

F: Intake Air Temperature (IAT) Sensor

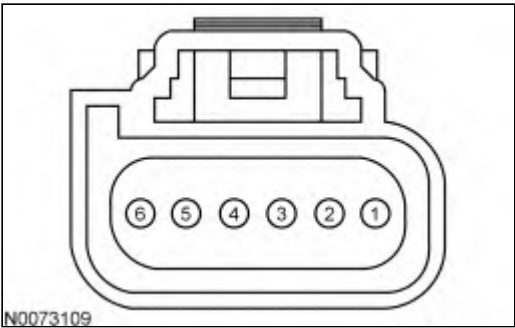
Note: Regeneration may occur during normal operation. During regeneration, diagnostic procedures may display biased values. If a regeneration occurs during diagnostic procedures, allow the process to complete before continuing diagnostics.

This pinpoint test is intended to diagnose the following:

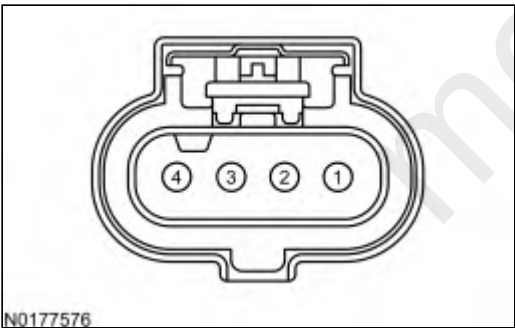
- harness circuits: IAT and SIGRTN
- mass airflow/intake air temperature (MAF/IAT) sensor (12B579)
- PCM (12A650)

Mass Airflow/Intake Air Temperature (MAF/IAT) Sensor Connector

A



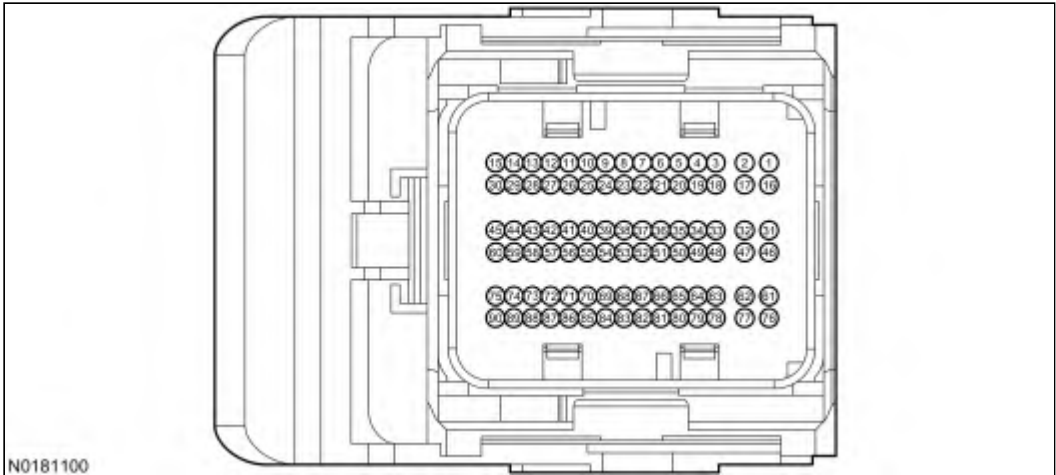
B



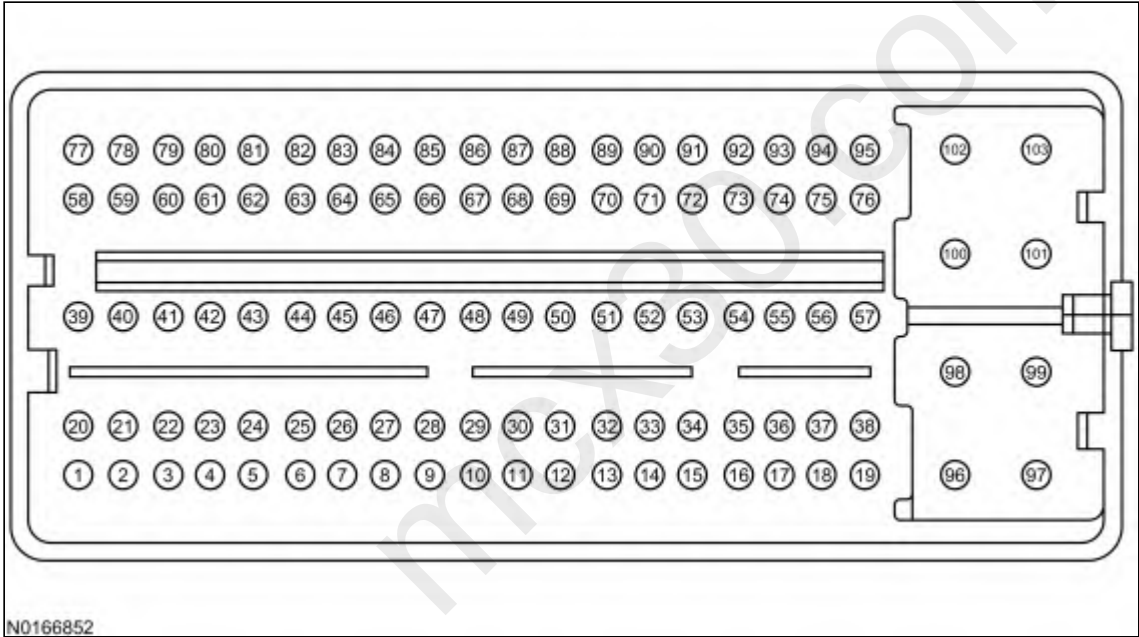
Vehicle	Connector	Pin	Circuit
F-150, F-650 / F-750, Transit, Transit Connect	A	2 4	IAT SIGRTN
F-Series Super Duty	B	3 2	SIGRTN VREF

Powertrain Control Module-B (PCM-B) Connector

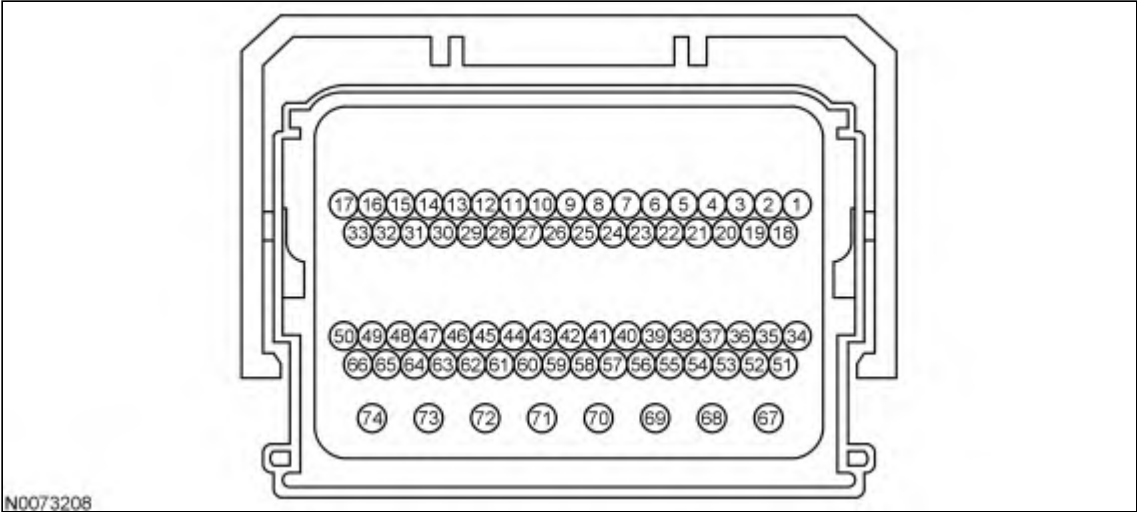
A



B

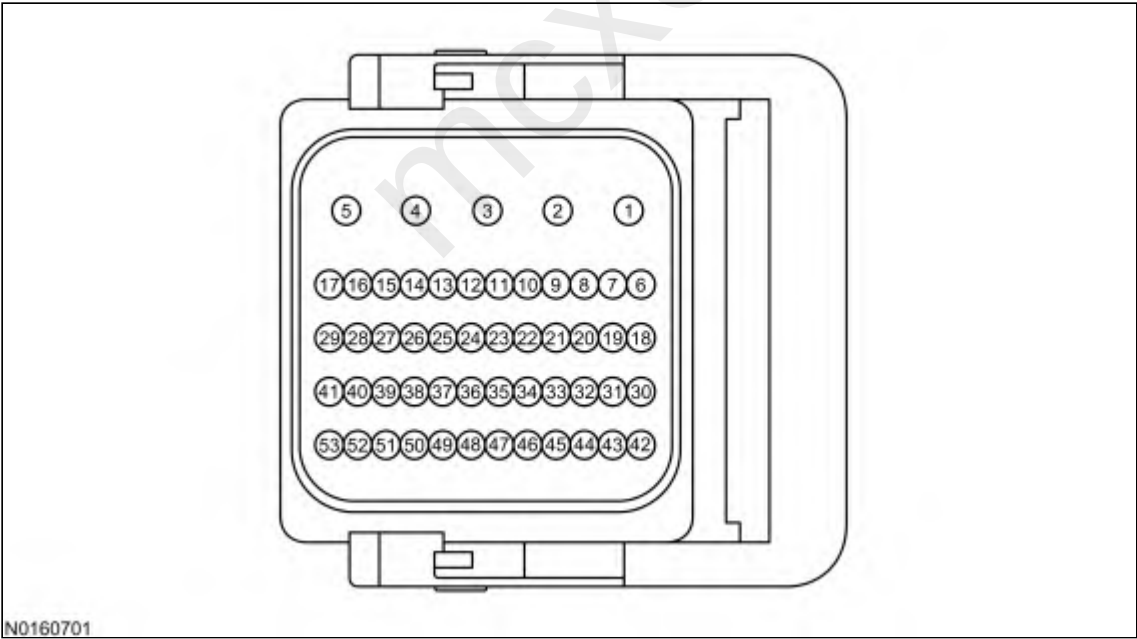


C



Vehicle	Connector	Pin	Circuit
F-Series Super Duty	A	11	SIGRTN
Transit Connect	B	4	SIGRTN
		17	IAT
All other vehicles	C	60	SIGRTN
		47	IAT

Powertrain Control Module-T (PCM-T) Connector



Pin	Circuit
15	SIGRTN (Signal Return)
9	IAT (Intake Air Temperature)

F1 PRELIMINARY DIAGNOSIS

Note: Diagnose circuit DTCs before range or performance DTCs.

Are DTCs P009A, P0110, P0111, P0112 or P0113 present?

Yes	For F-Series Super Duty, GO to F2 . For all others, GO to F3 .
No	RETURN to Section 3, Symptom Charts for further direction.

F2 CHECK FOR VOLTAGE AT THE SENSOR

- Ignition OFF.
- MAF/IAT Sensor connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
VREF	SIGRTN

Is the voltage between 4.5 - 5.5 V?

Yes	GO to F3 .
No	GO to Pinpoint Test B .

F3 CHECK FOR AN OPEN

- Ignition OFF.
- For Transit,
- PCM-T connector disconnected.
- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) PCM-T Connector, Harness Side
IAT	IAT - Pin 9
SIGRTN	SIGRTN - Pin 15

- For all others,
- PCM-B connector disconnected.
- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) PCM-B Connector, Harness Side
IAT	IAT
SIGRTN	SIGRTN

Are the resistances less than 5 ohms?

Yes	GO to F4 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

F4 CHECK FOR A SHORT TO GROUND

- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-)
IAT	Ground

- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
IAT	SIGRTN

Are the resistances greater than 10K ohms?

Yes	GO to F5 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

F5 CHECK FOR A SHORT TO VOLTAGE

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

(+) MAF/IAT Sensor Connector, Harness Side	(-)
IAT	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to F6 .

F6 INTERMITTENT CHECK

- Ignition ON, engine OFF.
- Access the PCM and monitor the IAT11_V (VOLT) PID.
- While observing the PID, carry out the following:
 - Wiggle all accessible harness from the MAF/IAT sensor to the PCM and lightly tap on the sensor.
 - Wiggle the MAF/IAT sensor connector.
 - Look for sudden changes in the voltage when the harness and connector are wiggled or when the MAF/IAT sensor is tapped.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.

No	For F-150 and Transit with DTCs P0112 or P0113, INSTALL a new MAF/IAT sensor. Clear the PCM DTCs. REPEAT the self-test. For all others, GO to F7 .
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F7 TEMPERATURE SENSOR CORRELATION

Note: Check temperature values while engine is at ambient temperature, cold soak the engine for a minimum of 8 hours if necessary.

- Ignition ON, engine OFF.
- Access the PCM and monitor the AAT (TEMP), CAC_T (TEMP), ECT2_1 (TEMP) and EGRTC (TEMP) PIDs.
- For Transit,
- Access the PCM and monitor the IAT (TEMP) PID.
- For all others,
- Access the PCM and monitor the IAT11 (TEMP) PID.
- The IAT temperature must be within the following ranges:
 - Within 15°C (27°F) degrees of the AAT reading
 - Within 16°C (28.8°F) degrees of the CAC_T reading
 - Within 20°C (36°F) degrees of the ECT2_1 reading (F-650 / F-750, F-Series Super Duty)
 - Within 20°C (36°F) degrees of the EGRTC reading

Is the IAT11 PID within specification?

Yes	Unable to duplicate the condition. CHECK for a loose connection, and damaged or corroded terminals. WIGGLE the harness attempting to recreate the concern. REPAIR as necessary.
No	INSTALL a new MAF/IAT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. Clear the PCM DTCs. REPEAT the self-test.