

Vehicle	Connector	Pin	Circuit
Continental 3.7L, E-Series, F-650 / F-750, Flex TiVCT 3.5L, Mustang TiVCT 5.2L	B	1 2	CKP- CKP+
EcoSport 1.0L, KA 1.0L, Transit Connect 1.0L	C	3 2 1	CKP SIGRTN VREF
EcoSport 1.5L, Escape/Kuga 1.5L, F-Series Super Duty, KA 1.2L, KA 1.5L, Motorhome / Stripped Chassis / Step Van	A	3 2 1	CKP SIGRTN VREF
Expedition, Explorer 3.3L, F-150 3.3L, F-150 3.5L, Flex GTDI 3.5L, Ford GT, Navigator, Transit	A	1 2 3	CKP SIGRTN VREF
Fusion 1.5L	D	3 2 1	CKP SIGRTN VREF
Fusion 2.5L, Ranger 2.5L, Transit Connect 2.5L	E	2 1	CKP- CKP+
Mustang 2.3L	F	2 3 1	CKP SIGRTN VREF
Mustang 5.2L Supercharged	A	3 1 2	CKP SIGRTN VREF
All other vehicles	A	2 3 1	CKP SIGRTN VREF

Powertrain Control Module (PCM) Connector

For PCM connector views or reference values, refer to Section 6, Reference Values.

Vehicle	Connector	Pin	Circuit
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Vehicle	Connector	Pin	Circuit
Continental 2.0L, Continental 2.7L, Continental 3.0L, EcoSport 1.0L Automatic Transmission, EcoSport 2.0L, Flex GTDI 3.5L, Ford GT, Fusion 1.5L, Fusion 2.0L, Fusion 2.7L, MKZ	198 PIN	E11	CKP
Continental 3.7L, E-Series, F-650 / F-750, Flex TiVCT 3.5L, Mustang TiVCT 5.2L	198 PIN	E70 E69	CKP+ CKP-
Corsair 2.0L, Corsair 2.3L, Edge 2.0L, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Explorer 2.3L, Mustang 2.3L, Nautilus 2.0L, Ranger 2.3L, Transit Connect 1.0L, Transit Connect 2.0L	198 PIN	E23	CKP
Corsair 2.5L, EcoSport 1.5L Automatic Transmission, Escape/Kuga 2.5L, KA 1.5L Automatic Transmission	198 PIN	E60	CKP
EcoSport 1.0L Manual Transmission	198 PIN	E49	CKP
EcoSport 1.5L Manual Transmission, KA 1.2L, KA 1.5L Manual Transmission	112 PIN	E35	CKP
Expedition, F-150 3.5L High Output, Navigator	198 PIN	E27	CKP
Fusion 2.5L, Transit Connect 2.5L	198 PIN	E60 E59	CKP+ CKP-
KA 1.0L	128 PIN	E37	CKP
Mustang 5.2L Supercharged	306 PIN	E120	CKP
Ranger 2.5L	128 PIN	T6 T14	CKP+ CKP-
All other vehicles	306 PIN	E78	CKP

JD1 CHECK THE CKP SENSOR SIGNAL SENT TO THE PCM

Note: The battery should be fully charged and the starting system should be functioning correctly.

- Remove the fuel pump fuse to disable the fuel pump.
- Ignition ON, engine OFF.
- Access the PCM and monitor the RPM (RPM) PID.
- Crank the engine.

Is the RPM greater than 150 RPM?

Yes	For DTCs P0335, P0336, P0339 or P2617, GO to JD2 . For DTC P033F or P1336 with no start, GO to Pinpoint Test A . For DTC P033F or P1336, GO to Pinpoint Test HD . For all others, the CKP, PCM, and harness are working correctly. RETURN to Section 3, Symptom Charts for further direction.
No	GO to JD2 .

JD2 CHECK THE CKP SENSOR AND TRIGGER WHEEL FOR OBVIOUS PHYSICAL DAMAGE

Note: A trigger wheel that is physically damaged, bent more than 1.0 mm, or has contamination present on the magnetic surfaces, may cause an intermittent CKP signal.

- Ignition OFF.
- Check the trigger wheel for contamination or debris.
- Check the CKP sensor and trigger wheel for physical damage.

Is a concern present?

Yes	REPAIR as necessary. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . CARRY OUT the Misfire Monitor Neutral Profile Correction procedure using the scan tool.
No	For Aviator, Continental 2.0L, Continental 2.7L, Continental 3.0L, Corsair, EcoSport, Edge, Escape/Kuga, Expedition, Explorer, F-150, F-Series Super Duty, Flex 3.5L GTDI, Ford GT, Fusion 1.5L, Fusion 2.0L, Fusion 2.7L, KA, MKZ,

Motorhome / Stripped Chassis / Step Van,
 Mustang 2.3L,
 Mustang 5.0L,
 Mustang 5.2L Supercharged,
 Nautilus,
 Navigator,
 Ranger 2.3L,
 Transit,
 Transit Connect 1.0L, and
 Transit Connect 2.0L, GO to [JD10](#).
 For all others, GO to [JD3](#).

JD3 CHECK FOR CORRECT CKP BIAS VOLTAGES IN THE PCM

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

(+) CKP Sensor Connector, Harness Side	(-) Vehicle Battery
CKP+	Negative terminal
CKP-	Negative terminal

Are the voltages between 1 - 3 V?

Yes	GO to JD4 .
No	GO to JD6 .

JD4 CHECK THE CKP SENSOR RESISTANCE

- Ignition OFF.
- Measure the resistance between:

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

Is the resistance between 0.25K - 1.1K ohms?

Yes	GO to JD5 .
No	INSTALL a new CKP sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM). CARRY OUT the Misfire Monitor Neutral Profile Correction procedure using the scan tool.

JD5 CHECK THE CKP HARNESS SHIELD GROUND

Note: The harness shield protects the CKP signal from electrical noise and is grounded at one end, typically near the PCM.

Note: Carry out the following resistance measurement between the CKP shield and the ground.

- Measure the resistance between:

(+) CKP_SHLD Assembly Connector, Harness Side	(-)
CKP_SHLD	Ground

Is the resistance less than 5 ohms?

Yes	GO to JD6 .
No	REPAIR the open circuit. CHECK for an intermittent ground connection. Clear the PCM DTCs. REPEAT the self-test.

JD6 CHECK FOR SHORT BETWEEN CKP(+) AND CKP(-)

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

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

Is the resistance greater than 10K ohms?

Yes	GO to JD7 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

JD7 CHECK THE CKP CIRCUITS FOR AN OPEN

- Measure the resistance between:

(+) CKP Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
CKP-	CKP-
CKP+	CKP+

Are the resistances less than 5 ohms?

Yes	GO to JD8 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

JD8 CHECK THE CKP CIRCUITS FOR A SHORT TO GROUND

- Measure the resistance between:

(+) CKP Sensor Connector, Harness Side	(-) Vehicle Battery
CKP+	Negative terminal

(+) CKP Sensor Connector, Harness Side	(-) Vehicle Battery
CKP-	Negative terminal

Are the resistances greater than 10K ohms?

Yes	GO to JD9 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

JD9 CHECK THE CKP CIRCUIT FOR A SHORT TO VOLTAGE

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

(+) CKP Sensor Connector, Harness Side	(-) Vehicle Battery
CKP+	Negative terminal
CKP-	Negative terminal

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to JD14 .

JD10 CHECK FOR VOLTAGE AT THE SENSOR

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

(+) CKP Sensor Connector, Harness Side	(-) CKP Sensor Connector, Harness Side
VREF	SIGRTN

Is the voltage between 4.5 - 5.5 V?

Yes	GO to JD11 .
No	GO to Pinpoint Test C .

JD11 CHECK FOR AN OPEN

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

(+) CKP Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
CKP	CKP

Is the resistance less than 5 ohms?

Yes	GO to JD12 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

JD12 CHECK FOR A SHORT BETWEEN CIRCUITS

- Measure the resistance between:

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

- Measure the resistance between:

(+) CKP Sensor Connector, Harness Side	(-) CKP Sensor Connector, Harness Side
CKP	VREF
CKP	SIGRTN

Are the resistances greater than 10K ohms?

Yes	GO to JD13 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

JD13 CHECK FOR A SHORT TO VOLTAGE

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

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

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to JD14 .

JD14 INTERMITTENT CHECK

Note: Chafed CKP or CMP wires or other physical damage to the harness may cause an intermittent short in the CKP or CMP circuit.

- Ignition OFF.
- PCM connector connected.
- Visually check for chafed CKP and CMP wires or other physical damage to the CKP or CMP harness.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	GO to JD15 .

JD15 CHECK FOR CORRECT OPERATION

- Ignition OFF.
- PCM connector disconnected.
- CKP Sensor connector disconnected.
- Visually inspect for:
 - pushed out pins
 - corrosion
- Connect all the PCM connectors and the CKP sensor connector. Make sure the connectors are seated correctly.
- Carry out the PCM KOEO self-test.
- Carry out the PCM KOER self-test.
- Verify the concern is still present.

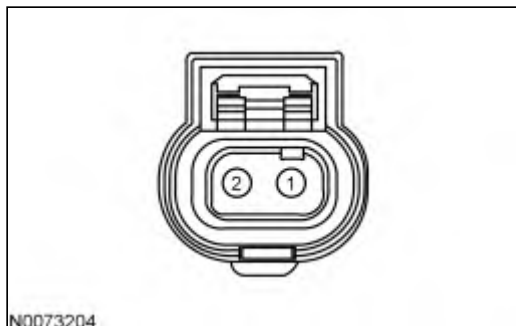
Is the concern still present?

Yes	INSTALL a new CKP sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM), REFER to Section 2, Resetting The Keep Alive Memory (KAM) . CARRY OUT the Misfire Monitor Neutral Profile Correction procedure using the scan tool.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

KH: Cylinder Deactivation

This pinpoint test is intended to diagnose the following:

- cylinder deactivation solenoid
- harness circuits: CDC1 and VPWR

Cylinder Deactivation-Cylinder 1 Solenoid Connector

Pin	Circuit
1	VPWR (Vehicle Power)
2	CDC1 (Cylinder Deactivation Control Cylinder 1)

Powertrain Control Module (PCM) Connector

For PCM connector views or reference values, refer to Section 6, Reference Values.

Connector	Pin	Circuit
198 PIN	E3	CDC1

KH1 CHECK FOR DTCS

Are DTCs P3401, P3402, P3403 or P3404 present?

Yes	GO to KH2 .
No	RETURN to Section 3, Symptom Charts for further direction.

KH2 CYLINDER POWER BALANCE TEST

- Carry out the Power Balance Test. Refer to the instruction manual provided by the scan tool manufacturer.

Are all cylinders contributing correctly during the power balance test?

Yes	GO to KH3 .
No	CHECK for an engine mechanical or oil flow concern. Refer to the appropriate section in the Workshop Manual to continue diagnosis.

KH3 CHECK THE CYLINDER DEACTIVATION SOLENOID RESISTANCE

- Ignition OFF.
- Cylinder Deactivation-Cylinder 1 Solenoid connector disconnected.
- Measure the resistance between:

(+) Cylinder Deactivation-Cylinder 1 Solenoid Connector, Component Side	(-) Cylinder Deactivation-Cylinder 1 Solenoid Connector, Component Side
CDC1 - Pin 2	VPWR - Pin 1

Is the resistance between 5 - 14 ohms?

Yes	GO to KH4 .
No	INSTALL a new Cylinder Deactivation solenoid. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. Clear the PCM DTCs. REPEAT the self-test.

KH4 CHECK THE CYLINDER DEACTIVATION SOLENOID FOR INTERNAL SHORTS

- Measure the resistance between:

(+) Cylinder Deactivation-Cylinder 1 Solenoid Connector, Component Side	(-)
CDC1 - Pin 2	Ground

Is the resistance greater than 10K ohms?

Yes	GO to KH5 .
No	INSTALL a new Cylinder Deactivation solenoid. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. Clear the PCM DTCs. REPEAT the self-test.

KH5 CHECK THE VPWR CIRCUIT FOR AN OPEN

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

(+) Cylinder Deactivation-Cylinder 1 Solenoid Connector, Harness Side	(-)
VPWR - Pin 1	Ground

Is the voltage greater than 10.5 V?

Yes	GO to KH6 .