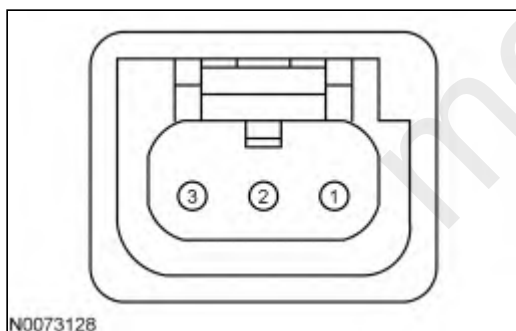
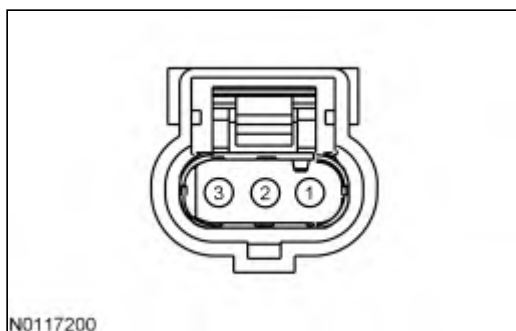


V: Camshaft Position (CMP) Sensor

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:

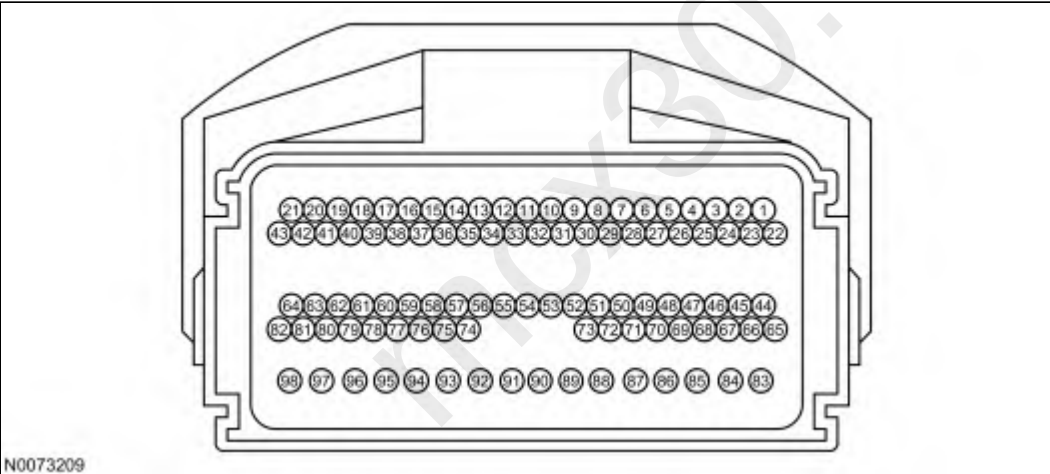
- harness circuits: VREF, CMP11 and SIGRTN
- CMP11 sensor (12K073)
- PCM (12A650)

Camshaft Position Bank 1 Sensor 1 (CMP11) Sensor Connector**A****B****C**

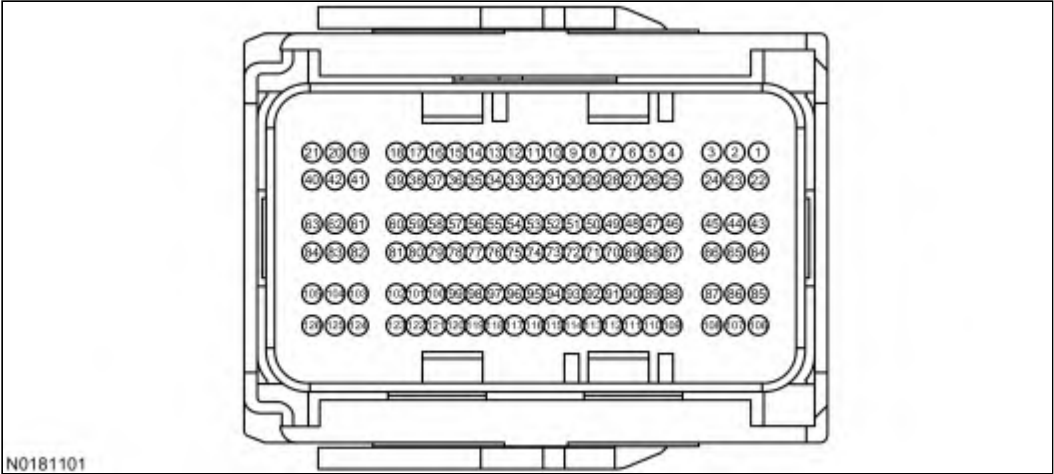
Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	3 2 1	SIGRTN CMP11 VREF
F-150	B	2 1 3	SIGRTN CMP11 VREF
Transit	B	2 3 1	SIGRTN CMP11 VREF
All other vehicles	C	2 3 1	SIGRTN CMP11 VREF

Powertrain Control Module-E (PCM-E) Connector

A

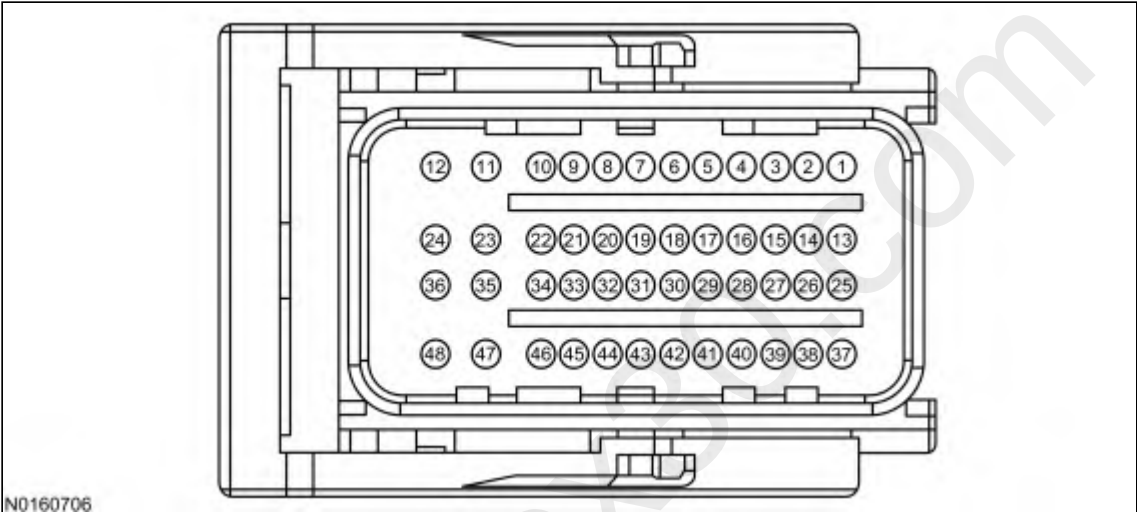


B



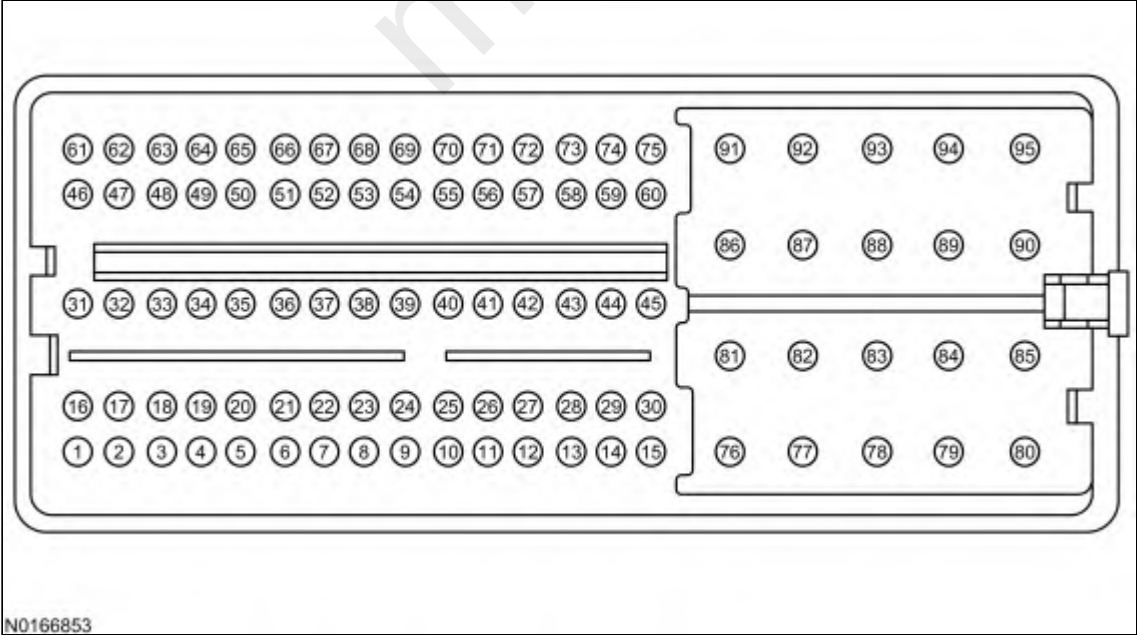
N0181101

C



N0160706

D



N0166853

Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	47 32	SIGRTN CMP11
F-Series Super Duty	B	39 38	SIGRTN CMP11
Transit	C	34 4	SIGRTN CMP11
Transit Connect	D	37 38	SIGRTN CMP11
All other vehicles	A	25 32	SIGRTN CMP11

V1 CHECK FOR DTCS

Are DTCs P0016, P0340, P0341, P0342, P0343, P061C or P1177 present?

Yes	GO to V2 .
No	For symptoms without DTCs, GO to V2 . For all others, RETURN to Section 3, Symptom Charts for further direction.

V2 CHECK THE VOLTAGE TO THE CMP11 SENSOR

- CMP11 Sensor connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) CMP11 Sensor Connector, Harness Side	(-)
VREF	Ground

Is the voltage between 4.5 - 5.5 V?

Yes	GO to V3 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

V3 CHECK THE CMP11 AND SIGRTN CIRCUITS FOR AN OPEN

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

(+) CMP11 Sensor Connector, Harness Side	(-) PCM-E Connector, Harness Side
CMP11	CMP11
SIGRTN	SIGRTN

Are the resistances less than 5 ohms?

Yes	GO to V4 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

V4 CHECK THE CMP11 AND SIGRTN CIRCUITS FOR A SHORT TO GROUND

- Measure the resistance between:

(+) CMP11 Sensor Connector, Harness Side	(-)
CMP11	Ground
SIGRTN	Ground

Are the resistances greater than 10K ohms?

Yes	GO to V5 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

V5 CHECK THE CMP11 AND SIGRTN CIRCUITS FOR A SHORT TO VOLTAGE

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

(+) CMP11 Sensor Connector, Harness Side	(-)
CMP11	Ground
SIGRTN	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to V6 .

V6 CHECK THE CMP11 SENSOR FOR CORRECT OPERATION

- Ignition OFF.
- PCM-E connector connected.
- Connect a 5 amp fused jumper wire between the following:

Point A CMP11 Sensor Connector, Harness Side	Point B CMP11 Sensor Connector, Component Side
VREF	VREF
CMP11	CMP11
SIGRTN	SIGRTN

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

(+) CMP11 Sensor Connector, Component Side	(-)

(+) CMP11 Sensor Connector, Component Side	(-)
CMP11	Ground

- Record the voltage.
- Ignition ON, engine running.
- Measure the voltage between:

(+) CMP11 Sensor Connector, Component Side	(-)
CMP11	Ground

Is the voltage reading less than 0.5V with the ignition ON, engine OFF and greater than 2V with the ignition ON, engine running?

Yes	GO to V7 .
No	GO to V8 .

V7 INSPECT THE HARNESS

- Ignition OFF.
- Remove the jumper wire(s).
- Check the harness for routing, alterations, incorrect shielding, or electrical interference from other systems.
- Check the CMP11 sensor connector for damage or corrosion.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	For DTC P061C, GO to YA5 . For DTC P1177, GO to V8 . For all others, GO to V9 .

V8 CHECK THE CMP11 SENSOR

- Ignition OFF.
- Remove the jumper wire(s).
- Inspect the CMP11 sensor connector for damaged or corroded pins.
- Remove the CMP11 sensor.
- Inspect the CMP11 sensor for misalignment and incorrect installation.
- Inspect the CMP11 sensor for damage.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	For DTC P1177, the system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test. For all others, INSTALL a new CMP11 sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. Clear the PCM DTCs. REPEAT the self-test.

V9 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	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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