

## KF: Fan Control Relays

← [KF: Introduction](#)

### KF1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

**Note:** For Edge and MKX 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	No
For DTC P028D, P028E, or P0480, GO to <a href="#">KF3</a> .	For symptoms without DTCs, GO to <a href="#">KF2</a> .
For DTC P0481, GO to <a href="#">KF8</a> .	For all others, RETURN to <a href="#">Section 3</a> , Symptom Charts for further direction.
For all others, GO to <a href="#">KF13</a> .	

### 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	No
REFER to the Workshop Manual Section 412-00, Climate Control System, to diagnose the A/C system.	GO to <a href="#">KF3</a> .

### 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 - Pin 1	Ground
B+ - Pin 3	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	No
GO to <a href="#">KF4</a> .	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	No
INSTALL a new relay in question. Clear the PCM DTCs. REPEAT the self-test.	GO to <a href="#">KF5</a> .

## 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 - Pin 2	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	No
GO to <a href="#">KF6</a> .	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 - Pin 2	Ground

- For all others,
- Measure the resistance between:

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

Is the resistance greater than 10K ohms?

Yes	No
GO to <a href="#">KF7</a> .	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 - Pin 2	Ground

- For all others,
- Measure the voltage between:

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

Is any voltage present?

Yes	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	For Ecosport, Focus 1.0L, Fiesta 1.6L TIVCT and KA, GO to <a href="#">KF18</a> .  For DTCs P028D, P028E, or P0480, GO to <a href="#">KF23</a> .  For all others, GO to <a href="#">KF8</a> .

## KF8 CHECK THE VOLTAGE TO THE RELAYS

- Ignition OFF.
- FC3 Relay connector disconnected.
- Ignition ON, engine OFF.
- For Fiesta 1.0L,
- Measure the voltage between:

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

- For Focus 2.3L and MKC with 5 fan relays,
- FC3 Relay connector disconnected.
- FC5 Relay connector disconnected.
- Measure the voltage between:

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

- Measure the voltage between:

( + ) FC5 Relay Connector, Harness Side	( - )
VPWR - Pin 1,5	Ground
B+ - Pin 3	Ground

- For all others,
- FC2 Relay connector disconnected.
- Measure the voltage between:

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

- Measure the voltage between:

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

### Are the voltages greater than 10.5 V?

Yes	No
GO to <a href="#">KF9</a> .	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	No
INSTALL a new relay in question.  Clear the PCM DTCs. REPEAT the self-test.	GO to <a href="#">KF10</a> .

## KF10 CHECK THE HFC CIRCUIT FOR AN OPEN

- Ignition OFF.
- PCM connector disconnected.
- For Fiesta 1.0L,
- Measure the resistance between:

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

- For Focus 2.3L and MKC with 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	No
GO to <a href="#">KF11</a> .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

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## KF11 CHECK THE HFC CIRCUIT FOR A SHORT TO GROUND

- For Fiesta 1.0L,
- Measure the resistance between:

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

- For Focus 2.3L and MKC with 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	No
GO to <a href="#">KF12</a> .	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	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	For DTC P0481, GO to <a href="#">KF23</a> . For all others, GO to <a href="#">KF13</a> .

## KF13 CHECK THE VOLTAGE TO THE FC2 AND FC4 RELAYS

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

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

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

( + ) FC4 Relay Connector, Harness Side	( - )
VPWR - Pin 1,3	Ground

Are the voltages greater than 10.5 V?

Yes	No
GO to <a href="#">KF14</a> .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

## KF14 CHECK THE FC2 AND FC4 RELAYS

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

Is a concern present?

Yes	No
INSTALL a new FC2 or FC4 relay in question. Clear the PCM DTCs. REPEAT the self-test.	GO to <a href="#">KF15</a> .

## KF15 CHECK THE MFC CIRCUIT FOR AN OPEN

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

( + ) FC2 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	No
GO to <a href="#">KF16</a> .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

## KF16 CHECK THE MFC CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:

( + ) FC2 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	No
GO to <a href="#">KF17</a> .	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
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#### Is any voltage present?

Yes	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	For DTC P0482, GO to <a href="#">KF23</a> .  For all others, GO to <a href="#">KF18</a> .

### 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 and Fiesta 1.0L,
- 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 Focus 1.0L,
- Measure the resistance between:

( + ) Charge Air Cooler Cooling Fan Relay Connector, Harness Side	( - ) Charge Air Cooler Cooling Fan Motor Connector, Harness Side
FANPWR - Pin 5	FANPWR - Pin 1

- 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
FC	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
FC	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
FANPWR - Pin 5	FANPWR - Pin 1

**Are the resistances less than 5 ohms?**

Yes	No
GO to <a href="#">KF19</a> .	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 Focus 1.0L,

- Measure the voltage between:

( + ) Charge Air Cooler Cooling Fan 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	No
REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.	GO to <a href="#">KF20</a> .

## KF20 CHECK GROUND CIRCUITS

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

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

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

- For Focus 1.0L,
- Measure the resistance between:

( + ) Charge Air Cooler Cooling Fan Motor Connector, Harness Side	( - )
GND - Pin 2	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	No
GO to <a href="#">KF21</a> .	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, MFC PID, or the HFC PID.

- Ignition OFF.
- PCM connector connected.
- Charge Air Cooler Cooling Fan Relay connector connected.
- 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 CACC\_FAN (PER) PID.
- Access the PCM and control the LFC (MODE) PID.
- Access the PCM and control the MFC (MODE) PID.
- Access the PCM and control the HFC (MODE) PID.
- Command the PIDs ON.
- Measure the voltage between:

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

- Measure the voltage between:

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

- Measure the voltage between:

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

Ground

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

**Are the voltages greater than 10.5 V?**

Yes	No
GO to <a href="#">KF22</a> .	GO to <a href="#">KF23</a> .

## KF22 CHECK FOR CORRECT FAN OPERATION

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

- Ignition OFF.
- Charge Air Cooler Cooling Fan Motor connector connected.
- Cooling Fan Motor 1 connector connected.
- Cooling Fan Motor 2 connector connected.
- Ignition ON, engine OFF.
- Access the PCM and control the CACC\_FAN (PER) PID.
- Access the PCM and control the LFC (MODE) PID.
- Access the PCM and control the MFC (MODE) PID.
- Access the PCM and control the HFC (MODE) PID.
- Command the PIDs ON.
- For Ecosport, Fiesta and KA,
- Check for fan operation.
- Command the LFC PID OFF.
- Check for fan operation.

**Do the fans operate when commanded ON?**

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

## KF23 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	No
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.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.