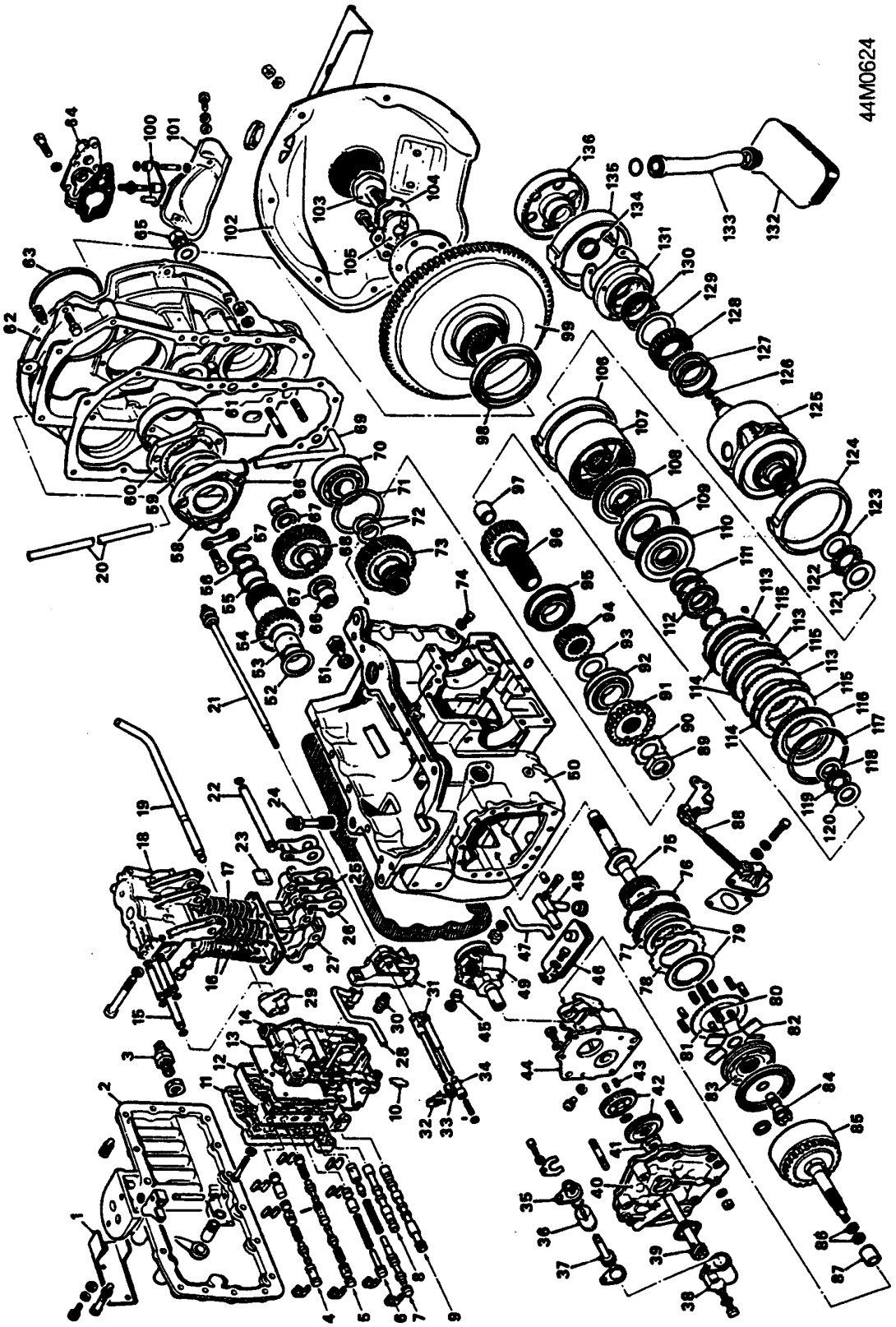
AUTOMATIC GEARBOX

CONTENTS


44M0624

Automatic gearbox components

1. Inhibitor switch guard plate
2. Front cover
3. Inhibitor switch
4. Reverse dump valve and third gear valve
5. Top and second gear valves
6. Engagement control pressure valve
7. Regulator valve
8. Governor valve
9. Selector valve
10. Flap valve
11. Lid
12. Valve chest
13. Separator plate
14. Pipe chest
15. Pipes – valve block to servos
16. Second and reverse gear servos
17. Third gear servo
18. Servo body
19. Pipe – converter to valve block
20. Dipstick tube
21. Transverse selector rod
22. Pivot shaft
23. Strut
24. Adapter
25. Pivot shaft washer
26. Reaction levers
27. Servo levers
28. Valve block connector and pipe
29. Guide – pipe assembly
30. Valve block connector
31. Park lock assembly
32. Locking clip
33. Adjuster
34. Cam assembly
35. Plain bush
36. Speedometer pinion housing
37. Speedometer pinion
38. Speedometer drive housing
39. Speedometer gear
40. End housing
41. Thrust washer
42. Governor drive gears
43. Roll pin
44. Governor mounting plate
45. Yoke
46. Oil strainer
47. Pipe forward clutch
48. Oil suction pipe
49. Governor
50. Gearbox case
51. Drain plug
52. Front thrust washer
53. Front bush
54. Converter output gear
55. Rear bush
56. Backing ring
57. 'C' shaped thrust washer
58. Rear case
59. Oil seal
60. Stator carrier
61. Bush
62. Converter housing
63. Oil pump cover
64. Low pressure valve
65. Input gear nut
66. Idler gear bearing
67. Thrust washer
68. Idler gear
69. Pipe – converter to low pressure valve
70. Bearing
71. Retainer
72. Shims
73. Input gear
74. Dowel bolt
75. Forward shaft
76. Circlip
77. End plate
78. Intermediate plate
79. Clutch plates
80. Reverse shut off valve
81. Pressure plate
82. Toggle
83. Piston
84. Reverse shut – off valve piston
85. Forward clutch
86. Forward clutch shaft rings
87. Assembly sleeve
88. Kick – down linkage
89. Nut
90. Lock washer
91. Forward clutch hub
92. Bearing
93. Spacing washer
94. Final drive pinion
95. Bearing
96. Top and reverse clutch hub
97. Bush
98. Oil seal
99. Converter
100. Bellcrank lever
101. Bellcrank lever cover
102. Converter cover
103. Converter retaining bolt
104. Lock washer
105. Key plate
106. Second gear brake band
107. Top and reverse clutch
108. Reverse gear booster piston
109. Cylinder
110. Top gear piston
111. Piston return spring
112. Spring retainer
113. Intermediate plates
114. Separation springs
115. Clutch plates
116. End plate
117. Circlip
118. Thrust washer
119. Needle – roller thrust bearing
120. Thrust race washer
121. Thrust washer (thin)
122. Needle – roller thrust bearing
123. Thrust washer (thick)
124. Third gear brake band
125. Bevel gear train
126. Sealing ring
127. End plate spacer
128. Freewheel
129. Intermediate spacer
130. Needle – roller bearing
131. Freewheel housing
132. Main oil strainer
133. Oil pick – up pipe
134. Needle – roller bearing
135. Reverse gear brake band
136. Freewheel reaction member

DESCRIPTION

The automatic gearbox incorporates a three – element fluid torque converter coupled with a bevel gear train which provides four forward gears and reverse. The system is controlled by a floor – mounted selector lever within a gated quadrant marked with six positions:

Selector positions
'R' for reverse
'N' for neutral
'1' for first gear
'2' for second gear
'3' for third gear
'D' for automatic drive using all forward gears.

The system can be used as a fully automatic four – speed gearbox, with the gears changing automatically from rest to maximum speed according to the throttle position and load. If a lower gear is required to obtain greater acceleration, an instant full throttle position, i.e 'kick – down' on the accelerator, immediately produces the down change.

Complete manual control or over – ride is possible in the '1', '2' and '3' positions. However, it is very important that downward changes are effected within the speed range of the gear selected otherwise serious damage may result to the automatic gearbox components. The second '2', third '3' and top gears, provide engine braking whether driving 'manual' or 'automatic'. Manual selection allows the driver to stay in a particular gear to suit conditions.

***Note:** There is NO engine braking in first gear* **'1'** , it is a 'FREE WHEEL' gear on over – run.

Recommended speed ranges

	m.p.h.	km/h
First '1'	0 to 25	0 to 40
Second '2'	5 to 45	8 to 72
Third '3'	15 to 55	25 to 88

MECHANICAL SYSTEM

– refer to diagrams on pages 6 to 11.

Torque converter
The hydraulic torque converter has a maximum torque conversion ratio of 2 : 1 and provides a means of obtaining additional engine torque when starting from rest and accelerating in first, second and third ratios.

Clutches
The hydraulically operated multi – disc clutches connect the gear train to the final drive. In forward ratios the forward clutch is applied; in reverse gear the top and reverse clutch is applied. The top and reverse clutch has a tandem piston arrangement; when a reverse gear is engaged both pistons are pressurised and provide a greater clamping load to the clutch plates.

Bands and servos
Three servo – operated bands are used; second gear band is applied for second gear, the third gear band for third gear, the reverse gear band for reverse. The bands apply a clamping load on members of the gear train and hold them stationary to provide the gear ratios.

One – way clutch
The one – way clutch is used in the first ratio of drive. The forward clutch is applied, the carrier is stationary, its reaction being controlled by the one – way clutch.

Gear train
The gear train is of the epicyclic type and has eight spiral bevel gears. Engine power is transmitted from the converter output gear through an idler gear to the input gear which drives the bevel reduction gears in the gear train assembly.

Governor
The governor is sensitive to both road speed and throttle position, and controls the upward and downward gear – changes while 'D' is selected.

HYDRAULIC SYSTEM

– refer to diagrams on pages 12 to 14.

The automatic gearbox is controlled hydraulically by the valve block assembly under the combined influence of the driver, using the selector lever and throttle pedal, together with a governor, sensitive to throttle pedal operation and road speed.

Oil Pump

The engine oil pump has a high potential output and serves both the engine lubrication and automatic gearbox from a common oil supply.

Valve block

The valve block consists of three basic units, i.e the lid, valve chest, and pipe chest. The valve chest incorporates the various valves, details of which are given below.

The selector valve directs oil from the main supply to either the governor valve for automatic gear – shifting, or to the appropriate clutch or servo for manual selection.

The regulator valve controls the main line pressure, a secondary piston on the valve boosts this pressure when reverse is selected.

The governor valve movement is controlled by the mechanical governor and it directs the oil flow to the appropriate clutch or servo for automatic gear – shifts.

The relay valves are used for shifts from second to third and third to top. They enable the clutch or servo required to be supplied either from the selector valve in 'manual' control or the governor valve in 'automatic'. In addition, pistons are fitted in front of the second and third relay valves to ensure that on up – shifts the engagement of the new ratio and release of the old occur simultaneously to prevent engine overspeeding between shifts. A relay valve is not required for the first gear as the torque reaction is controlled mechanically by a one – way clutch.

The engagement control valve has a primary function of eliminating harsh engagement when selecting **'D'** or a forward gear from the rest position.

Operation of engagement control valve.

When a forward gear is selected, the selector valve in the valve block directs oil to shuttle valves located in the back of the valve block. The oil passes through the shuttle valves and pressurises the third and reverse gear servos, thus applying the brake bands and bringing the rotating components of the gear train gently to rest. The oil flows simultaneously to the engagement control valve which, at a predetermined pressure, directs oil to the forward clutch; and as there is relatively little movement between the driving and driven members the gear engagement is smooth.

To complete the operating sequence, oil is also fed behind the shuttle valves which move and allow the oil pressure in the third and reverse servos to exhaust, thus releasing the third and reverse gear bands.

Converter

The three – element type converter is bolted to the tapered end of the crankshaft. Oil under pressure is directed into the converter; surplus oil from the converter passes through a low pressure valve, eventually into the gear train for lubrication and return to sump. A

Torque multiplication is at maximum at turbine stall and slightly above 2:1 varying infinitely as turbine speed increases to a 1:1 ratio when the stator rotates at the same speed as the impeller and turbine.

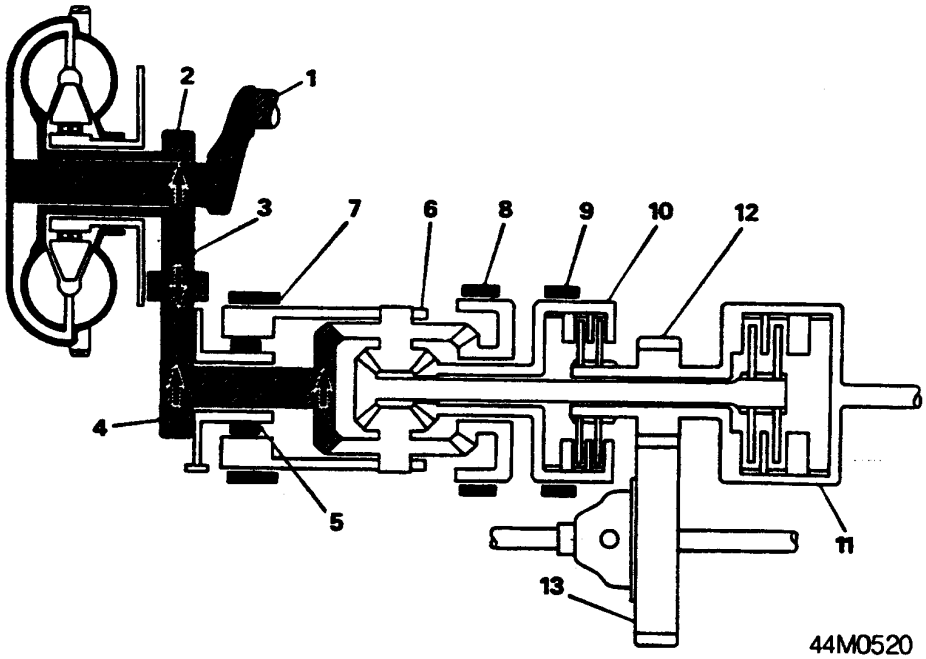
Low pressure valve

This valve controls the pressure in the converter to 30 lbf/in², 2.1 bar. When the engine is stopped the valve is seated, preventing the converter draining. This ensures that the oil level is stable when checking the combined engine/gearbox oil level and also provides an efficient converter when starting the engine.

MECHANICAL POWER FLOW DIAGRAMS

The power flow diagrams indicate how the various ratios are obtained. Four speeds and reverse are provided and these are brought into operation by engaging the appropriate friction members.

NEUTRAL



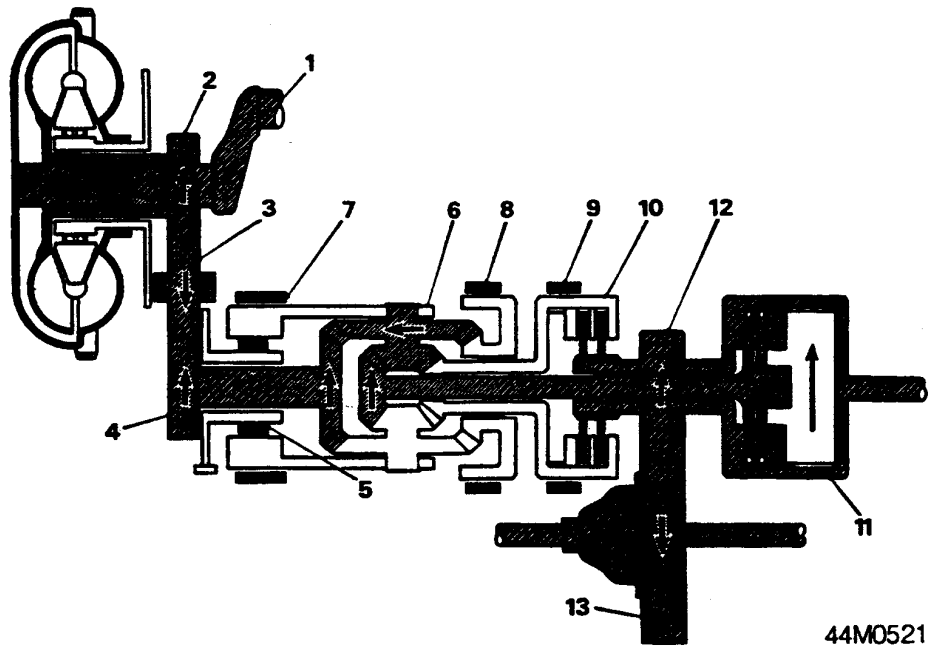
NEUTRAL

When in neutral all the bands and clutches are disengaged, therefore there is no drive to the final drive pinion.

KEY TO COMPONENTS

1. Crankshaft
2. Converter output gear
3. Idler gear
4. Input gear
5. One – way clutch
6. Gear carrier
7. Reverse band
8. Third gear band
9. Second gear band
10. Top and reverse clutch
11. Forward clutch
12. Final drive pinion
13. Final drive gear

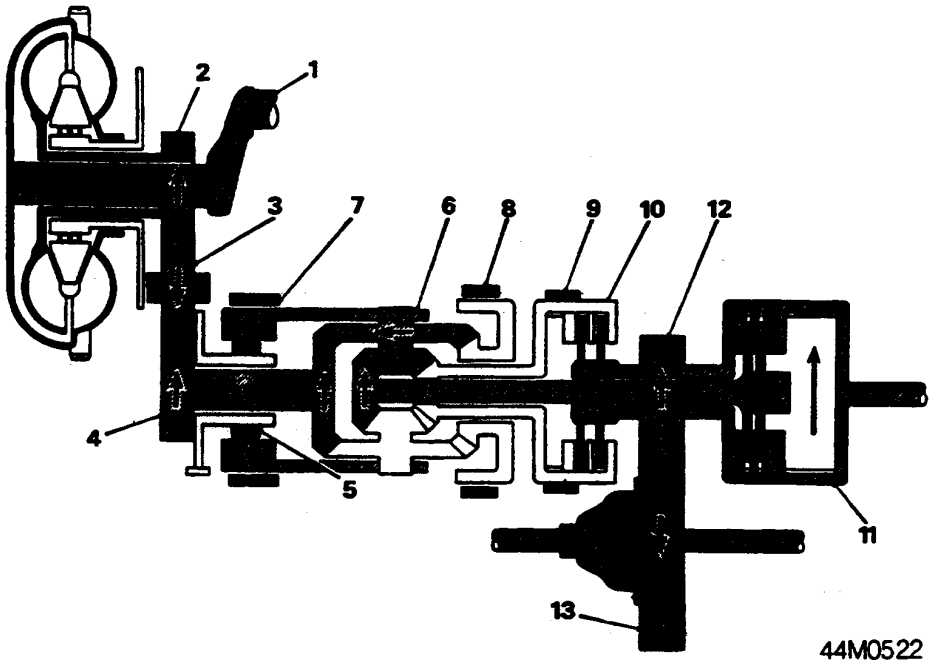
FIRST GEAR



FIRST GEAR ('1' or 'D' selected)
Forward clutch applied and the one – way clutch operative. The carrier is stationary, its reaction being controlled by the one – way clutch.
The input bevel gear drives the planet wheels and the planet pinions drive the forward output pinion and shaft. Power is thus transferred through the planet assemblies to the mainshaft, forward clutch and the forward output gear.
Gear ratio 2.69:1.

MECHANICAL POWER FLOW DIAGRAMS

SECOND GEAR

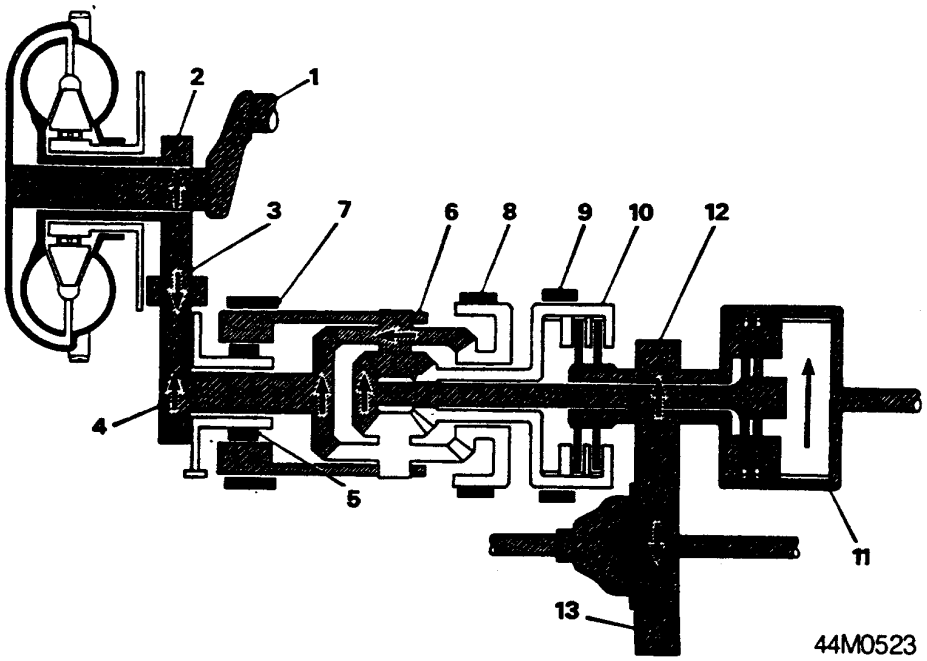


SECOND GEAR ('2' or 'D' selected)
Forward clutch applied and second gear reaction band applied to hold the top and reverse clutch drum stationary. With the planet gear cluster orbiting around the reverse output bevel gear, power is transmitted from the input bevel gear through the planets to the mainshaft.
Gear ratio 1.845:1.

KEY TO COMPONENTS

1. Crankshaft
2. Converter output gear
3. Idler gear
4. Input gear
5. One – way clutch
6. Gear carrier
7. Reverse band
8. Third gear band
9. Second gear band
10. Top and reverse clutch
11. Forward clutch
12. Final drive pinion
13. Final drive gear

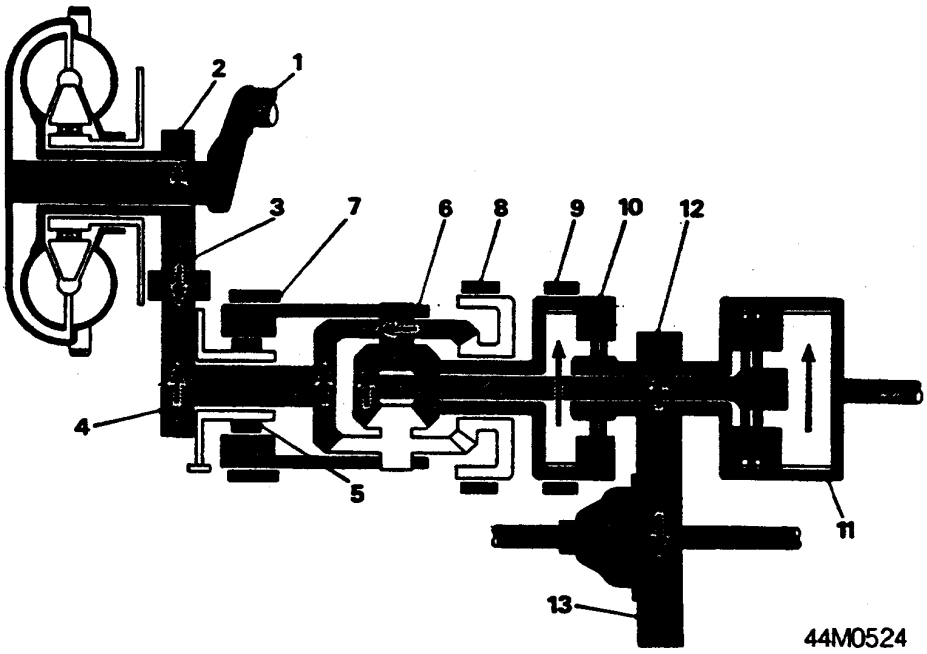
THIRD GEAR



THIRD GEAR ('3' or 'D' selected)
Forward clutch applied and the third gear reaction band applied to hold the third speed reaction gear stationary. The planet gear cluster orbits around this gear and increases the speed of the carrier. Power is transmitted from the input bevel gear through the planets to the mainshaft.
Gear ratio 1.46:1.

MECHANICAL POWER FLOW DIAGRAMS

TOP GEAR

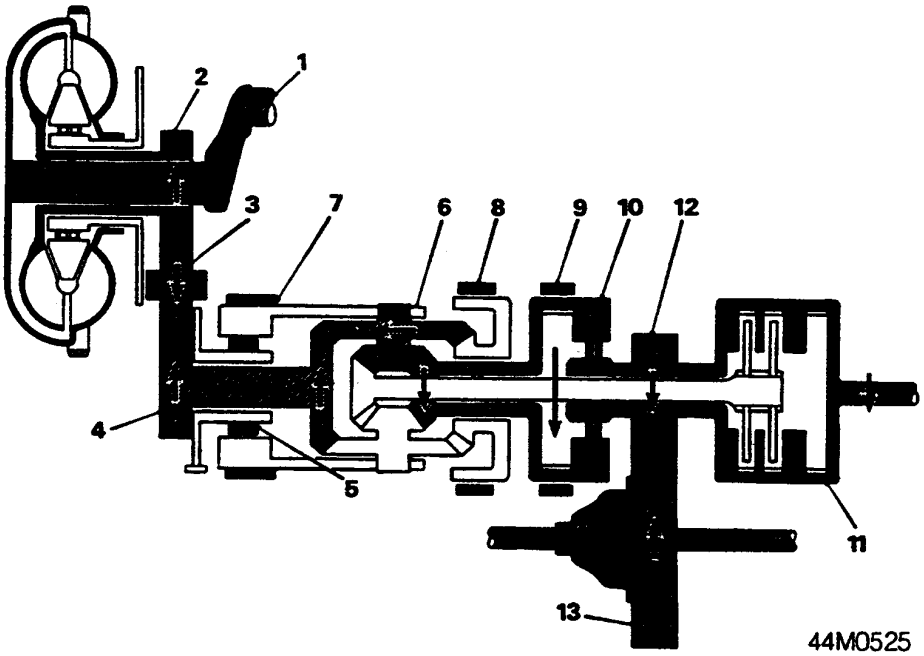


TOP GEAR ('D' selected)
All brake bands are released. Forward clutch applied, top and reverse clutch applied. This in effect holds the bevel and reduction gears stationary within the gear carrier. The complete assembly then rotates as one unit to provide direct drive.
Gear ratio 1.0:1.

KEY TO COMPONENTS

1. Crankshaft
2. Converter output gear
3. Idler gear
4. Input gear
5. One – way clutch
6. Gear carrier
7. Reverse band
8. Third gear band
9. Second gear band
10. Top and reverse clutch
11. Forward clutch
12. Final drive pinion
13. Final drive gear

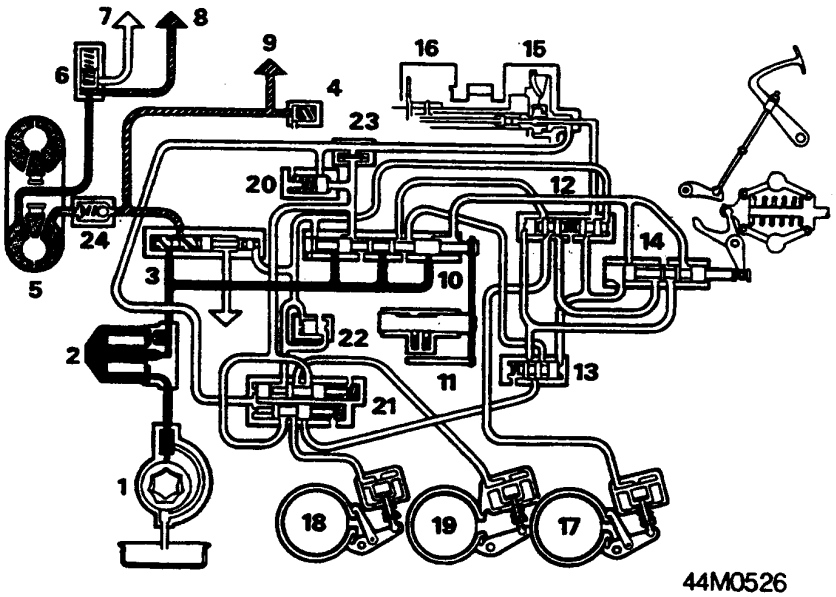
REVERSE GEAR



REVERSE GEAR ('R' selected)
Top and reverse clutch applied. The reverse brake band is also applied to hold the carrier stationary, the planet gears rotate the third speed reaction gear in the opposite direction to the input gear. Power is transmitting reverse drive through top and reverse clutch to the final drive.
Gear ratio 2.69:1.

LINE PRESSURE AND LUBRICATION DIAGRAMS

NEUTRAL



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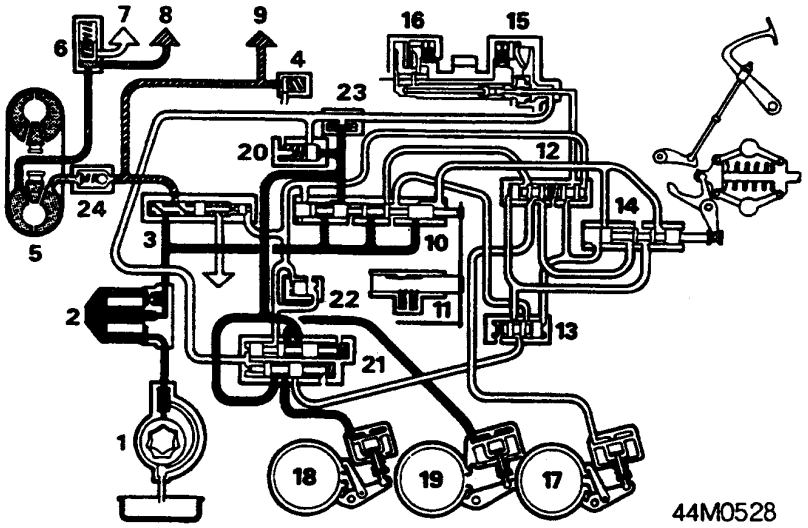
Line pressure
Converter pressure
Lubrication
Exhaust

44M0527

KEYS TO DIAGRAMS

1. Main oil pump
2. Oil filter
3. Regulator valve
4. Engine lubricating relief valve
5. Converter
6. Low pressure valve
7. To sump
8. Gear train lubrication
9. Engine lubrication
10. Selector valve
11. Selector valve detent
12. Second and top gear valves
13. Third gear valve
14. Governor valve
15. Forward clutch
16. Top and reverse clutch
17. Second gear brake band
18. Third gear brake band
19. Reverse gear brake band
20. Engagement control pressure valve
21. Engagement control shuttle valves
22. One – way dump valve
23. One – way flap valve
24. Restrictor valve (in converter pipe)



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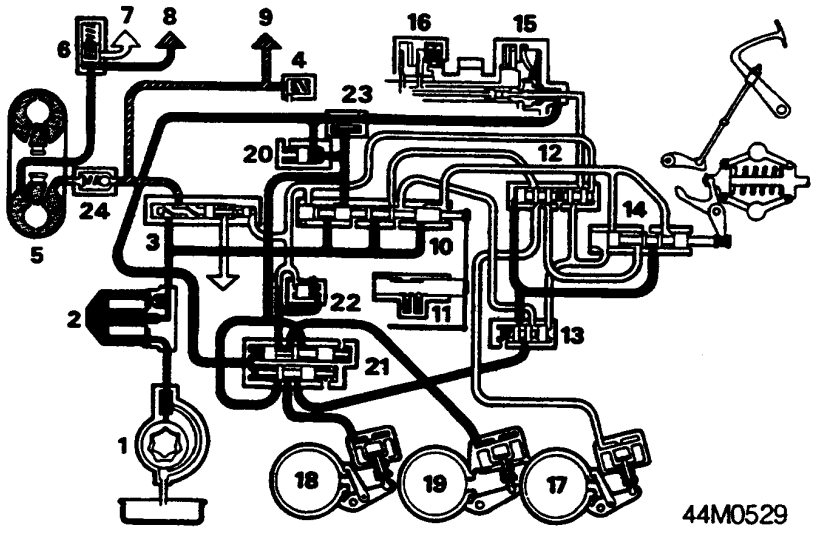
FORWARD CLUTCH ENGAGEMENT
STAGE 1:

The selector valve directs oil through the shuttle valves to pressurise the third and reverse gear servos, and simultaneously to the engagement control valve, which, at a predetermined pressure, directs oil to apply the forward clutch.

KEY TO DIAGRAMS

1. Main oil pump
2. Oil filter
3. Regulator valve
4. Engine lubrication relief valve
5. Converter
6. Low pressure valve
7. To sump
8. Gear train lubrication
9. Engine lubrication
10. Selector valve
11. Selector valve detent
12. Second and top gear valves
13. Third gear valve
14. Governor valve
15. Forward clutch
16. Top and reverse clutch
17. Second gear brake band
18. Third gear brake band
19. Reverse gear brake band
20. Engagement control pressure valve
21. Engagement control shuttle valves
22. One – way dump valve
23. One – way flap valve
24. Restrictor valve (in converter pipe)



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FORWARD CLUTCH ENGAGEMENT
STAGE II:

With the forward clutch applied, the shuttle valves move and allow the oil pressure in the third and reverse servos to exhaust and thus release the third and reverse gear bands.

Line pressure
Converter pressure
Lubrication
Exhaust

44M0527

SERVICE REQUIREMENTS

1. Fully road test and diagnose faults as detailed in the Mechanical Fault Finding Manual before dismantling an automatic gearbox. Use ROAD TEST PROCEDURE and DIAGNOSIS CHART; make adjustments as necessary and re – test after rectification.
2. High standards of cleanliness are essential: Clean outside of casing with paraffin prior to removal of any components. Rags and cloth must be clean and lint free, preferably nylon.
3. Prior to assembly, clean all parts in chlorinated industrial solvent only. Renew all defective components. Lubricate all components with engine oil. **DO NOT assemble dry** .
4. Use new joint washers. Where jointing compound is required use Hylomar SQ32M, Hermetite or Wellseal, or an equivalent.
5. Retain thrust washers and bearings with petroleum jelly; do not use grease.
6. Tighten screws, bolts and nuts to recommended torque figure.
7. For all operations where access is required beneath vehicle, it should be on a lift, over a pit or front raised on stands.
8. **Use only ROVER genuine parts.**

EXAMINATION OF COMPONENTS

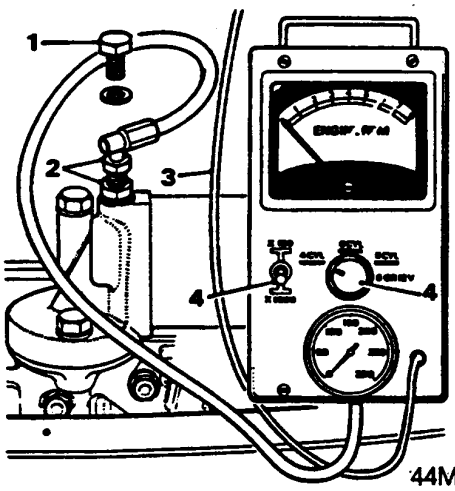
Service Repair No. 44.01.02

Transmission case and servo castings	Check for cracks and obstruction in passages
Oil pump	Check for scoring and excessive wear
Shafts	Check bearing and thrust faces for scoring
Clutch plates	Check for warping, scoring, overheating and excessive wear
Bands	Check for scoring, overheating and excessive wear
Drums	Check for overheating and scoring
Gears	Check teeth for chipping, scoring, wear and condition of thrust faces
Uni-directional clutch and races	Check for scoring, overheating and wear
Valve block and governor	Check for burrs, crossed or stripped threads, and scored sealing faces
Impeller hub	Check for pitting and wear. Ensure good contact
Thrust washers	Check for burrs, scoring and wear
White metal bushes	Check for scoring and loss of white metal
Lip seals	Check for cuts, hardening of rubber, leakage past outer diameter
Rubber 'O' rings and seals	Check for hardening, cracking, cuts or damage
Sealing rings	Check fit in groove and wear (evident by lip overhanging groove)

TEST EQUIPMENT

Service Repair No. 44.01.03

Connecting



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1. Remove screwed plug from oil filter head
2. Fit tool adapter **18G 677C** into filter head and connect the pressure pipe union of tool **18G 677Z** onto adapter.
3. Connect tachometer connections of tool **18G 677Z** as follows:
   a Red connection to ignition coil (+)
   b Black connection to battery earth (−).
4. Set tool **18G 677Z** to '4' CYL and 'x1000'.

ROAD TEST PROCEDURE

Service Repair No. 44.01.04
Connect test equipment **18G 677Z** to engine and transmission, see **Test equipment,** and position equipment inside car where it can be read from driver's seat.

Carry out this test procedure completely, in order given noting:
Tests 1 to 4 Rectify any fault as it is found before proceeding to the next test.
Tests 5 to 11. It may be possible to complete these tests, noting any faults in order to rectify them after tests. However, it must be noted that this could allow one fault to mask another.

Test	Fault	Rectification
1. Check oil level	a Oil level incorrect	1a Correct oil level, see **MAINTENANCE.**
2. Check throttle with pedal fully depressed	a Throttle not fully open	2a Adjust throttle cable
3. Check adjustment of selector cable	a Cable is out of adjustment	3a Adjust cable 3b Check inhibitor switch and its wiring for short – circuiting
4. Check that starter will operate only when **'N'** is selected	a Starter will not operate in **'N'** and **'P'** b Starter operates in all positions	4a Adjust inhibitor switch
5. If possible, run engine until it reaches its normal operating temperature. Chock wheels, apply brakes and run engine at 1000 rev/min for **'D' and 1200 rev/min for 'R'** Select each transmission position in turn and note pressure registered.	a In position **'N'** , **'1'** , **'2'** , **'3'** , **'D'** : Less than 6.5 bar, 95 lbf/in^2 b In position **'R'** : Less than 11.3 bar, 165 lbf/in^2	5a Refer to **Pressure test diagnosis*** 5b Refer to **Pressure test diagnosis***
6. Apply hand and foot brakes, and with engine idling, select **'R'** from **'N'** and **'1'** from **'N'**	a Excessive bump on engagement of **'R'** or **'1'** b Engine stalls on engagement of **'R'** or **'1'**	6a Reduce engine idle speed to within specified limits 6b Increase engine idle speed to within specified limits
7. Select **'1'** , release brakes and check that car drives forward but that there is no engine braking when throttle is released	a Car does not drive forward b Engine braking can be felt	7a Remove and check forward clutch and one – way clutch fixing bolt; if satisfactory renew freewheel 7b Renew free wheel
8. Select **'1'** and drive away, using manual gear – change to select **'2'** and **'3'** progressively as road speed increases. When road speed is above 25 m.p.h. (40 km.h) select **'D'** and release throttle pedal	a Drive in **'1'** but not in **'2'** b Drive in **'1'** and **'2'** , but not in **'3'** . c Drive in **'1'** , **'2'** , and **'3'** , but no upward gear – change (to fourth gear) on selecting **'D'**	8a Check second gear brake band adjustment. If satisfactory, check second gear servo. 8b Check third gear brake band adjustment. If satisfactory, check third gear servo. 8c Check kick – down linkage adjustment. If correct, check the governor for freedom of operation. If governor is satisfactory, remove and check top reverse clutch

Test	Fault	Rectification
9. Stop car, select **'D'** and accelerate up through the gears using 'kick – down'. Check that gear – changes occur within speed range, see **SHIFT SPEEDS**	a Gear – changes occur at low speeds b Gear – changes occur at high speed	9a Check kick – down linkage adjustment 9b Check kick – down linkage adjustment. If correct, check the governor for freedom of operation
10. Stop car, select **'R'** and drive car backwards	a Car will not drive backwards	10a Check reverse gear brake band adjustment. If satisfactory, check reverse servo.
11. Stall test: Ensure engine is at normal running temperature. Chock front wheels and apply hand and foot brakes. Select **'D'**, pause fro 5 seconds and then gradually fully depress throttle pedal **for not more than 5 seconds** . Note highest rev/min obtained. Allow gearbox to cool for one minute. Select **'R'**, repeat above test and note highest rev/min obtained.	a A reading outside range 1500 to 1800 rev/min Conduct stall test in open area with space in front of and behind vehicle. Ensure selector cable is set correctly.	11a Refer to **Stall test diagnosis***

*Refer to **Mechanical Fault Finding Manual**

SHIFT SPEEDS

Service Repair No. 44.01.07

Following chart indicates speed range at which automatic gear changes should take place when driving with **'D'** selected and the throttle in various positions.

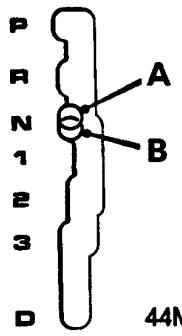
Shift speed chart

Shift	Light throttle	Full throttle	Kick-down shift	Kick-down
MPH				
1-2	11-16	25-33	4-3	48-58
2-3	15-20	25-33	3-2	34-29
3-4	22-28	55-65	2-1	22-29
km/h				
1-2	18-25	40-53	4-3	77-93
2-3	24-32	61-74	3-2	55-70
3-4	35-45	88-105	2-1	35-46

SELECTOR CABLE ADJUSTMENT

Checking

1. Apply handbrake, position selector lever at 'P' and start engine.
2. Move selector lever into 'R' and note that reverse engages.



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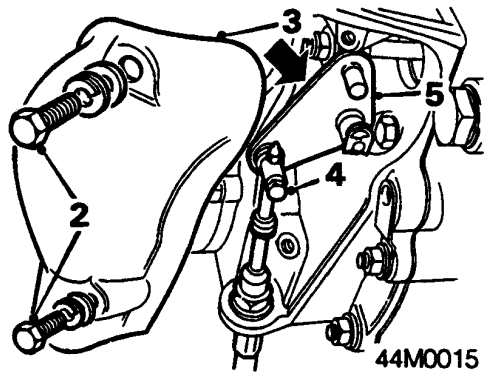
3. Slowly move selector lever to 'N', reverse must disengage at position A in illustration.
4. Move selector lever into '1' and note that first gear engages.
5. Slowly move selector lever back to 'N', first gear must have disengaged when position B in illustration is reached.
6. If above conditions have not been met, selector cable must be adjusted.
7. Stop engine, select 'P'.

Adjusting

1. Raise front of vehicle.

WARNING: Support on safety stands.



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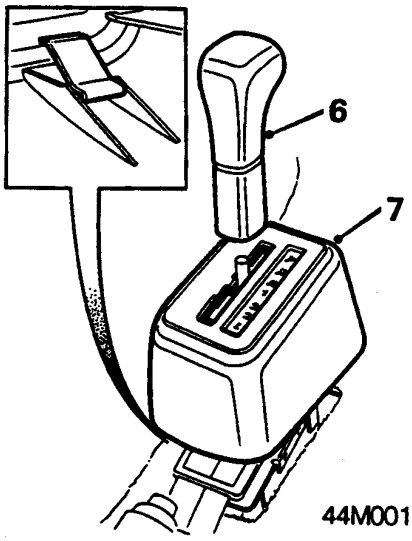
2. Remove 2 bolts, gear selector cable cover to gearbox.
3. Remove cover.
4. Slacken screw clamping gear selector cable.
5. Rotate bellcrank lever anti-clockwise to position valve rod in its fully out (park) position.



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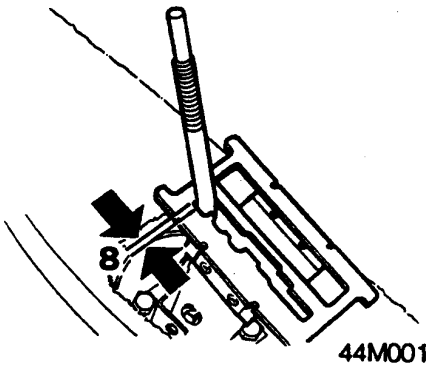
6. Unscrew knob from gear selector lever.
7. Lift off selector lever housing, noting 4 retaining clips which may become detached.



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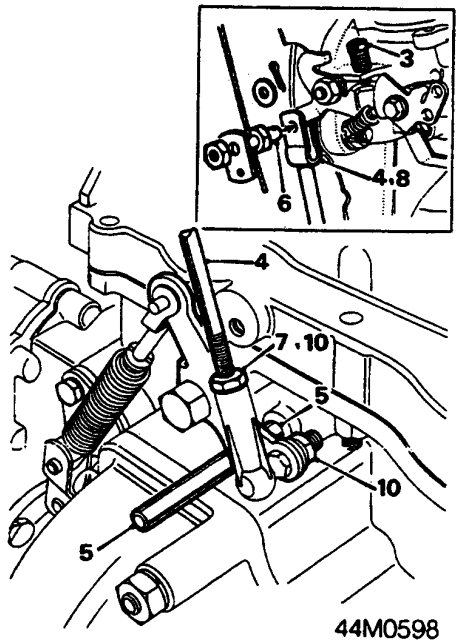
8. Insert a feeler gauge of 0.76 to 0.89 mm between selector lever and end of slot in selector gate.
9. Keeping selector lever against feeler gauge, tighten cable clamp to 4 Nm.
10. Fit selector cable cover, fit and tighten cover bolts.
11. Fit 4 retaining clips to slots inside selector lever housing and fit housing.
12. Fit selector lever knob.
13. Remove stand(s) and lower vehicle.
14. Carry out checking procedure to ensure adjustment is correct.

KICK - DOWN LINKAGE ADJUST

Service Repair No. 44.30.02

Check

1. Connect tachometer connections of **18G 677ZC, see Service Requirements.**
2. Run engine to its normal running temperature.



44M0598

3. Check engine idling speed with tachometer, adjust idle speed if necessary.
4. Disconnect kick - down control rod at throttle lever.
5. Insert a 6.0mm diameter rod through hole in intermediate bell - crank lever and locate in hole in the gearbox casing.
6. Check if kick - down control rod can now be re - connected to throttle linkage, with its fulcrum pin an easy sliding fit through its forked end and throttle lever.

Adjust

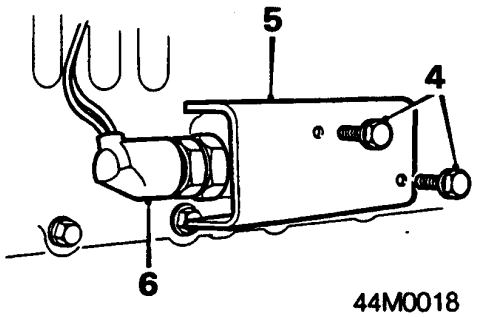
7. Slacken kick - down rod ball - joint locking nut.
8. Disconnect forked end of rod at throttle lever and turn rod until correct length is obtained.
9. Re - connect rod at throttle lever, tighten ball - joint locking nut and remove checking rod.
10. Test drive car to ensure that 'kick - down' changes occur within speed range given in Test 9 of **TEST PROCEDURE**
    a If gear changes occur at a lower speed, slacken ball joint locking nut, disconnect ball - joint and screw it onto rod a further two complete turns. Reconnect and tighten ball - joint and re - check kick - down changes.
    b If gear changes occur at a higher speed, follow procedure in 'a' except that ball - joint must be unscrewed two complete turns to lengthen rod.

STARTER INHIBITOR SWITCH ADJUSTMENT

1. Ensure gear selector cable is correctly adjusted.
2. Raise front of vehicle.

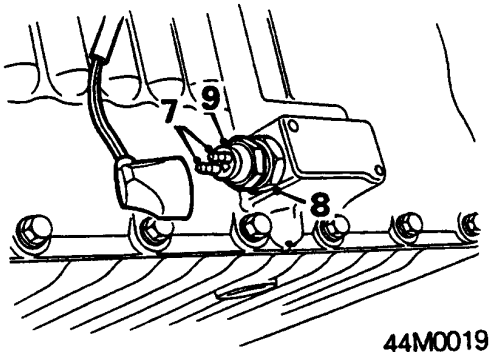
WARNING: Support on safety stands.

3. Position gear selector lever at 'D'.



44M0018

4. Remove 2 bolts, inhibitor switch cover to gearbox.
5. Remove inhibitor switch cover.
6. Disconnect inhibitor switch plug.



44M0019

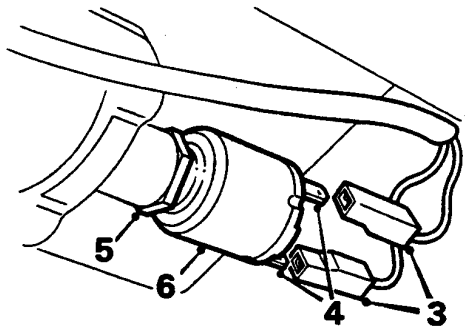
7. Connect a circuit continuity tester across switch terminals.
8. Slacken switch locknut.
9. Unscrew switch until circuit is made.
10. Screw switch in until circuit is just broken, then screw switch in a further 3 to 4 flats.
11. Hold switch in this position and tighten locknut to 5 Nm.
12. Check to ensure that circuit is made only when selector lever is at 'P' and 'N'.
13. Remove continuity tester and connect switch plug.
14. Fit selector cable cover, fit and tighten cover bolts.
15. Position gear selector at 'P'.
16. Remove stand(s) and lower vehicle.
17. Check that engine will start only when selector lever is at 'P' and 'N'.

REVERSE LIGHT SWITCH ADJUSTMENT

1. Raise front of vehicle.

WARNING: Support on safety stands.

2. Position gear selector lever at 'R'.



44M0020

3. Disconnect 2 Lucars from reverse light switch.
4. Connect a circuit continuity tester across switch terminals.
5. Slacken reverse light switch locknut.
6. Unscrew switch until circuit is broken.
7. Screw switch in until circuit is just made, then screw switch in a further quarter to half turn.
8. Hold switch in this position and tighten locknut to 5 Nm.
9. Check to ensure circuit is made only when selector lever is at 'R'.
10. Remove continuity tester and connect switch Lucars.
11. Position gear selector lever at 'P'.
12. Remove stand(s) and lower vehicle.

BRAKE BANDS ADJUSTMENT

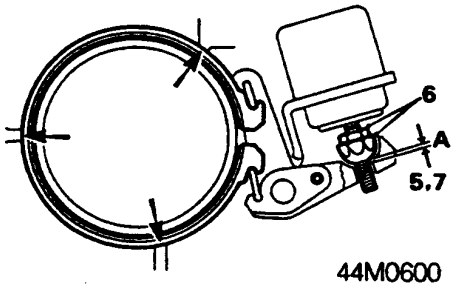
Service Repair No. 44.30.06

Check

1. Remove front grille.
2. Drain engine/automatic gearbox oil, see **MAINTENANCE.**
3. Raise front of vehicle.

WARNING: Support on safety stands.

4. Remove front cover securing bolts and lift off cover complete with oil filter assembly.



44M0600

5. Check brake band adjustment; free movement **'A'** between servo lever and spherical nut should be 1.02 to 1.03mm.

Adjust

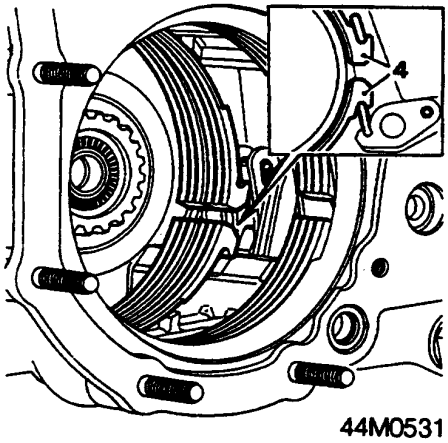
6. Slacken locknut and turn spherical adjusting nut until brake band is in contact with transmission casing stops (arrowed) and all slack is eliminated.
7. Turn spherical adjusting nut downwards into lever just until no free – play exists, then turn adjusting nut upwards 5 to 7 flats.
8. Re – check that clearance is within tolerance figures given; hold spherical nut and tighten locknut.
9. Repeat procedure in 5 to 8 to adjust other two brake bands.
10. Fit a new joint washer coated with Hylomar jointing compound (or equivalent).
11. Refit front cover and tighten retaining bolts.
12. Lower ramp.
13. Refill engine/automatic gearbox with oil, see **MAINTENANCE.**
14. Refit front grille.

BRAKE BANDS

Service Repair No. 44.10.18

Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Remove gearbox from engine, see **Gearbox assembly.**
3. Remove primary drive gear train assembly, see **Primary drive gears.**



44M0531

4. Unhook three brake bands from servo reaction levers and struts.
5. Manoeuvre each band out through top of gearbox.

WARNING: Use methylated spirit/ denatured alcohol to wash dust from components. Do not use any petroleum - based fluids.

Refit

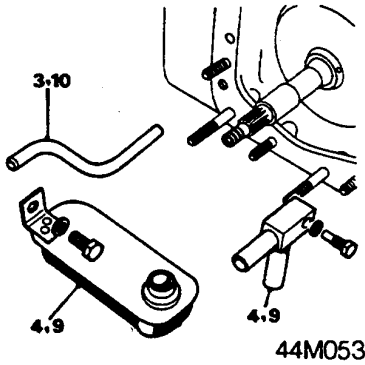
6. Refit three bands into gearbox and engage them onto servo reaction levers and struts, commencing with second gear band, third gear band and finally 'wider' reverse gear band.
7. Refit primary gear train assembly, see **Primary drive gears.**
8. Remove front cover and check brake band adjustment, see **Adjustments**
9. Refit gearbox to engine. see **Gearbox assembly.**
10. Refit engine/automatic gearbox assembly, see **ENGINE.**

FORWARD CLUTCH

Service Repair No. 44.12.04

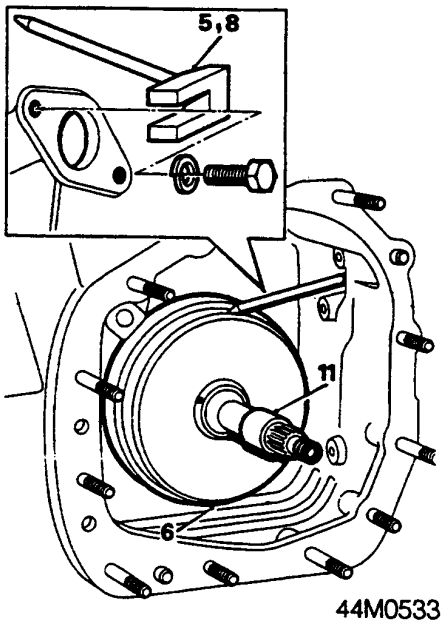
Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Remove governor housing assembly, **Governor housing assembly.**



44M0532

3. Remove forward clutch feed pipe.
4. Remove oil strainer and pick - up pipe.



44M0533

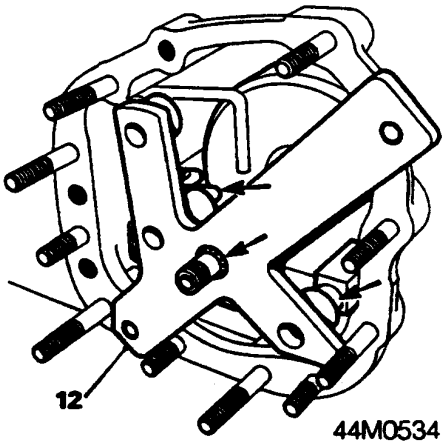
5. Remove forward clutch retaining tool **18G 1097.**
6. Withdraw forward clutch from gearbox casing.

Refit

7. Refit forward clutch and ensure that clutch plates engage forward clutch hub splines. Rotate clutch assembly backwards and forwards to assist engagement; when correctly fitted, there is only a small clearance between forward clutch and centre web of gearbox casing.

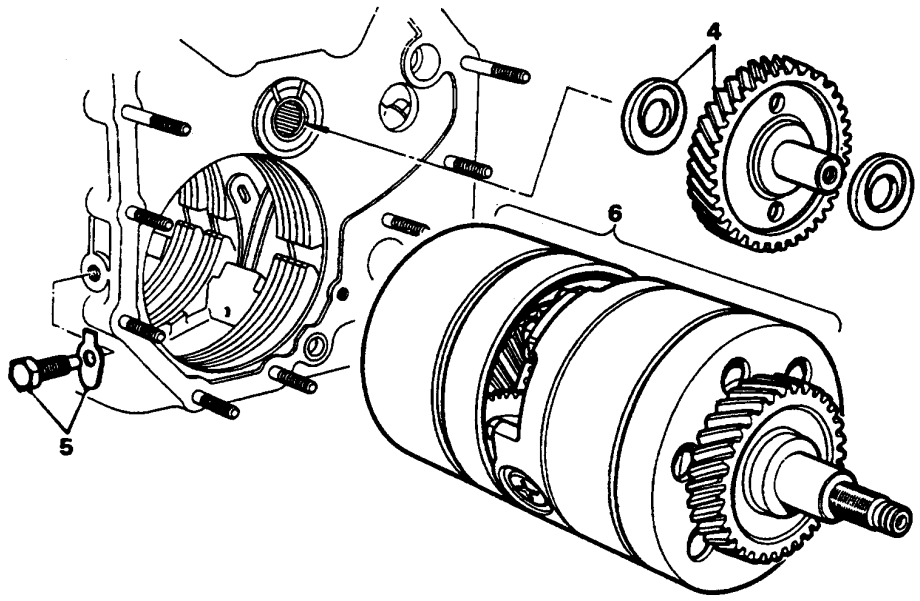
***CAUTION:** If clutch is not fully engaged on hub splines, flange of governor housing will not contact gearbox casing; any excessive force used may damage clutch plates.*

8. Refit **18G 1097** to retain position of forward clutch.
9. Refit and secure oil strainer assembly.
10. Refit forward clutch feed pipe (long end into gearbox casing).
11. Pull nylon assembly sleeve back over rings on forward clutch shaft; it will become safely displaced along shaft when governor housing is refitted.



44M0534

12. Fit **18G 1094** to align forward clutch shaft and oil pipes 'arrowed'; remove tool.
13. Fit a new governor housing joint washer coated with Hylomar jointing compound (or equivalent) onto casing
14. Refit governor housing assembly, **Governor housing assembly.**
15. Refit engine/automatic gearbox assembly, see **ENGINE.**



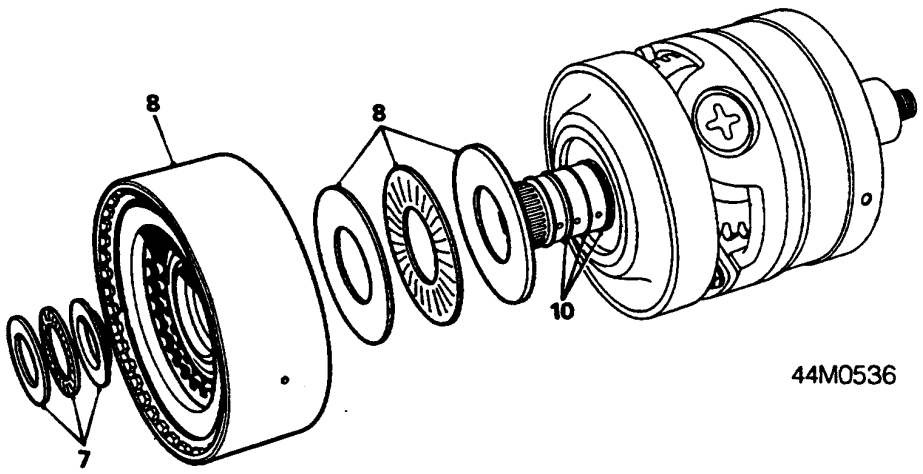
44M0535

TOP AND REVERSE CLUTCH

Service Repair No. 44.12.07

Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Remove converter assembly, see **Converter assembly.**
3. Remove converter housing, see **Converter housing.**
4. Remove idler gear.
5. Knock back lock washer tab and remove dowel bolt securing gear train assembly into gearbox casing.
6. Pull out gear train assembly complete with free – wheel reaction member and top and reverse clutch assembly.

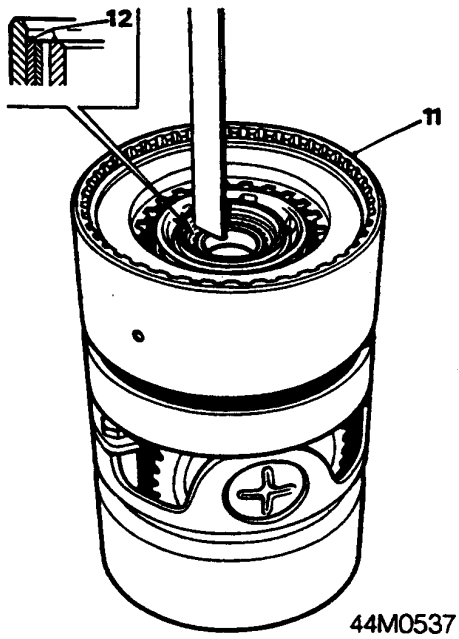


44M0536

7. Remove thrust washer, needle thrust bearing and stepped thrust washer from end of top and reverse clutch.
8. Pull top and reverse clutch off gear train, noting thrust washer (thin), needle thrust bearing, and selective thrust washer (thick), which locate onto reverse output gear shaft.

Refit

9. Ensure that thrust washers and needle thrust bearing referred to in 8 are correctly located.
10. Check that 'O' ring seals located on reverse output gear shaft are in good condition; renew as necessary.



44M0537

11. Refit top and reverse clutch to gear train assembly.
12. Check across splined end of reverse output shaft and the adjacent face of top and reverse clutch. Both faces must be exactly level with no gap. If both faces are not level with each other, measure difference in height and follow procedure in 13 to 17.
13. Lift off top and reverse clutch.
14. Remove thrust washers and needle thrust bearing.
15. Measure thickness of selective (thick) thrust washer fitted; select required thickness washer from size chart given below.

Note: *This adjustment ensures that third speed reaction gear has no end – float and correct backlash is maintained.*

Selective washer size chart

Thickness mm	Part Nos
1.93 to 1.98	22G 748
1.83 to 1.88	22G 749
1.73 to 1.78	22G 750
1.63 to 1.68	22G 751

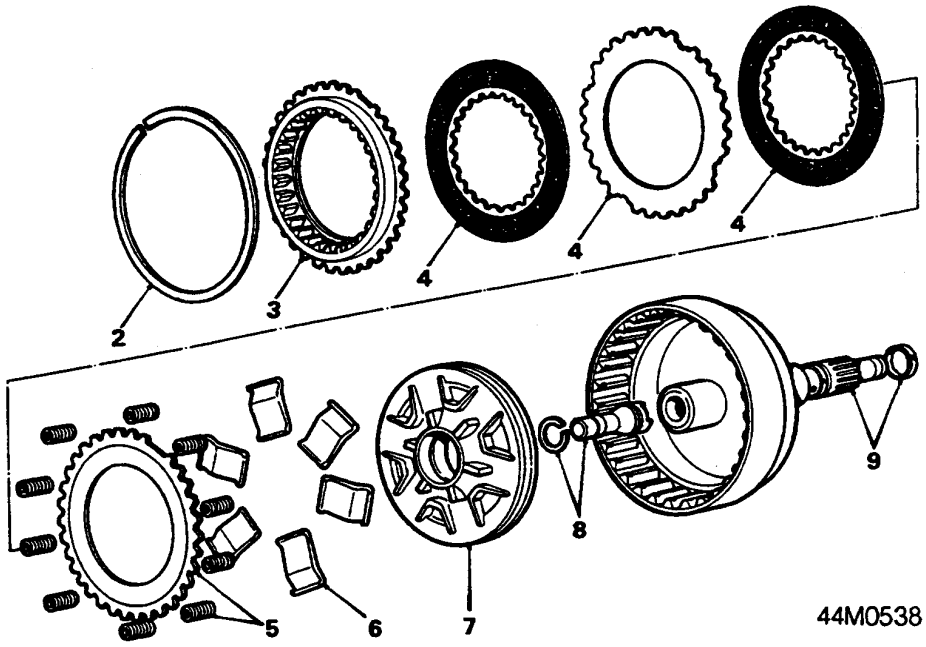
16. Fit selected thrust washer, needle thrust bearing and thin thrust washer.
17. Refit top and reverse clutch and re – check that two faces are now exactly level.
18. Smear petroleum jelly onto stepped thrust washer and locate it on end of top and reverse clutch.
19. Smear petroleum jelly onto thrust washer and needle roller bearing and fit them into their location on top and reverse clutch hub (inside gearbox).
20. Refit gear train complete with free – wheel support and top and reverse clutch into gearbox. Use hand pressure only to push it into position; quick rotation of input gear backwards and forwards will assist in engagement of top and reverse friction plates with top and reverse clutch hub splines.

Note: *When correctly assembled dowel bolt will engage easily in free – wheel support.*

21. Fit a new lock washer, refit and tighten dowel bolt securing gear train to 38 Nm. Tap over lock washer tab.

CAUTION: *Apply a spot* **Loctite Hydraulic Seal 542** *to dowel bolt threads.*

22. Refit idler gear.
23. Refit converter housing, see **Converter housing.**
24. Refit converter assembly, see **Converter assembly.**
25. Refit engine/automatic gearbox assembly, see **ENGINE.**



44M0538

FORWARD CLUTCH - OVERHAUL

Service Repair No. 44.12.10

Dismantle

1. Remove forward clutch, see **Forward clutch.**
2. Remove end-plate circlip.
3. Remove end-plate.
4. Remove clutch plates (two paper-faced interposed with one steel intermediate plate).

WARNING: Use methylated spirit/denatured alcohol to wash dust from components. Do not use any petroleum-based fluids.

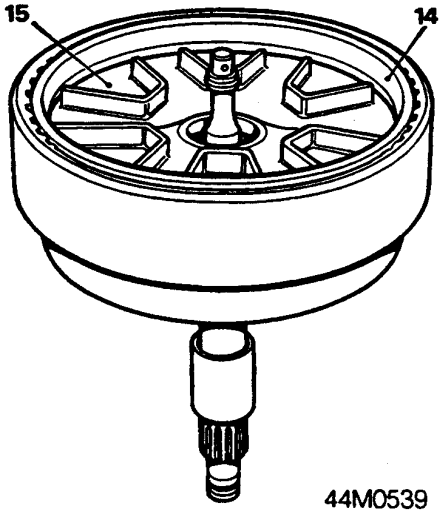
5. Lift out piston return springs and pressure plate.
6. Remove six toggles.
7. Use an air pressure line and blow out piston.
8. Extract circlip retaining reverse shut-off valve and withdraw valve.
9. Remove cast-iron sealing rings if replacements are to be fitted.

Inspection

10. Check all parts for wear, and renew as required. Fit new 'O' rings and seals to piston and reverse shut-off valve piston.
11. Check cast-iron sealing rings for wear; rings should not have any sideways movement in their locating grooves; renew as required.
12. Examine all clutch plates and renew those showing signs of wear or damage.

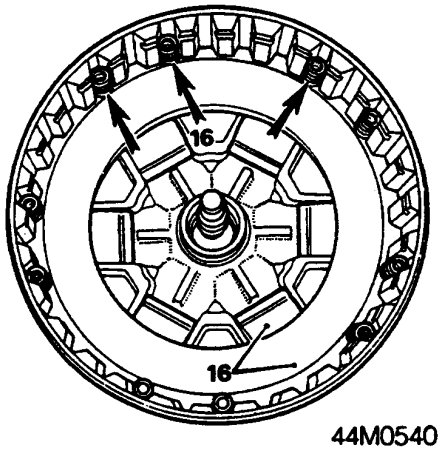
Reassemble

13. Refit reverse shut-off valve piston and secure with a new circlip.



44M0539

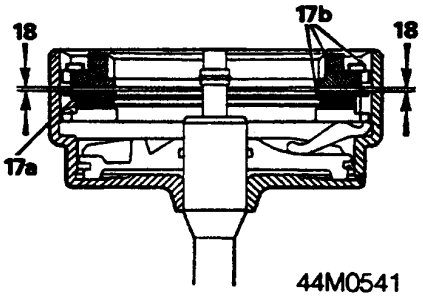
14. Fit **18G 1102** into forward clutch drum.
15. Lubricate piston seal with oil, insert piston into tool (lips of seal facing outwards), press piston fully into its bore and remove tool.



44M0540

16. Refit toggles, pressure plate and piston return springs. Locate spring in order illustrated.

Adjust



44M0541

17. End-float adjustment. Assemble remaining components in following order for purpose of checking adjustment.
    a Refit two paper-faced plates together.
    b Refit intermediate plate, end plate and circlip.
18. Check with feeler gauges clearance between intermediate plate and end plate.

Clearance between
intermediate
plate and end plate . . 0.25 to 0.90mm

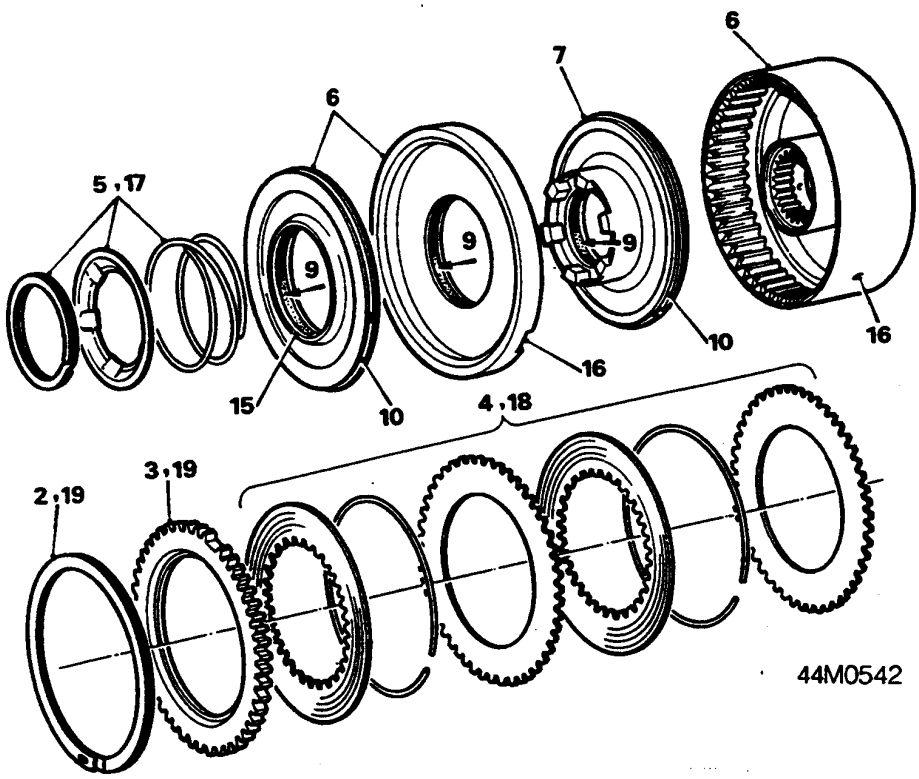
19. Remove and measure thickness of intermediate and end plates, and from this measurement select from chart given below correct thickness plate(s) to rectify end-float to within tolerance given.

Intermediate and end plate chart

Plate	Thickness	Part No.
Intermediate	1.70mm	27H 7722
Intermediate	1.88mm	37H 7033
End	8.22mm	27H 7724
End	9.21mm	37H 7032

Reassemble

20. Reassemble clutch plates in correct order (see item 4), refit end-plate and circlip.
21. Check that paper-faced plates will move freely, align the plates with each other to assist when refitting unit.
22. Refit forward clutch, see **Forward clutch.**



TOP AND REVERSE CLUTCH - OVERHAUL

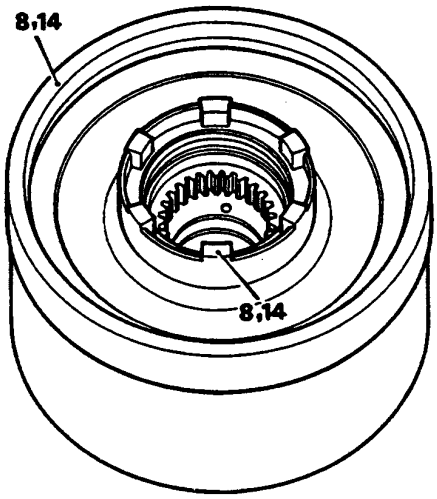
Service Repair No. 44.12.13

Dismantle

1. Remove top and reverse clutch, see **Top and reverse clutch.**
2. Remove Spirolox circlip.
3. Remove retainer plate.
4. Lift out clutch plates and separation spring rings.

WARNING: Use methylated spirit or denatured alcohol to wash dust from components. Do not use any petroleum - based fluids.

5. Remove Spirolox circlip, spring retainer and piston return coil spring.
6. Lightly shock clutch drum against a flat surface to remove top gear piston and cylinder as one unit.
7. If reverse booster piston has also been shocked out of its bore in clutch drum, refit it, easing piston ring in with a screwdriver.



44M0543

8. Fit **18G 1103** into clutch unit, hold both together upside - down and shock assembly against a flat surface to remove reverse booster piston from clutch drum into tool. Lift out **18G 1103** complete with piston and remove piston from tool.
9. Remove seals 'arrowed' from top gear piston, cylinder, and reverse gear booster piston.
10. Remove, if necessary, piston rings from top gear piston and reverse gear booster piston.

Inspect

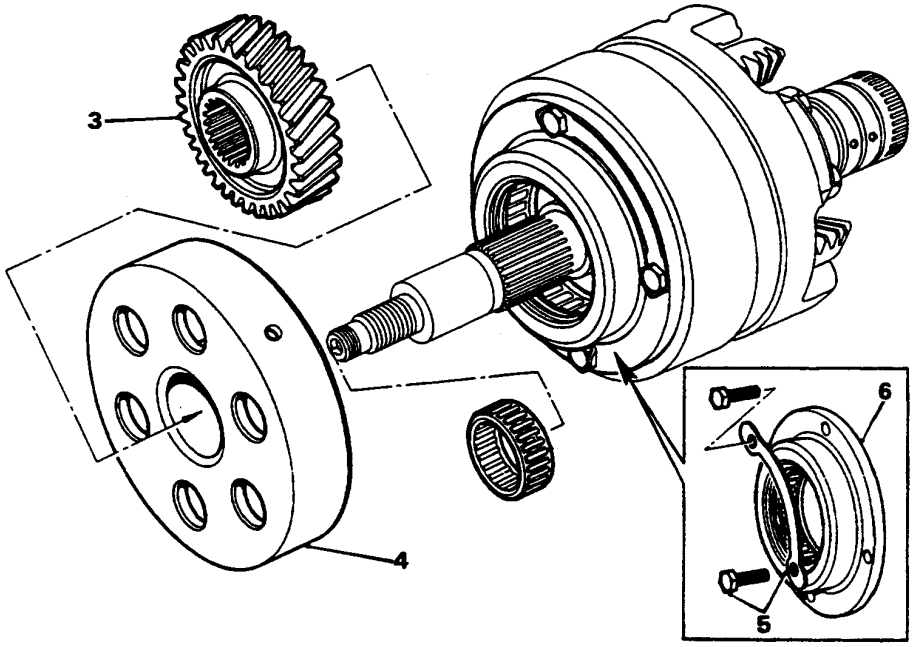
11. Examine all parts for wear and renew those showing signs of wear or damage. Renew all oil seals in piston and cylinder.
12. Check piston rings, and replace if necessary. Piston ring gap for both rings when fitted in their respective bores is 0.4 to 0.5mm.

Reassemble

13. Lubricate new seals with oil and fit them to their respective components.
14. Insert **18G 1103** into clutch unit, refit reverse gear booster piston (boss facing outwards) into tool, push it squarely downwards into its bore and remove tool.
15. Refit top gear piston into its cylinder, with boss facing outwards.
16. Refit top gear piston and cylinder assembly into clutch, with cut – aways on rear outer edge of cylinder opposite holes in clutch drum.
17. Refit top gear piston return spring, spring retainer and Spirolox circlip.
18. Refit clutch plates and separator spring rings in order illustrated, with cut – away portion of steel plates in alignment.
19. Refit retainer plate and Spirolox circlip.

Note: *Before refitting clutch unit ensure that bronze plates can be moved freely into alignment with each other.*

20. Refit top and reverse clutch, see **Top and reverse clutch.**



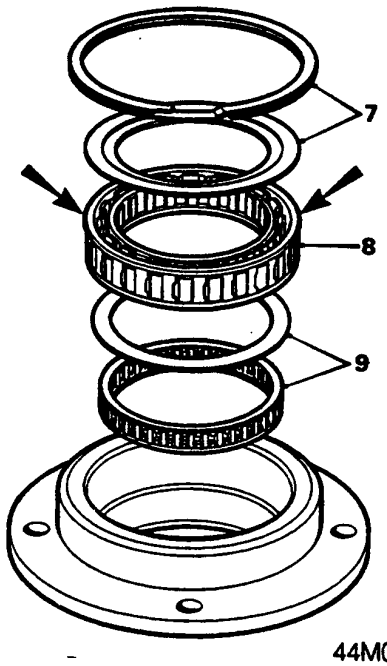
44M0545

FIRST GEAR FREE - WHEEL ASSEMBLY

Service Repair No. 44.12.16

Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Remove gear train assembly, see **Primary drive gears.**
3. Pull off input gear.
4. Remove first gear free - wheel reaction member.
5. Knock back locking plate tabs and remove bolts retaining first gear free - wheel assembly to gear train.
6. Lift off first gear free - wheel housing assembly.



44M0544

7. Remove Spirolox circlip and end plate spacer.
8. Lift out first gear free - wheel.
9. Remove intermediate spacer plate and needle thrust bearing.

Inspection

10. Examine free - wheel unit and needle thrust bearing for excessive wear or damage, and renew if necessary.

Refit

11. Reverse remove procedure in 7 to 9 to refit the components into free - wheel housing.

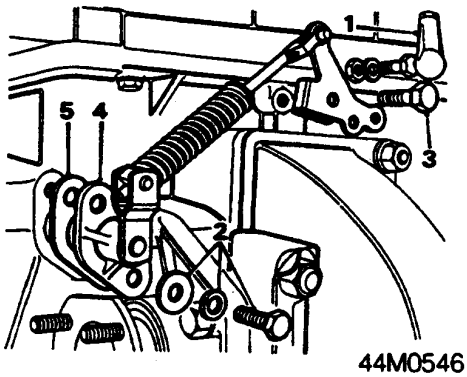
Ensure that lip of free wheel 'arrowed' is positioned uppermost otherwise unit will be inoperative in use.

12. Refit first gear free – wheel housing assembly to gear train; use new locking plates, tighten retaining bolts and lock up locking plate tabs.
13. Re – fit free – wheel reaction member and input gear.
14. Refit gear train assembly, see **Primary drive gears.**
15. Refit engine/automatic gearbox assembly, see **ENGINE.**

KICK – DOWN CONTROL

Service Repair No. 44.15.01

Remove

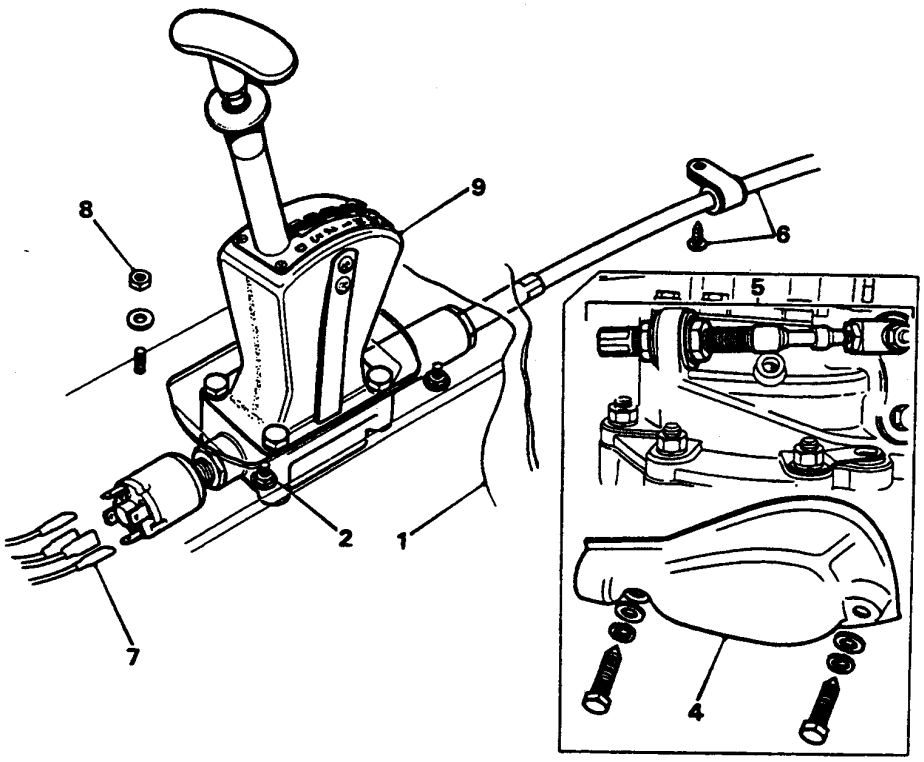


44M0546

1. Disconnect governor kick – down control rod ball – end from control.
2. Remove two set screws and washers securing control to gearbox casing.
3. Remove pivot bolt securing control linkage to the gearbox casing.
4. Withdraw governor control out of gearbox.

Refit

5. Fit a new joint washer to control assembly, insert governor control lever into gearbox and positioned as shown illustrated.
6. Refit kick – down control securing screw and pivot bolt. Tighten kick – down control to gearbox casing securing screws to 0.7 Nm.
7. Re – connect governor kick – down control rod ball – end to control.



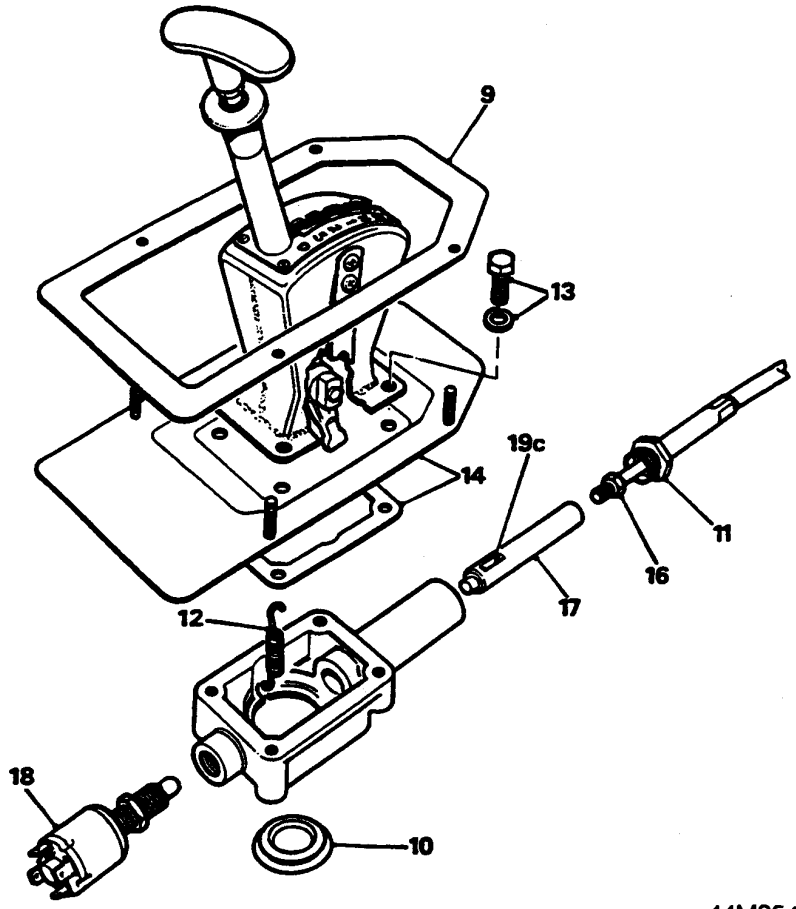
44M0547

SELECTOR MECHANISM ASSEMBLY

Service Repair No. 44.15.04
Service Repair No. 44.15.05 – Overhaul

Remove

1. Pull back the front floor covering
2. Slacken four nuts retaining selector mechanism mounting plate to floor panel.
3. Raise car on a hoist.
4. Remove bellcrank cover plate.
5. Disconnect selector cable from gearbox, see **Selector cable.**
6. Remove screw retaining cable clip to floor panel and pull cable clear of gearbox.
7. Note inhibitor switch wiring connections and disconnect wires.
8. Remove nuts retaining selector mechanism mounting plate to floor panel.
9. Remove selector mechanism with cable attached from car; note that a joint washer is fitted between mounting plate and floor panel.



44M0548

Dismantle

10. Remove rubber grommet from base of selector mechanism housing and hold assembly in a vice.
11. Slacken nut retaining outer cable to housing.
12. Release reverse return spring from underside of housing.
13. Unscrew four screws retaining selector mechanism quadrant to housing.
14. Remove selector mechanism quadrant; lift off mounting plate and joint washer.
15. Unscrew outer cable out of housing with operating plunger attached.
16. Hold plunger with a screwdriver through slot, and slacken nut securing inner cable to plunger.
17. Unscrew plunger from selector cable.
18. Unscrew and remove inhibitor switch.

Refit

19. Reverse procedure in 1 to 18 noting following:
    a Lubricate all moving parts with a graphite based grease.
    b Screw inner cable fully into plunger and tighten nut.
    c Fit plunger into housing with relieved side of slot uppermost to accept selector lever.
20. Adjust selector cable assembly, see **Adjustments**
21. Check that engine can **ONLY** be started when **'N'** is selected, see **Adjustments.**

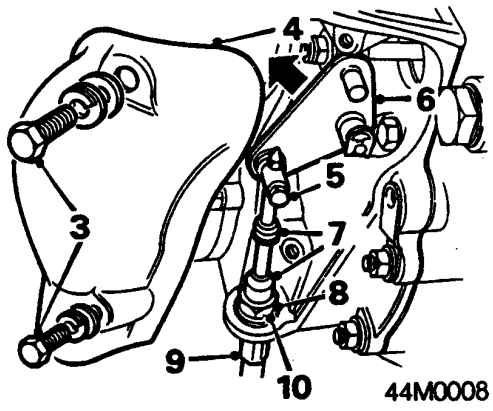
SELECTOR CABLE

Remove

1. Raise front of vehicle.

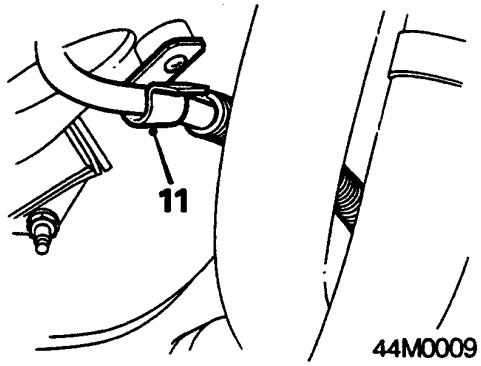
WARNING: Support on safety stands.

2. Position gear selector lever at 'P'.



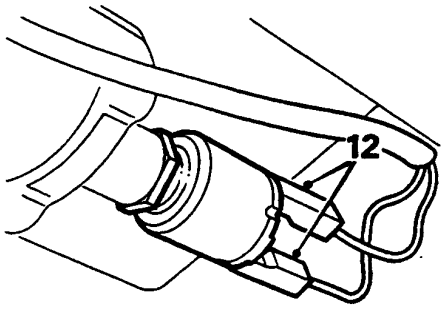
44M0008

3. Remove 2 bolts, gear selector cable cover to gearbox.
4. Remove cover.
5. Slacken screw clamping gear selector cable.
6. Rotate bellcrank to disconnect selector cable from clamp.
7. Remove 2 rubber sleeves from cable.
8. Remove locknut, selector cable to gearbox.
9. Withdraw cable from gearbox.
10. Remove flat washer from cable.



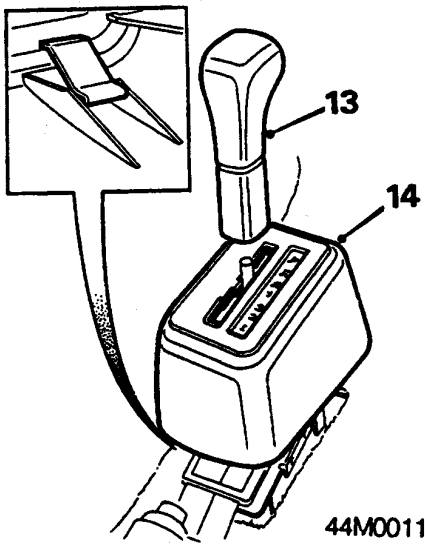
44M0009

11. Release cable from clip.



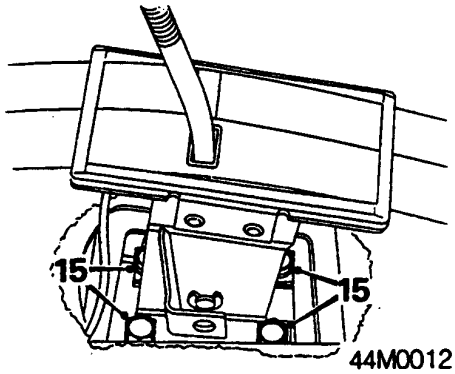
44M0010

12. Disconnect 2 Lucars from reverse light switch.



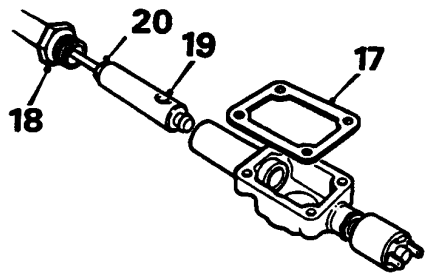
44M0011

13. Unscrew knob from gear selector lever.
14. Lift off selector lever housing, noting 4 retaining clips which may become detached.



44M0012

15. Remove 4 bolts, selector lever housing to selector cable housing.



44M0013

16. Remove selector cable and cable housing from vehicle.
17. Remove gasket.
18. Unscrew selector cable from cable housing.
19. Withdraw cable and plunger from cable housing.
20. Slacken lock nut and unscrew inner cable from plunger.

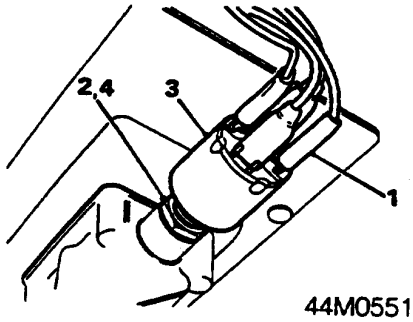
Refit

21. Clean cable housing and grease cable.
22. Screw inner cable fully into plunger and tighten locknut.
23. Fit cable and plunger to cable housing and screw outer cable into housing. Tighten outer cable into housing.
24. Rotate inner cable to position cable plunger with relieved side of hole uppermost to accept selector lever.
25. Fit cable housing and gasket to vehicle.
26. Fit 4 cable housing bolts and tighten to 4 Nm.
27. Fit rubber sleeves to cable and insert inner cable into clamp.
28. Adjust selector cable, see **Adjustments.**
29. Fit selector cable cover, fit and tighten cover bolts.
30. Fit 4 retaining clips to slots inside selector lever housing and fit housing.
31. Fit selector cover knob.
32. Remove stand(s) and lower vehicle.
33. Carry out checking procedure to ensure selector cable adjustment is correct, see **Adjustments.**

STARTER INHIBITOR SWITCH

Service Repair No. 44.15.19

Remove



44M0551

1. Disconnect electrical connections at switch.
2. Release locking nut.
3. Unscrew and remove switch from selector mechanism housing.
4. Remove locking nut.

Refit

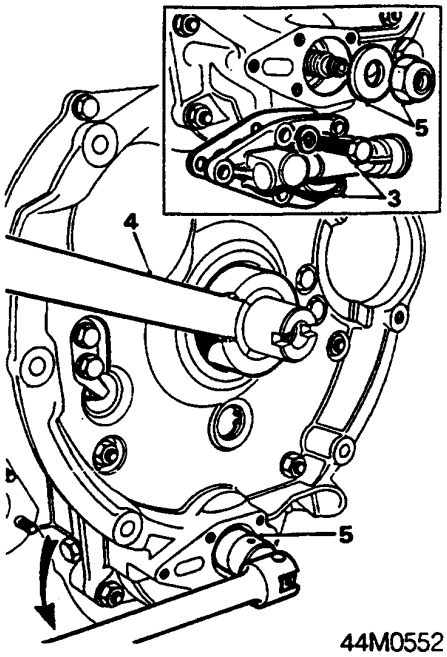
5. Position selector lever at **'N'** .
6. Screw locking nut onto switch.
7. Screw switch into selector mechanism housing.
8. Adjust inhibitor switch, see **Adjustments**

CONVERTER HOUSING

Service Repair No. 44.17.01

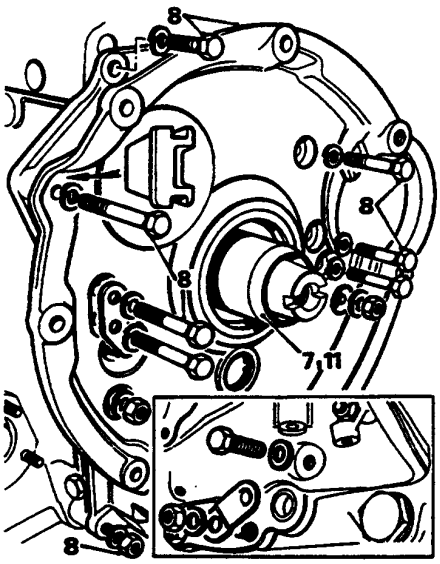
Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Remove converter, see **Converter assembly.**



44M0552

3. Remove securing screws and detach low pressure valve from converter housing.
4. Fit **18G 1088** over converter output gear to hold crankshaft.
5. Remove input gear self – locking nut.
6. Remove two set screws securing bell – crank lever to converter housing.

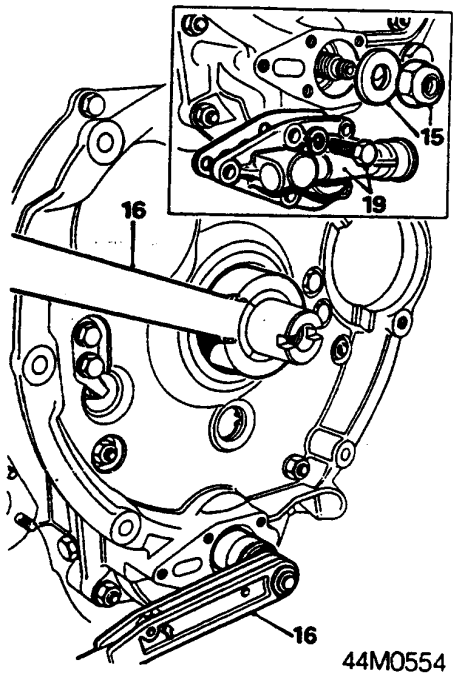


44M0553

7. Fit **18G 1098** over converter output gear.
8. Remove nuts and screws securing converter housing to power unit; withdraw housing partially and disconnect feed pipe from housing.
9. Remove housing and its joint washer.

Refit

10. Check that joint faces are clean and free from burrs; rectify as necessary and fit a new joint washer.
11. Ensure that **18G 1098** is still positioned on the converter output gear.
12. Refit converter housing, connecting feed pipe to housing. Ensure that feed pipe and the nylon pipe assembly at valve block are aligned then push the housing fully home. Remove tool **18G 1098.**
13. Refit securing nuts and screws; note that UNC threaded screws secure housing to gearbox casing while those threaded UNF screw into cylinder block.
14. Tighten screws and nuts to 25Nm.



44M0554

15. Refit washer and self – locking nut to input gear shaft.
16. Use **18G 1088** to hold converter output gear, and tighten input shaft nut 95Nm.
17. Refit bell – crank lever.
18. Connect gear selector cable and adjust, see **Adjustments**
19. Refit low pressure valve with a new joint washer.
20. Refit converter, see **Converter assembly.**
21. Refit engine/automatic gearbox assembly, see **ENGINE.**

CONVERTER HOUSING OIL SEAL

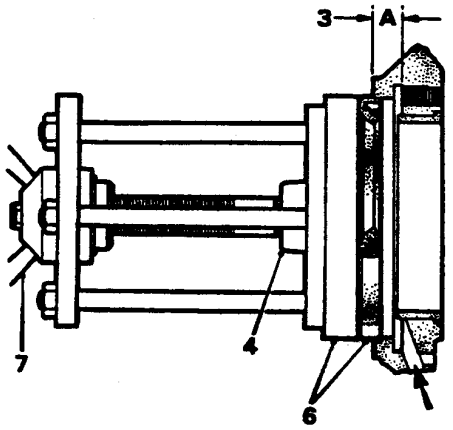
Service Repair No. 44.17.04

Remove – engine in car

1. Remove converter assembly, see **Converter assembly.**
2. Remove old seal, using **18G 1087;** hook tool into oil seal groove and top outwards on tool, working round seal until removed.

Refit

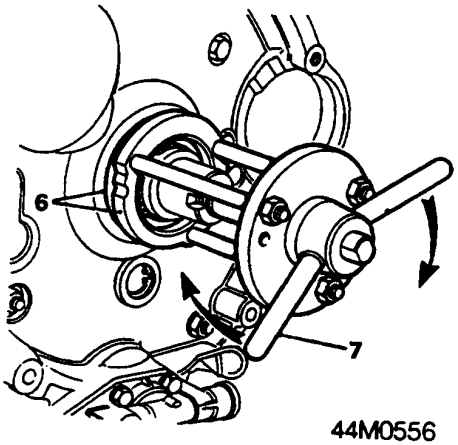
CAUTION: *New seal must be fitted to correct depth in order that drain hole 'arrowed' behind seal remains open.*



44M0555

3. Take a depth measurement from any convenient point on the periphery of housing bore of front face of housing to undercut face **'A'** illustrated. This measurement will be approximately 9.5mm, but should it be more or less than this measurement, this must be taken into account and either added to or subtracted from 9.5mm.
   Example:
   If measurement is 9.5mm, fit new seal to be flush with front face of converter housing.
   If measurement is less than 9.5mm, fit seal proud of housing face by difference of measurement obtained.

Note: *Converter housing face is not machined, therefore initial measurement position and that used when fitting a new seal must always be taken from same position on housing.*



44M0556

4. Screw short threaded end of **18G 1068A** securely into crankshaft.
5. Liberally lubricate new oil seal.
6. Assemble new seal together with **18G 1068B** into position on housing as illustrated.
7. Screw in wing nut of tool until seal is pressed into housing to depth of measurement taken in procedure 3.
8. Remove **18G 1068B** and **18G 1068A.**
9. Refit converter assembly, see **Converter assembly.**

CONVERTER ASSEMBLY

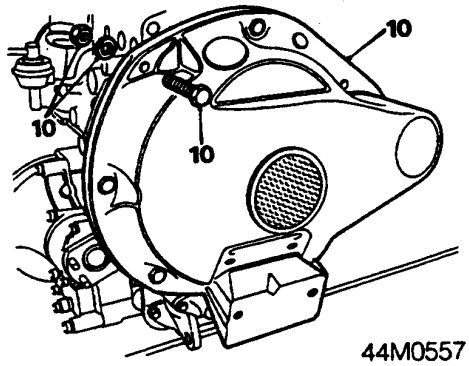
Service Repair No. 44.17.07

Remove

1. Raise front of vehicle.

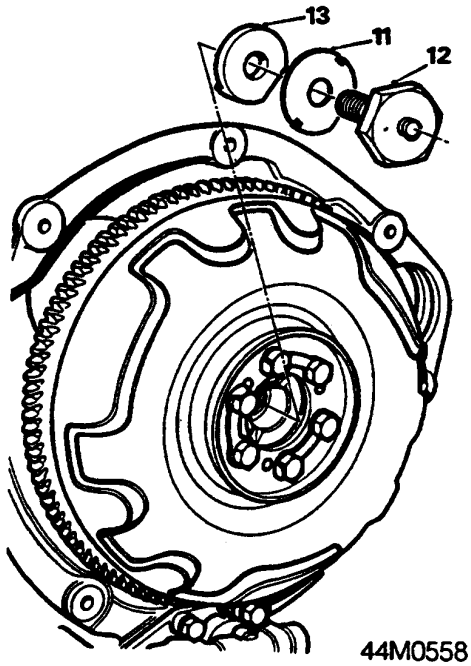
WARNING: Support on safety stands.

2. Fit engine lifting brackets to rocker cover securing nuts and support power unit.
3. Disconnect engine tie – rod from rear of cylinder block.
4. Disconnect exhaust pipe at manifold flange.
5. Remove oil filter bowl and head assembly, see **MAINTENANCE.**
6. Remove nuts and bolts securing right – hand engine mounting to sub – frame.
7. Raise rear of engine sufficiently to remove nuts and bolts securing starter motor and converter cover.
8. Disconnect and remove starter motor.
9. Turn converter cover slightly anti – clockwise and remove cover complete with engine mounting attached.



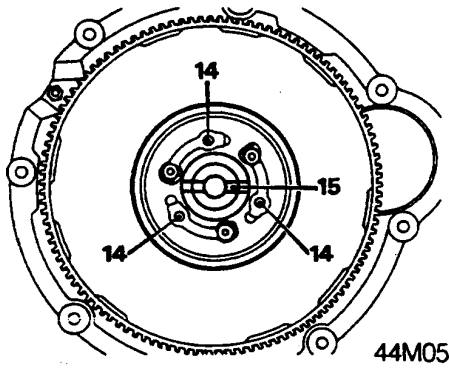
44M0557

10. Remove converter cover retaining bolts and nuts and lift off cover.



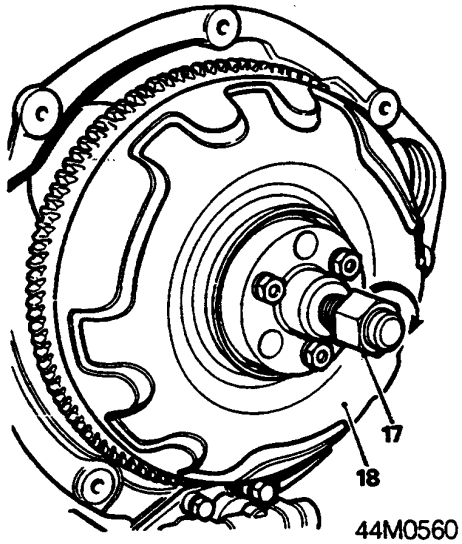
44M0558

11. Knock back lock washer tab from converter retainer bolt.
12. Hold converter from turning and remove converter retaining bolt, using **18G 587.**
13. Lever out key plate locating converter to crankshaft.



44M0559

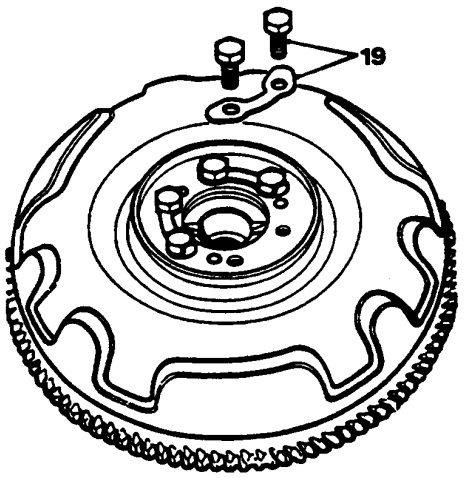
14. Knock back locking tabs and remove three equally spaced set screws from converter centre.
15. Rotate converter until crankshaft slot is horizontal.
16. Insert plug of **18G 1086** into end of crankshaft.



44M0560

17. Fit **18G 1086** onto converter and screw in centre bolt until converter is released from crankshaft taper; remove tool.
18. Lift off converter; note that it will still retain a quantity of oil.

Refit



44M0561

19. Remove each pair of bolts in turn from converter centre and fit new locking plates. Tighten bolts to 30Nm and lock up locking tabs.

***CAUTION:** Do not remove all six screws from converter at one time.*

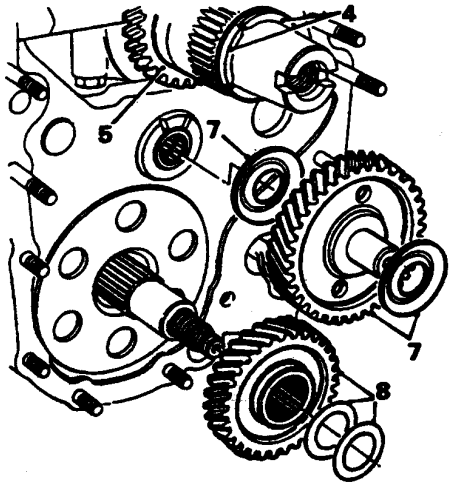
20. Refit converter onto converter output gear and align offset slot of converter with slot in end of crankshaft.
21. Refit key plate into slot.
22. Fit converter retaining bolt with a new lock washer.
23. Hold converter from turning and tighten retaining bolt to 150Nm, tap over lock washer tab.
24. Refit converter cover.
25. Refit starter motor.
26. Refit oil filter assembly with a new joint washer, tighten bolts to 20Nm see **MAINTENANCE.**
27. Reverse procedure in 1 to 4.

PRIMARY DRIVE GEARS

Service Repair No. 44.17.10

Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Remove converter assembly, see **Converter assembly.**
3. Remove converter housing, see **Converter housing.**



44M0562

4. Remove converter output gear rear thrust washer and backing ring.
5. Pull off converter output gear.
6. Remove output gear front thrust washer.
7. Remove idler gear and thrust washers.
8. Remove input gear and adjustment shims.

***Note:** Procedure for checking end-float adjustment of idler and converter output gears and pre-load adjustment of input gear is detailed below:*

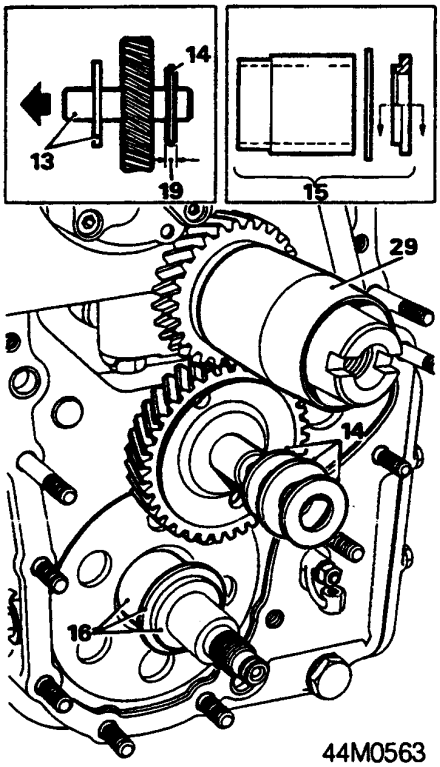
Adjust

9. Converter output gear: Refit output gear front thrust washer, with the chamfered side of washer (arrowed) towards crankshaft.
10. Refit converter output gear with its rear backing ring and rear thrust washer.

11. Check converter output gear end – float with feeler gauges; clearance should be between 0.099 to 0.16mm.
    Adjust if necessary by selecting and fitting correct thickness thrust washer from range given below.

Converter output gear thrust washer chart
2.85 to 2.90mm
2.90 to 2.95mm
2.95 to 3.0mm
3.0 to 3.05mm

12. Remove converter output gear after adjustment.

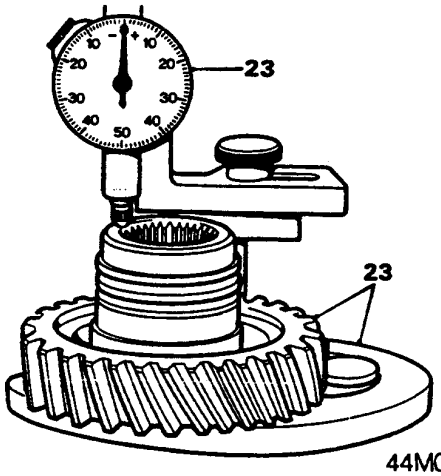


44M0563

13. *Idler and input gears:* Assemble idler gear to gearbox with a thrust washer on gearbox side of gear.
14. Use larger washers of **18G 1089** with a dental wax washer interposed between the two and fit onto converter housing side of idler gear.
15. Cut a dental wax washer and interpose it between **18G 1089 A** and **18G 1089/1**; this assembly replaces input gear for checking pre – load adjustment.
16. Fit **18G 1089A** and **18G 1089/1** with wax washer onto input gear shaft.
17. Fit a new converter housing joint washer; refit housing and tighten retaining bolts and nuts to 25Nm. Do not fit output shaft nut.
18. Remove converter housing.
19. Remove idler gear and washers.
    Measure total thickness of thrust washer and **18G 1089** with its wax washer.
    Subtract 0.10 to 0.18mm from the total thickness of measurement taken to obtain correct idler gear end – float.
20. Select two washers of approximately equal thicknesses from range given below:

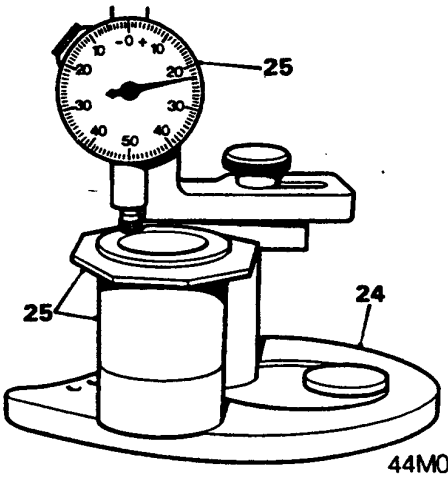
Idler gear thrust washer chart
3.30 to 3.32mm
3.35 to 3.37mm
3.40 to 3.42mm
3.45 to 3.47mm
3.50 to 3.53mm

21. Fit selected thrust washers onto and refit idler gear.
22. *Input gear pre – load:* Remove dummy input gear (**18G 1089A** and **18G 1089/1** with wax washer) from input gear shaft, keep complete assembly together and place to one side.



44M0564

23. Place input gear onto a surface plate or onto **18G 191A** and use dial test indicator gauge to take a mean reading. Set dial test indicator gauge to zero as illustrated.



44M0565

24. Remove input gear, and substitute complete assembly removed in procedure 22 onto **18G 191A** or a surface plate.
25. Check additional thickness measurement of this assembly.

Mean reading obtained on dial test indicator gauge indicates total thickness of adjustment shims required to eliminate end-float.
To this figure, add a shim thickness of 0.025 to 0.07mm to give required input bearing pre-load adjustment.
Select required thickness of shims from chart.

Input gear shims
0.07mm
0.30mm

Refit

26. Refit input gear and shims.
27. Remove housing joint washer used for 'Adjust' procedure and fit a new one.
28. Refit converter output gear and thrust washers.
29. Fit **18G 1098** over output gear.
30. Refit converter housing, see **Converter housing.**
31. Refit converter assembly, see **Converter assembly.**
32. Refit engine/automatic gearbox assembly, see **ENGINE.**

DATA

Converter output gear end-float	0.09 to 0.16mm
Idler gear end-float	0.10 to 0.18mm
Input gear pre-load	0.02 to 0.07mm

GEARBOX ASSEMBLY

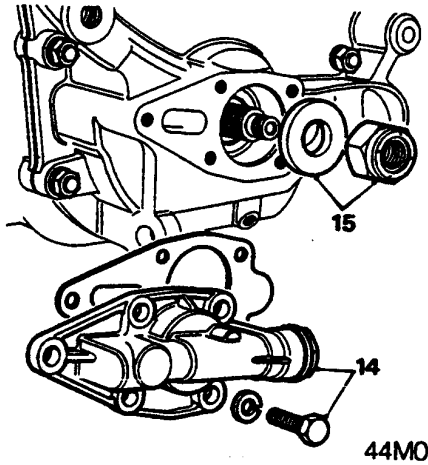
Service Repair No. 44.20.01

Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Drain oil.
3. Remove oil filter assembly.
4. Remove starter motor.
5. Remove securing nuts and bolts and detach converter end-cover.
6. Knock back lock washer on converter retaining bolt.
7. Hold converter from turning and use **18G 587** to remove converter retaining bolt.
8. Remove key plate locating converter to crankshaft.
9. Turn converter until end slot is horizontal.
10. Knock back locking tabs and remove three equally spaced set screws from converter centre.

***CAUTION:** Do not remove all six set screws at one time.*

11. Locate plug adapter of **18G 1086** into end of crankshaft.
12. Screw **18G 1086** onto converter, hold converter from turning and screw in centre bolt of tool to release converter from crankshaft taper.
13. Lift off converter and remove tool. Note that converter will still retain a quantity of oil.



44M0566

14. Remove low pressure valve retaining screws and detach the valve.
15. Hold converter output gear with tool **18G 1088** and remove input gear self-locking nut and washer.
16. Remove two set screws securing bell-crank lever to converter housing.
17. Remove rubber block (grommet) from converter housing.
18. Remove set screws, nuts, and spring washers securing the converter housing to power unit.
19. Locate **18G 1098** over converter output gear.
20. Withdraw converter housing.
21. Disconnect external engine oil feed pipe from adapter on gearbox casing.
22. Lever main oil feed pipe from oil pump and gearbox casing.
23. Remove nuts and set screws securing engine to gearbox.
24. Fit suitable lifting equipment to engine and lift engine away from gearbox.

Inspect

25. Ensure that all joint faces are clean and free from burrs.
26. Check that all oil seals and 'O' rings are in perfect condition, and fit replacements where required to following components:
    a Oil feed pipe 'O' rings (pump to block).
    b Main oil strainer pick-up pipe 'O' ring.
    c Front main bearing cap oil seal.

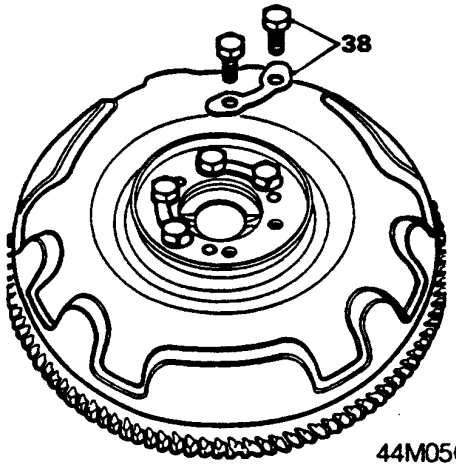
Refit

27. Grease joint faces of engine crankcase and locate new joint washers into position.
28. Position front main bearing cap oil seal on transmission case.
29. Lower engine onto gearbox and start retaining nuts and spring washers onto studs before completely lowering engine onto gearbox; tighten all retaining nuts evenly and trim off any excess joint from rear of unit.
30. Connect up and tighten external oil feed pipe.
31. Refit internal oil feed pipe into its locations in the oil pump and cylinder block.
32. Fit a new converter housing joint washer to power unit.
33. Fit **18G 1098** over converter output gear.
34. Refit converter housing and ensure that converter outlet pipe is in alignment with nylon guide so that pipe will enter valve block pipe chest. Tighten housing retaining bolts and nuts to 25Nm.

Note:

a UNC screws are fitted into gearbox casing.
b Screw with copper washer is fitted adjacent to transverse selector rod.

35. Fit **18G 1088** onto converter output gear.
36. Refit input shaft washer and Nyloc nut, hold converter output gear from turning with **18G 1088** and tighten retaining nut to 95Nm. Remove **18G 1088.**
37. Refit low pressure valve with a new joint washer



44M0567

38. Remove each pair of bolts in turn from converter centre and refit them with new locking plates. Tighten bolts to 30Nm, tap over lock washer tabs.

CAUTION: *Do not remove all six bolts from converter centre at one time.*

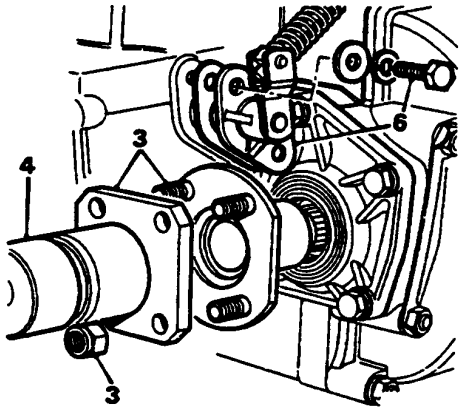
39. Refit converter and align offset slot with slot on crankshaft; insert locating key plate.
40. Refit converter retaining bolt with a new lock washer, hold converter from turning and tighten bolt with **18G 587** tap over lock washer tab.
41. Insert rubber block into its location in converter housing and refit converter end cover.
42. Refit gear selector bell – crank lever.
43. Refit starter motor.
44. Refit engine oil filter assembly, see **ENGINE.**
45. Refit engine/automatic gearbox assembly, see **ENGINE.**
46. Refill engine/automatic gearbox with oil, see **MAINTENANCE.**

GEARBOX ASSEMBLY - OVERHAUL

Service Repair No. 44.20.06

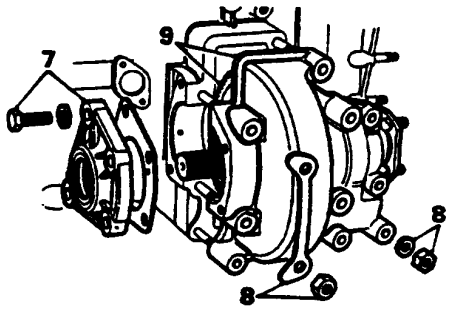
Dismantle

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Remove gearbox assembly from engine, see **Gearbox assembly.**



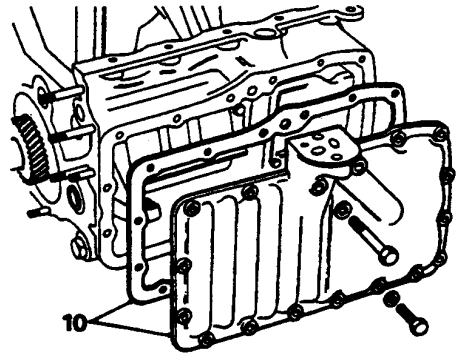
44M0568

3. Fit **18G 284 - 4** adapter to differential driving flange and secure with drive shaft universal joint nuts.
4. Screw tool **18G 284** onto **18G 284 - 4** and impact driving flange off splined shaft.
5. Repeat procedure in 3 and 4 to remove other driving flange.
6. Remove securing screws and detach kick - down control assembly.



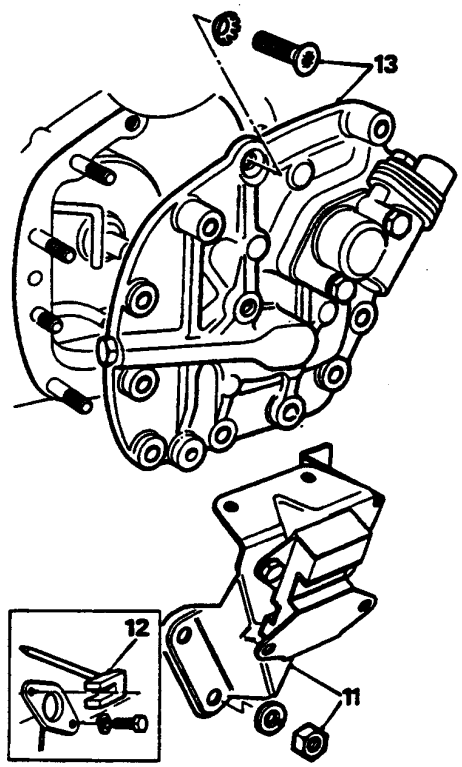
44M0569

7. Remove differential end cover securing screws and remove cover.
8. Release locking plate tabs and remove differential/final drive housing securing nuts.
9. Withdraw housing and final drive assembly.



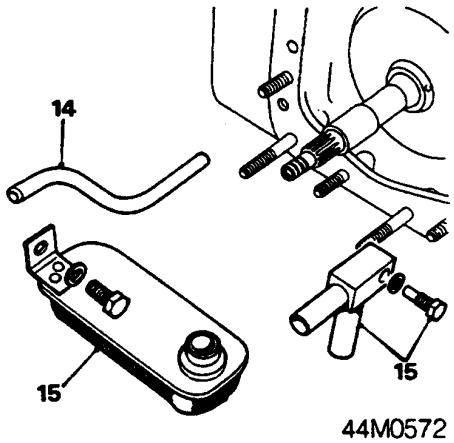
44M0570

10. Remove front cover securing screws and detach cover.



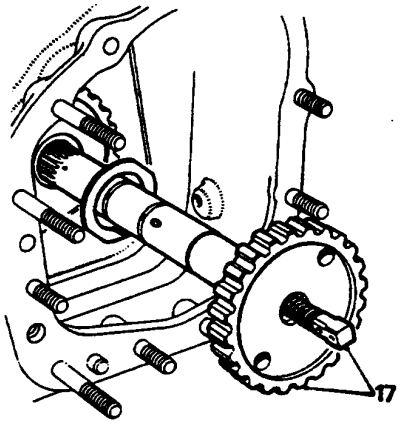
44M0571

11. Remove securing nuts and detach engine mounting casting from governor housing.
12. Fit **18G 1097** to hold forward clutch in place.
13. Remove governor housing securing screw and nuts and withdraw housing assembly.



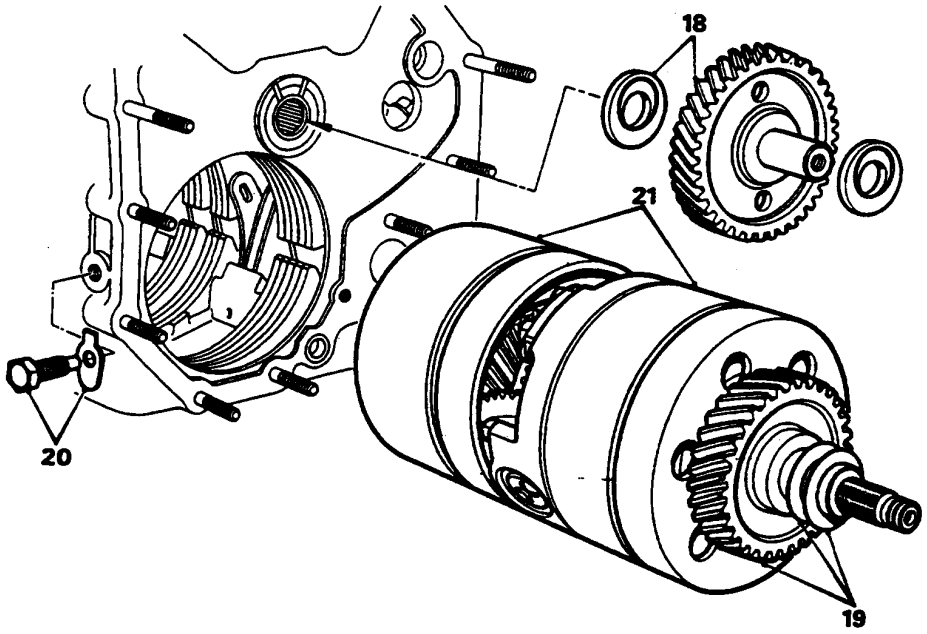
44M0572

14. Pull out forward clutch feed pipe.
15. Remove dowel bolt and set screw securing pick – up pipe and oil strainer and lift out strainer assembly.
16. Remove **18G 1097** and withdraw forward clutch assembly.



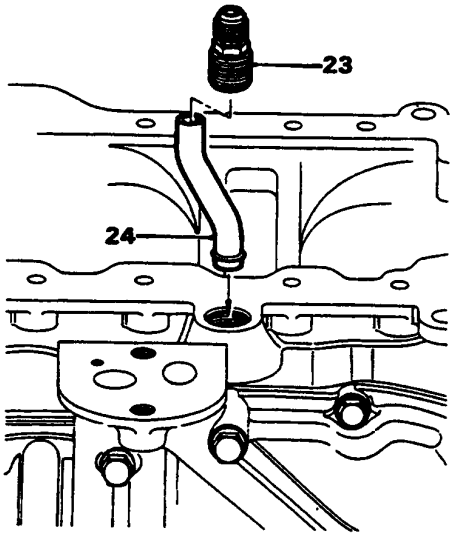
44M0573

17. Pull out forward output shaft; note reverse shut – off valve located in end of shaft.



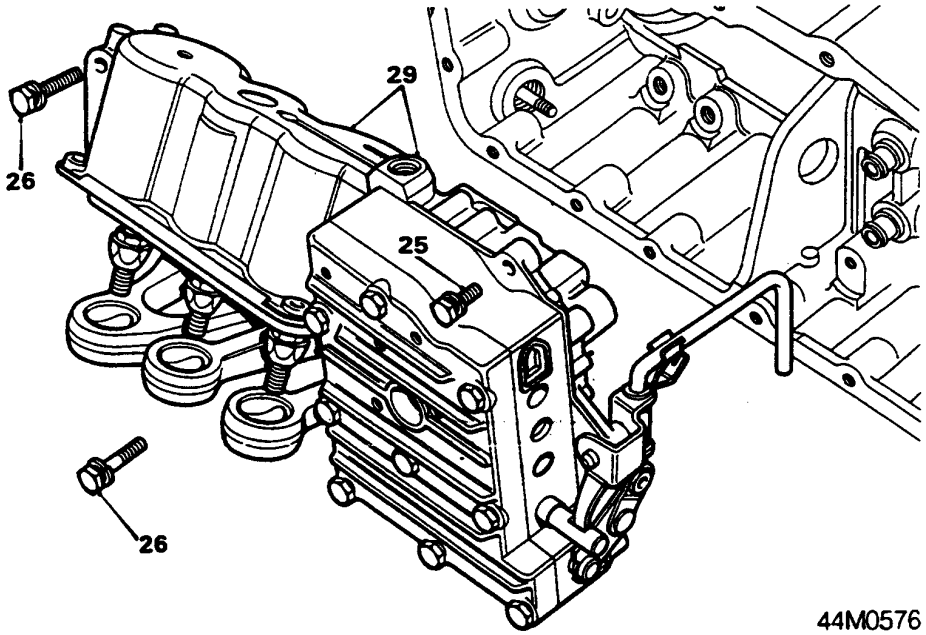
44M0574

18. Remove idler gear and thrust washers.
19. Remove input gear with its pre – load adjustment shims.
20. Tap back lock washer tab of dowel bolt retaining the gear train.
21. Pull out gear train assembly complete with top and reverse clutch.
22. Unscrew and pull out transverse selector rod.



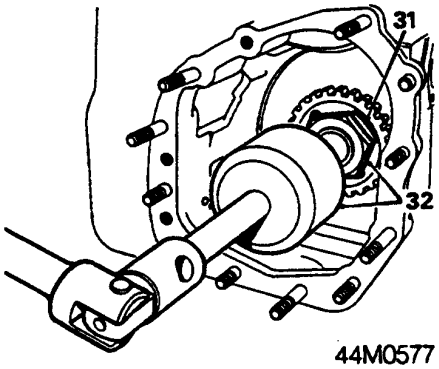
44M0575

23. Unscrew and remove engine oil feed pipe adapter.
24. Withdraw shaped copper pipe through adapter hole.



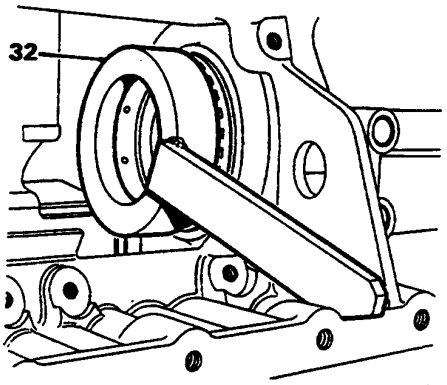
44M0576

25. Remove valve block retaining bolts.
26. Remove servo unit retaining bolts.
27. Unhook brake bands from servo reaction levers and struts.
28. Remove brake bands from casing.
29. Remove servo unit and valve block as a complete assembly.
30. Remove needle thrust bearing and washer which will have remained in top and reverse clutch hub when gear train assembly was removed.



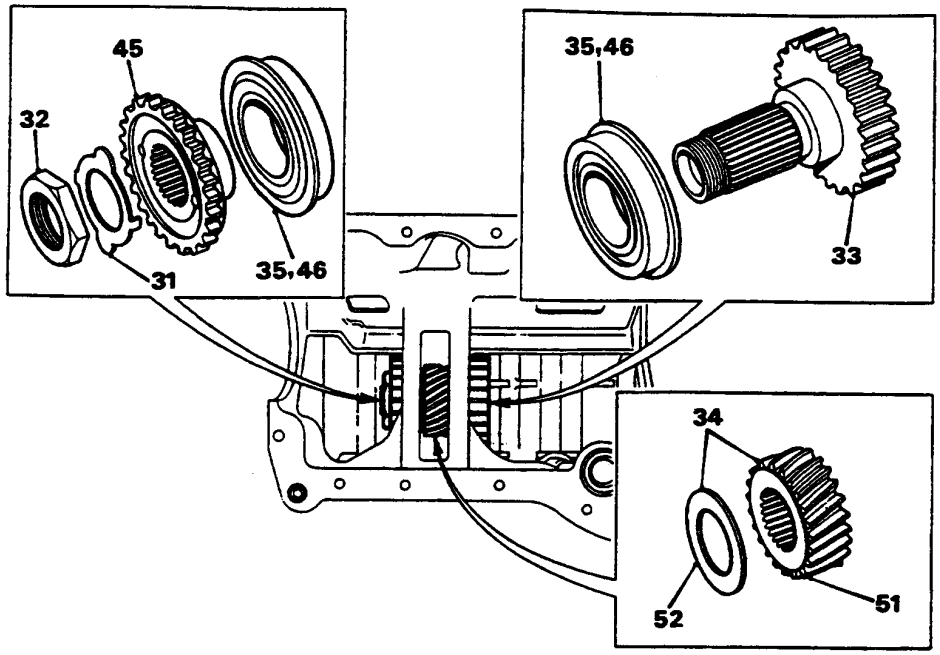
44M0577

31. Knock back lock washer tabs on forward clutch splined hub nut.



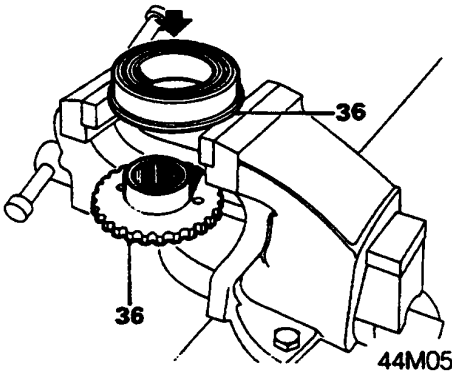
44M0578

32. Use **18G 1095** to hold top/reverse splined hub, and remove hub retaining nut with **18G 1096.**



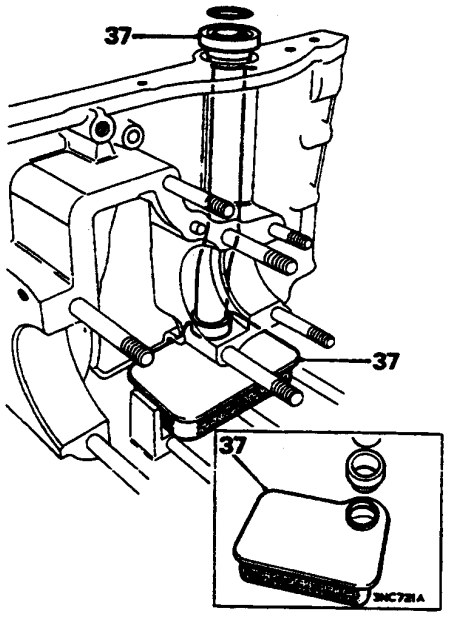
44M0579

33. Drift top/reverse clutch hub out of centre web of the gearbox casing.
34. Remove final drive gear pinion with its selective thrust washer.
35. Drift out both bearings from opposing sides of centre web. Drift bearings on their outer race so that each bearing will be removed in one piece.



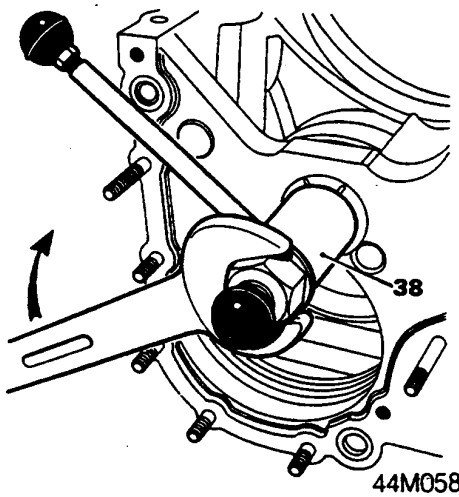
44M0580

36. Support extreme outer edge of bearing on a vice and drift out forward clutch splined hub.



44M0581

37. Withdraw main oil pick – up pipe and remove strainer.



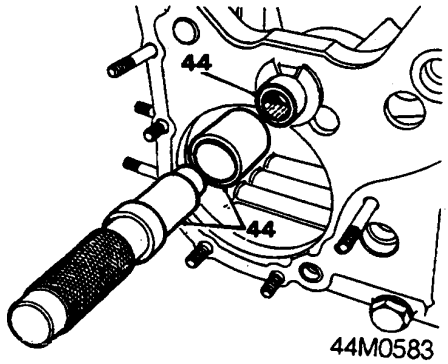
44M0582

38. Use **18G 581** to withdraw idler gear needle roller bearing out of gearbox casing.

Inspection

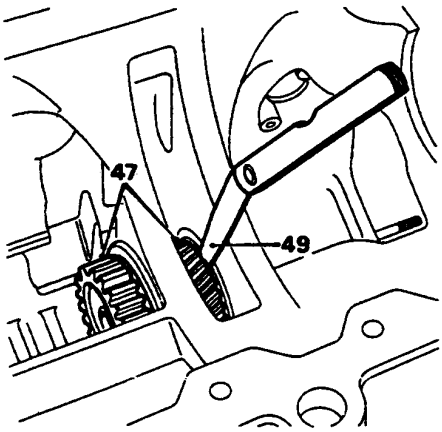
39. Absolute cleanliness is essential; use fuel (petrol) or paraffin (kerosene) where necessary for cleaning. Dry the components with an air pressure line or use lint - free rag.
40. Dismantle each particular unit or assembly and overhaul it following procedure given; reference will be made in 'Reassembling' sequence to operation number covering overhaul procedure for each particular assembly.
41. All 'O' rings and seals should be renewed; inspect all cast iron sealing rings for wear or sideways movement in their locating grooves, and renew as necessary.
42. Examine all joint faces for burrs or damage and rectify as necessary. Always fit new joint washers, lock washers and locking plates.
43. Immerse all 'O' rings and seals in clean engine oil prior to reassembling each unit, and ensure that they are well lubricated when rebuilding gearbox assembly. Use petroleum jelly where necessary when reassembling to secure thrust washers and races in position.

Reassemble



44M0583

44. Refit idler gear needle roller bearing using **18G 1126.** Drift bearing into casing as far as sleeve on tool will allow.
45. Drift forward clutch splined hub into its bearing.

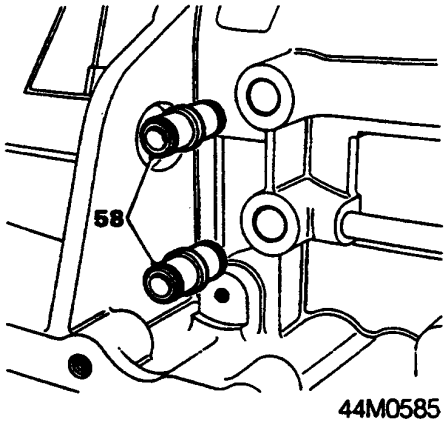


44M0584

46. Refit top/reverse clutch hub bearings into centre webs of gearbox casing. Drift each bearing on its outer cage until bearing register contacts casing web.
47. Refit top/reverse clutch hub, together with final drive gear pinion but without selective shim washer.
48. Lightly tighten clutch hub retaining nut until light friction is felt on bearings when rotating hub.
49. Check with feeler gauges gap existing between final drive gear pinion and forward clutch hub bearing face.
50. From gap measurement taken subtract 0.05mm and select a shim washer of this thickness from range available.
51. Remove retaining nut and drift out top/reverse clutch hub and withdraw final drive gear pinion.
52. Smear selected shim washer with petroleum jelly and stick it onto forward clutch side of pinion for assembly purposes.
53. Refit complete assembly and fit a new top/reverse clutch hub nut lock washer. Use **18G 1095** to hold hub, and tighten

top/reverse hub nut with **18G 1096** to 200Nm.

54. Check that there is only light friction on bearings when rotating hub; bearing pre-load is 0.05mm. Tap over lock washer tabs.
55. Insert three brake bands into casing and place them in their fitted positions.
56. Overhaul servo assembly, see **Servo assembly - Overhaul.**
57. Overhaul valve block assembly, see **Valve block assembly.**



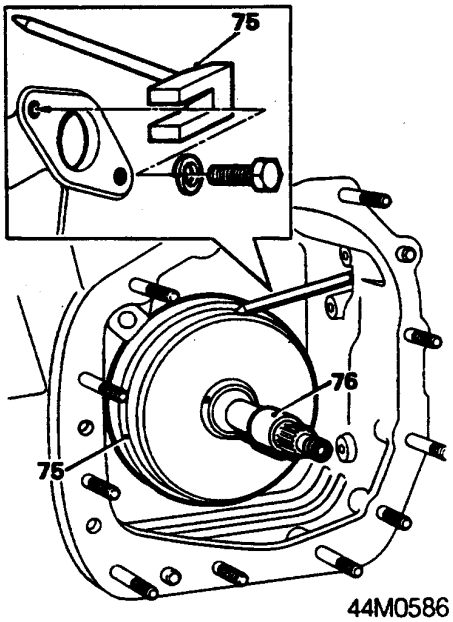
44M0585

58. Refit two valve block connections into gearbox casing.
59. Assemble valve block and servo unit as an assembly and refit it into gearbox casing.
60. Refit and tighten servo unit securing bolts to 23Nm.
61. Refit and tighten valve block securing bolts to 14Nm.
62. Locate brake bands onto servo unit reaction levers and struts.
63. Screw transverse selector rod fully into valve block linkage.
64. Overhaul top and reverse clutch, see **Top and reverse clutch - Overhaul.**
65. Overhaul first gear free-wheel, see **First gear free-wheel assembly.**
66. Reassemble overhauled assemblies onto gear train, check that faces of reverse output shaft and top/reverse clutch are level, see **Top and Reverse Clutches**
67. Refit stepped thrust washer onto end of top/reverse clutch with petroleum jelly.
68. Smear petroleum jelly onto thrust bearing and secure them in position in top/reverse clutch hub in gearbox casing.
69. Refit forward output shaft with its reverse shut-off valve.
70. Refit gear train assembly into gearbox. Use hand pressure only to push it into position; quick rotation of the input gear backwards and forwards will assist engagement of the top and reverse clutch friction plates with top and reverse clutch hub splines.

***Note:** When correctly assembled, dowel bolt will engage easily in free-wheel reaction member.*

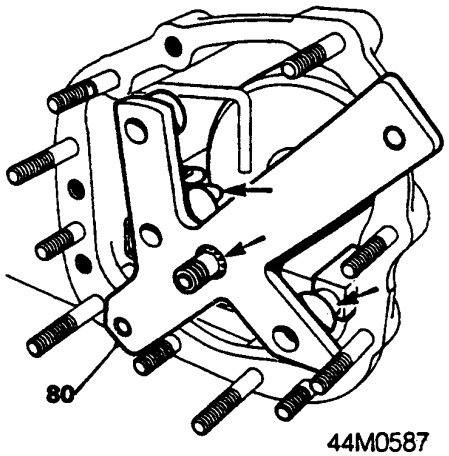
71. Fit a new lock washer, refit and tighten dowel bolt and tap over lock washer tab.
72. Carry out brake band Adjust procedure, see **Adjustments.**
73. Overhaul forward clutch assembly, see **Forward clutch - Overhaul.**
74. Refit forward clutch and ensure that clutch plates engage forward clutch hub splines. Rotate clutch assembly backwards and forwards to assist engagement; when correctly fitted, there is only a small clearance between the forward clutch and centre web of gearbox casing.

***CAUTION:** If clutch is not fully engaged on hub splines, flange of governor housing will not contact gearbox casing; any excessive force used may damage clutch plates.*



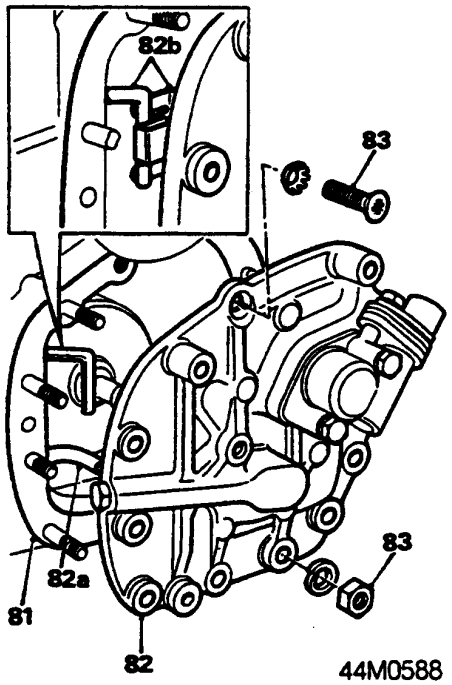
44M0586

75. Use **18G 1097** to hold forward clutch securely in position until governor housing has been refitted.
76. Pull nylon assembly sleeve back over rings on the forward clutch shaft; it will become safely displaced along shaft when governor housing is refitted.
77. Refit auxiliary oil strainer assembly and secure with set screw and dowel bolt locating pick-up pipe.
78. Refit forward clutch feed pipe (long end into gearbox casing).
79. Overhaul governor housing assembly, see **Governor housing - Overhaul** .



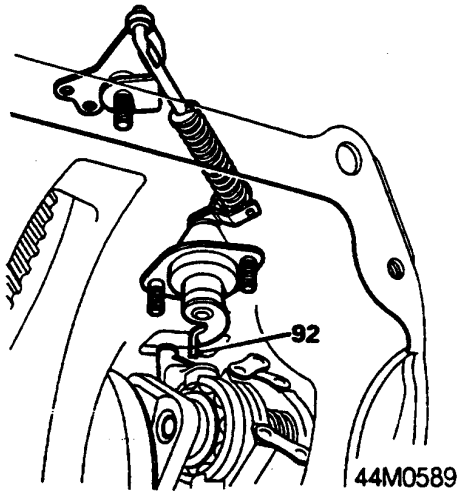
44M0587

80. Locate **18G 1094** onto gearbox casing dowels and align pipes and forward clutch shaft; remove tool.



44M0588

81. Fit a new joint washer coated with Hylomar jointing compound (or equivalent) onto casing.
82. Refit governor housing giving particular attention to the following points as housing is being pushed onto studs:
    a Check that forward clutch feed pipe has started to engage its location in housing.
    b Check that governor valve linkage engages correctly between two forks and spring clip drive of the governor unit.
83. Tighten governor housing securing nuts and screw to 18Nm.
84. Remove forward clutch holding **18G 1097.**
85. Refit engine mounting casting to governor housing.
86. Refit main oil pick – up pipe and strainer.
87. Refit and adjust differential assembly, see **DIFFERENTIAL.**
88. Refit idler gear and thrust washers.
89. Refit input gear with its adjustment shims.
90. Refit gearbox to engine, see **gearbox assembly.**
91. Fit a new joint washer coated with Hylomar jointing compound (or equivalent) and refit front cover.



44M0589

92. Refit kick – down control assembly with lever positioned as illustrated.
93. Refit engine/automatic gearbox assembly, see **ENGINE.**

DATA

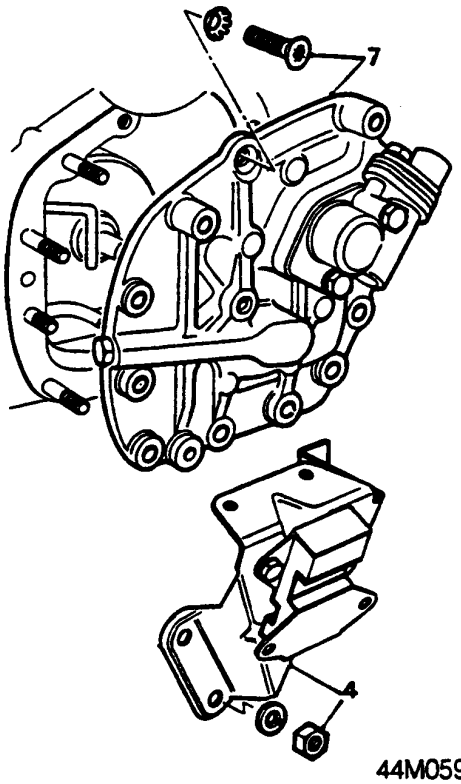
Top/reverse clutch hub bearing pre – load	0.05mm
Brake band adjustment	1.02 to 1.03mm
Input gear bearing pre – load	0.02 to 0.08mm
Idler gear end – float .	0.10 to 0.18mm

GOVERNOR HOUSING ASSEMBLY

Service Repair No. 44.22.01

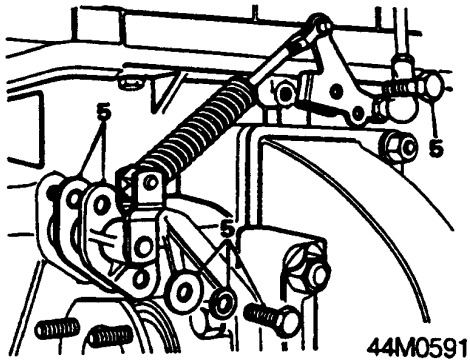
Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE.**
2. Drain engine/automatic gearbox oil, see **MAINTENANCE.**
3. Remove radiator assembly from engine, see **COOLING SYSTEM.**



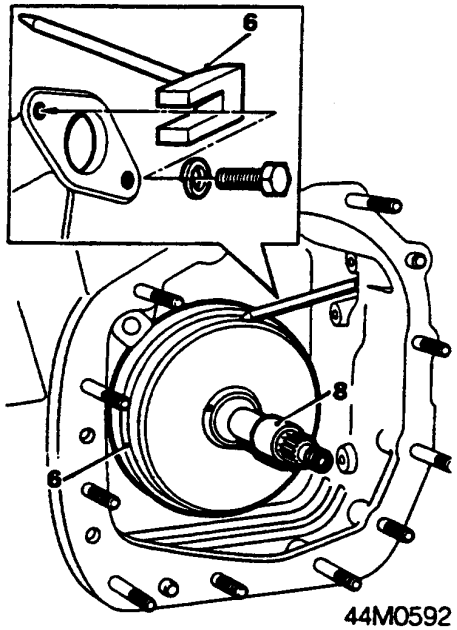
44M0590

4. Remove securing nuts and detach engine mounting adapter bracket complete with mounting attached from governor housing.



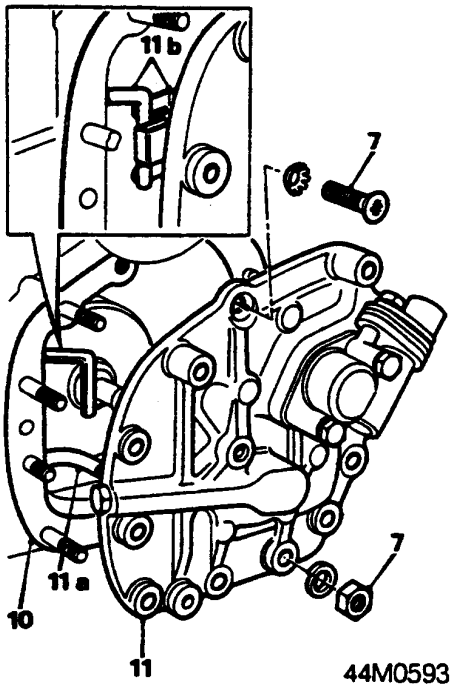
44M0591

5. Remove screws and detach kick – down control assembly from gearbox casing.



44M0592

6. Fit tool **18G 1097** to retain position of forward clutch.

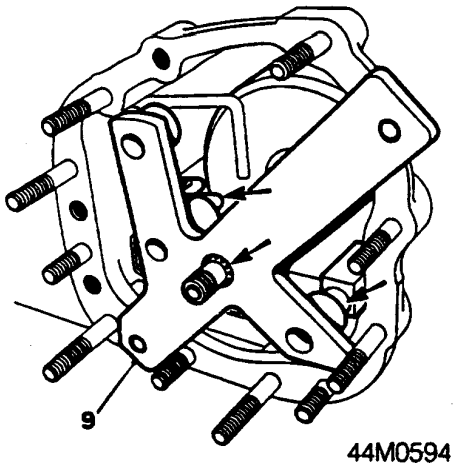


44M0593

7. Remove securing nuts and withdraw governor housing assembly.

Refit

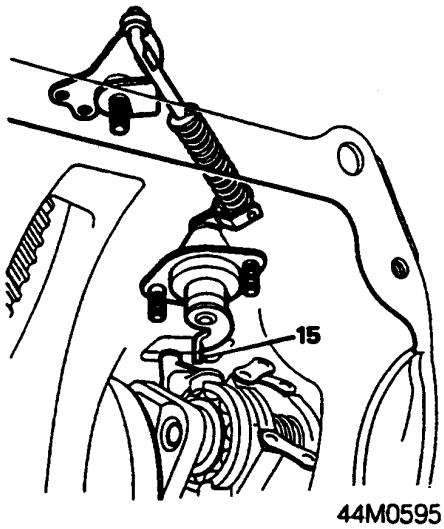
8. Pull nylon assembly sleeve back over rings on forward clutch shaft, it will become safely displaced along shaft when governor housing is refitted.



44M0594

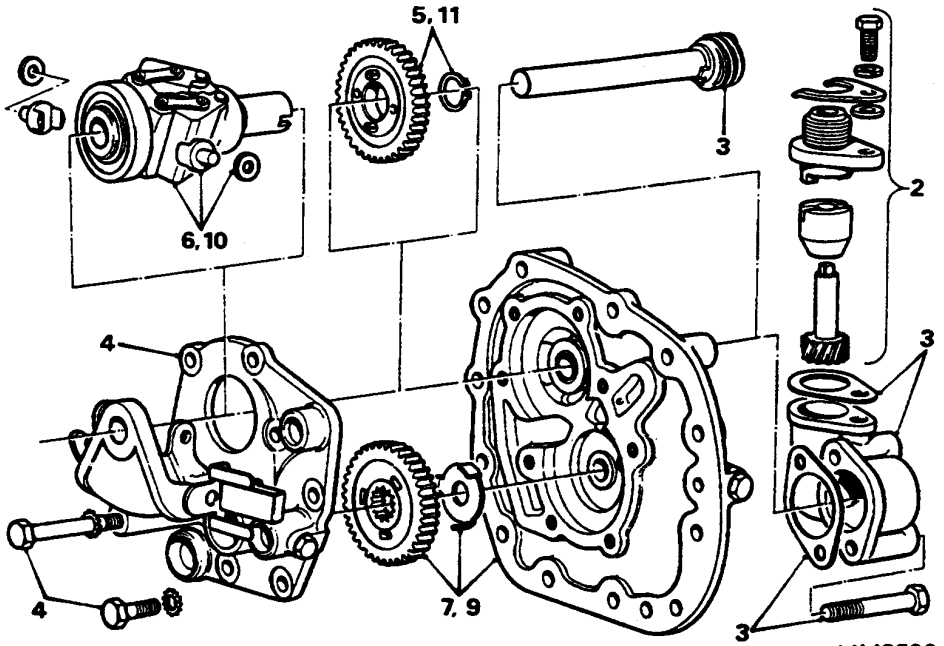
9. Locate tool **18G 1094** onto gearbox casing dowels and align pipes and forward clutch shaft; remove tool.
10. Smear or spray Hylomar jointing compound (or equivalent) onto new joint washer and fit it to gearbox casing.

11. Refit governor housing giving particular attention to the following points as housing is being pushed onto studs:
    a Check that forward clutch feed pipe has started to engage its location in housing.
    b Ensure that governor valve linkage engages correctly with spring clip drive of governor as housing is pushed on. Link engages between two forks and spring clip and **THAT** is its operating position; it **MUST NOT** enter into centre open portion of clip.
12. Tighten governor housing bolts to 18Nm.
13. Refit engine mounting adapter plate to governor housing.
14. Remove tool **18G 1097.**



44M0595

15. Refit kick – down control and tighten securing screws to 7 Nm.
16. Refit radiator assembly, see **COOLING SYSTEM.**
17. Refit engine/automatic gearbox assembly, see **ENGINE.**
18. Refill engine/automatic gearbox with oil, see **MAINTENANCE.**



44M0596

GOVERNOR ASSEMBLY – OVERHAUL

Service Repair No. 44.22.04

Dismantle

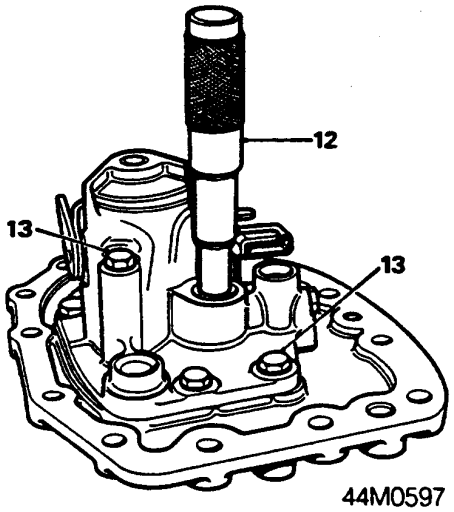
1. Remove governor housing assembly, see **Governor housing assembly.**
2. Remove one screw and withdraw speedometer drive pinion components.
3. Remove two securing screws, detach pinion housing and withdraw speedometer drive gear.
4. Remove set screws and bolt securing governor mounting plate and remove it from end housing.
5. Remove circlip and withdraw gear off governor shaft.
6. Remove governor unit with its bearing retaining trunnions and washers.
7. Remove second auxiliary pump gear and steel thrust washer from governor housing end – cover.

Inspection

8. Examine all components for wear or damage; renew the governor assembly if bearing requires replacement. Renew gear and casing assemblies as necessary.

Reassemble

9. Reassemble gear and thrust washer into governor housing end cover.
10. Refit governor assembly with its retaining trunnions and washers to mounting plate.
11. Refit other gear and circlip onto governor assembly.



44M0597

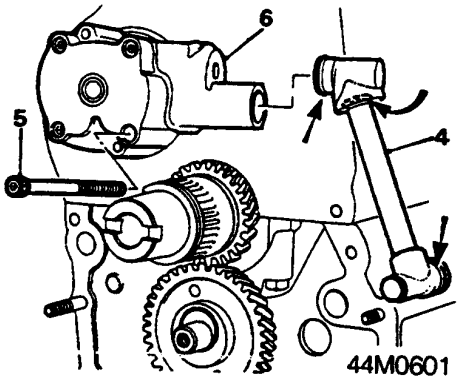
12. Refit two housing assemblies together and centralise the assemblies and gear with **18G 1106.**
13. Tighten retaining screws and bolt to 18Nm, and remove **18G 1106.**
14. Insert speedometer drive gear through end housing and governor unit.
15. Refit pinion housing with a new joint washer and refit pinion assembly.
16. Refit governor housing assembly, see **Governor housing assembly.**

OIL PUMP

Service Repair No. 44.32.01

Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE - Repairs.**
2. Remove converter assembly, see **Converter assembly.**
3. Remove converter housing, see **Converter housing.**
4. Withdraw oil feed pipe from pump to gearbox casing.



44M0601

5. Use an Allen key and remove oil pump retaining screws.
6. Remove oil pump assembly; pump drive coupling may also be attached or it may stay in end of camshaft.

Refit

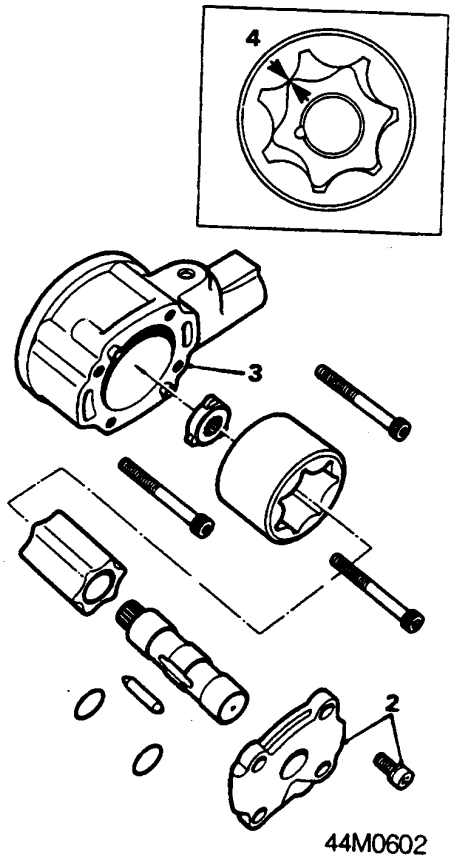
7. Renew oil pump joint washer and ensure that it is correctly fitted.
8. Refit pump with splined shaft engaging drive coupling; refit and tighten retaining screws.
9. Check oil seals on and in oil feed pipe 'arrowed', and renew as required.
10. Refit oil feed pipe.
11. Refit converter housing, see **Converter housing.**
12. Refit converter assembly, see **Converter assembly.**
13. Refit engine/automatic gearbox assembly, see **ENGINE - Repairs.**

OIL PUMP - OVERHAUL

Service Repair No. 44.32.04

Dismantle

1. Remove oil pump, see **Oil pump.**



44M0602

2. Remove retaining screw and detach pump cover.
3. Place a straight-edge across face of pump body and measure clearance between top face of rotors and underside of straight-edge. Clearance should not exceed 0.13mm. If clearance is excessive, this may be ioremedied by lapping joint face of pump body.
4. Measure clearance between rotor lobes when they are positioned as shown. If clearance is in excess of 0.15mm, pump assembly must be renewed.

Inspection

5. Clean and examine components for wear or damage; renew the pump assembly if necessary.

Reassemble

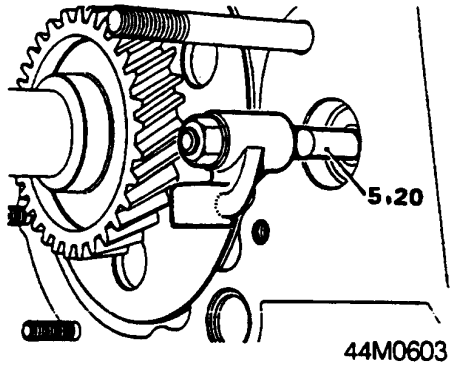
6. Refit pump cover and refit retaining screw.
7. Refit oil pump, see **Oil pump.**

SERVO ASSEMBLY

Service Repair No. 44.34.01

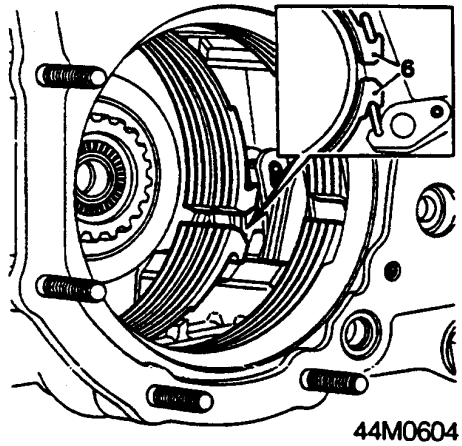
Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE - Repairs.**
2. Remove converter assembly, see **Converter assembly.**
3. Remove converter housing, see **Converter housing.**
4. Remove primary gear train assembly, see **Primary drive gears.**



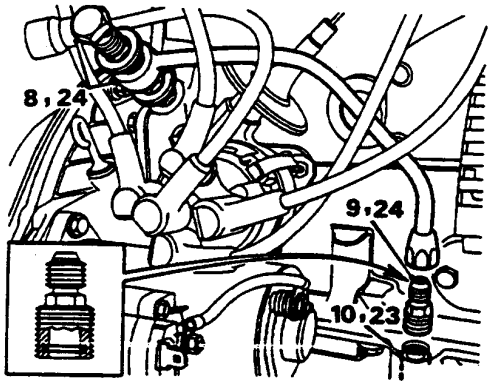
44M0603

5. Unscrew and remove transverse selector rod.



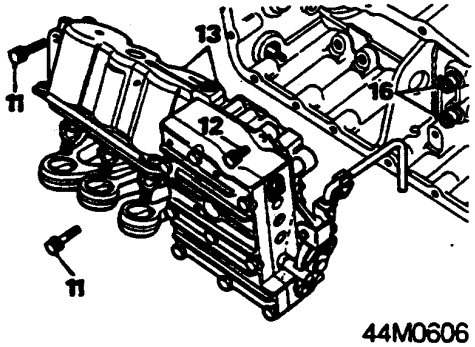
44M0604

6. Unhook three brake bands from servo reaction levers and struts.
7. Remove front cover securing bolts and lift off cover complete with oil filter assembly.



44M0605

8. Slacken engine oil pipe banjo union bolt and disconnect other end of pipe from adapter.
9. Unscrew and remove adapter.
10. Withdraw shaped copper pipe through adapter hole.



44M0606

11. Remove servo assembly securing bolts.
12. Remove three bolts securing valve block.
13. Withdraw servo unit and valve block as an assembly from gearbox casing.
14. Detach servo unit from valve block.

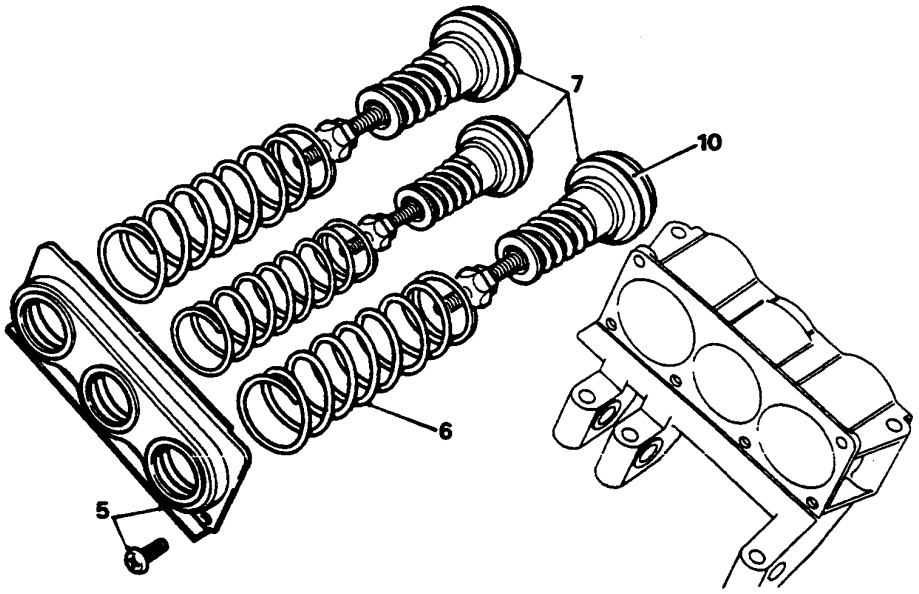
Refit

15. Assemble servo unit to valve block.
16. Fit valve block connections into locations in gearbox casing.
17. Refit servo/valve block assembly loosely into gearbox casing with valve block linkage located over web in casing.
18. Engage valve block linkage with spring clip drive of governor unit; see procedure in 15 to 17 in **Valve Block Assembly**

19. Refit and tighten valve block and servo unit securing bolts as follows:

Valve block bolts	14Nm
Servo bolts	23Nm

20. Screw transverse selector rod fully into valve block selector valve linkage.
21. Locate brake bands onto servo unit reaction levers and struts.
22. Refit gear train assembly.
23. Refit shaped copper pipe through adapter hole and locate it in valve block pipe chest.
24. Screw in adapter and re-connect engine oil feed pipe.
25. Use a new joint washer coated with Hylomar jointing compound (or equivalent) and refit front cover.
26. Refit converter housing, see **Converter housing.**
27. Refit converter assembly, see **Converter assembly.**
28. Refit engine/automatic gearbox assembly, see **ENGINE - Repairs.**



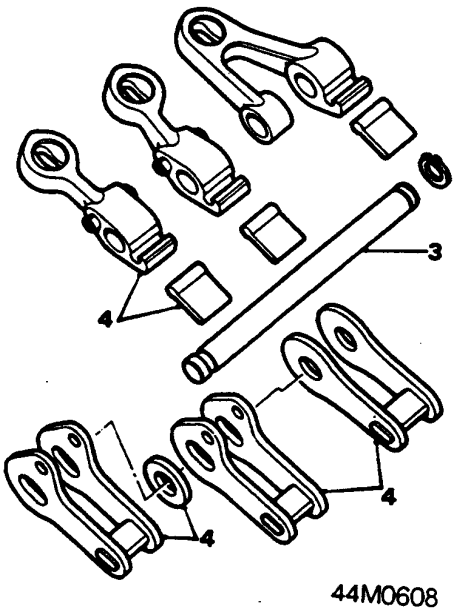
44M0607

SERVO ASSEMBLY - OVERHAUL

Service Repair No. 44.34.04

Dismantle

1. Remove servo assembly, see **Servo assembly.**
2. Detach servo unit from valve block assembly.



44M0608

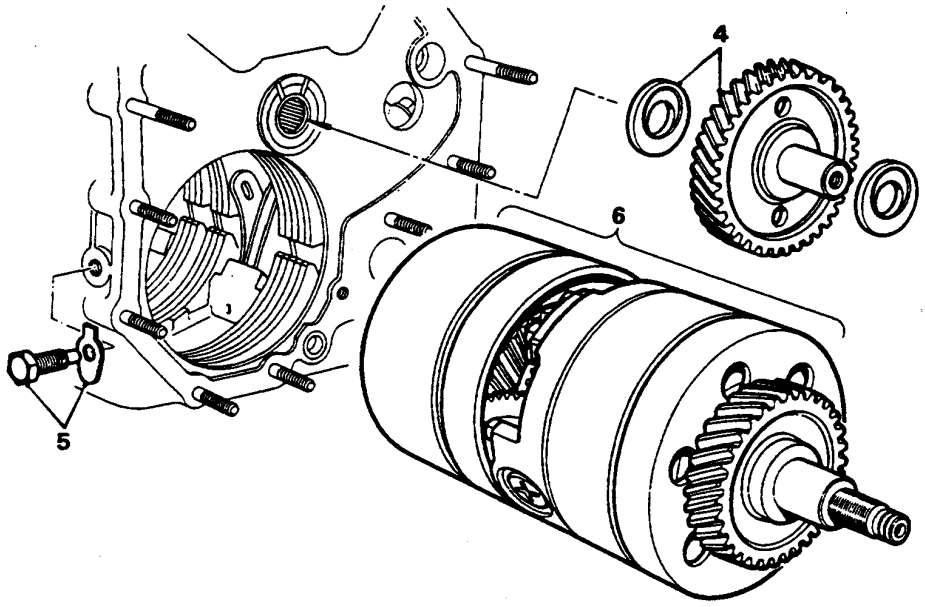
3. Remove centre shaft.
4. Lift out servo levers, reaction levers, washer, and struts.
5. Hold servo cover and remove securing screws and cover.
6. Lift out piston springs.
7. Pull out servo pistons.

Inspection

8. Examine all parts for wear and check bores of servo unit for scoring; fit a new assembly if bores are damaged.
9. Renew piston seals and any other parts as required.

Reassemble

10. Lubricate new seals with oil and fit them onto their respective pistons (lips of seals facing inwards towards bores).
11. Reverse remove procedure in 2 to 7, ensuring correct assembly of reaction levers and struts (with washer correctly positioned as illustrated).
12. Reassemble servo unit to valve block.
13. Refit servo assembly, see **Servo assembly.**



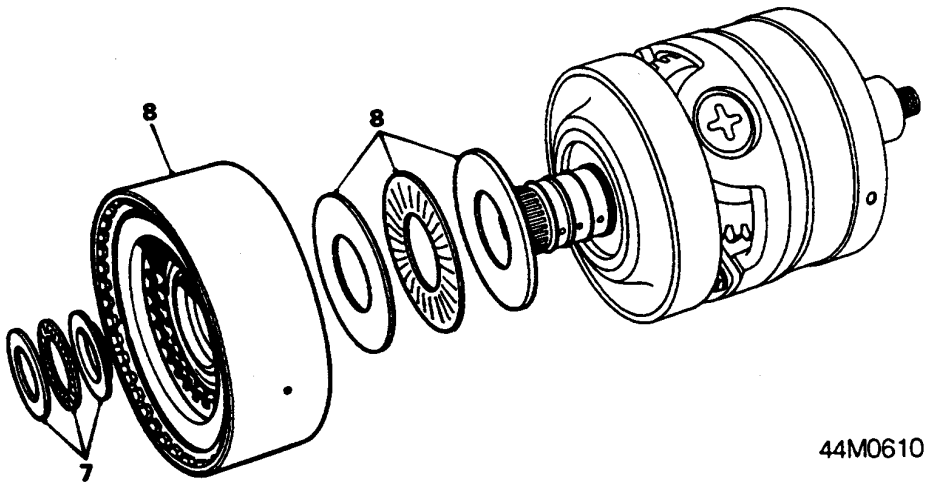
44M0609

GEAR TRAIN

Service Repair No. 44.36.01

Remove

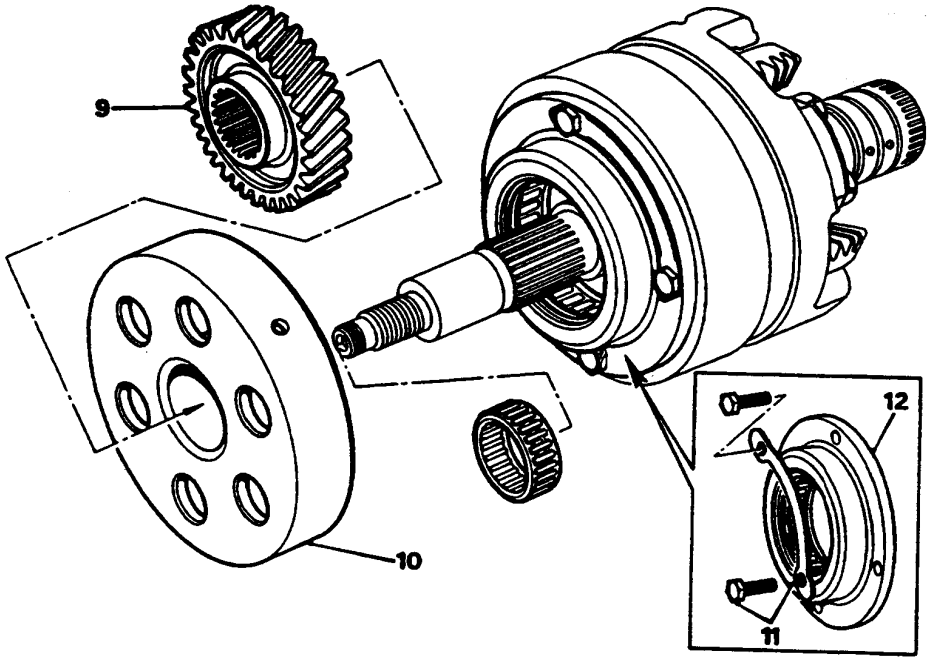
1. Remove engine/automatic gearbox assembly, see **ENGINE - Repairs.**
2. Remove converter assembly, see **Converter assembly.**
3. Remove converter housing, see **Converter housing.**
4. Remove idler gear.
5. Knock back lock washer tab and remove dowel bolt retaining gear train assembly into gearbox casing.
6. Pull out gear train assembly complete with free - wheel reaction member and top and reverse clutch assembly.



44M0610

7. Remove thrust washer, needle thrust bearing and the stepped thrust washer from end of top and reverse clutch.

8. Pull top and reverse clutch off gear train, noting thrust washer (thin), needle thrust bearing, and selective thrust washer (thick), which locate onto reverse output gear shaft.



44M0611

9. Pull off input gear.
10. Remove first gear free – wheel reaction member.
11. Knock back locking plate tabs and remove bolts retaining first gear free – wheel assembly to gear train.
12. Lift off first gear free – wheel housing assembly.

***Note:** If a new gear train is to be fitted, assembly will be complete with third speed reaction gear; this is equivalent to unit removed and necessary components removed from the unit as detailed in procedure 7 to 12.*

Refit

13. Reverse remove procedure, fitting new locking plates where applicable and lock over locking plate tabs. Torque tighten as follows:

First gear free – wheel bolts	8Nm
Dowel bolt – gear train	38Nm

***CAUTION:** Apply hydraulic sealant to dowel bolt threads.*

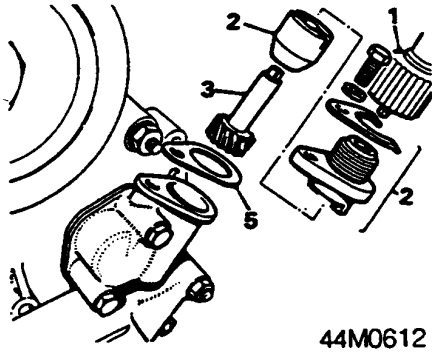
14. Check that top and reverse clutch end face is level with output shaft; see procedure in 11 to 17 in **Top and Reverse Clutches**
15. Refit idler gear.
16. Refit converter housing, see **Converter housing.**
17. Refit converter assembly, see **Converter assembly.**
18. Refit engine/automatic gearbox assembly, see **ENGINE.**

SPEEDOMETER DRIVE PINION

Service Repair No. 44.38.04

Remove

1. Disconnect speedometer drive cable from pinion housing.



44M0612

2. Remove securing screw and withdraw spring plate, pinion bearing housing and drive pinion assembly.
3. Extract pinion from housing.

Refit

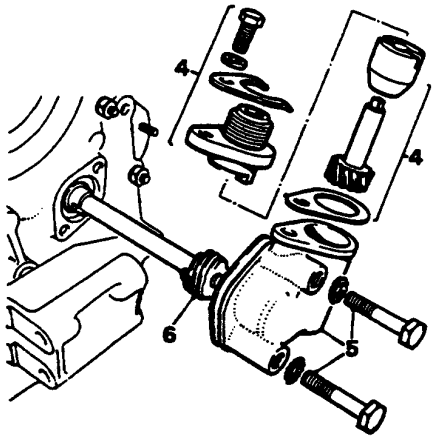
4. Refit pinion into housing.
5. Fit a new joint washer, refit pinion bearing housing and spring plate and tighten securing screw.
6. Connect up speedometer drive cable.

SPEEDOMETER DRIVE GEAR

Service Repair No. 44.38.07

Remove

1. Remove engine/automatic gearbox assembly, see **ENGINE - Repairs.**
2. Remove screws securing radiator to engine mounting adapter bracket.
3. Remove nuts retaining engine mounting adapter bracket to governor housing and detach bracket.



44M0613

4. Remove securing screw and withdraw spring plate, pinion bearing housing and drive pinion assembly.
5. Remove two securing screws and detach drive pinion housing from governor housing.
6. Withdraw speedometer drive gear.

Refit

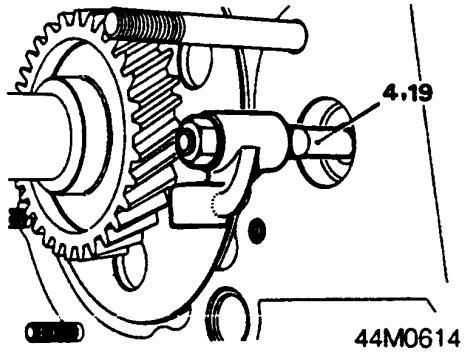
7. Refit speedometer drive gear, if gear cannot easily be pushed fully into engagement with governor, follow the procedure in 8 to 10.
8. Disconnect kickdown control rod ball-joint, remove the screws and detach kickdown control assembly from gearbox casing.
9. Insert a finger through hole and raise governor end bearing into alignment and push drive gear spindle fully into engagement.
10. Refit and connect up kickdown control assembly.
11. Reverse procedure in 2 to 6.
12. Refit gearbox assembly, see **ENGINE - Repairs.**

VALVE BLOCK ASSEMBLY

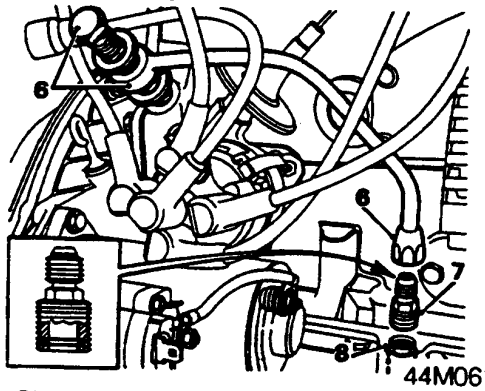
Service Repair No. 44.40.01

Remove

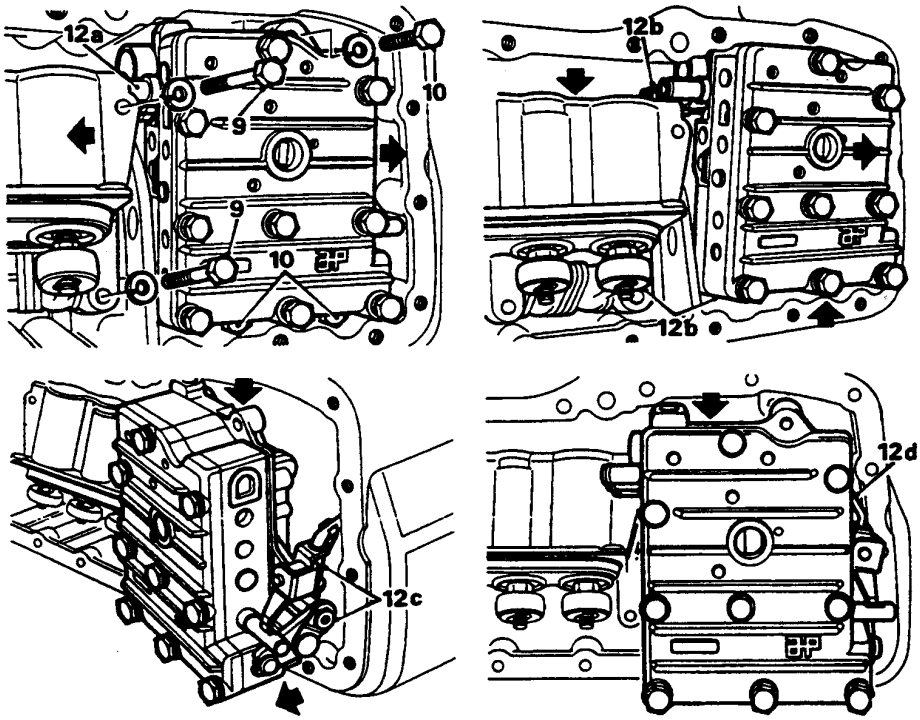
1. Remove automatic gearbox assembly, see **ENGINE.**
2. Remove the converter assembly, see **Converter assembly.**
3. Remove the converter housing, see **Converter housing.**



4. Unscrew and withdraw selector rod out of the gearbox.
5. Remove securing bolts and lift off the oil filter assembly.



6. Slacken engine oil pipe banjo union bolt and disconnect other end of pipe from adapter.
7. Unscrew and remove adapter.
8. Withdraw shaped copper pipe through adapter hole.

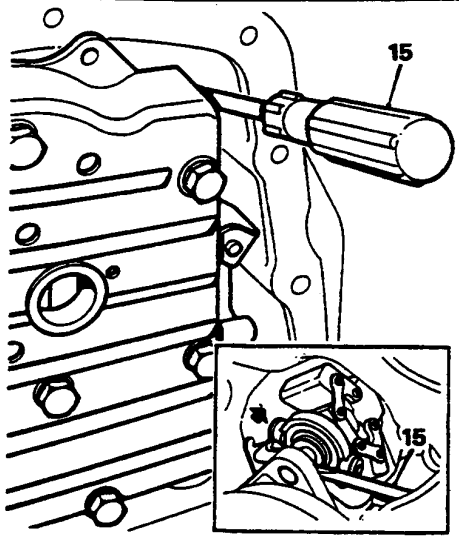


44M0616

9. Remove servo unit securing bolts.
10. Remove three bolts securing valve block to the gearbox casing.
11. Pull valve block outwards to release the governor valve operating link from spring clip drive mechanism of governor unit.
12. To remove complete valve block assembly, follow the operation sequence illustrated and detailed below in 'a' to 'd'. 'Arrows' indicate direction of movement of valve block and servo units:
    a Move valve block away from servo until three interconnecting pipes are release from servo.
    b Pull servo unit downwards and move valve block upwards and sideways to get connecting pipes over top of servo unit.
    c Manoeuvre valve block so that selector valve and governor valve linkage is clear of casing.
    d Pull linkage end of valve block outwards, lift the governor rod link over web in gearbox casing and remove valve block assembly.
13. Before refitting, check 'O' rings on interconnecting pipes and valve block to casing connections. Fit new 'O' rings as required and refit two short connections into their locations in gearbox casing.

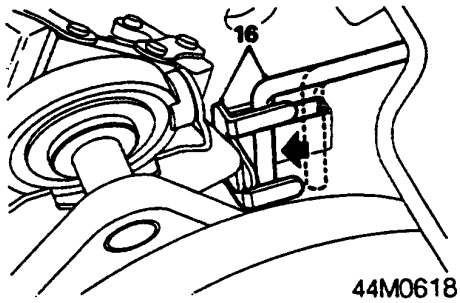
Refit

14. Refit valve block, noting following:
    a Locate governor link over web in transmission before attempting to position valve block and engage pipes.
    b Reverse sequence 'a' to 'd' in procedure 12 to get the valve block in position and interconnecting pipes engaged in servo unit.
    c Finally engage governor valve link with spring clip drive of governor; see procedure in 15 to 17.



44M0617

15. Using a long thin screwdriver, insert it between governor carrier and bearing to provide required angle of spring clip drive with valve block link.

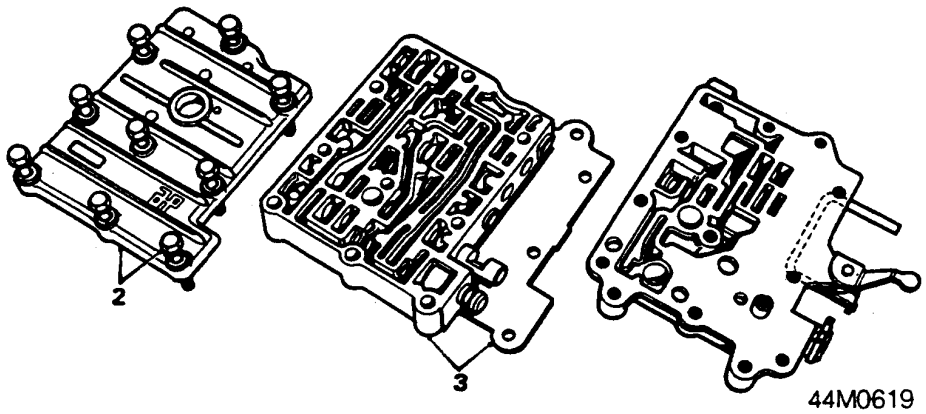


44M0618

16. Hold link with a pair of suitable pliers and push the link fully into engagement with spring clip drive (as illustrated). Pull out screwdriver.
17. Push valve block inwards to engage it with pipe connections in gearbox casing.
18. Refit and tighten valve block and servo unit securing bolts as follows:

Valve block bolts	14Nm
Servo bolts	23Nm

19. Screw transverse selector rod fully into valve block selector valve linkage.
20. Remainder is a reversal of remove procedure.
21. Refit converter housing, see **Converter housing.**
22. Refit converter assembly, see **Converter assembly.**
23. Refit engine/automatic gearbox assembly, see **ENGINE.**



44M0619

VALVE BLOCK ASSEMBLY - OVERHAUL

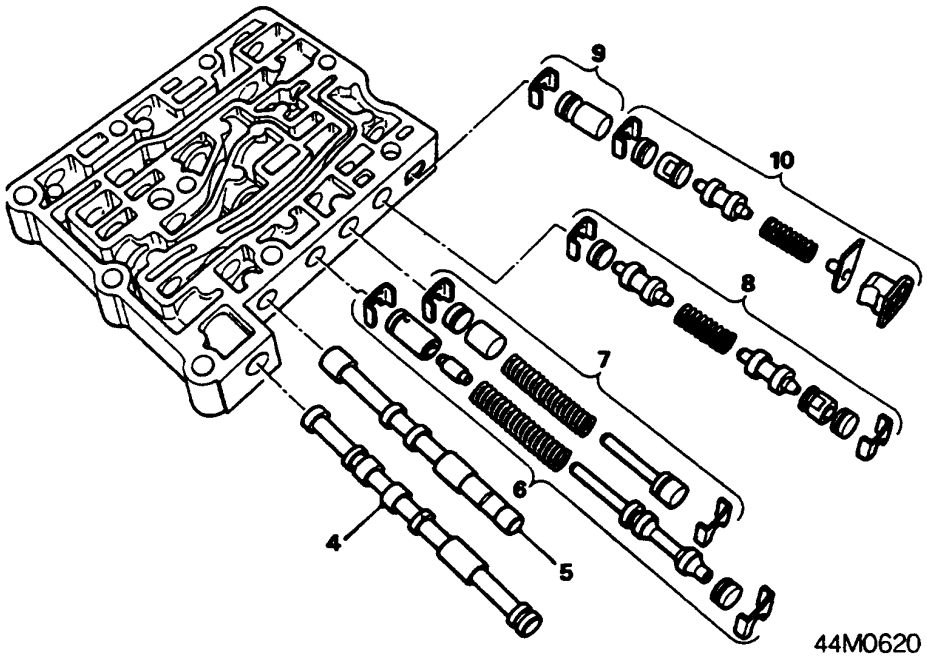
Service Repair No. 44.40.04

Dismantle

1. Remove valve block assembly, see **Valve block assembly.**

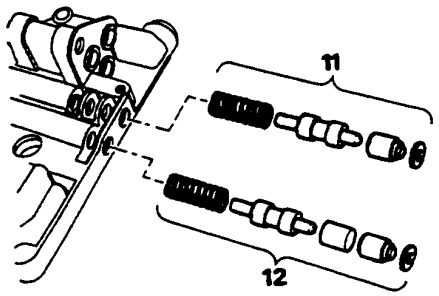
Note: *Before dismantling valve block it must be remembered that valves are selected for each bore.*
It is important to reassemble each valve into its original bore and position. Absolute cleanliness is essential, therefore it is advisable to dismantle unit on a clean sheet of paper.

2. Remove retaining bolts and detach lid.
3. Remove valve chest and separator plate from pipe chest, not small flap valve fitted between valve chest and separator plate.



44M0620

4. Remove selector valve.
5. Remove governor valve.
6. Remove 'C' clips and plugs and withdraw regulator valve components.
7. Remove 'C' clips and plug and withdraw engagement control valve components.
8. Remove 'C' clips and plugs and withdraw second and fourth gear valves and components.
9. Remove end 'C' clip and extract plug and one-way dump valve.
10. Remove centre 'C' clip, plastic end plug and spring retainer; extract third gear valve components.



44M0621

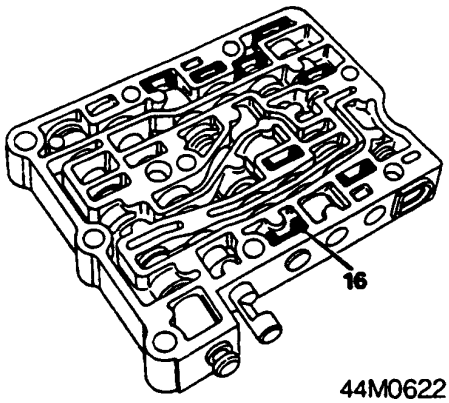
11. *Pipe chest:* Third gear and reverse gear shuttle valves are located in back of pipe chest. Depress abutment plug and remove retaining washer, third gear shuttle valve and spring.
12. Repeat procedure in 11 to remove reverse gear shuttle valve, except that an engagement piston is also fitted in the same bore.

Inspection

13. Clean all parts thoroughly in clean fuel (petrol) or paraffin (kerosene) and dry off using an air pressure line.
14. Check for burrs on valves and bores, check that all valves move freely in their respective bores. Immerse all components in clean engine oil before reassembling.

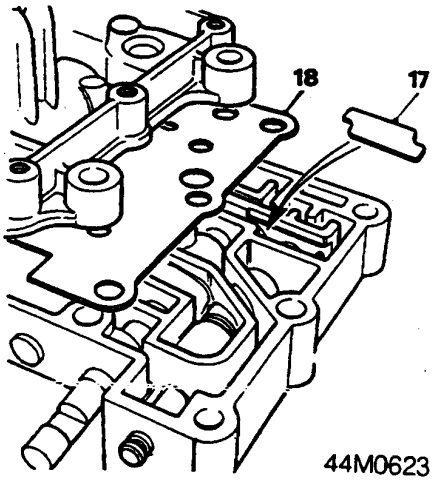
Reassemble

15. Reverse dismantling procedure in 2 to 12 with the components fitted in order illustrated.



44M0622

16. Check that all 'C' clips have been correctly located and fitted as shown in illustration.



44M0623

17. When refitting main sections together, start with valve chest – front face downwards and insert flap valve into its location (arrowed).
18. Refit separator plate and pipe chest to valve chest and locate governor operating lever with governor valve, and selector rod link into grooved end of selector valve.
19. Hold complete assembly together, turn it over, and refit lid.
20. Tighten lid retaining bolts as follows:

5/16 in UNF bolts	25Nm.
3/8 in UNF bolts	40Nm.

21. Refit valve block assembly, see **Valve block assembly.**