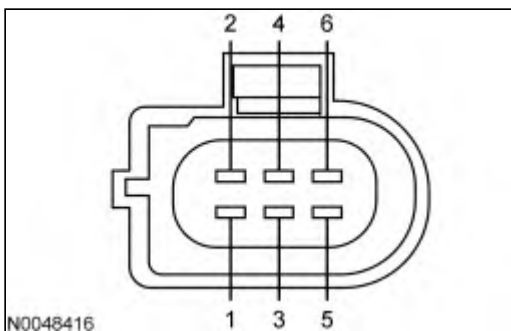
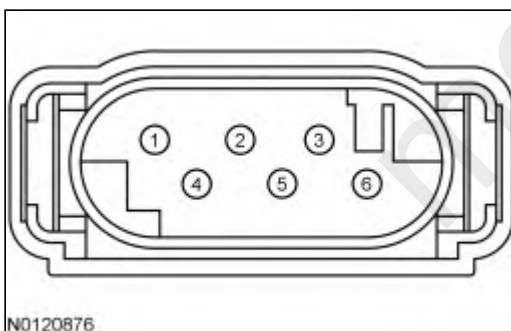


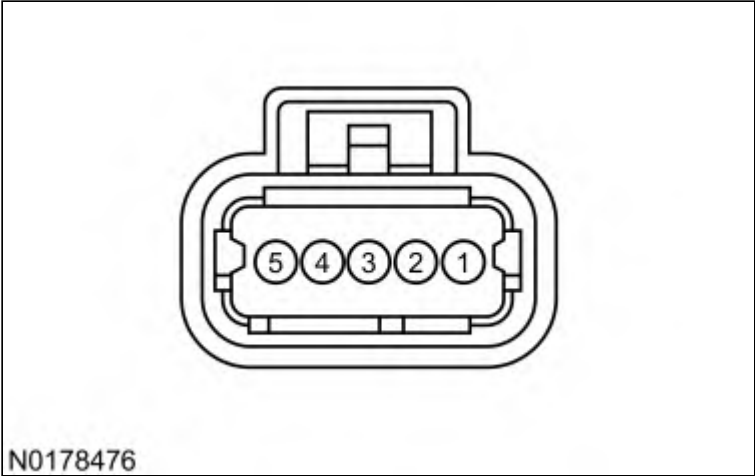
AX: Intake Throttle

Note: Regeneration may occur during normal operation. During regeneration, diagnostic procedures may display biased values. If a regeneration occurs during diagnostic procedures, allow the process to complete before continuing diagnostics.

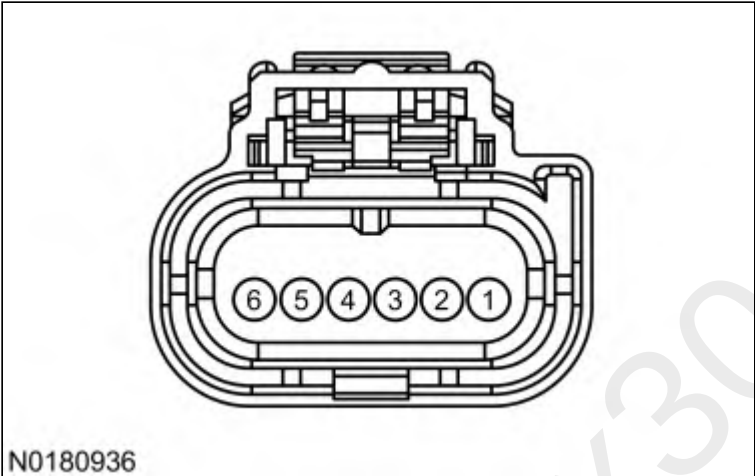
This pinpoint test is intended to diagnose the following:

- harness circuits: TACM+, TACM-, TP, SIGRTN and VREF
- intake throttle actuator (9E926)
- PCM (12A650)

Intake Throttle Actuator Connector**A****B****C**



D

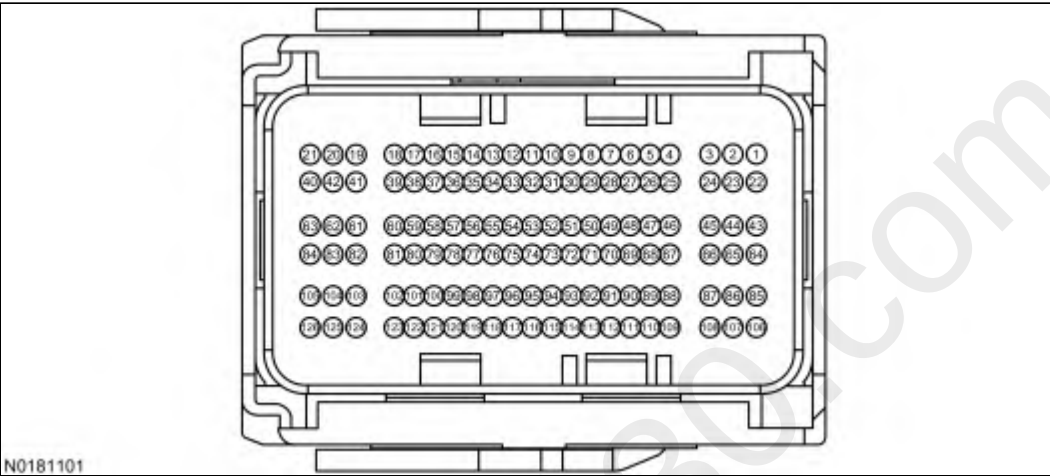


Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	2 6 5 3 1	TACM- TACM+ TP SIGRTN VREF
Transit	B	1 4 6 2 3	TACM- TACM+ TP SIGRTN VREF
Transit Connect	C	2 1 4 3 5	TACM- TACM+ TP SIGRTN VREF

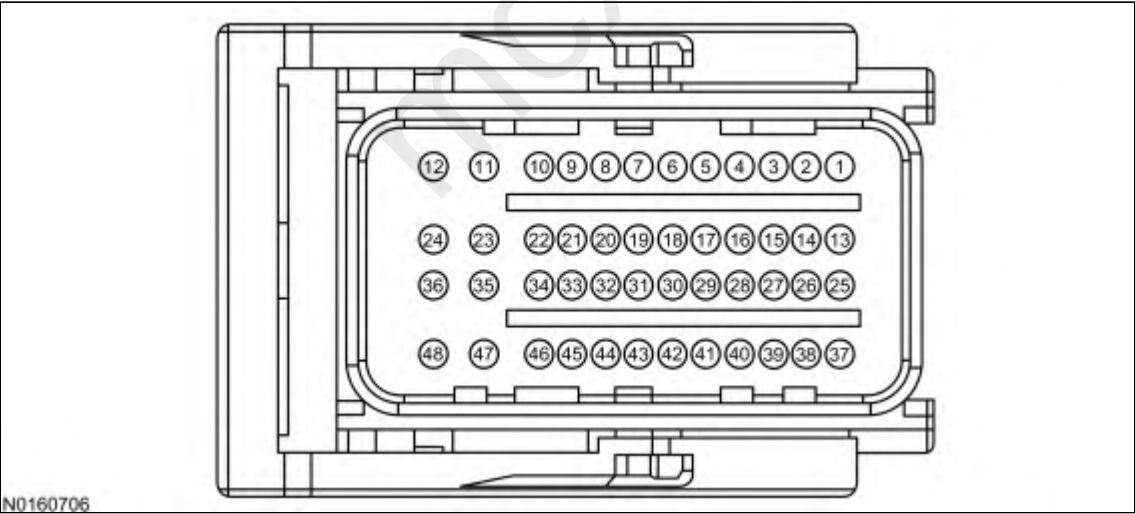
Vehicle	Connector	Pin	Circuit
All other vehicles	D	2 1 3 4 5	TACM- TACM+ TP SIGRTN VREF

Powertrain Control Module-E (PCM-E) Connector

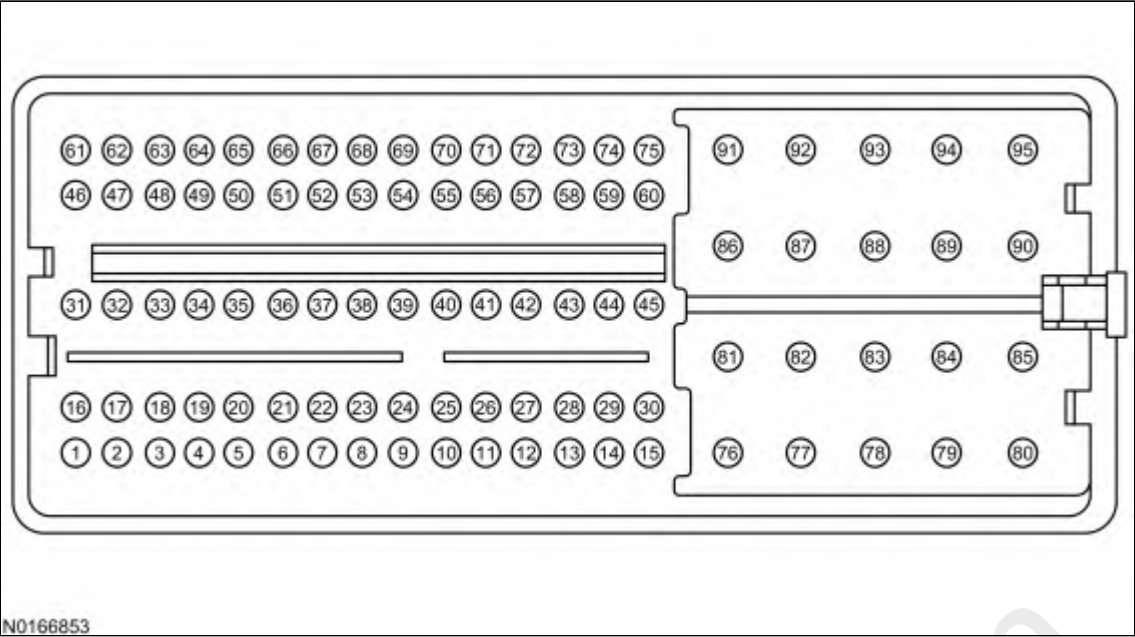
A



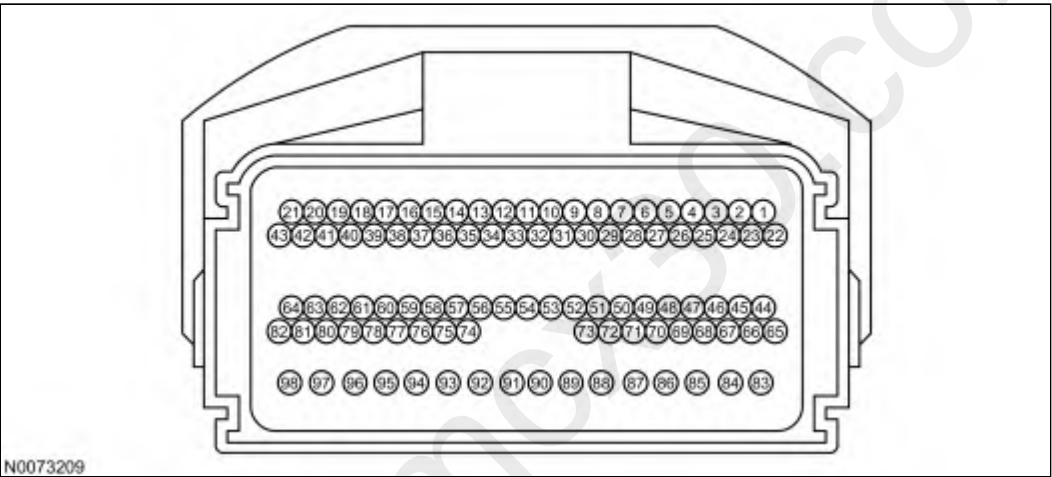
B



C



D



Vehicle	Connector	Pin	Circuit
F-Series Super Duty	A	3 2 122	TACM- TACM+ TP
Transit	B	44 43 16	TACM- TACM+ TP
Transit Connect	C	83 78 56	TACM- TACM+ TP
All other vehicles	D	44 45 29	TACM- TACM+ TP

AX1 PRELIMINARY DIAGNOSIS

Are DTCs P02E0, P02E1, P02E2, P02E3, P02E4, P02E8, P02E9, P02FA or P0488 present?

Yes	GO to AX2 .
No	RETURN to Section 3, Symptom Charts for further direction.

AX2 CHECK FOR VOLTAGE BETWEEN THE VREF AND SIGRTN CIRCUITS

- Ignition OFF.
- Intake Throttle Actuator connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Intake Throttle Actuator Connector, Harness Side	(-) Intake Throttle Actuator Connector, Harness Side
VREF	SIGRTN

Is the voltage between 4.5 - 5.5 V?

Yes	GO to AX3 .
No	GO to Pinpoint Test B .

AX3 CHECK THE INTAKE THROTTLE ACTUATOR HARNESS FOR AN OPEN

- Ignition OFF.
- PCM-E connector disconnected.
- Measure the resistance between:

(+) Intake Throttle Actuator Connector, Harness Side	(-) PCM-E Connector, Harness Side
TP	TP
TACM+	TACM+
TACM-	TACM-

Are the resistances less than 5 ohms?

Yes	GO to AX4 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

AX4 CHECK THE INTAKE THROTTLE ACTUATOR HARNESS FOR A SHORT TO GROUND

- Measure the resistance between:

(+) Intake Throttle Actuator Connector, Harness Side	(-)
TP	Ground
TACM+	Ground
TACM-	Ground

Are the resistances greater than 10K ohms?

Yes	GO to AX5 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

AX5 CHECK THE INTAKE THROTTLE ACTUATOR HARNESS FOR A SHORT TO VOLTAGE

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

(+) Intake Throttle Actuator Connector, Harness Side	(-)
TP	Ground
TACM+	Ground
TACM-	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to AX6 .

AX6 CHECK FOR THE TACM+ AND TACM- CIRCUITS SHORTED TOGETHER

- Ignition OFF.
- Measure the resistance between:

(+) Intake Throttle Actuator Connector, Harness Side	(-) Intake Throttle Actuator Connector, Harness Side
TACM+	TACM-

Is the resistance greater than 10K ohms?

Yes	GO to AX7 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

AX7 CHECK THE INTERNAL RESISTANCE OF THE INTAKE THROTTLE ACTUATOR MOTOR

- Measure the resistance between:

(+) Intake Throttle Actuator Connector, Component Side	(-) Intake Throttle Actuator Connector, Component Side
TACM+	TACM-

Is the resistance between 1 - 900 ohms?

Yes	GO to AX8 .
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No	For F-650 / F-750 and Transit, INSTALL a new Intake Throttle Actuator. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function MAF Sensor on the scan tool. REFER to Section 2, Clear The Continuous Diagnostic Trouble Codes (DTCs) And Reset The Emission Monitors Information in The Powertrain Control Module (PCM). Clear the PCM DTCs. REPEAT the self-test. For all others, INSTALL a new Intake Throttle Actuator. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function EGR Throttle on the scan tool. REFER to Section 2, Clear The Continuous Diagnostic Trouble Codes (DTCs) And Reset The Emission Monitors Information in The Powertrain Control Module (PCM). Clear the PCM DTCs. REPEAT the self-test.
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AX8 INTERMITTENT CHECK

- Ignition ON, engine OFF.
- PCM-E connector connected.
- Intake Throttle Actuator connector connected.
- Access the PCM and monitor the EGRTTP_V (VOLT) PID.
- While observing the PID for voltage spikes, wiggle, shake, and bend small sections of the wiring harness while working from the intake throttle actuator to the PCM.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	For Transit Connect, GO to AX10. For all others, GO to AX9.

AX9 CHECK THE INTAKE THROTTLE ACTUATOR OPERATION WITH THE ENGINE OFF

- Ignition ON, engine OFF.
- Access the PCM and monitor the EGRTTP_V (VOLT) PID.
- Access the PCM and control the EGRTTP_CMD (PER) PID.
- Monitor the EGRTTP_V PID and compare the values to the intake throttle position sensor table.

Intake Throttle Position Sensor (Approximate)

EGRTTP_CMD PID	EGRTTP_V PID minimum	EGRTTP_V PID maximum
0%	0.45 (F-150) 0.53 (F-Series Super Duty) 0.00 (Transit) 4.215 (All Others)	0.65 (F-150) 0.57 (F-Series Super Duty) 0.60 (Transit) 4.845 (All Others)
100%	4.4 (F-150) 4.0 (F-Series Super Duty) 3.90 (Transit) 0.16 (All Others)	4.6 (F-150) 4.75 (F-Series Super Duty) 4.50 (Transit) 1.34 (All Others)

Does the EGRTTP_V PID value approximately match the values in the intake throttle position sensor table?

Yes	GO to AX10 .
No	For F-650 / F-750 and Transit, INSTALL a new Intake Throttle Actuator. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function MAF Sensor on the scan tool. REFER to Section 2, Clear The Continuous Diagnostic Trouble Codes (DTCs) And Reset The Emission Monitors Information in The Powertrain Control Module (PCM). Clear the PCM DTCs. REPEAT the self-test. For all others, INSTALL a new Intake Throttle Actuator. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function EGR

Throttle on the scan tool. REFER to Section 2, [Clear The Continuous Diagnostic Trouble Codes \(DTCs\) And Reset The Emission Monitors Information in The Powertrain Control Module \(PCM\)](#).
Clear the PCM DTCs. REPEAT the self-test.

AX10 CHECK THE INTAKE THROTTLE ACTUATOR OPERATION WITH THE ENGINE OFF

- Ignition OFF.
- Disconnect the charge air cooler (CAC) tube from the intake throttle actuator.
- Ignition ON, engine OFF.
- Access the PCM and control the EGRTP_CMD (PER) PID.
- Command the EGRTP_CMD PID to close and open the intake throttle actuator.
- Visually inspect the intake throttle plate for correct operation.

Does the intake throttle actuator operate correctly?

Yes	GO to AX11 .
No	For F-650 / F-750 and Transit, INSTALL a new Intake Throttle Actuator. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function MAF Sensor on the scan tool. REFER to Section 2, Clear The Continuous Diagnostic Trouble Codes (DTCs) And Reset The Emission Monitors Information in The Powertrain Control Module (PCM). Clear the PCM DTCs. REPEAT the self-test. For all others, INSTALL a new Intake Throttle Actuator. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function EGR Throttle on the scan tool. REFER to Section 2, Clear The Continuous Diagnostic Trouble Codes (DTCs) And Reset The Emission Monitors Information in The Powertrain Control Module (PCM). Clear the PCM DTCs. REPEAT the self-test.

AX11 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.
- Verify the concern is still present.

Is the concern still present?

Yes	For DTC P02E1, GO to Pinpoint Test ZZ. For all others, 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.

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