DV: THROTTLE BODY ASSEMBLY ELECTRONIC THROTTLE CONTROL (ETC) - PINPOINT TEST

DV: Throttle Body Assembly Electronic Throttle Control (ETC)

DV: Introduction ⬅

DV1 CHECK FOR DTCS

Note: If DTC P0068 is present, diagnose all other DTCs first.

Are DTCs P0068, P0120, P0121, P0122, P0123, P0124, P0221, P0222, P0223, P1584, P1588, P2100, P2101, P2107, P2109, P2111, P2112, P2118, P2119, P2135, P2163, P2176, U0606, U210F or U2110 present?

Yes	No
For DTC P0068, GO to DV3 . For DTCs P2100 or P2107, GO to DV2 . For all others, GO to DV5 .	RETURN to Section 3, Symptom Charts for further direction.

DV2 REPEAT THE KOEO OR KOER SELF-TEST

Note: DTC P2107 may set when a failure mode effects management (FMEM) action is taken.

- Ignition ON, engine OFF.
- Carry out the PCM self-test.

Are any DTCs present other than P2100 or P2107?

Yes	No
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.	GO to DV5 .

DV3 CHECK FOR LEAKS

- Inspect the entire intake air system from the air cleaner housing to the intake manifold for leaks such as:
  - loose connections on the intake air tube at the air cleaner housing or throttle body
  - cracked or punctured intake air tube
  - hoses connecting to the intake air tube

    - hoses connecting to the throttle body
    - obstructions, restrictions, or damage
- Inspect the entire length of all the vacuum hoses for:
    - correct connections
    - damage or cracks
    - damaged or cracked vacuum tees
- Inspect the intake manifold or gasket for leaks.
- Verify the integrity of the positive crankcase ventilation (PCV) system.

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to DV4 .

DV4 CHECK FOR INTAKE AIR LEAKS

- Ignition ON, engine running.
- Listen for air noise around the mass airflow (MAF) sensor (if equipped) and throttle body assembly.

Is a concern present?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to DV5 .

DV5 CHECK THE THROTTLE BODY

WARNING: SUBSTANTIAL OPENING AND CLOSING TORQUE IS APPLIED BY THIS SYSTEM. TO PREVENT INJURY, BE CAREFUL TO KEEP FINGERS AWAY FROM THROTTLE MECHANISM WHEN ACTUATED. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

Note: Make sure the ETB harness connector is connected correctly.

- Ignition OFF.
- Remove the inlet tube from the throttle body.
- Visually inspect the air induction system for obstructions.
- Visually inspect for throttle plate obstructions or engine deposits.
- Check the ETB harness and connectors for the following:
    - damaged connectors
    - crossed TACM circuits
    - pushed out pins
    - corrosion
    - incorrect connections

Is a concern present?

Yes	No

REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	For DTC P0068, GO to DV16 . For DTC P2118, GO to DV12 . For all others, GO to DV6 .

DV6 CHECK THE VREF VOLTAGE TO TP

Note: In the following measurement note the polarity of the probes.

- Ignition OFF.
- ETBTPS connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) ETBTPS Connector, Harness Side	(-) ETBTPS Connector, Harness Side
ETCREF	ETCRTN

Is the voltage between 4.5 - 5.5 V?

Yes	No
GO to DV7 .	GO to Pinpoint Test C .

DV7 CHECK THE TP CIRCUIT FOR AN OPEN OR CROSSED SENSOR WIRES

- Ignition OFF.
- PCM connector disconnected.
- For Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0L,
- Measure the resistance between:

(+) ETBTPS Connector, Harness Side	(-) PCM Connector, Harness Side
TP	TP

- For all others,
- Measure the resistance between:

(+) ETBTPS Connector, Harness Side	(-) PCM Connector, Harness Side
TP1	TP1
TP2	TP2

Are the resistances less than 5 ohms?

Yes	No
GO to DV8 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DV8 CHECK THE TP CIRCUIT FOR A SHORT TO GROUND

- For Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0L,
- Measure the resistance between:

(+) ETBTPS Connector, Harness Side	(-)
TP	Ground

- For all others,
- Measure the resistance between:

(+) ETBTPS Connector, Harness Side	(-)
TP1	Ground
TP2	Ground

Are the resistances greater than 10K ohms?

Yes	No
GO to DV9 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DV9 CHECK THE TP CIRCUITS FOR A SHORT TOGETHER

- For Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0L,
- Measure the resistance between:

(+) ETBTPS Connector, Harness Side	(-) ETBTPS Connector, Harness Side
TP	ETCREF
TP	ETCRTN

- For all others,
- Measure the resistance between:

(+) ETBTPS Connector, Harness Side	(-) ETBTPS Connector, Harness Side
TP1	TP2
TP1	ETCREF
TP1	ETCRTN
TP2	ETCREF
TP2	ETCRTN

Are the resistances greater than 10K ohms?

Yes	No
GO to DV10 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DV10 CHECK THE TP CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0L,
- Measure the voltage between:

(+) ETBTPS Connector, Harness Side	(-)
TP	Ground

- For all others,
- Measure the voltage between:

(+) ETBTPS Connector, Harness Side	(-)
TP1	Ground
TP2	Ground

Is any voltage present?

Yes	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	For DTCs P1584, P1588, P2100, P2101, P2107, P2109, P2111, P2112, P2119, P2163 or P2176, GO to DV11 . For all others, GO to DV16 .

DV11 CHECK THE TACM HARNESS FOR AN OPEN

- Ignition OFF.

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

(+) ETBTACM Connector, Harness Side	(-) PCM Connector, Harness Side
TACM+	TACM+
TACM-	TACM-

Are the resistances less than 5 ohms?

Yes	No
GO to DV12 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DV12 CHECK THE TACM+ AND TACM- CIRCUITS FOR A SHORT TO GROUND

- Measure the resistance between:

(+) ETBTACM Connector, Harness Side	(-)
TACM+	Ground
TACM-	Ground

Are the resistances greater than 10K ohms?

Yes	No
GO to DV13 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DV13 CHECK THE HARNESS FOR A SHORT TO GND, PWR, ETCREF, AND ETCRTN

- Measure the resistance between:

(+) ETBTACM Connector, Harness Side	(-) PCM Connector, Harness Side
TACM+	PWRGND
TACM+	VPWR
TACM+	ETCRTN
TACM+	ETCREF
TACM-	PWRGND
TACM-	ETCRTN
TACM-	VPWR

TACM-	ETCREF

Are the resistances greater than 10K ohms?

Yes	No
GO to DV14 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DV14 CHECK FOR TACM HARNESS CIRCUITS SHORTED TOGETHER

- Measure the resistance between:

(+) ETBTACM Connector, Harness Side	(-) ETBTACM Connector, Harness Side
TACM+	TACM-

Is the resistance greater than 10K ohms?

Yes	No
For DTC P2118, GO to DV16 . For all others, GO to DV15 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DV15 CHECK THE TACM FOR A SHORT OR OPEN

- Measure the resistance between:

(+) ETBTACM Connector, Component Side	(-) ETBTACM Connector, Component Side
TACM+	TACM-

Is the resistance between 1 - 90 ohms (KA 1.5L) or 1 - 900 ohms (all others)?

Yes	No
GO to DV16 .	INSTALL a new ETB. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test.

DV16 CHECK THE THROTTLE POSITION (TP) OPEN AND CLOSED VOLTAGES

WARNING: SUBSTANTIAL OPENING AND CLOSING TORQUE IS APPLIED BY THIS SYSTEM. TO PREVENT INJURY, BE CAREFUL TO KEEP FINGERS AWAY FROM THROTTLE MECHANISM WHEN ACTUATED. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

Note: Certain failure mode effects management (FMEM) operating strategies maintain limited vehicle function in the event of a PCM, harness, or component concern and may prevent the throttle plate from opening. If the throttle plate does not open, follow the NO answer.

Note: Make sure the accelerator pedal is not applied during the fully released voltage measurements.

- Ignition OFF.
- ETBTPS connector connected.
- PCM connector connected.
- Ignition ON, engine OFF.
- For Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0L,
- Access the PCM and monitor the TP1 (PER) PID.
- Press the accelerator pedal to the floor and release.

Electronic Throttle Control Throttle Position Sensor Signal Percentages

	Vehicle	TP1
Aviator, Expedition, Explorer, F-150 2.7L, F-150 3.3L, F150 3.5L, Mustang 2.3L, Navigator, Ranger 2.3L, Transit	Pedal fully released	13.3 - 21.4
Aviator, Expedition, Explorer, F-150 2.7L, F-150 3.3L, F150 3.5L, Mustang 2.3L, Navigator, Ranger 2.3L, Transit	Pedal fully applied	85.3 - 95.2
Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 2.0L, Nautilus, Transit Connect 1.0L, Transit Connect 2.0L	Pedal fully released	12.1 - 25.4
Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 2.0L, Nautilus, Transit Connect 1.0L, Transit Connect 2.0L	Pedal fully applied	84.3 - 94.1
Escape/Kuga 1.5L	Pedal fully released	10.9 - 24.7
Escape/Kuga 1.5L	Pedal fully applied	87.9 - 95.6
F-150 5.0L, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 5.0L (all others), Mustang 5.2L Supercharged	Pedal fully released	8.0 - 20.0
F-150 5.0L, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 5.0L (all others), Mustang 5.2L Supercharged	Pedal fully applied	84.7 - 93.7
Mustang 5.0L (Bullitt)	Pedal fully released	26.8 - 34.1
Mustang 5.0L (Bullitt)	Pedal fully applied	94.1 - 95.6

- For all others,
- Access the PCM and monitor the TP1 (VOLT) and TP2 (VOLT) PIDs.
- Press the accelerator pedal to the floor and release.

Electronic Throttle Control Throttle Position Sensor Signal Voltages

Vehicle	Accelerator Pedal Position	TP1	TP2
Continental 2.0L, Continental 2.7L, Continental 3.0L, EcoSport 2.0L, Fusion 2.0L, Fusion 2.7L, MKZ 2.0L, MKZ 3.0L	Pedal fully released	3.7 - 4.7	0.3 - 1.16
Continental 2.0L, Continental 2.7L, Continental 3.0L, EcoSport 2.0L, Fusion 2.0L, Fusion 2.7L, MKZ 2.0L, MKZ 3.0L	Pedal fully applied	0.3 - 1.0	4.0 - 4.7
EcoSport 1.0L, KA 1.0L	Pedal fully released	3.64 - 4.14	0.85 - 1.36
EcoSport 1.0L, KA 1.0L	Pedal fully applied	1.01 - 1.46	3.54 - 3.98
EcoSport 1.5L, Fusion 1.5L	Pedal fully released	3.86 - 4.37	0.63 - 1.14
EcoSport 1.5L, Fusion 1.5L	Pedal fully applied	0.48 - 0.92	4.07 - 4.52
F-650 / F-750	Pedal fully released	3.7 - 4.7	0.3 - 2.9
F-650 / F-750	Pedal fully applied	0.3 - 2.9	4.1 - 4.7
KA 1.5L	Pedal fully released	3.76 - 4.84	0.19 - 1.19
KA 1.5L	Pedal fully applied	0.16 - 1.24	3.76 - 4.84
Ford GT	Pedal fully released	3.2 - 3.67	1.34 - 1.81
Ford GT	Pedal fully applied	0.20 - 0.36	4.40 - 4.64
Mustang 5.2L TiVCT	Pedal fully released	3.2 - 3.67	1.34 - 1.81
Mustang 5.2L TiVCT	Pedal fully applied	0.36 - 0.56	4.44 - 4.64
All others	Pedal fully released	3.7 - 4.7	0.3 - 1.9
All others	Pedal fully applied	0.7 - 2.9	4.1 - 4.7

Is the percentage PID within range (Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0) or are both voltage PIDs within the chart ranges (all others)?

Yes	No

For DTC P0068, GO to DV19 . For all others, unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z .	For DTCs P2101, P2107 or P2118, GO to Pinpoint Test Z . For DTCs P1584, P1588, P2109, P2163 or P2176, INSTALL a new ETB. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test. For DTCs P2111, P2112 or P2119, INSTALL a new ETBTPS. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test. For all others, GO to DV17 .

DV17 CHECK FOR AN INTERMITTENT CONCERN

- Ignition ON, engine OFF.
- For Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0L,
- Access the PCM and monitor the TP_A_RCNT_F (MODE) PID.
- For all others,
- Access the PCM and monitor the TP1 (VOLT) and TP2 (VOLT) PIDs.
- Wiggle, shake, and bend the harness from the TP to the PCM.

Does the TP_A__RCNT_F PID value change (Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0) or does the TP1 and TP2 PID voltages change (all others)?

Yes	No
REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	For Aviator, Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Expedition, Explorer, F-150, F-Series Super Duty, Motorhome / Stripped Chassis / Step Van, Mustang 2.3L, Mustang 5.0L, Mustang 5.2L Supercharged, Nautilus, Navigator, Ranger 2.3L, Transit, Transit Connect 1.0L, and Transit Connect 2.0L, INSTALL a new ETBTPS. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test. For all others, GO to DV18 .

DV18 CHECK THE TP SIGNAL

- Ignition ON, engine OFF.
- Access the PCM and monitor the TP1 (VOLT) and TP2 (VOLT) PIDs.
- Monitor the TP1 and TP2 PID voltages while disconnecting the ETBTPS connector.
- ETBTPS connector disconnected.

Do the TP1 and TP2 PID voltages change?

Yes	No
GO to DV20 .	GO to Pinpoint Test Z .

DV19 CHECK FOR SELF-TEST DTCS

Note: After retrieving the continuous memory DTCs, diagnose any non-ETC related DTCs before continuing.

- Ignition ON, engine OFF.
- Clear the PCM DTCs.
- Drive the vehicle while exercising the throttle.
- Carry out the PCM self-test.

Is DTC P0068 present?

Yes	No
For vehicles with a MAF sensor, CHECK the MAF sensor and connector for damage and corrosion. REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test. For all others, CHECK the MAP sensor and connector for damage and corrosion. REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z .

DV20 CHECK FOR CORRECT OPERATION

- Ignition OFF.
- Disconnect all the PCM connectors.
- Disconnect the ETBTPS connector.
- Visually inspect for:
  - pushed out pins
  - corrosion
- Connect all the PCM connectors and the ETBTPS connector. Make sure the connectors are seated correctly.
- Carry out the PCM self-test.
- Verify the concern is still present.

Is the concern still present?

Yes	No

INSTALL a new ETBTPS. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.