

MAINTENANCE SERVICING OF HEWLAND FT 200, FG 400, FGA & FGB TRANSAXLE GEARBOX UNITS



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FT200,FG400,FGA & FGB TRANSAXLE GEARBOX UNITS

GENERAL NOTES ON MAINTENANCE AND OVERHAUL

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, circlips, oil seals and gaskets should always be used on re-assembly.

When warming the casings, keep the blow lamp moving. Test with a spot of moisture, which will bounce off at correct temperature. Do not overheat.

TORQUE SETTINGS

Pinion Nut (L.H.) 115 ft/lbs
 Layshaft Nut (R.H.) 80 ft/lbs
 Crownwheel Bolts 75 ft/lbs
 All ⁵/₁₆ in. UNF Nuts. 20 ft/lbs

| | FT 200 | FG 400 | FGA | FGB |
|--------------------------|--------------|--------------|--------------|--------------|
| Dry Weight (approximate) | 90 lbs | 110 lbs | 110 lbs | 112 lbs |
| Oil Capacity | 1.75 litres | 2 litres | 2 litres | 2 litres |
| Type of Oil | SAE 80 or 90 | SAE 80 or 90 | SAE 80 or 90 | SAE 80 or 90 |

Notes: Oil capacity given for transmission without oil cooler etc.

THE GEARBOX UNIT-FT & FG

REMOVING THE UNIT *Refer to Illustration A*

End Cover

1. Remove the UNF Nyloc nuts (1) and washers (2) securing the end cover. Take off cover and 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 gear box 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 bearing carrier securing nuts and washers (5/16UNF).
2. Using a plastic mallet, tap the bearing carrier and remove it from the main case, complete with layshaft assembly and gear train. Support the gears, hubs and clutch rings with the hand, as they slide off the pinion.

The gearbox unit is now completely removed.

To re-fit, assemble 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 pinion shaft. Each gear is etched with two sets of numbers.

It is essential that gears should be correctly paired according to these numbers.

GEAR TRAIN DISASSEMBLY

1. Remove hubs, clutch rings and gears. Wash and inspect for wear and cracks, particularly 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 dismantled, check that self-locking nuts are tight. Continue disassembly as follows:

To Remove Selector Finger Housing (5)

4. Remove selector finger housing as follows:
 - (1) Remove bung, spring and plunger (18, 19, 20) from the selector finger housing and withdraw selector finger (35).
 - (2) Slacken and remove UNC Allen cap screw (5/16 in).
 - (3) Slacken and remove UNF Nyloc nut inside housing (5/16 in) (51).

5. Remove gasket from bearing carrier.
6. To remove forks, remove nut (50). Remove all three sets and lift off forks (47,46,48).
7. Slacken and remove all three cap screws (40) and take out the top selector rod springs and balls (38 & 39). Then take out the three selector rods, one at a time, collecting the bottom balls and springs.
8. Remove the UNC cap screw (3/8 in.) and push out the locking slugs (41).
9. Inspect pinion and layshaft tail bearings and renew if necessary. To remove, warm up surround area. Bearings are located by cap screws (13).

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

10. When replacing bottom balls and springs, set up to correct height. About one-third of the balls should be exposed. Continue by inserting locking slugs and selector rods, then top balls and springs.
11. Any hub replaced 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. (See Setting the Selector Forks-page 5, para 4)

THE GEARBOX UNIT (continued)

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 FT/FGT will save costly setting-up time and vastly reduce the possibility of error. (Fig. 1)

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

1. Warm the bearing carrier and drop in the pinion tail bearing as described above.
2. Place the jig in a vice. Slide the hubs with top gear and thrust washer, on to 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 in. to .010 in.). (For FGB see page 31)
5. Remove from jig. Fit selector forks to rods together with nuts and washers.
6. Build up the hubs, gears and clutch rings, and slide them back on to 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 with either gear.

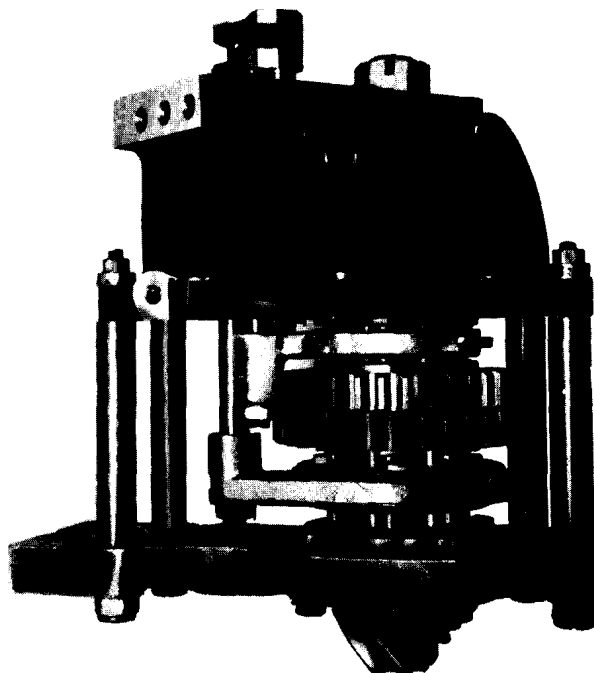


Fig. 1 Hewland Forksetting Jig

(c)When fully engaged with either gear there should still be 0.005 in. clearance between the gear and clutch-ring faces.

(d)If clutch-ring is over engaged it could result in gears overheating and seizing up or cause excessive wear on selector fork.

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 (but not excessive).

Remove From Jig

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

Note: The correct torque is 115 ft/lbs for pinion nut, and 80 ft/lbs for nut.

THE GEARBOX UNIT—FT 200,FG 400 & FGA

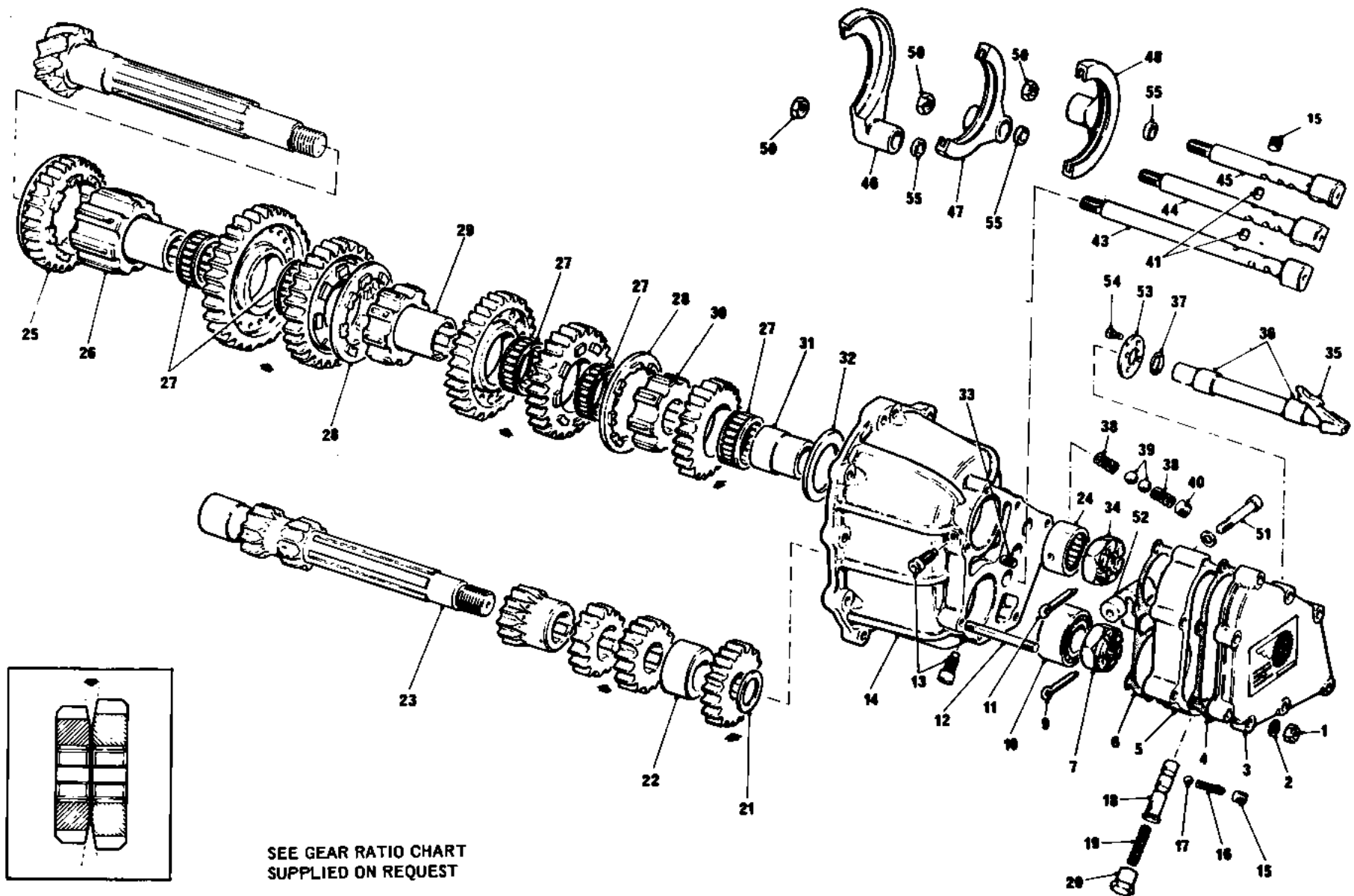


Illustration A

GEARBOX UNIT PARTS LIST

| Illus. No. | Description | Part No. | Qty. |
|------------|---------------------------------|----------|------|
| A1 | Nut 5/16 in. UNF Nyloc | FT 2013 | 36 |
| A2 | Washer 5/16 in. Chamfered flat | FT 2027 | 36 |
| A3 | End Cover – Standard | FT 204 | 1 |
| A4 | Gasket, End Cover | FT 260 | 1 |
| A5 | Selector Finger Housing | FT 203 | 1 |
| A6 | Gasket, Selector Finger Housing | FT 261 | 1 |
| A7 | Nut, Layshaft (R.H.) | FT 236 | 1 |
| A0 | | | |
| A9 | Split Pin | FT 2301 | 2 |
| A10 | Bearing, Layshaft | FT 2343 | 1 |
| A11 | | | |
| A12 | Stud | FT 2026 | 7 |
| A13 | Screw, Bearing Retaining | FT 2293 | 2 |
| A14 | Bearing Carrier | FT 202 | 1 |
| A15 | Screw | FT 2026 | 2 |
| A16 | Spring | FT 2034 | 1 |
| A17 | Ball | FT 2033 | 1 |
| A18 | Plunger | FT 2030 | 1 |
| A19 | Spring , | FT 2032 | 1 |
| A20 | Plug | FT 2035 | 1 |
| A21 | Thrust Washer | FT 2345 | 1 |
| A22 | Spacer | FT 2346 | 1 |
| A23 | Layshaft (see ratio chart) | FT 234 | 1 |
| A24 | Bearing | FT 2291 | 2 |
| A25 | First and Reverse Sliding Gear | FT 231 | 1 |
| A26 | Hub Front (FT only) | FT 226 | 1 |
| A26 | Hub Front (Length 3 1/16 in.) | FG 226 | 1 |
| A26 | Hub Front (Length 2 15/16 in.) | FGA226 | 1 |
| A27 | Needle Bearing | FT 2261 | 5 |
| A28 | Clutch Ring (FT only) | FT 232 | 2 |

| Illus. No. | Description | Part No. | Qty. |
|------------|------------------------|----------|------|
| A28 | Clutch Ring (FG/FGA) | DG 232 | 2 |
| A29 | Hub Centre (FT only) | FT 227 | 1 |
| A29 | Hub Centre (FG/FGA) | FG 227 | 1 |
| A30 | Hub Rear (FT only) | FT 228 | 1 |
| A30 | Hub Rear (FG/FGA) | FG 228 | 1 |
| A31 | Inner Track 5th Gear | FT 229 | 1 |
| A32 | Thrust Washer | FT 2294 | 1 |
| A33 | Stud | FT 2025 | 1 |
| A34 | Nut, Pinion (L.H.) | FT 230 | 1 |
| A35 | Selector Finger | FT 252 | 1 |
| A36 | Bush | FT 2036 | 2 |
| A37 | 'O' Ring | FT 2037 | 1 |
| A38 | Spring | FT 2022 | 6 |
| A39 | Ball | FT 2021 | 6 |
| A40 | Screw | FT 2023 | 3 |
| A41 | Plunger | FT 2024 | 2 |
| A42 | Screw (not illus.) | FT 2031 | 1 |
| A43 | Selector Rod 1st/Rev. | FT 246 | 1 |
| A44 | Selector Rod 2nd/3rd | FT 247 | 1 |
| A45 | Selector Rod 4th/5th | FT 248 | 1 |
| A46 | Selector Fork 1st/Rev. | FT 249 | 1 |
| A 4 7 | Selector Fork 2nd/3rd | FT 250 | 1 |
| A48 | Selector Fork 4th/5th | FT 251 | 1 |
| A50 | Nut | FT 2462 | 3 |
| A51 | Screw | FT20311 | 1 |
| A52 | Spacer | FT20310 | 1 |
| A53 | Plate | FT 2030 | 1 |
| A54 | Screw | FT 2039 | 4 |
| A55 | Spacer (various sizes) | FT 2463 | 3 |

THE MAIN CASE & DIFFERENTIAL COMPARTMENT-FT 200

Removal and replacement of units and assemblies. Refer to Illustration 5.

DIFFERENTIAL AND DRIVE

1. Remove the slave cylinder securing bolts and washers and take off cylinder (18) complete with clutch push-rod.

N.B. unhook spring attached to side plate.

2. Take off the left-hand side plate, having first removed the UNF Nyloc nuts and washers and UNF nuts (5/16 in.) on the tie bars. Loosen with light blows from a plastic mallet, and remove differential assembly.
3. Remove the right-hand side-plate.

Re-assemble in reverse order to above.

CLUTCH SHAFT

1. Slacken the top and bottom swivel pins (25) and slide off, the thrust bearing (36) and bearing carrier (35) from the end of the clutch shaft.
2. Remove the clutch fork split pin (39) and clevis pin (26) and detach clutch fork (24).
3. Remove the cap screws (34). Tap out complete clutch shaft assembly.
4. Remove circlip (29) from clutch shaft, press out clutch shaft. Remove circlip (30) from spigot housing (33) and withdraw bearing and oil seal.

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

5. Fit a new oil seal (32). Replace circlips if required, and pay particular attention to bearings.
6. When bolting the spigot to its housing, put a smear of locking fluid on the three cap screws and jointing compound on spigot face.
7. Check that the bearing carrier rotates freely after tightening down the two swivel pins (25).

PINION REMOVAL

To remove the pinion, proceed as follows:

1. Knock back tab washers (4) and remove bolts (3).
2. Remove clamp plate (7).
3. Warm up outside area of main case sufficiently to remove pinion bearing,
4. Particular attention should be given to the shim or shims under pinion bearing.

LAYSHAFT BEARING

1. To remove the layshaft bearing, first remove the reverse idler gear by taking out the split pin (40) from the castellated nut (14). Check the gear and bearing for wear and re-assemble in the reverse order.
2. Remove the locating bolt (38) on under side of the main case. Warm up the main case surrounding the bearing area, until sufficiently warm to allow the end bearing to be lightly tapped out.
3. Remove all drain plugs. Wash out the main case to remove any sludge.
4. Warm up main case and re-assemble in reverse order. When inserting bearing (42) care should be taken to ensure that the locating hole on bearing (42) is in line with bolt (38).

DISMANTLING THE SUB-ASSEMBLIES

DIFFERENTIAL (*Illustration D*)

The following instructions apply to the cam and pawl type differential FT 200 Gearbox.

1. Bend back the tabs (18). remove the bolts (19) and take off the crown wheel (17).
2. Remove in turn the outer housing (15), outer cam track (14) and inner cam track (12).
3. Remove the eight plungers (pawls) (13) from the plunger carrier (11).
4. Wash and examine for wear or damage with particular attention to pawls, and profiles of the cam tracks. Ensure that:
5. The splines of the inner cam track are towards the drive shaft (3).
6. New bolts and tabs are used for the crown wheel. Tighten with a torque spanner to 75 **ft/lbs** Smear bolts with locking fluid.

N.B. *On reassembly use a good quality grease to lubricate the inner cam track bearing surfaces. We recommend the use of "Molyslip" grease for this purpose.*

Reassemble in reverse order to above.

FINAL DRIVE -OUTBOARD BRAKES

Left Hand Side Plate (*Illustration D*)

1. Remove the drive shaft circlip (20) and knock out the shaft (3).
2. Support the side plate on fire bricks and warm it, having first covered the oil seal (6) with a block of metal for protection. The outer track of the differential bearing (10) and the shims (9) should now drop out.
3. Remove the large circlip (6) which retains the side plate bearing (7) and oil seal (6). so that both can be withdrawn.

Right Hand Side Plate

Follow the same procedure as above.

Reassemble in reverse order to above, fitting new oil seals if necessary.

FINAL DRIVE - INBOARD BRAKES

Left Hand Side Plate (*Illustration E*)

1. Remove the drive shaft circlip (4) and knock out shaft.
2. Support the side plate on fire bricks and warm it, having first covered the oil seal (2) with a block of metal for protection. The outer track of the differential bearing (7), the shims (6), the spacer (5) and the drive shaft bearing (3) should now drop out.

Right Hand Side Plate

Follow same procedure as above.

Re-assamble in reverse order to above, fitting new oil seals if necessary.

THE MAIN CASE & DIFFERENTIAL COMPARTMENT—FT 200

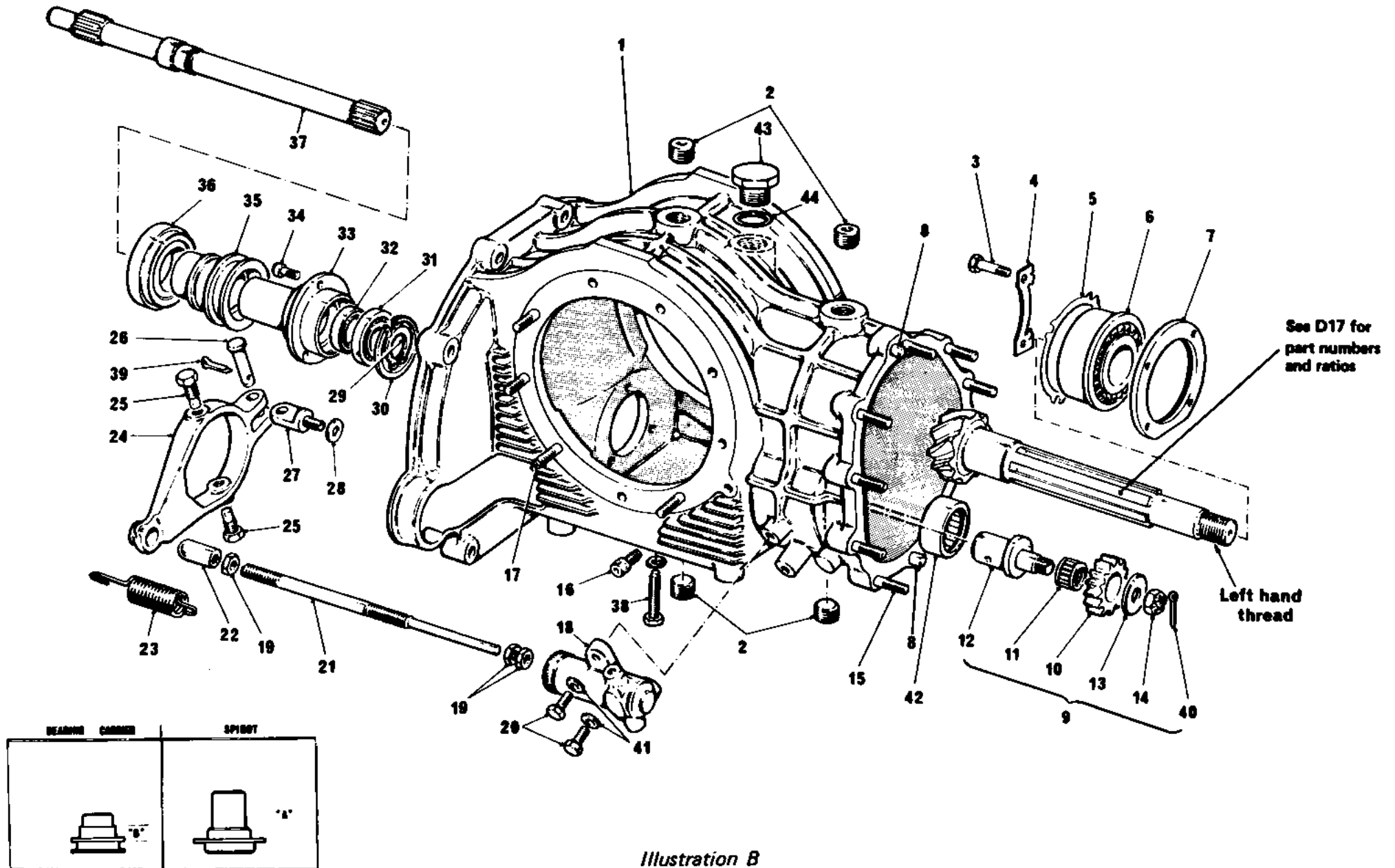


Illustration B

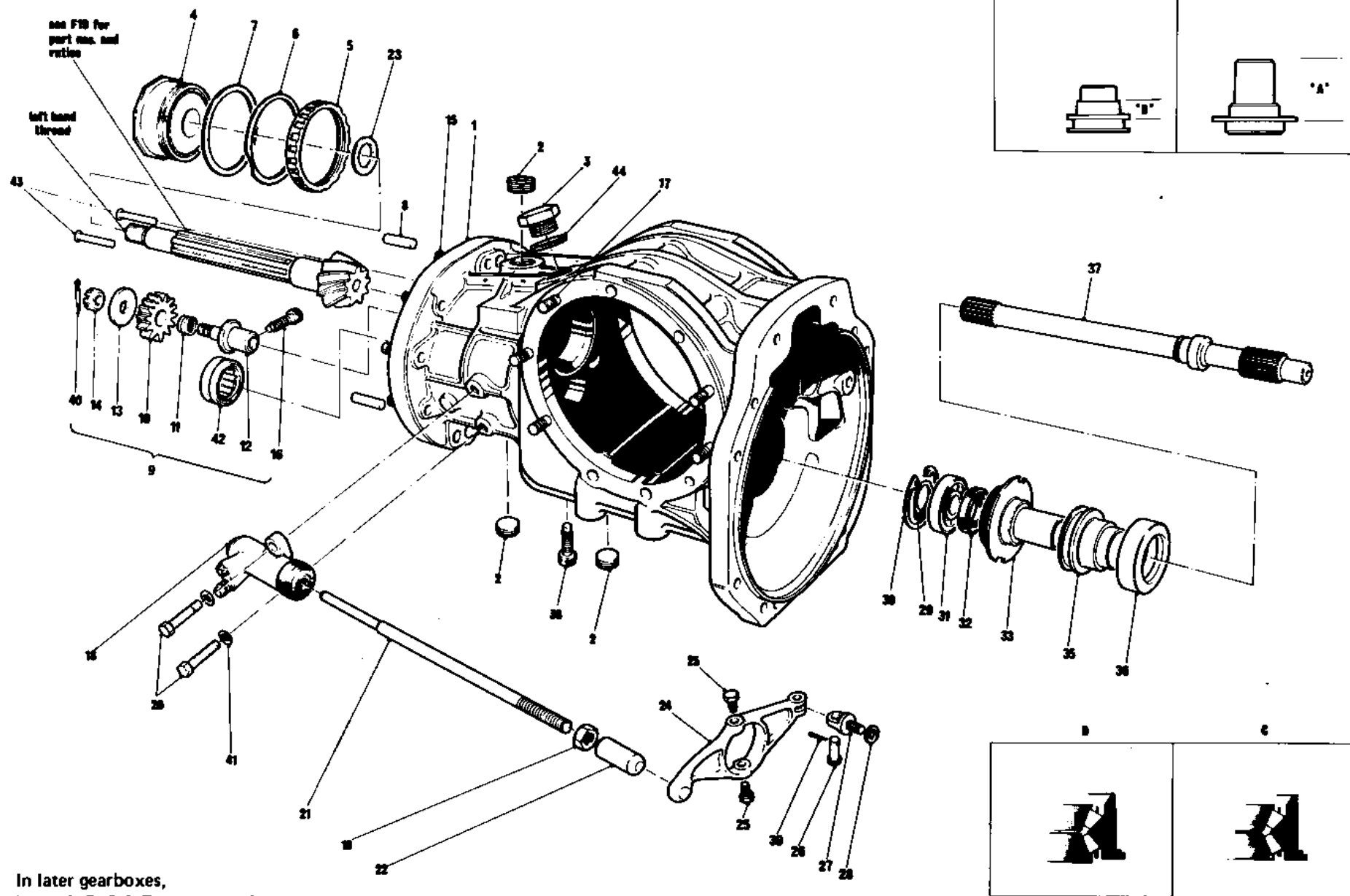
MAIN CASE PARTS LIST-FT 200

illustration B

| Illus. No. | Description | Part No. | Qty. |
|------------|--------------------------|----------|------|
| B1 | Main Case | FT 201 | 1 |
| B2 | Drain Plug | FT 2011 | 4 |
| B3 | Bolt, 5/16 in. UNF | FT 2251 | 4 |
| B4 | Tab Washer | FT 2252 | 2 |
| B5 | Shims 3-5-10-15-25 Thou. | FT 2253 | |
| B6 | Bearing | FT 2221 | 1 |
| B7 | Clamp Plate | FT 225 | 1 |
| B8 | Dowel | FT 2015 | 2 |
| B9 | Reverse Idler Complete | FT 237 | 1 |
| B10 | Reverse Idler Gear | FT 237 1 | 1 |
| B11 | Bearing | FT 2372 | 1 |
| B12 | Spigot | FT 2373 | 1 |
| B13 | Washer | FT 2374 | 1 |
| B14 | Nut | FT 2375 | 1 |
| B15 | Studs | FT 2014 | 9 |
| B16 | Retainer Reverse | FT 2376 | 1 |
| B17 | Stud (outboard brakes) | FT 2012 | 12 |
| B17 | Stud (inboard brakes) | FT 2012A | 8 |
| Not illus. | Screw (inboard brakes) | FT 20128 | 4 |
| B18 | Cylinder | FT 2582 | 1 |
| B19 | Nut | FT 2581 | 3 |
| B20 | Bolt | FT 2583 | 2 |
| B21 | Rod | FT 258 | 1 |
| B22 | Nosepiece | FT 259 | 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|--|----------|------|
| B23 | Spring | FT 2584 | 1 |
| B24 | Clutch Fork | FT 254 | 1 |
| B25 | Swivel Bolt | FT 256 | 2 |
| B26 | Clevis Pin | FT 257 | 1 |
| B27 | Pivot | FT 255 | 1 |
| B28 | Washer | FT 2551 | 1 |
| B29 | Circlip | FT 2390 | 1 |
| B30 | Circlip | FT 24410 | 1 |
| B29 | Bearing | FT 24412 | 1 |
| B32 | Oil Seal | FT 24411 | 1 |
| B33 | Spigot (state length 'A' when ordering) | FT 244- | 1 |
| B34 | Screws, Cap, 1/4 in. UNC | FT 24413 | 3 |
| B35 | Bearing Carrier (state length 'B' when ordering) | FT 245- | 1 |
| B36 | Bearing | FT 245A | 1 |
| B37 | Clutch Shaft (state engine/adaptor etc. when ordering) | FT | 1 |
| B38 | Screw Retaining | FT 2342 | 1 |
| B39 | Split Pin | DG 2571 | 1 |
| B40 | Split Pin | FT 2377 | 1 |
| B41 | Washers | FT 2585 | 2 |
| B42 | Bearing | FT 2291 | 2 |
| B43 | Inspection Plug | TL 2011 | 1 |
| B44 | Washer | FGB 2018 | 1 |

THE MAIN CASE—FG 400 & FGA



Note: In later gearboxes, items 4, 5, 6 & 7 are reversed and item 23 is omitted.

Illustration C

MAIN CASE PARTS LIST-FG 400 & FGA

illustration C

| Illus. No. | Description | Part No. | Qty. |
|------------|------------------------|------------|------|
| C1 | Main Case | FG 201 | 1 |
| c 2 | Drain Plug | FT 2011 | 3 |
| c3 | Inspection Plug | TL 2011 | 1 |
| c4 | Bearing (Inset C) | HC8.2221 | 1 |
| c4 | Bearing (Inset D) | FGA.2221 | 1 |
| c 5 | Nut (Inset C) | HC8.2221 A | 1 |
| c 5 | Nut (Inset D) | FGA.2221 A | 1 |
| C 6 | Spacer Pinion Bearing | HC8.2222A | 1 |
| c 7 | Shims | HC8.2222 | 1 |
| C8 | Dowel | FT 2015 | 2 |
| C9 | Reverse Idler Complete | FT 237 | 1 |
| C10 | Reverse Idler Gear | FT 2371 | 1 |
| C11 | Bearing | FT 2372 | 1 |
| C12 | Spigot | FT 2373 | 1 |
| C13 | Washer | FT 2374 | 1 |
| C14 | Nut | FT 2375 | 1 |
| C15 | Stud | FT 2014 | 9 |
| C16 | Retainer Reverse | FT 2376 | 1 |
| C17 | Stud | FT 2012A | 11 |
| Not illus. | Screw | FT 20126 | 1 |
| Not illus. | Stud (FGA only) | FGA.2012 | 2 |
| C18 | Cylinder | FG 2582 | 1 |
| C19 | Nut | FT 2581 | 1 |
| C20 | Bolt | FT 2583 | 2 |
| c21 | Rod | LG 258 | 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|--|----------|------|
| c22 | Nosepiece | FT 259 | 1 |
| C23 | Spacer Pinion Head | FG 2222 | 1 |
| C24 | Clutch Fork | DG 254 | 1 |
| C25 | Swivel Bolt | FT 256 | 2 |
| C 26 | Clevis Pin | FG 257 | 1 |
| C27 | Pivot | FG 255 | 1 |
| C28 | Washer | FT 2551 | 1 |
| c29 | Circlip | FT 2390 | 1 |
| C30 | Circlip | FT 24410 | 1 |
| c31 | Bearing | FT 24412 | 1 |
| C32 | Oil Seal | FT 24411 | 1 |
| c33 | Spigot (state length 'A' when ordering) | FG 244-S | 1 |
| c34 | | | |
| c35 | Bearing Carrier (state length 'B' when ordering) | FT 245- | 1 |
| C36 | Bearing | FT 245A | 1 |
| c37 | Clutch Shaft (state engine/adaptor etc. when ordering) | FG 239- | 1 |
| C38 | Screw Retaining | FT 2342 | 1 |
| c39 | Split Pin | DG 2571 | 1 |
| C40 | Split Pin | FT 2377 | 1 |
| c41 | Washer | FT 2585 | 2 |
| C42 | Bearing | FT 2291 | 2 |
| c43 | Roll Pin (reversed pinion bearing) | FG 2222E | 2 |
| c44 | Washer | FGB 2018 | 1 |

GEARBOX COMPONENTS-FGB

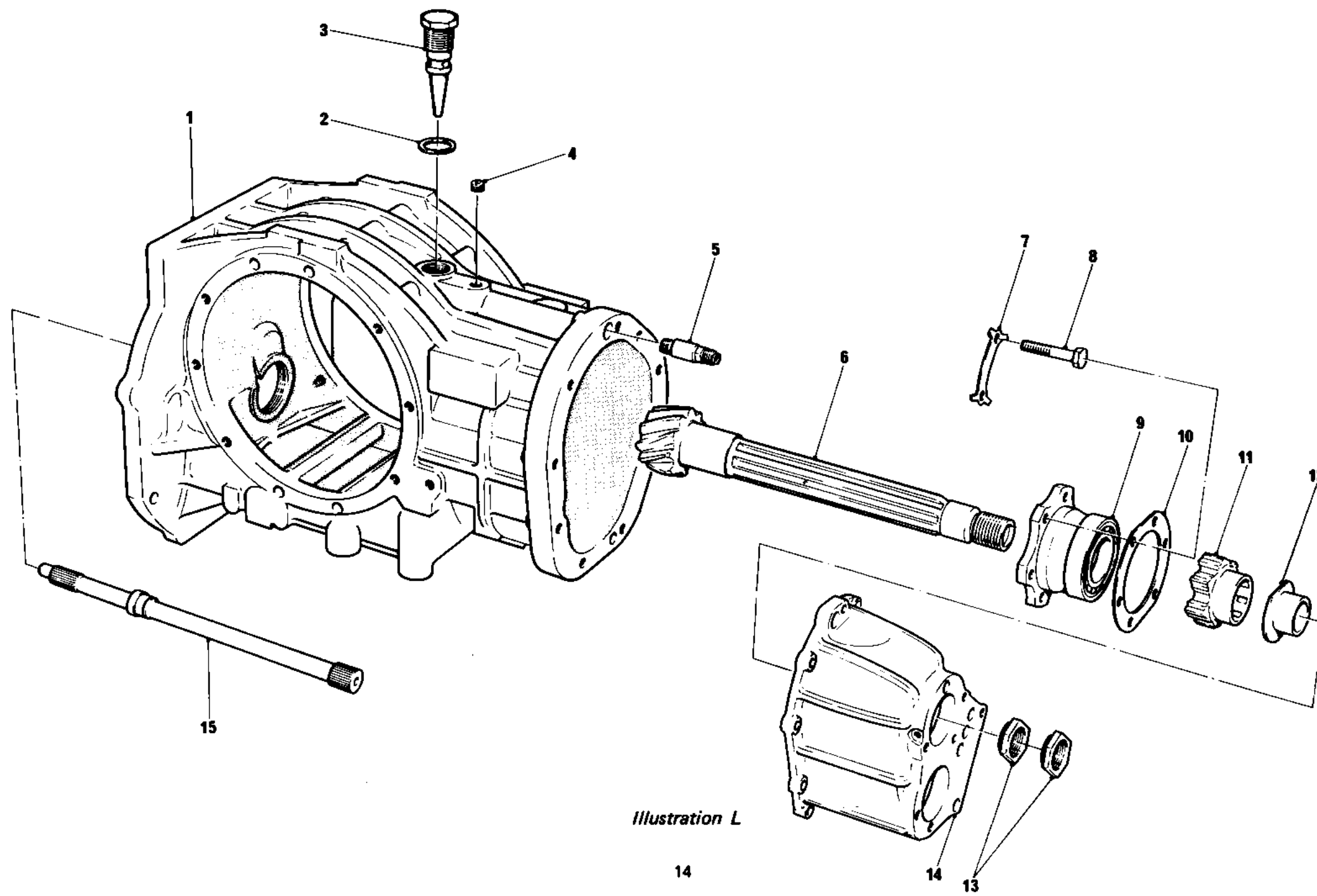


Illustration L

GEARBOX COMPONENTS PARTS LIST-FGB

Illustration L

| <i>Illus. No.</i> | Description | Part No. | Qty. | Replaces Parts on FGA | |
|-------------------|--|-----------|------|-----------------------|--------------|
| | | | | Part No. | Ill/Item No. |
| L1 | Main Case | FGB 201 | 1 | FG 201 | C1 |
| L2 | Washer | FGB 2018 | 1 | | |
| L3 | Oil Feed | FGB 2017 | 1 | TL 2011 | |
| L4 | Plug | FT 2031 | 1 | | |
| L5 | Dowel/Oil Union | FGB 2015 | 1 | FT 2015 | C8 |
| L6 | Crown Wheel & Pinion 8/31 | FGB 221 B | 1 | FG 221 B | F19 |
| | Crown Wheel & Pinion 8/35 | FGB 221D | 1 | FG 221 D | F19 |
| L7 | Tab Washer | TL2.2233 | 3 | | |
| L8 | Bolt | TL 2251 | 6 | | |
| L9 | Pinion Bearing | TL2.2221 | 1 | FGA 2221 | c4 |
| L10 | Shim (various sizes) | FGB 2232 | AR | HC8.2222 | c7 |
| L11 | Hub, Rear | FGB 228 | 1 | FG 228 | A30 |
| | | | | FT 229 | A31 |
| L12 | Inner Track | FGB 229 | 1 | FT 2294 | A32 |
| L13 | Nut, Pinion LH | FGA6.230 | 2 | FT 230 | A34 |
| L14 | Bearing Carrier | FGB 202 | 1 | FT 202 | A14 |
| L15 | Clutch Shaft . | FGB 239- | 1 | FG 239- | c37 |
| | . Note: State engine/adaptor etc. when ordering. | | | | |

THE MAIN CASE & DIFFERENTIAL COMPARTMENT-FG 400,FGA & FGB

Removal and Replacement of Units and Assemblies *(Refer to Illus. C)*

DIFFERENTIAL AND DRIVE

1. Remove the slave cylinder securing bolts and washers and take off slave cylinder (18) complete with clutch push-rod.
2. Take off the left hand side plate, having first removed the nuts and washers (5/16 in. UNF) and nuts (3/8 in. UNF) on the four tie bars. Loosen with light blows from a plastic mallet, and remove differential assembly.
3. Remove the right hand side plate.

Re-assemble in reverse order to above.

CLUTCH SHAFT

1. Slacken off the top and bottom swivel pins (25) and slide the thrust bearing (36) and carrier (35) off the end of the clutch shaft.
2. Remove the clutch fork (24), after taking out the split pin and clevis pin.
3. Unscrew spigot from case and remove complete assembly.

Alternate method without removal of spigot:

- 3(a) Remove clutch shaft circlip (29) and knock shaft out through front of spigot.
4. Remove circlip (30) and knock bearing out of spigot, into differential compartment. Remove oil seal.

Reassemble in reverse order to above, noting the following:

5. Check spigot is tight in case.
6. Fit a new oil seal (32). Renew circlips if required, and pay particular attention to bearings.
7. Check that the bearing carrier rotates freely after tightening down the two swivel pins (25).

PINION REMOVAL

To remove pinion, proceed as follows:

1. Remove bearing retaining nut (5).
2. Warm up outside area of main case sufficiently to remove pinion bearing.
3. Particular attention should be given to the shims under pinion bearing.

LAYSHAFT BEARING

1. To remove the layshaft bearing first remove the reverse idler gear by taking out the split pin (40) from the castellated nut (14), remove nut and washer. Check gear and bearing for wear.
2. Remove the locating bolt (38) on under side of the main case. Warm up the main case surrounding the bearing area, until sufficiently warm to allow bearing to be lightly tapped out.
3. Remove all drain plugs. Wash out the main case to remove any sludge.
4. Warm up main case and re-assemble in reverse order. When inserting bearing (42) care should be taken to ensure that the locating hole on bearing is in line with bolt

DISMANTLING THE SUB-ASSEMBLIES

Refer to Illustrations F, G or H

DIFFERENTIAL

The following are general instructions that cover the cam and pawl type differential. Minor differences do however occur between FG 400 and FGA gearboxes. Reference to parts list may be required.

1. Bend back the tabs (20) remove the bolts (21), take off crown wheel (19).
2. Remove in turn the outer housing (17), outer and inner cam tracks (16-14).
3. Remove the eight plungers (pawls) (15) from the plunger carrier (13).
4. Wash and examine for wear or damage, with particular attention to pawls, and profiles of the cam tracks.
5. Assemble in reverse order, making certain that splines of the inner cam track are towards the left hand drive shaft.
6. Always use new bolts and tabs for crown wheel. Tighten to 75 ft/lbs Smear bolts with locking fluid.

N.B. On reassembly use a good quality grease to lubricate cam lobes and bearing faces. "Moly-slip" is recommended.

FINAL DRIVE - FG 400 SIDE PLATES FOR OUTBOARD BRAKES. (Illus. F)

1. Remove drive shaft circlip (22) and knock out shaft.
2. Support the side plate 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.

Re-assemble in reverse order to above, fitting new oil seals if necessary.

FINAL DRIVE - FG 400 SIDE PLATES FOR INBOARD BRAKES. (Illus. G)

1. Remove drive shaft circlip (7) and knock out shaft.
2. Remove six cap screws (1) from oil seal retainer (8) and take off retainer.
3. Support side plate on fire bricks and warm it. The outer track of the differential bearing (11), the shims (10) and drive shaft bearing should now drop out.

Re-assemble in reverse order to above, fitting new oil seals if necessary.

FINAL DRIVE - FGA. (Illus. H)

1. Remove drive shaft circlip (22) and knock out shaft.
2. Support the side plate 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) the shims (10), the spacer (9) and the drive shaft bearing should drop out.

Re-assemble in reverse order to above, fitting new oil seals if necessary.

DIFFERENTIAL & FINAL DRIVE FT 200—OUTBOARD BRAKES

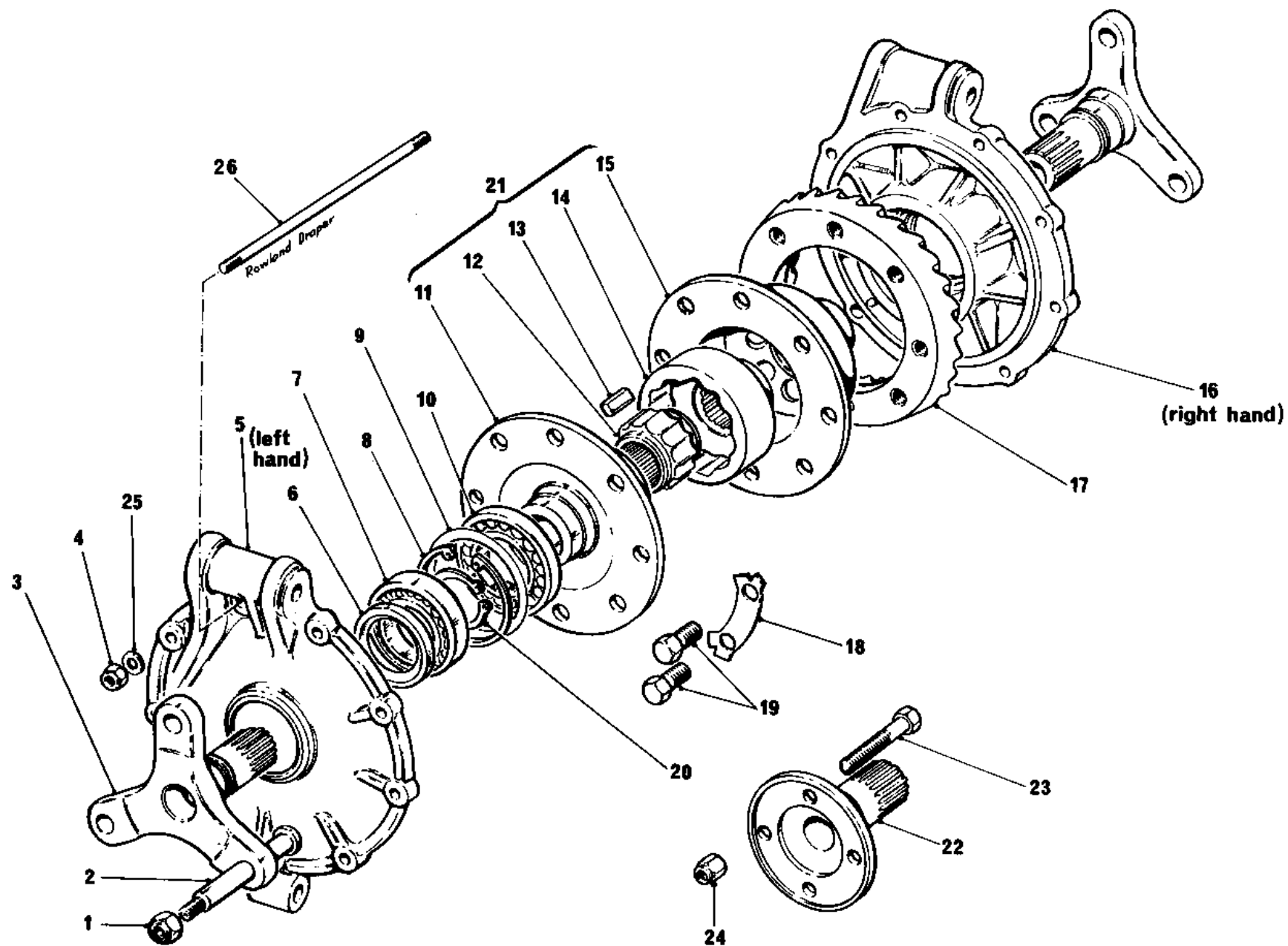


Illustration D

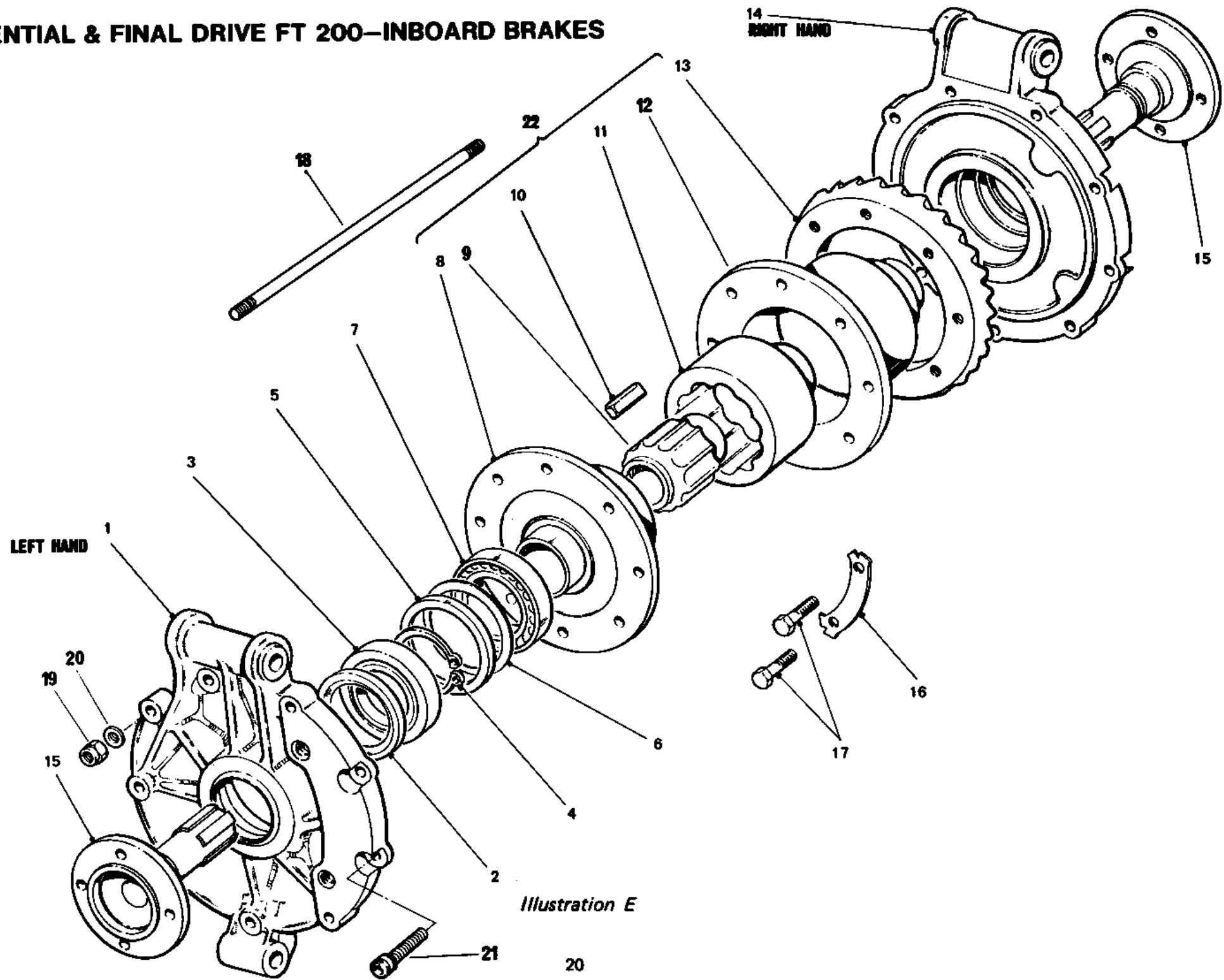
DIFFERENTIAL & FINAL DRIVE PARTS LIST-FT 200-OUTBOARD BRAKES

Illustration D

| Illus. No. | Description | Part No. | Qty. |
|------------|------------------------------------|----------|------|
| D1 | Nut 7/16 in. UNF Nyloc | FT 2195 | 6 |
| D2 | Bolt Drive Shaft 5/4 in. p.c.d. | FT 2192 | 6 |
| D2 | Bolt Drive Shaft 4 7/16 in. p.c.d. | FT 2192A | 6 |
| D3 | Drive Shaft 5/4 in. p.c.d. | FT 219 | 2 |
| D3 | Drive Shaft 4 7/16 in. p.c.d. | FT 219A | 2 |
| D4 | Nut 5/16 in. UNF Nyloc | FT 2013 | 36 |
| D5 | Side Plate | FT 205 | 1 |
| D6 | Oil Seal | FT 2054 | 2 |
| D7 | Bearing | FT 2053 | 2 |
| DB | Circlip | FT 2052 | 2 |
| D9 | Shims 3-5-10-15-20 thou. | FT 2061 | |
| D10 | Bearing | FT 2051 | 2 |
| D11 | Plunger Carrier | FT 214 | 1 |
| D12 | inner Cam Track | FT 216 | 1 |
| D13 | Plungers | FT 217 | 8 |
| D14 | Outer Cam Track | FT 215 | 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|----------------------------|----------|------|
| D15 | Outer Housing | FT 213 | 1 |
| D16 | Side Plate | FT 206 | 1 |
| D17 | Crown Wheel & Pinion 7:31 | FT 221 | 1 |
| D17 | Crown Wheel & Pinion 9:31 | FT 221A | 1 |
| D17 | Crown Wheel & Pinion 8:31 | FT 221B | 1 |
| D17 | Crown Wheel & Pinion 10:31 | FT 221C | 1 |
| D17 | Crown Wheel & Pinion 13:36 | FT 221M | 1 |
| D18 | Tab Washer | FT 2212 | 4 |
| D19 | Bolt | FT 2211 | 8 |
| D20 | Circlip | FT 2191 | 2 |
| D21 | Limited Slip Differential | FT 212 | 1 |
| D22 | Drive Shaft H.S. 1300 | FT 218 | 2 |
| D23 | Bolt | FT 2193 | 8 |
| D24 | Nut 3/8 in. UNF Nyloc | FT 2196 | 8 |
| D25 | Washer | FT 2027 | 36 |
| D26 | Tie Bar | FT 262 | 3 |

DIFFERENTIAL & FINAL DRIVE FT 200—INBOARD BRAKES



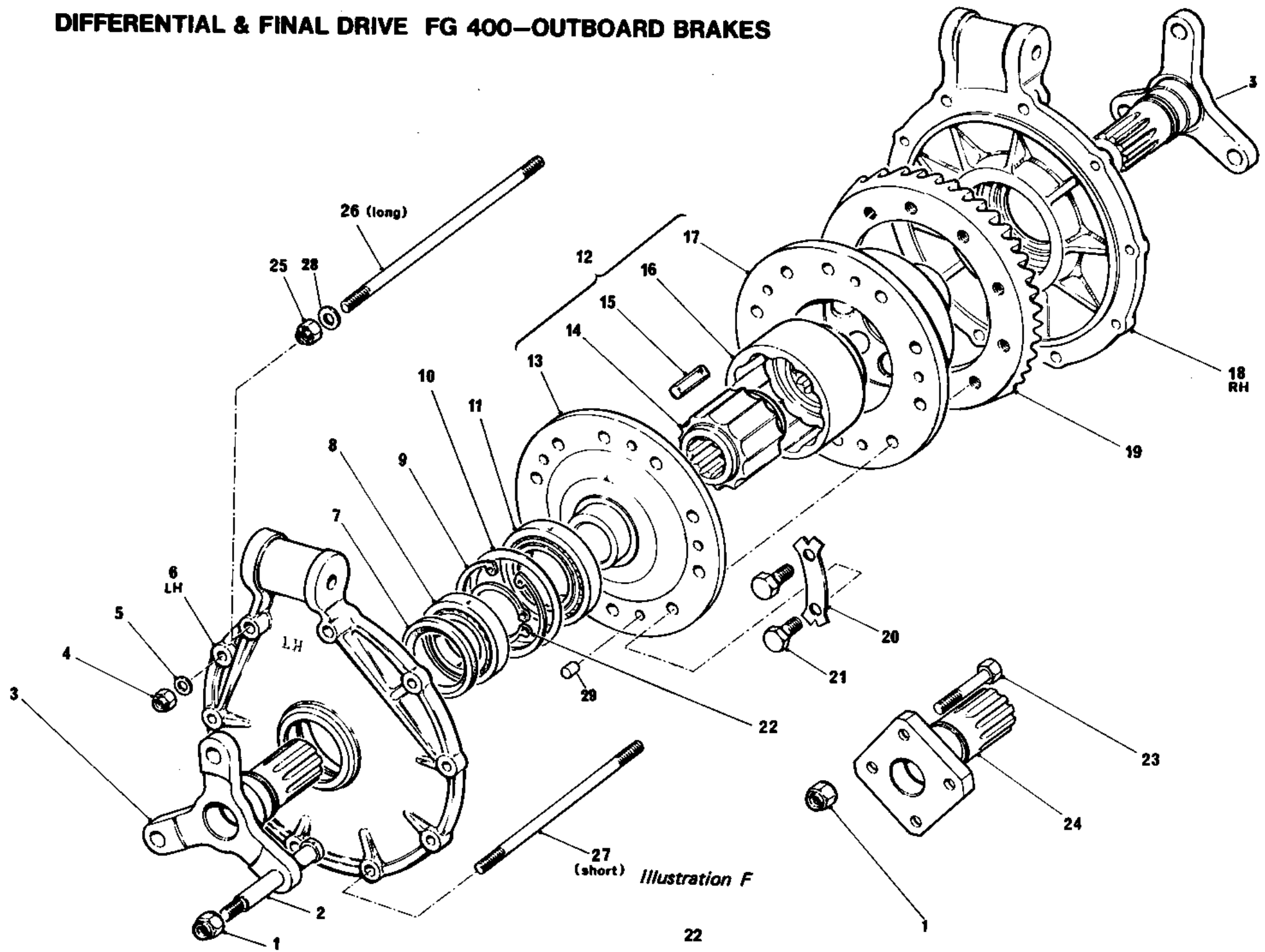
DIFFERENTIAL & FINAL DRIVE PARTS LIST-FT 200-INBOARD BRAKES

Illustration E

| Illus. No. | Description | Part No. | Qty. |
|------------|---------------------------|----------|------|
| E1 | Side Plate | FT 205B | 1 |
| E2 | Oil Seal | FT 2054 | 2 |
| E3 | Bearing | FT 2053A | 2 |
| E4 | Circlip | FT2191A | 2 |
| E5 | Spacer L/H | FT 2052A | 1 |
| E5 | Spacer R/H (not illus.) | FT 2062A | 1 |
| E6 | Shim 3-5-10-15-20 thou. | FT 2061 | |
| E7 | Bearing | FT 2051 | 2 |
| E8 | Plunger Carrier | FT 214 | 1 |
| E9 | Inner Cam Track | FT 216 | 1 |
| E10 | Plungers | FT 217 | 8 |
| E11 | Outer Cam Track | FT 215 | 1 |
| E12 | Outer Housing | FT 213 | 1 |
| E13 | Crown Wheel & Pinion 7:31 | FT 221 | 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|-----------------------------|----------|------|
| E13 | Crown Wheel & Pinion 9:31 | FT 221A | 1 |
| E13 | Crown Wheel & Pinion 8:31 | FT 2218 | 1 |
| E13 | Crown Wheel & Pinion 10:31 | FT 221C | 1 |
| E13 | Crown Wheel & Pinion 13:36 | FT 221M | 1 |
| E14 | Side Plate | FT 206B | 1 |
| E15 | Drive Shaft H.S. 1300 | FT 218A | 2 |
| E15 | Drive Shaft H.S. C.V. Joint | FT 2188 | 2 |
| E15 | Drive Shaft V.W. C.V. Joint | FT 218F | 2 |
| E16 | Tab Washer | FT 2212 | 4 |
| E17 | Bolt | FT 2211 | 8 |
| E18 | Tie Bar | FT 262A | 3 |
| E19 | Nut 5/16 in. UNF Nyloc | FT 2013 | 32 |
| E20 | Washer | FT 2027 | 36 |
| E21 | Screw | FT 20128 | 4 |
| E22 | Limited Slip Differential | FT 212 | 1 |

DIFFERENTIAL & FINAL DRIVE FG 400—OUTBOARD BRAKES



DIFFERENTIAL & FINAL DRIVE PARTS LIST-FG 400-OUTBOARD BRAKES

Illustration F

| Illus. No. | Description | Part No. | Qty. |
|------------|---------------------------|----------|------|
| F1 | Nut 7/16 in. UNF Nyloc | FT 2195 | 6/8 |
| F2 | Bolt | FT 2192 | 6 |
| F3 | Drive Shaft 5% in. p.c.d. | DG 219 | 2 |
| F4 | Nut 5/16 in. UNF Nyloc | FT 2013 | 36 |
| F5 | Washer | FT 2027 | 36 |
| F6 | Side Plate | FG 205 | 1 |
| F7 | Oil Seal | LG 2054 | 2 |
| F6 | Bearing | LG 2053 | 2 |
| F9 | Circlip | LG 2052 | 2 |
| F10 | Shim 35-10-15-25 thou. | DG 2061 | |
| F11 | Bearing | DG 2051 | 2 |
| F12 | Limited Slip Differential | DG 212 | 1 |
| F13 | Plunger Carrier | DG 214 | 1 |
| F14 | Inner Cam Track | LG 216 | 1 |
| F15 | Plunger | LG 217 | 8 |
| F16 | Outer Cam Track | LG 215 | 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|----------------------------|----------|------|
| F17 | Outer Housing | DG 213 | 1 |
| F18 | Side Plate | FG 206 | 1 |
| F19 | Crown Wheel & Pinion 7:31 | FG 221 | 1 |
| F19 | Crown Wheel & Pinion 9:31 | FG 221A | 1 |
| F19 | Crown Wheel & Pinion 8:31 | FG 221 B | 1 |
| F19 | Crown Wheel & Pinion 10:31 | FG 221C | 1 |
| F20 | Tab Washer | FT 2212 | 5 |
| F21 | Bolt | FT 2211 | 10 |
| F22 | Circlip | LG 2191 | 2 |
| F23 | Bolt | LG 2193 | 8 |
| F24 | Drive Shaft HS 1400 | DG 218 | 2 |
| F25 | Nut 3/8 in. UNF Nyloc | FT 2196 | 8 |
| F26 | Tie Bar | LG 262 | 2 |
| F27 | Tie Bar | DG 262 | 2 |
| F28 | Washer | FT 2585 | 6 |
| F29 | Dowel | DG 213A | 5 |

DIFFERENTIAL & FINAL DRIVE PARTS LIST-FG 400-INBOARD BRAKES

Illustration G

| Illus. No. | Description | Part No. | Qty. |
|------------|---------------------------|----------|------|
| G1 | Screw, Cap, 1/4 in. UNC | FG 2233 | 12 |
| G2 | Oil Seal | LG 2054 | 2 |
| G3 | Bearing | DG 2053A | 2 |
| G4 | Nut 5/16 in. UNF Nyloc | FT 2013 | 36 |
| G5 | Washer | FT 2027 | 36 |
| G6 | Side Plate | FG 2058 | 1 |
| G7 | Circlip | DG 2191A | 2 |
| G8 | Retaining Plate | DG 206AI | 2 |
| G9 | Washer | FT 2585 | 8 |
| G10 | Shim 3-5-10-15-20 thou. | DG 2061 | |
| G11 | Bearing | DG 2051 | 2 |
| G12 | Limited Slip Differential | DG 212 | 1 |
| G13 | Plunger Carrier | DG 214 | 1 |
| G14 | Inner Cam Track | LG 216 | 1 |
| G15 | Plunger | LG 217 | 8 |
| G16 | Outer Cam Track | LG 215 | 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|----------------------------|----------|------|
| G17 | Outer Housing | DG 213 | 1 |
| G18 | Side Plate | FG 2068 | 1 |
| G19 | Crown Wheel & Pinion 7:31 | FG 221 | 1 |
| G19 | Crown Wheel & Pinion 9:31 | FG 221A | 1 |
| G19 | Crown Wheel & Pinion 8:31 | FG 221 B | 1 |
| G19 | Crown Wheel & Pinion 10:31 | FG 221 C | 1 |
| G20 | Tab Washer | FT 2212 | 5 |
| G21 | Bolt | FT 2211 | 10 |
| G22 | Dowel | DG 213A | 5 |
| G23 | Drive Shaft H.S. 1400 | DG 218A | 2 |
| G24 | Drive Shaft 100 ST | DG 2188 | 2 |
| G24 | Drive Shaft 89 ST | DG 218D | 2 |
| G24 | Drive Shaft V.W. C.V. | FG 218A | 2 |
| G25 | Nut 3/8 in. UNF Nyloc | FT 2196 | 8 |
| G26 | Tie Bar | LG 262 | 2 |
| G27 | Tie Bar | DG 262A | 2 |

DIFFERENTIAL & FINAL DRIVE—FGA

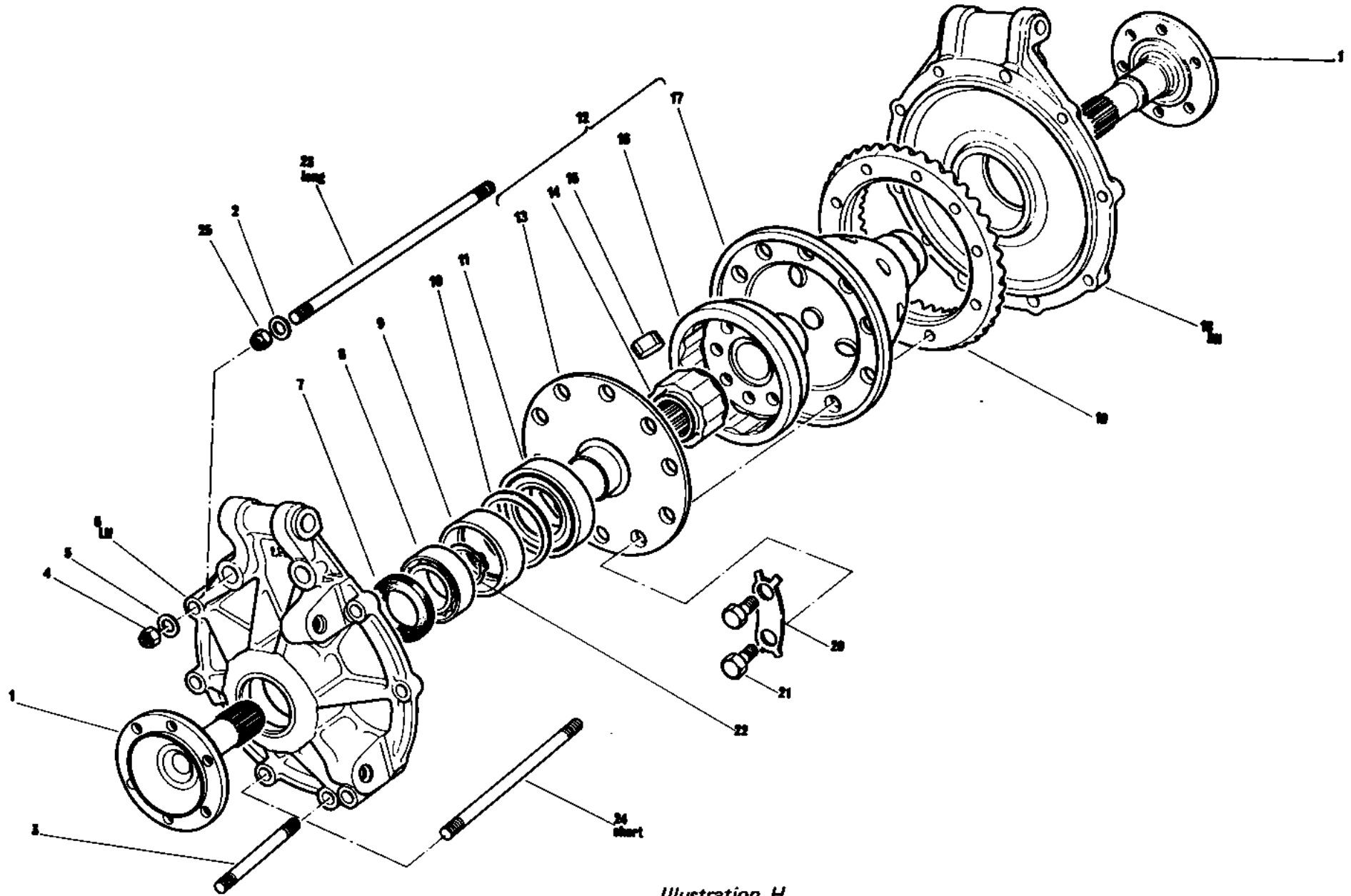


Illustration H

DIFFERENTIAL & FINAL DRIVE PARTS LIST-FGA

Illustration H

| Illus. No. | Description | Part No. | Qty. |
|------------|---------------------------|-----------|------|
| H1 | Drive Shaft 12 holes | FGA 218A | 2 |
| H1 | Drive Shaft 100 ST | FGA 2188 | 2 |
| H1 | Drive Shaft H.S. 1400 | FGA 218C | 2 |
| H2 | Washer | FT 2585 | 8 |
| H3 | Stud | FGA 2012 | 2 |
| H4 | Nut 5/16 in. UNF Nyloc | FT 2013 | 36 |
| H5 | Washer | FT 2027 | 36 |
| H6 | Side Plate | FGA 205C | 1 |
| H7 | Oil Seal | FT 2054 | 2 |
| H8 | Bearing | TL 2053 | 2 |
| H9 | Spacer L/H | FGA 2052A | 1 |
| H9 | Spacer R/H (not illus.) | FGA 2062A | 1 |
| H10 | Shim 3-5-10-15-20 thou. | FT 2061 | |
| H11 | Bearing | FT 2051 | 2 |
| H12 | Limited Slip Differential | TL 212 | 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|-------------------------------|----------|------|
| H13 | Plunger Carrier | TL 214 | 1 |
| H14 | Inner Cam Track | TL 216 | 1 |
| H15 | Plungers (thickness 5/16 in.) | TL 217 | 8 |
| H16 | Outer Cam Track | TL 215 | 1 |
| H17 | Outer Housing | TL 213 | 1 |
| H18 | Side Plate | FGA 206A | 1 |
| H19 | Crown Wheel & Pinion 7:31 | FG 221 | 1 |
| H19 | Crown Wheel & Pinion 9:31 | FG 221A | 1 |
| H19 | Crown Wheel & Pinion 8:31 | FG 221 B | 1 |
| H19 | Crown Wheel & Pinion 10:31 | FG 221C | 1 |
| H20 | Tab Washer | FT 2212 | 5 |
| H21 | Bolt | FT 2211 | 10 |
| H22 | Circlip | FT 2191A | 2 |
| H23 | Tie Bar | LG 262 | 2 |
| H24 | Tie Bar | DG 262A | 2 |
| H25 | Nut 3/8 in. UNF Nyloc | FT 2196 | 8 |

DIFFERENTIAL ASSEMBLY—FGB & DGB

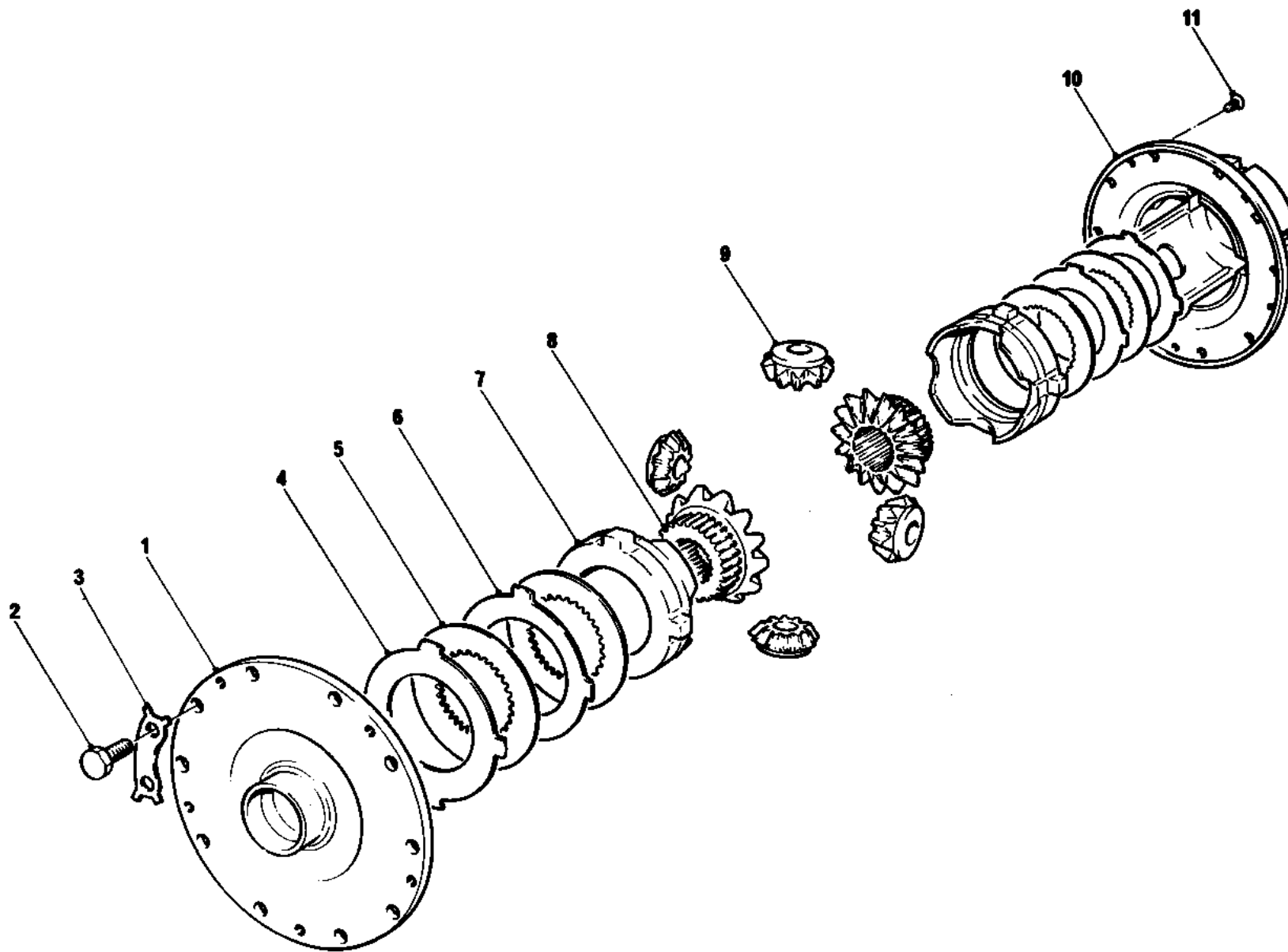


Illustration M

DIFFERENTIAL ASSEMBLY PARTS LIST-FGB &DGB

Illustration M

FGB 212 DIFFERENTIAL ASSEMBLY (AS ILLUSTRATED)

| Illus. No. | Description | Part No. | Qty. |
|------------|------------------------|-----------|------|
| M1 | End Plate | FGB 214 | 1 |
| M2 | Bolt | FGB 2211 | 10 |
| M3 | Tab Washer | FT 2212 | 5 |
| M4 | Clutch Plate, Belville | LG 2139 | 2 |
| M5 | Disc | LG 2138 | 4 |
| M6 | Clutch Plate | LG 21310 | 2 |
| M7 | Ring, Side Gear | FGB 2137 | 2 |
| M8 | Side Gear | TL2.2136 | 2 |
| M8 | Pinion Gear | LG 2135 | 4 |
| M10 | Differential Case | FGB213 | 1 |
| M11 | Screw | FGB 21312 | 5 |

DGB 212 DIFFERENTIAL ASSEMBLY (NOT ILLUSTRATED)

| Illus. No. | Description | Part No. | Qty. |
|------------|------------------------|-----------|------|
| M1 | End Plate | DGB 214 | 1 |
| M2 | Bolt | FGB 2211 | 10 |
| M3 | Tab Washer | FT 2212 | 5 |
| M4 | Clutch Plate, Belville | LG 2139 | 2 |
| M5 | Disc | LG 2138 | 4 |
| M6 | Clutch Plate | LG 21310 | 2 |
| M7 | Ring, Side Gear | FGB 2137 | 2 |
| M8 | Side Gear | LG 2136 | 2 |
| M9 | Pinion Gear | LG 2135 | 4 |
| M10 | Differential Case | DGB 213 | 1 |
| M11 | Screw | FGB 21312 | 5 |

Fig. 2 Using the Dial Recording Micrometer to measure backlash

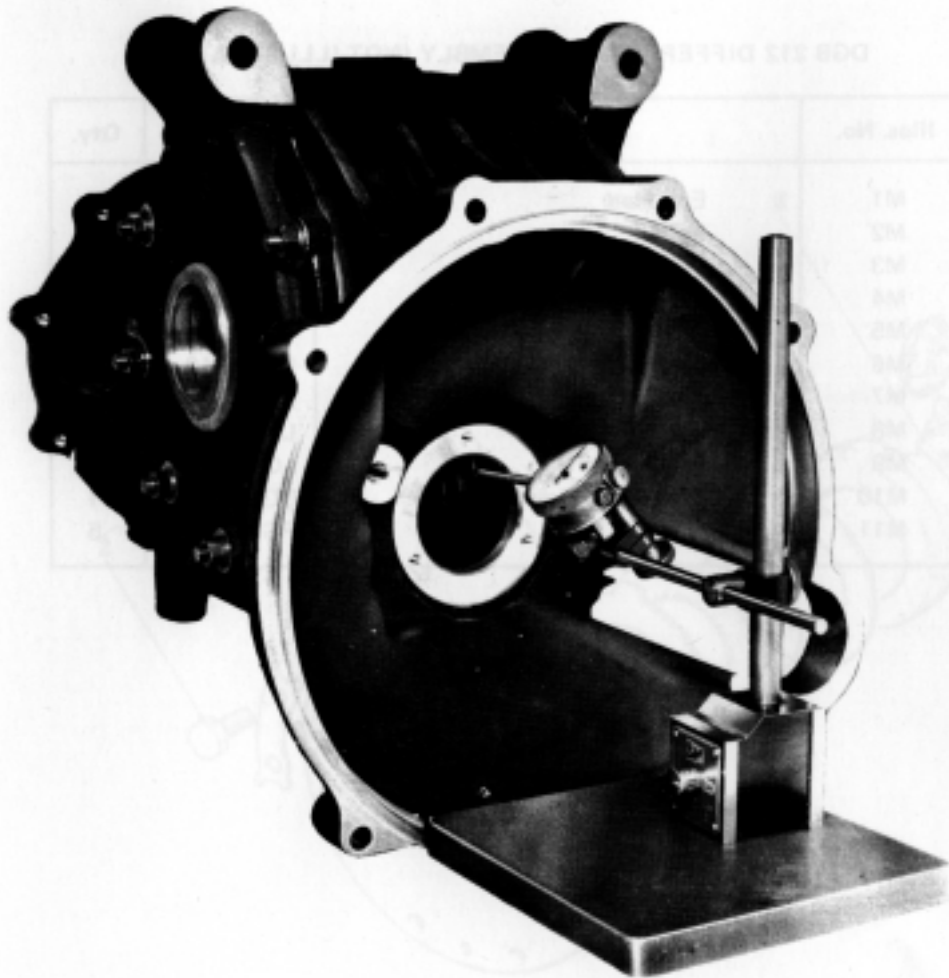
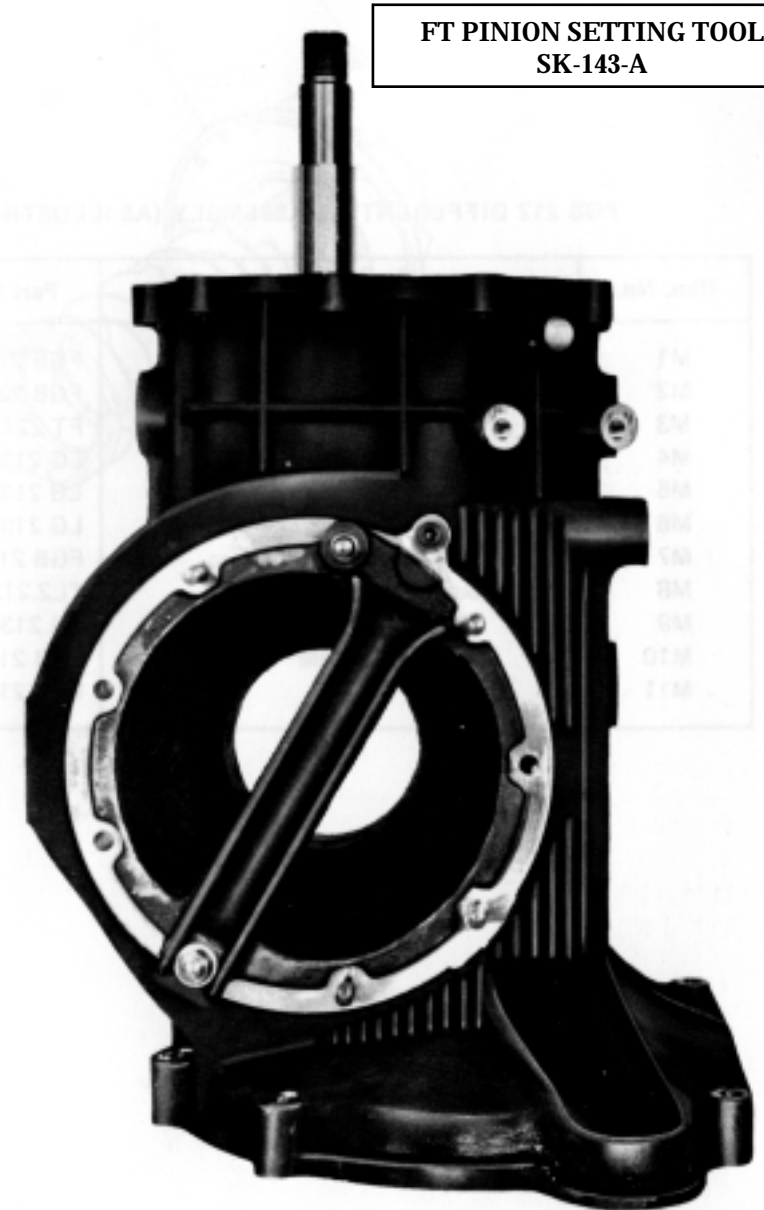


Fig. 3 Hewland Setting Gauge in Position



SETTING-UP THE CROWN WHEEL & PINION

Crown wheel and pinion sets are supplied as matched and lapped pairs, tested and passed before leaving the factory, and therefore should only be fitted to run as a pair, marked with a "HE" number on each part.

Setting up is possible with the use of engineers blue, but the faster and more positive method is to use a Hewland pinion depth gauge. Procedure is as follows:

SETTING PINION ON FT 200

Refer to illustration B.

1. When fitting a new pinion it is also advisable to fit a new pinion bearing (6).
2. Press bearing (6) onto pinion shaft, ensuring flanged shoulder is correct way round.
3. Select a shim (5), i.e. used undamaged shims from removed pinion. Warm up the outside of main case.
4. Insert shim in correct position and drop pinion and bearing into the main case.
5. Fit clamp plate (7), insert four bolts (3). tighten into clamp plate.
6. Allow main case to cool.

USING THE HEWLAND SETTING GAUGE TO CHECK PINION DEPTH

7. Place setting gauge in position in place of side plate of main case, Bolt across face.
8. Using a feeler gauge, determine the clearance between the setting gauge and the pinion. The correct clearance is marked on the pinion and should be achieved using shims (5).

9. When pinion clearance is correct, remove clamp bolts (3), put on clamp plate tab washers (4) smear Loctite on threads, re-fit bolts (3) and tighten into clamp plate (7). Knock ever tab washers.

SETTING PINION OF FG400 & FGA

Refer to Illustration C.

1. When fitting a new pinion it is also advisable to fit a new pinion bearing.

All FGA gearboxes are fitted with a larger pinion bearing (4-FGA2221). and to some FG 400 gearboxes up to 1976. The pinion bearing is fitted reversed in some FG gearbox main cases prior to 1976, and in all FG gearboxes subsequently.

When separating the pinion from the main case, make special note of order and location of pinion bearing, shims, and any spacers that might be present, to ensure correct re-assembly.

2. Press bearing (4) onto pinion shaft, ensuring flanged shoulder is correct way round.
3. Select a shim (7), i.e. used shims from removed pinion. Warm up the outside of main case.
4. Insert shim (7) in correct position and fit pinion and bearing into the main case.
5. Using old nut (5), and spacer (6), if fitted lock bearing into main case.
6. Allow main case to cool.

USING THE HEWLAND SETTING GAUGE TO CHECK PINION DEPTH

7. Put setting gauge in position in place of side plate of main case, bolt across face.
8. Using a feeler gauge, determine the clearance between the setting gauge and the pinion. The correct clearance is marked on the pinion, and should be achieved using shims (7).
9. When pinion clearance is correct, remove old nut (5) and fit new nut. Use a little Loctite and tighten to a torque of 200 ft/lbs
10. Using round-nosed punch, knock the grooved part of nut into the cut in thread of bearing.

SETTING PINION OF FGB

Refer to Illustration L

1. When fitting a new pinion it is also advisable to fit a new pinion bearing.
2. Press bearing (9) onto pinion shaft, making sure flanged shoulder is correct way round.
3. Select a shim (10). i.e. used undamaged shims from removed pinion. Warm up outside of main case.
4. Insert shim (10) in correct position and fit pinion and bearing into main case.
5. Insert 6 bolts (8) (with plain washers to protect magnesium face), and tighten.
6. Allow main case to cool.

7. Use the Hewland setting gauge to check pinion depth, as for FG400 or FGA.
8. Adjust shimming as required until correct clearance is obtained.
9. Finally re-assemble 6 bolts (8) with new tab washers and tighten.
10. Tab over washers.
11. Check the position of Hubs as this may vary with new setting of pinion, as described on page 36 and adjust if required.

ADJUSTING PRE-LOAD OF DIFFERENTIAL FT200, FG400, FGA, FGB

1. Although differences exist between the method of retaining the drive shaft bearing in the side plate, the method of setting the crown wheel up is the same in all cases.
2. Assemble the drive shaft bearings in the side plates, where they take the differential thrust (FT inboard, FGA), together with spacers. With other gearboxes, this can be accomplished at a later stage.
3. Assemble differential unit, and fit crown wheel. Use solid dummy bearings in place of the two differential taper bearings. The thickness of shims is critical. If they have to be replaced, make sure it is with shims of the same thickness.
4. Fit the differential unit and side plates to the main case. Bolt up, including tie bars, to normal tension.

5. Turn the pinion shaft by hand to test the pre-load. Adjust by means of shims until satisfactory.

N.B. Turn the pinion with hubs removed. Using reasonable effort, it should be possible to turn it by gripping the splines by hand, 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 pre-load.

TO ADJUST THE BACKLASH

For this operation you will require a post-mounted dial indicator with an extended probe. (Fig.2 page 30)

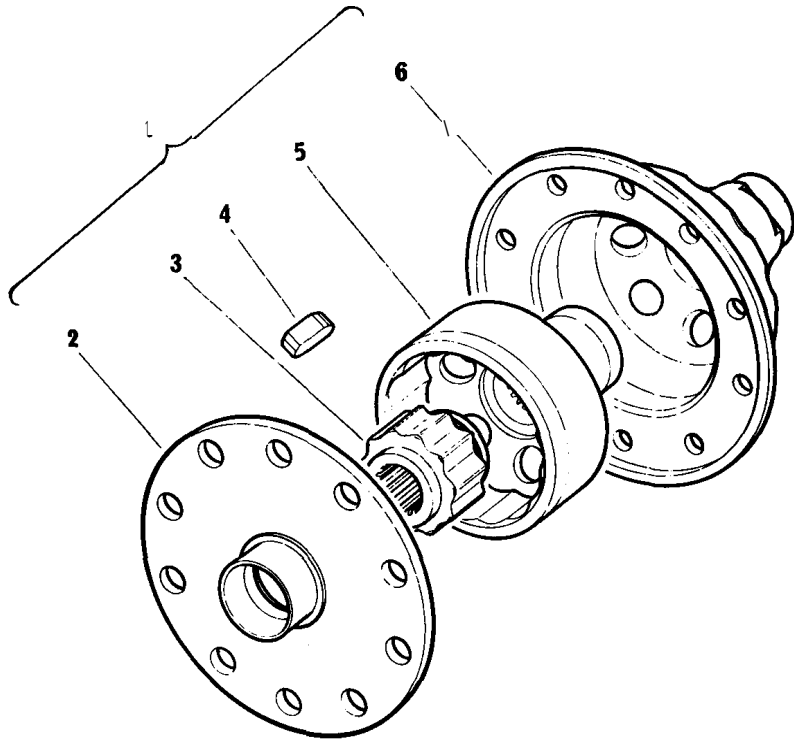
1. Remove the solid dummy bearings from the differential unit and replace them with dummy bearings. (Real bearing with increased tolerances for easy substitution).
2. Insert the probe of the dial indicator through spigot housing until it touches one of the teeth of the crown wheel. Note the reading on the dial indicator. Turn pinion by hand to rotate crown wheel, and take at least 12 readings. (14 readings are standard practice in our workshops.) Minimum reading should be .004 in.
3. To increase or decrease backlash, change shims from one side of differential to the other, but remember that once the pre-load has been set, you can use only the shims that are already there.

Re-assemble as follows:

4. Press inner bearings onto differential assembly.
5. Warm up one side plate (FT outboard, FG 400) and fit oil seal, drive shaft bearing and circlip or plate.
6. Press the drive shaft into the bearing and retain with circlip.
7. Insert shim or shims, and bearing outer track. Place heavy weight on bearing track to flatten shimming. Allow to cool.
8. Repeat for other side plate. After cooling, assemble one side to the main case. Complete the assembly of the differential and drive unit as described above.

N.B. If renewing the differential bearings, make certain that the width of the new bearings, also when using dummy bearings, are the same as old bearings being replaced. Any differences must be adjusted in final shimming.

ALTERNATIVE DIFFERENTIAL-FGA



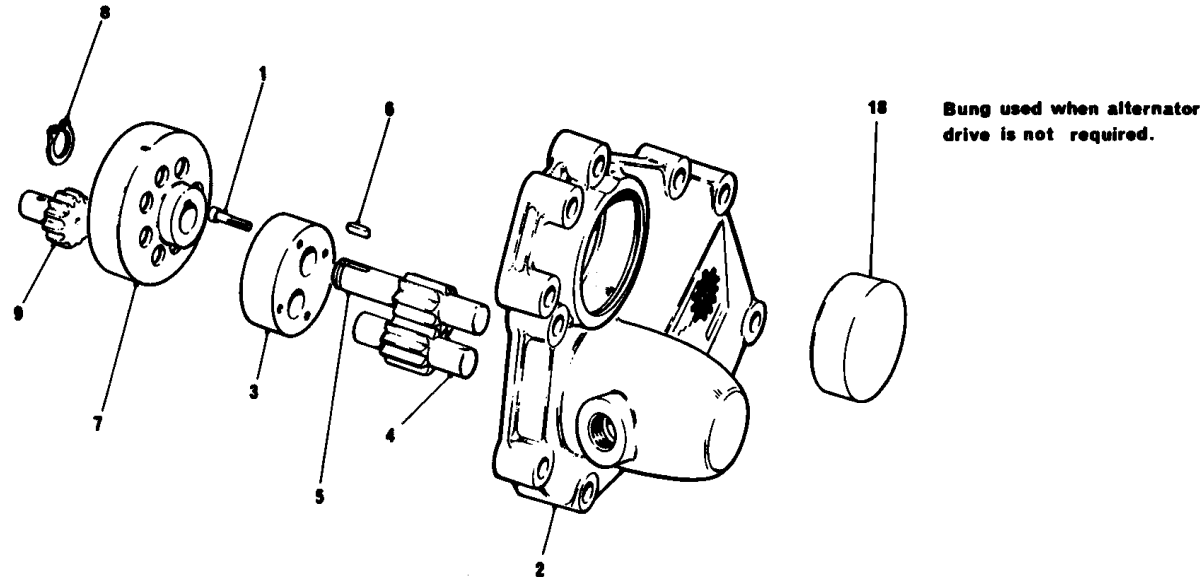
| Illus. No. | Description | Part No. | Qty. |
|------------|------------------------------|----------|------|
| J1 | Limited Slip Differential | TL2.212 | 1 |
| J2 | Plunger Carrier | TL2.214 | 1 |
| J3 | Inner Cam Track | TL2.216 | 1 |
| J4 | Plungers (thickness 3/8 in.) | LG 217 | 8 |
| J5 | Outer Cam Track | TL2.215 | 1 |
| J6 | Outer Housing | TL2.213 | 1 |

Fitted as standard from gearbox number FGA 169

Illustration J

OIL PUMP

Illustration K



The oil pump is located on the end cover of the gearbox unit. It is extremely strong and unlikely to suffer serious wear.

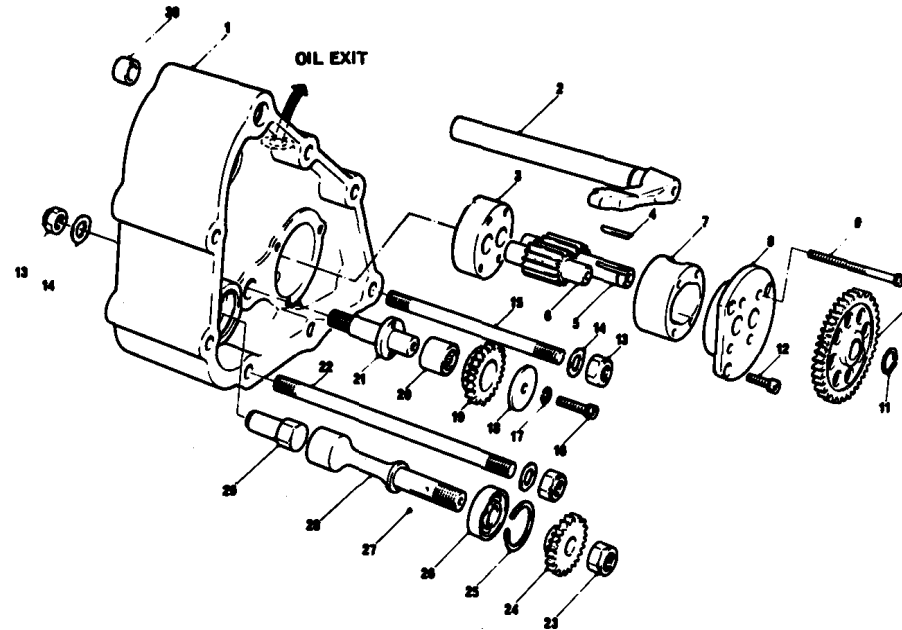
To Remove:

1. Slacken and remove the 5/16 in. UNF nyloc end cover securing nuts (8 off).
2. Gently tap the end cover off gearbox housing.
3. Remove circlip (8) and pull off gear (7) removing the key on the shaft.
4. Remove the cap screws (1) and take off top cover (3).
5. Remove both gears from housing.
6. Clean and check gears and body for possible scouring.
7. Re-assemble in reverse order.

| Illus. No. | Description | Part No. | Qty. |
|------------|--|----------|------|
| K | Pump | FT 265 | 1 |
| K1 | Screws, 2BA | DG 26510 | 4 |
| K2 | Pump Body (Combined End Cover) | FT 2652 | 1 |
| K3 | Pump Cover | FT 2653 | 1 |
| K4 | Gear | DG 2654 | 1 |
| K5 | Gear | DG 2655 | 1 |
| K6 | Key | DG 2656 | 1 |
| K7 | Gear, Internal | FT 2657 | 1 |
| K8 | Circlip | DG 2658 | 1 |
| K9 | Gear | FT 2659 | 1 |
| K18 | Plug (use only when Alternator not required) | FT 26512 | 1 |

OIL PUMP-FT & FG

illustration N



| Illus No. | Description | Part No. | Qty. |
|-----------|---------------------|------------|------|
| N1 | Body, Oil Pump | FT 203P | 1 |
| N2 | Selector Finger | FGA6.252 | 1 |
| N3 | Pump Cover, End | FGA6.2652A | 1 |
| N4 | Key | DG 2656 | 1 |
| N5 | Rotor, Driver | DG 2655 | 1 |
| N6 | Rotor, Idler | DG 2654 | 1 |
| N7 | Body, Pump | FGA6.2652 | 1 |
| NB | Pump Cover, Front | FGA6.2653 | 1 |
| N9 | Screw, 4BA | FGA 26510 | 4 |
| N10 | Gear, Rotor Driver | FGA6.2657 | 1 |
| N11 | Circlip | DG 2656 | 1 |
| N12 | Screw, 2BA | DG 2651 | 3 |
| N13 | Nut, Nyloc 5/16 in. | FT 2013 | 9 |
| N14 | Washer, 5/16 in. | FT 2027 | 9 |
| N15 | Stud, Short | FGA6.2031 | 2 1 |

| Illus. No. | Description | Part No. | Qty. |
|------------|----------------------------|------------|------|
| N16 | Screw 2BA | FGA6.2651 | 1 |
| N17 | Washer | FGA6.2651 | A 1 |
| N18 | Washer, Fixed | FGA6.2659C | 1 |
| N19 | Gear, Idler, Oil Pump | FGA6.2659A | 1 |
| N20 | Bearing, Idler Gear | FGA62659D | 1 |
| N21 | Shaft, Idler Gear | FT 2651 OB | 1 |
| N22 | Stud, long | FGA6.2026 | 7 |
| N23 | Nut, Nyloc, 3/8 in. | FT 2196 | 1 |
| N24 | Gear, Drive, Oil Pump | FT 2659A | 1 |
| N25 | Circlip, Bearing Retaining | HC9.2342 | 1 |
| N26 | Bearing, Drive Shaft | FT 2659D | 1 |
| N27 | Ball Locating | FT 2659E | 1 |
| N28 | Drive Shaft, Pump | FT 2659C | 1 |
| N29 | Drive Insert Layshaft | FT 26598 | 1 |
| N30 | Dowel | FGA6.2029A | 2 |

SETTING GEAR POSITIONS FOR GEARBOXES WITH ROTATING TOP GEAR THRUST WASHER

SETTING GEAR POSITIONS IN MAIN CASE (Fig. 4)

1. With pinion set-up in main case, slide front hub onto pinion shaft.
2. Slide spacer next to front hub.
3. With the aid of a machined straight-edge check the level of the spacer relative to main case rear face.
If lower – Use longer front hub or shim at position X-X.
If higher (proud) – Use shorter -front hub or grind face of hub at position X-X.
If level (flush) – Setting is correct.

SETTING GEAR POSITIONS WITH SELECTOR FORK JIG

1. Using methods described above, achieve spacer level with front face of bearing carrier.
2. Set selector forks.

Notes: *All bearing carriers set by this method are interchangeable on main cases.*

Clearance between top gear thrust bearing and casting is not to a critical tolerance (min. 0.020 in).

