

## 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 rear bearing retainer. 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-transmission adapter bolts and slide transfer case off of transmission output shaft (towards rear). Lower transfer case out of vehicle and remove gasket from between transfer case and adapter.

#### Installation

Reverse removal procedures to install transfer case. Fill case with 6.5 pints (3.1 liters) of Dexron II type automatic transmission fluid.

### BORG-WARNER 1350 (4WD 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 case from vehicle. Remove gasket from between transfer case and extension housing.

#### Installation

1. To install transfer case, reverse removal procedures. When installing shift lever assembly, tighten large bolt first, then small bolt. Refer to **TORQUE SPECIFICATIONS (BRONCO II & RANGER)**.
2. When installing vent assembly, White marking on hose should be positioned in notch in shifter with upper end of hose 2 inches above top of shifter, inside of shift lever boot.
3. Before installing front drive shaft into transfer case, lubricate female splines of transfer case input shaft with multipurpose grease.

4. Fill transfer case to bottom of fill plug hole with Dexron-II automatic transmission fluid.

## **BORG-WARNER 1356 (BRONCO & "F" SERIES W/PTO)**

### **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 driveshaft from front output yoke.
2. Disconnect rear driveshaft from rear output shaft yoke. Disconnect speedometer cable assembly from transfer case rear bearing retainer. Disconnect vent hose from transfer case.

**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.**

3. Support transfer case with transmission jack. Remove bolts retaining transfer case to transmission adapter. Slide transfer case rearward off of transmission output shaft and lower transfer case from vehicle and remove gasket between transfer case and adapter.

### **Installation**

To install, reverse removal procedure.

## **BORG-WARNER 1359 (BRONCO II)**

### **Removal**

**CAUTION: The catalytic converter is located beside the transfer case. Be careful when working around the catalytic converter because of the extremely high temperatures generated by the converter.**

1. Raise vehicle. Disconnect rear driveshaft 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**

To install, reverse removal procedure. For tightening specifications, see **TORQUE SPECIFICATIONS (BRONCO II & RANGER)**.

## **TRANSMISSION REMOVAL & INSTALLATION**

### **5-SPEED MAZDA (AEROSTAR)**

#### **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 adaptor. 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 driveshaft 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 and 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. If removed, position slave cylinder over transmission input shaft with tower portion facing transmission. Position clutch housing so slave cylinder tabs align with slots in housing.
2. Install clutch housing on transmission. Install and tighten nuts to 30-40 ft. lbs. (41-54 N.m). Place transmission on transmission jack and position a safety chain around transmission case.
3. Lift transmission into position in vehicle. Ensure transmission input shaft splines engage pilot bearing in flywheel. Clutch housing must be piloted in dowel pins in engine block.

**NOTE: To prevent galvanic corrosion, use only aluminum washers when installing clutch housing to engine.**

4. Install bolts retaining clutch housing to engine block. Tighten bolts to 28-33 ft. lbs. (38-51 N.m). If removed, position insulator on transmission. Install and tighten bolts to 60-80 ft. lbs. (82-108 N.m).
5. Position crossmember in frame brackets. Install nuts and bolts and finger tighten. Lower transmission so insulator studs are piloted in proper holes in crossmember. Tighten nuts to 71-94 ft. lbs. (97-127 N.m).
6. Remove cap from extension housing. Install drive shaft, ensuring that marks scribed on drive shaft and rear axle flange are in alignment. Install "U" bolts and nuts and tighten to 96-180 INCH lbs. (11-20 N.m).
7. Install speedometer cable (conventional speedometer) or connect wire (electronic speedometer). Connect back-up lamp switch and shift indicator wire to senders on transmission. Remove cap from hydraulic clutch tube.
8. Install clip retaining tube and fitting to slave cylinder. To complete installation, reverse removal procedure.

## 5-SPEED MAZDA (BRONCO II & RANGER)

### Removal

1. Place shift lever in neutral position. Remove boot retainer screws and bolts attaching retainer cover to gearshift lever retainer. Disconnect clutch master cylinder push rod from clutch pedal.
2. Pull gearshift lever assembly, shim and bushing straight up and away from lever retainer. Cover shift tower in extension housing with a cloth to avoid dropping foreign material into transmission.
3. Disconnect clutch hydraulic system master cylinder push rod from clutch pedal. Open hood and disconnect battery negative cable from battery terminal. Raise vehicle. Disconnect drive shaft at rear axle drive flange.
4. Pull drive shaft rearward and disconnect from transmission. Install a suitable plug in extension housing to prevent lubricant leakage. Remove clutch housing dust shield and slave cylinder and secure it at one side.
5. Remove speedometer cable from extension housing. Disconnect starter motor and back-up lamp switch wires. Place jack under engine, protecting oil pan with a wood block.
6. On 4WD vehicles, remove transfer case. Remove starter motor. Position a transmission jack under transmission. Remove bolts, lock washers and flat washers attaching transmission to engine rear plate.
7. Remove nuts and bolts attaching transmission mount and damper to crossmember. Remove nuts attaching crossmember to frame side rails and remove crossmember.
8. Lower engine jack. Work clutch housing off locating dowels and slide transmission rearward until input shaft spline clears clutch disc. Remove transmission from vehicle.

## **Installation**

To install, reverse removal procedure. For tightening specifications, see **TORQUE SPECIFICATIONS (BRONCO II & RANGER)**.

## **5-SPEED MITSUBISHI (BRONCO II & RANGER)**

### **Removal**

1. Place gearshift selector in neutral. Remove boot retainer bolts. Remove bolts attaching retainer cover to gearshift lever retainer. Pull gearshift lever assembly out of transfer case adapter. Cover opening in transfer case adapter with a cloth to prevent dirt from falling into adapter.
2. Open hood and disconnect battery negative cable from battery terminal. Raise vehicle. Index rear drive shaft to front axle flange and transfer case. Disconnect drive shaft at rear axle flange. Pull rear drive shaft rearward and disconnect drive shaft from transmission.
3. Install a suitable plug in transfer case adapter to prevent lubricant leakage. Remove clutch housing dust shield. Disconnect hydraulic fluid line from clutch slave cylinder. Plug line to prevent fluid leakage. Disconnect speedometer from transfer case adapter.
4. Disconnect starter motor cable, back-up lamp switch wire and shift indicator switch wire. Disconnect neutral position switch (2.3L EFI engine). Place jack under engine block, protecting oil pan with wood block. Remove transfer case from vehicle.
5. Remove starter. Place a transmission jack under transmission. Remove bolts, lock washers and flat washers attaching transmission to engine and plate. Remove nuts and bolts attaching transmission mount and damper to crossmember.
6. 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. Remove transmission from vehicle.

### **Installation**

To install, reverse removal procedure. For tightening specifications, see **TORQUE SPECIFICATIONS (BRONCO II & RANGER)**.

## **4-SPEED OVERDRIVE ("E" SERIES)**

### **Removal**

1. Raise and support vehicle. Mark drive shaft position for reassembly reference. Disconnect drive shaft from rear axle and slide shaft out of transmission. Disconnect speedometer cable and shift rods. Remove bolts connecting shift control to transmission case.
2. Remove rear transmission support-to-crossmember bolts. Support engine with transmission jack and raise transmission enough to take weight off number 3 crossmember. Remove bolts holding crossmember to frame side supports. Remove crossmember.
3. Place jack under rear of engine and raise high enough to remove weight from forward crossmember. Remove crossmember. With transmission supported by and secured to transmission jack, remove clutch housing-to-transmission bolts.
4. Move transmission to the rear until input shaft clears clutch housing and remove transmission. **DO NOT** depress clutch pedal while transmission is out of vehicle.

### **Installation**

To install transmission, reverse removal procedure. Refer to **TORQUE SPECIFICATIONS (ALL EXCEPT BRONCO II & RANGER)**.

## **(T.O.D.) 4-SPEED OVERDRIVE ("F" SERIES 2WD)**

### **Removal**

1. Raise vehicle on hoist. Mark drive shaft to aid as reference at reassembly. Disconnect drive shaft from rear flange. Slide drive shaft off transmission output shaft and install extension housing seal installer into extension housing to prevent lubrication leakage.
2. Disconnect speedometer cable from extension housing. Disconnect back-up lamp switch and high gear switch wires. Remove shift lever from transmission. Support engine with a transmission jack and remove extension housing-to-engine rear support attaching bolts.
3. Raise rear of engine high enough to remove weight from crossmember. Remove bolts retaining crossmember to frame rail side supports and remove crossmember. Support transmission on a jack and remove bolts attaching transmission to flywheel housing.
4. Move transmission and jack rearward until transmission input shaft clears flywheel housing. If necessary, lower engine enough to obtain clearance for transmission removal. **DO NOT** depress clutch pedal while transmission is removed.

### **Installation**

To install, reverse removal procedure.

## **(T.O.D.) 4-SPEED OVERDRIVE (BRONCO & F-150 4WD)**

### **Removal**

1. Raise vehicle on a hoist. Drain transmission and transfer case. Disconnect 4WD indicator switch wire

connector at transfer case. Disconnect back-up lamp switch wire connector at transmission. If equipped, remove skid plate. Mark front and rear drive shafts for reference at reassembly.

2. Disconnect rear drive shaft from transfer case and wire it out of way. Disconnect front drive shaft from transfer case and wire out of way. Remove speedometer cable from transfer case. Remove retaining clips and shift rod from transfer case control lever and transfer case shift lever.
3. Disconnect vent hose from transfer case. Remove shift lever from transmission. Support transmission with a transmission jack and remove transmission housing-to-engine rear support bracket. Raise rear of transmission high enough to remove weight from crossmember.
4. Remove 2 nuts connecting upper gusset to frame on both sides of frame. Remove nut and bolt assembly connecting gusset to support. Remove gusset on left side. Remove bolts holding transmission to transmission support plate on crossmember. Raise transmission with a transmission jack.
5. Remove nut and bolt assemblies connecting support plate to crossmember. Remove support plate and right gusset. Remove nut and bolt assemblies connecting crossmember to frame. Remove crossmember. Remove heat shield from transfer case. Support transfer case with a transmission jack.
6. Remove 6 bolts retaining transfer case to transmission adapter. Slide transfer case rearward off of transmission output shaft and lower transfer case from vehicle. Remove gasket between transfer case and adapter. Support transmission on a jack and remove bolts attaching transmission to flywheel housing.
7. Move transmission and jack rearward until transmission input shaft clears flywheel housing. If necessary, lower engine enough to obtain clearance for transmission removal. **DO NOT** depress clutch pedal while transmission is removed.

## Installation

To install, reverse removal procedure.

## NP-435 4-SPEED (BRONCO & "F" SERIES)

### Removal

1. Remove floor mat. Remove shift lever, shift ball and boot as an assembly. On 4WD models, remove transfer case shift lever, shift ball and boot as an assembly. On F150-350 models, remove floor pan transmission cover or weather pad. Remove seat if necessary.
2. To remove gearshift lever and knob, first remove inner cap with Puller (T73T 7220 A). Remove seat and spring. Remove gearshift lever. Disconnect back-up light.
3. Raise vehicle. Disconnect speedometer cable and rear drive shaft. Wire shaft out of way. On 4WD models, drain transfer case, remove front drive shaft from case and wire out of way.
4. Remove cotter pin holding shift link and remove link. Remove bolts holding bracket to transfer case. Position transmission jack under transfer case.
5. Remove transfer case-to-transmission bolts and remove transfer case. On all models, place transmission jack under transmission and lift slightly. Remove transmission-to-insulator, insulator-to-crossmember and crossmember-to-frame bolts. Remove insulator and crossmember.
6. Remove transmission-to-clutch housing bolts and lower transmission out of vehicle.

### Installation

To install, reverse removal procedures.

## **WARNER T-18 ("F" SERIES 2WD)**

### **Removal**

1. Working from inside vehicle, remove floor mat and body floor pan cover. Remove gearshift lever, shift ball and boot as an assembly. Remove weather pad. Raise and support vehicle. Disconnect speedometer cable.
2. Disconnect back-up light switch from rear of gear shift housing cover. Disconnect drive shaft from transmission and wire out of way. **DO NOT** allow shaft to hang free as damage to universal joint may result. Disconnect clutch linkage.
3. Remove skid plate (if equipped) and heat shield. Support transmission with jack. Remove crossmember gusset-to-frame bolts and gusset-to-crossmember bolts. Remove transmission-to-insulator bolts. Raise transmission and remove insulator-to-crossmember bolts. Remove insulator.
4. Remove right gusset, crossmember-to-frame bolts and crossmember. Remove transmission-to-clutch housing bolts. Move transmission away from clutch housing until input shaft clears housing. Lower transmission out of vehicle.

### **Installation**

To install, reverse removal procedures. When installing shift lever, shift ball and boot assembly, lubricate the spherical ball seat with multipurpose grease.

## **WARNER T-18 (BRONCO & "F" SERIES 4WD)**

### **Removal**

1. Working from inside vehicle, remove floor mat and access cover to floor pan. Place shift lever in reverse position and remove cover, 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. Remove drain plug and allow transmission to drain. Replace plug. Disconnect front and rear drive shafts from transfer case and wire out of way. **DO NOT** allow shafts to hang free as damage to universal joint may result.
3. Remove shift link retainer ring and remove shift link from transfer case. Disconnect speedometer cable. Place transmission jack under transfer case. Remove transfer case-to-transmission bolts and lower transfer case out of vehicle.
4. Remove rear support bracket-to-transmission bolts (8), position transmission jack under transmission and remove rear support bracket and brace. Remove transmission-to-clutch housing bolts (4), and remove transmission.

### **Installation**

To install, reverse removal procedures.

## **WARNER T19A/C ("F" SERIES 2WD)**

### **Removal**

1. Working from inside vehicle, remove floor mat and body floor pan cover. Remove gearshift lever, shift ball and boot as an assembly. Remove weather pad.
2. Raise vehicle. Place transmission jack under transmission and disconnect speedometer cable.

Disconnect back-up light switch from rear of gear shift housing cover. Disconnect drive shaft and clutch linkage. Wire out of way.

3. Remove transmission rear insulator and lower retainer. Remove skid plate (if equipped) and heat shield. Remove upper gusset bolts and gusset-to-crossmember bolts. Remove left side gusset.
4. Remove transmission-to-support plate bolts, raise transmission slightly and remove support plate-to-crossmember bolts. Remove support plate and right gusset. Remove crossmember-to-frame bolts and remove crossmember.
5. Remove transmission-to-clutch housing bolts. Move transmission to the rear until input shaft clears housing and remove transmission.

## Installation

To install transmission, reverse removal procedures. When installing shift lever, shift ball and boot assembly, lubricate spherical ball seat with multipurpose grease.

## WARNER T19A & C ("F" SERIES 4WD)

### Removal

1. Working from inside vehicle, remove floor mat and access cover to floor pan (shift lever in reverse when removing 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. Drain transmission and replace drain plug. Disconnect front and rear drive shafts from transfer case and wire out of way.
3. Remove shift link retainer ring and remove link from transfer case. Disconnect speedometer cable. Place transmission jack under transfer case and remove transfer case-to-transmission bolts (6). Lower transfer case out of vehicle.
4. Remove rear support bracket-to-transmission bolts (8). Place transmission jack under transmission and remove rear support bracket and brace. Remove transmission-to-clutch housing bolts (4) and remove transmission.

### Installation

To install, reverse removal procedures.

## TORQUE SPECIFICATIONS

### ALL EXCEPT BRONCO II & RANGER

#### TORQUE SPECIFICATIONS (ALL EXCEPT BRONCO II & RANGER)

Application	Ft. Lbs. (N.m)
Transmission-to-Clutch Housing	
Bronco II & Ranger	30-40 (42-56)
All Others	35-50 (49-70)
Transfer Case-to-Transmission	
Borg-Warner 1345	25-43 (35-60)
Borg-Warner 1350 Series	25-35 (35-49)
Insulator-to-Crossmember	



4-Speed Overdrive	50-70 (70-98)
Bronco II & Ranger	71-94 (98-132)
All Others - 2WD	50-70 (70-98)
All Others - 4WD	35-45 (49-63)
<b>Insulator-to-Transmission</b>	
4-Speed Overdrive	50-70 (70-98)
T19A & C 4-Speed	45-60 (63-84)
All Others	60-80 (84-112)

## **BRONCO II & RANGER**

### **TORQUE SPECIFICATIONS (BRONCO II & RANGER)**

<b>Application</b>	<b>Ft. Lbs. (N.m)</b>
<b>Transmission-to-Clutch Housing</b>	
Bronco II & Ranger	30-40 (42-56)
All Others	35-50 (49-70)
<b>Transfer Case-to-Transmission</b>	
Borg-Warner 1345	25-43 (35-60)
Borg-Warner 1350 Series	25-35 (35-49)
<b>Insulator-to-Crossmember</b>	
4-Speed Overdrive	50-70 (70-98)
Bronco II & Ranger	71-94 (98-132)
All Others - 2WD	50-70 (70-98)
All Others - 4WD	35-45 (49-63)
<b>Insulator-to-Transmission</b>	
4-Speed Overdrive	50-70 (70-98)
T19A & C 4-Speed	45-60 (63-84)
All Others	60-80 (84-112)