Service Manual

Classic 500 & 350

SECTION

ONE 01

INTRODUCTION

Foreword

PREPARATION FOR SERVICE

Good preparation is very important for carrying out correct service job. The motorcycle should be cleaned well before starting a repair job. Cleaning will occasionally uncover sources of trouble. Availability of tools, measuring instruments and parts should be ensured before commensing an overhaul, since Interruption to locate tools or parts can cause distraction and needless delay. Use of special tools will ensure a quality service.

USE OF GENUINE SPARE PARTS

Use only genuine Royal Enfield spares whenever replacing parts. Use of non genuine parts can seriously affect motorcycle performance and may result in costly rework, vehicle down time and above all customer dissatisfaction.

NOTE :

Proper service and repair is important for the safe and reliable operation of all mechanical products. The service procedures recommended and detailed in this manual will help to carry out correct repairs.

SAFETY

Every care is taken to ensure that the information given in this manual is correct at the time of going to print. However, Royal Enfield does not assume responsibility for any damage, loss or injury caused to the vehicle or to the person carrying out repairs, due to errors or omissions in this manual.

IMPORTANT NOTICE

All images shown are only for reference to explain and may not be exactly the same on the motorcycle. Technical specifications are subject to change without prior notice.

Because of changes that may occur in the manufacturing process, since this manual was printed, it is possible some instructions or illustrations found within this manual may differ from those found on the vehicle. However the technical information found within this manual is correct at the time, when it was approved for printing.

Future modifications, improvements etc will be communicated to our Authorised Distributors / Importers as and when changes are done to the motorcycle.

Contents

HOW TO USE YOUR SERVICE MANUAL

Pictorial presentation of various activities, make this manual easy to understand and user friendly.

This service manual is divided into 10 Sections 01 to 10. Page numbers for each section starts with 01. Thus, page 05-10 indicates 10th page of section 5.

The sections are subdivided into subjects and presented in the following order.

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Four stroke cycle operation

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Auto Chain Tensioner Assembly

Engine breather System

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Blow up Charts

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- Unidirectional fittings list
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SECTION SIX 06 ENGINE MANAGEMENT SYSTEM (EMS)

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Function of components

Identification of a malfunction identification of EMS

Instruction Do's & Dont's on EMS

Trouble shooting - EMS

SECTION SIX 07 CV CARBURETOR

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Assembling procedure of Carburetor

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Trouble Shooting

Contents

SECTION

TWO 02

GENERAL

Salient Features of the Unit Construction Engine & Engine Management System

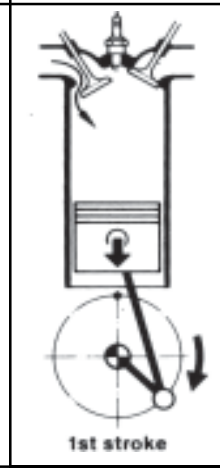
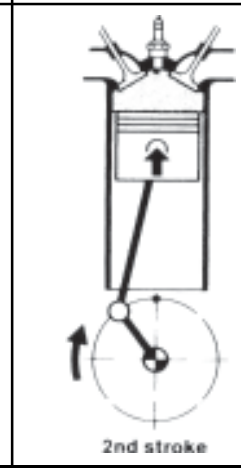
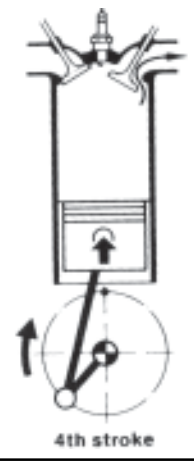
UNIT CONSTRUCTION ENGINE

- HIGH TORQUE ENGINE
- ENHANCED POWER DELIVERY
- HYDRAULIC TAPPETS
- AUTO DECOMPRESSOR
- AUTO CHAIN TENSIONER FOR PRIMARY CHAIN
- HIGH CAPACITY TRACHOIDAL OIL PUMP FOR BETTER LUBRICATION

ELECTRONIC FUEL INJECTION SYSTEM

- IMPROVED ACCELERATION & HIGH SPEED CRUISING
- EXCELLENT COLD STARTING ABILITY
- ACCURATELY CONTROLLED, AIR FUEL MIXTURE & IGNITION TIMING BY THE ENGINE CONTROL UNIT
- IMPROVED PERFORMANCE AND FUEL EFFICIENCY THRO FUEL INJECTION SYSTEM.

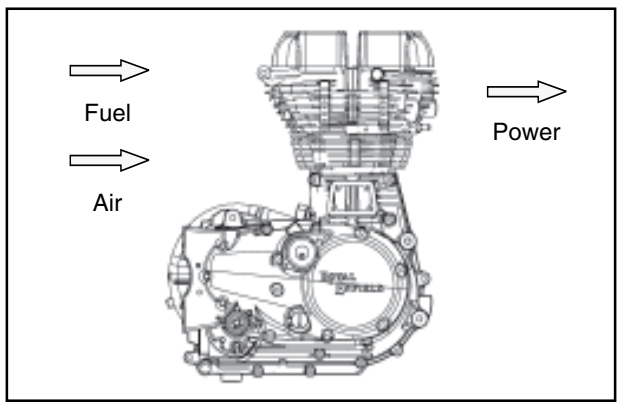
FOUR STROKE CYCLE OPERATION

	SUCTION STROKE	**COMPRESSION STROKE**	**POWER STROKE**	**EXHAUST STROKE**
Inlet Valve	Open	Closed	Closed	Closed
Exhaust Valve	Closed	Closed	Closed	Open
Piston Movement	TDC to BDC	BDC to TDC	TDC to BDC	BDC to TDC
Gas Flow	Air Petrol mixture is drawn into cylinder	Air Petrol mixture gets compressed. Few degrees before BTDC, spark plug produces spark.	Air petrol mix. burns, gas expands. Piston is pushed down.	Exhaust gas flows out.
	 1st stroke	 2nd stroke	 3rd stroke	 4th stroke

Basic Terminology of IC Engines

ENGINE :

The Engine converts Chemical energy availbale in petrol into heat energy then to mechanical energy for motion. It is the powerplant of the vehicle where the power is generated for moving the vehicle.



BORE :

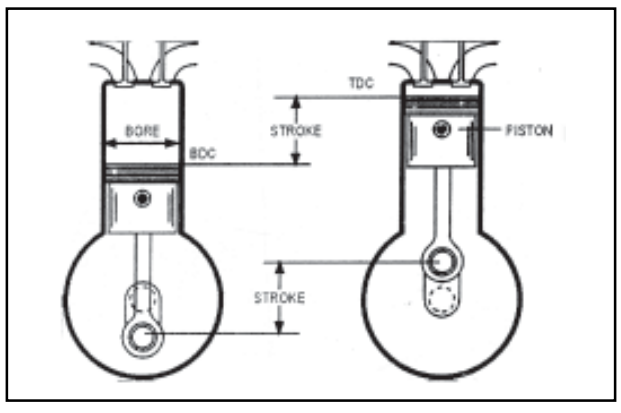
Bore is the inside diameter of the cyclinder block in which Piston moves up and down.

TDC :

TDC stands for Top Dead Center. It is the top most position to which the piston can travel in the cylinder barrel.

BDC :

BDC stands for Bottom Dead Center. It is the bottom most position to which the piston can travel in the cylinder barrel.



STROKE :

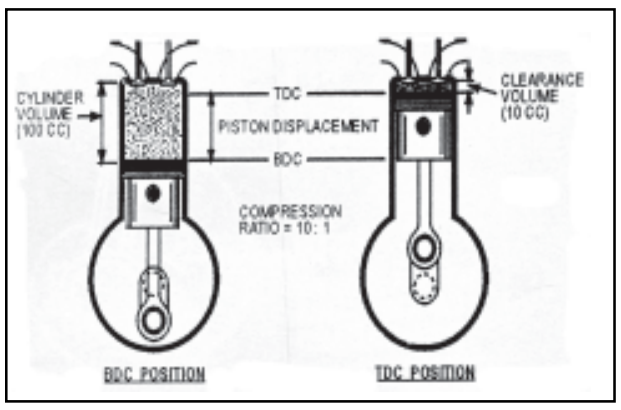
It is a distance travelled by piston from TDC to BDC or Vice Versa.

CUBIC CAPACITY / DISPLACEMENT :

It is a volume generated by piston when it travels from TDC to BDC. It is measured as Cubic Centimeter (CC). It can be mathematically arrived at with the radious of the piston and the stroke of the engine. ($pr^2 \times l$, when 'r' is the radius of the piston and 'l' is the length of the stroke, & p is a constant equal to 3.14). It is also known as Swept Volume or Displacement volume of the engine.

CLEARANCE VOLUME :

It is the nominal volume or the space available above the piston when the piston is at the topmost position (TDC).



Basic Terminology of IC Engines

TOTAL VOLUME :

It is the sum of the swept voume (Displacement volume) and Clearance volume.

Total Volume = Swept volume + Clerance volume.

COMPRESSION RATIO :

It is a ratio between total volume in the engine to the clearance volume available at the end of compression stroke.

$$\text{Compression ratio} = \frac{\text{Total volume of air fuel mixture}}{\text{Clearance volume}}$$

VOLUMETRIC EFFICIENCY :

Volumetric efficiency is the ratio between the volume of air fuel mixture that actually enters the cylinder and Swept volume.

$$\text{Volumetric Efficiency} = \frac{\text{Volume of air fuel mixture inhaled during suction stroke}}{\text{Swept volume}}$$

HORSE POWER (HP OR PS) :

HP : Horse Power

PS : PFERDESTARKE is German unit of power. Horse Power is the ability of the engine to do a certain amount of work in a given time.

One Horse power is the power required for lifting a weight of 75 Kg. through vertical distance of one meter in one second.

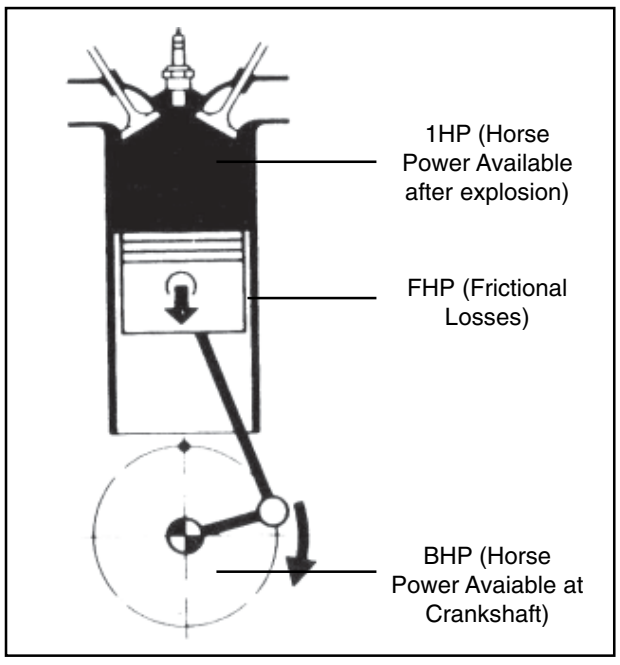
Conversion :

1PS = 0.986 HP = 0.735 KW
1 HP = 1.014 PS = 0.744 KW
1KW = 1.360 PS = 1.340 HP

Basic Terminology of IC Engines

IHP :

IHP stands for Indicated Horse Power. Indicated Horse Power is the power actually developed inside the engine cylinder by combustion process. It is utilised to drive the piston.



FHP :

FHP stands for Frictionl Horse Power.

It is the amount of horse power used or lost to overcome the friction between various moving components of the engine.

BHP :

BHP stands for Brake Horse Power

Brake Horse Power is the amount of Power actually available at the crankshaft or output shaft. It is calculated by using dynamometer.

BHP = IHP - FHP

Mechanical Efficiency :

Mechanical Efficiency is the ratio between Brake horsepower and Indicated horse power.

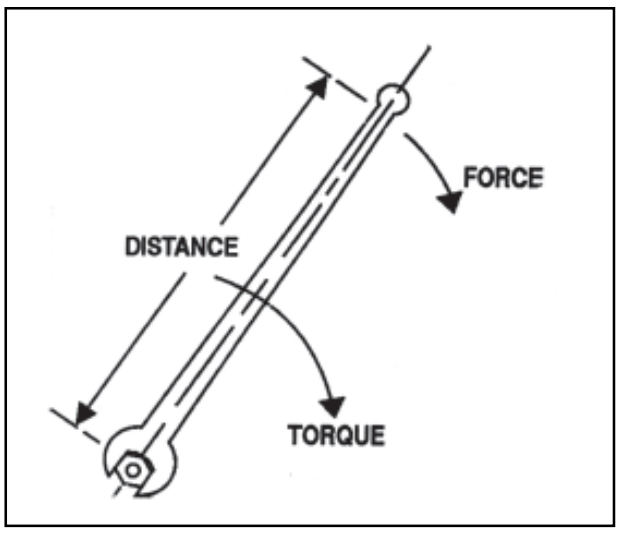
$$\frac{\text{Brake horsepower}}{\text{Indicated Horse power}} = \frac{\text{BHP}}{\text{IHP}}$$

TORQUE :

Torque is a twisting or turning force or effort. It is the product of a distance and force in circular motion.

In the picture shown the torque-applied is the product of distance (distance between the center of the bolt and point where force is acting) and the amount of force applied.

With the same force, if the distance is increased, the torque will also increase and if distance is reduced, torque applied will also be reduced.



CONVERSION :

1kg-m = 7.23 lb.ft = 9.81 N-m.

1lb.ft = 0.138 Kg-m = 1.356 N-m.

1 N-m = 0.102 Kg-m = 0.737 lb.ft

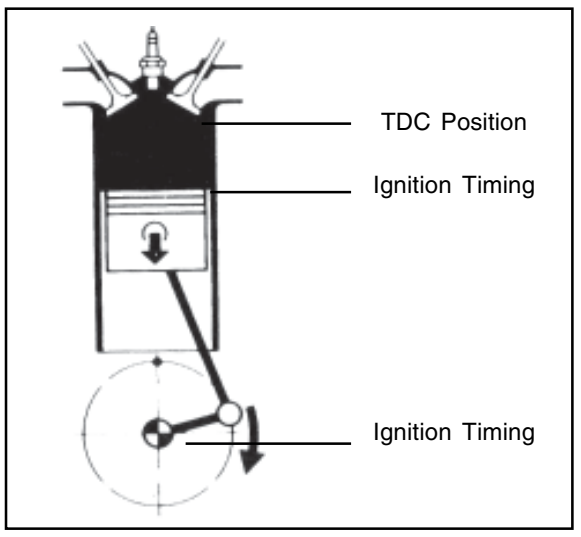
Basic Terminology of IC Engines

IGNITION TIMING :

Ignition timing is the timing in degrees of rotation of crank shaft at which spark commences so that the spark from the spark plug can ignite the mixture in the combusion chamber at the end of TDC during compression stroke.

If spark occurs earlier than specified ignition timing, it is called “Advance” timing.

If spark occurs after the specified ignition timing, it is called “Retard” timing.



IDLING SPEED :

It is the speed of the crankshaft (i.e. RPM) of the engine when the throttle is in closed position.

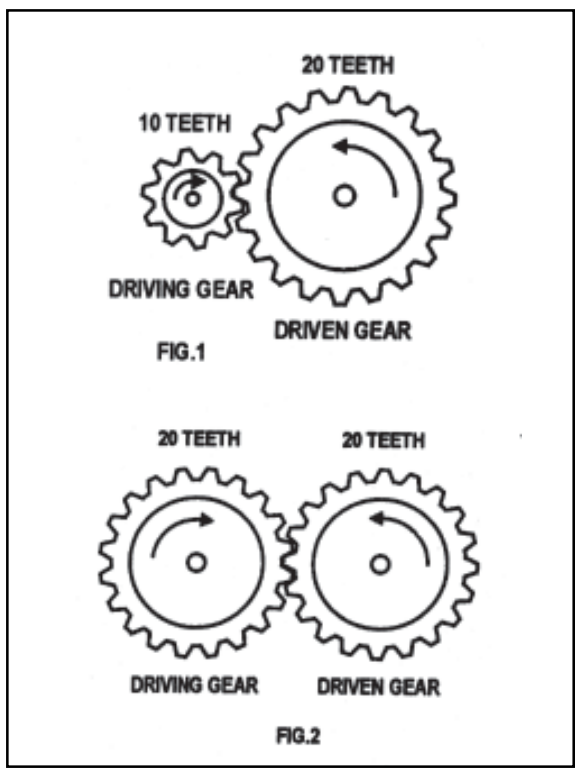
Gear ratio :

The relative rotation between “Driven Gear” and “Driving Gear” is known as the “Gear Ratio”. It is determined by number of teeth on the respective gears.

$$\text{Gear Ratio} = \frac{\text{No. of teeth of Driven Gear}}{\text{No. of teeth of Driving Gear}}$$

In Fig. 1, the Gear ratio is 20 ¸ 10 = 2 : 1

In Fig. 2, the Gear ratio is 20 ¸ 20 = 1 : 1



Gear ratios multiply the engine torque to fulfil various demands for pulling the vehicle like.

- More effort is required during initial movement of the vehicle.
- More effort is required to climb an elevation.
- More effort is required while driving in muddy or sandy surfaces etc.

FINAL DRIVE RATIO :

It is a relative rotation between the engine sprocket and the sprocket on the rear wheel. Both the sprockets are connected through drive chain.

Final drive ratio further multiplies the torque available at the output shaft of the gear box.

Technical Specifications

A.	ENGINE AND ENGINE SYSTEMS		
		CLASSIC 500	**CLASSIC 350**
1.	Engine Type	4 Stroke Single Cyl., Air cooled	4 Stroke Single Cyl. Air cooled
2.	Bore	84mm	70mm
3.	Stroke	90mm	90mm
4.	Displacement	499cc	346cc
5.	Compression ratio	8.5:1	8.5:1
6.	Max Power @ rpm	27.2 HP @ 5250 rpm	19.6 HP @ 5250 rpm
7.	Max Torque @ rpm	41.3 Nm @ 4500 rpm	28 Nm @ 4000 rpm
8.	Idle rpm	1050 ± 200 rpm	1050 ± 200 rpm
9.	Starting	Kick & Electric Start	Kick & Electric Start
10.	Air filter element	Paper element	Paper element
11.	Lubrication	Forced Lubrication, Wet Sump	Forced Lub., Wet Sump
12.	Engine oil tank capacity	2.75 litres	2.75 litres
13.	Engine oil grade	MOTUL 3000 4T Plus 15W50 API SL JASO MA	MOTUL 3000 4T Plus 15W50 API SL JASO MA
14.	Cooling	Natural air flow	Natural air flow
B.	**TRANSMISSION**		
1.	Clutch	Wet multiplate (7 Friction Plates & 6 Steel Plates)	Wet multiplate(6 Friction Plates & 5 Steel Plates)
2.	Primary drive	3/8” Duplex chain & sprocket	3/8” Duplex chain & sprocket
3.	Primary ratio	2.15 : 1	2.15 : 1
4.	Gear box	5 Speed Constant Mesh	5 Speed Constant Mesh
5.	Overall Ratio		
	1^{st}	3.063 : 1	3.063 : 1
	2^{nd}	2.013 : 1	2.013 : 1
	3^{rd}	1.522 : 1	1.522 : 1
	4^{th}	1.212 : 1	1.212 : 1
	5^{th}	1:1	1:1
6.	Secondary drive	5/8” Chain & Sprocket	5/8” Chain & Sprocket
7.	Secondary ratio	2.235 : 1	2.375 : 1
8.	Drive Chain links	102 Links	100 Links

Technical Specifications

C.	CHASSIS		
		CLASSIC 500	**CLASSIC 350**
1.	Frame	Tubular	Tubular
2.	Front Suspension	Telescopic, hydraulic damping, Stroke 130 mm	Telescopic, hyd. damping, Stroke 130 mm
3.	Rear Suspension	Swing arm with gas shock absorbers	Swing arm with gas shock absorbers
4.	Fr. Fork oil capacity	195 cc per leg	195 cc per leg
5.	Front fork oil	1F Endurance Fork Oil	1F Endurance Fork Oil
6.	Front Brake	Hydraulic, Hand operated, 280 mm dia ventilated disc	Hydraulic, Hand operated, 280 mm dia ventilated disc
7.	Rear Brake	Mechanical, Foot operated, 153 mm internal expanding	Mechanical, Foot operated, 153 mm internal expanding
8.	Brake Oil Capacity	60 ml	60 ml
9.	Brake Oil Grade	DOT 3 or DOT 4	DOT 3 or DOT 4
10.	Tyre size :	Front 90/90 - 18" - 51 P	Front 3.25X19 - 4PR/6PR
		Rear 110/90 - 18" - 61 P	Rear 110/90 - 18" - 61 P
D.	**TYRE PRESSURE**		
1.	Solo :	Front 20 PSI (1.41 kg. / cm^2)	Front 20 PSI (1.41 kg. / cm^2)
		Rear 30 PSI (2.11 kg. / cm^2)	Rear 30 PSI (2.11 kg. / cm^2)
2.	With Pillion :	Front 22 PSI (1.55 kg. / cm^2)	Front 22 PSI (1.55 kg. / cm^2)
		Rear 32 PSI (2.25 kg. / cm^2)	Rear 32 PSI (2.25 kg. / cm^2)
3.	Fuel tank capacity	13.5 litres	13.5 litres
4.	Reserve / Low Fuel Warning	2.5 litres	2 litres approx.
5.	Dead Stock of Petrol (Unusable petrol)	0.75 litres	Not applicable
E.	**ELECTRICALS**		
1.	Generation	Alternator	Alternator
2.	System	12V - DC	12V - DC
3.	Battery	12V - 14 AH MF	12V - 14 AH MF

4.	Spark plug - primary	Mico - WR7 DDC 4	Mico - WR5DC
5.	Spark plug - secondary	Super Bosch UR5DC	Super Bosch UR5DC
6.	Spark plug gap	0.7 to 0.8 mm	0.7 to 0.8 mm
7.	Head lamp	12V, 60/55w	12V, 60/55w
8.	Tail / Brake Lamp	12V 5 / 21W	12V 5 / 21W
9.	Speedometer lamp	12V, 3.4W	12V, 3.4W
10.	Hi beam indicator	12V, 2W	12V, 2W
11.	Neutral lamp Tell tale	12V, 2W	12V, 2W
12.	Turn Signal Tell Tale	12V, 2W	12V, 2W
13.	Turn signal	12V, 10W	12V, 10W
14.	Horn	12V DC	12V DC
15.	Starter Motor	12V, 0.9 KW	12V, 0.7 KW
F.	**WEIGHTS**		
1.	Kerb Weight	187 Kg.	182 Kg
2.	Max pay load	178 Kg	168 Kg
G.	**DIMENSIONS**		
1.	Length	2160 mm	2160 mm
2.	Width	800 mm	800 mm
3.	Height	1050 mm	1050 mm
4.	Wheel base	1370 $\pm$ 20 mm	1370 $\pm$ 20 mm
5.	Ground clearance	135 mm	135 mm
6.	Saddle height	800 mm	800 mm

NOTE :

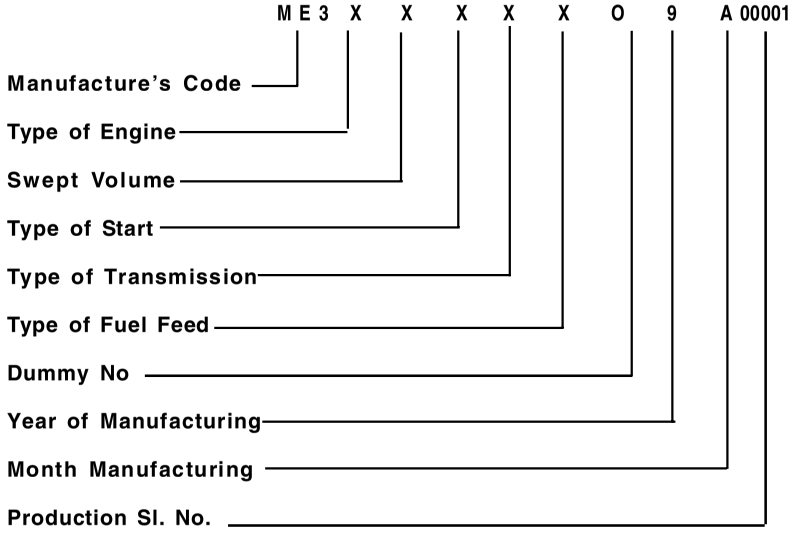
1. Values given above are for your guidelines only
2. In view of continuous improvements, specifications are likely to change without notice

CHASSIS NO.

ENGINENO.

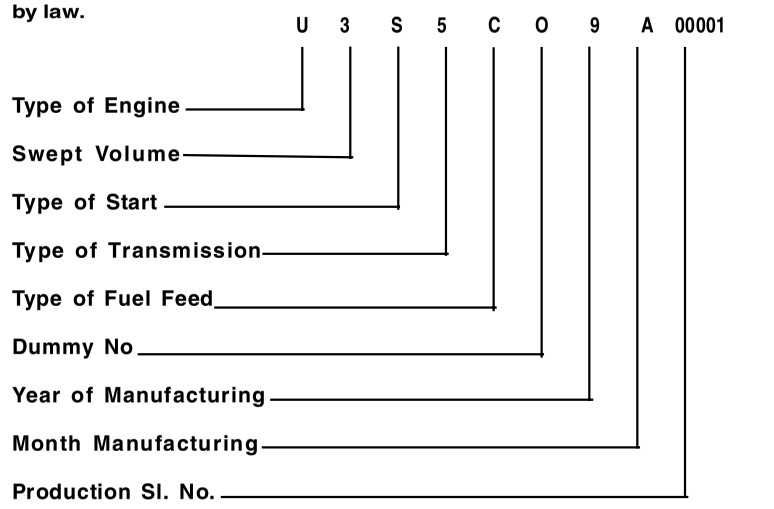
VEHICLE IDENTIFICATION NUMBER -

The VIN is a 17 digit number punched on the right side steering head tube.



ENGINE NUMBER - DETAILS

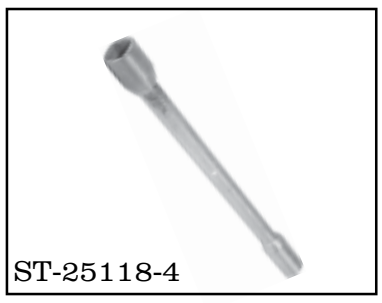
The engine number is punched on the left hand side Crankcase - below the Cylinder barrel. It is the means of identification of the Engine and its production details. Please do not tamper with the number as it is prohibited by law.



List of Special Tools & Its Application

SL. NO.	PART NO.	DESCRIPTION	APPLICATION
1	ST-25118 - 4	Cylinder head nut tightening tool	To remove and tightening of cylinder head nut.
2	ST-25123 - 1	Valve spring compressor	To compress the valve spring for removal and fitting of valve.
3	ST-25612-4	Rotor tightening & loosening tool	To hold magneto rotor while loosening magneto nut.
4	ST-25128 - 2	Puller for magneto rotor	Removal of magneto rotor assy.
5	ST-25592-4	Connecting rod locking tool	To hold connecting rod in its top position.
6	ST-25151-4	Puller for chain case outer	To remove Crankcase LH cover.
7	ST-25591-4	Sprocket & Clutch tightening tool	To hold the clutch housing and sprag sprocket while dismantling & assembly.
8	ST-25594-4	Clutch plate tightening tool	To compress clutch springs while dismantling & reassembling of clutch plates.
9	ST-25153 - 4	Extractor for gear box rocker pivot pin	Removal of rocker shaft spring top pivot pin and camplate pivot pin.
10	ST-25835-2	Front drive sprocket removing tool	To remove FD sprocket on the sleeve gear.
11	ST-25834-2	Front fork dismantling tool	To hold pipe seat of front fork while dismantling main tube with bottom case (fork end assy.)
12	ST-25114-4	Extractor for fork oil seal	To remove oil seal from front fork end assy. (bottom case)
13	ST-25113 - 4	Mandrel for oil seal	Fitment of oil seal in front fork end assy.
14	ST-25112-4	Expander for front fork Oil seal	Expanding the oil seal lip while inserting main tube into bottom case of front fork.
15	ST-25110-3	Gauge plate for tightening chain stay	Alignment of swing arm while mounting / tightening into chassis.
16	ST-25244 - 4	Special spanner adjuster	To adjust gas filled shock absorber spring load.

List of Special Tools & Its Application



ST-25118-4

Cylinder head nut tightening tool

Application : To remove and tightening of cylinder head nut.

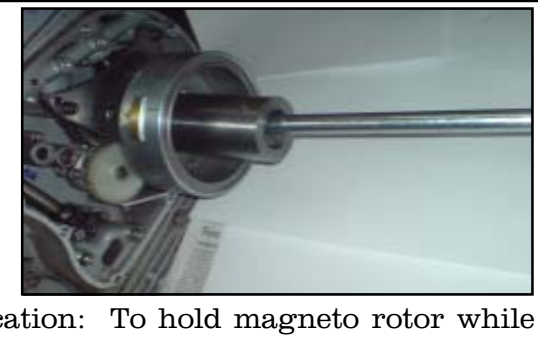
ST-25123-1

Valve spring compressor

Application : To compress the valve spring for removal and fitting of valve.

ST-25612-4

Rotor tightening & loosening Tool



Application: To hold magneto rotor while loosening of magneto nut.

ST-25128-2

Puller Magneto (Rotor Extractor)

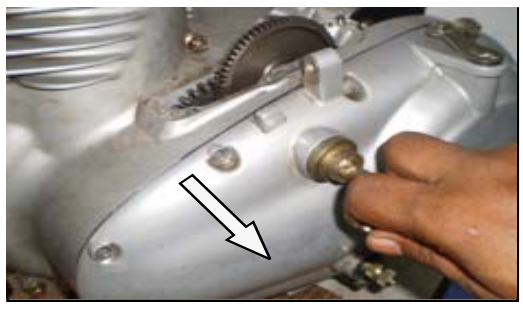
Application : Removal of magneto rotor assy.

List of Special Tools & Its Application

Connecting rod locking tool

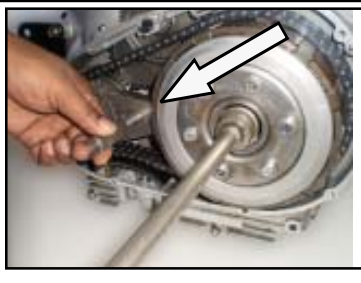
Application : To hold the connecting rod in its top position.

Puller for chain case outer



Application :To remove Crank case LH cover.

Sprocket & clutch tightening tool



Application : To hold Clutch housing & sprag sprocket while dismantling / tightening the Clutch & Sprag Sprocket bolt.

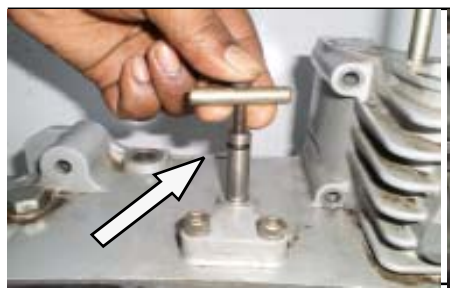
Clutch plate tightening tool

Application : To compress clutch springs while dismantling & reassembling of clutch plates.

List of Special Tools & Its Application

ST-25153-4

Extractor for Gear box rocker pivot pin



Application : To remove gear rocker shaft spring top pivot pin and gear cam plate pivot pin.

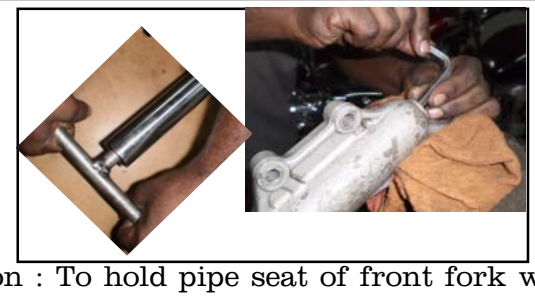
ST-25835-2

FD sprocket removing tool

Application : To remove front drive sprocket from Sleeve Gear.

ST-25834-2

Front fork Dismantling tool



Application : To hold pipe seat of front fork while dismantling & tightening of front fork main tube with bottom case (fork end assy.).

ST-25114-4

Extractor for Fork oil seal

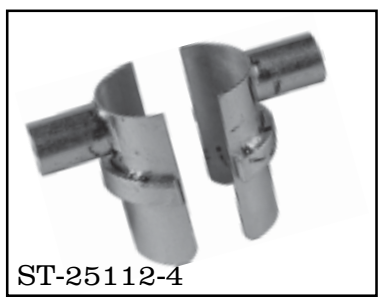
Application : To remove oil seal in front fork bottom case.

List of Special Tools & Its Application

ST-25113-4

Mandrel for oil seal

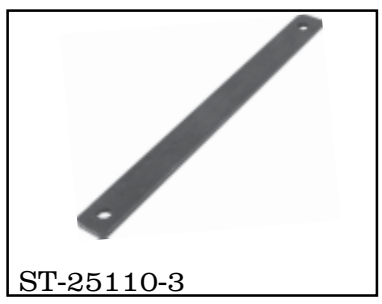
Application : Fitment of oil seal into front fork bottom case.



ST-25112-4

Expander for front fork oil seal

Application : Expanding the oil seal lip while inserting main tube into bottom case of front fork



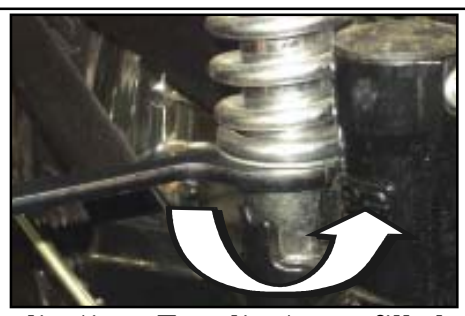
ST-25110-3

Gauge plate for tightening chain stay

Application : Alignment of Swing Arm while mounting / tightening into chassis.

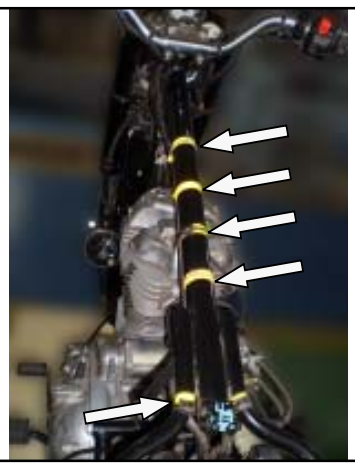
ST-25244-4

Special spanner adjuster



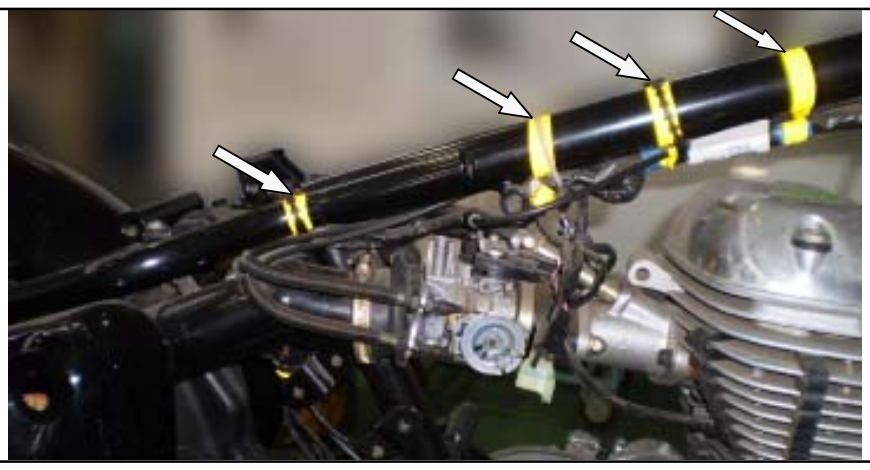
Application :To adjust gas filled shock absorber spring load.

Control Cables & Wiring Harness Routing

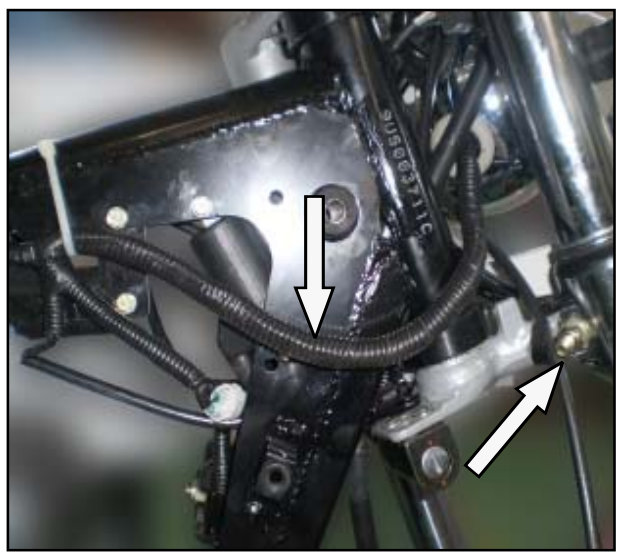


UNDER TANK AND SEAT TOP VIEW

UNDER TANK LH VIEW



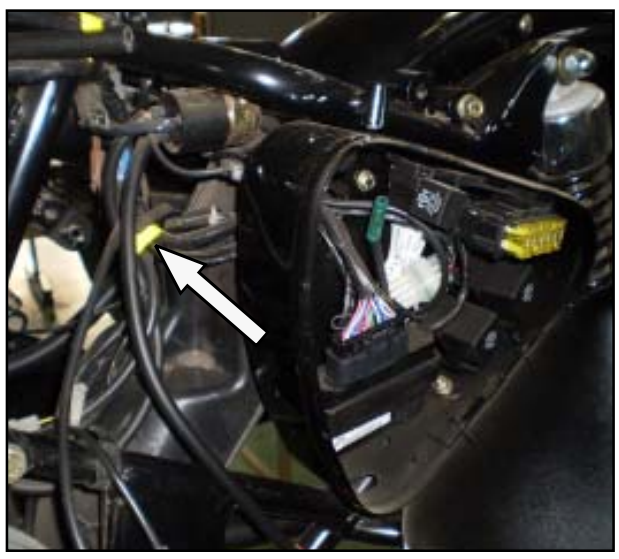
UNDER TANK RH VIEW



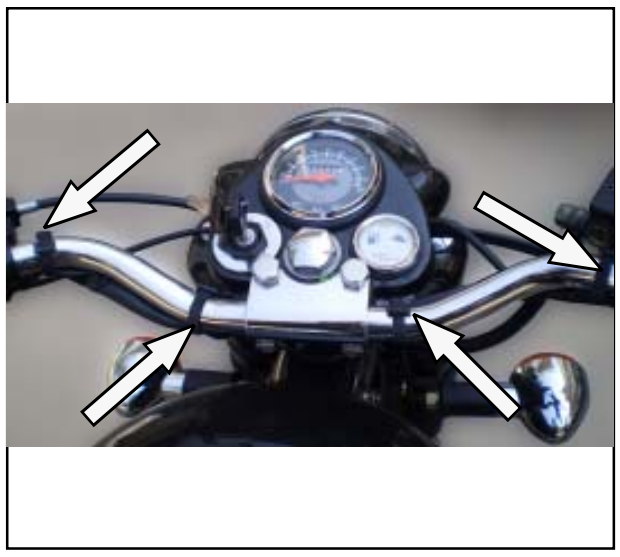
HARNESS ROUTING STEERING RH

MAGNETO WIRES ROUTING

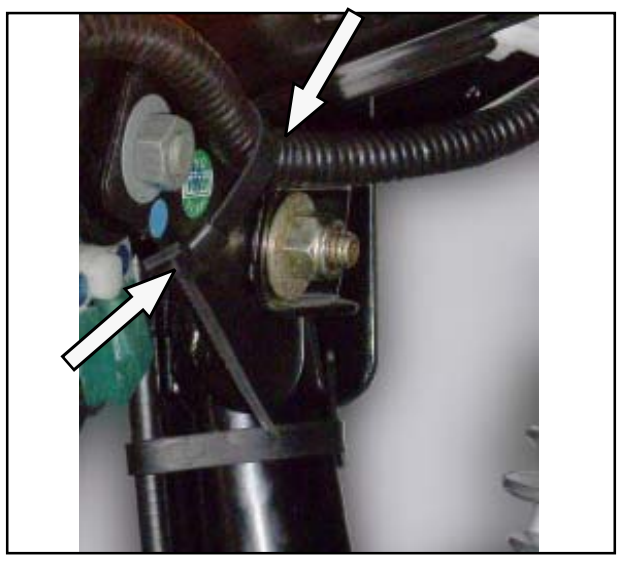
PLUG WIRE ROUTING



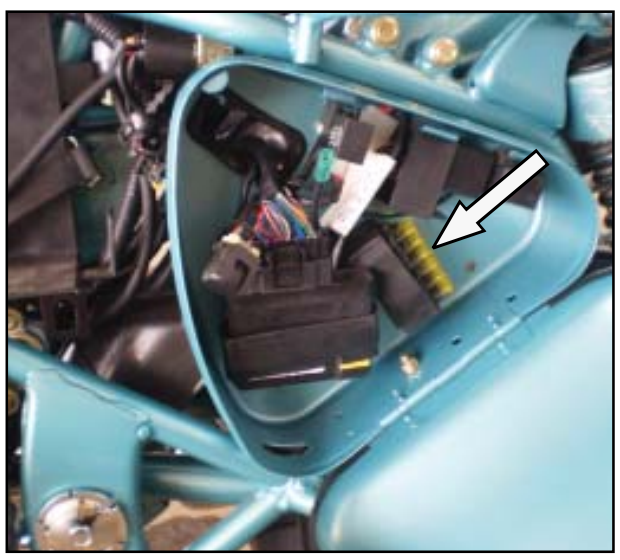
STARTER RELAY CABLE ROUTING



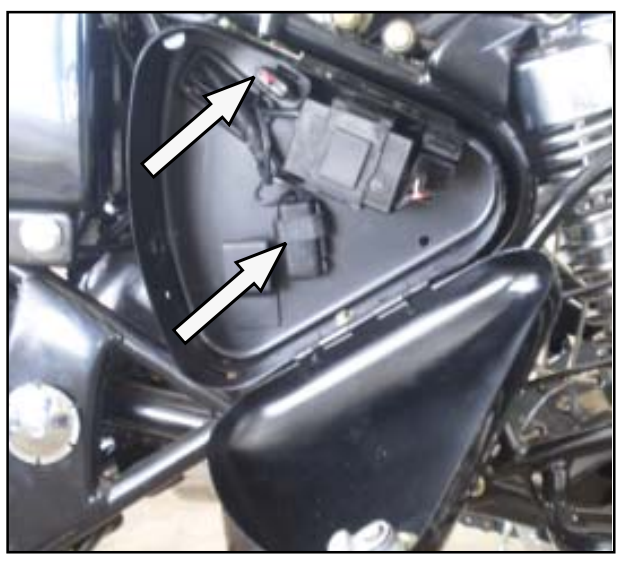
HANDLE BAR INSTRUMENT PANEL & CABLE ROUTING



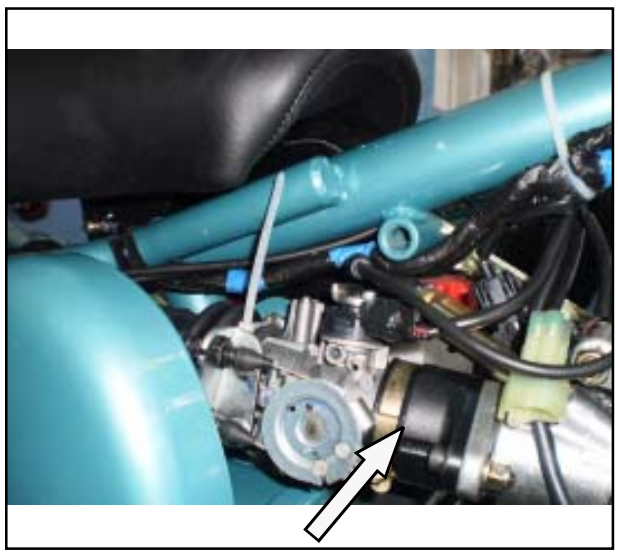
HORN WIRE ROUTING



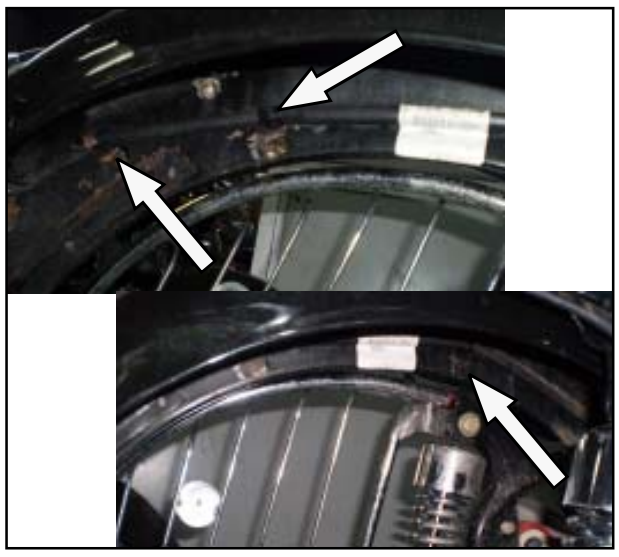
FUSE CARRIERS ARRANGEMENT (CLASSIC 500)



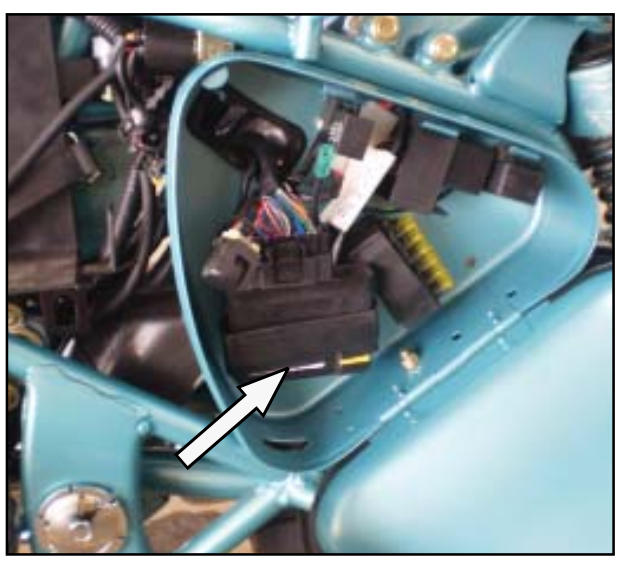
FUSE CARRIERS ARRANGEMENT (CLASSIC 350)



THROTTLE BODY MOUNTING



TAIL LAMP & TRAFFICATOR WIRES ROUTING



ECU MOUNTING (CLASSIC 500)

TCI UNIT MOUNTING (CLASSIC 350)

SECTION

THREE 03

SERVICE DATA

Service Limits of Components (All units in mm unless specified)

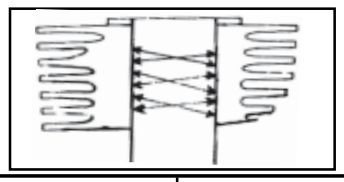
WEAR LIMITS

Wear limits are given as new min, new max and service limits.

New components must be within the limits specified. Components within service limits may be reused after careful inspection. Use of parts beyond service limit can reduce the operating life of the component and may affect the motorcycle performance seriously.

Cylinder bore

Cylinder bore : Point of measurement



	Classic 500	Classic 350
New Min.	84.045	70.00
New Max.	84.075	70.03
Service Limit	84.190	70.10

Ring to groove clearance : Comp. Top rings

	Classic 500	Classic 350
New Min.	0.03	0.04
New Max.	0.07	0.08
Service Limit	0.11	0.12

Piston

	Classic 500	Classic 350
New Min.	83.940	69.94
New Max.	83.970	69.97
Service Limit	83.890	69.87

Ring to groove clearance comp rings - Middle

	Classic 500	Classic 350
New Min.	0.03	0.04
New Max.	0.07	0.18
Service Limit	0.15	0.12

Piston to bore clearance

	Classic 500	Classic 350
New Min.	0.095	0.05
New Max.	0.115	0.07
Service Limit	0.30	0.20

Ring to groove clearance : oil ring

	Classic 500	Classic 350
New Min.	0.06	0.06
New Max.	0.15	0.15
Service Limit	0.21	0.21

Service Limits of Components (All units in mm unless specified)

Piston ring end gap : compression

	Classic 500		Classic 350	
From top	1st	2nd	1st	2nd
New Min.	0.20	0.35	0.15	0.20
New Max.	0.35	0.50	0.3	0.4
Service Limit	0.70	0.85	0.6	0.7

Piston Pin diameter

	Classic 500	Classic 350
New Min.	19.992	19.992
New Max.	19.997	19.997
Service Limit	19.982	19.982

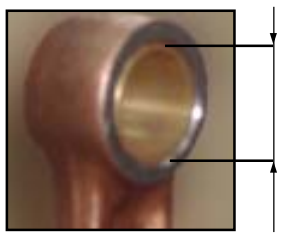
Piston ring end gap - Oil Ring

	Classic 500	Classic 350
New Min.	0.20	0.20
New Max.	0.70	0.70
Service Limit	0.90	0.90

Big end axial play

	Classic 500	Classic 350
New Min.	0.20	0.20
New Max.	0.55	0.55
Service Limit	0.65	0.65

Small end bore inner diameter



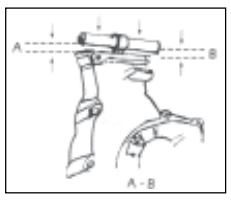
	Classic 500	Classic 350
New Min.	20.007	20.007
New Max.	20.016	20.016
Service Limit	20.046	20.046

Crank shaft : Run out

	Classic 500	Classic 350
New Min.	0.00	0.00
New Max.	0.04	0.04
Service Limit	0.08	0.08

Service Limits of Components (All units in mm unless specified)

Connecting rod bend



	Classic 500	Classic 350
New Min.	0.00	0.00
New Max.	0.05	0.05
Service Limit	0.08	0.08

Valve stem OD (Inlet)

	Classic 500	Classic 350
New Min.	6.965	6.965
New Max.	6.980	6.980
Service Limit	6.955	6.955

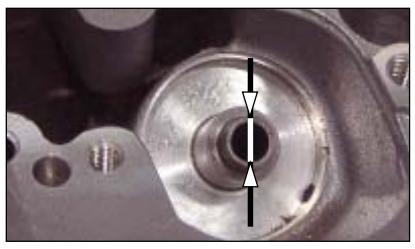
Cylinder Head warpage

	Classic 500	Classic 350
New Min.	0.00	0.00
New Max.	0.05	0.05
Service Limit	0.07	0.07

Valve to guide (inlet) clearance

	Classic 500	Classic 350
New Min.	0.02	0.02
New Max.	0.05	0.05
Service Limit	0.08	0.08

Valve guide bore



	Classic 500	Classic 350
New Min.	7.00	7.00
New Max.	7.015	7.015
Service Limit	7.25	7.25

Valve stem OD (Exhaust)

	Classic 500	Classic 350
New Min.	6.945	6.945
New Max.	6.960	6.960
Service Limit	6.935	6.935

Service Limits of Components (All units in mm unless specified)

Valve to guide (Exhaust) Clearance

	Classic 500	Classic 350
New Min.	0.04	0.04
New Max.	0.07	0.07
Service Limit	1.00	1.00

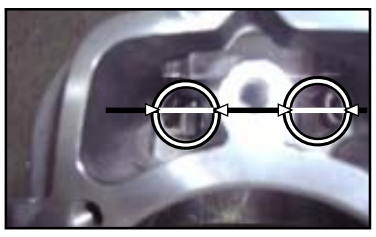
Hydraulic Tappet OD

	Classic 500	Classic 350
New Min.	21.387	21.387
New Max.	21.405	21.405
Service Limit	21.380	21.380

Valve Spring : length

	Classic 500	Classic 350
New Min.	42.80	42.80
New Max.	44.80	44.80
Service Limit	41.50	41.50

Hydraulic Tappet guide bore

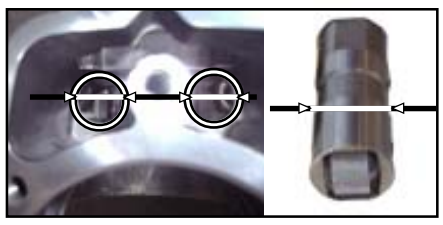


	Classic 500	Classic 350
New Min.	21.417	21.417
New Max.	21.438	21.438
Service Limit	21.450	21.450

Push rod run out

	Classic 500	Classic 350
New Min.	0.00	0.00
New Max.	0.02	0.02
Service Limit	0.05	0.05

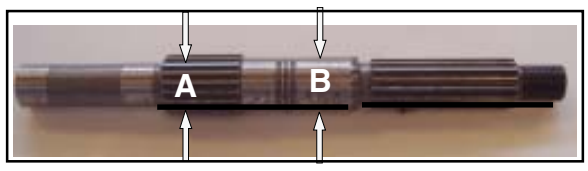
Hydraulic tappet to guide clearance



	Classic 500	Classic 350
New Min.	0.012	0.012
New Max.	0.051	0.051
Service Limit	0.060	0.060

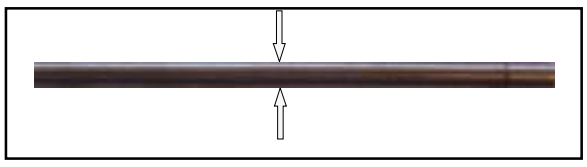
Service Limits of Components (All units in mm unless specified)

Main shaft Outer diameter



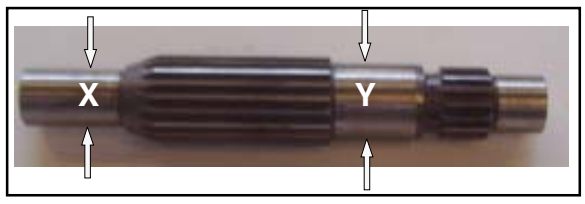
	Classic 500		Classic 350	
Location	A	B	A	B
New Min.	19.99	23.93	19.99	23.93
New Max.	20.00	23.95	20.00	23.95
Service Limit	19.97	23.90	19.97	23.90

Selector fork shaft outer diameter



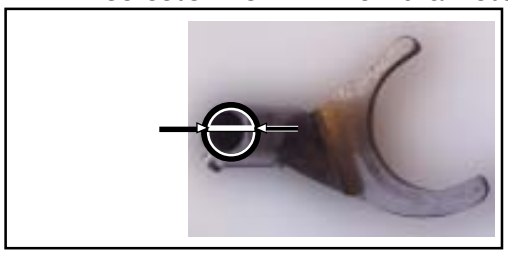
	Classic 500	Classic 350
New Min.	9.96	9.96
New Max.	9.98	9.98
Service Limit	9.94	9.94

Lay shaft Outer diameter



	Classic 500		Classic 350	
Location	X	Y	X	Y
New Min.	17.99	23.95	17.99	23.95
New Max.	18.00	23.97	18.00	23.97
Service Limit	17.97	23.93	17.97	23.93

Selector fork inner diameter

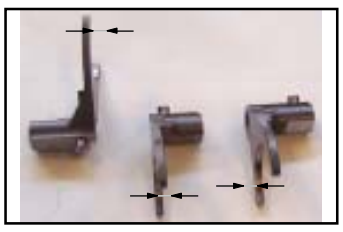


	Classic 500	Classic 350
New Min.	10.00	10.00
New Max.	10.03	10.03
Service Limit	9.98	9.98

Cam plate inner diameter

	Classic 500	Classic 350
New Min.	13.01	13.01
New Max.	13.03	13.03
Service Limit	13.06	13.06

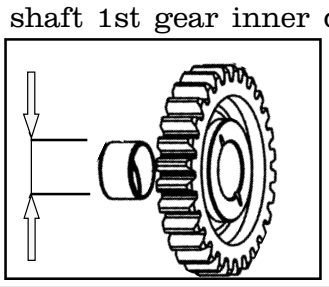
Selector fork lug thikness



	Classic 500	Classic 350
New Min.	3.90	3.90
New Max.	3.95	3.95
Service Limit	3.88	3.88

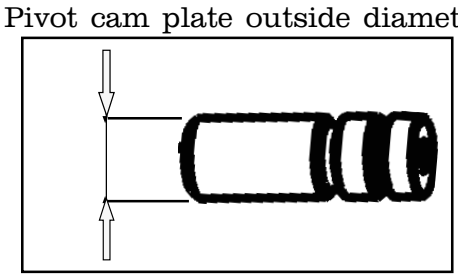
Service Limits of Components (All units in mm unless specified)

Lay shaft 1st gear inner diameter



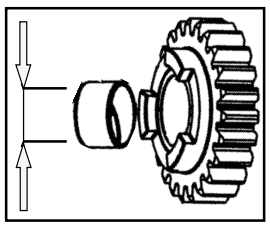
	Classic 500	Classic 350
New Min.	18.03	18.03
New Max.	18.06	18.06
Service Limit	18.09	18.09

Pivot cam plate outside diameter



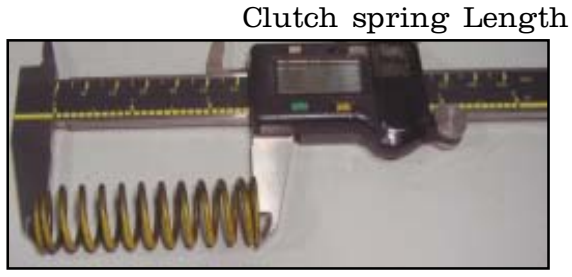
	Classic 500	Classic 350
New Min.	12.98	12.98
New Max.	13.00	13.00
Service Limit	12.96	12.96

Lay shaft 2nd gear inner diameter



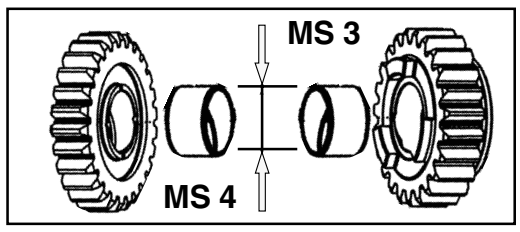
	Classic 500	Classic 350
New Min.	24.00	24.00
New Max.	24.03	24.03
Service Limit	24.06	24.06

Clutch spring Length



	Classic 500	Classic 350
New Min.	64.5	64.5
New Max.	65.5	65.5
Service Limit	60.0	60.0

Main shaft 3rd&4th gear inner diameter



	Classic 500	Classic 350
New Min.	24.00	24.00
New Max.	24.03	24.03
Service Limit	24.06	24.06

Friction plate with insert : thickness

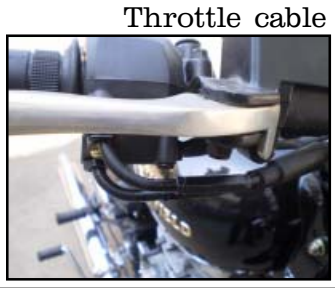
	Classic 500	Classic 350
New Min.	2.95	2.95
New Max.	3.05	3.05
Service Limit	2.60	2.60

Service Limits of Components (All units in mm unless specified)

Clutch steel plate : Distortion

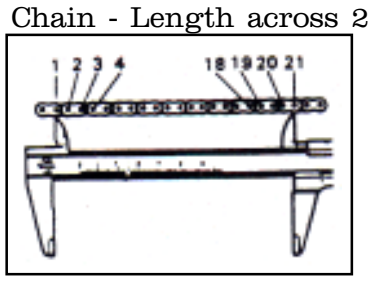
	Classic 500	Classic 350
New Min.	0.00	0.00
New Max.	0.05	0.05
Service Limit	0.10	0.10

Throttle cable free play



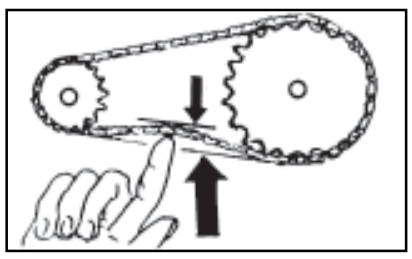
	Classic 500	Classic 350
New Min.	-	-
New Max.	1 mm	1 mm
Service Limit	2 mm	2 mm

Duplex Chain - Length across 21 pins



	Classic 500	Classic 350
New Min.	190.00	190.00
New Max.	191.00	191.00
Service Limit	195.00	195.00

Drive chain : slackness

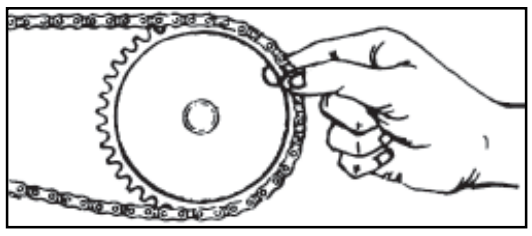


	Classic 500	Classic 350
New Min.	20.00	20.00
New Max.	30.00	30.00
Service Limit	-	-

Clutch cable -Free play

	Classic 500	Classic 350
New Min.	2 mm	2 mm
New Max.	4 mm	4 mm
Service Limit	-	-

Rear Sprocket chain pull off



	Classic 500	Classic 350
New Min.	-	-
New Max.	-	-
Service Limit	5.00	5.00

Service Limits of Components (All units in mm unless specified)

Sprocket

	Classic 500	Classic 350
New Min.	Sharp, bend broken teeth	
New Max.		
Service Limit		

Brake drum rear : Internal dia.

	Classic 500	Classic 350
New Min.	152.40	152.40
New Max.	152.50	152.50
Service Limit	153.50	153.50

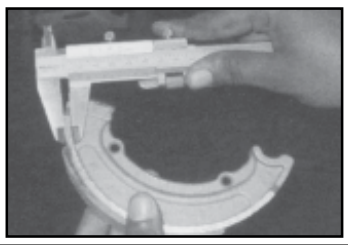
Drive chain length across 21 pins

	Classic 500	Classic 350
New Min.	320	320
New Max.	322	322
Service Limit	328	328

Wheel rim: Face out / Run out

	Classic 500	Classic 350
New Min.	0	0
New Max.	1.0 mm	1.0 mm
Service Limit	2.00 mm	2.00 mm

Brake lining thickness



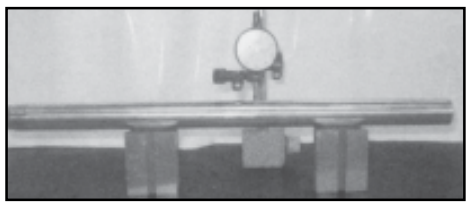
	Classic 500	Classic 350
New Min.	3.80	3.80
New Max.	4.06	4.06
Service Limit	2.00	2.00

Axle shaft : run out

	Classic 500	Classic 350
New Min.	0.00	0.00
New Max.	0.01	0.01
Service Limit	0.02	0.02

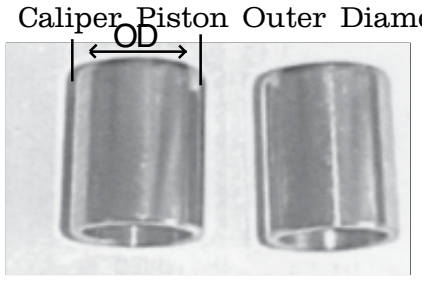
Service Limits of Components (All units in mm unless specified)

Main tube - run out



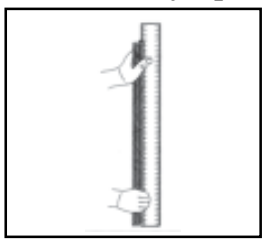
	Classic 500	Classic 350
New Min.	0.00	0.00
New Max.	-	-
Service Limit	0.04	0.04

Caliper Piston Outer Diameter



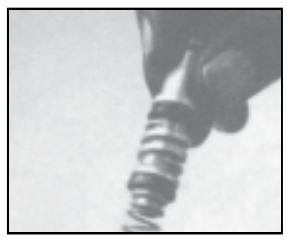
	Classic 500	Classic 350
New Min.	-	-
New Max.	-	-
Service Limit	25.31mm	25.31mm

Front fork assembly spring : length



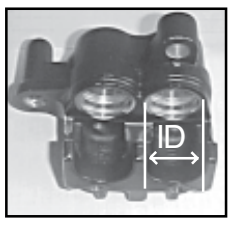
	Classic 500	Classic 350
New Min.	538	538
New Max.	544	544
Service Limit	527	527

Master Cylinder piston OD



	Classic 500	Classic 350
New Min.	-	-
New Max.	-	-
Service Limit	12.64 mm	12.64 mm

Caliper Bore Inner Diameter



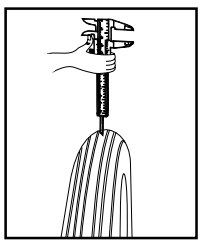
	Classic 500	Classic 350
New Min.	-	-
New Max.	-	-
Service Limit	25.46 mm	25.46 mm

Master Cylinder Bore

	Classic 500	Classic 350
New Min.	-	-
New Max.	-	-
Service Limit	12.76 mm	12.76 mm

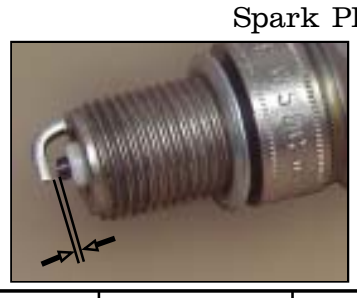
Service Limits of Components (All units in mm unless specified)

Tyre tread : Depth



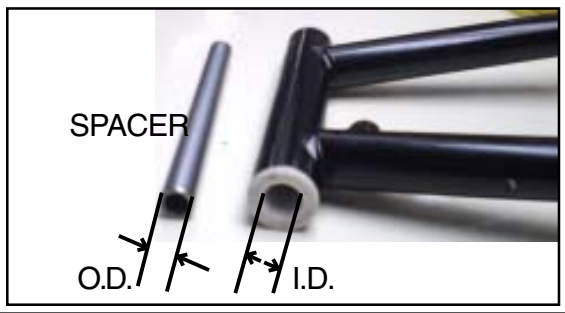
	Classic 500	Classic 350
New Min.	-	-
New Max.	-	-
Service Limit	1.00 mm	1.00 mm

Spark Plug Gap



	Classic 500	Classic 350
New Min.	0.7	0.7
New Max.	0.8	0.8
Service Limit	-	-

Swing Arm bush & spacer



	Classic 500		Classic 350	
Location	Bush after reaming I.D.	Spacer I.D	Bush after reaming I.D.	Spacer I.D
New Min.	18.9	18.7	18.9	18.7
New Max.	19.0	18.8	19.0	18.8
Service Limit	19.5	18.5	19.5	18.5

Periodical Maintenance

The maintenance schedule detailed here will help you maintain your Classic Motorcycles meticulously and to get a long trouble free service. The schedule provided herein is based upon average riding conditions and indicates the Kms at which regular inspections, adjustments, replacements and lubrications are to be carried out. The frequency of the maintenance must be shortened depending upon the severity of the driving condition or if the motorcycle is used in a very dusty environment, severe cold, extreme heat, bad roads, standing water etc., Contact the nearest Royal Enfield Dealer for expert advice and to carry out the required maintenance.

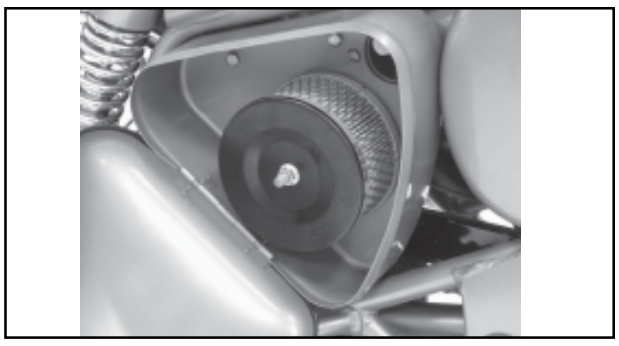
S. No.	DESCRIPTION	FREE SERVICE Whichever is earlier				PAID SERVICE						
	Kms (x 1000)	0.5	3	6	9	12	15	18	21	24	27	30
	Months	1.5	3	6	9							
1	Engine Oil	R	I	R	I	R	I	R	I	R	I	R
		Check level at every 500 Kms or earlier as required										
2	Engine oil filter element	R		R		R		R		R		R
3	Engine suction filter and Secondary drain magnetic plug	C		C		C		C		C		C
4	Spark plug - 2nos.	C&A	C&A	C&A	C&A	C&A	R	C&A	C&A	C&A	C&A	R
5	HT leads for crack	I	I	I	I	I	I	I	I	I	I	I
6	Air filter element	C	C	C	C	R	C	C	C	R	C	C
7	Carburettor	Clean, Inspect and Tune as required										
8	Fuel Tap	C	C	C	C	R	C	C	C	R	C	C
9	Fuel tank			C		C		C		C		C
10	Fuel hose	I	I	I	I	R	I	I	I	R	I	I
11	Accelerator and carburetor cable play Adjustment	A	A	A	A	A	A	A	A	A	A	A
12	Rubber hose, Air filter to Carburettor	I	I	I	I	R	I	I	I	R	I	I
13	Rubber hose, Inlet manifold	I	I	I	I	R	I	I	I	R	I	I
14	Inlet / Exhaust valve seating						I					I
15	Cylinder head											D
16	Exhaust system											D
17	Clutch free play	Adjust every 1000 Kms or earlier as required										
18	Rear brake pedal pivot	L	L	L	L	L	L	L	L	L	L	L
19	Battery terminals (apply petroleum jelly)	C	C	C	C	C	C	C	C	C	C	C
20	Battery Electrolyte level		I	I	I	I	I	I	I	I	I	I
21	Earth wire eyelet (behind battery carrier)					I						I
22	Rear Wheel Drive Chain	Adjust for every 1000 Kms Clean, Lubricate & adjust every 3000 Kms or earlier as required										
23	Front Fork oil			I		R		I		R		I
24	Hand levers & kick starter pivot	Lubricate every 1000 Kms or earlier as required										
25	Rear brake play	Adjust every 1000 Kms or earlier as required										
26	Rear brake cam			L		L		L		L		L
27	Steering ball races / Play Adjustment		A			L		A		L		A
28	Spokes tightness	I		I		I		I		I		I
29	Wheel rim run out front & rear			I		I		I		I		I
30	Tyre wear		I	I	I	I	I	I	I	I	I	I

A : Adjust C : Clean D : De-carbonise I : Inspect L : Lubricate R : Replace

Note : For Maintenance after 30,000 Kms, Please repeat the same frequency specified above, in consultation with a Royal Enfield Authorised Service Centre.

Periodical Maintenance

AIRFILTER CLEANING

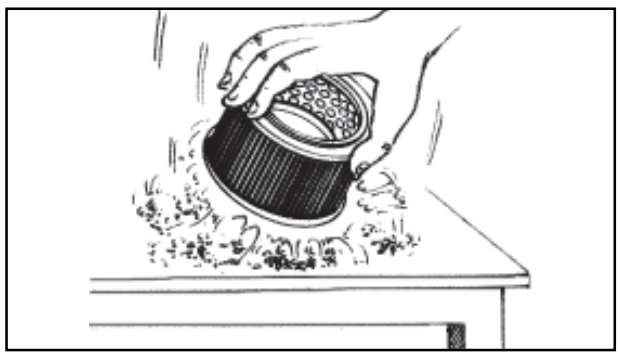


☆ Open filter box cover RH

☆ Remove centre mounting nut

☆ Take out the air filter element

☆ Tap off the dirt



☆ Blow compressed air from outside to inside.

☆ Check for cracks, holes, clogging etc.

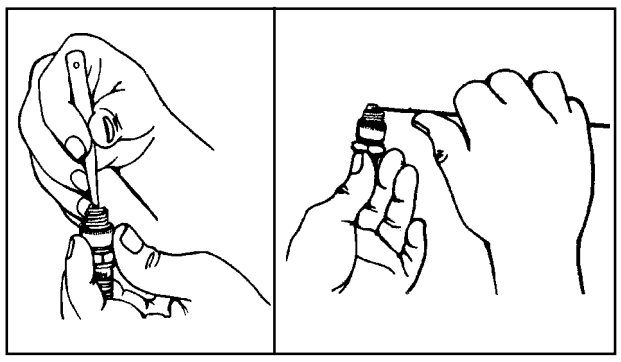
☆ Replace, if defective

☆ Assemble in the reverse order of dismantling.

SPARK PLUG CLEANING

☆ Disconnect suppressor cap and remove spark plug using spark plug spanner.

☆ Clean insulator tip and electrodes using a pointed scrapper or plug cleaner.



☆ Check and set electrode gap to 0.7 to 0.8 mm.

☆ Refit the spark plug and connect the H.T. lead

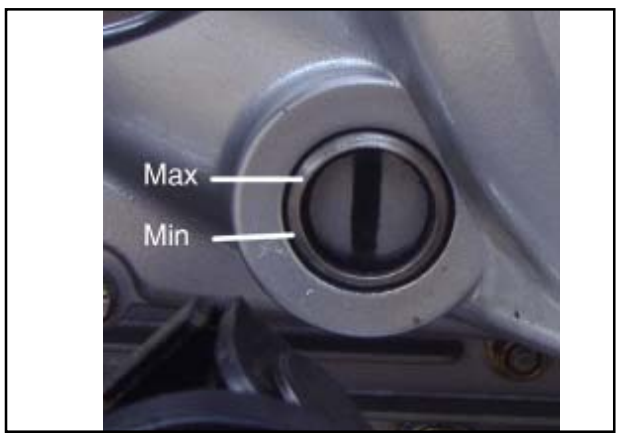
NOTE :

A serviceable spark plug produces thick light blue spark across the electrode. If spark plug produces yellow / red, side sparks, replace it with new.

ENGINE OIL

OIL LEVEL CHECK

☆ Place the motorcycle on the centre stand Before checking the oil level start and warm the engine for few minutes. Switch "OFF" the ignition, wait for two minutes and then check oil level at the inspection window on the RH Crankcase cover

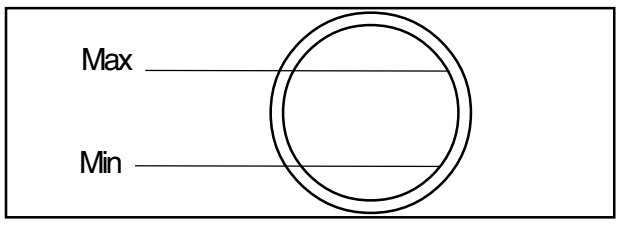


☆ Two level marks are provided on the Oil level window in Cover RH Max. & Min.

☆ If oil level is below the Min mark top up, till the level in between Max and Min mark. Do not overfill.

NOTE :

Oil capacity Min to Max mark is approx 350 ml.

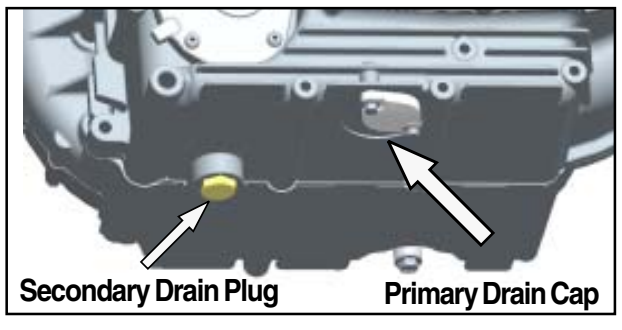


OIL CHANGE :

Refer Periodical Maintenance chart (page No. 03-12) for frequency.

☆ Keep vehicle on level ground.

☆ Start the engine and warm up sufficiently so that the oil drains faster.



DRAINING PROCEDURE :

☆ Keep a clean tray under the engine

☆ Remove the two Hex Flange Bolts M5 X 16, Sump drain Cap, “O” ring and Suction filter Assy.

☆ Remove the Magnetic Plug assy along with its washer.

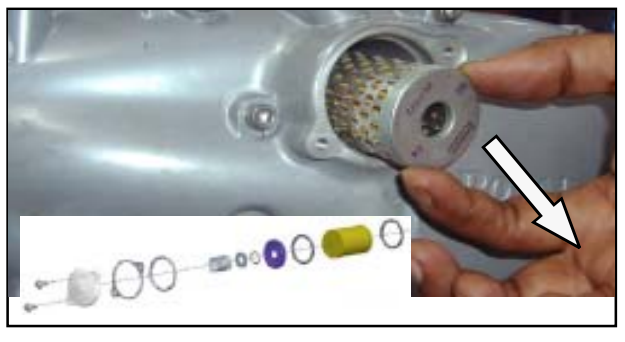
☆ After the oil drains out, remove vehicle from centre stand and tilt the vehicle to both LH and RH sides 3 to 4 times to drain out maximum oil.

☆ Quantity of oil that can be drained in 2.35 Litres approximately.

NOTE :

Replace oil filter element whenever engine oil is changed.

☆ Remove the old oil filter as shown in Fig.

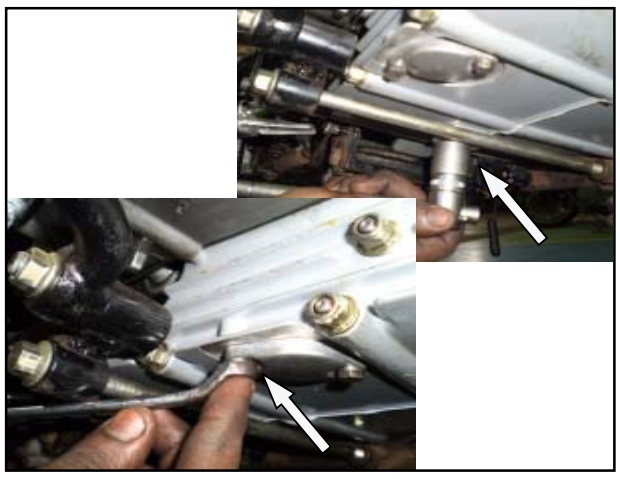


FITTING PROCEDURE

☆ Soak the new oil filter in engine oil for 15 minutes.

☆ Refit the oil filter, “O’’rings and plate washer.

☆ After cleaning secondary oil drain magnet bolt assemble the same to crankcase with washer.



☆ Assemble cleaned suction filter element in to Crank case and fix suction filter cap with “O” ring.

☆ Fill up with 15W50 API, SL grade, MOTUL 3000 4T Plus engine oil.

☆ Refil oil quantity 2.40 Litres.

☆ Check the oil level.

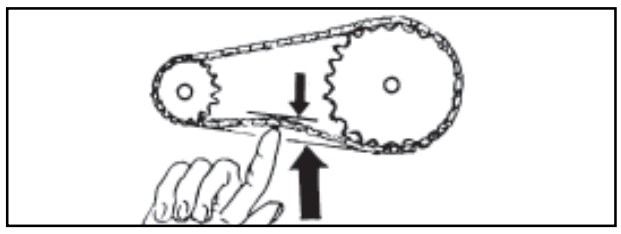
☆ Oil level should be up to “MAX” level.

REAR WHEEL CHAIN

SLACKNESS ADJUSTMENT :

☆ Check slackness, It should be in between

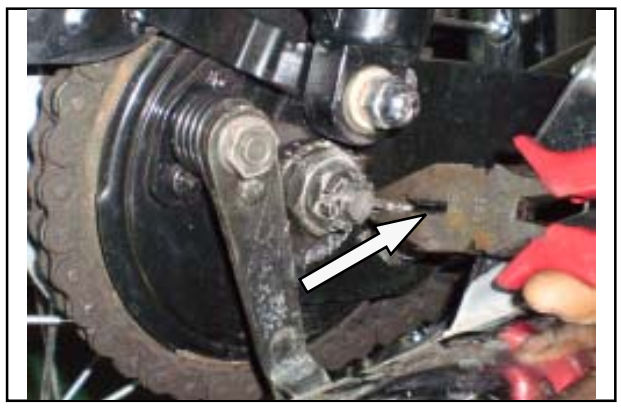
25 to 30 mm



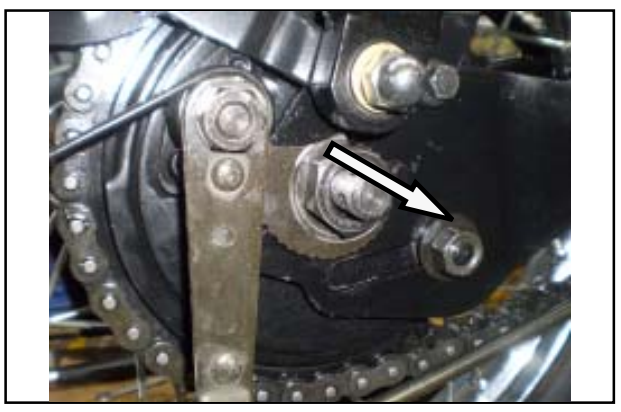
☆ If more or less adjust as follows -

☆ Initially clean then lubricate chain > EP90 oil and rotate rear wheel.

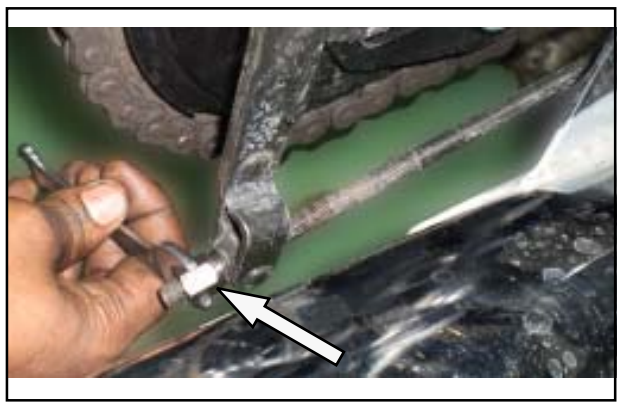
☆ Remove split pin and Hex castle nut on the RH side.



☆ Loosen anchor nut.

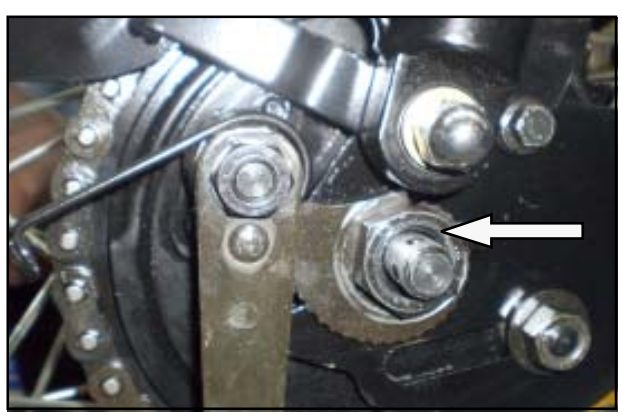


☆ Loosen the brake rod nut



☆ Turn the adjuster cams on both sides till 25 to 30 mm chain slackness is achieved

☆ Check and ensure that the number of notches from the punch mark on the cam to the notch resting on the pin are equal on both sides.



☆ Rotate the wheel and apply brake and tighten all the nuts and lock the split pin.

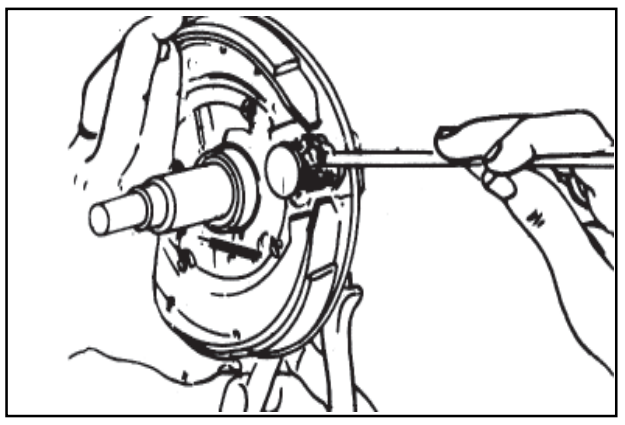
BRAKE CAM GREASING

(EVERY 6,000 KMS)

☆ Remove the brake cover plate.

☆ Clean the brake cam and apply grease.

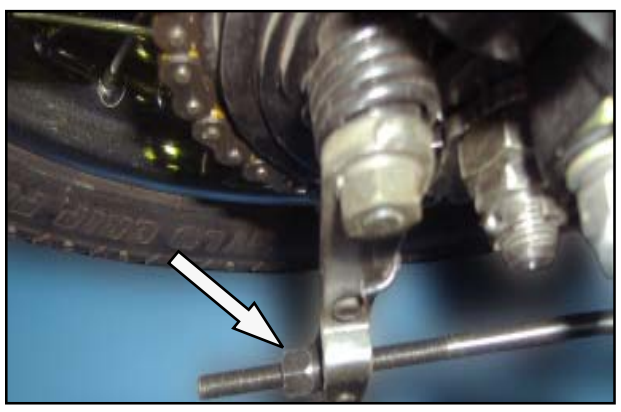
☆ Refit the cover plate.



BRAKE PEDAL PLAY ADJUSTMENT

PEDAL FREE PLAY 20 TO 30 MM

☆ Turn in/out the adjuster nut for correct pedal play



REAR BRAKE SWITCH ADJUSTMENT

☆ Loosen bottom nut and tighten top nut till the brake light comes on when brake pedal is pressed.

☆ Tighten the bottom nut duly ensuring that the brake lamp is not glowing continously.

☆ In case brake light is continously glowing then readjust till correct position in achieved.

NOTE :

Always re-check after adjustment of brake pedal level and free play.

REAR SHOCK ABSORBERS ADJUSTMENT

☆ The rear shock absorber spring preload can be increased or reduced according to road and load conditions.

☆ Increase the spring preload for high load operation.

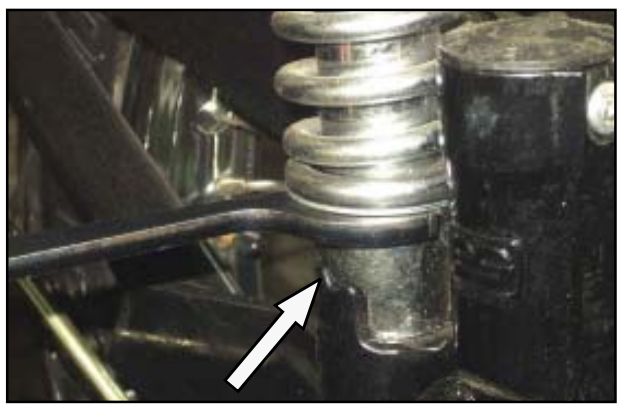
☆ Reduce the spring preload for low load operation.

☆ The adjuster provided on the bottom of the spring has five notches.

☆ To carry out the adjustment proceed as follows :

☆ Using special tool, place it on the slot provided on the adjuster.

☆ Turn the adjuster such that the adjuster moves up to increase the spring preload and vice versa to reduce the spring preload.



CAUTION

Adjust both left and right shock absorbers to the same notch.

FRONT FORK

A. OIL LEVEL CHECK (EVERY 6000 KMS)

☆ Take out front fork from the vehicle. Remove bolt cap.

☆ Check oil level with a 5 mm dia rod.

☆ The level height must be 370 to 380 mm.

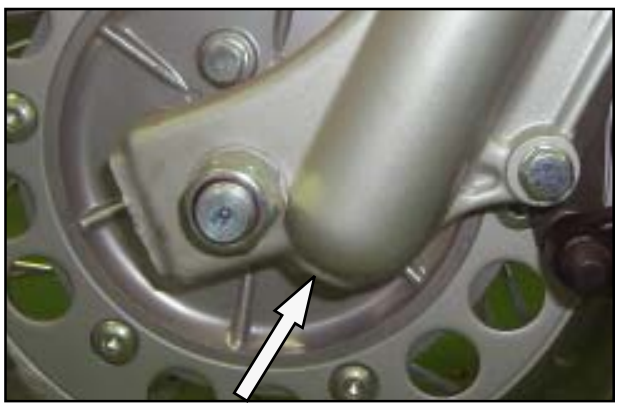
☆ Top up, with 1F Endurance Fork Oil or equivalent, if required

B. OIL CHANGE

(EVERY 12,000 KMS)

☆ Remove the fork ends from the vehicle.

☆ Check as detailed in the Section 8



☆ Fill 195 ml of 1F Endurance Fork Oil in each leg .

☆ Bump the fork several times and then assemble bolt cap with "O" ring (to release air lock if any).

☆ Assemble back all removed parts.

DISC BRAKE FLUID LEVEL CHECK

☆ Check brake fluid is above the 'Min' level in master cylinder.

☆ Top up if level is below 'Min' mark.

☆ To Top up the fluid, remove the master cylinder top cover 2 screws and take out cover, plate & diaphragm.

☆ Top up brake Fluid DOT 3 or DOT 4 upto "MAX" level.

CAUTION :

As the brake fluid is highly corrosive, take care that it does not spill over other parts. It is suggested to wipe brake fluid immediately, if there is any spill over in other parts,using a soft cloth (preferably a wet cloth).

STEERING PLAY ADJUSTMENT

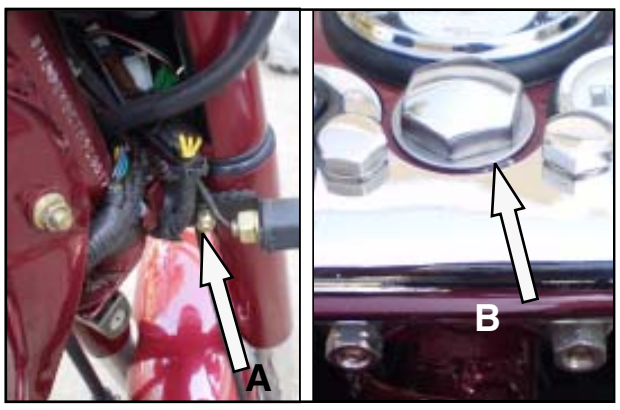
(EVERY 6,000 KMS)

☆ Keep a wooden plank under the stand.

☆ Rock the front end and feel the play at stem top end as shown in fig.

☆ If felt, adjust as follows :

☆ Loosen crown plate bolts as shown picture 'A'



☆ Tighten stem lock nut as shown picture 'B'

☆ Check play.

☆ Steering to be free with out any play.

☆ Tighten all the screws in reverse order.

STEERING BALL RACE LUBRICATION (EVERY 12,000 KMS)

☆ Remove steering stem assembly.

☆ Clean and check the balls and races thoroughly for damages / pittings / discolouration.

☆ Change them if found defective.

☆ Pack grease and balls (Lithium Calcium based) on the bottom ball race as shown in Fig.

☆ Pack grease in the top ball race.

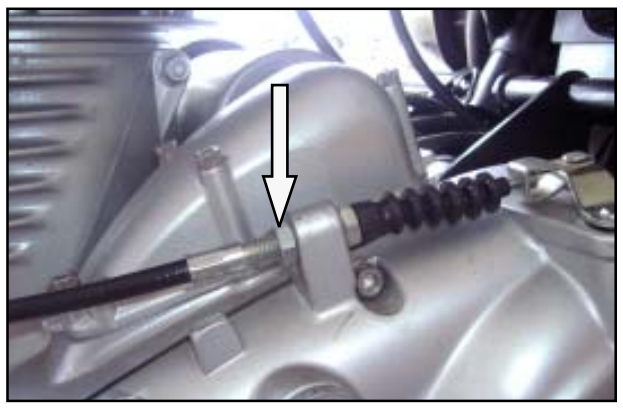
☆ Assemble the steering stem.

CLUTCH CABLE FREE PLAY : (2-3MM)

LEVER END

☆ Check clutch cable button seating position inside lever and condition of the cable.

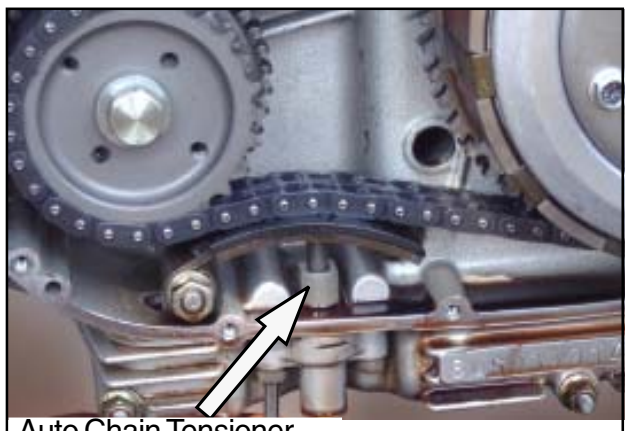
☆ Screw in or out the cable adjuster for setting the required play at lever end (2 to 3 mm).



☆ After adjustment refix cable boot.

PRIMARY CHAIN TENSION ADJUSTMENT

☆ This vehicle is fitted with Auto chain tensioner. Hence there is no need for periodic manual adjustment.



Auto Chain Tensioner

THROTTLE CABLE PLAY ADJUSTMENT (CLASSIC 500)

Throttle rotor free play 2-3 mm.

There are two adjuster provided - one at the top near the throttle grip and the other on the throttle body. Minor adjustments can be carried out at the top.

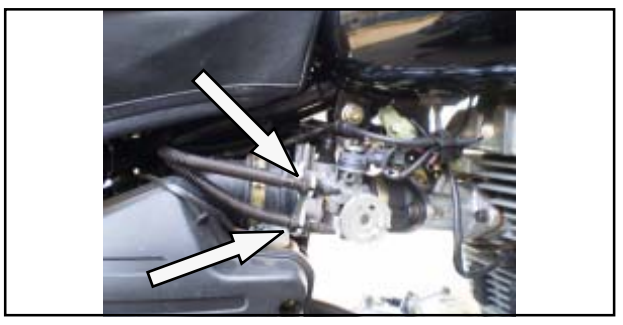
(A) ADJUSTMENT AT HANDLE BAR END (CLASSIC 500)

☆ Slide the rubber boot, use 10 mm spanner to adjust cable outer and lock the nut. Move the rubber boot

(B) ADJUSTMENT AT THROTTLE BODY END (CLASSIC 500)

☆ Loosen the lock nuts on both the cables.

☆ Adjust both cables unitform and tighten the lock nuts.



THROTTLE CABLE ASSY REPLACEMENT (CLASSIC 500)

☆ While replacing throttle cable following procedure is recommended

- (A) Connect throttle cable to Rotor / throttle grip assembly

- (B) Connect cable to throttle body and ensure the recommended free play.

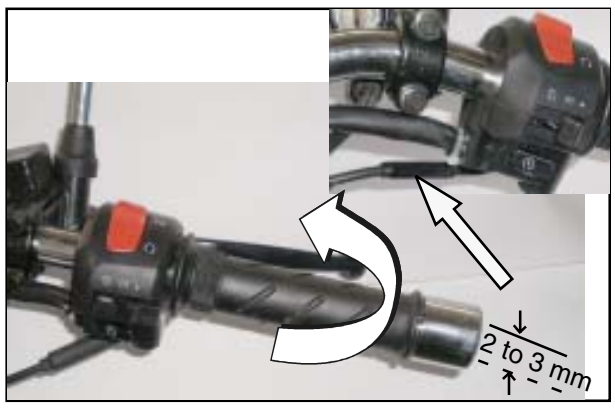
- (C) Route and strap the cable properly.

THROTTLE CABLE PLAY ADJUSTMENT (CLASSIC 350)

(A) ADJUSTMENT OF FREE PLAY AT ROTOR(THROTTLE) GRIP

FREE PLAY : 2 TO 3 MM

☆ Check throttle radial free play 2-3 mm. If excess play then adjust throttle cable as shown Fig.



☆ Slide the rubber boot, use 10 mm spanner to adjust cable outer and lock the nut. Move the rubber boot over the lock nuts.

(B) CHECKING PROCEDURE OF THROTTLE POSITION SENSOR (TPS) CABLE

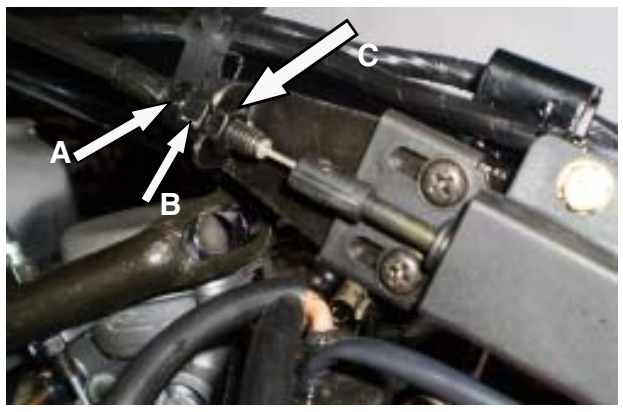
To achieve response from TPS ignition timing

change over after 40% operation of rotor grip following adjustment and placement is recommended.

☆ After adjustment of throttle grip free play, raise the throttle grip to " FULL" position and observe TPS push rod free movement.

NOTE:

Ensure following position of A, B, C TPS cable outer nuts & bracket mounting X, Y screws.

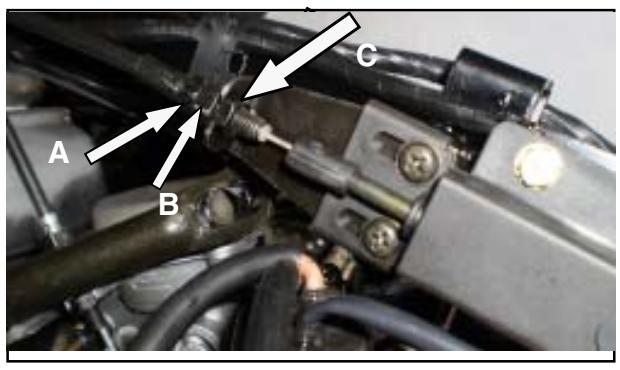


(C) REPLACEMENT PROCEDURE OF THROTTLE POSITION SWITCH (TPS) ASSY.

While replacing TPS assy. following steps are important to achive ignition timing changing shall take place at 40% of throttle opening to obtain more mileage and reduced emissions.

Step 1:

☆ Two nuts (A & B) shall assemble outside the throttle guide bracktet as showm in Fig.

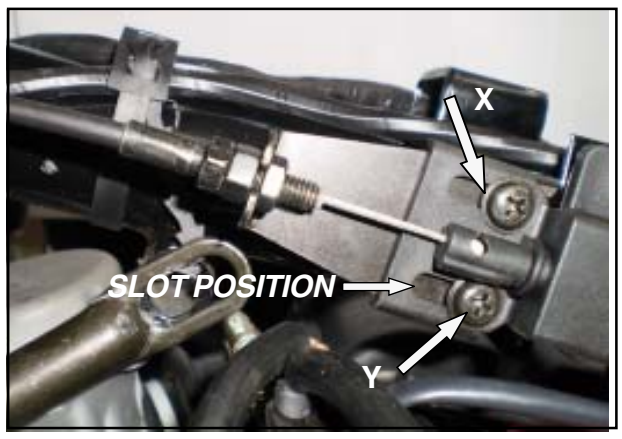


Step 2:

☆ One nut (C) shall assemble inside the throttle guide bracket at extreme left position as shown in Fig.

Step 3:

☆ Throttle guide bracket screws (X & Y) shall assemble with the throttle switch body bracket at extreme right position of the slots as shown in Fig.



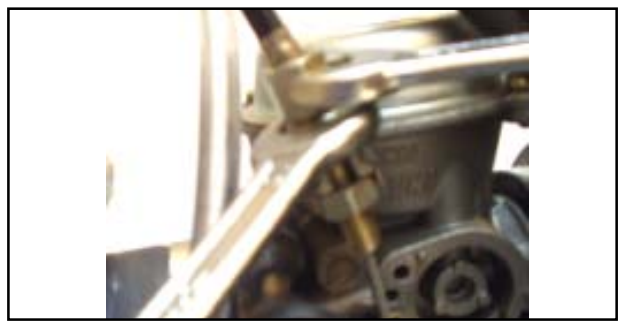
NOTE :

After TPS cable / switch fitment, please ensure that cable lock nuts (A, B, C) & mounting screws (X, Y) are being tightened.

(D) ADJUSTMENT OF INNER CABLE FREE PLAY AT CARBURETOR

- ☆ Loosen the lock nut in throttle cable to adjust free play up to 1 mm.
- ☆ Screw out the cable adjuster will reduce the play, where as screw in result increase the play.

- ☆ After adjustment of inner cable free play, retighten the lock nut as shown in Fig.



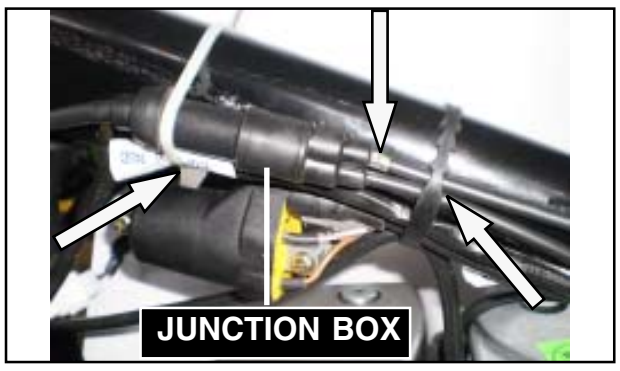
CAUTION :

After adjustment of free play, please ensure that throttle pully being rested on the idling screw. Other wise engine speed increases erratically.

THROTTLE CABLE ASSY REPLACEMENT (CLASSIC 350)

- ☆ While replacing throttle cable following procedure is recommended.

(A) Connect throttle cable to Rotor / throttle grip assembly.
(B) Connect cable to TPS switch as illustrated in step no.1 & 2 at Page No. 03-20.
(C) Connect cable to Carburetor throttle pully and ensure that recommended free play.
(D) Route and strap the cable properly as shown in Fig.



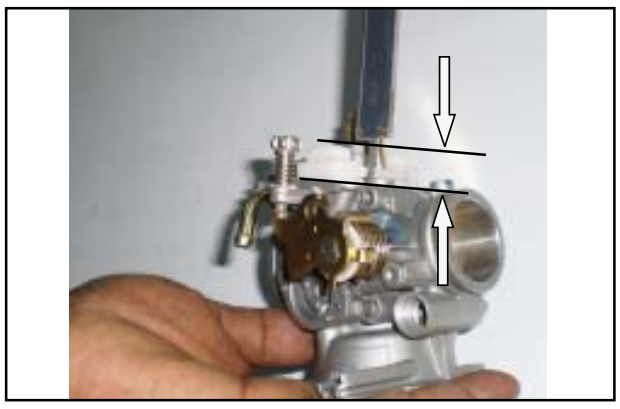
NOTE :

Ensure that outer cable is being seated inside the cable junction box as shownin Fig.

Periodical Maintenance

FLOAT HEIGHT ADJUSTMENT

- ☆ Remove the float chamber body and "O" ring.
- ☆ Hold the mixing chamber body in inverted position as shown in Fig.



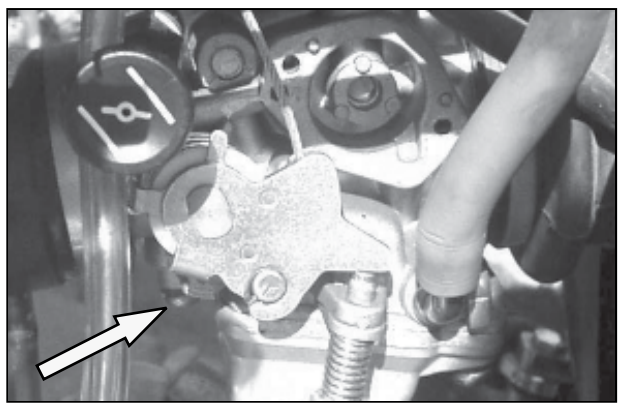
- ☆ Hold the float so that its tongue just contacts the spring loaded plunger of the float needle valve.
- ☆ With a Vernier Caliper, measure the height from the mixing chamber body face to top of the float is 17.1 mm(as shown in Fig.)
- ☆ If the float height is incorrect, correct it by bending the float assembly tongue.
- ☆ Check the float height again.

NOTE :

After adjustment of float height, please ensure free movement of float in its pivot pin.

CV CARBURETOR DRAIN AND TUNING PROCEDURE

- ☆ Drain the carburetor before tuning process.
- ☆ Set the carburetor pilot screw to 3 full turns out from fully closed position.
- ☆ Now, start and warm up the engine for 2 minutes.



- ☆ Check for the smooth running of the Engine.
- ☆ If erratic turn pilot screw in or out upto one turn.
- ☆ Adjust the idling screw until the engine is smoothly ticking over 1050 ± 200 rpm
- ☆ Refit the boot to the pilot screw.

ENGINE COMPRESSION TEST

STEP-A

- ☆ Start and warmup the engine to normal running temperature.
- ☆ Remove the spark plug & connect compression gauge.

☆ Switch "OFF" Ignition and engine stop switch condition.

☆ Hold the throttle open fully and kick several times (5 to 6 times).

☆ Note down the reading and repeat the above process 3 times. Take to average mean reading in 100 ± 10 PSI which is the correct compression pressure. Specified engine compression pressure.

STEP-B

☆ In case compression pressure is less than 80 PSI, then refit spark plug & start again to warmup the engine.

a) Remove spark plug & put few drops of engine oil into the combustion chamber.

b) Connect compression gauge & repeat the procedure as explained in the step-A.

☆ If compression pressure does not increase, then check for

- blown out cylinder head gasket
- improper torque of Rocker bearing bolts or cylinder head nuts.
- valve seat - damage / leakage
- valvestem bend
- cylinder head warpage
- improper valve timing

☆ If compression pressure reading increases, then check for

- Improper alignment of piston ring (end gap position)
- piston ring jamed in groove.
- scoring / seizure of cylinder barrel / piston
- worn out piston/rings
- worn out cylinder barrel

NOTE :

In case compression pressure is more than 110 PSI then engine requires Decarbonisation of cylinder head / piston (combustion chamber).

DECARBONISING

(EVERY 30,000 KMS)

CYLINDER HEAD

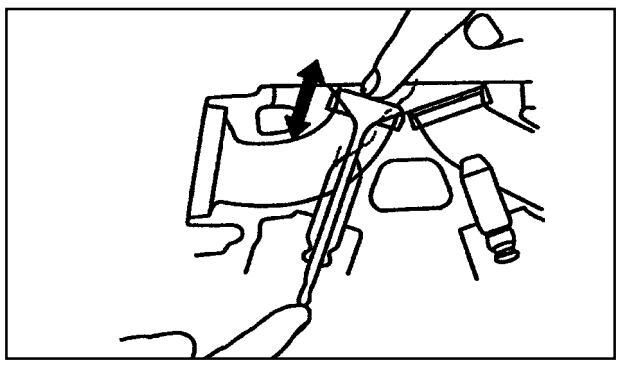
☆ Remove carbon from the valves, ports and combustion chamber by scrapping. Take care not to cause any damage to the valve faces or valve seat inserts. Scrape gently to avoid scoring the cylinder head.

☆ Remove the piston rings carefully. For cleaning the groove in the piston, a piece of broken piston ring thrust into a wooden handle and filed to a chisel point can be used.

CYLINDER HEAD AND VALVES

VALVE SEAT INSPECTION

☆ Clean both Inlet & Exhaust valves and thoroughly remove the carbon deposits



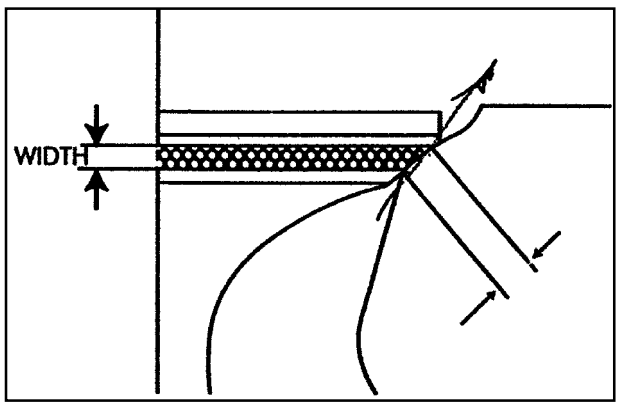
☆ Apply light coating of Prussian blue to the valve seats.

NOTE :

Ensure proper valve seat contact by taping the valve in the valve seat without rotating.

☆ Remove the valve and inspect the width of each seat.

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



Standard : 0.9 - 1.1 mm

Service Limit : 1.5 mm

☆ Valve seat width is not within specification, reface the valve seat.

CAUTION :

If a valve face is burnt or badly wornout or if it contacts the seat unevenly, replace the valve.

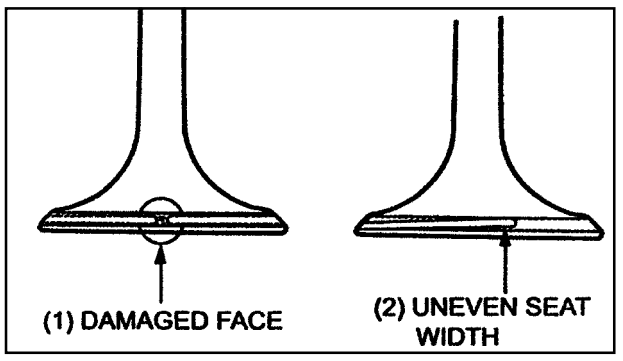
INSPECT THE VALVE SEAT FACE FOR :

☆ Damage of the face :

Replace the valve and re-face the valve seat.

☆ Uneven seat width :

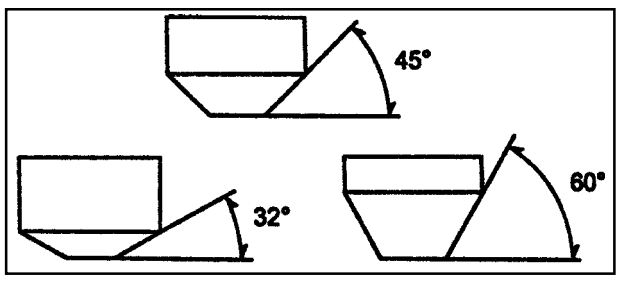
Bent or collapsed valve stem. Replace the valve and re-face the valve seat.



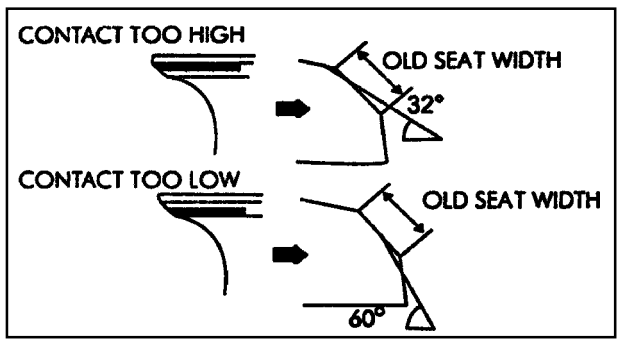
☆ Contact area is too high or too low. re-face the valve seat.

VALVE SEAT REFACING

☆ Valve Seat cutters, a grinder or equivalent valve seat refacing equipment are recommended to correct worn valve seat.



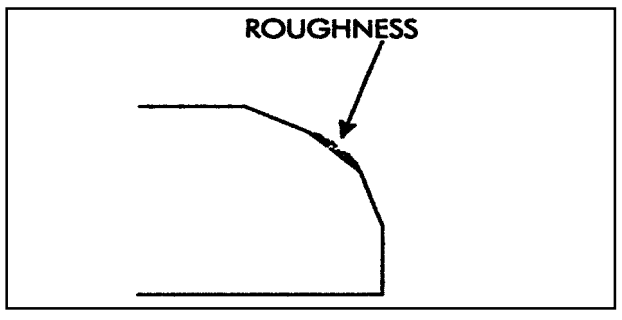
☆ If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.



☆ If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.

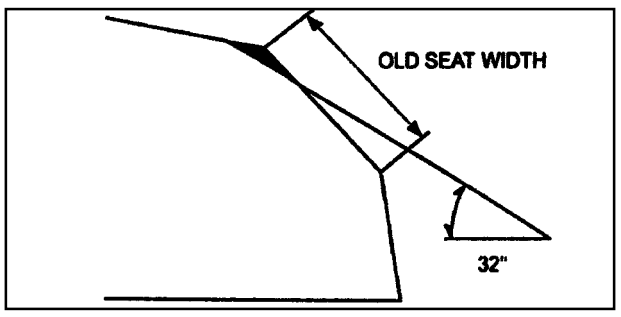
NOTE :

Reface the valve seat with a 45 degree cutter when a valve guide is replaced.

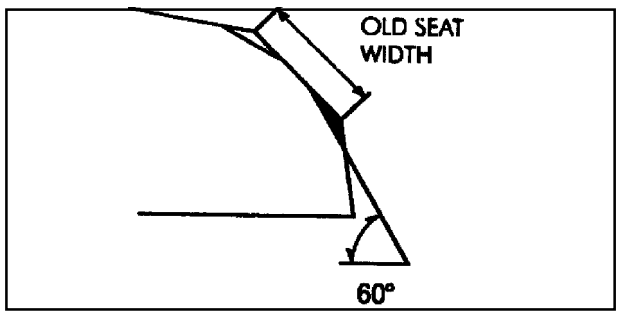


☆ Use a 45 degree cutter to remove the roughness or irregularities from the seat.

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

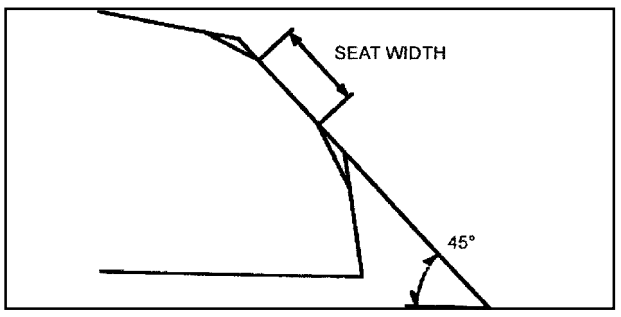


☆ Using 60 degree cutter, remove the bottom 1/4 of the old seat.



☆ Remove the cutter and inspect the area.

☆ Install a 45 degree finish cutter and cut the seat to proper width.



☆ Make sure that all printing 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 applying light pressure.

NOTE :

Excessive lapping pressure may deform or damage the seat.

Change the angle of lapping tool frequently to prevent uneven seat wear.

Lapping compound can cause damage if it enters between the valve stem and guide.

☆ After lapping, wash any residual compound off the cylinder head and valve.

☆ Recheck the seat contact after lapping.

☆ Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

☆ Install the valve spring seats and new valve stem seals.

☆ Lubricate each valve stem with clean engine oil.

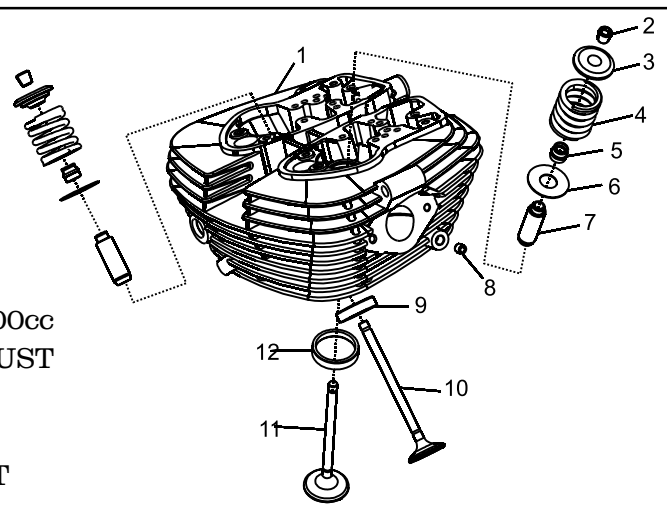
☆ Insert the intake and exhaust valve into the valve guides.

NOTE :

To avoid damage to the seating face, turn the valve slowly while inserting.

THE PARTS DETAIL OF CYLINDER HEAD ASSEMBLY

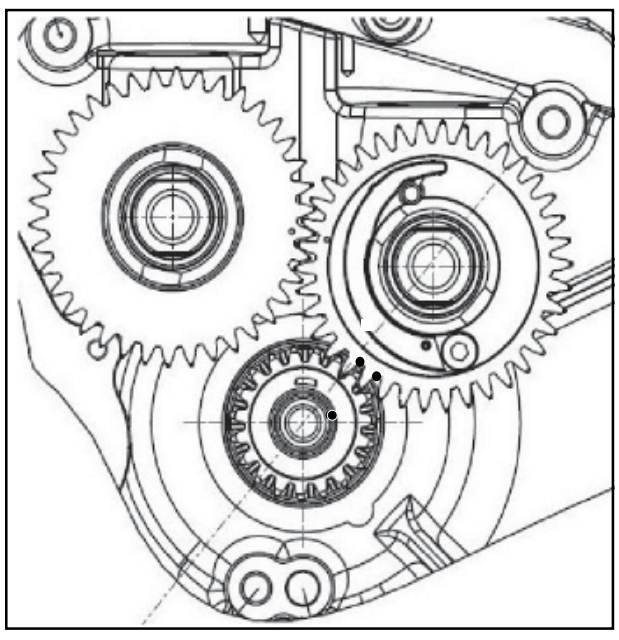
1. CYLINDER HEAD
2. SPLIT COLLAR
3. RETAINER, SPRING
4. VALVE SPRING
5. VALVE STEM SEAL
6. SEAT, SPRING
7. VALVE GUIDE
8. PLUG OR EOT SENSOR for 500cc
9. VALVE SEAT INSERT, EXHAUST
10. VALVE EXHAUST
11. VALVE INLET
12. VALVE SEAT INSERT, INLET



VALVE TIMING CUM ECCENTRIC CAM SPINDLE

Bring piston to TDC so that the key way in the Rotor assembly is at 12 O' Clock position.

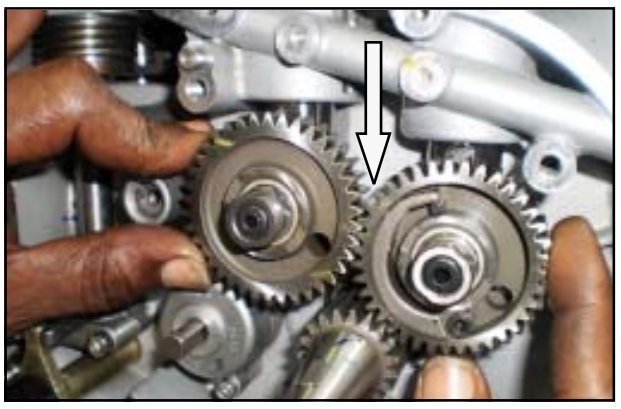
Check position of the exhaust cam teeth between two punch marks with punch mark on the Fly wheel RH shaft timing gear.



Similarly check position of the inlet cam single punch mark align with the single punch mark on the exhaust cam.

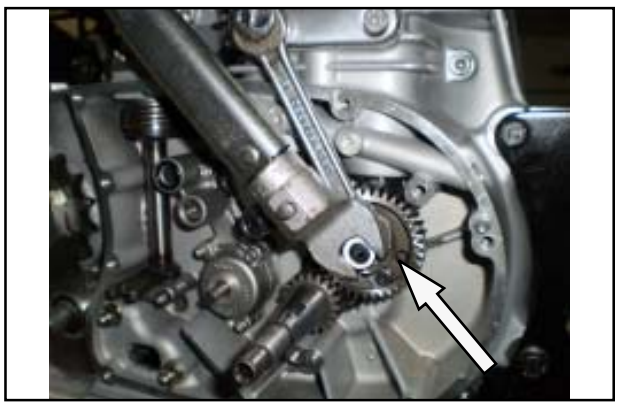
ECCENTRIC CAM SPINDLE ADJUSTMENT

☆ The center distance adjustment of gears is achieved by rotating the eccentric sleeve and locking it on the spindle by using M 10 lock nut once the desired backlash is arrived.

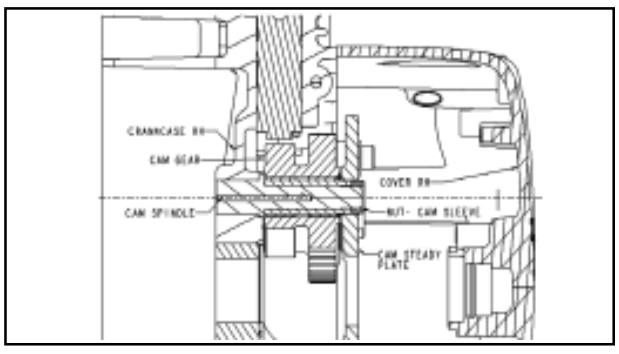


☆ Ensure to hold the eccentric sleeve by spanner while tightening the lock nut which prevent the rotation of the sleeve during tightening the lock nut.

☆ The backlash is first adjusted between pinion to exhaust gear and then exhaust to inlet gear to get effective backlash adjustment.



☆ The tightening torque for M10 lock nut is 2 KG-M. This must be ensured.



Periodical Maintenance

☆ Over size Cam Spindle (For Spares)

570040 : 0.1 mm Over size Spindle

570041 : 0.2 mm Over Size Spindle

CAUTION :

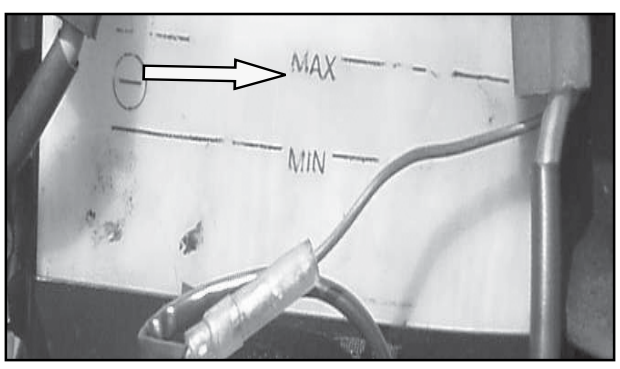
- During first service, the backlash between the cam gears must be checked. If not with in the desirable limit and if a slight cam noise is observed, then further adjustment of the eccentric sleeve has to be carried out as mentioned above.
- After adjustment to the required backlash, both the Inlet & Exhaust lock nut in the spindle must be tightened to the specified torque.

BATTERY

ELECTROLYTE LEVEL CHECKING :

☆ Electrolyte level can be seen through the casing.

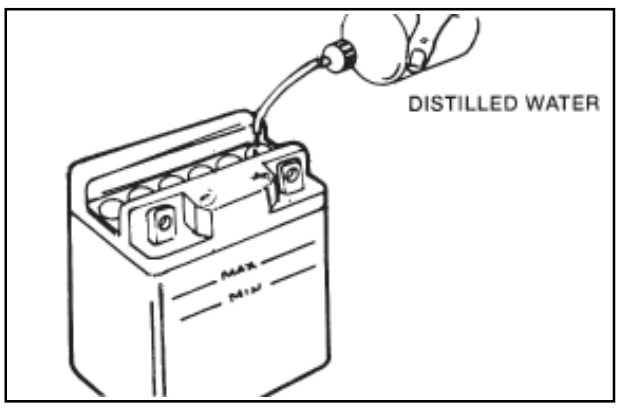
☆ Electrolyte to be filled upto "MAX" Mark.



NOTE :

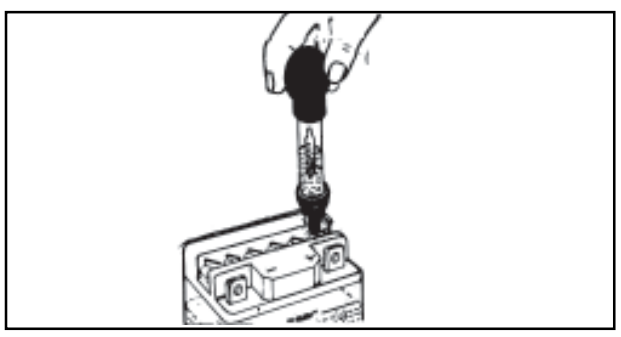
When electrolyte level drops to "MIN" Level, then top up distilled water upto "MAX" Level.

☆ If required, top up with distilled water.



SPECIFIC GRAVITY CHECKING :

☆ Check specific gravity (SG) with a hydrometer.



☆ Specific Gravity -

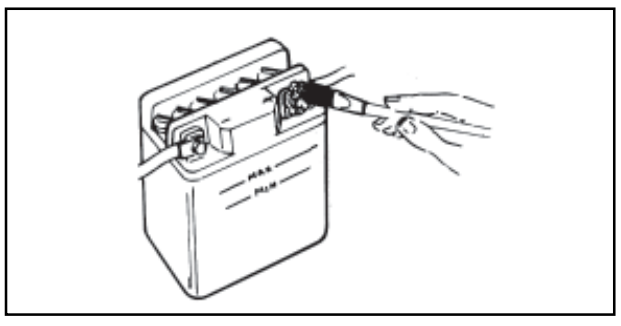
Fully charged 1.24 to 1.26.

Needs to be recharged 1.15 or less than that

TERMINAL CLEANING :

☆ Clean terminal with warm water and apply petroleum jelly.

☆ In case of sulphation clean by zero base emary paper.

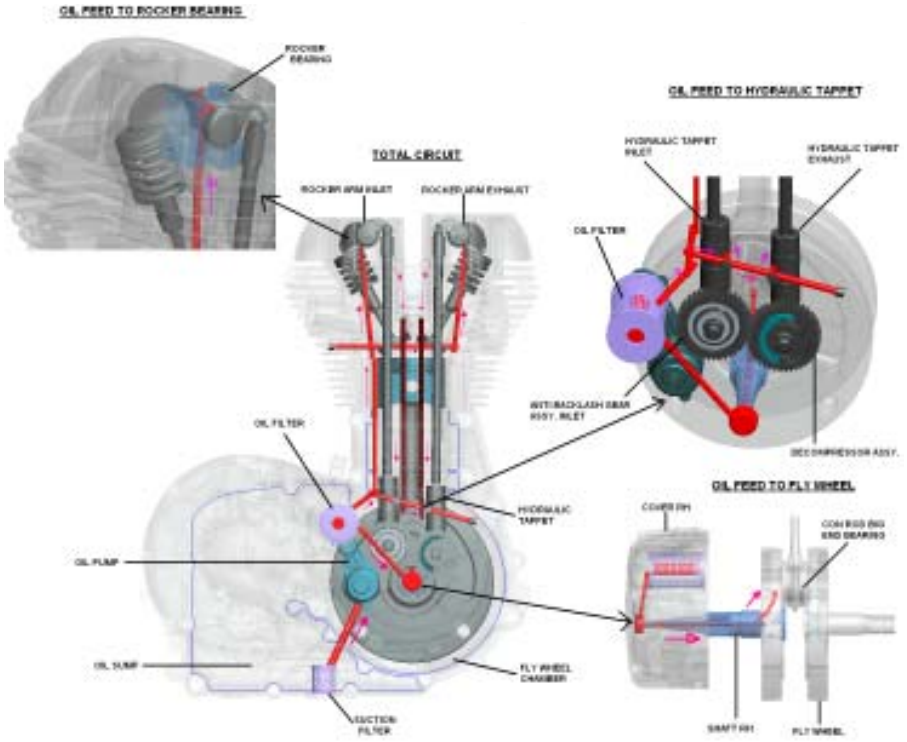


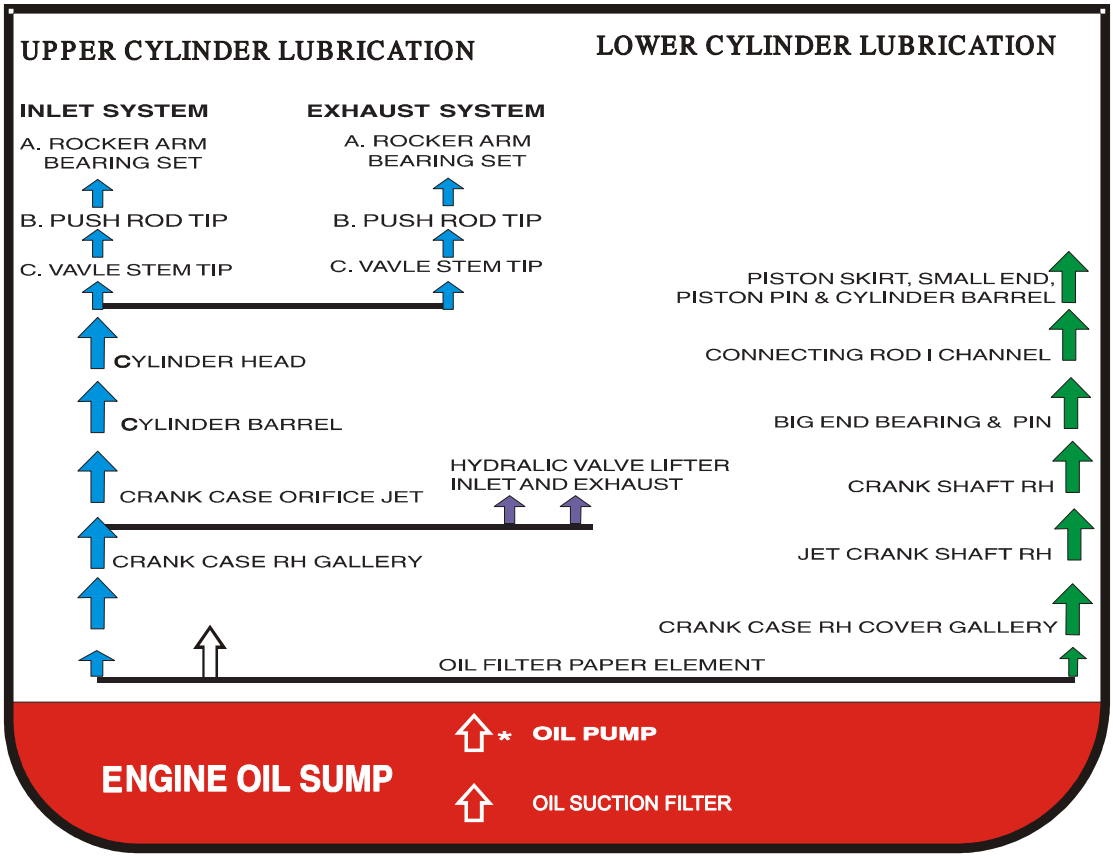
SECTION

FOUR 04

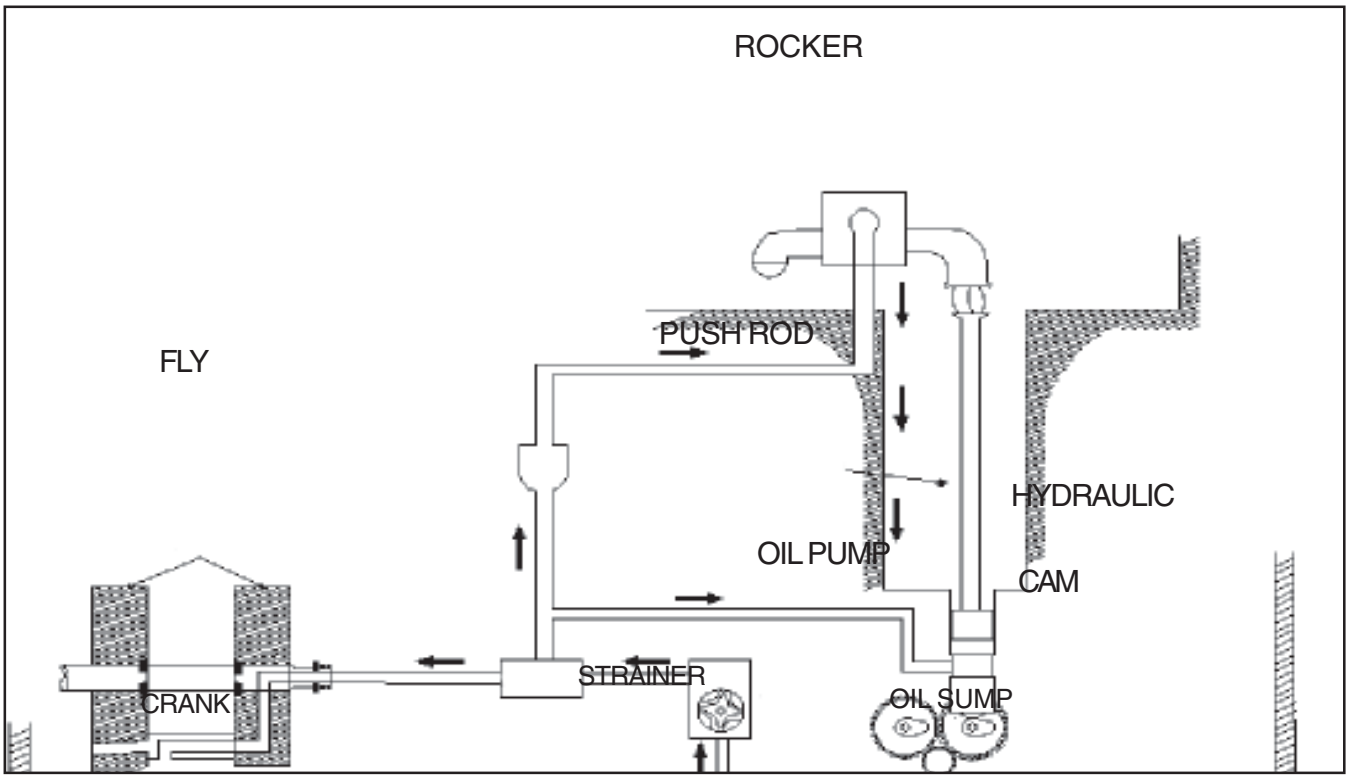
ENGINE

Engine Lubrication System





Lubrication System



LUBRICATION SYSTEM :

Oil from the oil tank is circulated to various parts through a powerful oil pump. The oil in the sump gets filtered through an oill strainer located in the crankcase and then pumped into the oil filter element located in the RH Cover. From here oil is circulated to 3 main areas. The first branch goes to flywheel to lubricate crank shaft as well as barrel piston assembly. The second branch goes to hydraulic tappet to maintain the oil pressure constantly. The third branch goes to rocker assembly and drains down to RH cover chamber through the push rod tunnel.

LUBRICATION OIL :

- ☆ Specification: MOTUL 3000 4T PLUS 15W50 API, JASO MA SL - GRADE ESTER-Semi Synthetic
- ☆ Oil capacity: 2.75 l - Initial oil filling: through Oil filler Cap = 2.5 l, through Crankcse LH Cover: 0.25 l

Lubrication System

OIL PUMP : TROCHOID TYPE

Trichoidal high flow oil pump delivers oil with a pressure of 4.5 Bar. This provides good lubrication to all the moving parts and enhances the life of the moving parts in the engine.

CLASSIC 350

Output : 4.5 Litre per minute at 2750 RPM

CLASSIC 500

Output : 9 Litre per minute at 2750 RPM

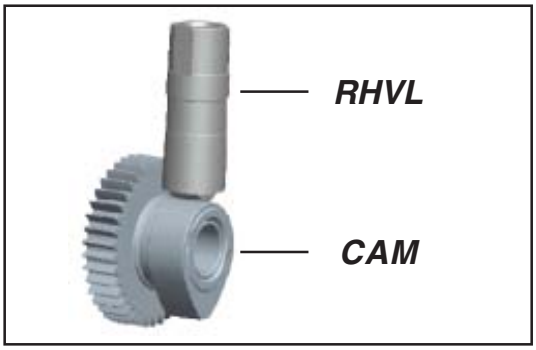
Hydraulic Tappets (Roller Hydaulic Valve Lifter (RHVL)

WHAT IS HYDRAULIC TAPPET :

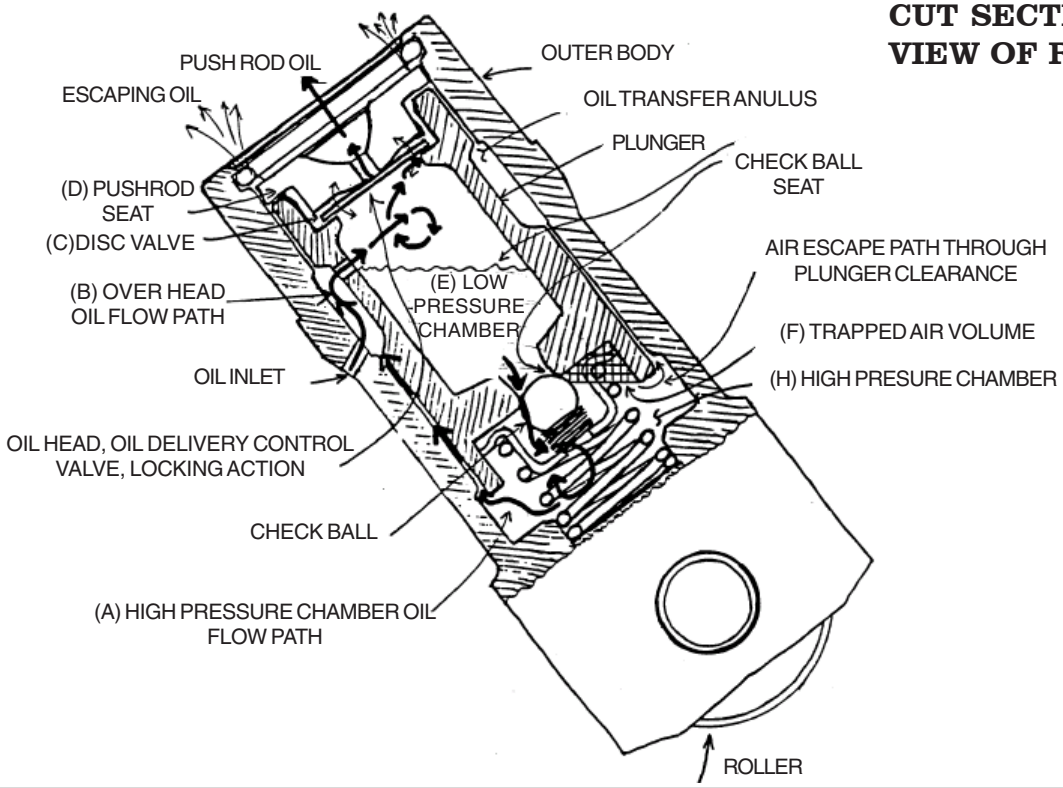
Hydraulic tappet (also called RHVL - Roller Hydraulic Valve Lifter) is the element connects between cam profile to push rod and it operates with aid of the hydraulic pressure to eliminate the clearance and noise between valve train parts.

BENEFIT OF HYDRAULIC TAPPET :

1. Roller follower on cam with hydraulic tappet avoid sliding motion and friction, provides improved tappet and cam life.
2. Control of valve train lash adjustment. The RHVL compensates for changes in the length of valve train components by wear or variations in engine temperature.



CUT SECTION VIEW OF RHVL



Hydraulic Tappets (Roller Hydaulic Valve Lifter (RHVL)

WORKING PRINCIPLE :

Engine oil enters the lifter through the body feed hole, and flows into the inside of the plunger through the plunger feed hole, filling the "low pressure chamber" (E, in Figure)

The oil flow continues around the check ball and through the slots of the ball retainer to fill the cavity below the plunger, called the "high pressure chamber" (A, in Figure). Oil is forced down into this area by momentary low pressure which occurs once during each valve event (cam revolution), which the RHVL roller bearing in on the cam base circle.

As the RHVL rises up the nose of the cam and the full load of the valve train is applied on the lifter, a predetermined and closely held clearance of .0002/.0003 inch (.0051/.0076 mm)between the outer diameter of the plunger and the inner diameter of the body permits a controlled amount of oil to escape up from the high pressure chamber.

This controlled oil leakage compresses the plunger spring and allows a small relative movement of the plunger with respect to the body. This movement is called LEAKDOWN (see Figure 04-4) and occurs once during each valve lift event.

As the RHVL rides back down the flank of the cam and returns to the base circle, the plunger spring provides the force to maintain zero back lash and forces the plunger back to its original position relative to the body. This allows engine oil to once again fill the high pressure chamber so the cycle can be repeated.

The volume of oil that enters the high pressure chamber during each base circle event is equal to the volume of oil that is lost through the plunger-to-body diametral clearance during the valve lift event (Leakdown).

The overhead oil supply is accurately metered from the "low pressure chamber", which is at engine oil pressure, by using a flat metal disk (metering valve C, in Figure), which wobbles against a cylindrical radius curved surface on the bottom of the push rod seat (D, in Figure). Oil then flows up through the hole in the push rod seat to lubricate the overhead valve train components (oil flow path B, in Figure).

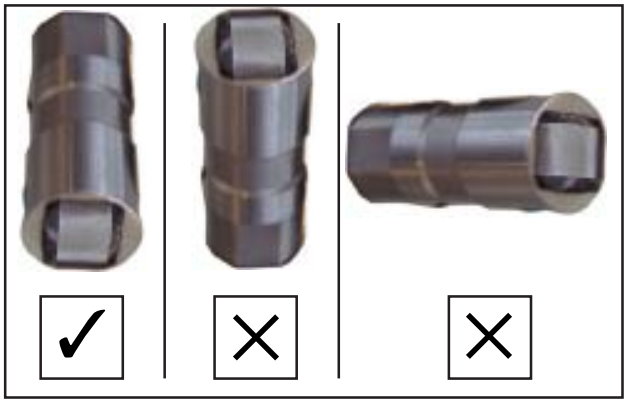
The metering valve moves sufficiently to keep the push rod seat hole free and unclogged. When the engine is shut down, the valve seats on the shoulder of the plunger to minimize drain back of oil.

If the engine structure or valve train expands or contracts with changes in engine temperature or other differentials, the RHVL will automatically adjust its own internal length to compensate for these changes.

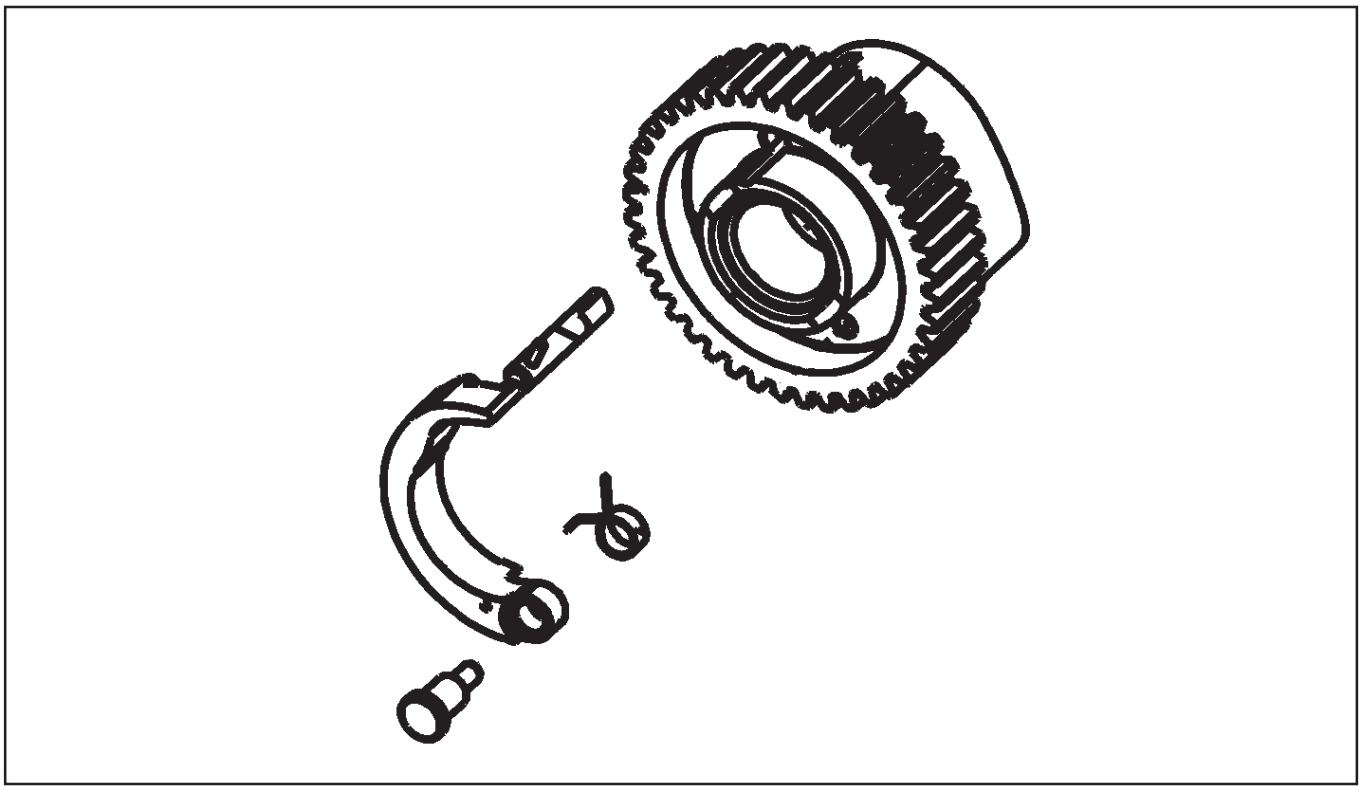
PRECAUTIONARY MEASURES :

The hydraulic tappets have minute holes for the oil to circulate and to also act at the hydraulic media. Hence oil contamination must be as less as possible. For this, all the filters (oil filter on cover RH, sump drain filter with magnet and second drain plug with magnet) must be cleaned periodically as mentioned in this Service manual.

Whenever the RHVL is removed for service / replacement or stored in spare parts, they must be kept upright (the rollar side surface pointing downwards and the push rod seating surface at top side as shown in fig. below) to prevent the oil from drian off.



Auto Decompressor



AUTO DECOMPRESSOR - WORKING PRINCIPLE

a. The Flyweight type decompressor consists of a flyweight mechanism mounted on the cam gear exhaust.

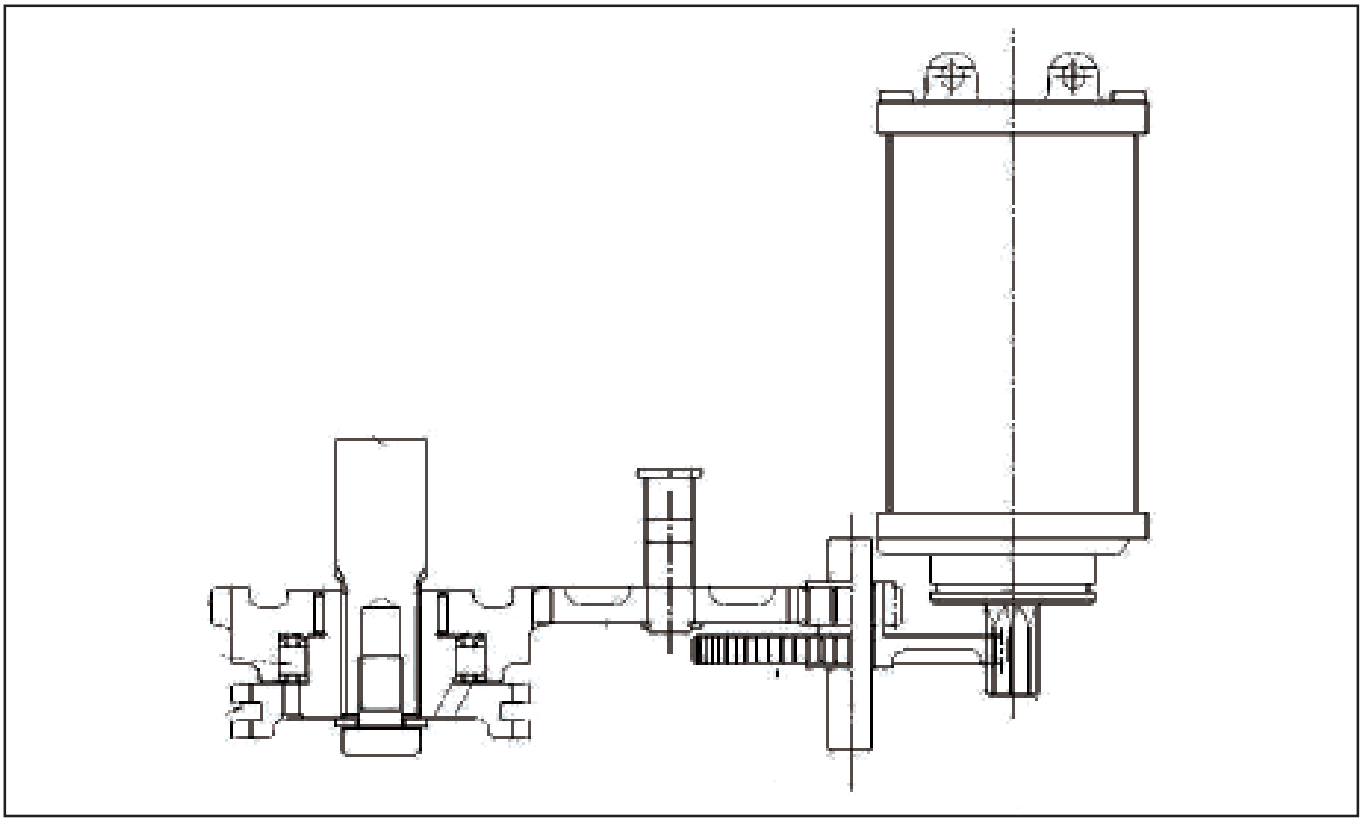
b. When the engine is cranking below a certain speed (350 rpm approx.), a pin rotates to protrude above the base circle of the exhaust cam.

c. The pin momentorily open the exhaust valve on the compression stroke, lowering the pressure in the cylinder head combustion chamber thus leading to freeness when starting engine.

BENEFITS OF AUTO DECOMPRESSOR :

- Easy for kick or self start system.
- Avoids back kick and hence life of the sprag clutch system enhanced.

Electric Starting System & Sprag Mechanism

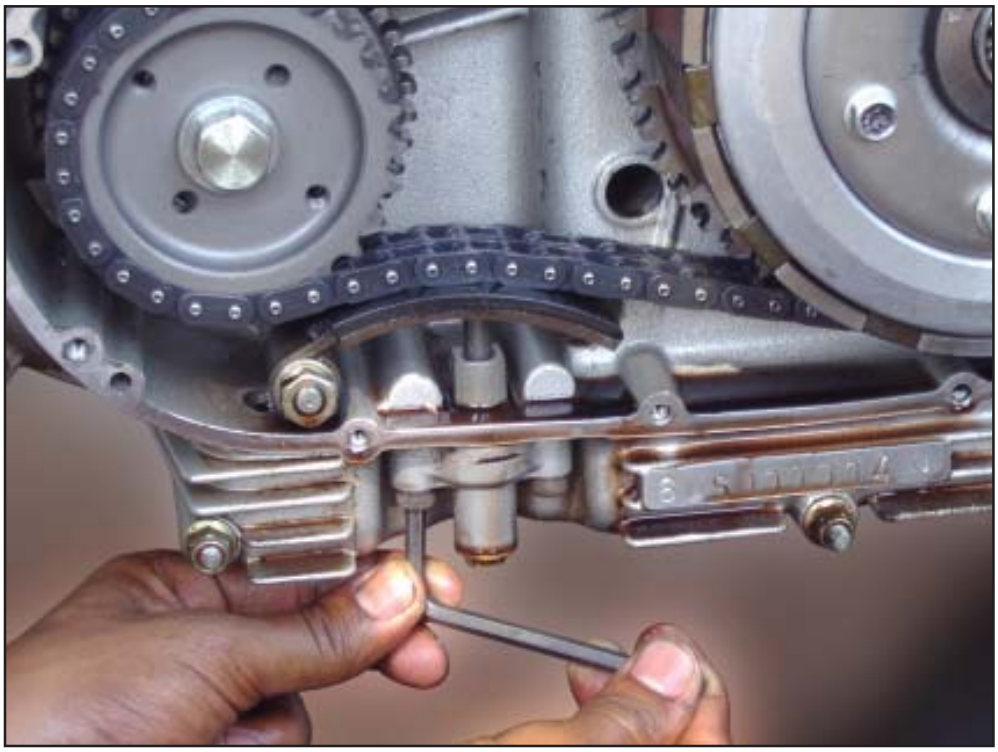


WORKING PRINCIPLE

The sprag is located in the primary sprocket on the crankcase drive side. This provides better rigidity of the sprag mechanism during initial cranking.

The auto decompressor mechanism further helps in reducing the load on the sprag during intitial cranking and also prevents reversal phenomenon of the crank shaft.

Auto Chain Tensioner Assembly



WORKING PRINCIPLE

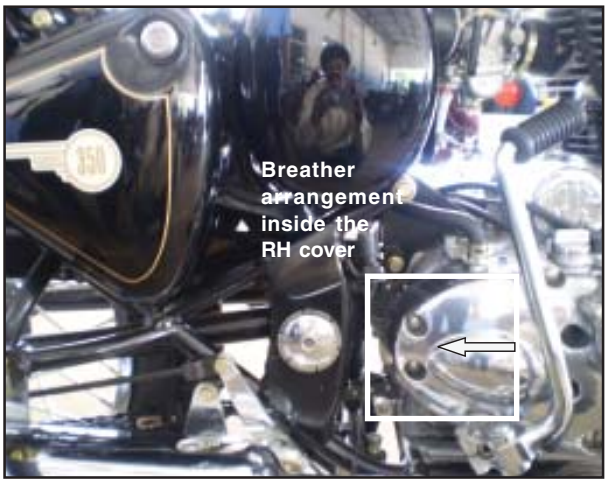
The auto chain tensioner has a spring loaded plunger mechanism with a ratchet arrangement. It eliminates need for manual adjustment of the primary chain tension.

It is assembled on the crankcase LH below the chain tensioner pad. The spring loaded plunger applies force on the chain tensioner pad thereby lifting it and holding aginst the primary chain to the required tension.

The oneway rachet mechanism in the auto chain tensioner ensures that the plunger does not drop down due to the downward force of the chain tensioner pad.

It normally does not require any maintenance or service.

Engine Breather System

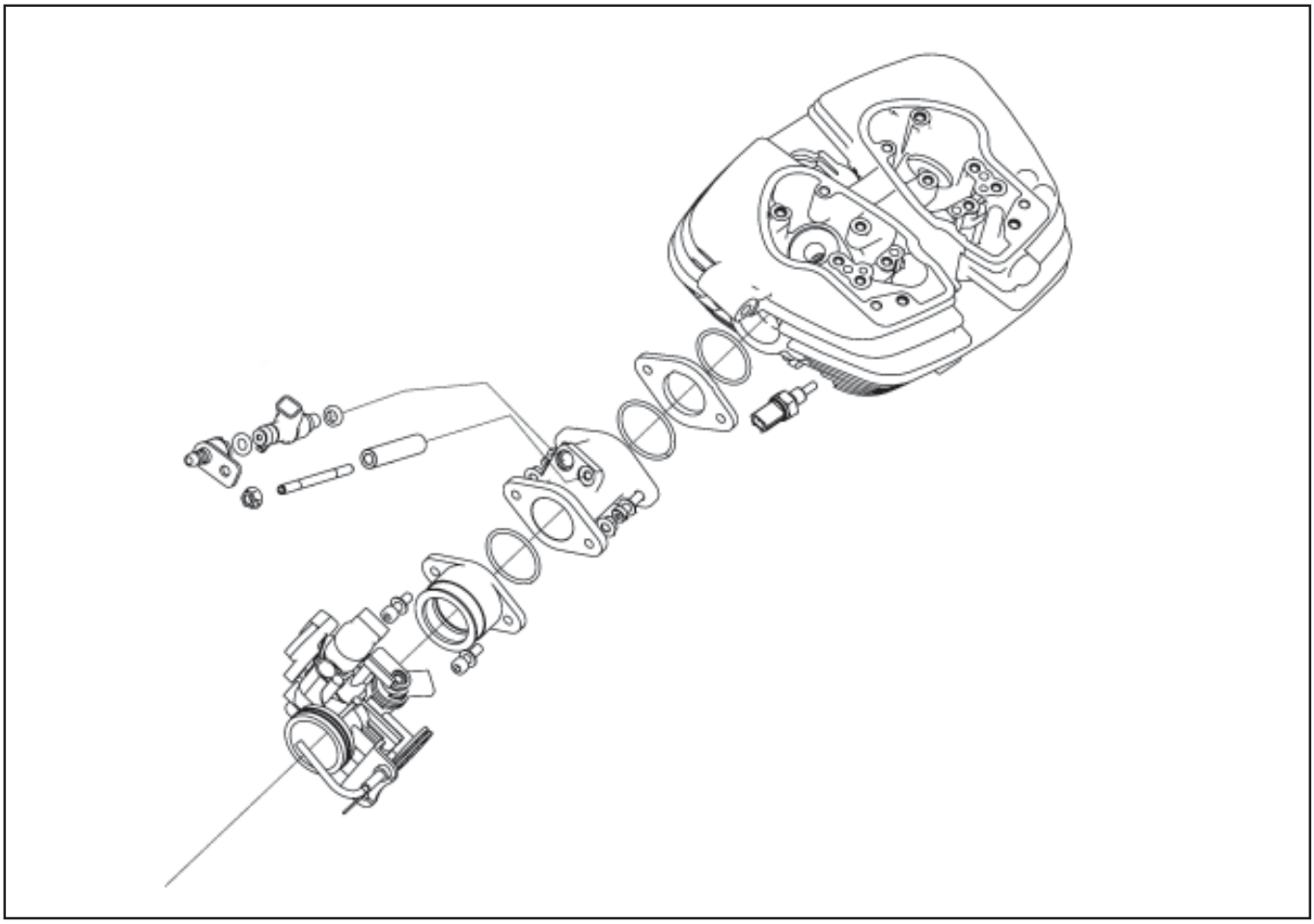


WORKING PRINCIPLE

The engine breather system is located on the RH cover of the crankcase. A connecting hole directs the engine breathing into a chamber in the RH cover which has an inbuilt deflector to deflect the oil that may come along with the fumes from the crankcase. This oil gets drained through a small hole provided at the bottom of the breather chamber.

The emission passes through the deflector chamber and goes to the air filter housing and passes through the inlet manifold back into the cylinder head.

Inlet Manifold & Throttle Body



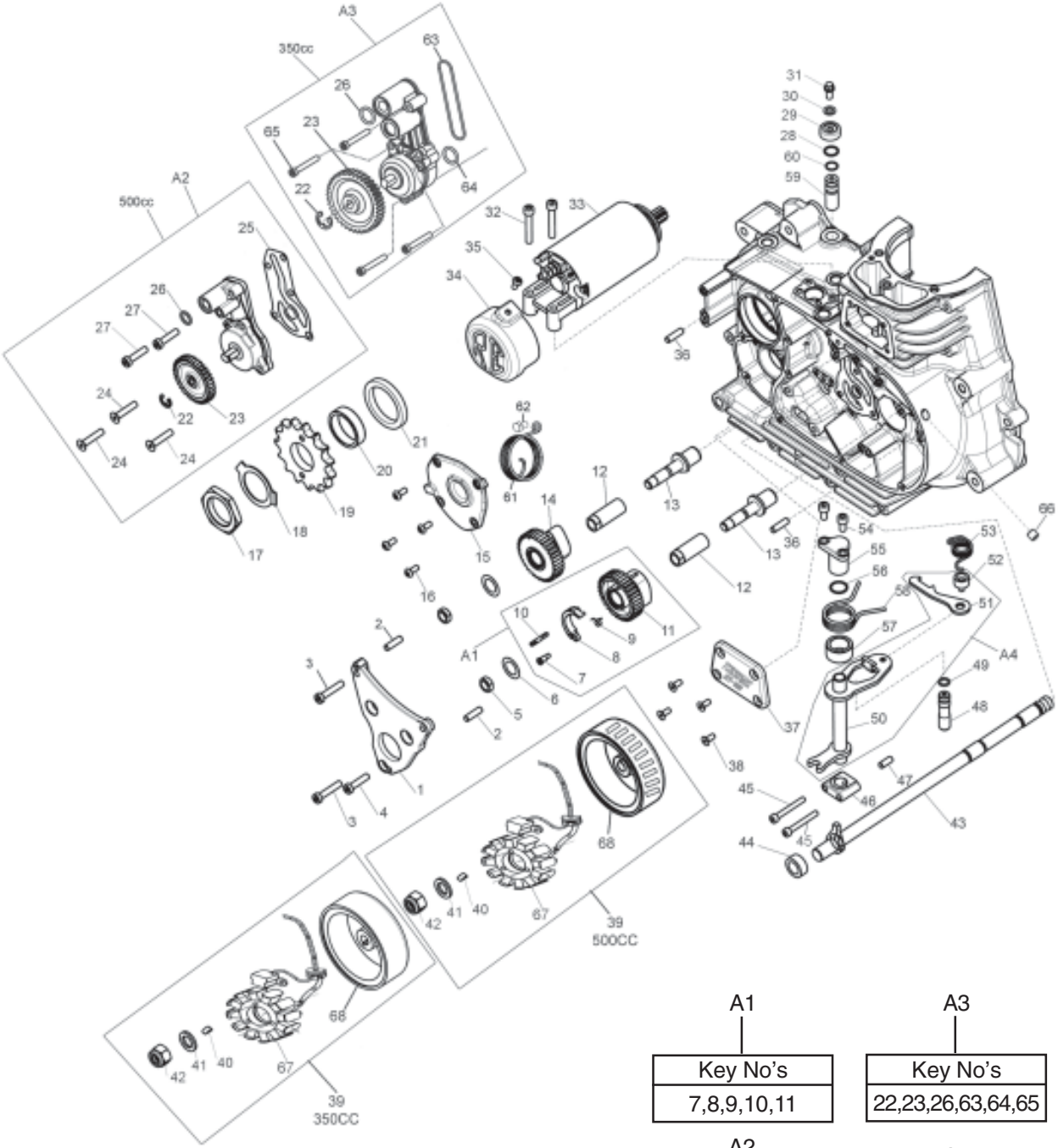
The inlet manifold has the fuel injector located on top portion and the throttle body attach to it.

The throttle body has a butterfly valve attached which is operated by the throttle cables attached to a small drum on the right side.

A manual Bi starter is located on the left side and is operated with spring and plunger type arrangement.

An idle air bypass screw is provided on the throttle body. It is the large brass coloured screw that is accessed from the top of the throttle body. The clamps on the throttle body may be loosened and the throttle body rotated outwards from the top to access the screw without removing the fuel tank and to adjust the idle speed with the bike running. Turn the screw CLOCKWISE (in) to DECREASE the idle speed. Turn the screw ANTICLOCKWISE (out) to increase the idle speed. Remember that this is an AIR BYPASS screw – not a throttle stop screw. Turning the screw about ¼ turn will result in an approximate 200 RPM change in the idle speed. DO NOT adjust the throttle stop screw on the side of the throttle body unless you are using the factory supplied software to recalibrate the base throttle opening.

Crankcase RH - Coverside View



A1	A3
Key No's	Key No's
7,8,9,10,11	22,23,26,63,64,65

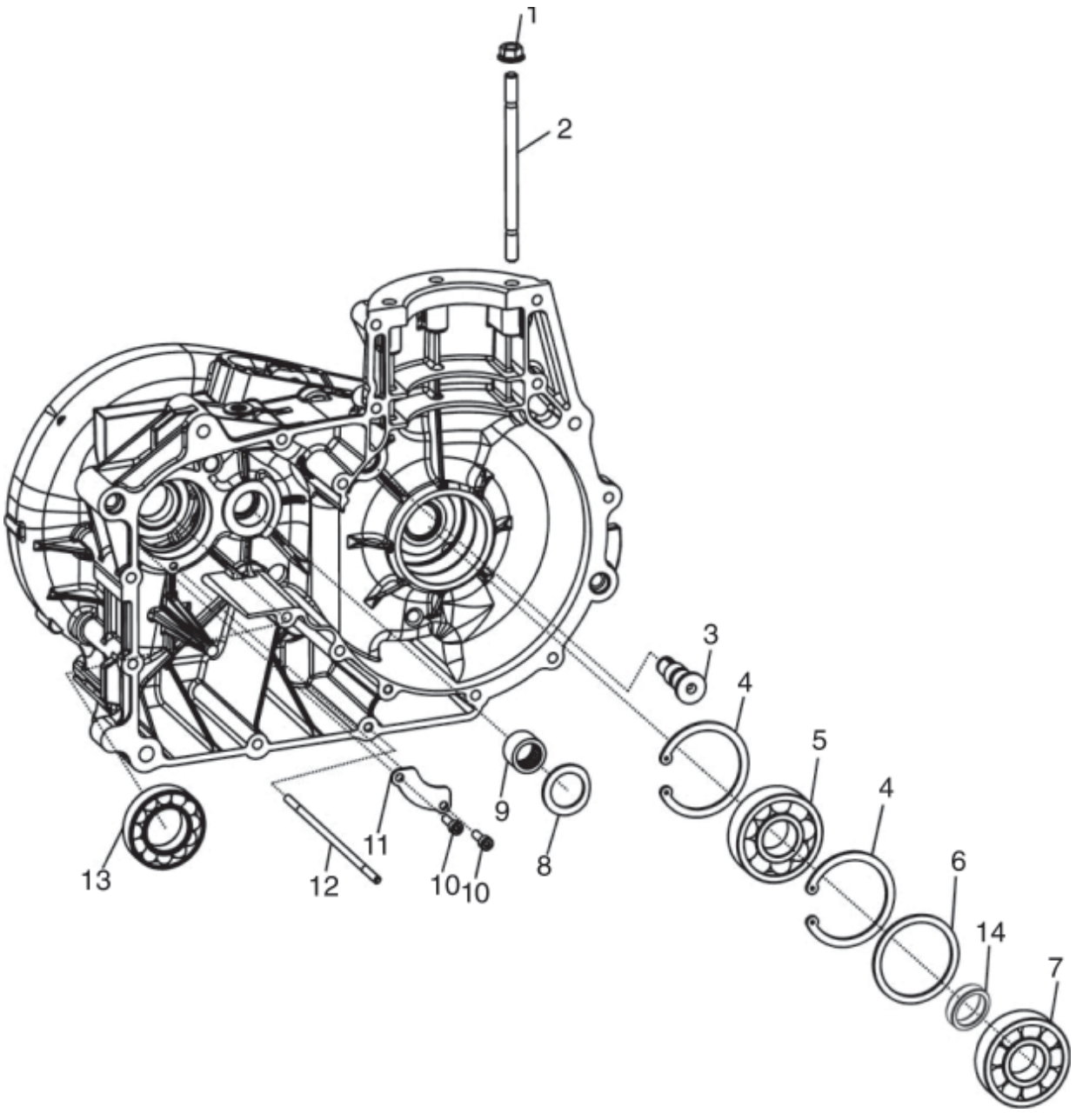
A2	A4
Key No's	Key No's
22,23,24,25,26,27	50,51,52

Crankcase RH - Coverside View

Key No.	Description	Qty.
A1	CAM GEAR ASSEMBLY-EXHAUST WITH DECOMPRESSOR ASSY.	1
A2	OIL PUMP ASSEMBLY - 500CC	1
A3	OIL PUMP ASSEMBLY - 350CC	1
A4	GEAR CHANGER ASSEMBLY	1
1	CAM STEADY PLATE	1
2	DOWEL 6 MM	2
3	HEX. SOCKET HEAD CAP SCREW, M6 X 30	2
4	HEX. SOCKET HEAD CAP SCREW, M6 X 25	1
5	NUT - CAM SPINDLE	2
6	SHIM, CAM GEAR	2
7	PIVOT	1
8	FLY WEIGHT	1
9	TORSION SPRING	1
10	PIN ASSEMBLY	1
11	CAM GEAR AUB ASSEMBLY - EXHAUST	1
12	CAM SLEEVE	2
	CAM SPINDLE ADJUSTABLE	2
13	CAM SPINDLE ADJUSTABLE (0.1 OVERSIZE)	2
	CAM SPINDLE ADJUSTABLE (0.2 OVERSIZE)	2
14	CAM, GEAR - INLET	1
15	COVER, KICK START SHAFT	1
16	HEX SOCKET PAN HEAD SCREW M5 X 12	4
17	NUT, SLEEVE GEAR	1
18	TAB WASHER	1
19	FD SPROCKET 18 TEETH FOR 500CC & 16 TEETH FOR 350CC	1
20	DISTANCE PIECE	1
21	OIL SEAL	1
22	CIRCLIP	1
23	PUMP DRIVE PINION	1
24	CSK SOCKET HEAD SCREW M6 X 30	3
25	GASKET, OIL PUMP	1
26	'O' RING, OIL PUMP OUTLET	1
27	HEX. SOCKET HEAD CAP SCREW M6 X 25	2
28	'O'- RING	1
29	CAP, PIVOT PIN	1
30	COPPER WASHER	1

Key No.	Description	Qty.
31	HEX FLANGE BOLT M5 X 12	1
32	HEX SOCKET HEAD CAP SCREW M6 X 60	2
33	STARTER MOTOR ASSEMBLY	1
34	COVER STARTER MOTOR	1
35	HEX SOCKET, BUTTON HEAD SCREW, M5 X 12	1
36	DOWEL PIN	2
37	TAPPET DOOR	1
38	CSK SOCKET HEAD SCREW M5 X 12	4
39	FLY WHEEL MAGNETO ASSEMBLY	1
40	MAGNETO KEY	1
41	PLAIN WASHER,	
42	HEX. NUT M12 X 1.25	1
43	ASSEMBLY, GEAR LEVER SHAFT	1
44	SPACER - SHAFT, GEAR LEVER	1
45	HEX. SOCKET HEAD CAP SCREW, M5 X 40	2
46	PIVOT BEARING, ROCKER SHAFT BOTTOM	1
47	DOWEL, LOWER PIVOT BEARING	1
48	STOP PIN	1
49	'O' RING	1
50	ROCKER SHAFT ASSEMBLY	1
51	STRIKER, GEAR CHANGE	1
52	PIN, PIVOT	1
53	SPRING, GEAR CHANGE STRIKER	1
54	HEX. SOCKET HEAD CAP SCREW, M6 X 12	2
55	PIVOT BEARING, ROCKER SHAFT UPPER	1
56	'O' RING BLACK NITRILE RUBBER	1
57	SPACER	1
58	SPRING	1
59	PIVOT, CAMPLATE	1
60	'O' RING	1
61	SPRING KICK	1
62	HEX SCREW M6X16	1
63	'O' RING - OIL PUMP	1
64	'O' RING	1
65	HEX. SOCKET HD. CAP SCREW, M4X30	4
66	PLUG	4
67	STATOR AND PULSAR COIL ASSEMBLY	1
68	ROTOR AND RELUCTOR ASSEMBLY	1

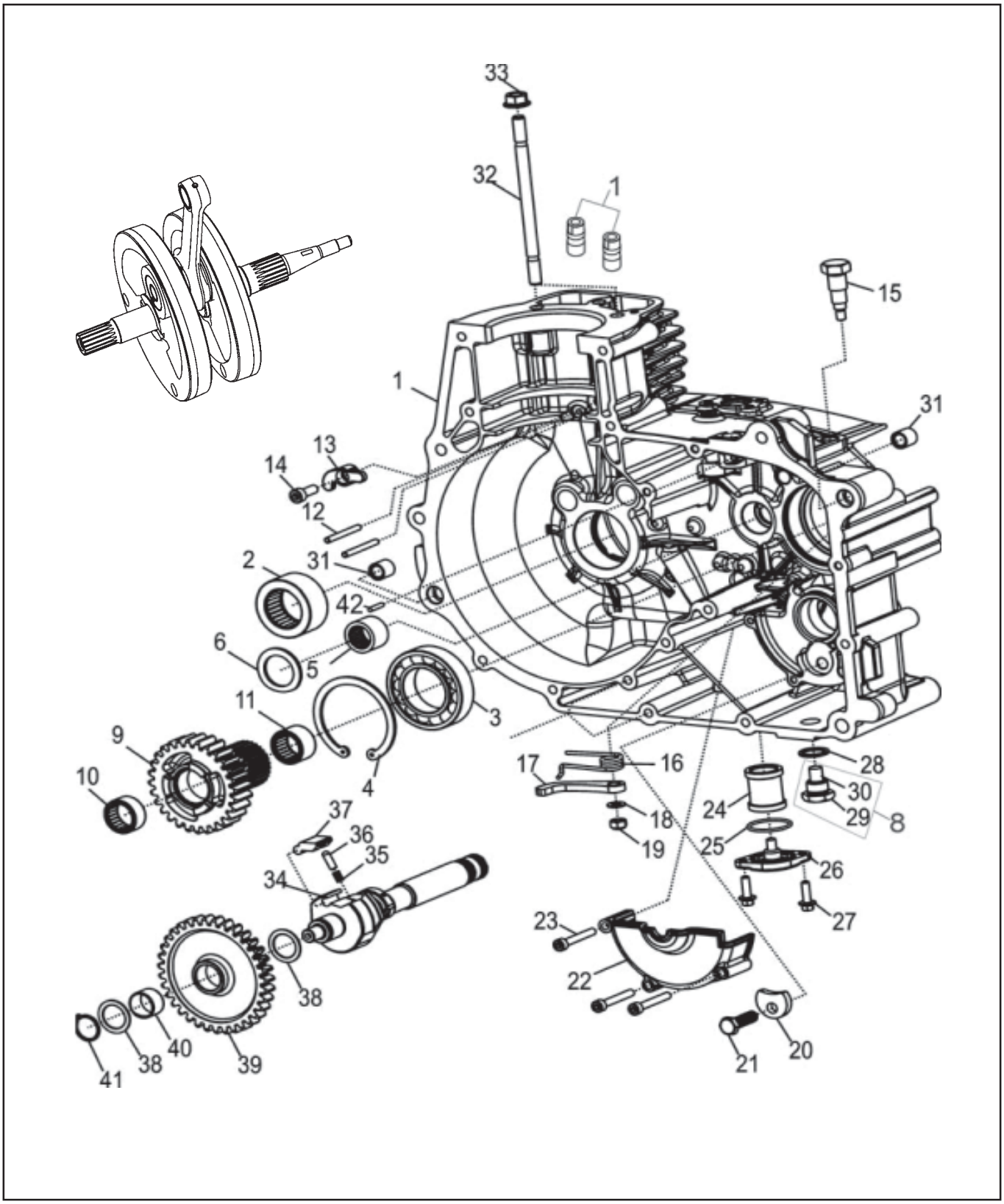
Crankcase LH - Inside View



Crankcase LH - Inside View

Key No.	Description	Qty.
A1	CAM GEAR ASSEMBLY-EXHAUST WITH DECOMPRESSOR ASSY.	1
1	FLANGE HEX NUT - M8 X 1.25	3
2	STUD, M8 X 128	3
3	JACK SHAFT	1
4	CIRCLIP	2
5	BALL BEARING 6305 C3 (25 X 62 X17)	1
6	BEARING SPACER CRANKCASE LH	1
7	ROLLER BEARING NU 305 C4 (25 X 62 X 17)	1
8	WASHER, THRUST	1
9	NEEDLE BEARING	1
10	HEX SOCKET HEAD CAP SCREW, M5 X 16	2
11	RETAINER PLATE, MAINSHAFT BEARING	1
12	STUD M6 X 133	2
13	BALL BEARING 6006, C3 (G/B MAIN SHAFT)	1
14	BEARING SPACER - LH CRANKSHAFT	1

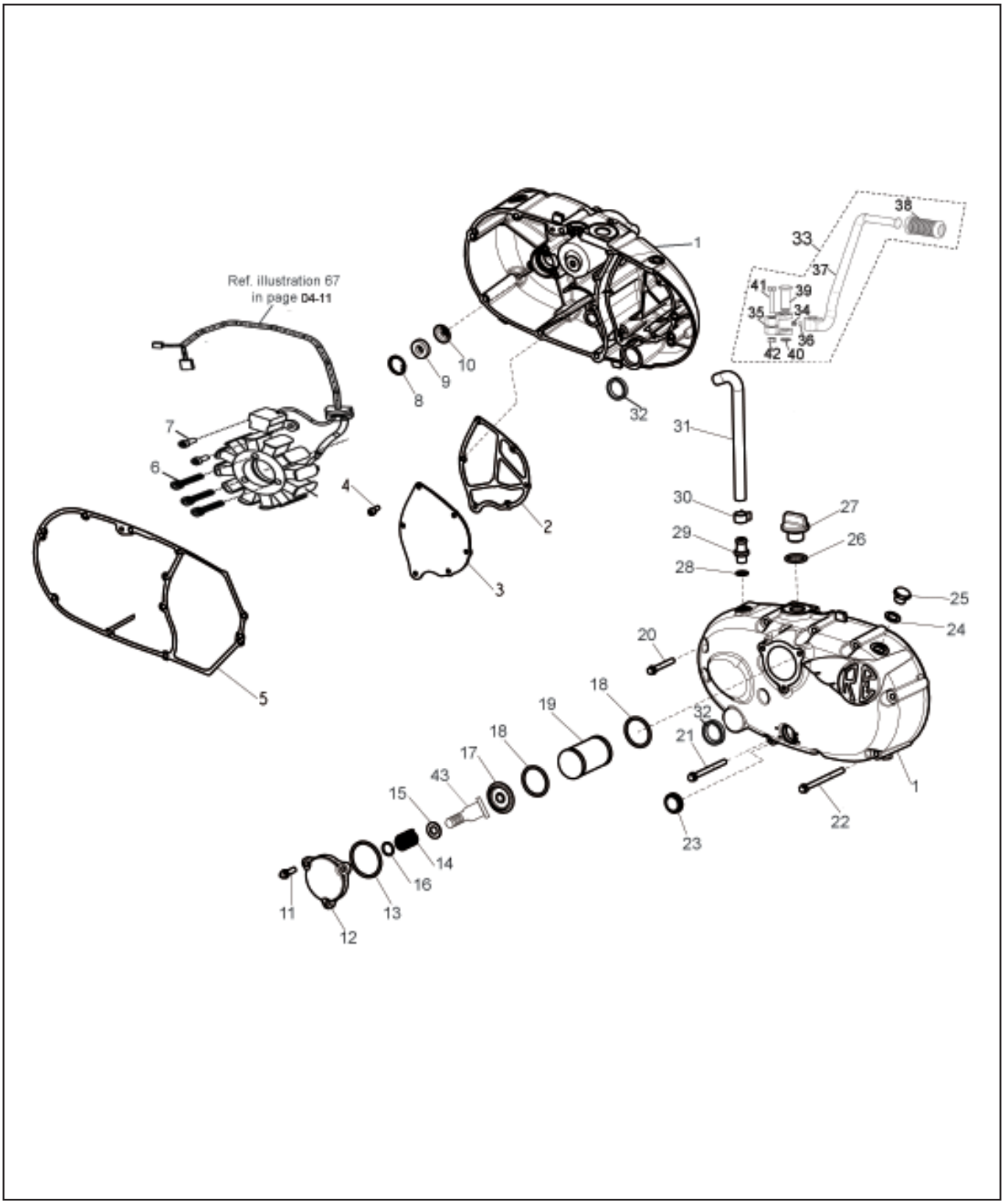
Crankcase RH - Inside View



Crankcase RH - Inside View

Key No.	Description	Qty.
1	HYDRAULIC VALVE LIFTER ROLLER	2
2	BEARING NRB	1
3	DEEP GROOVE BALL BEARING-SLEEVE GEAR	1
4	CIRCLIP 6.2 X 2N	1
5	NEEDLE BEARING	1
6	WASHER, THRUST	1
7	CRANK SHAFT ASSEMBLY	1
8	OIL DRAIN BOLT WITH MAGNET	1
9	SLEEVE GEAR	1
10	NEEDLE BEARING	1
11	NEEDLE BEARING	1
12	NEEDLE ROLLER	2
13	BRACKET - PIN - HYDRAULIC - TAPPET	1
14	HEX. SOCKET HEAD CAP SCREW, M6 X12	1
15	BOLT, PAWL	1
16	SPRING	1
17	PAWL, CAMPLATE	1
18	MACHINED WASHER 6.4	1
19	NUT M6 X 1, FLANGE NYLOC TYPE	1
20	STOP PLATE	1
21	HEX SCREW M8 X 23	1
22	OIL THROWER	1
23	HEX SOCKET HEAD CAP SCREW M5 X 35	3
24	SUCTION FILTER ASY	1
25	O RING-DRAIN CAP	1
26	SUMP DRAIN CAP	1
27	HEX. FLANGE BOLT M5X16	2
28	WASHER DRAIN PLUG	1
29	DRAIN PLUG	1
30	MAGNET	1
31	DOWEL - HOLLOW	2
32	STUD, M8 X 128	3
33	FLANGE NUT-M8	3
34	KICK START SHAFT	1
35	SPRING	1
36	PLUNGER	1
37	PAWL	1
38	WASHER THRUST	2
39	ASSY., KICK START GEAR	1
40	BUSH	1
41	CIRCLIP 18N	1
42	LOCATING PIN,(PIVOT)-NRB 3X21.8	1

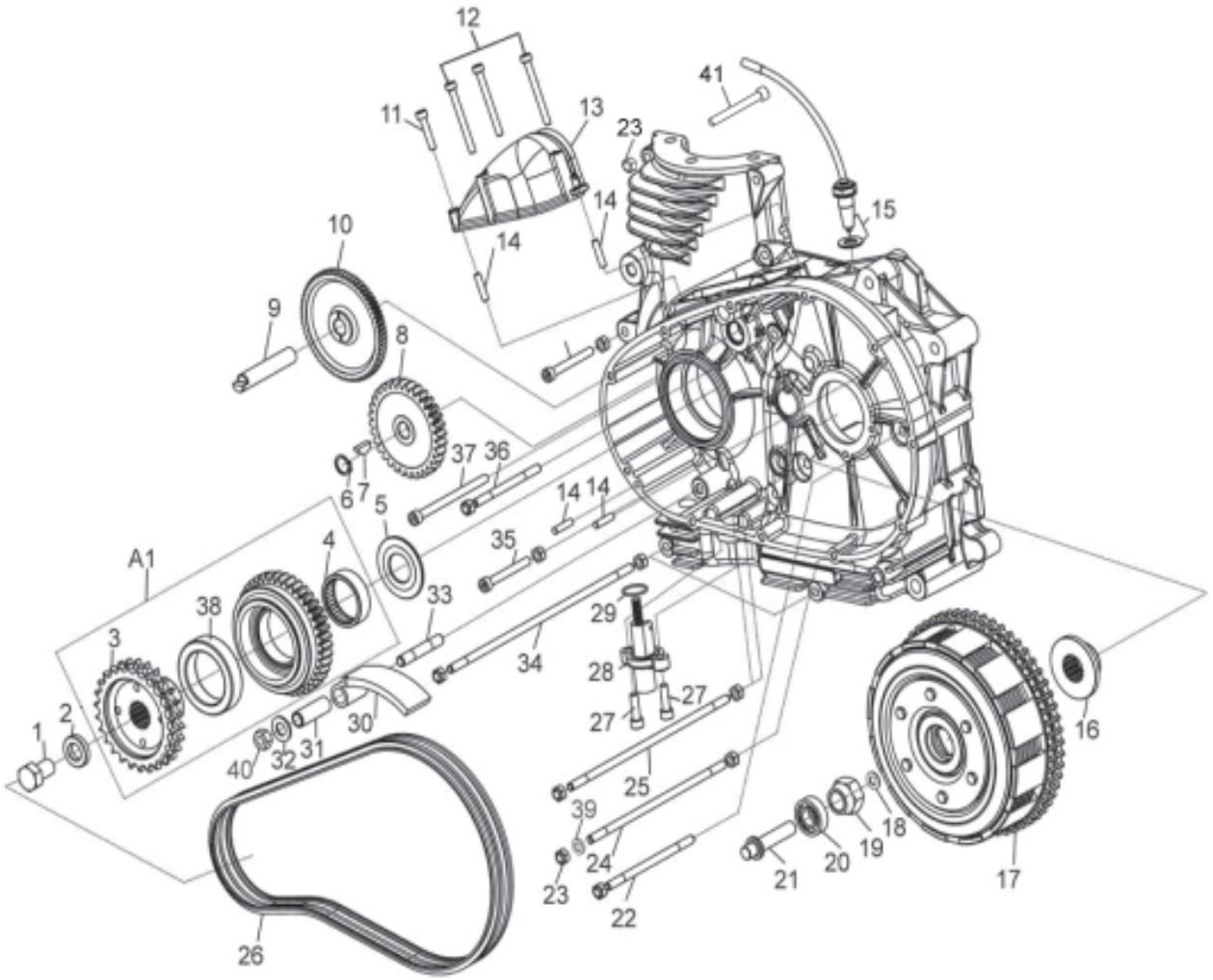
Engine Cover RH



Engine Cover RH

Key No.	Description	Qty.
A1	RH COVER SUB ASSEMBLY	1
1	COVER RH	1
2	GASKET, COVER PLATE	1
3	COVER PLATE, BREATHER CHAMBER	1
4	HEX. SCREW, M5 X 12	6
5	GASKET - COVER RH	1
6	ALLEN SCREW M6 X 30	3
7	HEX SOCKET HEAD CAP SCREW M5X16	2
8	CIRCLIP 24N	1
9	OIL SEAL, CRANK FEED	1
10	JET, CRANKSHAFT RH	1
11	HEX FLANGE BOLT M6 X 1 X 20	3
12	CAP, OIL FILTER	1
13	'O' - RING, FILTER CAP	1
14	SPRING	1
15	WASHER	1
16	'O' - RING	1
17	SPRING CAP	1
18	'O' - RING	1
19	ELEMENT - OIL FILTER	1
20	HEX. FLANGE BOLT, M6 X 1 X 45	2
21	HEX. FLANGE BOLT, M6 X 1 X 70	7
22	HEX. FLANGE BOLT, M6 X 1 X 85	2
23	OIL LEVEL WINDOW	1
24	WASHER, INSPECTION SCREW	1
25	INSPECTION SCREW, IGNITION TIMING	1
26	'O' - RING	1
27	OIL FILLER CAP, METAL	1
28	SEALING WASHER	1
29	BOLT BREATHER	1
30	CLIP BREATHR PIPE	1
31	BREATHER PIPE	1
32	OIL SEAL KICK START	2
33	KICK START CRANK ASSEMBLY	1
34	SPRING	1
35	BOSS, KICK START CRANK	1
36	BALL DIA 6.35	1
37	LEVER KICK START	1
38	SLEEVE KICK START LEVER	1
39	PIN	1
40	CIRCLIP 10	1
41	HEX BOLT M8X40	1
42	HEX NUT M8	1
43	SCREW SPRING CAP	1

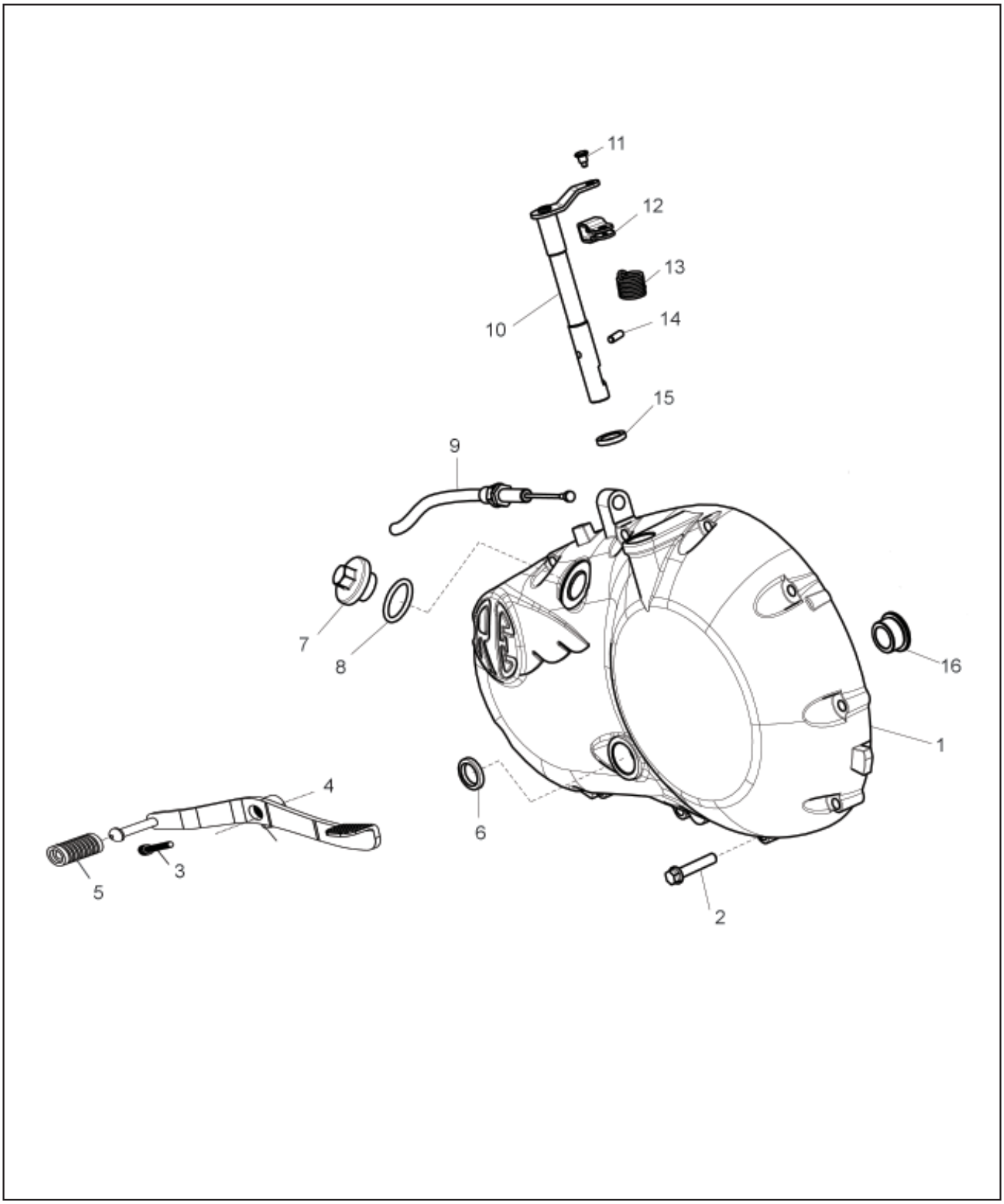
Crankcase LH - Coverside View



Crankcase LH - Coverside View

Key No.	Description	Qty.
A1	SPRAG CLUTCH ASSEMBLY	1
1	HEX. HEAD SCREW	1
2	WASHER	1
3	ENGINE SPROCKET	1
4	NEEDLE BEARING	1
5	DISTANCE WASHER, SPRAG CLUTCH	1
6	CIRCLIP	1
7	KEY - JACK SHAFT	1
8	GEAR, - JACK SHAFT	1
9	SHAFT, DOUBLE GEAR	1
10	DOUBLE GEAR - STARTER DRIVE	1
11	HEX. SOCKET HEAD CAP SCREW, M5 X 25	1
12	HEX. SOCKET HEAD CAP SCREW, M5 X 45	3
13	HOUSING STARTER DRIVE	1
14	DOWEL (6MM)	2
15	NEUTRAL SWITCH WITH PACKING	1
16	COLLAR, MAINSHAFT	1
17	CLUTCH ASSEMBLY COMPLETE	1
18	PLAIN WASHER	1
19	NYLOCK NUT	1
20	BALL BEARING 6001	1
21	CLUTCH PUSH PAD	1
22	STUD M6 X 106	1
23	NUT M6X1, FLANGE NYLOC TYPE	20
24	STUD M6 X 168	1
25	STUD M6 X 196	2
26	PRIMARY CHAIN	1
27	HEX. SOCKET HEAD CAP SCREW, M6X20	2
28	AUTO CHAIN TENSIONER ASSEMBLY	1
29	'O' RING, CHAIN TENSIONER ASSEMBLY	1
30	CHAIN TENSIONER PAD	1
31	BUSH, CHAIN TENSIONER PAD	1
32	PLAIN WASHER	1
33	STUD, CHAIN TENSIONER PAD	1
34	STUD M6 X 226	2
35	HEX. SOCKET HEAD CAP SCREW, M6 X 50	2
36	STUD M6 X 80	1
37	HEX. SOCKET HEAD CAP SCREW, M6X85	1
38	SPRAG CLUTCH BEARING	1
39	COPPER WASHER	1
40	NUT - TENSIONER PAD	1
41	HEX. SOCKET HEAD CAP SCREW, M6 X 90	4

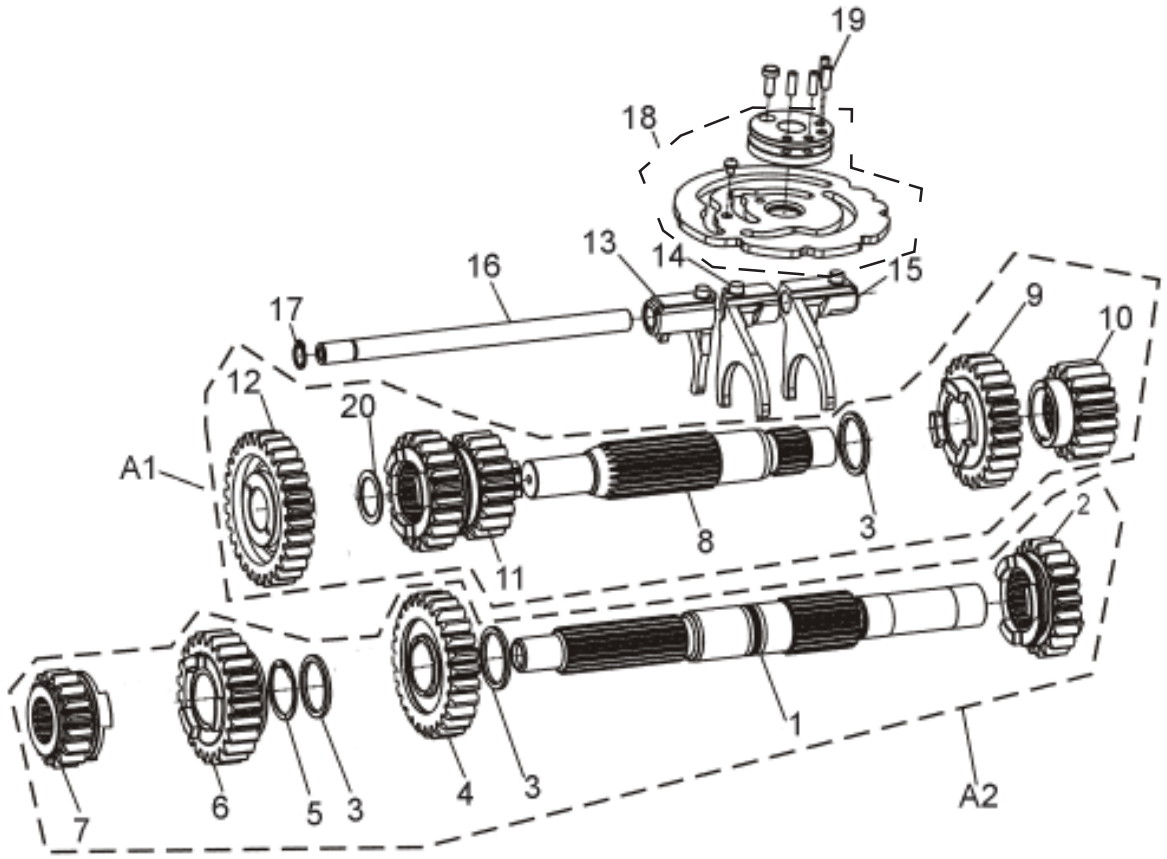
Engine Cover LH



Engine Cover LH

Key No.	Description	Qty.
A1	LH COVER SUB ASSEMBLY	1
A2	CLUTCH OPERATING LEVER	1
1	COVER, LH	1
2	HEX. FLANGE BOLT , M6 X 1 X 30	11
3	HEX SCREW M6 X 30	1
4	GEAR PEDAL ASSEMBLY	1
5	SLEEVE, GEAR LEVER	1
6	OIL SEAL 14 X 20 X 3	1
7	OIL FILLER PLUG	1
8	'O' - RING (PLUG)	1
9	CLUTCH CABLE ASSEMBLY	1
10	CLUTCH OPERATING LEVER ASSEMBLY	1
11	PIN, CLUTCH OPERATING LEVER	1
12	CABLE CLEVIS, CLUTCH OPERATING LEVER	1
13	SPRING, CLUTCH OPERATING LEVER	1
14	LOCK PIN SPRING, CLUTCH OPERATING MECH.	1
15	OIL SEAL INA G 12 X 18 X 5	1
16	BUSH	1

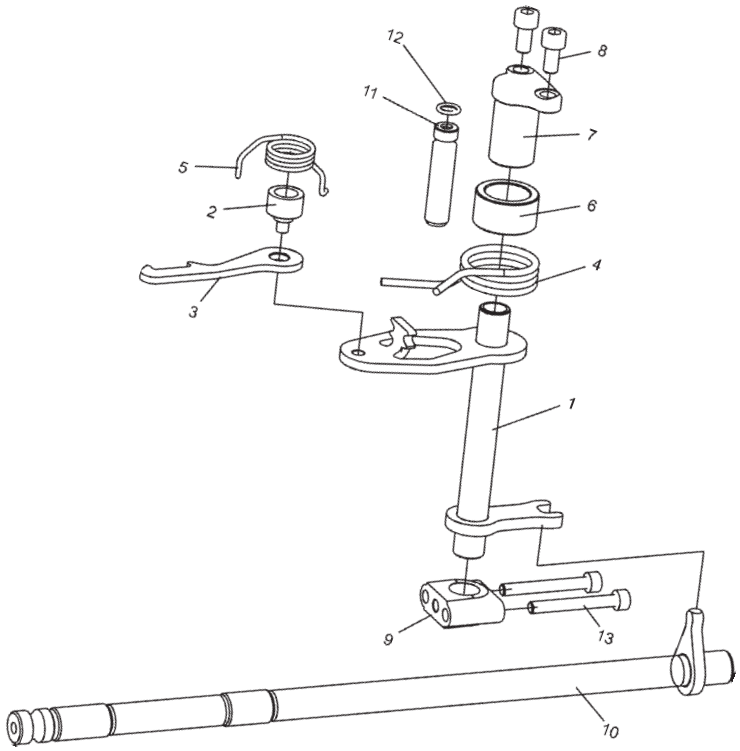
Gear Train Assembly

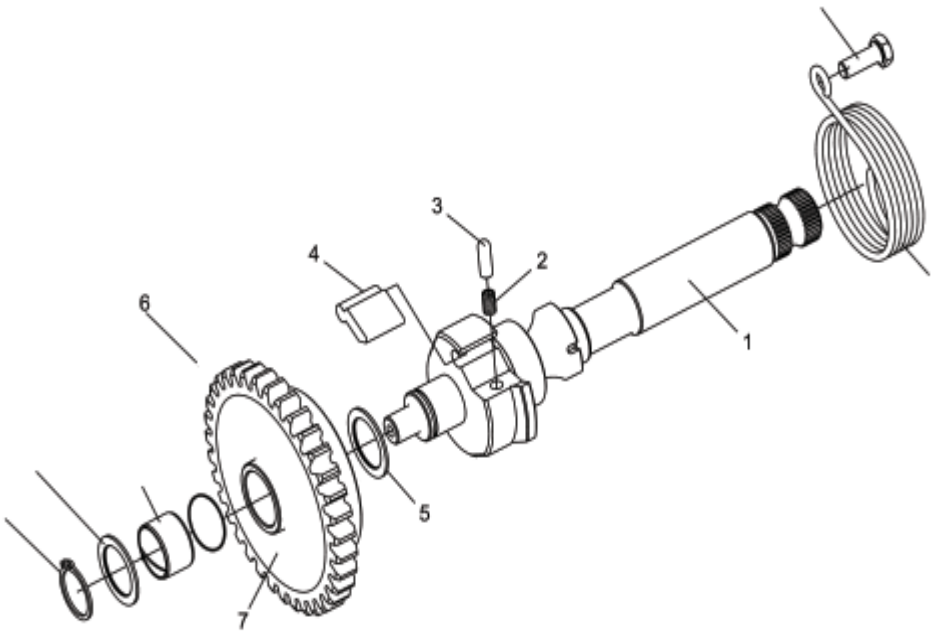


Gear Train Assembly

Key No.	Description	Qty.
A1	LAY SHAFT SUB ASSEMBLY	1
A2	MAIN SHAFT SUB ASSEMBLY	1
1	MAIN SHAFT	1
2	MAIN SHAFT 2ND GEAR	1
3	WASHER, THRUST	3
4	MAIN SHAFT 4TH GEAR ASSEMBLY	1
5	CIRCLIP	1
6	MAIN SHAFT 3RD GEAR ASSEMBLY	1
7	MAIN SHAFT 1ST GEAR	1
8	LAY SHAFT	1
9	LAY SHAFT 2ND GEAR ASSY. WITH BUSH	1
10	LAY SHAFT HIGH GEAR	1
11	LAY SHAFT 3RD GEAR / 4TH DOUBLE GEAR	1
12	LAY SHAFT 1ST GEAR ASSEMBLY	1
13	SELECTOR FORK LH	1
14	SELECTOR FORK CENTRE	1
15	SELECTOR FORK RH	1
16	SELECTOR FORK SHAFT	1
17	CIRCLIP	1
18	CAM PLATE ASSEMBLY	1
19	ROLLER	4
20	WASHER THRUST	1

Gear Shifting / Kick Starter



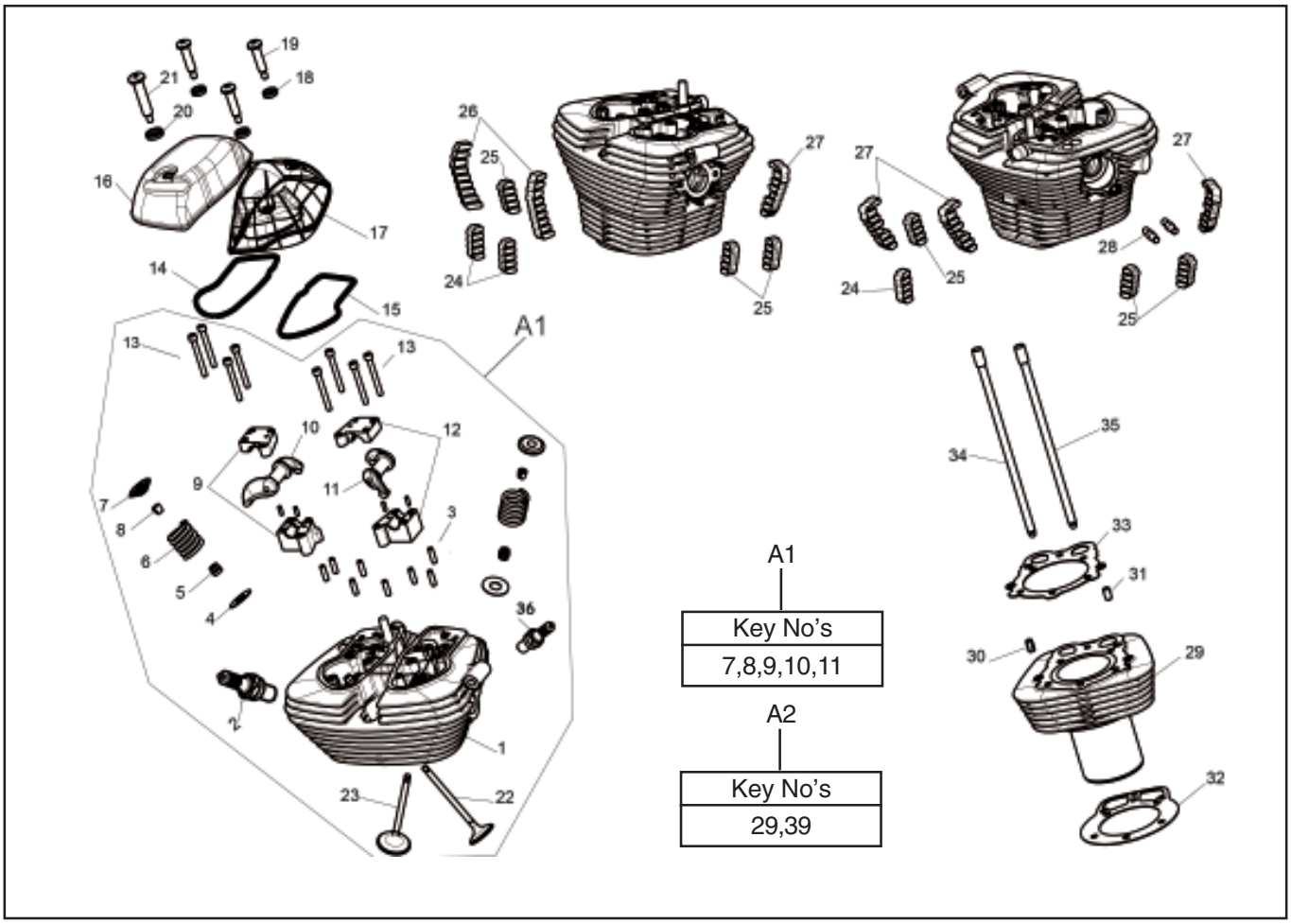


Gear Shifting / Kick Starter

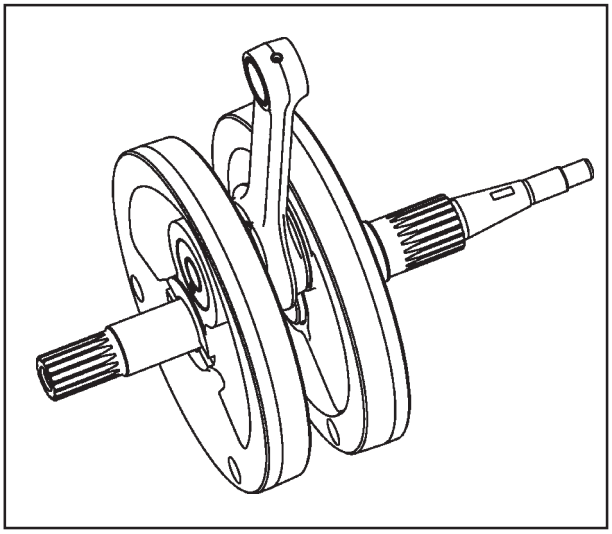
Key No.	Description	Qty.
1	SS ROCKER SHAFT ASSEMBLY,	1
2	PIN PIVOT	1
3	STRIKER, GEAR CHANGE	1
4	SPRING	1
5	SPRING, GEAR CHANGE STRIKER	1
6	SPACER	1
7	PIVOT BEARING, ROCKER SHAFT UPPER	1
8	HEX. SOCKET HEAD CAP SCREW, M6 X 12	2
9	PIVOT BEARING, ROCKER SHAFT BOTTOM	1
10	ASSEMBLY, GEAR LEVER SHAFT	1
11	STOP PIN	1
12	O-RING	1
13	HEX. SOCKET HEAD CAP SCREW, M5 X 40	2

Key No.	Description	Qty.
A1	KICKSTARTER SHAFT SUB ASSEMBLY	1
1	KICKSTART SHAFT	1
2	SPRING	1
3	PLUNGER	1
4	PAWL	1
5	WASHER, THRUST	1
6	KICKSTART GEAR ASSEMBLY	1
7	KICKSTARTER GEAR 35T	1
8	BUSH	1
9	CIRCLIP	1
10	SPRING	1
11	HEX SCREW M6	1

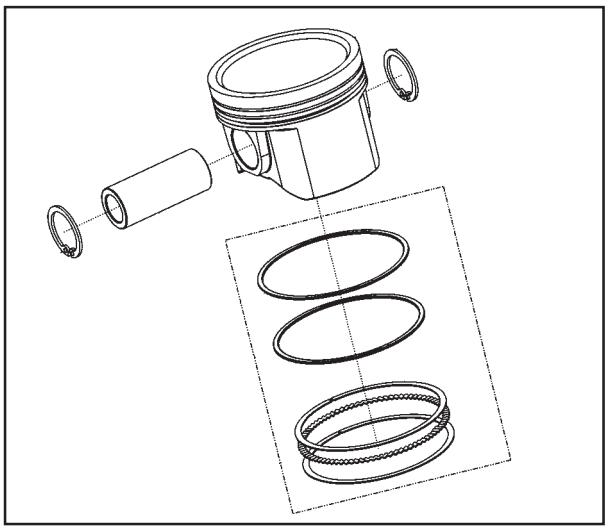
Cylinder Head, Barrel, Piston & Crankshaft



CRANK SHAFT ASSY.



PISTON ASSY.

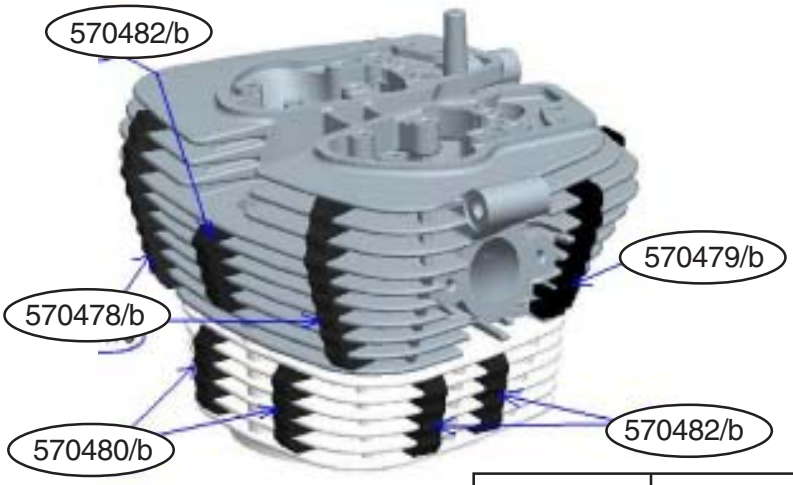


Cylinder Head, Barrel, Piston & Crankshaft

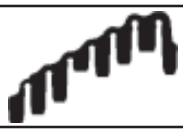
Key No.	Description	Qty.
A1	CYLINDER HEAD ASSEMBLY	1
A2	CYLINDER PISTON ASSEMBLY	1
1	CYL. HEAD SUB ASSY. (CYL. HEAD, VALVE GUIDE, VALVE SEATS)	1
2	SPARK PLUG - M 14	1
3	DOWEL (6 MM)	8
4	SEAT, SPRING	2
5	VALVE STEM SEAL	2
6	VALVE SPRING	2
7	RETAINER, SPRING	2
8	SPLIT COLLAR	4
9	ROCKER BEARING SET-EXHAUST	1
10	ROCKER ARM, EXHAUST	1
11	ROCKER ARM - INLET	1
12	ROCKER BEARING SET-INLET	1
13	HEX. SOCKET HEAD CAP SCREW, M6 X 55	8
14	GASKET, ROCKER COVER EXHAUST	1
15	GASKET, ROCKER COVER INLET	1
16	ROCKER COVER - EXHAUST	1
17	ROCKER COVER - INLET	1
18	WASHER-SEAL	3
19	HEX. HEAD SCREW-ROCKER COVER	3
20	WASHER SEAL	1
21	HEX. HEAD SCREW	
	ROCKER COVER	1
22	VALVE EXHAUST	1
23	VALVE INLET	1
24	DAMPER PAD - CYLINDER BARREL	3
25	DAMPER PAD - CYLINDER BARREL TAPPER	6
26	DAMPER PAD LH - CYLINDER HEAD	2
27	DAMPER PAD RH - CYLINDER HEAD	4
28	STUD, EXHAUST	2
29	CYL. BARREL ASSEMBLY	1
30	DOWEL PIN	1
31	DOWEL PIN	1
32	GASKET	1
33	MLS GASKET	1
34	PUSH ROD ASSEMBLY, EXHAUST	1
35	PUSH ROD ASSEMBLY, INLET	1
36	SPARK PLUG - M 10 - BOSCH (UR 5DC)	1
37	CIRCLIP	2
38	RING SET STD	1
39	PISTON ASSEMBLY WITH RINGS STD	1

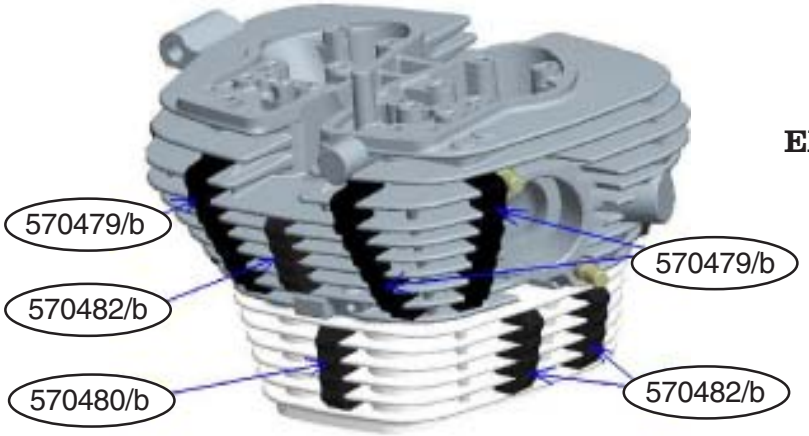
Damper Pad Position Details

NUMBER OF DAMPER PADS PER ENGINE = 15



INLET SIDE VIEW

Part No.	Description	Quantity per engine	Image
570478/b	Damper pad-cylinder head LH	2	
570479/b	Damper pad-cylinder head RH	4	



EXHAUST SIDE VIEW

Part No.	Description	Quantity per engine	Image
570480/b	Damper pad straight - Barrel	3	
570482/b	Damper pad taper - Barrel	6	

SECTION

FIVE 05

ENGINE DISMANTLING INSPECTION & ASSEMBLY

Engine Dismantling, Inspection & Assembly

COMPONENTS THAT CAN BE REMOVED WITHOUT REMOVING THE ENGINE FROM FRAME.

- ☆ Cylinder head assembly
- ☆ Cylinder block
- ☆ Magneto assembly
- ☆ Primary drive
- ☆ Clutch assembly
- ☆ Timing gears
- ☆ Oil pump Assembly
- ☆ Gearbox foot control mechanism
- ☆ Kick Main Spring replacement
- ☆ Self Starter Sprag Bearing replacement.

ENGINE NEED TO BE REMOVED FROM THE FRAME FOR THE FOLLOWING JOBS:

- ☆ Crank case repair/change
- ☆ Crank case centre gasket change i.e liquid sealant gasket.
- ☆ Crank shaft main bearings LH & RH replacement.
- ☆ Gears, Mainshaft or Layshaft, Sleeve Gear repair / replacement
- ☆ Mainshaft or Layshaft Bearings replacement.
- ☆ Self starter Idler Gear jack Shaft replacement.
- ☆ Kick Starter Gear, Pawl, Spring or Plunger replacement.
- ☆ Roller Hydraulic Valve Lifter (RHVL) replacement.

ENGINE DISASSEMBLY

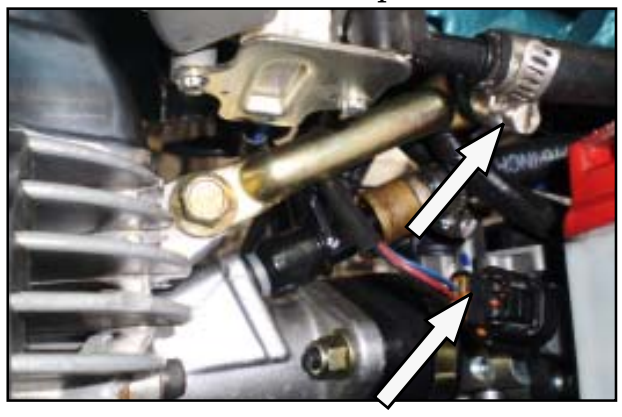
- ☆ Cylinder Head Sub Assembly
- ☆ Cylinder Barrel Sub Assembly
- ☆ Cover RH Sub Assembly
- ☆ Components dismantling on Crankcase RH
- ☆ Cover LH Sub Assembly
- ☆ Components dismantling on Crankcase LH
- ☆ Opening / splitting of Crank case RH & LH
- ☆ Gear Train removal
- ☆ Lay shaft and Main shaft sub Assembly

Engine Dismantling, Inspection & Assembly

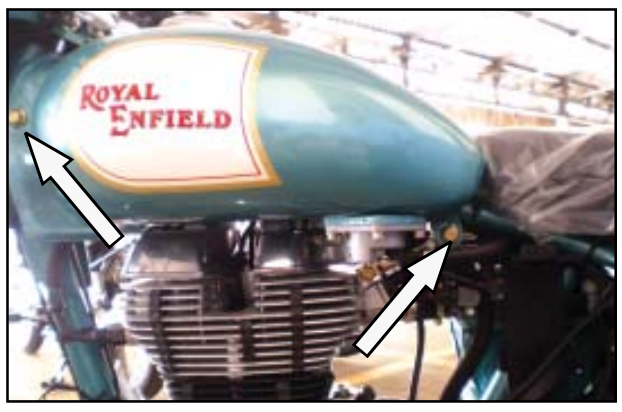
DISMANTLING PROCEDURE

☆ Disconnect fuel hose. Take care to ensure fuel does not spill.

☆ Disconnect fuel pump module and low fuel sensor couplers.



☆ Remove the front and rear flange nuts, washer at the front & rear mounting of the fuel tank.

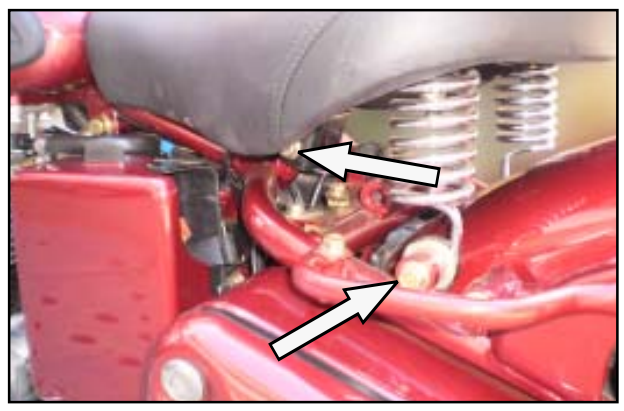


☆ Lift the tank from the seat side & remove.

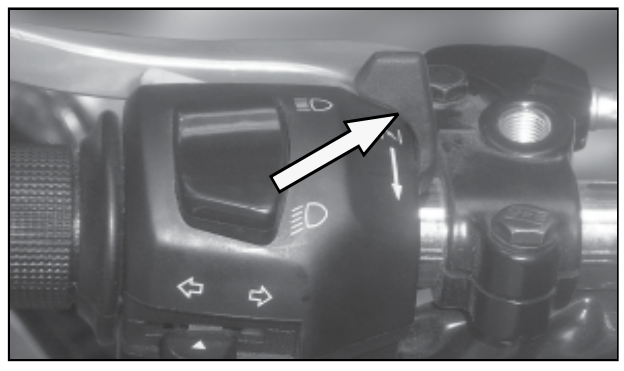
CAUTION :

Keep a cloth on the front end of the fuel tank, (below the handle bar clamp) to avoid damage to the fuel tank while removing.

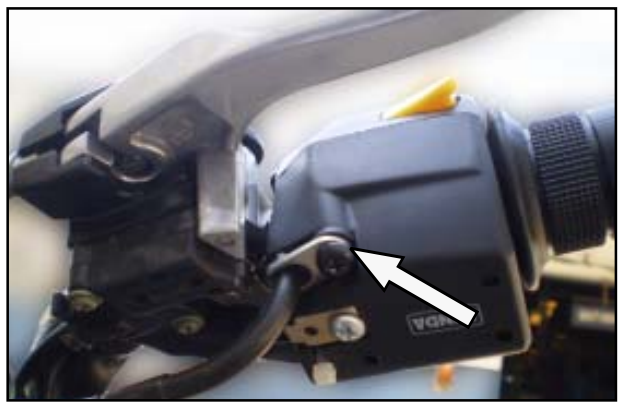
☆ Remove the mounting bolts as shown and remove the seat.



☆ Manual Bi starter



☆ Remove the 2 screws, at the bottom of the LH switch module and separate the module from the handle bar.

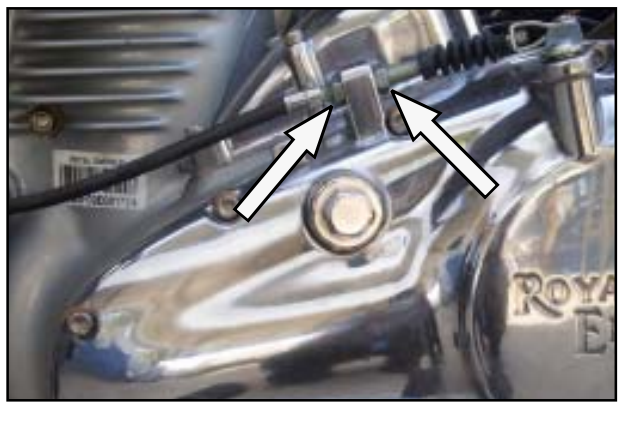


☆ Disconnect the cable from the lever.

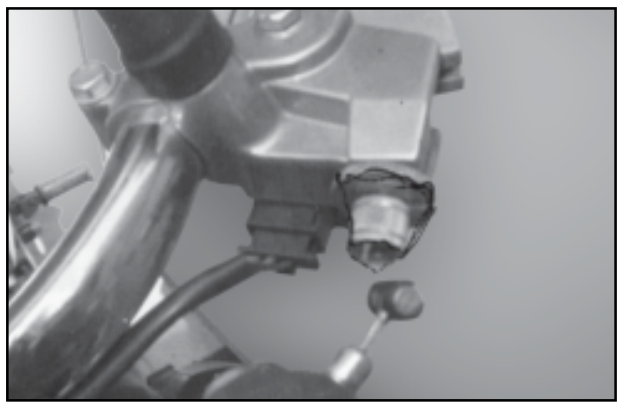
CLUTCH CABLE REMOVAL

☆ Slacken the adjuster at the clutch cover end and disconnect the cable from the lever.

☆ Take out clutch cable from the cover.

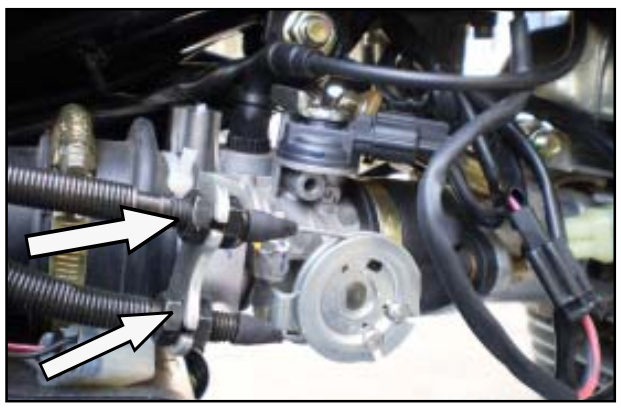


☆ Remove the clutch cable from the clutch lever at handle bar end.



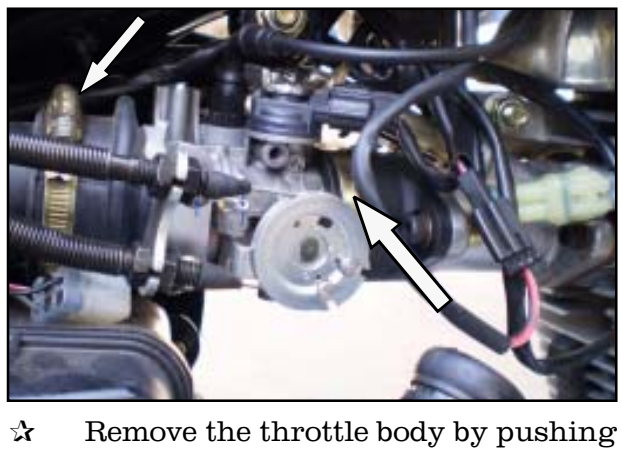
REMOVAL OF THROTTLE CABLE

☆ Slacken the adjusters at the throttle body end for both cables.

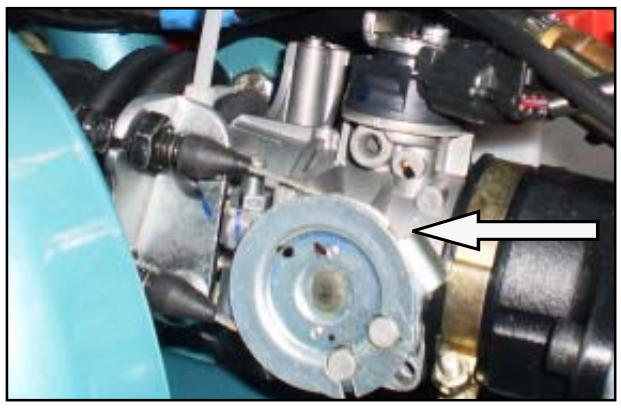


REMOVAL OF THROTTLE BODY

☆ Loosen the throttle body flange & bellow clip.



☆ Remove the throttle body by pushing towards Air Filter box.



Engine Dismantling, Inspection & Assembly

REMOVAL OF SILENCER AND EXHAUST PIPE

☆ Remove the centre silencer bracket mounting screw with plain washer.

☆ Remove the rear mounting at the pillion foot rest end

NOTE :

Loosen the rear brake rod adjuster nut so that the brake pedal can be depressed to allow the exhaust pipe to be removed.

☆ Remove the flange nut 2 nos. from cylinder head.

☆ Remove the Silencer Assembly with Exhaust pipe.

☆ Remove the Suppressor Cap

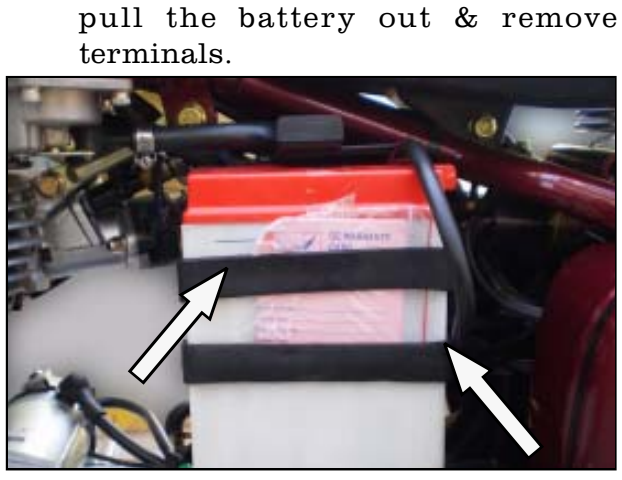
BATTERY REMOVAL

☆ Ensure ignition switch is in “OFF” position.

☆ Remove battery cover on LH side.

Engine Dismantling, Inspection & Assembly

☆ Remove the battery holding straps pull the battery out & remove terminals.

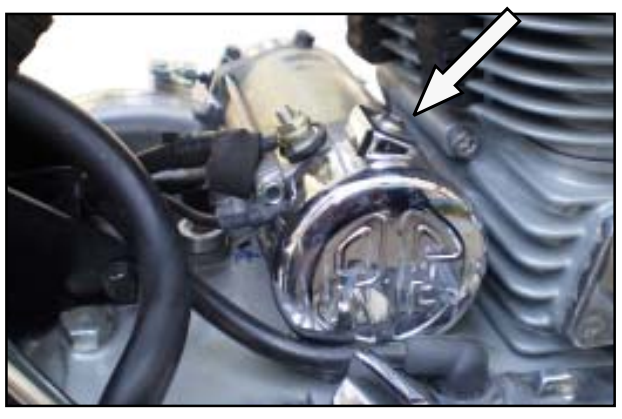


CAUTION :

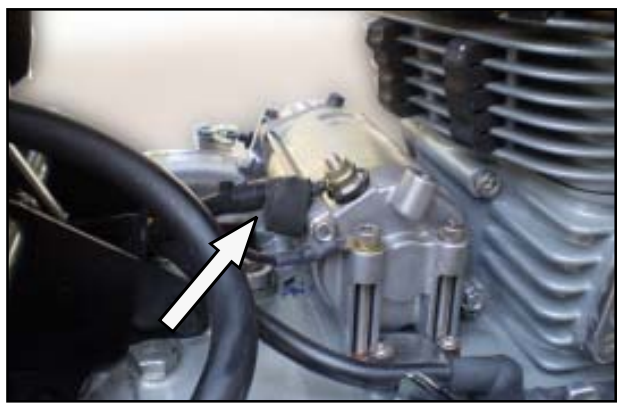
Always remove earth wire terminal first.

REMOVAL OF E-START MOTOR

☆ Remove the cover screw

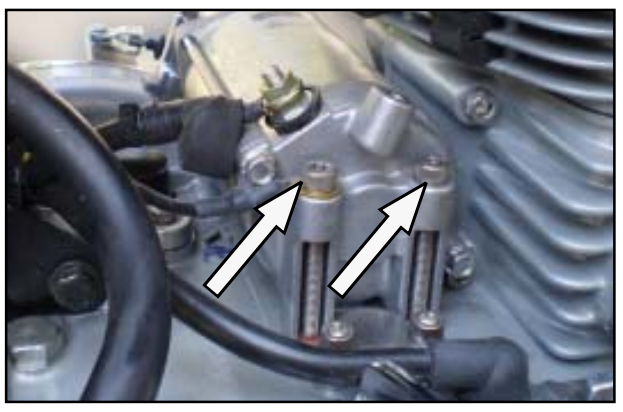


☆ Remove the terminal rubber boot.



☆ Remove the terminal nut & take out the terminal wire lead.

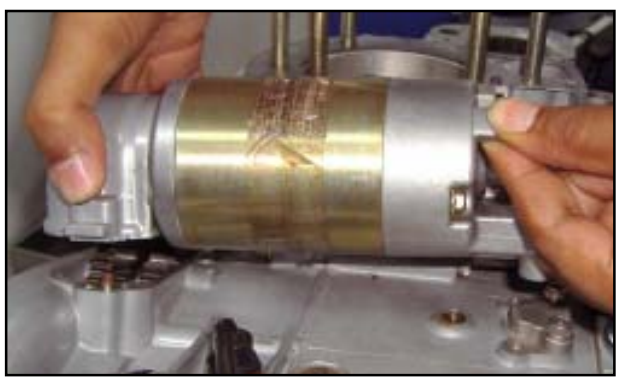
☆ Remove the 2 mounting allen screws.



☆ Lift the motor upwards and pull out of the housing in the front.

☆ Remove 4 screws of the starter drive housing and tap gently to free the housing.

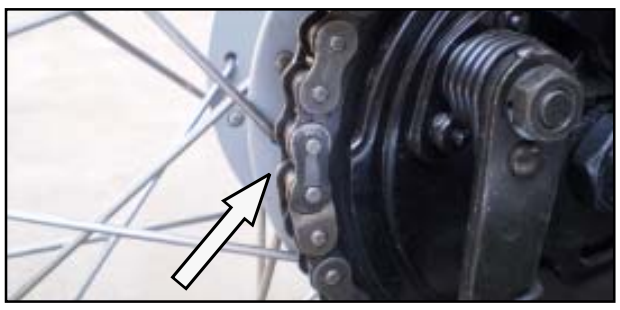
☆ Gently lift the motor and remove the motor along with the housing. Remove the 2 dowels for the housing drive.



Engine Dismantling, Inspection & Assembly

REMOVAL OF DRIVE CHAIN

☆ Rotate the rear wheel to bring the chain lock to a convenient position and remove the chain lock.



☆ Remove the chain link and the drive chain.

REMOVAL OF SIDE STAND

☆ Remove the mounting nuts and remove the side stand.

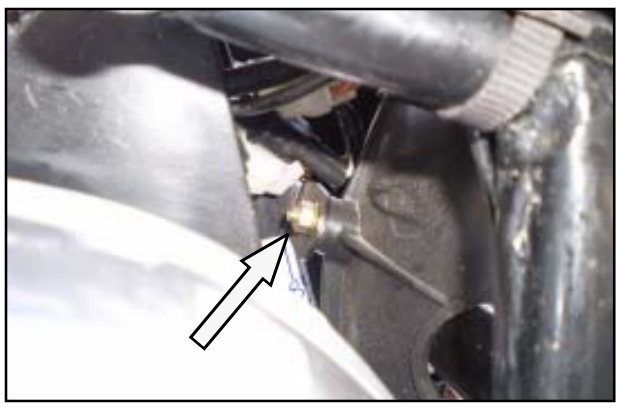
REMOVAL OF REAR BRAKE SWITCH

☆ Disconnect the brake switch spring from brake lever.

☆ Disconnect the rear brake switch coupler from the wiring harness

☆ Slacken the nyloc nuts & remove the brake light switch.

☆ Remove the piece mudguard bracket bolt along with 2 plain washers & 1 star washer



☆ Remove rider foot rest LH & RH (C5)

Engine Dismantling, Inspection & Assembly

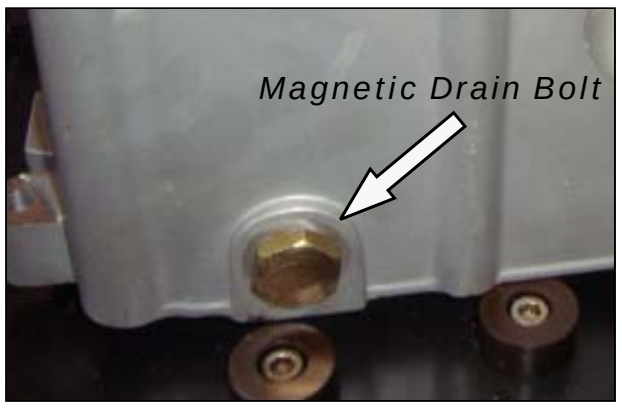
ENGINE OIL DRAIN

Always best to drain the engine oil in warm condition.

☆ Remove the 2 Flanged hex bolts. Remove the drain cap with 'O' ring.

☆ Remove suction filter.

☆ Remove the magnetic drain plug with washer.



CYLINDER HEAD ASSEMBLY

☆ Remove the 4 allen screws along with rubber seals from Inlet and exhaust rocker covers.

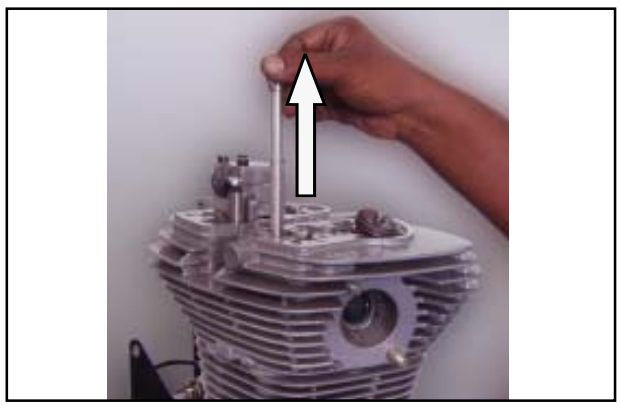
☆ Remove the Inlet & Exhaust Rocker cover, dowel & rubber gasket.

☆ Remove the 4 allen screws each on the rocker bearing inlet & exhaust.

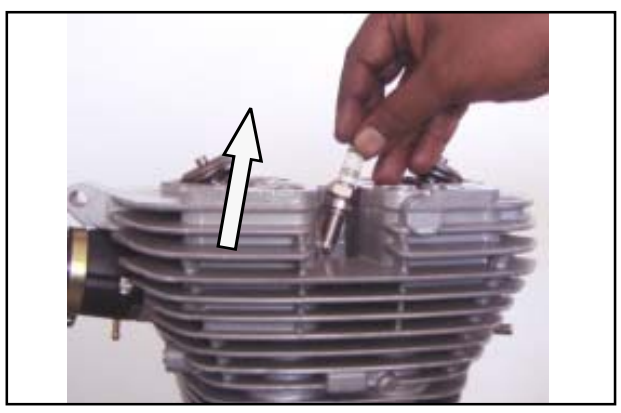
☆ Remove the inlet and exhaust rocker bearing with dowel and rocker arm.

Engine Dismantling, Inspection & Assembly

☆ Remove inlet and exhaust pushrods

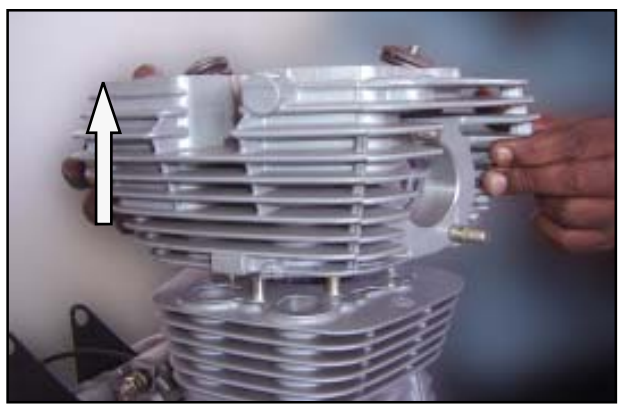


☆ Remove the Spark plug

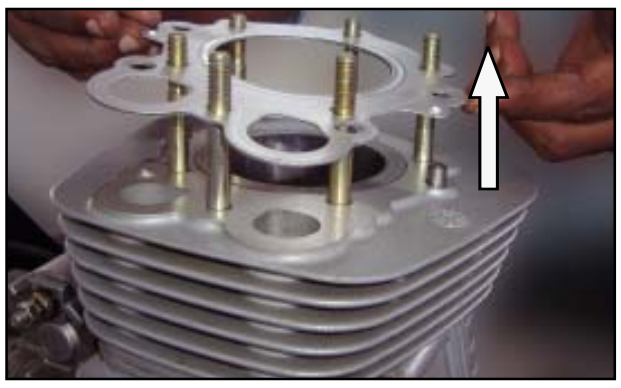


☆ Remove the 6 flanged hex nuts, securing the cylinder head.

☆ Remove the Cylinder head assy.



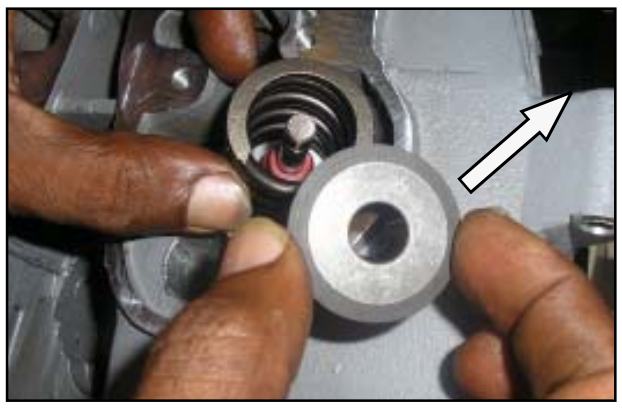
☆ Remove the multi layer steel (MLS) head gasket.



REMOVAL OF VALVES

☆ Remove the Inlet & Exhaust valves by using special tool No. ST25123-1 Valve spring compressor as shown

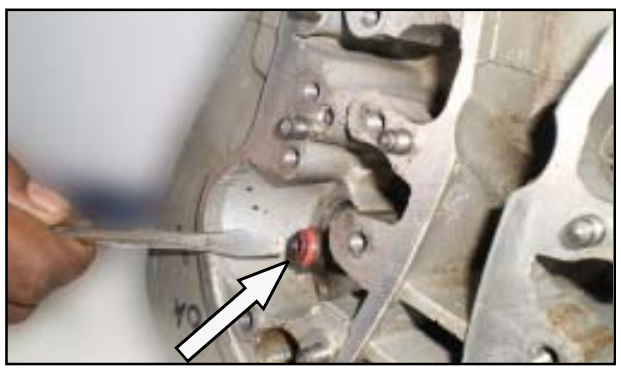
☆ Remove the Inlet Valve spring retainer, split collar and Spring.



☆ Remove Inlet Valve as shown

NOTE: Similarly follow the same process to remove Exhaust Valve.

☆ Remove Inlet and Exhaust Valve stem seal from valve guides.



NOTE : Always replace valve stem seal in case of removal of valve from Cylinder head.

CYLINDER BARREL SUB ASSY.

☆ Gently tap Cylinder barrel and remove along with 2 dowel pins.

NOTE : Ensure piston is at TDC.

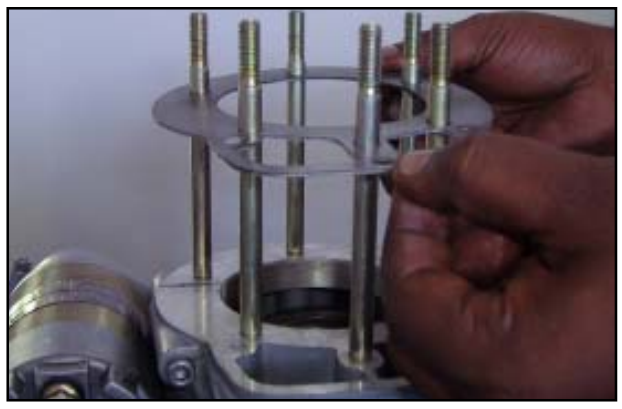
☆ Remove gudgeon pin and piston.

NOTE : Carefully remove the piston pin clip from the piston while covering Crank case neck with a shop towel, as shown.

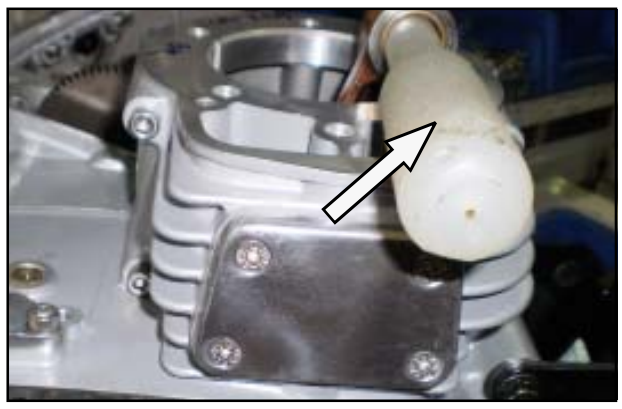
☆ Remove gudgeon pin and piston.

NOTE : Carefully remove the piston rings from the piston without deforming.

☆ Remove Cylinder barrel bottom Gasket.



☆ Use Special tool No. ST - 25592-4 to hold connecting rod as shown Fig.

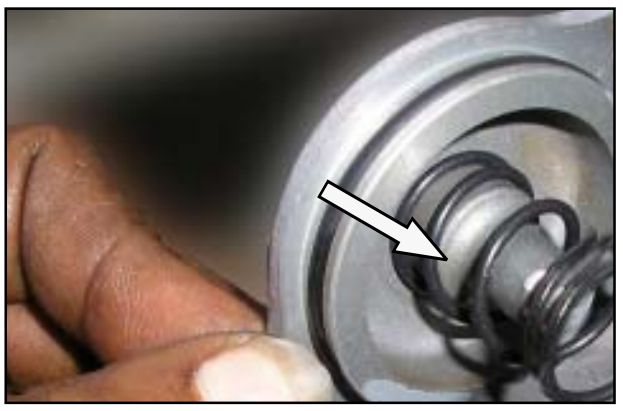


REMOVAL OF COVER RH SUB ASSEMBLY :

☆ Remove kickstarter lever.

☆ Remove oil filter cover bolts.

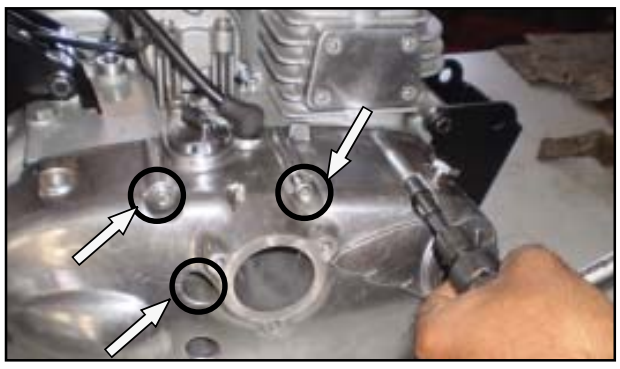
☆ Remove oil filter cap, “O”ring & Spring.



CAUTION : Care must be taken while removing cover due to spring force.

☆ Remove the 3 “O” rings, Oil filter element spring cap, washer & Oil filter element.

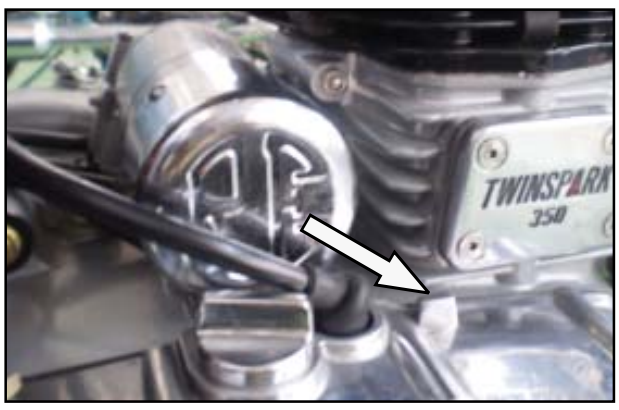
☆ Remove the 11 bolts securing cover RH. Gently tap & pull out the cover evenly



☆ It may be necessary to tap the cover slightly to remove since the magnetic forces in the rotor can be acting on the stator and making it difficult to remove

CAUTION :

Tap only at the places shown to avoid damage to the RH cover

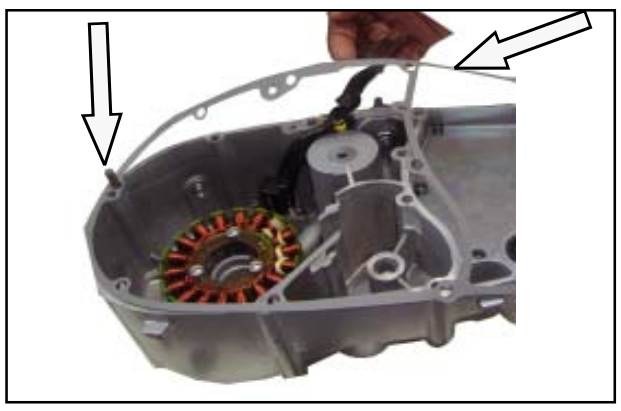


NOTE :

Remove the stator coupler from the wiring harness before removing RH Cover.

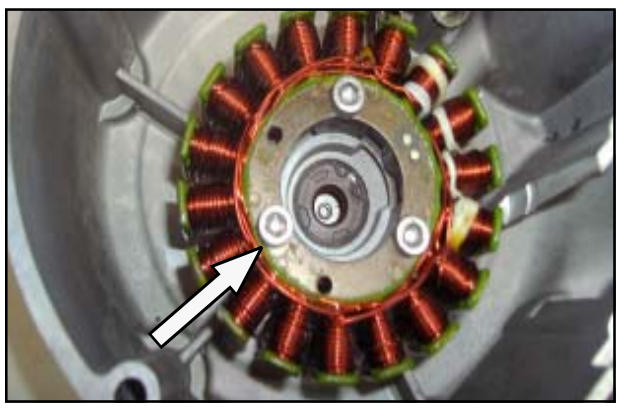
Place a plastic tray below the RH cover for collecting the oil that will drip while removing the cover.

☆ Remove RH cover gasket & 2 dowels.



☆ Remove Pulser coil by removing 2 screws

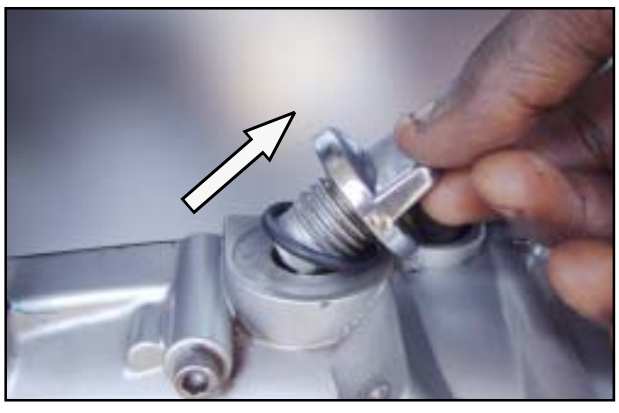
☆ Remove Stator assembly by removing 3 mounting screws.



☆ Remove circlip, oil seal and jet crankshaft

NOTE : This Oil seal is recommended to be replaced at every 20,000 kms interval.

☆ Remove oil filler cap and "O" ring



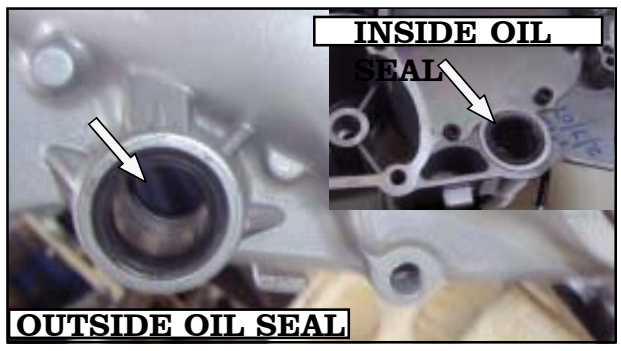
☆ Remove Ignition Timing check bolt and washer (if not removed earlier).

☆ Remove Breather bolt and washer

☆ Remove 6 Nos. allen screws to remove breather chamber cover

☆ Remove breather chamber gasket

☆ Remove the 2 oil seals from the Kick Shaft hole

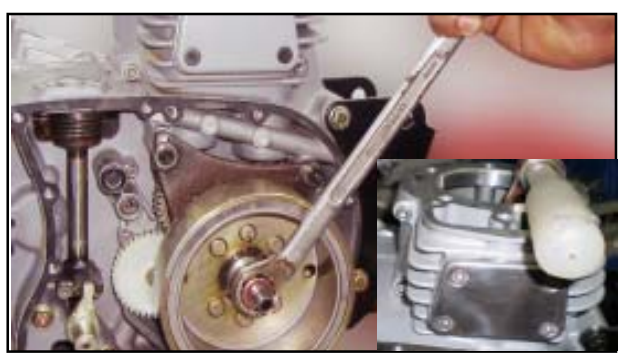


COMPONENTS FOR DISMANTLING FROM CRANKCASE RH

REMOVAL OF ROTOR ASSEMBLY

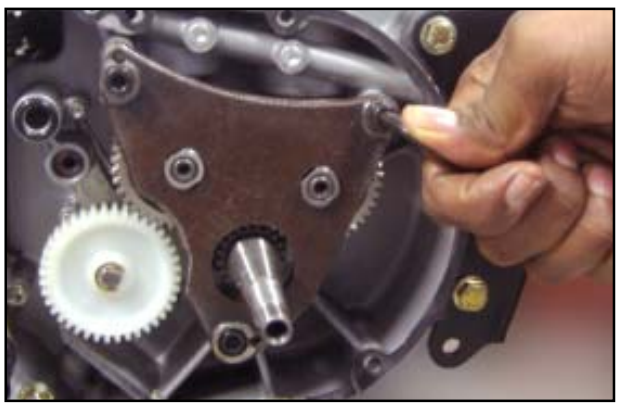
☆ Loosen and remove magneto lock nut and plain washer.

☆ Ensure the connecting rod is locked properly with the special tool resting firmly and evenly on the crankcase top position.



☆ Use Special tool No. ST - 25128-2 Magneto removing tool to remove

☆ Remove the 3 allen screws & 2 dowels from Cam steady plate.

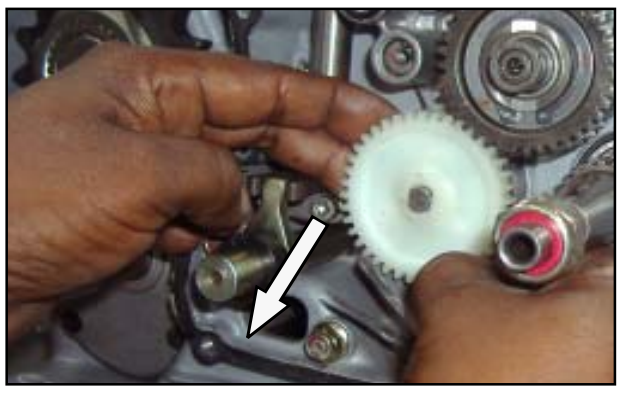


☆ Remove Cam steady plate and the shims.

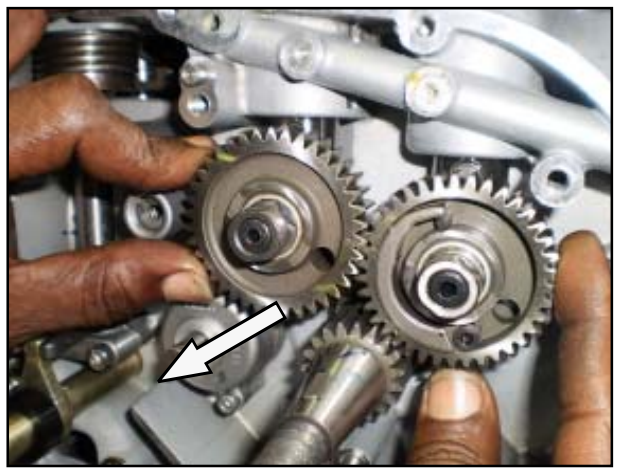
NOTE :

Check the number of shims on inlet and exhaust cams. It is important to reduce noise and axial play between the cam gear face and the cam steady plate.

☆ Remove oil pump plastic gear after removing circlip. Observe short boss of pump drive gear should face outwards in case of 350cc and long face should face outwards in case of 500cc



☆ Remove Cam gear inlet.



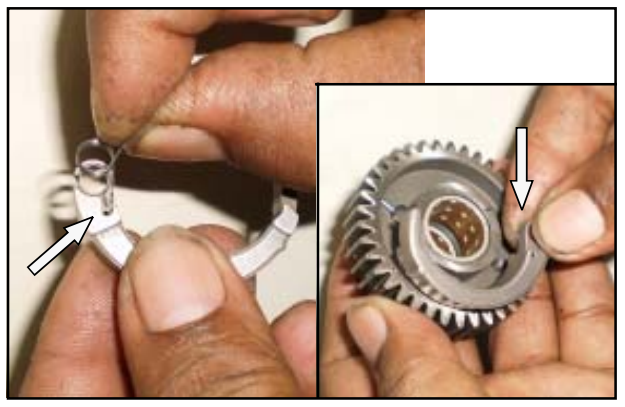
☆ Remove Cam gear Exhaust (Auto decompressor sub assy).

☆ Exhaust cam with auto decompressor.

DISMANTLING PROCEDURE OF AUTO DECOMPRESSOR

☆ Remove mounting allen screw on flyweight sub assembly.

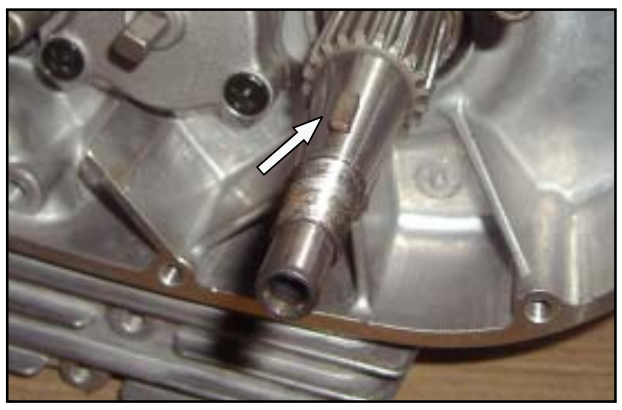
☆ Remove flyweight along with return spring over actuating pin lever as shown in Fig.



NOTE : Ensure spring bend lug being seated inside flyweight hole properly.

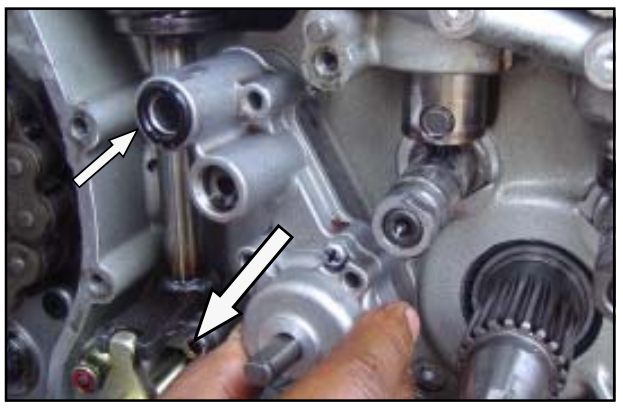
☆ Remove the actuating pin in the Exhaust cam.

☆ Remove the woodruff key.



☆ Remove the 4 allen screws to remove Oil pump assy.

☆ Remove the Oil pump assembly with "O" ring.



CAUTION :

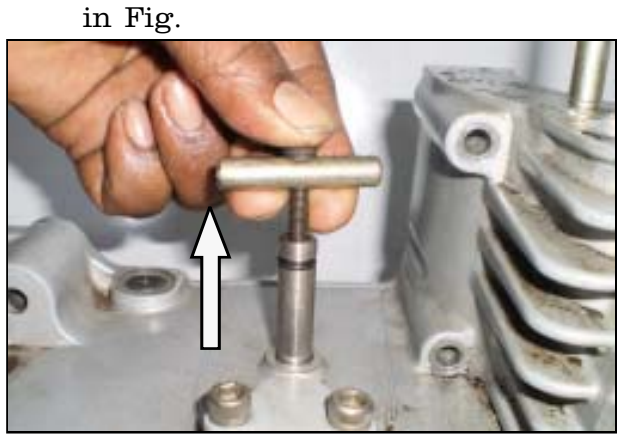
Ensure "O" ring must be located on the oil pump body outlet.

☆ Remove Gear lever from engine LH cover side.

☆ Remove Gear lever shaft with bush (spacer shaft).

Engine Dismantling, Inspection & Assembly

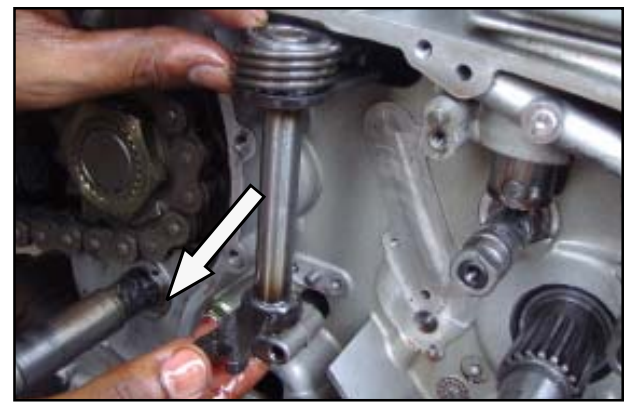
☆ Remove rocker shaft return spring pivot pin with "O" ring by using special No. ST 25123-4 Extractor for 5 speed gear box pivot pin as shown in Fig.



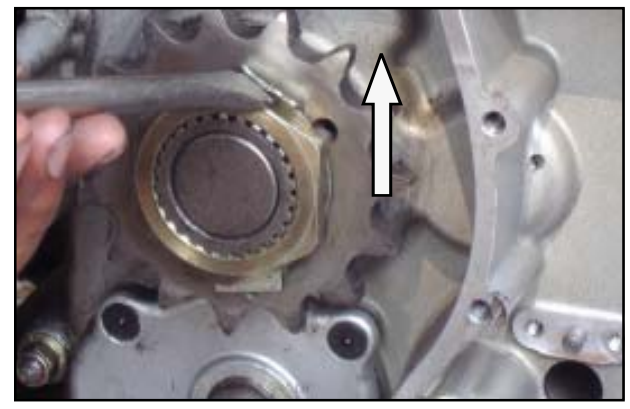
☆ Remove the two bolts and remove the rocker shaft upper pivot bearing with "O" ring.

☆ Remove the two screws holding the lower pivot bearing ..

☆ Remove the rocker shaft assembly by gently tilting and twisting out.

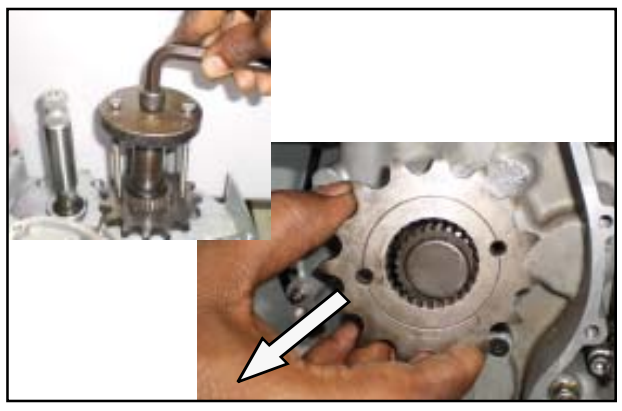


☆ Straighten lock tab and Unlock the FD sprocket nut.



☆ Remove nut and lock washer.

☆ Remove FD Sprocket



NOTE :

Use special tool while removing FD sprocket if necessary.

☆ Pull out Sleeve gear Spacer by using monkey / gas plier as shown in Fig.

☆ Remove 4 Nos. Kicker Cover screws.

☆ Remove kicker shaft cover with oil seal.

☆ Remove Kick starter return spring locking bolt with washer.

☆ Remove Kick starter return spring from kickshaft spindle.

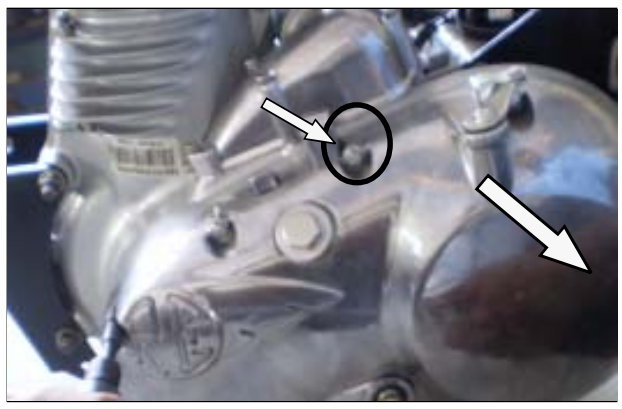
Engine Dismantling, Inspection & Assembly

DISMANTLING COVER LH SUB ASSEMBLY :

☆ Remove the 11 bolts holding the cover LH.

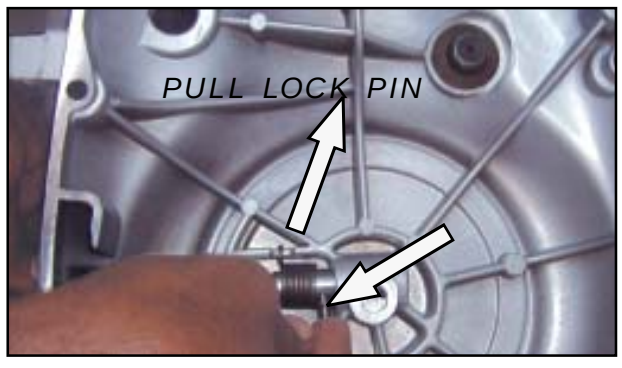
☆ Remove inspection plug along with "O" ring

☆ Tap and remove the Clutch cover.

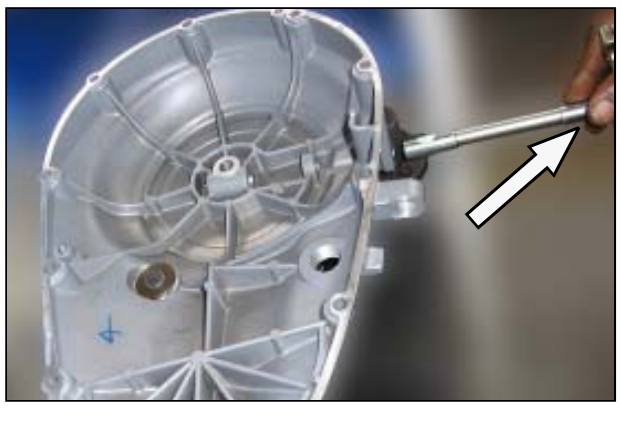


☆ It may be necessary to tap the cover slightly to remove.

☆ Remove lock pin and spring from clutch operating shaft.



☆ Remove clutch operating shaft assy from clutch cover.



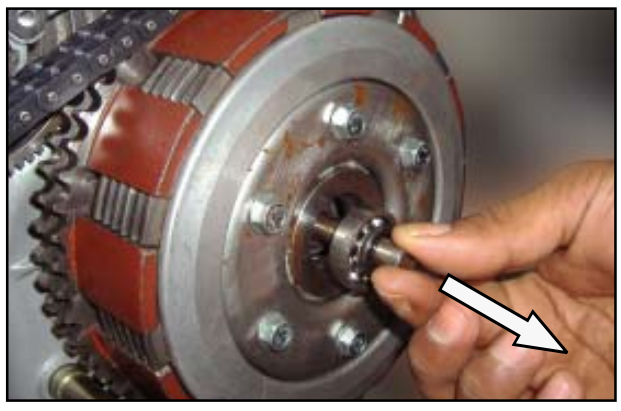
☆ Remove Clutch operating shaft oil seal and 2 Nos. of Dowels.

☆ Remove gear lever shaft bush and oil seal.

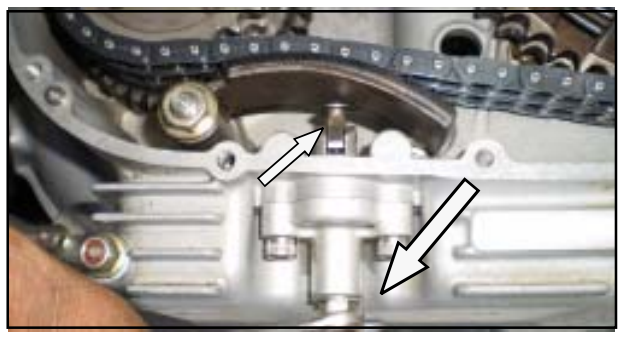
COMPONENTS FOR DISMANTLING FROM CRANKCASE LH

REMOVAL OF CLUTCH ASSY.

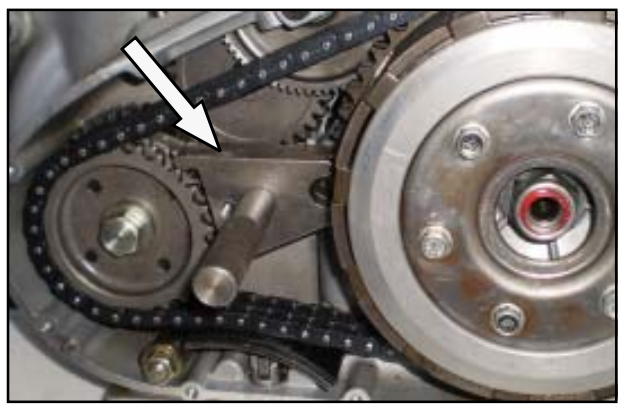
☆ Remove clutch push pad, ball bearing & bearing retainer cup.



☆ Remove auto chain tensioner bottom bolt,"O"ring. and its spring. Unlock clip and press push rod to slacken duplex chain.

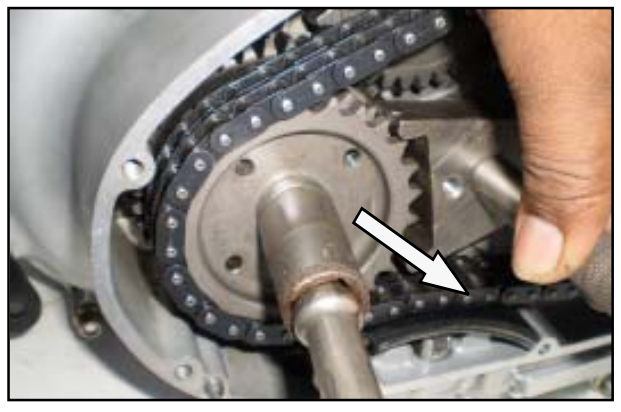


☆ Use Special tool No. ST - 25591-4 Clutch centre nut holding tool to lock Clutch outer sprocket and engine drive sprag clutch.



☆ Remove nyloc nut & plain washer.

☆ Remove 17mm Hex bolt on the Engine sprocket.



☆ Remove Duplex chain along with Sprag clutch and Clutch assembly.

☆ Remove Engine sprocket and sprag clutch gear assembly.

☆ Remove sprag clutch bearing.

NOTE :

Flange wide faces of the sprag clutch bearing must face outwards.

DISMANTLING OF CLUTCH ASSEMBLY

☆ Remove 2 hex bolts at opposite locations

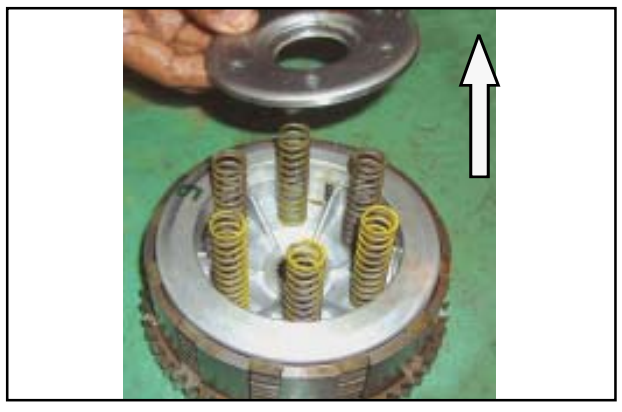
☆ Fix Special tool No. ST - 25594-4 Clutch Spring Compressing Tool and tighten the 2 long bolts fully so as to hold the springs down loosen & remove the other 4 bolts.

☆ Remove the special tool holding both evenly to release the spring tension.

NOTE :

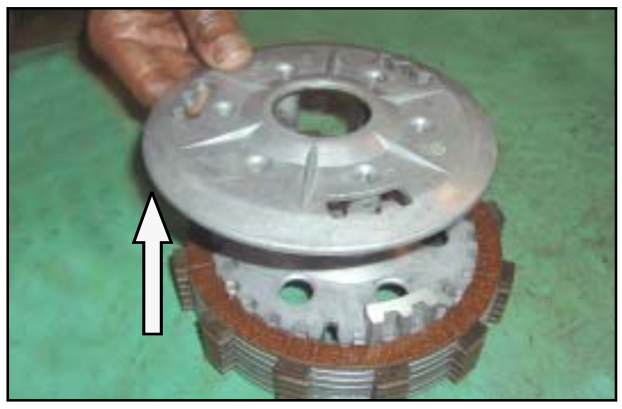
Loosen bolts in opposite direction simultaneously 5 threads each.

☆ Remove Spring retainer plate & 6 Springs.



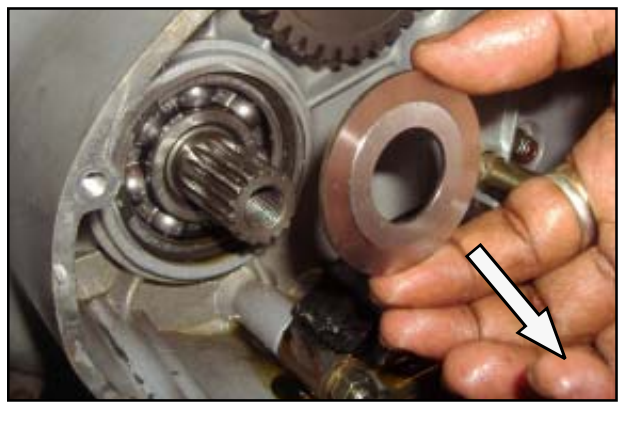
☆ Remove clutch drum sprocket with big washer.

☆ Remove clutch hub, centre, friction and steel plates.



☆ Remove collar on main shaft (distance collar from Crankcase LH).

☆ Remove special distance washer sprag clutch on Crankshaft LH.



☆ Remove hex nut and washer to remove chain tensioner pad.

Engine Dismantling, Inspection & Assembly

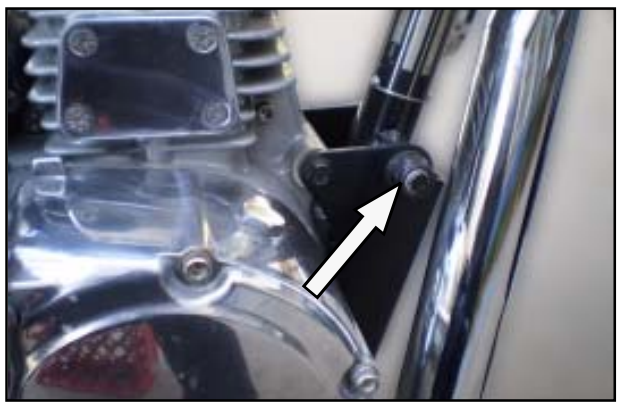
☆ Remove Auto chain tensioner body assy. by removing the 2 Nos. allen screws.

☆ Remove double gear shaft and double gear starter drive.

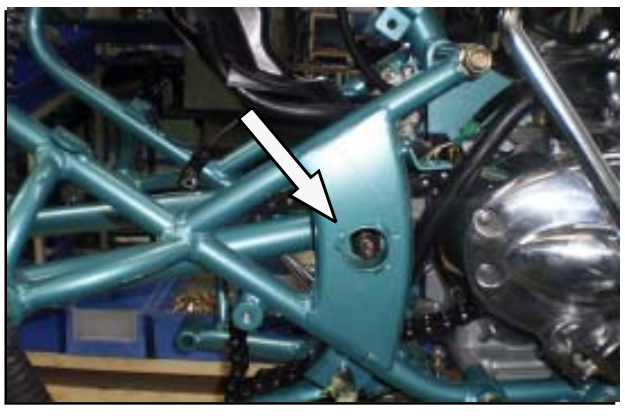
☆ Remove the jack gear after removing the circlip.

☆ Remove the rear engine mounting nut along with the washer.

☆ Remove the front engine mounting nut



☆ Loosen chain stay bolt



Engine Dismantling, Inspection & Assembly

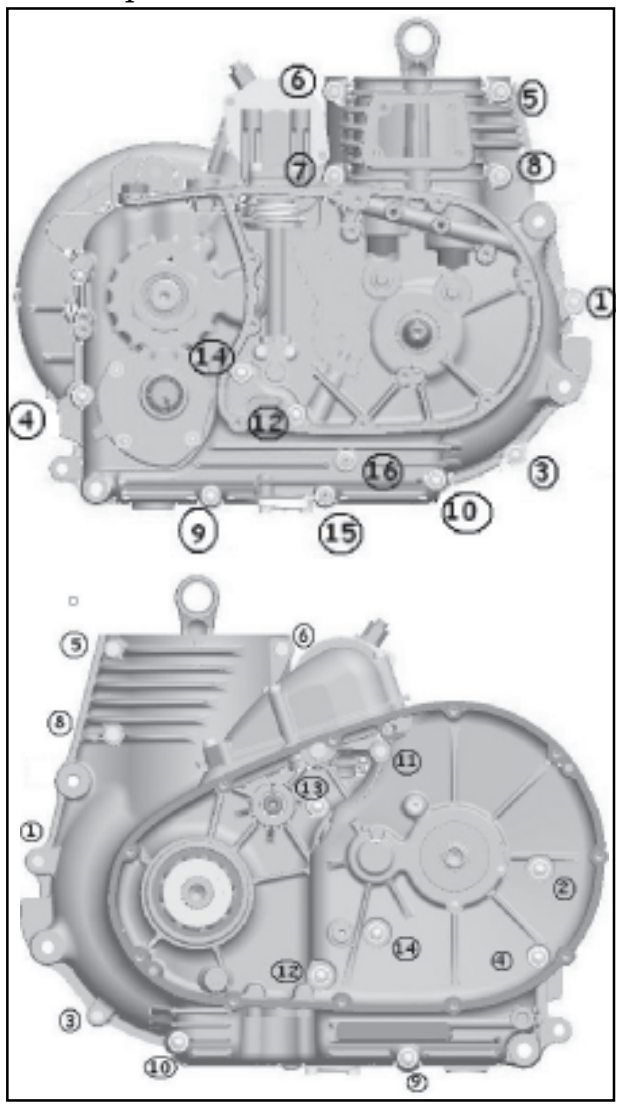
☆ Remove centre stand & footrest supports.

☆ Remove the front and rear engine studs & slide the engine assembly off the frame.

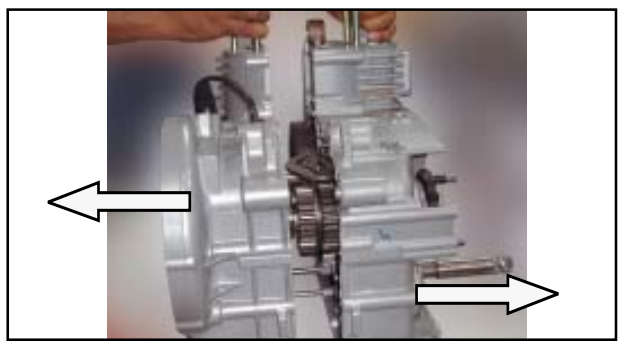
☆ Remove Engine Front Mounting Bracket.

☆ Remove Mudguard mounting clip & Rear Engine Mounting Bracket.

☆ Loosen the crankcase stud nuts and allen screws as per the following sequence.

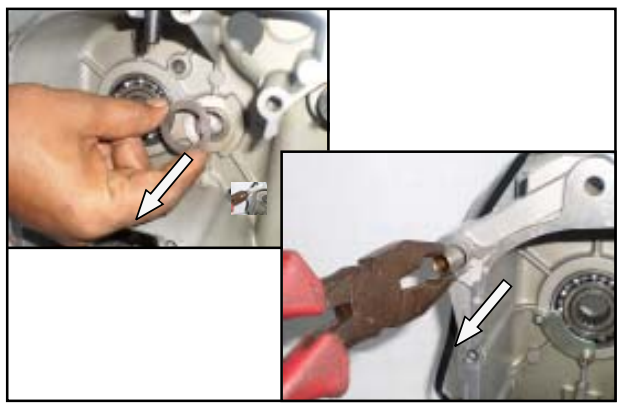


☆ Tap gently and remove the crankcase



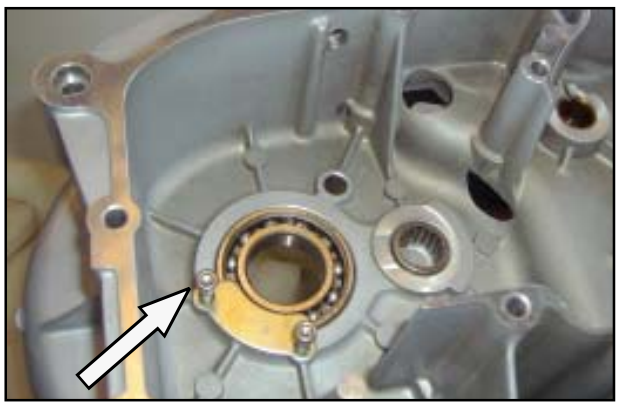
LH.

☆ Remove special thrust washer (lay shaft) from Crank case LH & 2 Nos. Dowel pins.

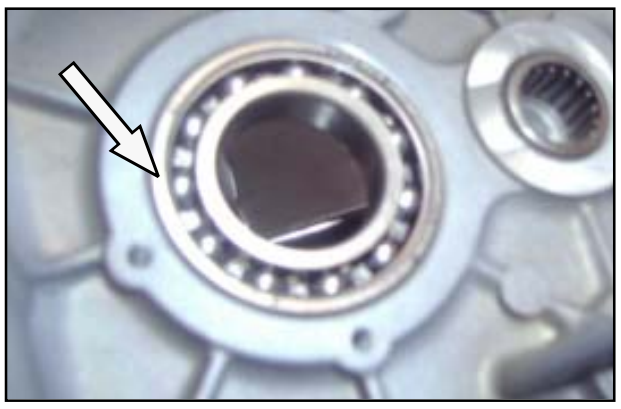


☆ Pull out the crank shaft from the crankcase RH.

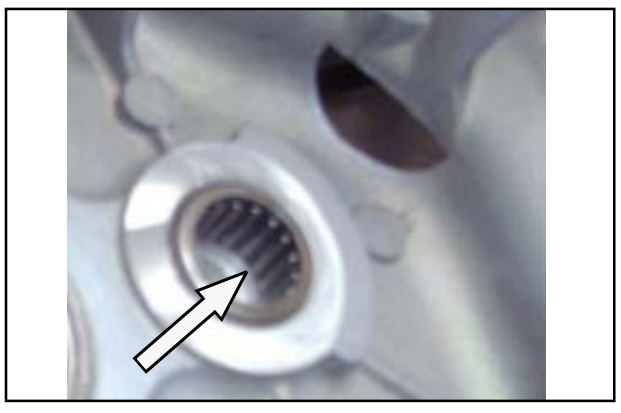
☆ Remove clutch bearing retainer plate holding screws and remove the retainer plate from crankcase LH.



☆ Remove clutch ball bearing from crankcase LH.



☆ Remove needle roller bearing for lay shaft from crankcase LH.

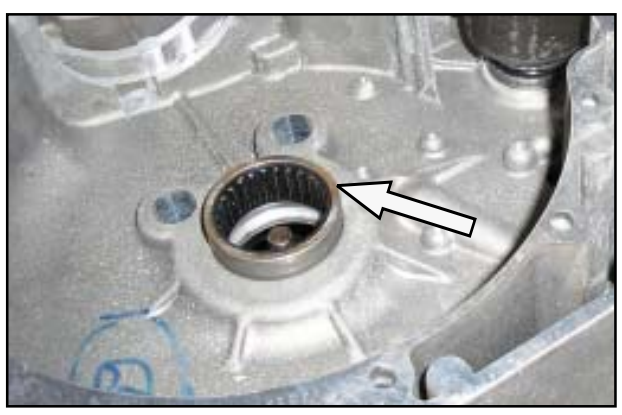


☆ Remove roller bearing NU 305 from crankcase LH.

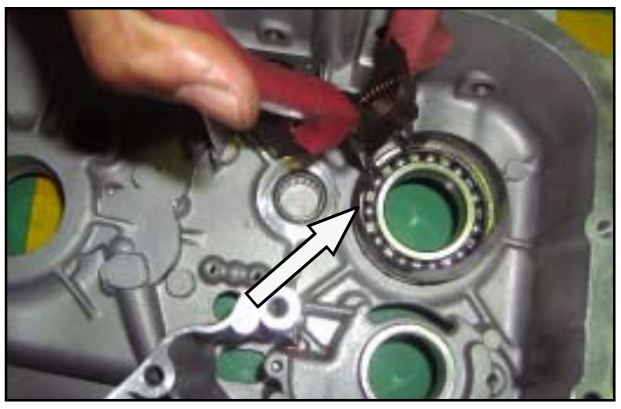
☆ Remove spacer, circlip, crank shaft bearing 6305 from crankcase LH.

☆ Remove last circlip from crankcase LH.

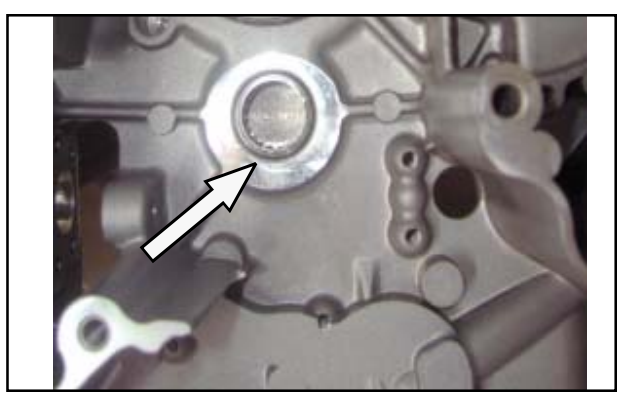
☆ Remove crank shaft needle roller bearing from crankcase RH.



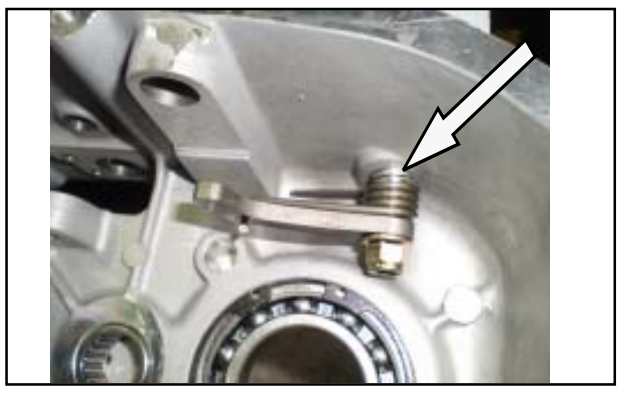
☆ Remove circlip and sleeve gear ball bearing 6007 from crankcase RH.



☆ Remove lay shaft needle bearing from crankcase RH.

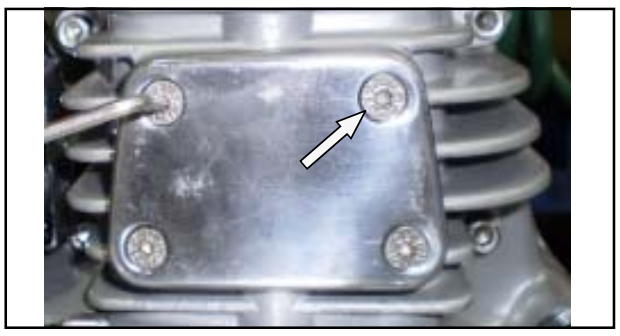


☆ Remove nyloc nut, machined washer, pawl - camplate, return spring and bolt pawl from crankcase RH.



Engine Dismantling, Inspection & Assembly

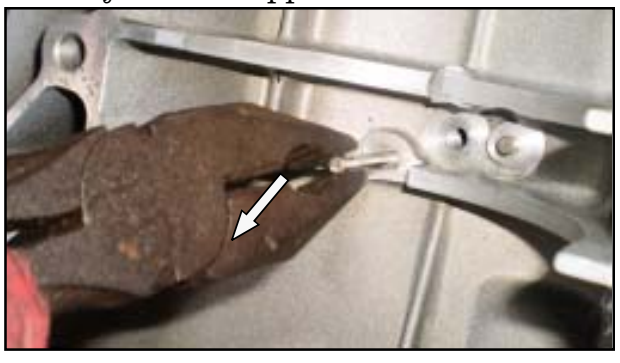
☆ Remove Tappet cover by dismantling 4 Allen screws.



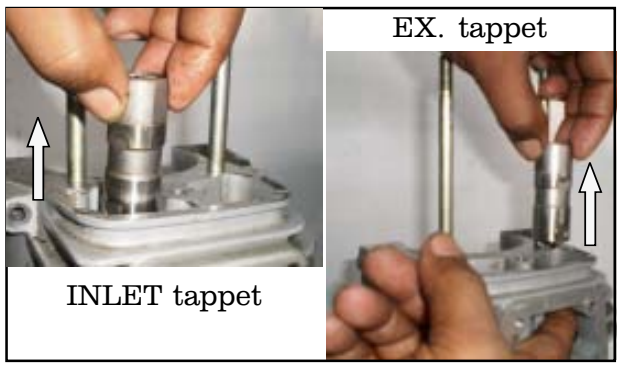
☆ Remove the Tappet cover.

☆ Remove the Allen screw, and the bracket - join - hydraulic tappets.

☆ Gently pull out the 2 needle roller pins holding the inlet and exhaust hydraulic tappets.



☆ Remove the exhaust and inlet hydraulic tappets carefully from Crankcase top side.



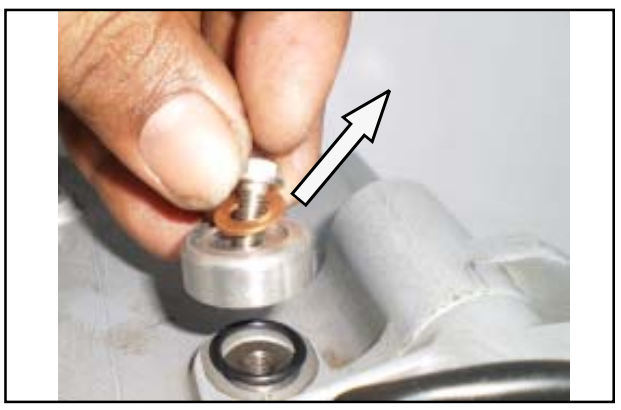
NOTE: Remove Inlet tappet first and then the exhaust tappet.

CAUTION :

Store the tappets carefully & right side up as detailed earlier.

GEAR TRAIN REMOVAL

☆ Remove the bolt, copper washer, cap pivot pin and "O" ring above the cam plate pivot pin.



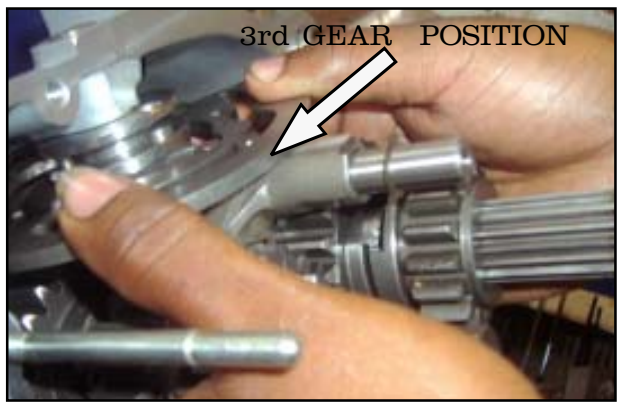
☆ Remove the 3mm roller locating pin.

☆ Pull out cam plate pivot pin with "O" ring by using special tool No. ST 25153-4 Extractor shown below.

☆ Remove LS 1st gear and thrust washer from the Layshaft.

☆ Gently slide out the gear train assembly along with the cam plate, Fork shaft, Forks, Layshaft double gear(LS3 & LS4) and main shaft with all gears.

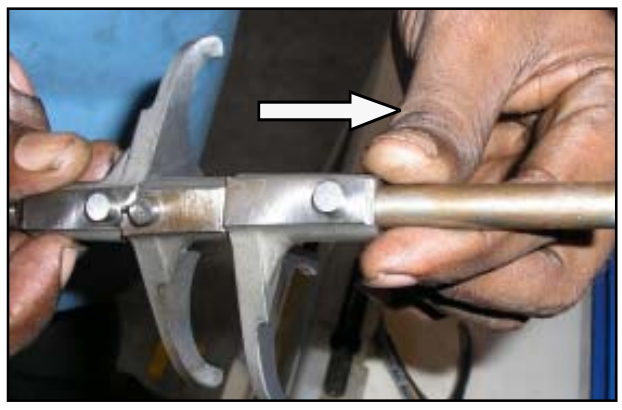
NOTE: Turn cam plate to select 3rd gear position before removing for ease of removal / reassembly.



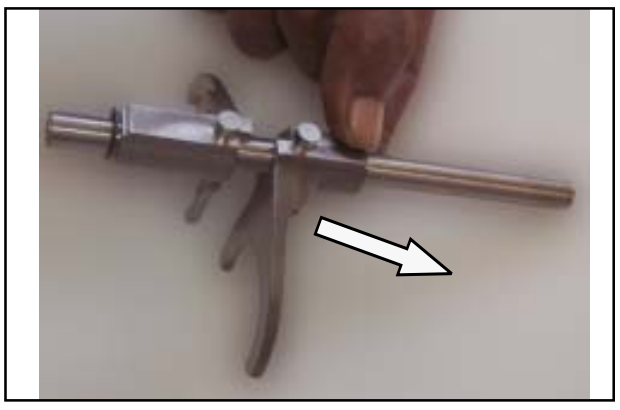
☆ Remove special thrust washer (Layshaft) from Crank case RH

☆ Check that the 4 rollers are in place in the cam plate correctly while removing to avoid damage to the pins or its location in the cam plate.

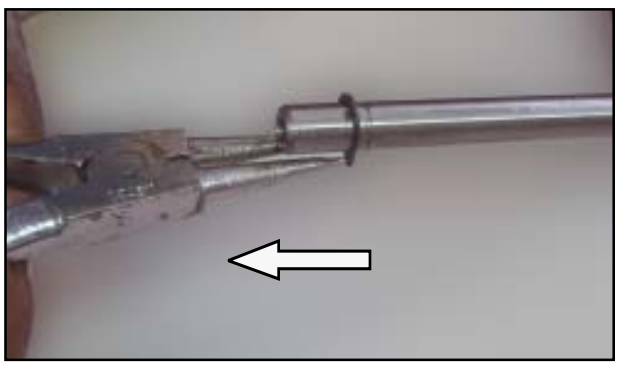
☆ Remove selector fork sub assembly from main shaft & lay shaft sliding gears to take out RH selector fork.



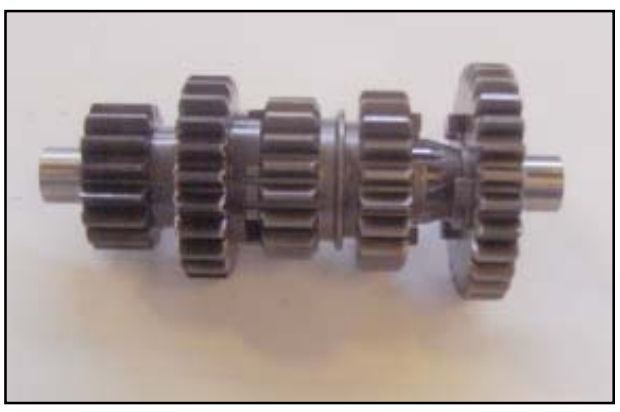
☆ Remove centre selector fork from the selector shaft and then LH selector fork.



☆ Remove circlip from the selector shaft if required.

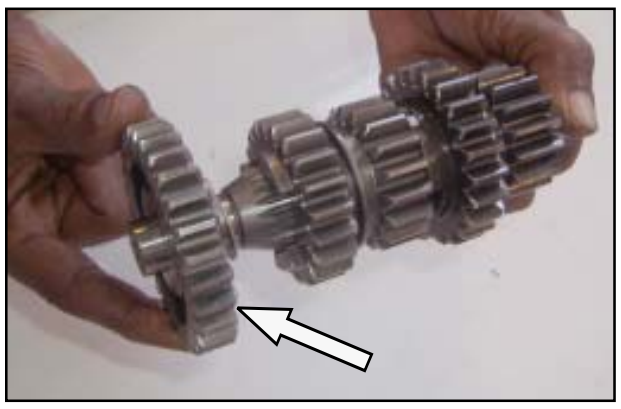


LAYSHAFT SUB ASSEMBLY

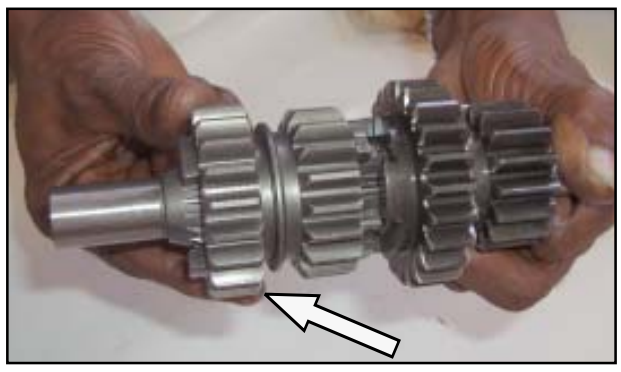


DISMANTLING OF LAYSHAFT SUB ASSEMBLY

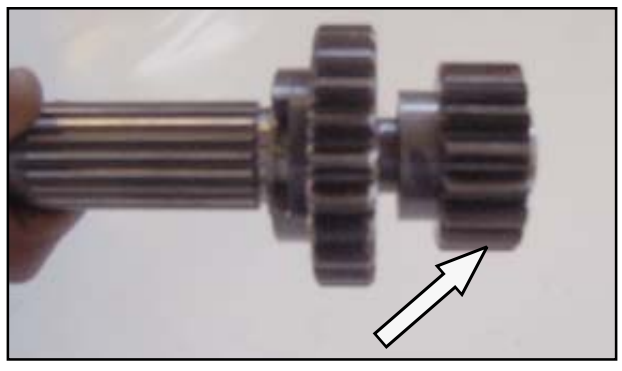
☆ Remove Lay shaft 1st gear and thrust washer.



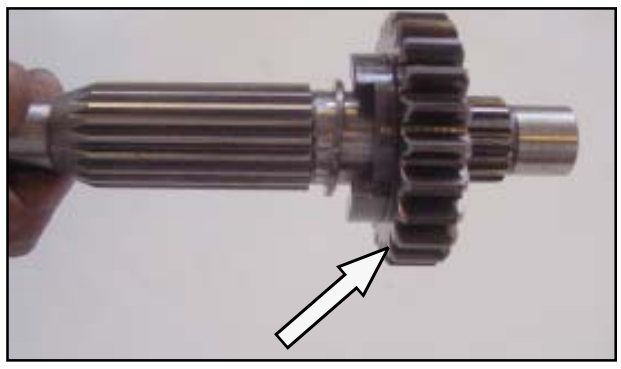
☆ Remove Double gear (LS 3rd and 4th gear).



☆ Remove the high gear.



☆ Remove 2nd gear and thrust washer.

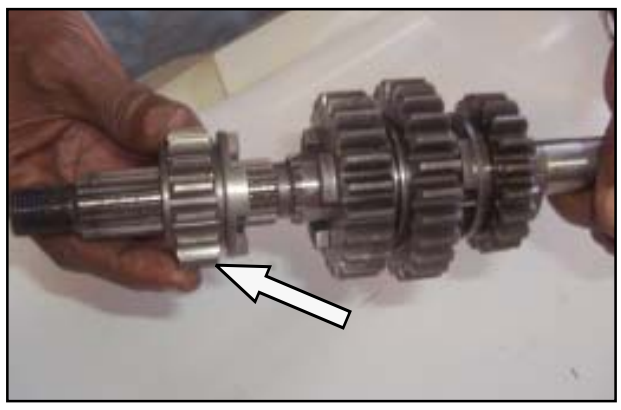


☆ Layshaft

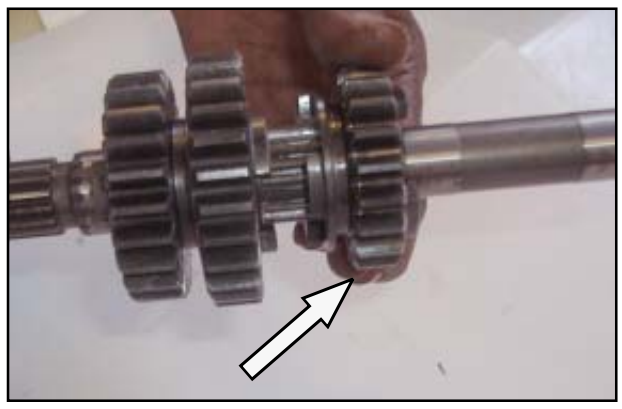
MAIN SHAFT SUB ASSEMBLY

DISMANTLING OF MAINSHAFT SUB ASSEMBLY

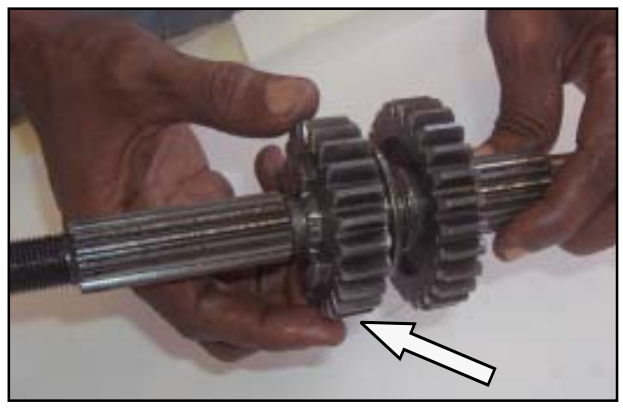
☆ Remove main shaft 1st gear.



☆ Remove the main shaft 2nd gear.

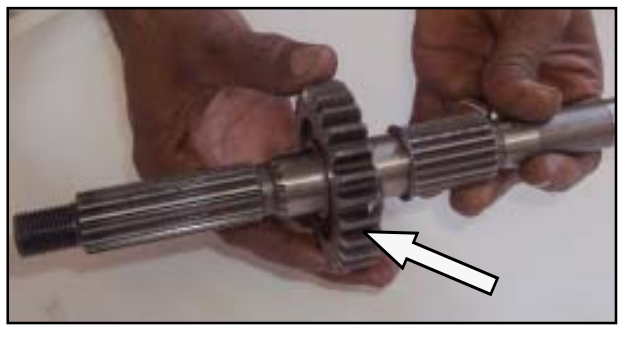


☆ Remove the main shaft 3rd gear.



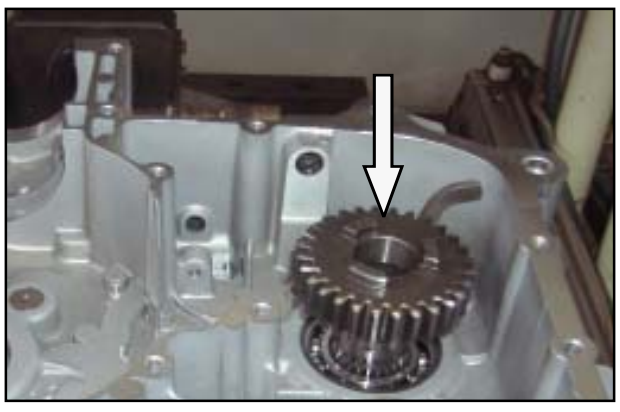
☆ Remove circlip & 1st. thrust washer.

☆ Remove 4th gear and 2nd thrust washer.



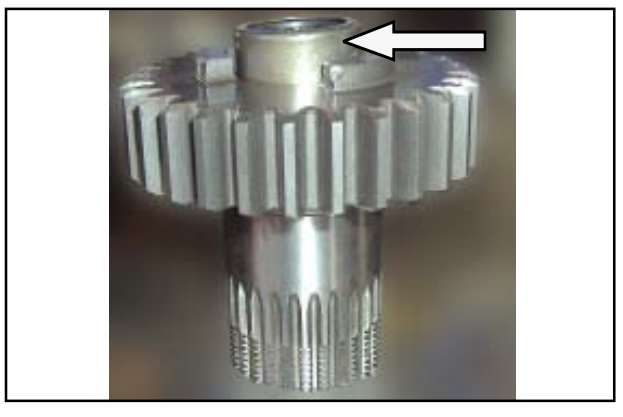
☆ Main shaft

REMOVAL OF SLEEVE GEAR ASSEMBLY

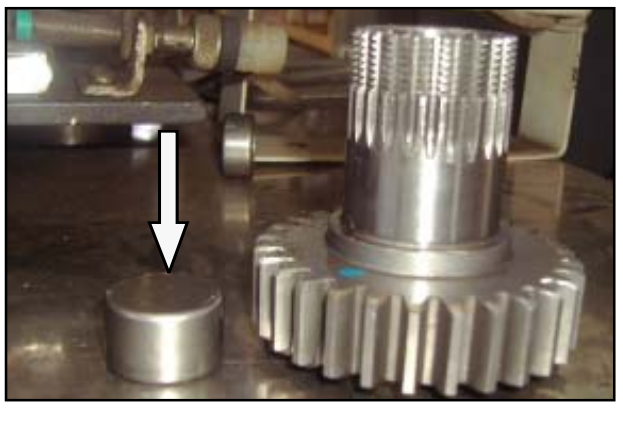


REMOVAL OF SLEEVE GEAR SUB ASSEMBLY

☆ Remove open end needle bearing.



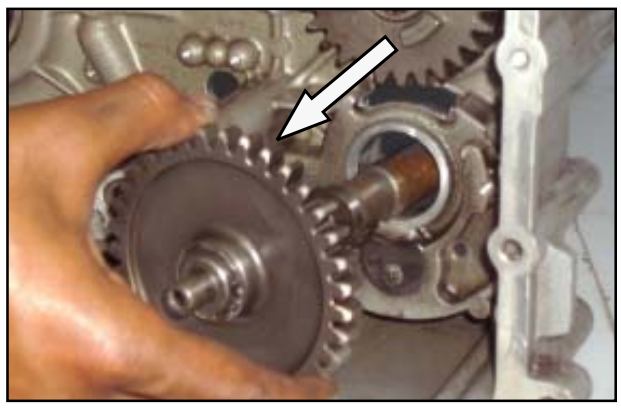
☆ Remove closed end needle bearing.



REMOVAL OF KICK STARTER ASSEMBLY

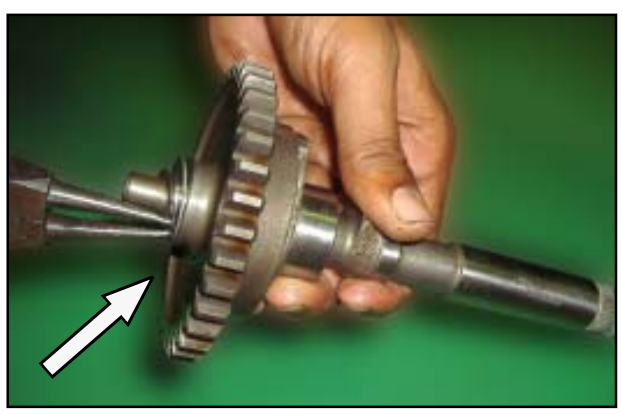
☆ Remove 3 allen screws to take out oil thrower (plastic cap).

☆ Pull out kick starter sub assy. as shown in Fig.

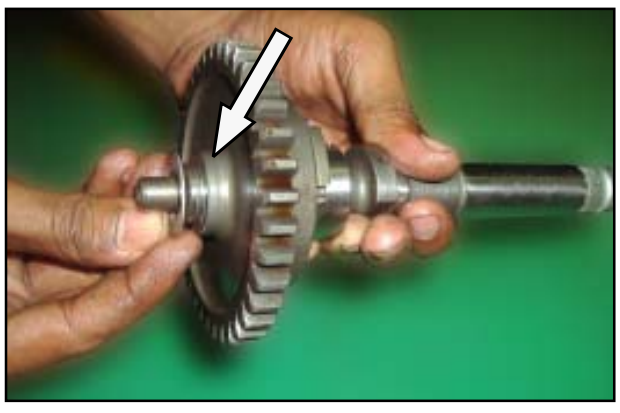


REMOVAL OF KICK STARTER SUB ASSEMBLY

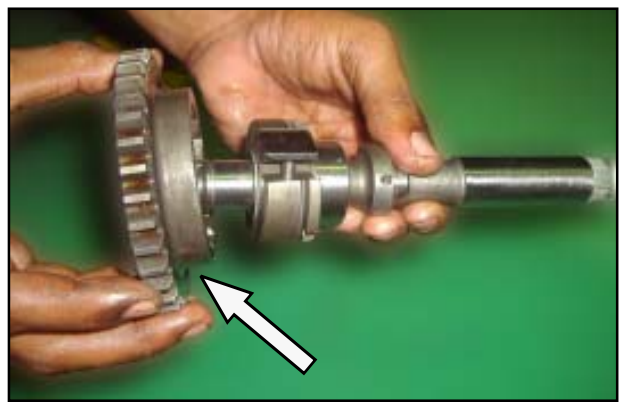
☆ Remove circlip & thrust washer.



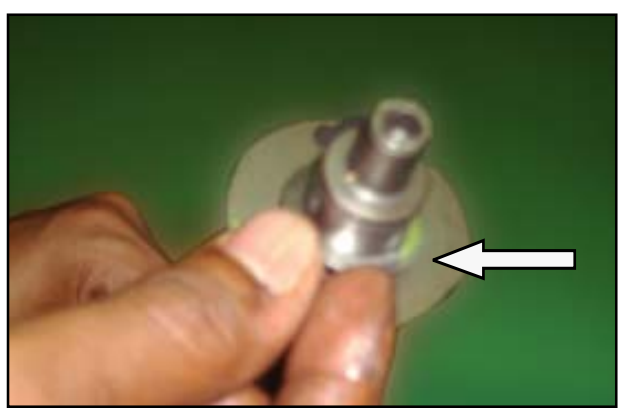
☆ Remove the thrust washer.



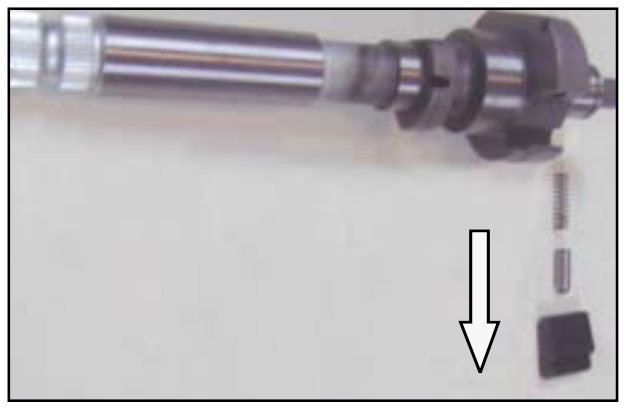
☆ Remove the Kick pinion gear.



☆ Remove the thrust washer from kick spindle.



☆ Remove the Kick pawl, plunger and spring from kickstarter shaft.



Engine Dismantling, Inspection & Assembly

VITAL PARTS

I. BEARINGS

S.No.	USAGE	DESCRIPTION	QTY
1.	NBI 45 × 30 × 20	Crankcase RH - Crankshaft bearing	1
2.	Ball Bearing 6305 C3 (25×62×17)	Crankcase LH - Crankshaft bearing	1
3.	Roller Bearing Nu305 C4 (25×62×17)	Crankcase LH - Crankshaft bearing	1
4.	Ball bearing 6006, C3	Crankcase LH - Main Shaft bearing	1
5.	Lay Shaft bearing 550032/a	Fitted on Crankcase RH and Crankcase LH	2
6.	NRB 3 × 21.8	Locating Pin-Pivot, cam plate	1
7.	Needle Bearing SCE 228 (C3)	Sprag Clutch & Clutch Sprocket drum bearing	2
8.	Ball bearing 6007 C3	Crankcase RH with Sleeve gear	1
9.	Needle bearing Hk 2012 & BK 2016	Sleeve gear bearings	2
10.	Ball bearing 6001, C3	Clutch pushrod / Lifter plate bearing	1
11.	NRB 35 X 42 X 20	Connecting rod - big end	1

II. GEARS / SPROCKETS

Sl.No.	ITEM	DESCRIPTION	NO. OF TEETH	RATIO
1	PRIMARY REDUCTION			2.15
		Clutch outer sprocket Primary drive sprocket	56 26	
2	GEAR BOX ASSY	1st Gear LS / MS	28/16	3.06
		2nd Gear	20/23	2.01
		3rd Gear	18/26	1.52
		4th Gear	23/20	1.21
		High Gear	16/28	1.0
3	SELF STARTER SYSTEM			
		Starter Motor		
		Drive Gear		
		Driven Gear		
		Idler Jack Gear		
		Sprag clutch outer		

UNIDIRECTIONAL FITTINGS LIST

- ☆ Deep groove ball bearing 6007-RSH/ C3 in Crankcase RH- Rubber sealed facing FD sprocket side.
- ☆ Gear rocker shaft bottom pivot bearing-Smooth machined surface side facing upwards.
- ☆ Main shaft 2nd Gear- Selector fork groove side facing towards M.S. 4th Gear.
- ☆ Special thrust washer Lay shaft RH - Profile towards sleeve gear side on RH Crank case.
- ☆ Special thrust washer Lay shaft LH - Profile towards Crank shaft bearing side on LH Crank case.
- ☆ Rear engine mounting plate-"R" index mark side facing RH (FD sprocket) side.
- ☆ Gear jack shaft - Flat face facing outwards.
- ☆ Distance washer sprag clutch - Double step facing inside (should rest on Crankshaft and Crankcase LH side bearing).
- ☆ Sprag Clutch Bearing -Wide Flanges side facing upwards.
- ☆ Clutch plain plate- All plates smooth teeth face in same direction while fitting on Clutch hub.
- ☆ FD sprocket- Side face circular groove facing outwards.
- ☆ Oil pump inner and outer trochoid gear- Punch mark facing outwards.
- ☆ Cam Gear sub assy. exhaust- The teeth inbetween two punch marks must align with Crankshaft timing pinion gear punch mark.
- ☆ Cam Gear Inlet- Single punch mark must align with single punch mark of Cam gear exhaust.
- ☆ Oil pump drive pinion - Short boss facing outwards.
- ☆ Piston rings -"1 IP" and "2 IP" facing upwards.
- ☆ Piston- "A" or "B" mark on the crown facing towards throttle body / inlet side.

TORQUE SPECIFICATION - ENGINE

S. No	PART No.	DESCRIPTION	LOCATION	TORQUE VALUE	
				Kg / M.	N / M.
1	570013	HEX SOCKET HD CAP SCREW, M5 X 16	RETAINER PLATE / SUCTION FILTER MTG	0.60	6
2	570016	HEX.SOCKET HD.CAP SCREW, M5 X 45	E START HOUSING COVER	0.60	6
3	570094	HEX.SOCKET HD.CAP SCREW, M5 X 25	E START HOUSING COVER	0.60	6
4	570232	HEX.SOCKET HD.CAP SCREW, M6 X 12	STOP PLATE, PIVOT PIN / COVER LH / PIVOT BRG LOWER	1.00	10
5	570020	HEX FLANGE BOLT	CRANK CASE SET ASSY	2.50	25
6	145879	FLANGED HEX. BOLT M8 X 112	FRONT ENGINE MTG PLATE	2.50	25
7	145867	FLANGED HEX. NUT M8 X 1.25	FRONT ENGINE MTG PLATE / EXHAUST PIPE MTG	2.50	25
8	570088	STUD 168L (M6)	CRANKCASE SET ASSY	1.00	10
9	570090	STUD 106L (M6)	CRANKCASE SET ASSY	1.00	10
10	570089	STUD 196L (M6)	CRANKCASE SET ASSY	1.00	10
11	570024	HEX.SOCKET HD.CAP SCREW, M6 X 50	CRANKCASE SET ASSY	1.00	10
12	570085	DOWEL, STUD (M6)	CRANKCASE SET ASSY	1.00	10
13	570025	HEX.SOCKET HD.CAP SCREW, M6 X 90	CRANKCASE SET ASSY	1.00	10
14	570086	STUD 226L (M6)	CRANKCASE SET ASSY	1.00	10
15	570087	STUD 133L (M6)	CRANKCASE SET ASSY	1.00	10
16	570091	STUD 80L (M6)	CRANKCASE SET ASSY	1.00	10
17	145866	FLANGED HEX. NUT M6 X 1	CRANKCASE SET ASSY	1.00	10
18	570030	HEX.SOCKET HD.CAP SCREW, M6 X 20	AUTO CHAIN TENSIONER ASSY / COVER LH	1.00	10
19	570095	CHAIN TENSIONER STUD, (M8)	AUTO CHAIN TENSIONER ASSY	2.50	25
20	141051	HEX.NUTM8	AUTO CHAIN TENSIONER ASSY / KS CRANK	2.50	25
21	570100	NUT (M10 X 1)	CAM SPINDLE SLEEVE NUT	2.00	20
22	570421	HEX.SOCKET HD.CAP SCREW, M6 X 30	CAM STEADY PLATE	1.00	10
23	570132	HEX.SOCKET HD.CAP SCREW, M6 X 25	CAM STEADY PLATE	1.00	10
24	500355	HEX.SOCKET HD.CAP SCREW M6 X 16,	BRACKET, PIN, HYD, TAPPET / INLET FLANGE	1.00	10
25	570198	CSK SOCKET HEAD SCREW M5 X 0.8 X 12	TAPPET DOOR	0.60	6
26	570051	HEX.SOCKET HD.CAP SCREW, M4 X 30	OIL PUMP HOUSING ASSY	0.60	6
27	570064	HEX.HEAD SCREW M12 X 1.25 X 20	SHAFT LH	4.80	48
28	550025	HEX NUT M12 X 1.25	SHAFT RH	4.80	48
29	570463	HEX.SOCKET HD.CAP SCREW, M6 X 60	E START MOTOR MOUNTING / COVER RH	1.00	10

TORQUE SPECIFICATION - ENGINE

S. No	PART No.	DESCRIPTION	LOCATION	TORQUE VALUE	
				Kg / M.	N / M.
30	570215	BOLT, PAWL (M6 X 1)	GEAR BOX INDEX	1.00	10
31	570233	HEX.SOCKET HD.CAP SCREW, M5 X 40	PIVOT BEARING, ROCKER SHAFT LOWER	0.60	6
32	550138	CSK SOCKET HEAD SCREW M5 X 0.8 X 16,	COVER, KICKSTART SHAFT	0.60	6
33	145090	HEX SCREW M6 X 16	KICKSTART, SPRING	1.00	10
34	570240	HEX.SOCKET HD.CAP SCREW, M5 X 35	COVER K.S. GEAR	0.60	6
35	142291	HEX SCREW M8 X 22.5	STOP PLATE, KICK PAWL	2.50	25
36	111914	HEX.BOLT M8 X 40	ASSY, KICK START CRANK	2.50	25
37	143498	HEX. SCREW M6 X 25	GEAR LEVER	1.00	10
38	141060	HEX. NUT M6	GEAR LEVER	1.00	10
39	570246	NUT (M35 X 1.5)	FD SPROCKET	8.00	80
40	570440	HEX SCREW M6 X 1 X 35	CLUTCH ASSY	1.00	10
41	560525	HEX. NUT WITH NYLOC INSERT M16X1.5,	MAIN SHAFT, CLUTCH SIDE	4.80	48
42	570444	BOLT, BREATHER (M12)	BREATHER ASSY	2.00	20
43	570422	HEX.SOCKET HD.CAP SCREW, M6 X 100	COVER RH	1.00	10
44	570130	HEX.SOCKET HD.CAP SCREW, M6 X 85	COVER RH	1.00	10
45	570423	HEX.SOCKET HD.CAP SCREW, M6 X 40	COVER RH	1.00	10
46	570021	HEX.SOCKET HD.CAP SCREW, M6 X 80	COVER RH	1.00	10
47	570425	HEX.SOCKET HD.CAP SCREW, M5 X 12	COVER PLATE, BREATHER CHAMBER	0.60	6
48	570431	HEX FLANGE BOLT	CAP, OIL FILTER	0.60	6
49	570131	HEX.SOCKET HD.CAP SCREW, M6 X 60	ROCKER BEARING	1.00	10
50	570129	HEX HEAD SCREW ROCKER COVER MTG	ROCKER COVER	1.00	10
51	570175	FLANGED HEX. BOLT M8 X 90	STEADY BRACKET CYL. HEAD	2.50	25
52	570177	HEX NUT WITH NYLON INSERT, M8	STEADY BRACKET CYL. HEAD	3.20	25
53	500327	FLANGE NUT M8	CYL.HEAD MOUNTING	3.20	25
54	500104	STUD, M8 X 128	CY.HEAD MOUNTING	2.50	25
55	570304	HEX SOCKET HEAD CAP SCREW M6 X 12	PIVOT BEARING, UPPER	1.0 0	10
56	550095	ALLEN SCREW M6 X 30	STATOR COIL MOUNTING	1.00	10
57	570276	MAGNETIC PLUG ASSY	CRANKCASE DRAIN	2.00	20
58	500339	STUD EXHAUST EXHAUST PIPE MTG		0.60	6
59	572025	SPARK PLUG		2.80	28

Engine Dismantling, Inspection & Assembly

ENGINE ASSEMBLY

Please ensure all the parts are cleaned and stored in a sequence for inspection and reassembly.

Lubricate all moving parts prior to reassembly.

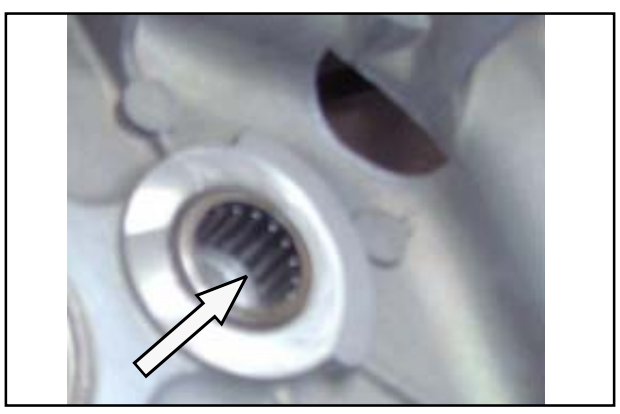
While fixing bearings or bushes in the crankcases, it is necessary to heat the crankcase for ease of fixing.

Cool the crankcases after the fixing the bearings / bushings before further assembly.

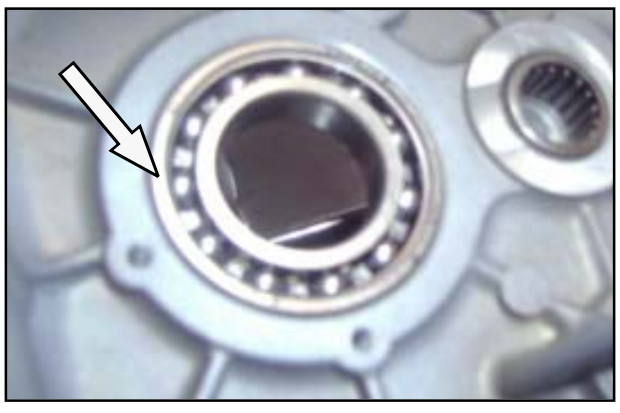
ASSEMBLY OF ENGINE BEARINGS

CRANKCASE LH

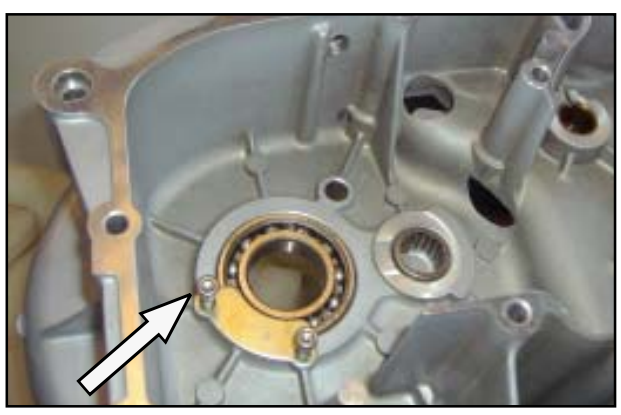
☆ Assemble Needle roller bearing for lay shaft.



☆ Assemble clutch ball bearing (6006-C3) for main shaft.

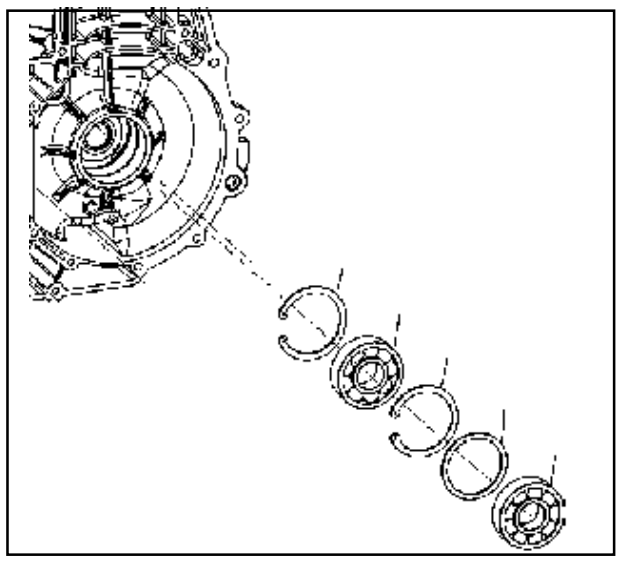


☆ Fix the clutch bearing retainer plate with 2 allen bolts (Torque 0.60 KG-M/6 NM).



☆ Insert 1st circlip in Crank case LH.

☆ Assemble 6305 - C3 bearing after 1st circlip. Insert 2nd circlip then bearing spacer in Crank case LH as shown in Fig.

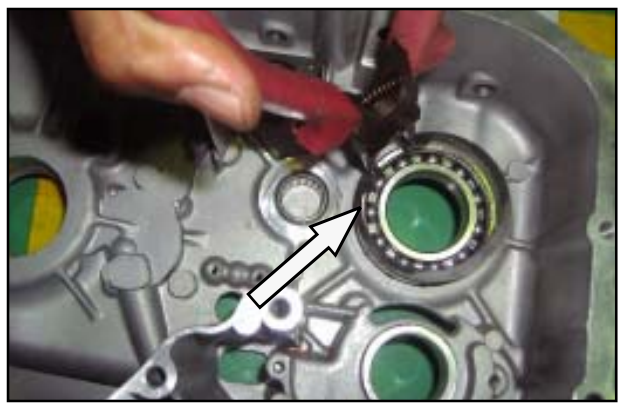


☆ Assemble NU 305 big roller bearing after bearing spacer in LH Crank case for crankshaft.

CRANKCASE RH

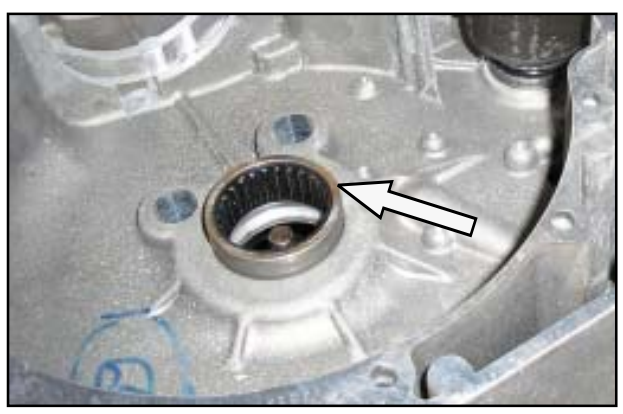
☆ Assemble Needle bearing for lay shaft.

☆ Assemble sleeve gear ball bearing (6007 R1/C3) and circlip.

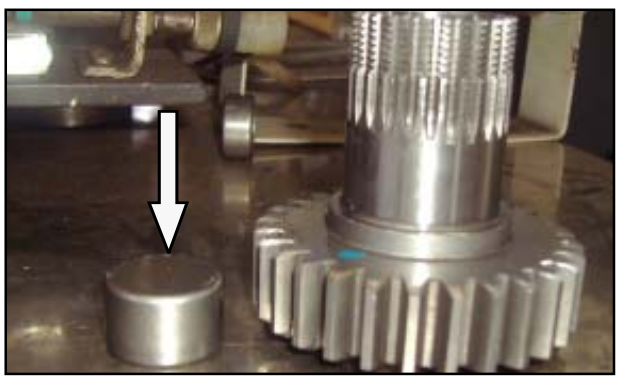


NOTE : Ensure the rubber sealed face is facing the FD sprocket side, while assembling the 6007 bearing.

☆ Insert circlip and then assemble crankshaft RH side needle roller bearing into Crank case.



☆ Assemble closed end needle bearing inside sleeve Gear.



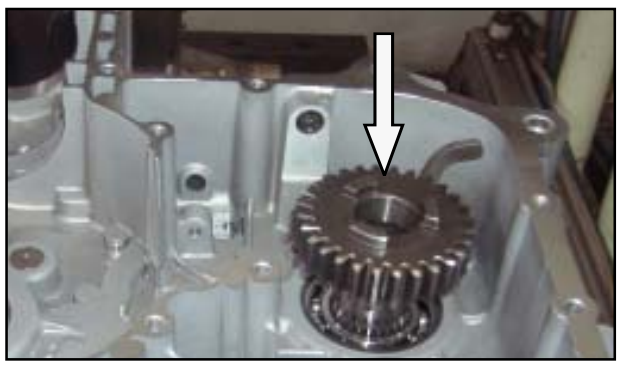
☆ Assemble open end needle bearing. Check bearing seating position and for free rotation.

☆ Assemble bolt pawl (Torque 2.0 KG-M) into Crank Case RH as shown in Fig. Fix cam plate return spring, pawl cam plate with machined washer and nyloc nut (Torque 1 KG-M).

NOTE :

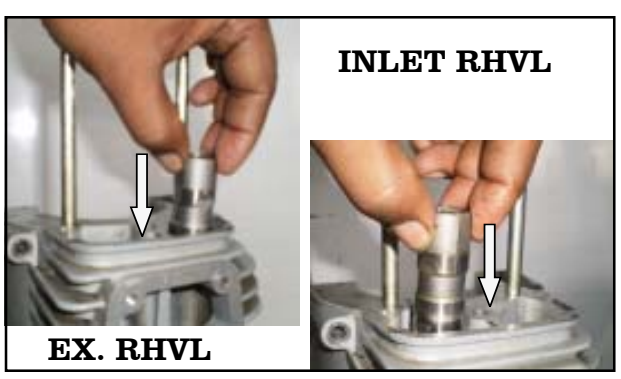
Apply LOCKTITE 542 thread sealant before assembling bolt pawl

☆ Insert sleeve Gear into Crankcase RH.



NOTE : Do not hammer directly over sleeve Gear. It is recommended to use arbor press.

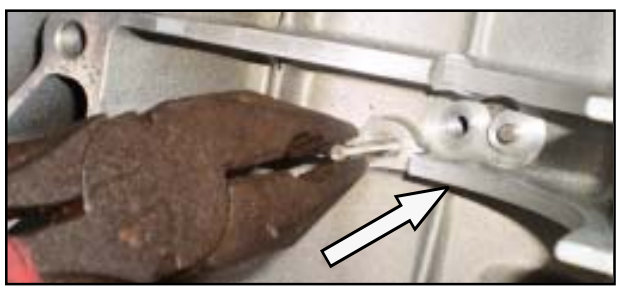
☆ Assemble exhaust and inlet hydraulic tappets carefully into Crank case RH lubricate and check free upward & downward movement inside Crank case RH tunnel.



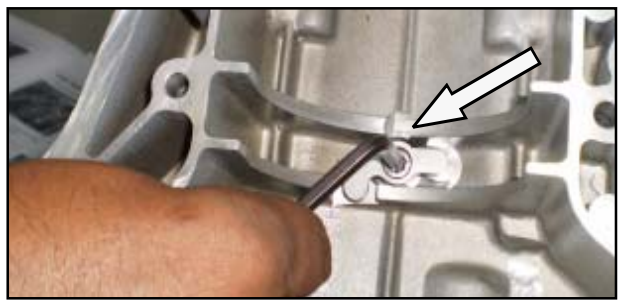
CAUTION :

Please ensure the roller should be facing downwards during assembly.

☆ Fix the needle roller pins into Crank case RH.



☆ Fit bracket lock clip to hold needle roller pin of hydraulic valve lifter and tighten with allen screw (Torque 1 KG-M).



☆ Assemble cleaned suction filter element into Crank case RH.

☆ Assemble 2 Nos. of Flanged hex bolts (Torque 0.6 KG-M) to fix drain cap with "O" ring.

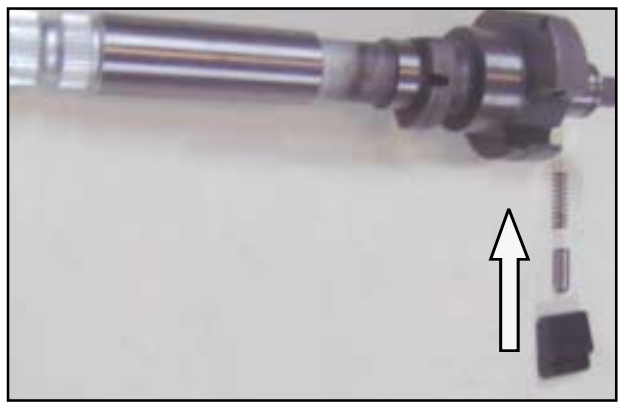
☆ Assemble magnetic drain plug assy. (Torque 2 KG-M) with washer on crankcase RH.

NOTE :

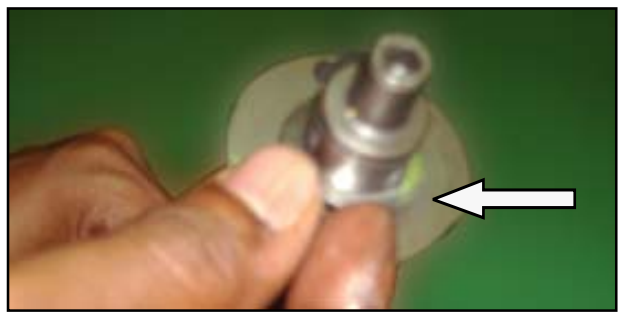
Apply LOCKTITE 542 thread sealant before assembling the drain plug.

ASSEMBLING OF KICK STARTER SUB ASSEMBLY

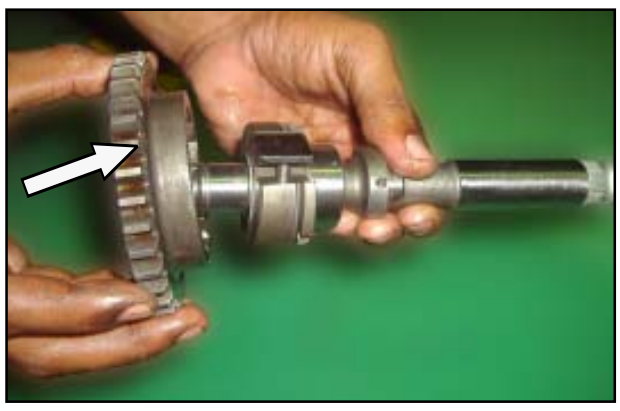
☆ Insert the spring, plunger and pawl in the kick starter spindle.



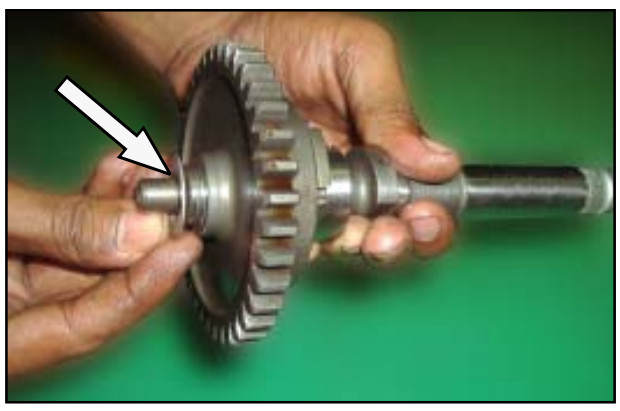
☆ Fix the thrust washer on kick spindle.



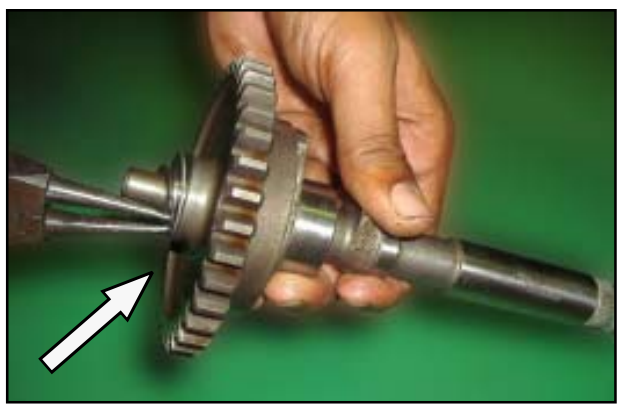
☆ Assemble the Kick pinion gear over kick pawl mechanism.



☆ Insert the thrust washer above the kick spindle.

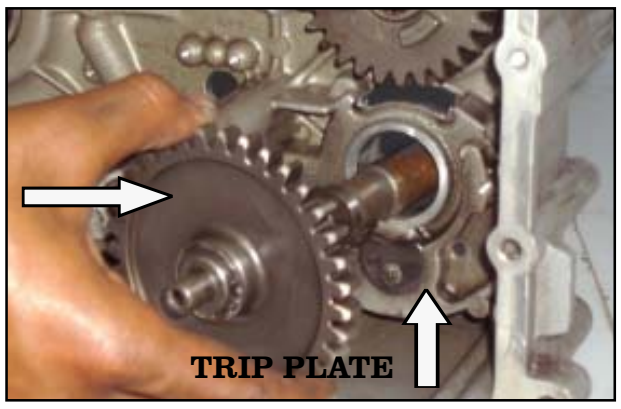


☆ Lock the circlip over kick sub assy.



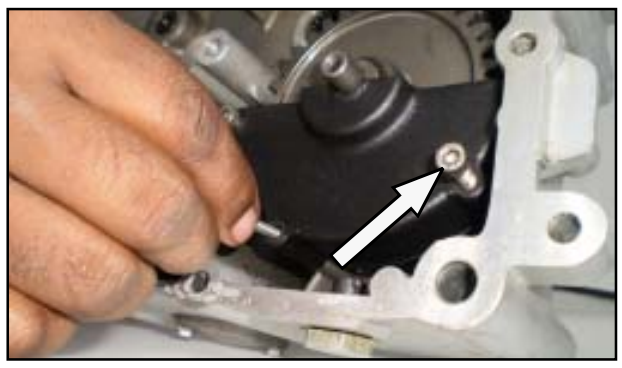
NOTE : Ensure free rotation of kick pinion gear while pressing down the kick pawl and plunger.

☆ Fix kickstarter sub assy in to Crankcase RH as shown in Fig.

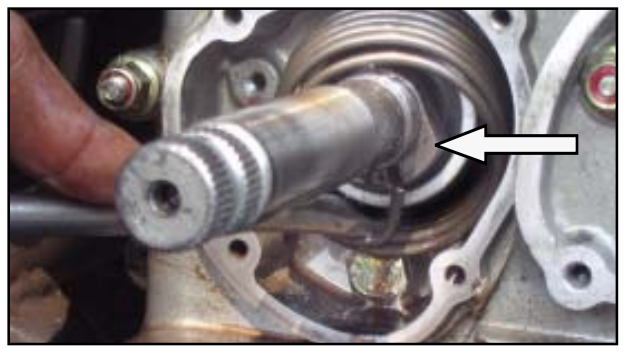


NOTE : Ensure kick pawl is seated over the trip plate in the Crank case RH. Rotate kick Gear and confirm free wheel movement.

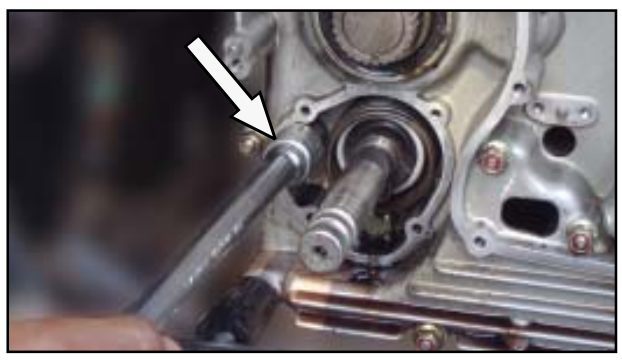
☆ Assemble oil thrower under the kickstarter Gear (Torque 0.6 KG-M).



☆ Assemble Kick starter return spring by hooking into kickshaft spindle.



☆ Insert spring locking bolt with washer into kick spring eyelet and rotate clockwise to lock Kick starter return spring on the Crank case and tighten (Torque 1 KG-M).



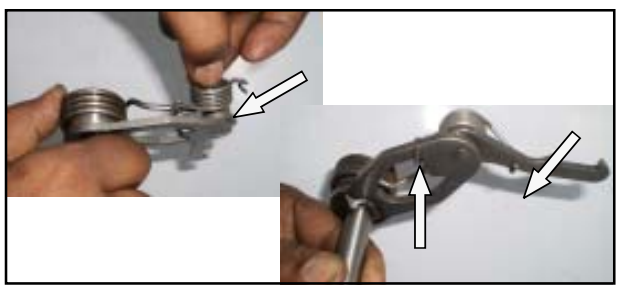
☆ Apply LOCTITE 5699 RTV silicon liquid gasket then assemble kick shaft Cover with oil seal on Crank case RH by 4 screws (Torque 0.6 KG-M).

NOTE : Ensure oil seal is replaced before fixing kick shaft cover.

ASSEMBLING OF GEAR ROCKER SHAFT SUB ASSEMBLY

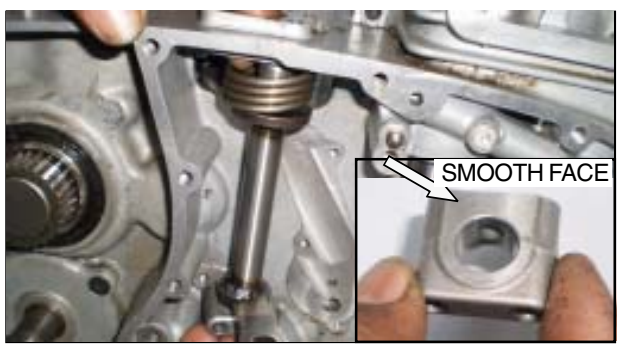
☆ Assemble gear change spring on rocker shaft assy. Then assemble spacer inside the spring as shown in Fig.

☆ Assemble striker spring on rocker shaft assy.



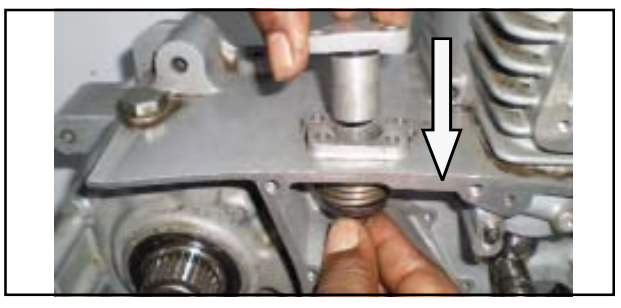
NOTE : Ensure striker spring both ends are seated on striker lever rocker shaft.

☆ Assemble rocker shaft sub assy. carefully into Crank case window, after fixing the dowel over the Crank case RH along with bottom pivot Bearing.



NOTE : Ensure bottom pivot bearing smooth machined surface are facing upwards.

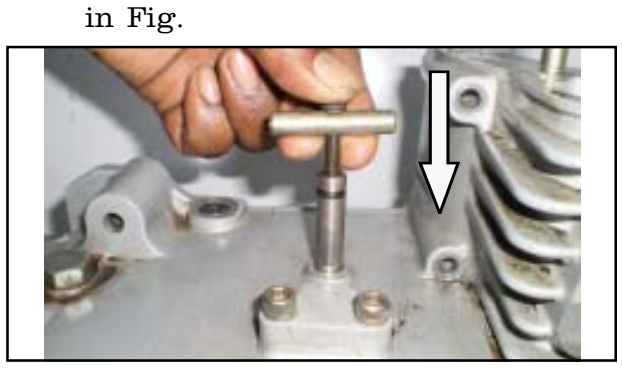
☆ Assemble rocker shaft upper pivot bearing with "O" ring with 2 bolts (Torque 1 KG-M).



☆ Assemble lower pivot bearing 2 allen bolts (Torque 0.6 KG-M).

NOTE : It is recommended to tighten the upper pivot bearing first and then the bottom pivot bearing to avoid gear shifting problems.

☆ Assemble rocker return spring stop pin along with "O" ring by using special tool No. ST 25123-4 as shown in Fig.



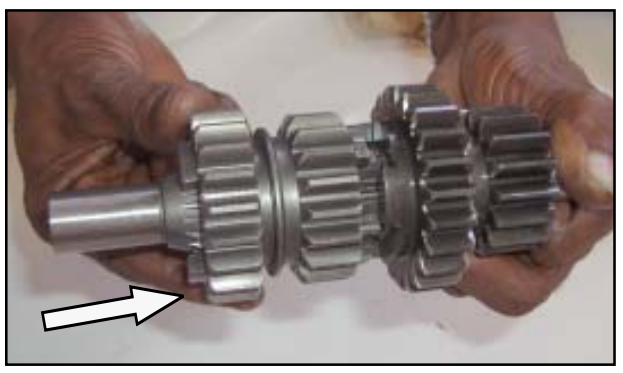
NOTE : Apply thread lock sealant before fixing spring stop pin to avoid oil seepage.

ASSEMBLING OF LAYSHAFT SUB ASSEMBLY

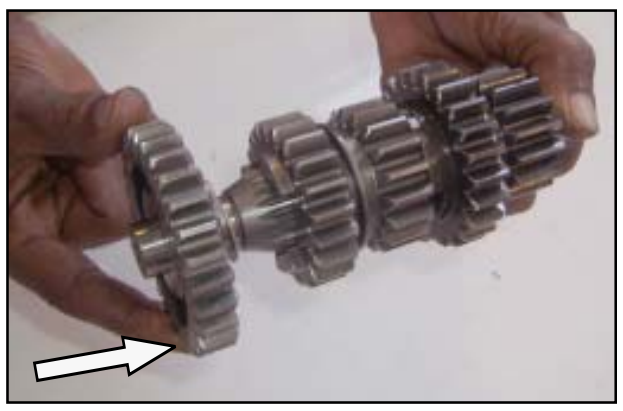
☆ Assemble thrust washer and then 2nd gear on layshaft.

☆ Assemble High gear.

☆ Assemble Double gear (LS 3rd and 4th gear).



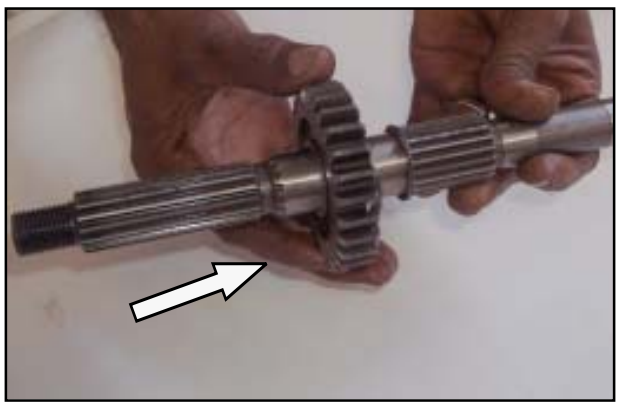
☆ Assemble thrust washer and then Lay shaft 1st gear.



LAYSHAFT SUB ASSEMBLY

ASSEMBLING OF MAINSHAFT SUB ASSEMBLY

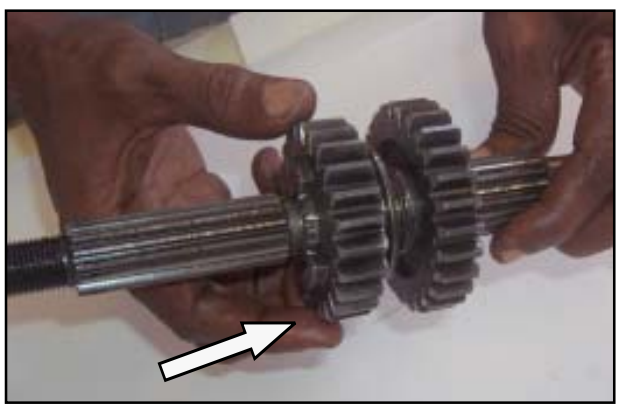
☆ Smear oil and assemble the 1st thrust washer and then the 4th gear on the main shaft.



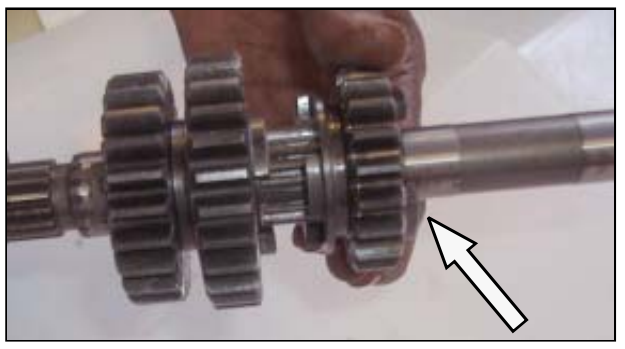
☆ Assemble 2nd thrust washer and fix circlip to lock the 4th Gear.

☆ Smear oil on the 3rd & 4th gear with bush before assembly on Mainshaft.

☆ Assemble main shaft 3rd gear.



☆ Assemble main shaft 2nd gear as shown.

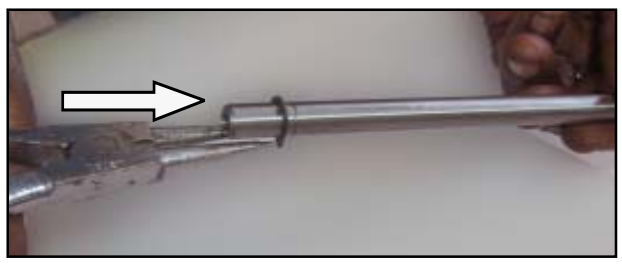


NOTE : Ensure 2nd gear selector fork groove side is facing towards MS 4th gear.

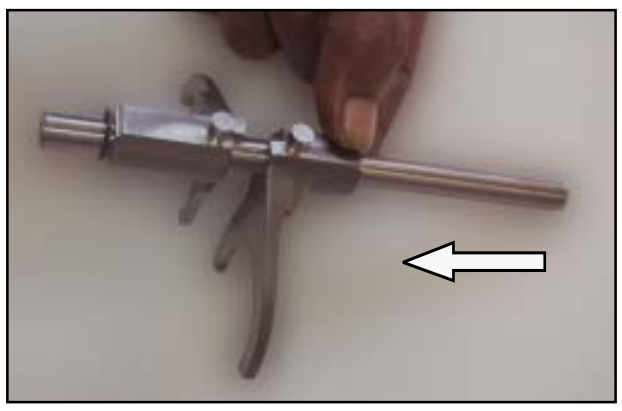
☆ Assemble main shaft 1st gear.

MAIN SHAFT SUB ASSEMBLY

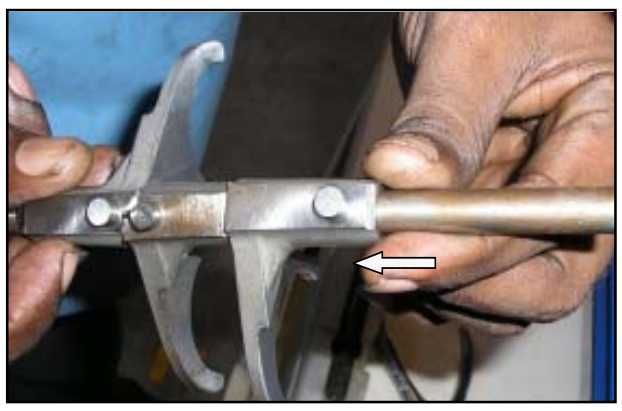
☆ Assemble circlip on the selector shaft.



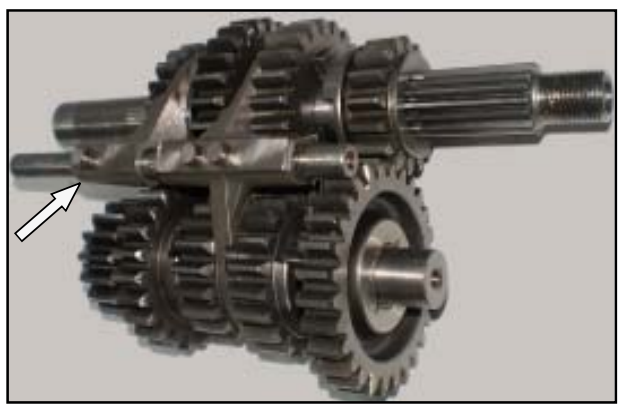
☆ Assemble LH selector fork on the selector shaft and then insert centre fork so that the cut shoulders of both the forks are matched.



☆ Assemble RH selector fork as shown in Fig.



☆ Assemble selector fork sub assembly over main and Layshaft sub assy. as shown in Fig.

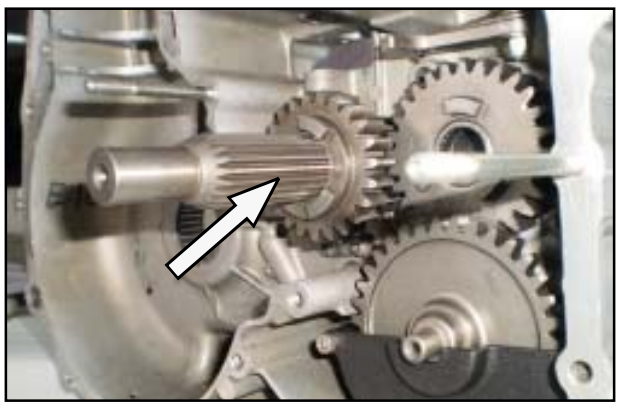


☆ Always assemble the cam plate on selector fork sub assembly in 3rd gear position & ensure the 4 rollers are in good condition and located properly.

☆ Locate special thrust washer (Layshaft) on Crank case RH and stick using grease.

NOTE : Ensure special thrust washer profile is facing towards sleeve gear.

☆ Assemble the thrust washer, LS2nd gear & High gear with Lay shaft mounted on the Crank case RH as shown in Fig.



☆ Hold the cam plate and gear train sub assembly along with Fork shaft, Forks, Lay shaft double gear (LS3 & LS4) and main shaft with all gears (in 3rd gear position). Gently slide inside the crankcase RH.

NOTE : Ensure alignment of main shaft with sleeve gear hole, fork shaft with fork hole inside the Crank case RH and sliding gear with lay shaft.

☆ Insert cam plate piviot pin with "O" ring

with special tool No. ST 25123-4 as shown in Fig.

NOTE : Apply LOCTITE 577 thread sealant to pivot pin to avoid oil seepage if any.

☆ Insert 3 mm locating pin to lock piviot pin as shown in Fig.

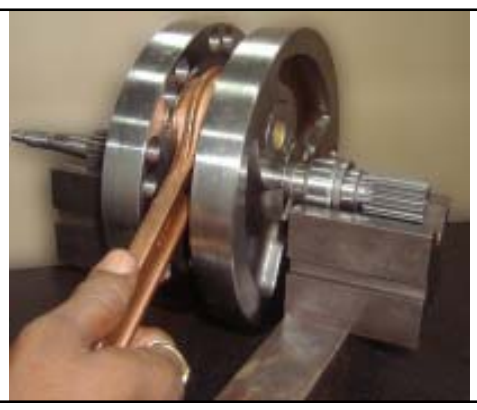
☆ Assemble thrust washer and then LS 1st gear on the Layshaft.

NOTE :

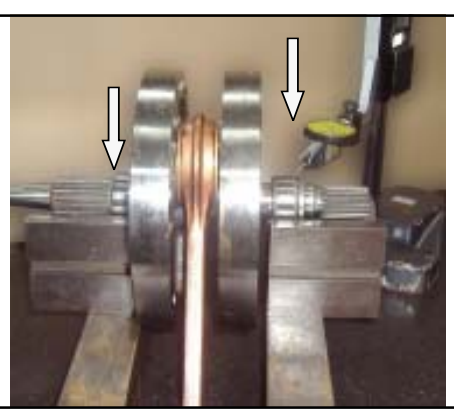
Check Gear shifting system by rotating Cam plate and Main shaft sub assy while rotating the shafts simultaneously. Check for smooth gears engagement.

☆ Assemble "O" ring, cap pivot, copper washer and tighten bolt (Torque 1 KG-M).

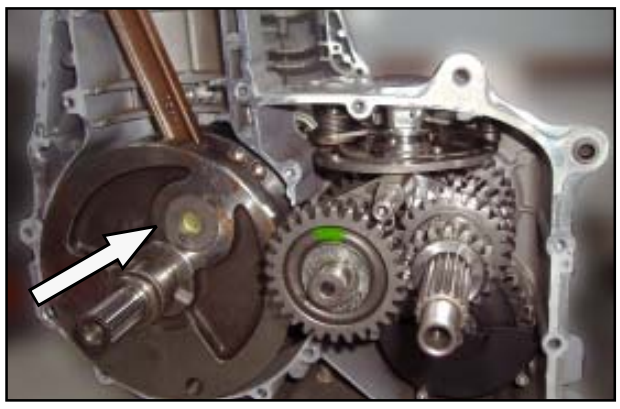
☆ Check Crank shaft big end bearing axial play is within service limit.



☆ Check Crank shaft run out is within service limit.



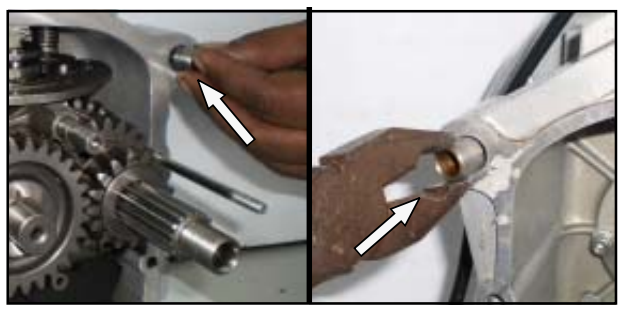
☆ Assemble the crank shaft into the crankcase RH.



NOTE :

Ensure the bearing inner races (small one on timing shaft & big one on drive shaft) are fitted on the crank shaft before assembling in the crankcase RH.

☆ Assemble the 2 dowel pins on the crankcase and apply LOCKTITE 5699 RTV silicon liquid gasket on the RH Crank case seating surface.



☆ Assemble special thrust washer (lay shaft) on Crank case LH.

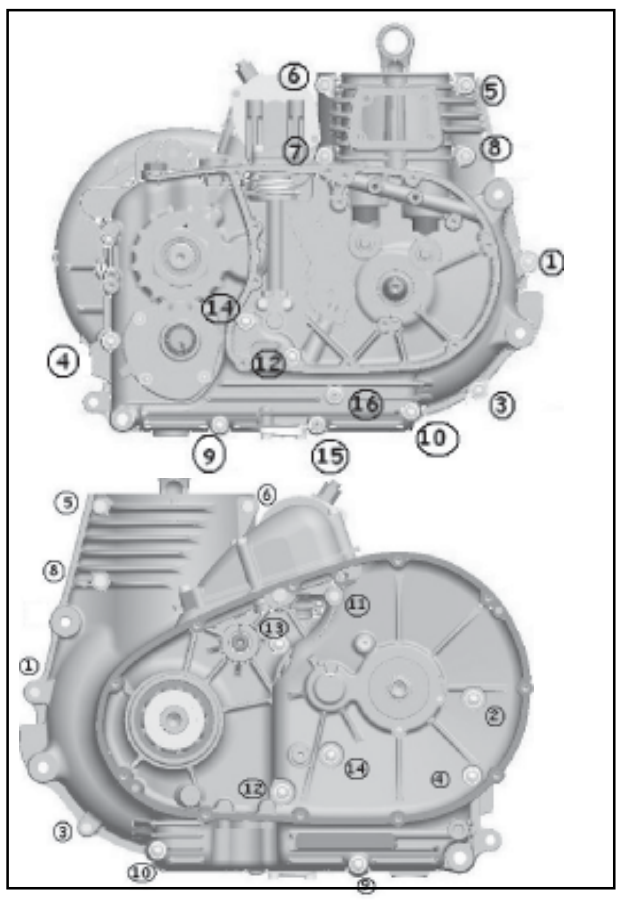
NOTE :

Ensure special thrust washer profile facing towards Crank shaft bearing side on LH Crank case.

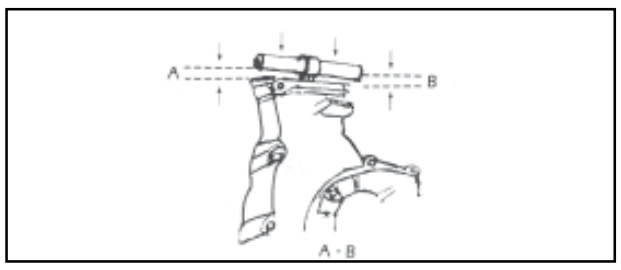
☆ Insert the jack shaft from the crankcase LH inside & fix the woodruf key.

☆ Assemble the crankcase LH over RH Crank case by tapping gently. Simultaneously holding self motor jack shaft carefully.

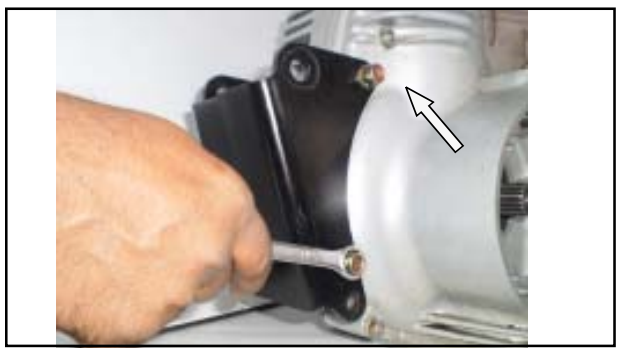
☆ Tighten the crankcase stud nuts and allen screws as per the following sequence.



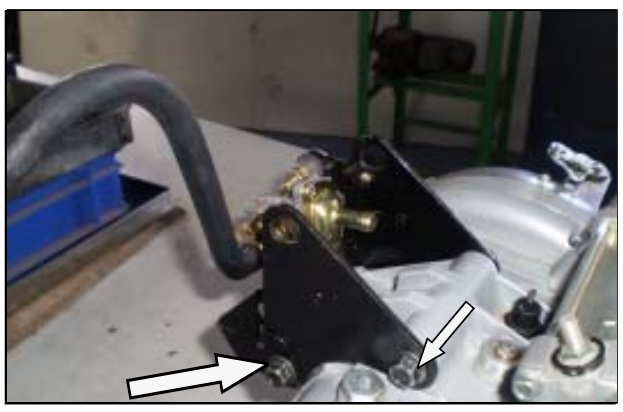
☆ Check connecting rod bend as shown in Fig.



☆ Assemble Front Engine Mounting Brackets and tighten bolts (Torque 2.5 KG-M).



☆ Assemble Rear Engine Mounting Bracket and the piece mudgaurd holding bracket (Torque 2.5 KG-M).



NOTE : Ensure **" R"** index mark side is facing towards RH side (FD Sprocket) of the engine.

☆ Assemble neutral switch with packing.

☆ Locate the crankcase on the frame and fit the front engine mounting stud.

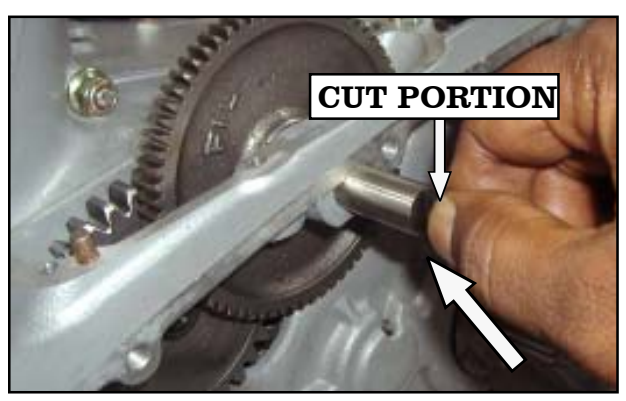
☆ Fit the rear engine mounting stud.

☆ Fit the centre stand and foot rest supports.

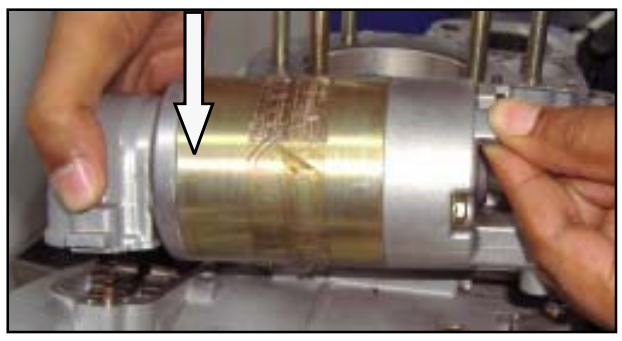
☆ Ensure the woodruf key is located correctly on the jack shaft and fix the circlip.

NOTE : Ensure step face of jack shaft gear should face inside (Towards Crank case LH)

☆ Locate the double gear for starter drive in the crankcase and insert shaft. Ensure cut portion of shaft is facing upwards.



☆ Fix the dowels in the crankcase and carefully fix the motor with housing starter drive. Apply LOCKTITE 5699 RTV silicon liquid gasket on the joint face.



☆ Fix the 4 Allen screws of housing starter drive and tighten (Torque 0.6 KG-M).

☆ Fix the main cable on the starter motor on tighten. Insert rubber boot properly.

☆ Fix the E-Start motor with 2 allen bolts (Torque 1 KG-M) along with earthing cable.

NOTE : Apply LOCKTITE 577 thread sealant to mounting bolts to avoid oil seepage if any.

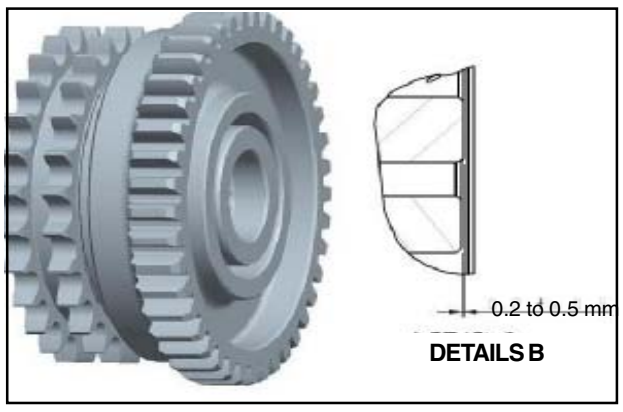
☆ Fix the E-Start motor cover.

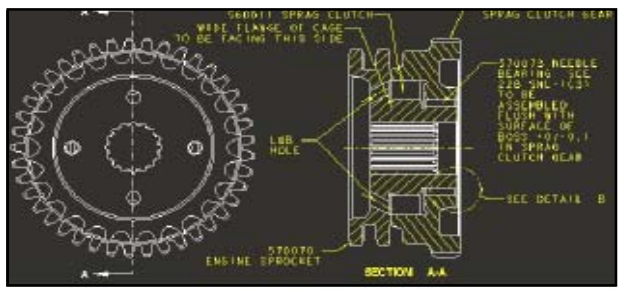
☆ Assemble spacer (distance washer) on Crankshaft LH.

CAUTION:

This double stepped faceshould be inside.

SPRAG CLUTCH ASSEMBLY





☆ Ensure the distance between sprag clutch gear end face and engine sprocket end face should be maintained between 0.2 to 0.5 mm as indicated in the above image.

NOTE : Crank the engine gently for ease of assembly.

CAUTION : Do not rotate the starter motor while assembling as it will damage the "O" ring.

P Assemble sprag clutch bearing.

NOTE : Ensure wide flanges face of the sprag clutch bearing must face outwards.

☆ Assemble Engine primary sprocket and sprag clutch gear assembly.

CAUTION : Lubricate the needle bearing well before assembling on the sprag clutch.

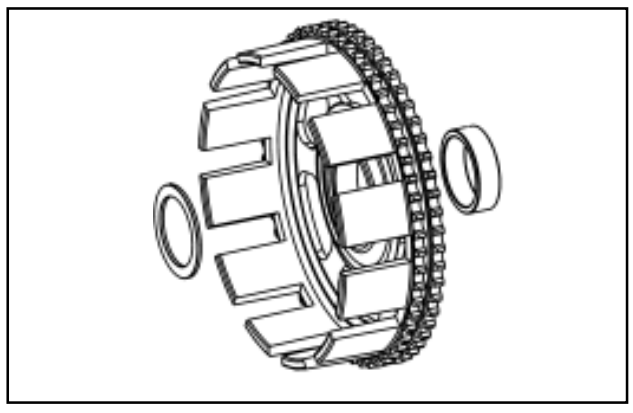
☆ Assemble the primary chain auto chain tensioner body assy. with "O" ring and tighten with 2 allen screws (Torque1 KG-M).

☆ Assemble chain tensioner pad, washer and hex nut (Torque 2.5 KG-M).

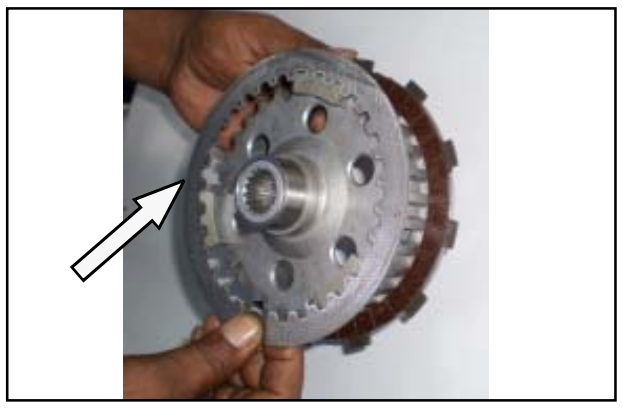
☆ Assemble collar on main shaft (distance collar on Crankcase LH).

ASSEMBLY OF CLUTCH

☆ Assemble needle roller Bearing (SCE 228-C3) in the clutch sprocket and locate the thrust washer.



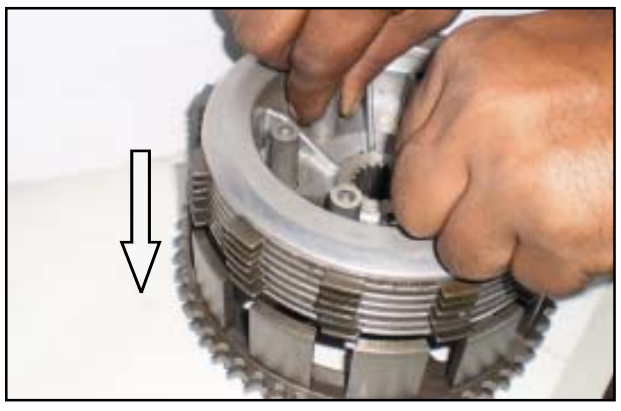
☆ Assemble clutch friction plate over clutch hub and then clutch plain plate. Similarly follow the same to sub assemble all the clutch plates.



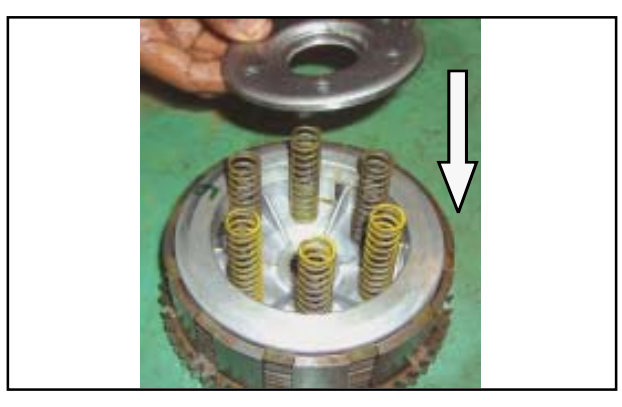
CAUTION : Ensure smooth face of all clutch plain plates are kept in the same direction to avoid clutch jerk / slippage.

☆ Assemble wheel clutch on clutch hub.

☆ Insert clutch sub assy. into clutch sprocket. after placing the thrust washer.

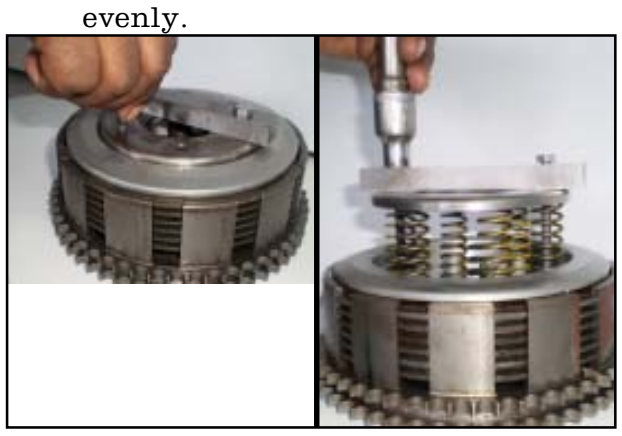


☆ Assemble clutch springs 6 Nos. on clutch sub assy. then place clutch spring holder.



☆ Use Special tool No. ST - 25594-4 Clutch spring compressing tool to compress the clutch springs over spring holder and tighten with 2 long bolts.

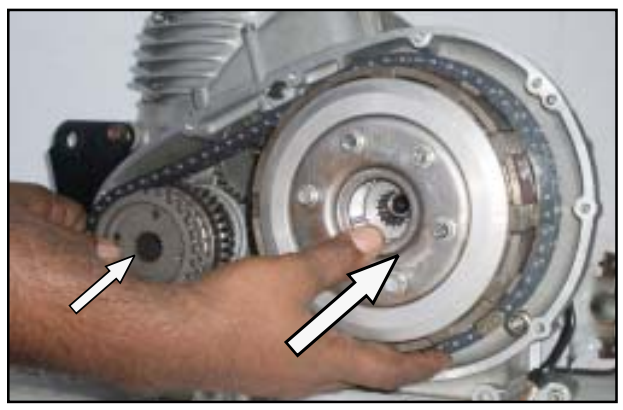
☆ Assemble the 4 clutch holding bolts bolts and tighten diagonally and evenly.



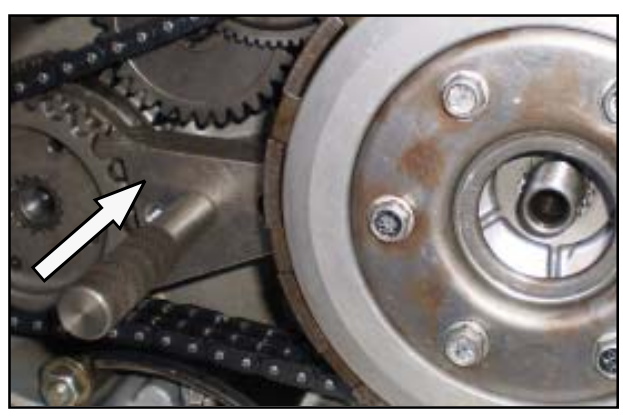
NOTE : Tighten bolts diagonally and evenly 5 threads each (Torque 1 KG-M).

☆ Remove the 2 long bolts and the special tool. Fix the 2 hex bolts.

☆ Assemble Duplex chain over Engine sprag clutch sprocket and Clutch assembly. Mount on main shaft.



☆ Use Special tool No. ST 25591-4 Clutch centre holding tool to lock Clutch sprocket and engine sprag clutch assy.



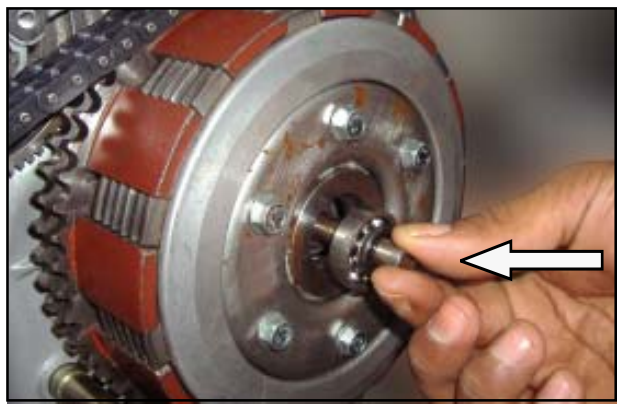
☆ Fix 17 mm hex head bolt with washer on sprag clutch assy. (Torque 4.8 KG-M).

☆ Fix the washer and nyloc hex nut 24 mm over clutch assembly and tighten.

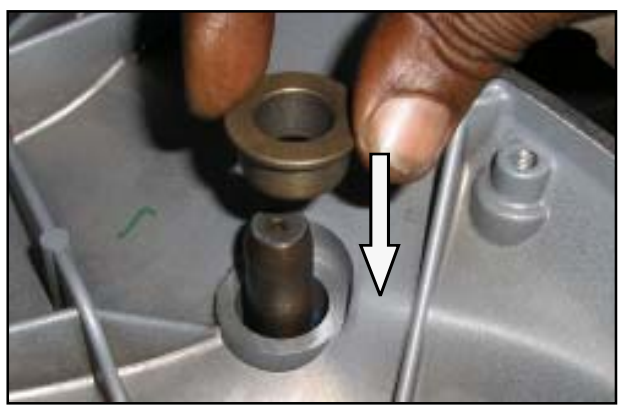
☆ Use Torque wrench to tighten the nyloc nut on Clutch (Torque 4.2 KG-M).

☆ Fix the spring and bolt with “O” ring for the auto chain tensioner (Torque 1 KG-M).

☆ Assemble clutch bearing cup, ball bearing (6001) & clutch push pad.



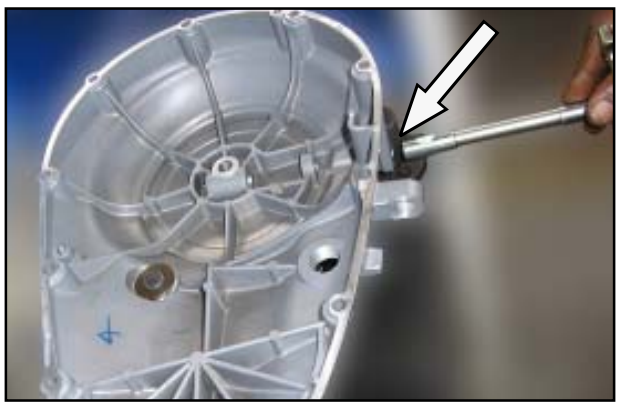
☆ Assemble gear lever shaft bush.



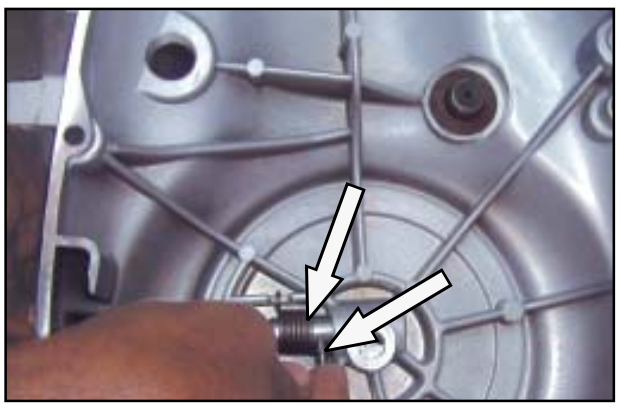
☆ Assemble gear lever oil seal on cover LH .

☆ Assemble Clutch operating shaft oil seal.

☆ Assemble clutch operating shaft assembly on cover LH.



☆ Assemble spring for clutch operating shaft and lock the pin.



☆ Assemble oil filler plug with "O" ring.

☆ Assemble the cover LH on Crank case LH.

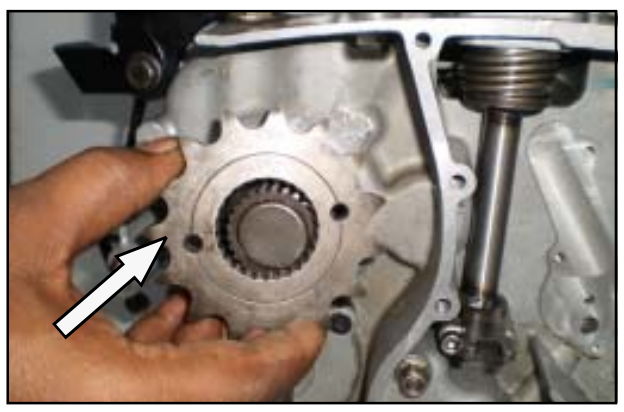
NOTE : Ensure 2 Nos. dowel pins are located properly. Apply LOCKTITE 5699 RTV silicon liquid gasket.

☆ Locate 11 bolts on cover LH and tighten (Torque 1 KG-M).

☆ Assemble clutch cable on Crank case cover LH and fix to clevis.

☆ Assemble Sleeve gear Spacer over sleeve as shown in Fig.

☆ Assemble FD Sprocket .



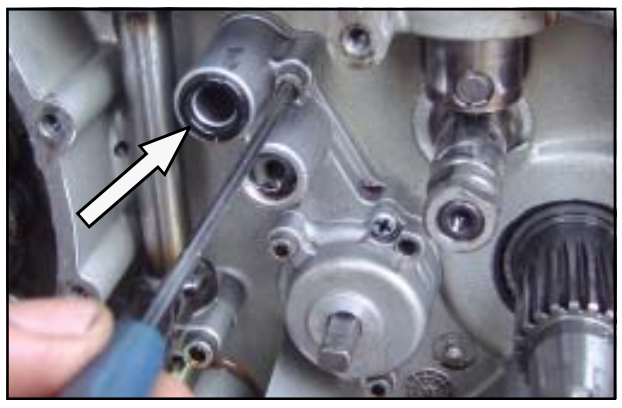
NOTE : Care to be taken while fixing the FD sprocket direction circular groove index mark, facing outwards.

☆ Assemble lock type washer and nut (Torque 7.5 KG-M).

☆ Lock the tab over the FD sprocket nut.

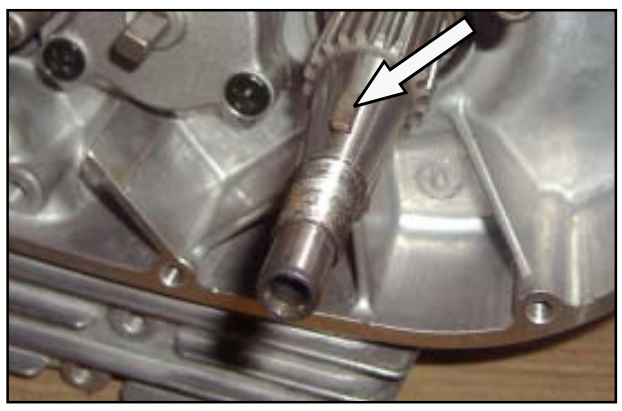
☆ Fix Rear Chain master link, plate and lock clip.

☆ Assemble oil pump on Crank case RH and tighten with 4 allen screws (Torque 0.35 to 0.6 KG-M).



CAUTION : Ensure "O" ring is located on the oil pump body outlet.

☆ Fix the woodruff key carefully on Crankshaft.



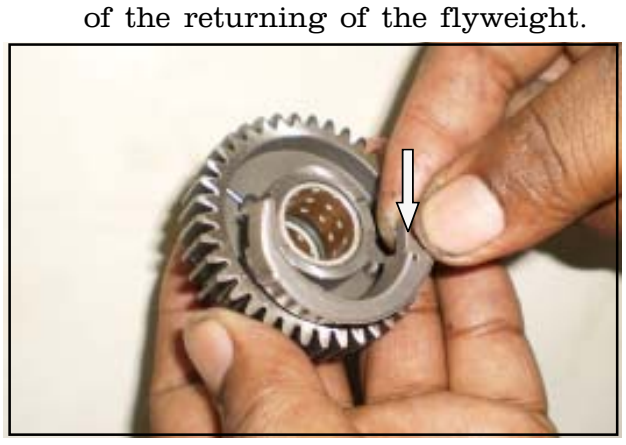
☆ Assemble Gear lever shaft assembly into RH Crank case window and then fix gear shaft spacer.

ASSEMBLING PROCEDURE OF AUTO DECOMPRESSOR

☆ Locate the actuating pin in the Exhaust cam.

☆ Assemble the flyweight along with return spring over activating pin and tighten with allen screw.

☆ Lubricate and ensure free movement of the returning of the flyweight.

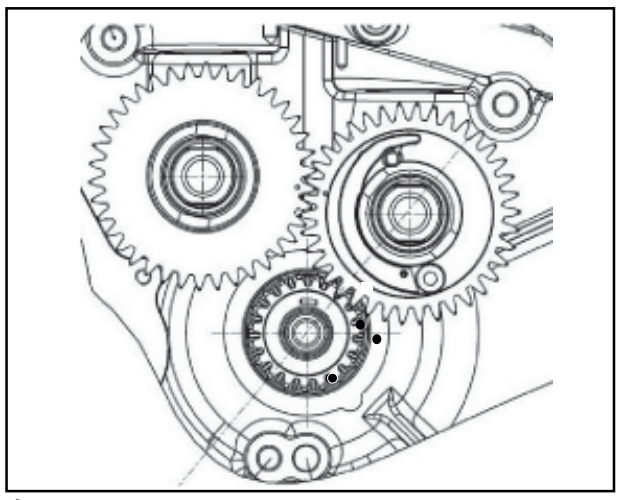


NOTE : Ensure spring eyelet is seated properly inside flyweight hole.

VALVE TIMING

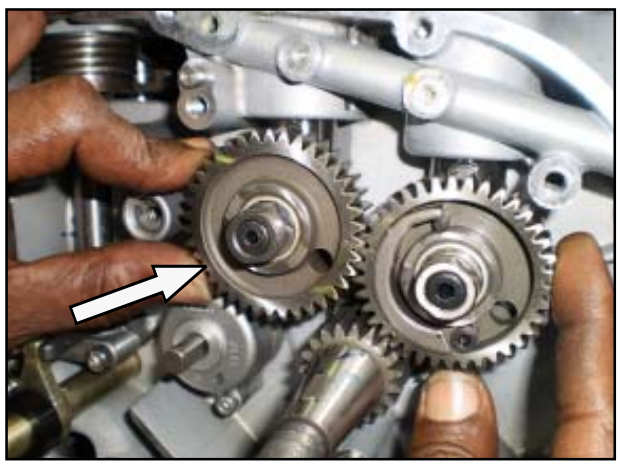
☆ Bring piston to TDC so that the woodruf key in the timing shaft is at 12' Clock position.

ASSEMBLY PROCEDURE OF CAM GEARS



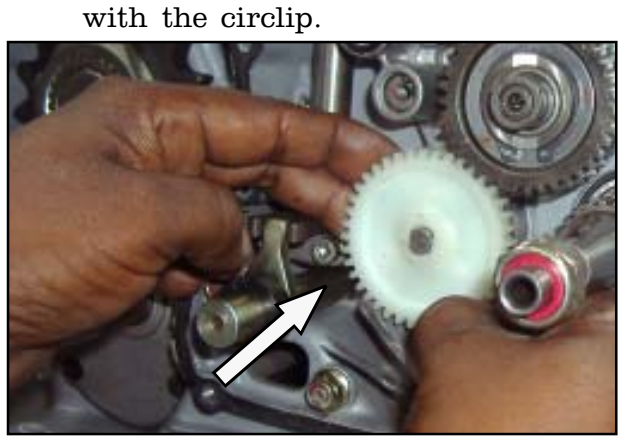
☆ Locate the exhaust cam on the spindle and ensure the 2 punch marks on the cam aligns with the punch mark on the timing shaft gear.

☆ Locate the inlet cam on the spindle and align the single punch marks on the inlet and exhaust cams.

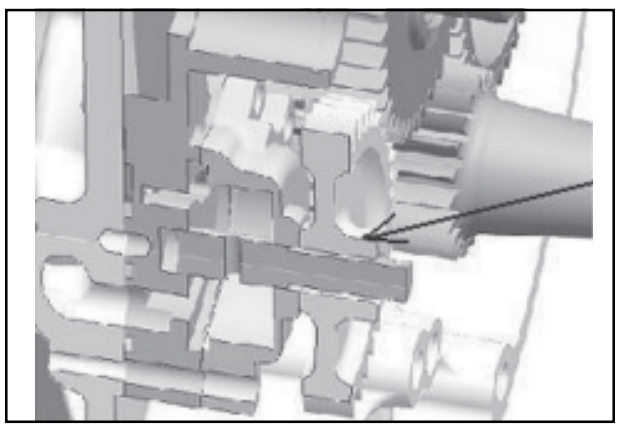


NOTE : After assembling both cam gears, adjust Eccentric cam to reduce gear back-lash (Torque 2 KG-M).

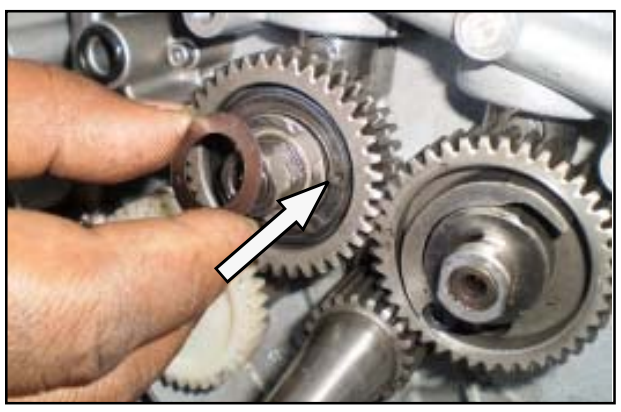
☆ Fix oil pump drive pinion and lock it with the circlip.



NOTE : Ensure the short boss of the gear is facing outwards in case of 350cc and long boss of the gear is facing outwards in case of 500cc



☆ Add one shim each on inlet and exhaust cam.



NOTE : To reduce axial play in between Cam Gears outer surface and steady late, additional shim may be added as per need.

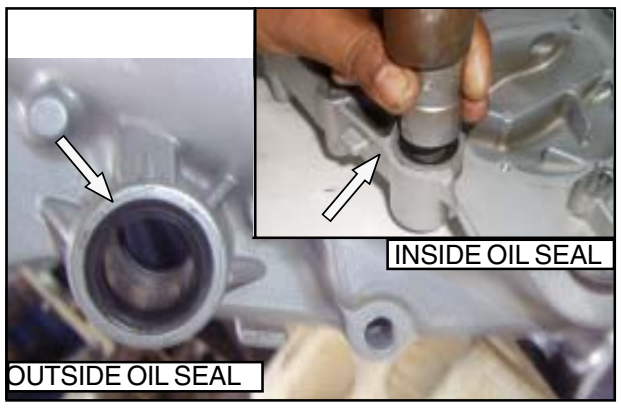
☆ Fix Cam steady plate and check for axial play of Cam Gears to avoid noise problem.

☆ Assemble the dowels and allen screws on Cam steady plate and tighten (Torque 1 KG-M).

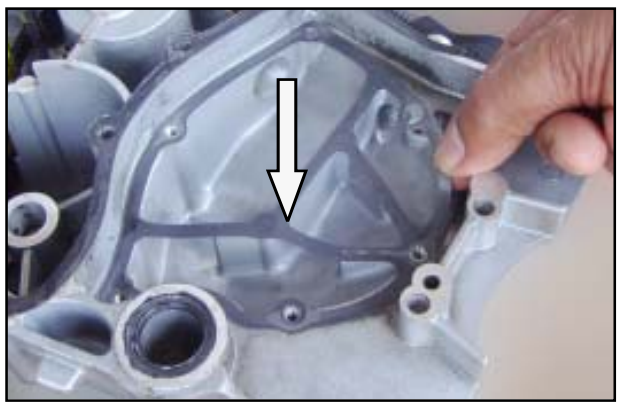
☆ Assemble magneto rotor, plain washer and nut and tighten (Torque 4.8 KG-M).

NOTE : Use special tool No. ST 25592-4 to lock connecting rod movement during tightening magneto nut.

☆ Fix oil seal 2 Nos. at Kick Shaft hole on Crank case RH cover.

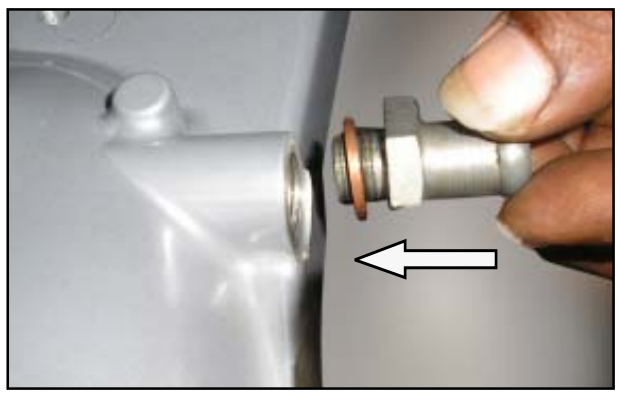


☆ Fix breather chamber gasket.



☆ Assemble 6 allen screws to fix breather chamber cover plate (Torque 0.60 KG-M).

☆ Assemble Breather bolt and washer (Torque 2.0 KG-M).

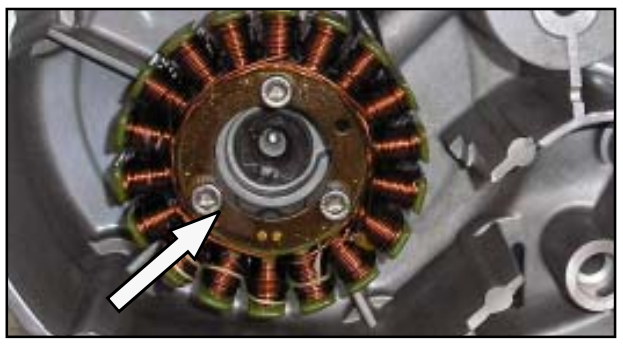


☆ Assemble Ignition Timing inspection bolt with copper washer (if not assembled earlier) Torque 1.5 KG-M.

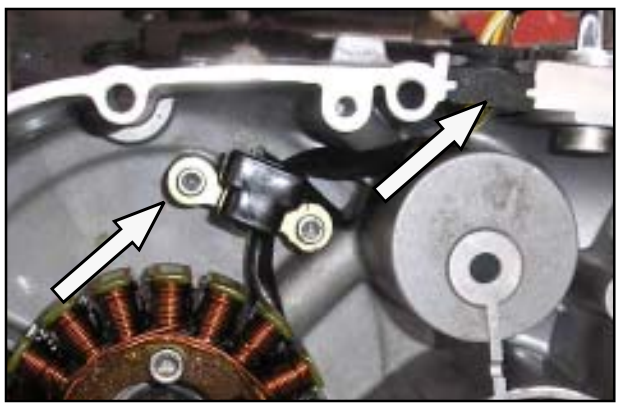
☆ Assemble jet Crankshaft, oil seal Crank feed and circlip on cover RH inside.

NOTE : Replace the oil seal every 20,000 kms interval.

☆ Assemble Stator on cover RH and tighten with 3 mounting screws (Torque 1 KG-M).

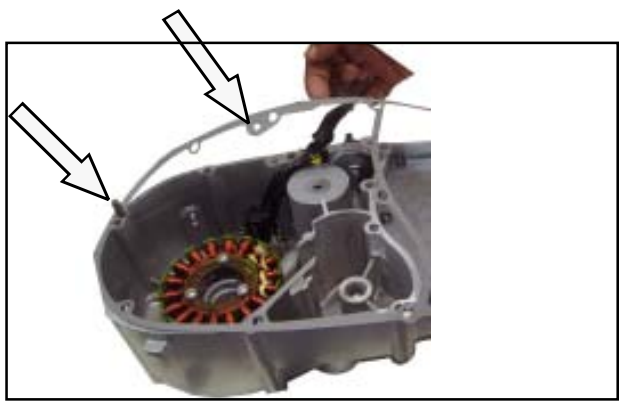


☆ Assemble Pulser coil on cover RH and tighten with 2 screws (Torque 1 KG-M).



NOTE : Apply LOCKTITE 595 silicon adhesive sealant to magneto wire cable grommet to avoid oil seepage.

☆ Assemble 2 dowels and RH Crank case cover gasket.



☆ Assemble cover RH carefully by aligning kickshaft and dowels.

☆ Fix cover RH and tighten with 11 allen screws (Torque 1 KG-M).

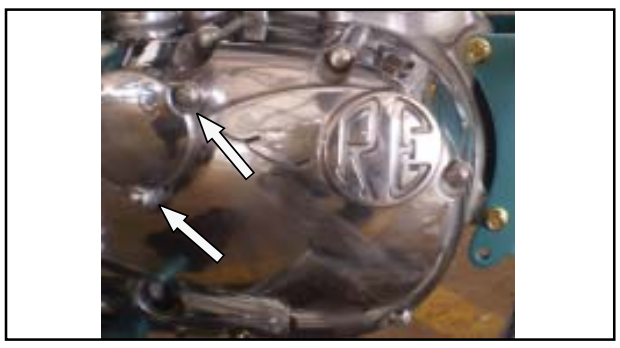
☆ Assemble the “O” rings, Oil filter element, washer and plate as shown.

☆ Assemble “O”ring, Spring and gasket oil filter cap.

CAUTION : Care must be taken while fixing cover due to spring force and gasket.

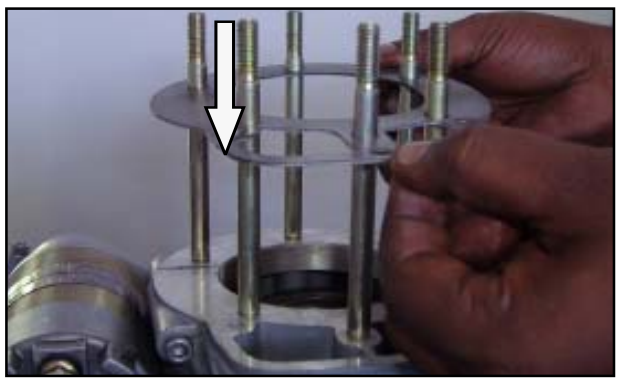
☆ Assemble oil filter cover (Torque 0.60

KG-M).



☆ Assemble kickstarter lever (Torque 2.5 KG-M).

☆ Fix Cylinder barrel bottom Gasket.



PISTON SUB ASSEMBLY

CLEANING

☆ Remove piston rings from piston.

☆ Scrap the carbon deposits from the piston groove with the help of scrapper.

☆ Scrap the carbon deposits from the skirt area and groove area of piston without causing any scratches or scoring.

☆ Clean piston, rings and piston pin with cleaning solvent and dry it with compressed air.

INSPECTION

☆ Visually inspect for cracks, scratches, scoring, seizure marks, pitting etc.,

☆ Check for piston wear, measure the outside diameter of piston perpendicular to the piston pin hole (Ref page No. 03-2)

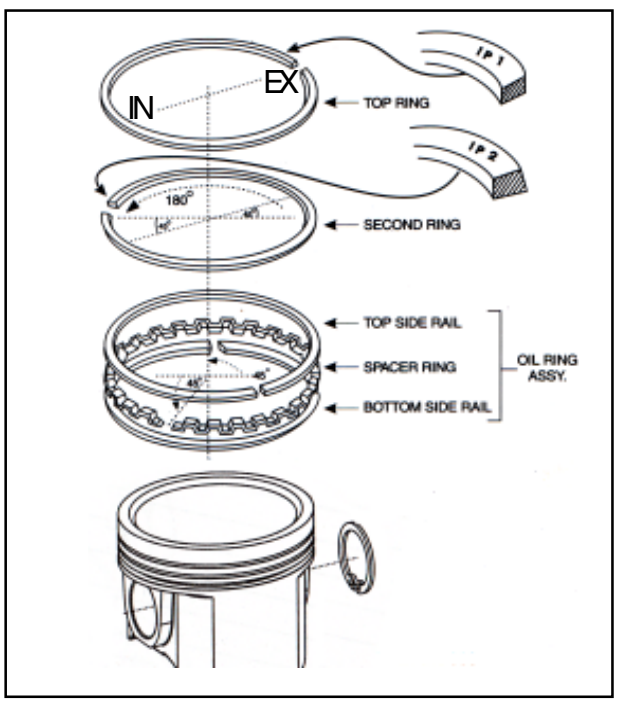
☆ Insert piston rings on its appropriate grooves and check side clearance between the ring and grooves.

☆ Check the piston rings end gap at the bottom end of the Cylinder.

CAUTION : Set each piston ring squarely into the Cylinder barrel at a point 25 mm from the bottom, pushing the ring by piston head and then measuring the end gap.

☆ Check the piston pin for wear. Measure outside dia of piston pin at 3 points.

ASSEMBLY



☆ Locate the oil ring expander into the oil ring groove.

☆ Slide the bottom rail to the bottom of the expander.

☆ Slide top rail to the top of the expander.

☆ Place the second ring in piston (Index mark “2 IP” facing upwards).

NOTE :

Second ring has a taper edge cross section and is hard chrome plated.

☆ Locate the top ring (Index mark “1 IP” facing upwards).

NOTE : Top ring has rectangular cross section with black colour (Nitride coating).

☆ Stagger piston rings end gap as shown in Fig.

NOTE : After installation, the ring should rotate freely rotatable in the ring grooves.

CAUTION : Ensure the open end of any piston ring does not align with the piston pin boss.

☆ Locate the piston on the connecting rod and insert the piston pin into the piston.

☆ Fit the circlips on either side and ensure they are located properly in the grooves.

NOTE : Carefully fix the piston pin clip into the piston boss while covering Crank case neck by shop towel / chamois cloth as shown in Fig.

CYLINDER BARREL

CLEANING

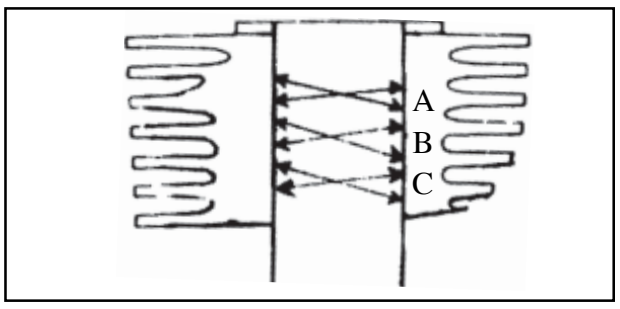
☆ Scrap the carbon deposit from the top edge of the bore.

☆ Clean the barrel with cleaning solvent and dry it with compressed air.

INSPECTION

☆ Visually check for cracks, scratches, breakage of fins, scoring, seizure mark etc of the Cylinder bore.

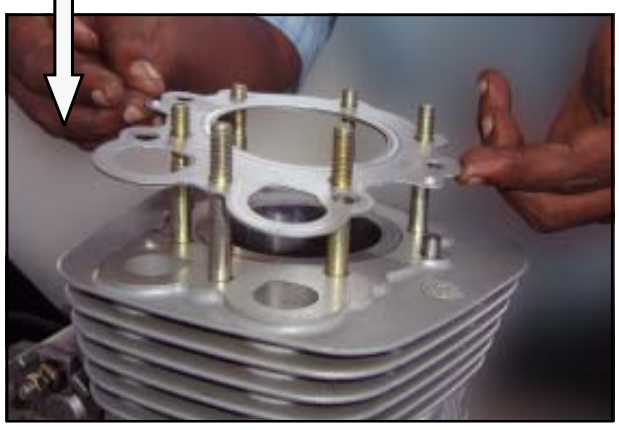
☆ Check Cylinder liner for wear at 3 locations measure the cylinder ID in X and Y axis.



☆ Thoroughly lubricate cylinder bore with fresh engine oil and then assemble over the piston by gently twisting and tilting.

NOTE : Do not use any sharp objects to press piston rings against groove. Use thumb finger force to locate rings in its position properly.

☆ Assemble the multi layer steel (MLS) head gasket on the barrel & 2 Nos. dowels.



CYLINDER HEAD

CLEANING

☆ Scrap off the carbon deposit on the face of the Cylinder head and exhaust port.

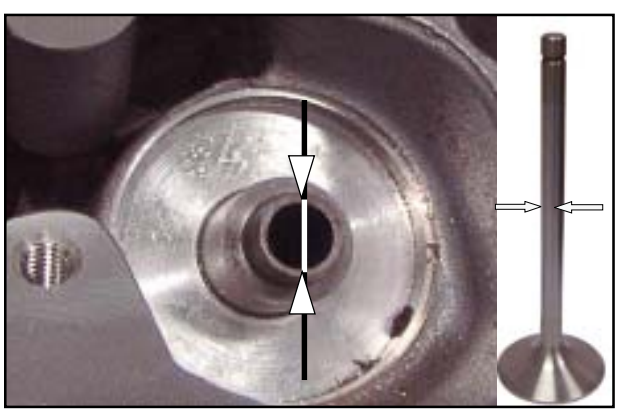
INSPECTION

☆ Visually check for any cracks, breaks of Cylinder head fins.

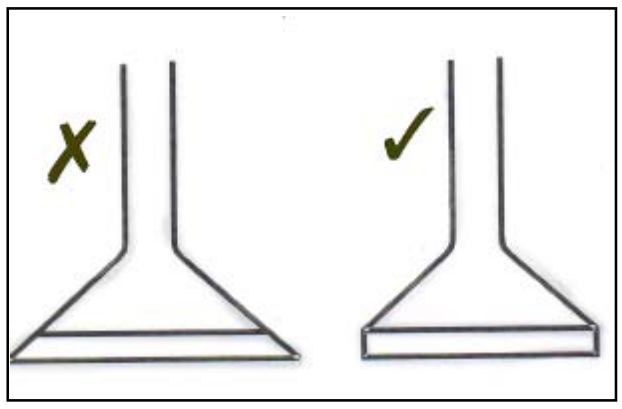
☆ Check valve stem scoring, bent or any other damage.

☆ Check the Cylinder head face for warpage on surface plate as shown in Fig.

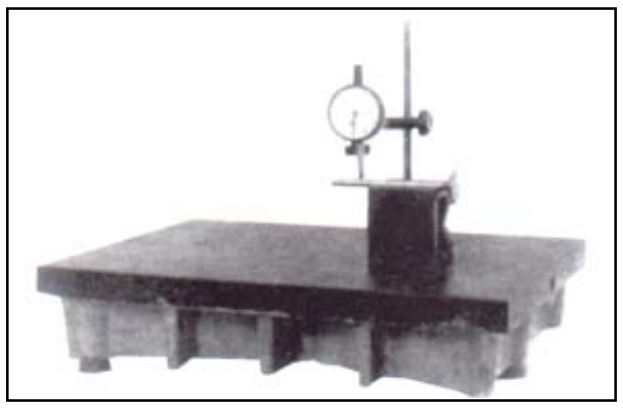
☆ Check the valve guide for wear with small bore gauge and valve stem OD by vernier caliper to measure valve to guide clearance.



☆ Replace valve if the valve head is knife edged.

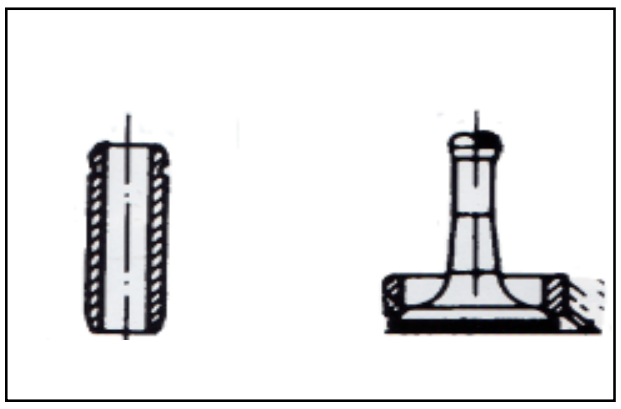


☆ Check the valve stem for run out.

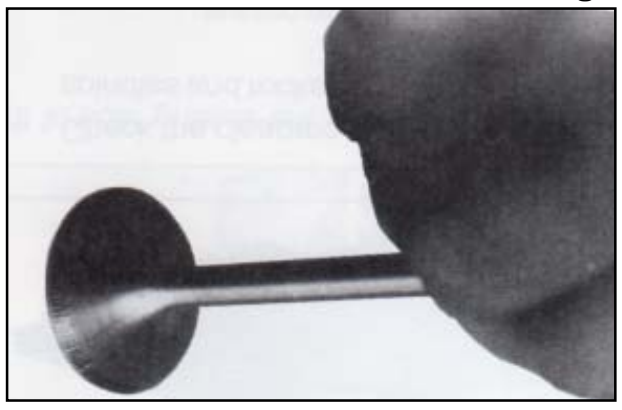


☆ Check inlet and exhaust valve stem for wear.

☆ Check the valve seat to valve head seating as below.



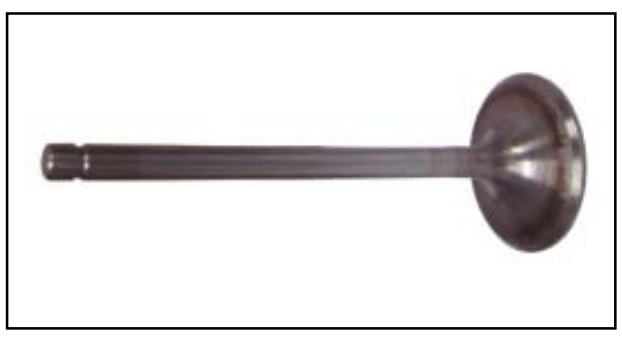
☆ Make pencil marks on the seating area of valve head as shown in Fig.



☆ Assemble valves into the valve seat.

☆ Using a suction valve grinder rotate the valve back and forth, several times.

☆ Remove the valve and check for pencil marks.



☆ Proper seating erases all the pencil marks.

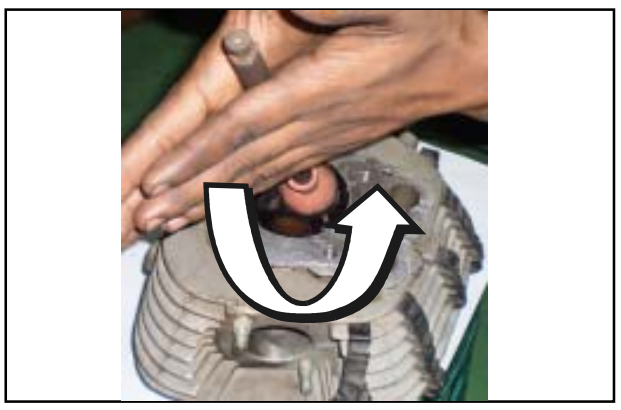
☆ In case if the pencil marks are not erased, grind the valve to the seat as below

- Apply fine grinding paste on to the valve seating area.

WARNING : Do not allow the grinding paste to seep into the valve stem and valve guide.

☆ Using a suction valve grinder / valve lapping stick, rotate the valve back and forth several times.

☆ Lift and turn the valve by half and grind valve on its seat.



☆ Repeat the process of valve lapping as explained several times for ensuring perfect valve seating.

☆ Clean the valve and valve seat thoroughly.

VALVE SEAT INSPECTION :

- ☆ Check and ensure proper seating with pencil marks as explained above.
- ☆ Valve seating on valve seat can also be checked as follows:

- ☆ Assemble the valve assembly in position. Keep the Cylinder head on a table. Fill petrol on top of the valves. Seepage of petrol past the valve seat indicates improper valve seating.
- ☆ Check the free length of valve spring.

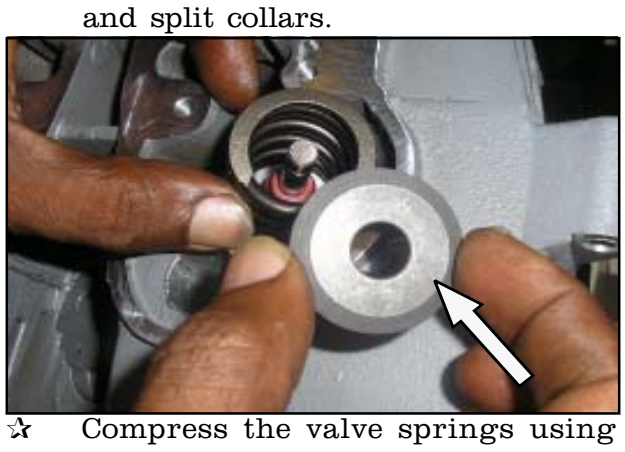
ASSEMBLY

- ☆ Install the valve spring seats and new valve stem seals.

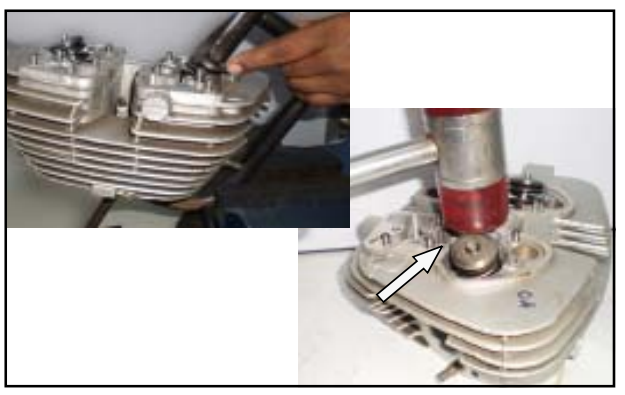
NOTE : Please ensure cleaning of the cylinder head with solvent and blow thorough all oil passages with compressed air.

- ☆ Lubricate each valve stem with fresh engine oil and fix the inlet and exhaust valve into the valve guides.

- ☆ Assemble the valve spring, retainer and split collars.



- ☆ Compress the valve springs using special tool ST 25123-1, valve spring compressor and fix the split collar locks on the inlet valve.



☆ Similarly follow the same process to assemble the exhaust Valve as shown in Fig.

NOTE:

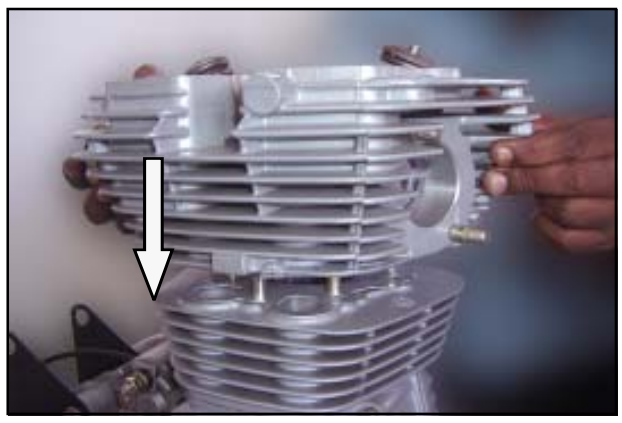
Please ensure split collars are locked on the valve stem groove by tapping gently with a plastic hammer on retainer spring.

VALVE LEAKAGE TEST

☆ Pour solvent into exhaust port and check for valve seat leakage if any.

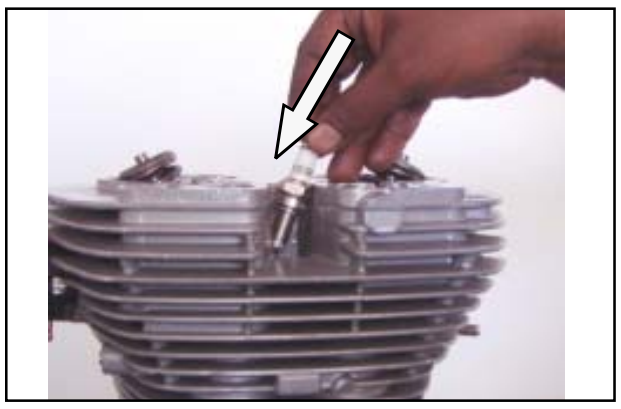
☆ Similarly check for inlet valve seat leakage.

☆ Assemble the Cylinder head assy. on the Barrel.



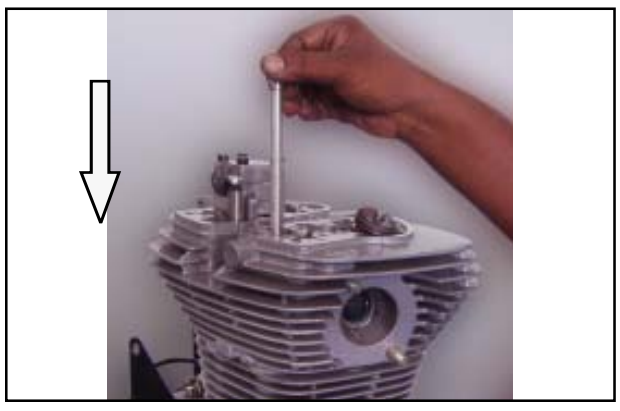
☆ Tighten the 6 flanged hex nuts diagonally and evenly.

☆ Assemble the spark plug

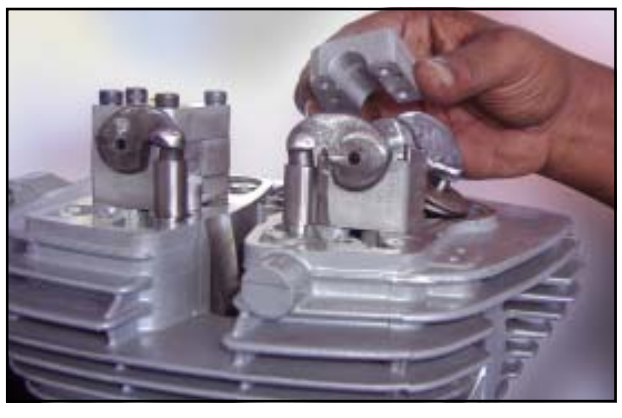


☆ Check run out of the push rods.

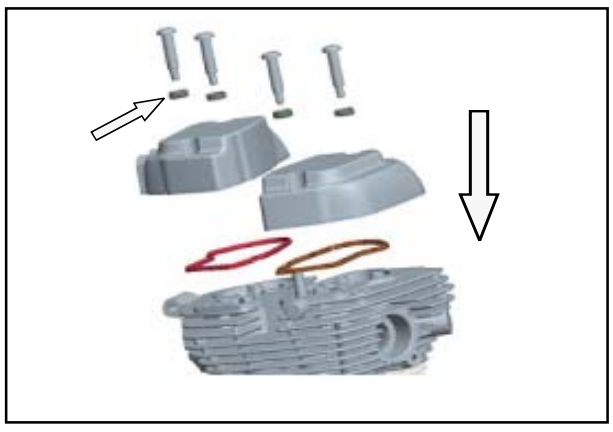
☆ Assemble inlet and exhaust pushrods.



☆ Assemble the inlet and exhaust rocker bearing with dowel and tighten allen screws



☆ Assemble the Inlet & Exhaust Rocker covers, dowels & rubber gasket then tighten rocker cover bolt with rubber washer (Torque 1 KG-M)) .



☆ Assemble tappet door by applying LOCKTITE 5699 RTV silicon gasket on Crank case RH then tighten screws (Torque 0.60 KG-M).

☆ Tighten the swing arm nut to specified torque.

☆ Tighten the front engine mounting stud nuts to the specified torque.

☆ Tighten the rear engine stud nuts to the specified torque.

☆ Tighten the centre stand and foot rest nuts to the specified torque.

☆ Assemble throttle body and connect the throttle cables.

☆ Fill recommended the engine oil to the correct level and tighten filler cap with “O” ring.

☆ Assemble the exhaust pipe and silencer in the reverse order of disassembly.

☆ Fix the clutch cable & the manual Bi Starter to the handle bar levers.

☆ Connect all the electrical couplers.

☆ Connect the brake light switch to the pedal.

☆ Connect the fuel hose to the pump.

☆ Assemble the battery & connect the terminals. Check for proper working of all electrical equipments.

☆ Fix the dual seat.

☆ Start machine and run in idle RPM for few minutes. Switch off & check oil level add oil to bring level below “Max” level.

☆ Adjust rear brake and chain terminals. Align the rear wheel.

SECTION

SIX 06

ENGINE MANGEMENT SYSTEM

Engine Management System (EMS)

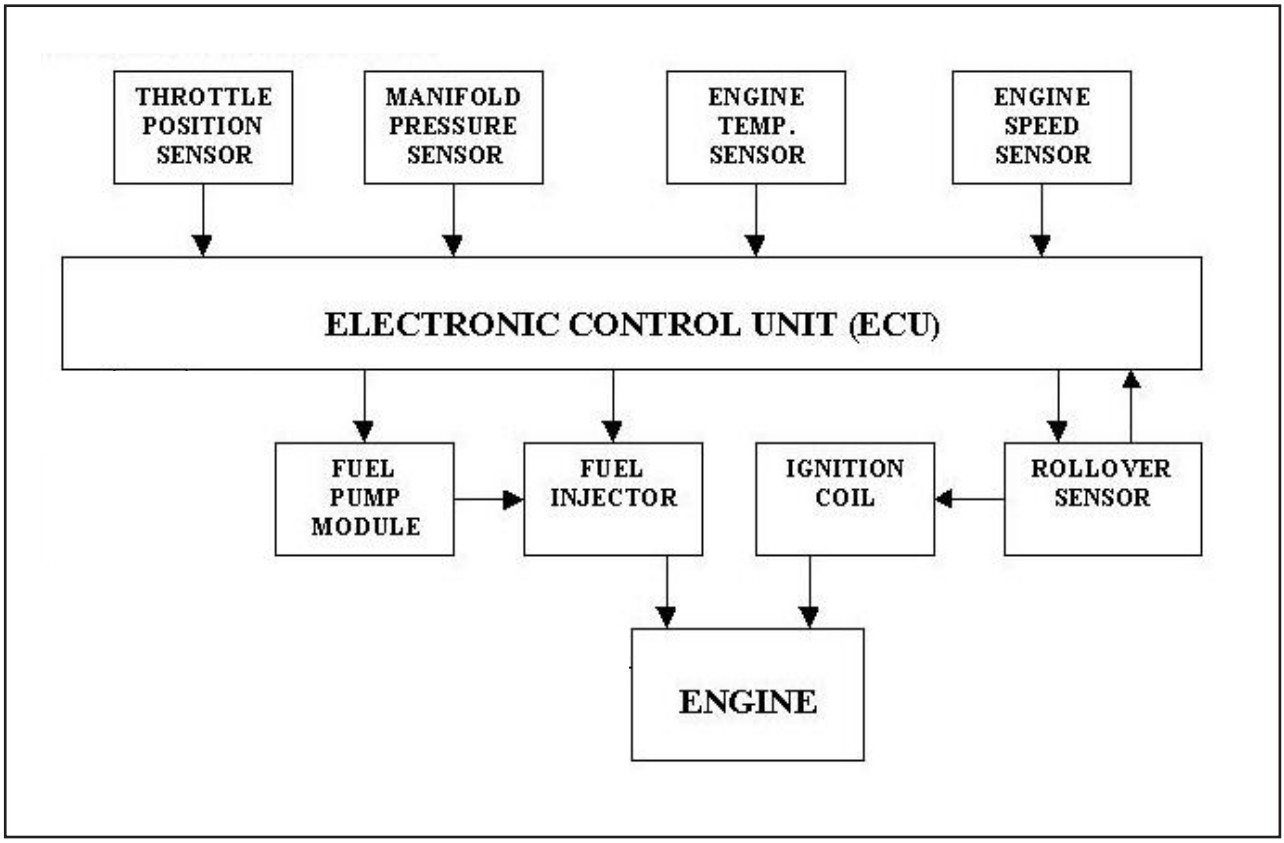
The Classic 500 is fitted with an intelligent Engine Management System (EMS).

It consists of an Electronic Control Unit (ECU) which constantly takes inputs like engine speed, engine temperature, throttle position, manifold air pressure, exhaust oxygen feed back etc, from the respective sensors, provided in the vehicle and determines both the ignition timing and the ideal amount of fuel to be injected, to optimize the air-fuel ratio.

THE BENEFITS OF EMS ARE :

- ☆ Good acceleration.
- ☆ Sustained high speed cruising and driveability.
- ☆ Low exhaust emission.
- ☆ Excellent cold starting ability.
- ☆ Better fuel economy.

ENGINE MANAGEMENT SYSTEM - FUNCTIONAL DIAGRAM



Function of Components in EMS

ELECTRONIC CONTROL UNIT (ECU)

ALTERNATOR

THROTTLE BODY ASSEMBLY

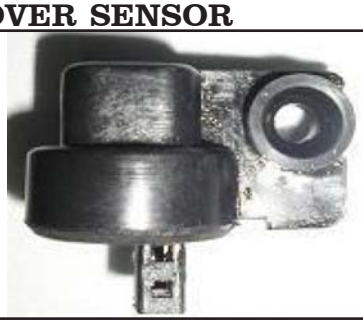
TEMPERATURE SENSOR

FUEL INJECTOR ASSEMBLY

CRANK POSITION SENSOR

FUEL PUMP MODULE

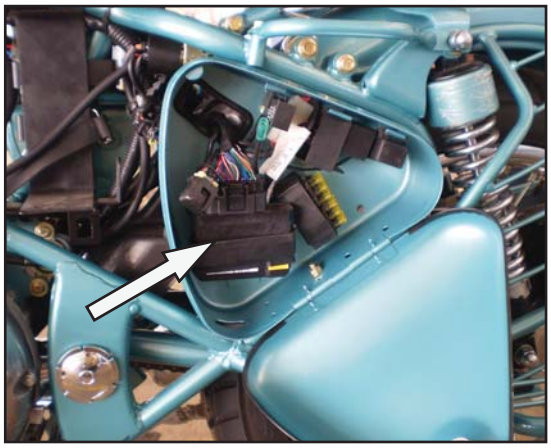
ROLLOVER SENSOR



MALFUNCTION INDICATOR LAMP (MIL)

Function of Components in EMS

ELECTRONIC CONTROL UNIT (ECU)

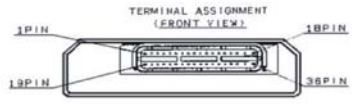


The ECU consists of a microprocessor. It controls the output devices by giving pulses to the respective devices. It has two memories Flash Memory and E^2 PROM.

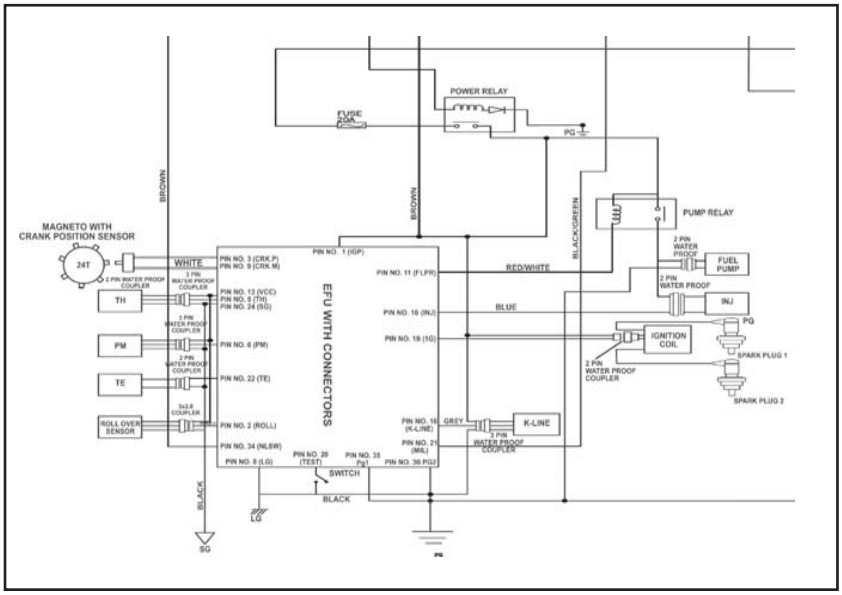
Flash memory is an exclusive recording unit for controlling program and setting data. It collects different inputs from various sensors and calculates optimised values and gives outputs to the respective controlling devices.

E^2PROM is an abbreviation for Electronically Erasable Programmable Read Only Memory. This is an exclusive recording unit for breakdown information/history preservation. The main advantage is, the system is nonvolatile and stores the data even when the electricity is off. While in operation the other breakdown information gets recorded automatically.

ECU PIN CONFIGURATION



1																	18
IGP	ROLL	CRK-P	-	TH	PM		LG	CRK-M	K-LINE	FLPR	-	VCC	-	-	INJ	HEGOHT	IG
-	TEST	MIL	TW	-	SG	-	-	-	-	-	-	-	-	NE	NLSW	PG1	PG2
19																	36



Specification

Operating Voltage : 8 – 16 V.

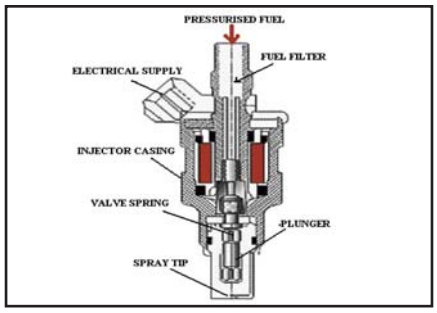
Sensor Supply Voltage : 5 V.

Operating
temperature : –10° C to + 60° C.

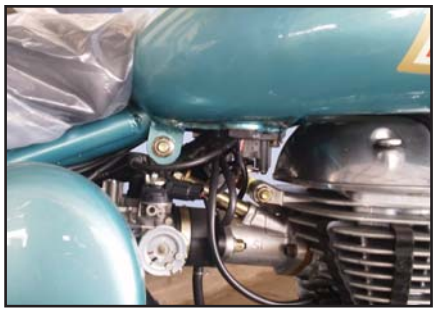
Storage
Temperature : –20° C to + 80° C.

Function of Components in EMS

FUEL INJECTOR



Exploded view of fuel injector



Assembled between throttle body and cylinder head

Specification:

Operating Voltage : 10 – 14 V.

Operating temperature : –30° C to + 120° C.

Fuel Injection pressure : 294 kpa (2.9 bar)

Solenoid Operating Resistance : 10.3 ± 0.5 Ohms

Fuel Injector is a solenoid operated electromagnetic valve, which atomizes the fuel by forcing it through a small nozzle under high pressure. The injection system used is a timed injection system and the injection is done close to the inlet valve. The injector operates based on the pulse width signal given by the ECU. The fuel injector is assembled in the inlet manifold located between the inlet port on the cylinder head and air filter. It is placed at an angle in the intake manifold so as to give maximum fuel spray and minimum wall wetting.

THE ADVANTAGES OF FUEL INJECTION ARE :

- ☆ Excellent cold starting
- ☆ Consistent idling RPM
- ☆ Good acceleration
- ☆ Full power output

Function of Components in EMS

FUEL PUMP MODULE

Assembled on the fuel tank bottom left side

Specification:

Operating Voltage : 6 – 14.5 V.

Operating
temperature : –20° C to + 60° C.

Controlled Pressure
Regulator : 294 KPa.

Inbuilt Filter
Capability : Upto 10 Microns

The fuel pump creates a positive pressure in the fuel lines and pumps gasoline through the injector. The Pump operation is determined by the ECU so that it gives exactly the required volume of fuel. The Pump maintains a uniform (294kPa) fuel pressure. Any excess pressure is bypased back into the fuel tank so that the fuel hose, injector etc.do not get damaged due to excess pressure.

The fuel pump module has an inbuilt micro fuel filter which filters even the most minute dust particles to prevent damage to the seat in the injector.

The pump is located inside the fuel tank so that it is submerged in liquid and hence cannot ignite itself due to electrical sparks and cause an explosion.

LOW FUEL SENSOR

Assembled in fuel tank bottom RH side

Specification:

Operating voltage : 9V to 16V DC.

Fuel level in tank to switch ON : 2.5 ± 0.5 Litres.

Lamp load : 12V, 4W Max.

Tightening torque : 12 – 14 N-m

Operating temperature : – 10°C to +85°C.

A low fuel sensor is provide d so that an indication appears in the MIL if the fuel in the tank is less than 2.5 litres.

MALFUNCTION INDICATOR LAMP (MIL)

Assembled on the headlamp casing

Specification:

Operating Voltage : 12 V.

Bulb Rating : 12V, 4W.

Malfunction or abnormalities in any of the EFI components (sensors) is indicated by MIL located on the right side on the headlamp casing. When the ignition key is switched on, the stop switch is in RUN position & the side stand is retracted, the MIL will glow for few seconds, which indicates that the ECU is checking the vital functionality of the sensors. In case of any fault, in the system the MIL will remain “ON” continuously.

Function of Components in EMS

THROTTLE BODY MODULE

Assembled between air filter and inlet manifold

Specification:

Operating Voltage : 5 V.

Out Put Voltage : 0 – 5V.

Throttle Angle : 0 – 80°

Throttle Resistance Maximum : 5 K©.

Throttle Out Put Voltage at Idling : 0.6 ± 0.2V.

Storage Temperature : –20° C to + 80° C

The throttle body is a part of the air induction system. It controls the amount of air flowing into the engine, in response to throttle opening. A throttle plate (butterfly valve is used for regulating the airflow)

The throttle body also has a throttle position sensor (TPS), a manifold pressure sensor (MAP) and a manual Bi Starter.

Function of Components in EMS

THROTTLE POSITION SENSOR (TPS):

TPS is used to monitor the position of the throttle and is located on the butterfly spindle so that it can directly monitor the position of the butterfly throttle valve. The sensor is usually a potentiometer and therefore provides a variable resistance depending upon the position of the butterfly valve and hence throttle position can be sensed by the ECU. The sensor signal is used by the ECU as an input to its control system. The ignition timing and fuel injection timing (and potentially other parameters) are altered depending upon the position of the throttle, and also depending on the rate of change of the position.

THE ECU USES THE THROTTLE VALVE POSITION TO KNOW:

- ☆ The mode in which the engine is operating. i.e. idle, part throttle, wide-open throttle etc.
- ☆ Emission controls at wide-open Throttle (WOT).
- ☆ Air-fuel ratio correction.
- ☆ Power increase correction.
- ☆ Fuel cutoff control.

MANIFOLD PRESSURE SENSOR (MAP):

The MAP provides instantaneous manifold pressure information to the ECU. This is necessary to calculate air density and determine the engine's air mass flow rate, which in turn is used to calculate the appropriate fuel flow to the engine through the injector.

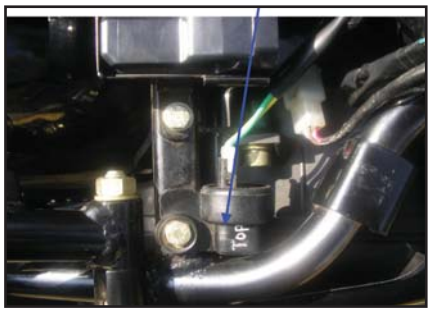
MANUAL BI STARTER

Located in the throttle body and operated manually through a lever on the handle bar LH. When the lever is pulled down, a cable pulls up the spring loaded piston in the throttle body.

Helps in providing additional air into the engine during cold start, for better idling RPM, till the engine operating temperature is attained.

Function of Components in EMS

ENGINE OIL TEMPERATURE SENSOR



Assembled on the cylinder head

Specification:

Operating temperature : –30° C to +120° C

Operating Voltage : 5 ± 0.5 V.

Resistance Value w.r.t. Temperature

–20° C — 18.8 Kilo Ohms

+ 40° C — 1.136 Kilo Ohms

+ 100° C — 0.1553 Kilo Ohms

Engine temperature sensor is used to measure the engine oil temperature. It senses the oil temperature and provides the input to the ECU which calculates the average engine temperature. The ECU accordingly operates the injector to optimise the air fuel ratio. The engine temperature sensor is located in the cylinder head underneath the inlet manifold and on the oil passage.

CRANK POSITION SENSOR

Assembled on the engine RH cover

Specification:

Output voltage : 3-5 V AC.

Resisitance : 200 ± 20 Ohms

The crank position sensor is an inductive pulse generator; the crank sensor scans 23 short and 1 long protrusion on the alternator. The long protrusion is located at 5° before top dead center and is used by the powertrain control module as a reference mark for the crank-shaft position. The crank position sensor sends an alternating voltage signal to the powertrain control module, which is used to determine engine speed and ignition timing. Thus the speed of the engine at that instant is known by the ECU.

If the engine runs beyond the maximum rated speed (5500 rpm), the ECU cuts off the fuel supply to the injector so that the engine will stall and the RPM will reduce to its rated operating RPM.

This is a safety aspect inbuilt to prevent damage to moving engine parts.

Function of Components in EMS

ROLL OVER SENSOR

Assembled under the seat

Specification:

Operating Voltage : 12V.

Operating Angle : 60° + 10°.

Operating Temperature : –20°C to +85°C.

The Roll over sensor is also known as a bank angle sensor. If the motorcycle is banking below 60° from the road surface OR in the event of an imminent falling over in a mishap, this sensor signals the ECU which in turn will cut off the fuel supply to the injector and the ignition, thus stalling the engine to prevent further damage that may be caused if the engine is still running with the throttle stuck wide open and the gears are engaged.

The Rollover Sensor is located under the seat on the vehicle-mounting strip of the frame.

Malfunction Identification of EMS

There are three levels of identifying a malfunction in the ECU or the sensors.

LEVEL 1 VISUAL

This is indicated by the lamp in the MIL glowing continuously. Check for any sensor loose connections and plug in properly. If still MIL GLOWS, then check for the the problem by Test Pin or by DOL TOOL.

LEVEL 2 TEST PIN

An open single pole connector is provided close to the UCE. By inserting a piece of wire into this connector and grounding it to an earth, the defective sensor can be identified by the following frequency of the MIL blinking.

MIL BLINK	MAL FUNCTION INDICATION
MIL will glow continuous. Engine will start but not perform to its potential.	
LONG 0 SHORT 6	Throttle Position Sensor (TPS) circuit malfunctioning
LONG 0 SHORT 9 malfunctioning	Manifold Absolute Pressure (MAP) circuit
LONG 1 SHORT 1	Engine oil Temperature (TE) circuit malfunctioning
MIL will glow continuous. Engine will NOT Start but will crank.	
LONG 1 SHORT 5	Rollover Sensor circuit malfunctioning
LONG 3 SHORT 3	Injector circuit malfunctioning
LONG 3 SHORT 7	Ignition Coil circuit malfunctioning
LONG 4 SHORT 1	Fuel Pump circuit malfunctioning
LONG 6 SHORT 6	Crankshaft position circuit malfunctioning

Malfunction Identification of EMS

LEVEL 3 DOL

This is done by connecting a DOL tool to the connector near the ECU. This will accurately determine the defective sensor and show the details on the diagnostic screen with the following respective codes as shown below.

P Code	MAL FUNCTION INDICATION
MIL will glow continuous. Engine will start but not perform to its potential.	
P0120	Throttle Position Sensor (TPS) circuit malfunctioning
P0105	Manifold Absolute Pressure (MAP) circuit malfunctioning
P0195	Engine oil Temperature (TE) circuit malfunctioning
Engine will NOT Start but will crank. MIL will glow continuous	
P1630	Rollover Sensor circuit malfunctioning
P0201	Injector circuit malfunctioning
P0351	Ignition Coil circuit malfunctioning
P0230	Fuel Pump circuit malfunctioning
P0335	Crankshaft position circuit malfunctioning

Instructions (Do's & Don'ts) on EMS

1) DO NOT remove any of the sensor connections / couplers / Battery connections when the Ignition switch is ON OR the engine is running.

2) DO ensure the battery is in good condition & Fully Charged Battery.

3) DO start the engine only when it is in centre stand or when rider sitting on the vehicle with both the stands retracted.

4) Switch ON the ignition key, engine stop switch to RUN position and retract the side stand completely and wait for approximately 3 seconds for the MIL (MALFUNCTION INDICATOR LAMP) to switch off, Start the engine only after this happens.

5) DO NOT rev the engine fully – immediately after starting OR just before shutting off the engine.

6) DO NOT remove the fuel hose (high pressure) from the fuel pump to fuel injector, when engine is running OR with the ignition switch ON. Fuel flows at a very high pressure during these times.

7) DO NOT use a booster or high voltage-charging unit instead of a battery. Use only a good, correctly charged battery to start OR check the motorcycle.

8) DO NOT use high pressure water jet to clean the ECU / Throttle Body / any of the sensors. Keep them well protected while washing the vehicle.

Trouble Shooting (EMS)

S No	Symptom	Possible Cause	Remedy
1	MIL does not glow when ignition key switched ON	Engine stop switch is in OFF position	Switch engine stop switch ON
		Battery discharged	Check battery electrolyte level & Sp. gravity. Recharge battery
		Fuse blown.	Check all fuses. Assess cause of failure, rectify & replace fuse
2	MIL glows Continuously	Sensor couplers / wires loose contact.	Check all sensor and wiring harness connections for proper connectivity
3	MIL Glows & Switches OFF but vehicle does not start		
A	E Start related	Battery discharged	Check battery electrolyte level & Sp. gravity. Recharge battery
		Starter motor cables loose connection.	Check cable connections for proper tightness.
		Relay starter not working.	Check resistance across relay starter (between blue & white wire) Replace relay starter if faulty.
		Starter motor does not rotate	Check for firm wire connections. Check if motor is jammed. Replace starter motor.
B	Ignition Related	Ignition coil power relay defective / loose connections	Check power relay connection or replace if found to be faulty.
		Roll over sensor not connected / loose connection.	Check roll over sensor coupler connection
C	Fuel Pump	Fuel pump relay does not work	Check proper connectivity in wiring harness & coupler continuity with voltmeter. Check fuel pump relay resistance. Replace relay if defective
		Fuel pump clogged / internal short	Check for proper connectivity in wiring harness & continuity with voltmeter. Check fuel pump resistance. Repair electrical connections/loose contact. Replace pump if defective
D	Fuel Related	Fuel air mixture too rich due to extreme cold weather & repeated cranking without using Manual Bi starter.	Hold throttle fully open. Hold Manual Bi starter and start engine. Release throttle as soon as engine starts.
		Manual Bi starter vent hole clogged / plunger stuck in cold position due to extreme cold condition/icing	Clean Throttle body to ensure vents are clean. Check proper working of Bi starter plunger.
		No pressure buildup in fuel main line	Check fuel pump for proper working. Correct fuel hose if kinked /jammed / leaking at joints. Correct as necessary.

Trouble Shooting (EMS)

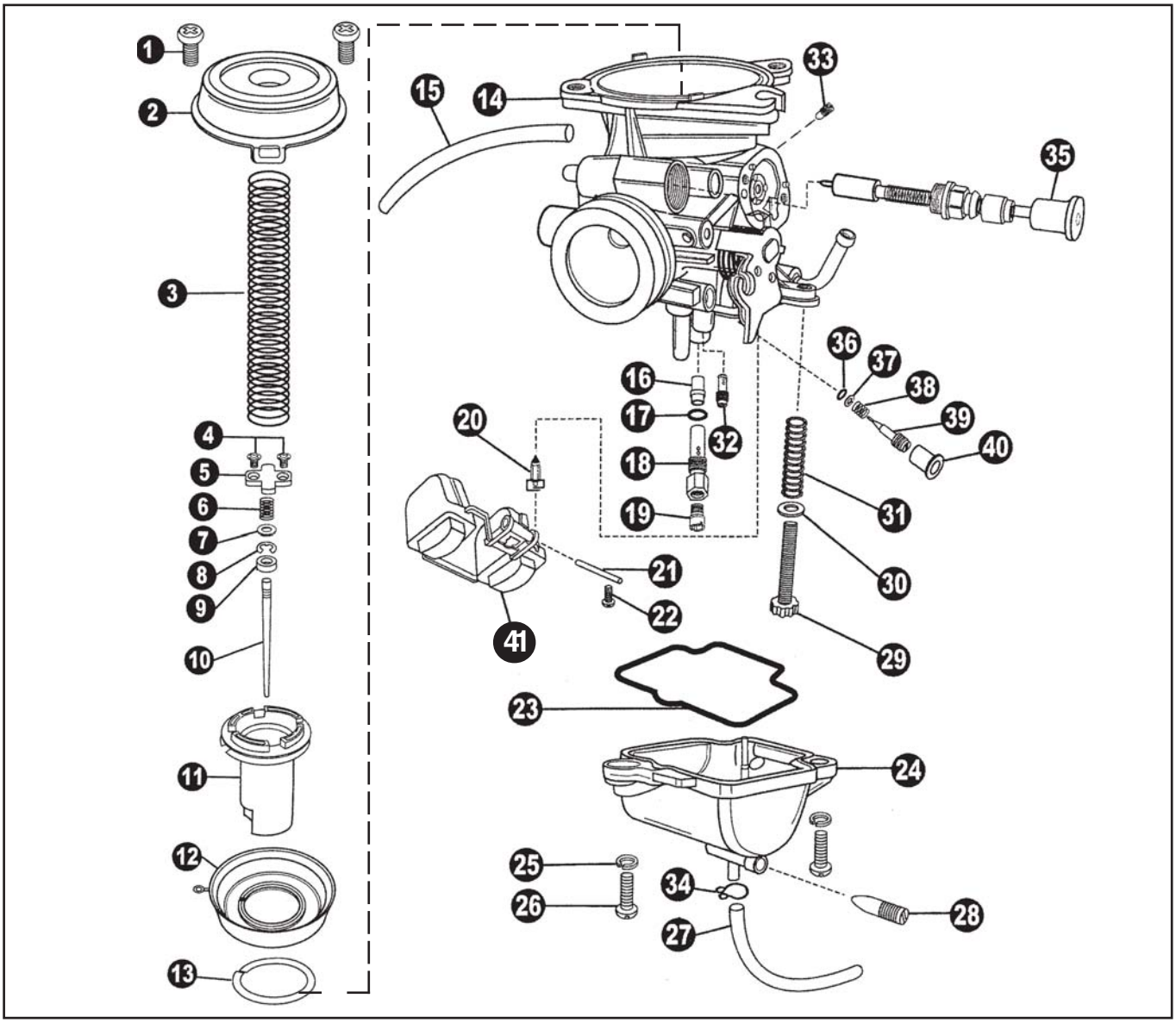
S No	Symptom	Possible Cause	Remedy
E	Ignition related	Spark plug Fouled	Replace spark plug
		Spark plug cap shorting	Replace spark plug cap
		Ignition coil wire loose connection or broken.	Check for proper wire connection. Replace damaged wire connections
		Faulty HT coil power relay.	Check power relay resistance / wire connections. Replace if faulty.
		Faulty H T coil	Replace H T coil
		No output from Magneto	Check pulsar coil / Magneto output connections
4	Vehicle Starts but Switches off	Crank sensor loose connections/ faulty	Check Crank sensor & its connections
		Roll over Sensor Loose connections /	Check Roll over sensor & its connections
5	High fuel consumption / Uneven Idling / Poor Pick up / Smoky Exhaust / Engine runs badly	Injector holes clogged	Replace injector.
		Loose inlet manifold / Leak in inlet manifold	Check & correct
		Loose connections or problem in manifold pressure sensor	Check continuity and correct
		Stuck butterfly in throttle body / broken throttle Cables	Check & correct
		Loose connections or problem in throttle position Sensor.	Check continuity and correct Check & correct
		Defective temperature sensor.	Check & correct
6	Battery discharging frequently	Poor Output from charging coils in magneto	Check Output voltage (10V -16v AC @ 1000rpm)
		Poor charging by RR Unit	Check RR unit & Replace
		Weak battery cells	Replace the battery.
7	Battery not Charging	Charging circuit fuse Blown	Check wiring harness connections & replace fuse
		Low or weak electrolyte.	Check battery & correct
		Cells weak	Check battery & replace
		No output from RR Unit. Poor connection/RR unit failed	Check & correct / replace RR unit
		No output from magneto burnt coils in magneto unit	Check for loose connections /

SECTION

SEVEN 07

CV CARBURETOR

CV Carburetor - Exploded View



1. Top cover fixing screw
2. Diaphragm top cover
3. Piston valve spring
4. Jet Needle plate fix screw
5. Jet needle fixing plate
6. Jet needle retainer spring
7. Jet needle washer
8. Jet needle E-ring
9. Jet needle ring
10. Jet needle
11. Piston valve assy.
12. Diaphragm (piston valve)
13. Diaphragm retainer ring
14. Body CV carburetor
15. Air vent hose
16. Needle jet
17. O-ring
18. Jet holder
19. Main jet
20. Float Needle Valve assy.
21. Float pin
22. Screw
23. O-ring Float chamber
24. Float chamber body assy
25. Washer screw mounting
26. Screw assy.
27. Hose drain
28. Drain screw
29. Idle adjust screw/ bolt
30. Packing washer
31. Spring Idle screw
32. Pilot jet
33. Pilot air jet
34. Clip (Hose drain)
35. Choke Plunger assy.
36. O-ring
37. Washer
38. Spring
39. Mixer Screw
40. Cap
41. Float body

Functions of Carburetor

CARBURETOR PERFORMS THREE IMPORTANT FUNCTIONS :

1. It varies the air-fuel ratio according to the operating conditions and requirements of the engine.
2. It produces a mixture which is properly atomized. Atomization is the mixing of air and fuel to form a fine spray or mist and to deliver the mixture to the engine.
3. It regulates the amount of air - fuel mixture required by the engine.

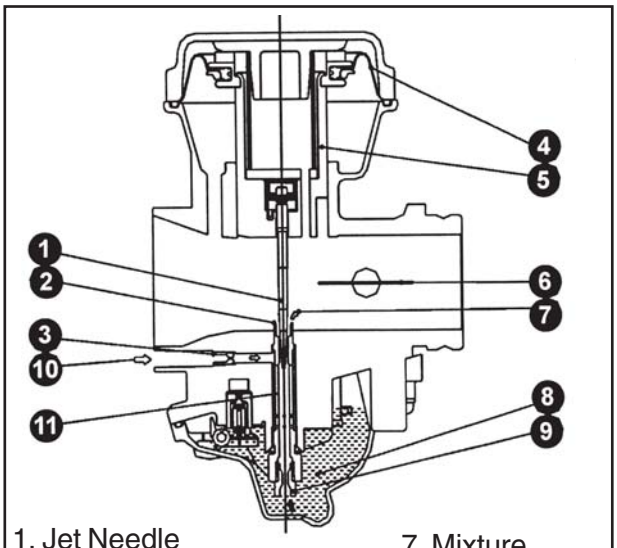
P In order to meet requirements for the proper mixture ratio under various conditions the following systems are being used in Butterfly slide (BS) type carburetors.

1.1 Fuel Inlet and Float System

1.2 Starter System

1.3 Pilot System (Slow Speed System)

1.4 Main System (High Speed System)



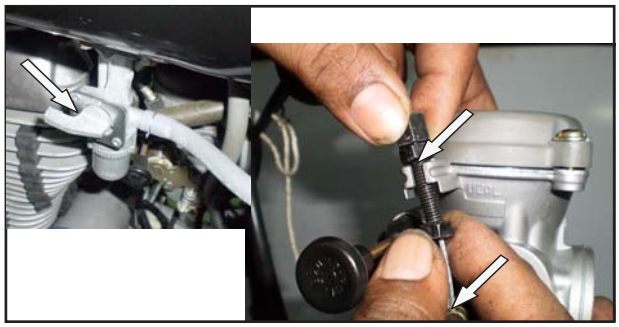
1. Jet Needle
2. Needle Jet
3. Main Air Jet
4. Diaphragm
5. Piston Valve
6. Buterfly Valve
7. Mixture
8. Petrol
9. Main Jet
10. Air
11. Jet Holder

CARBURETOR REMOVAL

REMOVAL :

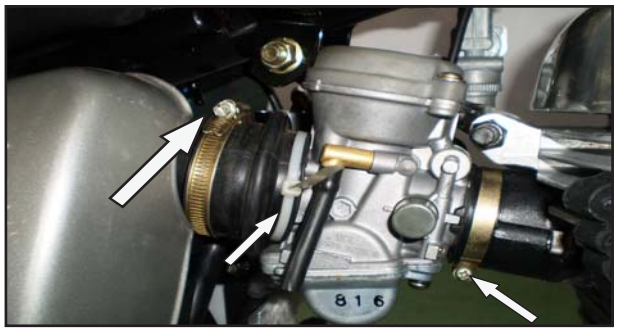
☆ Turn the fuel tap to the "OFF " position.

☆ Disconnect fuel hose from carburetor by pressing clip.



☆ Loosen cable outer nut and lock nut by 10 mm spanner. Slip the tip of the cable from the slot in the throttle pully.

☆ Drain the petrol from carburetor float chamber in a separate pan / tray by loosing drain screw.



☆ Unscrew completly the drain screw from the float chamber body if nessasary.

☆ Remove strap from Air filter bellow.

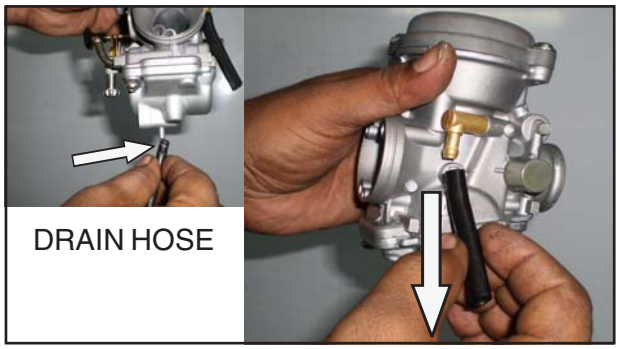
☆ Loosen the clip screw from bellow and flange carburetor.

☆ Tilt and twist to remove the carburetor gently.

NOTE : After following the above said procedure for removal of carburetor from the motorcycle carefully.

Dismantling Proceedure - Carburetor

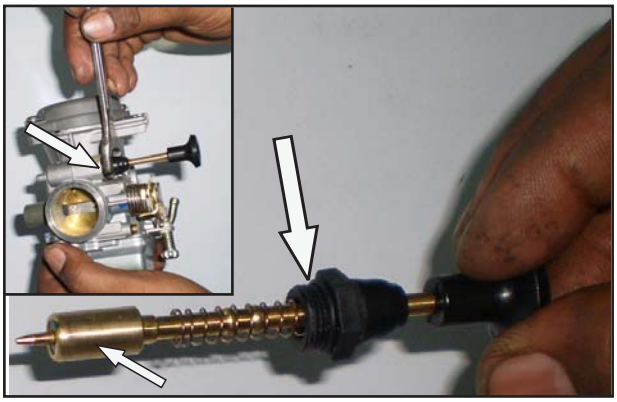
☆ Remove drain hose and air vent hose.



NOTE :

Inspect both hose pipes for clog. Clean thoroughly before fixing.

☆ By using the right size spanner to remove the choke plunger sub assy. along with the spring.



CAUTION :

In case of lever type choke plunger assy. it comes out as a single unit.

NOTE :

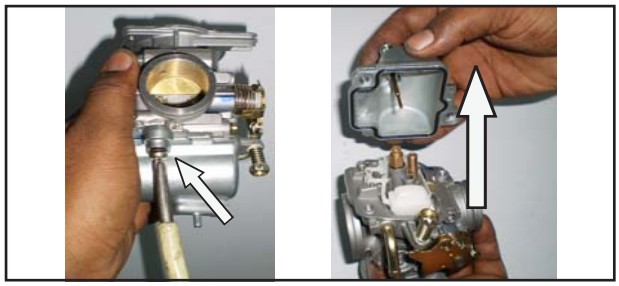
Inspect choke piston and needle. Clean by solvent & wipe dust / carbon particals by banian cloth.

☆ Unscrew the top cover fixing screws and remove the diaphragm top cover, piston valve spring from the carburetor as shown in Fig.

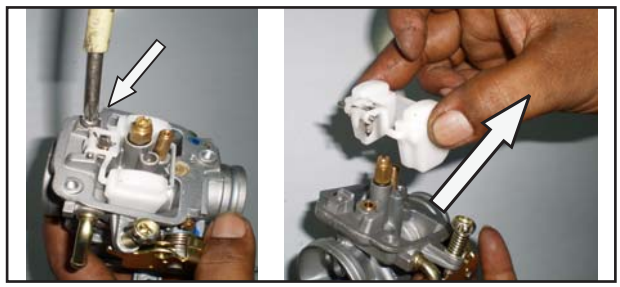
Note : Care to be taken while removing diaphragm top cover due to spring force.

☆ Gently remove thorottle piston valve assembly as shown in Fig.

☆ Unscrew the float body fixing screws and remove the float chamber body assy. from the mixing body along with "O" ring.

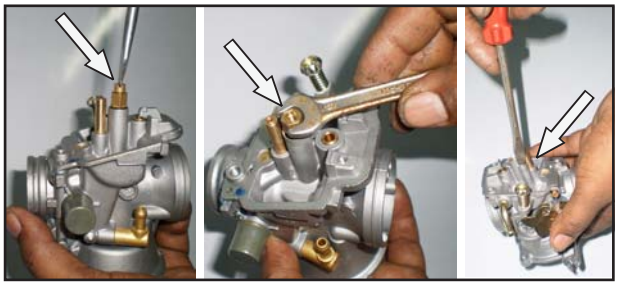


☆ Unscrew the float toggle pin mounting screw and then remove the float body unit along with needle valve assy.



Dismantling Proceedure - Carburetor

☆ Unscrew the main jet, main jet holder and pilot jet from the mixing body.

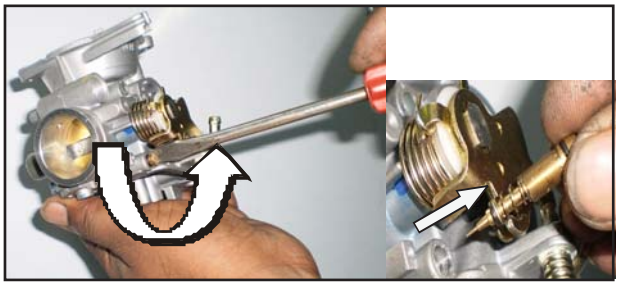


NOTE : Ensure that float body and needle valve are being removed before carrying out any other jobs.

☆ Remove the needle jet from the mixing body only if it is necessary.

☆ Unscrew the pilot air jet from the mixing body if required.

☆ Unscrew the mixture control screw along with its spring, plate washer and o-ring.



NOTE : Carefully remove "O" ring mixture screw.

CAUTION : Spray carburetor cleaner in all passages to ensure that there is no blockage due to dust, dirt, gum or carbon deposit, especially in the main air passage, pilot air passages, including by-pass holes and pilot outlet.

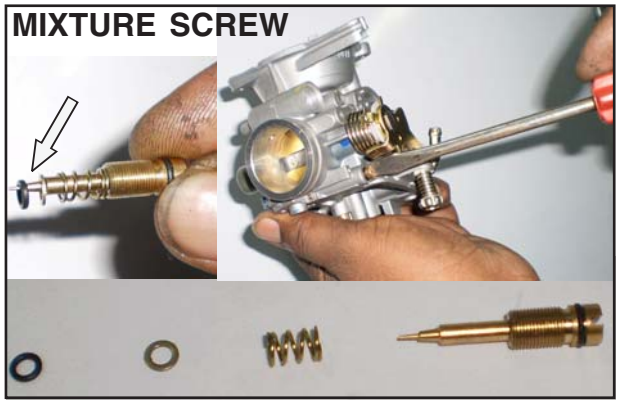
☆ Now clean all the carburetor components and apply compressed dry air in all passages of mixing body unit.

TORQUE SPECIFICATION

PILOT JET	-	8 kgf - cm
MAIN JET	-	18 kgf - cm
MAIN JET HOLDER	-	18 kgf - cm
BOWL FIXING SCREW	-	35 kgf - cm
PILOT AIR JET #1	-	7 kgf - cm
PILOT AIR JET #2	-	7 kgf - cm
DRAIN SCREW	-	20 kgf - cm
JET NEEDLE FIXING PLATE SCREW	-	10 kgf - cm
FLOAT PIN FIXING SCREW	-	20 kgf - cm
DIAPHRAGM TOP FIXING SCREW	-	35 kgf - cm
R.C. BODY COVER FIXING SCREW	-	20 kgf - cm
GUIDE HOLDER	-	25 kgf - cm

Assembling Proceedure - Carburetor

☆ Assemble spring, washer and "O" ring on the mixture screw body carefully and then fix into the mixing body unit.



NOTE : Do not inter change"O" ring and washer sequence to avoid tuning problem.

Apply a coat of petroliem jelly over mixture screw thread portion before fixing into mixing body to avoid mixture screw jam problem.

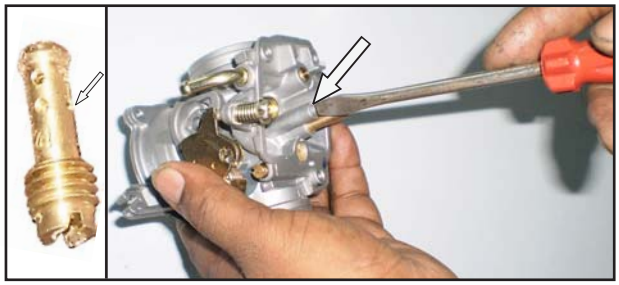
Pre set mixture screw position to 3 turns out from fully close position.

☆ Assemble the pilot air jet to the mixing body if removed.

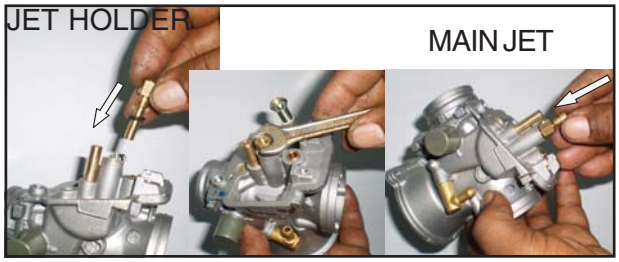
☆ Assemble the needle jet through Main jet hole and tap gently into the mixing body if removed.

NOTE : Ensure that the small dia face towards mixing body hole. While fixing the needle jet ensure that the correct concentricity to main jet holder hole is maintained.

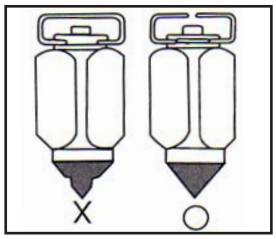
☆ Screw the pilot jet (ensure that all holes are clearly visible on the pilot jet body).



☆ Assemble Main jet holder with "O" ring and then Main jet as shown in Fig.

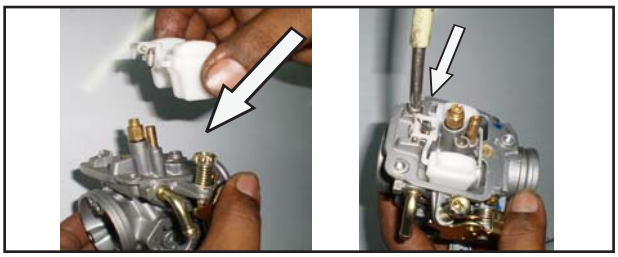


☆ Inspect float needle valve spring cushion effect on clip side and rubber tip for worn out if any.

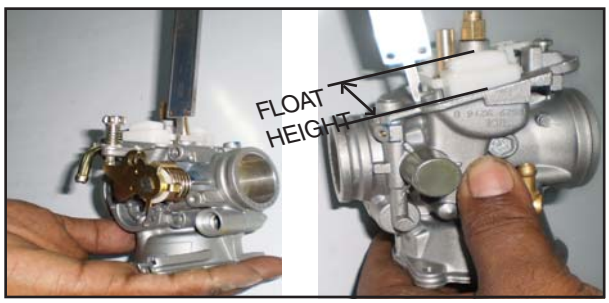


☆ Place the float needle valve assy. into its seat while holding the float body in place with the tab hooked into the float needle hanger.

☆ Assemble float body along with needle valve assy. and then fix float toggle pin. Tighten the float pin fixing screw gently.



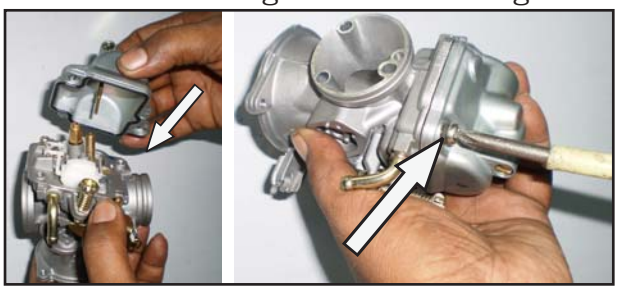
☆ Check float level height (specified 17.1 mm) on both sides of float by vernier caliper or steel scale. If necessary adjust.



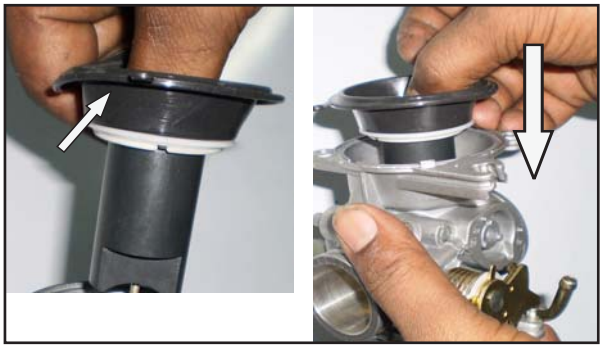
Assembling Proceedure - Carburetor

NOTE : Ensure that float body swinging freely on float toggle pin. Recheck again float height after the adjustment.

☆ Assemble float chamber body along with "O" ring as shown in Fig.

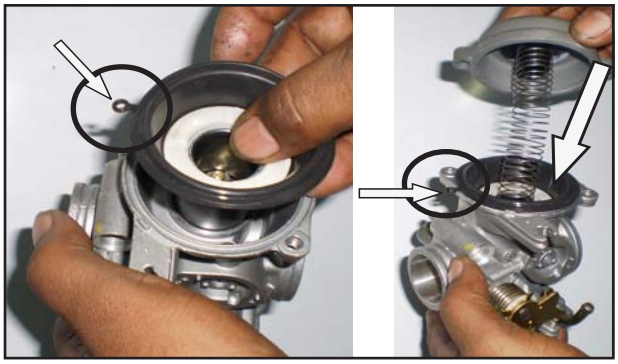


☆ Inspect rubber diaphragm and retainer ring. In case of dust or carbon particals wipe with banian cloth carefully before assembling into mixing body.



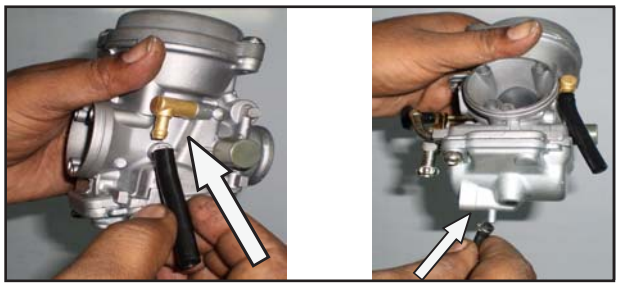
NOTE : Lubricate a thin film of engine oil on throttle pistion valve before fixing into mixing body.

☆ Assemble throttle piston sub assembly by locating rubber tip tab being seated on the mixing body. Fix pistion valve spring and top cover as shown in Fig.

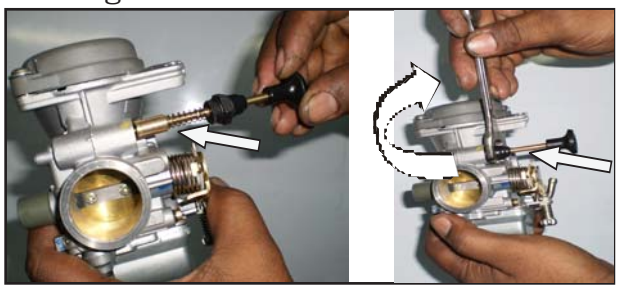


NOTE : Do not clean diaphragm by brake fluid or compressed air.

☆ Assemble air vent hose and then drain hose.

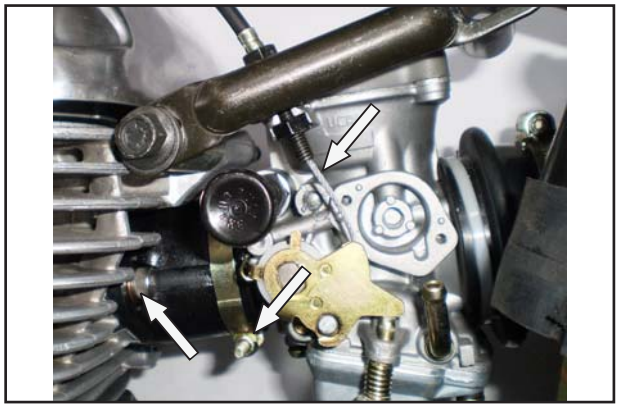


☆ Assemble choke plunger sub assembly into mixing body and tighten the nut.



INSTALLATION OF CARBURETOR

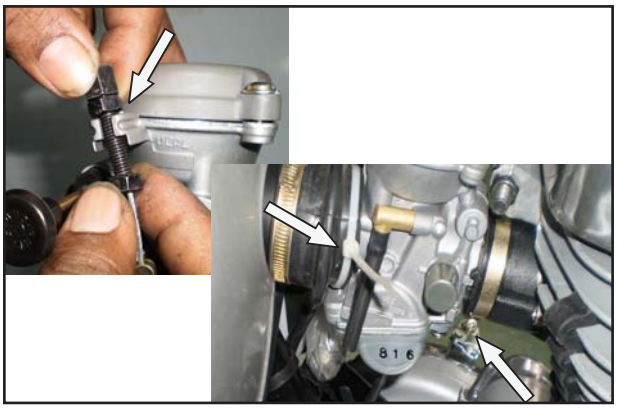
☆ Follow the reverse order of removal process.



NOTE : After installation check for any fuel leakage from the carburetor or fuel hose.

Assembling Proceedure - Carburetor

☆ Adjust throttle cable free play at carburetor 1 mm.



NOTE : Ensure that after adjustment throttle outer cable nuts and lock nut are being tightend properly.

Ensure bellow clip and strap are being tightened properly.

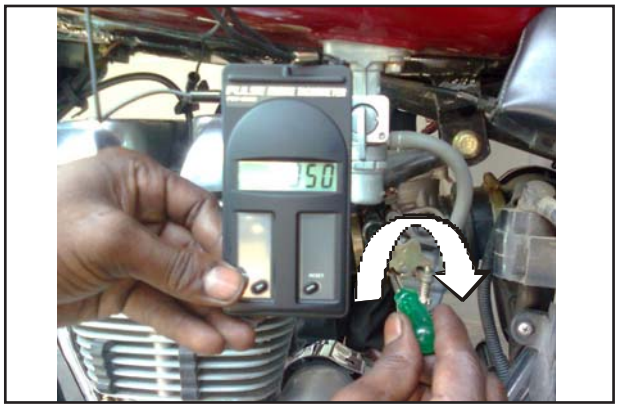
CARBURETOR TUNING PROCEDURE

☆ After installation as per above said procedure, follow the following steps:

1. Warm up the engine adequately and set the idling screw so that the engine runs at a higher rpm than its normal idling specification (1300 RPM approximately).

2. Now turn the Mixture screw in or out slowly and select a position where the engine rpm reaches to the peeak / highest speed position while setting. Now stop adjustment of Mixture screw. Normally this will occur inbetween 3 $\pm$ 1 turns of Mixture screw from fully close position.

3. Now adjust the idle screw to bring down the engine revolution to the specified idle 1050 $\pm$ 200 RPM.



4 After adjusting the idling rpm check the CO% (1 to 1.5%) and readjust the mixture screw if necessary.

5. After adjusting idling speed, check for its stability / flat spot / missing if any, by accelerating 3 to 4 times. Repeat above said the steps untill engine speed increases smoothly.

NOTE : Incase the idle speed is too high will cause poor mileage, if it is too low engine will stall.

CAUTION : During idle speed turn the handle bar to extreme right or left hand side, if any change in idle speed noticed, the throttle cable may be improperly adjusted or wrongly routed. Correct the same before test ride.

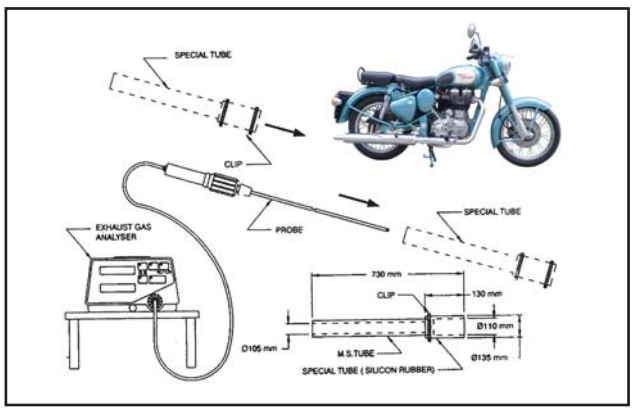
Carburetor Maintenance

PROCEDURE FOR SETTING IDLING SPEED AND CO%

- ☆ If the engine performance is good, the Mixture screw (MCS) need not be disturbed.
- ☆ The idling speed can be adjusted only with the idling screw.
- ☆ If there is a performance deterioration, clean carburetor and readjust the idling speed and mixture screw setting.

CARRY OUT THE CO% EMISSION CHECK AS FOLLOWS:

- ☆ Warmup the engine by riding the vehicle for about 4 kms.
- ☆ Warmup the measuring instrument as per the equipment manufacturer's recommendations, before carrying out the measurements.
- ☆ Inspect the Silencer assembly for any leakage. If any leakage noticed, ensure to arrest the leakage before measurement of CO%.
- ☆ Set the idling speed (1050 ± 200 rpm) as explained in page No. 03-23.
- ☆ Fix a separate special tube made of silicon rubber to the Body Complete Silencer and tighten its clamp screw.
- ☆ Insert the sample probe of analyser atleast 600 mm inside special tube to prevent the dilution of exhaust sample with the air.



MAINTENANCE TIPS

- ☆ The maintenance of the carburetor is merely a question of cleaning periodically in order to avoid blockage of jets and channels.
- ☆ Maintaining a full tank of petrol doesn't allow fuel tank to rust and there by reduces rust deposits in the carburetors.
- ☆ Drain the carburetor at every 3,000 Kms interval by removing the drain screw to drain all the deposits from float chamber body.
- ☆ When using the choke do not open the throttle as it may cause flooding.
- ☆ Clean Air-filter regularly, as a blocked or damaged air-filter will have an adverse effect on both the carburetor as well as the engine performance.

SERVICE GUIDELINES

- ☆ While re-assembling dismantled carburetors, always replace the old gaskets and o-ring with new ROYAL ENFIELD genuine spares.
- ☆ Cleaning of jets should be done only with the help of carburetor cleaner and compressed air.
- ☆ Check the float height and ensure that it is as per specifications.
- ☆ Ensure that the pilot jet is not tightened beyond the specified torque as this will cause the head to shear and removal of the jet from the mixing body becomes nearly impossible.
- ☆ Do not tamper with the e-ring position of the jet needle or change the sizes of the jets in order to attain better mileage or power as this will have adverse effect on the engine performance and lead to pre-mature wear of engine parts.

Carburetor Maintenance

- ☆ While assembling the jet needle ensure that the jet needle ring pin coincides with the corresponding hole in piston valve.
- ☆ Generally, it is not advisable to remove the jet needle. if it is necessary, un screw the jet needle fixing plate screws and remove the jet needle along with the jet needle retainer spring.
- ☆ Ensure that the seating area of the choke plunger assembly is not worn or damaged. If worn or damaged, replace the plunger assembly.
- ☆ Tighten all screws & jets to the right specifications.

Trouble Shooting

PROBLEM	CAUSE	RECTIFICATION
STARTING TROUBLE	Clogged starter circuit	Clean starter circuit with carbo cleaner.
	Pilot jet clogging	Clean jet with spray / replace if necessary.
	Low fuel level	Adjust float height to spec.
	Flooding	Check float for damage/puncture or float height.
IDLING NOT STABLE	Pilot jet clogging	Clean jet with spray / replace.
	Incorrect mixture screw setting	Adjust mixture screw as per specification.
	High / Low fuel level	Adjust float height to spec.
	Piston valve sticky	Clean piston valve / mixing body and ensure. no damage in piston valve and diaphragm.
FLOODING	High fuel level	Adjust float height for spec.
	Improper seating of needle valve in valve seat	Clean needle valve*I* replace if necessary.
	Float puncture	Replace float.
POOR PICKUP	Main *I* Pilot jet clogged	Clean *I* replace.
	High *I* Low fuel level	Adjust float height to spec.
	Incorrect E-ring in jet needle	Assemble E-ring in position correct position.
POOR MILEAGE	Clogging of main air *I* pilot air circuit.	Clean with carbo Cleaner.
	High fuel level	Adjust float height to spec.
	Incorrect E-ring position in jet needle	Assemble E-ring in the correct notch.

SECTION

EIGHT 08

CHASSIS, WHEELS & BRAKES

Torque Specification - Chassis

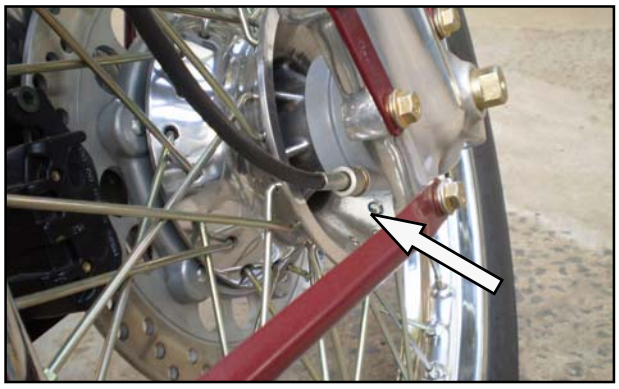
S. No	PART No.	DESCRIPTION	LOCATION	TORQUE VALUE	
				Kg / M.	N/M.
		Handle Bar			
1	146032	Handle Bar Clip Bolts	Handle Bar Clip	1.20	12
3	560574	Master Cylinder Cap Screws	Master Cylinder Reservoir Cap	0.13	1.5
2	560609	Fr. Brake Lever Pivot Bolt	Fr. Brake Lever Pivot	1.20	12
4	560579	Brake Lever Pivot Lock Nut	Brake Lever Pivot	1.00	10
5	110116	Steering Stem Top Nut -	Steering Stem Top		
5A		Replacing new ball races-Tighten upto 7-8 Kg.M(70-80Nm), loosen fully & retighten to	Replacing new ball races - Tighten upto 7-8 Kg.M(70-80Nm), loosen fully & retighten to	0.15-0.35	2-4
5B		During removal for greasing - Tighten upto 1.89 Kg.M(18-20Nm), loosen fully & retighten to	During removal for greasing - Tighten upto 1.89 Kg.M(18-20Nm), loosen fully & retighten to	0.15-0.35	2 - 4
		Chassis			
1	145863	FLANGE BOLT M8 X 70	Front Fork Pinch Bolts	3.30	33
2	580335	FLANGED HEX. BOLT M10 X 85	FUEL TANK FRONT MOUNTING	5.00	50
3	580337	FLANGED HEX. BOLT M10 X 75	FUEL TANK REAR MOUNTING	5.00	50
4	500355	SCREW M6	FUEL PUMP MOUNTING SCREWS	0.10	1
5	580342	FLANGED HEX BOLT ½" X 120	ENGINE MOUNTING FRONT	7.00	70
6	580338	FLANGED HEX BOLT M8 X 120	ENGINE MOUNTING FRONT TOP	3.00	30
7	580341	FLANGED HEX BOLT M8 X 112	ENGINE MOUNTING FRONT BOTTOM	3.00	30
8	580114	FLANGED HEX BOLT M10 X 270	ENGINE MOUNTING REAR	7.00	70
9	580345	FLANGED HEX BOLT M8 X 100	ENGINE MOUNTING REAR	3.00	30
10	580448	FLANGED HEX BOLT M10 X 260	ENGINE MOUNTING BOTTOM	5.00	50
11	145865	FLANGED HEX SERRATED NUT M10X1.5	RIDER FOOT REST RH MOUNTING	5.00	50
12	580343	HEX. NYLOCK NUT	SWING ARM MOUNTING	7.00	70
13	581158	HEX SOCKET HEAD CAP SCREW M8 X 35 2	SILENSER FRONT MOUNTING E5/G5	3.00	30
14	142182	HEX NUT WITH NYLON INSERT, M 8	FOOT REST & SILENSER REAR MOUNTING E5/G5	5.00	50
15	580349	FLANGED HEX BOLT, M8 X 20	REAR BRAKE PEDAL	3.00	30
16	146434	HEX NUT M12 X 1.25	REAR BRAKE COVER ANCHOR PIN NUT	2.00	20
17	580366	NUT	REAR BRAKE LEVER NUT	3.00	30

Torque Specification - Chassis

S. No	PART No.	DESCRIPTION	LOCATION	TORQUE VALUE	
				Kg / M.	N/M.
18	580360	HEX. CASTLE NUT	REAR WHEEL SPINDLE NUT	7.00	70
19	170352	DOMED NUT	REAR SHOCK ABSORBER TOP & BOTTOM	4.00	40
20	145881	FLANGED HEX BOLT M8 X 45	REAR MUDGUARD CARRIER FRONT MOUNTING C5	3.00	30
21	580592	FLANGE HEX. BOLT M8 X 10	CHAIN GUARD MTG. / REAR M.GUARD REAR MTG.	3.00	30
22	141051	HEX NUT M8	SEAT MOUNTING REAR C5	3.00	30
23	145862	FLANGED HEX BOLT M8	FRONT MUDGUARD STAYS BOTTOM MOUNTING C5	3.00	30
24	141306	HEX NUT WITH NYLOCK INSERT	FRONT MUDGUARD STAYS TOP SCREWS MOUNTING C5	0.30	3
25	571055	ENGINE TEMPERATURE SENSOR	CYLINDER HEAD	1.20	12
26	571054	OXYGEN SENSOR	EXHAUST PIPE	2.50	25
27	550086	NYLOCK NUT M6	FUEL INJECTOR ASSEMBLY, THROTTLE FLANGE	0.10	1
28	570091	STUD 80L	FUEL INJECTOR ASSEMBLY	0.10	1
		FRONT WHEEL / HYDRAULIC DISC BRAKE :			
1	560525	HEX NUT WITH NYLOCK INSERT (M16×1.5)	FRONT WHEEL SPINDLE NUT	5 - 7	50-70
2	560546	HEX FLANGE BOLT M8 × 25	FRONT DISC MOUNTING BOLTS	1.50	15
3		BRAKE CALIPER MOUNTING BRAKET BOLTS	BRAKE CALIPER MOUNTING	2.70	27
4	560591	BLEED SCREW	BRAKE CALIPER BLEEDER SCREW	0.60	6
5	560594	PIN BOLT	BRAKE CALIPER	2.30	23
6		BRAKE PAD PIN BOLT	BRAKE CALIPER	1.80	18
7	560534	BANJO BOLT	BRAKE HOSE BANJO	3.50	35

Front Wheel Removal

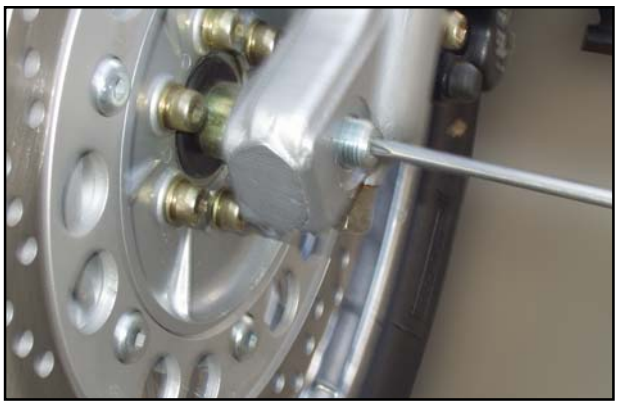
- ☆ Place the vehicle on its center stand.
- ☆ Place a suitable wooden block below the front end of engine to support the vehicle so that the front wheel is lifted up by 25mm from the ground.
- ☆ Disconnect speedo cable.



- ☆ Loosen the pinch bolt on the RH fork end.

- ☆ Loosen and remove the axle nut and the washer

- ☆ Tap the axle gently to remove it out of the fork end and the wheel



- ☆ Tilt the vehicle slightly to the right side and take out the wheel along with the speedo drive and the bush.
- ☆ Take care to ensure the brake disc does not get damaged while removing the wheel or while storing the wheel.
- ☆ Place a 4 mm thick wooden or plastic wedge between the brake pads to avoid the pistons from coming out too far from the brake caliper, if the front brake lever is depressed accidentally.

CAUTION : Do not depress the front brake lever when the front wheel is removed.

FRONT WHEEL BEARINGS REMOVAL

- ☆ Remove the dust seals on either sides of the wheel hub.
- ☆ Drive out bearings by tapping on the spacer using a suitable rod and remove the spacer after taking out the bearings.

REASSEMBLY

- ☆ Fix th lugs of the drive are seated correctly.
- ☆ Locate the bush on the left side of the wheel (Disc brake side)

- ☆ Remove the wedge between the brake pads and position the wheel between the fork legs, taking care to ensure the brake disc in seated correctly between the brake pads in the caliper
- ☆ Fix the wheel axle from the right side fork leg, carefully ensuring that the holes int eh fork legs and the wheel assembly are aligned. Do nto force the axle or tap heavily on the axle as it will damage the bearing inner races and the threads on the axle.
- ☆ Position the speedo drive correctly such that the cable threads are parallel to the ground and the cable will have a smooth bend when fixed on the speedo drive.
- ☆ Fix the washer and tighten the nylock nut to the specified torque.
- ☆ Check the wheel for free rotation by spinning it gently and tighten the pinch bolt on the Right side to the specified torque.
- ☆ Connect the speedo cable and check the speedo meter for proper working by rotating the wheel.

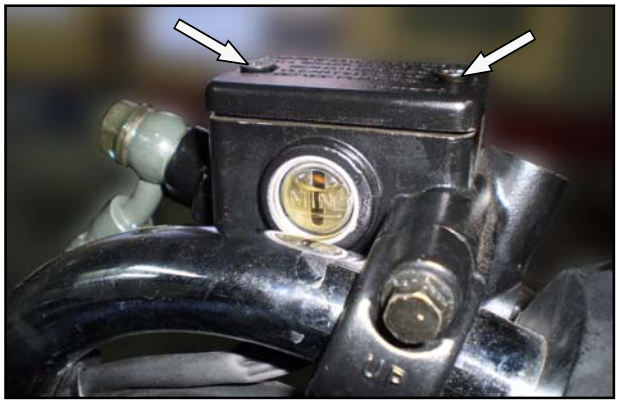
DISC BRAKE

GENERAL INSTRUCTIONS

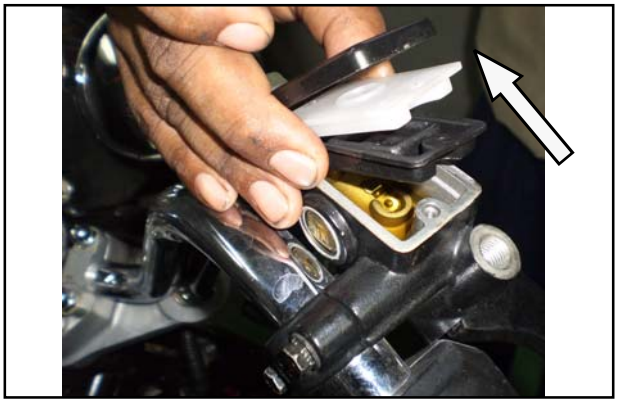
- ☆ Check the system for any fluid leaks at banjo union joints, damaged brake hose etc.
- ☆ Ensure the handle bar is positioned straight and the master cylinder in the handle bar is parallel to the ground, whenever checking fluid level.
- ☆ Clean master cylinder filler cap before removing.
- ☆ Use only DOT 3 or DOT 4 grade brake fluid from a sealed container. Do not mix different types of brake fluid as they may not be compatible.
- ☆ Whenever the disc brake system is overhauled, ensure that the old fluid is drained out completely and then fill with fresh brake fluid.
- ☆ In case the brake fluid is contaminated, drain out completely, refill with fresh fluid and bleed.
- ☆ Use only fresh brake fluid to clean rubber parts. Do not use any petroleum based cleaning solvents, water or detergents etc.
- ☆ Cover motorcycle painted surfaces, plastic and rubber parts while bleeding a brake system. Do not allow brake fluid to come in contact with any parts of the motorcycle as brake fluid has highly corrosive properties.
- ☆ Always replace brake pads as a set only.
- ☆ Always replace banjo union washers, 'O' rings, diaphragm washers, dust seals and piston seals whenever the hydraulic disc brake system is overhauled.
- ☆ Always replace damaged parts like pistons, fixing pin etc. Do not attempt to repair as it may render the disc brake to become ineffective.

DRAINING OLD BRAKE FLUID

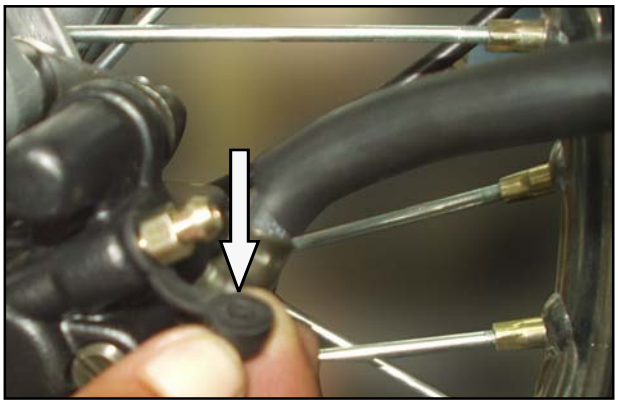
- ☆ Remove the Master Cylinder top cover screws.



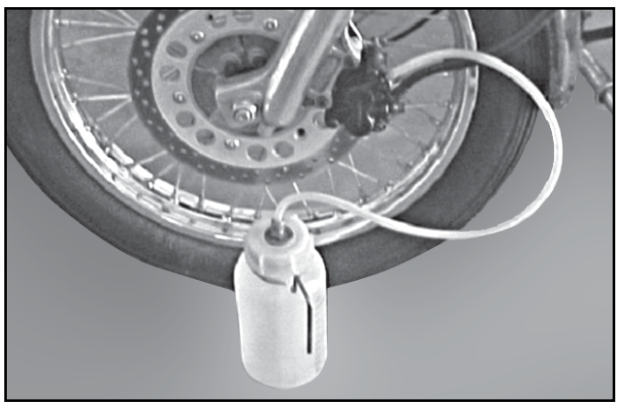
☆ Remove the Master Cylinder top cover, diaphragm plate & diaphragm.



☆ Remove the protective boot from the bleeder nipple on the calliper assembly.



☆ Fix a transparent flexible tube of length 12" (30 Cms.) firmly on the bleeder nipple and insert the other end into a glass or plastic container to collect the old brake fluid.



☆ Loosen the bleeder screw by 1 turn approximately

☆ Depress brake lever slowly and fully and release. This will force the brake fluid out of the bleeder screw. Repeat this process till the brake fluid drains out completely from the master cylinder and the wheel calliper assembly.

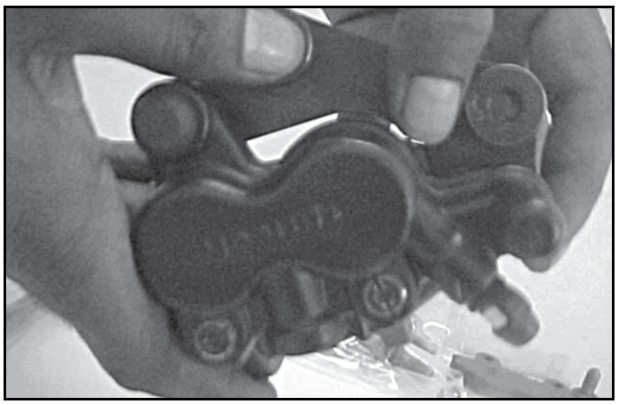
OVERHAULING CALIPER AND MASTER CYLINDER

☆ Place a clean tray or container below the calliper assembly to collect the old oil.

☆ Loosen and remove the banjo bolt with the washers from the Caliper

☆ Drain out the entire brake fluid from the master cylinder and brake hose by depressing and releasing the brake lever.

☆ Remove the calliper assembly from the fork leg and drain out the brake fluid



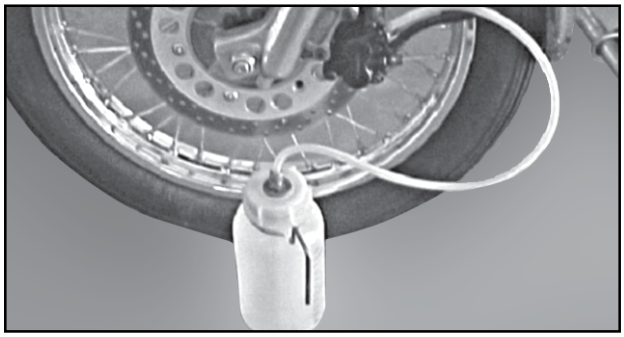
☆ Reassemble the calliper and refit the banjo bolts after draining out the oil

BLEEDING PROCEDURE

NORMAL METHOD

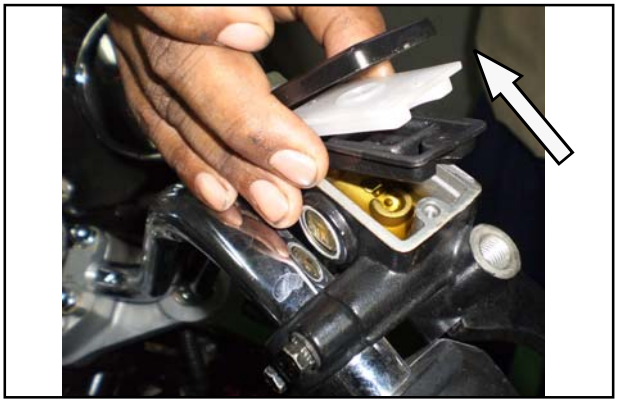
☆ Ensure the bleeding screw and the brake hose banjo is fully tight.

☆ Fix a transparent flexible tube of length 12" (30 Cms.) firmly on the bleeder nipple and insert the other end into a glass or plastic container containing fresh brake fluid. Ensure the tube end is fully immersed in the fluid. This will prevent atmospheric air from getting sucked into the caliper unit during the bleeding process.

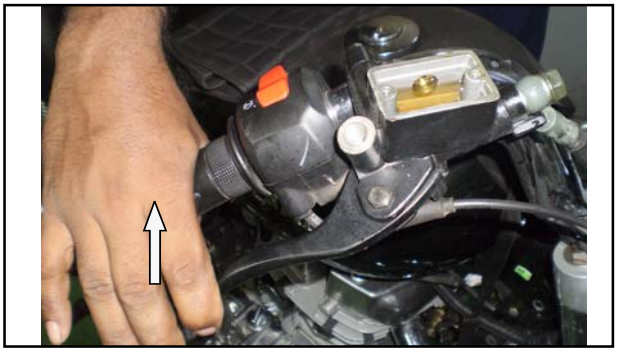


☆ Fill the master cylinder with brake fluid from a sealed container, till the "MAX" level.

☆ Fix the diaphragm, plate and top cover. Do not tighten the screws completely since it may be required to top up fluid during the bleeding process.



☆ Depress the brake lever completely and release fully so as to allow the brake fluid to fill up in the brake hose and caliper.



☆ When a slight firmness is felt on the lever and it depresses only halfway, hold the lever firmly in that position. **DO NOT RELEASE THE LEVER.**

☆ Loosen the bleeder screw by ½ turn to allow air bubbles in the brake system to escape out.

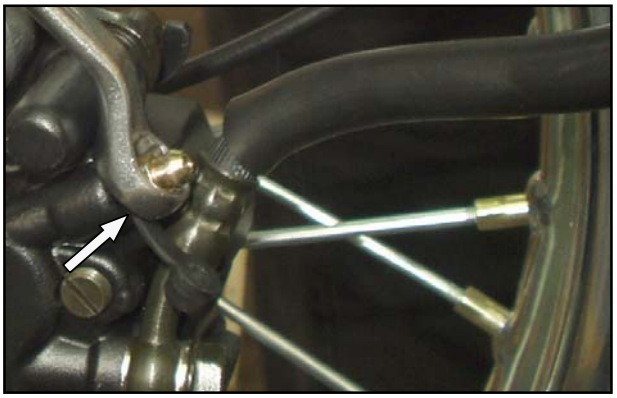
☆ When the bleeder screw is loosened and the air escapes out along with the brake fluid through the bleeder nipple, the brake lever will further depress. Allow the lever to depress fully and hold. **DO NOT RELEASE THE LEVER.**

☆ Tighten the bleeder screw firmly and then only release the brake lever.

NOTE: Check the fluid level in the master cylinder and top up if necessary till the "MAX" mark.

☆ Repeat the process detailed above, till the brake lever movement is minimal and locks in applied position. Also check and ensure there are no more air bubbles being carried out by the fluid while bleeding the system.

☆ Ensure the bleeder screw is tightened fully and fix the dust cap.



☆ Check the fluid level and top up to "MAX" level and refit the diaphragm and the top cover and tighten with the screws.

☆ Check for any leaks at the banjo or the bleeding screw area and ensure all mounting bolts are tightened to the correct torque.

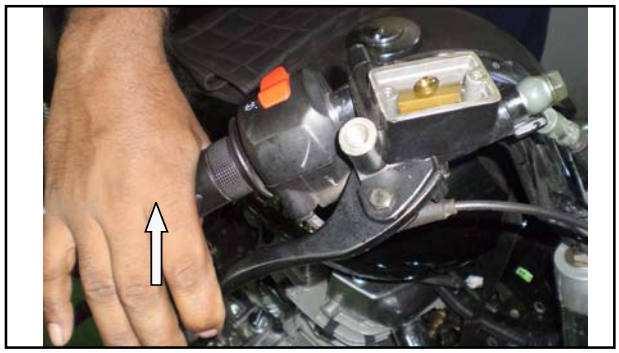
BLEEDING PROCEEDURE

REVERSE BLEEDING METHOD:

P Ensure the bleeding screw and the brake hose banjo is fully tight.

☆ Fill the master cylinder with brake fluid from a sealed container, till the "Max" level.

☆ Depress the brake lever completely and release fully so as to allow the fluid to travel into the brake hose and the wheel caliper.



☆ When a slight pressure "build up" is felt on the lever, depress and hold. **DO NOT RELEASE THE LEVER.** The air in the hydraulic system will be expelled upwards during this operation, allowing the fluid to fill up in the calliper and the brake hose completely.

NOTE: The brake fluid level will go down when the air escapes out. Check level constantly and top up to "MAX" level.

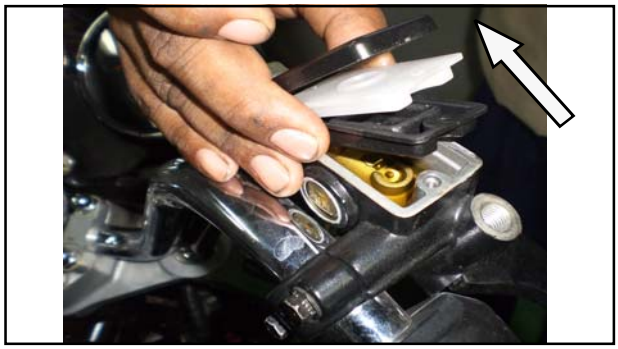
☆ Repeat the process detailed above, till the brake lever movement is minimal and locks in applied position. Also check and ensure there are no more air bubbles coming into the master cylinder.

☆ Check the fluid level and top up to "MAX" level. Refit the diaphragm and the top cover and tighten with the screws.

DISASSEMBLY OF MASTER CYLINDER

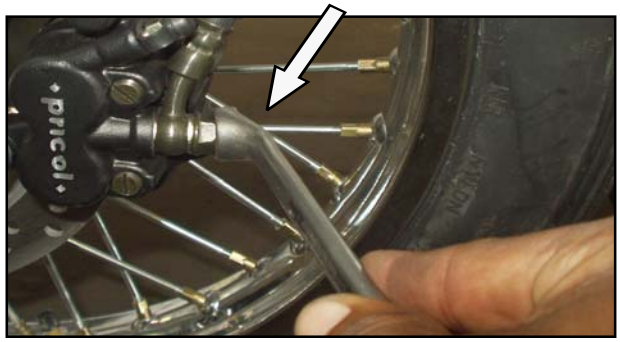
☆ Remove the Master Cylinder top cover screws.

☆ Remove the Master Cylinder top cover, diaphragm plate & diaphragm.



☆ Place a clean tray or container below the calliper assembly to collect the old brake fluid.

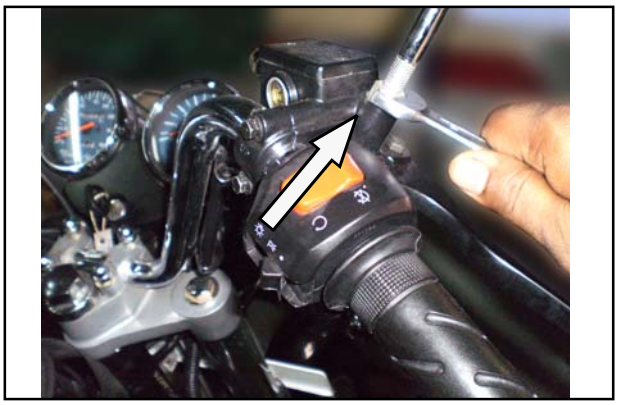
☆ Loosen and remove the banjo bolt with the washers from the Caliper assembly.



☆ Drain out the entire brake fluid from the master cylinder and brake hose by depressing and releasing the brake lever.

☆ Remove the calliper assembly from the fork leg and drain out the brake fluid

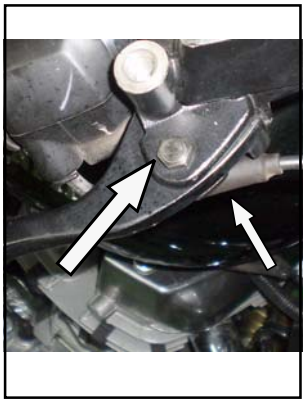
☆ Remove the Rear view mirror RH.



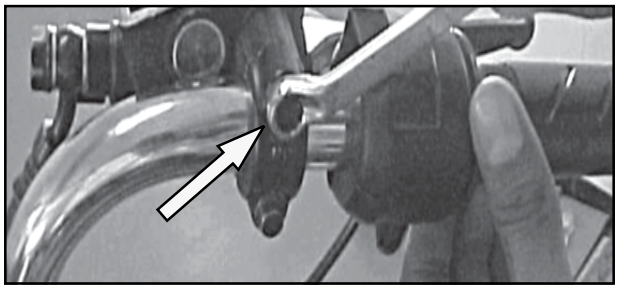
☆ Disconnect the Front brake switch wire and remove the switch from the master cylinder.

☆ Disconnect the Banjo bolt and the remove the brake hose from the master cylinder end

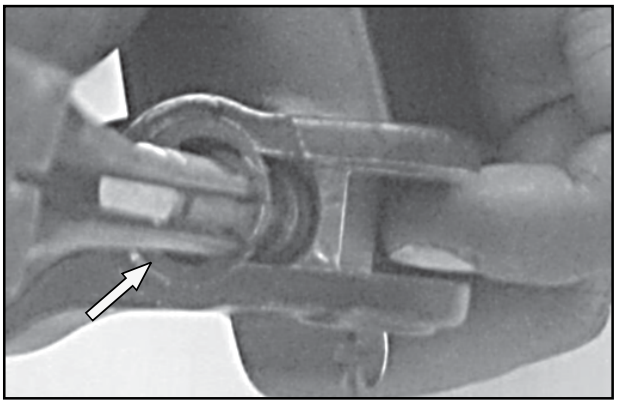
☆ Remove the brake lever pivot lock nut, brake lever pivot and the brake lever



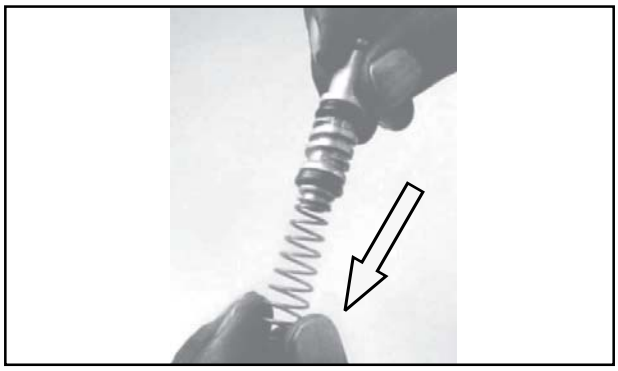
☆ Remove the master cylinder clamp bolts and remove the master cylinder from the handle bar.



☆ Remove the boot and the Circlip from the master cylinder body.



☆ Remove the conical spring (Piston compression spring)



INSPECTION

☆ Check both the rubber seals on the plunger for wear, cracked edges or any other damage. Replace seals whenever the plunger is removed

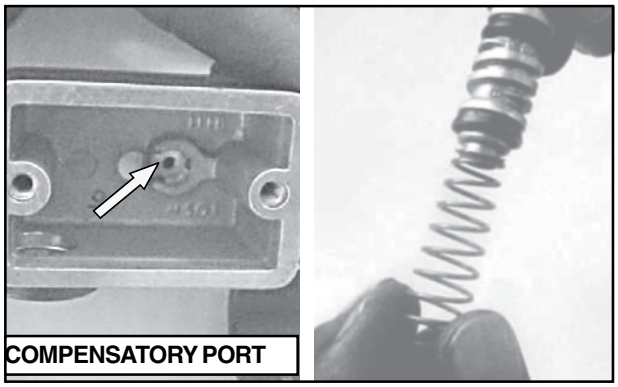
☆ Check the master cylinder housing and piston for any scoring, pitting due to corrosion or any other damages.

☆ Check the master cylinder bore for any damages, scoring marks etc. Measure the inner diameter - Service limit: 12.76 mm

☆ Check the piston outer surface for any damages, scoring marks etc. Measure the out diameter - Service Limit: 12.64 mm

CLEANING

☆ Clean the hydraulic disc brake parts only with clean and new brake fluid as using any other cleaning material can damage the parts and make the brakes ineffective.

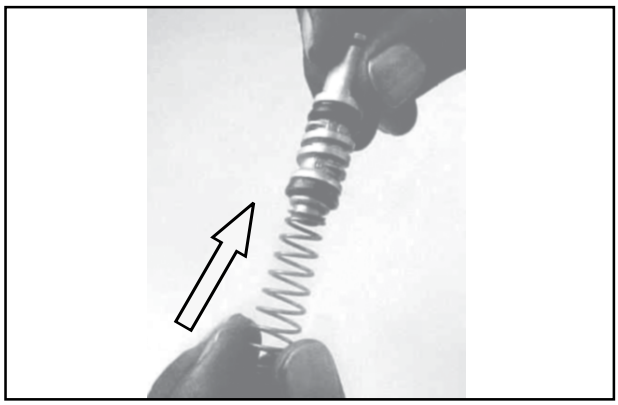


CAUTION :

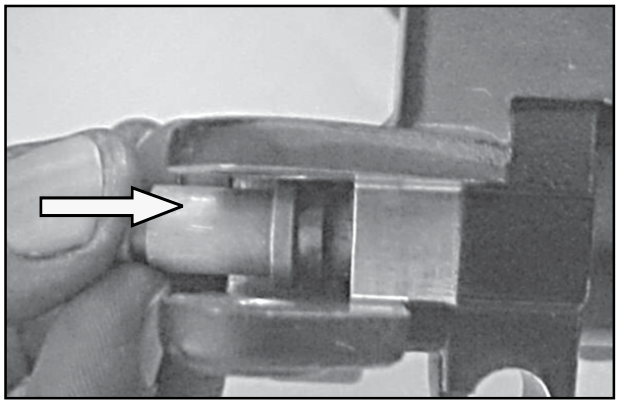
Do not clean the hydraulic disc brake parts with any other cleaning material, solvents or water. **USE NEW BRAKE FLUID ONLY.**

REASSEMBLY OF MASTER CYLINDER

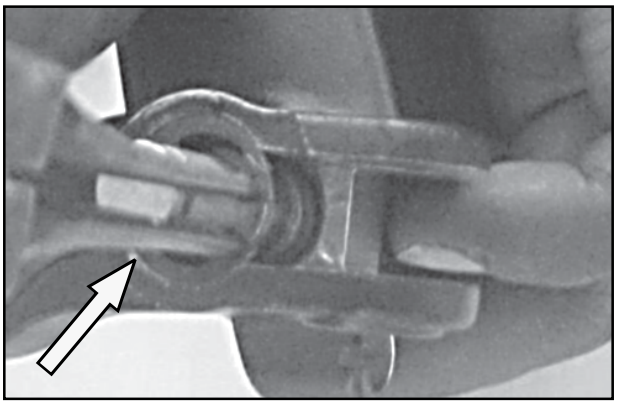
☆ Assemble the conical spring (compression) on the piston. Smear the piston, seals and cylinder bore with fresh brake fluid.



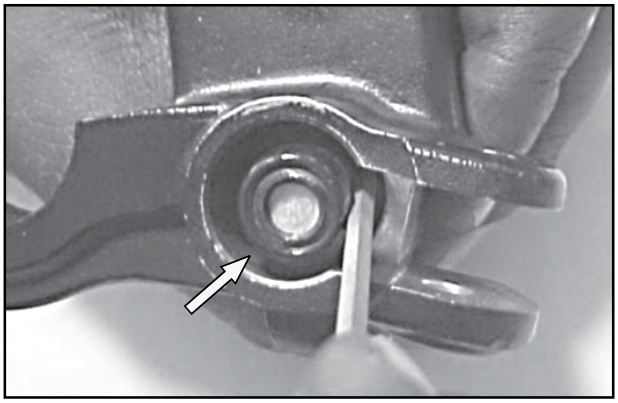
☆ Assemble the piston sub-assembly into the master cylinder by gently pushing it into the bore



☆ Locate the circlip into the groove of the master cylinder. Ensure the circlip is seated correctly inside the groove.



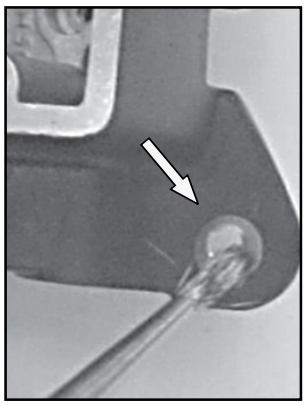
☆ Assemble the rubber Boot.

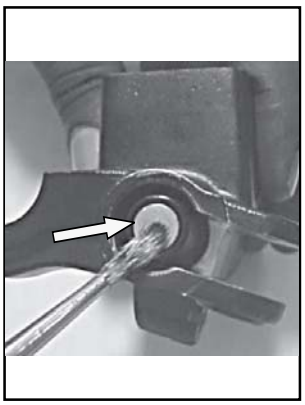


CAUTION :

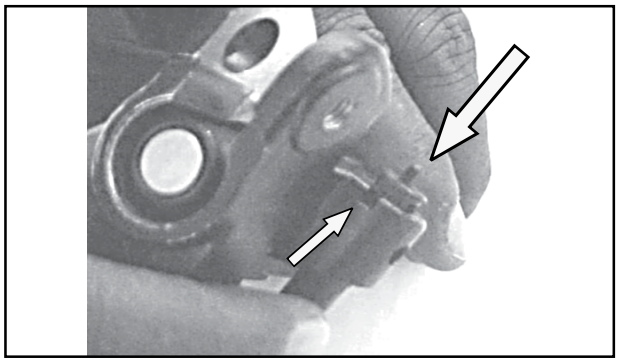
Do not use tools with sharp ends.

☆ Apply Silicon grease on the Lever pivot hole and on the Piston surface.



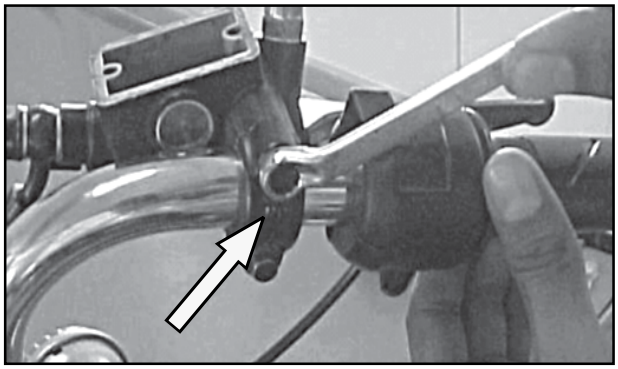


☆ Assemble the Brake Switch

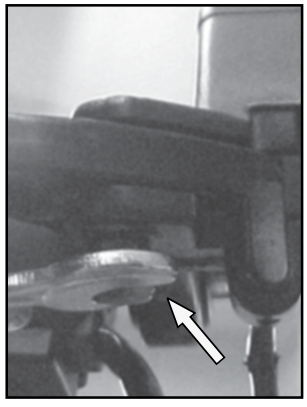


☆ Fix the master cylinder assembly on the handle bar with the 'UP' mark facing upwards.

☆ Tighten the master cylinder assy. clamp top bolt first and then tighten the bottom bolt. Torque 0.90 KG-M.



☆ Assemble the brake lever in the front bracket and tighten with the bolt first and then tighten the lock nut

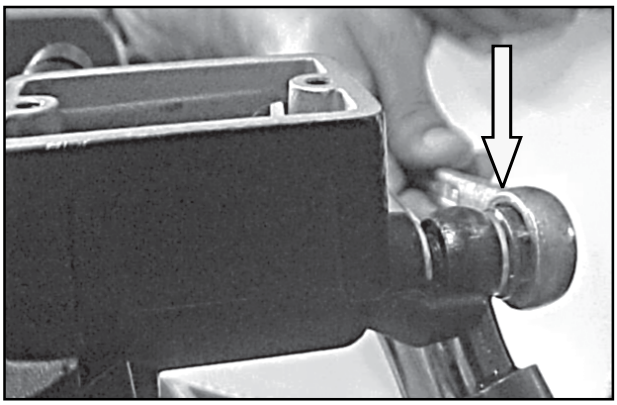


☆ Torque values: Bolt-lever 0.6 KG-M
Nut-lever 0.6 KG-M

☆ Position the brake hose on the master cylinder such that it is pointing downwards correctly and tighten with the banjo bolt. Replace the banjo bolt sealing washers whenever the bolt is removed.

☆ Tighten the banjo bolt firmly

Torque 3.5 KG-M.



☆ Connect the brake light switch.

☆ Fill the brake fluid till "MAX" mark and bleed the system.

☆ Assemble the diaphragm, plate and cover. Tighten screws gently

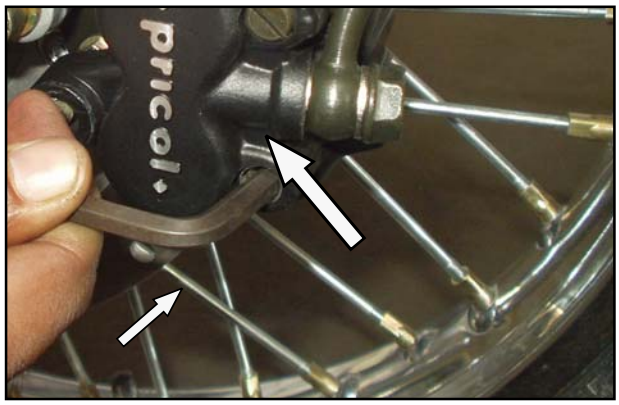
Torque 0.15 KG-M.

☆ Assemble the rear view mirror.

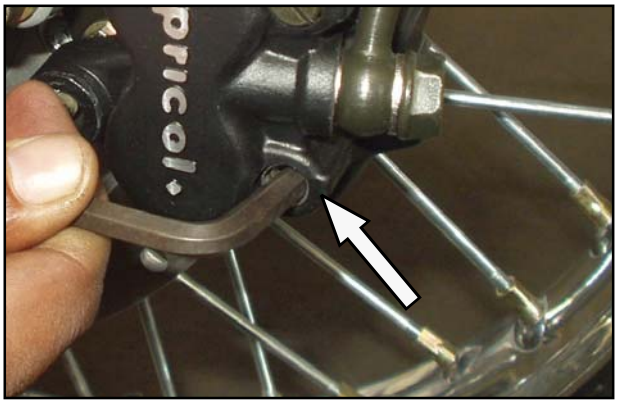
DISASSEMBLY OF WHEEL CALIPER

☆ Disconnect the brake Hose by removing the Banjo bolt and sealing washers.

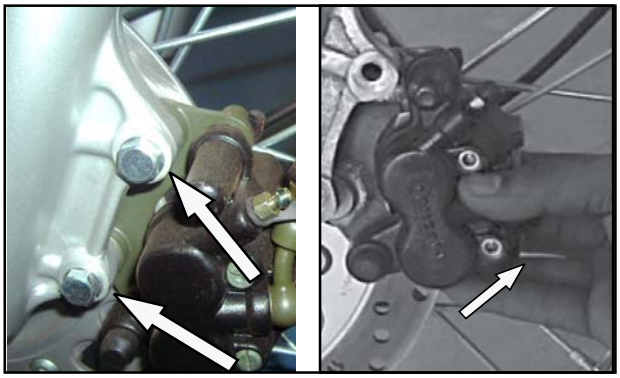
☆ Remove the Grub screws.



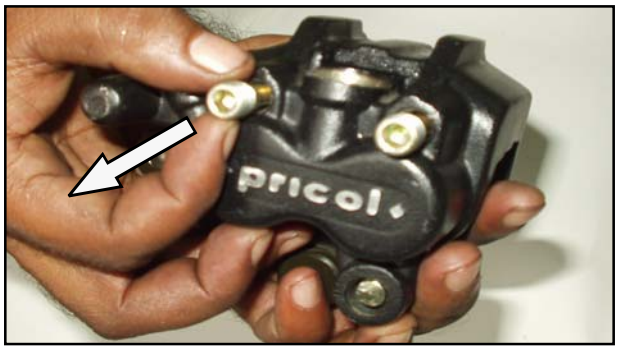
☆ Loosen both the pin bolts



☆ Loosen and remove the 2 mounting bolts holding the caliper to the fork and remove the caliper assembly



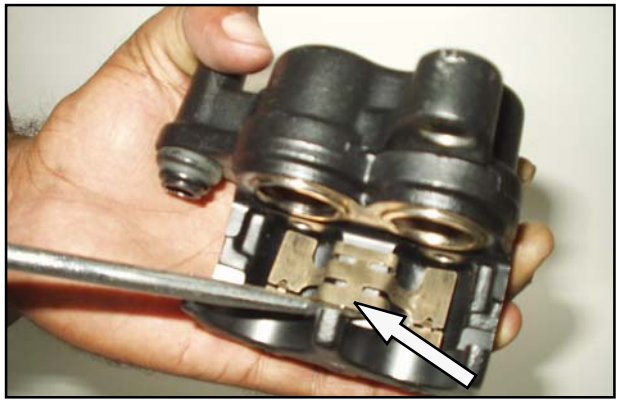
☆ Remove pin bolt.



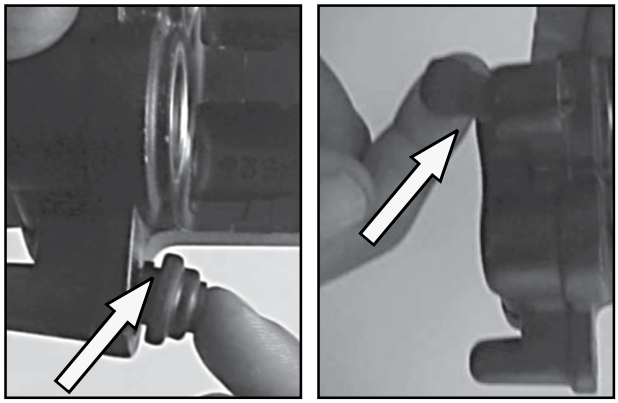
☆ Remove the brake pads from the caliper assembly.

☆ Remove mounting bracket from the Caliper assembly.

☆ Remove the brake pad tensioner spring plate.

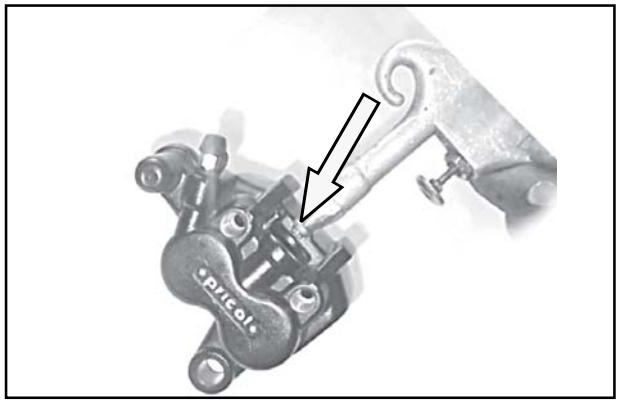


☆ Remove the Bellow & Boot.



☆ Hold the caliper body with the pistons facing downwards.

☆ Blow compressed air with a nozzle at a low pressure, into the oil passage hole on the caliper, so that the pistons can be removed

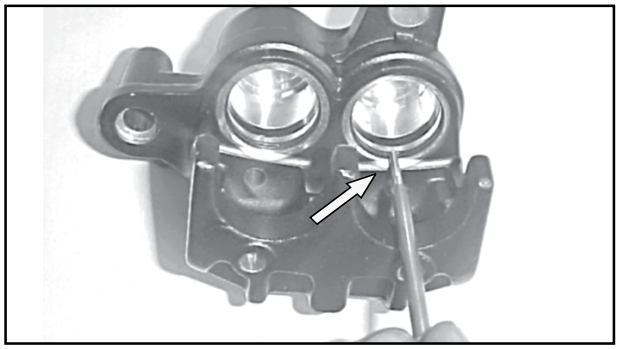


CAUTION : Do not use high pressure air or any pliers or sharp objects to remove the pistons as their working surface can get damaged.

Ensure the pistons do not fly out of the caliper body due to high air pressure. Support the pistons

Take care not to damage the sides of the piston as it cannot be reused in case it gets damaged.

Remove he dust seals and piston seals from the calliper using a blunt tool.



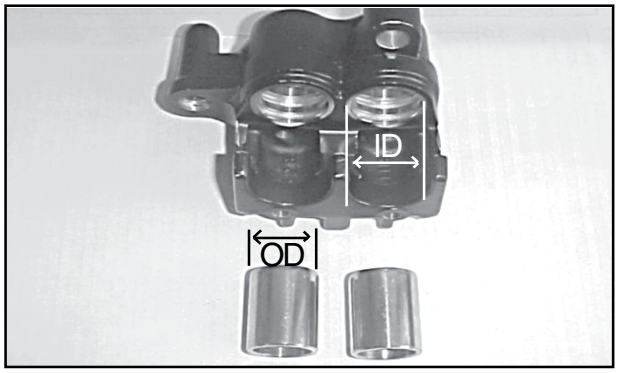
☆ Clean the seal grooves with brake fluid.

CAUTION : Care should be taken to avoid any damage on the bore of the sliding surface.

INSPECTION

☆ Check the caliper cylinder surface and

Piston outer surface for scoring or other damages. Measure the caliper cylinder I.D. Service limit – 25.46 mm



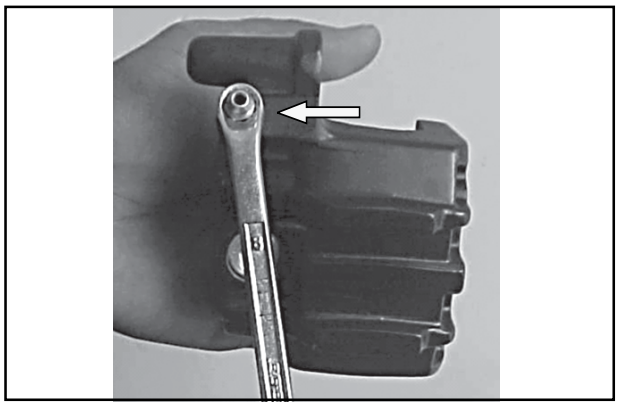
Measure the caliper piston O.D.

Service limit – 25.31 mm

CAUTION :

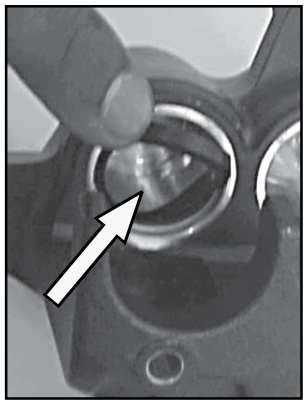
Enough care should be taken to avoid damages of the piston O.D. while servicing/ handling.

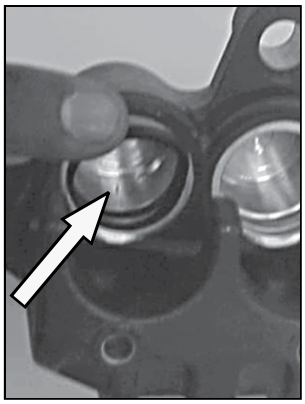
☆ Remove the Bleed screw.



CALIPER ASSEMBLY

☆ Coat clean brake fluid on new dust seals and piston seals and install them in the seal grooves of the caliper body.

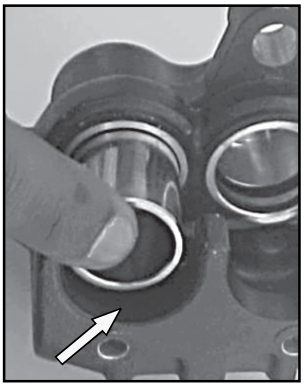


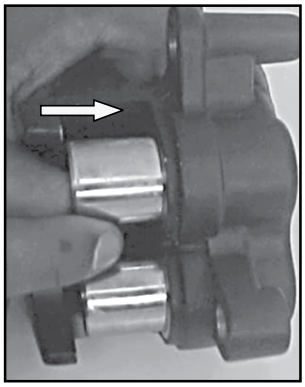


NOTE :

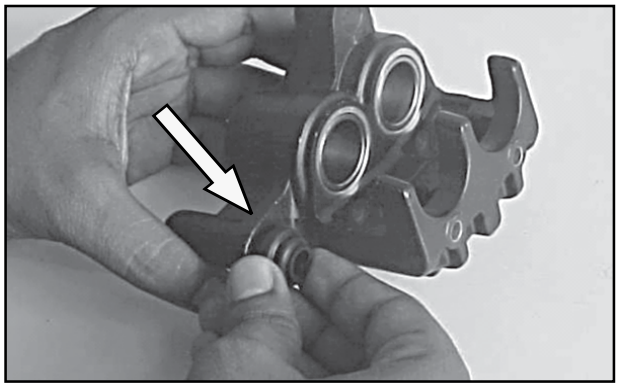
Ensure the piston seal are fixed on the inner groove and the dust seals are fixed on the outer groove.

☆ Coat the caliper cylinders and Pistons with clean brake fluid and install the Pistons into the caliper body with the dished end facing inwards.

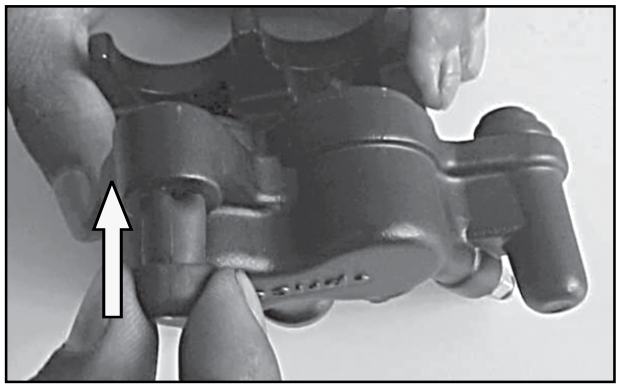




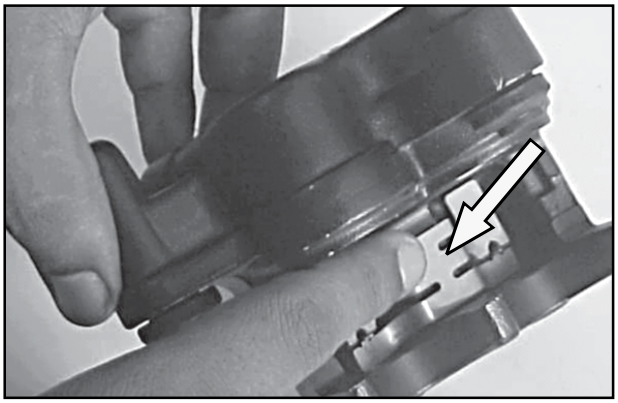
☆ If the Caliper Boot and Bellow are hard or deteriorated, replace them with new ones.



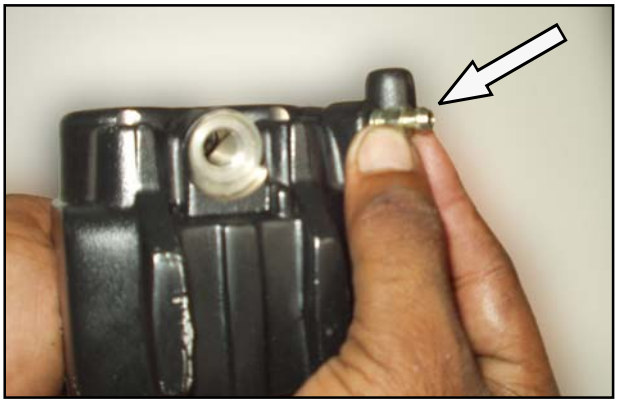
☆ Smear fresh brake fluid on the caliper boot and bellow and assemble them as shown.



☆ Install the Pad tension spring plate into the Caliper body.

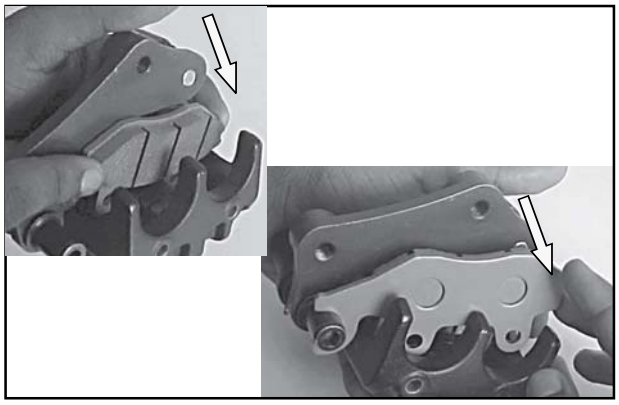


☆ Assemble Bleed screw with the dust cap on the caliper body.

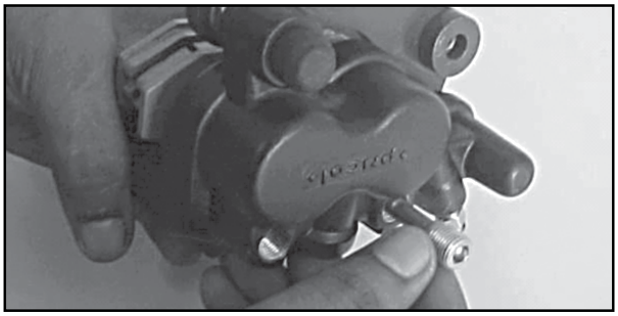


☆ Assemble the Mounting Bracket on the caliper Body.

☆ First install the brake pad at the piston side and then install the other brake pad



☆ Apply Silicon grease on the Pin OD and then assemble the Pin bolt by pressing brake pads into caliper body.



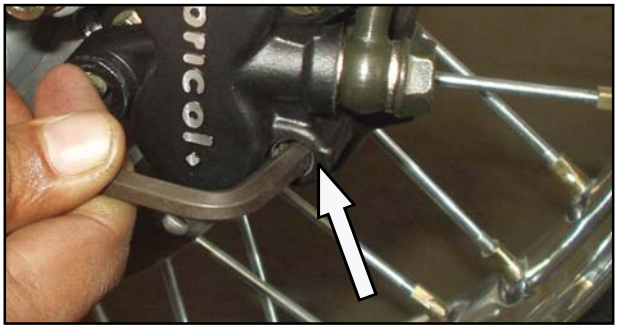
☆ Mount the Caliper assembly on the Fork and tighten the Mounting bolts evenly.

NOTE :

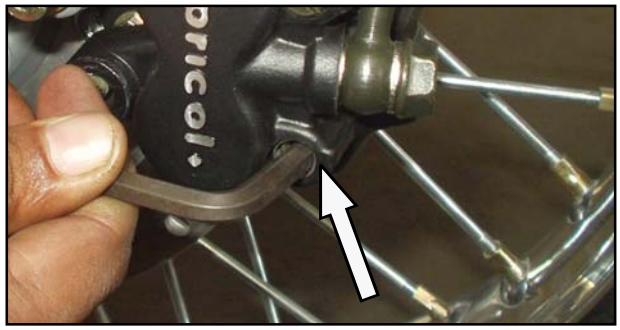
Ensure disc plate is in between both brake pads

Torque : 2.7 to 3.0 KG – M

☆ Tighten the Pin bolts with a torque of 1.5 2.0 KG - M after mounting the caliper assembly on the fork assembly.



☆ Fix the Grub screws on the pins and tighten to a torque of 0.2 to 0.3 KG-M.



P Connect the brake hose to the caliper with New sealing washers and tighten the Banjo bolt.

Torque : 3.5 to 3.8 KG -M.

☆ Fill fresh brake fluid in the Master cylinder and bleed the air out of the hydraulic brake system.

WHEEL DISC INSPECTION

Check the wheel disc periodically for any oil or grease stains, slush, grit, scoring marks etc. Keep the disc clean and dry at all times for the brakes to work at peak efficiency. If the Disc is scored heavily, replace the disc. IF the scoring is very mild, remove the same using a mild abrasive paper.

☆ Check the Disc thickness and the 'Run-Out' of Disc.11

Sl. No.	Parameter	Service Limit	Inspection method
1	Disc Thickness	As described on the disc	
2	Disc runout	0.3mm	

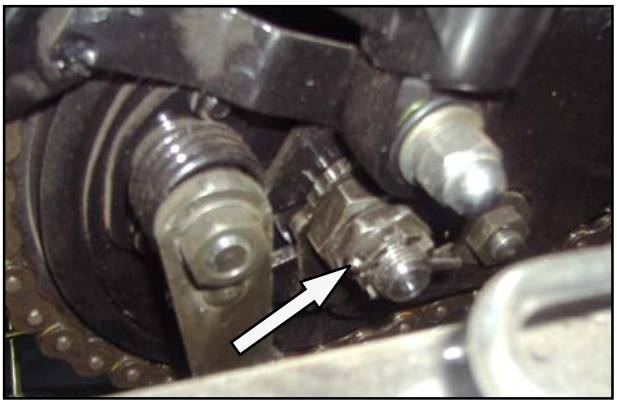
REAR WHEEL REMOVAL

Rear wheel can be dismantled without removing the rear chain and rear wheel sprocket.

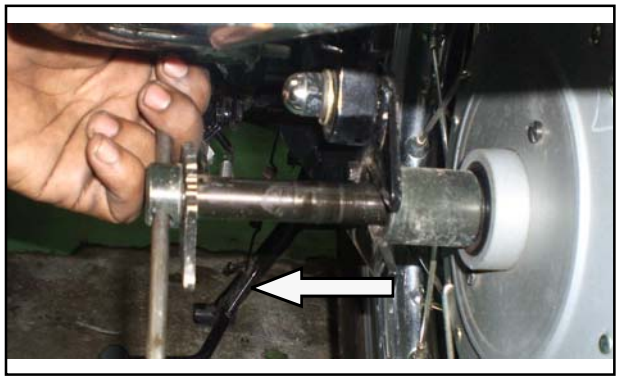
☆ Place the vehicle on its center stand

☆ Ensure the rear wheel is lifted off the ground by placing suitable wedges under the centre stand legs

☆ Remove the split pin and the castle nut from the rear hub spindle



☆ Pull out the spindle with the chain adjuster and remove the spacer from the LH side.



☆ Tilt the vehicle to the right and free it form the sprocket lugs and slid it outwards

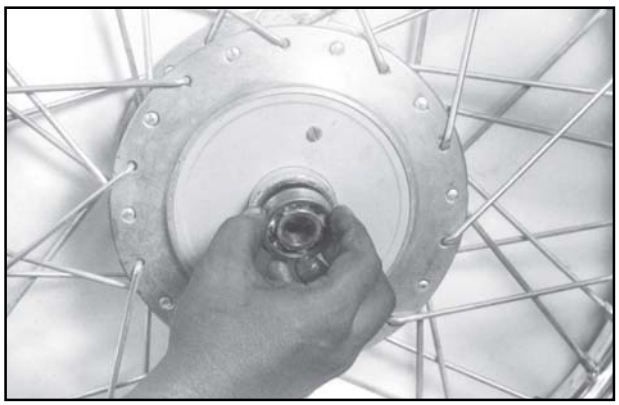
☆ Remove the cush drives (4 Nos.) from the hub.

CAUTION :

The cush drives are locked to the hub with rubber lugs. Pull out the cush rubbers gently to avoid damage to the lugs

☆ Remove the dust seals.

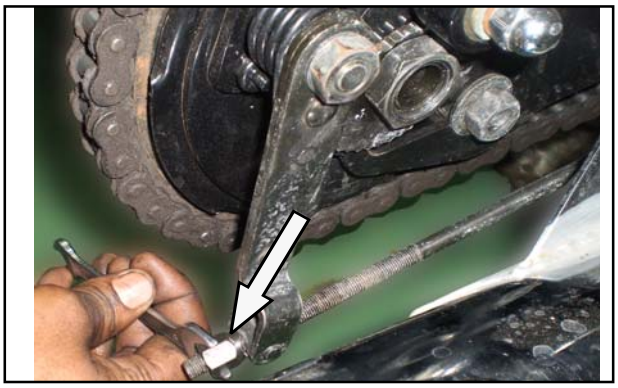
☆ Drive out the bearings (2 Nos) and take out the spacer.



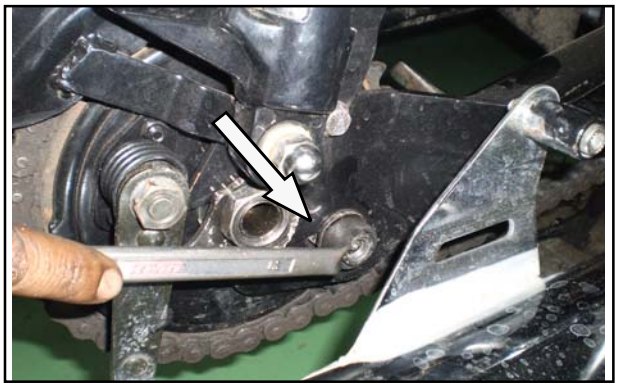
BRAKE DRUM ASSEMBLY

☆ Remove the drive chain from the sprocket.

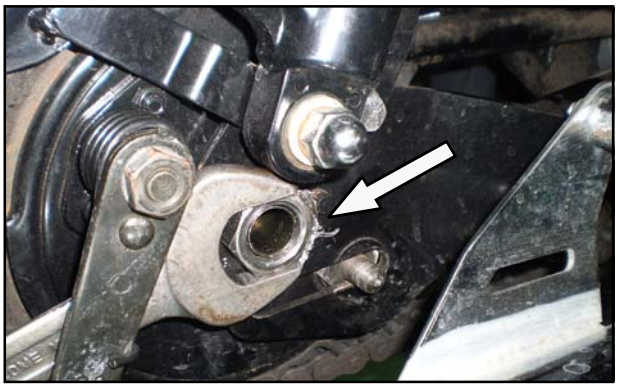
☆ Disconnect the brake operating rod from the cam lever.



☆ Remove the cover plate anchor nut from the chain stay.

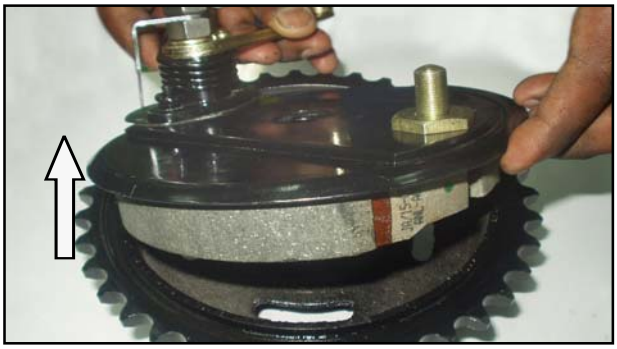


☆ Remove the nut from hub spindle short.



☆ Remove sprocket drum assy. from the swing arm along with brake shoes and cover plate carefully. Disconnect chain if not removed earlier.

☆ Take out sprocket drum, brake shoes, and spacer



☆ Remove the oil seal.

☆ Drive out the bearing from the hub sprocket.

CLEANING

☆ Clean all parts except brake shoes, cush drive and tyre, with solvent and dry with compressed air.

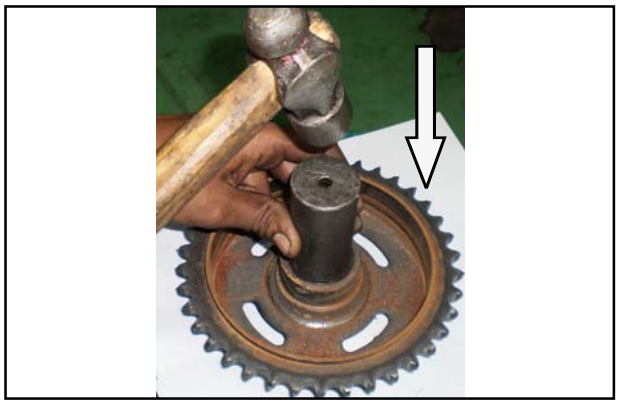
☆ Clean the brake shoe & cush drive with dry cloth / cloth wet with solvent.

INSPECTION

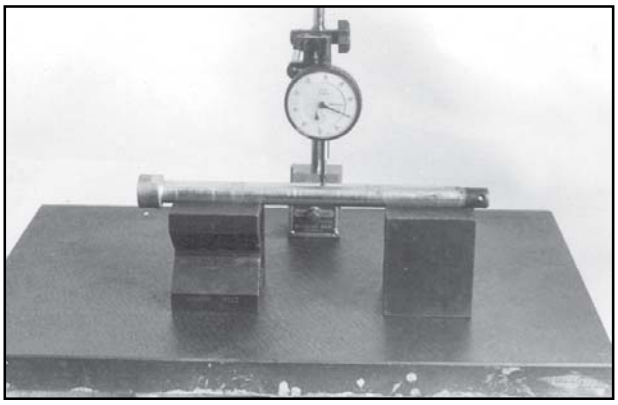
☆ Visually check all parts for breaks, cracks, dents, scoring, glazing or any other damage.

☆ Check bearings for free rotation, axial play and radial clearance. Replace if necessary.

☆ Lubricate bearing by MP grease and then assemble into sprocket drum by using bearing punch as shown in Fig.



☆ Check the spindle for bend as shown in Fig.



ASSEMBLY

☆ Assemble in the reverse order of disassembly.

☆ While assembling replace the grease seals and split pin.

SECTION

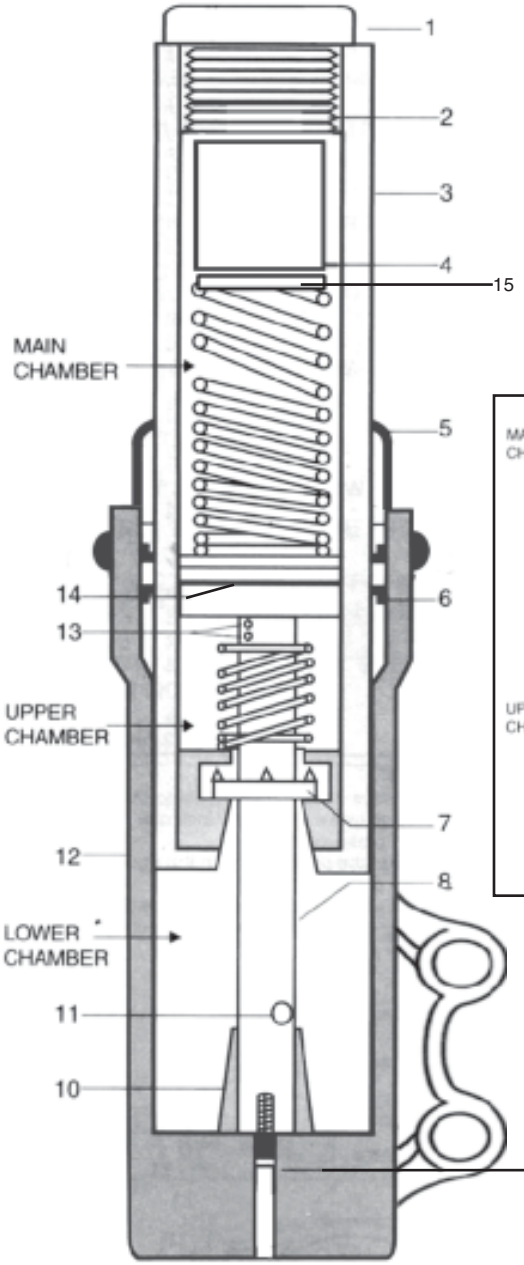
NINE 09

SUSPENSION & STEERING

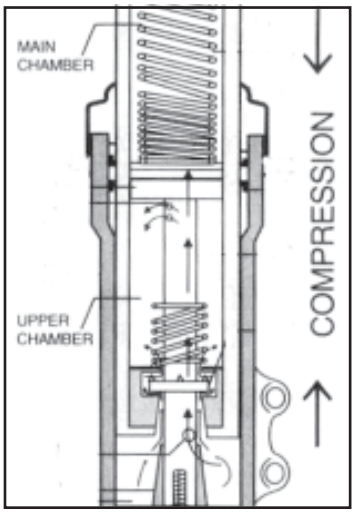
Front Fork Working Principle - for Classic 500 & 350

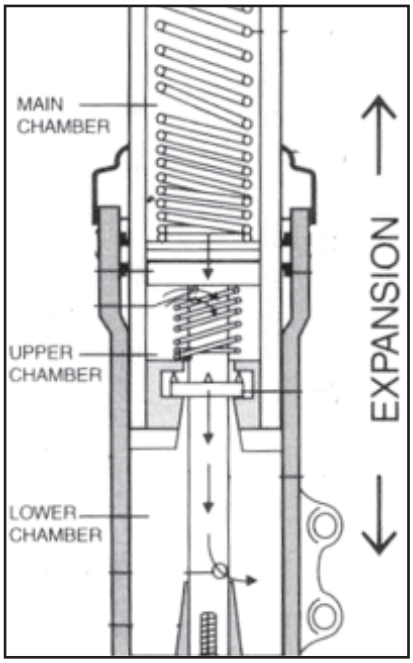
☆ **FORK STROKE LENGTH : 130 MM**

☆ **FORK MOVEMENT IS CONTROLLED BY THE COMPRESSION SPRING AND HYDRAULIC DAMPING FORCE**

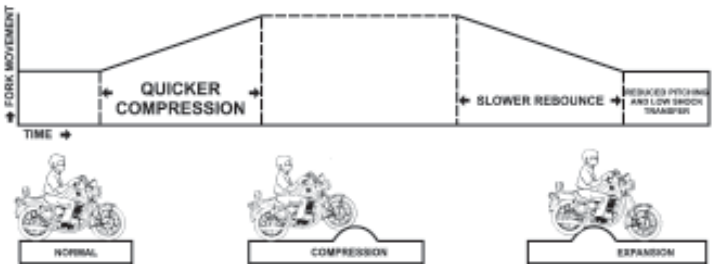


S.No.	Description	S.No.	Description
1.	Bolt cap	9.	Copper washer & allen bolt
2.	"O" ring	10.	Oil control collar
3.	Main tube	11.	Thorough oil hole
4.	Spacer	12.	Bottom tube
5.	Seal dust	13.	Orifices
6.	Fork oil seal & circlip	14.	Piston ring
7.	One way check valve	15.	Washer spring seat
8.	Fork piston		





● *OIL FLOW DURING REBOUND STROKE*

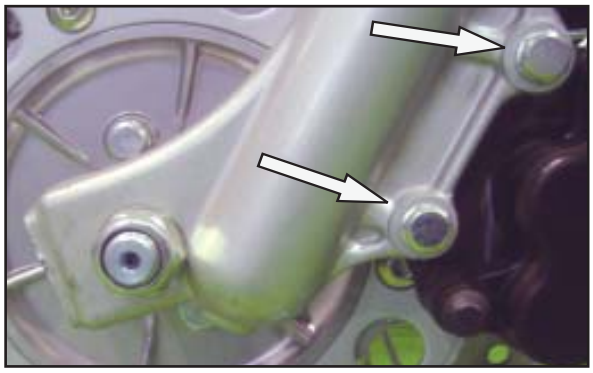


FRONT FORK DIS ASSEMBLY

☆ Place motorcycle on centre stand.

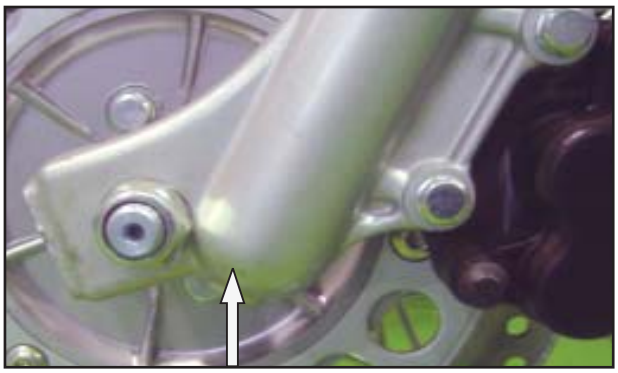
☆ Remove speedo cable, front wheel and mudguard.

☆ Remove caliper mounting bolts and take out the caliper.



DISMANTLING PROCEDURE

☆ Remove the allen screw from the bottom tube and drain the oil.



☆ Gently tap the fork bottom tube downwards and remove the bottom tube.

REMOVAL OF FORK SEALS

☆ Loosen the pinch bolt on fork crown bottom.

☆ Remove the plug screw from the head lamp casing and using special tool ST 25108-3, unscrew and remove the main tubes, cover tubes, bush and washer.

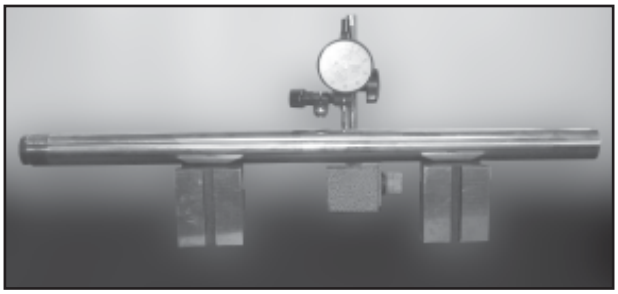
☆ Remove the circlip from the bottom tube and take out the spacer and dust seal.

☆ Place special tool ST 25114-4 on bottom tube and lever out the oil seal along with spacer.

INSPECTION

☆ Visually inspect all parts for damages, cracks, bends, wear marks or any other damage.

☆ Check the main tube for any bend.



☆ Measure the spring length.

☆ Inspect the other internal parts for any visual damage.

FRONT FORK ASSEMBLY

☆ Assemble the front fork in the reverse order of dis-assembly.

☆ Replace the oil seals and the 'O'rings with new.

STEERING DISASSEMBLY

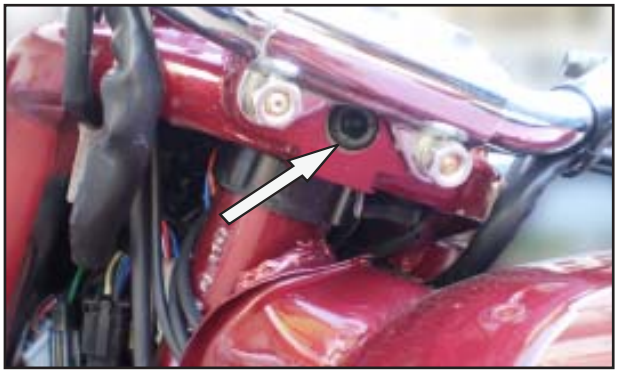
☆ Remove the front fork assembly.

☆ Disconnect all wires and remove headlamp unit and trafficators.

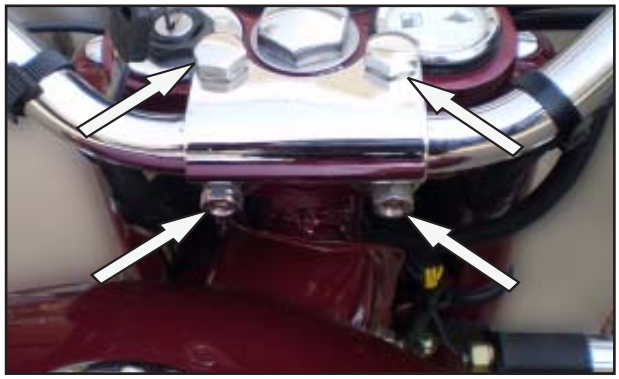
☆ Take out cover tube, bush and washer.

☆ Remove head lamp assembly.

☆ Loosen the head lamp casing allen screw.

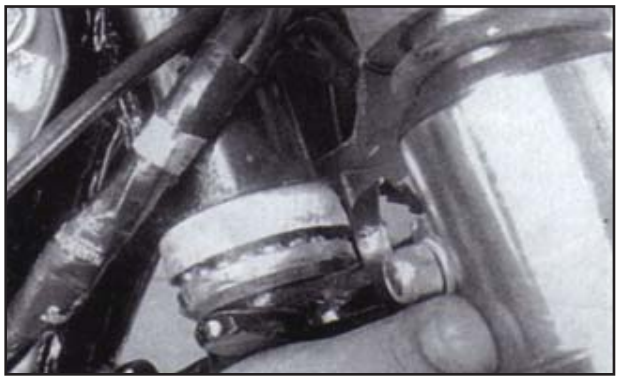


P Remove the handle bar clamp bolts and nuts and take out handle bar.



P Remove the stem lock nut and washer carefully.

P Tap the steering stem downwards, taking care to collect the steering race balls (38 nos) for inspection.



☆ Remove head lamp casing.

☆ Drive out ball races and cover from head lamp casing.

☆ Using a copper drift, tap out ball race and cover from the frame head tube.

☆ Take out ball race from steering stem.

CLEANING

☆ Clean all the parts carefully for inspection.

☆ Rub the bearing race balls in a clean cloth.

INSPECTION

☆ Inspect the balls for marks of wear, corrosion, pitting and damage.

Replace if necessary.

☆ Inspect the races for

- Grooves
- Excessive / uneven wear.

☆ Replace if found defective.

☆ Check all parts for cracks, pitting or any other damage.

REASSEMBLY OF STEERING

☆ Using a hollow drift, fix the bottom ball race the steering stem.

☆ Fix the ball race on the frame head tube (top).

☆ Fix the ball race along with cover on the frame head tube (Bottom).

☆ Apply grease on steering stem bottom ball race and Top ball races in the frame head tube.

☆ Locate 19 balls each on the ball races - steering stem bottom and frame had tube top.

☆ Locate the head lamp casing over the frame down tube such that the centre holes align.

☆ Insert the steering stem into the frame head tube slowly and steadily. Till it matches with the frame head tube bottom ball race.

☆ Tighten the stem with lock nut with washer.

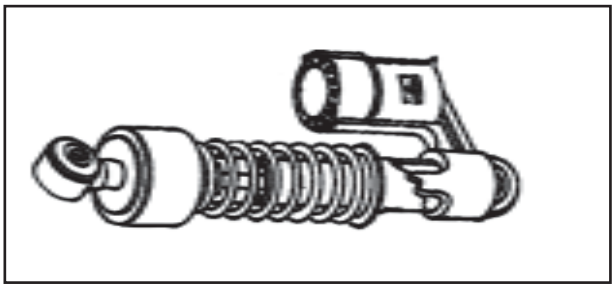
☆ Assemble front forks, mudguard & front wheel in reverse order of disassembly. Assemble the handle bar and other parts.

☆ Adjust the steering stem play correctly & tighten the steering stem rinch bolt under the handle bar bracket.

GAS FILLED SHOCK ABSORBER

WORKING PRINCIPLE

☆ The pressure of the nitrogen/Air, in the reserve tube of a gas charged shock varies from 75 to 120 psi, depending on the amount of fluid in the reserve tube. The gas serves several important functions to improve the ride control characteristics of the shock absorbers.

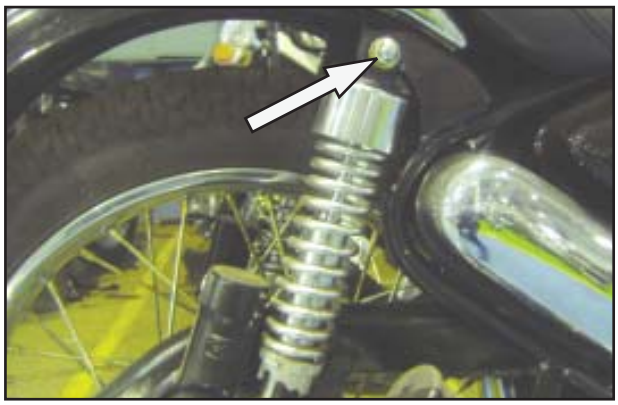


☆ The main function is to increase the resistance of fluid flow into the reserve tube. This improves valving performance during the beginning of rebound stroke.

☆ Another function is to minimize aeration of the shock absorber's hydraulic fluid. The pressure of the nitrogen gas / air prevents air bubbles or foam from weakening the hydraulic effectiveness of fluid flow through both the piston and base valve systems. Foam affects performance since foam compresses, fluid does not. This is alternatively called as cavitation. The effect of foaming will result in poor riding comfort.

REMOVAL AND ASSEMBLY OF REAR SHOCK ABSORBER

☆ Remove the top and bottom mounting nuts and washers.

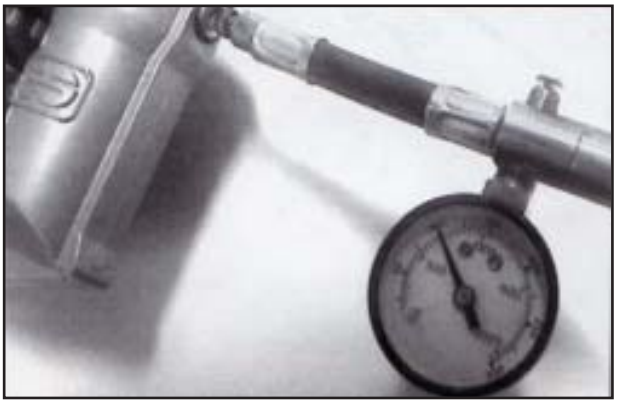


☆ Pull out the shock absorber from bottom and slide out from frame.

☆ Assemble in the reverse of removal.

RECHARGING OF SHOCK ABSORBERS

☆ Remove the small screw with "O" Ring.



☆ Inject the special purpose needle into the hole provided in the screw (Puncturing the rubber) and start pumping the air into the chamber till the pressure reached to 100 PSI (7 BAR). Tolerance for filling pressure can be 6.7 BAR to 7 BAR.

☆ Fit the small screw with "O" Ring.

NOTE:

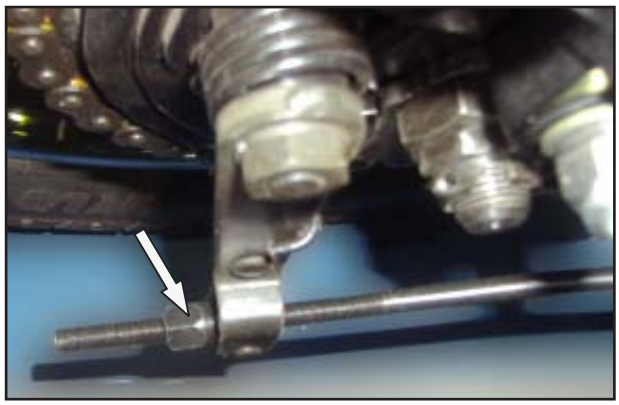
The shock absorber needs recharging when the system pressure is less than 5 BAR.

SWING ARM

REMOVAL

☆ Remove the chain link and take out the chain.

☆ Disconnect the brake rod nut.



☆ Remove the rear wheel sprocket assembly (1).

☆ Remove the shock absorbers (2).

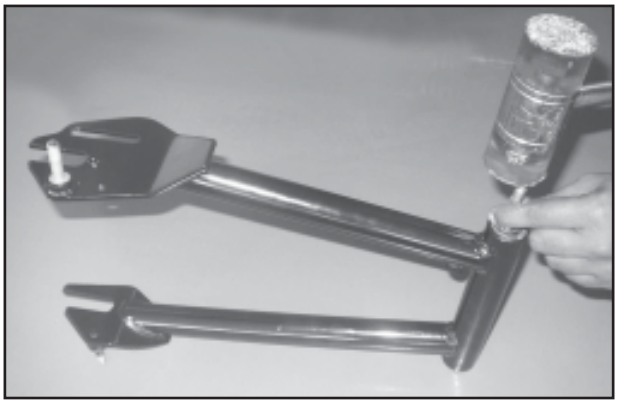
☆ Remove the chain guard.

☆ Remove the swing arm cap swing pivot.

☆ Remove the swing arm hex nyloc nut & washer.

☆ Tap and pull out the swing arm flange hex bolt.

☆ Using a mandrel, drive out the plastic bush from either sides of the swing arm and remove the steel spacer.

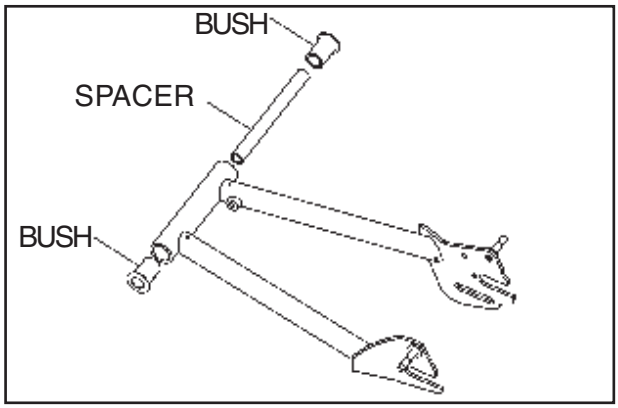


CAUTION :

Do not remove plastic bush, unless it is defective.

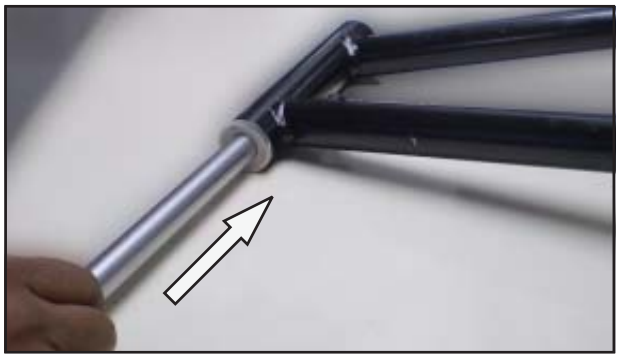
ASSEMBLY

☆ Press the new plastic bush into the swing arm tube.

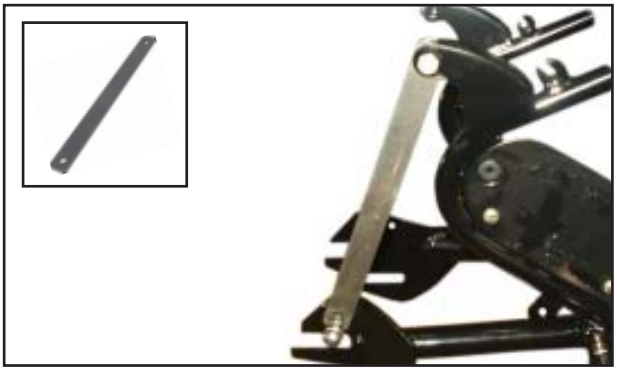


☆ Always use reamer to ream the bush after pressing into swing arm tube.

☆ Apply grease inside the bush and then insert spacer as shown in Fig.



☆ Position special tool ST 25110-3 on shock absorber mounting pins.



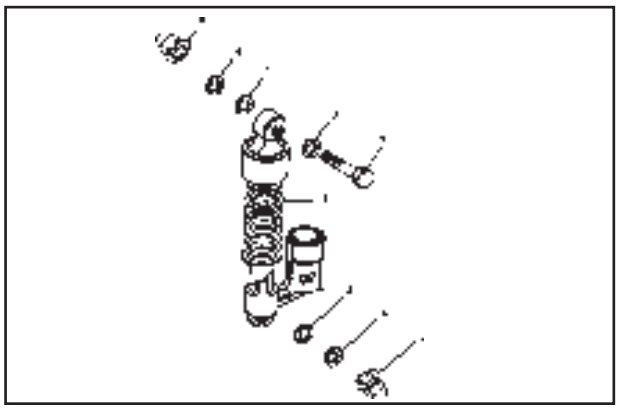
☆ Position it on frame and insert the swing arm hex bolt after applying grease.

☆ Place a washer and tighten nut.

☆ After tightening the swing arm hex nyloc nut. Remove special Tool ST 25110-3.

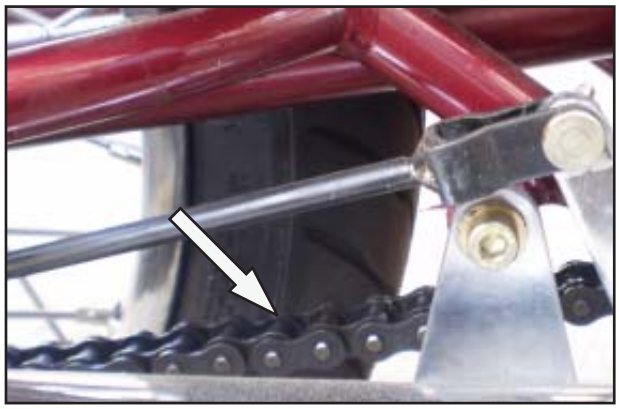
☆ Fix both side caps swing pivot carefully.

☆ Assemble both side shock absorbers, washers and dome nuts as shown in Fig.



☆ Assemble the chain guard.

☆ Assemble the rear wheel and adjust drive chain free play.



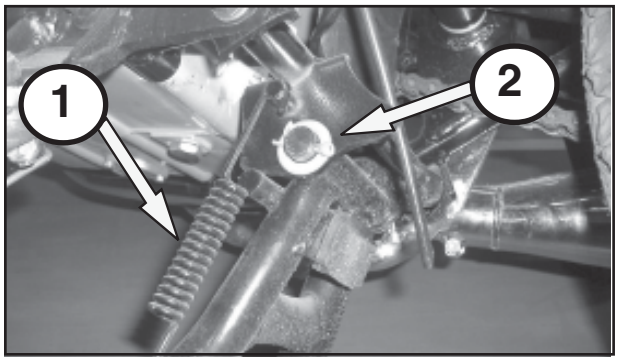
CENTER STAND

DISASSEMBLY

☆ Disconnect the stand return spring two nos. (1)

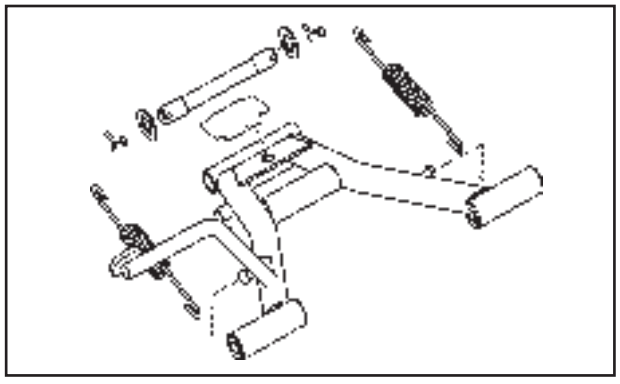
☆ Remove the split pins & washers from the both ends of the centre stand spindle (2).

☆ Drive out the centre stand spindle.



ASSEMBLY

☆ Assemble the centre stand in the reverse order of disassemble as shown in Fig.



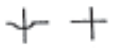
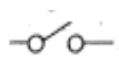
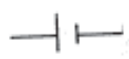
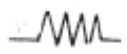
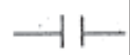
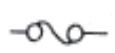
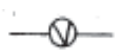
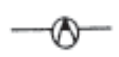
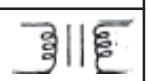
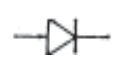
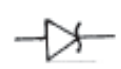
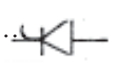
SECTION

TEN 10

ELECTRICALS

Electricals

ELECTRICAL SYMBOLS

01. Alternating current (AC)	...	
02. Direct current (DC)	...	
03. Wired across	...	
04. Connection	...	
05. Switch	...	
06. Ground	...	
07. Cell	...	
08. Battery	...	
09. Bulb	...	
10. Coil	...	
11. Resistor	...	
12. Capacitor	...	
13. Armature and brush	...	
14. Fuse	...	
15. Volt meter	...	
16. Ammeter	...	
17. Transformer	...	
18. Transistor	...	
19. Rectifier / Diode	...	
20. Zener Diode	...	
21. Silicon Controlled Rectifier	...	

BATTERY

CONSTRUCTION

Positive Plate - Porous mass of lead dioxide (Pbo_2) (Positive active material)

Negative Plate - Porous mass of spongy Lead (Pb) (Negative active material)

Electrolyte - Diluted sulphuric acid (H_2SO_4)

Separator - Micro porous, acid resistant electrical insulator between positive & negative plates

Container - Polypropylene casing to house the plate group & electrolyte

Cover - To seal the battery container

Filling Plugs - To facilitate filling of electrolyte and water topping up.

Gang Piece - To vent gases through common manifold and exhaust nozzle

Terminals - To make connections to the electrical loads.

Intercell Poles - To connect the cells in series internally.

Exhaust Tube - To discharge the vent gases.

Exhaust Seal Cap - To protect the dry charged plates from oxidation.

SCR

Electricals

PRECAUTIONS :

- ☆ Wear rubber gloves while handling a battery.
- ☆ Use only constant current battery charger of correct charging rate, to charge batteries.
- ☆ Remove the filler caps only to fill distilled water OR if the battery is to be charged. Hydration may occur when atmospheric air contacts the plates.
- ☆ Keep all the filler caps removed while charging the battery.
- ☆ Use only distilled water to top up the level after the initial charging.
- ☆ During charging, the electrolyte temperature should not exceed 45°C if necessary, discontinue the charging to cool the electrolyte.
- ☆ Ensure that the battery is placed on a non-metallic surface while charging.
- ☆ Keep fire and spark away from battery charging area.
- ☆ Never run the motorcycle without connecting the battery as it may lead premature failure of electrical parts.

CHARGING

INITIAL CHARGE (NEW BATTERY)

ELECTROLYTE :

- ☆ Diluted sulphuric acid with distilled water to a specific gravity of 1.240

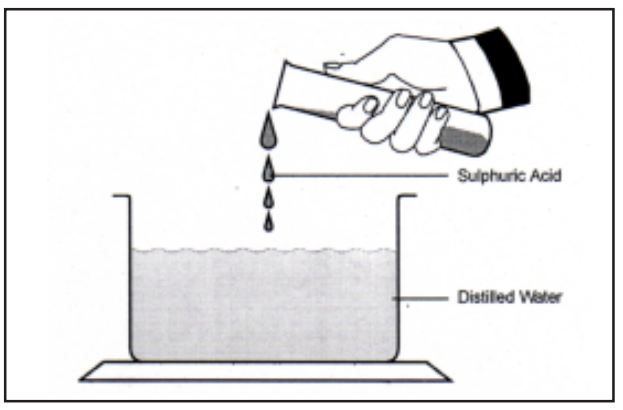
PREPARATION :

- ☆ Take required distilled water in a Hydrometer or equivalent container.
- ☆ Slowly, add sulphuric acid to it.

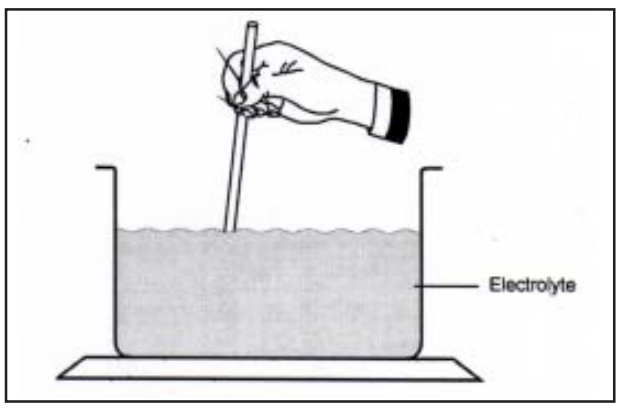
CAUTION :

It is important to ensure that the sulphuric acid is added into the distilled water and not vice versa. Stir and check the specific gravity of electrolyte and add sulphuric acid till the specific gravity becomes 1.240

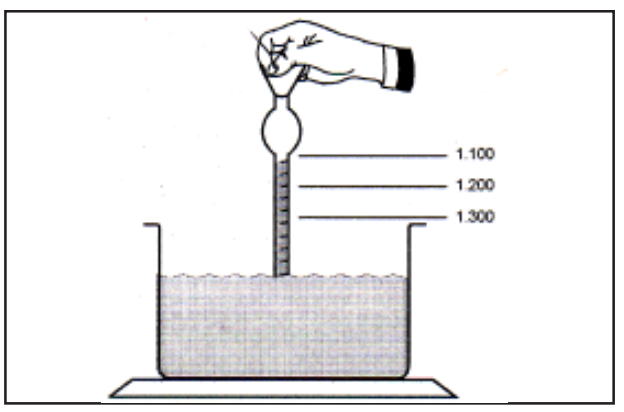
Never add sulphuric acid to battery electrolyte for topping up or increasing specific gravity. It would lead to sulphation.



- ☆ Stir with a glass rod.



- ☆ Check the specific gravity with hydrometer.



TEMPERATURE OF ELECTROLYTE :

☆ Cool the electrolyte to about 30 deg. C before filling it in the battery, just below the maximum level indicated.

SOAKING PERIOD:

☆ Keep the battery with electrolyte filled for about half an hour before commencement of charging. Top up the level with electrolyte if necessary.

CHARGING A NEW BATTERY:

☆ Connect the battery to the charger and charge as detailed below..

Battery	Duration	Charging Current
12V 14AH	10Hrs	1.4 Amps

RECHARGING USED BATTERIES:

☆ When the specific gravity of electrolyte is less than 1.220, drain out the electrolyte and refill with fresh electrolyte of strength 1.240 and charge the battery as detailed above.

☆ when a charged battery remains unused for more than 3 weeks, check the electrolyte for correct specific gravity, top up if required with distilled water up to maximum mark and charge the battery.

CAUTION :

Always connect the positive and negative terminals of battery into the positive and negative sockets provided in the constant current battery charger.

Always disconnect the Negative (-ve) terminal first & then the Positive (+ve). When re-connecting the battery to the vehicle after re-charging first connect Positive(+ve) terminal & then the Negative(-ve) terminal.

Keep all battery filler caps open while charging.

CHARGING PROCEDURE:

☆ Switch on the mains 'ON'. See that the charger indicator light is glowing

☆ Switch on the charger ON/OFF switch

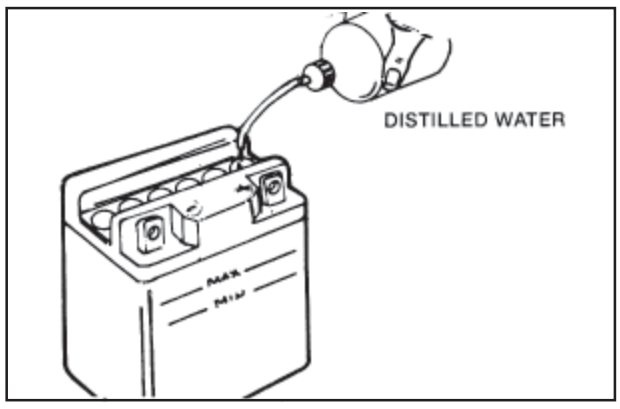
☆ Disconnect the battery from the charger when fully charged.

INDICATION OF FULL CHARGE:

☆ Free gassing from electrolyte for more than 90 minutes.

☆ 3 consecutive reading taken in intervals of 30 minutes each to read constantly 1 .240 or more of specific gravity.

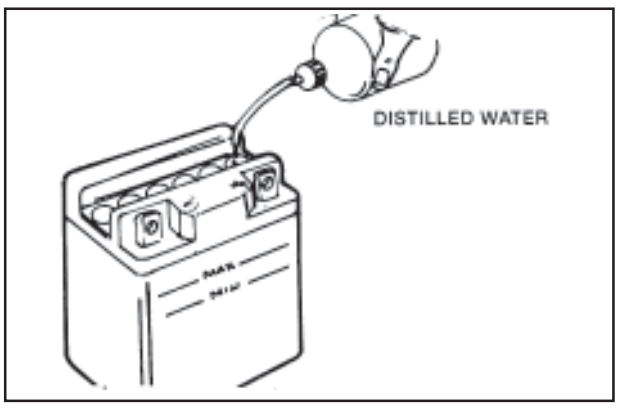
☆ Voltage: 12.0 TO 13.2V



Electricals

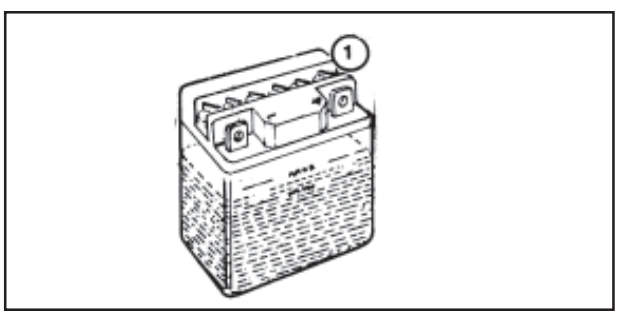
MAINTENANCE

☆ Check the electrolyte level and top up, if necessary to the 'MAX' mark with distilled water every week.



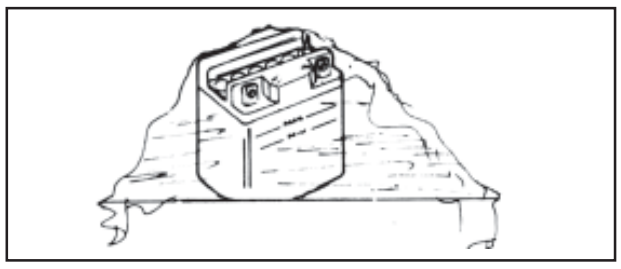
CAUTION : For topping, use only distilled water.

☆ Keep the battery surface clean and dry.



☆ Never over charge the battery - it damages the battery & plates may buckle.

☆ Remove the battery from the motorcycle and store it separately when the motorcycle is not in operation for more than one month.



☆ Protect battery from direct sunlight, heat, rain and dust.

☆ Keep exhaust seal cap in place to avoid deterioration of dry charge properties

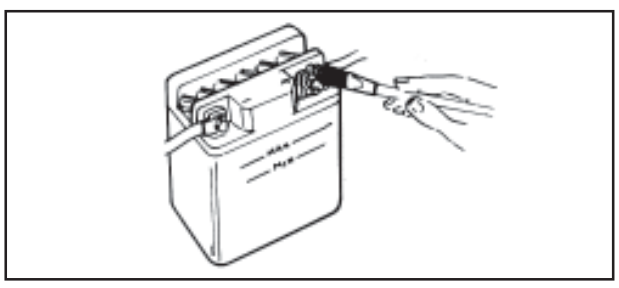
☆ New dry charged batteries need initial charging duration of 8 to 10 hours - Upto 3 months from the date of manufacturing.

☆ Beyond 3 months the batteries may need extended duration of initial charging subject to storage conditions.

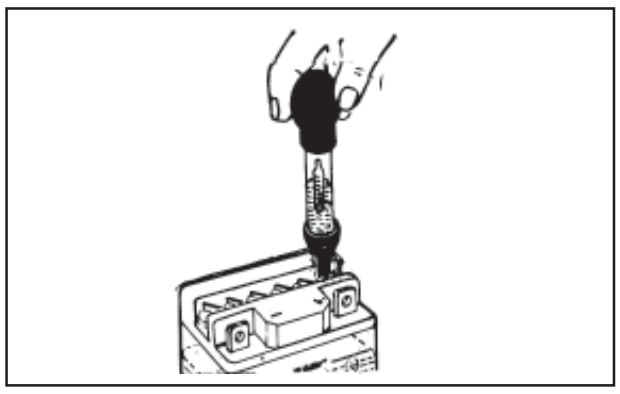
☆ Charged batteries, if kept idle should be boost charged once in 3 to 4 weeks

☆ It is always a good practice to boost charge the batteries before fitment to ensure full state of charge.

☆ Check the terminals and cables for corrosion. Apply petroleum jelly on terminals to prevent corrosion.



☆ Check specific gravity of electrolyte. The float graduation in level with the electrolyte in it, is the specific gravity of the electrolyte.



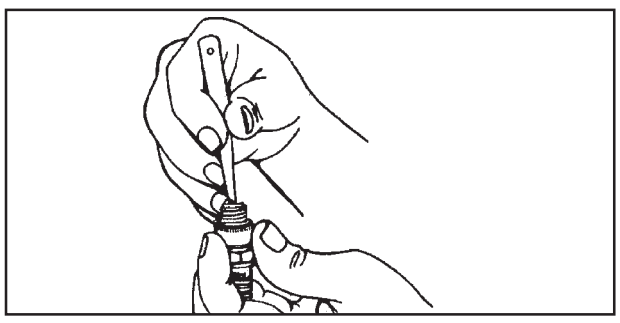
Specific Gravity	
Fully charged	Requires Recharging
1 .24	1 .15

P Check voltage with voltmeter

Voltage	
Fully charged	Fully Discharged
13 .2	10.8

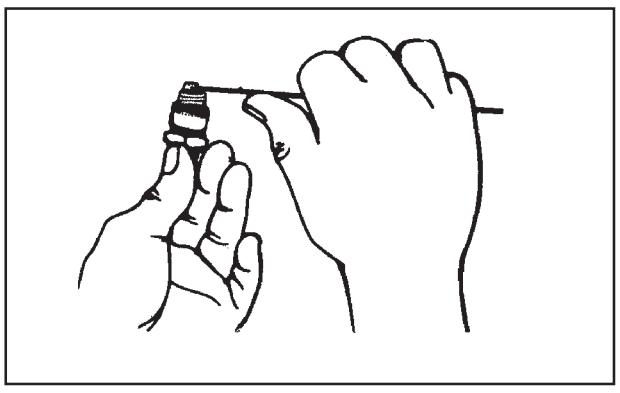
SPARK PLUG MAINTENANCE

☆ Neglecting the spark plug maintenance eventually leads to difficult starting and poor performance. If the spark is used for a long period, the electrode gradually burns away and carbon builds up along the inside part. Once in 3000 kms or earlier, the plug should be removed for inspection, cleaning and resetting the gap.



☆ Carbon deposits on the spark plug establishes a 'shunt' between center and earth electrodes, that prevents good sparking and causes misfiring. Clean the deposits off periodically, with a spark plug cleaning tool / machine.

☆ Check spark plug for pitted out the earth and center electrodes. If the earth electrode has worn off to a knife edge and center electrode has reduced in height, replace it with new.



INSPECTION

☆ Clean the electrodes and set gap to 0.7 mm to 0.8 mm

☆ Clean the plug in a 'Spark plug cleaner cum Tester'

☆ Test the plug for proper sparking in the tester

Light blue, solid, continuous spark seen in the tester	Spark Plug OK
Yellow or red spark; intermittent or no spark; or side spark as seen in the tester mirror	Spark Plug Not OK

Checking Procedure of Electrical Eomponents

- ☆ Stator coil
- ☆ Pulsar coil
- ☆ Ignition coil
- ☆ Suppressor Cap
- ☆ Battery
- ☆ Horn
- ☆ Relay Starter
- ☆ Starter motor
- ☆ IC Flasher
- ☆ RR Unit

MEASURING INSTRUMENT

☆ Multimeter

STARTER COIL

☆ SPECIFICATION

Resistance mode - Across any two wires

☆ CHECKING PROCEDURE

Set the multimeter in resistance mode.

Check the Resistance between wires

a. Yellow 1 to yellow 2 - 0.8 to 1.5 ohms

b. Yellow 2 to yellow 3 - 0.8 to 1.5 ohms

c. Yellow 3 to yellow 1 - 0.8 to 1.5 ohms

PULSAR COIL

☆ SPECIFICATION

Resistance mode - Across the wires

180 - 240 Ω (ohms).

☆ CHECKING PROCEDURE

Set the multimeter in resistance mode.

Check the Resistance between

a. Green to white wire.

IGNITION COIL

☆ SPECIFICATION

Resistance mode across

a. Between Brown to Red/white 4 to 8 ohms.

b. Between Brown to HT lead 12.5 to 16 Kilo Ohms.

☆ CHECKING PROCEDURE

Set the multimeter in resistance mode.

Check the Resistance between

a. Brown to Red/white(Primary)

b. Brown to HT lead (Secondary)

Checking Procedure of Electrical Components

CAUTION :

Brown or white/red to core no connectivity.

SUPPRESSOR CAP - M14

☆ SPECIFICATION

Resistance Mode - 4.5 to 6 K ohms

BATTERY

☆ SPECIFICATION

Voltage mode - 11.5 to 13 V

BATTERY WHEN CHARGING

☆ SPECIFICATION

Voltage mode - 13 to 14.5 V with head light on @ 3000 RPM

HORN

☆ SPECIFICATION

Continuity Mode - Beep Sound

RELAY STARTER

☆ SPECIFICATION

Resistance 4 to 5 ohms.

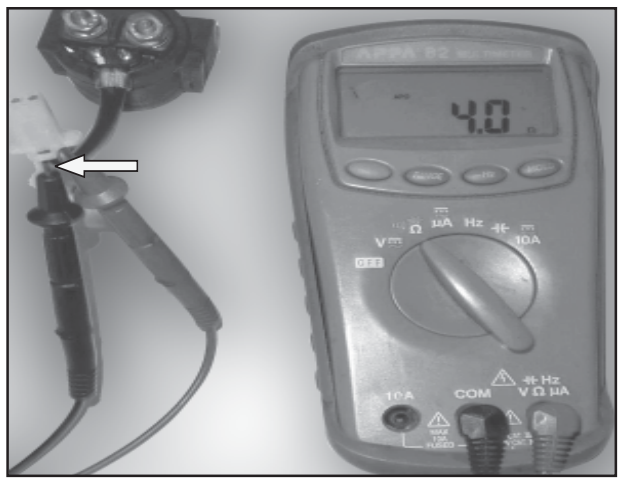
☆ CHECKING PROCEDURE

Set the multimeter in resistance mode.

Check the Resistance between

a. Green/white to white wire.

Checking Procedure of Electrical Components



E- STARTER MOTOR

☆ SPECIFICATION

Resistance 0.3 to 0.5 ohms.

☆ CHECKING PROCEDURE

Set the multimeter in resistance mode.

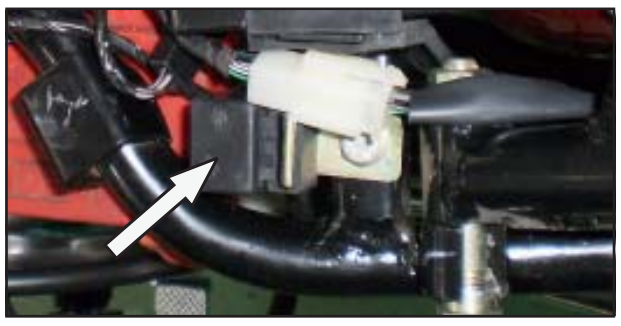
Check the Resistance between motor terminal & aluminium body.

IC FLASHER

☆ CHECKING PROCEDURE

Ensure Battery voltage > 12 V, all indicator bulbs are ok. Then starts the vehicle and turn the indicator switch to LH or RH mode.

If indicators not functional replace it by a new IC Flasher.



CAUTION :

Never try to repair / tamper IC Flasher.

RR UNIT

☆ CHECKING PROCEDURE

Set the multimeter in voltage mode (DCV 20). Connect the multimeter to Battery terminals and then check the voltage as shown in Fig.

Start and accelerate upto 3000 RPM and then check online voltage inbetween 12.2 to 13.5 voltage.

NOTE:

Repeat the test with head light on and OFF condition. If RR unit is defective will not fall above specified voltage.

Checking Procedure of Electrical Components

ELECTRICAL PARTS INSPECTION

CLUTCH SWITCH

Check the continuity for the following wires

Clutch lever in normal condition : Brown and Black ; if no continuity, switch is not ok.

Clutch lever in pressed condition : Black and Green; if no continuity, switch is not ok.

MODE	BROWN	BLACK	GREEN
Normal	●	●	
Press		●	●

STARTER SWITCH

Check the continuity between Red/Blue wire and Blue/white wire of Switch module RH coupler when switch is pressed.

MODE	RED / BLUE	BLUE / WHITE
ON	●	●
OFF		

STARTER RELAY

Give 12V DC supply to the starter relay coupler and check for the continuity between the two bolted terminals. If continuity shows then component is OK.

STARTER MOTOR

Connect DC supply +ve to the motor terminal and -ve to the body of the motor.
Direction of rotation - Clockwise

DO'S AND DON'TS

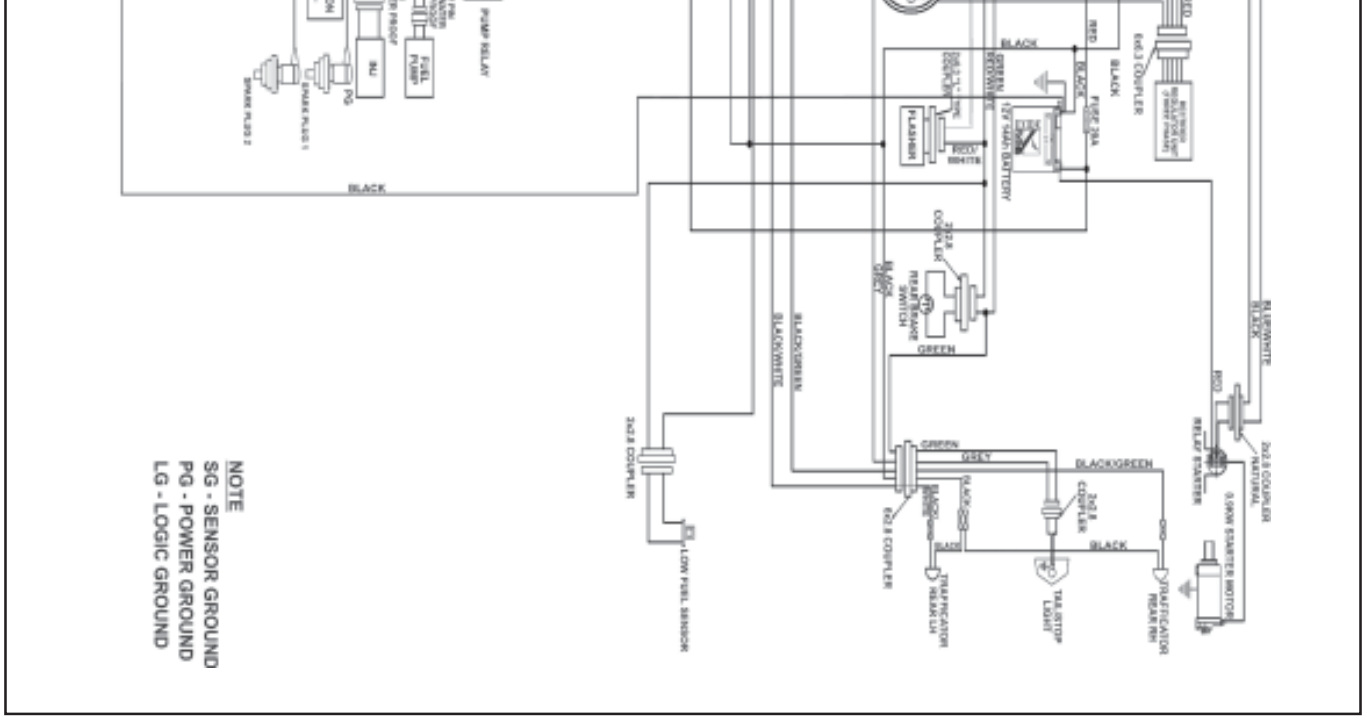
DO'S

- ☆ Check battery for electrolyte level periodically and top up with distilled water only.
- ☆ For longer battery life, de-clutch before starting.
- ☆ If the battery is weak (below 10 V), start with the kick starter and do not try to start with self starter.
- ☆ Always maintain correct Engine oil level.
- ☆ Check for Engine backfire, if it exist & it will damage the sprag clutch & gears. Maintain correct ignition timing.
- ☆ Hold the starter switch until the engine starts.
- ☆ Service your bike only at authorized service stations.

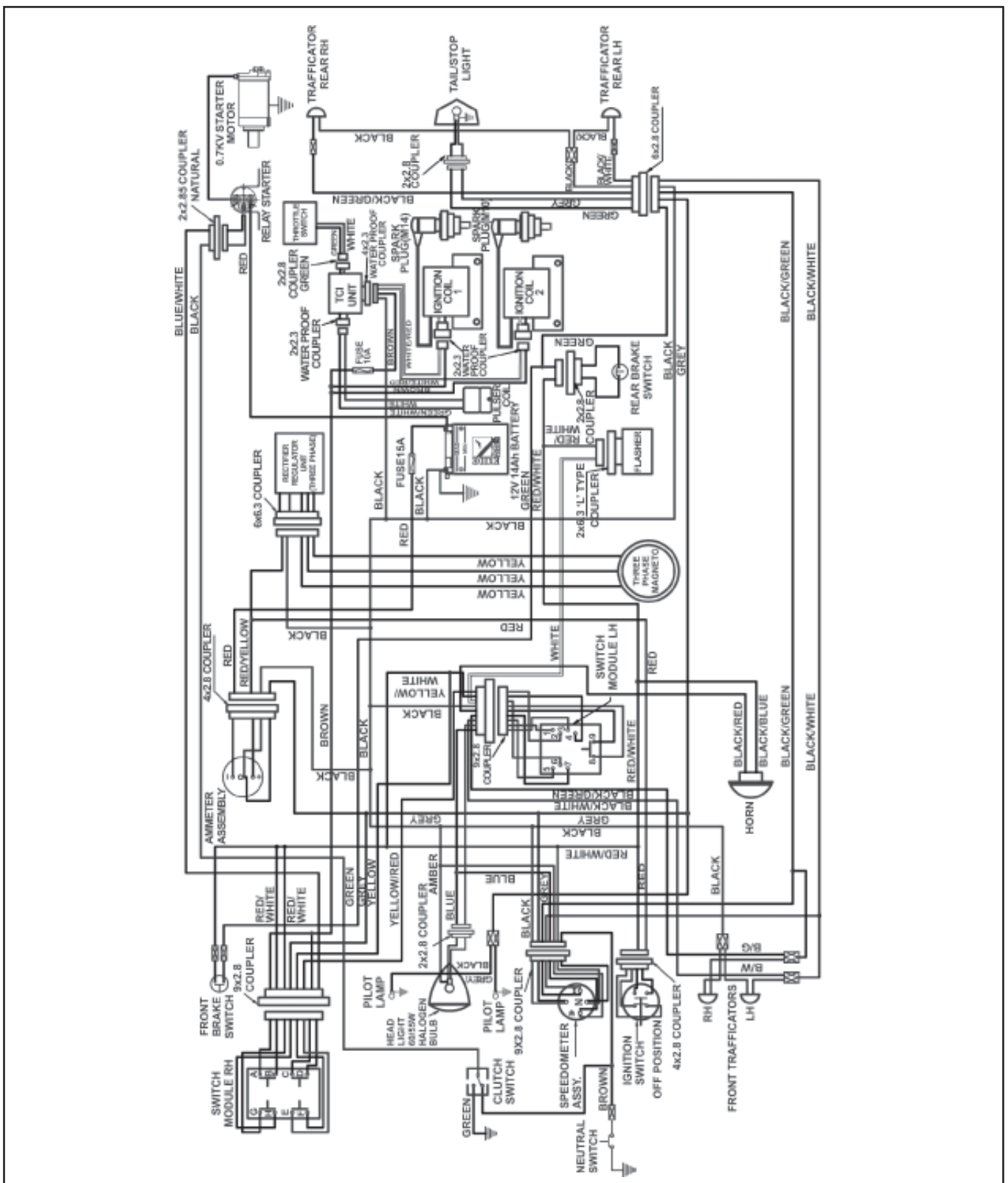
DON'TS

- ☆ Never overcharge the battery.
- ☆ Never spray water with great force on starter motor, RH tool box and other electrical parts.
- ☆ Do not carry out any repairs on the Starter motor, and relay starter or the sprag clutch mechanism.

Complete Wiring Diagram - Classic 500



Complete Wiring Diagram - Classic 350



Trouble Shooting - Electricals

PROBLEMS	PROBLEM CAUSES
1. E-start motor not working.	1. Fuse blown. 2. If the battery voltage increases with RPM increase, replace RR Unit. 3. Faulty relay starter. 4. Starter motor cables loose connection. 5. Starter motor failure.
2. Fuse blown when pilot lamp switched	1. Rear harness cable routing fouling with 'ON' the tyre. 2. Rear harness cable fouling with taillamp bracket.
3. Fuse blown when Head light high beam	1. Check the Headlight wiring harness 'ON'
4. Relay starter not working.	1. Check the coil resistance. 2. If you can hear the sound of relay actuation but starter motor does not rotate, change the relay starter.
5. Battery discharging frequently.	1. Check the alternator. o/v–should be 8 V to 10 V AC @ 1000rpm (open circuit, across any two of its wire yellow-yellow), If the voltage is less than this, change the alternator. 2. Check for battery voltage increase with respect to increase in RPM. Otherwise replace the RR unit (If alternator is ok) 3. Battery cells may be weak.

SECTION

ELEVEN 11

TROUBLE SHOOTING

Trouble Shooting

This section discusses trouble shooting on various performance problems.

This following check list can be helpful in locating most of the operating troubles.

Observation	Causes	Remedies
Complaint : Engine fails to start		
General	Ignition switch in 'OFF" Position	Switch 'ON' ignition
	Stop switch in 'OFF" Position	Push stop switch to 'ON' position.
	Fuel is stale due to vehicle being in storage for a long period	Clean petrol tank and carburetor and fill the tank with fresh petrol
Fuel Starvation	Fuel adulterated	Refill with good fuel
	No fuel in the tank	Fill up the tank
	Vent hole clogged in fuel tank cap	Clean vent hole.
	Fuel Line Clogged	Clean the fuel line.
	Fuel hose cracked resulting in fuel leaking out and not getting supplied to injector	Check and replace
	No fuel Supply from Fuel pump	Replace fuel pump.
	Fuel pump pressure insufficient/fuel pump not working	Check fuel pump coupler connection/ Check fuel pump relay for proper working
	Fuel Injector blocked	Replace fuel injector.
Electricals Related (No Voltage/No Spark / Weak spark /Side spark / intermittent spark	MIL glowing continuously	Check Sensor connections & correct
	Weak Battery / Dead Battery	Charge / Replace the battery
	Electrical connections Loose	Check & Correct
	Electrode Gaps incorrect	Adjust the gap
	Wrong specification spark plug	Replace with right plug
	Defective spark plug	Change Spark Plug
	Spark plug electrode dirty / fouled	Clean park plug & Reset gap.
	Spark plug cap / lead not connected	Fix cap / lead firmly.
	Spark plug insulation cracked	Replace Spark plug.
	Wrong Spark Plug	Fit the correct Spark Plug
	Loose HT connections/ damaged HT lead	Fix connections firmly/ Replace Lead
	Defective plug cap	Change the cap
	Cracked spark plug insulator	Change the spark plug
	Loose connections	Tighten connections
	Fouled Spark plug	Clean and adjust the gap
	Cracked HT lead	Replace H.T. lead

Trouble Shooting

Observation	Causes	Remedies
Poor Cranking	Loose spark plug	Tighten spark plug
	Loose cylinder head nuts	Tighten cylinder head nuts
	Blown cylinder head gasket	Change cylinder head gasket
	Auto Decompressor mechanism stuck in open position	Ensure flyweight in exhaust cam gear assembly in free to operate.
	Valves Leaking due to poor seating/burnt valves or seats	Check & Correct
	Piston Rings Worn out	Replace piston rings
	Worn out / scored/ glazed cylinder barrel	Replace cylinder barrel/piston
	Piston rings stuck in piston grooves	Clean, check and refit/replace piston rings
Complaint : Engine starts but switches OFF		
General	Idling RPM low	Adjust the idle air bypass screw in the throttle body
Fuel Related	Fuel is stale due to vehicle being in storage for a long period	Clean petrol tank and carburetor and fill the tank with fresh petrol
	Fuel adulterated	Refill with good fuel
	Fuel level very low in tank	Fill up the tank
	Vent hole clogged in fuel tank cap	Clean vent hole.
	Fuel Line Clogged	Clean the fuel line.
	Fuel hose cracked resulting in fuel leaking out and not getting supplied to injector	Check and replace
	Fuel pump pressure insufficient/fuel pump not working	Check fuel pump coupler connection/ Check fuel pump relay for proper working
	Fuel Injector partially blocked	Replace fuel injector.
	Loose / damaged throttle body to engine hose / air filter to throttle body	Check and correct
Electricals Related	Weak Battery	Charge / Replace the battery
	Electrical connections Loose	Check & Correct
	Incorrect Electrode gap	Adjust the gap
	Spark plug electrode dirty / fouled	Clean park plug & Reset gap.
	Wrong specification spark plug	Fit the correct Spark Plug
	Loose HT connections/ damaged HT lead	Fix connections firmly/ Replace Lead.
Complaint : Idling Erratic / high		
General	Idling RPM High	Adjust the idle air bypass screw in the throttle body
	No throttle cable free play	Adjust throttle cable free play
	Stuck throttle inner cable	Clean / Replace cable
	Loose / damaged throttle body to engine hose / air filter to throttle body	Tighten / replace the hose
	Suction leakage	Check and correct

Trouble Shooting

Observation	Causes	Remedies
Fuel Related	Fuel is stale due to vehicle being in storage for a long period	Clean petrol tank and carburetor and fill the tank with fresh petrol
	Fuel adulterated	Refill with good fuel
	No fuel in the tank	Fill up the tank
	Fuel pump pressure low	Check and correct
	Fuel Injector partially blocked	Replace fuel injector.
Electricals Related	Incorrect Electrode gap	Adjust the gap
	Spark plug electrode dirty / fouled	Clean park plug & Reset gap.
	Wrong specification spark plug	Fit the correct Spark Plug
	Loose HT connections/ damaged HT lead	Fix connections firmly/ Replace Lead.
Complaint : Engine stalls gradually		
General	Loose / damaged throttle body to engine hose / air filter to throttle body	Tighten / replace the hose
	Poor Compression	Check and correct
Fuel Related	Fuel is stale due to vehicle being in storage for a long period	Clean petrol tank and carburetor and fill the tank with fresh petrol
	Fuel adulterated	Refill with good fuel
	Fuel level very low in tank	Fill up the tank
	Vent hole clogged in fuel tank cap	Clean vent hole.
	Fuel Line Clogged	Clean the fuel line.
	Fuel hose cracked resulting in fuel leaking out and not getting supplied to injector	Check and replace
	Fuel pump pressure insufficient/fuel pump not working	Check fuel pump coupler connection/ Check fuel pump relay for proper working
	Fuel Injector partially blocked	Replace fuel injector.
	Loose / damaged throttle body to engine hose / air filter to throttle body	Check and correct
Electricals Related	Weak Battery	Charge / Replace the battery
	Electrical connections Loose	Check & Correct
	Incorrect Electrode gap	Adjust the gap
	Spark plug electrode dirty / fouled	Clean park plug & Reset gap.
	Wrong specification spark plug	Fit the correct Spark Plug
	Loose HT connections/ damaged HT lead	Fix connections firmly/ Replace Lead.
Complaint :Engine Misfires & cuts off		
Fuel Related	Fuel is stale due to vehicle being in storage for a long period	Clean petrol tank and carburetor and fill the tank with fresh petrol
	Fuel adulterated	Refill with good fuel
	No fuel in the tank	Fill up the tank
	Fuel pump pressure low	Check and correct
	Fuel Injector partially blocked	Replace fuel injector.

Trouble Shooting

Observation	Causes	Remedies
Electricals Related	Incorrect Electrode gap	Adjust the gap
	Spark plug electrode dirty / fouled	Clean park plug & Reset gap.
	Wrong specification spark plug	Fit the correct Spark Plug
	Loose HT connections/ damaged HT lead	Fix connections firmly/ Replace Lead.
Complaint :Poor Pickup/ Loss of Power/ Engine Overheating		
General	Excessive pay load	Reduce pay load
	Under inflated tyres	Inflate to correct pressure
	Rear Chain Adjusted too tight	Adjust chain tension
	Brakes are Binding	Adjust brake
	Dirty / Blocked cooling fins	Clear and clean the fins
	Wrong spark plug specification	Replace it with correct plug
	Torn / damaged air filter element	Change
	Wrong grade Lubrication oil	Change the oil
	Lube oil I starvation	Check and correct
	Engine Oil level Excess	Drain and correct the oil level
	Wheel Bearings Sticky	Clean and lubricate the bearings
	Throttle Cable Free play excess	Adjust throttle cable free play
	Stuck throttle inner cable	Clean / Replace cable
	Loose / damaged throttle body to engine hose / air filter to throttle body	Tighten / replace the hose
	Suction leakage	Check and correct
	Air filter Blocked/Dirty/Torn	Check and correct
	Excessive carbon deposit	Decarbonise the engine
Fuel Related	Fuel is stale due to vehicle being in storage for a long period	Clean petrol tank and carburetor and fill the tank with fresh petrol
	Fuel adulterated	Refill with good fuel
	No fuel in the tank	Fill up the tank
	Fuel pump pressure low	Check and correct
	Fuel Injector partially blocked	Replace fuel injector.
Transmission Related	No clutch cable free play.	Adjust clutch cable play
	Stuck clutch cable	Clean and free and cable
	Weak clutch springs	Check and Replace
	Clutch Plates Worn out/Glazed	Check and Replace
Complaint :High Oil Consumption		
External Leaks	Loose drain plug	Tighten the plugs
	Loose crankcase joints	Tighten fasteners
	Damaged gaskets	Replace the gaskets
	Damaged sealing surface	Face / Replace the parts

Trouble Shooting

Observation	Causes	Remedies
Smoke through exhaust	Wrong grade/recycled lube oil	Replace it with right grade oil
	Damaged valve stem seal	Replace the seal
	Worn out / scored valve guide / valve stem	Check and Replace
	Vertically aligned piston ring	Properly stagger the piston end gaps rings
	Excessive piston ring end gap	Replace the piston rings
	Wrong fitment of piston rings	Refit the piston rings correctly
	Connecting Rod Bent	Replace the crankshaft
	Clearance Excess between Piston & Cylinder Barrel	Check and Replace
	Glazed cylinder walls	Check and Replace
Complaint :Engine Noisy		
Engine	Incorrect octane rating of fuel	Use correct fuel
	Excessive clearance between piston and cylinder	Check and Replace
	Loose rocker arm spindle in rocker arm	Check and Replace
	Hydraulic valve lifters damaged	Check and Replace
	Excessive small end clearance	Check and Replace
	A humming/Howling/ backlash noise when accelerated	Adjust the Cam spindles to achieve correct cam gears meshing
	Damaged cams	Check and Replace
	Worn-out/damaged Big end bearings	Check and Replace
Complaint :Premature Wear of Engine Components		
	Cracked or improperly fitted suction/Air filter	Check and Correct/Replace
	Dirty/adulterated fuel	Check and Correct/Replace
	Dirty/adulterated/ Wrong Grade oil	Replace oil at regular intervals
Complaint :Gears Hard/Not Engaging		
	Weak clutch spring.	Check and Replace
	Clutch lever free play excess	Check and Correct
	Cam plate pivot pin Oversize	Change to correct size pin.
	Cam plate ratchet face rubbing against the face of the pivot pin	Replace pivot pin / camplate.
	Selector fork face rubbing against the cam plate face	Change selector fork / Camplate
	Burr in the cam plate track / outer side of the cam plate	Remove burr in the cam plate inner track and outer side
	Ratchet rivet protruding from cam plate	Check and Replace
	Selector fork & peg edges chipped off	Check and Replace
	Selector fork shaft bent / scoring marks in the shaft.	Check and Replace

Trouble Shooting

Observation	Causes	Remedies
	Burrs in splined position of the shaft	Check and Replace
	Improper position of the return spring.	Check and Replace
Complaint : Brakes Poor		
	Improperly adjusted brakes	Check & Correct
	Front brake Disc Warped/Scored	Check & Correct
	Brake linings worn / Uneven wear	Check & Correct
	Brake drum scored / Uneven wear	Check & Correct
Complaint : Vehicle Wobbles		
	Wheel rim runout	Check & Correct
	Loose / Broken spokes	Tighten / Replace spokes
	Tyres not fitted correctly	Refit tyres correctly
	Wheels misaligned	Ensure proper alignment
	Under inflated tyres	Inflate to correct pressure
Complaint : Electricals		
Bulbs do not light	Loose / improper connection	Check & Correct
	Bulb fused	Check & Correct
	Fuse blown	Check & Correct
	Switch defective	Check & Correct
	Switch defective	Check & Correct
	Flasher defective	Check & Correct
Complaint : Electric start not working		
	Battery discharged fully	Check & Recharge
	MIL Glowing Continuously	Check & Correct
	Loose Electrical connections	Check & Correct
	Neutral indicator not glowing	Bring the vehicle in neutral
	Clutch Switch Defective	Check & Replace
	E start Motor not working	Check & Replace

Royal Enfield