

TRANSMISSION REMOVAL & INSTALLATION - M/T

MANUAL TRANSMISSION REMOVAL Ford Motor Co.

TRANSFER CASE REMOVAL & INSTALLATION

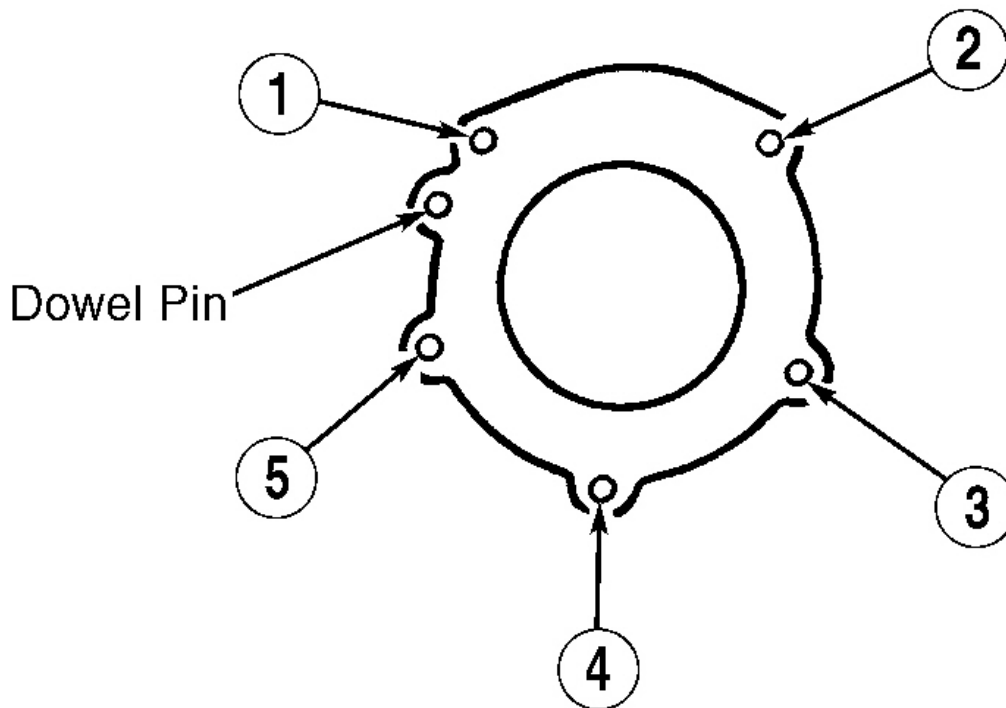
BORG-WARNER 1345 ("F" SERIES)

Removal

1. Raise vehicle. Remove drain plug and drain fluid from transfer case. Replace plug. Disconnect 4WD indicator switch connector at transfer case. If equipped, remove skid plate.
2. Disconnect front and rear drive shafts from transfer case output shaft yokes, and wire out of way. **DO NOT** allow shafts to hang free as damage to universal joints may result.
3. Disconnect speedometer driven gear from transfer case rear cover. Remove retaining clips and shift rod from transfer case control and transfer case shift levers. Disconnect vent hose from case.
4. Remove heat shield. Support transfer case with transmission jack. Remove transfer case-to-extension housing bolts. Slide transfer case off of transmission output shaft. Lower transfer case out of vehicle. Remove gasket from between transfer case and adapter.

Installation

Install new transfer case/extension housing gasket. To complete installation, reverse removal procedure. Tighten extension housing bolts in sequence to specifications. See **Fig. 1**. Also, refer to **TORQUE SPECIFICATIONS (TRANSFER CASE)**. Fill case with 3.3 qts. (3.0L) of Mercon ATF (XT-2-QDX or EAZ-19582-B).



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Fig. 1: B-W 1345 Extension Housing Tightening Sequence
 Courtesy of FORD MOTOR CO.

BORG-WARNER 1350 (BRONCO II & RANGER)

Removal

1. Raise vehicle. Remove skid plate (if equipped). Remove drain plug and drain fluid from case. Replace plug. Disconnect 4WD indicator switch connector at transfer case. Disconnect front drive shaft from front axle. Loosen front shaft boot clamp and slide out drive shaft and boot as an assembly.
2. Disconnect rear drive shaft from transfer case. Disconnect speedometer driven gear from transfer case rear cover. Disconnect vent hose from control lever.
3. Loosen bolts retaining shifter to extension housing. Pull on control lever until bushing slides off transfer case shift lever pin. Unscrew shift lever from control lever, as needed.
4. Remove heat shield from transfer case. Support transfer case with jack and remove transfer case-to-transmission extension housing bolts (5). Slide transfer case to the rear and off of transmission output shaft. Lower transfer case from vehicle. Remove gasket from between transfer case and extension housing.

Installation

1. Install new gasket for extension housing. To complete installation, reverse removal procedure. Note the following during installation.
 - When installing shift lever, tighten large bolt first.

- When installing vent assembly, White marking on hose should be positioned in notch in shifter. Upper end of hose should be 3/4" above top of shifter, just below floor pan.
 - Before installing front drive shaft into transfer case, lubricate transfer case input shaft female splines with multipurpose grease.
2. Tighten transfer case-to-extension housing bolts in sequence to specifications. See **TORQUE SPECIFICATIONS (TRANSFER CASE)**. Also, see **Fig. 2**. Fill transfer case with 1.5 qts. (1.4L) of Mercon ATF (XT-2-QDX or EAZ-19582-B).

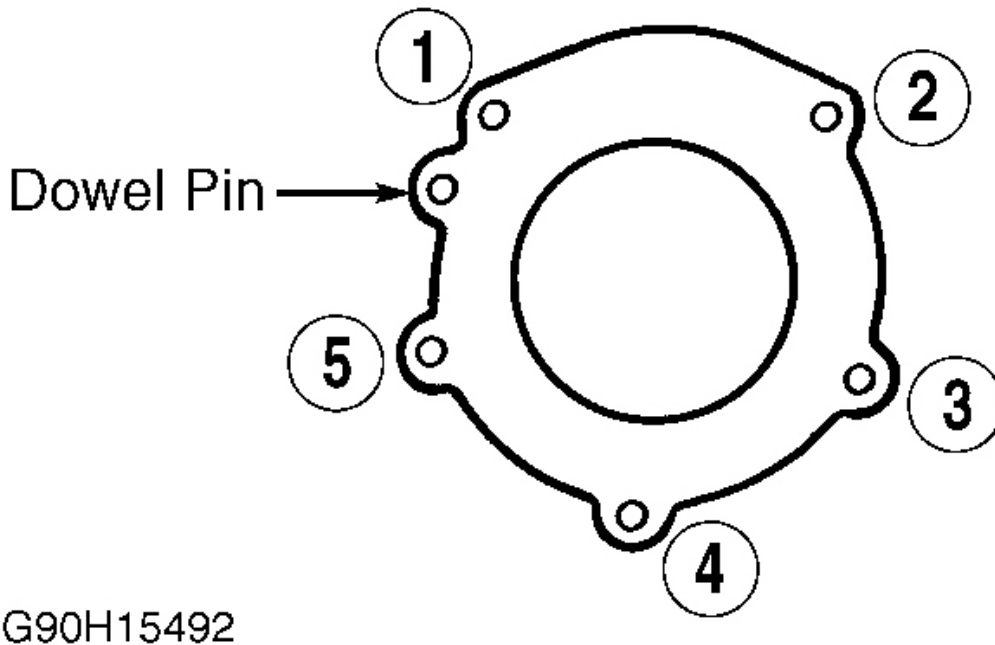


Fig. 2: B-W 1350 Extension Housing Tightening Sequence
 Courtesy of FORD MOTOR CO.

BORG-WARNER 1354 (BRONCO II & RANGER)

Removal

1. Raise vehicle. Remove skid plate and damper (if equipped). Remove drain plug and drain fluid from transfer case. Disconnect 4WD indicator switch wire connector at transfer case.
2. Disconnect front and rear drive shaft from output shaft yoke. Disconnect speedometer cable assembly from transfer case rear cover. Disconnect vent hose from control lever. Remove shift lever retaining nut and lever.
3. Loosen or remove large and small bolts (one each) retaining shifter to extension housing. Remove lever assembly and bushing. Support transfer case jack. Remove bolts retaining transfer case to extension housing. Slide transfer case rearward off of transmission output shaft. Lower transfer case from vehicle and remove gasket between transfer case and adapter.

NOTE: When installing shift lever assembly, always tighten large bolt first.

Installation

Install new transfer case-to-extension housing gasket. To complete installation, reverse removal procedure. Tighten transfer case-to-extension housing bolts in sequence and to specifications. Refer to **TORQUE SPECIFICATIONS (TRANSFER CASE)**. Also, see **Fig. 2**. Fill transfer case with 1.3 qts. (1.2L) of Mercon ATF (XT-2-QDX or EAZ-19582-B).

BORG-WARNER 1356 (BRONCO & "F" SERIES)

Removal

1. Raise vehicle on hoist. Place a drain pan under transfer case, remove drain plug and drain fluid from transfer case. Disconnect 4WD indicator switch wire connector at transfer case. Disconnect front drive shaft from front output yoke.
2. Disconnect rear drive shaft from rear output shaft yoke. Disconnect speedometer cable assembly from transfer case rear bearing retainer. Disconnect vent hose from transfer case.
3. Support transfer case with transmission jack. Remove bolts retaining transfer case to transmission adapter. Slide transfer case rearward off of transmission output shaft. Lower transfer case from vehicle and remove gasket between transfer case and adapter.

Installation

1. Install new gasket. To complete installation, reverse removal procedure. Tighten extension housing bolts in sequence to specifications. Refer to **TORQUE SPECIFICATIONS (TRANSFER CASE)**. Also, see **Fig. 3**. Fill transfer case with 2.0 qts. (1.9L) of Mercon ATF (XT-2-QDX or EAZ-19582-B).

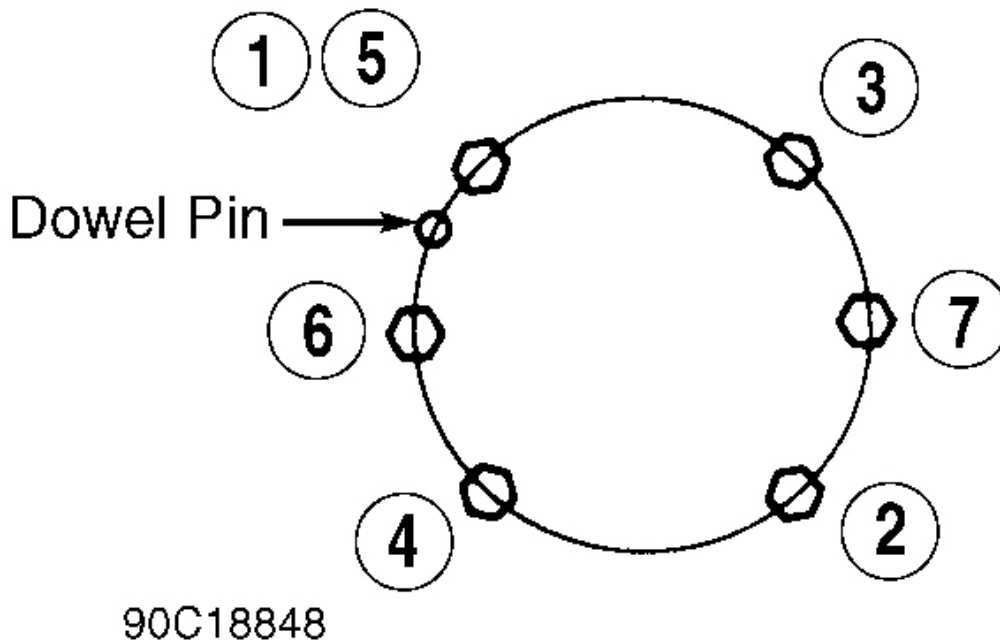


Fig. 3: B-W 1356 Extension Housing Tightening Sequence
 Courtesy of FORD MOTOR CO.

BORG-WARNER 1359 (BRONCO II)

Removal

1. Raise vehicle. Disconnect rear drive shaft from transfer case output shaft flange. Disconnect speedometer cable assembly from transfer case rear cover. Support transfer case with a transmission jack.
2. Remove 5 bolts retaining transfer case to transmission extension housing. Slide transfer case rearward off transmission output shaft and lower transfer case from vehicle. Remove gasket from between transfer case and extension housing.

Installation

Install a new extension housing gasket. To complete installation, reverse removal procedure. Tighten extension housing bolts in sequence to specifications. See **Fig. 2**. Also, refer to **TORQUE SPECIFICATIONS (TRANSFER CASE)**. Fill transfer case with 2.0 qts. (1.9L) of Mercon ATF (XT-2-QDX or EAZ-19582-B).

TRANSMISSION REMOVAL & INSTALLATION

BORG-WARNER T-18 4-SPEED (F-150/250 2WD)

Removal

1. Remove floor mat and body floor pan cover. Remove gearshift lever shift ball and boot. Remove isolator pad.
2. Raise vehicle on hoist. Remove drain plug and drain transmission. Install drain plug. Position transmission jack under transmission. Disconnect speedometer cable. Disconnect back-up light switch connector from rear of gearshift housing cover.
3. Disconnect drive shaft or coupling shaft. Disconnect clutch linkage from transmission and wire it aside. Remove skid plate (if equipped). Remove nuts connecting upper gusset to frame on both sides of frame. Remove nut/bolt connecting gusset to crossmember.
4. Remove left side gusset. Remove transmission mount bolts and nuts. Raise transmission. Remove right side gusset. Remove crossmember nuts and remove crossmember.
5. Remove transmission-to-clutch housing bolts. Move transmission to rear until input shaft clears clutch housing. Lower and remove transmission.

Installation

1. Ensure transmission input shaft splines are clean and free of rust. Place transmission on transmission jack. Install guide studs in clutch housing. Raise transmission until input shaft splines are aligned with clutch disc splines.
2. Slide transmission forward into position on guide studs. Remove guide studs. Install bolts and tighten to specifications. To complete installation, reverse removal procedure. Fill with 3.5 qts. (3.3L) of SAE 80W lubrication. Check for proper fluid level.

BORG-WARNER T-18 4-SPEED (BRONCO & F150/250 4WD)

Removal

1. Remove floor mat and body floor pan cover. Place shift lever in Reverse position. Remove gearshift cover. Remove insulator and dust cover. Remove transfer case shift lever, shift ball and boot as an assembly.
2. Remove transmission shift lever, shift ball and boot as an assembly. Raise vehicle on hoist. Remove drain plug and drain transmission and transfer case. Disconnect rear and front drive shafts and wire them aside.
3. Remove shift linkage from transmission. Remove speedometer cable. Position transmission jack under transfer case. Remove transfer case-to-transmission bolts. Remove transfer case.
4. Remove rear support bracket-to-transmission bolts. Position transmission jack under transmission. Remove rear support bracket brace. Remove transmission-to-clutch housing bolts. Remove transmission.

Installation

1. Ensure transmission input shaft splines are clean and free of rust. Place transmission on jack. Install guide studs in engine block. Raise transmission until input shaft splines are aligned with clutch disc splines.
2. Slide transmission forward onto guide studs. Remove guide studs and install clutch housing-to-engine bolts. Tighten to specifications. To complete installation, reverse removal procedure. Fill with 3.5 qts. (3.3L) of SAE 80W lubrication. Check for proper fluid level.

FORD S5-42 (2WD BRONCO, E-350 & "F" SERIES)

Removal

1. Shift transmission into Neutral. Remove carpet or floor mat. Remove ball from the upper shift lever. Remove 4 screws and remove boot and bezel assembly from transmission opening cover. Remove 2 bolts and remove upper shift lever from lower shift lever.
2. Raise vehicle on hoist and position safety stands under vehicle. Disconnect speedometer cable. Disconnect back-up lamp switch located at top left side of transmission. Remove drain plug and drain oil from transmission. Position transmission jack under transmission.
3. Disconnect drive shaft and clutch linkage from transmission and wire it to one side. On "F" Series Super Duty vehicles, remove transmission parking brake from transmission. Remove transmission rear insulator and lower retainer.
4. Remove crossmember. Remove bolts that retain transmission to engine block. Move transmission to rear until input shaft clears engine flywheel. Lower transmission from vehicle.

Installation

1. Ensure transmission input shaft splines are clean and free of rust. Place transmission on jack. Install guide studs in engine block. Raise transmission until input shaft splines are aligned with clutch disc splines.
2. Slide transmission forward onto guide studs. Remove guide studs and install clutch housing-to-engine bolts. Tighten to specifications. To complete installation, reverse removal procedure. Fill with 3.5 qts. (3.3L) of SAE 80W lubrication. Check for proper fluid level.

FORD S5-42 (4WD BRONCO, E-350 & "F" SERIES)

Removal

1. Shift transmission into Neutral. Remove carpet or floor mat. Remove 4 screws and remove boot and bezel assembly from transmission opening cover. Remove 2 bolts and upper shift lever from lower shift lever. Raise vehicle on hoist. Remove drain plugs and drain transmission and transfer case.
2. Disconnect rear drive shaft from transfer case and wire it out of the way. Disconnect front drive shaft from transfer case and wire it out of way. Disconnect back-up lamp switch. Remove speedometer cable from transfer case. If equipped, remove skid pan from beneath transfer case.
3. Position transmission jack under transfer case. Remove 6 bolts holding transfer case to transmission and carefully lower transfer case from vehicle, using care to ensure that transfer case shift lever clears opening in floor pan.
4. Remove transmission rear insulator and lower retainer. Remove crossmember. Remove bolts that retain transmission to engine block. Move transmission to rear until input shaft clears engine flywheel housing. Lower transmission from vehicle.

Installation

1. Ensure transmission input shaft splines are clean and free of rust. Place transmission on jack. Install guide studs in engine block. Raise transmission until input shaft splines are aligned with clutch disc splines.
2. Slide transmission forward onto guide studs. Remove guide studs and install clutch housing-to-engine bolts. Tighten to specifications. To complete installation, reverse removal procedure. Fill with 3.5 qts. (3.3L) of SAE 80W lubrication. Check for proper fluid level.

MAZDA M50D (AEROSTAR, BRONCO II & RANGER)

Removal

1. Disconnect negative battery cable from battery. Shift transmission into Neutral. Remove 4 bolts retaining boot assembly to floor. Lift boot up shift lever assembly.
2. Remove 4 bolts retaining shift lever assembly to transmission remote shift rail adapter. Remove lever, knob and boot assembly. Raise vehicle on a hoist. Disconnect starter cable and wires. Remove starter retaining bolts and remove starter.
3. Remove clip retaining tube to hydraulic clutch slave cylinder. Remove tube and fitting from slave cylinder. Cap end of tube and slave cylinder to prevent foreign object damage.
4. Disconnect back-up lamp switch, shift indicator and neutral position wires from senders on transmission. Remove cable (conventional speedometer) or disconnect wire (electronic speedometer) from fitting.
5. Scribe a mark on drive shaft and rear axle flange, marking drive shaft position for installation. Remove "U" bolts and nuts from rear axle flange. Remove drive shaft.
6. Cap transmission extension housing to prevent lubricant spillage. Remove nuts retaining insulator to crossmember. Loosen nut and washer assemblies attaching front insulators to crossmember brackets.
7. Position transmission jack under transmission. Place jack safety chain around transmission. Slightly raise transmission. Remove nuts and bolts retaining crossmember to frame. Remove crossmember.
8. Remove bolts retaining clutch housing to engine. Bring transmission rearward to separate clutch housing from dowel pins in rear of engine block. Slowly lower transmission from vehicle.

Installation

1. Ensure mating surfaces and locating dowels are clean and free of burrs. Ensure input shaft is clean and free of rust. Place transmission on jack and position under vehicle. Raise transmission and align input shaft with clutch splines. Move transmission forward until clutch housing seats on dowel pins.
2. Install and tighten bolts to specifications. To complete installation, reverse removal procedure. Fill transmission with 3.8 qts. (3.6L) of Mercon ATF (XT-2-QDX or EAZ-19582).

MAZDA M50D (BRONCO, "E" & "F" SERIES 2WD)

Removal

1. Shift transmission into Neutral. Remove carpet or floor mat for access. Remove shifter boot retainer screws. Slide boot up shift lever shaft. Remove shift lever retainer bolt and shift lever.
2. Raise vehicle on hoist. Disconnect speedometer cable. Disconnect back-up light switch, located on top left of transmission. Remove drain plug and drain gear oil. Install drain plug.
3. Position transmission jack under transmission. Disconnect drive shaft from extension housing and wire to one side. On models with 7.3L engines, disconnect clutch slave cylinder hydraulic line. On all other models, remove clutch slave cylinder hydraulic line by pressing White retainer bushing with Disconnect Tool (T88T-70522-A). See **Fig. 4**.
4. Remove transmission rear mount and lower retainer. Remove skid plate (if equipped). Remove catalytic converter heat shield.
5. Remove 2 upper gusset-to-frame nuts from both sides. Remove transmission-to-transmission support plate bolts on crossmember. Raise transmission with transmission jack.
6. Remove nut and bolt connecting support plate to crossmember. Remove support plate. Remove right gusset. Remove nuts and bolts holding crossmember to frame. Remove crossmember. Remove transmission-to-engine block bolts. Move transmission rearward until input shaft clears flywheel.

Lower transmission from vehicle.

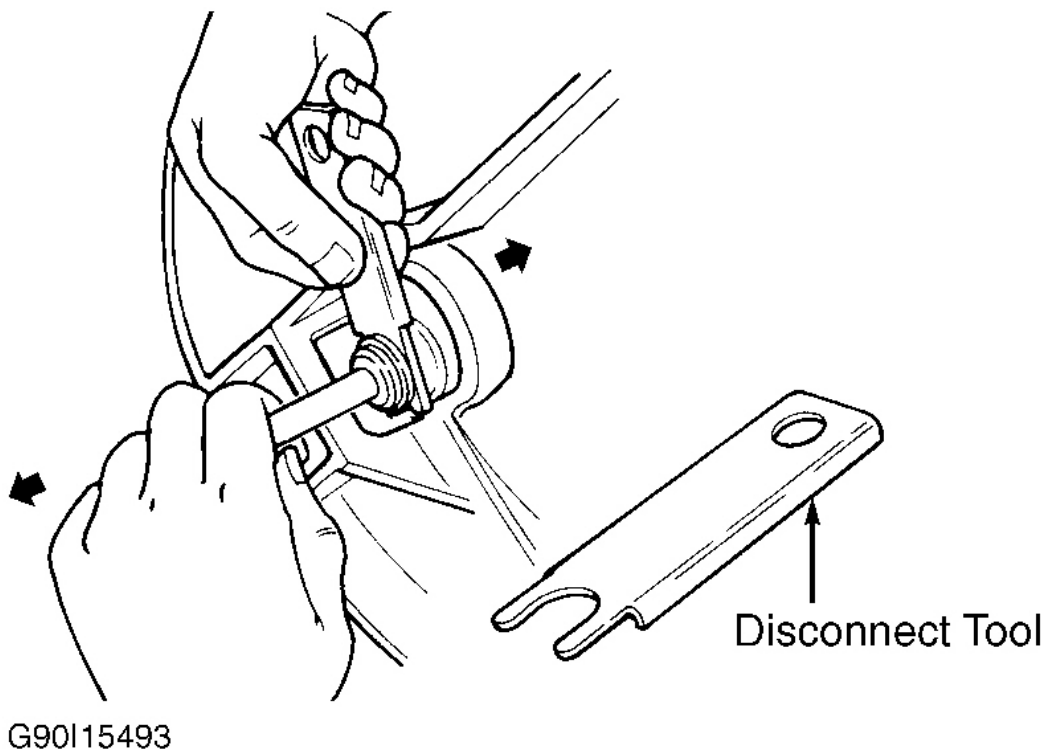


Fig. 4: Clutch Hydraulic Line Removal (Except 7.3L Diesel)
Courtesy of FORD MOTOR CO.

Installation

1. Ensure transmission input shaft splines are clean and free of rust. Place transmission on jack. Install guide studs in engine block. Raise transmission until input shaft splines are aligned with clutch disc splines.
2. Slide transmission forward onto guide studs. Remove guide studs and install clutch housing-to-engine bolts. Tighten to specifications. To complete installation, reverse removal procedure. Fill with 3.8 qts. (3.6L) of Mercon ATF (XT-2-QDX or EAZ-19582).

MAZDA M50D (BRONCO, "E" & "F" SERIES 4WD)

Removal & Installation

1. Shift transmission into Neutral. Remove carpet or floor mat for access. Remove shifter boot retainer screws. Slide boot up shift lever shaft. Remove shift lever retainer bolt and shift lever.
2. Raise vehicle on hoist. Disconnect back-up light switch, located on top left of transmission. Remove drain plugs and drain gear oil from transmission and transfer case. Install drain plugs.
3. Disconnect rear drive shaft from extension housing and wire to one side. Disconnect back-up light switch. Disconnect speedometer cable from transfer case. Remove skid plate (if equipped).

4. Position transmission jack under transfer case. Remove 6 transfer case-to-transmission bolts. Lower transfer case. Ensure transfer case shift lever clears opening in floor pan.
5. Remove transmission rear mount and lower retainer. Remove catalytic converter heat shield.
6. Remove 2 upper gusset-to-frame nuts from both sides. Remove transmission-to-transmission support plate bolts on crossmember. Raise transmission with transmission jack.
7. Remove nut and bolt connecting support plate to crossmember. Remove support plate. Remove right gusset. Remove crossmember-to-frame nuts and bolts. Remove crossmember.
8. Remove transmission-to-engine block bolts. Move transmission rearward until input shaft clears flywheel. Lower transmission from vehicle.

Installation

1. Ensure transmission input shaft splines are clean and free of rust. Place transmission on jack. Install guide studs in engine block. Raise transmission until input shaft splines are aligned with clutch disc splines.
2. Slide transmission forward onto guide studs. Remove guide studs and install clutch housing-to-engine bolts. Tighten to specifications. To complete installation, reverse removal procedure. Fill with 3.8 qts. (3.6L) of Mercon ATF (XT-2-QDX or EAZ-19582).

MITSUBISHI FM132 (2WD) & FM146 (4WD)

Removal

1. Disconnect negative battery cable. Place gearshift selector in Neutral. Remove shift boot retainer bolts. Remove bolts attaching retainer cover to gearshift lever retainer.
2. Pull gearshift lever assembly out of control housing. Cover opening in control housing to prevent dirt from entering transmission. Raise vehicle. Index rear drive shaft axle flange and front transfer case flange (if equipped).
3. On 2WD models, disconnect rear drive shaft at rear axle flange. On 4WD models, disconnect drive shaft at both rear axle flange and transfer case. Remove front drive shaft. Install plug in transfer case adapter to prevent lubricant leakage.
4. On all models, pull rear drive shaft rearward and disconnect drive shaft from transmission. Remove clutch housing dust shield. Disconnect hydraulic fluid line from clutch slave cylinder. Plug line to prevent fluid leakage.
5. Disconnect speedometer cable. Disconnect starter motor cable, back-up lamp switch wire and neutral position switch wire. Place jack under engine block, protecting oil pan with wood block. Remove transfer case from vehicle as previously described (if equipped).
6. Remove starter. Place a jack under transmission. Remove bolts attaching clutch housing-to-engine. Remove nuts/bolts attaching transmission mount and damper to crossmember.
7. Remove nuts attaching crossmember to frame side rails and remove crossmember. Lower engine jack. Work clutch housing off locating dowels and slide transmission rearward until input shaft clears clutch disc and pressure plate. Remove transmission from vehicle.

Installation

1. Ensure mating surfaces and locating dowels are free of burrs. Ensure transmission input shaft is clean and free of rust. Place transmission on jack and position under vehicle. Raise transmission into position and start input shaft into clutch disc.

2. Align splines on input shaft with splines in clutch disc. Move transmission forward until clutch housing seats on locating dowels. Install bolts retaining clutch housing-to-engine block.
3. Tighten bolts to specifications. To complete installation, reverse removal procedure. Fill transmission with 3.4 qts. (3.2L) of SAE 80W lubricant.

TORQUE SPECIFICATIONS

TRANSFER CASE

TORQUE SPECIFICATIONS (TRANSFER CASE)

Application	Ft. Lbs. (N.m)
Borg-Warner 1345	
Control Lever-To-Transfer Case Bolt	
Large Bolt	71-90 (96-122)
Small Bolt	31-42 (42-57)
Drain Plug	10-14 (14-19)
Extension Housing-to-Transfer Case Bolt ⁽¹⁾	25-43 (34-58)
Front Drive Shaft-to-Yoke Bolt/Nut	10-15 (14-21)
Rear Drive Shaft-to-Yoke Nut	10-15 (14-21)
Skid Plate Bolt	15-20 (21-27)
Borg-Warner 1356	
Drain Plug	10-14 (14-19)
Extension Housing-to-Transfer Case Bolt ⁽²⁾	25-43 (34-58)
Front Drive Shaft-to-Yoke Bolt/Nut	10-15 (14-21)
Rear Drive Shaft-to-Yoke Nut	
Bronco	20-25 (27-34)
"F" Series	10-15 (14-21)
Skid Plate Bolt	15-20 (21-27)
All Others	
Control Lever-to-Transfer Case Bolt (Bronco II & Ranger)	
Large Bolt	70-90 (95-122)
Small Bolt	31-42 (42-57)
Drain Plug	14-22 (19-30)
Rear Driveshaft-to-Transfer Case Output Flange Bolt	61-87 (83-118)
Extension Housing-to-Transfer Case Bolt ⁽³⁾	25-35 (34-47)
Front Drive Shaft-to-Yoke Bolt/Nut	12-16 (16-22)
Skid Plate Bolt	15-20 (21-27)
Transfer Case Strut (Aerostar)	
Strut-to-Engine Bolt	45-60 (61-81)
Strut-to-Transfer Nut	45-60 (61-81)
(1) Tighten in sequence. See Fig. 1 .	
(2) Tighten in sequence. See Fig. 2 .	
(3) Tighten in sequence. See Fig. 3 .	

TRANSMISSION

TORQUE SPECIFICATIONS (TRANSMISSION)

Application	Ft. Lbs. (N.m)
Mazda M5OD (Aerostar, Bronco II & Ranger)	
Clutch Housing-to-Engine Bolt	28-38 (38-52)
Drive Shaft U-Bolt	10-15 (14-21)
Shift Lever Bolt	46-68 (64-92)
Starter Bolt	15-20 (21-27)
Transmission Mount-to-Crossmember Nut	60-80 (81-109)
Transmission Mount-to-Transmission Bolt	60-80 (81-109)
Mazda M5OD (Bronco & Ranger)	
Clutch Housing-to-Engine Bolt	40-50 (54-68)
Drive Shaft U-Bolt	10-15 (14-21)
Starter Bolt	15-20 (21-27)
Transmission Mount-to-Crossmember Nut	71-94 (96-127)
Transmission Mount-to-Transmission Bolt	45-60 (61-81)
Ford S5-42 ZF (Bronco E350 & "F" Series)	
Clutch Housing-to-Engine Bolt	40-50 (54-68)
Drive Shaft U-Bolt	10-15 (14-21)
Starter Bolt	15-20 (21-27)
Transmission Mount-to-Crossmember Nut	50-70 (68-95)
Transmission Mount-to-Transmission Bolt	45-60 (61-81)
Upper Shift Lever-to-Lower Shift Lever	16-24 (22-33)
Borg-Warner (F150/250 2WD)	
Clutch Housing-to-Engine Bolt	35-50 (47-68)
Drive Shaft U-Bolt	10-15 (14-21)
Starter Bolt	15-20 (21-27)
Transmission Mount-to-Crossmember Nut	50-70 (68-95)
Transmission Mount-to-Transmission Bolt	45-60 (61-81)
Upper Shift Lever-to-Lower Shift Lever	16-24 (22-33)
Mitsubishi FM132 (2WD) & FM146 (4WD)	
Clutch Housing-to-Engine Bolt	35-50 (47-68)
Drain Plug	25-40 (34-54)
PTO Cover Bolt	25-35 (34-47)
Starter Bolt	15-20 (21-27)
Transmission Mount-to-Crossmember Nut	50-70 (68-95)
Transmission Mount-to-Transmission Bolt	45-60 (61-81)