Ford Motor Company

FCSD Technical Training

INTERACTIVE STUDY GUIDE

2004 EXPLORER/MOUNTAINEER NEW MODEL TECHNICIAN TRAINING

FCS-13854-DL

Ford Customer Service Division
Technical Training

FORDSTAR DEALER COMMUNICATIONS NETWORK

IMPORTANT SAFETY NOTICE

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all motor vehicles, as well as the personal safety of the individual doing the work. This manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools and parts for servicing vehicles, as well as in the skill of the individual doing the work. This manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from instructions provided in this manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.

As you read through the procedures, you will come across NOTES, CAUTIONS, and WARNINGS. Each one is there for a specific purpose. NOTES give you added information that will help you to complete a particular procedure. CAUTIONS are given to prevent you from making an error that could damage the vehicle. WARNINGS remind you to be especially careful in those areas where carelessness can cause personal injury. The following list contains some general WARNINGS that you should follow when you work on a vehicle.

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires you to be under the vehicle.
- Be sure that the ignition switch is always in the OFF position, unless otherwise required by the procedure.
- Set the parking brake when working on the vehicle. If you have an automatic transmission, set it in PARK unless instructed otherwise for a specific service operation. If you have a manual transmission it should be in RE-VERSE (engine OFF) or NEUTRAL (engine ON) unless instructed otherwise for a specific service operation.
- Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide.
- Keep yourself and your clothing away from moving parts when the engine is running, especially the fan and belts.
- To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold, tail pipe, catalytic converter and muffler.
- Do not smoke while working on the vehicle.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle. Tie long hair securely behind your head.
- Keep hands and other objects clear of the radiator fan blades. Electric cooling fans can start to operate at any time by an increase in underhood temperatures, even though the ignition is in the OFF position. Therefore, care should be taken to ensure that the electric cooling fan is completely disconnected when working under the hood.

The recommendations and suggestions contained in this manual are made to assist the dealer in improving his dealership parts and/or service department operations. These recommendations and suggestions do not supersede or override the provisions of the Warranty and Policy Manual, and in any cases where there may be a conflict, the provisions of the Warranty and Policy Manual shall govern.

The descriptions, testing procedures, and specifications in this handbook were in effect at the time the handbook was approved for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications, design, or testing procedures without notice and without incurring obligation. Any reference to brand names in this manual is intended merely as an example of the types of tools, lubricants, materials, etc. recommended for use. Equivalents, if available, may be used. The right is reserved to make changes at any time without notice.

WARNING: MANY BRAKE LININGS CONTAIN ASBESTOS FIBERS. WHEN WORKING ON BRAKE COMPONENTS, AVOID BREATHING THE DUST. BREATHING THE ASBESTOS DUST CAN CAUSE ASBESTOSIS AND CANCER.

Breathing asbestos dust is harmful to your health.

Dust and dirt present on car wheel brake and clutch assemblies may contain asbestos fibers that are hazardous to your health when made airborne by cleaning with compressed air or by dry brushing.

Wheel brake assemblies and clutch facings should be cleaned using a vacuum cleaner recommended for use with asbestos fibers. Dust and dirt should be disposed of in a manner that prevents dust exposure, such as sealed bags. The bag must be labeled per OSHA instructions and the trash hauler notified as to the contents of the bag.

If a vacuum bag suitable for asbestos is not available, cleaning should be done wet. If dust generation is still possible, technicians should wear government approved toxic dust purifying respirators.

OSHA requires areas where asbestos dust generation is possible to be isolated and posted with warning signs. Only technicians concerned with performing brake or clutch service should be present in the area.

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Ford Motor Company

CUSTOMER EXPECTATIONS

Customer Expectations: Service

1. Make it convenient to have my vehicle serviced at your dealership.
2. The Service Advisor should demonstrate a genuine concern for my service needs.
3. Fix it right the first time.
4. Complete servicing my vehicle in a timely and professional manner.
5. Provide me with a clear and thorough explanation of the service performed.
6. Call me within a reasonable amount of time after my service visit to ensure that I'm completely satisfied.
7. Be responsive to questions or concerns I bring to your attention.

Expectation 3

''Fix It Right The First Time, on Time.''
Both service advisors and technicians are important players when it comes to Expectation #3.

Why
Customers tell us ''Fixing It Right The First Time, on Time'' is one of the reasons they would decide to return to a dealer to buy a vehicle and get their vehicles serviced.

Technician Training
It is our goal to help the technician acquire all of the skills and knowledge necessary to ''Fix It Right The First Time, on Time.'' We refer to this as ''competency.''

Technician's Role
Acquire the skills and knowledge for competency in your specialty via:

STST
- Self Study
- FordStar Broadcasts
- Ford Multimedia Training (FMT)
- Instructor Led

New Model
- Self Study
- FordStar Broadcasts
- Instructor Led

The Benefits
The successful implementation of expectations means:
- Satisfied customers
- Repeat vehicle sales
- Repeat service sales
- Recognition that Ford and Lincoln/Mercury technicians are ''the Best in the Business''

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NOTES

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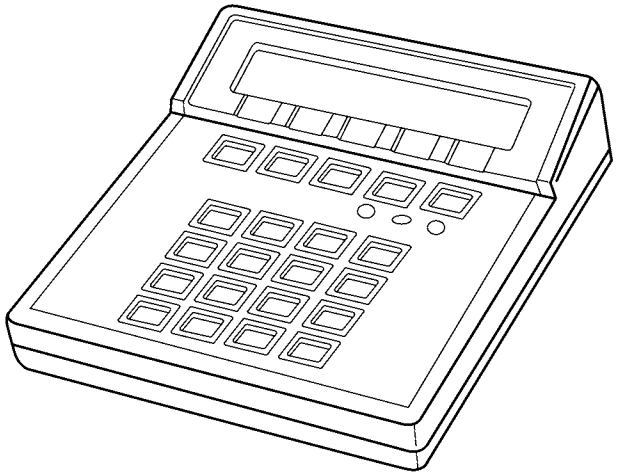
Technical Training

The distance learning course you are about to take is intended to give you new knowledge and information about diagnosing and servicing Ford and Lincoln/Mercury vehicles. We hope you will apply this knowledge and information to ‘‘Fix It Right The First Time’’ as part of the effort to satisfy our customer, the owners of Ford and Lincoln/Mercury products.

Ground Rules for Successful Completion

This course is what we call ‘‘**score based**.’’ Successful completion of this course requires a passing score of 80% or greater on the Post-Test questions. Achievement of 80% or greater will result in a ‘‘PASS’’ in your STARS training history. A score of less than 80% results in a ‘‘FAIL’’ in your STARS training history. If you logon and participate in the class, but choose NOT to answer any of the questions, you will receive an ‘‘AUDIT’’ in your training history. You may return to complete the test in a future class session, if desired. Completion of the test will replace the ‘‘AUDIT’’ in your STARS training history.

LOGGING ON



T5000232

Your response keypad transmits data and voice between you and the host site via telephone lines and satellite. It is your ‘‘lifeline,’’ connecting you to the instructor as well as to other participants. Using the keypad, you can become fully involved in the seminar, asking questions and contributing relevant comments.

To log on at the beginning of the broadcast session:

1. Enter your Social Security number (in response to the keypad prompt). If you press an incorrect key, press CLEAR and re-enter the numbers.
2. Press ENTER.
3. The system validates your ID number by displaying your name on your keypad. If your name does not appear on the keypad, re-enter your ID number.
4. If you cannot successfully log on, contact the FORDSTAR Help Desk:

   USA Dealers call 1–800–790–HELP (4357).

   Canadian Dealers call 1–800–467–8925.

KEYPAD OPERATION

CALL Key

- Press the CALL key if you have a question or comment. This places you in the call queue. The system indicates your name and location to the instructor.
- It takes approximately 60 seconds for the instructor to respond. If you change your mind about asking the question, simply press the CALL key again. As long as the instructor has not accepted your call, this takes you out of the call queue.

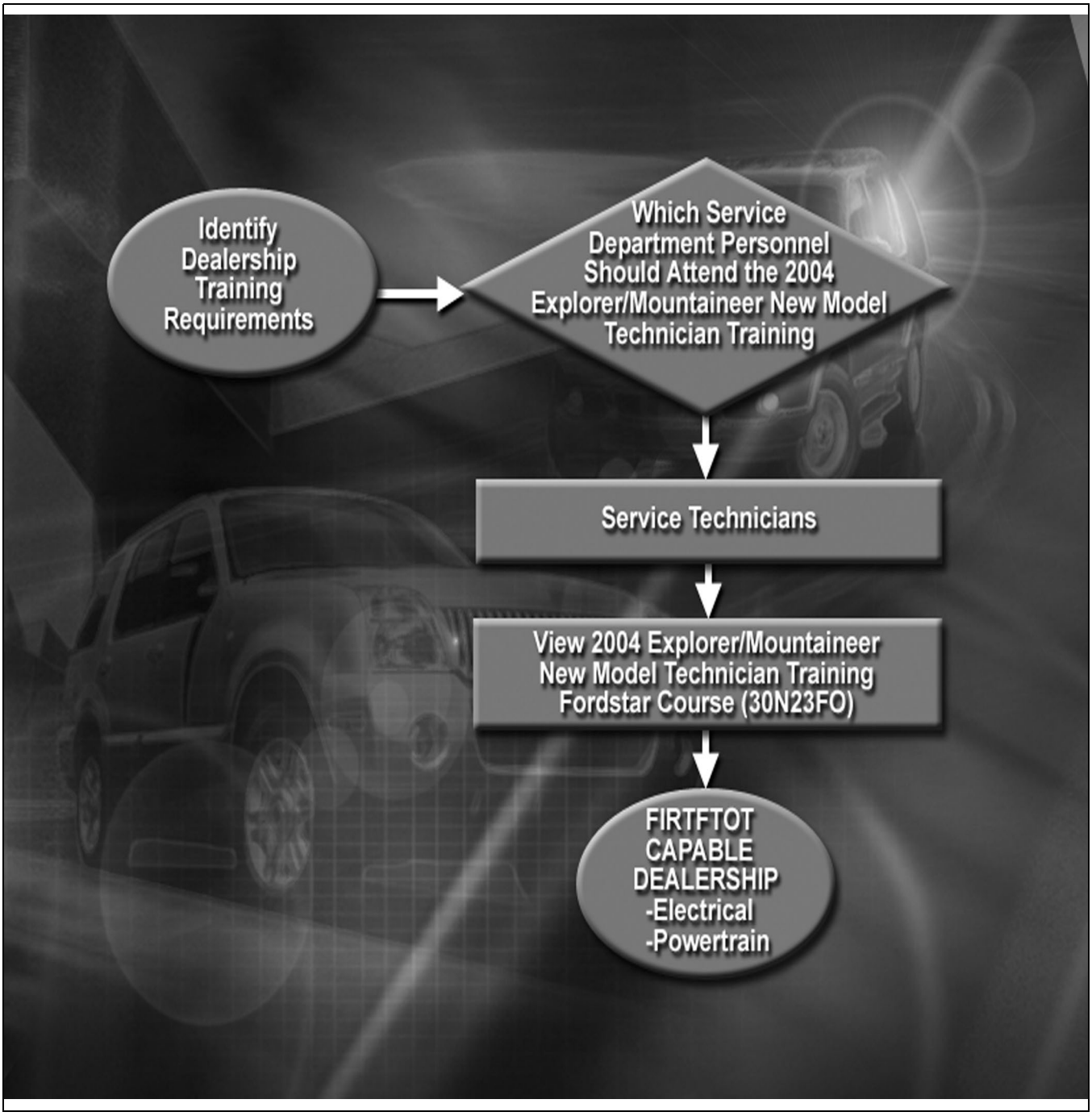
WAIT and SPEAK Lights

- The red WAIT light illuminates when your call is received and placed in the call queue.
- When the instructor calls on you, the green SPEAK light illuminates and your microphone is activated.
- The microphone is the gray dot between the SPEAK and WAIT lights. Speak in a normal tone of voice from a normal sitting position. The instructor will hear you — as will all the other students, wherever they are located.

FLAG Key

- Use the FLAG key when requested by the instructor. the FLAG key is usually used to alert the instructor that you have completed tests or exercises.

IN-DEALERSHIP TRAINING MAP



PURPOSE

The purpose of this FORDSTAR course is to provide Ford and Lincoln/Mercury service technicians with the knowledge needed to understand new systems, new or updated components and unique diagnostic and service procedures for the 2004 Explorer/Mountaineer.

AGENDA

The information in this course is presented in the following lessons:

- Lesson 1: Overview
- Lesson 2: Chassis
- Lesson 3: Powertrain
- Lesson 4: Electrical

NOTES

OBJECTIVES

- Identify the new exterior features.
- Identify the new interior features.
- Identify the new mechanical and chassis features.
- Identify the proper lifting and jacking points.
- Identify the maintenance check points.
- Identify the 17-character Vehicle Identification Number (VIN) coding.

Exterior Features



Explorer and Mountainer Exterior

The optional exterior features include:

- New exterior badging.
- Revised body side moulding.
- New front and rear bumper cladding.

Interior Features



Explorer/Mountaineer Interior

Interior optional features include:

- Quad bucket seating.
- Six-way power driver and passenger seats.
- 40/20/40 second row seat with three-point center restraint and headrest.
- ‘‘Moduleless’’ heated front seats.
- Second-generation air curtain (canopy).
- Dual zone electronic automatic temperature control.
- Auxiliary rear heater and A/C system.

Mechanical and Chassis Features

Mechanical and chassis features include:

- A 4.0L SOHC V6 and 4.6L 2V V8 engine.
- A 5R55S transmission.
- Tire Pressure Monitoring System (TPMS).
- Advance Trac™ stability assist.

Lifting and Jacking



Lifting and Jacking Points

Explorer and Mountaineer lifting and jacking points are the same as those on the 2003 models. When jacking or lifting the Explorer and Mountaineer, be sure to observe all of the Workshop Manual cautions and warnings.

⚠ **CAUTION: Never place a jack or lift under the fuel tank or differential cover. Doing so may cause damage to the fuel tank or cause the differential to leak.**

Maintenance Check Points

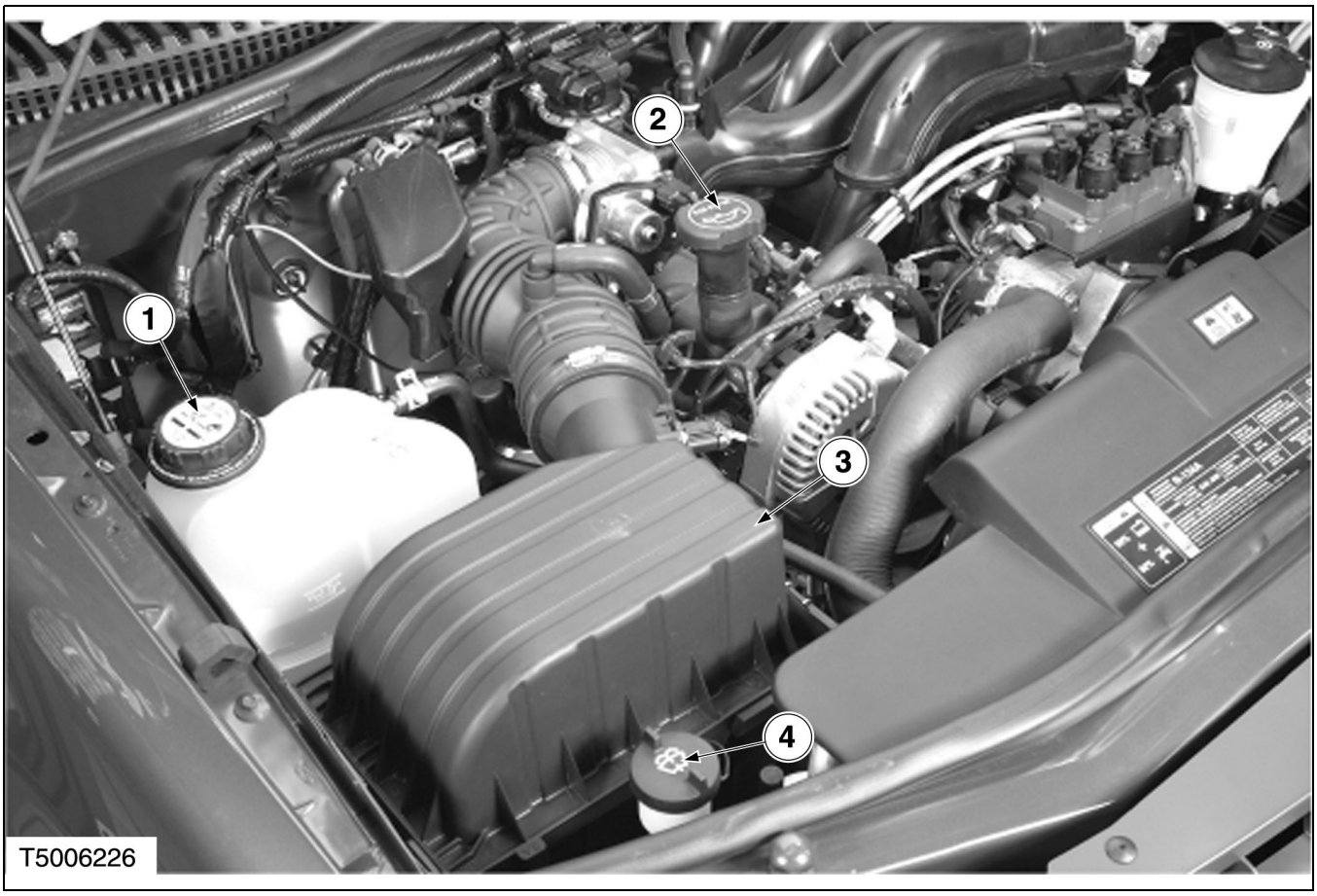


Maintenance Check Points 4.0L SOHC V6 (1 of 2)

Item	Description
1	Power steering fluid reservoir
2	Engine oil dipstick

Item	Description
3	Brake fluid reservoir
4	Battery

It is important to check fluid levels at the recommended maintenance intervals. Always use Ford-specified fluids and lubricants.



Maintenance Check Points 4.0L SOHC V6 (2 of 2)

Item	Description
1	Engine coolant reservoir
2	Engine oil fill cap

Item	Description
3	Air filter assembly
4	Windshield washer reservoir



Maintenance Check Points 4.6L 2V V8 (1 of 2)

Item	Description
1	Brake fluid reservoir
2	Battery

Item	Description
3	Engine oil dipstick
4	Power steering fluid reservoir

It is important to check fluid levels at the recommended maintenance intervals. Always use Ford-specified fluids and lubricants.



Maintenance Check Points 4.6L 2V V8 (2 of 2)

Item	Description
1	Engine coolant reservoir
2	Engine oil fill cap

Item	Description
3	Air filter assembly
4	Windshield washer reservoir

Identification Codes

Vehicle Identification Codes

The Vehicle Identification Number (VIN) is a 17-digit combination of letters and numbers. The VIN is stamped on a metal tab rivited on the instrument panel, at the top upper left of the dash. The VIN is also found on the Vehicle Emission Certification Information (VECI) label.

Item	Description
1	World Manufacturer Identifier
2	Brake Type/Gross Vehicle Weight Rating (GVWR)
3	Vehicle Line, Series, Body Type
4	Engine Type
5	Check Digit
6	Model Year
7	Assembly Plant
8	Production Sequence Number

- World Manufacturer Identifier

The first three VIN positions are the World Manufacturer Identifier.

Code	Definition
1FM	Ford Motor Company, USA, multi-purpose vehicle
4M2	Ford Motor Company (Mercury), USA, multi-purpose vehicle

- Brake Type/Gross Vehicle Weight Rating (GVWR)

The fourth VIN position is the vehicle brake type and GVWR code. All vehicles use hydraulic brakes. This code may also identify the vehicle safety restraint system.

Code	Definition
Z	5,001-6,000 pounds GVWR with driver and front passenger airbags
D	5,001-6,000 pounds GVWR with driver and front passenger airbags and side impact air canopies

- Vehicle Line, Series, Body Type

VIN position five through seven indicate the vehicle line, series and body type.

Code	Definition
U62	Explorer, 4x2, XLS, multi-purpose vehicle
U63	Explorer, 4x2, XLT, multi-purpose vehicle
U64	Explorer, 4x2, Eddie Bauer, multi-purpose vehicle
U65	Explorer, 4x2, Limited, multi-purpose vehicle
U66	Mountaineer, 4x2, multi-purpose vehicle
U72	Explorer, 4x4, XLS, multi-purpose vehicle
U73	Explorer, 4x4, XLT, multi-purpose vehicle
U74	Explorer, 4x4, Eddie Bauer, multi-purpose vehicle
U75	Explorer, 4x2, Limited, multi-purpose vehicle
U82	Explorer, XLS, all-wheel drive (AWD) multi-purpose vehicle
U83	Explorer, XLT, all-wheel drive (AWD) multi-purpose vehicle
U84	Explorer, Eddie Bauer, all-wheel drive (AWD) multi-purpose vehicle
U85	Explorer, Limited, all-wheel drive (AWD) multi-purpose vehicle
U86	Mountaineer, all-wheel drive (AWD) multi-purpose vehicle

- Engine Type

The eighth VIN position is the engine type (displacement and number of cylinders).

Code	Definition
E	4.0L, SOHC, V6, EFI
K	4.0L, SOHC, V6, EFI, flex fuel
W	4.6L, SOHC, V8, EFI

- Check Digit

The ninth VIN position is a government assigned, computer-generated check digit.

- Model Year

The tenth VIN position is the model year code.

Code	Definition
4	2004

- Assembly Plant

The eleventh VIN position is the assembly plant code.

Code	Definition
U	Louisville, Kentucky
Z	St Louis (Hazelwood), Missouri

- Production Sequence Number

VIN positions 12 through 17 are an alphanumeric code for the vehicle build sequence. This is also the vehicle serial and warranty number.

Vehicle Identification Codes

Code	Definition
A00001-E99999	Ford
J00001-L99999	Mercury

OBJECTIVES

- Identify new features of the suspension system.
- Identify new features of the steering system.
- Identify new features of the driveline system.
- Identify new features of the brake system.

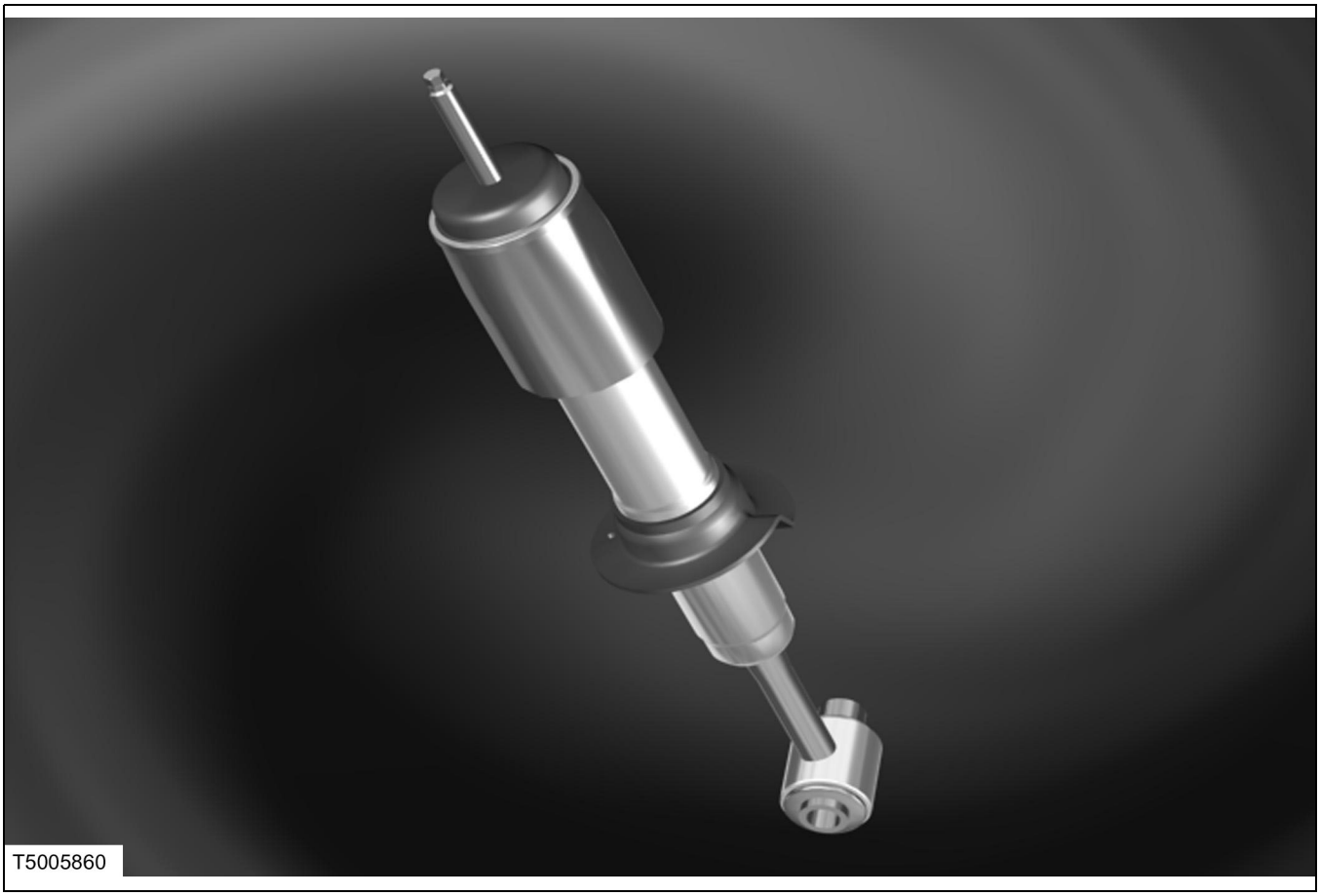
Suspension System

The Explorer and Mountaineer front suspension system is a coil spring-over-shock design similar to that of the Aviator.

- The Explorer and Mountaineer suspension however, has the following improvements:
  - Redesigned shock absorbers.
  - Redesigned coil springs.
  - Redesigned shock absorber upper insulators.

NOTE: This change softens the harder ride caused by raising the tire pressure from 30 to 35 psi.

Front Shock Absorbers

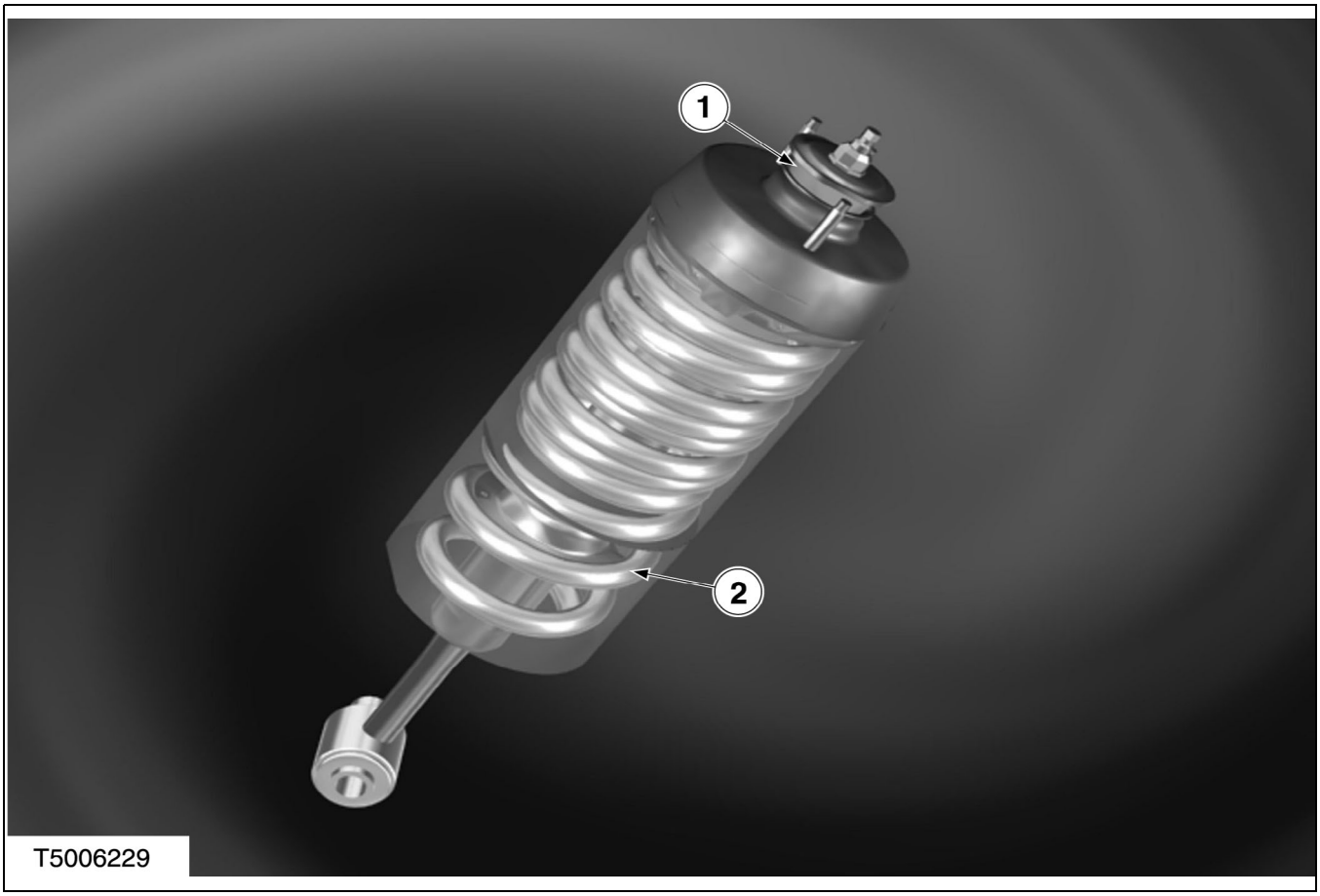


Front Shock Absorbers

The shock absorbers for the front suspension have been changed.

- The valving in the shocks have been changed from rod displaced valving to full displaced valving.
- The shocks lengths and attachment points for the suspension have not changed.
- The fasteners and their torques specifications are carry over.
- The lower spring seat is lowered 40mm (1.57 inches).
  - This change improves the package by lowering the stress on the spring.

Front Shock Absorber Upper Insulators And Coil Spring



Front Shock Absorber Upper Insulators And Coil Spring

Item	Description
1	Insulator

Item	Description
2	Coil Spring

The front shock absorber upper insulators have been improved.

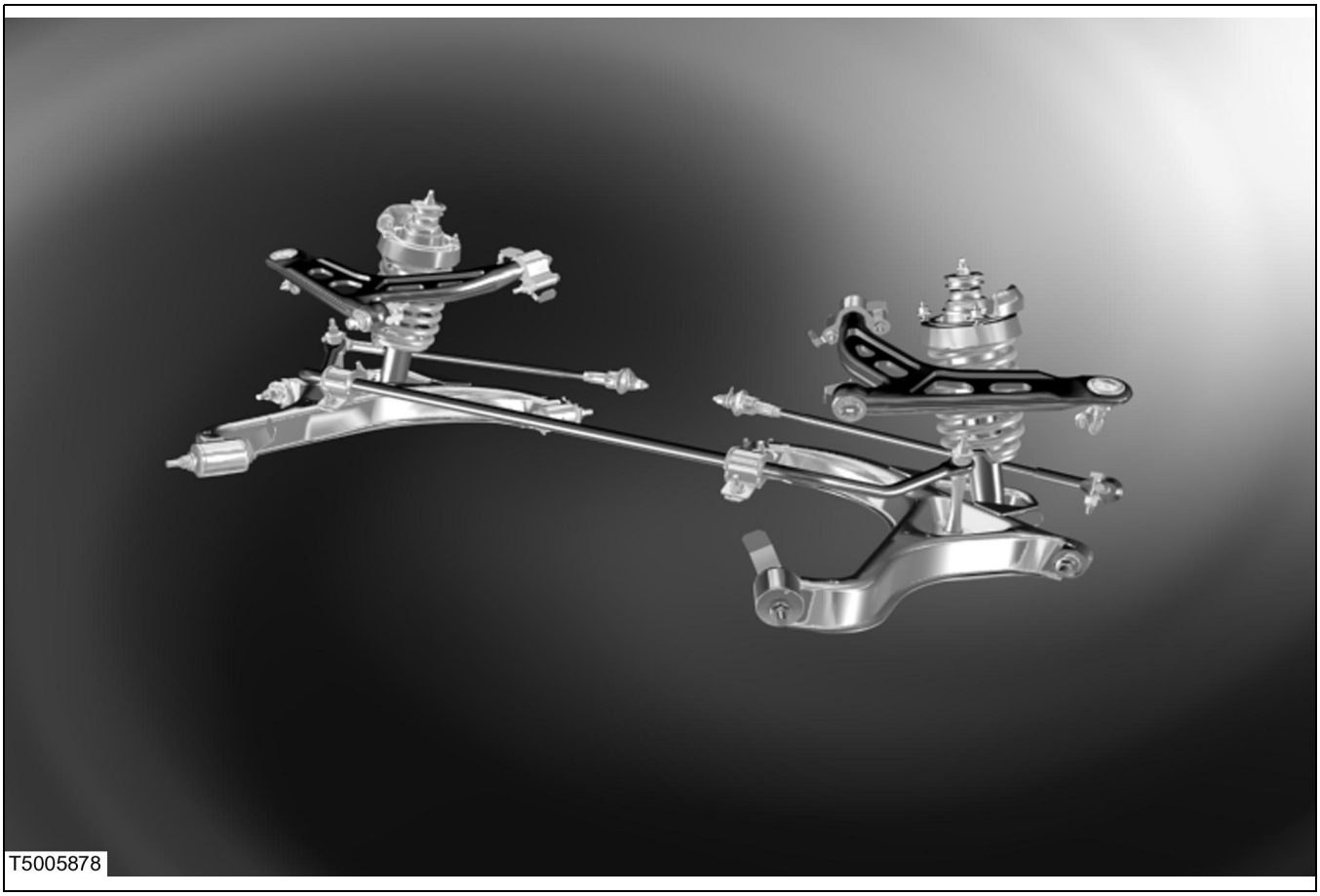
- The upper insulator thickness has been increased from 2mm to 10mm (0.08-0.39 inch).
- This design change was due to the spring seat change mentioned earlier.

The front coil springs are now taller.

- This design accomodates the previously mentioned changes.
- Spring rates remain unchanged from previous model years.

NOTE: The new springs will **not** fit older vehicles (and vice versa). The spring height is incompatible.

Rear Suspension

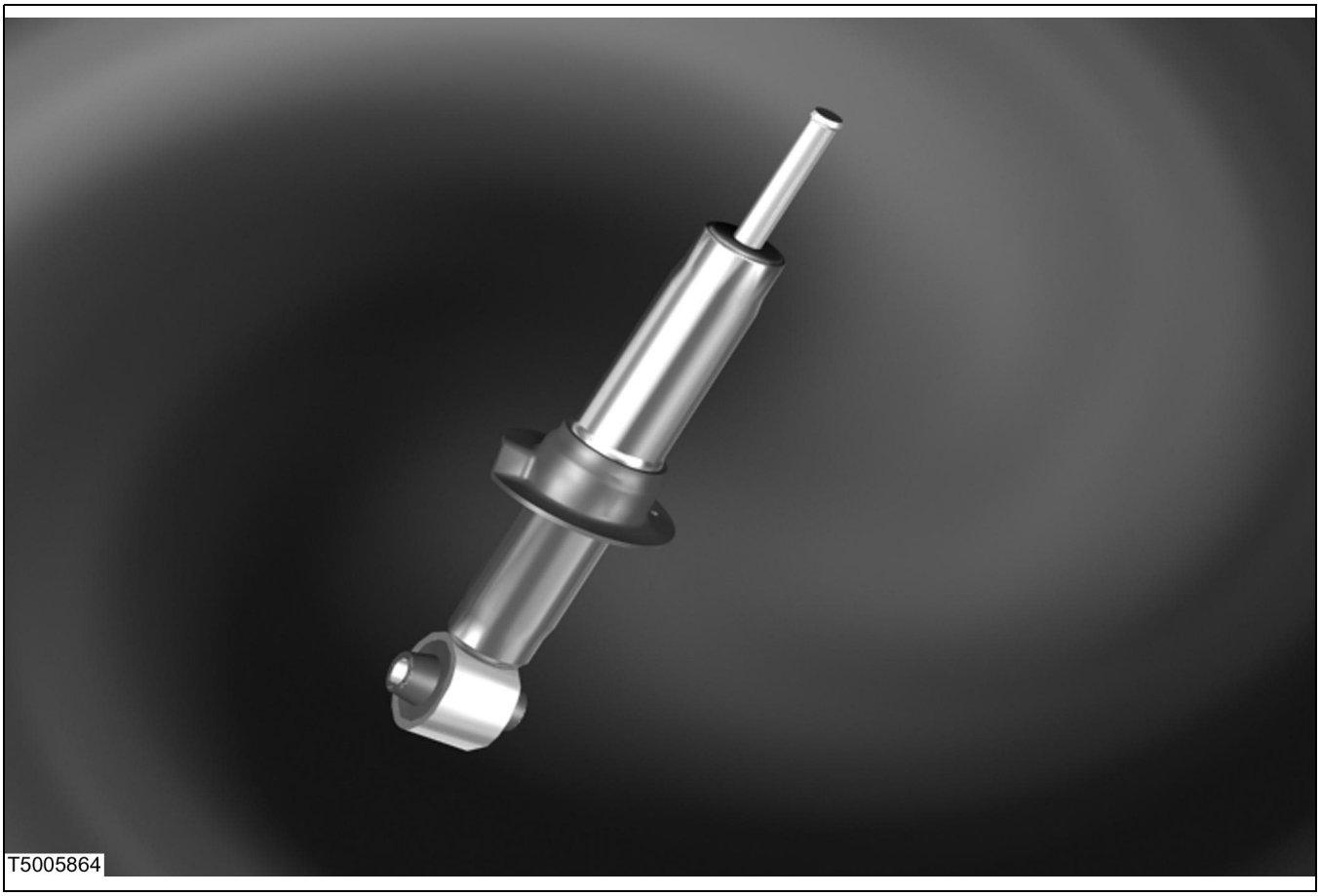


Rear Suspension

The rear suspension also features a coil spring-over-shock system. The major differences on the 2004 MY Explorer and Mountaineer rear suspension are:

- Redesigned shock absorbers.

Rear Shock Absorbers

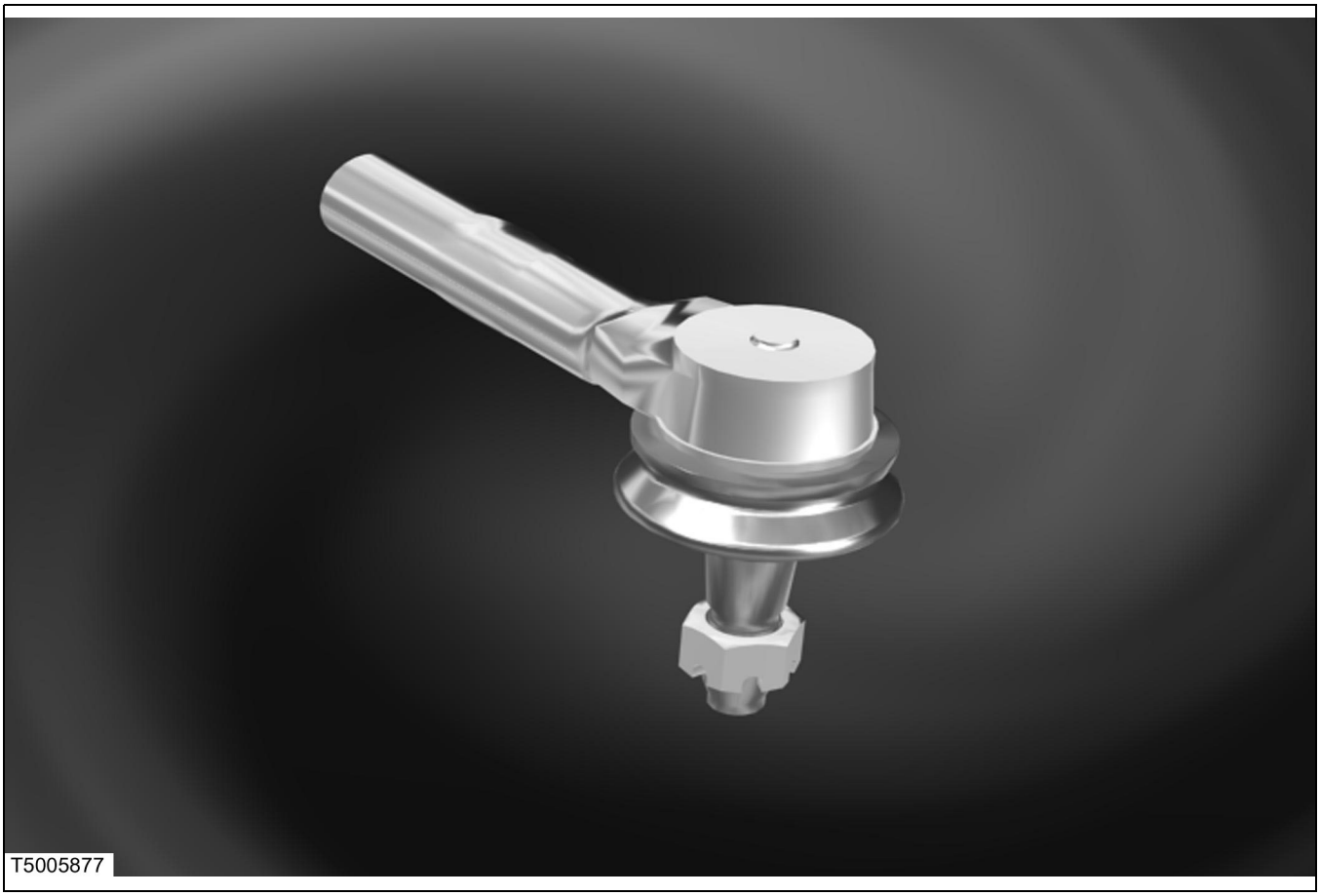


Rear Shock Absorbers

The shock absorbers for the rear suspension have been changed.

- The valving in the shocks have been changed from rod displaced valving to full displaced valving.
- The shocks lengths and attachment points for the suspension have not changed.
- The fasteners and their torques remain carry over.
- Spring height and rate is carryover.

Steering System

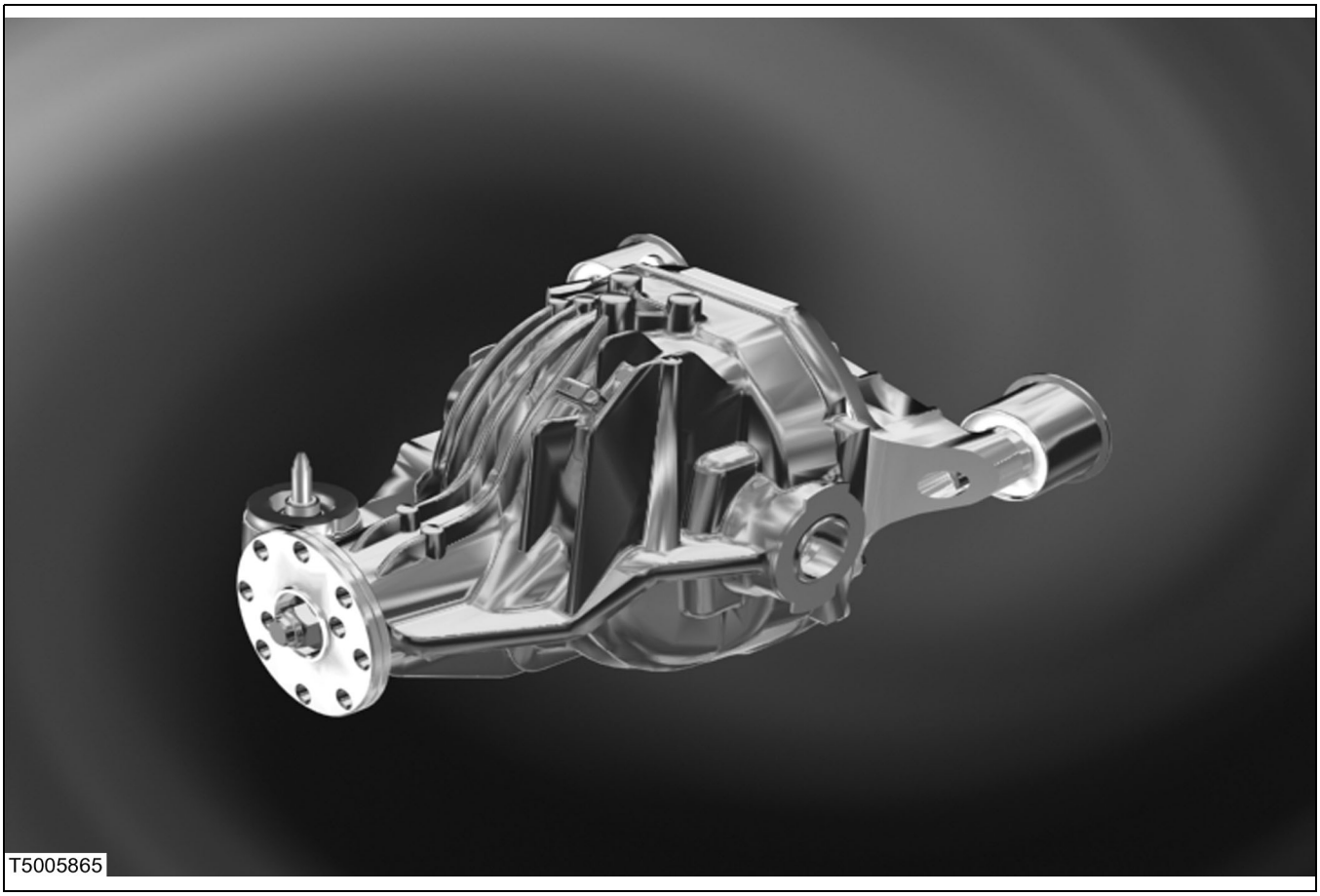


Outer Tie Rod Ends

The outer tie rod end was modified to improve steering feel.

- Overall length was increased by 4mm (0.157 inch)
  - Because of this change, it is important to service this component with the appropriate part number.

Driveline System

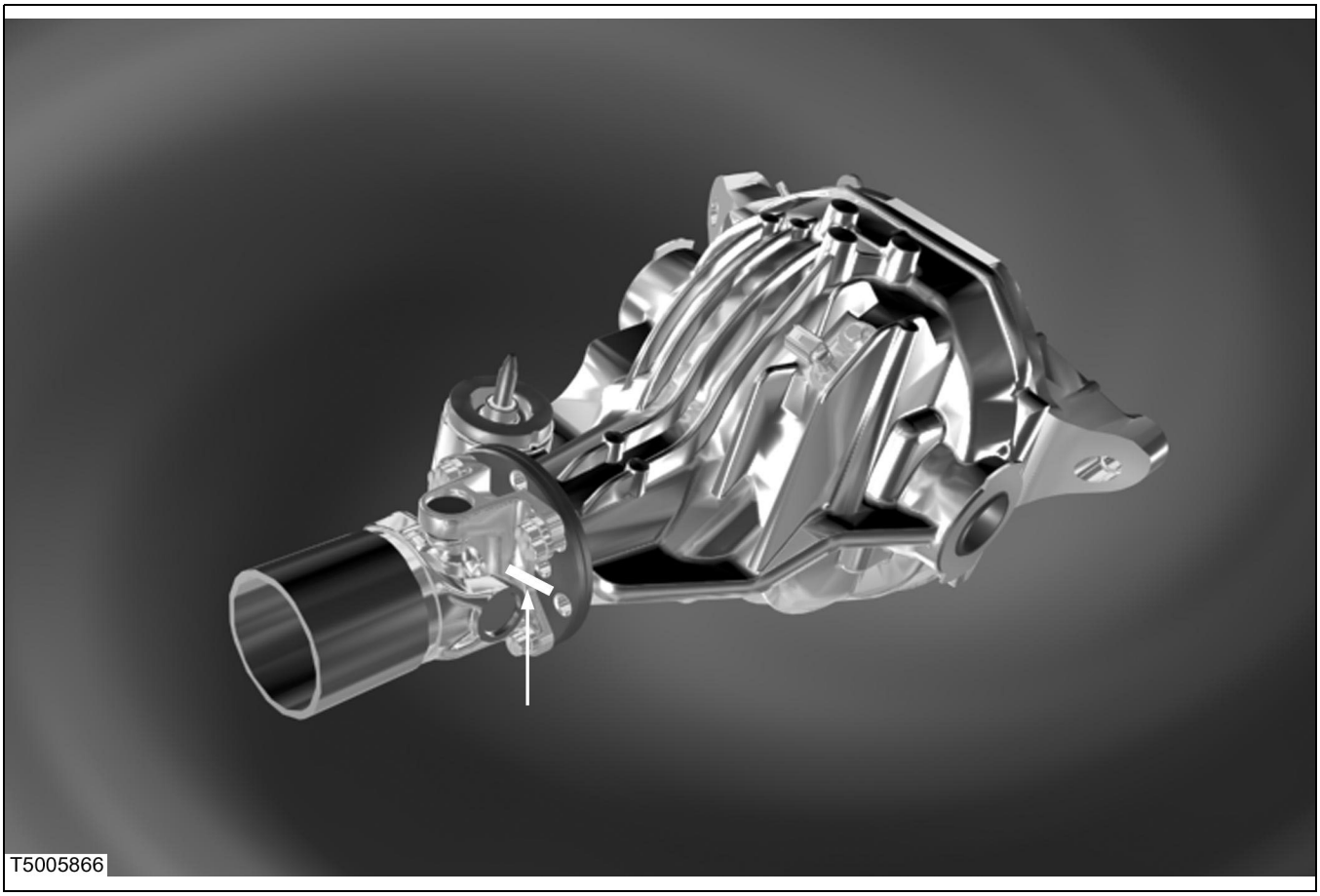


Rear Differential

The Explorer and Mountaineer driveline system is similar to that of the 2003 Aviator. It uses a Dana 30 front differential. The rear differential is an 8.8-inch Ford axle.

- Features of the driveline system include:
  - A 3.55 axle ratio on 2WD vehicles.
  - A 3.73 axle ratio on 4WD vehicles.
  - New bushings.

Driveline Indexing



Indexing the Rear of the Rear Driveshaft

Always index the driveshafts before removal to avoid creating a vibration. Indexing the Explorer and Mountaineer front and rear driveshafts is done using the same procedure as the 2003 MY Explorer and Mountaineer.

1. Put the vehicle in NEUTRAL and raise it on a hoist.
2. Index-mark the rear axle pinion flange to the driveshaft flange.
3. Index-mark the rear driveshaft and the extension housing. Before removing or reinstalling the driveshaft, make sure these marks are aligned. Do not allow the transmission output shaft to rotate before realignment. The purpose of this step is to maintain alignment between the yoke and output shaft.

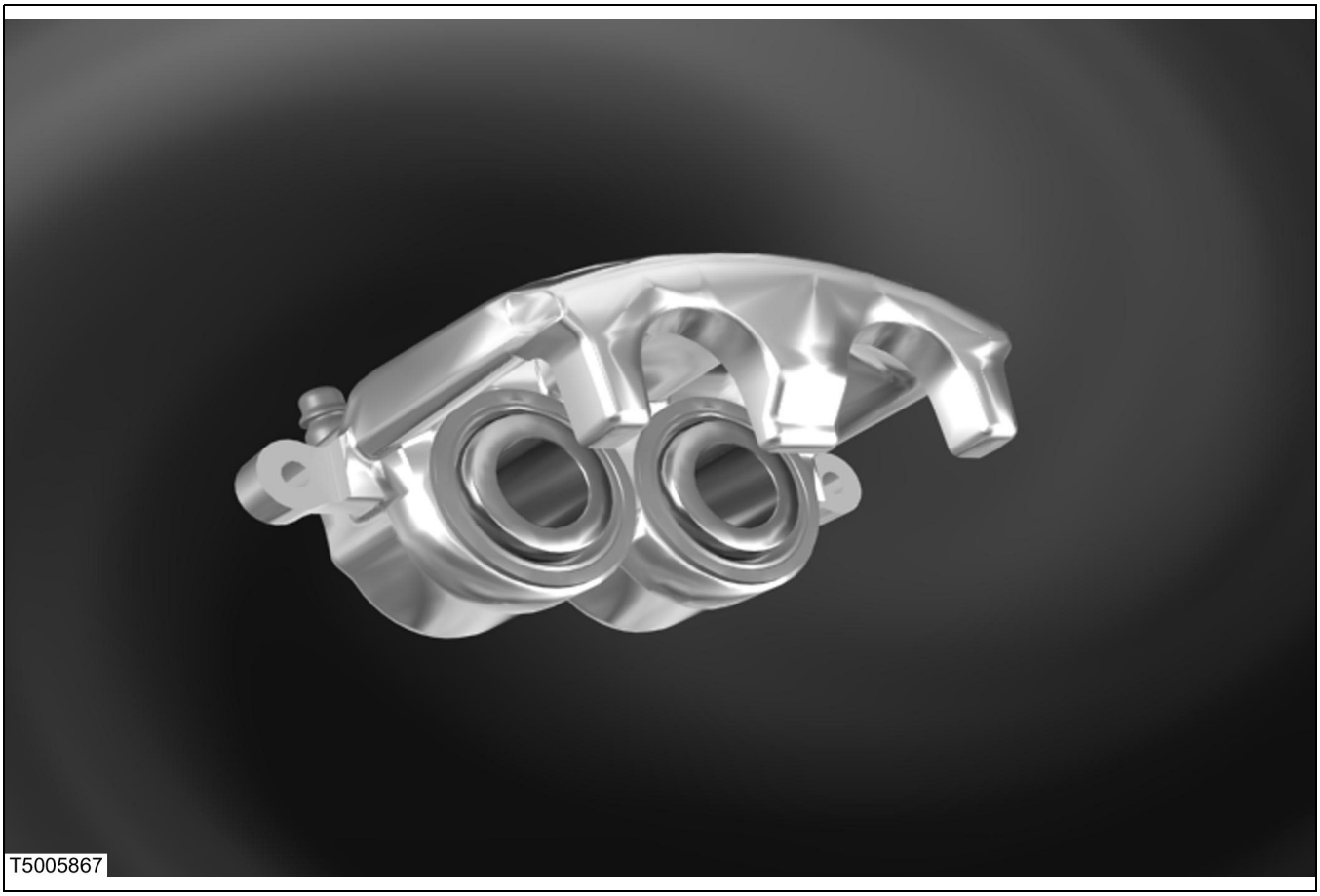
NOTE: Repeat the procedure for the front driveshaft.

Driveline System Lubricants

Refer to the chart for lubricants when servicing the Explorer and Mountaineer driveline.

Item	Specification
Front Axle	
Motorcraft SAE 80W-90 Premium Axle Lubricant XY-80W90-QL	WSP-M2C197-A
Rear Axle	
High Performance 75W-140 Rear Axle Lubricant XY-75W140-QL	WSL-M2C192-A
Driveshaft Slip Yoke	
Premium Long-Life Grease XG-1-C	ESA-M1C75-B

Brake/Stability Assist Systems

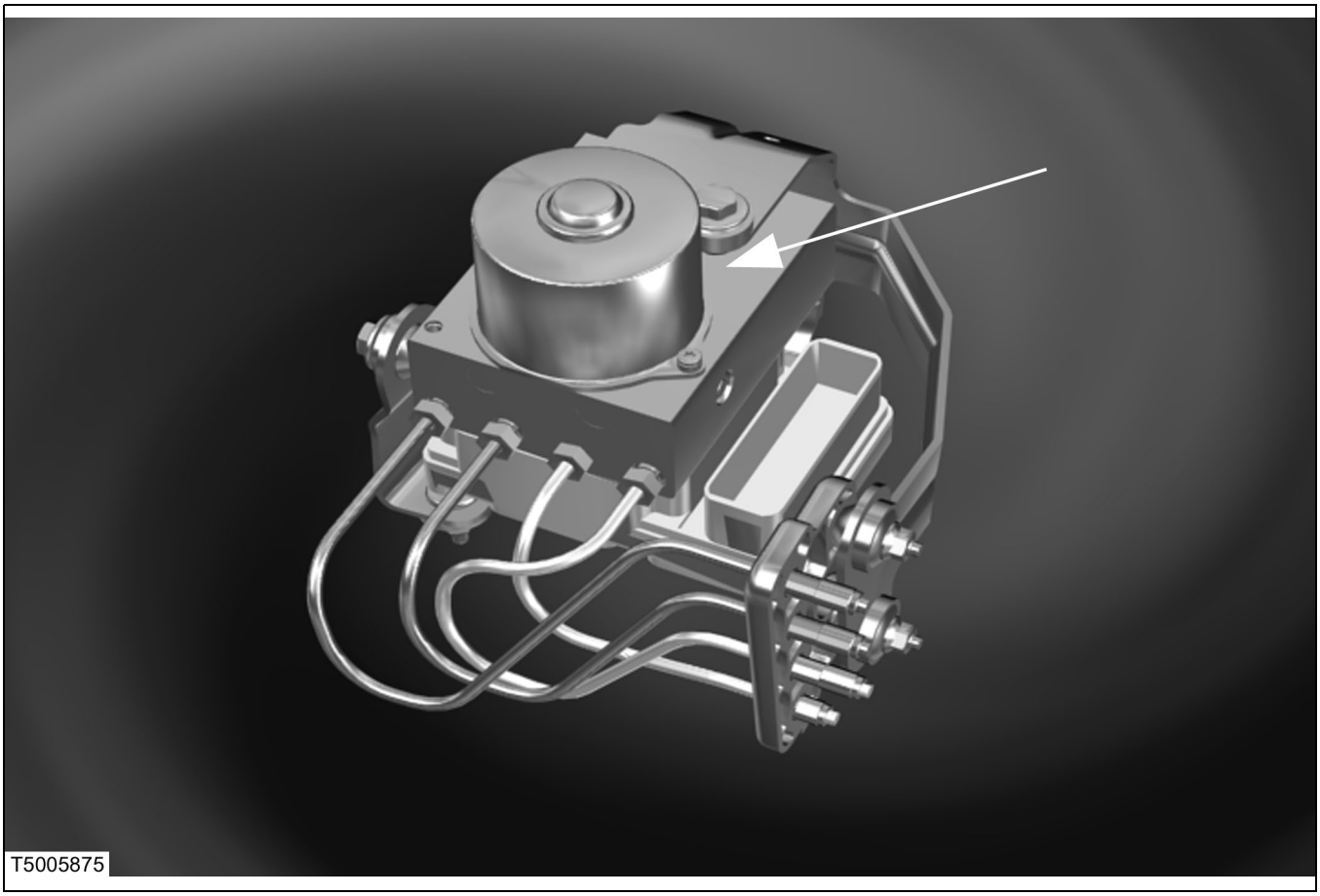


Dual Piston Caliper

The features of the base Explorer and Mountaineer brake system include:

- Dual-piston front calipers.
- Single-piston rear calipers.
- Drum-in-hat type rear disc brake.

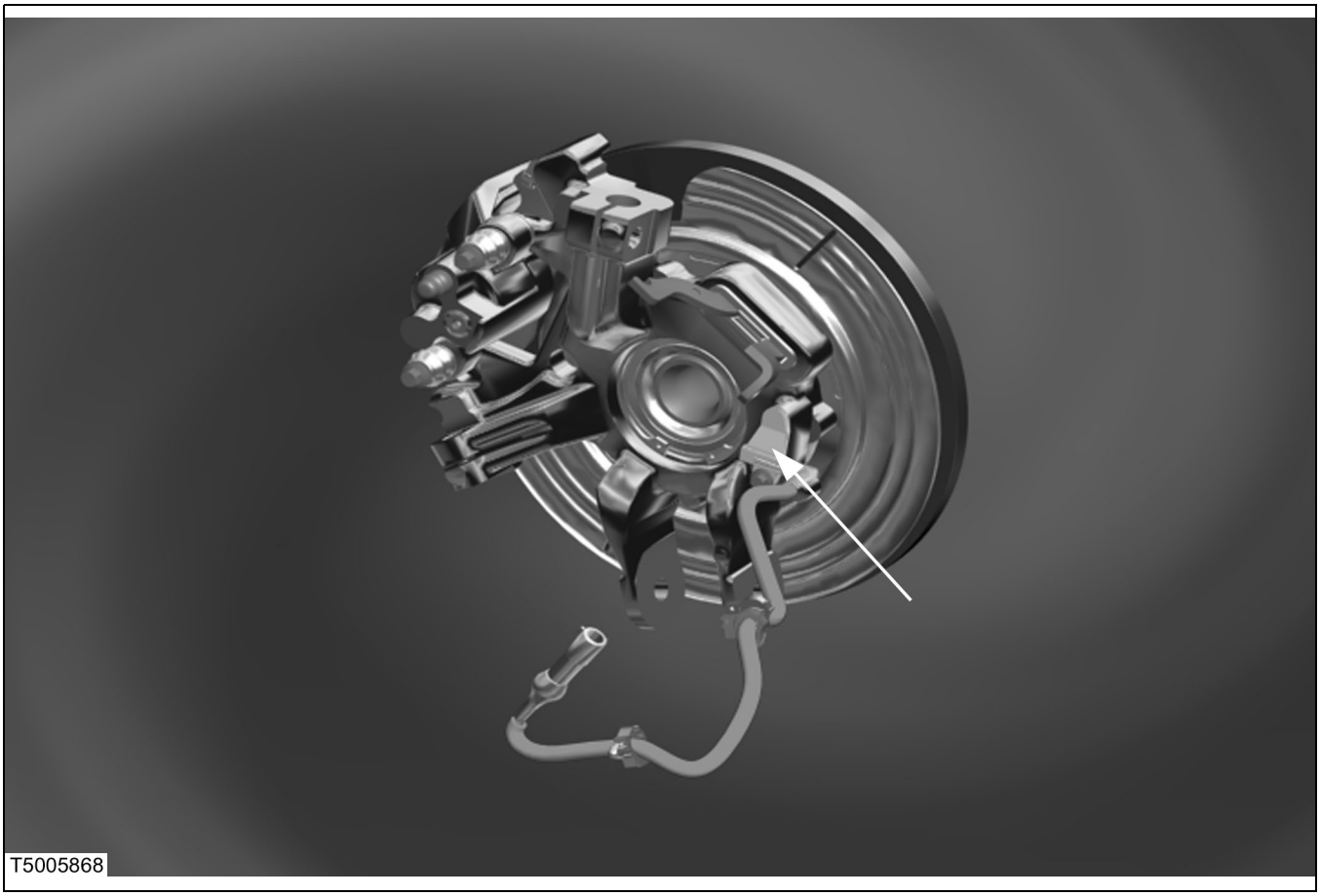
Electronic Brake Distribution (EBD)



Hydraulic Control Unit (HCU)

Electronic Brake Distribution (EBD) acts like an electronic proportioning valve to control rear brake pressure. When EBD is disabled, the amber ABS warning indicator and the red brake warning indicator illuminate.

Identifying 4-Channel and 3-Channel ABS Systems

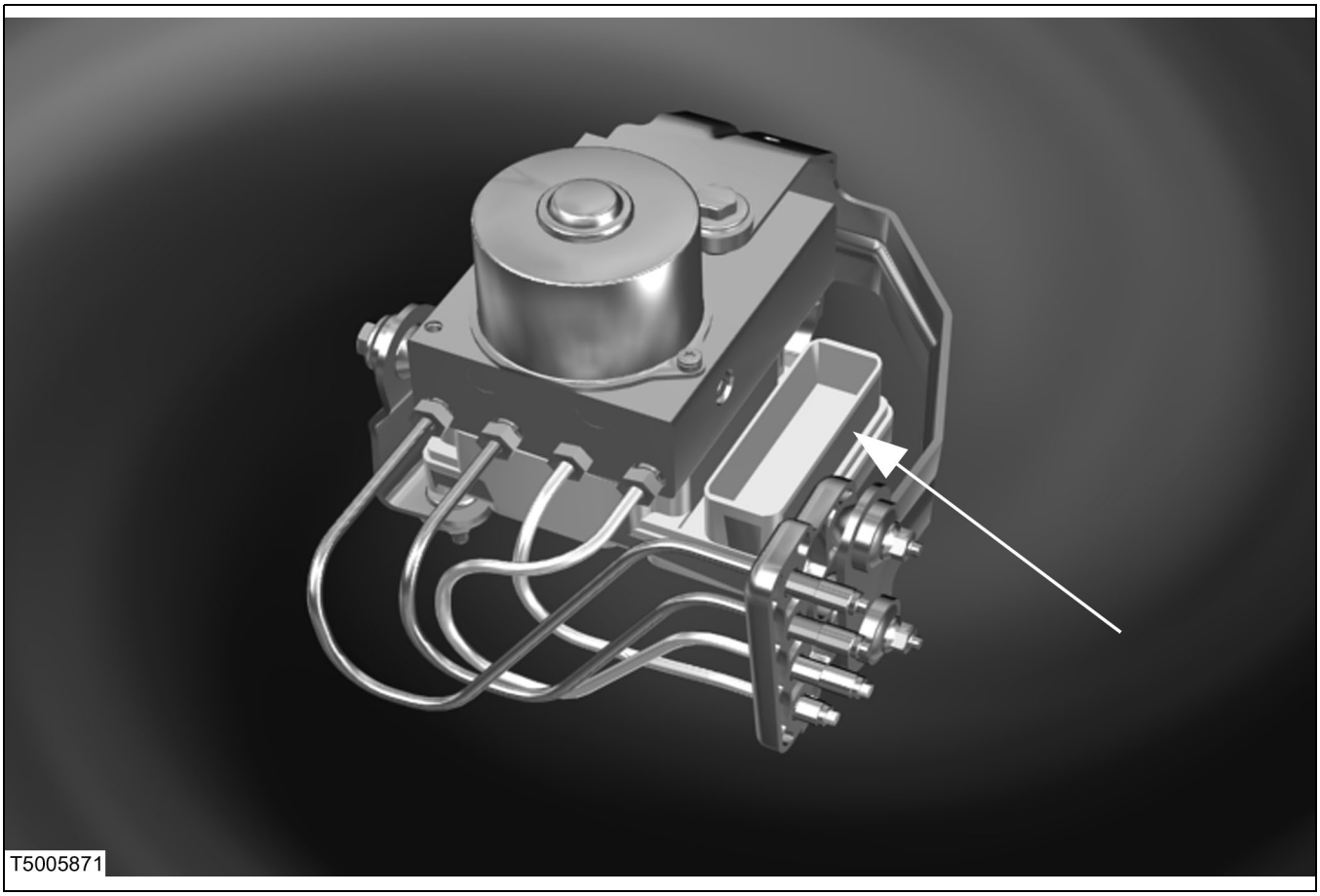


4-Channel Rear Speed Sensor

The Explorer and Mountaineer four-wheel disc brake system is available with two different ABS systems: a standard 3-channel system and an optional 4-channel system.

- The four-channel system is a requirement of stability assist/traction control.
- A vehicle equipped with a 3-channel system does not have stability assist/traction control.
- There are two ways to quickly identify the type of system with which the vehicle is equipped. First, look for the stability assist button on the center console. Second, look at the rear wheel speed sensor.
  - The four-channel system uses a wheel speed sensor on each half shaft.
  - The three-channel system retains the wheel speed sensor on the differential.
- A vehicle equipped with a 3-channel system does not have stability assist/traction control.

Stability Assist Module



Stability Assist Module

The stability assist module simultaneously manages the anti-lock braking, traction control and engine control systems to maintain vehicle control during deceleration and acceleration. The stability assist module signals the Hydraulic Control Unit (HCU) to open and close the appropriate solenoid valves when it detects:

- An impending wheel lock.
- Wheel spin.
- Vehicle motion that is inconsistent with the driver's commands by comparing the driver's steering input and brake application with the actual vehicle motion.

Normal Stability Assist System Characteristics

When the ignition switch is put in the RUN position, the stability assist module conducts a preliminary electrical check. Then at approximately 20 km/h (12 mph), the hydraulic pump motor turns on for about one-half second.

- Any malfunction of the anti-lock brake control system disables stability assist and illuminates the anti-lock brake warning indicator. The power-assist braking system, however, continues to function normally.
- When the system checks itself, a slight movement of the brake pedal can be felt. This test occurs above 48 km/h (30 mph) and can take up to eight minutes on a curvy road.
- The self-test runs if:
  - The vehicle is stable.
  - The driver is not braking.
  - The accelerator pedal is slightly depressed.
- After the self-test, the stability assist system is ready to activate when needed.
- When stability assist activates, the driver may experience any of the following:
  - A rumble or grinding sound much like ABS or traction control.
  - A small deceleration or a reduction in the acceleration of the vehicle.
  - The stability assist indicator will flash.
  - A vibration in the brake pedal, much like ABS.
- If the event is severe and the driver's foot is not on the brake, the brake pedal moves to apply higher brake forces. A ''whoosh'' sound can also be heard from under the instrument panel.

NOTE: The stability assist system activates only when the vehicle is traveling in a forward direction, not reverse. Stability assist can be turned off by the driver, but the ABS function cannot.

Traction Control

Traction control on vehicles equipped with a four-channel system operates in the following manner:

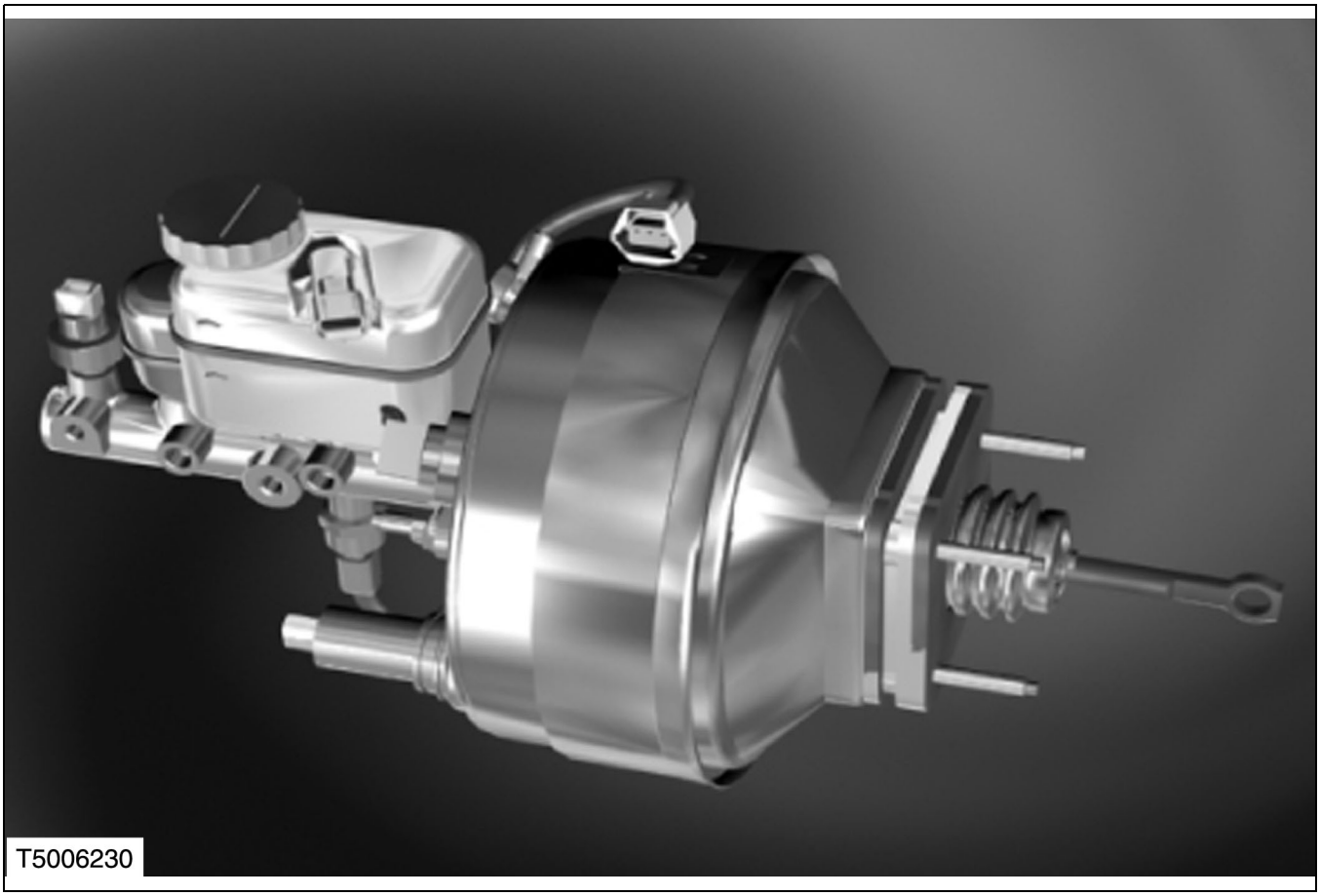
- At speeds under 100 km/h (62 mph), when a drive wheel looses traction, the stability assist module/ECU signals the PCM to reduce engine torque, while simultaneously applying and releasing the appropriate brake caliper(s) to maintain traction. The PCM reduces torque by changing ignition timing, reducing fuel injector pulses or closing the throttle via the Electronic Throttle Body (ETB).
- After the vehicle speed exceeds 100 km/h (62 mph), traction control is accomplished only through PCM torque control

Quick Assist Braking (With Stability Assist)

The Explorer and Mountaineer use a software program called Quick Assist to provide a faster introduction of brake boost during emergency stops. Components of the standard vacuum assist work with the Pedal Travel Sensor (PTS), brake pressure transducers, active booster solenoid and release switch to accomplish this function.

- The release switch is located in the power brake booster. The stability assist module receives a signal from the release switch that an emergency braking application has terminated. The stability assist module de-energizes the active booster solenoid, and maximum brake assist is turned off. The active booster solenoid valve is located in the power brake booster. The active booster solenoid valve admits atmospheric pressure to the driver side of the booster chamber to enable maximum brake assist when Quick Assist is activated. The stability assist module actuates the active booster solenoid valve.

Active Booster



Active Booster

Quick assist includes the following unique components:

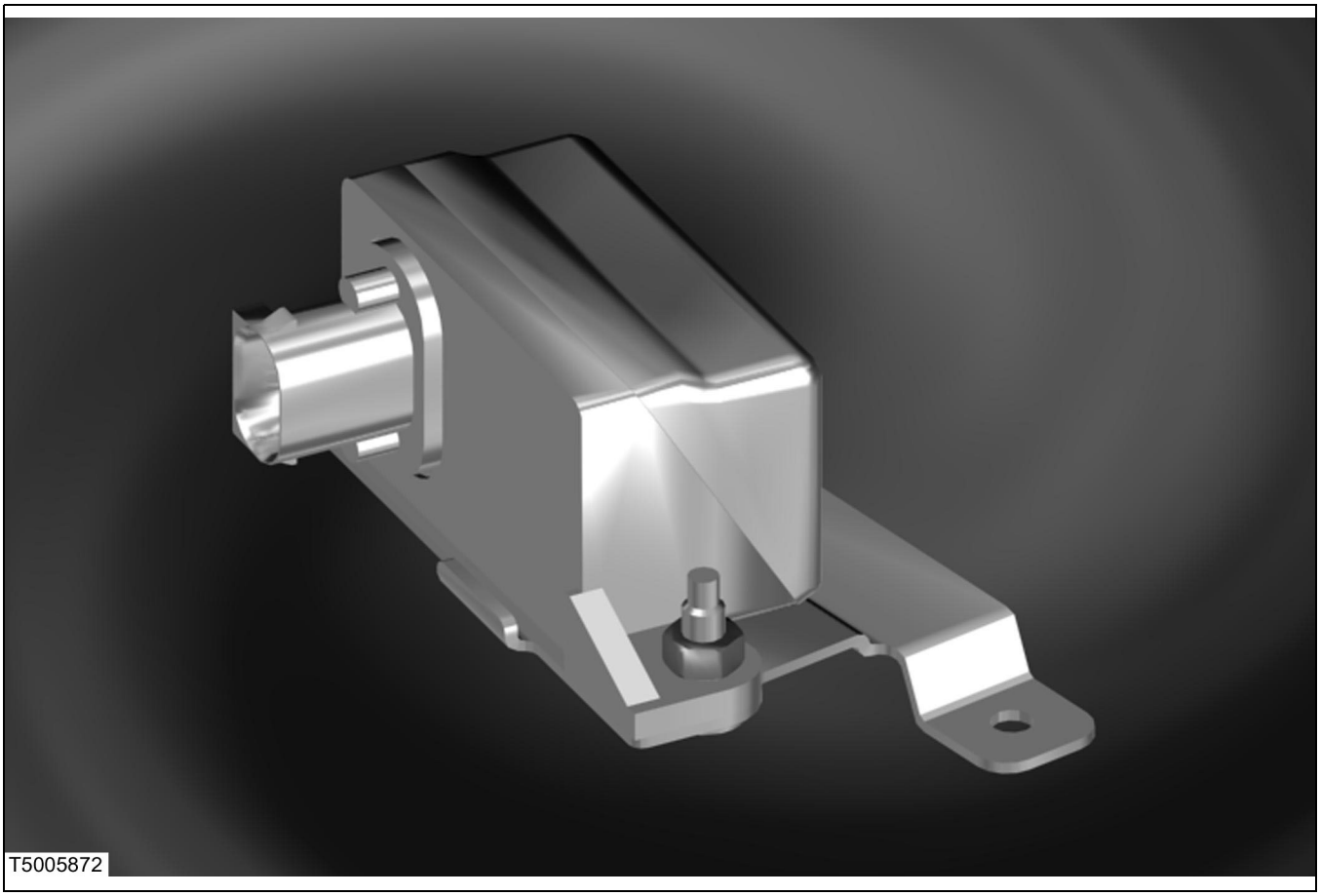
- New tandem dual-port stability assist master cylinder with pressure transducers.
- Active brake booster with integral solenoid and a brake booster release switch

The main components of the active brake booster operate in the same way as any conventional brake booster. What makes the active brake booster unique is that it can be activated by the stability assist module using the active booster solenoid. This occurs when the assist module is correcting driver inputs to maintain stability or when cold weather prevents the hydraulic control unit from quickly drawing brake fluid from the reservoir.

When the brake pedal is depressed, the release switch transmits signals to the module. The module then actuates the brake booster by:

- Applying current to the solenoid to open the air valve and create force.
- Decreasing current to the solenoid to close the air valve and reduce output force.
- The brake pedal is pulled forward as the master cylinder piston moves when the stability assist module is activating the brake booster.

Stability Assist Sensors



Yaw/Lateral/Longitudinal Accelerometer Sensor

The stability assist module uses data from the following sensors to help the vehicle driver maintain directional stability:

- The Yaw/Lateral/Longitudinal Accelerometer Sensor includes the following sensors in one location that measures:
  - Yaw rate.
  - Lateral acceleration.
  - Longitudinal acceleration.

Yaw Rate Sensor

The yaw rate sensor measures the relative vehicle motion around the vertical axis through its center of gravity. In other words, it tells the stability assist module if the vehicle is oversteering.

Lateral Accelerometer

The lateral accelerometer measures the acceleration as the vehicle slides sideways and is incorporated into the same unit as the yaw rate sensor. The lateral accelerometer will measure some lateral acceleration due to gravity, if the vehicle is parked sideways on a slope, even though the vehicle is not moving.

Longitudinal Accelerometer (4WD Vehicles)

The longitudinal accelerometer measures the acceleration when the vehicle moves forward and rearward along the centerline of the vehicle's front and rear wheels.

Location

These sensors are located under the carpet, below the right rear passenger seat.

Additional Sensors

In addition to the yaw, lateral, longitudinal sensor cluster, the ABS/traction control/stability control systems use the following sensors:

- Brake Pedal Position (BPP) sensor
- Primary brake pressure sensor
- Secondary brake pressure sensor
- Brake Pedal Position (BPP) sensor
- Wheel Speed Sensor (WSS)
  - Three sensors (without stability assist)
  - Four sensors (with stability assist)

Stability Assist System Calibration/Configuration

The stability assist module must be calibrated/configured whenever a component specific to the stability assist system is disconnected or a new component is installed.

- An active/fail lamp flashing may also indicate that the stability assist module needs calibration/configuration.
- If a DTC is logged for any component of the stability assist system, the DTC must be cleared before carrying out the recalibration procedure.
- If a DTC is retrieved after recalibration, refer to the Anti-Lock Brake System (ABS) Module Diagnostic Trouble Code (DTC) Index.
- If installing a new stability assist module, the calibration procedures as well as the configuration procedure must be carried out. For additional information regarding the module configuration and calibration, follow the diagnostic tool directions for the calibration procedure.
- A diagnostic scan tool is used to calibrate the lateral accelerometer, longitudinal accelerometer, yaw rate sensor active brake booster learn cycle and steering wheel rotation sensor calibration. Before starting the procedure:

1. Position the vehicle on a level surface.
2. Chock the wheels to prevent the vehicle from moving.
3. Connect the diagnostic scan tool to the Data Link Connector (DLC) and follow the on-screen instructions to navigate and perform the stability assist calibration feature.
4. Use the diagnostic scan tool to calibrate.

The stability assist system calibration/configuration includes calibrating/configurating the module and sensors.

Stability Assist Calibration Codes

DTC	Description
C1277	Steering wheel angle 1 and 2 circuit failure
C1278	Steering wheel angle 1 and 2 signal fault
C1279	Yaw rate sensor circuit failure
C1280	Yaw rate sensor signal fault
C1281	Lateral accelerometer circuit failure
C1282	Lateral accelerometer signal fault
C1285	Booster solenoid circuit failure
C1287	Booster pedal force switch circuit failure
C1288	Pressure transducer main/primary input circuit failure
C1730	Reference voltage out of range (+5 V)
C1960	Driver brake apply circuit failure
C1963	Stability control inhibit warning
C1440	ABS Pressure Transducer Input Circuit Failure
C1991	Module Calibration Failure
C1996	Active Yaw Control Disabled
C1998	Module Calibration Not Complete
C2769	ABS Longitudinal Acceleration Sensor Circuit
C2770	Longitudinal Acceleration Sensor Signal
C2777	Sensor Cluster Bus Failure
C2778	Sensor Cluster Power Supply Failure

If any of the DTCs listed above is present, clear all DTCs before calibrating the stability assist module. After clearing the DTCs indicated on the stability assist calibration list, the lamp will flash. If a DTC is retrieved after calibration, refer to the stability assist Module DTC Index in the Workshop Manual.

Diagnostic Trouble Codes

The following two pages list the DTCs associated with the stability assist feature.

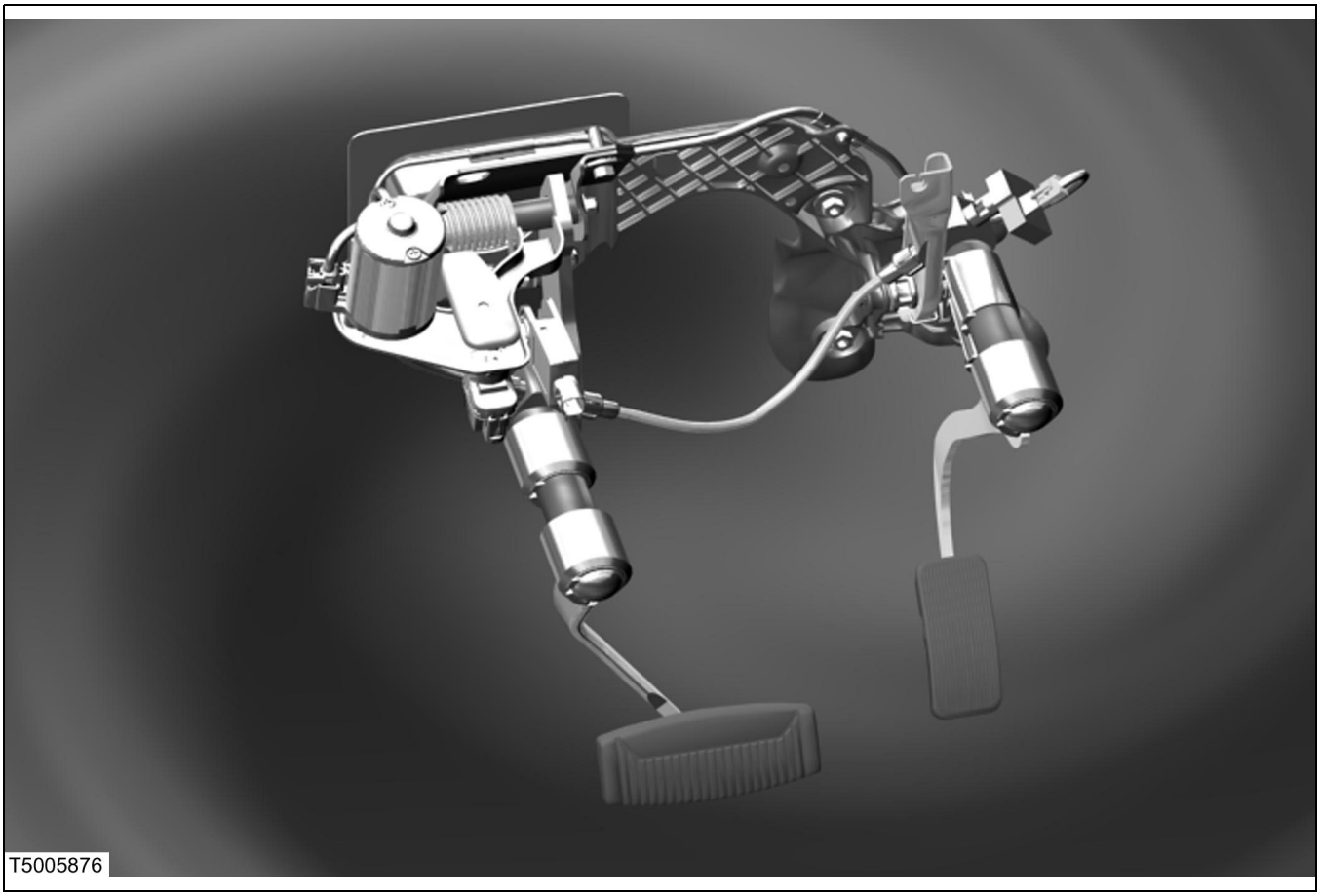
DTC	Description
B1342	ECU is defective
B1483	Brake pedal input circuit failure
B1676	Battery pack voltage out of range
B2477	Module configuration failure
B2734	Pedal travel sensor (PTS) supply error
B2736	Pedal travel sensor (PTS) circuit failure
B2737	Pedal travel sensor (PTS) jammed error
B2738/B2740	Pedal travel sensor (PTS) spike error
B2741	Sensor cluster loop end
B2900	VIN mismatched
C1095	ABS hydraulic pump motor circuit failure
C1145	Speed wheel sensor RF input circuit failure
C1155	Speed wheel sensor LF input circuit failure
C1165	Speed wheel sensor RR input circuit failure
C1175	Speed wheel sensor LR input circuit failure
C1233	Speed wheel sensor LF input signal missing
C1234	Speed wheel sensor RF input signal missing
C1235	Speed wheel sensor RR input signal missing
C1236	Speed wheel sensor LR input signal missing
C1277	Steering wheel angle 1 and 2 circuit failure
C1278	Steering wheel angle 1 and 2 signal fault
C1279	Yaw rate sensor circuit failure
C1280	Yaw rate sensor signal fault
C1281	Lateral accelerometer circuit failure
C1282	Lateral accelerometer signal fault
C1285	Booster solenoid circuit failure
C1287	Booster pedal force switch circuit failure
C1288	Pressure transducer main/primary input circuit failure

The following is a continuation of the DTCs associated with the stability assist feature.

DTC	Description
C1440	Pressure transducer main/primary input signal faulted
C1516	Roll rate sensor signal fault
C1517	Roll rate sensor circuit failure
C1730	Reference voltage out of range (+5 V)
C1805	Mismatched PCM and/or stability assist module
C1960	Driver brake apply circuit failure
C1963	Stability control inhibit warning
C1991	Module calibration failure (checksum failure)
C1996	Active yaw and roll stability control disabled
C1998	Module calibration not complete
C2769	Longitudinal Acceleration sensor electrical failure
C2770	Longitudinal Acceleration sensor plausibility failure
C2777	Sensor cluster bus failure
C2778	Power supply failure
U1900	CAN network No. 1 communication BUS fault-receive error
U1901	CAN network No. 2 communication BUS fault-receive error
U2023	Fault received from external node

NOTE: DTC C1730 Reference voltage out of range must be repaired before DTC C1279, C1280, C1281, C1282 and C1288.

Adjustable Pedals



Adjustable Pedals

For added driver comfort, the Explorer and Mountaineer may be equipped with optional power adjustable pedals. The memory feature remembers the pedal positions for three different drivers.

- The adjustable pedal system includes the following components:
  - Adjustable pedals
  - Adjustable pedal motor (serviced separately)
  - Adjustable pedal cable (serviced separately)
  - Pedal position sensor
  - Memory features
  - Switch
  - Driver seat module

NOTE: Before removing any adjustable brake pedal components, the adjustable pedals must be positioned completely forward or completely rearward.

OBJECTIVES

- Identify new features of the engine systems.
- Identify new features of the powertrain control-engine performance systems.
- Identify new features of the fuel systems.
- Identify new features of the automatic transmission - 5R55S.

Engine

LEV I Defined

Starting in the northeastern states in the 2000 model year and nationally in 2001, new cars and light light-duty trucks must meet tailpipe standards that are more stringent than EPA can mandate prior to model year 2004. These standards will be enforceable in the same manner as any other federal new motor vehicle program. National LEV will reduce air pollution nationwide, harmonize federal and California motor vehicle standards to reduce manufacturers design and testing costs, avoid a patchwork of state regulatory requirements, and achieve emission reductions in the northeast equivalent to or better than would be achieved if each northeastern state adopted the California Low Emission Vehicle program. Although it originated as a way to help the northeastern states address their smog problems, National LEV will have public health and environmental benefits nationwide.

LEV II Defined

The California Air Resources Board (ARB) approved a package of new automobile emission standards known as Low Emission Vehicle II (LEV II). The regulations will run from 2004 through 2010. Among other standards, the regulatory package requires most mini vans, pickup trucks and sport utility vehicles (SUVs) to reduce emissions to passenger car levels by 2007. These vehicles currently certify to a less stringent medium-duty vehicle category standard. Since the emission standards are expressed in grams of pollutants emitted from the vehicle per mile, the light trucks and SUVs will have to be actually cleaner than cars if emissions are compared relative to the engine power output. Other requirements in the LEV II package include:

- An extension and tightening of the fleet average standards requiring automakers to reduce fleet emission levels each year through 2010. A ‘‘fleet’’ includes all new vehicles an automaker sells each year in California.
- Significantly lower oxides of nitrogen (the main contributor to smog) standards for low and ultra-low emission vehicles; a reduction of 75 percent from current LEV standards.
- Increased emission control durability standards, from 100,000 miles to 120,000 miles, for all passenger cars and other vehicles up to 8500 pounds gross vehicle weight.
- Further reduction in evaporative emissions from hoses, gas lines, and valves.
- Creation of partial zero-emission vehicle (ZEV) credits for vehicles that achieve near-zero emissions, such as hybrids, fuel cells and cars meeting the new super ultra low emission vehicle (SULEV) standard.

4.0L SOHC V-6 Engine



4.0L SOHC V-6 Engine

The Explorer and Mountaineer can be equipped with a 4.0-liter, SOHC, V-6 engine with:

- 210 hp and 254 lb-ft of torque.

To meet U.S. government LEV I emission requirements and to accomodate new features, many components of the 4.0L SOHC V6 have been modified. These include:

- All evaporative emission hoses and fittings.
  - The lines and connections use quick connect ends.
  - The lines and connections are constructed of a non-permeable material.
  - This design allow this vehicle to meet LEV I evaporative emission standard.

The materials used for the following seals and gaskets have improved materials to minimize the level of evaporative emission permeation.

- The intake manifold and gasket.
- The oil filter-to-cylinder block gasket.
- The camshaft position sensor O-ring.

4.6L 2V V-8 Engine



4.6L 2V V-8 Engine

The Explorer and Mountaineer can be equipped with a 4.6-liter 2V V-8 engine with:

- 239 horsepower and 282 ft-lb of torque.

To meet U.S. government LEV II emission requirements and to accomodate new features, many components of the 4.6L 2V V8 have been modified. These include:

- All evaporative emission hoses and fittings:
  - Use quick connect ends for lines and connections.
  - Are constructed of a non-permeable material.
  - Meet LEV II evaporative emission standards.
- The cylinder block.
  - Sealing surfaces have been improved for a more positive seal.

- The cylinder bore finish, taper and roundness tolerances:
  - Improve and increase the longevity of the piston ring-to-cylinder wall seal.
  - Assist in the reduction in engine oil consumption.
  - Improve the life of the catalytic converter substrate to meet LEV II requirements for the full useful life of the vehicle.
- The oil drainback design:
  - Internal passage modifications improve oil drainback.
  - Reduces the volume of oil that remains in the upper end of the engine.

The materials used for the following seals and gaskets have improved materials to minimize the level of evaporative emission permeation:

- Intake manifold.
- Upper-to-lower intake manifold gasket.
- Intake manifold-to-cylinder head gasket.
- Throttle body-to-intake manifold gasket.
- Oil filter-to-cylinder block gasket.
- Oil adaptor and bolt seal.
- Dipstick O-ring.
- Dipstick tube O-ring.
- Oil pan gasket.
- Camshaft Position (CMP) Sensor O-ring.

Coolant

The Explorer and Mountaineer cooling systems use premium gold coolant. Motorcraft Premium Gold Engine Coolant:

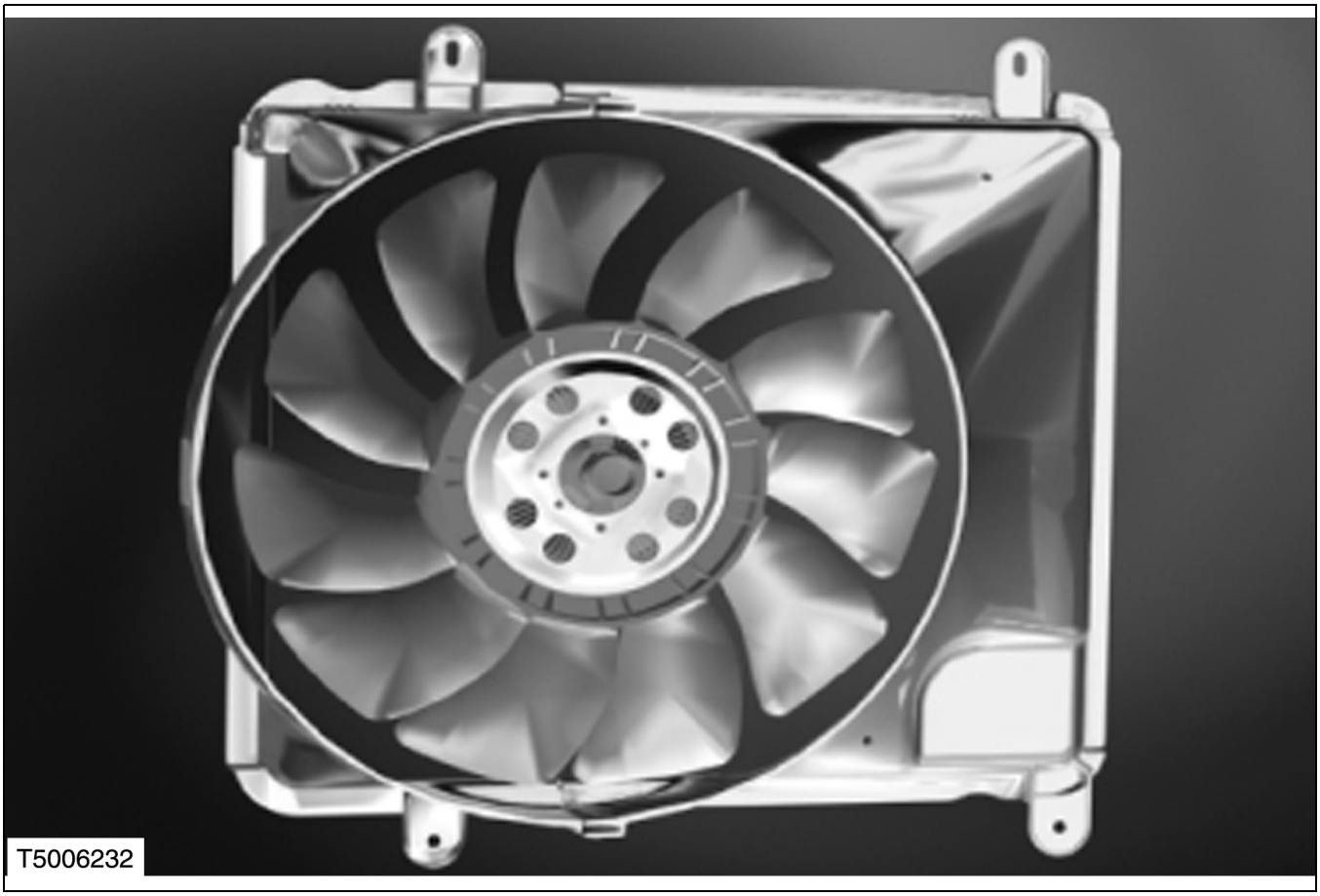
- Provides a 5-year/100,000-mile life for initial fill.
- Loses its long life if mixed with conventional coolant.
- Is ethylene glycol based, similar to conventional green coolant.
- Unlike conventional coolant, contains nitrites, a single organic acid, and no phosphates.
- Is not compatable with orange Organic Acid Technology (OAT) coolant.

Always use Ford-specified coolants and chemicals when servicing the Explorer and Mountaineer cooling system. The following table details the specifications for the hybrid cooling system.

Cooling System Specification Table

Item	Specifications
Coolant Capacity	18.6 L (4.9 gallons)
Coolant Types	
Motorcraft Premium Gold Engine Coolant VC-7B or equivalent	WSS-M97B51-A1
Radiator Cap Pressure Test	89-124 kPa (13-18 psi)
Thermostat Opening Temperature	
Starts to open	86.7-90.6°C (190°F)
Fully open	105°C (210°F)

Fan And Shroud Assembly

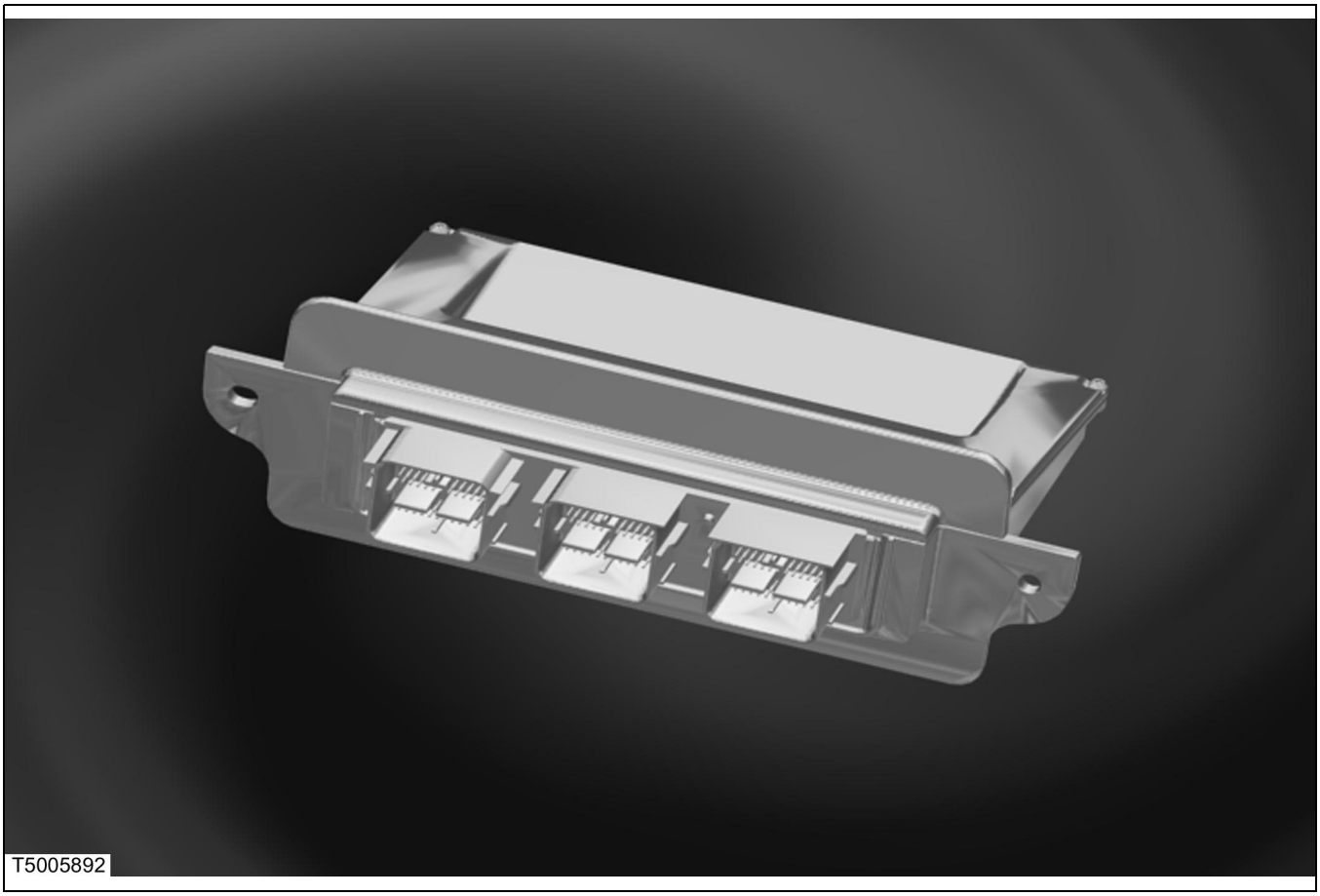


Fan And Shroud Assembly (4.6L Shown)

The mechanically driven fan measures 493mm (19.4 inches) vs. 457mm (18 inches) for the 2003 models.

- The size was increased to improve A/C performance.
- All hardware and torque specifications are carryover.
- Shroud is serviced in two halves (left and right).

Powertrain Controls - Engine Performance

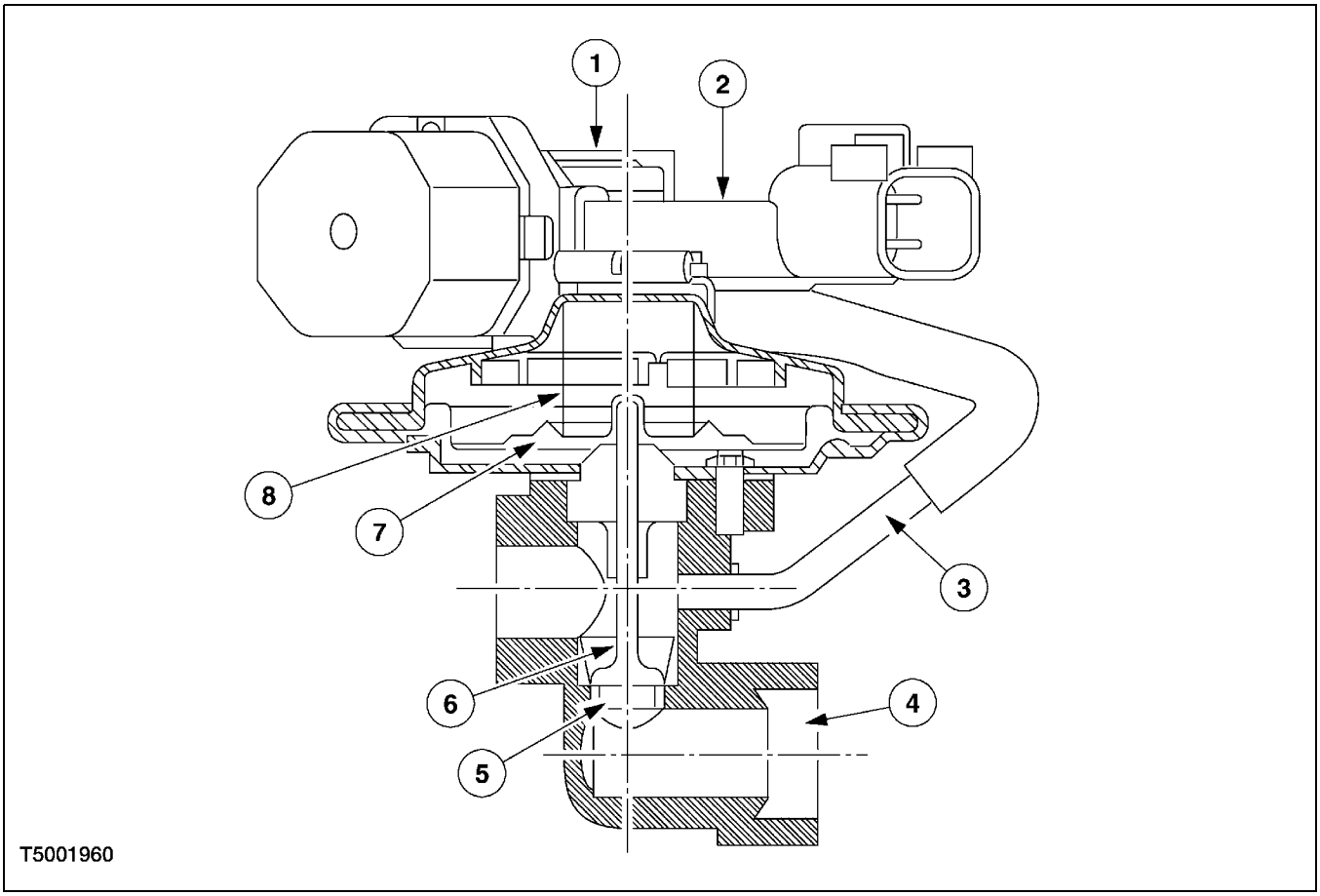


PCM 150-Pin Connector

The 2004 Explorer and Mountaineer use one of two different PCM configurations (depending on engine size and fuel system type).

- The 4.0L gas and FFV equipped vehicles use a Black Oak Power PC (PPC) style PCM.
- The 4.6L equipped vehicles use a Spanish Oak PPC style PCM.
  - This style of PCM utilizes 150 pins instead of the more common 104-pin PCM.
  - This style of PCM is similar to the PCM used in the 2003 Ford Thunderbird and Lincoln LS.
  - Since there is no breakout box for both PCMs, be sure to use a DVOM and flex probes for diagnostic electrical checks.
- All 4.0L Flex Fuel Vehicle (FFV) vehicles use a Powertrain Electronic Control (PTEC)-style PCM.
- Both PCMs are located below the instrument panel under the right side A-pillar lower cowl panel.
- The connector is now a lever-type, quick-connect design, similar to the style used on F-150 and Ranger.

Exhaust Gas Recirculation System Module (ESM EGR)



EGR System Module Components

Item	Description
1	EVR
2	DP and MAP transducer
3	Upstream DP pick-up port
4	Exhaust flow direction

Item	Description
5	Valve seat
6	Pin/pintle
7	Diaphragm
8	EGR spring

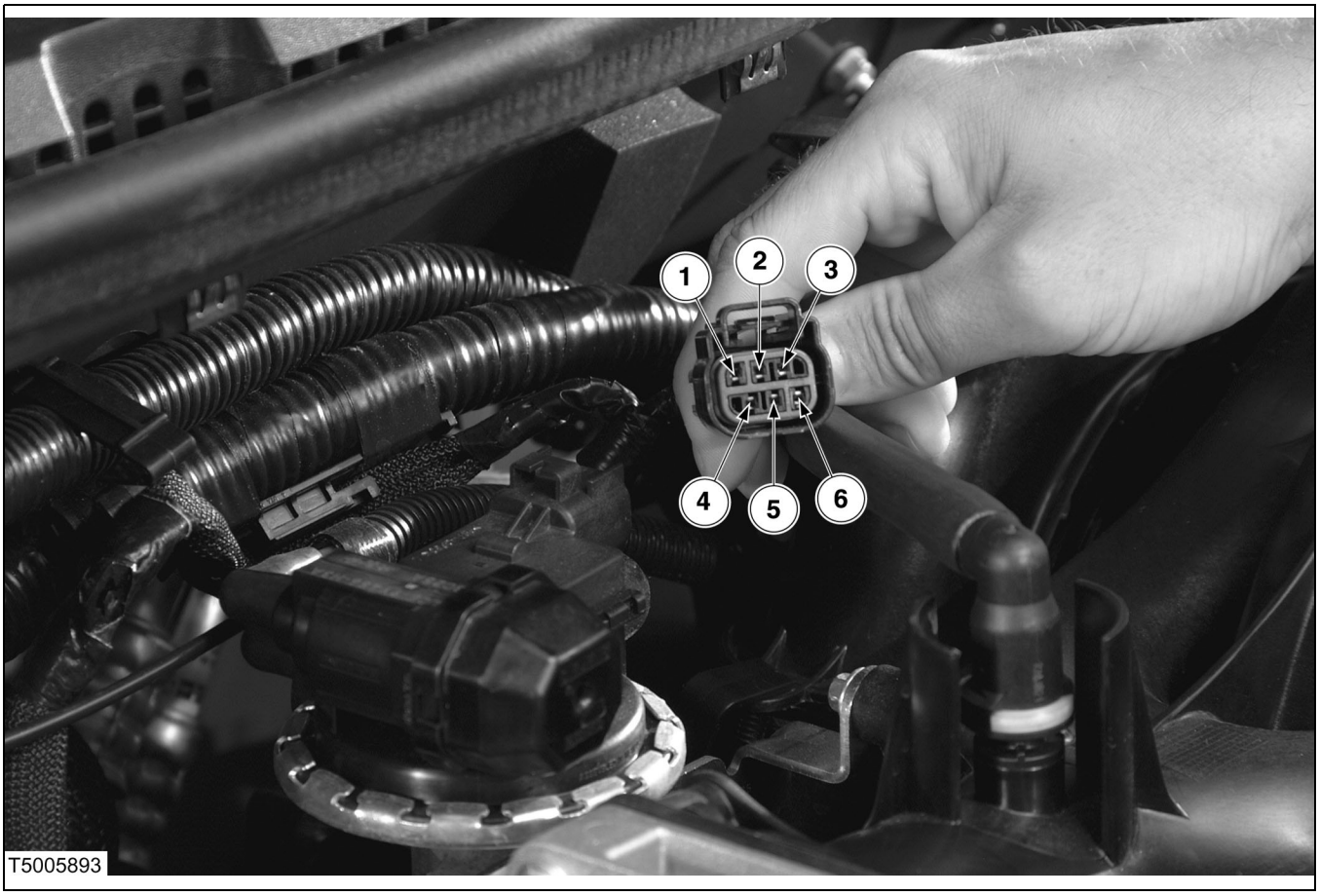
The Explorer and Mountaineer use a revised Differential Pressure Feedback (DPFE) Exhaust Gas Recirculation (EGR) system. The system functions in the same manner as the conventional DPFE system. The various system components, however, have been combined into a single component called the EGR System Module (ESM).

The ESM bolts directly to the intake manifold, with a metal gasket between the two components forming the measuring orifice. Conventional DPFE systems have an orifice located in the tube leading to the EGR valve. The new arrangement makes it possible to relocate the pickup ports used to measure EGR flow.

The upstream port is now located directly on the EGR valve, just beyond the pintle. The downstream port is now located on the intake manifold. This arrangement results in the downstream port measuring Manifold Absolute Pressure (MAP). This allows the downstream port reading from the ESM to not only be used for measuring EGR flow, but also as a MAP input to the other modules. This new arrangement increases system reliability and response time.

The ESM provides the PCM with a differential DPFE signal similar to the conventional DPFE system as well as a downstream pressure/MAP signal. This allows the PCM to obtain a MAP signal without adding an additional MAP sensor.

The ESM is serviced as a complete assembly. When installing a new assembly, make sure that the metal gasket is installed between the ESM and intake manifold. Failure to install the metal gasket will result in an inaccurate flow measurement and ESM self test failure (code P0401/P1408). Diagnosis is similar to previous model years.

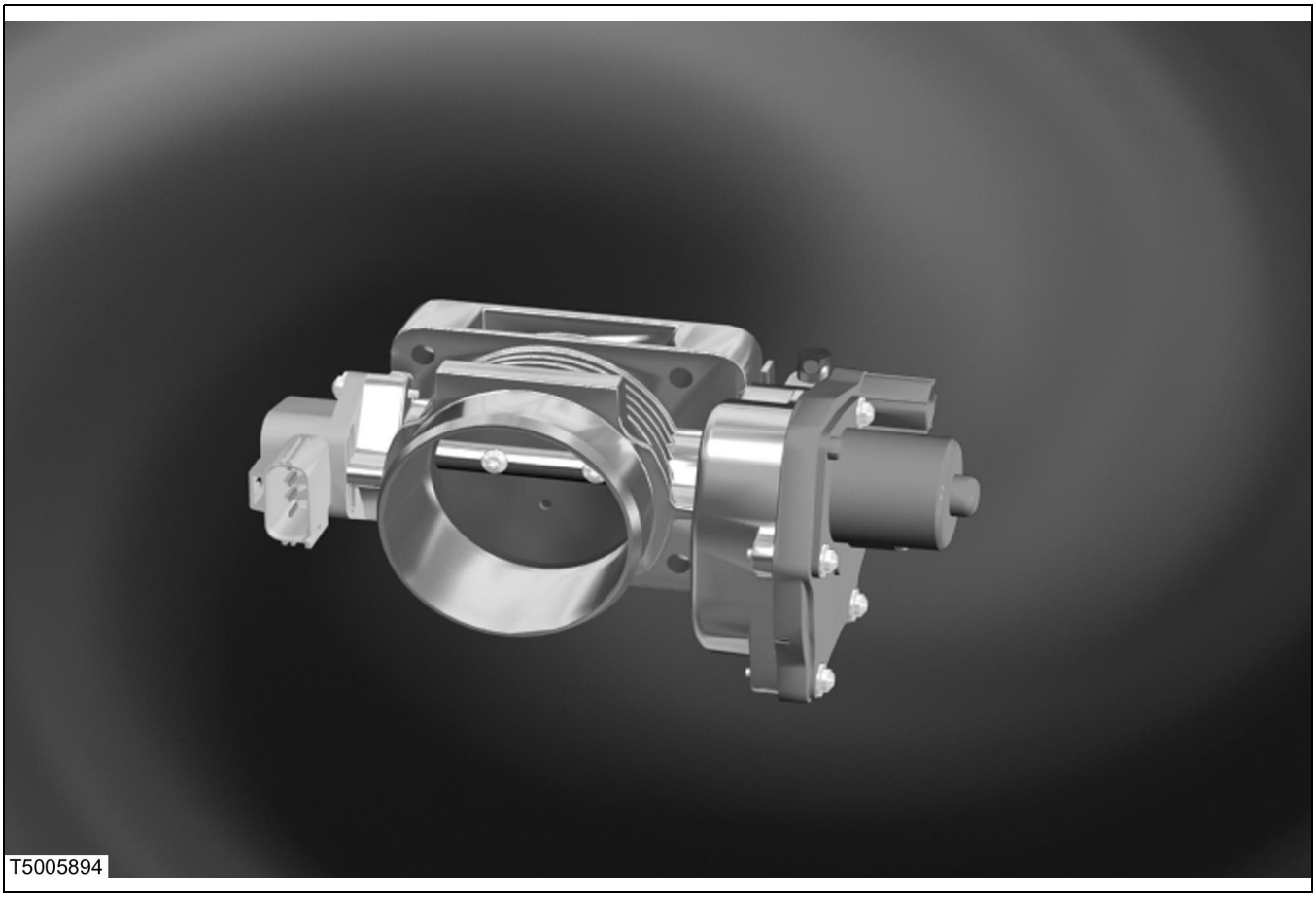


ESM Connector

The following list details how the six-pin harness connector is wired:

- Pin 1 — EVR Signal (output from PCM)
- Pin 2 — VREF
- Pin 3 — MAP signal (input)
- Pin 4 — VPWR
- Pin 5 — DPFE Signal (input)
- Pin 6 — SIG RTN

Electronic Throttle Control (ETC) Generation II



4.0L Electronic Throttle Body (ETB)

The 2004 4.0L SOHC V6 and 4.6L 2V V8 engines are among the first engines with full-authority, Electronic Throttle Control (ETC). The main reason for using the ETC system is to improve driveability. The ETC system is a drive-by-wire system that completely eliminates the need for a conventional throttle cable between the throttle pedal and the throttle body. All throttle plate movements are actuated by an electric motor after receiving commands from the PCM. All cruise control functions are now managed by the PCM, and are carried-out electrically.

- The system does not have a conventional throttle cable between the accelerator pedal and the mechanical throttle body.
- This system replaces cruise control hardware, cables and actuators.
- ETC system components include:
  - Accelerator Pedal Position Sensor (APPS) assembly (with three tracks for redundency).
  - New, enhanced-capacity PCM.
  - New Electronic Throttle Body (ETB) includes:
    - Brass-plated throttle valve.

– Throttle plate driver motor.

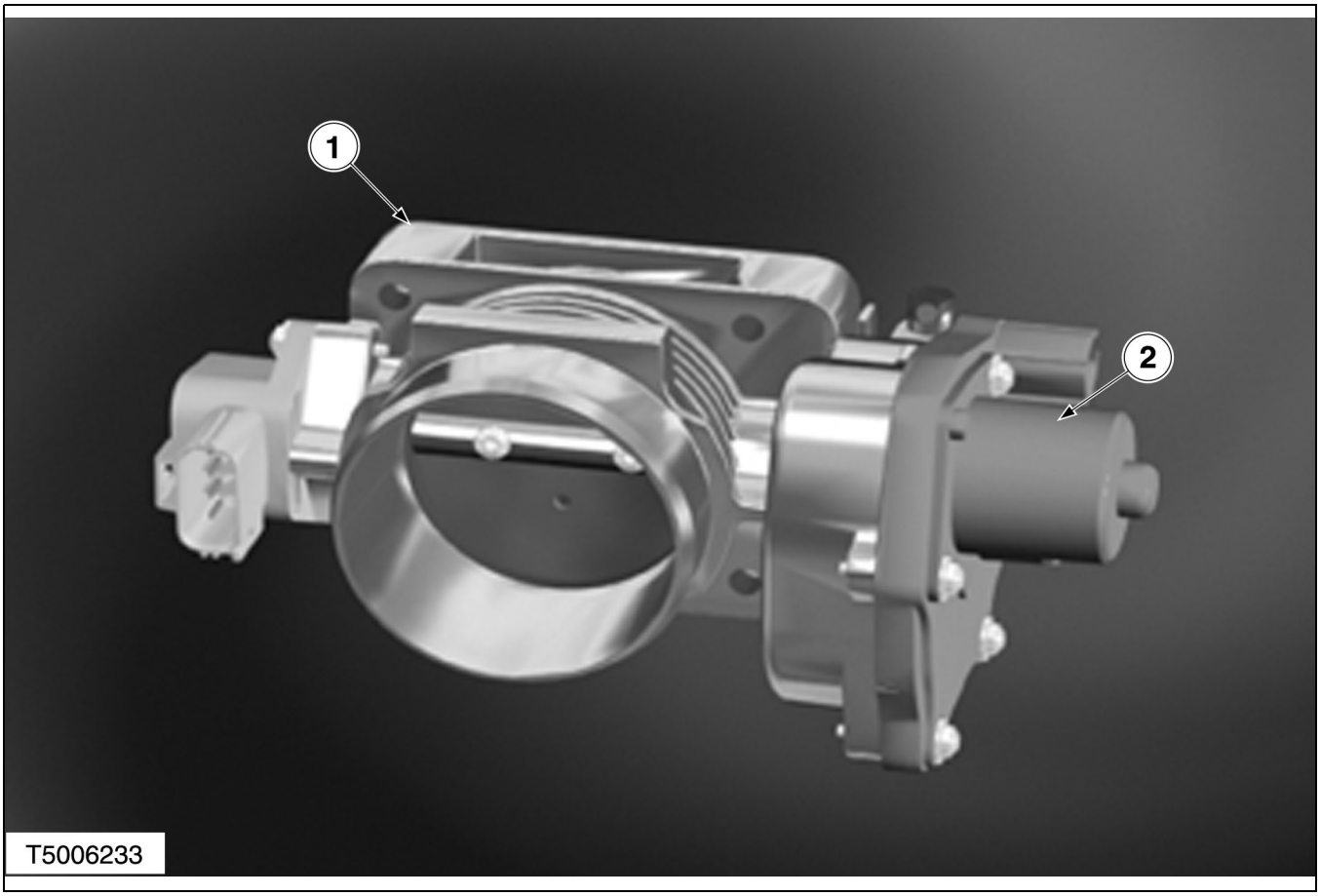
– Dual throttle position (TP) sensors.

– Gear train.

NOTE: The PCM reduces the rate of throttle plate opening when the vehicle is in reverse or 4x4 mode. The vehicle may seem to ‘‘hesitate’’ when the throttle is applied and there may be a different sensation when in Reverse or 4x4 mode.

NOTE: The system also has a rev limiter that is used in Park and Neutral. The engine is limited to 3,000 rpm. This is not a fuel cutoff strategy. The engine runs very smooth, but is held to 3,000 rpm.

ETB Driver Motor



ETB Driver Motor

Item	Description
1	Throttle body

Item	Description
2	Driver motor

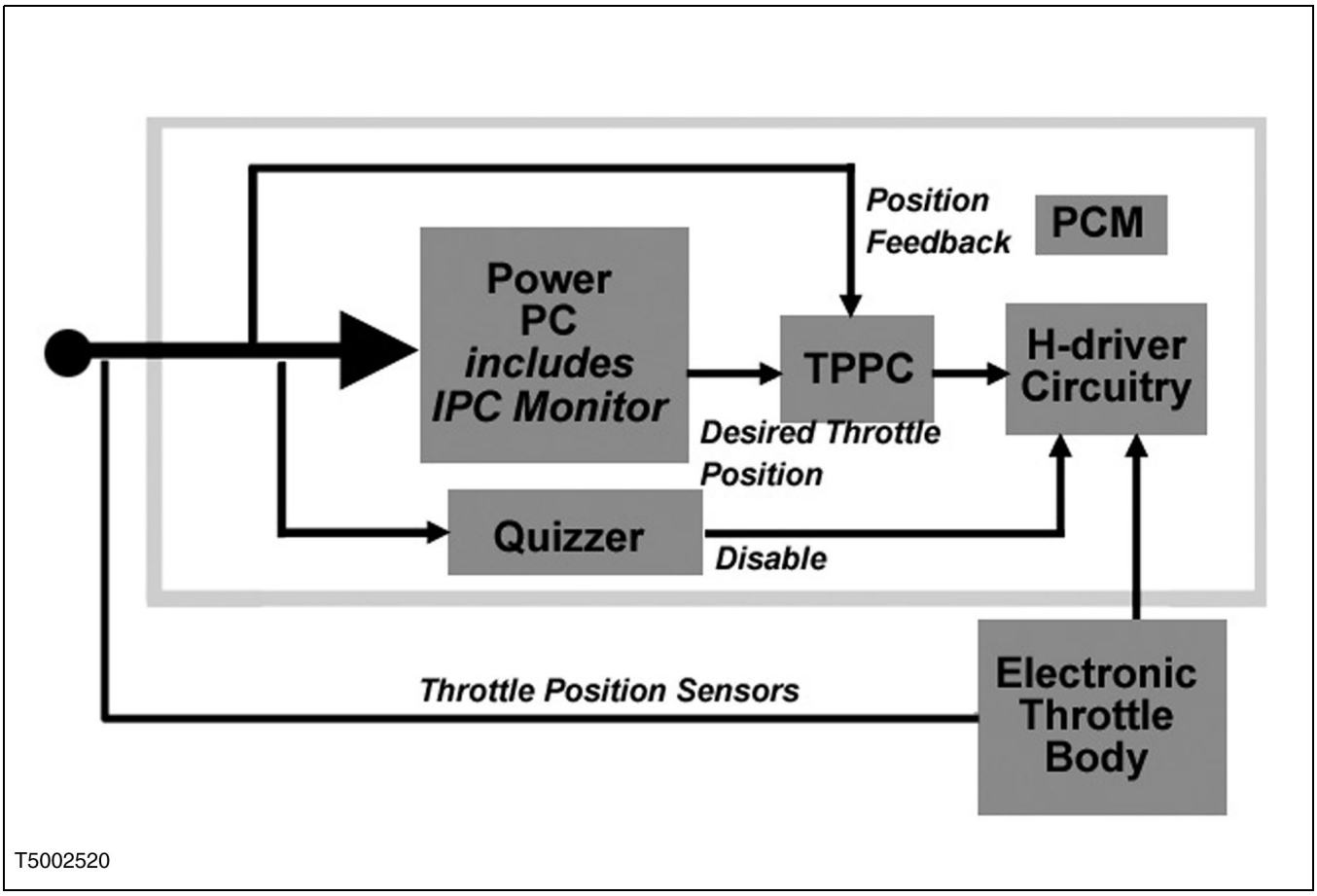
Cruise control is now a function of the ETC, performed by the ETB.

- The PCM determines and controls the throttle angle required to:
  - Achieve vehicle speed increase.
  - Maintain set speed.
  - Reduce set speed through use of the throttle motor.

Repair

Repair concerns for the ETC system consist of components replacement only, such as the throttle body, APP sensors and the PCM.

NOTE: Refer to the appropriate section in the Workshop Manual for complete details.



New PCM Contains Several New Processors

The Black Oak Power PC is the main microprocessor which contains engine and transmission control logic including the desired throttle angle and OBD-II logic.

- The PCM includes the following new functions:
  - Independent Plausibility Check (IPC).
    - The IPC resides in the Black Oak Power PC and checks powertrain torque output versus driver demand over the full range of driver demand.
  - E-Quizzer.
    - The E-Quizzer monitors the ‘‘health’’ of the PCM.
    - When driver demand is at idle, the E-Quizzer checks that the throttle plate is at idle.
  - The Throttle Plate Position Controller (TPPC) is a separate microprocessor within the PCM.
    - The TPPC commands the throttle plate motor and monitors TP1 and TP2.
    - 4x4 Control.

Throttle Plate Position Controller (TPPC)

The function of the Throttle Plate Position Controller, or TPPC, watches for certain failure modes and stores the appropriate code.

- The following DTCs pertain to the TPPC:
  - P2107 - TPPC - Processor fault, faulty command from the Black Oak PCM to TPPC. No FMEM or amber wrench or Message Center text, Pedal Follower with RPM Guard.

DTC	Description
P2111	Throttle actuator system stuck open (MIL, ETC Light, Forced Idle Mode)
P2112	Throttle actuator system stuck closed (MIL, ETC Light, Forced Idle Mode)
P2100	Throttle actuator circuit open (MIL, ETC Light, Forced Idle Mode)
P2101	Throttle actuator range/performance test (MIL, ETC Light, Forced Limited RPM Mode)

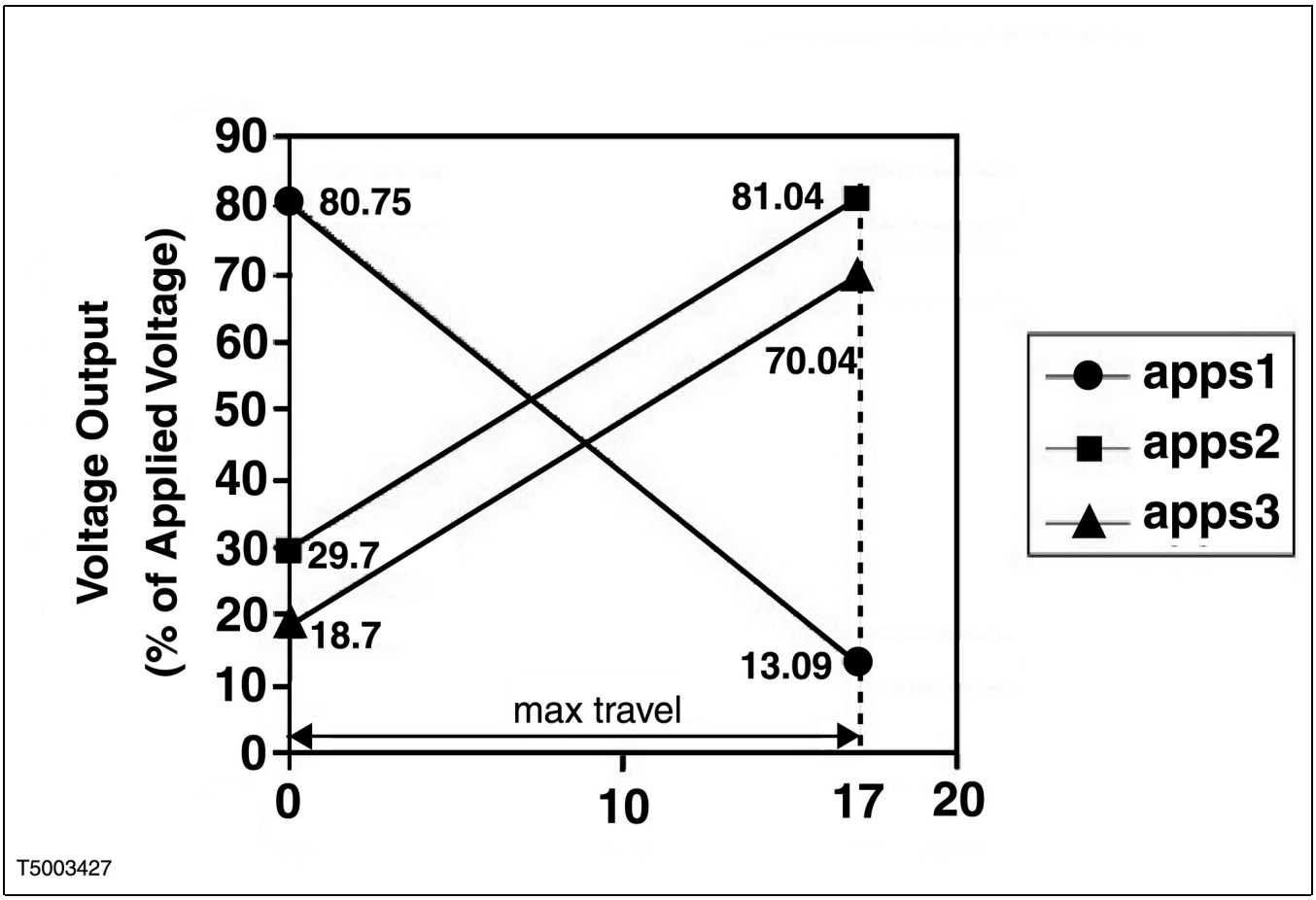
Accelerator Pedal Position Sensor (APPS)



Accelerator Pedal Position Sensor (APPS)

The system includes an Accelerator Pedal Position Sensor (APPS) assembly.

- The APPS assembly:
  - Is located at the top of the accelerator pedal.
  - Contains three analog pedal position sensors.



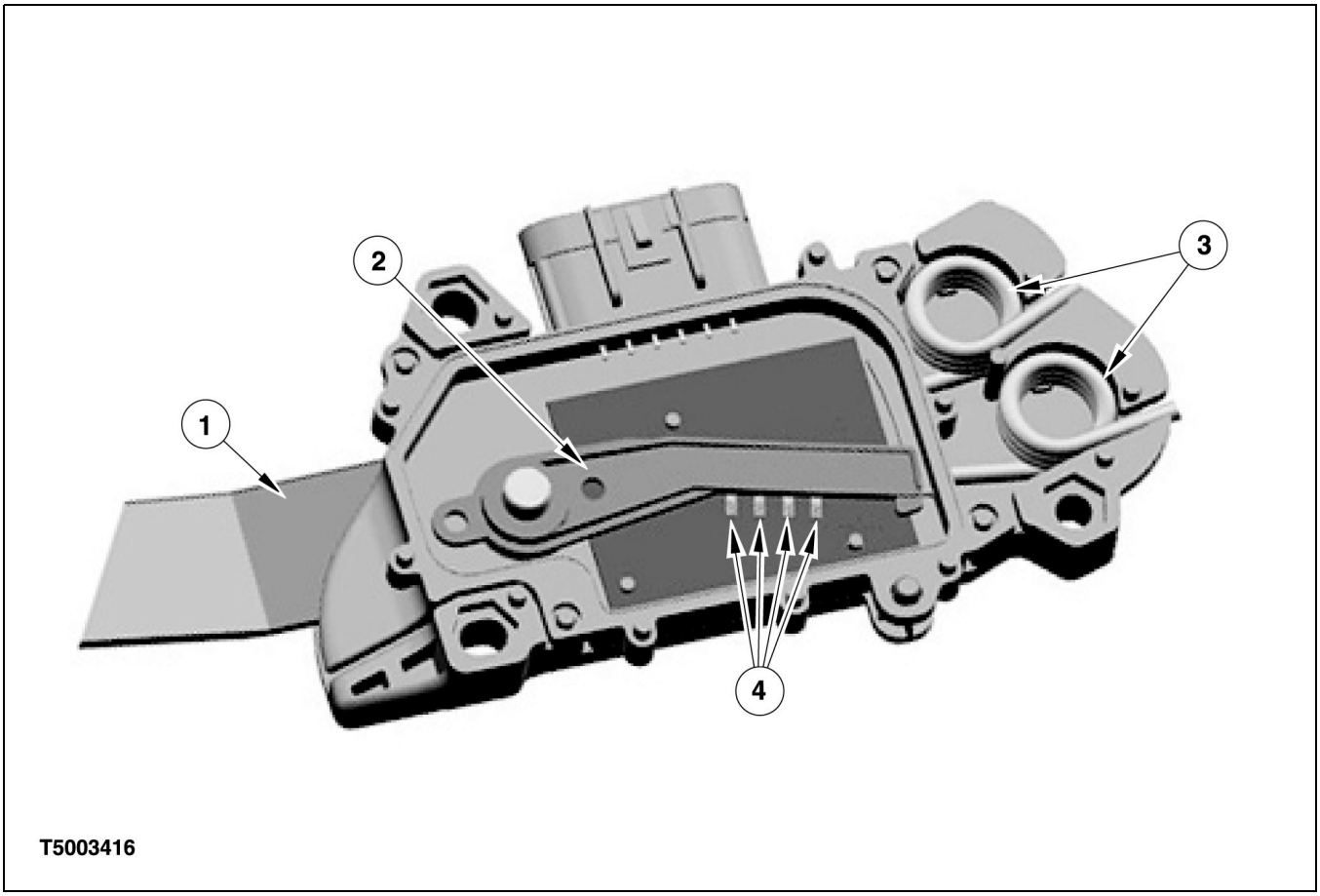
APPS Pedal Travel

The driver actuates the accelerator pedal in the usual manner. The APPS is not adjustable. No adjustment is required because pedal position and relative movement is calculated within the PCM.

- APPS 1 voltage is in the range of 4.10 to 0.95 volts:
  - 4.10 volts with the pedal at rest.
  - 0.95 volts with the pedal fully depressed.
- APPS 1 is used as the driver demand indicator:
  - The PCM uses APPS1 at all times unless APPS1 has failed.
- APPS 2 voltage is in the range of 1.51 to 3.90 volts:
  - 1.51 volts with the pedal at rest.
  - 3.90 volts with the pedal fully depressed.
- APPS 3 voltage is in the range of 0.95 to 3.34 volts:
  - 0.95 volts with the pedal at rest.
  - 3.34 volts with the pedal fully depressed.

- When APPS 1 and 2 disagree, diagnostics are performed. APPS 3 is used as a redundant check.
  - The APPS, not the TP sensors, is now the best indication of driver demand.
  - When APPS 1 and APPS 3 disagree, diagnostics are performed. APPS 2 is used as a redundant check.

Operation



Inside an APPS

Item	Description
1	Throttle pedal lever
2	APPS wiper arm

Item	Description
3	Throttle return springs
4	APPS 1-3 and ground

The main reason for using the ETC system is to improve driveability.

- Based on vehicle speed, throttle response to accelerator pedal movement is adjusted by the PCM.
  - When the driver presses the accelerator pedal, three Accelerator Pedal Position Sensors (APPS) measure pedal movement and provide an output voltage to the PCM.
  - Multiple APPS are built into the system as a safety feature.
  - The throttle pedal has two return springs to ensure that the accelerator pedal is always returned to the ‘‘zero’’ position when released.
  - Smallest closed pedal position (APPS_RATCH) is continuously learned for each sensor.
  - Pulling up on the accelerator pedal with the ignition on causes the PCM to learn a low pedal ratch value. The PCM detects a small amount of pedal travel in the at rest position but no failure mode will occur.

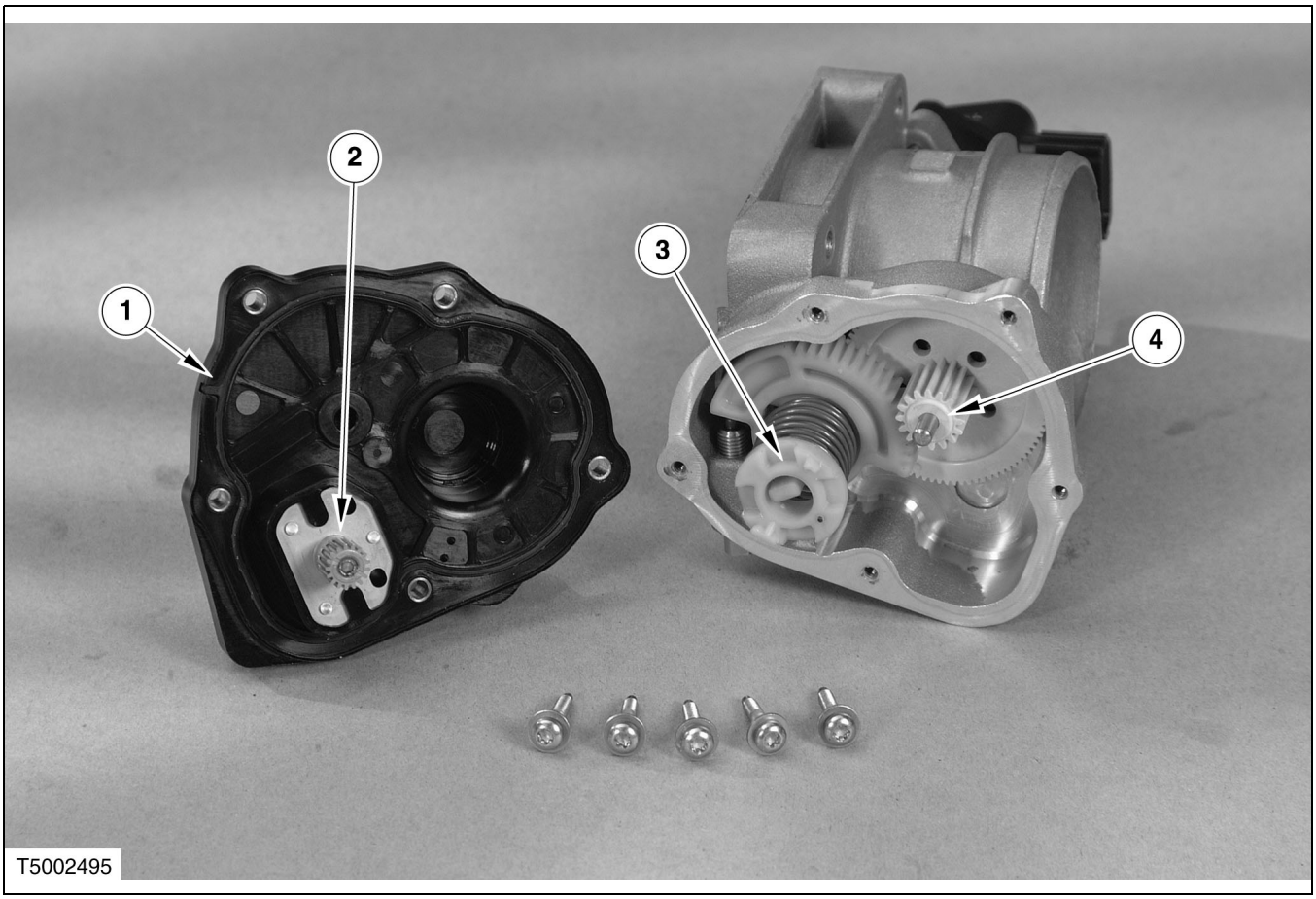
Accelerator Pedal Position Sensor (APPS) Check

The Accelerator Pedal Position Sensor (APPS) check watches for certain failure modes and stores the appropriate DTC.

- The following DTCs apply to the accelerator pedal position sensors:

DTC	Description
P2122	APPS 1 circuit Low Input (ETC light, Selects APPS 2, non-MIL)
P2123	APPS 1 circuit High Output (ETC light, selects APPS 2, non-MIL)
P2121	APPS 1 range/performance (ETC light, selects APPS 2, non-MIL)
P2138	APPS 1/APPS 2 voltage correlation (ETC light, or message center text, non-MIL)
P2127	APPS 2 Low Input (ETC light, selects APPS 1, non-MIL)
P2128	APPS 2 High Input (ETC light, selects APPS 1, non-MIL)
P2126	APPS 2 range/performance (ETC light, selects APPS 1, non-MIL)
P2140	APPS 2/APPS 3 voltage correlation (ETC light, selects APPS 1, non-MIL)
P2132	APPS 3 Low Input (ETC light, Selects APPS 1, non-MIL)
P2133	APPS 3 High Output (ETC light, Selects APPS 1, non-MIL)
P2131	APPS 3 range/performance (ETC light, Selects APPS 1, non-MIL)
P2139	APPS 1/APPS 3 voltage correlation (ETC light, selects APPS 1, non-MIL)

- These codes are continuously monitored and require less than one second to register a malfunction.
- Circuits are monitored and DTCs are set if voltages are above or below voltage values specified in the PCED manual.



Electronic Throttle Body Motor

Item	Description
1	Throttle motor cover
2	Throttle drive gear

Item	Description
3	Throttle return spring
4	Reduction gear

The new electronic throttle body controls throttle plate angle to perform several functions.

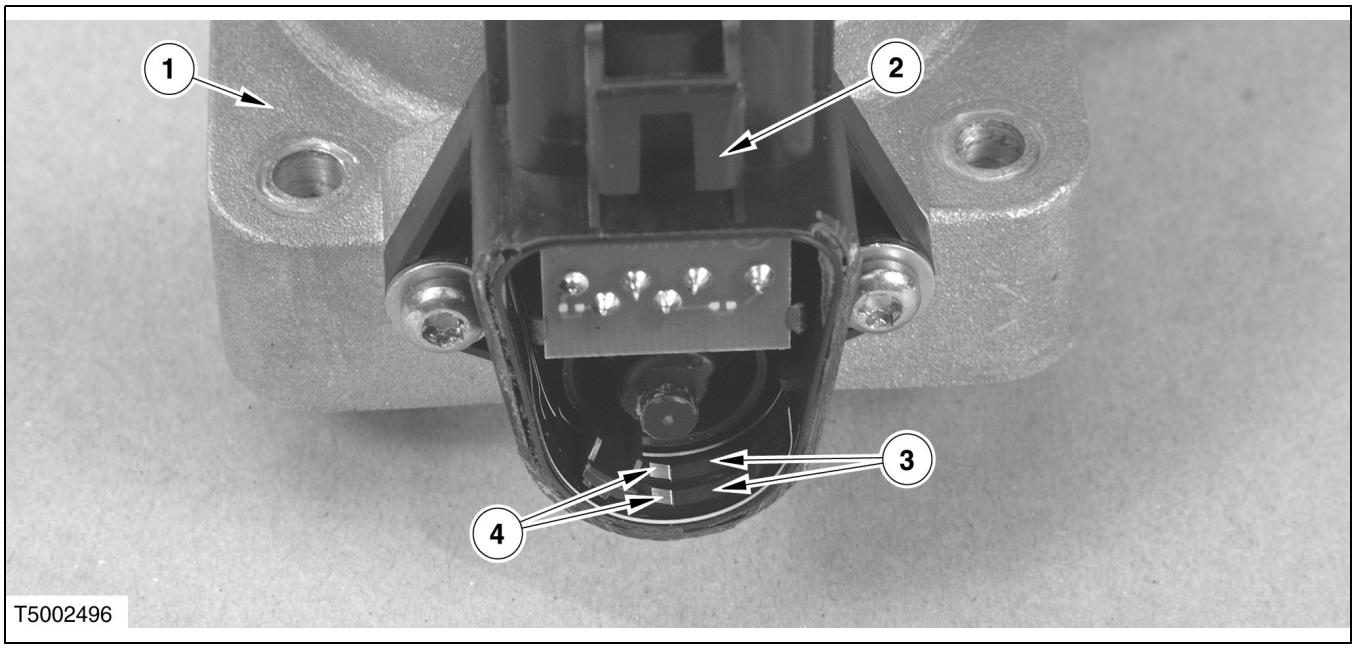
- Functions include:
  - Idle speed control.
  - Cruise control.
- Limp-home spring, which opens the throttle eight degrees, if the PCM loses power.

NOTE: The breakaway, factory-set idle, speed screw on the ETB is not adjustable.

The PCM provides an output based on accelerator pedal position, which drives a DC motor via a reduction gear.

- The PCM positions the throttle plate at the requested angle.
- Two throttle position sensors monitor throttle plate movement to provide position information feedback and as a rationality check.

- The throttle system has the necessary safety features to monitor correct operation of all components.
- The PCM uses TP1 for large throttle angle changes and TP2 for small throttle angle changes because it has better resolution.
  - Idle throttle angle resolution is 1/16 degree, through a total of 17 degrees of pedal travel.
- Hardstop (ETC_RATCH) is learned by the PCM and TPPC every time the PCM powers up.



TP Sensor Tracks in the ETB (Shown in Cutaway)

Item	Description
1	Throttle body
2	TP sensor

Item	Description
3	TP sensor tracks
4	TP sensor leads

Two resistive-track throttle position (TP) sensors are mounted to the single throttle shaft.

- Both sensors rotate as a unit.
- Both TP sensors share a common ground circuit, but each sends a separate signal to the PCM based on what voltage is allowed through each separate resistive TP track.
- TP sensors are not serviceable individually (both are part of the complete TP sensor unit).

Throttle Position (TP) Sensor Check

The Throttle Position (TP) sensor check watches for certain failure modes and stores the appropriate DTC.

- The following DTCs apply to the throttle position sensor:

DTC	Description
P0122	TP low input (MIL, ETC light, pedal follower with RPM guard)
P0123	TP 1 high input (MIL, ETC light, pedal follower with RPM guard)
P0121	TP 1 range/performance (non-MIL)
P2135	TP 1/TP 2 voltage correlation (ETC light, non-MIL, Pedal Follower Guard)
P0222	TP 2 circuit continuity (MIL, ETC light, Pedal Follower with RPM Guard)
P0223	TP 2 high input, circuit continuity (MIL, ETC light, Pedal Follower with RPM Guard)
P0221	TP 2 range/performance (non-MIL)

- Circuits are monitored and DTCs are set if voltages are above or below voltage values specified in the PCED manual.

Warning Lamps



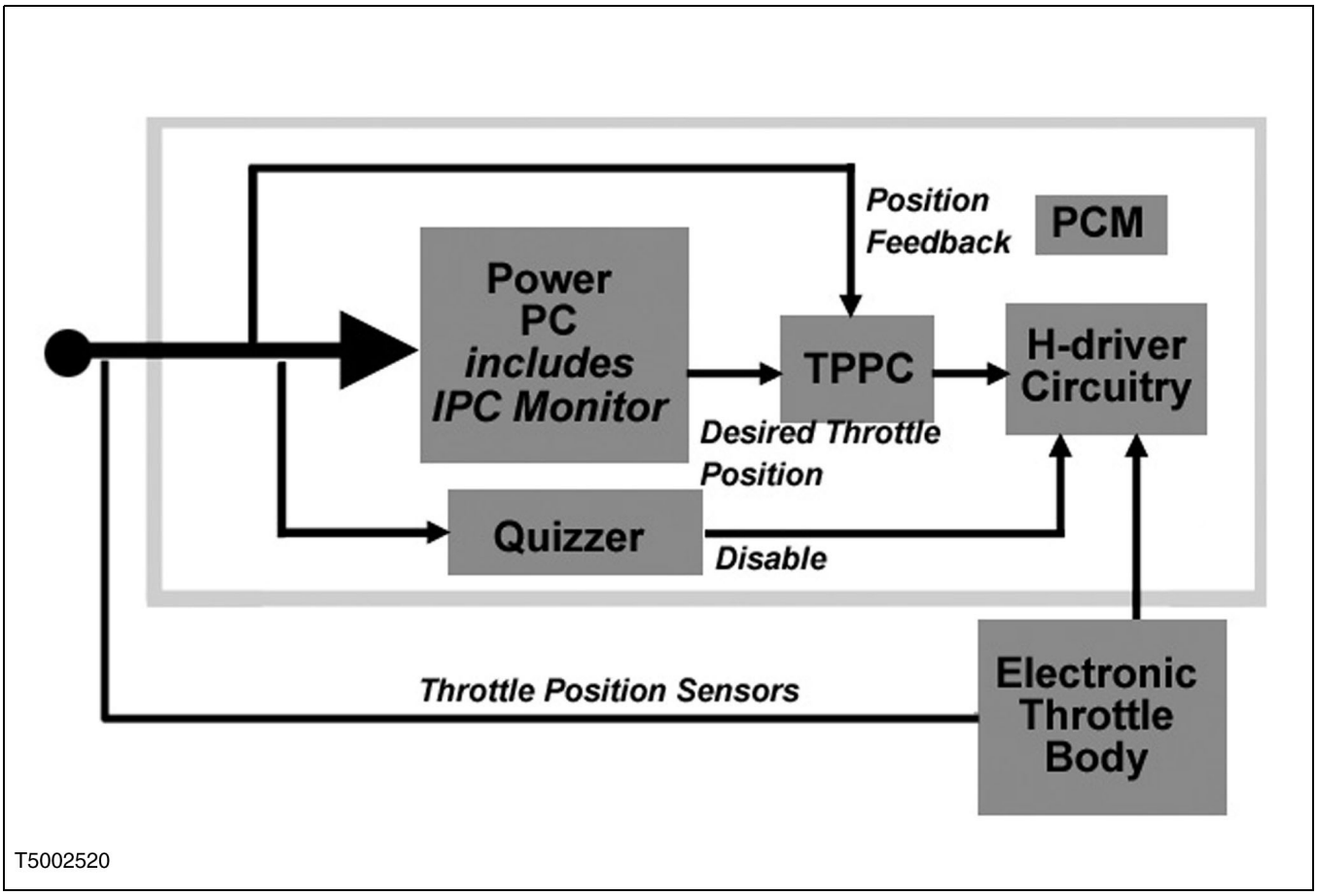
Warning Lamps

Item	Description
1	Amber warning wrench

Item	Description
2	Stability assist

In the event of a failure mode, the driver receives malfunction warning lamps on the instrument cluster.

- The instrument cluster uses the following to warn the driver of a fault:
  - Message Center text (Engine Failsafe Mode).
  - An amber warning wrench.
- This lamp illuminates when a defect has been detected in the Electronic Throttle Control (ETC) system. The engine has defaulted to a limp-home operation. There are various levels of limp home modes with Electronic Throttle. Limp home modes range from No Effect On Driveability to Default Throttle to Forced Engine Shutdown. When the ETC light is illuminated engine speed is limited by pedal position for all modes except Default Throttle and Forced Engine Shutdown. Vehicle requires service when the wrench light is illuminated.



IPC and PCM are Monitored by E-Quizzer

The Independent Plausibility Check (IPC) function in the PCM monitors ETC inputs and outputs and takes the FMEM action. The IPC and PCM are subject to several potential failure modes. Therefore, if the E-Quizzer determines that the IPC or PCM function is impaired in any way, it takes appropriate Failure Mode and Effects Management (FMEM) action.

- All of the following modes display the same wrench or text to the driver:
  - Forced Engine Shutdown
  - Forced Limited RPM and Forced Idle (Throttle and Pedal not available)
  - Forced Limited RPM
  - Forced Idle
  - Forced Limited Power
  - No Effect on Driveability

ETC System Diagnosis

Two or more failed APP sensors trigger a Failure Mode and Effects Management (FMEM) mode resulting in high idle.

- The PCM has new failure modes in the ETC System. The ETC system, in some diagnostic information, may be referred to as the Throttle Actuator Control System (TACS). TACS DTCs associated with a failure modes.

DTC	Description
P2104	TACS - Forced Idle
P2105	TACS - Forced Engine Shut Down
P2106	TACS - Forced Limited Power
P2110	TACS - Forced Limited RPM
P2110/P2104	Forced Limited RPM and Forced Idle Mode

NOTE: Refer to the PCED manual for complete details on these DTCs.

Forced Engine Shut Down Mode

The Forced Engine Shut Down mode is the most critical mode.

- In the Forced Engine Shutdown Mode, the warning to the driver is:
  - Amber wrench or Message Center text ‘‘Engine Failsafe Mode.’’
- The fail-safe actions are:
  - Fuel injectors shutoff.
  - Fuel pump disabled.
  - Power is inhibited to ETB motor.
- This failure is caused by:
  - PCM, RAM or ROM hardware fault.
  - E-Quizzer processor RAM, ROM or CPU fault.
  - Incompatible or incomplete PCM and E-Quizzer software check.
  - If PCM and E-Quizzer communication fails at power-up.
- Related DTC:
  - P2105 - Forced Engine Shut Down

Forced Limited RPM and Forced Idle Mode

The Forced Limited RPM and Forced Idle Mode is the second mode.

- In the Forced Limited RPM and Forced Idle Mode, the warning to the driver is:
  - Amber wrench or Message Center text ‘‘Engine Failsafe Mode.’’
- The fail-safe action is:
  - With or without power to ETB motor, the throttle plate is fixed at an angle of eight degrees.
  - Control based on zero accelerator pedal position.
  - Limited engine speed to a fixed low speed.
  - Cruise control off.
- This failure is due to one or more of the following system faults:
  - TPPC processor loss of control.
  - Two TP sensors out of range.
  - Miswired ETB motor and TP sensors.
  - Two or more APPS sensor failed.
  - PCM or E-Quizzer processor analog to digital chip failure.
- Related DTC:
  - P2110 and P2104 Simultaneously.

Forced Limited RPM Mode

The Forced Limited RPM Mode is the third failure mode.

- In the Forced Limited RPM Mode, the warning to the driver is:
  - Amber wrench or Message Center text ‘‘Engine Failsafe Mode.’’
- The fail-safe action is:
  - With or without power to ETB motor, the throttle plate is fixed at an angle of eight degrees.
  - With power to the ETB, limited engine speed can be increased by pressing the accelerator pedal.
  - Cruise control off.
- This failure is due to one or more of the following system faults:
  - TPPC processor loss of control.
  - Two TP sensors out of range.
  - Miswired ETB motor and TP sensors.
  - Stuck throttle
  - ETB motor circuit open
- Related DTC:
  - P2110 - Forced Limited RPM.

Forced Idle Mode

The Forced Idle Mode is the fourth failure mode.

- In the Forced Idle Mode, the warning to the driver is:
  - Amber wrench or Message Center text ‘‘Engine Failsafe Mode.’’
- The fail-safe action is:
  - Throttle plate is at an idle angle.
  - Limit engine RPM to fixed low speed.
- This failure is due to:
  - Two or more APPS failures.
  - Stuck throttle.
- Related DTC:
  - P2104 - Forced Idle

Forced Limited Power Mode

Forced Limited Power Mode is the fifth failure mode.

- In the Forced Limited Power Mode, the warning to the driver is:
  - Amber wrench or Message Center text ‘‘Engine Failsafe Mode.’’
- The fail-safe action is:
  - Power limited to less than maximum
  - Limted engine RPM that can be increased by pressing the accelerator pedal.
  - No cruise control.
- This failure is due to:
  - One TP out of range.
  - Two TP’s disagree in range.
  - MAF out of range.
  - OSS out of range.
  - TSS Failure.
  - CKP out of range.
  - Actual Torque exceeds demanded torque.
  - When the driver demand is at idle and the throttle plate is not at idle.
- Related DTC:
  - P2106 - Forced Limited Power.

No Effect on Driveability Mode

No Effect on Driveability Mode is the sixth failure mode.

- In the No Effect on Driveability Mode, the warning to the driver is:
  - Amber wrench or Message Center text ‘‘Engine Failsafe Mode.’’
- This failure is due to:
  - One APPS fault.
  - Processor software incompatibility.

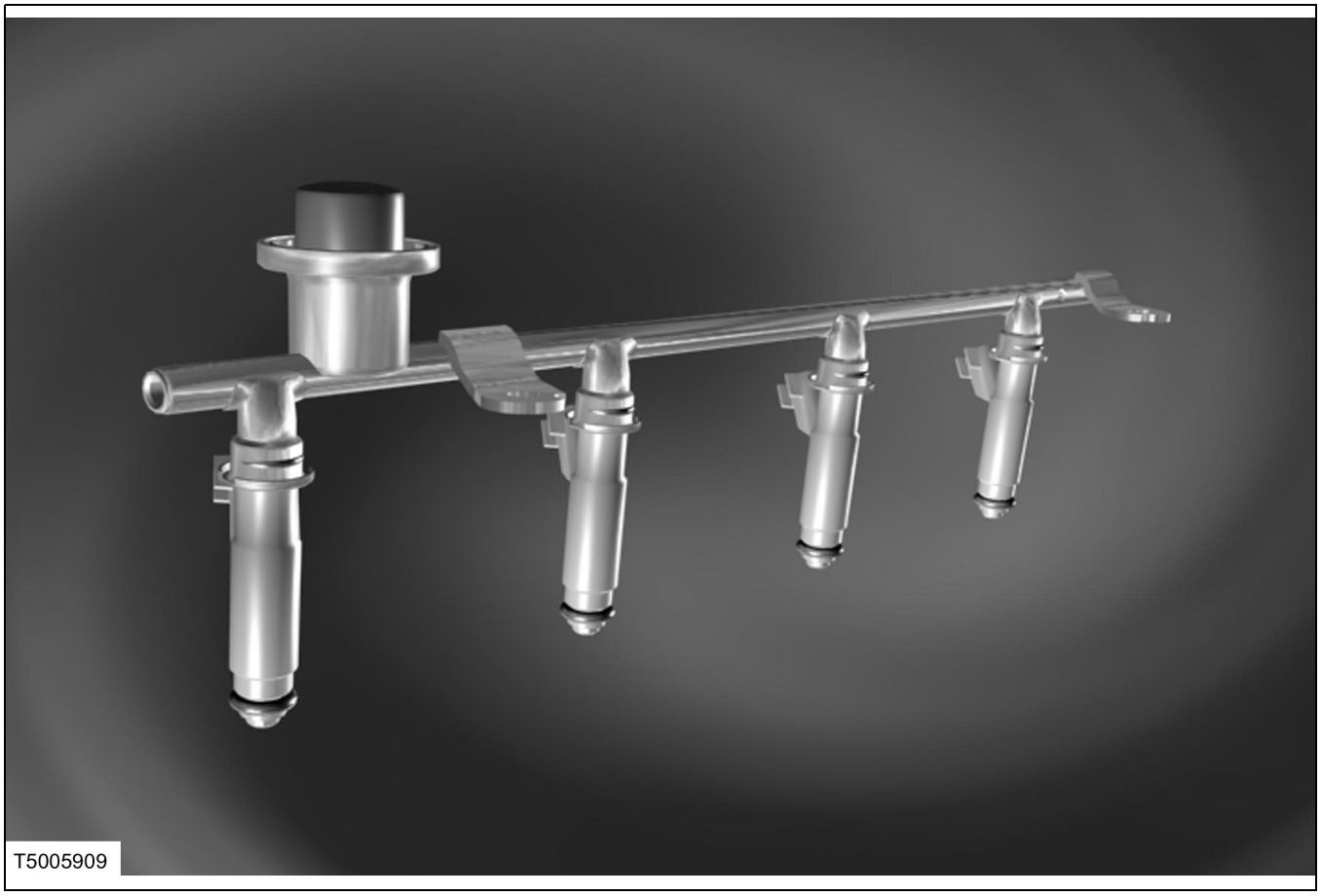
Electronic Throttle System

The Electronic Throttle System operates by watching for certain failure modes and stores the appropriate DTC.

- The following DTCs can be set by the Electronic Throttle System:
  - P0606 - PCM processor failure.
  - U0300 - Incompatible or incomplete PCM and E-Quizzer software check.

Fuel System

Pulse Damper



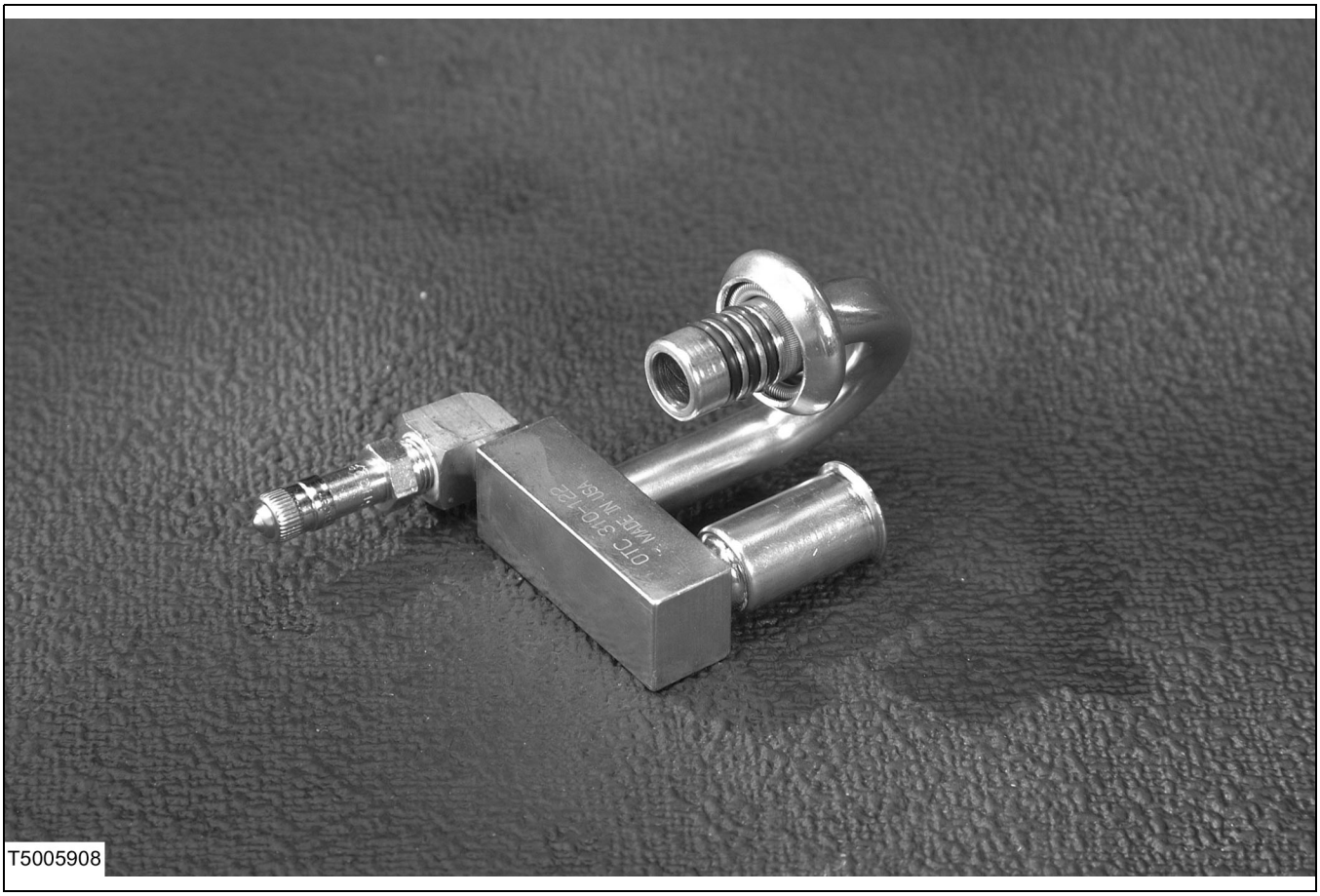
Pulse Damper

A redesigned pulse damper, mounted on the fuel rail, reduces evaporative emissions.

Features of the pulse damper are:

- A non-permeable diaphragm.
  - Because of this change, it is important to service this component with the correct part number.

Fuel Pressure Gauge Adaptor



Fuel Pressure Gauge Adaptor (4.6L)

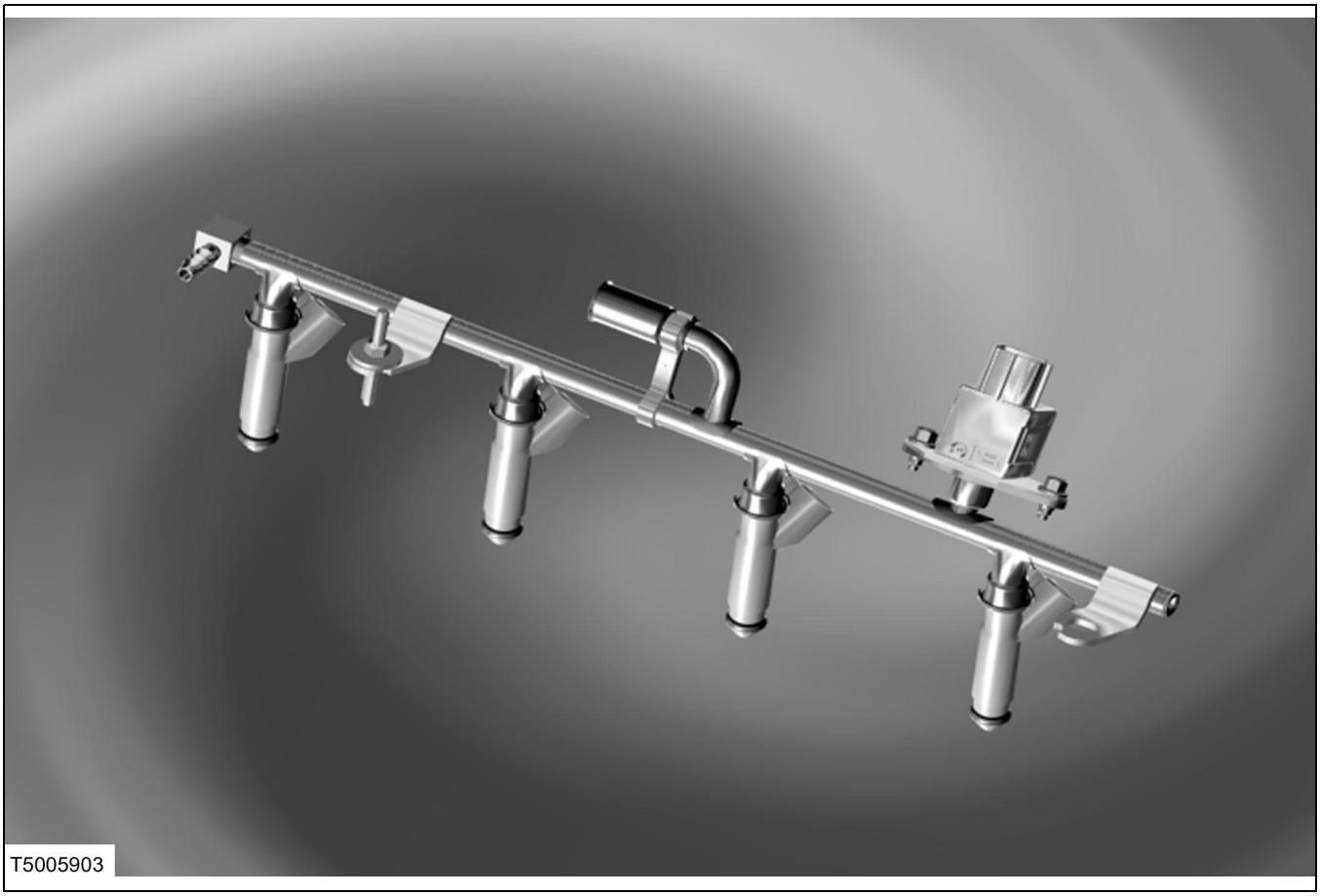
The fuel pressure test port (Schrader valve) has been deleted to meet LEV I and LEV II emission standards.

- To physically check fuel pressure, use special tool 310-122 Connector, Fuel Pressure Gauge and the following Workshop Manual procedure.

1. Relieve the fuel pressure from the fuel rail.
2. Disconnect the flexible fuel line at the fuel rail.
3. Install special tool 310-122 and an appropriate fuel pressure gauge.
4. Start the engine and record the fuel pressure.
5. Relieve the fuel pressure from the fuel rail.

NOTE: To check fuel pressure on a 4.0L engine, use tool number 310-100.

Fuel Pressure Sensor (FPS)



Fuel Pressure Sensor (FPS)

The Fuel Pressure Sensor (FPS) senses the pressure difference between the fuel injection supply manifold and the intake manifold, and provides the PCM with the current fuel injection supply manifold pressure. The return fuel line to the fuel tank has been deleted in this type of fuel system. The differential fuel intake manifold pressure, together with inferred fuel temperature, provides an indication of the fuel vapors in the fuel rail.

- The PCM uses this information to vary the duty cycle output to the FPDM, which controls the speed of the FP. The speed of the FP sustains fuel injection supply manifold pressure which preserves fuel in its liquid state.
- The increase in dynamic range of the fuel injector is due to the higher pressure, which allows injector pulse width to decrease.

Fuel Rail

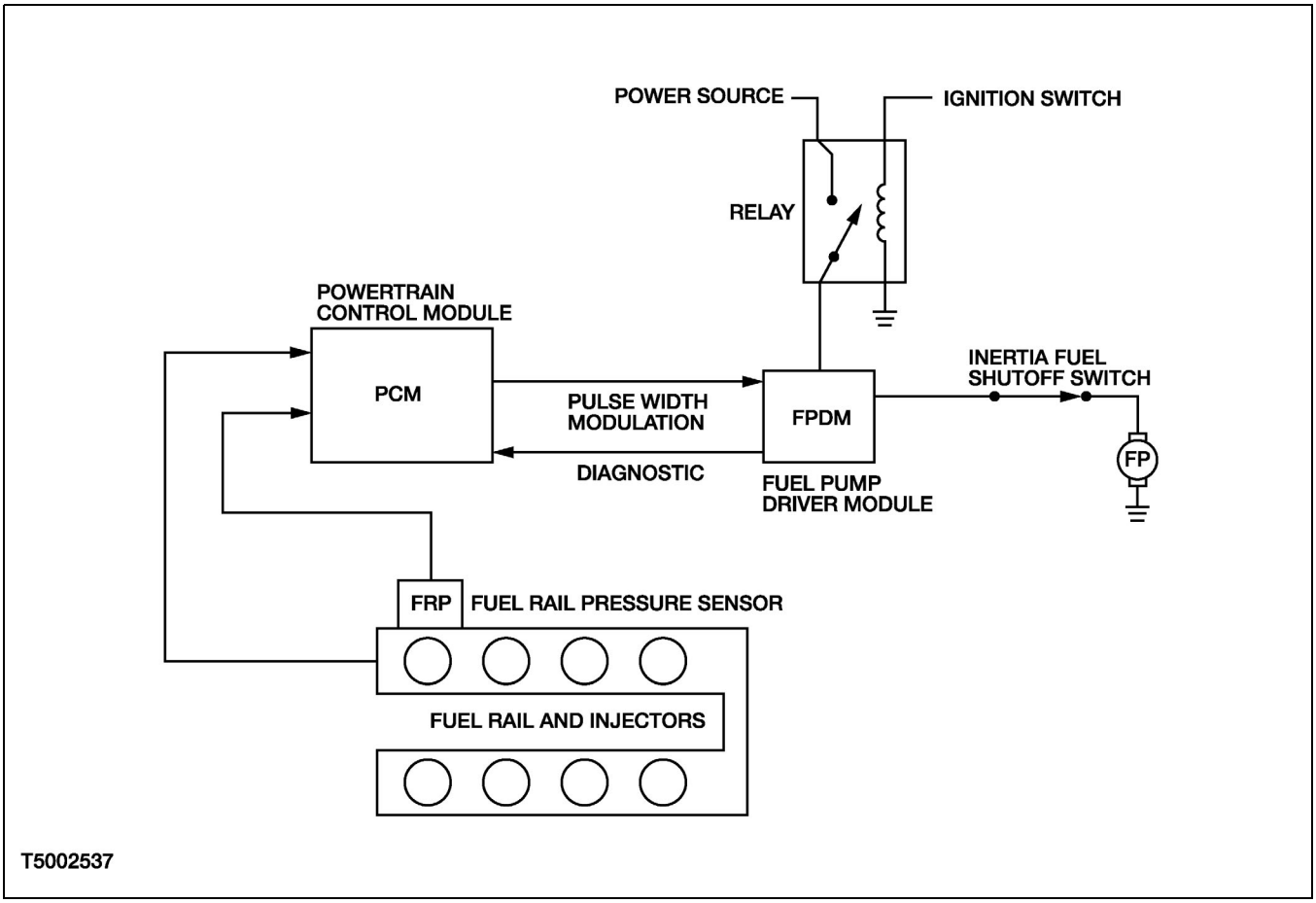
The fuel rail and injectors are similar to those used on other electronic returnless fuel systems.

The Explorer and Mountaineer are equipped with an Electronic Returnless Fuel System (ERFS). The system includes a:

- Redesigned fuel rail.
- Fuel pump/sender unit modified to provide increased fuel flow.
- Fuel Pump Driver Module (FPDM).
- Fuel rail shield added to the left rear of the engine.
- Redesigned fuel pressure sensor.

Fuel rail Schrader valve has been deleted.

Electronic Returnless Fuel System



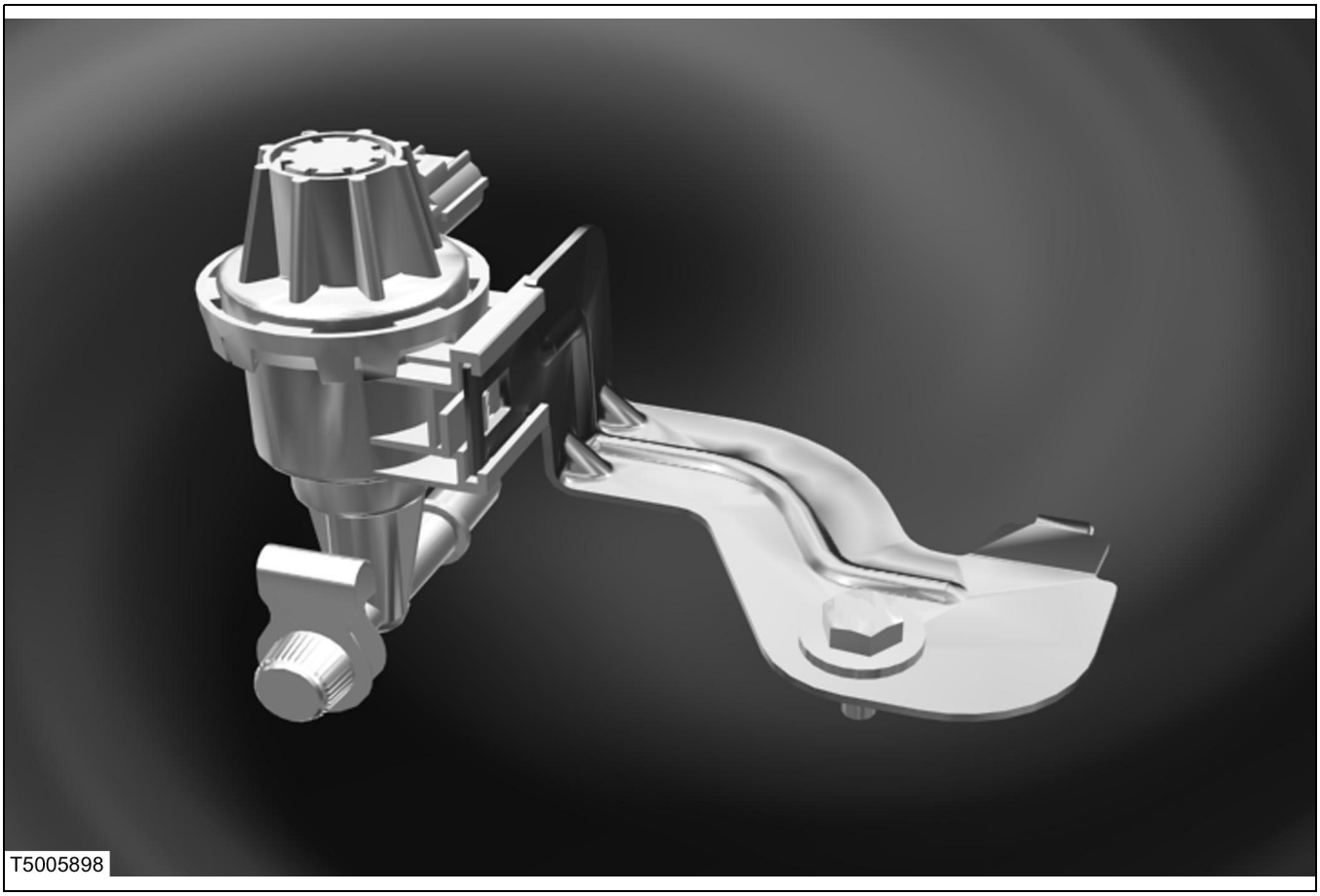
ERFS Block Diagram

Operation and features of the ERFS are as follows:

1. The fuel delivery system is enabled during crank or running mode once the PCM receives a crankshaft position (CKP) sensor signal.
2. The fuel pump logic is defined in the fuel system control strategy and is carried out by the PCM.
3. The PCM commands a duty cycle to the Fuel Pump Driver Module (FPDM).
4. The FPDM (located in the passenger side lower D-pillar) modulates the voltage to the Fuel Pump (FP) to achieve the proper fuel pressure. Voltage for the FP is supplied by the power relay or FPDM power supply relay.
5. The Fuel Rail Pressure (FRP) sensor provides the PCM with the current fuel rail pressure data. The PCM uses this information to vary the duty cycle output to the FPDM to compensate for varying loads.
6. The volume of fuel injected is controlled by the length of time the fuel injector is held open. The injector is normally closed and is operated by 12-volt VPWR from the power relay. The ground signal is controlled by the PCM.

7. There are three filtering or screening devices in the fuel delivery system. The intake sock is a fine, nylon mesh screen mounted on the intake side of the fuel pump. The fuel filter assembly is located between the FP and the fuel rail. There is a fuel filter screen located on the fuel rail side of the fuel injector.
8. The FP module contains the FP and the fuel sender assembly. The FP is located inside the reservoir and supplies fuel to the engine.
9. The Inertia Fuel Shutoff (IFS) switch (located above the passenger side kick panel), is used to de-energize the fuel delivery secondary circuit in the event of a collision. The IFS switch is a safety device that should only be reset after a thorough inspection of the vehicle (following a collision).

Electronic Vapor Management Valve (EVMV)



Electronic Vapor Management Valve (EVMV)

Electronic Vapor Management Valve (EVMV) hose ends have been changed to SAE style (vs barbed push on connection).

Carbon Canister (4.6L)

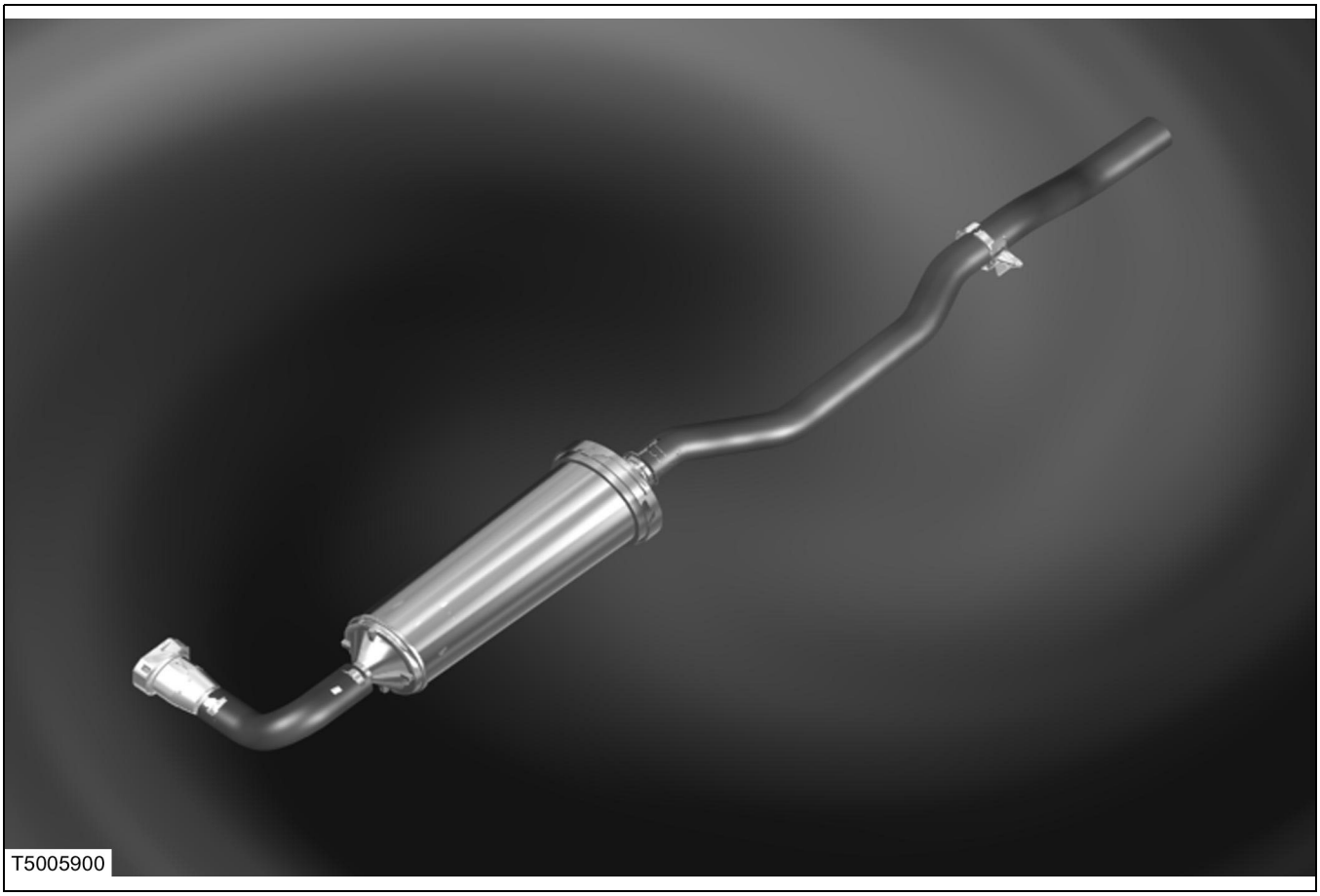


Carbon Canister (4.6L)

The carbon canister used on the 4.6L engine package has been improved to meet LEV II emission requirements.

- The canister uses a single 3.0L housing verses two 1.5L canisters used on the 4.0L engine package.
- It is retained with a snap together design.
- No special tool or diagnostics are required.

Bleed Canister (4.6L)

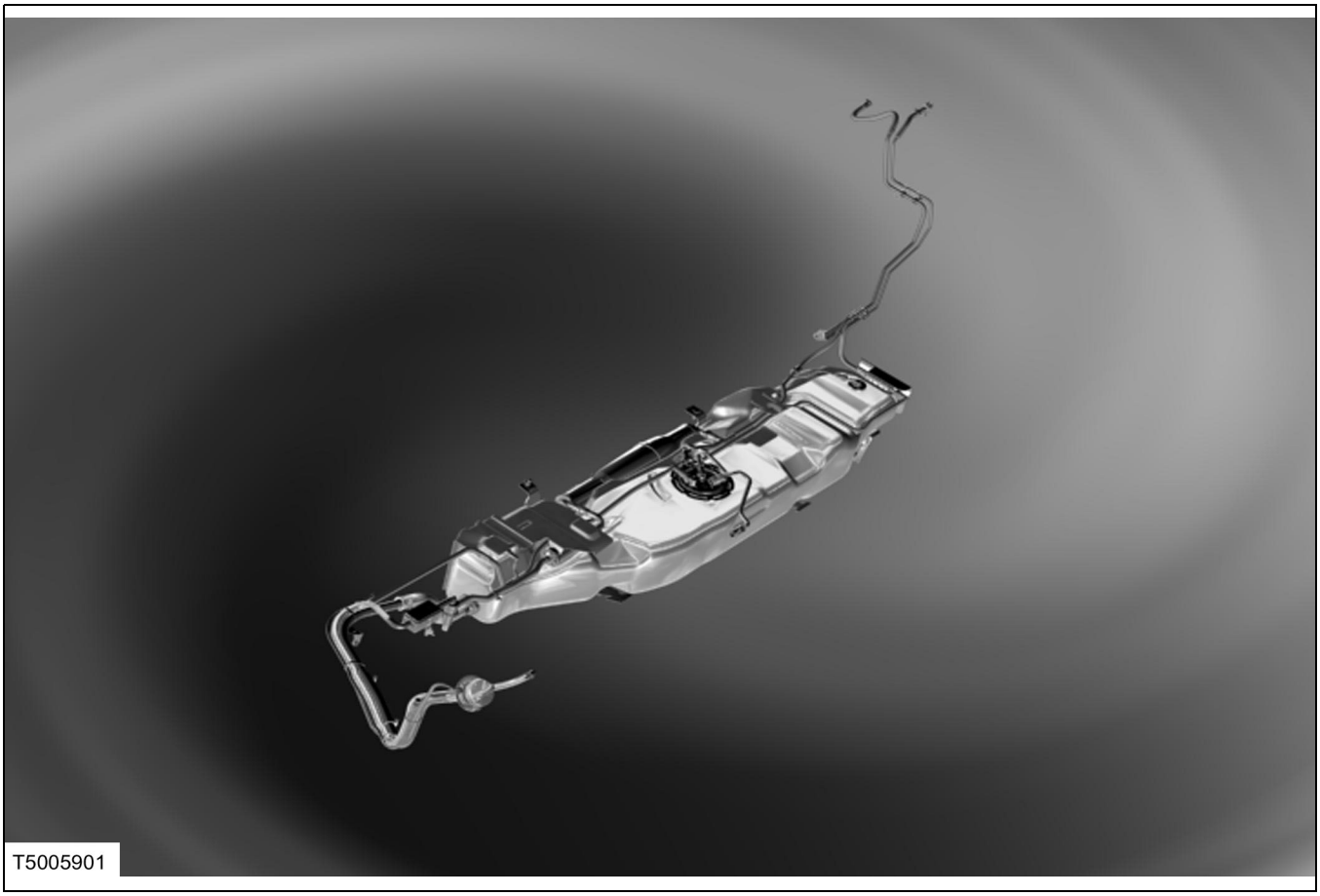


Bleed Canister (4.6L)

The bleed canister captures any hydrocarbons that may migrate out of the main canister during hot temperature performance.

- Prevents these migrating hydrocarbons from getting into the atmosphere.
- No special tool or diagnostics are required.

Fuel And Vapor Lines



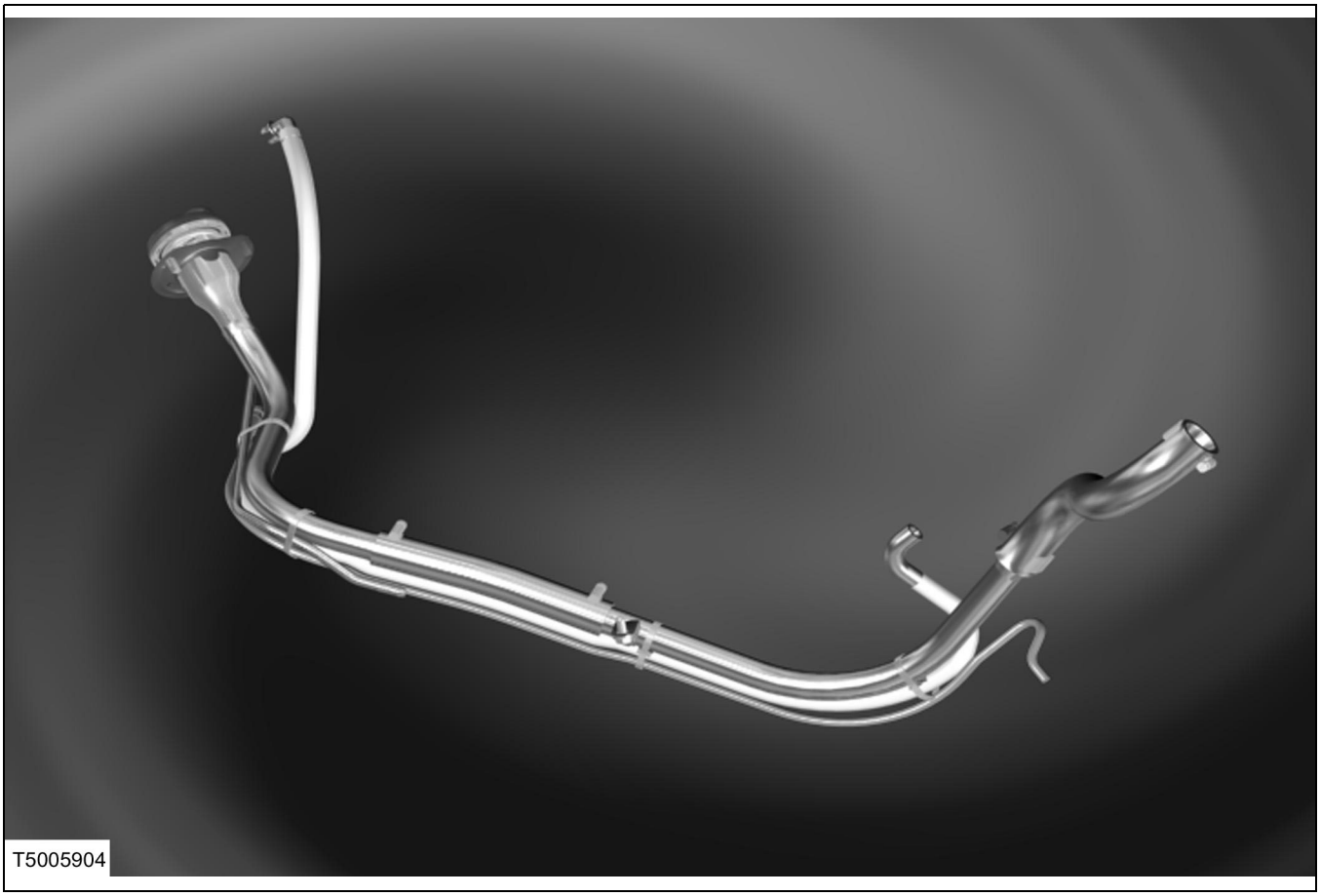
Fuel And Vapor Lines (4.6L Shown)

The fuel and vapor line have been modified to comply with LEV I and LEV II emission standards.

- Vapor lines
  - – Routing is carryover.
  - – The fuel tank end is common with previous model Explorer and Mountaineer, and the end has an SAE quick-connect.
- VMV hose
  - – Lines connections style has changed from push on with clamps to SAE connectors at both ends (intake manifold and EVMV).

- Fuel lines
  - 4.0L equipped vehicles have SAE type connectors at fuel filler and fuel rail.
  - 4.6L equipped vehicles have a new style upper fuel line bracket (at the transmission bell housing).
  - 4.6L connectors are all carryover.
  - All bracketry for both the 4.0L and the 4.6L are in the same location.
  - 4.0L and 4.6L lower brackets are carryover.

Fuel Filler Pipe



Fuel Filler Pipe

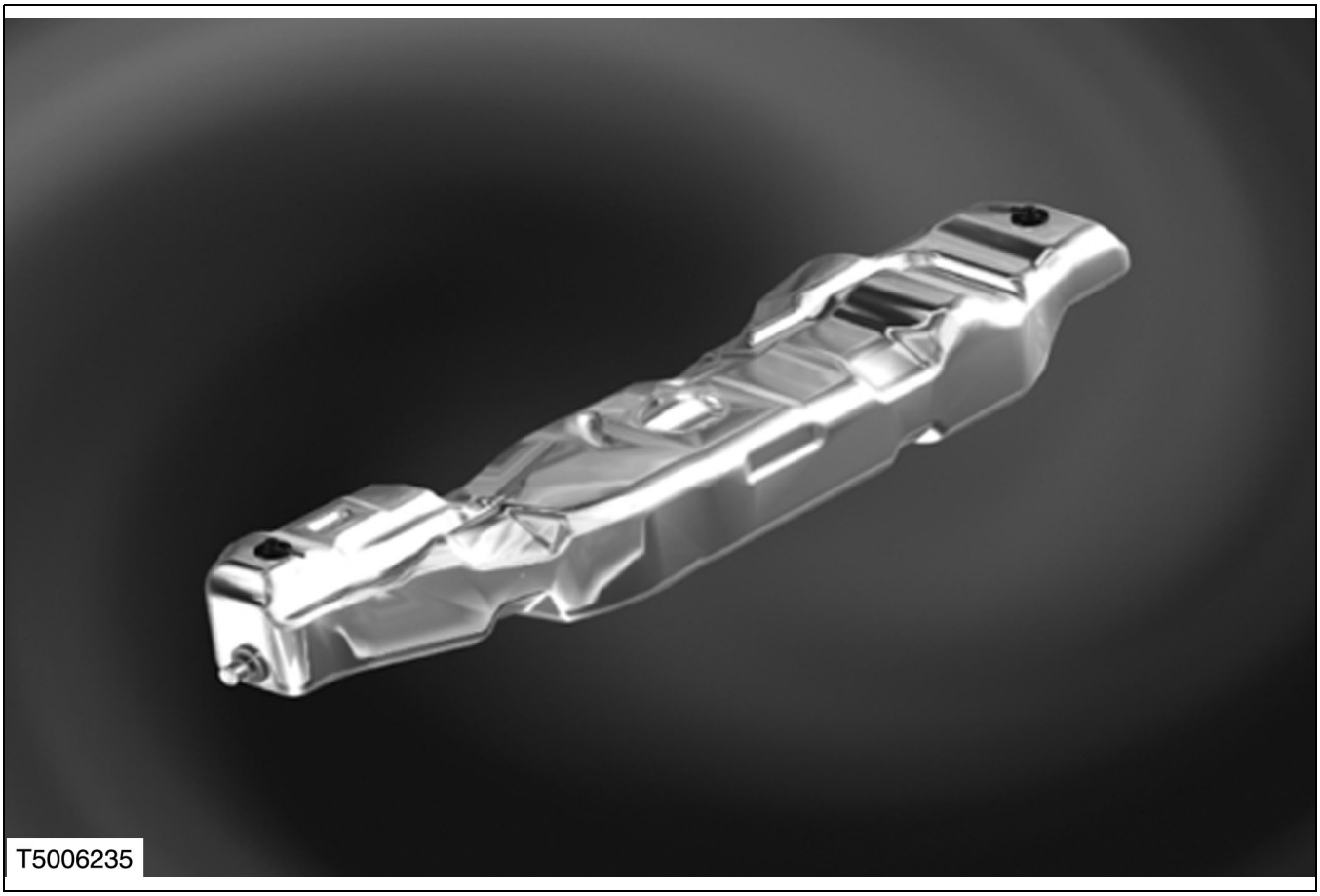
The fuel filler pipe has been modified to meet LEV I and LEV II emission standards.

- 4.0L equipped vehicles use a carryover main fill pipe, lower fill hose and 1/8-turn cap.
- 4.6L equipped vehicles use a unique upper pipe, (stainless steel with a thread and curl expansion).
  - This tube does not contain a plastic insert with flapper.
  - Uses new 1/4 turn, LEV II compliant, vacuum vent-only fuel filler cap.
- New lower fill hose for 4.0/4.6L to meet LEV II emission standards.

NOTE: If replacing the fuel filler pipe on an FFV, you must replace it with a fuel filler neck equipped with two screen arresters per federal requirements.

- The fuel filler pipe finish has been improved to meet LEV I and LEV II emission standards.
  - 4.0L equipped vehicles have a carryover Low Carbon Steel (LCS) upper and lower pipe.
  - 4.6L equipped vehicles have a stainless steel upper pipe and a coated LCS lower pipe.

Fuel Tank



Fuel Tank

The fuel tank used on the 4.6L vehicle has been modified to meet LEV II emmision standards.

- The fuel tank used on the 4.0L application meets LEV I emmisions standards.
- New one port sender flange with no return line from the filter back to the pump.
  - All other parts are carryover.
- The fuel tank used on the 4.6L application meets LEV II emmisions standards.
  - Includes two Grade Vent Valves (GVV).
  - The Fuel Level Vent Valve (FLVV) is part of the fuel sender flange.
  - The sender flange is attached with a new cam lock design retainer.
  - Uses one 3.0L ‘‘torpedo’’ canister (vs. two 1.5L).
  - Uses a small bleed canister.
  - New supply line and routing from the sender flange to the fuel filter.
- The fuel filter used on both application has only one inlet (for ERFS) with no return from the filter to the pump.

NOTE: Both tanks attach with common carryover fuel tank straps and torques.

Fuel Pump Sender Tool

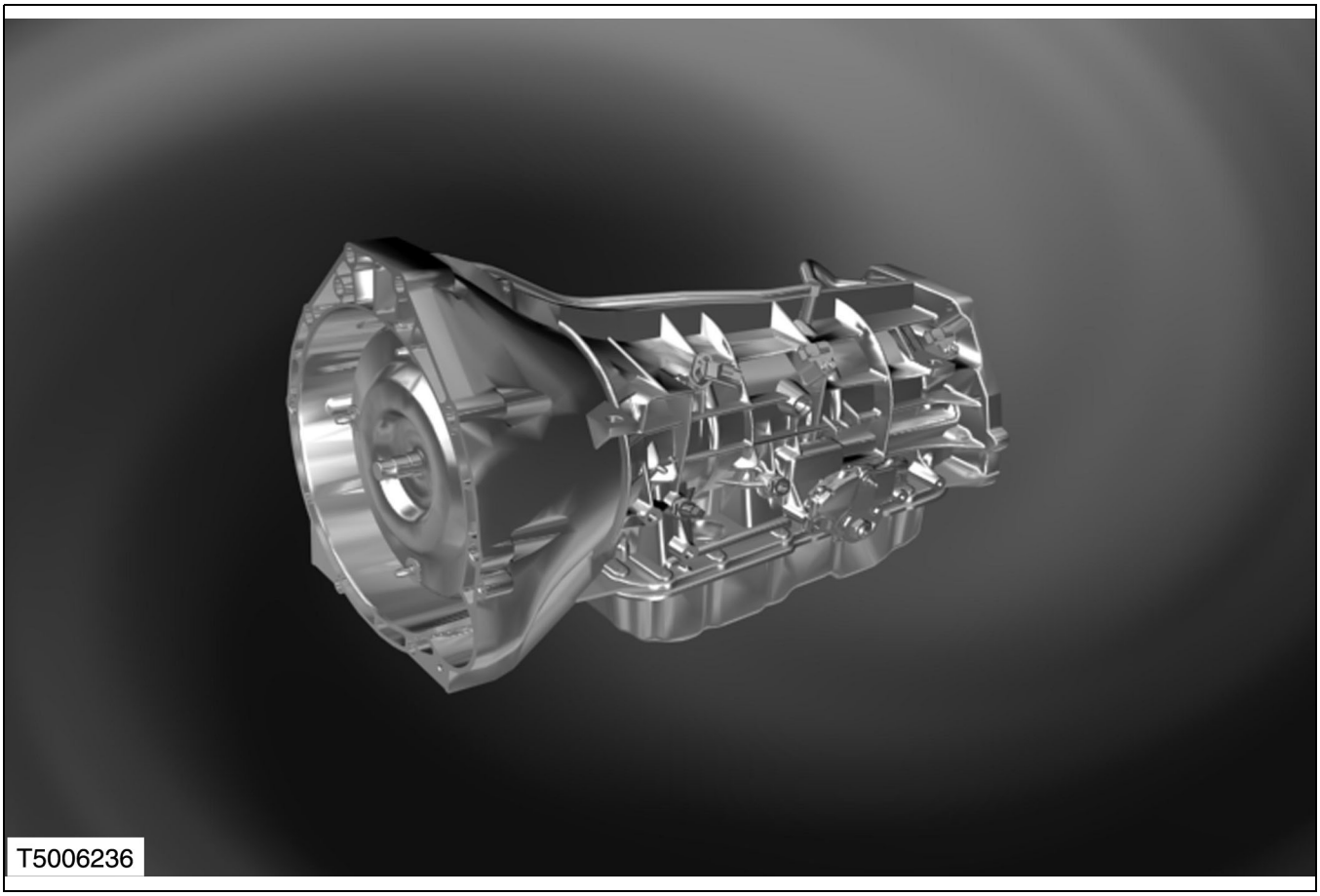


Fuel Pump Sender Tool

The sender flange is attached with a cam lock design retainer.

- 4.6L equipped vehicles require the use of special tool 310-123: wrench, fuel tank sender for removal.
- The 4.0L uses a carryover tool.

Transmission System



5R55S Transmission

The Explorer and Mountaineer are equipped with the 5R55S transmission. Diagnosis and service procedures are mostly unchanged from previous model years.

Minor 5R55S changes for the Explorer and Mountaineer include:

- Improved calibrations for shift feel and timing.
- Revised transmission fluid formulation.
  - The fluid for service is still Mercon® V.
  - The production fluid has been changed from what is called B fluid to E Fluid.
  - This is a hypo-allergenic version of B.
  - This new formulation required a change in transmission hose material to retain long term durability.

Transmission Shift Strategy

Mechanical throttle versus Electronic Throttle Control (ETC) for transmission operation works in the following way:

- With mechanical throttle vehicles, the accelerator pedal is connected by cable to the throttle plate and the driver controls airflow into the engine directly. The throttle plate position is measured directly and used as a measure of driver intent. Transmission shift and convertor clutch events are scheduled based on throttle position.
- With ETC vehicles the accelerator pedal is connected to a pedal position sensor. When in automatic range, the PCM uses the pedal position and the output shaft speed sensor to determine a desired output shaft torque. Using a model of the transmissions, this is converted to a commanded throttle angle. Transmission shift and convertor clutch events are scheduled based on the accelerator pedal position.
- For either type of throttle system, the pressure control programming used to control shift feel uses an estimate of the actual torque being made by the engine. This estimate is based on the MAF sensor measurement of airflow and is not directly related to the commanded engine torque.

OBJECTIVES

- Identify new features of the module communication networks.
- Identify new features of the instrument cluster.
- Identify new features of the climate controlled seats.

Module Communication Networks

The Explorer and Mountaineer use the following module networks:

- UART-Based Protocol (UBP)
- International Standards Organization (ISO) 9141
- High-speed Controller Area Network (CAN)
- Audio Control Protocol (ACP)

The following is a chart that compares network communication features of the 2004 MY to the 2003 MY Explorer and Mountaineer.

Explorer/Mountaineer 2003 to 2004 Architecture Comparison

MODULE	2003	2004	COMMENTS
ABS Only	SCP	CAN	2004: Replace SCP with CAN
ABS/IVD	SCP/CAN	CAN	2004: Delete SCP
VSM	UBP	UBP	2004: Add door ajar hardware for 4x4 neutral tow feature
DEATC	SCP	CAN	2004: Replace SCP with CAN
4x4 Module	UBP	CAN	2004: Integrated into PCM. Standalone board
4x4 Module w/IVD	UBP/CAN	CAN	2004: Integrated into PCM. Standalone board
IC	SCP/UBP	CAN/UBP	2004: Replace SCP with CAN
DSM	UBP	UBP	2004: Carryover
RCM/ARM	ISO9141	ISO9141	2004: Carryover
PCM	SCP	CAN	2004: Black/Spanish Oak. Replace SCP with CAN
HSM	N/A	N/A	Deleted for module-less heated seat system
TPMS	SCP	CAN	2004: Replace SCP with CAN
PAM	ISO9141	ISO9141	2004: Carryover

UART-Based Protocol (UBP)

The UBP network is a single-wire network that allows inter-module communication. The UBP network will not operate if shorted to power or ground.

The modules on the UBP network are:

- Instrument Cluster (IC)
- Driver's Seat Module (DSM)
- Vehicle Security Module (VSM)
  - Perimeter alarm has been deleted.

For a list of related DTCs, refer to the appropriate section of the PC/ED Manual.

ISO 9141

The ISO 9141 network is used for diagnostic tests. It does not allow inter-module communication and does not operate if shorted to power or ground.

The modules on the ISO network are:

- Restraints Control Module/Advanced Restraint Module (RCM/ARM)
- Park Aid Module (PAM)

For a list of related DTCs, refer to the appropriate section of the PC/ED Manual.

High-Speed Controller Area Network (CAN)

The high-speed CAN network allows inter-module communication and still operates if one wire is shorted to ground or power. The CAN provides high communication speed needed for the Interactive Vehicle Dynamics (IVD) system.

The modules on the CAN network are:

- Antilock Brake System/Interactive Vehicle Dynamics (ABS/IVD)
- Dual Electronic Automatic Temperature Control (DEATC)
- Powertrain Control Module (PCM)
- Tire Pressure Monitor (TPM)
- Instrument Cluster (IC)

For a list of related DTCs, refer to the appropriate section of the PC/ED Manual.

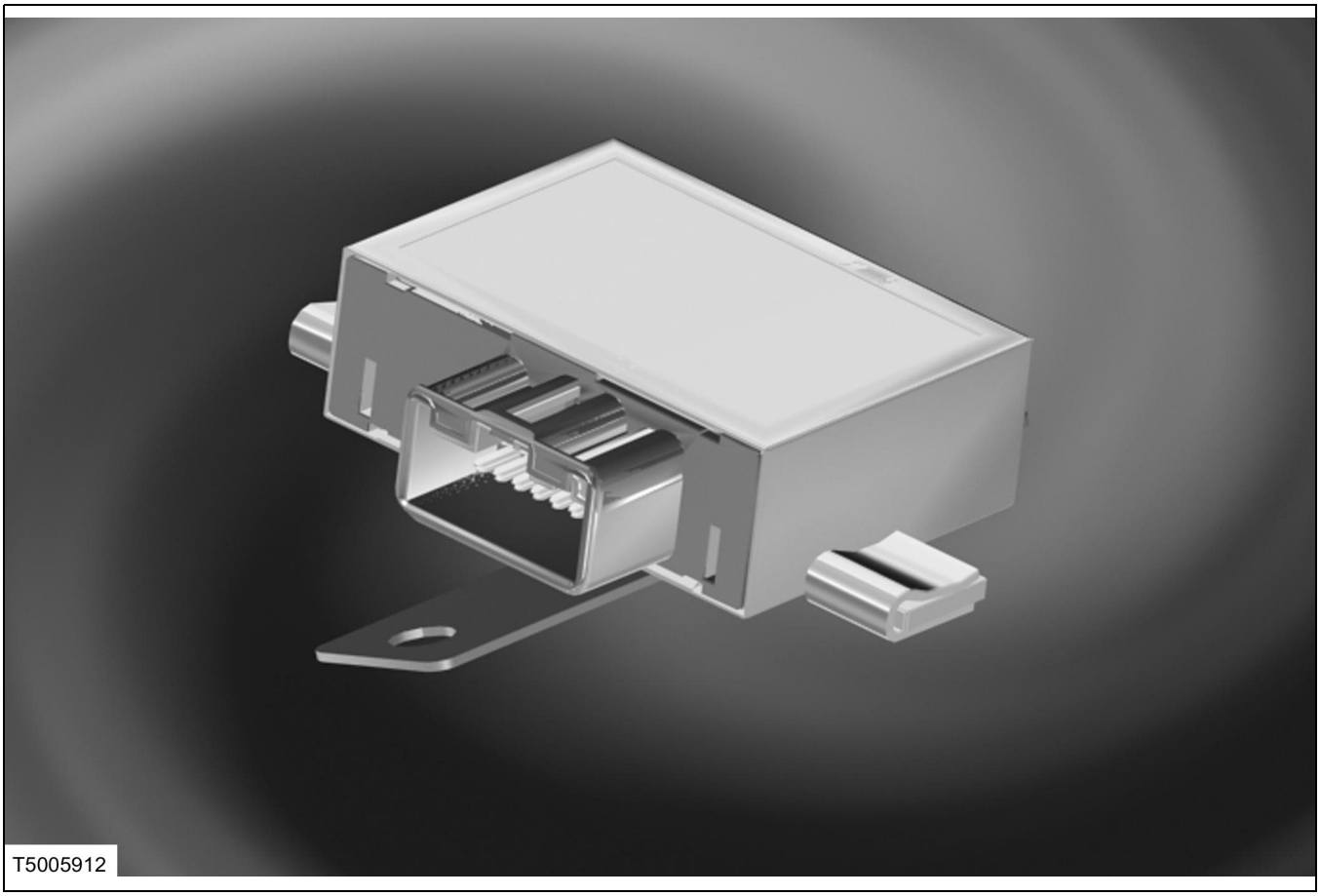
Audio Control Protocol (ACP)

The ACP network allows communication between the following:

- Radio
- DVD Unit

For a list of related DTCs, refer to the appropriate section of the PC/ED Manual.

Tire Pressure Monitoring System (TPMS)



TPMS Module

The tire pressure monitoring system (TPMS) monitors the air pressure in all tires (except for the spare). The TPMS components are:

- The TPMS module that is located behind the right-hand C-pillar trim panel.
- Four wheel-mounted TPMS sensors, one per tire (except the spare):
  - Transmit radio signals to the TPMS module approximately every 60 seconds.
  - The valve stem acts as the radio antenna and the module is the receiver.
  - Are powered by batteries which cannot be independently replaced. The batteries and sensors are serviced as an assembly.
- The TPMS module compares data from each tire pressure sensor to the low pressure limits. If the TPMS module determines that the tire pressure is below limits, the TPMS module communicates via the High Speed CAN (HSCAN) network to the vehicle message center, which then displays a warning message and illuminates the TPMS warning lamp.

TPMS Service Kit



TPMS Service Kit

If the sensors require service, a TPMS service kit is available.

The service kit number is 2L2Z-1565-AA. The kit includes:

- one special valve cap
- one nickel-plated valve core
- one grommet
- one retention nut

Each time a sensor is removed:

- Replace all parts in the service kit except the core.
- Replace the core if the core has been removed or is damaged.
- TPMS sensor is part number 2L2Z-1A150-AA.

TPMS Warning System

Messages	Conditions
WARNING — TIRE VERY LOW	One or more tires has very low pressure. When this warning message is displayed, a warning chime sounds and a telltale lights continuously, reminding the driver to stop the vehicle as soon as safely possible and check the tires for correct pressure, leaks and damage. For Explorer/Mountaineer this means at least one tire is below 25 psi.
CHECK TIRE PRESSURE	Any of the tire pressures are high or low. When this warning message is displayed, a warning chime sounds and a telltale lights continuously, reminding the driver to stop the vehicle as soon as safely possible and check the tires for correct pressure, leaks and damage. For Explorer/Mountaineer this means at least one tire is below 30 psi.
TIRE PRESSURE SENSOR FAULT	One or more tire pressure sensors are malfunctioning. TPMS telltale flashes for 20 seconds then goes out.
TIRE PRESSURE MONITOR FAULT	The message center is not configured correctly. All four wheel sensors have failed. All four wheel sensors are incorrectly trained. All four wheel sensors are missing. Internal module fault. TPMS telltale flashes for 20 seconds then goes out. All of the listed causes trigger a telltale as well as a message.

The four possible TPMS warning messages and their possible causes are listed in the table above.

NOTE: Following a repair, extinguish the warning lamp by either driving the vehicle over 20 mph (32 kph) or let it sit for approximately one hour.

TPMS Diagnosis

The TPMS system requires new procedures for diagnosis and tire service. This training course highlights the procedures and service requirements in some detail, but is not intended to take the place of the Workshop Manual. Refer to Section 204-04 in the Workshop Manual for full details.

NOTE: Tire sealing products render the TPMS sensor inoperative. Removing the sealer from the tire and wheel assembly and replacing the contaminated sensor is the only way to repair this type of damage.

The first step in diagnosis is to verify the customer concern. Then, check the fuses and make a cursory inspection to make sure:

- The tire pressure is correct.
- The tires are matched and of the proper size.
- The TPMS sensors are installed on the vehicle.

If the inspection reveals an obvious concern, repair as required. If the concern remains after the inspection, connect a diagnostic scan tool to the data link connector (DLC) and check for fault codes.

If a TPMS code is present, refer to the TPMS DTC chart for the code that applies. If no TPMS codes are present, refer to the symptom chart in the Workshop Manual. The following list is a quick reference of the more detailed chart in the Workshop Manual.

TPMS Diagnostic Trouble Codes

For reference, DTCs in the TPMS system are:

DTC	Description
B1342	ECU is defective
B2477	Module configuration failure/mismatch
B2849	Horn output relay circuit open
B2872	Tire pressure sensor fault
C2780	ECU in manufacturing mode
U0073	CAN bus off - Transmit Error
U1900	CAN communication bus fault receiver error

Tire Pressure Adjustments and Customer Satisfaction

Vehicles equipped with a Tire Pressure Monitoring System (TPMS) periodically monitor the air pressures in each tire. The TPMS informs (via the TPMS light) the customer of low tire pressure when the tire pressure is 6 psi (+/- 2 psi) below the cold tire placard pressure.

The air pressure in each tire depends on several factors; one of them being the temperature of the air inside the tire. As the air temperature inside the tire increases, the air pressure also increases. While driving in a normal manner, a typical tire may increase approximately 2 to 4 psi in inflation pressure from a cold start situation. This increase in tire pressure is a direct response to an increase in the air temperature. The air temperature depends on several factors, such as, rate of tire rotation, tire deflection, amount of braking, etc.

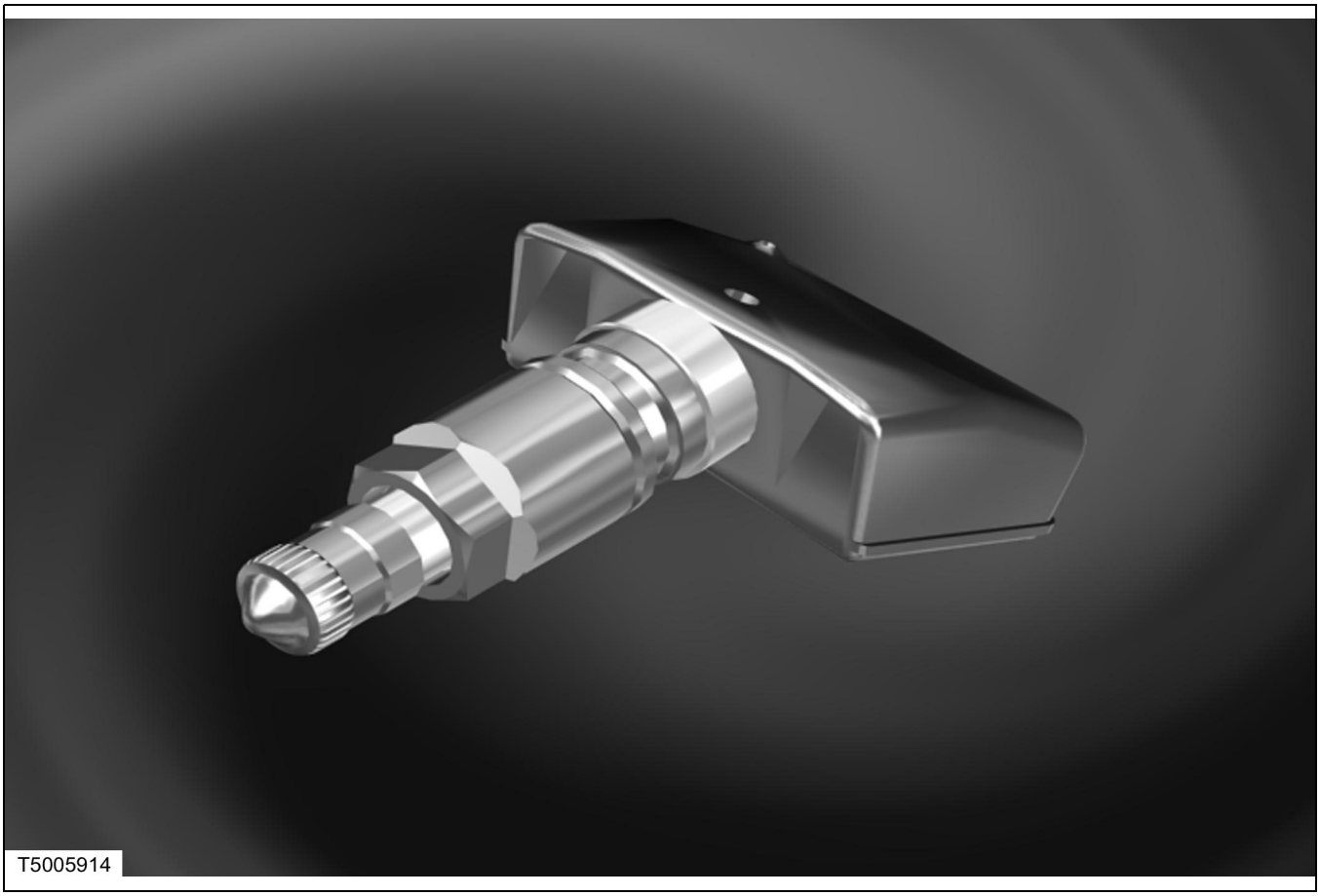
In a similar way, tire pressure decreases if the contained air temperature decreases. For example, if the vehicle is stationary overnight with the outside temperature significantly lower than the daytime temperature, the tire pressure may decrease approximately 3 psi for a drop of 30° F in ambient temperature. This lower pressure value may be detected by the TPMS as being significantly lower than the cold pressure specification, and thus, activates the TPMS warning system for low tire pressure. If the low tire pressure warning light has been set, check and inflate all road tires to the cold tire pressure specification which is recommended for this vehicle. Tire pressure adjustment may be required during colder months of the year.

- Use the following table to adjust tire pressure when your shop temperature is greater than the outside temperature.
  - This chart assumes that shop temperature is 21º C (70º F).

Tire Pressure Setting Adjustment Chart

Certification Label Pressure (psi)	This chart assumes shop temperature is 21º C (70º F). Outside Ambient Air Temperature (Degrees F)								
	-10	0	10	20	30	40	50	60	70
	Adjust Tire Pressure To:								
30	37	36	35	34	33	33	32	31	30
32	39	38	37	36	36	35	34	33	32
34	41	40	40	39	38	37	36	35	34
36	44	43	42	41	40	39	38	37	36
38	46	45	44	43	42	41	40	39	38
40	48	47	46	45	44	43	42	41	40
40	48	47	46	45	44	43	42	41	40
44	53	52	51	50	48	47	46	45	44
46	55	54	53	52	51	49	48	47	46
48	57	56	55	54	53	52	50	49	48
50	60	59	57	56	55	54	52	51	50

TPMS Removal and Installation



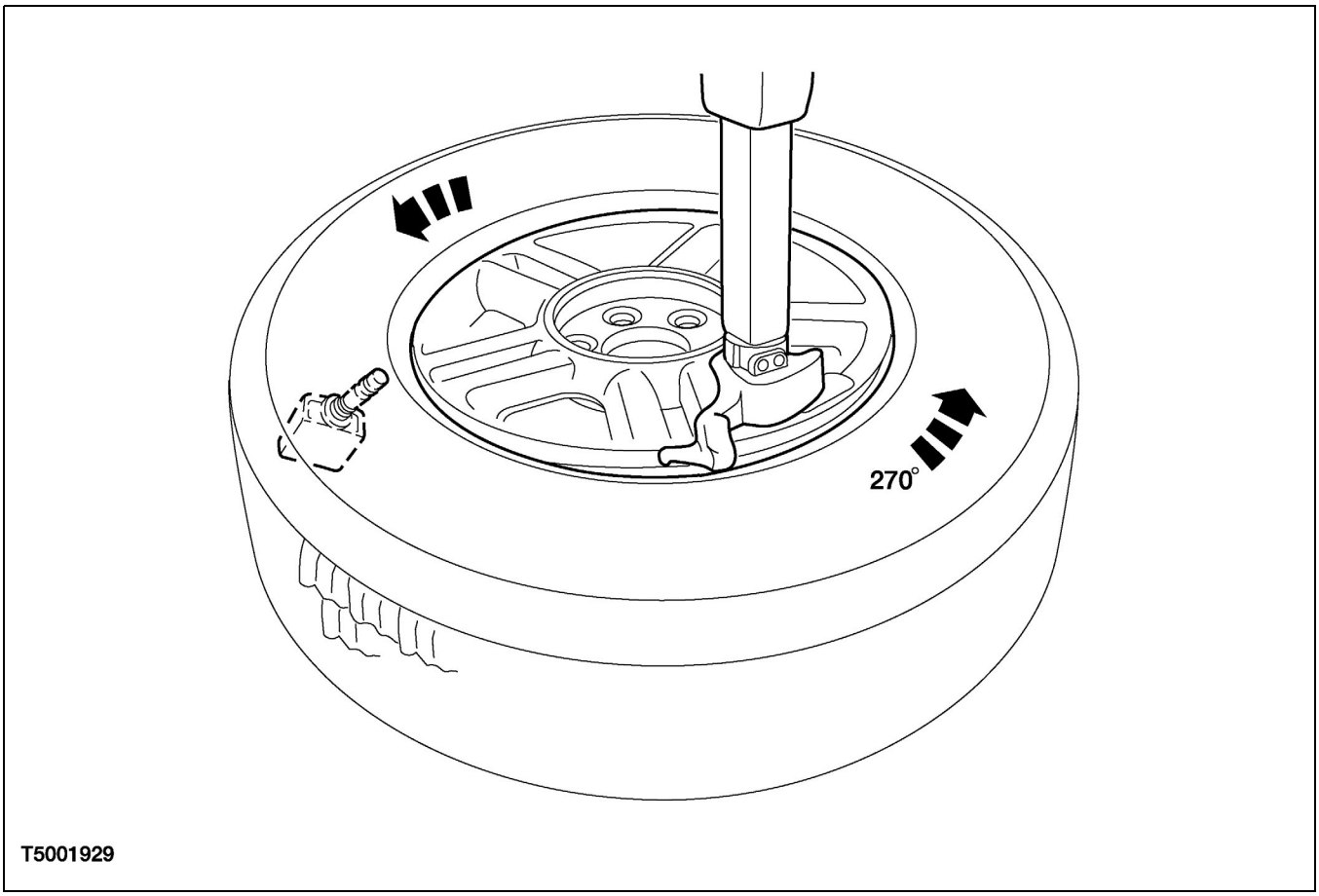
TPMS Sensor

TPMS removal requires special procedures to prevent damage to the TPMS sensors.

⚠ **CAUTION: Do not remove the valve stem core to relieve the tire pressure. If the valve stem core is inadvertently removed from the valve stem, a new nickel-plated core must be installed. Failure to use a nickel-plated core will result in corrosion and the possible loss of tire pressure.**

To remove the TPMS sensor:

1. Position the valve stem at the 6 o'clock position.
2. Remove the sensor-retaining nut and push the sensor/valve stem into the tire.
3. Place the wheel and tire on the turntable of the tire machine so that the valve stem hole is positioned 270 degrees from the mounting/dismounting fixture arm.
4. Separate both beads of the tire from the wheel. Be sure the tire machine arm does not contact the sensor.



TPMS Sensor — 270 Degrees from Contact Arm

5. Index-mark the valve stem and wheel weight positions.
6. Lubricate the bead of the tire.
7. Dismount the outside bead of the tire from the rim.
8. Remove the tire pressure sensor.

NOTE: If replacing the tire, continue with normal replacement procedures and move to step 9 only after mounting the inside bead of the new tire onto the rim.

9. Replace sensor grommet, install the sensor and tighten the retainer nut to 8 Nm (71 lb-in).
10. Lubricate and mount the outside bead of the tire to the rim. Do not allow the tire to rotate relative to the rim while mounting the tire.
11. Inflate the tire to the pressure specified on the safety certification label located on the driver door jamb.
12. Retorque sensor retaining nut to 8 Nm (71 in-lb).
13. Install the wheel and tire assembly.
14. Train the tire pressure sensors, only if replacing with new.

TPMS Sensor Training



TPMS Sensor Training

The tire pressure sensors do not need to be trained at pre-delivery, but the procedure must be performed after servicing any TPMS component.

The tire pressure sensor training procedure must be performed on one vehicle at a time, in an area with minimal radio frequency noise. Examples of radio frequency sources include electrical motors, appliances, cellular telephones and remote transmitters.

Perform the following steps to complete the training procedure:

1. With the ignition switch in the OFF position, turn to the RUN position. Repeat two more times, ending in the RUN position. Do not wait more than two seconds between each key cycle.
2. Press and release the brake pedal.
3. Turn the ignition switch to the OFF position, then to the RUN position. Repeat two more times, ending in the RUN position. Do not wait more than two seconds between each key cycle.

NOTE: If the learn mode is successfully entered, the horn will sound once to indicate to begin the sensor training. The sequence, starts on the left front, goes to the right front, then the right rear, and is completed on the left rear tire.

⚠ **WARNING: DEATH OR SERIOUS INJURY CAN OCCUR IF MAGNETICALLY SENSITIVE DEVICES ARE EXPOSED TO THIS MAGNET. MAGNETS CAN AFFECT PACEMAKERS.**

4. After the initial horn report or when the message center displays TRAIN LEFT FRONT TIRE (if equipped), place the magnet (tool number 204-324) on the valve stem of the LF tire pressure sensor. If successful, the horn will sound briefly to indicate that the TPMS module has recognized the tire pressure sensor.
5. Within two minutes after the horn sounds, remove the magnet from the LF tire valve stem and place the magnet on the valve stem of the RF tire pressure sensor. The horn will sound briefly to indicate that the TPMS module recognized the tire pressure sensor.
6. After the horn sounds for the RF sensor, remove the magnet from the RF tire valve stem and place the magnet on the valve stem of the RR tire pressure sensor. The horn will sound briefly to indicate that the TPMS module recognized the tire pressure sensor.
7. After the horn sounds for the RR sensor, remove the magnet from the RR tire valve stem and place the magnet on the valve stem of the LR tire pressure sensor. The horn will sound briefly to indicate that the TPMS module recognized the tire pressure sensor.
8. After the horn sounds for the LR sensor, remove the magnet from the LR tire valve stem and place the magnet on the valve stem of the spare tire pressure sensor. The horn will sound briefly to indicate that the TPMS module recognized the tire pressure sensor.

NOTE: If at any time during the tire training procedure, the TPMS module fails to recognize any of the four tire pressure sensors, the horn will sound twice when the module exits train mode and the message center will display TIRES NOT TRAINED-REPEAT (if equipped) . If this occurs, the sensor training procedure must be repeated from the beginning.

Instrument Cluster



Instrument Cluster

The Explorer and Mountaineer instrument cluster is a configurable Instrument Cluster (IC).

- It is essentially the same as the 2003 MY Explorer and Mountaineer with the addition of CAN communications, the TPMS and ETC warning lamp. The IC includes:
  - Microprocessor
  - Stepper Motors
  - Indicator lamp
  - Internal circuitry
- Except for replacing the lens and the bulbs, the IC can only be serviced as an assembly.

IC

The IC is connected to the CAN and UART-Based Protocol (UBP) networks.

- On the CAN network, the IC communicates with the:
  - PCM
  - TPMS
  - 4x4 Module (part of the PCM)
  - ABS
- On the UBP network, the IC communicates with:
  - VSM
  - RCM

The following chart shows the GEM functions that the IC has taken over:

GEM Delete Feature Comparison

FEATURE	2002	2002.5/2003	2004
Autolamps	GEM	BSM	BSM
Battery Saver	GEM	Cluster	Cluster
Beltminder Chime Control	GEM	ARM/Cluster	ARM/Cluster
Seat Belt Lamp Control	GEM	ARM/Cluster	ARM/Cluster
Airbag Lamp Redundant Chime	GEM	ARM/Cluster	ARM/Cluster
Delayed Accessory	GEM	Cluster	Cluster
Door Ajar Chime/Lamp	GEM	VSM/Cluster	VSM/Cluster
Head Lamps On Chime Control	GEM	Cluster	Cluster
Interior Lamps	GEM	Cluster	Cluster
Key On Ignition Chime Control	GEM	Cluster	Cluster
Puddle Lamp Control	GEM	Cluster	Cluster
Rear Defrost Timer	GEM	Cluster	Cluster
Wiper Controls (Front)	GEM	Wiper Motor	Wiper Motor
Wiper Controls (Rear)	GEM	Wiper Motor	Wiper Motor
ABS Lamp	Hardwire	SCP	CAN
Red Brake Lamp (Low Brake Fluid)	Hardwire	SCP	CAN

NOTE: When installing a new instrument cluster, the instrument cluster must be reconfigured. For additional information, refer to Section 418-00 in the Workshop Manual.

New Cluster Graphics



New Cluster Graphics

Item	Description
1	TPMS indicator
2	Stability assist indicator

Item	Description
3	ETB indicator (‘‘amber wrench’’)

The 2004 Explorer and Mountaineer feature new cluster graphics including:

- TPMS indicator
- Stability assist indicator

Instrument Cluster Self-Diagnostic Mode

Diagnostics can be entered using a diagnostic scan tool or through the on-demand self-diagnostic mode. To enter the instrument cluster self-diagnostic mode:

1. Turn the engine off.
2. Simultaneously depress and hold the message center RESET and SETUP buttons.
3. Turn the ignition switch to the RUN position and hold until the display indicates TEST. This takes from three to five seconds.
4. Depress the reset button once to advance to each stage of the self-test.
5. Record DTCs.
6. Exit the instrument cluster self-test mode by turning the ignition switch to the OFF position.

- For reference, the instrument cluster self-test mode displays and descriptions are included on the following pages.

Self-Test Mode

Message Center Cluster Display	Description
TEST	Initial entry display into self-test mode.
GAUGES SWEEP	Carries out gauge sweep of all gauges, then displays the present gauge values. Also carries out the checksum test on ROM and EEPROM.
All segments illuminated	Illuminates all odometer segments.
TEST TELLTALES	Illuminates all micro-controlled lamps and LEDs.
PART NUMBER, 4L2T-10849-##	Displays alphanumeric part number.
SERIAL NUMBER ######	Displays serial number in decimal.
IGNITION KEY	Displays key-in ignition status.
ROM LEVEL ####, CHECKSUM ####	Returns to normal operation of all micro-controlled lamps and LEDs and displays hexadecimal value for Read-Only Memory (ROM) level (used when requesting assistance from the hotline).
NVM LEVEL ##, CHKSUM ####	Displays hexadecimal ROM level and type as stored in Non-Volatile Memory (NVM).
FINAL DATE, ####	Displays hexadecimal coding of final manufacturing test date.
MODULE CONFIG, BYTE1-BYTE4=##	Displays hexadecimal of bytes 1-4 of module configuration settings.
DIAG TROUBLE, CODE: ####	Displays a 16-bit DTC in hexadecimal format. DTCs displayed are those detected in continuous operation, not during self-test.
VEHICLE SPEED, ###.# MPH	Displays English speed value being input, speedometer will indicate present speed.
VEHICLE SPEED, ###.# KPH	Displays metric speed value being input, speedometer will indicate present speed.
TACH VALUE, ####RPM	Displays the tachometer value being input to the instrument cluster. Tachometer will indicate present rpm.
FUEL LEVEL A/D, ###	Displays present fuel level analog/digital ratio input in decimal. The instrument cluster will indicate present fuel level.
FUEL LEVEL %, ###	Displays present fuel level percent status in decimal.
COOLANT TEMP, ###	Displays last temperature gauge input value from HSCAN, temperature gauge will indicate present temperature.
ODO HSCAN INPUT, ###	Displays the odometer input received through HSCAN in decimal.

Self-Test Mode (Cont.)

Message Center Cluster Display	Description
OIL PRESSURE, ###	Displays the last analog/digital reading of the oil pressure switch contact resistance, oil gauge will indicate present level.
BRAKE FLUID AD, #	Displays the brake fluid level received from the ABS module.
BATTERY VOLTS, ##.#	Displays present SBATT reading in 10th of volt.
PWM DIM STEP, ##	Displays dimming step in decimal.
PWM DIM INPUT , ###	Displays present hexadecimal pulse width modulation (PWM) dimming input.
PRNDL, ##	Displays hexadecimal value of PRNDL inputs packed into a single byte.
PARK BRAKE, #	Displays input status of the park brake switch.
LIFTGATE AJAR, #	Displays input status of liftgate ajar input.
SEATBELT, #	Displays input status of safety belt switch.
RUN/START, #	RUN/START sense circuit check.
RUN/ACC, #	RUN/ACC sense circuit check.
CHECK ENGINE, ###	Displays 8-bit hexadecimal value of HSCAN service engine soon (MIL) telltale command.
PORT A, B, E and J, ##	Displays 8-bit hexadecimal value for ports A, B, E and G (base clusters) or J (message center clusters) readings (used when requesting information from the hotline).
PORT H, IB, P, S and T, ##	Displays 8-bit hexadecimal value for ports P, S, T, CAN, AD0 and AD1 (base clusters) or H, IB, P, S and T (message center clusters) in analog/digital readings (used when requesting information from the hotline).
PORT AD00-AD17	Displays 8-bit hexadecimal value for ports AD00-AD17 in analog/digital readings (used when requesting information from the hotline).

IC DTCs

For reference, DTCs associated with the IC are:

DTC	Description
B1201	Fuel sender circuit failure
B1204	Fuel sender circuit short to ground
B1205	EIC switch-1 assembly circuit failure
B1209	EIC switch-2 assembly circuit failure
B1255	Air temperature external sensor circuit open
B1257	Air temperature external sensor circuit short to ground
B1317	Battery voltage high
B1318	Battery voltage low
B1342	ECU is defective
B1345	Heated backlite input circuit short to ground
B1352	Ignition key-in circuit failure
B1360	Ignition run/acc circuit open
B2143	Odometer NVM memory failure
B2477	Module configuration failure
B2499	Courtesy lamp output failure
B2659	Courtesy switch fault
C1284	Oil pressure switch failure
U1950	UBP communication bus fault
U2013	Compass module is not responding
U1900	CAN communication BUS fault - receive error

Climate Controlled Seats

Heated Seats



Heated Seats

The heated seats are now ‘‘module-less’’.

- The heating pads are now controlled directly by their respective heated seat switches.
  - When the heated seat switch is in the ON position, the heated seat feature will be enabled.
  - A thermostat (located in each seat cushion) stops current flow to the heating pads if the temperature exceeds 71° C (160° F).
  - There is no longer a ‘‘timer’’ feature that allows the system to ‘‘time out’’.
  - If an occupant has enabled the heated seat feature prior to the ignition being turned off, it will still be enabled when the ignition key is turned back on.
- Diagnosis and service of the heating pads and switch are the same as prior model Explorer and Mountaineers.
  - The seatback and seat cushion heating pads are serviceable separately from the remainder of the seat assembly.

Quad Seating Package



Quad Seating Package

The quad seating feature (similar to Aviator) has been added to the list of seating options.

- The 2004 Explorer/Mountaineer second row seating options are as follows:
  - A 40/20/40 seating arrangement, where there are three seperate seating surfaces.
  - A 60/40 seating arrangement where there are two seperate seating surfaces. One seating surface accomodates two passengers.
  - A 50/50 seating arrangement (quad seating) where there are two seperate seating surfaces that accomodates one passenger each.
- The quad seating is a carryover design from the Aviator with the following exceptions:
  - Seat foam and trim have been changed to match Explorer/Mountaineer interior options.
- Diagnosis and service is similar to previous model Explorer/Mountaineers.

ESSENTIAL SPECIAL SERVICE TOOLS

NOTES

APPENDIX: ESSENTIAL SPECIAL SERVICE TOOLS

GLOSSARY OF TERMS

NOTES

FCSD

Technical Training

Questions/Comments/Suggestions FAX Form

Please use this form to contact us regarding Technical Training Courses on FORDSTAR
Fax this form to the Technical Training FAX-Line at 313-317-7194

Dealership _____ Your Name _____

Phone Number _____ Course _____

Dealer P&A Code _____ Date You Took Course _____

Dealer FAX Phone _____ Your I.D. Number _____

Please write your questions, comments, or suggestions:

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If you have a concern, how would you like it resolved?

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Thanks for your Feedback!