

OWNERS MANUAL

...with installation instructions

Banks SmartLock™ TRANS BRAKE

1994-2002 Dodge 5.9L Turbo-Diesel Pickups

(For use with non-CBC equipped Banks Brakes)

THIS MANUAL IS FOR USE WITH SYSTEM 55269

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BANKS

Dear Customer,

Your new Banks SmartLock is an integrated electronic control that seamlessly locks the torque converter, raises transmission line-pressure, reduces transmission temperatures and optimizes braking performance.

If you have any questions concerning the installation of the Banks Smartlock Trans Brake, please call our Technical Service Hotline at (888) 839-2700 between 7:00 am and 5:00 pm (PT). If you have any questions relating to shipping or billing, please contact our Customer Service Department at (888) 839-5600.

Thank you.

Note: This system is for use on vehicles which have been equipped with a Banks Brake which utilizes a mechanical throttle switch. This system is **NOT** compatible with the Banks Computerized Brake Controller (CBC).

General Installation Practices

1. For ease of installation of your Smartlock Trans Brake, please read this 8-page Owner's Manual before starting any work. Become thoroughly familiar with all components and phases of the installation before beginning any work.

2. Inspect all components supplied for any foreign material that may have entered during shipping and handling.

3. The installation should be performed at a time when the vehicle has been allowed to completely cool. This installation requires the installer to work near surfaces that may remain hot after the vehicle has been run. Failure to allow the vehicle to cool may result in personal injury.

4. Pay particular attention to the routing of wires and hoses. Keep them away from exhaust heat, moving parts and sharp edges that may cause cuts or other damage. Route or tie away from critical areas as required. Keep all wires a minimum of 6" from hot exhaust parts, 8" or more is recommended whenever possible.

Warning! Never work under any vehicle supported only by a jack of any kind. **DO NOT USE concrete blocks or other masonry items that may collapse under the vehicle weight.**

System Includes:

- Smartlock Trans Brake
- Pneumatic line pressure boost actuator assembly
- Wiring harness
- Bypass connector
- Owner's manual
- Warranty Statement
- Cable Ties (13)
- T-Tap (2)
- 1/4" male spade connector (1)
- 1/4" female spade receptacle (1)
- 1/4"-20 bolt (1)
- 1/4"-20 nylock nut (1)
- 1/4" washers (2)

Installation Procedure

CAUTION: Installation of the SmartLock Trans Brake is **NOT** complete until Functional Testing, described on pg. 7 of this manual, has been successfully completed.

PNEUMATIC LINE PRESSURE BOOST ACTUATOR ASSEMBLY INSTALLATION:

NOTE: The following instructions assume that a Banks Brake system has been previously installed on the vehicle.

- 1.** As a precaution, disconnect the ground of the battery. If there is more than one battery, disconnect both.
- 2.** Raise and support the vehicle.
- 3.** Disconnect the cable from the kick-down lever on the side of the transmission case as shown in **Figure 1**.
- 4.** Disconnect the return spring attached to the kick-down lever as shown in **Figure 2**. Save the spring for reuse later.
- 5.** Loosen the tightening screw and remove the OEM kick-down lever as shown in **Figure 3**.
- 6.** Remove the bolt shown in **Figure 4** from the transmission case and install the line pressure boost actuator bracket as shown. Temporarily finger-tighten the bolt to allow adjustment.
- 7.** Slide the actuator control lever over the throttle valve shaft and tighten the bolt. Re-attach the return spring to the transmission case actuator control bracket as shown in

Figure 1

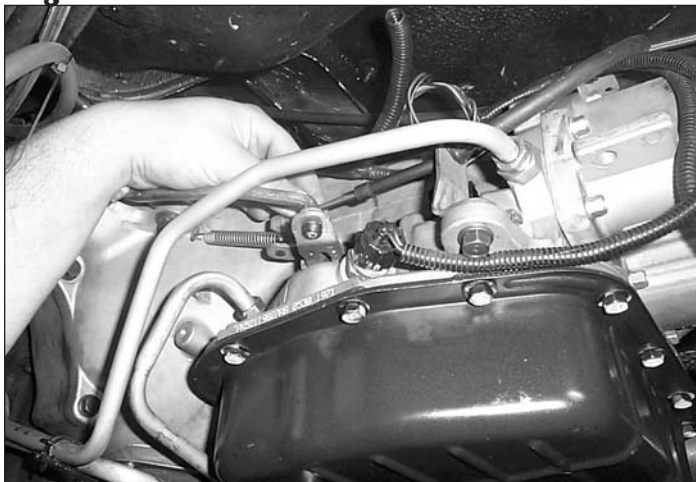


Figure 2

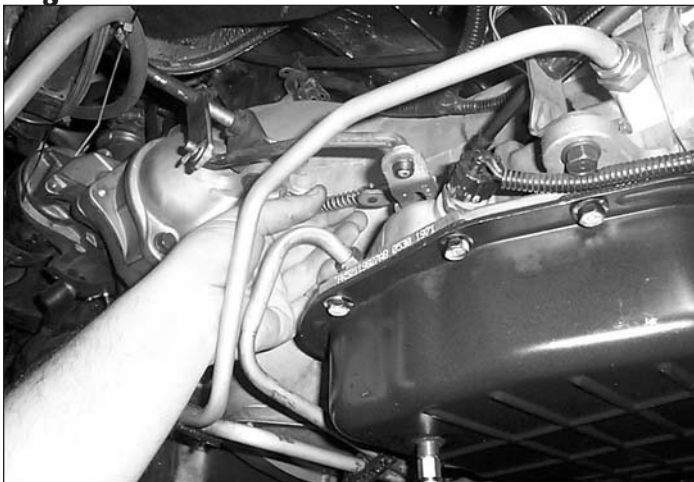


Figure 3

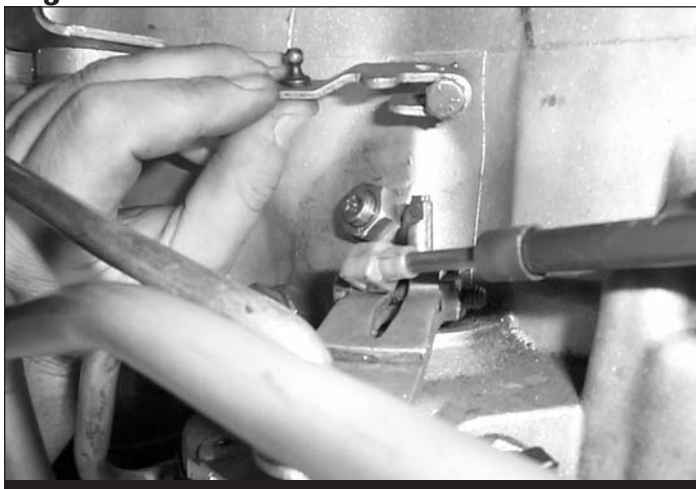


Figure 4

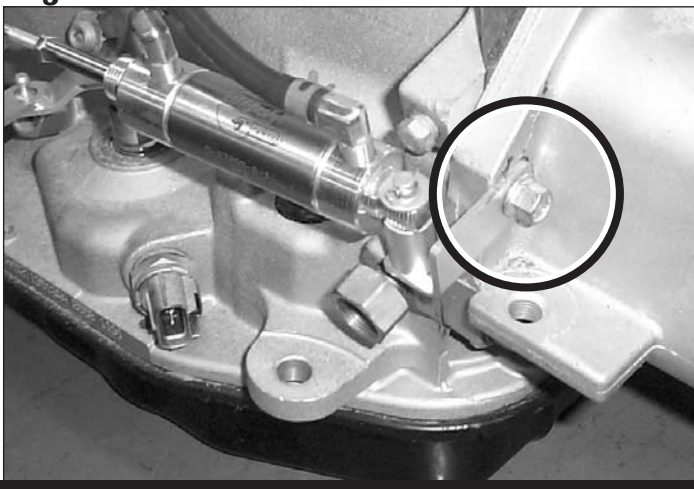


Figure 5. Re-attach the kick down cable removed in Step 3. Actuate the lever by hand several times and ensure there is no binding or the system will fail to function properly. Also ensure that the return spring is sufficient to return the lever to the stop. If not, use a pair of side cutters to shorten the spring as necessary. Remove ¼" at a time until the spring is able to return the lever to the stop. Use needle-nosed pliers to reform the hooked ends after they are cut. The rear mounting bracket can be loosened and rotated to eliminate binding. Apply a general purpose water resistant lithium grease to all

sliding surfaces such as the actuator shaft extension to reduce sliding friction.

8. Connect the black rubber vent hose to the front of the pneumatic actuator and the blue silicone hose to the rear of the actuator as shown in **Figure 6**. Route the hoses away from the transmission along the frame rail and up toward the engine compartment.

9. Secure the vent line in the engine compartment as shown in **Figure 7**. Be sure the bronze filter is facing down to allow moisture to drain.

10. Route the blue silicone vacuum line along the underside of the cowl toward the Banks Brake actuator. Secure the line with the cable ties included.

11. Locate the vacuum supply line running from the actuator control valve to the Banks Brake vacuum actuator. Cut the line as shown in **Figure 8** and install the vacuum tee. Secure each vacuum connection with the supplied spring band clamps.

Figure 5

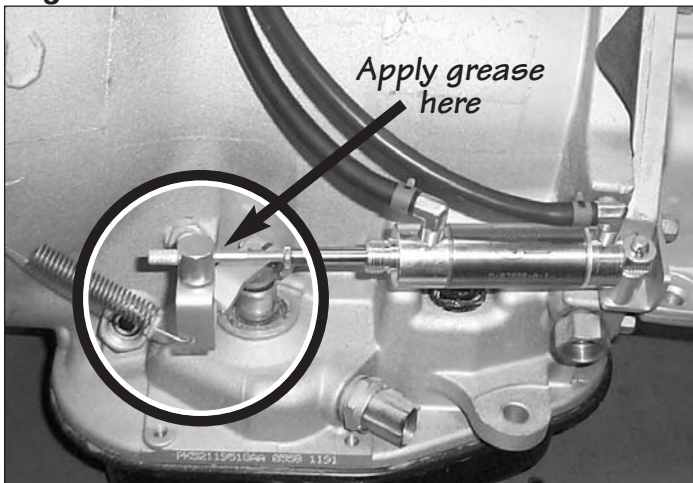


Figure 7

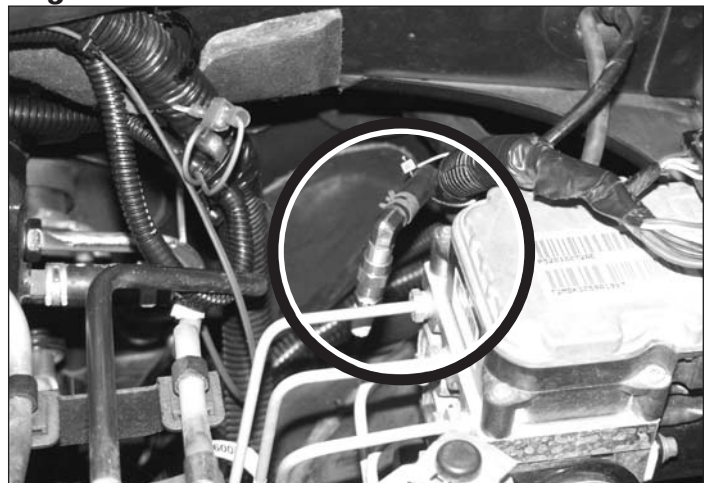


Figure 6

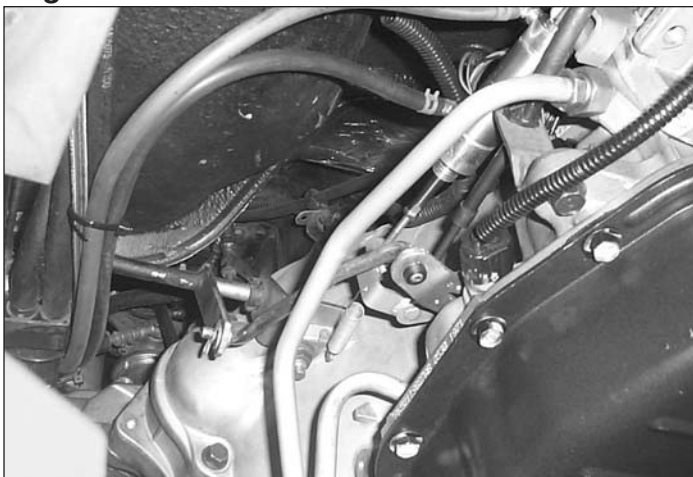
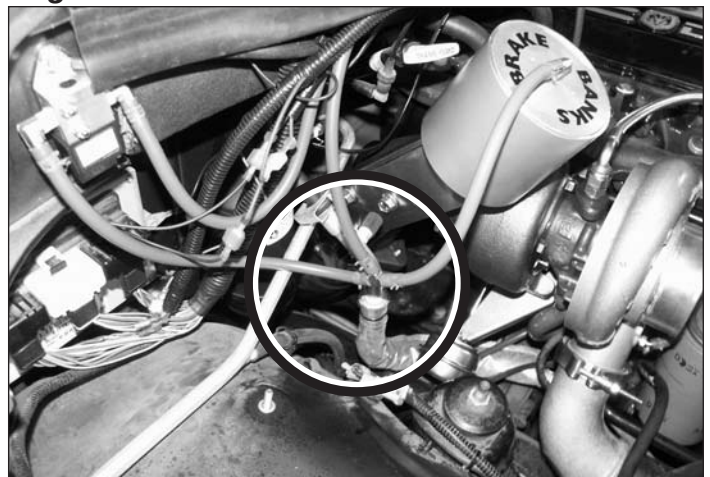


Figure 8



SMARTLOCK TRANS BRAKE INSTALLATION:

NOTE: The following instructions assume that a Banks Brake system has been previously installed on the vehicle.

1. Inside the cab, remove the dash kick panel below the steering column by removing the three screws and pulling on the panel.

2. On the driver's side firewall, there is a soft 3½" diameter grommet located under the cowl that allows the vehicle's wiring harness to pass from the cab to the engine

compartment. Enlarge the hole slightly to allow the Smartlock wiring harness to pass through. Be careful not to damage the vehicle harness. See **Figure 9**.

3. Locate the cast aluminum support frame surrounding the steering column under the dash. The inside vertical surface of the frame just to the left of the steering column will be used to mount the Smartlock Trans Brake box. Ensure that the surface is clean and free of oil, grease and dirt. Clean and dry using a cloth dampened with rubbing alcohol or similar cleaning solution.

4. Peel the protective backing from the foam tape on the Smartlock Trans Brake. The Smartlock Trans Brake should be oriented so that the electrical connector is facing toward the rear of the vehicle. See **Figure 10**. Attach the Smartlock Trans Brake to the aluminum frame. Apply light pressure to the Trans Brake box by hand for approximately 60 seconds to seat the foam tape and create a strong bond.

5. Locate the end of the wire harness with the white 10-pin connector. Plug this connector into the Smartlock Trans Brake.

Figure 9

ENLARGE HOLE IN THIS GROMMET APPROXIMATELY 1/2" TO ALLOW BANKS BRAKE WIRING HARNESS TO PASS THROUGH

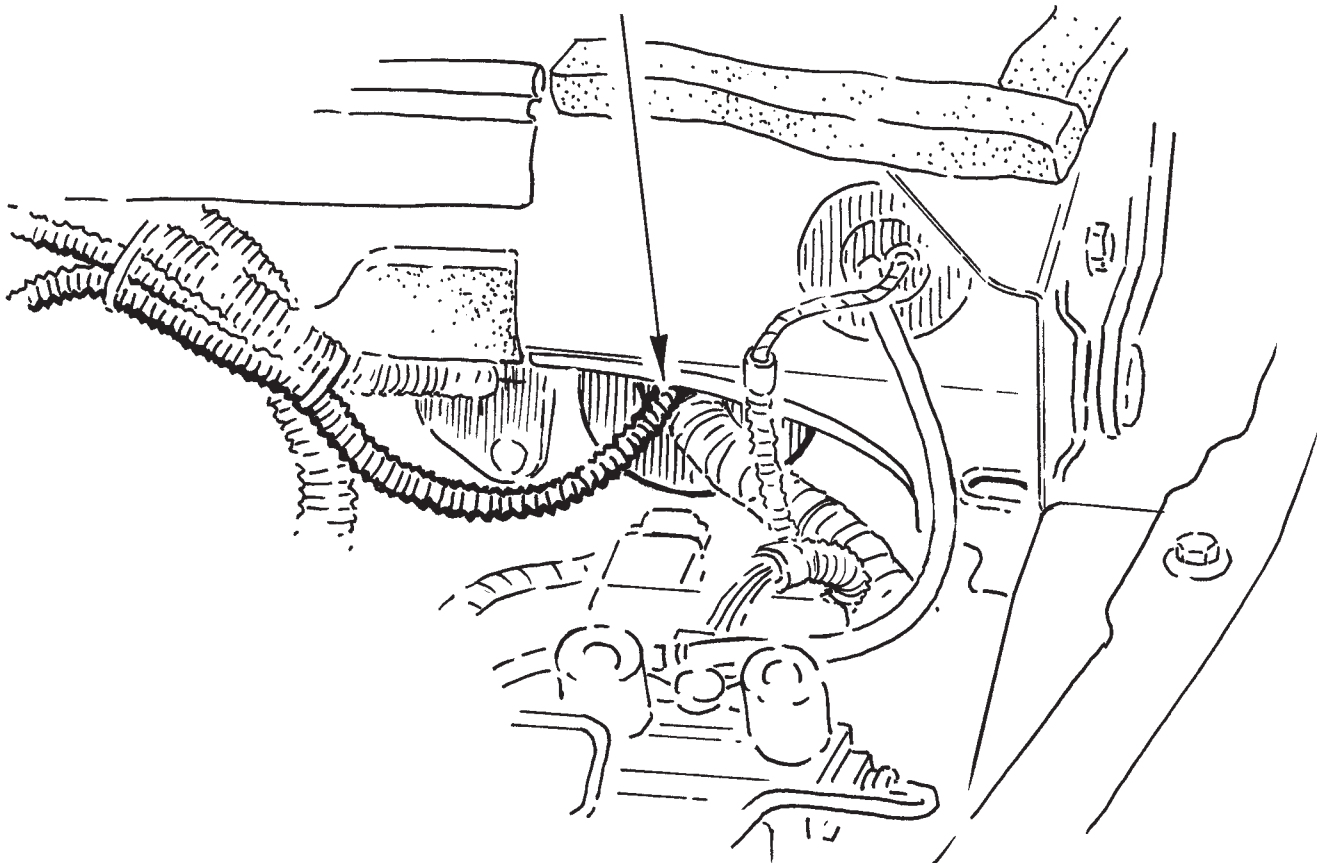


Figure 10



6. Drill a ¼" hole through the sheet metal frame at the location shown for attaching the wiring harness ground lead. Secure the lead with the ¼-20 bolt, nylock nut and washers provided. See **Figure 10**.

7. Route remaining length of wire harness through the firewall grommet identified in **Step 2**. Once inside the engine compartment, route the harness leads along the underside of the cowl towards the black air filter housing assembly. Secure the harness with the cable ties provided.

8. Remove the black air filter box assembly and air inlet hose to gain access to the three PCM connectors located on the lower passenger side firewall.

9. Install a red T-Tap connector on the 18 AWG white wire with an orange tracer at pin 27 of connector 2 (middle connector of three). For 1994-95 vehicles the circuit is located at pin 47 of PCM connector. See

Figure 11



Figure 11. Connect the violet wire from the Smartlock harness to the T-Tap.

NOTE: *Be sure that the tab on the violet wire is properly seated in the slot of the T-Tap connector or the Smartlock will fail to function properly.*

10. Install a red T-Tap connector on the 18 AWG orange wire with a white tracer at pin 13 of connector 3 (left of three). Connect the pink wire from the SmartLock harness to the T-Tap. For 1996-98 vehicles, the circuit is located at pin 6 of connector 3 and is a light green wire with an orange tracer. For 1994-95 vehicles, the circuit is located at pin 37 of PCM connector and is a light green wire with orange tracer.

11. Locate the 18 AWG orange wire with a black tracer at pin 11 of connector 2 (middle connector of three). For 1994-95 vehicles the circuit is located at pin 54 of PCM

connector. Cut and strip the wires and install the supplied male and female spade connectors. Install the male connector on the transmission side of the circuit and the female connector on the PCM side of the circuit. Connect the orange and yellow wires from the Smartlock harness to the installed connectors. See **Figure 11**.

12. Route the red wire lead of the Smartlock harness to the Banks Brake actuator control valve location.

13. Disconnect the green wire from the actuator control valve and plug it into the mating connector on the Smartlock harness. Plug the remaining connector on the Smartlock harness into the previously disconnected lead on the Banks Brake actuator control valve.

FUNCTIONAL TESTING

Once the installation is complete, a test drive should be performed to ensure that the Smartlock Trans Brake is functioning properly. The following procedure should be used to verify that the torque converter is locked when the brake is active and that it disengages at the proper vehicle speed.

- 1.** Obtain a steady vehicle speed in 3rd gear with overdrive cancelled and the torque converter locked on a flat road where it is safe to allow the vehicle to slow to approximately 20 mph.
- 2.** While maintaining this speed, turn the power switch for the Banks Brake to the "ON" position. Release the accelerator pedal to activate the exhaust brake and SmartLock Trans Brake.
- 3.** Once the exhaust brake is activated the torque converter will remain locked and engine RPM will begin to decrease at the same rate as vehicle speed decreases. Allow the vehicle to slow to approximately 30 mph.

4. At a vehicle speed of approximately 30 mph, the Smartlock Trans Brake will return control of the torque converter to the factory computer and it will unlock causing the engine RPM to decrease rapidly. This is an indication that the Smartlock Trans Brake is functioning properly.

5. Obtain a steady vehicle speed in overdrive with the torque converter locked on a flat road where it is safe to allow the vehicle to slow to approximately 20 MPH.

6. While maintaining this speed, turn the switch for the Banks Brake to the "On" position. Release the accelerator pedal to activate the exhaust brake.

7. Once the exhaust brake is activated, the torque converter will remain locked and the engine rpm will begin to decrease at the same rate as vehicle speed decreases. Activate the overdrive cancel switch and ensure that the vehicle downshifts to 3rd gear. Apply light throttle pressure to allow the torque converter to re-lock. Release the accelerator pedal and ensure that the

torque converter remains locked until approximately 30 MPH.

8. Once this functional testing is completed, the Smartlock Trans Brake is ready for service.

TROUBLE SHOOTING

If the system fails to function properly, verify that the wire taps are installed correctly and on the proper wires.

If the Smartlock Trans Brake should ever need to be removed from the vehicle, the system includes a by-pass plug that must be connected to the white 10-pin connector in place of the Smartlock Trans Brake. Failure to utilize the by-pass plug will result in a "Check Engine" light on the dash and a Diagnostic Trouble Code being stored in the factory computer.

SMARTLOCK TRANS BRAKE FUNCTIONAL DESCRIPTION COMPARED TO FACTORY TRANSMISSION

OEM Transmission Function for Torque Converter Lockup

The Dodge automatic transmission is capable of torque converter clutch engagement in third or fourth gear range. Normally the clutch engagement is controlled by PCM inputs such as coolant temperature, engine rpm, vehicle speed and throttle position. If the overdrive control switch is in the normal ON position, the clutch will engage after the shift to fourth gear and above approximately 45 mph. If the control switch is in the OFF position, the clutch will engage after the shift to third gear at approximately 35 mph at light throttle.

OEM Transmission Function for Line Pressure Boost

The Dodge transmission includes a throttle valve that is actuated by a mechanical lever. An interconnect linkage between the throttle valve and accelerator pedal allows the transmission line pressure to be

controlled as a function of accelerator pedal position. As pedal position opening increases, transmission line pressure will increase.

Smartlock Trans Brake Function

The Smartlock Trans Brake uses the OEM transmission's capability of locking the torque converter and raising transmission line pressure to optimize the functionality of the Banks Brake exhaust brake system.

To allow 100% of the available retarding force to be transferred to the drive wheels, the Smartlock Trans Brake interrupts the torque converter lockup command from the vehicle's PCM and allows the torque converter to remain locked under dropped throttle conditions. The OEM transmission will normally unlock the converter under these conditions. The torque converter lockup command will remain in effect until approximately 30 mph.

There are two operating conditions that will require light throttle pressure to engage the torque converter clutch. These are:

(1) Activating the exhaust brake switch under dropped throttle and
(2) Re-locking the torque converter after an overdrive to 3rd gear downshift. Under these conditions, simply apply light throttle pressure until the vehicle's computer engages the lockup clutch (indicated by a slight drop in engine rpm) and release the accelerator pedal. Clutch engagement should remain in effect until approximately 30 mph.

To further optimize transmission function under exhaust braking conditions, the Smartlock Trans Brake will pneumatically actuate the throttle valve lever under dropped throttle conditions to increase transmission line pressure.

NOTE: The Smartlock System is designed to compliment the function of the Banks Brake. It is not designed or intended for use under acceleration as a means to hold the torque converter locked or raise transmission line pressure. This device does not increase the torque capacity of the vehicle's transmission under acceleration.

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