

KF: Fan Control Relays

This pinpoint test is intended to diagnose the following:

- Low Fan Control (LFC), High Fan Control (HFC), and Fan Control (FC) relays
- harness circuits: LFC, HFC and VPWR
- PCM (12A650)

Two Speed Fan Operation

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

Refer to Section 1, [Engine Control Components](#).

Cooling Fan Motor 1 Connector



N0073223

Vehicle	Connector	Pin	Circuit
Fiesta	A	1 2	GND FANPWR
Mustang	A	2 1	GND FANPWR
All other vehicles	A	2 1	FC FANPWR

Cooling Fan Motor 2 Connector

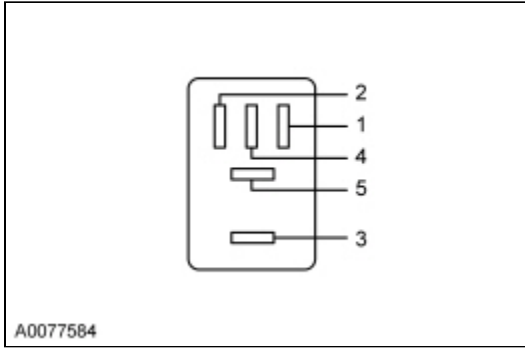


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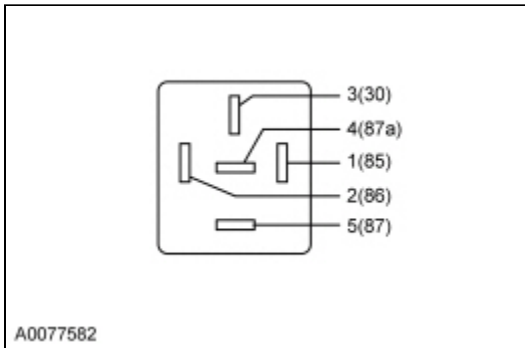
Pin	Circuit
2	GND (Ground)
1	FANPWR (Fan Power)

Low Fan Control (LFC) Relay Connector

A



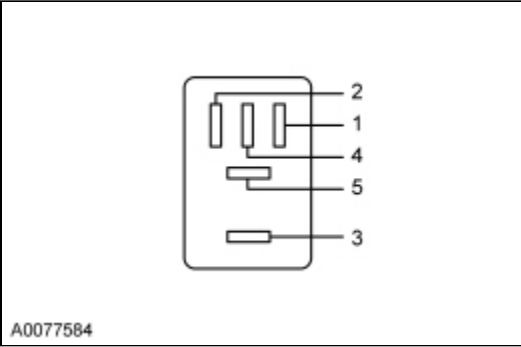
B



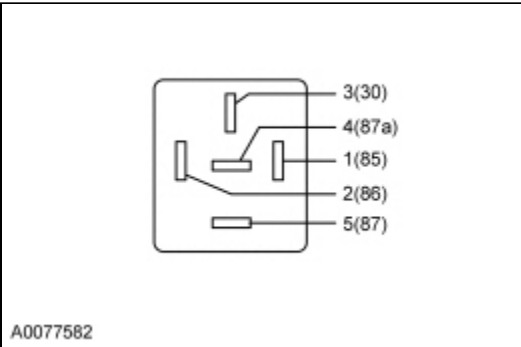
Vehicle	Connector	Pin	Circuit
Explorer, MKS, Taurus	A	5 1 3 2	FANPWR LFC B+ VPWR
Mustang	B	5 1 3 2	FANPWR LFC B+ VPWR
All other vehicles	A	5 2 3 1	FANPWR LFC B+ VPWR

High Fan Control (HFC) Relay Connector

A



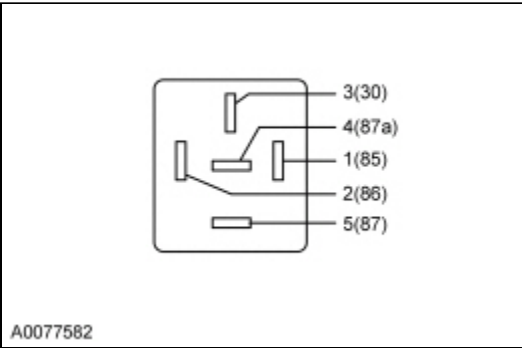
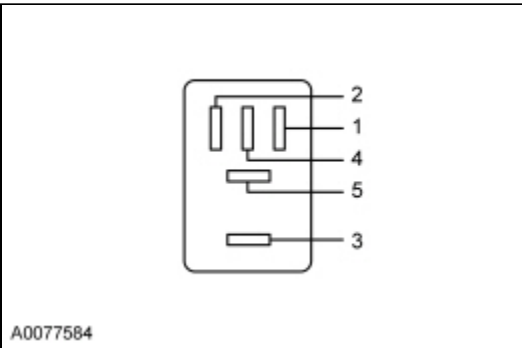
B



Vehicle	Connector	Pin	Circuit
Expedition, Fusion, MKZ, Navigator	A	3 2 5 1	FANPWR HFC B+ VPWR
Explorer, MKS, Mustang, Taurus	B	5 1 3 2	FANPWR HFC B+ VPWR
F-150	A	5 2 3 1	FANPWR HFC B+ VPWR
Fiesta, Flex, MKT	B	5 2 3 1	FANPWR HFC B+ VPWR

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

Fan Control (FC) Relay Connector

A**B**

Vehicle	Connector	Pin	Circuit
Expedition, F-150, Flex, MKT, Navigator	A	5 3 4 2	GND FC FANPWR HFC
All other vehicles	B	5 3 4 1	GND FC FANPWR HFC

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

Powertrain Control Module (PCM) Connector

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

Vehicle	Connector	Pin	Circuit
Explorer 2.0L	154 PIN	B96 B24	HFC LFC
Explorer GTDI 3.5L, F-150 3.5L, Flex GTDI 3.5L,	198 PIN	B4 B23	HFC LFC

Vehicle	Connector	Pin	Circuit
Fusion 1.5L, Fusion 1.6L, Fusion 2.0L, MKS 3.5L, MKT 2.0L, MKT 3.5L, MKZ 2.0L, Taurus 2.0L, Taurus GTDI 3.5L			
Fiesta 1.6L	128 PIN	B13	HFC
Fiesta 1.0L	198 PIN	B3 B42	HFC LFC
All other vehicles	190-PIN	B18 B34	HFC LFC

KF1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Are DTCs P0480 or P0481 present?

Yes	For DTC P0480, GO to KF3 . For all others, GO to KF8 .
No	For symptoms without DTCs, GO to KF2 . For all others, RETURN to Section 3, Symptom Charts for further direction.

KF2 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	GO to KF3 .

KF3 CHECK THE VOLTAGE TO THE LFC RELAY

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

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

Are the voltages greater than 10.5 V?

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

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

Is a concern present?

Yes	INSTALL a new LFC relay. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF5 .

KF5 CHECK THE LFC CIRCUIT FOR AN OPEN

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

(+) LFC 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 LFC CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:

(+) LFC 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 LFC CIRCUIT FOR A SHORT TO VOLTAGE

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

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

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
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No	For Fiesta 1.6L TIVCT, GO to KF13 . For DTC P0480, GO to KF18 . For all others, GO to KF8 .
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KF8 CHECK THE VOLTAGE TO THE FC AND HFC RELAYS

- Ignition OFF.
- HFC Relay connector disconnected.
- Ignition ON, engine OFF.
- For Fiesta 1.0L and Mustang,
- Measure the voltage between:

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

- For all others,
- FC Relay connector disconnected.
- Measure the voltage between:

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

- Measure the voltage between:

(+) HFC 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 FC AND HFC RELAYS

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

Is a concern present?

Yes	INSTALL a new FC or HFC relay in question. Clear the PCM DTCs. REPEAT the self-test.
No	GO to KF10 .

KF10 CHECK THE HFC CIRCUIT FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- For Fiesta 1.0L and Mustang,

- Measure the resistance between:

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

- For all others,
- Measure the resistance between:

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

- Measure the resistance between:

(+) HFC 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 Fiesta 1.0L and Mustang,
- Measure the resistance between:

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

- For all others,
- Measure the resistance between:

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

- Measure the resistance between:

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

Are the resistances greater than 10K ohms?

Yes	GO to KF12 .
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No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
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KF12 CHECK THE HFC CIRCUIT FOR A SHORT TO VOLTAGE

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

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

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	For DTC P0481, GO to KF18 . For all others, GO to KF13 .

KF13 CHECK THE FAN PWR CIRCUIT FOR AN OPEN

- Ignition OFF.
- For Fiesta 1.0L and Mustang,
- Measure the resistance between:

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

- Measure the resistance between:

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

- For Fiesta 1.6L TIVCT,
- Measure the resistance between:

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

- For all others,
- Measure the resistance between:

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

- Measure the resistance between:

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

- Measure the resistance between:

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

- Measure the resistance between:

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

Are the resistances less than 5 ohms?

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

KF14 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.
- 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 KF15 .

KF15 CHECK GROUND CIRCUITS

- Ignition OFF.
- For Fiesta and Mustang,
- Measure the resistance between:

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

- For all others,
- Measure the resistance between:

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

- Measure the resistance between:

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

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

Note: *Not all vehicles will have cooling fan motor 2 or the HFC PID.*

- Ignition OFF.
- PCM connector connected.
- LFC Relay connector connected.
- FC Relay connector connected.
- HFC Relay 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

- For Fiesta and Mustang,
- Record the voltage.
- Command the LFC PID OFF.
- Record the voltage.

Are the voltages greater than 10.5 V?

Yes	GO to KF17 .
No	GO to KF18 .

KF17 CHECK FOR CORRECT FAN OPERATION

Note: *Not all vehicles will have cooling fan motor 2 or the HFC PID.*

- 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.
- For Fiesta and Mustang,
- 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.

KF18 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.

