RALLIART

Assembly Instructions for

RA553455S1..Gearbox Assembly
MRA-200..Gearbox internal parts kit.
(SK-1698.....Fork setting fixture)

Conversion for Lancer Evolution

HEWLAND
ENGINEERING LIMITED

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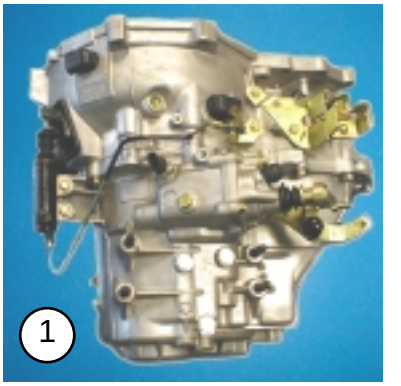
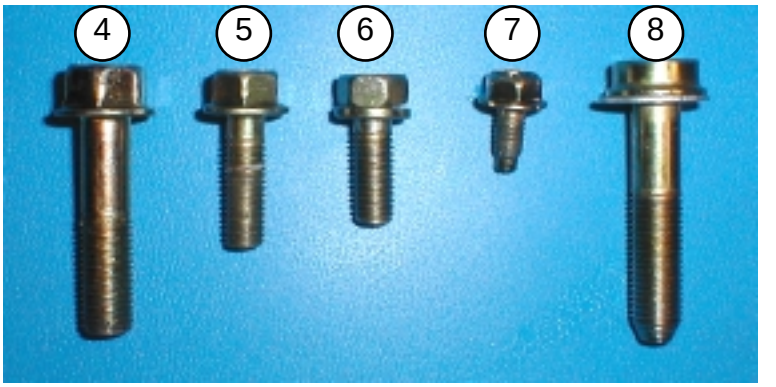
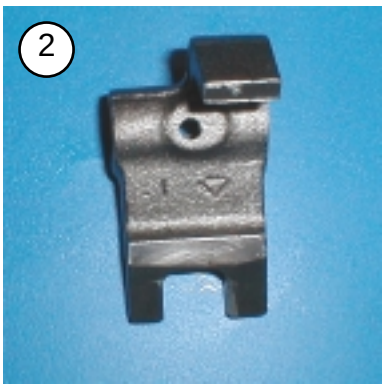
1. Preparation

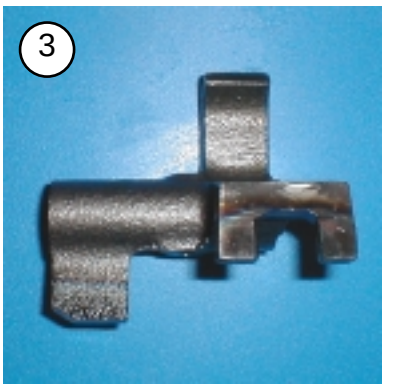
Deconstruct the existing gearbox and set aside the following items for future use:

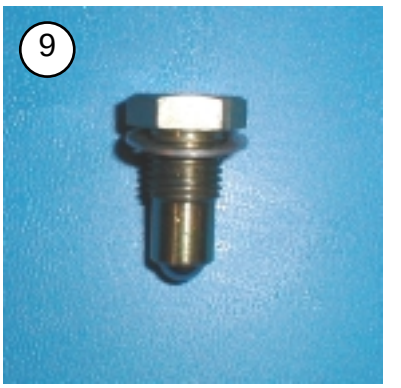


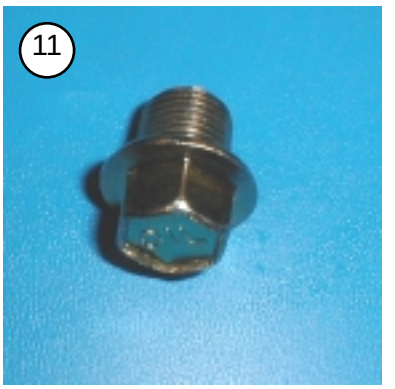
1. All casings and external mechanisms.
2. 1st/2nd selector head including roll pin.
3. 5th/reverse selector head including roll pin.
4. 16 x Maincase bolts.
   (M10x40 - MF140266)
5. 4 x Gear shift shaft bolts and washers.
   (M8X25 - MF140227)
6. 2 x Selector shaft bolts and washers.
   (M8X22- MF241254)
7. 6 x Sump tray bolts.
   (M6X10 - MD097012
8. Reverse idler retaining bolts and wash'r.
   (M10X46 - MD749978)
9. 3 x Detents
   (MD7499435 - or option - see appendix A)
10. Reverse switch (MD730979)
11. Drain plug (MD701850)
12. Final drive wheel retaing bolt
13. Reverse idler post
14. Differential (complete)

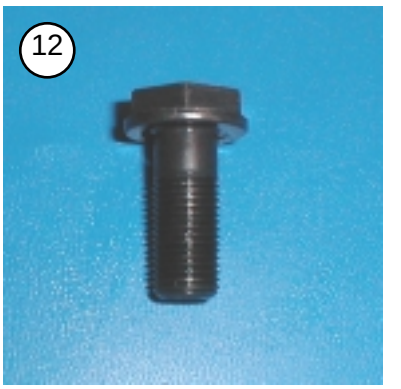


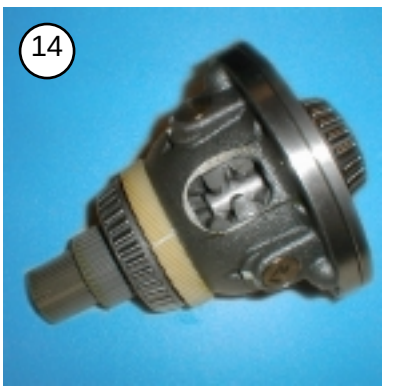












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2. Layshaft Assembly

Press off bearings from the original layshaft using Raliart tool #MD998801, as shown in *fig 2-1 and fig 2-2* and remove seals from the maincase bearing.

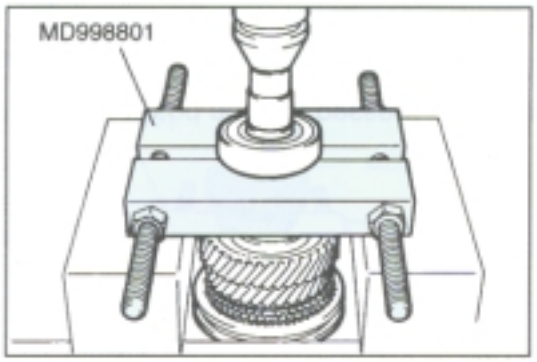

fig 2-1

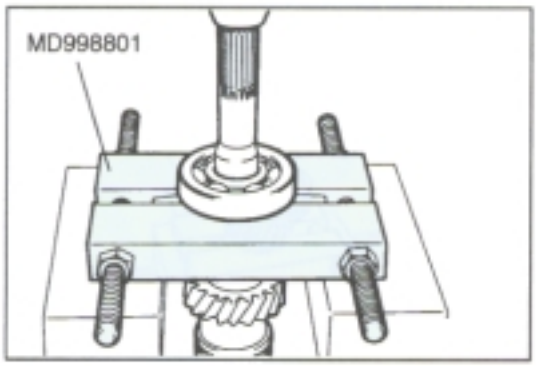

fig 2-2

Build the layshaft assembly engaging MRA-235-17/25 Hub Gear (#28a), MRA-235-18/20 (#8a) and MRA-235-28/24 (#12a) gears onto the splined shaft MRA-234 (#10a). Secure the assembly by fitting circlip CIR-076 (#25).

Press the bearings retained from the original shaft onto the assembly and fit circlip FT-219-1A (#13).

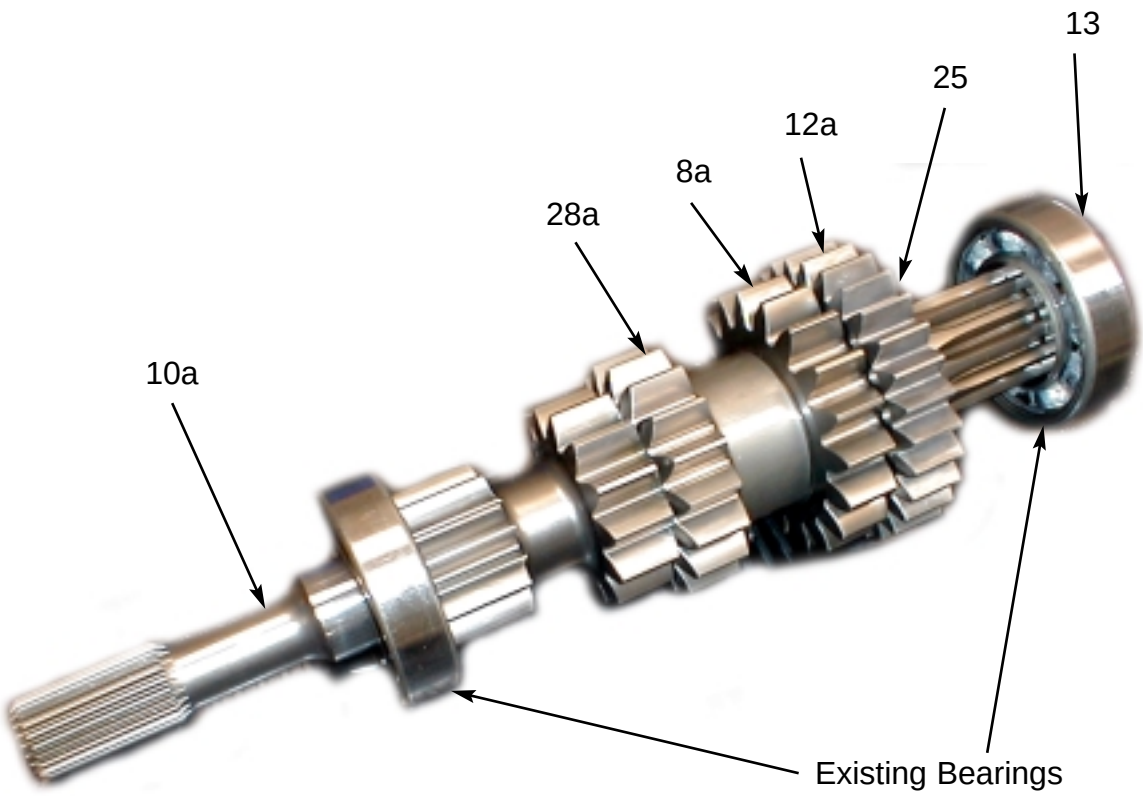

Fig 2-3. Layshaft Assembly

3. Mainshaft Assembly

Use the fork setting fixture (SK-1698) to assist in assembling the mainshaft.

Place the mainshaft (MRA-221 - #9a) into the fork setting fixture (*fig 3-1).*

Slide mainshaft spacer MRA-221-1 (#16) onto the mainshaft (*fig 3-2)*.

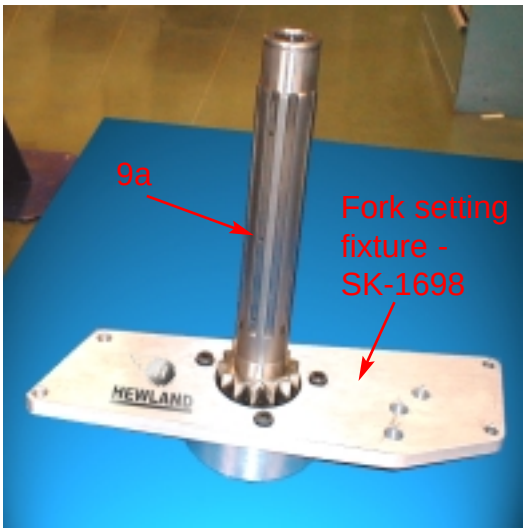

fig 3-1.

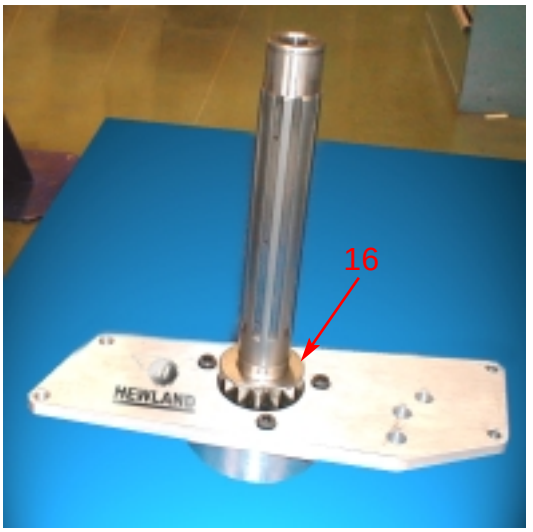

fig 3-2.

Place MRA-233-13/26 pinion gear (#10c) and bearing BEA-029 (#14) onto the smooth bore, splined, end of hub MRA-226 (#20) (*fig 3-3a*). Fit clutch ring DGB-232-S (#24) onto the hub external spline, completing the sub assembly by fitting MRA-233-12/36 pinion gear (#10b), and bearing BEA-029 (#14).

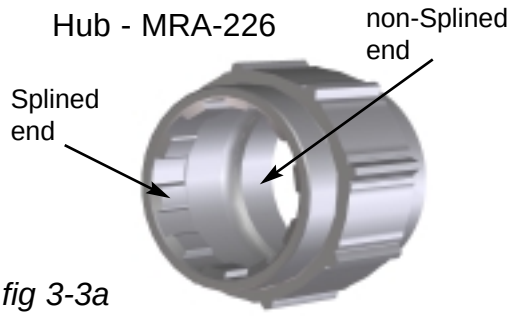

fig 3-3a

Engage the sub assembly onto the mainshaft splines, smooth bore side first (*fig 3-3*), followed by mainshaft hub spacer MRA-221-2 (#15) (*fig 3-4*).

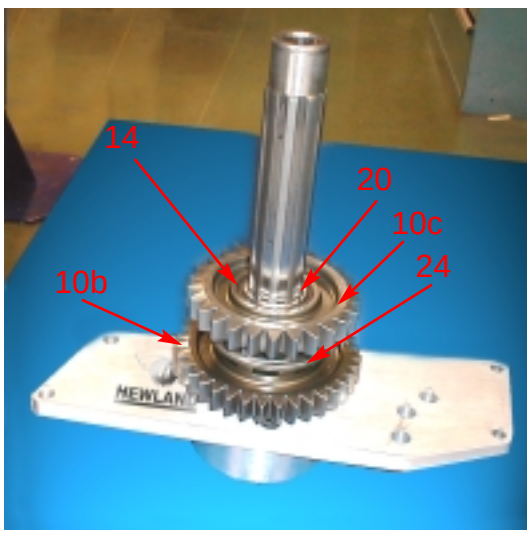

fig 3-3.

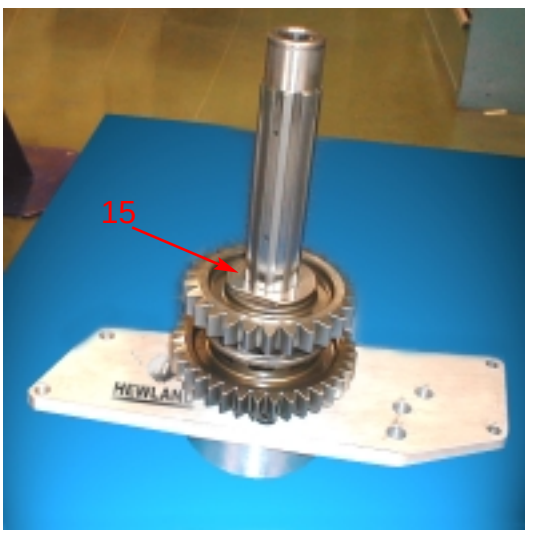

fig 3-4.

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Follow the same procedure for the sub assembly of MRA-233-17/25 pinion gear (#28b) and bearing BEA-029 (#14) onto the end of 3rd/4th hub ST-228 (#21).

Hub - ST-228

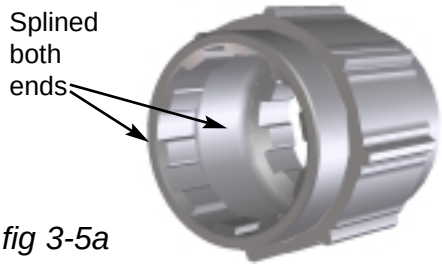

fig 3-5a

Engage clutch ring DGB-232-S (#24) onto the hub external spline, completing the sub assembly by fittingMRA-233-18/20 pinion gear (#8b) and 3rd/4th hub ST-228 (#21).

Engage the sub assembly onto the mainshaft splines, MRA-233-17/25 pinion gear (#28b) towards the final drive. Fit the second mainshaft hub spacer.MRA-221-2 (#15).

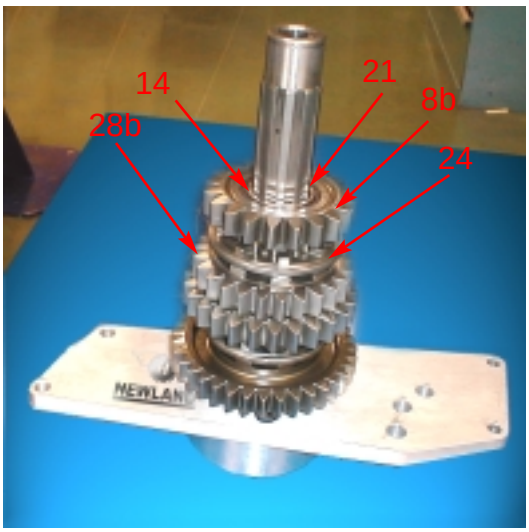

fig 3-5.

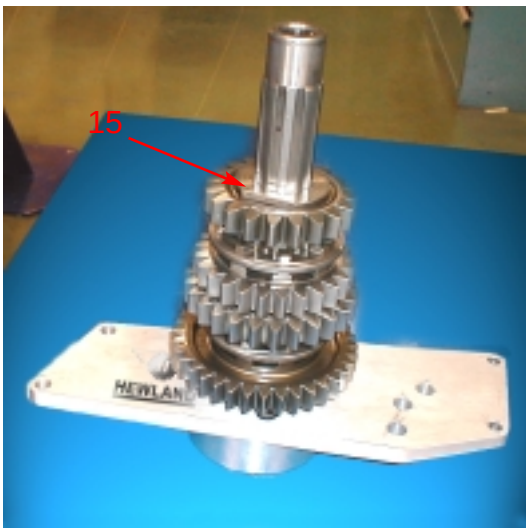

fig 3-6.

The same procedure is followed for the sub assembly of MRA-233-28/24 pinion gear (#12b) and bearing BEA-029 (#14) onto the end of hub MRA-228 (#22).

Engage clutch ring DGB-232-S (#24) onto the hub external spline, completing the sub assembly by fitting reverse pinion gear MRA-231 (#26), making sure the 5th gear is placed on the stepped end of 5th/REV hub MRA-228 (#22) (*fig 3-7a)*.

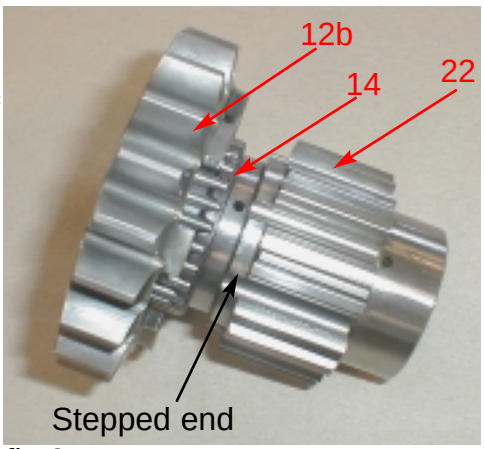

fig 3-7a.

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Engage the third hub onto the mainshaft with MRA-233-28:24 pinion gear (#12b) towards the final drive (*fig 3-7*).

Fit mainshaft spacer MRA-221-3 (#23) with its larger face towards the reverse gear (*fig 3-8 and 3-8a*).

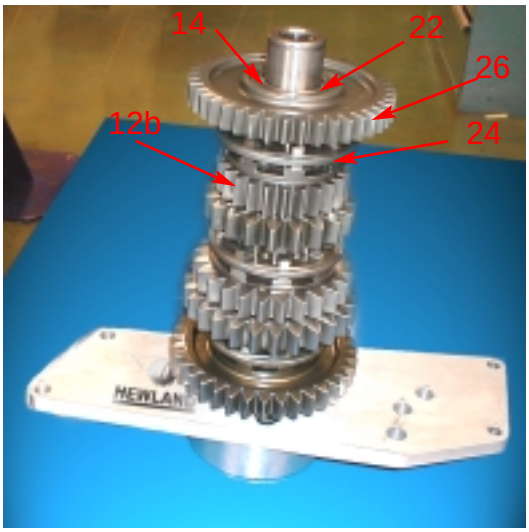

fig 3-7.

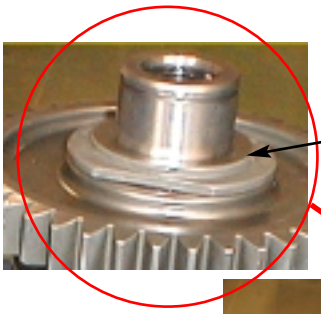

fig 3-8a.

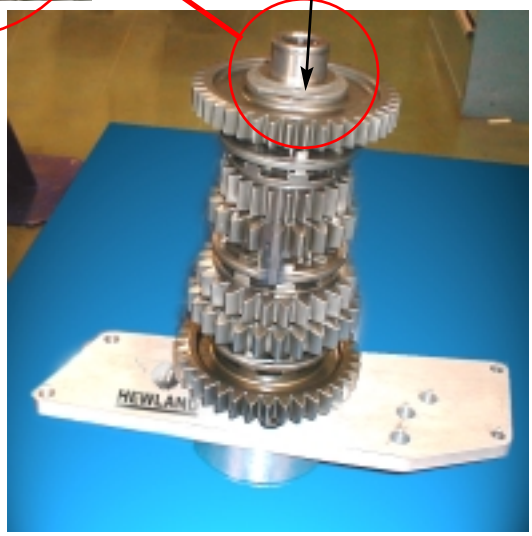

fig 3-8.

Press the *inner* race of bearing BEA-148 (#17) up to the spacer and secure with circlip FT-219-1A (#13). Insert the oil seal (#19) in the mainshaft (fig 3-9).

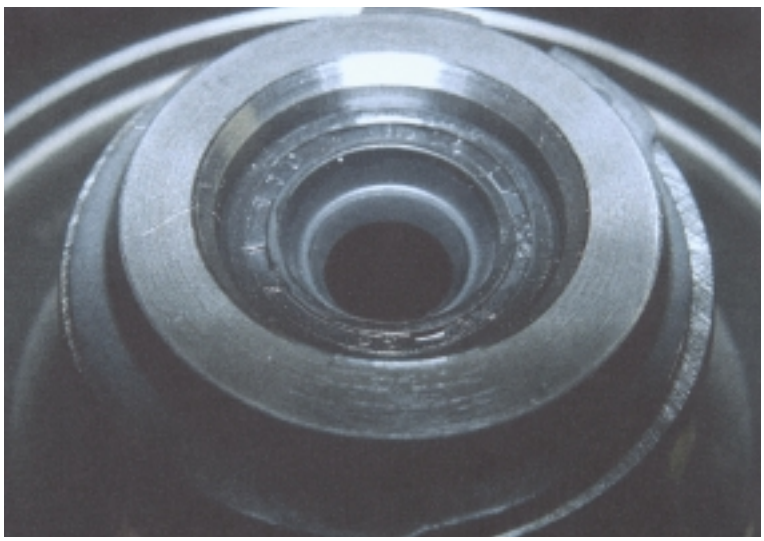
fig 3-9.

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4. Fork Setting

Insert the roller bearing BEA-099(#18) for the mainshaft into the clutch housing.

To obtain the correct end float/preload for both layshaft and mainshaft, follow the procedure as laid down on pages 22B-16 and 22B-17 of the Lancer Evo workshop manual (reproduced as Appendix D in this manual).

Place the correct shim (see Appendix E) and bearing BEA-148 (#17) into the mainshaft counterbore within the maincase (*Fig 4-1*).

Place a .040” (1.0mm) selector spacer MRA-246-1 (#27) onto 1st/2nd selector rod MRA-246 (#7) and fit fork MRA-250 (#6) *without* its key. Lightly lock in place with a **plain** M16 x 1.5 nut (10Nm torque). Ensure the detent notches are facing away from the fork (*Fig 4-2*).

Engage the fork onto the clutch ring between 1st and 2nd gear on the main shaft. Holding the selector rod in place, lower the final drive shaft assembly into position in the maincase. At the same time guide the selector rod into its bore (*Fig 4-3)*.

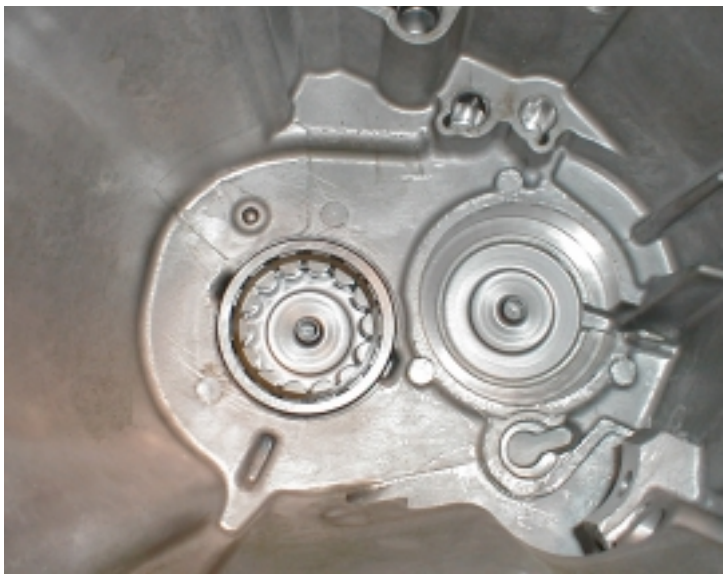

Fig 4-1

Fig 4-2

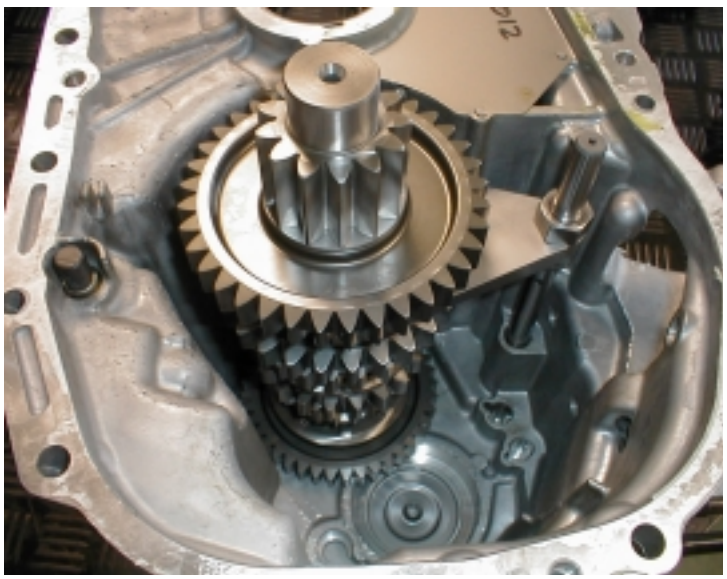

Fig 4-3

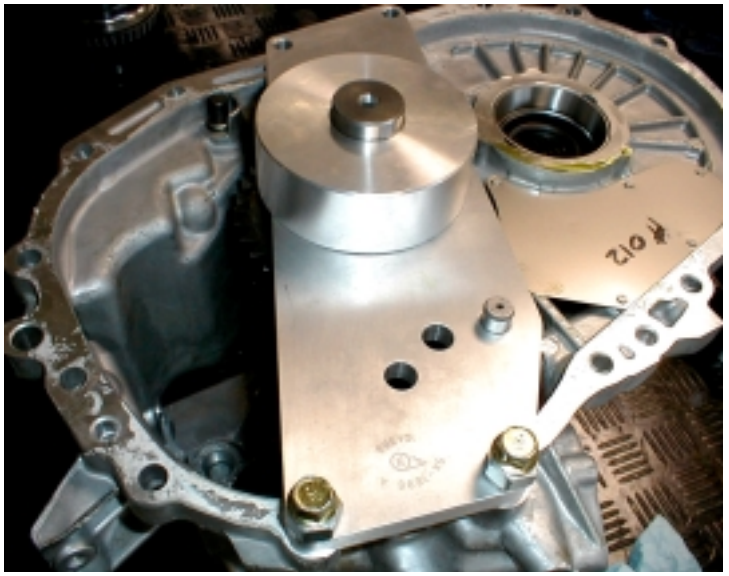

Fig 4-4

Fit the fork setting fixture over the final drive spigot on the mainshaft and selector rod. Using four (4) maincase bolts lightly secure the fixture (10Nm torque) (*Fig 4-4)*.

Set the selector rod to the neutral position (centre notch) by looking through the detent hole and fit one of the original detents (*Fig 4-5)*.

Fig 4-5

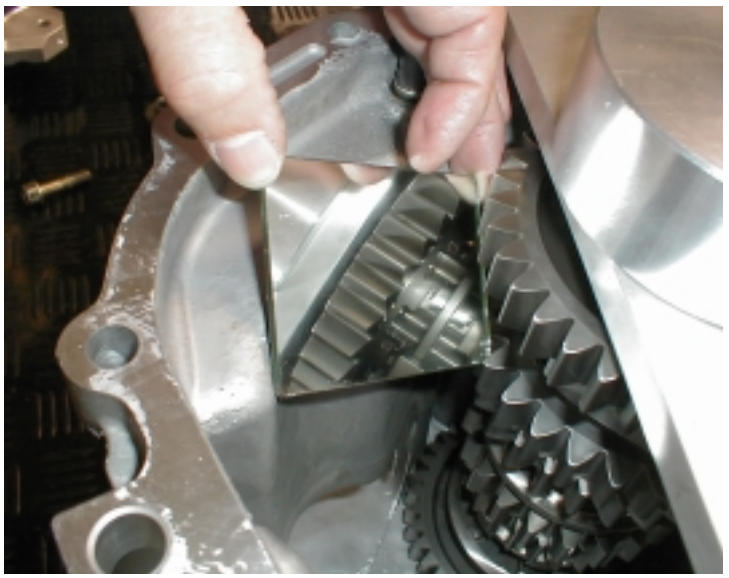

Fig 4-6

Using a mirror inspect the fork setting (*Fig 4-6)*. The dogs on the clutch ring must be mid way between the dogs on the 1st and 2nd pinion gears. Should minor adjustments be necessary, the spacer MRA-246-1 (#27) can either be ground to size, or replaced with a thicker spacer suitably ground to size.

Having obtained the correct fork setting, remove the mainshaft and set aside the selector rod and fork.

Follow the same procedure as above, using another .040”(1.0mm) spacer MRA-246-1 (#27) to assemble the 3rd/4th rod MRA-247-A (#4) and fork MRA-251(#5) (without its key). Having fitted the mainshaft, selector rod assembly and detent in place with the fixing jig.

Fig 4-7

As a guide, a .046”(1.15mm) spacer MRA-246-1 (#27) is required to fit the 5th/REV selector rod MRA-248 (#2) and fork MRA-252 (#3) . Build in the same way as the other rods (without its key) and fit the assembly, again with the aid of the fixing jig. Fork setting inspection can be made through the “sump plate” aperture adjacent to the reverse idler gear. Again, any adjustments must be made by grinding the spacer to the required size.

Remove the mainshaft and 5th/REV rod. Fit the appropriate keys (DG-256-6 (#29) and MRA-248 (#30))to each fork, and, using *Fig 4-7* as a guide, lock each fork to its rod with NUT020 (#1) as illustrated.

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Selector Frok and Rod Assemblies

1st-2nd Selector Fork and Rod Assembly consists:

MRA-246 Selector Rod Item # 7
MRA-250 Selector Fork Item # 6
NUT-020 M16 Nut Item # 1
MRA-248 Key Item # 29
MRA-246-1 Spacer Item # 27
Selector head and roll pin recovered from doner gearbox

5th-Reverse Selector Fork and Rod Assembly consists:

MRA-248 Selector Rod Item # 2
MRA-252 Selector Fork Item # 3
NUT-020 M16 Nut Item # 1
MRA-248 Key Item # 29
MRA-246-1 Spacer Item # 27
Selector head and roll pin recovered from doner gearbox

3rd-4thSelector Fork and Rod Assembly consists:

MRA-247-A Selector Rod Item # 4
(Complete with selector head and roll pin)
MRA-251 Selector Fork Item # 5
NUT-020 M16 Nut Item # 1
DG-265-6 Key Item # 29
MRA-246-1 Spacer Item # 27

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5. Final Assembly

Fit the final drive wheel to the existing differential using the original bolts tightened to 132Nm with Loctite 648

Fit the outer bearing, BEA-099 (#18) into the appropriate counterbore in the clutch housing. Place the differential assembly into the clutch housing.

Fit the fork assembly onto the three clutch rings (*Fig 5-1*) and, while held in place, mesh the layshaft and its gears into engagement with drive gears on the mainshaft(*Fig 5-2*). Holding both shafts and the selector rods locked together (*Fig 5-3*), lower the complete assembly into the clutch housing (*Fig 5-4*). The layshaft should be guided through the oil seal allowing its bearing to locate in the bellhousing. The mainshaft will engage in the final drive wheel and its bearing into the outer race. At the same time the three selector rods will align with their respective location bores.

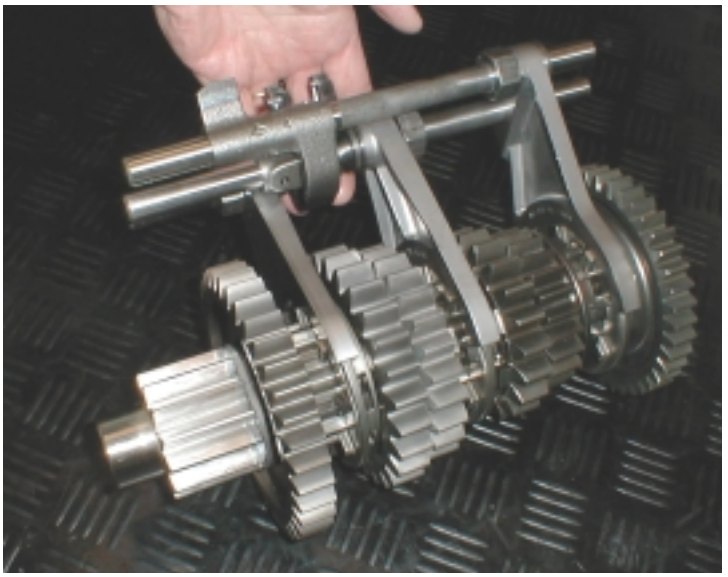

Fig 5-1.

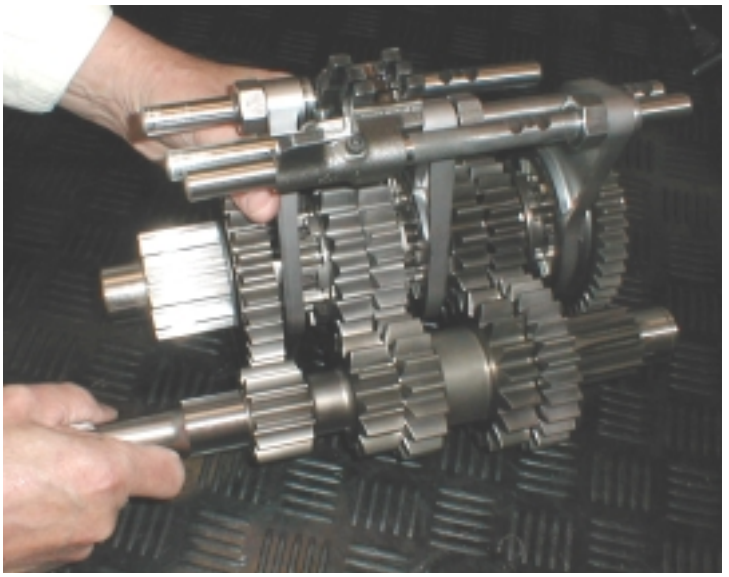

Fig 5-2.

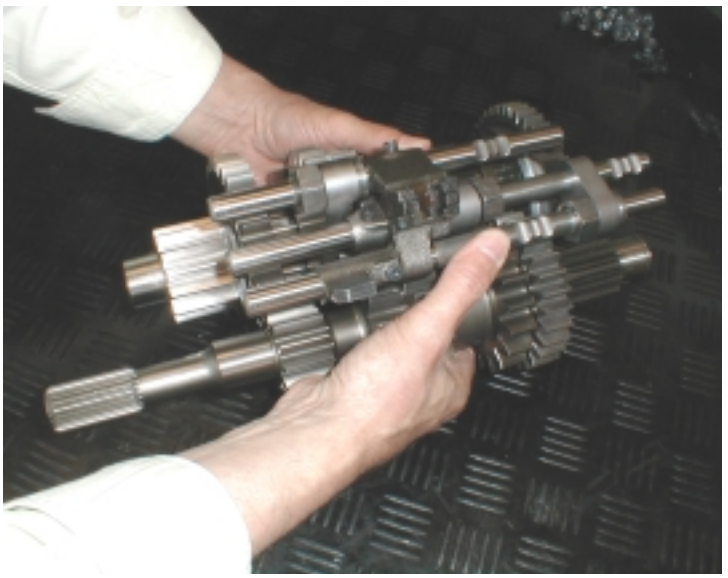

Fig 5-3.

Fig 5-4.

Place bearing BEA-148 (#17) onto it’s inner race on the mainshaft.

Using heavy grease, hold the layshaft and mainshaft shims into their counterbores in the main case.Using Hylamar to seal the faces, lower the maincase onto the gear assembly. Check that the selector rods are free by sliding them through their travel before finally bolting up the cases(44Nm). Fit the detents to the selector rods in the neutral position. Replace the selector mechanism and its locking pin.

Exchange the reverse idler gear MRA-237 (#11) using the original spacers and circlip. Remount in its cradle inside the sump aperture and fit the plate using sealant.

Appendix A Parts List

Component	Part Number	Description	Qty. Per
	RA553455S1	GEARBOX ASSEMBLY	1
	MRA-200	GEARBOX INTERNALPARTS KIT	1
1	NUT-020	M16 NUT	3
2	MRA-248	SELECTOR ROD - 5TH/REV	1
3	MRA-252	SELECTOR FORK - 5TH/REV	1
4	MRA-247-A	SELECTOR ROD 3rd/4th- ASSY	1
5	MRA-251	SELECTOR FORK - 3RD/4TH	1
6	MRA-250	SELECTOR FORK - 1ST/2ND	1
7	MRA-246	SELECTOR ROD	1
8	MRA-4TH-SET	4TH GEAR SET - CONSISTS OF:	1
8a	*MRA-233-18/20*	*INPUT GEAR*	*1*
8b	*MRA-235-18/20*	*PINION GEAR*	*1*
9	MRA-221-SET	MAINSHAFT AND FINAL DRIVE	1
10	MRA-234-SET	LAYSHAFT SET - CONSISTS OF:	1
10a	*MRA-234*	*LAYSHAFT*	*1*
10b	*MRA-233-12/36*	*PINION GEAR*	*1*
10c	*MRA-233-13/26*	*PINION GEAR*	*1*
11	MRA-237	REVERSE IDLER GEAR	1
12	MRA-5TH-SET	5TH GEAR SET - CONSISTS OF:	1
12a	*MRA-233-28/24*	*INPUT GEAR*	*1*
12b	*MRA-235-28/24*	*PINION GEAR*	*1*
13	FT-219-1A	CIRCLIP	2
14	BEA-029	BEARING	6
15	MRA-221-2	MAINSHAFT SPACER - HUB	2
16	MRA-221-1	MAINSHAFT SPACER	1
17	BEA-148	BEARING (NJ207EC)	1
18	BEA-099	BEARING (NJ2207EC)	1
19	LIP-041	OIL SEAL	1
20	MRA-226	1ST/2ND HUB	1
21	ST-228	3RD/4TH HUB	1
22	MRA-228	5TH/REVERSE HUB	1
23	MRA-221-3	MAINSHAFT SPACER	1
24	DGB-232-S	CLUTCH RING	3
25	CIR-076	CIRCLIP	1
26	MRA-231	REVERSE PINION GEAR	1
27	MRA-246-1	SELECTOR SPACER (3-OFF EACH)	1
28	MRA-3RD-SET	3RD GEAR SET - CONSISTS OF:	1
28a	*MRA-233-17/25*	*INPUT GEAR*	*1*
28b	*MRA-235-17/25*	*PINION GEAR*	*1*
29	DG-265-6	KEY	1
30	MRA-248-1	KEY	2
	SK-1698	FORK SETTING FIXTURE	1
OPTION PARTS			
For strong neutral shift return			
1	MD771659	SPRING, NEUTRAL RETURN	1
2	MD771658	SPRING, NEUTRAL RETURN	1
3	MD747930	DETENT	3
Evolution 7 conversion parts.			
1	MD771828	BRACKET ASSEMBLY, SHIFT CABLE	1
2	MD756706	SLEVE, SPEED METER DRIVEN GEAR	1
3	MD747055	GEAR SPEED SENSOR	1
4	MR581401	M/T CASE BRACKET	1
5	MF241250	BOLT, WASHER ASSEMBLY (M8X14)	1

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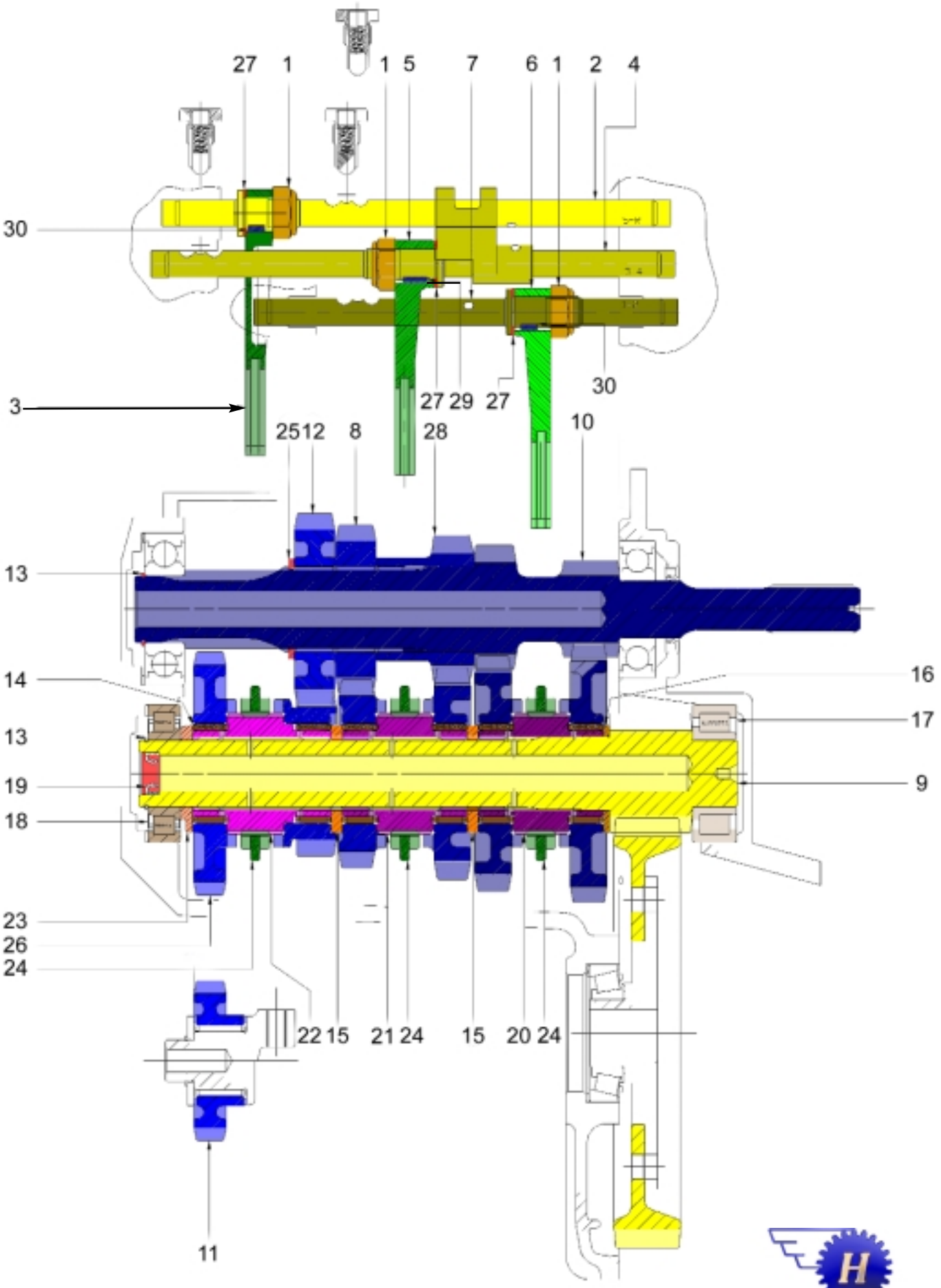
Appendix B Assembly Drawing



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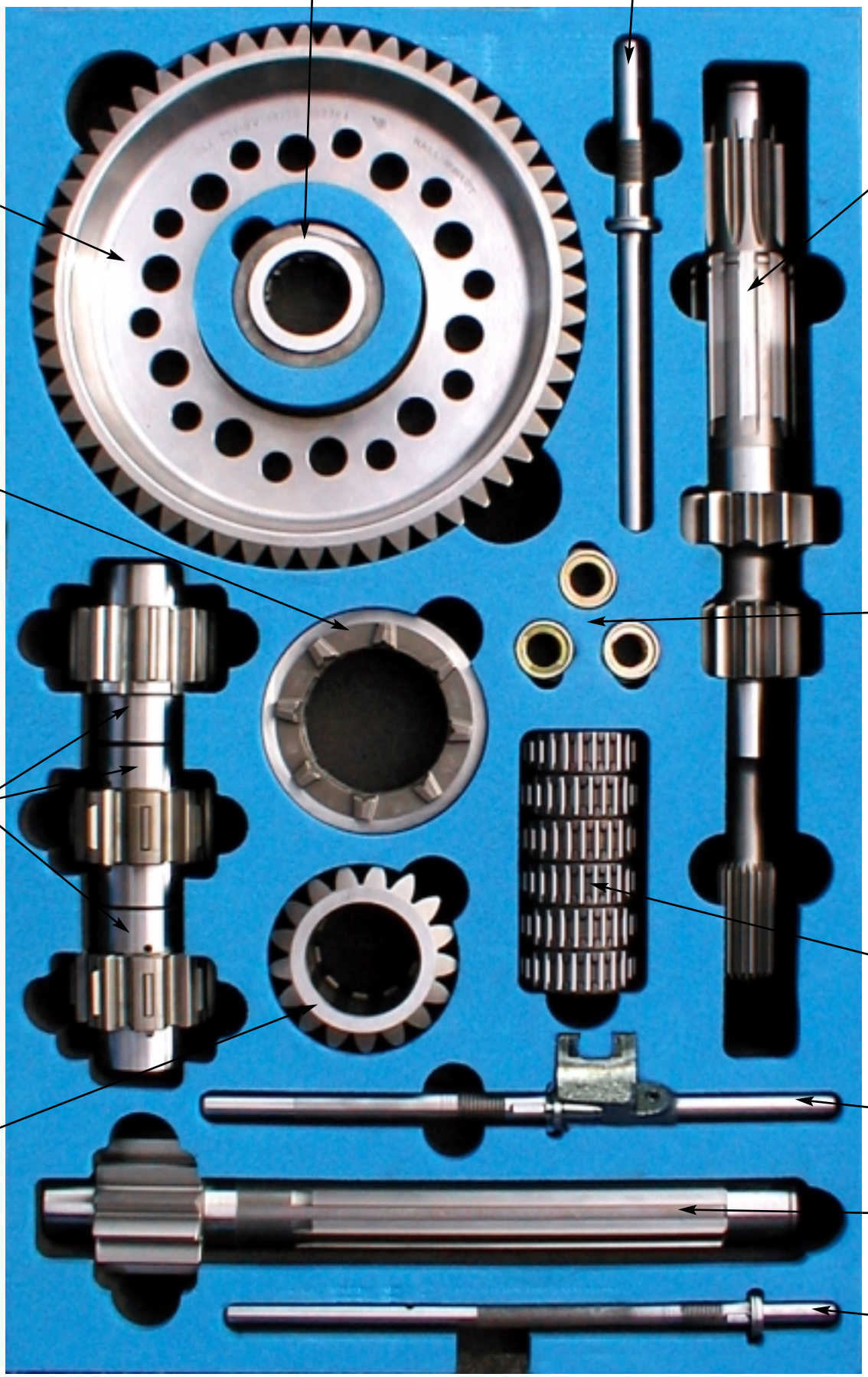
Appendix C **Gearbox Parts as Packed**

Bottom Layer



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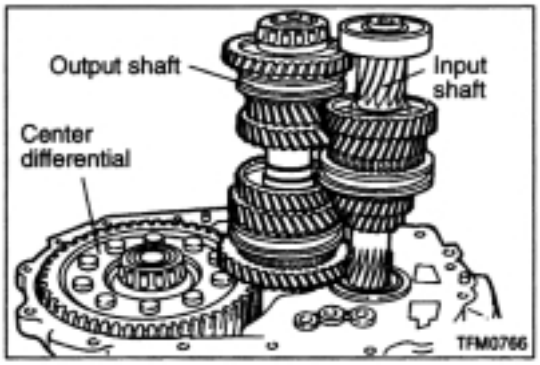
Appendix C (cont'd) Gearbox Parts as Packed

Top Layer

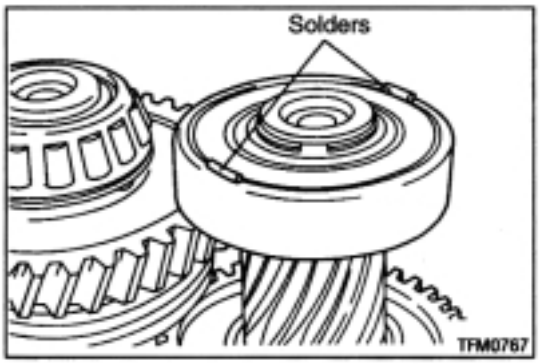
HEWLAND



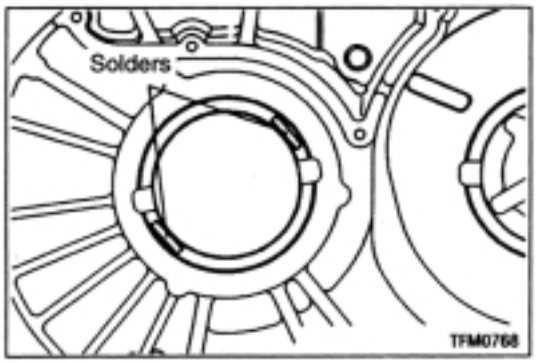
ADJUSTMENT BEFORE ASSEMBLY

SPACER SELECTION FOR ADJUSTING INPUT SHAFT END PLAY / OUTPUT SHAFT PRELOAD / DIFFERENTIAL PRELOAD

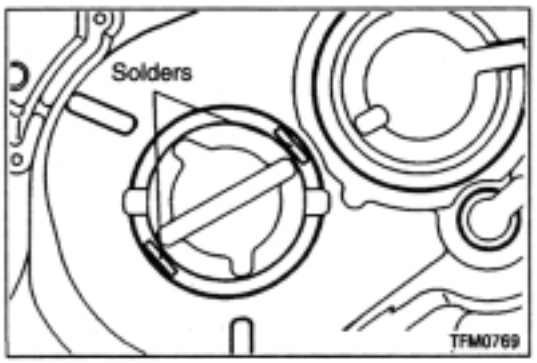
(1) Install the input shaft, output shaft and centre differential as a set to the clutch housing.



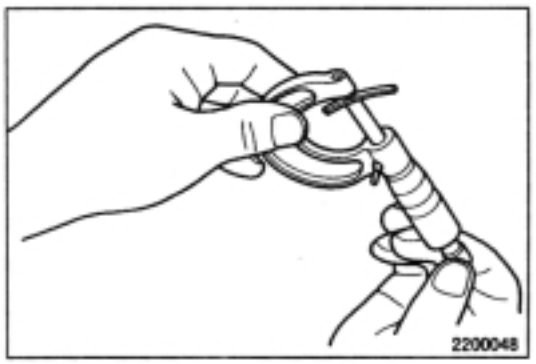
(2) Place two pieces of solder (1.6 mm in diameter and approx 10mm in length) on the input shaft rear bearing at the positions shown in the illustration.



(3) Place two pieces of solder (1.6 mm in diameter and approx 10mm in length) on the transmission case at the positions shown in the illustration.
(4) Install the bearing outer race.
(5) Install the transmission case and tighten the bolts to the specified torque.



(6) Remove the transmission case. If the solder is not crushed, repeat the steps (2) through (5) using solder with larger diameter.



(7) Measure the thickness of the crushed solder with a micrometer and select spacers that will provide the standard end play/proload value.

Standard Value:
Input shaft end play.....0 - 0.17 mm
Output shaft end play.....0.13 - 0.18 mm
Centre differential preload...0.05 - 0.11 mm

Appendix E Spacer List for Adjustment

Spacer M/T Input Shaft

PART#	THICKNESS
MD723600	1.34
MD723603	1.43
MD723606	1.52
MD723609	1.61
MD756760	1.70
MD756763	1.79

Spacer M/T Output Shaft

PART#	THICKNESS
MD720938	0.86
MD720939	0.89
MD720940	0.92
MD720941	0.95
MD720942	0.98
MD720943	1.01
MD720944	1.04
MD720945	1.07
MD710454	1.10
MD700270	1.13
MD710455	1.16
MD710456	1.19
MD700271	1.22
MD710457	1.25
MD710458	1.28
MD706574	1.31
MD710459	1.34
MD710460	1.37
MD710461	1.40
MD710462	1.43

Spacer M/T Differential

PART#	THICKNESS
MD727660	0.74
MD754476	0.77
MD727661	0.80
MD720937	0.83
MD720938	0.86
MD720939	0.89
MD720940	0.92
MD720941	0.95
MD720942	0.98
MD720943	1.01
MD720944	1.04
MD720945	1.07
MD710454	1.10
MD700270	1.13
MD710455	1.16
MD710456	1.19
MD700271	1.22
MD710457	1.25
MD710458	1.28
MD706574	1.31