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Coding Information

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Title: EPA 2007 MaxxForce® 11 and 13 Engines Accelerator Position Sensor / Idle Validation Switch APS / IVS Diagnostics

Applies To: 2008 - 2009 MaxxForce® 11 and 13 engine equipped WorkStar®, TranStar™, and ProStar™ vehicles.

DESCRIPTION

Two new APS sensors (Accelerator Position Sensor) have been developed and released for use with pre-2010 emissions International Engines. The new sensors listed below contain "non-contact" hall-effect idle validation sensors. This replaces the open/closed IVS switches in the old sensors. As a result of this new design, the normal resistance measurements performed for the potentiometer and idle validation switch on the previous "contact' sensor are no longer applicable. A technician can continue to perform resistance measurement tests on the engine harness with the sensor unplugged (open circuit), but should rely solely upon the voltage measurement tests, with a breakout harness installed, at the ECM and APS sensor, and the new sensor connected.

SYMPTOMS

- APS/ IVS fault codes present
- Engine speed restricted to idle
- Erratic automatic transmission operation
- Engine warning lights illuminated

POSSIBLE DIAGNOSTIC TROUBLE CODES

APS/IVS Diagnostic Trouble Code		
DTC	Condition	Possible Causes
1131	APS signal out-of-range LOW	• APS signal OPEN or shorted to GND& • VREF circuit OPEN or shorted to GND • Failed sensor
1132	APS signal out-of-range HIGH	• APS signal shorted to PWR • Failed sensor
1133	APS signal in-range fault	• Circuit fault • Failed sensor • Open diagnostic resistor or circuit
1134	APS/IVS disagreement	• Circuit fault • Failed sensor • Open diagnostic resistor or circuit
1135	Idle validation switch fault	• IVS circuit OPEN or shorted to GND or PWR • Failed sensor • Open diagnostic resistor or circuit
1129	APS VREF out-of-range HIGH	• VREF circuit shorted to PWR • Failed sensor • Open diagnostic resistor or circuit
1130	APS VREF out-of-range LOW	• VREF circuit OPEN or shorted to GND • Failed sensor

PARTS INFORMATION

Part #	Description	Qty.
3681684C91	1150 Ohm Resistor	2
2603893C91	APS	1

DIAGNOSTICS

There can be various conditions that can cause APS/IVS related issues. As with any performance related fault, a thorough description of the issue, from the operator are critical.

- Is the fault sensitive to road conditions, such as rough terrain, hills, etc?
- Is the fault temperature sensitive?
- Does the fault occur, when coming to a stop, or when accelerating or cruising?
- Do any other faults occur at the same time, such as loss of dash cluster, or other in cab accessories?
- Are there other codes, that can be attributed to this issue such as loss of ignition related faults?

If any circuit issues are suspected, a thorough visual inspection of all circuitry for shorts, and opens is critical, as intermittent issues are usually caused by wiring faults. Any harness mounting points should be disassembled and inspected. Harnesses should be inspected and if damaged, repaired where they pass by sharp edges, or possible points of abrasion. If harnesses are pulled too tight remount to provide a marginal amount of slack, to prevent the connector or circuits from being pulled loose.

When inspecting connectors, be sure to verify that all connectors have been properly "locked" into place, and a light coat of dielectric grease be applied to the terminals upon reinstallation.

If idle validation faults are an issue, testing of the ignition voltage supply to the sensor should be performed.

COMPONENT FUNCTION/DESCRIPTION

APS/IVS Circuit Operation
The APS/IVS is integrated into one component and mounted on the pedal. The APS/IVS switch can be replaced without replacing the complete assembly.

The EIM determines accelerator pedal position by processing input signals from the APS and the IVS.

APS

The APS is a potentiometer sensor that is supplied with a 5Vreference voltage at Pin C from EIM Pin X4-4 and is grounded at Pin B from EIM Pin X4-24. The sensor returns a variable voltage signal from Pin A to EIM Pin X4-18.

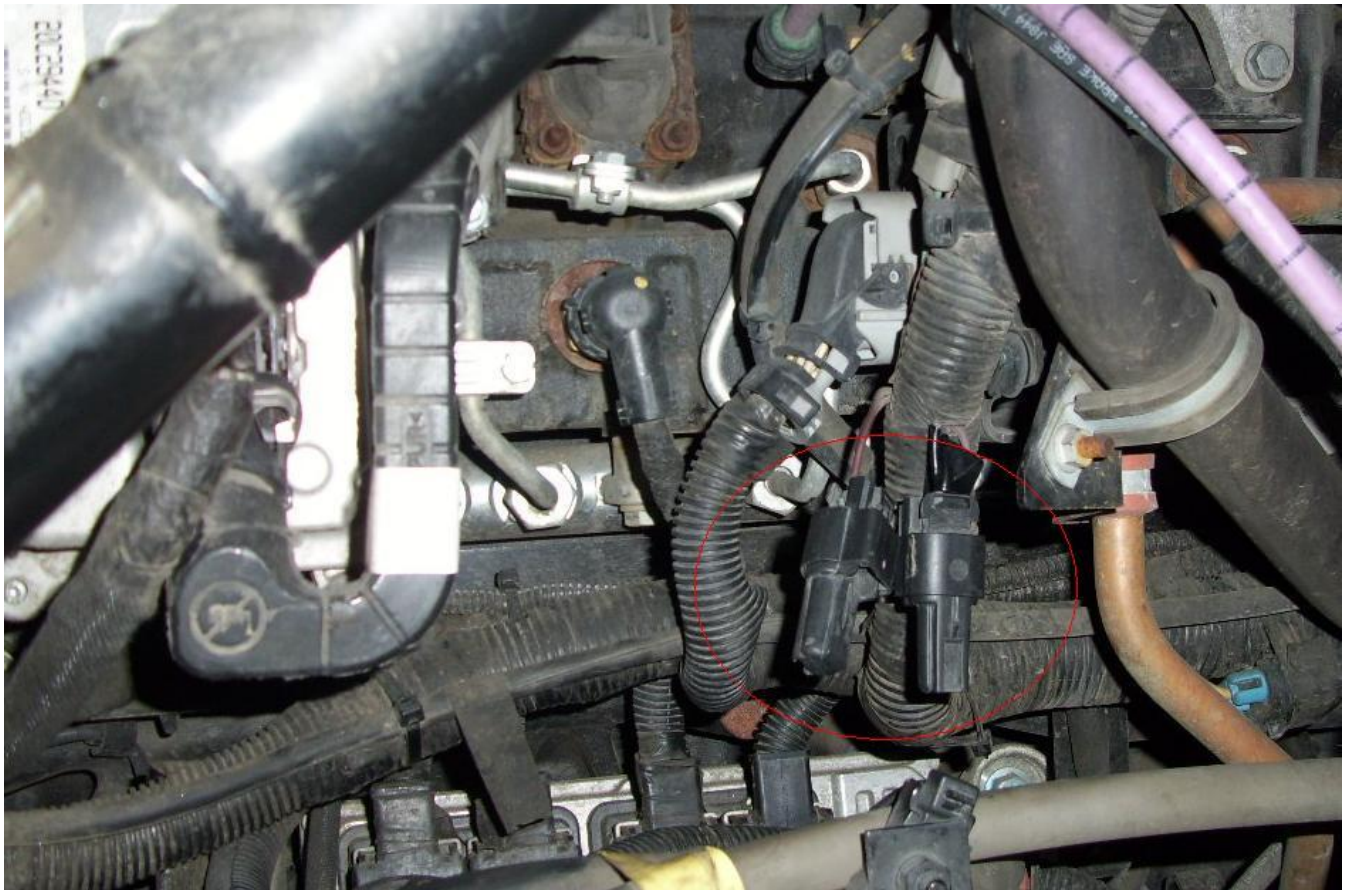
IVS
The IVS is an ON/OFF switch that is supplied B+ on Pin F from the PWR fuse. The switch sends an ON or OFF idle voltage signal from Pin D to EIM Pin X4-23.

APS Auto-Calibration
The EIM auto-calibrates the APS signal every time the ignition key is turned on. The EIM learns the lowest and highest pedal positions allowing for maximum pedal sensitivity. When the key is turned off, this information is lost until the next key cycle where the process is repeated. No accelerator pedal adjustment is needed with this feature.

Fault Detection / Management
When the key is on, the EIM continuously monitors the APS/IVS circuits for expected voltages. It also compares the APS and IVS signals for conflict. If a conflict occurs, the EIM sets a DTC.

Any malfunction of the APS/IVS sensor circuit illuminates the amber engine lamp. If the EIM detects an APS signal out of range HIGH or LOW, the engine ignores the APS signal and operates at low idle. If a disagreement in the state of IVS and APS is detected by the EIM and the EIM determines that it is an IVS fault, the EIM only allows a maximum of 50% APS to be commanded. If the EIM cannot discern if it is an APS or IVS fault, the engine is allowed to operate at low idle only.

NOTE:
The APS / IVS circuit for the MaxxForce® 11 and 13 is slightly different from other International Engine APS / IVS circuits.
Note the 1150 ohm resistor in series with the IVS circuit and the 1150 ohm resistor in parallel with VREF and the X4-15 Diag. **These resistors can have a direct inpact on the IVS/APS operation, so circuit diagnostics should be performed.**

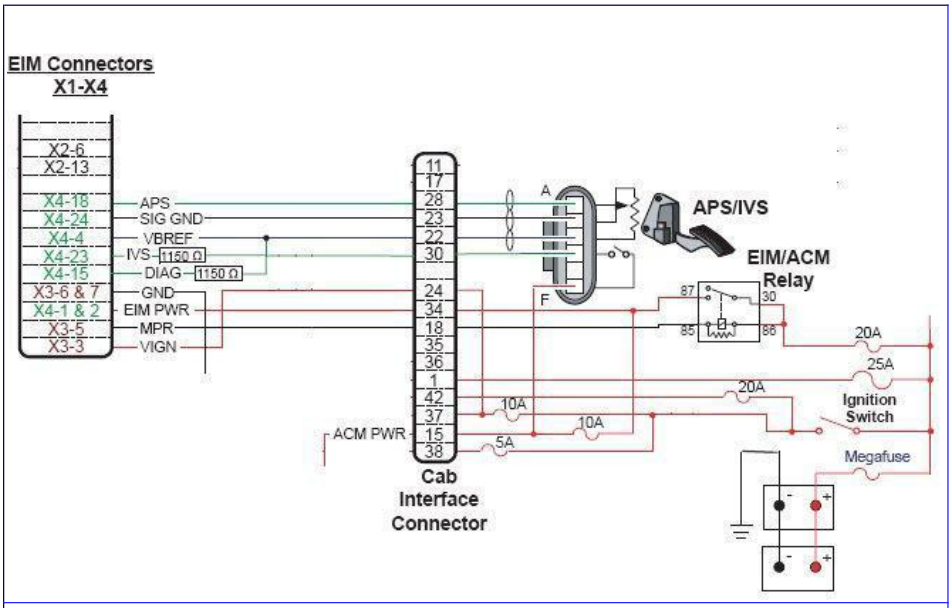


TROUBLESHOOTING

ZTSE 4485A - APS /IVS Breakout Tee

NOTE:

When performing diagnostic tests, be sure to refer to the correct circuit diagram manuals, found on ISIS, for the vehicle you are working on.



2008 - 2009 MaxxForce 11 and 13 typical APS / IVS circuit

NOTE:

If all circuit and operational tests have been performed, and all wiring/components have been inspected and are deemed to be satisfactory, yet the issue is still not resolved, open a tech service case file for further diagnostic assistance.

ADDITIONAL RELATED IKNOW DOCUMENTS:

IK0800218 Accelerator Position Sensor/Idle Validation Switch APS /IVS Diagnostics, 3-Box equipped engine control systems

IK0800219 DLC equipped vehicles Accelerator Position Sensor/IdleValidation Switch APS / IVS Diagnostics NavPak™, CEC equipped engine control systems

IK0800223
DLCII equipped vehicles Accelerator Position Sensor/Idle Validation Switch APS / IVS Diagnostics DLCII equipped engine control systems

IK0800226 Accelerator Position Sensor/ Idle Validation Switch APS / IVS Diagnostics, MaxxForce® equipped engine control systems

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