KN: Variable Speed Electric Cooling Fan

KN: Introduction

KN1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Is DTC P0480 present?

Yes	No
For KOEO and KOER DTC P0480, GO to KN2. For continuous memory DTC P0480, GO to KN8.	For a cooling fan(s) that does not operate (low, medium, high or variable speed), GO to KN10.

KN2 CHECK FOR A MECHANICAL CONCERN WITH THE COOLING FAN MOTOR OR FOR OBSTRUCTIONS LIMITING THE COOLING FAN MOTOR OPERATION

- Ignition OFF.
- CF Module connector disconnected.
- Rotate the cooling fan by hand. The cooling fan should rotate freely, with no abnormal binding. If binding is present, remove any foreign materials or install a new cooling fan as required.
- Measure the voltage between:

(+) CF Module Connector, Harness Side	(-) CF Module Connector, Harness Side
B+ - Pin 1	GND - Pin 2

Is the voltage greater than 10 V?

Yes	No
GO to KN4.	GO to KN3.

KN3 CHECK THE VOLTAGE TO THE COOLING FAN MODULE USING GROUND AS A REFERENCE

- Measure the voltage between:

(+) CF Module Connector, Harness Side	(-)
B+ - Pin 1	Ground

Is the voltage greater than 10 V?

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

KN4 CHECK THE FCV CIRCUIT(S)

- Connect the 1.6K ohms resistor between the FCV and B+ circuits at the CF module harness connector (this simulates cooling fan circuitry).
- Ignition ON, engine OFF.
- Carry out the PCM KOEO self-test.

Is DTC P0480 present?

Yes	No
GO to KN5 .	GO to KN12 .

KN5 CHECK THE FCV CIRCUIT FOR A SHORT TO VOLTAGE IN THE HARNESS

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

(+) CF Module Connector, Harness Side	(-)
FCV - Pin 4	Ground

Is the voltage less than 1 V?

Yes	No
GO to KN6 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KN6 CHECK THE FCV CIRCUIT FOR A SHORT TO GROUND IN THE HARNESS

- Ignition OFF.
- Measure the resistance between:

(+) CF Module Connector, Harness Side	(-)
FCV - Pin 4	Ground

Is the resistance greater than 10K ohms?

Yes	No
GO to KN7 .	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

KN7 CHECK FOR AN OPEN CIRCUIT BETWEEN THE PCM AND COOLING FAN MODULE

- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) CF Module Connector, Harness Side
FCV	FCV - Pin 4

Is the resistance less than 5 ohms?

Yes	No
GO to KN14 .	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

KN8 CONTINUOUS MEMORY DTC P0480: CHECK THE B+ AND GND CIRCUIT FOR AN INTERMITTENT CONCERN

- Ignition OFF.
- CF Module connector disconnected.
- Rotate the cooling fan by hand. The cooling fan should rotate freely, with no abnormal binding. If binding is present, remove any foreign materials or install a new cooling fan as required.
- Connect a non-powered test lamp between:

Point A CF Module Connector, Harness Side	Point B CF Module Connector, Harness Side
B+ - Pin 1	GND - Pin 2

- 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.
  - Shake, wiggle, and bend the B+ and GND circuits to the CF
  - Shake, wiggle, and bend the associated fuse

Is a concern present?

Yes	No
ISOLATE the concern and REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.	GO to KN9 .

KN9 CHECK THE FCV CIRCUIT(S) FOR INTERMITTENT CONCERNS

- Connect the 1.6K ohms resistor between the FCV and B+ circuits at the CF module harness connector (this simulates cooling fan circuitry).
- Measure the voltage between:

(+) CF Module Connector, Harness Side	(-)
FCV - Pin 4	Ground

- Ignition ON, engine OFF.
- Enter output test mode. Refer to Section 2, 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 module and the PCM. Note that voltage changes suddenly when a concern is detected.
- Exit output test mode.

Is a concern present?

Yes	No
ISOLATE the concern and REPAIR as necessary.	GO to Pinpoint Test Z .

Clear the PCM DTCs. REPEAT the self-test.	

KN10 COOLING FAN MOTOR DOES NOT OPERATE (WITH NO DTCS): COMMAND THE COOLING FAN ON TO CHECK OPERATION

- Carry out the PCM KOEO self-test.
- Listen to the cooling fan.

Does the cooling fan operate sometime during the KOEO self-test?

Yes	No
The concern is elsewhere. RETURN to Section 3, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index for further direction.	GO to KN11 .

KN11 CHECK THE B+ AND GND CIRCUITS TO THE COOLING FAN MODULE

- Ignition OFF.
- CF Module connector disconnected.
- Rotate the cooling fan by hand. The cooling fan should rotate freely, with no abnormal binding. If binding is present, remove any foreign materials or install a new cooling fan as required.
- Measure the voltage between:

(+) CF Module Connector, Harness Side	(-) CF Module Connector, Harness Side
B+ - Pin 1	GND - Pin 2

Is the voltage greater than 10 V?

Yes	No
GO to KN12 .	GO to KN13 .

KN12 CHECK THE COOLING FAN MOTOR OPERATION

Note: Both 30 amp fused jumper wires should be connected to the wiring harness that directly connects to the cooling fan motor.

Note: For vehicles equipped with dual cooling fans, both cooling fans must be checked for correct operation.

Note: Allow the cooling fan to operate for a minimum of two minutes and observe for any noise or binding.

Note: With the cooling fan motor disconnected voltage may not be present at the cooling fan module. Do not measure voltage at the cooling fan motor.

- CF Motor connector disconnected.
- Connect a 30 amp fused jumper wire between the VPWR circuit at the CF motor connector harness side and the vehicle battery positive terminal side.
- Connect a 30 amp fused jumper wire between the GND circuit at the CF motor connector harness side and the vehicle battery negative terminal side.

Does the cooling fan operate correctly?

Yes	No
INSTALL a new CF module. REFER to the Workshop Manual Section 303-03, Engine Cooling. Clear the PCM DTCs. REPEAT the self-test.	INSTALL a new CF motor. REFER to the Workshop Manual Section 303-03, Engine Cooling. Clear the PCM DTCs. REPEAT the self-test.

KN13 CHECK THE VOLTAGE TO THE COOLING FAN MODULE USING GROUND AS A REFERENCE

- Measure the voltage between:

(+) CF Module Connector, Harness Side	(-)
B+ - Pin 1	Ground

Is the voltage greater than 10 V?

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

KN14 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, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) , 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.