



Disassembly and assembly of subassemblies:

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1. S6-650 Disassembly

1. Position the transmission on the floor with the output flange pointing up. Block up the housing to allow room for the input shaft.



If you are working on a seal leak, the unit can be repaired while it is still assembled.



For this step, use numbers 14(output), 33(input) and 20 on the Tool List.

2. Remove the four 6mm Allen bolts and remove the shifter.

3. Remove the 10mm bolt and speed sensor.



Step 1.3 and 1.4 is performed on the 4x2 model only.

4. Remove the output flange nut and the output flange.



Failure of the power take-off equipment will not be covered under the O.E. warranty and should not be coded as a transmission failure.

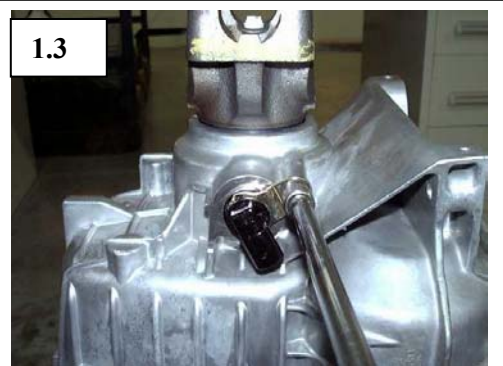
1.1



1.2



1.3



1.4





1. S6-650 Disassembly (cont.)

5. Remove the nineteen 10mm extension housing to intermediate housing bolts.



Mark the position of the wiring harness bracket.

6. Remove the four 14mm detent caps using the slide hammer and oil seal remover, then the four springs. Leave the detent plungers in the housing unless they are damaged.



Use a center punch to start a small hole in the detent before using the slide hammer and the oil seal remover.



For this step, use number [14](#) and [20](#) on the Tool List.

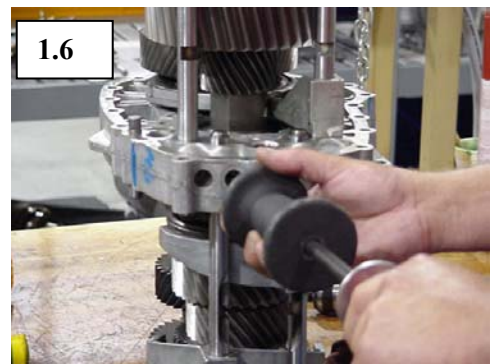
7. Remove the 1 5/8" main shift detent.

8. Remove the extension housing using a rubber hammer to separate the extension housing from the intermediate housing.

1.5



1.6



1.7



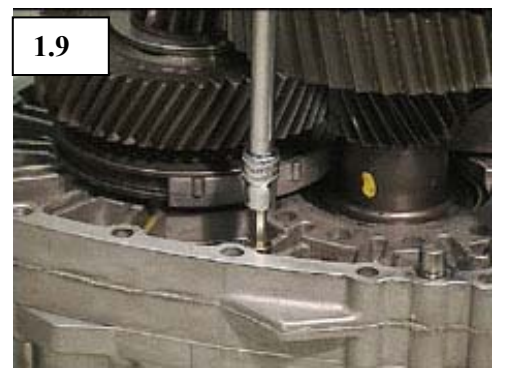
1.8





1. S6-650 Disassembly (cont.)

9. Remove the two 6mm Allen bolts from the intermediate housing.



10. Using a chain and hooks, carefully lift the intermediate housing assembly out of the main housing.



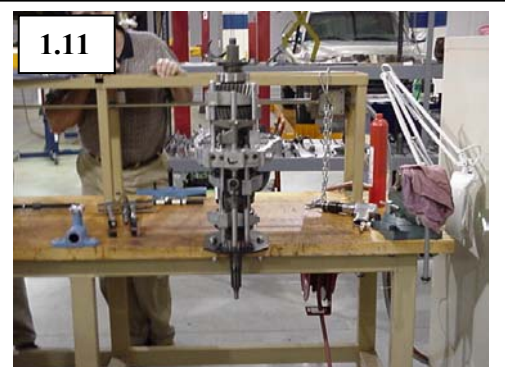
For this step, use number [13](#) on the Tool List.



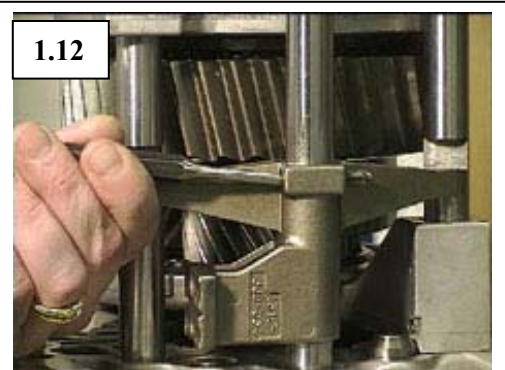
11. Position the main shaft /counter shaft assembly on the holding plate that has been mounted to a sturdy workbench.



For this step, use number [24](#) on the Tool List.



12. Using a hammer and punch, remove the main shift rail driver roll pin.





1. S6-650 Disassembly (cont.)

13. Using a hammer and punch, remove the 2 / 3 – 4 / 5 rail driver roll pin, located on the lower section of the main shift rail.

14. Remove the main shift rail.



Do not force the shaft or it will cause damage to the ball sleeve in the intermediate housing.

15. Remove the sixth gear roll pins.

16. Remove the sixth gearshift rail by lightly tapping the sixth gearshift fork with a rubber hammer while pulling up on the shift rail.



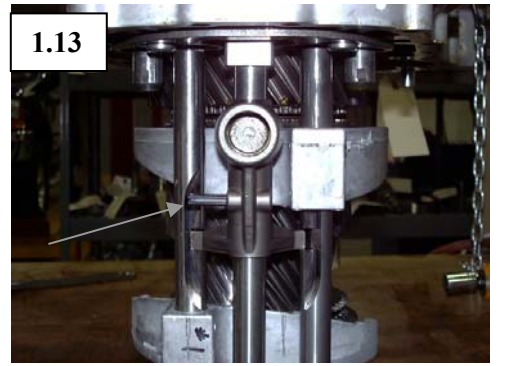
Check that the interlock plate is in the sixth gear position before removing the sixth gear rail.

17. Using a hammer and a punch, remove the roll pins from the first/reverse shift fork.

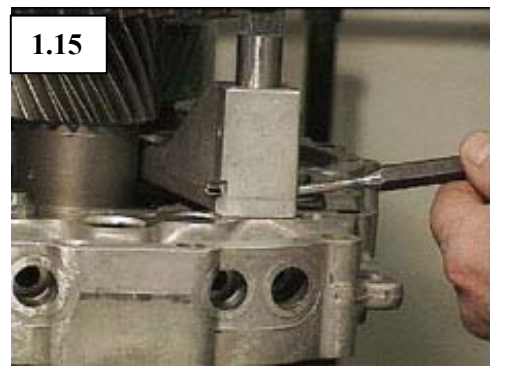


All shift forks must be inspected for wear. If they are worn through the molly coating, they must be replaced.

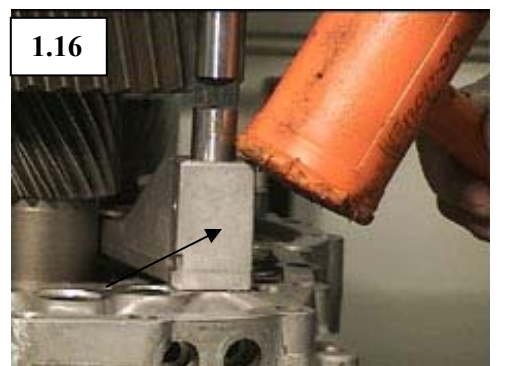
1.13



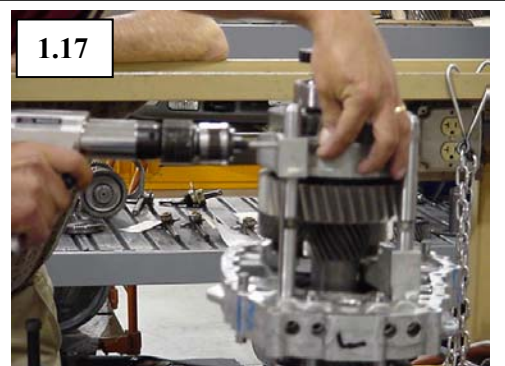
1.15



1.16



1.17





1. S6-650 Disassembly (cont.)

18. Lightly tap the first/reverse shift fork with a rubber hammer while pulling up on the shift rail.



Check that the interlock plate is in the first/reverse position before removing the first/reverse shift rail.



Step 1.19 is performed on the 4x4 model only.

19. Using a pair of snap ring pliers, remove the snap ring



Always discard the snap ring, it will distort when it is removed. This is a selective snap ring.

20. Using a 2-jaw puller, remove the tone wheel, main shaft bearing, first/reverse gears, synchronizer assembly, and needle bearing.

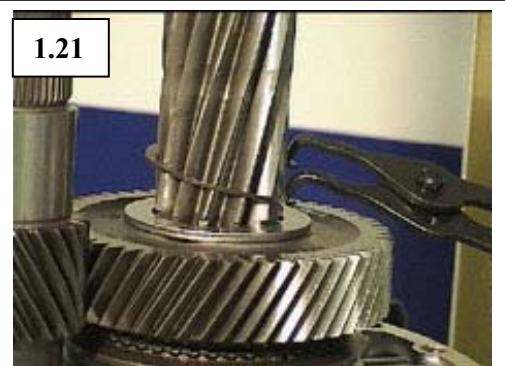
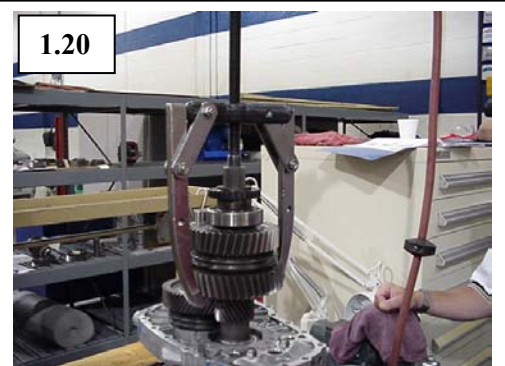


For this step, use number [16](#) on the Tool List.

21. Remove the sixth gear, snap ring, needle bearing, synchronizer assembly and thrust washer.



Always discard the snap ring, it will distort when it is removed. This is a selective snap ring.





1. S6-650 Disassembly (cont.)

22. Remove the three 5mm collar screws from the interlock plate.

23. Install the driver into the lifting fixture.



For steps 1.23, 1.24 and 1.25, use numbers 1 and 15 on the Tool List.

24. Mount the lifting fixture onto the counter shaft and intermediate housing.

25. Using the lifting fixture, pull the intermediate housing up to remove the sixth gear synchronizer assembly and bearing race.



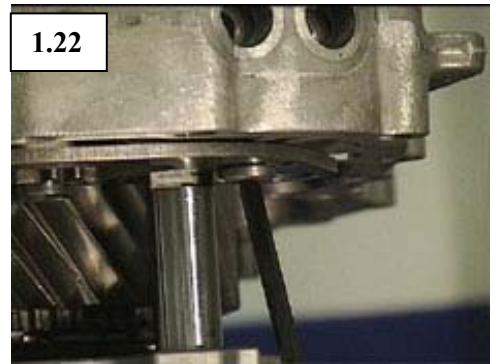
Check that the 2 / 3-4 / 5 shift rails are not binding while pulling the intermediate housing.

26. Remove the interlock plate and the 2 / 3-4 / 5 shift fork assemblies.

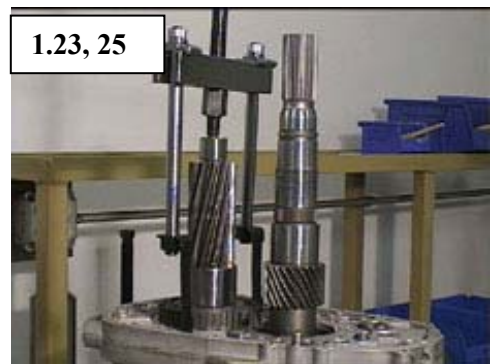
27. Remove the sixth gear spacer ring.

28. Position the main shaft assembly onto the mounting plate with the input shaft in the upright position.

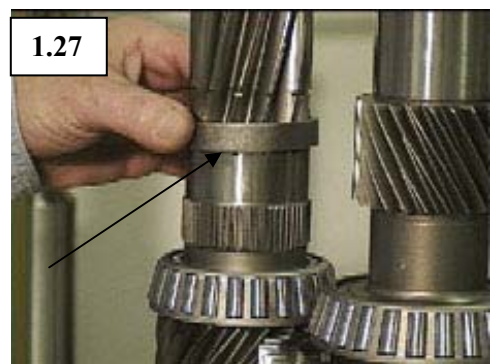
1.22



1.23, 25



1.27



1.28





2. S6-650 Disassembly (cont.)

29. Remove the input shaft from the main shaft assembly.

1.29



1.29





2. Disassembly and assembly of subassemblies: input shaft disassembly.

1. Position the input shaft in the split puller.



For this step, use number 25 on the Tool List.

2. Using a two jaw puller or press, remove the input shaft bearing.

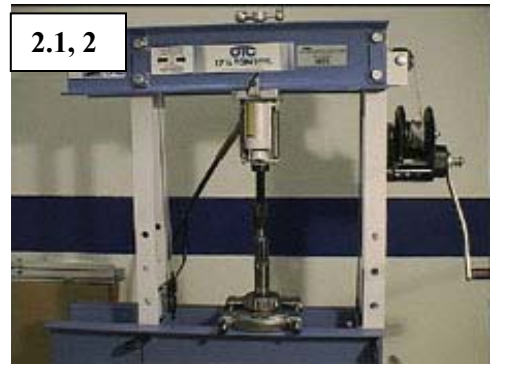


For this step, use numbers 16 and 28 on the tool List.



Never reuse a bearing that has been removed in this manner.

2.1, 2





3. Disassembly and assembly of subassemblies: main shaft disassembly.

1. Using the bearing puller and pulley puller remove the pocket bearing.



For this step, use numbers 18 and 19 on the Tool List.

2. Remove the 4 / 5 synchronizer hub snap ring.



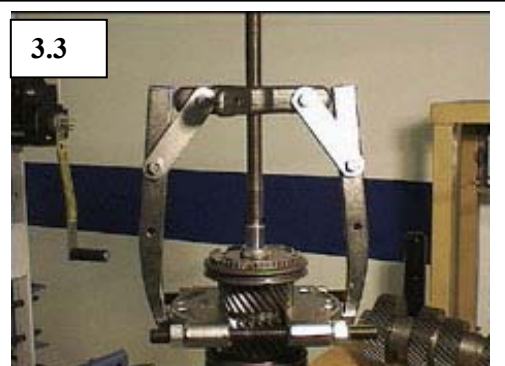
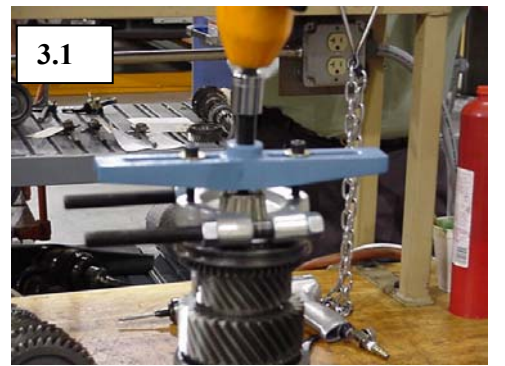
Always discard the snap ring, it will distort when it is removed. This is a selective snap ring.

3. Using the split puller and a two jaw puller, remove the 4 / 5 synchronizer assembly and fourth gear.



For this step, use numbers 16 and 25 on the Tool List.

4. Remove the fourth gear needle bearing.





3. Disassembly and assembly of subassemblies: main shaft disassembly (cont.)

5. Using a 25 ton press and split puller, remove the thrust washer, third gear, synchronizer assembly, second gear and bearing.



For this step, use numbers 25 and 28 on the Tool List.

6. Using the split puller and a press, remove the main shaft intermediate bearing.



For this step, use numbers 25 and 28 on the Tool List.



*Only remove the bearing if you are going to replace it
Removing the bearing in this manner could cause
damage to the bearing.*

3.5



3.6





4. Disassembly and assembly of subassemblies: counter shaft disassembly.

1. Using the split puller and press, remove the counter shaft bearings.

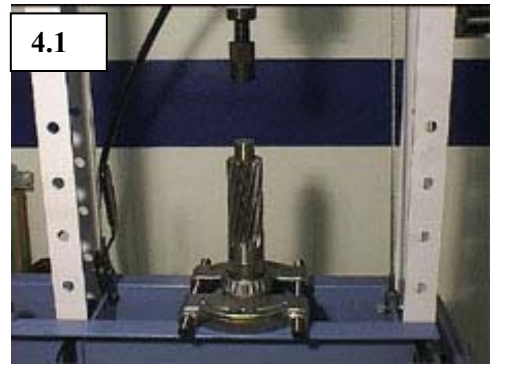


For this step, use numbers 25 and 28 on the Tool List.



*Only remove the bearing if you are going to replace it
Removing the bearing in this manner could cause
damage to the bearing.*

4.1





5. Disassembly and assembly of subassemblies: extension housing.

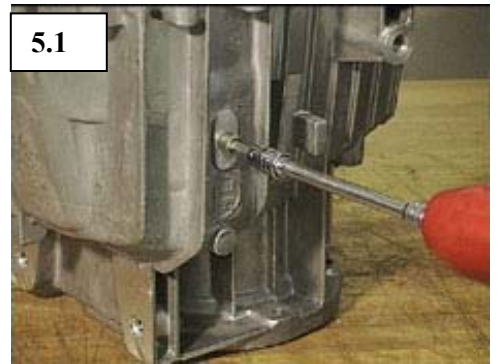
1. Remove the 6mm Allen reverse idler shaft bolt.
2. Remove the reverse idler shaft support.
3. Remove the reverse idler shaft and the reverse idler gear.
4. Using an internal bearing puller, remove the counter shaft roller bearing.



For this step, use numbers 7 and 23 on the Tool List.

*This bearing should only be removed if it is defective.
Removing the bearing in this manner could destroy it.*

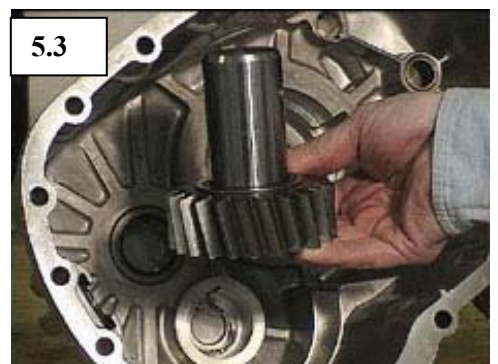
5.1



5.2



5.3



5.4





5. Disassembly and assembly of subassemblies: extension-housing (cont.)

5. Using a blind hole bearing puller, remove the main shift rail needle bearing.



For this step, use numbers 1 and 6 on the Tool List.



This bearing should only be removed if it is defective. Removing the bearing in this manner could destroy it.



Step 5.6 is performed on the 4x2 model only.

6. If replaced, apply loctite to one side of the magnet.

7. Install the magnet so that the loctite is against the housing.

8. Using a 22 mm deep well socket, remove the reverse light switch.

9. Using the shift rail installer, install the ball sleeve.



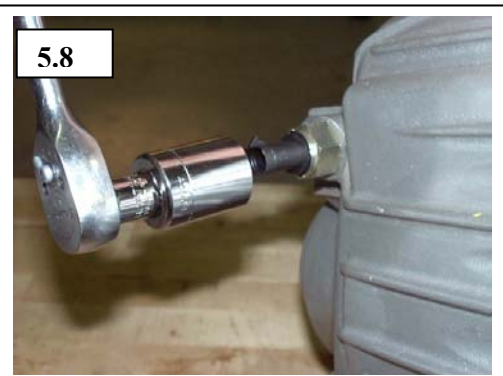
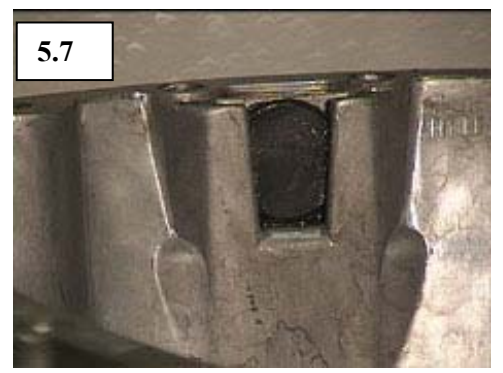
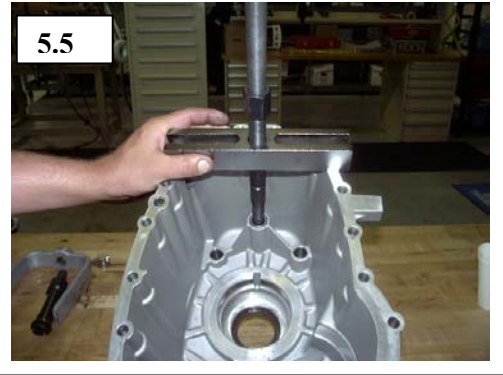
For this step, use numbers 2 and 8 on the Tool List.



Heating the housing with a heat gun will ease the installation of the ball sleeve.



For this step, use number 27 on the Tool List.





5. Disassembly and assembly of subassemblies: extension housing (cont.)

10 Using the countershaft rear bearing installer, install the countershaft support bearing.



For this step, use numbers 2 and 11 on the Tool List.



Heating the housing with a heat gun will ease the installation of the bearing.



For this step, use number 27 on the Tool List.

11. Place and torque the reverse light switch.



Use a light coat of pipe sealant on the treads of the reverse light switch.

12. Install the idler gear, holding spacer and new usit ring into the rear housing.

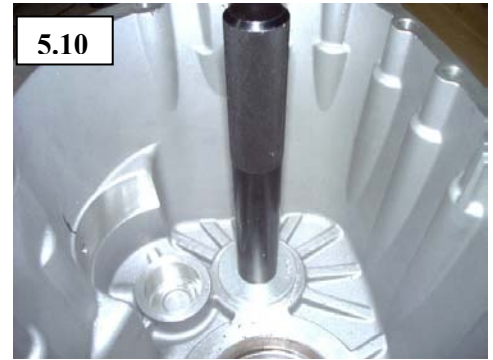


Orient the idler gear so that the oil grooves face the output side of the housing.

13. Place and torque the 6mm Allen bolt.

14. Install the speedo sensor, place and torque the 10mm bolt.

5.10



5.11



5.12. 13



5.14





6. Disassembly and assembly of subassemblies: case.

1. Using the countershaft bearing race remover and the bridge forcing screw, remove the counter shaft bearing race and shim.



For this step, use numbers 17 and 23 on the Tool List.

2. Using the input shaft bearing race remover and the bridge forcing screw, remove the input bearing race, nilos ring, shim and oil trough.



For this step, use numbers 17 and 31 on the Tool List.

3. Using a blind hole bearing remover, remove the shift rail needle bearing.



For this step, use numbers 1 and 6 on the Tool List.



This bearing should only be removed if it is defective. Removing the bearing in this manner could destroy it.

4. Using a brass drift, remove the intermediate plate main shaft bearing race.



Only replace the race if the main bearing is replaced

6.1



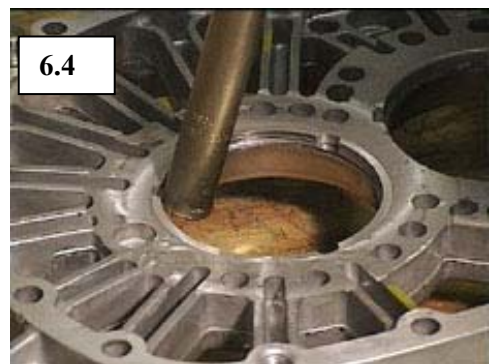
6.2



6.3



6.4



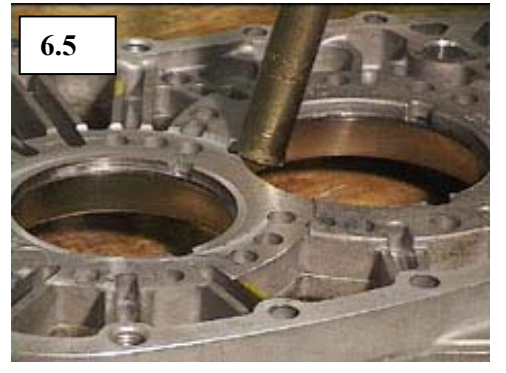


6. Disassembly and assembly of subassemblies: case (cont.)

5. Using a brass drift, remove the intermediate plate counter shaft bearing race.



Only replace the race if the main bearing is replaced.





7. Disassembly and assembly of subassemblies: assembly.

1. Using a bearing installer and handle, install the intermediate plate counter shaft bearing race.



For this step, use numbers 2 and 10 on the Tool List.



Heating the intermediate plate with a heat gun will ease the installation of the bearing race.



For this step, use number 27 on the Tool List.

2. Using a bearing installer and handle, install the intermediate plate main shaft bearing race.



For this step, use numbers 2 and 9 on the Tool List.



Heating the intermediate plate with a heat gun will ease the installation of the bearing race.



For this step, use number 27 on the Tool List.

3. Install the main shaft shift rail ball sleeve.



For this step, use numbers 2 and 8 on the Tool List.



Heat the case with a heat gun, this will ease the installation of the ball sleeve.



For this step, use number 27 on the Tool List.

4. Using the bearing installer and handle, install the counter shaft bearing race.



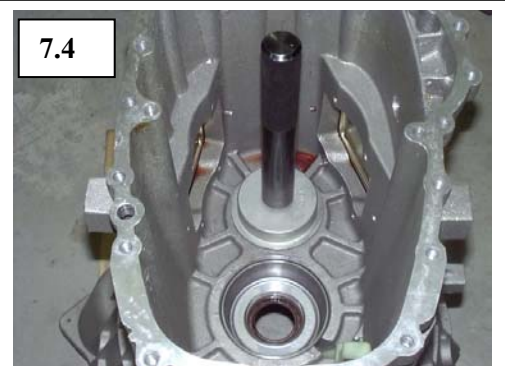
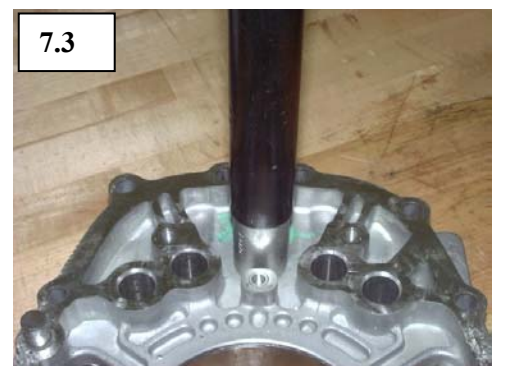
For this step, use numbers 2 and 10 on the Tool List.



Heat the case with a heat gun, this will ease the installation of the race. Do not over heat the case.



For this step, use number 27 on the Tool List.





7. Disassembly and assembly of subassemblies: assembly (cont.)

5. Using the bearing installer and handle, install the input shaft bearing race.



For this step, use numbers 2 and 9 on the Tool List.



Heat the case with a heat gun, this will ease the installation of the race. Do not over heat the case.



For this step, use number 27 on the Tool List.

6. Using the shift rail installer, install the ball sleeve.



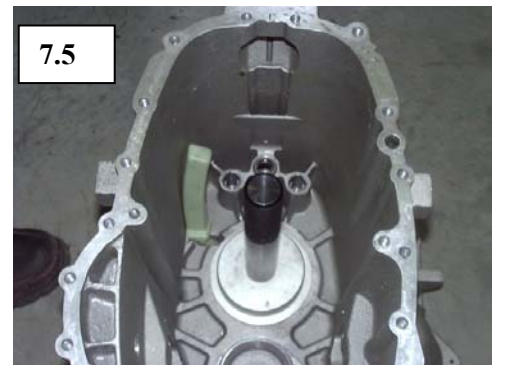
For this step, use numbers 2 and 8 on the Tool List.



Heating the housing with a heat gun will ease the installation of the ball sleeve.



For this step, use number 27 on the Tool List.





8. Disassembly and assembly of subassemblies: input shaft assembly.

1. Using a toaster oven, heat the input shaft bearing.



For this step, use number 26 on the Tool List.

2. While it is still hot, seat the bearing down against its stop.



For this step, use number 29 on the Tool List.

3. Remove the input shaft oil dam.

4. Using the installer, install the new input shaft oil dam.



For this step, use number 2 and 9 on the Tool List.



Make sure the oil dam is completely seated. Rotate the shaft while looking at the oil dam to make sure it is not cocked out of position.

8.2



8.3



8.4





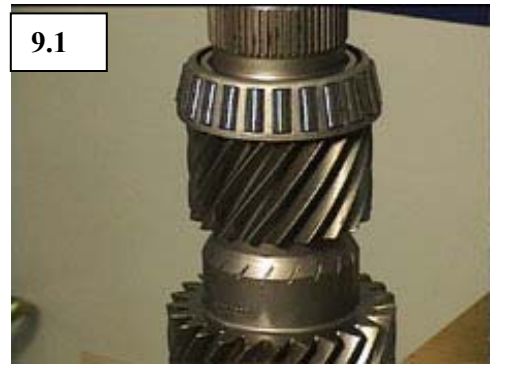
9. Disassembly and assembly of subassemblies: counter shaft assembly

1. Using a toaster oven, heat the counter shaft bearings and install.



For this step, use number 26 on the Tool List.

9.1





10. Disassembly and assembly of subassemblies: main shaft assembly.



During assembly, lightly oil all bearings and synchronizers.

1. Using a toaster oven, heat the main shaft intermediate housing bearing.



For this step, use number 26 on the Tool List.

2. While the bearing is still hot, seat the bearing down against the stop.

3. Rotate the shaft 180 degrees and carefully place back into the holding fixture.

4. Install the needle bearing, second gear and second gear synchronizer package.



For this step, use number 24 on the Tool List.



The synchronizer package contains three pieces.

5. Pre-align the notches on the 2/3 synchronizer hub with the lugs on the synchronizer ring.

6. Using a toaster oven, heat the synchronizer hub.



For this step, use number 26 on the Tool List

7. Using a press, install the synchronizer hub.

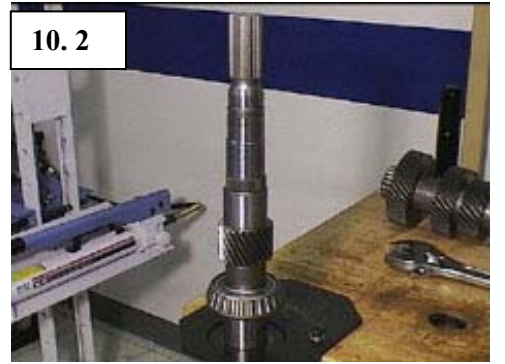


For this step, use number 25, 28 and 29 on the Tool List.

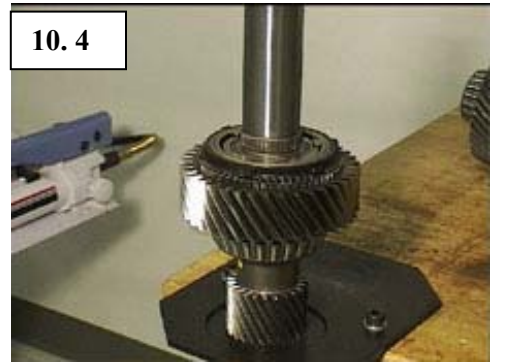


Be careful not to damage the main shaft intermediate bearing. You may want to use the bearing race from the intermediate housing to protect the bearing.

10. 2



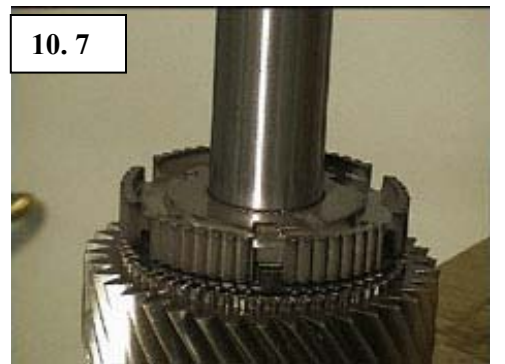
10. 4



10. 5



10. 7





10. Disassembly and assembly of subassemblies: main shaft assembly (cont.)

8. After the synchronizer hub has cooled, install the 2 / 3 sliding sleeve



The sliding sleeve has three flat areas on it, which must line up with the detent area of the synchronizer body.

9. Install the three pressure pieces, springs and balls.



The 2 / 3 synchronizer springs are 19.7 mm long.

10. Install the third gear synchronizer package aligning the lugs on the synchronizer ring with the slots on the synchronizer hub.

11. Using a toaster oven, heat the third gear bearing race and install.

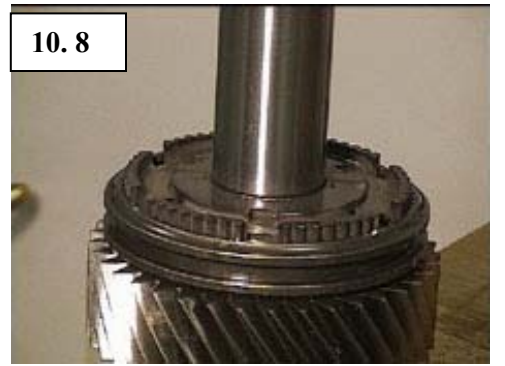


If the race is heated properly, it will slip into position.

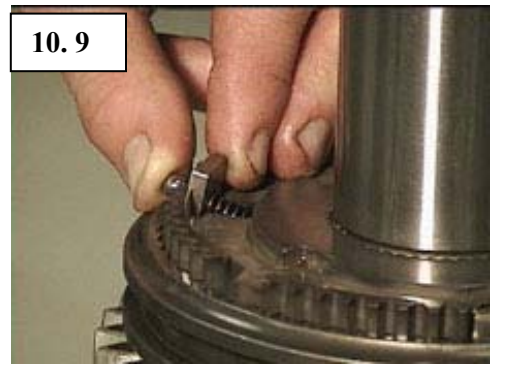


For this step, use numbers 25, 26, 28, 29 and 30 on the Tool List.

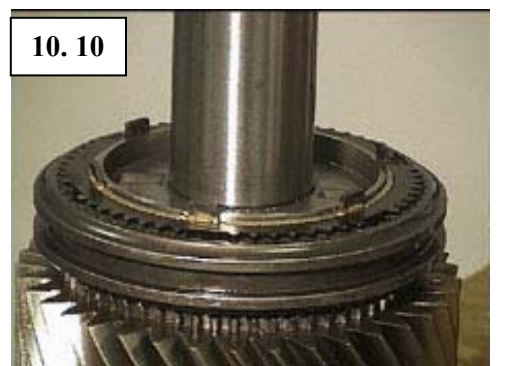
10. 8



10. 9



10. 10



10. 11





10. Disassembly and assembly of subassemblies: main shaft assembly (cont.)

12. After allowing the third gear bearing race to cool, install the third gear needle bearing and gear.

13. Using a toaster oven, heat the thrust washer and install.



Even after the thrust washer is heated, you still must use a press to install it into position.



For this step, use numbers 25, 26, 28, 29 and 30 on the Tool List.

14. Heat the fourth gear needle bearing race and install.



If the race is heated properly, it will slip into position.



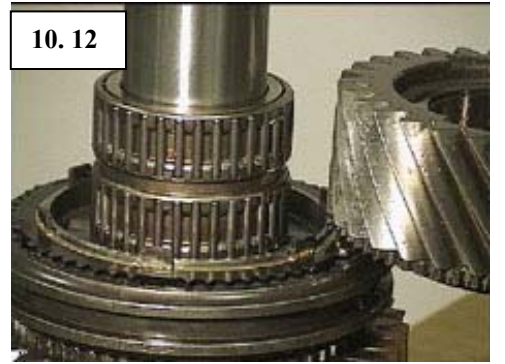
For this step, use number 26 and 30 on the Tool List.

15. After the needle bearing race has cooled, install the fourth gear needle bearing, gear and synchronizer ring.



Do Not force the fourth gear onto the shaft, once the race cools the gear will slip into position.

10. 12



10. 13



10. 14



10. 15





10. Disassembly and assembly of subassemblies: main shaft assembly (cont.)

16. Using a toaster oven, heat the 4 / 5 synchronizer body and install.



For this step, use numbers 25, 26, 28, and 29 on the Tool List.

17. Install the 4 / 5 synchronizer snap ring.



Make sure the snap ring is completely seated, they are selective fit. Be sure to completely fill the snap ring groove without forcing the snap ring into the groove.

18. Using a toaster oven, heat the pocket bearing and install.



For this step, use numbers 25, 26, 28, and 30 on the Tool List.

19. Install the 4 / 5 sliding sleeve.

10. 16



10. 17



10. 18



10. 19





10. Disassembly and assembly of subassemblies: main shaft assembly (cont.)

20. Install the three pressure pieces and the 22.7 mm springs.

21. Install the fifth gear synchronizer ring.

22. Install a good amount of assembly lube in the fifth gear input shaft area, to pre-lube the pocket bearing.

23. Install the fifth gear input shaft.

10. 20



10. 21



10. 22



10. 23





11. Subassembly final assembly.



During assembly, lightly oil all bearings and synchronizers.

1. Position the main shaft and counter shaft assembly in the holding fixture.



For this step, use number 24 on the Tool List.

2. Install the sixth gear synchronizer hub spacer.

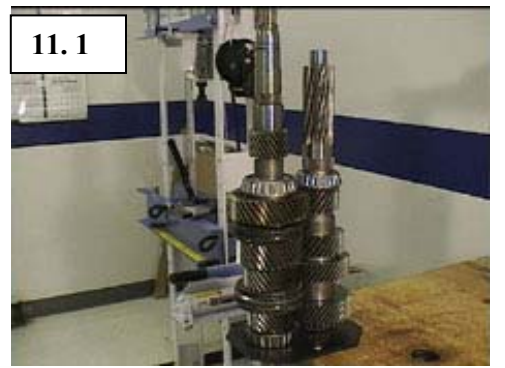
3. Install the 2 / 3 – 4 / 5 shift fork assembly and interlock plate onto the rails.



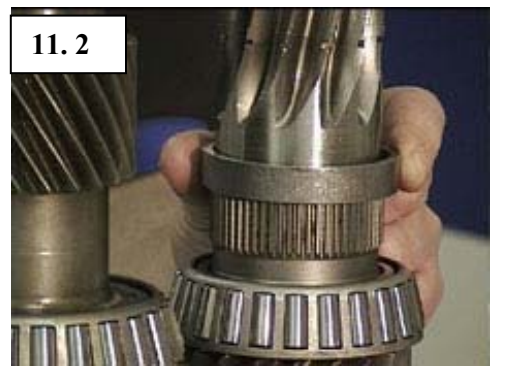
The numbers on the interlock plate must face towards the input side of the shaft assembly.

4. Install the intermediate plate on the main shaft and counter shaft.

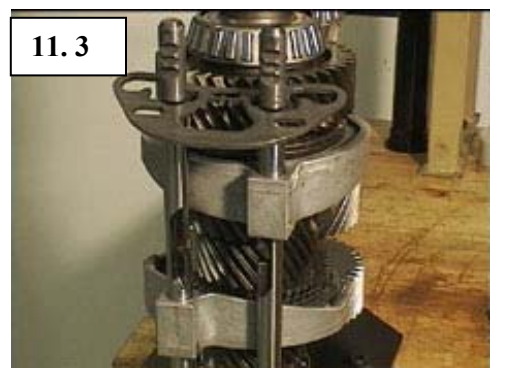
11.1



11.2



11.3



11.4





11. Subassembly final assembly (cont.)

5. Place and torque the three 5mm shoulder bolts on the interlock plate.

6. Install the sixth gear synchronizer assembly.



The sixth gear synchronizer assembly must be installed with the snap ring on the synchronizer body down against the intermediate housing.



The sixth gear synchronizer assembly is a slip fit.

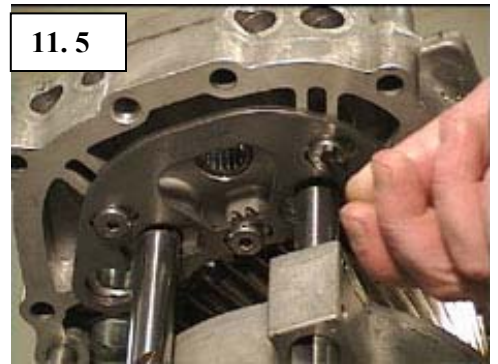
7. Using a toaster oven, heat the sixth gear needle bearing race and install.



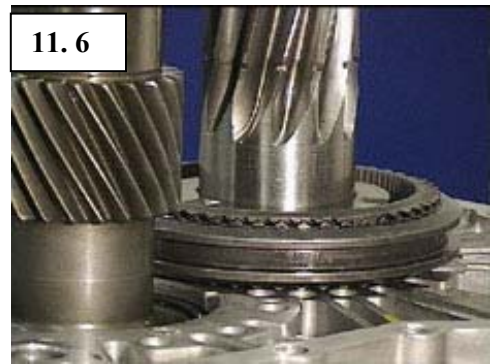
For this step, use number 26 on the Tool List.

8. After the sixth gear needle-bearing race has cooled, install the sixth gear needle bearing.

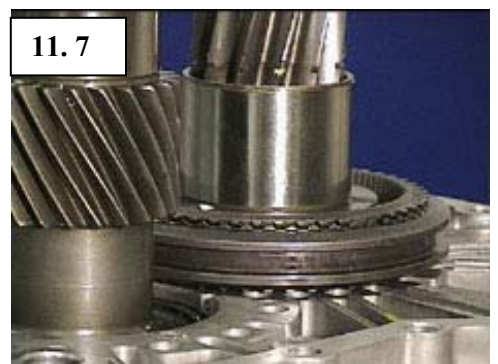
11.5



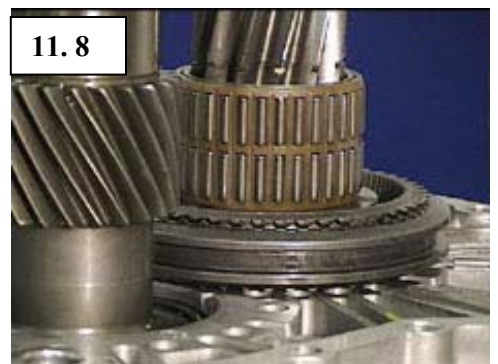
11.6



11.7



11.8





11. Subassembly final assembly (cont.)

9. Install the sixth gear thrust washer and snap ring.



Make sure that the snap ring is completely seated, and the tabs are locked into the teeth of the counter shaft. The snap ring is a selective fit.

10. Install the first needle bearing and gear.

11. Install the first/reverse synchronizer assembly.



The chamfer on the sliding sleeve should go toward the first gear position.



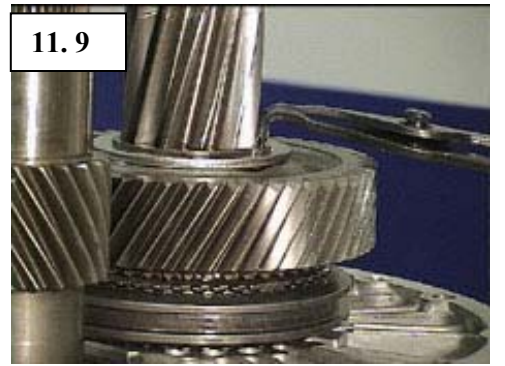
The first/reverse gear synchronizer assembly is a slip fit.

12. Using a toaster oven, heat the reverse gear bearing race and install.

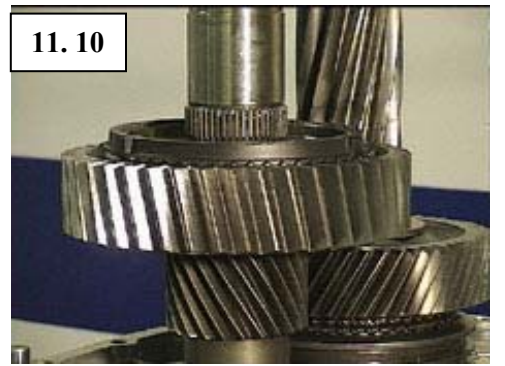


For this step, use number [26](#) on the Tool List.

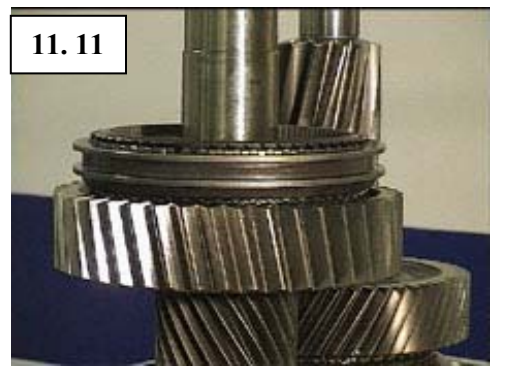
11. 9



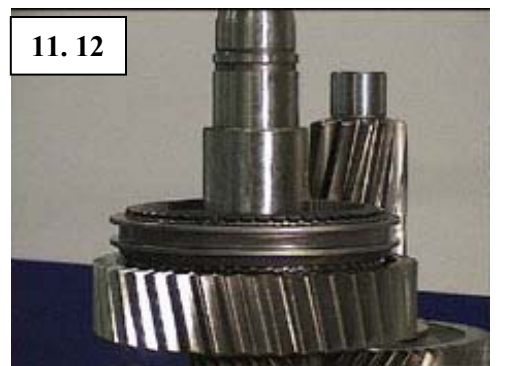
11. 10



11. 11



11. 12





11. Subassembly final assembly (cont.)

13. After the reverse gear bearing race has cooled, install the reverse gear needle bearing and gear.

14. Using a toaster oven, heat the thrust washer and install.



For this step 11.14 and 11.15, use numbers 26 and 29 on the Tool List.

15. Using a toaster oven, heat the main shaft output bearing and install.

16. Install the snap ring on the 4x4 model. For the 4x2 models as shown in picture 11.16 install the tone wheel.



Make sure the snap ring is completely seated, it is a selective fit. Be sure to completely fill the snap ring groove without forcing the snap ring into position.

11. 13



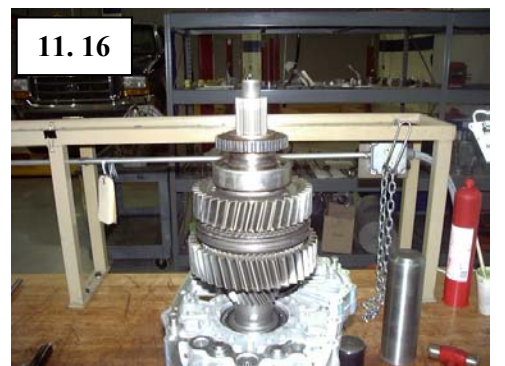
11. 14



11. 15



11. 16





11. Subassembly final assembly (cont.)

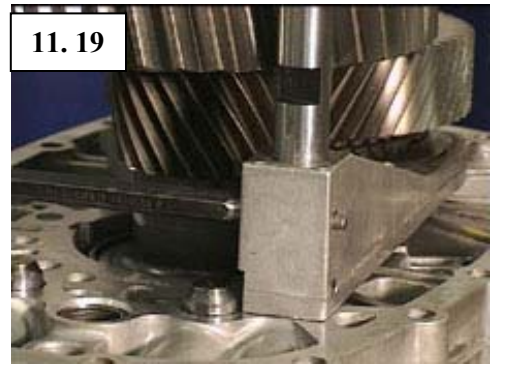
17. Move the interlock plate into the sixth gear position.
18. Install the sixth gearshift fork and rail.
19. Using a 3/16" punch, align the roll pin location with the top hole on the fifth gear.
20. Install the roll pin in the lower hole in the sixth gear fork.
21. Install the roll pin in the upper hole in the sixth gear fork.
22. Move the interlock to the first/reverse position.
23. Install the first/reverse fork and rail assembly.



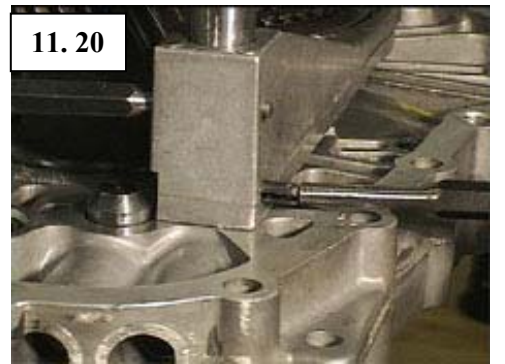
When installing the roll pin, be careful not to hit the sealing surface of the intermediate plate.

24. Using a 3/16" punch, align the roll pin location with the top hole on the first/reverse gear shift fork assembly.

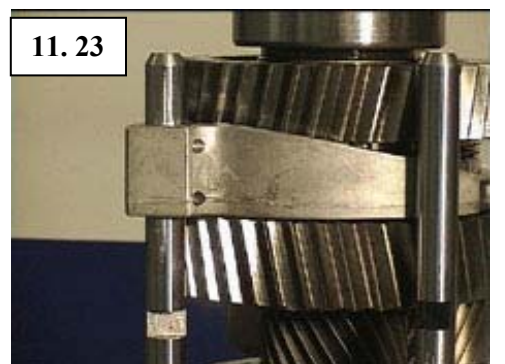
11. 19



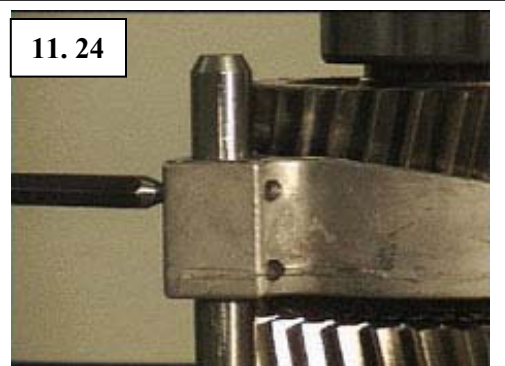
11. 20



11. 23



11. 24





11. Subassembly final assembly (cont.)

25. Install the roll pin in the lower section of the first/reverse fork.

26. Install the roll pin in the upper hole on the first/reverse fork.

27. Using a 3 / 8 punch, install the four 14mm detent caps and springs.



Use a light coat of gasket maker on the detent caps. Verify that the detent plungers are in the housing.

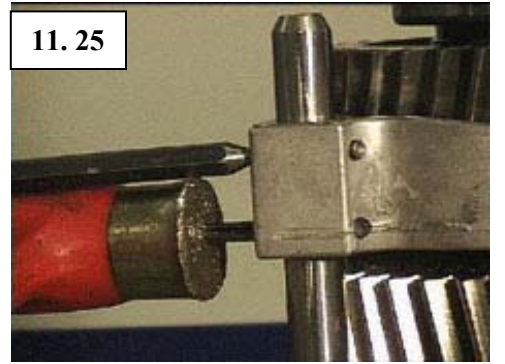
28. Identify the position of the main shift rail.



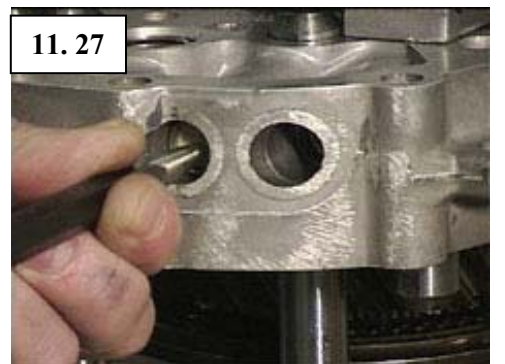
The part numbers on the main shift rail, driver and finger should face the output side of the transmission or the shorter roll pin location to the output side of the transmission.

29. Install the main shift rail, aligning the interlock finger with the interlock plate.

11. 25



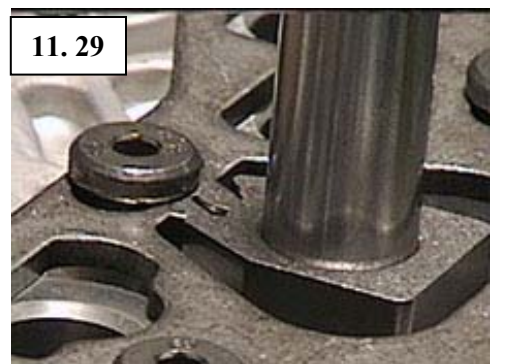
11. 27



11. 28



11. 29





11. Subassembly final assembly (cont.)

30. Install the smaller lower shift finger and the large roll pin.



The large roll pin should be oriented so that the slot on the roll pin faces away from the gear set.

31. Using a 3/16 punch, align the large roll pin and install.

32. Install the small roll pin so that its slot is rotated 180 degrees from the larger roll pin's slot.

33. Install the larger upper shift finger and large roll pin.



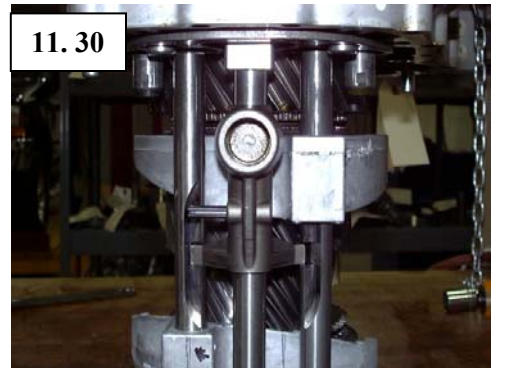
The large roll pin should be oriented so that the slot on the roll pin faces away from the gear set.

34. Install the small roll pin.

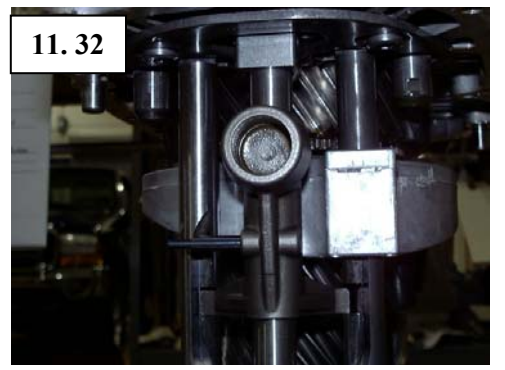


The small roll pin should be oriented so that the slot on the roll pin faces towards the gear set.

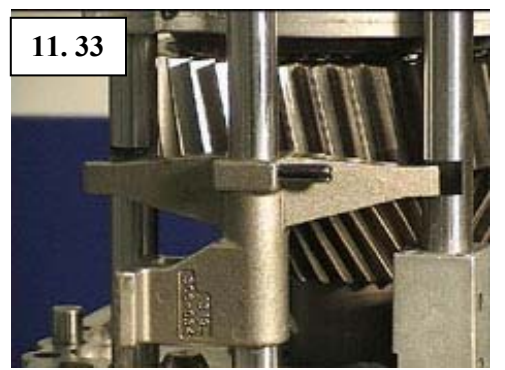
11.30



11.32



11.33



11.34





11. Subassembly final assembly (cont.)

35. Mount the lifting fixture onto the ribs of the intermediate housing.



For this step, use number 13 on the Tool List.



Place wood blocks under the housing for clearance of the inputshaft.

36. Install the shaft assembly into the main housing.

37. Using two 6mm Allen bolts, secure the intermediate plate to the main housing.

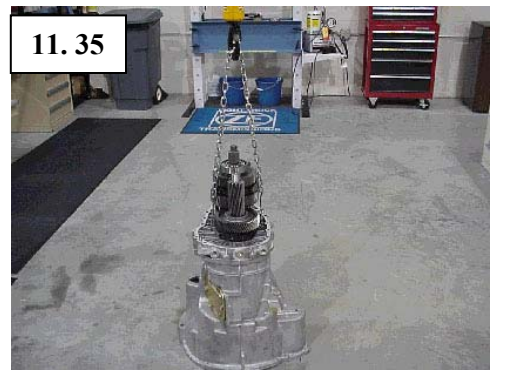
38. Using a torque wrench, torque the two 6mm Allen bolts.

39. Mount a dial indicator, as shown in the Support Graphic, to the counter shaft.

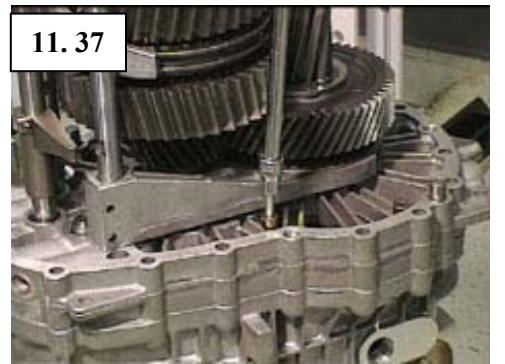


For this step, use numbers [21](#) and [22](#) on the Tool List.

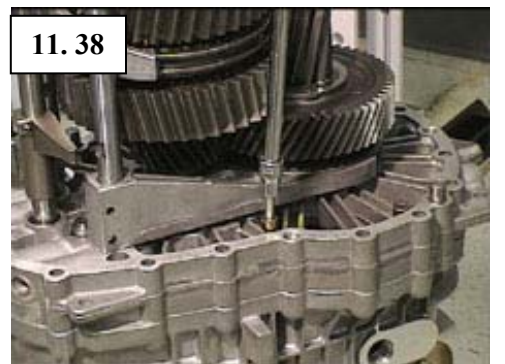
11. 35



11. 37



11. 38



11. 39





11. Subassembly final assembly (cont.)

40. Remove the six 14mm bolts from the P.T.O cover.



You may want to lift up on the countershaft through the P.T.O opening.

41. Carefully lift up on the sixth gear and take the clearance measurement off the dial indicator.

42. Add the pre-load spec to the measurement.

43. Mount the dial indicator, as shown in the Support Graphic, to the main shaft.



For this step, use numbers 21 and 22 on the Tool List.

44. Using the dial indicator, measure the clearance.



Carefully lift up on the first gear and take a clearance measurement reading off the dial indicator.

45. Add the pre-load spec to the clearance measurement.

46. Remove the two 6 mm Allen bolts.

11. 41



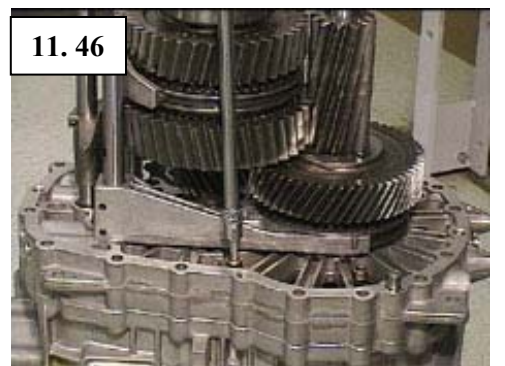
11. 43



11. 44



11. 46





11. Subassembly final assembly (cont.)

47. Mount the lifting fixture to the ribs of the intermediate housing.



For steps 11.47 and 11.48, use number 13 on the Tool List.



Place wood blocks under the housing for clearance of the inputshaft.

48. Using the lifting fixture, remove the assembly.

49. Remove the main shaft race from the main housing.



For this step, use numbers 23, and 31 on the Tool List.

50. Remove the counter shaft race from the main housing.



For this step, use numbers 17 and 23 on the Tool List.

51. Using the pre-load measurement, select the appropriate shim.

52. Install the counter shaft race with the new shim.



For this step, use numbers 2, 10 and 27 on the Tool List.



Heating the housing with a heat gun will ease the installation of the ball sleeve.

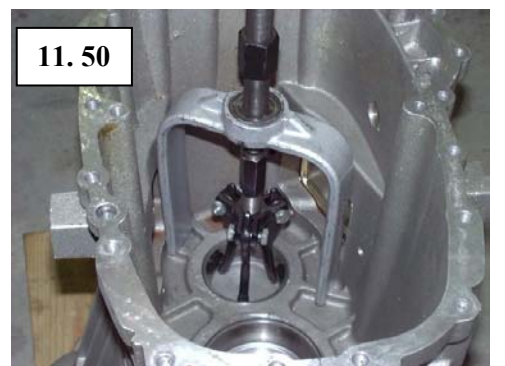
11. 47



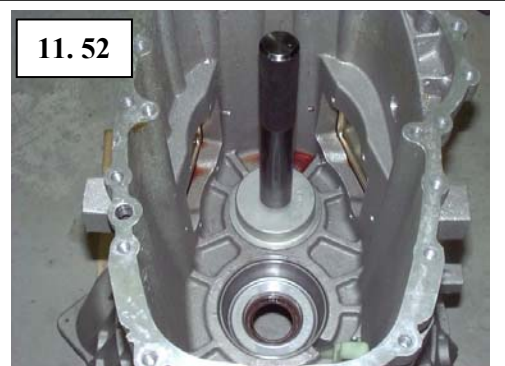
11. 49



11. 50



11. 52





11. Subassembly final assembly (cont.)

53. Using the clearance measurement, select the appropriate shim and nilos ring.

54. Install the main shaft race with the new shim, nilos ring and oil trough.



For this step, use numbers 2, 9 and 27 on the Tool List.



Heating the housing with a heat gun will ease the installation of the ball sleeve.

55. Apply a thin coat of loctite to the sealing surface of the front case.

56. Using the lifting fixture, position the shaft assembly into the front case.



Place wood blocks under the housing for clearance of the inputshaft.



For this step, use number 13 on the Tool List.

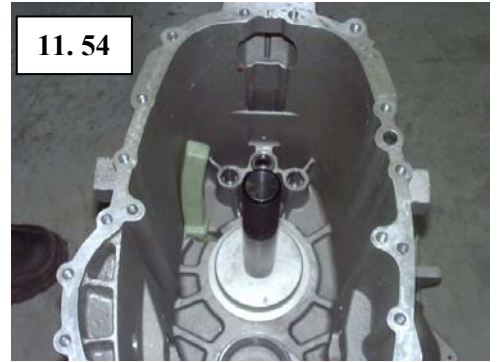
57. Place and torque the two 6mm Allen bolts in the intermediate housing.

58. Apply loctite to the sealing surface of the rear housing.

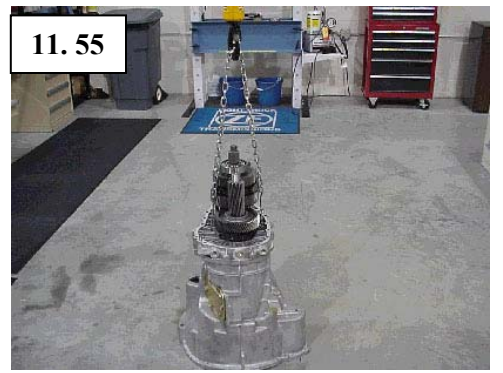
59. Place the rear housing onto the main assembly.

60. Place and torque the nineteen 10mm case half bolts.

11. 54



11. 55



11. 57



11. 60





11. Subassembly final assembly (cont.)

61. Apply a light coat of loctite to the threaded area of the main detent bolt.

62. Place and torque the main detent.

63. Place and torque using the cross torque pattern the P. T. O. cover with a new gasket with the six 14 mm bolts.

64. Using a seal installer, install the front seal.



For this step, use number 5 on the Tool List.

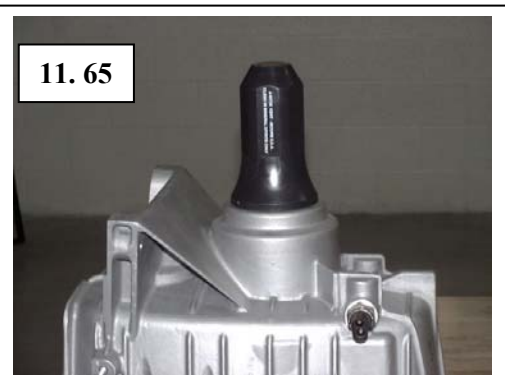
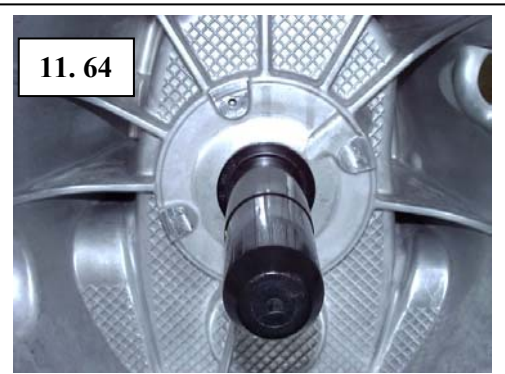
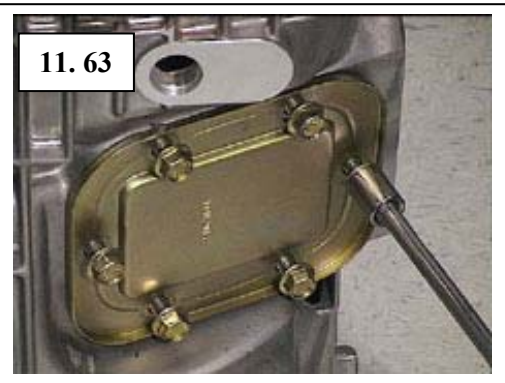
65. Using a seal installer, install the output seal.



For this step, use number 4 on the Tool List.



Perform Steps 11.66 and 11.67 for the 4x2 models only. For all other models, skip to Step 11.69.





11. Subassembly final assembly (cont.)

66. Install the yoke.

67. Place and torque the NEW locking nut.



For this step, use tool number 32 on the Tool List.



Never reuse the old locking nut.

68. Dry install the shifter.

69. Place and torque four 6 mm Allen bolts.

70. Shift the transmission through all of its gears to assure proper shifting.



To install the transmission in the vehicle, the shifter must be removed. Follow the transmission installation procedure.



Make sure you fill the unit with the proper type and amount of oil.

11. 66



11. 68





S6-650 Specifications

Lubricant Refill Capacities

Description

Castrol Transmax S (synthetic) Automatic Transmission Fluid, GM Part Number 12378515

Amount of Refill

6 Liters or 6.34 quarts

Adjustments

Preload

Measurement and adjustments of the tapered roller bearings is necessary. The main shaft, input shaft, and counter shaft cluster gear should be adjusted to provide a preload of 0.02 – 0.09mm. After adjusting the two shafts, each should be rotated a few times to center the rollers in the bearings involved.

Mounting Temperatures

All parts requiring heat should not be heated higher than 150 degree's C or 300 degree's F.

General Specifications

Thread locker – GM Part Number 12345382

Pipe Sealant - GM Part Number 12346004

Gasket Maker - GM Part Number 12378515

Torque Specifications

| Description | Nm | Lb-Ft | Lb-In | Quantity |
|------------------------|-----------|--------------|--------------|-----------------|
| End Yoke to Main Shaft | 330 | 244 | | 1 |
| Shifter Housing. | 23 | 17 | | 4 |
| P.T.O. Cover | 38 | 28 | | 12 |
| Idler Shaft Bolt | 23 | 17 | | 1 |

**Torque Specifications (cont.)**

| Description | Nm | Lb-Ft | Lb-In | Quantity |
|----------------------------|-----------|--------------|--------------|-----------------|
| Interlock Plate Bolts | 10 | 7 | 84 | 3 |
| Reverse Light Switch | 20 | 15 | | 1 |
| Case Half Bolts | 23 | 17 | | 19 |
| Fill Plug | 35 | 26 | | 1 |
| Drain Plug | 35 | 26 | | 1 |
| Breather | 10 | 7 | 84 | 1 |
| Main Shift Rail Detent. | 70 | 52 | | 1 |
| Intermediate Housing Bolts | 23 | 17 | | 2 |
| Speedo Sensor | 10 | 7 | 84 | 1 |
| CSC Studs | 7 | 5 | | 2 |

Synchronizer Reserve

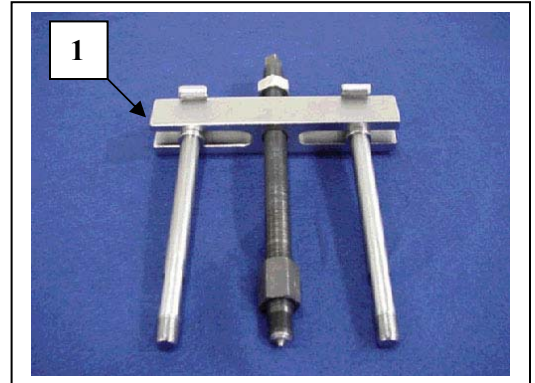
| | | | |
|--------------------|---|-------------|-------------|
| New Gear, New Ring | Second & Third | Min. 1.55m | Max. 1.85mm |
| | Fourth, Fifth , Sixth Reverse, First | Min. 1.30mm | Max. 2.10mm |

Axial Gear Clearance

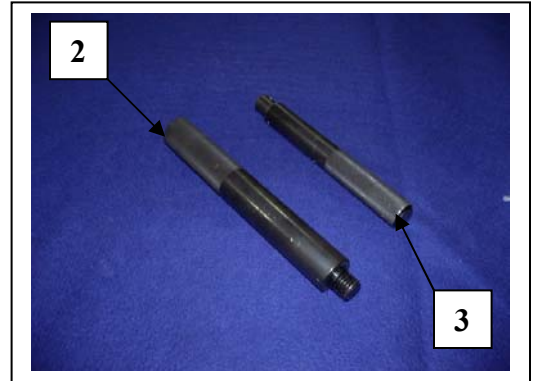
Axial Gear Clearance is 0.15mm to 0.35mm.



**1. T-Bar Push Puller
J 44707**



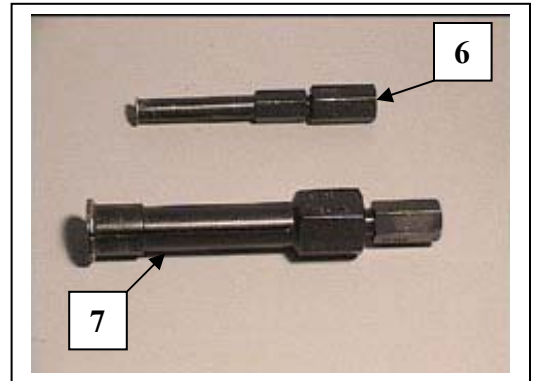
**2. Driving Handle
J 8092**



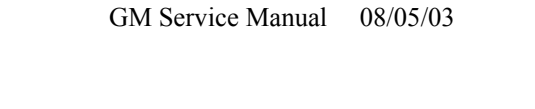
**3. Driver Handle Extension
J 21465-13**



**4. Rear Oil Seal Installer
J 44732**



**5. Input Shaft Oil Seal Installer
J 44731**



**6. Shift Rail Bearing Remover
J 44737**

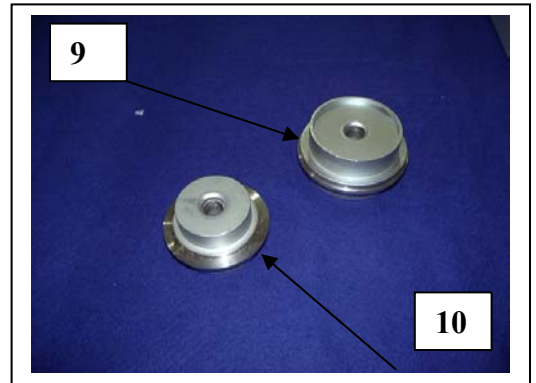
**7. Countershaft Bearing Remover
J 44738**



**8. Shift Rail Bearing Installer
J 44741**



**9. Mainshaft & Input Bearing Race
Installer
J 44746**

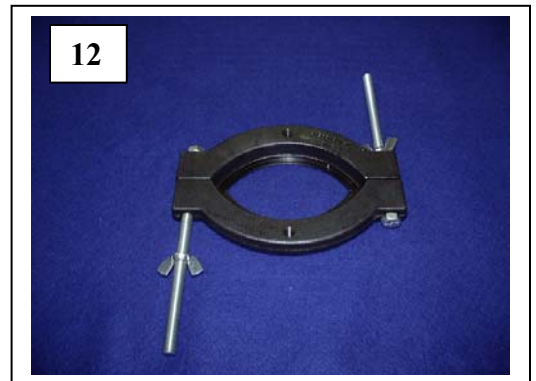


**10. Countershaft Bearing Race Installer
J 44745**

**11. Countershaft Rear Bearing Installer
J 44742**

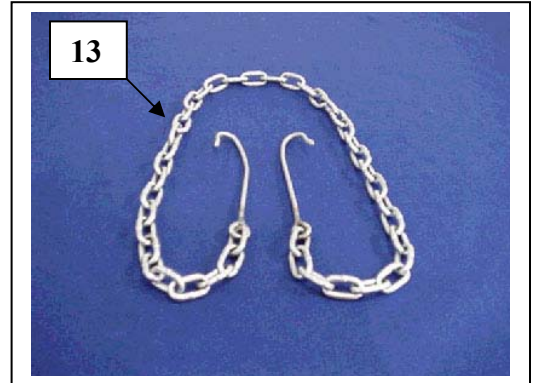


**12. Gear and Bearing Separator
J 36513**





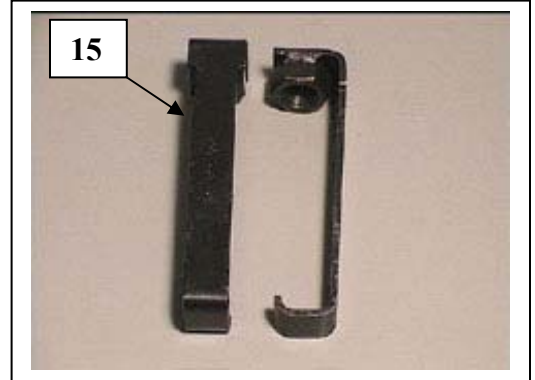
13. Use a suitable Chain and S Hooks



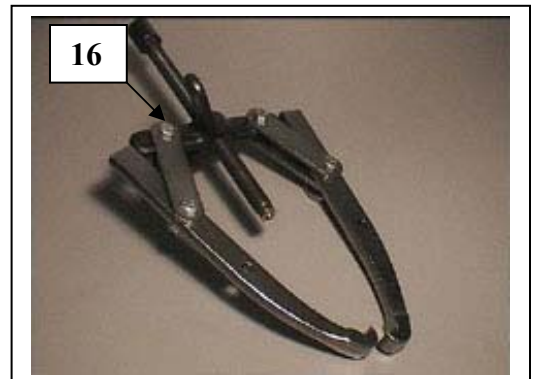
**14. Output Shaft Oil Seal Remover
J 36825**



**15. Intermediate Case Puller Legs
J 44730**



**16. Two/Three Jaw Puller
J 44726**

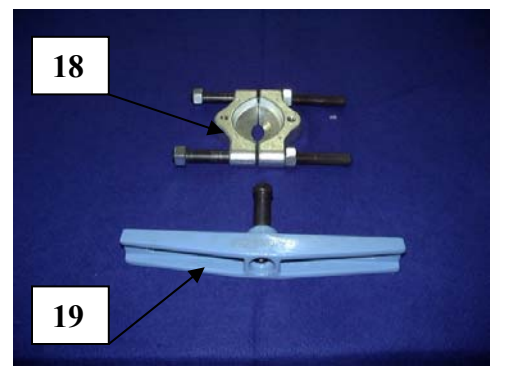




**17. Countershaft Bearing Race Remover
J 44738**



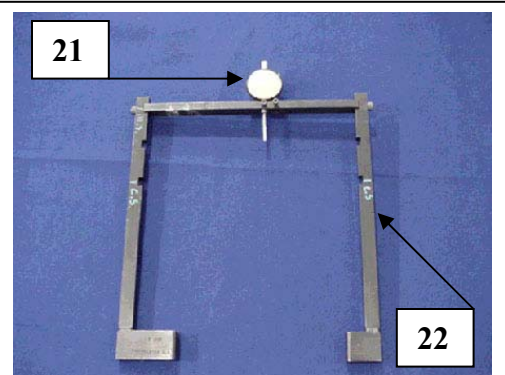
**18. Bearing Puller
J 22912-01**



**19. Pulley Puller
J 8433**



**20. Slide Hammer
J 23907**



**21. Dial Indicator
J 26900-12 (Metric)
J 29763**

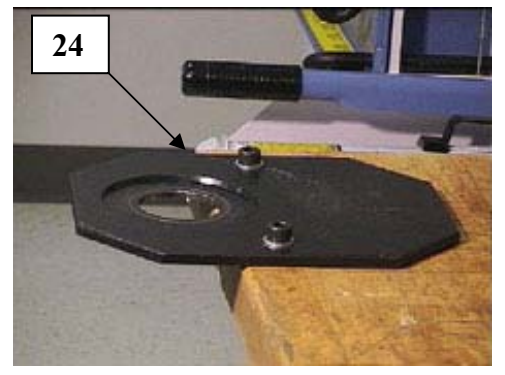
**22. Dial Indicator Bracket
J 44739**



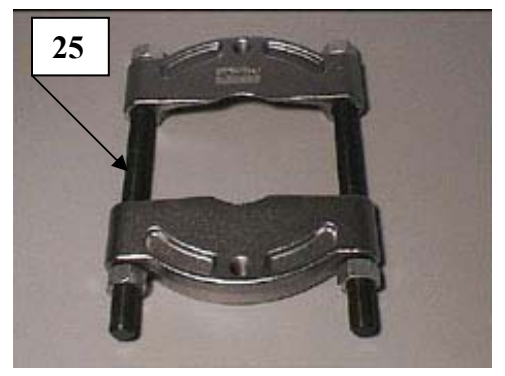
**23. Bridge and Forcing Screw
J 44736**



**24. Gear Pack Assembly Fixture
J 44725**



**25. Split Plate Bearing Puller
J 44749**

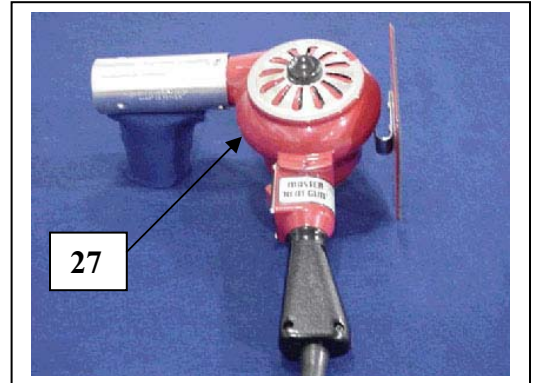


26. Toaster Oven

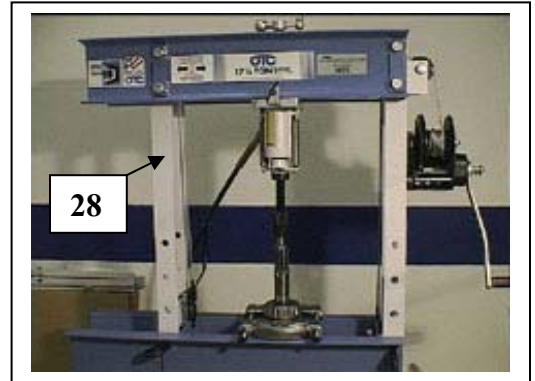




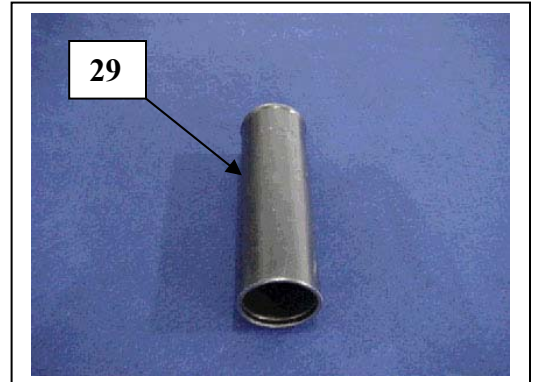
**27. Heat Gun
J 25070**



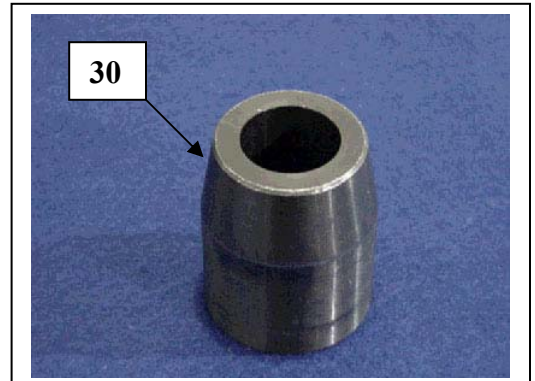
28. Press 25 Ton



**29. Installation Tube
J 44735**

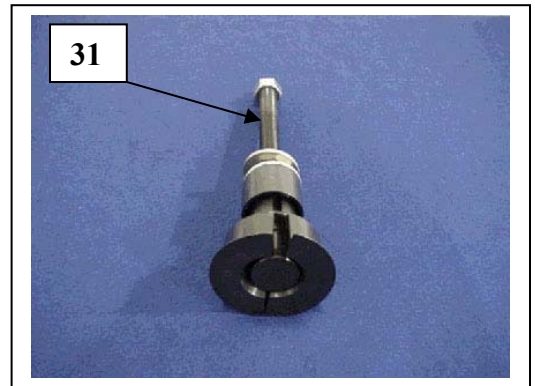


**30. Installation Aligner
J 44734**





**31. Input Shaft Bearing Race Remover
J 44733**



**32. Pinion Flange Holder
J 8614-01**



**33. Input Seal Remover
J 44748**

