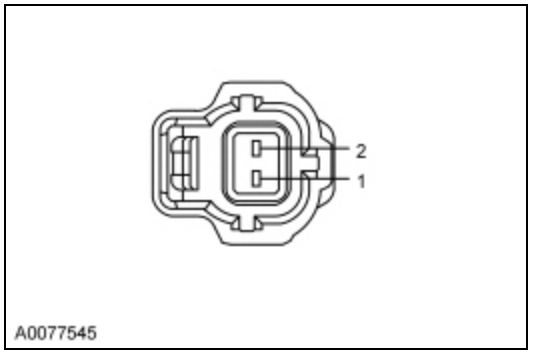
KE: Idle Air Control (IAC) Valve

This pinpoint test is intended to diagnose the following:

- idle air control (IAC) valve (9F715)
- harness circuits: IAC, PWR and B+ (IAC-RC)
- powertrain control module (PCM) (12A650)

Idle Air Control (IAC) Connector



Vehicle	Connector	Pin	Circuit
Focus	A	1 2	IAC PWR
All other vehicles	A	2 1	IAC PWR

Powertrain Control Module (PCM) Connector

For PCM connector views or reference values, refer to Section 6.

Vehicle	Connector	Pin	Circuit
Focus	150 (50-50-50) Pin	E38 E50	IAC-RC IAC

Vehicle	Connector	Pin	Circuit
Freestar/Monterey	104 Pin	83	IAC
Ranger	170 Pin	E33	IAC
Taurus	104 Pin	58 83	IAC-RC IAC
All other vehicles	150 (50-50-50) Pin	E39	IAC

KE1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)
Are DTCs P0505, P0506, P0507, P0511, P1504, P1506, or P1507 present?

Yes	For DTCs P0505, P0506, P0511, P1504 or P1507, GO to KE2. For DTCs P0507 or P1506, GO to KE15.
No	For all other symptoms without DTCs, GO to KE2.

KE2 DTCS P0505, P0506, P0511, P1504 OR P1507: CHECK FOR INLET AIR LEAKS (OR STARTS ONLY AT PART THROTTLE)

- With the engine running at idle (if possible), listen for vacuum leaks.
- Inspect the entire intake air system from the mass air flow (MAF) sensor to the intake manifold for leaks such as:
  - damaged or loose IAC air tubes.
  - cracked or punctured intake air tube.
  - loose intake air tube at the air cleaner housing or throttle body.
  - IAC valve or gasket seal.
  - EGR valve gasket seal.
  - vacuum supply connector and hose.
  - PCV valve, connectors and hoses.

Are any leaks present?

Yes	REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.
No	GO to KE3.

KE3 CHECK FOR VOLTAGE TO THE IAC SOLENOID

Note: *If EGR DTC P0402 is output during the self-test, diagnose it first before continuing with this pinpoint test.*

- IAC connector disconnected.
- Key ON, engine OFF.
- Measure the voltage between:

(+) IAC Connector, Harness Side	(-) Vehicle Battery
PWR	Negative terminal

Is the voltage greater than 10 V?

Yes	GO to KE4.
No	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

KE4 CHECK THE RESISTANCE OF THE IAC VALVE

- Key in OFF position.
- IAC connector disconnected.
- Measure the resistance between:

(+) IAC Connector, Component Side	(-) IAC Connector, Component Side
PWR	IAC

Is the resistance between 6 ohms - 15 ohms?

Yes	GO to KE5.
No	INSTALL a new IAC valve. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.

KE5 CHECK THE IAC VALVE FOR AN INTERNAL SHORT TO THE IAC CASE

- Measure the resistance between:

(+) IAC Connector, Component Side	(-) IAC Connector, Component Side
IAC	IAC Case

Is the resistance greater than 10K ohms?

Yes	GO to KE6.
No	INSTALL a new IAC valve. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls.

	CLEAR the DTCs. REPEAT the self-test.

KE6 CHECK THE IAC CIRCUIT FOR AN OPEN IN THE HARNESS

- IAC connector disconnected.
- PCM connector disconnected.
- Measure the resistance between:

(+) IAC Connector, Harness Side	(-) PCM Connector, Harness Side
IAC	IAC

Is the resistance less than 5 ohms?

Yes	For IAC-RC applications, GO to KE7. For all others, GO to KE8.
No	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

KE7 CHECK IAC-RC FOR VOLTAGE

- Measure the voltage between:

(+) PCM Connector, Harness Side	(-)
IAC-RC	Ground

Is the voltage greater than 10 V?

Yes	GO to KE8.
No	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

KE8 CHECK THE IAC CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS

- Key ON, engine OFF.
- Measure the voltage between:

(+) PCM Connector, Harness Side	(-) Vehicle Battery
IAC	Negative terminal

Is the voltage less than 1 V?

Yes	GO to KE9.
No	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

KE9 CHECK THE IAC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS

- Key in OFF position.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-)
IAC	Ground

Is the resistance greater than 10K ohms?

Yes	GO to KE10.
No	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

KE10 CHECK FOR A DROP IN IDLE RPM WITH THE IAC DISCONNECTED

- PCM connector connected.
- IAC connector connected.
- Key ON, engine running.
- Bring the engine to normal operating temperature.
- Transmission in PARK or NEUTRAL.
- Disconnect the IAC valve.

Does the RPM drop or the engine stall?

Yes	GO to KE12.
No	GO to KE11.

KE11 CHECK FOR A STUCK IAC PINTLE

- Key in OFF position.
- Inspect the entire intake air system for debris, blockage or other damage.
- Remove and inspect the IAC valve and check the pintle movement.
- Check the air tubes (if equipped) for blockage or damage.
- Remove and inspect the air cleaner element for excessive dirt.

Is the IAC valve OK?

Yes	GO to KE12.
No	INSTALL a new IAC valve. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.

KE12 VERIFY THE DTC
Is DTC P0511 or P1504 present in continuous memory or from the KOER self-test?

Yes	GO to KE22.
No	GO to KE13.

KE13 CHECK THE IAC SIGNAL FROM THE PCM

Note: *If stalling occurs, place a shim under the hard stop screw to maintain idle conditions.*

Note: *With the engine at normal operating temperature, closed throttle and all accessories off, the IAC duty cycle should be between approximately 22% and 65%.*

- PCM connector connected.
- IAC connector connected.
- Key ON, engine running.
- Access the PCM and monitor the RPM PID.
- Access the PCM and monitor the IAC PID.
- Slowly increase the engine speed to 3,000 RPM and return to closed throttle. (Note: If closed throttle RPM is significantly higher than normal, ignore this step).

Is the duty cycle between 22 - 65%?

Yes	GO to KE14.
No	INSTALL a new IAC valve. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.

KE14 VERIFY THE DTC
Is DTC P0506, P0511, P1504 or P1507 present in continuous memory?

Yes	GO to KE20.
No	INSPECT the throttle body for damage. REPAIR as necessary. If OK, INSTALL a new IAC valve. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM).

KE15 DTCS P0507 OR P1506: CHECK FOR INLET AIR LEAKS

- Key ON, engine running.
- With the engine running at idle, listen for vacuum leaks.

- Inspect the entire intake air system from the mass air flow (MAF) sensor to the intake manifold for leaks such as:
  - damaged or loose IAC air tubes.
  - cracked or punctured intake air tube.
  - loose intake air tube at the air cleaner housing or throttle body.
  - IAC valve or gasket seal.
  - EGR valve gasket seal.
  - vacuum supply connector and hose.
  - PCV valve, connectors and hoses.

Are any leaks present?

Yes	REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.
No	GO to KE16.

KE16 CHECK FOR EVAP DTCS

Note: *EVAP system malfunctions can cause IAC DTCs or idle speed concerns.*

Are any EVAP DTCs present?

Yes	DISREGARD the current diagnostic trouble code (DTC) at this time. DIAGNOSE the next DTC. GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions.
No	GO to KE17.

KE17 CHECK THE IAC VALVE FOR CORRECT FUNCTION

- Key ON, engine running.
- Bring the engine to normal operating temperature.
- Transmission in PARK or NEUTRAL.
- Disconnect the IAC Valve.

Does the RPM drop or the engine stall?

Yes	GO to KE18.
No	INSPECT the throttle body for damage. REPAIR as necessary. If OK, INSTALL a new IAC valve. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM). CLEAR the DTCs. REPEAT the self-test.

KE18 CHECK THE IAC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS

Note: *Refer to the PCM connector pin numbers in the beginning of this pinpoint test.*

- Key in OFF position.
- Scan tool connector disconnected.

- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) Vehicle Battery
IAC	Negative terminal

Is the resistance greater than 10K ohms?

Yes	GO to KE19.
No	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

KE19 VERIFY THE SYMPTOM
Is a fast idle symptom currently present?

Yes	GO to KE22.
No	GO to KE20.

KE20 CHECK THE IAC SYSTEM FOR AN INTERMITTENT OPEN OR SHORT
- PCM connector connected.
- Key ON, engine running.
- Access the PCM and monitor the IAC and RPM PIDs.
- With the engine at normal operating temperature, closed throttle and all accessories off, the IAC duty cycle should be between approximately 22% and 65%.
- Observe the PIDs while carrying out the following at idle:
  - Lightly tap on the and wiggle the harness connector to simulate road shock.
  - Grasp the vehicle harness closest to the IAC valve. Shake and bend a small section of the harness from the IAC to the bulkhead and from the bulkhead to the PCM.

Do the IAC or RPM PIDs suddenly change in value, indicating a concern?

Yes	ISOLATE the concern. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.
No	GO to KE21.

KE21 VERIFY THE SYMPTOM
Is an idle quality, starting or stalling symptom currently present?

Yes	INSTALL a new IAC valve. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.

No	RETURN to Section 3, Symptom Charts for further direction.

KE22 CHECK FOR CORRECT PCM OPERATION

- Disconnect all the PCM connectors.
- Visually inspect for:
  - pushed out pins
  - corrosion
- Connect all the PCM connectors and make sure they seat correctly.
- Carry out the PCM self-test and verify the concern is still present.

Is the concern still present?

Yes	INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM).
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.