

FORD: 1999-2003 SUPER DUTY F SERIES
2000-2003 EXCURSION

Article **00-8-6** is being republished in its entirety to update the model year coverage.

ISSUE

This TSB provides information on the 4X4 system, particularly the front locking hubs.

ACTION

Refer to the following text for information regarding the 4X4 system and the front wheel hub locks.

SERVICE PROCEDURE

4X4 ESOF LOCKING HUB: DIAGNOSTIC AND SERVICE ISSUES

Many system components are involved in proper operation of the ESOF (Electronic Shift-On-The-Fly) locking hubs on 1999 and newer Super Duty and Excursion 4X4 vehicles. Before diagnosing the hub locks themselves as the cause of 4X4 concerns, be sure to verify all related system components.

HUB LOCK OPERATION

The Super Duty and Excursion 4X4 ESOF system uses timed vacuum sequences to lock and unlock the wheel ends. A high vacuum level is used to engage the hub locks, and a lower vacuum level is used to disengage the hub locks, after which the vacuum is released and the hub lock holds itself in the proper mode. The vacuum signals are supplied to the hub locks by system components, including Generic Electronic Module (GEM), wiring harness, solenoid, vacuum harness, and vacuum seals. As a first step in service, eliminate such obvious items as loose wiring connections, loose vacuum connections, or damaged vacuum lines.

NOTE: The information in Technical Service Bulletins is intended for use by trained, professional technicians with the knowledge, tools, and equipment to do the job properly and safely. It informs these technicians of conditions that may occur on some vehicles, or provides information that could assist in proper vehicle service. The procedures should not be performed by "do-it-yourselfers". Do not assume that a condition described affects your car or truck. Contact a Ford, Lincoln, or Mercury dealership to determine whether the Bulletin applies to your vehicle.

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DISENGAGE TIME

“Slow” release of the hub locks is not considered abnormal for this system. Anytime vacuum is applied to the hubs, whether for 4X4 or 4X2, the hub locks will initially engage. If 4X4 was requested, they will remain engaged, but if 4X2 was selected, the internal mechanism will release only after the GEM timers expire and vacuum is vented from the hub. This normally takes 15 seconds, but can take up to 2 minutes depending on how the 4X4 mode switch was operated. After the hub mechanism releases, internal springs must work the hub lock gears to the disengaged position. Road bumps, vehicle speed, acceleration cycles, or momentary reversal of direction can assist this process, varying the length of time the hub locks remain engaged in each situation.

MANUAL OVERRIDE

The hub locks have manual override selector dials which, when rotated to the “lock” position, will keep the mechanism locked regardless of the instrument panel 4X4 mode switch position. Verify that both dials are in “auto” before evaluating ESOF operation.

MATCHING PAIRS NOT REQUIRED

Left and right side hub locks are not connected other than by the common vacuum supply line. If a malfunction in either hub lock is diagnosed, it should be replaced as an individual unit; there is no need to “balance” an axle with new hub locks on both sides. If both sides appear to be malfunctioning, be sure to verify upstream system integrity before replacing both hub locks.

HUB LOCK REMOVAL

After removing the hub lock retaining ring, be sure not to use tools other than hands or “grip” gloves as damage may occur to either the paint or function of the hub lock. Pliers or channel locks should be only considered as a last resort as they will usually damage the hub lock, making replacement necessary.

HUB CONTAMINATION

If contamination (water, mud, etc.) is found in the hub cavity, look for the source. If it is due to system leaks other than the hub lock, they must be found and repaired. Always replace the hub lock O-ring before re-use.

TORSIONAL FAILURE

If a torsional failure (twisting fracture) of the hub lock is suspected or the internal gears are “shattered”, the axle constant shaft may have been damaged as well. Inspect the axle shaft carefully; if twisting has occurred at the base of the axle splines, it is difficult to see without removing the bearing assembly.

RATCHETING

If a “ratcheting” noise is found especially over road bumps and potholes, suspect the needle bearing that supports the inboard end of the axle constant shaft within the hub/bearing assembly. Eliminate this as a cause before servicing the hub lock. Wear at this bearing can set up vibration, which may be heard as ratcheting, while a seized bearing can bind the shaft, forcing it to rotate in 4X2.

OTHER APPLICABLE ARTICLES: NONE

SUPERSEDES: 00-8-6

WARRANTY STATUS: INFORMATION ONLY

OASIS CODES: 508000, 509000, 510000, 597997,
702000, 702100