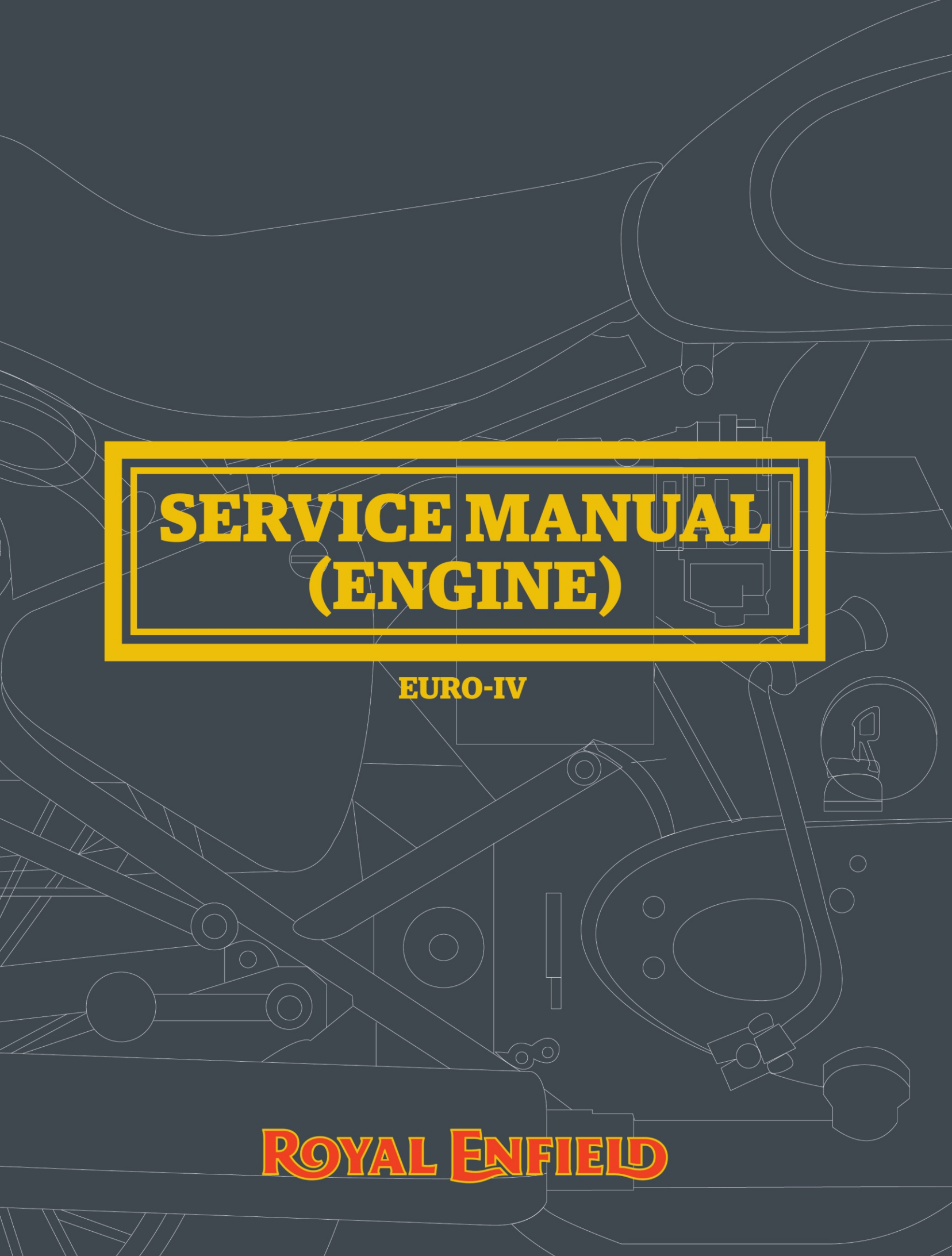




SERVICE MANUAL (ENGINE)

EURO-IV

ROYAL ENFIELD

PREFACE

"FIRST TIME RIGHT" is a very important element for ensuring customer satisfaction.

This Service Manual is published to help technician carry out repairs on Royal Enfield Motorcycles in a scientific manner.

This service manual is created for the following Euro IV models sold in UK & European countries.

- BULLET EFI
- BULLET CLASSIC EFI
- CONTINENTAL GT

This manual will help guide in the basic servicing, periodical maintenance, systematic disassembly, Parts inspection and assembling procedures of various mechanisms / systems of the motorcycle.

This Manual is intended for use primarily by a person who is well versed with basic repair techniques of a motorcycle, usage of general purpose, special tools & diagnostic tools. While basic & routine maintenance can be carried out with general purpose tools, it will require the technician to have special tools & diagnostic equipments to attend to major jobs diagnosis of Engine Management System.

In the event of non availability of any special tool or Royal Enfield NACS II Diagnosis tool, it is recommended that the motorcycle may please be taken a nearest Royal Enfield Authorised Service Station for a detailed investigation & proper attention.

While this manual is updated with latest Information and Specifications, at the time of going to print, due to continuous improvements being done to improve performance, some of the data, illustrations etc., in this manual may differ from the actual parts fitted in the engine.

Subsequent & continuous improvement that may be done on the motorcycles to enhance customer satisfaction, will be uploaded in the RMI portals & also available with Royal Enfield Authorised dealer & Service Station.

This manual is specifically made for the Unit Construction Engine and has to be read in conjunction with the vehicle Service Manual for attention to Engine Management System, induction & exhaust system.

Please do feel free to write to us at support@royalenfield.com, if you have any queries, clarification, suggestions or feedback.

With warm regards

SERVICE HEAD QUARTERS

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Website: www.royalenfield.com

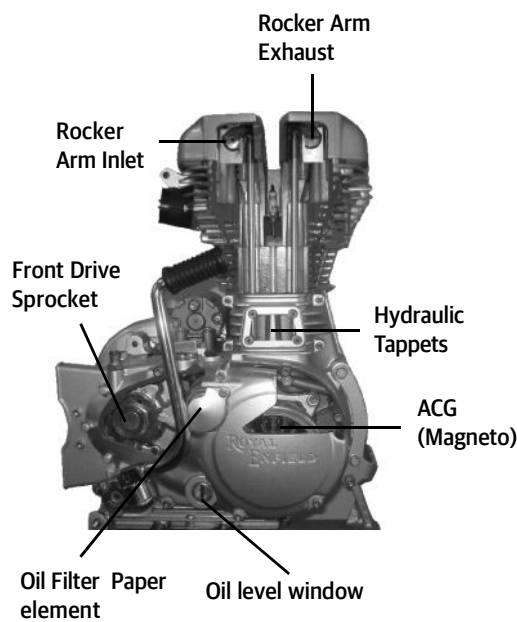
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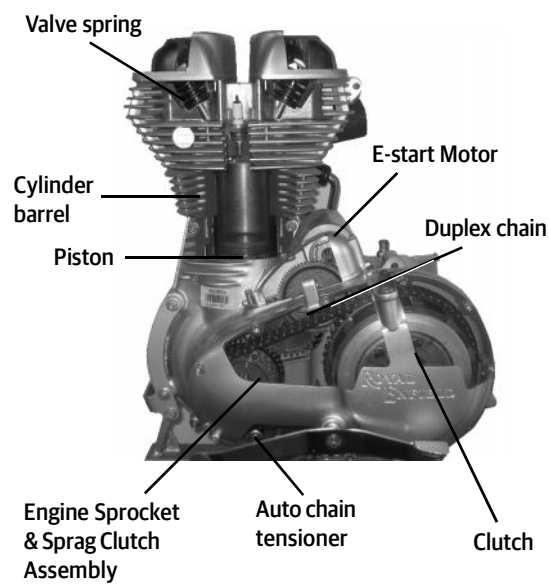
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ENGINE VIEWS

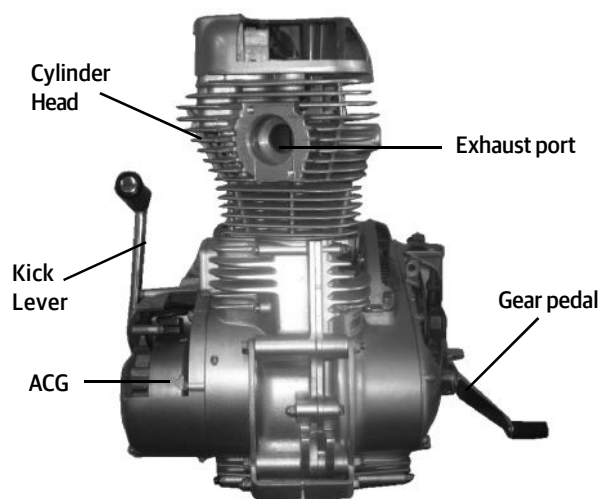
TIMING SIDE (RH)



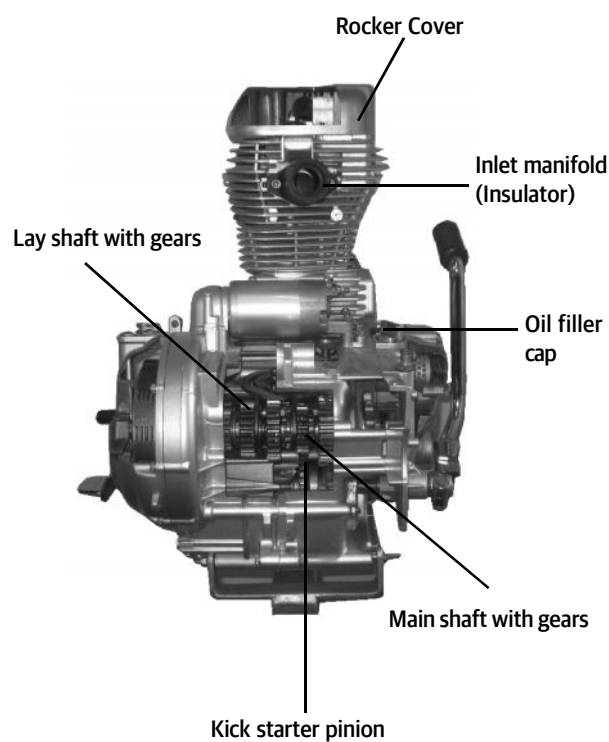
DRIVING SIDE (LH)



**FRONT VIEW
(EXHAUST SIDE)**



REAR VIEW



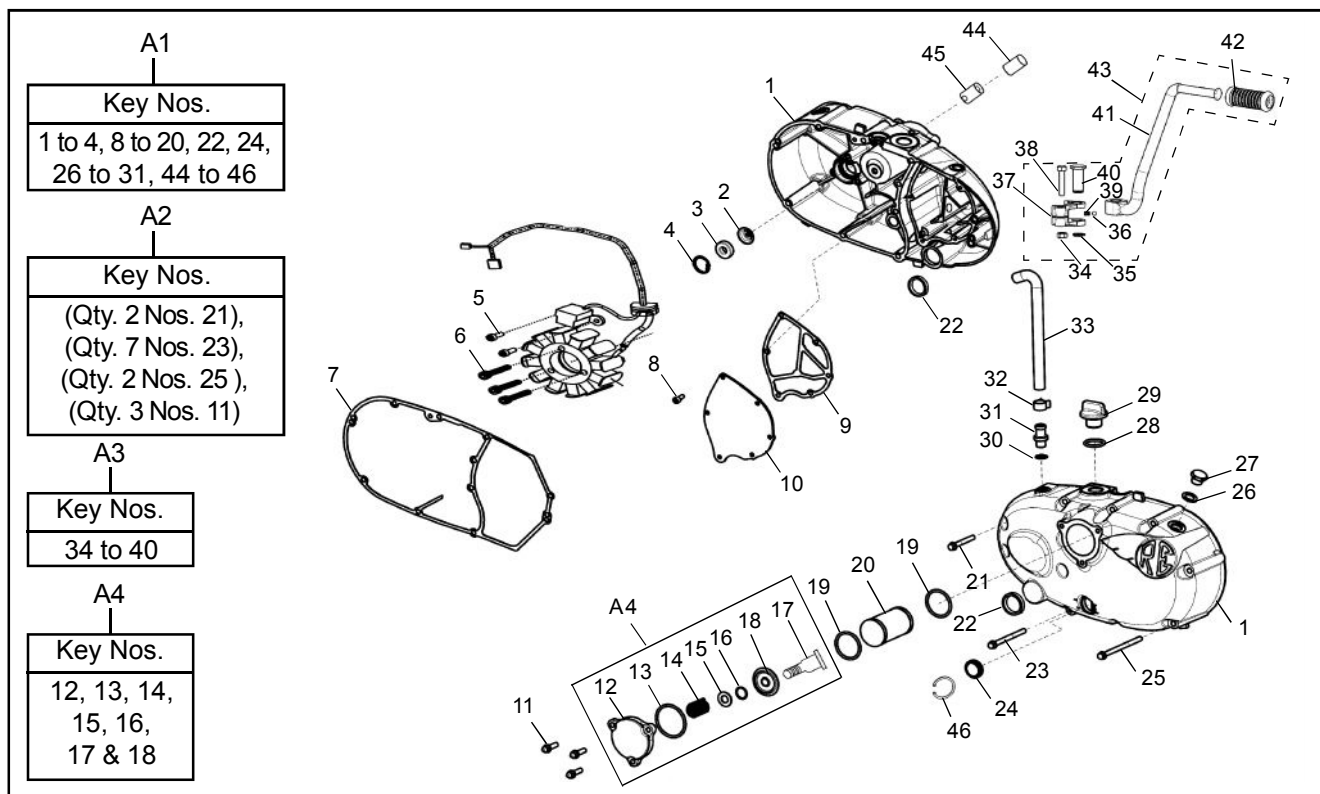
TECHNICAL SPECIFICATIONS

TECH SPEC POINT	BULLET CLASSIC EFI	BULLET EFI	CONTINENTAL GT
ENGINE			
Engine	4 Stroke, air cooled, single cylinder		4 Stroke, air cooled, single cyl., OHV, SI
Capacity	499 cc (Displacement)		535 cc
Bore	84 mm		87 mm
Stroke	90 mm		90 mm
Compression ratio	8.5 : 1		8.5 : 1
Max. Power @ RPM	20.3 Kw @ 5250 RPM		21.4 kw @ 5100 RPM
Max. Torque @ RPM	41.3 Nm @ 4000 RPM		44 Nm @ 4000 RPM
Air filter Element	Paper Element		Paper Element
Lubrication	Forced Lubrication, Wet Sump		Forced Lubrication, Wet Sump
Fuel Supply	Electronic Fuel Injection		Electronic Fuel Injection
IGNITION SYSTEM			
Ignition system	Digital Electronic Ignition		Electronic Ignition
Spark plug gap	0.8 mm		0.8 - 0.9 mm
Spark plug	WQR8DC (Bosch)		WQR8DC (Bosch)
TRANSMISSION			
Clutch	Wet Multiplate		Wet Multiplate (7 Plates)
Drive Chain links	102 pitch 101 pitch		101 Pitch
Primary drive	Duplex Chain drive 3/8" pitch		Duplex Chain
Gear box	5 Speed Constant Mesh		Constant Mesh 5 Speed
Gear Ratios	I - 3.063 : 1		I - 3.063 : 1
	II - 2.013 : 1		II - 2.013 : 1
	III - 1.522 : 1		III - 1.522 : 1
	IV - 1.212 : 1		IV - 1.212 : 1
	V - 1.000 : 1		V - 1.000 : 1
Primary Drive Ratio	2.15 : 1		2.15 : 1
Secondary Drive	Chain Drive		18 Teeth (F.D. Sprocket)
Secondary ratio	2.235:1		2.12:1

- Values / Dimensions mentioned above are for reference only.
- In view of continuous improvements, the specifications are subject to change without prior notice.

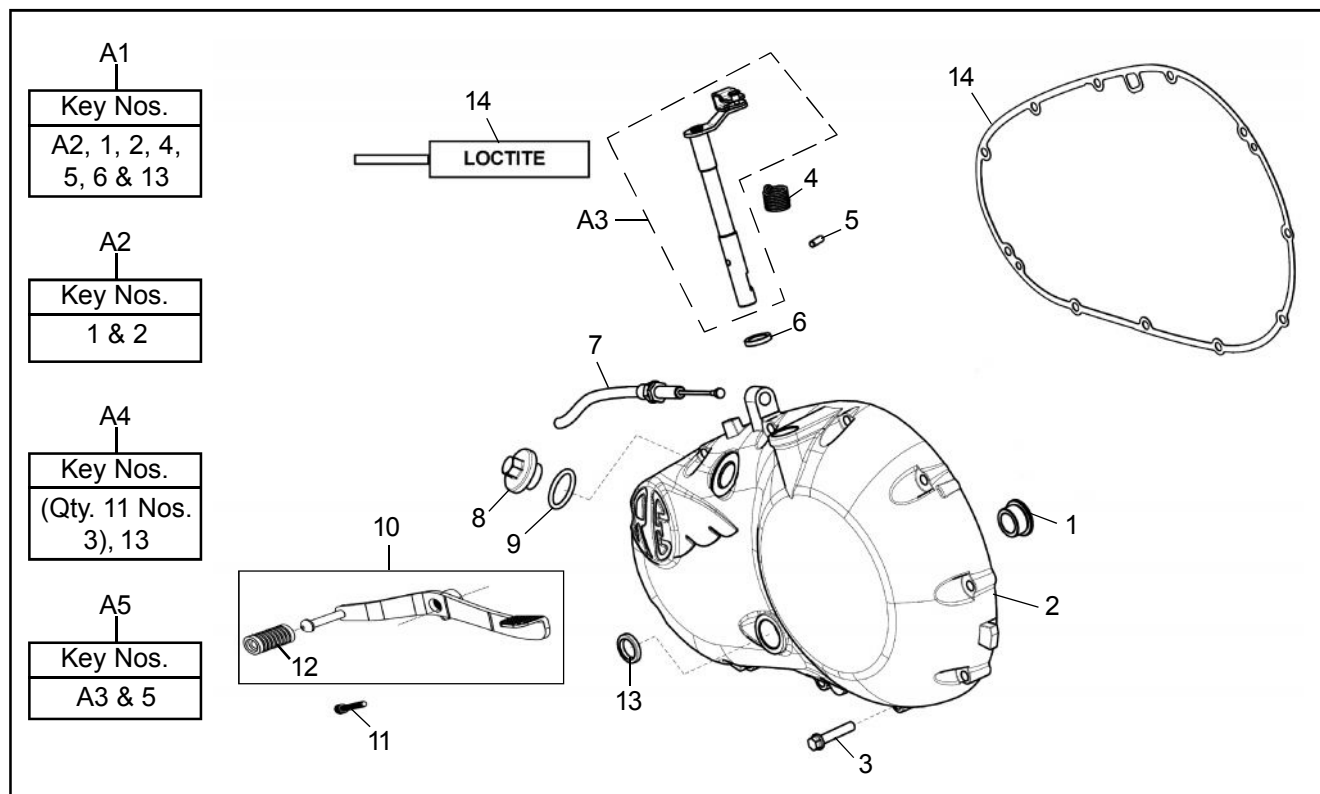
EXPLODED VIEWS

COVER RH



S.NO.	DESCRIPTION	QTY.
A1	RH Cover Assembly Complete	1
A2	Bolt Repair Kit RH Crankcase Cover - Classic	1
A3	Kick Boss Repair Kit - Classic	1
A4	Cap, Oil Filter Sub Assembly	1
1	Cover RH Sub Assembly	1
2	Jet, Crankshaft RH	1
3	Oil Seal, Crank Feed 24 X 10 X 7	1
4	Circlip 24N	1
5	Hex Socket Head Cap Screw M5 X 0.8 X 16	2
	Hex Flanged Bolt M5 X 0.8 X 16	2
6	Hex Socket Head Cap Screw M5 X 30 SS	3
	Cap Screw - End Cover	3
7	Gasket - Cover RH	1
8	Hex. Socket Screw, M5 X 12	6
9	Gasket, Cover Plate	1
10	Cover Plate, Breather Chamber	1
11	Hex Flange Bolt M6 X 1 X 20	3
12	Cap, Oil Filter - Buffed	1

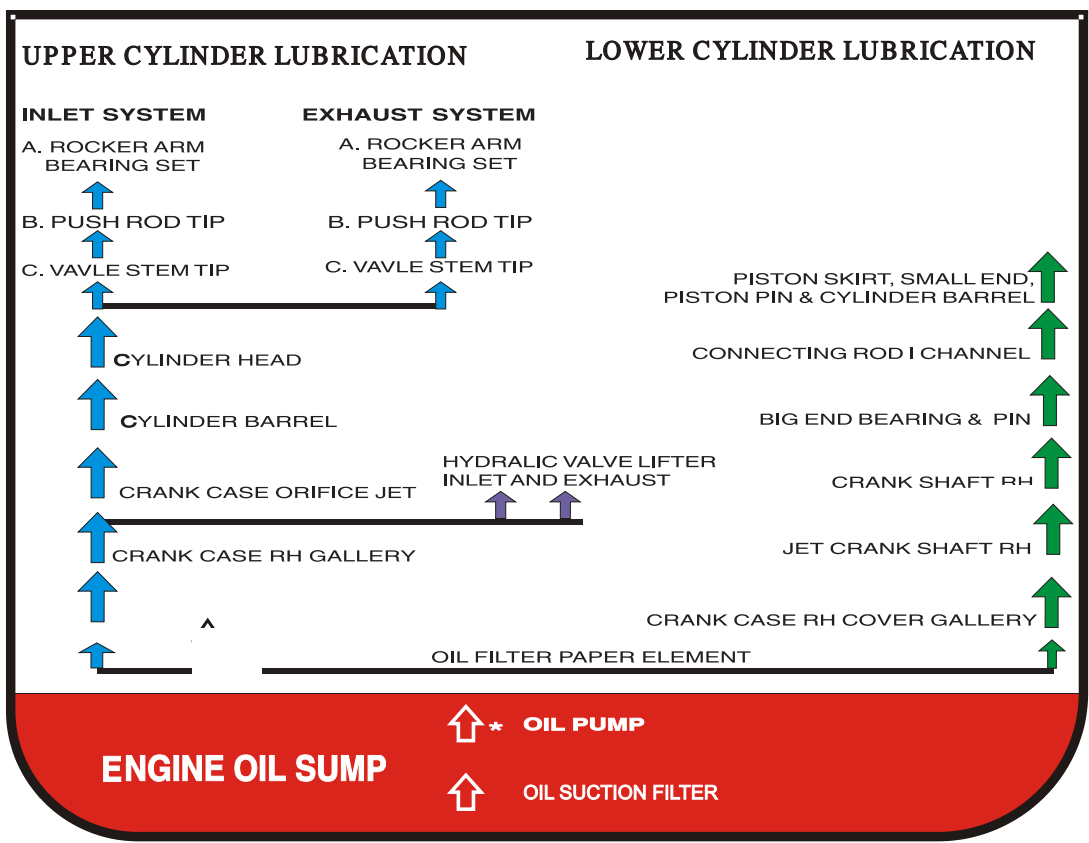
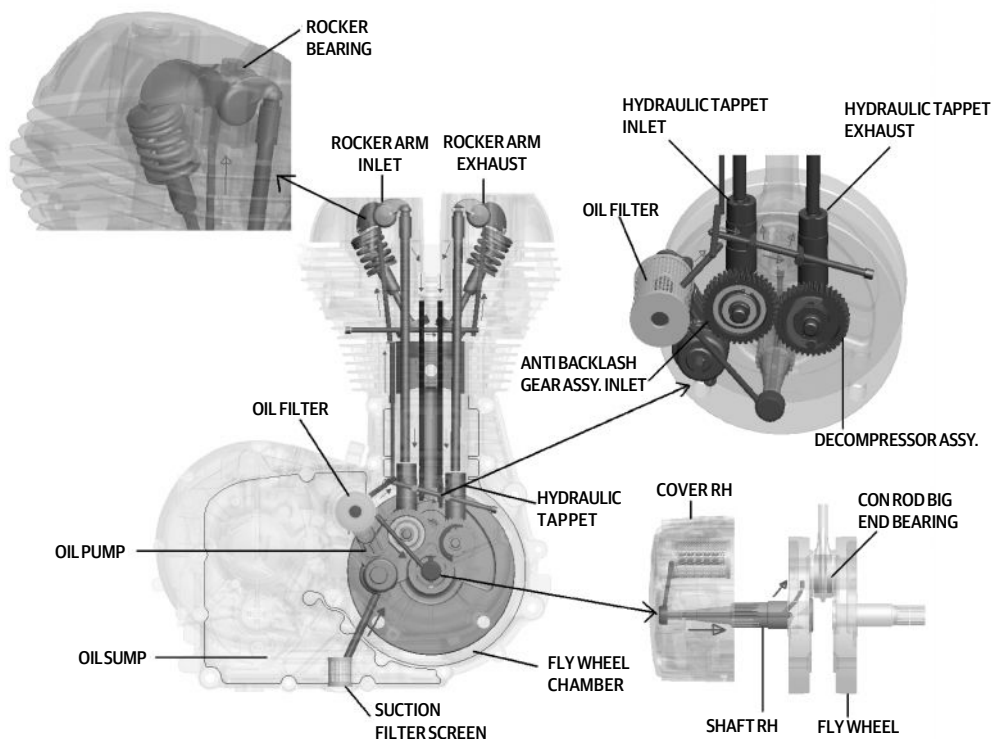
S.NO.	DESCRIPTION	QTY.
13	'O' - Ring, Filter Cap	1
14	Spring	1
15	Washer	1
16	'O' - Ring Cap Oil Filter	1
17	Screw Spring Cap	1
18	Spring Cap	1
35	Circlip 10	1
36	Ball Dia 6.35	1
37	Boss, Kick Start Crank	1
38	Hex Bolt M8 X 40L	1
39	Spring	1
40	Pin	1
41	Lever Kick Start	1
42	Kick Start Crank Rubber - New Type	1
43	Kick Start Crank Assembly	1
44	Plug Dummy	1
45	Plug ID 2.3 mm Restrictor - LEE Plug	1
46	Circlip Oil Window	1

COVER LH

S.NO.	DESCRIPTION	QTY.
A1	LH Cover Assembly Complete	1
A2	LH Cover Sub Assembly	1
A3	Clutch Operating Lever and Clevis Assy.	1
A4	Bolt & Seal Kit Crank Case Cover LH - Classic	1
A5	Clutch Operating Lever, Clevis & Pin Assy. Kit	1
1	Bush Open - GL Shaft	1
2	Cover, LH	1
3	Hex. Flange Bolt , M6 X 1 X 30	11
4	Spring, Clutch Operating Lever	1
5	Lock Pin Spring, Clutch Operating Mech.	1
6	Oil Seal INAG 12 X 18 X 5, Clutch Operating Lever	1
7	Clutch Cable Assembly	1
8	Oil Filler Plug	1

S. NO.	DESCRIPTION	QTY.
9	'O' Ring 26.5 mm	1
	'O' Ring Plug	1
10	Gear Pedal Assembly (Gear Lever) with Sleeve Rubber	1
11	Hex. Flange Bolt , M6 X 1 X 30	1
	Cap Screw - End Cover	1
12	Sleeve, Gear Lever - Rubber	1
13	Oil Seal 14 X 20 X 3	1
14	Gasket LH Crank Case Cover	1
	Liquid Gasket (Loctite 5699) 30 ML	1

LUBRICATION SYSTEM



LUBRICATION SYSTEM

The oil from the Crankcase sump is circulated to various parts through a Trichoidal high flow oil pump.

The oil in the sump is to be refiltered through an oil strainer (primary) located in the Crankcase sump and pumped into the oil filter element (secondary) in the crankcase cover RH. After filtering the pumped pressurised oil, from element is circulated into 3 main areas.

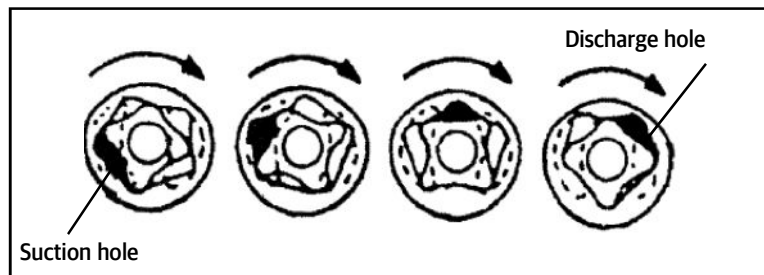
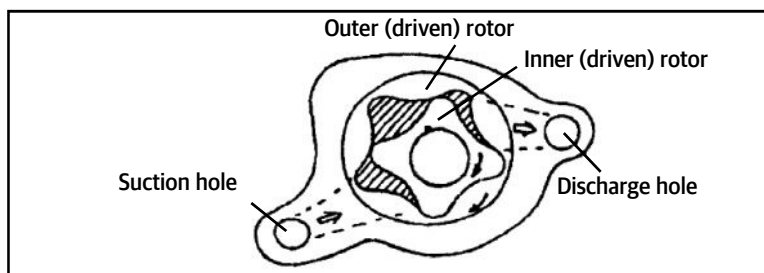


*UCE 500CC/535CC Output : 9.5 Litre per minute @ 6000 RPM

- The first branch goes to flywheel to lubricate crank shaft, con rod assembly and barrel piston assembly.
- The second branch - goes to hydraulic tappets to maintain a positive oil pressure for the hydraulic tappets to operate the third branch goes to rocker arms assembly and drains down to Right cover chamber through the push rod tunnel, it also lubricates inlet and exhaust cam gears and finally reaches to oil sump in crankcase.

OIL PUMP :

Trichoidal high flow oil pump type delivers 9.5 Lit./Min. of lubricating oil. This provides excellent lubrication to all the internal moving parts and enhances the life of the engine moving parts.



PERIODICAL MAINTENANCE CHART

The maintenance schedule detailed here will help you maintain your Royal Enfield motorcycle meticulously and to get a long trouble free service. The schedule provided herein is based upon average riding conditions and indicates the mileage at which regular inspections, adjustments, replacements and lubrications must be carried out in the engine. The frequency of the maintenance must be shortened depending upon the severity of the driving condition OR if the motorcycle is used in a dusty environment, severe climatic conditions, bad roads, water logged areas etc., Contact a nearest Royal Enfield Authorized Dealer / Distributor for expert advice and to carry out the periodical maintenance.

S. No.	DESCRIPTION	SCHEDULE											
		Kms (x 1000)	0.5	3	6	9	12	15	18	21	24	27	30
		Miles (x 1000)	0.3	2	3.75	6	7.5	9.5	11.25	13	15	17	18.75
1	Engine Oil		R		R		R		R		R		R
		Check level every 500 Kms or earlier as required											
2	Engine oil filter element		R		R		R		R		R		R
3	Engine sump filter (oil strainer)		C		C		C		C		C		C
4	Magnetic drain plug under gear box and secondary drain plug under crankshaft in crankcase right		C		C		C		C		C		C
5	Spark plug		A	A	A	A	A	R	A	A	A	A	R
6	Inlet/Exhaust valve seating (compression/vacuum test)							I					I
7	Cylinder head												D
8	Exhaust system												D

A : Adjust

C : Clean

D : De-Carbonise

I : Inspect

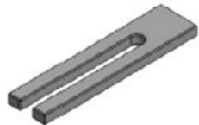
L : Lubricate

R : Replace

NOTE:

For Maintenance after 30,000 Kms, Please repeat the same frequency specified above, in consultation with a Royal Enfield Authorised Dealer / Distributor.

SPECIAL TOOLS USAGE LIST

Part No.	Description	Photo	Usage purpose
ST-26199-3	Cylinder head nut tightening tool		To remove and tightening of cylinder head nut.
ST-25123-1	Valve spring compressor		To compress the valve spring for removal and fitting of valve.
ST-27529-2	Piston Support Plate		To support piston for removing circlip
ST-25592-4	Connecting rod locking tool		To support the connecting rod in its top position.
ST-25612-4	Rotor Tightening & Loosening Tool		To lock magneto rotor for tightening / loosening hex nut.
ST-25128-2	Puller Magneto (Rotor Extractor)		Removal of magneto rotor assy.
ST-25151-4	Puller for chain case outer		To remove Crank case Left cover.
ST-25591-4	Sprocket & clutch holding tool		To lock Clutch housing & engine sprocket for loosening / tightening the Clutch & engine Sprocket bolt.
ST-25594-4	Clutch spring compression		To compress clutch springs while dismantling & reassembling of clutch plates.
ST-25153-4	Extractor for Gear box rocker pivot pin		To remove gear rocker shaft spring top pivot pin and gear cam plate pivot pin.
ST-25835-2	FD sprocket removing tool		To remove front drive sprocket from Sleeve Gear.

ENGINE DISMANTLING SEQUENCE

BEFORE DISMANTLING COMPLETE ENGINE AND / OR SUB ASSEMBLIES

- Drain engine oil in warm condition (if engine is in startable condition).
- Ensure Ignition switch & Engine kill switch are in 'OFF' position.
- Disconnect the Battery.
- Remove wiring connections to sensor connected to engine
- Disconnect fuel supply.
- Ensure piston is in TDC position
- Ensure gears are in neutral position.

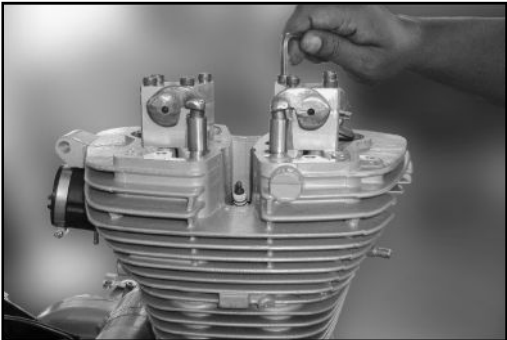
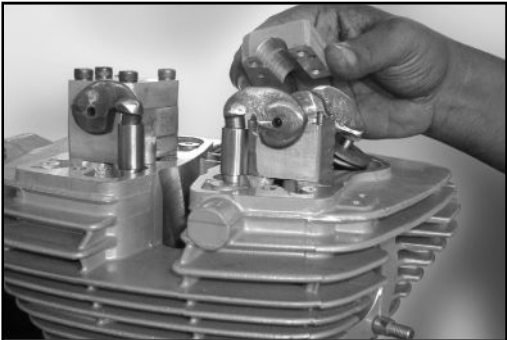
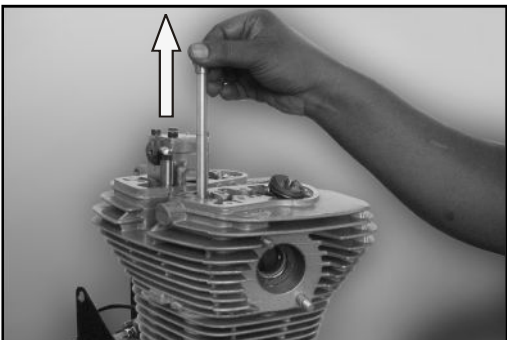
COMPONENTS THAT CAN BE REMOVED WITH THE ENGINE MOUNTED ON THE FRAME

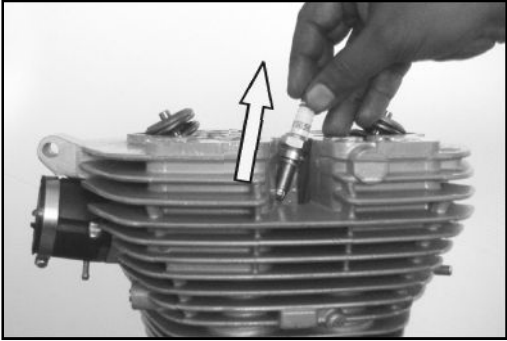
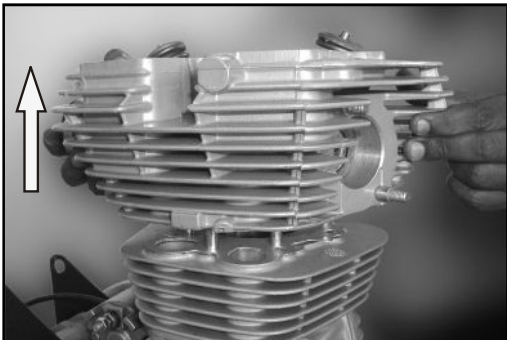
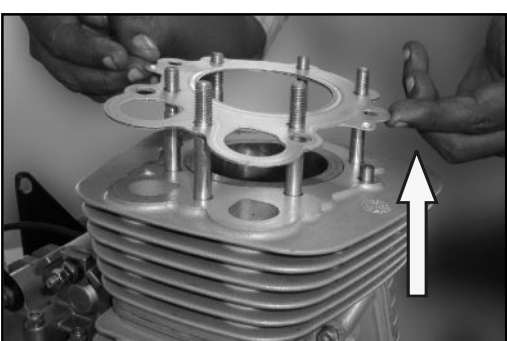
- Cylinder head assembly
- Cylinder barrel & Piston
- Cover RH
- Cover LH
- Clutch assembly
- Inlet and Exhaust Cam assy.
- Oil pump Assembly

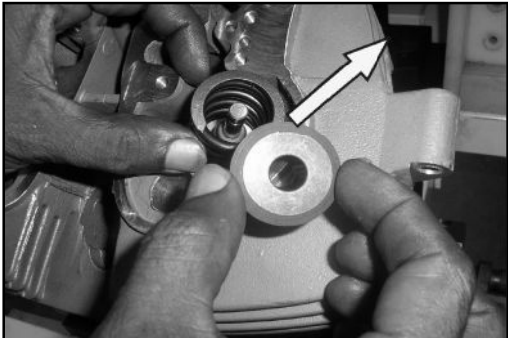
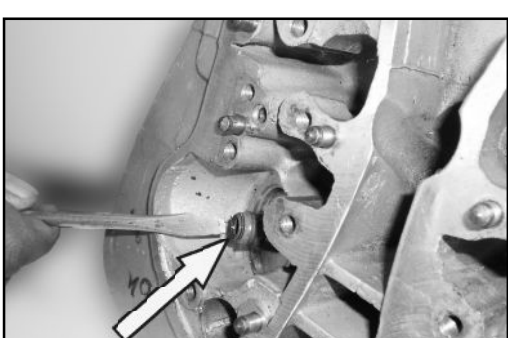
ENGINE SHOULD BE REMOVED FROM THE FRAME FOR THE FOLLOWING JOBS

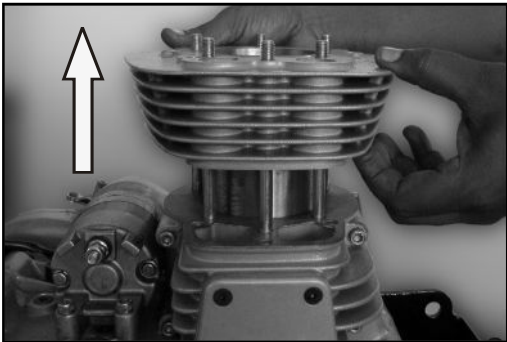
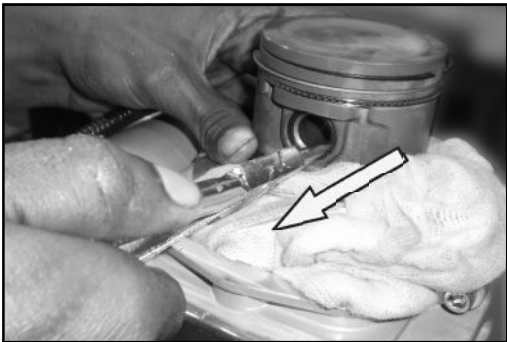
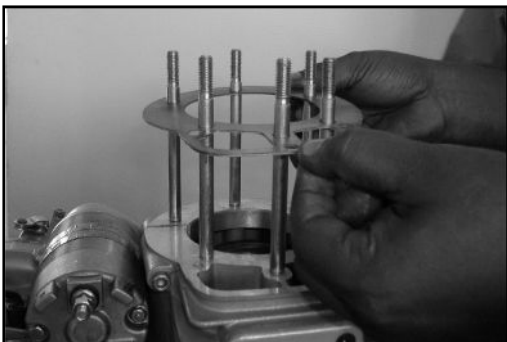
- Crank case repair/replacement.
- Crank shaft and main bearings replacement.
- Roller Hydraulic Valve Lifter (RHVL) replacement.
- Kick Starter Gear, Pawl, Spring, Plunger replacement.
- Transmission parts like Gears, Mainshaft, Layshaft, repair / replacement

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.1	Engine oil Drain ■ Remove the magnetic drain plug 1 & 3 with washer and Drain Bolt 3. ■ Remove the 2 Flanged hex bolts and the drain cap with 'O' ring. ■ Remove suction filter.	NOTE: It is best to drain the engine oil in warm condition. Plug M14 Socket spanner 22 mm Hex. flanged Bolt M5 T spanner 8 mm

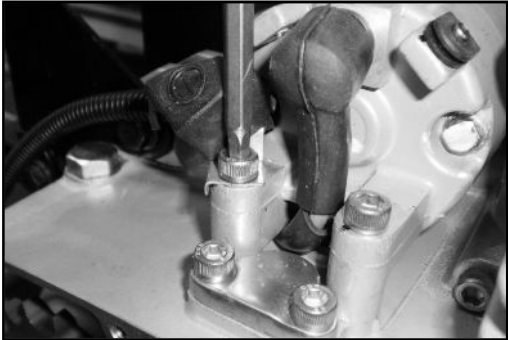
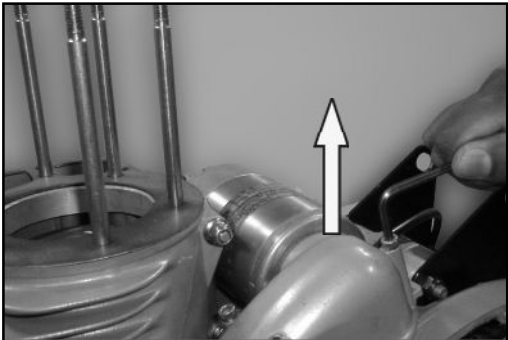
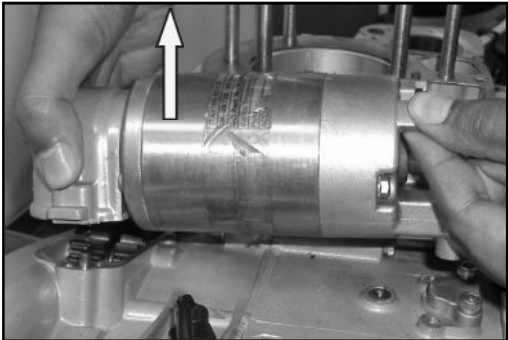
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.2	Cylinder Head ■ Remove 2 bolts along with rubber seals from Inlet and exhaust rocker covers. ■ Remove the Inlet & Exhaust Rocker cover, dowel & rubber gasket. ■ Remove 4 bolts each on the rocker bearing inlet & exhaust. ■ Remove the inlet and exhaust rocker bearing complete with dowel and rocker arm. ■ Remove inlet and exhaust pushrods.	Hex Socket Plug M14 Allen Key 8 mm   Hex Socket Plug M6 Allen Key 5 mm  

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.2	Cylinder Head ■ Remove the Spark plug ■ Remove the 6 flanged hex nuts, securing the cylinder head to crankcase. ■ Gently tap the cylinder head from bottom & remove. ■ Remove the multi layer steel (MLS) head gasket.	Hex. Bolt M8 Tspanner13MM    

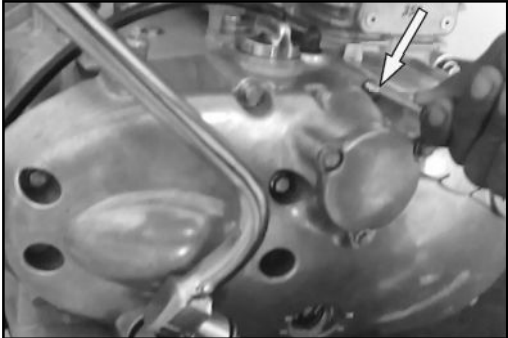
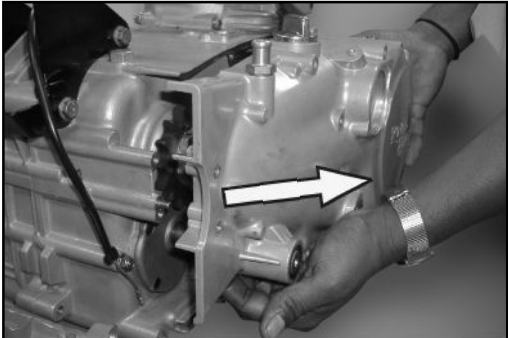
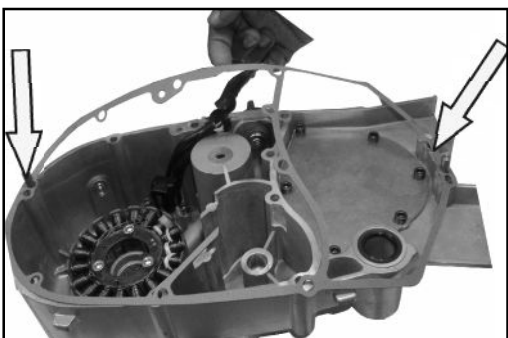
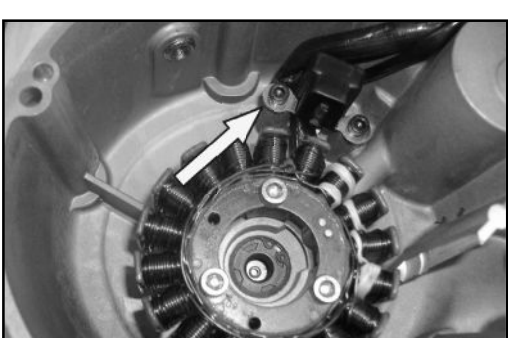
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.3	Dismantling Inlet & Exhaust Valves ■ Locate special tool on the inlet valve such that the bolt is seated on the valve. The collar is seated on the valve spring retainer. ■ Tighten the bolt on special tool to compress valve spring. ■ Remove the valve split collars from the spring retainer. ■ Loosen special tool till the spring is fully expanded & the tool can be removed. ■ Remove spring retainer top valve spring & collar bottom. ■ Remove valve from the valve guide from the inside of the cylinder head. ■ Remove Inlet and Exhaust Valve stem seal from valve guides.	Special tool No. ST25123-1 NOTE: Repeat the same process to dismantle Exhaust Valve.    

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.4	Cylinder barrel / piston ■ Gently tap Cylinder barrel and remove. ■ Remove circlip from piston on one side. ■ Gently push out gudgeon pin from the other side till it is free from the connecting rod small end. ■ Remove piston along with ring & gudgeon pin. ■ Remove Cylinder barrel bottom Gasket.	NOTE: Ensure the 2 dowels are removed from the cylinder barrel / crankcase from piston.  NOTE: ■ Ensure piston is at TDC. ■ Cover the crankcase suitably to prevent the circlip from falling inside.   NOTE: Carefully remove the piston rings from the piston without deforming. 

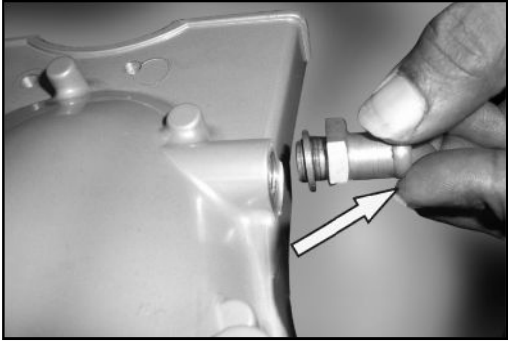
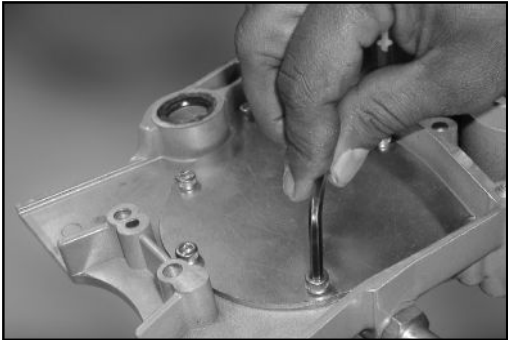
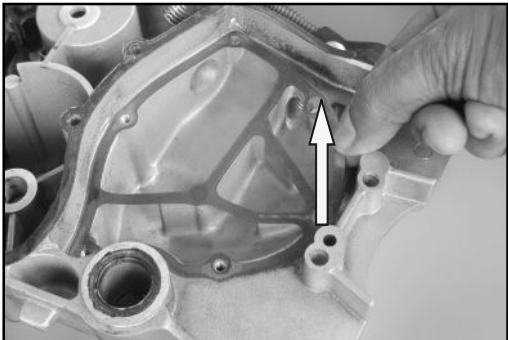
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.4	Cylinder barrel / piston ■ Hold connecting rod by using Special tool.	Special tool No. ST-25592-4 NOTE: Support connecting rod by using special tool ST-25592-4 to prevent damage to connecting rod.

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.5	Starter motor & housing ■ Loosen 2 hex screw holding starter motor to crankcase. ■ Loosen 4 hex screw holding starter motor to crankcase. ■ Gently pull out the starter motor along with housing.	  

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.6	Removal of RH Cover ■ Remove kickstarter lever. ■ Remove oil filter cover bolts. ■ Remove oil filter cap gasket, "O"ring & Spring. ■ Remove the 3 "O" rings, Oil filter element spring cap, washer & Oil filter element.	Hex. Flange Bolt M6 T Spanner 8 mm CAUTION: Care must be taken while removing cover due to spring force.

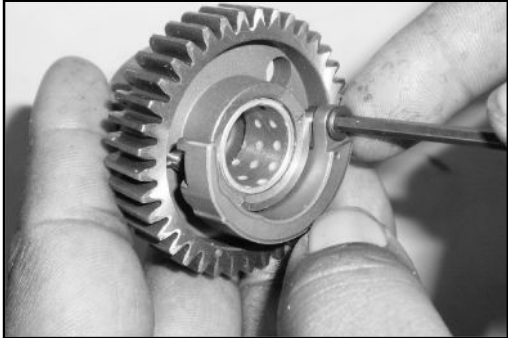
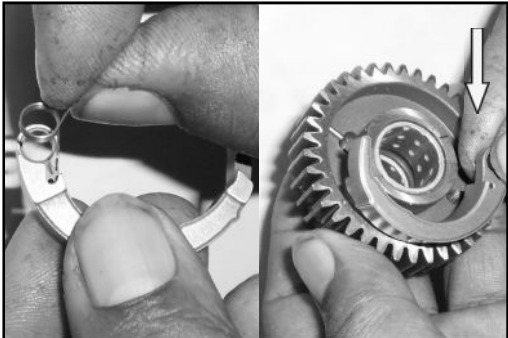
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
8.6	Removal of RH Cover - Loosen & remove 2 hex flanged bolts from cover RH front. - Loosen & remove 7 hex flanged bolts from cover RH top, center & bottom. - Loosen & remove 1 hex flanged bolt from cover RH rear. - It may be necessary to tap the cover gently to remove since the magnetic forces in the rotor can be acting on the stator and making it difficult to remove - Remove Right cover gasket & 2 dowels. - Remove Pulser coil by removing 2 screws.	Hex.Flange Bolt M6 Socket Spanner 8 mm CAUTION: Tap only at the places shown to avoid damage to the Right cover . NOTE: Remove the stator coupler from the wiring harness before removing Right Cover. Hex. Socket Head Cap screw M5 Allen Key 4 mm	   

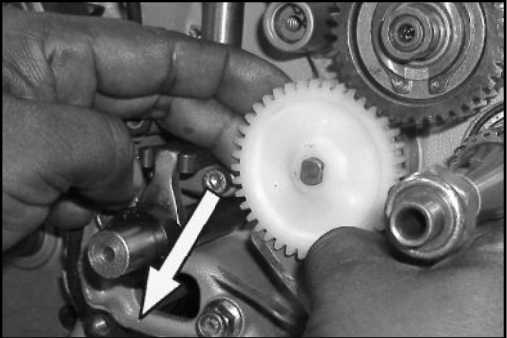
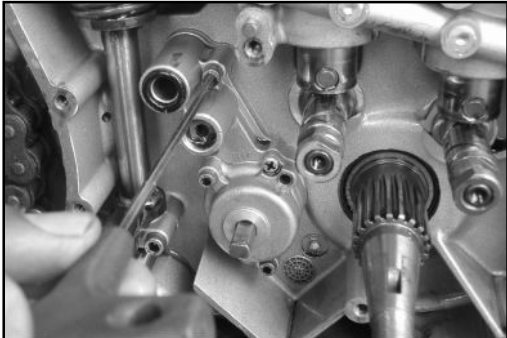
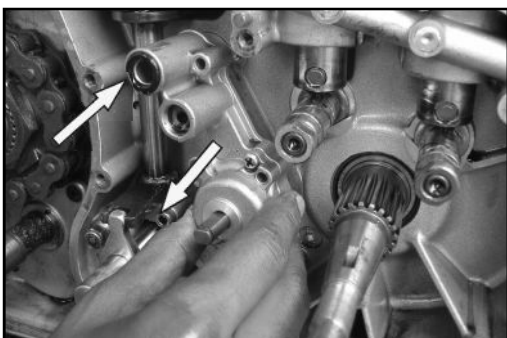
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.6	Removal of RH Cover ■ Remove Stator assembly by removing 3 mounting screws. ■ Remove circlip, oil seal and jet crankshaft. ■ Remove oil filler cap and "O" ring. ■ Remove Ignition Timing check bolt and washer (if not removed earlier).	Hex. socket head cap screw M5 Allen Key 4 mm

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.6	Removal of RH Cover ■ Remove Breather bolt and washer. ■ Remove screws to remove breather chamber cover. ■ Remove breather chamber gasket. ■ Remove the 2 oil seals from the Kick Shaft hole	     Hex Socket Head Cap. Screw M5 Allen Key 4 mm

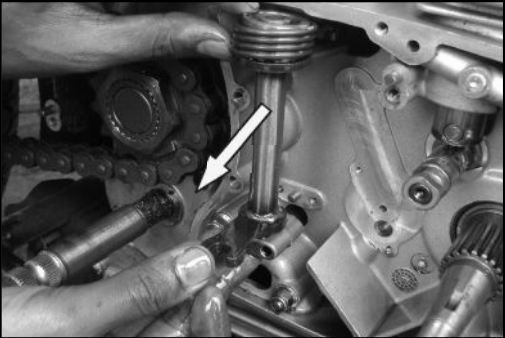
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.7	Removal of Rotor Assembly ■ Locate special tool No. ST-25612-4 on the magneto rotor threaded fully. ■ Insert socket spanner 19mm in the tool to locate on the hex nut. ■ Hold special tool firmly to ensure magneto rotor does not rotate. ■ Loosen & remove hex nut & washers. ■ Remove special tool from magneto rotor. ■ Locate special tool ST-25128-2 on the magneto rotor threaded fully. ■ Tighten threaded bolt till it released the magneto rotor from shaft. ■ Remove magneto rotor along with special tool ■ Remove the woodruff key.	Hex. Nut M12 Socket Spanner 19 mm CAUTION: While removing rotor from shaft ensure crank shaft does not rotate. NOTE: Ensure threaded bolt in puller is fully loosened

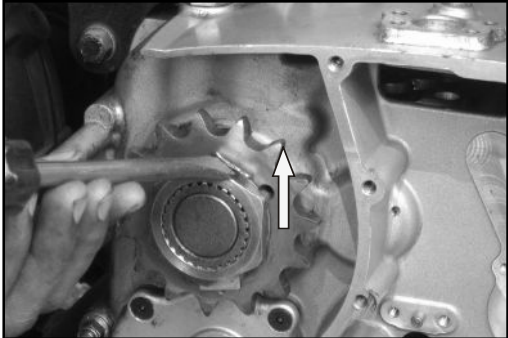
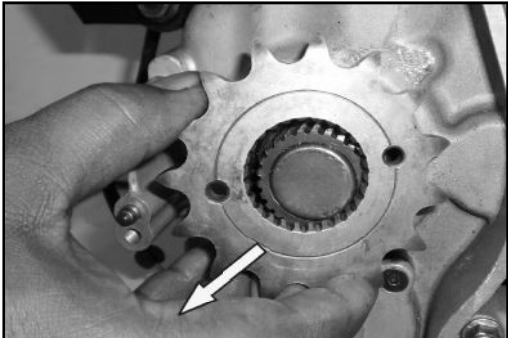
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.8	Cam steady plate & cam gears ■ Remove the 3 allen screws & 2 dowels from Cam steady plate. ■ Remove Cam steady plate and the shims. ■ Remove Cam gear inlet. ■ Remove Cam gear Exhaust along with Auto decompressor assy.	Hex.Soc Screw M6 Allen Key 5 mm 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.

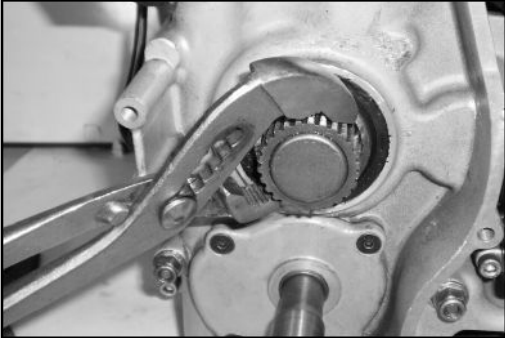
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.9	Auto Decompressor ■ Remove hex socket screw on flyweight in exhaust cam. ■ Remove flyweight along with return spring. ■ Remove the actuating pin.	Hex socket head cap Screw M4 Allen Key 3 mm   

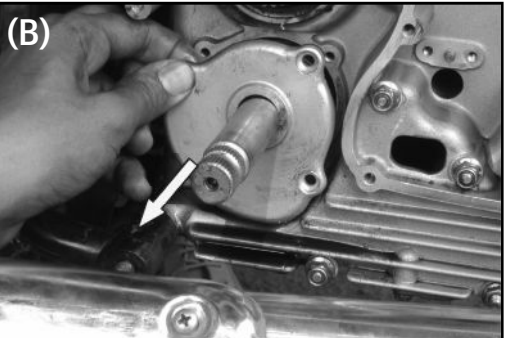
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.10	Oil Pump ■ Remove oil pump plastic gear after removing circlip. ■ Remove the 4 allen screws to remove Oil pump assy. along with gasket / rubber ring. ■ Remove the Oil pump assembly with "O" ring.	NOTE: Observe short boss of pump drive gear should face outwards.   

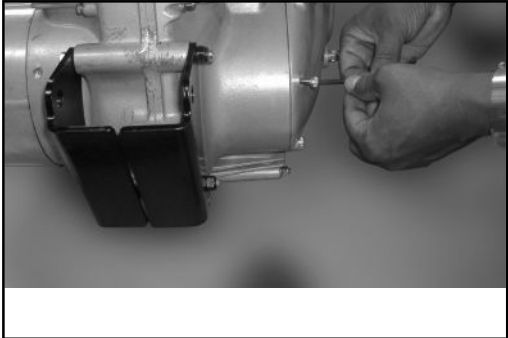
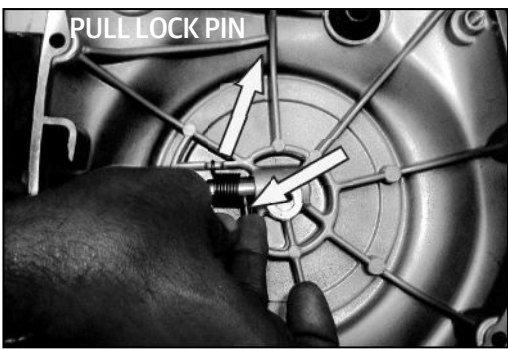
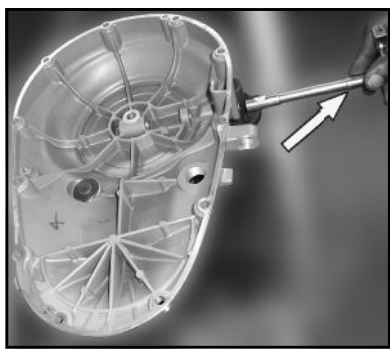
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.11	Gear Shift assembly removal ■ Remove Gear change lever from gear shift shaft on LH side ■ Remove Gear shift shaft with spacer from RH side. ■ Locate Special tool on rocker shaft return spring pivot pin with "O" ring & gently pull the pivot pin out of the Crankcase RH. ■ Remove the 2 hex socket head cap screws and remove the rocker shaft upper pivot bearing with "O" ring. ■ Remove the 2 hex socket head cap screws holding the lower pivot bearing.	Special Tool No.ST 25123-4 Hex socket head cap screw M6 Allen Key 5 mm Hex Socket Head cap Screw M5 Allen Key 4 mm

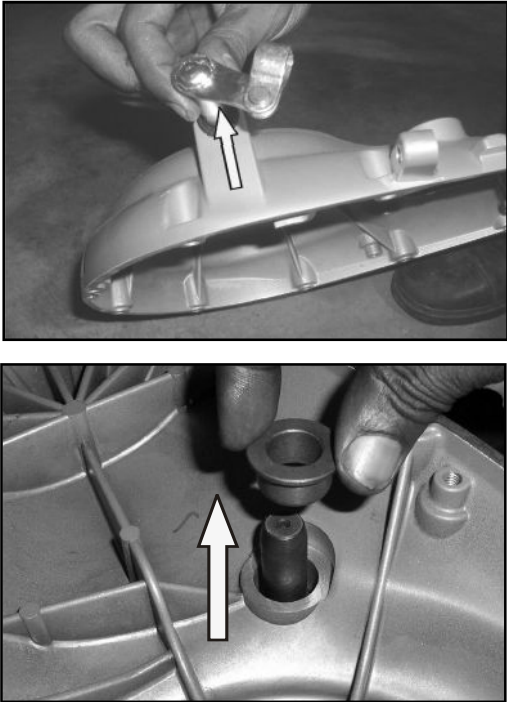
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.11	Gear Shift assembly removal ■ Remove the rocker shaft assembly by gently tilting and twisting from crankcase RH	

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.12	F.D. Sprocket ■ Straighten lock tab and Unlock the FD sprocket nut. ■ Remove nut and lock washer (A). ■ Locate Special tool on FD Sprocket & remove from shaft.	Socket Spanner 32mm   Special tool No.ST-25612-4  

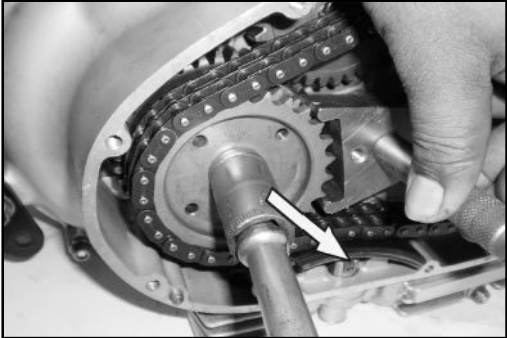
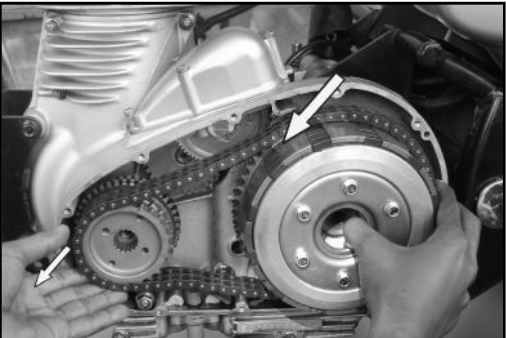
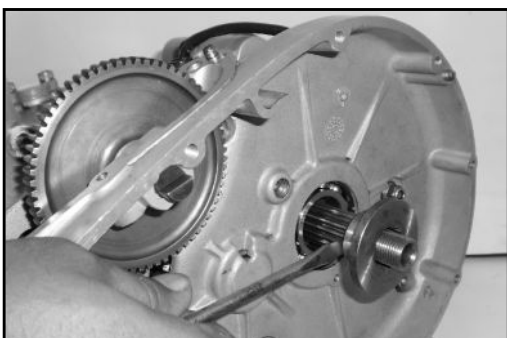
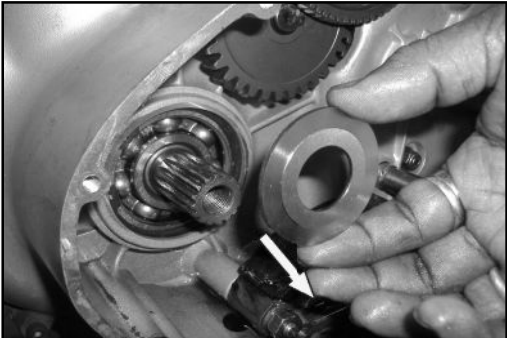
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.12	F.D. Sprocket ■ Gently Pull out Sleeve gear Spacer from the sleeve gear.	

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.13	Kick Starter ■ Remove 4 hex socket screw hold cover (A). ■ Remove kick starter shaft cover with oil seal (B). ■ Remove Kick starter return spring locking bolt with washer (A). ■ Remove Kick starter return spring from kick starter shaft (B).	Hex. Soc. Pan head screw M5 Allen Key 4mm (A)  (B)  Flanged Hex Bolt M6 Socket Spanner 10mm (A)  (B) 

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.14	Cover LH ■ Remove inspection plug along with "O" ring ■ Remove the 11 hex flange on cover LH holding the cover Left. ■ It may be necessary to tap the cover slightly to remove from crankcase. ■ Remove lock pin and spring from clutch operating shaft. ■ Remove clutch operating shaft assy from clutch cover.	Hex Flange Bolt M6 Socket Spanner 8MM    

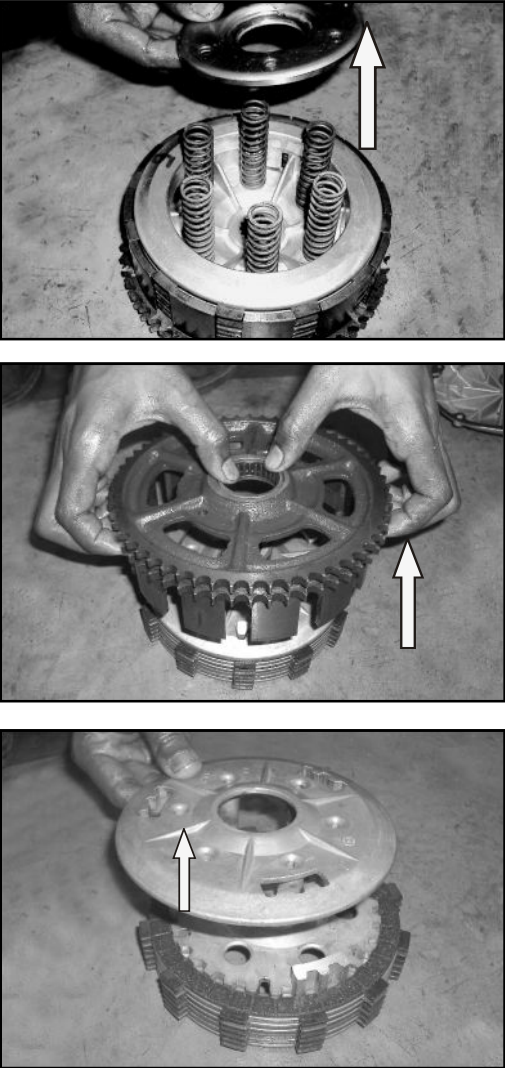
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.14	Cover LH ■ Remove Clutch operating shaft oil seal and 2 Nos. of Dowels. ■ Remove gear lever shaft bush and oil seal.	

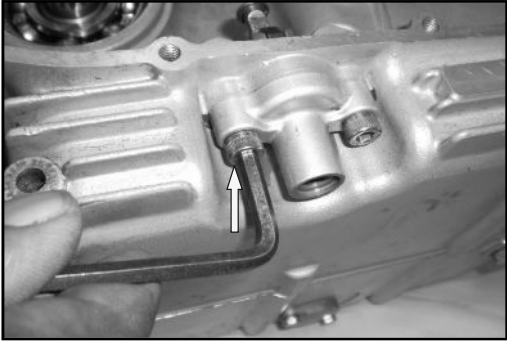
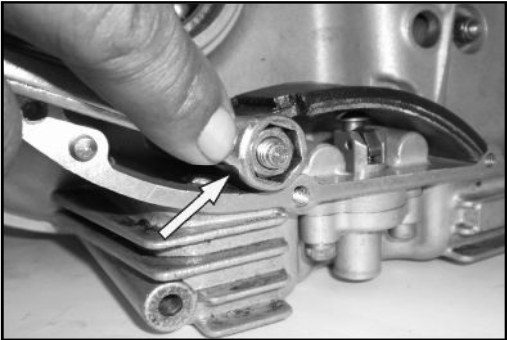
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.15	Clutch Assembly ■ Remove clutch push pad, ball bearing & bearing retainer cup. ■ Remove auto chain tensioner bottom bolt, "O"ring and spring. ■ Gently press push rod lock to release plunger & lower chain pad to slackness primary chain tensioner. ■ Locate Special tool to lock Clutch outer sprocket and engine sprocket. ■ Loosen & remove nyloc nut & plain washer from clutch center.	Special tool No.ST-25591-4 Hex. Nut M16 Socket spanner 21mm

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.15	Clutch Assembly ■ Remove bolt on t3he Engine sprocket. ■ Remove Duplex chain along with Sprag clutch and Clutch assembly. ■ Remove special tool & gently pull out clutch assy. along with engine sprocket & primary chian. ■ Remove distance washer from engine drive shaft and collar from main shaft. ■ Remove collar on main shaft (distance collar from crankshaft LH). ■ Remove special distance washer sprag clutch on Crankshaft drive side.	Hex. Flange Screw M12 Socket Spanner 19 mm    Flanged U Nut M8 

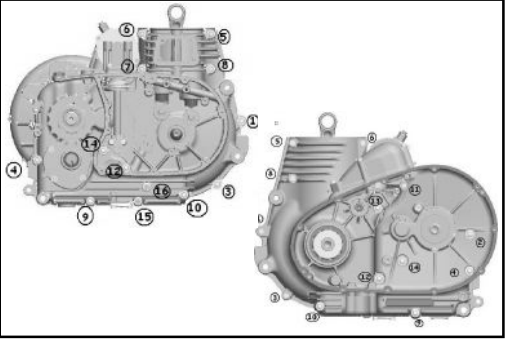
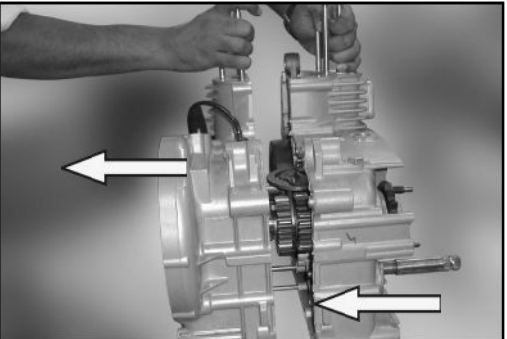
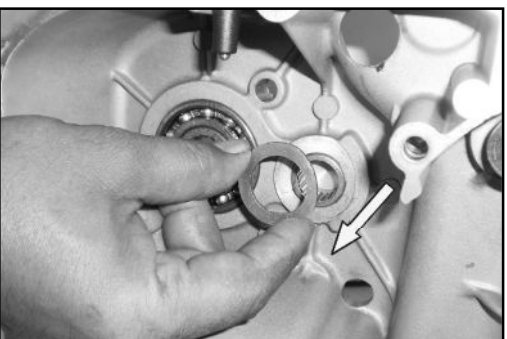
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.16	Sprag Clutch Assembly ■ Remove sprag clutch assy. from primary chain. ■ Holding drive gear gently rotate engine sprocket clockwise pull out simultaneously to separate engine sprocket from sprag gear. ■ Remove spacer. ■ Remove sprag clutch from sprag gear.	

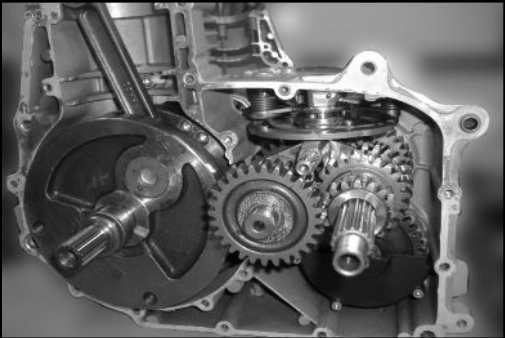
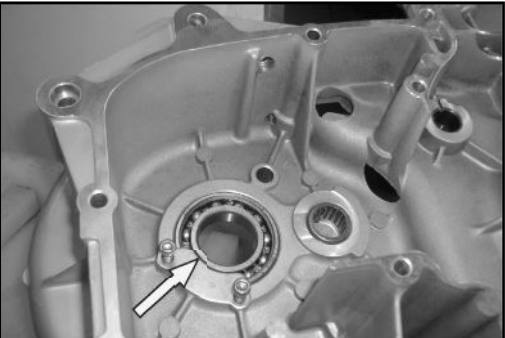
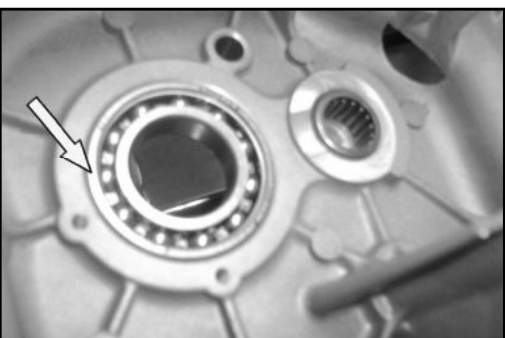
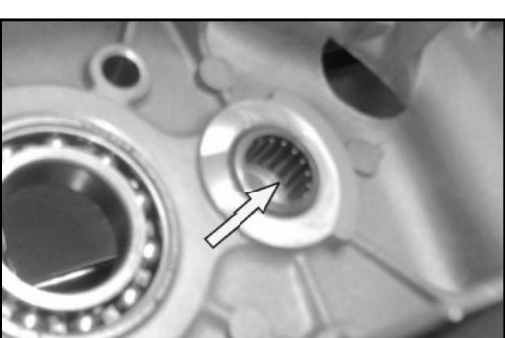
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
8.17	Dismantling of Clutch Assembly ■ Remove 2 hex screw from clutch assy. ■ Locate Special Tool and clutch assy. & tighten with 2 screws such that the special tool is fully seated on the clutch. ■ Loosen & remove the other 4 hex screws on clutch assy. <		

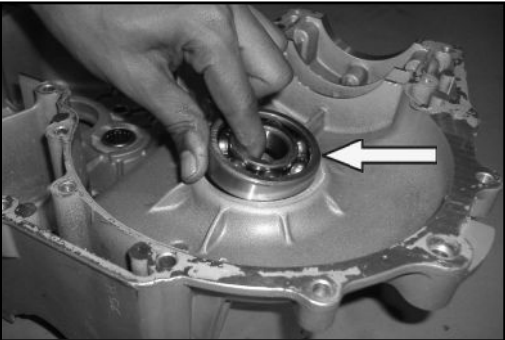
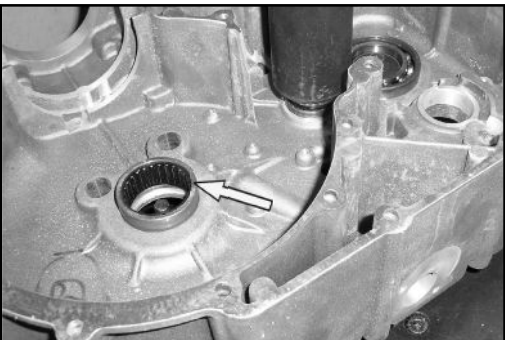
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.17	Dismantling of Clutch Assembly ■ Remove Spring retainer plate & 6 Springs ■ Remove clutch drum sprocket with big washer. ■ Remove clutch hub, centre, friction and steel plates.	

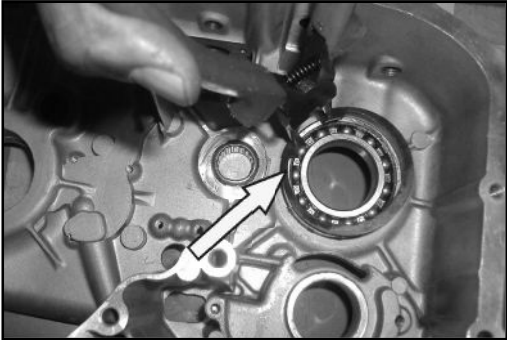
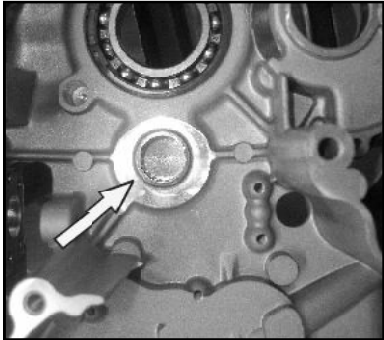
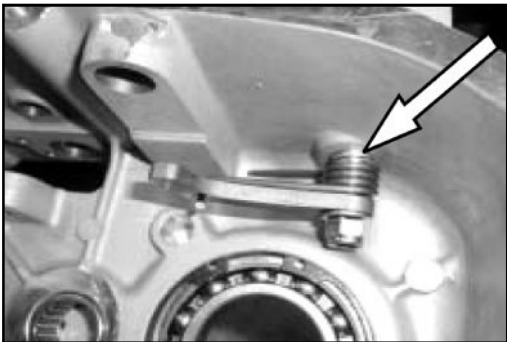
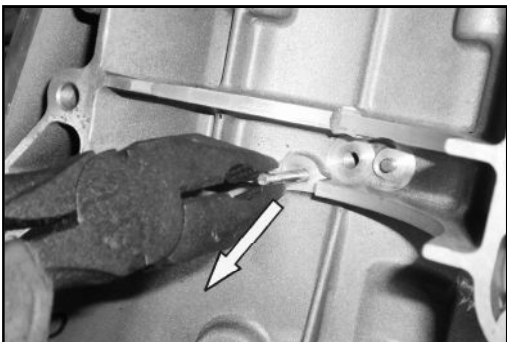
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.18	Auto Chain Tensioner ■ Remove hex nut and washer to remove chain tensioner pad. ■ Remove Auto chain tensioner body assy. by removing the allen screws.	Hex Socket Head Cap Screw M6 Allen Key 6mm  

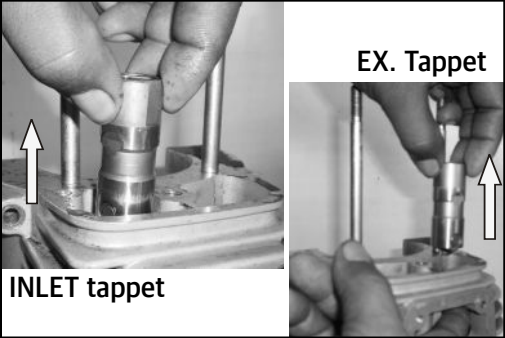
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.19	Starter Double Gear ■ Remove double gear shaft and double gear from crankcase LH. ■ Remove circlip in jack shaft. ■ Remove gear.	NOTE: Ensure jack shaft is not pushed into the crankcase.

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
8.20	Crankcase LH & RH - Loosen the crankcase nuts and remove completely. - Loosen hex socket screw. - Gently split the crankcase & remove crankcase LH so as to leave the gear & shaft in crankcase RH. - Remove special thrust washer (lay shaft) from Crankcase Left & 2 Nos. Dowel pins.	Hex Socket Head Screw M6 Allen Key 5mm NOTE: Ensure all nuts & hex socket are recommended before splitting crankcase.	   

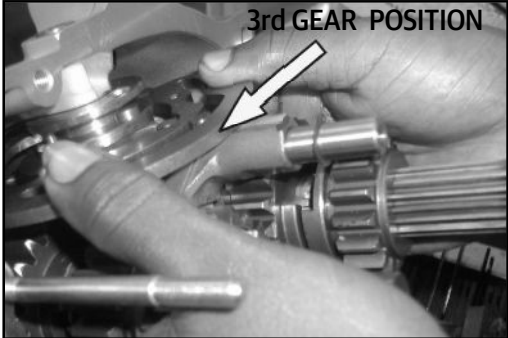
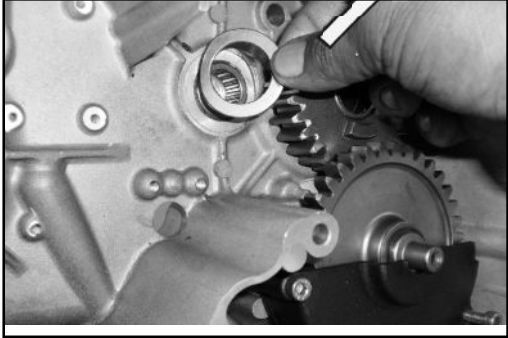
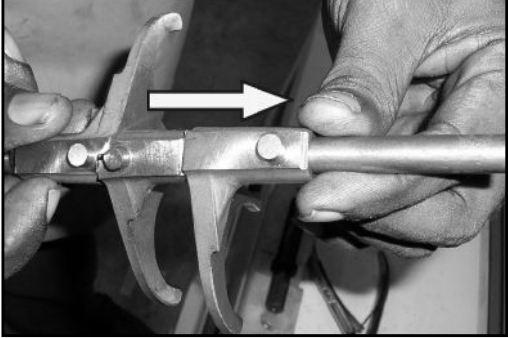
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
8.20	Crankcase LH & RH ■ Pull out the crank shaft from the crankcase Right. ■ Remove clutch bearing retainer plate holding screws and remove the retainer plate from crankcase Left. ■ Remove clutch ball bearing from crankcase Left. ■ Remove needle roller bearing for lay shaft from crankcase Left.	Hex Flange Bolt M5 Allen Key 4 mm CAUTION: Ensure all oil seals are removed before dismantling crankcase, heat crakcases in an electric woven such that the bearings & bushes can drop out of the crankcase & turned upside down	   

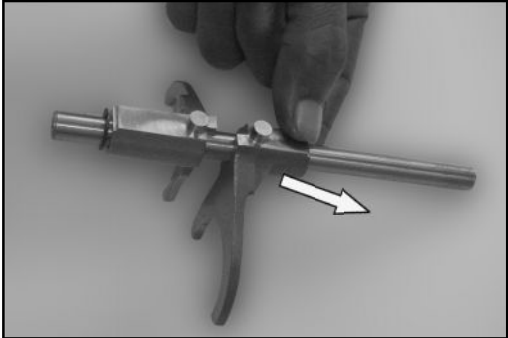
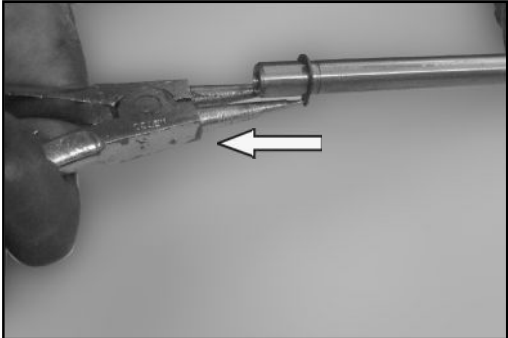
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.20	Crankcase LH & RH ■ Remove roller bearing NU 305 from crankcase Left. ■ Remove spacer, circlip, crank shaft bearing 6305 from crankcase Left. ■ Remove last circlip from crankcase Left. ■ Remove crank shaft needle roller bearing from crankcase Right.	   

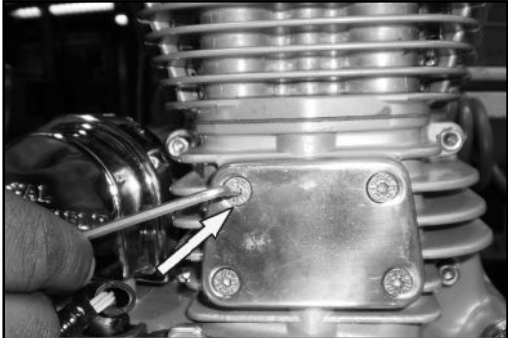
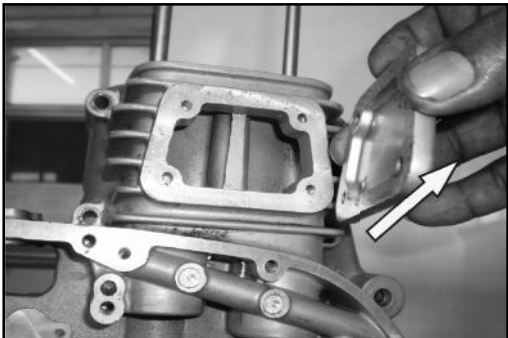
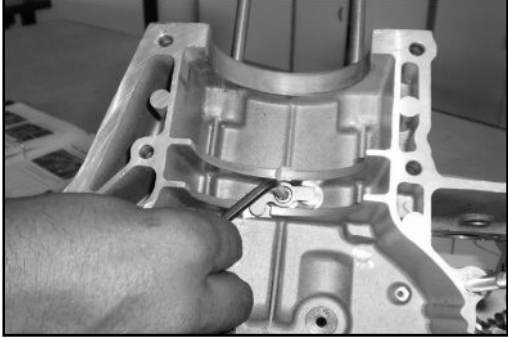
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.20	Crankcase LH & RH ■ Remove circlip and sleeve gear ball bearing 6007 from crankcase Right. ■ Remove lay shaft needle bearing from crankcase Right. ■ Remove nyloc nut, machined washer, pawl - camplate, return spring and bolt pawl from crankcase Right. ■ Gently pull out the 2 needle roller pins holding the inlet and exhaust hydraulic tappets.	   

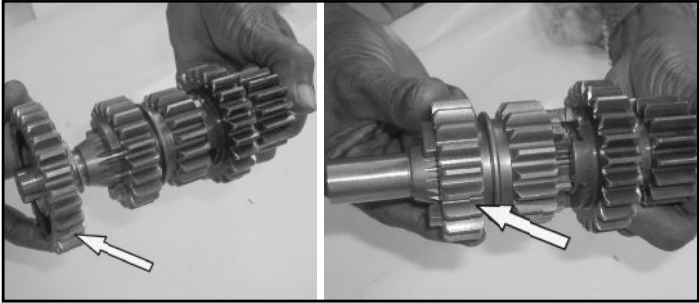
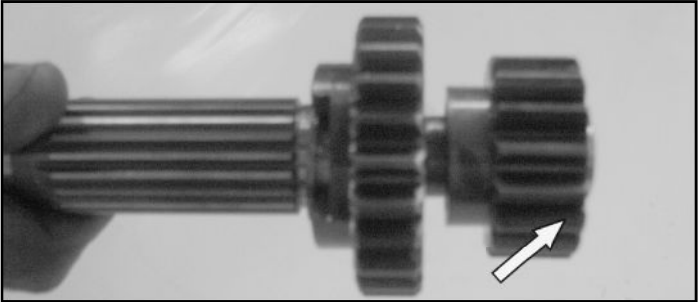
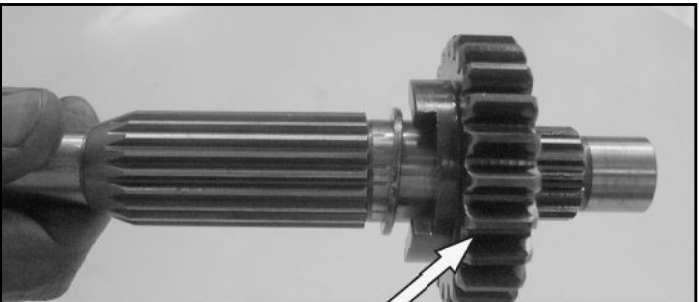
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.20	Crankcase LH & RH ■ Gently pull out the exhaust and inlet hydraulic tappets carefully from Crankcase RH top side.	NOTE: Remove Inlet tappet first and then the exhaust tappet. CAUTION: Store the tappets carefully in vertical direction always.  INLET tappet EX. Tappet

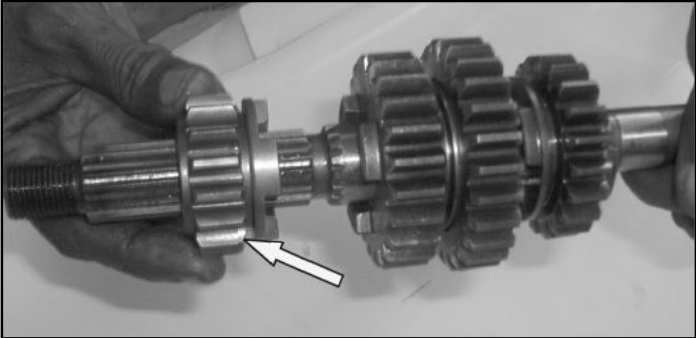
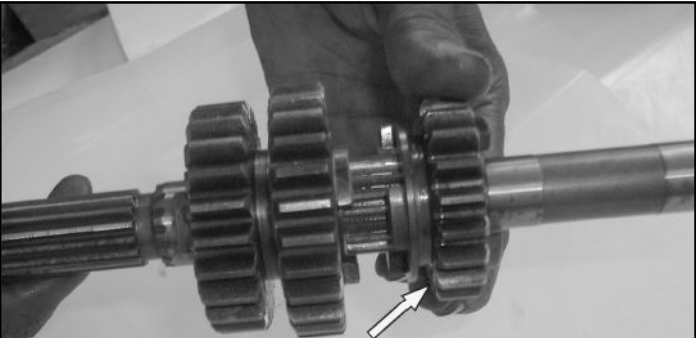
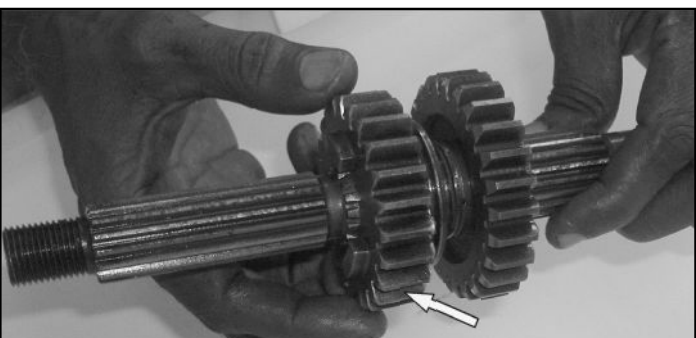
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.21	Gear Train Removal ■ Remove the bolt, copper washer, cap pivot pin and "O" ring above the cam plate pivot pin on crankcase RH. ■ Gently pull out the 3mm roller locating pin from crankcase RH inside. ■ Locate special tool on cam plate pivot pin & gently pull out cam plate pivot pin with "O" ring from crankcase RH. ■ Remove Layshaft 1st gear and thrust washer from the Layshaft.	Special tool No.ST 25153-4

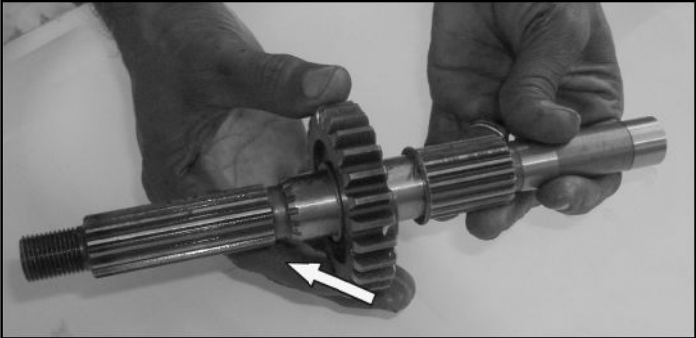
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.21	Gear Train Removal ■ Gently pull out the gear train & selector assembly as a complete set from crankcase RH. ■ Remove the cam plate from the gears ■ Seperate the main shaft & drive shaft gears. ■ Remove selector fork sub assembly from main shaft & lay shaft sliding gears to take out Right selector fork.	NOTE: Rotate cam plate such that it is in 3rd gear position before removing.  NOTE: Ensure special thrust washers of layshaft is removed from crankcase RH  NOTE: Ensure the 4 roller do not drop out of the cam plate .  NOTE: Take care not to drop the selector fork while separating the gear shafts. 

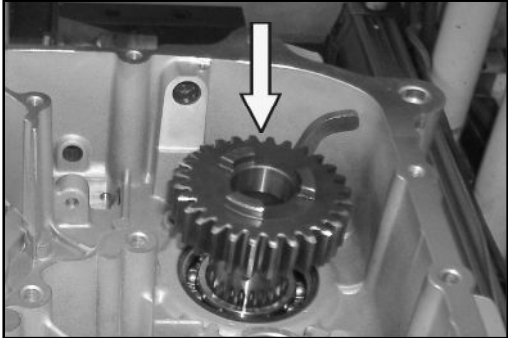
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.21	Gear Train Removal ■ Remove centre selector fork from the selector shaft and then Left selector fork. ■ Remove circlip from the selector shaft if required.	 

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.22	Hydraulic Tappets ■ Remove the Tappet cover by screws on crankcase RH outer. ■ Remove the Tappet cover. ■ Remove special thrust washer (Layshaft) from Crank case RH. ■ Remove the Allen screw, and the bracket on crankcase RH inside from barrel sealing area.	Hex Socket CSK head Screw M5 Allen Key 4 mm   Hex Cap Screw M5 Allen Key 4mm 

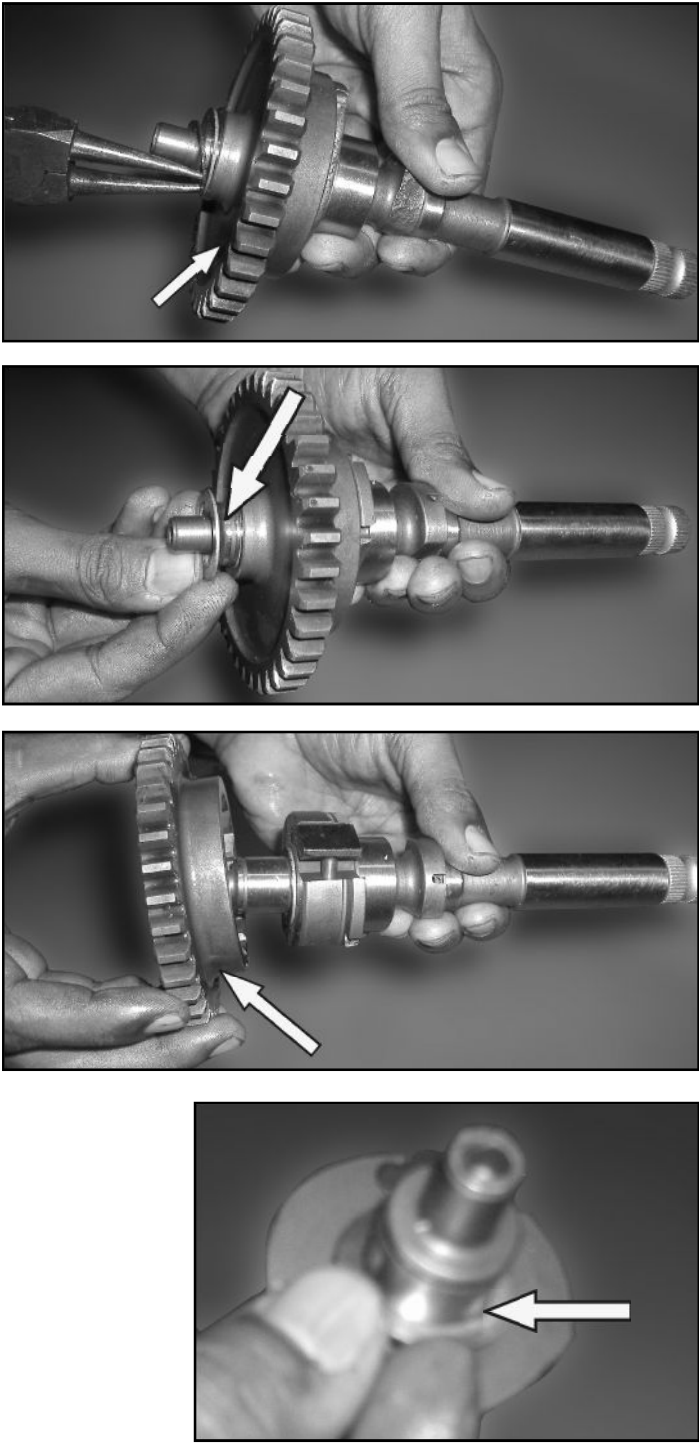
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.23	Layshaft ■ Remove Double gear (Layshaft 3rd and 4th gear) from larger side of layshaft. ■ Remove the high gear from smaller side of lay shaft. ■ Remove 2nd gear and thrust washer from smaller side of layshaft	  

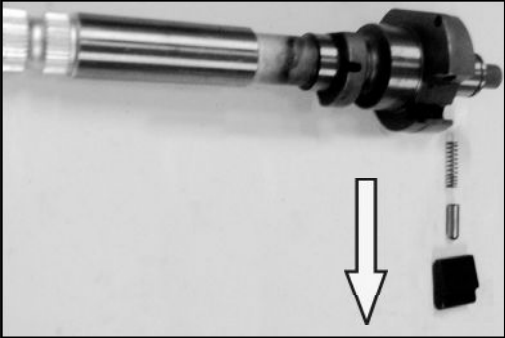
S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.24	Mainshaft ■ Remove main shaft 1st gear from the thread end of main shaft. ■ Remove the main shaft 2nd gear from opposite end. ■ Remove the main shaft 3rd gear from opposite end. ■ Remove circlip & 1st. thrust washer.	   

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.24	Mainshaft ■ Remove 4th gear and 2nd thrust washer from threaded end of main shaft	

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.25	Sleeve Gear ■ Gently pull out sleeve gear assy. from bearing in crankcase.	

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.26	Kick Starter ■ Remove 3 hext socket screw on the oil through. ■ Remove oil trough. ■ Gently pull out kick starter sub assy. from crankcase RH by rotate clock wise to release kick pawl from its stop.	Hex.Socket Screw M5 Allen Key 4mm

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.27	Kick Starter Shaft ■ Remove circlip & thrust washer from kick starter end of shaft. ■ Remove the thrust washer. ■ Remove the Kick pinion gear. ■ Remove the thrust washer.	

S. No.	Aggregate to Dismantle / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
8.27	Kick Starter Shaft ■ Remove the Kick pawl, plunger and spring from kickstarter shaft.	

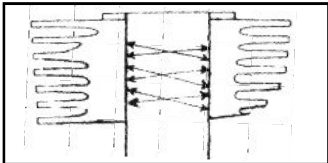
UNIDIRECTIONAL FITTINGS LIST

- Deep groove ball bearing 6007-RSH/C3 in Crankcase Right- 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 Mainshaft 4th Gear.
- Special thrust washer Lay shaft Right - Profile towards sleeve gear side on Right Crank case.
- Special thrust washer Lay shaft Left - Profile towards Crank shaft bearing side on Left Crank case.
- Rear engine mounting plate-"R" index mark side facing Right (FD sprocket) side.
- Gear jack shaft - Flat face facing outwards.
- Distance washer sprag clutch - Double step facing inside (should rest on Crankshaft and Crankcase Left 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.

INSPECTION

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	
			
	UCE 500	UCE 535	
New Min.	84.045	87.045	
New Max.	84.075	87.074	
Service Limit	84.190	87.190	

Ring to groove clearance : Comp. Top rings		
		
	UCE 500	UCE 535
New Min.	0.03	0.03
New Max.	0.07	0.05
Service Limit	0.11	0.11

		Piston	
	UCE 500	UCE 535	
New Min.	83.940	86.940	
New Max.	83.970	86.970	
Service Limit	83.890	86.890	

Ring to groove clearance comp rings - Middle		
		
	UCE 500	UCE 535
New Min.	0.03	0.05
New Max.	0.07	0.09
Service Limit	0.15	0.15

		Piston to bore clearance	
			
	UCE 500	UCE 535	
New Min.	0.095	0.095	
New Max.	0.115	0.114	
Service Limit	0.30	0.30	

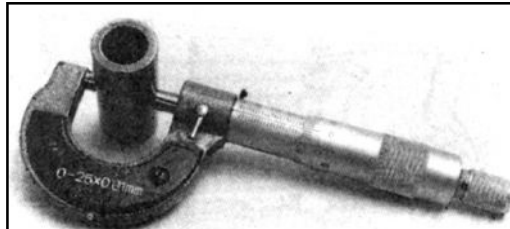
Ring to groove clearance : oil ring		
		
	UCE 500	UCE 535
New Min.	0.04	0.010
New Max.	0.16	0.180
Service Limit	0.21	0.44

Piston ring end gap : compression



	UCE 500		UCE 535	
From top	1st	2nd	1st	2nd
New Min.	0.20	0.35	0.20	0.35
New Max.	0.35	0.50	0.35	0.50
Service Limit	0.70	0.85	0.70	0.85

Piston Pin diameter



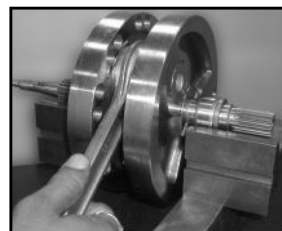
	UCE 500	UCE 535
New Min.	19.992	19.992
New Max.	19.997	19.997
Service Limit	19.982	19.982

Piston ring end gap - Oil ring - Top and bottom rail



	UCE 500	UCE 535
New Min.	0.20	0.20
New Max.	0.70	0.70
Service Limit	0.90	0.90

Big end axial play



	UCE 500	UCE 535
New Min.	0.20	0.20
New Max.	0.55	0.55
Service Limit	0.65	0.65

Small end bore inner diameter

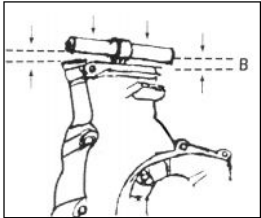


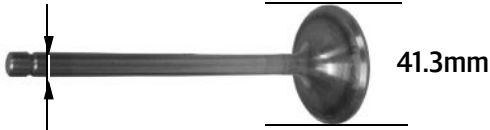
	UCE 500	UCE 535
New Min.	20.007	20.007
New Max.	20.016	20.016
Service Limit	20.046	20.046

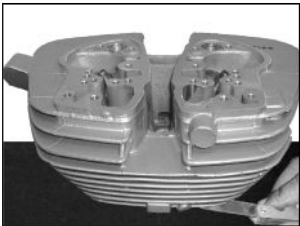
Crank shaft : Run out

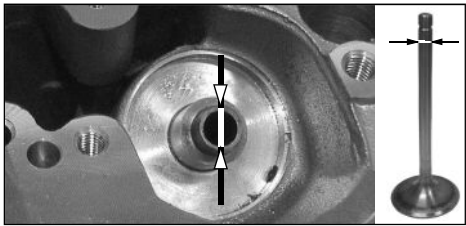


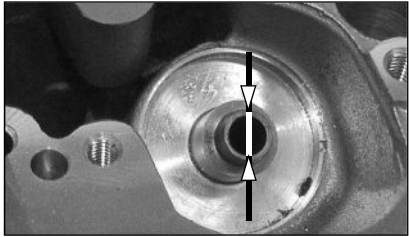
	UCE 500	UCE 535
New Min.	0.00	0.00
New Max.	0.05	0.05
Service Limit	0.08	0.08

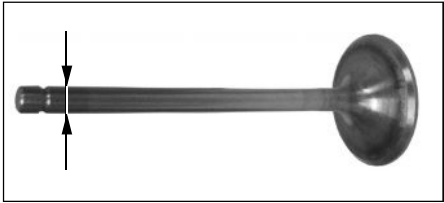
Connecting rod bend		
		
	UCE 500	UCE 535
New Min.	0.00	0.00
New Max.	0.05	0.05
Service Limit	0.08	0.08

Valve stem OD (Inlet)	
	
	UCE 500
New Min.	6.965
New Max.	6.980
Service Limit	6.955

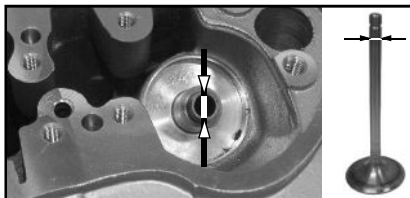
Cylinder Head warpage		
		
	UCE 500	UCE 535
New Min.	0.00	0.00
New Max.	0.05	0.05
Service Limit	0.07	0.07

Valve to guide (inlet) clearance		
		
	UCE 500	UCE 535
New Min.	0.02	0.02
New Max.	0.05	0.05
Service Limit	0.08	0.08

Valve guide bore		
		
	UCE 500	UCE 535
New Min.	7.000	7.000
New Max.	7.015	7.015
Service Limit	7.040	7.040

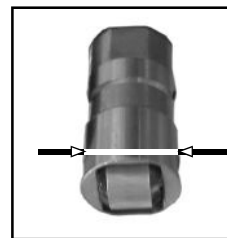
Valve stem OD (Exhaust)		
		
	UCE 500	UCE 535
New Min.	6.945	6.945
New Max.	6.960	6.960
Service Limit	6.935	6.935

Valve to guide (Exhaust) Clearance



	UCE 500	UCE 535
New Min.	0.040	0.040
New Max.	0.070	0.070
Service Limit	0.120	0.120

Hydraulic Tappet OD



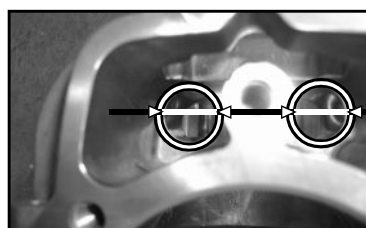
	UCE 500	UCE 535
New Min.	21.387	21.387
New Max.	21.405	21.405
Service Limit	21.380	21.380

Valve Spring : length



	UCE 500	UCE 535
New Min.	42.80	42.80
New Max.	43.80	43.80
Service Limit	41.50	41.50

Hydraulic Tappet guide bore



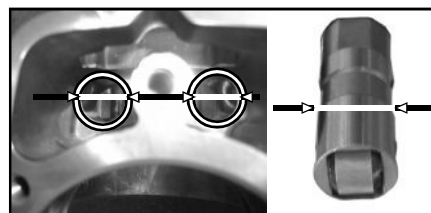
	UCE 500	UCE 535
New Min.	21.417	21.417
New Max.	21.438	21.438
Service Limit	21.450	21.450

Push rod run out

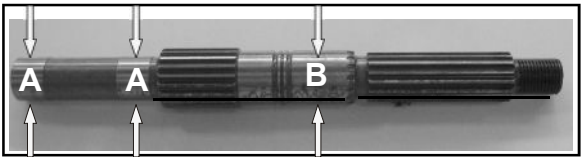


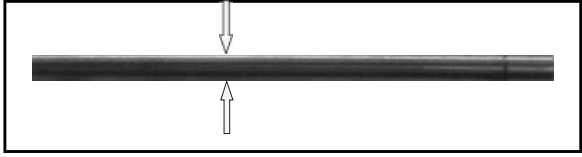
	UCE 500	UCE 535
New Min.	0.00	0.00
New Max.	0.03	0.03
Service Limit	0.05	0.05

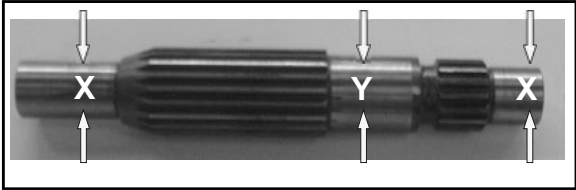
Hydraulic tappet to guide clearance

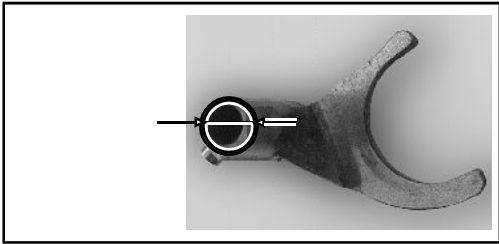


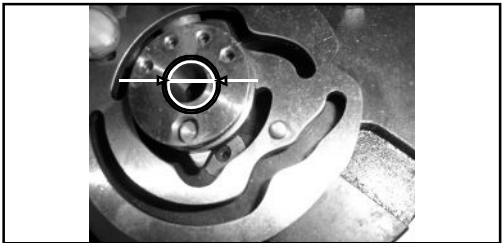
	UCE 500	UCE 535
New Min.	0.012	0.012
New Max.	0.051	0.051
Service Limit	0.060	0.060

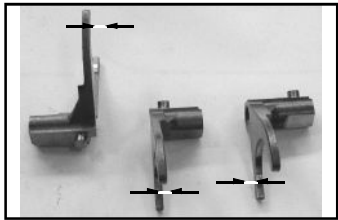
Main shaft Outer diameter		
		
	UCE 500	
Location	A	B
New Min.	19.99	23.93
New Max.	20.00	23.95
Service Limit	19.97	23.90

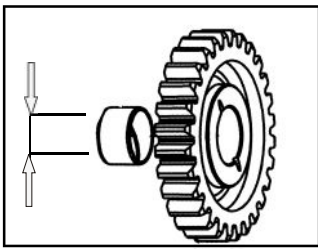
Selector fork shaft outer diameter			
			
	UCE 500	UCE 350	UCE 535
New Min.	9.96	9.96	9.96
New Max.	9.98	9.98	9.98
Service Limit	9.94	9.94	9.94

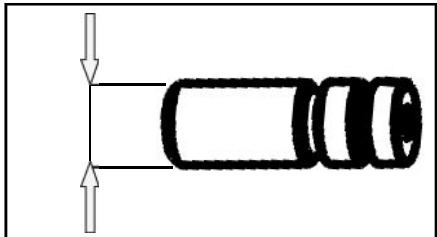
Lay shaft Outer diameter		
		
	UCE 500	
Location	X	Y
New Min.	17.99	23.95
New Max.	18.00	23.97
Service Limit	17.97	23.93

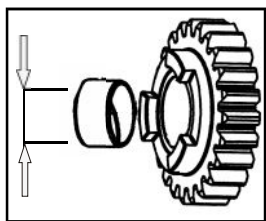
Selector fork inner diameter		
		
	UCE 500	UCE 535
New Min.	10.00	10.00
New Max.	10.03	10.03
Service Limit	10.06	10.06

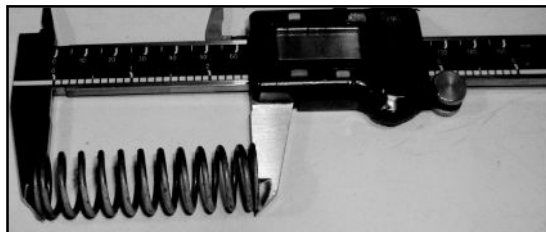
Cam plate ratchet inner diameter		
		
	UCE 500	UCE 535
New Min.	12.995	12.995
New Max.	13.045	13.045
Service Limit	13.060	13.060

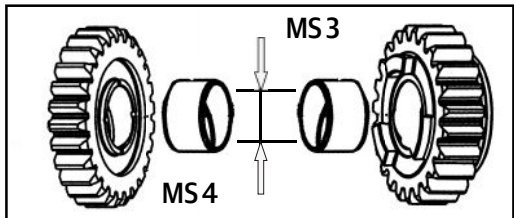
Selector fork lug thickness		
		
	UCE 500	UCE 535
New Min.	3.90	3.90
New Max.	3.95	3.95
Service Limit	3.88	3.88

Lay shaft 1st gear inner diameter		
		
	UCE 500	UCE 535
New Min.	18.03	18.03
New Max.	18.06	18.06
Service Limit	18.09	18.09

Pivot cam plate outside diameter		
		
	UCE 500	UCE 535
New Min.	12.98	12.98
New Max.	13.00	13.00
Service Limit	12.96	12.96

Lay shaft 2nd gear inner diameter		
		
	UCE 500	UCE 535
New Min.	24.02	24.02
New Max.	24.05	24.05
Service Limit	24.06	24.06

Clutch spring Length		
		
	UCE 500	UCE 535
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		
		
	UCE 500	UCE 535
New Min.	24.00	24.00
New Max.	24.03	24.03
Service Limit	24.06	24.06

Friction plate with insert : thickness		
		
	UCE 500	UCE 535
New Min.	2.95	2.95
New Max.	3.05	3.05
Service Limit	2.60	2.60

Clutch steel plate : Distortion



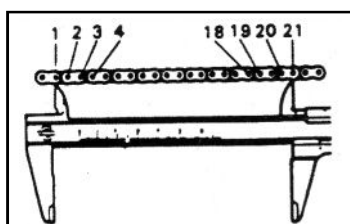
	UCE 500	UCE 535
New Min.	0.00	0.00
New Max.	0.05	0.05
Service Limit	0.10	0.10

Double Electrode Spark Plug Gap



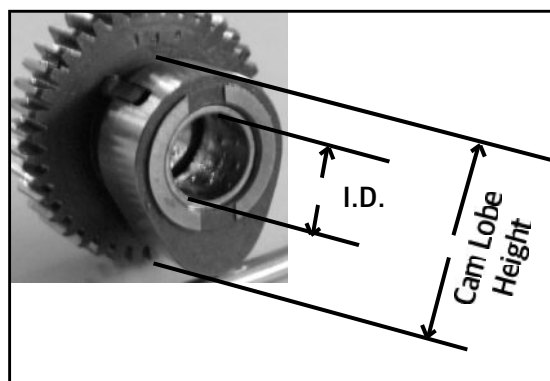
	UCE 500
New Min.	0.8
New Max.	0.9
Service Limit	1

Duplex Chain - Length across 21 pins



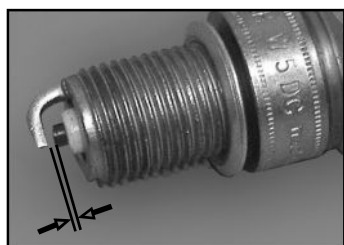
	UCE 500	UCE 535
New Min.	190.00	190.00
New Max.	191.00	191.00
Service Limit	195.00	195.00

Exhaust & Inlet cam assembly

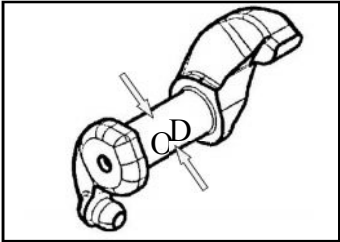


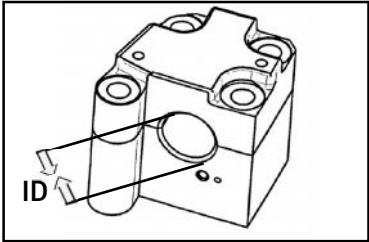
	UCE 500, 535 - Inlet		UCE 500, 535 - exhaust	
Location	Cam Bush I.D.	Cam Lobe height	Cam Bush I.D.	Cam Lobe height
New Min.	15.884	38.079	15.884	37.679
New Max.	15.886	38.179	15.886	37.779
Service Limit	15.916	37.979	15.916	37.579

M10 & M14 Spark Plug Gap



	UCE 500, 535
New Min.	0.7
New Max.	0.8
Service Limit	0.9

Rocker Arm Shaft OD	
	
	UCE 500, 535
New Min.	15.890
New Max.	15.910
Service Limit	16.011

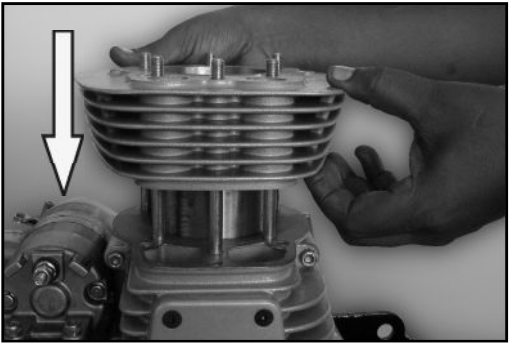
Rocker Bearing ID	
	
	UCE 500, 535
New Min.	15.848
New Max.	15.860
Service Limit	15.838

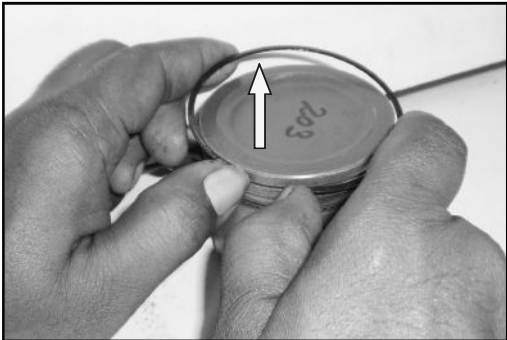
Oil pump body clearance	
	
	UCE 500, 535
New Min.	0.080
New Max.	0.200
Service Limit	-

Oil pump end clearance	
	
	UCE 500, 535
New Min.	0.053
New Max.	0.10
Service Limit	-

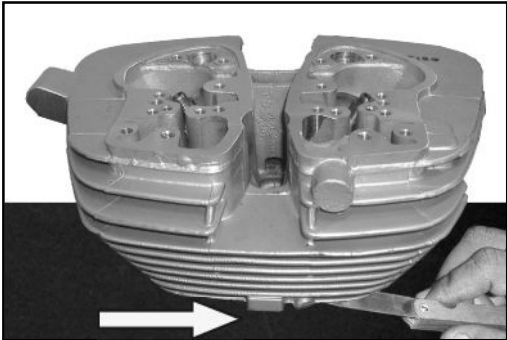
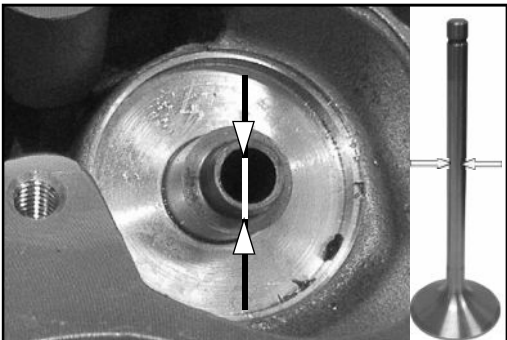
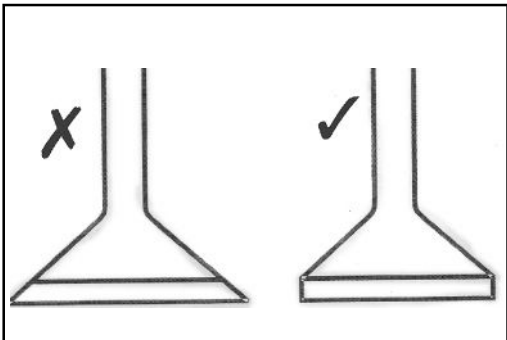
NOTE:

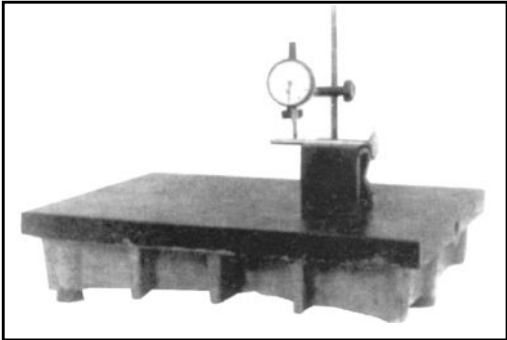
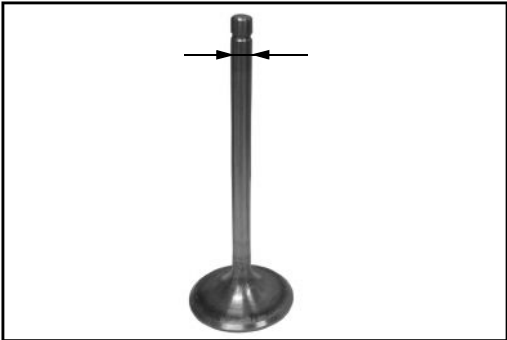
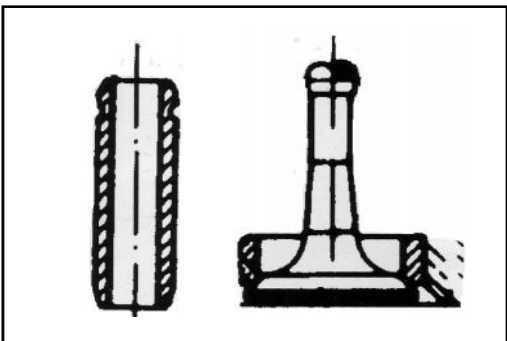
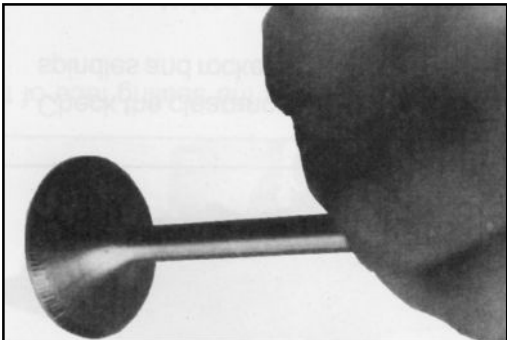
Tip clearance between rotors new 0.15mm Max.

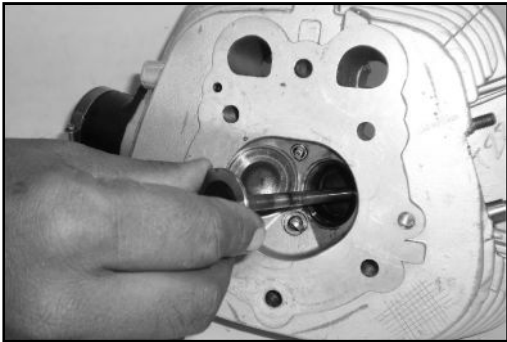
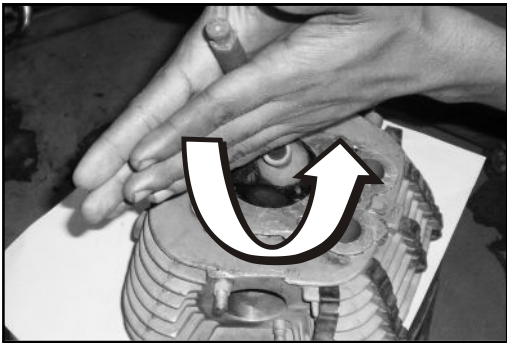
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.1	Cylinder Barrel Cleaning ■ Scrap the carbon deposit from the top edge of the bore. ■ Clean the barrel with cleaning solvent and dry it with compressed air. Inspection ■ Visually check for cracks, scratches, breakage of fins, scoring, seizure mark etc of the Cylinder bore. ■ 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. 

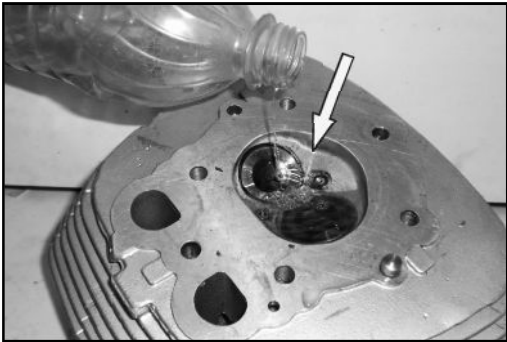
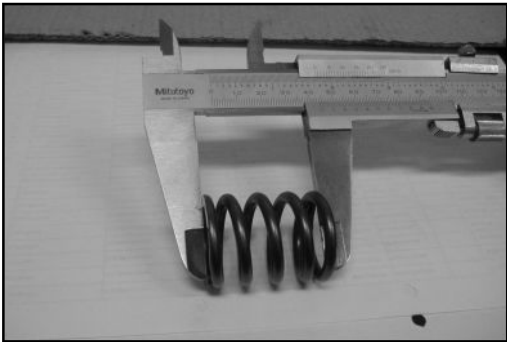
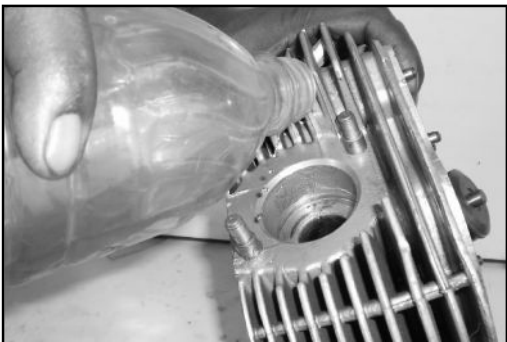
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.2	Piston Sub Assembly Cleaning ■ Remove piston rings from piston. ■ Scrub the carbon deposits from the piston groove with the help of scrapper. ■ Scrap the carbon deposits from the skirt area and groove area 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. ■ Insert piston rings on its appropriate grooves and check side clearance between the ring and grooves.	  

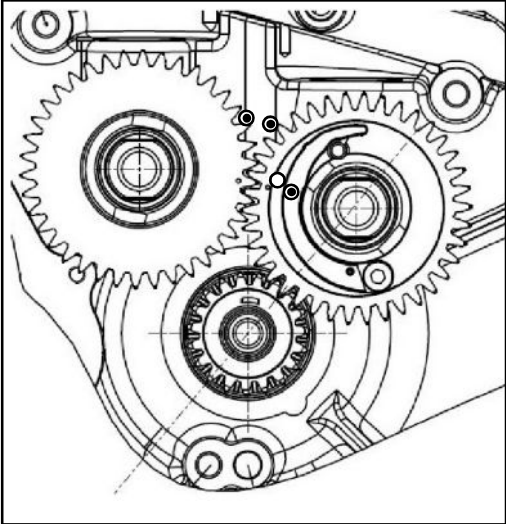
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.2	Piston Sub Assembly Inspection ■ Check the piston rings end gap at the bottom end of the Cylinder. ■ Check the piston pin for wear. Measure outside dia of piston pin at 3 points.	CAUTION : Set each piston 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.  

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.3	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. ■ 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.	   

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.3	Cylinder Head Inspection ■ 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.	   

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.3	Cylinder Head Inspection ■ 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. ■ 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.	  WARNING: Do not allow the grinding paste to seep into the valve stem and valve guide.  

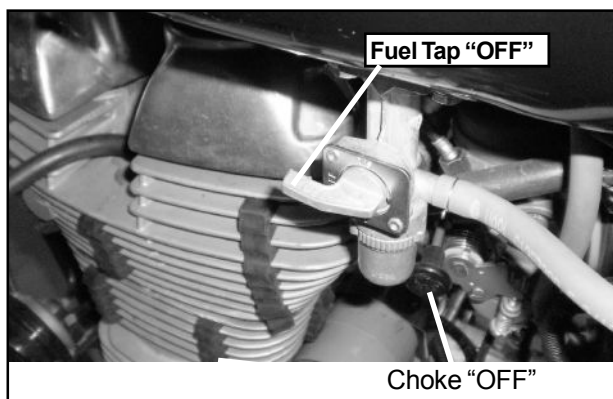
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.4	Valve Seat Inspection ■ Check and ensure proper seating with pencil marks as explained above. ■ Valve seating on valve seat can also be checked as follows: ■ Assemble the valve assembly in position. Keep 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. ■ Pour solvent into exhaust port and check for valve seat leakage if any.	  

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
11.5	ValveTiming ■ Bring piston to TDC so that the woodruff key in the timing shaft is at 12' Clock position.	

ENGINE COMPRESSION TEST

STEP-A

- Start and warm-up the engine to normal running temperature.
- Remove the spark plug & connect compression gauge.
- Please ensure that
 - a) Turn Fuel tap to "OFF" position.
 - b) Choke "OFF" position (normal running condition)



- Hold throttle / rotor grip at "FULL" position & then kick several times (5 to 6 times).
- Note down the reading and repeat the above process 3 times. Take the average mean reading to know actual compression pressure. Specified engine compression pressure 80 to 110 PSI.

STEP-B

- In case compression pressure less than 80 PSI, then refit spark plug & start again to warm-up the engine.



- a) Remove spark plug & put few drops of engine oil into the combustion chamber.
- b) Connect compression gauge & repeat above said procedure as explained in the step-A.
- 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
- 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
 - valve stem bend
 - cylinder head warpage
 - improper valve timing
 - Auto decompressor

STEP-C

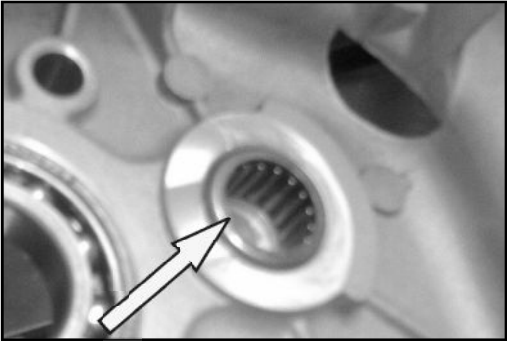
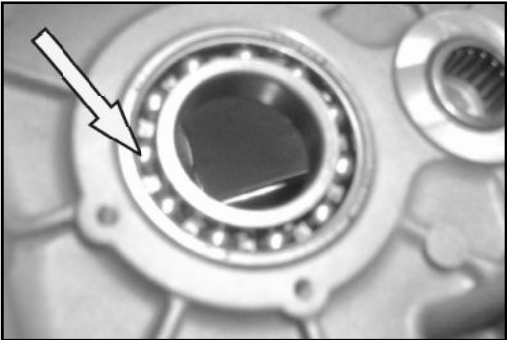
- In case compression pressure is more than 110 PSI then engine requires Decarbonisation of cylinder head / piston (combustion chamber). Also check for smoky exhaust problem.

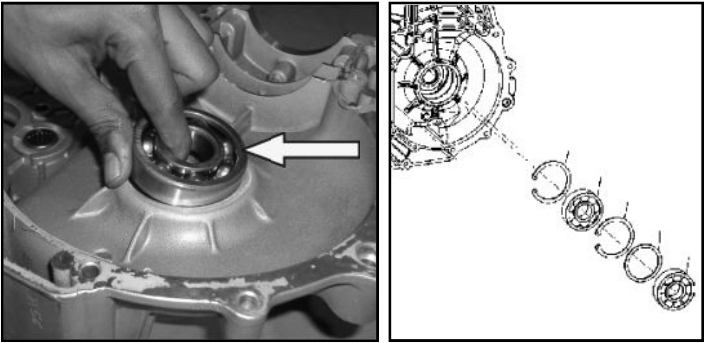
TORQUE CHART

Aggregate	Component	Fastener	Qty.	Torque Range	
				Nm	Kg-M
RH Crankcase	Pawl stop plate assy	Hex Screw M8 * 23	1	25	2.5
	Indexing Pawl Assy	Hex nut M6 * 1 (U nut)	1	20	2
	Indexing pawl lock nut assy	Bolt Pawl,M12 *1.5 -6h	1	10	1
	Magnetic Plug assy	Magnetic Plug assy,M14 *1.25	1	20	2
	Sump Drain Cap Assy	Hex flange bolt M5 * 16	2	6	0.6
	Hyd. tappet lock pin "S" bracket assy	Hex soc head cap screw M6	2	10	1
	Tappet door assy	CSK socket head screw M5 *0.8*12	2	4	0.4
	Kick starter spring bolt assy	Hex Screw M6*16	1	10	1
	Kick starter cover assy	Hex Socket Pan head screw M5*12	4	6	0.6
	FD sprocket assy - 17 Teeth	Nut M35*1.5	1	78	8
	Pump Assy	Hex Socket Head cap screw M6*25	2	10	1
		CSK Socket Head cap screw M6*30	3	10	1
	Starter motor assy	Hex Socket Head cap screw M6*60	2	10	1
	Cam pivot screw assy	Pivot M4*0.7	1	3	0.3
	Inlet/Exhaust Cam sleeve nut assy	Nut M10 * 1	2	20	2
	Cam steady plate assy	Hex Socket Head cap screw M6*30	2	10	1
		Hex Socket Head cap screw M6*25	1	10	1
LH Crankcase	Auto chain tensioner assy	Hex Socket Head cap screw M6*20	2	10	1
	Retainer plate assy	Hex Socket Head cap screw M5*16	2	6	0.6
	Box assy for 13 Screws	Nut M6*1	22	10	1
	Starter motor housing assy	Hex Socket Head cap screw M5*25	1	10	1
	Starter motor housing assy	Hex Socket Head cap screw M5*45	3	10	1
	Chain Pad nut assy	Hex Nut M8 * 1.25	2	20	2
	Engine Sprocket & Sprag gear assy	Hex flange screw M12*1.25	1	65	6.6

Aggregate	Component	Fastener	Qty.	Torque Range	
				Nm	Kg-M
RH Cover	Breather plate assy	Hex Socket Head cap screw M5*12	6	6	0.6
	Pulsar Coil assy	Hex Socket Head cap screw M5*16	2	6	0.6
	Stator Coil assy	Hex Socket Head cap screw M5*30	3	10	1
	Inspection screw assy	Inspection screw M6*14 * 1.25	1	20	2
	Oil filter cap assy	Hex flange bolt M6 * 1	3	10	1
	Breather bolt assy	Bolt M12*1.5	1	20	2
	Magento Assy	Hex Nut M12 *1.25	1	47	4.8
	RH Cover assy	Hex flange bolt M6 * 1 * 45	1	10	1
		Hex flange bolt M6 * 1 * 70	7	10	1
		Hex flange bolt M6 * 1 * 85	2	10	1
LH Cover	Cover LH assy	Oil Filter plug M18*1	1	20	2
		Hex Flanged bolt M6*1	1	10	1
Cylinder Head	Sprak plug assy M14	Spark Plug M14(WQR8DC)	1	25	2.5
	Sprak plug assy M10	Spark Plug M10 (UR6DC)	1	13	1.3
	Cylinder Head	Nut M8,Grade 10	2	30	3.1
	Cylinder head assy	Flanged Hex nut M8*1.25	1	30	3.1
	Inlet/Exhaust Rocker bearing assy	Hex Socket head cap screw M6*55	4	10	1
	Rocker cover assy	Bolts M7*1	3	14	1.4
		Hex head screw rocker cover mounting (seal bolt) M7*1	1	14	1.4
Gear Train	Pivot upper bearing assy	Hex Socket head Head cap screw M6*16	1	10	1
	Pivot lower bearing assy	Hex Socket head Head cap screw M5*40	1	6	0.6
Engine	Rear mounting bracket assy	Hex Nut with Nyloc insert M8	2	25	2.5
	Front munting bracket assy	Hex Nut with Nyloc insert M8	2	25	2.5
Clutch	Clutch Assy	Hex Nut with Nyloc insert M 16 *1.5	1	47	4.8

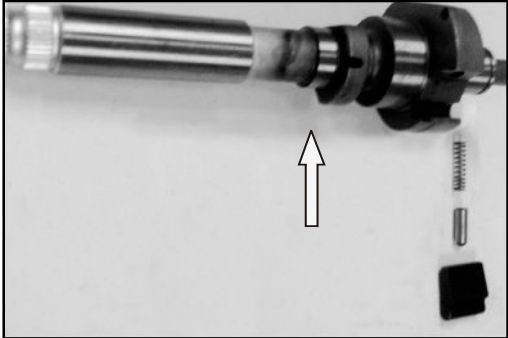
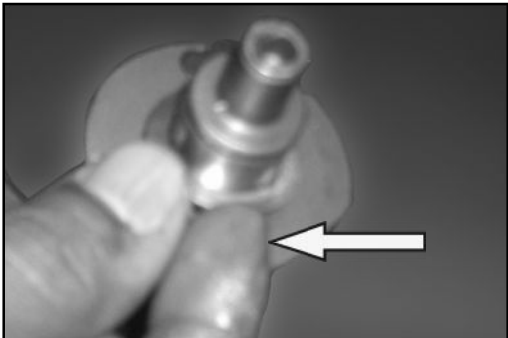
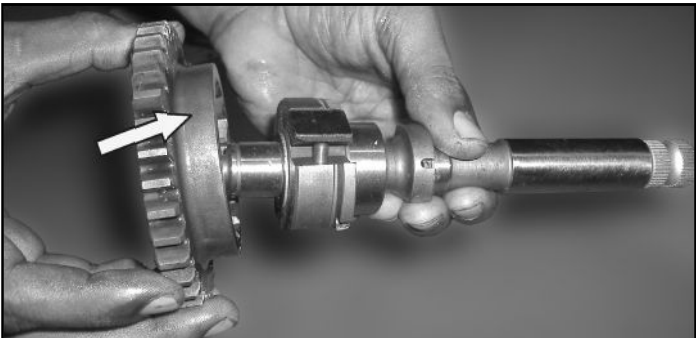
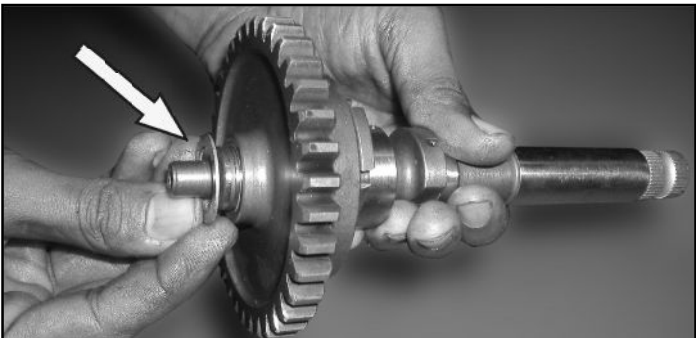
ENGINE ASSEMBLING SEQUENCE

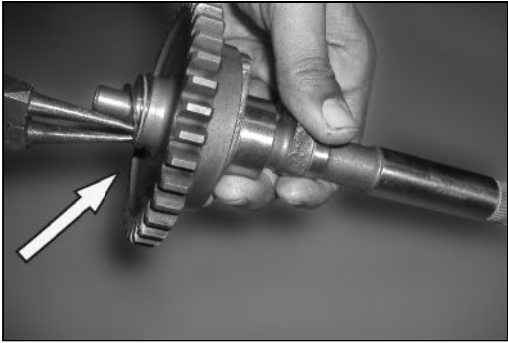
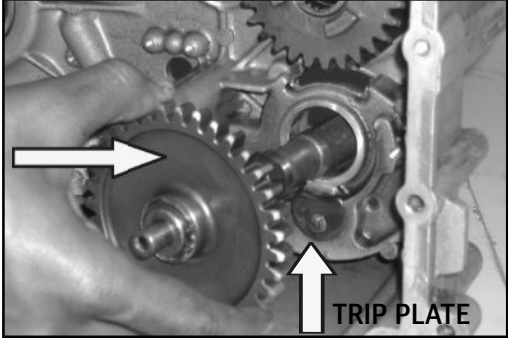
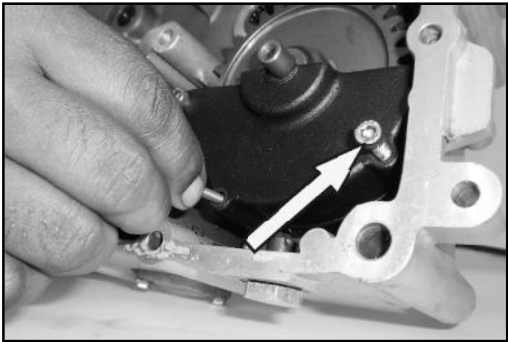
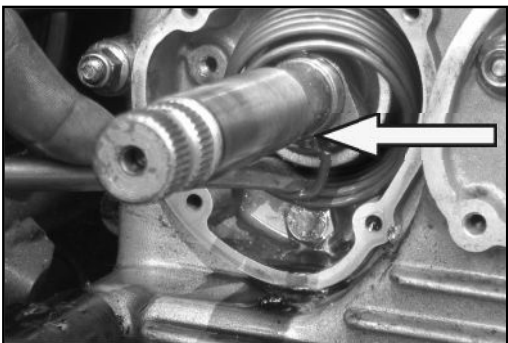
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.1	Engine Bearings Crankcase LH ■ Assemble Needle roller bearing for lay shaft. ■ Assemble clutch ball bearing (6006- C3) for main shaft. ■ Fix the clutch bearing retainer plate with 2 allen bolts (Torque 0.60 KG-M/6 NM). ■ Insert 1st circlip in Crank case Left.	NOTE: 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. Hex.Flange bolt M5 Allen Key 4mm    

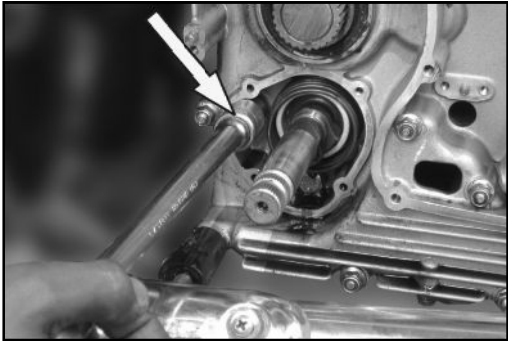
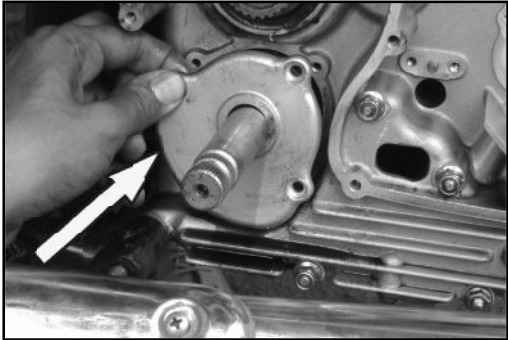
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.1	Engine Bearings Crankcase LH ■ Assemble 6305 - C3 bearing after 1st circlip. Insert 2nd circlip then bearing spacer in Crank case Left. ■ Assemble NU 305 big roller bearing after bearing spacer in Left Crank case for crankshaft.	 

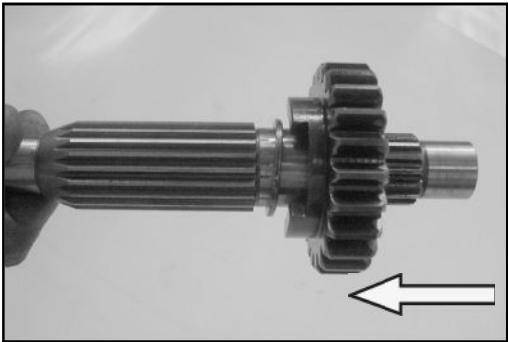
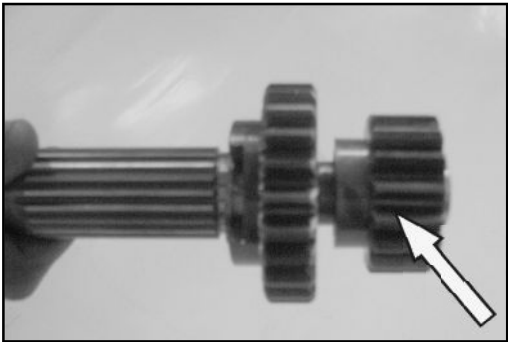
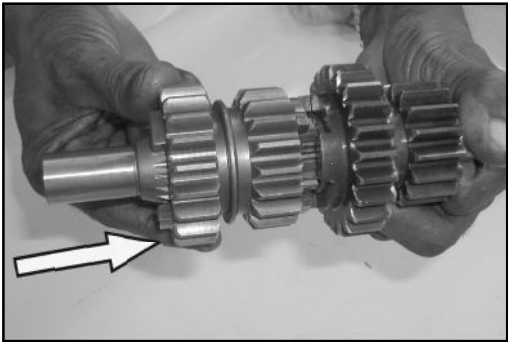
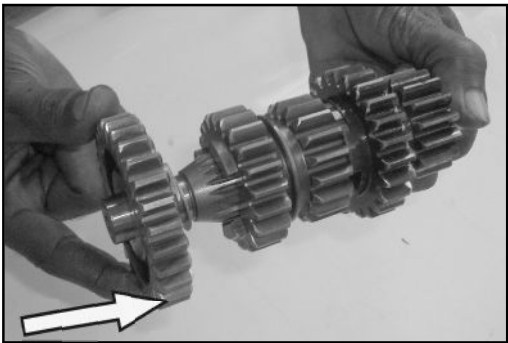
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.2	Engine Bearings Crankcase RH ■ Assemble Needle bearing for lay shaft. ■ Assemble sleeve gear ball bearing (6007 R1/ C3) and circlip. ■ Insert circlip and then assemble crankshaft Right side needle roller bearing into Crank case. ■ Assemble closed end needle bearing inside sleeve Gear.	NOTE: Ensure the rubber sealed face is facing the FD sprocket side, while assembling the 6007 bearing.

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.2	Engine Bearings Crankcase RH ■ Assemble open end needle bearing. Check bearing seating position and for free rotation.	

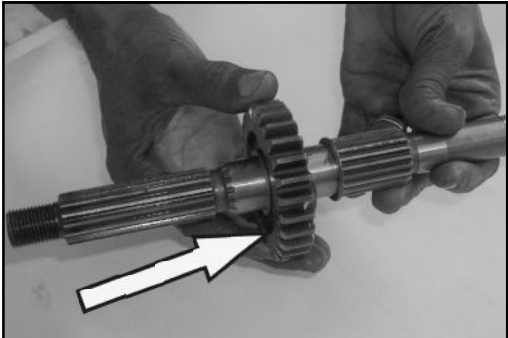
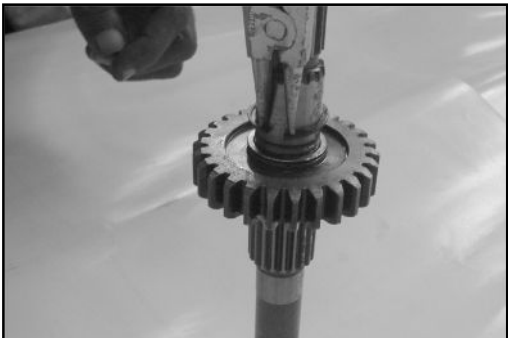
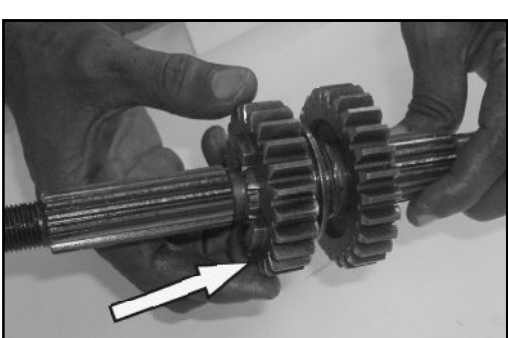
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.3	Kick Starter sub Assembly ■ Insert the spring, plunger and pawl in the kick starter spindle. ■ Fix the thrust washer on kick spindle. ■ Assemble the Kick pinion gear over kick pawl mechanism. ■ Insert the thrust washer above the kick spindle.	   

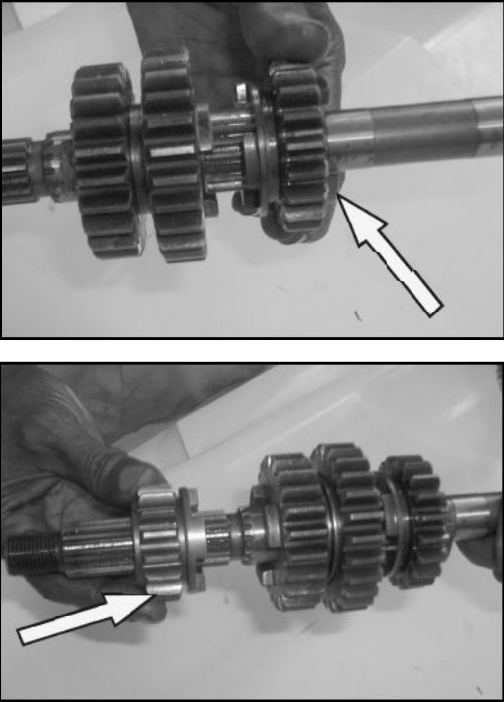
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.4	Kick Starter Shaft ■ Lock the circlip over kick sub assy. ■ Fix kickstarter sub assy in to Crankcase Right as shown in Fig. ■ Assemble oil thrower under the kickstarter Gear (Torque 0.6 KG-M). ■ Assemble Kick starter spring on kick starter stud that the inner lug is above & facing the stud & eyelet in facing down.	NOTE: Ensure free rotation of kick pinion gear while pressing down the kick pawl and plunger.  NOTE: Ensure kick pawl is seated over the trip plate in the Crank case Right. Rotate kick Gear and confirm free wheel movement.  Torque 0.6 KG-M  

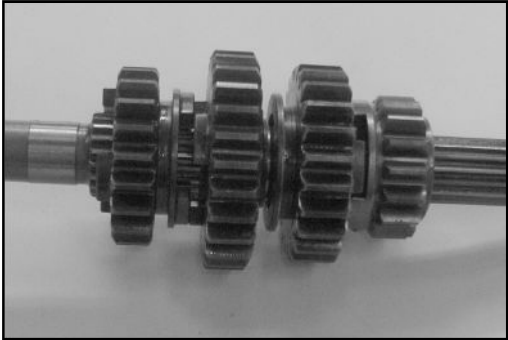
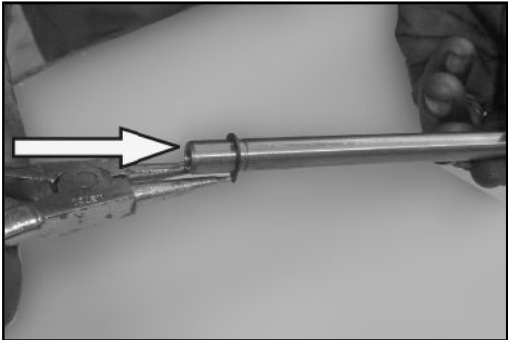
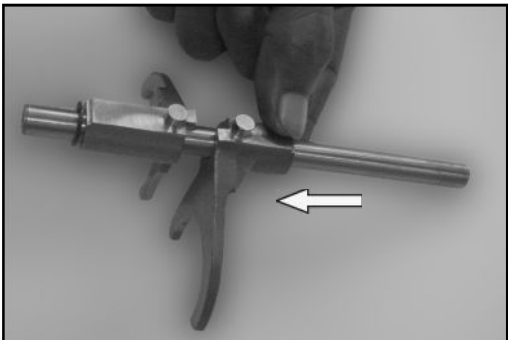
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.4	Kick Starter Shaft ■ Using a suitable rod inserted into spring eyelet rotate the spring clockwise till the eyelet matches the mounting hole in crankse RH . ■ Carefull reamin the rod while supporting the eyelet to prevent it from setting disturbed. ■ Insert the hext bolt into spring eyelet & tighten on crankcase RH. ■ Apply LOCTITE 5699 RTV silicon liquid gasket then assemble kick shaft Cover with oil seal on Crank case Right by 4 screws.	Hex bolt M6 Socket Spanner 10 mm  NOTE: Ensure oil seal is replaced before fixing kick shaft cover. Hex. Flange Screws M5 Allen Key 4 mm Torque 0.6 KG-M 

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.5	Layshaft Sub Assembly ■ Assemble thrust washer and then 2nd gear on layshaft. ■ Assemble High gear. ■ Assemble Double gear (Layshaft 3rd and 4th gear). ■ Assemble thrust washer and then Lay shaft 1st gear.	   NOTE: Ensure bottom pivot bearing smooth machined surface are facing upwards 

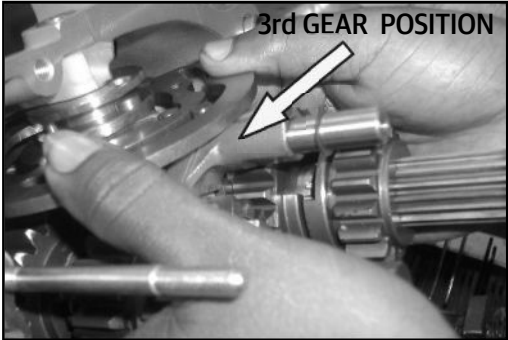
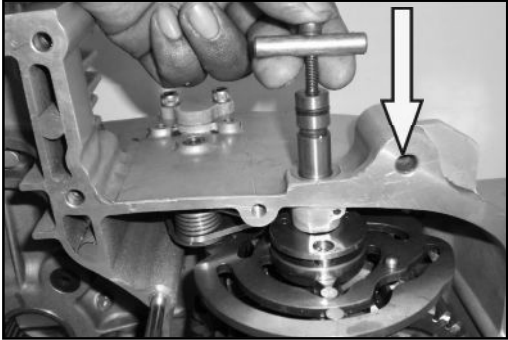
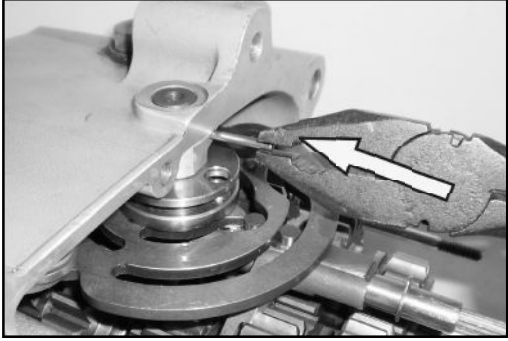
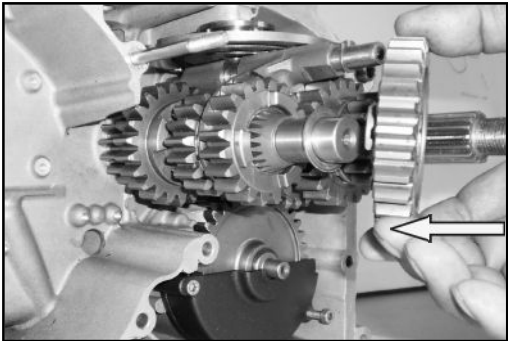
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.5	Layshaft Sub Assembly ■ Assemble rocker shaft upper pivot bearing with "O" ring with 2 bolts (Torque 1 KG-M).	Hex. Soc Hd Cap Screw M6 Allen Key 5mm Torque 1 KG-M

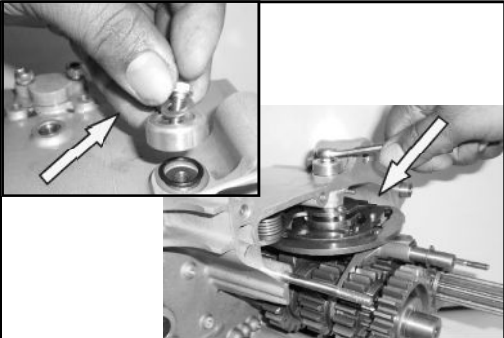
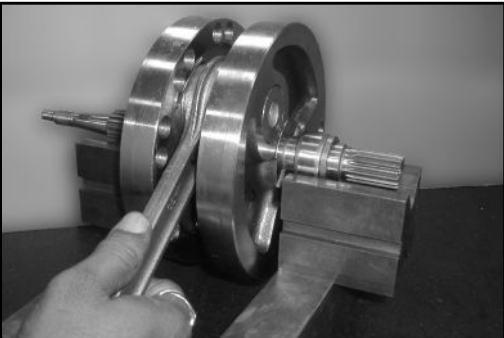
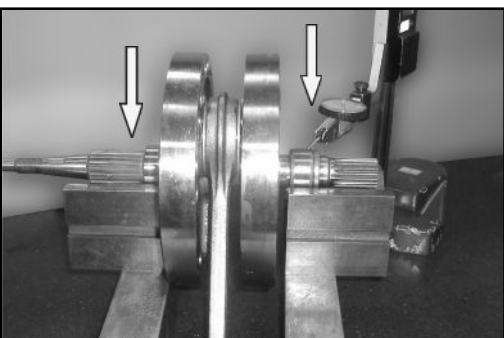
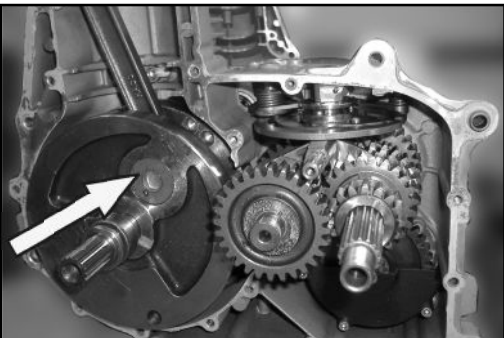
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Mainshaft Sub Assembly ■ Smear oil and assemble the 1st thrust washer and then the 4th gear on the main shaft. ■ Assemble 2nd thrust washer and fix circlip to lock the 4th Gear. ■ Smear oil on the 3rd & 4th gear with bush before assembly on Mainshaft. ■ Smear oil on the 3rd & 4th gear with bush before assembly on Mainshaft. ■ Assemble main shaft 3rd gear.	   

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Mainshaft Sub Assembly ■ Assemble main shaft 2nd gear. ■ Assemble main shaft 1st gear.	NOTE: Ensure 2nd gear selector fork groove side is facing towards Mainshaft 4th gear. 

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Main Shaft Sub Assembly ■ Assemble circlip on the selector shaft. ■ Assemble Left selector fork on the selector shaft and then insert centre fork so that the cut shoulders of both the forks are matched. ■ Assemble Right selector fork.	   

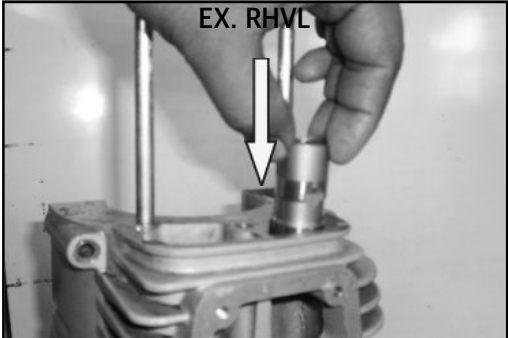
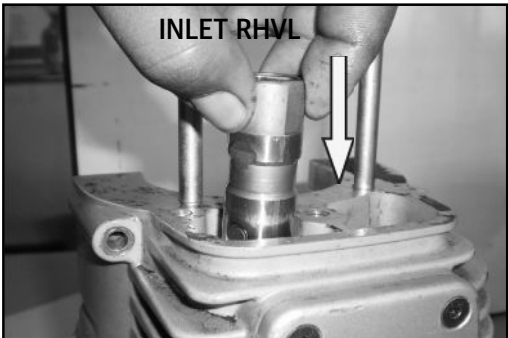
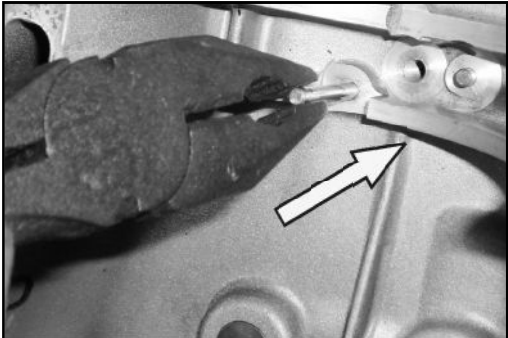
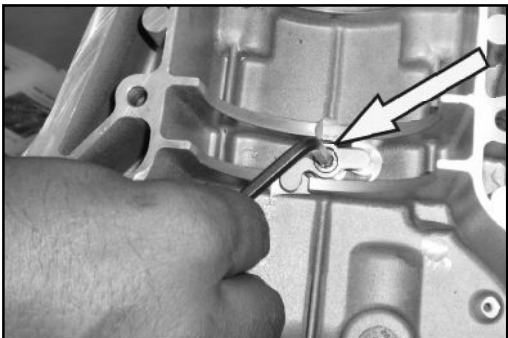
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Main Shaft Sub Assembly ■ Assemble selector fork sub assembly over main and Layshaft sub assy. ■ Always assemble the cam plate on selector fork sub assembly in 3rd gear position & ensure the 4 rollers are in good condition and located properly. ■ Locate special thrust washer (Layshaft) on Crank case Right and stick using grease. ■ Assemble the thrust washer, Layshaft 2nd gear & High gear with Lay shaft mounted on the Crank case Right.	NOTE: Ensure special thrust washer profile is facing towards sleeve gear. NOTE: Ensure alignment of main shaft with sleeve gear hole, fork shaft with fork hole inside the Crank case Right and sliding gear with lay shaft.

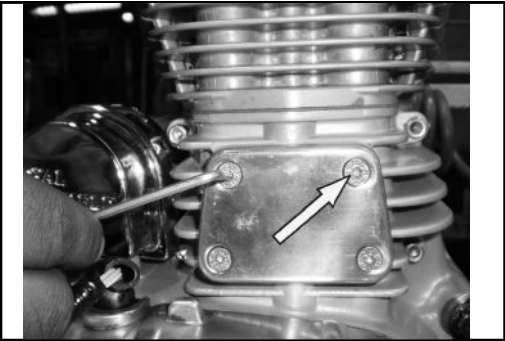
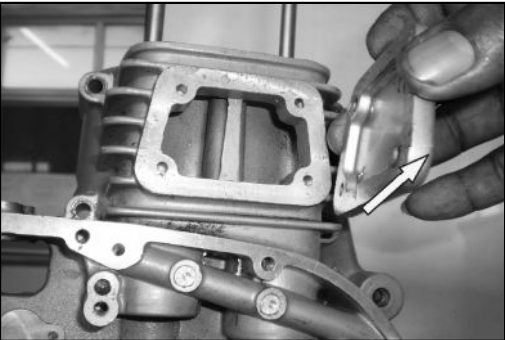
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Main Shaft Sub Assembly ■ Hold the cam plate and gear train sub assembly along with Fork shaft, Forks, Lay shaft double gear (Layshaft 3rd & 4th) and main shaft with all gears (in 3rd gear position). Gently slide inside the crankcase Right. ■ Insert cam plate pivot pin with "O" ring. ■ Insert 3 mm locating pin to lock pivot pin. ■ Assemble thrust washer and then Layshaft 1st gear on the Layshaft.	 3rd GEAR POSITION NOTE: Apply LOCTITE 577 thread sealant to pivot pin to avoid oil seepage if any. Special tool No. ST 25123-4  NOTE: Check Gear shifting system by rotating Cam plate and Main shaft sub assy while rotating the shafts simultaneously. Check for smooth gears engagement.  

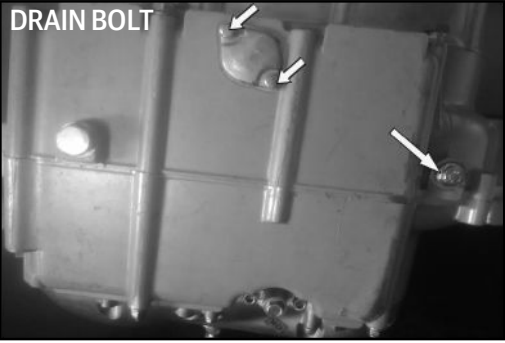
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Main Shaft Sub Assembly ■ Assemble "O" ring, cap pivot, copper washer and tighten bolt. ■ Check Crank shaft big end bearing axial play is within service limit. ■ Check Crank shaft run out is within service limit. ■ Assemble the crank shaft into the crankcase Right.	Hex Flange bolt M5 Socket spanner 8mm Torque 1 Kg-M    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 Right. 

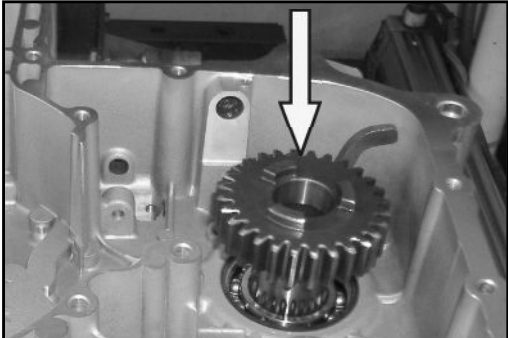
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Main Shaft Sub Assembly ■ Assemble the 2 dowel pins on the crankcase and apply LOCKTITE 5699 RTV silicon liquid gasket on the Right Crank case seating surface. ■ Assemble special thrust washer (lay shaft) on Crank case Left. ■ Apply gasket sealant on crankcase RH mating surface. ■ Insert the jack shaft into crankcase LH inner side. ■ Assemble the crankcase LH on crankcase RH ensuring - all shaft holes are aligned - The jack shaft is in position and does not fall off. - The crankcase joints are perfectly matched.	NOTE : Ensure special thrust washer profile facing towards Crank shaft bearing side on Left Crank case. CAUTION : Ensure gasket sealant not applied excess in & on bearings etc. CAUTION : Ensure jack shaft does not fall off while assembling on crankcase LH & RH.

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.6	Main Shaft Sub Assembly ■ Tighten crankcase stud nuts and allen screws diagonally and as per the sequence in the illustration shown. ■ The crankcase can be assembled on the vehicle. ■ Ensure the woodruff key is located correctly on the jack shaft. ■ Locate idle gear on jackshaft ensure - Step face is facing crankcase LH inside. - Locate proper ends on woodruff key.	CAUTION : During tightening rotate shaft to ensure freeness. CAUTION : Ensure barrel seating area is suitable covered while assembling crankcase on the vehicle. NOTE: Ensure step face of jack shaft gear facing crankcase LH inside. NOTE: Ensure smaller gear is facing crankcase LH inside & meshes with idler gear

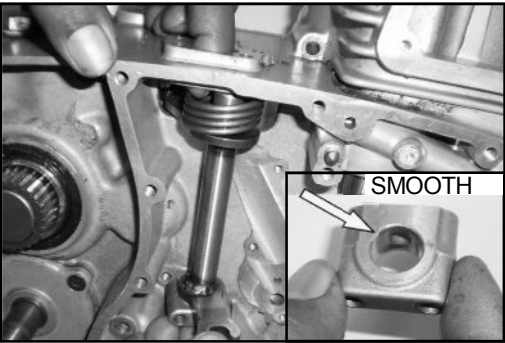
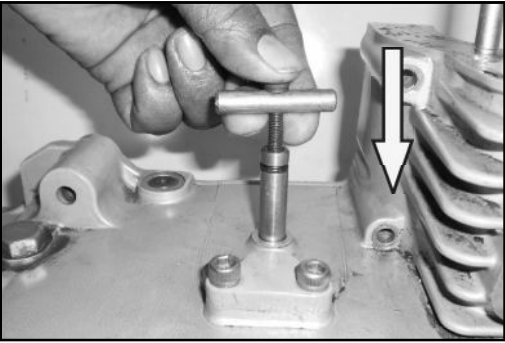
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.7	Hydraulic Tappets ■ Insert hydraulic tappet in crankcase RH with the roller facing down. - Ensure small oil hole in facing oil galler in crankcase RH - Ensure the rollers in perpendicular to the cam spindle. ■ Locate needle roller pin inside crankcase RH to lock hydraulic tappet from rotation. ■ Locate bracket pin over needle roller pin of hydraulic valve lifter and tighten with hex socket screw.	Please ensure the roller should be facing downwards during assembly.   Ensure hydraulic tappet free up & down movement  Hex socket screws M6 Allen Key 45 mm Torque 1 KG-M 

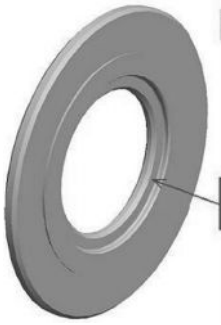
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.7	Hydraulic Tappets ■ Locate tappet cover on crankcase RH. ■ Tighten 4 hex socket csk head screws.	Hex Socket CSK head Screw M5 Allen Key 4 mm  

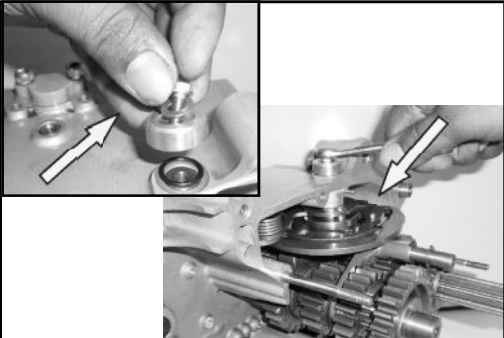
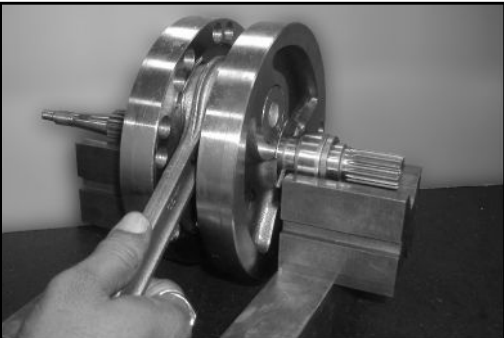
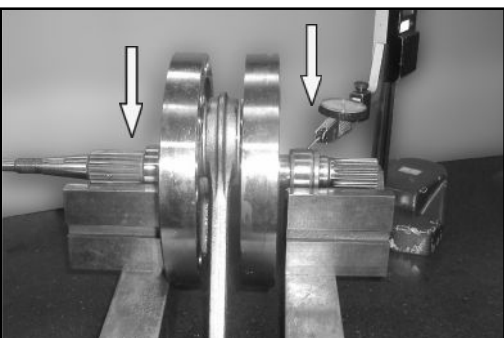
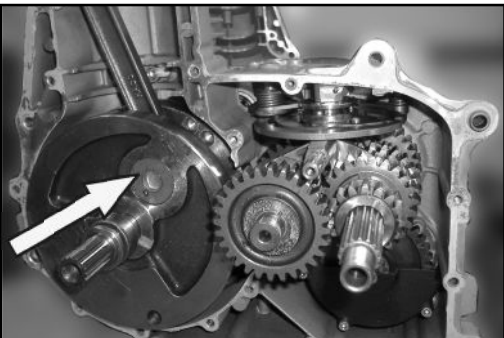
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.8	Drain Plug ■ Assemble magnetic drain plug assy with O ring on crankcase Right.	NOTE: Apply LOCKTITE 542 thread sealant before assembling the drain plug. Hex flange bolt M5 Socker Spanner 8mm Torque 2 KG-M 

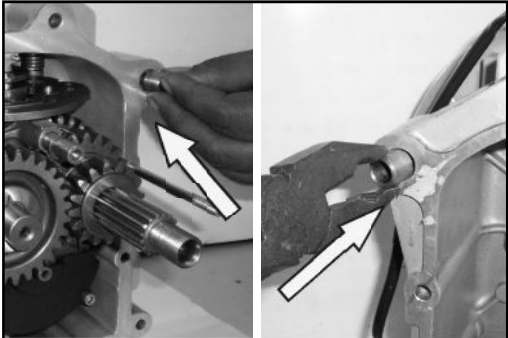
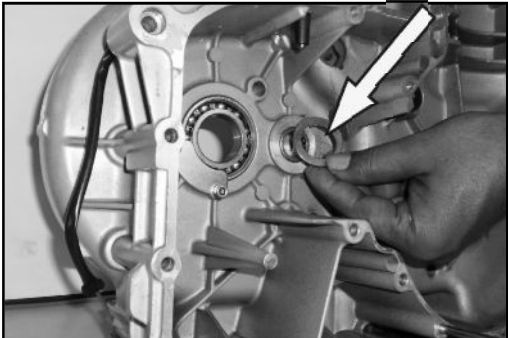
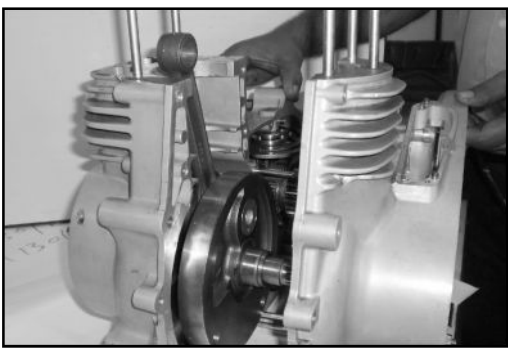
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.9	Gear Train ■ Insert sleeve Gear into Crankcase Right.	NOTE: Do not hammer directly over sleeve Gear. 

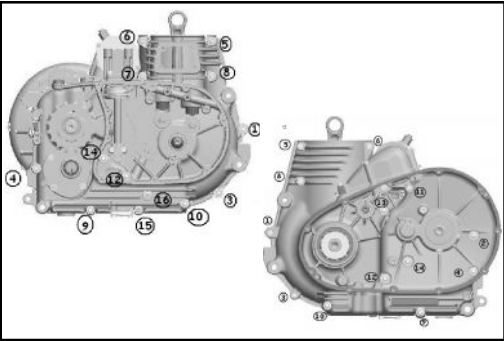
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.10	Gear Rocker Shaft on Crankcase RH outer ■ Locate gear change spring on rocker shaft assy. ensuring the ends are correctly position at the rocker shaft. Locate spacer inside the spring. ■ Assemble striker spring on rocker shaft assy.	NOTE: Ensure striker spring both ends are seated on striker lever rocker shaft.

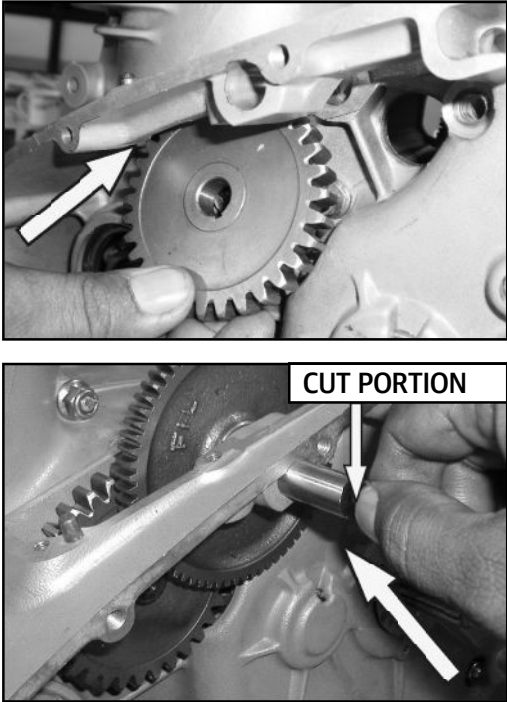
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.10	Gear Rocker Shaft on Crankcase RH outer ■ Assemble rocker shaft sub assy. carefully into Crankcase RH such that the striker is facing RH towards rear inner side of crankcase RH. ■ Ensure lower pivot bearing loctite pin is in place in crankcase RH. ■ Insert lower pivot bearing on rocker shaft with its maching side facing the rocker shaft. ■ Assemble lower pivot bearing bolts. ■ Align lower pivot bearing mounting holder to crankcase RH & locate 2 hext socket screw. ■ Assemble upper pivot bearing crankcase RH outside & tighten with 2 hex socket head screw. ■ Tighten lower pivot bearing hex socket head cap screw. ■ Use Special tool to assemble rocker return spring stop pin along with 'O' ring.	 Hex Soc Head Cap Screw M5 Allen Key 4 mm Torque 0.6 KG-M NOTE: It is recommended to tighten the upper pivot bearing first and then the bottom pivot bearing hex screw.  NOTE: Apply thread lock sealant before fixing spring stop pin to avoid oil seepage. Special tool No. ST 25123-4 Hex Socket Head Cap Screw M5 Allen key 4mm 

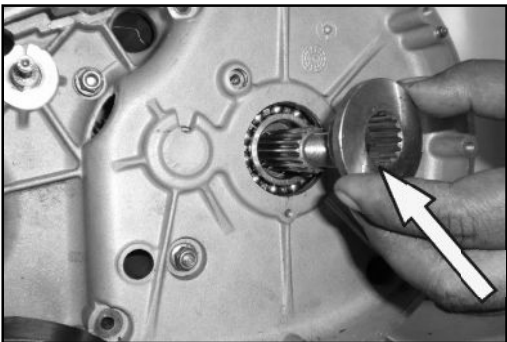
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.10	Gear Rocker Crank-case RH inner Assemble bolt pawl into Crank Case Right as shown in Fig. Fix cam plate return spring, pawl cam plate with machined washer and nyloc nut.	CAUTION : This double stepped face should be inside. Torque 2 KG-M Pawl Bolt Torque 1 KG-M Nyloc Nut 

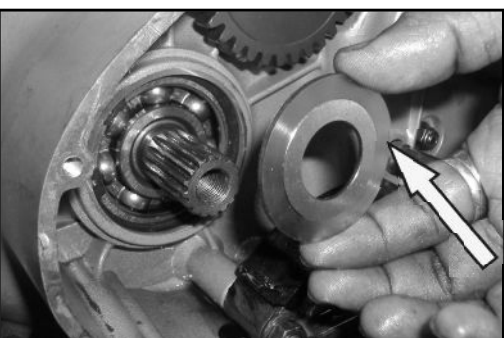
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.11	Crankcase LH & RH ■ Assemble "O" ring, cap pivot, copper washer and tighten bolt. ■ Check Crank shaft big end bearing axial play is within service limit. ■ Check Crank shaft run out is within service limit. ■ Assemble the crank shaft into the crankcase Right.	Hex Flange bolt M5 Socket spanner 8mm Torque 1 Kg-M    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 Right. 

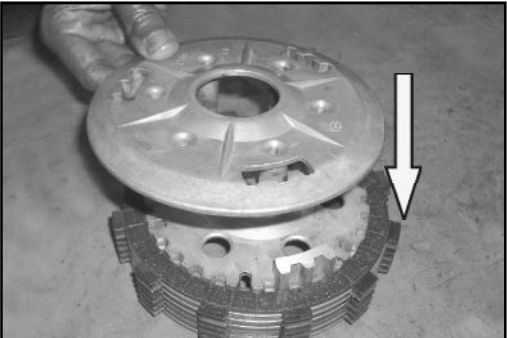
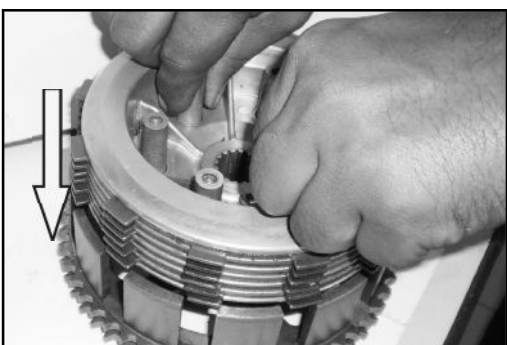
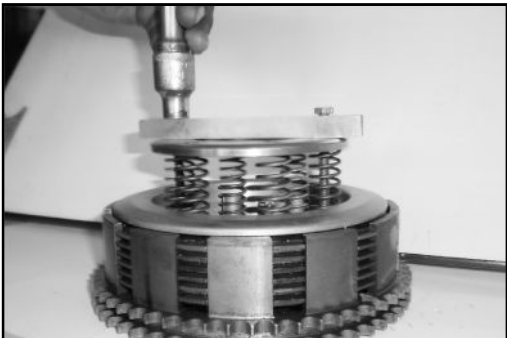
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.11	Crankcase LH & RH ■ Assemble the 2 dowel pins on the crankcase and apply LOCKTITE 5699 RTV silicon liquid gasket on the Right Crank case seating surface. ■ Assemble special thrust washer (lay shaft) on Crank case Left. ■ Apply gasket sealant on crankcase RH mating surface. ■ Insert the jack shaft into crankcase LH inner side. ■ Assemble the crankcase LH on crankcase RH ensuring - all shaft holes are aligned - The jack shaft is in position and does not fall off. - The crankcase joints are perfectly matched.	 NOTE : Ensure special thrust washer profile facing towards Crank shaft bearing side on Left Crank case.  CAUTION : Ensure gasket sealant not applied excess in & on bearings etc.  CAUTION : Ensure jack shaft does not fall off while assembling on crankcase LH & RH.

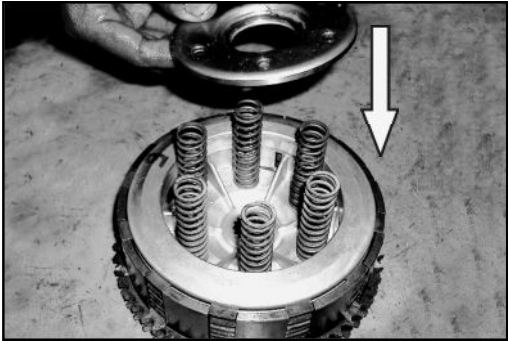
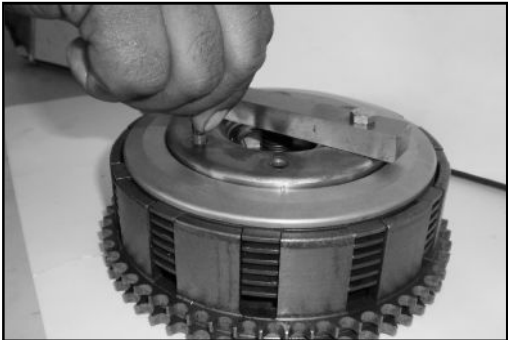
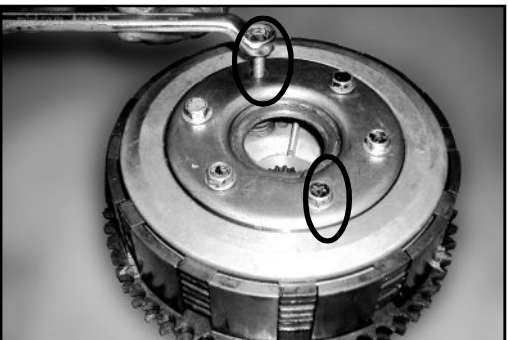
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.11	Crankcase LH & RH ■ Tighten crankcase stud nuts and allen screws diagonally and as per the sequence in the illustration shown. ■ The crankcase can be assembled on the vehicle. ■ Ensure the woodruff key is located correctly on the jack shaft. ■ Locate idle gear on jackshaft ensure - Step face is facing crankcase LH inside. - Locate proper ends on woodruff key.	CAUTION : During tightening rotate shaft to ensure freeness. CAUTION : Ensure barrel seating area is suitable covered while assembling crankcase on the vehicle. NOTE: Ensure step face of jack shaft gear facing crankcase LH inside. NOTE: Ensure smaller gear is facing crankcase LH inside & meshes with idler gear 

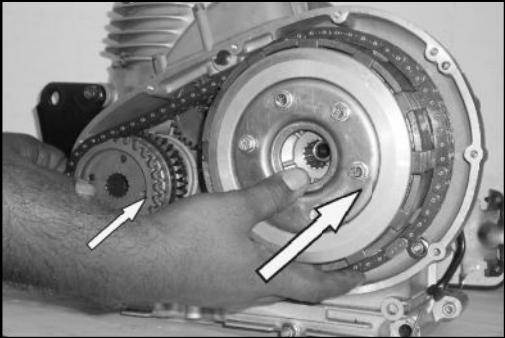
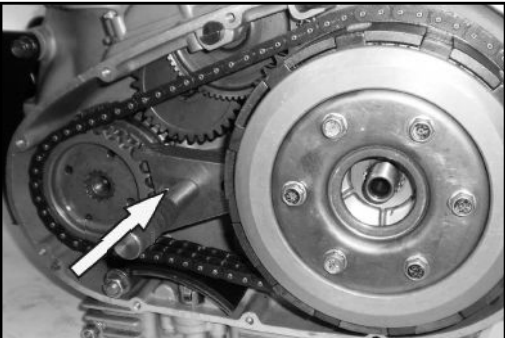
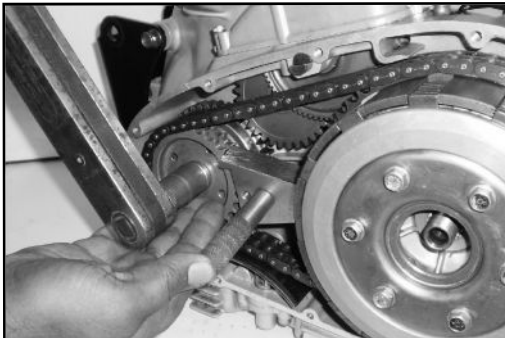
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.12	Starter Double Gear ■ Locate the double gear in the crankcase LH and insert shaft. ■ Ensure cut portion of shaft is facing upwards.	 The top photograph shows a hand inserting a shaft into a gear. The bottom photograph shows a hand adjusting the shaft, with a label 'CUT PORTION' and an arrow pointing to the cut end of the shaft.

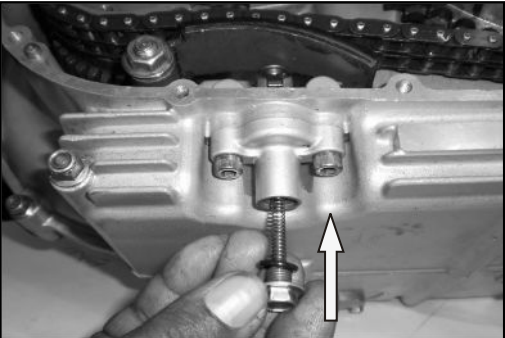
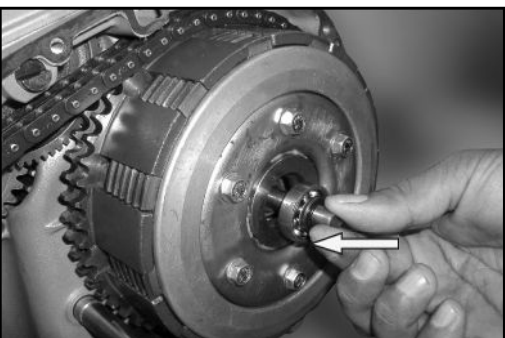
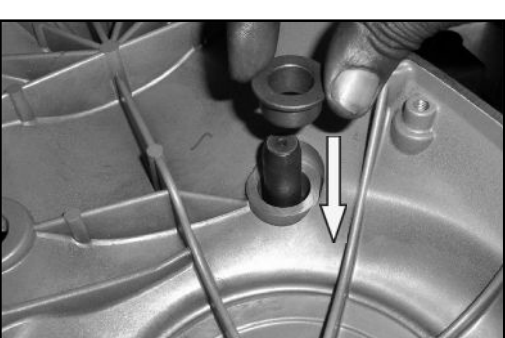
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.13	Auto Chain Tensioner ■ Assemble the primary chain auto chain tensioner body assy. with "O" ring and tighten with 2 allen screws (Torque 1 KG-M). ■ Assemble chain tensioner pad, washer and hex nut. ■ Assemble collar on main shaft (distance collar on	Hex Soc. Hd Cap Screw M6 Allen Key 5 mm Torque 1 KG-M  Hex.Flange U Nut 8mm Ring Spanner 10mm Torque 2.5 KG-M  

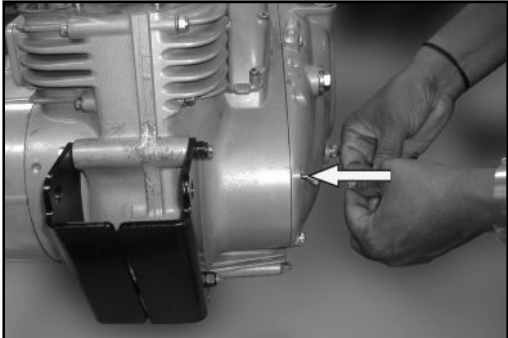
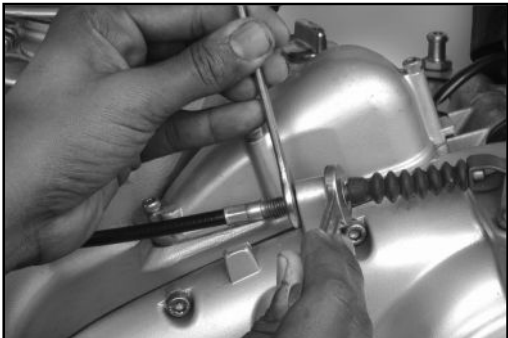
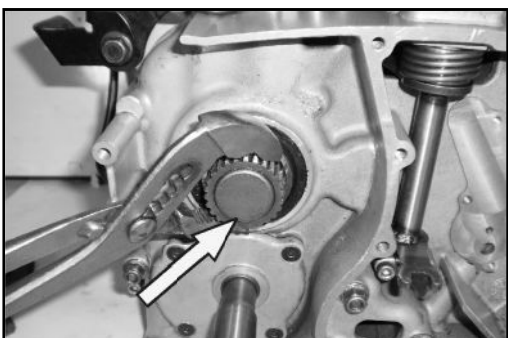
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.14	Sprag Clutch Assembly ■ Assemble sprag clutch bearing into gear with the wide flange facing outside. ■ Locate engine sprocket into sprag clutch & gently press inside simultaneously rotating anticlockwise. ■ Assemble spacer (distance washer) on Crankshaft Left.	NOTE: Ensure wide flanges face of the sprag clutch bearing must face outwards. CAUTION : Lubricate the needle bearing well before assembling on the sprag clutch.   

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.15	Sub Assembly of Clutch Plates ■ Assemble clutch friction plate over clutch hub and then clutch plain plate. Similarly follow the same to sub assemble all the clutch plates. ■ 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.	CAUTION : Ensure smooth face of all clutch plain plates are kept in the same direction to avoid clutch jerk / slippage.    Special tool No. ST-25594-4 Hex. Bolt M6 Socket Spanner 8 mm 

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.15	Sub Assembly of Clutch Plates ■ Use Special 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. ■ Remove the 2 long bolts and the special tool. Fix the 2 hex bolts. ■ Locate clutch sprocket engine in primary chain, assembly as a set on the main shaft & crankshaft respectively . ■ Locate thrust washer in clutch sprocket.	NOTE: Tighten bolts diagonally and evenly 5 threads each (Torque 1 KG-M).    

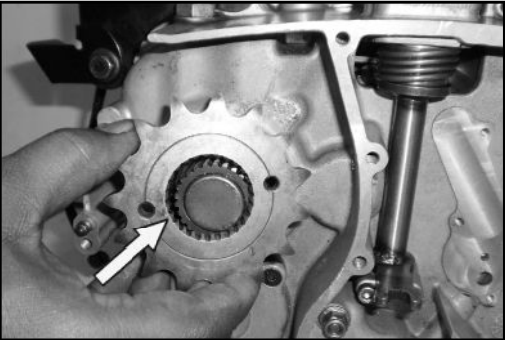
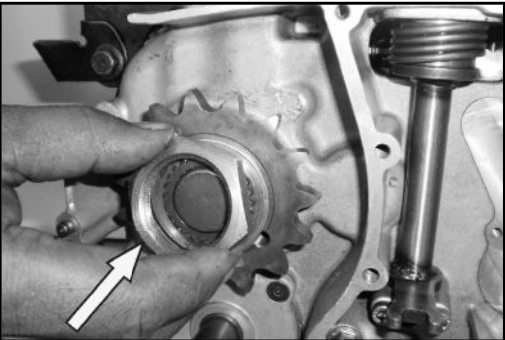
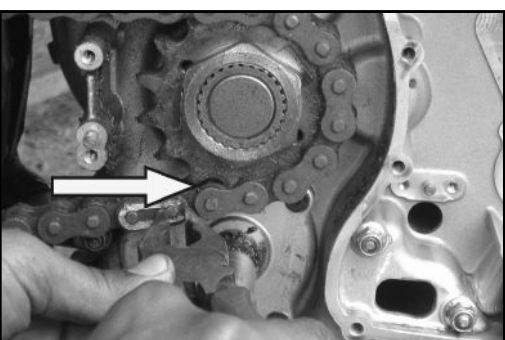
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.16	Assembly of Clutch ■ Assemble clutch plate assy on main shaft ensuring the splines in clutch hub mate with main shaft & the clutch plate lugs match with clutch sprocket. ■ Locate Special tool between Clutch sprocket and engine sprag clutch assy. ■ Fix hex head bolt with washer on sprag clutch assy. ■ Fix the washer and nyloc hex nut over clutch assembly and tighten.	Special tool No. ST 25591-4   Hex Flange Bolt M17 Socket Spanner 24 mm Torque 4.8 Kg-M  Nyloc Nut M20 Socket Spanner 24 mm 

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
12.16	Assembly of Clutch ■ Use Torque wrench to tighten the nyloc nut on Clutch. ■ 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.	Torque 4.2 Kg-M Hex Flange Screw M5 Allen Key 4mm	   

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.17	Cover LH ■ Locate 11 allen screws on cover Left and tighten. ■ Assemble clutch cable on Crank case cover Left and fix to clevis. ■ Assemble Sleeve gear Spacer over sleeve as.	Hex Flange bolt M6 Allen Key 5mm Torque 1 Kg-M   

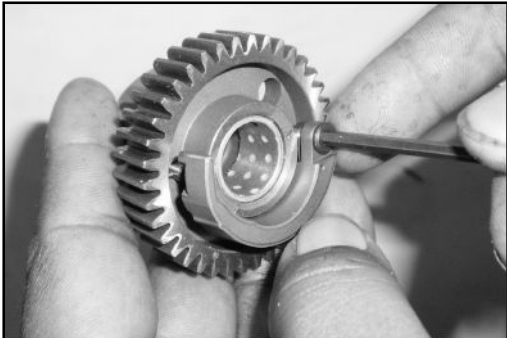
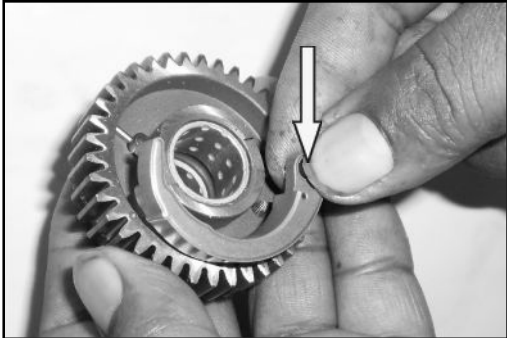
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.17	Cover LH ■ Assemble clutch operating shaft assembly on cover LH. ■ Assemble spring for clutch operating shaft and lock the pin. ■ Assemble oil filler plug with "O" ring. ■ Assemble the cover LH on Crank case LH.	NOTE: Ensure 2 Nos. dowel pins are located properly. Apply LOCKTITE 5699 RTV silicon liquid gasket.

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.17	Cover LH ■ Assemble gear lever oil seal on cover Left . ■ Assemble Clutch operating shaft oil seal.	 

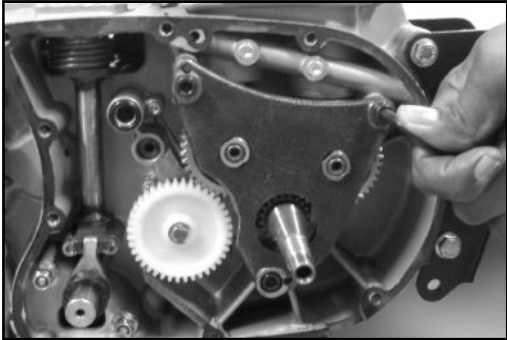
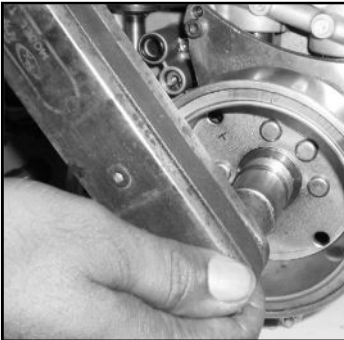
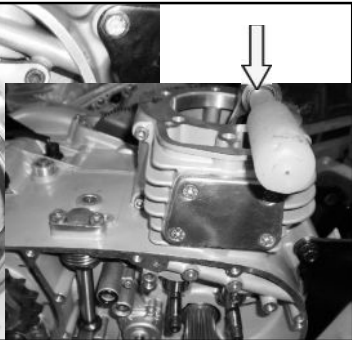
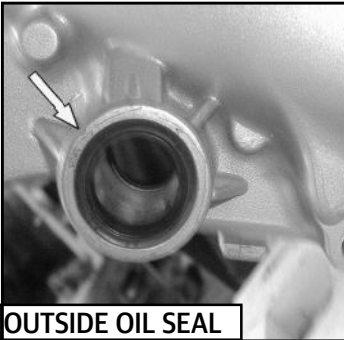
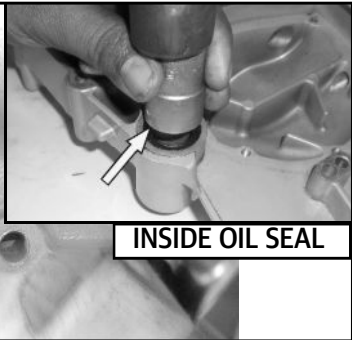
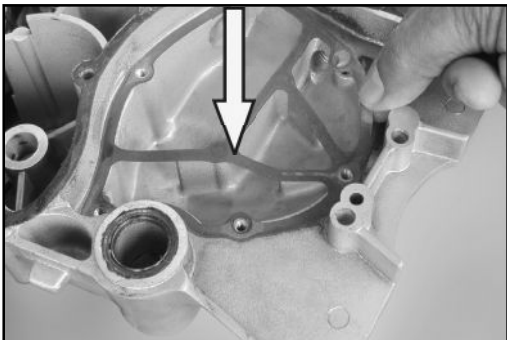
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.18	FD Sprocket ■ Assemble FD Sprocket. ■ Assemble lock type washer and nut (Torque 7.5 KG-M). ■ Lock the tab over the FD sprocket nut. ■ Fix Rear Chain master link, plate and lock clip.	NOTE: Care to be taken while fixing the FD sprocket direction circular groove index mark, facing outwards. Hex Flange U Nut Socket Spanner 24 mm Torque 7.5 Kg-M    

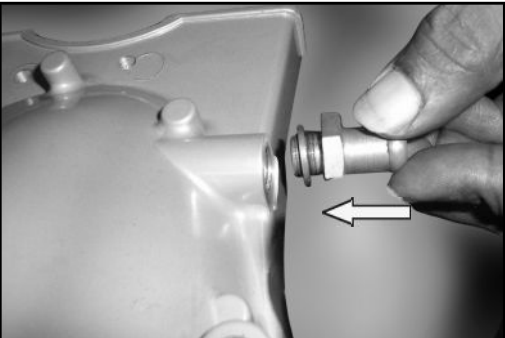
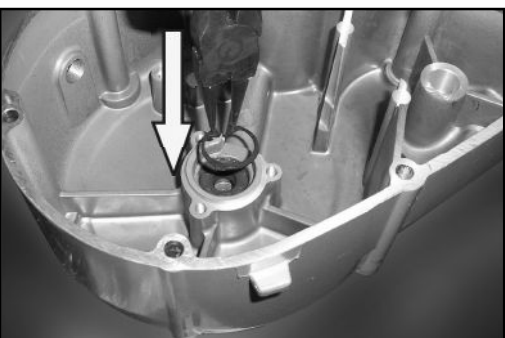
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.19	Gear Shift Assembly ■ Locate the rocker shaft assembly on crankcase RH. ■ Install 2 Hex holding the lower pivot bearing ■ Install 2 hex screws and locate the rocker shaft upper pivot bearing with "O" ring. ■ Locate Special tool on rocker shaft return spring pivot pin with "O" ring & gently push the pivot pin into the Crankcase RH. ■ Locate Gear shift shaft with spacer on RH side. ■ Locate Gear change lever on gear shift shaft on LH side	Hex Socket Head Cap Screws M5 Allen Key 4mm Torque 0.6 Kg-M Hex Socket Head Cap Screws M6 Allen Key 5mm Torque 1 Kg-M Special Tool No : ST-25123-4

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.20	Oil Pump ■ Assemble oil pump on Crank case Right and tighten with 4 allen screws (Torque 0.35 to 0.6 KG-M). ■ Fix the woodruff key carefully on Crankshaft. ■ Assemble Gear lever shaft assembly into Right Crank case window and then fix gear shaft spacer.	CAUTION : Ensure "O" ring is located on the oil pump body outlet.

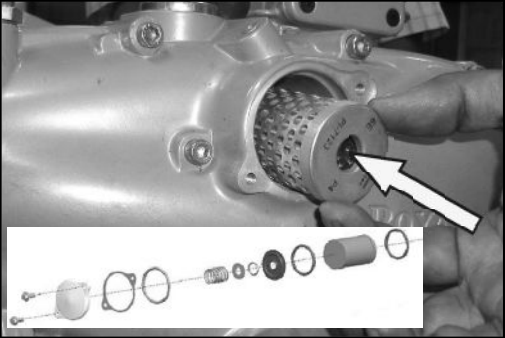
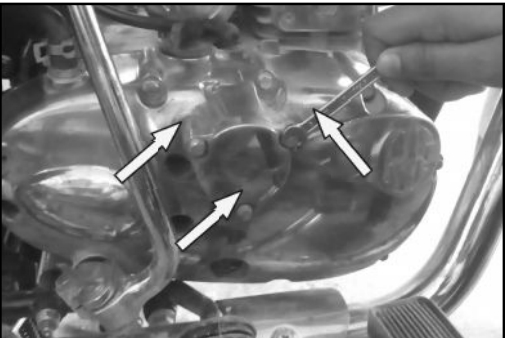
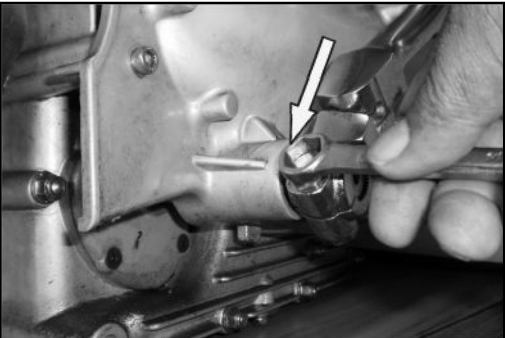
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.21	Auto Decompressor ■ Locate the actuating pin in the Exhaust cam. ■ Assemble the flyweight along with return spring over activating pin and tighten with allen screw. ■ Lubricate and ensure free movement of the returning of the flyweight.	  NOTE: Ensure spring eyelet is seated properly inside flyweight hole. 

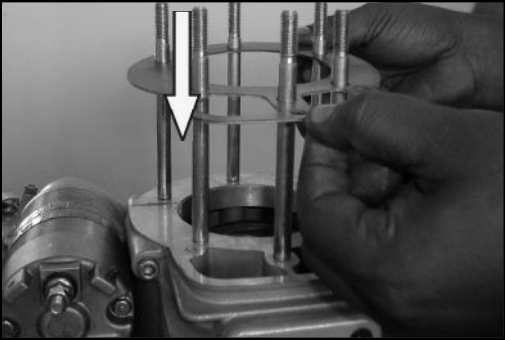
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.22	Assembly Procedure of Cam Gears ■ Locate the exhaust cam on the spindle and ensure the 2 punch marks on the cam aligns with the punch mark on the timing shaft gear. ■ Locate the inlet cam on the spindle and align the single punch marks on the inlet and exhaust cams. ■ Fix oil pump drive pinion and lock it with the circlip. ■ Add one shim each on inlet and exhaust cam. ■ Fix Cam steady plate and check for axial play of Cam Gears to avoid noise problem.	NOTE: After assembling both cam gears, adjust Eccentric cam to reduce gear backlash (Torque 2 KG-M). NOTE: Ensure the short boss of the gear is facing outwards. NOTE: To reduce axial play in between Cam Gears outer surface and steady late, additional shim may be added as per need. Hex Socket ScreW M6 Allen Key 5 mm Torque 1 Kg-M

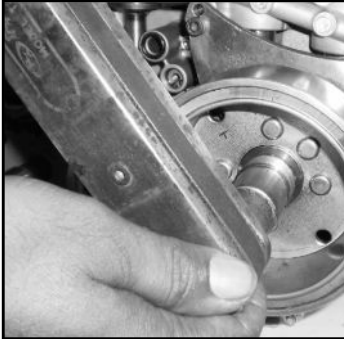
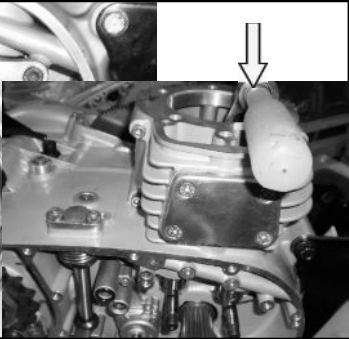
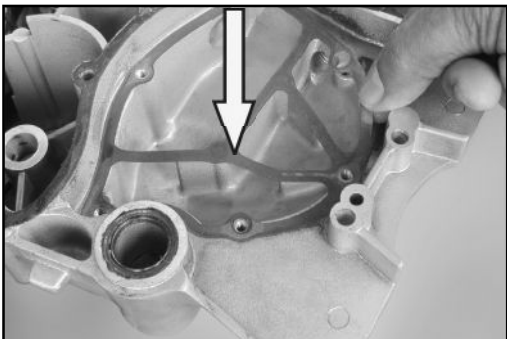
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
1222	Assembly Procedure of Cam Gears ■ Assemble the dowels and allen screws on Cam steady plate and tighten (Torque 1 KG-M). ■ Assemble magneto rotor, plain washer and nut and tighten (Torque 4.8 KG-M) by using Special tool. ■ Fix oil seal 2 Nos. at Kick Shaft hole on Crank case Right cover. ■ Fix breather chamber gasket.	 Special tool No. ST 25592-4     OUTSIDE OIL SEAL INSIDE OIL SEAL 

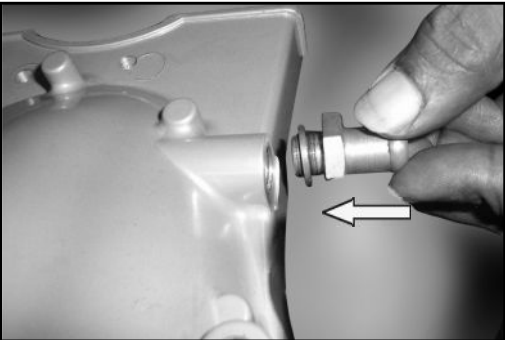
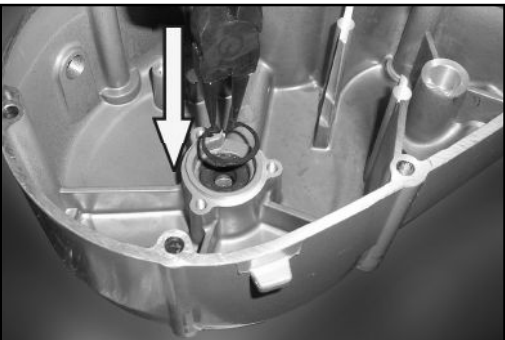
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
12.22	Assembly Procedure of Cam Gears ■ Assemble 6 allen screws to fix breather chamber cover plate (Torque 0.60 KG-M). ■ Assemble Breather bolt and washer. ■ Assemble Ignition Timing inspection bolt with copper washer (if not assembled earlier). ■ Assemble jet Crankshaft, oil seal Crank feed and circlip on cover Right inside.	Hex.Socket Hd Cap Screw M5 Allen Key 4 mm Torque 0.6 KG-M Torque 2 KG-M Torque 1.5 KG-M NOTE: Replace the oil seal every 20,000 kms interval.	   

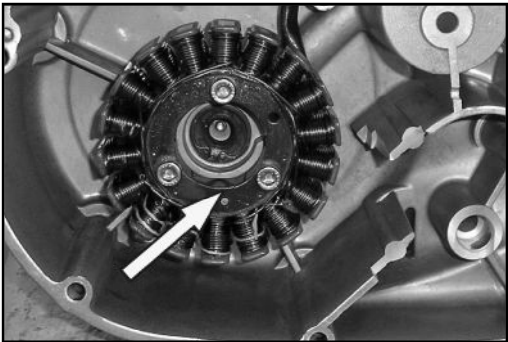
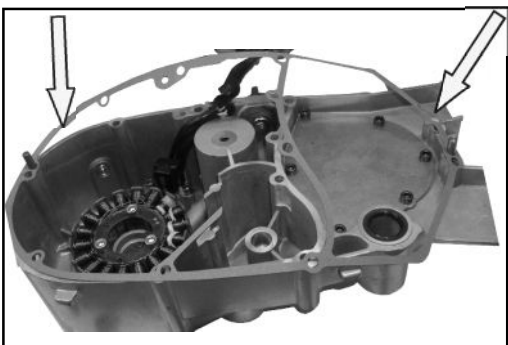
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.22	Assembly Procedure of Cam Gears ■ Assemble Stator on cover Right and tighten with 3 mounting screws (Torque 1 KG-M). ■ Assemble Pulser coil on cover Right and tighten with 2 screws (Torque 1 KG-M). ■ Assemble 2 dowels and Right Crank case cover gasket. ■ Assemble cover Right carefully by aligning kickshaft and dowels. ■ Fix cover Right and tighten with 11 allen screws (Torque 1 KG-M).	Hex Soc. Hd Cap Screws M5 Allen Key 4 mm Torque 1 KG-M NOTE: Apply LOCKTITE 595 silicon adhesive sealant to magneto wire cable grommet to avoid oil seepage. Hex Soc. Hd.Cap Screw M6 Allen Key 5 mm Torque 1 KG-M

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.22	Assembly Procedure of Cam Gears ■ Assemble the "O" rings, Oil filter element, washer and plate as shown. ■ Assemble "O" ring, Spring and gasket oil filter cap. ■ Assemble oil filter cover (Torque 0.60 KG-M). ■ Assemble kickstarter lever (Torque 2.5 KG-M).	 CAUTION : Care must be taken while fixing cover due to spring force and gasket.   Torque 2.5 Kg-m 

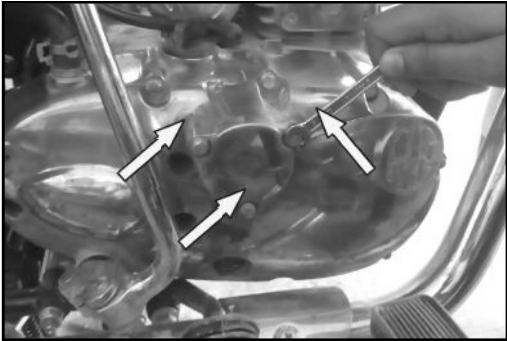
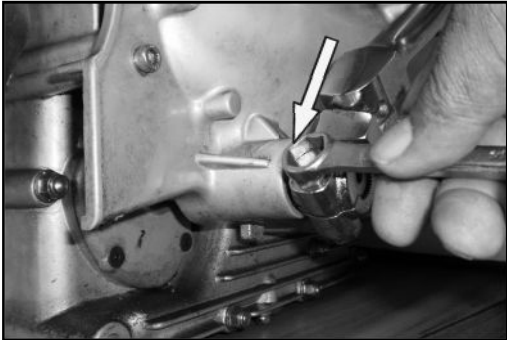
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.22	Assembly Procedure of Cam Gears ■ Fix Cylinder barrel bottom Gasket.	

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.23	Assembly of Rotor Assembly ■ Assemble magneto rotor, plain washer and nut and tighten (Torque 4.8 KG-M) by using Special tool. ■ Fix oil seal 2 Nos. at Kick Shaft hole on Crank case Right cover. ■ Fix breather chamber gasket.	Special tool No. ST 25592-4     INSIDE OIL SEAL OUTSIDE OIL SEAL 

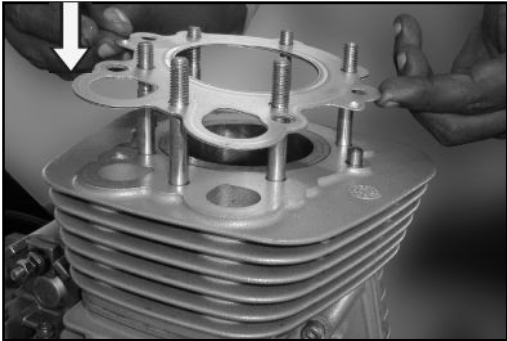
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
12.23	Assembly of Rotor Assembly ■ Assemble 6 allen screws to fix breather chamber cover plate (Torque 0.60 KG-M). ■ Assemble Breather bolt and washer. ■ Assemble Ignition Timing inspection bolt with copper washer (if not assembled earlier). ■ Assemble jet Crankshaft, oil seal Crank feed and circlip on cover Right inside.	Hex.Socket Hd Cap Screw M5 Allen Key 4 mm Torque 0.6 KG-M 	
		Torque 2 KG-M 	
		Torque 1.5 KG-M 	
		NOTE: Replace the oil seal every 20,000 kms interval. 	

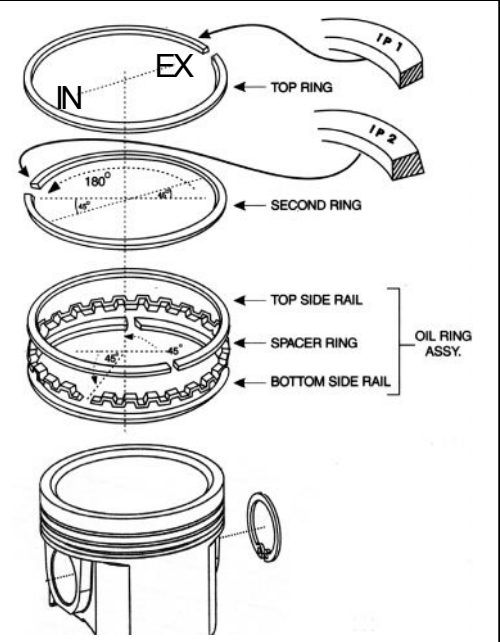
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.23	Assembly of Rotor Assembly ■ Assemble Stator on cover Right and tighten with 3 mounting screws (Torque 1 KG-M). ■ Assemble Pulser coil on cover Right and tighten with 2 screws (Torque 1 KG-M). ■ Assemble 2 dowels and Right Crank case cover gasket.	Hex Soc. Hd Cap Screws M5 Allen Key 4 mm Torque 1 KG-M NOTE: Apply LOCKTITE 595 silicon adhesive sealant to magneto wire cable grommet to avoid oil seepage. Hex Soc. Hd.Cap Screw M6 Allen Key 5 mm Torque 1 KG-M   

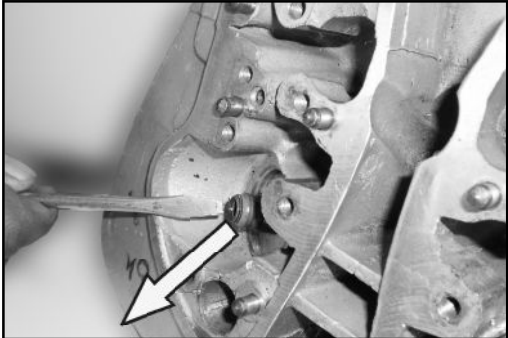
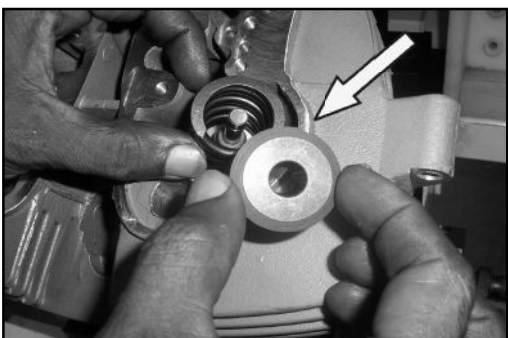
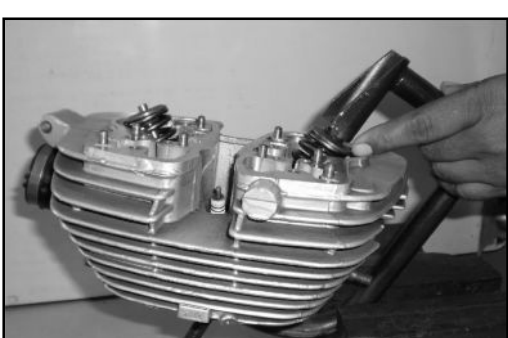
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.24	Assembly of RH Cover ■ Assemble 2 dowels and Right Crank case cover gasket. ■ Assemble cover Right carefully by aligning kickshaft and dowels. ■ Fix cover Right and tighten with 11 allen screws (Torque 1 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.

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.24	Assembly of RH Cover ■ Assemble oil filter cover (Torque 0.60 KG-M). ■ Assemble kickstarter lever (Torque 2.5 KG-M).	 Torque 2.5 Kg-m 

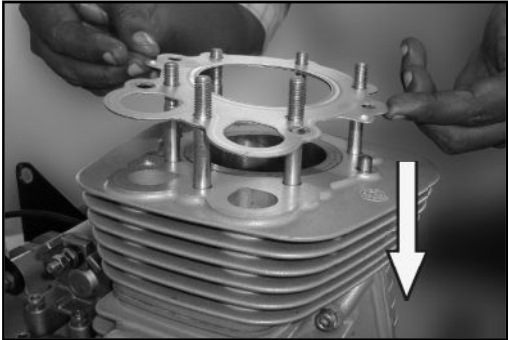
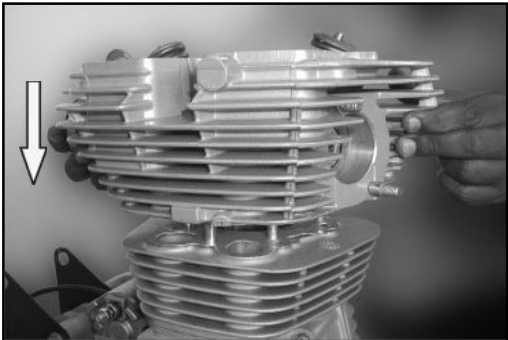
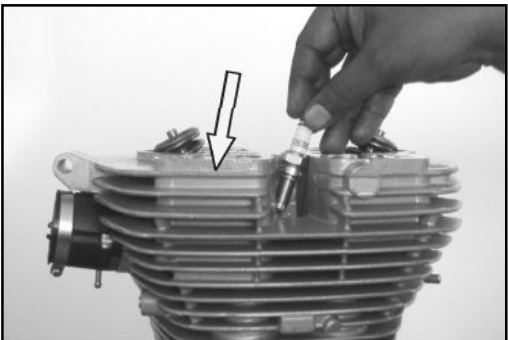
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.25	Starter motor & housing ■ Fix the dowels in the crankcase and carefully fix the motor with housing starter drive. Apply LOCKTITE 5699 RTV silicon liquid gasket on the joint face ■ Fix the 4 Allen screws of housing starter drive and tighten. ■ 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. ■ Fix the E-Start motor cover.	Allen Screw M5 Allen Key 4mm Torque 0.6 KG-M NOTE: Apply LOCTITE 577 thread sealant to mounting bolts to avoid oil seepage if any. Hex Soc. Screw M6 Allen Key 5 mm Torque 1 KG-M

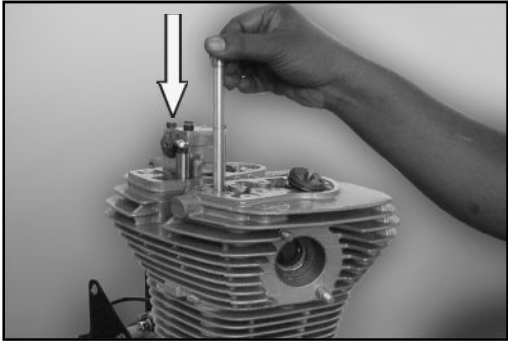
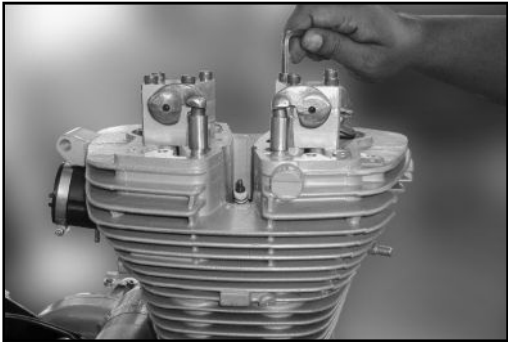
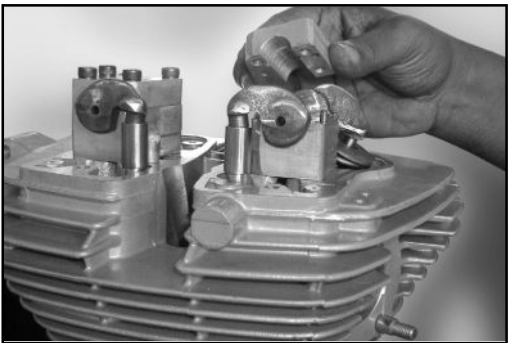
S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.26	Cylinder Barrel/ Piston ■ Assemble the multi layer steel (MLS) head gasket on the barrel & 2 Nos. dowels.	

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos	
12.27	Piston Ring Sub 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). ■ Locate the top ring (Index mark "1 IP" facing upwards). ■ Stagger piston rings end gap as shown in Fig. ■ 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: Second ring has a taper edge cross section and is hard chrome plated. NOTE: Top ring has rectangular cross section with black colour (Nitride coating). 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. 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.	
			
			
			

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
1228	Assembly of Inlet / Exhaust Valves ■ Locate Inlet and Exhaust Valve stem seal in valve guides. ■ Locate valve in the valve guide on the inside of the cylinder head. ■ Locate spring retainer top valve spring & collar bottom. ■ Locate special tool till the spring is fully compressed	   

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.28	Assembly of Inlet / Exhaust Valves ■ Locate the valve split collars on the spring retainer. ■ Loosen the bolt on special tool and remove special tool on the inlet valve when the bolt is seated on the valve, the collar is seated on the valve spring retainer.	Repeat the same process to assemble Exhaust valve Special Tool No : ST-25123-1

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.29	Cylinder Head Assembly ■ Locate the multi layer steel (MLS) head gasket. ■ Gently locate the cylinder head on barrel. ■ Install 6 hex flanged nuts securing the cylinder head to crankcase. ■ Locate Spark plug.	  Hex Flange Bolt M8 T Spanner 13mm Torque 3 Kg-M  

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.29	Cylinder Head Assembly ■ Locate Inlet & Exhaust Push rods. ■ Locate rocker arm and gently locate the inlet and exhaust rocker bearings along with dowel. ■ Install 4 Hex Plugs each on the rocker bearing inlet & exhaust. ■ Locate the Inlet & Exhaust Rocker cover, dowel & rubber gasket. ■ Install 2 Hex Plugs with rubber seals on Inlet and exhaust rocker covers.	  Hex Socket Plug M6 Allen Key 5 mm Torque 1 Kg-M  Hex Socket Plug M7 Allen Key 6 mm Torque 1.4 Kg-M 

S. No.	Aggregate to Assemble / Instructions	Fastener, Size, Tool Usage, Precautions, Photos
12.30	Engine Oil Filling ■ Fill recommended the engine oil to the correct level and tighten filler cap with "O" ring.	

TROUBLE SHOOTING

It is very important for a competent and successful technician to be able to diagnose a fault correctly and first time right.

If the symptom is not diagnosed systematically and correctly, it will not only result in expensive and time consuming repairs BUT will end up with an unsatisfied customer as well. Also the fault will not be rectified, and will result in repetitive repairs.

In order to accurately troubleshoot and correctly a fault, the technician should be very thorough with:

- Each and every component of the motorcycle, its function and the effect it has on the overall performance of the motorcycle.
- Typical failures or symptoms that will occur in the event a component fails or is in the process of failure

The second most important aspect to be able to correctly troubleshoot a fault is to understand the exact nature of failure, conditions under which the failure occurs etc. Towards this it is very important to ask meaningful and correct questions to the rider of the motorcycle about the circumstances which caused the failure.

For Eg. If a motorcycle comes with a fault of engine misfiring, the technician should ask the correct questions to the rider such as

- Did the misfiring start immediately after fuel was refilled?
- Did the misfiring occur immediately after the motorcycle was water washed, used in water logged area etc.
- Was the motorcycle out of use for a prolonged period of time.
- Was the motorcycle attended to by any unauthorized / inexperienced free lance technical person/s

This will help analyze and pinpoint the most likely cause of the misfiring and help in rectifying the fault.

The third most important aspect is a careful and visual inspection with a "careful eye for detail", for any telltale signs of what could have caused the fault and then

narrow down to the assembly/subassembly/suspected part.

It is also very essential to be able to analyze and understand the nature of failure as:

- Failure due to not adhering to the periodical maintenance service schedule.
- Failure due to improper servicing by an unauthorized person
- Failure due to misuse/abuse of the motorcycle.
- Consequential failure (part failed due to malfunctioning of another part).
- New or unique failure (One off in nature)
- Premature failure of a part

Finally, a detailed and systematic inspection of the suspect assembly/subassembly/ part will help rectify the fault correctly and accurately.

The following table details symptoms, possible cause and remedy for some of the common faults that arise in a motorcycle engine. The list is not exhaustive and intended to be used only as a guide to help trouble shoot faults.

13.1 ENGINE CRANKS BUT DOES NOT START

Symptom	Probable Cause	Remedy
A. Ignition spark weak	Battery voltage low	Recharge/ replace battery
	Spark plug cap / high tension wire loose / shorted / defective	Check & correct
	Spark plug incorrect	Replace with correct spark plug
	Spark plug sooty / wet	Check & clean spark plug
	Spark plug gap incorrect	Correct spark plug gap
	Spark plug insulator cracked	Replace spark plug
	No spark from Ignition coil	Check & Replace Ignition coil
	Pulsar coil defective	Check & Replace
B. No Ignition spark	Battery dead	Recharge/ replace battery
	Spark plug cap / high tension wire shorted / defective / disconnected	Check & correct
	Spark plug insulator cracked	Replace spark plug
	No spark from Ignition coil	Check & Replace Ignition coil
	Pulsar coil defective	Check & Replace
C. Fuel related	No Fuel in fuel tank	Fill fuel tank.
	Stale / adulterated fuel	Clean fuel tank Fill with fresh fuel
	Fuel Tap in Closed Position	Turn fuel knob to On/Reserve
	Air vent blocked in fuel cap	Clean air vent/s
	Fuel filter clogged	Clean fuel filter
	Fuel line pinched	Check & correct fuel line
	Ambient temperature too low for engine to start	Use Choke for starting in cold conditions
	Choke Left ON	Shut OFF choke
D. Compression related	Spark plug loose	Tighten spark plug to torque
	Tappets adjusted too tight	Check & adjust tappets to specn
	Cylinder head gasket blown	Check & replace
	Cylinder head nuts loose	Check & tighten to torque
	Cylinder head warped	Check & replace
	Valve stem bent, seating area burnt, excess carbon deposit on seating area, Valve springs broken	Check & replace
	Piston rings sticky/ worn-out	Check & replace
	Cylinder barrel / Piston excess clearance	Check & replace

13.2 ENGINE DOES NOT CRANK

Symptom	Probable Cause	Remedy
A. Starter motor does not rotate	Ignition key not in ON position	Switch ON ignition key
	Engine Kill switch in OFF position	Switch ON engine Kill switch
	Gears not in neutral (neutral lamp not glowing)	Depress clutch / shift to correct neutral & start
	Battery voltage low	Check battery. Recharge replace battery
	Starter circuit Fuse blown	Check all fuses & replace blown fuse
	Starter motor connections loose	Check & tighten connections
	Starter relay connections loose	Check & tighten connections
	Ignition Switch defective	Check & replace Ignition switch
	Starter button defective	Check & replace RH switch.
	Starter relay failed	Check & replace starter relay
	Starter motor failed	Check & replace starter motor
	Major short in Wiring harness	Check & correct wiring harness
B. Starter motor rotates BUT engine does not crank	Motor rotates slowly due to low battery / worn out starter motor brush	Check & correct battery / starter motor
	Magneto rotor woodruff key broken	Check & replace woodruff key
	Starter clutch assembly slipping	Check & replace starter clutch assy
C. Engine does not crank and sounds locked.	Inlet/ Exhaust rocker arm seized in rocker shaft	Investigate cause of seizure, check & correct as required
	Cam shaft seized in cylinder head/cover	Investigate cause of seizure, check & correct as required
	Cam chain jammed in sprocket gears	Investigate cause of seizure, check & correct as required
	Piston Seized in cylinder barrel	Investigate cause of seizure, check & correct as required
	Piston Pin seized in connecting rod small end	Investigate cause of seizure, check & correct as required
	Big end bearing seized in Crank pin / connecting rod big end	Investigate cause of seizure, check & correct as required
	Crankshaft bearings in LH/RH crankcases seized	Investigate cause of seizure, check & correct as required

13.3 IDLING ERRATIC / ENGINE MISFIRING AT LOW RPM

Attribute	Probable Cause	Remedy
A. Ignition related	Battery voltage low	Recharge/ replace battery
	Suppressor cap/ H T lead loose	Check & correct as required
	Suppressor cap/ H T lead defective	Check & correct as required
	Spark plug fouled / wet	Replace / clean spark plug
	Electrode gap too less/excessive	Check and correct electrode gap
	Spark plug wrong specifications	Replace with correct spark plug
	Ignition coil defective	Check & replace
	Pulsar coil / Magneto defective	Check & replace
B. Fuel/ Induction related	Adulterated / Bad fuel	Clean fuel tank. Fill with fresh fuel
	Air vent holes in Fuel tank cap	Check & clean air vents partially blocked
	Fuel flow partially blocked	Check & clean fuel tap / filter
	Air filter dirty / clogged	Check & clean / replace
	Pulse air valve pipe connections loose / cracked	Check & correct
C. Compression related	Spark plug loose	Check & tighten to torque
	Inlet / Exhaust tappets adjusted wrongly	Check & correct
	Cylinder head gasket blown	Check & correct
	Cylinder head studs loose	Check & tighten to torque
	Cylinder head seating area warped	Check & replace
	Cam shaft sticky rotation /seized in cylinder head	Check & correct
	Valve spring broken or weak	Check & replace
	Valve not seating properly (stem bent. Heavy carbon deposit on seating surface)	Check & replace
	Piston rings worn out/ broken / stuck in ring groove	Check & replace
	Cylinder / piston worn	Check & replace

13.4 PICKUP POOR / SLUGGISH

Attribute	Probable Cause	Remedy
A. Ignition related	Suppressor cap/ H T lead defective	Check & correct as required
	Spark plug fouled / wet	Replace / clean spark plug
	Electrode gap too less/excessive	Check and correct electrode gap
	Spark plug wrong specifications	Replace with correct spark plug
	Ignition coil defective	Check & replace
	Pulsar coil / Magneto defective	Check & replace
B. Fuel/Induction related	Adulterated / Bad fuel	Clean fuel tank. Fill with fresh fuel
	Fuel flow partially blocked	Check & clean fuel tap / filter
	Air filter dirty / clogged	Check & clean / replace
	Pulse air valve pipe connections loose / cracked	Check & correct
C. Compression related	Spark plug loose	Check & tighten to torque
	Inlet / Exhaust tappets adjusted wrongly	Check & correct
	Cylinder head gasket blown	Check & correct
	Cylinder head studs loose	Check & tighten to torque
	Cylinder head seating area warped	Check & replace
	Cam shaft sticky rotation / seized in cylinder head	Check & correct
	Valve spring broken or weak	Check & replace
	Valve not seating properly (stem bent. Heavy carbon deposit on seating surface)	Check & replace
	Piston rings worn out/ broken / stuck in ring groove	Check & replace
	Cylinder / piston worn	Check & replace
D. Transmission related	Rear chain tension too slack / tight	Check & correct
	No free play in clutch / clutch release sticky	Check & correct
	Engine oil quantity too high	Check & correct
	Engine oil wrong grade/ high viscosity	Check & correct
	Clutch plates worn out / warped / sticky release / burnt	Check & correct
E. Others	Front / rear brakes jamming	Check & correct
	Front / rear wheel bearing jammed	Check & correct

13.5 ENGINE MISFIRING AT HIGH SPEEDS/ HIGH RPM.

Attribute	Probable Cause	Remedy
A. Ignition related	Spark plug electrode gap too less/ excessive	Check and correct electrode gap
	Spark plug wrong specifications	Replace with correct spark plug
	Spark plug insulator cracked	Check & replace
	Suppressor cap/ H T lead loose	Check & correct as required
	Suppressor cap/ H T lead defective	Check & correct as required
	Ignition coil defective	Check & Replace
	Pulsar coil / Magneto defective	Check & replace
B. Fuel/ Induction related	Adulterated / stale fuel / water content in fuel	Check, Clean fuel tank. Fill with fresh fuel
	Fuel flow partially blocked	Check & clean fuel tap / filter
	Inlet manifold loose / cracked	Check & tighten / replace inlet manifold
	Spark plug loose	Tighten spark plug to torque
C. Compression Related	Tappets adjusted too tight	Check & adjust tappets correctly
	Cylinder head bolts loose	Check & tighten to torque
	Cylinder head gasket damaged	Check & Replace
	Cylinder head warped	Check & Replace
	Valve spring broken or weak	Check & Replace
	Valve not seating properly (valve bent, worn, carbon accumulation on the seating surface.)	Check & Replace
	Excessive Carbon in combustion chamber	Check & Clean
	Piston ring bad (worn, weak, broken, or sticking)	Check & Replace
	Piston rings clearance excessive	Check & Replace
	Cylinder, piston worn	Check & Replace

13.6 EXHAUST SMOKE EXCESS		
Symptom	Probable Cause	Remedy
A. Blacksmoke	Adulterated / Bad fuel	Clean fuel tank Fill with fresh fuel
	Spark plug Electrode gap too less	Check and correct electrode gap
	Spark plug wrong specifications	Replace with correct spark plug
	Air Filter element clogged	Check & Clean
	Pulse air valve pipe connections loose / cracked	Check & correct
	Ignition coil defective	Check & replace
B. Brown smoke	Adulterated / Bad fuel	Clean fuel tank. Fill with fresh fuel
	Air filter box poorly sealed / element partially clogged	Check & correct
C. Bluish / White smoke	Engine oil level too high	Check & Maintain Oil level as Recommended
	Valve stem seal damaged	Check & correct
	Excess clearance between valve stem & guide	Check & correct
	Oil scrapper ring worn out	Check & correct
	Cylinder barrel / piston clearance high	Check & replace

13.7 ENGINE HEAT EXCESSIVE

Attribute	Probable Cause	Remedy
A. Driving/trafficrelated	Prolonged driving in low gear at High speeds / High gear at Low speeds	Ride in appropriate gear as required by traffic conditions
	Engine in Idling RPM for prolonged periods	Switch off Engine if required to be in standstill traffic for more than 2 minutes.
	Vehicle in standstill with gear engaged and clutch depressed for prolonged periods	Shift to neutral & release clutch
	Engine RPM high when vehicle at standstill position	Allow engine to run in idling RPM when in neutral
	Riding in traffic with brakes partially engaged for prolonged periods	Release both brakes and drive at appropriate speeds
B. Ignition Related	Spark plug electrode gap too less/excessive	Check and correct electrode gap
	Spark plug wrong specifications	Replace with correct spark plug
	Spark plug insulator cracked	Check & replace
	Suppressor cap/ H T lead loose	Check & correct as required
	Suppressor cap/ H T lead defective	Check & correct as required
	Ignition coil defective	Check & Replace
	Pulsar coil / Magneto defective	Check & replace
C. Fuel / Inductionrelated	Adulterated / Bad fuel	Clean fuel tank Fill with fresh fuel
	Air filter dirty / clogged	Check & clean / replace
D. Compression Related	Spark plug loose	Tighten spark plug to torque
	Tappets adjusted too tight	Check & adjust tappets correctly
	Excessive Carbon in combustion chamber	Check & Clean
	Poor compression due to cyl. head gasket blown, Valve seating improper, Piston rings worn out / broken, Piston/Cyl. worn out	Check & correct
E. Others	Engine oil less viscous / wrong specification / level too low	Check & correct
	Oil cooler fins dirty / blocked	Check & clean oil cooler fins
	Clutch slipping	Check & correct
	Front / Rear brakes jammed	Check & correct
	Engine oil pressure less	Check & correct
	Silencer choked	Check & clean

13.8 ENGINE NOISY		
Attribute	Probable Cause	Remedy
A. Knocking noise	Prolonged driving in low gear at High speeds / High gear at Low speeds	Ride in appropriate gear as required by traffic conditions
	Excessive Engine heat	Check & correct
	Adulterated / Bad fuel	Clean fuel tank. Fill fresh fuel
	Incorrect plug gap. Wrong spec spark plug	Check & correct gap
	Excessive carbon in combustion chamber	Check & correct
	Pulse air valve pipe connections loose / cracked	Check & correct
	Exhaust pipe & cylinder head joint not sealed correctly	Check & tighten exhaust flange nuts / replace gasket
B. Lubrication related	Engine oil less viscous/wrong specification / level too low	Check & correct
	Oil filter element blocked	Replace filter element
	Oil pressure low	Check & correct
C. Top End noise	Tappets clearance excessive correctly	Check & adjust tappets
	Camshaft sticky rotation	Check & correct
	Cam lobes in camshaft uneven wear	Check & replace
	Cylinder head gasket blown	Check & replace
	Valve spring broken / weak	Check & replace
	Valve stem squeaky noise	Replace stem seals
	Valve stem to guide clearance high	Check & replace
D. Cylinder barrel/central portion noise	Piston rings broken	Check & replace
	Cylinder / Piston scored / housing also for damages	Check & replace. Check air filter
	Excess clearance between piston / barrel (Piston slap)	Check & replace
	Cam chain pads worn out	Check & replace
	Auto chain tensioner jammed	Check & replace
	Excessive clearance between Cam chain / sprockets	Check & replace
	Connecting rod small end / piston pin clearance excess	Check & replace
E. Bottom end noise	Connecting rod bent	Check & replace crankshaft
	Excess clearance between connecting rod big end / crank pin	Check & replace crankshaft
	Crankshaft / balancer shaft support bearings worn	Check & replace
	Crankshaft run out excessive	Check & replace
	Balancer shaft / crankshaft gears backlash	Check & correct
F. Transmission noise	Clutch housing/friction plate clearance excessive	Check & replace
	Clutch housing gear / crank gear backlash	Replace matched gears
	Drive / counter gears backlash	Check & replace
	Drive / Countershaft bearings worn out	Check & replace
	Gears / bushes seized in drive /counter shaft	Check & replace

13.9 GEAR SHIFTING HARD / SLIPS		
Attribute	Probable Cause	Remedy
A. Clutch cable related	Routing improper	Check & correct
	Strapped too tight to frame	Check & correct
	Inner cable sticky	Check & replace
	Inner/outer cable damaged	Check & replace
	Free play excess	Correct free play to 2-3mm
B. Oil related	Oil less / more viscous. Wrong specification	Check & correct
	Oil level too high / too low	Check & correct
C. Shift lever / linkage / shifting Mechanism related	Gear lever position incorrect	Check & correct
	Shift lever sticky / jammed on pivot pin	Check, clean & lubricate pivot pin
	Gear shift linkage ball joint stuck/worn out	Check & correct
	Return spring weak / broken	Check & replace
	Indexing pawl pins worn out	Check & replace
	Shift forks sticky in pin / selector drum	Check & correct
	Shift forks / pins worn out	Check & replace
	Selector drum grooves worn out	Check & replace
D. Clutch assembly related	Clutch pad sticky / worn out	Check & replace
	Clutch plates movement sticky	Check & correct
	Springs weak / broken	Check & replace
	Friction plates worn out / burnt	Check & replace
	Steel plates warped	Check & replace
	No end float of clutch assembly in shaft	Check & correct
E. Gears does not engage	Shift forks sticky in pin / selector drum	Check & correct
	Selector drum rotation sticky	Check & correct
	Sliding gear movement sticky in shaft	Check & correct
	Gears / bushes partially seized in shaft	Check & correct
F. Gears overshifts	Shift forks / pins worn out	Check & replace
	Selector drum grooves worn out	Check & replace
	Sliding Gear dogs worn out	Check & replace
	Drive shaft/counter shaft splines worn out	Check & replace
	Drive / counter shaft bearings wornout	Check & replace



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