

## Changing Gear Ratios - Hewland Mk8/9 4 Speed Gearbox:

In the following instructions, the numbers in square brackets refer to illustration numbers in the Hewland MARK 8/9 MANUAL page 10, and also Hewland Engineering Web Site - navigate to 'Parts Locator' and 'Mk8/9 4 speed Geartrain Assembly'.

### Equipment required:

- 1¼" A/F socket
- Medium screwdriver
- 120 lb.ft. torque wrench
- Soft mallet
- 17mm Allen key
- Drain tray
- 7/16" A/F & 13mm sockets and extensions
- Clean tray in which to strip gears
- 13mm open end spanner
- Gear oil, SAE 80/90, 2 pints/1¼ litre (For Hewland ally main case, add ½ pint / ¼ litre.)
- Side cutters
- Light sealer (e.g. Hylomar)
- 2 x 5/32" split pins

- 1) Remove 7 x ¼" UNF nuts and washers from rear cover. Remove cover.
- 2) Disconnect selector finger from gear linkage (various fittings, according to car manufacturer). Remove finger.
- 3) Remove 2 split pins from large castellated nuts. Unscrew and remove long screw from centre of layshaft (lower shaft).
- 4) Lock gearbox in two gears, reverse and top (lower selector rod in, upper rod out). Turn shafts or roll car until engagement is complete. Slacken both large castellated nuts, lower is right hand thread - leave on shaft, upper nut left hand thread - remove completely. Return selector rods to neutral.
- 5) Remove 9 x 13mm nuts and washers securing selector housing to main case, one is only accessible by open end spanner. Tap housing lightly to break seal and to clear the dowels. More force is not necessary and can damage the housing. Do not use levers. If in doubt, re-check previous items.
- 6) Carefully slide away the housing, complete with gears, supporting pinion shaft gears as they come away. If there is a shim[2] between the pinion bearing and the front hub[4], this must be fitted on re-assembly.
- 7) Turn assembly on end and support (the end cover is useful for this). Remove layshaft nut previously loosened and remove layshaft[19 or 27], keeping gears and spacers in strict order.
- 8) Remove the following sub-assemblies from their forks and place on a clean surface 1st/reverse hub/gear[3,4,5,6], 2nd/3rd hub/gear/clutch ring[7,8,9,10,11,12], top gear hub/clutch ring assembly[13,14], top gear/inner track[15,16,26].
- 9) At this point, take the opportunity to examine all parts for excessive wear. Dogs are subjected to constant wear every time that gear is engaged, but once the dog edges on both gear and clutch ring are rounded one third down, that gear is unlikely to stay in engagement. Pay particular attention to the gear teeth for signs of scuffing which may indicate that replacement parts are required. If you notice any heavy loadings on the ends of gears and hubs or looseness of the pinion shaft, then seek specialist advice.
- 10) Change gear ratios strictly as a pair of gears (one gear from each shaft). Both gears in a pair are stamped with the number of teeth on both gears (e.g. 19/32 ratio consists of one 19 tooth gear stamped '19 32' and one 32 tooth gear stamped '19 32'). Any other stamped letter (e.g. M or S) must be on both gears or they are not a matched pair and will not normally run together.
- 11) Re-assemble pinion (upper) shaft[1] parts in this order, lubricating as you progress - make sure thrust washer[17] is in place in the end of the selector housing: top gear[16], dogs uppermost: needle roller bearing[15]: inner track[26]: clutch ring[13] in top gear fork: top gear hub[14] (the short one) inside clutch ring: 3rd gear[11], dogs down: needle roller bearing[12]: 2nd gear[9], dogs up: needle roller bearing[10]: clutch ring in fork[7]: next largest hub[8], shank down: 1st/reverse hub/gear assembly[3,4,5,6], 1st gear with dogs down, reverse with groove above teeth and well located on its fork.

- 12) Re-assemble layshaft in this order - washer[25] next to ball bearing in housing: top gear[24] with a chamfered side towards the housing (later gears have chamfers both sides): one large spacer[23]: 3rd gear[22], chamfer up: 2nd gear[21], chamfer down: second large spacer[20]: 1st gear[30], chamfer up: small spacer[29]: reverse gear[28], teeth up: carefully slide the layshaft[27] through this assembly, into the ball bearing and locate with the right hand thread large nut. If an integral first gear/layshaft[19] is used, it takes the place of the previous 4 items[27,28,29,30].
- 13) Now pack away any gears not being used, in pairs (check markings). This double checks that you have fitted true pairs.
- 14) Check your gear assembly. Pinion shaft gears should increase in size from 4th to 1st, layshaft gears should decrease. Each pinion shaft gear should line up with its mating layshaft gear. The dogs of pinion shaft gears should face clutch rings. Clutch rings and large reverse gear should be well located in their respective forks.
- 15) Clean housing faces and apply sealer. Only a small amount of light sealer is required, excess will eventually choke the bearings. Silicone rubber sealer is not necessary, and not particularly recommended due to the great effort needed to clean off the old sealer prior to re-application.
- 16) Supporting pinion shaft gears to prevent them falling away from the forks, offer up the assembly, turning shafts or rolling the car to line up the splines. If you are baulked at the last 1/2" or so, try selecting top gear (upper rod backwards) and roll the car again. Do not use the mallet until the housing reaches the dowels. If in trouble, start again from 13).
- 17) Fit the pinion nut and just 2 of the M8 nuts and washers, 'nip up' the pinion and layshaft castellated nuts, then check that all gears engage correctly. If in any doubt, take apart and check again. When satisfied, fit the rest of the M8 nuts and washers. Pass the long screw into the layshaft and screw up until just nipped. If it will not engage the thread, loosen the layshaft nut, push shaft forward and try again.
- 18) Lock in two gears as in 4). Tighten pinion shaft and layshaft nuts to 120 lb.ft. and 70 lb.ft. respectively before lining up to the next split pin hole. Slacken the long layshaft screw to line up its split pin hole. Fit split pin and bend the tails over in opposite directions. Remove any tail that is likely to foul the end cover.
- 19) Return selector rods to neutral and refit the finger, smearing its bore with grease. Connect selector finger to gear linkage.
- 20) Clean mating faces, apply sealant and fit rear cover. Check that all gears can be engaged fully, then refill with oil - 2 pints (1¼ litre) from dry, 1¾ pints (1 litre) from a ratio change. For Hewland aluminium main case, add ½ pint (¼ litre). Do not fill to the 'level' plug on the side of the gearbox.

Written by and reproduced with the kind permission of Tony Wilson  
Hewland Specialist. <http://web.ukonline.co.uk/tonywilson43>