Computers and Control Systems: Pinpoint Tests
Test X: Constant Control Relay Module (CCRM)

X: Constant Control Relay Module (CCRM)
Introduction

X

Note

This Pinpoint Test is intended to diagnose the following:

- Constant Control Relay Module (CCRM) (12B581 (w/ bracket), 12B577 (module only))
- Harness circuits: B+, FC, LFC, HFC, ACCS, WAC, VPWR (TO CCRM), A/C Clutch PWR, (Low/High) Fan PWR, GND
- Powertrain Control Module (PCM) (12A650)

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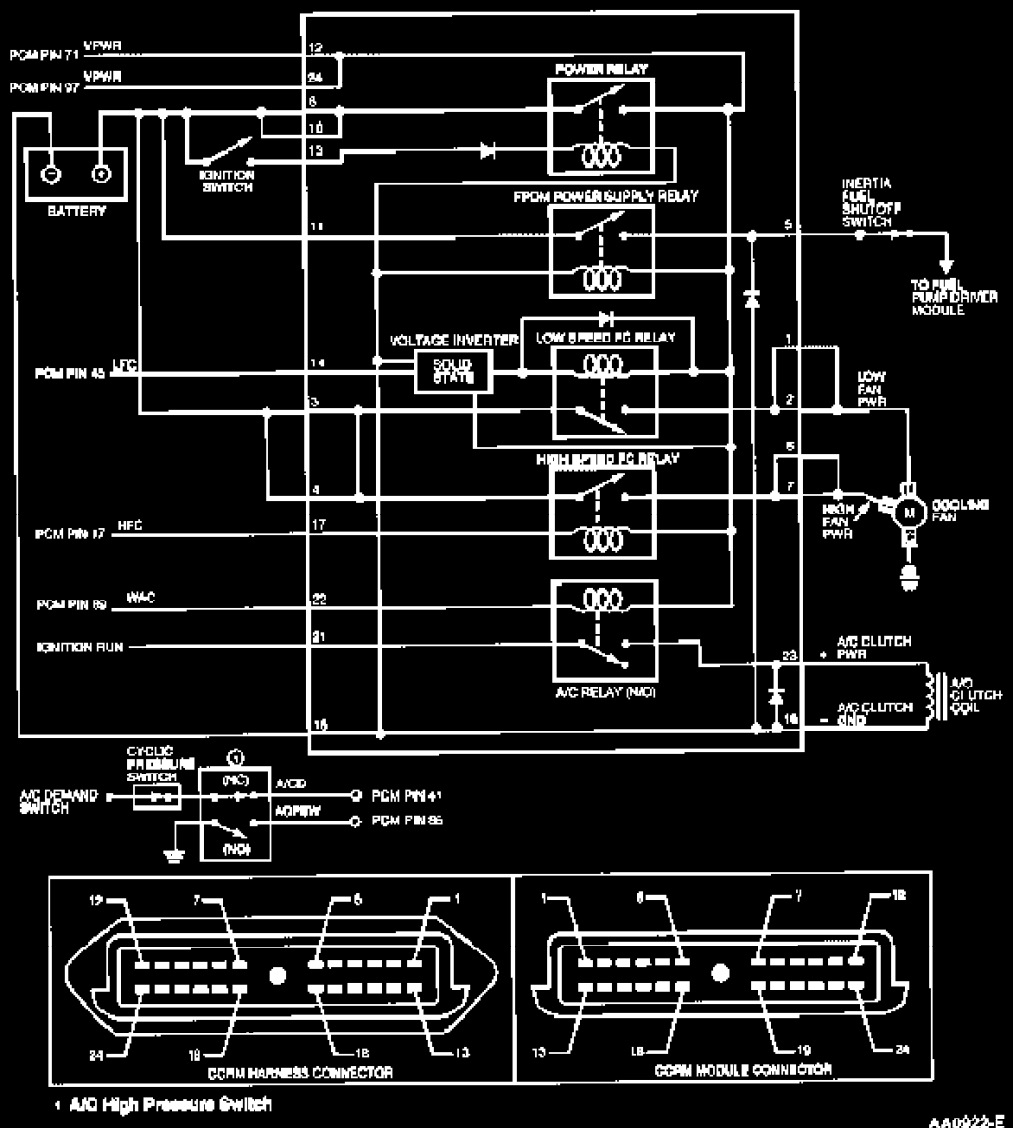
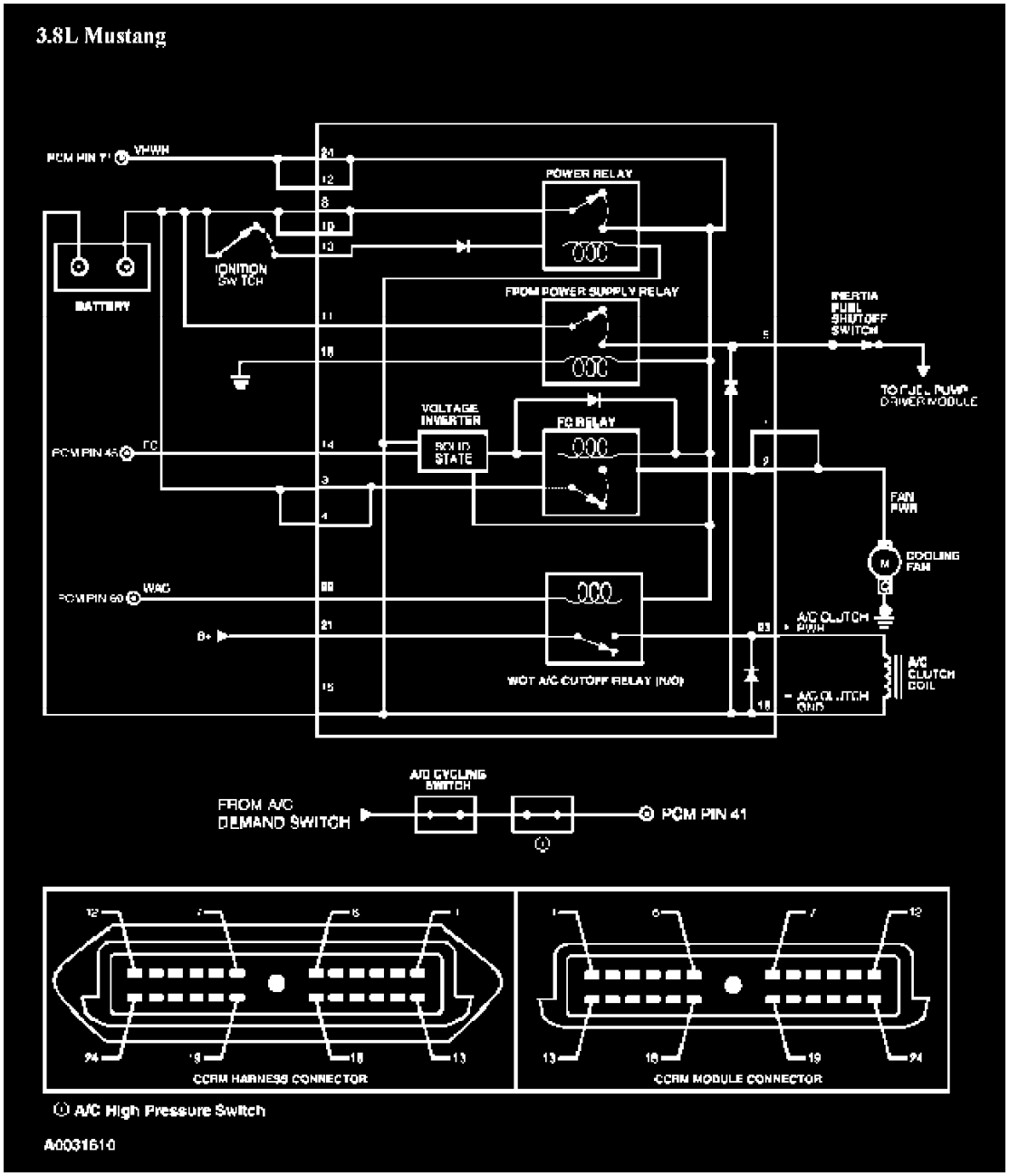
Pinpoint Test Schematics and Connectors

For PCM connector views, refer to Section 1, Powertrain Control Hardware.

Escort





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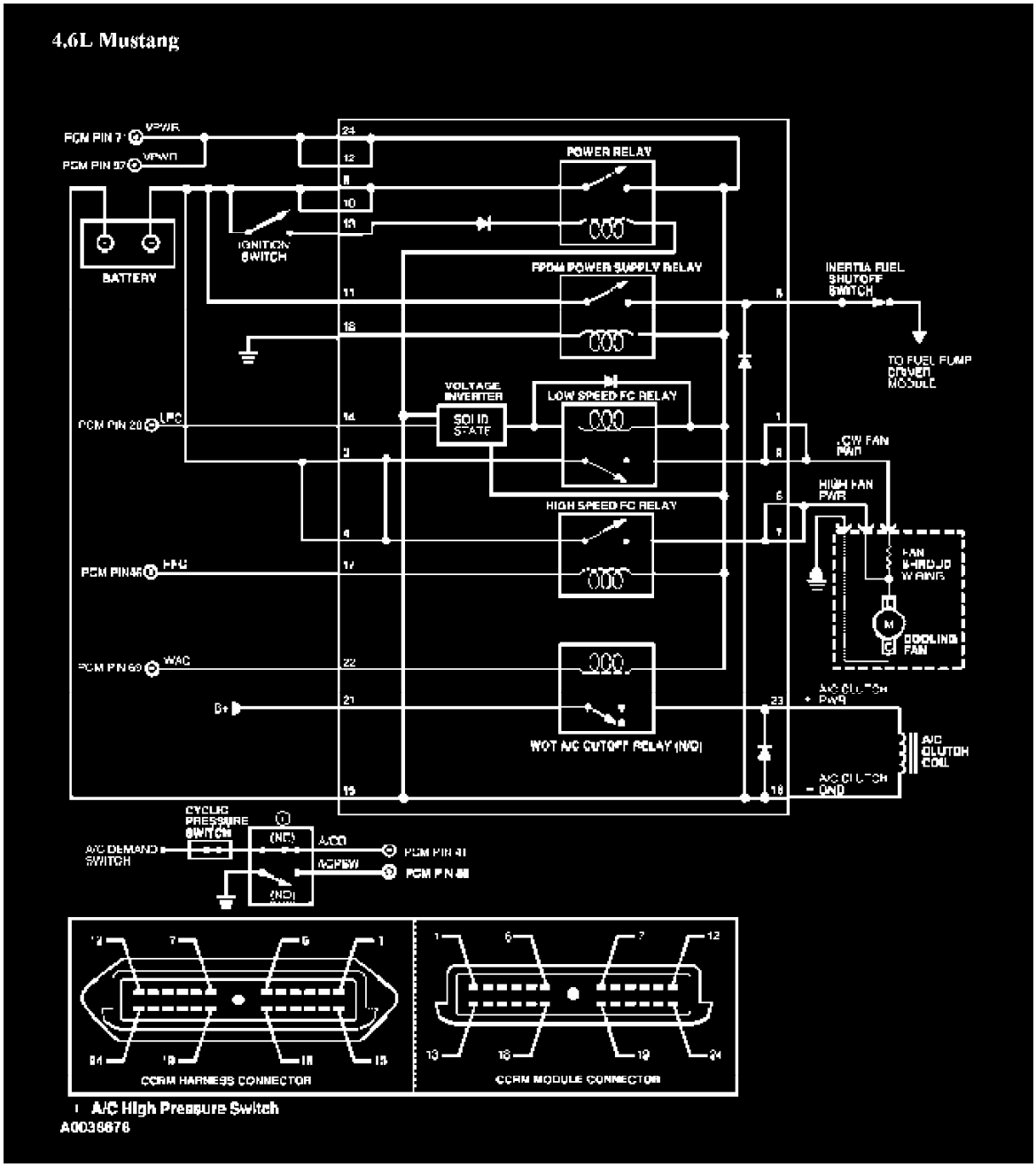

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X: Constant Control Relay Module (CCRM) X

X1 VPWR CHECK AT FUEL INJECTOR FAILED IN PINPOINT TEST C: CHECK FOR OPEN VPWR CIRCUIT BETWEEN CCRM AND THE FUEL INJECTOR

- Fuel injector disconnected.
- Disconnect CCRM.
- Disconnect scan tool from DLC.
- Measure resistance of VPWR circuit between the fuel injector harness connector and both pins 12 and 24 (VPWR) of the CCRM harness connector.

Is either resistance less than 5.0 ohms?

Yes	No
RECONNECT fuel injector. GO to X2 .	BOTH resistances GREATER than 5.0 ohms. REPAIR open VPWR circuit between the CCRM and the splice to the fuel injector.

X2 CHECK B+ AND IGN START/RUN VOLTAGE TO CCRM

- Measure voltage to Pin 8 and Pin 10 (B+) of the CCRM harness connector.
- Key on, engine off.
- Measure voltage to Pin 13 (IGN START/RUN) of the CCRM harness connector.

Are all voltages greater than 10.5 volts?

Yes	No
KEY OFF. GO to X3 .	B + or IGN START/RUN circuit fault. CHECK condition of related fuse(s). If OK, REPAIR open circuit. If fuse is damaged, CHECK IGN START/RUN or B+ and VPWR circuits for short to ground before replacing.

X3 CHECK CCRM GROUND CIRCUIT

- Measure voltage between pin 8 (B+) and pin 15 (GND) at the CCRM harness connector.

Is voltage greater than 10.5 volts?

Yes	No
REPLACE CCRM.	REPAIR open ground circuit to CCRM (pin 15).

X15 DTC P1479 OR P0481: CHECK HIGH SPEED FAN CONTROL (FC) RELAY AND HFC CIRCUIT IN CCRM

Note: For one-speed fan applications, disregard DTC P1479/P0481.

- Disconnect CCRM.
- Check high speed FC relay coil resistance:
  - Measure resistance between pin 17 and pin 24 of the CCRM.
  - Resistance must be between 65 and 110 ohms.
- Check CCRM for internal shorts (each of the following resistances must be greater than 1,000 ohms):
  - Measure resistance of CCRM between pin 17 and the following pins: 1 through 11, 13 and 21.
  - Measure resistance of CCRM between pins 17 and 15 (it may be necessary to switch the red and black DVOM probes to get resistance reading greater than 1,000 ohms).
  - Measure resistance between pin 17 and the CCRM case.

Are the CCRM checks OK?

Yes	No
GO to X16 .	REPLACE CCRM.

X16 CHECK FOR OPEN HFC CIRCUIT

- Disconnect PCM.
- Measure resistance of HFC circuit between PCM harness connector and pin 17 of CCRM harness connector.

Is resistance less than 6.0 ohms?

Application	HFC PCM Pin
Escort	17
Mustang	46

Yes	No
GO to X17 .	REPAIR open circuit.

X17 CHECK HFC CIRCUIT FOR SHORT TO POWER IN HARNESS

- Key on.
- Measure voltage between HFC circuit at PCM harness connector and chassis ground.

Is voltage less than 1.0 volt?

Yes	No
KEY OFF. GO to X18 .	REPAIR short circuit.

X18 CHECK HFC CIRCUIT FOR SHORT TO GROUND IN HARNESS

- Disconnect scan tool from DLC.
- Measure resistance between HFC circuit at PCM harness connector and chassis ground.

Is resistance greater than 10,000 ohms?

Yes	No
If DTC P1479/P0481 was received in Quick Test: CONNECT scan tool to DLC. Key on, engine off. Access Output Test Mode on scan tool. Command high speed fan on, wait 10 seconds, then turn fan off. If high speed fan turns on, and off as expected, disregard P1479/P0481 and return to Section 3 . If fan does not operate correctly, REPLACE PCM (refer to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)). **All others:** REPLACE CCRM. VERIFY HIGH FAN PWR circuit is not short to ground.	REPAIR short circuit.

X20 DTC P1474 OR P0480; DOES FAN RUN WITH KEY ON?

Note: During diagnosis, FC applies to the fan control circuit (single-speed fans), and LFC applies to the low fan control circuit (two-speed fans).

Does the cooling fan always run with the key on?

Yes	No
KEY OFF. GO to X24 .	KEY OFF. GO to X21 .

X21 CHECK FC/LFC CIRCUIT FOR SHORT TO GROUND IN HARNESS

- Disconnect scan tool from DLC.
- Disconnect PCM.
- Disconnect CCRM.
- Measure resistance between pin 14 of the CCRM harness connector and chassis ground.

Is resistance greater than 10,000 ohms?

Yes	No
GO to X22 .	REPAIR short circuit.

X22 CHECK FAN RUNNING MODE

- Connect CCRM.
- Key on, engine off.

Is fan running with the key on?

Yes	No
REPLACE PCM (refer to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)).	REPLACE CCRM.

X24 CHECK FOR OPEN FC/LFC CIRCUIT IN HARNESS

- Disconnect PCM.
- Disconnect CCRM.
- Measure resistance of the FC/LFC circuit between PCM harness connector and pin 14 of the CCRM harness connector.

Is resistance less than 5.0 ohms?

Application	FC/LFC PCM Pin
4.6L Mustang	28
All Others	45

Yes	No
GO to X25 .	REPAIR open circuit.

X25 CHECK FC/LFC CIRCUIT FOR SHORT TO POWER IN HARNESS

- Key on.
- Measure voltage between pin 14 of the CCRM harness connector and chassis ground.

Is voltage less than 1.0 volt?

Yes	No
KEY OFF. GO to X26 .	REPAIR short circuit.

X26 FC/LFC CIRCUIT FAULT ISOLATION CHECK

- Reconnect CCRM.
- Jumper FC/LFC circuit at PCM harness connector to chassis ground.
- Key on, engine off.

Does fan continue to run?

Yes	No
KEY OFF. REPLACE CCRM.	KEY OFF. REPLACE PCM (refer to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)).

X30 CONTINUOUS MEMORY DTC P1474 OR P0480: CHECK FAN CONTROL (FC) OR LOW FAN CONTROL (LFC) CIRCUIT FOR OPEN OR SHORT TO POWER

- Disconnect cooling fan connector.
- Connect a non-powered test lamp between the (LOW) FAN PWR circuit and ground circuit at the cooling fan harness connector.
- Key on, engine off.
- Observe test lamp for an indication of a fault while completing the following (since the FC/LFC circuit is grounded to turn the fan OFF, the lamp will illuminate when an open or short to power is detected):
  - Shake, wiggle, bend the FC/LFC circuit between the PCM and CCRM.
  - Lightly tap on the CCRM to simulate road shock.

Is a fault indicated?

Yes	No
KEY OFF. ISOLATE fault and REPAIR as necessary.	GO to X31 .

X31 CHECK FC/LFC CIRCUIT FOR SHORT TO GROUND

- Key on, engine off.
- Access Output Test Mode on scan tool.
- Command Low Speed Fan on.
- Observe test lamp for an indication of a fault while completing the following (the lamp will turn off when a fault is detected, indicating a short to ground or an open in VPWR):
  - Shake, wiggle, bend the FC/LFC circuit between the PCM and CCRM.
  - Lightly tap on the CCRM to simulate road shock.

Is a fault indicated?

Yes	No
ISOLATE fault and REPAIR as necessary.	KEY OFF. GO to Z1 .

X35 DTC P1479 OR P0481: CHECK HIGH FAN CONTROL (HFC) CIRCUIT FOR OPEN OR SHORT TO POWER

Note: For one-speed fan applications, disregard DTC P1479/P0481.

- Disconnect cooling fan connector. Inspect connector for damaged or pushed out pins, corrosion and loose wires. Repair as necessary.
- Connect a non-powered test lamp between the HIGH FAN PWR circuit and ground circuit at the cooling fan harness connector.
- Key on, engine off.
- Access Output Test Mode on scan tool.
- Command high speed fan on.
- Observe test lamp for an indication of a fault while completing the following (the lamp will turn off when a fault is detected, indicating an open or short to power):
  - Shake, wiggle, bend the HFC circuit between the PCM and CCRM.
  - Lightly tap on the CCRM to simulate road shock.

Is a fault indicated?

Yes	No
KEY OFF. ISOLATE fault and REPAIR as necessary.	GO to X36 .

X36 CHECK HFC CIRCUIT FOR SHORT TO GROUND

- Key on, engine off.
- Command high speed fan off.
- Observe test lamp for an indication of a fault while completing the following (the lamp will turn on when a fault is detected, indicating a short to ground):
  - Shake, wiggle, bend the HFC circuit between the PCM and CCRM.
  - Lightly tap on the CCRM to simulate road shock.

Is a fault indicated?

Yes	No
ISOLATE fault and REPAIR as necessary. RESTORE vehicle.	KEY OFF. GO to Z1 .

X40 ELECTRIC COOLING FAN FUNCTIONAL CHECK

Note: For the proper results of these pinpoint tests, no DTCs must have been present during PCM Quick Test.

- Key on, engine off.
- Access Output Test Mode on scan tool.
- Command of the cooling fan on and check for fan operation. For two speed fan applications, check both fan speeds (wait 30 seconds after commanding high speed fan on).

Does the fan operate (all speeds)?

Yes	No
KEY OFF. Cooling fan circuits OK. RETURN to Section 3 chart.	COMMAND cooling fan off. REMAIN in Output Test Mode. GO to X41 .

X41 ELECTRIC COOLING FAN CONCERN: DID THE FAN OPERATE AT ANY SPEED?

- For 3.8L Mustang, GO to X42 .

During the operational check of both fan speeds, did the fan operate at any speed?

Yes	No
Only one fan speed is operational. GO to X50 .	Cooling fan will not operate at any speed. GO to X42 .

X42 COOLING FAN WILL NOT OPERATE AT ANY SPEED: COMMAND FAN ON (HIGH SPEED FOR TWO-SPEED APPLICATIONS) AND CHECK FOR VOLTAGE AT FAN

- Key on, engine off.
- Disconnect cooling fan.
- Command fan on (high speed for two speed fan applications).
- Measure voltage between the (HIGH) FAN PWR circuit at the cooling fan harness connector and chassis ground.

Is voltage greater than 10.0 volts?

Yes	No
KEY OFF. Power is being supplied to fan. GO to X45 .	KEY OFF. GO to X43 .

X43 CHECK FOR B+ TO FAN CONTROL RELAYS IN CCRM

- Disconnect CCRM.
- Measure voltage at pins 3 and 4 of the CCRM harness connector.

Is voltage greater than 10.0 volts?

Yes	No
GO to X44 .	B+ fault. CHECK condition of related fuses. If OK, REPAIR open circuit. If fuse is damaged, CHECK B+ and FAN PWR circuits for short to ground before replacing.

X44 CHECK FOR OPEN FAN PWR CIRCUIT BETWEEN CCRM AND COOLING FAN

- **For 3.8L Mustang:**
  - Measure resistance of FAN PWR circuit between pin 2 of the CCRM harness connector and the fan harness connector.
- **All others:**
  - Measure resistance of HIGH FAN PWR circuit between pin 6 of the CCRM harness connector and the fan harness connector.
  - Measure resistance of LOW FAN PWR circuit between pin 2 of the CCRM harness connector and the fan harness connector.

Is each resistance less than 7.0 ohms?

Yes	No
For 3.8L Mustang: GO to X70 . **All others:** REPLACE CCRM. VERIFY FAN PWR circuit(s) are not short to ground.	REPAIR open circuits(s).

X45 CHECK FOR OPEN COOLING FAN GROUND CIRCUIT

- Disconnect scan tool from DLC.
- Measure resistance of ground circuit between the cooling fan harness connector and chassis ground.

Is resistance less than 5.0 ohms?

Yes	No
REPLACE fan.	REPAIR open circuit.

X50 DETERMINE WHICH FAN SPEED IS OPERATIONAL

Was the low speed fan operational?

Yes	No
High speed fan inoperative. GO to X65 .	Low speed fan inoperative. GO to X51 .

X51 LOW SPEED FAN INOPERATIVE: COMMAND LOW SPEED FAN ON AND CHECK FOR VOLTAGE TO COOLING FAN

- Key on, engine off.
- Disconnect cooling fan.
- Command low speed fan on.
- Measure LOW FAN PWR circuit voltage at the cooling fan harness connector.

Is voltage greater than 10.0 volts?

Yes	No
KEY OFF. **For 4.6L Mustang:** GO to X54 . **All others:** REPLACE fan.	KEY OFF. GO to X52 .

X52 CHECK FOR OPEN LOW FAN PWR CIRCUIT BETWEEN CCRM AND FAN

- Disconnect CCRM.
- Measure resistance of the LOW FAN PWR circuit between the cooling fan harness connector and pins 1 and 2 of the CCRM harness connector.

Are both resistances less than 5.0 ohms?

Yes	No
GO to X70 .	REPAIR open circuit.

X54 CHECK FOR OPEN DROPPING RESISTOR ON FAN SHROUD ASSEMBLY

- Measure resistance between the LOW FAN PWR and HIGH FAN PWR pins of the fan shroud assembly.

Is resistance less than 6.0 ohms?

Yes	No
REPLACE fan.	Verify condition of dropping resistor, replace as necessary (use care when removing resistor from mounts). If OK, replace fan assembly.

X65 HIGH SPEED FAN INOPERATIVE: COMMAND HIGH SPEED FAN ON AND CHECK FOR VOLTAGE TO COOLING FAN

- Key on, engine off.
- Disconnect cooling fan.
- Command high speed fan on.
- Measure HIGH FAN PWR circuit voltage at the cooling fan harness connector.

Is voltage greater than 10.5 volts?

Yes	No
KEY OFF. REPLACE fan.	KEY OFF. GO to X66 .

X66 CHECK FOR OPEN HIGH FAN PWR CIRCUIT

- Disconnect CCRM.
- Measure resistance of HIGH FAN PWR circuit between the cooling fan harness connector and pin 6 of the CCRM harness connector.

Is resistance less than 5.0 ohms?

Yes	No
GO to X70 .	REPAIR open circuit.

X70 IS SCAN TOOL CAPABLE OF VIEWING PIDS WHILE IN OUTPUT TEST MODE?

Note: The symptom low speed fan or high speed fan inoperative can be caused by a primary circuit fault, even though a DTC was not set.

Is scan tool being used capable of viewing PIDS while in Output Test Mode?

Yes	No
GO to X71 .	**For low speed fan inoperative (fan inoperative for 3.8L Mustang):** GO to X73 . **For high speed fan inoperative.** GO to X16 .

X71 CHECK OPERATION OF LOW SPEED FAN OR HIGH SPEED FAN PRIMARY CIRCUITS

- Reconnect CCRM and cooling fan.
- Key on, engine off.
- Access Output Test Mode on scan tool.
- **For low speed fan inoperative (fan inoperative for 3.8L Mustang):**
  - Access LFC and LFCF PIDs.
  - With LFC PID off (low speed fan commanded off by PCM), the LFCF PID must indicate no fault (or NO).
  - Command the Low Speed Fan on (the LFC PID will now be on).
  - The LFCF PID must still indicate no fault.
- **For high speed fan inoperative:**
  - Access HFC and HFCF PIDs.
  - With HFC PID off (high speed fan commanded off by PCM), the HFCF PID must indicate no fault (or NO).
  - Command the high speed fan on (the HFC PID will now be on).
  - The HFCF PID must still indicate no fault (or NO).

Does the HFCF or LFCF PID indicate a fault (or YES) with the fan commanded on or off?

Yes	No
KEY OFF. An HFC or LFC primary fault is detected. **If the HFCF PID indicated a fault:** GO to X15 and follow DTC P0481 diagnosis. **If the LFCF PID indicated a fault:** GO to X20 and follow DTC P0480 diagnosis.	Primary circuits OK. REPLACE CCRM. VERIFY applicable FAN PWR circuit is not short to ground.

X73 CHECK FC/LFC CIRCUIT FOR SHORT TO GROUND IN HARNESS

- Disconnect scan tool from DLC.
- Disconnect PCM.
- Measure resistance between pin 14 of the CCRM harness connector and chassis ground.

Is resistance greater than 10,000 ohms?

Yes	No
REPLACE CCRM. VERIFY applicable FAN PWR circuit is not shorted to ground.	REPAIR short circuit.

X80 LOW AND/OR HIGH SPEED COOLING FAN ALWAYS RUNS (NO DTCS); VERIFY FAN IS NOT ON BECAUSE OF A/C HIGH PRESSURE SWITCH INPUT TO PCM

- Start engine.
- Access ACP PID.

Is the ACP PID "CLOSED"?

Yes	No
The PCM will turn the cooling fan on when the A/C high pressure switch input is "closed". Leave engine running. GO to X81 .	Input OK. GO to X82 .

X81 CHECK A/C HIGH PRESSURE SWITCH (THE MEDIUM PRESSURE, NORMALLY OPEN CONTRACTS)

- Disconnect A/C high pressure switch.
- Again, view ACP PID.

Is the ACP PID still "CLOSED"?

Yes	No
KEY OFF. GO to X135 (to check A/C high pressure switch input to PCM).	KEY OFF. RECONNECT A/C high pressure switch. REFER to the Climate Control System, Section 412 of the Workshop Manual to check for proper A/C high pressure switch function, over-pressurized A/C system and other checks as directed.

X82 DISCONNECT CCRM AND CHECK IF FAN STILL RUNS

- Accessories off (A/C, blower, lamps).
- Key on, verify cooling fan always on symptom.
- Key off.
- Disconnect CCRM.
- Key on, engine off.

Is cooling fan still on?

Yes	No
KEY OFF. **For 3.8L Mustang:** REPAIR FAN PWR circuit short to power. **For all others:** GO to X83 .	Key off. GO to X84 .

X83 CHECK LOW FAN PWR AND HIGH FAN PWR CIRCUITS FOR SHORT TO POWER

- Disconnect cooling fan.
- Key on, engine off.
- Check for voltage on both the LOW FAN PWR and HIGH FAN PWR circuits at the cooling fan harness connector.

Are both voltages less than 1.0 volt?

Yes	No
KEY OFF. No fault is indicated at this time. VERIFY results of previous test steps. If OK, RECONNECT all components and RETURN to Section 3 for further diagnosis of this or any other symptom.	REPAIR short circuit.

X84 CHECK OPERATION OF LOW SPEED FAN OR HIGH SPEED FAN PRIMARY CIRCUITS

Note: The symptom cooling fan always runs can be caused by a primary circuit fault, even though a DTC was not set. This step will check the primary circuit operation.

- Reconnect CCRM.
- Key on, engine off.
- Access LFC and LFCF PIDs. With LFC PID off (low speed fan commanded off by PCM), the LFCF PID must indicate no fault (or NO).
- For all except 3.8L Mustang, access HFC and HFCF PIDs. With HFC PID off (high speed fan commanded off by PCM), the HFCF PID must indicate no fault (or NO).

Does the HFCF or LFCF PID indicate a fault (or YES) with the fan commanded off?

Yes	No
KEY OFF. An HFC or LFC primary circuit fault is detected. **If the HFCF PID indicated a fault:** GO to X15 and follow DTC P0481 diagnosis. **If the LFCF PID indicated a fault:** GO to X20 and follow DTC P0480 diagnosis.	Primary circuits OK. REPLACE CCRM.

X98 LACK OF COOLING (A/C)/A/C NOT FUNCTIONING: CHECK FOR VOLTAGE TO A/C CLUTCH

Note: If the A/C clutch will engage, follow the "YES" Action to Take of this test step. If not, or unsure, continue this test step.

- Key off.
- Disconnect A/C cycling switch.
- Install a jumper wire in the A/C cycling switch harness connector (to complete the circuit).
- Disconnect A/C clutch.
- Connect digital multimeter between the power pin and ground pin at the A/C clutch vehicle harness connector.
- Start engine.
- Turn A/C on, wait 15 seconds.
- Check voltage reading.
- After testing, turn key off and reconnect A/C clutch.

Was voltage greater than 10.5 volts?

Yes	No
REMOVE jumper. RECONNECT A/C cycling switch. **For all except 3.8L Mustang with the symptom "poor A/C system performance in hot ambient temperature":** GO to X145 to check A/C high pressure switch input to PCM. **All others:** REFER to the Climate Control System, Section 412 of the Workshop Manual to diagnose symptom. Also be aware that if the engine coolant temperature is detected high, the PCM will disengage the A/C clutch.	No voltage to A/C clutch. GO to X99 .

X99 CHECK ACCS INPUT TO PCM WITH A/C ON

- Start engine.
- A/C on.
- Access and view ACCS PID.
- After testing, remove jumper reconnect A/C cycling switch and turn key OFF.

Was the ACCS PID "ON"?

Yes	No
GO to X110 .	The PCM is not receiving the ACCS signal, and as a result will not allow the A/C to turn on. GO to X100 .

X100 ACCS PID OFF WITH A/C ON: CHECK FOR VOLTAGE TO A/C CYCLING SWITCH

- Key on, engine off.
- Disconnect A/C cycling switch.
- A/C demand switch to A/C on.
- Measure voltage at the A/C demand switch side of the A/C cycling switch harness connector.

Is voltage greater than 10.5 volts?

Yes	No
KEY OFF. GO to X101 .	KEY OFF. REFER to the Climate Control System, Section 412 in the Workshop Manual to check for causes of no voltage to the A/C cycling switch.

X101 CHECK IF A/C CYCLING SWITCH CONTACTS ARE CLOSED

- Measure resistance of the A/C cycling switch contacts at the A/C cycling switch connector.

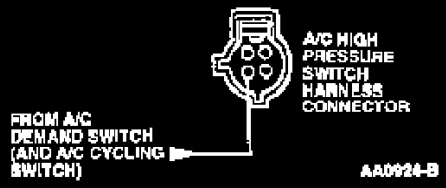
Is resistance less than 5.0 ohms?

Yes	No
GO to X102 .	REFER to the Climate Control System, Section 412 in the Workshop Manual to check the operation of the A/C cycling switch and proper refrigerant charge. REPAIR as necessary.

X102 CHECK FOR VOLTAGE TO DUAL FUNCTION A/C HIGH PRESSURE SWITCH

- Reconnect A/C cycling switch.
- Disconnect A/C high pressure switch.
- Key on, engine off.
- A/C on.
- Measure voltage on the A/C demand switch pin at the A/C high pressure switch harness connector.

Is voltage greater than 10.5 volts?



Yes	No
KEY OFF. GO to X103 .	REPAIR open between A/C cycling switch and A/C high pressure switch.

X103 CHECK RESISTANCE OF A/C HIGH PRESSURE SWITCH HIGH PRESSURE CONTACTS

- Measure resistance of the normally closed A/C high pressure switch high pressure contacts.

Is resistance less than 5.0 ohms?

Yes	No
GO to X104 .	REFER to the Climate Control System, Section 412 in the Workshop Manual to check for overpressurized A/C system, etc. If OK, REPLACE A/C high pressure switch, following instructions in the Climate Control System, Section 412 of the Workshop Manual.

X104 CHECK FOR VOLTAGE TO PCM ON ACCS CIRCUIT

- Reconnect A/C high pressure switch.
- Disconnect PCM.
- Key on.
- A/C ON.
- Measure voltage at PCM harness connector pin 41.

Is voltage greater than 10.5 volts?

Yes	No
REPLACE PCM (refer to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)).	REPAIR open circuit between the A/C high pressure switch and PCM.

X105 KOEO/KOER DTC P1460 OR P0645: VERIFY ACCS PID IS OFF

Note: Verify A/C and Defrost were off during KOEO/KOER Self-Test. If vehicle is not equipped with A/C, the WAC circuit is not used and the DTC P1460/P0645 can be ignored.

- Start engine.
- A/C and defroster off.
- Access ACCS PID.

Is the ACCS PID off?

Yes	No
KEY OFF. GO to X106 .	KEY OFF. GO to X125 (to check A/C circuits for short to power).

X106 CHECK WAC CIRCUIT AND WOT A/C CUTOFF RELAY IN CCRM

- Disconnect CCRM.
- Check WOT A/C cutoff relay coil resistance:
  - Measure resistance between pin 22 and pin 24 of the CCRM.
  - Resistance must be between 130 and 200 ohms.
- Check CCRM for internal short circuit (each of the following resistances must be greater than 1,000 ohms):
  - Measure resistance of CCRM between pin 22 and the following pins: 1 through 11, 13 and 21.
  - Measure resistance of CCRM between pins 22 and 15 (it may be necessary to switch the red and black DVOM probes to get resistance reading greater than 1,000 ohms).
  - Measure resistance between pin 22 and the CCRM case.

Are the CCRM checks OK?

Yes	No
GO to X107 .	REPLACE CCRM. Start engine. TURN A/C on, WAIT 15 seconds. A/C off. RERUN Quick Test.

X107 CHECK WAC CIRCUIT FOR SHORT TO POWER IN HARNESS

- Disconnect PCM.
- Key on.
- Measure voltage between pin 22 of the CCRM harness connector and chassis ground.

Is voltage less than 1.0 volts?

Yes	No
KEY OFF. GO to X108 .	REPAIR short circuit. START engine. TURN A/C on, WAIT 15 seconds. A/C off. RERUN Quick Test.

X108 CHECK WAC CIRCUIT FOR SHORT TO GROUND IN HARNESS

- Disconnect scan tool from DLC.
- Measure resistance between pin 22 of the CCRM harness connector and chassis ground.

Is resistance greater than 10,000 ohms?

Yes	No
GO to X109 .	REPAIR short circuit. START engine. TURN A/C on, WAIT 15 seconds. A/C off. RERUN Quick Test.

X109 CHECK FOR OPEN WAC CIRCUIT

- Measure resistance of WAC circuit between PCM harness connector pin 69 and pin 22 of the CCRM harness connector.

Is resistance less than 5.0 ohms?

Yes	No
REPLACE PCM (refer to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)). START engine. TURN A/C on, WAIT 15 seconds. A/C off. RERUN Quick Test.	REPAIR open circuit. START engine. TURN A/C on, WAIT 15 seconds. A/C off. RERUN Quick Test.

X110 NO/LOW VOLTAGE TO A/C CLUTCH (ACCS PID IS ON WITH A/C ON AND NO DTCS): CHECK FOR VOLTAGE TO CCRM

- Disconnect CCRM.
- Key on.
- Measure voltage to pin 21 of the CCRM harness connector.

Is voltage greater than 10.5 volts?

Yes	No
KEY OFF, A/C OFF. GO to X111 .	Voltage is not being supplied to pin 21 of the CCRM. CHECK condition of any related fuses. If OK, REPAIR open circuit. If fuse is damaged, check IGN RUN/B+ and A/C CLUTCH PWR circuits for short to ground before replacing.

X111 CHECK FOR OPEN A/C CLUTCH PWR AND A/C CLUTCH GROUND CIRCUITS

- Disconnect A/C clutch.
- Disconnect scan tool from DLC.
- Measure resistance of A/C clutch PWR circuit between pin 23 of the CCRM harness connector and the A/C clutch harness connector.
- Measure resistance of A/C clutch ground circuit between pin 16 of the CCRM harness connector and the A/C clutch harness connector.

Are both resistances less than 5.0 ohms?

Yes	No
VERIFY engine is not overheating when there is no voltage to A/C clutch (if engine coolant temperature is high, the PCM will turn off the A/C). If OK, REPLACE CCRM. VERIFY A/C Clutch PWR circuit is not shorted to ground.	REPAIR open circuit.

X115 DTC P1469 OR P0534: CHECK FOR CAUSES OF FAST A/C COMPRESSOR CLUTCH CYCLING

- Refer to the Climate Control System, Section 412 in the Workshop Manual to test A/C compressor clutch cycle times, and to check causes of fast A/C compressor clutch cycling.

Is a fault indicated?

Yes	No
REPAIR as required according to Workshop Manual direction. CLEAR the DTC(s). START engine and turn A/C on for about 2 minutes. A/C off. RERUN Quick Test.	GO to X116 to CHECK for intermittent electrical concern.

X116 CHECK FOR INTERMITTENT OPEN IN ACCS CIRCUIT

- Key on.
- Access ACCS PID.
- A/C on.
- Observe ACCS PID for an indication of a fault while completing the following (the ACCS PID will turn off and on quickly when a fault is detected, indicating an intermittent open):
  - Shake, wiggle, bend the ACCS circuit between the PCM and the source of the circuit (such as A/C switch, EATC module).
  - Lightly tap any pressure switches in the circuit to simulate road shock.
- Disconnect and inspect the A/C cycling switch connector.

Is a fault indicated?

Yes	No
KEY OFF. ISOLATE fault and REPAIR as necessary. CLEAR the DTC(s). START engine and TURN A/C on for about two minutes. A/C off. RERUN Quick Test.	UNABLE to duplicate fault at this time. CLEAR the DTCs. RETURN to Section 3 to service any additional symptoms.

X120 DTC P1460 OR P0645: CHECK FOR INTERMITTENT OPEN OR SHORT IN WAC CIRCUIT

Note: If vehicle is not equipped with A/C, the WAC circuit is not used and the DTC P1460/P0645 can be ignored.

- Disconnect A/C cycling switch.
- Install a jumper wire in the A/C cycling switch vehicle harness connector (to complete the circuit).
- Key on, engine off.
- For Mustang, A/C demand switch on.
- For Escort:
  - Access Output Test Mode on scan tool (refer to Section 2).
  - Turn outputs on (this will engage the A/C clutch).
- Check WAC circuit for open or short to power while completing the following (the A/C clutch will click on (off for Escort)) when a fault is detected):
  - Shake, wiggle, bend the WAC circuit from the CCRM to the PCM.
  - Lightly tap the CCRM to simulate road shock.
- Access Output Test Mode on the scan tool.
- Turn outputs off.
- Check WAC circuit for short to ground while completing the following (the A/C clutch will click off (on for Escort) when a fault is detected):
  - Shake, wiggle, bend the WAC circuit from the CCRM to the PCM.
  - Lightly tap the CCRM to simulate road shock.
- Key off, A/C off.

Is a fault indicated?

Yes	No
ISOLATE fault and REPAIR as necessary. COMPLETE PCM Reset to clear DTCs. START engine. TURN AC on, WAIT 15 seconds. A/C off. RERUN Quick Test.	REMOVE jumper wire. GO to Z1 .

X124 DTC P1464: CHECK ACCS PID

Note: Verify A/C and defrost were off during Self-Test. If A/C or defrost were on, turn off and rerun Self-Test.

- Key on, engine off.
- A/C and defrost off.
- Access ACCS PID.

Is ACCS PID on?

Yes	No
GO to X125 .	The ACCS PID indicates that the ACCS input to the PCM is low. VERIFY test results. With A/C and defrost off, RERUN Self-Test where DTC P1464 was received.

X125 ACCS PID ON: DISCONNECT A/C CYCLING SWITCH AND CHECK IF ACCS PID TURNS OFF

- Disconnect A/C cycling switch.
- Key on, engine off.
- Access ACCS PID.

Is ACCS PID off?

Yes	No
KEY OFF. VERIFY operation of A/C demand switch (REFER to the Climate Control System, Section 412 of the Workshop Manual). If OK, REPAIR short to power in A/C demand circuit to A/C cycling switch.	KEY OFF. **For Escort:** GO to X127 . **All others:** GO to X126 .

X126 CHECK A/C CLUTCH PWR CIRCUIT FOR SHORT TO POWER IN HARNESS

- Disconnect CCRM.
- Key on.
- Measure voltage between pin 23 of the CCRM harness connector and ground.

Is voltage less than 1.0 volt?

Yes	No
KEY OFF. GO to X127 .	REPAIR short circuit. RESTORE vehicle. VERIFY a symptom no longer exists.

X127 CHECK ACCS CIRCUIT FOR SHORT TO POWER IN HARNESS

- Key off.
- A/C cycling switch and CCRM (except Escort) disconnected.
- Disconnect PCM.
- Key on.
- Measure voltage between PCM harness connector pin 41 and ground.

Is voltage less than 1.0 volt?

Yes	No
For Escort: REPLACE PCM. **All others:** KEY OFF. GO to X128 .	REPAIR short circuit.

X128 CHECK ACCS CIRCUIT VOLTAGE TO PCM WITH CCRM CONNECTED

- Reconnect CCRM.
- Key on.
- Again, measure voltage between PCM harness connector pin 41 and ground.

Is voltage less than 1.0 volt?

Yes	No
REPLACE PCM.	REPLACE CCRM.

X130 DOES THE A/C TURN OFF WHEN THE A/C DEMAND SWITCH IS TURNED OFF?

Does the A/C turn off when the A/C demand switch is turned off?

Yes	No
GO to X131 .	GO to X140 .

X131 CHECK IF A/C CUTS OFF DURING WOT

- Start engine.
- A/C on.
- Initiate brief Wide Open Throttle (WOT) and return to idle. Listen for the A/C clutch to disengage during the WOT, then re-engage a few seconds after returning to idle (a "click" sound will be heard when the clutch re-engages).

Note: If the clicking sound cannot be heard, disconnect the A/C clutch. With a test lamp connected between the power pin and ground pin of the A/C clutch harness connector, observe the test lamp while performing the brief WOT. The test lamp must go off during the brief WOT, then come back on a few seconds after returning to idle.

- Repeat test, if necessary, to verify results.

Does A/C clutch or test lamp operate as indicated?

Yes	No
KEY OFF. RECONNECT A/C clutch (if necessary). The WAC circuit is operating properly. At this time the A/C will cut-off during WOT. GO to Z1 to diagnose intermittent concerns, or RETURN to Section 3 to service any other concerns.	GO to X132 .

X132 NO WOT A/C CUTOFF, NO DTCS PRESENT: CHECK CCRM

- Reconnnect A/C clutch (if necessary).
- Key on, engine off.
- Access Output Test Mode on scan tool.
- A/C demand switch on.
- While listening to the A/C clutch, command the outputs off and on a couple of times.

Does the A/C clutch engage and disengage when the outputs are cycled off and on?

Yes	No
KEY OFF. WOT A/C cutoff is operating properly. If symptom is intermittent, GO to Z1 . Otherwise, testing is complete. RETURN to Section 3 to service any other symptoms.	VERIFY that the A/C clutch was engaged during testing. If not, REPEAT test with clutch engaged. If clutch was engaged, REPLACE CCRM.

X135 ACPSW PID CLOSED WITH A/C HIGH PRESSURE SWITCH DISCONNECTED: CHECK ACPSW CIRCUIT FOR SHORT TO GROUND IN HARNESS

- A/C high pressure switch disconnected.
- Disconnect scan tool from DLC.
- Disconnect PCM.
- Measure resistance between PCM harness connector pin 86 and ground.

Is resistance greater than 10,000 ohms?

Yes	No
REPLACE PCM (refer to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)).	REPAIR short circuit.

X140 A/C ALWAYS ON: CHECK FOR VOLTAGE AT A/C CLUTCH WITH A/C OFF

- A/C and defroster OFF.
- Disconnect A/C clutch.
- Connect a digital multimeter between the power pin and ground pin at the A/C clutch harness connector.
- Start engine.
- Monitor voltage.
- After testing, turn key off and reconnect A/C clutch.

Was voltage less than 2.0 volts?

Yes	No
The electrical portion of the A/C system is not at fault. REFER to Climate Control System, Section 412 in the Workshop Manual.	A fault is indicated in the A/C electrical system. GO to X141 .

X141 CHECK ACCS INPUT TO PCM WITH A/C OFF

- Key off.
- Connect scan tool to data link connector.
- Start engine.
- A/C and defrost off.
- Access ACCS PID (Powertrain Menu).

Is the ACCS PID "OFF"?

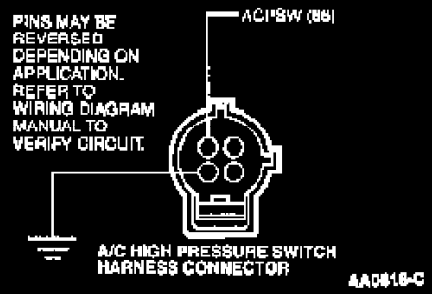
Yes	No
KEY OFF. REFER to Climate Control System, Section 412 in the Workshop Manual.	KEY OFF. GO to X125 .

X145 CHECK A/C HIGH PRESSURE SWITCH MEDIUM PRESSURE CIRCUITS

Note: An A/C high pressure switch medium pressure circuit concern can result in the high speed cooling fan not coming on when the A/C refrigerant pressure becomes high. In hot ambient conditions, this may result in the refrigerant pressure continuing to increase until the A/C high pressure switch high pressure contacts open, shutting off the A/C until the pressure drops to an acceptable range.

- Key off.
- Disconnect A/C high pressure switch.
- A/C off (to prevent chance of short circuits).
- Connect a jumper wire between the A/C high pressure switch circuit and ground circuit at the A/C high pressure switch harness connector.
- Start engine, wait 15 seconds.

Does the high speed fan come on?



Yes	No
KEY OFF. A/C high pressure switch medium pressure circuits are OK. REMOVE jumper. RECONNECT A/C high pressure switch. REFER to the Climate Control System, Section 412 in the Workshop Manual to diagnose symptom.	An A/C high pressure switch medium pressure circuit concern may exist. GO to X146 .

X146 CHECK FOR OPEN GROUND CIRCUIT TO A/C HIGH PRESSURE SWITCH

- Key on, engine running.
- Connect jumper wire between the A/C high pressure switch circuit at the A/C high pressure switch harness connector and the battery negative post.
- Wait 15 seconds.

Does the high speed fan come on now?

Yes	No
KEY OFF. REPAIR open ground circuit to the A/C high pressure switch. REMOVE jumper wire.	KEY OFF. REMOVE jumper wire. GO to X147 .

X147 CHECK FOR OPEN A/C HIGH PRESSURE SWITCH (ACPSW) CIRCUIT BETWEEN A/C HIGH PRESSURE SWITCH AND PCM

- Disconnect PCM.
- Measure resistance of the ACPSW circuit between the PCM harness connector pin 86 and the A/C high pressure switch harness connector.

Is resistance less than 5.0 ohms?

Yes	No
REPLACE PCM (refer to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM)).	REPAIR open circuit.