

INSTALLATION GUIDE

Replacing your Existing 4 speed Gears with the New 5 Speed Cluster

General Description

The existing 4 speed gearbox is fitted to all models as a separate unit.

The designation of the gearbox can be determined from the prefix stamped on the gearbox shell, immediately before the serial number. This is on the main shell, stamped on the top right hand side, near the end cover joint

12 Prefix

Viper and Venom Models

14 Prefix

MSS Models

The suffix R represents Close Ratio Gear Ratios, as fitted to Clubman and Thruxton models. It is not necessary to dismantle the engine to gain access to the gearbox, but it is necessary to remove the gearbox complete from the frame.

The recognised method to do this is to remove the gearbox within the rear engine plates.

This will require the removal of the dynamo covers, the primary chaincases, primary chain, and clutch assembly.

Please check that all the required components for the 5 speed cluster have been delivered to you.



Illustrated above, are the components of the 5 speed cluster as you will receive them. The Particular set illustrated is for the Road Ratio with reverse cam plate.

To enable installation both the Mainshaft and the Layshaft assemblies have to be disassembled, requiring the locating circlips to be removed.

With all the items disassembled, please check all components have been received and are ready for assembly.

We have provided a check-list for this purpose and recommend that this is used prior to taking your bike off the road.

Similarly, if it is felt that the bearings will require to be renewed, or additional parts may be required, try to pre-empt this and have these available prior to the stripdown.

We have some of these components available. These are listed at the end of these instructions.

Gearbox Removal

Before commencing to replace the gear cluster, it is advisable to remove the gearbox from the frame. The engine and gearbox must be lifted out of the frame and the engine plates removed.

Prior to the removal of the gearbox from the frame, drain the oil from the gearbox, via the drain plug, at the bottom of the front cover, allowing for the oil to drain into a receptacle placed below. The contents of the gearbox, when full, is one imperial pint (0.56litres).SAE50.

They are retained by two bolts that pass through the top lug of the gearbox shell and by the single bolt through the bottom lug. Not that the two upper bolts have specially shaped heads that align with slots in the left hand engine plate, to facilitate gearbox movement for primary chain adjustment. It is also advisable to remove the draw bolt adjuster on the right hand engine plates, to provide clearance for the engine plates to be lifted away. It is retained by a nut and washer on the inside of the engine plate.

When the engine plates have been removed, prepare a clean work area suitable for the gearbox to be stripped, preferably on a cloth or newspaper, so that any parts inadvertently misplaced will fall onto the clean surface, and similarly the new internals will not become contaminated prior to installation.

Dismantling the Gearbox



The kickstarter assembly is bolted to the exterior of the gearbox end cover by two short bolts and one long bolt at the bottom.

When these bolts are withdrawn, the complete kickstarter assembly can be removed without the need to detach the kickstarter arm or to release the spring tension.

Dismantling the Gearbox (cont)



Note there is no gasket between the end of the kickstarter bearing housing and the end of the gearbox outer cover with which it fixes to.

It is probable that the end cover over the right hand end of the mainshaft will have been removed at an earlier stage, in order to slacken the nut on the end of the mainshaft. If the cover is still in position, it should be removed at this stage by withdrawing the two short retaining bolts. This cover has a paper gasket to the jointing face.



To slacken the nut on the right hand end of the gearbox mainshaft, place a close fitting spanner across the cruciform end on the left hand end of the mainshaft, so that it can be held rigidly whilst the right hand nut is slackened and removed.

Dismantling the Gearbox – Removing the end Cover

The end cover is retained to the gearbox shell by 8 ¼" bolts around the periphery. There is no necessity to remove the single bolt close to the kickstarter housing, which acts solely as an oil level plug.

The end cover should now lift away, but if it does not come away easily, it may be necessary to tap the right hand end of the gearbox mainshaft through the centre of the ball race that remains in the end cover, if the shaft is a tight fit in the bearing.



Dismantling the Gearbox – Removing the Selectors and 4 speed Cluster

With the end cover removed, it is most probable that the floating bush that supports the right hand end of the layshaft will remain on the layshaft and should be removed. Alternatively, it may remain within the kickstart housing. If so, it can be left within this for the time being. This bearing will be required for the refitment of the 5 speed cluster.

Remove the bottom gear pinion from the end of the mainshaft. It will pull off quite easily.

Draw out the two selector forks rods that extend through the selector forks. They are a push fit in the far end of the gearbox shell and are provided with a groove close to the right hand end, which will aid extraction.



Do not use undue force, and take care not to damage the surface of the rods, as again, this will be re used.

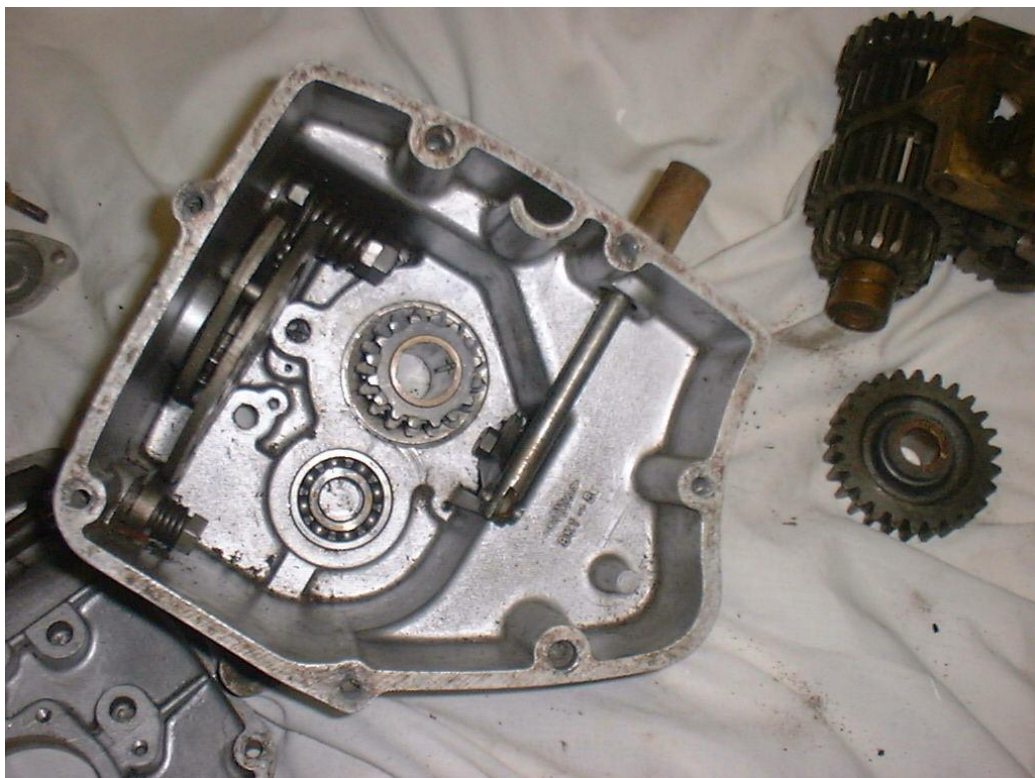
Withdraw the mainshaft from the left hand side (clutch side) of the gearbox. The upper selector fork can now be disengaged from the camplate and can be lifted away, along with the double sliding pinions.



The complete layshaft assembly can now be disengaged together with the lower selector fork. Some difficulty may occur in the case of the close ratio and TT close ratio gearboxes (prefix 12) with either the 17 or 18 close ratio gear.

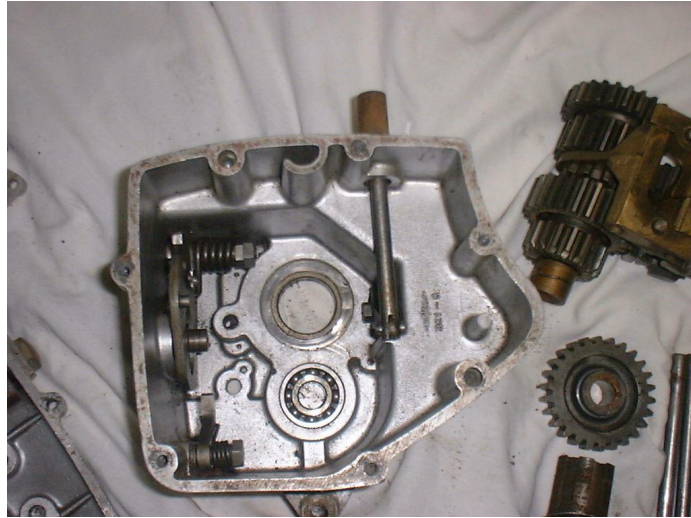
They will withdraw only in one position, because of the sixteen pickup teeth of the top gear pinion coinciding with sleeve gear teeth in that position.

The layshaft must be rotated until the teeth are aligned correctly, to permit the withdrawal.



Remove the sleeve gear by tapping the gear inwards through the main bearing.

Dismantling the Gearbox – Gear change Mechanism



It is not necessary to remove the pivot mechanism of the gear change, with only the camplate and its associated striking pawl requiring removal.

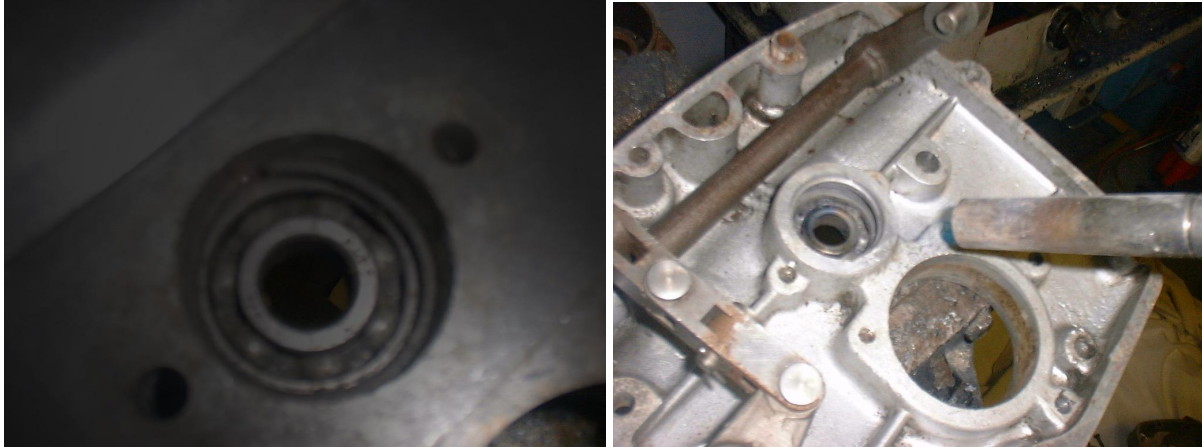
The camplate is a push fit over the camplate ratchet plate , that is mounted on the pivot.
Remove camplate and striking pawl.



*The Gearbox is now stripped to a level that is ready to accept the new 5 speed gear cluster.
If there is any doubt regarding the general condition of the gearbox and its bearings, we would recommend, as a minimum these are inspected and preferably changed, whilst the gearbox is at this level of overhaul.
It is easier to replace now than having to re-strip the gearbox, in a few months time!
With this in mind the next section outlines the removal and replacement of the bearings and general inspection of the components to be re-used.*

Removing the Gearbox Bearings

The mainshaft bearing in the end cover of the gearbox can be jarred out of position with the retaining circlip first being removed, and the end cover being gently heated.



Once the cover has reached an even temperature, bring the cover down smartly on a block of wood.

The bearing should be released from the cover.

The sleeve gear bearing is retained by a screwed ring, on the external face of the gearbox. The ring has 3 machined slots to aid its removal.



Before the ring can be removed, the clutch thrust cup assembly will require to be dismantled. This is held in position by two small screws with a retaining wire.

It is our experience to find that the aluminium shell is peened over to prevent the locking ring from turning. It is necessary to clear this material away, even to the level of dressing the thread within the case, to ease its removal.

As it is not expected for the installer to have the actual Velo Service Tool X2725 to aid the removal of this ring, a hammer and punch will have to suffice!

Prior to attempting to undo the ring, gently heat the gearbox shell, to an even temperature, to help release the grip on the ring.