

**Computers and Control Systems: Pinpoint Tests****Test DV: Throttle Body Assembly Electronic Throttle Control (ETC)**

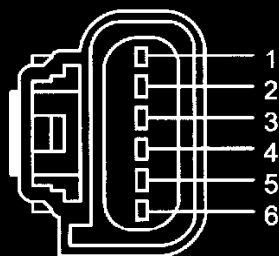
PINPOINT TEST DV: THROTTLE BODY ASSEMBLY ELECTRONIC THROTTLE CONTROL (ETC)

**Throttle Body Assembly Electronic Throttle Control (ETC)****DV**

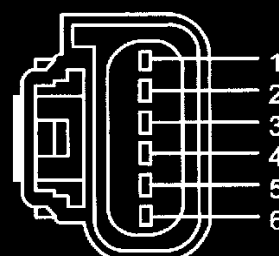
**⚠ WARNING: Substantial opening and closing torque is applied by this system. To prevent injury, be careful to keep fingers away from throttle mechanism when actuated. Failure to follow these instructions may result in personal injury.**

This pinpoint test is intended to diagnose the following:

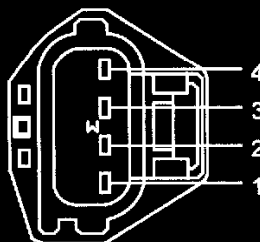
- electronic throttle body (ETB) (9F991)
- harness circuits: ETCRTN, ETCREF, TP1, TP2, TACM+, and TACM-
- powertrain control module (PCM) (12A650)

**Electronic Throttle Body Throttle Position Sensor (ETBTPS) Connector****A**

A0077520

**B**

A0094772

**C**

A0077519

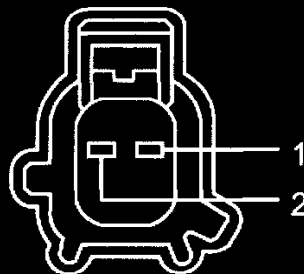
**Warning And Electronic Throttle Body Throttle Position Sensor (ETBTPS) Connector**

## Throttle Body Assembly Electronic Throttle Control (ETC)

DV

Vehicle	Connector	Pin	Circuit
F-150 4.2L	A	5 6 4 1 2 3	TACM+ TACM- TP2 TP1 ETCRTN ETCREF
Five Hundred, Freestyle, Montego	B	1 2 6 3 4 5	TACM+ TACM- TP2 TP1 ETCRTN ETCREF
Fusion 2.3L, Milan 2.3L	B	1 2 4 6 3 5	TACM+ TACM- TP2 TP1 ETCRTN ETCREF
Fusion 3.0L, Milan 3.0L, Zephyr	B	2 1 6 3 4 5	TACM+ TACM- TP2 TP1 ETCRTN ETCREF
All other vehicles	C	1 4 3 2	TP2 TP1 ETCRTN ETCREF

## Electronic Throttle Body Throttle Actuator Control Motor (ETBTACM) Connector



A0077510

## Throttle Body Assembly Electronic Throttle Control (ETC)

DV

Pin	Circuit
2	TACM- (Throttle Actuator Control Motor -)
1	TACM+ (Throttle Actuator Control Motor +)

## Powertrain Control Module (PCM) Connector

For PCM connector views or reference values, refer to Reference Values.

Vehicle	Connector	Pin	Circuit
E-Series 4.6L, E-Series 6.8L, E-Series 5.4L, F-Super Duty	170 Pin	B16, B4, E66 B18, B6, E59 B35 B47 E51 E34 E60 E61	ETCREF ETCRTN VPWR PWRGND TACM- TACM+ TP2 TP1
Expedition, F-150, Mark LT, Navigator	190 Pin	B21, B28, E66 B58, B59, E59 B51 B67 E51 E34 E60 E61	ETCREF ETCRTN VPWR PWRGND TACM- TACM+ TP2 TP1
Explorer, Mountaineer, Mustang	170 Pin	B24, B4, E66 B43, B6, E59 B35 B47 E51 E34 E60 E61	ETCREF ETCRTN VPWR PWRGND TACM- TACM+ TP2 TP1
Fusion, Milan, Zephyr	140 Pin	B21, B28, E66 B59, B60, E59 B51 B67 E51 E34 E60 E61	ETCREF ETCRTN VPWR PWRGND TACM- TACM+ TP2 TP1

(Continued)

# Throttle Body Assembly Electronic Throttle Control (ETC)

## DV


Vehicle	Connector	Pin	Circuit
LS	150 (60-32-58) Pin	B20, B23, E24 B17, B5, E15 B32 B24 E27 E35 E57 E32	ETCREF ETCRTN VPWR PWRGND TACM- TACM+ TP2 TP1
All other vehicles	150 (50-50-50) Pin	B24, B4, E18 B41, B6, E7 B35 B47 E48 E47 E29 E19	ETCREF ETCRTN VPWR PWRGND TACM- TACM+ TP2 TP1

Test Step		Results / Action to Take									
<b>DV1</b>	<b>CHECK FOR DTCS</b> <ul style="list-style-type: none"> <li>Are DTCs P0068, P0121, P0122, P0123, P0221, P0222, P0223, P2100, P2101, P2107, P2111, P2112, or P2135 present?</li> </ul>	<p><b>Yes</b> For DTC P0068, GO to <b>DV14</b>. For DTCs P0121, P0122, P0123, P0221, P0222, P0223, P2111, or P2112, GO to <b>DV2</b>. For DTCs P2100 or P2107, GO to <b>DV20</b>. For DTC P2101, GO to <b>DV26</b>. For Fusion, Milan, and Zephyr with DTC P2135, GO to <b>DV5</b>. For all others with DTC P2135, GO to <b>DV6</b>.</p> <p><b>No</b> For all others, GO to DTC Charts, Diagnostic Trouble Code (DTC) Charts and Descriptions.</p>									
<b>DV2</b>	<b>CHECK THE TP OPEN AND CLOSED VOLTAGES</b> <ul style="list-style-type: none"> <li>Key ON, engine OFF.</li> <li>Access the PCM and monitor the TP1 and TP2 PIDs.</li> <li>Press the accelerator pedal to the floor and release.</li> </ul> <p><b>Electronic Throttle Control Throttle Position Sensor Signal Voltages</b></p> <table border="1"> <thead> <tr> <th>Accelerator Pedal Position</th> <th>TP1</th> <th>TP2</th> </tr> </thead> <tbody> <tr> <td>Pedal fully released</td> <td>3.7 - 4.7</td> <td>0.3 - 1.9</td> </tr> <tr> <td>Pedal fully applied</td> <td>0.7 - 2.9</td> <td>4.1 - 4.7</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Are both PIDs within the chart ranges?</li> </ul>	Accelerator Pedal Position	TP1	TP2	Pedal fully released	3.7 - 4.7	0.3 - 1.9	Pedal fully applied	0.7 - 2.9	4.1 - 4.7	<p><b>Yes</b> GO to <b>DV18</b>.</p> <p><b>No</b> GO to <b>DV3</b>.</p>
Accelerator Pedal Position	TP1	TP2									
Pedal fully released	3.7 - 4.7	0.3 - 1.9									
Pedal fully applied	0.7 - 2.9	4.1 - 4.7									

Powertrain Control Module (PCM) Connector And DV1-DV2

## Throttle Body Assembly Electronic Throttle Control (ETC)

## DV

Test Step		Results / Action to Take				
<b>DV3</b>	<b>CHECK FOR OBSTRUCTION OF THE THROTTLE BODY</b>   <b>WARNING:</b> 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.  <b>Note:</b> Moving the throttle plate manually may cause DTC P2106 to set during the self-test. <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Remove the inlet tube from the throttle body.</li> <li>• Visually inspect for throttle plate obstructions or sludge.</li> <li>• Slowly, push the throttle plate to wide open and release.</li> <li>• <b>Does the throttle plate move freely to wide open and back?</b></li> </ul>	<b>Yes</b> For continuous memory DTCs P0121, P0122, P0221, or P0222 alone or together, GO to <b>DV4</b> . For continuous memory DTCs P2100, P2101, P2107, P2111, or P2112 alone or together, GO to <b>DV20</b> . For Fusion, Milan, and Zephyr with all other DTCs, GO to <b>DV5</b> . For all others, GO to <b>DV6</b> .  <b>No</b> ISOLATE and REPAIR the obstruction. CLEAR the DTCs. REPEAT the self-test.				
<b>DV4</b>	<b>CHECK THE VREF VOLTAGE TO TP</b> <ul style="list-style-type: none"> <li>• ETBTPS connector disconnected.</li> <li>• Key ON, engine OFF.</li> <li>• Measure the voltage between:               <table border="1" data-bbox="300 976 852 1060"> <tr> <td>( + ) ETBTPS Connector, Harness Side</td> <td>( - ) ETBTPS Connector, Harness Side</td> </tr> <tr> <td>ETCREF</td> <td>ETCRTN</td> </tr> </table> </li> <li>• <b>Is the voltage between 4 - 6 V?</b></li> </ul>	( + ) ETBTPS Connector, Harness Side	( - ) ETBTPS Connector, Harness Side	ETCREF	ETCRTN	<b>Yes</b> For Fusion, Milan, and Zephyr, GO to <b>DV5</b> . For all others, GO to <b>DV6</b> .  <b>No</b> GO to Pinpoint Test C.
( + ) ETBTPS Connector, Harness Side	( - ) ETBTPS Connector, Harness Side					
ETCREF	ETCRTN					

DV3-DV4

## Throttle Body Assembly Electronic Throttle Control (ETC)

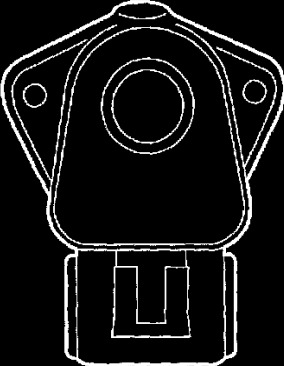
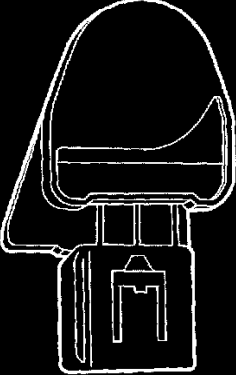
# DV

Test Step		Results / Action to Take																									
<b>DV5</b>	<b>CHECK THE FUNCTIONALITY OF THE TP SENSOR</b>																										
<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>ETBTPS connector disconnected.</li> <li>For Fusion 2.3L and Milan 2.3L, measure the resistance between:</li> </ul>																											
<table border="1"> <thead> <tr> <th>(+) ETBTPS Connector, Component Side</th> <th>(-) ETBTPS Connector, Component Side</th> <th>Minimum Resistance (ohms)</th> <th>Maximum Resistance (ohms)</th> </tr> </thead> <tbody> <tr> <td>ETCREF</td> <td>ETCRTN</td> <td>2,000</td> <td>4,000</td> </tr> </tbody> </table>		(+) ETBTPS Connector, Component Side	(-) ETBTPS Connector, Component Side	Minimum Resistance (ohms)	Maximum Resistance (ohms)	ETCREF	ETCRTN	2,000	4,000																		
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ETCREF	ETCRTN	475	1,365																								
<ul style="list-style-type: none"> <li>Are all the resistances within specifications?</li> </ul>		<p><b>Yes</b> GO to <b>DV10</b>.</p> <p><b>No</b> INSTALL a new ETB. CLEAR the DTCs. REPEAT the self-test.</p>																									

DV5

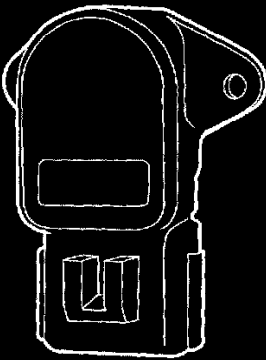
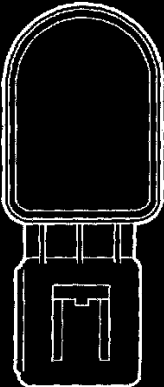
# Throttle Body Assembly Electronic Throttle Control (ETC)

DV

Test Step	Results / Action to Take
<p><b>DV6 DETERMINE THE TYPE OF ETBTPS ON THE VEHICLE</b></p> <p><b>Note:</b> There are 2 types of ETBTPS available. Compare the sensor housing of the ETBTPS on the vehicle to the illustrations.</p> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Determine if the vehicle is equipped with a Type I ETBTPS.</li> </ul> <div style="text-align: center;">  <p>N0027685</p>  <p>N0027687</p> </div> <ul style="list-style-type: none"> <li>• Is the vehicle equipped with a Type I ETBTPS?</li> </ul>	<p><b>Yes</b> GO to DV8.</p> <p><b>No</b> GO to DV7.</p>

# Throttle Body Assembly Electronic Throttle Control (ETC)

DV

DV7	Test Step	Results / Action to Take
	<p><b>CHECK FOR A TYPE II ETBTPS</b></p> <p><b>Note:</b> There are 2 types of ETBTPS available. Compare the sensor housing of the ETBTPS on the vehicle to the illustrations.</p> <ul style="list-style-type: none"> <li>Determine if the vehicle is equipped with a Type II ETBTPS.</li> </ul>	
		
	<p>N0027686</p>	
		
	<p>N0027692</p>	
	<ul style="list-style-type: none"> <li>Is the vehicle equipped with a Type II ETBTPS?</li> </ul>	<p><b>Yes</b> GO to DV9.</p> <p><b>No</b> GO to DV6.</p>

# Throttle Body Assembly Electronic Throttle Control (ETC)

## DV

Test Step		Results / Action to Take																								
<b>DV8</b>	<b>CHECK THE RESISTANCE OF THE TYPE I ETBTPS</b> <ul style="list-style-type: none"> <li>ETBTPS connector disconnected.</li> <li>Measure the resistance between:</li> </ul> <p><b>Type I</b></p> <table border="1"> <thead> <tr> <th>(+) ETBTPS Connector, Component Side</th> <th>(-) ETBTPS Connector, Component Side</th> <th>Minimum Resistance (ohms)</th> <th>Maximum Resistance (ohms)</th> </tr> </thead> <tbody> <tr> <td>TP1</td> <td>ETCREF</td> <td>1,100</td> <td>3,500</td> </tr> <tr> <td>TP1</td> <td>ETCRTN</td> <td>2,500</td> <td>5,900</td> </tr> <tr> <td>TP2</td> <td>ETCREF</td> <td>1,800</td> <td>4,900</td> </tr> <tr> <td>TP2</td> <td>ETCRTN</td> <td>800</td> <td>2,800</td> </tr> <tr> <td>ETCREF</td> <td>ETCRTN</td> <td>1,800</td> <td>4,900</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Are all the resistances within the specifications?</li> </ul>	(+) ETBTPS Connector, Component Side	(-) ETBTPS Connector, Component Side	Minimum Resistance (ohms)	Maximum Resistance (ohms)	TP1	ETCREF	1,100	3,500	TP1	ETCRTN	2,500	5,900	TP2	ETCREF	1,800	4,900	TP2	ETCRTN	800	2,800	ETCREF	ETCRTN	1,800	4,900	<p><b>Yes</b> GO to <b>DV10</b>.</p> <p><b>No</b> For Five Hundred, Freestyle, Montego, and F-150 4.2L, INSTALL a new ETB. CLEAR the DTCs. REPEAT the self-test. For all others, INSTALL a new ETBTPS. CLEAR the DTCs. REPEAT the self-test.</p>
(+) ETBTPS Connector, Component Side	(-) ETBTPS Connector, Component Side	Minimum Resistance (ohms)	Maximum Resistance (ohms)																							
TP1	ETCREF	1,100	3,500																							
TP1	ETCRTN	2,500	5,900																							
TP2	ETCREF	1,800	4,900																							
TP2	ETCRTN	800	2,800																							
ETCREF	ETCRTN	1,800	4,900																							
<b>DV9</b>	<b>CHECK THE RESISTANCE OF THE TYPE II ETBTPS</b> <ul style="list-style-type: none"> <li>ETBTPS connector disconnected.</li> <li>Measure the resistance between:</li> </ul> <p><b>Type II</b></p> <table border="1"> <thead> <tr> <th>(+) ETBTPS Connector, Component Side</th> <th>(-) ETBTPS Connector, Component Side</th> <th>Minimum Resistance (ohms)</th> <th>Maximum Resistance (ohms)</th> </tr> </thead> <tbody> <tr> <td>TP1</td> <td>ETCREF</td> <td>700</td> <td>1,800</td> </tr> <tr> <td>TP1</td> <td>ETCRTN</td> <td>1,300</td> <td>2,800</td> </tr> <tr> <td>TP2</td> <td>ETCREF</td> <td>1,000</td> <td>2,400</td> </tr> <tr> <td>TP2</td> <td>ETCRTN</td> <td>500</td> <td>1,500</td> </tr> <tr> <td>ETCREF</td> <td>ETCRTN</td> <td>700</td> <td>2,100</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Are all the resistances within the specifications?</li> </ul>	(+) ETBTPS Connector, Component Side	(-) ETBTPS Connector, Component Side	Minimum Resistance (ohms)	Maximum Resistance (ohms)	TP1	ETCREF	700	1,800	TP1	ETCRTN	1,300	2,800	TP2	ETCREF	1,000	2,400	TP2	ETCRTN	500	1,500	ETCREF	ETCRTN	700	2,100	<p><b>Yes</b> GO to <b>DV10</b>.</p> <p><b>No</b> For Five Hundred, Freestyle, Montego, and F-150 4.2L, INSTALL a new ETB. CLEAR the DTCs. REPEAT the self-test. For all others, INSTALL a new ETBTPS. CLEAR the DTCs. REPEAT the self-test.</p>
(+) ETBTPS Connector, Component Side	(-) ETBTPS Connector, Component Side	Minimum Resistance (ohms)	Maximum Resistance (ohms)																							
TP1	ETCREF	700	1,800																							
TP1	ETCRTN	1,300	2,800																							
TP2	ETCREF	1,000	2,400																							
TP2	ETCRTN	500	1,500																							
ETCREF	ETCRTN	700	2,100																							
<b>DV10</b>	<b>CHECK THE TP1 AND TP2 CIRCUITS FOR A SHORT TO VOLTAGE IN THE HARNESS</b> <ul style="list-style-type: none"> <li>PCM connector disconnected.</li> <li>Key ON, engine OFF.</li> <li>Measure the voltage between:</li> </ul> <table border="1"> <thead> <tr> <th>(+) ETBTPS Connector, Harness Side</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td>TP1</td> <td>Ground</td> </tr> <tr> <td>TP2</td> <td>Ground</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Is any voltage present?</li> </ul>	(+) ETBTPS Connector, Harness Side	(-)	TP1	Ground	TP2	Ground	<p><b>Yes</b> REPAIR the short circuit to PWR. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> GO to <b>DV11</b>.</p>																		
(+) ETBTPS Connector, Harness Side	(-)																									
TP1	Ground																									
TP2	Ground																									

# Throttle Body Assembly Electronic Throttle Control (ETC)

## DV

Test Step		Results / Action to Take												
<b>DV11</b>	<b>CHECK THE TP1 AND TP2 CIRCUITS FOR AN OPEN IN THE HARNESS</b> <ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Measure the resistance between: <table border="1"> <thead> <tr> <th>( + ) ETBTPS Connector, Harness Side</th> <th>( - ) PCM Connector, Harness Side</th> </tr> </thead> <tbody> <tr> <td>TP1</td> <td>TP1</td> </tr> <tr> <td>TP2</td> <td>TP2</td> </tr> </tbody> </table> </li> <li>Are the resistances less than 5 ohms?</li> </ul>	( + ) ETBTPS Connector, Harness Side	( - ) PCM Connector, Harness Side	TP1	TP1	TP2	TP2	<b>Yes</b> GO to DV12. <b>No</b> REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.						
( + ) ETBTPS Connector, Harness Side	( - ) PCM Connector, Harness Side													
TP1	TP1													
TP2	TP2													
<b>DV12</b>	<b>CHECK THE TP1 AND TP2 CIRCUITS FOR A SHORT TO GROUND IN THE HARNESS</b> <ul style="list-style-type: none"> <li>Measure the resistance between: <table border="1"> <thead> <tr> <th>( + ) ETBTPS Connector, Harness Side</th> <th>( - ) Vehicle Battery</th> </tr> </thead> <tbody> <tr> <td>TP1</td> <td>Negative terminal</td> </tr> <tr> <td>TP2</td> <td>Negative terminal</td> </tr> </tbody> </table> </li> <li>Are the resistances greater than 10K ohms?</li> </ul>	( + ) ETBTPS Connector, Harness Side	( - ) Vehicle Battery	TP1	Negative terminal	TP2	Negative terminal	<b>Yes</b> GO to DV13. <b>No</b> REPAIR the short circuit to GND. CLEAR the DTCs. REPEAT the self-test.						
( + ) ETBTPS Connector, Harness Side	( - ) Vehicle Battery													
TP1	Negative terminal													
TP2	Negative terminal													
<b>DV13</b>	<b>CHECK THE TPS CIRCUIT FOR A SHORT TOGETHER</b> <ul style="list-style-type: none"> <li>Measure the resistance between: <table border="1"> <thead> <tr> <th>( + ) ETBTPS Connector, Harness Side</th> <th>( - ) ETBTPS Connector, Harness Side</th> </tr> </thead> <tbody> <tr> <td>TP1</td> <td>TP2</td> </tr> <tr> <td>TP1</td> <td>ETCREF</td> </tr> <tr> <td>TP1</td> <td>ETCRTN</td> </tr> <tr> <td>TP2</td> <td>ETCREF</td> </tr> <tr> <td>TP2</td> <td>ETCRTN</td> </tr> </tbody> </table> </li> <li>Are the resistances greater than 10K ohms?</li> </ul>	( + ) ETBTPS Connector, Harness Side	( - ) ETBTPS Connector, Harness Side	TP1	TP2	TP1	ETCREF	TP1	ETCRTN	TP2	ETCREF	TP2	ETCRTN	<b>Yes</b> GO to DV14. <b>No</b> REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
( + ) ETBTPS Connector, Harness Side	( - ) ETBTPS Connector, Harness Side													
TP1	TP2													
TP1	ETCREF													
TP1	ETCRTN													
TP2	ETCREF													
TP2	ETCRTN													
<b>DV14</b>	<b>CHECK FOR A TP2 SIGNAL HIGH VERSUS LOAD WHILE DRIVING THE VEHICLE</b> <ul style="list-style-type: none"> <li>ETBTPS connector connected.</li> <li>PCM connector connected.</li> <li>Key ON, engine running.</li> <li>Access the PCM and monitor the TP2 and LOAD PIDs.</li> <li>Drive the vehicle while exercising the throttle and ETC/TP sensor and accessing the PIDS.</li> <li>Is the TP2 PID greater than 2.44 volts and the LOAD PID less than 30%?</li> </ul>	<b>Yes</b> GO to DV15. <b>No</b> GO to DV16.												

DV11-DV14

## Throttle Body Assembly Electronic Throttle Control (ETC)

# DV

Test Step		Results / Action to Take
<b>DV15</b>	<b>CHECK FOR INLET AIR LEAKS</b> <ul style="list-style-type: none"> <li>• Check the air inlet system for leaks.</li> <li>• Listen for air noise around the MAF sensor and throttle body while the engine is running.</li> <li>• <b>Is a concern present?</b></li> </ul>	<b>Yes</b> REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.  <b>No</b> GO to DV16.
<b>DV16</b>	<b>CHECK FOR A TP2 SIGNAL LOW VERSUS LOAD WHILE DRIVING THE VEHICLE</b> <ul style="list-style-type: none"> <li>• Key ON, engine running.</li> <li>• Access the PCM and monitor the TP2 and LOAD PIDs.</li> <li>• Drive the vehicle while exercising the throttle and ETCTP sensor and accessing the PIDS.</li> <li>• <b>Is the TP2 PID less than 0.24 volt and the LOAD PID greater than 55%?</b></li> </ul>	<b>Yes</b> GO to DV17.  <b>No</b> GO to DV18.
<b>DV17</b>	<b>CHECK FOR SELF-TEST DTCs</b> <ul style="list-style-type: none"> <li>• Key ON, engine OFF.</li> <li>• Clear the DTCs.</li> <li>• Drive the vehicle while exercising the throttle.</li> <li>• Retrieve the continuous memory DTCs.</li> <li>• <b>Are any DTCs present?</b></li> </ul>	<b>Yes</b> GO to DV18.  <b>No</b> Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z.

DV15-DV17

# Throttle Body Assembly Electronic Throttle Control (ETC)

## DV

Test Step		Results / Action to Take
<b>DV18</b>	<b>CHECK THE TP SENSOR OPERATION</b> <ul style="list-style-type: none"> <li>• Key ON, engine OFF.</li> <li>• Access the PCM and monitor the TP1 and TP2 PIDs.</li> <li>• Slowly press the accelerator pedal from fully released to fully applied while observing the voltage readings.</li> <li>• Use the chart as a reference.</li> </ul> <p><b>TP1 and TP2 Sensor Output Voltages</b></p> <p>A0096020</p> <ul style="list-style-type: none"> <li>• <b>Do all signal values smoothly change when the accelerator is pressed?</b></li> </ul>	<p><b>Yes</b> For continuous memory DTC P0068, CHECK the mass air flow (MAF) and manifold absolute pressure (MAP) sensors and connectors for damage and corrosion. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. For all others, GO to <b>DV19</b>.</p> <p><b>No</b> For Five Hundred, Freestyle, Montego, and F-150 4.2L with DTC P2135, INSTALL a new ETB. CLEAR the DTCs. REPEAT the self-test.</p> <p>For all others with DTC P2135, INSTALL a new ETBTPS. CLEAR the DTCs. REPEAT the self-test.</p> <p>For all others without DTC P2135, GO to <b>DV29</b>.</p>
<b>DV19</b>	<b>CHECK THE TPS CIRCUIT FOR AN INTERMITTENT CONCERN</b> <ul style="list-style-type: none"> <li>• Access the PCM and monitor the TP1 and TP2 PIDs.</li> <li>• Wiggle, shake, and bend the harness from the TP to the PCM.</li> <li>• <b>Are the voltages between 0.49 - 4.65 V?</b></li> </ul>	<p><b>Yes</b> GO to <b>DV28</b>.</p> <p><b>No</b> REPAIR as necessary. If DTC P2100 or P2101 is present, GO to <b>DV20</b>.</p>
<b>DV20</b>	<b>CHECK THE TACM MOTOR VISUALLY</b> <p><b>Note:</b> Make sure the TACM harness connector is properly connected.</p> <ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Inspect the TACM for damaged housing, harness connector, and harness.</li> <li>• <b>Are there any concerns with the TACM hardware?</b></li> </ul>	<p><b>Yes</b> INSTALL a new ETB. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> GO to <b>DV21</b>.</p>

DV18-DV20

# Throttle Body Assembly Electronic Throttle Control (ETC)

## DV

Test Step		Results / Action to Take																		
<b>DV21</b>	<b>CHECK THE TACM FOR A SHORT OR OPEN</b> <ul style="list-style-type: none"> <li>ETBTACM connector disconnected.</li> <li>Measure the resistance between: <table border="1"> <thead> <tr> <th>( + ) ETBTACM Connector, Component Side</th> <th>( - ) ETBTACM Connector, Component Side</th> </tr> </thead> <tbody> <tr> <td>TACM+ - Pin 1</td> <td>TACM- - Pin 2</td> </tr> </tbody> </table> </li> <li>Is the resistance between 1 ohm - 900 ohms?</li> </ul>	( + ) ETBTACM Connector, Component Side	( - ) ETBTACM Connector, Component Side	TACM+ - Pin 1	TACM- - Pin 2	<b>Yes</b> GO to DV22. <b>No</b> INSTALL a new ETB. CLEAR the DTCs. REPEAT the self-test.														
( + ) ETBTACM Connector, Component Side	( - ) ETBTACM Connector, Component Side																			
TACM+ - Pin 1	TACM- - Pin 2																			
<b>DV22</b>	<b>CHECK THE TACM HARNESS FOR AN OPEN</b> <ul style="list-style-type: none"> <li>PCM connector disconnected.</li> <li>Measure the resistance between: <table border="1"> <thead> <tr> <th>( + ) ETBTACM Connector, Harness Side</th> <th>( - ) PCM Connector, Harness Side</th> </tr> </thead> <tbody> <tr> <td>TACM+ - Pin 1</td> <td>TACM+</td> </tr> <tr> <td>TACM- - Pin 2</td> <td>TACM-</td> </tr> </tbody> </table> </li> <li>Are the resistances less than 5 ohms?</li> </ul>	( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side	TACM+ - Pin 1	TACM+	TACM- - Pin 2	TACM-	<b>Yes</b> GO to DV23. <b>No</b> REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.												
( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side																			
TACM+ - Pin 1	TACM+																			
TACM- - Pin 2	TACM-																			
<b>DV23</b>	<b>CHECK THE HARNESS FOR A SHORT TO GND, PWR, ETCREF, AND ETCRTN</b> <ul style="list-style-type: none"> <li>Measure the resistance between: <table border="1"> <thead> <tr> <th>( + ) ETBTACM Connector, Harness Side</th> <th>( - ) PCM Connector, Harness Side</th> </tr> </thead> <tbody> <tr> <td>TACM+ - Pin 1</td> <td>PWRGND</td> </tr> <tr> <td>TACM+ - Pin 1</td> <td>VPWR</td> </tr> <tr> <td>TACM+ - Pin 1</td> <td>ETCRTN</td> </tr> <tr> <td>TACM+ - Pin 1</td> <td>ETCREF</td> </tr> <tr> <td>TACM- - Pin 2</td> <td>PWRGND</td> </tr> <tr> <td>TACM- - Pin 2</td> <td>ETCRTN</td> </tr> <tr> <td>TACM- - Pin 2</td> <td>VPWR</td> </tr> <tr> <td>TACM- - Pin 2</td> <td>ETCREF</td> </tr> </tbody> </table> </li> <li>Are the resistances greater than 10K ohms?</li> </ul>	( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side	TACM+ - Pin 1	PWRGND	TACM+ - Pin 1	VPWR	TACM+ - Pin 1	ETCRTN	TACM+ - Pin 1	ETCREF	TACM- - Pin 2	PWRGND	TACM- - Pin 2	ETCRTN	TACM- - Pin 2	VPWR	TACM- - Pin 2	ETCREF	<b>Yes</b> GO to DV24. <b>No</b> REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side																			
TACM+ - Pin 1	PWRGND																			
TACM+ - Pin 1	VPWR																			
TACM+ - Pin 1	ETCRTN																			
TACM+ - Pin 1	ETCREF																			
TACM- - Pin 2	PWRGND																			
TACM- - Pin 2	ETCRTN																			
TACM- - Pin 2	VPWR																			
TACM- - Pin 2	ETCREF																			
<b>DV24</b>	<b>CHECK FOR TACM HARNESS CIRCUITS SHORTED TOGETHER</b> <ul style="list-style-type: none"> <li>Measure the resistance between: <table border="1"> <thead> <tr> <th>( + ) ETBTACM Connector, Harness Side</th> <th>( - ) ETBTACM Connector, Harness Side</th> </tr> </thead> <tbody> <tr> <td>TACM+ - Pin 1</td> <td>TACM- - Pin 2</td> </tr> </tbody> </table> </li> <li>Is the resistance greater than 10K ohms?</li> </ul>	( + ) ETBTACM Connector, Harness Side	( - ) ETBTACM Connector, Harness Side	TACM+ - Pin 1	TACM- - Pin 2	<b>Yes</b> GO to DV25. <b>No</b> REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.														
( + ) ETBTACM Connector, Harness Side	( - ) ETBTACM Connector, Harness Side																			
TACM+ - Pin 1	TACM- - Pin 2																			

DV21-DV24

# Throttle Body Assembly Electronic Throttle Control (ETC)

## DV

Test Step		Results / Action to Take				
<b>DV25</b>	<b>CHECK FOR SELF-TEST CODES</b>					
	<ul style="list-style-type: none"> <li>ETBTACM connector connected.</li> <li>PCM connector connected.</li> <li>Key ON, engine OFF.</li> <li>Carry out the self-test.</li> <li><b>Is DTC P2101 present?</b></li> </ul>	<p><b>Yes</b> GO to <b>DV26</b>.</p> <p><b>No</b> GO to <b>DV28</b>.</p>				
<b>DV26</b>	<b>CHECK FOR PROPER TACM+ WIRING IN THE HARNESS CONNECTOR</b>					
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>ETBTACM connector disconnected.</li> <li>PCM connector disconnected.</li> <li>Measure the resistance between:</li> </ul> <table border="1" data-bbox="305 695 857 785"> <tr> <td>( + ) ETBTACM Connector, Harness Side</td> <td>( - ) PCM Connector, Harness Side</td> </tr> <tr> <td>TACM+ - Pin 1</td> <td>TACM+</td> </tr> </table> <ul style="list-style-type: none"> <li><b>Is the resistance less than 5 ohms?</b></li> </ul>	( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side	TACM+ - Pin 1	TACM+	<p><b>Yes</b> GO to <b>DV27</b>.</p> <p><b>No</b> REPAIR the open circuit. WIRE the TACM harness connector per the TACM and PCM connector diagrams. CLEAR the DTCs. REPEAT the self-test.</p>
( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side					
TACM+ - Pin 1	TACM+					
<b>DV27</b>	<b>CHECK FOR PROPER TACM- WIRING IN THE HARNESS CONNECTOR</b>					
	<ul style="list-style-type: none"> <li>Measure the resistance between:</li> </ul> <table border="1" data-bbox="305 936 857 1026"> <tr> <td>( + ) ETBTACM Connector, Harness Side</td> <td>( - ) PCM Connector, Harness Side</td> </tr> <tr> <td>TACM- - Pin 2</td> <td>TACM-</td> </tr> </table> <ul style="list-style-type: none"> <li><b>Is the resistance less than 5 ohms?</b></li> </ul>	( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side	TACM- - Pin 2	TACM-	<p><b>Yes</b> GO to <b>DV29</b>.</p> <p><b>No</b> GO to <b>DV28</b>.</p>
( + ) ETBTACM Connector, Harness Side	( - ) PCM Connector, Harness Side					
TACM- - Pin 2	TACM-					
<b>DV28</b>	<b>CHECK THE REPAIR THROUGH PROCEDURE</b>					
	<ul style="list-style-type: none"> <li>Key ON, engine OFF.</li> <li>Record and clear the DTCs.</li> <li>Cycle the accelerator pedal to the floor and back several times.</li> <li>Check for self-test DTCs.</li> <li><b>Are any ETC system related DTCs present?</b></li> </ul>	<p><b>Yes</b> GO to <b>DV29</b>.</p> <p><b>No</b> GO to Pinpoint Test Z.</p>				
<b>DV29</b>	<b>CHECK FOR CORRECT PCM OPERATION</b>					
	<ul style="list-style-type: none"> <li>Disconnect all the PCM connectors.</li> <li>Visually inspect for: <ul style="list-style-type: none"> <li>pushed out pins</li> <li>corrosion</li> </ul> </li> <li>Connect all the PCM connectors and make sure they seat correctly.</li> <li>Carry out the PCM self-test and verify the concern is still present.</li> <li><b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new PCM. REFER to Diagnostic Methods, Flash Electrically Erasable Programmable Read Only Memory (EEPROM).</p> <p><b>No</b> The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>				