

# 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.

## 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). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommended that you do not attempt to perform the procedures described in this manual. 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.

## 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 or coolant. 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 or 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.

▲ 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.

▲ 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.

**MEMO**



## HOW TO USE THIS MANUAL

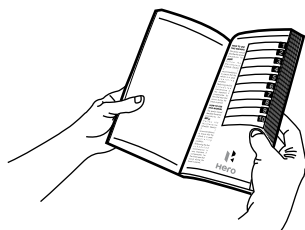
This shop manual describes the service procedures for **DASH**. Follow the Maintenance Schedule **SECTION-3** recommendations to ensure that the vehicle is in peak operating condition. Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

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

**SECTION-4** through **21** describe parts of the scooter, wiring and troubleshooting are 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 these sections easily. decisions we have provided safety messages and other information throughout this manual.



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 PRINTING 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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





## SECTION

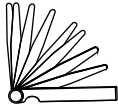
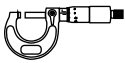



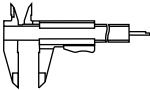
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# SYMBOLS

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.
	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.



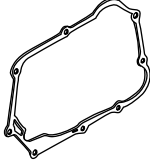

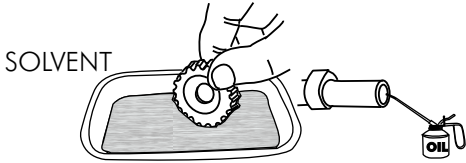
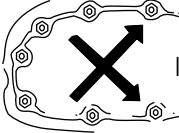
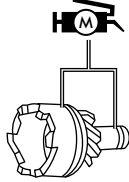

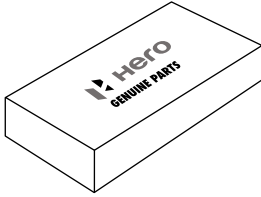
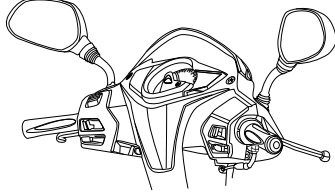
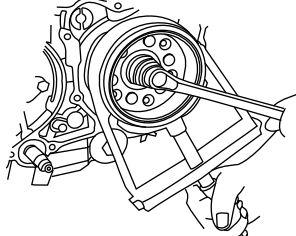

SYMBOLS	DESCRIPTION
	Feeler Gauge
	Micrometer
	Cylinder Bore Gauge
	Dial Gauge
	Degreasing
	Vernier Caliper

**MEMO**

# 1.GENERAL INFORMATION

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<b>Engine Torque Values</b>	<b>1-22</b>	<b>/Hoses Routing</b>	<b>1-34</b>

## GENERAL SERVICE PRECAUTIONS

<p>Always replace gaskets, O-rings, circlips and cotter pins with new ones.</p> <div><div>O-RING </div><div>CIRCLIP </div><div>GASKET </div><div>COTTER PIN </div></div>	<p>When engine and final drive components are disassembled and inspected, coat the mating surface with a lubricant to prevent corrosion.</p> <div></div>
<p>When tightening nuts and bolts, start first with the larger or centre ones. Tighten these to the specified torque using a criss-cross pattern.</p> <div><p>IN A x PATTERN</p></div>	<p>After assembling components, use proper assembly lubricants.</p> <div></div>
<p>Use only genuine Hero MotoCorp parts and recommended lubricants.</p> <div></div>	<p>After assembling, check every part for proper installation, movement and operation.</p> <div></div>
<p>Use specified special and common tools only.</p> <div></div>	<p>Always ensure mutual safety when working with a partner.</p> <div></div>

# GENERAL INFORMATION

## 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 for the engine and exhaust system to cool down before handling these parts.

### BATTERY HYDROGEN GAS & ELECTROLYTE

- 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 and lubricants or their equivalents.  
Parts that do not meet Hero MotoCorp's design specifications may damage the scooter.
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 1-29 through 1-57.

### BATTERY

#### ▲ WARNING

The battery gives off 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.

## GENERAL INFORMATION

### FEATURES

#### COMBINATION LOCK

Multi-functional combination lock with ignition ON-OFF, seat catch opening, fuel tank lid cover opening and steering lock option for more convenience.



1

#### CENTER COMPARTMENT

- Large under seat compartment to accommodate a helmet, documents and tools.
- Maximum weight capacity is 10 kg.



#### HELMET HOLDER

Two helmet holders are located under the seat. To secure the helmet to the holder, remove the seat, attach the helmet strap or ring to the helmet holder and close the seat.



#### LUGGAGE HOOKS

Two luggage hooks are provided in scooter to carry a light luggage like shopping bags or carry bags. one hook is provided below the handlebar weighing up to 3 kg and the other hook is located below the front end of the seat weighing up to 1.5 kg.



## GENERAL INFORMATION

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### EXTERNAL FUEL FILLING

- An external fuel filling port provided near the rear grip for convenient filling.
- To open the filler cap, insert the key & while pushing in turn it clockwise to "Fuel Open" position . The lid will be open.
- Remove the fuel filler cap by turning it anti-clockwise.



### AIR FILTER

Maintenance free viscous paper pleated type air filter is used in this scooter for enhanced filtration of air for longer engine life.



### ENGINE

Fuel efficient and powerful 4-stroke OHC engine with latest design.



### VARIOMATIC TRANSMISSION

Variomatic automatic transmission provides seamless acceleration throughout a wide range of speeds.





## GENERAL INFORMATION

### DRY AUTOMATIC CENTRIFUGAL CLUTCH

The system is equipped with dry automatic centrifugal clutch and there is no need for clutch operation when starting or stopping.



1

### ROLLER ROCKER ARM

The rocker arm roller rolls over the cam lobe instead of sliding and hence reduces the friction and wear.



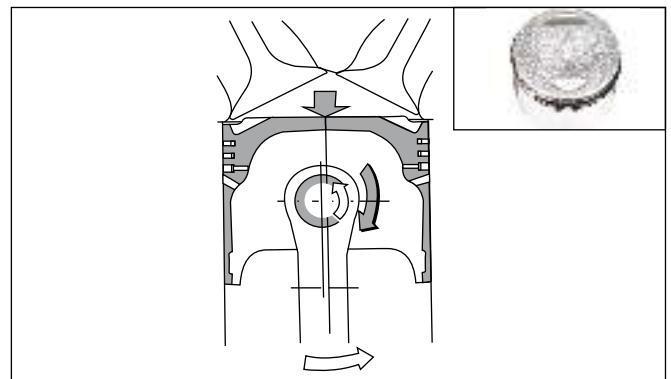
### CENTRIFUGAL DECOMPRESSION SYSTEM

Automatic centrifugal decompression system reduces kick starting effort and kick back during starting. Reduces the load on the battery during electric start.



### PISTON PIN

- Off-Set piston pin reduces stress on reciprocating parts.
- In addition it also reduces piston slap at the dead centres leading to enhanced engine life and low noise level.



## GENERAL INFORMATION

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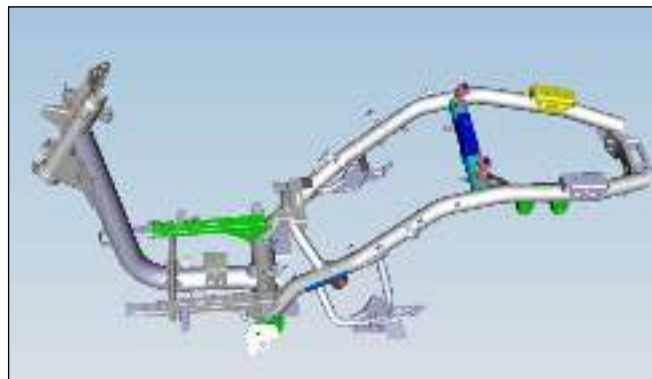
### AUTOMATIC CAM CHAIN TENSIONER

The cam chain tensioner takes up slack in the cam chain automatically.



### FRAME

High rigidity under bone frame, most suitable for step-thru vehicles ensuring rider comfort.



### PARKING BRAKE

Rear parking brake is a safety feature which prevents scooter from rollover when parked on side stand.



### INTEGRATED BRAKING SYSTEM

Integrated braking delivers enhanced braking & stability by simultaneously actuating front and rear brake. This leads to shorter braking distance for safety.



## GENERAL INFORMATION

### TELESCOPIC FRONT SUSPENSION

Telescopic front suspension for a more stable and comfortable ride.



1

### FRONT WHEEL

- 12 inch 5-spoke alloy wheel with reduced un-sprung mass to improve maneuverability.
- Bigger wheel to ride well on bumpy pavement and on cobblestone streets.
- Speed, acceleration and handle will also be less affected, making it easier to adjust suspension setting.
- Designed with consideration in mind to give a quite high, positive value for trail between 40 and 110 mm.



### TUBELESS TYRES

Designed for an enhanced performance, tubeless tyre prevent sudden deflation in case of puncture.



### EXHAUST MUFFLER

Stylish muffler with 2-way catalytic converter to reduce harmful content from the exhaust gases and two piece heat protector for pillion safety.



## GENERAL INFORMATION

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### BALL CAGE STEERING HEAD BEARING

Bigger diameter and rugged design with an ability to handle greater load.

Can work under slight pre-load to avoid risk of unwanted free play leading to precise steering and better handling on rough terrain.



### MFR HEADLAMP AND POSITION LAMPS

- A high intensity trapezoidal multi focal reflector head lamp to ensure optimum distribution of light.
- DC twin position lamp to enhance rider's position on the road for the oncoming traffic, adding to safety.



### TURN SIGNAL LAMPS

Turn signal lamps have elongated clear lens with multi focal reflector and amber bulb to enhance visibility & safety.



### TAIL/STOP LAMP

- Multi focal reflector LED tail/stop lamp for better luminosity for added safety.





## GENERAL INFORMATION

### MAINTENANCE FREE BATTERY

MF Battery ensures sufficient cold cranking ampere (CCA) for easy starting even in cold conditions. Does not require topping up of distilled water and specific gravity inspection once filled & sealed.



1

### FULLY TRANSISTORISED IGNITION SYSTEM (FTIS)

Fully transistorised ignition system provided a longer spark duration which improves combustion and reduces exhaust emission.



### DIGITAL ANALOG METER CONSOLE

- New precised digi-analogue meter console in its class giving a classy and stylish look.
- It includes digital fuel gauge for better accuracy, trip meter for measuring particular trip or calculating mileage and odometer for readout of total distance travelled.



### SERVICE REMINDER

A "service reminder" is provided in meter console, to indicate the user to bring the vehicle to an authorised Hero MotoCorp workshop for service.



## GENERAL INFORMATION

### IMMOBILIZER SYSTEM/INDICATOR

- An anti-theft device built into the ignition system, which prevents the engine to start without an authorized key.
- If there is a malfunction in the immobilizer system, the Immobilizer indicator would glow continuously and start blinking after 10 seconds after the ignition switch is turned "ON".



### PASSING SWITCH

Passing switch is helpful for safe overtaking during night riding. The headlamp flashes on to signal approaching vehicles when passing. The passing switch allows to switch from low beam to high beam with easy press and auto release.



### MOBILE CHARGING USB 3.0 PORT

A USB charging port is provided inside the center compartment to charge mobile phone.

#### NOTE

Do not connect multi-point charger to the USB port.



### BOOT LAMP

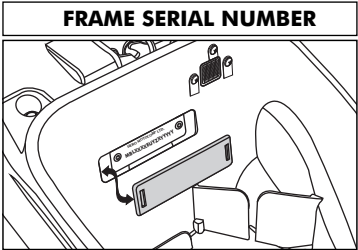
- A boot lamp is provided in the center compartment for better visibility during night.
- It will switch "ON" only when seat is opened.



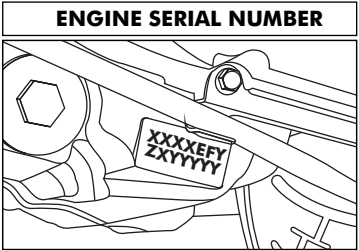
# GENERAL INFORMATION

## MODEL IDENTIFICATION: DASH

1



Location: Stamped on the rear of the frame body inside the center compartment. Remove the cover to access VIN plate.



Location : Stamped on the lower side of the left crankcase.



The carburetor identification number is stamped on the carburetor body inlet manifold side.

# GENERAL INFORMATION

## SPECIFICATIONS

GENERAL					
ITEM			SPECIFICATION		
Dimensions	Overall length		1841 mm		
	Overall width		695 mm		
	Overall height		1190 mm		
	Wheelbase		1261 mm		
	Ground clearance		155 mm		
	Saddle height		775 mm		
	Kerb weight		110 kg		
	Maximum payload		130 kg		
Frame	Frame type		High rigidity under bone type		
	Front suspension		Telescopic, hydraulic shock absorber		
	Rear suspension		Unit swing with spring loaded hydraulic damper		
	Tyre size	Front	90/90x12-54J (Tubeless tyre)		
		Rear	90/100x10-53J (Tubeless tyre)		
	Wheel rim size	Front	12x2.15 (Cast wheel)		
		Rear	10x2.15 (Cast wheel)		
	Minimum turning radius		1.90 metres		
	Cold tyre pressure	Rider only	Front	1.50 kgf/cm <sup>2</sup> (22 psi)	
			Rear	2.00 kgf/cm <sup>2</sup> (29 psi)	
		Rider and pillion	Front	1.50 kgf/cm <sup>2</sup> (22 psi)	
			Rear	2.50 kgf/cm <sup>2</sup> (36 psi)	
	Front brake		Internal expanding shoe type, 130 mm		
	Rear brake (Integrated)		Internal expanding shoe type, 130 mm (Integrated Braking System)		
	Fuel tank capacity		5.5 litres (Minimum)		
Caster angle		28°			
Trail length		90 mm			
Engine	Type		Air cooled, 4-stroke single cylinder OHC		
	Maximum power		6.20kW @ 8000 rpm		
	Maximum torque		8.30 Nm @ 6500 rpm		
	Cylinder arrangement		Single cylinder, horizontal engine		
	Bore and stroke		50.0x56.5 mm		
	Displacement		110.9 cc		
	Compression ratio		9.5:1		
	Valve train		OHC, Poppet valve		
	Engine oil capacity		0.8 litre at disassembly		
			0.7 litre at oil change		
	Lubrication system		Forced pressure and wet sump		
	Oil pump type		Trochoid		
	Air filtration		Viscous, Paper pleated type		
	Maximum valve lift	Intake	6.2 mm		
		Exhaust	5.8 mm		
	Valve timing	Intake valve	Open	2° BTDC (1mm valve lift and zero tappet gap)	
			Close	40° ABDC (1mm valve lift and zero tappet gap)	
		Exhaust valve	Open	29° BBDC (1mm valve lift and zero tappet gap)	
			Close	3° BTDC (1mm valve lift and zero tappet gap)	
	Valve clearance in (Cold Condition)		Intake	0.14 mm	
			Exhaust	0.14 mm	
	Idle speed		1700±100 rpm		



## GENERAL INFORMATION

### SPECIFICATIONS

#### GENERAL

ITEM		SPECIFICATION
Carburetor	Carburetor type	Side draft variable venturi (Piston) with TCIS
	Identification number	AAWB
	Venturi diameter	Ø 17 mm
	Main jet	# 82.5
	Pilot jet	# 15
	Float level	11.3 mm
Drive Train	Clutch system	Dry, Automatic centrifugal clutch
	Primary reduction	Variomatic drive (2.51-0.85)
	Final reduction	50/20x50/12 (10.417)
Electrical System	Ignition system	Fully transistorized CDI
	Ignition timing	"F" Mark 15° BTDC @ 1500 rpm
		Full advance 33° BTDC @ 4000 rpm
	Starting system	Electric start/kick start
	Charging system	Single phase alternator
	Battery	12V-4Ah ETZ-5 *MF-Battery
	Alternator	110W @ 5000 rpm
	Spark plug	Champion-PRZ 9 HC (Federal Mogul)
	Spark plug gap	0.6-0.7 mm
Lamps	Main fuse	10A
	Headlamp (High/Low)	12V-35W/35W, Halogen bulb, **MFR
	Position lamp	12V-5Wx2 nos.
	Tail/stop lamp	12V-0.4W/1.6Wx8 nos. (LED)
	Turn signal lamp	12V-10Wx4 nos. (Amber bulb with clear lens), **MFR
	Licence plate lamp	12V-5W
	Boot lamp	12V-2W
	Meter illumination	12V-80 mWx3 nos. (LED-Amber)
	Turn signal indicator	12V-105 mWx2 nos. (LED-Green)
	High beam indicator	12V-133 mW (LED-Blue)
	LCD Illumination	12V-135 mW (LED-Amber)

\*MF-Maintenance Free  
\*\*MFR-Multi-Focal Reflector

# GENERAL INFORMATION

## SERVICE LIMIT

MAINTENANCE			
ITEM		SPECIFICATION	
Throttle grip free play		2-6 mm	
Spark plug	Standard	Champion-PRZ 9 HC (Federal Mogul)	
Spark plug gap		0.6-0.7 mm	
Valve clearance	Intake	0.14 mm	
	Exhaust	0.14 mm	
Recommended engine oil		Brand: Hero 4T Plus Grade: SAE 10W30 SJ Grade (JASO MA) Manufactured by:- 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.	
Engine oil capacity	At draining	0.7 litre	
	At disassembly	0.8 litre	
Engine idle speed		1700±100 rpm	
Drive belt width		18.40 mm	
Recommended final reduction oil		SAE 10W30 SJ JASO MA Grade	
Final reduction oil capacity	At draining	0.10 litre	
	At disassembly	0.12 litre	
Front brake lever free play		10-20 mm	
Rear brake lever free play (Integrated)		10-20 mm	
Cold tyre pressure	Rider only	Front	1.50 kgf/cm <sup>2</sup> (22 psi)
		Rear	2.0 kgf/cm <sup>2</sup> (29 psi)
	Rider & pillion	Front	1.50 kgf/cm <sup>2</sup> (22 psi)
		Rear	2.50 kgf/cm <sup>2</sup> (36 psi)
Tyre size	Front	90/90x12-53 J (Tubeless Tyre)	
	Rear	90/100x10-53 J (Tubeless Tyre)	
Minimum tread depth	Front	1.0 mm	
	Rear	1.0 mm	
Battery standard voltage		12.4 V	

LUBRICATION SYSTEM				
ENGINE OIL		ITEM	SPECIFICATION	
Engine oil capacity		At draining	0.7 litre	
		At disassembly	0.8 litre	
Recommended engine oil		Brand: Hero 4T Plus Grade: SAE 10W30 SJ Grade (JASO MA) Manufactured by:- 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.		
OIL PUMP SERVICE DATA				
		ITEM	STANDARD	SERVICE LIMIT
Oil pump	Outer rotor-to-body clearance		0.15-0.21 mm	0.35 mm
	Rotor tip clearance		0.15 mm	0.20 mm
	Pump end clearance		0.05-0.10 mm	0.12 mm

## GENERAL INFORMATION

FUEL SYSTEM		ITEM	SPECIFICATION
		Carburetor type	Side draft variable venturi (Piston) with TCIS
		Identification number	AAWB
		Venturi diameter	Ø 17 mm
		Piston bore diameter	Ø 16 mm
		Float level	11.3 mm
		Pilot screw initial opening	2-1/4 ± 1/2 turns out
		Idle speed	1700 ± 100 rpm
		Main jet	# 82.5
		Pilot jet	# 15
		Pilot air jet	# 130
		Throttle grip free play	2-6 mm
		Fuel tank capacity	5.5 litres (Minimum)

1

ENGINE REMOVAL/INSTALLATION		ITEM	SPECIFICATION
Engine oil capacity	At draining		0.7 litre
	At disassembly		0.8 litre

CYLINDER HEAD/VALVES			ITEM	STANDARD	SERVICE LIMIT
Cylinder compression				12±2 (kgf/cm <sup>2</sup> ) 171±28 (psi)	- -
Camshaft cam lobe height		Intake	32.272-32.352 mm	32.235 mm	
		Exhaust	31.989-32.069 mm	31.952 mm	
Cylinder head war page				0.10 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		0.013-0.043 mm	0.11 mm	
Valve	Stem O.D.	Intake	4.975-4.990 mm	4.95 mm	
		Exhaust	4.955-4.970 mm	4.93 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	0.030-0.057 mm	0.10 mm	
	Spring free length		35.66 mm	34.70 mm	
Valve seat width		0.9-1.1 mm	1.5 mm		
Valve guide height		12.9-13.1 mm	-		

# GENERAL INFORMATION

CYLINDER/PISTON		ITEM	STANDARD	SERVICE LIMIT
Cylinder	I.D.		50.005-50.015 mm	50.10 mm
	Ovality		-	0.10 mm
	Taper		-	0.10 mm
	Warpage		-	0.10 mm
Piston	Piston O.D		49.980-49.995 mm	49.90 mm
	Piston pin hole I.D.		13.002-13.008 mm	13.04 mm
	Piston pin O.D.		12.994-13.000 mm	12.96 mm
	Piston-to-piston pin clearance		0.002-0.014 mm	0.07 mm
	Connecting rod small end I.D.		13.010-13.028 mm	13.06 mm
	Cylinder-to-piston clearance		0.010-0.030 mm	0.10 mm
	Connecting rod to piston pin clearance		0.010-0.034 mm	0.10 mm
	Piston ring-to-groove clearance	Top	0.015-0.050 mm	0.09 mm
		2nd	0.015-0.050 mm	0.09 mm
	Piston ring end gap	Top	0.10-0.25 mm	0.60 mm
		2nd	0.10-0.25 mm	0.70 mm
		Oil (Side rail)	0.20-0.70 mm	1.10 mm

KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH		ITEM	STANDARD	SERVICE LIMIT
Drive belt width			18.40 mm	17.50 mm
Movable drive face	Bush I. D.		20.035-20.085 mm	20.60 mm
	Boss O. D.		20.01-20.025 mm	19.98 mm
	Weight roller O. D.		17.92-18.08 mm	17.40 mm
Clutch	Outer I. D.		125.0-125.2 mm	125.5 mm
	Lining thickness		4.0 mm	2.0 mm
Driven pulley	Face spring free length		108.5 mm	92.20 mm
	Driven face O. D.		33.965-33.985 mm	33.94 mm
	Movable driven face I. D.		34.000-34.025 mm	34.06 mm

FINAL REDUCTION		ITEM	SPECIFICATION
Final reduction oil capacity	At draining		0.12 litre
	At disassembly		0.10 litre
Recommended final reduction oil		Brand: Hero 4T Plus Grade: SAE 10W30 SJ Grade (JASO MA) Manufactured by:- 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.	

CRANKCASE/CRANKSHAFT		ITEM	STANDARD	SERVICE LIMIT
Connecting rod big end side clearance			0.10-0.35 mm	0.60 mm
Connecting rod big end radial clearance			0-0.008 mm	0.05 mm
Crankshaft run out			0.01-0.05 mm	0.10 mm

## GENERAL INFORMATION

### FRONT WHEEL/BRAKE/SUSPENSION/STEERING

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		-	1.0
Cold tyre pressure	Rider only	1.50 kgf/cm <sup>2</sup> (22 psi)	-
	Rider & pillion	1.50 kgf/cm <sup>2</sup> (22 psi)	-
Front axle run out		-	0.2 mm
Front wheel rim run out	Radial	-	2.0 mm
	Axial	-	2.0 mm
Front brake drum I.D.		130 mm	131 mm
Front brake shoes lining thickness 4.5 mm		1.5 mm	-
Fork spring free length		259.5 mm	254.3 mm
Fork oil capacity		97 ml	-
Fork pipe run out		-	0.20 mm

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### REAR WHEEL/BRAKE/SUSPENSION

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		-	1.0 mm
Cold tyre pressure	Rider only	2.00 kgf/cm <sup>2</sup> (29 psi)	-
	Rider & pillion	2.50 kgf/cm <sup>2</sup> (36 psi)	-
Final shaft run out		-	0.2 mm
Rear wheel rim run out	Radial	-	2.0 mm
	Axial	-	2.0 mm
Rear brake drum I.D.		130 mm	131 mm
Rear brake shoes lining thickness		4.5 mm	1.5 mm

### TUBELESS TYRES

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth	Front	-	1.0 mm
	Rear	-	1.0 mm
Cold tyre pressure	Front	Rider only	1.50 kgf/cm <sup>2</sup> (22 psi)
		Rider & pillion	1.50 kgf/cm <sup>2</sup> (22 psi)
	Rear	Rider only	2.00 kgf/cm <sup>2</sup> (29 psi)
		Rider & pillion	2.50 kgf/cm <sup>2</sup> (36 psi)
Wheel rim run out	Front	Radial	2.0 mm
		Axial	2.0 mm
	Rear	Radial	2.0 mm
		Axial	2.0 mm

# GENERAL INFORMATION

## BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATION
Battery	Capacity		12V-4 Ah, *MF Battery (ETZ-5)
	Current leakage		0.1 mA (Maximum)
	Voltage @ 20° C/68° F	Needs charging below	12.4V
Alternator	Capacity		110W @ 5000 rpm
	Charging coil resistance (Ω)	White-Green	0.1-1Ω
Regulator/Rectifier	Regulated voltage	Charging	14.3±0.4V
		Lighting	14±0.5V

\*MF-Maintenance Free

## IGNITION/IMMOBILIZER SYSTEM

IGNITION/IMMOBILIZER SYSTEM		
ITEM		SPECIFICATION
Spark plug	Standard	Champion-PRZ 9 HC (Federal Mogul)
Spark plug gap		0.6-0.7 mm
Peak voltage	Ignition coil primary	12 V
	Ignition pulse generator	1.3V (min)@350 rpm, gap 1.1 mm
Ignition timing	" F " Mark, Deg.	15° BTDC @ 1500 rpm
	Full Advance, Deg.	33° BTDC @ 4000 rpm
Ignition coil	Primary coil resistance, Ω @ 20° C	2.3±0.2 Ω
	Secondary coil resistance (Without Plug Cap), kΩ @ 20° C	11kΩ±2.2 Ω
	Secondary coil resistance (With Plug Cap), kΩ @ 20° C	16kΩ±3.2 Ω
Ignition pulse generator resistance, Ω @20° C		180-280 Ω
Stator coil resistance, Ω @20°C		0.1-1.0 Ω

## ELECTRIC STARTER

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	9.0 mm	4.0 mm

## LAMPS/METERS/SWITCHES

ITEM		SPECIFICATION
Bulb	Headlamp (High/Low)	12V-35W/35W Halogen Bulb, **MFR
	Tail/stop lamp	12V-0.4W/1.6Wx8 nos. (LED)
	Position lamp	12V-5Wx2 nos.
	Turn signal lamp	12V-10Wx4 nos. (Amber bulb with clear lens), **MFR
	Licence plate lamp	12V-5W
	Boot lamp	12V-2W
	Meter Illumination	12V-80 mWx3 nos. (LED-Amber)
	LCD Illumination	12V-135 mW (LED-Amber)
	High beam indicator	12V-133 mW (LED-Blue)
	Turn signal indicator	12V-105 mWx2 nos. (LED-Green)
Fuse		10A

\*\*MFR-Multi-Focal Reflector

## GENERAL INFORMATION

### ENGINE TORQUE VALUES

SR. NO.	ITEM	THREAD SIZE & TYPE	TORQUE		PR VALUES N-m	REMARKS
			N-m	kgf-m		
1	Bolt main stand spring	Bolt special M 8x1.25	18~25	1.8~2.5	22	
2	Crankcase component left	Bolt flange 8x12	10~15	1.0~1.5	13	Mission oil check and drain
3	Plate left cover	Screw tapping 4x8	2.5~3.9	0.25~0.4	3	
4	Cap oil filter	M 30x1.5	18~22	1.8~2.2	20	
5	Bolt plug drain, 12mm	M 12x1.5	20~29	2.0~3.0	24	
6	Cylinder head	Nut hex, 7 mm	16~20	1.6~2.0	18	Apply engine oil
7	Plate breather seperator	Screw tapping 4x8	2.5~3.9	0.25~0.4	3	
8	Bolt head cover	Bolt special M 6x1.0	10~14	1.0~1.4	12	
9	Sprocket cam	Bolt knock, 5 mm	7~11	0.7~1.1	9	Apply engine oil
10	Nut tappet adjusting	M 5x0.5	8~12	0.8~1.2	10	Apply engine oil
11	Lifter assembly tensioner	Screw pan, 6 mm	3.4~5.0	0.35~0.5	4	
12	Pivot cam chain tensioner	Bolt special M 6x1.0	8~12	0.8~1.2	10	
13	Oil pump assembly	Bolt hex 6x30	8~12	0.8~1.2	10	
14	Plate oil pump	Screw tapping 4x8	2.5~3.9	0.25~0.4	3	
15	Fan component cooling	Bolt flange 6x16	8~12	0.8~1.2	10	
16	Cover component fan	Screw tapping 5x16	1.5~2.5	0.15~0.25	2	
17	Shroud inlet	Screw tapping 5x16	1.5~2.5	0.15~0.25	2	
18	Shroud exhaust	Bolt wash 6x20	6~8	0.6~0.8	7	
19	Face component drive	Nut hex, 12 mm	54~64	5.5~6.5	55	Apply engine oil
20	Plate assembly drive	Nut special, 28 mm	49~59	5.0~6.0	54	
21	Outer component clutch	Nut hex, 12 mm	44~54	4.5~5.5	49	
22	Flywheel component	Nut flange, 10 mm	34~44	3.5~4.5	39	
23	Pulser oil assembly (Stator component)	Bolt knock, 5 mm	5~7	0.5~0.7	6	
24	Spark plug	M 10x1.0	14~18	1.4~1.8	16	

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## GENERAL INFORMATION

### FRAME TORQUE VALUES

SR. NO.	ITEM	THREAD SIZE & TYPE	TORQUE		PR VALUES N-m	REMARKS
			N-m	kgf-m		
1	Handle					
	Handle post	M 10x1.25	29~39	3.0~4.0	34	
	Handle lever pivot screw	M 5x0.8	0.5~1.5	0.05~0.15	1	
	Nut hex, 5 mm	M 5x0.8	4~5	0.4~0.5	4.5	See no. 8
2	Engine hanger					
	Frame side	M 10x1.25	64~74	6.5~7.5	69	
	Engine side	M 10x1.25	44~54	4.5~5.5	49	
3	Muffler					
	Muffler protector	M 6x1.0	11.8~15.7	1.2~1.6	14	
	Exhaust pipe protector	M 6x1.0	11.8~15.7	1.2~1.6	14	
	Muffler component exhaust	M 10x1.25	44~54	4.5~5.5	49	
4	Fuel tank					
	Auto cock assembly	M 16x1.5	15~20	1.5~2.0	18	
5	Air/cleaner cover	M 5, Tapping	0.78~1.47	0.08~0.15	1.1	
6	Light assembly boot	M 4, Tapping	0.35~0.5	0.35~0.5	0.43	
7	Socket assembly bolt	M 4, Tapping	0.35~0.5	0.35~0.5	0.43	
8	Steering					
	Steering stem lock nut	BC 1	59~78	6~8	68	
9	Front suspension					
	Bolt flange bridge fork MTG	M 10x1.25	24~30	2.4~3.0	27	
10	Rear suspension					
	Rear cushion (Upper side)	M 10x1.25	34~44	3.5~4.5	39	
	Rear cushion (Lower side)	M 8x1.25	18~25	1.8~2.5	22	
11	Brake					
	Front brake arm	M 6x1.0	8~12	0.8~1.2	10	
	Rear brake arm	M 6x1.0	8~12	0.8~1.2	10	
	Front brake cable	M 6x1.0	8~12	0.8~1.2	10	
12	Wheel					
	Front axle nut	M 12x1.25	49~69	5.0~7.0	59	U-Nut
	Rear axle nut	M 16x1.5	108~128	11~13	118	U-Nut, Apply oil

#### 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 shall be used for service procedure.
3. # Marked applications oil is not required for assembly on line.
4. Apply engine oil 10 W 30 SJ grade.

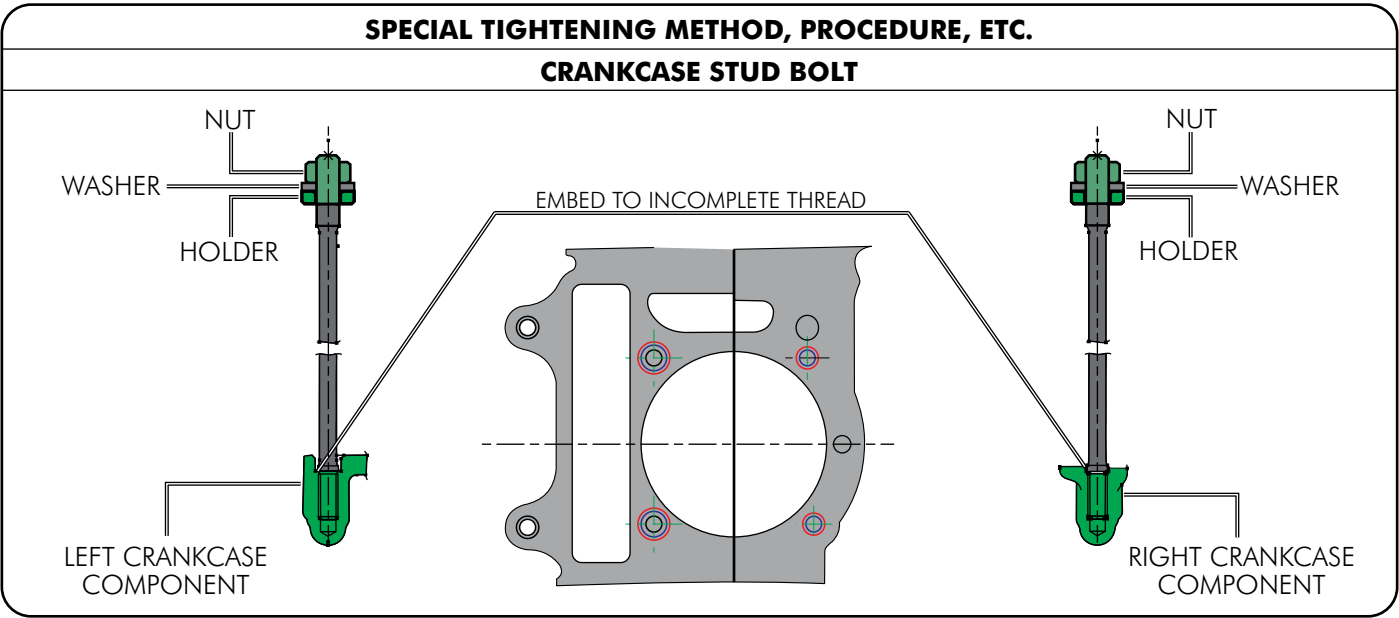
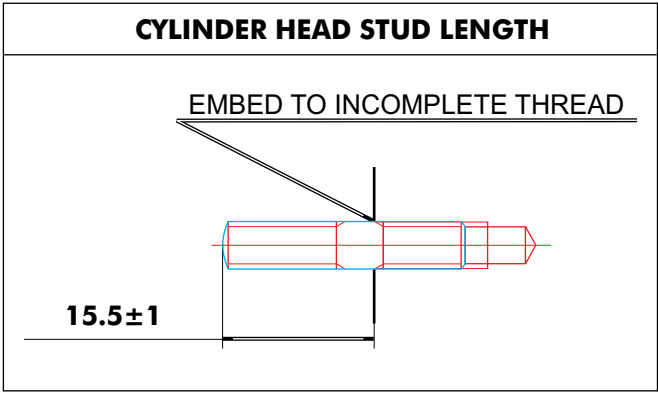
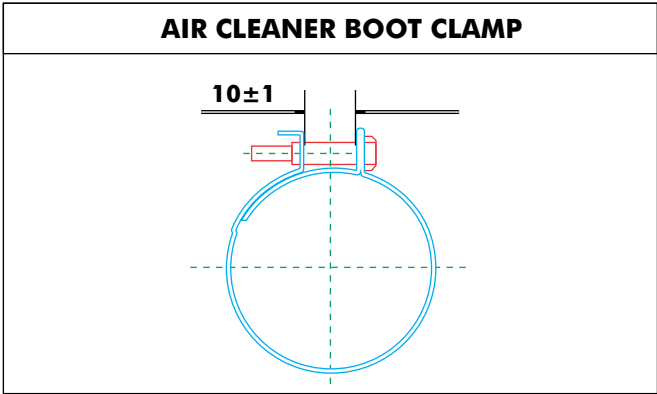


GENERAL INFORMATION

GENERAL TORQUE VALUES

STANDARD			1
FASTENER TYPE	TORQUE (N-m)	TORQUE (kgf-m)	
5 mm bolt and nut	4.4~6	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	
5 mm screw	3.4~5.0	0.35~0.5	
6 mm screw	7~11	0.7~1.1	
6 mm flange bolt 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 below and on the next page are for important fasteners.
  - Others should be tightened to standard torque values listed above.



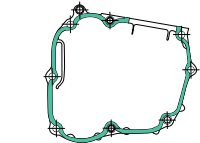
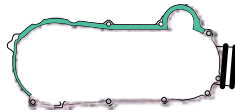
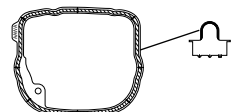
# GENERAL INFORMATION

## LUBRICATION & SEAL POINTS

### ENGINE

BLOCK NAME OF PARTS NAME	APPLIED AREA	MATERIAL	METHOD OF AMOUNT	PUR- POSE	REMARKS
Engine case		MC-4 stroke, gasoline engine oil	At disassembly 0.80 liter At change 0.70 liter	1	
Final reduction			At disassembly 120 cm <sup>3</sup> At change 100 cm <sup>3</sup>	1	
Cylinder	Inner wall of sleeve		Oiler	1	
Cylinder stud bolt	Threaded portion of nut side	Engine oil	Apply	4	
Nut hex, 7mm (Cam holder)	Whole surface		Apply	4	
Washer, 7.2x16x2.5 (Cam holder)	Whole surface		Apply	4	
Crankshaft	Bearing of connecting rod big end and side		Oiler	1	3 cm <sup>3</sup> min
	Connecting rod of small end hole		Oiler	1	
	Rotation area of right/left main bearing		Oiler	1	2 cm <sup>3</sup> min (Each bearing)
	Tapered area of right crankshaft		Degrease	4	
	Teeth of timing sprocket		Oiler	1	
	Threaded portion of left crankshaft		Apply	4	
	Teeth of oil pump drive gear		Oiler	1	
Piston	Sliding area, pin hole ring groove	Engine oil	Oiler	1	
Piston pin	Outer surface		Oiler or oil bath	1	
Piston ring	Whole surface		Oiler or oil bath	1	
Cam sprocket	Teeth of sprocket		Oiler	1	
Bolt knock, 5 mm	Whole surface		Apply	4	
Cam chain	Whole surface		Oil bath	1	
Rocker arm	Roller surface and inner surface		Oiler	1	
Tappet adjusted screw nut	Whole surface		Oil bath	4	
Rocker arm shaft	Sliding area		Oiler	1	
Valve inlet/exhaust	Sliding portion of guide		Apply	1	
Oil pump	Rotor and bearing area of shaft		Oiler	1	
Oil pump cover	Hole (Bearing area)		Apply	1	
Oil pump shaft	Shaft (Bearing area)		Apply	1	
Oil pump driven gear	Teeth		Oiler	1	
Mission gear and shaft	Teeth and bearing area		Oiler	1	
Bearing ball/needle	Sliding area		Oiler	1	
O-ring	Whole surface		Oil bath or apply	5	
Nut hex, 12 mm (Face component drive)	Seating surface		Apply	4	
Oil seal	Lip		Apply	1	
	Outer surface of press fit area	Soapsuds or engine oil	Apply	5	

GENERAL INFORMATION

BLOCK NAME OF PARTS NAME	APPLIED AREA	MATERIAL	METHOD OF AMOUNT	PUR- POSE	REMARKS
Camshaft	Cam area of whole surface	Engine oil with MoS <sub>2</sub>	Brush coat	1	Mixture ratio of MoS <sub>2</sub> paste: 50% (vol %)
	Bearing area	Engine oil	Oiler	1	
Decompressor cam	Sliding area (Surface a)	Engine oil with MoS <sub>2</sub>	Oiler	1	Mixture ratio of MoS <sub>2</sub> paste: 50% (vol %)
	Sliding area (Surface b)	Engine oil with MoS <sub>2</sub>	Oiler	1	
Stem seal	Press fit area	Soapsuds or engine oil	Apply	5	
Main stand stopper rubber	Insertion area	Soapsuds or water	Apply	5	
Cover component head	Tube joint press fit area	TB 1215 or Equivalent	Apply	2	
Driven face assembly	Inner surface of driven gear face boss	Grease: Shell stamina EP Grease 2	Fill up 7-8g	1	No grease allowed on spline of or shaft after assembled with drive shaft. No grease allowed on pulley surface
	Cam groove of moveable on face		Fill up 1.5-2g	1	
	Ball bearing (6902U)	Shell: Alvania R3 Idemitsu: Autorex 8	Fill up	1	
	Needle bearing	Shell: Retinex LX2	Fill up	1	
Gear component kick driver	Friction spring sliding area	Sumico: Molypaste 300 or Equilvant	Apply	1	
	Bearing area (End)		Apply 0.2-0.3g	1	
Kick spindle component	Bearing area		Apply 0.1-0.3g	1	
Pinion assembly starter	Bearing area (Both ends)	Idemitsu: Autorex 8	Apply 0.1-0.3g	1	
Right crankcase	Mating surface (Hatched area)	Three bond #1215	Spreading	2	
Left cover	Mating surface (Hatched area)	Three bond #1215	Spreading	2	
Gasket head cover	Mating surface with cylinder head cover (Hatched area)	Grease (General purpose)	Spreading	5	

**NOTE**  
1. Engine oil for spreading shall be MC 4-stroke gasoline engine oil without molybdenum.

- PURPOSE**
1. Lubrication

2. Seal

3. Lock

4. Apply for torque stabilizing

5. Others

# GENERAL INFORMATION

## FRAME

SR. NO.	BLOCK NAME OF PARTS NAME	APPLIED AREA	MATERIAL	METHOD OF AMOUNT	PURPOSE	REMARKS
1	Handle					
	Left handle grip rubber	Inside of grip	Adeshive: Cemedine #540 or Equivalent	Spreading bonded area to be 80% min of contact area	3	
2	Brake					
	Rear brake lever pivot	Rocking area of pivot	HES 02012-2-1-2	Spreading	1	
	Front brake lever pivot			Spreading	1	
3	Control cable					
	Throttle cable	Inside of boot	Silicon grease TSG 3251 or Equivalent	Filling up (0.1 cc)	1	Has been applied at the time of delivery
	Speedometer cable	Inside of cashing	Silicon grease daphny XLA-2 or Equivalent	Inject		
4	Air cleaner					
	Tube air/cleaner connecting	Case contact surface	Adeshive: Cemedine #540 or Equivalent	Apply	3	Has been bonded at the time of delivery
5	Frame					
	Seat catch component	Contact area	HES 02012-2-1-2	Apply (1.5 g)	1	To be applied at the time of installation
6	Main stand					
	Shaft main stand	Contact area	HES 02012-2-1-2	Spreading	1	To be applied at the time of installation
7	Saree stand	Contact area	HES 02012-2-1-2	Apply	1	To be applied at the time of installation

## PURPOSE

<div><div>1. Lubrication</div><div>2. Seal</div><div>3. Lock</div><div>4. Apply for torque stabilizing</div><div>5. Others</div></div>
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## GENERAL INFORMATION

### 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

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# GENERAL INFORMATION

## SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
37	Front fork oil seal driver attachment dia, 31mm	To drive in new oil seal.	070HHKFN004
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 Insertor	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

## GENERAL INFORMATION

### SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
72	Flywheel puller	To remove the flywheel from crankshaft.	070HHKTN001
73	Collet, 17mm	To remove bearing from crankcase.	070HHKTN002
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

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# GENERAL INFORMATION

## SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
107	T-stem cone remover	To remove T-stem bottom cone.	070HHKZJ001
108	Steering race remover	To remove upper/bottom steering race.	070HHKZJ002
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 motorcycle in upright position.	070HHKZJ011
118	Frame stand	To support the motorcycle 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



## GENERAL INFORMATION

### EMISSION CONTROL SYSTEM

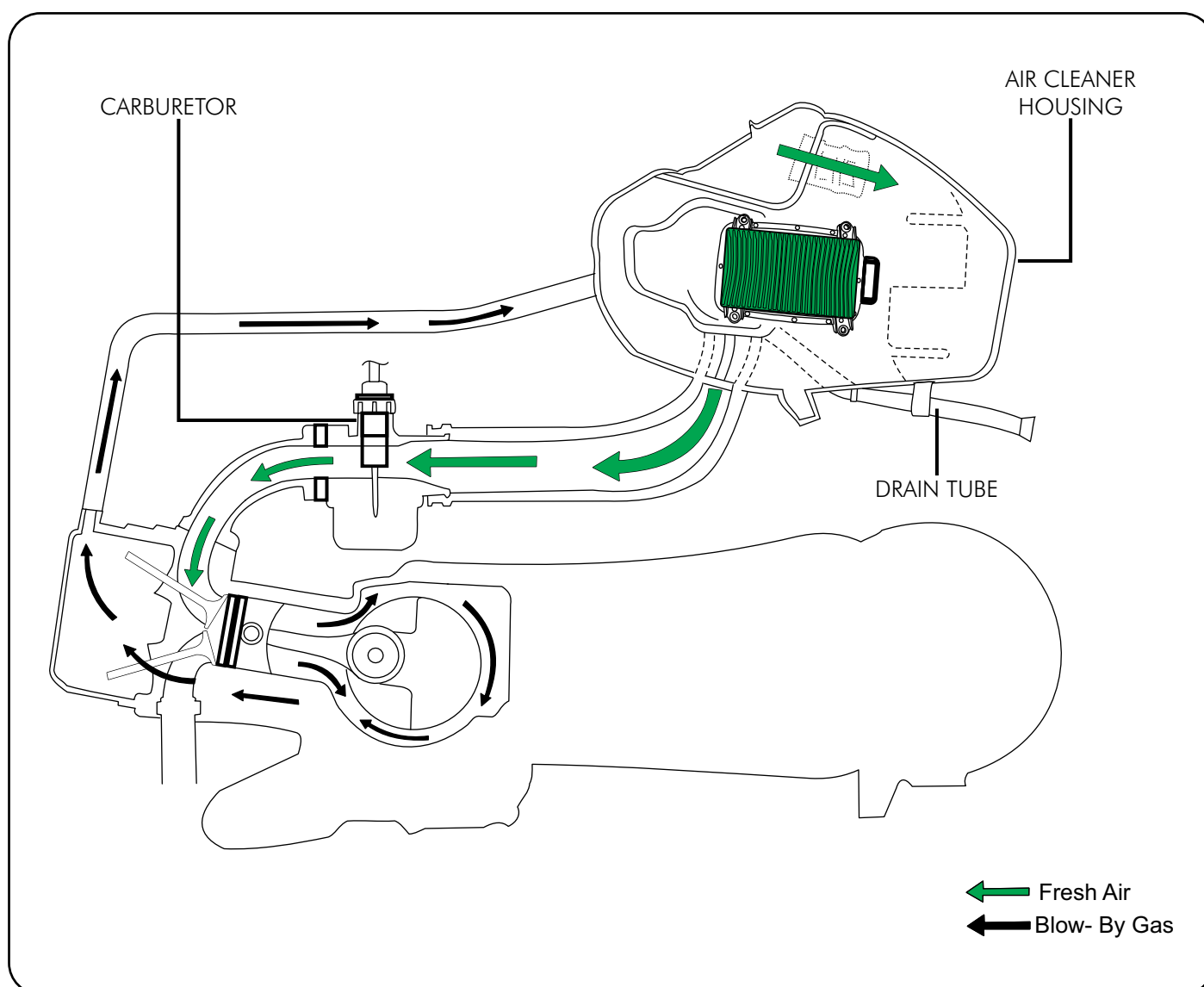
#### SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>) 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 carburetor setting as well as other systems, to reduce carbon monoxide and hydrocarbon.

#### 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 carburetor.

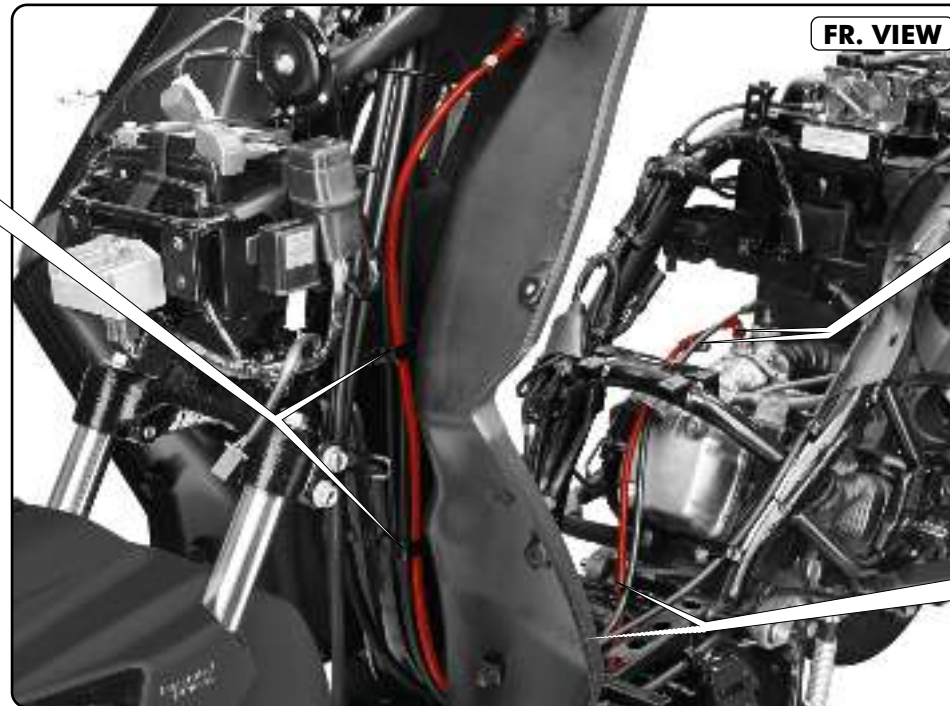


## CABLE/WIRING HARNESS/TUBES/HOSES ROUTING

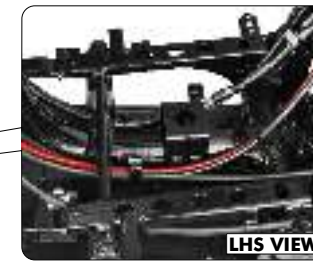
### BYSTARTER CABLE



Bystarter cable is routed through the clamps welded on the frame behind the steering head/front forks.



Bystarter cable is routed through the plastic router and the cable is properly connected to the carburetor.



Bystarter cable is routed through the clamp and the guide mounted on the frame under the floor panel.

## INTEGRATED BRAKE CABLES



LHS VIEW

The integrated brake cable routed through a flexible clamp welded to the handlebar.



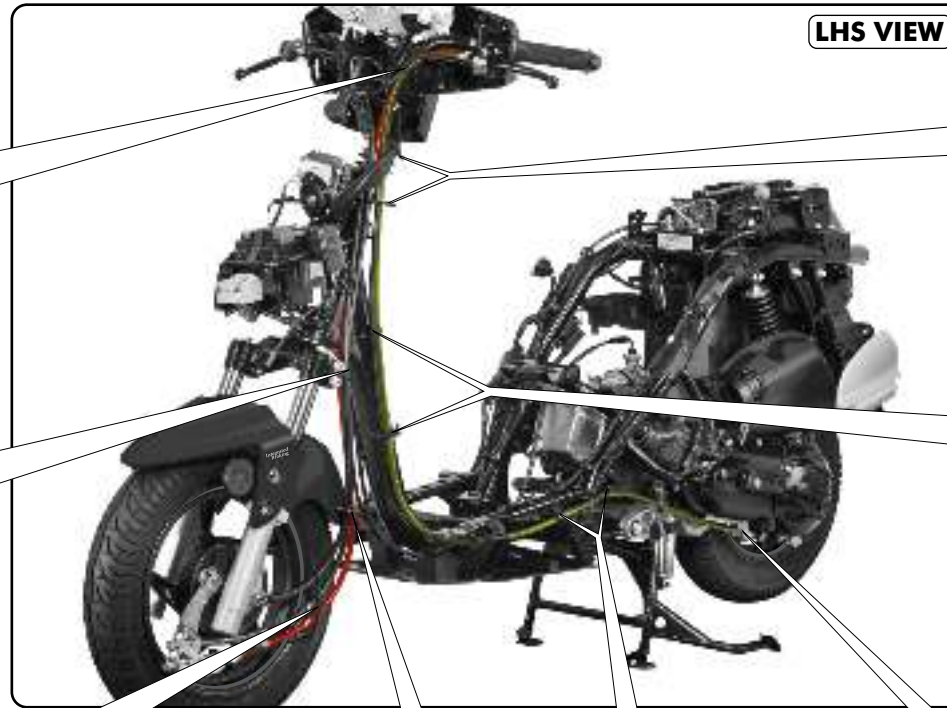
LHS VIEW

The integrated brake cable routed through a cable guide welded on the steering stem bottom bridge.



LHS VIEW

The integrated brake cable routed through a cable guide mounted on the brake panel.



LHS VIEW



LHS VIEW

The integrated brake cable routed through the guides welded on handlebar/steering head.



LHS VIEW

The integrated brake cable is routed through the clamps welded on the frame behind steering head/front forks.



LHS VIEW

The integrated brake cable routed through a cable guide mounted on the engine near rear wheel.



LHS VIEW

The integrated brake cable routed through a cable guide fitted on the front fender.



LHS VIEW

The integrated brake cable routed through a clamp and the guide welded to the frame near side stand.



**BRAKE CABLE (FRONT)**



**BRAKE CABLE (REAR)**

## FRONT BRAKE/SPEEDOMETER CABLE



Front brake cable is routed through the flexible clamp welded on the handlebar.



The front brake/speedometer cable routed through a cable guide welded on the steering stem bottom bridge.



The front brake/speedometer cable routed through a cable guide mounted on the brake panel.



The front brake/speedometer cable routed through the guides welded on the handlebar/steering head.



The front brake/speedometer cable routed through the guide fitted on the front fender.



**SPEEDOMETER CABLE**



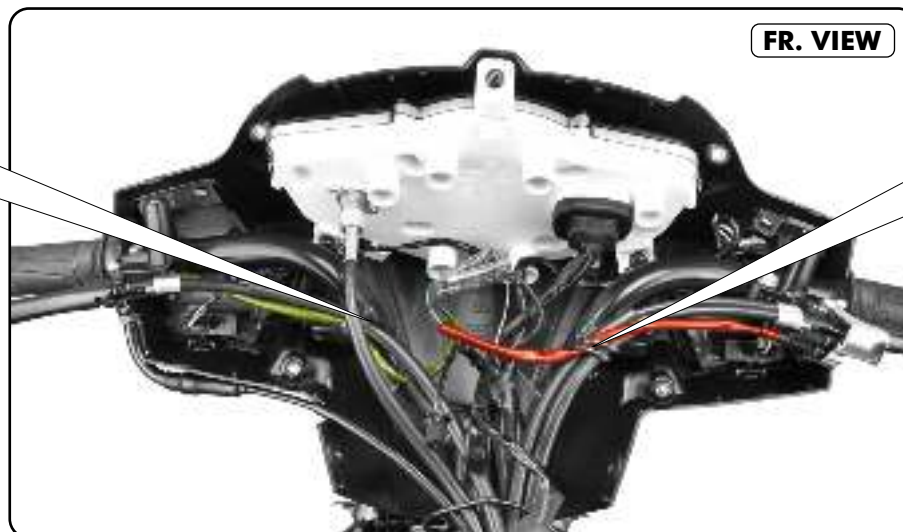
**FRONT BRAKE CABLE**



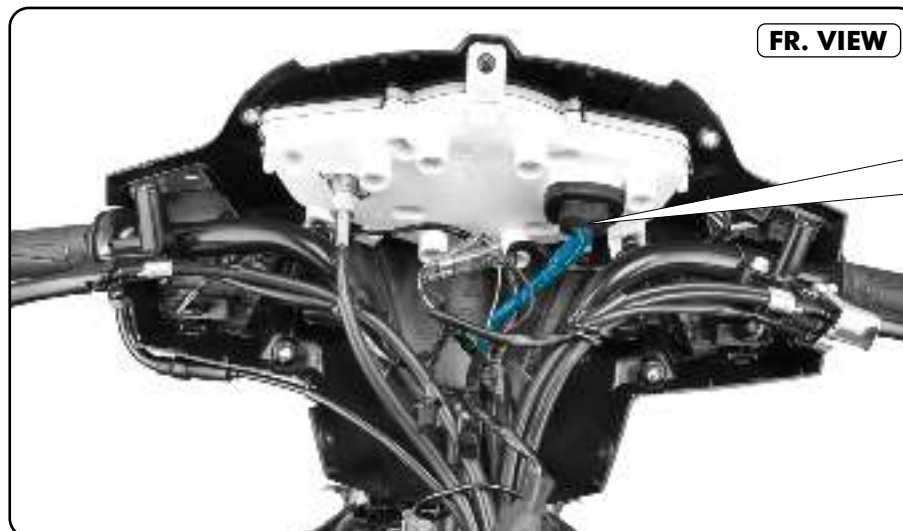
## FRONT/REAR (INTEGRATED) STOP LAMP SWITCH/16P CONNECTOR CORD



The front stop switch cord is routed through the flexible clamp welded on the handlebar.



The rear (integrated) stop switch cord is routed through the flexible clamp welded on the handlebar.



16P connector is properly connected to the speedometer console and the rubber boot is installed on the connector.

FRONT STOP SWITCH CORD
  REAR (INTEGRATED) STOP SWITCH CORD
  16P CONNECTOR CORD

GENERAL INFORMATION

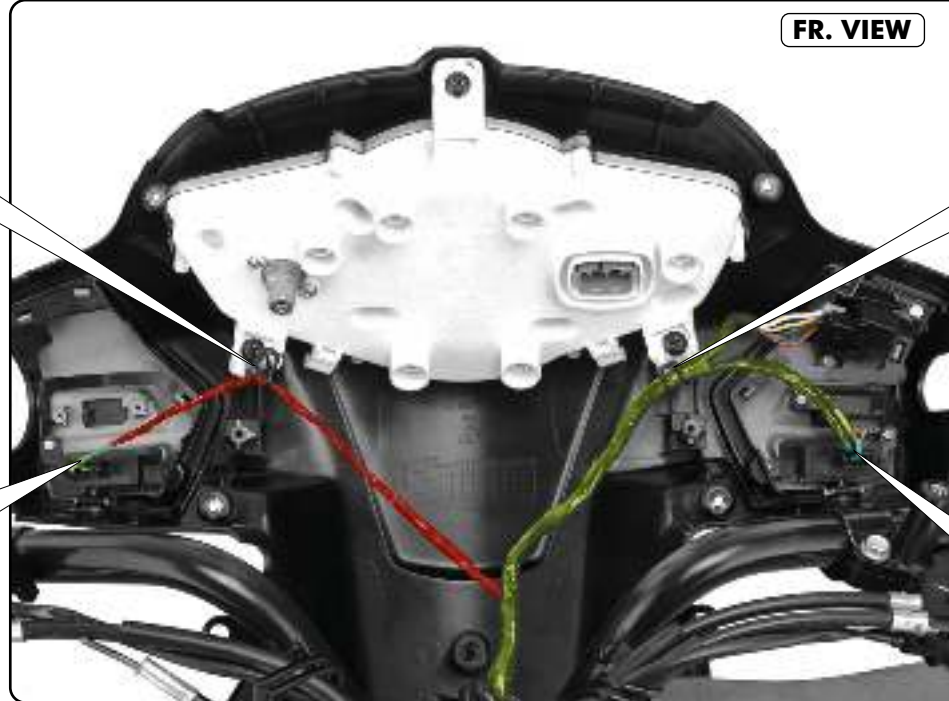
## RIGHT/LEFT SWITCH HOUSING CORD



Right switch housing assembly cord is routed through the clamp fixed on the meter console.



Right switch housing assembly connectors are properly connected to the switch housing.



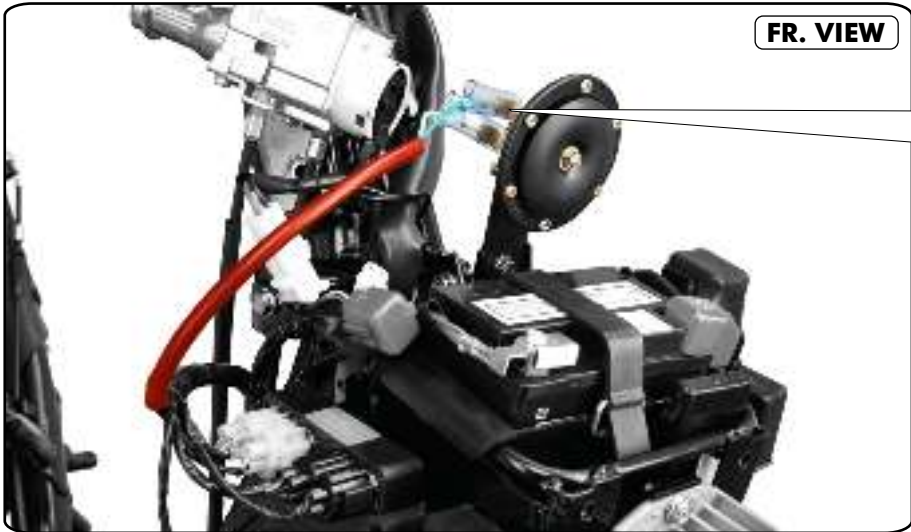
Left switch housing assembly cord is routed through the clamp fixed on the meter console.



Left switch housing assembly connectors are properly connected to the switch housing.

■ RIGHT SWITCH HOUSING CORD ■ LEFT SWITCH HOUSING CORD

**HORN/SPARK UNIT WITH IMMOBILIZER CORD**



**FR. VIEW**



**FR. VIEW**

Horn connectors are properly connected over the terminals.



**RHS VIEW**

Spark unit with immobilizer connectors are connected properly to the spark unit with immobilizer.



**HORN CORD**



**SPARK UNIT WITH IMMOBILIZER CORD**

## PASSING RELAY/REGULATOR/RECTIFIER CORD

Passing relay connectors are properly connected to the passing relay.



Regulator/Rectifier unit cord routed through the tie-wrap mounted on the battery mounting stay.



PASSING RELAY CORD



REGULATOR/RECTIFIER CORD



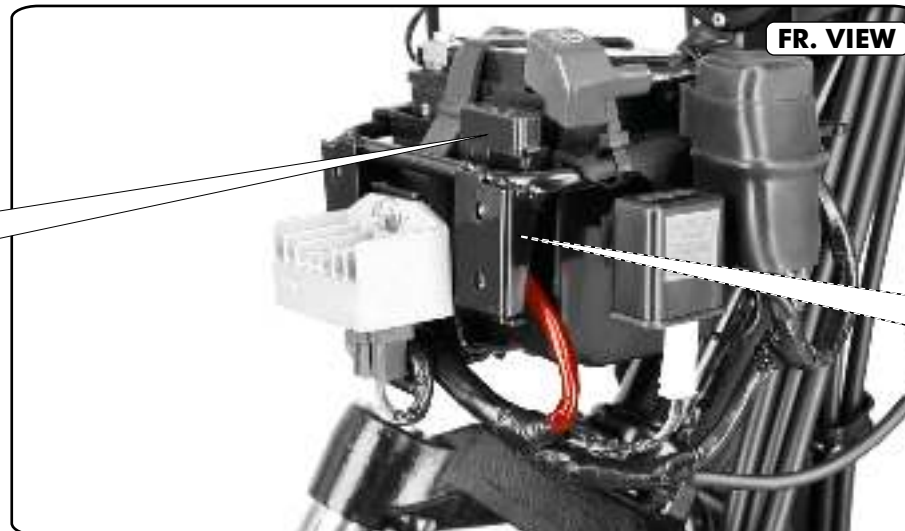
## TURN SIGNAL RELAY/FUSE CORD



Turn signal relay cord is properly connected to the turn signal relay.



Fuse box with main and spare fuse (10A) mounted on front side of the battery case.

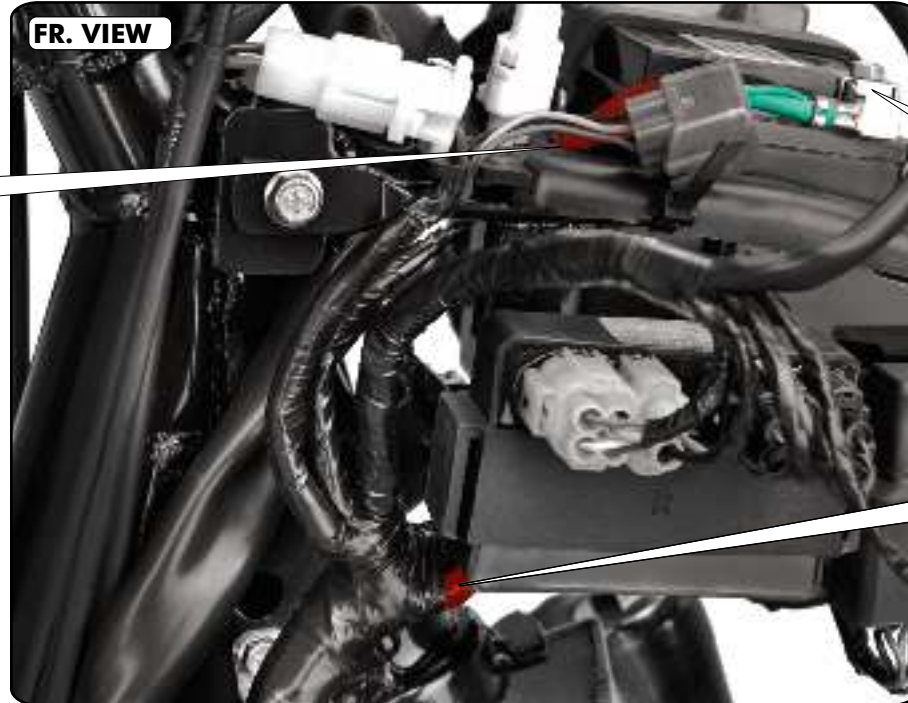


Fuse cord from the main wiring harness connected to the 10A fuse properly.

■ TURN SIGNAL RELAY CORD ■ FUSE CORD

**BATTERY (-) VE CABLE**

Battery (-)ve/earth cable is routed through the guide provided on the battery case.



Tighten the battery (-)ve/earth cable properly on the battery (-)ve terminal.



Battery (-)ve/earth cable from the main wiring harness is routed behind the battery and connected battery (-)ve terminal.

## THROTTLE CABLE



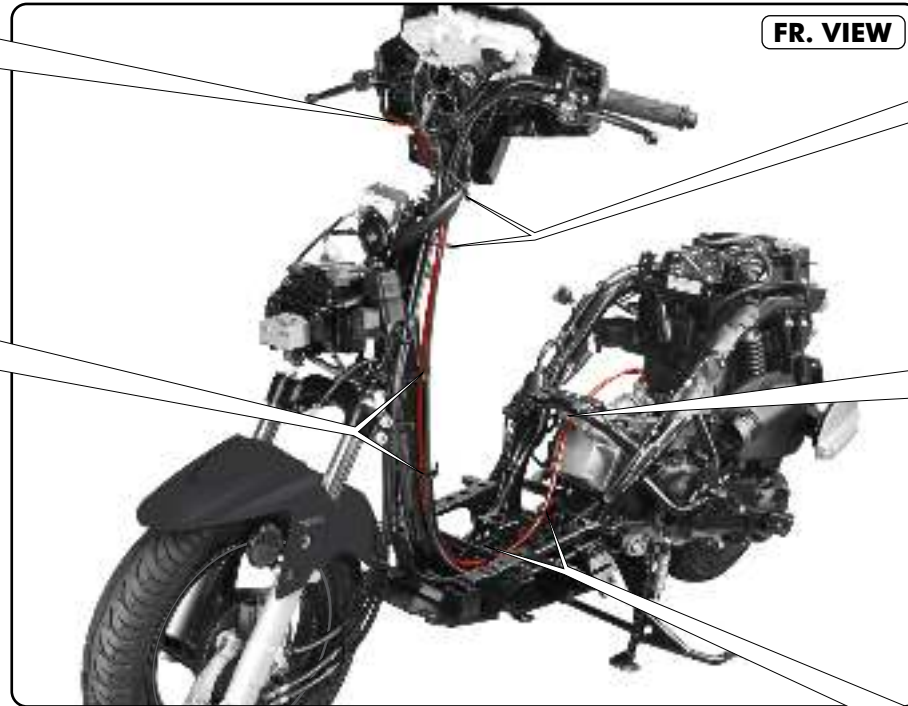
FR. VIEW

Throttle cable is adjusted and the boot is fitted on the adjuster properly.



FR. VIEW

Throttle cable is routed through the clamps welded on the frame behind steering head/front forks.



FR. VIEW



FR. VIEW

Throttle cable is routed through the guides welded on handlebar/steering head.



TOP VIEW

Throttle cable is routed through the clamp and the plastic router then it is properly connected to the carburetor.



TOP VIEW

Throttle cable is routed through the clamp and the guide mounted on the frame under the floor panel.

GENERAL INFORMATION



## ACG CORD, STARTER MOTOR & EARTH CABLES



TOP VIEW

Starter motor (+)ve and earth cables are properly connected to the starter motor terminal.



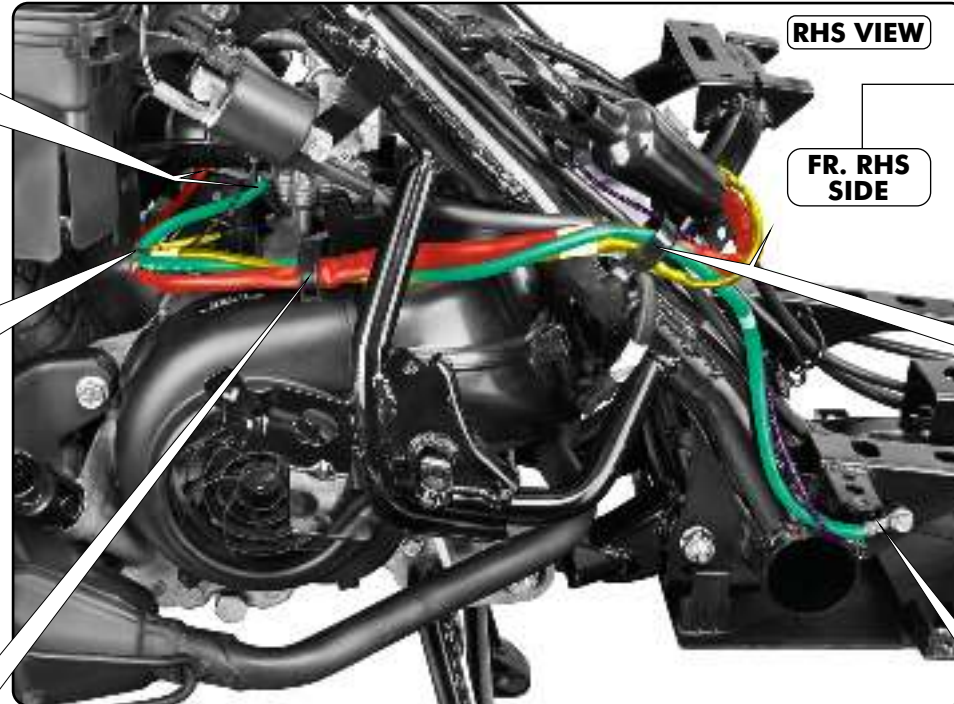
FR. VIEW

Starter motor (+)ve, ACG and earth cables are routed through the tie-wrap mounted on the fan cover.



TOP VIEW

Starter motor (+)ve, ACG and earth cables are routed through the guide provided on the fan cover.



RHS VIEW

FR. RHS  
SIDE



RHS VIEW

Earth cables are properly connected to the frame behind the battery mounting stay.



RHS VIEW

Starter motor (+)ve, ACG and earth cables are routed through the clamp and the tie-wrap mounted on the frame.



RHS VIEW

Earth cables are properly connected to the frame behind the right floor side cover.



STARTER MOTOR CABLE

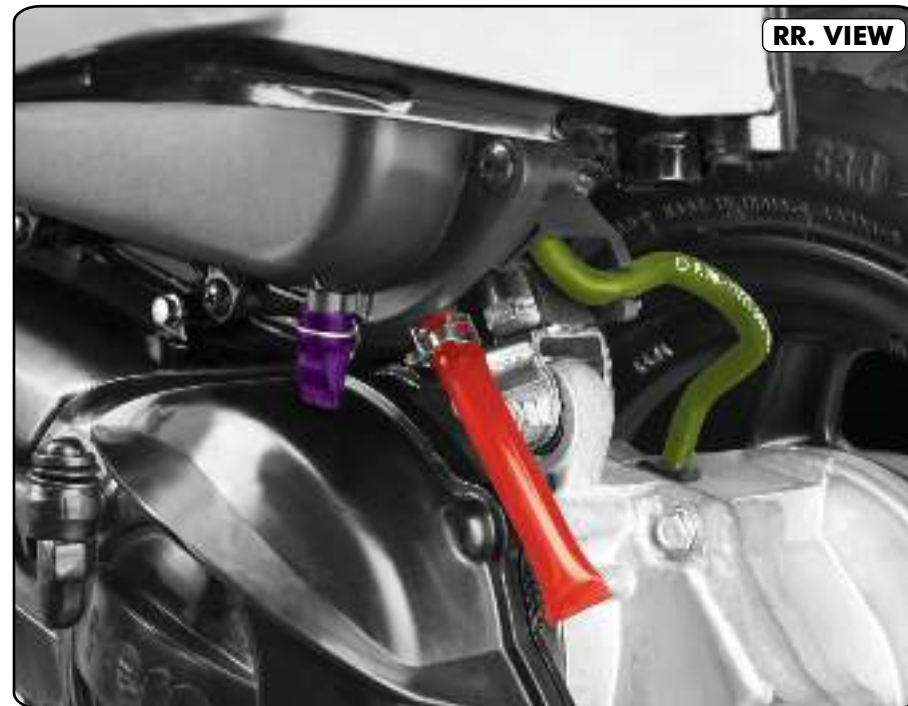


ACG CORD



EARTH CABLES

## FINAL REDUCTION BREATHER TUBE/ AIR CLEANER DRAIN PLUG/DRAIN HOSE

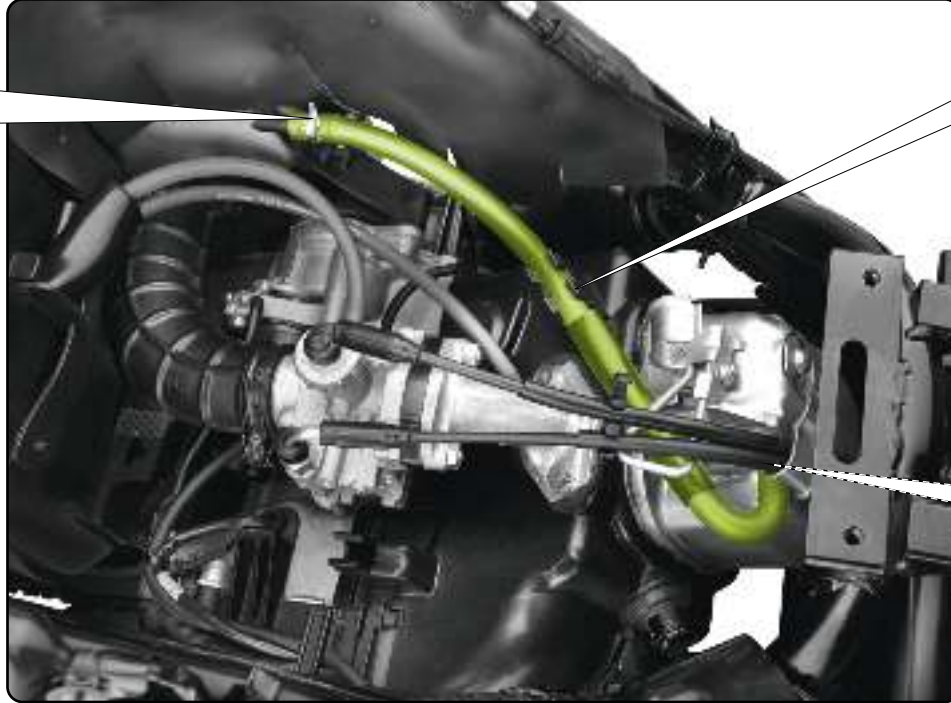


The final reduction breather tube is properly connected to the reduction gearbox and air cleaner.  
The air cleaner drain plug is properly connected to the air cleaner by clip.  
The air cleaner drain hose is properly connected to the air cleaner by clamp.

 AIR CLEANER DRAIN HOSE  AIR CLEANER DRAIN PLUG  FINAL REDUCTION BREATHER TUBE

**ENGINE BREATHER TUBE**

Engine breather tube is properly connected to the air cleaner by clamp.



Engine breather tube is routed through the guide provided on the intake shroud.



Engine breather tube is properly connected to the cylinder head cover by clip.

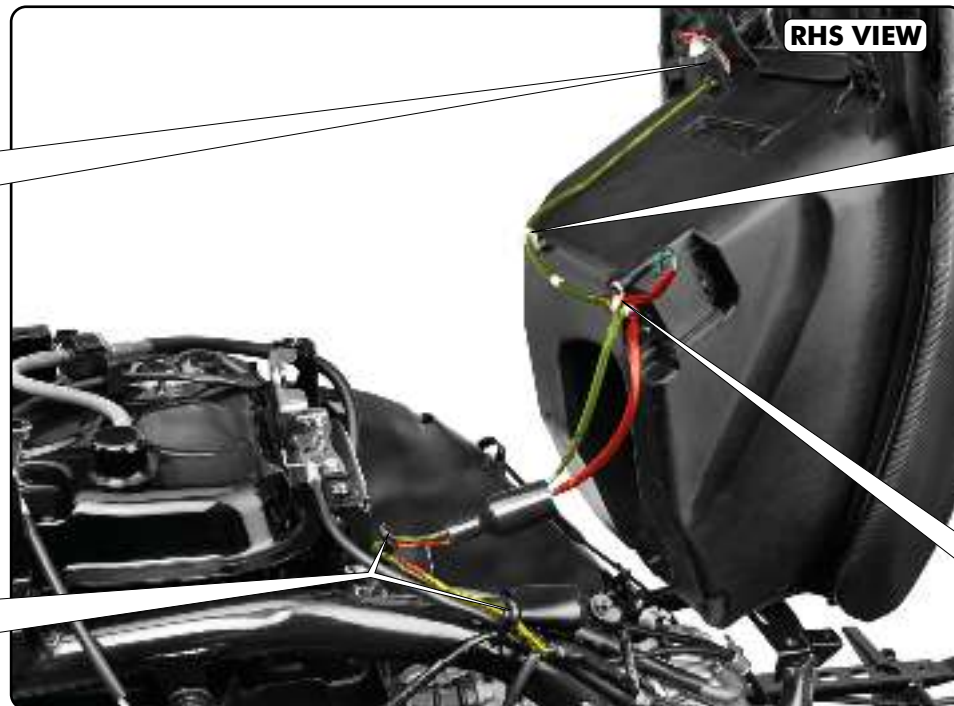
## BOOT LAMP/USB CHARGER ASSEMBLY CORD



Boot lamp cord routed through the tie-wrap mounted on the center compartment.



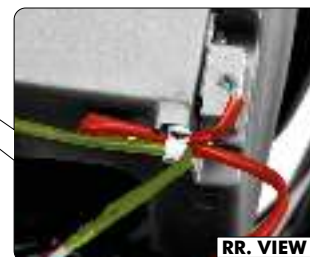
Boot lamp and USB charger assy. cords are routed through the clamps mounted on the frame near seat catch assembly.



RHS VIEW



Boot lamp cord routed through the guide fixed by screw on the centre compartment.



Boot lamp and USB charger assy. cords are routed through the guide fixed by screw on the centre compartment.



USB CHARGER ASSEMBLY CORD



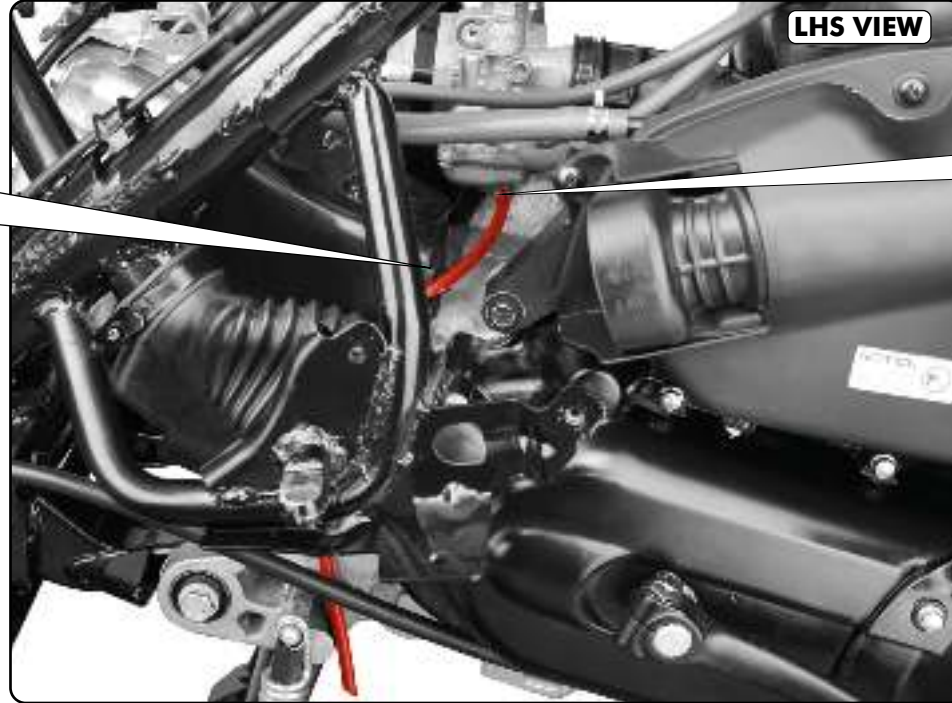
BOOT LAMP CORD

GENERAL INFORMATION



**CARBURETOR DRAIN TUBE**

Carburetor drain tube is routed through the guide provided on intake shroud.



Carburetor drain tube is properly connected to the carburetor by clip.



# TAIL/STOP/REAR TURN SIGNAL LAMP CORD



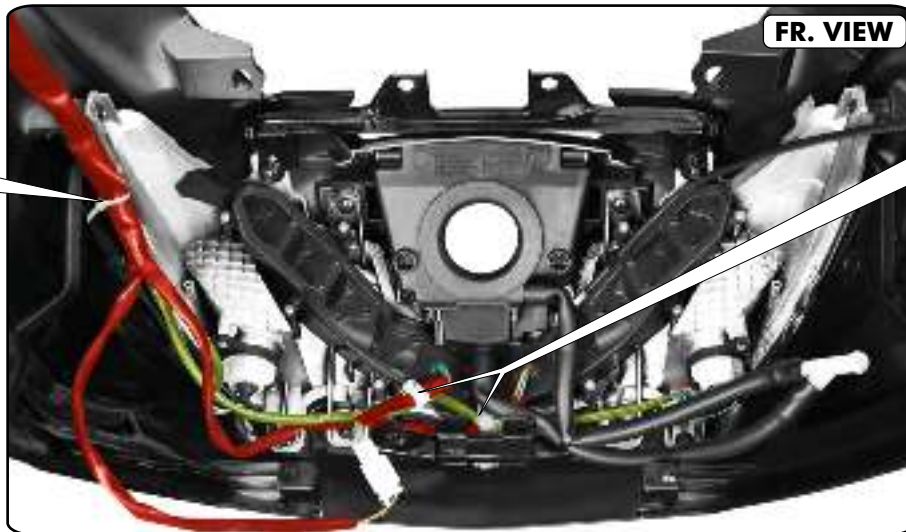
Tail/stop/rear turn signal lamp cord routed through the tie-wrap mounted on the body cover and clamp mounted on the frame.



Tail/stop/rear turn signal lamp cord routed through the guide on the body cover.



Tail/stop/rear turn signal lamp cord routed through the tie-wrap mounted on the tail/stop lamp unit.



Tail/stop/rear turn signal lamp cord routed through the guides fixed by screw on the tail/stop unit.



TAIL/STOP LAMP CORD

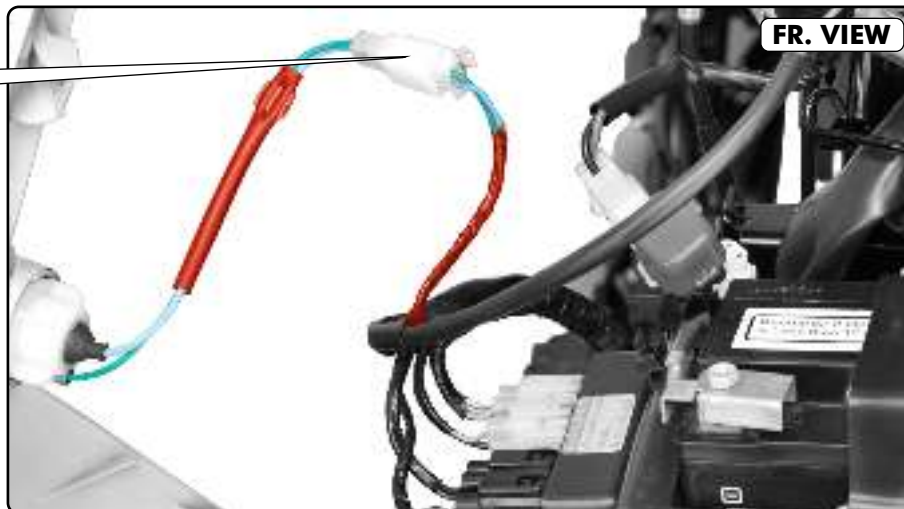


RIGHT/LEFT TURN SIGNAL LAMP CORD

GENERAL INFORMATION

**FRONT TURN SIGNAL LAMP CORD**

Front right turn signal lamp cord is connected to the main wiring harness by 2P connector.

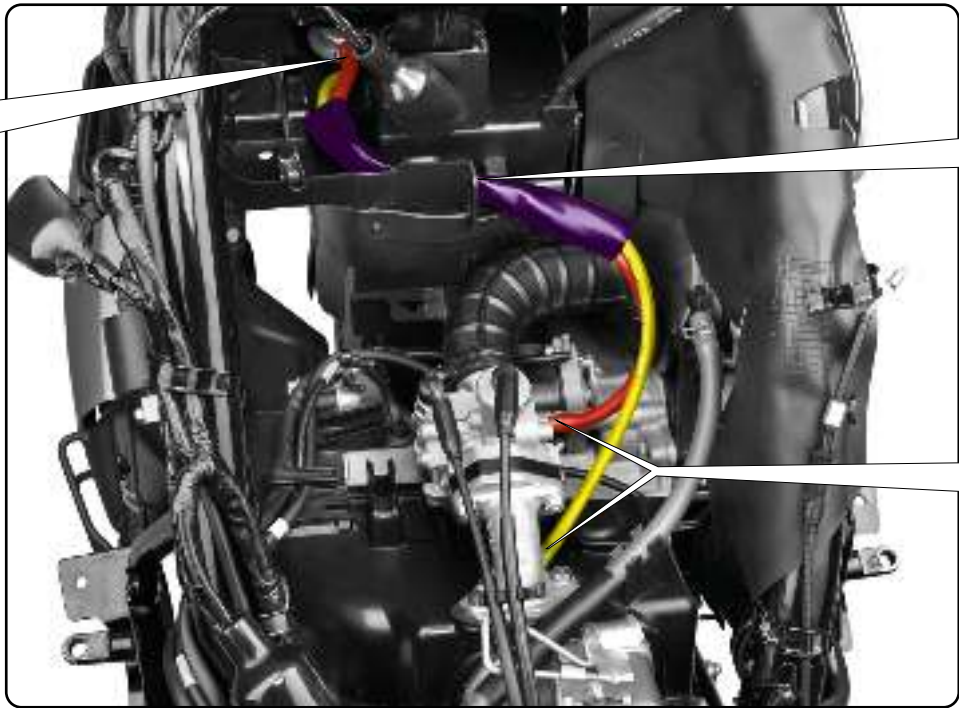
**FR. VIEW**

Front left turn signal lamp cord is connected to the main wiring harness by 2P connector.

# FUEL SUPPLY/VACUUM TUBES



Fuel supply and vacuum tubes are properly connected to the auto fuel valve by clip.



Fuel supply and vacuum tubes are routed through the rear fender grooves.



Fuel supply and vacuum tubes are properly connected to the carburetor and intake manifold pipe by clip.



FUEL SUPPLY TUBE



VACUUM TUBE

## FUEL UNIT CORD/TWO WAY VALVE BREATHER TUBE



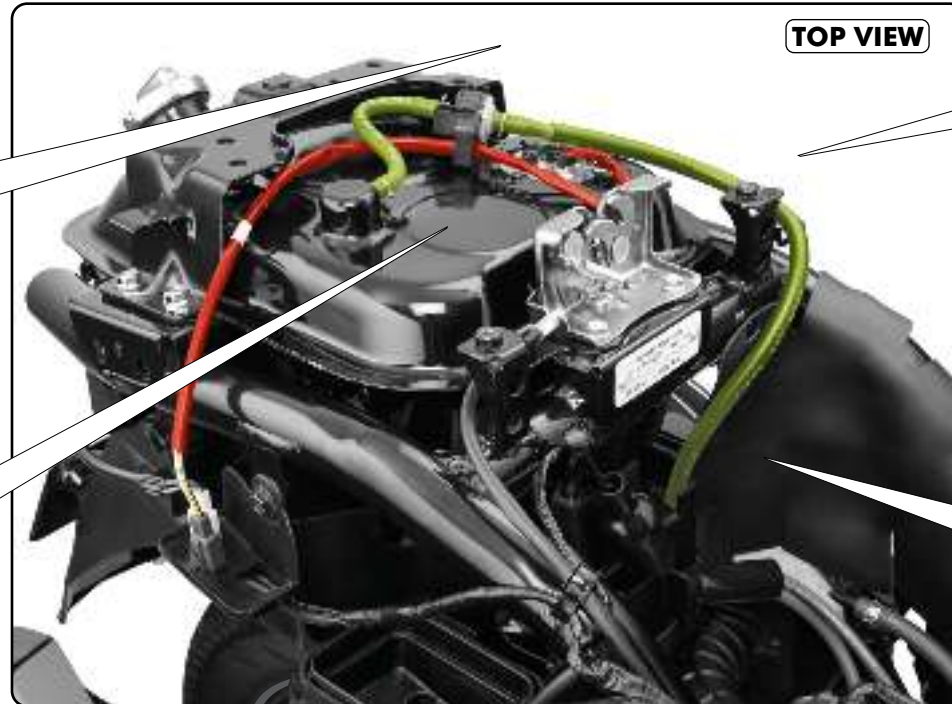
TOP VIEW

Two way valve breather tube is properly connected to the valve on both sides by clip and fuel unit cord routed through the guide provided on the two way valve mounting.



TOP VIEW

Two way valve breather tube is properly connected to the fuel tank by using clip.



TOP VIEW



TOP VIEW

Two way valve breather tube is routed through the guide mounted on the frame.



TOP VIEW

Two way valve breather tube is properly connected to the rear fender by clip.



FUEL UNIT CORD



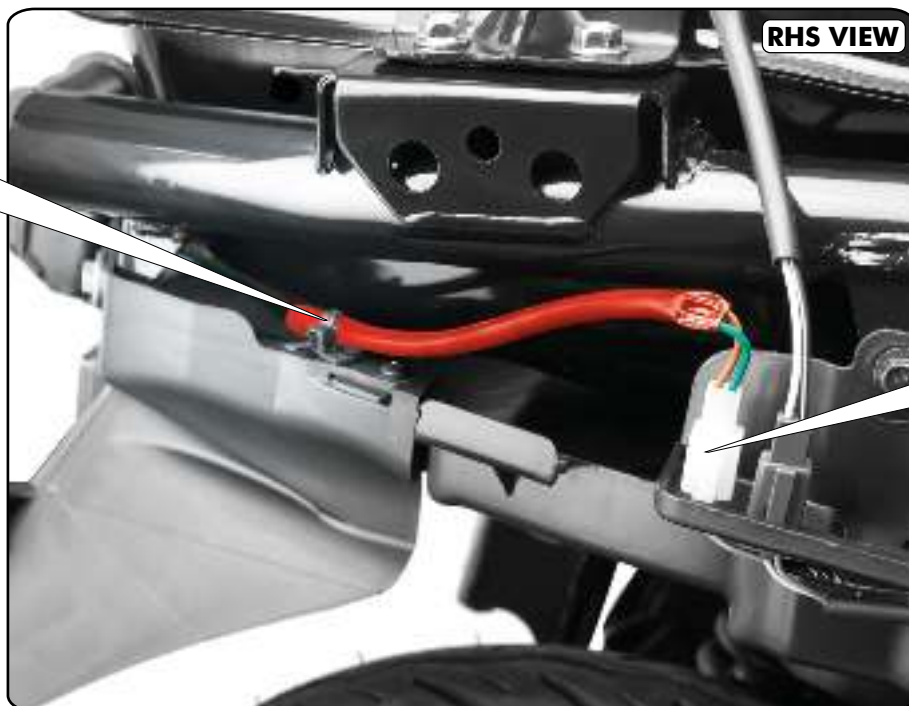
TWO WAY VALVE BREATHER TUBE



## LICENCE PLATE LAMP CORD



Licence plate lamp cord is routed through the tie-wrap mounted on the rear fender.



Licence plate lamp cord is properly connected to the 2P connector through the rear fender.

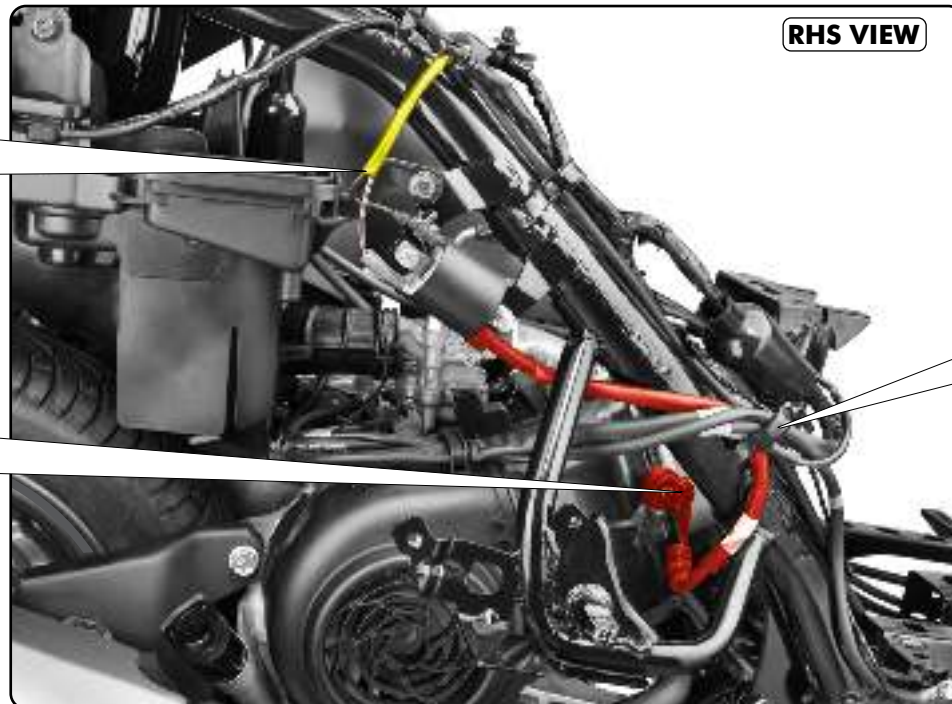
GENERAL INFORMATION

**IGNITION COIL CORD/NOISE SUPPRESSOR CAP**

Ignition coil connectors are properly connected on its terminals.



Noise suppressor cap is properly connected to the spark plug.



HT cord is routed through the clamp welded on the frame.

 HT CORD  IGNITION COIL CORD

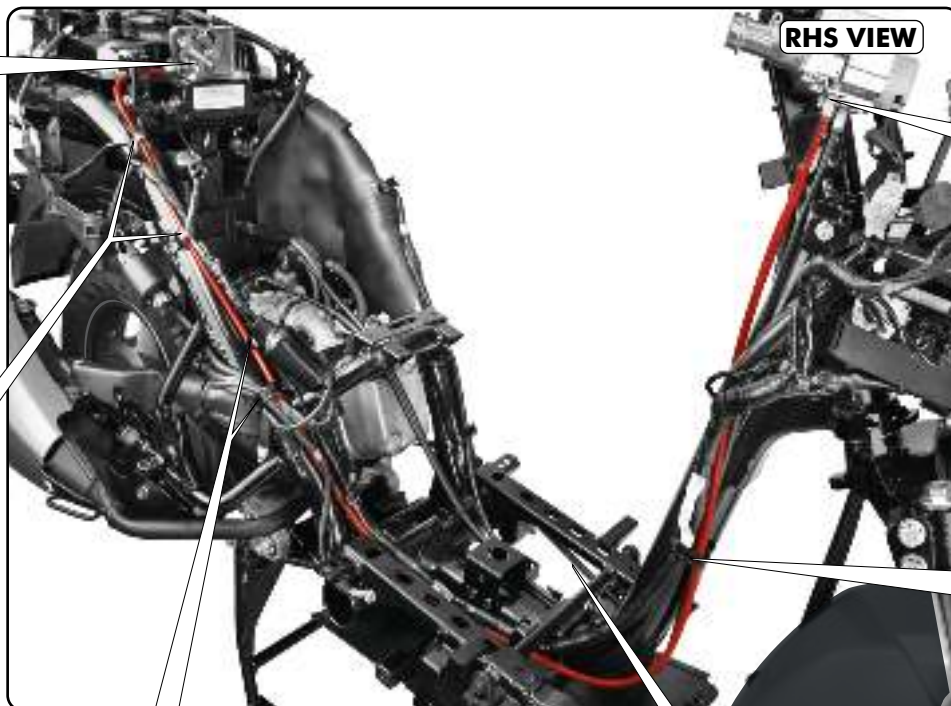
## SEAT CATCH CABLE



Seat catch cable hook is properly connected to the seat catch plate.



Seat catch cable is routed through the clamps welded on the frame.



RHS VIEW



Seat catch cable hook is properly connected to the plate fixed on the ignition switch assembly.



Seat catch cable is routed through the clamp welded on the frame.



Seat catch cable is routed through the clamps welded on the frame.



Seat catch cable is routed through the clamp welded on the frame.



## FUEL LID COVER CATCH CABLE



Fuel lid cover catch cable is routed through the clamp welded on the frame.



Fuel lid cover catch cable is routed through the clamps welded on the frame.



Fuel lid cover catch cable is routed through the guides provided on the tail/stop lamp LED unit.



Fuel lid cover catch cable hook is properly connected to the plate fixed on the ignition switch assembly.



Fuel lid cover catch cable is routed through the clamp welded on the frame.



Fuel lid cover catch cable is routed through the clamp welded on frame and end cover is fitted properly on the cable connector.



## DRAIN TUBES



Drain tubes are routed through the tie-wrap mounted on the tail/stop lamp LED unit stay.



Drain tube is routed through the guides provided on the inner side of rear fender.

 DRAIN TUBES

**STARTER MAGNETIC SWITCH CORD/BATTERY (+)VE CABLE**

Connect the battery (+)ve cable to the positive terminal and the screw has been tightened properly then the cap is fitted on the terminal.

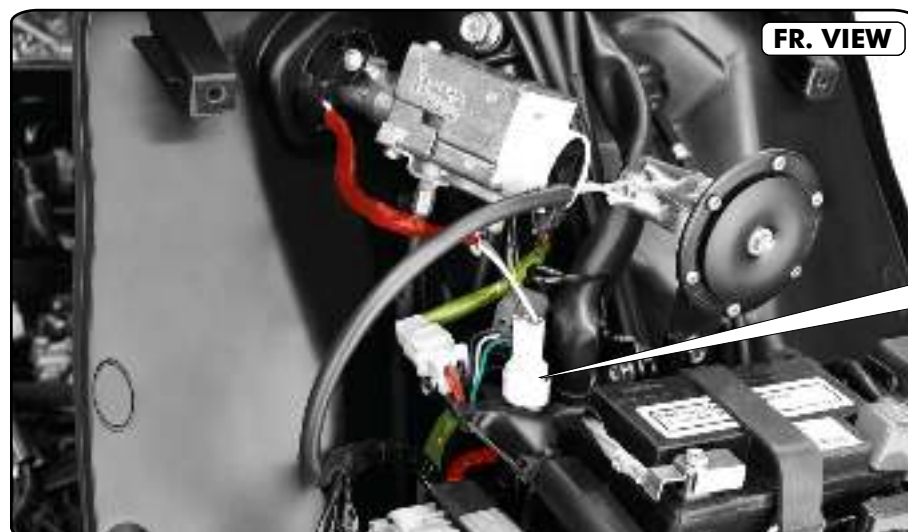


Starter magnetic switch cord is routed through the guide provided on the battery case and connected to battery (+)ve terminal..



Starter magnetic switch cord is properly connected to the switch.

## IGNITION SWITCH/IMMOBILIZER/DLC SERVICE CONNECTOR CORD



Immobilizer antenna cord is routed through the guide provided on the battery case.



Ignition switch and DLC service connector cord are routed through the guide provided on the battery case.

■ IMMOBILIZER/DLC SERVICE CONNECTOR CORD
 ■ IGNITION SWITCH CORD



**MAIN WIRING HARNESS-I****RHS VIEW**

Main wiring harness routed through the clamp welded on the frame.

**LHS VIEW**

Main wiring harness routed through the clamps welded on the frame.

**TOP VIEW**

Main wiring harness routed through the clamps welded on the frame.

**RHS VIEW****RHS VIEW**

Main wiring harness is routed through the guide provided under the battery case.

**FR. VIEW**

Main wiring harness is routed through the tie-wrap fitted on the frame near regulator/rectifier.

**RHS VIEW**

Main wiring harness routed through the clamp welded on the frame.

## MAIN WIRING HARNESS-II



Main wiring harness is routed through the guide welded on the frame.



Main wiring harness is routed through the tie-wrap fitted on the frame and guide welded on the frame behind the battery case.



Main wiring harness routed through the tie-wrap fitted on the handlebar.

GENERAL INFORMATION

## 2. BODY PANELS/EXHAUST SYSTEM

### SYSTEM DIAGRAM

2



# BODY PANELS/EXHAUST SYSTEM

<b>Service Information</b>	<b>2-1</b>	<b>Seat/Fuel Tank Cover</b>	<b>2-9</b>
<b>Torque Values</b>	<b>2-1</b>	<b>Center Compartment</b>	<b>2-9</b>
<b>Special Tools</b>	<b>2-1</b>	<b>Rear Grip/Center Cover</b>	<b>2-10</b>
<b>Troubleshooting</b>	<b>2-1</b>	<b>Body Cover</b>	<b>2-10</b>
<b>Rear View Mirrors</b>	<b>2-2</b>	<b>Pillion Step</b>	<b>2-13</b>
<b>Handlebar Cover</b>	<b>2-2</b>	<b>Floor Panel</b>	<b>2-13</b>
<b>Front Fender</b>	<b>2-4</b>	<b>Inner Cover</b>	<b>2-14</b>
<b>Front Center Cover</b>	<b>2-5</b>	<b>Rear Fender</b>	<b>2-15</b>
<b>Front Left/Right cover</b>	<b>2-6</b>	<b>Women Pillion Step</b>	<b>2-16</b>
<b>Right Floor Side Cover</b>	<b>2-7</b>	<b>Main Stand</b>	<b>2-16</b>
<b>Left Floor Side Cover</b>	<b>2-7</b>	<b>Muffler Protector</b>	<b>2-17</b>
<b>Front Lower/Under Cover</b>	<b>2-8</b>	<b>Exhaust Muffler</b>	<b>2-17</b>
<b>Seat Lock/Seat Open</b>	<b>2-8</b>		

## 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.
- Always replace the exhaust pipe gasket once the exhaust pipe is removed from the engine.
- When installing the exhaust system, loosely install the exhaust pipe fasteners. Always tighten the exhaust mounting nuts from the cylinder head side first. Then tighten the mounting fasteners.
- Always inspect the exhaust system for leak after installation.



**TORQUE VALUES**

<b>EXHAUST MUFFLER MOUNTING BOLT</b>	<b>: 4.9 kgf-m</b>
<b>EXHAUST MUFFLER PROTECTOR MOUNTING BOLT</b>	<b>: 1.4 kgf-m</b>

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



**SPECIAL TOOLS**



**MAIN/SIDE STAND SPRING INSTALLER**  
**PART NUMBER: 070 HH 198 037**



**CENTRIFUGAL CLUTCH SPRING REMOVER**  
**PART NUMBER: 070 HH KTP 08**

## TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak
- Poor performance
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler



**BODY PANELS/EXHAUST SYSTEM**

**REAR VIEW MIRRORS  
REMOVAL/INSTALLATION**

Slide up the rubber boot.



Loosen the special nut and remove the right side rear view mirror.  
Follow the same procedure for the left side rear view mirror.  
Installation is in the reverse order of removal.



**HANDLEBAR COVER  
FRONT COVER  
REMOVAL/INSTALLATION**

Remove the rear view mirrors.  
Remove the screws (6 nos.) from the rear side.



Remove the mounting bolt from the front side.





## BODY PANELS/EXHAUST SYSTEM

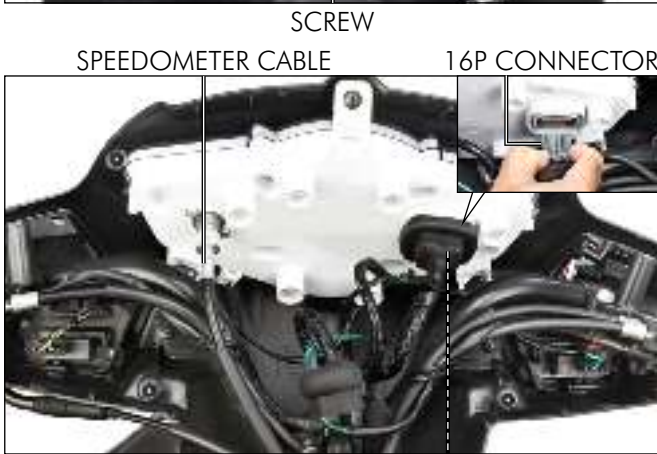
Remove the front handlebar cover by releasing the tabs.  
Disconnect the headlamp and position lamp connector.  
Installation is in the reverse order of removal.

### REAR COVER REMOVAL/INSTALLATION

Remove the front cover (page 2-2).  
Remove the screw from the rear side.

Disconnect the 16P connector and speedometer cable.

Remove the screws (2 nos.) from the front side.



BODY PANELS/EXHAUST SYSTEM

Disconnect the right & left handlebar switch connectors (page 19-14 & 19-15).  
Installation is in the reverse order of removal.

RIGHT HANDLEBAR SWITCH CONNECTOR



LEFT HANDLEBAR SWITCH CONNECTORS

**FRONT FENDER  
REMOVAL/INSTALLATION**  
Remove the cable guide from the front fender.

FRONT FENDER



CABLE GUIDE

Remove the screws (2 nos.) and bolt.

SCREWS



BOLT

Remove the screws (2 nos.) and bolt.

SCREWS



BOLT

## BODY PANELS/EXHAUST SYSTEM

Pull out the front fender towards front side.  
Installation is in the reverse order of removal.



### FRONT CENTER COVER REMOVAL/INSTALLATION

Remove the screws (2 nos.) from the rear side.



Remove the screws (2 nos.) from the bottom side.



Remove the front center cover by sliding it towards bottom  
while releasing the tabs from the lock clips.  
Installation is in the reverse order of removal.





BODY PANELS/EXHAUST SYSTEM

FRONT LEFT/RIGHT COVER  
REMOVAL/INSTALLATION

Remove the front center cover (page 2-6).  
Remove the screws (4 nos.) as shown.



Remove the screws (4 nos.) and the bolts (4 nos.).



Release the tabs and disconnect the right/left turn signal lamp connectors.  
Remove the front left/right covers from the vehicle.  
Installation is in the reverse order of removal.



## BODY PANELS/EXHAUST SYSTEM

### RIGHT FLOOR SIDE COVER REMOVAL/INSTALLATION

Remove the screws (3 nos.).

Pull the right floor side cover by sliding it towards rear to release the tabs from the slots in the floor panel.

Remove the right floor side cover.

Installation is in the reverse order of removal.



### LEFT FLOOR SIDE COVER REMOVAL/INSTALLATION

Remove the screws (3 nos.).

Pull the left floor side cover by sliding it towards rear to release the tabs from the slots in the floor panel.

Remove the left floor side cover.

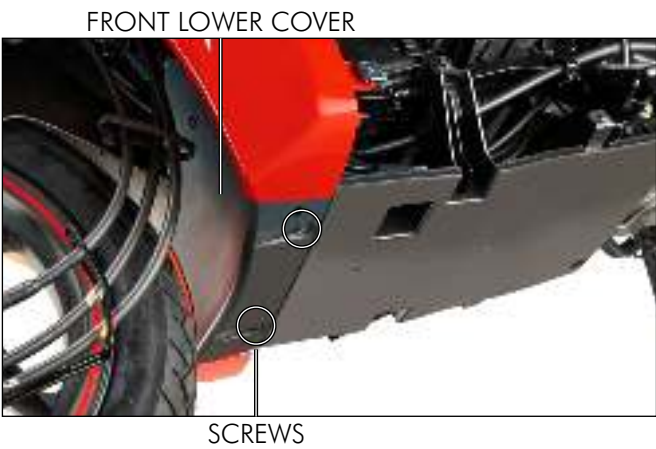
Installation is in the reverse order of removal.



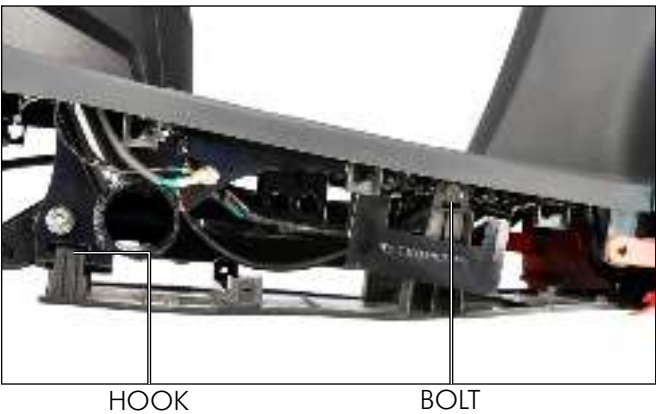
**BODY PANELS/EXHAUST SYSTEM**

**FRONT LOWER/UNDER COVER  
REMOVAL/INSTALLATION**

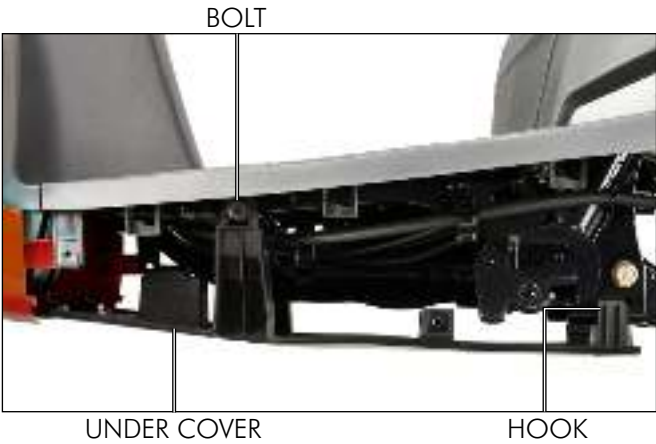
Remove the front left/right cover (page 2-7).  
Remove the right/left floor side cover (page 2-8 & 2-9).  
Remove the screws (2 nos.) and the front lower cover.



Remove the bolt and push the hook up and release it from the right side.



Remove the bolt and push the hook up and release it from the left side.  
Remove the under cover.  
Installation is in the reverse order of removal.



**SEAT LOCK/SEAT OPEN  
OPERATION**

Open the seat by inserting the key and turning it in counter-clockwise direction.





## BODY PANELS/EXHAUST SYSTEM

To lock the seat push down the seat until it locks ("Click sound" is an audible indicator that the seat has got locked).



### SEAT REMOVAL/INSTALLATION

Open the seat (page 2-10).

Remove the nuts (2 nos.) and the seat from the center compartment.

Installation is in the reverse order of removal.

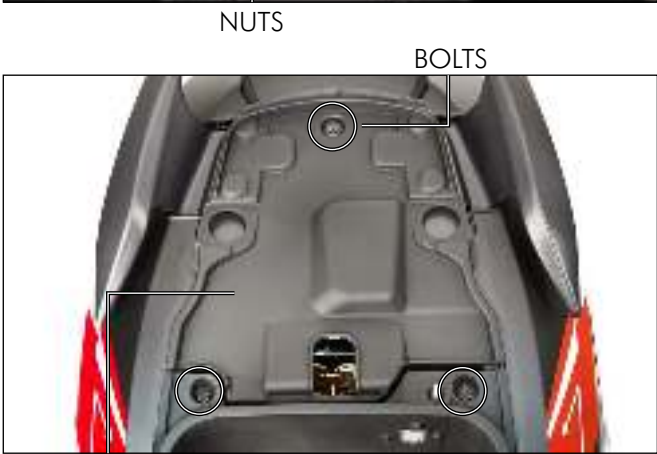


### FUEL TANK COVER REMOVAL/INSTALLATION

Open the seat (page 2-10).

Remove the bolts (3 nos.) and the fuel tank cover.

Installation is in the reverse order of removal.



FUEL TANK COVER

### CENTER COMPARTMENT REMOVAL/INSTALLATION

Open the seat (page 2-10).

Remove the mounting bolts (4 nos.).



MOUNTING BOLTS



## BODY PANELS/EXHAUST SYSTEM

Lift-up the center compartment and disconnect the boot lamp & USB charger connectors.  
Remove the center compartment.  
Installation is in the reverse order of removal.



BOOT LAMP CONNECTOR  
CENTER COMPARTMENT USB CHARGER CONNECTOR  
MOUNTING BOLTS



REAR GRIP

### REAR GRIP

#### REMOVAL/INSTALLATION

Remove the fuel tank cover (page 2-11).  
Remove the mounting bolts (4 nos.) and rear grip.  
Installation is in the reverse order of removal.

### CENTER COVER

#### REMOVAL/INSTALLATION

Remove the screws (2 nos.).  
Remove the center cover.  
Installation is in the reverse order of removal.



SCREWS

### BODY COVER

#### REMOVAL/INSTALLATION

Remove the center compartment (page 2-11).  
Remove the rear grip (page 2-12).  
Remove the center cover (page 2-12).  
Remove the mounting screws (2 nos.).



MOUNTING SCREWS

# BODY PANELS/EXHAUST SYSTEM

Remove the mounting screws (2 nos.).



MOUNTING SCREWS

Remove the mounting screws (2 nos.) from both sides of the vehicle.



MOUNTING SCREWS

Remove the mounting bolts (4 nos.).



MOUNTING BOLTS

Open the fuel lid cover catch cable end cover.  
Disconnect the fuel lid cover catch cable.



FUEL LID COVER CATCH CABLE

CABLE END COVER

CATCH CABLE END

BODY PANELS/EXHAUST SYSTEM

Remove the fuel tank cap.



FUEL TANK CAP  
BODY COVER

Remove the body cover while releasing the tabs from both sides of the vehicle.



TABS  
DRAIN TUBES

Disconnect the drain tubes and remove the body cover towards rear.  
Install the fuel tank cap.  
Installation is in the reverse order of removal.



TIE-WRAP

Dismount the tie-wrap clamp and disconnect the tail/stop/turn signal lamp connector.



CONNECTOR



# BODY PANELS/EXHAUST SYSTEM

## PILLION STEP REMOVAL/INSTALLATION

Remove the split pin.

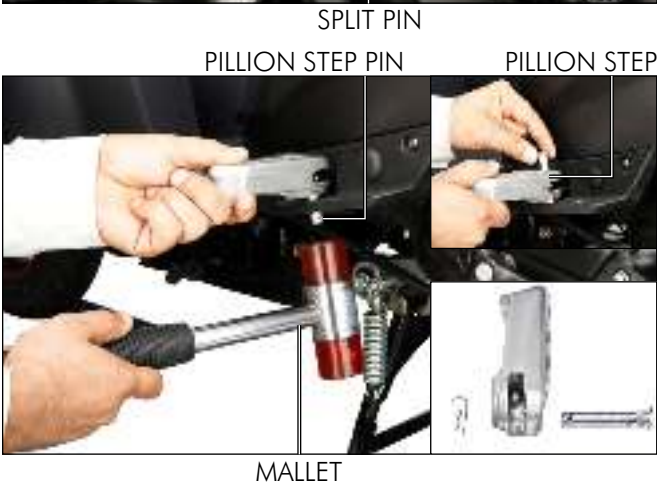
Tap out the pillion step pin using a soft mallet.  
Remove the pillion step.

Installation is in the reverse order of removal.

### NOTE

- While installing, align the line on the pillion step pin head with the index mark on the pillion step.
- Always use a new split pin while installation.

Follow the same procedure for removal of right side pillion step.



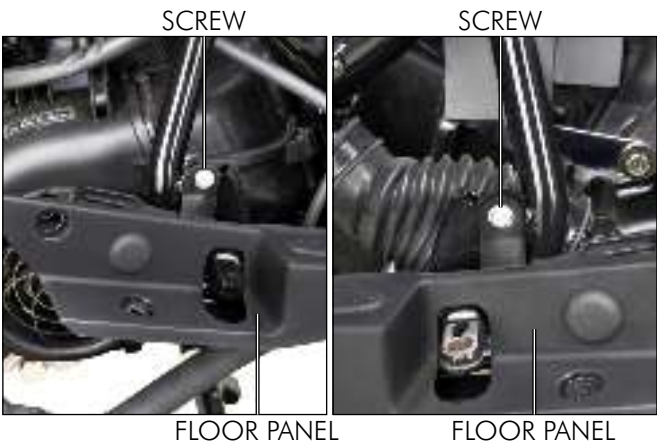
## FLOOR PANEL

Remove the right/left floor side cover (page 2-8 & 2-9).

Remove the body cover (page 2-12).

Remove the right/left pillion step.

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



## BODY PANELS/EXHAUST SYSTEM

Remove the mounting bolts (4 nos.).



MOUNTING BOLTS

Remove the floor panel while releasing the tabs from the inner cover slots as shown.  
Installation is in the reverse order of removal.



FLOOR PANEL

SCREW

IMMOBILIZER ANTENNA

### INNER COVER

Remove the front left/right cover (page 2-7).  
Remove the floor panel (page 2-15).  
Disconnect the immobilizer connector.  
Remove the screw and the immobilizer antenna from the ignition switch.



IMMOBILIZER CONNECTOR

CARBURETOR

Disconnect the bystarter cable from the carburetor and release it from the guides.



BYSTARTER CABLE

## BODY PANELS/EXHAUST SYSTEM

Remove the inner cover while releasing the pins from the frame.

Installation is in the reverse order of removal.

- Route the bystarter cable properly (**SECTION-1**).
- Align the inner cover pins on the frame properly while installation.

### REAR FENDER

Remove the body cover (page 2-12).

Disconnect the fuel unit and licence plate lamp connectors.

Remove the rear fender mounting bolts (2 nos.) from the right side of the vehicle.

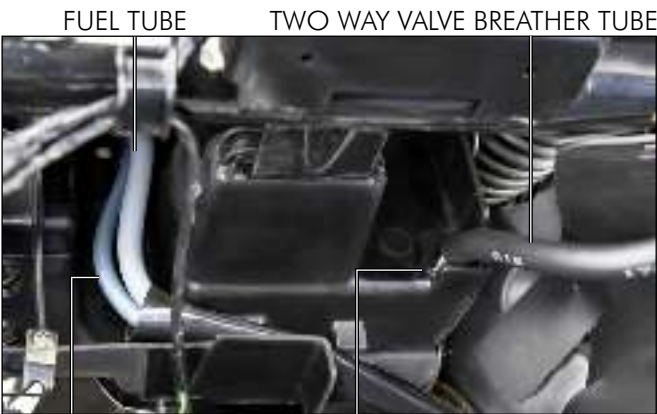
Release the fuel tank vacuum tube and fuel tube from the rear fender grooves.

Remove the clip and release the two way valve breather tube from the rear fender.

Remove the rear fender mounting bolt from the left side of the vehicle.



ALIGN CONNECTORS INNER COVER MOUNTING BOLTS



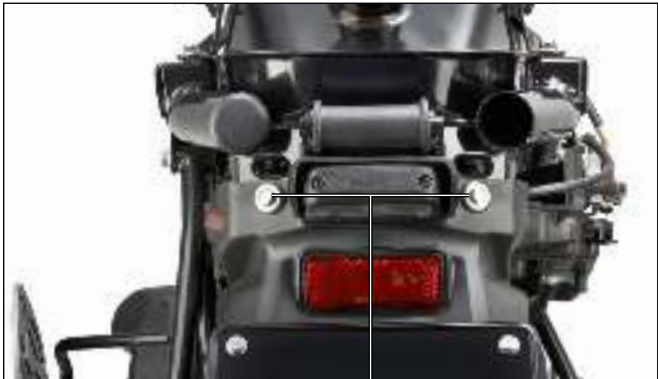
FUEL TUBE TWO WAY VALVE BREATHER TUBE VACUUM TUBE CLIP MOUNTING BOLT





## BODY PANELS/EXHAUST SYSTEM

Remove the mounting bolt-washers (2 nos.) from the rear



MOUNTING BOLT-WASHERS

Remove the rear fender from the vehicle towards rear.  
Installation is in the reverse order of removal.

**NOTE**

Route the cables/hoses/tubes/wires properly (SECTION-1).



REAR FENDER

### WOMEN PILLION STEP

Remove the body cover (page 2-12).  
Remove the mounting bolts (2 nos.) from the left side of the vehicle.  
Remove the women pillion step.  
Installation is in the reverse order of removal.



MOUNTING BOLTS

WOMEN PILLION STEP  
SPRINGS

### MAIN STAND REMOVAL/INSTALLATION

Remove the left floor side cover (page 2-9).  
Park the scooter securely.  
Remove the main stand springs using the special tool as shown.



**CENTRIFUGAL CLUTCH SPRING REMOVER  
PART NUMBER: 070 HH KTP 08**



MAIN STAND

## BODY PANELS/EXHAUST SYSTEM

Remove the split pin and washer from the main stand shaft on the right side of the vehicle.

Remove the main stand shaft and the main stand.  
Installation is in the reverse order of removal.

**NOTE**

- Apply grease on the main stand shaft sliding surface and install it.



**MAIN/SIDE STAND SPRING INSTALLER**  
**PART NUMBER: 070 HH 198 037**

### MUFFLER PROTECTOR REMOVAL/INSTALLATION

Remove the socket bolts (2 nos.).  
Remove the tail cap end.  
Remove the bolt-washers (3 nos.) and rubber packing (3 nos.).  
Remove the muffler protector.  
Installation is in the reverse order of removal.

**TORQUE**

**EXHAUST MUFFLER PROTECTOR MOUNTING**  
**BOLT: 1.4 kgf-m**

### EXHAUST MUFFLER

**⚠ WARNING**

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

**REMOVAL**

Remove the right floor side cover (page 2-8).  
Remove the exhaust pipe joint nuts (2 nos.).

SPLIT PIN



WASHER

MAIN STAND SHAFT



MAIN STAND

BOLT-WASHERS/RUBBER PACKING



SOCKET BOLTS    TAIL CAP END    MUFFLER PROTECTOR



JOINT NUTS

## BODY PANELS/EXHAUST SYSTEM

Remove the muffler mounting bolts (2 nos.).  
Remove the muffler.  
Remove the exhaust pipe gasket from the cylinder head.

### INSTALLATION

Install a new exhaust pipe gasket into the cylinder head.  
Install the exhaust muffler, mounting bolts and exhaust pipe joint nuts.  
Tighten the joint nuts.

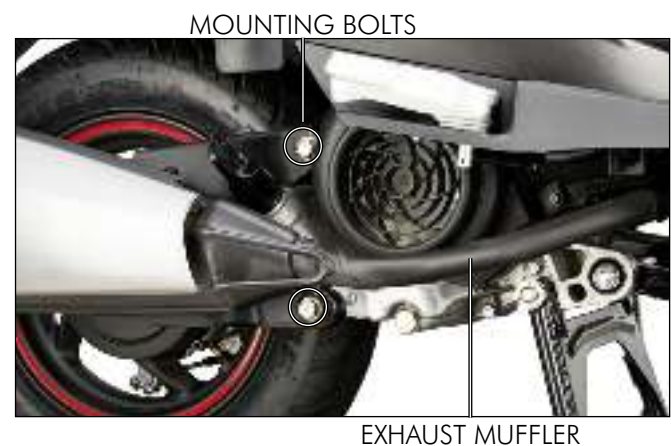
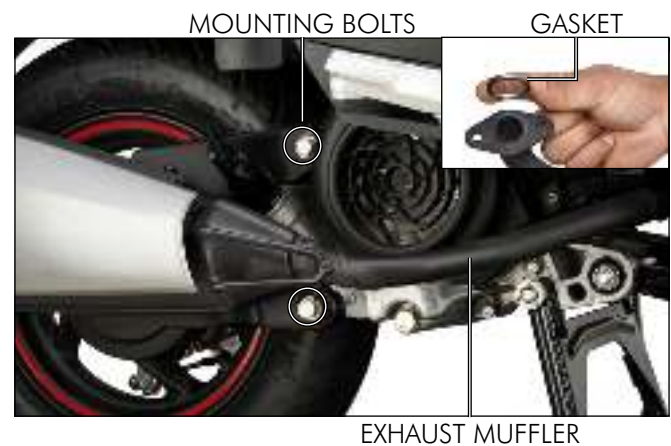
Tighten the muffler mounting bolts to the specified torque.

#### TORQUE

**EXHAUST MUFFLER MOUNTING BOLT: 4.9 kgf-m**

#### NOTE

- It is important to maintain the specified torque during maintenance.
- When installing the exhaust system, loosely install the exhaust pipe fasteners. Always tighten the exhaust mounting nuts from the cylinder head side first, then tighten the mounting fasteners.



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## MEMO

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## 3. MAINTENANCE

**3**

<b>Service Information</b>	<b>3-1</b>	<b>Parking Lock Operation</b>	<b>3-15</b>
<b>Specifications</b>	<b>3-1</b>	<b>Brake Shoes Wear</b>	<b>3-15</b>
<b>Torque Values</b>	<b>3-2</b>	<b>Battery</b>	<b>3-15</b>
<b>Special Tools</b>	<b>3-2</b>	<b>Stop Lamp Switch</b>	<b>3-16</b>
<b>Maintenance Schedule</b>	<b>3-3</b>	<b>Head Lamp Focus</b>	<b>3-16</b>
<b>Fuel Lines/Fuel Valve</b>	<b>3-4</b>	<b>Belt Case/Kick Starter Driven Gear</b>	<b>3-16</b>
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<b>Air Cleaner</b>	<b>3-5</b>	<b>Clutch Shoe Wear</b>	<b>3-17</b>
<b>Drain/Crankcase Breather Tube</b>	<b>3-7</b>	<b>Nuts, Bolts and Fasteners</b>	<b>3-17</b>
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<b>Valve Clearance</b>	<b>3-8</b>	<b>Wheels/Tyres</b>	<b>3-19</b>
<b>Engine Oil</b>	<b>3-11</b>	<b>Steering Head Bearings</b>	<b>3-19</b>
<b>Engine Oil Strainer Screen</b>	<b>3-12</b>	<b>Crankcase Breather Tube</b>	<b>3-20</b>
<b>Final Drive Oil</b>	<b>3-12</b>	<b>Main Stand</b>	<b>3-20</b>
<b>Engine Idle Speed</b>	<b>3-13</b>	<b>Exhaust Emission</b>	<b>3-20</b>
<b>Brake System</b>	<b>3-13</b>		

### 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 exhaust evacuation system in an enclosed area.
- 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.

### SPECIFICATIONS

MAINTENANCE		
ITEM		SPECIFICATION
Throttle grip free play		2-6 mm
Spark plug	Standard	Champion-PRZ 9 HC (Federal Mogul)
Spark plug gap		0.6-0.7 mm
Valve clearance	Intake	0.14 mm
	Exhaust	0.14 mm
Recommended engine oil		Brand: Hero 4T Plus Grade: SAE 10W30 SJ Grade (JASO MA) Manufactured by:- 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited

## MAINTENANCE

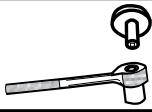

MAINTENANCE		ITEM		SPECIFICATION
Engine oil capacity	At draining		0.7 litre	
	At disassembly		0.8 litre	
Engine idle speed				1700±100 rpm
Drive belt width(Service limit)				17.50 mm
Recommended final reduction oil				SAE 10W30 SJ JASO MA Grade
Final reduction oil capacity	At draining		0.10 litre	
	At disassembly		0.12 litre	
Front brake lever free play				10-20 mm
Rear brake lever free play (Integrated)				10-20 mm
Cold tyre pressure	Rider only	Front	1.50 kgf/cm <sup>2</sup> (22 psi)	
		Rear	2.0 kgf/cm <sup>2</sup> (29 psi)	
	Rider & pillion	Front	1.50 kgf/cm <sup>2</sup> (22 psi)	
		Rear	2.50 kgf/cm <sup>2</sup> (36 psi)	
Tyre size	Front		90/90x12-53 J (Tubeless Tyre)	
	Rear		90/100x10-53 J (Tubeless Tyre)	
Minimum tread depth	Front		1.0 mm	
	Rear		1.0 mm	
Battery standard voltage				12.4 V

### TORQUE VALUES

<b>SPARK PLUG</b>	<b>: 1.6 kgf-m</b>
<b>VALVE ADJUSTING SCREW LOCK NUT</b>	<b>: 1.0 kgf-m</b>
<b>OIL DRAIN BOLT</b>	<b>: 2.4 kgf-m</b>
<b>CYLINDER HEAD COVER BOLT</b>	<b>: 1.2 kgf-m</b>
<b>ENGINE OIL STRAINER SCREEN CAP</b>	<b>: 2.0 kgf-m</b>

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

### SPECIAL TOOLS

	<b>TAPPET ADJUSTER WITH SOCKET</b> <b>PART NO: 070 HH 198 006</b>
	<b>MF BATTERY TESTER</b> <b>PART NO: 070 HH KRYH 008</b>



# MAINTENANCE SCHEDULE

ITEMS		SERVICE	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	
		DAYS	1 <sup>st</sup> 60	Next 100	Next 100	Next 100	Next 100	Next 100	Next 100	Next 100	Next 100	Next 100	Next 100	
		KM Note-1	500-750	3000-3500	6000-6500	9000-9500	12000-12500	15000-15500	18000-18500	18000-18500	18000-18500	18000-18500	30000-30500	
	Fuel Lines		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	
**	Bystarter 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	Do not open air cleaner element unless there is a drivability problem					R
	Drain/Crankcase Breather Tube	Note-3	I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C	
@	Spark Plug		I, C, A	I, C, A	I, C, A	I, C, A	R	I, C, A	I, C, A	I, C, A	I, C, A	R	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		R	T	R	T	R	T	T	R	T	R	T	
**	Engine Oil Strainer Screen		C		C		C		C		C		C	
**	Final Drive Oil	Note-4				R			Replace once in every 10000 km					
*	Engine Idle Speed/Carburetor		I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	
	Brake System		C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	
	Front/Integrated Brake 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	
	Brake Shoes Wear		I	I	I	I	I	I	I	I	I	I	I	
	Parking Lock Operation		I	I	I	I	I	I	I	I	I	I	I	
☛	Battery Voltage		I	I	I	I	I	I	I	I	I	I	I	
	Stop Lamp Switch		I	I	I	I	I	I	I	I	I	I	I	
	Headlamp Focus		I	I	I	I	I	I	I	I	I	I	I	
	Belt Case/Kick Starter Driven Gear		C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	C, L	
**#	Drive Belt			I		I		I			I		I	
***	Clutch Shoe Wear				I		I		I		I		I	
**	Nuts, Bolts & Fasteners		I	I	I	I	I	I	I	I	I	I	I	
	Front Suspension/Oil	Note-7	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	
***	Wheels/Tyres		I	I	I	I	I	I	I	I	I	I	I	
	Wheel Bearings	Note-8	I	I	I	I	I	I	I	I	I	I	I	
***	Steering Head Bearings		I, A	I, A	I, A	I, A	I, L, A	I, A	I, A	I, A	I, L, A	I, A	I, A	
	Main Stand		L	L	L	L	L	L	L	L	L	L	L	
●	Muffler (Catalytic Converter)				I, E		I, E		I, E		I, E		I, E	

\* Clean carburetor if required after inspection during service.

\*\* Should be serviced by a "Skilled Technician" of your Authorised Hero MotoCorp workshop.

\*\*\* In the interest of safety, we recommend these items to be serviced only by your Authorised Hero MotoCorp workshop.

\*\*\*\* Replace engine oil once in every 6000 km. Top up if the oil level is at or near the lower level mark. # Replace drive belt once in every 24000 km.

• Check idle CO emission along with idle rpm/idle CO adjustment (if required). @ Replace once in every 12000 km. ☛ Check battery voltage.

☛ Check battery electrolyte level. **Note-1:** At higher odometer readings, repeat the frequency interval established here. **Note-2:** Replace once in every 15000 km or early replacement may be required when riding in dusty areas. **Note-3:** Service more frequently when riding in rain or at full throttle. **Note-4:** Service more frequently if the scooter is ridden in unusually wet or dusty areas. **Note-5:** Replace once in every 10000 km or once in a year, whichever is earlier. Replacement requires mechanical skill. **Note-6:** Inspect if side stand switch is installed. **Note-7:** Replace the front fork oil once in every 2 years or 20000 km, whichever is earlier. **Note-8:** Inspect the bearings free play, replace if necessary. **Note-9:** Inspect for any play in the mounting bushes, replace if necessary. Ensure that each paid service is availed with in 90 days or 3000 km from the date of previous service, whichever is earlier.

**NOTE:-** Always wipe the water from the scooter after washing. Use clean soft cloth or pressurized 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

# MAINTENANCE

## FUEL LINES

Remove the center compartment (page 2-11).  
Check the fuel tube and vacuum tube for:-

- Leakage.
- Loose or improperly positioned clip.
- Deteriorated or damage tube.

Replace any part which shows signs of deterioration damage or leak.

### NOTE

Insert the hoses deeply to the joint so that the clips past the protruding area.

## FUEL VALVE

### ⚠ WARNING

Petrol is extremely inflammable and is explosive under certain condition. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the work area or where petrol is stored.

Attach a syringe to the vacuum tube and suck small amount of air. The fuel should flow out from the fuel pipe. If flow is restricted replace the fuel valve (page 5-15).

## 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 cables at their upper ends (page13-20). Thoroughly lubricate the cables and their pivot points with silicon grease (TSG 3251) or equivalent.

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

### ⚠ WARNING

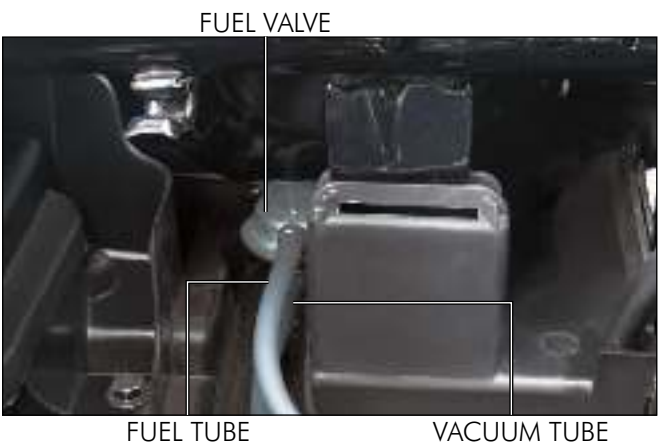
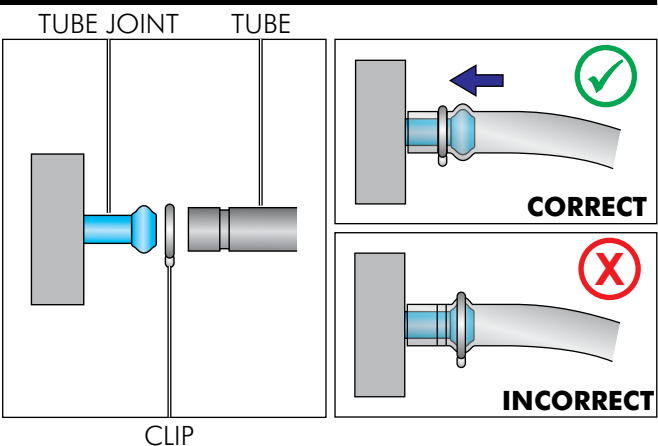
Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle slide operation and may lead to a loss of throttle control while riding.

With the engine idling, turn the handlebar all the way to the right and left to ensure that idle speed does not change.

If idle speed increases, check the throttle grip free play and the throttle cable connection.

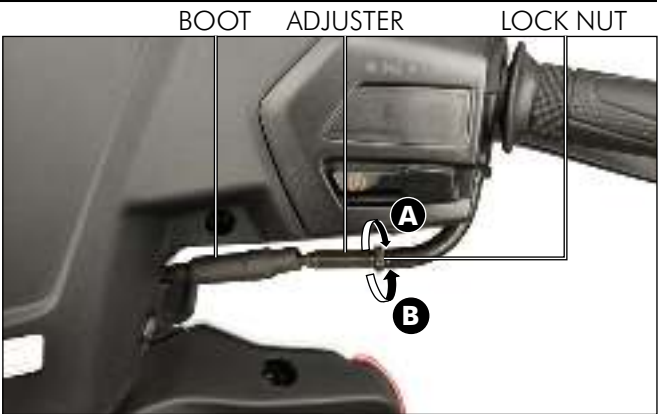
Measure the throttle grip free play at the throttle grip flange.

**FREE PLAY: 2-6 mm**



MAINTENANCE

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.  
(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 position.



(A) DECREASE FREE PLAY (B) INCREASE FREE PLAY

BYSTARTER OPERATION

- This scooter is equipped with a fuel enriching circuit controlled bystarter valve.
  - The bystarter valve opens the enriching circuit via a bystarter cable when the bystarter knob is pulled out.
- Check for smooth operation of the bystarter knob. Lubricate the bystarter cable end, if the operation is not smooth.  
Inspect the cable for cracks which could allow moisture to enter. Replace the cable, if necessary.



BYSTARTER KNOB

In cold condition use bystarter to start the engine. Pull the bystarter knob all the way out and start the engine. Let the engine warm up so that it responds to the throttle operation.  
Push the bystarter knob inside when the engine is sufficiently warm.

NOTE

- Do not use bystarter in warm or hot conditions.
- Do not open the throttle while starting the engine by using an electric starter or kick starter.



BYSTARTER KNOB AT "ON" POSITION

AIR CLEANER

NOTE

If the scooter 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 body cover (page 2-12).  
Remove the screws (6 nos.) and 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.



SCREWS

# MAINTENANCE

Remove the screws of air cleaner element.



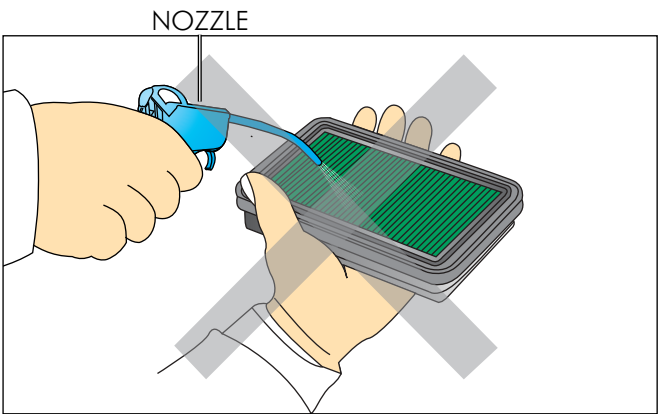
Remove the air cleaner element.

**CAUTION**

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



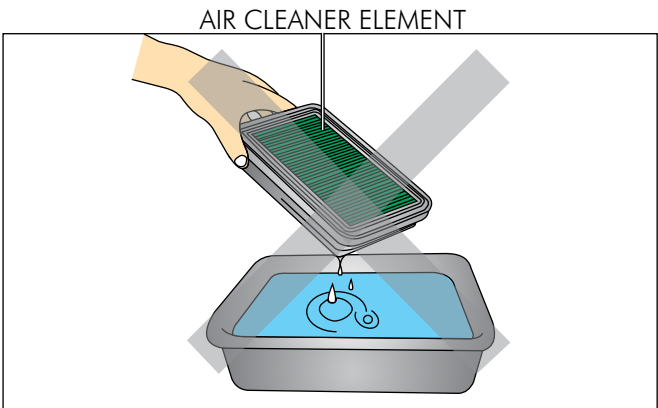
Do not clean with solvent to remove dust and also do not use forced air on it. The viscous oil will be lost and filter becomes dry. As the base filter paper is coarse, it cannot block fine dust when it becomes dry.



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 body cover (page 2-12).





MAINTENANCE

DRAIN/CRANKCASE BREATHER TUBE

NOTE

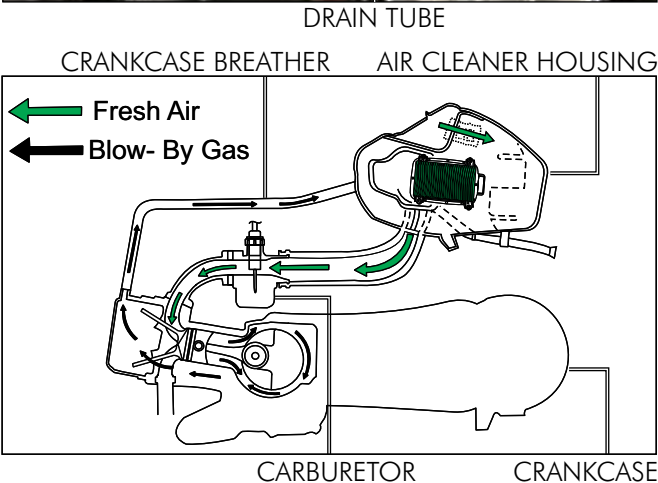
- Service more frequently when riding in rain, at full throttle or after the scooter is washed or overturned. Service if the deposits level can be seen in the transparent section of the drain tube.
- Always ensure to reinstall the drain tube after draining the deposit.

Remove the clamp from the air cleaner assembly and disconnect the drain tube.

Drain the deposits into a suitable container.

Connect the drain tube.

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



SPARK PLUG

Remove the center cover (page 2-12).

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

NOTE

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

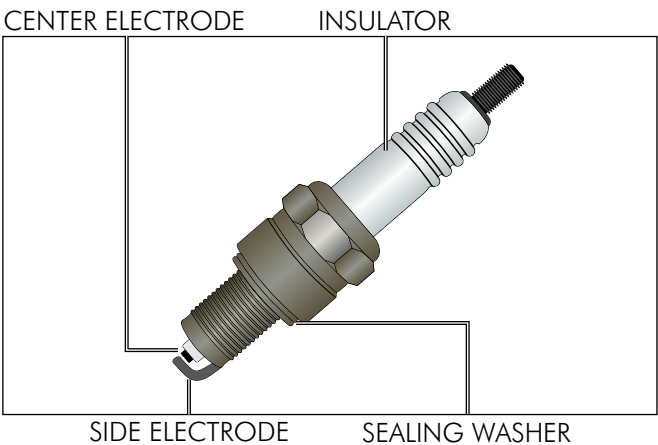
Remove the spark plug using the spark plug wrench. Inspect, clean, adjust or replace as per the maintenance schedule (page 3-3).

RECOMMENDED SPARK PLUG:-

Champion-PRZ 9 HC (Federal mogul)  
INSPECTION

Check the following and replace, if necessary.

- Insulator for cracks or damage
- Electrodes for fouling, damage, discoloration or wear
- Burning condition, colorations;
  - Dark to light brown indicates good condition.
  - Excessive lightness indicates malfunctioning ignition system or lean mixture.
  - Wet or black sooty deposit indicates over-rich mixture.





# MAINTENANCE

## 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: 0.6-0.7 mm**

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

### TORQUE

**SPARK PLUG: 1.6 kgf-m**

## 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 tighten the new spark plug, then tighten it about 1/4 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.

Connect the noise suppressor cap.

Install the center cover (page 2-12).

## VALVE CLEARANCE

### NOTE

Inspect and adjust the valve clearance when the engine is cold (below 35°C/95°F). The clearance will change as the engine temperature raises.

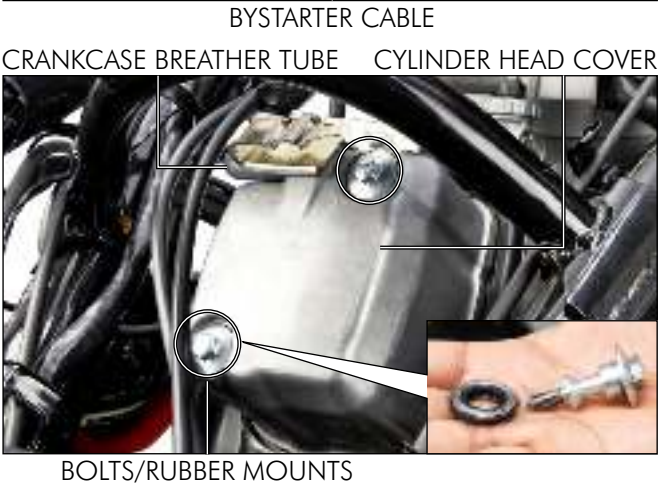
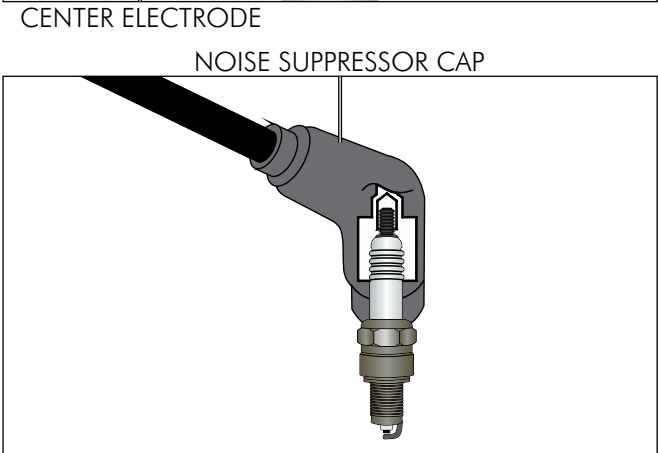
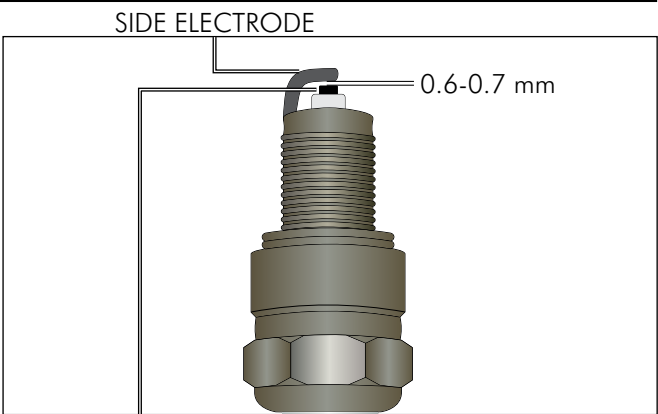
Remove the center cover (page 2-12).

Remove the body cover (page 2-12).

Release the throttle cable and bystarter cable from the cylinder head cover clamp.

Disconnect the crankcase breather tube from the cylinder head cover.

Remove the bolts/rubber mounts (2 nos.) and the cylinder head cover.



# MAINTENANCE

Remove the timing hole cap from the cooling fan cover.



TIMING HOLE CAP

Turn the crankshaft clockwise and align the "T" mark on the flywheel with the index mark on the right crankcase cover.



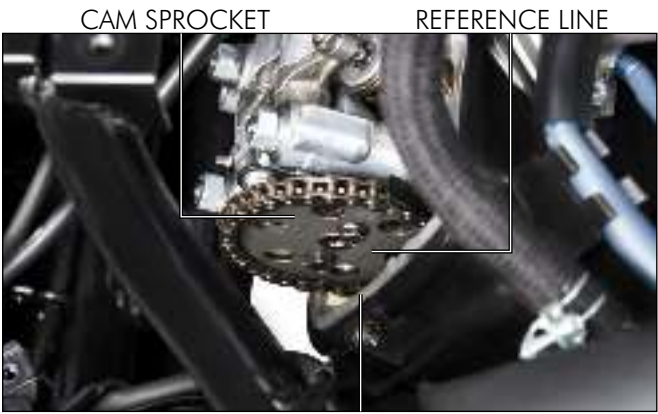
INDEX MARK

"T" MARK

Make sure the reference line on cam sprocket is parallel to cylinder head surface.

Make sure that the piston is at TDC (Top Dead Centre) on the compression stroke. (The rockers 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 realign the "T" mark with the index mark.



CAM SPROCKET

REFERENCE LINE

CYLINDER HEAD SURFACE

Apply clean engine oil on the feeler gauge.

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

## VALVE CLEARANCE

**INTAKE** : 0.14 mm

**EXHAUST** : 0.14 mm



ADJUSTING SCREW

FEELER GAUGE

LOCK NUT

# MAINTENANCE

Adjust the valve clearance by loosening the lock nut and turning the adjust screw until there is slight drag is felt on the feeler gauge while sliding it out.  
Hold the adjust screw and tighten the lock nut.



## TAPPET ADJUSTER WITH SOCKET

**PART NO: 070 HH 198 006**

Recheck the valve clearance.

## TORQUE

**VALVE ADJUSTING SCREW LOCK NUT: 1.0 kgf-m**

Check whether the cylinder head cover gasket is in good condition and replace it with a new one if necessary.

Install the cylinder head cover and bolts/rubber mounts (2 nos.).

## TORQUE

**CYLINDER HEAD COVER BOLT: 1.2 kgf-m**

Connect the crankcase breather tube to the cylinder head cover.

Install the timing hole cap to the cooling fan cover.

TAPPET ADJUSTER WITH SOCKET



FEELER GAUGE

GASKET



CYLINDER HEAD COVER

CRANKCASE BREATHER TUBE CYLINDER HEAD COVER



BOLTS/RUBBER MOUNTS

TIMING HOLE CAP



COOLING FAN COVER



## MAINTENANCE

Route the bystarter cable and throttle cable to the cylinder head cover clamp properly.

Install the body cover (page 2-12).

Install the center cover (page 2-12).

THROTTLE CABLE



BYSTARTER CABLE

### ENGINE OIL

#### OIL LEVEL INSPECTION

1. Park the scooter on its main stand.
2. Start the engine and let it idle for 3-5 minutes.
3. Stop the engine and wait for 2-3 minutes (55° to 65° C).
4. Remove the oil level dipstick, wipe it clean and insert without screwing it in.
5. Remove the oil level dipstick and check the oil level.
6. If required add the specified oil up to the upper level mark. Do not overfill.
7. Quantity of the oil to be filled is approximately 0.70 litre during oil change when the engine is not opened for any work.
8. Reinstall oil level dipstick and check for oil leaks.

#### OIL CHANGE

##### NOTE

- Drain engine oil while engine is warm and the scooter 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.

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

##### TORQUE

**OIL DRAIN BOLT: 2.4 kgf-m**



OIL LEVEL DIPSTICK

OIL LEVEL DIPSTICK



DRAIN BOLT SEALING WASHER

# MAINTENANCE

3. Fill the crankcase with recommended engine oil.  
**Engine Oil Capacity: 0.7 litre at oil change  
: 0.8 litre at disassembly.**
4. Reinstall the oil level dipstick with a new O-ring.
5. Oil level should be in between the upper and the lower oil mark on the oil level gauge .

## ENGINE OIL STRAINER SCREEN

Drain the engine oil (page 3-11).  
Remove the oil strainer screen cap, spring and oil strainer screen.  
Clean the oil strainer screen thoroughly using high flash point solvent (kerosene).  
Check the screen and O-ring for damage or deterioration.  
Replace the oil strainer screen, if necessary.  
Install the oil strainer screen, spring and cap with new O-ring.  
Tighten the oil strainer screen cap.

### TORQUE

**ENGINE OIL STRAINER SCREEN CAP: 2.0 kgf-m**

Fill the crankcase with the recommended engine oil (page 3-11).

## FINAL DRIVE OIL

### NOTE

Replace the final drive oil as per maintenance schedule.

Remove the oil level check bolt.  
Remove the oil drain bolt, slowly turn the rear wheel and drain the oil.  
After the oil is completely drained, install the oil drain bolt with a new sealing washer and tighten it.  
Fill the transmission case with recommended oil through the check bolt hole up to the bottom edge of the bolt hole.

### RECOMMENDED OIL

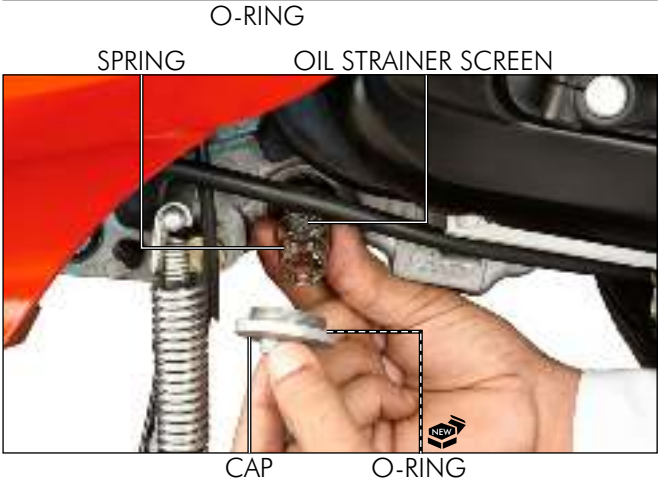
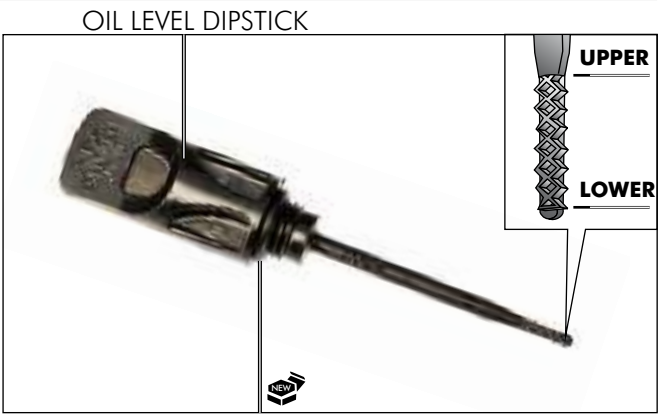
**SAE 10W 30, SJ Grade**

### OIL CAPACITY

**0.10 litre at oil change**

**0.12 litre at disassembly**

Install the oil level check bolt with a new sealing washer and tighten it.





MAINTENANCE

ENGINE IDLE SPEED

NOTE

- Inspect and adjust the idle speed after all other engine adjustment are within specification.
- The engine must be warm (55° to 65°C) for accurate inspection and adjustment.

Park the scooter on its main stand on level ground.

Start the engine and warm it upto (55° to 65° C) and allow it to idle.

Stop the engine and connect a tachometer, start the engine let it idle.

Check the idle speed and adjust by turning the throttle stop screw.

Remove the centre compartment (page 2-12).

If the idle speed is out of specification, check the following:-

- Throttle operation and throttle grip free play (page 3-4).
- Intake air leak or engine to top-end problem.

ENGINE IDLE SPEED: 1700± 100 rpm

⚠ WARNING

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

BRAKE SYSTEM

FRONT BRAKE

Measure the front brake lever free play at the tip of the brake lever.

FREE PLAY: 10-20 mm

Check the brake cable for kinks or other damages.

Check that the brake arm, spring and fasteners are in good condition.

If adjustment is necessary, proceed as mentioned below. Right hand front brake cable (A) on "1" side.

1. Push the integrated brake arm by hand in the direction as shown.
2. Turn the first adjuster nut till you cannot turn it by hand.
3. Check the free play of right lever.

FREE PLAY: 10-20 mm

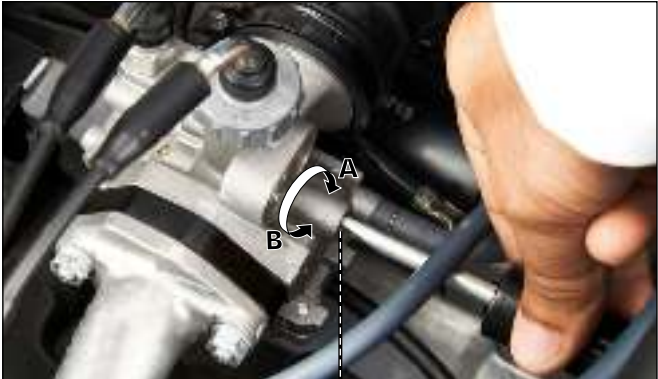
4. If the free play is more than 20 mm further turn the adjuster nut to obtain the desired free play.

THROTTLE STOP SCREW



A-INCREASE RPM

B-DECREASE RPM



THROTTLE STOP SCREW  
FRONT BRAKE LEVER



FIRST ADJUSTER NUT FRONT BRAKE CABLE-A



INTEGRATED BRAKE ARM

# MAINTENANCE

- Left hand integrated brake cable (B) on "2" side.
1. Push the integrated brake arm by hand in the direction as shown.
  2. Tighten the second adjuster nut until a gap is created between joint and the slot on the first side in brake arm.
  3. After ensuring the gap, turn the second adjuster nut counterclockwise by half rotation

**NOTE**

- "1" & "2" is marked on integrated brake arm.
  - While installing speedometer and brake cable make sure that both are always routed via the given hose-clamps.
- Lubricate the front brake cam and anchor pin (page 13-13).

## REAR BRAKE (INTEGRATED)

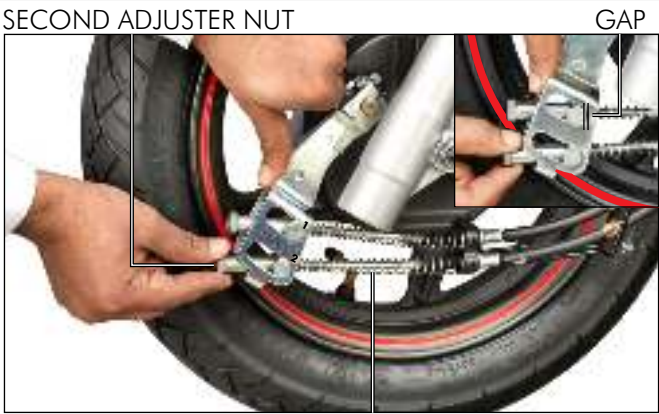
Measure the rear brake (integrated) lever free play at the tip of the brake lever.

**FREE PLAY: 10-20 mm**

If adjustment is necessary, turn the rear brake adjuster nut.  
Check the brake cable for kinks or other damage.  
Check that the brake arm, spring and fasteners are in good condition.

**NOTE**

Make sure that the cut-out on the adjuster nut is seated properly on the brake arm pin after the final adjustment is made.

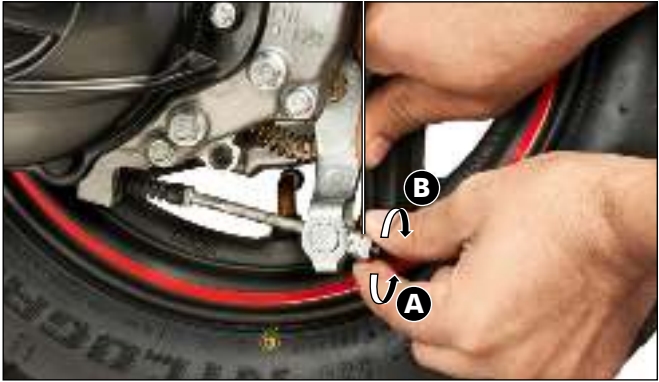


INTEGRATED BRAKE CABLE-B

REAR BRAKE (INTEGRATED) LEVER

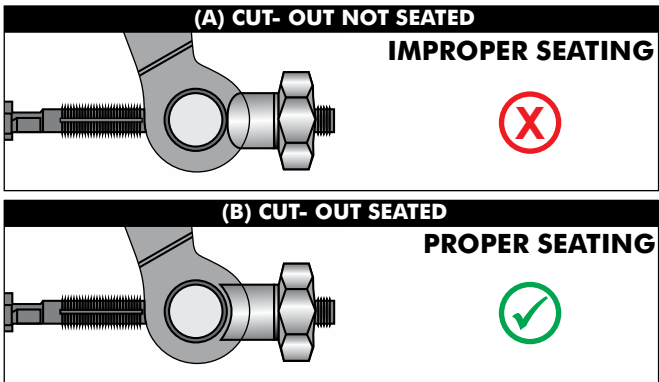


ADJUSTER NUT



(A) INCREASE FREE PLAY

(B) DECREASE FREE PLAY



## PARKING LOCK OPERATION

### NOTE

Check the parking lock operation after the brake system has been inspected and adjusted.

Squeeze the rear brake (Integrated) lever and set the parking lock.

Check that the front wheel and rear wheel are locked completely.



PARKING LOCK

## BRAKE SHOES WEAR

### FRONT BRAKE

Replace the front brake shoes if the indicator arrow "↗" on the brake arm aligns with the reference mark "▽" on the brake panel when the front brake is fully applied.

Refer to (page 13-9) for front brake shoe replacement and brake drum inspection.



REFERENCE MARK INDICATOR ARROW

### REAR BRAKE

Replace the rear brake shoes if the indicator of the brake arm align with the reference mark on the transmission case when the rear brake is fully applied.

Refer to (page 14-4) for rear brake shoe replacement and brake drum inspection.



INDICATOR

REFERENCE MARK

## BATTERY

Park the scooter on its main stand on level ground.

Remove the front center cover (page 2-6).

### 1. MAINTENANCE FREE TYPE

#### ⚠ WARNING

This vehicle is equipped with a Maintenance-Free Battery and can be permanently damaged if the cap sealing strip is removed. It is not necessary to check the battery electrolyte level or add distilled water as the battery is an Maintenance-Free (sealed) type. Measure the battery voltage using a multi-meter or MF-Battery Tester.

#### STANDARD VOLTAGE: 12.4 V

For battery charging procedure (page 16-11).

Installation is in the reverse order of removal.



(-)VE TERMINAL (+)VE TERMINAL

BATTERY



# MAINTENANCE

## STOP LAMP SWITCH

### NOTE

The stop lamp switch at the brake lever cannot be adjusted. If the stop lamp switch actuation and brake engagement are off, either replace the switch unit or the malfunctioning parts of the system.

Check that the stop lamp comes "ON" when the brake lever is pressed and the brake engagement begins.



BRAKE LEVER

## HEADLAMP FOCUS

### ⚠ WARNING

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

Park the scooter on its main stand on a level surface.

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

After adjusting the headlamp aim, tighten the headlamp adjusting bolt.



HEADLAMP ADJUSTING BOLT

## BELT CASE/KICK STARTER DRIVEN GEAR

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

Clean the belt case using clean shop towel.

### CAUTION

Do not use compressed air to clean belt case.

Installation is in the reverse order of removal.



BELT CASE

## KICK STARTER DRIVEN GEAR

Remove the kick starter driven gear (page 9-4).

Apply molybdenum grease (0.2-0.3 gm) to the driven gear shaft bearing area and friction spring sliding area.

Installation is in the reverse order of removal.



SHAFT BEARING AREA

# MAINTENANCE

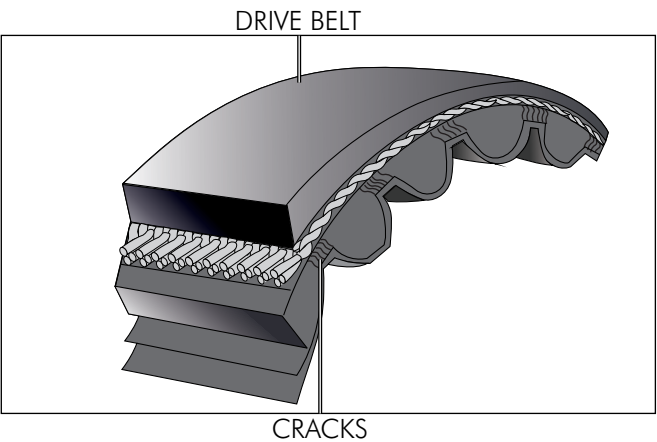
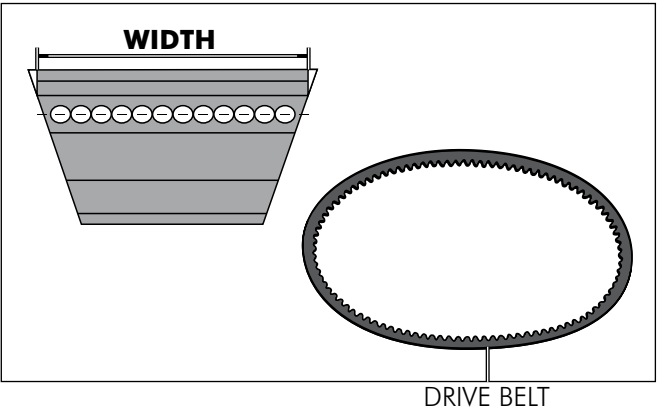
## DRIVE BELT

Remove the drive belt (page 9-12).  
Check the drive belt for cracks, separation, abnormal/excessive wear or damage. Replace, if necessary.  
Check whether any oil or grease adhered on the drive belt and clean it.  
Measure the drive belt width.

**SERVICE LIMIT**  
**DRIVE BELT WIDTH: 17.50 mm**

### NOTE

- Do not bend the belt against it's natural bend to see the crack.
  - Replace the belt if belt cracks reaches till the cord as shown.
  - A worn or damaged drive belt may cause a loss in scooter performances.
  - Replace the drive belt every 24000 km. Use a genuine Hero MotoCorp replacement belt drive.
- Install the drive belt (page 9-24).



## CLUTCH SHOE WEAR

Remove the clutch shoes (page 9-17).  
Check the clutch shoes for wear or damage.  
Measure the lining thickness of each shoe.

**SERVICE LIMIT**  
**LINING THICKNESS: 2.0 mm**  
Install the clutch shoes (page 9-23).



## NUTS, BOLTS AND FASTENERS

Check that all nuts and bolts are tightened to correct torque values (SECTION-1).  
Check that all cotter pin, safety clip, hose clamps and cable stays are in place and properly secured.





# MAINTENANCE

## SUSPENSION

### ▲ WARNING

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



### FRONT SUSPENSION

Release the scooter from the main stand and check the action of the front suspension by applying the front brake and compressing the forks several times.

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

Replace damage component which cannot be repaired.

Tighten all nuts and bolts.

Refer (SECTION-13) for fork services.

Check the wheel bearings for looseness or damage and replace, if necessary.



### REAR SUSPENSION

Check the action of the rear shock absorber by compressing it several times.

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

Replace damage component which cannot be repaired.

Tighten all nuts and bolts.

Refer (SECTION-14) for shock absorber service.



Raise the rear wheel off the ground by placing the scooter on its main stand.

Check for worn engine mounting bushings by holding the rear wheel and attempting to move the wheel side to side.

Check the wheel bearings for looseness or damage and replace, if necessary.



WHEELS/TYRES

NOTE

Check the tyre pressure when the tyres are cold to ensure accurate comparative measurements. checking tyres after they are warm will give inaccurate reading.

Measure the tyre pressures with the tyre pressures gauge.

RECOMMENDED TYRE PRESSURE

COLD TYRE PRESSURE	FRONT kgf/cm <sup>2</sup> (psi)	REAR kgf/cm <sup>2</sup> (psi)
RIDER ONLY	1.50 (22)	2.00 (29)
RIDER AND PILLION	1.50 (22)	2.50 (36)

NOTE

Operation without optimum tyre pressure will cause uneven tyre wear.

Check the front and rear wheels for trueness and uneven wear of tyres.

Measure the tread depth at the center of tyre.

Replace the tyre when the tread depth reaches the following limits:-

MINIMUM TREAD DEPTH:

FRONT : 1.0 mm

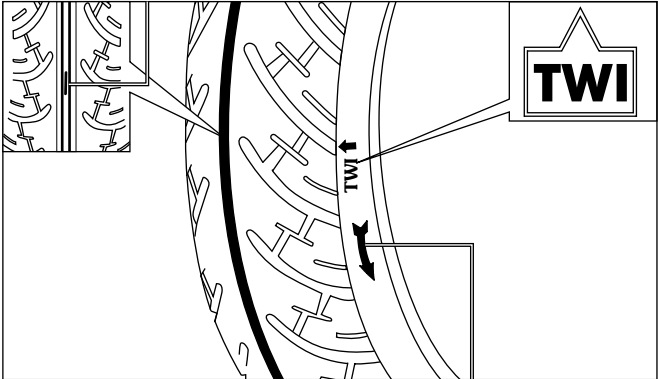
REAR : 1.0 mm

Check for crack and damage to tyre tread and walls. check for a nail, piece of metal and stones, etc. which may have become lodged within the tread or embedded in tyres.

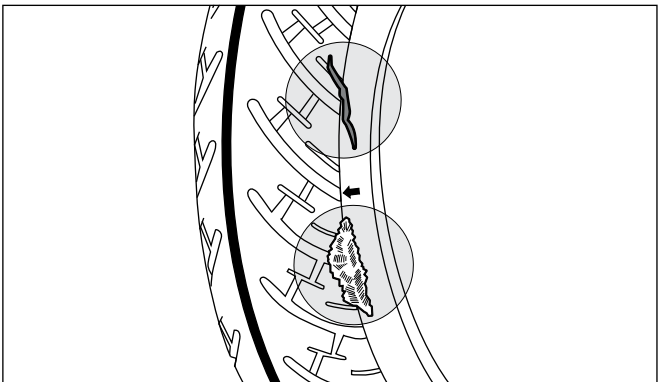


AIR PRESSURE GAUGE

TREAD WEAR INDICATOR



ARROW MARK



STEERING HEAD BEARINGS

Park the scooter on its main stand and raise the front wheel off the ground.

NOTE

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

Check that the handlebar rotates freely side to side. If the handlebar rotates unevenly, binds or has play, inspect and adjust the steering head bearings (SECTION 13).

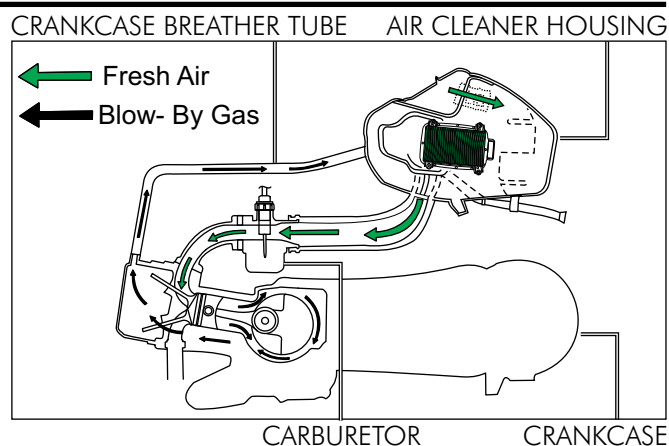


## MAINTENANCE

### CRANKCASE BREATHER TUBE

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

Service more frequently when ridden in rain at full throttle or after the motorcycle is washed.



### MAIN STAND

Park the scooter on the level surface.

Check the main stand return springs for damage or loss of tension.

Check the main stand for freedom of movement. Lubricate the main stand shaft, if necessary (page 2-19).

Make sure the main stand is not bent.



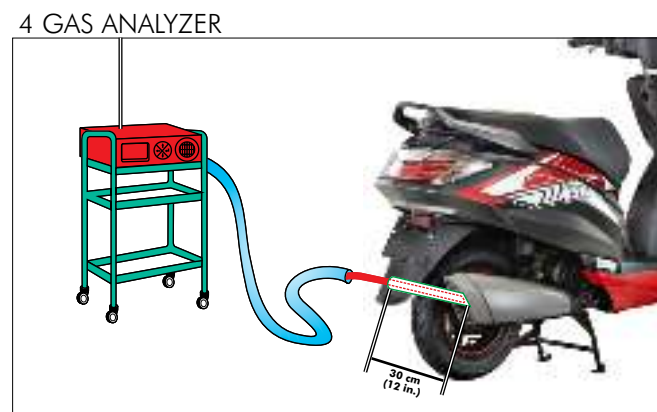
### EXHAUST EMISSION MEASUREMENT AT IDLE

1. Check the following items before inspection;
  - Air cleaner
  - Spark plug
  - Crankcase breather
  - Ignition timing
2. Park the scooter on the main stand on a level surface
3. 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).
4. Warm up the engine to the normal operating temperature (Engine oil temperature: Approx. (55° to 65° C).
5. Check the engine idle speed.

**Idle speed: 1700 ± 100 rpm**

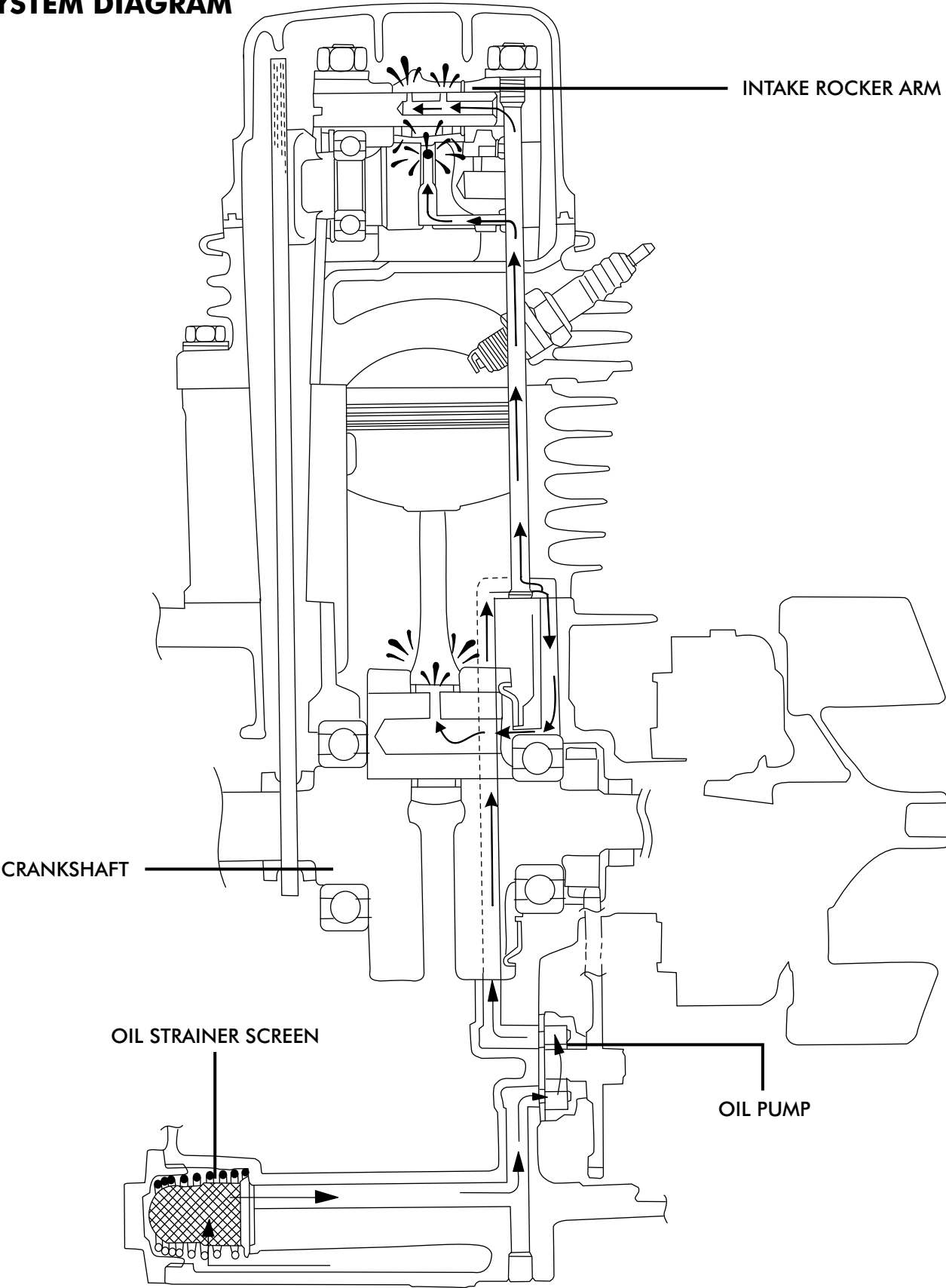
6. Insert the probe into the muffler and measure the carbon monoxide (CO%) and hydrocarbon (HC ppm) concentration.

**CO Measurement at idle: 0.02-0.4 %**



# 4. LUBRICATION SYSTEM

## SYSTEM DIAGRAM



# LUBRICATION SYSTEM

Service Information	4-1	Troubleshooting	4-2
Specifications	4-1	Oil Pump	4-3
Torque Values	4-1	Lubrication Points	4-7

## 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 run 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.
- The oil filter screen cleaning and oil pump servicing can be done with engine in the frame.
- 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.

## SPECIFICATIONS

LUBRICATION SYSTEM				
ENGINE OIL		ITEM	SPECIFICATION	
Engine oil capacity		At draining	0.7 litre	
		At disassembly	0.8 litre	
Recommended engine oil			Brand: Hero 4T Plus Grade: SAE 10W30 SJ Grade (JASO MA) Manufactured by:- 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.	
OIL PUMP SERVICE DATA				
		ITEM	STANDARD	SERVICE LIMIT
Oil pump	Outer rotor-to-body clearance		0.15-0.21 mm	0.35 mm
	Rotor tip clearance		0.15 mm	0.20 mm
	Pump end clearance		0.05-0.10 mm	0.12 mm

	<b>TORQUE VALUES</b>
---	----------------------

<b>OIL PUMP ASSEMBLY MOUNTING BOLT</b>	<b>: 1.0 kgf-m</b>
<b>PLATE ATTACHING SCREW</b>	<b>: 0.3 kgf-m</b>

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



### TROUBLESHOOTING

#### Oil level too low

- External oil leaks
- Worn valve guide or seal
- Worn piston rings or cylinder
- Oil not added frequently enough

#### Oil contamination

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

#### Low oil pressure

- Oil level low
- Clogged oil strainer
- Internal oil leaks
- Incorrect engine oil grade

#### No oil pressure

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

# LUBRICATION SYSTEM

## OIL PUMP

### REMOVAL

#### NOTE

Oil pump can be removed with engine in frame.

Drain the engine oil (page 3-11).

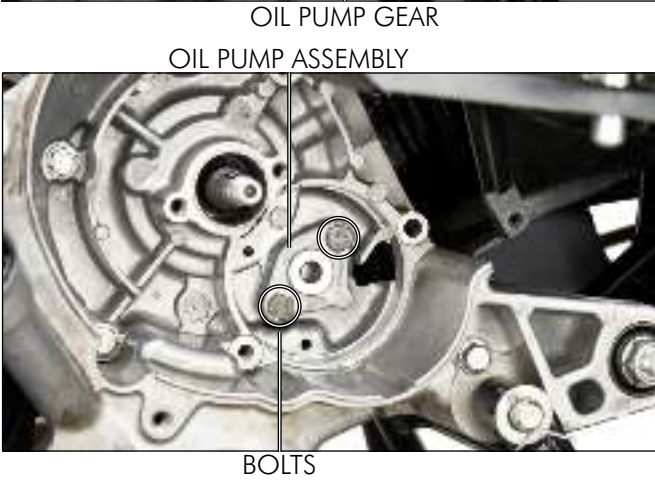
Remove the alternator assembly (page 11-2).

Remove the oil pump cover bolts (2 nos.).

Screw the 5 mm bolts (2 nos.) into the threaded holes in the oil pump cover and pull the cover out of the right crankcase.

Remove the oil pump gear along with the shaft.

Remove the oil pump mounting bolts (2 nos.) and the oil pump assembly.



# LUBRICATION SYSTEM

## DISASSEMBLY

Remove the dowel pins (2 nos.).  
Remove the oil pump plate attaching screw and pump plate.  
Remove the inner and outer rotor from the oil pump body. Clean all disassembled part in a high flash point solvent (kerosene) and check for damage or abnormal wear.

## INSPECTION

Check the oil pump gear for crack, damage or wear. Replace the parts, if necessary.

- Measure the clearance at several places and use the largest reading to compare to 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.

Temporarily install outer rotor, inner rotor and oil pump gear into the oil pump body.

Measure outer rotor to body clearance using a feeler gauge.

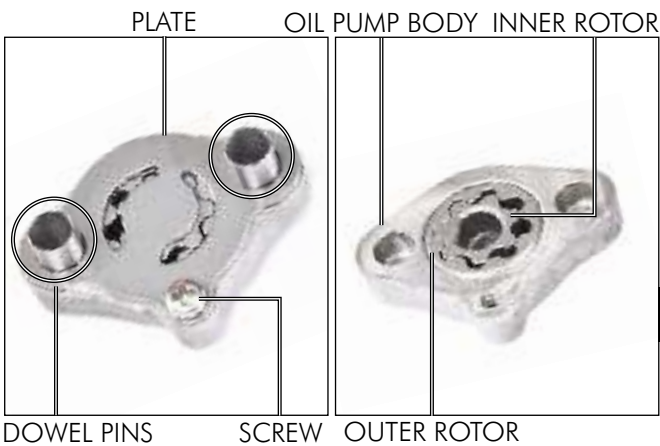
### SERVICE LIMIT

**OUTER ROTOR TO BODY CLEARANCE: 0.35 mm**

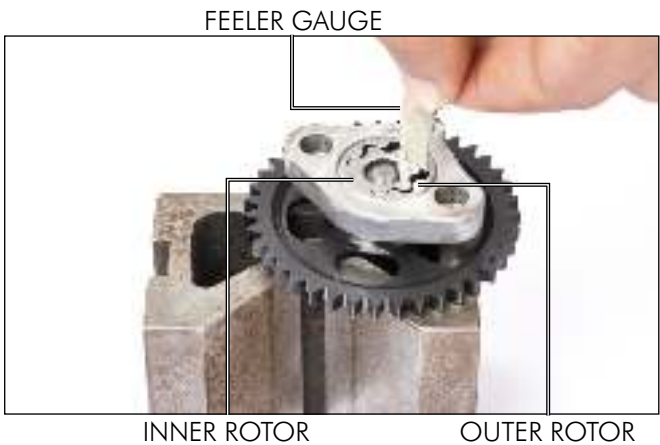
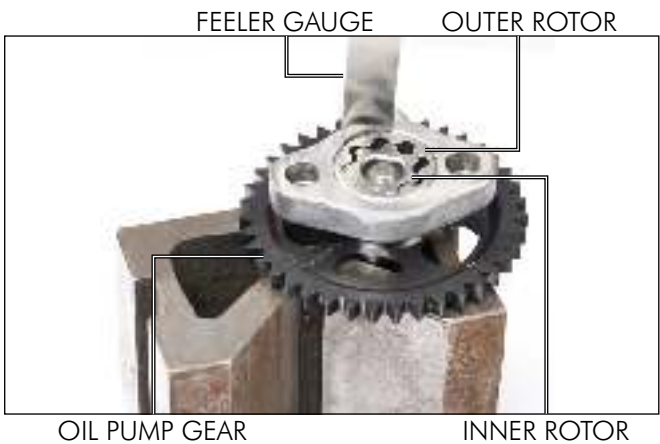
Measure the rotor tip clearance between the inner and outer rotors.

### SERVICE LIMIT

**ROTOR TIP CLEARANCE: 0.20 mm**



4



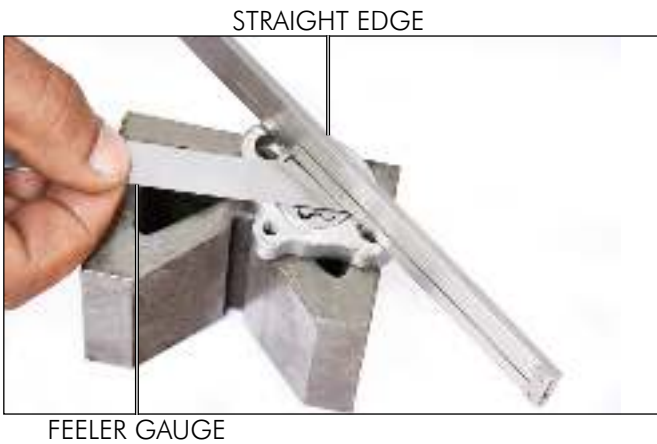
# LUBRICATION SYSTEM

Remove the oil pump gear and remove the rotor shaft.  
Measure the pump end clearance using a straight edge and feeler gauge.

**SERVICE LIMIT**

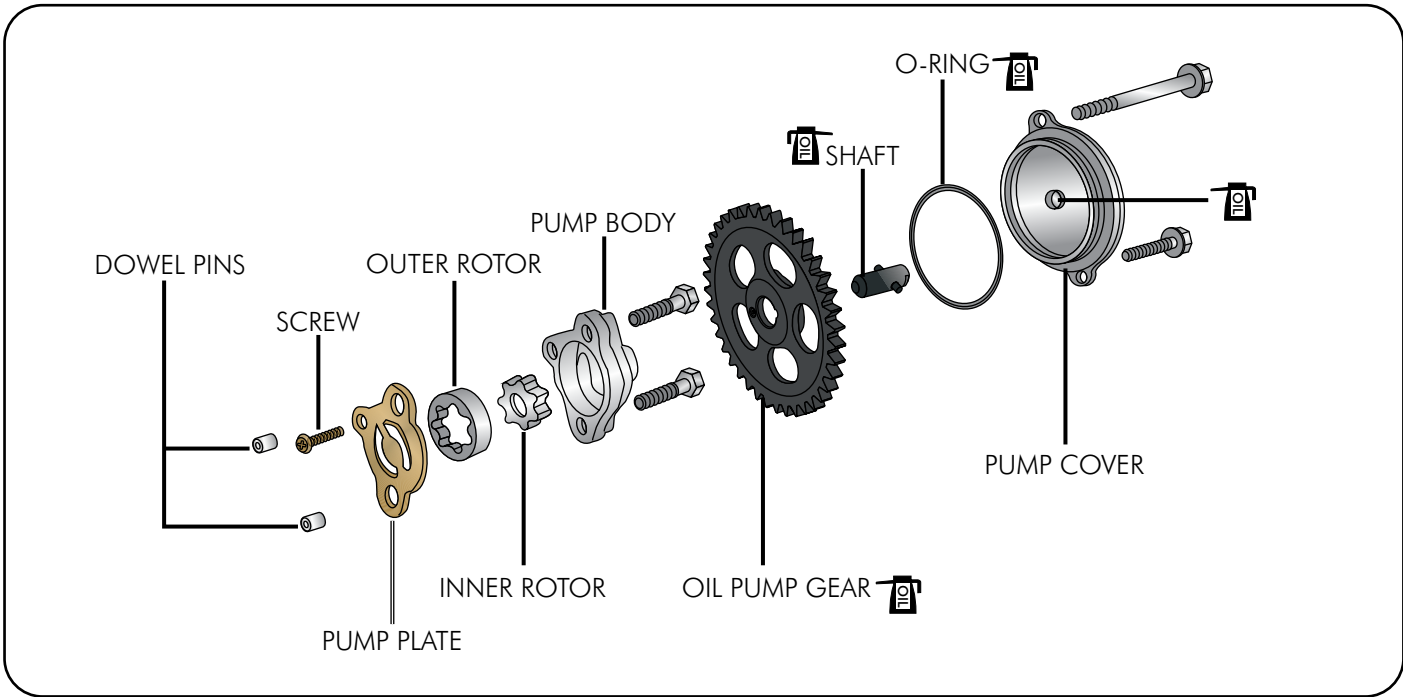
**PUMP END CLEARANCE: 0.12 mm**

Remove the inner and outer rotors from the pump body.



## ASSEMBLY

Clean all disassembled parts in a high flash point solvent (kerosene) and check for damage or abnormal wear.

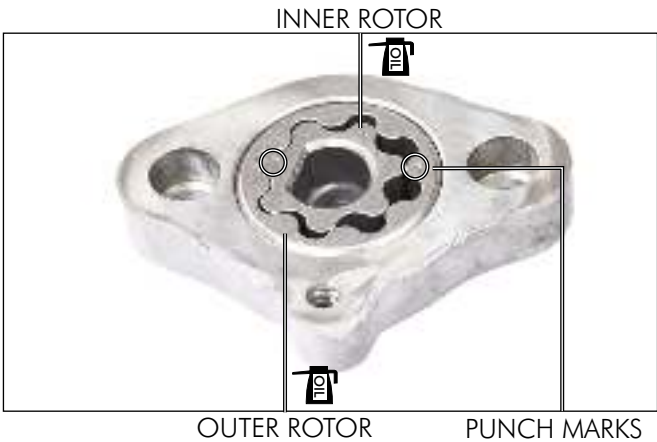


Apply clean engine oil to the outer rotor and install it in the oil pump body with its punch mark facing up.

**NOTE**

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

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



# LUBRICATION SYSTEM

Install the dowel pins (2 nos.).  
Install the pump plate by aligning the holes in the pump plate with the two dowel pins.  
Install and tighten the oil pump plate attaching screw to the specified torque.

**NOTE**

Check that the oil pump rotates smoothly with the oil pump gear.

**TORQUE**

**PLATE ATTACHING SCREW: 0.3 kgf-m**

**INSTALLATION**

Install the oil pump assembly onto the right crankcase and tighten the mounting bolts (2 nos.) to the specified torque.

**TORQUE**

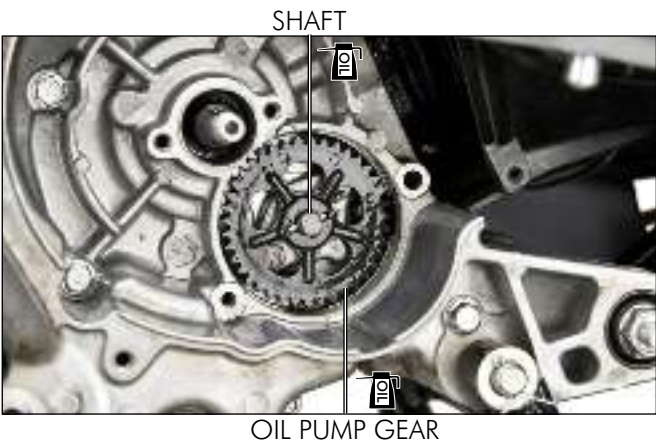
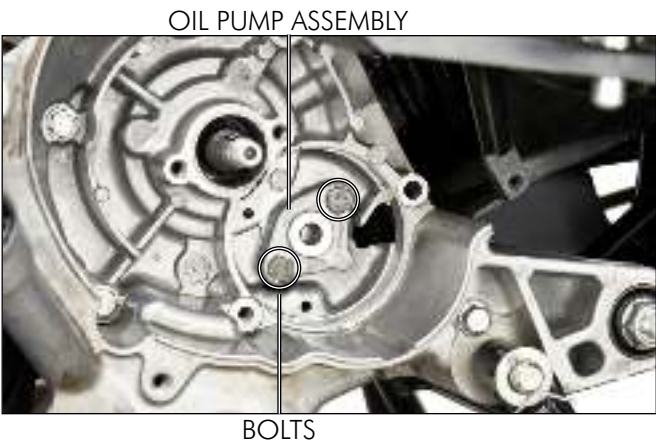
**OIL PUMP ASSEMBLY MOUNTING BOLT: 1.0 kgf-m**

Apply engine oil and install the shaft into the oil pump gear.  
Apply engine oil and install the oil pump gear along with the shaft into the oil pump assembly.

**CAUTION**

While rotating the oil pump gear by hand, the movement should be smooth.

Apply grease to the oil pump gear shaft hole in the oil pump cover.  
Coat a new O-ring with oil and install it onto the oil pump cover.  
Install the oil pump cover into the right crankcase.





# LUBRICATION SYSTEM

Install and tighten the oil pump cover mounting bolts (2 nos.).  
Install the alternator assembly (page 11-5).  
Fill the crankcase with recommended engine oil (page 3-11).



## 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.

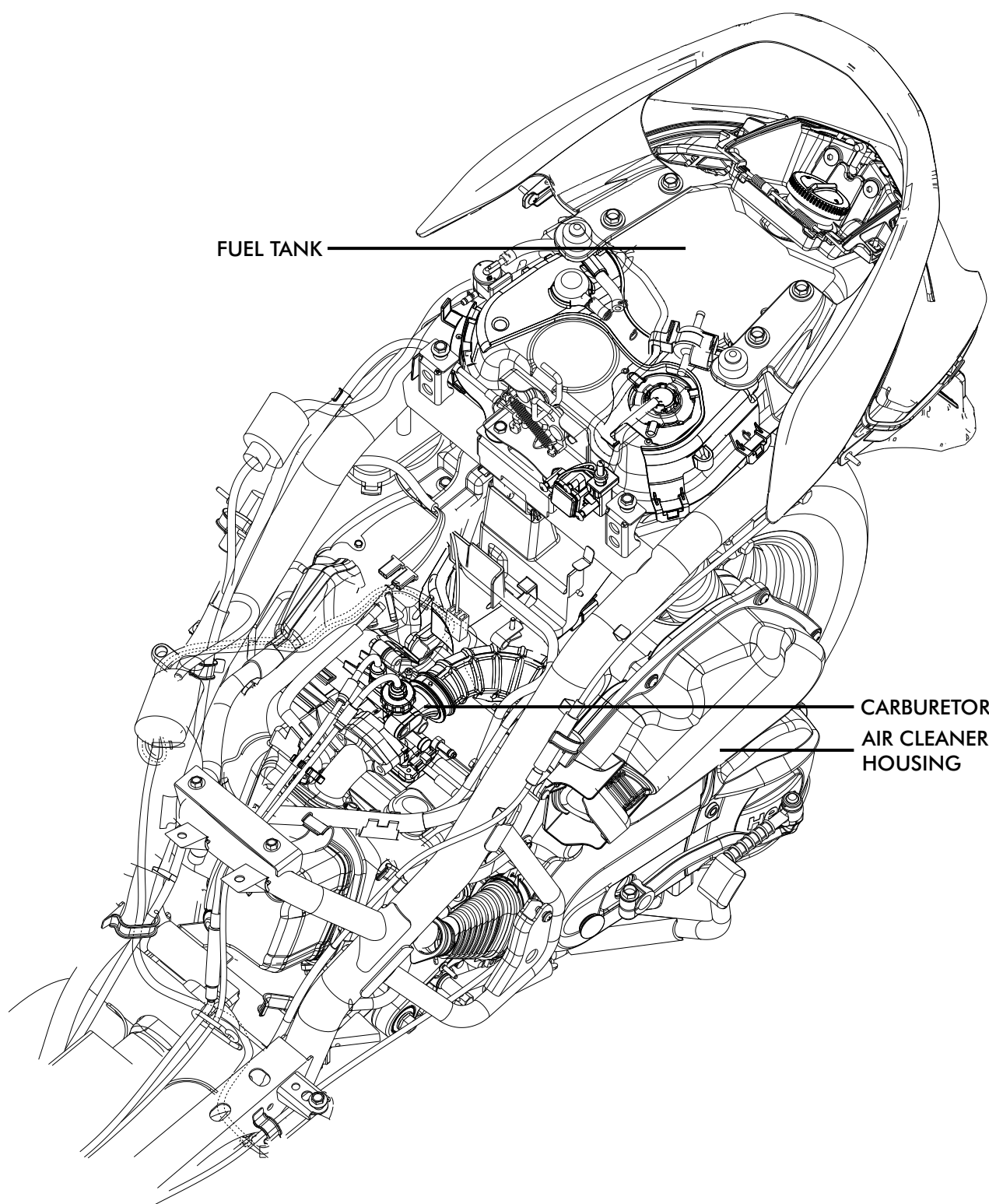
### CONTROL CABLES

Periodically disconnect the throttle and front brake cables at their upper ends. Thoroughly lubricate the cables and their pivot points with commercially available recommended cable lubricant or low viscosity oil.



## 5. FUEL SYSTEM

### SYSTEM DIAGRAM



# FUEL SYSTEM

<b>Service Information</b>	<b>5-1</b>	<b>Throttle Valve Installation</b>	<b>5-4</b>
<b>Specifications</b>	<b>5-1</b>	<b>Bystarter Valve</b>	<b>5-6</b>
<b>Special Tools</b>	<b>5-1</b>	<b>Carburetor Body Removal</b>	<b>5-7</b>
<b>Troubleshooting</b>	<b>5-2</b>	<b>Carburetor Body Installation</b>	<b>5-13</b>
<b>Air Cleaner Housing</b>	<b>5-3</b>	<b>Pilot Screw Adjustment</b>	<b>5-14</b>
<b>Throttle Valve Removal</b>	<b>5-3</b>	<b>Fuel Tank</b>	<b>5-15</b>

## SERVICE INFORMATION

### GENERAL

- Petrol is extremely flammable and is explosive under certain conditions. Work in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the work area or where petrol is stored.
- If the engine is run 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.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.

### CAUTION

- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- Before disassembling the carburetor, place a suitable container under the carburetor drain tube. Loosen the drain screw and drain the fuel.
- After removing the carburetor, wrap the intake port of the engine with a shop towel or cover it with piece of tape to prevent any foreign material from dropping into the engine.

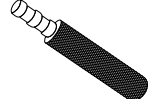
### NOTE

- If vehicle is to be stored for more than one month, drain the float chamber. Fuel left in the float chamber may cause clogged jets resulting in hard starting or poor driveability.
- For the fuel level sensor removal/installation and inspection refer (page 19-20).

## SPECIFICATIONS

FUEL SYSTEM	
ITEM	SPECIFICATION
Carburetor type	Side draft variable venturi (Piston) with TCIS
Identification number	AAWB
Venturi diameter	Ø 17 mm
Piston bore diameter	Ø 16 mm
Float level	11.3 mm
Pilot screw initial opening	2-1/4 ± 1/2 turns out
Idle speed	1700 ± 100 rpm
Main jet	# 82.5
Pilot jet	# 15
Pilot air jet	# 130
Throttle grip free play	2-6 mm
Fuel tank capacity	5.5 litres (Minimum)

**SPECIAL TOOLS**

**ALUMINIUM PLUG**  
**PART NO: 070 HH 198 014**

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

### TROUBLESHOOTING

#### Engine does not start

- No fuel in fuel tank
- No fuel to carburetor
  - Fuel strainer clogged
  - Fuel tube clogged
  - Fuel valve vacuum tube clogged
  - Float valve stuck
  - Float level misadjusted
  - Fuel tank cap breather hole clogged
- Too much fuel getting into the carburetor
  - Air cleaner clogged
  - Flooded carburetor
  - Float valve worn out
  - Deposition on float valve seat
  - Fuel tank cap breather hole block
  - Intake air leak
- Fuel cock stuck
- Bad fuel quality
- Fuel jet clogged
- Fuel contaminated/deteriorated
- Ignition system faulty (SECTION-16)

#### Engine stalls, hard to start, rough idling

- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
- Intake air leak
- Idle speed misadjusted
- Pilot screw misadjusted
- Float level misadjusted
- Carburetor clogged
- Ignition system faulty (SECTION-17)
- Flooded carburetor
- Improper carburetor tuning
- Bad quality of fuel
- Fuel tank cap breather hole block
- Air cleaner choked
- Fuel line restricted

#### Backfiring or misfiring during acceleration

- Fuel mixture too lean
- Ignition system faulty (SECTION-17)
- Lean mixture in slow circuit
- Faulty ASV control valve
- Faulty ASV check valve
- Clogged hose of the ASV system

#### Lean mixture

- Fuel jet clogged
- Float valve faulty
- Float level too low
- Fuel tank cap breather hole clogged
- Fuel strainer clogged
- Fuel tube restricted
- Intake air leak
- Throttle valve faulty
- Carburetor tuning

#### Rich mixture

- Float valve faulty
- Choke valve in close position
- Float level too high
- Air passage clogged
- Air jets clogged
- Air cleaner contaminated
- Choke valve faulty
- Ignition timing improper

# FUEL SYSTEM

## AIR CLEANER HOUSING

For air cleaner housing cover removal and element replacement (page 3-5).

### REMOVAL

Remove the body cover (page 2-12).  
Loosen the air cleaner boot band screw.  
Release the clamp and disconnect the engine breather tube from the air cleaner housing.

Disconnect the transmission case breather tube from the air cleaner housing.

Remove the mounting bolts (2nos.) and air cleaner housing.

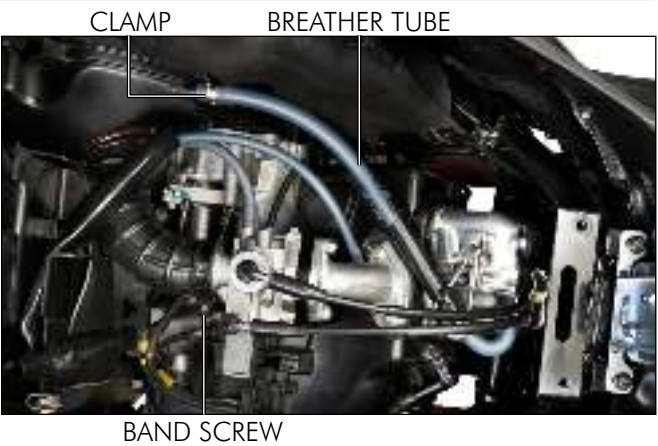
### INSTALLATION

Install the air cleaner housing in the reverse order of removal.  
Route the tubes properly.  
Install the body cover (page 2-12).

## THROTTLE VALVE

### REMOVAL

Remove the center compartment (page 2-11).  
Loosen the carburetor top.





# FUEL SYSTEM

Remove the carburetor top and throttle valve from the carburetor.



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



Disassemble the following:-

- Holder
- Spring
- Jet needle
- E-ring
- Rings
- Throttle valve

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

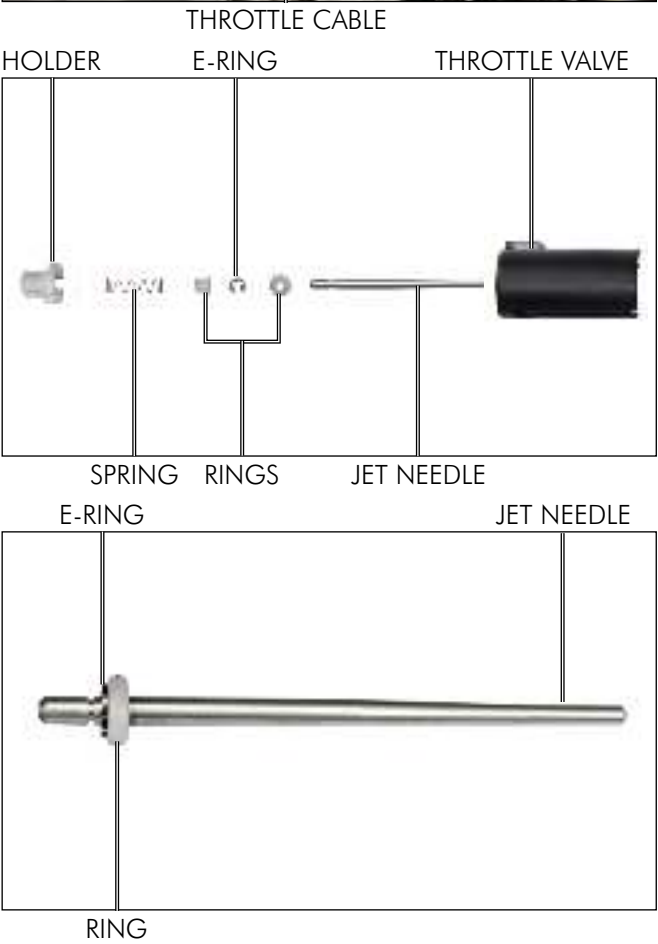
**NOTE**

The position of E-ring should not be changed as this will lead to adverse engine performance.

## THROTTLE VALVE INSTALLATION

Install the ring and E-ring on the jet needle.

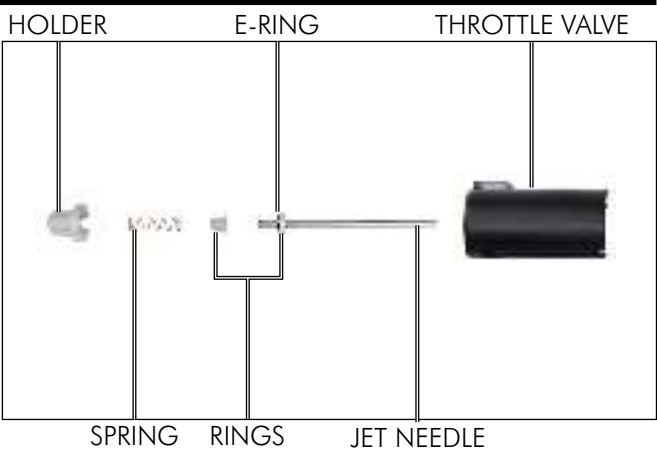
**STANDARD POSITION: 2<sup>nd</sup> groove from top**



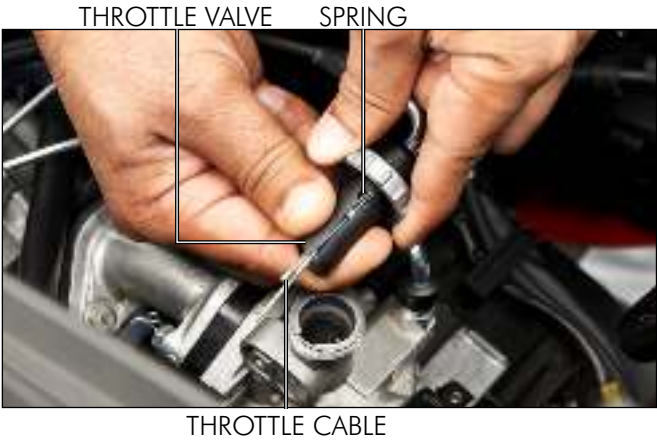
# FUEL SYSTEM

Assemble the following:-

- Throttle valve
- Ring
- Jet needle with ring/E-ring
- Spring
- Holder



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 carburetor top into the carburetor body.



Tighten the carburetor top securely.  
After installation, check that there are no fuel leaks.  
Perform the following adjustment:  
- Throttle grip free play (page 3-5).  
- Engine idle speed (page 3-13).  
Install the center compartment (page 2-11).



**BYSTARTER VALVE  
REMOVAL/INSTALLATION**

Remove the center compartment (page 2-11).  
Loosen the bystarter valve lock nut and remove it from the carburetor body.

Check the bystarter valve for scoring, scratches or wear.  
Check the seat at the tip of bystarter valve for stepped wear.  
Replace the bystarter valve set, if necessary.

To remove the bystarter valve, compress the spring and release the bystarter cable and spring from the bystarter valve.  
Install the new bystarter valve to the bystarter cable.

Install the bystarter valve to the carburetor body.  
Tighten the bystarter valve lock nut.  
After installation, check for smooth operation of the bystarter knob.

Handle the bystarter valve lock nut with care, it can be easily damaged.



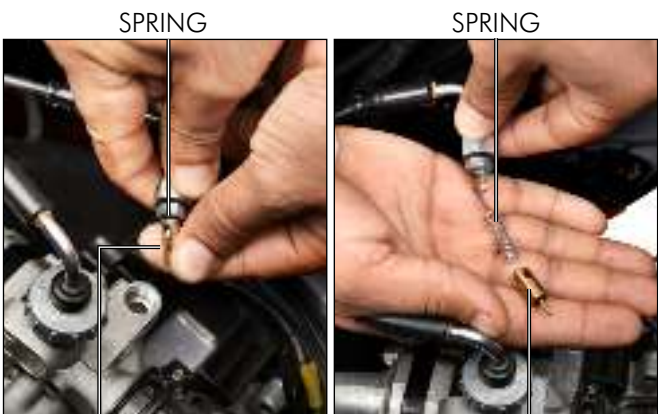
BYSTARTER CABLE

BYSTARTER VALVE LOCK NUT

5



BYSTARTER VALVE



SPRING

SPRING

BYSTARTER VALVE

BYSTARTER VALVE



BYSTARTER VALVE



# FUEL SYSTEM

## CARBURETOR BODY

### REMOVAL

#### ⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in a work area or where gasoline is stored can cause a fire or explosion.

Remove the throttle valve (page 5-3).

Remove the bystarter valve (page 5-6).

Place a suitable container below the drain tube. Loosen the drain screw and drain the fuel from carburetor.

Remove the clip and disconnect the fuel tube from the carburetor.

#### NOTE

Plug the special tool in the fuel tube to avoid the entry of dust inside the tube.



#### ALUMINIUM PLUG

PART NO: 070 HH 198 014

Loosen the air cleaner connecting boot band screw.

Remove the carburetor mounting nuts (2nos.) and carburetor.

BYSTARTER VALVE LOCK NUT



BYSTARTER CABLE

DRAIN TUBE



DRAIN SCREW



CONTAINER

FUEL TUBE



CLIP



ALUMINIUM PLUG

CARBURETOR

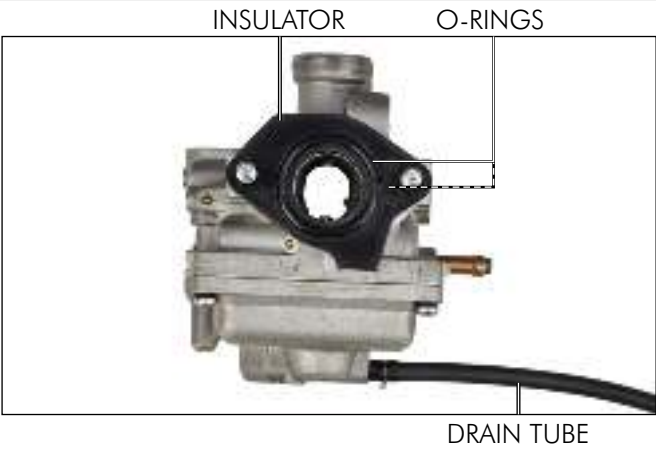


SCREW

MOUNTING NUTS

## FUEL SYSTEM

Remove the insulator from the carburetor.  
Remove the O-rings from the insulator and the carburetor.  
Disconnect the drain tube from the carburetor.



### DISASSEMBLY

Remove the float chamber screws/washers (4 nos.).



Remove the float chamber.



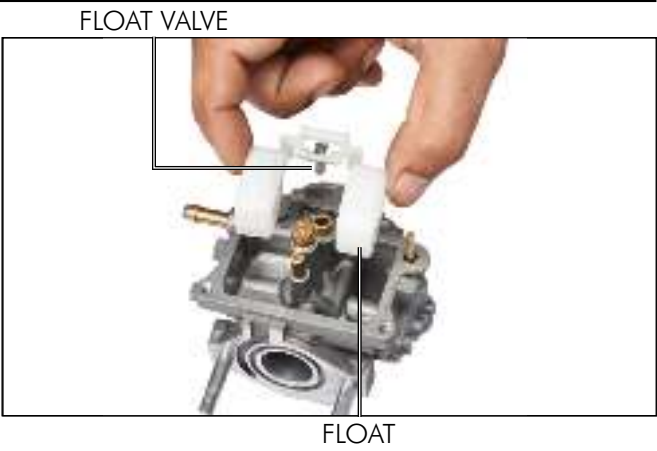
Remove the float pin.





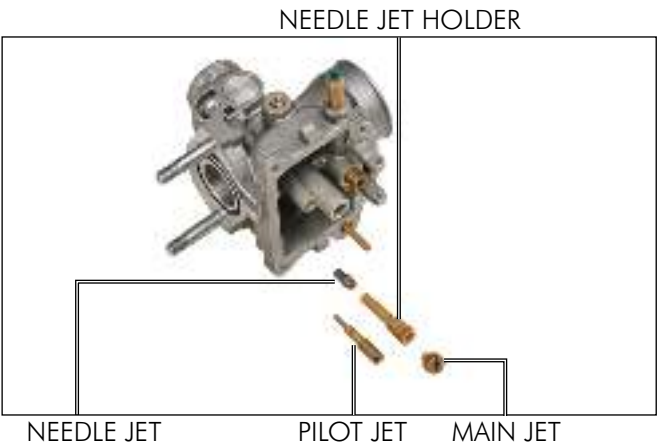
# FUEL SYSTEM

Remove the float and float valve as an assembly from the carburetor.



Remove the following:-

- Main jet
- Pilot jet
- Needle jet holder
- Needle jet



## NOTE

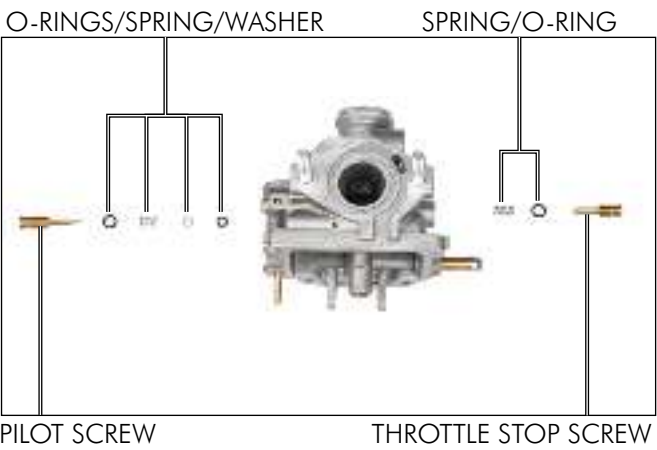
Before removing the pilot screw, record the number of turns until it seats lightly.

Remove the following:-

- Pilot screw/O-ring/spring/washer/O-ring
- Throttle stop screw/O-ring/spring

## CAUTION

- Handle all jets with care, they can be easily scored or scratched.
- The pilot screw will be damaged if hard tightened against the seat.



# FUEL SYSTEM

## INSPECTION

### CAUTION

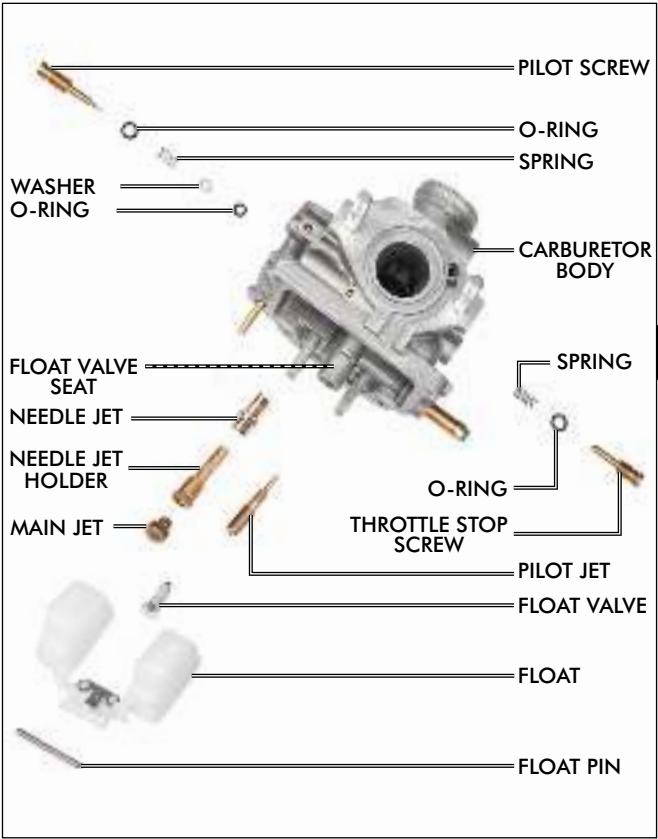
A worn or contaminated valve does not seat properly and will eventually flood the carburetor.

Inspect the following:-

- Float and float pin for deformation or damage
- Float valve tip contact area for wear, contamination or damage, replace if necessary.
- Float valve seat for stepped wear or damage, replace the carburetor body if the seat is damaged.
- Check the operation of the float valve.
- Inspect each jet for wear or damage, replace if necessary.
- Check the pilot screw, throttle stop screw, springs, washers and O-rings for wear or damage, replace if necessary.
- Check the carburetor body for wear or damage, replace if necessary.

### NOTE

If the needle jet is damaged, replace it with jet needle as a set.



5

## CLEANING

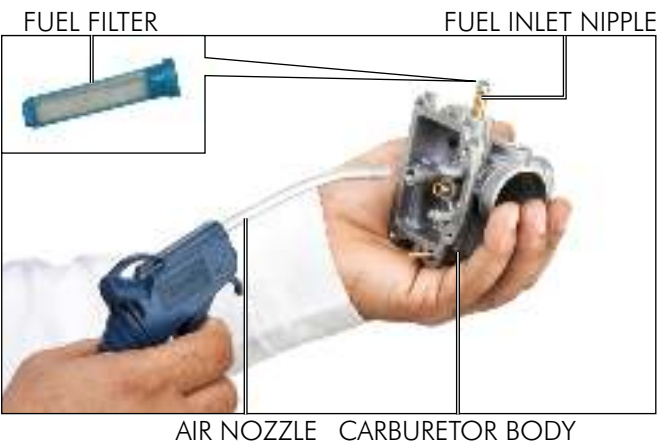
Blow open each air and fuel passages in the carburetor body with compressed air.

### CAUTION

Cleaning the air and fuel passage with a piece of wire will damage the carburetor body.

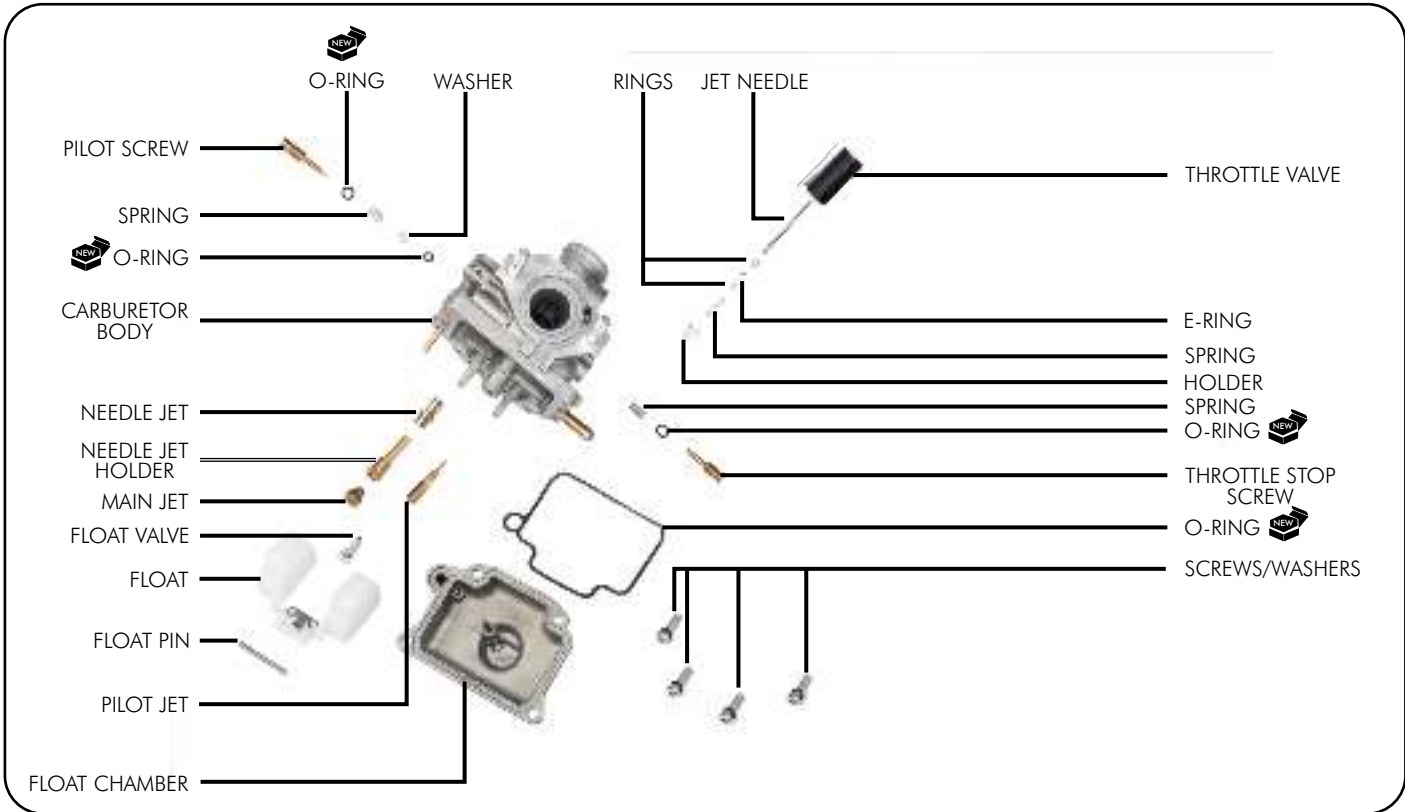
Clean the fuel filter (#110 mesh) thoroughly by using the non flammable or high flash point solvent (kerosene).

Check the filter for wear or damage and replace, if necessary.



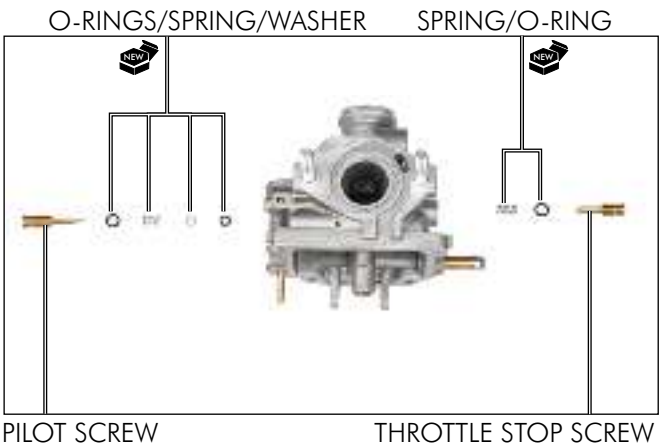
# FUEL SYSTEM

## ASSEMBLY



Install the following:-

- Throttle stop screw/new O-ring/spring
- Pilot screw/new O-ring/spring/washer/new O-ring

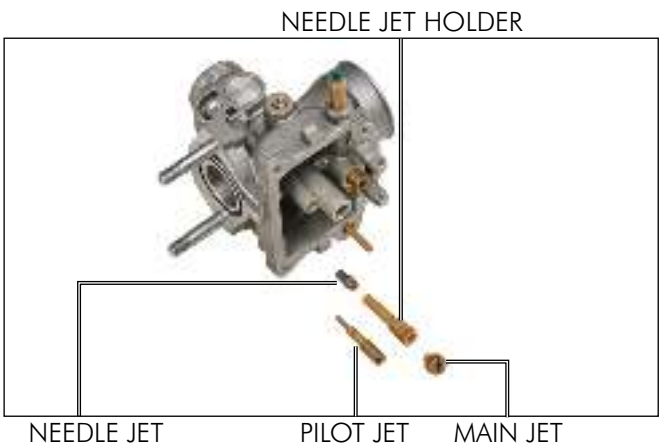


Install the following:-

- Main jet
- Pilot jet
- Needle jet holder
- Needle jet

Perform the pilot screw adjustment, if new pilot screw is installed (page 5-15).

Install the pilot screw and return it to its original position as noted during removal.



# FUEL SYSTEM

Install the float and float valve as an assembly to the carburetor.

FLOAT VALVE



5

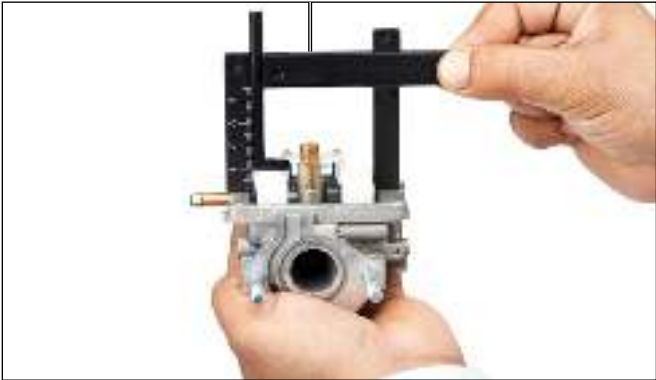
FLOAT

FLOAT PIN

Install the float pin through the carburetor body and float.



FLOAT LEVEL GAUGE



## FLOAT LEVEL INSPECTION

### NOTE

- Check the float level after inspecting the float valve and float.
- Set the float level gauge so that it is perpendicular to the float chamber face and inline with the main jet.

With the float valve seated and the float arm just touching the valve, measure the float level with the special tool as shown.

**FLOAT LEVEL: 11.3 mm**



### FLOAT LEVEL GAUGE

The float cannot be adjusted. Replace the float assembly if the float level is out of specification.

Install the float chamber with new O-ring.

FLOAT CHAMBER



O-RING

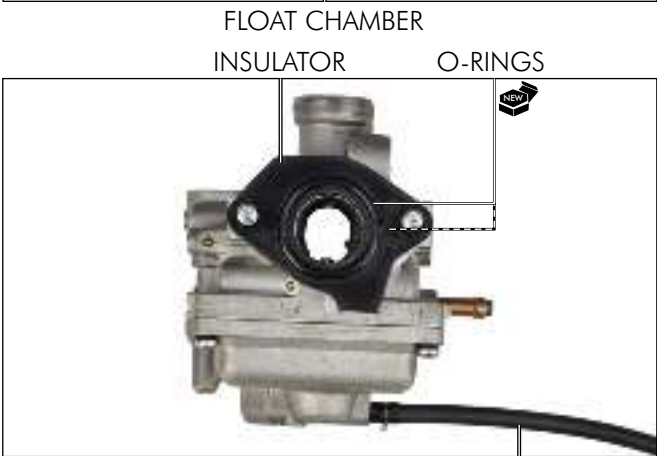
# FUEL SYSTEM

Install and tighten the float chamber screws/washers (4 nos.).

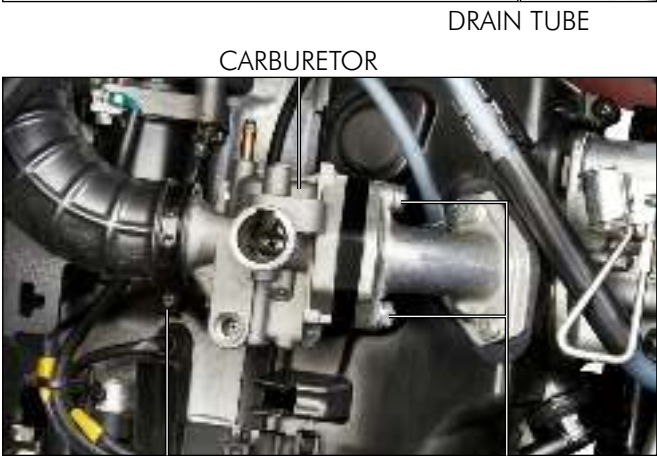


## CARBURETOR BODY INSTALLATION

Connect the drain tube to the carburetor.  
Install the new O-rings into the grooves of insulator and carburetor body.

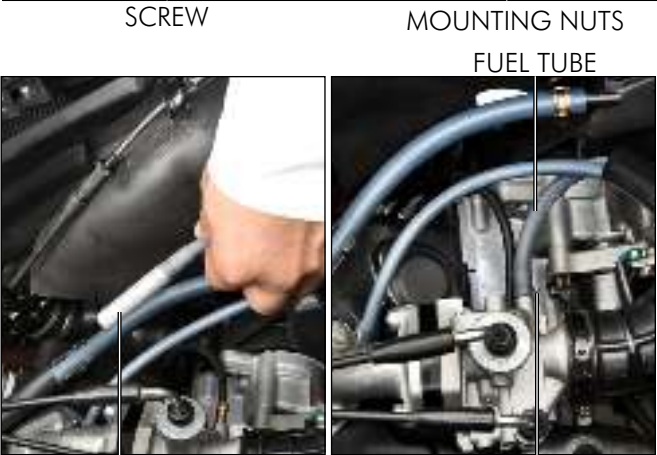


Install the carburetor and carburetor mounting nuts (2nos.).  
Tighten the air cleaner connecting boot band screw.



Unplug the special tool from the fuel tube.  
Connect the fuel tube to the carburetor and install the clip..

**TOOL**  
**ALUMINIUM PLUG**  
**PART NO: 070 HH 198 014**





# FUEL SYSTEM

Tighten the drain screw.



DRAIN SCREW

5

Install the bystarter valve (page 5-6).  
Install the throttle valve (page 5-4).



BYSTARTER CABLE

PILOT SCREW

## PILOT SCREW ADJUSTMENT

### NOTE

The pilot screw is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or a new pilot screw is installed.

### CAUTION

Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat hard.

- Turn the pilot screw clockwise until it seats lightly and then turn it out to the specification.

**PILOT SCREW INITIAL OPENING: 2-1/4 ± 1/2 turns out**



PILOT SCREW

THROTTLE STOP SCREW

- Warm up the engine to the normal operating temperature (55° to 65° C).
- Stop the engine and connect the tachometer.
- Start the engine and adjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1700 ± 100 rpm**

- Turn the pilot screw in or out slowly to obtain the highest engine speed.
- Readjust the idle speed to the specified value with the help of throttle stop screw.
- Make sure that the engine does not misfires or run erratically. Repeat steps 5 and 6 until engine speed increases smoothly.
- Readjust the idle speed with the throttle stop screw.



THROTTLE STOP SCREW

# FUEL SYSTEM

## FUEL TANK REMOVAL

**⚠ WARNING**

Gasoline is extremely flammable and is explosive under certain condition. KEEP OUT OF REACH OF CHILDREN.

Remove the body cover (page 2-12).  
Disconnect the fuel unit 2P connector.



FUEL UNIT 2P CONNECTOR

Disconnect the fuel and vacuum tubes from the fuel valve.



FUEL VALVE

FUEL TUBE

VACUUM TUBE

Remove the seat catch assembly mounting bolts (2 nos.) and the seat catch assembly.  
Release the two-way valve breather hose from the guide.



SEAT CATCH ASSEMBLY

GUIDE

MOUNTING BOLTS

Remove the mounting bolts (4 nos.) and remove the rear grip mounting bracket.  
Remove the fuel tank from the frame.

## INSTALLATION

Installation is in the reverse order of removal.

**NOTE**

- After installation, check that there are no fuel leaks.
- Route the cable, hose, wire and tabs properly (SECTION-1).



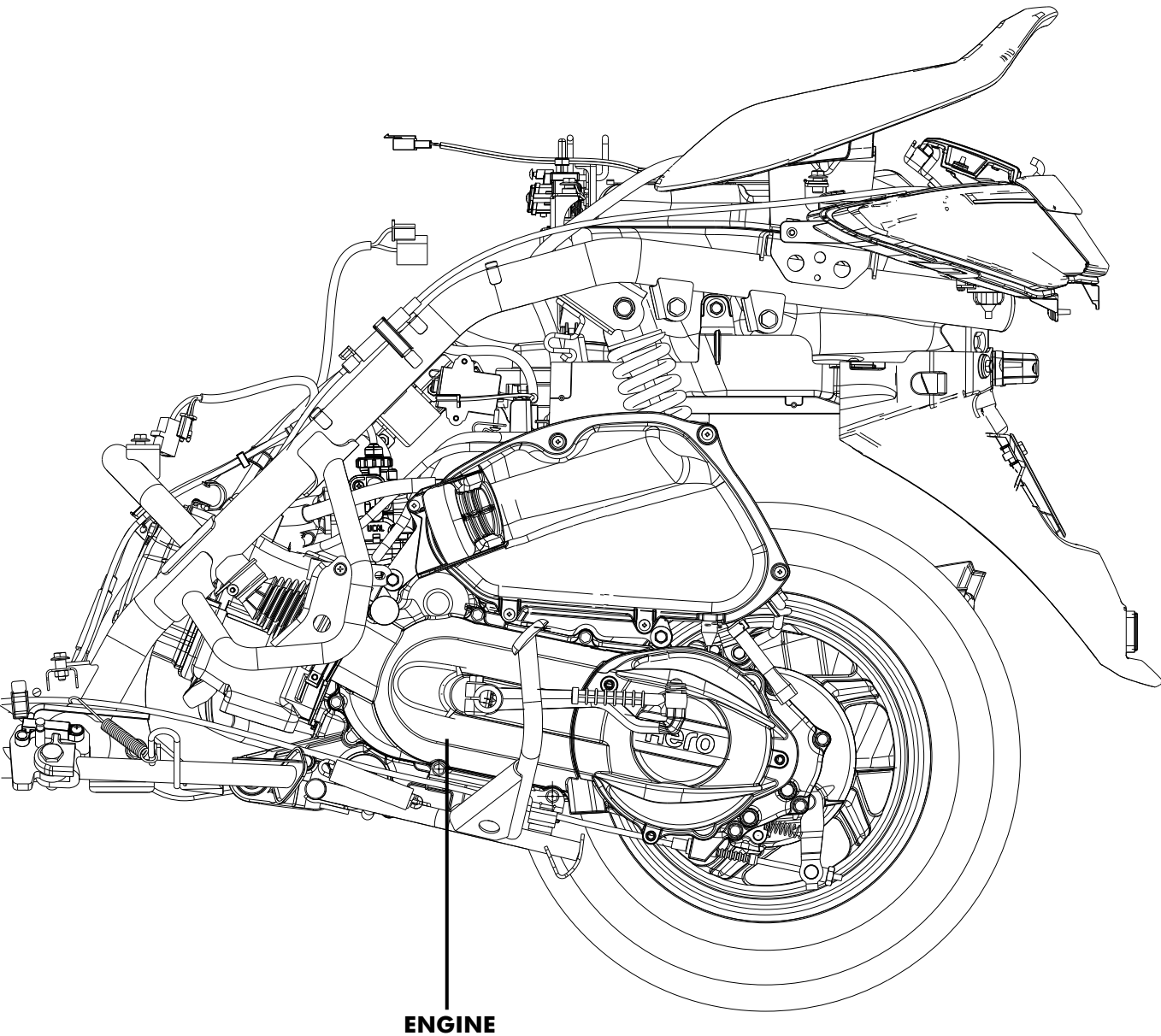
REAR GRIP MOUNTING BRACKET

MOUNTING BOLTS

FUEL TANK

# 6. ENGINE REMOVAL/INSTALLATION

## SYSTEM DIAGRAM



# ENGINE REMOVAL/INSTALLATION

<b>Service Information</b>	<b>6-1</b>	<b>Engine Removal</b>	<b>6-2</b>
<b>Specifications</b>	<b>6-1</b>	<b>Engine Hanger Link</b>	<b>6-4</b>
<b>Torque Values</b>	<b>6-1</b>	<b>Engine Installation</b>	<b>6-5</b>

## SERVICE INFORMATION

### GENERAL

- The following components can be serviced with the engine installed in the frame:-
  - Oil pump (SECTION-4)
  - Carburetor (SECTION-5)
  - Drive and driven pulleys/clutch (SECTION-9)
  - Final reduction (SECTION-10)
  - Alternator (SECTION-11)
- The following components require engine removal for servicing:
  - Cylinder head/valves (SECTION-7)
  - Cylinder/piston (SECTION-8)
  - Crankcase/crankshaft (SECTION-12)
- When installing the engine, be sure to tighten engine mounting fasteners to the specified torque.

## SPECIFICATIONS

<b>ENGINE REMOVAL/INSTALLATION ITEM</b>		<b>SPECIFICATIONS</b>
Engine oil capacity	At draining	0.7 litre
	At disassembly	0.8 litre

	<b>TORQUE VALUES</b>
---	----------------------

<b>ENGINE HANGER MOUNTING NUT</b>	<b>: 6.9 kgf-m</b>
<b>ENGINE MOUNTING NUT</b>	<b>: 4.9 kgf-m</b>
<b>REAR SHOCK ABSORBER UPPER MOUNTING BOLT</b>	<b>: 3.9 kgf-m</b>
<b>REAR WHEEL NUT</b>	<b>: 11.8 kgf-m</b>

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



# ENGINE REMOVAL/INSTALLATION

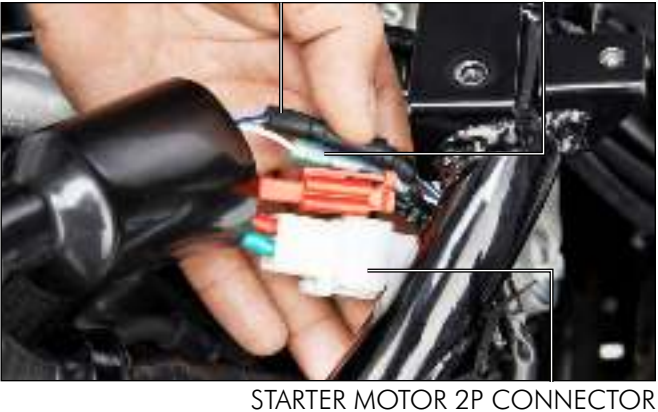
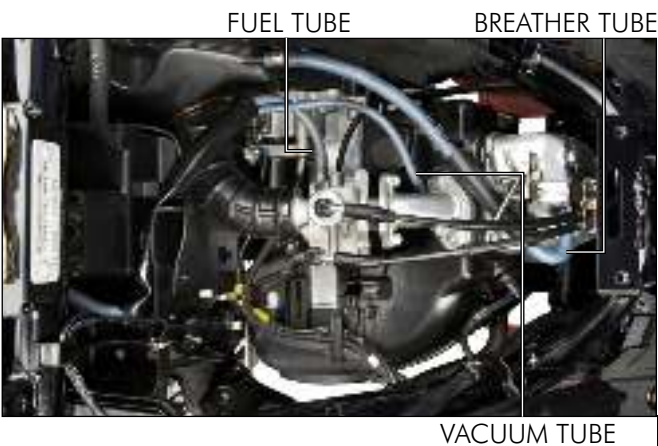
## ENGINE REMOVAL

Park the scooter on its main stand and support the frame securely.  
Drain the engine oil if the crankcase is to be serviced (page 3-11).  
Remove the body cover (page 2-12).  
Remove the right/left floor side covers (page 2-8 & 2-9).  
Remove the following:-  
- Throttle valve (page 5-3).  
- Bystarter valve (page 5-6).  
Disconnect the fuel tube and vacuum tubes.

Disconnect the noise suppressor cap from the engine.

Disconnect the following:-  
- Starter motor 2P connector.  
- Stator coil 1P connector.  
- Ignition pulse generator 1 P connector.

Release the wires from the clamp.





# ENGINE REMOVAL/INSTALLATION

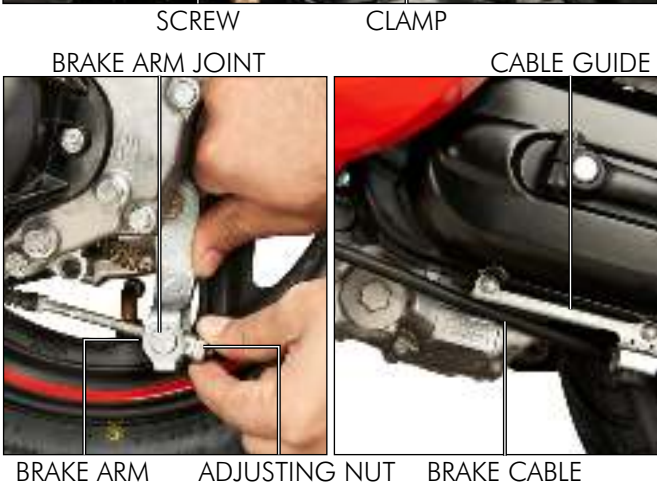
Remove the bolt to disconnect the starter motor ground cable from the frame.



Remove the screw and the clamp.  
Disconnect the air duct from the frame.



Remove the rear brake adjusting nut and disconnect the brake cable from the brake arm.  
Remove the brake arm joint.  
Remove the brake cable from the left crankcase and cable guide.



Remove the rear shock absorber upper mounting bolt.



## ENGINE REMOVAL/INSTALLATION

Remove the engine mounting nut and pull out the mounting bolt from the left side.



ENGINE MOUNTING BOLT/NUT

6

Remove the engine from the frame.

Remove the following:-

- Air cleaner assembly (page 5-3)
- Rear shock absorber (page 14-7)
- Carburetor (page 5-7)
- Exhaust muffler (page 2-20)
- Rear wheel (page 14-3)
- Brake shoes (page 14-4)
- Main stand (page 2-18)



### ENGINE HANGER LINK

Check the engine hanger link for damage or deterioration and replace if necessary.

To remove the engine hanger link assembly, remove the engine hanger link nut and pull out the mounting bolt from the left side.

Install the engine hanger link and mounting bolt.

Install and tighten the nut to the specified torque.

#### TORQUE

**ENGINE HANGER MOUNTING NUT: 6.9 kgf-m**

MOUNTING BOLT

NUT



ENGINE HANGER LINK

### ENGINE INSTALLATION

To install the engine to the frame,

Install the following:-

- Main stand (page 2-18)
- Brake shoes (page 14-4)
- Rear wheel (page 14-4)
- Exhaust muffler (page 2-20)
- Carburetor (page 5-13)
- Rear shock absorber (page 14-9)
- Air cleaner assembly (page 5-3)



# ENGINE REMOVAL/INSTALLATION

**NOTE**

Route the wires, tubes and cables properly (SECTION-1).

**CAUTION**

Carefully align the mounting points preventing damage to engine, frame, wires and cables.

Install the engine assembly onto the frame.  
Insert the engine mounting bolt from the left side. Install and tighten the nut to the specified torque.

**TORQUE**

**ENGINE MOUNTING NUT: 4.9 kgf-m**

Install the rear shock absorber upper mounting bolt and tighten it to the specified torque.

**TORQUE**

**REAR SHOCK ABSORBER UPPER MOUNTING BOLT: 3.9 kgf-m**

Install the brake cable to the crank case and cable clamp.  
Install the brake arm joint and connect the brake cable.  
Install the rear brake adjusting nut.  
Adjust the rear brake (integrated) lever free play (page 3-15).

Connect the air duct to the frame.  
Install the clamp and tighten the screw properly.

ENGINE MOUNTING BOLT/NUT



REAR SHOCK ABSORBER UPPER MOUNTING BOLT



CABLE GUIDE

BRAKE ARM JOINT



BRAKE CABLE

BRAKE ARM

ADJUSTING NUT

AIR DUCT



SCREW

CLAMP



# ENGINE REMOVAL/INSTALLATION

Connect the starter motor ground cables to the frame.  
Install and tighten the bolt.

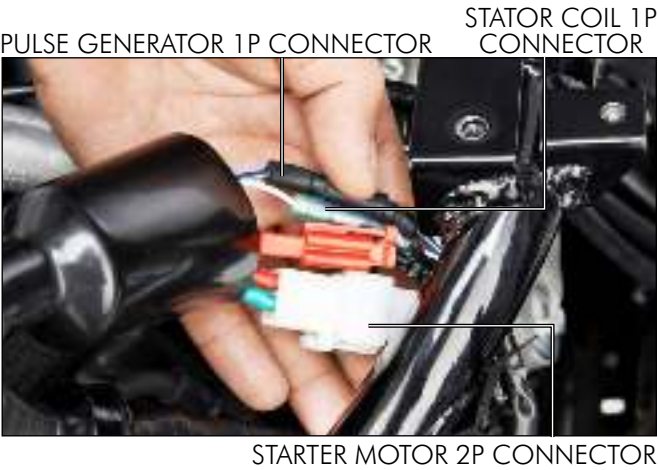


6

Route the wires into the clamp properly.



Connect the following:-  
- Ignition pulse generator 1P connector.  
- Stator coil 1P connector.  
- Starter motor 2P connector.



Connect the noise suppressor cap to the cylinder head.



## ENGINE REMOVAL/INSTALLATION

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Connect the engine breather tube to the cylinder head cover.

Connect the fuel tube and vacuum tubes.

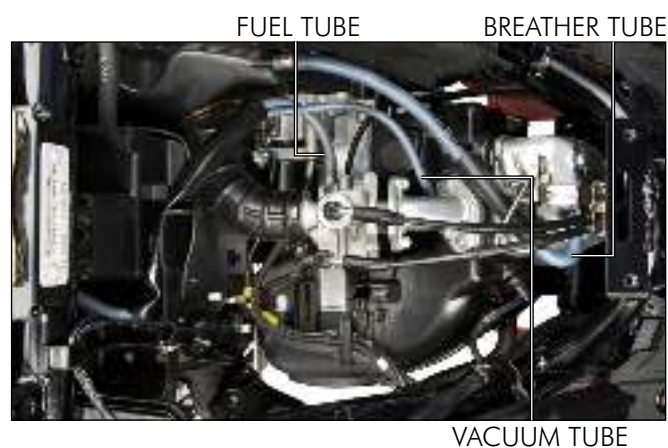
Install the following:-

- Throttle valve (page 5-4).
- Bystarter valve (page 5-6).

Install the right/left floor side covers (page 2-8 & 2-9).

Install the body cover (page 2-12).

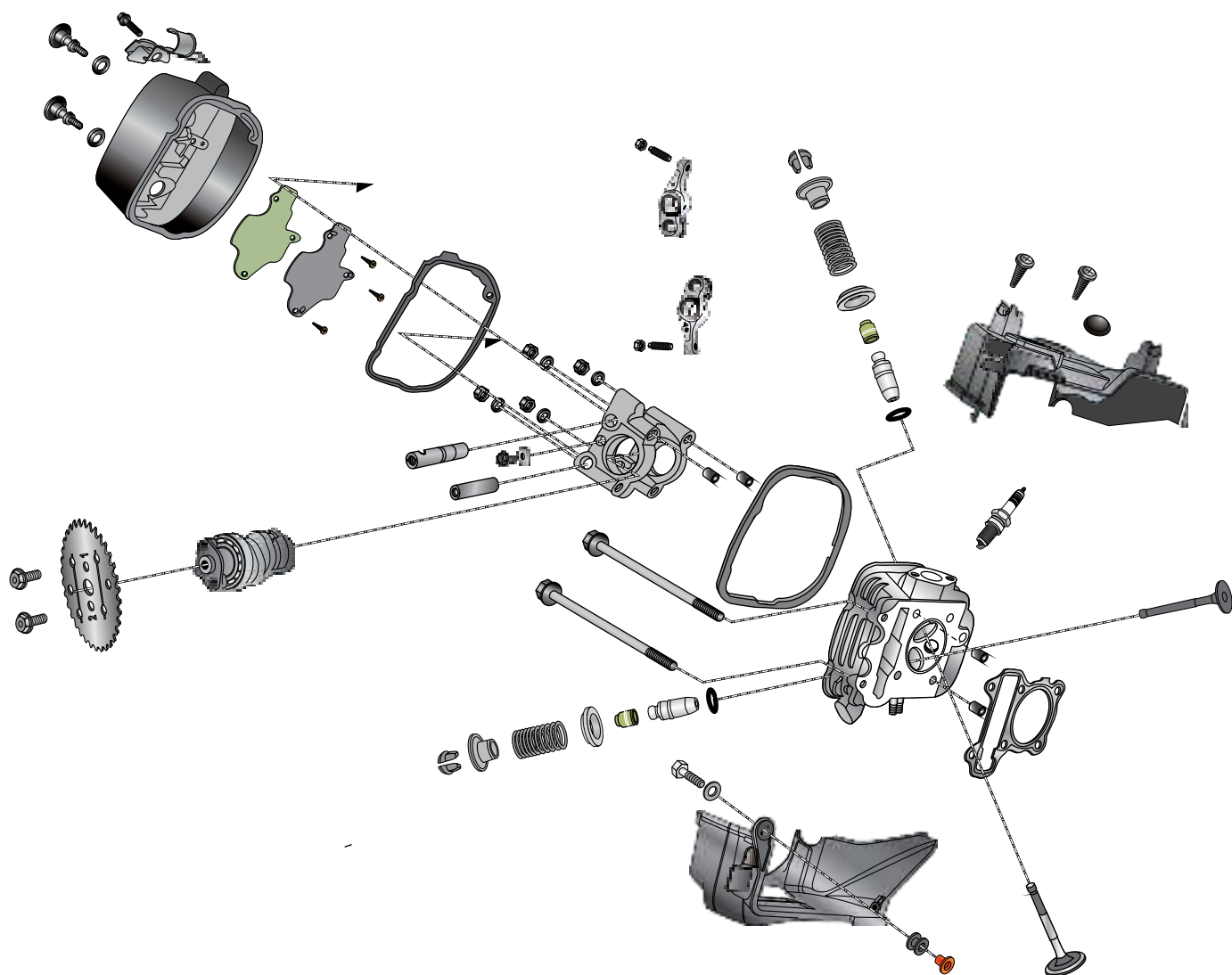
Fill the crankcase with recommended engine oil (page 3-11).





# 7. CYLINDER HEAD/VALVES

## SYSTEM DIAGRAM



# CYLINDER HEAD/VALVES

<b>Service Information</b>	<b>7-1</b>	<b>Camshaft Holder Removal</b>	<b>7-5</b>
<b>Specifications</b>	<b>7-1</b>	<b>Cylinder Head Removal</b>	<b>7-9</b>
<b>Torque Values</b>	<b>7-2</b>	<b>Valve Guide Replacement</b>	<b>7-13</b>
<b>Special Tools</b>	<b>7-2</b>	<b>Valve Seat Inspection</b>	<b>7-14</b>
<b>Troubleshooting</b>	<b>7-2</b>	<b>Breather Separator Cleaning</b>	<b>7-17</b>
<b>Cylinder Compression</b>	<b>7-3</b>	<b>Cylinder Head Installation</b>	<b>7-19</b>
<b>Cooling Fan Cover</b>	<b>7-4</b>	<b>Camshaft Holder Installation</b>	<b>7-21</b>
<b>Intake/Exhaust Shrouds</b>	<b>7-4</b>		

## SERVICE INFORMATION

### GENERAL

- The engine must be removed from the frame to service the rocker arms, camshaft, cylinder head and valves.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through the oil passages in the cylinder head. Clean the oil passage before assembling the cylinder head.

## SPECIFICATIONS

CYLINDER HEAD/VALVES			ITEM	STANDARD	SERVICE LIMIT
Cylinder compression				12±2 (kgf/cm²) 171±28 (psi)	- -
Camshaft cam lobe height		Intake	32.272-32.352 mm	32.235 mm	
		Exhaust	31.989-32.069 mm	31.952 mm	
Cylinder head war page				0.10 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		0.013-0.043 mm	0.11 mm	
Valve	Stem O.D.	Intake	4.975-4.990 mm	4.95 mm	
		Exhaust	4.955-4.970 mm	4.93 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	0.030-0.057 mm	0.10 mm	
	Spring free length		35.66 mm	34.70 mm	
Valve seat width			0.9-1.1 mm	1.5 mm	
Valve guide height			12.9-13.1 mm	-	

## CYLINDER HEAD/VALVES


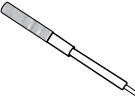
	<b>TORQUE VALUES</b>
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<b>SPARK PLUG</b>	<b>: 1.6 kgf-m</b>
<b>CAMSHAFT HOLDER NUT</b>	<b>: 1.8 kgf-m</b>
<b>BREATHER SEPARATOR PLATE MOUNTING SCREW</b>	<b>: 0.3 kgf-m</b>
<b>CYLINDER HEAD COVER BOLT</b>	<b>: 1.2 kgf-m</b>
<b>CAM SPROCKET BOLT</b>	<b>: 0.9 kgf-m</b>
<b>CAM CHAIN TENSIONER LIFTER PAN SCREW</b>	<b>: 0.4 kgf-m</b>
<b>INLET SHROUD MOUNTING SCREW</b>	<b>: 0.2 kgf-m</b>
<b>EXHAUST SHROUD MOUNTING BOLT-WASHER</b>	<b>: 0.7 kgf-m</b>

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

7

	<b>SPECIAL TOOLS</b>
--	----------------------

	<b>VALVE SPRING COMPRESSOR</b> <b>PART NO: 070 HH 198 005</b>
	<b>VALVE GUIDE REMOVER</b> <b>PART NO: 070 HH 198 010</b>

<b>VALVE GUIDE REAMER</b>
<b>SEAT CUTTER (45° IN)</b>
<b>SEAT CUTTER (45° EX)</b>
<b>FLAT CUTTER (32° IN)</b>
<b>FLAT CUTTER (32° EX)</b>
<b>INTERIOR CUTTER (60° EX)</b>
<b>CUTTER HOLDER</b>

### 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
  - Burnt 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 and crankshaft (SECTION-12)

## CYLINDER HEAD/VALVES

### CYLINDER COMPRESSION

#### ▲ WARNING

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

Warm up the engine to normal operating temperature (55° to 65° C) and stop the engine.

Remove the center cover (page 2-12).

Disconnect the noise suppressor cap. and clean the spark plug mounting area using compressed air. Remove the spark plug.

Install the compression gauge attachment in the spark plug hole.

Connect the compression gauge to the attachment.

Open the throttle all the way and crank the engine with the starter motor or apply kick until the gauge needle stops raising.

#### COMPRESSION PRESSURE

**STANDARD:  $12 \pm 2$  kgf/cm<sup>2</sup> (171  $\pm$  28 psi)**

#### NOTE

- Crank the engine until the gauge reading stops rising.
- The maximum reading is usually reached within 4-7 seconds.

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

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.

- Worn piston ring
- Worn cylinder and piston

If the compression is the same as the previous value, check the valves for leakage, cylinder head bolt looseness.

COMPRESSION GAUGE



## CYLINDER HEAD/VALVES

### COOLING FAN COVER

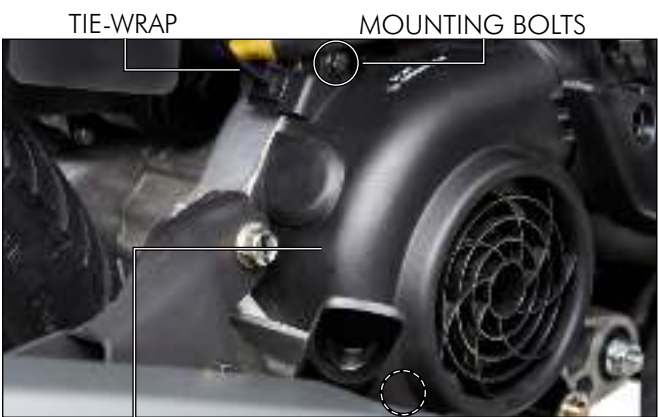
#### REMOVAL

Remove the right floor side cover (page 2-8).  
Release the ACG & starter motor wire harness from the tie-wrap.  
Remove the mounting bolts (2 nos.).

Remove the mounting bolts (2 nos.) and the cooling fan cover while releasing the tabs with its slots.

#### INSTALLATION

Installation is in the reverse order of removal.



COOLING FAN COVER

COOLING FAN COVER



MOUNTING BOLTS



INSULATOR/GASKET INTAKE PIPE MOUNTING BOLTS



COOLING FAN COVER SCREWS EXHAUST SHROUD

### INTAKE/EXHAUST SHROUDS

#### REMOVAL

Dismount the engine from the frame (SECTION-6).  
Remove the following:-  
- Carburetor (page 5-7).  
- Muffler assembly (page 2-20).  
Remove the mounting bolts (2 nos.) intake pipe, insulator, O-rings and gasket.

Remove the cooling fan cover.  
Remove the screws (2 nos.) and bolt-washer.  
Remove the intake and exhaust shrouds by releasing the tabs from its slots.



# CYLINDER HEAD/VALVES

## INSTALLATION

Install the intake and exhaust shrouds by aligning the tabs with its slots.

Install and tighten the bolt-washer and screws (2 nos.) to the specified torque.

### TORQUE

**INLET SHROUD MOUNTING SCREW: 0.2 kgf-m**

**EXHAUST SHROUD MOUNTING**

**BOLT-WASHER: 0.7 kgf-m**

Install the cooling fan cover.

Install the new O-rings and new gasket to the insulator and install the insulator with the **(PI)** mark facing upwards.

Install and tighten the mounting bolts (2 nos.).

Install the following:-

- Muffler assembly (page 2-20).
- Carburetor (page 5-13).

Mount the engine on the frame (**SECTION-6**).

## CAMSHAFT HOLDER

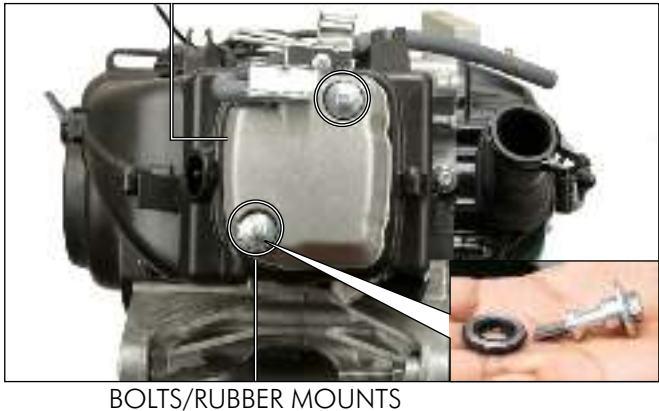
### REMOVAL

Remove the intake/exhaust shrouds (page 7-4).

Remove the head cover bolts/rubber mounts (2 nos.).

Remove the cylinder head cover and gasket.

Remove the shroud seal.



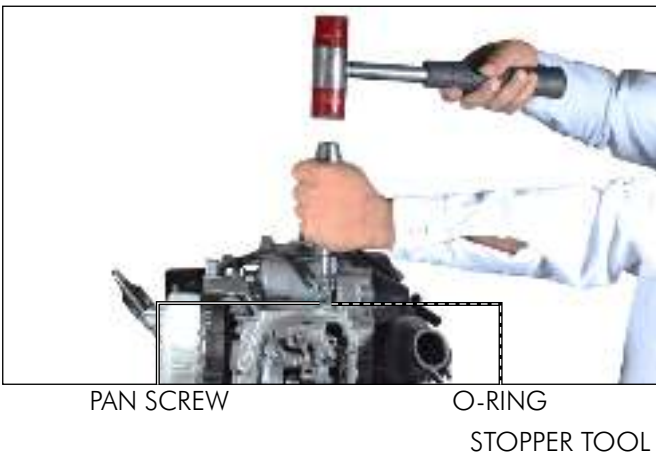
# CYLINDER HEAD/VALVES

Rotate the crankshaft clockwise and align the “T” mark on the flywheel with the index mark on the right crankcase.  
Make sure that the piston is at TDC on the compression stroke.  
The rocker arms should be free in this condition.  
If the rocker arms are not free, rotate the crankshaft one full turn and realign the “T” mark with the index mark.

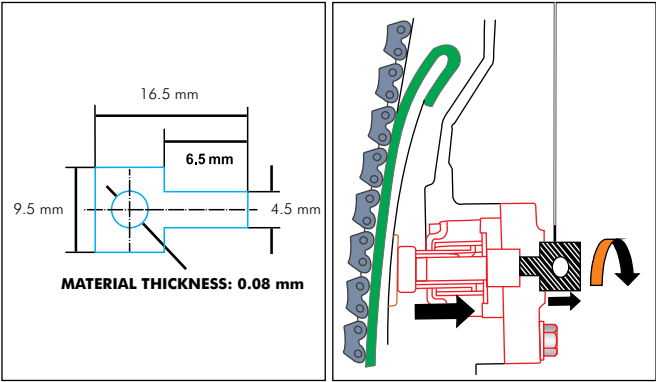


Remove the cam chain tensioner lifter pan screw and O-ring.

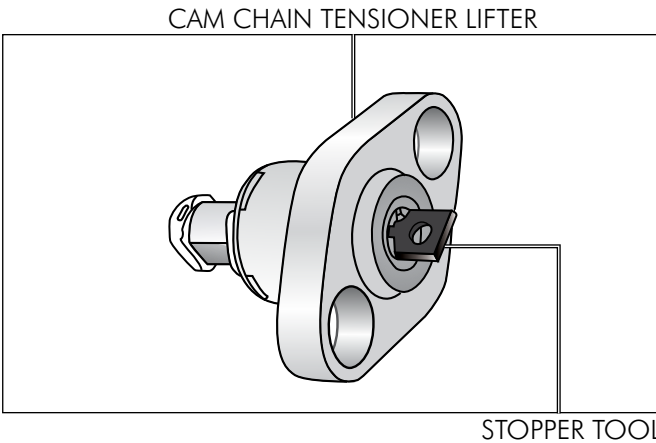
**NOTE**  
Always use impact driver to remove the pan screw.



Make a tensioner shaft stopper tool out of a thin piece of steel (0.8 mm thickness) using the diagram.  
Install the stopper tool to the cam chain tensioner lifter.



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.



# CYLINDER HEAD/VALVES

Loosen and remove the cam sprocket bolts (2 nos.) while holding the crankshaft.

Dislodge the cam sprocket from the camshaft and remove the cam chain from the sprocket.

**NOTE**

Loosen the stopper bolt/washer, if it is required to disassemble the camshaft holder.

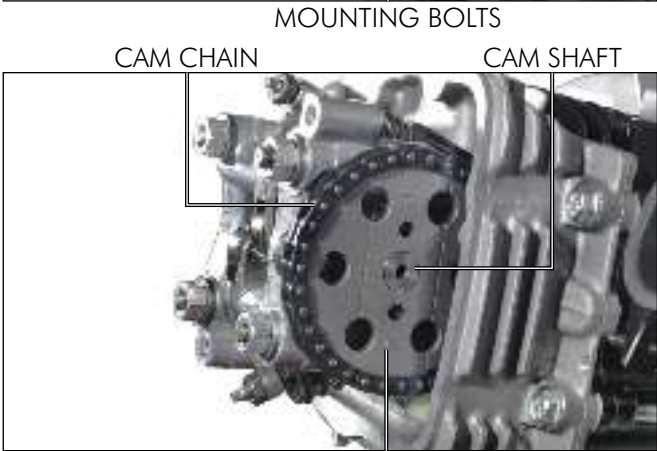
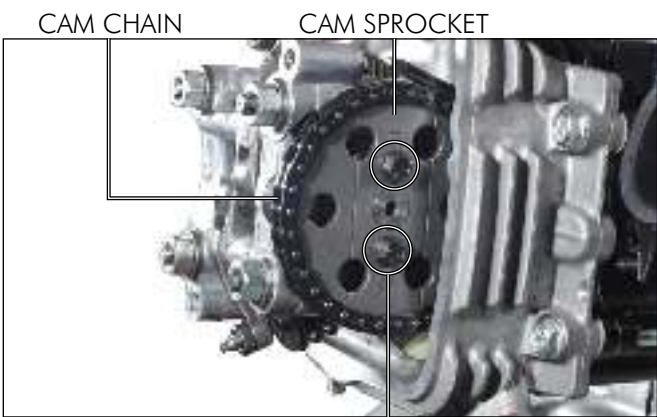
Loosen the cylinder head side bolts (2 nos.).

Loosen the nuts (4 nos.) in a crisscross pattern in 2 to 3 steps.

Remove nuts/washers.

Remove the camshaft holder assembly from the cylinder head.

Remove the dowel pins.



# CYLINDER HEAD/VALVES

## CAMSHAFT HOLDER DISASSEMBLY

Remove the stopper bolt/washer from the camshaft holder.



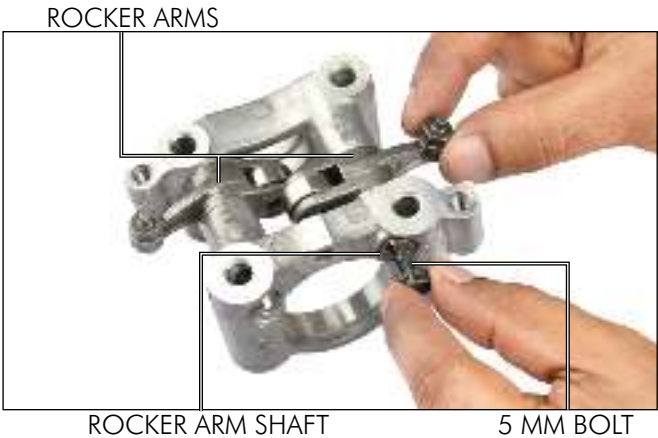
Remove the camshaft from the holder by aligning the cam lobes with the cut-out in the holder.



Thread in a 5 mm bolt into the threaded hole in the rocker arm shaft and pull the shaft out of the camshaft holder.  
Remove the rocker arm.  
Follow the same procedure for removal of other rocker arm shaft and rocker arm.

### NOTE

While removing the rocker arms, mark/tag them for easy identification and to avoid any interchange during re-assembly.



## INSPECTION

### ROCKER ARM AND ROCKER ARM SHAFT

Turn the rocker arm roller with your finger, the roller should turn smoothly and quietly.

### NOTE

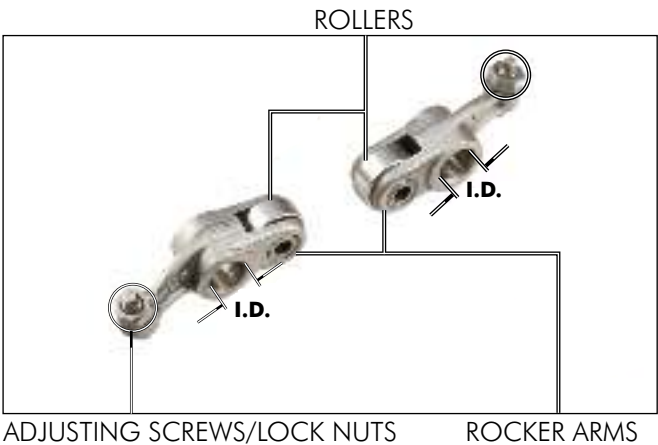
If either of the rocker arms requires replacement, inspect the cam lobes for scoring, chipping or flat spots.

Measure the rocker arm I.D.

### SERVICE LIMIT

**ROCKER ARM I.D.: 10.06 mm**

Check the adjusting screws and lock nuts for wear or damage.  
Replace if necessary.





# CYLINDER HEAD/VALVES

Measure the rocker arm shaft O.D.

**SERVICE LIMIT**

**ROCKER ARM SHAFT O.D.: 9.95 mm**

Inspect the rocker arms and shafts for wear, damage or clogged oil hole.

Calculate rocker arm-to-shaft clearance.

**ROCKER ARM TO SHAFT CLEARANCE: 0.11 mm**

ROCKER ARM SHAFT



## 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.

**NOTE**

- Do not rotate the bearing races when dry.
- Always clean and lubricate the bearing before rotating.

BEARING



BEARING



## CAM LOBE

Measure the height of each cam lobe.

**SERVICE LIMIT**

**INTAKE: 32.235 mm**

**EXHAUST: 31.952 mm**

Inspect each cam lobe for wear, scratches or scoring.

CAMSHAFT



CAM LOBE

SPARK PLUG

CYLINDER HEAD SIDE BOLTS



## CYLINDER HEAD

### REMOVAL

Loosen the spark plug using spark plug wrench.

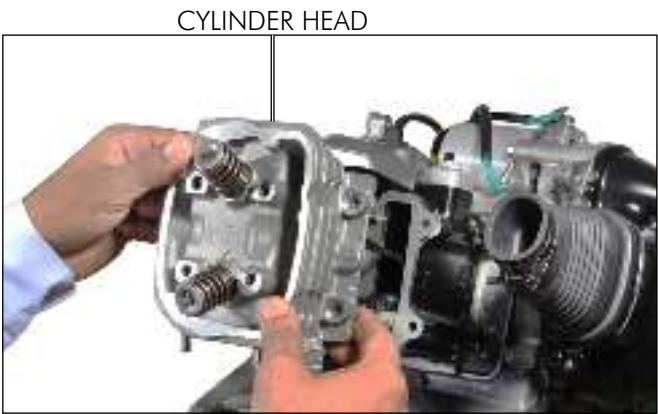
Remove the camshaft holder (page 7-8).

Remove the cylinder head side bolts.

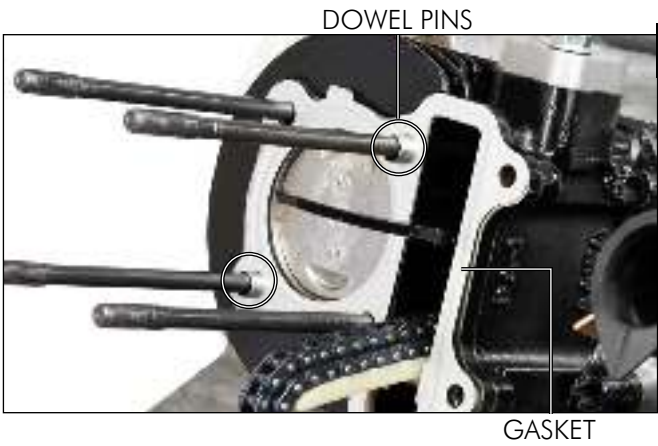


# CYLINDER HEAD/VALVES

Remove the cylinder head from the engine.

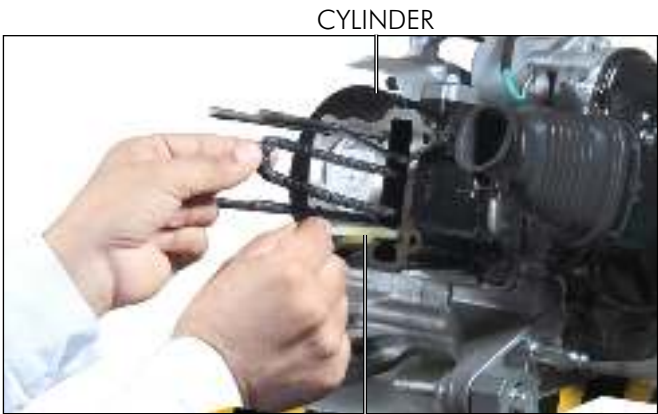


Remove the cylinder head gasket and dowel pins.



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Remove the cam chain guide from the cylinder and check for excessive wear or damage.



## CYLINDER HEAD DISASSEMBLY

Remove the spark plug from the cylinder head.



# CYLINDER HEAD/VALVES

Compress the valve springs using the valve spring compressor and remove the valve spring cotters.



**VALVE SPRING COMPRESSOR**  
**PART NO: 070 HH 198 005**

### CAUTION

To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.

Remove the retainer, spring and valve from the cylinder head. Remove the stem seals and spring seat from the cylinder head. Do not reuse the old stem seals.

### NOTE

Mark all parts during disassembly so that they can be placed back in the original location during installation.

Follow the same procedure for the other side also.

## CYLINDER HEAD INSPECTION

Remove the carbon deposits from the combustion chamber and clean off the cylinder head gasket surfaces. Check the spark plug hole and valve areas of the combustion chamber for cracks.

Check the cylinder head for warpage with a straight edge and feeler gauge.

### SERVICE LIMIT

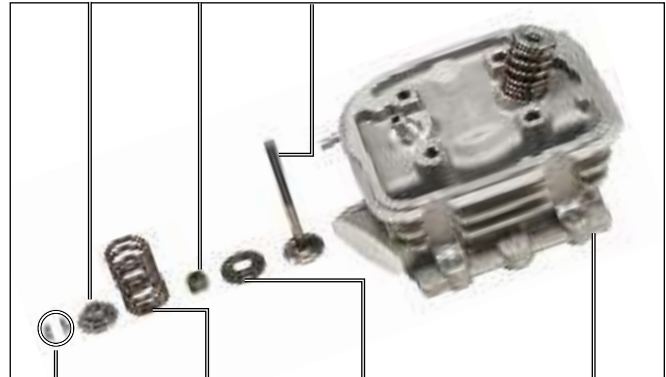
**CYLINDER HEAD WAR PAGE: 0.10 mm**

VALVE SPRING COMPRESSOR



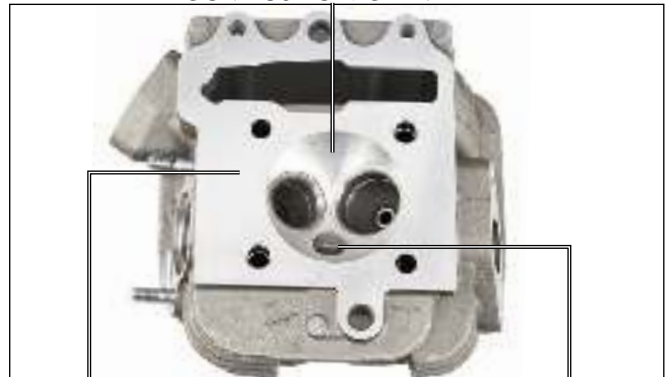
COTTERS

RETAINER STEM SEAL VALVE



COTTERS SPRING SPRING SEAT CYLINDER HEAD

COMBUSTION CHAMBER



CYLINDER HEAD GASKET SURFACE SPARK PLUG HOLE

STRAIGHT EDGE



FEELER GAUGE

CYLINDER HEAD

# CYLINDER HEAD/VALVES

Measure the valve spring free length.

**SERVICE LIMIT**

**VALVE SPRING FREE LENGTH: 34.70 mm**



VALVE SPRING

Inspect each valve for trueness, burning, scoring or abnormal stem wear.

Insert the valves in their original position in the cylinder head. Check that each valve moves up and down smoothly, without binding.

Measure and record each valve stem O.D. in three places along the valve guide sliding area.

**SERVICE LIMIT**

**INTAKE: 4.95 mm**

**EXHAUST: 4.93 mm**



VALVE

VALVE GUIDE REAMER

Ream the valve guide to remove any carbon build-up before checking the guide.

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.



**VALVE GUIDE REAMER**

**NOTE**

- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.
- Use cutting oil on reamer during this operation.
- 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.



Measure and record each valve guide I.D.

**SERVICE LIMIT**

**VALVE GUIDE I.D.: INTAKE/EXHAUST: 5.03 mm**

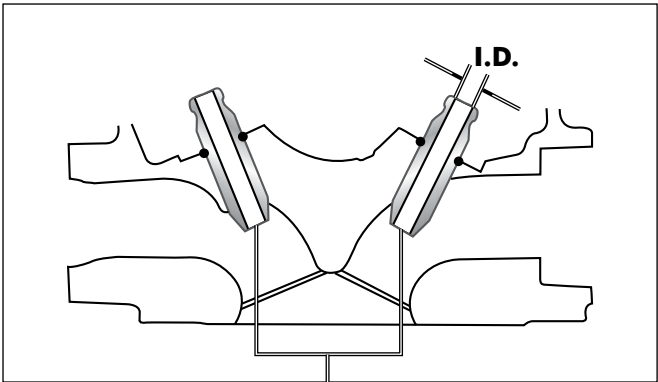
Calculate the stem-to-guide clearance.

**SERVICE LIMIT**

**STEM-TO-GUIDE CLEARANCE INTAKE: 0.08 mm**

**STEM-TO-GUIDE CLEARANCE EXHAUST: 0.10 mm**

If the stem-to-guide clearance exceeds 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.



VALVE GUIDES

# CYLINDER HEAD/VALVES

If the stem-to-guide clearance still exceeds the service limit with new guides, replace the valve and guide.

**NOTE**

Inspect and reface the valve set 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 war page.
- Be careful not to damage the mating surface.

**▲ WARNING**

To avoid burn, wear heavy gloves when handling the heated cylinder head.

Support the cylinder head and drive the valve guides and clips out of the cylinder head from the combustion chamber side.



**VALVE GUIDE REMOVER**

**PART NO: 070 HH 198 010**

While the cylinder head is still heated, take off the new valve guides from the freezer and install the new clips to the new guides.

Drive new guides in the cylinder head from the camshaft side.

After installing the valve guides, measure the valve guide height from the cylinder head.

**VALVE GUIDE HEIGHT: 12.9-13.1 mm**

Let the cylinder head cool to room temperature.

Ream the new valve guides.

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

VALVE GUIDE REMOVER

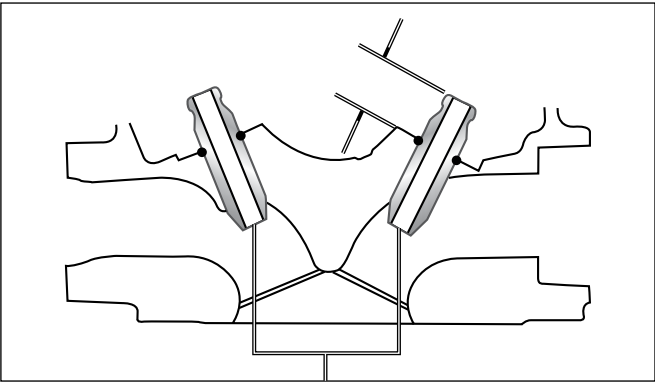


VALVE GUIDE REMOVER



CLIP

VALVE GUIDE



VALVE GUIDES

## CYLINDER HEAD/VALVES



### VALVE GUIDE REAMER

#### NOTE

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, if the valve is installed slanted, it causes oil leaks from the stem seal and improper valve set contact and result in the valve seat refacing be performed.
- 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.

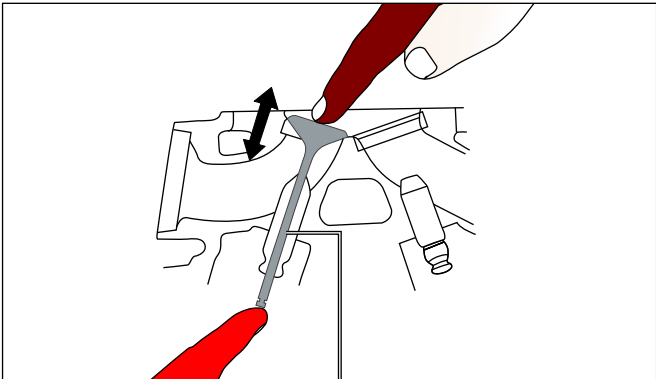


### VALVE SEAT INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to each valve face. Tap the valve against the valve seat several times using a hand-lapping tool, without rotating the valve, to make a clear pattern.

Remove the valve and inspect the valve seat face.



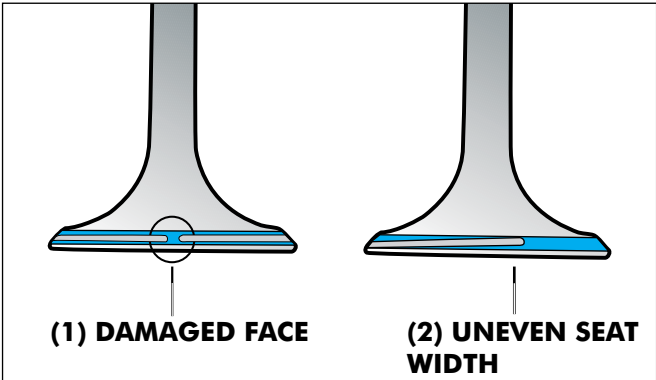
7

#### NOTE

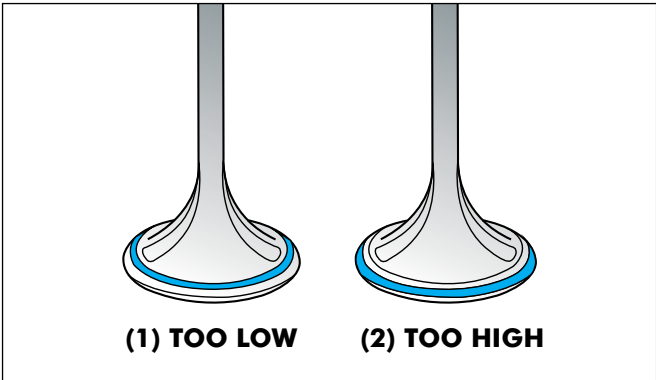
The valve cannot be ground. If the valve face is burned or badly worn if it contacts the seat unevenly, replace the valve.

Inspect the valve seat face for:

- Uneven seat width:
  - Bent or collapsed valve stem.
- Damaged face:
  - Replace the valve and reface the valve seat.



- Contact area (too high or too low):
  - reface the valve seat.





# CYLINDER HEAD/VALVES

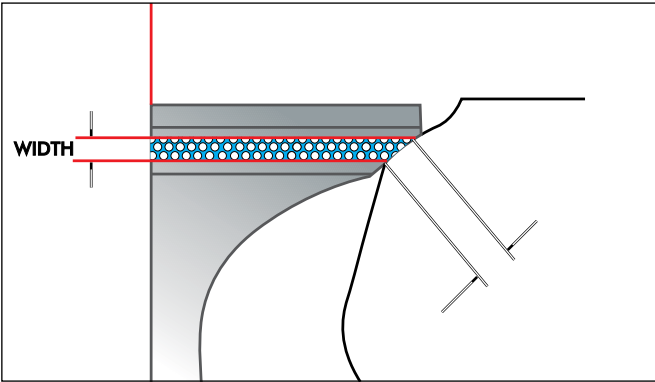
Inspect the width of valve seat.

The valve seat contact should be within the specified width and even all around the circumference.

**SERVICE LIMIT**

**VALVE SEAT WIDTH: 1.5 mm**

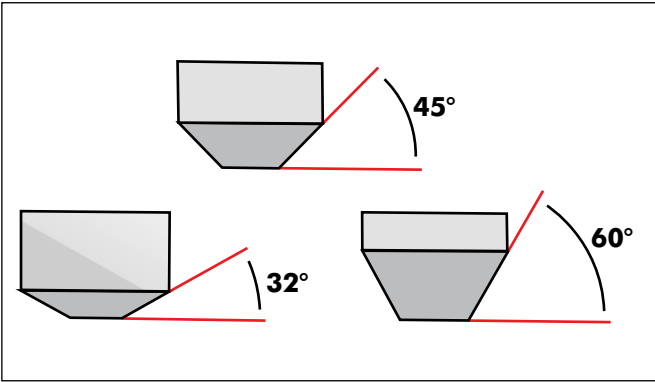
If the valve seat width is not within specification, reface the valve seat



## VALVE SEAT REFACING

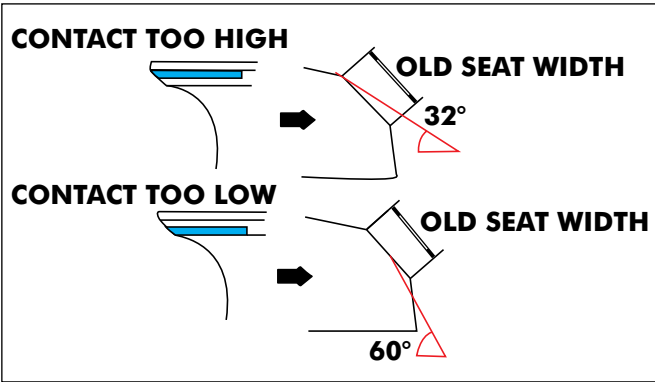
**NOTE**

Be careful not to grind the seat more than necessary

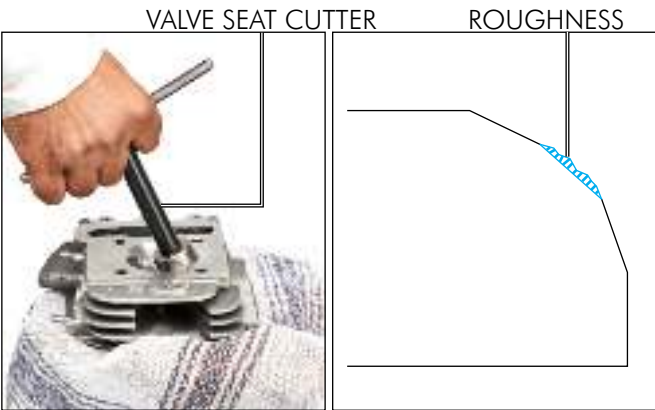


If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° inner cutter. Refinish the seat to specification, using a 45° finish cutter.

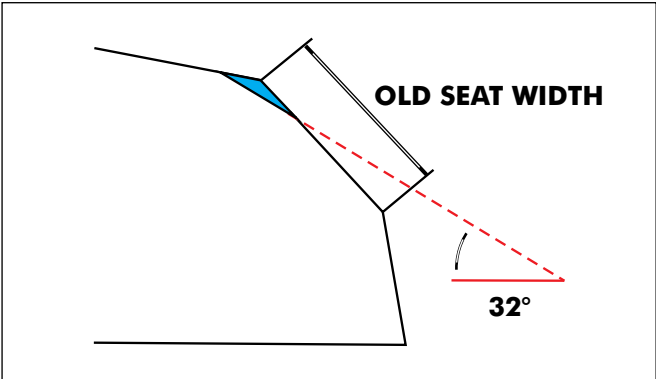


Use a 45° cutter to remove the roughness or irregularities from the seat.

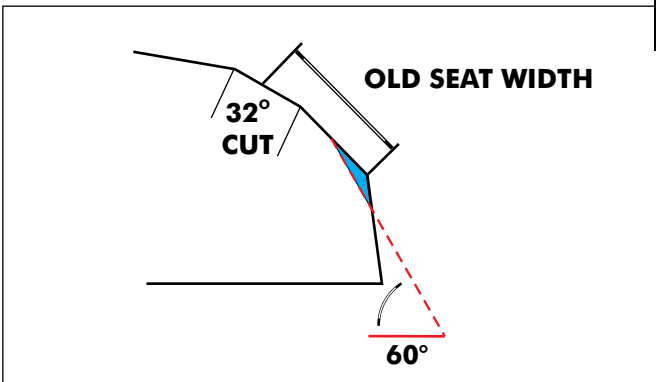


# CYLINDER HEAD/VALVES

Using 32° cutter, remove top 1/4 of the existing valve seat material.

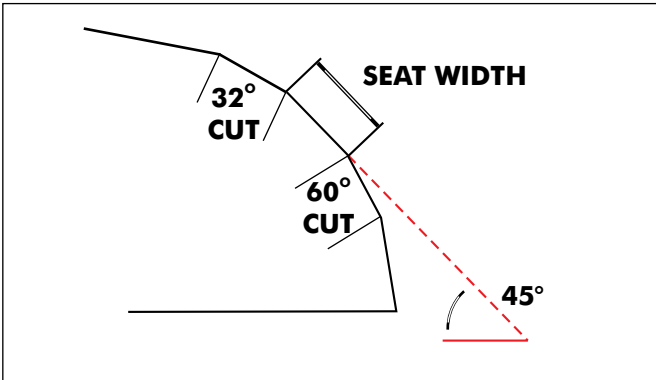


Using 60° cutter, remove top 1/4 of the existing valve seat material.



Using 45° cutter, cut the seat to the proper width.  
Make sure that all pitting and irregularities are removed.  
Refinish if necessary.

**STANDARD SEAT WIDTH: 0.9-1.1 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 and recheck the seat contact.



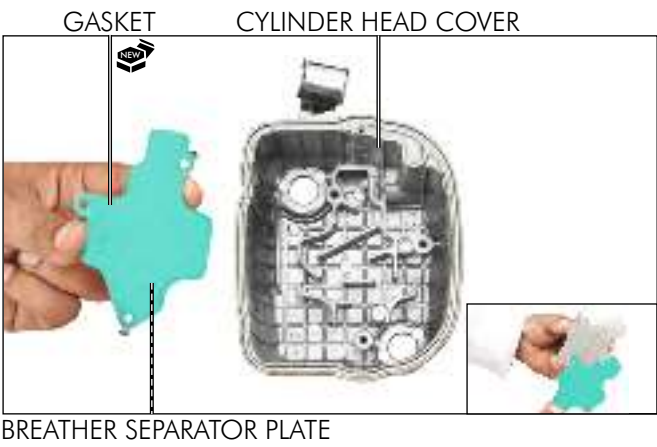
# CYLINDER HEAD/VALVES

## BREATHER SEPARATOR CLEANING

Remove the cylinder head cover gasket.  
Straighten the lock tabs of the breather separator plate.  
Remove the screws and breather separator plate.



Clean the separator plate and inside of the cylinder head cover thoroughly.  
Install the breather separator plate with new gasket.



Install and tighten the screws.

### TORQUE

#### BREATHER SEPARATOR PLATE MOUNTING

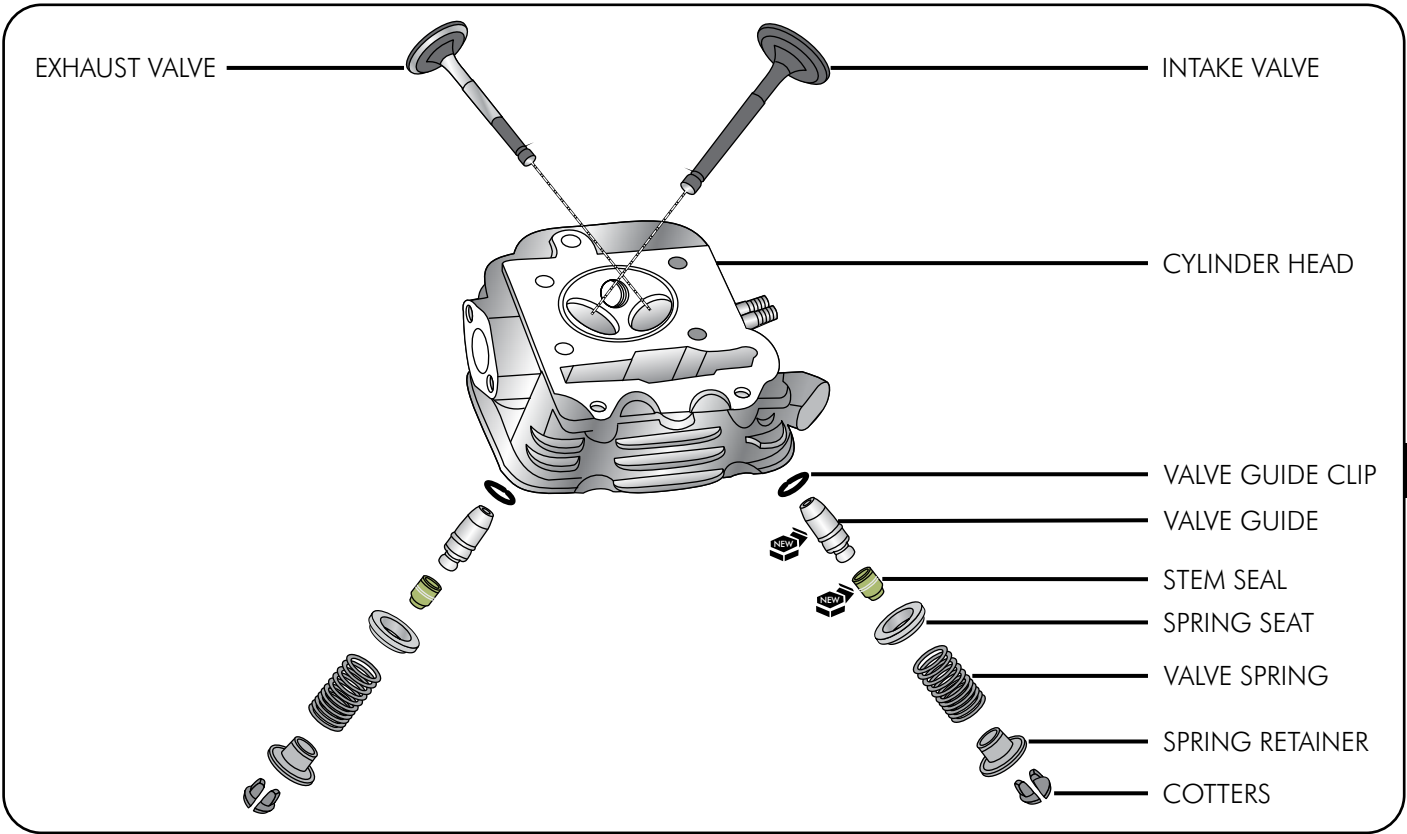
**SCREW: 0.3 kgf-m**

Bend the lock tabs of the plate against the screw heads.  
Install the new cylinder head cover gasket.



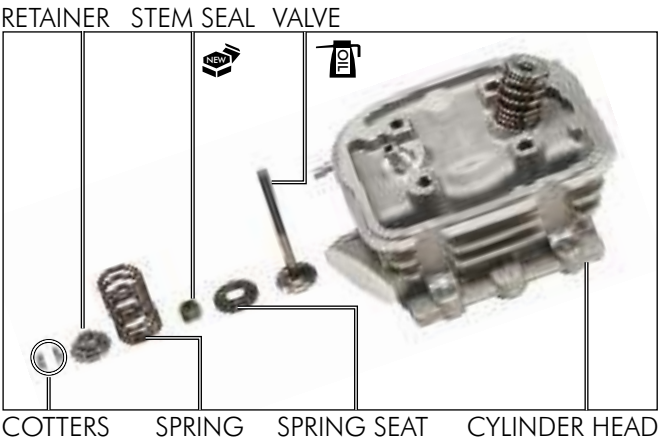
CYLINDER HEAD/VALVES

ASSEMBLY

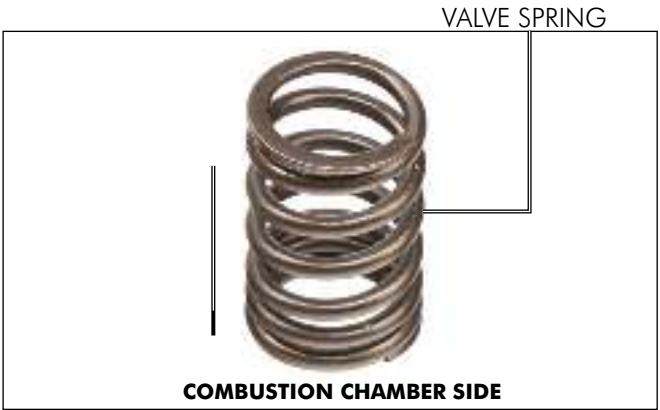


7

Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.  
Install the valve spring seat and new valve stem seal.  
Lubricate each valve stem with clean engine oil.  
Insert the valve into the valve guide.  
**NOTE**  
To avoid damage to the stem seal, turn the valve slowly when inserting.



Install the valve spring and retainer. The spring closely wound coil should face towards the combustion chamber side.



# CYLINDER HEAD/VALVES

Compress the valve spring and install the valve cotters.



## VALVE SPRING COMPRESSOR

PART NO: 070 HH 198 005

### CAUTION

To prevent the loss of tension, do not compress the valve spring more than necessary

### NOTE

To ease installation of the cotters, grease them first.

Support the cylinder head so that the valve heads will not contact anything that causes damage.

Seat the cotters firmly using two soft mallets as shown. Hold one mallet on the valve stem and gently tap in with the other mallet.

Follow the same procedure for the other side also.

## CYLINDER HEAD INSTALLATION

Install the cam chain guide so that its bosses are placed in the grooves of the cylinder.

Install the dowel pins and a new gasket.

VALVE SPRING COMPRESSOR

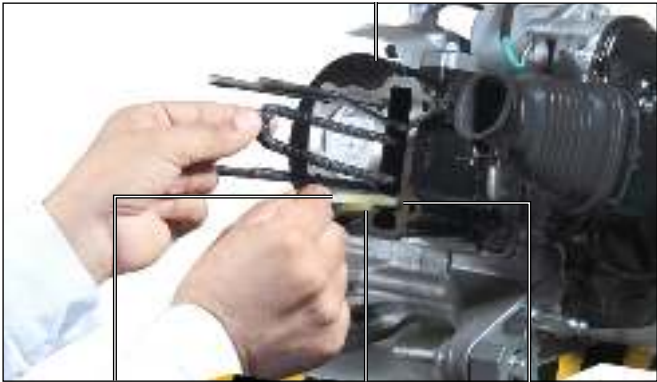


COTTERS



COTTERS

CYLINDER



CAM CHAIN GUIDE

BOSS

GROOVE

DOWEL PINS

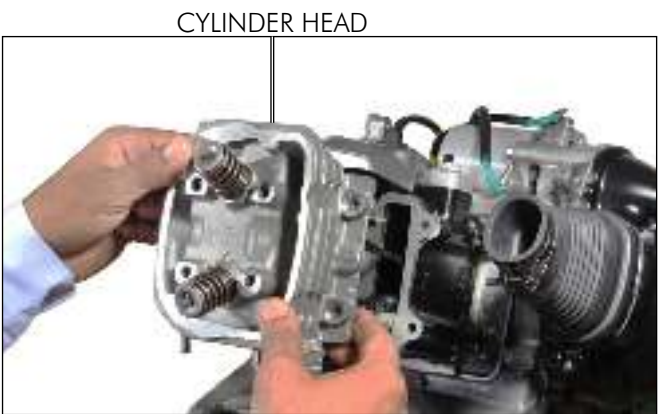


GASKET



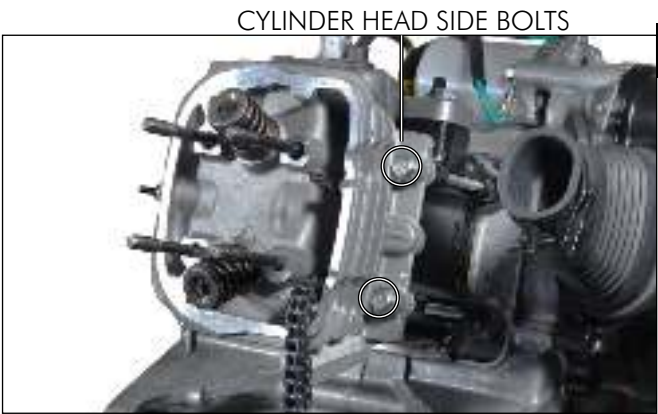
# CYLINDER HEAD/VALVES

Install the cylinder head on the engine.



Install and hand tighten the cylinder head side bolts.  
Tighten the spark plug to the specified torque.

**TORQUE**  
**SPARK PLUG: 1.6 kgf-m**



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## CAMSHAFT HOLDER ASSEMBLY

### NOTE

Clean each parts of the assembly in solvent and lubricate them with clean engine oil.



# CYLINDER HEAD/VALVES

Lubricate the camshaft cam lobes with molybdenum oil solution.

Install the camshaft into the camshaft holder by aligning the cam lobes with the cut-outs in the holder.

Thread in a 5 mm bolt into the threaded hole in the rocker arm shaft and install the shaft into the camshaft holder, while installing the rocker arm.

Follow the same procedure for installing the other rocker arm shaft and rocker arm.

**NOTE**

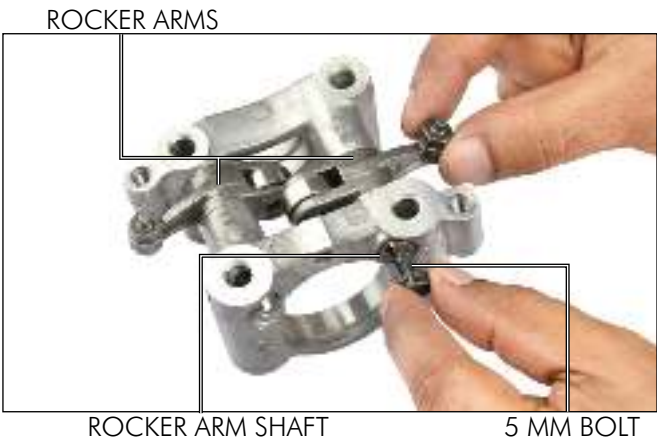
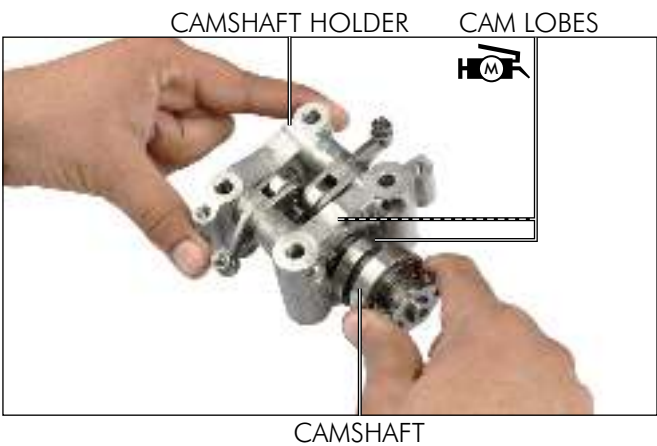
- Install the rocker arm shaft with the threaded side facing out.
- While assembly, use the intake and exhaust rocker arms with their respective places as noted during removal.

Install and hand tighten the stopper bolt/washer to the camshaft holder.

## CAM SHAFT HOLDER INSTALLATION

Install the dowel pins.

Align the groove in the intake rocker arm shaft with the stud bolt by turning the shaft and install the camshaft holder on the cylinder head.



## CYLINDER HEAD/VALVES

Install the washers and camshaft holder nuts, then tighten the nuts to the specified torque in a criss-cross pattern in 2-3 steps.

Tighten the cylinder head side bolts.

Tighten the stopper bolt to the specified torque.

### TORQUE

**CAMSHAFT HOLDER NUT: 1.8 kgf-m**

Install the cam chain onto the cam sprocket, then mount the cam sprocket onto the camshaft.

Turn the crankshaft clockwise from flywheel side slowly and align the timing mark (index line) on the cam sprocket with the top surface of the cylinder head and the "T" mark aligns with the index mark.

Align the bolt holes in the camshaft with the cam sprocket bolt holes and install the cam sprocket bolts.

Tighten the cam sprocket bolts while holding the crankshaft.

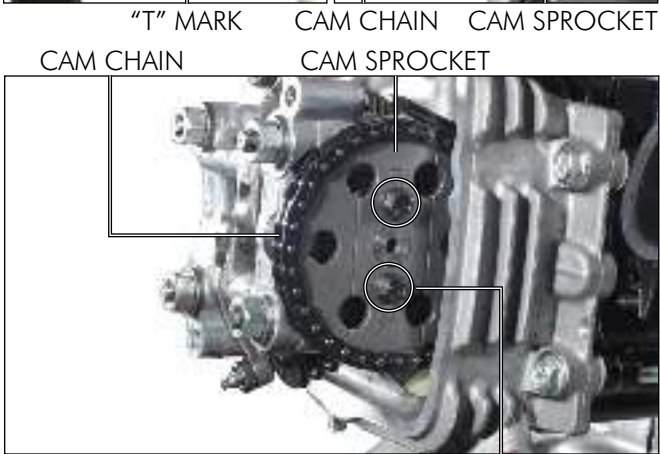
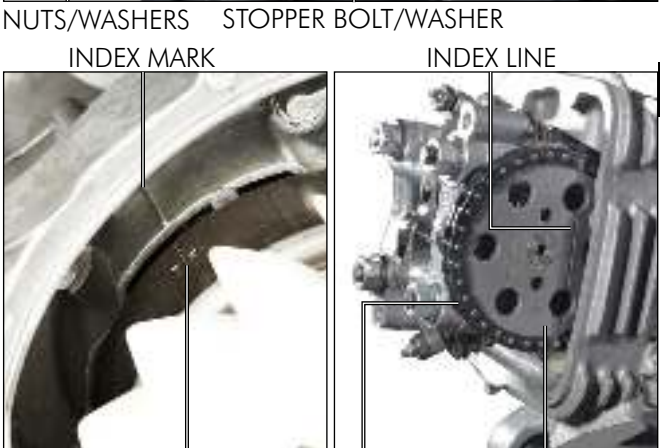
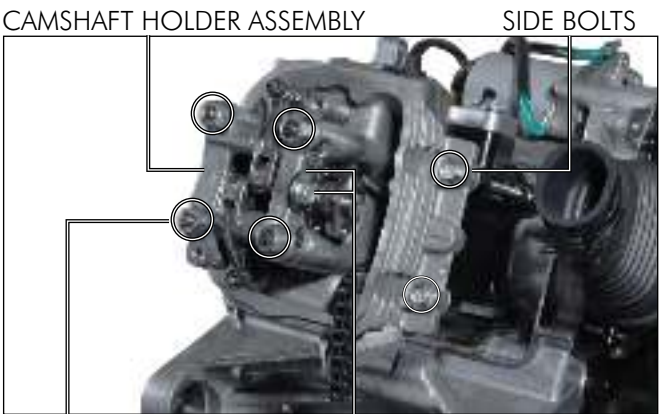
### NOTE

Always tighten bolt ① first and then bolt ② as mentioned on the cam sprocket.

### TORQUE

**CAM SPROCKET BOLT: 0.9 kgf-m**

Remove the stopper tool from the cam chain tensioner lifter.



# CYLINDER HEAD/VALVES

Install the cam chain tensioner lifter pan screw with a new O-ring.

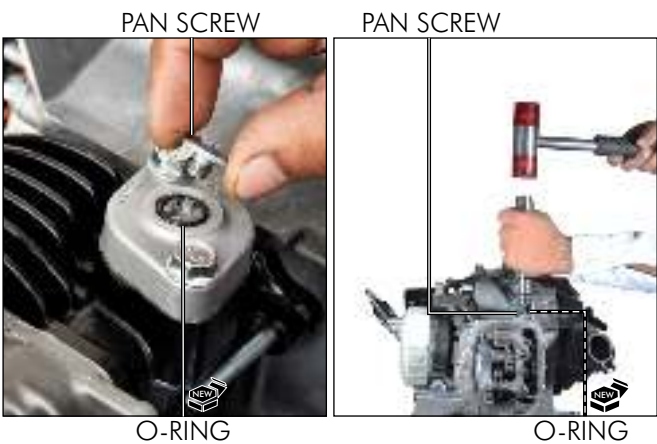
**NOTE**

Always use impact driver to install the pan screw.

**TORQUE**

**CAM CHAIN TENSIONER LIFTER PAN**

**SCREW: 0.4 kgf-m**



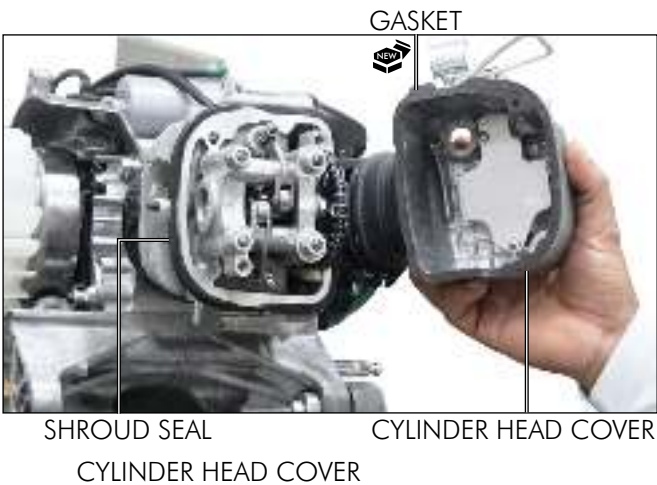
Install the shroud seal.

**NOTE**

While installing, the shroud seal contains "IN" should come at the intake side and "EX" should come at the exhaust side.

Install a new gasket into the groove in the cylinder head cover.

Install the cylinder head cover on the cylinder head.



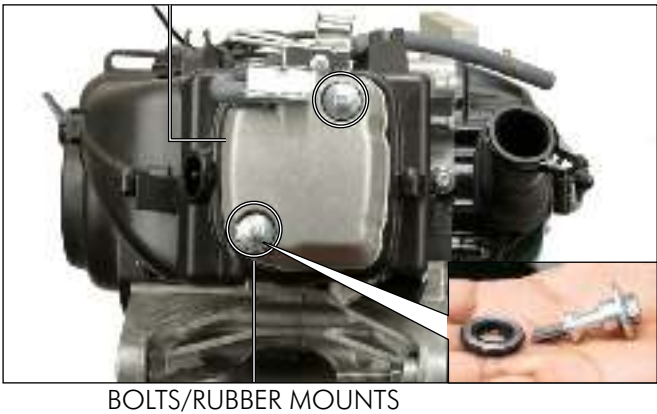
Install the cylinder head cover bolts/new rubber mounts (2 nos.).  
Tighten the cylinder head cover bolts to the specified torque.

**TORQUE**

**CYLINDER HEAD COVER BOLT: 1.2 kgf-m**

Install the following:

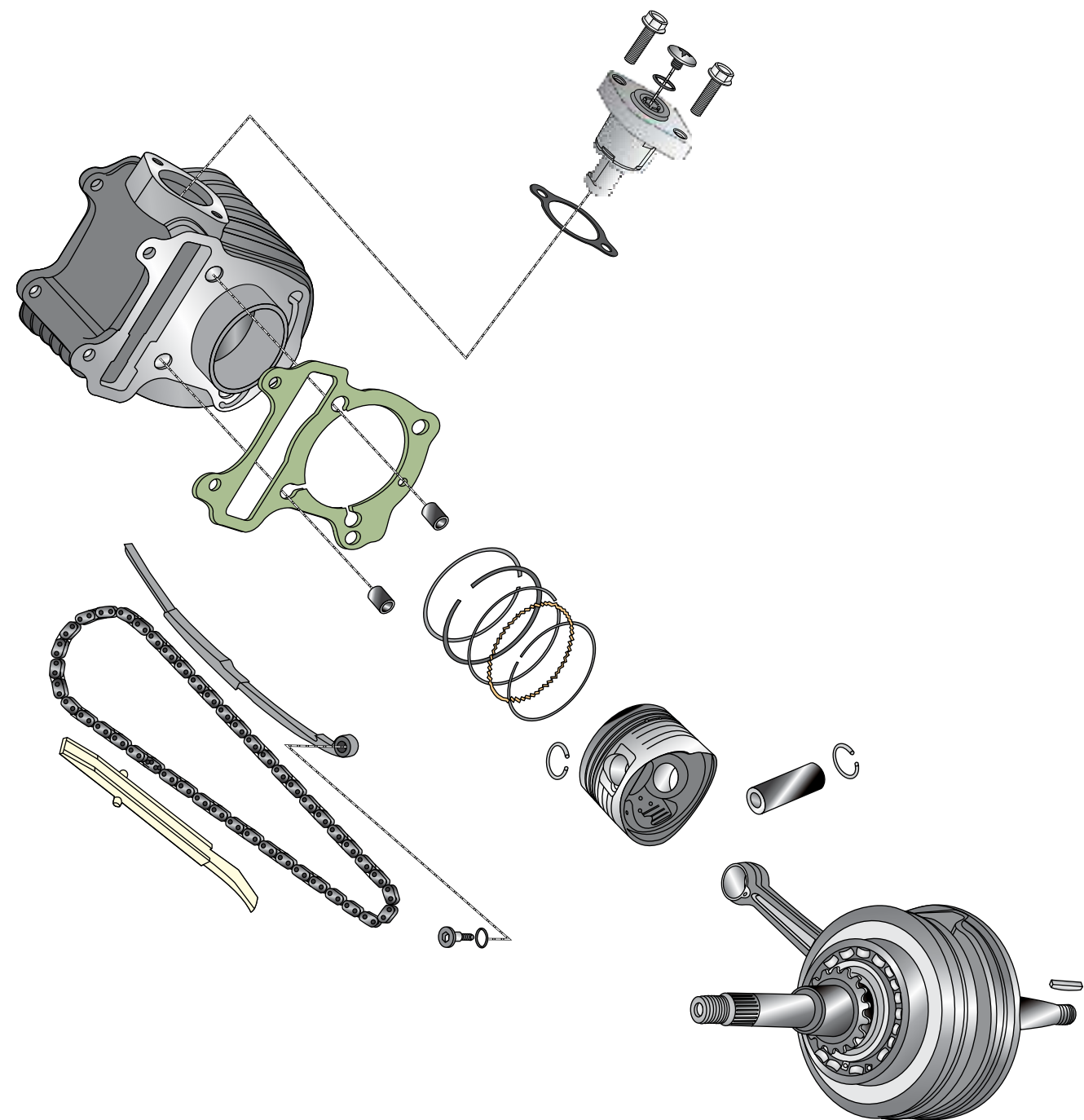
- Intake/exhaust shrouds (page 7-5).
- Mount the engine on the frame (SECTION-6).





# 8. CYLINDER/PISTON

## SYSTEM DIAGRAM





# CYLINDER/PISTON

<b>Service information</b>	<b>8-1</b>	<b>Piston Ring Installation</b>	<b>8-6</b>
<b>Specifications</b>	<b>8-1</b>	<b>Piston Installation</b>	<b>8-7</b>
<b>Torque Values</b>	<b>8-1</b>	<b>Cylinder Installation</b>	<b>8-8</b>
<b>Special Tools</b>	<b>8-2</b>	<b>Cam Chain Tensioner</b>	<b>8-8</b>
<b>Troubleshooting</b>	<b>8-2</b>	<b>Lifter Removal</b>	<b>8-8</b>
<b>Cylinder Removal</b>	<b>8-3</b>	<b>Cam Chain Tensioner</b>	<b>8-10</b>
<b>Piston Removal</b>	<b>8-4</b>	<b>Lifter Installation</b>	
<b>Piston Ring Removal</b>	<b>8-4</b>		

## SERVICE INFORMATION

### GENERAL

- To service the cylinder piston, the engine must be removed from the frame.
- Be careful not to damage the mating surfaces by using a screw driver while 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.
- Take care not to damage the cylinder wall and piston.

### SPECIFICATIONS

CYLINDER/PISTON		ITEM	STANDARD	SERVICE LIMIT
Cylinder	I.D.		50.005-50.015 mm	50.10 mm
	Ovality		-	0.10 mm
	Taper		-	0.10 mm
	Warpage		-	0.10 mm
Piston	Piston O.D		49.980-49.995 mm	49.90 mm
	Piston pin hole I.D.		13.002-13.008 mm	13.04 mm
	Piston pin O.D.		12.994-13.000 mm	12.96 mm
	Piston-to-piston pin clearance		0.002-0.014 mm	0.07 mm
	Connecting rod small end I.D.		13.010-13.028 mm	13.06 mm
	Cylinder-to-piston clearance		0.010-0.030 mm	0.10 mm
	Connecting rod to piston pin clearance		0.010-0.034 mm	0.10 mm
	Piston ring-to-groove clearance	Top	0.015-0.050 mm	0.09 mm
		2nd	0.015-0.050 mm	0.09 mm
	Piston ring end gap	Top	0.10-0.25 mm	0.60 mm
		2nd	0.10-0.25 mm	0.70 mm
		Oil (Side rail)	0.20-0.70 mm	1.10 mm

	<b>TORQUE VALUES</b>
---	----------------------

<b>CAM CHAIN TENSIONER LIFTER PAN SCREW</b>	<b>: 0.4 kgf-m</b>
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For other nuts, bolts, fasteners etc. refer the standard torque values (SECTION-1).

CYLINDER/PISTON

	<b>SPECIAL TOOLS</b>
---	----------------------

	<b>PISTON SLIDE BASE PART NO: 070 HH 198 027</b>
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TROUBLE SHOOTING

Compression too low, hard to start or poor performance at low speed

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

Excessive smoke

- Worn cylinder or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Excessive noise

- Worn cylinder and piston
- Worn piston pin and piston pin hole

Overheating

- Excessive carbon deposit on piston or combustion chamber

# CYLINDER/PISTON

## CYLINDER REMOVAL

Remove the cylinder head (page 7-10).  
Lift the cylinder and remove it, ensure not to damage the piston with the stud bolts.  
Remove the air cleaner boot.

### CAUTION

Ensure not to damage the sliding surface of the piston and cylinder.

Remove the dowel pins and gasket.  
Clean any gasket material off the mating surface of the cylinder, be careful not to damage the mating surface.

## INSPECTION

Inspect the cylinder wall for scoring, wear or damage .  
Measure and record the cylinder I.D. at three levels in both X and Y axis.  
Take the maximum reading to determine the cylinder wear.

### SERVICE LIMIT

**CYLINDER I.D.: 50.10 mm**

Calculate the cylinder-to-piston clearance.

### SERVICE LIMIT

**CYLINDER TO PISTON CLEARANCE: 0.10 mm**

Calculate the cylinder out-of-round at three levels in X and Y axis. Take the maximum reading to determine the taper and ovality.

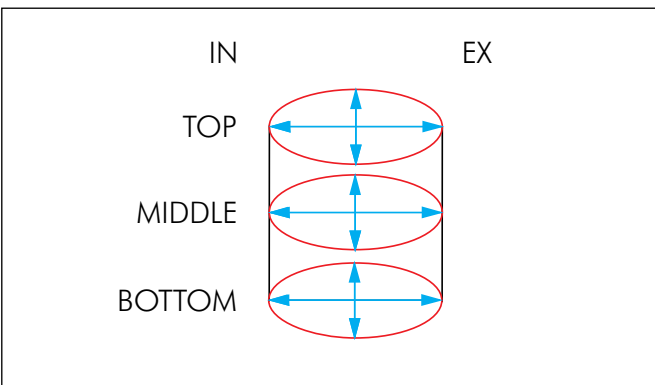
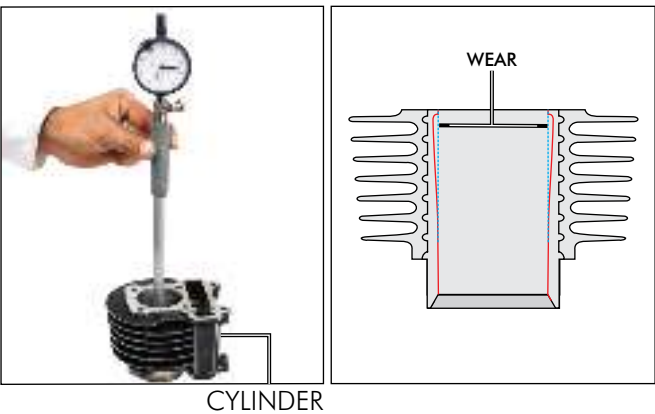
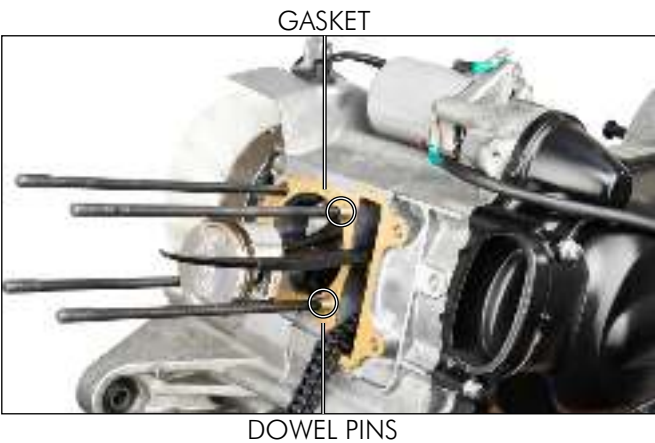
### SERVICE LIMIT

**TAPER : 0.10 mm**

**OVALITY : 0.10 mm**

The cylinder must be rebored and an oversize piston rings fitted if the service limit is exceeded.

The cylinder must be rebored so that the clearance between oversize piston and rebored cylinder should be maintained between 0.010-0.030 mm.

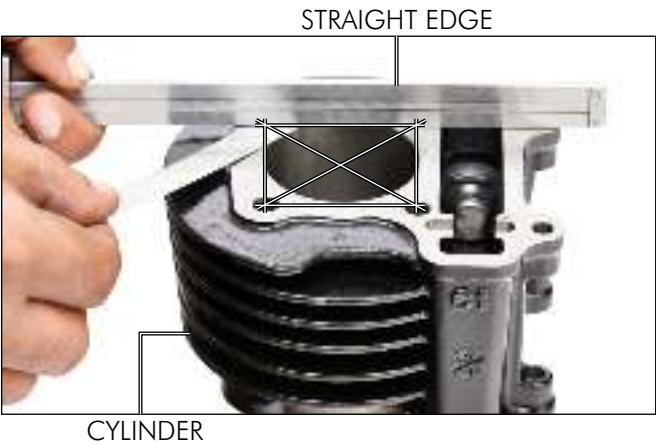


## CYLINDER/PISTON

Check the cylinder for warpage with a straight edge and a feeler gauge

**SERVICE LIMIT**

**CYLINDER WARPAGE: 0.10 mm**



### PISTON REMOVAL

**NOTE**

Place a lint free shop towel over the crankcase opening to prevent piston pin clips falling into the crankcase.

Remove the piston pin clip using nose plier.



8

Remove the piston pin by using blunt shaft and remove the piston.

**CAUTION**

- Do not damage or scratch the piston.
- Do not apply side force to the connecting rod.

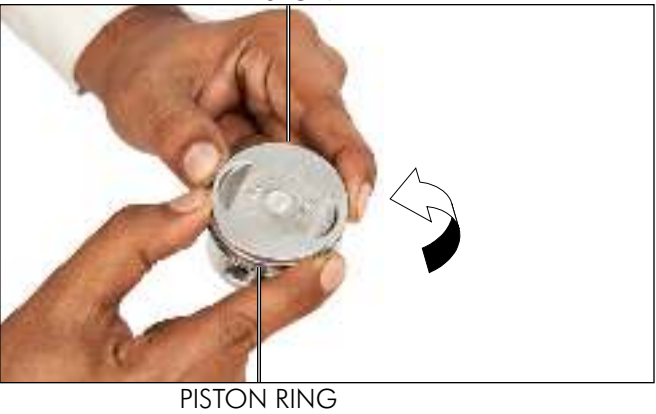


### PISTON RING REMOVAL

Spread each piston ring and remove it by lifting it up at a point opposite to the gap.

**CAUTION**

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston when the piston ring are being removed.



# CYLINDER/PISTON

## INSPECTION

Inspect the piston for cracks or other damages.  
Inspect the ring grooves for excessive wear and carbon build-up.  
Inspect the piston rings and replace them if they are damaged.  
Inspect the piston rings for movement by rotating the rings.  
The rings should be able to move in their grooves freely.

### NOTE

- Clean carbon deposits from the ring grooves with an old piston ring. Never use a wire brush since it will scratch the groove.
- Clean carbon deposits from the piston.

Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-groove clearance.

### SERVICE LIMIT

**TOP : 0.09 mm**

**SECOND : 0.09 mm**

Insert each piston ring into the bottom of the cylinder squarely using the piston.

Measure the ring end gap using a feeler gauge.

### SERVICE LIMIT

**TOP : 0.60 mm**

**SECOND : 0.70 mm**

**OIL (SIDE RAIL) : 1.10 mm**

Measure the piston O.D. 90° to the piston pin hole and at point 10 mm from bottom of the piston skirt.

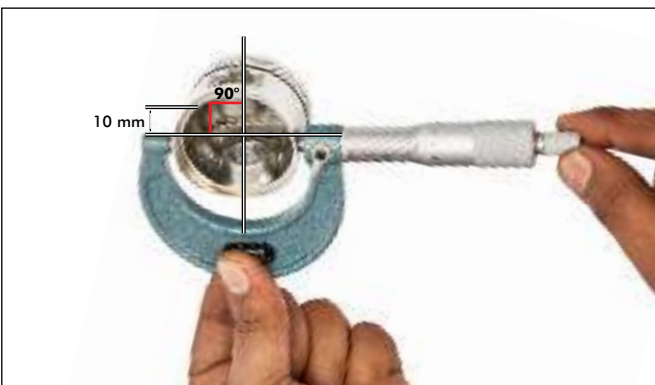
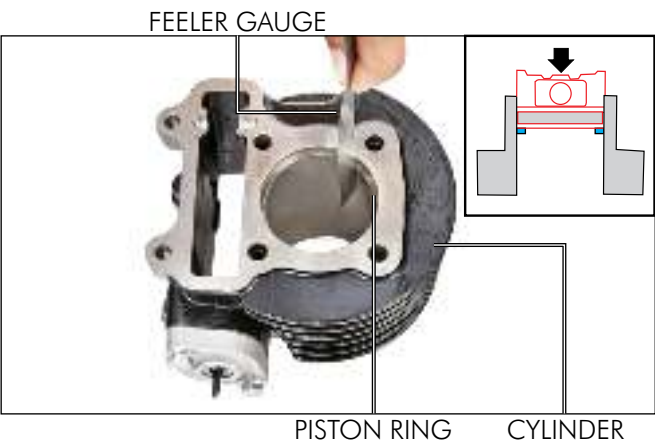
### SERVICE LIMIT

**PISTON O.D.: 49.90 mm**

Compare this measurement against the maximum cylinder I.D. measurement and calculate the cylinder-to-piston clearance.

### SERVICE LIMIT

**CYLINDER TO PISTON CLEARANCE: 0.10 mm**





## CYLINDER/PISTON

Measure piston pin hole I.D. in X and Y axis.

Take the maximum reading to determine the I.D.

### **SERVICE LIMIT**

**PISTON PIN HOLE I.D.: 13.04 mm**

Measure the piston pin O.D. at three points.

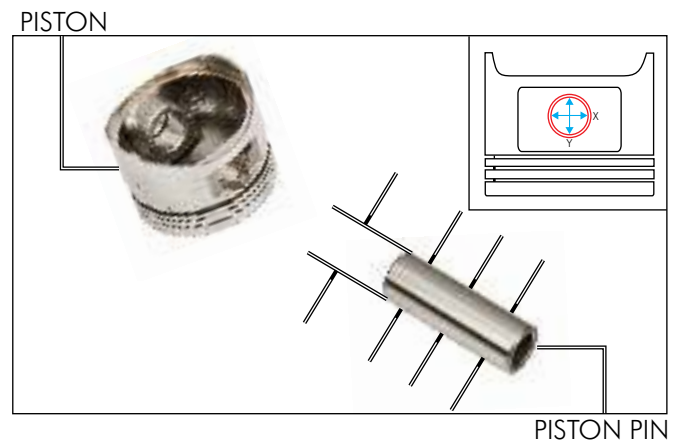
### **SERVICE LIMIT**

**PISTON PIN O.D.: 12.96 mm**

Calculate the piston-to-piston pin clearance.

### **SERVICE LIMIT**

**PISTON TO PISTON PIN CLEARANCE: 0.07 mm**



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Measure the connecting rod small end I.D.

### **SERVICE LIMIT**

**CONNECTING ROD SMALL END I.D.: 13.06 mm**

Calculate the connecting rod-to-piston pin clearance.

### **SERVICE LIMIT**

**CONNECTING ROD SMALL END TO PISTON  
PIN CLEARANCE: 0.10 mm**



## **PISTON RING INSTALLATION**

Clean the piston ring grooves thoroughly.

Carefully install the piston rings onto the piston with their markings facing up.

### **NOTE**

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston when the piston rings is installed.
- Do not mix the top and second rings.

Space the piston ring ends gaps 120° apart.

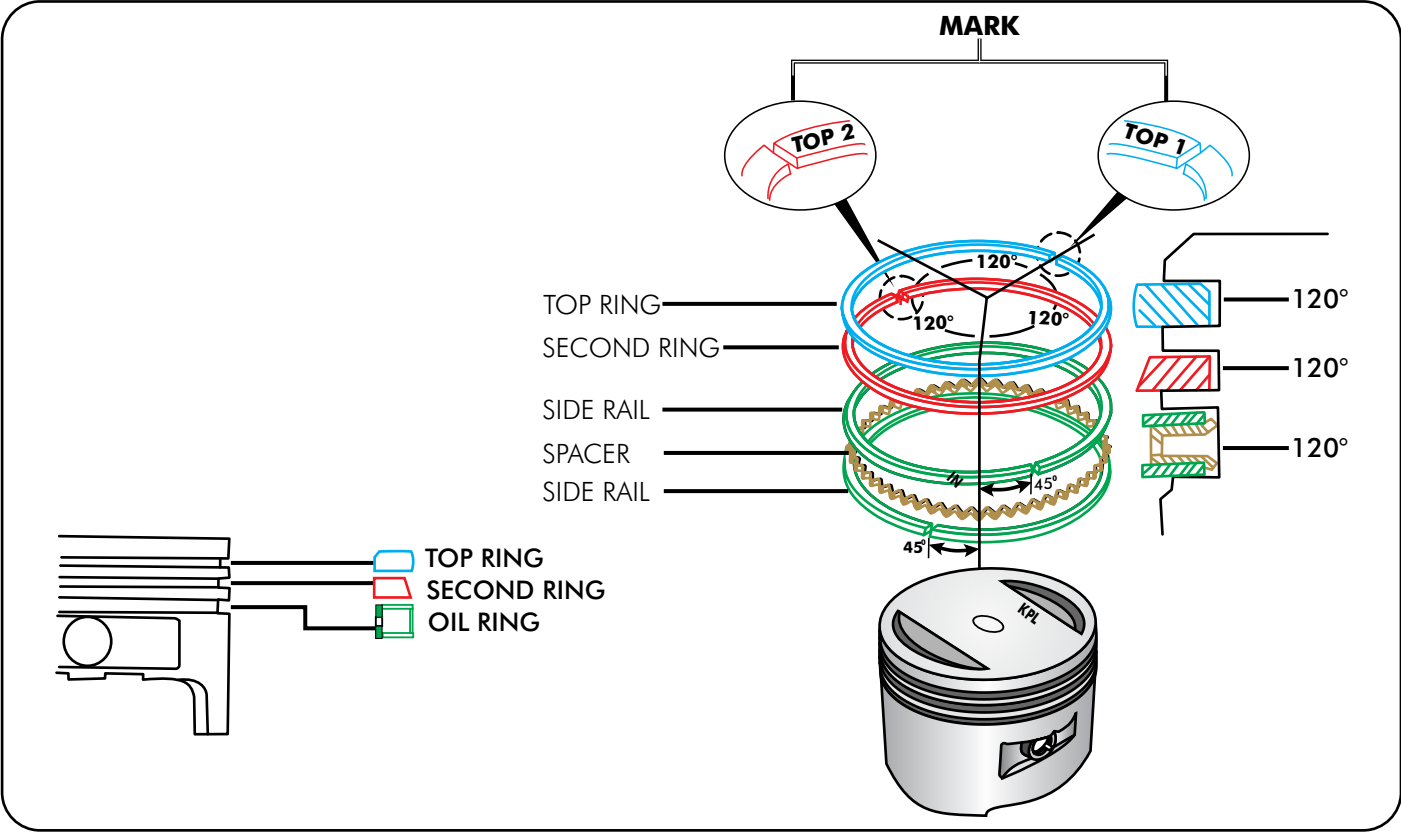
Do not align the gaps in the oil rings (side rails).

After installing the rings they should rotate freely in the ring grooves, without sticking.



8-6

# CYLINDER/PISTON



## PISTON INSTALLATION

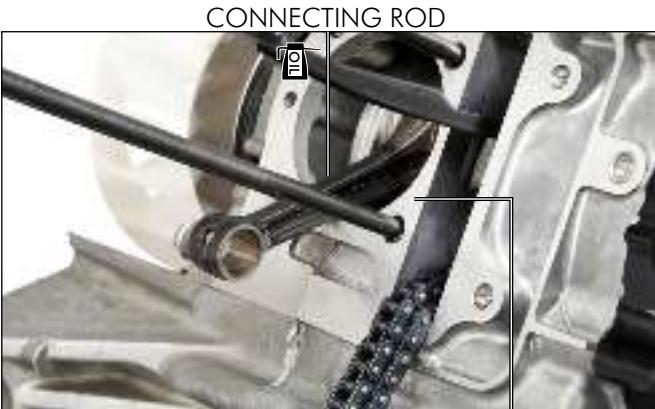
Clean any gasket material from the cylinder mating surface of the crankcase.

### NOTE

When cleaning the cylinder mating surface, place a lint free shop towel over the cylinder opening to prevent dirt entry in the engine.

Apply engine oil solution to the connecting rod small end inner surface.

Apply engine oil to the piston pin outer surfaces.  
Install the piston with the "IN" mark facing towards the intake side and insert the piston pin through the piston and connecting rod.



CYLINDER/PISTON

Install new piston pin clips into the grooves of the piston pin hole.

CAUTION

Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.

NOTE

- Place a lint free shop towel over the crankcase opening to prevent piston pin clips falling into the crankcase.
- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cut-out.

CYLINDER INSTALLATION

Install the dowel pins and new gasket.  
Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.

NOTE

- Remove any gasket material from the cylinder gasket surface on the crankcase using a scrapper.
- When cleaning the cylinder mating surface, place a lint free shop towel over the crankcase opening to prevent dirt entry in the engine.
- Do not reuse the gasket, replace with new one.

Place piston slide base under the piston.



PISTON SLIDE BASE

PART NO: 070 HH 198 027

Install the cylinder over the piston while compressing the piston rings with your fingers.  
Route the cam chain through the cylinder, remove the piston slide base and seat the cylinder onto the crankcase.  
Install the air cleaner boot.  
Install the cylinder head (page 7-19).

CAUTION

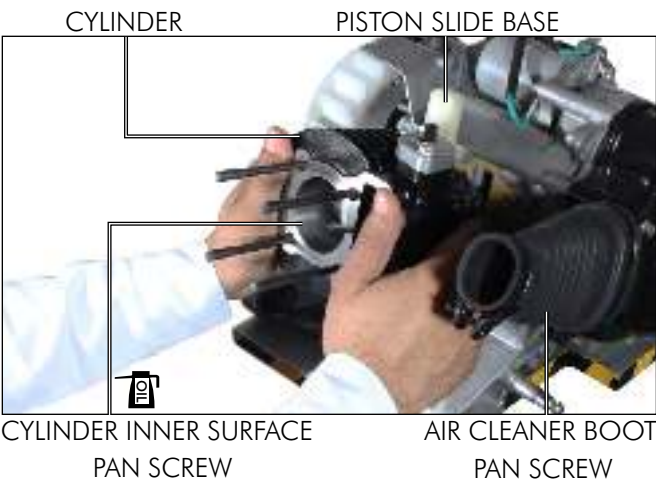
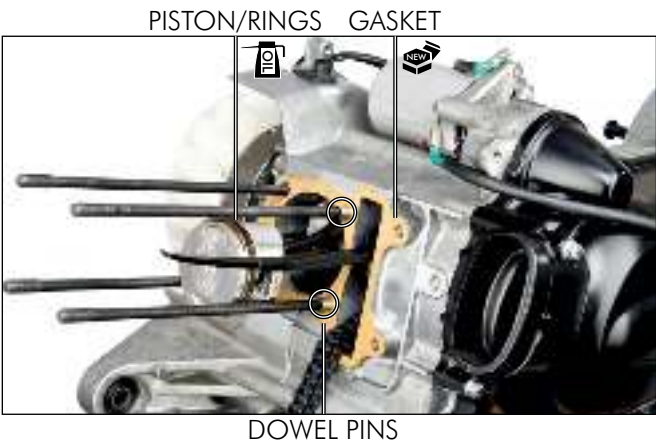
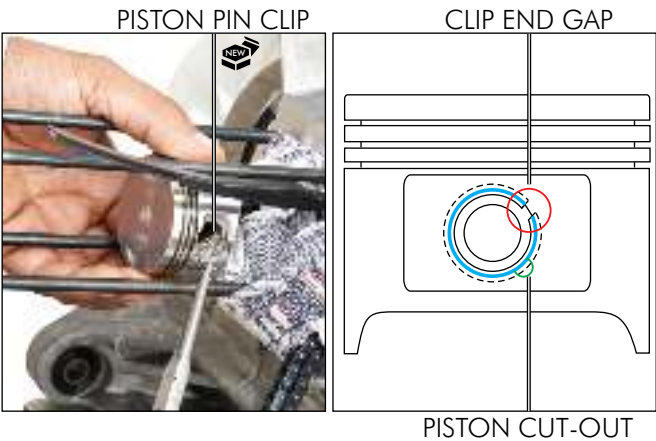
Be careful not to damage the piston rings and cylinder wall.

CAM CHAIN TENSIONER LIFTER REMOVAL

Remove the tensioner pan screw and O-ring.

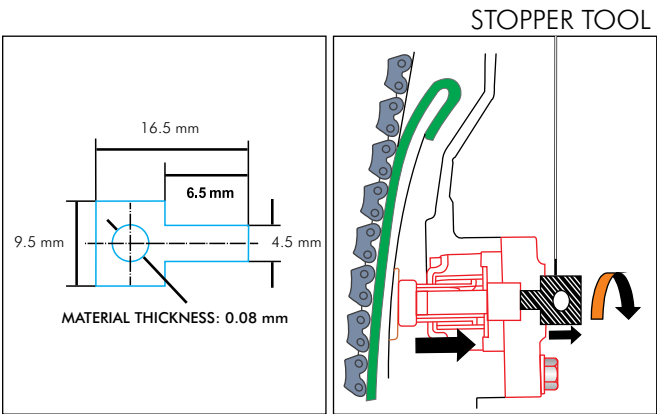
NOTE

Always use impact drive to remove the pan screw.



# CYLINDER/PISTON

Make a tensioner shaft stopper tool out of a thin piece of steel (0.8 mm thickness) using the diagram.  
Install the stopper tool to the cam chain tensioner lifter.



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.



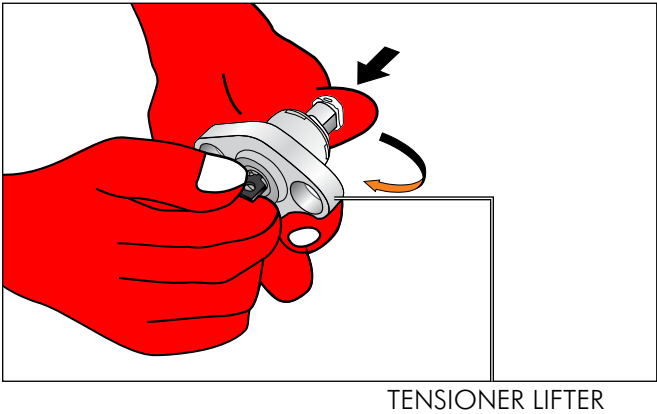
Remove the cam chain tensioner lifter and gasket.



## 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 tensioner lifter shaft clockwise with the stopper tool to retract the tensioner lifter, then insert the stopper fully to hold the tensioner lifter in the retracted position.

Install the cam chain tensioner lifter along with a new gasket.

NOTE

Never assemble the 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 tensioner lifter.

Apply clean engine oil to a new O-ring and install it to the lifter.

Install the tensioner lifter pan screw and tighten it to the specified torque.

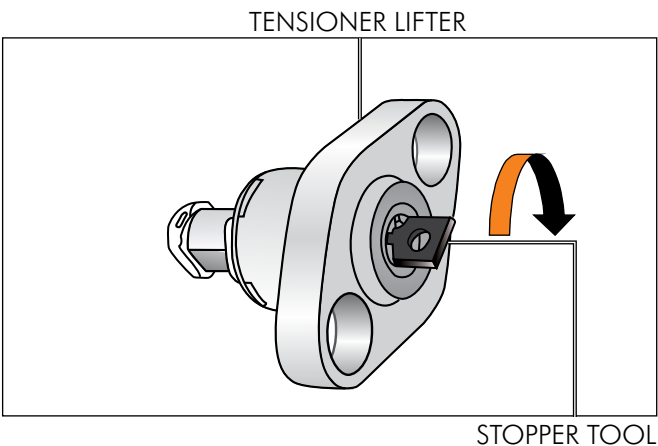
TORQUE

CAM CHAIN TENSIONER LIFTER PAN

SCREW: 0.4 kgf-m

NOTE

Always use impact drive to install the pan screw.





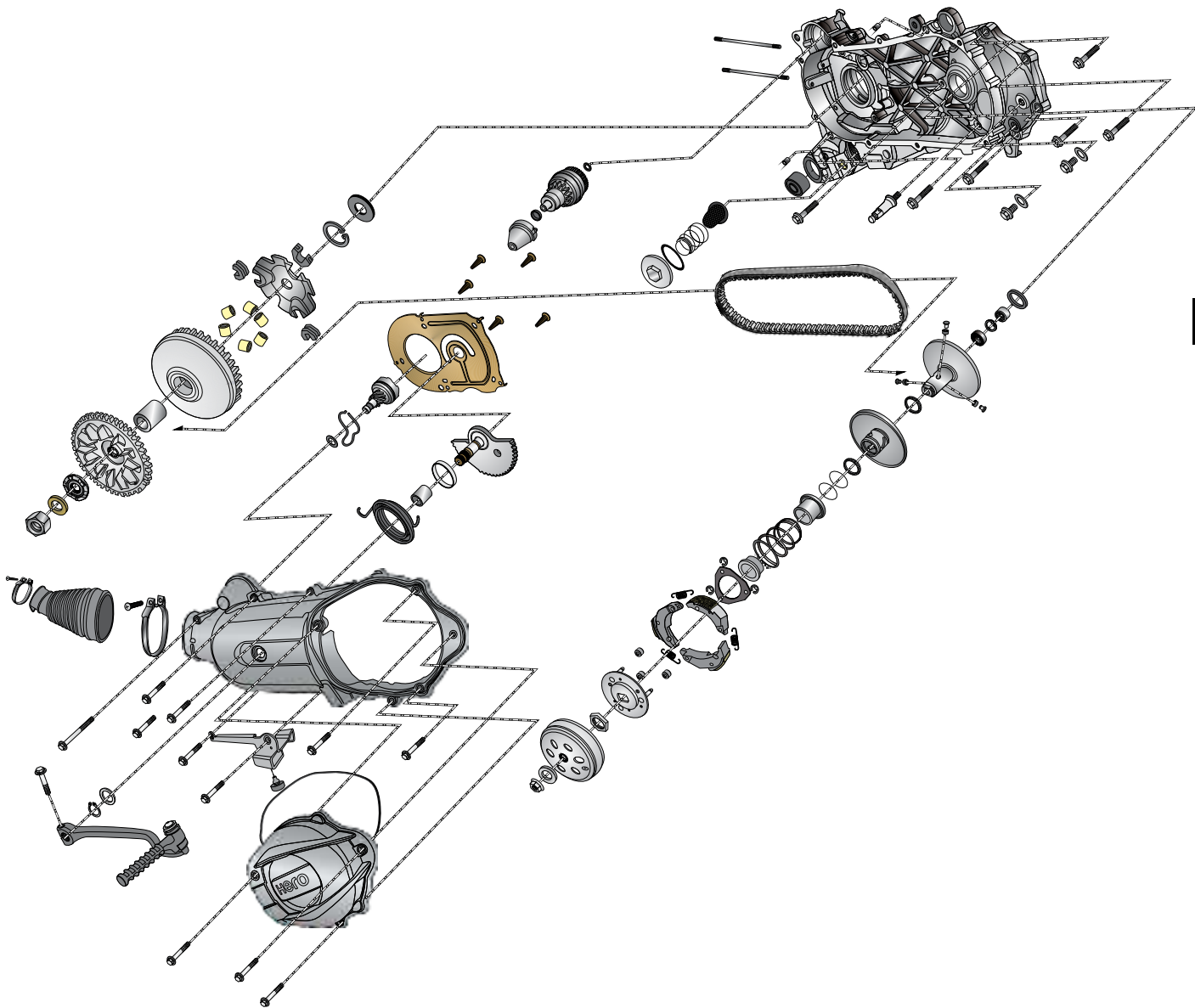
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## MEMO

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# 9. KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

## SYSTEM DIAGRAM



# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

<b>Service Information</b>	<b>9-1</b>	<b>Kick Starter/Left Crankcase</b>	
<b>Specifications</b>	<b>9-1</b>	<b>Cover Installation</b>	<b>9-8</b>
<b>Torque Values</b>	<b>9-1</b>	<b>Starter Pinion</b>	<b>9-10</b>
<b>Special Tools</b>	<b>9-2</b>	<b>Drive Pulley Removal</b>	<b>9-11</b>
<b>Troubleshooting</b>	<b>9-2</b>	<b>Drive Pulley Installation</b>	<b>9-13</b>
<b>Kick Starter/Left Crankcase</b>		<b>Clutch/Driven Pulley Removal</b>	<b>9-15</b>
<b>Cover Removal</b>	<b>9-3</b>	<b>Clutch/Driven Pulley Installation</b>	<b>9-21</b>

## SERVICE INFORMATION

### ⚠ WARNING

Never operate the starter motor with the left crankcase cover removed.

### GENERAL

- Kick starter/drive and drive pulleys/clutch can be serviced with the engine installed on the frame.
- Avoid getting grease and oil on the V-belt and pulley drive faces in order to prevent belt slippage.
- Do not apply grease to the movable drive face and weight rollers.

## SPECIFICATIONS

KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH ITEM		STANDARD	SERVICE LIMIT
Drive belt width		18.40 mm	17.50 mm
Movable drive face	Bush I. D.	20.035-20.085 mm	20.60 mm
	Boss O. D.	20.01-20.025 mm	19.98 mm
	Weight roller O. D.	17.92-18.08 mm	17.40 mm
Clutch	Outer I. D.	125.0-125.2 mm	125.5 mm
	Lining thickness	4.0 mm	2.0 mm
Driven pulley	Face spring free length	108.5 mm	92.20 mm
	Driven face O. D.	33.965-33.985 mm	33.94 mm
	Movable driven face I. D.	34.000-34.025 mm	34.06 mm


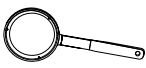

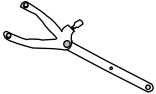
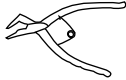

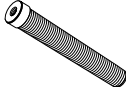



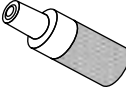


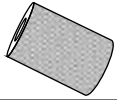



**TORQUE VALUES**

<b>COVER PLATE SCREW</b>	<b>: 0.3 kgf-m</b>
<b>DRIVE PULLEY FACE NUT</b>	<b>: 5.5 kgf-m</b>
<b>CLUTCH OUTER NUT</b>	<b>: 4.9 kgf-m</b>
<b>DRIVEN PULLEY FACE NUT</b>	<b>: 5.4 kgf-m</b>
<b>CRANKCASE MOUNTING BOLT</b>	<b>: 1.3 kgf-m</b>

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

# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

 <b>TOOL</b>	<b>SPECIAL TOOLS</b>		
	<b>DRIVE FACE HOLDER</b> <b>PART NO: 070 HH KTP 05</b>		<b>COLLET, 20 mm</b> <b>PART NO: 070HH KZN 003</b>
	<b>UNIVERSAL HOLDER</b> <b>PART NO: 070 HH 198 003</b>		<b>PIERER'S PLIER</b> <b>PART NO: 070 HH KFN 003</b>
	<b>DRIVEN FACE SPRING COMPRESSOR</b> <b>PART NO: 070 HH KZN 002</b>		<b>DRIVEN FACE BEARING REMOVER/INSTALLER</b> <b>PART NO: 070 HH KTP 09</b>
	<b>DRIVEN PULLEY FACE NUT SOCKET</b> <b>PART NO: 070 HH KTP 06</b>		<b>PILOT, 15 mm</b> <b>PART NO: 070 HH KFN 013</b>
	<b>CENTRIFUGAL CLUTCH SPRING REMOVER/INSTALLER</b> <b>PART NO: 070 HH KTP 08</b>		<b>HANDLE BEARING DRIVER</b> <b>PART NO: 070 HH KFN 008</b>
	<b>BEARING REMOVER SHAFT</b> <b>PART NO: 070 HH KFN 006</b>		<b>DRIVER OUTER, 24x27 mm</b> <b>PART NO: 070 HH KFN 021</b>
	<b>BEARING REMOVER WEIGHT</b> <b>PART NO: 070 HH KFN 007</b>		<b>PILOT, 20 mm</b> <b>PART NO: 070 HH KTN 006</b>

9

## TROUBLESHOOTING

### Engine starts but scooter does not move

- Worn drive belt
- Damaged ramp plate
- Worn or damaged clutch shoe
- Broken driven face spring
- Worn drive belt
- Damaged ramp plate
- Worn or damaged clutch shoe
- Broken driven face spring

### Engine stalls or scooter creeps

- Broken clutch shoe spring

### Poor performance at high speed or lack of power

- Worn drive belt
- Weak driven face spring
- Worn weight rollers
- Contaminated pulley faces

# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

## KICK STARTER/LEFT CRANKCASE COVER REMOVAL

Remove the left floor side cover (page 2-9).



LEFT FLOOR SIDE COVER

Loosen the air duct band screw and disconnect the air duct from the left crankcase cover.



SCREW

Remove the left crankcase rear component cover bolts (3 nos.).



COVER BOLTS  
COVER

Remove the left crankcase rear component cover.





# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Release the rear brake cable from the cable holder.  
Remove the left crankcase cover bolts (8 nos.).  
Remove the left crankcase cover.



Remove the dowel pins (2 nos.).



## DISASSEMBLY

Raise the lock tabs of the left crankcase cover plate.  
Remove the screws (5 nos.) and left crankcase cover plate.

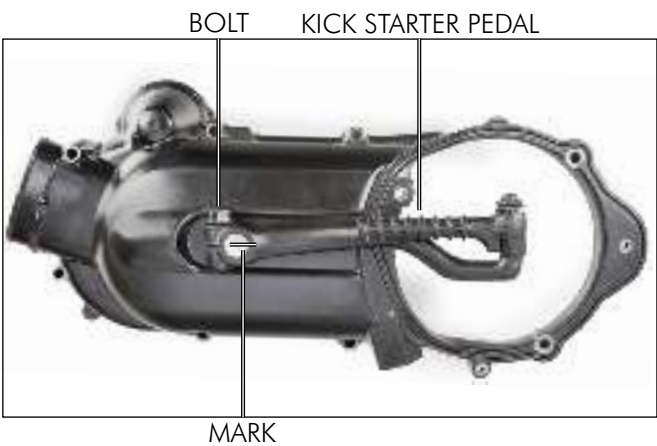


Remove the kick starter driven gear while moving the kick starter pedal.  
Remove the thrust washer.

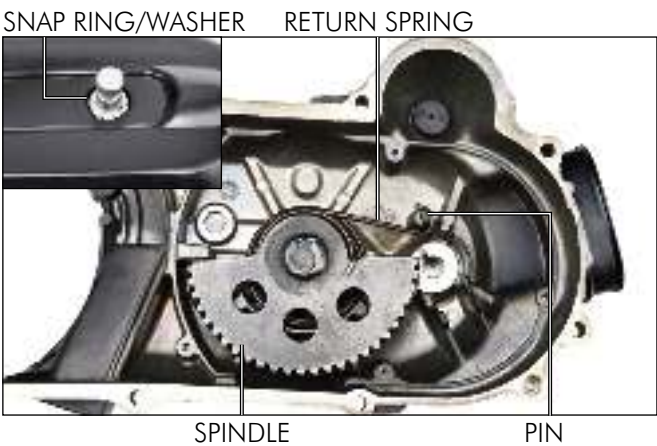


# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

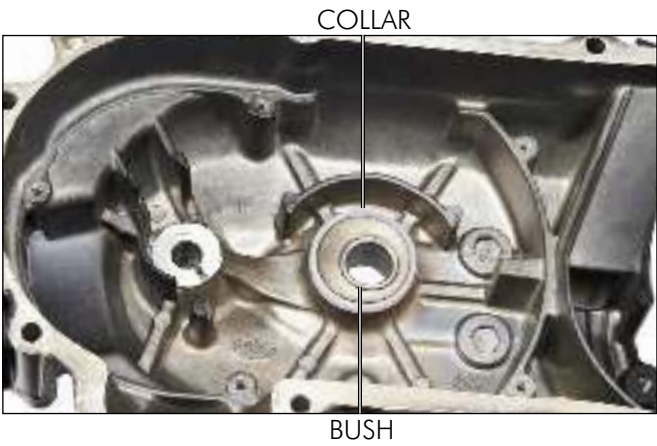
Before removing the kick starter pedal, mark the pedal and spindle for proper installation position.  
Remove the bolt and the kick starter pedal.



Unhook the return spring from the pin on the crankcase cover.  
Remove the snap ring and washer.  
Remove the kick starter spindle and return spring.



Remove the spindle bush and collar.



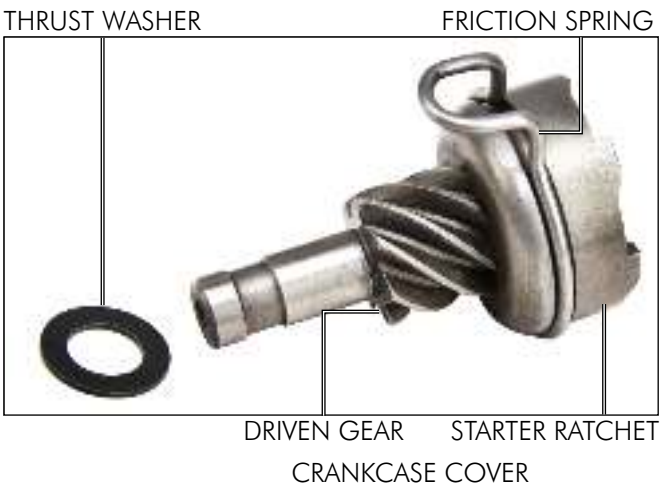
## INSPECTION

- Inspect the following:-
- Spindle for wear or damage
  - Gear teeth for wear or damage
  - Return spring for weakness or damage
  - Bush for wear or damage



# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

- Driven gear for wear or damage.
- Friction spring for weakness or damage.
- Starter ratchet teeth of the drive pulley face for wear or damage.

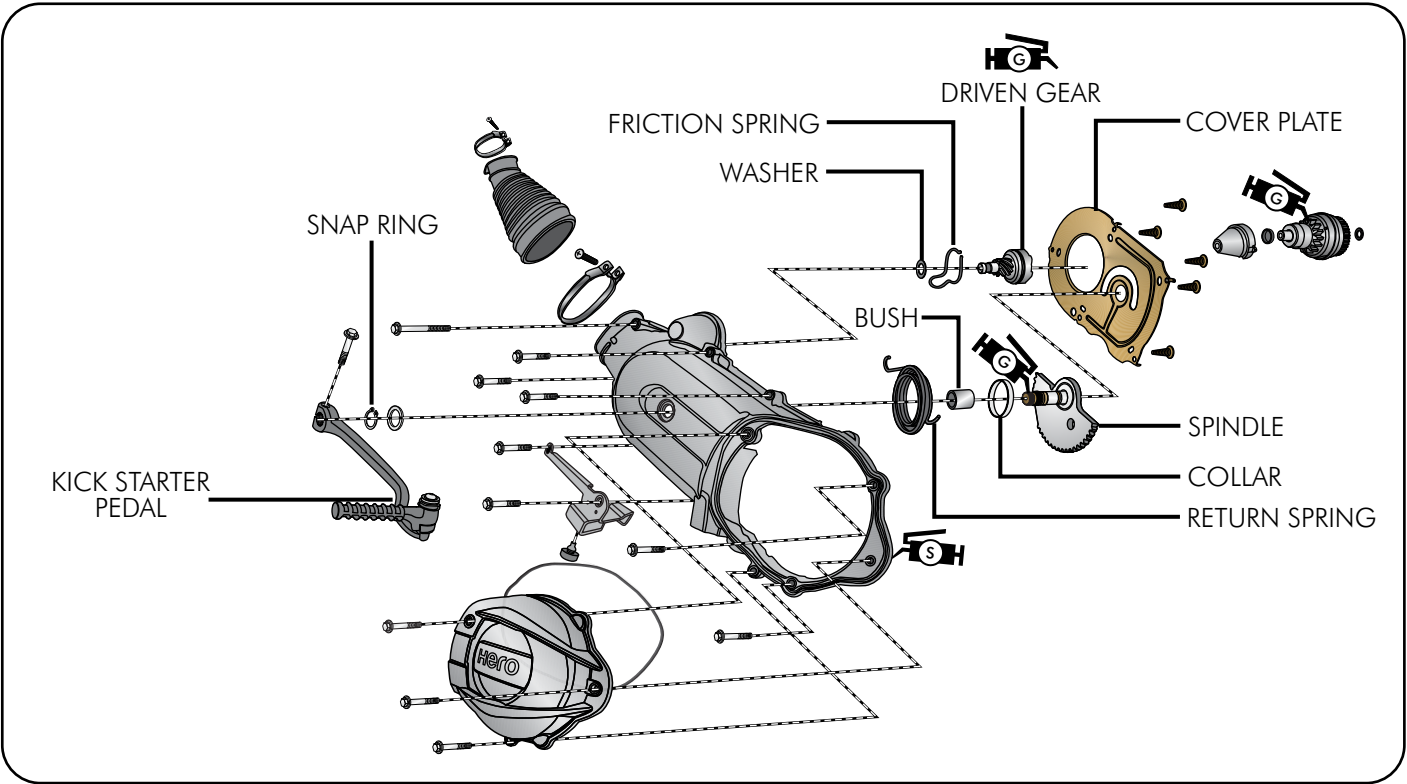


- Check crankcase cover for wear or damage.



9

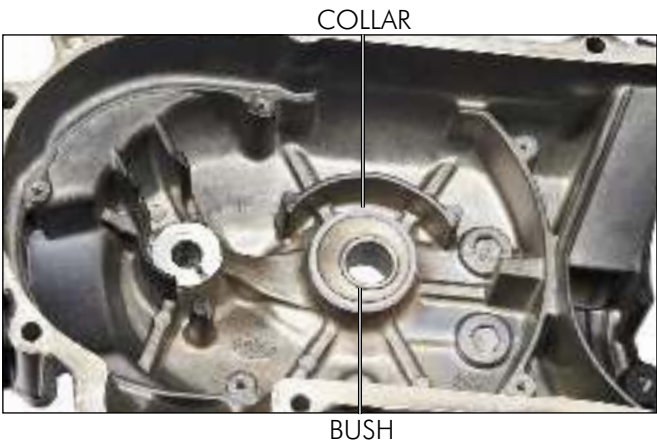
## ASSEMBLY



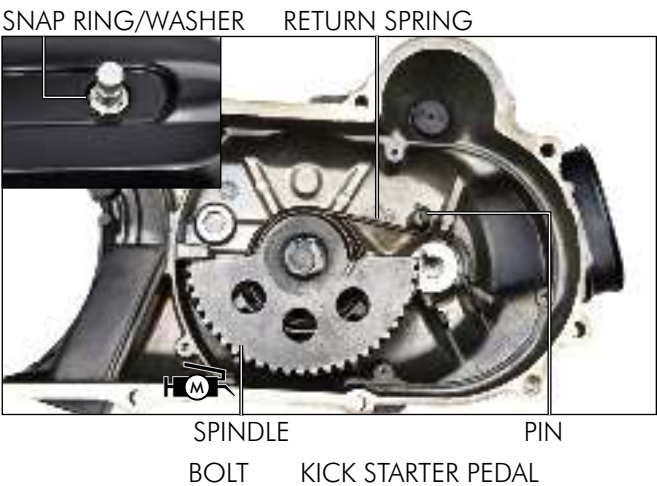


# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Install the bush and collar into the left crankcase cover.



Apply moly paste (0.1-0.3 gm) to the kick starter spindle journal.  
Install the spindle and return spring into the crankcase cover and hook the short end of the spring to the spindle groove.  
(Do not hook the long end of the spring).  
Install the washer and snap ring to secure the spindle.  
Make sure that the snap ring is seated into the spindle groove securely, then hook the long end of the return spring to the pin on the crankcase cover.



Install the kick starter pedal in its original position as marked during removal and tighten the bolt.

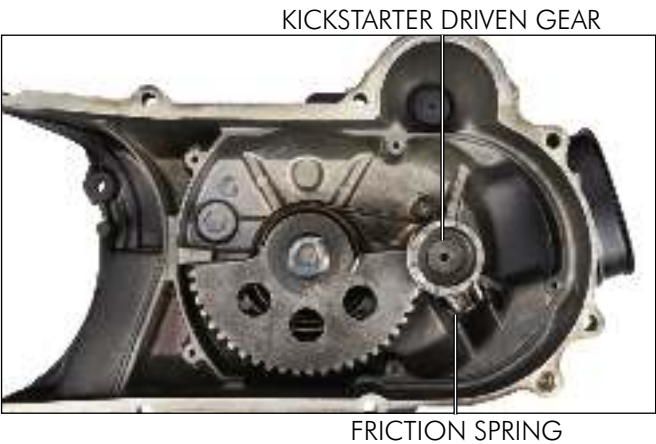


Install the new thrust washer onto the crankcase cover.  
Apply moly paste (0.2-0.3 gm) to the driven gear shaft bearing area and friction spring sliding area.  
Turn the kick starter pedal and hold it.  
Install the driven gear while aligning the friction spring.



# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Hook with the groove in the crankcase cover and return the pedal to engage the driven gear and spindle gear.

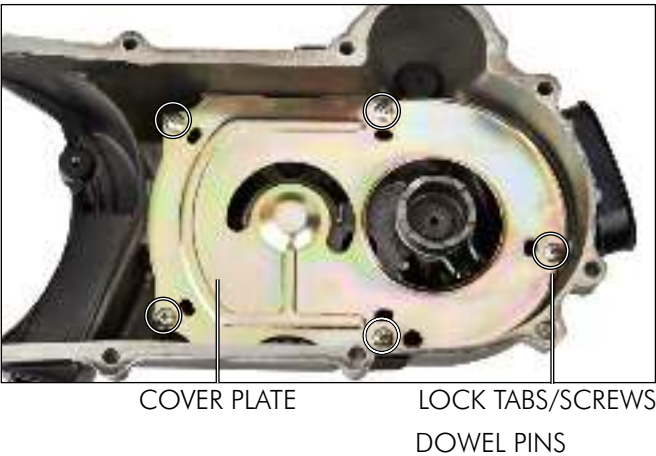


Install the left crankcase cover plate and tighten the screws (5nos.).

**TORQUE**

**COVER PLATE SCREW: 0.3 kgf-m**

Bend the lock tabs of the cover plate against the screw heads.

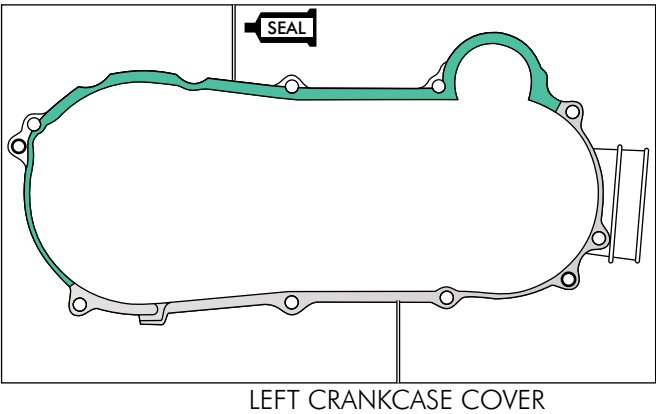


## KICK STARTER/LEFT CRANKCASE COVER INSTALLATION

Clean the left crankcase and crankcase cover mating surface thoroughly, and ensure not to damage the mating surface. Install the dowel pins (2 nos.).



Apply liquid gasket on the left crankcase cover mating surface (only in the shaded area as shown).





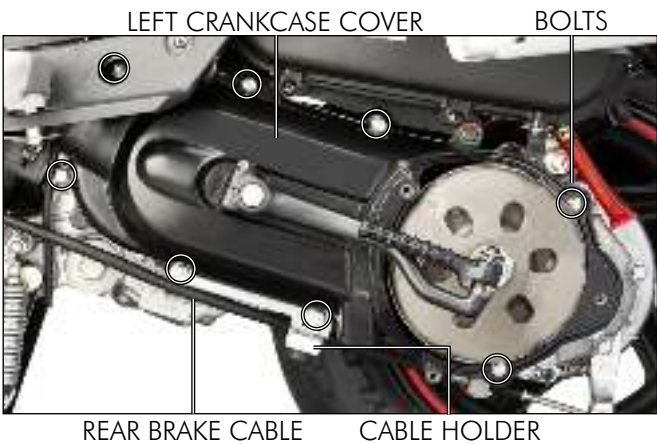
# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Install the left crankcase cover with cable holder.  
Install and tighten the bolts in a crisscross pattern in 2 or 3 steps to the specified torque.

**TORQUE**

**CRANKCASE MOUNTING BOLT: 1.3 kgf-m**

Route the rear brake cable into the cable holder.



Install the left crankcase rear component cover.



Install and tighten the left crankcase rear component cover bolts.



Connect the air duct to the left crankcase cover.  
Install and tighten the band screw securely.  
After installation, check that the kick starter pedal operates properly.



## KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Install the left floor side cover (page 2-9).



LEFT FLOOR SIDE COVER

STARTER PINION HOLDER

### STARTER PINION REMOVAL

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

Remove the starter pinion holder.



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Remove the starter pinion and washer



STARTER PINION

WASHER

### INSPECTION

Check that the starter pinion operates smoothly.

Check the pinion gear teeth and shaft for wear or damage.

Check the starter driven gear teeth of the drive pulley face for wear or damage.



STARTER PINION

# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

## INSTALLATION

Apply grease (0.1-0.3 gm) to the starter pinion shaft journal.  
Install the new washer and starter pinion into the left crankcase.



Install the starter pinion holder by aligning its bosses with the grooves in the left crankcase.  
Install the left crankcase cover (page 9-9).

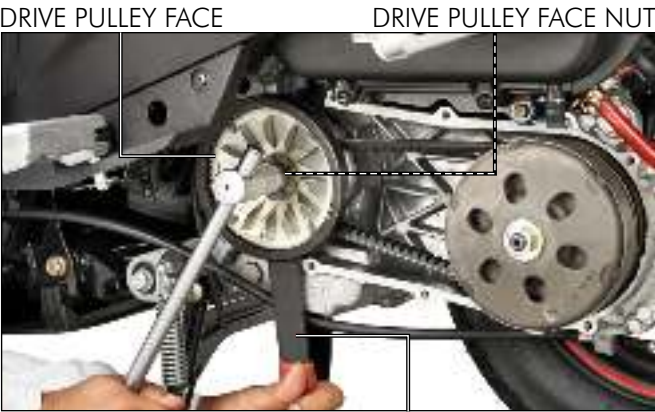


## DRIVE PULLEY REMOVAL

Remove the starter pinion (page 9-10).  
Hold the drive pulley face with drive face holder and loosen the drive pulley face nut.



**DRIVE FACE HOLDER**  
**PART NO: 070 HH KTP 05**



Remove the nut, washer, ratchet starter and drive pulley face.



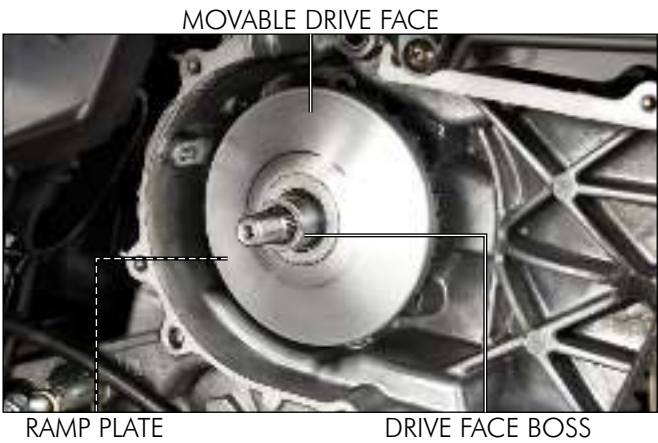


# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Remove the drive belt from the crankshaft.

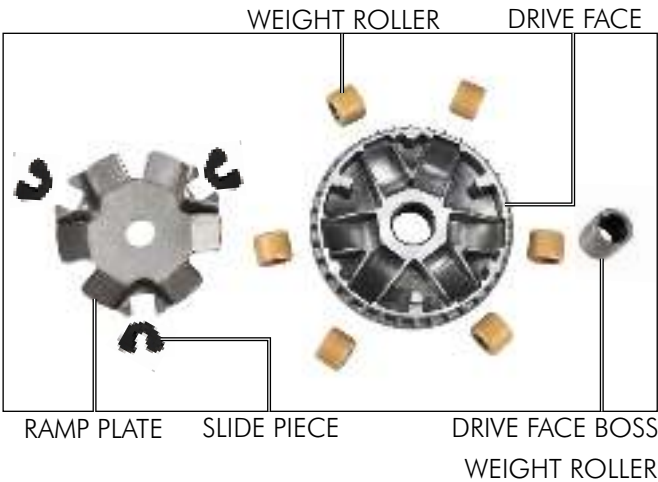


Hold the movable drive face, ramp plate at the back of the face and drive face boss together and remove them from the crankshaft as an assembly.



Disassemble the following parts:-

- Drive face boss
- Drive face
- Ramp plate
- Slide pieces
- Weight rollers



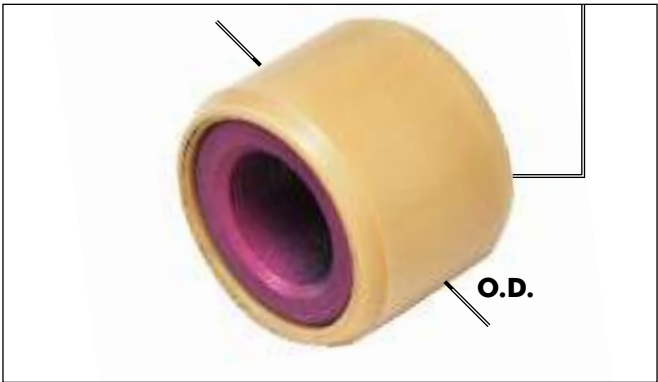
## INSPECTION

### WEIGHT ROLLER

Check each roller for wear or damage.  
Measure the weight roller O.D.

### SERVICE LIMIT

**WEIGHT ROLLER O.D.: 17.40 mm**



# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

## MOVABLE DRIVE FACE-BOSS

Check the drive face boss for wear or damage. Measure the boss O.D.

### SERVICE LIMIT

**DRIVE FACE BOSS O.D.: 19.98 mm**

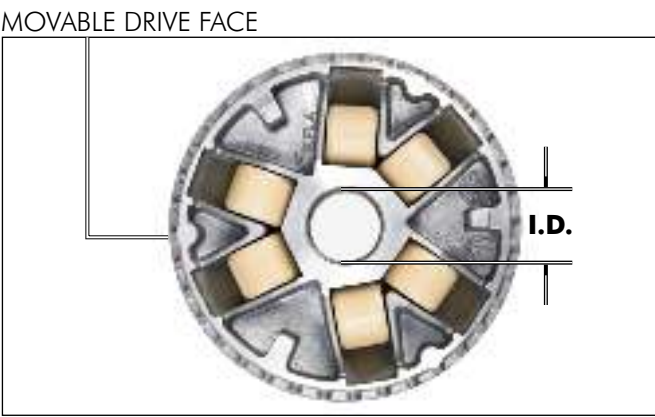


## MOVABLE DRIVE FACE

Measure the movable drive face bush I.D.

### SERVICE LIMIT

**MOVABLE DRIVE FACE BUSH I.D.: 20.60 mm**



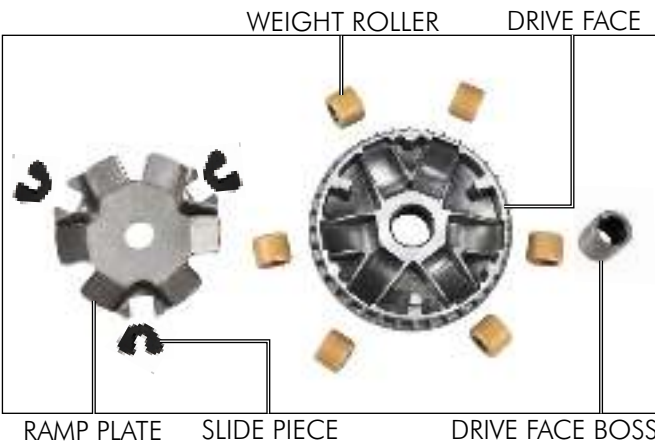
## DRIVE PULLEY INSTALLATION

### NOTE

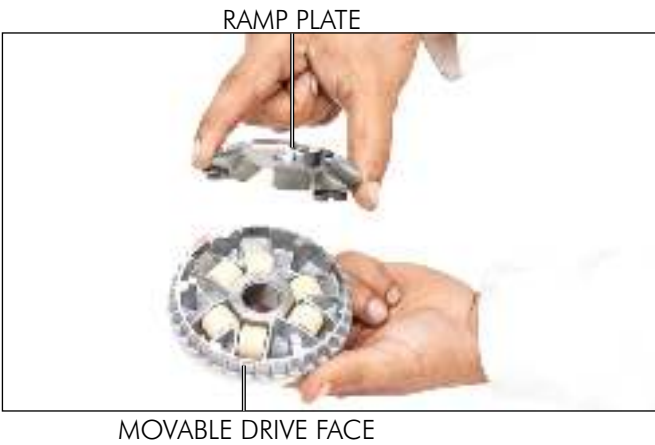
- Clean any oil and grease from the pulley faces.
- Replace the drive belt, if found contaminated.
- Do not apply grease to the movable drive face and weight rollers.

Install the weight rollers into the movable drive face.

Install the slide pieces on the ramp plate.



Install the ramp plate over the movable drive face.



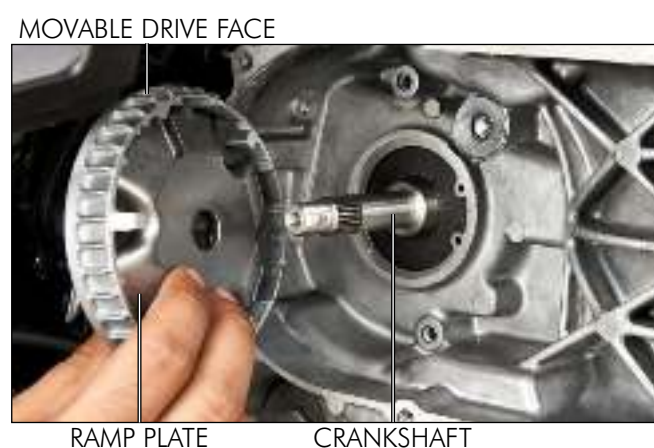


## KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

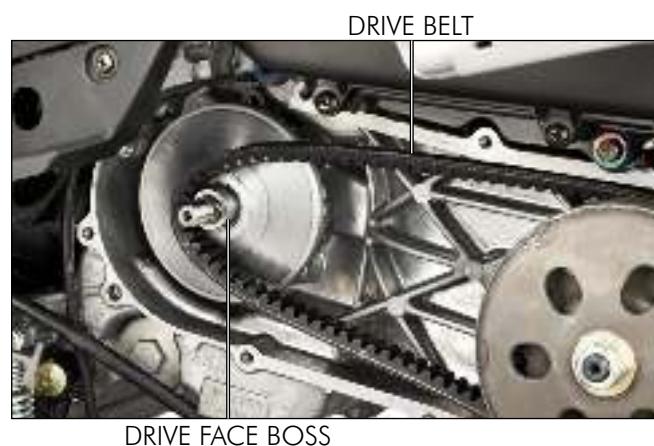
Install the drive face boss into the movable drive face.



Install the movable drive face assembly on the crankshaft while holding the ramp plate.



Install the drive belt on the drive face boss.



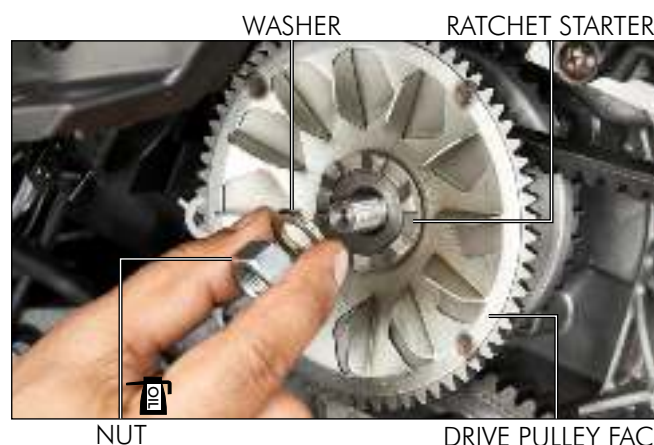
Squeeze the drive belt into the driven pulley grooves so that it slackens enough to install drive pulley face on to the crankshaft.

Install the drive pulley face, starter ratchet, washer and nut.

Apply oil to the drive pulley face nut threads and seating surface and install it.

### NOTE

Ensure the starter ratchet has seated completely on the crankshaft splines.



# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Hold the drive pulley face with the drive face holder and tighten the drive pulley face nut to the specified torque.



**DRIVE FACE HOLDER**

**PART NO: 070 HH KTP 05**

**TORQUE**

**DRIVE PULLEY FACE NUT: 5.5 kgf-m**

Install the starter pinion (page 9-11).



DRIVE PULLEY FACE NUT

DRIVE FACE HOLDER

## CLUTCH/DRIVEN PULLEY REMOVAL

Remove the drive pulley (page 9-12).

Hold the clutch outer with universal holder and remove the clutch outer nut/washer.

Remove the clutch outer.



**UNIVERSAL HOLDER**

**PART NO: 070 HH 198 003**



CLUTCH OUTER NUT/WASHER

UNIVERSAL HOLDER

CLUTCH OUTER

Remove the clutch/driven pulley assembly from the drive shaft along with the belt.



CLUTCH/DRIVEN PULLEY ASSEMBLY

DRIVE BELT

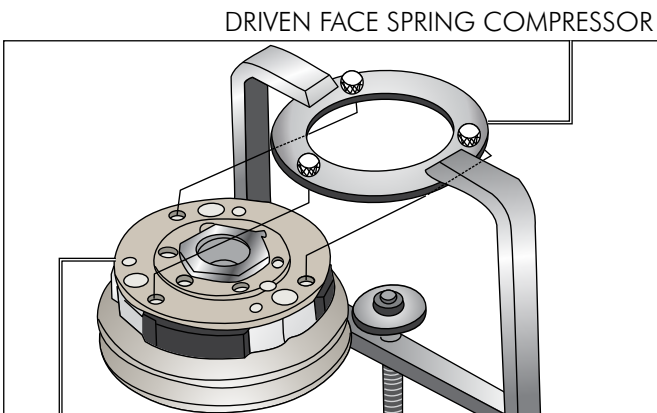
Set the clutch spring compressor onto the clutch/driven pulley, aligning the bosses with the holes in the clutch.



**DRIVEN FACE SPRING COMPRESSOR**

**PART NO: 070 HH KZN 002**

Hold the clutch spring compressor tool in a vice.



DRIVEN FACE SPRING COMPRESSOR

CLUTCH/DRIVEN PULLEY

KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Remove the clutch/driven pulley face nut using the socket wrench.



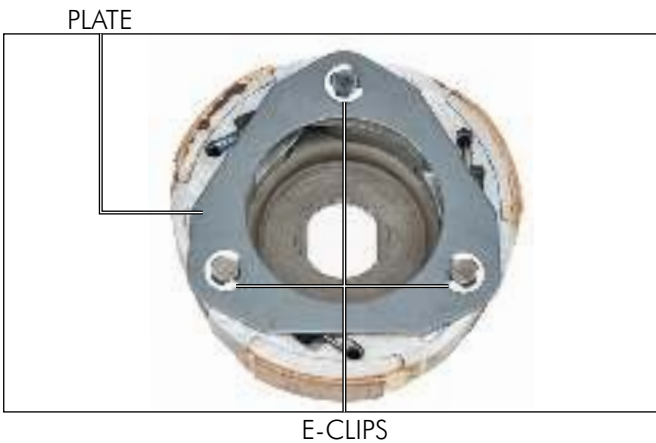
**DRIVEN PULLEY FACE NUT SOCKET**  
**PART NO: 070 HH KTP 06**

Loosen the spring compressor and remove the following:-

- Driven pulley
- Driven face spring
- Spring seat
- Clutch



Remove the E-clips (3 nos.) and plate.



9

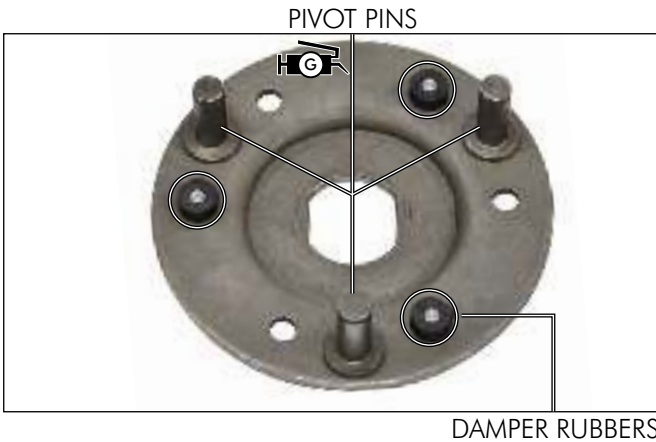
Remove the clutch shoe springs and clutch shoes from the clutch drive plate.



**CENTRIFUGAL CLUTCH SPRING REMOVER/INSTALLER**  
**PART NO: 070 HH KTP 08**



Remove the damper rubbers (3 nos.).



# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

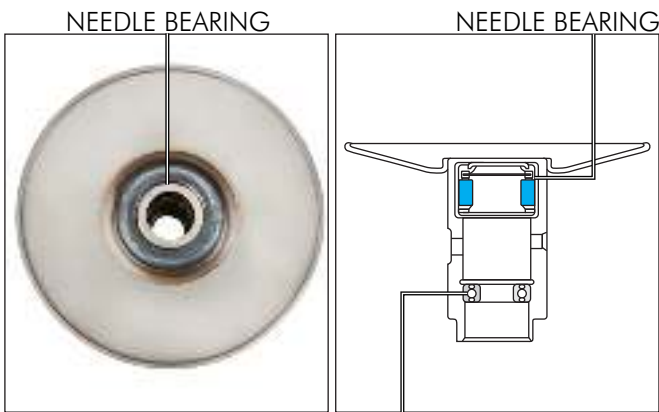
Remove the seal collar.  
Remove the guide roller pins (3 nos.).  
Remove the movable driven face from the driven face.

Remove the oil seals and O-rings from the movable driven face.



## DRIVEN FACE BEARING REPLACEMENT

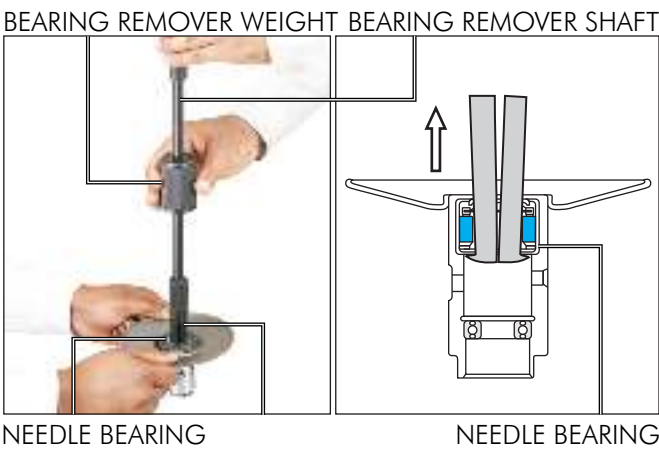
Place the driven face with the needle bearing facing upwards.



Remove the needle bearing using the special tool.



**BEARING REMOVER SHAFT**  
**PART NO: 070 HH KFN 006**  
**BEARING REMOVER WEIGHT**  
**PART NO: 070 HH KFN 007**  
**COLLET, 20 mm**  
**PART NO: 070HH KZN 003**



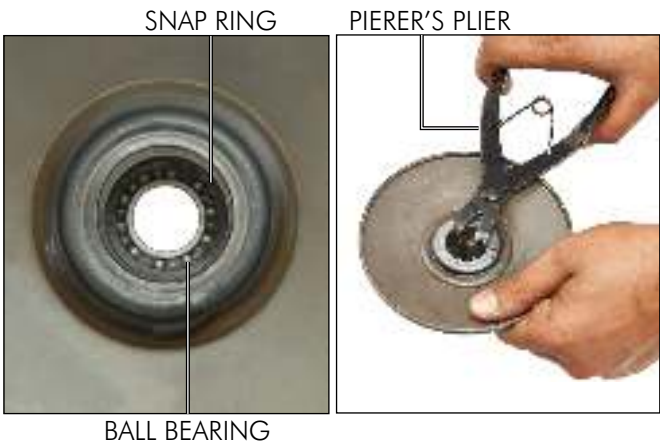


KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Remove the snap ring.



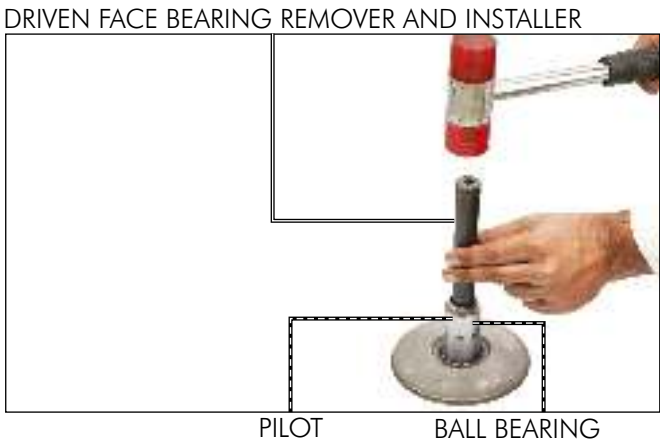
**PIERER'S PLIER**  
**PART NO: 070 HH KFN 003**



Drive the ball bearing out of the driven face with the special tool using a mallet.



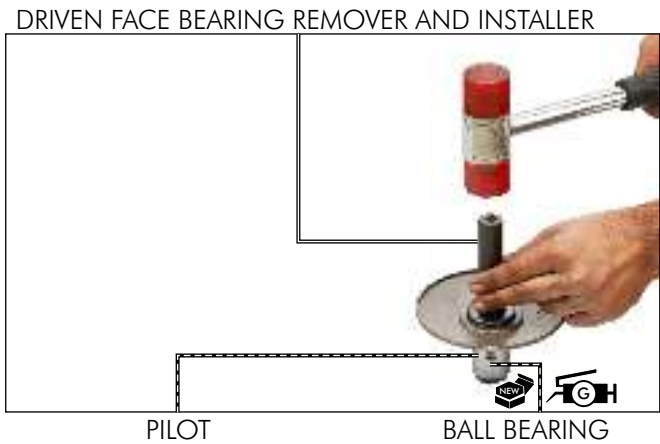
**DRIVEN FACE BEARING REMOVER/INSTALLER**  
**PART NO: 070 HH KTP 09**  
**PILOT, 15 mm**  
**PART NO: 070 HH KFN 013**



Pack new ball bearing cavities with grease.  
Drive the ball bearing into the driven face with the sealed side facing down using the special tool with a mallet.



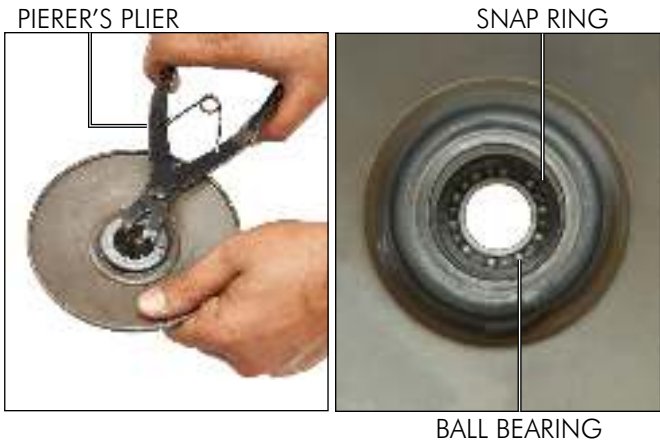
**DRIVEN FACE BEARING REMOVER/INSTALLER**  
**PART NO: 070 HH KTP 09**  
**PILOT, 15 mm**  
**PART NO: 070 HH KFN 013**



Install the snap ring properly into the driven face groove.



**PIERER'S PLIER**  
**PART NO: 070 HH KFN 003**





# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Pack the inside of the driven face with 5.0-5.5 gm of grease.  
Apply grease to the new needle bearing.  
Drive the needle bearing into the driven face with the markings facing up.



**HANDLE BEARING DRIVER**  
**PART NO: 070HH KFN 008**  
**DRIVER OUTER, 24x27 mm**  
**PART NO: 070 HH KFN 021**  
**PILOT, 20 mm**  
**PART NO: 070 HH KTN 006**

## DRIVE BELT INSPECTION

Check the drive belt for cracks, separation and wear.  
Replace, if necessary.

### NOTE

- Do not bend the belt against it's natural bend to see the crack.
- Replace the belt if belt cracks reaches till the cord as shown.

Measure the width of the drive belt as shown.  
Replace the belt if the service limit is exceeded.

### SERVICE LIMIT

**DRIVE BELT WIDTH: 17.50 mm**

### NOTE

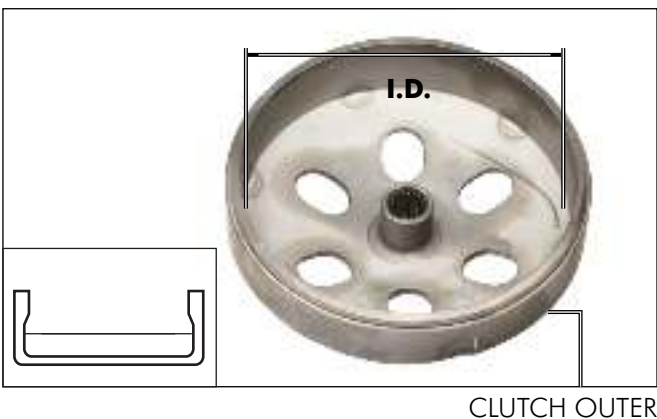
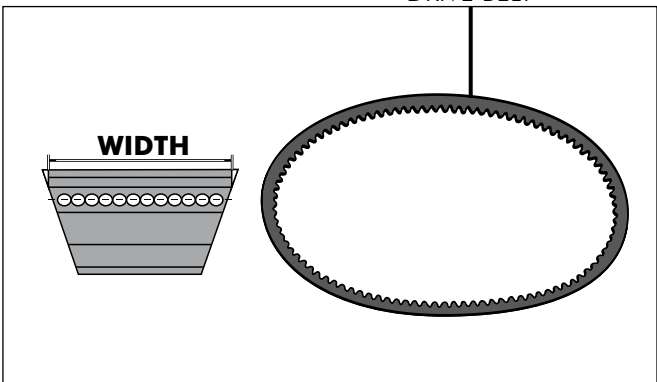
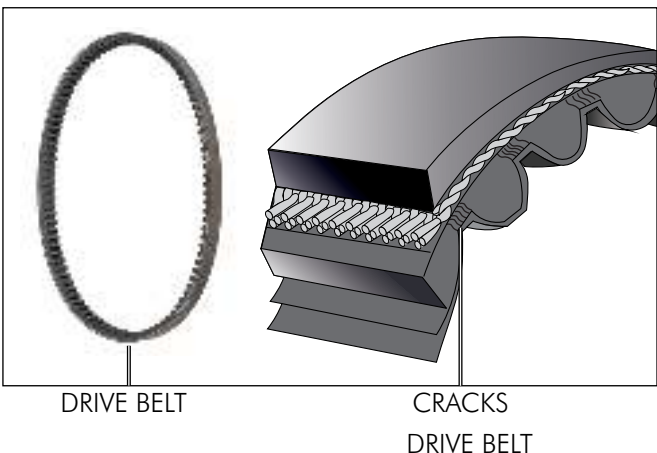
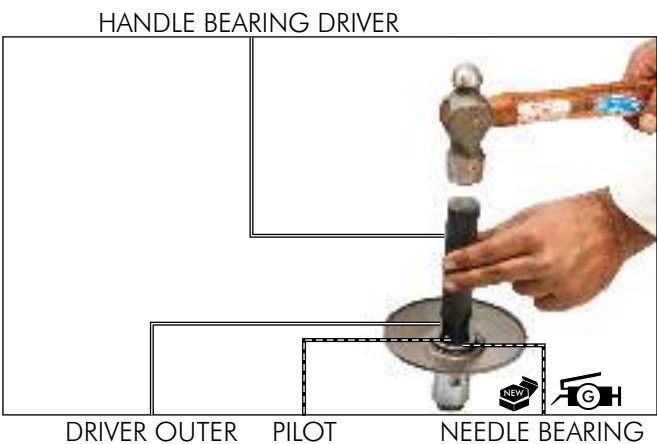
- Use a genuine Hero MotoCorp replacement drive belt.
- Avoid presence of oil or grease on the drive belt or pulley face.
- Clean off any grease or oil before reinstalling.

## CLUTCH OUTER

Check the clutch outer for wear or damage.  
Measure the clutch outer I.D.

### SERVICE LIMIT

**CLUTCH OUTER I.D.: 125.5 mm**



## KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

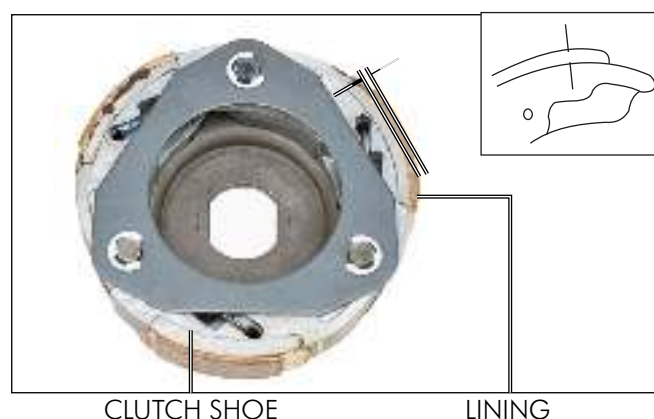
### CLUTCH SHOE LINING

Check the clutch shoe for wear or damage.

Measure the thickness of each shoe.

#### SERVICE LIMIT

**CLUTCH SHOE LINING THICKNESS: 2.0 mm**



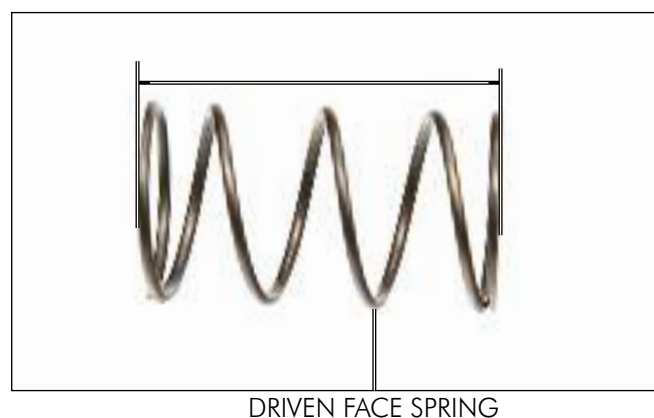
### DRIVEN FACE SPRING

Measure the driven face spring free length.

#### SERVICE LIMIT

### DRIVEN PULLEY FACE SPRING

**FREE LENGTH: 92.20 mm**



### DRIVEN FACE

Check the driven face for wear or damage.

Measure the driven face O.D.

#### SERVICE LIMIT

**DRIVEN FACE O.D.: 33.94 mm**



### MOVABLE DRIVEN FACE

Check the movable driven face for wear, scratches or damage.

Measure the movable driven face I.D.

#### SERVICE LIMIT

**MOVABLE DRIVEN FACE I.D.: 34.06 mm**



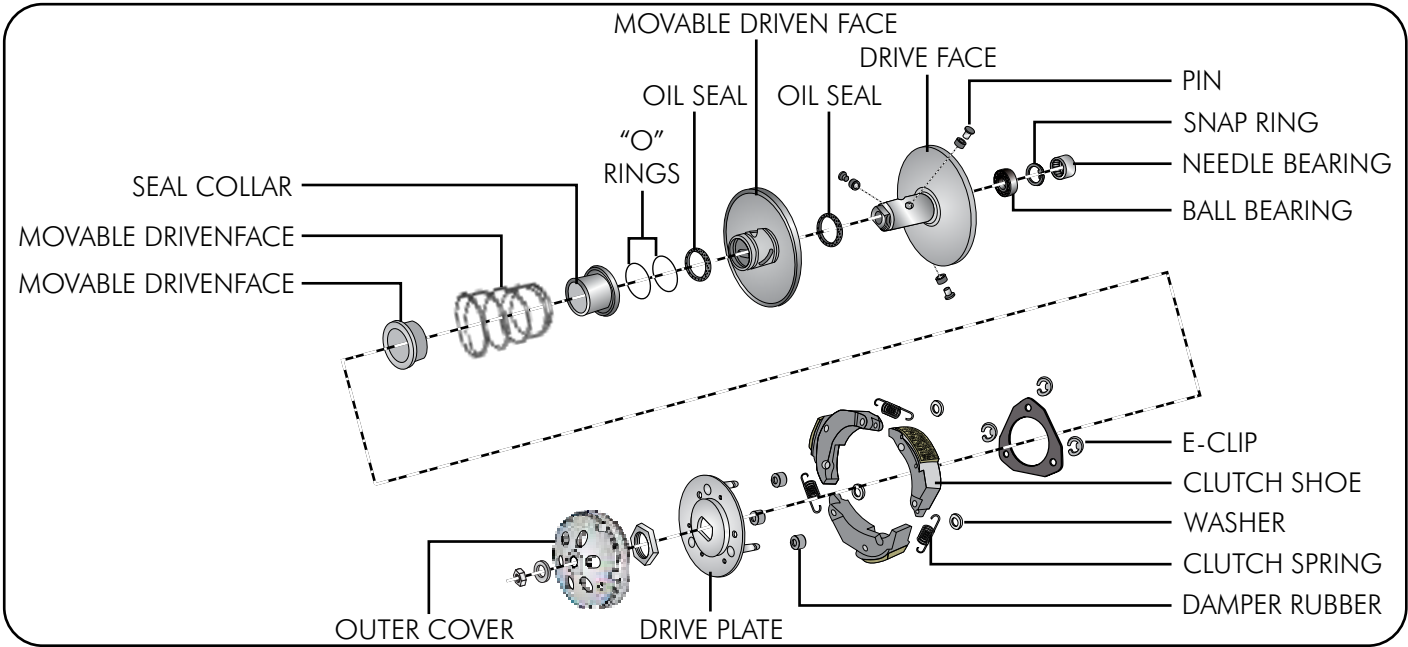
# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

## CLUTCH/DRIVEN PULLEY INSTALLATION

### NOTE

- Clean any oil and grease from the pulley faces and clutch outer.
- Replace the contaminated clutch outer.

### ASSEMBLY



Clean the pulley faces.

Apply grease to new oil seal lip and install them into the movable driven face.

Coat new O-rings with grease and install them onto the movable driven face.

Apply grease to the inside surface the movable driven face (5.0-5.5 g).

Install the movable driven face onto the driven face. Apply grease to the guide roller pins and install them into the holes in the driven face.



## KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Install the seal collar.



SEAL COLLAR

Check the damper rubbers for damage or deformation; replace, if necessary.

Apply small amount of grease to the pivot pins.



DAMPER RUBBERS

Install clutch shoes on the pivot pins and push into the place.

Clean the brake shoes if there is any grease on them.

### CAUTION

Grease or oil damages clutch shoes and can lead to a loss of engaging ability.

Install the clutch shoe springs using the centrifugal clutch spring remover/installer.



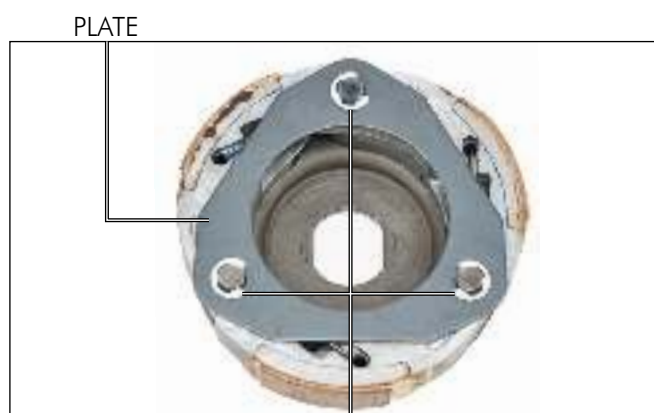
### CENTRIFUGAL CLUTCH SPRING REMOVER/INSTALLER

PART NO: 070 HH KTP 08



CLUTCH SHOE SPRING

Install the plate and secure them with E-clips.



E-CLIPS

# KICK STARTER/DRIVE AND DRIVEN PULLEYS/CLUTCH

Assemble the following:-

- Driven pulley
- Driven face spring
- Spring seat
- Clutch

Set the clutch spring compressor over the clutch/driven pulley, aligning the bosses with the holes in the clutch.

Hold the spring compressor in a vice.

Install and tighten the clutch/driven pulley face nut to the specified torque.

## TORQUE

**DRIVEN PULLEY FACE NUT: 5.4 kgf-m**

Remove the spring compressor from the clutch/driven pulley assembly.

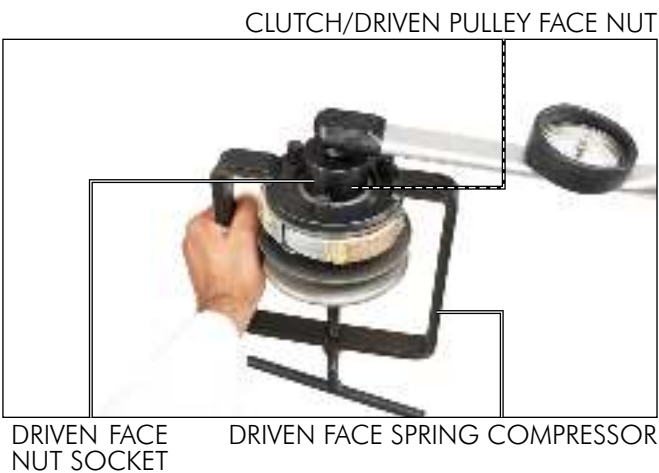


## DRIVEN FACE SPRING COMPRESSOR

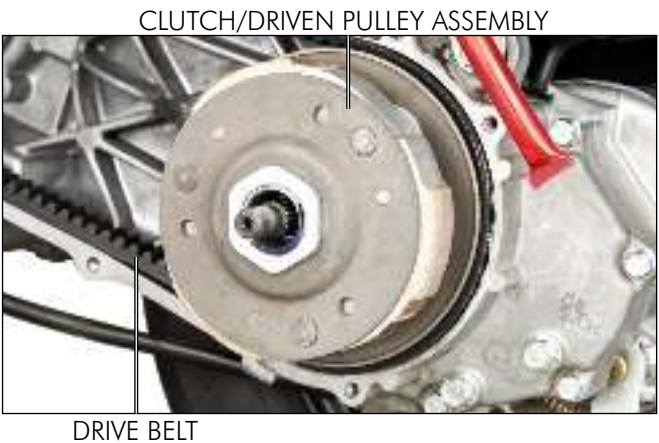
**PART NO: 070 HH KZN 002**

**DRIVEN FACE NUT SOCKET**

**PART NO: 070 HH KTP 06**



Install the drive belt and clutch/driven pulley assembly.



Install the clutch outer and nut/washer.

Hold the clutch outer with the universal holder and tighten the clutch outer nut to the specified torque.



## UNIVERSAL HOLDER

**PART NO: 070 HH 198 003**

## TORQUE

**CLUTCH OUTER NUT: 4.9 kgf-m**

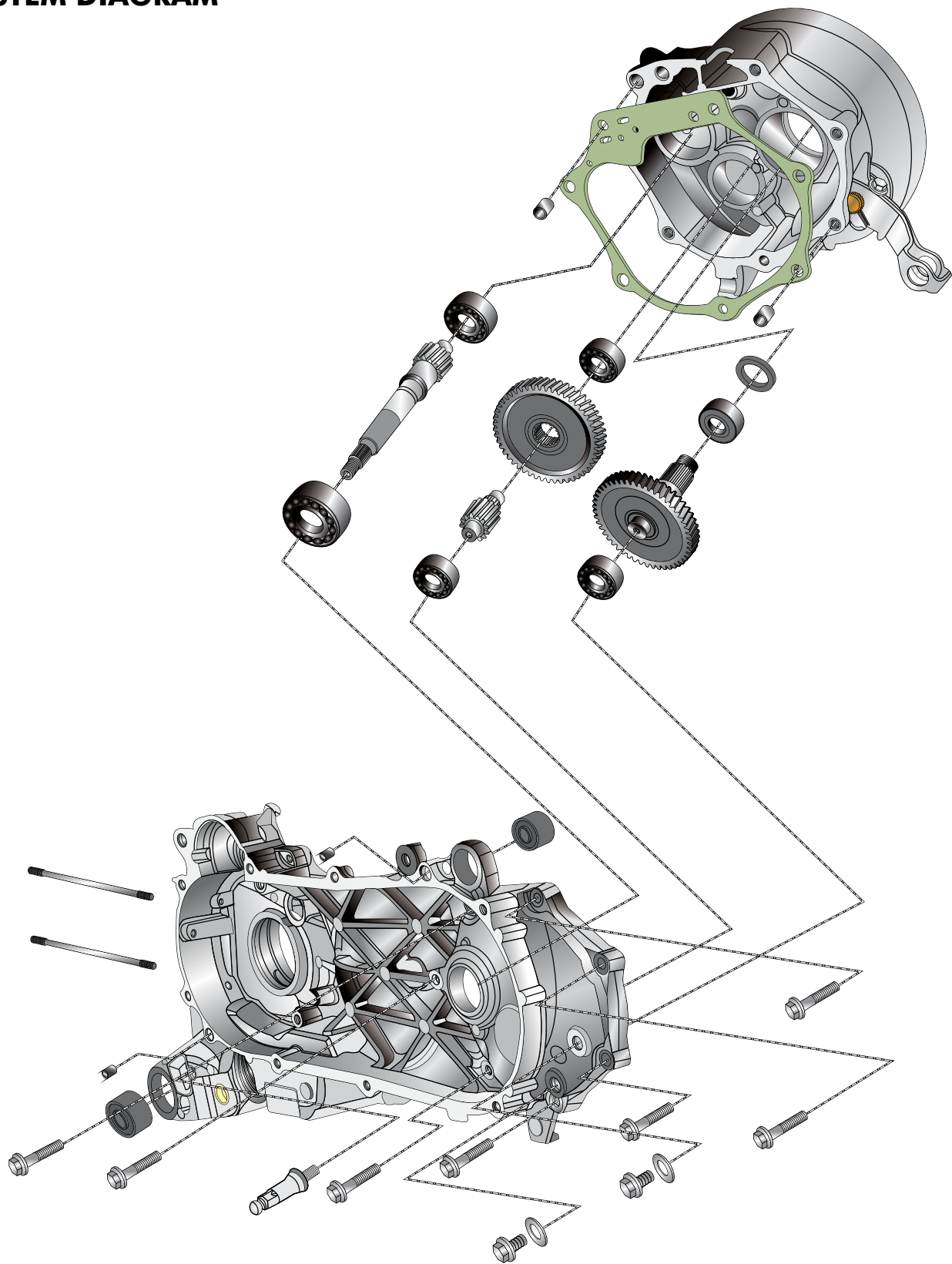
Install the drive pulley (page 9-14).





# 10. FINAL REDUCTION

## SYSTEM DIAGRAM



10

# FINAL REDUCTION

<b>Service Information</b>	<b>10-1</b>	<b>Drive Shaft</b>	<b>10-4</b>
<b>Specifications</b>	<b>10-1</b>	<b>Bearing Removal</b>	<b>10-5</b>
<b>Special Tools</b>	<b>10-2</b>	<b>Final Reduction Inspection</b>	<b>10-5</b>
<b>Troubleshooting</b>	<b>10-2</b>	<b>Transmission Case Bearing</b>	<b>10-7</b>
<b>Final Reduction Disassembly</b>	<b>10-3</b>	<b>Final Reduction Assembly</b>	<b>10-10</b>

## SERVICE INFORMATION

### GENERAL



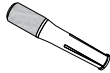
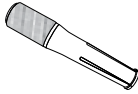
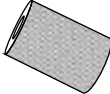
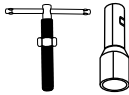
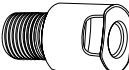

- The final reduction servicing can be performed with the engine installed in the frame.
- When installing the drive shaft, be sure to use the special tool, position the special tool against the bearing inner race and pull the drive shaft into the bearing.

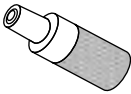





## SPECIFICATIONS

FINAL REDUCTION		ITEM	SPECIFICATION
Final reduction oil capacity	At draining		0.12 litre
	At disassembly		0.10 litre
Recommended final reduction oil			Brand: Hero 4T Plus Grade: SAE 10W30 SJ Grade (JASO MA) Manufactured by:- 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.

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

FINAL REDUCTION

 TOOL	SPECIAL TOOLS
	<b>BEARING REMOVER SHAFT</b> PART NO: 070 HH KFN 006
	<b>COLLET, 12 mm</b> PART NO: 070 HH 198 026
	<b>COLLET, 15 mm</b> PART NO: 070 HH KFN 005
	<b>BEARING REMOVER WEIGHT</b> PART NO: 070 HH KFN 007
	<b>CRANKSHAFT BEARING INSERTER (LH SIDE)</b> PART NO: 070 HH KTN 007
	<b>DRIVE SHAFT INSTALLER EXTENSION</b> PART NO: 070 HH KZN 001
	<b>DRIVE SHAFT BEARING REMOVER WITH SLEEVE</b> PART NO: 070 HH KTP 04

	<b>HANDLE BEARING DRIVER</b> PART NO: 070 HH KFN 008
	<b>DRIVER OUTER, 42x47 mm</b> PART NO: 070 HH KFN 011
	<b>DRIVER OUTER, 32x35 mm</b> PART NO: 070 HH KFN 010
	<b>PILOT, 12 mm</b> PART NO: 070 HH KFN 012
	<b>PILOT, 15 mm</b> PART NO: 070 HH KFN 013
	<b>PILOT, 20 mm</b> PART NO: 070 HH KTN 006

TROUBLESHOOTING

Engine starts but scooter would not move

- Damaged transmission
- Seized transmission
- Faulty drive and driven pulley/clutch

Abnormal noise

- Worn, seized or chipped gears
- Worn or damaged transmission bearing

Oil leaks

- Oil level too high
- Worn or damaged oil seal
- Cracked crankcase

# FINAL REDUCTION

## FINAL REDUCTION DISASSEMBLY

Drain the final reduction oil (page 3-12).

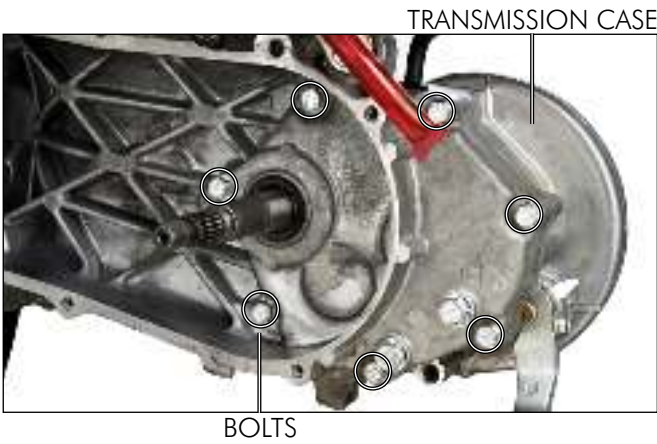
Remove the following:-

- Rear wheel (page 14-3)
- Rear brake adjusting nut and brake arm joint (page 14-5)
- Clutch/driven pulley (page 9-15)

Disconnect the final reduction breather tube from the air cleaner housing.



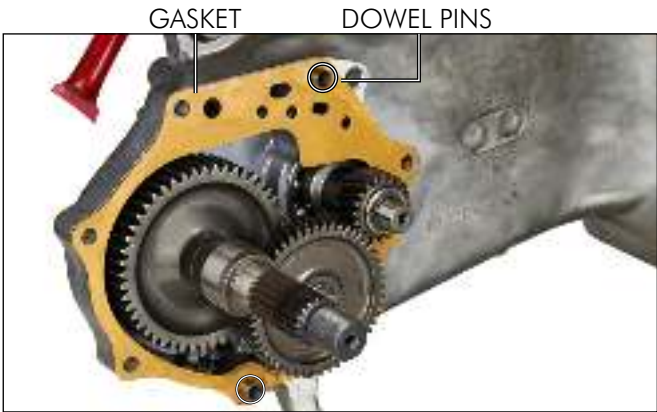
Remove the bolts (7 nos.) and the transmission case.



Remove the dowel pins (2 nos.) and gasket.

### NOTE

Clean any gasket residual material from the mating surface being careful not to damage it.



Remove the counter gear and counter gear shaft.



## FINAL REDUCTION

Remove the final shaft.



FINAL SHAFT

### DRIVE SHAFT REMOVAL

Remove the drive shaft from the left crankcase.

**NOTE**

Use a plastic mallet to remove the drive shaft from the crankcase.



DRIVE SHAFT

DRIVE SHAFT

10

Remove the drive shaft oil seal.



OIL SEAL

If the drive shaft bearing remains in the crankcase, removal can be done by using special tool.



**HANDLE BEARING DRIVER**  
**PART NO: 070 HH KFN 008**  
**DRIVER OUTER, 32x35 mm**  
**PART NO: 070 HH KFN 010**  
**PILOT, 20 mm**  
**PART NO: 070 HH KTN 006**



HANDLE BEARING DRIVER

PILOT

DRIVER ATTACHMENT



# FINAL REDUCTION

## BEARING REMOVAL

### DRIVE SHAFT BEARING

The drive shaft bearing is press fitted on the drive shaft.  
Remove it using the special tool as shown.



**DRIVE SHAFT BEARING REMOVER WITH SLEEVE**  
**PART NO: 070 HH KTP 04**



## FINAL REDUCTION

### INSPECTION

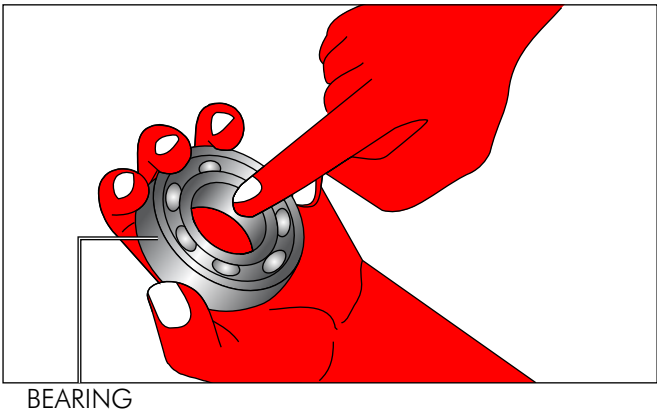
Check the left crankcase and transmission cover bearings for wear or damage.



Turn the inner race of each bearing with your finger.  
The bearing should turn smoothly and quietly.  
Also check that bearing outer races fit tightly in the crankcase.

#### NOTE

Clean the bearing in a high flash point solvent (kerosene) and air dry. Apply few drops of engine oil before rotating for smoothness.



Check the final shaft for excessive wear, damage or signs of seizure.



## FINAL REDUCTION

Check the counter gear shaft and counter gear for excessive wear, damage or signs of seizure.



### LEFT CRANKCASE BEARING REMOVAL

#### CAUTION

Be careful not to damage the left crankcase and transmission case mating surfaces.

#### COUNTER GEAR SHAFT BEARING

Remove the counter gear shaft bearing using the special tools.



#### BEARING REMOVER SHAFT

PART NO: 070 HH KFN 006

#### BEARING REMOVER WEIGHT

PART NO: 070 HH KFN 007

COLLET, 12 mm

PART NO: 070 HH 198 026



10

Remove the final shaft bearing using the special tools.



#### BEARING REMOVER SHAFT

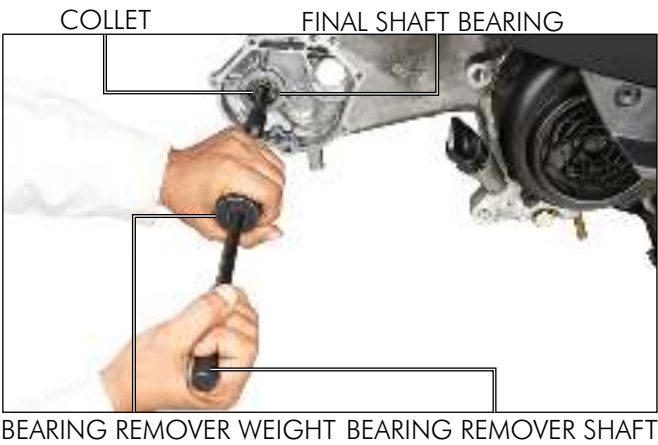
PART NO: 070 HH KFN 006

#### BEARING REMOVER WEIGHT

PART NO: 070 HH KFN 007

COLLET, 15 mm

PART NO: 070 HH KFN 005



10-6

# FINAL REDUCTION

## INSTALLATION

### NOTE

- Make sure not to push the ball or inner race of the bearing.
- Make sure not to damage the rolling surface of the bearing.

### FINAL SHAFT BEARING

Apply engine oil to new bearing rotating areas.  
Drive new bearing into the left crankcase.



#### HANDLE BEARING DRIVER

**PART NO: 070 HH KFN 008**

**DRIVER OUTER, 32x35 mm**

**PART NO: 070 HH KFN 010**

**PILOT, 15 mm**

**PART NO: 070 HH KFN 013**

#### COUNTER GEAR SHAFT BEARING

Apply engine oil to new bearing rotating areas.  
Drive new bearing into the left crankcase.



#### HANDLE BEARING DRIVER

**PART NO: 070 HH KFN 008**

**DRIVER OUTER, 32x35 mm**

**PART NO: 070 HH KFN 010**

**PILOT, 12 mm**

**PART NO: 070 HH KFN 012**

#### DRIVE SHAFT BEARING

Apply engine oil to new bearing rotating areas.  
Drive new bearing into the left crankcase.



#### HANDLE BEARING DRIVER

**PART NO: 070 HH KFN 008**

**DRIVER OUTER, 42x47 mm**

**PART NO: 070 HH KFN 011**

**PILOT, 20 mm**

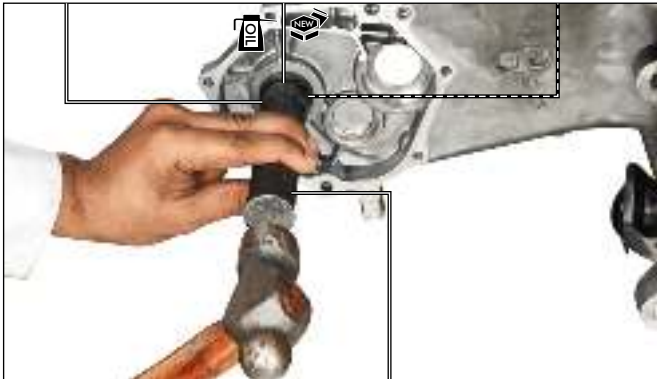
**PART NO: 070 HH KTN 006**

## TRANSMISSION CASE BEARING

### REMOVAL

Disconnect the final reduction breather tube from the transmission case.  
Remove the final shaft oil seal from the transmission case.

DRIVER OUTER    FINAL SHAFT BEARING    PILOT



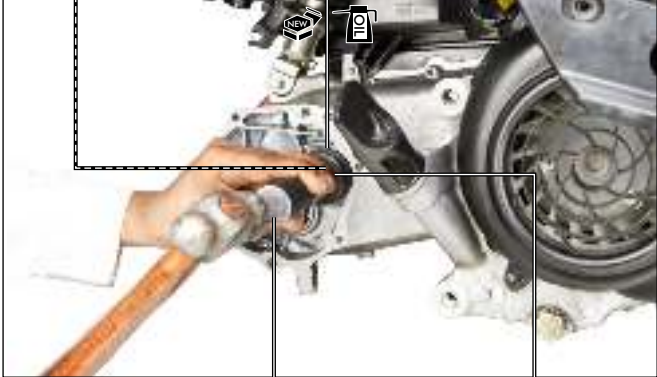
HANDLE BEARING DRIVER

PILOT    COUNTER GEAR SHAFT BEARING



HANDLE BEARING DRIVER    DRIVER OUTER

PILOT    DRIVE SHAFT BEARING



HANDLE BEARING DRIVER    DRIVER OUTER

BREATHER TUBE    TRANSMISSION CASE



OIL SEAL

## FINAL REDUCTION

### COUNTER GEAR SHAFT/DRIVE SHAFT BEARING

Remove the counter gear shaft and drive shaft bearings using the special tools.



#### BEARING REMOVER SHAFT

PART NO: 070 HH KFN 006

#### BEARING REMOVER WEIGHT

PART NO: 070 HH KFN 007

COLLET, 12 mm

PART NO: 070 HH 198 026

### FINAL SHAFT BEARING

Drive out the final shaft bearing using the special tools.



#### HANDLE BEARING DRIVER

PART NO: 070 HH KFN 008

DRIVER OUTER, 32x35 mm

PART NO: 070 HH KFN 010

PILOT, 20 mm

PART NO: 070 HH KTN 006

## INSTALLATION

### NOTE

- Make sure not to push the ball or inner race of the bearing.
- Make sure not to damage the rolling surface of the bearing.

### DRIVE SHAFT/COUNTER GEAR SHAFT BEARING

Apply engine oil to new bearing rotating areas.

Drive new bearing into the transmission case.



#### HANDLE BEARING DRIVER

PART NO: 070 HH KFN 008

DRIVER OUTER, 32x35 mm

PART NO: 070 HH KFN 010

PILOT, 12 mm

PART NO: 070 HH KFN 012

### FINAL SHAFT BEARING

Apply engine oil to new bearing rotating areas.

Drive new bearing into the transmission case.

#### HANDLE BEARING DRIVER

PART NO: 070 HH KFN 008

DRIVER OUTER, 42x47 mm

PART NO: 070 HH KFN 011

PILOT, 20 mm

PART NO: 070 HH KTN 006

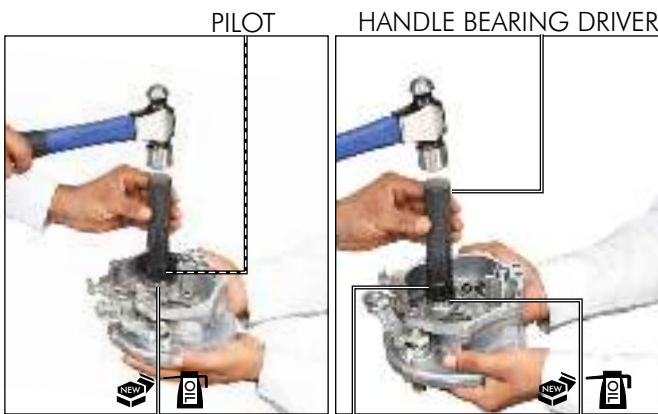
BEARING REMOVER SHAFT      BEARING REMOVER WEIGHT



COLLET      COUNTER GEAR SHAFT BEARING      DRIVE SHAFT BEARING  
HANDLE BEARING DRIVER



PILOT      BEARING      DRIVER OUTER



PILOT      HANDLE BEARING DRIVER  
DRIVE SHAFT BEARING      DRIVER OUTER      COUNTER GEAR SHAFT BEARING  
DRIVER OUTER      HANDLE BEARING DRIVER



FINAL SHAFT BEARING      PILOT

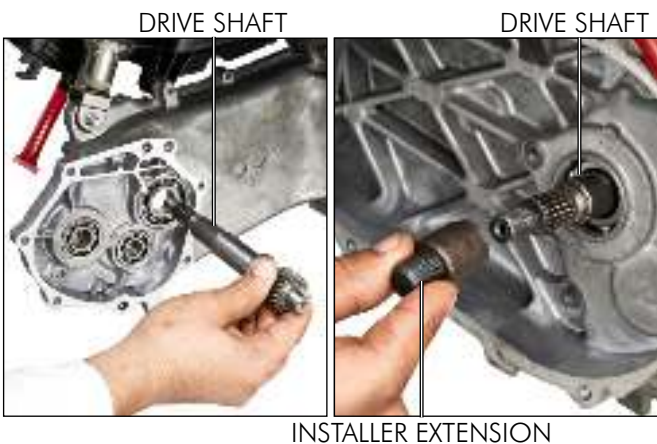


# FINAL REDUCTION

Install the drive shaft into the left crankcase.  
Thread the drive shaft installer extension on the drive shaft.



**DRIVE SHAFT INSTALLER EXTENSION**  
**PART NO: 070 HH KZN 001**



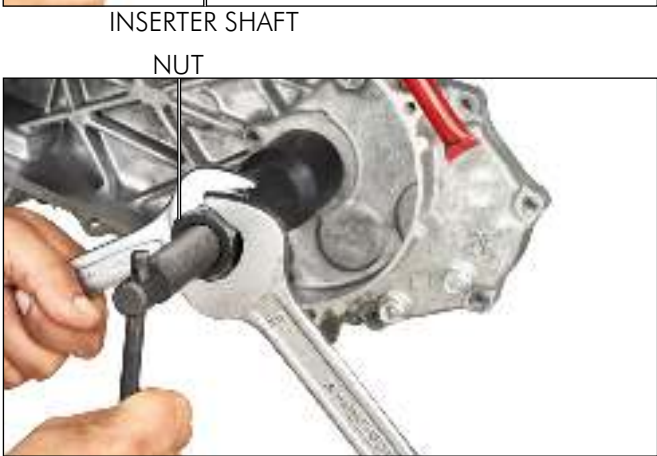
Place the inserter driver on the drive shaft.  
Thread the bearing inserter shaft as shown and tighten the nut.



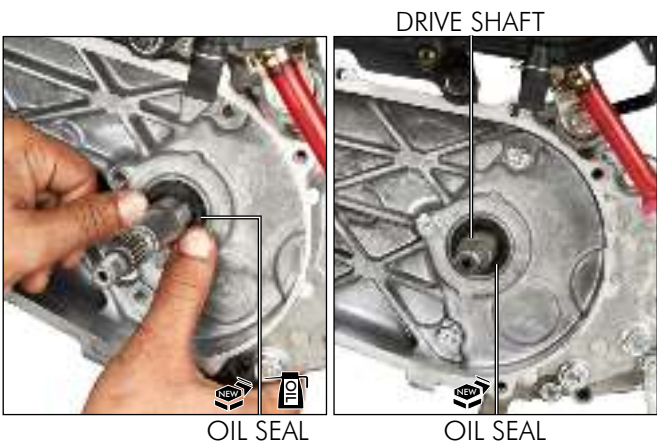
**CRANKSHAFT BEARING INSERTER (LH SIDE)**  
**PART NO: 070 HH KTN 007**



Hold the driver and draw the drive shaft into the bearing inner race by turning the nut.



Coat the circumference and lip of a new oil seal with engine oil.  
Install the oil seal into the left crankcase until the depth from the crankcase end surface is 0-0.5 mm.





# FINAL REDUCTION

## FINAL REDUCTION ASSEMBLY

Install the final shaft.



FINAL SHAFT  
COUNTER GEAR SHAFT

Install the counter gear shaft and counter gear.



COUNTER GEAR

Install the dowel pins (2 nos.) and a new gasket.

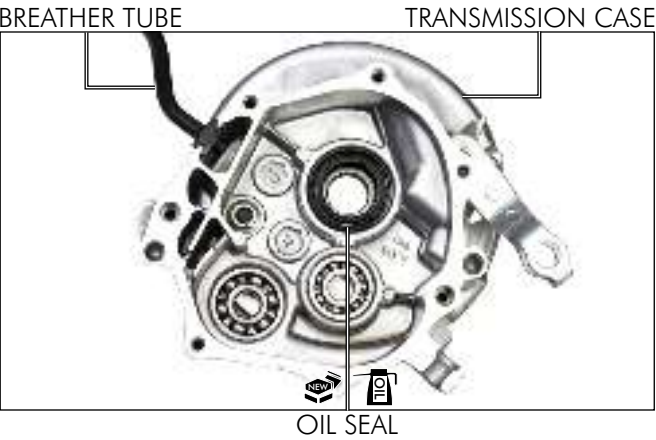
**NOTE**

Clean any gasket residual material from the mating surface being careful not to damage it.



GASKET  
DOWEL PINS

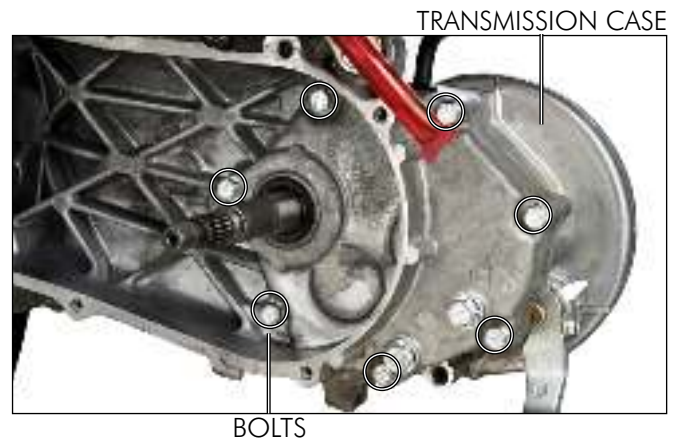
Coat the circumference and lip of a new final shaft oil seal with engine oil and install it on the transmission case.  
Install final reduction breather tube on the transmission case.



BREATHER TUBE  
TRANSMISSION CASE  
OIL SEAL

## FINAL REDUCTION

Install the transmission case onto the left crankcase.  
Install and tighten the bolts (7 nos.).



Connect the final reduction breather tube to the air cleaner housing.

Install the following:-

- Clutch/driven pulley (page 9-21)
- Rear brake adjusting nut and brake arm joint (page 14-7)
- Rear wheel (page 14-4)

Fill the transmission case with the recommended oil (page 3-11).

### OIL CAPACITY

**At disassembly: 0.12 litre**

**At draining: 0.10 litre**

Install the oil level check bolt with a new sealing washer and tighten it.



### RECOMMENDED OIL

**HERO 4T Plus**

**SAE 10W30, SJ Grade, JASO MA, Tide Water**

**(in collaboration with Nippon Oil, Japan)**

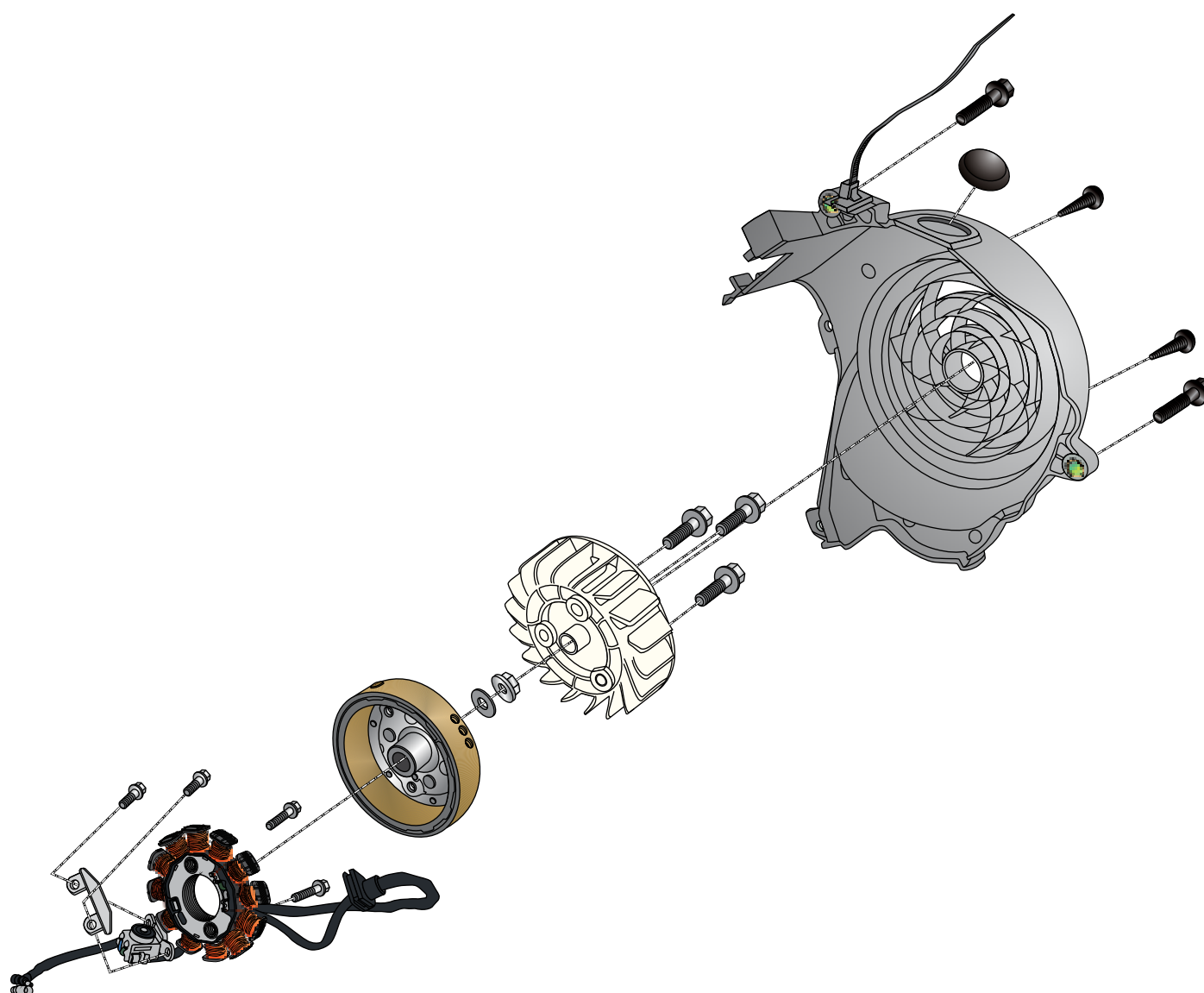
**SAE 10W30, SJ Grade, JASO MA, Savita Chemicals**

**(in collaboration with Idemitsu, Japan)**

**BPC Limited (BPCL 4T Oil)**

## 11.ALTERNATOR

### SYSTEM DIAGRAM



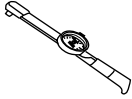
# ALTERNATOR

<b>Service Information</b>	<b>11-1 Stator/Ignition Pulse</b>	
<b>Torque Values</b>	<b>11-1 Generator Removal</b>	<b>11-3</b>
<b>Special Tools</b>	<b>11-1 Stator/ignition Pulse</b>	<b>11-4</b>
<b>Alternator Removal</b>	<b>11-2 Generator Installation</b>	
	<b>Alternator Installation</b>	<b>11-5</b>


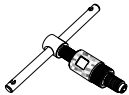

## SERVICE INFORMATION

### GENERAL

- Some electrical components may be damaged if terminals for connectors are connected or disconnected while the ignition switch is "ON" and current is present.
- This section covers service of the alternator stator, flywheel and the cooling fan. These parts can be serviced with the engine installed in the frame.
- Refer to (SECTION-16) for alternator stator inspection.

	<b>TORQUE VALUES</b>
<b>COOLING FAN MOUNTING BOLT : 1.0 kgf-m</b>	
<b>FLYWHEEL NUT : 3.9 kgf-m</b>	
<b>PULSE GENERATOR MOUNTING BOLT : 0.6 kgf-m</b>	

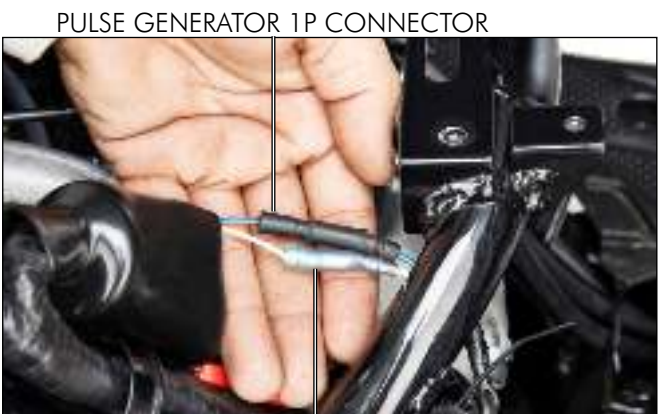
For other nuts, bolts, fasteners etc. refer the standard torque values (SECTION-1).

	<b>SPECIAL TOOLS</b>
	<b>FLYWHEEL HOLDER PART NO: 070 HH KTP 11</b>
	<b>FLYWHEEL PULLER PART NO: 070 HH KTP 10</b>

# ALTERNATOR

## ALTERNATOR REMOVAL

Remove the body cover (page 2-12).  
Remove the right floor side cover (page 2-8).  
Remove the exhaust muffler (page 2-20).  
Disconnect the pulse generator and stator coil 1P connectors.



STATOR COIL 1P CONNECTOR  
COOLING FAN COVER



Remove the cooling fan cover (page 7-4).

Hold the cooling fan and remove the bolts (3 nos.).  
Remove the cooling fan.



BOLTS COOLING FAN  
FLYWHEEL HOLDER

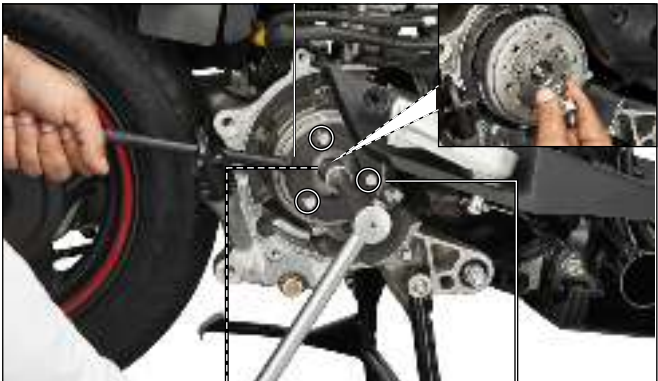
Hold the flywheel with the flywheel holder and install the cooling fan bolts temporarily.  
Remove the flywheel nut/washer.



### FLYWHEEL HOLDER

**PART NO: 070 HH KTP 11**

Remove the cooling fan bolts and the flywheel holder.



FLYWHEEL NUT/WASHER BOLTS



# ALTERNATOR

Remove the flywheel by using the flywheel puller.



**FLYWHEEL PULLER**  
**PART NO: 070 HH KTP 10**



Remove the woodruff key from the crankshaft.

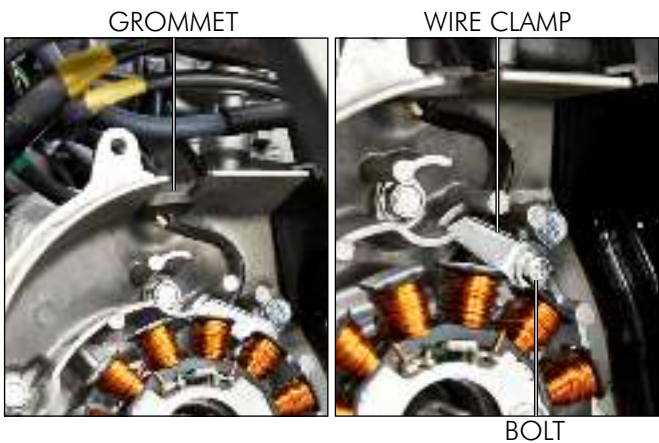
**NOTE**

- When removing the woodruff key, be careful not to damage the key groove or crankshaft.
- Do not misplace the woodruff key.

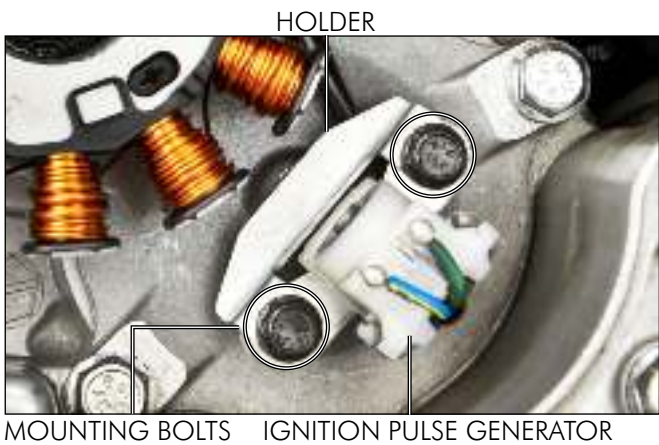


## STATOR/IGNITION PULSE GENERATOR REMOVAL

Dislodge the grommet from the crankcase.  
Remove the bolt and wire clamp.



Remove the mounting bolts (2 nos.)/holder and dismount the ignition pulse generator from its place.



# ALTERNATOR

Remove the mounting bolts (2 nos.) and the stator/ignition pulse generator assembly from the right crankcase.



MOUNTING BOLTS STATOR

Remove the stator. Replace if necessary.

**NOTE**

Care should be taken for not damaging the coils while removal/installation.



STATOR

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## STATOR/IGNITION PULSE GENERATOR INSTALLATION

Install the stator to the right crankcase.  
Clean and apply locking agent to the stator mounting bolt threads.  
Install and tighten the stator mounting bolts.



MOUNTING BOLTS STATOR HOLDER

Install the ignition pulse generator and holder.  
Install and tighten the mounting bolts (2 nos.) to the specified torque.

**TORQUE**

**PULSE GENERATOR MOUNTING BOLT: 0.6 kgf-m**



MOUNTING BOLTS IGNITION PULSE GENERATOR



# ALTERNATOR

Install the wire clamp.  
Install and tighten the bolt.  
Apply liquid sealant to the wire grommet seating surface and install the grommet into the groove on the right crankcase.

## ALTERNATOR INSTALLATION

Install the woodruff key into the crankshaft groove.

### NOTE

Check that there is no debris inside the flywheel before installation. The magnets attract steel filings and other ferrous material.

Clean any oil or grease from the tapered portion of the crankshaft and the tapered hole in the flywheel.  
Install the flywheel onto the crankshaft by aligning its groove with the woodruff key.  
Install the washer and flywheel nut.

Hold the flywheel with the flywheel holder and install the cooling fan bolts temporarily.



### FLYWHEEL HOLDER

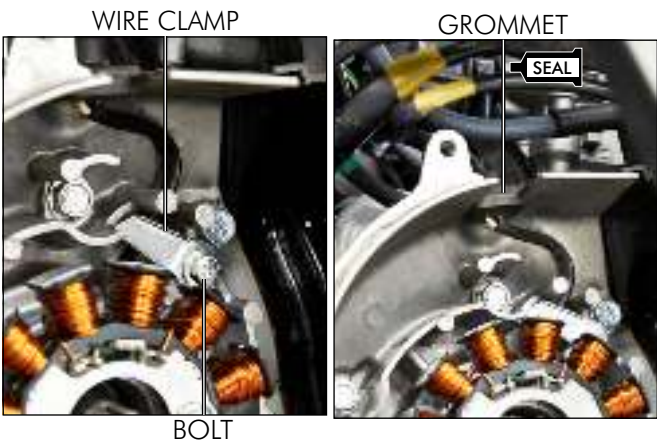
**PART NO: 070 HH KTP 11**

Tighten the flywheel nut to the specified torque.

### TORQUE

**FLYWHEEL NUT: 3.9 kgf-m**

Remove the cooling fan bolts and the flywheel holder.



## ALTERNATOR

Install the cooling fan.

Install and tighten the bolts (3 nos.) to the specified torque.

### **TORQUE**

**COOLING FAN MOUNTING BOLT: 1.0 kgf-m**

### **NOTE**

Bolts other than the actual can damage the stator coil winding.



BOLTS COOLING FAN  
COOLING FAN COVER

Install the cooling fan cover (page 7-4).



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Connect the pulse generator and stator coil 1 P connectors.

Install the exhaust muffler (page 2-20).

Install the right floor side cover (page 2-8).

Install the body cover (page 2-12).

PULSE GENERATOR 1P CONNECTOR



STATOR COIL 1P CONNECTOR

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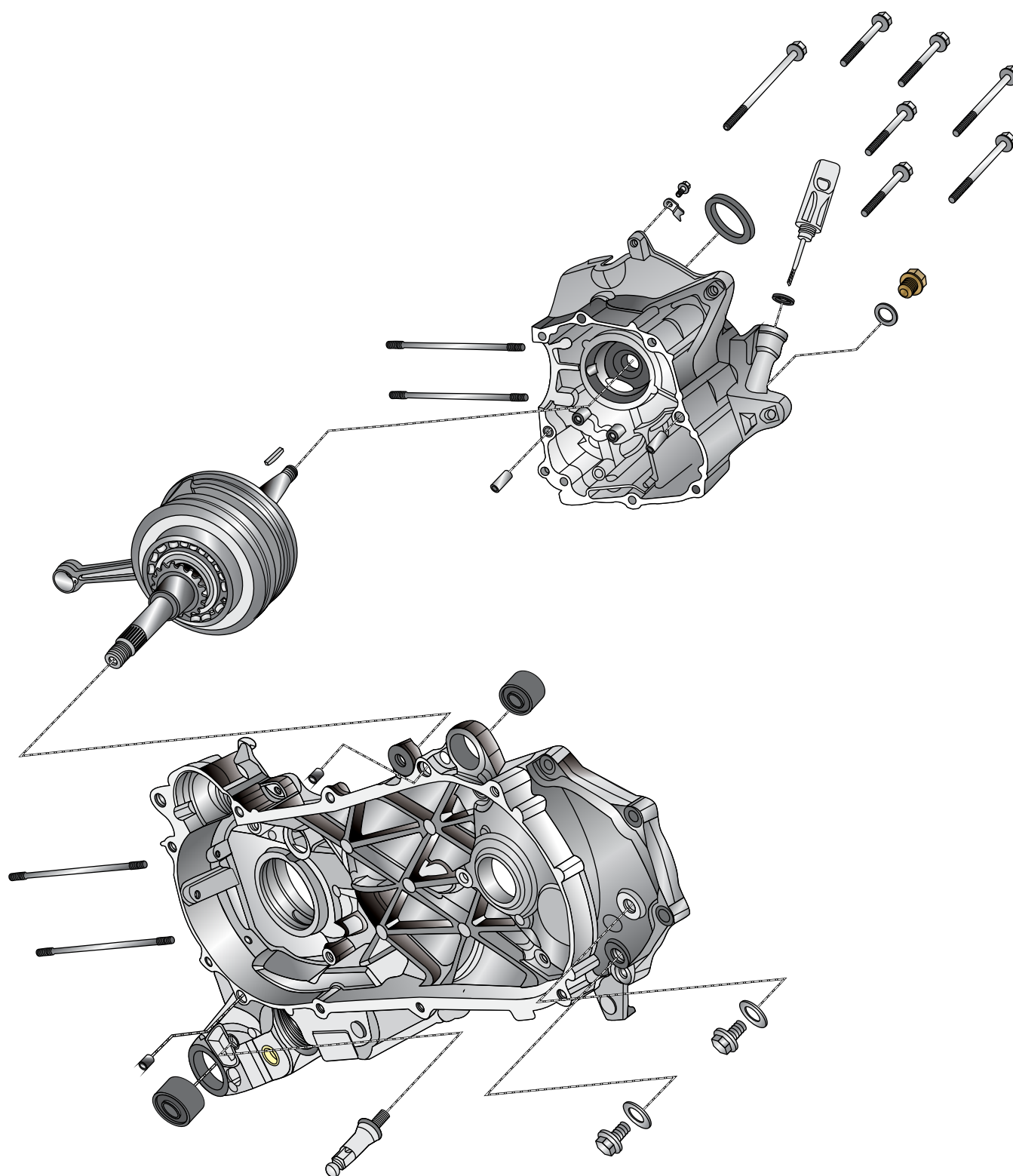
## MEMO

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## 12. CRANKCASE/CRANKSHAFT

### SYSTEM DIAGRAM



12

# CRANKCASE/CRANKSHAFT

<b>Service Information</b>	<b>12-1</b>	<b>Crankcase/Crankshaft</b>	<b>12-3</b>
<b>Specifications</b>	<b>12-1</b>	<b>Disassembly</b>	
<b>Torque Values</b>	<b>12-1</b>	<b>Crankshaft Inspection</b>	<b>12-5</b>
<b>Special Tools</b>	<b>12-2</b>	<b>Crankcase Bushes</b>	<b>12-6</b>
<b>Troubleshooting</b>	<b>12-2</b>	<b>Crankshaft/Crankcase Assembly</b>	<b>12-8</b>

## SERVICE INFORMATION

### GENERAL

- This section covers the crankcase separation to service the crankshaft.
- The engine must be removed from the frame to separate the crankcase.
- The following parts must be removed before separating the crankcase:
  - Exhaust muffler (SECTION-2)
  - Air cleaner housing, carburetor (SECTION-3)
  - Oil pump (SECTION-4)
  - Cylinder head/valves (SECTION-7)
  - Cylinder/piston (SECTION-8)
  - Drive pulley/clutch/driven pulley (SECTION-9)
  - Final reduction (SECTION-10)
  - Alternator (SECTION-11)
  - Rear wheel/brake/suspension (SECTION-14)
- Ensure not to damage the crankcase mating surfaces when separating and assembling the crankcase halves.
- The crankcase oil seals must be replaced with new ones when assembling the crankcase halves.

## SPECIFICATIONS

CRANKCASE/CRANKSHAFT ITEM	STANDARD	SERVICE LIMIT
Connecting rod big end side clearance	0.10-0.35 mm	0.60 mm
Connecting rod big end radial clearance	0-0.008 mm	0.05 mm
Crankshaft run out	0.01-0.05 mm	0.10 mm

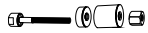
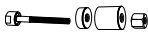
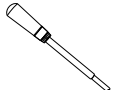
	<b>TORQUE VALUES</b>
---	----------------------

### CAM CHAIN TENSIONER PIVOT BOLT : 1.0 kgf-m

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

## CRANKCASE/CRANKSHAFT

	<b>SPECIAL TOOLS</b>
---	----------------------

	<b>REAR ENGINE FOUNDATION BUSH REMOVER, 8x20 mm PART NO: 070 HH KTP 01</b>
	<b>FRONT ENGINE FOUNDATION BUSH REMOVER, 10x27 mm PART NO: 070 HH KTP 02</b>
	<b>MAIN STAND/SIDE STAND SPRING INSTALLER PART NO:070 HH 198 037</b>

	<b>RIGHT CRANKSHAFT OIL SEAL INSTALLER PART NO: HMCL 1014 AAWA 03</b>
	<b>LEFT CRANKSHAFT OIL SEAL GUIDE PART NO: HMCL 1014 AAWA 01</b>
	<b>LEFT CRANKSHAFT OIL SEAL INSTALLER PART NO: HMCL 1014 AAWA 02</b>

### TROUBLESHOOTING

#### Abnormal engine noise

- Worn or damaged connecting rod bearing
- Worn or damaged crankshaft bearings

# CRANKCASE/CRANKSHAFT

## CRANKCASE/CRANKSHAFT DISASSEMBLY

Refer to service information (page 12-1) for removal of necessary parts before disassembling the crankcase.  
Remove the main stand return springs (page 2-18).

Remove the split pin, washer, main stand pivot pin and main stand.

Remove the cam chain tensioner pivot bolt and cam chain tensioner.

Remove the mounting bolts (2 nos.).  
Remove the electric starter from the engine.



RETURN SPRINGS



WASHER SPLIT PIN

MAIN STAND PIVOT PIN MAIN STAND PIVOT BOLT



CAM CHAIN TENSIONER



ELECTRIC STARTER

MOUNTING BOLTS

## CRANKCASE/CRANKSHAFT

Remove the crankcase bolts (7 nos.).

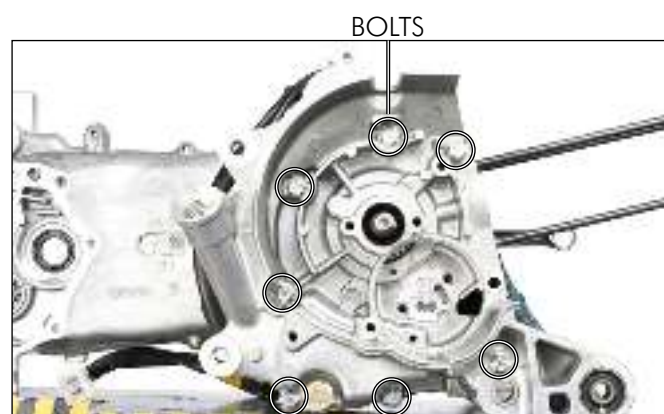
Place the crankcase with the left crankcase down and remove the right crankcase from the left crankcase.

### NOTE

Separate the right crankcase while tapping it at several locations with a nylon mallet.

### CAUTION

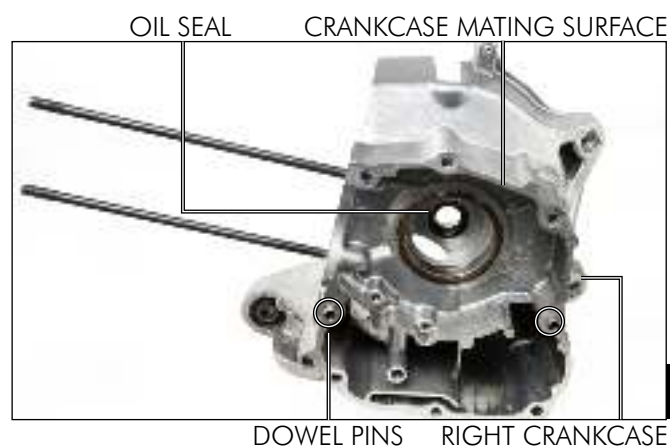
Be careful, not to damage the crankcase mating surface.



Remove the dowel pins.

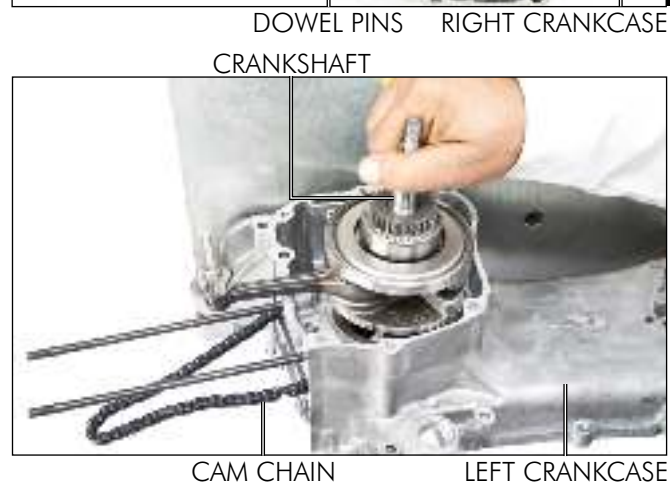
Remove the oil seal.

Clean off liquid gasket residue from crankcase mating surface.



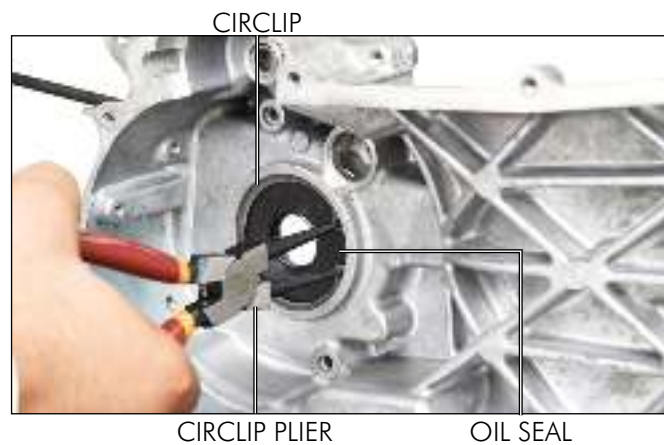
Derail the cam chain from the sprocket and remove the crankshaft from the left crankcase.

Remove the cam chain.



Remove the circlip with a circlip plier.

Remove the oil seal from the left crankcase.





# CRANKCASE/CRANKSHAFT

## CAM CHAIN TENSIONER INSPECTION

Check the cam chain tensioner for wear or damage.

CAM CHAIN TENSIONER



## CRANKSHAFT INSPECTION

Measure the connecting rod big end side clearance with a feeler gauge.

### SERVICE LIMIT

#### CONNECTING ROD BIG END SIDE

**CLEARANCE: 0.60 mm**

CONNECTING ROD



FEELER GAUGE

Measure the connecting rod big end radial clearance.

### SERVICE LIMIT

#### CONNECTING ROD BIG END RADIAL

**CLEARANCE: 0.05 mm**

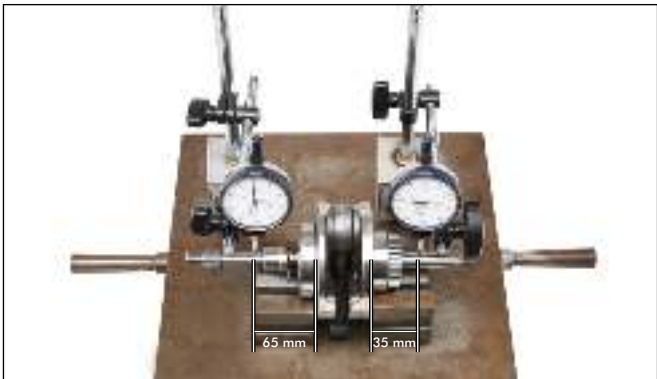


CONNECTING ROD

Set the crankshaft on V-blocks and read the run out using dial indicators. Actual run out is 1/2 of total indicator reading.

### SERVICE LIMIT

**CRANKSHAFT RUN OUT: 0.10 mm**

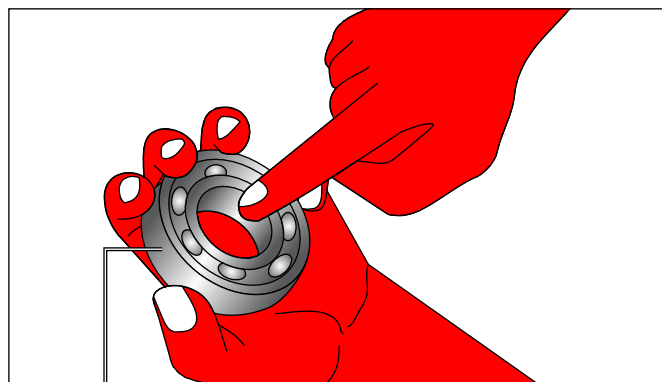


## CRANKCASE/CRANKSHAFT

### BEARING

Turn the outer race of each bearings with your finger. The bearings should turn smoothly and quietly. Also check that the inner race fits tightly on the crankshaft.

Replace the crankshaft assembly if the races do not turn smoothly, quietly or if they fit loosely on the crankshaft.



BEARING

### CRANKCASE BUSHES

#### LEFT FRONT ENGINE FOUNDATION BUSH REMOVAL

Install a bush remover onto the left crankcase front mounting bush.

Tighten the nut as shown here.

Keep on tightening the nut until the bush comes out.



**FRONT ENGINE FOUNDATION BUSH REMOVER, 10x27 mm**

**PART NO: 070 HH KTP 02**

#### INSTALLATION

Apply grease onto the bush.

Install the bush into the bolt and install onto the crankcase in the sequence as shown here.



**FRONT ENGINE FOUNDATION BUSH REMOVER, 10x27 mm**

**PART NO: 070 HH KTP 02**

Tighten the nut as shown here.

Keep on tightening the nut until the bush is installed completely onto the left crankcase.



FRONT ENGINE FOUNDATION BUSH REMOVER

12



BUSH

LEFT CRANKCASE



BUSH

# CRANKCASE/CRANKSHAFT

## RIGHT FRONT ENGINE FOUNDATION BUSH REMOVAL

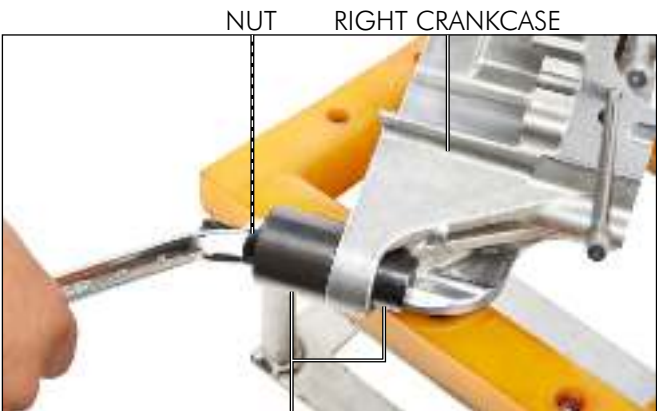
Install a bush remover onto the right crankcase front mounting bush.

Tighten the nut as shown here.

Keep on tightening the nut until the bush comes out.



**FRONT ENGINE FOUNDATION BUSH REMOVER, 10x27 mm**  
**PART NO: 070 HH KTP 02**



FRONT ENGINE FOUNDATION BUSH REMOVER

## INSTALLATION

Apply grease onto the bush.

Install the bush into the bolt and install onto the crankcase in the sequence as shown here.



**FRONT ENGINE FOUNDATION BUSH REMOVER, 10x27 mm**  
**PART NO: 070 HH KTP 02**



BUSH

RIGHT CRANKCASE

Tighten the nut as shown.

Keep on tightening the nut until the bush is installed completely onto the right crankcase.



BUSH

REAR ENGINE FOUNDATION BUSH REMOVER

## REAR ENGINE FOUNDATION BUSH REMOVAL

Install a bush remover onto the left crankcase rear mounting bush.

Tighten the nut as shown here.

Keep on tightening the nut until the bush comes out.



**REAR ENGINE FOUNDATION BUSH REMOVER, 8x20 mm**  
**PART NO: 070 HH KTP 01**



LEFT CRANKCASE

## CRANKCASE/CRANKSHAFT

### INSTALLATION

Apply grease on the bush and install the bush into the bolt and install onto the crankcase.

Tighten the nut.

Keep on tightening the nut until the bush is installed completely onto the left crankcase.



#### REAR ENGINE FOUNDATION BUSH

REMOVER, 8x20 mm

PART NO: 070 HH KTP 01



### CRANKSHAFT/CRANKCASE ASSEMBLY

Clean the insides of the left and right crankcases.

Check the crankcase for cracks or other faults.

#### 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.

#### CAUTION

Be careful not to damage the crankcase mating surfaces.

Install the cam chain into the left crankcase.

Install the crankshaft into the left crankcase through the cam chain.

#### NOTE

Ensure that the connecting rod is in its TDC position while installing the crankshaft.



12

CRANKSHAFT

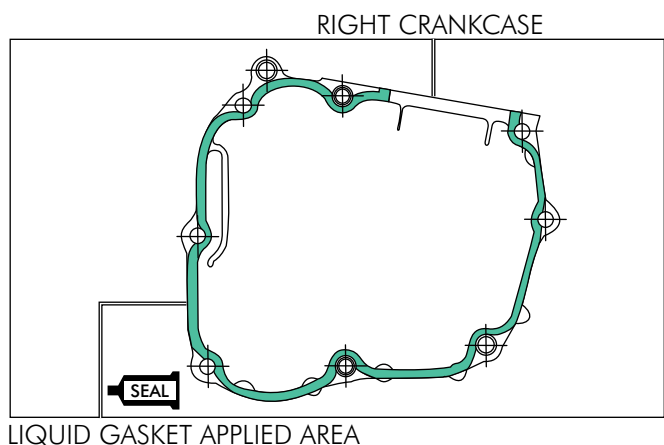


CAM CHAIN

Install the dowel pins.

Apply "THREE BOND 1215" or equivalent.

Apply a light but even coating of sealant to all crankcase mating surface except the oil passage area.





# CRANKCASE/CRANKSHAFT

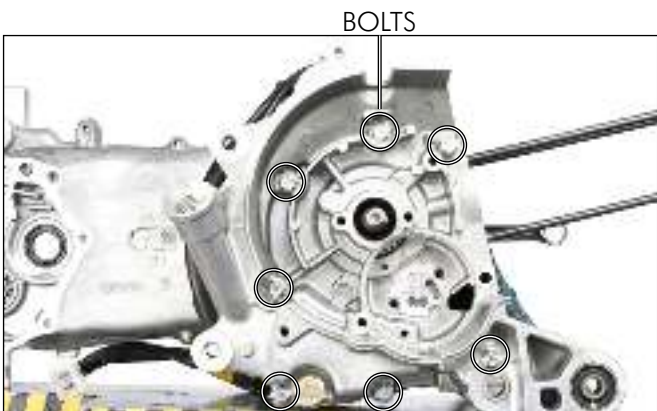
Place the right crankcase over the crankshaft onto the left crankcase.

**CAUTION**

Do not force crankcase halves together. If excessive force is required, there is something wrong. Remove the right crankcase and check for misaligned parts.

Install the crankcase bolts (7 nos.) and tighten them in a crisscross pattern in 2 or 3 steps.

Check that the crankshaft turns smoothly.



Coat the lip and circumference of a new oil seal with engine oil.

Locate the oil seal onto the crankcase using the thumbs.



Install the oil seal with the oil seal installer.



**RIGHT CRANKSHAFT OIL SEAL INSTALLER**

**PART NO: HMCL 1014 AAWA 03**

The oil seal has to be located in the right crankcase so that the depth from the inside of the case is 19-20 mm.



OIL SEAL

Install the cam chain tensioner.

Install and tighten the pivot bolt to the specified torque.

**TORQUE**

**CAM CHAIN TENSIONER PIVOT BOLT: 1.0 kgf-m**



CAM CHAIN TENSIONER



## CRANKCASE/CRANKSHAFT

Install the oil seal guide on the crankshaft.



### LEFT CRANKSHAFT OIL SEAL GUIDE

**PART NO: HMCL 1014 AAWA 01**

Coat the lip and circumference of a new oil seal with engine oil.

Slide the oil seal through the oil seal guide and locate it in its groove.

Remove the oil seal guide.

Using the thumbs, push the oil seal into its groove.

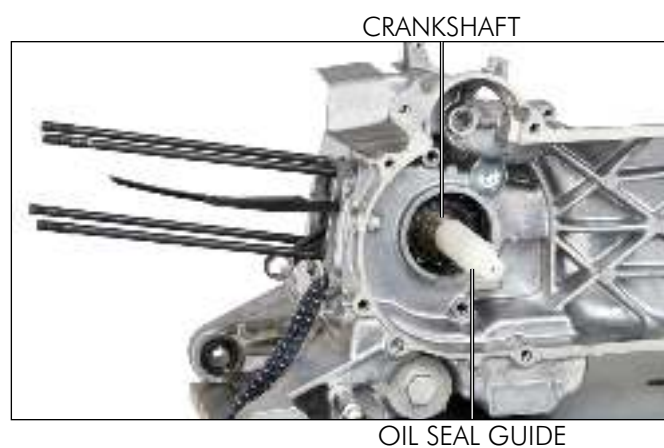
Using the oil seal installer install the oil seal completely in its groove.



### LEFT CRANKSHAFT OIL SEAL INSTALLER

**PART NO: HMCL 1014 AAWA 02**

The oil seal should be located in the left crankcase so that the depth from the outside of the case is 3.6-4.1 mm.



12

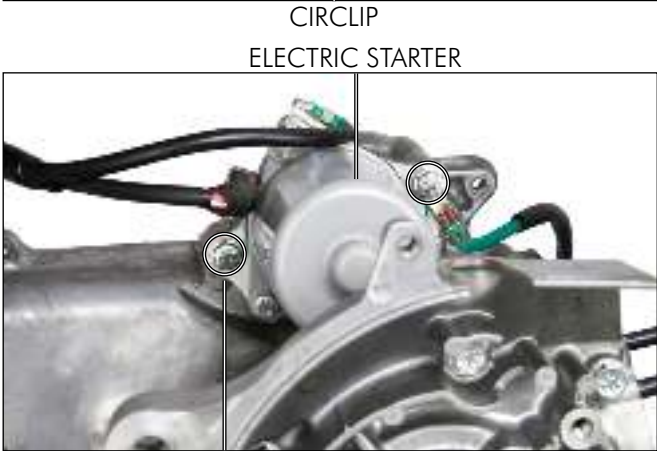


# CRANKCASE/CRANKSHAFT

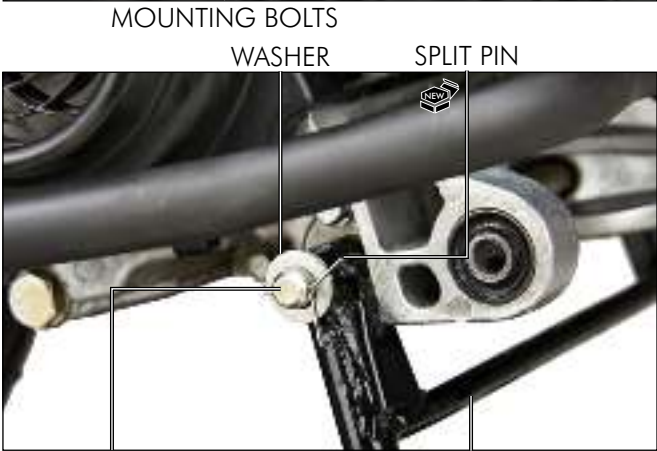
Using a circlip plier, install the circlip in its groove.



Remove the mounting bolts (2 nos.).  
Remove the electric starter from the engine.



Install the main stand onto the crankcase, insert the pivot bolt and secure it with the washer and a new split pin.



Hook the main stand return spring to the stand and spring pin (page 2-18).



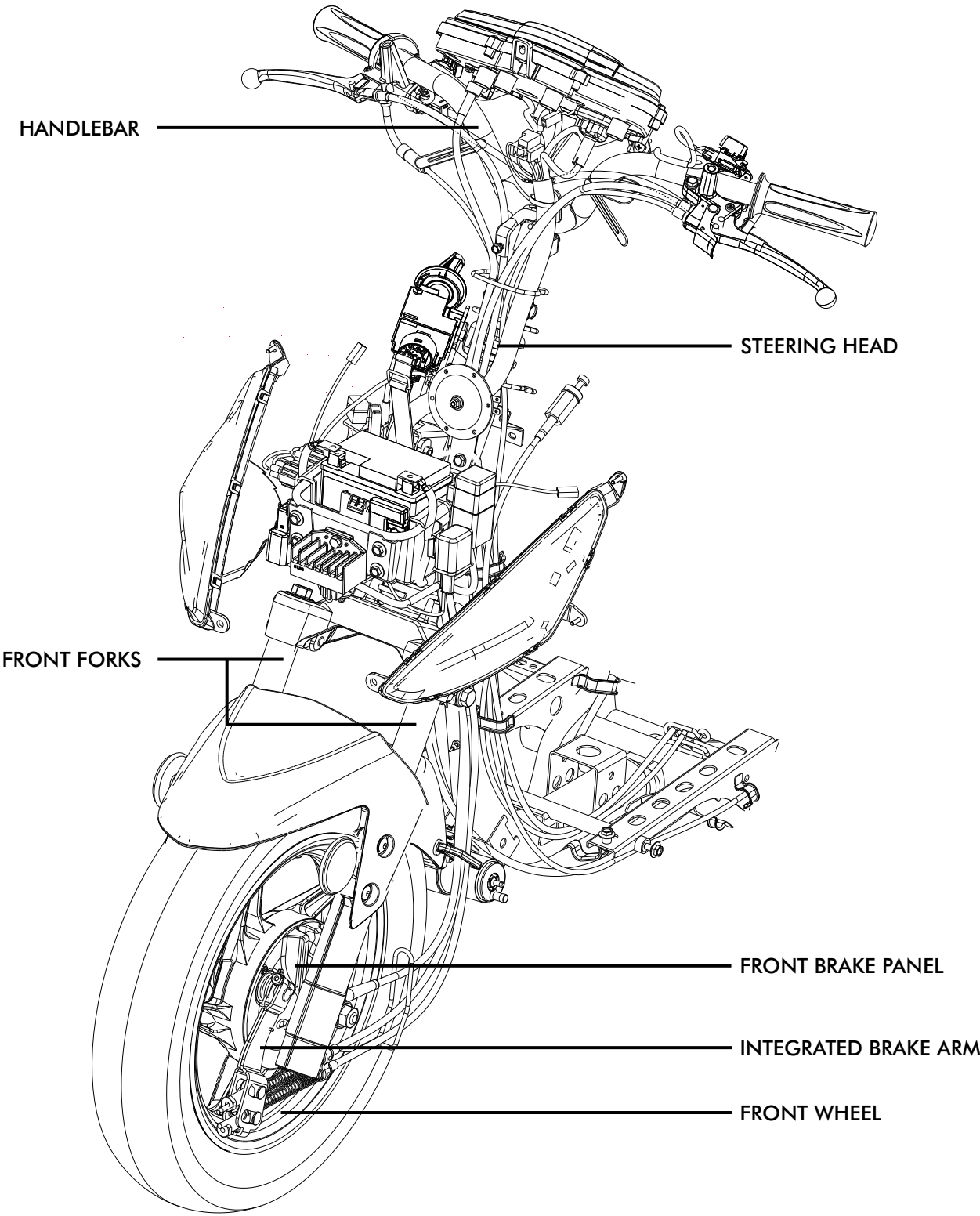
## MAIN STAND/SIDE STAND SPRING INSTALLER PART NO:070 HH 198 037

Refer to service information (page 12-1) for installation of necessary parts after assembling the crankcase.



# 13. FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## SYSTEM DIAGRAM



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Service Information	13-1	Front Wheel	13-3
Specifications	13-1	Front Brake	13-8
Torque Values	13-1	Handlebar	13-15
Special Tools	13-2	Fork	13-21
Troubleshooting	13-2	Steering Stem	13-31

## SERVICE INFORMATION

### GENERAL

- A contaminated brake drum or shoe increase stopping distance. Discard contaminated shoe and clean a contaminated drum with a high quality brake de-greasing agent.
- Raise the front wheel off the ground by supporting the frame securely when servicing the front wheel and suspension.
- Always check the brake operation before riding the scooter. Refer to (SECTION-18 & 19) for inspection.

## SPECIFICATIONS


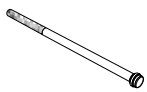
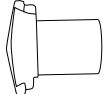
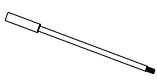

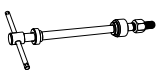

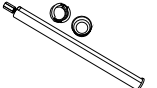
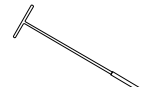
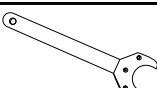

FRONT WHEEL/BRAKE/SUSPENSION/STEERING			
ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		-	1.0
Cold tyre pressure	Rider only	1.50 kgf/cm <sup>2</sup> (22 psi)	-
	Rider & pillion	1.50 kgf/cm <sup>2</sup> (22 psi)	-
Front axle run out		-	0.2 mm
Front wheel rim run out	Radial	-	2.0 mm
	Axial	-	2.0 mm
Front brake drum I.D.		130 mm	131 mm
Front brake shoes lining thickness 4.5 mm		1.5 mm	
Fork spring free length		259.5 mm	254.3 mm
Fork oil capacity		97 ml	-
Fork pipe run out		-	0.20 mm

	<b>TORQUE VALUES</b>
---	----------------------

HANDLEBAR POST PINCH NUT	: 3.4 kgf-m
FRONT AXLE NUT	: 5.9 kgf-m
INTEGRATED BRAKE ARM NUT	: 1.0 kgf-m
STEERING STEM LOCK NUT	: 6.8 kgf-m
BRIDGE BOLT	: 2.7 kgf-m
FRONT FORK BOLT	: 2.2 kgf-m
CABLE GUIDE BOLT	: 1.0 kgf-m

For other nuts, bolts, fasteners etc. refer the standard torque values.

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

 TOOL	SPECIAL TOOLS
	<b>UPPER CONE RACE REMOVER</b> PART NO: 070 HH KTP 13
	<b>BOTTOM CONE RACE REMOVER HEAD</b> PART NO: 070 HH KTP 14
	<b>BOTTOM CONE RACE REMOVER SHAFT</b> PART NO: 070 HH KTP 15
	<b>BOTTOM CONE RACE REMOVER WEIGHT</b> PART NO: 070 HH KTP 16
	<b>UPPER AND BOTTOM CONE INSTALLER</b> PART NO: 070 HH KTP 17
	<b>T-STEM CONE INSTALLER</b> PART NO: 070 HH KTP 18
	<b>T-STEM CONE REMOVER</b> PART NO: HMCL 0815 AAWA 02
	<b>FRONT FORK DISMANTLING TOOL</b> PART NO: 070 HH 198 020
	<b>TOP CONE RACE HOLDER</b> PART NO: 070 HH KZN 004
	<b>STEERING BEARING ADJUSTING NUT SOCKET, 45.3 mm</b> PART NO: 070 HH KTP 12

## TROUBLESHOOTING

### Hard steering

- Steering top cone race too tight
- Worn or damaged steering bearing
- Worn or damaged steering bearing races
- Bent steering stem
- Insufficient tyre pressure

### Steers to one side or does not track straight

- Damaged or loose steering bearings
- Bent fork
- Bent front axle
- Bent frame
- Worn or damaged wheel bearings

### Front Wheel Wobbling

- Bent rim
- Worn or damaged front wheel bearing
- Faulty front tyre
- Unbalanced front tyre and wheel

	<b>SOCKET STEERING STEM NUT, 32 mm</b> PART NO: 070 HH GBG 004
	<b>HANDLE BEARING DRIVER</b> PART NO: 070 HH KFN 008
	<b>DRIVER OUTER, 3x35 mm</b> PART NO: 070 HH KFN 010
	<b>PILOT DRIVER, 12 mm</b> PART NO: 070 HH KFN 012
	<b>BEARING REMOVER HEAD, 12 mm</b> PART NO: 070 HH KFN 017
	<b>WHEEL BEARING REMOVER SHAFT</b> PART NO: 070 HH KZJ 009
	<b>STEERING RACE INSTALLER</b> PART NO: 070 HH KZJ 003
	<b>FRONT FORK OIL SEAL DRIVER BODY</b> PART NO: 070 HH 198 018
	<b>FRONT FORK OIL SEAL DRIVER ATTACHMENT, 31 mm</b> PART NO: 070 HH KFN 004
	<b>FRONT FORK SPRING SPACER COMPRESSOR</b> PART NO: HMCL 0815 AAWA 03

### Wheel Turns Hard

- Faulty front wheel bearings
- Bent front axle
- Front brake drag

### Hard suspension

- High tyre pressure
- Bent or damaged fork tube
- Clogged fluid passage
- Incorrect fluid viscosity
- Oil volume too high

### Soft suspension

- Weak fork spring
- Low tyre pressure
- Insufficient fork fluid
- Oil viscosity too low (wrong grade of oil)

### Front suspension noise

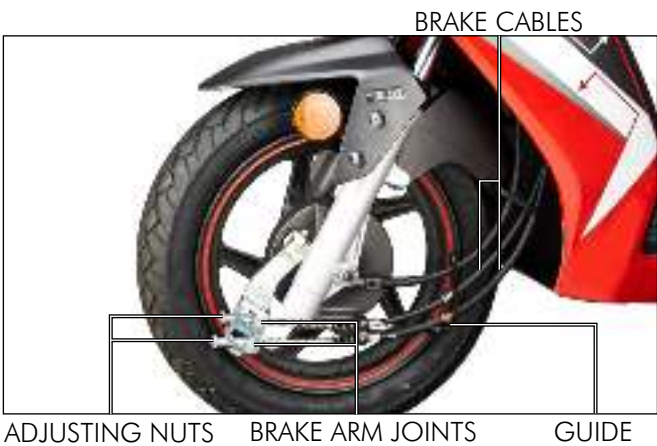
- Loose front suspension fasteners
- Uneven fluid quantity in fork tubes
- Faulty slider bushing



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## FRONT WHEEL REMOVAL

Park the scooter on its main stand.  
Remove the brake arm adjusting nuts, brake cables and  
brake arm joints.  
Release the brake cables from the guide.



Push the tab and disconnect the speedometer cable.  
Release the speedometer cable from the guide.



Loosen and remove the front axle nut.



Support the frame securely and raise the front wheel off the  
ground.  
Remove the front axle and the front wheel.



FRONT WHEEL/BRAKE/SUSPENSION/STEERING

DISASSEMBLY

Remove the brake panel from the front wheel hub.



Remove the collar and dust seal from the right side of front wheel hub.



Insert the bearing remover head into the bearing.  
From the opposite side install the bearing remover shaft and drive the right side bearing out of the wheel.  
Remove the distance collar.



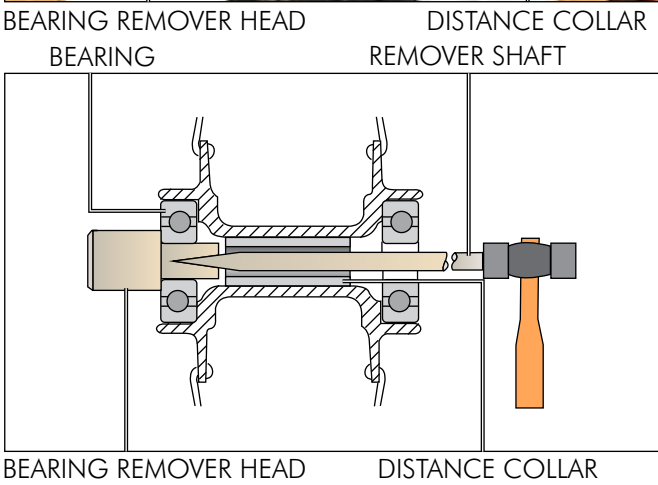
13



**BEARING REMOVER HEAD, 12 mm**  
**PART NO: 070 HH KFN 017**  
**WHEEL BEARING REMOVER SHAFT**  
**PART NO: 070 HH KZJ 009**

NOTE

Replace the wheel bearings in pairs.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Follow the same procedure for the removal of left side bearing.



**BEARING REMOVER HEAD, 12 mm**

**PART NO: 070 HH KFN 017**

**WHEEL BEARING REMOVER SHAFT**

**PART NO: 070 HH KZJ 009**

**NOTE**

Replace the wheel bearings as a pair.

## INSPECTION

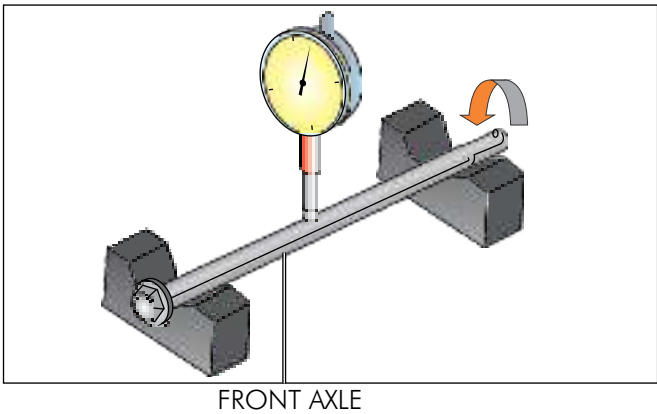
### FRONT AXLE

Set the front axle in V-blocks and measure the run out using a dial indicator.

Actual run out is ½ the total indicator reading.

**SERVICE LIMIT**

**FRONT AXLE RUN OUT: 0.2 mm**



### WHEEL RIM

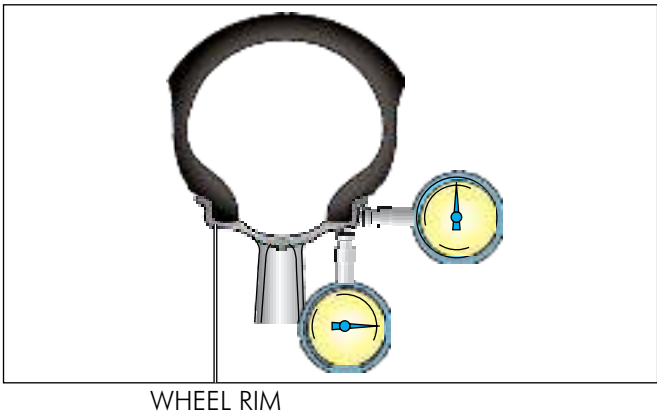
Check the rim run out by placing the wheel in a turning stand. Spin the wheel slowly and read the run out using the dial indicator.

Actual run out is ½ the total indicator reading.

**SERVICE LIMIT**

**RADIAL : 2.0 mm**

**AXIAL : 2.0 mm**



### WHEEL BEARING

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 bearing if the races do not turn smoothly, quietly or if they fit loosely in the hub.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## ASSEMBLY



### NOTE

- Never reinstall an old bearing, once a bearing has been removed, the bearing must be replaced with a new one.
- Do not allow the bearings to tilt while driving them in.

Pack all bearing cavities with grease.

Drive in a new bearing squarely with the sealed side facing up until it is fully seated (Left side of the front wheel).

Apply a thin coat of grease to the distance collar and install it.

Pack all bearing cavities with grease.

Drive in a new bearing squarely with the sealed side facing up until it is fully seated (Right side of the front wheel).



### HANDLE BEARING DRIVER

PART NO: 070 HH KFN 008

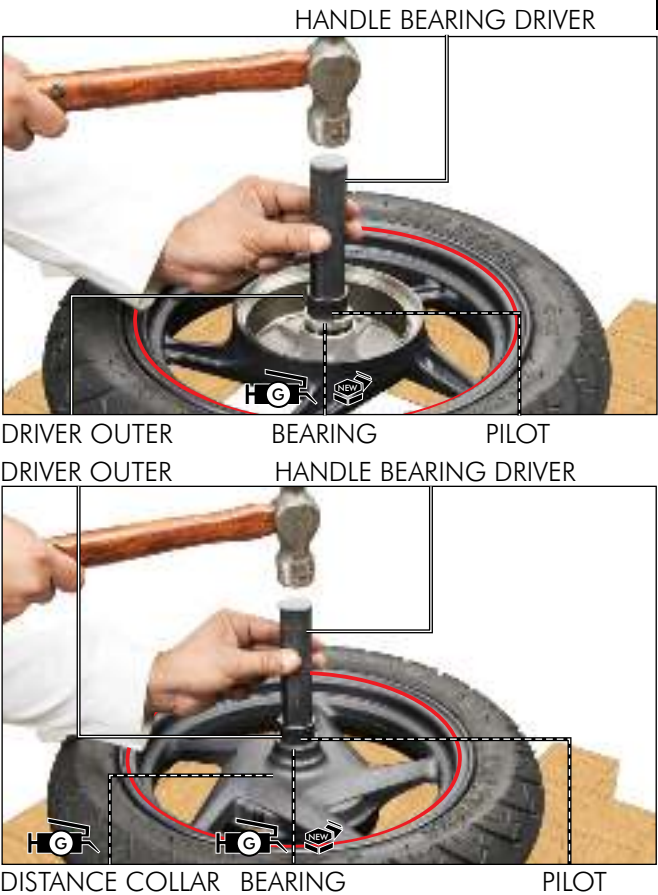
DRIVER OUTER, 32x35 mm

PART NO: 070 HH KFN 010

PILOT DRIVER, 12 mm

PART NO: 070 HH KFN 012

13





# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Apply grease to a new dust seal lip and install it.



Install the collar on the right side of the front wheel hub.



Install the brake panel on the left side of the front wheel.



## INSTALLATION

Install the front wheel between the fork legs by aligning the brake panel groove with the left front fork boss.





# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Apply thin coat of grease to the front axle and insert it from the right side of the wheel.



Install the front axle nut and tighten it to the specified torque.

**TORQUE**  
**FRONT AXLE NUT: 5.9 kgf-m**



Route the speedometer and brake cables to the guide properly.

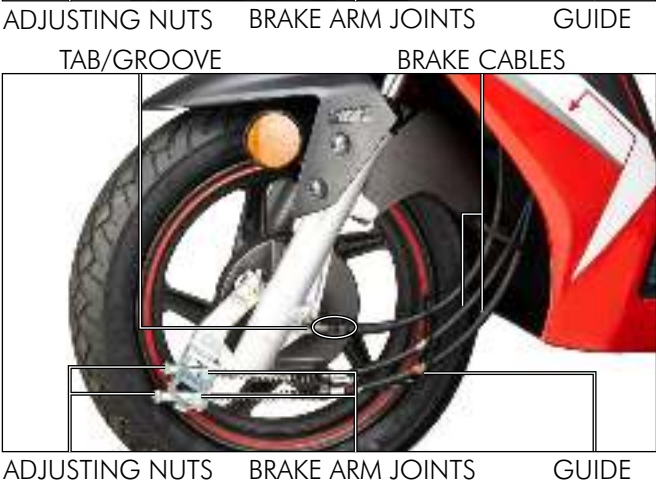
Connect the speedometer cable by aligning its tab with the groove of the speedometer gear box.

Install the brake arm joints into the brake arm.

Install the brake cables through the brake panel and the brake arm.

Install the brake adjusting nuts.

Adjust the rear brake (integrated) lever free play (page 3-15).



## FRONT BRAKE REMOVAL

Remove the front wheel (page 13-3).

### ⚠ WARNING

- A contaminated brake drum or shoe reduces braking efficiency. Discard contaminated shoes and clean the contaminated drum with a high quality brake de-greasing agent.
- Never use air hose or dry brush to clean brake assemblies. Use a vacuum cleaner or alternate method to minimize the hazard caused by air borne brake dust.

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the brake panel from the wheel hub.



## INSPECTION

### BRAKE DRUM

Measure the front brake drum I.D.

### SERVICE LIMIT

FRONT BRAKE DRUM I.D.: 131 mm



### BRAKE SHOES LINING

Measure the brake shoes lining thickness.

### SERVICE LIMIT

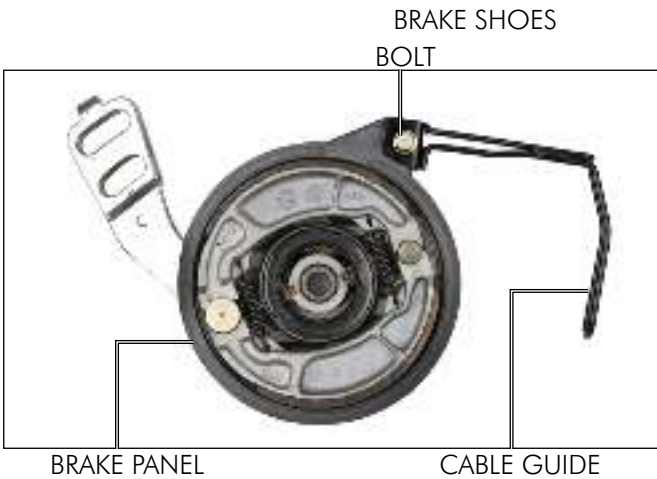
BRAKE SHOES LINING THICKNESS: 1.5 mm

## BRAKE SHOES LINING



## DISASSEMBLY

Remove the bolt and the cable guide from the brake panel.

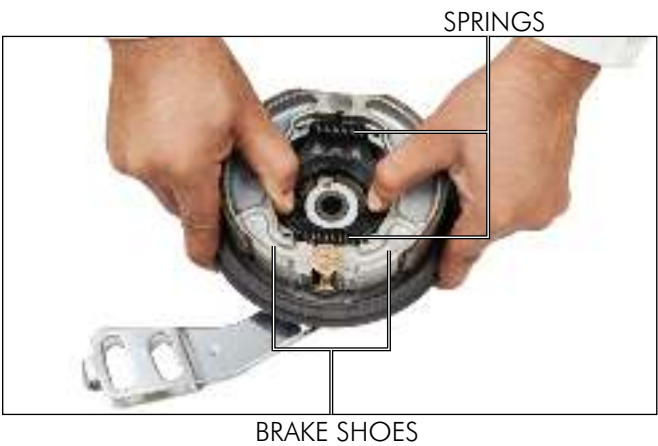


# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

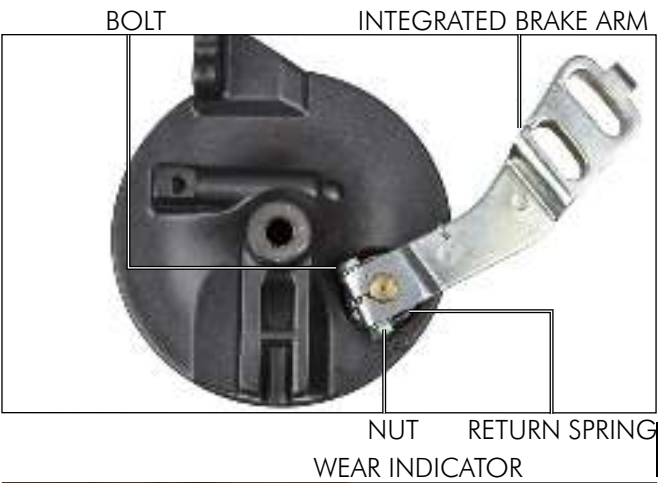
Expand the brake shoes by hands and remove the brake shoes/springs.

**NOTE**

- Replace the brake shoes as a set.
- Mark the brake shoes to ensure that they are reinstalled on their original position.



Remove the integrated brake arm nut and bolt. Unhook the return spring from the integrated brake arm and remove the integrated brake arm from the brake panel.



Remove the brake wear indicator and return spring.



Remove the brake cam from the brake panel.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the felt seal from the brake panel.



Remove the speedometer drive gear and washers from the brake panel.



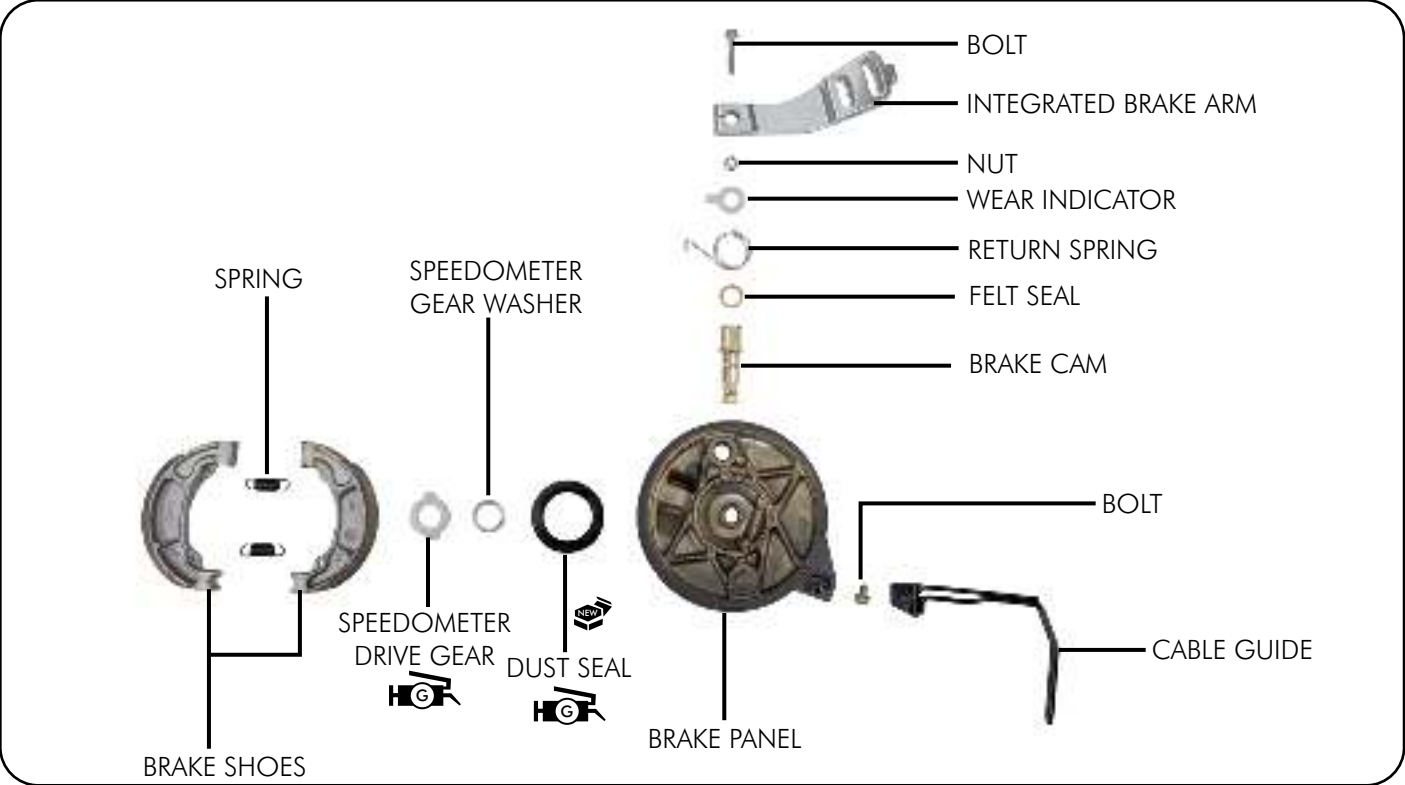
Remove the dust seal from the brake panel.  
Remove the speedometer pinion gear/bush from the brake panel.





# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## ASSEMBLY



Apply grease to the speedometer pinion gear/bush and install it into the brake panel.

Apply grease to the new dust seal lip and install it into the brake panel.



Apply grease to the speedometer drive gear and install it along with new washers into the brake panel.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Apply engine oil to the felt seal and install it on the brake panel.



FELT SEAL

Apply grease to the brake cam sliding surface and install it to the brake panel.  
Apply grease on the anchor pin.



BRAKE CAM

ANCHOR PIN

RETURN SPRING END/HOLE

Install the return spring by inserting its end into the hole in the brake panel.



RETURN SPRING

WEAR INDICATOR PLATE

Install the wear indicator plate by aligning its wide tooth with the corresponding groove of the brake cam.



WIDE TOOTH/GROOVE

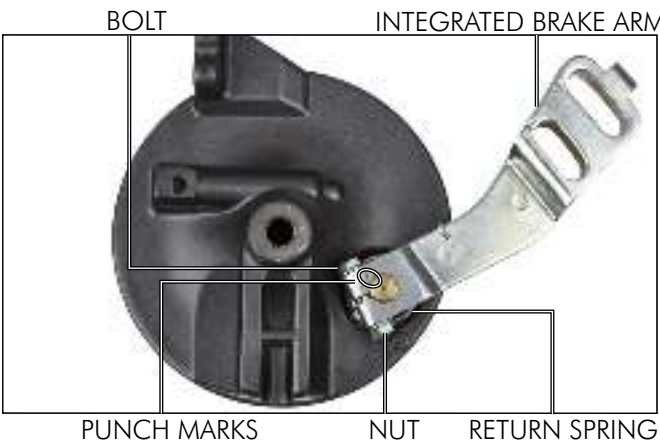
# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the integrated brake arm on the brake cam by aligning the punch marks.

Install the integrated brake arm bolt and nut.

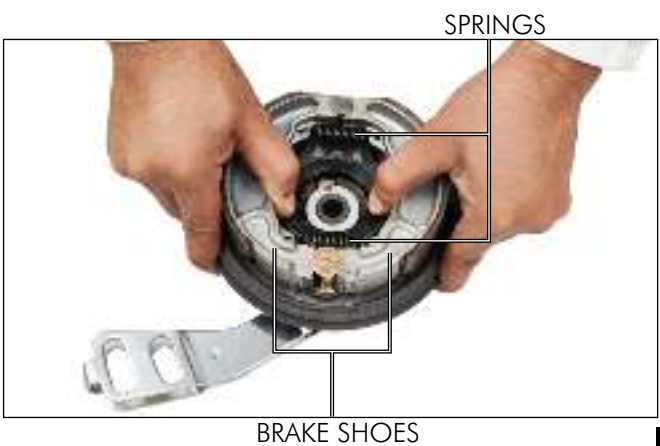
Tighten the nut to the specified torque.

**TORQUE**  
**INTEGRATED BRAKE ARM NUT: 1.0 kgf-m**



Install the brake shoes/springs.

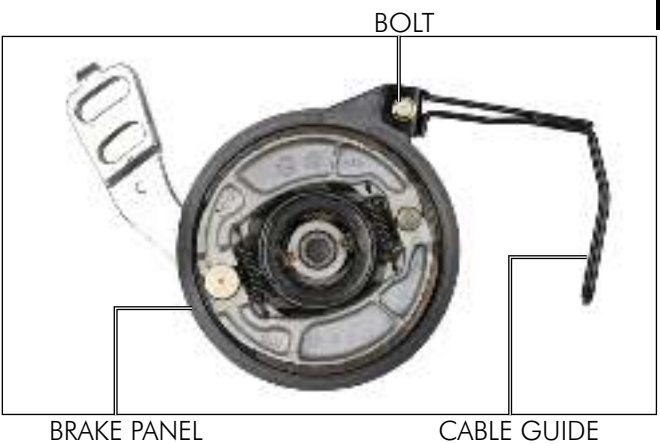
- NOTE**
- Contaminated brake linings increase stopping distance.
  - Keep grease off the brake linings.
  - Wipe any excess grease off the brake cam and anchor pin.



Install the cable guide to the brake panel.

Install and tighten the bolt to the specified torque.

**TORQUE**  
**CABLE GUIDE BOLT: 1.0 kgf-m**



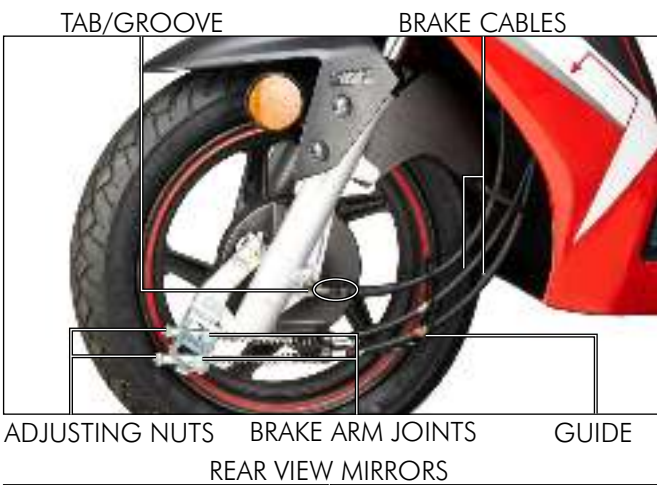
## INSTALLATION

Install the brake panel into the wheel hub.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the front wheel (page 13-7).



## HANDLEBAR REMOVAL

Remove the front and rear handlebar cover (page 2-2 & 2-3).  
Remove the inner cover (page 2-16).



Remove the upper throttle housing mounting bolt .



Remove the upper throttle housing by releasing the tab from the slot in the under throttle housing.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the under throttle housing from the right side of handlebar.  
Release the throttle cable end and disconnect the cable from the throttle grip pipe.



Remove the steering right handlebar end and throttle grip/throttle grip pipe.



Remove the mounting bolt and handlebar bracket band.



Remove the handlebar bracket from the left side of handlebar.





# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the handlebar end and handlebar grip from the left side of the handlebar.



Release the tie-wrap from the handlebar.



Release all the cables from the flexible clips and cable guides.



Remove the handlebar mounting bolt/collar/washer/nut.





# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the handlebar from the vehicle.



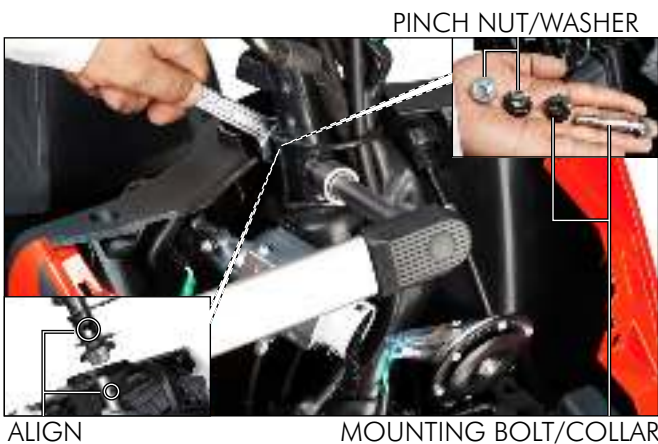
## INSTALLATION

Install the handlebar on the vehicle.

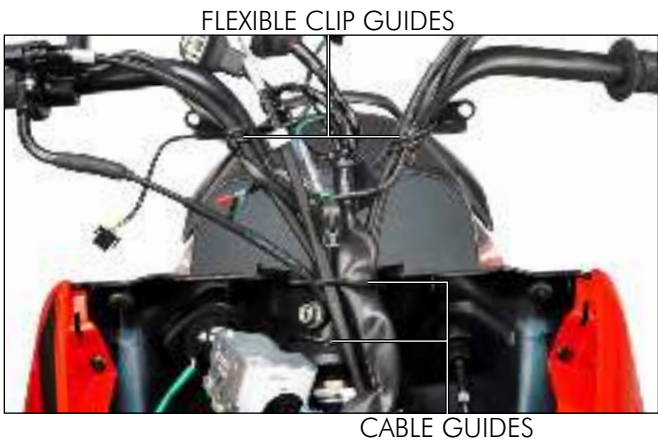


Align the hole in the handlebar with the steering stem hole.  
Install the handlebar mounting bolt/collar from the front side and nut/washer from the rear side.  
Tighten the nut to the specified torque.

**TORQUE**  
**HANDLEBAR POST PINCH NUT: 3.4 kgf-m**



Route all the cables properly through the flexible clips and cable guides.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

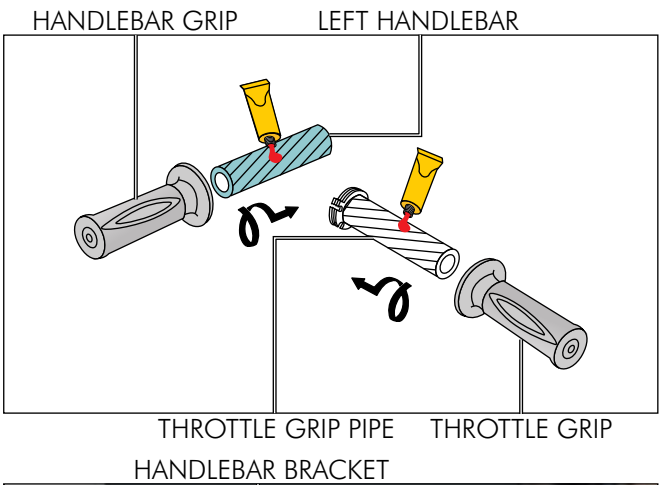
Mount the tie-wrap into the slot on the handlebar.



If the handlebar grips were removed apply # 540 cemedine or its equivalent to the inside surface of the grips and to the clean surface of the left handlebar and the throttle pipe. Wait 3-5 minutes and install the grip. Rotate the grips for even application of the adhesive.

**NOTE**

Allow the adhesive to dry for an hour before using.



Install the handlebar bracket by aligning the pin with the hole in the left side of the handlebar.



Install the handlebar bracket band.  
Install and tighten the mounting bolt.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Apply grease to the throttle grip pipe inner surface.



THROTTLE GRIP PIPE  
THROTTLE GRIP

Install the throttle grip/throttle grip pipe on the right side of the handlebar and steering right handlebar end.



RIGHT HANDLEBAR END  
THROTTLE GRIP PIPE

Apply silicon grease to the throttle cable end and connect the cable to the throttle grip pipe.  
Install the under throttle housing on the right side of handlebar.



THROTTLE CABLE END  
UNDER THROTTLE HOUSING  
UPPER THROTTLE HOUSING  
TAB/SLOT

Install the upper throttle housing by aligning the slot with the tab in under throttle housing.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the upper throttle housing mounting bolt .



MOUNTING BOLT  
REAR VIEW MIRRORS

Install the inner cover (page 2-16).  
Install the front and rear handlebar cover (page2-3).



## FORK REMOVAL

Remove the following:-

- Front center cover (page 2-6)/front right/left cover (page 2-7).
- Front fender (page 2-4).
- Front wheel (page 13-3).



FRONT FORKS

Dismount the spark unit, turn signal relay, passing relay, starter relay and fuse box from the mounting stay.  
Disconnect the RR unit coupler and release the tie-wrap from the stay.

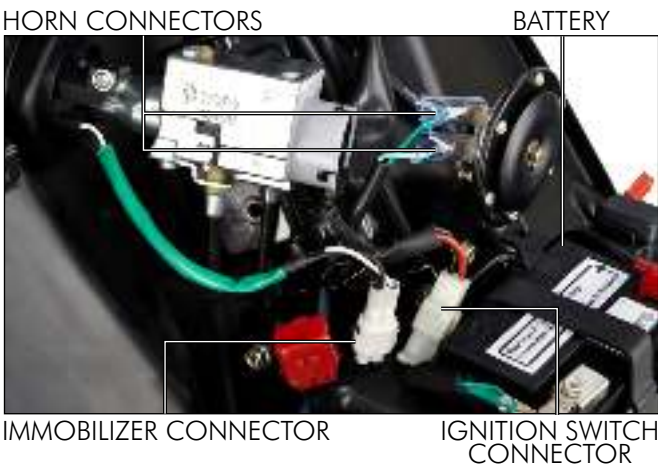


SPARK UNIT FUSE BOX STARTER RELAY  
PASSING RELAY RR UNIT COUPLER TURN SIGNAL RELAY



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Disconnect the ignition switch and immobilizer connectors.  
Disconnect the horn switch connectors.  
Remove the battery (page 16-7 & 16-17).



Remove the front mounting stay bolts (3 nos.) and the stay.



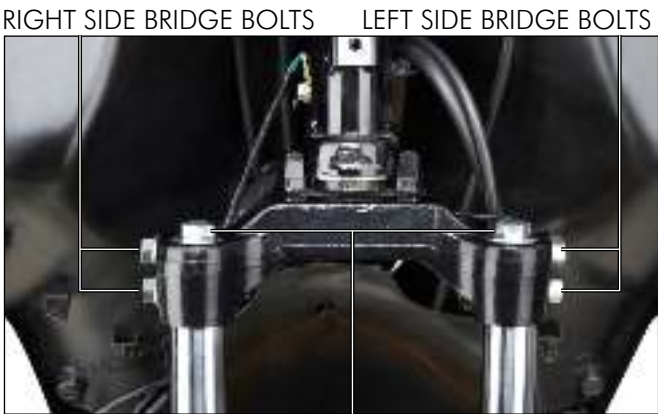
MOUNTING BOLTS

Loosen the front fork bolts.

**NOTE**

If the fork is to be disassembled then loosen the bolt before loosening the bridge bolts.

While holding the forks, loosen the right/left side bridge bolts.



Remove the forks by sliding it down from the bridge while rotating with hands as shown.



FRONT FORKS



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## DISASSEMBLY

Remove the fork bolt and the O-ring.

### ⚠ WARNING

The fork bolt is under spring pressure. Use care while removing.

### CAUTION

- Do not distort the fork pipe.
- Loosen the fork bolt by using a dummy T-stem.

### NOTE

Loosen the fork bolt by gripping the fork pipe in the vehicle T-stem before complete removal or by using a dummy T-stem after removal.

Remove the fork spring from the fork pipe.

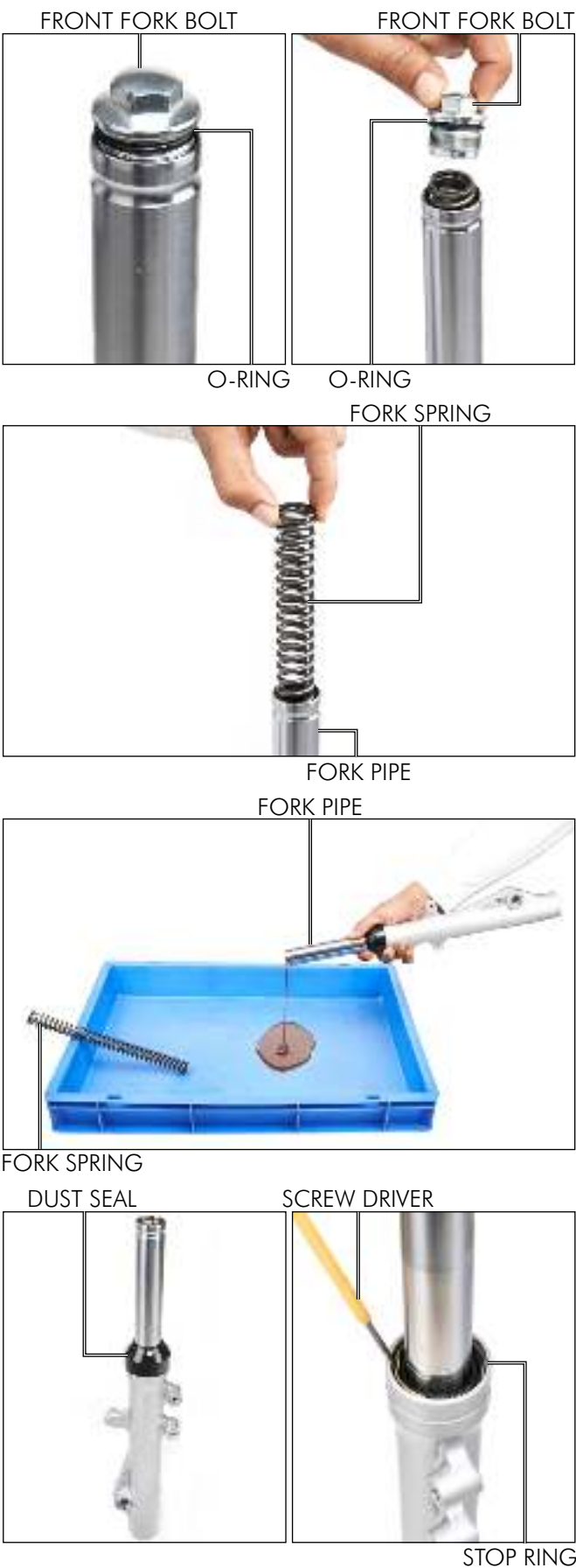
Pour out the fork oil from the fork slider by pumping the fork several times (8-10 times).

Remove the dust seal.

Remove the oil seal stop ring carefully by prying it out from the

### NOTE

Be careful not to scratch the fork pipe.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Lock the fork piston using special tool as shown.  
Remove the socket bolt/special washer using an impact driver.



## FRONT FORK DISMANTLING TOOL

PART NO: 070 HH 198 020

### NOTE

- Use your foot on front fork dismantling tool to lock and to avoid fork piston turning with the socket bolt.
- Do not damage the fork slider.



FORK SOCKET BOLT/SPECIAL WASHER

FRONT FORK DISMANTLING TOOL

FORK PISTON

13

Remove the fork pipe along with the fork piston and the oil lock piece from the slider.  
Remove the fork piston from the fork pipe.



OIL LOCK PIECE

FORK PIPE

Remove the rebound spring from the fork piston.



FORK PISTON

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the oil seal from the fork slider.

**NOTE**

- Do not score the inner fork pipe sliding surface.
- Check that the fork pipe moves smoothly in the fork slider. If it does not, check the fork pipe for bend or damage.

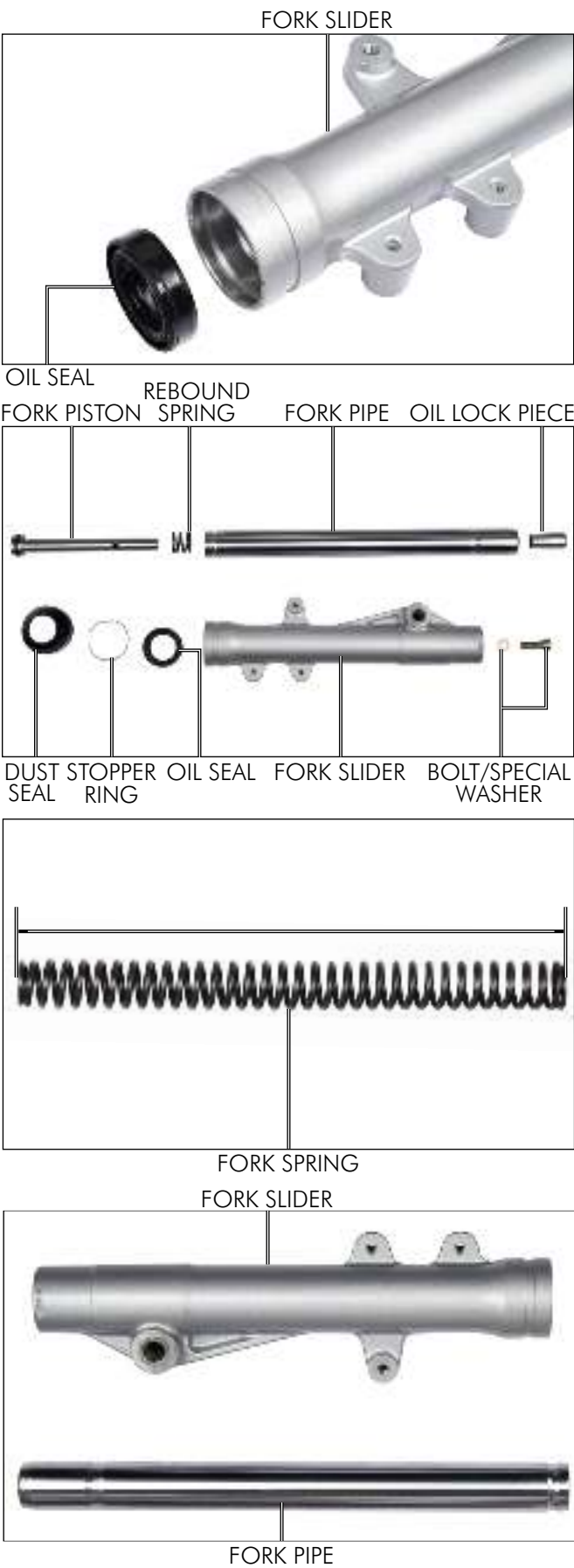
**INSPECTION  
FORK SPRING**

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 FREE LENGTH: 254.3 mm**

**FORK PIPE/SLIDER**

Check the fork pipe and slider for score marks, scratches or abnormal wear.  
Replace the components if necessary.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Check the piston for score marks, scratches or abnormal wear.  
Check the rebound spring for fatigue or damage.  
Replace the components, if necessary.



Set the fork pipe in V-block and measure the fork pipe runout by rotating it with a dial indicator.  
The actual run out is 1/2 of the total indicator reading.

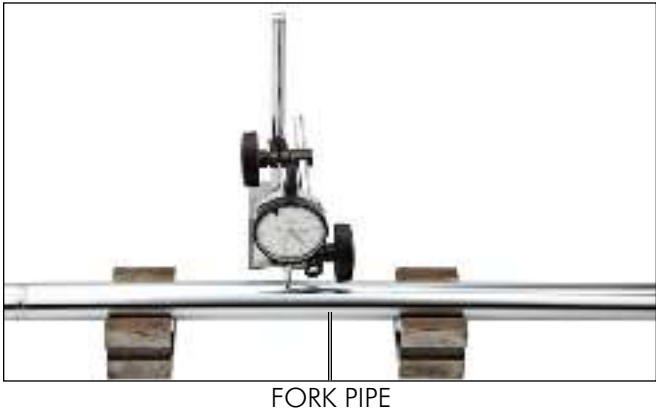
**SERVICE LIMIT**

**FORK PIPE RUN OUT: 0.20 mm**

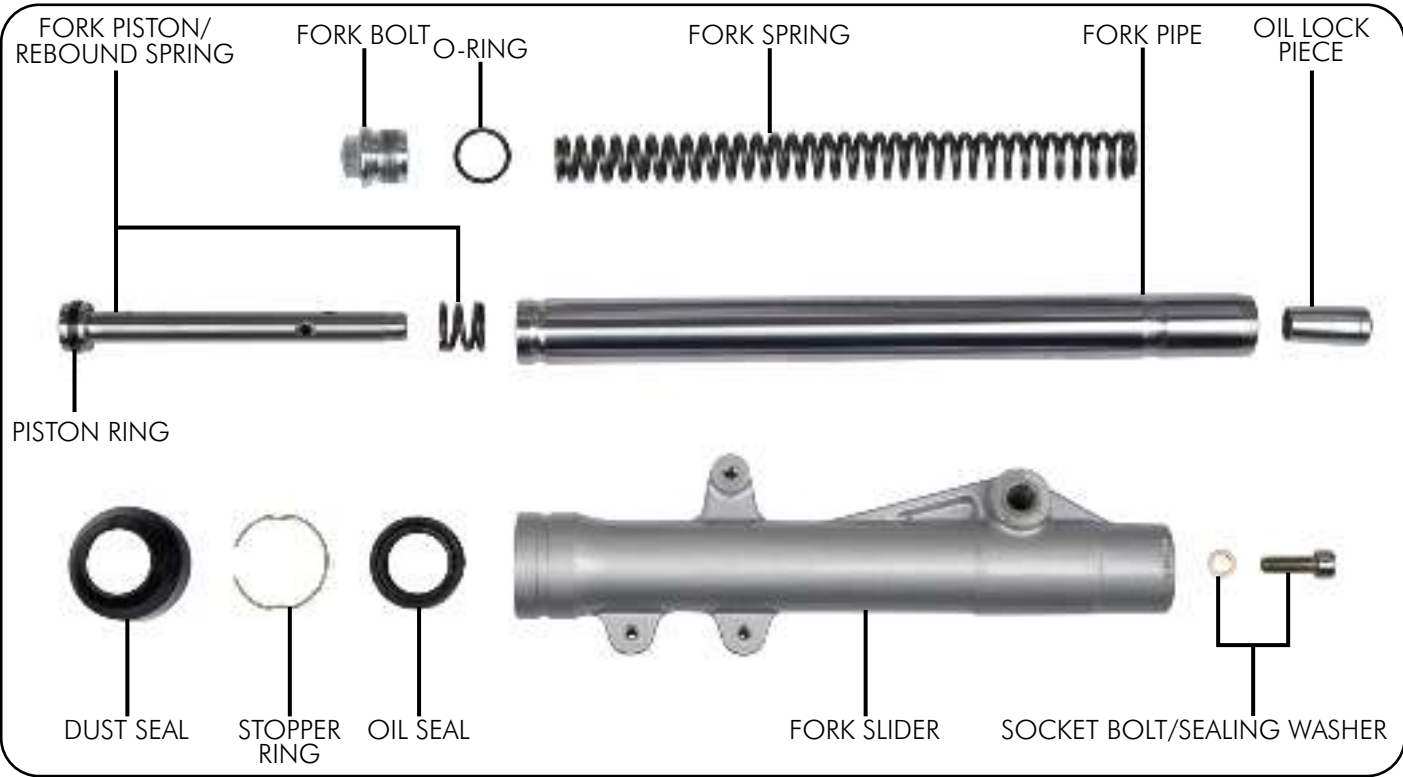
Replace if the service limit is exceeded or there are scoring or knocks that will allow fork oil to leak past the seals.

**NOTE**

Do not reuse fork pipe if it cannot be perfectly straightened with minimal effort.



**ASSEMBLY**



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

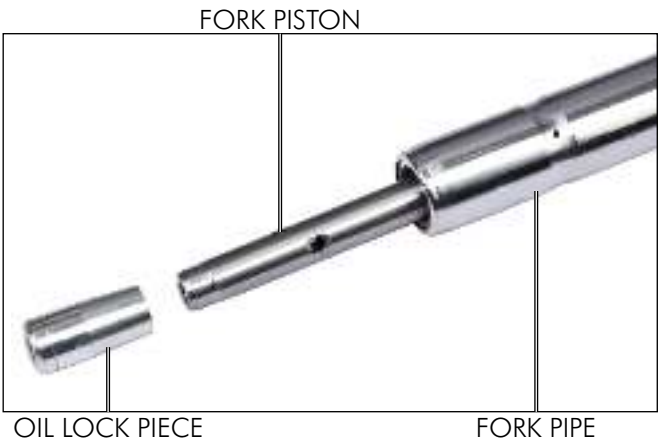
Install the rebound spring on the fork piston.

**NOTE**

Always replace the piston ring with a new one, once the front fork is dismantled.



Install the fork piston into the fork pipe.  
Install the oil lock piece at the fork piston end.



Apply fork fluid to a new oil seal lip and install it onto the fork pipe with the marking side facing up.  
Install the oil seal on the fork tube from the working area side.  
When installing the oil seal, wrap the edge and groove of the fork pipe with tape.  
Install the fork pipe along with the fork piston into the slider.





# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Lock the fork piston using special tool as shown.



**FRONT FORK DISMANTLING TOOL**  
**PART NO: 070 HH 198 020**

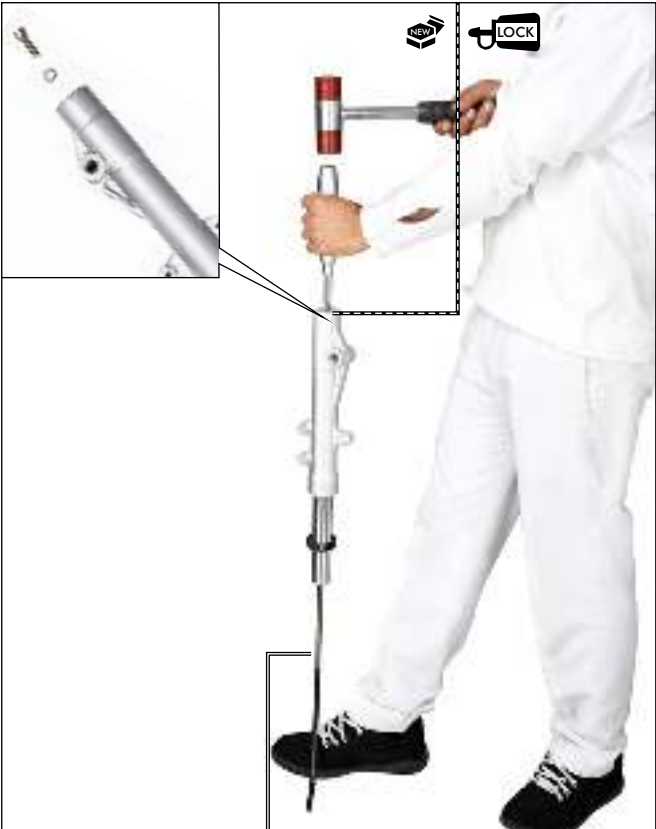
Clean and apply a locking agent to the fork socket bolt threads and install it with a new special washer into the fork piston.

Tighten the fork socket bolt.

**NOTE**

Use your foot on front fork dismantling tool to lock and to  
Avoid fork piston turning with the socket bolt.

FORK SOCKET BOLT/SPECIAL WASHER



FRONT FORK DISMANTLING TOOL

FORK SEAL DRIVER/ATTACHMENT

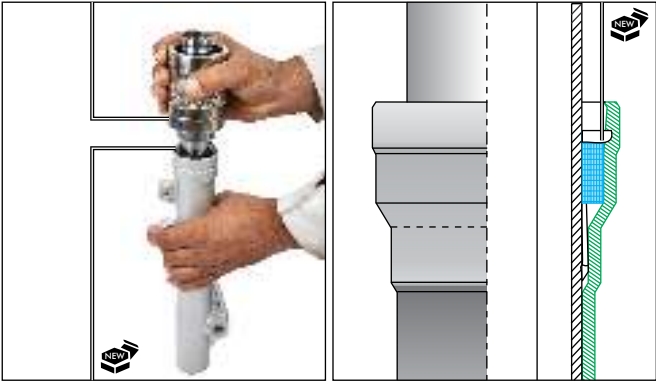
OIL SEAL

13

Drive the oil seal in the slider.



**FRONT FORK OIL SEAL DRIVER BODY**  
**PART NO: 070 HH 198 018**  
**FRONT FORK OIL SEAL**  
**DRIVER ATTACHMENT, 31 mm**  
**PART NO: 070 HH KFN 004**



OIL SEAL

Install the oil seal stop ring into the groove of the fork slider.  
Install a new dust seal.

DUST SEAL



STOP RING

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Pour the specified amount of recommended fork fluid into the fork tube.

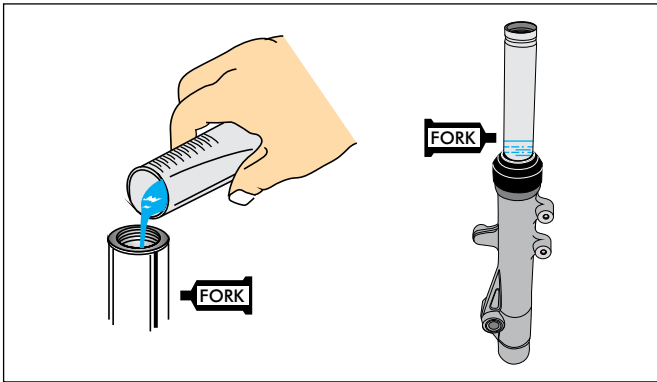
**FORK OIL CAPACITY: 97 ml**

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.

**CAUTION**

Do not mix "1F" and "2F" grade fork oil.



Clean the spring with a high flash point solvent (Kerosene) and allow it to dry.

**NOTE**

Do not wipe the spring with shop towel.

Install the fork spring into the fork pipe.



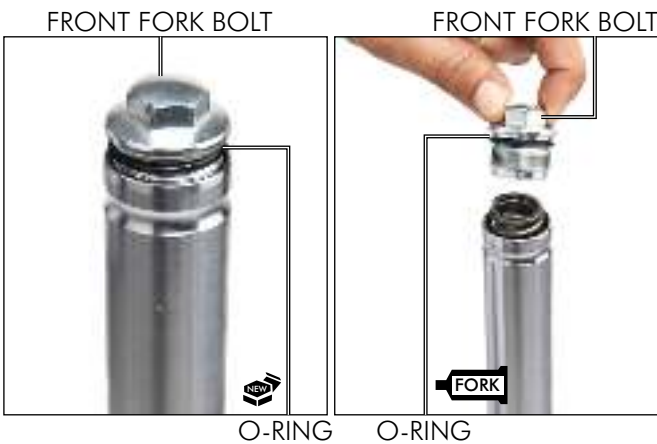
FORK PIPE

Apply fork fluid to a new O-ring and install it to the fork bolt.

Install the fork bolt by pushing it onto the fork pipe.

**NOTE**

- Be careful not to cross thread the fork bolt.
- Tighten the fork bolt after installing the fork pipe into the fork bridge.



O-RING

O-RING

**INSTALLATION**

Install the forks through the bridge while rotating with hands as shown.

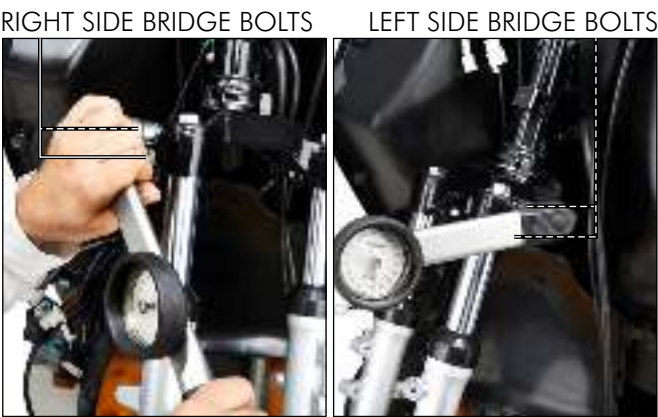


FRONT FORKS

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

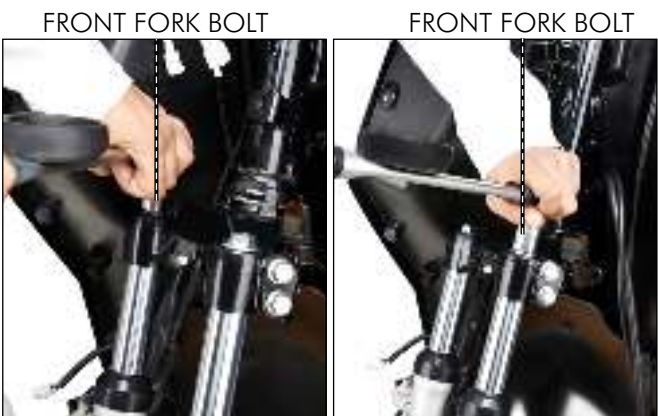
While holding the forks, install the right/left side bridge bolts.  
Tighten the right/left side bridge bolts to the specified torque.

**TORQUE**  
**BRIDGE BOLT: 2.7 kgf-m**



Tighten the front fork bolts to the specified torque.

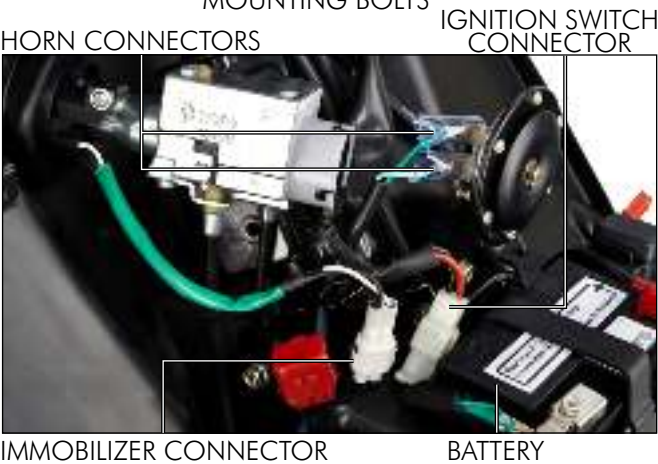
**TORQUE**  
**FRONT FORK BOLT: 2.2 kgf-m**



Install the front mounting stay.  
Install and tighten the front mounting stay bolts (3 nos.).



Install the battery (page 16-7 & 16-19).  
Connect the horn switch connectors.  
Connect the ignition switch and immobilizer connectors.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the tie-wrap to the stay and connect the RR unit coupler.  
Mount the spark unit, turn signal relay, passing relay, starter relay and fuse box to the mounting stay.

- Install the following:-
- Front wheel (page 13-7).
  - Front fender (page 2-4).
  - Front right/left cover (page 2-7)/Front center cover (page 2-6).

## STEERING STEM REMOVAL

Remove the handlebar (page 13-15).  
Remove the front fork (page 13-21).  
Remove the steering stem nut by using special tools as shown.



**SOCKET STEERING STEM NUT, 32 mm**

**PART NO: 070 HH GBG 004**

**TOP CONE RACE HOLDER**

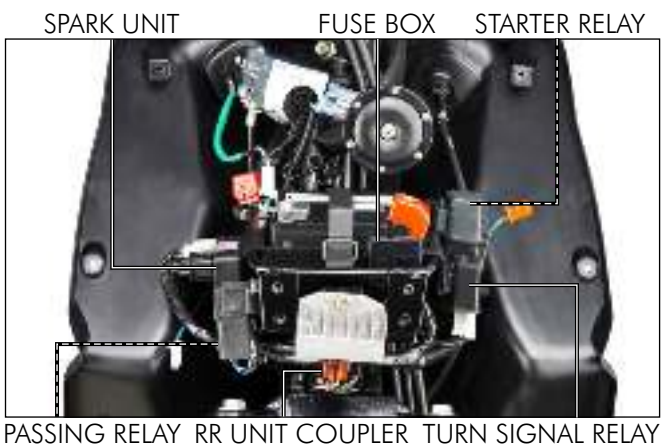
**PART NO: 070 HH KZN 004**

Support the steering stem and remove the top cone race using special tool.



**STEERING BEARING ADJUSTING NUT SOCKET, 45.3 mm**

**PART NO: 070 HH KTP 12**



FRONT FORKS  
SOCKET STEERING STEM NUT      STEERING STEM NUT



TOP CONE RACE HOLDER      STEERING STEM NUT  
STEERING BEARING ADJUSTING NUT SOCKET



TOP CONE RACE      TOP CONE RACE

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the upper ball cage assembly from the steering head.

UPPER BALL CAGE ASSEMBLY



Remove the steering stem from the steering head pipe along with lower ball cage assembly.

STEERING HEAD PIPE



STEERING STEM

STEERING STEM

Remove the lower ball cage assembly from the steering stem.



LOWER BALL CAGE ASSEMBLY

## INSPECTION

Check the ball cage assembly for wear or damage.



BALL CAGE ASSEMBLY



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Check the upper and lower ball races for wear or damage.

## BALL RACE REPLACEMENT

Drive out the upper and lower ball races from the steering head pipe by using the special tools as shown.



**UPPER CONE RACE REMOVER**

**PART NO: 070 HH KTP 13**

**BOTTOM CONE RACE REMOVER HEAD**

**PART NO: 070 HH KTP 14**

**BOTTOM CONE RACE REMOVER SHAFT**

**PART NO: 070 HH KTP 15**

**BOTTOM CONE RACE REMOVER WEIGHT**

**PART NO: 070 HH KTP 16**

### NOTE

Always replace bearings and races as a set.

Install the new upper and lower ball races using the special tool as shown.



**UPPER AND BOTTOM CONE INSTALLER**

**PART NO: 070 HH KTP 17**

**STEERING RACE INSTALLER**

**PART NO: 070 HH KZJ 003**

## BOTTOM CONE RACE REPLACEMENT

Remove the dust seal from the steering stem.

Remove the bottom cone race from the steering stem by using the special tool as shown.



**T-STEM CONE REMOVER**

**PART NO: HMCL 0815 AAWA 02**

UPPER BALL RACE



UPPER CONE RACE  
REMOVER



LOWER BALL RACE  
REMOVER HEAD



REMOVER SHAFT

REMOVER WEIGHT

UPPER AND LOWER BALL RACES



UPPER AND BOTTOM CONE RACE INSTALLER

STEERING STEM



DUST SEAL

T-STEM CONE REMOVER



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Apply molykote grease on the new bottom cone race inner surface and install it on the steering stem by using the special tool as shown.



**T-STEM CONE INSTALLER**  
**PART NO: 070 HH KTP 18**

Apply grease to the new dust seal lip and install it to the steering stem.

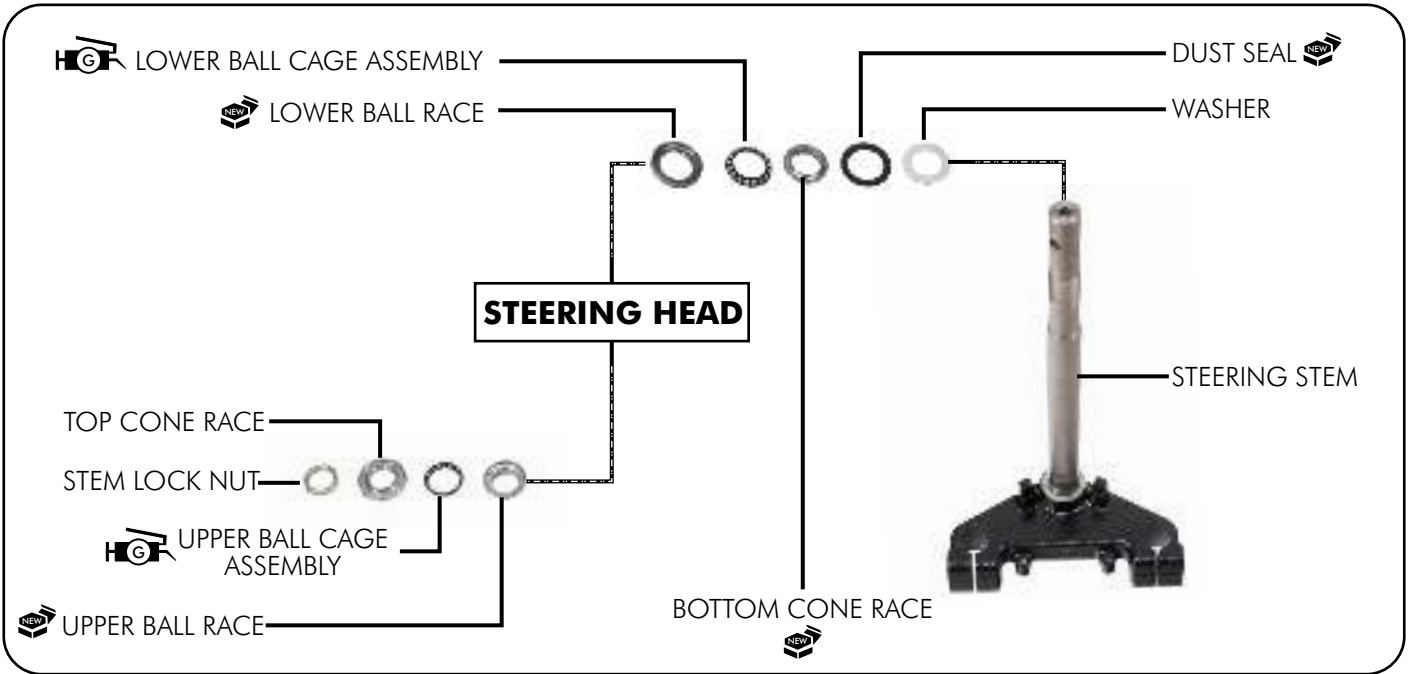


**13**

## INSTALLATION

### NOTE

If the scooter has been involved in an accident, examine the area around the steering head for cracks or deformation.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Apply grease to the lower ball cage assembly and install it on the steering stem.



Install the steering stem into the steering head pipe along with lower ball cage assembly.



Apply grease to the upper ball cage assembly and install it on the steering head.



Tighten the top cone race.



**STEERING BEARING ADJUSTING NUT SOCKET, 45.3 mm**  
**PART NO: 070 HH KTP 12**



## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Rotate the steering stem lock-lock several times to seat the steering bearing.

Loosen the steering top cone race.

Tighten the top cone race fully by hand, then loosen it to 45° (1/8 turn).

Install and tighten the steering stem lock nut to the specified torque.

Hold the steering top cone race using the special tool as shown.

### TORQUE

**STEERING STEM LOCK NUT: 6.8 kgf-m**



**SOCKET STEERING STEM NUT, 32 mm**

**PART NO: 070 HH GBG 004**

**TOP CONE RACE HOLDER**

**PART NO: 070 HH KZN 004**

Make sure that the steering stem moves smoothly without play or binding.

### NOTE

Check for both side ways and axial play of the steering.

Install the front fork (page 13-29).

Install the handlebar (page 13-18).



STEERING STEM

SOCKET STEERING STEM NUT

STEERING STEM NUT



TOP CONE RACE HOLDER

STEERING STEM NUT

STEERING STEM



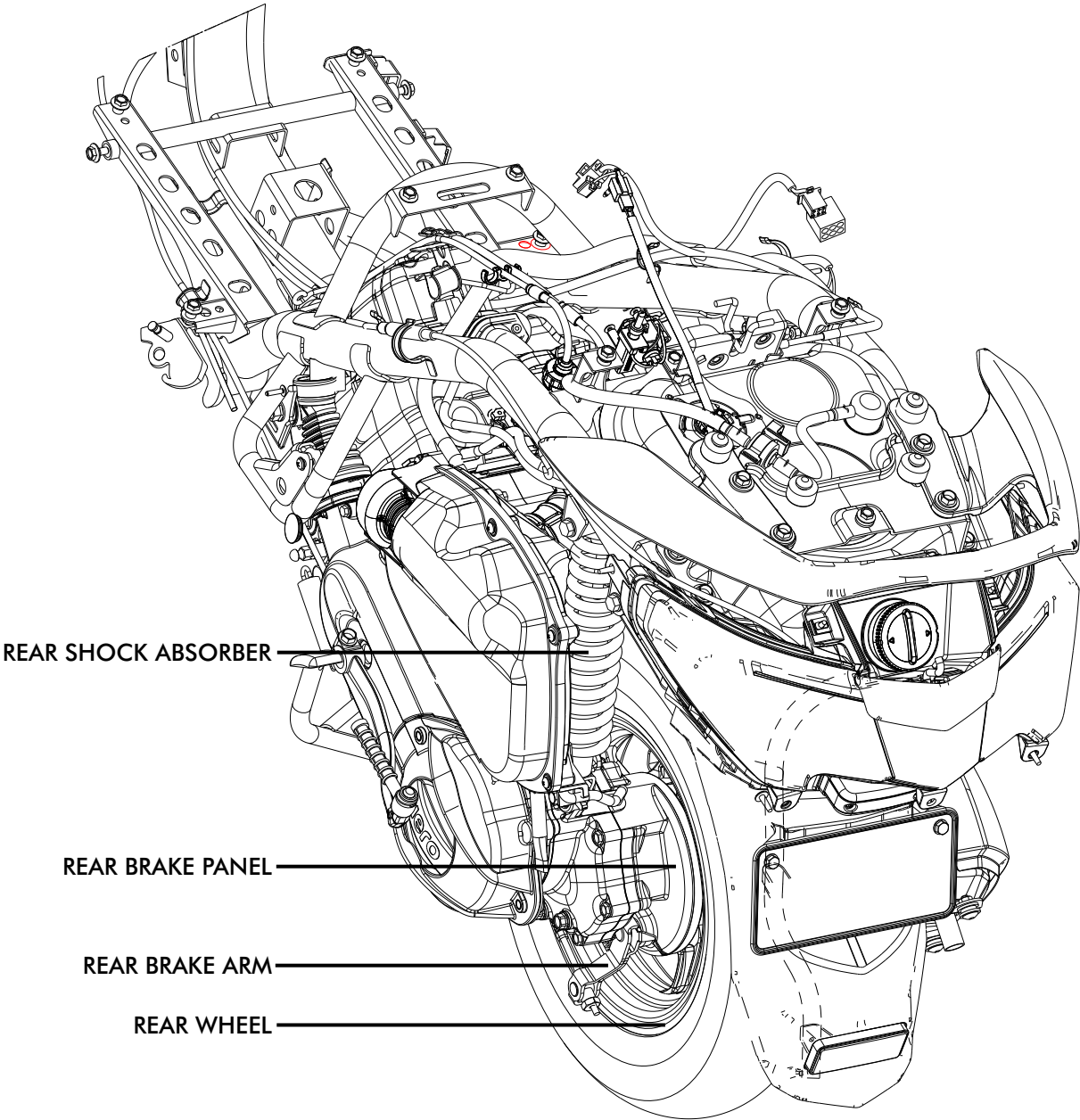
STEERING STEM NUT

**MEMO**



# 14. REAR WHEEL/BRAKE/SUSPENSION

## SYSTEM DIAGRAM



# REAR WHEEL/BRAKE/SUSPENSION

<b>Service Information</b>	<b>14-1</b>	<b>Rear Wheel Removal</b>	<b>14-3</b>
<b>Specifications</b>	<b>14-1</b>	<b>Rear Wheel Installation</b>	<b>14-4</b>
<b>Torque Values</b>	<b>14-1</b>	<b>Rear Brake</b>	<b>14-4</b>
<b>Special Tools</b>	<b>14-2</b>	<b>Rear Shock Absorber Removal</b>	<b>14-7</b>
<b>Troubleshooting</b>	<b>14-2</b>	<b>Rear Shock Absorber Installation</b>	<b>14-9</b>

## SERVICE INFORMATION

### GENERAL

Frequent inhalation of brake shoe 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 approved vacuum cleaner.
- Riding on damaged rims impairs safe operation of the scooter.
- When servicing the rear wheel and suspension, park the scooter using a center stand or hoist.
- A contaminated brake drum or shoe reduces braking efficiency. Discard contaminated shoes and clean a contaminated drum with a high quality brake de-greasing agent.
- After the rear wheel installation, check the brake operation by applying the brake lever. Refer (SECTION-18 & 19) for stop lamp switch inspection.
- Use genuine Hero MotoCorp replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to the brake system information (SECTION-13 & 14).
- The scooter is equipped with "Tubeless tyres" on both the wheels.

### SPECIFICATIONS

REAR WHEEL/BRAKE/SUSPENSION ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth			1.0 mm
Cold tyre pressure	Rider only	2.00 kgf/cm <sup>2</sup> (29 psi)	-
	Rider & pillion	2.50 kgf/cm <sup>2</sup> (36 psi)	-
Final shaft run out			0.2 mm
Rear wheel rim run out	Radial	-	2.0 mm
	Axial	-	2.0 mm
Rear brake drum I.D.		130 mm	131 mm
Rear brake shoes lining thickness		4.5 mm	1.5 mm

	<b>TORQUE VALUES</b>
---	----------------------

<b>REAR AXLE NUT</b>	<b>: 11.8 kgf-m</b>
<b>REAR BRAKE ARM BOLT</b>	<b>: 1.0 kgf-m</b>
<b>SHOCK ABSORBER UPPER MOUNTING BOLT</b>	<b>: 3.9 kgf-m</b>
<b>SHOCK ABSORBER LOWER MOUNTING BOLT</b>	<b>: 2.2 kgf-m</b>

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

# REAR WHEEL/BRAKE/SUSPENSION

	<b>SPECIAL TOOLS</b>
	<b>SHOCK ABSORBER EXTRACTOR</b> <b>PART NO: 070 HH KTP 19</b>

## TROUBLESHOOTING

### Rear wheel wobbles

- Bent rim
- Worn or damaged rear wheel bearings
- Worn or damaged driven flange bearing
- Faulty rear tyre
- Axle nut, engine mounting nut not tightened properly
- Insufficient tyre pressure
- Unbalanced tyre and wheel

### Hard suspension

- Bent rear shock absorber damper rod
- High tyre pressure

### Poor brake performance

- Improper brake adjustment
- Contaminated brake shoe lining
- Worn brake cam
- Contaminated brake drum
- Worn brake drum

### Soft suspension

- Weak rear shock absorber spring
- Faulty rear shock absorber damper

# REAR WHEEL/BRAKE/SUSPENSION

## REAR WHEEL REMOVAL

Park the scooter on its main stand.  
Remove the exhaust muffler (page 2-20).  
Remove the rear axle nut, washer and the rear wheel.

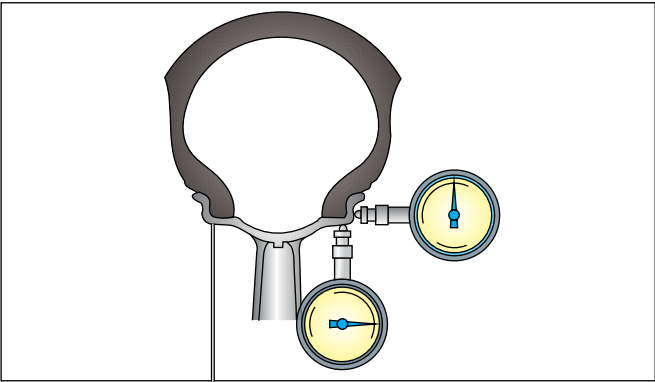
Check the rotating direction mark on the tyre.



## INSPECTION WHEEL RIM

Check the wheel rim run out using a dial indicator.  
Actual run out is  $\frac{1}{2}$  the total indicator reading.

**SERVICE LIMITS**  
**RADIAL: 2.0 mm**  
**AXIAL: 2.0 mm**



WHEEL RIM

Measure the rear brake drum I.D.

**SERVICE LIMIT**  
**REAR BRAKE DRUM I.D: 131mm**



## REAR WHEEL/BRAKE/SUSPENSION

### REAR WHEEL INSTALLATION

Apply engine oil to the axle nut threads and seating surface.  
Install the rear wheel, washer and rear axle nut.



Tighten the rear axle nut to the specified torque.

#### TORQUE

**REAR AXLE NUT: 11.8 kgf-m**

Install the exhaust muffler (page 2-20).



### REAR BRAKE DISASSEMBLY

Remove the rear wheel (page 14-3).

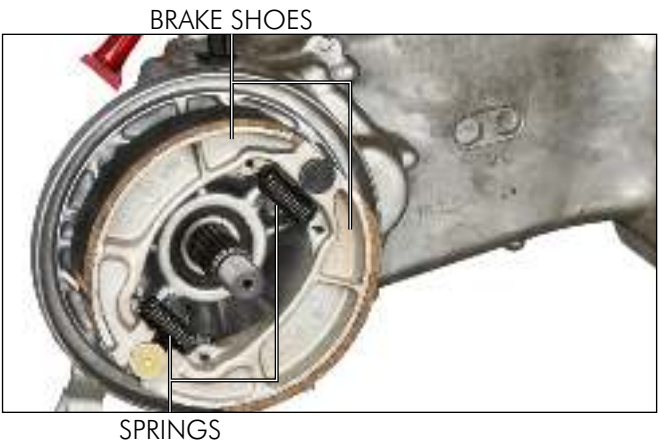


14

Expand the brake shoes and remove them from the brake cam and anchor pin.

Remove the shoe springs from the brake shoes.

- Always replace the brake shoes as a set.
- Mark the brake shoes to ensure that they are reinstalled on their original position.





# REAR WHEEL/BRAKE/SUSPENSION

Remove the adjusting nut, brake cable and brake arm joint from the brake arm.

Remove the brake arm return spring.

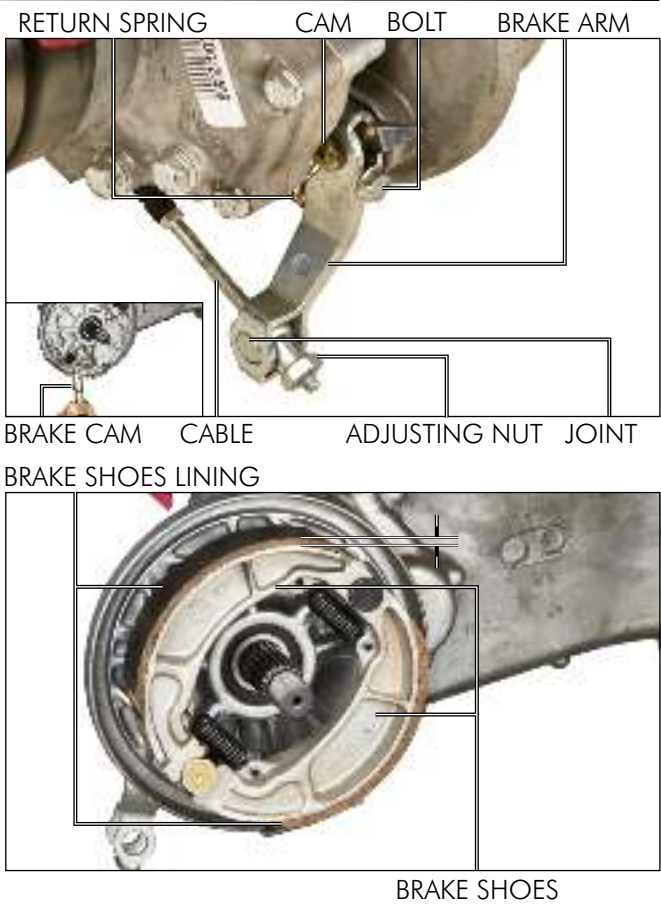
Remove the brake arm bolt, brake arm, brake cam and dust seal from the brake panel (transmission case).

## BRAKE SHOES LINING

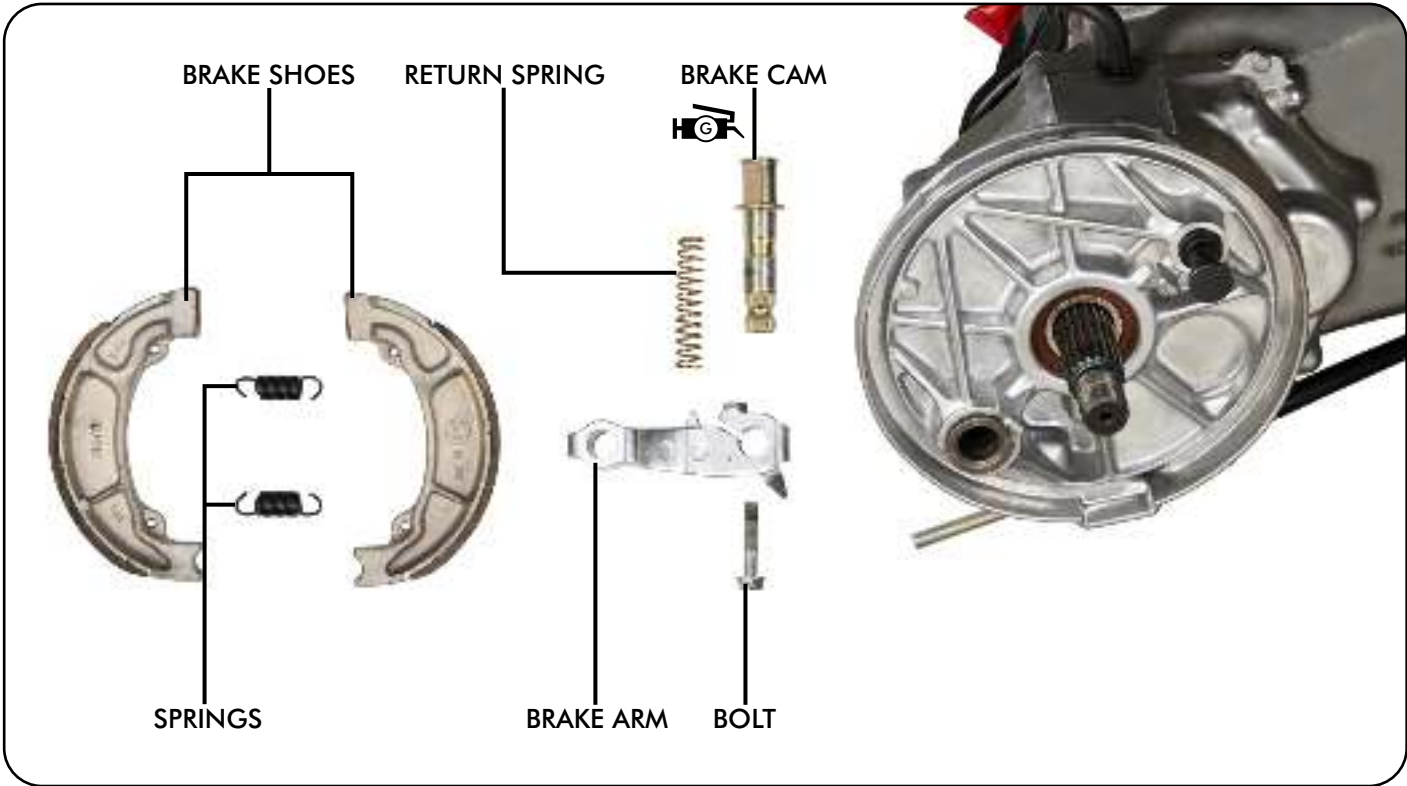
Measure the brake shoes lining thickness.

### SERVICE LIMIT

**BRAKE SHOES LINING THICKNESS: 1.5 mm**



## ASSEMBLY



# REAR WHEEL/BRAKE/SUSPENSION

Apply grease to a new dust seal lip and install it into the brake panel (transmission case).  
Apply grease to the brake cam sliding surface and install it into the brake panel.  
Apply grease to the anchor pin.

Install the brake arm onto the brake cam, aligning the punch marks on the arm and cam.  
Install and tighten the rear brake arm bolt to the specified torque.

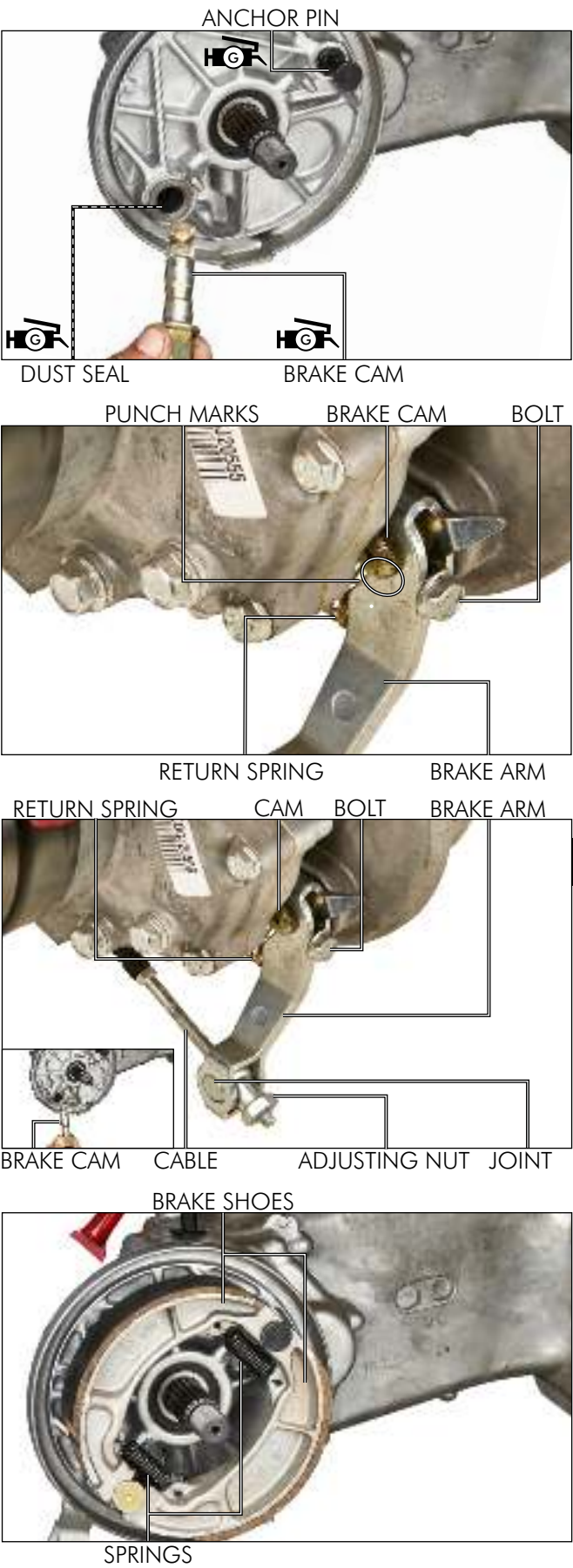
**TORQUE**  
**REAR BRAKE ARM BOLT: 1.0 kgf-m**  
Install the return spring.

Install the brake arm joint, brake cable and brake adjusting nut.

**⚠ WARNING**

- Contaminated brake linings increases stopping distance.
- Keep grease off the linings.
- When the brake shoes are reused, install them on their original position.

Install the shoe springs onto the brake shoes.  
Install the brake shoes along with springs on the brake cam and anchor pin.  
Wipe any excess grease from the brake cam and anchor pin.



# REAR WHEEL/BRAKE/SUSPENSION

Install the rear wheel (page 14-4).  
Adjust the rear brake (integrated) (page 3-15).



REAR WHEEL

## REAR SHOCK ABSORBER REMOVAL

Park the scooter on its main stand.  
Remove the body cover (page 2-12).  
Remove the upper mounting bolt.



UPPER MOUNTING BOLT

Remove the lower mounting bolt.



LOWER MOUNTING BOLT

Support the frame and then remove the rear shock absorber.



REAR SHOCK ABSORBER

# REAR WHEEL/BRAKE/SUSPENSION

## DISASSEMBLY

Compress the shock absorber with the shock absorber extractor.

Remove the upper joint by loosening the lock nut.

Remove the extractor to disassemble the shock absorber.



## SHOCK ABSORBER EXTRACTOR

PART NO: 070 HH KTP 19

## CAUTION

- Compress the shock absorber only to the extent required.
- Over tightening may damage the spring.

## INSPECTION

Visually inspect the shock absorber for wear or damage.

Check the following:-

- Damper rod for bend or damage.
- Damper unit for leakage or other damage.
- Bush for wear or damage.

Check for smooth damper operation.

Replace the shock absorber as an assembly, if necessary.

## ASSEMBLY

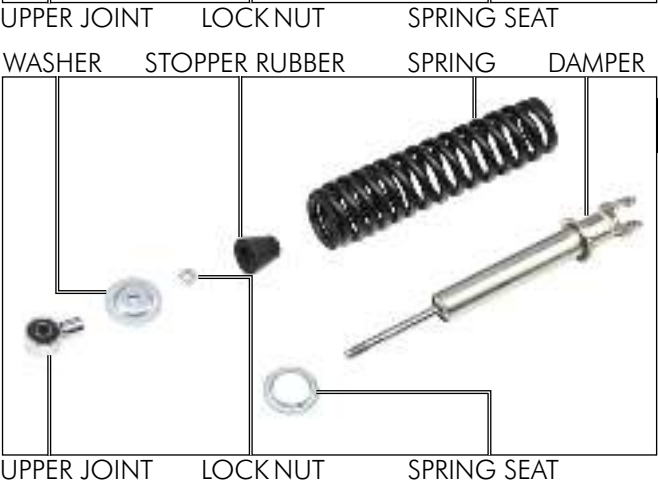
Install the damper into the spring seat, spring and stopper rubber.

Compress the spring with the shock absorber extractor.

Install lock nut, washer and upper joint.

Apply locking agent to the nut threads.

Tighten the lock nut securely.





# REAR WHEEL/BRAKE/SUSPENSION

## REAR SHOCK ABSORBER

### INSTALLATION

Support the frame and align the shock absorber to the frame and engine mounting.

Install the upper and the lower mounting bolt.

Tighten the lower mounting bolt to the specified torque.

### TORQUE

#### SHOCK ABSORBER LOWER MOUNTING

**BOLT: 2.2 kgf-m**

Tighten the upper mounting bolt to the specified torque.

### TORQUE

#### SHOCK ABSORBER UPPER MOUNTING

**BOLT: 3.9 kgf-m**

Install the body cover (page 2-12).



LOWER MOUNTING BOLT

UPPER MOUNTING BOLT





# 15. TUBELESS TYRES

Service Information	15-1	Rim Valve Replacement	15-4
Specifications	15-1	Wheel Inspection	15-4
Tyre Removal	15-2	Tyre Installation	

## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- Riding on damaged wheels impairs safe operation of the scooter.
  - Installing improper tyres or using tyres that are excessively worn or improperly inflated tyres on scooter 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/rear wheel off the ground by supporting the scooter securely with a jack or other support under the engine.
  - After the front/rear 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 (SECTION-13 & 14).

## SPECIFICATIONS

TUBELESS TYRES		ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth	Front			-	1.0 mm
	Rear			-	1.0 mm
Cold tyre pressure	Front	Rider only		1.50 kgf/cm <sup>2</sup> (22 psi)	-
		Rider & pillion		1.50 kgf/cm <sup>2</sup> (22 psi)	-
	Rear	Rider only		2.00 kgf/cm <sup>2</sup> (29 psi)	-
		Rider & pillion		2.50 kgf/cm <sup>2</sup> (36 psi)	-
Wheel rim run out	Front	Radial		-	2.0 mm
		Axial		-	2.0 mm
	Rear	Radial		-	2.0 mm
		Axial		-	2.0 mm

# TUBELESS TYRES

## TYRE REMOVAL

Remove the front wheel (page 13-3).  
Remove the rear wheel (page 14-3).  
Remove the valve cap and bleed air by pressing the valve core.

Bleed the air by removing the valve core using valve core screw driver.

Collapse the bead with a tyre bead breaker.

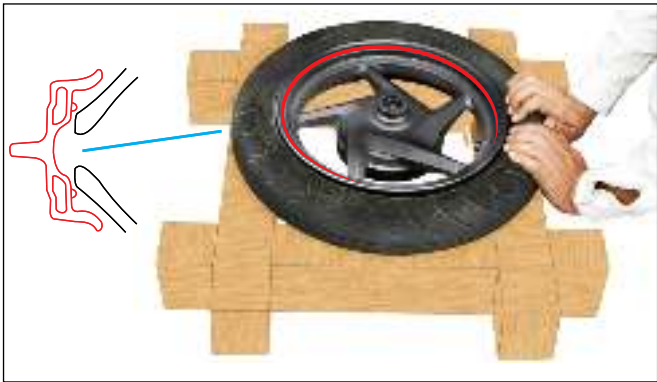
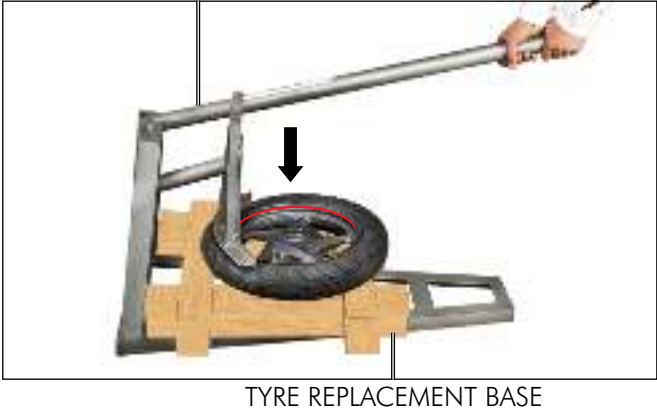
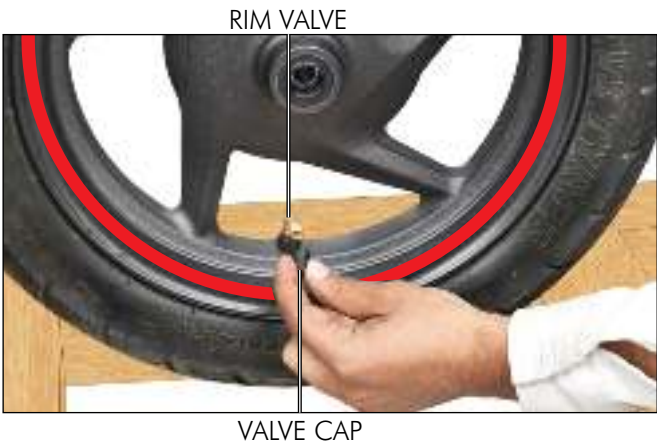
### NOTE

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.



# TUBELESS TYRES

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 scooter tyre levers.
- To avoid damaging the rim, use rim protectors.

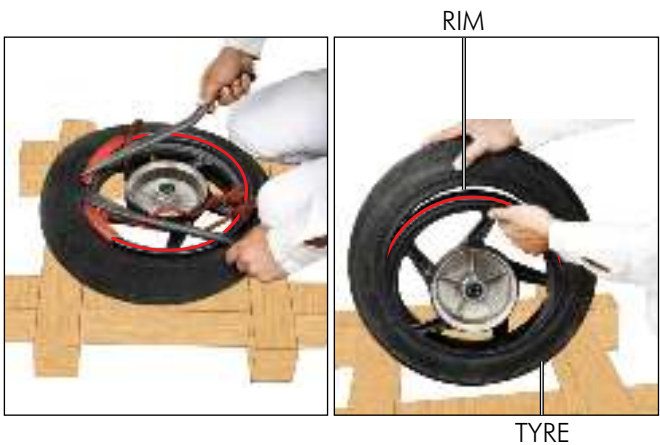
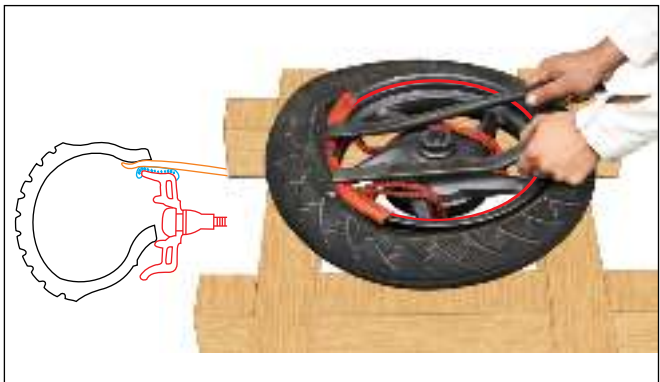
Insert another tyre lever 30~50 mm from the first tyre lever and pry the tyre over the rim little by little.

**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 another side of bead using same procedure.  
Remove the tyre from the rim.



# TUBELESS TYRES

## RIM VALVE REPLACEMENT

Cut off the rim valve at the base.

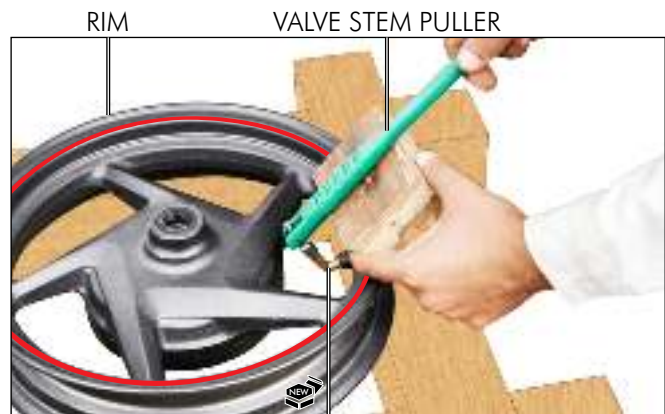
Apply mild detergent solution to the new rim valve and insert it from inside of the rim. pull it in radially towards the center of the wheel using a special tool.

### 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.



RIM VALVE



RIM VALVE

## 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

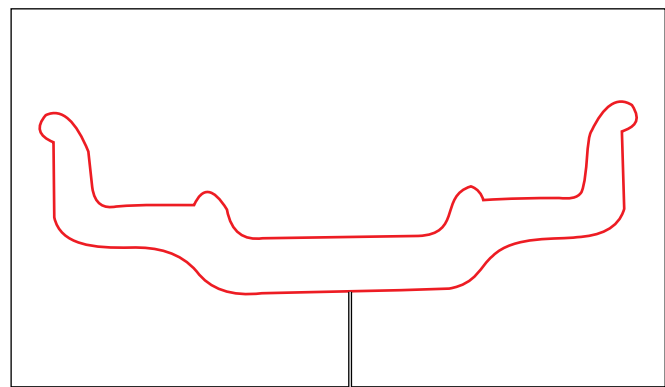
### INSTALLATION

#### ⚠ WARNING

Any attempt to mount a passenger car tyre on a scooter 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.



RIM

'O' PAINT MARK



DIRECTION OF ROTATION

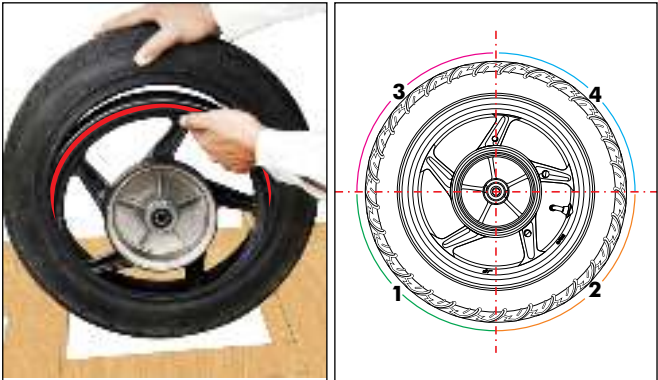


## TUBELESS TYRES

### ⚠ 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 scooter 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 of the other side. During this step, hold 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  $\frac{3}{4}$  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.



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### NOTE

Hold one tyre lever upright to allow removal of the other tyre lever.





# TUBELESS TYRES

**NOTE**

The last portion of the bead is the most difficult to install. The rim and bead may be damaged if the bead on the opposite side of the point where you are working is not in the rim center.

When the remaining section is about 50 to 60 mm, pry the two tyre levers simultaneously to install the bead completely.

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. Over inflation may cause a tyre to burst with sufficient force to result in serious injury.

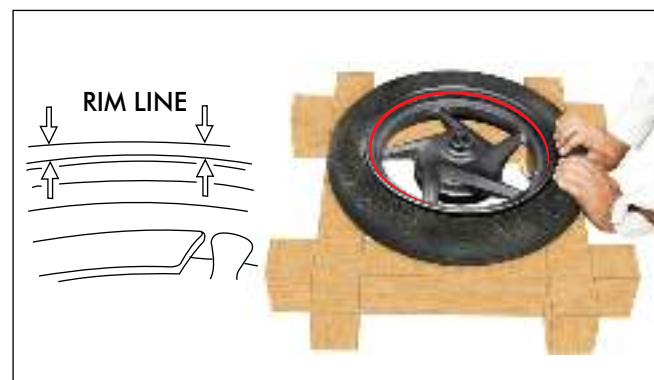
**NOTE**

- 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 fill air in while pushing down on the tyre.

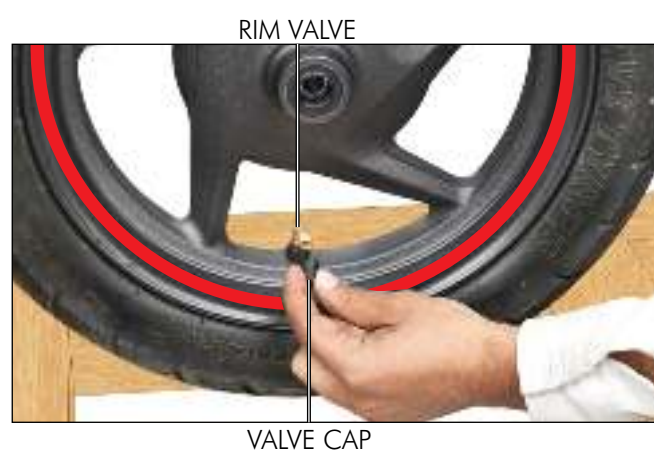


## TUBELESS TYRES

Check that the tyre bead seats on the tyre rim securely and that the rim line of the tyre is concentric with the rim.

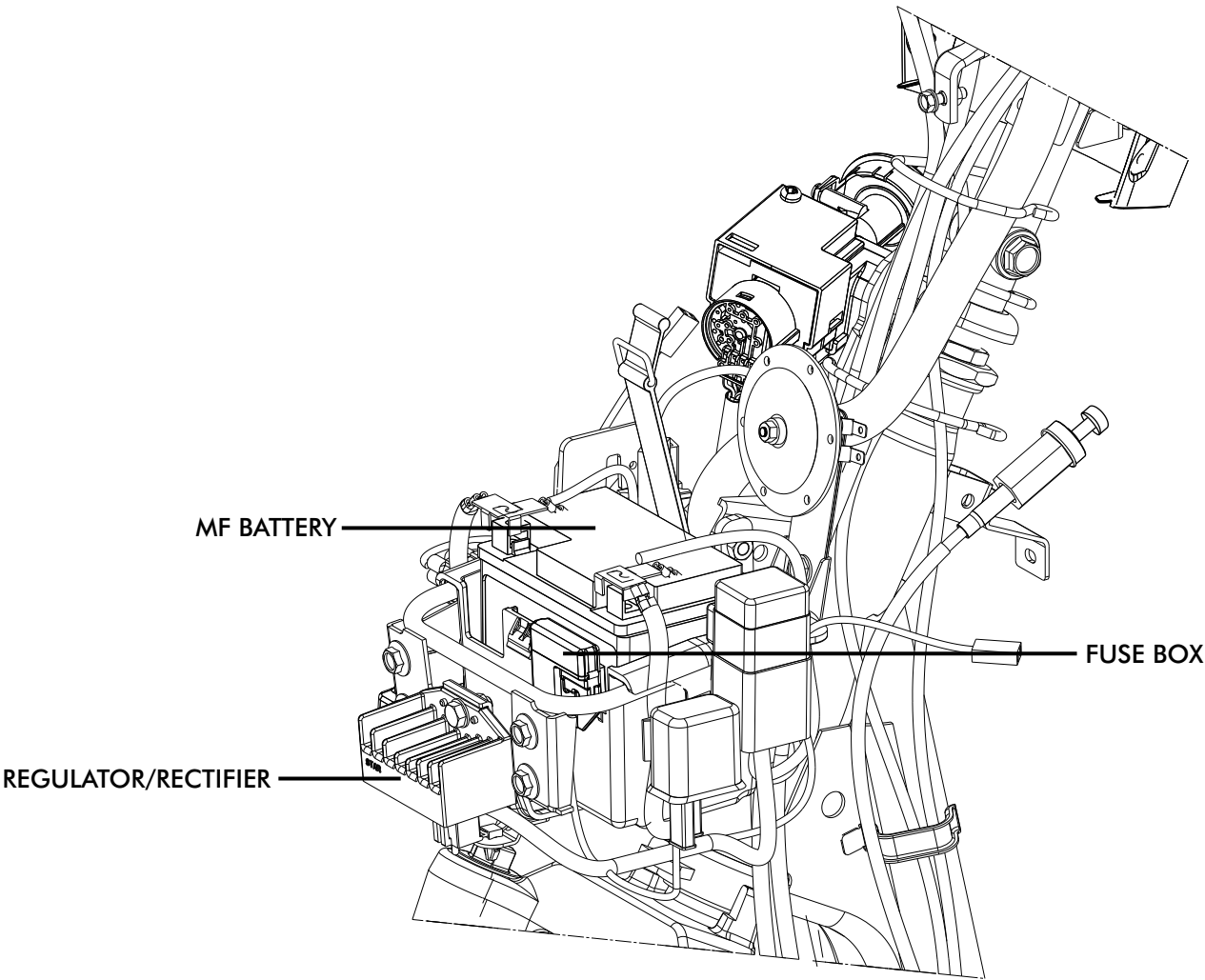


Adjust the tyre pressure as per specification.  
Install the valve cap.  
Install the rear wheel (page 14-4).  
Install the front wheel (page 13-7).



# 16. BATTERY/CHARGING SYSTEM

## SYSTEM DIAGRAM



# BATTERY/CHARGING SYSTEM

<b>Service Information</b>	<b>16-1</b>	<b>MF- Battery Charger</b>	<b>16-11</b>
<b>Specifications</b>	<b>16-2</b>	<b>Stories Batteries</b>	<b>16-12</b>
<b>Special Tools</b>	<b>16-2</b>	<b>Charging System</b>	<b>16-13</b>
<b>Troubleshooting</b>	<b>16-3</b>	<b>Regulator/Rectifier</b>	<b>16-14</b>
<b>Maintenance Free Battery</b>	<b>16-7</b>	<b>Alternator Inspection</b>	<b>16-15</b>
<b>MF-Battery Testing</b>	<b>16-8</b>		

## 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 your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 16 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 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 scooter, 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 in 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 headlamp and tail lamp "ON" for a long periods of time without riding the scooter.
- The battery will self-discharge when the scooter 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.

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

## BATTERY/CHARGING SYSTEM

### SPECIFICATIONS

BATTERY/CHARGING SYSTEM			
ITEM			SPECIFICATION
Battery	Capacity		12V-4 Ah, *MF Battery (ETZ-5)
	Current leakage		0.1mA (Maximum)
	Voltage (@ 20° C/68° F)	Needs charging below	12.4V
Alternator	Capacity		110W @ 5000 rpm
	Charging coil resistance (Ω)	White-Green	0.1-1Ω
Regulator/Rectifier	Regulated voltage	Charging	14.3±0.4V
		Lighting	14±0.5V

**\*MF-Maintenance Free**

	<b>SPECIAL TOOLS</b>
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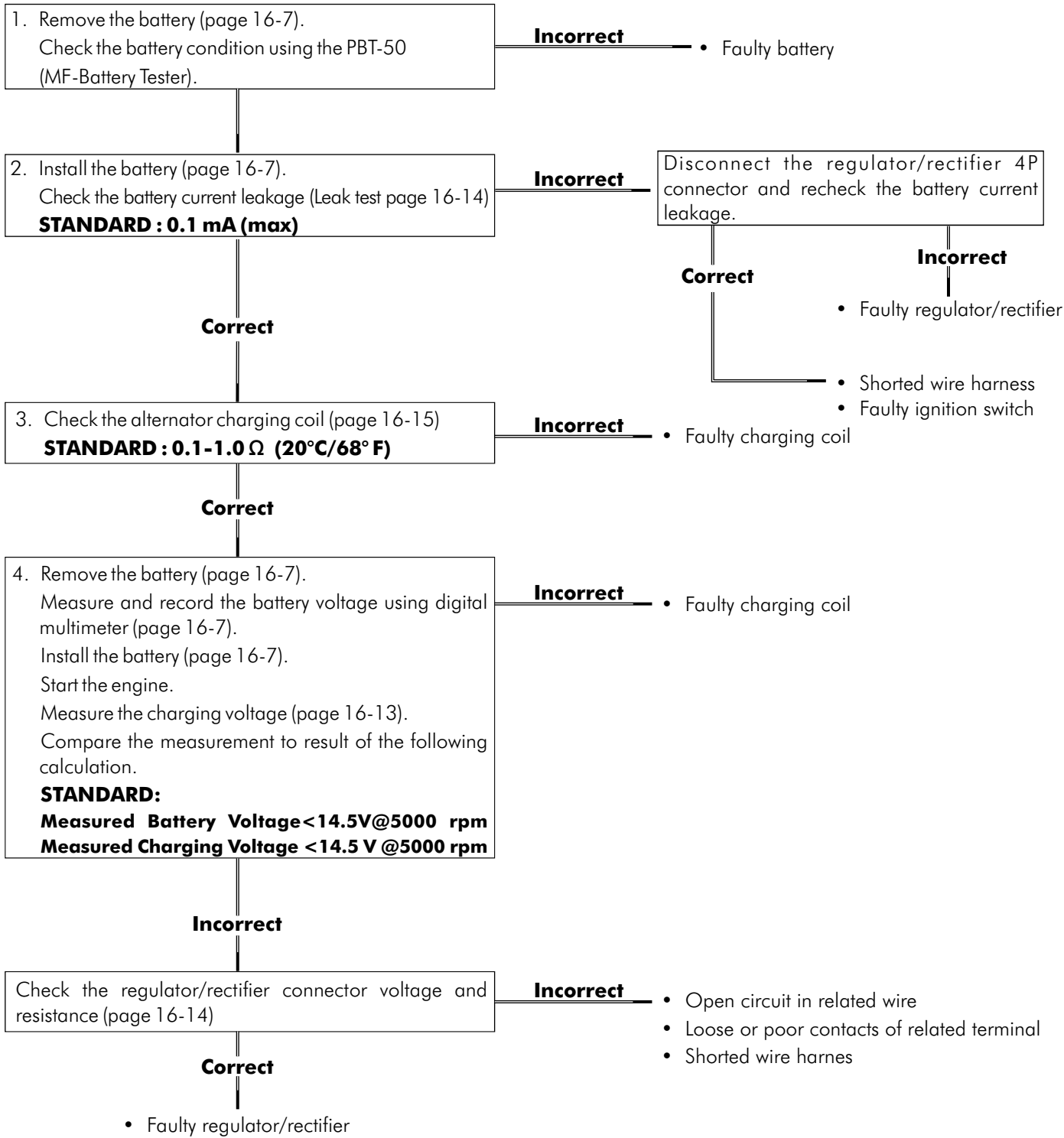
	<b>MF-BATTERY TESTER</b> <b>PART NO: 070 HH KRYH 008</b>
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# BATTERY/CHARGING SYSTEM

## TROUBLESHOOTING

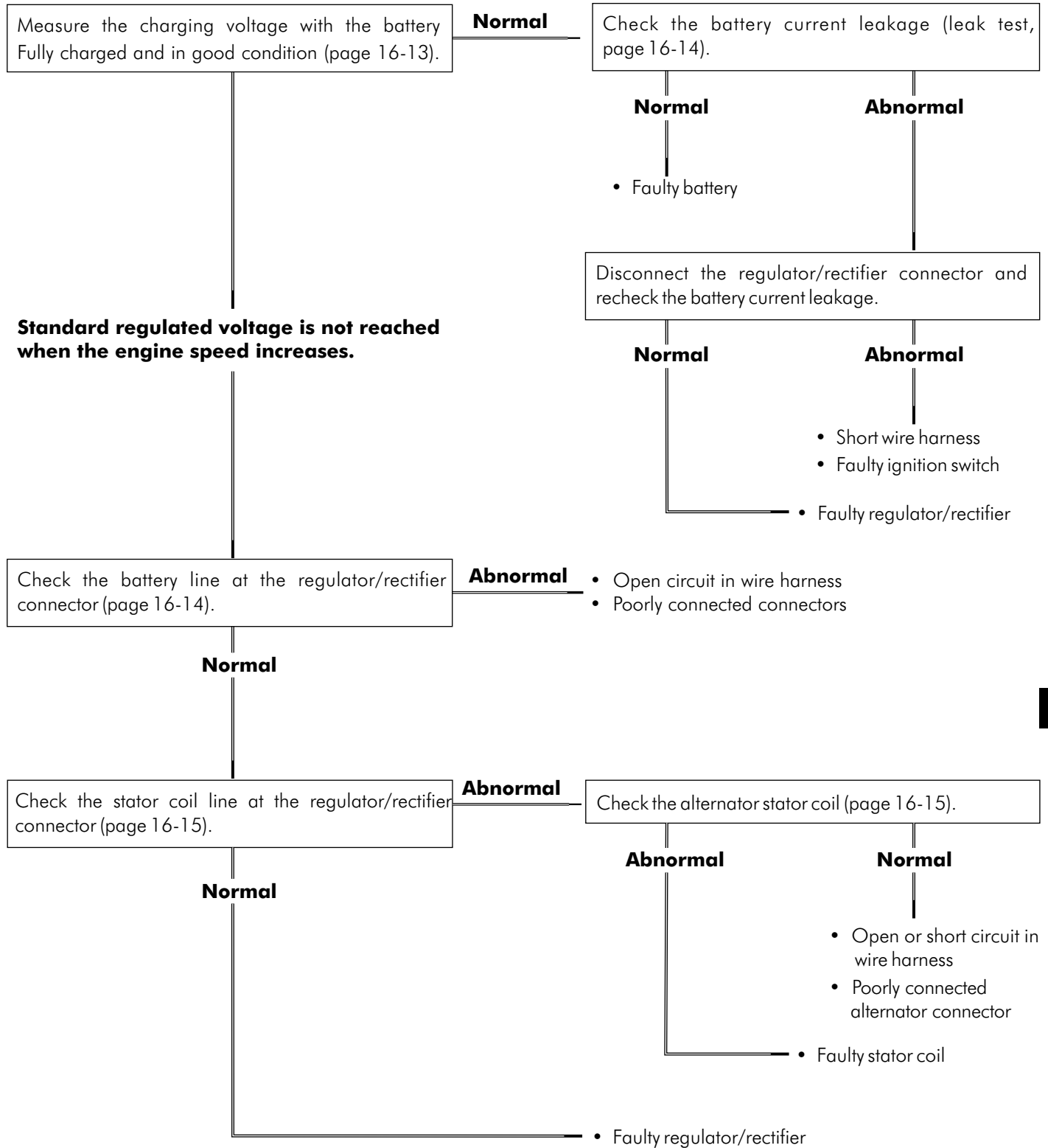
### Battery is damaged or weak



## BATTERY/CHARGING SYSTEM

### TROUBLESHOOTING

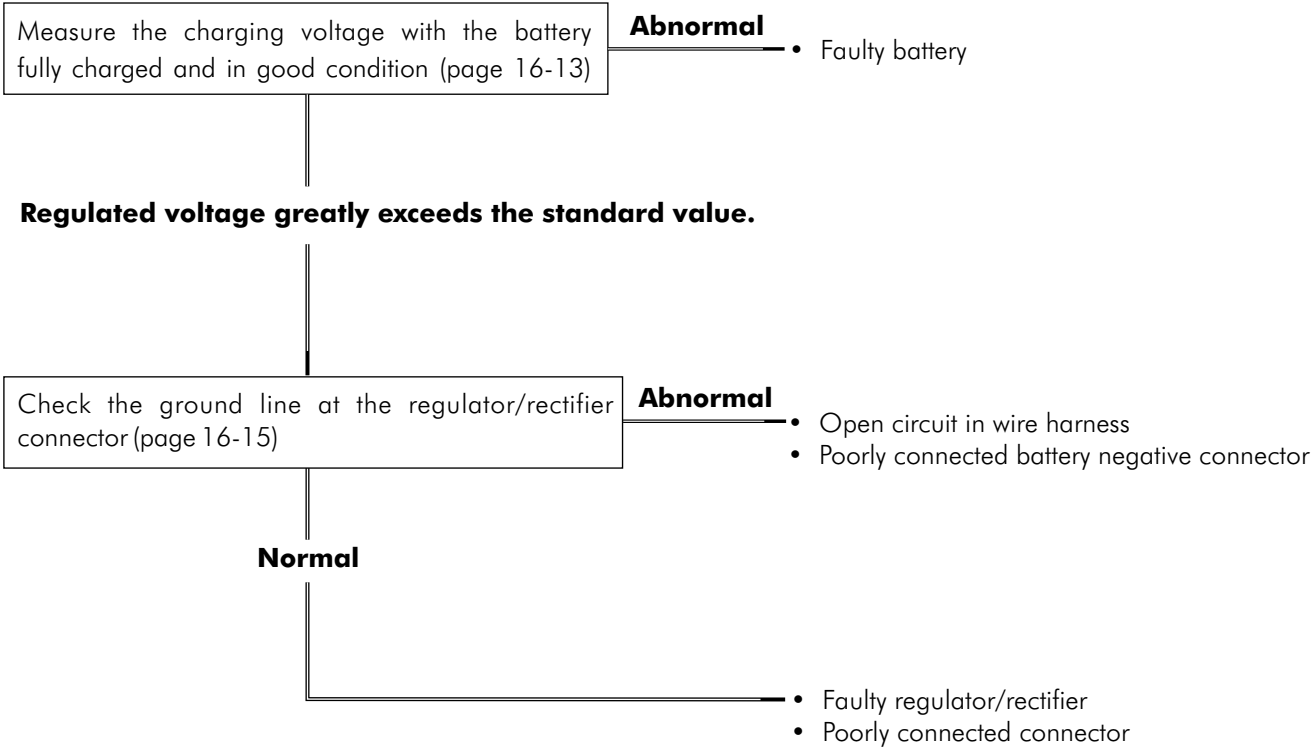
#### Battery undercharging (voltage not raised to regulated voltage)



# BATTERY/CHARGING SYSTEM

## TROUBLESHOOTING

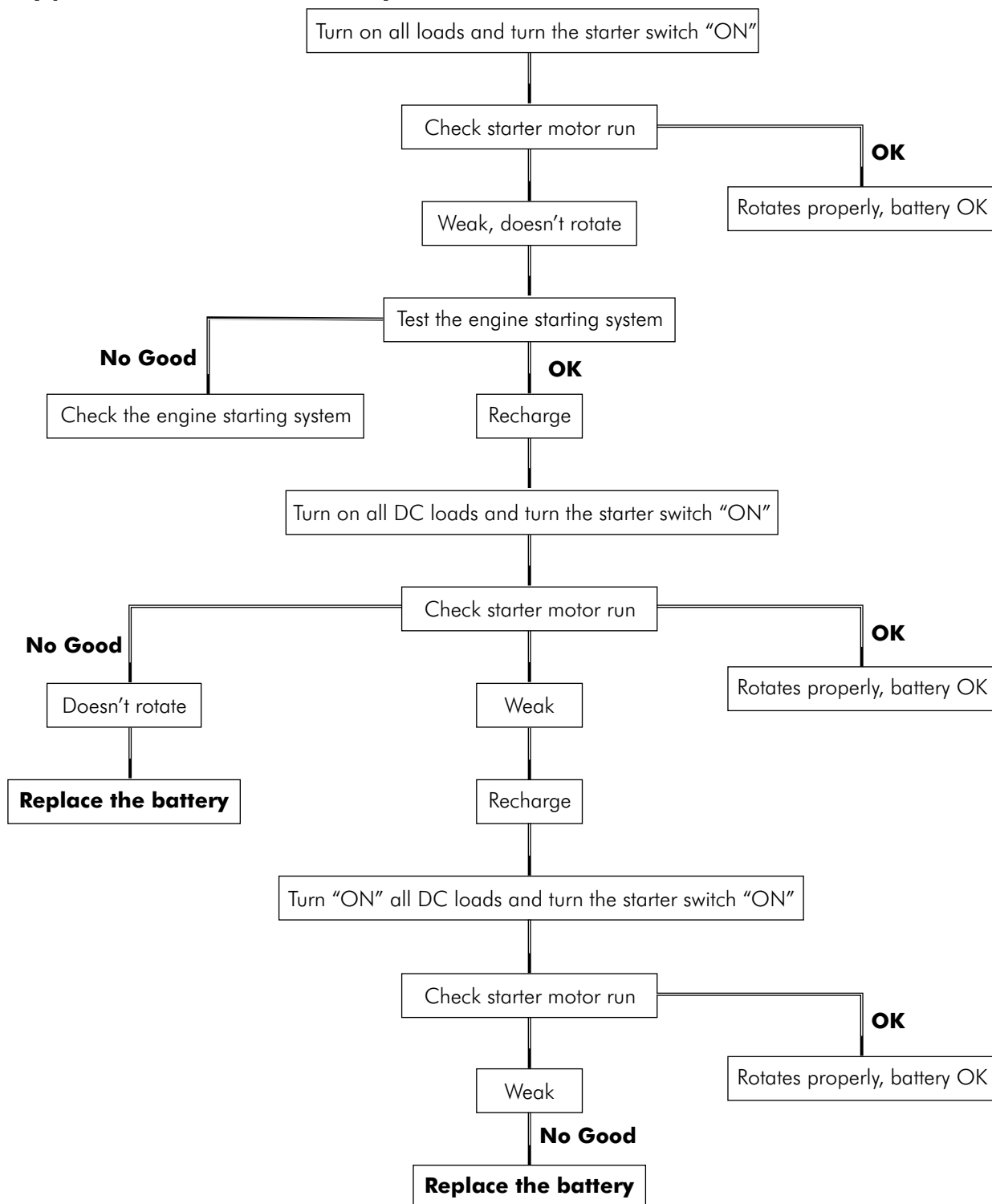
### Battery overcharging (regulated voltage too high)



## BATTERY/CHARGING SYSTEM

### TROUBLESHOOTING

Battery performance check with battery installed on the scooter.



#### 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 16-11).
- Decision for battery replacement to be taken after using the MF-battery tester, after recharging the battery.

# BATTERY/CHARGING SYSTEM

## MAINTENANCE FREE BATTERY REMOVAL/INSTALLATION

### NOTE

Always turn the ignition switch "OFF" before removing or installing the battery.

Remove the front center cover (page 2-6).

Release the battery band.

Disconnect the negative (-)ve cable from the negative (-)ve terminal, then disconnect the positive (+)ve cable from the positive (+)ve terminal.

Remove the battery from the battery case.

### INSTALLATION

Installation is 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 a thin coat of petroleum jelly to prevent the corrosion.

### INSPECTION

Measure the battery voltage using a commercially available digital multimeter.

### BATTERY VOLTAGE

**NEEDS CHARGING: Below 12.4 V**

BATTERY



BATTERY BAND

NEGATIVE (-)VE CABLE      POSITIVE (+)VE CABLE



NEGATIVE (-)VE TERMINAL      POSITIVE (+)VE TERMINAL



BATTERY

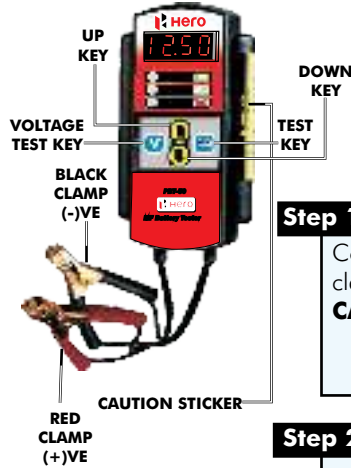
BATTERY





# BATTERY/CHARGING SYSTEM

## 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 scooter.

### 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.

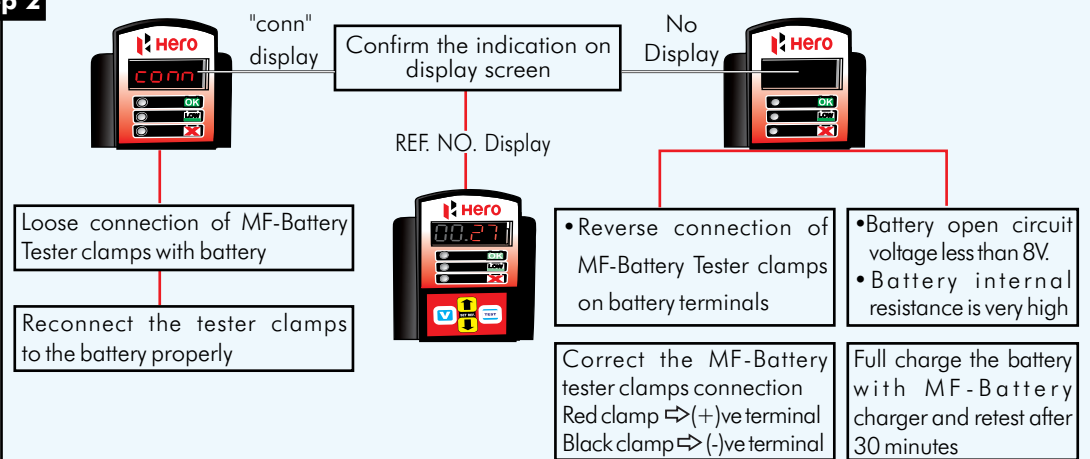
: Do not charge the battery before the test, check in "as is" condition.

: If the battery is charged by MF- Battery Charger or on vehicle, wait for minimum 30 minutes before testing.

### Step 2

- 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 than 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 from heat, humidity, water and dust.
  - Check the MF-Battery with MF Battery tester in "as is" condition. In case 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.



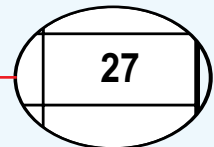
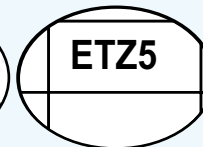
### REF NO. LIST IS AT BACK PANEL

#### TEST INSTRUCTIONS-12V Vehicles 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

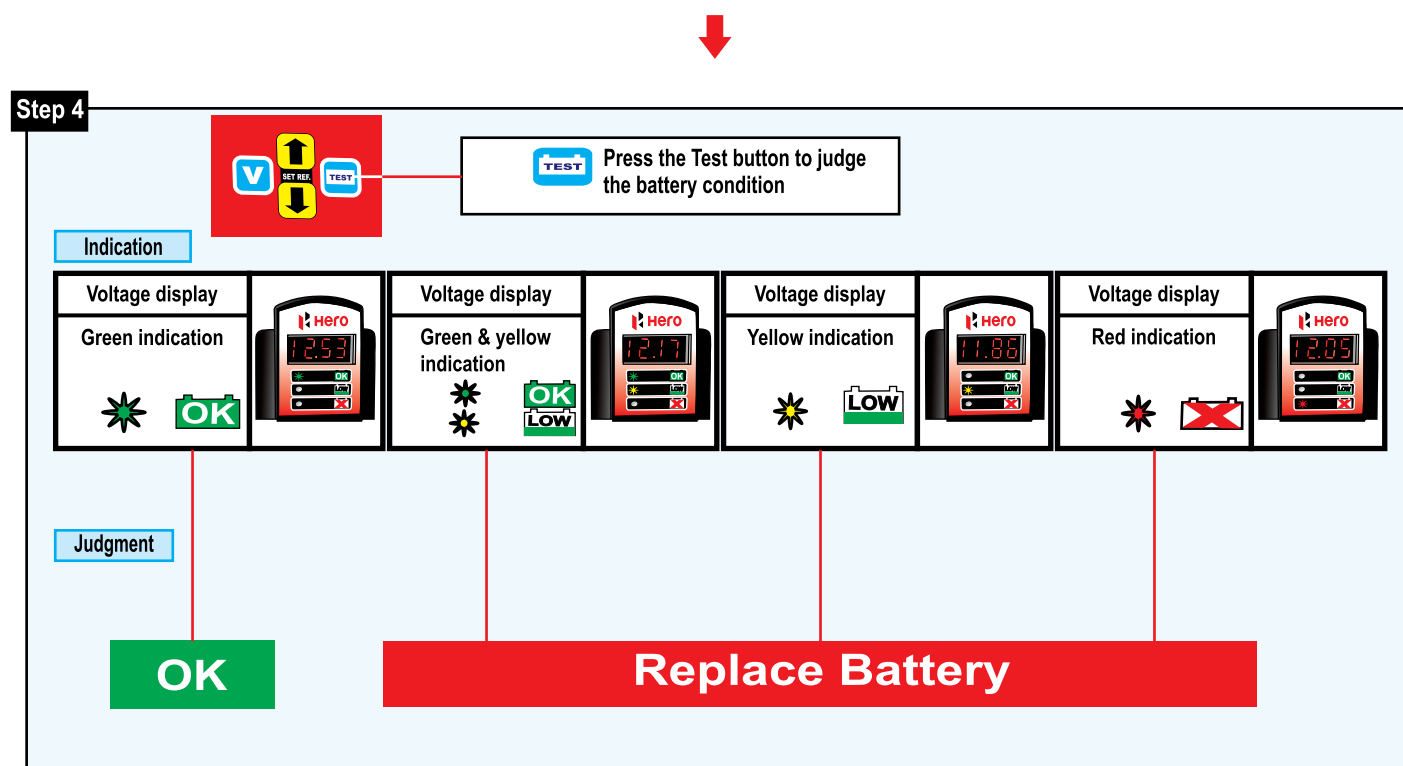
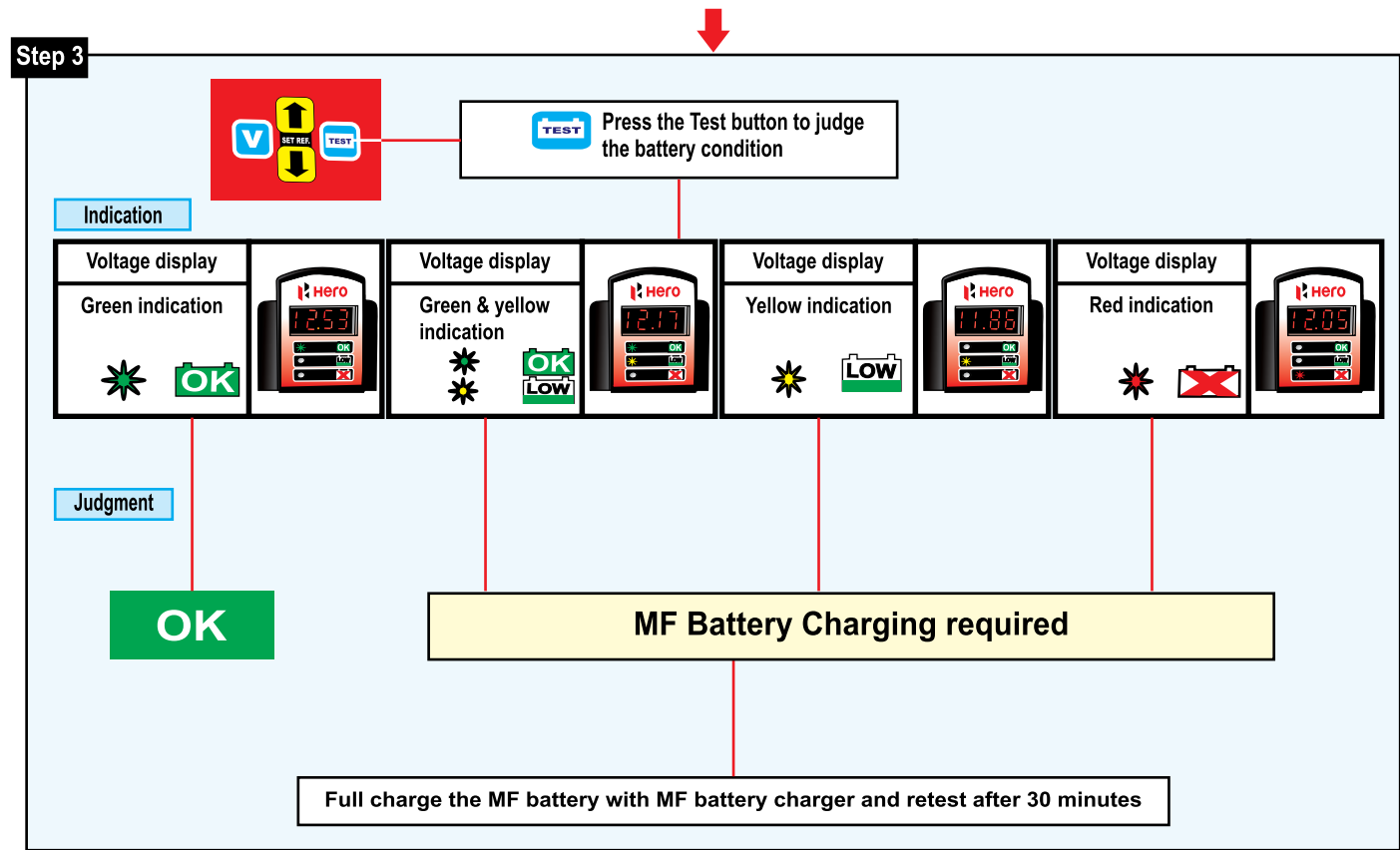
Vehicle	Battery		Ref. Number
	Make	Model	
DASH	EXIDE	ETZ5	27



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.

# BATTERY/CHARGING SYSTEM



## ELECTROLYTE FILLING IN A NEW DRY TYPE BATTERY

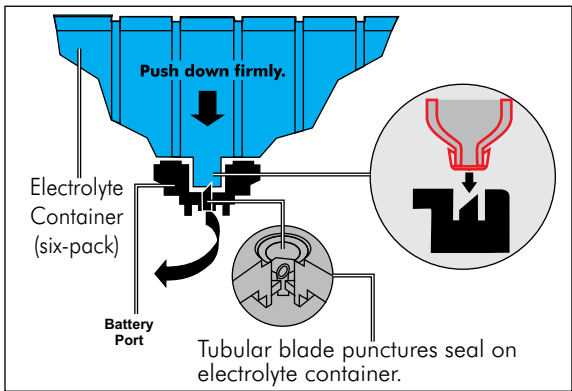
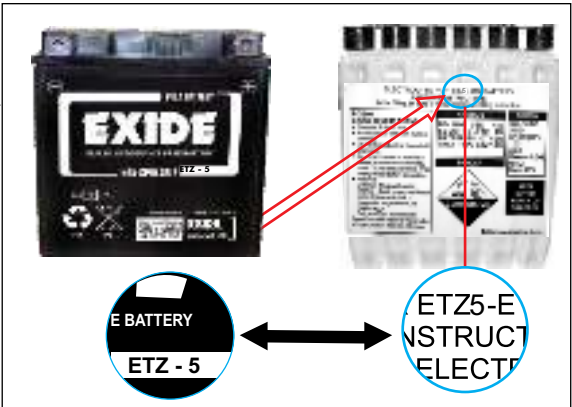
1. Match the electrolyte container to the battery.
2. Peel-off the aluminum sealing tape from the battery.
3. Remove the RUBBER SEALING CAP STRIP from the battery container.
  - Do not damage or remove the electrolyte container aluminum seals.
  - Do not cut or puncture the container.
4. Invert the electrolyte 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 12.4V 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.



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# BATTERY/CHARGING SYSTEM

## 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 positive (+) terminal and Black lead to negative (-) 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 (20 V/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.

## BATTERY/CHARGING SYSTEM

### STORING BATTERIES

#### STORAGE PLACE

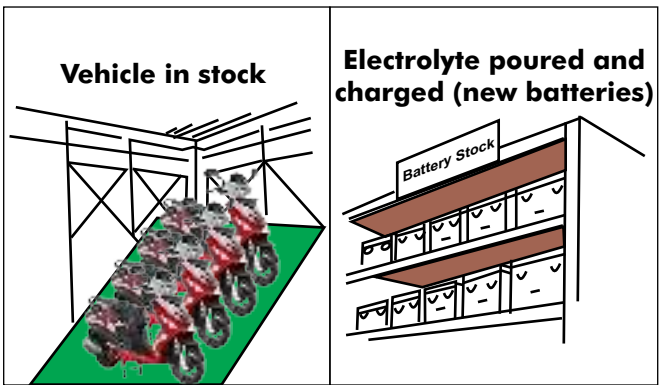
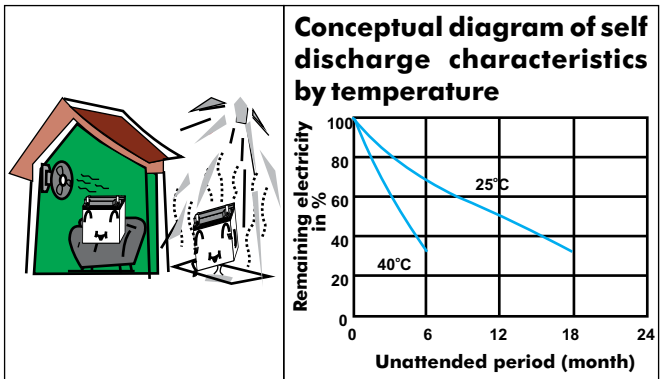
**Keep batteries in a cool place.**

- A cool place (-5 to 15°C) is desirable.
- A place with little dust that is not exposed to rain nor direct sun.
- \* Self discharge:

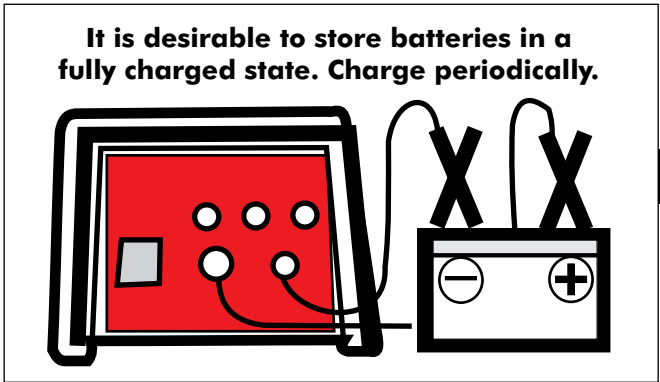
The battery, after the electrolyte is filled, loses its electrolyte with the progress of time at a very small rate, even if the external circuit is not connected. This is called self discharge, and the rate is generally greater when the temperature is high.

#### ELECTROLYTE IS POURED AND CHARGED

When new vehicles are stocked with charged batteries for which the electrolyte is filled, charge them once every six months. This is the same for stocked batteries.



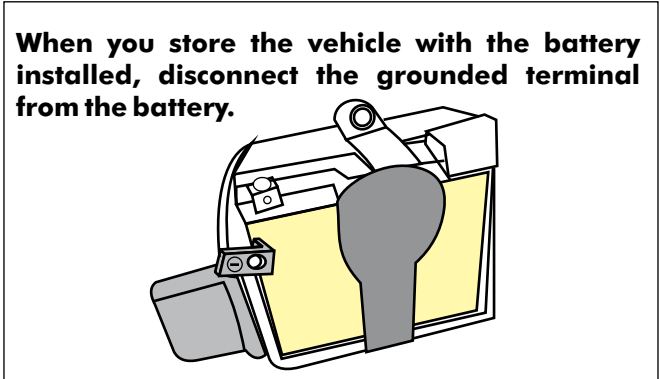
When the open voltage becomes below 12.4V even if the time is less than six months, charge the battery. This is to compensate the self discharge. Moreover, this will reduce sulfation when the batteries are stored at discharged state for a long period of time.



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### 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.





# BATTERY/CHARGING SYSTEM

## 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 front center cover (page 2-6).

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.

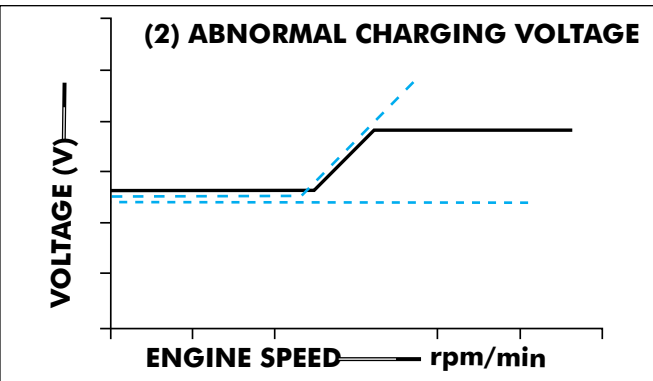
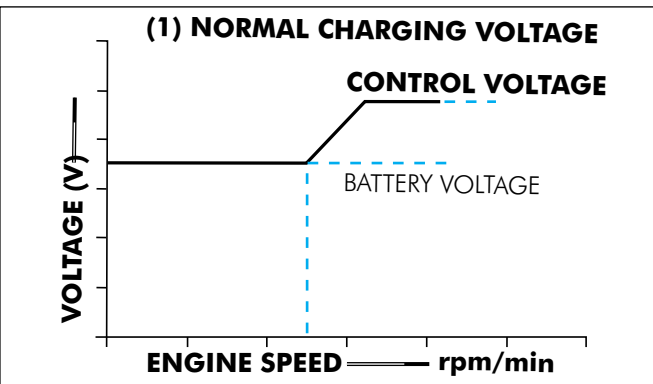
Read the multimeter.

### Battery regulated voltage: 14.3±0.4 V maximum 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.

BATTERY



## BATTERY/CHARGING SYSTEM

### CURRENT LEAKAGE TEST

Remove the front center cover (page 2-6).

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: 0.1 mA (Maximum)**

If current leakage exceeds the specified value a short 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.

Installation is in the reverse order of removal.

### REGULATOR/RECTIFIER

#### REMOVAL/INSTALLATION

Remove the front center cover (page 2-6).

Remove the regulator/rectifier by removing bolt.

#### NOTE

Route the wire harness properly. Refer (SECTION-1).

### WIRE HARNESS

#### INSPECTION

Disconnect the regulator/rectifier 4P connector.

Check the connector for loose or corroded terminals.

Check the following at the regulator/rectifier connector terminals at wire harness side.

Check the voltage between red wire and ground.

**STANDARD: BATTERY VOLTAGE**

#### CONNECTION

**(+)VE PROBE : RED WIRE**

**(-)VE PROBE : GROUND**

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.



(+)VE PROBE

(-)VE PROBE

MOUNTING BOLT



REGULATOR/RECTIFIER



4P CONNECTOR



PROBES

4P CONNECTOR

# BATTERY/CHARGING SYSTEM

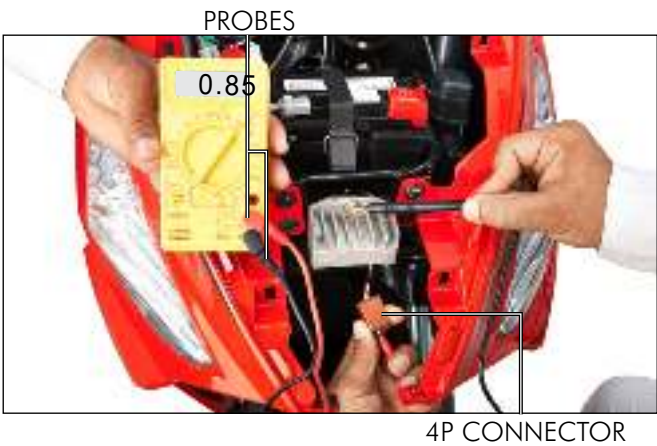
Check the resistance between white wire and ground.

**STANDARD: 0.1-1.0 Ω at 20° C (68° F)**

**CONNECTION**

**(+)VE PROBE : WHITE WIRE**

**(-)VE PROBE : GROUND**



Check the continuity between green wire and ground.

**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 is in the reverse order of removal.



**LIGHTING OUTPUT**

Open the front handle bar cover (page 2-2).

(Do not remove headlamp assembly).

Connect the multimeter positive (+)ve probe to the headlamp blue terminal and negative (-)ve probe to the green wire terminal.

Start the engine and turn the headlamp switch to "ON" and the dimmer switch to "HI" position.

Check the lighting output voltage.

**REGULATED VOLTAGE: 14±0.5 V at 5000 rpm**

**NOTE**

Measure the voltage with the headlamp wire connectors connected.

Installation is in the reverse order of removal.



## ALTERNATOR INSPECTION

**NOTE**

This inspection can be performed with the alternator stator installed.

Remove the center compartment (page 2-11).

Disconnect the alternator connector.

Measure the stator coil resistance between the connector and ground.

**STANDARD: 0.1-1.0 Ω at 20° C (68° F)**

**CONNECTION**

**(+)VE PROBE : WHITE WIRE**

**(-)VE PROBE : GROUND**

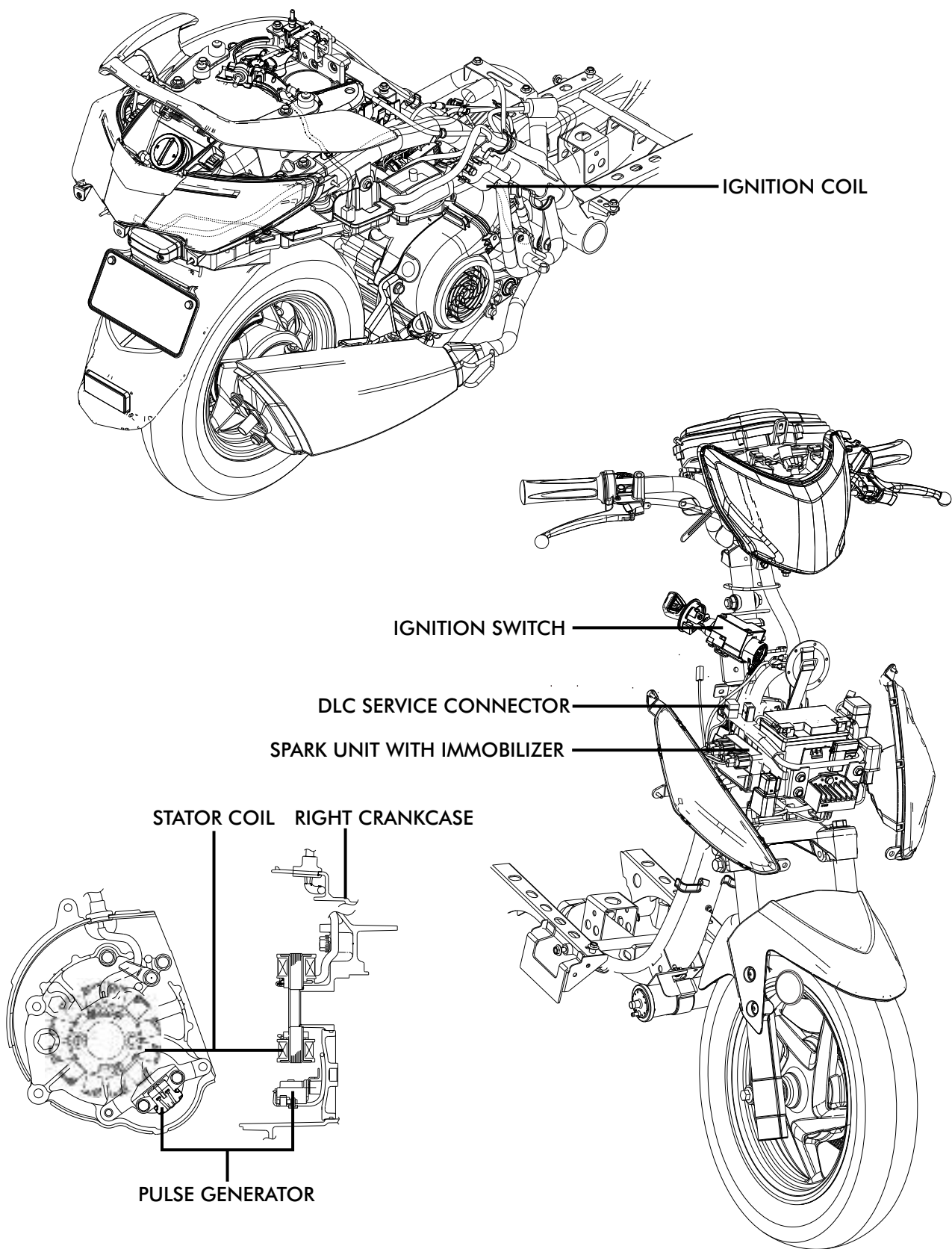
Installation is in the reverse order of removal.





# 17. IGNITION/IMMOBILIZER SYSTEM

## SYSTEM DIAGRAM



## IGNITION/IMMOBILIZER SYSTEM

<b>System Diagram</b>	<b>17-0</b>	<b>Immobilizer System</b>	
<b>Service Information</b>	<b>17-1</b>	<b>Diagnostic Code Indication</b>	<b>17-10</b>
<b>Specifications</b>	<b>17-2</b>	<b>Diagnostic Trouble Codes</b>	<b>17-12</b>
<b>Special Tools</b>	<b>17-2</b>	<b>HIDI Upgradation Procedure</b>	<b>17-13</b>
<b>Troubleshooting</b>	<b>17-3</b>	<b>VIN Reading/pairing Procedure</b>	<b>17-14</b>
<b>Ignition System Inspection</b>	<b>17-6</b>	<b>Immobilizer/malfunction</b>	
<b>Ignition Coil</b>	<b>17-6</b>	<b>Indicator</b>	<b>17-17</b>
<b>Ignition Pulse Generator</b>	<b>17-8</b>	<b>Spark Unit Inspection</b>	<b>17-17</b>
<b>AC Generator/Ignition Timing</b>	<b>17-9</b>		
<b>Spark Unit</b>	<b>17-10</b>		

### SERVICE INFORMATION

#### GENERAL

- 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 servicing the ignition system, always follow the steps in the troubleshooting on (page 17-3).
  - The spark Ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
  - The spark unit may be damaged if dropped. Also, if the connector is disconnected when current is flowing, the excessive voltage may damage the unit. Always turn off ignition switch before servicing.
  - A faulty ignition system is often related to poor connections. Check those connections before proceeding.
  - Make sure the battery is adequately charged. A weak battery may be unable to turn the starter motor quickly enough, or adequate ignition current may not be supplied.
  - Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
  - For ignition pulse generator (alternator starter) removal/installation, see (SECTION-11).
  - For ignition switch inspection, see (page 19-9).
  - When checking the spark unit with immobilizer, follow the steps in the troubleshooting flow chart (SECTION-21).
  - Keep the key away from the other vehicle's key when using it. The jamming of the key code signal may occur and the proper operation of the system will be obstructed.
  - The key has built-in electronic part (transponder). Do not drop and strike the key against a hard material object and do not leave the key on the dashboard in the car, etc. Where the temperature will rise. Do not leave the key in the water for a prolonged time such as by washing the clothes.
  - If the keys have been lost, it can be replaced and pair with spark unit with immobilizer.
  - The system does not function with a duplicated key. Code is registered/paired into the transponder with the spark unit with immobilizer.
  - The immobilizer can store up to two key codes. (The two keys can be registered).
  - Do not modify the spark unit with immobilizer system as it can cause the system failure. (The vehicle cannot be started).
  - Both the keys should be paired
  - In the eventuality of any one of the ignition key(s) getting lost, you should immediately register a complaint with the local Police and approach the nearest Hero MotoCorp Authorised dealer with following documents for further assistance
    - Vehicle registration copy
    - Insurance copy
    - Copy of police registered complaint, preferably FIR
    - 2<sup>nd</sup> Ignition key
- • You should get the 2<sup>nd</sup> ignition key deactivated and request for fresh key. Pairing is to be carried out for both the keys.




# IGNITION/IMMOBILIZER SYSTEM


### CAUTION

The ignition key is a sensitive electronic instrument. Please take care of following guidelines to avoid any damage to vehicle Immobilizer system:


- Do not place any heavy object on the ignition key(s).
- Do not tamper with ignition key(s).
- Do not put both the ignition keys in the same key ring.
- Do not hang any heavy metal objects in the key chain having the ignition key.
- The system may not recognize the key's codes if any other Immobilizer's ignition key is kept near the ignition switch. Engine may not start due to interference of other ignition key(s) with your Immobilizer system. Hence, only registered ignition key(s) should be used to crank the engine otherwise continuous electric starting attempt may lead to battery discharge.



Do not expose the ignition key to high temperature.



Do not place the ignition key near magnetic objects (e.g. speakers).




Do not keep ignition key near equipment having low radio frequency (e.g. TV, walkie-talkie).


### SPECIFICATIONS

IGNITION/IMMOBILIZER SYSTEM ITEM		SPECIFICATION
Spark plug	Standard	Champion-PRZ 9 HC (Federal)
Spark plug gap		0.6-0.7 mm
Peak voltage	Ignition coil primary	12 V
	Ignition pulse generator	1.3V (min)@350 rpm, gap 1.1 mm
Ignition timing	" F " Mark, Deg.	15° BTDC @ 1500 rpm
	Full Advance, Deg.	33° BTDC @ 4000 rpm
Ignition coil	Primary coil resistance, Ω @ 20° C	2.3±0.2 Ω
	Secondary coil resistance (Without Plug Cap), kΩ @ 20° C	11kΩ±2.2 Ω
	Secondary coil resistance (With Plug Cap), kΩ @ 20° C	16kΩ±3.2 Ω
Ignition pulse generator resistance, Ω @20° C		180-280 Ω
Stator coil resistance, Ω @20° C		0.1-1.0 Ω


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



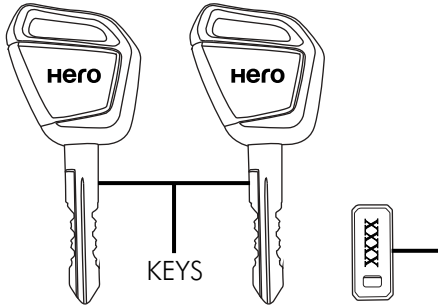
**SPECIAL TOOLS**



**HERO INTEGRATED DIAGNOSTIC INSTRUMENT (HIDI)**  
**PART NO: HMCL 0214 AABA 01**



**HIDI WIRE HARNESS**  
**PART NO: HMCL 0214 AABA 02**



KEYS

KEY NUMBER PLATE

- This scooter has two keys and a key number plate.
- You will need the key number if you ever have to replace a key. Store the plate in a safe place.
- To reproduce keys, bring all keys, key number plate and scooter to your Authorised Hero MotoCorp workshop.
- Up to two keys can be registered with the immobilizer system, including the one in hand.

# IGNITION/IMMOBILIZER SYSTEM

## TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose noise suppressor cap or spark plug wire
  - Water entering the noise suppressor cap (Leaking the ignition coil secondary voltage).
- If there is no spark at the cylinder, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is spark the exchanged ignition coil is faulty.

### No spark at spark plug

Unusual Condition		Probable cause (check in numerical order)
Ignition coil primary voltage	Low peak voltage	1. The multimeter impedance is too low. 2. Cranking speed is too slow 3. The sampling time of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once). 4. Poorly connected connectors or an open circuit in the ignition System. 5. Faulty ignition coil. 6. Faulty spark unit (in case when above NO.1-5 are normal).
	No peak voltage.	1. Incorrect peak voltage adapter connections. 2. Battery is undercharged. 3. Faulty ignition switch. 4. Loose or poorly connected spark unit connectors. 5. Open circuit or poor connection in the Black/Red wire of the spark unit. 6. Open circuit or poor connection in the green wire of the spark unit. 7. Faulty peak voltage adapter. 8. Faulty ignition pulse generator. (Measure the peak voltage). 9. Faulty spark unit (in case when above No. 1 -8 are normal).
	Peak voltage is normal but no spark jumps at the plug.	1. Faulty spark plug or leaking ignition coil secondary current. 2. Faulty ignition coil.
Ignition pulse generator	Low peak voltage.	1. The multimeter impedance is too low. 2. Cranking speed is too slow. 3. The sampling time of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (in case when above no.1 - 3 are normal).
	No peak voltage	1. Faulty peak voltage adapter. 2. Faulty ignition pulse generator.

# IGNITION/IMMOBILIZER SYSTEM

## TROUBLESHOOTING

when the ignition switch is turned "ON" with the properly registered key, the immobilizer/malfunction indicator appears on the LCD display for approx. 1 second then it goes off and the immobilizer system functions normally. If there is any malfunction or the properly registered key is not used, the indicator will remains "ON", for 10 seconds and then starts blinking or continuously "ON" as per the specified pattern.

Check for blown fuse (10A) before starting troubleshooting.

If Immobilizer/malfunction indicator is not turn "ON" then following may be the failure part,

- 1) Battery
- 2) Harness wire
- 3) Speedometer console
- 4) Spark unit

### 1) BATTERY

Check the battery voltage.

### 2) HARNESS WIRE

Check the continuity of Blue/White wire between speedometer console and spark unit with immobilizer.

#### Connection:

Blue/White at spark unit with immobilizer

Blue/White at speedometer console

### 3) SPEEDOMETER CONSOLE

Check the battery input at speedometer console,

- If there is no input, then there should be fuse or wire harness problem.
- If there is an input, then the vehicle will start and the speedometer console faulty. Replace the console.

### 4) SPARK UNIT

Check the spark unit power line,

- If there is no supply then there should be fuse or wire harness problem.
- If all the above conditions are met, replace the spark unit with immobilizer.

Diagnostic code is indicated (Code signals cannot send or receive).

Check the power input line (Black) at the spark unit with immobilizer connector (page 17-18).

No

Open or short circuit in (Black) wire.

Yes

Check the ground line (Green) at the spark unit connector (page 17-18).

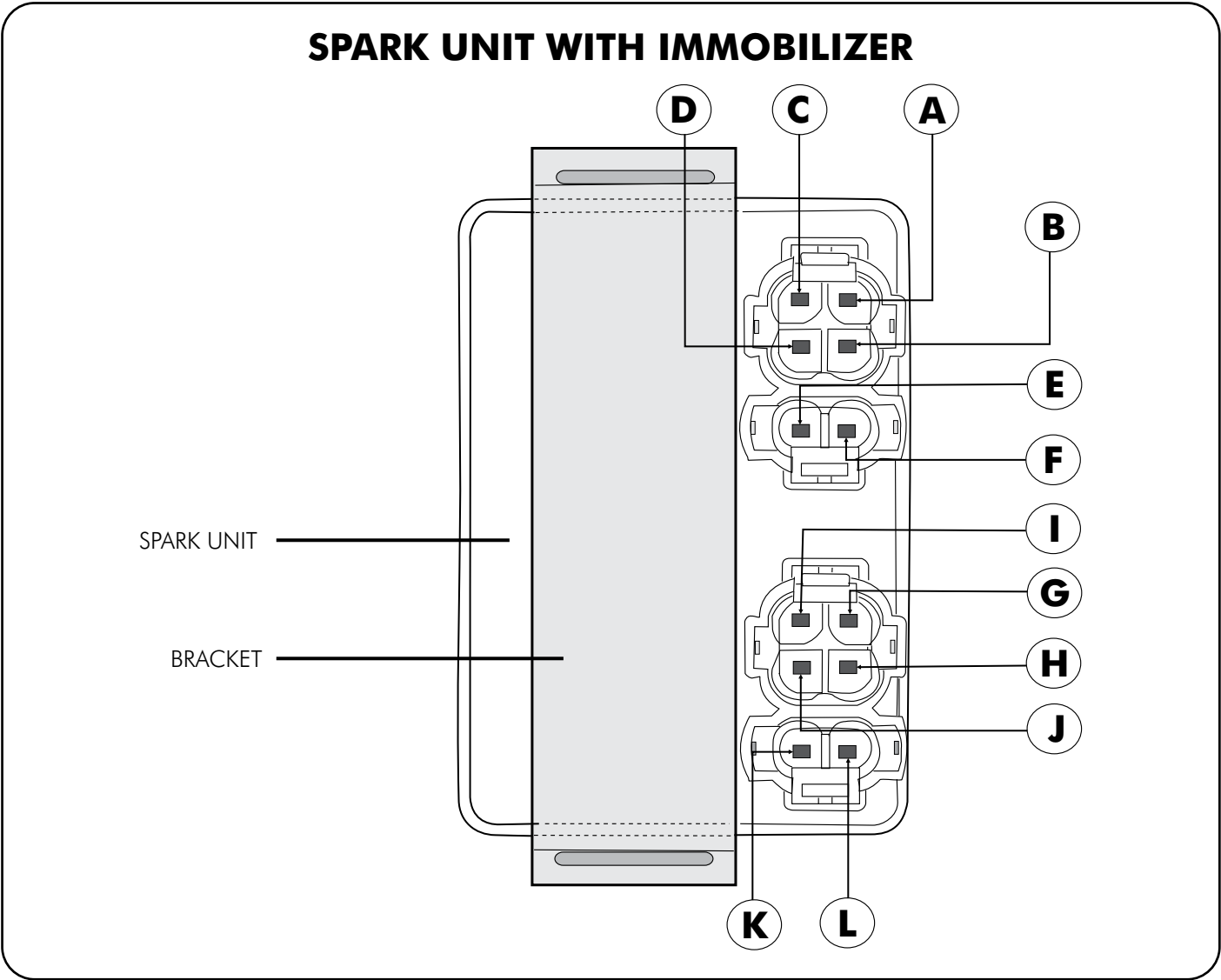
No

Open or short circuit in (Green) wire.

Yes

Faulty spark unit with immobilizer

# IGNITION/IMMOBILIZER SYSTEM



**TERMINAL CODE**

- A** - Starter switch
- B** - Ignition coil(-ve)
- C** - Relay
- D** - Earth
- E** - Ignition coil(+ve)
- F** - Serial line
- G** - LCD
- H** - Battery
- I** - Pulser coil
- J** - No Connection
- K** - Antenna - TX2
- L** - Antenna - TX1

**WIRE COLOUR**

- Yellow/Red
- Pink/Black
- White/Green
- Green
- Black/Yellow
- Pink/Blue
- Blue/White
- Black
- Blue/Yellow
- Empty
- Black/Blue
- Black/Red

# IGNITION/IMMOBILIZER SYSTEM

## IGNITION SYSTEM

### INSPECTION

Remove the noise suppressor cap from the plug, install a known good spark plug to the plug cap and ground it to the engine. Turn the ignition switch “ON” and crank the engine. Spark should jump at the plug electrodes. If there is no spark, check the ignition circuit.

### NOTE

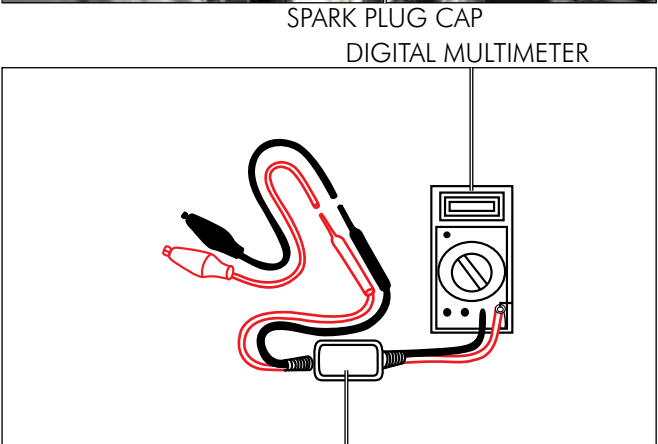
- If no spark jumps at the plug, electrodes check all connections for loose or poor contact before measuring peak voltage.
- The reading differs depending on the multimeter input impedance. Therefore, use only commercially available multimeter with the input impedance higher than 10 MΩ/DCV.

Connect the peak voltage adaptor to the digital multimeter.



**Peak voltage adaptor with commercially available multimeter with the input impedance higher than 10 MΩ/DCV.**

Installation is in the reverse order of removal.



## IGNITION COIL

### REMOVAL

Remove the body cover (page 2-12). Disconnect the ignition coil primary wire connectors. Disconnect the noise suppressor cap from the spark plug. Remove the mounting bolts and the ignition coil from the frame.

### INSTALLATION

Install the ignition coil in the reverse order of removal.





# IGNITION/IMMOBILIZER SYSTEM

## IGNITION COIL

### PRIMARY PEAK 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.
- The reading differs depending on the multimeter input impedance. Therefore , use only commercially available multimeter with the input impedance higher than 10 M $\Omega$ /DCV.

#### ▲ WARNING

To avoid possible electrical shock during voltage measurements, do not touch test probe metal parts.

Remove the body cover (page2-12).

Connect the peak voltage adaptor (+)ve probe to the Black/Yellow connector terminal and (-)ve probe to body Ground.

Turn the ignition switch "ON".

Crank the engine with the kick starter and read the ignition coil primary peak voltage.

**PEAK VOLTAGE: 12V**

#### CONNECTION:

**(+)ve probe-Black/Yellow wire connector terminal**

**(-)ve probe -Body ground.**

If the peak voltage is abnormal, check an open circuit or poorly connected connectors in black/yellow wire.

If no defects are found in the harness, refer to the troubleshooting chart. Refer (SECTION-21).

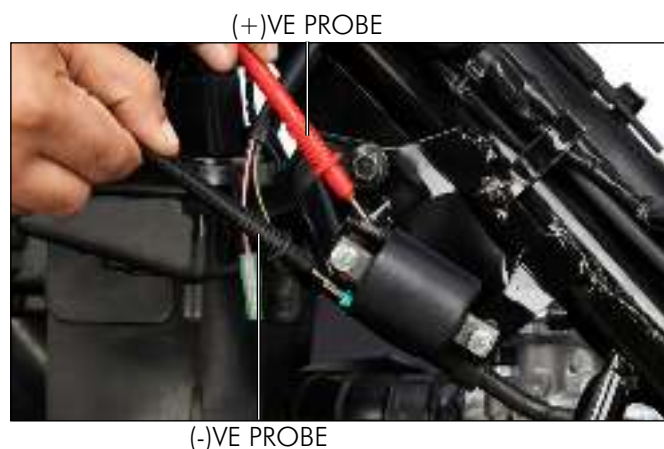
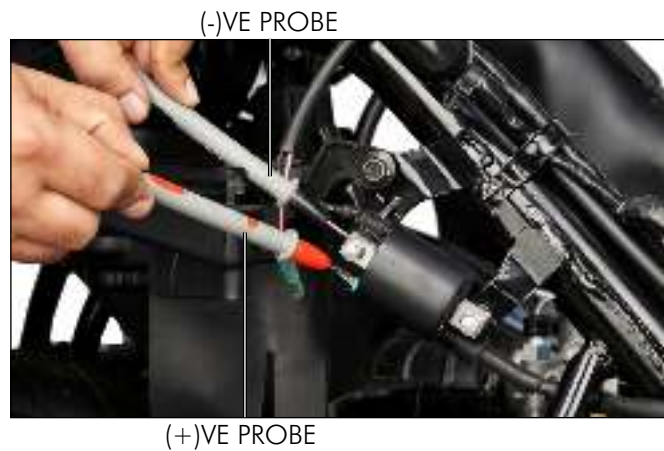


**Peak voltage adaptor with commercially available multimeter with the input impedance higher than 10 M $\Omega$ /DCV.**

## PRIMARY COIL RESISTANCE

Disconnect the ignition coil primary wire connectors. Measure the primary coil resistance between the connector terminals.

**STANDARD: 2.3 $\pm$ 0.2  $\Omega$  @ 20° C**



# IGNITION/IMMOBILIZER SYSTEM

## SECONDARY COIL RESISTANCE

Remove the noise suppressor cap from the spark plug wire (HT cable) and measure the secondary coil resistance between the spark plug wire and body ground.

**STANDARD:  $11\text{ k}\Omega \pm 2.2\text{ k}\Omega$  (without noise suppressor cap)**

Remove the noise suppressor cap from the spark plug wire (HT cable) and measure the secondary coil resistance between the spark plug wire and body ground.

**STANDARD:  $16\text{ k}\Omega \pm 3.2\text{ k}\Omega$  (with noise suppressor cap)**

Installation is in the reverse order of removal.

## IGNITION PULSE GENERATOR

### PEAK VOLTAGE

#### NOTE

Install the spark plug into the cylinder head and measure the peak voltage under normal cylinder compression.

Remove the front center cover (page 2-6).

Disconnect the spark unit with immobilizer 4P connector.

Connect the peak voltage adaptor (+)ve probe to the pulse generator (Blue/Yellow) wire terminal and (-)ve probe to ground. Crank the engine with the kick starter and read the pulse generator peak voltage.

#### PEAK VOLTAGE:

**1.3 V (min) @ 350 rpm, Air gap 1.1 mm**

Remove the center compartment (page 2-6).

If the peak voltage measured at spark unit connector is abnormal, disconnect the pulse generator wire connector (Blue/Yellow).

Connect peak voltage adaptor (+)ve to pulse generator (Blue/Yellow) wire & (-)ve to Ground.

Measure the peak voltage & compare it with voltage measured at the spark unit connector.

#### NOTE

- If the peak voltage measured at the spark unit is abnormal and the one measured at the pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltage measured are abnormal, refer to the troubleshooting chart (page 17-3 & 17-4).



**Peak voltage adaptor with commercially available multimeter with the input impedance higher than  $10\text{ M}\Omega/\text{DCV}$ .**



1P CONNECTOR

# IGNITION/IMMOBILIZER SYSTEM

## PULSE GENERATOR RESISTANCE

### NOTE

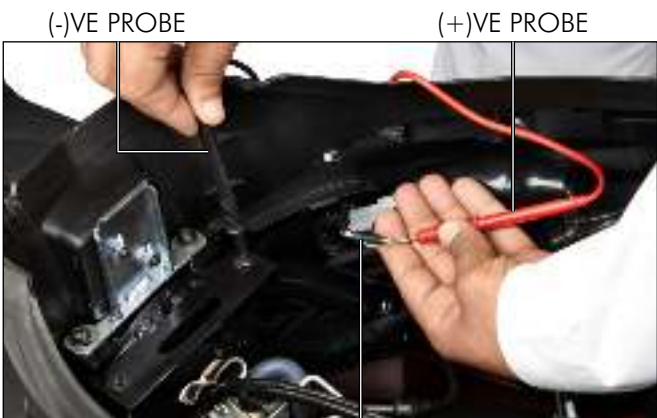
It is not necessary to remove alternator stator and pulse generator to make this inspection.

Remove the center compartment (page2-11).

Disconnect the pulse generator (Blue/Yellow) wire connector. Measure the pulse generator resistance between the connector terminal and green wire.

**STANDARD: 180 -280 Ω at 20°C(68°F)**

Installation is in the reverse order of removal.



1P CONNECTOR  
(-)VE PROBE (+)VE PROBE

## AC GENERATOR

### INSPECTION

Remove the center compartment (page2-11).

Disconnect the stator coil (White) wire connector. Measure the stator coil resistance between the connector terminal and green wire.

**STANDARD: 0.1-1.0 Ω at 20°C(68°F)**

Installation is in the reverse order of removal.



1P CONNECTOR  
TIMING HOLE CAP

## IGNITION TIMING

### NOTE

- The spark ignition timing is not adjustable. If the timing is not correct, check the spark unit and pulse generator and replace any faulty parts.
- Warm the engine up to normal operating temperature (55 to 65°C).

### ▲ WARNING

- If the engine is run 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 the loss of consciousness and may lead to death.

Remove the timing hole cap.

Connect a timing light and a tachometer. Start the engine and check the ignition timing.

The timing at idle is correct if the "F" mark on the flywheel is inline with the index mark on the left crankcase.

Check the advance timing "Full advance", raise the engine speed to 4000 rpm, the "H" mark should be visible in the timing hole.

### Ignition Timing:

"F" Mark, Deg. : 15° BTDC (1500 rpm)

"Full Advance", Deg. : 33° BTDC (4000 rpm)

Install the timing hole cap.





## IGNITION/IMMOBILIZER SYSTEM

### SPARK UNIT WITH IMMOBILIZER REMOVAL/INSTALLATION

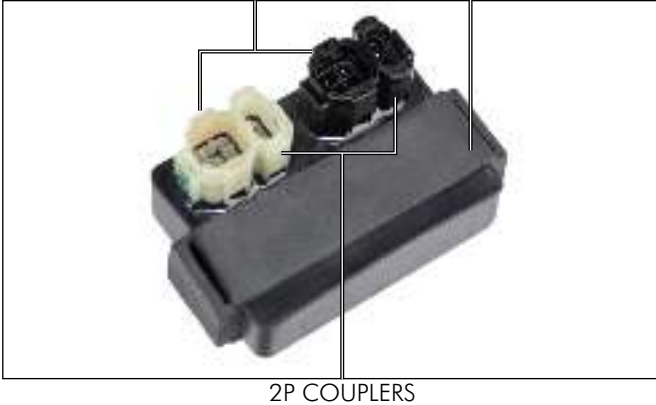
Remove the front center cover (page 2-6).  
Remove the spark unit with immobilizer from the battery stay, disconnect the 4P connectors and 2P connectors.  
Remove the spark unit with immobilizer.

Install the spark unit with immobilizer in the reverse order of removal.

SPARK UNIT WITH IMMOBILIZER



4P COUPLERS SPARK UNIT



IMMOBILIZER/MALFUNCTION INDICATOR



### IMMOBILIZER SYSTEM DIAGNOSTIC CODE INDICATION

Park the scooter on its main stand.

#### NOTE

When the ignition switch is turned "ON" the immobilizer /malfunction indicator appears on the LCD display for 1 second and goes off immediately.

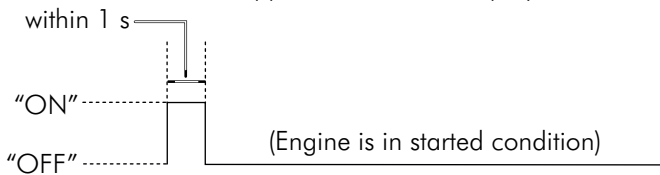
Turn the ignition switch to "ON" with properly registered key.  
If there is any malfunction or the properly registered key is not used, the indicator will remain "ON", for 10 seconds and then starts blinking or continuously "ON" as per the specified pattern.

#### BLINKING PATTERN

##### Mode 1: Normal working condition:

- Immobilizer/malfunction indicator goes off within 1 second as below condition are met;
- Key authentication is successful.
- Authentication is successful with spark unit.

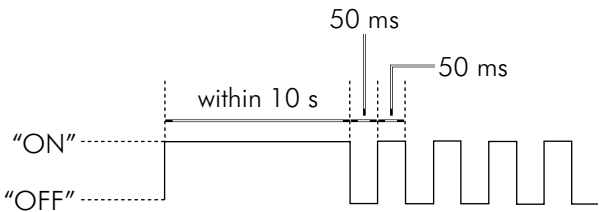
**NOTE:** Immobilizer/malfunction Indicator does not appear on the LCD display, once the engine is started.



# IGNITION/IMMOBILIZER SYSTEM

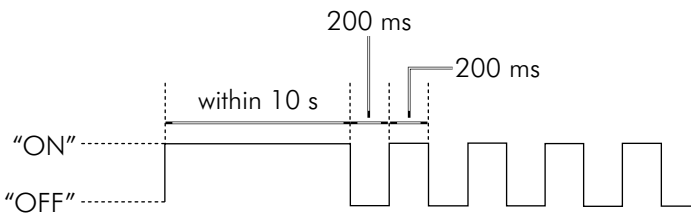
## Mode 2: Key unique code mismatch:

- Immobilizer/malfunction indicator appears on the LCD display for 10 sec, if the specified condition not met (10 sec, measured from ignition "ON" detection). After 10 sec, it starts blinking in 50 ms "ON" and 50 ms "OFF" time pattern.



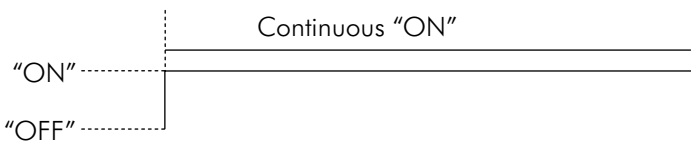
## Mode 3: No signal to spark unit:

- Immobilizer/malfunction indicator appears on the LCD display for 10 sec, if the specified condition is not met (10 sec measured from ignition "ON" detection). After 10 sec, it starts blinking in 200 ms "ON" and 200 ms "OFF" time pattern.



## Mode 4: No response from spark unit:

- Immobilizer/malfunction indicator appears on the LCD display continuously from ignition "ON" detection.



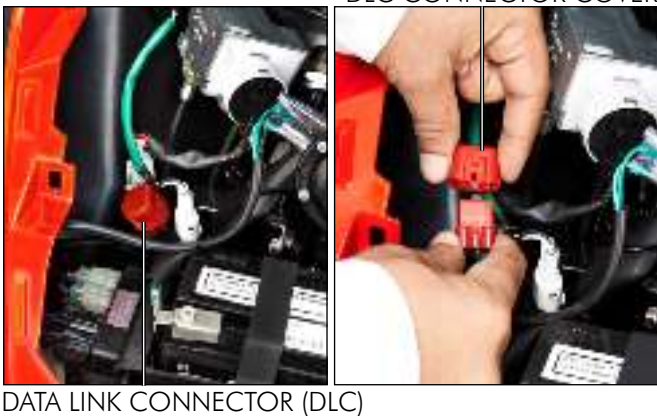
## MALFUNCTION CODE READING PROCEDURE

If you wish to read the spark unit with immobilizer system for malfunction data, perform the following:

Turn the ignition switch to "OFF".

Remove the front center cover (page 2-6).

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





# IGNITION/IMMOBILIZER SYSTEM

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



## HERO INTEGRATED DIAGNOSTIC INSTRUMENT (HIDI)

**PART NO: HMCL 0214 AABA 01**

**HIDI WIRE HARNESS**

**PART NO: HMCL 0214 AABA 02**

HIDI WIRE HARNESS CONNECTOR



DATA LINK CONNECTOR (DLC)

HIDI TOOL



Diagnostic trouble code will be displayed in HIDI tool.  
Installation is in the reverse order of removal

## DIAGNOSTIC TROUBLE CODES

The diagnostic trouble codes denote the failure codes of spark unit with immobilizer system. Malfunction like vehicle not starting, vehicle starting with one key only, immobilizer/malfunction indicator blinking, vehicle stop suddenly while driving etc., could be symptoms of a defective spark unit or transponder key.

To identify the defect, connect the HIDI & check the malfunction as per the diagnostic trouble codes and repair or replace the defective component. After replacing defective component again do the pairing as per requirement.

### NOTE

In case both the ignition keys are lost customer should carry vehicle registration, insurance and police FIR or register complaint copy to the dealer to prove the ownership of the vehicle.

17

Diagnostic Trouble Code	Description	Action to be taken
Unpaired unit assembly spark	Unit assembly spark is blank. No code stored in unit assembly spark	Unit assembly spark needs to be paired with vehicle
Key 2 unpaired	Only one key code available in unit assembly spark memory	2nd key needs to be paired in vehicle
Key mismatch	Key unique code (ID) not matching with ID stored in unit assembly spark	Need to try with correct key or new keys needs to be paired with vehicle in case keys get lost
Communication NG	Communication between unit assembly spark and key is not happening	Either key transponder are damaged or antenna/wire harness needs to be checked and failed parts needs to be replaced.
Communication OK	Immobilizer system is working fine	If transponder observed damaged: new keys Needs to be paired.
NG unit assembly spark	Immobilizer system in unit assembly spark is not responding	New unit assembly spark needs to be paired with vehicle.

# IGNITION/IMMOBILIZER SYSTEM

## HIDI UPGRADATION PROCEDURE

To upgrade HIDI, download the highlighted softwares from the biz portal as shown.

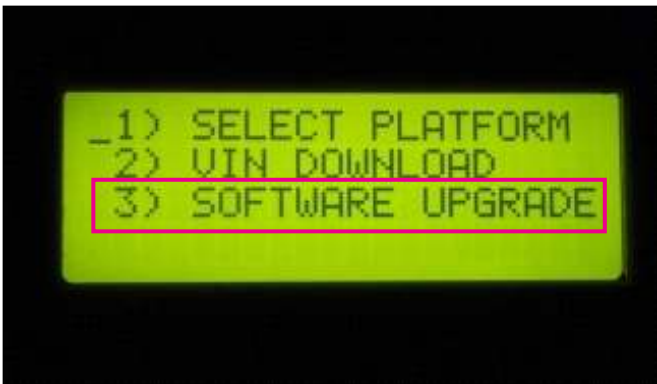


Double click and open the “HIDI Reflash Software Tool.exe” file and browse for “HIDI\_APPV1P0” downloaded file on “HIDI Reflash Software Tool.exe” as shown.



Connect HIDI to the PC using USB cable and check for proper PC connectivity.

Select “SOFTWARE UPGRADE” option from the HIDI main menu and press “Enter” on HIDI.

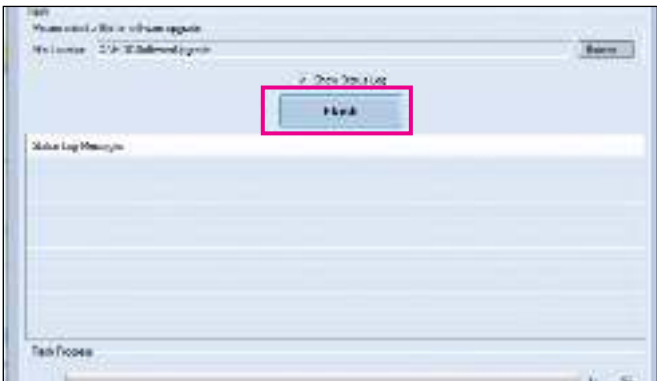


Click on “FLASH” to upgrade the HIDI software as shown.

### NOTE

Ensure the following points before clicking on “FLASH” button.

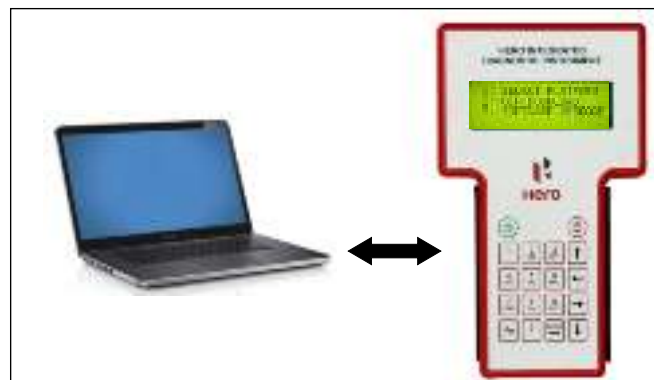
- Proper connectivity of HIDI with PC.
- Always ensure to connect charger to the HIDI.
- Make sure laptop/desktop is connected to AC charger /CPU to ensure the system does not go to sleep/shut down or Hibernate modes while flashing.
- Do not disturb the setup once the flashing process is started.
- Abrupt cancellation or disconnection can render the HIDI useless.



## IGNITION/IMMOBILIZER SYSTEM

### VIN READING/PAIRING PROCEDURE

- Download authorization code from the server and save it in the "C" drive.
- Upload the authorization code into the HIDI by connecting HIDI with the computer/laptop.



Connect the HIDI with vehicle and insert key into the ignition switch and turn "ON" the ignition.

Select the "SELECT PLATFORM" option by pressing "1" or "Enter".  
To select the model "MAESTRO EDGE/DASH" press "2" or use down arrow to select the option.



Select "TROUBLESHOOTING" by pressing "3" or use down arrow to select the option.

To continue the process press "Enter".

If there is no VIN available in the memory then we can also type the VIN manually.



17

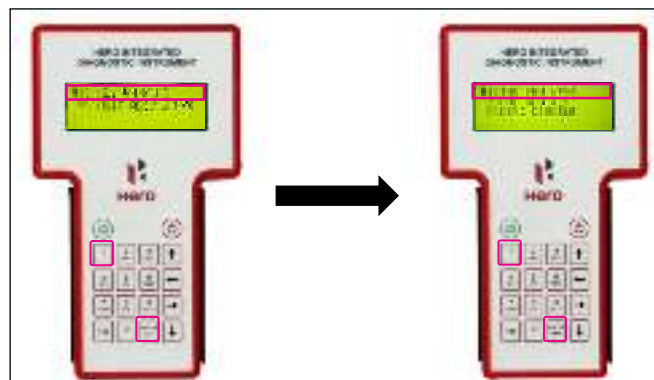
### (1) KEY PAIRING

- A) TWO NEW KEYS
- B) ONE NEW KEY
- C) KEY 2 DISABLE

Choose "KEY PAIRING" by pressing "1" or "Enter".

#### A) TWO NEW KEYS

Press "1" or "Enter" to chose the "Two new keys" option.



## IGNITION/IMMOBILIZER SYSTEM

To pair the NEW KEY1 press "Enter". After pairing NEW KEY1, turn "OFF" the ignition and remove the key from the ignition switch.

Now insert the NEW KEY2 in the key cylinder and turn "ON" the ignition.

Press "Enter" to pair the NEW KEY2H.



### B) ONE NEW KEY

Press "2" or use down arrow to select the "ONE NEW KEY" option.

Insert NEW KEY1 in the key cylinder and switch "ON" the ignition switch.

Press "Enter" to pair the new key1.



After pairing NEW KEY1, turn "OFF" the ignition and remove the key from the ignition switch.

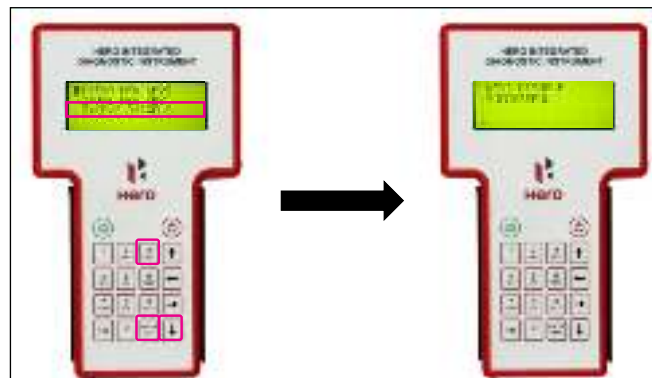
Now insert the OLD KEY 2 in the key cylinder and turn "ON" the ignition switch.

Press "Enter" to pair the old key2.



### C) KEY 2 DISABLE

Press "3" or use down arrow and choose "KEY2 DISABLE" option to disable the misplaced key.





## IGNITION/IMMOBILIZER SYSTEM

### (2) SPARK UNIT ASSEMBLY PAIRING

- A) NEW UNIT ASSEMBLY SPARK
- B) NEW UNIT ASSEMBLY SPARK & TWO NEW KEYS
- C) NEW UNIT ASSEMBLY SPARK & ONE NEW KEY
- D) NEW UNIT ASSEMBLY SPARK & KEY 2 DISABLE

#### (A) NEW UNIT ASSEMBLY SPARK

Choose "UNIT ASSEMBLY SPARK" by pressing "2" or use down arrow to select the option.

To continue the process press "Enter".

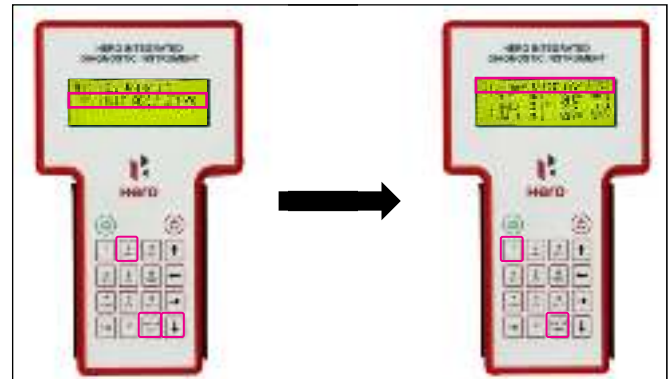
Press "1" or "Enter" to choose the "NEW UNIT ASSEMBLY SPARK" option.

Press "Enter" to pair the OLD KEY1.

After pairing OLD KEY1, turn "OFF" the ignition switch and remove the key from the ignition switch.

Insert the OLD KEY2 in the key cylinder and turn "ON" the ignition.

Press "Enter" to pair the OLD KEY2.



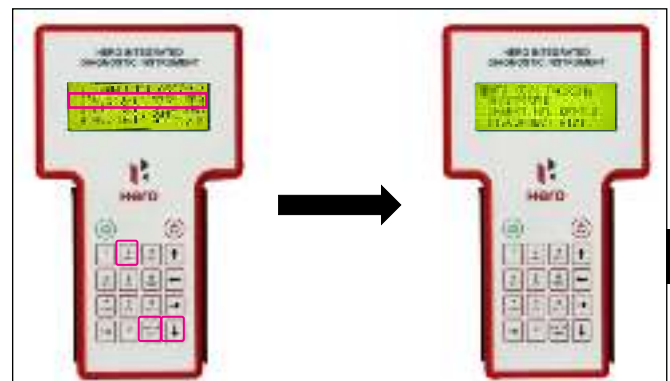
#### (B) NEW UNIT ASSEMBLY SPARK & TWO NEW KEYS

Turn "ON" the ignition.

Now select the option "NEW UNIT ASSEMBLY SPARK & TWO NEW KEYS" by pressing "2" or using down arrow to select the option.

After pairing the NEW KEY1 insert the NEW KEY2 in the key cylinder.

Now disconnect the HIDI and turn "ON" the ignition to pair the NEW KEY2.



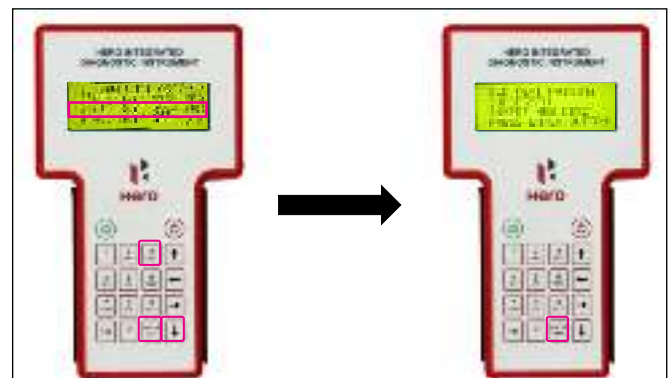
#### © NEW UNIT ASSEMBLY SPARK & ONE NEW KEY

Insert the OLD KEY1 in the key cylinder and turn "ON" the ignition.

Now select the option "NEW UNIT ASSEMBLY SPARK & ONE NEW KEY" by pressing "3" or using down arrow to pair the old key1.

After pairing the OLD KEY1 insert the NEW KEY2 and switch "ON" the ignition.

Now press enter to pair the NEW KEY2.





# IGNITION/IMMOBILIZER SYSTEM

## (D) NEW UNIT ASSEMBLY SPARK & KEY 2 DISABLE

Insert the OLD KEY1 in the key cylinder and turn "ON" the ignition.

Now select the option "NEW UNIT ASSEMBLY SPARK & KEY2 DISABLE" by pressing "4" or using down arrow to pair the OLD KEY1.

After paring the OLD KEY1 press "Enter" to disable the KEY2.



## IMMOBILIZER/MALFUNCTION INDICATOR INSPECTION

Remove the front handlebar cover (page 2-2).

### POWER INPUT LINE

Measure the voltage between the red (+)ve and green (-)ve wire terminals.

Turn the ignition switch "ON".

There should be battery voltage.

Installation is in the reverse order of removal.



## SPARK UNIT WITH IMMOBILIZER INSPECTION

### POWER INPUT LINE

Remove the front center cover (page 2-6).

Disconnect the 4P connector (white colour) from the spark unit with immobilizer.

Measure the voltage between the Black wire terminal (+)ve and ground (-)ve.

Turn the ignition switch "ON".

There should be battery voltage.



### GROUND LINE

Disconnect the 4P connector (white colour) from the spark unit. Check for continuity between the green wire terminal and ground.

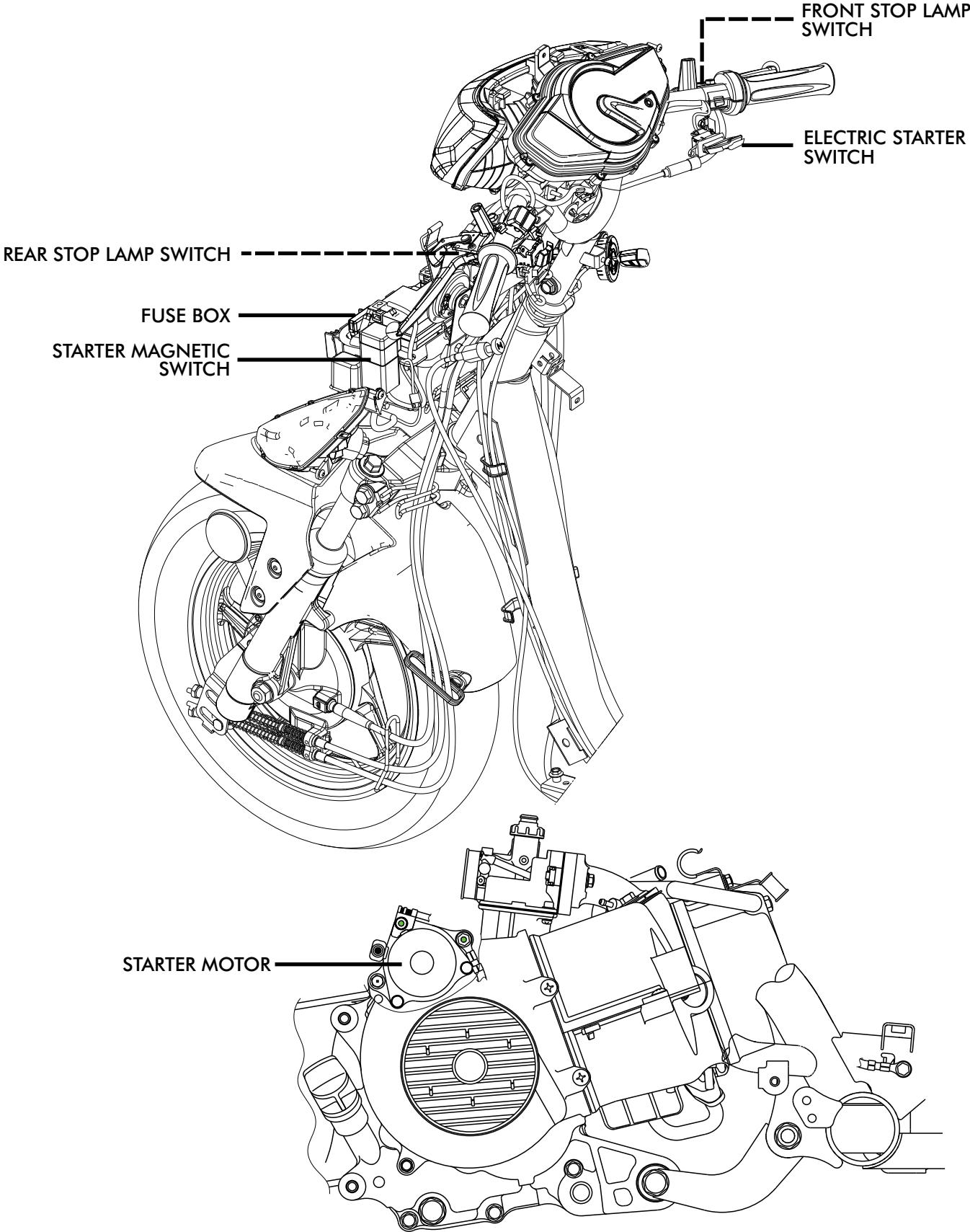
There should be continuity at all times.

Installation is in the reverse order of removal.



# 18.ELECTRIC STARTER

## SYSTEM DIAGRAM



# ELECTRIC STARTER

<b>Service Information</b>	<b>18-1</b>	<b>Brush</b>	<b>18-5</b>
<b>Specifications</b>	<b>18-1</b>	<b>Starter Motor Installation</b>	<b>18-7</b>
<b>Troubleshooting</b>	<b>18-2</b>	<b>Starter Magnetic Switch</b>	<b>18-9</b>
<b>Starter Motor Removal</b>	<b>18-3</b>	<b>Front/Rear stop lamp switch</b>	<b>18-11</b>
<b>Commutator</b>	<b>18-4</b>		

## SERVICE INFORMATION

### GENERAL

#### ▲ WARNING

Always turn the ignition switch "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.

- The starter motor can be serviced with the engine installed in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-2)
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See (SECTION-17) for ignition switch /immobilizer inspections.
- See (SECTION-10) for starter pinion inspection.

## SPECIFICATIONS

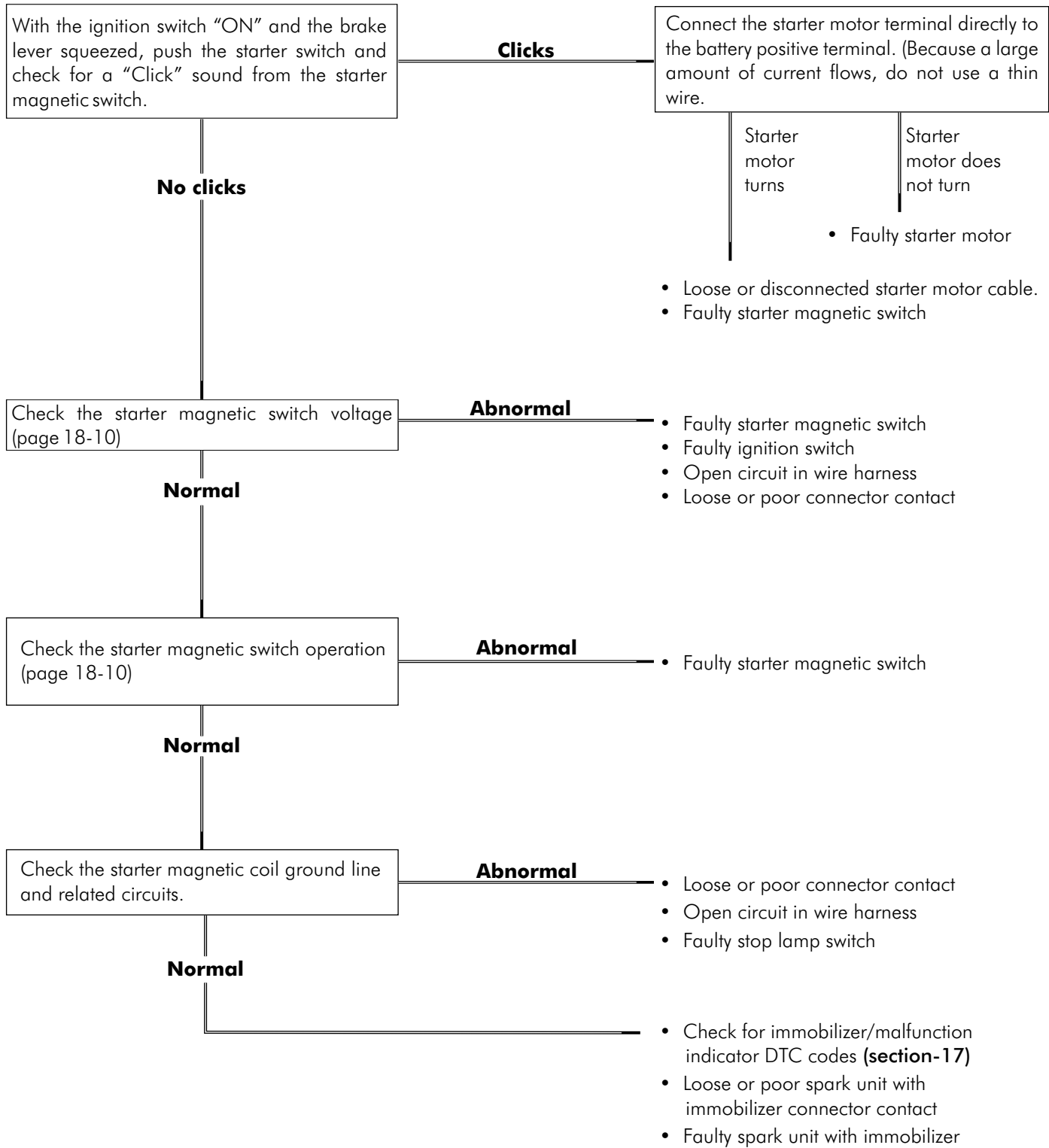
<b>ELECTRIC STARTER ITEM</b>	<b>STANDARD</b>	<b>SERVICE LIMIT</b>
Starter motor brush length	9.0 mm	4.0 mm

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

TROUBLESHOOTING

Starter motor will not turn

- Check for a blown main fuse (10 A)
- Check that the battery is fully charged and in good condition.



# ELECTRIC STARTER

## STARTER MOTOR REMOVAL

**⚠ WARNING**

Always turn the ignition switch “OFF” before servicing the starter motor. The motor could suddenly start, causing serious injury.

Remove the body cover (page 2-12).  
Disconnect the starter motor 2P connector.

Remove the mounting bolts, ground wire and the starter motor.

Release the starter motor cord and ground wire from the tie-wrap.

Slide the dust cover off the starter motor terminal.  
Remove the screw/washer and the bolt/washer, then disconnect the starter motor wire harness from the starter motor.



STARTER MOTOR 2P CONNECTOR



MOUNTING BOLTS  
TIE-WRAP GROUND WIRE



STARTER MOTOR CORD



SCREW/WASHER BOLT/WASHER  
DUST COVER WIRE HARNESS



## ELECTRIC STARTER

Remove the mounting bolts (2 nos.) and the motor case.



MOUNTING BOLTS

### DISASSEMBLY

Remove the following:-

- Armature
- Front bracket
- Gasket



FRONT BRACKET

ARMATURE

ARMATURE COIL

### 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.



COMMUTATOR BARS

Check for continuity between pairs of commutator bars. There should be continuity.



COMMUTATOR BARS

# ELECTRIC STARTER

Also, check for continuity between the individual commutator bars and the armature shaft.  
There should be no continuity.

## BRUSH INSPECTION

Remove the screws, brush holder, springs and the brushes from the front bracket.

## INSPECTION

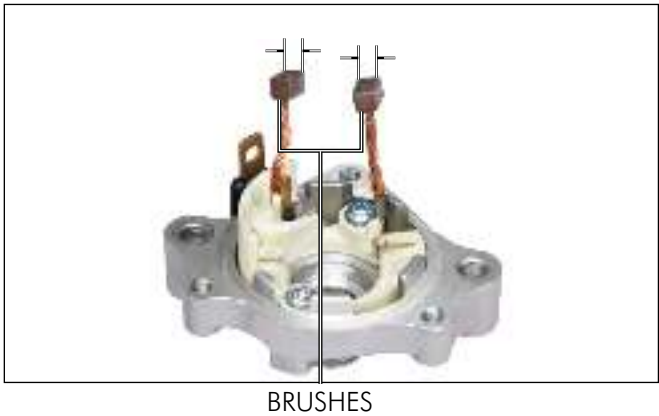
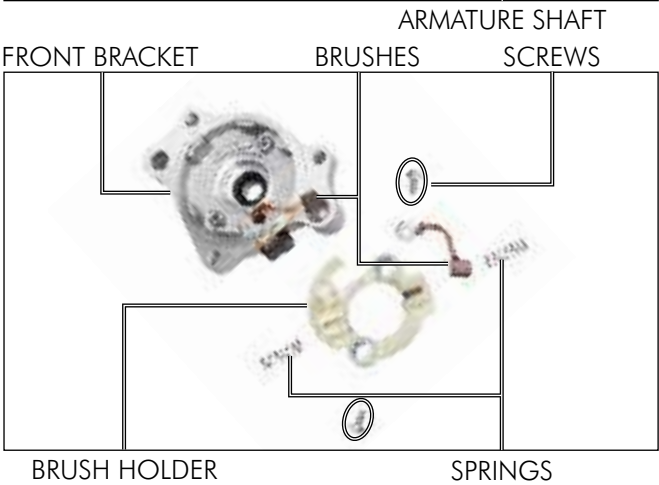
Measure the brush length.

### SERVICE LIMIT

**BRUSH LENGTH: 4.0 mm**

## MOTOR CASE INSPECTION

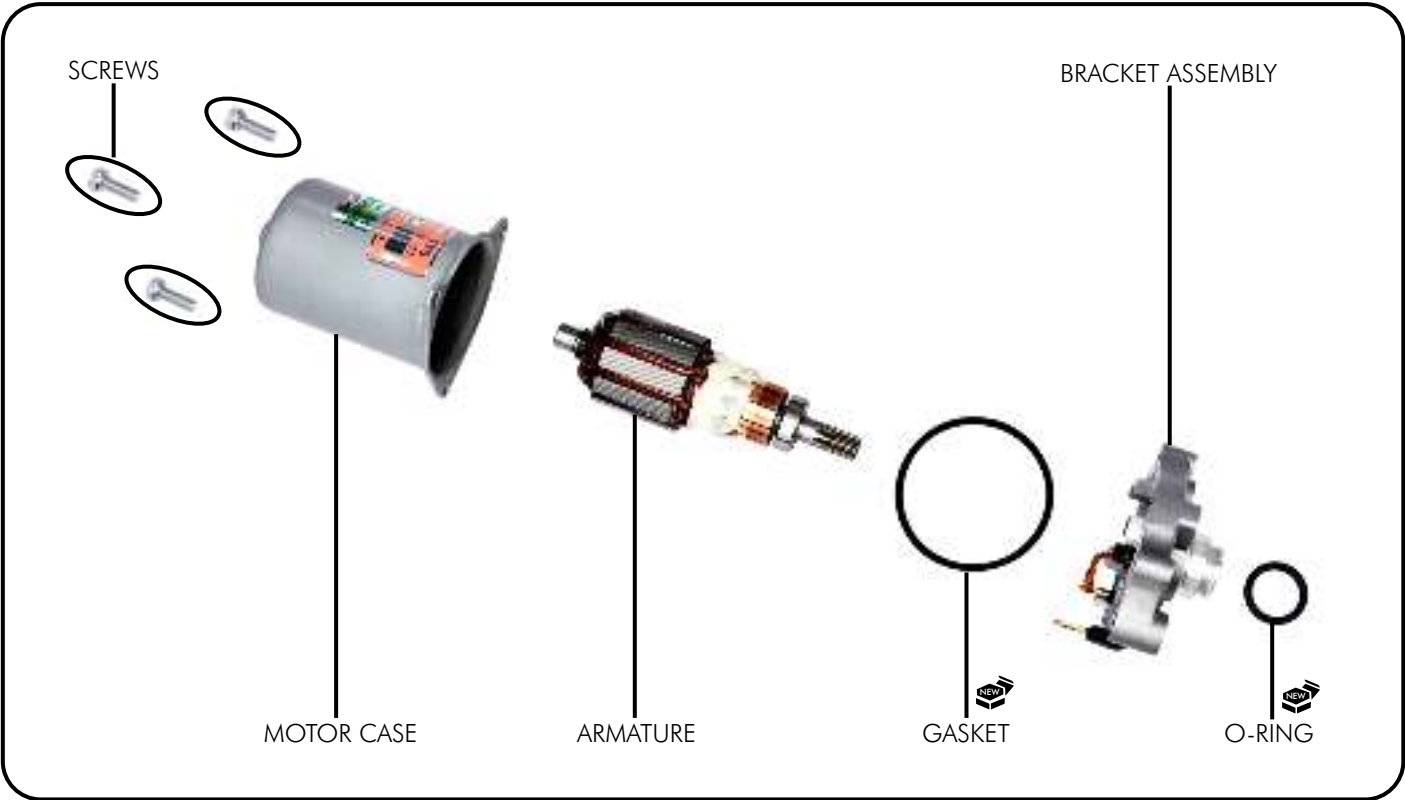
Check the metal bushing for wear or damage.



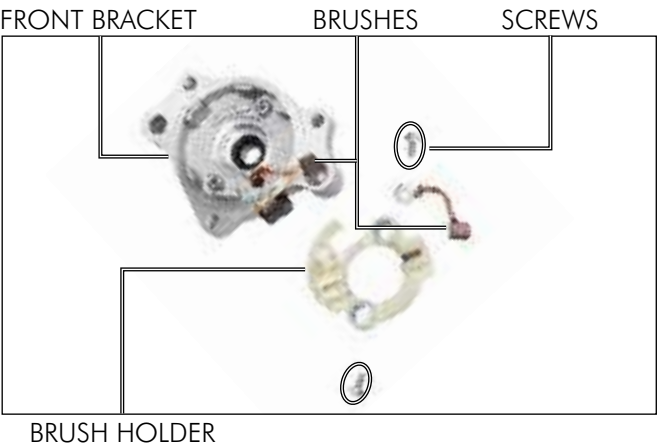
# ELECTRIC STARTER

## FRONT BRACKET INSPECTION

Check the oil seal for wear, damage or deterioration.



Install the brush holder into the front bracket while aligning the brush holder into the front bracket.  
Install the brush into the brush holder.  
Install and tighten the screws.



# ELECTRIC STARTER

Install the springs into the brush holder.

## REAR COVER INSPECTION

Push and hold the brushes into the brush holder and insert the armature into the front bracket.

### CAUTION

Be careful not to damage the brush and armature.

Install a new gasket onto the front bracket.

## STARTER MOTOR INSTALLATION

Install the armature into the motor case while holding the armature tightly to keep the magnet from pulling the armature against the case.

### CAUTION

The coil may be damaged if the magnet pulls the armature against the case.



SPRINGS

FRONT BRACKET



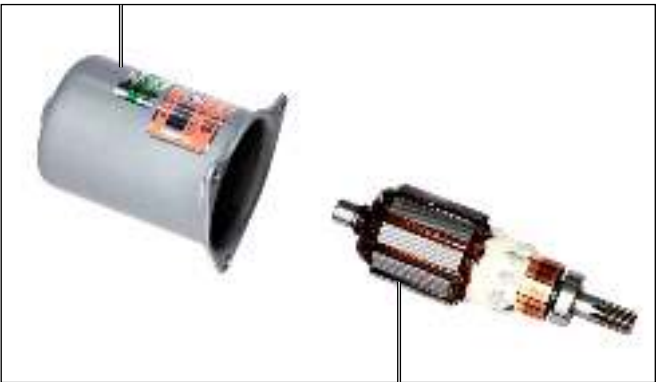
ARMATURE

GASKET



FRONT BRACKET

MOTOR CASE



ARMATURE

## ELECTRIC STARTER

Install and tighten the mounting bolts (2 nos.).



MOUNTING BOLTS

Connect the starter motor wire harness to the starter motor.  
Install the screw/washer and the bolt/washer, then tighten it along with the terminal wires.  
Slide the dust cover on the starter motor terminal.



DUST COVER

WIRE HARNESS

Install the starter motor into the crankcase.  
Install the ground wire and mounting bolts (2 nos.).  
Tighten the bolts securely.



MOUNTING BOLTS

TIE-WRAP GROUND WIRE

Route the starter motor cord and ground wire into the tie-wrap properly.



STARTER MOTOR CORD



# ELECTRIC STARTER

Connect the starter motor 2P connector.  
Install the body cover (page 2-12).



STARTER MOTOR 2P CONNECTOR  
BOOT

## STARTER MAGNETIC SWITCH REMOVAL/INSTALLATION

Remove the front center cover (page 2-6).



STARTER MAGNETIC SWITCH  
BOOT

Release the tie-wrap and remove the starter magnetic switch boot.



STARTER MAGNETIC SWITCH

Disconnect the starter magnetic switch from the wiring harness 4P connector.  
Installation is in the reverse order of removal.



4P CONNECTOR

## ELECTRIC STARTER

### INSPECTION

Make sure that the battery voltage is as per the standard voltage.

Refer battery voltage inspection (page 16-7).

Make sure that the front and rear stop lamp switch is working properly. If it is not working, refer front and rear stop lamp switch inspection (page 18-11).

Turn the ignition switch "ON", press the front or integrated brake lever and press the starter switch.

The starter magnetic switch coil is normal, if the starter magnetic switch "clicks".

If it does not click, check the starter magnetic switch voltage and ground circuit.

### OPERATION CHECK

Connect the 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.



STARTER MAGNETIC SWITCH



STARTER MAGNETIC SWITCH

SPARK UNIT WITH IMMOBILIZER CONNECTOR

### STARTER MAGNETIC SWITCH VOLTAGE & GROUND RELATED CIRCUITS

Remove the front center cover (page 2-6).

Disconnect the spark unit with immobilizer 4P connector.

Measure the voltage between the yellow/red wire and green wire of the spark unit with immobilizer 4P connector.

There should be battery voltage, when the front/integrated brake lever and starter switch is pressed with the ignition switch "ON".

**Standard: Battery voltage**  
**CONNECTION**

**(+)ve probe to yellow/red wire**

**(-)ve probe to green wire**

Measure the voltage between the green/white wire and green wire of the spark unit with immobilizer 4P connector.

There should be battery voltage, when the front/integrated brake lever and starter switch is pressed with the ignition switch "ON".

**Standard: Battery voltage**  
**CONNECTION**

**(+)ve probe to green/white wire**

**(-)ve probe to green wire**

Installation is in the reverse order of removal.



SPARK UNIT WITH IMMOBILIZER CONNECTOR



## ELECTRIC STARTER

### FRONT/REAR STOP LAMP SWITCH INSPECTION

Remove the front handlebar cover (page 2-2).

Disconnect the front stop lamp switch connectors.

Measure the voltage between the green/yellow wire and green wire of the front stop lamp switch wire connectors.

There should be battery voltage, when the front brake lever is pressed with the ignition switch "ON".

**Standard: Battery voltage**

#### CONNECTION

**(+)ve probe to green/yellow wire**

**(-)ve probe to black wire**

Disconnect the integrated stop lamp switch connectors.

Measure the voltage between the green/yellow wire and green wire of the integrated stop lamp switch wire connectors.

There should be battery voltage, when the integrated brake lever is pressed with the ignition switch "ON".

**Standard: Battery voltage**

#### CONNECTION

**(+)Ve probe to green/yellow wire**

**(-)Ve probe to black wire**

Installation is in the reverse order of removal.



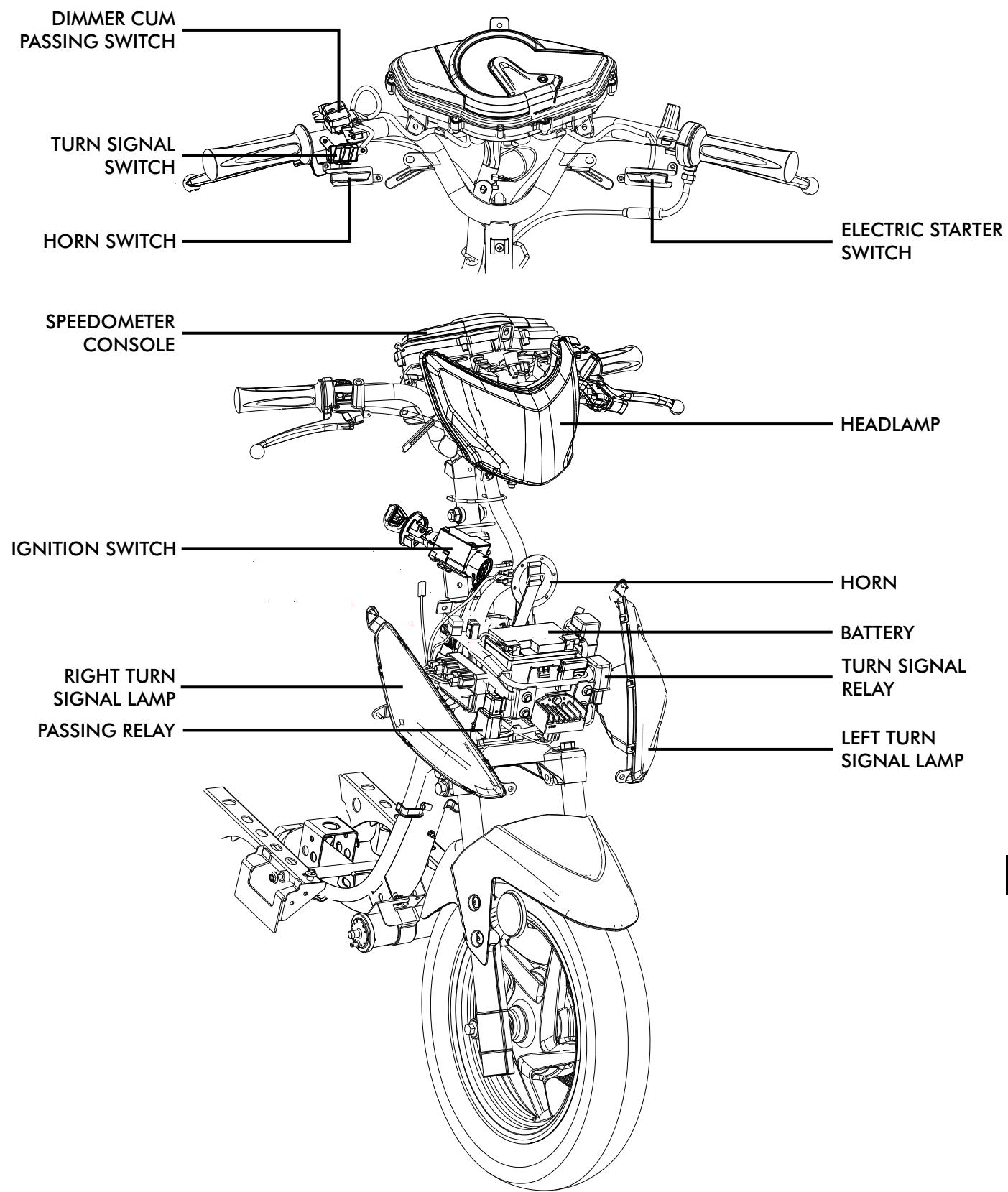
FRONT STOP LAMP SWITCH CONNECTORS



INTEGRATED STOP LAMP SWITCH CONNECTORS

# 19. LAMPS/METERS/SWITCHES

## SYSTEM DIAGRAM





## LAMPS/METERS/SWITCHES

<b>Service Information</b>	<b>19-1</b>	<b>USB Charger Assembly</b>	<b>19-10</b>
<b>Specifications</b>	<b>19-2</b>	<b>Boot Lamp</b>	<b>19-10</b>
<b>Troubleshooting</b>	<b>19-2</b>	<b>Horn</b>	<b>19-12</b>
<b>Headlamp</b>	<b>19-3</b>	<b>Handlebar Switches</b>	<b>19-13</b>
<b>Position Lamp</b>	<b>19-4</b>	<b>Turn Signal Relay</b>	<b>19-15</b>
<b>Turn Signal Lamp</b>	<b>19-4</b>	<b>Passing Relay</b>	<b>19-16</b>
<b>Turn Signal Unit Replacement</b>	<b>19-5</b>	<b>Fuel Gauge/Fuel Unit</b>	<b>19-17</b>
<b>Stop/Tail Lamp Unit Replacement</b>	<b>19-6</b>	<b>Meter Console Functions</b>	<b>19-21</b>
<b>Licence Plate Lamp</b>	<b>19-6</b>	<b>Immobilizer/Malfunction</b>	<b>19-23</b>
<b>Combination Meter</b>	<b>19-7</b>	<b>Indicator</b>	<b>19-23</b>
<b>Stop Lamp Switch</b>	<b>19-8</b>	<b>Combination Meter</b>	<b>19-24</b>
<b>Ignition switch</b>	<b>19-9</b>	<b>Inspection (16P)</b>	<b>19-24</b>

## SERVICE INFORMATION

### GENERAL

- Check the battery condition before performing any inspection that requires proper battery voltage.
- Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.
- All plastic connectors have locking tabs that must be released before disconnecting and must be aligned when reconnecting.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. A multimeter 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.
- 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 scooter. Simply disconnect the connectors and connect a continuity tester to the terminals or connections.
- A continuity test can be made with the switches installed on the scooter.

The following colour codes are used throughout this section.

<b>B</b>	BLACK	<b>BR</b>	BROWN
<b>Y</b>	YELLOW	<b>O</b>	ORANGE
<b>L</b>	BLUE	<b>SB</b>	SKY BLUE
<b>G</b>	GREEN	<b>LG</b>	LIGHT GREEN
<b>R</b>	RED	<b>P</b>	PINK
<b>W</b>	WHITE	<b>GR</b>	GRAY



## LAMPS/METERS/SWITCHES

### SPECIFICATIONS

LAMPS/METERS/SWITCHES		
ITEM		SPECIFICATION
Bulb	Headlamp (High/Low)	12V-35W/35W Halogen Bulb, **MFR
	Tail/stop lamp	12V-0.4W/1.6Wx8 nos. (LED)
	Position lamp	12V-5Wx2 nos.
	Turn signal lamp	12V-10Wx4 nos. (Amber bulb with clear lens), **MFR
	Licence plate lamp	12V-5W
	Boot lamp	12V-2W
	Meter Illumination	12V-80 mWx3 nos. (LED-Amber)
	LCD Illumination	12V-135 mW (LED-Amber)
	High beam indicator	12V-133 mW (LED-Blue)
	Turn signal indicator	12V-105 mWx2 nos. (LED-Green)
Fuse		10A

**\*\*MFR-Multi-Focal Reflector**

### TROUBLESHOOTING

**No lights come on when lighting switch is turned "ON".**

- Faulty or fused bulb
- Faulty lighting switch
- Open circuit in wire harness or loose connection
- Weak or dead battery

**Headlamp beam does not shift when dimmer cum passing switch is operated .**

- Faulty bulb
- Faulty dimmer cum passing switch

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

# LAMPS/METERS/SWITCHES

## HEADLAMP

### BULB REPLACEMENT

#### ▲ WARNING

A halogen headlamp bulb becomes very hot while the headlamp is “ON”, and remain hot for a while after it is turned “OFF”. Be sure to let it cool down before servicing.

### REMOVAL/INSTALLATION

Remove the front handlebar cover (page 2-2).

Remove the dust cover.

Loosen the screw and unhook the bulb retainer.

Remove the headlamp bulb by turning it counter-clockwise while pushing it in. Replace with the new bulb.



DUST COVER



SCREW RETAINER

BULB

Install a new headlamp bulb by aligning the tabs of the bulb with the slots of the headlamp unit.

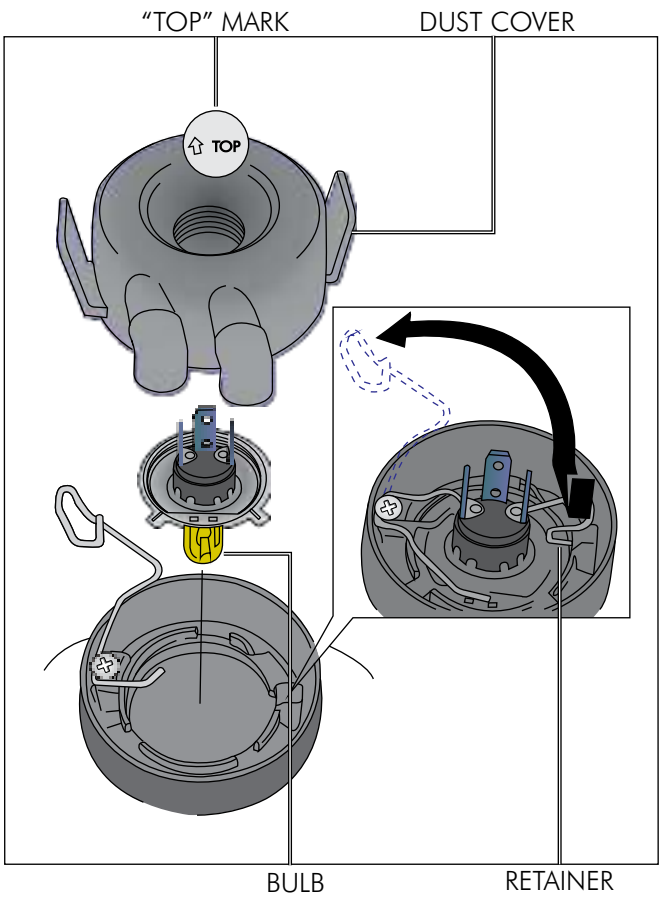
Hook the bulb retainer into the headlamp unit groove.

Install the dust cover with its “TOP” mark facing up.

Installation is in the reverse order of removal.

#### CAUTION

- Wear clean gloves while replacing the bulb. Do not hold the headlamp bulb with your fingers, as they may create hot spots on the bulb and cause it to break.
- If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
- Be sure to install the dust cover after replacing the bulb.



BULB

RETAINER

## LAMPS/METERS/SWITCHES

### POSITION LAMP REMOVAL/INSTALLATION

Remove the front handlebar cover (page 2-2).  
Remove the position lamp bulb from the socket.

Remove the position lamp bulb from the holder and replace it with the new one.  
After replacing the position lamp, the bulb holder can be fitted back in the socket on the front cover.  
Installation is in the reverse order of removal.



### TURN SIGNAL LAMP BULB REPLACEMENT FRONT

Twist the bulb socket 45° counter-clockwise to remove the bulb along with the socket.



Remove the turn signal bulb from the socket and replace it with a new one.

# LAMPS/METERS/SWITCHES

## REAR

Twist the bulb socket 45° counter-clockwise to remove the bulb along with the socket.

Remove the turn signal bulb from the socket and replace it with a new one.

REAR TURN SIGNAL LAMP BULB SOCKET



REAR TURN SIGNAL LAMP UNIT  
BULB SOCKET



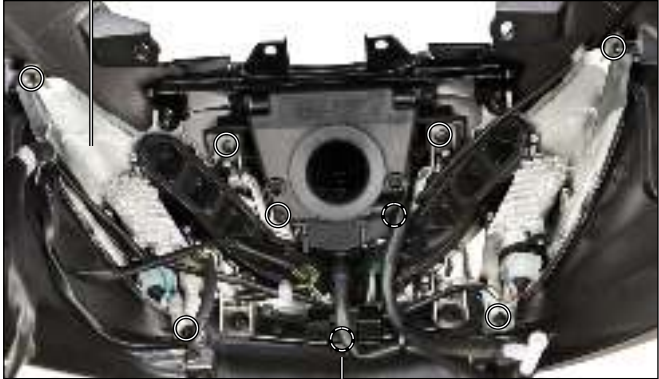
BULB

FRONT TURN SIGNAL UNIT



SCREWS

REAR TURN SIGNAL UNIT



SCREWS

## TURN SIGNAL UNIT REPLACEMENT

### FRONT

Remove the front right/left cover (page 2-7).  
Remove the screws (3 nos.) and remove the turn signal unit.  
Installation is in the reverse order of removal.

### REAR

Remove the body cover (page 2-12).  
Remove the screws (9 nos.) and remove the turn signal unit.  
Installation is in the reverse order of removal.



## LAMPS/METERS/SWITCHES

### STOP/TAIL LAMP UNIT REPLACEMENT

Turn the ignition switch “ON” and check the tail/stop lamp operation.

Check that all LED in the stop lamp unit illuminate with the front/integrated brake lever pressed.

Check that all LED in the tail lamp unit illuminate with ignition switch and lighting switch “ON” condition.

If any LED does not turn “ON”, replace the stop/tail lamp unit.

### REMOVAL/INSTALLATION

Remove the body cover (page 2-12).

Remove the screws (10 nos.).

Disconnect the stop/tail lamp connector and the drain tubes.

Release the fuel catch cable from the stop/tail lamp unit guide.

Remove the stop/tail lamp unit.

Installation is in the reverse order of removal.

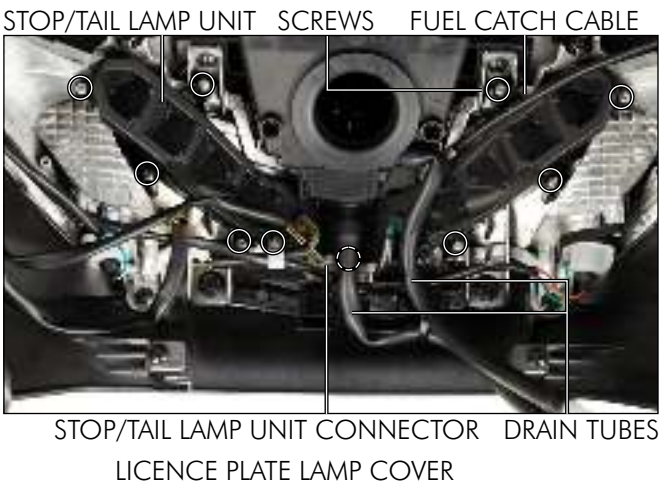
### LICENCE PLATE LAMP BULB REPLACEMENT

Remove the body cover (page 2-12).

Remove the screws (2 nos.) and the licence plate lamp cover.

Remove the licence plate lamp bulb and replace it with a new one, if necessary.

Installation is in the reverse order of removal.





# LAMPS/METERS/SWITCHES

## COMBINATION METER

### REMOVAL

Remove the front/rear handle bar cover (page 2-2, 2-3).  
Remove the screws (3 nos.) and combination meter.



COMBINATION METER

### DISASSEMBLY

Remove the bezel mounting screws.



Remove the bezel from the combination meter inner/under case.



Remove the under case mounting screws.



# LAMPS/METERS/SWITCHES

Remove the inner case from the under case.



Remove the speedometer component mounting screws and the speedometer component.

## ASSEMBLY

Assembly is in the reverse order of disassembly.



SPEEDOMETER COMPONENT

## INSTALLATION

Install the combination meter and screws (3 nos.).  
Install the front/rear handle bar cover (page 2-2, 2-3).



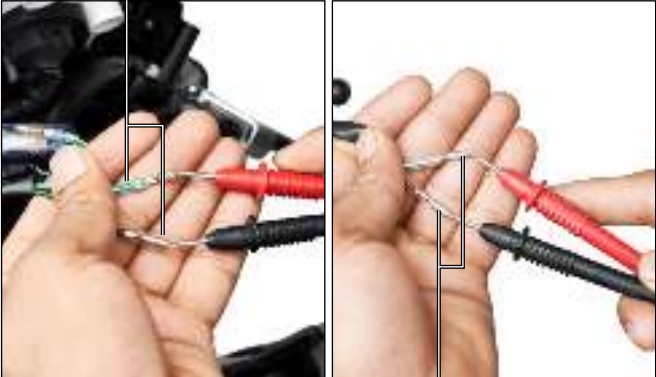
COMBINATION METER

FRONT STOP LAMP SWITCH CONNECTORS

## STOP LAMP SWITCH

### FRONT/INTEGRATED

Remove the front handlebar cover (page 2-2).  
Disconnect the front/integrated stop lamp switch connectors and check for continuity between the switch terminals.  
There should be continuity with the brake lever depressed and no continuity when the brake lever is released.  
Installation is in the reverse order of removal.



INTEGRATED STOP LAMP SWITCH CONNECTORS

# LAMPS/METERS/SWITCHES

## IGNITION SWITCH

### REMOVAL

Remove the inner cover (page 2-16).  
Disconnect the ignition switch and immobilizer antenna 2P connector.

Disconnect the seat lock cable and fuel lid cable from the mounting stays.

Remove the mounting screws (2 nos.) and the ignition switch.

### INSTALLATION

Installation is in the reverse order of removal.

### INSPECTION

Remove the inner cover (page 2-16).  
Disconnect the ignition switch 2P connector.  
Check for continuity between the wire terminals of the ignition switch connector in each switch position.  
Continuity should exist between the color coded wires as follows:-

#### STARTER SWITCH

Colour	Black	Red
LOCK		
OFF		
ON	—	—

IMMOBILIZER ANTENNA 2P CONNECTOR



IGNITION SWITCH CONNECTOR  
MOUNTING STAYS



SEAT LOCK CABLE

FUEL LID CABLE



MOUNTING SCREWS

IMMOBILIZER CONNECTOR



IGNITION SWITCH CONNECTOR

## LAMPS/METERS/SWITCHES

### USB CHARGER ASSEMBLY REMOVAL/INSTALLATION

The USB charger assembly is located inside the center compartment.

Remove the center compartment (page 2-11).  
Remove the wire guide mounting screw and release the wire from the guide.  
Remove the mobile charging socket mounting screws (2 nos.).

Remove the USB charger assembly from the center compartment.

### INSTALLATION

Installation is in the reverse order of removal.

### BOOT LAMP OPERATION CHECK

The boot lamp is located in the center compartment.  
The lamp comes "ON" when the seat is lifted and the lamp goes "OFF" when the seat is closed.  
When the seat is lifted, boot lamp switch releases whereby closing the circuit and the lamp comes "ON".  
When the seat is closed, the boot lamp switch is pressed down and the lamp goes "OFF".  
Lift the seat and check whether the boot lamp comes "ON".  
If the lamp comes "ON", press the boot lamp switch down, and the lamp should go "OFF".  
This would confirm the normal functioning of the switch.





# LAMPS/METERS/SWITCHES

## BULB REPLACEMENT

Remove the centre compartment (page 2-11).  
Remove the bulb holder.

Replace the boot lamp bulb.  
Installation is in the reverse order of removal.

## REPLACEMENT PROCEDURE

Remove the centre compartment (page 2-11).  
Remove the screws (2 nos.) and release the boot lamp wire harness from the guides.

Remove the mounting screws (3 nos.)



BULB HOLDER



BULB HOLDER

BOOT LAMP BULB

BOOT LAMP WIRE HARNESS



SCREWS



BOOT LAMP

SCREWS



## LAMPS/METERS/SWITCHES

Remove the boot lamp assembly as a set.

**NOTE**

Replacement has to be done as a complete set and not as separate component



BOOT LAMP ASSEMBLY  
SWITCH

Installation is in the reverse order of removal.



BOOT LAMP  
CONNECTORS HORN

### HORN REMOVAL/INSTALLATION

Remove the front center cover (page 2-6).  
Disconnect the horn wire connectors.  
Remove the mounting bolt and horn.  
Installation is in the reverse order of the removal.



MOUNTING BOLT

### INSPECTION

Remove the horn (page 19-13).  
Connect the battery voltage to the horn terminals.  
The horn is normal if it sounds when the battery voltage is connected across the terminals.  
Installation is in the reverse order of removal.



HORN

# LAMPS/METERS/SWITCHES

## HANDLEBAR SWITCHES

Remove the front handlebar cover (page 2-2).

### RIGHT HANDLEBAR SWITCH

Disconnect the right handlebar switch wire connector.



RIGHT HANDLEBAR SWITCH CONNECTOR

Check the switch for continuity between the wire terminals of the handlebar switch connector.

There should be continuity between the colour coded wire in below chart.

### ELECTRIC STARTER SWITCH

Colour	Yellow/Red	Green/Yellow
Free		
Push	—	—

Installation is in the reverse order of removal.

### SWITCH REPLACEMENT

Remove the right switch housing mounting screw.



ELECTRIC STARTER SWITCH  
RIGHT SWITCH HOUSING



SCREW

RIGHT SWITCH HOUSING

Open the right switch housing while releasing the tabs from the slots.

Disconnect the electric starter switch connector and remove the right switch housing.



STARTER SWITCH CONNECTOR

LAMPS/METERS/SWITCHES

Remove the screws (2 nos.) and the electric starter switch unit.

Replace the switch, if necessary.

Installation is in the reverse order of removal.



LEFT HANDLEBAR SWITCHES

Remove the front handlebar cover (page 2-2).

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.

DIMMER CUM PASSING SWITCH

Colour	Blue/ Green	White	White/ Blue	Black	Red/ Black
PASS		—	—	—	—
LO		—	—		
HI	—	—	—		



TURN SIGNAL SWITCH

Colour	Sky Blue	Orange	Grey
L		—	—
N			
R	—	—	—



HORN SWITCH

Colour	Light Green	Black
Free		
Push	—	—

Installation is in the reverse order of removal.

SWITCH REPLACEMENT

Remove the left switch housing mounting screw.



## LAMPS/METERS/SWITCHES

Open the left switch housing while releasing the tabs from the slots.

Disconnect the dimmer cum passing, turn signal and horn switch connectors and remove the left switch housing.

Remove the screws (2 nos.) and the horn switch unit.

Remove the screws (2 nos.) and the turn signal switch unit.

Remove the screws (2 nos.) and the dimmer cum passing switch unit.

Replace the switches, if necessary.

Installation is in the reverse order of removal.

### TURN SIGNAL RELAY REMOVAL/INSTALLATION

Remove the front center cover (page 2-6).

Disconnect the connector and remove the turn signal relay from its mounting.

#### INSPECTION

##### 1. Recommended Inspection

If the turn signal light does not blink, check the following:-

- Battery condition
- Fused bulb
- Incorrect bulb wattage
- Ignition and turn signal switch function
- Loose or poorly connected wire connectors

If any of the above items are not in good condition replace or repair the malfunction parts.

If above items are all normal, check as given below:-

##### 2. Turn Signal Circuit Inspection

Disconnect the connector from the turn signal relay and short the connector with a jumper wire.

Still light does not come "ON".

- Open or short circuit in wire harness.

Light comes on

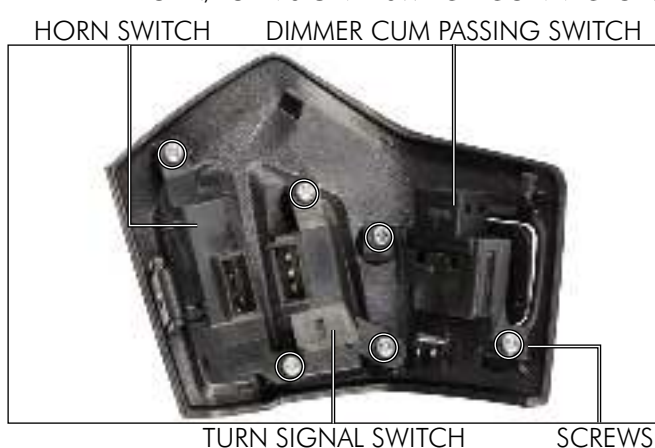
- Faulty turn signal relay
- Poor connection of the connector

Installation is in the reverse order of removal.

DIMMER CUM PASSING SWITCH CONNECTOR



HORN/TURN SIGNAL SWITCH CONNECTORS



TURN SIGNAL SWITCH

SCREWS

TURN SIGNAL RELAY



CONNECTOR



TURN SIGNAL RELAY



## LAMPS/METERS/SWITCHES

### PASSING RELAY (POWER RELAY) REMOVAL

Remove the front center cover (page 2-6).  
Disconnect the passing relay connector and dismount the passing relay from the stay.



PASSING RELAY

PASSING RELAY CONNECTOR



PASSING RELAY

Measure the voltage between the following:-

**Connection: (+) ve probe to black wire**  
**(-) ve probe to ground**

**Standard: Battery voltage**

**Connection: (+) ve probe to red/black wire**  
**(-) ve probe to ground**

**Standard: (a) Battery voltage when pass switch is operated**  
**(B) No voltage when pass switch is not Operated**

### INSPECTION

Check for continuity between the following:

**Connection: Pin 3-Pin 4**

**Standard: Continuity**

**Connection: Pin 1-Pin 2**

**Standard: Continuity**

Connect a battery to passing relay terminals 1 and 2.

Check for continuity between the following:-

**Connection: Pin 3-Pin 5**

**Standard: Continuity**

### INSTALLATION

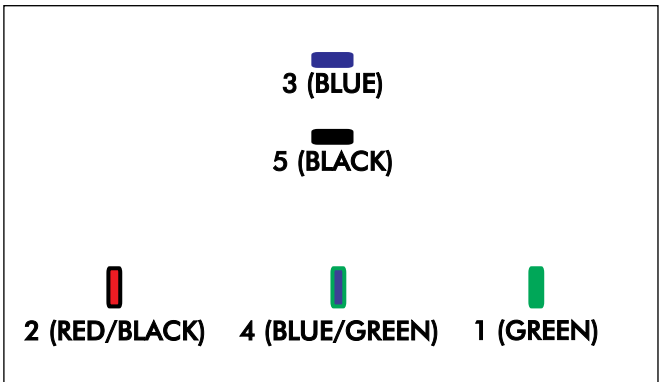
Installation is in the reverse order of removal.



PASSING RELAY

### TEST SPECIFICATION FOR RELAY POWER FUNCTION

The function of the power relay is to switch the circuit of HI BEAM to BATTERY on pressing of PASSING SWITCH.





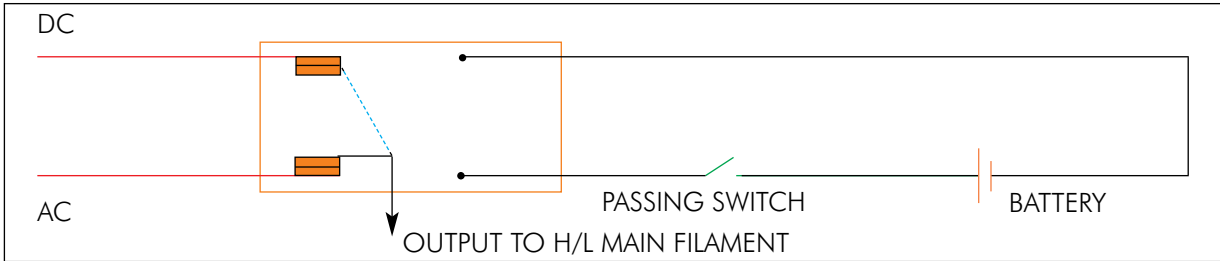
## LAMPS/METERS/SWITCHES

CONDITION	PRESS PASSING SWITCH	INPUT POWER
Headlamp "ON"	HI beam gets "ON"	HI beam at DC LO beam at AC

Relay power has five contact points. Out of these three contact points, two (3 & 4) are normally closed in this NC condition, AC voltage supplied at terminal 4 will flow to terminal 3. So the voltage of the main filament of H/L bulb (HI beam) will flow through this circuit. It implies that the H/L will run on AC voltage when HI beam is glowing.

Now the other pair of contact points is (3 & 5). These contact points are normally open in this "NO" condition. But when the relay is operated (by pressing PASSING SWITCH) the contact is made between terminals 3 & 5 and broken between 3 & 4. So the voltage to MAIN filament (HI beam) of H/L will now be through battery & not AC.

When the scooter is used in "AHO"(Always Headlamp ON) at LO beam (DIP FILAMENT) and PASSING switch is pressed, in this case HI beam will also get "ON" (on DC) due to relay operation. Simultaneously LO beam will remain in "ON" condition at AC voltage.



Installation is in the reverse order of removal

### FUEL GAUGE/FUEL UNIT REMOVAL

Remove the body cover (page 2-12).

Disconnect the fuel unit 2P connector.

FUEL UNIT 2P CONNECTOR



Dismount the two-way valve from its mounting.



TWO-WAY VALVE

## LAMPS/METERS/SWITCHES

Turn the fuel unit retainer to counter-clockwise with a pair of needle nose pliers and remove the retainer.



FUEL UNIT RETAINER  
FUEL UNIT ASSEMBLY

Remove the fuel unit assembly.



FUEL UNIT ASSEMBLY

### INSTALLATION

Check that the base packing is in good condition, replace if necessary.

Install the fuel unit assembly into the fuel tank.



Install the fuel unit retainer on the fuel unit assembly.  
Align the retainer with its “arrow” mark facing forward.  
Turn the retainer to clockwise direction to match the arrow head on the retainer with the arrow head on the fuel tank and lock it.



FUEL UNIT RETAINER

# LAMPS/METERS/SWITCHES

Mount the two-way valve on the fuel tank.



TWO-WAY VALVE  
FUEL UNIT 2P CONNECTOR

Connect the fuel unit 2P connector.  
Install the body cover (page 2-12).



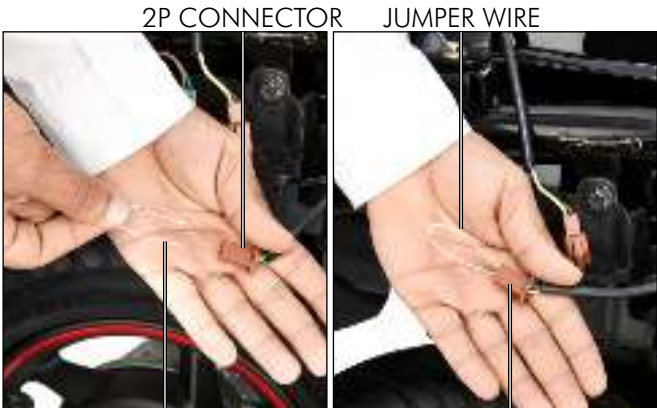
FUEL UNIT 2P CONNECTOR

## FUEL GAUGE/FUEL UNIT OPERATION CHECK

Remove the body cover (page 2-12).  
Disconnect the fuel unit 2P connector.



Short the Yellow/White and Green wire terminals of the fuel unit 2P connector with the suitable jumper wire.



2P CONNECTOR JUMPER WIRE  
JUMPER WIRE 2P CONNECTOR

## LAMPS/METERS/SWITCHES

Turn the ignition switch “ON” and check the fuel gauge segments. All the segments would be visible for few seconds and goes off.

If the above condition is not met, check the following:-



### CAUTION

- Be careful not to damage the unit cable.
- Be careful not to bend the float arm of the unit.

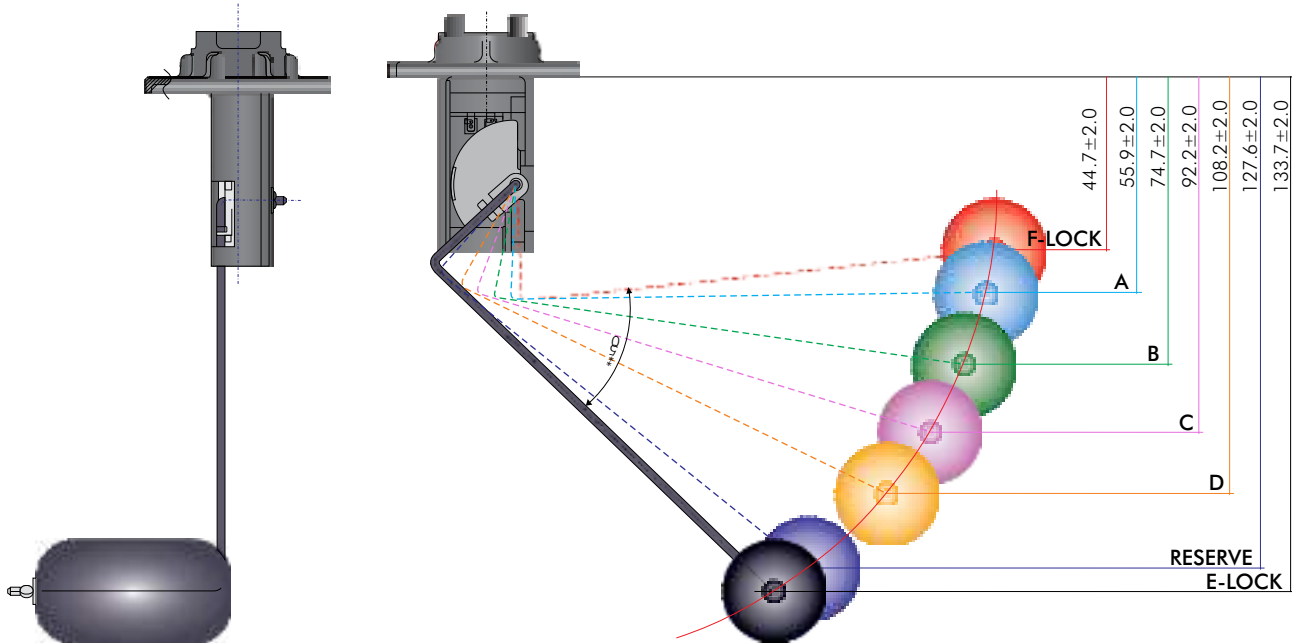
Turn the ignition switch “ON”.

Connect the multimeter to the fuel unit 2P connector and set the knob to resistance value.

Move the fuel unit float up/down and make sure that the fuel gauge segments changes accordingly.

Inspect the resistance of the float at different positions as shown.

If the system inspection is “OK” but fuel gauge segments are not changing properly, replace the fuel unit.



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### INDICATION STANDARD

FLOAT POSITION	F-LOCK	A	B	C	D	RESERVE	E-LOCK
FG INDICATION***	5 BAR	5 BAR→4 BAR	4 BAR→3 BAR	3 BAR→2 BAR	2 BAR→1 BAR	1 BAR→1 BAR BLINKING	1 BAR BLINKING
RESISTANCE (ohms)	8.0	17.0	31.2	45.3	59.5	84.4	93.0
TOLERANCE (ohms)	±2	±2	±2	±2	±2.5	±2.5	±2.5
VOLUME (ltrs)***	>5.5	5.5	4.5	3.5	2.5	1.2	<1.2



# LAMPS/METERS/SWITCHES

## FUEL GAUGE INDICATION STANDARD (FOR CUSTOMER REFERENCE ONLY):

BAR INDICATION	5 BAR→4 BAR	4 BAR→3 BAR	3 BAR→2 BAR	2 BAR→1 BAR	1 BAR→1 BAR BLINKING
RESISTANCE (ohms)	17.20	31.10	42.90	57.20	80.0
TOLERANCE (ohms)	±3.70	±3.0	±3.10	±3.30	±3.50

Installation is in the reverse order of removal.

## METER CONSOLE FUNCTIONS ODOMETER/TRIPMETER

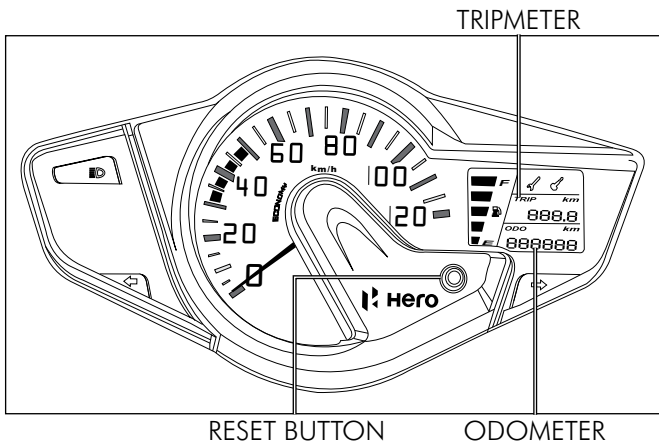
The odometer shows accumulated distance traveled.

The tripmeter shows distance traveled since trip meter was reset last time.

Tripmeter displays upto 999.9 km If the tripmeter exceeds "999.9" km it will return to "0.0" km automatically.

When tripmeter is selected long press the reset button will reset tripmeter to zero.

The odometer displays from "0 to 999999" km.



## FUEL GAUGE

The fuel gauge is of a Liquid Crystal Display (LCD) type. The approximate amount of fuel quantity available in the fuel tank is indicated by the number of segments in the display. Each segment display approx. 1.0 litre of fuel.

If all the segments are displayed it means fuel quantity in the fuel tank is 5.5 litres (Minimum).

If only one segment is displayed and blinks, this indicates that the fuel quantity is low and the fuel tank should be refilled as soon as possible.



## SERVICE REMINDER INDICATOR

The Service reminder indicator is to indicate an user to bring the vehicle to an Authorized Hero MotoCorp workshop for service.

The service reminder indicator starts blinking when the vehicle covers kilometers as specified in the maintenance schedule. The service reminder indicator will keep on blinking throughout the kilometer interval for a particular service and will stay "ON" thereafter.





## LAMPS/METERS/SWITCHES

To reset the service reminder, press and hold the select button and switch on the ignition key. The service reminder will reset after 2 seconds.

### NOTE

After getting the vehicle serviced, make sure that the service reminder has been reset.

## IMMOBILIZER/MALFUNCTION INDICATOR

Your DASH scooter is provided with an immobilizer system. This is an anti-theft device built into the ignition system, which prevents the engine to start without an authorised key.

You have been provided with two ignition keys at the time of purchase of your DASH scooter. While you would be using one ignition key, the other one has to be kept safely.

An Immobilizer/Malfunction indicator appears on the LCD in the speedometer console.

when the ignition switch is turned "ON" with the properly registered key, the immobilizer/malfunction indicator appears on the LCD display for approx. 1 second then it goes off and the immobilizer system functions normally.

If there is any malfunction or the properly registered key is not used, the indicator will remains "ON", for 10 seconds and then starts blinking or continuously "ON" as per detected malfunction.

In this case, visit your nearest Authorised Hero MotoCorp workshop.

## COMBINATION METER INSPECTION (16P)

### NOTE

Ensure that the battery is in good condition (section 16). If not, then replace with a new battery and then inspect.

Turn the ignition switch "ON".

Check the following:

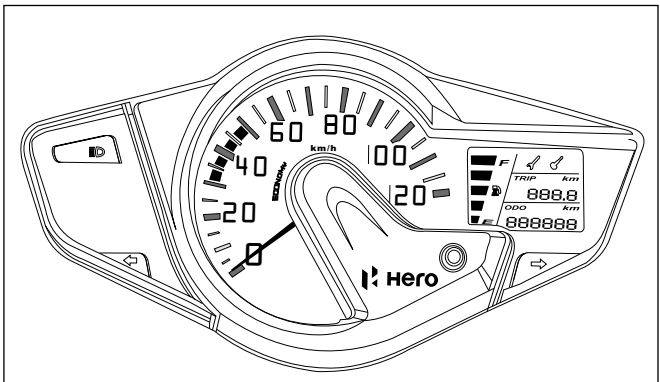
- All LCD segments are displayed for speedometer. A figure of '888.8' is visible.
- All LCD segments are displayed for odometer. A figure of '888888' is visible.

Total Distance (Odometer Reading)	Indicator Behaviour
0 km	OFF
500-750 km	Blinking
After 750 km	ON
3000-3500 km	Blinking
After 3500 km	ON
6000-6500 km	Blinking
After 6500 km	ON
.	.
.	.
.	.

SPARK UNIT WITH IMMOBILIZER



IMMOBILIZER/MALFUNCTION INDICATOR



# LAMPS/METERS/SWITCHES

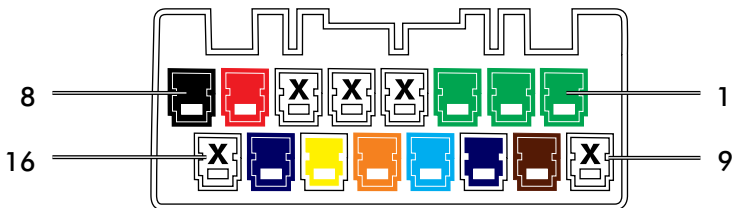
- The tachometer needle swings from MIN-MAX-MIN.
- All LCD segments are displayed for fuel gauge. A figure of " " is visible.
- Immobilizer/malfunction indicator is displayed.
- Service reminder indicator is displayed.

If no display is observed:

Disconnect the combination meter 16P connector (page 2-3).

## 16P CONNECTOR TERMINAL

1	: Ground	- Green
2	: Ground	- Green
3	: Ground	- Green
4	: TxD	- Empty
5	: RxD	- Empty
6	: NS TEST	- Empty
7	: Battery	- Red
8	: Ignition	- Black
9	: Not Used	- Empty
10	: Illumination	- Brown
11	: Immobilizer	- Blue/White
12	: Turn R	- Sky Blue
13	: Turn L	- Orange
14	: Fuel Input	- Yellow/White
15	: High Beam	- Blue
16	: Not Used	- Empty



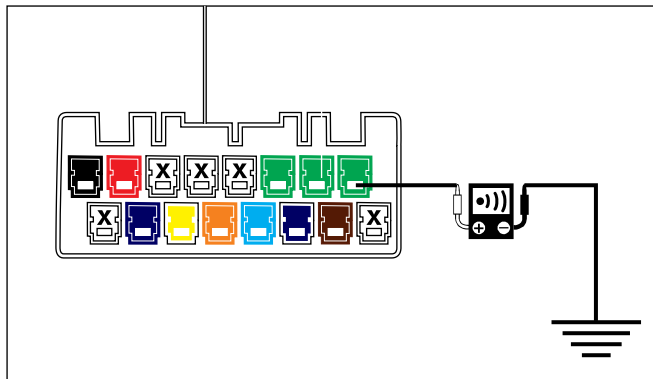
Check pin 1 with body ground for continuity.

**Connection: Pin 1 (Green)- Body Ground**

**Standard: Continuity**

If no continuity is observed then replace the wire harness.

## COMBINATION METER 16P CONNECTOR



## LAMPS/METERS/SWITCHES

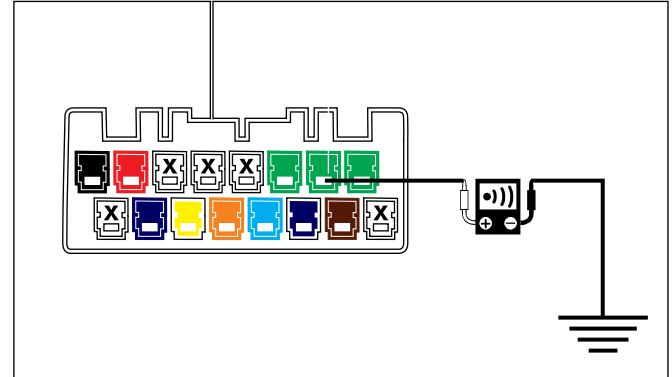
Check pin 2 with body ground for continuity.

**Connection: Pin 2 (Green)- Body Ground**

**Standard: Continuity**

If no continuity is observed then replace the wire harness.

COMBINATION METER 16P CONNECTOR



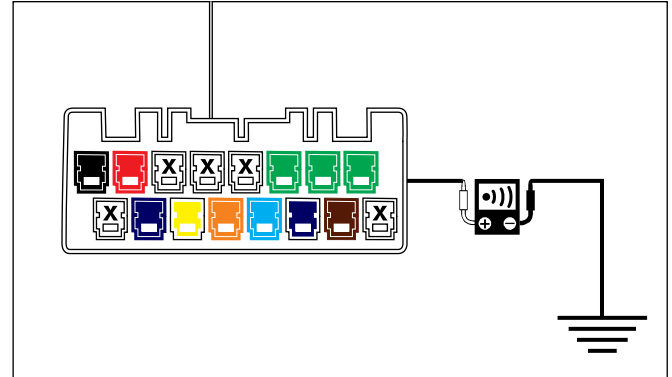
Check pin 3 with body ground for continuity.

**Connection: Pin 3 (Green)- Body Ground**

**Standard: Continuity**

If no continuity is observed then replace the wire harness.

COMBINATION METER 16P CONNECTOR



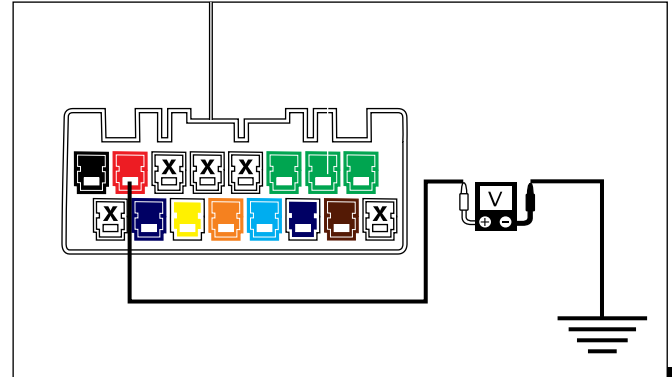
If continuity observed is "OK" then check the voltage at pin 7.

**Connection: Pin 7 (Red)- Body Ground**

**Standard: Battery Voltage**

If no continuity is observed then replace the wire harness.

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.

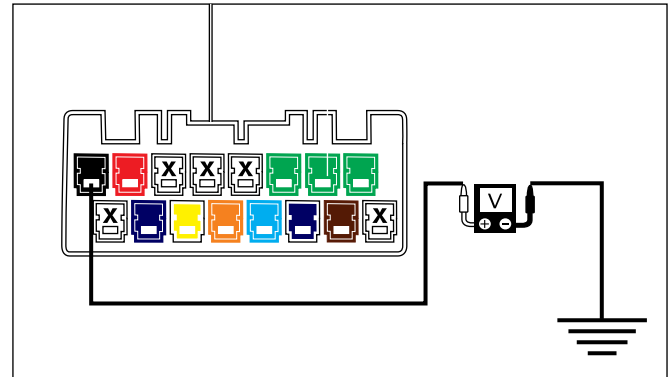
**Connection: Pin 8 (Black)- Ground**

**Standard: Battery Voltage**

If no voltage is observed then replace the wire harness.

If voltage is "OK" then replace combination meter.

COMBINATION METER 16P CONNECTOR



# LAMPS/METERS/SWITCHES

## FUEL METER

Turn the ignition switch "ON".

Check the following.

- All LCD segments are displayed for fuel gauge. A figure of " " is visible.

If the above display is "OK" then check the fuel unit (page 19-20).

If the fuel gauge segments does not function properly, then disconnect the combination meter 16P connector (page 2-3).

Check the continuity between pin 14 in 16P connector with Yellow/White wire at fuel gauge 2P connector.

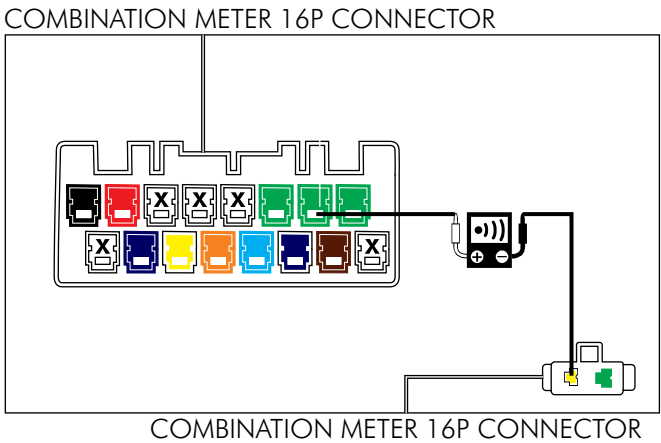
**Connection: Meter Unit 16P Connector Pin 14 (Yellow/ White)- Fuel Gauge Unit 2P Connector Yellow/White**

**Standard: Continuity**

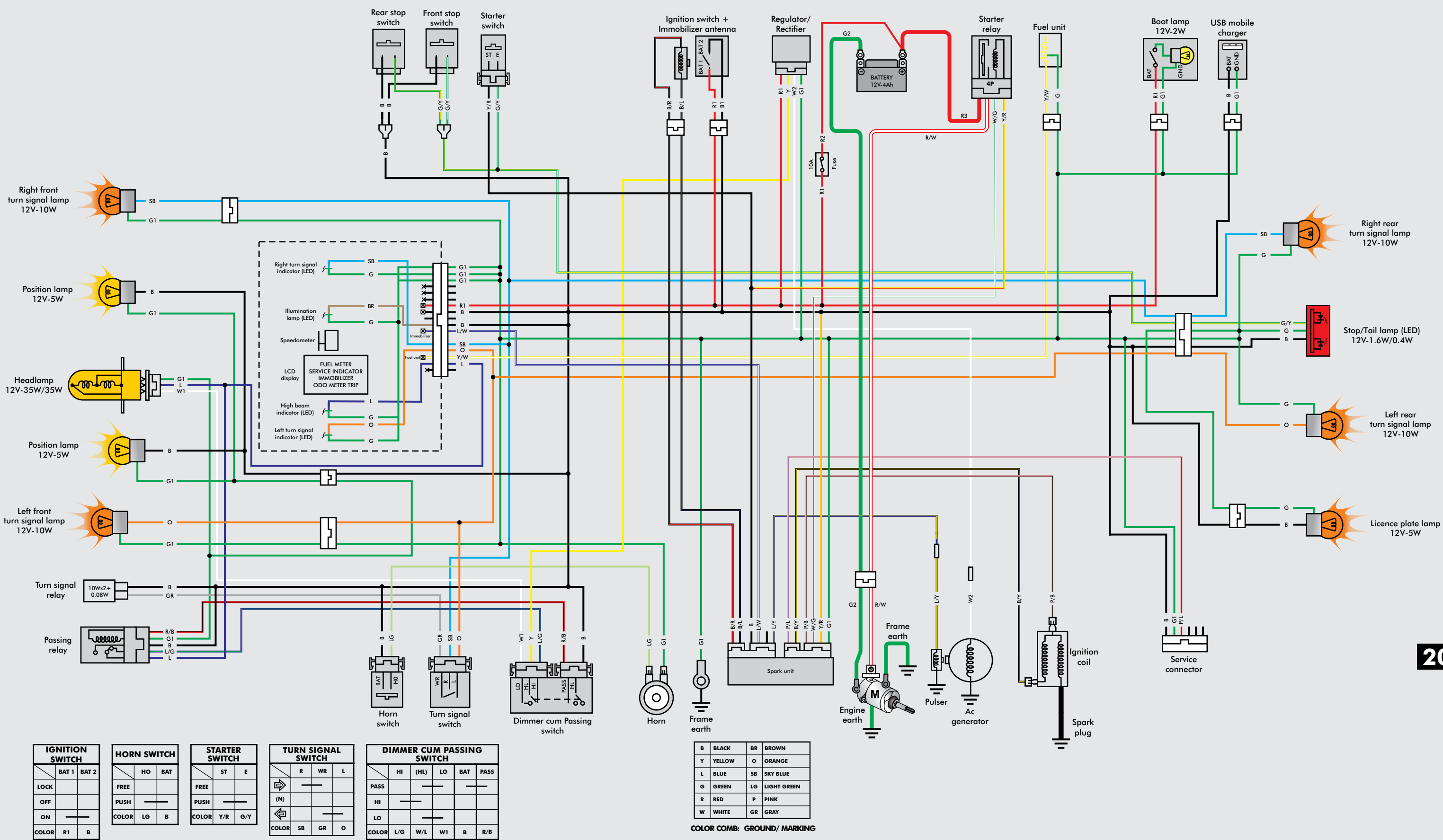
If continuity is not observed then replace the wire harness.

If continuity is observed then replace the fuel unit.

Installation is in the reverse order of removal.



20. WIRING DIAGRAM





# 21. TROUBLESHOOTING

<b>Engine Will Not Start or is Hard to Start</b>	<b>21-1 Poor Performance at High Speed</b>	<b>21-4</b>
<b>Engine Lacks Power</b>	<b>21-2 Poor Handling</b>	<b>21-4</b>
<b>Poor Performance at idle and Low Speeds</b>	<b>21-3</b>	

## ENGINE WILL NOT START OR IS HARD TO START

### PROBABLE CAUSE

1. Check the fuel flow to _____ Carburetor Reaching carburetor	Not reaching to carburetor _____	<ul style="list-style-type: none"><li>• No fuel in fuel tank</li><li>• Clogged fuel line</li></ul>
2. Remove and inspect spark plug Dry plug	Wet plug _____	<ul style="list-style-type: none"><li>• Faulty spark plug</li><li>• Fouled spark plug</li><li>• Faulty spark unit</li><li>• Faulty pulse generator</li><li>• Broken or shorted spark plug wire</li><li>• Faulty ignition coil</li><li>• Faulty ignition switch</li><li>• Poorly connected broken or shorted ignition system wires</li></ul>
3. Test cylinder compression Compression normal Normal compression	Low compression _____	<ul style="list-style-type: none"><li>• Incorrect valve seat contact</li><li>• Valve clearance too small</li><li>• Valve stuck open</li><li>• Worn cylinder and piston rings</li><li>• Damaged cylinder head gasket</li><li>• Seized valve</li><li>• Improper valve timing</li></ul>
4. Start by following normal starting procedure Engine does not start	Engine starts but soon stops _____	<ul style="list-style-type: none"><li>• Air leaking past carburetor insulator</li><li>• Misadjusted idle speed</li><li>• Clogged carburetor</li><li>• Improper ignition timing</li><li>• Fuel/air mixture too lean</li></ul>
5. Remove and check spark plug Dry spark plug	Wet spark plug _____	<ul style="list-style-type: none"><li>• Carburetor bystarter excessively closed</li><li>• Flooded carburetor</li><li>• Fuel/air mixture too rich</li><li>• Dirty air cleaner element</li></ul>
6. Start with bystarter applied		

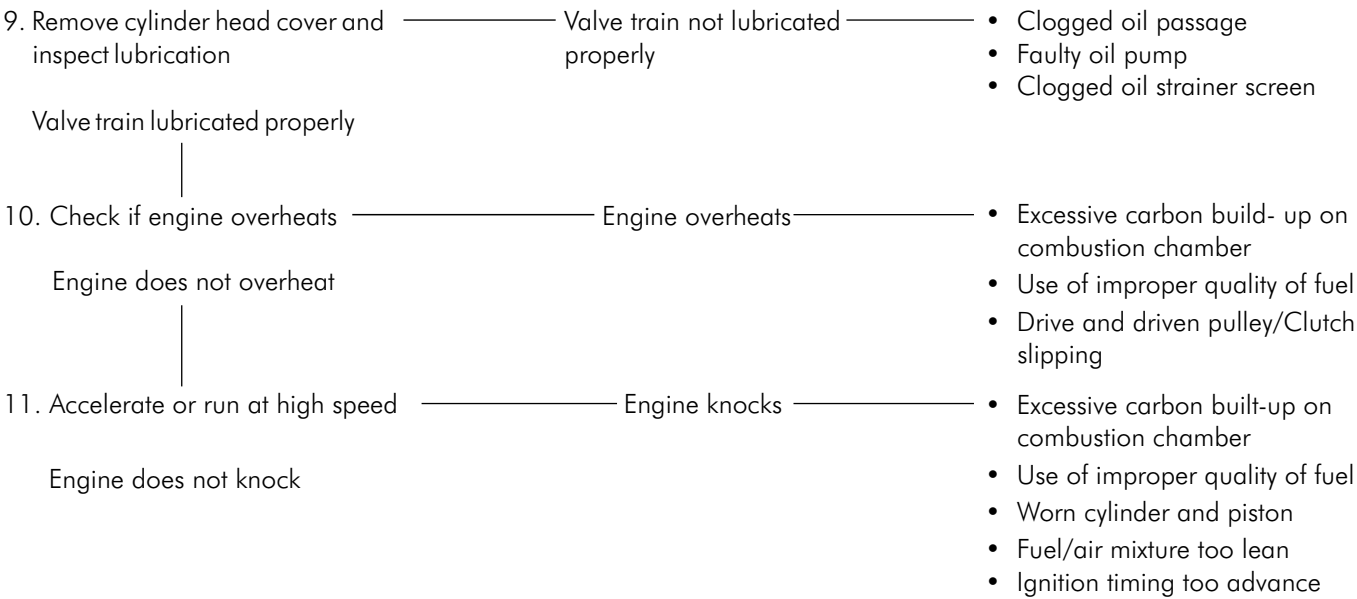
# TROUBLESHOOTING

## ENGINE LACKS POWER

### PROBABLE CAUSE

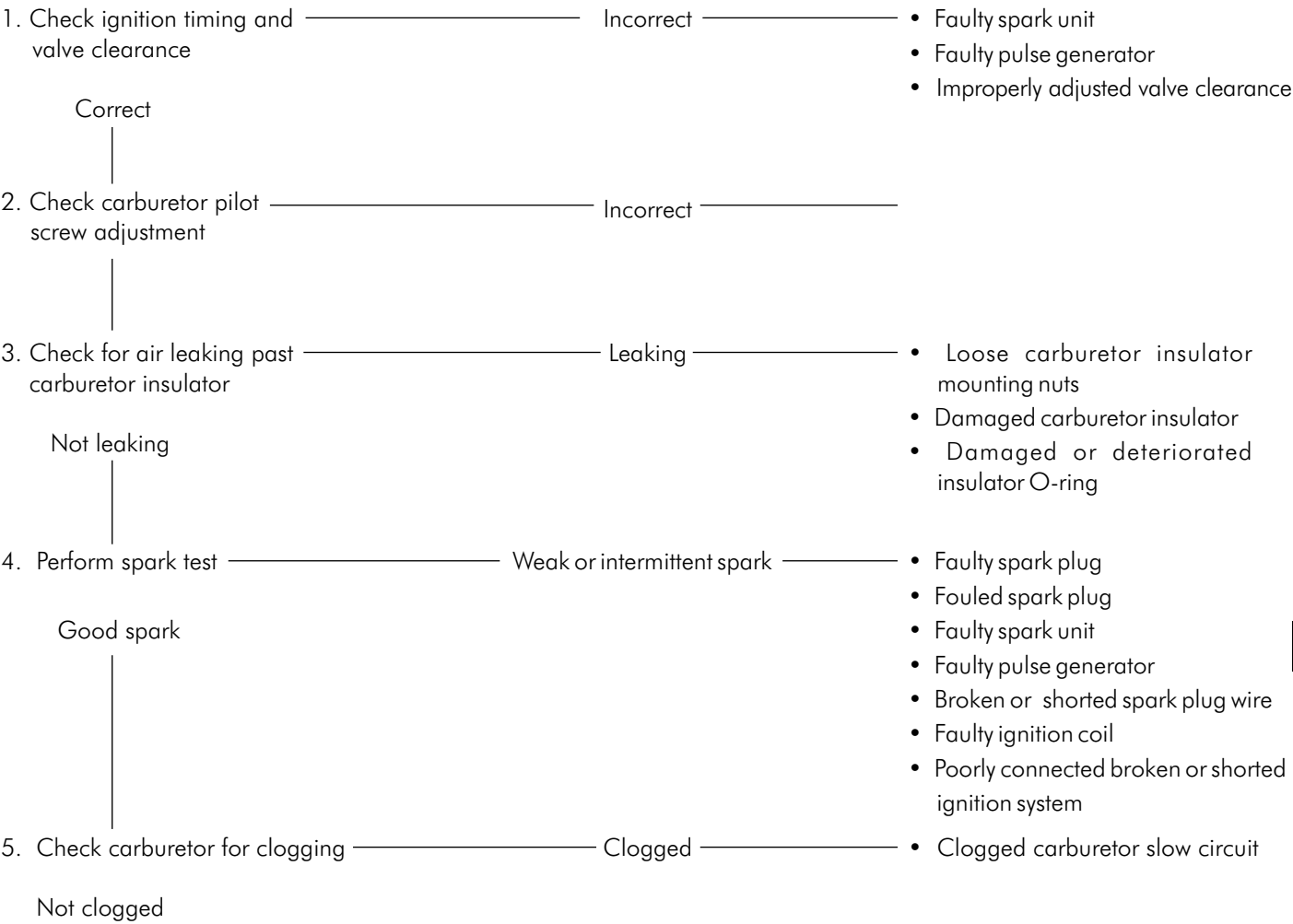
1. Raise wheels off the ground and spin by hand	Wheels do not spin freely	<ul style="list-style-type: none"><li>• Brake dragging</li><li>• Worn out or damaged wheel bearing</li><li>• Wheel bearing needs lubrication</li></ul>
wheels spin freely		
2. Check tyre pressure	Pressure too low	<ul style="list-style-type: none"><li>• Punctured tyre</li><li>• Faulty tyre valve</li></ul>
Normal pressure		
3. Lightly accelerate engine	Engine speed does not increase sufficiently	<ul style="list-style-type: none"><li>• Fuel/air mixture too rich or lean</li><li>• Clogged air cleaner</li><li>• Restricted fuel flow</li><li>• Clogged fuel tank cap breather hole</li><li>• Clogged muffler</li></ul>
Engine speed increases		
4. Check ignition timing	Incorrect	<ul style="list-style-type: none"><li>• Faulty spark unit</li><li>• Faulty pulse generator</li><li>• Improperly installed pulse generator</li></ul>
Correct		
5. Test cylinder compression	Low compression	<ul style="list-style-type: none"><li>• Incorrect valve seat contact</li><li>• Valve clearance too small</li><li>• Worn cylinder and piston rings</li><li>• Damaged cylinder and piston rings</li><li>• Seized valve</li><li>• Improper valve timing</li></ul>
Normal compression		
6. Check carburetor for clogging	Clogged	<ul style="list-style-type: none"><li>• Carburetor not serviced frequently enough</li></ul>
Not clogged		
7. Remove and check spark plug a compression gauge	Fouled or discoloured	<ul style="list-style-type: none"><li>• Spark plug not serviced frequently enough</li><li>• Use of spark plug with improper heat range</li></ul>
Good condition		
8. Remove oil level gauge and check oil level	Incorrect	<ul style="list-style-type: none"><li>• Oil level too high</li><li>• Oil level too low</li><li>• Contaminated oil</li></ul>
Correct		

# TROUBLESHOOTING



## POOR PERFORMANCE AT IDLE AND LOW SPEEDS

### PROBABLE CAUSE



# TROUBLESHOOTING

## POOR PERFORMANCE AT HIGH SPEEDS

		PROBABLE CAUSE
1. Check ignition timing	Incorrect	<ul style="list-style-type: none"><li>Faulty spark unit</li><li>Faulty pulse generator</li><li>Improperly installed pulse generator</li></ul>
Correct		
2. Disconnect fuel line at carburetor	Fuel flow restricted	<ul style="list-style-type: none"><li>Lack of fuel in fuel tank</li><li>Clogged fuel line</li><li>Clogged fuel strainer screen</li><li>Clogged fuel tank cap breather hole</li></ul>
Fuel flow freely		
3. Check the carburetor jets for clogging	Clogged	<ul style="list-style-type: none"><li>Clogged carburetor jets (Clean them)</li></ul>
Not clogged		
4. Check valve timing	Incorrect	<ul style="list-style-type: none"><li>Improperly installed cam sprocket</li></ul>
Correct		
5. Check valve spring	Weak	<ul style="list-style-type: none"><li>Faulty valve spring</li></ul>
Normal		
5. Check bystarter	Abnormal	<ul style="list-style-type: none"><li>Replace</li></ul>
Normal		

## POOR HANDLING

	PROBABLE CAUSE
1. If steering is heavy	<ul style="list-style-type: none"><li>Check tire pressure</li><li>Steering bearing adjustment nut too tight</li><li>Damaged steering head bearing</li></ul>
2. If either wheel is wobbling	<ul style="list-style-type: none"><li>Excessive wheel bearing play</li><li>Bent rim</li><li>Loose engine mounting bolt</li><li>Excessively worn engine mounting bushing</li><li>Bent frame</li></ul>
3. If scooter pulls to one side	<ul style="list-style-type: none"><li>Front and rear wheels not aligned</li><li>Bent fork</li><li>Bent frame</li></ul>