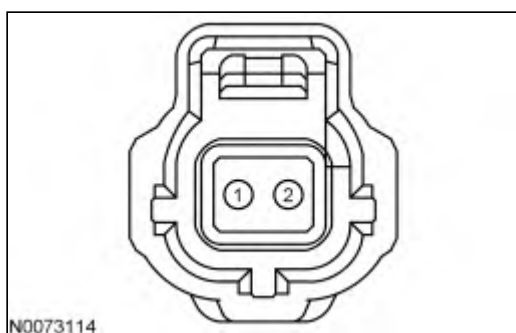


FB: Charge Air Cooler Temperature (CACT) Sensor

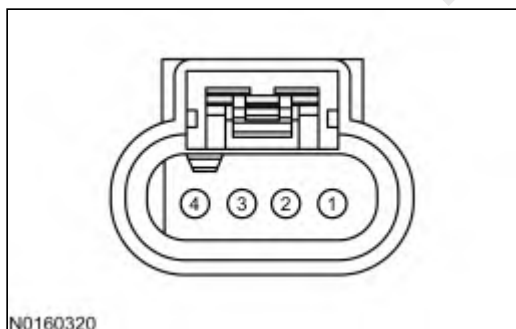
Note: Regeneration may occur during normal operation. During regeneration, diagnostic procedures may display biased values. If a regeneration occurs during diagnostic procedures, allow the process to complete before continuing diagnostics.

This pinpoint test is intended to diagnose the following:

- harness circuits: CACT and SIGRTN
- CACT sensor (12A697)
- PCM (12A650)

Charge Air Cooler Temperature (CACT) Sensor Connector

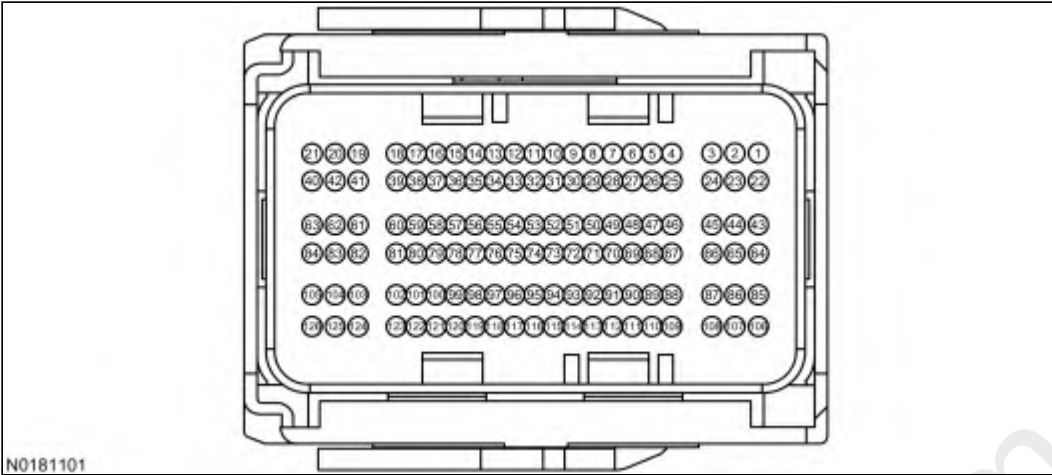
Pin	Circuit
2	SIGRTN (Signal Return)
1	CACT (Charge Air Cooler Temperature)

Manifold Absolute Pressure/Charge Air Cooler Temperature (MAP/CACT) Sensor Connector

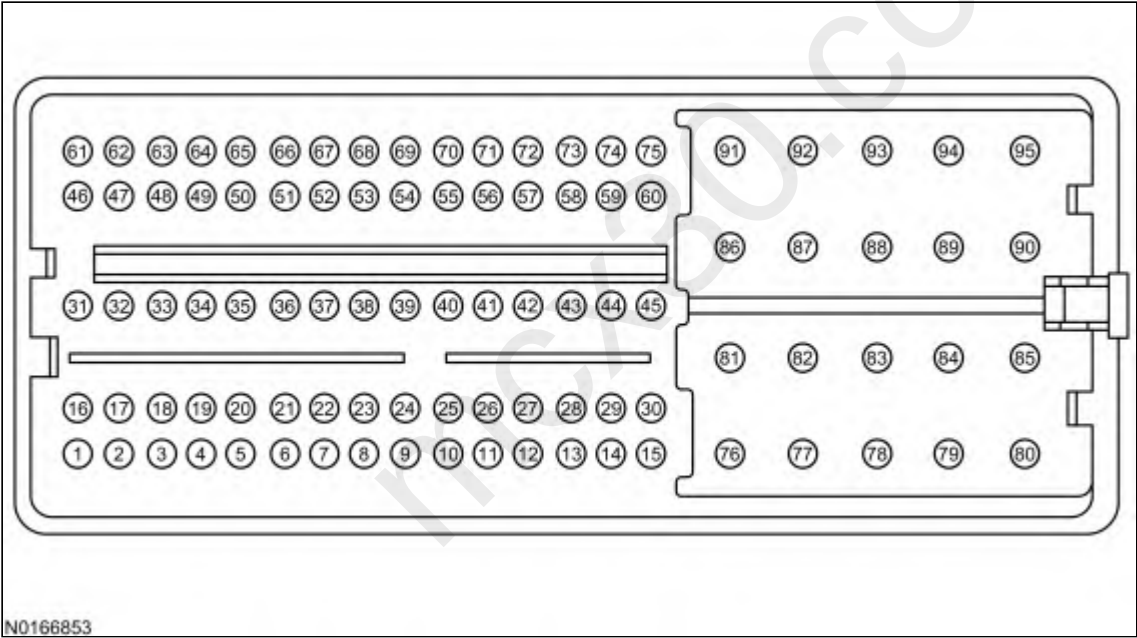
Pin	Circuit
4	SIGRTN (Signal Return)
3	CACT (Charge Air Cooler Temperature)

Powertrain Control Module-E (PCM-E) Connector

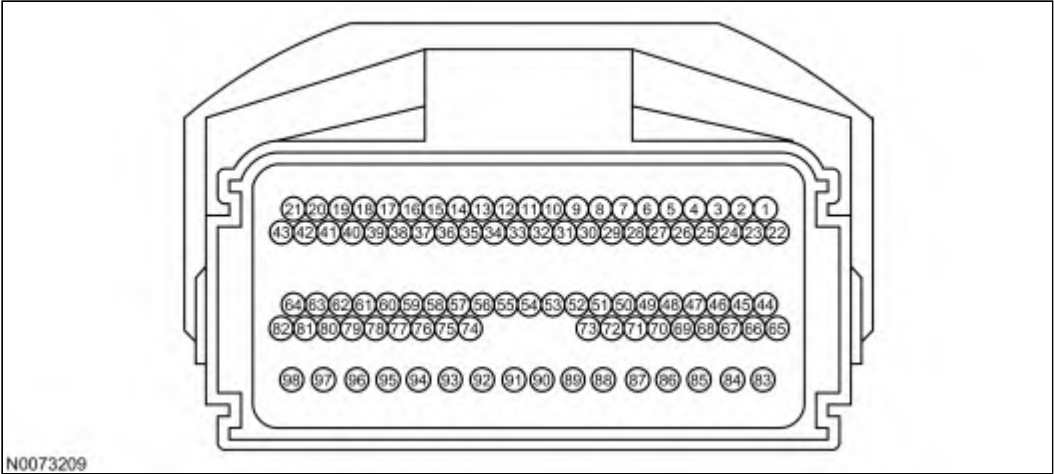
A



B

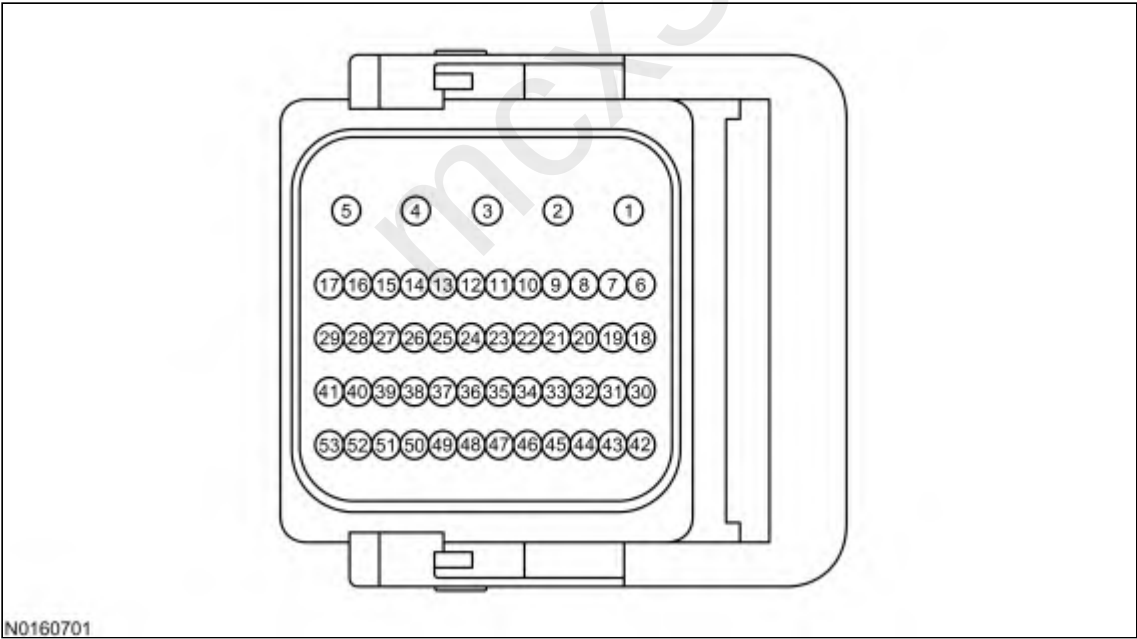


C



Vehicle	Connector	Pin	Circuit
F-Series Super Duty	A	36 13	SIGRTN CACT
Transit Connect	B	29	CACT
All other vehicles	C	4 13	SIGRTN CACT

Powertrain Control Module-T (PCM-T) Connector



Pin	Circuit
6	SIGRTN (Signal Return)
11	CACT (Charge Air Cooler Temperature)

FB1 PRELIMINARY DIAGNOSIS

Note: Diagnose circuit DTCs before range or performance DTCs.

Are DTCs P007B, P007C, P007D, P007E or P026A present?

Yes	GO to FB2 .
No	RETURN to Section 3, Symptom Charts for further direction.

FB2 CHECK FOR AN OPEN

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

(+) CACT Sensor Connector, Harness Side	(-) PCM-T Connector, Harness Side
CACT - Pin 1	CACT - Pin 11
SIGRTN - Pin 2	SIGRTN - Pin 6

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

(+) MAP/CACT Sensor Connector, Harness Side	(-) PCM-E Connector, Harness Side
CACT - Pin 3	CACT
SIGRTN - Pin 4	SIGRTN

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

(+) CACT Sensor Connector, Harness Side	(-) PCM-E Connector, Harness Side
CACT - Pin 1	CACT
SIGRTN - Pin 2	SIGRTN

Are the resistances less than 5 ohms?

Yes	GO to FB3 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

FB3 CHECK FOR A SHORT BETWEEN CIRCUITS

- For Transit Connect,

- Measure the resistance between:

(+) MAP/CACT Sensor Connector, Harness Side	(-)
CACT - Pin 3	Ground
SIGRTN - Pin 4	Ground

- Measure the resistance between:

(+) MAP/CACT Sensor Connector, Harness Side	(-) MAP/CACT Sensor Connector, Harness Side
CACT - Pin 3	SIGRTN - Pin 4

- For all others,
- Measure the resistance between:

(+) CACT Sensor Connector, Harness Side	(-)
CACT - Pin 1	Ground
SIGRTN - Pin 2	Ground

- Measure the resistance between:

(+) CACT Sensor Connector, Harness Side	(-) CACT Sensor Connector, Harness Side
CACT - Pin 1	SIGRTN - Pin 2

Are the resistances greater than 10K ohms?

Yes	GO to FB4 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

FB4 CHECK FOR A SHORT TO VOLTAGE

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

(+) MAP/CACT Sensor Connector, Harness Side	(-)
SIGRTN - Pin 4	Ground
CACT - Pin 3	Ground

- For all others,
- Measure the voltage between:

(+) CACT Sensor Connector, Harness Side	(-)

(+) CACT Sensor Connector, Harness Side	(-)
SIGRTN - Pin 2	Ground
CACT - Pin 1	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to FB5 .

FB5 INTERMITTENT CHECK

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

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	GO to FB6 .

FB6 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.

Note: All PIDs may not be available on all vehicles.

- Ignition ON, engine OFF.
- Access the PCM and monitor the AAT (TEMP), CAC_T (TEMP), IAT11 (TEMP), ECT2_1 (TEMP), EGRTC (TEMP), IAT (TEMP) and EGRTA (TEMP) PIDs.
- For Transit,
- The CAC_T temperature must be within the following ranges:
 - Within 10°C (18°F) degrees of the AAT reading
 - Within 19°C (34.2°F) degrees of the EGRTA and the EGRTC readings
- For all others,
- The CAC_T temperature must be within the following ranges:
 - Within 10°C (18°F) degrees of the AAT reading
 - Within 16°C (28.8°F) degrees of the IAT11 reading
 - Within 20°C (36°F) degrees of the ECT2_1 reading
 - Within 19°C (34.2°F) degrees of the EGRTC reading

Is the CAC_T PID within specification?

Yes	GO to FB7 .
No	INSTALL a new CACT sensor. Clear the PCM DTCs. REPEAT the self-test.

FB7 CHECK THE CHARGE AIR COOLER (CAC) SYSTEM

Note: Visually inspect the vehicle for aftermarket accessories and performance modifications (exhaust system, turbocharger, performance chip). Refer to Section 1 [Engine Control \(EC\) System](#), Modifications to OBD Vehicles.

- Check the CAC system for low fluid level, cracked, restricted or misrouted coolant lines, cracked or restricted heat exchanger.

- Check the charge air cooler (CAC) and intake air systems for leaks and restrictions.

Are any concerns present?

Yes	REPAIR or INSTALL a new component as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	For DTCs P026A or P007E, GO to Pinpoint Test ZZ . For all others, INSTALL a new CACT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. Clear the PCM DTCs. REPEAT the self-test.

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