



SERVICING INSTRUCTIONS AND ILLUSTRATED PARTS LIST FOR HEWLAND DG-300 MARK 2 GEARBOX

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GENERAL NOTES—MAINTENANCE AND OVERHAUL

The Mark 2 DG-300 Gearbox has five forward ratios and reverse. It is designed for use with rear engine competition cars having a capacity of up to 4 1/2 litres.

Only one final drive ratio is used, Since the drive is indirect at all times, any change in ratio can be made through the gearbox. The drive is taken from the clutch shaft to the spiral bevel final drive via straight cut gears. Gear change is effected by non-synchronised face dogs. Ratios can be changed without removing the unit from the chassis, and all requirements can be met from our extensive range of gears. All ratios except bottom are inter-changeable, and may be arranged in any order.

The differential and crown wheel assembly is mounted on two taper roller bearings located in the side plates and adjustable to correct pre-load by shims. Output shafts are also mounted in the side plates and lip oil seals are fitted.

The gears run directly on caged needle roller bearings, and each gear and bearing revolved as an assembly. Heat treated nickel-chrome steel is used for all gears and shafts. Selector forks are cast in aluminium bronze and casings in magnesium alloy.

The differential is of Limited Slip design, the unit normally supplied being the Cam and Pawl type.

The gearbox unit is lubricated by oil splash, and the final drive by pump. The pump is located in the maincase, and is fed via a filter which can be withdrawn from the outside of the case. The oil is piped out of the maincase on the right hand side and returns via external piping, thus providing for the fitting of an oil cooler. The latter is strongly recommended to ensure that oil temperature does not exceed its maximum of 100°C.

The gear change rod is mounted low down on the right hand side. The clutch is operated by steel fork and push-rod - accepted as the simplest and most reliable system, especially with monocoque chassis. The push-rod is actuated from a slave cylinder mounted on the side of the maincase.

The general configuration of the DG-300 Mark 2 Series provides the maximum utilisation of power allied to minimum weight for the power required to be transmitted.

NOTE:

Only genuine Hewland spares should be used as replacements. These are manufactured in our own workshops to the fine tolerances necessary, and rigorously inspected and tested.

New nuts and gaskets should always be used on re-assembly. When warming the outside of the case, keep the blowlamp moving. Do not overheat. Test with a spot of moisture, which will bounce off when the case is hot enough.

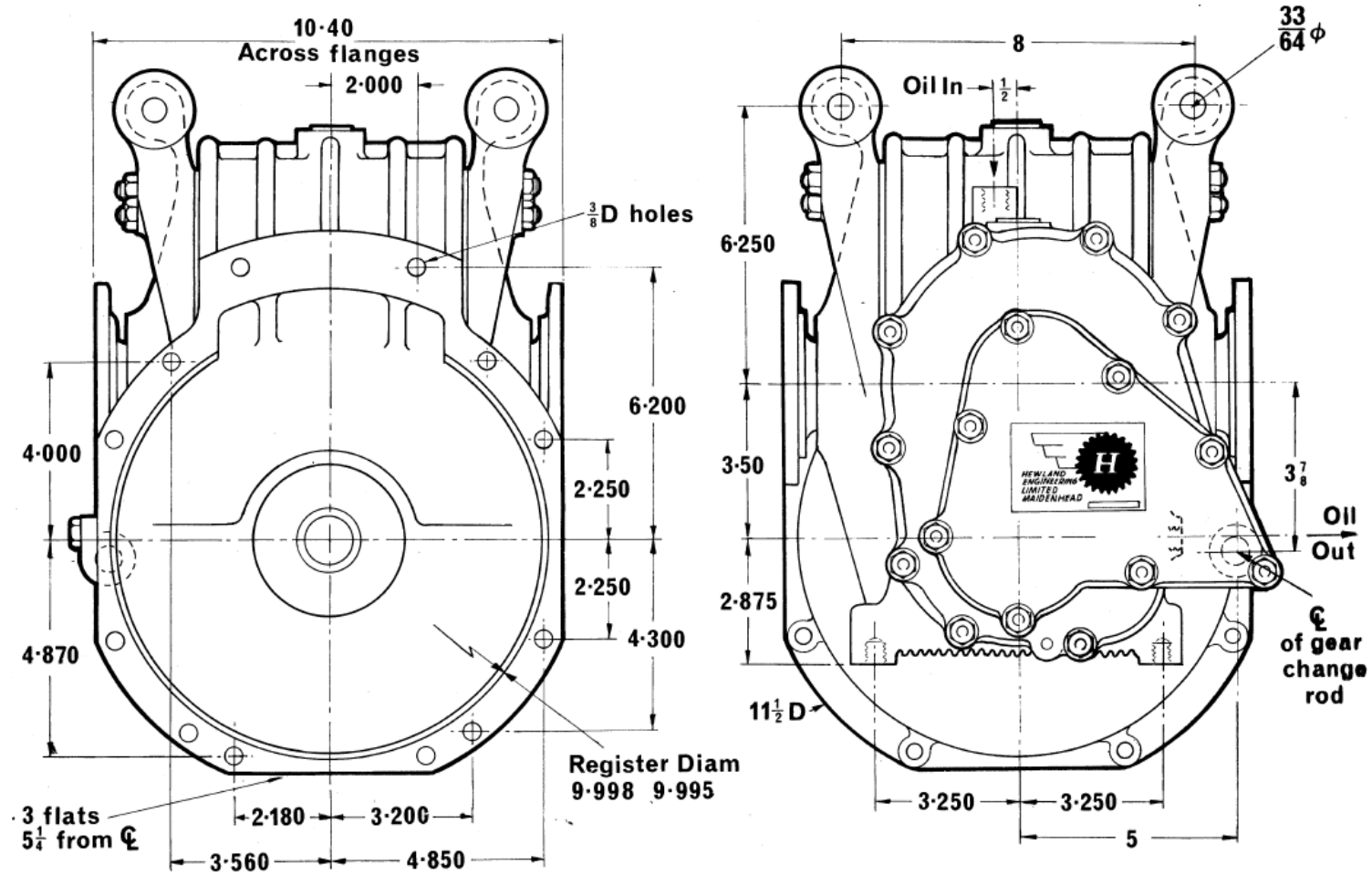
When refilling with oil, put half the quantity into each filler hole. Never put all the oil in one oil sump.

WEIGHT : 118lbs / 53.5kg

OIL CAPACITY: 3 1/2 pints

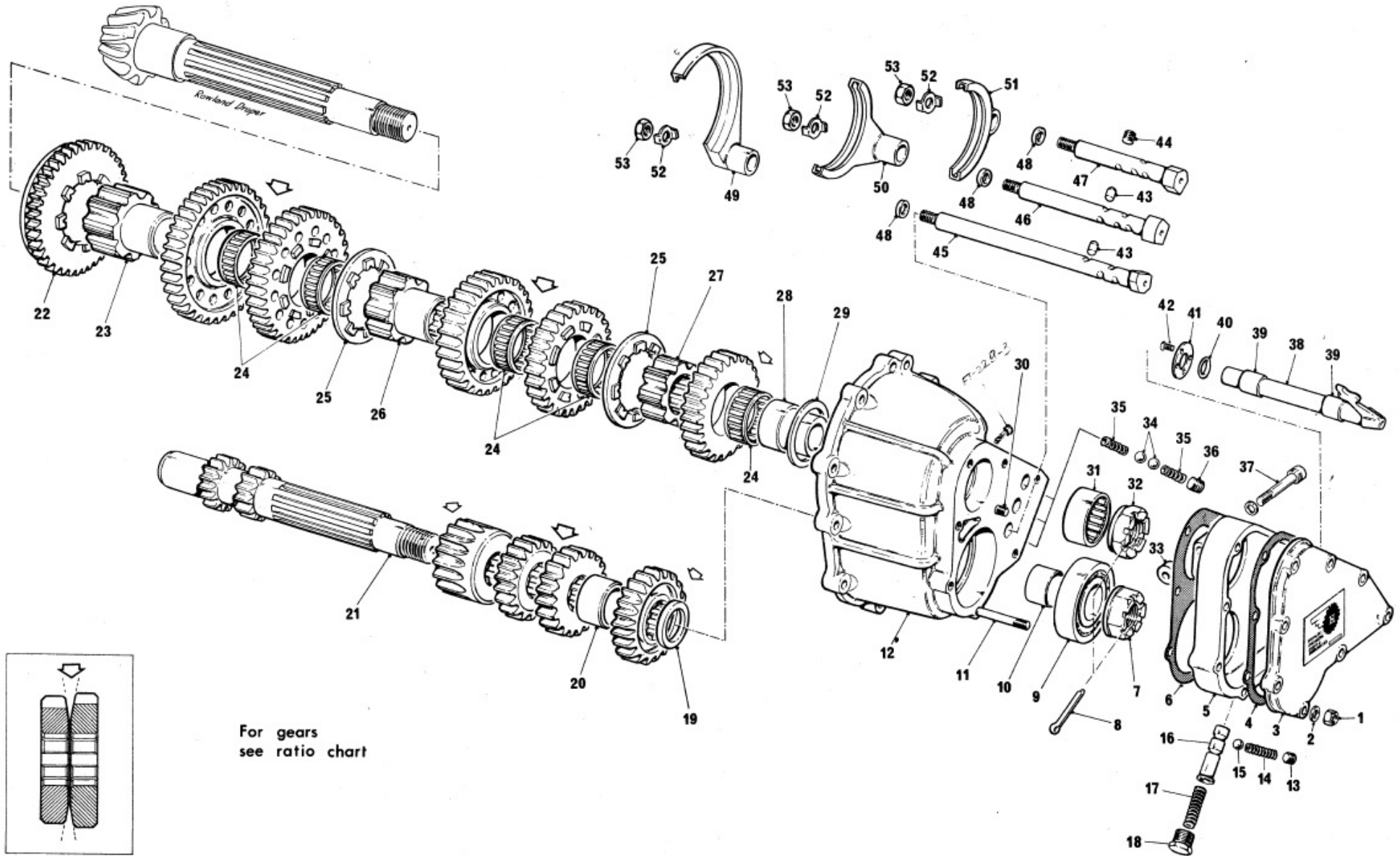
OIL TYPE: S.A.E 80 or 90

TECHNICAL SPECIFICATION



Dimensions in INCHES

GEARBOX UNIT



THE GEARBOX UNIT

REMOVING THE UNIT:

END COVER

- 1) Remove the eight 5/16 UNF Nyloc Nuts and washers from the end cover. Take off the cover and the gasket.
- 2) Remove the split pins from the castellated pinion and layshaft nuts.
- 3) Push the heads of the two outside selector rods, thus engaging the gears. This locks the gearbox by engaging 2 gears.
- 4) Remove the pinion nut (left hand thread) and slacken off the layshaft nut (conventional right hand thread).
- 5) Now withdraw the two outside selector rods to disengage the gears.

BEARING CARRIER

- 1) Remove the ten 5/16 UNF nuts and washers.
- 2) Using a plastic mallet, tap the bearing carrier and remove it from the maincase, complete with layshaft assembly and gear train. Support the gears, hubs and clutch rings with the hand as they come off the pinion.

The gearbox unit is now completely removed. Replace in reverse order to above.

CHANGING GEAR RATIOS:

When changing a gear ratio, take off the slackened layshaft nut and remove the layshaft from the bearing carrier. Gears are exchanged in pairs - one from the layshaft and one from the pinionshaft. Each gear is etched with two sets of numbers. The first is the number of its own teeth. The second is the number of teeth on its mating gear. It is essential that gears should be correctly paired according to these numbers.

STRIPPING THE GEAR TRAIN

- 1) Remove hubs, clutch rings and gears. Wash and inspect for wear and cracks, giving particular attention to the clutch rings
- 2) Examine forks for heavy or uneven wear, and test for excessive play between forks and clutch rings
- 3) If forks are not to be stripped, check that nuts are tight and properly tabbed. Continue stripping.

THE GEARBOX UNIT

TO REMOVE THE SELECTOR FINGER HOUSING (5)

- 4) Remove selector finger housing by
 - 1) Remove bung, spring and plunger (16,17,18) from the selector finger housing and withdraw selector finger (38)
 - 2) Undo 5/16 UNC Allen cap screw
 - 3) Undo 5/16 UNF Nyloc nut inside housing
- 5) Remove gasket from bearing carrier
- 6) To remove forks, knock back locking tabs (52) and undo nut (53). Remove all three sets and lift off forks (49,50,51).
- 7) Undo the three Allen cap screws (36) and take out the two selector rod springs and balls (35 and 34). Then take out the three selector rods one at a time, followed by the bottom balls and springs.
- 8) Undo the 3/8 UNC Allen cap screw (44) and push out the locking slugs (43).
- 9) Inspect pinion and layshaft tail bearings and renew if necessary. ~to remove, warm up surrounding area. N.B. In layshaft bearing check for wear on steel sleeve and renew if necessary.

Re-assemble in reverse order to above, subject to the following:

- 10) When replacing bottom balls and springs set up to correct height. About one third of the ball should be exposed. Continue by inserting locking slugs and selector rods, then top balls and springs.
- 11) Any hub renewed should be identical in length with the original. If replacing all hubs or main bearing carrier, check that overall length of pinion assembly has not been altered. Clearance is essential to avoid overheating and seizure, but too much clearance will cause excessive wear.

SETTING UP THE SELECTOR FORKS

Extreme accuracy in setting up is imperative to ensure that gears engage freely, and to avoid uneven or excessive wear. The use of a Hewland Forksetting Jig is strongly recommended. Designed specifically for DG-300 it will save costly setting up time and vastly reduce the possibility of error.

Note that when 2 layshaft gears run together, their chamfered face must face each other (see diagram A).

- 1) Warm the case and drop in the pinion tail bearing as described above.
- 2) Place the jig in a vice and slide the hubs, top gear and thrust washer onto the dummy pinion.
- 3) Attach the bearing carrier to the jig using temporary nuts.
- 4) Tighten the pinion nut then check for correct clearance on top gear (.008" to .010")
- 5) Remove from jig. Fit selector forks to rods, with nuts and washers.
- 6) Build up the hubs, gears and clutch rings and slide them back onto the setting jig.
- 7) Adjust the forks individually. Correct positioning requires that:
 - a) The clutch ring should be centred on its hub between the two gears.
 - b) The clutch ring should engage fully engage with either gear.
 - c) When fully engaged with either gear there should still be 0.005 clearance between the gear and clutch ring faces.

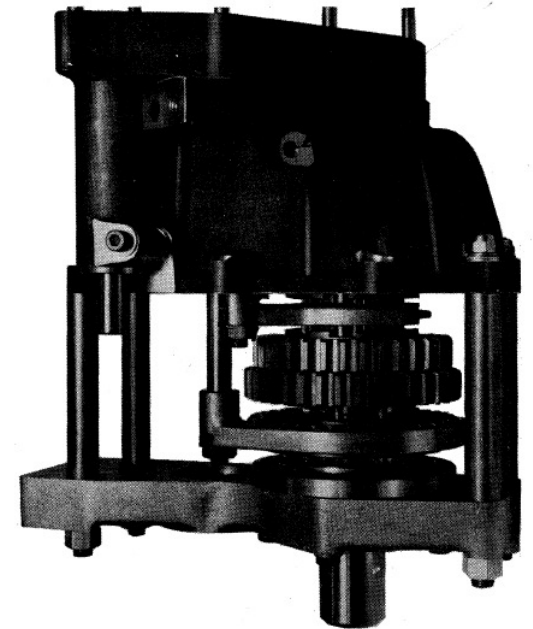
When satisfied with the set up, continue as follows:

- 8) Tighten all three selector rods using new nuts and tabs. At the same time make sure that the selector rod heads are correctly aligned and that there is clearance between them.

REMOVING FROM JIG

- 9) Warm up surrounding area and out in layshaft bearing. Build up the complete layshaft assembly with gears, spacers and thrust washer. Replace in bearing carrier.
- 10) Put the complete set up back into the jig, re-check all clearances and test all movements. When satisfied, take from jig and bolt it onto the gearbox using a jointing compound.
- 11) Tighten the nyloc nuts around the bearing carrier. Replace the nuts on the pinion and layshaft and tighten using a torque spanner. Put in split pins.
- 12) Replace the selector finger housing and selector finger, renewing the gasket (6). Put in a new gasket (4) and replace the end cover.

The correct torque for the pinion nut is 115 ft.lbs and for the layshaft nut is 80 ft.lbs.



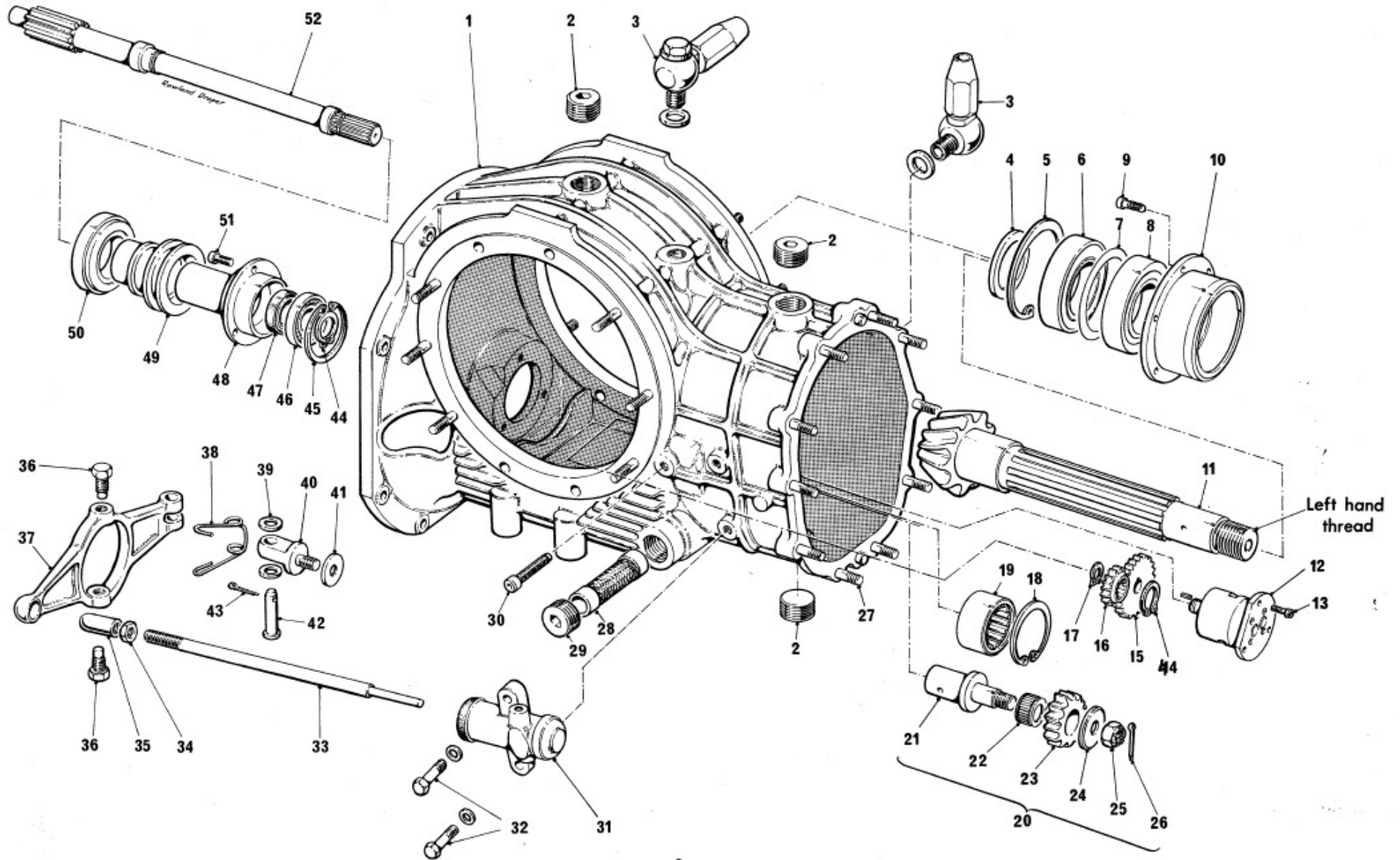
THE HEWLAND FORKSETTING JIG
(Figure 2)

THE GEARBOX UNIT

ILLUS No.	DESCRIPTION	QTY	PART NO.
NA	GEARBOX COMPLETE STD	1	DG-300
NA	GEARBOX COMPLETE ALTERNATOR DRIVE	1	DG-300-A
A1	5/16" UNF NYLOC NUT	30	FT-201-3
A2	5/6" FLAT WASHER	30	F3B-236-1
A3	END COVER	1	DG-204
A4	GASKET END COVER	1	DG-260
A5	SELECTOR FINGER HOUSING	1	DG-203
A6	GASKET SELECTOR FINGER	1	DG-261
A7	NUT LAYSHAFT	1	DG-236
A8	SPLIT PIN	2	FT-230-1
A9	BEARING LAYSHAFT	1	VG-234-3
A10	BUSH	1	FT-203-6
A11	STUD	7	FT-202-6
A12	BEARING CARRIER	1	DGLR-202
A13	SCREW	1	FT-203-1
A14	SPRING	1	FT-203-4
A15	BALL	1	FT-203-3
A16	PLUNGER	1	DG-203-0
A17	SPRING	1	FT-203-2
A18	PLUG	1	FT-203-5
A19	THRUST WASHER	1	DG-234-5
A20	SPACER	1	DG-234-6
A21	LAYSHAFT STD	1	DG-234
A22	REVERSE AND 1ST SLIDING GEAR	1	DG-231
A23	HUB FRONT	1	DGA-226-C
A24	NEEDLE BEARINGS	5	DG-226-1
A25	CLUTCH RING	2	DG-232-S

ILLUS No.	DESCRIPTION	QTY	PART NO.
A26	HUB CENTRE	1	DG-227
A27	HUB REAR	1	DGA-228
A28	INNER TRACK 5TH GEAR	1	DG-229
A29	THRUST WASHER	1	DG-229-4
A30	STUD	1	FT-202-5
A31	BEARING	2	DGB-229-1
A32	NUT	1	DG-230
A33	SPACER	1	DG-203-10
A34	BALLS: STEEL	6	FT-202-1
A35	SPRING	6	FT-202-2
A36	SCREW	3	FT-202-3
A37	SCREW	1	FT-203-11
A38	SELECTOR FINGER	1	FT-252
A39	BUSH 5/8"	2	FT-203-6
A40	O-RING	1	FT-203-7S
A41	PLATE	1	FT-203-8
A42	SCREWS	4	FT-203-9
A43	PLUNGERS	2	FT-202-4
A44	SCREWS	1	FT-202-8
A45	SELECTOR ROD 1ST & REVERSE	1	DG-246
A46	SELECTOR ROD 2ND & 3RD	1	DG-247
A47	SELECTOR ROD 4TH & 5TH	1	DG-248
A48	ADJUSTING SPACER	3	FT-246-3
A49	SELECTOR FORK 1ST & REVERSE	1	DG-249-IC
A50	SELECTOR FORK 2ND & 3RD	1	DG-250
A51	SELECTOR FORK 4TH & 5TH	1	FT-251-C
A52	TAB WASHER	3	FT-221-2
A53	NUT	3	FT-246-2

MAINCASE AND DIFFERENTIAL COMPARTMENT



MAINCASE AND DIFFERENTIAL COMPARTMENT REMOVAL AND REPLACEMENT OF UNITS AND ASSEMBLIES

DIFFERENTIAL AND DRIVE

- 1) Take off the slave cylinder (31) complete with clutch push-rod, by removing the two bolts and washers.
- 2) Take off the left-hand sideplate, having first removed the 5/16 UNF Nyloc nuts and washers and 3/8 UNF Nyloc nuts of the 4 tie bars. Loosen with light blows from a plastic mallet.
- 3) Support the complete differential assembly on a hammer shaft and lift it out of the maincase.
- 4) Remove the right-hand sideplate.
- 5) Replace in reverse order to above.

CLUTCH SHAFT

- 1) Unhook the spring (38) from the clutch fork clevis pin, enabling the fork to swing free.
- 2) Slacken off the top and bottom swivel pins (36) and slide the thrust bearing (50) and bearing carrier (49) off the end of the clutchshaft.
- 3) Remove the clutch fork (37) after taking out the split pin and clevis pin.
- 4) Remove the four 1/4" UNC allen cap screws (51) and slide out complete clutchshaft assembly.
- 5) Remove small circlip and oil pump driver gear (16). Remove second circlip and press clutchshaft out of spigot housing.
- 6) Remove the large circlip (45), then the bearing and oil seal (46 & 47).

Reassemble in reverse order and also:-

- 7) Fit a new oil seal (47). Replace any worn parts, giving particular attention to the bearing.
- 8) When bolting the spigot to its housing, put a smear of locking fluid on the 4 allen cap screws and jointing compound on spigot face.
- 9) Check that the bearing carrier rotates freely after tightening down the two swivel pins (36).

PINION REMOVAL

To remove the pinion proceed as follows:

- 1) Remove the 6 1/2 UNC allen cap screws (9) and warm up the outside of the maincase (1).
- 2) Remove the pinion and housing bearing carrier (910) complete, through the sideplate.
- 3) Take out the idler gear by removing the split pins (26) and locking nut (25), the slide off the idler spigot.

OIL PUMP

- 1) Remove the circlip that retains the driven gear and remove gear and cap screws and slide out pump unit.

LAYSHAFT BEARING

The layshaft bearing is removed by warming the outside of the case, having first taken out the circlip. This bearing will be damaged from removing and should NOT be disturbed unless it has to be renewed. Wash and inspect all parts and wash out maincase to remove sludge. Ensure that no small metallic objects or particles have been left in the case.

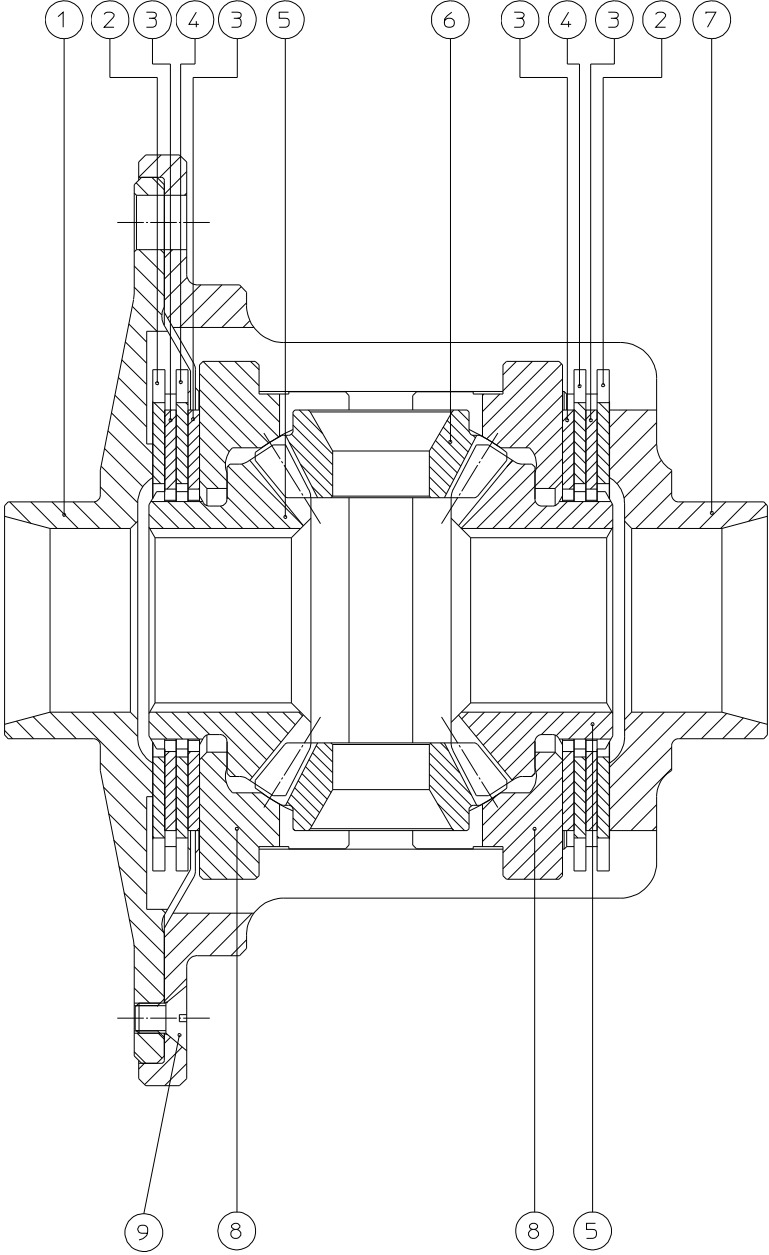
MAINCASE AND DIFFERENTIAL PARTS LIST

ILLUS. No.	DESCRIPTION	QTY	PART NO.
C1	MAINCASE	1	DGLR-201
C2	OIL FILLER PLUG	3	FT-201-1
C3	BANJO UNION COMPLETE	2	LG2262
C4	<u>C4 TO C10 USE PARTS:</u> SHIM SOCKET CAP SCREW PINION BEARING ASSEMBLY	-	DG-223-1B DG-223-3 DGLM-222-1
C5			
C6			
C7			
C8			
C9			
C10			
C11	CROWN WHEEL & PINION 11:38	1	DG-221
C11	CROWN WHEEL & PINION 9:31	1	DG-221
C11	CROWN WHEEL & PINION 8:31	1	DG-221
C12	OIL PUMP ASSEMBLY	1	FGB-265
C13	SCREWS	3	DG-265-1
C14	CIRCLIP CLUTCH SHAFT	3	FT-239-0
C15	GEAR OIL PUMP	1	DGLR-265-7
C16	GEAR CLUTCH SHAFT	1	DG-265-9
C17	CIRCLIP	1	FGB-265-5A
C18	CIRCLIP	1	DG-234-2
C19	BEARING	2	DGB-229-1
C20	REVERSE IDLER ASSEMBLY	1	FT-237
C21	REVERSE IDLER SPIGOT	1	FT-237-3
C22	BEARING	1	FT-237-2
C23	GEAR	1	FT-237-1
C24	WASHER	1	FT-237-4
C25	NUT	1	FT-237-5

ILLUS No.	DESCRIPTION	QTY	PART NO.
C26	SPLIT PIN	1	FT-237-7
C27	STUD	10	FT-201-4
C28	OIL FILTER	1	LG-266
C29	PLUG	1	LG-266-1
C30	SCREW	1	FT-237-6
C31	SLAVE CYLINDER	1	FT-258-2
C32	BOLTS	2	FT-258-3
C33	PUSH ROD	1	LG-258
C34	NUT	1	FT-258-1
C35	PUSH ROD END	1	FT-259
C36	SWIVEL BOLT	2	FT-256
C37	CLUTCH FORK	1	DG-254
C38	SPRING	1	DG-258-4
C39	WASHER	2	---
C40	FULCRUM	1	FT-255
C41	WASHER	1	DG-255-1
C42	CLEVIS PIN	1	DG-257
C43	SPLIT PIN	1	DG-257-1
C44	CIRCLIP	1	FT-239-0
C45	CIRCLIP	1	FT-244-10
C46	BEARING	1	FT-244-12
C47	OIL SEAL	1	FT-244-11
C48	SPIGOTS - TO SUIT MOST COMPETITIVE ENGINES	PRICE + AVAILABILITY ON APPLICATION	
C49	BEARINGS - TO SUIT MOST COMPETITIVE ENGINES		
C50	THRUST BEARING	1	FT-245-11
C51	SCREWS	3	FT-244-13
C52	CLUTCH SHAFTS - TO SUIT MOST COMPETITIVE ENGINES	PRICE + AVAILABILITY ON APPLICATION	

SALISBURY DIFFERENTIAL (DGB-212)

ITEM No.	DESCRIPTION	PART No.	Qty.
1	END PLATE	DGB-214	1
2	BELVILLE PLATE	LG-213-9	2
3	CORE PLATE	LG-213-8	4
4	CLUTCH PLATE	LG-213-10	2
5	SIDE BEVEL GEAR	DGC-213-6AH	2
6	PLANET BEVEL GEAR	DGC-213-5H	4
7	DIFFERENTIAL CASE	DGB-213	1
8	SIDE GEAR RING	FGB-213-7	2
9	SCREW	FGB-213-12	5

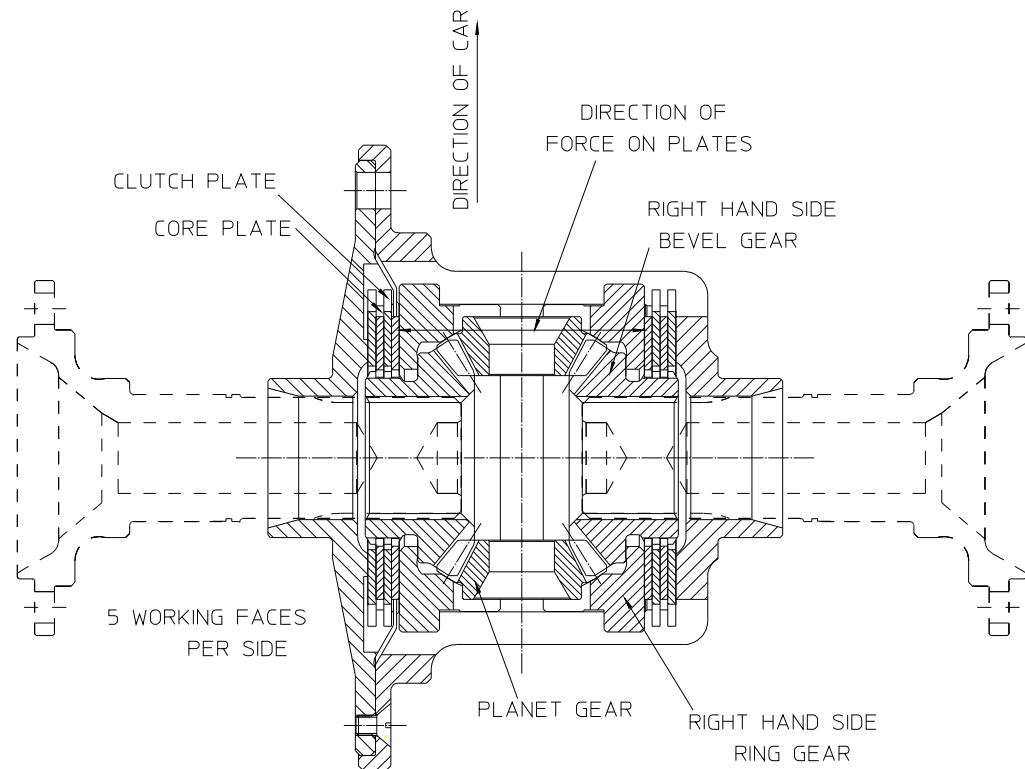


POWERFLOW DIFFERENTIAL

This powerflow differential unit is designed with versatility as its major asset. Many factors will contribute to the settings required. A car with good traction and low power, may require a completely different arrangement to that of a car with poor traction and high power.

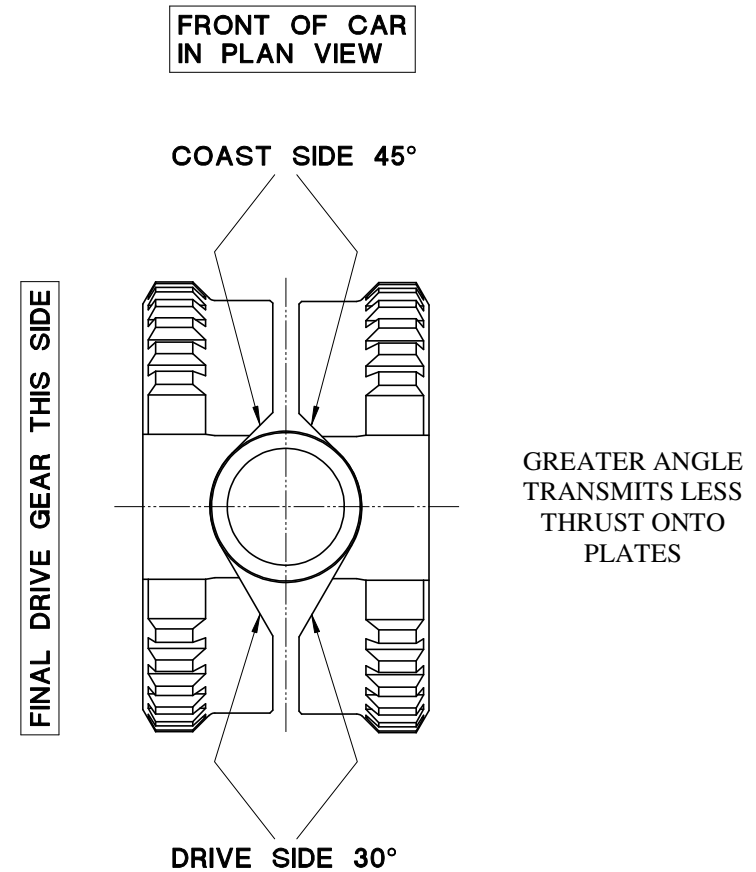
There are 8 friction plates within the unit- 4 splined to the diff casing, and 4 splined to the side bevel gears. Slip limiting is dependant on the friction resistance between these plates, and is affected by clamping the plates together. Four factors contribute to the total friction torque between the plates :-

- 1** The side bevel gears thrust apart to clamp the plates as they transmit the driving power. This is a feature of the gear geometry, and is not adjustable.
- 2** The ramp angles cut on the sidering gears have an effect on how much of the transmitted torque is converted into sideways (clamping) force onto the plates. For example, on the drive side ramp, 45 degrees transmits less sideways force than 30 degrees. Likewise on the coast side ramp, an 80 degree angle will transmit little or no clamping force onto the plates, whereas a 45 degree angle will transmit a much greater force. Side ring gears are available with many different drive/ coast ramp angle combinations.



POWERFLOW DIFFERENTIAL

- 3 The second adjustable factor is how tightly the plate stack is compressed on assembly (known as static preload). The preload torque is measured between the side bevel gears, by holding one side bevel gear stationary, and measuring the torque required to turn the other using tools SK-838-C. When the diff is assembled, the preload torque must be at least 8lbs.ft, but can be much greater if required. New plates 'run in' so a higher preload is advised than with used plates. Preload torque may be changed by grinding plate thickness.
- 4 The final adjustment is simply to reorder the plate stack so as to change the number of relatively rotating faces. The diagram shows the stack setup with the maximum 8 working faces. Standard stack may be shuffled to give as few as 4 working faces.

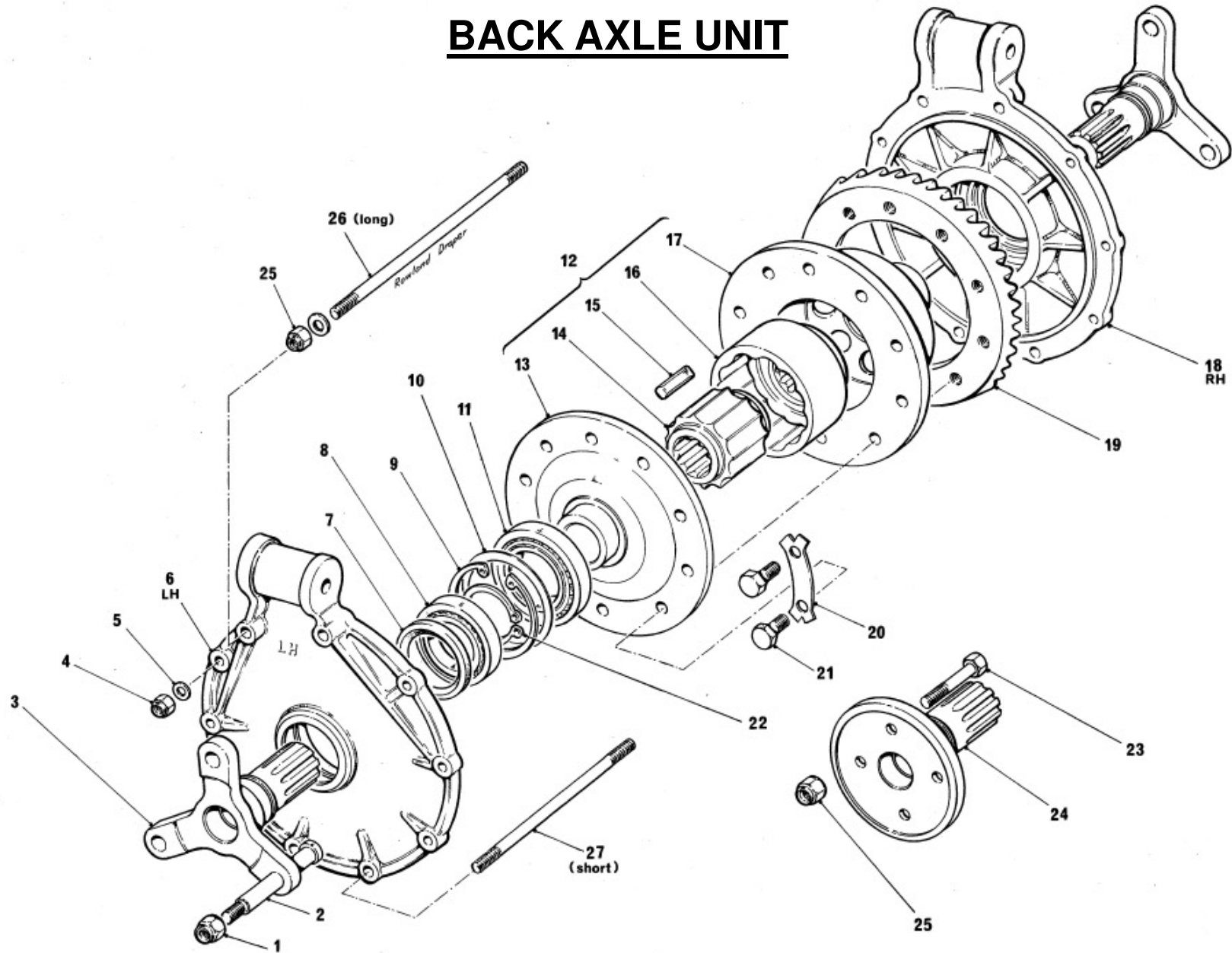


TYPICAL 30°/45° RAMPS SHOWN

STRIPPING THE ASSEMBLIES

DRAWINGS AND INSTRUCTIONS

BACK AXLE UNIT



BACK AXLE PARTS LIST

ILLUS No.	DESCRIPTION	QTY	PART NO.
B1	7/16" NYLOC NUT	6	FT-219-5
B2	BOLT DRIVE SHAFT	6	FT-219-2
B3	DRIVE SHAFT - L/H OR R/H	2	DG-219
B4	5/16" NYLOC NUT	31	FT-201-3
B5	5/16" WASHER	31	F3D-236-1
B6	SIDE PLATE	1	DG-205-B
B7	OIL SEAL	2	LG-205-4
B8	BEARING	2	LG-205-3
B9	CIRCLIP	2	LG-205-2
B10	SHIM SIDEPLATE	VAR	DG-206-1
B11	BEARING	2	DG-205-1
B12	LIMITED SLIP DIFF.	1	DG-212
B13	PLUNGER CARRIER	1	DG-214
B14	INNER CAM TRACK	1	LG-216
B15	PLUNGER	8	LG-217
B16	OUTER CAM TRACK	1	LG-215
B17	OUTER HOUSING	1	DG-213
B18	SIDEPLATE	1	DG-206-B
B19	CRWONWHEEL AND PINION	See chart maincase	
B20	TAB WASHER	5	FT-221-2
B21	CROWNWHEEL BOLT	10	VG-221-1
B22	CIRCLIP	2	LG-219-1
B23	DRIVESHAFT BOLT	8	LG-219-3
B24	DRIVE SHAFT - L/H OR R/H	2	DG-218
B25	3/8" NYLOC NUT	8	FT-219-6
B26	TIE BAR	2	LG-262-A
B27	TIE BAR	2	DG0262-B

STRIPPING THE SUB-ASSEMBLIES

DIFFERENTIAL

The following instructions apply to the cam-and-pawl type differential DG-300 gearboxes

- 1) Bend back the tabs (20), remove the bolts (21) and take off the crownwheel (19).
- 2) Remove in turn the outer housing (17), outer cam track (16) and inner cam track (14).
- 3) Remove the eight plungers (pawls) (15) from the plunger carrier (13).
- 4) Wash and examine for wear or damage, giving particular attention to pawls and profiles of the cam tracks.
- 5) Make certain that -
 - * The splines of the inner cam track are towards the driveshaft (3) diagram (B).
 - * New bolts and tabs are used for the crownwheel. Tighten with a torque spanner to 75 ft.lbs and smear bolts with locking fluid.

N.B - On re-assembly use a good quality grease to lubricate the inner cam track bearing surfaces. We recommend 'Moly-slip.'
Re-assemble in reverse order to above.

FINAL DRIVE

Left Hand Sideplate and Right Hand Sideplate

- 1) Remove the driveshaft circlip (22) and knock out the shaft (3).
- 2) Support the sideplate on fire bricks and warm it, having first covered the oil seal (7) with a block of metal for protection. The outer track of the differential bearing (11) and the shims (10) should now drop out.
- 3) Remove the large circlip (9) which retains the side plate bearing (8) and oil seal (7), so that both can be withdrawn
- 4) Reassemble in reverse order, fitting new oil seals if necessary.

OIL PUMP

The unit is extremely sturdy and simple in design. It operates at gear below its maximum rating and is unlikely to suffer serious wear. To clean it and inspect gears and body for possible scoring, remove the four allen cap screws (19) and take off the pump cap (18). When re-assembling, make sure that the driving shaft (16) is nearest the flat side of the cap.

OIL FILTER

Remove filter plug (29) and filter (28) and clean. Renew if required.

STRIPPING THE SUB-ASSEMBLIES

NOTES ON RE-ASSEMBLY TO THE MAINCASE

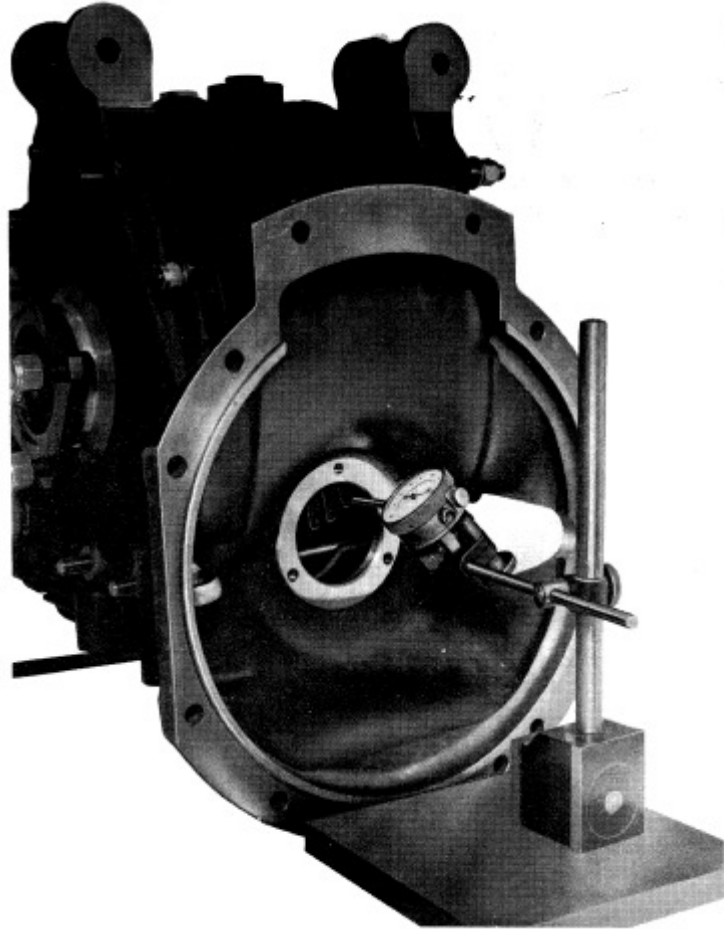
Replace the units and sub-assemblies in the reverse order to which they were dismantled, with special attention to the following-

- 1) Slide the oil pump home, then push the splined end of the shaft (16) through the driven gear (12). Take care to replace the circlip (10). Secure it from the back with the 3 allen cap screws (13 on main assembly) using a smear of locking fluid.
- 2) When replacing the filter bung (28), do not over-tighten or you may collapse the filter. It should be 'just possible' to turn the filter using slight hand pressure.

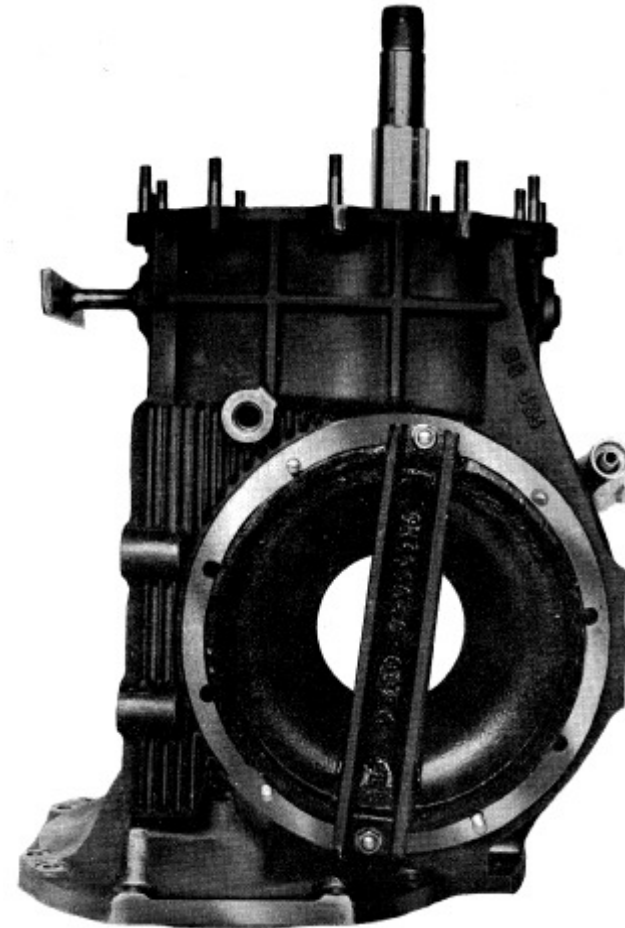
TO REMOVE THE PINION FROM BEARING CARRIER ASSEMBLY

- 1) Place the whole assembly under a hydraulic press whilst still in position on the pinion and press off.
- 2) Remove the bearing, shims and circlip (5). Support the carrier on blocks and knock out the shims and bearings from the housing (10) by pushing from the front. Note which bearing is removed first as one bearing is roller and one bearing is ball type. Inspect and renew if necessary.

SETTING GAUGE AND MEASURING BACKLASH



THE HEWLAND SETTING GAUGE IN POSITION
(Figure 3)



HOW THE DIAL RECORDING MICROMETER IS USED
TO MEASURE BACKLASH
(Figure 4)

FITTING A NEW CROWNWHEEL AND PINION

The crownwheel and pinion are supplied as a pair, precision matched and lapped. Each pair is individually tested and passed as perfect before leaving the factory and neither part should ever be replaced without the other.

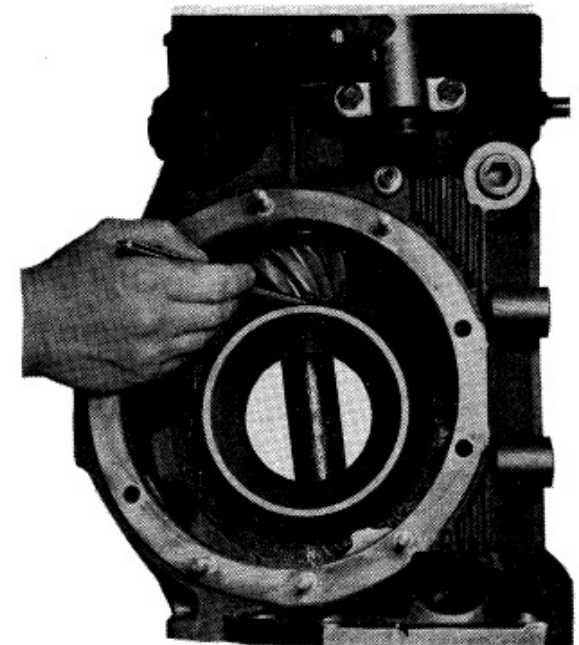
Setting up can be done in the usual way, using engineer's blue. A faster and more positive method however, is to use the new Hewland Setting Gauge procedure as follows:

SETTING UP: USING THE HEWLAND SETTING GAUGE

- 1) Using dummy bearings (we can supply these if required) make up bearing housing assembly and inset the circlip (5).
- 2) Press the bearings into the housing and by means of a feeler gauge determine the clearance at the end of the housing.
- 3) Add 0.002" above the feeler gauge reading to allow for slight pre-load on the bearings.
- 4) Remove the circlip and top bearing. Insert shims then replace bearing and circlip.
- 5) Insert spacer (4) onto pinion and slide on the bearing housing assembly.
- 6) Slide on hubs and tighten up pinion nut.
- 7) Warm up the maincase and insert the pinion assembly.
- 8) Replace the allen cap screws (9). Due to a slight 'float' on the dummy bearings support the pinion tail by putting on the bearing carrier complete with the pinion tail bearing.

TO CHECK PINION DEPTH

- 9) Put setting gauge in position in place of side plate of maincase and bolt across the face.
- 10) Using a feeler gauge, determine the clearance between the setting gauge and pinion, The distance between the pinion and the setting jig must agree with the figure marked in the new pinion. This is adjusted by means of the pinion spacer (4).
- 11) Remove the setting gauge from the maincase.
- 12) Remove the pinion bearing carrier assembly. Assemble the new bearings with the shims from the dummy bearings,
- 13) Press the bearing carrier assembly onto the pinion.
- 14) Warm up the maincase. Re-insert the pinion assembly. Smear the allen cap screws with 'loctite' and tighten up.



PINION IN SETTING GAUGE
(Figure 5)

FITTING A NEW CROWNWHEEL AND PINION

TO ADJUST PRELOAD

- 1) Assemble the differential unit, using the new crownwheel and solid dummy bearings in place of the two inner differential bearings (11). The thickness of the shims is critical. If they have to be renewed make sure they are replaced with shims of the same thickness as the originals.
- 2) Assemble the differential unit and sideplates to the maincase. Hoist up, including tie bars, to normal tension.
- 3) Now turn the pinion by hand to test the preload. Adjust by means of shims until satisfactory.

NOTE: Turn the pinion with hubs removed. Using reasonable effort it should be possible to turn it by gripping the splines, but more effort will be needed with dummy bearings than with real ones. Make sure there is some evidence of backlash. Absence of backlash will give a false impression of preload.

TO ADJUST THE BACKLASH

For this operation you will require a post-mounting dial indicator with an extended probe (Figure 4).

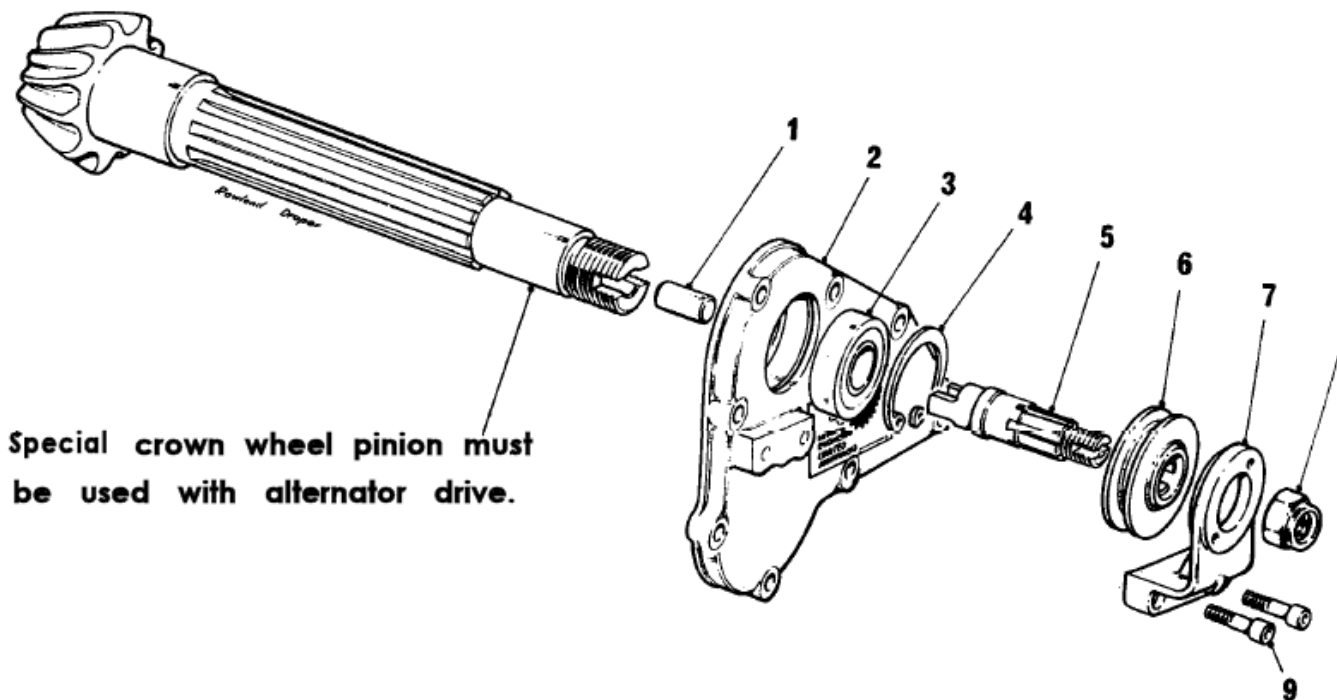
- 1) Remove the solid dummy bearings from the differential unit and replace them with dummy bearings. (Real bearings with increased tolerances for easy substitution).
- 2) Insert the probe of the dial indicator through spigot housing until it touches one of the teeth of the crownwheel (Figure 4). Note the reading on the dial indicator. Turn pinion by hand to rotate crownwheel and take at least 12 readings. (14 readings are standard practice in our own workshops). The minimum reading should be 0.004”
- 3) To increase or decrease backlash, change shims from one side of the differential to the other. But remember that once the pre-load has been set you can only use the shims that are already there. Continue to test until satisfactory.

RE-ASSEMBLE AS FOLLOWS

- 1) Press inner bearings onto differential assembly.
- 2) Warm up one sideplate and insert oil seal, sideplate bearing and circlip.
- 3) Press the driveshaft into the sideplate and retain with circlip.
- 4) Insert shim or shims, and outer bearing track. Place a heavy weight on bearing to flatten out shims.
- 5) Repeat for the other sideplate. After cooling, assemble one sideplate to the maincase. Complete the assembly of the differential and drive unit as described above.

NOTE: If renewing the differential carrier bearings, make certain that the width of the dummy bearings used for pre-load and backlash are the same width as the new bearings.

ALTERNATOR DRIVE AND PARTS LIST



ILLUS No.	DESCRIPTION	QTY	PART NO.
D1	SUPPORT PLUG	1	DG-204-4A
D2	END COVER	1	DG-204-A
D3	BEARING	1	FT-204-1A
D4	CIRCLIP	1	CIR-185
D5	DRIVESHAFT	1	DG-204-5A
D6	PULLEY	1	FT-204-6A
D7	BRACKET	1	FT-204-9A
D8	NUT	1	FT-204-3A
D9	SCREWS	2	FT-204-7A

OIL PUMP AND PARTS LIST

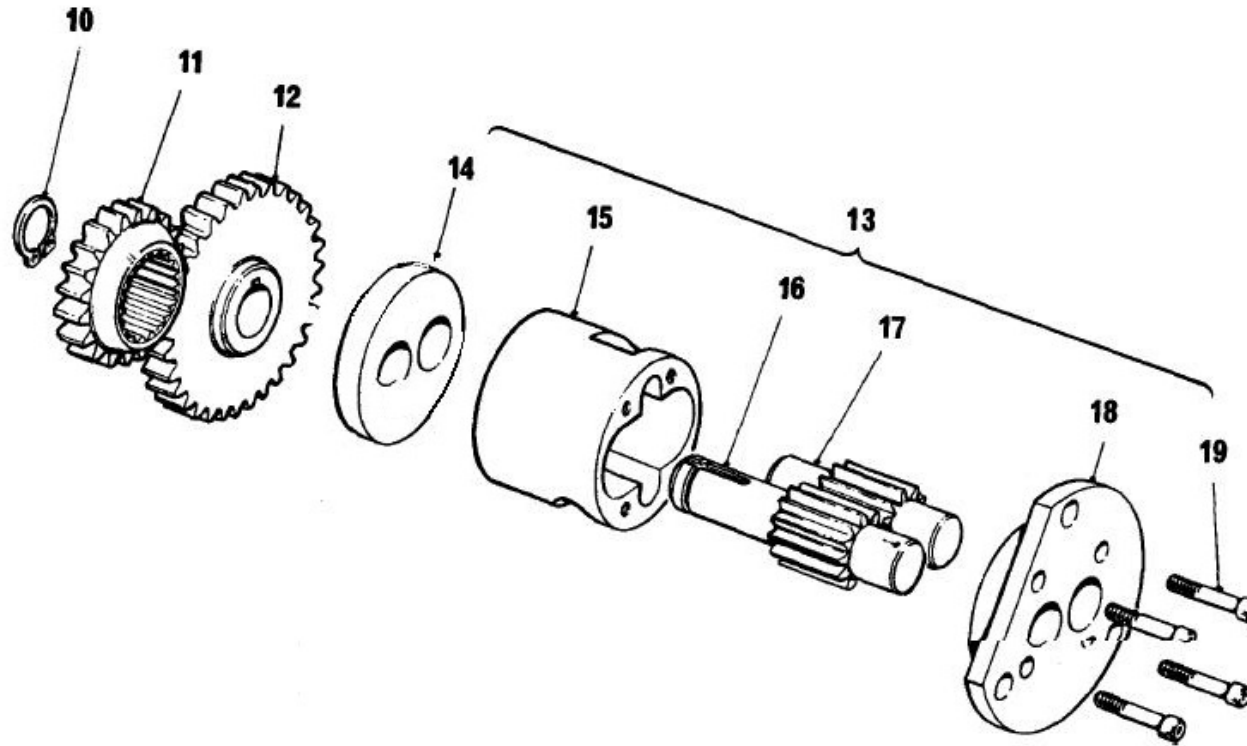


ILLUSTRATION NO.	DESCRIPTION	QTY	PART NO.
D10	CIRCLIP	1	FGB-265-5A
D11	GEAR CLUTCH SHAFT	1	DC-265-9
D12	GEAR OIL PUMP	1	DGLR-265-7
D13	OIL PUMP ASSEMBLY	1	FGB-265
D14	OIL PUMP END COVER	1	FGB-265-2A
D15	OIL PUMP BODY	1	FGB-265-2
D16	GEAR	1	FGB-265-5
D17	GEAR	1	FGB-265-4
D18	PUMP COVER	1	DGLR-265-3
D19	SCREWS	4	FGB-265-10
	SPARE RATIOS		A PAIR
SPECIAL MACHINED BEARING CARRIERS, SELECTOR FINGER HOUSING, CROWN WHEEL AND PINION - MUST BE USED WITH ALTERNATOR DRIVE			

ADAPTOR PLATES
 A WIDE SELECTION OF ADAPTORS ARE STOCKED
 PRICES AND AVAILABILITY ON APPLICATION

MISCELLANEOUS
 *HYLOMAR - ANON SETTING JOINTING COMPOUND
 *RUBBER COUPLING 5 ¼ PCD
 *GASCO ML - METAL LOCKING SEALANT
 *FORGINGS SUITABLE FOR MAKING UP DRIVE SHAFTS
 TO MATCH THE 5% PCD
 *RUBBER COUPLING PART No. SK 28
 *SETTING JIG - LESS PINION AND BEARING
 *DUMMY BEARINGS FOR SETTING CWP
 *CLUTCH ALIGNING TOOL - SPECIFY CLUTCH

MANUAL MODIFICATION HISTORY

14/11/2011 PAGE 6: ITEMS i, A2, A8, A9, A10,A12, A23, A25, A27, A31, A39, A40, A49, A51 & A52 PART NUMBERS CHANGED.
PAGE 10: ITEMS C4 -C10, C14, C19, C26, C30, C35, C38, C42 & C44 PART NUMBERS CHANGED.
PAGE 18: #14 WOODRUFF KEY REMOVED - OIL PUMP END COVER ADDED (FGB-265-21)AND
PARTS LIST CHANGED.

24/11/2011 PAGES 11-13 ADDED: SALISBURY DIFFERENTIAL (11) AND POWERFLOW DIFFERENTIAL EXPLANATIO (12,13)

16/12/2011 ALTERNATOR DRIVE PART LIST CHANGED FROM FT-204-2A TO CIR-185