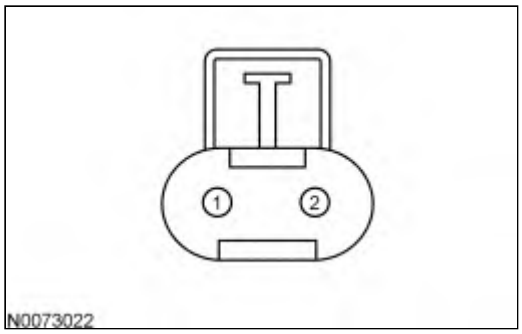
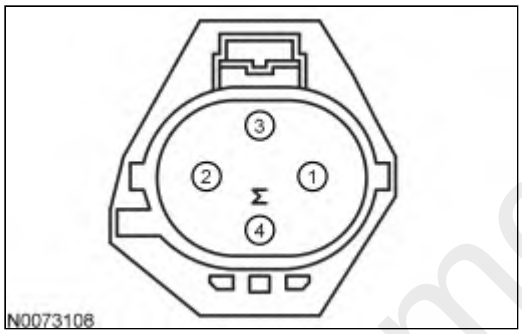
Cooling Fan (CF) Motor Connector



Pin	Circuit
1	GND (Ground)
2	FANPWR (Fan Power)

Cooling Fan Motor 1 Connector

A



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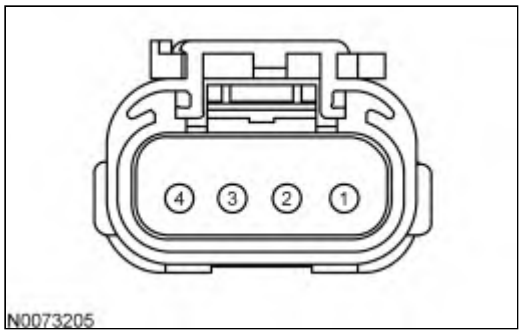

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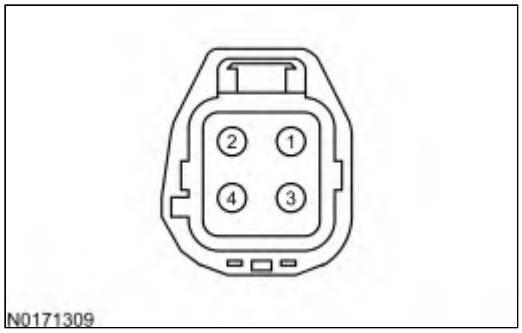
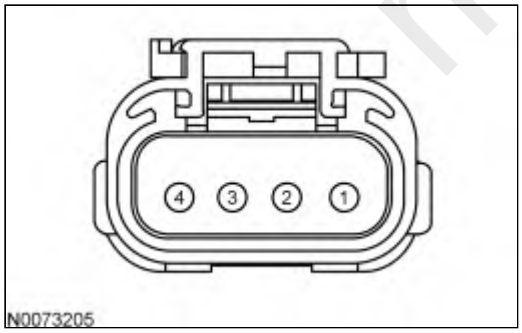


Vehicle	Connector	Pin	Circuit
Aviator, Corsair, Escape/Kuga, Explorer, Ford GT, Transit Connect	A	4 2 1	FCV GND FANPWR
Edge 3 Pin Cooling Fan Motor, Nautilus 3 Pin Cooling Fan Motor	B	4 1 2	FCV GND FANPWR
Expedition 3 Pin Cooling Fan Motor, F-150 3 Pin Cooling Fan Motor, Navigator 3 Pin Cooling Fan Motor	C	2 1 3	FCV GND FANPWR

Cooling Fan Motor 2 Connector

A



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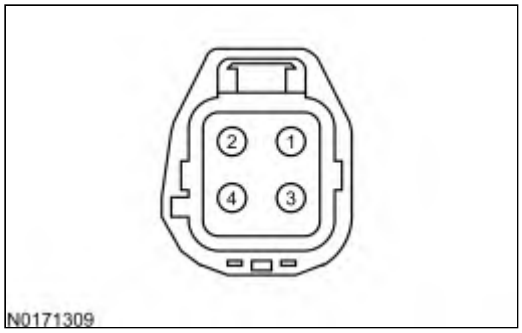

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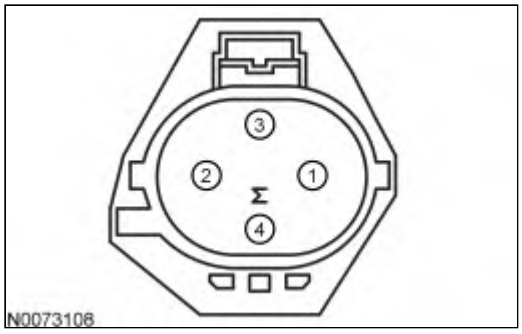
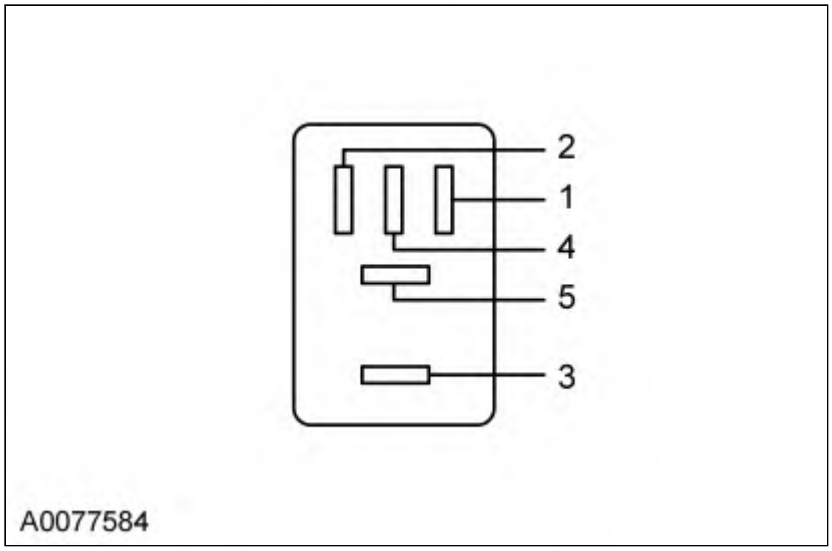


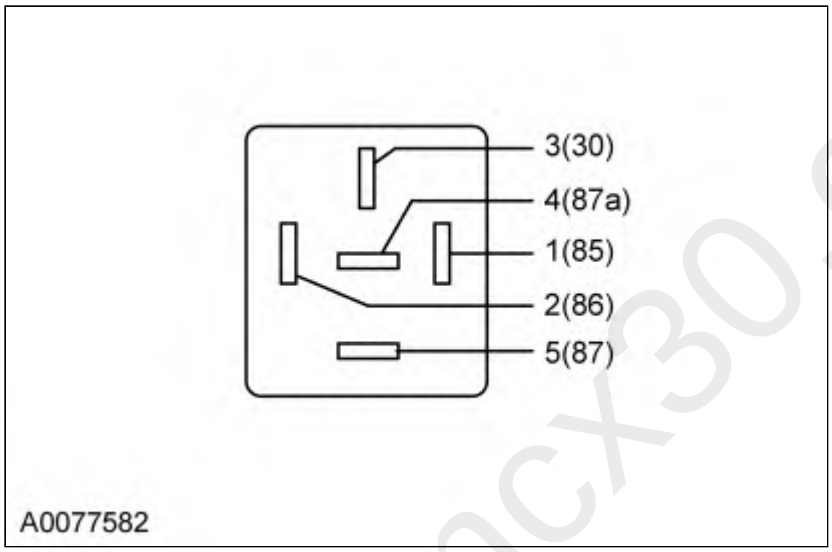
Vehicle	Connector	Pin	Circuit
Edge 3 Pin Cooling Fan Motor	A	4 1 2	FCV GND FANPWR
Expedition 3 Pin Cooling Fan Motor, F-150 3 Pin Cooling Fan Motor, Navigator 3 Pin Cooling Fan Motor	B	2 1 3	FCV GND FANPWR
Ford GT	C	4 2 1	FCV GND FANPWR
Nautilus 3 Pin Cooling Fan Motor	B	4 1 2	FCV GND FANPWR

Fan Control 1 (FC1) Relay Connector

A



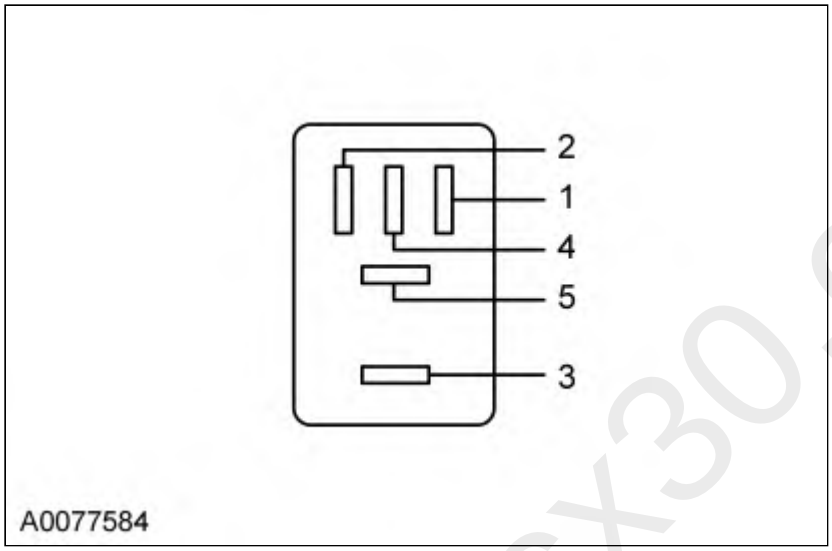
B



Vehicle	Connector	Pin	Circuit
Continental, Edge, Nautilus	A	5 2 3 1 3	FANPWR GND B+ VPWR B+
Aviator, Explorer	A	4 2 1 3	FANPWR GND B+ VPWR
Corsair, Escape/Kuga, Ford GT	A	5 2 3 1	FANPWR GND B+ VPWR

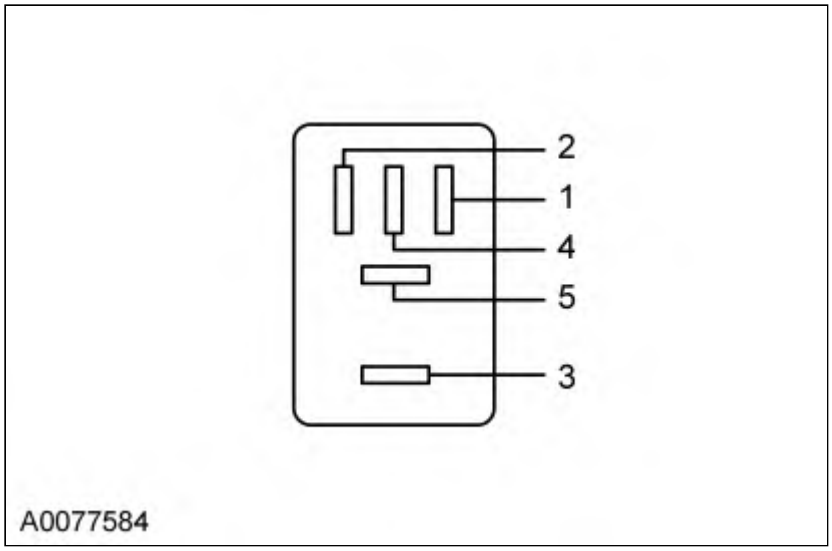
Vehicle	Connector	Pin	Circuit
EcoSport, Flex, Fusion, KA, MKZ, Mustang, Ranger 2.5L	A	3	B+
Transit	B	3	B+

Fan Control 2 (FC2) Relay Connector



Pin	Circuit
5	FANPWR (Fan Power)
2	GND (Ground)
1	VPWR (Vehicle Power)
3	B+ (Battery Positive Voltage)

Fan Control 3 (FC3) Relay Connector



Vehicle	Connector	Pin	Circuit
Continental	A	5 2 1 3	FANPWR GND VPWR B+
Edge	A	3 1 2 5	FANPWR GND VPWR B+
Nautilus	A	3 2 1 5	FANPWR GND VPWR B+

Powertrain Control Module (PCM) Connector

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

Vehicle	Connector	Pin	Circuit
Corsair 2.0L, Corsair 2.3L, Edge, Escape/Kuga 1.5L, Escape/Kuga 2.0L, Explorer 2.3L, Nautilus	198 PIN	B43	FCV
Corsair 2.5L, Escape/Kuga 2.5L	198 PIN	B66	FCV

Vehicle	Connector	Pin	Circuit
Expedition, F-150 3.5L High Output, Navigator	198 PIN	B41	FCV
Ford GT	198 PIN	B83	FCV
Transit Connect 1.0L, Transit Connect 2.0L	198 PIN	B43	FCV
Transit Connect 2.5L	198 PIN	B66	FCV
All other vehicles	306 PIN	B59	FCV

KN1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)
Is DTC P0480 present?

Yes	GO to KN4.
No	For symptoms without DTCs, GO to KN2. For all others, RETURN to Section 3, Symptom Charts for further direction.

KN2 VERIFY A/C STATUS
- Verify the A/C system is OFF.
- Ignition ON, engine running.
- Access the PCM and monitor the AC_REQ (MODE) PID.

Is A/C being requested?

Yes	REFER to the Workshop Manual Section 412-00, Climate Control System, to diagnose the A/C system.
No	For electric cooling fan(s) always on, GO to KN3. For all others, GO to KN4.

KN3 CHECK THE AIR CONDITIONING PRESSURE TRANSDUCER SENSOR
- Ignition OFF.
- ACP Sensor connector disconnected.
- Ignition ON, engine running.

Does the cooling fan turn off?

Yes	REFER to the Workshop Manual Section 412-00, Climate Control System, to diagnose the Air Conditioning Pressure (ACP) Sensor.
No	GO to KN4.

KN4 COMMAND THE COOLING FAN ON TO CHECK OPERATION

Note: *Some vehicles have more than one cooling fan. Make sure both cooling fans operate correctly.*
- Ignition ON, engine OFF.
- Access the PCM and control the FAN_DSD (PER) PID.
- Access the PCM and control the FANELC_CMD PID.
- Command the fan to full ON.

Does the cooling fan operate when commanded ON?

Yes	The concern is elsewhere. RETURN to Section 3, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index for further direction.
No	GO to KN5.

KN5 CHECK THE VOLTAGE TO THE COOLING FAN

Note: *Not all vehicles have all components listed.*

- Ignition OFF.
- For Transit Connect,
- CF Module connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) CF Module Connector, Harness Side	(-)
FANPWR - Pin 1	Ground

- For all others,
- Cooling Fan Motor 1 connector disconnected.
- Cooling Fan Motor 2 connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
FANPWR	Ground

- Measure the voltage between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
FANPWR	Ground

Is the voltage greater than 10.5 V?

Yes	For Expedition, F-150, Navigator, and Transit Connect, GO to KN14. For all others, GO to KN9.
No	For Expedition, F-150, Navigator, and Transit Connect, GO to KN13. For all others, GO to KN6.

KN6 CHECK FOR VOLTAGE TO THE RELAY

Note: *Not all vehicles have all components listed.*

- Ignition OFF.
- For Ford GT,
- FC1 Relay connector disconnected.
- FC2 Relay connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) FC1 Relay Connector, Harness Side	(-)
B+	Ground
VPWR	Ground

- Measure the voltage between:

(+) FC2 Relay Connector, Harness Side	(-)
B+ - Pin 3	Ground
VPWR - Pin 1	Ground

- For all others,
- FC1 Relay connector disconnected.
- FC3 Relay connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) FC1 Relay Connector, Harness Side	(-)
B+	Ground
VPWR	Ground

- Measure the voltage between:

(+) FC3 Relay Connector, Harness Side	(-)
B+	Ground
VPWR	Ground

Are the voltages greater than 10.5 V?

Yes	GO to KN7.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KN7 CHECK THE RELAY

- Carry out the Relay Component Test. Refer to Wiring Diagrams Cell 149.

Is a concern present?

Yes	INSTALL a new FC relay in question. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KN8.

KN8 CHECK THE RELAY GROUND

Note: *Not all vehicles have all components listed.*

- Ignition OFF.
- For Ford GT,

- Measure the resistance between:

(+) FC1 Relay Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-)
GND - Pin 2	Ground

- For all others,
- Measure the resistance between:

(+) FC1 Relay Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) FC3 Relay Connector, Harness Side	(-)
GND	Ground

Is the resistance less than 5 ohms?

Yes	GO to KN9.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KN9 CHECK FOR AN OPEN CIRCUIT

Note: *Not all vehicles have all components listed.*

- Ignition OFF.
- PCM connector disconnected.
- For Ford GT,
- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) PCM Connector, Harness Side
FCV	FCV

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) FC1 Relay Connector, Harness Side
FANPWR	FANPWR

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-) PCM Connector, Harness Side
FCV	FCV

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-) FC2 Relay Connector, Harness Side
FANPWR	FANPWR - Pin 5

- For all others,
- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) PCM Connector, Harness Side
FCV	FCV

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) FC1 Relay Connector, Harness Side
FANPWR	FANPWR

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-) PCM Connector, Harness Side
FCV	FCV

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-) FC3 Relay Connector, Harness Side
FANPWR	FANPWR

Are the resistances less than 5 ohms?

Yes	GO to KN10.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KN10 CHECK THE FCV CIRCUIT FOR A SHORT TO GROUND

Note: *Not all vehicles have all components listed.*

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
FCV	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
FCV	Ground

Are the resistances greater than 10k ohms?

Yes	GO to KN11.
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KN11 CHECK THE FCV CIRCUIT FOR A SHORT TO VOLTAGE

- Not all vehicles have all components listed.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
FCV	Ground

- Measure the voltage between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
FCV	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KN12.

KN12 CHECK THE FCV CIRCUITS FOR INTERMITTENT CONCERNS

Note: *Some vehicles have more than one cooling fan. Make sure both cooling fans operate correctly.*

Note: *Not all vehicles have all components listed.*

- Ignition OFF.
- CF Motor connector disconnected.
- Cooling Fan Motor 1 connector disconnected.
- Cooling Fan Motor 2 connector disconnected.
- Visually inspect all connectors for:
  - pushed out pins
  - corrosion
- CF Motor connector connected.
- CF Module connector connected.
- Cooling Fan Motor 1 connector connected.
- Cooling Fan Motor 2 connector connected.
- PCM connector connected.
- FC Relay connector connected.
- FC1 Relay connector connected.
- FC2 Relay connector connected.
- FC3 Relay connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the FAN_DSD (PER) PID.
- Access the PCM and control the FANELC_CMD PID.
- Command the fan to full ON.
- While observing the fan, wiggle, shake, and bend small sections of the wiring harness while working from the cooling fan to the PCM.

Is a concern present?

Yes	REPAIR as necessary. If a wiring concern is not present, INSTALL a new cooling fan. REFER to the Workshop Manual Section 303-03, Engine Cooling. Clear the PCM DTCs. REPEAT the self-test.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

KN13 CHECK THE RELAY GROUND CIRCUIT

- Ignition OFF.
- BJB-C connector disconnected.
- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-)
GND - Pin 10, 6	Ground

Is the resistance less than 5 ohms?

Yes	GO to KN14.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KN14 CHECK FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- BJB-A connector disconnected.
- BJB-B connector disconnected.
- For Expedition, F-150 and Navigator,
- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) PCM Connector, Harness Side
FCV	FCV

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) BJB-B Connector, Harness Side
FANPWR	FANPWR - Pin 2

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-) PCM Connector, Harness Side
FCV	FCV

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-) BJB-B Connector, Harness Side
FANPWR	FANPWR - Pin 26

- For Transit Connect,
- Measure the resistance between:

(+) CF Module Connector, Harness Side	(-)
GND - Pin 2	Ground

- Measure the resistance between:

(+) CF Module Connector, Harness Side	(-) PCM Connector, Harness Side
FCV - Pin 4	FCV

- Measure the resistance between:

(+) CF Module Connector, Harness Side	(-) BJB-A Connector, Harness Side
FANPWR - Pin 1	FANPWR - Pin 20

- For all others,
- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) PCM Connector, Harness Side
FCV	FCV

- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-) BJB-A Connector, Harness Side
FANPWR	FANPWR - Pin 20

Are the resistances less than 5 ohms?

Yes	GO to KN15.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KN15 CHECK THE FCV FOR A SHORT TO GROUND

Note: *Not all vehicles have all components listed.*

- For Transit Connect,
- Measure the resistance between:

(+) CF Module Connector, Harness Side	(-)
FCV - Pin 4	Ground

- For all others,
- Measure the resistance between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
FCV	Ground

- Measure the resistance between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
FCV	Ground

Are the resistances greater than 10k ohms?

Yes	GO to KN16.
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KN16 CHECK THE FCV FOR A SHORT TO VOLTAGE

Note: *Not all vehicles have all components listed.*

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

(+) CF Module Connector, Harness Side	(-)
FCV - Pin 4	Ground

- For all others,
- Measure the voltage between:

(+) Cooling Fan Motor 1 Connector, Harness Side	(-)
FCV	Ground

- Measure the voltage between:

(+) Cooling Fan Motor 2 Connector, Harness Side	(-)
FCV	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KN17.

KN17 CHECK THE FCV FOR INTERMITTENT CONCERNS

Note: *Some vehicles have more than one cooling fan. Make sure both cooling fans operate correctly.*

Note: *Not all vehicles have all components listed.*

- Ignition OFF.
- BJB-A connector disconnected.
- BJB-B connector disconnected.
- BJB-C connector disconnected.
- Cooling Fan Motor 1 connector disconnected.
- Cooling Fan Motor 2 connector disconnected.
- Visually inspect all connectors for:
  - pushed out pins
  - corrosion
- BJB-A connector connected.
- BJB-B connector connected.
- BJB-C connector connected.
- Cooling Fan Motor 1 connector connected.
- Cooling Fan Motor 2 connector connected.
- PCM connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the FAN_DSD (PER) PID.
- Access the PCM and control the FANELC_CMD PID.
- Command the fan to full ON.
- While observing the fan, wiggle, shake, and bend small sections of the wiring harness while working from the cooling fan to the PCM.

Is a concern present?

Yes	REPAIR as necessary. If a wiring concern is not present, INSTALL a new cooling fan. REFER to the Workshop Manual Section 303-03, Engine Cooling. Clear the PCM DTCs. REPEAT the self-test.
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

DF: Vehicle Speed Circuit (VSC) Check

WARNING: Strict observance of posted speed limits and driving conditions is mandatory when proceeding through the following drive cycles.

Failure to follow these instructions may result in personal injury.

This pinpoint test is intended to diagnose the following:

- PCM (12A650)

DF1 CHECK FOR DTCS
Is DTC U0121 present?

Yes	REFER to the Workshop Manual Section 206-09, Vehicle Dynamic Systems, Symptom Charts, No communication with the ABS module.
No	GO to DF2.

DF2 VISUAL INSPECTION
- Carry out the ABS self-test.

Are any DTCs present?

Yes	REFER to the Workshop Manual Section 206-09, Vehicle Dynamic Systems, to continue diagnosis of the ABS.
No	GO to DF3.

DF3 CHECK THE PCM VEHICLE SPEED SIGNAL INPUT

WARNING: Strict observance of posted speed limits and attention to driving conditions are mandatory when carrying out the road test. Failure to follow these instructions may result in personal injury.

- Access the PCM and monitor the VSS (SPD) PID.
- Road test the vehicle while monitoring the VSS PID.

Does the VSS PID increase and decrease while driving?

Yes	The concern is not present at this time. CHECK for a loose connection, and damaged or corroded pins. WIGGLE the harness attempting to recreate the concern. REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	GO to DF4.

DF4 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.