

Computers and Control Systems: Pinpoint Tests
Test KN: Variable Speed Electric Cooling Fan
PINPOINT TEST KN: VARIABLE SPEED ELECTRIC COOLING FAN

Variable Speed Electric Cooling Fan

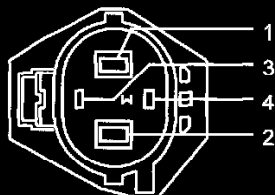
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⚠ WARNING: Crown Victoria Police Interceptor vehicles equipped with fire suppression system, refer to Fire Suppression System for Important Safety Warnings. Failure to follow these instructions may result in personal injury.

This pinpoint test is intended to diagnose the following:

- variable speed electric cooling fan (8T00)
- harness circuits: FCV, B+, GND
- powertrain control module (PCM) (12A650)

Cooling Fan (CF) Motor Connector



A0077538

Pin	Circuit
4	FCV (Fan Control Variable)
2	GND (Ground)
1	B+ (Battery Positive Voltage)

Powertrain Control Module (PCM) Connector

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

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Vehicle	Connector	Pin	Circuit
Crown Victoria, Grand Marquis, Town Car	170 Pin	E7	FCV
Fusion, Milan, MKZ	140 Pin	B8	FCV
All other vehicles	190 Pin	B48	FCV

Test Step		Results / Action to Take			
KN1	CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)	Yes For KOEO and KOER DTC P0480, GO to KN2 . For continuous memory DTC P0480, GO to KN8 . For continuous memory DTC P0483, GO to KN13 . No For electric cooling fan(s) does not operate (low, medium, high or variable speed), GO to KN10 .			
	<ul style="list-style-type: none"> Is DTC P0480 or P0483 present? 				
KN2	KOEO AND KOER DTC P0480: CHECK THE B+ AND GND CIRCUIT FOR AN OPEN IN THE HARNESS	Yes GO to KN4 . No GO to KN3 .			
	<ul style="list-style-type: none"> Key in OFF position. CF Motor connector disconnected. Rotate the fan by hand. The fan should rotate freely, with no abnormal binding. If binding is present, remove any foreign materials or install a new fan assembly as required. Measure the voltage between: <table border="1"> <thead> <tr> <th>(+) CF Motor Connector, Harness Side</th> <th>(-) CF Motor Connector, Harness Side</th> </tr> </thead> <tbody> <tr> <td>B+ - Pin 1</td> <td>GND - Pin 2</td> </tr> </tbody> </table> Is the voltage greater than 10 V? 		(+) CF Motor Connector, Harness Side	(-) CF Motor Connector, Harness Side	B+ - Pin 1
(+) CF Motor Connector, Harness Side	(-) CF Motor Connector, Harness Side				
B+ - Pin 1	GND - Pin 2				

KN1-KN2

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Test Step		Results / Action to Take				
KN3	CHECK THE VOLTAGE TO THE FAN MOTOR USING GROUND AS A REFERENCE					
	<ul style="list-style-type: none"> Measure the voltage between: <table border="1"> <tr> <td>(+) CF Motor Connector, Harness Side</td> <td>(-)</td> </tr> <tr> <td>B+ - Pin 1</td> <td>Ground</td> </tr> </table> <ul style="list-style-type: none"> Is the voltage greater than 10 V? 	(+) CF Motor Connector, Harness Side	(-)	B+ - Pin 1	Ground	<p>Yes REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.</p> <p>No A B+ circuit concern is present. 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 installing a new fuse/fuse link.</p>
(+) CF Motor Connector, Harness Side	(-)					
B+ - Pin 1	Ground					
KN4	CHECK THE FCV CIRCUIT(S)					
	<ul style="list-style-type: none"> Connect the 1.6K ohms resistor between the FCV and B+ circuits at the CF harness connector (this simulates cooling fan circuitry). Key ON, engine OFF. Check for KOEO DTCs. Is DTC P0480 present? 	<p>Yes GO to KN5.</p> <p>No INSTALL a new cooling fan motor.</p> <p>CLEAR the DTCs. REPEAT the self-test.</p>				
KN5	CHECK THE FCV CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS					
	<ul style="list-style-type: none"> Key in OFF position. PCM connector disconnected. Key ON, engine OFF. Measure the voltage between: <table border="1"> <tr> <td>(+) CF Motor Connector, Harness Side</td> <td>(-)</td> </tr> <tr> <td>FCV - Pin 4</td> <td>Ground</td> </tr> </table> <ul style="list-style-type: none"> Is the voltage less than 1 V? 	(+) CF Motor Connector, Harness Side	(-)	FCV - Pin 4	Ground	<p>Yes GO to KN6.</p> <p>No REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.</p>
(+) CF Motor Connector, Harness Side	(-)					
FCV - Pin 4	Ground					
KN6	CHECK THE FCV CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS					
	<ul style="list-style-type: none"> Key in OFF position. Measure the resistance between: <table border="1"> <tr> <td>(+) CF Motor Connector, Harness Side</td> <td>(-)</td> </tr> <tr> <td>FCV - Pin 4</td> <td>Ground</td> </tr> </table> <ul style="list-style-type: none"> Is the resistance greater than 10K ohms? 	(+) CF Motor Connector, Harness Side	(-)	FCV - Pin 4	Ground	<p>Yes GO to KN7.</p> <p>No REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.</p>
(+) CF Motor Connector, Harness Side	(-)					
FCV - Pin 4	Ground					

KN3-KN6

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Test Step		Results / Action to Take				
KN7	CHECK FOR AN OPEN CIRCUIT BETWEEN THE PCM AND FAN MOTOR <ul style="list-style-type: none"> Measure the resistance between: <table border="1"> <tr> <td>(+) PCM Connector, Harness Side</td> <td>(-) CF Motor Connector, Harness Side</td> </tr> <tr> <td>FCV</td> <td>FCV - Pin 4</td> </tr> </table> Is the resistance less than 5 ohms? 	(+) PCM Connector, Harness Side	(-) CF Motor Connector, Harness Side	FCV	FCV - Pin 4	Yes GO to KN14. No REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.
(+) PCM Connector, Harness Side	(-) CF Motor Connector, Harness Side					
FCV	FCV - Pin 4					
KN8	CONTINUOUS MEMORY DTC P0480: CHECK THE B+ AND GND CIRCUIT FOR AN INTERMITTENT CONCERN <ul style="list-style-type: none"> Key in OFF position. CF Motor connector disconnected. Rotate the fan by hand. The fan should rotate freely, with no abnormal binding. If binding is present, remove any foreign materials or install a new fan assembly as required. Connect a non-powered test lamp between: <table border="1"> <tr> <td>(+) CF Motor Connector, Harness Side</td> <td>(-) CF Motor Connector, Harness Side</td> </tr> <tr> <td>B+ - Pin 1</td> <td>GND - Pin 2</td> </tr> </table> 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 present. <ul style="list-style-type: none"> Shake, wiggle, and bend the B+ and GND circuits to the CF Shake, wiggle, and bend the associated fuse Is a concern present? 	(+) CF Motor Connector, Harness Side	(-) CF Motor Connector, Harness Side	B+ - Pin 1	GND - Pin 2	Yes ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. No GO to KN9.
(+) CF Motor Connector, Harness Side	(-) CF Motor Connector, Harness Side					
B+ - Pin 1	GND - Pin 2					
KN9	CHECK THE FCV CIRCUIT(S) FOR INTERMITTENT CONCERNS <ul style="list-style-type: none"> Connect the 1.6 K ohms resistor between the FCV and B+ circuits at the CF harness connector (this simulates cooling fan circuitry). Measure the voltage between: <table border="1"> <tr> <td>(+) CF Motor Connector, Harness Side</td> <td>(-)</td> </tr> <tr> <td>FCV - Pin 4</td> <td>Ground</td> </tr> </table> Key ON, engine OFF. Enter output test mode. Refer to Diagnostic Methods, Output Test Mode (OTM). Command the low speed fan ON. Observe the digital multimeter (DMM) for an indication of a concern while shaking, wiggling, and bending the FCV circuit between the CF motor and the PCM. Note that voltage changes suddenly when a concern is detected. Is a concern present? 	(+) CF Motor Connector, Harness Side	(-)	FCV - Pin 4	Ground	Yes ISOLATE the concern and REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test. No GO to Pinpoint Test Z.
(+) CF Motor Connector, Harness Side	(-)					
FCV - Pin 4	Ground					

KN7-KN9

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Test Step		Results / Action to Take				
KN10	COOLING FAN MOTOR DOES NOT OPERATE (WITH NO DTCS): COMMAND THE FAN ON TO CHECK OPERATION					
	<ul style="list-style-type: none"> Carry out the KOEO self-test. Listen to the fan. Does the fan operate sometime during the KOEO self-test? 	<p>Yes The concern is elsewhere. RETURN to Symptom Charts, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index for further direction.</p> <p>No GO to KN11.</p>				
KN11	CHECK THE B+ AND GND CIRCUITS TO THE COOLING FAN MOTOR					
	<ul style="list-style-type: none"> Key in OFF position. CF Motor connector disconnected. Rotate the fan by hand. The fan should rotate freely, with no abnormal binding. If binding is present, remove any foreign materials or install a new fan assembly as required. Measure the voltage between: <table border="1"> <tr> <td>(+) CF Motor Connector, Harness Side</td> <td>(-) CF Motor Connector, Harness Side</td> </tr> <tr> <td>B+ - Pin 1</td> <td>GND - Pin 2</td> </tr> </table> Is the voltage greater than 10 V? 	(+) CF Motor Connector, Harness Side	(-) CF Motor Connector, Harness Side	B+ - Pin 1	GND - Pin 2	<p>Yes INSTALL a new cooling fan motor.</p> <p>CLEAR the DTCs. REPEAT the self-test.</p> <p>No GO to KN12.</p>
(+) CF Motor Connector, Harness Side	(-) CF Motor Connector, Harness Side					
B+ - Pin 1	GND - Pin 2					
KN12	CHECK THE VOLTAGE TO THE COOLING FAN USING GROUND AS A REFERENCE					
	<ul style="list-style-type: none"> Measure the voltage between: <table border="1"> <tr> <td>(+) CF Motor Connector, Harness Side</td> <td>(-)</td> </tr> <tr> <td>B+ - Pin 1</td> <td>Ground</td> </tr> </table> Is the voltage greater than 10 V? 	(+) CF Motor Connector, Harness Side	(-)	B+ - Pin 1	Ground	<p>Yes REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.</p> <p>No A B+ circuit concern is present. 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 installing a new fuse/fuse link.</p> <p>CLEAR the DTCs. REPEAT the self-test.</p>
(+) CF Motor Connector, Harness Side	(-)					
B+ - Pin 1	Ground					
KN13	CONTINUOUS MEMORY DTC P0483: CHECK FOR A COOLING FAN MOTOR OBSTRUCTION OR A COOLING FAN MOTOR MECHANICAL FAILURE					
	<ul style="list-style-type: none"> Is a cooling fan motor obstruction or a cooling fan motor mechanical failure present? 	<p>Yes REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.</p> <p>No CLEAR the DTCs. REPEAT the self-test.</p>				

KN10-KN13

Variable Speed Electric Cooling Fan**KN**

Test Step		Results / Action to Take
KN14	CHECK FOR CORRECT PCM OPERATION <ul style="list-style-type: none">• Disconnect all the PCM connectors.• Visually inspect for:<ul style="list-style-type: none">— 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.

KN14