
UNIT 1 MOTORCYCLE REPAIRING

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1.1 INTRODUCTION

In this unit, we shall study about the repairing of motorcycle. Automobile technicians should acquire basic troubleshooting and repairing skills for attending various breakdowns of a motorcycle. Customers who do not wish to purchase new motorcycle parts would like to get the minor repairs done rather than replacing them with the new parts. This would save them from incurring large expenditure. Also there is increased tendency of failure when they are purchased second hand. Automobile being one of the fastest growing industries in India, there is going to be a great need of competent technicians with adequate repair skills in times to come.

Objectives

After studying this unit and subsequent practicing, you should be able to acquire the

- skills required for troubleshooting of a motorcycle and identify different kinds of failure and reasons thereof, and
- skills required for repair of various parts of the motorcycle.

1.2 REPAIRING OF MOTORCYCLE

1.2.1 Basic Concept

Proper care and maintenance are essential for trouble free operation and optimum performance of the motorcycle. A quality repair ensures that excess wear and tear is not taking place and the motorcycle can run without any complaint for a long time.

After the motorcycle is produced in the factory it goes through the initial phase, which is known as bedding in period. During bedding in period the tolerances pertaining to the motorcycle change which requires adjustment. Hence the first service is very critical. Thereafter a regular maintenance schedule should be strictly followed to enhance the performance of the motorcycle.

If these services or maintenances are not done as per the manufacturer's guidelines, it can severely impair the performance of the motorcycle. In some cases it can lead to premature wear of engine components or to the frame parts facing a customer to incur heavy expenditure. Failure of some functions like brakes can even cause fatal accident.

Hence, it is essential to take care of the motorcycle by following periodic service and maintenance tips.

1.2.2 Lubrication Complaints

If the engine oil level is too low, check for the following things:

- External oil leaks
- Worn out piston rings
- Worn out valve guide and/or stem seal

If the oil is contaminated, check for the following things :

- Oil is not changed often enough as recommended
- Faulty cylinder head gasket
- Worn out piston rings

SAQ 1



What are the types of lubrication complaints?

1.2.3 Complaints of Engine Starting

If there is a problem related to the starting of the bike, it can be due to mechanical as well as electrical reasons. The possible reasons could be related to the following :

- Spark Plug
- HT Coil Secondary
- Spark Plug Adaptor
- Ignition Timing
- Fuel Quantity and its Quality
- Pulser Coil
- Carburettor
- HT Coil Primary
- Valve Clearance
- Exterior Coil
- Valve Timing
- CDI Unit
- Air Filter
- Valve Leak

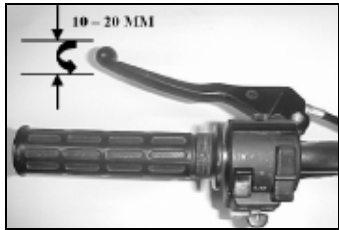
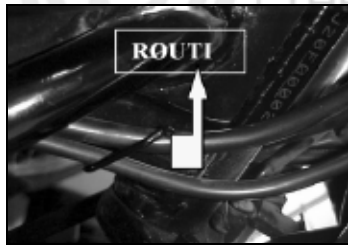
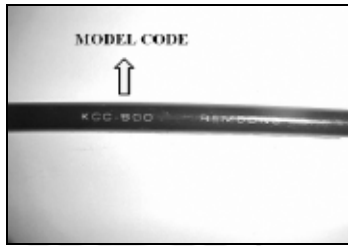
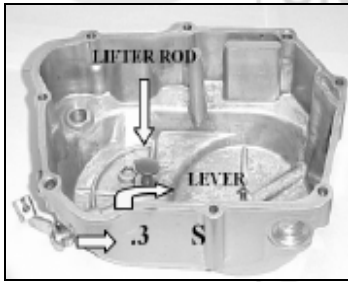
What could be the reasons for starting complaint?

1.2.4 Clutch Complaints

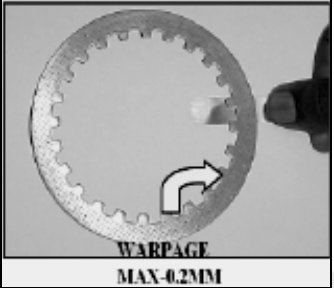
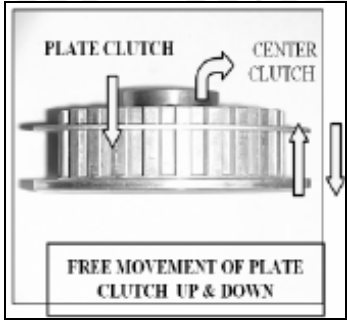


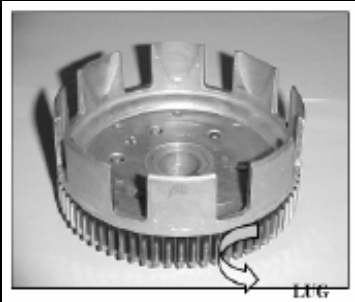
Nature of complaints could be that of following :

- (a) Clutch judder (jerking)
- (b) Clutch slipping
- (c) Half clutch noise

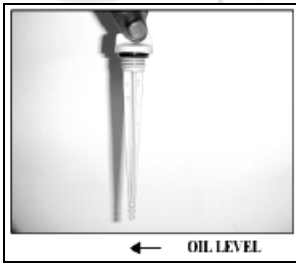

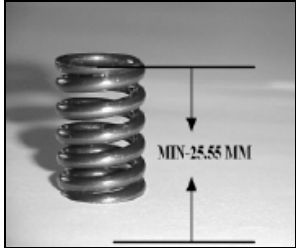
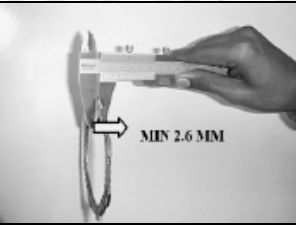

The following checks and inspections are to be performed and remedial measures undertaken to make a clutch trouble free :

| Check | Inspection | Location |
|--|--|--|
| 1. Check clutch free play. | Check for free play of the clutch lever. It should be within 10-20 mm. |  |
| 2. Check clutch cable routing. | Ensure that the cable is routed as per standard routing, through the brackets provided. |  |
| 3. Check clutch cable model. | Ensure the cables fitted are of the respective model and not interchanged with other model. Also ensure that the cable is genuine. |  |
| 4. Remove clutch cover and check clutch operating arm, spring and clutch lifter rod. | Check for free movement of rod clutch lifter in the cover right crankcase. Check for lever complete clutch for free rotation in the cover right crankcase and condition of spring lever complete clutch. |  |

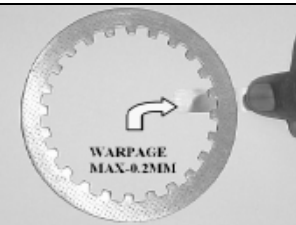
Specific Inspection for the Clutch Jerking




| Check | Inspection | Location |
|--|--|--|
| 1. Check plate clutch for warpage. | Place plate clutch on surface plate and check for warpage. Ensure that 0.20 mm feeler gauge does not slide freely. |  |
| 2. Check plate clutch movement on center clutch. | Place plate clutch on centre clutch as shown in the picture and move the plate clutch up and down, while moving the plate clutch in the center clutch, the plate should move up & down without any resistance. |  |
| 3. Check plate clutch pressure height. | Check plate clutch pressure leg height by placing the plate clutch pressure on the surface plate. Plate clutch pressure should not tilt on the surface plate. |  |
| 4. Check disc clutch friction warpage. | Place the disc clutch friction on the surface plate and check for warpage. |  |
| 5. Check complete outer clutch lugs for deep cuts. | Visually check for any deep cuts formed on the outer complete clutch lugs. |  |

Specific Inspection for the Clutch Slipping

| Check | Inspection | Location |
|--|--|---|
| 1. Check engine oil level and viscosity. | Ensure that the engine oil level is maintained till the upper mark on the gauge oil level. Check engine oil viscosity. Oil should not be abnormally thick. |  |
| 2. Check plate oil Separator. | Check for plate oil separator fitment. |  |
| 3. Check clutch spring height. | Check clutch spring height with a Vernier caliper. Spring height should be of minimum height of 25.55 mm. |  |
| 4. Check disc clutch friction thickness. | Check disc clutch friction thickness which should be minimum of 2.6 mm. |  |
| 5. Check plate clutch pressure. | Check plate clutch pressure for any step using a straight edge. |  |

Specific Inspection for Half Clutch Noise

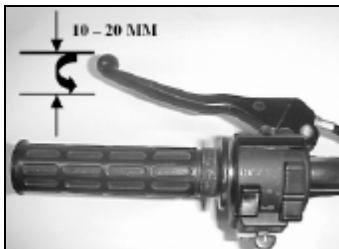
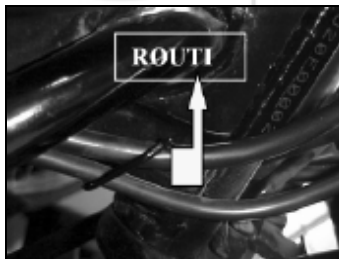
| Check | Inspection | Location |
|--------------------------------|--|---|
| 1. Check plate clutch warpage. | Place plate clutch on surface plate and check for warpage. Ensure that 0.20 mm feeler gauge does not slide freely. |  |

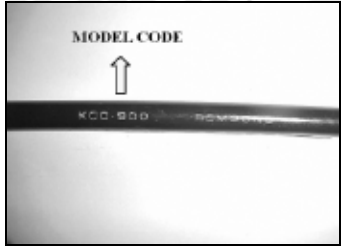

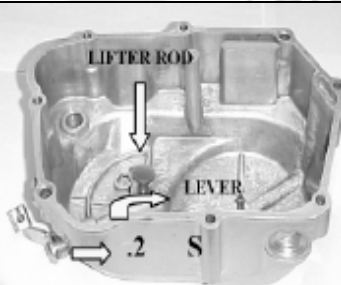
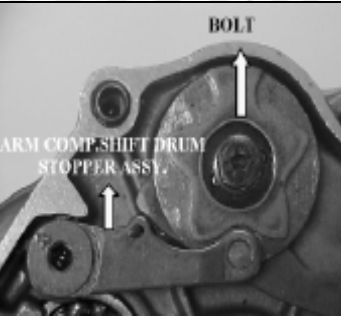
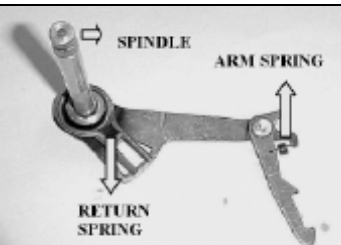

| | | |
|---|---|---|
| 2. Check plate clutch pressure height. | Check plate clutch pressure leg height by placing the plate clutch pressure on the surface plate. Plate clutch pressure should not tilt on the surface plate. |  |
| 3. Check complete outer clutch lugs for deep cuts. | Visually check for any deep cuts formed on the outer complete clutch lugs. |  |
| 4. Check plate clutch lifter bolts for even tightening. | Reset clutch assembly using plate lifter clutch alignment tool. |  |


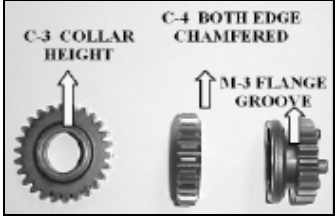
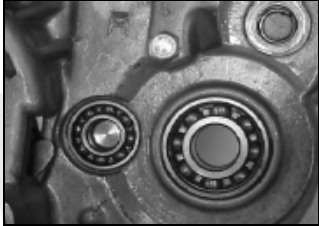
1.2.5 Gear Complaints

Nature of Complaints

- (a) Gear shifting hard
- (b) Gear slipping
- (c) Gear noise



| Check | Inspection | Location |
|--------------------------------|---|--|
| 1. Check clutch free play. | Check for free play of the clutch lever, it should be within 10-20 mm. |  |
| 2. Check clutch cable routing. | Ensure that the cable is routed as per standard routing, through the brackets provided. |  |


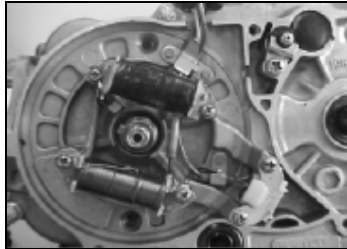

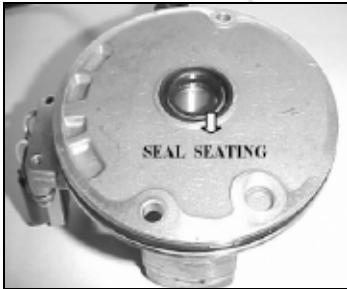
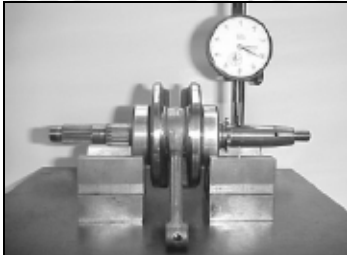
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|---|---|--|
| <p>3. Clutch cable model.</p> | <p>Ensure the cables fitted is of the respective model and not interchanged with other model. Also ensure that the cable is genuine.</p> |  |
| <p>4. Open cover left crank case and check shifter drum bolt and washer.</p> | <p>Check shifter drum bolt torque and washer direction and avail ability.</p> |  |
| <p>5. Remove clutch cover and check clutch operating arm, spring and clutch lifter rod.</p> | <p>Check for free movement of rod clutch lifter in the cover right crankcase. Check for lever complete clutch for free rotation in the cover right crankcase and condition of spring lever complete clutch.</p> |  |
| <p>6. Check plate shift drum stopper bolt and arm comp. Shift drum stopper.</p> | <p>Ensure that the plate shift drum bolt is tight and in arm shift drum stopper assembly, check stopper arm bolt for torque, stopper arm spring condition, stopper arm roller for roundness and stopper arm for bend.</p> |  |
| <p>7. Check spindle comp. Gear shift.</p> | <p>Check spindle comp. Gear shift for bend, rust, arms for bend and arm spring condition and availability.</p> |  |
| <p>8. Check pin shift return spring.</p> | <p>Check pin shift return spring for proper torque.</p> |  |

| | | |
|--|---|---|
| <p>9. Dismantle crank case and explode main shaft, counter shaft, gear shifter drum and kick spindle assembly and check sequence of parts fitment while dismantling.</p> | <p>Check all gear teeth using magnifying glass for teeth condition, shifter fork claw thickness, and shifter fork I.D, dog teeth and slot condition, sliding gear movement on main and counter shaft. Shifter drum O.D. Kick pinion movement on kick spindle, thrust washer and cir-clip condition.</p> |  |
| <p>10. Check for gears interchange between Y2K and non Y2K model.</p> | <p>Check for mixing of Y2K and non Y2K gears by seeing the identification marks provided on the gears.</p> |  |
| <p>11. Counter shaft and main shaft bearing condition and seating of bearing in the crankcase.</p> | <p>Check for bearing wear out and proper seating in the crankcase.</p> |  |

1.2.6 Stator Plate Oil Seal Complaints

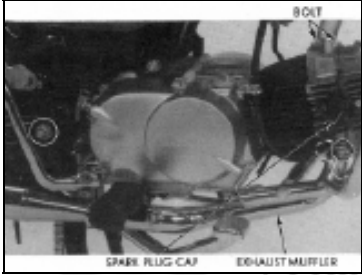


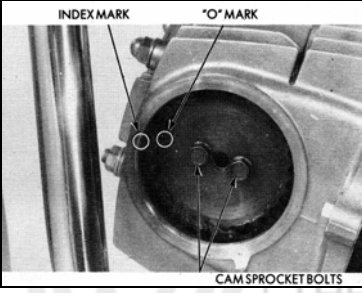

To attend to repairs relating to stator plate oil seal, the following steps are undertaken :

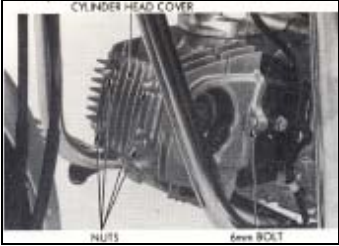
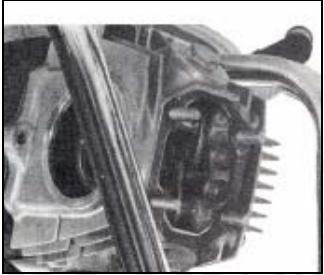
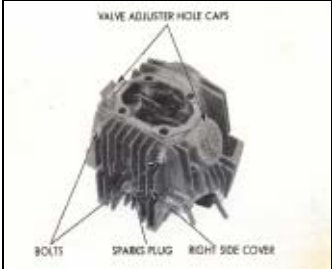
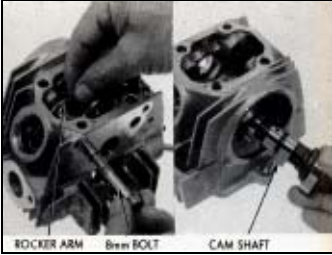

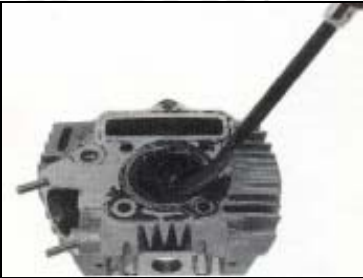
| Check | Inspection | Location |
|--------------------------------|--|--|
| <p>1. Check engine oil.</p> | <p>Check engine oil level and viscosity.</p> |  |
| <p>2. Check breather tube.</p> | <p>Check breather tube for blockage and also air filter box hole where breather tube is connected, for any blockage.</p> |  |



| | | |
|---|---|--|
| <p>3. Remove cover left crank case and check for leakage.</p> | <p>Before attending oil seal leakage check if any leak is there in the highlighted points – Neutral switch “o” ring leak, Shifter drum bolt oil leak, Counter shaft oil seal leak, Gear shifter spindle oil seal leak, Oil priming bolt oil leak.</p> |  |
| <p>4. If no leak found in the above listed area remove flywheel.</p> | <p>Remove fly wheel and check weather oil leak is from the seal or “o” ring.</p> |  |
| <p>5. If “o” ring is found to be leaking or oil seal is found to be leaking check as mentioned.</p> | <p>If “O” ring found to be leaking change “O” rings. If oil seal found to be leaking check oil seal seating area on crankshaft for any deep scoring marks, dents and metal erosion by using a lens before replacing oil seal. If crank shaft found damaged replace.</p> |  |
| <p>6. If crankshaft oil seal seating area found ok.</p> | <p>Replace with a new oil seal and ensure the seal seats in the stator plate properly and while fixing the stator plate ensure using stator plate oil seal guide without fail.</p> |  |
| <p>7. After trial if oil seal found still leaking.</p> | <p>Dismantle engine and check crank shaft for run out which should not be more than 0.10 mm.</p> |  |

1.2.7 Cylinder Head De-carburising and Valve Lapping

Cylinder head mounts on the top of the engine cylinder, the inner side of the cylinder head is always in direct contact of combustion gases. The carbon particles deposit on the inner side of the cylinder head and inlet and exhaust valves. It is essential to remove these carbon particles from the cylinder head and valves. The following steps are taken to decarbonise the engine :

| STEPS | ILLUSTRATIONS |
|--|--|
| <ul style="list-style-type: none"> Remove the exhaust muffler. Disconnect the spark plug. Remove the intake pipe bolt. Loosen the bolt detaching the left side cover from the cylinder head. |  |
| <ul style="list-style-type: none"> Remove the bolt and left side cover. |  |
| <ul style="list-style-type: none"> Remove the gearshift pedal. Remove the left crankcase cover. |  |
| <ul style="list-style-type: none"> Rotate the generator rotor counterclockwise and align the "T" mark on the generator rotor with the index mark on the left crankcase. Make sure that the "O" mark on the cam sprocket is aligned with the index mark on the cylinder head cover. Remove the cam sprocket bolts. |  |
| <ul style="list-style-type: none"> Remove the cam chain by lifting it up with the screw driver. Remove the cam sprocket. |  |

| | |
|---|--|
| <ul style="list-style-type: none"> • Remove the cylinder head nuts. • Remove the cylinder head cover. • Remove the 6mm bolt attaching the cylinder head and cylinder. |  <p>CYLINDER HEAD COVER</p> <p>NUTS 6mm BOLT</p> |
| <ul style="list-style-type: none"> • Remove the cylinder head. |  |
| <ul style="list-style-type: none"> • Remove the spark plug. • Check the spark plug for cracks at the outer and inner insulator. • Remove the valve adjuster hole caps. • Remove the bolts and the cylinder head right side cover. |  <p>VALVE ADJUSTER HOLE CAPS</p> <p>BOLTS SPARK PLUG RIGHT SIDE COVER</p> |
| <ul style="list-style-type: none"> • Screw an 8 mm bolt to the rocker arm shaft and pull out each rocker arm shaft. • Remove the rocker arm. • Remove the cam shaft. |  <p>ROCKER ARM 8mm BOLT CAM SHAFT</p> |
| <ul style="list-style-type: none"> • Compress the valve spring compressor and remove the retainer, valve spring and valve. |  <p>VALVE SPRING COMPRESSOR</p> <p>ATTACHMENT</p> |
| <ul style="list-style-type: none"> • Remove the carbon deposits from the combustion chamber. • Remove any gasket material from the contact face of the cylinder head. |  |

| | |
|--|--|
| <ul style="list-style-type: none"> • Clean both intake and exhaust valves thoroughly to remove carbon deposits. • Apply a light coating of valve grinding paste to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tools. |  |
| <ul style="list-style-type: none"> • Remove the valve and inspect the face. • Measure the valve seat. |  |

SAQ 3



- Write the types of gear complaints.
- What could be the reasons for gear shifting being hard and gear making noise?

1.3 SUMMARY

In this unit, we have gone through various complaints related to engine starting, problem related to gear, clutch, etc. and their possible reasons of trouble making. The procedures to repair/rectify the problems were also studied. In the next unit, we deal with various troubles that may be reported by a customer and the possible remedies for the same.

1.4 ANSWERS TO SAQs

Refer the relevant preceding text in the unit or other useful books/manuals available on the topic at workshops to get the answers of the SAQs.