16 118 8 TRANSMISSION - OVERHAUL (MT-75/4x4)

SPECIAL SERVICE TOOLS REQUIRED:

Transfer box radial oil seal installer	14-028
Universal flange holding wrench	15-030-A
Counter shaft roller bearing installer	15-036
Remover (basic tool)	15-050
Output flange oil seal installer	15-058
Installer	15-064
Input shaft socket wrench	15-073
Guide sleeve socket wrench	16-040
Transmission housing remover and installer	16-041
Adaptor for front transmission housing	16-041-01
Adaptor for mainshaft removal	16-041-02
Adaptor for output flange oil seal	16-043-A
Guide sleeve oil seal installer	16-044
Roller bearing inner ring remover	16-050
Mainshaft nut socket wrench	16-051
Mounting bracket	16-052
Mainshaft installer	16-053
Installer for double-lipped radial oil seal	16-054
Universal spindle	21-023
Selector shaft ball sleeve extractor	21-036-A
Selector shaft ball sleeve extractor	21-037-B
Selector shaft ball sleeve installer	21-044-A
Transfer box radial oil seal extractor	21-051

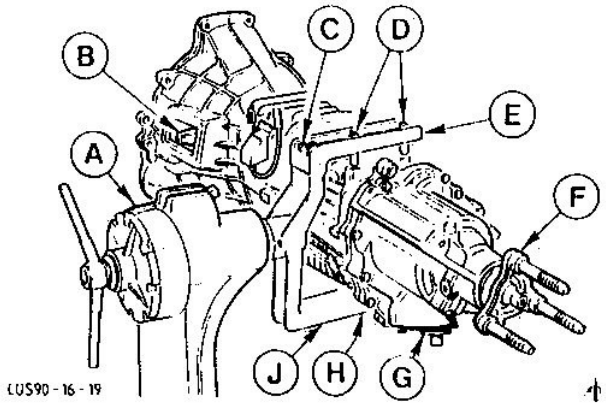

Fig.1. MT-75/4x4 transmission mounted on stand.
- A - Assembly stand
- B - Clutch release lever
- C - Mounting bracket connecting bolts
- D - Mounting bracket retaining bolts
- E - Upper part of mounting bracket
- F - Output flange
- G - Transmission mounting
- H - Clamp bolt of transmission mounting bracket
- J - Mounting bracket

To Dismantle

NOTE: When assembling, replace all the snap rings and circlips and fit replacements of the appropriate thickness so as to eliminate all end float. Refer to the Parts Microfiche for the selection of available snap rings and circlips. Replace all seals.
When assembling, tighten the nuts and bolts to the torques specified in Technical Data.
All running and sliding faces of transmission components and transfer box components for which no particular oil is specified must be lubricated with transmission fluid (for transmission components) or automatic transmission fluid (for transfer box components).

1. Fit the transmission on the assembly stand using mounting bracket 16-052 and universal spindle 21-023.

2. Remove the clutch release lever with the release bearing. Unbolt the transmission mounting (2 bolts), Fig.1. Remove the Torx studs from the output flange using a Torx socket wrench (see "PROPRIETARY TOOLS").

3. Unscrew the oil drain plug and the oil filler plug from the transmission. Drain off the transmission fluid. Unscrew the oil drain plug from the transfer box and drain off the automatic transmission fluid, Fig.2.

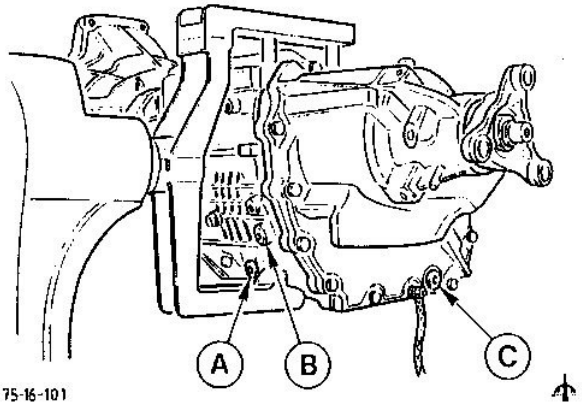

Fig.2. A - Transmission oil drain plug
B - Transfer box oil filler plug
C - Transfer box oil drain plug

4. Remove the output flange nut from the transmission mainshaft using a 30 mm double hexagon socket wrench (see Proprietary Tools). Hold the flange with Special Tool 15-030-A, Fig.3.

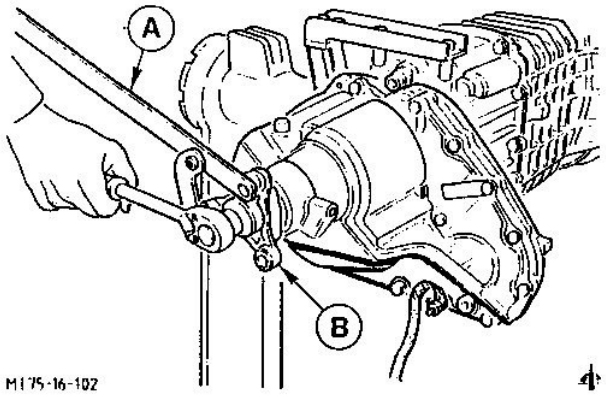

Fig.3. Remove output flange nut.
A - Special Tool 15-030
B - Output flange

5. Hold the output flange with Special Tool 15-030-A and pull it off the transmission mainshaft using a conventional three-legged puller, Fig.4.

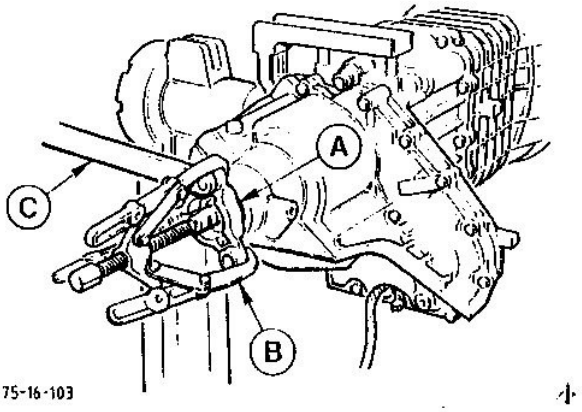

Fig.4. Pull off output flange.
A - Output flange
B - Three-legged puller
C - Special Tool 15-030-A

Fig.4. Pull off output flange.

6. Remove the output flange oil seal from the transfer box using Special Tool 21-051, Fig.5.

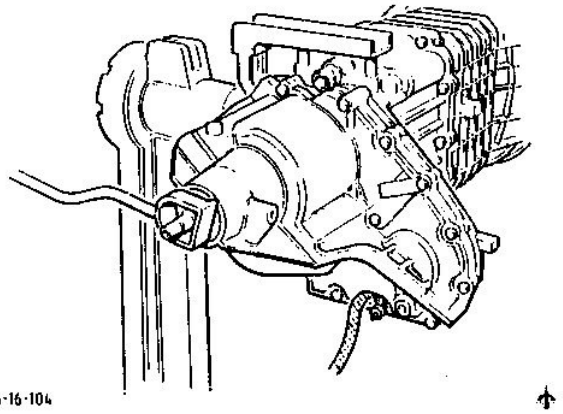

Fig.5. Remove oil seal using Special Tool 21-051.

7. Drive the upper and lower pins out of the transfer box.
Unscrew the 15 transfer box retaining bolts, Fig.6. Unscrew the nuts and remove the earth strap.

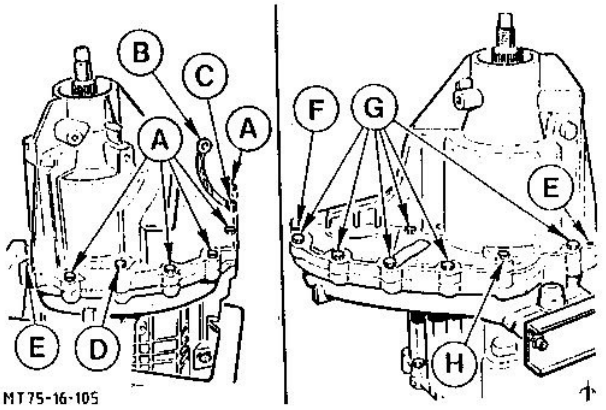

Fig.6. Transfer box retaining bolts.

Fig.6. Transfer box housing/rear transmission housing retaining bolts.
A - Short bolts - left-hand lower half
B - Earth strap
C - 2 nuts, 1 stud
D - Long bolt - left-hand lower half
E - Upper locating dowel
F - Lower locating dowel
G - Short bolt - right-hand upper half
H - Long bolt - right-hand upper half

8. Carefully prise the transfer box housing away from the transmission housing with 2 suitable levers, placing a block of wood under the levers, Fig.7.
Remove the transfer box housing.

NOTE: Do not damage the mating faces.

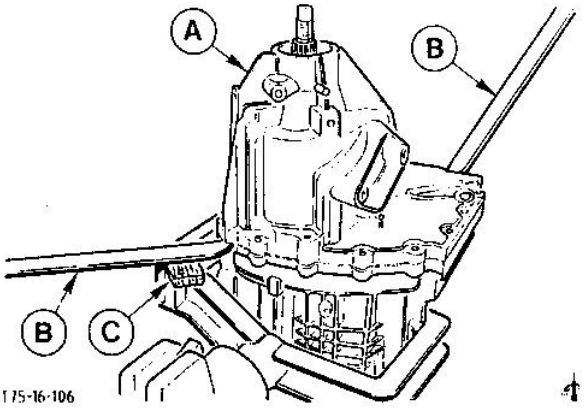

Fig.7. Remove transfer box.

Fig.7. Remove transfer box.
A - Transfer box housing
B - Lever
C - Block

9. Remove the magnetic disc and the shim on the planetary gear carrier, Fig.8.

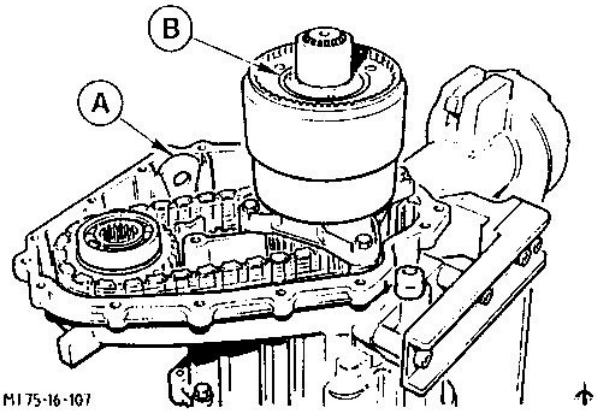

Fig.8. A - Magnetic disc
B - Shim

10. Remove the planetary gear train complete with the viscous coupling and annulus, Fig.9.

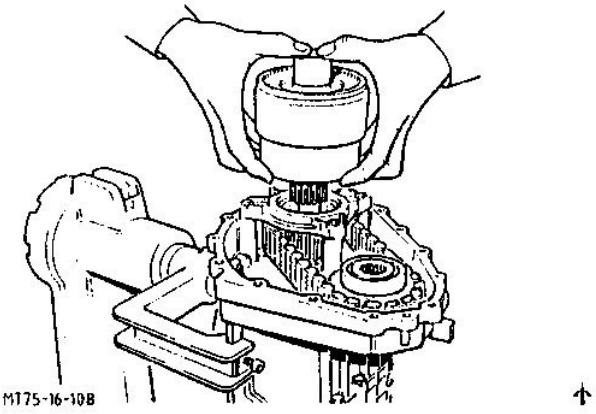

Fig.9. Lift off planetary gear train complete with viscous coupling and annulus.

11. Unscrew the 2 short and the 2 long retaining bolts from the drive sprocket bearing housing, Fig.10, and remove them with the U-shaped washers.

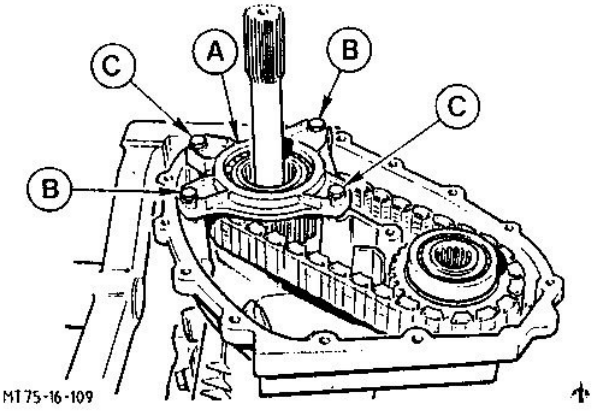

Fig.10. A - Bearing housing
B - Short bolts
C - Long bolts

12. Prise off the drive sprocket bearing housing with 2 levers with hardwood blocks between the levers and the mating face, Fig.11.

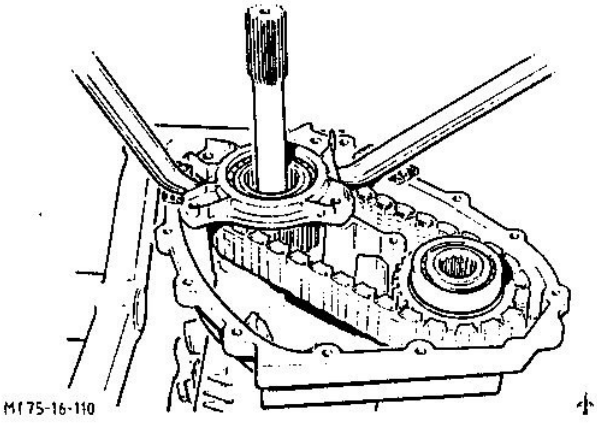

Fig.11. Prise off bearing housing with 2 levers.

13. Withdraw the radial oil seal for the driveshaft to the front axle box using Special Tool 21-051, Fig.12.

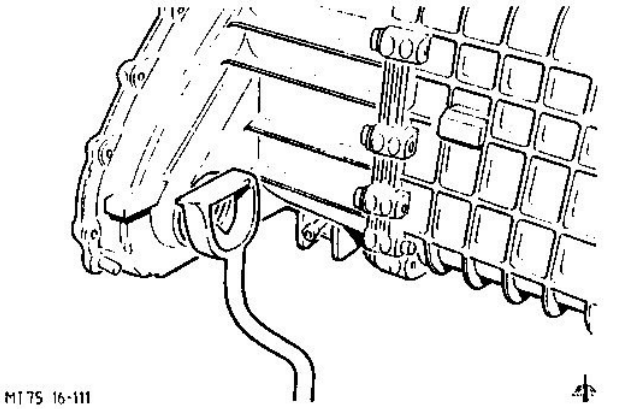

Fig.12. Extract radial oil seal using Special Tool 15-051.

14. Remove the driving and the driven sprocket each with its 2 ball bearings by applying even pressure on the upper ball bearing of the driving sprocket with 2 levers (on hardwood blocks) while simultaneously driving the driven sprocket and its ball bearings out of the housing using Special Tool 16-044, Fig.13.

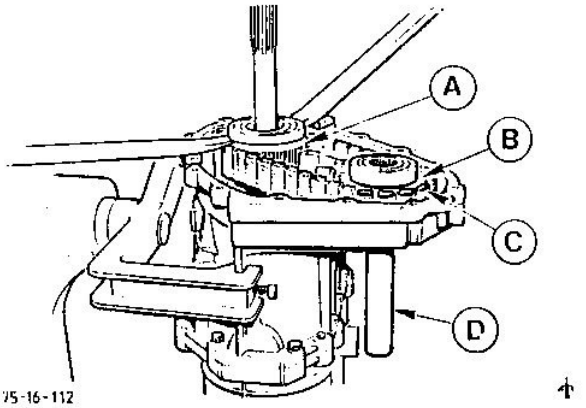

Fig.13. A - Driving sprocket
B - Driven sprocket C - Chain
D - Special Tool 16-044

15. Press the selector shaft in to engage 4th gear. Unscrew the transmission mainshaft nut using Special Tool 16-051, Fig.14A., while holding the input shaft with Special Tool 15-073 and a spanner, Fig.14B.

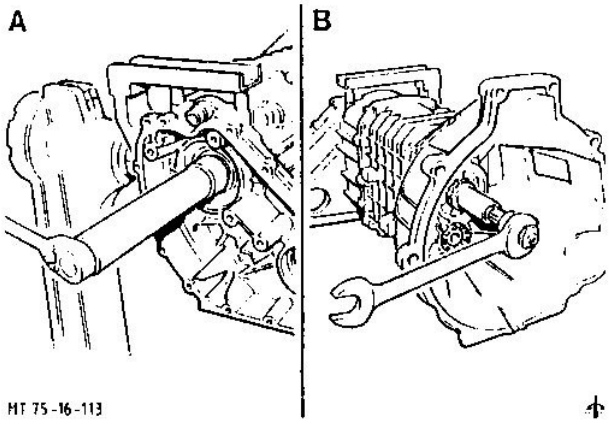

Fig.14. Unscrew transmission mainshaft nut.
A - Unscrew transmission mainshaft nut using Special Tool 16-051
B - Hold input shaft with Special Tool 15-073 and spanner

Fig.14. Unscrew transmission mainshaft nut.

16. Remove the retainer from the countershaft bearing housing (1 bolt), Fig.15A. Remove the countershaft bearing housing using a conventional 17 mm hexagon socket, Fig.15B.

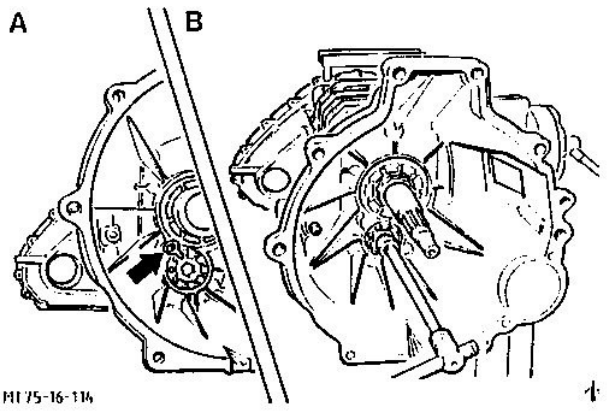

Fig.15. Countershaft bearing housing.
A - Remove circlip
B - Remove bearing housing

17. Remove the clutch release bearing guide sleeve using Special Tool 16-040, Fig.16. Remove the steel washer from the guide sleeve.

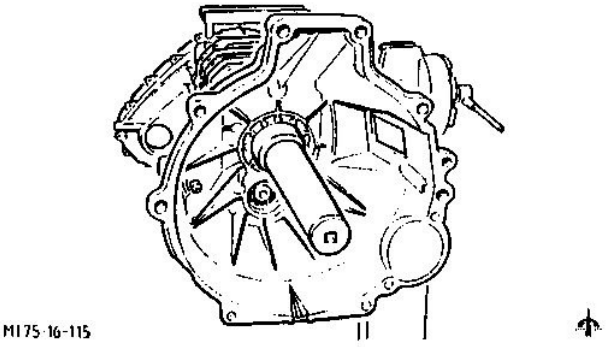

Fig.16. Remove clutch release bearing guide sleeve using Special Tool 16-040.

18. Remove the input shaft inner circlip, Fig.17.

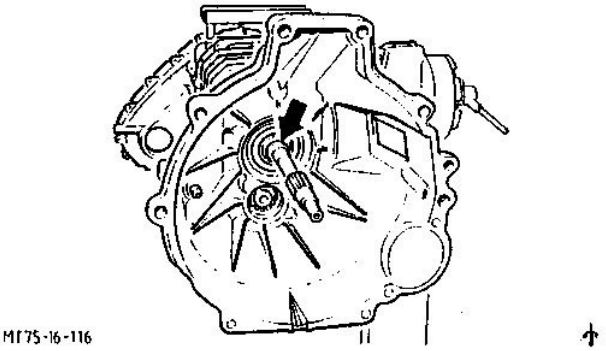

Fig.17. Input shaft inner circlip.

19. Unscrew the threaded plug of the selector detent mechanism. Remove the spring and pin. Extract the sleeve with circlip pliers. Remove the ball, Fig.18.

Fig.18. Selector shaft detent mechanism.
A - Threaded plug
B - Spring
C - Pin
D - Circlip pliers
E - Sleeve
F - Ball

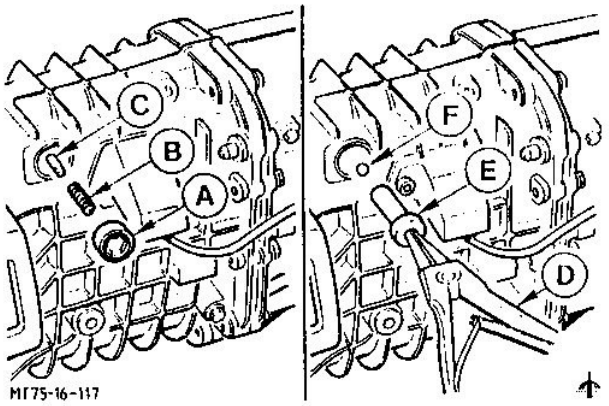

Fig.18. Selector shaft detent mechanism.

20. Remove the locking plate detent screw. Remove the reversing light switch (2 screws).
Loosen the 2 (blue) bolts of the reverse gear idler shaft but only remove the front bolt, Fig.19.

Fig.19. Bolts/screws on left-hand side of transmission.
A - Reversing light switch with retaining screws
B - Detent screw of locking plate/ transmission breather
C - Rear bolt of reverse gear idler shaft
D - Front bolt of reverse gear idler

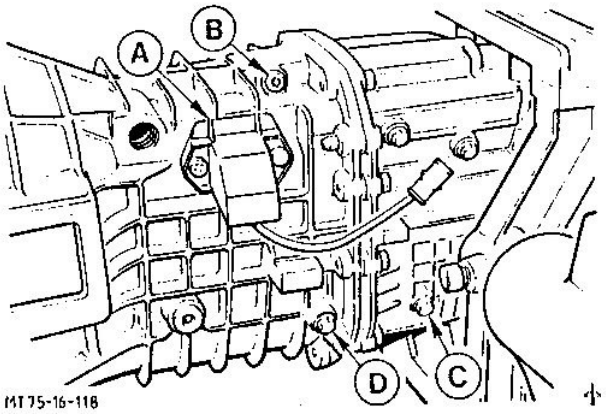

Fig.19. Bolts/screws on left-hand side of transmission.

To Remove Front Transmission Housing

NOTE: Do not hammer back the locating dowels.

21. Undo and remove the 10 transmission housing retaining bolts, Fig.20.

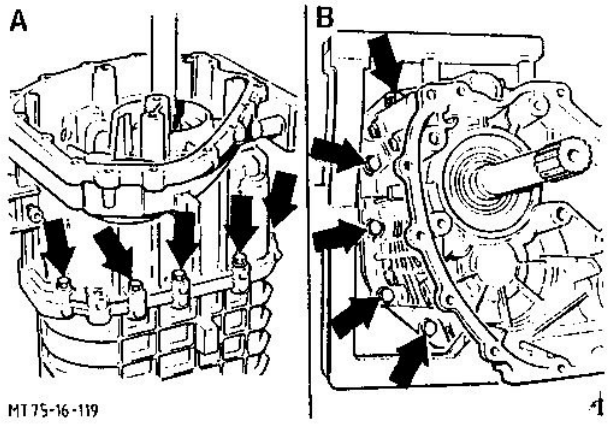

Fig.20. Transmission housing retaining bolts.
A - Right-hand side
B - Left-hand side

22. Separate the transmission housing sections. Screw in a transmission housing retaining bolt part of the way. Position a lever under the bolt. Carefully separate the transmission housing sections using 2 levers, Fig.21.

NOTE: Do not apply the levers on the mating faces.

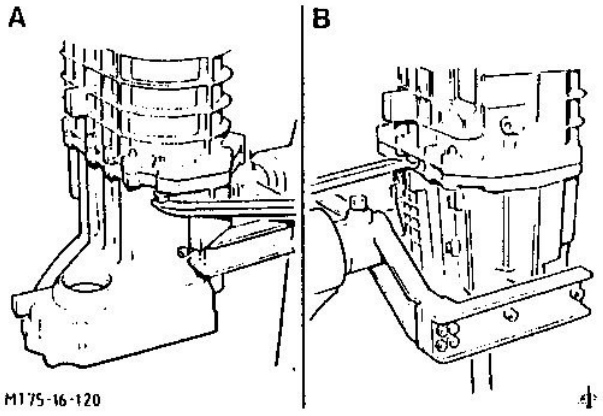

Fig.21. Separate transmission housing sections.

Fig.21. Separate transmission housing sections.
A - Leverage point on right-hand side with inserted bolt and block
B - Leverage point on left-hand side

23. Pull the front transmission housing off the rear transmission housing. To do this, screw Special Tools 16-041 and 16-041-01 into the threaded hole of the guide sleeve. Carefully pull the front transmission housing off the rear transmission housing, Fig.22.

NOTE: Before screwing in the Special Tool, check the threaded hole and the thread of the Special Tool for damage or dirt. After fitting, unscrew the adaptor (16-041-01) a quarter turn by hand. The front transmission housing must come away from the locating dowels easily. Do not apply any appreciable pressure to the input shaft via the Special Tool when separating the housing halves as this could damage the 4th gear synchronizer ring. If necessary, use levers to assist with the separating operation but do not apply the levers on the mating faces.

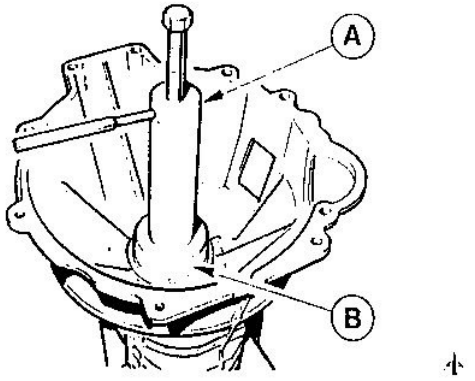

Fig.22. Pull off front transmission housing.
A - Special Tool 16-041
B - Special Tool 16-041-01

To Remove the Transmission Mainshaft and Gear Assembly:

24. Withdraw the auxiliary selector shaft from the 3rd/4th gear selector fork. Remove the 3rd/4th gear selector fork from the 3rd/4th gear synchronizer unit.

Unscrew the second bolt of the reverse gear idler shaft. Remove the magnetic disc from the rear transmission housing, Fig.23.

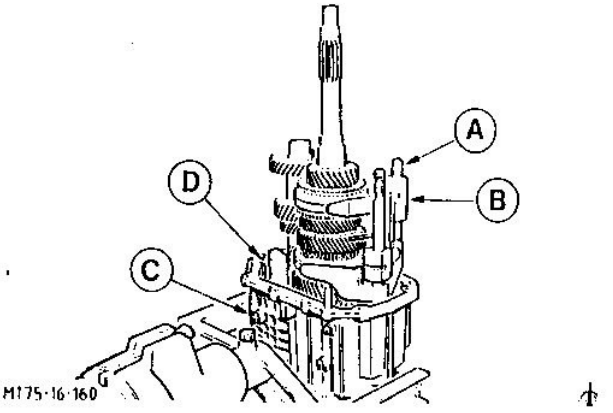

Fig.23. Remove transmission components.

Fig.23. Remove transmission components.
A - Auxiliary selector shaft
B - 3rd/4th gear selector fork
C - Bolt of reverse gear idler shaft
D - Magnetic disc

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NOTE: Before pressing the transmission mainshaft out of the bearing in the rear transmission housing, move the selector shaft to the "neutral position" so that the guide pin cannot be broken off the selector pin holder.

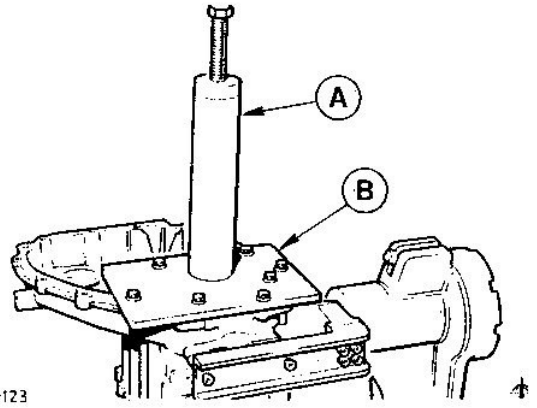

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Fig.24. Special Tools attached.
A - Special Tool 16-041
B - Special Tool 16-041-02

25. Turn the transmission housing through 180°. Slide Special Tool 16-041 over the mainshaft. Secure Special Tool 16-041-02 to the rear transmission housing with 7 bolts, Fig.24.

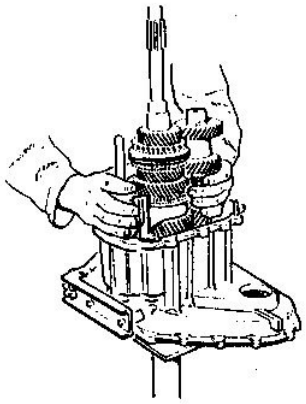

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Fig.25. Lift out complete gear assembly with main selector shaft.

26. Swivel the transmission so that the tool is at the bottom. Press the transmission mainshaft upwards out of the bearing in the transfer box using Special Tool 16-041, Fig.24.
Lift the input shaft, transmission mainshaft, countershaft, main selector shaft and reverse gear idler shaft assembly out of the transmission housing, Fig.25.

NOTE: Hold the transmission components together with cable ties to facilitate removal.

Remove the Special Tools from the transfer box.

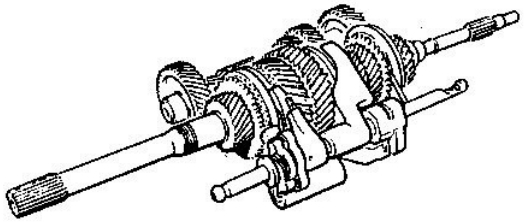

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Fig.26. Complete gear assembly removed.

27. Remove the transmission mainshaft spacer sleeve from the transfer box, Fig.27.

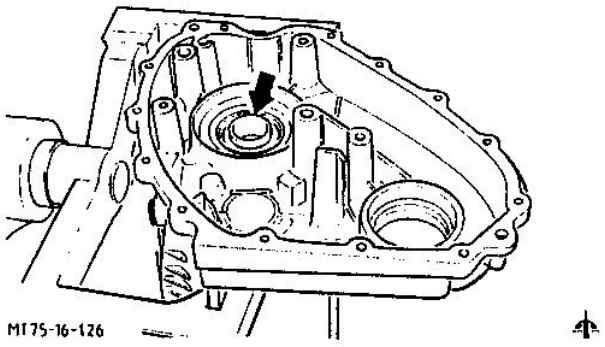

Fig.27. Transmission mainshaft spacer sleeve.

To Dismantle Transfer Box

28. Remove the thrust plate of the transmission mainshaft bearing from the transfer box (3 bolts), Fig.28.

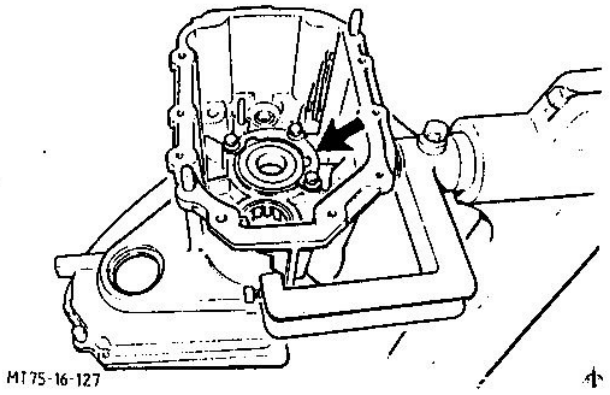

Fig.28. Retaining plate of transmission mainshaft bearing.

29. Drive the transmission mainshaft bearing out of the transfer box towards the inside using Special Tool 16-044, Fig.29.

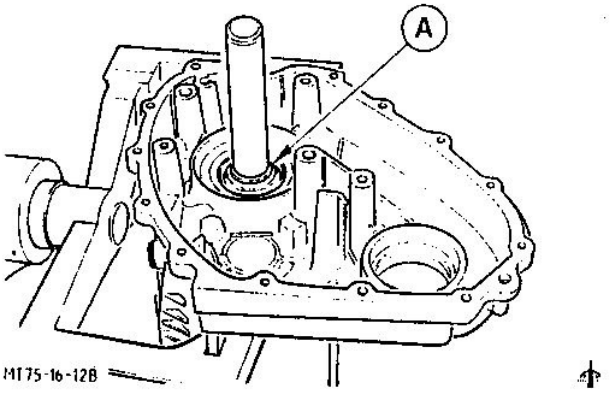

Fig.29. Remove transmission mainshaft bearing.
A - Special Tool 16-044

30. Drive the double-lipped radial oil seal of transmission mainshaft out of the transfer box from the inside using a suitable piece of tube, Fig.30.

NOTE: The radial oil seal has different outside diameters and therefore can only be removed in one direction.

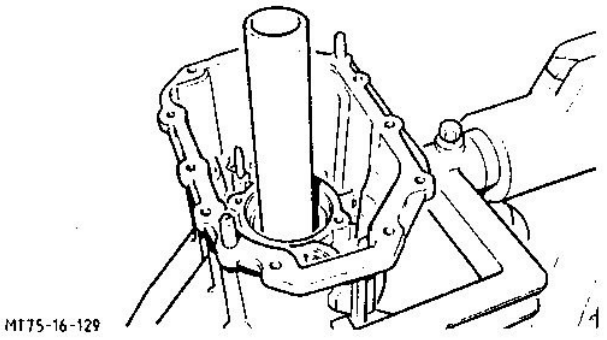

Fig.30. Drive out double-lipped radial oil seal with suitable length of tube.

31. Draw the countershaft roller bearing from the transfer box using a conventional internal extractor, Fig.31.

NOTE: Protect the mating faces of the transmission housing from damage with strips of aluminium.

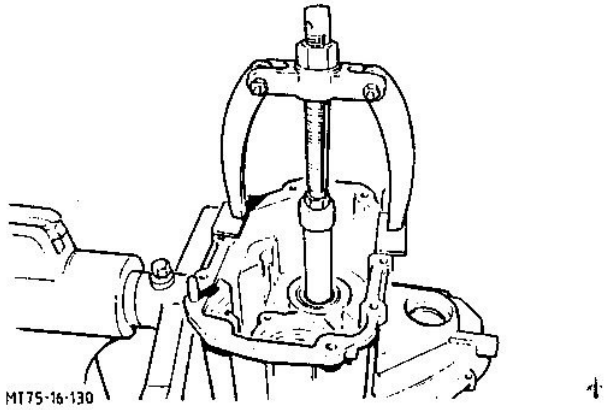

Fig.31. Extract roller bearing with conventional internal extractor.

32. Drive the bearing of the main selector shaft ball sleeve out of the transfer box with the radial oil seal using a suitable drift, Fig.32.

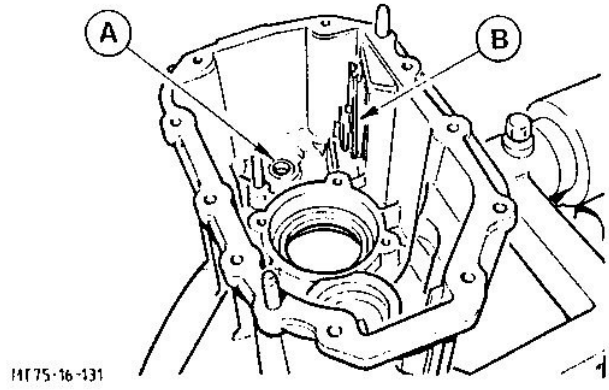

Fig.32. A - Main selector shaft ball sleeve
B - Selector gate

33. Remove the selector gate, Fig.32, from the transfer box (2 fit bolts), Fig.33.

NOTE: Only remove the selector gate if the transfer box is being replaced.

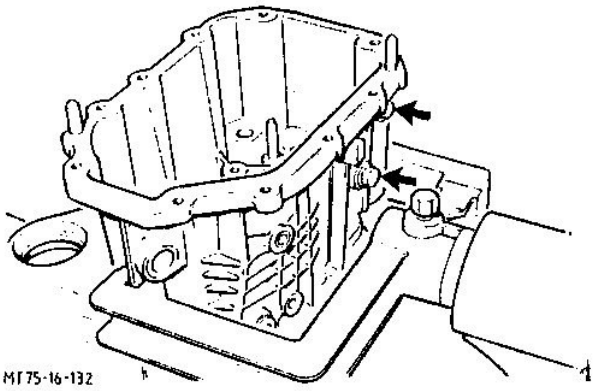

Fig.33. Selector gate special bolts.

To Reassemble Transfer Box

34. Fit the bearing of the main selector shaft ball sleeve bearing flush in the transfer box from the inside using Special Tool 21-044-A, Fig.34.

35. Fit the main selector shaft radial oil seal in the transfer box using an appropriate sleeve.

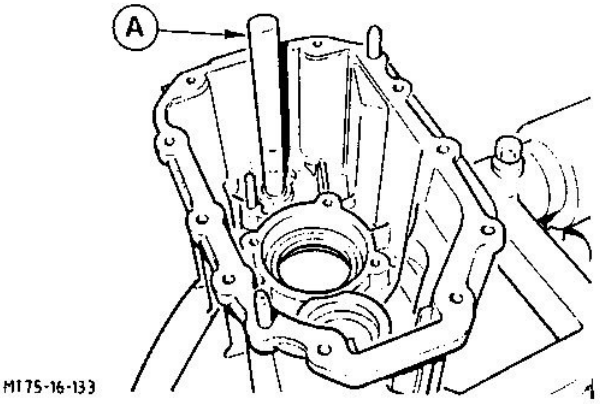

Fig.34. Fit main selector shaft ball sleeve.
A - Special Tool 21-044-A

36. If removed, fit the selector gate, Fig.35, in the transfer box with new special bolts.

37. Fit the countershaft roller bearing and the transmission mainshaft bearing.
To do this, heat the area around the bearing seats in the transfer box to a temperature of 70 to 100°C with a hot air blower.

NOTE: Cool the mainshaft bearing and countershaft bearing before fitting.

Fit the transmission mainshaft ball bearing with the closed side facing upwards and fit the countershaft roller bearing.

Secure the mainshaft bearing retaining plate with the 3 bolts, Fig.35

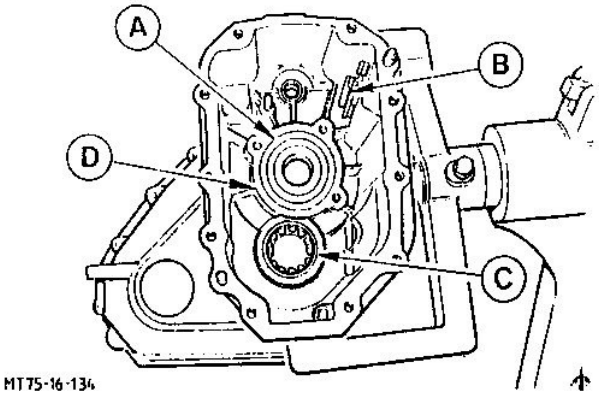

Fig.35. A - Bearing - closed side upwards
B - Selector gate
C - Roller bearing
D - Heated area

38. If the transfer box is being replaced, a new detent pin must be fitted for the gear shift. The distance between the tip of the detent pin and the housing mating face should be 69,0 ± 0,3 mm, Fig.36.

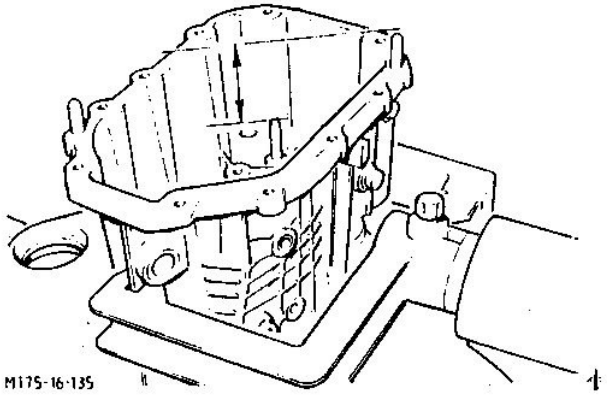

Fig.36. Distance from tip of detent pin to mating face 69,0 ± 0,3 mm.

To Dismantle Front Transmission Housing:

39. Drive the input shaft bearing out forwards, from the front transmission housing, using using a suitable length of tube. Detach the ball bearing circlip and discard the circlip, Fig.37.

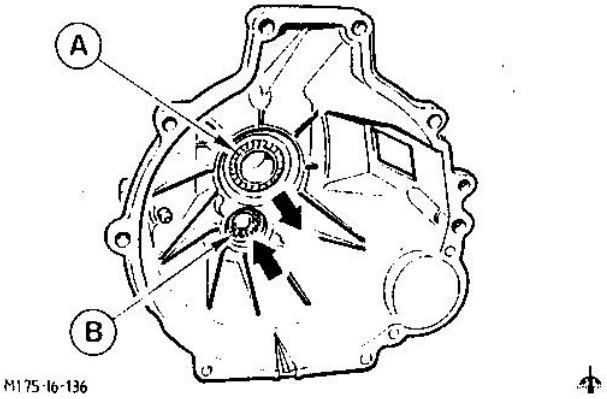

Fig.37. A - Input shaft bearing (removed towards front)
B - Countershaft roller bearing (removed towards rear)

40. Remove the main selector shaft ball sleeve bearing using a suitable internal extractor or, when available, Special Tool 21-036-A with the spindle of 21-037-B and an appropriate thrust element 55 mm in length and 13 mm in diameter, Fig.38

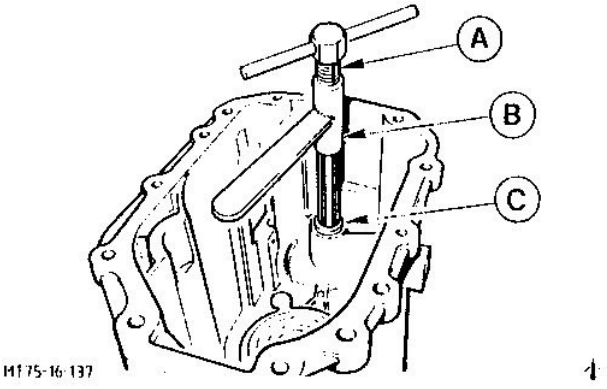

Fig.38. A - Special Tool 21-037-B
B - Special Tool 21-036-A
C - Main selector shaft ball sleeve bearing

To Reassemble Front Transmission Housing:

41. Fit the main selector shaft sleeve bearing flush in the front transmission housing from inside using Special Tool 21-044-A, Fig.39

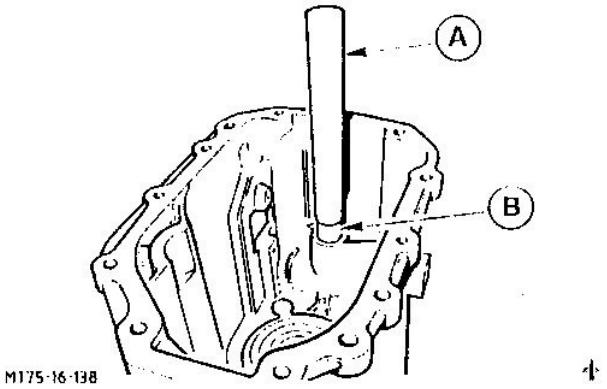

Fig.39. A - Special Tool 21-044-A
B - Main selector shaft sleeve bearing

42. Heat the bearing seat of the countershaft roller bearing in the front transmission housing to a temperature of 70 to 100°C with a hot air blower and fit the roller bearing so that it protrudes 2 mm using Special Tool 15-036, Fig.40.

NOTE: Do not drive the countershaft roller bearing flush into the front transmission housing but let it protrude approximately 2,0 mm, Fig.40.

43. Heat the bearing seat of the input shaft bearing in the front transmission housing to a temperature of 70 to 100°C using a hot air blower and fit the ball bearing flush with a suitable length of tube or, if available, Special Tool 15-064 and a drift from the clutch side, Fig.41.

NOTE: Fit the input shaft ball bearing with a new circlip. Cool the ball bearing before fitting circlip.

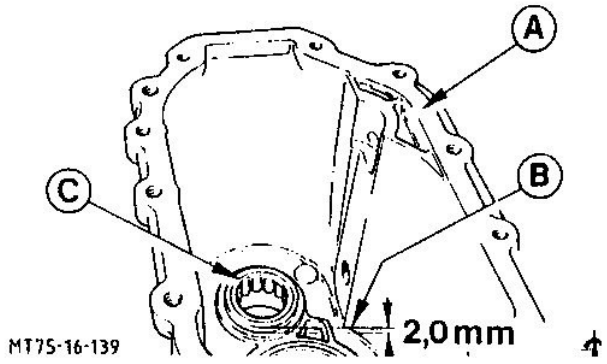

Fig.40. A - Front transmsisson housing
B - Protrusion of 2 mm
C - Countershaft roller bearing

Fig.41. Fit input shaft ball bearing in front transmission housing (shown with Special Tool 15-064)
A - Input shaft bearing
B - Drift
C - Special Tool 15-064

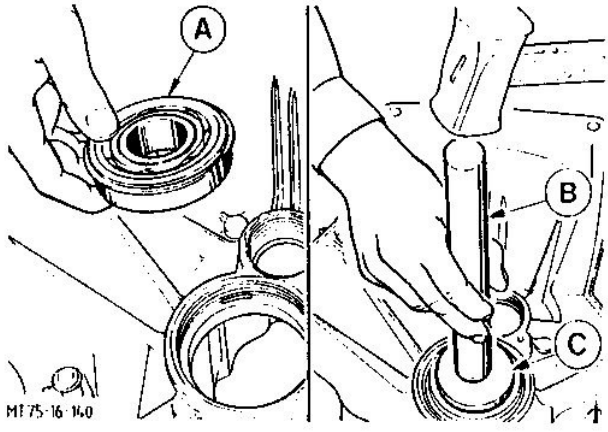

Fig.41. Fit input shaft bearing in front transmission housing (shown with Special Tool 15-064).

44. Pull off the countershaft bearing inner rings using Special Tool 15-050 A in conjunction with Special Tool 16-050, Fig.42.

Fig.42. Pull off countershaft bearing inner rings.
A - Special Tool 15-050 A
B - Special Tool 16-050
C - Countershaft

45. Heat the countershaft bearing inner rings to a temperature of approximately 100°C and draw them onto the countershaft.

NOTE: When the countershaft roller bearings are replaced, the inner rings must also be replaced as the two parts are paired.

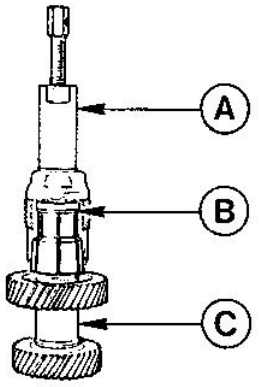

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Fig.42. Pull off countershaft bearing inner rings.

To Dismantle Reverse Gear Idler Shaft:

46. Drive out the roll pin and remove the bearing block, idler gear and needle roller bearing from the idler shaft.

Fig.43. Reverse gear idler shaft - exploded view.
A - Shaft
B - Needle roller bearing
C - Idler gear
D - Roll pin
E - Bearing block

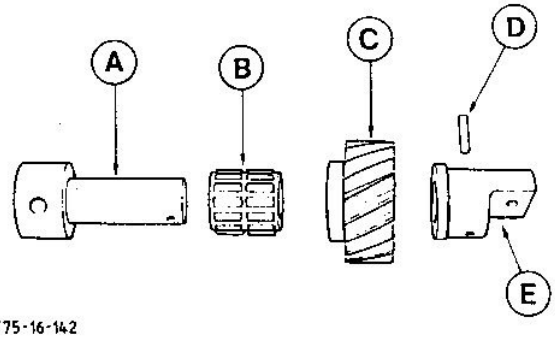

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Fig.43. Reverse gear idler shaft - exploded view.

To Reassemble Reverse Gear Idler Shaft:

47. Slide the bearing, idler gear and bearing block onto the idler shaft and secure them with the roll pin.

NOTE: Make sure that the bearing block is fitted turned at the right angle. The threaded holes must line up with one another.

48. Remove the radial oil seal from the clutch release bearing guide sleeve.

49. Fit the radial oil seal in the clutch release bearing guide sleeve using Special Tool 16-044.

NOTE: The sealing lip must point towards the tool when the seal is fitted, Fig.44.

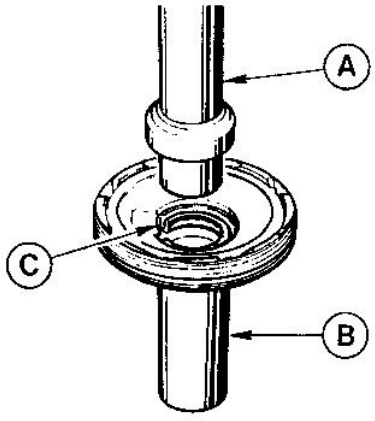

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Fig.44. Fit radial oil seal.
A - Special Tool 16-044
B - Clutch release bearing guide sleeve
C - Radial oil seal in position

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To Dismantle Transmission Mainshaft

50. Remove the input shaft with the 4th gear synchronizer ring and input shaft/transmission mainshaft roller bearing.

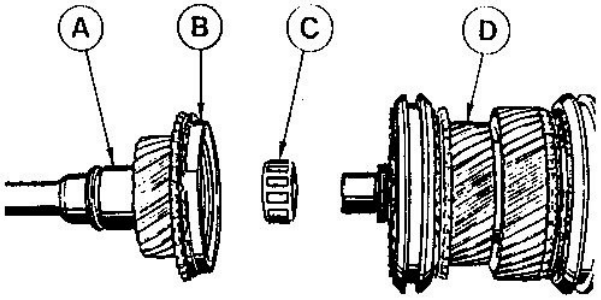

Fig.45. Input shaft removed
A - Input shaft
B - 4th gear synchronizer ring
C - Input shaft/transmission mainshaft roller bearing
D - Transmission mainshaft

Fig.45. Input shaft removed.

51. Remove the 5th gear cog with the synchronizer ring and needle roller bearing from the transmission mainshaft, Fig.46.

52. Clamp the transmission mainshaft in a vice with the output side pointing downwards.

NOTE: Use soft jaws.

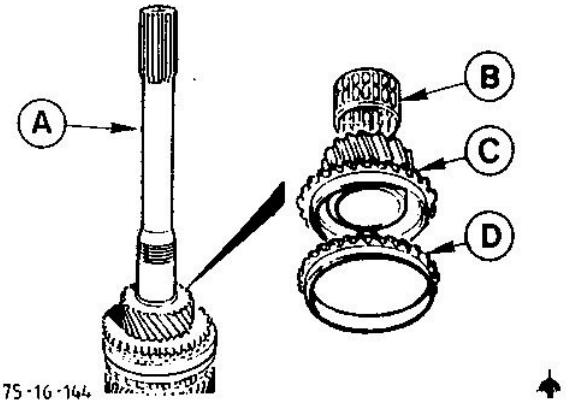

Fig.46. A - Transmission mainshaft
B - Needle roller bearing
C - 5th gear cog
D - Synchronizer ring

Fig.46.

CAUTION: Danger of injury - do not remove the synchronizer unit on its own otherwise it could fall apart.

53. Remove the snap ring for the 3rd/4th gear synchronizer unit from the transmission mainshaft and remove the 3rd/4th gear synchronizer unit complete with the 3rd gear cog and 3rd gear needle roller bearing from the transmission mainshaft, Fig.47.

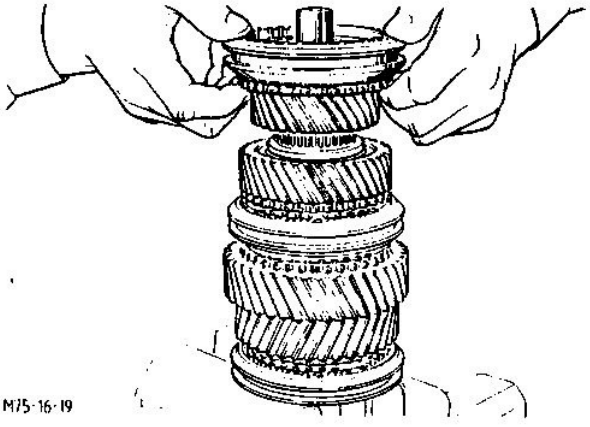

Fig.47. Remove 3rd/4th gear synchronizer unit complete with 3rd gear cog.

54. Heat the 3rd gear bearing bush to approx. 100°C with a hot air blower. Align the 2nd gear oil grooves with the openings in the bearing bush. Lift the bearing off the transmission mainshaft using 2 suitable levers and pull it off using a puller, Fig.48.

    Remove the 2nd gear cog with the needle roller bearing and the 2nd gear synchronizer ring from the transmission mainshaft.

NOTE: Do not mix up the needle roller bearings of the 2nd and 3rd gear cogs. Always keep the bearing with its associated cog.

CAUTION: Danger of injury - do not remove the synchronizer unit on its own otherwise it may fall apart.

55. Remove the snap ring of the 1st/2nd rear synchronizer unit from the transmission mainshaft.
    Remove the 1st/2nd gear synchronizer unit complete with 1st gear cog and 1st gear needle roller bearing from the transmission mainshaft.

56. Release the transmission mainshaft from the vice and clamp it again with the output side pointing upwards.

57. Remove the snap ring of the 5th/reverse gear synchronizer unit from the transmission mainshaft. Remove the 5th/reverse gear synchronizer unit complete with the reverse gear cog and needle roller bearing from the transmission mainshaft.

58. Do not remove the synchronizer unit on its own since there is a danger of it falling apart.

    The 1st/2nd gear and 5th/reverse gear synchronizer units are identical. Do not mix them up when reassembling.

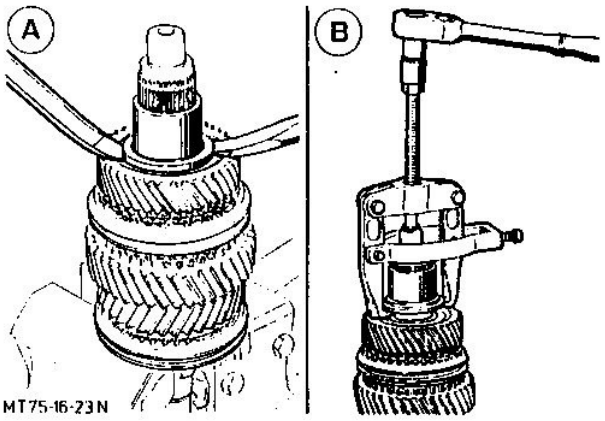

Fig.48. Remove 3rd gear bearing bush.
A - Lift
B - Pull off

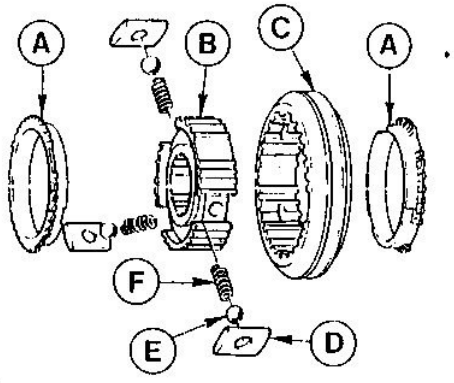

Fig.49. Synchronizer unit - exploded view.

Fig.49. Synchronizer unit - exploded view
A - Synchronizer rings
B - Synchronizer hub
C - Selector ring
D - Inserts
E - Ball
F - Spring

To Reassemble Transmission Mainshaft:

NOTE: Replace all the snap rings and circlips. Select new snap rings and circlips so that they fit in the appropriate groove without any play, Fig.50. Snap rings and circlips are available in different thicknesses (see parts Microfiche). Before assembling, oil all the transmission parts, synchronizer rings and needle roller bearings with the specified transmission fluid (see Technical Data).

59. Clamp the transmission mainshaft in the vice with the output side pointing upwards.

NOTE: Use soft jaws.

60. Slide the reverse gear needle roller bearing and the reverse gear cog onto the transmission mainshaft. Fit the 5th/reverse gear synchronizer unit and synchronizer ring on the mainshaft and secure them with the circlip.

61. Release the transmission mainshaft from the vice and clamp it again with the output side pointing downwards.

62. Slide the 1st gear needle roller bearing and cog onto the transmission mainshaft. Fit the 1st/2nd gear synchronizer ring, synchronizer unit and cog on the transmission mainshaft and secure them with a snap ring, Fig.51.

63. Slide the 2nd gear synchronizer ring, needle roller bearing and 2nd gear cog onto the transmission mainshaft.

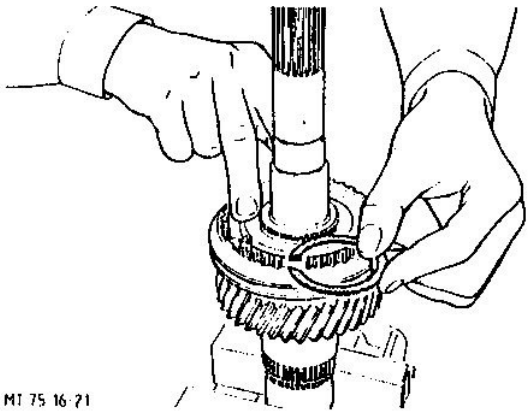

Fig.50. Select circlip (5th/reverse gear synchronizer MT-75 shown without 4x4).

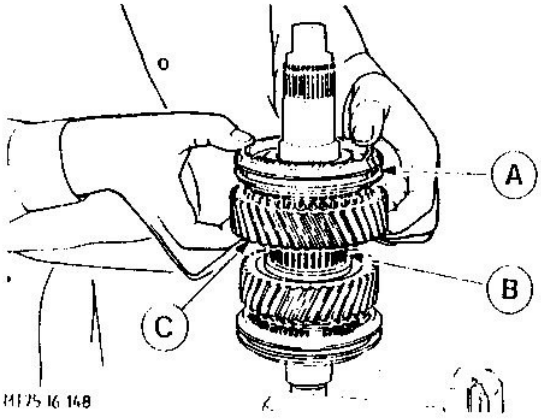

Fig.51. Fit 1st/2nd gear synchronizer unit.
A - 1st gear cog
B - Synchronizer unit
C - 1st gear needle roller bearing

64. Heat the bearing bush of the 3rd gear needle roller bearing to a temperature of approximately 100°C and slide the bearing bush onto the transmission mainshaft.

NOTE: Make sure that the bearing bush is slid fully onto the transmission mainshaft and is in contact with the shoulder on the transmission mainshaft, Fig.52. Only replace the 3rd gear needle roller bearing in conjunction with the bearing bush.

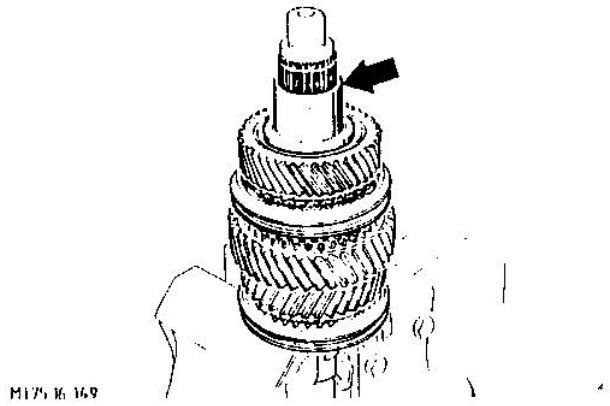

Fig.52. Bearing bush of 3rd gear needle roller bearing.

65. When the bearing bush has cooled, fit the 3rd gear needle roller bearing and cog. Slide the synchronizer ring and the 3rd/4th gear synchronizer unit with the short collar facing upwards, onto the transmission mainshaft and secure them with a snap ring, Fig.53.

66. Remove the transmission mainshaft assembly from the vice. Fit the 5th gear synchronizer ring, 5th gear needle roller and cog on the transmission mainshaft.

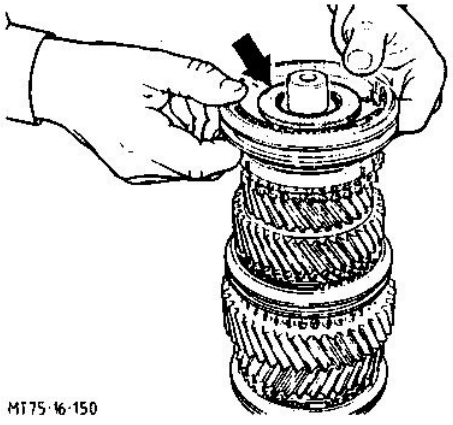

Fig.53. Short collar of 3rd/4th gear synchronizer unit.

To Dismantle Main Selector Shaft:

67. Remove the circlip in front of the spring retainer from the main selector shaft. Remove the spring retainer, spring and spring carrier, Fig.54.

NOTE: Catch the two balls of the spring carrier.

Fig.54. Selector shaft - exploded view
A - Spring retainer
B - Spring carrier
C - Selector pin holder
D - Selector pin
E - Main selector shaft
F - Locking sleeve
G - 1st/2nd gear selector fork
H - Balls
J - Spring
K - Circlip

68. Drive the roll pin out of the selector pin holder and main selector shaft. Pull the selector pin holder off the selector shaft.

69. Remove the 1st/2nd gear selector fork and locking sleeve from the main selector shaft.

70. Drive the roll pin out of the selector pin and main selector shaft and remove the selector pin.

NOTE: Do not remove the actuating pin for the reversing light switch, Fig.54. The main selector shaft is supplied complete with the actuating pin.

To Assemble Main Selector Shaft:

71. Slide the selector pin onto the main selector shaft and secure it with the roll pin. The pin must point in the opposite direction to the actuating pin for the reversing light switch.

72. Slide the locking sleeve onto the selector shaft and selector pin and fit the 1st/2nd gear selector fork on the selector shaft, Fig.55.

73. Slide the selector pin holder onto the selector shaft and secure it with the roll pin. Press the roll pin in centrally, i.e. so it is countersunk on both sides.

NOTE: The pins on the selector pin holder must point in the same direction as the actuating pin for the reversing light switch, Fig.56.

74. Fit the spring carrier with the two balls on the main selector shaft. Fit the spring and spring retainer and secure them with a snap ring.

NOTE: The opening in the spring carrier for the detent pin must face in the opposite direction to the actuating pin for the reversing light switch.

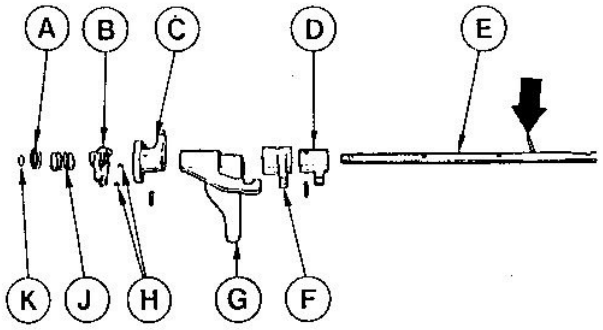

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Fig.54. Selector shaft - exploded view.

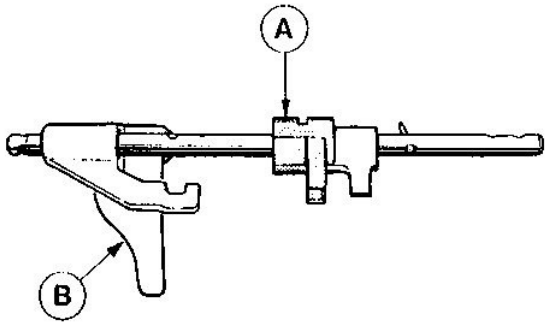

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Fig.55. Fit selector fork and locking sleeve.
A - Locking sleeve
B - 1st/2nd gear selector fork

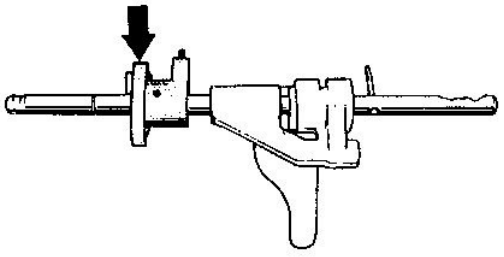

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Fig.56. Selector pin holder.

To Reassemble Transmission

75. Clamp the transmission mainshaft assembly in the vice with the output side pointing downwards.

NOTE: Use soft jaws.

76. Fit the main selector shaft to the transmission mainshaft with the spring carrier at the bottom so that the 1st/2nd gear slector fork engages in the middle 1st/2nd gear synchronizer unit, Fig.57.

77. Fit the input shaft with the 4th gear synchronizer ring and input shaft/transmission mainshaft roller bearing.

NOTE: Lubricate the bearing with transmission fluid (see Technical Data for specification).

78. Assemble the countershaft with the transmission mainshaft and secure the shafts with a cable tie, Fig.58.

Fig.58. Assemble countershaft with transmission mainshaft.
A - Input shaft
B - Transmission mainshaft
C - Countershaft
D - Cable tie

79. Insert the 5th/reverse gear selector fork in the lower (5th/reverse gear) synchronizer unit with the outrigger pointing upwards, to the right of the main selector shaft, Fig.59.

Fig.59. Secure reverse gear idler shaft and 5th/reverse gear selector fork with second cable tie (viewed from two directions).
A - Transmission mainshaft
B - Second cable tie
C - Idler shaft
D - 5th/reverse gear selector

80. Fit the reverse gear idler shaft to the countershaft and the transmission mainshaft with the end with the flat at the top. Secure the reverse gear idler shaft and 5th/reverse selector fork with a second cable tie, Fig.59.

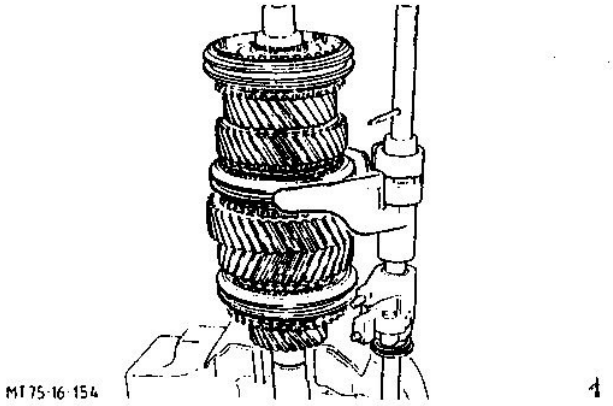


Fig.57. Fit main selector shaft to transmission mainshaft.

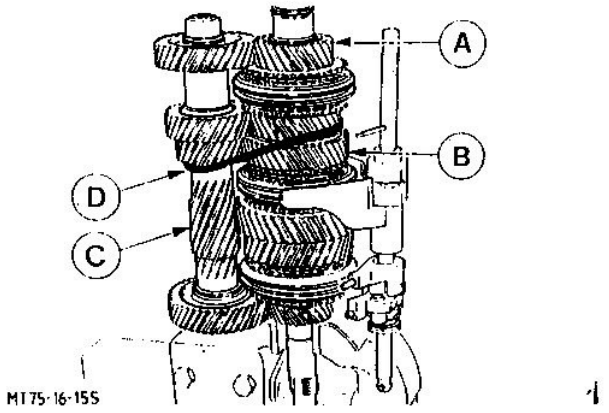


Fig.58. Assemble countershaft with transmission mainshaft.

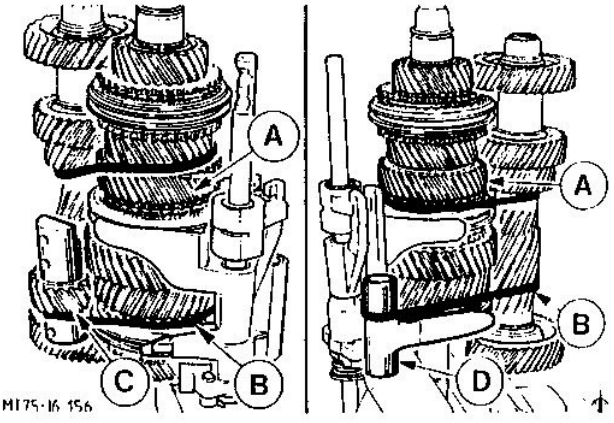


Fig.59. Secure reverse gear idler shaft and 5th/reverse gear selector fork with second cable tie (view from two directions).

81. Position the transfer box upright on the assembly stand with the opening uppermost.

82. Release the complete gear assembly (transmission mainshaft, countershaft, main selector shaft, reverse gear idler, input shaft and 5th/reverse gear selector fork) from the vice and carefully insert it, output end first in the transfer box, Fig.60.

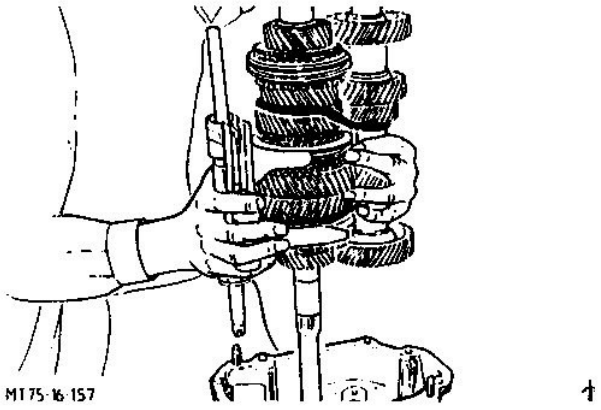


Fig.60. Insert complete drive train in transfer box.

83. Engage 4th gear. Draw the transmission mainshaft into the transfer box using Special Tools 16-053 and 16-051 and hold it with Special Tool 15-073, Fig.61.

NOTE: Fit Special Tool 16-053 with the short collar towards the transmission.

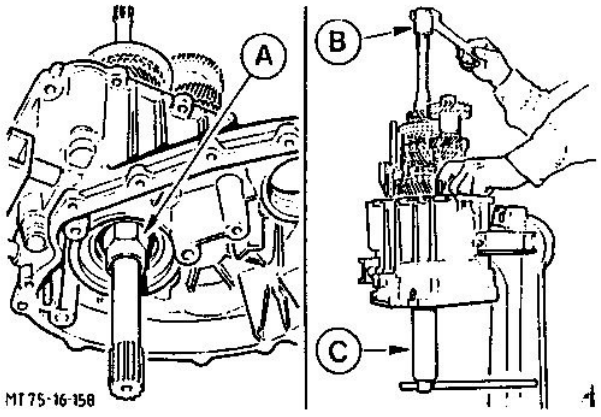


Fig.61. Draw in transmission mainshaft
A - Special Tool 16-053
B - Special Tool 15-073
C - Special Tool 16-051

Fig.61. Draw in transmission mainshaft.

84. Unscrew installer Special Tool 16-053. Fit installer with the long collar towards the transmission and pull the transmission mainshaft fully in. Disengage 4th gear.

NOTE: As the mainshaft is drawn in make sure that the countershaft goes into the rear roller bearing (move it gently). The distance "X" between the countershaft gear and the synchronizer cone on the 3rd, gear cog must not be zero, Fig.62.

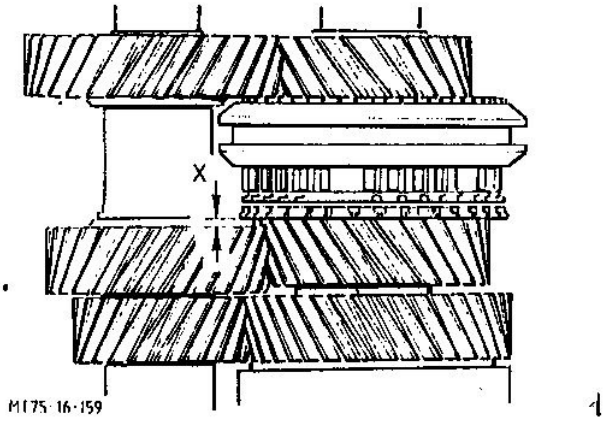


Fig.62. Distance "X" between countershaft gear and synchronizer cone on 3rd gear cog.

85. Insert the rear bolt of the reverse gear idler shaft and screw it in finger tight.

86. Insert the magnetic disc in the transmission housing and remove the cable ties from the gear assembly.

87. Insert the auxiliary selector shaft in the 3rd/4th gear and 5th/reverse gear selector forks and the transfer box, with the chamfered side pointing upwards, Fig.63.

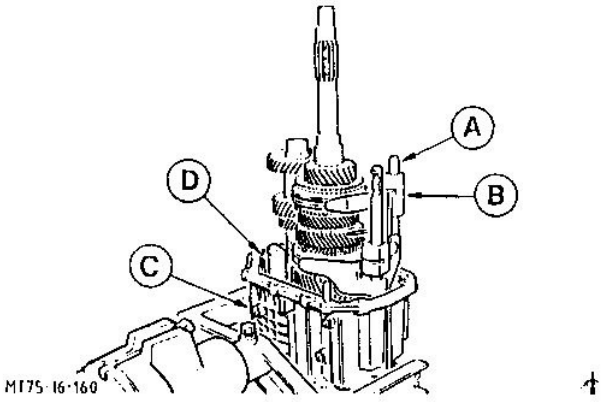


Fig.63. Gear assembly inserted.
A - Auxiliary selector shaft
B - 3rd/4th gear selector fork
C - Bolt
D - Magnetic disc

88. Slip the front transmission housing over the input shaft, transmission mainshaft, countershaft and selector shafts and support it on the transfer box with 3 spacer sleeves approximately 25 mm long, Fig.64.

89. Fit Special Tool 16-041 on the input shaft. Fit the 2-piece sleeve over the input shaft and secure it with the tube; slide the large sleeve over that and unscrew the nut and washer onto the thread.

Apply sealer (see Technical Data) to the transfer box mating face.

NOTE: The mating faces must be clean and free of grease and oil.

90. Remove the spacer sleeves. Draw the front transmission housing onto the transfer box.

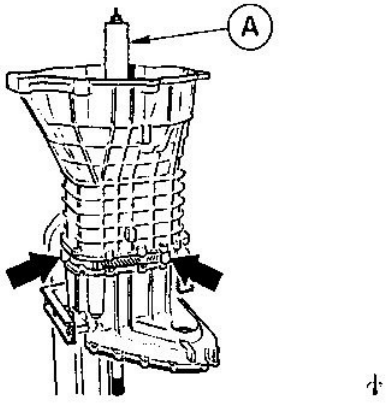


Fig.64. Front transmission housing supported on transfer box with spacer sleeves.
A - Special Tool 16-041

NOTE: Do not damage the thread when fitting the Special Tool in the front transmission housing. Do not tilt the countershaft front ball bearing when drawing on the Front transmission housing. Observe the assembly process through the bearing hole in the housing.

91. Insert 2 housing bolts on opposite sides and carefully draw the housing halves together. Then insert the remaining 8 housing bolts. Tighten all the bolts to the specified torque, Fig.65. Remove the Special Tool.

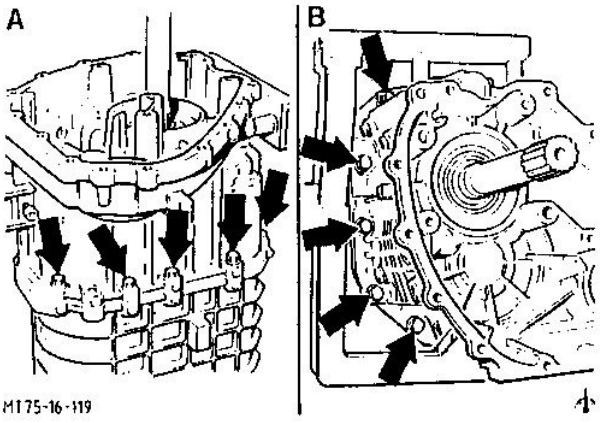


Fig.65. Transmission housing retaining bolts
A - Right-hand side
B - Left-hand side

92. Position the transmission horizontally on the stand.

93. Smear the thread of the locking plate detent screw with sealer (see Technical Data), insert it in the front transmission housing and tighten it to the specified torque, Fig.66.

NOTE: Sealer must not get into the transmission breather hole in the detent screw.

Fig.66. Screw/bolts on left-hand side of transmission.
A - Reversing light switch with retaining screws.
B - Detent screw of locking plate/ transmission breather
C - Rear bolt of reverse gear idler shaft
D - Front bolt of reverse gear idler shaft

94. Fit the front bolt of the reverse gear idler shaft and tighten the 2 bolts, Fig.66.

95. Fit the reversing light switch with the wiring pointing downwards, Fig.66.

96. Press the sleeve of the selector shaft detent mechanism into the front transmission housing as far as it will go, insert the ball, pin and spring. Smear the thread of the screw plug with sealer (see Technical Data), insert the screw and tighten it, Fig.67.

Fig.67. Selector shaft detent mechanism.
A - Sleeve
B - Ball
C - Pin
D - Spring
E - Threaded plug

97. Measure and fit the input shaft inner circlip, Fig.68.

NOTE: Circlips are available in 5 thicknesses. The differences are colour coded.

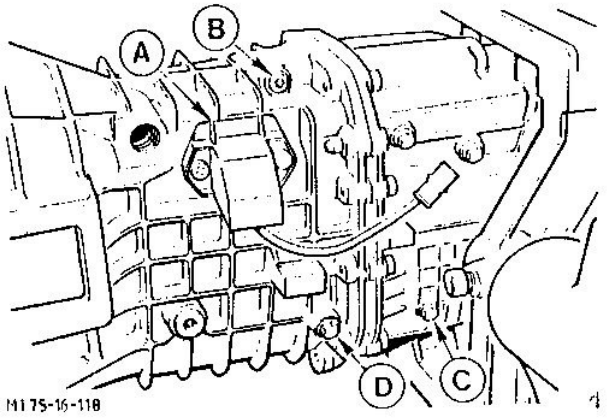


Fig.66. Screws/bolts in left-hand side of transmission.

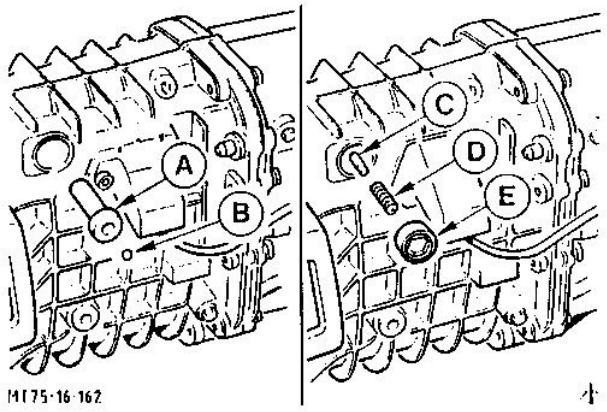


Fig.67. Selector shaft detent mechanism.

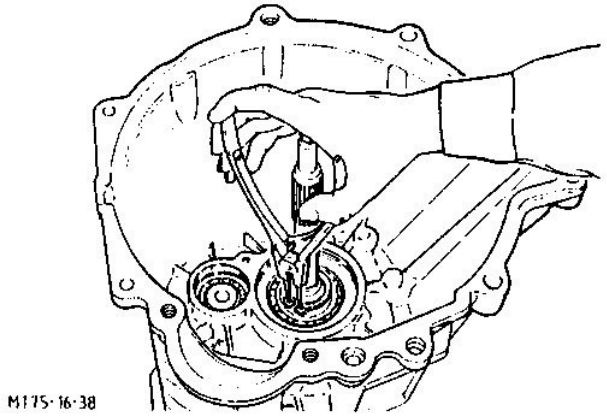


Fig.68. Fit input shaft circlip.

98. Fit the steel washer in the guide sleeve. Grease the thread of the guide sleeve (see Technical Data for grease specification). Screw the locating sleeve into the front transmission housing with a new greased O-ring. Tighten the guide sleeve using Special Tool 16-040, Fig.69.

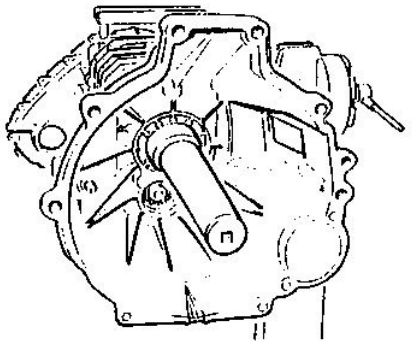


Fig.69. Tighten clutch release bearing guide sleeve with Special Tool 16-040.

99. Fit a new greased O-ring on the countershaft bearing housing. Screw the bearing housing into the front transmission housing and tighten the bearing housing, Fig.70.

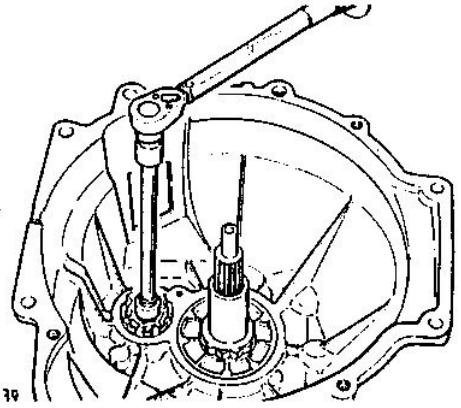


Fig.70. Fit countershaft bearing housing in front transmission housing.

100. Mark the position of the bearing housing in relation to the transmission housing. Slacken the bearing housing 60° from this position, Fig.71.

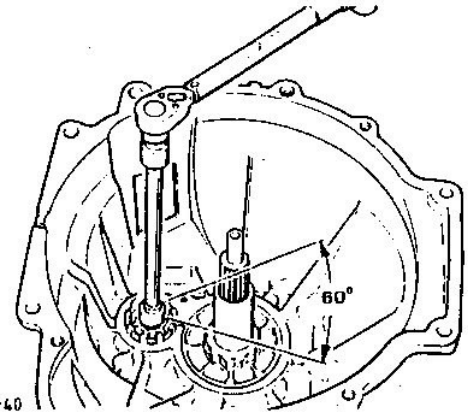


Fig.71 Slacken bearing housing 60° from marked position.

101. Strike two blows on each of the bosses next to the bearing housing using a brass drift and hammer to drive the countershaft bearing against the bearing housing, Fig.72.

102. Check that the countershaft bearing is resting against the bearing housing. The bearing housing must not screw in easily by hand otherwise repeat sub-operation 101.

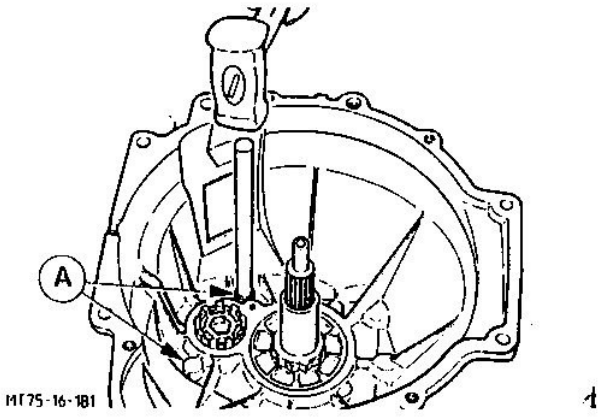


Fig.72. Drive countershaft bearing against bearing housing.
A - bosses

103. Fit the bearing housing retainer and secure it with the bolt.

104. Heat the transmission mainshaft spacer sleeve to a temperature of 70 to 100°C with a hot air blower and shrink it onto the rear end of the transmission mainshaft, Fig.73.

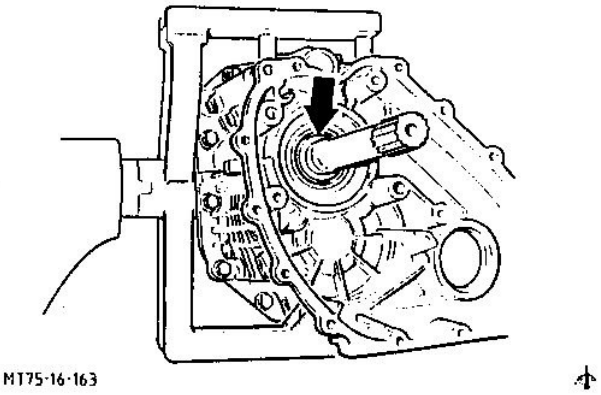


Fig.73. Transmission mainshaft spacer sleeve.

105. Fit the double-lipped radial oil seal of the transmission mainshaft in the rear transmission housing using Special Tool 16-054, Fig.74.

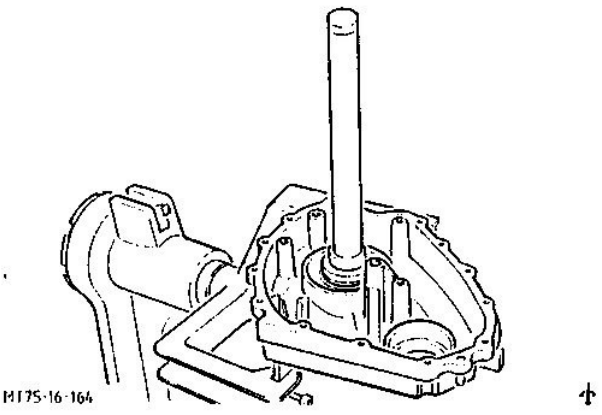


Fig.74. Fit transmission mainshaft transfer box radial oil seal using Special Tool 16-054.

106. Engage 4th gear. Fit the nut to the transmission mainshaft and tighten it with Special Tool 16-051 and a torque wrench, holding the input shaft with Special Tool 15-073 and a spanner, Fig.75.

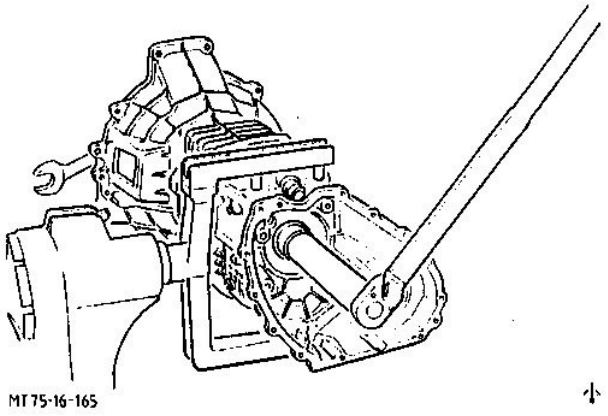


Fig.75. Tighten transmission mainshaft nut using Special Tool 16-051 and torque wrench.

To Dismantle Transfer Box

107. Remove the oil pipe and oil seal from the transfer box.
Detach the oil deflector from the transfer box housing (2 bolts), Fig.76.

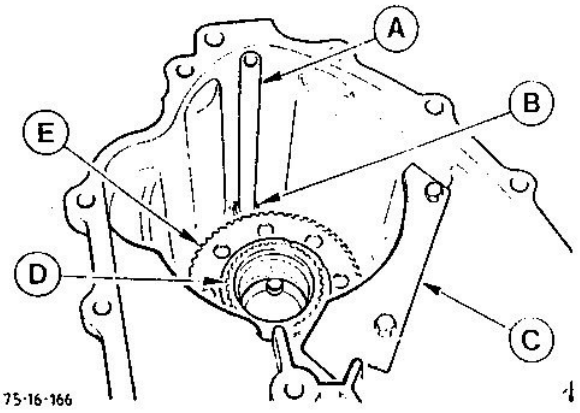
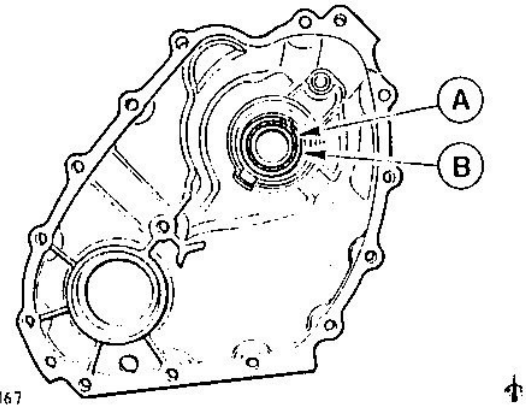


Fig.76. Transfer box housing.
A - Oil pipe
B - Seal
C - Oil deflector
D - Output shaft
E - Drive plate

108. Remove the drive plate and the output shaft shim from the transfer box, Fig.76.

Fig.76. Transfer box.

109. Press the output shaft out of the transfer box housing using a press.



110. Remove the circlip of the transfer box housing bearing using a suitable drift, Fig.77.

Fig.77. A - Transfer box bearing
B - Circlip

To Dismantle Output Shaft

111. Clamp the output shaft in a vice and pull off the output shaft ball bearing using a conventional three-legged puller and extension (Special Tool 16-025-01), Fig.78.

NOTE: Use aluminium jaws in the vice.

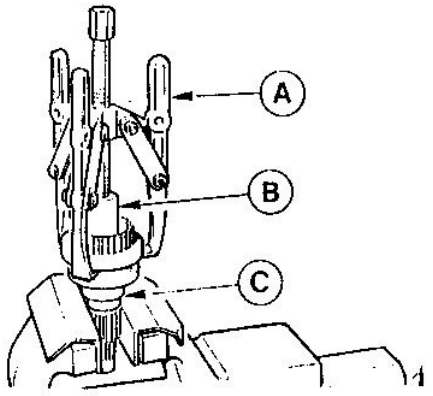


Fig.78. Pull off ball bearing.
A - Three-legged puller
B - Extension - Special Tool 16-025-01
C - Output shaft

Fig.78. Pull off bearing.

To Assemble Output Shaft

112. Heat the output shaft bearing with a hot air blower and shrink it flush onto the bearing seat.

NOTE: Do not fit the drive plate and shim yet because the shim thickness must be measured again.

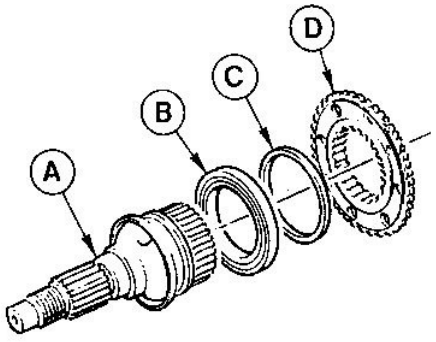


Fig.79. Output shaft components.
A - Output shaft
B - Bearing
C - Shim
D - Drive plate

Fig.79. Output shaft components.

To Assemble Transfer Box

113. Heat the transfer box housing to a temperature of 70 to 100°C with a hot air blower, fit the transfer box housing bearing in the bearing seat and secure the circlip, Fig.80.

114. Drive the output shaft into the bearing in the transfer box housing using a copper drift.

115. Fit the oil baffle in the transfer box (2 bolts).

116. Fit the oil pipe and a new seal in the transfer box.

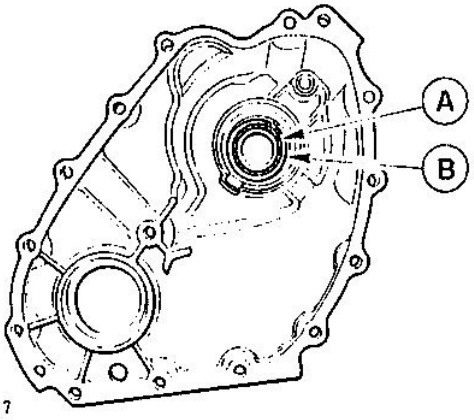


Fig.80. Fit bearing in transfer box housing.
A - Bearing
B - Circlip

117. Remove the annulus, planetary gear carrier and thrust washer from the sun wheel shaft, Fig.81.

Fig.81. Sun wheel shaft with planetary gear train and viscous coupling.
A - Shim (already removed)
B - Annulus
C - Planetary gear carrier
D - Thrust washer
E - Sun wheel shaft
F - Viscous coupling

118. Detach the sun wheel shaft from the viscous coupling by tapping it on a wooden block.

NOTE: Do not dismantle the viscous coupling any further.

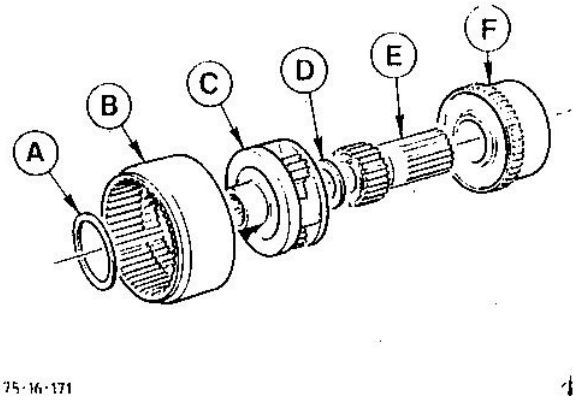


Fig.81. Sun wheel shaft with planetary gear train and viscous coupling.

119. Slide the viscous coupling onto the sun wheel shaft.

120. Slide the thrust washer, planetary gear carrier and annulus onto the sun wheel shaft.

121. Pull off the bearings of the driven and driving chain sprockets using a conventional puller and suitable thrust element, Fig.82.

122. Heat the bearings of the driven and driving chain sprockets to a temperature of approximately 80°C with a hot air blower and fit them onto the sprockets.

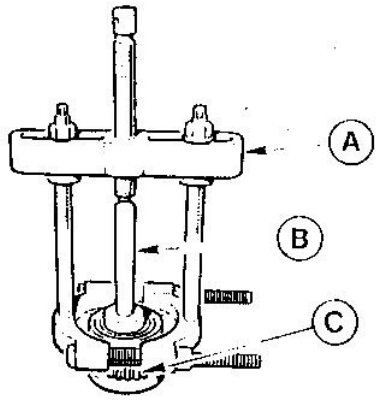


Fig.82. Pull off bearings
A - Puller
B - Thrust element
C - Driven sprocket

123. Insert the sprockets and chain in the housing.

To do this, heat the area of the housing around the driven sprocket to a temperature of 70 to 100°C with a hot air blower and let the driven sprocket cool for approximately half an hour.

NOTE: Fit the sprocket bearings evenly in the bearing seats in the transmission housing.

124. Fit the driving sprocket bearing housing with the 2 guide sleeves and secure it (2 long and 2 short bolts with U-shaped washers), Fig.83.

NOTE: Coat the threads of the bolts with thread-locking compound (see Technical Data) and insert them.

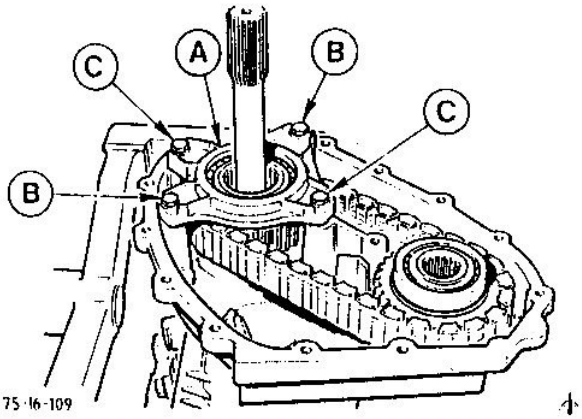


Fig.83. Fit bearing housing
A - Bearing housing
B - Short bolts
C - Long bolts

125. Insert the viscous coupling, planetary gear train and annulus complete.

126. Fit the planetary gear carrier shim and the drive plate to the planetary gear train, Fig.84.
Insert the magnetic disc in the housing, Fig.84.

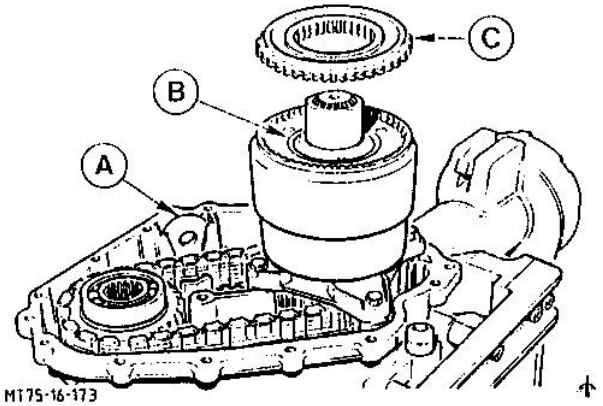


Fig.84. A - Magnetic disc
B - Shim
C - Drive

127. Fit the output flange radial oil seal in the rear transfer box housing using Special Tool 15-058 and adaptor 16-043-A, Fig.85. Grease the sealing lips of the radial oil seal (see Technical Data).

Fig.85. Fit radial oil seal.
A - Special Tool 15-058
B - Special Tool 16-043-A
C - Radial oil seal

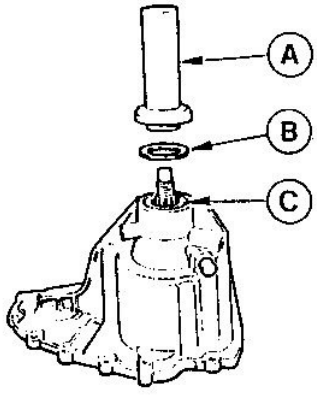


Fig.85. Fit radial oil seal.

128. Fit the output flange to the output shaft. Smear the thread of the output flange nut with sealer (see Technical Data) and fit the nut. Clamp Special Tool 15-030-A in a vice. Fit the output flange in Special Tool 15-030-A and tighten the nut, Fig.86.

Fig.86. Fit output flange.
A - Output flange
B - Special Tool clamped in vice
C - Torque wrench

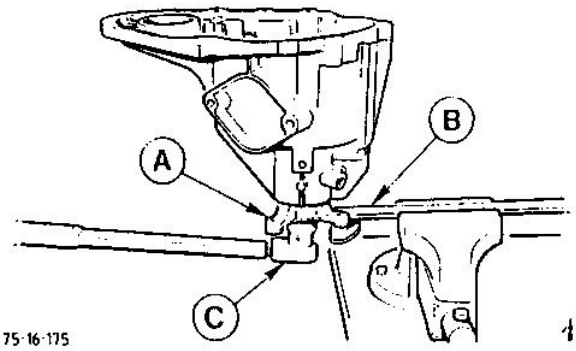


Fig.86. Fit output flange.

129. Measure for shim for transfer box end float:

NOTE: The mating faces must be clean and free of burrs.

Fig.87. Measure end float (distance from mating face of transfer box to bearing inner race shown from above).
A - Steel rule
B - Depth gauge
C - Mating face
D - Ball bearing inner race

Measure the distance from the mating face of the transfer box housing to the bearing inner race with a steel rule and depth gauge at 3 points and note the figures, Fig.87 and Fig.88.

Fig.88. Measure end float (distance from mating face of transfer box housing to bearing inner race shown in partially scrap side view).
A - Steel rule
B - Depth gauge
C - Mating face
D - Bearing inner race

If the values differ, calculate the mean of the measured values, e.g. in the case of 3 measurements.

Measurement 1	158,2 mm
Measurement 2	+158,0 mm
Measurement 3	+158,1 mm

474,3 mm divided by 3 (number of measurements)

= 158,1 mm

Measure the width of the steel rule with a slide caliper and substract this figure from the measured distance.

Example

Measured distance	158,1 mm
Width of steel rule	- 29,5 mm
Distance from mating face to bearing inner race	128,6 mm

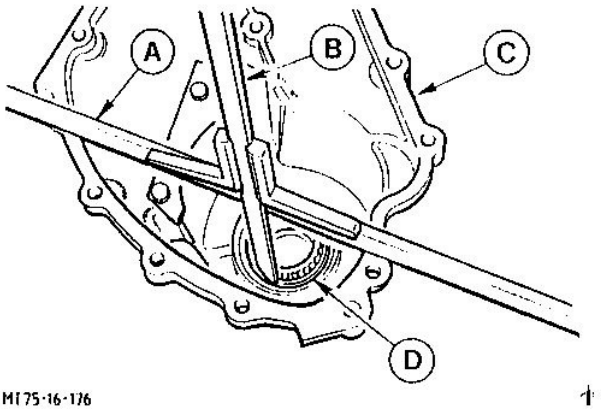


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Fig.87. Measure end float (distance from mating face of transfer box to bearing inner race shown from above).

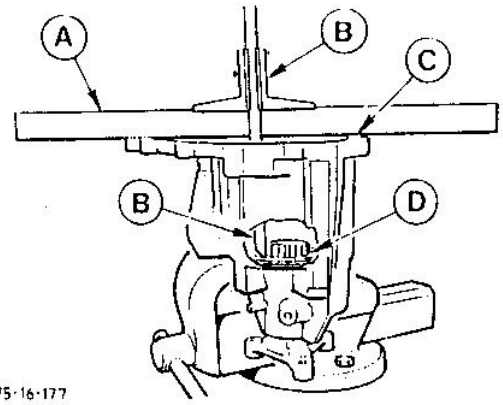

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Fig.88. Measure end float (distance from mating face of transfer box to bearing inner race shown in partially scrap side view).

130. Measure the distance from the mating face of the transmission housing to the ground face of the drive plate with a steel rule and depth gauge at 2 points and note the figures, Fig.89.

Fig.89. Measure end float (distance from mating face of transmission housing to ground face of drive plate).
A - Depth gauge
B - Ground face of drive plate
C - Transmission housing mating face
D - Steel rule

If the measurements are different, calculate the mean from the measured values:

154,5 mm
+154,7 mm
309,2 mm

309,2 mm divided by 2 (number of measurements)

= 154,6 mm

Example:

Distance measured	154,6 mm
Width of steel rule	-29,5 mm
Distance from drive plate to mating face	125,1 mm

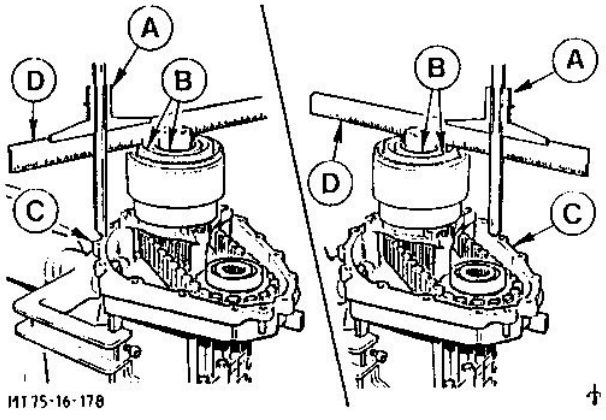

Fig.89. Measure end float (distance from mating face of transmission housing to ground face of drive plate).

To Determine Shim Thickness

131. Calculate the difference between the two measurements and substract 0,5 to 0,7 mm (mean 0,6 mm) for end float from this value. The difference is the size of shim to be fitted (see Parts Microfiche).

Example

Measurement 1	128,6 mm
Measurement 2	-125,1 mm
Difference	3,5 mm
Difference	3,5 mm
End float	- 0,6 mm
Thickness of shim	2,9 mm

132. Fit the required shim and the drive plate in the transfer box housing.

To Fit Transfer Box Housing

133. Heat the bearing seat on the output shaft bearing to a temperature of 70 to 100°C with a hot air blower.

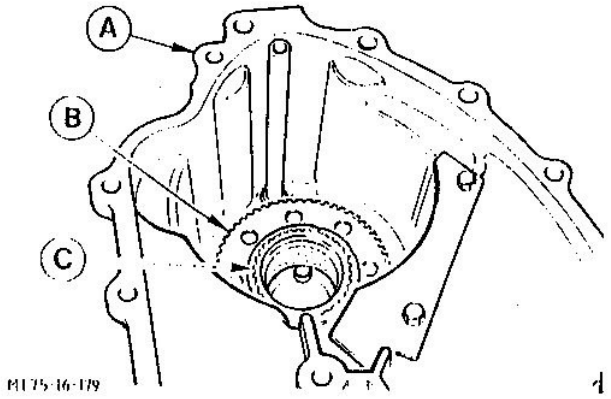

Fig.90. Transfer box housing.
A - Transfer box housing
B - Drive plate (with shim underneath)
C - Output shaft

Fig.90. Transfer box housing.

134. Smear the mating face (free of oil and grease) with sealer (see Technical Data).

135. Fit and align the transfer box housing on the transmission housing.

NOTE: The drive plate teeth must mesh with the teeth of the annulus.

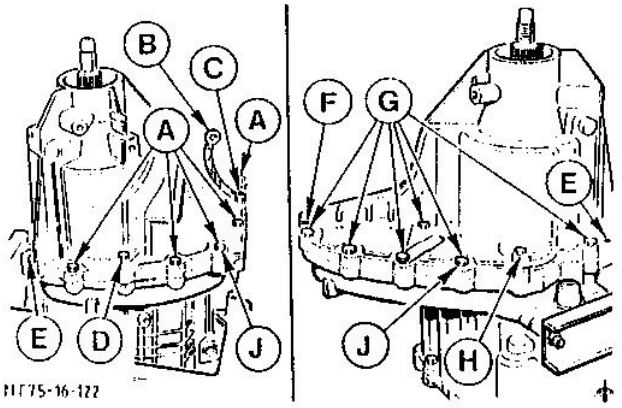

Fig.91. Bolts securing transfer box housing to rear transmission housing.

136. Drive the two locating dowels into the transmission housing, Fig.91 (E, F).

137. Tighten the transfer box housing retaining bolts uniformly, working diagonally. Screw in the stud fit the nut and secure the earth strap with the second nut. Mark the 2 bolts with thread-locking paint (see (Technical Data), Fig.91 (A, B, C, D, G, H, J)

Fig.91. Bolts securing transfer housing to rear transmission housing.
A - Short bolts - left-hand lower half
B - Earth strap - left-hand lower half
C - 2 nuts, 1 stud
D - Long bolts
E - Upper locating dowel
F - Lower locating dowel
G - Short bolts - right-hand upper half
H - Long bolts - right-hand upper hald
J - Bolts with thread-locking paint

138. Fit the radial oil seal of the driveshaft to the front axle box in the transfer box housing using special 14-028, Fig.92. Fit the radial oil seal as far as the shoulder. Smear the sealing lips with grease (see Technical Data).

139. Screw in and tighten the oil drain plugs and the oil filler plug, Fig.93.

140. Fit the vibration damper and tighten the studs to the specified torque using a Torx socket wrench (see Proprietary Tools).

141. Fit the Torx studs in the transmission output flange:

- Clean the threaded holes in the transmission output flange and the threads of the studs (to remove all traces of grease and dirt).
- Apply 2 drops of thread locking compound (see Technical Data) threaded offset at 180° on the flange-end threads of the studs.
- Insert the studs and tighten them to the specified torque.

NOTE: The studs must be tightened completely within a maximum of 5 minutes of applying the thread locking compound.

- Let the thread locking compound harden for 30 minutes.

142. Fit the transmission mounting.

143. Remove the mounting bracket and remove the transmission, Fig.94.

Fig.94. MT-75/4x4 transmission on stand.
A - Stand
B - Clutch release lever
C - Mounting bracket connecting bolts
D - Mounting bracket retaining bolts
E - Upper part of mounting bracket
F - Output flange
G - Transmission mounting
H - Transmission mounting bracket clamp bolt
J - Mounting bracket

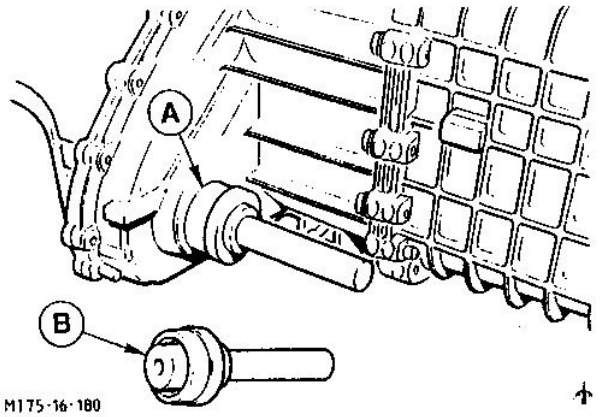

Fig.92. A - Radial oil seal
B - Special Tool 14-028.

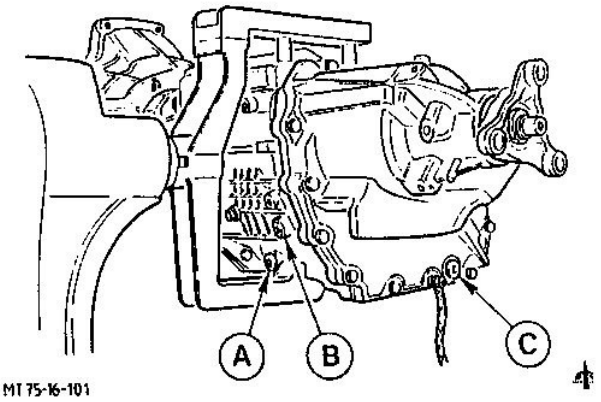

Fig.93. A - Transmission oil drain plug
B - Transfer box oil filler plug
C - Transfer box oil drain plug

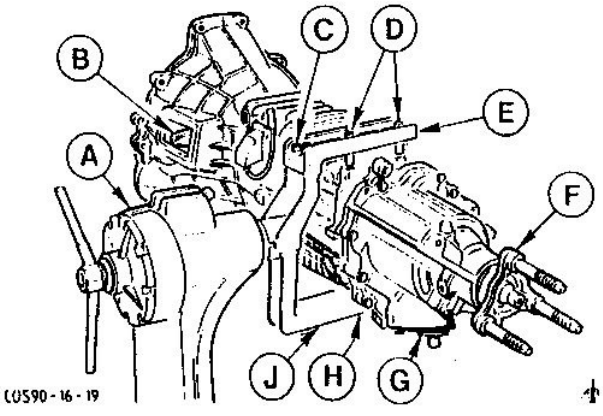

Fig.94. MT-75/4x4 transmission on stand.