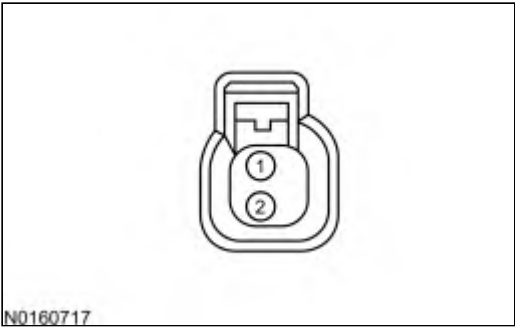
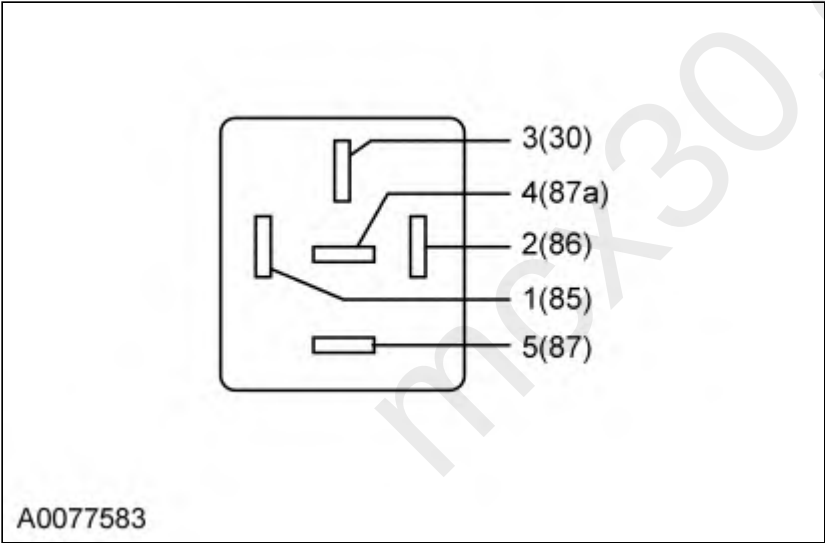




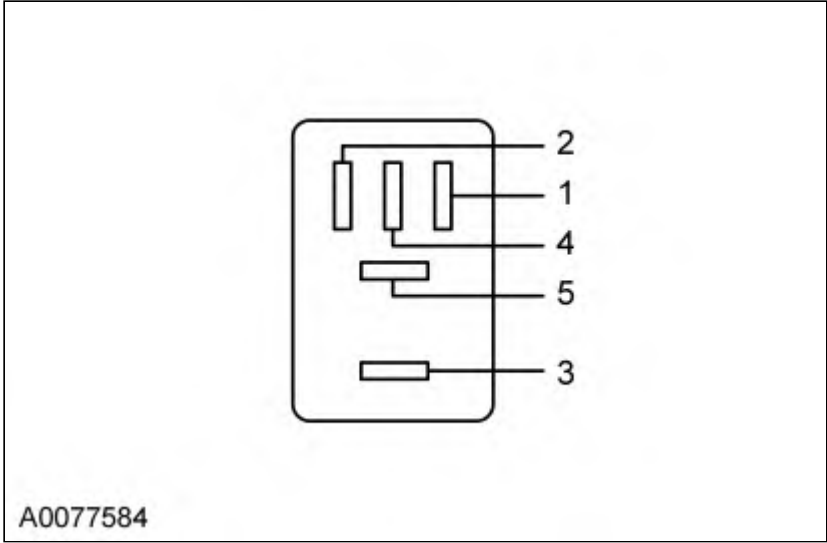
| Vehicle            | Connector | Pin | Circuit |
|--------------------|-----------|-----|---------|
| EcoSport,<br>KA    | A         | 1   | VPWR    |
| All other vehicles | A         | 2   | VPWR    |

Powertrain Control Module Power (PCM Power) Relay Connector

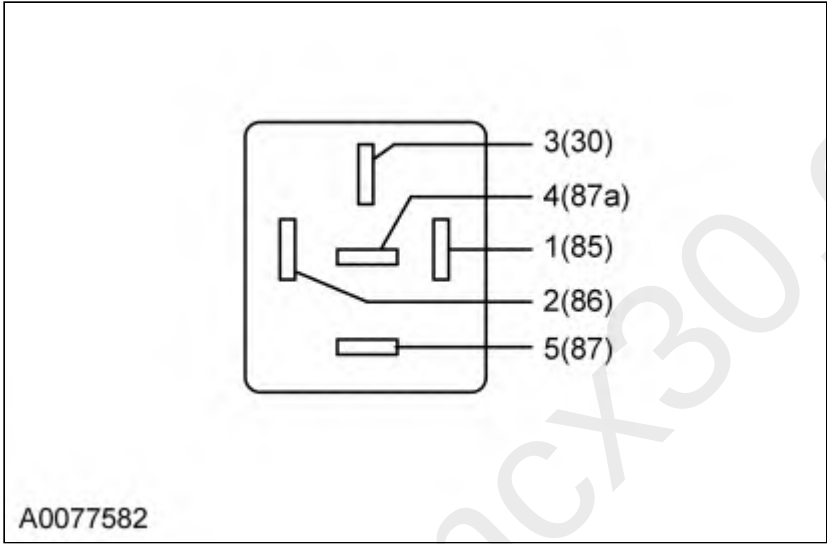
A



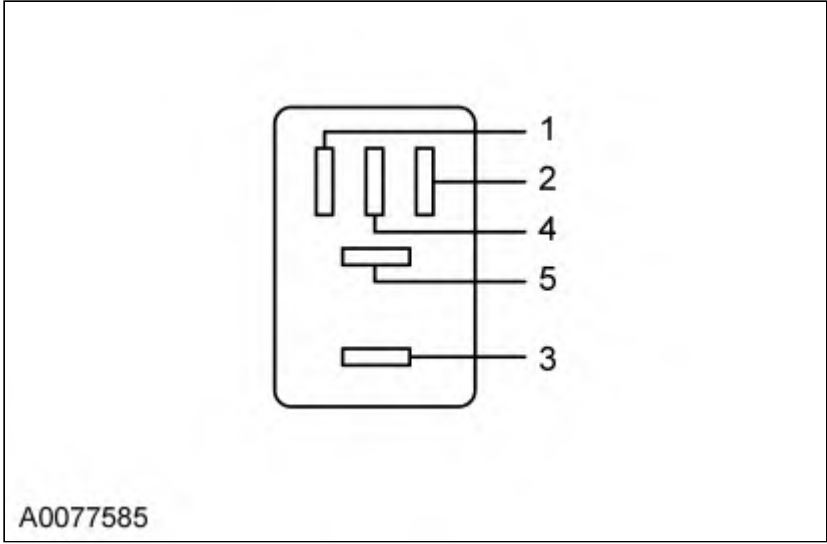
B



C



D



| Vehicle                                                              | Connector | Pin            | Circuit             |
|----------------------------------------------------------------------|-----------|----------------|---------------------|
| Continental 2.0L,<br>Continental 2.7L,<br>Continental 3.0L,<br>KA    | A         | 5<br>2<br>1, 3 | VPWR<br>PCMRC<br>B+ |
| Continental 3.7L                                                     | A         | 5<br>1<br>2, 3 | VPWR<br>PCMRC<br>B+ |
| E-Series,<br>Edge,<br>Flex,<br>Ford GT                               | B         | 5<br>2<br>1, 3 | VPWR<br>PCMRC<br>B+ |
| EcoSport,<br>F-Series Super Duty                                     | C         | 5<br>2<br>1, 3 | VPWR<br>PCMRC<br>B+ |
| F-650 / F-750,<br>Motorhome / Stripped Chassis / Step Van,<br>Ranger | C         | 5<br>1<br>2, 3 | VPWR<br>PCMRC<br>B+ |
| Mustang                                                              | D         | 3<br>2<br>1, 5 | VPWR<br>PCMRC<br>B+ |
| All other vehicles                                                   | B         | 5<br>1<br>2, 3 | VPWR<br>PCMRC<br>B+ |

### Powertrain Control Module (PCM) Connector

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

| Vehicle                                                                                                                                                                   | Connector | Pin                            | Circuit                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------|------------------------|
| Continental 2.0L,<br>Continental 2.7L,<br>Continental 3.0L,<br>EcoSport 1.0L,<br>EcoSport 2.0L,<br>Flex GTDI 3.5L,<br>Fusion 1.5L,<br>Fusion 2.0L,<br>Fusion 2.7L,<br>MKZ | 198 PIN   | B101, B102, B103<br>B48<br>B58 | VPWR<br>ISP-R<br>PCMRC |

| Vehicle                                                                                                                                  | Connector | Pin                                   | Circuit                           |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------|-----------------------------------|
| Continental 3.7L,<br>E-Series,<br>F-650 / F-750                                                                                          | 198 PIN   | B97, B99<br>B64<br>B20                | VPWR<br>ISP-R<br>PCMRC            |
| Corsair 2.0L,<br>Corsair 2.3L,<br>Edge 2.0L,<br>Escape/Kuga 1.5L,<br>Escape/Kuga 2.0L,<br>Explorer 2.3L,<br>Mustang 2.3L,<br>Ranger 2.3L | 198 PIN   | B100, B101, B102<br>B64<br>B25        | VPWR<br>ISP-R<br>PCMRC            |
| Corsair 2.5L,<br>Escape/Kuga 2.5L,<br>Transit Connect 2.5L                                                                               | 198 PIN   | B97, B99<br>B41<br>B20                | VPWR<br>ISP-R<br>PCMRC            |
| EcoSport 1.5L Automatic Transmission                                                                                                     | 198 PIN   | E18<br>B97, B99<br>B41<br>B20         | INJPWRM<br>VPWR<br>ISP-R<br>PCMRC |
| EcoSport 1.5L Manual Transmission                                                                                                        | 112 PIN   | E22<br>B55, B56<br>B43<br>B25         | INJPWRM<br>VPWR<br>ISP-R<br>PCMRC |
| Expedition,<br>Navigator                                                                                                                 | 198 PIN   | B101, B102, B103<br>B48<br>B25        | VPWR<br>ISP-R<br>PCMRC            |
| F-150 3.5L High Output                                                                                                                   | 198 PIN   | B101, B102, B103<br>B83<br>B25        | VPWR<br>ISP-R<br>PCMRC            |
| F-150 3.5L                                                                                                                               | 306 PIN   | B13<br>B60                            | ISP-R<br>PCMRC                    |
| F-Series Super Duty,<br>Motorhome / Stripped Chassis / Step Van                                                                          | 306 PIN   | B14<br>B1, B16, B2<br>B13<br>B60      | INJPWRM<br>VPWR<br>ISP-R<br>PCMRC |
| Flex TiVCT 3.5L                                                                                                                          | 198 PIN   | B21<br>B97, B99<br>B64<br>B20         | INJPWRM<br>VPWR<br>ISP-R<br>PCMRC |
| Ford GT                                                                                                                                  | 198 PIN   | B95<br>B101, B102, B103<br>B48<br>B58 | INJPWRM<br>VPWR<br>ISP-R<br>PCMRC |

| Vehicle                                       | Connector | Pin                            | Circuit                           |
|-----------------------------------------------|-----------|--------------------------------|-----------------------------------|
| Fusion 2.5L                                   | 198 PIN   | B21<br>B97, B99<br>B41<br>B20  | INJPWRM<br>VPWR<br>ISP-R<br>PCMRC |
| KA 1.0L                                       | 128 PIN   | E29<br>B36, E24<br>B45<br>B37  | INJPWRM<br>VPWR<br>ISP-R<br>PCMRC |
| KA 1.2L,<br>KA 1.5L Manual Transmission       | 112 PIN   | B55, B56<br>B43<br>B25         | VPWR<br>ISP-R<br>PCMRC            |
| KA 1.5L Automatic Transmission                | 198 PIN   | B97, B99<br>B43<br>B20         | VPWR<br>ISP-R<br>PCMRC            |
| Mustang 5.2L Supercharged                     | 306 PIN   | B1, B16, B2<br>B64<br>B20      | VPWR<br>ISP-R<br>PCMRC            |
| Mustang TiVCT 5.2L                            | 198 PIN   | B1, B16, B2<br>B64<br>B20      | VPWR<br>ISP-R<br>PCMRC            |
| Nautilus 2.0L                                 | 198 PIN   | B100, B101, B102<br>B64<br>B58 | VPWR<br>ISP-R<br>PCMRC            |
| Ranger 2.5L                                   | 128 PIN   | B11, B12<br>B8<br>B1           | VPWR<br>ISP-R<br>PCMRC            |
| Transit GTDI 3.5L                             | 306 PIN   | B101, B102, B103<br>B13<br>B60 | VPWR<br>ISP-R<br>PCMRC            |
| Transit Connect 1.0L,<br>Transit Connect 2.0L | 198 PIN   | B100, B101, B102<br>B25        | VPWR<br>PCMRC                     |
| All other vehicles                            | 306 PIN   | B1, B16, B2<br>B13<br>B60      | VPWR<br>ISP-R<br>PCMRC            |

## B1 CHECK FOR DTCS

**Note:** If DTC P0607, P068A or P06B8 is retrieved after a PCM reprogramming, turn the ignition OFF and allow the PCM to complete a normal power down sequence. Clear the PCM DTCS and repeat the PCM self-test. If DTC P0607, P068A or P06B8 is retrieved again, continue with this pinpoint test.

**Are DTCS P0685, P0686, P0687, P0689, P068A, P0690, P1793, P2510, or U300C present?**

|            |                                                                                                  |
|------------|--------------------------------------------------------------------------------------------------|
| <b>Yes</b> | For DTC P068A, GO to <a href="#">B2</a> .<br>For DTCS P0689 or P2510, GO to <a href="#">B7</a> . |
|------------|--------------------------------------------------------------------------------------------------|

|           |                                            |
|-----------|--------------------------------------------|
|           | For all others, GO to <a href="#">B9</a> . |
| <b>No</b> | GO to <a href="#">B4</a> .                 |

## B2 CHECK THE BATTERY AND CHARGING SYSTEM

- Check the battery and charging system voltages. Refer to the Workshop Manual Section 414-00, Charging System, Inspection and Verification.

### Are the battery and charging system voltages within specification?

|            |                                                                                                                                                                                                                                                       |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Yes</b> | For Aviator, Corsair, Escape/Kuga, Explorer, Transit, and Transit Connect, GO to <a href="#">B5</a> .<br>For all others, GO to <a href="#">B3</a> .                                                                                                   |
| <b>No</b>  | REPAIR as necessary. REFER to the Workshop Manual Section 414-00, Charging System, Symptom Chart to diagnose the system voltage low or battery is discharged symptom or the system voltage high symptom.<br>Clear the PCM DTCs. REPEAT the self-test. |

## B3 CHECK THE PCM POWER RELAY

- Carry out the PCM power relay component test. Refer to the Wiring Diagrams Cell 149, Component Testing.

### Does the PCM power relay pass the component test?

|            |                                                                          |
|------------|--------------------------------------------------------------------------|
| <b>Yes</b> | GO to <a href="#">B4</a> .                                               |
| <b>No</b>  | INSTALL a new PCM Power Relay. Clear the PCM DTCs. REPEAT the self-test. |

## B4 CHECK THE B+ VOLTAGE TO PCM POWER RELAY

- Ignition OFF.
- PCM Power Relay connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

| ( + ) PCM Power Relay Connector, Harness Side | ( - )  |
|-----------------------------------------------|--------|
| B+                                            | Ground |

### Is the voltage greater than 10.5 V?

|            |                                                                    |
|------------|--------------------------------------------------------------------|
| <b>Yes</b> | GO to <a href="#">B5</a> .                                         |
| <b>No</b>  | REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test. |

## B5 CHECK THE PCMRC CIRCUIT FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- For Aviator, Corsair, Escape/Kuga, Explorer, and Transit Connect,
- BJB-B connector disconnected.
- Measure the resistance between:

| ( + ) BJB-B Connector, Harness Side | ( - ) PCM Connector, Harness Side |
|-------------------------------------|-----------------------------------|
| PCMRC                               | PCMRC                             |

- For Transit,
- BJB-A connector disconnected.
- Measure the resistance between:

| ( + ) BJB-A Connector, Harness Side | ( - ) PCM Connector, Harness Side |
|-------------------------------------|-----------------------------------|
| PCMRC - Pin 33                      | PCMRC                             |

- For all others,
- Measure the resistance between:

| ( + ) PCM Power Relay Connector, Harness Side | ( - ) PCM Connector, Harness Side |
|-----------------------------------------------|-----------------------------------|
| PCMRC                                         | PCMRC                             |

**Is the resistance less than 5 ohms?**

|            |                                                                    |
|------------|--------------------------------------------------------------------|
| <b>Yes</b> | GO to <a href="#">B6</a> .                                         |
| <b>No</b>  | REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test. |

#### **B6 CHECK THE PCMRC CIRCUIT FOR A SHORT TO VOLTAGE**

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

| ( + ) PCM Connector, Harness Side | ( - )  |
|-----------------------------------|--------|
| PCMRC                             | Ground |

**Is any voltage present?**

|            |                                                                     |
|------------|---------------------------------------------------------------------|
| <b>Yes</b> | REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test. |
| <b>No</b>  | GO to <a href="#">B7</a> .                                          |

#### **B7 CHECK THE ISP-R VOLTAGE AT THE PCM**

- Ignition OFF.
- PCM connector disconnected.
- For Aviator, Corsair, Escape/Kuga, Explorer, and Transit Connect,
- BJB-B connector connected.
- For Transit,
- BJB-A connector connected.
- For all others,
- PCM Power Relay connector connected.
- Ignition ON, engine OFF.
- Measure the voltage between:

| ( + ) PCM Connector, Harness Side | ( - ) |
|-----------------------------------|-------|
|                                   |       |

| ( + ) PCM Connector, Harness Side | ( - )  |
|-----------------------------------|--------|
| ISP-R                             | Ground |

Is the voltage greater than 10.5 V?

|            |                                                                                                    |
|------------|----------------------------------------------------------------------------------------------------|
| <b>Yes</b> | For DTCs P0689 or P2510, GO to <a href="#">B13</a> .<br>For all others, GO to <a href="#">B8</a> . |
| <b>No</b>  | REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.                                 |

#### B8 CHECK FOR AN OPEN VPWR CIRCUIT

- Ignition OFF.
- For Aviator, Corsair, Escape/Kuga, Explorer, and Transit Connect,
- BJB-B connector disconnected.
- Measure the resistance between:

| ( + ) BJB-B Connector, Harness Side | ( - ) PCM Connector, Harness Side |
|-------------------------------------|-----------------------------------|
| VPWR                                | VPWR                              |

- For Transit,
- BJB-A connector disconnected.
- Measure the resistance between:

| ( + ) BJB-A Connector, Harness Side | ( - ) PCM Connector, Harness Side |
|-------------------------------------|-----------------------------------|
| VPWR - Pin 42                       | VPWR                              |

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

| ( + ) PCM Power Relay Connector, Harness Side | ( - ) PCM Connector, Harness Side |
|-----------------------------------------------|-----------------------------------|
| VPWR                                          | VPWR                              |

Is the resistance less than 5 ohms?

|            |                                                                                                                                                                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Yes</b> | For DTC P068A, GO to <a href="#">B13</a> .<br>For Aviator, Corsair, Escape/Kuga, Explorer, and Transit Connect, INSTALL a new BJB.<br>Clear the PCM DTCs. REPEAT the self-test.<br>For all others, INSTALL a new PCM Power relay.<br>Clear the PCM DTCs. REPEAT the self-test. |
| <b>No</b>  | REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.                                                                                                                                                                                                             |

#### B9 CHECK THE PCMRC CIRCUIT FOR A SHORT TO GROUND

- Ignition OFF.
- PCM connector disconnected.

- For Aviator, Corsair, Escape/Kuga, Explorer, and Transit Connect,
- BJB-B connector disconnected.
- For Transit,
- BJB-A connector disconnected.
- For all others,
- PCM Power Relay connector disconnected.
- Measure the resistance between:

| ( + ) PCM Connector, Harness Side | ( - )  |
|-----------------------------------|--------|
| PCMRC                             | Ground |

Is the resistance greater than 10K ohms?

|            |                                                                     |
|------------|---------------------------------------------------------------------|
| <b>Yes</b> | GO to <a href="#">B10</a> .                                         |
| <b>No</b>  | REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test. |

#### B10 CHECK THE ISP-R CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Measure the voltage between:

| ( + ) PCM Connector, Harness Side | ( - )  |
|-----------------------------------|--------|
| ISP-R                             | Ground |

Is any voltage present?

|            |                                                                                                                                                                                                                                                                                                                                   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Yes</b> | REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.                                                                                                                                                                                                                                                               |
| <b>No</b>  | For Aviator,<br>Continental 2.0L,<br>Continental 2.7L,<br>Continental 3.0L,<br>Corsair 2.0L,<br>Corsair 2.3L,<br>EcoSport 1.0L,<br>EcoSport 2.0L,<br>Edge,<br>Escape/Kuga 1.5L,<br>Escape/Kuga 2.0L,<br>Expedition,<br>Explorer,<br>F-150,<br>Flex 3.5L GTDI,<br>Ford GT,<br>Fusion 1.5L,<br>Fusion 2.0L,<br>Fusion 2.7L,<br>MKZ, |

Mustang 2.3L,  
Mustang 5.0L,  
Nautilus,  
Navigator,  
Ranger 2.3L,  
Transit,  
Transit Connect 1.0L, and  
Transit Connect 2.0L, GO to [B12](#).  
For all others, GO to [B11](#).

**B11 CHECK THE INJPWRM CIRCUIT FOR AN OPEN**

- INJ connector disconnected.
- Measure the resistance between:

| ( + ) PCM Connector, Harness Side | ( - ) INJ Connector, Harness Side |
|-----------------------------------|-----------------------------------|
| INJPWRM                           | VPWR                              |

Is the resistance less than 5 ohms?

|            |                                                                    |
|------------|--------------------------------------------------------------------|
| <b>Yes</b> | GO to <a href="#">B13</a> .                                        |
| <b>No</b>  | REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test. |

**B12 CHECK THE INJPWR\_M PID**

- Ignition OFF.
- BJB-A connector connected.
- BJB-B connector connected.
- PCM Power Relay connector connected.
- PCM connector connected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the INJPWR\_M (VOLT) PID.
- Record the INJPWR\_M PID value.
- Ignition OFF.
- Record the INJPWR\_M PID value.

Is the INJPWR\_M PID voltage reading above 10.5 V with ignition ON and 0 V with the ignition OFF?

|            |                                                                  |
|------------|------------------------------------------------------------------|
| <b>Yes</b> | GO to <a href="#">B13</a> .                                      |
| <b>No</b>  | REPAIR the circuit.<br>Clear the PCM DTCs. REPEAT the self-test. |

**B13 CHECK FOR CORRECT PCM OPERATION**

- Ignition OFF.
- 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?**

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

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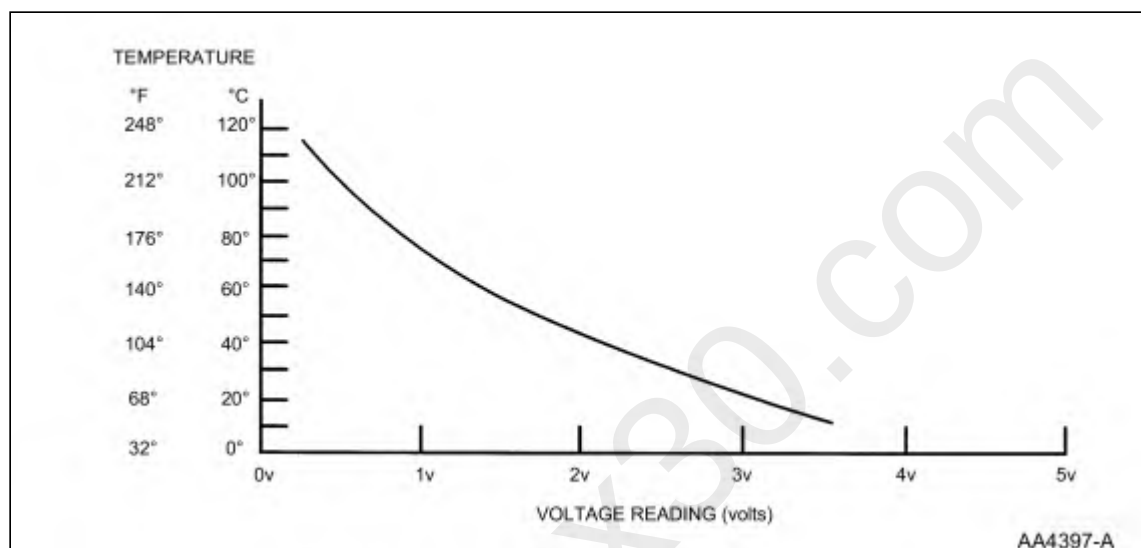
mcx30.com

**DN: Pressure And Temperature Sensors**

This pinpoint test is intended to diagnose the following:

- intake air temperature 2 (IAT2) sensor (12A697)
- manifold absolute pressure (MAP)/charge air cooler temperature (CACT) sensor (9F479)
- manifold absolute pressure (MAP)/intake air temperature 2 (IAT2) sensor (9F479)
- turbocharger boost pressure (TCBP)/charge air cooler temperature (CACT) sensor (9F479)
- harness circuits: IAT2, CACT, SIGRTN and VREF
- PCM (12A650)

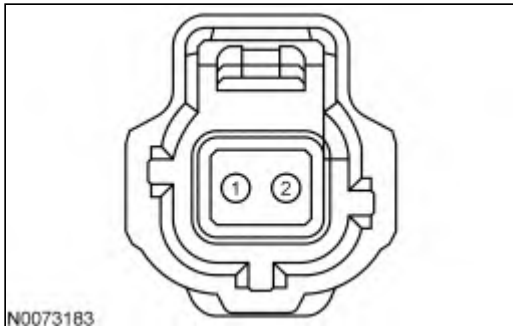
Voltage values calculated for VREF equals 5 volts. These values can vary by 15% due to sensor and VREF variations.

**TEMPERATURE SENSOR VOLTAGE AND RESISTANCE SPECIFICATIONS**

| Temperature |     | Temperature Sensor Values |
|-------------|-----|---------------------------|
| °C          | °F  | Resistance (K ohms)       |
| 120         | 248 | 1.18                      |
| 110         | 230 | 1.55                      |
| 100         | 212 | 2.07                      |
| 90          | 194 | 2.80                      |
| 80          | 176 | 3.84                      |
| 70          | 158 | 5.37                      |
| 60          | 140 | 7.70                      |
| 50          | 122 | 10.97                     |
| 40          | 104 | 16.15                     |
| 30          | 86  | 24.27                     |
| 20          | 68  | 37.30                     |
| 10          | 50  | 58.75                     |
| 0           | 32  | 95.85                     |

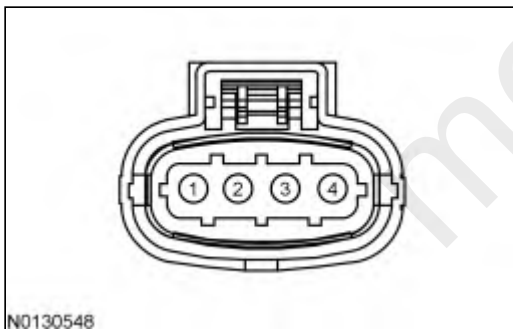
| Temperature |    | Temperature Sensor Values |
|-------------|----|---------------------------|
| °C          | °F | Resistance (K ohms)       |
| -10         | 14 | 160.31                    |

### Intake Air Temperature 2 (IAT2) Sensor Connector



| Pin | Circuit                         |
|-----|---------------------------------|
| 2   | SIGRTN (Signal Return)          |
| 1   | IAT2 (Intake Air Temperature 2) |

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



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

### Manifold Absolute Pressure/Intake Air Temperature 2 (MAP/IAT2) Sensor Connector