

## Removal and Installation

## Removal

1. Park the vehicle on a level surface, shut down the engine, apply the parking brake, and chock the rear tires.
2. Disconnect the batteries and place the transmission in neutral.
3. Remove the transmission drain plug from the bottom of the transmission and drain the automatic transmission fluid (ATF) into a suitable clean container. See [Fig. 1](#). Install the drain plug and tighten to the following specifications based on the model:

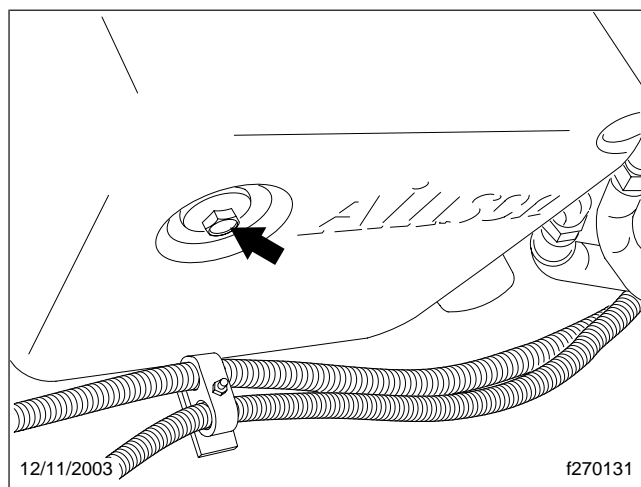


Fig. 1, Drain Plug

- Models 1000/2000/2400: 22 to 30 lbf-ft (30 to 40 N·m)
- Models MD-3060/B-300: 18 to 24 lbf-ft (25 to 32 N·m)

**NOTE:** The ATF drained from the transmission can be used again if it is clean and if the container into which it was drained contained no ethylene glycol.

4. Support the driveline with a jack stand between the aft midship bearing and the rear axle.
5. Disconnect the driveline from the transmission.
  - 5.1 Remove the bolts holding the aft midship bearing bracket. See [Fig. 2](#).
  - 5.2 Remove the front driveline guard. See [Fig. 3](#).

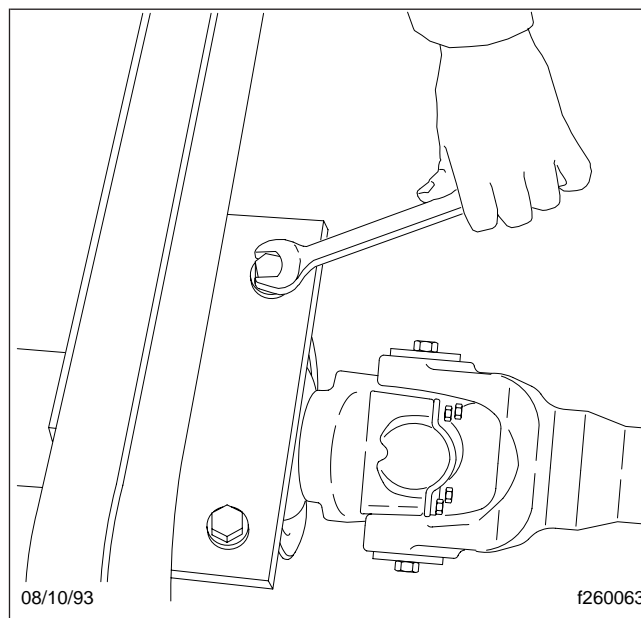


Fig. 2, Midship Bearing Fastener

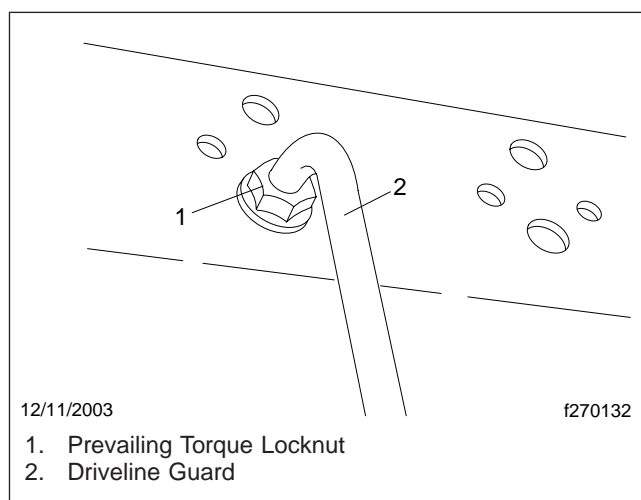
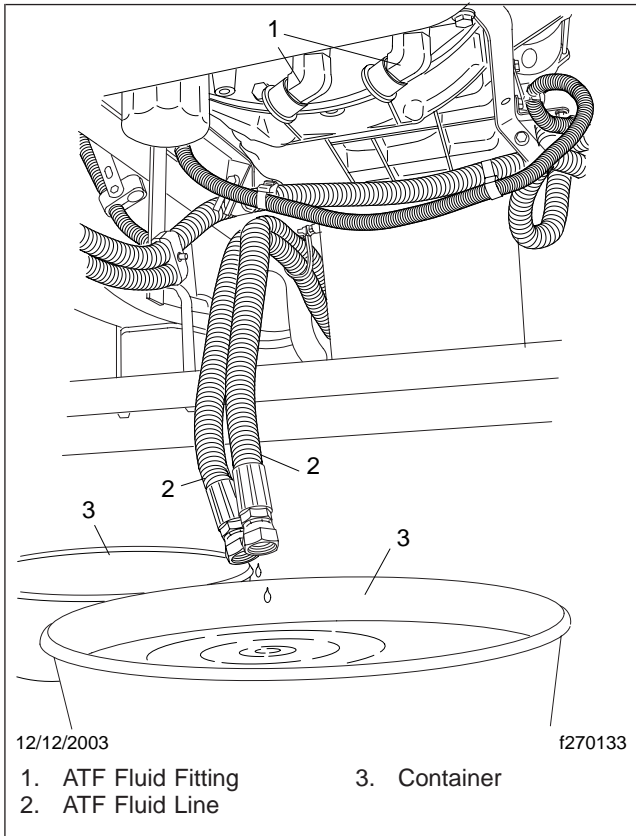


Fig. 3, Driveline Guard

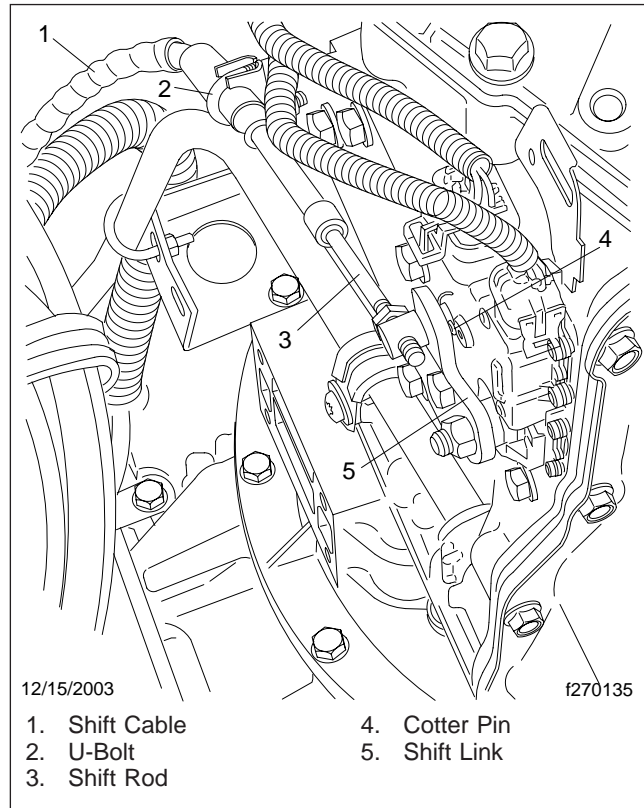
- 5.3 Remove the forward midship bracket.
- 5.4 Remove the transmission yoke U-joint from the transmission.
- 5.5 Support the disconnected driveshaft.
6. Disconnect the transmission fluid cooler lines from the transmission and drain the remaining ATF into a suitable container. See [Fig. 4](#). Cap the fittings to prevent entry of foreign matter.

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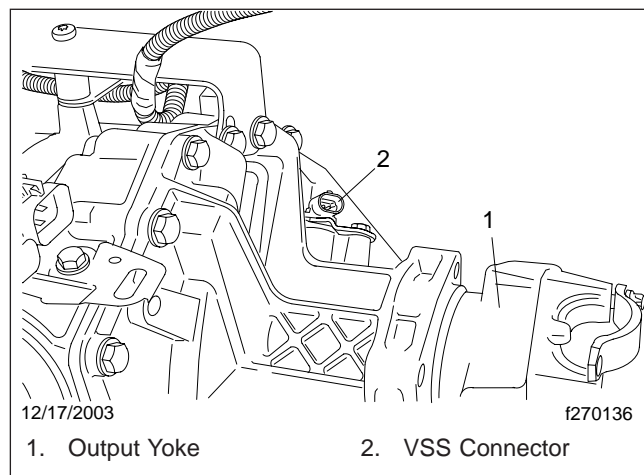


**Fig. 4, Fluid Cooler Lines**

7. Disconnect the shift cable from the transmission. See **Fig. 5**. For detailed instructions, see **Subject 110**.
8. Disconnect the electrical harnesses from the transmission.
  - 8.1 Disconnect the speedometer sensor cable from the small vehicle speed sensor (VSS) connector near the output yoke. See **Fig. 6**.
  - 8.2 Disconnect the cannon plug on the right-hand side of the gear box just above the oil pan. See **Fig. 7**.
  - 8.3 Disconnect the double shift/back-up connector on the left-hand side of the gear box next to the shift link. See **Fig. 8**.
  - 8.4 On 1000/2000/2400 models, disconnect the transmission harness from the transmission control unit (TCU) mounted on the frame rail. See **Fig. 9**.



**Fig. 5, Shift Cable Connection**



**Fig. 6, VSS Connector**

On MD-3060/B-300 models, disconnect the three-piece TCU connector from the transmission control unit (TCU) on top of the gear box.

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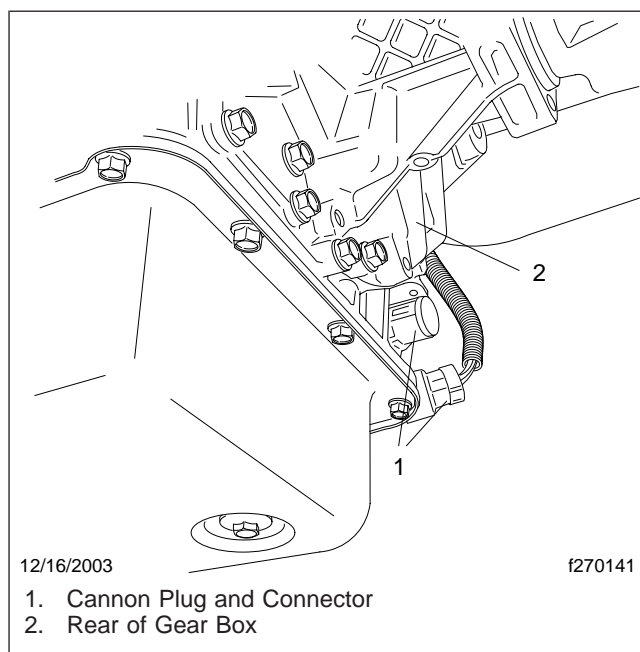


Fig. 7, Cannon Plug

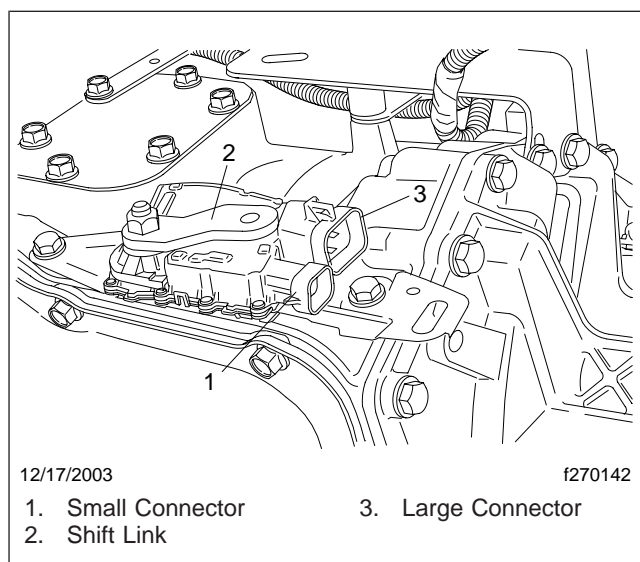


Fig. 8, Shift/Backup Connectors

9. Remove the ATF fill/dipstick tube. See [Fig. 10](#).

- 9.1 Remove the mounting screw and cushioned clamp that holds the fill/dipstick tube.

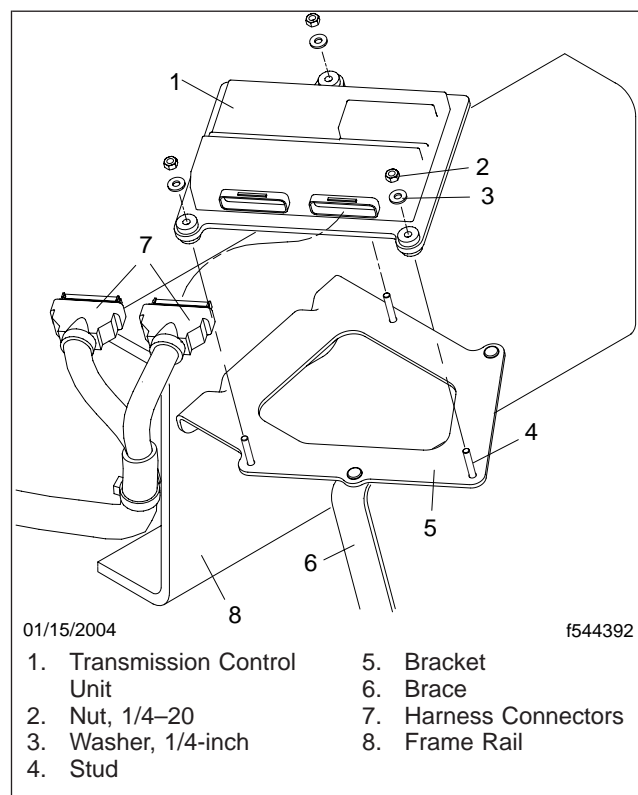
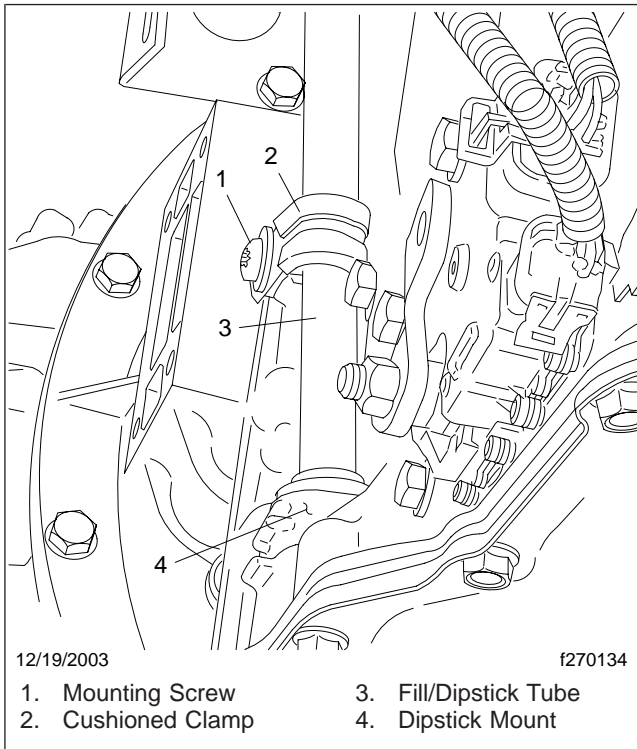


Fig. 9, Transmission Control Unit

- 9.2 Remove the U-bolt that secures the fill/dipstick tube to the clamp bolted onto the bell housing.
- 9.3 Pull the fill/dipstick tube out of the transmission case.
- 9.4 Plug the hole where the dipstick mounts with a clean shop towel to prevent entry of foreign material.
10. Remove the capscrews that attach the flexplate to the flywheel ring gear. See [Fig. 11](#).
- 10.1 Remove the capscrews that hold the ring gear inspection cover. Then remove the cover from the timing case (flywheel housing).
- 10.2 Using a screwdriver, turn the ring gear until one of the capscrews that hold the flexplate adaptor to the torque converter can be removed through the flexplate access hole.

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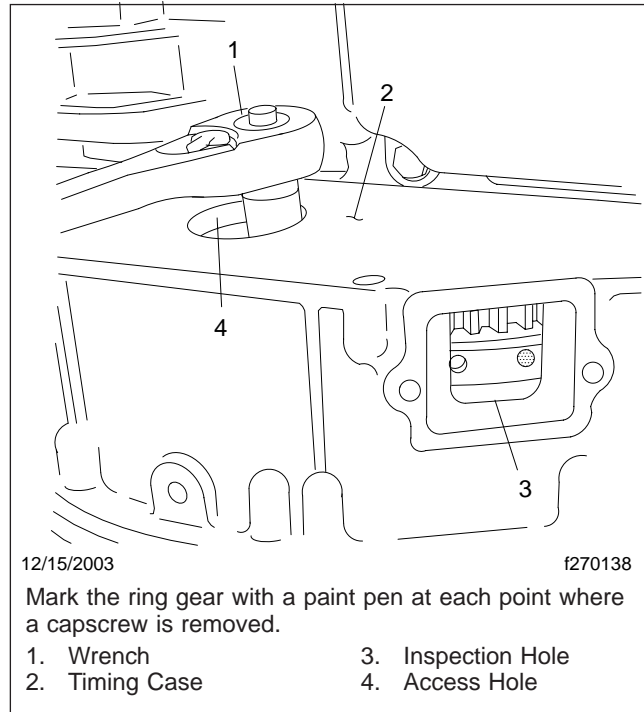
**Fig. 10, Fill/Dipstick Tube**

10.3 For ease of installation, mark the ring gear with a paint pen at each point where a capscrew is removed.

10.4 Continue turning the ring gear and removing the capscrews through the access hole until all are removed.

**NOTE:** There are six capscrews on 1000/2000/2400 models, and 12 on MD-3060/B-300 models.

11. Slide the jack into place under the transmission. Protect the oil pan with the jack support brackets. See [Fig. 12](#). Secure the transmission with a chain. Anchor the chain with bolts at the front lifting bosses on the top of the transmission.
12. Remove the twelve transmission mounting bolts. See [Fig. 13](#).
13. Remove the battery cable bracket and the fill/dipstick tube clamp which are both supported by one of the transmission mounting bolts.



**Fig. 11, Ring Gear Access**

14. Remove the muffler support bracket which is supported by two of the transmission mounting bolts. See [Fig. 14](#).

### **! WARNING**

**Do not allow the torque converter to become disengaged from the oil pump. This could allow the torque converter to fall, possibly causing component damage and/or personal injury.**

15. Move the transmission jack to the rear. Lower the jack and lift the vehicle, as needed, to allow the transmission to clear the frame rail and any other attached components.
16. If necessary to remove the transmission, place jack stands under the vehicle.
17. Roll the transmission jack back and remove the transmission.

### Installation

**IMPORTANT:** Before installing the transmission, make sure the rear tires are chocked and the

## Removal and Installation

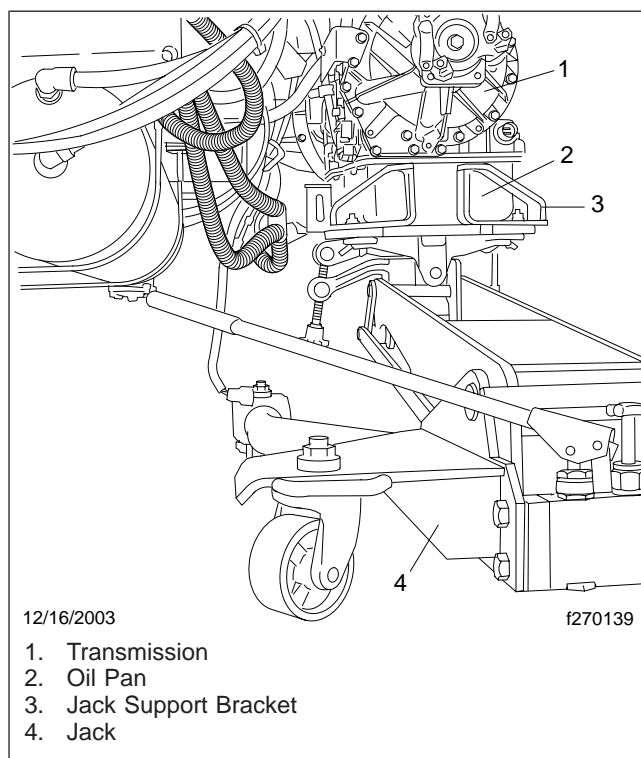


Fig. 12, Support the Transmission

transmission is securely chained to the transmission jack.

1. If necessary, raise the vehicle frame with a hydraulic jack to obtain adequate clearance for installing the transmission. Place jack stands under the front of the vehicle.
2. With the transmission on a jack, roll the transmission into place behind the flexplate. Remove the jack stands, and lower the vehicle frame.
3. Raise the jack until the transmission lines up with the flexplate.
4. Push the transmission toward the engine until it seats squarely against the engine timing case with the bolt holes in the transmission housing aligned with those in the timing case.

**NOTE:** No force is required. If interference is encountered, move the transmission away from the engine and correct the problem.

5. Install the transmission mounting bolts until firm. While installing the transmission mounting bolts, attach the muffler support

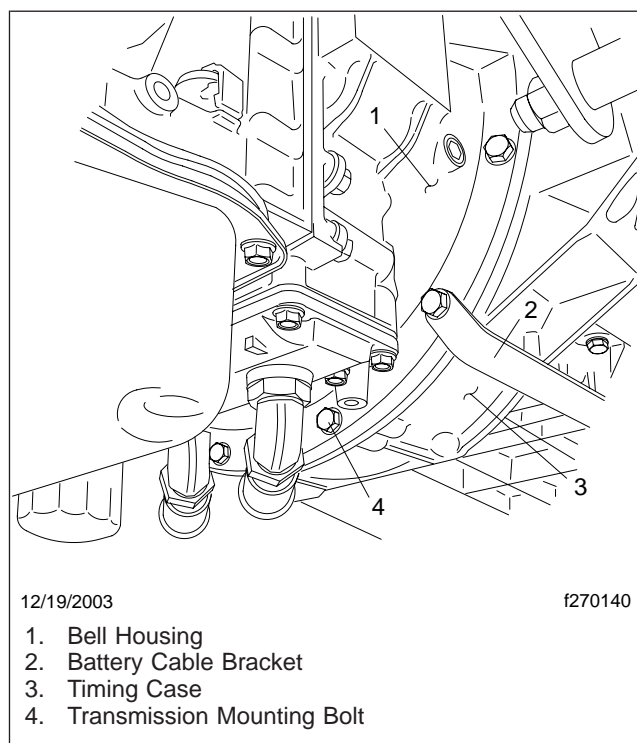


Fig. 13, Transmission Mounting Bolts

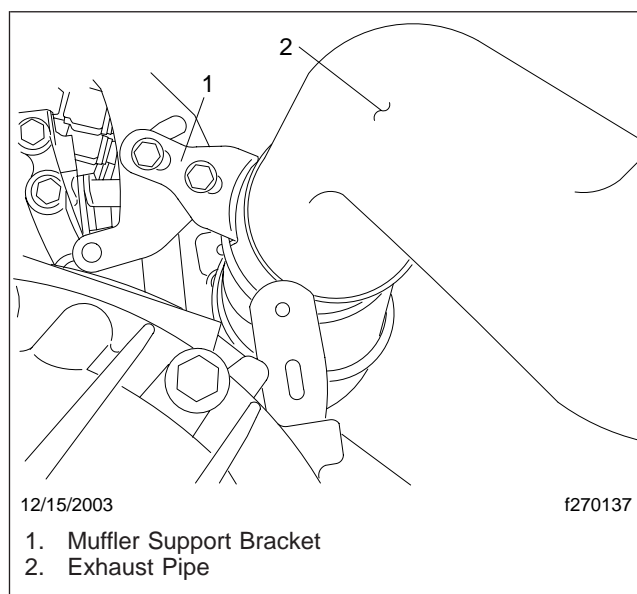


Fig. 14, Muffler Support Bracket

bracket, and fill/dipstick tube clamp to the appropriate bolts, as removed.



## Removal and Installation

6. Install the flexplate adaptor capscrews.
  - 6.1 Turning the ring gear for access, install all the capscrews through the access hole. Don't tighten them now.

Be careful not to drop the capscrews inside the torque converter cover. The transmission must be removed to get them out.

**IMPORTANT:** To prevent cocking of the flexplate adaptor, install all the capscrews before tightening any of them.
  - 6.2 Tighten the capscrews, in a star pattern, to the following specifications based on the model:
    - Models 1000/2000/2400: 42 to 50 lbf-ft (57 to 68 N·m)
    - Models MD-3060/B-300: 18 to 21 lbf-ft (24 to 29 N·m)
  - 6.3 Install the access cover and its capscrews.
7. Tighten the M10 transmission mounting bolts 38 to 45 lbf-ft (51 to 61 N·m) in a star pattern. See [Fig. 13](#).
8. Remove the chain that's holding the transmission to the transmission jack.
9. Lower the transmission jack and remove it.
10. Connect the transmission fluid cooler hoses to the transmission. Tighten the fittings 40 to 50 lbf-ft (54 to 68 N·m). See [Fig. 4](#).
11. Install the ATF fill/dipstick tube.
  - 11.1 Inspect the fill/dipstick tube seal. Replace it if damaged.
  - 11.2 Install the fill/dipstick tube and cushioned clamp. Tighten the clamp capscrew 12 lbf-ft (16 N·m).
12. Connect the shift cable to the transmission. See [Fig. 5](#). For detailed instructions, see [Subject 110](#).
13. Connect all electrical lines to the transmission, as removed. Install new tie straps as needed.
14. Connect the driveshaft.
  - 14.1 Slide the front of the driveshaft into the transmission output yoke.
  - 14.2 Install the transmission yoke U-joint end caps and lock straps. For torque values, see [Specifications 400](#).
  - 14.3 If the midship bearing bracket bolts and nuts were removed, install them. Tighten the nuts 95 lbf-ft (129 N·m).
  - 14.4 Install the driveline guard. Tighten the prevailing torque locknuts 68 lbf-ft (92 N·m).
15. Fill the transmission with ATF. See [Specifications 400](#) for a list of approved fluids.
16. Connect the batteries.
17. Make sure the transmission is still in neutral. With the service brakes applied, start the engine, and check around the transmission for leaks. Repair leaks as necessary.
18. Check the ATF level. Add fluid as needed.
19. Remove the chocks from the rear tires.
20. Road test the vehicle, and check the transmission for correct operation.

## Shift Cable Removal and Installation

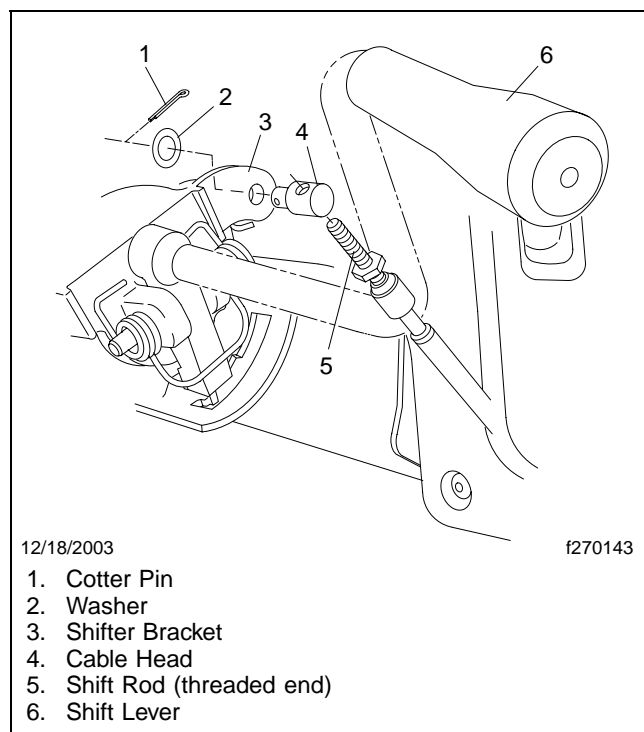
NOTE: This procedure is used to service the column-mounted shift lever.

## Removal

1. Park the vehicle on a level surface, shut down the engine, apply the parking brake, and chock the rear tires.

IMPORTANT: Make sure the shift lever is in neutral when the shift cable is disconnected.

2. From inside the driver's compartment, disconnect the top end of the shift cable from the shifter bracket. See **Fig. 1**.
  - 2.1 Remove the clamshell covers on the steering column. For instructions, see **Section 46.02**, subject 110.
  - 2.2 Pull the cotter pin out of the small hole in the cable head. Remove the cotter pin and washer from the cable head.



**Fig. 1, Connection to Shift Lever**

NOTE: It may be necessary to loosen the U-bolt and/or cushioned clamp to allow the cable head to come out.

- 2.3 Pull the cable head out of the hole in the shifter bracket.
- 2.4 Unscrew the cable head from the threaded end of the shift rod.
3. Remove the U-bolt that holds the shift cable tight against the dash-mounted bracket. See **Fig. 2**.
4. Remove the cushioned clamp that fastens the shift cable to the steering column standoff bracket.
5. Attach a length of wire to the exposed end of the shift cable. Loop the other end of the wire around the shift lever. See **Fig. 3**.

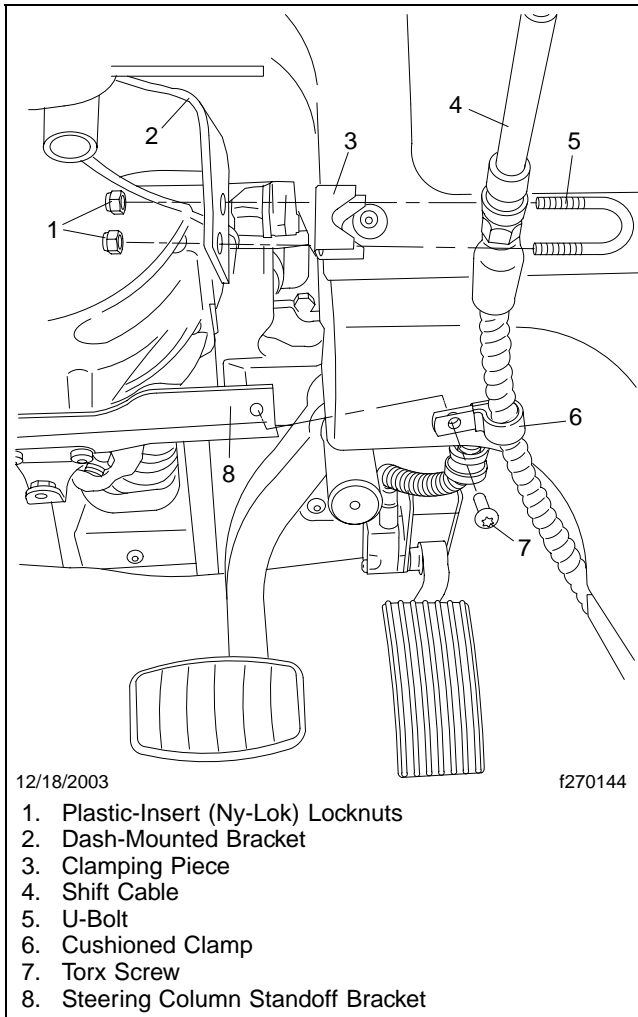
NOTE: On installation, this wire will be used to pull the new cable up through the driver's compartment floor.

6. From underneath the chassis, disconnect the bottom end of the shift cable from the shift selector lever. See **Fig. 4**.
  - 6.1 Pull the cotter pin out of the small hole in the cable head. Remove the cotter pin and washer from the cable head.
  - 6.2 Pull the cable head out of the hole in the shifter bracket.
  - 6.3 Unscrew the cable head from the threaded end of the shift rod.
7. Remove the U-bolt that holds the shift cable tight against the gear box.
8. Remove the cushioned clamp that fastens the shift cable to the upper chassis bracket. See **Fig. 5**.
9. Pull the shift cable down through the metal sleeve in the driver's compartment and out through the hole in the floor. Detach the cable from the wire.

## Installation

1. From underneath the chassis, attach the cable to the wire, as removed.
2. From inside the driver's compartment, pull up on the wire looped around the shift lever until the shift cable has sufficient length inside the driver's compartment to attach to the shifter bracket.

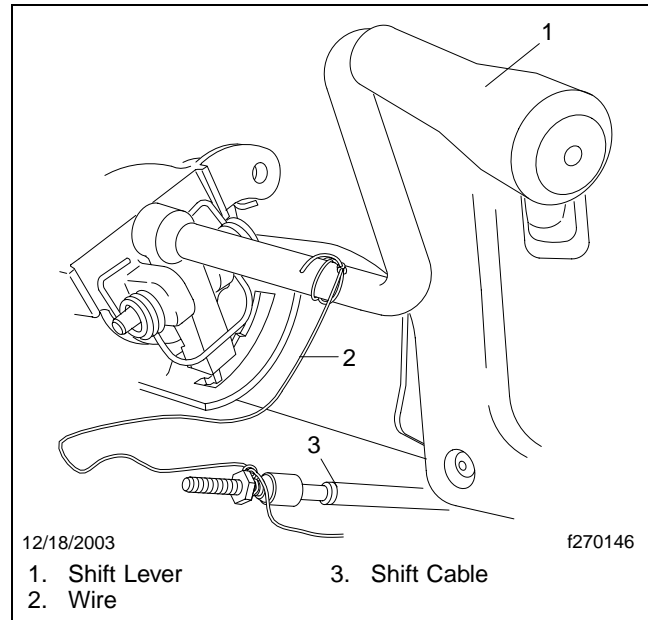
### Shift Cable Removal and Installation



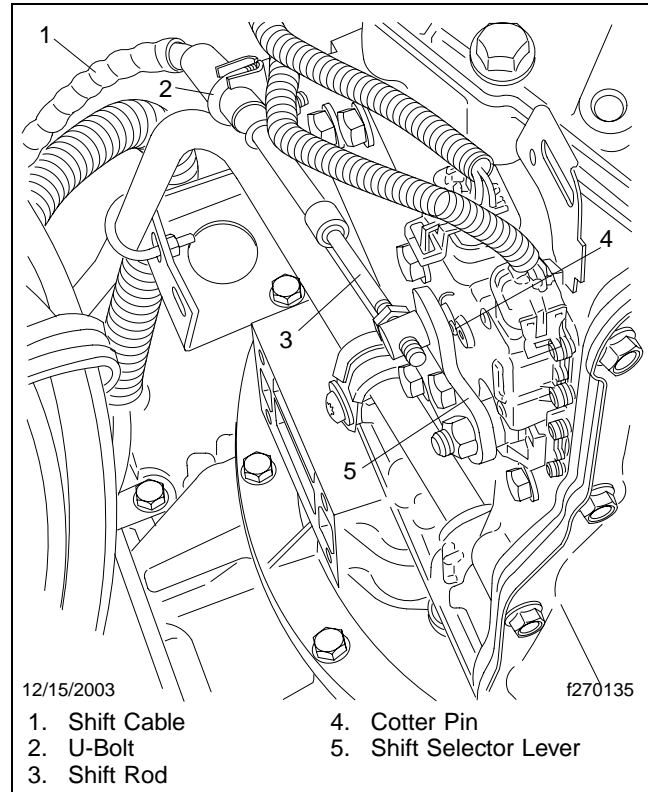
**Fig. 2, Bracketry in Driver's Compartment**

**IMPORTANT:** Make sure the shift lever is in neutral before connecting the shift cable.

3. Connect the top end of the shift cable to the shifter bracket. See **Fig. 1**.
  - 3.1 Thread the cable head onto the exposed end of the shift cable.
  - 3.2 Insert the cable head through the hole in the shifter bracket.
  - 3.3 Install the washer on the cable head.
  - 3.4 Insert a new cotter pin into the small hole in the cable head and bend the ends back.



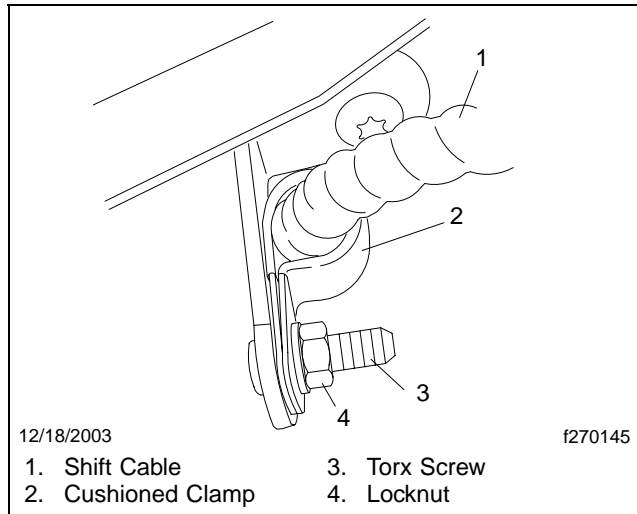
**Fig. 3, Loop a Wire Around the Shift Lever**



**Fig. 4, Connection to Shift Selector Lever**



## Shift Cable Removal and Installation

**Fig. 5, Upper Chassis Clamp**

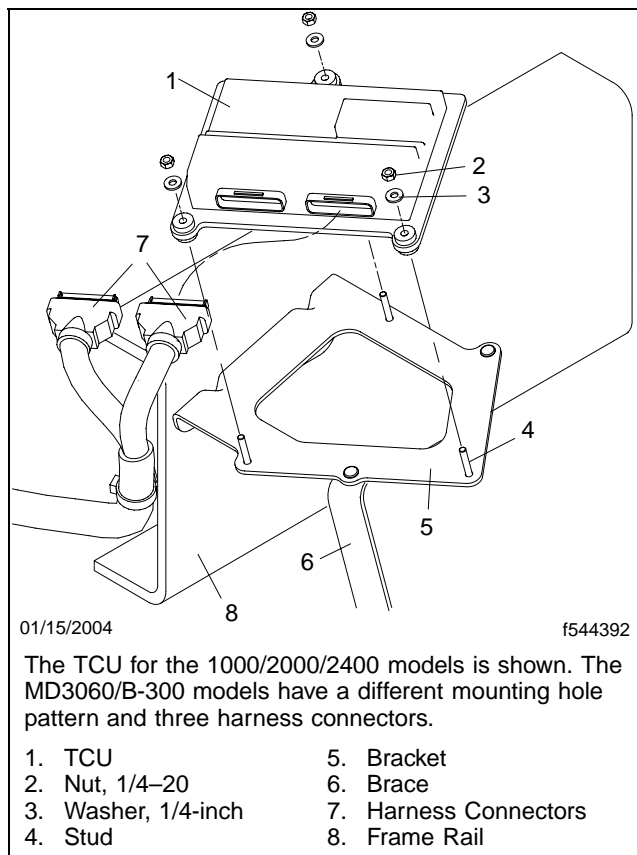
Make sure the shift cable is firmly attached to the shifter bracket.

10. Start the engine and check the shift lever and transmission for proper operation in both forward and reverse gears. Adjust the pointer on the shift lever as needed.
4. Install the U-bolt that holds the shift cable tight against the dash-mounted bracket. See **Fig. 2**.
  5. Install the cushioned clamp that fastens the shift cable to the steering column standoff bracket.
  6. From underneath the chassis, connect the bottom end of the shift cable to the shift selector lever. See **Fig. 4**. If necessary to adjust the shift selector lever, see the instructions in the *Allison Mechanic's Tips*.
    - 6.1 Thread the cable head onto the exposed end of the shift cable.
    - 6.2 Insert the cable head through the hole in the shift selector lever.
    - 6.3 Install the washer on the cable head.
    - 6.4 Insert a new cotter pin into the small hole in the cable head and bend the ends back. Make sure the shift cable is firmly attached to the shift selector lever.
  7. Install the U-bolt that holds the shift cable tight against the gear box.
  8. Install the cushioned clamp that fastens the shift cable to the upper chassis bracket. See **Fig. 5**.
  9. Remove the chocks from the rear tires.

## Transmission Control Unit Replacement

**Replacement**

1. Park the vehicle on a level surface, shut down the engine, set the parking brake, and chock the tires.
2. Disconnect the batteries.
3. Remove the transmission harness connectors from the transmission control unit (TCU) mounting plate on the left-hand frame rail just behind the front wheel well and just forward of the battery compartment. See **Fig. 1**.
4. Remove the three nuts and washers from the studs on the mounting plate.
5. Lift the old TCU away from the mounting plate and remove it from the vehicle.
6. Position the new TCU on the studs of the mounting plate. Install the nuts and washers and tighten the nuts 72 lbf-in (800 N·cm). See **Fig. 1**.
7. Connect the two harness connectors to the new TCU.
8. Remove the chocks from the tires.

**Fig. 1, Transmission Control Unit**

For a schematic diagram of the transmission wiring routed through the J1 connector, see [Fig. 1](#). For a

schematic diagram of the transmission wiring routed through the J2 connector, see [Fig. 2](#).

Torque Values, 1000/2000/2400 Models				
Description	Size	Grade/Class	Torque	
			lbf-ft (N-m)	lbf-in (N-cm)
Transmission Mounting Bolts	M10 x 1.5	8.8	38–45 (51–61)	—
Dipstick Clamp Screw	—	—	12 (16)	—
Driveline Guard Prevailing Torque Locknuts	1/2–13	C	68 (92)	—
Midship Bearing Bracket Capscrews	3/4–11	—	95 (129)	—
Flexplate Adaptor Capscrews	M10 x 1.5	—	40–50 (54–68)	—
Transmission Control Unit Mounting Nuts	1/4–20	—	—	72 (800)
Transmission Fluid Cooler Hose Fittings	#16	—	40 (54)	—
Transmission Fluid Drain Plug	—	—	22–30 (32–40)	—
U-Joint End Cap Bolts	3/8–24	—	50 (68)	—
	1/2–20	—	110 (149)	—

Table 1, Torque Values, 1000/2000/2400 Models

Torque Values, MD-3060/B-300 Models			
Description	Size	Grade/Class	Torque: lbf-ft (N-m)
Transmission Mounting Bolts	M10 x 1.5	8.8	38–45 (51–61)
Dipstick Clamp Screw	—	—	12 (16)
Driveline Guard Prevailing Torque Locknuts	1/2–13	C	68 (92)
Midship Bearing Bracket Capscrews	3/4–11	—	95 (129)
Flexplate Adaptor Capscrews	M8 x 1.25	—	18–21 (24–29)
Transmission Fluid Cooler Hose Fittings	#16	—	40–50 (54–68)
Transmission Fluid Drain Plug	—	—	18–24 (25–32)
U-Joint End Cap Bolts	3/8–24	—	50 (68)
	1/2–20	—	110 (149)

Table 2, Torque Values, MD-3060/B-300 Models

Approved Allison Transmission Lubricants*		
TES-295 Approval Number	Company	Product Brand Name
AN-051005	ExxonMobil Lubricants and Petroleum Specialties Company	Mobil Delvac Synthetic ATF
AN-011001	Castrol Heavy Duty Lubricants	TranSynd
AN-031002	BP	Autran Syn 295
AN-031003	Cognis Corporation	Emgard 2805
AN-031004	International Truck & Engine Company	Fleetrite Synthetic ATF

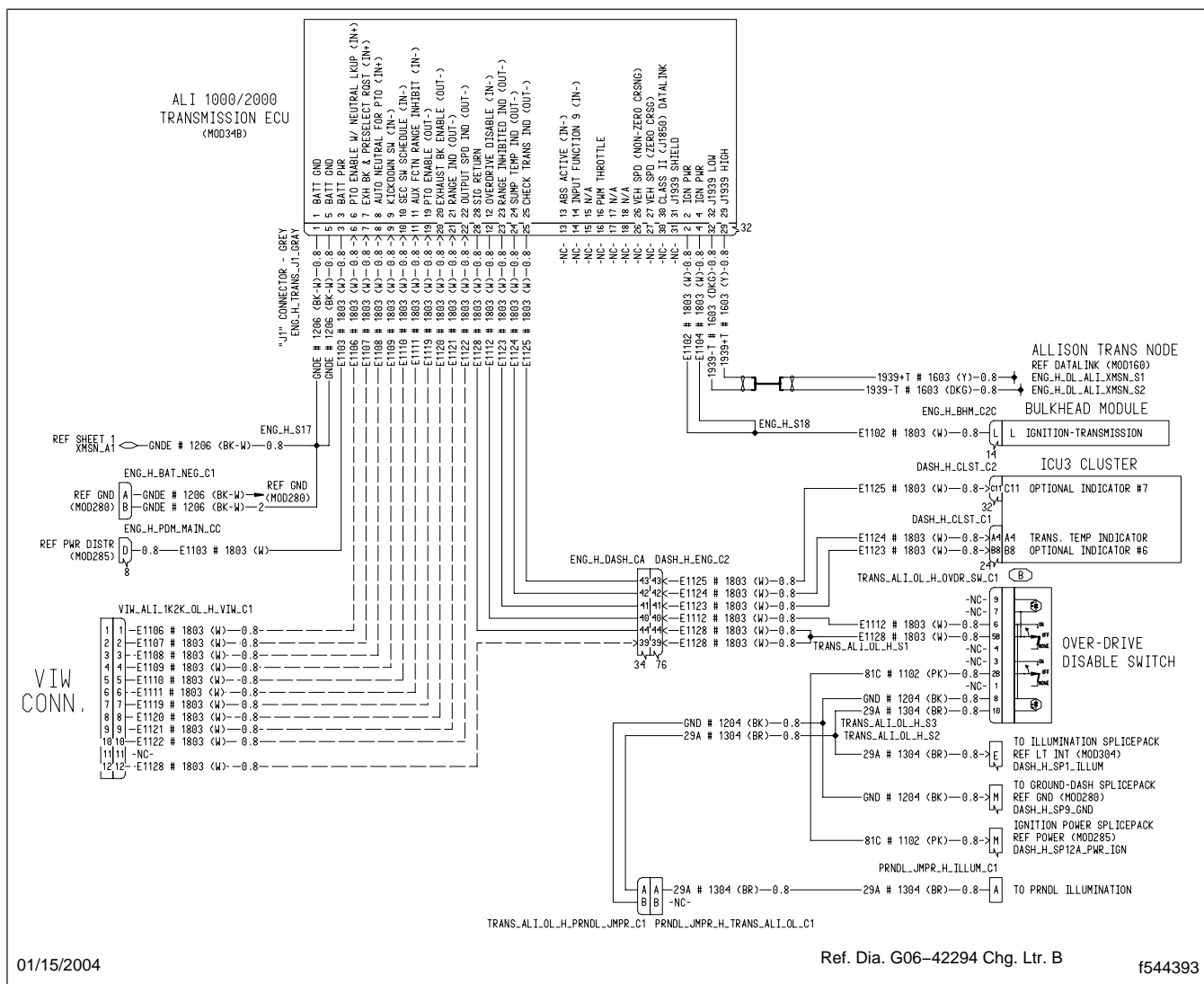
## Specifications

## Allison Automatic Transmission

Approved Allison Transmission Lubricants*		
TES-295 Approval Number	Company	Product Brand Name
AN-071006	John Deere & Company	HD SynTran

\* To check the latest Allison approved fluids, go to [www.allisontransmission.com](http://www.allisontransmission.com). Lubricants listed in order of preference. Do not mix types of oil.

### Table 3. Approved Allison Transmission Lubricants



**Fig. 1, Transmission Wiring, J1 Connector**

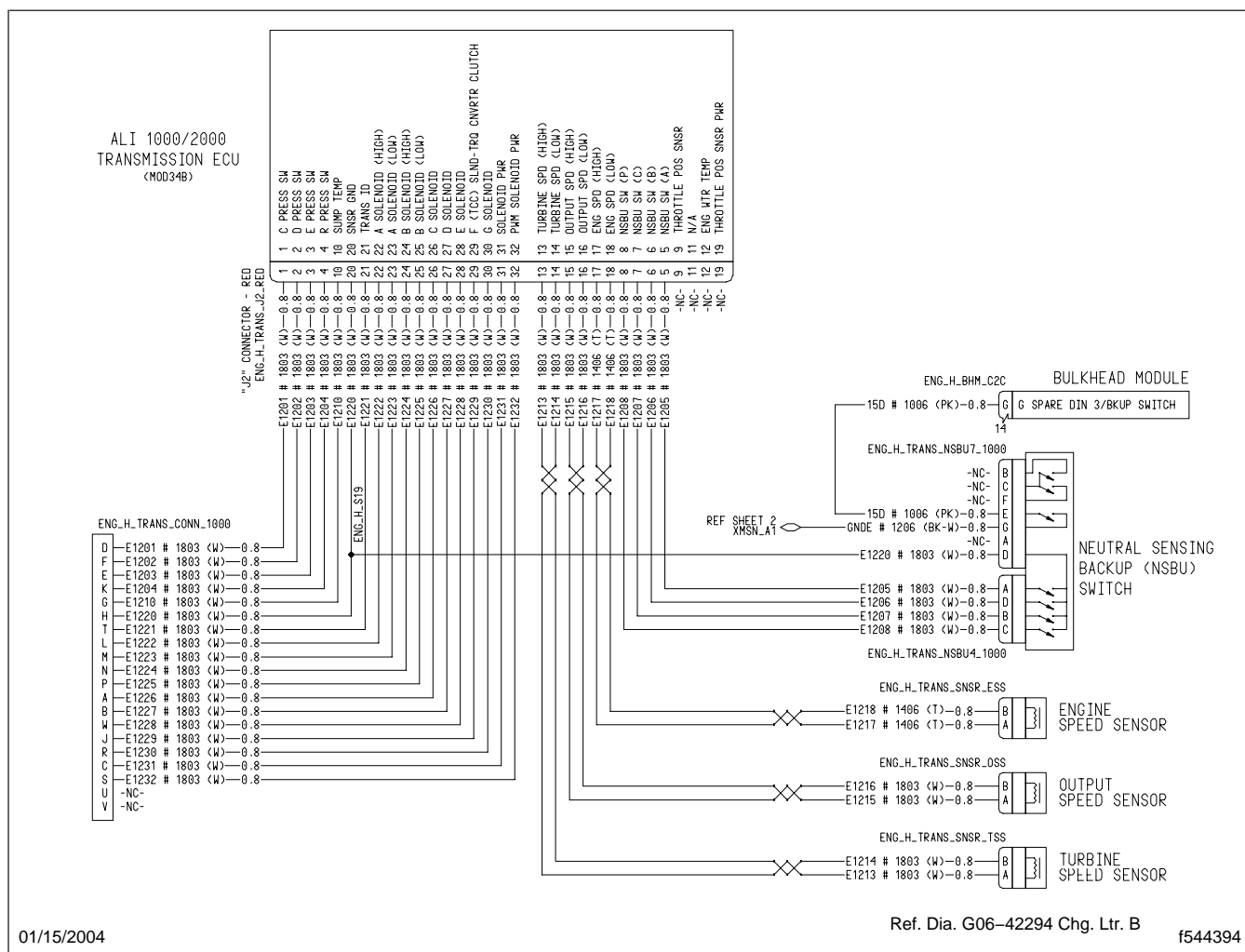


Fig. 2, Transmission Wiring, J2 Connector