

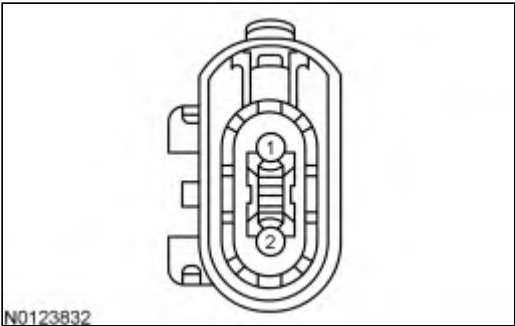
FA: Ambient Air Temperature (AAT) Sensor

This pinpoint test is intended to diagnose the following:

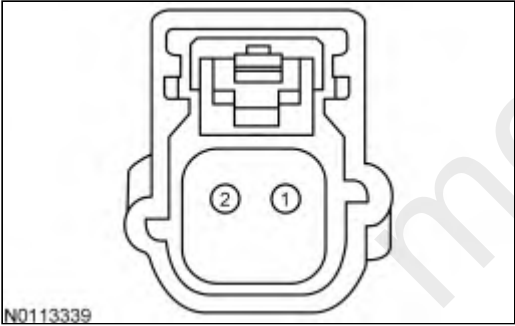
- AAT sensor (12A647)
- harness circuits: AAT and SIGRTN
- PCM (12A650)

Ambient Air Temperature (AAT) Sensor Connector

A



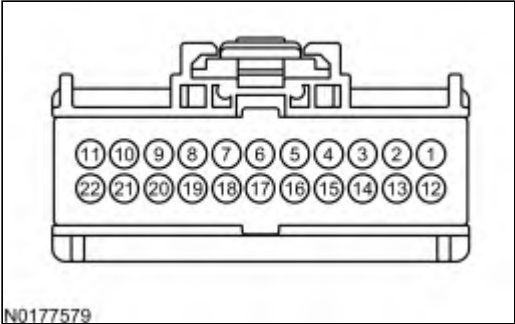
B



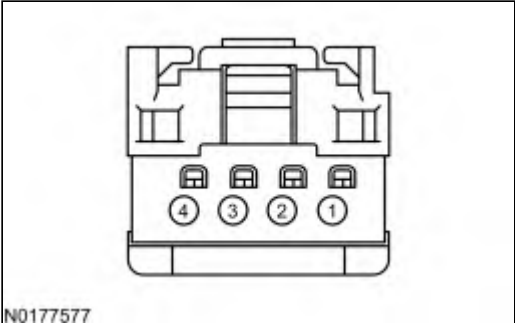
Vehicle	Connector	Pin	Circuit
Transit	A	2	SIGRTN
		1	AAT
All other vehicles	B	2	SIGRTN
		1	AAT

Right Exterior Rear View Mirror Assembly Connector

A



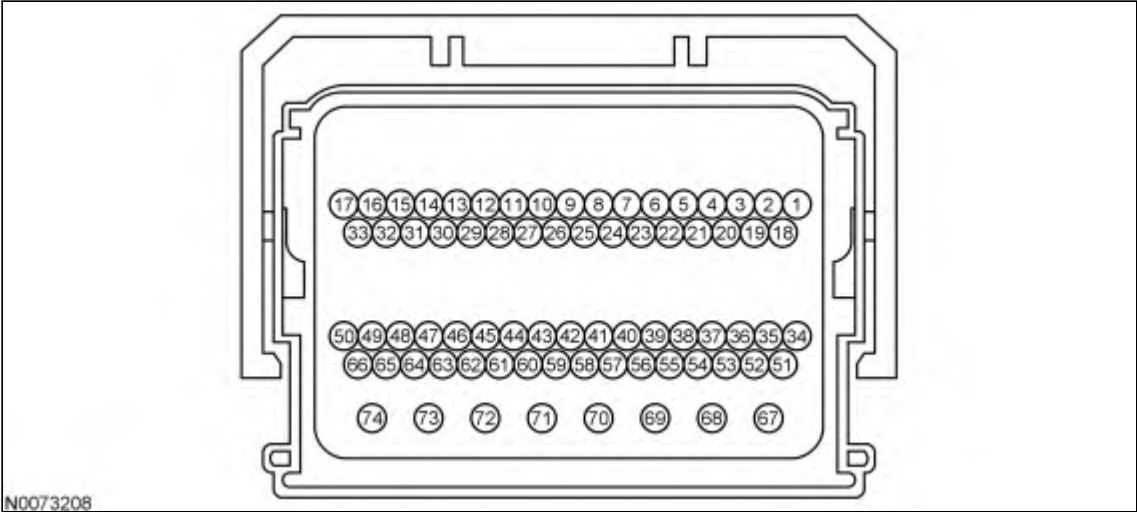
B



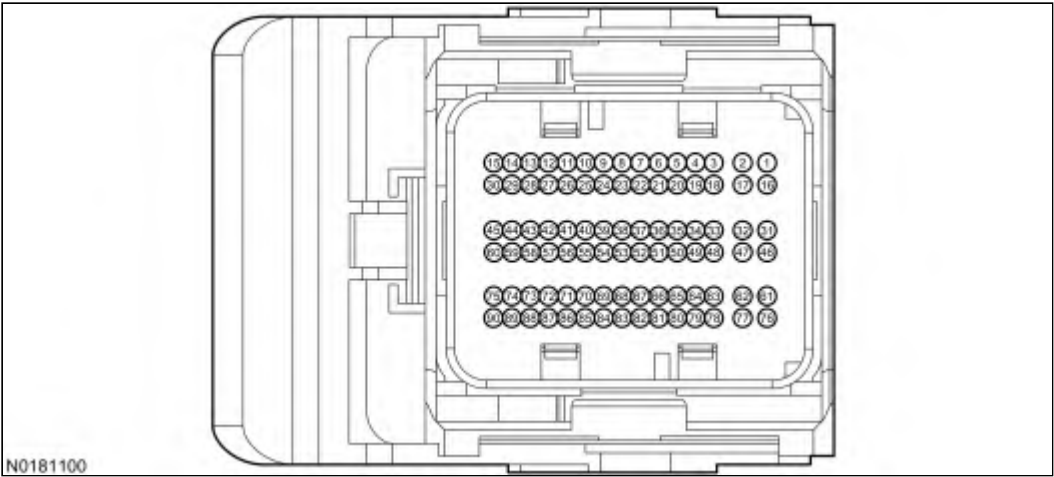
Vehicle	Connector	Pin	Circuit
F-Series Super Duty With Power Mirrors	A	2 6	SIGRTN AAT
F-Series Super Duty Without Power Mirrors	B	3 1	SIGRTN AAT

Powertrain Control Module-B (PCM-B) Connector

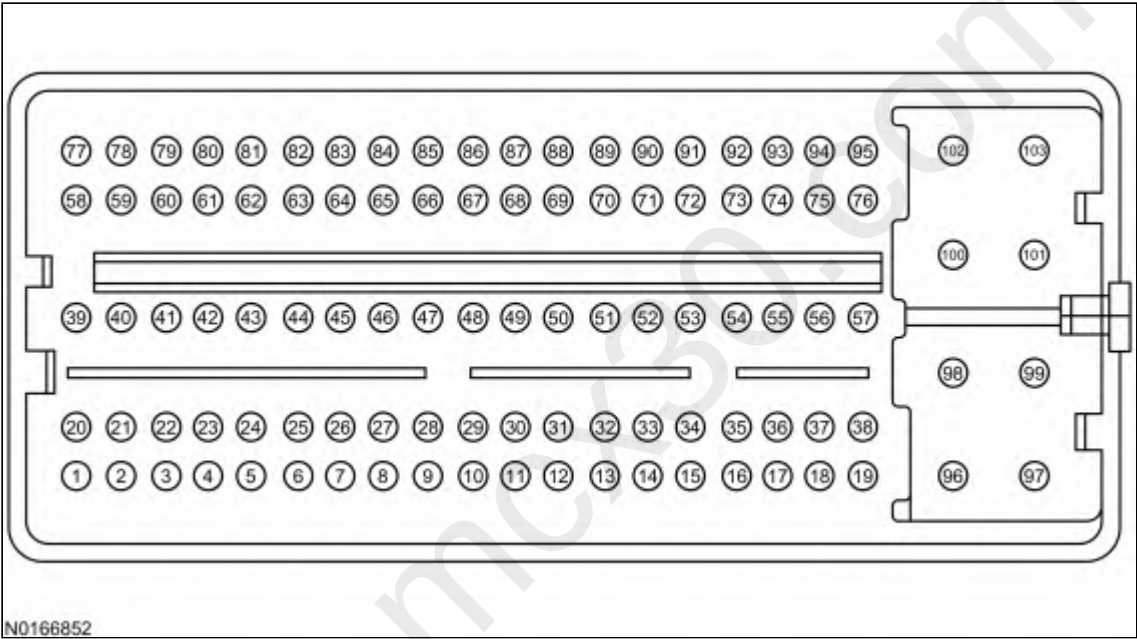
A



B



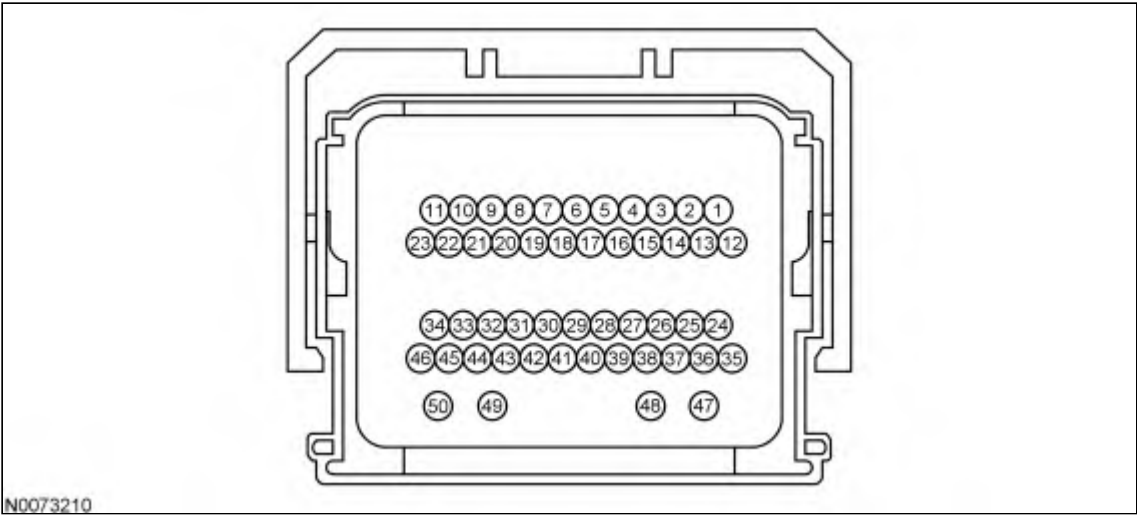
C



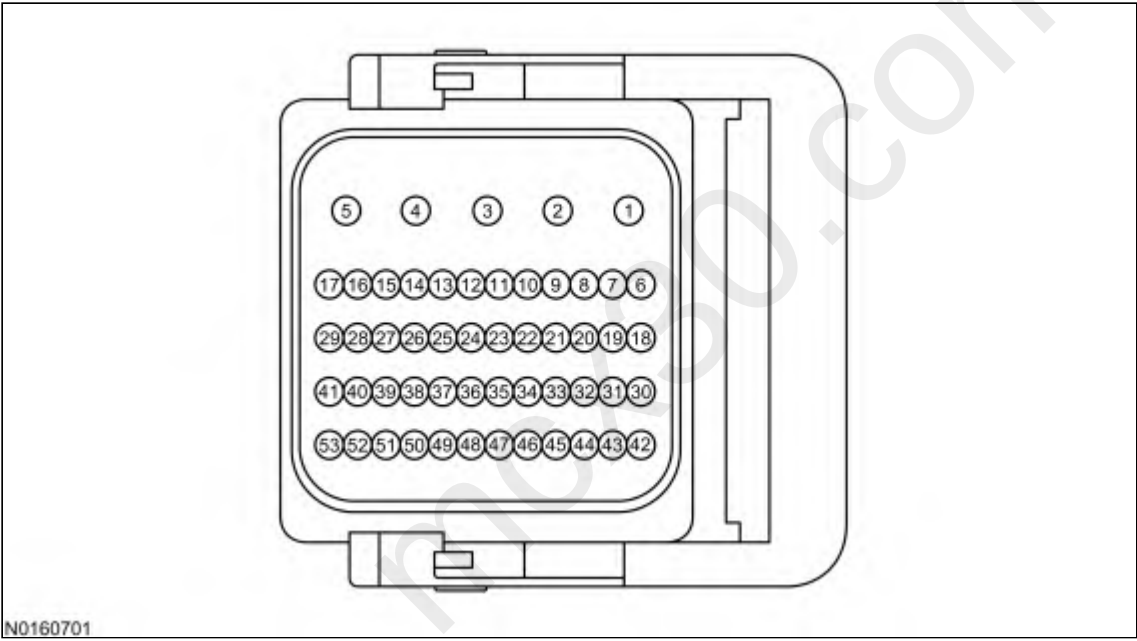
Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	3	AAT
F-Series Super Duty	B	85	SIGRTN
		86	AAT
Transit Connect	C	31	SIGRTN
		12	AAT
All other vehicles	A	44	SIGRTN
		3	AAT

Powertrain Control Module-T (PCM-T) Connector

A



B



Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	43	SIGRTN
Transit	B	21	AAT
		18	SIGRTN

FA1 PRELIMINARY DIAGNOSIS

Note: Diagnose circuit DTCs before range or performance DTCs.

Are DTCs P0070, P0071, P0072 or P0073 present?

Yes	GO to FA2 .
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No RETURN to Section 3, Symptom Charts for further direction.

FA2 CHECK FOR AN OPEN

- Ignition OFF.
- AAT Sensor connector disconnected.
- For F-650 / F-750,
- PCM-B connector disconnected.
- PCM-T connector disconnected.
- Measure the resistance between:

(+) AAT Sensor Connector, Harness Side	(-) PCM-B Connector, Harness Side
AAT	AAT

- Measure the resistance between:

(+) AAT Sensor Connector, Harness Side	(-) PCM-T Connector, Harness Side
SIGRTN	SIGRTN

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

(+) AAT Sensor Connector, Harness Side	(-) PCM-T Connector, Harness Side
AAT	AAT
SIGRTN	SIGRTN

- For F-Series Super Duty,
- PCM-B connector disconnected.
- Measure the resistance between:

(+) Right Exterior Rear View Mirror Assembly Connector, Harness Side	(-) PCM-B Connector, Harness Side
AAT	AAT
SIGRTN	SIGRTN

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

(+) AAT Sensor Connector, Harness Side	(-) PCM-B Connector, Harness Side
AAT	AAT
SIGRTN	SIGRTN

Are the resistances less than 5 ohms?

Yes	GO to FA3 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

FA3 CHECK FOR A SHORT TO GROUND

- For F-Series Super Duty,
- Measure the resistance between:

(+) Right Exterior Rear View Mirror Assembly Connector, Harness Side	(-)
AAT	Ground

- Measure the resistance between:

(+) Right Exterior Rear View Mirror Assembly Connector, Harness Side	(-) Right Exterior Rear View Mirror Assembly Connector, Harness Side
AAT	SIGRTN

- For all others,
- Measure the resistance between:

(+) AAT Sensor Connector, Harness Side	(-)
AAT	Ground

- Measure the resistance between:

(+) AAT Sensor Connector, Harness Side	(-) AAT Sensor Connector, Harness Side
AAT	SIGRTN

Are the resistances greater than 10K ohms?

Yes	GO to FA4 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

FA4 CHECK FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For F-Series Super Duty,
- Measure the voltage between:

(+) Right Exterior Rear View Mirror Assembly Connector, Harness Side	(-)
AAT	Ground

- For all others,
- Measure the voltage between:

(+) AAT Sensor Connector, Harness Side	(-)
AAT	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to FA5 .

FA5 INTERMITTENT CHECK

- Ignition OFF.
- AAT Sensor connector connected.
- For Transit,
- PCM-T connector connected.
- For F-650 / F-750,
- PCM-B connector connected.
- PCM-T connector connected.
- For all others,
- PCM-B connector connected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the AAT_V (VOLT) PID.
- While observing the PID, carry out the following:
 - Wiggle all accessible harness from the AAT sensor to the PCM and lightly tap on the sensor.
 - Wiggle the AAT sensor connector.
 - Look for sudden changes in the voltage when the harness and connector are wiggled or when the AAT sensor is tapped.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	For DTCs P0072 or P0073, INSTALL a new AAT sensor. Clear the PCM DTCs. REPEAT the self-test. For all others, GO to FA6 .

FA6 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 AAT temperature must be within the following ranges:
 - Within 10°C (18°F) degrees of the CAC_T reading
 - Within 15°C (27°F) degrees of the IAT (Transit) or IAT11 (all others) reading
 - Within 20°C (36°F) degrees of the ECT2_1 reading (F-650 / F-750, F-Series Super Duty)
 - Within 16°C (28.8°F) degrees of the EGRTC reading

Is the AAT PID within specification?

Yes	Unable to duplicate the condition. CHECK for a loose connection, and damaged or corroded terminals.
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	WIGGLE the harness attempting to recreate the concern. REPAIR as necessary.
No	INSTALL a new AAT sensor. REFER to the Workshop Manual Section 412-01, Climate Control. Clear the PCM DTCs. REPEAT the self-test.

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