Computers and Control Systems: Symptom Related Diagnostic Procedures
Diagnostic Routines

Test Step	Result ▶	Action to Take
1-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Battery connections. — Starter relay connections. — Transmission in Park (A/T) or Neutral (M/T). — Clutch fully depressed. — Alarm / anti-theft devices. — Fuses / fuse links. • **Are all checks OK?**	Yes ▶ No ▶	GO to 1-2. SERVICE as necessary. VERIFY a symptom no longer exists.
1-2 LISTEN FOR STARTER RELAY "CLICKING"		
• **Is a "clicking" sound heard from the starter relay when the ignition key is turned to START?**	Yes ▶ No ▶	GO to 1-3. GO to 1-5.
1-3 CHECK STARTING SYSTEM SECONDARY CIRCUITS		
• check starter, starter ground, starter relay cable to starter, battery or other related components for correct function. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 1-4.
1-4 CHECK BASE ENGINE		
• Check for base engine concerns (such as seized / hydro-locked engine, damaged flywheel). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. VERIFY test results. If OK, RETURN to Symptom Charts to service any additional symptoms.
1-5 CHECK OPERATION OF OTHER ELECTRICAL ACCESSORIES		
• **Do any other electrical accessories work (such as the headlights, radio)?**	Yes ▶ No ▶	GO to 1-6. SERVICE Electrical System as required.

Test Step		Result ▶	Action to Take
1-6	PERFORM PCM KOEO SELF-TEST. ALSO RETRIEVE ANY CONTINUOUS MEMORY DTCs.		
	• Go to Diagnostic Subroutine Step DSR10.	Yes ▶	FOLLOW Diagnostic Subroutine direction.
	• **Is a fault indicated?**	No ▶	GO to 1-7.
1-7	CHECK STARTING SYSTEM PRIMARY CIRCUITS		
	• Check the starting system primary circuits:	Yes ▶	SERVICE as required.
	— Check starter relay, brake interlock switch, ignition switch.	No ▶	VERIFY test results. RETURN to Symptom Index to service any additional symptoms.
	— Check transmission linkage adjustment, Transmission Range (TR) sensor adjustment, clutch switch.		
	• **Is a fault indicated?**		

Test Step		Result ▶	Action to Take
2-1	PRELIMINARY CHECKS		
	NOTE: Confirm that the correct starting procedure was used by the customer before proceeding with diagnosis.	Yes ▶	GO to 2-2.
	• Perform the following preliminary checks: — Vacuum leaks. — Fuel quality (concerns such as proper octane, contamination, winter/summer blend). — Intake air system (tubes). — Air cleaner (restrictions). — Battery condition and starter current draw.	No ▶	SERVICE as necessary. VERIFY a symptom no longer exists.
	• **Are all checks OK?**		
2-2	PERFORM PCM QUICK TEST		
	• Go to Diagnostic Subroutine Step DSR1.	Yes ▶	FOLLOW Diagnostic Subroutine direction.
	• **Is a fault indicated?**	No ▶	GO to 2-3.
2-3	CHECK SECONDARY IGNITION SYSTEM		
	• **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs.	Yes ▶	FOLLOW Pinpoint Test Step direction.
	• **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system.	No ▶	GO to 2-4.
	• **Is a fault indicated?**		
2-4	CHECK FUEL DELIVERY SYSTEM		
	• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1.	Yes ▶	FOLLOW Pinpoint Test direction.
	• **For Probe:** — Go to Pinpoint Test HC -Test Notes.	No ▶	GO to 2-5.
	• **All Others:** — Go to Pinpoint Test Step HC1.		
	• **Is a fault indicated?**		

Test Step		Result ▶	Action to Take
2-5	CHECK EXHAUST SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test. • Go to Pinpoint Test Step HF1* for restricted exhaust system diagnosis. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 2-6.
2-6	IS ENGINE OVERHEATING (HOT START CONCERN ONLY)?		
	• **For hot start concerns, does the engine appear to be overheating?**	Yes ▶ No ▶	GO to Cooling System Concerns: Overheating GO to 2-7.
2-7	CHECK PCV SYSTEM		
	• Go to Pinpoint Test Step HG1* for PCV System diagnosis. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. GO to 2-8.
2-8	CHECK EVAP SYSTEM		
	• **For Taurus/Sable, Crown Victoria/Grand Marquis, Town Car, Mark VIII, Windstar, Explorer/Mountaineer, Expedition/Navigator and 4.2L/4.6L/5.4L/6.8L E/F-Series:** — Go to Pinpoint Test Step HX39. • **For Probe:** — Go to Pinpoint Test Step HV1. • **All Others:** — Go to Pinpoint Test Step HW8. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 2-9.
2-9	CHECK INTAKE AIR SYSTEM		
	• Go to Pinpoint Test Step HU1* to check the intake air system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. GO to 2-10.
2-10	FOR 4.6L 4V MUSTANG, CHECK SECONDARY CIRCUITS USED FOR HIGH SPEED FUEL PUMP OPERATION		
	• For 4.6L 4V Mustang, go to Pinpoint Test Step X210 (to check secondary circuits used for high speed fuel pump operation). • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 2-11.

Test Step		Result ▶	Action to Take
2-11	CHECK STARTING SYSTEM		
	• Check the starting system. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 2-12.
2-12	ADDITIONAL CHECKS		
	• Additional checks: — Check for contaminated Mass Air Flow (MAF) sensor. — For Distributor Ignition (DI) applications, check engine block ground (check for symptom using a jumper cable from the battery negative post to the block). • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. SERVICE as necessary. VERIFY a symptom no longer exists.

Test Notes

Extended cranking because of a "No Start" can load the exhaust system with raw fuel, damaging the catalytic converter. For applications with

Secondary Air Injection **(AIR)** systems, perform the following after the no start condition has been repaired:

Electric Air Injection (AIR) System

Disconnect the Electric Secondary AIR Solid State Relay, run the engine until the surplus fuel is used up, and reconnect the relay. Disconnecting the relay may set a Powertrain Control Module **(PCM)** Diagnostic Trouble Code **(DTC)**. After all service has been completed, clear the PCM Continuous Memory DTCs.

Other AIR Applications

Disconnect the secondary air supply, run the engine until the surplus fuel is used up, and reconnect secondary air supply.

Test Step		Result	Action to Take
3-1	PRELIMINARY CHECKS		
	• Perform the following preliminary checks: — Fuel quality. — Inertia Fuel Shutoff Switch. — Any external fuel shutoff devices (such as kill switch, alarm). — Electrical connections. — Intake air tube integrity. — Fuses and relays. • **Are all checks OK?**	Yes ▶ No ▶	GO to 3-2. SERVICE as necessary. VERIFY a symptom no longer exists.
3-2	PERFORM PCM KOEO SELF TEST. ALSO RETRIEVE ANY CONTINUOUS MEMORY DTCs.		
	• Go to Diagnostic Subroutine Step DSR10. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 3-3.
3-3	DOES THE ENGINE START NOW WITH THE THROTTLE CLOSED?		
	• **Does the engine start now with the throttle closed?**	Yes ▶ No ▶	GO to 3-8. GO to 3-4.
3-4	IDLE AIR CONTROL (IAC) CHECK		
	• Attempt to start the engine at part throttle. • **Will the engine start and run smoothly at part throttle?**	Yes ▶ No ▶	Possible IAC concern. GO to Pinpoint Test Step KE2. GO to 3-5.
3-5	CHECK IGNITION/FUEL SYSTEM		
	• **For Electronic Ignition (EI) applications and Probe:** — Go to Pinpoint Test Step A1. • **For Distributor Ignition (DI) applications:** — Go to Pinpoint Test Step A20. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. GO to 3-6.
3-6	CHECK EXHAUST SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test • Go to Pinpoint Test Step HF1* to check for restricted exhaust system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. GO to 3-7.
3-7	CHECK BASE ENGINE		
	• Check for base engine concerns (such as damaged camshaft, improper compression). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 3-8.

Test Step		Result ▶	Action to Take
3-8	ADDITIONAL CHECKS		
• Additional checks: — For DI applications, check engine block ground (check for symptom using a jumper wire from the battery negative post to the block). • **Are all checks OK?**		Yes ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms.
		No ▶	SERVICE as necessary. VERIFY a symptom no longer exists.

Test Step		Result ▶	Action to Take
4-1	PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Vacuum leaks. — Throttle linkage. — Intake air system. — Throttle body. • **Are all checks OK?**		Yes ▶	GO to 4-2.
		No ▶	SERVICE as necessary. VERIFY a symptom no longer exists.
4-2	PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**		Yes ▶	FOLLOW Diagnostic Subroutine direction.
		No ▶	GO to 4-3.
4-3	CHECK PCV SYSTEM		
NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test. • Go to Pinpoint Test Step HG1* to check PCV system. • **Is a fault indicated?**		Yes ▶	FOLLOW Pinpoint Test direction.
		No ▶	GO to 4-4.
4-4	CHECK INTAKE AIR SYSTEM		
• Go to Pinpoint Test Step HU1* to check for air leaks. • **Is a fault indicated?**		Yes ▶	FOLLOW Pinpoint Test direction.
		No ▶	VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step		Result ▶	Action to Take
5-1	VERIFY ENGINE OPERATES AT NORMAL OPERATING TEMPERATURE		
	• **Does the engine appear to be either overheating or not reaching normal operating temperature (for all except the 5.4L and 6.8L, the ECT PID at normal operating temperature should read between .35 (112°C/232°F) and .75 (82°C/180°F) volt)?**	Yes ▶	GO to cooling system concerns Symptom Chart 17 for an overheating condition or Symptom Chart 18 for a runs cold condition.
		No ▶	GO to 5-2.
5-2	PRELIMINARY CHECKS		
	• Perform the following preliminary checks: — Vacuum leaks. — Throttle plate and linkage. — Speed control linkage binding / sticking. — Intake air tube (leaks). — Proper sealing of intake manifold and components attached to intake air (such as the EGR valve or IAC valve). • **Are all checks OK?**	Yes ▶ No ▶	GO to 5-3. SERVICE as necessary. VERIFY a symptom no longer exists.
5-3	PERFORM PCM QUICK TEST		
	• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 5-4.
5-4	CHECK FOR BASE ENGINE AIR LEAKS		
	• Check for base engine air leaks (such as intake manifold gasket air leaks). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required according to Service Manual direction. GO to 5-5.
5-5	CHECK INTAKE AIR SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test . • Go to Pinpoint Test Step HU1* to check the intake air system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
6-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Vacuum lines (routing, leaks). — Idle Air Control (connections). — Intake air tubes. — Wiring connections. • **Are all checks OK?**	Yes ▶ No ▶	GO to 6-2. SERVICE as necessary. VERIFY a symptom no longer exists.
6-2 DOES THE ENGINE IDLE ROUGH?		
• **Does the engine idle rough?**	Yes ▶ No ▶	GO to Symptom Chart 7. GO to 6-3.
6-3 IDLE AIR CONTROL (IAC) CHECK		
• Start engine and let idle. • Note rpm. • While checking for RPM drop or engine stall, disconnect IAC valve. • After testing, reconnect IAC valve. • **Did rpm drop or engine stall?**	Yes ▶ No ▶	IAC check passes. GO to 6-4. An Idle Air Control system fault may be present. GO to Pinpoint Test Step KE1.
6-4 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 6-5.
6-5 CHECK TRANSMISSION (FOR A/T WITH STALLS/QUITS ON DECELERATION)		
• For A/T with stalls/quits on deceleration, go to **Automatic Transmission / Testing and Inspection.** • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 6-6.

Test Step		Result ▶	Action to Take
6-6	FOR LOW IDLE WITH A/C ON, CHECK ACCS PID (E/F SERIES, EXPEDITION AND NAVIGATOR)		
	NOTE: This test step will determine if the PCM is receiving the ACCS signal (On the applications to be tested, the PCM does not have the ability to turn the A/C off. The ACCS signal informs the PCM of the additional A/C load). • Scan Tool connected. • Start engine. • Access ACCS PID. • Turn A/C on (verify A/C clutch engages). • Check the ACCS PID. • Key off, A/C off. • **Is the ACCS PID on with the A/C clutch engaged?**	Yes ▶ No ▶	The ACCS input is OK. GO to 6-7. ACCS input fault. GO to Pinpoint Test Step KM10.
6-7	CHECK LOAD INPUTS TO PCM (PROBE ONLY)		
	• For Probe with a low idle when one of the following components are on: blower motor, daytime running lamps, headlamps or rear window defrost, go to Pinpoint Test Step FE1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 6-8.
6-8	CHECK FUEL DELIVERY SYSTEM		
	• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Test HC - **Test Notes.** • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. GO to 6-9.
6-9	CHECK INTAKE AIR SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test. • Go to Pinpoint Test Step HU1* to check the intake air system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 6-10.

Test Step		Result ▶	Action to Take
6-10	ADDITIONAL CHECKS		
	• Additional checks: — Base engine. — Ignition (timing, secondary). — Refer to Symptom Chart 7 for other possible causes of a stalling symptom. • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. SERVICE as necessary. VERIFY a symptom no longer exists.

Test Step		Result ▶	Action to Take
7-1	PRELIMINARY CHECKS		
	• Perform the following preliminary checks: — Vacuum lines (routing, integrity). — Air filter (restricted). — Intake air tubes (leaks, restrictions). — Proper sealing of intake manifold and components attached to intake air (such as EGR valve or IAC valve). — Ignition wiring. — Fuel quality (concerns such as proper octane, contamination, winter / summer blend). — Electrical connections. — Be aware of the over rpm and speed limiting functions of the PCM. • **Are all checks OK?**	Yes ▶ No ▶	GO to 7-2. SERVICE as necessary. VERIFY a symptom no longer exists.
7-2	DOES ENGINE NOW STALL AT IDLE IN PARK / NEUTRAL?		
	• **Does the engine now stall at idle in Park / Neutral?**	Yes ▶ No ▶	Engine stalls now. GO to 7-6. GO to 7-3.

Test Step		Result ▶	Action to Take
7-3	DOES THE ENGINE IDLE ROUGH IN PARK/NEUTRAL?		
	• **Does the engine idle rough in Park/Neutral?**	Yes ▶	Engine idles rough. GO to 7-9.
		No ▶	GO to 7-4.
7-4	PERFORM PCM QUICK TEST		
	• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
		No ▶	GO to 7-11.
7-6	ENGINE STALLS NOW: PERFORM PCM KOEO SELF-TEST. ALSO RETRIEVE ANY CONTINUOUS MEMORY DTCs.		
	• Go to Diagnostic Subroutine Step DSR10. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
		No ▶	GO to 7-7.
7-7	IDLE AIR CONTROL (IAC) CHECK		
	• Attempt to start engine at part throttle. • **Does engine start and run smoothly at part throttle?**	Yes ▶	Possible IAC system concern. GO to Pinpoint Test Step KE2.
		No ▶	GO to 7-13.
7-9	ROUGH IDLE: PERFORM PCM KOEO SELF-TEST. ALSO RETRIEVE ANY CONTINUOUS MEMORY DTCs.		
	• Go to Diagnostic Subroutine Step DSR10. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
		No ▶	GO to 7-10.
7-10	IDLE AIR CONTROL (IAC) CHECK		
	• Start engine and let idle. • While checking for rpm drop or engine stall, disconnect IAC valve. • After testing, turn key off and reconnect IAC valve. • **Did rpm drop or engine stall when the IAC valve was disconnected?**	Yes ▶	IAC check passes. GO to 7-11.
		No ▶	Possible IAC system fault. GO to Pinpoint Test Step KE1.
7-11	CHECK PIDS		
	• Go to Diagnostic Subroutine Step DSR20. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
		No ▶	GO to 7-12.
7-12	CHECK LOAD INPUTS TO PCM (FOR PROBE WITH ROUGH IDLE ONLY)		
	• For Probe with a rough/low idle when one of the following components are on: blower motor, daytime running lamps, headlamps or rear window defrost, go to Pinpoint Test Step FE1. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction.
		No ▶	GO to 7-13.

Test Step		Result ▶	Action to Take
7-13	CHECK SECONDARY IGNITION SYSTEM		
	• **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 7-14.
7-14	CHECK FUEL DELIVERY SYSTEM		
	• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Test HC - Test Notes. • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 7-15.
7-15	CHECK EXHAUST SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test • Go to Pinpoint Test Step HF1* to check the exhaust system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 7-16.
7-16	CHECK PCV SYSTEM		
	• Go to Pinpoint Test Step HG1* to check the PCV system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 7-17.
7-17	CHECK TRANSMISSION (A/T ONLY)		
	• **For A/T, go to Automatic Transmission / Testing and Inspection.** • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required . GO to 7-18.

Test Step		Result ▶	Action to Take
7-18	CHECK EVAP SYSTEM		
	• **For Taurus/Sable, Crown Victoria/Grand Marquis, Town Car, Mark VIII, Windstar, Explorer/Mountaineer, Expedition/Navigator and 4.2L/4.6L/5.4L/6.8L E/F-Series:** — If symptom is "engine stalls", go to Pinpoint Test Step HX75. — For other symptoms, go to Pinpoint Test Step HX39. • **For Probe:** — Go to Pinpoint Test Step HV1. • **All others:** — Go to Pinpoint Test Step HW8. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 7-19.
7-19	CHECK BASE ENGINE		
	• Check for base engine concerns. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 7-20.
7-20	CHECK INTAKE AIR SYSTEM (for the following symptoms only: Stalls/quits at idle, runs rough at idle, rolling idle or symptoms associated with a sticking throttle body)		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test. • For the symptoms listed above, go to Pinpoint Test Step HU1* to check the intake air system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. GO to 7-21.
7-21	CHECK TRACTION CONTROL SYSTEM (Continental with Traction Control option only)		
	• For Continental with optional Traction Control, *go to Pinpoint Test Step HT50* to check Traction Control. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 7-22.
7-22	CHECK A/C PRESSURE SENSOR INPUT TO PCM (Escort/Tracer, Continental, Mark VIII)		
	• For applications with an A/C Pressure sensor and idle concerns with the A/C on, go to Pinpoint Test Step DS22. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 7-23.

Test Step		Result ▶	Action to Take
7-23	ADDITIONAL CHECKS		
	• Additional checks: — Driveline. — Transmission/clutch (M/T). — Charging system. — Optional Traction Control system (Contour/Mystique). — A/C system (for surge with A/C on). — Speed Control system (for surge with speed control on). — A/C compressor diode (for rolling idle and/or stumble when A/C cycles on). • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. SERVICE as necessary. VERIFY a symptom no longer exists.

Test Step	Result ▶	Action to Take
8-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Vacuum lines (check for damage and proper routing). — Spark plug wire routing (proper firing order). • **Are all checks OK?**	Yes ▶ No ▶	GO to 8-2. SERVICE as necessary. VERIFY a symptom no longer exists.
8-2 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 8-3.
8-3 CHECK SECONDARY IGNITION SYSTEM		
• **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 8-4.
8-4 CHECK FUEL DELIVERY SYSTEM		
• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Test HC - **Test Notes.** • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 8-5.
8-5 CHECK BASE ENGINE		
• check for base engine concerns (such as improper compression, worn camshaft / valvetrain, gasket leaks). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 8-6.

Test Step	Result ▶	Action to Take
8-6 CHECK EXHAUST SYSTEM		
NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test. • Go to Pinpoint Test Step HF1* for catalyst and exhaust system diagnosis. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms.

Test Notes

Verify symptom is reported under normal driving conditions without excessive engine/vehicle load conditions.

NOTE: For applications with Linear Knock Sensor (4.0L SOHC, 5.4L, and 6.8L trucks), a lack of power may result when the vehicle is operated with a breakout box installed at the Powertrain Control Module **(PCM)**. The Knock Sensor circuits are not shielded in the breakout box and Knock Sensor noise may be noticed by the PCM. If this happens spark timing will be retarded and a lack of power will result.

Test Step		Result ▶	Action to Take
9-1	PRELIMINARY CHECKS		
	• Perform the following preliminary checks: — Vacuum lines (check for damage and proper routing). — Intake air system (check for damaged tubes and dirty air filter). — Vehicle wiring (disconnected, corroded / damaged). — Throttle linkage. — Radiator (obstructed). — Transmission (fluid check). — Be aware of the over rpm / speed limiting functions of the PCM. • **Are all checks OK?**	Yes ▶ No ▶	GO to 9-2. SERVICE as necessary. VERIFY a symptom no longer exists.
9-2	PERFORM PCM QUICK TEST		
	• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 9-3.
9-3	CHECK PIDS		
	• Go to Diagnostic Subroutine Step DSR20. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 9-4.
9-4	CHECK INTAKE MANIFOLD TUNING VALVE (4.6L F-Series only)		
	• Scan Tool connected. • Access IMTVF PID. • Monitor the IMTVF PID in the following conditions: — Key on, engine off. — Transmission in Park / Neutral and engine rpm greater than 2800 rpm. • **Does the IMTVF PID read "YES" in either condition?**	Yes ▶ No ▶	A fault is detected. GO to Pinpoint Test Step HU65. GO to 9-5.

Test Step		Result ▶	Action to Take
9-5	CHECK FUEL PRESSURE REGULATOR CONTROL SOLENOID (Probe only)		
	• For Probe, go to Pinpoint Test Step KN1 (to check for damaged fuel pressure regulator control solenoid). • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 9-6.
9-7	CHECK FUEL DELIVERY SYSTEM		
	• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Test HC - **Test Notes** • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 9-8.
9-8	CHECK SECONDARY IGNITION SYSTEM		
	• **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 9-9.
9-9	CHECK EXHAUST SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test. • Go to Pinpoint Test Step HF1* to check the exhaust system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 9-10.
9-10	INSPECT SERIES THROTTLE ASSEMBLY (Continental with Traction Control option only)		
	• For Continental with optional Traction Control, go to Diagnostic Subroutine Step DSR25. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 9-11.
9-11	CHECK BASE ENGINE		
	• check for base engine concerns (such as improper compression, worn camshaft / valvetrain, gasket leaks). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 9-12.

Test Step		Result ▶	Action to Take
9-12	CHECK AUTOMATIC TRANSMISSION (A/T)		
	• For A/T, go to Transmission and Drivetrain (Diagnosis By Symptom-Poor Performance).	Yes ▶	SERVICE as required.
	• **Is a fault indicated?**	No ▶	GO to 9-13.
9-13	CHECK FOR BRAKE SYSTEM CONCERNS		
	• Check for brake system concerns (such as drag or binding).	Yes ▶	SERVICE as required.
	• **Is a fault indicated?**	No ▶	GO to 9-14.
9-14	CHECK FOR LACK OF A/C CUTOFF UNDER WOT CONDITIONS (applications with CCRM or WOT A/C cut-off relay)		
	• **For applications with CCRM or WOT A/C cut-off relay, does the A/C cut off under WOT conditions (refer to Chart 25, step 25-2, for procedure to check for A/C cutoff)?**	Yes ▶ No ▶	GO to 9-15. GO to Symptom Chart 25.
9-15	CHECK HIGH SPEED FUEL PUMP SECONDARY CIRCUITS (4.6L 4V Mustang only)		
	• For 4.6L 4V Mustang, go to Pinpoint Test Step X210 (to check secondary circuits used for high speed fuel pump operation). • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 9-16.
9-16	ADDITIONAL CHECKS		
	• Additional checks: — Customer driving habits (such as excessive loads or over rpm/speed limiting functions enabled). — Ignition base timing (if not previously checked). — Optional Traction Control system (Contour/Mystique). — IMRC linkage. — Clutch (M/T). — Charging system. • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. SERVICE as necessary. VERIFY a symptom no longer exists.

Test Step	Result ▶	Action to Take
10-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Vacuum lines. — Fuel (concerns such as fuel quality or proper grade). — Engine overheating. — Intake air system. • **Are all checks OK?**	Yes ▶ No ▶	GO to 10-2. SERVICE as necessary. VERIFY a symptom no longer exists.
10-2 CHECK IF ENGINE IS OVERHEATING		
• NOTE: For all except 5.4L and 6.8L, with the engine running and the temperature stabilized the ECT PID should be greater than .30 volt (temperature less than 116°C/240°F). • **Does the engine appear to be overheating?**	Yes ▶ No ▶	Engine is overheating. GO to Symptom Chart 17 GO to 10-3.
10-3 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 10-4.
10-4 CHECK BASE ENGINE		
• Check for base engine concerns (such as improper compression, valvetrain or camshaft damage, gasket leaks). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required GO to 10-5.
10-5 CHECK FUEL DELIVERY SYSTEM		
• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — *Go to Pinpoint Tests*, Pinpoint Test HC. • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 10-6.

Test Step	Result ▶	Action to Take
10-6 CHECK SECONDARY IGNITION SYSTEM • **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 10-7.
10-7 CHECK PCV SYSTEM NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint Test Notes. • Go to Pinpoint Test Step HG1* to check the PCV system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 10-8.
10-8 CHECK OCTANE ADJUST INPUT TO PCM (applications with Electronic Ignition and OCT ADJ Circuit to PCM Pin 30) • For applications with Electronic Ignition and OCT ADJ Circuit to PCM Pin 30, go to Pinpoint Test Step FG5 • **Is a fault indicated, or is symptom removed?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 10-9.
10-9 CHECK KNOCK SENSOR (KS) INPUT (applications with Knock Sensor) • For applications with KS, go to Pinpoint Test Step DG1 • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 10-10.
10-10 ADDITIONAL CHECKS • Additional checks: — Ignition base timing (if not previously checked). — Intake air system. — Engine oil quality. — If available, check TSBs for Octane Adjust information. • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. SERVICE as necessary. VERIFY a symptom no longer exists.

Test Notes

Since driving habits can have a significant influence on fuel economy, verify the concern before starting an in-depth diagnosis. Also, the following external factors could contribute to "poor fuel economy" conditions:

- Stop/Go City Driving.
- Improper Tire Pressure/Size.
- Vehicle Loads (Trailer Towing, etc.).
- Extended Winter Warm-up Conditions.
- High Speed Driving.
- Improper Axle Ratio.
- Improper Speedometer Gear Ratio.
- Road/Weather Conditions.
- Aftermarket Add-ons.
- Short-Run Operations.
- Customer Expectations/Driving Habits.

Test Step	Result ▶	Action to Take
11-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Air cleaner tube blockage. — Contaminated air cleaner element. — Transmission fluid level. — Fuel quality. — Coolant level. • **Are all checks OK?**	Yes ▶ No ▶	GO to 11-2. SERVICE as necessary. VERIFY a symptom no longer exists.
11-2 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 11-3.
11-3 CHECK PIDS		
• Go to Diagnostic Subroutine Step DSR20. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 11-4.
11-4 CHECK SECONDARY IGNITION SYSTEM		
• ***For Coil On Plug applications* (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 11-5.

Test Step	Result ▶	Action to Take
11-5 CHECK FUEL DELIVERY SYSTEM • **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Tests, Pinpoint Test HC. • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 11-6.
11-6 CHECK EXHAUST SYSTEM NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint Test Notes. • Go to Pinpoint Test Step HF1* to check the exhaust system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 11-7.
11-7 CHECK AUTOMATIC TRANSMISSION (A/T) • For A/T, go to the Transmission and Drivetrain (Diagnosis By Symptom - Poor Performance). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 11-8.
11-8 CHECK PCV SYSTEM • Go to Pinpoint Test Step HG1* to check the PCV system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 11-9.
11-9 ADDITIONAL CHECKS • Additional checks: — Brake drag. — Base engine concerns. — Incorrect PCV valve. — Contaminated MAF sensor. — Intake air system. — Cooling system. • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. SERVICE as necessary. VERIFY a symptom no longer exists.

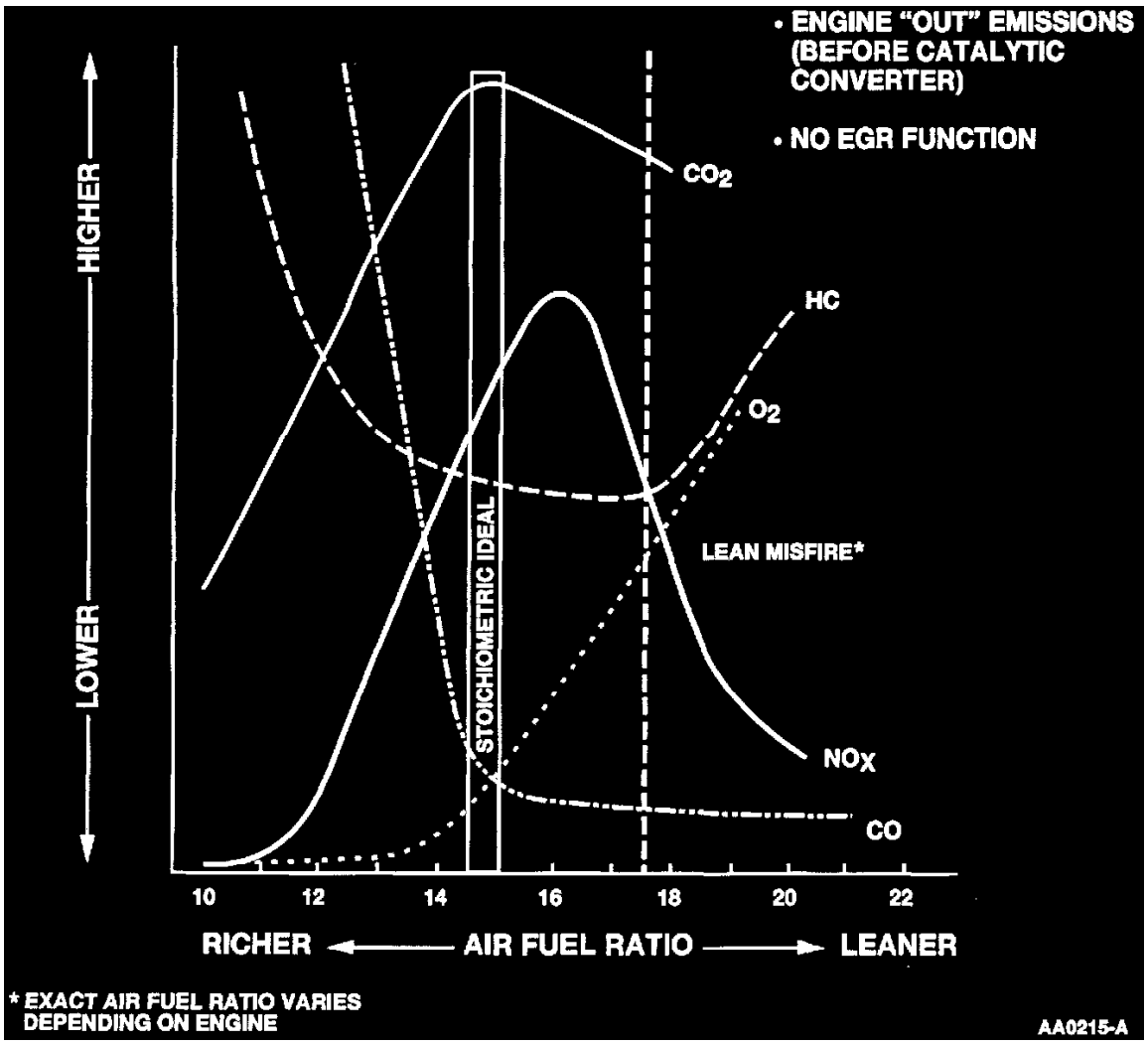
Test Notes

Inspection and Maintenance Tests

Canada and some states or metropolitan areas in the United States require periodic Emission, or Inspection and Maintenance **(I/M)** Tests. All Ford products have been designed to pass these tests. If a Ford product fails an I/M Test, it is probable that 1) the engine or catalyst temperature was not warm and stabilized before the test, or 2) the vehicle had idled excessively before the test.

If any emission components are replaced, perform the following before repeating the I/M Test procedure:

1. Clear Keep Alive Random Access Memory **(RAM)**, Powertrain Control Module **(PCM)** Reset
2. To relearn some basic Adaptive Learning, run engine at 2500 rpm for one minute and idle engine for two minutes.



Exhaust Gas Analysis Chart

Verifying an Excessive Grams Per Mile (GPM) Indication Using a Parts Per Million (PPM) Reading

For the vehicle's gas reading(s) that is excessive, compare the actual GPM reading to the gas cut point level needed to pass testing. Determine how much the actual GPM reading is over the cut point. This will give an indication of how much the PPM reading will have to be reduced (if the actual reading is twice the cut point, the baseline reading will have to be cut in half or more).

Example:

- The actual HC produced by a vehicle was 1.6 GPM. The cut point for HC in this example is 0.8 GPM. The actual reading is twice the cut point.
- The HC reading obtained for the same vehicle during the baseline drive averages 440 PPM. In order for this vehicle to pass the I/M test, the HC reading from the verification trip must be at least half of the baseline reading, or an average of 220 PPM or less.
- This method only gives a general idea of how much the PPM reading needs to be reduced in order for the vehicle to pass an I/M test that calculates GPM. This test is not exact. Experience will still have to be used to determine if the emission readings have been reduced enough for the vehicle to pass the I/M test.

	Test Step	Result ▶	Action to Take
12-1	ANALYZE VEHICLE'S INSPECTION AND MAINTENANCE (I/M) TEST REPORT		
	• Analyze I/M test report for data entry errors: — Correct model and year. — Correct test weight, if included on report (this number will be less than the vehicle's GVW). — Correct calibration, if included on report (such as Calif. or 49 State). • Analyze I/M test report results: — Identify which gas readings are high AND which readings are low. — For reports that include a drive trace, identify during which mode the gas(es) failed. Be aware that if all gases were high early then decreased, the catalyst may have been cool when testing began. • **Has the I/M test report been analyzed?**	Yes ▶ No ▶	GO to 12-2. REPEAT this test step.
12-2	DID THE VEHICLE FAIL ONLY AN EVAP SYSTEM LEAK TEST OR A PURGE FLOW TEST (if these tests were performed)?		
	• **Did the vehicle fail only an EVAP system leak test or purge flow test (all gases OK)?**	Yes ▶ No ▶	EVAP concern only. GO to 12-35. GO to 12-3.
12-3	BASELINE VEHICLE		
	NOTE: Baselining the vehicle's exhaust gas readings is important so the baseline readings can be used for comparison after any repair is made. • Baseline vehicle using an exhaust gas analyzer. If the vehicle must be driven, be certain any baseline drive used is repeatable. The same drive cycle will be used to verify any repair. • During the baseline, check for any related symptoms that may be present (such as driveability, transmission shifting or exhaust smoke concerns). • **Has the vehicle been baselined?**	Yes ▶ No ▶	GO to 12-4. REPEAT this test step.

Test Step	Result ▶	Action to Take
12-4 CHECK IF ANY OTHER SYMPTOMS ARE PRESENT		
• **Are any of the following symptoms present?** — **Driveability Concerns (including Idle or Transmission Concerns).** — **Exhaust smoke.** — **Cooling System Concerns (engine not operating at proper temperature)**	Yes ▶	GO to the Symptom Index at the start for direction to service the additional symptom. Also REFER to the Exhaust Gas Analysis Chart at the beginning of this Symptom Chart for additional information. After any service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	No other concerns present. GO to 12-5.
12-5 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Vacuum lines (leaks / blockage). — Electrical connections. — Proper scheduled maintenance. — Intake air tube and air cleaner concerns (such as obstructions, leaks or dirty air filter). — Ford authorized emission controls and components installed on vehicle. • **Are all checks OK?**	Yes ▶	GO to 12-6.
	No ▶	SERVICE as necessary. After service, GO to 12-40 to VERIFY repair.
12-6 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-7.
12-7 CHECK PIDS		
• *Go to Diagnostic Subroutine Step DSR20.* • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-8.
12-8 CHECK CARBON MONOXIDE (CO) LEVELS		
• **Did the vehicle have excessive CO levels?**	Yes ▶	Excessive CO levels indicate that the engine is running rich. GO to 12-15.
	No ▶	GO to 12-9.

Test Step	Result ▶	Action to Take
12-9 CHECK HYDROCARBON (HC) LEVELS		
• **Did the vehicle have excessive HC levels?**	Yes ▶	Excessive HC levels with low to normal CO levels indicate that the engine is running lean. GO to 12-25.
	No ▶	GO to 12-10.
12-10 CHECK OXIDES OF NITROGEN (NOx) LEVELS		
• **Did the vehicle have excessive NOx levels?**	Yes ▶	GO to 12-30.
	No ▶	VERIFY all previous testing.
12-11 HIGH CO LEVELS: CHECK HC LEVELS		
• **Did the vehicle have excessive HC levels?**	Yes ▶	GO to 12-16 (to check for incomplete combustion / running rich).
	No ▶	GO to 12-17 (to check for running rich).
12-16 CHECK SECONDARY IGNITION SYSTEM		
• **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-17.
12-17 CHECK FUEL DELIVERY SYSTEM FOR CONCERNS SUCH AS HIGH FUEL PRESSURE AND ABILITY TO HOLD PRESSURE		
• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Tests, Pinpoint Test HC. • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-18.
12-18 CHECK PCV SYSTEM FOR LEAKS, STUCK VALVE, ETC		
NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint Test Notes. • Go to Pinpoint Test Step HG1* to check the PCV System. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-19.

Test Step	Result ▶	Action to Take
12-19 CHECK EXHAUST SYSTEM		
• Go to Pinpoint Test Step HF1* to check the exhaust system. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test Step direction.
	No ▶	GO to 12-20.
12-20 CHECK BASE ENGINE		
• Check for proper compression, valvetrain, camshaft, etc. • **Is a fault indicated?**	Yes ▶	SERVICE as required. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-21.
12-21 ADDITIONAL CHECKS		
• Additional checks: — Incorrect PCV valve. • **Are all checks OK?**	Yes ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms.
	No ▶	SERVICE as necessary. After service, GO to 12-40 to verify repair.
12-25 HIGH "HC" WITH NORMAL TO LOW "CO" LEVEL: CHECK FUEL DELIVERY SYSTEM FOR CONCERNS SUCH AS LOW FUEL PRESSURE		
• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Tests, Pinpoint Test HC. • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-26.
12-26 CHECK SECONDARY IGNITION SYSTEM		
• **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair.
	No ▶	GO to 12-27.

Test Step	Result ▶	Action to Take
12-27 CHECK PCV SYSTEM NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint Test Notes. • Go to Pinpoint Test Step HG1* to check the PCV system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair. GO to 12-28.
12-28 CHECK BASE ENGINE • Check base engine for concerns such as intake manifold leaks,improper compression, valvetrain or camshaft damage. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair. GO to 12-29.
12-29 ADDITIONAL CHECKS • Additional checks: — Incorrect PCV valve. • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. After any service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair. SERVICE as necessary. After service, GO to 12-40 to verify repair.
12-30 HIGH "NOx" WITH NORMAL TO LOW "HC" AND "CO" LEVELS: CHECK BASE ENGINE FOR CONCERNS SUCH AS EXCESSIVE CARBON BUILD UP IN COMBUSTION CHAMBER • Check for base engine concerns such as excessive carbon build up in the combustion chamber. • ***Is a fault indicated?***	Yes ▶ No ▶	SERVICE as required. After service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair. GO to 12-31.

Test Step	Result ▶	Action to Take
12-31 ADDITIONAL CHECKS		
• Additional Checks: — Transmission Torque Converter Clutch operation. — Cooling System concerns (such as aftermarket front fascia covering intake air, intake air system modifications). — Engine running lean (concerns such as vacuum leaks, low fuel pressure (refer to steps starting at 12-25)). • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. After any service is performed, RETURN to this Symptom Chart's step 12-40 to verify repair. SERVICE as necessary. After service, GO to 12-40 to verify repair.
12-35 EVAP SYSTEM CONCERN: PRELIMINARY CHECKS		
• Analyze I/M Test Report to determine when concern is present. Attempt to verify concern. • Perform the following preliminary checks: — Fuel filler cap (check for physical damage or contamination). — EVAP system lines/hoses (check for proper connections, damage or blockage). — Fuel vapor storage canister damage. • **Are all checks OK?**	Yes ▶ No ▶	GO to 12-36. SERVICE as necessary. After service, GO to 12-38 to verify repair.
12-36 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. After service is performed, RETURN to this Symptom Chart's step 12-38 to verify repair. GO to 12-37.
12-37 CHECK EVAP SYSTEM		
• **For Taurus/Sable, Crown Victoria/Grand Marquis, Town Car, Mark VIII, Windstar, Explorer, Expedition/Navigator and 4.2L/4.6L/5.4L/6.8L E/F-Series:** — Go to Pinpoint Test Step HX39. • **For Probe:** — Go to Pinpoint Tests, Pinpoint Test Step HV1. • **All others:** — Go to Pinpoint Test Step HW8. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. After service is performed, RETURN to this Symptom Chart's step 12-38 to verify repair. VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms. After any service is performed, RETURN to this Symptom Chart's step 12-38 to verify repair.

Test Step	Result ▶	Action to Take
12-38 EVAP SYSTEM REPAIR VERIFICATION		
• Vehicle repair performed. • Reset the PCM Keep Alive Random Access Memory (RAM) by disconnecting the negative side of the battery for a minimum of five minutes. Be aware that this will set DTC P1000 (and reset the On-Board System Readiness Test). • To relearn some basic Adaptive Learning values, run the engine at 2500 rpm for one minute and idle engine for two minutes. • Rerun PCM Quick Test (refer to Diagnostic Subroutine DSR1). Service any DTCs as directed. • Perform the EVAP system leak test and flow check. • **Does the vehicle pass the EVAP system leak test and flow check?**	Yes ▶ No ▶	Save any repair documentation that may be required by local/federal laws. RETURN vehicle to customer. Original concern not repaired, or another concern exists. RETURN to 12-1 and proceed as directed.

Test Step		Result ▶	Action to Take
12-40	REPAIR VERIFICATION		
• Vehicle repair performed. • Reset the PCM Keep Alive Random Access Memory (RAM) by disconnecting the negative battery cable for a minimum of five minutes. Be aware that this will set DTC P1000 (and reset the On-Board System Readiness Test). • To relearn some basic Adaptive Learning (Trim) values, run the engine at 2500 rpm for one minute and idle engine for two minutes. • Rerun PCM Quick Test (refer to Diagnostic Subroutine DSR1. Service any DTCs as directed. • Again perform the baseline test using the exhaust gas analyzer. • NOTE: If vehicle needs to be driven for the baseline, it may be necessary to drive the vehicle first for up to five miles to relearn some additional Adaptive Learning values. Also, during the baseline be certain to use the same drive mode that was used for the original baseline test (refer to step 12-3). • For I/M 240 Emission Testing areas (original gas concentrations reported in Grams Per Mile): — Refer to the beginning of this symptom chart for information on verifying an excessive Grams Per Mile indication using a Parts Per Million (PPM) reading. • All others (original gas concentrations reported in Parts Per Million): — Verify gas levels are within acceptable range. • **Are all gases within the acceptable range?**		Yes ▶ No ▶	SAVE any repair documentation that may be required by local/federal laws. RETURN vehicle to customer. Gas level is still high, or another gas level is above the acceptable range: RETURN to step 12-1 and proceed as directed.

Test Step	Result ▶	Action to Take
13-1 WHICH WARNING INDICATOR IS CONCERN ASSOCIATED WITH?		
• **Is the concern associated with one of the lamps/warning indicators listed below?** • **Malfunction Indicator Lamp (MIL)** • **Transmission Control Indicator Lamp (TCIL)** • **Shift Indicator Lamp (SIL)** • **Temperature Warning Indicator Lamp (Trucks with 4.6L, 5.4L or 6.8L engines only)** • **"CHECK TRACTION CONTROL" message on message center (Continental)**	Yes ▶ No ▶	**If the symptom is "MIL on" AND "exhaust emission test failure":** GO to Symptom Chart 12. **All others:** GO to 13-2. SERVICE as required.
13-2 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Electrical connections. — System components relating to Warning Indicator (such as Electronic Engine Control (EC) components for MIL, cooling system components for Temperature Warning Indicator). — Verify Fuel Filler Cap is properly tightened. • **Are all checks OK?**	Yes ▶ No ▶	GO to 13-3. SERVICE as necessary. After service, if no other symptoms are present, GO to Diagnostic Subroutine Step DSR1 (to PERFORM PCM Quick Test).
13-3 IS THE SYMPTOM "TCIL NEVER ON" OR "MIL NEVER ON"?		
• **Is the symptom "TCIL never on" or "MIL never on" (this includes MIL never on during the bulb check when the engine is first started)?**	Yes ▶ No ▶	**FOR TCIL NEVER ON:** — GO to Pinpoint Test Step TB8. **FOR MIL NEVER ON:** — GO to Pinpoint Test Step NB2. GO to 13-4.
13-4 DOES THE ENGINE START?		
• **Does the engine start?**	Yes ▶ No ▶	GO to 13-5. GO to Symptom Chart 3.

Test Step		Result ▶	Action to Take
13-5	FOR MIL CONCERN ON TRUCKS WITH POWER TAKEOFF (PTO), CHECK FOR POSSIBILITY OF PTO CAUSING MIL		
	• For MIL concern on trucks equipped with Power Takeoff (PTO), go to Pinpoint Test Step FB3. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 13-6.
13-6	DOES THE ENGINE IDLE ROUGH IN PARK OR NEUTRAL		
	• **Does the engine idle rough in Park or Neutral?**	Yes ▶ No ▶	GO to Symptom Chart 7. GO to 13-7.
13-7	PERFORM PCM QUICK TEST		
	• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 13-8.
13-8	IS THE MIL OR TCIL ALWAYS ON WITH THE ENGINE RUNNING?		
	• **Is the MIL or TCIL always on with the engine running?**	Yes ▶ No ▶	**For MIL always on:** GO to Pinpoint Test Step NB1. **For TCIL always on:** GO to Pinpoint Test Step TB6. GO to 13-9.
13-9	FOR CONTINENTAL, IS THE CHECK TRACTION CONTROL MESSAGE ALWAYS DISPLAYED ON MESSAGE CENTER?		
	• **For Continental, is the CHECK TRACTION CONTROL message always displayed on Message Center?**	Yes ▶ No ▶	Check the Anti-Lock Brake system. GO to 13-10.

Test Step		Result ▶	Action to Take
13-10	FOR TRUCKS WITH 4.6L, 5.4L OR 6.8L ENGINES ONLY, IS A TEMPERATURE WARNING INDICATOR LAMP CONCERN PRESENT?		
	• **Is a Temperature Warning Indicator Lamp concern present?**	Yes ▶ No ▶	**If engine is overheating:** Be aware that since a PCM DTC was not received, the PCM has not attempted to turn the lamp on. **If engine is operating at normal temperature:** GO to Pinpoint Test Step DL40. GO to 13-11.
13-11	IS THE SIL ALWAYS ON OR ALWAYS OFF?		
	• **Is the SIL always on or always off?**	Yes ▶ No ▶	GO to Pinpoint Test Step KL1. VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
14-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Transmission fluid concerns (such as level, quality, leaks). — Wiring harness (connections). — Vehicle modifications (such as related electronic add-on items, large changes in tire diameter). • **Are all checks OK?**	Yes ▶ No ▶	GO to 14-2. SERVICE as necessary. VERIFY a symptom no longer exists.
14-2 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 14-3.
14-3 CHECK TRANSMISSION		
• Diagnosis By Symptom. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. VERIFY test results. If OK, GO to Pinpoint Test Step Z1, or RETURN to Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
15-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Electrical connections. • **Are all checks OK?**	Yes ▶ No ▶	GO to 15-2. SERVICE as necessary. VERIFY a symptom no longer exists.
15-2 IS THE SYMPTOM; FUEL GAUGE INOPERATIVE?		
• **Is the symptom the fuel gauge is inoperative?**	Yes ▶ No ▶	GO to 15-10. GO to 15-3.
15-3 CHECK INSTRUMENTATION		
• Go to Instrument Panel, Gauges and Warning Indicators. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 15-4
15-4 PERFORM EEC-V KOEO SELF-TEST. ALSO RETRIEVE ANY CONTINUOUS MEMORY DTCS		
• Go to Diagnostic Subroutine Step DSR10. • **Is a fault indicated?**	Yes ▶ No ▶	Follow Diagnostic Subroutine direction. **For symptom; inoperative tachometer:** GO to 15-5 **All others:** VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms.
15-5 IS VEHICLE A CONTINENTAL, MARK VIII OR A 5.8L/7.5L TRUCK		
• **Is the vehicle a Continental, Mark VIII or a 5.8L/7.5L truck?**	Yes ▶ No ▶	VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms. Vehicle has a Clean Tach Output circuit from PCM. GO to 15-6.

Test Step		Result ▶	Action to Take
15-6	CHECK CLEAN TACH OUTPUT CIRCUIT FROM PCM		
	• Go to Pinpoint Test Step JH1. • **Is a fault indicated?**	Yes ▶ No ▶	Follow Pinpoint Test direction. VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms.
15-10	DOES VEHICLE HAVE A FUEL LEVEL INPUT (FLI) CIRCUIT TO PCM (PIN 9 OR 12)		
	• **Does the vehicle have an FLI circuit to the PCM (this circuit will be on pin 9or 12?**	Yes ▶ No ▶	FLI circuit is present. GO to 15-11. Service the inoperative fuel gauge.
15-11	PERFORM PCM KOEO SELF-TEST. ALSO RETRIEVE ANY CONTINUOUS MEMORY DTCS.		
	• Go to Diagnostic Subroutine Step DSR10. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. Service the inoperative fuel gauge.

Test Step		Result ▶	Action to Take
16-1	CHECK PCV SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint Test Notes. • Go to Pinpoint Test Step HG1* to check the PCV system. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. If PCV system was plugged, GO to 16-2 to check for leaks. GO to 16-2.
16-2	PRELIMINARY CHECKS		
	• Perform the following preliminary checks: — External leaks. — Proper dipstick. — Proper oil viscosity. • **Are all checks OK?**	Yes ▶ No ▶	GO to 16-3. SERVICE as necessary. VERIFY a symptom no longer exists.
16-3	CHECK BASE ENGINE		
	• Check valves, valve guides, valve stem seals, cylinder head drain passages (blue smoke on start-up), piston rings or other areas that may result in high oil consumption. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step		Result ▶	Action to Take
17-1	PRELIMINARY CHECKS		
	• Perform the following preliminary checks: — Engine Coolant level. — Cooling fan(s) wiring connections. — Coolant leaks. — Water / anti-freeze mixture. — Radiator condition. — Collapsed / restricted radiator hoses. — Radiator pressure cap. — Overflow system. • **Are all checks OK?**	Yes ▶ No ▶	GO to 17-2. SERVICE as necessary. VERIFY a symptom no longer exists.
17-2	DOES THE VEHICLE HAVE AN ELECTRIC COOLING FAN?		
	• **Does the vehicle have an electric cooling fan?**	Yes ▶ No ▶	Electric cooling fan. GO to 17-3. GO to 17-7.
17-3	PERFORM PCM QUICK TEST		
	• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 17-4.
17-4	IS THE VEHICLE A MARK VIII?		
	• **Is the vehicle a Mark VIII?**	Yes ▶ No ▶	Check for binding / seized cooling fan or other concerns as directed. GO to 17-5.
17-5	ONE COOLING FAN MOTOR INOPERATIVE WHEN THE OTHER FAN MOTOR OPERATES (2.5L Contour / Mystique, Taurus / Sable and Windstar only)		
	• **For 2.5L Contour / Mystique, Taurus / Sable and Windstar, is one cooling fan motor inoperative when the other fan motor operates?**	Yes ▶ No ▶	**For Contour / Mystique and Windstar:** GO to Pinpoint Test Step KF70. **For Taurus / Sable:** GO to Pinpoint Test Step X85. GO to 17-6.

Test Step	Result ▶	Action to Take
17-6 ELECTRIC COOLING FAN FUNCTIONAL CHECK		
• Scan Tool connected. • Key on, engine off. • Access Output Test Mode on Scan Tool. • Command the cooling fan on and check for fan operation. For two speed fan applications, check both fan speeds (wait 30 seconds after commanding high speed fan on). • **Does the fan operate (all speeds)?**	Yes ▶ No ▶	Key off. GO to 17-7. COMMAND cooling fan off. REMAIN in Output Test Mode. **For Probe and Continental:** GO to Pinpoint Test Step KF30. **For Contour/Mystique and Windstar:** GO to Pinpoint Test Step KF50. **For Crown Victoria/Grand Marquis and Town Car:** GO to Pinpoint Test Step KF25. **All others:** GO to Pinpoint Test Step X40.
17-7 CHECK COOLING SYSTEM		
• Check the cooling system. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 17-8.
17-8 CHECK BASE ENGINE		
• Check for base engine concerns (such as core sand in the block, internal blockage, head leaks). • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. GO to 17-9.
17-9 ADDITIONAL CHECKS		
• Be aware of other factors that could cause overheating: — Gauge/sender. — Ignition base timing (if not previously checked). — Excessive vehicle load. — Transmission overheating — Excessive idling in very hot ambient temperatures. — Brake drag. • **Are all checks OK?**	Yes ▶ No ▶	VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms. SERVICE as necessary. VERIFY a symptom no longer exists.

Test Step	Result ▶	Action to Take
18-1 ELECTRIC COOLING FAN CHECK • Accessories off. • A/C and defroster off. • Engine cooled so electric cooling fan would not normally come on. • Start engine. • **Does the electric cooling fan run continuously?**	Yes ▶ No ▶	GO to 18-2. GO to 18-15.
18-2 PRELIMINARY CHECKS • Perform the following preliminary checks: — Wiring harness to cooling fan. — For two speed cooling fan applications, wiring harness to A/C High Pressure Switch (med. pressure high contacts) or A/C Pressure Sensor. • **Are all checks OK?**	Yes ▶ No ▶	GO to 18-3. SERVICE as necessary. VERIFY a symptom no longer exists.
18-3 PERFORM PCM QUICK TEST • Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 18-4.
18-4 DOES THE VEHICLE HAVE A ONE SPEED COOLING FAN? • **Does the vehicle have a one speed cooling fan?** NOTE: It may be helpful to check the vehicle specific Diagrams. If the application has only one fan control relay (either "stand-alone" or in the CCRM), it is a one speed cooling fan.	Yes ▶ No ▶	One speed fan. GO to the Pinpoint Test Step indicated below (to check the cooling fan secondary circuits). **For Mustang:** Pinpoint Test Step X80. **All others:** Pinpoint Test Step KF60. More than one fan speed. GO to 18-5.
18-5 IS THE VEHICLE AN ESCORT/TRACER, CONTINENTAL OR MARK VIII? • **Is the vehicle an Escort/Tracer, Continental or Mark VIII?**	Yes ▶ No ▶	GO to 18-10 (to check ACP sensor input). GO to 18-6 (to check A/C High Pressure Switch input).

	Test Step	Result ▶	Action to Take
18-6	CHECK A/C HIGH PRESSURE SWITCH INPUT TO PCM		
	• Scan Tool connected. • Start engine. • Access ACP PID. • **Is the ACP PID "CLOSED"?**	Yes ▶	The PCM will turn the cooling fan on when the A/C High Pressure Switch input is "closed". Leave engine running. GO to 18-7.
		No ▶	A/C High Pressure Switch input OK. Check the cooling fan secondary circuits). **For Contour/Mystique, Probe and Windstar:** — Pinpoint Test Step KF65. **For CCRM applications:** — Pinpoint Test Step X80.
18-7	CHECK A/C HIGH PRESSURE SWITCH (the medium pressure, normally open contacts)		
	• Engine running at idle. • Disconnect A/C High Pressure Switch. • Again, view the ACP PID on Scan Tool. • **Is the ACP PID still "CLOSED"?**	Yes ▶	Key off. GO to Pinpoint Test Step X135 (to check A/C High Pressure Switch input to PCM).
		No ▶	Key off. RECONNECT A/C High Pressure Switch. Check for proper A/C High Pressure Switch function, over-pressurized A/C system and other checks as directed.

Test Step		Result ▶	Action to Take
18-10	CHECK A/C PRESSURE (ACP) SENSOR INPUT TO PCM		
	• Scan Tool connected. • A/C off. • Start engine. • Access ACP V PID on Scan Tool. • **Is the ACP V PID greater than 3.2 volts?**	Yes ▶	Key off. Check for high A/C system pressure.
		No ▶	The ACP input is not causing the fan to run. GO to Pinpoint Test Step indicated below to check the cooling fan circuits. **For Escort/Tracer:** — Pinpoint Test Step X80. **For Continental:** — Pinpoint Test Step KF65. **For Mark VIII:** — VERIFY previous test step results. If OK, RETURN to the Symptom Index to service any additional symptoms.
18-15	CHECK COOLING SYSTEM		
	• Check for proper thermostat/cooling system operation. • **Is a fault indicated?**	Yes ▶	SERVICE as required.
		No ▶	GO to 18-16.
18-16	CHECK TEMPERATURE GAUGE/LIGHT AND SENDER		
	• Check gauge/light • **Is a fault indicated?**	Yes ▶	SERVICE as required.
		No ▶	VERIFY test results. If OK, RETURN to the Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
19-1 IDENTIFY EXHAUST SMOKE COLOR		
• Identify the color of the exhaust smoke. • **Is exhaust smoke determined to be either black, blue or white?**	Yes ▶	**For black smoke:** Rich fuel mixture indicated. GO to 19-2. **For blue smoke:** Burning oil indicated. GO to 19-10. **White smoke:** Water in combustion indicated. GO to 19-8.
	No ▶	Attempt to VERIFY symptom and exhaust smoke color.
19-2 BLACK SMOKE: PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Air cleaner (restricted airflow). — Air tube (collapsed, restricted). — Fuel return lines (restricted). • **Are all checks OK?**	Yes ▶	GO to 19-3.
	No ▶	SERVICE as necessary. VERIFY a symptom no longer exists.
19-3 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
	No ▶	GO to 19-4.
19-4 CHECK FUEL DELIVERY SYSTEM		
• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Tests Pinpoint Test HC • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction.
	No ▶	GO to 19-5.
19-5 CHECK SECONDARY IGNITION SYSTEM		
• **For Coil On Plug applications (3.4L SHO, Mark VIII, 5.4L and 6.8L):** — Go to Pinpoint Test Step JF1 to visually check coils and plugs. • **All others:** — Go to Pinpoint Test Step JB1 to check the secondary ignition system. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction.
	No ▶	VERIFY test step results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step		Result ▶	Action to Take
19-8	WHITE SMOKE: CHECK BASE ENGINE / COOLING SYSTEM		
	• Check for base engine concerns (such as cylinder head gasket leaks, intake manifold gasket leaks, engine block cracked or porous). • **Is a fault indicated?**	Yes ▶	SERVICE as required.
		No ▶	VERIFY test step results. If OK, RETURN to Symptom Index to service any additional symptoms.
19-10	BLUE SMOKE: CHECK PCV SYSTEM		
	NOTE: For 2.0L Probe, if an asterisk (*) follows a pinpoint test step reference, go to that pinpoint test notes. • Go to Pinpoint Test Step HG1* to check the PCV system. • **Is a fault indicated?**	Yes ▶	FOLLOW Pinpoint Test direction. If PCV system was plugged, GO to 19-11 to check for oil leaks.
		No ▶	GO to 19-11.
19-11	CHECK BASE ENGINE		
	• Check for base engine concerns (such as damaged valve guides, valve stems, valve seals, blocked oil drain passages in the heads (blue smoke on start-up), piston rings (not seated, seized, worn) damaged cylinder bores). • **Is a fault indicated?**	Yes ▶	SERVICE as required.
		No ▶	VERIFY test step results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
20-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Fuel lines. — EVAP system (canister, PF Sensor / VMV solenoid, rollover / vent valve and related vacuum hoses). — Fuel system (fuel injectors, fuel rails, fuel tank). • **Are all checks OK?**	Yes ▶ No ▶	GO to 20-2. SERVICE as necessary. VERIFY a symptom no longer exists.
20-2 VERIFY THAT FUEL PUMP IS OFF WHEN ENGINE IS NOT RUNNING		
NOTE: This condition would be associated with a fuel odor present with the engine off. • Key on, engine off. • Wait 5 seconds (for fuel pump to shut off normally). • Check to verify that the fuel pump is off. • After checking, turn key off. • **Was the fuel pump off?**	Yes ▶ No ▶	GO to 20-3. GO to Symptom Chart 30.
20-3 CHECK FUEL DELIVERY SYSTEM (NATURAL GAS APPLICATIONS ONLY)		
• For natural gas applications, Go to Pinpoint Test Step HB16. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 20-4.
20-4 CHECK EVAP SYSTEM		
• **For Taurus/Sable, Crown Victoria/Grand Marquis, Town Car, Mark VIII, Windstar, Explorer/Mountaineer, Expedition/Navigator and 4.2L/4.6L/5.4L/6.8L E/F-Series:** — Go to Pinpoint Test Step HX39. • **For Probe:** — Go to Pinpoint Test Step HV10. • **All others:** — Go to Pinpoint Test Step HW8. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 20-5.
20-5 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 20-6.
20-6 CHECK FUEL SYSTEM		
• Check for possible sources of the fuel odor. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required. VERIFY test step results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
21-1 ATTEMPT TO IDENTIFY / ISOLATE SOURCE OF NOISE		
• Attempt to identify / isolate the source of the noise. Use a stethoscope if necessary. Possible sources of noise could include: — Vacuum or exhaust system leaks. — Loose components. — Secondary ignition arcing. — Base engine components. — Intake air leaks. — Drive belts or related components. • **Has the source of the noise been found?**	Yes ▶ No ▶	If concern is obvious, SERVICE as necessary. Otherwise, GO to 21-2. Attempt to get more information about the symptom. If unable to verify symptom, RETURN to Symptom Index to service any additional symptoms.
21-2 BELT DRIVEN SECONDARY AIR SYSTEM COMPONENT NOISE (if equipped)		
• **Does the noise seem to be coming from a component of the belt driven Secondary Air Injection System?**	Yes ▶ No ▶	GO to 21-7. GO to 21-3.
21-3 IS THE NOISE A "SNAP" SOUND THAT MAY BE DUE TO SECONDARY IGNITION ARCING?		
• **Is the noise a "snap" sound that may be due to secondary ignition arcing?**	Yes ▶ No ▶	**For coil on plug applications:** CHECK condition of spark plug boots. SERVICE as necessary. **All others:** GO to Pinpoint Test Step JB1 for secondary ignition diagnostics. GO to 21-4.
21-4 IS THE NOISE "SPARK KNOCK"?		
• **Is the noise "spark knock"?**	Yes ▶ No ▶	GO to Symptom Chart 10. GO to 21-5.
21-5 IS THE NOISE BECAUSE THE ELECTRIC *SECONDARY AIR INJECTION (AIR) PUMP* ALWAYS RUNS (IF EQUIPPED)?		
• **Does the electric AIR pump always run?**	Yes ▶ No ▶	GO to Symptom Chart 22. GO to the appropriate system suspected of being the source of the noise.
21-7 IS THERE EXCESSIVE AIR PUMP BELT NOISE?		
• **Is there excessive AIR pump belt noise?**	Yes ▶ No ▶	GO to Pinpoint Test Step HM81 (for checks such as proper belt tension). GO to 21-8.
21-8 OTHER BELT DRIVEN SECONDARY AIR INJECTION SYSTEM NOISE		
• For other belt driven Secondary Air Injection System noise, go to Pinpoint Test Step HM83. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test Step direction. GO to 21-3 to diagnose other under hood engine noise.

Test Step	Result ▶	Action to Take
22-1 PRELIMINARY CHECKS		
• Perform the following preliminary check: — Electric Secondary Air Injection electrical connections. • **Are all checks OK?**	Yes ▶ No ▶	GO to 22-2. SERVICE as necessary. VERIFY a symptom no longer exists.
22-2 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
24-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — A/C wiring (shorts). — A/C and heater controls. — A/C system and compressor. • **Are all checks OK?**	Yes ▶ No ▶	GO to 24-2. SERVICE as necessary. VERIFY a symptom no longer exists.
24-2 IS THE VEHICLE A MARK VIII?		
• **Is the vehicle a Mark VIII?**	Yes ▶ No ▶	Mark VIII. GO to 24-4. GO to 24-3.
24-3 CHECK FOR VOLTAGE AT A/C CLUTCH WITH A/C OFF		
• A/C and Defroster OFF. • Disconnect A/C clutch. • Connect a digital multimeter between the power pin and ground pin at the A/C clutch vehicle harness connector. • Start engine. • Monitor voltage. • After testing, turn key off and reconnect A/C clutch. • **Was voltage less than 2.0 volts?**	Yes ▶ No ▶	The electrical portion of the A/C system is not at fault. A fault is indicated in the A/C electrical system. GO to 24-4.
24-4 CHECK ACCS INPUT TO PCM WITH A/C OFF		
• Key off. • Connect Scan Tool to Data Link Connector. • Start engine. • A/C and defrost off. • Access ACCS PID on Scan Tool. • **Is the ACCS PID "OFF"?**	Yes ▶ No ▶	GO to 24-5. Key off. GO to the Pinpoint Test Step indicated below. **For CCRM applications:** Pinpoint Test Step X125. **For Probe:** Pinpoint Test Step KM70. **For VLCM (Mark VIII):** Pinpoint Test Step XB76. **All others:** Pinpoint Test Step KM20.

Test Step		Result ▶	Action to Take
24-5	IS THE VEHICLE A PROBE OR MARK VIII?		
	• **Is the vehicle a Probe or Mark VIII?**	Yes ▶	GO to 24-6.
		No ▶	**For Contour/Mystique:** GO to Pinpoint Test Step KM95. **All others:** Key off. GO to the Heating and Air Conditioning.
24-6	PERFORM PCM KOEO SELF-TEST. ALSO RETRIEVE ANY CONTINUOUS MEMORY DTCs.		
	• Go to Diagnostic Subroutine Step DSR10. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
		No ▶	**For Probe:** GO to Pinpoint Test Step KM75. **For Mark VIII:** Verify previous test step results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step		Result ▶	Action to Take
26-1	PRELIMINARY CHECKS		
	• Perform the following preliminary checks: — Vacuum hoses (check for proper routing, disconnections or damage). — Electrical connections. • **Are all checks OK?**	Yes ▶	GO to 26-2.
		No ▶	SERVICE as necessary. VERIFY a symptom no longer exists.
26-2	PERFORM PCM QUICK TEST		
	• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
		No ▶	PCM Quick Test completed.

Test Step	Result ▶	Action to Take
27-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Stoplamp fuse. — Stoplamp switch installation. — Stoplamp bulbs. — Trailer tow harness and relay system (if equipped). — Add on devices into brake circuit. • **Are all checks OK?**	Yes ▶ No ▶	GO to 27-2. SERVICE as necessary. VERIFY a symptom no longer exists.
27-2 CHECK LIGHTING SYSTEM		
• Diagnose the stoplamp circuit. • **Is a fault indicated?**	Yes ▶ No ▶	SERVICE as required GO to 27-3.
27-3 DOES THE VEHICLE HAVE AN AUTOMATIC TRANSMISSION CONTROLLED BY THE POWERTRAIN CONTROL MODULE (PCM)?		
• **Does the vehicle have an automatic transmission controlled by the PCM?**	Yes ▶ No ▶	GO to 27-4. VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms.
27-4 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. VERIFY test results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Notes

A slight sulphur smell may be normal. Catalysts with less than 5-10 thousand miles (new vehicle or replaced catalyst) are likely to have a sulphur smell due to the highly active state of new catalysts. Replacing the catalyst can actually make the symptom worse.

Test Step	Result ▶	Action to Take
28-1 ARE ANY DRIVEABILITY OR EXHAUST SMOKE SYMPTOMS PRESENT?		
• **Are any driveability or exhaust smoke symptoms present?**	Yes ▶	REFER to the Symptom Index to service the other symptom(s).
	No ▶	GO to 28-2.
28-2 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Electrical connections. — Vacuum lines. — Verify odor is from exhaust and not under hood (such as battery acid odor). • **Are all checks OK?**	Yes ▶ No ▶	GO to 28-3. SERVICE as necessary. VERIFY a symptom no longer exists.
28-3 CHECK FUEL DELIVERY SYSTEM		
• **For Natural Gas applications:** — Go to Pinpoint Test Step HB1. • **For Probe:** — Go to Pinpoint Tests, Pinpoint Test HC. • **All others:** — Go to Pinpoint Test Step HC1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. GO to 28-4.
28-4 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. GO to 28-5.
28-5 CHECK EVAP SYSTEM		
• **For Taurus/Sable, Crown Victoria/Grand Marquis, Town Car, Mark VIII, Windstar, Explorer/Mountaineer, Expedition/Navigator and 4.2L/4.6L/5.4L/6.8L E/F-Series:** — Go to Pinpoint Test Step HX39. • **For Probe:** — Go to Pinpoint Test Step HV1. • **All others:** — Go to Pinpoint Test Step HW8. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Pinpoint Test direction. No fault is indicated at this time. Since sulphur content can vary in different fuels, suggest trying a different brand. If necessary, VERIFY previous test step results.

Test Step	Result ▶	Action to Take
29-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Vacuum hoses (check for proper routing, disconnections or damage). — Electrical connections. • **Are all checks OK?**	Yes ▶ No ▶	GO to 29-2. SERVICE as necessary. VERIFY a symptom no longer exists.
29-2 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶ No ▶	FOLLOW Diagnostic Subroutine direction. DTC P1000 is ignored in KOEO and KOER Self-Test. If P1000 was the only DTC received during Quick Test, GO to Pinpoint Test Step QC1. Otherwise, VERIFY test step results. If OK, RETURN to Symptom Index to service any additional symptoms.

Test Step	Result ▶	Action to Take
30-1 CAN THE ENGINE BE TURNED OFF?		
• **Can the engine be turned off?**	Yes ▶	GO to 30-2.
	No ▶	REFER to the note at the beginning of Symptom Chart 5.
30-2 PRELIMINARY CHECKS		
• Perform the following preliminary check: — Fuel pump circuit wiring, especially in the vicinity of power circuits. • **Are all checks OK?**	Yes ▶	GO to 30-3.
	No ▶	SERVICE as necessary. VERIFY a symptom no longer exists.
30-3 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
	No ▶	**For Continental and Mark VIII:** GO to Pinpoint Test Step KB60. **All others:** VERIFY test results.

Test Step	Result ▶	Action to Take
32-1 PRELIMINARY CHECKS		
• Perform the following preliminary checks: — Electronic engine control system component electrical connections. • **Are all checks OK?**	Yes ▶	GO to 32-2.
	No ▶	SERVICE as necessary. RERUN Data Link Diagnostics Network test. VERIFY that a symptom no longer exists.
32-2 PERFORM PCM QUICK TEST		
• Go to Diagnostic Subroutine Step DSR1. • **Is a fault indicated?**	Yes ▶	FOLLOW Diagnostic Subroutine direction.
	No ▶	VERIFY test results. If OK, GO to Pinpoint Test Step Z1