TECH TIP

SUBJECT: Transmission Removal and Replacement International® ProStar® and TranStar® Chassis Equipped With Navistar N13 Engine

MODELS AFFECTED: TC10® Product Family Transmissions

Introduction:

The purpose of this Tech Tip is to aid technicians in the efficient removal and installation of a TC10® transmission. The following the recommended steps can enable a technician to complete a Removal and Replacement procedure in approximately 7.5 hours.

A ProStar® chassis is used in the following Removal and Replacement procedure to reflect the degree of difficulty.

WARNING: To prevent property damage, personal injury, and/or death, park vehicle on hard flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in both directions.

WARNING: To prevent property damage, personal injury, and/or death, always wear safe eye protection when performing vehicle maintenance.

WARNING: To prevent property damage, personal injury, and/or death, if the vehicle must be raised, do not work under the vehicle supported only by jacks. Jacks can slip and fall over.

WARNING: To prevent property damage, personal injury, and/or death, always use floor stands to support the vehicle before working under it. Using only a jack could allow the vehicle to fall.

WARNING: To prevent property damage, personal injury, and/or death, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases.

Transmission Removal Procedure:

1. Bring vehicle into shop and park on flat surface.
2. Shift transmission into Neutral, set parking brake and turn engine off.
3. Install wheel chocks.

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4. Raise the vehicle hood and remove the passenger side inner fender. Refer to Figure 1 and Figure 2.

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Figure 1. Inner Fender

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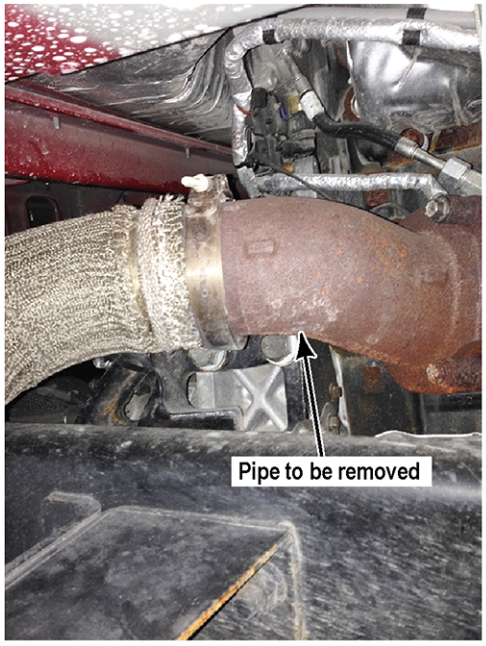
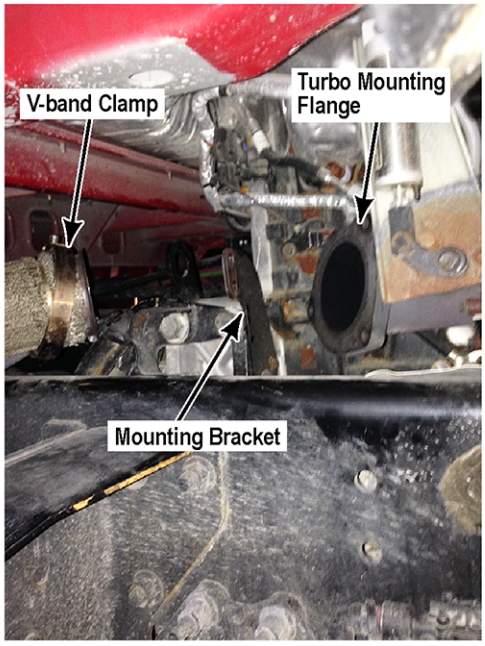
Figure 2. Inner Fender Removed

5. Remove exhaust pipe from turbo. To remove the pipe, remove the V-band clamp at the rear of pipe, three turbo mounting flange bolts, and two mounting bracket bolts. Refer to Figure 3. Once this pipe is removed, move flexible section of exhaust out of the way to allow access. Trucks without flexible pipe may have to remove additional components.



Pipe shown installed on truck



Pipe removed from truck

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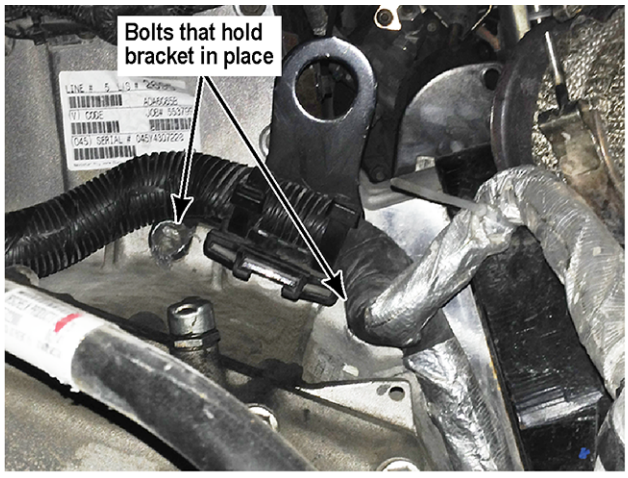
Figure 3. Exhaust Pipe to be Removed

6. From space created by removing inner fender and exhaust pipe, remove the two upper torque converter housing bolts to engine flywheel housing on passenger side. These bolts secure the wiring harness bracket pictured below. Refer to Figure 4 and Figure 5.



Wiring harness bracket attached to torque converter housing bolts

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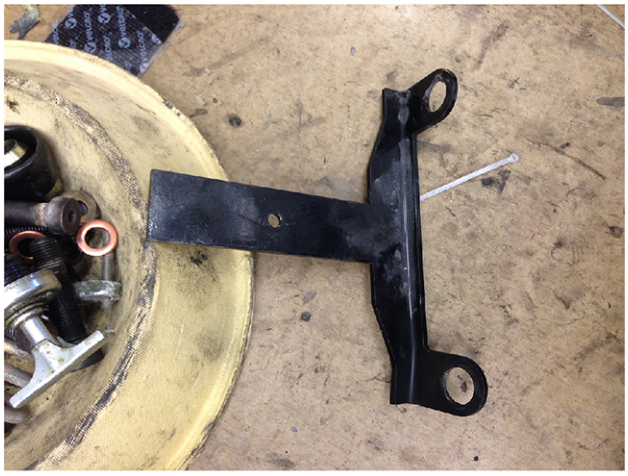
Figure 4. Bracket Bolts



Bracket removed to show bolt orientation

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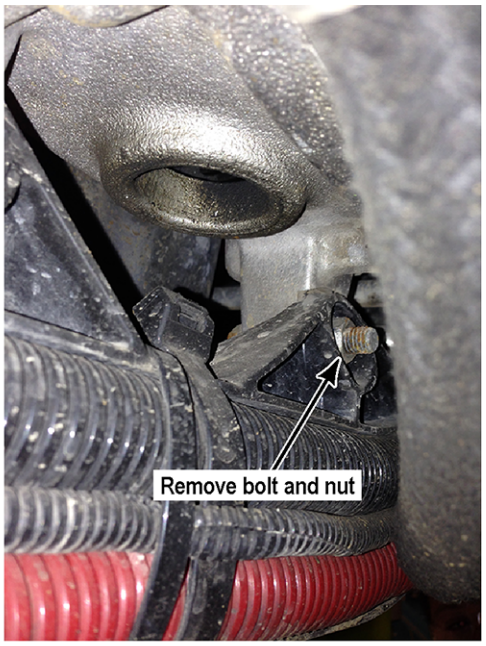
Figure 5. Bracket Removed

7. With vehicle lifted, remove bolts and nuts holding starter wiring harness under the engine flywheel housing. Refer to Figure 6.

Harness bolted to flywheel housing on passenger side (view from front)



Harness connected to flywheel housing (view from rear)

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Figure 6. Remove Bolts and Nuts

8. Remove transmission cooler lines from transmission. Some residual fluid will be lost (approximately 3-4 quarts). Refer to Figure 7.

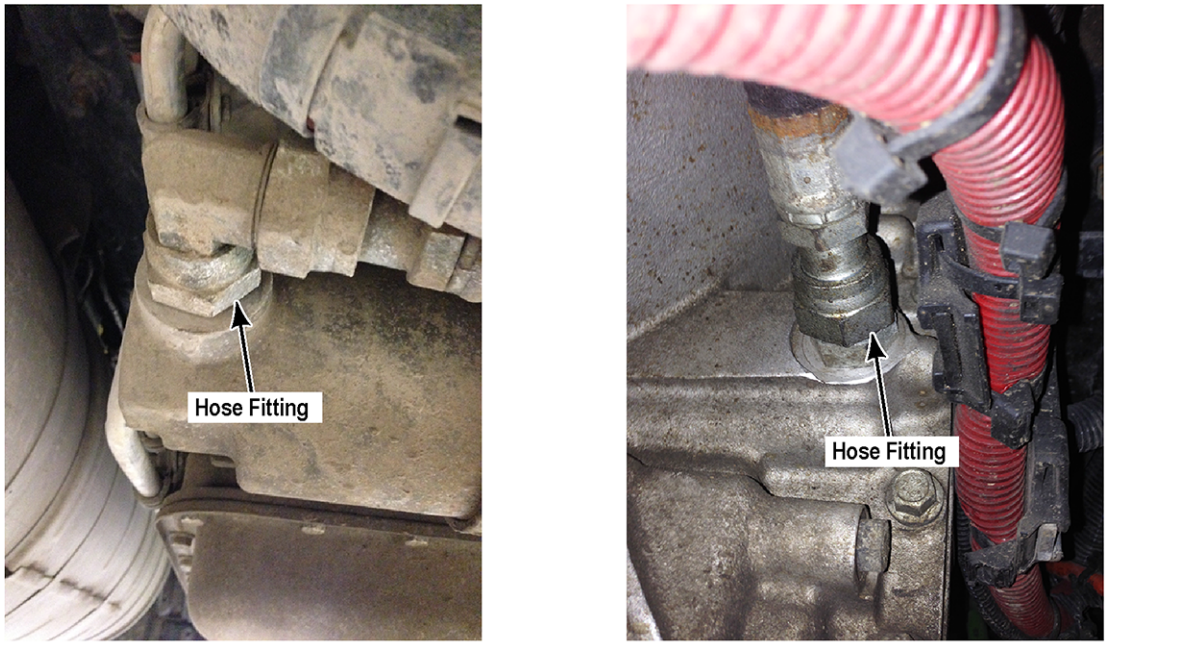


Figure 7. Cooler Lines

9. Disconnect and secure or remove driveline to allow enough space for removal of transmission.
10. Remove fuel lines and wiring harness brackets mounted to transmission case (fuel lines and harnesses are mounted to main case pads on both sides of the transmission). Be careful not to damage fuel lines. Refer to Figure 8.

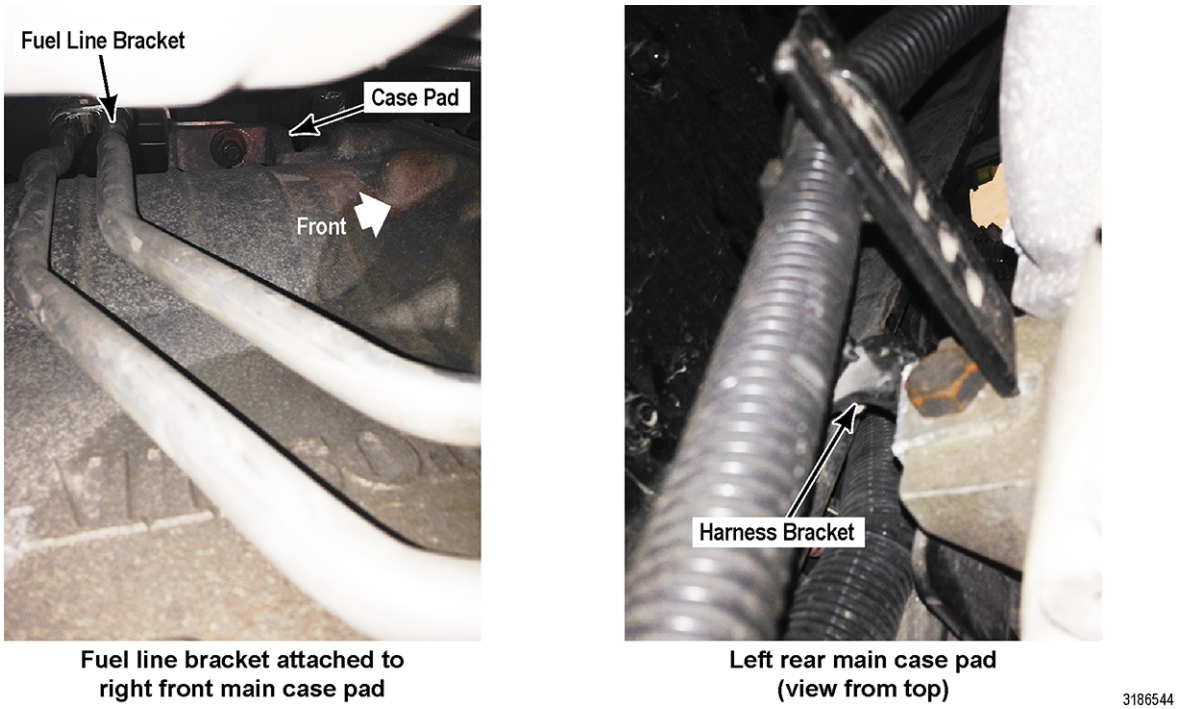
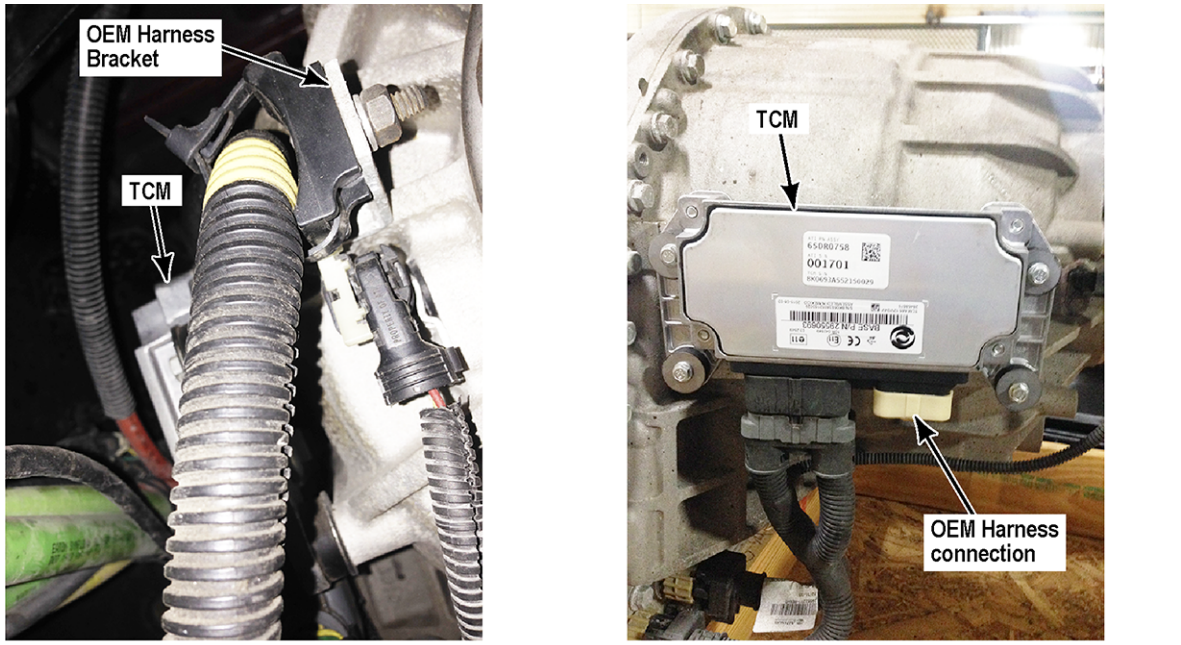


Figure 8. Fuel Line Bracket/Wiring Harness Bracket

11. Remove OEM harness connecter at Transmission Control Module (TCM) and remove OEM harness bracket near output speed sensor from transmission. Refer to Figure 9.

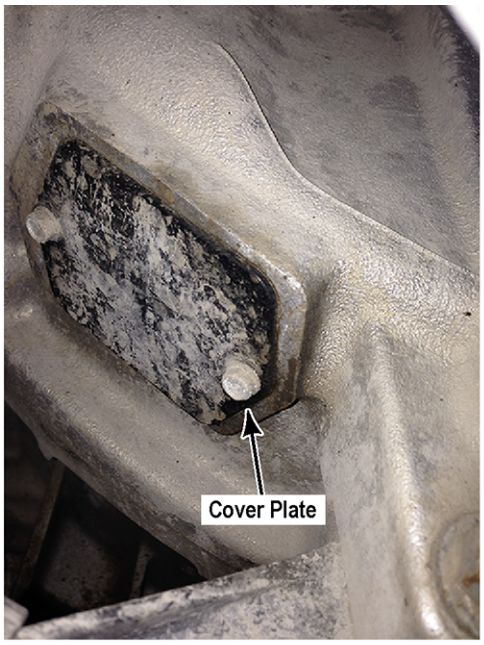


TCM mounted at rear of transmission

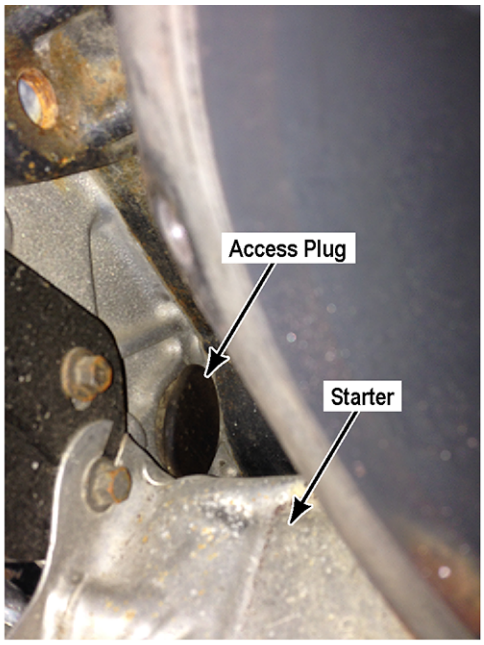
TCM mounted to transmission (side view)

Figure 9. OEM Harness Mount

12. To rotate engine crankshaft and allow access to torque converter bolts, remove plate at bottom of engine flywheel housing. Remove access plug located near starter to access and remove torque converter bolts. Adjust vehicle height as needed so that the engine crankshaft can be rotated while still having access to torque converter bolts from the wheel well. Refer to Figure 10.



Engine flywheel housing cover plate



Torque converter bolt access hole on passenger side with plug installed

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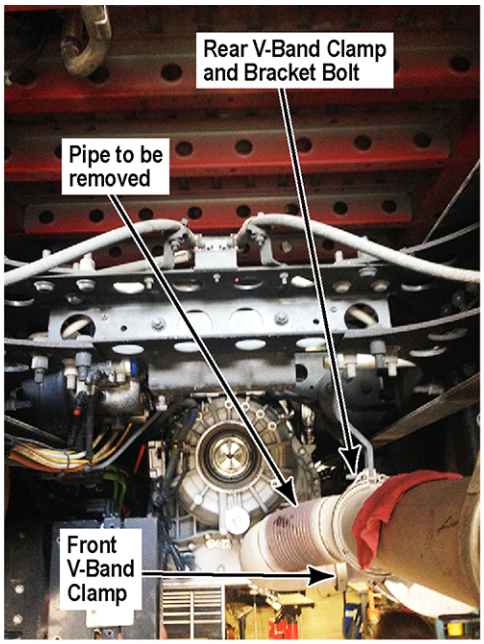
Figure 10. Flywheel Housing Cover

13. If the truck is equipped with horizontal exhaust, the exhaust pipe behind the aftertreatment may need to be removed. Removing the two V-band clamps and the hanger bolt should allow the pipe to be removed. Refer to Figure 11.



Rear view with driveline removed

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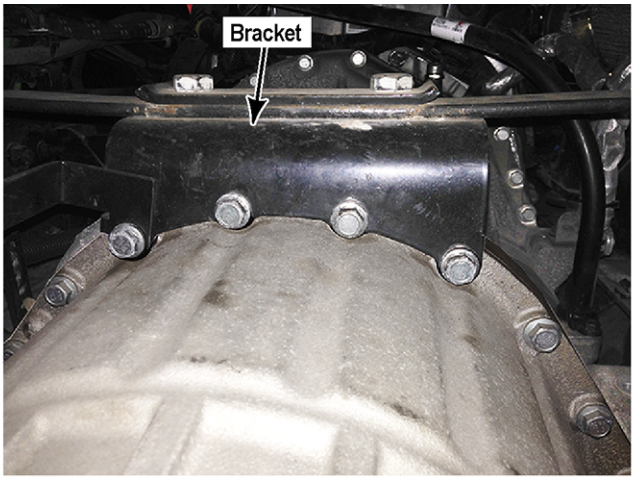
Figure 11. Driveline Removed

14. Support and secure the transmission with a transmission jack and remove the rear support. Be careful to note any wire harness brackets that are attached using the same bolts. Refer to Figure 12.



Rear support installed

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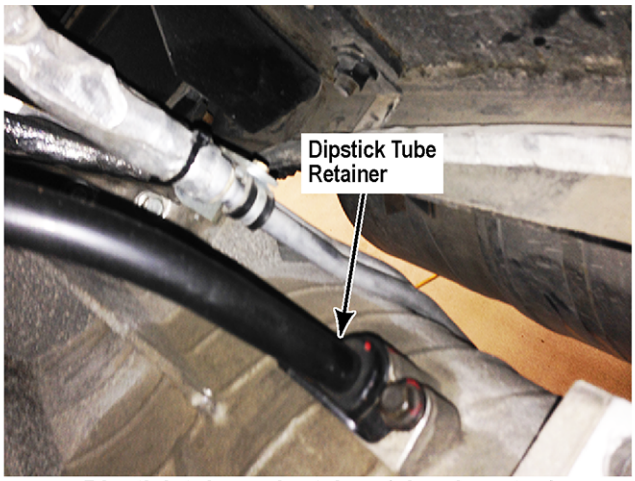
Figure 12. Bracket

15. Remove dipstick/tube retainer from transmission and pull dipstick tube loose. The dipstick tube will remain in the chassis when the transmission is removed. The TC10® dipstick tube has a long shank and cannot be removed with the transmission in the chassis. Refer to Figure 13.



Dipstick tube and retainer (view from top)

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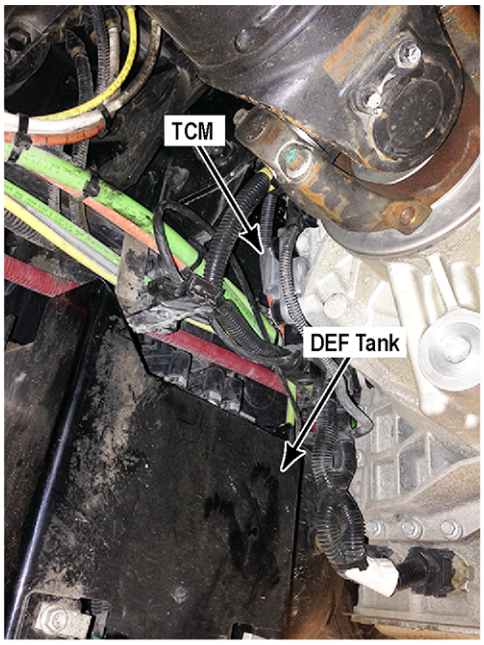
Figure 13. Dipstick Retainer

16. Remove all remaining torque converter housing bolts that secure the transmission to the engine flywheel housing. Some bolts near the top of the housing will require a long extension to access.
17. Slowly slide transmission back and begin lowering. The transmission should lower easily once the torque converter flexplate adaptor clears the flywheel housing. Use caution when lowering transmission to ensure that the TCM clears the Diesel Exhaust Fluid (DEF) tank and that there are no fuel or wiring harness brackets still attached to the transmission. Refer to Figure 14.



Rear of transmission

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Figure 14. DEF Tank

18. For installation, reverse steps 1-17. Refer to vehicle manufacturer's torque specifications for tightening engine flywheel housing bolts, transmission output yoke universal joint retention straps, and all removed brackets/components. Flexplate bolts to transmission torque converter should be tightened to 37 N m (27 lb ft) and the TCM connector should be tightened to 2-3 N·m (12-24 lb in).
19. Pre-fill the transmission fluid (TES 295 fluid), start the engine and check to make sure fluid is at the cold band on the dipstick.
20. Operate the engine with the transmission in Neutral to warm the transmission fluid. Verify proper transmission fluid level via the sift selector or dipstick. Add or remove fluid as required.