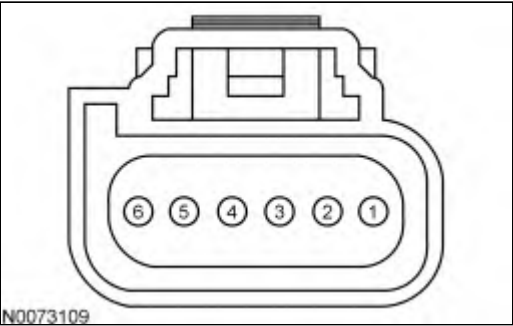


Vehicle	Connector	Pin	Circuit
All other vehicles	D	2 1	SIGRTN IAT

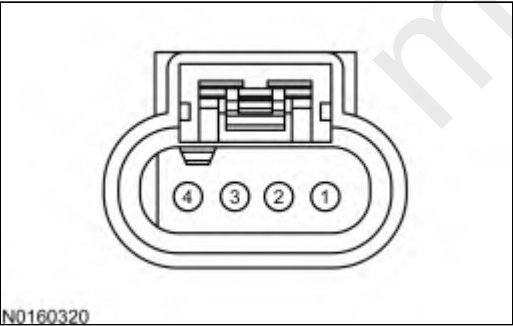
Mass Air Flow Bank 2, Sensor 1/Intake Air Temperature Bank 2, Sensor 1 (MAF21/IAT21) Sensor Connector



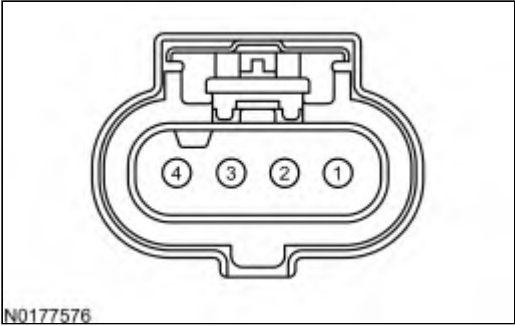
Pin	Circuit
4	SIGRTN (Signal Return)
2	IAT21 (Intake Air Temperature Bank 2, Sensor 1)

Manifold Absolute Pressure Temperature (MAPT) Sensor Connector

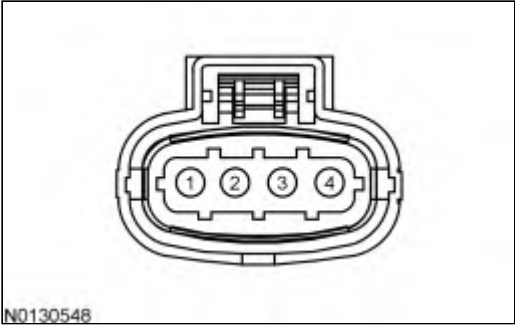
A



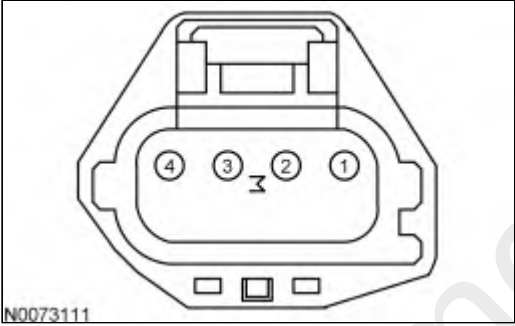
B



C



D



Vehicle	Connector	Pin	Circuit
Continental, EcoSport 1.5L, Edge, Flex 3.5L, KA, Nautilus, Transit Connect 1.0L	A	4 3	SIGRTN IAT
Corsair 2.5L, Escape/Kuga 2.5L, F-Series Super Duty 6.2L	B	4 3	SIGRTN IAT
Explorer 3.3L, F-150 3.3L, Transit TIVCT 3.5L	A	4 1	SIGRTN IAT

Vehicle	Connector	Pin	Circuit
F-150 5.0L	C	1	SIGRTN
		2	IAT
Ranger 2.5L	D	4	SIGRTN
		3	IAT

Powertrain Control Module (PCM) Connector

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

Vehicle	Connector	Pin	Circuit
Aviator, Explorer 3.0L, Mustang 5.2L Supercharged	306 PIN	B28 B24	SIGRTN IAT
Continental 2.0L, EcoSport 1.0L Manual Transmission, Fusion 1.5L, Fusion 2.0L, MKZ 2.0L	198 PIN	B19 B75	SIGRTN IAT
Continental 2.7L, Continental 3.0L, Flex GTDI 3.5L, Fusion 2.7L, MKZ 3.0L	198 PIN	B18 B75	SIGRTN IAT
Continental 3.7L, Flex TiVCT 3.5L	198 PIN	E29 E27	SIGRTN IAT
Corsair 2.5L, Escape/Kuga 2.5L	198 PIN	E77 E24	SIGRTN IAT
E-Series, F-650 / F-750, Mustang TiVCT 5.2L	198 PIN	B54 E27	SIGRTN IAT
EcoSport 1.0L Automatic Transmission	198 PIN	B19 B77	SIGRTN IAT
EcoSport 1.5L Automatic Transmission, KA 1.5L Automatic Transmission	198 PIN	E35 E24	SIGRTN IAT
EcoSport 1.5L Manual Transmission, KA 1.2L, KA 1.5L Manual Transmission	112 PIN	E4 E20	SIGRTN IAT
EcoSport 2.0L	198 PIN	B9 B75	SIGRTN IAT

Vehicle	Connector	Pin	Circuit
Edge 2.7L, F-Series Super Duty 7.3L, Motorhome / Stripped Chassis / Step Van, Mustang 5.0L, Nautilus 2.7L	306 PIN	B58 B24	SIGRTN IAT
Expedition, F-150 3.5L High Output, Navigator	198 PIN	E20 B34	SIGRTN IAT
Explorer 3.3L, F-150 3.3L, Transit TivCT 3.5L	306 PIN	E13 E50	SIGRTN IAT
F-150 2.7L	306 PIN	B43 B24	SIGRTN IAT
F-150 5.0L, F-Series Super Duty 6.2L	306 PIN	E13 E52	SIGRTN IAT
F-150 3.5L, Transit GTDI 3.5L	306 PIN	B26 B24	SIGRTN IAT
Ford GT	198 PIN	B9 B75 E32 B76	SIGRTN IAT SIGRTN IAT21
Fusion 2.5L, Transit Connect 2.5L	198 PIN	B54 B25	SIGRTN IAT
KA 1.0L	128 PIN	T17 T10	SIGRTN IAT
Ranger 2.5L	128 PIN	B38 E17	SIGRTN IAT
Transit Connect 2.0L	198 PIN	B89 B56	SIGRTN IAT
All other vehicles	198 PIN	B36 B56	SIGRTN IAT

DA1 PRELIMINARY DIAGNOSIS

Are DTCs P00AB, P00AC, P00AD, P0111, P0112, P0113, P0114, or P1112 present?

Yes	For DTCs P00AB or P0111, GO to DA7 . For all others, GO to DA2 .
No	RETURN to Section 3, Symptom Charts for further direction.

DA2 CHECK FOR AN OPEN

Note: Only measure the circuits that apply to the vehicle being diagnosed.

- Ignition OFF.
- PCM connector disconnected.
- For DTCs P00AC, or P00AD,

- MAF21/IAT21 Sensor connector disconnected.
- Measure the resistance between:

(+) MAF21/IAT21 Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
IAT21 - Pin 2	IAT21
SIGRTN - Pin 4	SIGRTN

- For Continental 3.7L, EcoSport 1.5L, Explorer 3.3L, F-150 3.3L, F-150 5.0L, F-Series Super Duty 6.2L, Flex 3.5L TIVCT, KA, Ranger 2.5L and Transit 3.5L TIVCT,
- MAPT Sensor connector disconnected.
- Measure the resistance between:

(+) MAPT Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
IAT	IAT
SIGRTN	SIGRTN

- For all others,
- IAT Sensor connector disconnected.
- Measure the resistance between:

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

Are the resistances less than 5 ohms?

Yes	GO to DA3 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

DA3 CHECK FOR A SHORT TO GROUND

- For DTCs P00AC, or P00AD,
- Measure the resistance between:

(+) MAF21/IAT21 Sensor Connector, Harness Side	(-)
IAT21 - Pin 2	Ground

- For Continental 3.7L, EcoSport 1.5L, Explorer 3.3L, F-150 3.3L, F-150 5.0L, F-Series Super Duty 6.2L, Flex 3.5L TIVCT, KA, Ranger 2.5L and Transit 3.5L TIVCT,
- Measure the resistance between:

(+) MAPT Sensor Connector, Harness Side	(-)
IAT	Ground

- For all others,
- Measure the resistance between:

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

Is the resistance greater than 10K ohms?

Yes	GO to DA4 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

DA4 CHECK FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For DTCs P00AC, or P00AD,
- Measure the voltage between:

(+) MAF21/IAT21 Sensor Connector, Harness Side	(-)
IAT21 - Pin 2	Ground

- For Continental 3.7L, EcoSport 1.5L, Explorer 3.3L, F-150 3.3L, F-150 5.0L, F-Series Super Duty 6.2L, Flex 3.5L TIVCT, KA, Ranger 2.5L and Transit 3.5L TIVCT,
- Measure the voltage between:

(+) MAPT Sensor Connector, Harness Side	(-)
IAT	Ground

- For all others,
- Measure the voltage between:

(+) 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	For DTCs P00AB, P00AC, or P00AD, INSTALL a new MAF21/IAT21 sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. Clear the PCM DTCs. REPEAT the self-test. For all others, GO to DA5 .

DA5 INTERMITTENT CHECK

- Ignition OFF.
- PCM connector connected.

- For Continental 3.7L, EcoSport 1.5L, Explorer 3.3L, F-150 3.3L, F-150 5.0L, F-Series Super Duty 6.2L, Flex 3.5L TIVCT, KA, Ranger 2.5L and Transit 3.5L,
- MAPT Sensor connector connected.
- For all others,
- IAT Sensor connector connected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the IAT (VOLT) PID.
- While observing the PID, wiggle, shake, and bend small sections of the wiring harness working from the sensor to the PCM.
- Lightly tap on the sensor and wiggle the harness connector to simulate road shock.

Does the IAT PID reading change?

Yes	REPAIR as necessary. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) . REPEAT the self-test.
No	GO to DA6 .

DA6 CHECK THE IAT CIRCUIT VOLTAGE CYCLING INTEGRITY

- Ignition OFF.
- For Continental 3.7L, EcoSport 1.5L, Explorer 3.3L, F-150 3.3L, F-150 5.0L, F-Series Super Duty 6.2L, Flex 3.5L TIVCT, KA, Ranger 2.5L and Transit 3.5L TIVCT,
- MAPT Sensor connector disconnected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the IAT (VOLT) PID.
- Record the IAT PID value.
- Connect a 5 amp fused jumper wire between the following:

Point A MAPT Sensor Connector, Harness Side	Point B
IAT	Ground

- Record the IAT PID value.
- For all others,
- IAT Sensor connector disconnected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the IAT (VOLT) PID.
- Record the IAT PID value.
- Connect a 5 amp fused jumper wire between the following:

Point A IAT Sensor Connector, Harness Side	Point B
IAT	Ground

- Record the IAT PID value.

Does the IAT PID change from greater than 3.0 volts to less than 0.20 volt when the jumper is connected?

Yes	For Continental 3.7L, EcoSport 1.5L, Explorer 3.3L, F-150 3.3L, F-150 5.0L, F-Series Super Duty 6.2L, Flex 3.5L TIVCT, KA, Ranger 2.5L and Transit 3.5L TIVCT, INSTALL a new MAPT sensor. For all others, INSTALL a new IAT 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) . REPEAT the self-test.

No	GO to DA8 .
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DA7 INTAKE AIR TEMPERATURE (IAT) SENSOR CORRELATION

Note: Check temperature values while engine is at ambient temperature, cold soak the engine for a minimum of 8 hours while not in direct sunlight, if necessary.

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

- Ignition OFF.
- IAT Sensor connector connected.
- Ignition ON, engine OFF.
- For Aviator, Continental 2.0L, Continental 2.7L, Continental 3.0L, Edge, Expedition, Explorer 2.3L, Explorer 3.0L, F-150 2.7L, F-150 3.5L, Flex 3.5L GTDI, Ford GT, Fusion 1.5L, Fusion 2.0L, Fusion 2.7L, MKZ, Nautilus, Navigator and Transit 3.5L GTDI,
- Access the PCM and monitor the AAT (TEMP), CAC_T (TEMP), IAT (TEMP) and IAT2 (TEMP) PIDs.
- For all others,
- Access the PCM and monitor the AAT (TEMP), CHT (TEMP), ECT (TEMP), ECT1 (TEMP) and IAT (TEMP) PIDs.

Are the temperature readings within 17°C (30°F) of each other?

Yes	GO to DA8 .
No	INSTALL a new IAT 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) . REPEAT the self-test.

DA8 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?

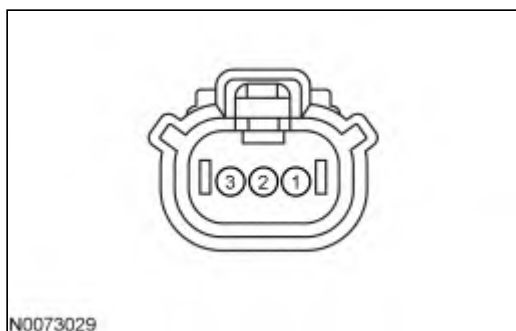
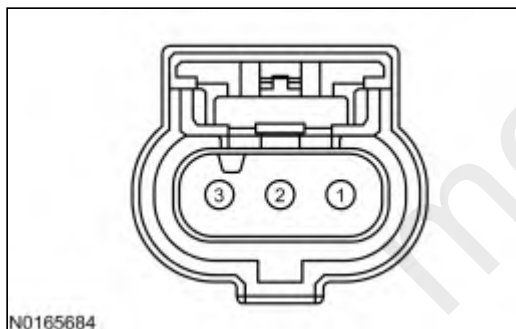
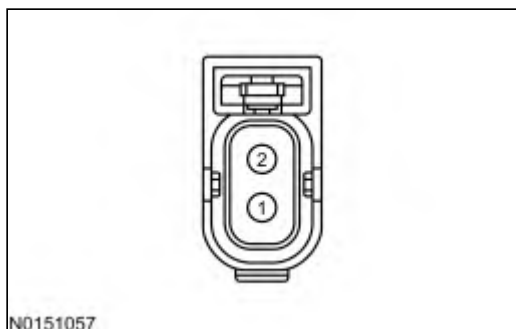
Yes	INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) , Programming the VID Block for a Replacement PCM.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

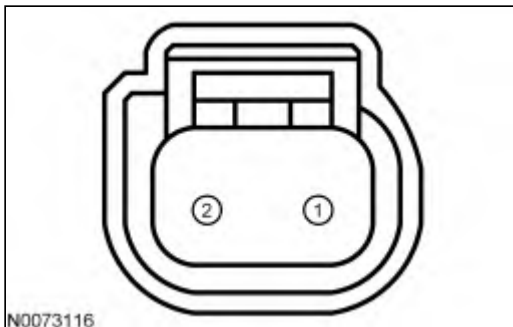
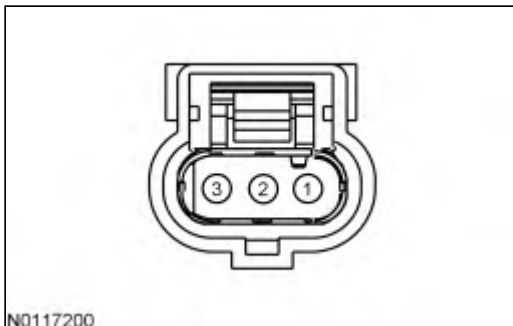
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JF: Integrated Ignition Coil On Plug Coils A Through J Failure

This pinpoint test is intended to diagnose the following:

- ignition coils (12029)
- ignition coil harness
- PCM (12A650)

Coil On Plug (COP) Connector**A****B****C****D**

**E**

Vehicle	Connector	Pin	Circuit
Continental 3.7L, Flex TiVCT 3.5L	A	1 3	COP VPWR
Corsair 2.5L, Escape/Kuga 2.5L, Explorer 3.3L, F-150 3.3L, Mustang 5.0L, Transit TiVCT 3.5L	B	1 3	COP VPWR
E-Series	A	3 1	COP VPWR
EcoSport 1.5L, KA	C	1 2	COP VPWR
F-150 5.0L, Mustang 5.2L	B	1 1 (Cylinder 3), 3 (All Others)	COP VPWR
F-650 / F-750	D	2 1	COP VPWR
F-Series Super Duty, Motorhome / Stripped Chassis / Step Van	B	3 1	COP VPWR
Flex GTDI 3.5L, Transit GTDI 3.5L	A	2 1 3	COP GND VPWR
Fusion 2.5L, Ranger 2.5L, Transit Connect 2.5L	D	1 2	COP VPWR