Computers and Control Systems: Pinpoint Tests
Test KF: Fan Control (FC) Relays
PINPOINT TEST KF: FAN CONTROL (FC) RELAYS

Fan Control (FC) Relays	KF

This pinpoint test is intended to diagnose the following:

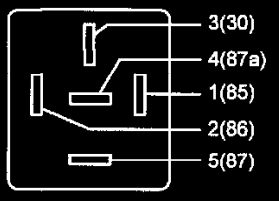
- LFC, MFC, HFC relays
- harness circuits: HFC, LFC, MFC, VPWR
- powertrain control module (PCM) (12A650)

Three Speed Fan Operation

Although the PCM output circuits are called low, medium and high fan control (FC), cooling fan operation is controlled by a combination of these outputs.

Refer to Description and Operation, Engine Control Components.

Low Fan Control (LFC) Relay Connector



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Pin	Circuit
2	LFC (Low Fan Control)
1	VPWR (Vehicle Power)

NOTE: The VPWR and LFC circuits may be reversed in the harness connector. Also, the LFC circuit may be wired to 2 separate relays. Refer to Vehicle/Diagrams for additional information.

Description, Three Speed Fan Operation And Low Fan Control (LFC) Relay Connector

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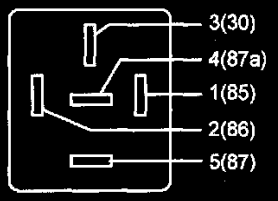
Medium Fan Control (MFC) Relay Connector



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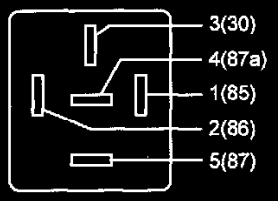
Pin	Circuit
2	MFC (Medium Fan Control)
1	VPWR (Vehicle Power)

NOTE: The VPWR and MFC circuits may be reversed in the harness connector. Also, the MFC circuit may be wired to 2 separate relays. Refer to Vehicle/Diagrams for additional information.

High Fan Control (HFC) Relay Connector



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Medium Fan Control (MFC) Relay Connector And High Fan Control (HFC) Relay Connector

Fan Control (FC) Relays — KF

Pin	Circuit
2	HFC (High Fan Control)
1	VPWR (Vehicle Power)

NOTE: The VPWR and HFC circuits may be reversed in the harness connector. Also, the HFC circuit may be wired to 2 separate relays. Refer to Vehicle/Diagrams for additional information.

Powertrain Control Module (PCM) Connector

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

Vehicle	Pin	Circuit
Escape/Mariner 2.3L	B38 B17 B39	HFC MFC LFC
Focus	B18 B34	HFC LFC
Mustang	E4 E7	HFC LFC
Ranger	E7	LFC
All other vehicles	B38 B39	HFC LFC

Test Step	Results / Action to Take
KF1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)	
• **Are DTCs P0480, P0481, P0482, P1474, P1477 or P1479 present?**	**Yes** For KOEO and KOER DTCs P0480 or P1474, GO to **KF3**. For continuous memory DTCs P0480 or P1474, GO to **KF36**. For DTCs P0481, P0482, P1477 or P1479, GO to **KF2**. **No** For fans always on: components, GO to **KF47**. For fans always on: all others, GO to **KF46**. For cooling fan circuits, GO to **KF47**. For all others, GO to DTC Index, Diagnostic Trouble Code (DTC) Charts and Descriptions.

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Test Step		Results / Action to Take
KF2	**DTCS P0481, P0482, P1477 OR P1479: CHECK FOR THE PRESENCE OF THESE DTCS**	
	• **Are DTCs P0481, P0482, P1477, or P1479 present? P0481 or P1479.**	**Yes** For KOEO and KOER DTCs P0481 or P1479, Escape 3.0L, Mariner 3.0L. GO to **KF27**. For continuous memory DTCs P0481 or P1479, Escape 3.0L, Mariner 3.0L. GO to **KF44**. For KOEO and KOER DTCs P0481 or P1479, all others, GO to **KF13**. For continuous memory DTCs P0481 or P1479, all others, GO to **KF38**. **No** For KOEO and KOER DTCs P0482 or P1477, Focus, GO to **KF18**. For continuous memory DTCs P0482 or P1477, Focus, GO to **KF42**. For KOEO and KOER DTCs P0482 or P1477, all others, GO to **KF8**. For continuous memory DTCs P0482 or P1477, all others, GO to **KF40**.
KF3	**KOEO AND KOER DTCS P0480 OR P1474: CHECK THE VPWR VOLTAGE TO THE LOW SPEED FC RELAY**	
	• LFC Relay connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) LFC Relay Connector, Harness Side: VPWR - Pin 1 (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF4**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

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Test Step	Results / Action to Take
KF4 CHECK FOR LFC CIRCUIT CYCLING • Key ON, engine OFF. • Connect a non-powered test lamp between: (+) LFC Relay Connector, Harness Side: VPWR - Pin 1 (-) LFC Relay Connector, Harness Side: LFC - Pin 2 • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Command the high speed fan ON. • Command the outputs OFF. • **Does the test lamp illuminate on and off when either the low or high speed cooling fan output is commanded on and off?**	**Yes** INSTALL a new LFC relay. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF5**.
KF5 CHECK THE LFC CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS • Remove the test lamp. • PCM connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) LFC Relay Connector, Harness Side: LFC - Pin 2 (-): Ground • **Is the voltage less than 1 V?**	**Yes** GO to **KF6**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
KF6 CHECK THE LFC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS • Measure the resistance between: (+) LFC Relay Connector, Harness Side: LFC - Pin 2 (-): Ground • **Is the resistance greater than 10K ohms?**	**Yes** GO to **KF7**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
KF7 CHECK THE LFC CIRCUIT FOR AN OPEN IN THE HARNESS • Measure the resistance between: (+) LFC Relay Connector, Harness Side: LFC - Pin 2 (-) PCM Connector, Harness Side: LFC • **Is the resistance less than 5 ohms?**	**Yes** GO to **KF59**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

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Test Step	Results / Action to Take
KF8 **KOEO AND KOER DTCS P0482 OR P1477: CHECK THE VPWR VOLTAGE TO THE MEDIUM SPEED FC RELAY** • MFC Relay connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) MFC Relay Connector, Harness Side: VPWR - Pin 1; (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF9**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF9 **CHECK FOR MFC CIRCUIT CYCLING** • Key ON, engine OFF. • Connect a non-powered test lamp between: (+) MFC Relay Connector, Harness Side: VPWR - Pin 1; (-) MFC Relay Connector, Harness Side: MFC - Pin 2 • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Command the high speed fan ON. • Command the outputs OFF. • **Does the test lamp illuminate on and off when either the low or high speed cooling fan output is commanded on and off?**	**Yes** INSTALL a new MFC relay. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF10**.
KF10 **CHECK THE MFC CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS** • Remove the test lamp. • PCM connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) MFC Relay Connector, Harness Side: MFC - Pin 2; (-): Ground • **Is the voltage less than 1 V?**	**Yes** GO to **KF11**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
KF11 **CHECK THE MFC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS** • Key in OFF position. • Measure the resistance between: (+) MFC Relay Connector, Harness Side: MFC - Pin 2; (-): Ground • **Is the resistance greater than 10K ohms?**	**Yes** GO to **KF12**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

Fan Control (FC) Relays — KF

Test Step		Results / Action to Take
KF12	**CHECK THE MFC CIRCUIT FOR AN OPEN IN THE HARNESS**	
	• Measure the resistance between: (+) MFC Relay Connector, Harness Side: MFC - Pin 2 (-) PCM Connector, Harness Side: MFC • **Is the resistance less than 5 ohms?**	**Yes** GO to **KF59**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF13	**KOEO AND KOER DTCS P0481 OR P1479: CHECK THE VPWR VOLTAGE TO THE HIGH SPEED FC RELAY**	
	• HFC Relay connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) HFC Relay Connector, Harness Side: VPWR - Pin 1 (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF14**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF14	**CHECK FOR HFC CIRCUIT CYCLING**	
	• Key ON, engine OFF. • Connect a non-powered test lamp between: (+) HFC Relay Connector, Harness Side: VPWR - Pin 1 (-) HFC Relay Connector, Harness Side: HFC - Pin 2 • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Command the high speed fan ON. • Command the outputs OFF. • **Does the test lamp illuminate on and off when either the low or high speed cooling fan output is commanded on and off?**	**Yes** INSTALL a new HFC relay. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF15**.
KF15	**CHECK THE HFC CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS**	
	• Remove the test lamp. • PCM connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) HFC Relay Connector, Harness Side: HFC - Pin 2 (-): Ground • **Is the voltage less than 1 V?**	**Yes** GO to **KF16**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

Fan Control (FC) Relays — KF

Test Step	Results / Action to Take
KF16 CHECK THE HFC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS • Key in OFF position. • Measure the resistance between: (+) HFC Relay Connector, Harness Side: HFC - Pin 2 (-): Ground • **Is the resistance greater than 10K ohms?**	**Yes** GO to **KF17**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
KF17 CHECK THE HFC CIRCUIT FOR AN OPEN IN THE HARNESS • Measure the resistance between: (+) HFC Relay Connector, Harness Side: HFC - Pin 2 (-) PCM Connector, Harness Side: HFC • **Is the resistance less than 5 ohms?**	**Yes** GO to **KF69**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF18 KOEO AND KOER DTCS P0482 OR P1477: CHECK THE VPWR VOLTAGE TO THE MFC1 RELAY **Note:** This application has 2 relays wired to the MFC circuit. This procedure may call out MFC1 and MFC2 relays. Either of the relays may be used as the number 1, with the other relay being number 2. • MFC1 Relay connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) MFC1 Relay Connector, Harness Side: VPWR (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF19**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF19 CHECK FOR MFC CIRCUIT CYCLING • Connect a non-powered test lamp between: (+) MFC1 Relay Connector, Harness Side: VPWR (-) MFC1 Relay Connector, Harness Side: MFC • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Command the high speed fan ON. • Command the outputs OFF. • **Does the test lamp illuminate on and off when either the low or high speed cooling fan output is commanded on and off?**	**Yes** INSTALL a new MFC1 relay at the end of diagnostics. Leave the relay disconnected. CLEAR the DTCs. REPEAT the self-test. GO to **KF24**. **No** Leave the test lamp connected. GO to **KF20**.

Fan Control (FC) Relays — KF

Test Step	Results / Action to Take
KF20 CHECK FOR MFC CIRCUIT CYCLING WITH THE MFC2 RLY DISCONNECTED • Connect a non-powered test lamp between: (+) MFC1 Relay Connector, Harness Side: VPWR (-) MFC1 Relay Connector, Harness Side: MFC • MFC2 Relay connector disconnected. • Command the low speed fan ON. • Command the high speed fan ON. • Command the outputs OFF. • **Does the test lamp illuminate on and off when either the low or high speed cooling fan output is commanded on and off?**	**Yes** INSTALL a new MFC2 relay. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF21**.
KF21 CHECK THE MFC CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS • PCM connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) MFC1 Relay Connector, Harness Side: MFC (-): Ground • **Is the voltage less than 1 V?**	**Yes** GO to **KF22**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
KF22 CHECK THE MFC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS • Key in OFF position. • Measure the resistance between: (+) MFC1 Relay Connector, Harness Side: MFC (-): Ground • **Is the resistance greater than 10K ohms?**	**Yes** GO to **KF23**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
KF23 CHECK THE MFC CIRCUIT FOR AN OPEN IN THE HARNESS • Measure the resistance between: (+) MFC1 Relay Connector, Harness Side: MFC (-) PCM Connector, Harness Side: MFC • **Is the resistance less than 5 ohms?**	**Yes** GO to **KF59**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

Fan Control (FC) Relays — KF

Test Step	Results / Action to Take
KF24 VERIFY THERE IS NOT AN OPEN IN THE CIRCUIT SPECIFIC TO THE MFC2 RELAY • Access the PCM and monitor the MFC_F PID. • Command the high speed fan ON. • Command the outputs OFF. • Command the low speed fan ON. • Command the outputs OFF. • **Does the PID indicate a concern (yes) when either the high or low speed cooling fan output is commanded on and off?**	**Yes** GO to **KF25.** **No** INSTALL a new MFC relay. CLEAR the DTCs. REPEAT the self-test.
KF25 CHECK THE VPWR VOLTAGE TO THE MFC2 RELAY • MFC2 Relay connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) MFC2 Relay Connector, Harness Side: VPWR (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF26.** **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF26 CHECK THE MFC CIRCUIT BETWEEN THE MEDIUM SPEED FC RELAY(S) • Key in OFF position. • Measure the resistance between: (+) MFC1 Relay Connector, Harness Side: MFC (-) MFC2 Relay Connector, Harness Side: MFC • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new MFC relay(s). CLEAR the DTCs. REPEAT the self-test. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF27 KOEO AND KOER DTCS P0481 OR P1479: CHECK THE VPWR VOLTAGE TO THE HFC1 RELAY **Note:** This application has 2 relays wired to the HFC circuit. This procedure may call out HFC1 and HFC2 relays. Either of the relays may be used as the number 1, with the other relay being number 2. • HFC1 Relay connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) HFC1 Relay Connector, Harness Side: VPWR (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF28.** **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

Fan Control (FC) Relays — KF

Test Step	Results / Action to Take
KF28 CHECK FOR HFC CIRCUIT CYCLING • Connect a non-powered test lamp between: (+) HFC1 Relay Connector, Harness Side: VPWR (-) HFC1 Relay Connector, Harness Side: HFC • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Command the high speed fan ON. • Command the outputs OFF. • **Does the test lamp illuminate on and off when either the low or high speed cooling fan output is commanded on and off?**	**Yes** INSTALL a new HFC1 relay at the end of diagnostics. Leave the relay disconnected. CLEAR the DTCs. REPEAT the self-test. GO to **KF33**. **No** Leave the test lamp connected. GO to **KF29**.
KF29 CHECK FOR HFC CIRCUIT CYCLING WITH THE HFC2 RLY DISCONNECTED • Connect a non-powered test lamp between: (+) HFC1 Relay Connector, Harness Side: VPWR (-) HFC1 Relay Connector, Harness Side: HFC • HFC2 Relay connector disconnected. • Command the low speed fan ON. • Command the high speed fan ON. • Command the outputs OFF. • **Does the test lamp illuminate on and off when either the low or high speed cooling fan output is commanded on and off?**	**Yes** INSTALL a new HFC2 relay. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF30**.
KF30 CHECK THE HFC CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS • PCM connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) HFC1 Relay Connector, Harness Side: HFC (-): Ground • **Is the voltage less than 1 V?**	**Yes** GO to **KF31**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.
KF31 CHECK THE HFC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS • Key in OFF position. • Measure the resistance between: (+) HFC1 Relay Connector, Harness Side: HFC (-): Ground • **Is the resistance greater than 10K ohms?**	**Yes** GO to **KF32**. **No** REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

Fan Control (FC) Relays

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Test Step		Results / Action to Take
KF32	**CHECK THE HFC CIRCUIT FOR AN OPEN IN THE HARNESS**	
	• Measure the resistance between: (+) HFC1 Relay Connector, Harness Side: HFC (-) PCM Connector, Harness Side: HFC • **Is the resistance less than 5 ohms?**	**Yes** GO to **KF59**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF33	**VERIFY THERE IS NOT AN OPEN IN THE CIRCUIT SPECIFIC TO THE HFC2 RELAY**	
	• Access the PCM and monitor the HFC_F PID. • Command the high speed fan ON. • Command the outputs OFF. • Command the low speed fan ON. • Command the outputs OFF. • **Does the PID indicate a concern (yes) when either the high or low speed cooling fan output is commanded on and off?**	**Yes** GO to **KF34**. **No** INSTALL a new HFC1 relay. CLEAR the DTCs. REPEAT the self-test.
KF34	**CHECK THE VPWR VOLTAGE TO HFC2 RLY**	
	• HFC2 Relay connector disconnected. • Key ON, engine OFF. • Measure the voltage between: (+) HFC2 Relay Connector, Harness Side: VPWR (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF35**. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF35	**CHECK THE HFC CIRCUIT BETWEEN THE HIGH SPEED FC RELAY(S)**	
	• Key in OFF position. • Measure the resistance between: (+) HFC1 Relay Connector, Harness Side: HFC (-) HFC2 Relay Connector, Harness Side: HFC • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new HFC relay(s). CLEAR the DTCs. REPEAT the self-test. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

Fan Control (FC) Relays

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Test Step		Results / Action to Take
KF36	**CONTINUOUS MEMORY DTCS P0480 OR P1474: CHECK THE LFC CIRCUIT FOR AN INTERMITTENT OPEN OR SHORT TO VOLTAGE**	
	Note: If the test lamp does not turn on, command the high speed fan on. • A/C and defrost off. • Left Fan Motor connector disconnected. • Right Fan Motor connector disconnected. • LFC Relay connector disconnected. • Connect a non-powered test lamp between: (+) LFC Relay Connector, Harness Side: VPWR - Pin 1 (-) LFC Relay Connector, Harness Side: LFC - Pin 2 • Key ON, engine OFF. • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Observe the test lamp for an indication of a concern while carrying out the following. Note that the lamp turns off when a concern is detected. — Shake, wiggle, and bend the LFC circuit(s). — Shake, wiggle, and bend the VPWR circuit to the LFC relay. — Inspect the LFC relay component for signs of damage. • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF37**.
KF37	**CHECK THE LFC CIRCUIT FOR AN INTERMITTENT SHORT TO GROUND**	
	• Key ON, engine OFF. • Command the outputs OFF. • Observe the test lamp for an indication of a concern while carrying out the following. Note that the lamp turns on when a concern is detected. — Shake, wiggle, and bend the LFC circuit — Lightly tap on the LFC RLY to simulate road shock • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z.

Fan Control (FC) Relays

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Test Step		Results / Action to Take
KF38	**CONTINUOUS MEMORY DTCS P0481 OR P1479: CHECK THE HFC CIRCUIT FOR AN INTERMITTENT OPEN OR SHORT TO VOLTAGE**	
	Note: If the test lamp does not turn on, command the low speed fan ON. • A/C and defrost off. • Left Fan Motor connector disconnected. • Right Fan Motor connector disconnected. • HFC Relay connector disconnected. • Connect a non-powered test lamp between: (+) HFC Relay Connector, Harness Side: VPWR - Pin 1 (-) HFC Relay Connector, Harness Side: HFC - Pin 2 • Key ON, engine OFF. • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the high speed fan ON. • Observe the test lamp for an indication of a concern while carrying out the following. Note that the lamp turns off when a concern is detected. — Shake, wiggle, and bend the HFC circuit(s) — Shake, wiggle, and bend the VPWR circuit to the HFC relay — Lightly tap on the HFC RLY to simulate road shock • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF39**.
KF39	**CHECK THE HFC CIRCUIT FOR AN INTERMITTENT SHORT TO GROUND**	
	• Key ON, engine OFF. • Command the outputs OFF. • Observe the test lamp for an indication of a concern. Note that the lamp illuminates when a concern is detected. Wiggle, shake, and bend the HFC circuit(s). Shake, wiggle, and bend the PCM on both high speed FC relays. • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z.

Fan Control (FC) Relays

KF

Test Step		Results / Action to Take
KF40	**CONTINUOUS MEMORY DTCS P0482 OR P1477: CHECK THE MFC CIRCUIT FOR AN INTERMITTENT OPEN OR SHORT TO VOLTAGE**	
	Note: If the test lamp does not turn on, command the high speed fan on. • A/C and defrost off. • Left Fan Motor connector disconnected. • Right Fan Motor connector disconnected. • MFC Relay connector disconnected. • Connect a non-powered test lamp between: (+) MFC Relay Connector, Harness Side: VPWR - Pin 1 (-) MFC Relay Connector, Harness Side: MFC - Pin 2 • Key ON, engine OFF. • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Observe the test lamp for an indication of a concern while carrying out the following. Note that the lamp turns off when a concern is detected. — Shake, wiggle, and bend the MFC circuit(s). — Shake, wiggle, and bend the VPWR circuit to the MFC relay. — Inspect the MFC RLY component for signs of damage. • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF41.**
KF41	**CHECK THE MFC CIRCUIT FOR AN INTERMITTENT SHORT TO GROUND**	
	• Key ON, engine OFF. • Command the outputs OFF. • Observe the test lamp for an indication of a concern. Note that the lamp illuminates when a concern is detected. Wiggle, shake, and bend the HFC circuit(s). Shake, wiggle, and bend the PCM on both high speed FC relays. • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z.

Fan Control (FC) Relays

KF

Test Step		Results / Action to Take
KF42	**CONTINUOUS MEMORY DTCS P0482 OR P1477: CHECK THE MFC CIRCUIT FOR AN INTERMITTENT OPEN OR SHORT TO VOLTAGE**	
	Note: This application has 2 relays wired to the MFC circuit. This procedure may call out MFC1 and MFC2 relays. Either of the relays may be used as the number 1, with the other relay being number 2. **Note:** If the test lamp does not turn on, command the high speed fan ON. • AC and defroster OFF. • Left Fan Motor connector disconnected. • Right Fan Motor connector disconnected. • MFC1 Relay connector disconnected. • Connect a non-powered test lamp between: (+) MFC1 Relay Connector, Harness Side: VPWR (-) MFC1 Relay Connector, Harness Side: MFC • Key ON, engine OFF. • Enter output test mode. Refer to Diagnostic Methods Output Test Mode (OTM). • Command the low speed fan ON. • Observe the test lamp for an indication of a concern while carrying out the following. Note that the lamp turns off when a concern is detected. — Shake, wiggle, and bend the MFC circuit between the PCM and both medium speed FC relays — Shake, wiggle, and bend the VPWR circuit to both medium speed FC relays — Lightly tap on the medium speed FC relay that is still connected to simulate road shock • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF43**.
KF43	**CHECK THE MFC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS**	
	• Key ON, engine OFF. • Command the outputs OFF. • Exit output test mode. • Observe the test lamp for an indication of a concern. Note that the lamp illuminates when a concern is detected. Wiggle, shake, and bend the MFC circuit(s). • Inspect the medium speed FC relay that is disconnected for intermittent concerns. • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to Pinpoint Test Z.

Fan Control (FC) Relays

KF

Test Step		Results / Action to Take
KF44	**CONTINUOUS MEMORY DTCS P0481 OR P1479: CHECK THE HFC CIRCUIT FOR AN INTERMITTENT OPEN OR SHORT TO VOLTAGE**	
	Note: This application has 2 relays wired to the HFC circuit. This procedure may call out HFC1 and HFC2 relays. Either of the relays may be used as the number 1, with the other relay being number 2. **Note:** If the test lamp does not turn on, command the high speed fan ON. • A/C and defroster OFF. • Left Fan Motor connector disconnected. • Right Fan Motor connector disconnected. • HFC1 Relay connector disconnected. • Connect a non-powered test lamp between: (+) HFC1 Relay Connector, Harness Side: VPWR (-) HFC1 Relay Connector, Harness Side: HFC • Key ON, engine OFF. • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Observe the test lamp for an indication of a concern while carrying out the following. Note that the lamp turns off when a concern is detected. — Shake, wiggle, and bend the PCM and both high speed FC relays. — Shake, wiggle, and bend the VPWR circuit to both high speed FC relays — Lightly tap on the high speed FC relay that is still connected to simulate road shock • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to **KF45.**
KF45	**CHECK THE HFC CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS**	
	• Key ON, engine OFF. • Command the outputs OFF. • Exit output test mode. • Observe the test lamp for an indication of a concern. Note that the lamp illuminates when a concern is detected. Wiggle, shake, and bend the HFC circuit(s) between the PCM and on both high speed FC relays. • Inspect the high speed FC relay that is disconnected for intermittent concerns. • **Is a concern present?**	**Yes** ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. **No** GO to Pinpoint Test Z.

Fan Control (FC) Relays

KF

Test Step		Results / Action to Take
KF46	**THE COOLING FAN ALWAYS RUNS (NO DTCS): VERIFY THE FAN IS NOT ON BECAUSE OF A/C HIGH PRESSURE SWITCH INPUT TO THE PCM**	
	• Key ON, engine running. • Access the PCM and monitor the ACP PID. • **Is the PID state CLOSED?**	**Yes** The PCM turns the fan on when the medium pressure, normally open contacts of the ACHP switch are closed. GO to **KF57**. **No** The input is OK. GO to **KF47**.
KF47	**COOLING FAN CONCERN (NO DTCS): CHECK THE FAN CONTROL PRIMARY CIRCUITS**	
	Note: Chose the PIDs below as appropriate, according to which circuits the vehicle has. • Verify that the A/C is OFF. • Verify engine temperature is below the temperature where the cooling fan comes on. • Key ON, engine OFF. • Access the PCM and monitor the LFC_F, MFC_F and HFC_F PIDs. • **Does either PID indicate a concern?**	**Yes** A concern is present in the primary circuit(s). GO to **KF48**. **No** For all except Ranger, the PCM primary circuit(s) is OK. To check for secondary wiring, REFER to Cooling System, Engine Cooling, for cooling system diagnosis. For Ranger: GO to **KF50**.
KF48	**DOES THE LFCF PID INDICATE A CONCERN?**	
	• **Does the LFCF PID indicate a concern?**	**Yes** The low fan control (LFC) circuitry has a primary circuit concern. GO to **KF3**. **No** GO to **KF49**.

Fan Control (FC) Relays

KF

Test Step	Results / Action to Take
KF49 DOES THE MFCF PID INDICATE A CONCERN?	
• **Does the MFCF PID indicate a concern?**	**Yes** The medium fan control (MFC) primary circuitry has a circuit concern. For Focus, GO to **KF18**. For all others, GO to **KF8**. **No** The high fan control (HFC) primary circuitry has a circuit concern. For Escape 3.0L, and Mariner 3.0L, GO to **KF27**. For all others, GO to **KF13**.
KF50 IS THE SYMPTOM: COOLING FAN ALWAYS RUNS?	
• **Is the symptom: cooling fan always runs?**	**Yes** GO to **KF56**. **No** GO to **KF51**.
KF51 ELECTRIC COOLING FAN CONCERN (WITH NO DTCS): ELECTRIC COOLING FAN FUNCTIONAL CHECK	
• Key ON, engine OFF. • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • **Does the fan operate?**	**Yes** All cooling fan circuit checks are OK. RETURN to Symptom Charts to continue diagnosis. **No** GO to **KF52**.
KF52 FAN INOPERATIVE: COMMAND THE LOW SPEED FAN ON AND CHECK FOR VOLTAGE TO THE CF	
• Key in OFF position. • CF Motor connector disconnected. • Key ON, engine OFF. • Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). • Command the low speed fan ON. • Measure the voltage between: **(+) CF Motor Connector, Harness Side** / **(-)** FAN PWR / Ground • **Is the voltage greater than 10 V?**	**Yes** GO to **KF53**. **No** GO to **KF54**.

Fan Control (FC) Relays

KF

Test Step	Results / Action to Take
KF53 CHECK THE GROUND CIRCUIT TO THE COOLING FAN • Key in OFF position. • Measure the resistance between: (+) CF Motor Connector, Harness Side: GND (-): Ground • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new CF motor. CLEAR the DTCs. REPEAT the self-test. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF54 CHECK THE B+ VOLTAGE TO THE FC RELAY • FC Relay connector disconnected. • Measure the voltage between: (+) FC Relay Connector, Harness Side: B+ (-): Ground • **Is the voltage greater than 10 V?**	**Yes** GO to ***KF55***. **No** REPAIR the open circuit. There is a B+ circuit concern. CHECK the condition of the related fuse/fuse links. If OK, REPAIR the open circuit. If the fuse/fuse link is damaged, CHECK the circuit for a short to ground before replacing the fuse/fuse link. CLEAR the DTCs. REPEAT the self-test.
KF55 CHECK THE FAN PWR CIRCUIT FOR AN OPEN IN THE HARNESS • Measure the resistance between: (+) FC Relay Connector, Harness Side: FAN PWR (-) CF Motor Connector, Harness Side: FAN PWR • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new FC relay. CLEAR the DTCs. REPEAT the self-test. **No** REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
KF56 CHECK FOR FC RLY CONTACTS ALWAYS CLOSED **Note:** Verify the A/C and defrost are off. • FC Relay connector disconnected. • Key ON, engine OFF. • **Does the fan run with the key in the ON position?**	**Yes** REPAIR the short circuit to PWR. CLEAR the DTCs. REPEAT the self-test. **No** INSTALL a new FC relay. CLEAR the DTCs. REPEAT the self-test.

Fan Control (FC) Relays — KF

Test Step	Results / Action to Take
KF57 CHECK THE A/CHPSW (MEDIUM PRESSURE, NORMALLY OPEN CONTACTS) • A/CHPSW connector disconnected. • Key ON, engine OFF. • Access the PCM and monitor the ACP PID. • **Is the PID state CLOSED?**	**Yes** GO to **KF58**. **No** CONNECT the A/CHPSW. REFER to Heating and Air Conditioning, Climate Control System, to diagnose the A/C system pressure. If OK, INSTALL a new A/CHPSW. CLEAR the DTCs. REPEAT the self-test.
KF58 CHECK THE A/CPSW CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS • Key in OFF position. • PCM connector disconnected. • Measure the resistance between: (+) A/CHPSW Connector, Harness Side: A/CPSW (-): Ground • **Is the resistance greater than 10K ohms?**	**Yes** VERIFY the results of the previous test steps. RETURN to Symptom Charts to continue diagnosis. **No** REPAIR the short circuit to GND. CLEAR the DTCs. REPEAT the self-test.
KF59 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 and verify the concern is still present. • **Is the concern still present?**	**Yes** INSTALL a new PCM. REFER to Diagnostic Methods, 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.