Borg-Warner 1345 Transfer Case

APPLIES TO F-250, F-350 (4x4)

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DESCRIPTION

The Borg-Warner 1345 is a two-piece all aluminum full-time transfer case (Figs. 1 and 2). The unit is supported by a positive displacement oil pump that directs oil flow through drilled holes in the rear output shaft. The pump turns with the rear output shaft and allows towing of the vehicle for extended distances without disconnecting the rear driveshaft.

DIAGNOSIS AND TESTING

Refer to Part 16-10, General Manual Transmission Service, for diagnosis and testing procedures.

![FIG. 2 Borg-Warner 1345 Transfer Case—Rear View Case Half]

REMOVAL AND INSTALLATION

Refer to Fig. 3.

1. Disconnect front driveshaft from front output yoke.
2. Disconnect rear driveshaft from rear output shaft yoke.
3. Disconnect speedometer driven gear from transfer case rear bearing retainer.
4. Remove retaining rings and shift rod from the transfer case shift lever and transfer case shift lever.
5. Connect front driveshaft to front output yoke.
6. Connect rear driveshaft to rear output shaft yoke.
7. Connect speedometer driven gear to transfer case rear bearing retainer.
8. Install retaining rings and shift rod to the transfer case shift lever and transfer case shift lever.
FIG. 3 Borg-Warner 1345 Transfer Case and Skid Plate Installation

9. Disconnect vent hose from transfer case.
10. Remove heat shield from frame.
   CAUTION: Catalytic converter is located beside heat shield. Be careful when working around catalytic converter because of the extremely high temperatures generated by the converter.
11. Support transfer case with a transmission jack.
12. Remove the bolts retaining transfer case to transmission adapter.
13. Lower transfer case from vehicle and remove gasket between transfer case and adapter.

Installation
1. Place a new gasket between transfer case and adapter.
2. Raise transfer case with transmission jack so transmission output shaft aligns with splined transfer case input shaft. Install bolts retaining transfer case to adapter. Tighten bolts to specification.
3. Remove transmission jack from transfer case.
4. Connect rear driveshaft to rear output shaft yoke. Tighten nut to specifications.
5. Install shift lever to transfer case. Install retaining nut.
6. Connect speedometer driven gear to transfer case.
7. Connect four wheel drive indicator switch wire connector at transfer case.
8. Connect front driveshaft to front output yoke. Tighten nut to specifications.
9. Position heat shield to frame crossmember and mounting lug on transfer case. Install and tighten bolts to specification.
10. Install skid plate to frame. Tighten nuts and bolts to specification.
11. Install drain plug and tighten to 19-29 N·m (14-22 ft. lb). Remove filler plug and install 2.9 liters (6.0 pints) of automatic transmission fluid meeting Ford specification ESP-M2C138-CJ, or Dexron II, Series D or equivalent. Install filler plug and tighten to 19-29 N·m (14-22 ft. lb).
12. Lower vehicle.

DISASSEMBLY AND ASSEMBLY
TRANSFER CASE

Refer to Fig. 4.

Disassembly
1. Remove transfer case from vehicle as described in this Part.
2. Drain fluid from case by removing filler plug from case half (Fig. 1).
3. Remove both output shaft yoke nuts and remove the rear output yoke and the front output yoke.
4. Remove the four-wheel drive indicator switch.
5. Separate the cover from the case by removing the attaching bolts. Pry the case and cover apart by inserting a flat-blade screwdriver or 1/2 inch square drive ratchet or breaker bar in the pry bosses (Fig. 5).
6. Remove the magnetic chip collector from the boss in the bottom of the case half.
7. Slide the shift collar hub off the rear output shaft (Fig. 6).
8. Compress the shift fork spring (Fig. 7) and remove the upper and lower spring retainers from the shaft.
9. As an assembly lift out from the case the four-wheel drive lockup fork and the lockup shift collar (Fig. 8). Remove the thrust washer. Be careful not to lose the nylon wear pads on the lockup fork.
10. Remove the snap ring from the front output shaft and remove the thrust washer.
11. Grip the chain and both sprockets, (Fig. 9) and lift straight up to remove the drive sprocket, driven sprocket and chain from the output shafts.
12. Lift the front output shaft out from the case.
Fig. 4 Borg-Warner 1345 Transfer Case Exploded View
FIG. 5 Separating Case and Cover Halves

FIG. 6 Removing Shift Collar Hub

FIG. 7 Removing Spring Retainers

13. Remove the four oil pump attaching screws and remove the oil pump rear cover, pickup tube, filter and pump body, two pump pins, pump spring, and oil pump front cover from the rear output shaft (Fig. 10).

FIG. 8 Removing Lock-up Fork and Shift Collar

FIG. 9 Removing Sprockets and Chain

FIG. 10 Removing Oil Pump Assembly
14. Remove the snap ring that holds the bearing retainer inside the case. Lift the rear output shaft while tapping on the bearing retainer with a plastic or soft mallet. Lift the rear output shaft and bearing retainer from the case (Fig. 11).

NOTE: Two dowel pins will fall into the case when the retainer is removed.

FIG. 11 Removing Rear Output Shaft

15. Remove the rear output shaft from the bearing retainer. If necessary, press the needle bearing assembly out from the bearing retainer.

16. Remove the C-clip that holds the shift cam (Fig. 12) to the shift actuating lever inside the case.

17. Remove the shift lever retaining screw and remove the shift lever from the case.

NOTE: When removing the lever, the shift cam will disengage from the shift lever shaft and may release the detent ball and spring from the case.

18. As an assembly, remove the planetary gear set, shift rail, shift cam, input shaft and shift forks from the case (Figs. 13 and 14). Be careful not to lose the two nylon wear pads on the shift fork.

19. Remove the spacer washer from the bottom of the case.

20. With a drift, drive out the plug from the detent spring bore (Fig. 15).

Assembly

Before assembly, lubricate all parts with automatic transmission fluid meeting Ford specification ESP-M2C138-CJ or Dexron II, Series D or equivalent.

1. Assemble the planetary gear set, shift rail, shift cam, input shaft and shift fork together as a unit (Fig. 16). Make sure the boss on the shift cam is installed toward the case. Install the spacer washer on the input shaft.

2. Place the rear output shaft in the planetary gear set, making sure the shift cam engages the shift fork actuating pin (Fig. 17).

FIG. 12 Removing Shift Cam C-Clip

FIG. 13 Removing Shift Rail

FIG. 14 Shifter Mechanisms
FIG. 15 Removing Detent Ball Plug

FIG. 16 Installing Planetary Gear Set and Shifter Mechanism

3. Lay the case on its side. Insert the rear output shaft and planetary gear set into the case. Make sure the spacer washer remains on the input shaft.

4. Install the shift rail into the hole in the case. Install the outer roller bushing into the guide in the case.

5. Remove the rear output shaft and position the shift fork in neutral.

6. Place the shift control lever shaft through the cam, and install the clip ring. Make sure the shift control lever is pointed downward and is parallel to the front face of the case.

7. Check shift fork and planetary gear engagement. Unit should operate freely without any binding.

8. If removed during disassembly, press new needle bearing into the bearing retainer using Tool T80T-7127-C.

9. Insert output shaft through the bearing retainer from the bottom side outward.

FIG. 17 Connect Shift Cam Engagement

10. Insert the rear output shaft pilot into the input shaft rear bushing. Align the dowel holes and lower the bearing into position.

11. Install dowel pins. Install snap ring that retains the bearing retainer in case.

12. Insert detent ball and spring in detent bore in case half (Fig. 18). Coat the seal plug with RTV sealant or equivalent. Drive plug into case until the lip of the plug is 0.79mm (1/32 inch) below the surface of the case. Peen the case over the plug in two places.

13. Install the oil pump front cover over the output shaft with the flanged side down. The word "Top" must be facing the top of the transfer case as the position the case is installed in the vehicle.

14. Install the oil pump spring and two pump pins with the flat side outward in the hole in the output shaft. Push in both pins to install the oil pump body, pickup tube and filter.

15. Place the oil pump rear cover on the output shaft with the flanged side outward. The word "Top" is positioned toward the top of the transfer case in the position the transfer case is installed in the vehicle. Apply Loctite or equivalent to oil pump bolts and install in pump cover. Tighten to 4.0-4.5 N·m (36-40 in-lb).

16. Install the thrust washer on the rear output shaft next to the oil pump.

17. Place drive sprocket on front output shaft. Install snap ring and thrust washer.

18. Install chain on drive sprocket and driven sprocket. Lower the chain and sprockets into position in the
case. The driven sprocket is installed through the front output shaft bearing and the drive sprocket is placed on the rear output shaft.

19. Engage the four-wheel drive shift fork on the shift collar. Slide the shift fork over the shift shaft and the shift collar over the rear output shaft. Make sure the nylon wear pads are installed on the shift fork tips and that the necked down part of the shift collar is facing rearward.

20. Push the four-wheel drive shift spring downward and install the upper spring retainer. Push the spring upward and install the lower retainer.

21. Install the shift collar hub on the rear output shaft.

22. Apply a bead of RTV sealant or equivalent on the case mounting surface. Lower the cover over the rear output shaft. Align the shift rail to its blind hole in cover. Make sure the front output shaft is fully seated in its support bearing. Install attaching bolts and tighten to 55-61 Nm (40-45 ft. lbs). Allow one hour curing time for gasket material prior to operating vehicle.

23. Install the four-wheel drive indicator switch. Torque to 11-16 Nm (8-12 ft. lbs).

24. Press an oil slinger on the front yoke. Install front and rear output shaft yokes. Coat nuts with Loctite or equivalent and tighten to 136-176 Nm (100-130 ft. lbs).

25. Refill transfer case with 2.9 liters (6.0 pints) of automatic transmission fluid meeting Ford specification ESP-M2C138-CJ, or Dexron, Series II, or equivalent. Tighten level and drain plugs to 9-18 Nm (6-14 ft. lbs). Tighten fill plug to 21-33 Nm (15-25 ft. lbs).

26. Install transfer case in vehicle as described in this Part.

27. Start engine and check transfer case for correct operation. Stop engine and check fluid level. Fluid should drip from level hole. If fluid flows out level hole in a stream, the pump may not be operating properly.
4. Place hub in planetary gear cage and install "T" shape lock key and snap ring.
5. Install locking plate, with dished side toward the planetary gear set, on the shift hub.
6. Lower the planetary assembly into the annulus gear. Be sure the tabs on the locking plate engage the annulus gear teeth. Install snap ring.

**COVER**

Disassembly
1. Remove snap ring retaining the rear output shaft ball bearing assembly in the cover.
2. Turn cover over and remove the rear output shaft seal with T50T-100-A, slide hammer, and Tool 1175-AG, seal remover (Fig. 22).
3. Remove speedometer drive gear.
4. Press the rear output shaft ball bearing out from the cover.
5. Remove speedometer gear adapter.
6. Remove front output shaft inner needle bearing from cover with T50T-100-A, slide hammer, and OTC 33864, seal remover (Fig. 23).

**CASE**

Disassembly
1. Remove snap ring retaining front output shaft ball bearing assembly in case.
2. Remove output shaft seal and both input shaft seals.
3. Press the front output shaft bearing and input shaft bushing from the case.

Assembly
1. Press new input shaft bushing into case. Make sure lug is in downward position.
2. Install new output shaft ball bearing. Install snap ring.
3. Press both input shaft seals into case.
4. Press front output shaft seal into case.

**FIG. 21** Planetary Gear Set

**FIG. 22** Removing Front Output Shaft Seal From Case

**FIG. 23** Removing Needle Bearing
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<tr>
<th>Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>T80T-7127-B</td>
<td>Front Output Shaft Bearing Replacor</td>
</tr>
<tr>
<td>T80T-7127-C</td>
<td>Rear Output Shaft Bearing Replacor</td>
</tr>
<tr>
<td>DB8L-100-T</td>
<td>Blind Hole Puller</td>
</tr>
<tr>
<td>DB8L-100-H</td>
<td>Blind Hole Puller</td>
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<tr>
<td>TOOL 1175-AC</td>
<td>Seal Remover</td>
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<tr>
<td>T50T-100-A</td>
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<tr>
<td>OTC-33864</td>
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