KF: Fan Control Relays

This pinpoint test is intended to diagnose the following:

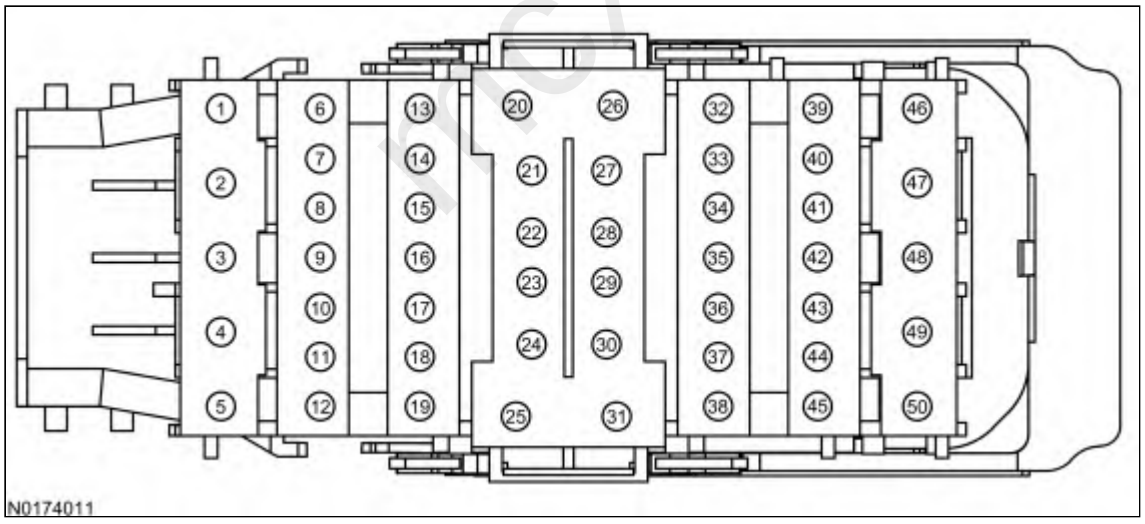
- CAC fan relay
- fan control (FC1, FC2, FC3, FC4, FC5) relays
- harness circuits: CACCF, FGC, LFC, MFC, HFC and VPWR
- PCM (12A650)

Although the PCM output circuits are called LFC, MFC, and HFC, cooling fan operation is controlled by a combination of these outputs.

Cooling Fan State

	PCM Output	Low Speed	Medium Speed	High Speed
Vehicles With 5 Fan Control Relays	LFC	ON	ON	ON
	MFC	OFF	ON	ON
	HFC	OFF	OFF	ON
All Others	LFC	ON	N/A	ON
	HFC	OFF	N/A	ON

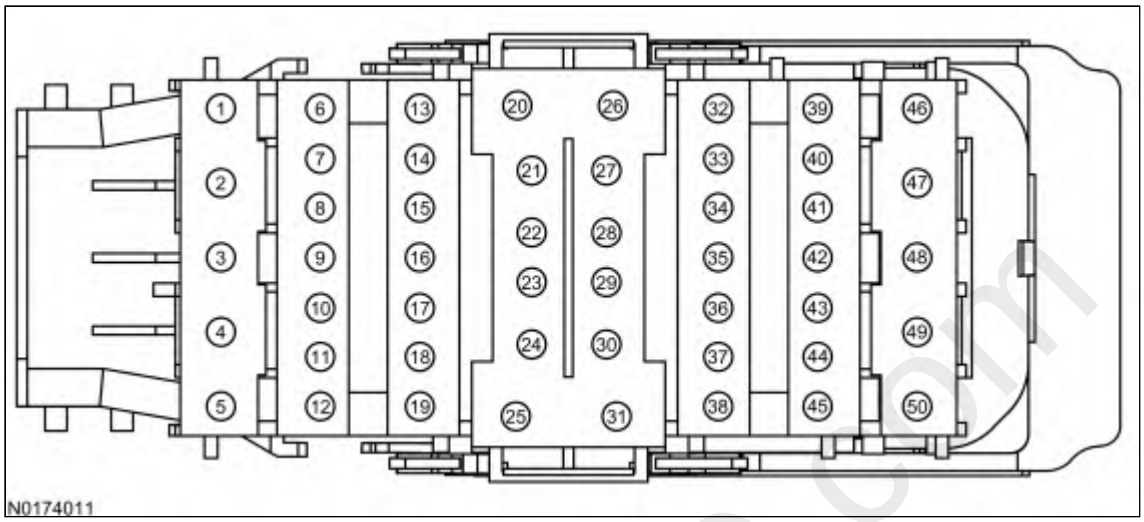
Battery Junction Box-A (BJB-A) Connector



Vehicle	Connector	Pin	Circuit
KA Automatic Transmission	A	47	FANPWR
		42	HFC
		36	LFC

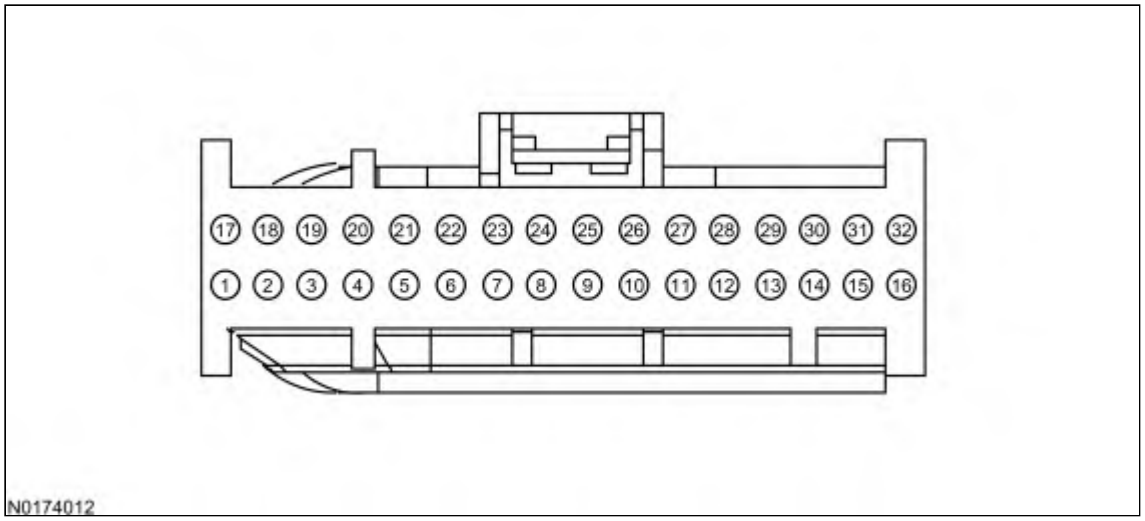
Vehicle	Connector	Pin	Circuit
KA Manual Transmission	A	47 42	FANPWR LFC
Transit Connect	A	6	CACCF

Battery Junction Box-B (BJB-B) Connector



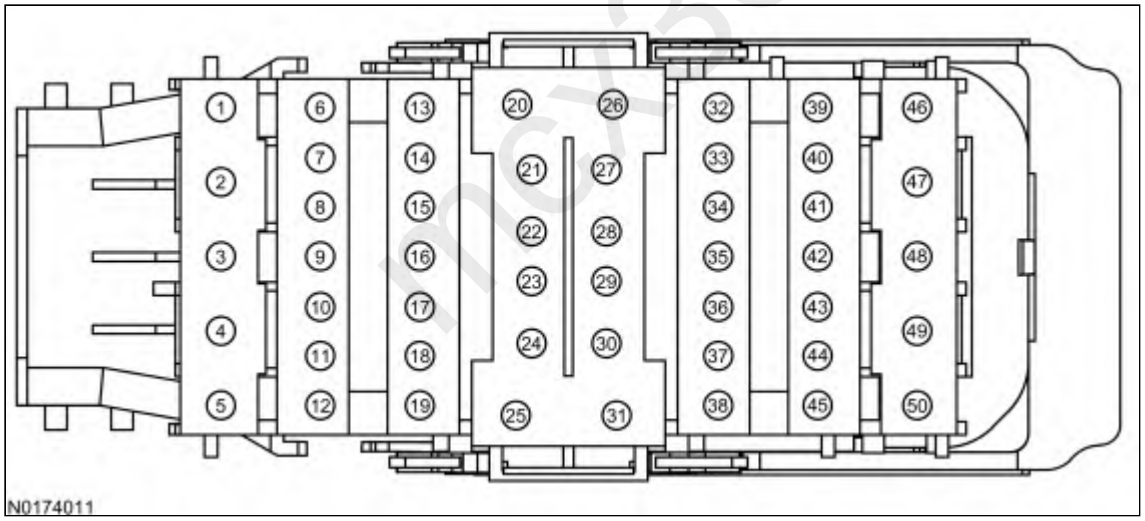
Vehicle	Connector	Pin	Circuit
Corsair, Escape/Kuga, Transit Connect	A	1	FANPWR
Expedition, F-150, Navigator	A	47 26 2	GND FANPWR FANPWR
Motorhome / Stripped Chassis / Step Van	A	34	FANPWR

Battery Junction Box-C (BJB-C) Connector



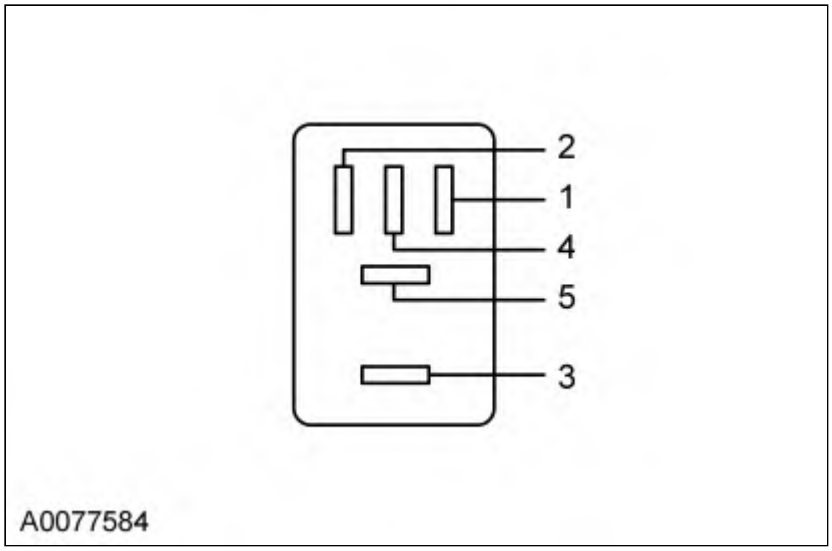
Vehicle	Connector	Pin	Circuit
Expedition, F-150 2 Pin Cooling Fan Motor, Navigator	A	6 10 19	HFC LFC CACCF
F-150 3 Pin Cooling Fan Motor	A	19	CACCF

Battery Junction Box-D (BJB-D) Connector



Pin	Circuit
47	FANPWR (Fan Power)

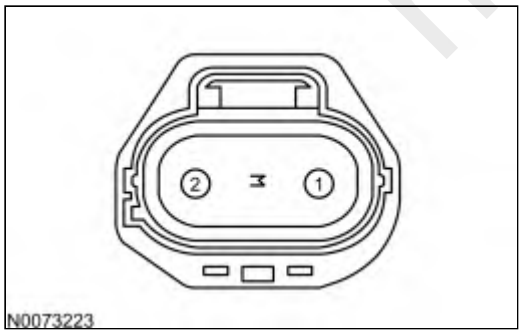
Charge Air Cooler Cooling Fan Relay Connector



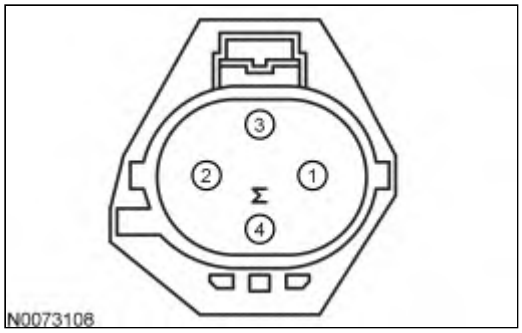
Vehicle	Connector	Pin	Circuit
Ford GT	A	5 1 3 2	FANPWR CACCF B+ VPWR
All other vehicles	A	5 2 3 1	FANPWR CACCF B+ VPWR

Charge Air Cooler Cooling Fan Motor Connector

A

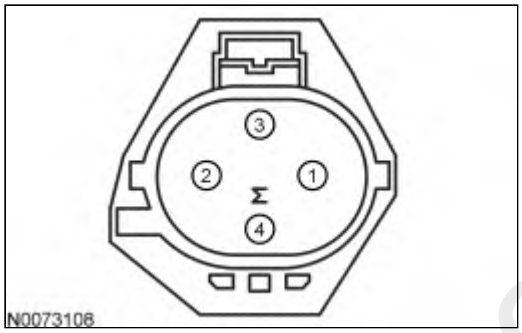


B



Vehicle	Connector	Pin	Circuit
Transit Connect 1.0L	A	2 1	GND FANPWR
All other vehicles	B	2 1	GND FANPWR

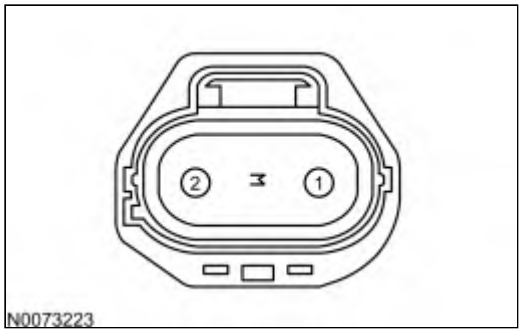
Charge Air Cooler Cooling Fan 2 Motor Connector



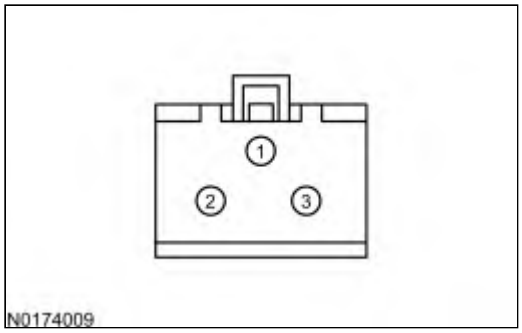
Pin	Circuit
2	GND (Ground)
1	FANPWR (Fan Power)

Cooling Fan Motor 1 Connector

A

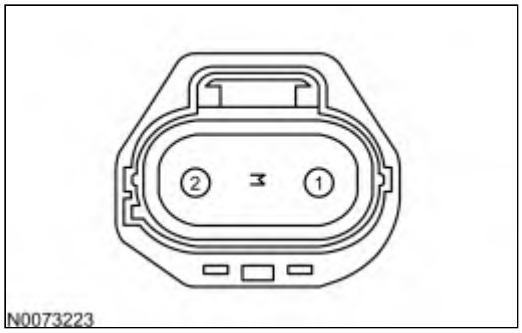


B



Vehicle	Connector	Pin	Circuit
EcoSport, Fusion, KA	A	1 2	GND FANPWR
Ranger 2.5L	B	1 3 2	GND FANPWR FANPWR
All other vehicles	A	2 1	FC FANPWR

Cooling Fan Motor 2 Connector

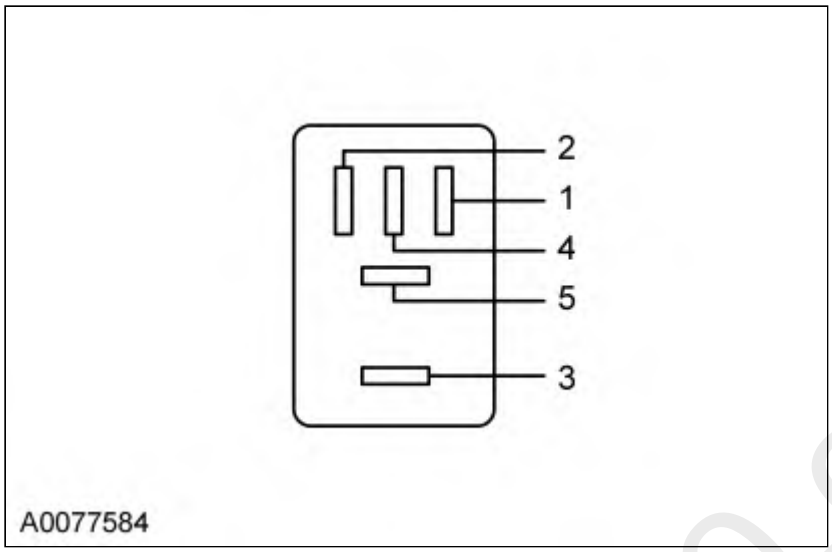


Pin	Circuit
2	GND (Ground)

Pin	Circuit
1	FANPWR (Fan Power)

Fan Control 1 (FC1) Relay Connector

A



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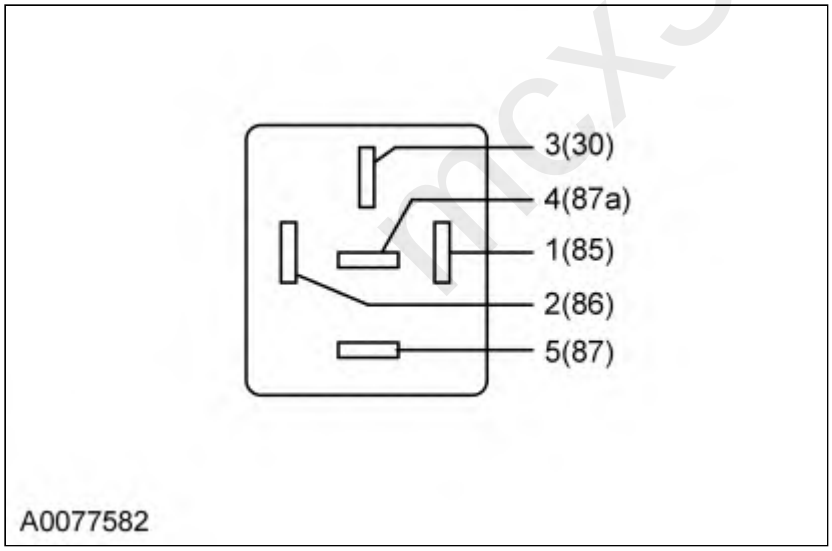
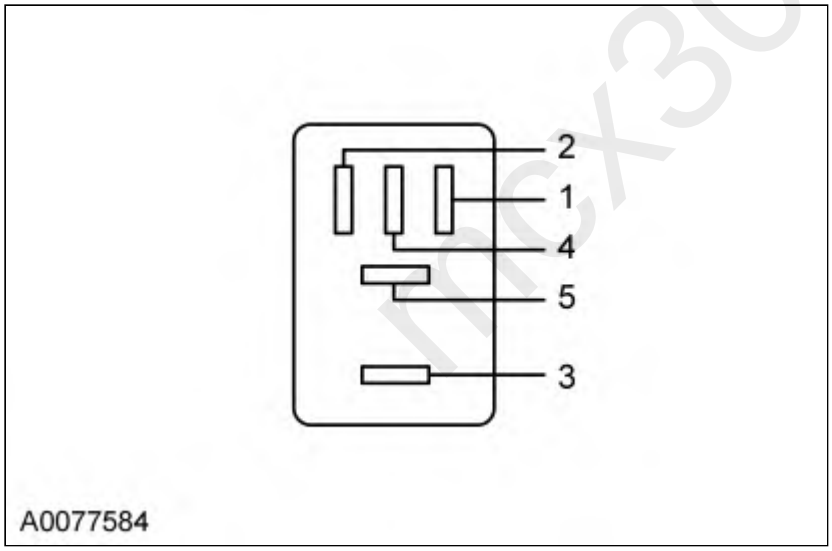


Vehicle	Connector	Pin	Circuit

Vehicle	Connector	Pin	Circuit
Continental, EcoSport, Edge, Flex, KA, Nautilus, Ranger 2.5L	A	5 2 3 1	FANPWR LFC B+ VPWR
Fusion, MKZ, Mustang	A	5 1 3 2	FANPWR LFC B+ VPWR
Transit	B	5 2 3 1	FANPWR LFC B+ VPWR

Fan Control 2 (FC2) Relay Connector

A



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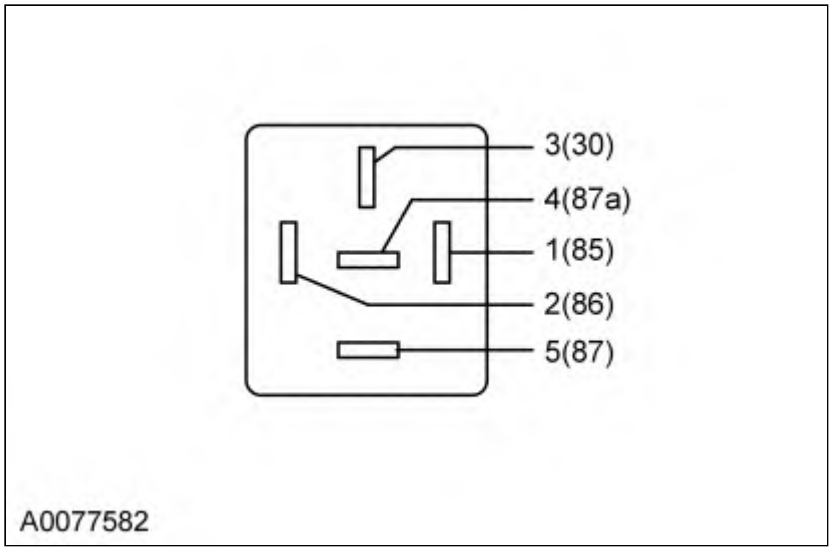
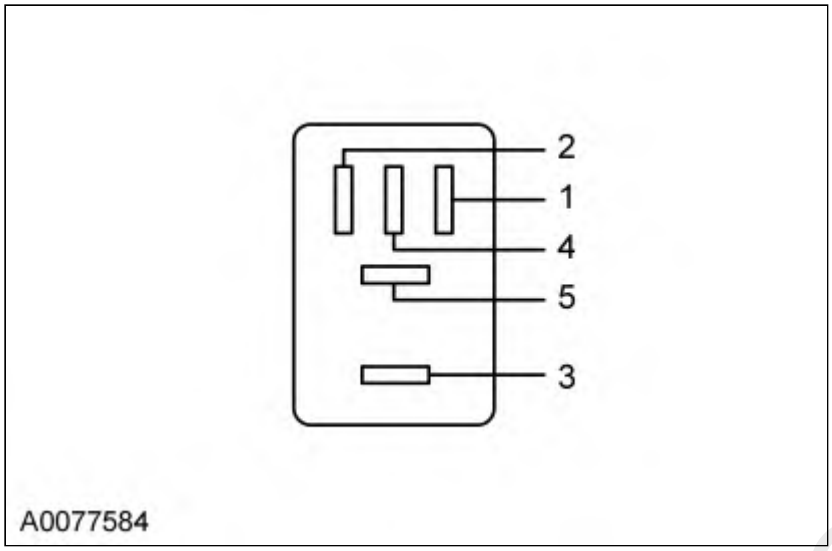


Vehicle	Connector	Pin	Circuit
Continental, Edge, Nautilus	A	5 3 4 2 1	GND FGC FANPWR HFC VPWR
EcoSport	B	5 2 3 1	FANPWR HFC B+ VPWR
Flex	B	5 3 4 2 1	GND FGC FANPWR HFC VPWR
Fusion, MKZ, Mustang	A	5 3 4 1 2	GND FGC FANPWR HFC VPWR
Ranger 2.5L	A	5 2 3 1	FANPWR HFC B+ VPWR
Transit	B	4 3 2 5 1	FGC FANPWR HFC B+ VPWR

NOTE: The HFC circuit may be wired to the FC3 and FC5 relays. Refer to the Wiring Diagrams Manual for additional information.

Fan Control 3 (FC3) Relay Connector

A



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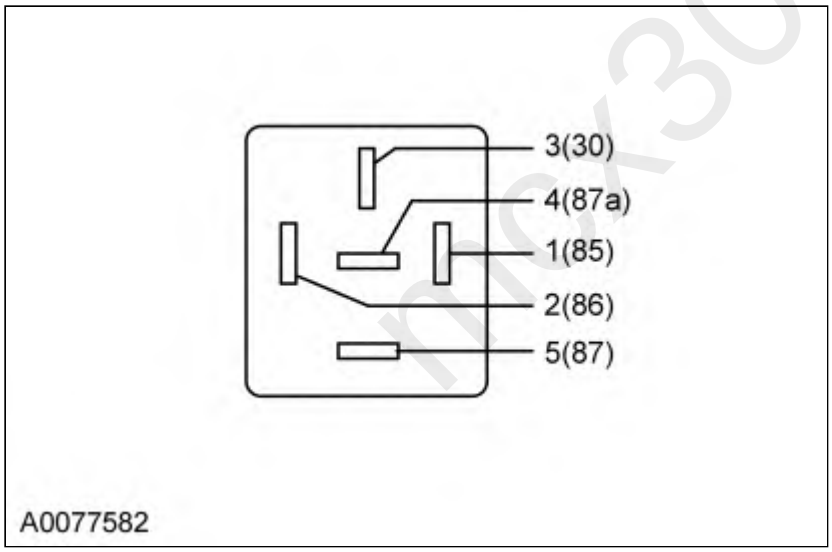
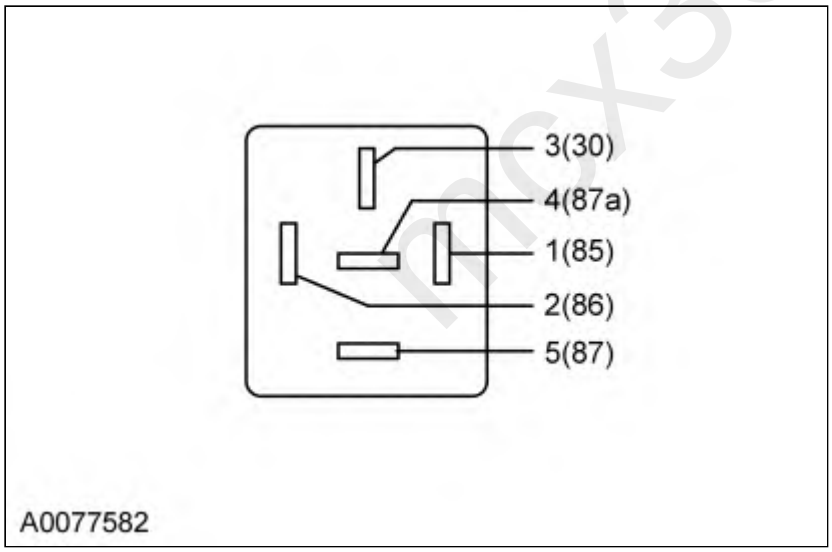


Vehicle	Connector	Pin	Circuit
Continental, Nautilus	A	5 2 3 1	FANPWR HFC B+ VPWR
Edge, Mustang	A	3 1 5 2	FANPWR HFC B+ VPWR

Vehicle	Connector	Pin	Circuit
Flex	B	5	FANPWR
		2	HFC
		3	B+
		1	VPWR
Fusion	A	3	FANPWR
		2	HFC
		5	B+
		1	VPWR
MKZ	A	3	GND
		2	HFC
		5	B+
		1	VPWR
Transit	B	5	GND
		3	FGC
		2	HFC
		1	VPWR

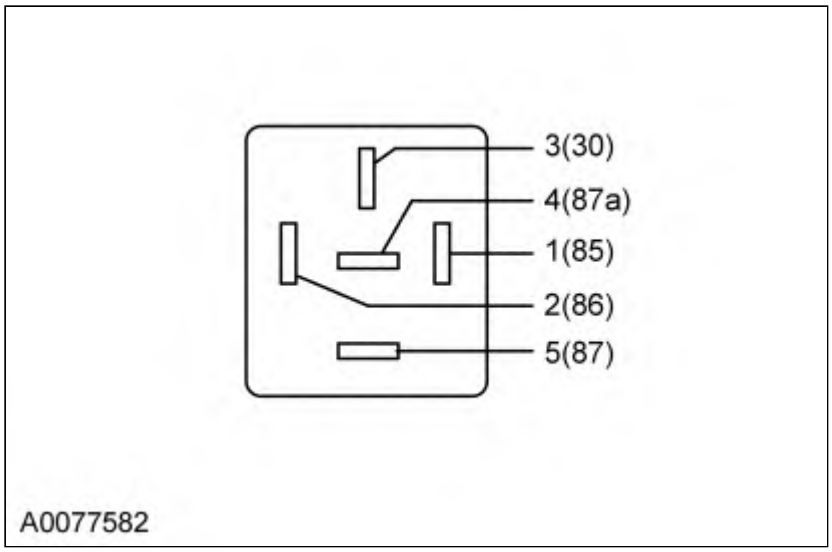
NOTE: The MFC circuit may be wired to the FC2 and FC4 relays. Refer to the Wiring Diagrams Manual for additional information.

Fan Control 4 (FC4) Relay Connector



Pin	Circuit
5	FANPWR (Fan Power)
4	FANRSTR2 (Fan Resistor 2)
2	MFC (Medium Fan Control)
1	VPWR (Vehicle Power)

Fan Control 5 (FC5) Relay Connector



Pin	Circuit
2	HFC (High Fan Control)

Powertrain Control Module (PCM) Connector

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

Vehicle	Connector	Pin	Circuit
Continental 3.7L, Flex TiVCT 3.5L, Mustang TiVCT 5.2L	198 PIN	B10 B17	HFC LFC
EcoSport 1.0L Automatic Transmission	198 PIN	B4 B23 E19	HFC LFC CACCF
EcoSport 1.0L Manual Transmission	198 PIN	B3 B42 E19	HFC LFC CACCF
EcoSport 1.5L Automatic Transmission, Fusion 2.5L, KA 1.5L Automatic Transmission	198 PIN	B67 B66	HFC LFC
EcoSport 1.5L Manual Transmission	112 PIN	B27 B26	HFC LFC
Edge 2.0L, Mustang 2.3L, Nautilus 2.0L	198 PIN	B39 B43	HFC LFC

Vehicle	Connector	Pin	Circuit
Edge 2.7L, F-150 2.7L, F-150 3.3L, F-150 5.0L, F-150 3.5L, Nautilus 2.7L, Transit	306 PIN	B89 B59	HFC LFC
Expedition, Navigator	198 PIN	B80 B41 B43	HFC LFC CACCF
F-150 3.5L High Output	198 PIN	B43	CACCF
Ford GT	198 PIN	B78	CACCF
KA 1.0L	128 PIN	E31	LFC
KA 1.2L, KA 1.5L Manual Transmission	112 PIN	B26	LFC
Mustang 5.0L	306 PIN	B89 B4	HFC LFC
Mustang 5.2L Supercharged	306 PIN	B10 B4	HFC LFC
Ranger	128 PIN	E29 T13	HFC LFC
Transit Connect	198 PIN	B61	CACCF
All other vehicles	198 PIN	B4 B23	HFC LFC

KF1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Note: *Check all the cooling fan system fuses. If any cooling fan system fuse is damaged, install all new cooling fan fuses and check the cooling fan system for normal operation before continuing with the pinpoint test.*

Note: *For Edge, Expedition, F-150, Nautilus, and Navigator with 3 pin Cooling Fan Motor 1 and Cooling Fan Motor 2 connectors, GO to Pinpoint Test KN.*

Are DTCs P028D, P028E, P0480, P0481 or P0482 present?

Yes	For Expedition, F-150, KA, Navigator, and Transit Connect, GO to KF23. For DTC P0481, GO to KF8. For DTC P0482, GO to KF13. For all others, GO to KF3.
No	For Expedition, F-150, KA, Navigator, and Transit Connect symptoms without DTCs, GO to KF23. For all others symptoms without DTCs, GO to KF2. For all others, RETURN to Section 3, Symptom Charts for further direction.

KF2 VERIFY A/C STATUS

Note: *Verify the A/C system pressures are correct. Refer to the Workshop Manual Section 412-00, Climate Control System, General Procedure, Refrigerant System Tests for additional information.*

- 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	GO to KF3.

KF3 CHECK THE VOLTAGE TO THE RELAYS

- Ignition OFF.
- For DTCs P028D or P028E,
- Charge Air Cooler Cooling Fan Relay connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	(-)
VPWR	Ground
B+	Ground

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

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

Are the voltages greater than 10.5 V?

Yes	GO to KF4.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF4 CHECK THE RELAYS

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

Is a concern present?

Yes	INSTALL a new relay in question. Clear the PCM DTCs. REPEAT the self-test.
No	For symptoms without DTCs, GO to KF8. For all others, GO to KF5.

KF5 CHECK THE CACCF AND LFC CIRCUITS FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- For DTCs P028D or P028E,

- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	(-) PCM Connector, Harness Side
CACCF	CACCF

- For all others,
- Measure the resistance between:

(+) FC1 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
LFC	LFC

Is the resistance less than 5 ohms?

Yes	GO to KF6.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF6 CHECK THE CACCF AND LFC CIRCUIT FOR A SHORT TO GROUND

- For DTCs P028D or P028E,
- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	(-)
CACCF	Ground

- For all others,
- Measure the resistance between:

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

Is the resistance greater than 10K ohms?

Yes	GO to KF7.
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KF7 CHECK THE CACCF AND LFC CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For DTCs P028D or P028E,
- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	(-)
CACCF	Ground

- For all others,
- Measure the voltage between:

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

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	For EcoSport, GO to KF18. For DTCs P028D, P028E, or P0480, GO to KF36. For all others, GO to KF8.

KF8 CHECK THE VOLTAGE TO THE RELAYS

- Ignition OFF.
- FC2 Relay connector disconnected.
- FC3 Relay connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

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

- Measure the voltage between:

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

Are the voltages greater than 10.5 V?

Yes	GO to KF9.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF9 CHECK FC2 AND FC3 RELAYS

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

Is a concern present?

Yes	INSTALL a new relay in question. Clear the PCM DTCs. REPEAT the self-test.
No	For symptoms without DTCs, GO to KF18. For all others, GO to KF10.

KF10 CHECK THE HFC CIRCUIT FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- For 5 fan relays,
- Measure the resistance between:

(+) FC3 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
HFC	HFC

- Measure the resistance between:

(+) FC5 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
HFC - Pin 2	HFC

- For all others,
- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
HFC	HFC

- Measure the resistance between:

(+) FC3 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
HFC	HFC

Are the resistances less than 5 ohms?

Yes	GO to KF11.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF11 CHECK THE HFC CIRCUIT FOR A SHORT TO GROUND

- For 5 fan relays,
- Measure the resistance between:

(+) FC3 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
HFC	HFC

- Measure the resistance between:

(+) FC5 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
HFC - Pin 2	HFC

- For all others,
- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-)
HFC	Ground

- Measure the resistance between:

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

Are the resistances greater than 10K ohms?

Yes	GO to KF12.
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KF12 CHECK THE HFC CIRCUIT FOR A SHORT TO VOLTAGE

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

(+) PCM Connector, Harness Side	(-)
HFC	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF36.

KF13 CHECK THE VOLTAGE TO THE FC2, FC3, AND FC4 RELAYS

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

- Ignition OFF.
- FC2 Relay connector disconnected.
- FC3 Relay connector disconnected.
- FC4 Relay connector disconnected.
- Ignition ON, engine OFF.
- Access the PCM and control the LFC (MODE) PID.
- Command the PID ON.
- Access the PCM and control the (MODE) PID.
- Command the PID ON.
- Access the PCM and control the HFC (MODE) PID.
- Command the PID ON.
- Measure the voltage between:

(+) FC2 Relay Connector, Harness Side	(-)
VPWR	Ground

- Measure the voltage between:

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

- Measure the voltage between:

(+) FC4 Relay Connector, Harness Side	(-)
VPWR - Pin 1	Ground

Are the voltages greater than 10.5 V?

Yes	GO to KF14.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF14 CHECK THE FC2, FC3, AND FC4 RELAYS

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

Is a concern present?

Yes	INSTALL a new FC2 or FC4 relay in question. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF15.

KF15 CHECK THE MFC CIRCUIT FOR AN OPEN

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

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

(+) FC2 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
MFC	MFC

- Measure the resistance between:

(+) FC3 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
MFC	MFC

- Measure the resistance between:

(+) FC4 Relay Connector, Harness Side	(-) PCM Connector, Harness Side
MFC - Pin 2	MFC

Are the resistances less than 5 ohms?

Yes	GO to KF16.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF16 CHECK THE MFC CIRCUIT FOR A SHORT TO GROUND

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

- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-)
MFC	Ground

- Measure the resistance between:

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

- Measure the resistance between:

(+) FC4 Relay Connector, Harness Side	(-)
MFC - Pin 2	Ground

Are the resistances greater than 10K ohms?

Yes	GO to KF17.
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KF17 CHECK THE MFC CIRCUIT FOR A SHORT TO VOLTAGE

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

(+) PCM Connector, Harness Side	(-)
MFC	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

No	For DTC P0482, GO to KF36. For all others, GO to KF18.

KF18 CHECK THE FAN PWR CIRCUIT FOR AN OPEN

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

- Ignition OFF.
- For EcoSport 1.0L charge air cooler cooling fan,
- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	(-) Charge Air Cooler Cooling Fan Motor Connector, Harness Side
FANPWR	FANPWR

- For Ford GT charge air cooler cooling fan,
- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	(-) Charge Air Cooler Cooling Fan 2 Motor Connector, Harness Side
FANPWR	FANPWR - Pin 1

- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	(-) Charge Air Cooler Cooling Fan Motor Connector, Harness Side
FANPWR	FANPWR

- For EcoSport,
- Measure the resistance between:

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

- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-) Cooling Fan Motor 1 Connector, Harness Side
FANPWR	FANPWR

- For Ranger,
- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-) Cooling Fan Motor 1 Connector, Harness Side
FANPWR	FANPWR

- For all others FC1 relay,
- Measure the resistance between:

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

- For all others FC2 relay,
- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-) Cooling Fan Motor 1 Connector, Harness Side
FGC	FC

- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-) Cooling Fan Motor 2 Connector, Harness Side
FANPWR	FANPWR - Pin 1

- Measure the resistance between:

(+) FC2 Relay Connector, Harness Side	(-) Cooling Fan Motor 1 Connector, Harness Side
FANRSTR1	FANPWR
FANPWR	FANPWR

- For all others FC3 relay,
- Measure the resistance between:

(+) FC3 Relay Connector, Harness Side	(-) Cooling Fan Motor 2 Connector, Harness Side
FANPWR	FANPWR - Pin 1

- Measure the resistance between:

(+) FC3 Relay Connector, Harness Side	(-) Cooling Fan Motor 1 Connector, Harness Side
FGC	FC

- For all others FC4 relay,
- Measure the resistance between:

(+) FC4 Relay Connector, Harness Side	(-) Cooling Fan Motor 2 Connector, Harness Side
FANRSTR2 - Pin 4	FANPWR - Pin 1

(+) FC4 Relay Connector, Harness Side	(-) Cooling Fan Motor 2 Connector, Harness Side
FANPWR - Pin 5	FANPWR - Pin 1

Are the resistances less than 5 ohms?

Yes	GO to KF19.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF19 CHECK THE FAN PWR CIRCUIT FOR A SHORT TO VOLTAGE

Note: *For vehicles with a single cooling fan, disregard the cooling fan motor 2 measurement in this step.*

- Ignition ON, engine OFF.
- For EcoSport 1.0L charge air cooler cooling fan,
- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
FANPWR	Ground

- For Ford GT charge air cooler cooling fan,
- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
FANPWR	Ground

- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan 2 Motor Connector, Harness Side	(-)
FANPWR - Pin 1	Ground

- For Ranger,
- Measure the voltage between:

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

- For all others,
- 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 - Pin 1	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF20.

KF20 CHECK GROUND CIRCUITS

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

- Ignition OFF.
- For EcoSport 1.0L charge air cooler cooling fan,
- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
GND	Ground

- For Ford GT charge air cooler cooling fan,
- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan 2 Motor Connector, Harness Side	(-)
GND - Pin 2	Ground

- For EcoSport and Ranger,
- Measure the resistance between:

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

- For all others,
- Measure the resistance between:

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

- Measure the resistance between:

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

- Measure the resistance between:

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

Are the resistances less than 5 ohms?

Yes	GO to KF21.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF21 COMMAND THE FANS ON AND CHECK FOR VOLTAGE TO THE COOLING FAN MOTORS

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

Note: *Not all vehicles will have cooling fan motor 2, charge air cooler cooling fan motor 2, HFC PID, or the MFC PID .*

- Ignition OFF.
- PCM connector connected.
- For EcoSport 1.0L, and Ford GT charge air cooler cooling fan,
- Charge Air Cooler Cooling Fan Relay connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the CACC_FAN (PER) PID.
- Command the PID ON.
- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
FANPWR	Ground

- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan 2 Motor Connector, Harness Side	(-)
FANPWR - Pin 1	Ground

- For all others,
- FC1 Relay connector connected.
- FC2 Relay connector connected.
- FC3 Relay connector connected.
- FC4 Relay connector connected.
- FC5 Relay connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the LFC (MODE) PID.
- Access the PCM and control the (MODE) PID.

- Access the PCM and control the HFC (MODE) PID.
- Command the PIDs ON.
- Measure the voltage between:

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

- Measure the voltage between:

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

- For EcoSport,
- Record the voltage.
- Command the LFC PID OFF.
- Record the voltage.

Are the voltages greater than 10.5 V?

Yes	GO to KF22.
No	GO to KF36.

KF22 CHECK FOR CORRECT FAN OPERATION

Note: *Not all vehicles will have cooling fan motor 2, charge air cooler cooling fan motor 2, HFC PID, or the MFC PID .*

- For EcoSport 1.0L and Ford GT charge air cooler cooling fan,
- Ignition OFF.
- Charge Air Cooler Cooling Fan Motor connector connected.
- Charge Air Cooler Cooling Fan 2 Motor connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the CACC_FAN (PER) PID.
- Command the PID ON.
- For all others,
- Ignition OFF.
- Cooling Fan Motor 1 connector connected.
- Cooling Fan Motor 2 connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the LFC (MODE) PID.
- Access the PCM and control the (MODE) PID.
- Access the PCM and control the HFC (MODE) PID.
- Command the PIDs ON.
- For EcoSport,
- Check for fan operation.
- Command the LFC PID OFF.
- Check for fan operation.

Do the fans operate when commanded ON?

Yes	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
No	INSTALL a new Cooling Fan motor in question.

	Clear the PCM DTCs. REPEAT the self-test.

KF23 CHECK DIAGNOSTIC TROUBLE CODES (DTCS)
Are DTCs P028D, P028E, P0480 or P0481 present?

Yes	For DTC P0481, GO to KF28. For all others, GO to KF25.
No	For symptoms without DTCs, GO to KF24. For all others, RETURN to Section 3, Symptom Charts for further direction.

KF24 A/C STATUS

Note: *Verify the A/C system pressures are correct. Refer to the Workshop Manual Section 412-00, Climate Control System, General Procedure, Refrigerant System Tests for additional information.*

- 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	GO to KF31.

KF25 CHECK THE CACCF AND THE LFC CIRCUITS FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- BJB-A connector disconnected.
- BJB-B connector disconnected.
- BJB-C connector disconnected.
- For Transit Connect with DTCs P028D or P028E,
- Measure the resistance between:

(+) BJB-A Connector, Harness Side	(-) PCM Connector, Harness Side
CACCF	CACCF

- For all others with DTCs P028D or P028E,
- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-) PCM Connector, Harness Side
CACCF	CACCF

- For KA,
- Measure the resistance between:

(+) BJB-A Connector, Harness Side	(-) PCM Connector, Harness Side
LFC	LFC

- For all others,

- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-) PCM Connector, Harness Side
LFC	LFC

Is the resistance less than 5 ohms?

Yes	GO to KF26.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF26 CHECK THE CACCF AND THE LFC CIRCUIT FOR A SHORT TO GROUND

- For Transit Connect with DTCs P028D or P028E,
- Measure the resistance between:

(+) BJB-A Connector, Harness Side	(-)
CACCF	Ground

- For all others with DTCs P028D or P028E,
- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-)
CACCF	Ground

- For KA,
- Measure the resistance between:

(+) BJB-A Connector, Harness Side	(-)
LFC	Ground

- For all others,
- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-)
LFC	Ground

Is the resistance greater than 10K ohms?

Yes	GO to KF27.
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KF27 CHECK THE CACCF AND THE LFC CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.

- For Transit Connect with DTCs P028D or P028E,
- Measure the voltage between:

(+) BJB-A Connector, Harness Side	(-)
CACCF	Ground

- For all others with DTCs P028D or P028E,
- Measure the voltage between:

(+) BJB-C Connector, Harness Side	(-)
CACCF	Ground

- For KA,
- Measure the voltage between:

(+) BJB-A Connector, Harness Side	(-)
LFC	Ground

- For all others,
- Measure the voltage between:

(+) BJB-C Connector, Harness Side	(-)
LFC	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF36.

KF28 CHECK THE HFC FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- BJB-A connector disconnected.
- BJB-C connector disconnected.
- For KA,
- Measure the resistance between:

(+) BJB-A Connector, Harness Side	(-) PCM Connector, Harness Side
HFC	HFC

- For all others,
- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-) PCM Connector, Harness Side
HFC	HFC

Are the resistances less than 5 ohms?

Yes	GO to KF29.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF29 CHECK THE HFC FOR A SHORT TO GROUND

- For KA,
- Measure the resistance between:

(+) BJB-A Connector, Harness Side	(-)
HFC	Ground

- For all others,
- Measure the resistance between:

(+) BJB-C Connector, Harness Side	(-)
HFC	Ground

Are the resistances greater than 10K ohms?

Yes	GO to KF30.
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KF30 CHECK THE HFC FOR A SHORT TO VOLTAGE

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

(+) PCM Connector, Harness Side	(-)
HFC	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF36.

KF31 CHECK THE FAN PWR FOR AN OPEN

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

- Ignition OFF.
- BJB-A connector disconnected.

- BJB-B connector disconnected.
- BJB-D connector disconnected.
- For charge air cooler cooling fan,
- Measure the resistance between:

(+) BJB-D Connector, Harness Side	(-) Charge Air Cooler Cooling Fan Motor Connector, Harness Side
FANPWR - Pin 47	FANPWR

- For KA,
- Measure the resistance between:

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

- For FC1 relay,
- Measure the resistance between:

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

- For all others,
- Measure the resistance between:

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

Are the resistances less than 5 ohms?

Yes	GO to KF32.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF32 CHECK THE FAN PWR FOR A SHORT TO VOLTAGE

Note: *For vehicles with a single cooling fan, disregard the cooling fan motor 2 measurement in this step.*

- Ignition ON, engine OFF.
- For charge air cooler cooling fan,
- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
FANPWR	Ground

- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan 2 Motor Connector, Harness Side	(-)
FANPWR - Pin 1	Ground

- For all others,
- 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 - Pin 1	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF33.

KF33 CHECK THE GROUND CIRCUITS

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

- Ignition OFF.
- For charge air cooler cooling fan,
- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
GND	Ground

- Measure the resistance between:

(+) Charge Air Cooler Cooling Fan 2 Motor Connector, Harness Side	(-)
GND - Pin 2	Ground

- For KA,
- Measure the resistance between:

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

- For all others,
- Measure the resistance between:

(+) BJB-B Connector, Harness Side	(-)
GND	Ground

Are the resistances less than 5 ohms?

Yes	GO to KF34.
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KF34 COMMAND THE FAN ON AND CHECK FOR VOLTAGE TO THE COOLING FAN MOTORS

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

Note: *Not all vehicles will have cooling fan motor 2, charge air cooler cooling fan motor 2, HFC PID, or the MFC PID .*

- Ignition OFF.
- PCM connector connected.
- For charge air cooler cooling fan,
- Charge Air Cooler Cooling Fan Relay connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the CACC_FAN (PER) PID.
- Command the PID ON.
- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	(-)
FANPWR	Ground

- Measure the voltage between:

(+) Charge Air Cooler Cooling Fan 2 Motor Connector, Harness Side	(-)
FANPWR - Pin 1	Ground

- For all others,
- BJB-A connector connected.
- BJB-B connector connected.
- BJB-C connector connected.
- BJB-D connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the LFC (MODE) PID.
- Access the PCM and control the HFC (MODE) PID.
- Command the PIDs ON.
- 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 - Pin 1	Ground

Are the voltages greater than 10.5 V?

Yes	GO to KF35.
No	GO to KF36.

KF35 CHECK FOR CORRECT COOLING FAN OPERATION

Note: *Not all vehicles will have cooling fan motor 2, charge air cooler cooling fan motor 2, HFC PID, or the MFC PID .*

- For charge air cooler cooling fan,
- Ignition OFF.
- Charge Air Cooler Cooling Fan Motor connector connected.
- Charge Air Cooler Cooling Fan 2 Motor connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the CACC_FAN (PER) PID.
- Command the PID ON.
- For all others,
- Ignition OFF.
- Cooling Fan Motor 1 connector connected.
- Cooling Fan Motor 2 connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the LFC (MODE) PID.
- Access the PCM and control the HFC (MODE) PID.
- Command the PIDs ON.

Do the fans operate when commanded ON?

Yes	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
No	INSTALL a new Cooling Fan motor in question. Clear the PCM DTCs. REPEAT the self-test.

KF36 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.