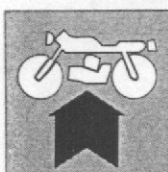


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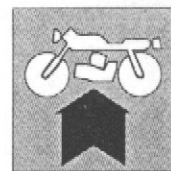
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ENGINE REASSEMBLY

General directions	H.5
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Reassembly of gear numbers	H.7
Clutch reassembly	H.14
Reassembly of the piston-cylinder-head unit	H.15
Reassembly of the valve on the cylinder	H.17
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Head re-assembly	H.20
Balance countershaft phasing	H.21
Clutch cover reassembly	H.23

**General directions.**

For a correct re-assembly follow in the adverse sense what shown for dismantling, however paying a special attention to every operation we specifically mention. We remind you that gaskets, oil rings, clamps and sealing washer in deformable material (as copper, aluminium, fibers, etc.) and self-locking nuts have always to be renewed.

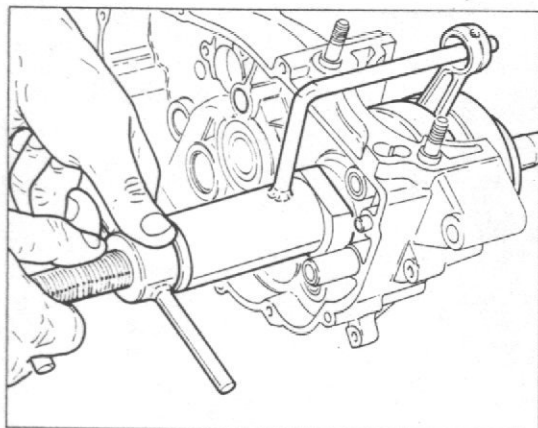
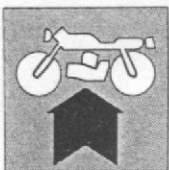
Bearings have been studied and drawn for a well determined number of working hours.

Considering the difficulty of assessing bearing wear, it is especially important to replace bearings on bikes that are used off-road or in other extreme conditions.

What above is suggested in addition to the size verification of the single componets, as foreseen in the proper chapter (see paragraph "ENGINE OVERHAULING").

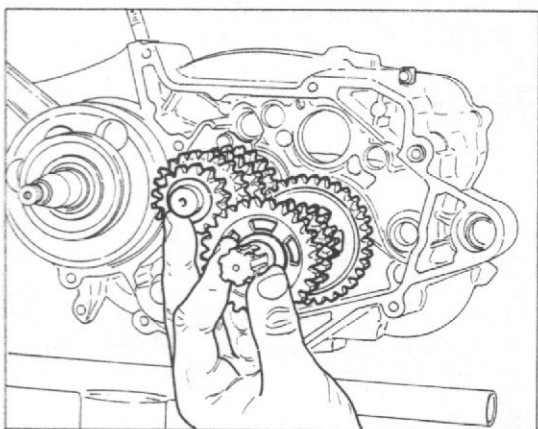
We emphasize the importance of thoroughly cleaning all components; bearings and all particulars subject to wear have to be lubricated with engine oil, before re-assembly. Screws and nuts must be locked at the prescribed torques.



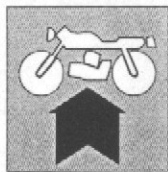


Reassembly of the drive shaft.

To reassemble the drive shaft on the R.H. half-crankcase use tool code **33047**. If this has not been done during the disassembly, it is necessary to remove the oil seal stop plate by unloosing the fastening screw (when it is reassembled lock it with "Loctite"). In this condition only, the tool can lay on a flat surface and it shall be possible to properly install the drive shaft into its seat.

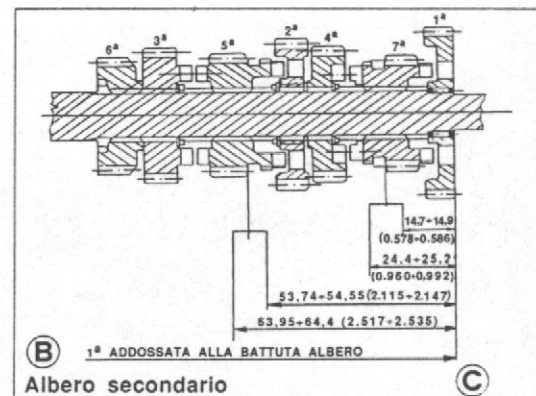
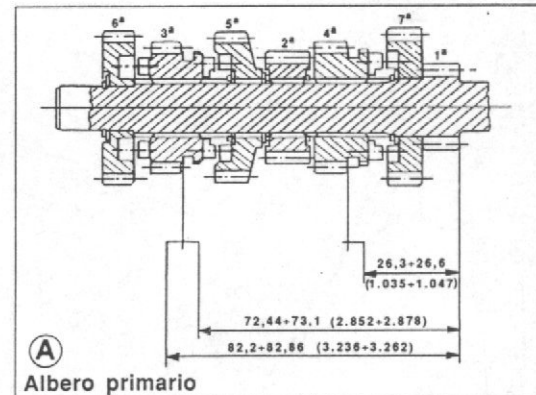


Before inserting it, lubricate the contact surfaces with engine oil.



Reassembly of gear numbers.

Insert into the R.H. crankcase both primary and secondary shafts of gearbox, at the same time, with their original thrust washers; for a correct gearbox operation, check the inspection quotes as shown in figures.

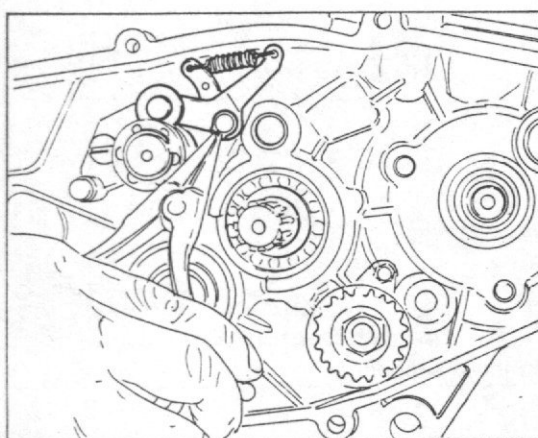
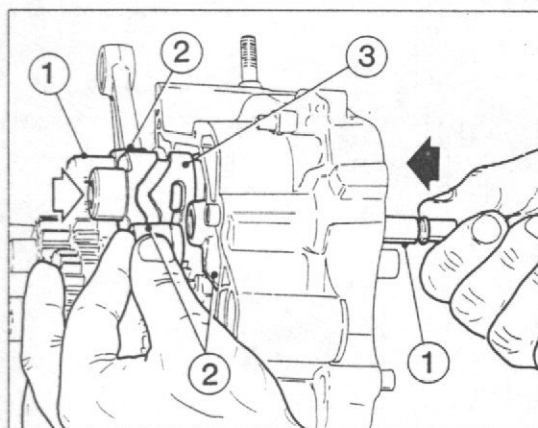
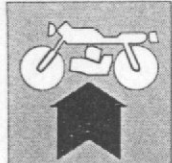


mm (in.)

A Main shaft

B Layshaft

C 1st gear aligned
with the shaft ledge



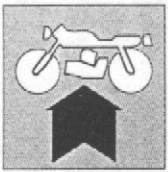
Insert the positive shaft and fix it with the plate and the play adjusting washers. Arrange positive shaft (3) to neutral position (the neutral indicator notch is up).

Insert gear forks (2) in their seats on the gears; connect the fork control pawls in their relevant seats on the positive shaft.

Mount fork sliding pins (1) from the half-crankcase outer side (the longer pin should be mounted in correspondence of the forks 1a-4a and 2a-3a).

Arrange the gasket between the half-crankcases using a sealant. Check the arrangement of the centering bushes.

Do not forget to fit the suitable shimming washer on the L.H. side, between the drive shaft and the bearing; close the two half-crankcases checking the correct arrangement of the gasket.



BEWARE! - In case of imperfect sealing of gasket, the following operating deficiencies may be noticed:

Air passage with consequent weakness of mixture and possible engine seizure.

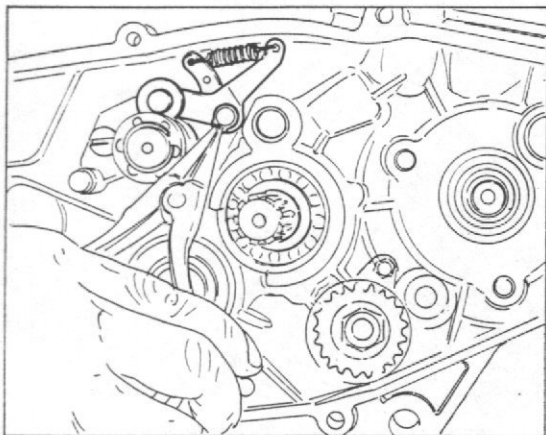
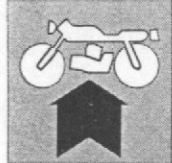
Oil leakage from the gearbox chamber to the crankshaft chamber; this could cause a quick lubricant consumption with overheating and gearbox seizure.

During the half-crankcases mating, check their perfect alignment and correct position.

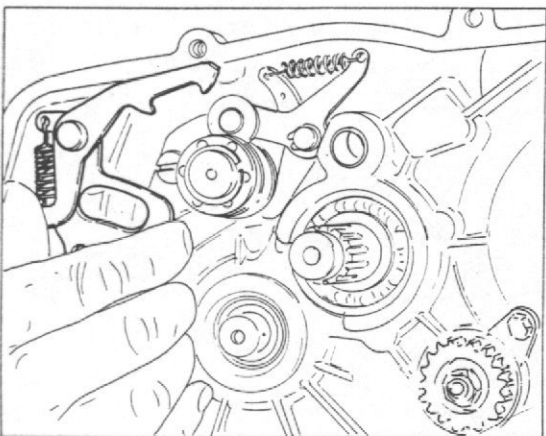
Verify that crankshaft and gearbox shafts freely rotate (neutral position). In case that rotation of above shafts does not occur correctly, it will be advisable to strike with a few blows of plastic mallet on these shafts to allow their correct bedding. In case of persistent unevenness, it is advisable to open the crankcases again.

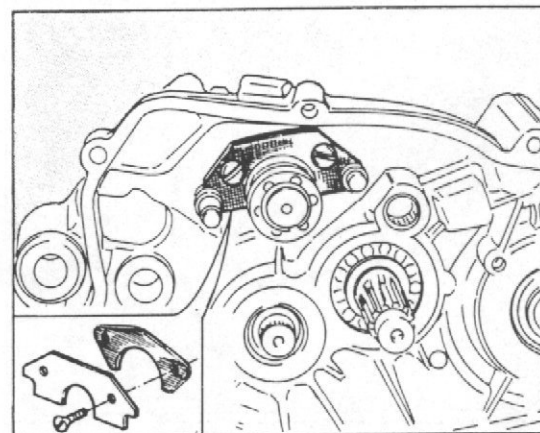
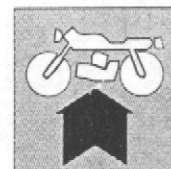
After crankcases mating, close with a clean cloth the cylinder housing in order to avoid the accidental immission of dirt or foreign bodies inside the crankshaft chamber.





Remount the neutral and gear fixing pawls and apply the suitable snap ring. Insert, from the half-crankcase outer side, the spring, the inner bush, the washer and the selector shaft. From the opposite side, fit the new oil seal, the washer and the stop ring on the end of the above mentioned shaft.





Check the speed engaging fork play, acting as follows:

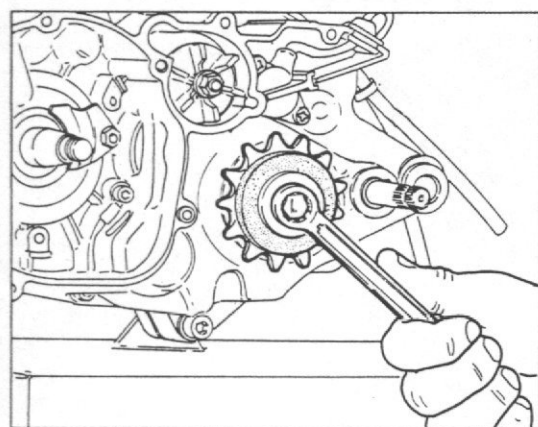
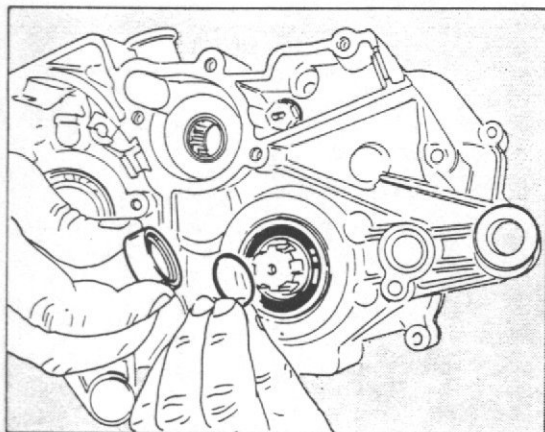
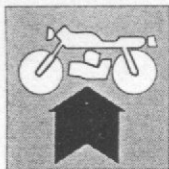
engage one gear and check that the desmodromic shaft has a certain end play; repeat this operation on every single speed.

Not verifying any play, it will be necessary to modify by adding or removing shims under the retaining plate of the desmodromic shaft, after having removed selector shaft and pawls again.

Shims are supplied with thickness of 0.0079 and 0.012 in.

If in spite of this adjustment, the end float lack remains, this deficiency could be due to:

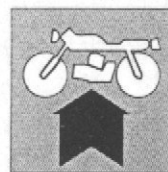
- bent sliding fork (to be identified and eventually replaced);
- faulty position of shims on sides of gearbox shafts.



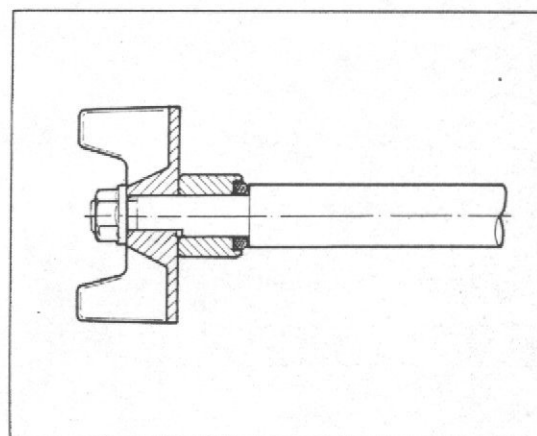
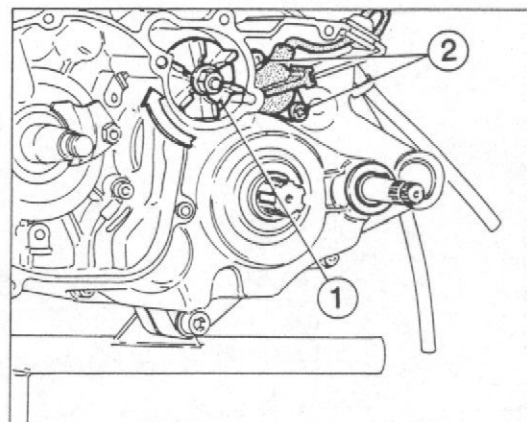
With the help of a suitable inserting device fit the new oil seal on the L.H. side of the secondary shaft; arrange the O-ring on the spacer and fit the spacer on the shaft. Fit the shimming washer and mount the lock ring. Fit the chain pinion and lock it with the screw and washer on the secondary shaft. Fit the new oil seal on both ends of the crankcase in correspondence of the drive shaft. Mount their relevant stop plates, locking the screws with "Loctite".

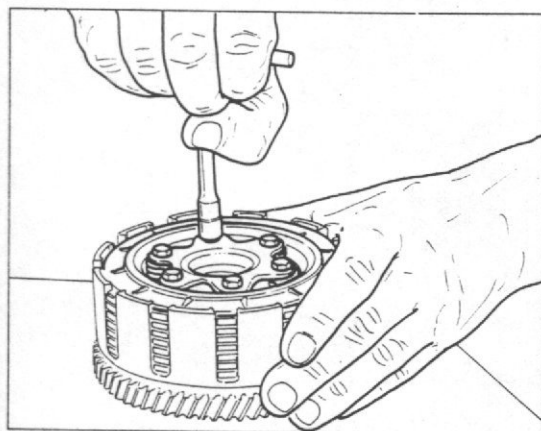
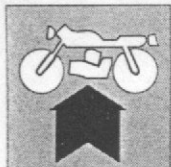
Mount the spacer and the O-ring on the motor shaft R.H. shaft.

On the crankshaft R.H. side insert in the following order: the first spacer, the OR ring, the oil pump control pinion, the second spacer, the tongue, the primary drive gear (with the cylindrical part turned outside), the stop washer and the nut. Insert in the corresponding seat the thrust, the pump control gear, the counter shaft and the second thrust.



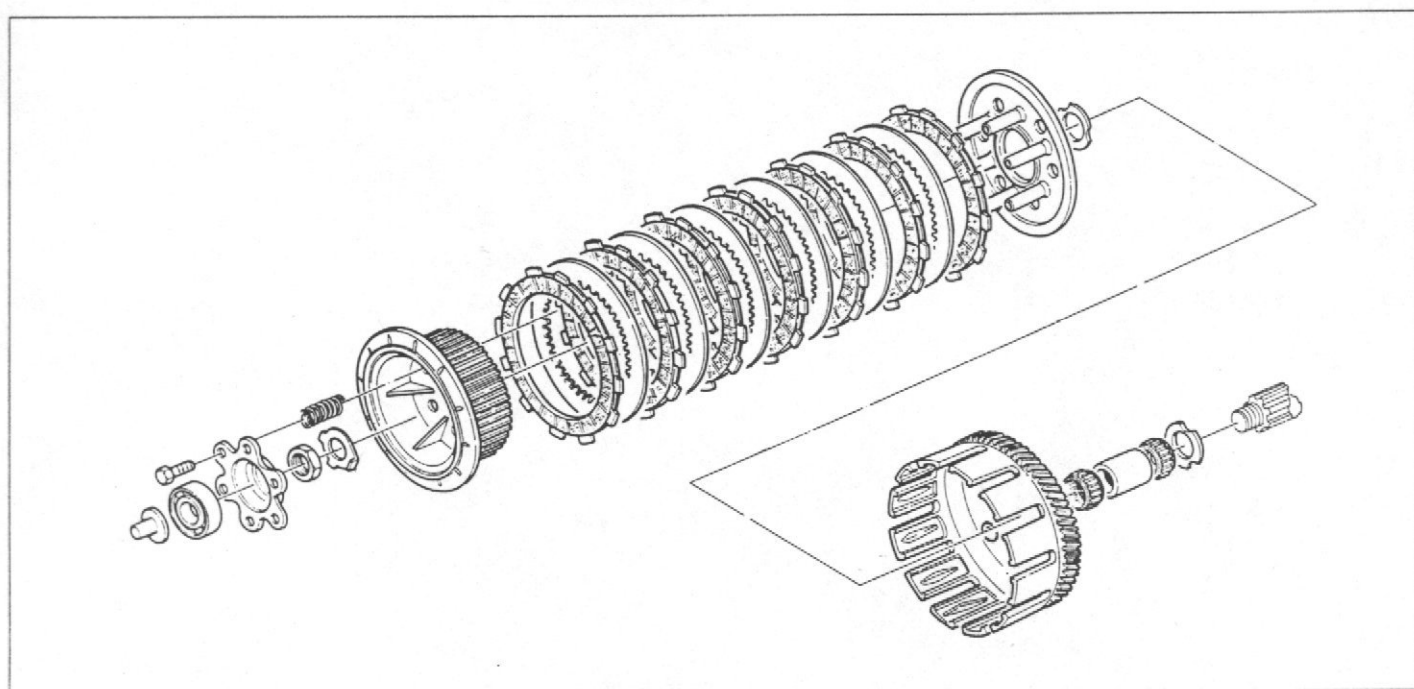
Fit the water pump control shaft on the R.H. half-crankcase, on which the control gear and the stop snap ring should have already been mounted. On the L.H. side, mount the O-ring, the spacer (the part without load is the O-ring seat). Fit the locking nut and tighten it, suitably supporting the gear to prevent the shaft from turning. Remount the spring and the neutral cap in their seat on the positive shaft; fit a new O-ring and remount the neutral indicator locking the two fastening screws (2) with "Loctite".

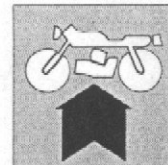




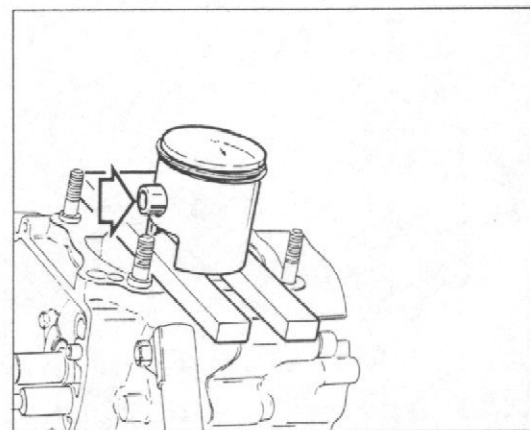
Clutch reassembly.

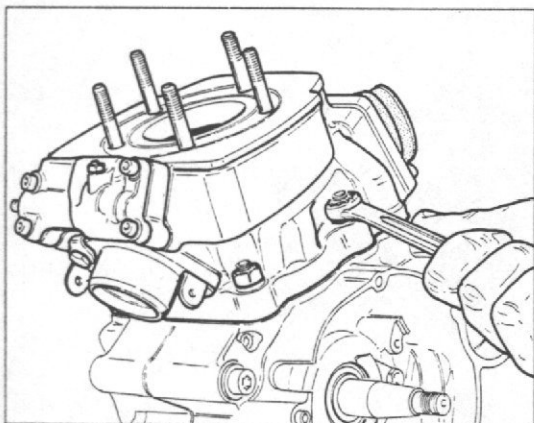
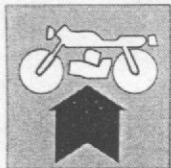
Provisionally insert the clutch pressure disc in the clutch housing; insert all the plates into the housing alternating a lined plate (the first one of the pack should be lined) to a smooth one. Fit the hub, the springs, the check disc and lock the whole assembly, at the recommended torque, with the six hexagonal-head screws. Now fit the three-point washer, the spacer and the two roller cages on the main shaft.



**Reassembly of the piston-cylinder-head unit.**

Insert the roller cage on the connecting rod small end, fit the piston on the connecting rod turning it so that the arrow marked on the head is turned towards the exhaust. Fit the pin by hand and lock it with the suitable locks.

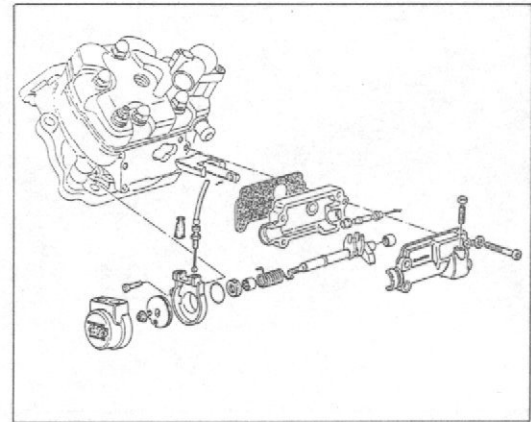
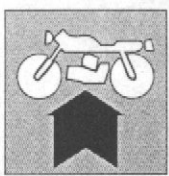




Having a cylinder provided with valve unit, and before inserting the piston inside the cylinder, check that the piston is in the bottom dead center position and lubricate the components with motor oil. By means of your fingers (or using the appropriate inserting device), press on the clamp ends and carefully insert the piston inside the cylinder.

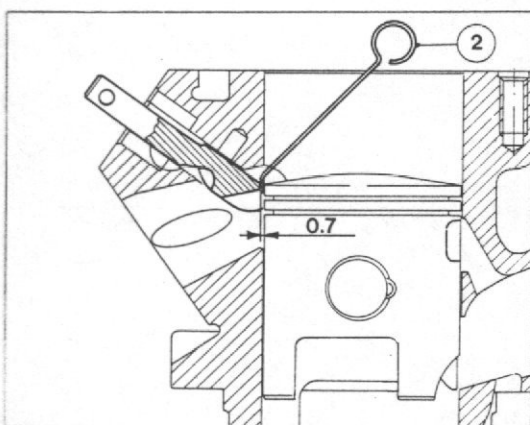
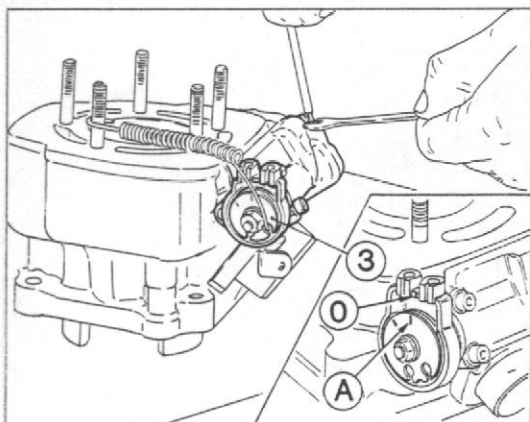
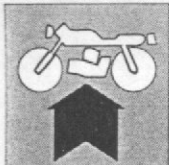


During the insertion phase, don't turn the cylinder because the clamp ends may enter the ducts.

**Reassembly of the valve on the cylinder.**

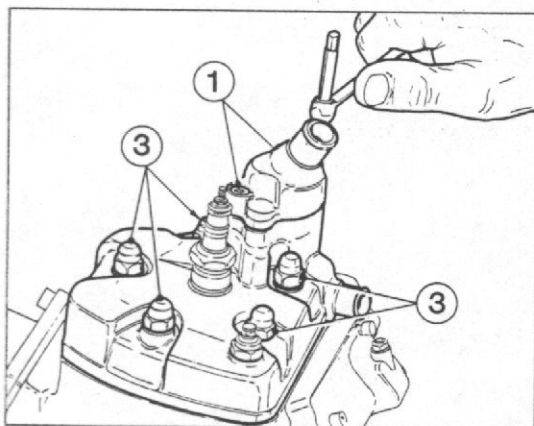
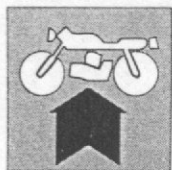
After having cleaned all the elements, assemble them as follows:

- insert the valve inside the cylinder seat;
- insert the gasket and the lower half-cover;
- clean the contact surfaces of the two half-covers;
- insert the push pin, with the corresponding bushing, into the valve rod end;
- insert the spring into the valve control pin and hook it in the correct seat;
- insert the needle cages on both side of the pin and oil seal, then insert the pin inside the lower cover seat, by hooking it to the push pin;
- apply some sealing material on the contact surfaces of the two half-covers and mount the external half-cover by pushing the spring terminal, in this way the spring will be preloaded, then fasten the 4 screws;
- insert the OR ring in the valve cover projecting side.

**Valve end-of-stroke register.**

If replacements have been performed or if the valve unit has been detached from its connections, it is necessary to check the end-of-stroke conditions and the control cables clearance as follows:

- insert the cover and fasten it to the cylinder through the appropriate screw;
- insert the pulley (3) on the control shaft terminal, turn it counterclockwise to the end of stroke and keep it in this position by means of a spring (see figure);
- after having loosened the nut, act on the register through an Allen wrench;
- insert the piston inside the cylinder and, through a proper pin (2), check that the clearance between valve and piston is 0.027 in.;
- in this condition, the fixed index (0) on the cover and the one (A) on the pulley must be aligned;
- by applying "Loctite", lock the nut on the register so as to avoid possible loosening;
- if the pulley or the cover have been replaced, mark the above mentioned indexes on the new components;
- in order to adjust the control cables tension, see par. "Electronic valve control cables tension adjustment".

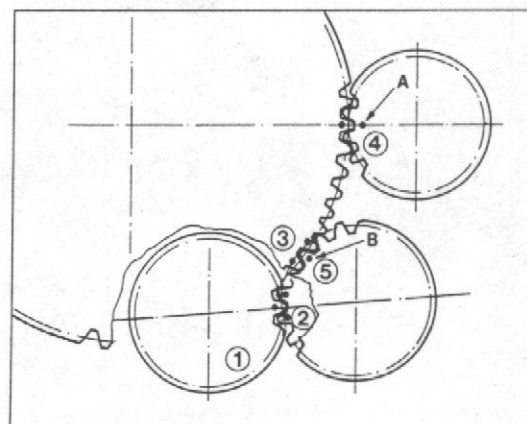
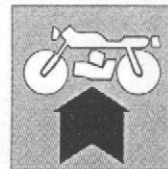


Head re-assembly.

Lock the cylinder and head fastening nuts (3) at the recommended torque and working crosswise. Remount the thermostat, the gasket and the cover fastening it with the suitable screws (1).

At every dismantling of the cylinder-piston assembly it is advisable to check the blade valve to be exempt from sealing faults, distortion or blade breaks. In these cases, replace components or better, the complete valve.

For checking and overhauling operations, see at paragraph "ENGINE OVERHAULING".

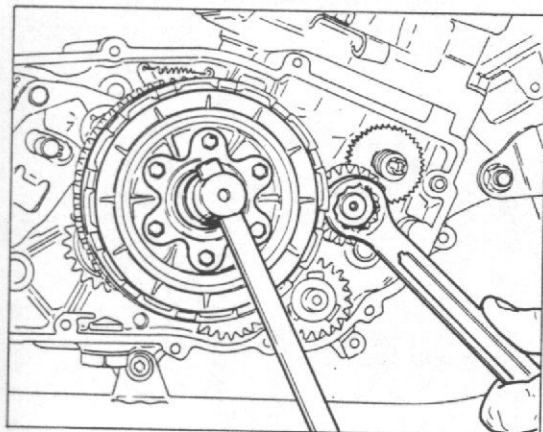
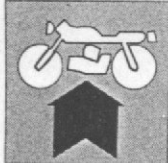
**Balance countershaft phasing.**

Phase the gear on countershaft (1) with lower transmission gear (2); the teeth concerning the phasing are marked. In this way the countershaft axle and transmission axle shall be aligned.

Arrange the piston at its bottom dead center.

Fit clutch housing (3) on the main shaft and phase it with main transmission gear (4) on the drive shaft.

To make sure that the phasing has been carried out properly, check that there are 7 teeth of housing (3) between marking (A) on the drive shaft gear and marking (B) on upper transmission gear (5).



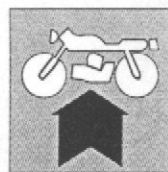
Insert the second three-point washer on the housing and fit the previously packed plates inside it.

Lock the middle nut at the recommended torque and carefully bend the safety washer. Mount the clutch thrust bearing.

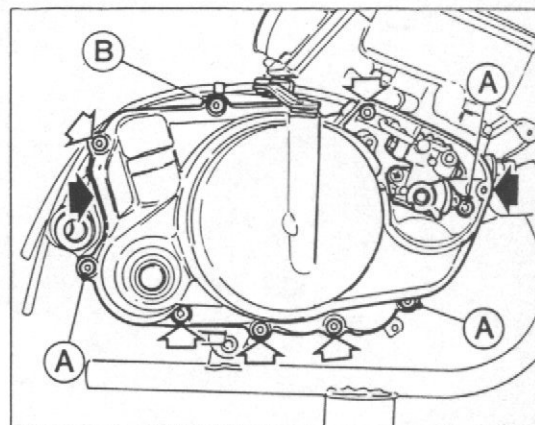


REMARK - The driving and driven discs package must freely slide both on central hub and clutch housing.

In case of difficult sliding, causing a faulty clutch operation, dismantle this group again and remove the obstacle. Also a tight locking of central nut could cause imperfections of clutch operation.

**Clutch cover reassembly.**

Check the correct position of the centering bushings, then reassemble the R.H. cover. Insert the spacer and the oil pump pipes fastening plate under the screw (B); remember that the three screws (A) are longer.



Provisionally install the oil pump.

Its final installation should be performed after connection of oil inflow and outflow, once the engine has been installed on the vehicle.



On the fastening screws apply Loctite.

For pump adjustment see the paragraph "ADJUSTMENTS".

