Heating and Air Conditioning: Testing and Inspection

Test I

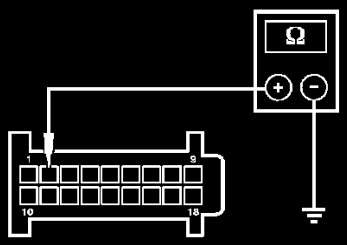
PINPOINT TEST I: THE A/C DOES NOT OPERATE/DOES NOT OPERATE CORRECTLY

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY

NOTE: Before carrying out the following test, diagnose any PCM DTCs.

NOTE: Before carrying out the following test, check that the A/C system pressure is above 290 kPa (42 psi). If the pressure is below 290 kPa (42 psi), refer to Fluorescent Dye Leak Detection.

Test Step		Result / Action to Take
I1	**CHECK ACCS PID WITH THE A/C OFF**	
	• Key in START position. • Press the OFF manual override button on the EATC module or select the OFF position on the EMTC module. • Enter the following diagnostic mode on the diagnostic tool: PCM ACCS PID. • **Does the PCM ACCS PID read ON?**	**Yes** EATC systems, GO to **I2**. EMTC systems, GO to **I3**. **No** GO to **I5**.
I2	**CHECK THE A/C SWITCH EATC PID WITH THE A/C OFF**	
	• Enter the following diagnostic mode on the diagnostic tool: A/C Switch PCM PID. • **Does the A/C switch EATC PID read ON?**	**Yes** INSTALL an EATC. Test the system for normal operation. **No** INSTALL a PCM. TEST the system for normal operation.
I3	**CHECK THE EMTC A/C SIGNAL WITH THE A/C OFF**	
	• Key in OFF position. • Disconnect: Instrument Cluster C2206. • Key in ON position. • Select the OFF position on the EMTC module. • Measure the resistance between instrument cluster C2206-2, circuit 348 (VT) and ground.  A0093342 • **Is the resistance less than 5 ohms?**	**Yes** GO to **I4**. **No** INSTALL a new PCM. TEST the system for normal operation.
I4	**CHECK CIRCUIT 348 (VT) FOR A SHORT TO GROUND**	
	• Key in OFF position. • Disconnect: EMTC Module C294a.	

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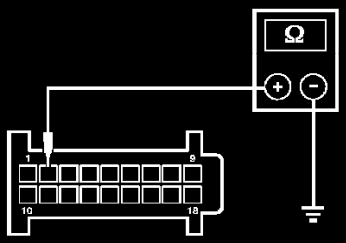
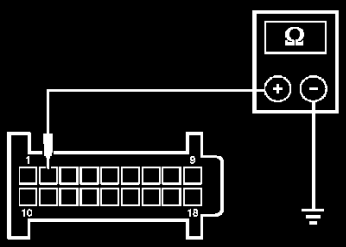
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
I4	**CHECK CIRCUIT 348 (VT) FOR A SHORT TO GROUND (Continued)**	
	• Measure the resistance between instrument cluster C2206-2, circuit 348 (VT) and ground.  A0093342 • **Is the resistance greater than 10,000 ohms?**	**Yes** INSTALL a new EMTC module. TEST the system for normal operation. **No** REPAIR circuit 348 (VT) for a short to ground. TEST the system for normal operation.
I5	**CHECK A/C CLUTCH RELAY PID WITH THE A/C OFF**	
	• Enter the following diagnostic mode on the diagnostic tool: PCM A/C Clutch Relay PID. • **Does the PCM A/C clutch relay PID read ON?**	**Yes** REFER to Computers and Control Systems. **No** EATC systems, GO to **I3**. EMTC system, GO to **I7**.
I6	**CHECK THE A/C SWITCH PID WITH THE A/C ON**	
	• Enter the following diagnostic mode on the diagnostic tool: PCM A/C Switch PID. • Press the PANEL and A/C manual override buttons on the EATC module or select panel mode and press the A/C button on the EMTC module. • **Does the PCM A/C switch PID read ON?**	**Yes** GO to **I8**. **No** INSTALL a new EATC or EMTC module. TEST the system for normal operation.
I7	**CHECK THE EMTC A/C SIGNAL WITH THE A/C ON**	
	• Key in OFF position. • Disconnect: Instrument Cluster C2206. • Key in ON position. • Select PANEL mode and press the A/C button on the EMTC module. • Measure the resistance between instrument cluster C2206-2, circuit 348 (VT) and ground.  A0093342 • **Is the resistance less than 5 ohms?**	**Yes** GO to **I9**. **No** GO to **I10**.

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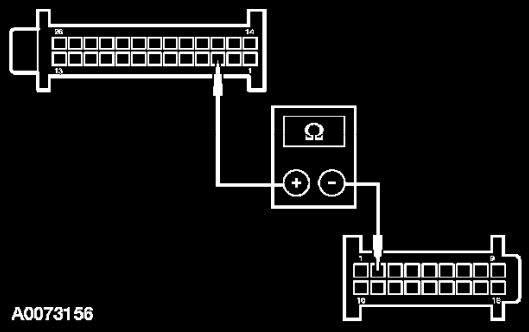
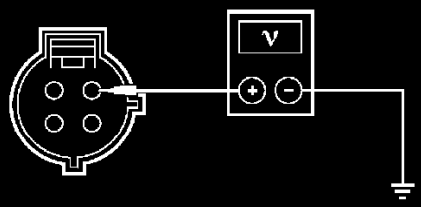
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
I8	**CHECK THE A/C REQUEST PID WITH THE A/C ON**	
	• Enter the following diagnostic mode on the diagnostic tool: PCM A/C Request PID. • Press the PANEL and A/C manual override buttons on the EATC module or select panel mode and press the A/C button on the EMTC module. • **Does the PCM A/C request PID read ON?**	**Yes** GO to **I9**. **No** EATC systems, INSTALL a new PCM. TEST the system for normal operation. Manual climate control systems, GO to **I6**.
I9	**CHECK THE A/C CLUTCH RELAY PID WITH THE A/C ON**	
	• Enter the following diagnostic mode on the diagnostic tool: PCM A/C Clutch Relay PID. • **Does the PCM A/C clutch relay PID read ON?**	**Yes** GO to **I16**. **No** GO to **I11**.
I10	**CHECK CIRCUIT 348 (VT) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: EMTC Module C294a. • Disconnect: Instrument Cluster. • Key in ON position. • Measure the resistance between EMTC module C294a-3, circuit 348 (VT) and instrument cluster C2206-2, circuit 348 (VT).  A0073156 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new PCM. TEST the system for normal operation. **No** REPAIR circuit 348 (VT) for an open. TEST the system for normal operation.
I11	**CHECK A/C CYCLING SWITCH VOLTAGE**	
	• Key in OFF position. • Disconnect: A/C Cycling Switch C130. • Key in ON position. • Measure the voltage between A/C cycling switch C130-1, circuit 441 (RD/YE) and ground.  A0013801 • **Is the voltage greater than 10 volts?**	**Yes** GO to **I12**. **No** GO to **I14**.
I12	**CHECK THE A/C CYCLING SWITCH**	
	• Key in OFF position. • Connect: PCM C175b.	

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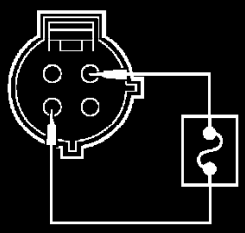
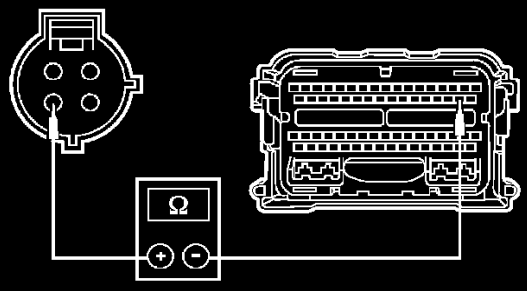
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
I12	**CHECK THE A/C CYCLING SWITCH (Continued)**	
	• Key in ON position. • Connect a fused jumper between A/C cycling switch C130-1, circuit 441 (RD/YE) and C130-4, circuit 347 (BK/YE).  A0008126 • **Does the A/C operate correctly?**	**Yes** INSTALL a new A/C cycling switch. TEST the system for normal operation. **No** GO to **I13**.
I13	**CHECK CIRCUIT 347 (BK/YE) FOR AN OPEN**	
	• Key in OFF position. • Disconnect: PCM C175b. • Measure the resistance between A/C cycling switch C130-4, circuit 347 (BK/YE) and PCM C175b-19, circuit 347 (BK/YE).  A0072942 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new PCM. TEST the system for normal operation. **No** REPAIR circuit 347 (BK/YE) for an open. TEST the system for normal operation.
I14	**CHECK CIRCUIT 295 (LB/PK)**	
	• Key in OFF position. • Disconnect: A/C High Pressure Switch C1078. • Key in ON position.	

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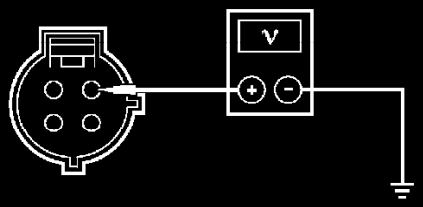
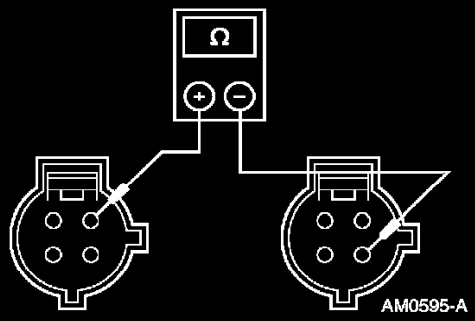
Test I12-I14

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
I14	**CHECK CIRCUIT 295 (LB/PK) (Continued)**	
	• Measure the voltage between A/C high pressure switch C1078-1, circuit 295 (LB/PK) and ground.  A0013801 • **Is the voltage greater than 10 volts?**	**Yes** GO to **I15**. **No** REPAIR circuit 295 (LB/PK) for an open. TEST the system for normal operation.
I15	**CHECK CIRCUIT 441 (RD/YE)**	
	• Key in OFF position. • Measure the resistance between A/C high pressure switch C1078-3, circuit 441 (RD/YE) and A/C cycling switch C130-1, circuit 441 (RD/YE).  AM0595-A • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new A/C high pressure switch. TEST the system for normal operation. **No** REPAIR circuit 441 (RD/YE) for an open. TEST the system for normal operation.
I16	**CHECK THE VOLTAGE AT THE A/C COMPRESSOR CLUTCH FIELD COIL**	
	• Key in OFF position. • Disconnect: A/C Compressor Clutch Field Coil C1110. • Key in ON position.	

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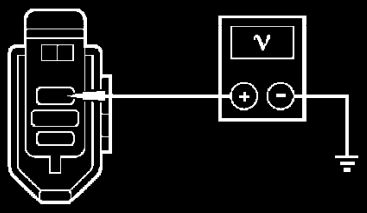
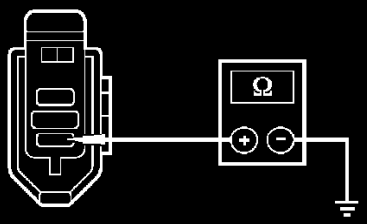
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
I16	**CHECK THE VOLTAGE AT THE A/C COMPRESSOR CLUTCH FIELD COIL (Continued)**	
	• Measure the voltage between A/C compressor clutch field coil C1110-1, circuit 321 (GY/WH) and ground.  A0013807 • **Is the voltage greater than 10 volts?**	**Yes** GO to **I17**. **No** GO to **I18**.
I17	**CHECK THE GROUND AT THE A/C COMPRESSOR CLUTCH FIELD COIL**	
	• Key in OFF position. • Measure the resistance between A/C compressor clutch field coil C1110-2, circuit 57 (BK) and ground.  A0013808 • **Is the resistance less than 5 ohms?**	**Yes** GO to **I20**. **No** REPAIR circuit 57 (BK) for an open. TEST the system for normal operation.
I18	**CHECK CIRCUIT 883 (PK/LB)**	
	• Key in OFF position. • Disconnect: A/C Clutch Relay. • Key in ON position.	

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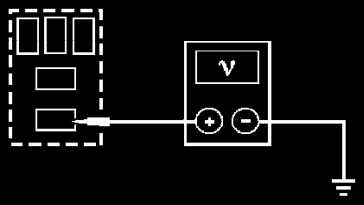
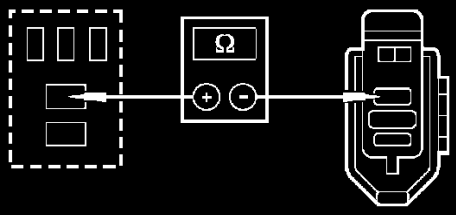
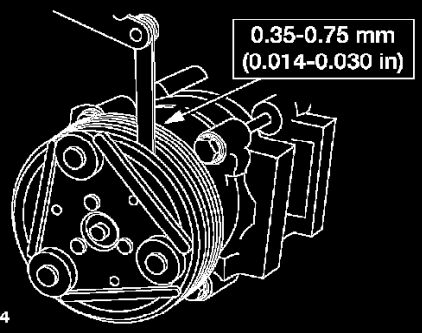
Test I16-I18

DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
I18	**CHECK CIRCUIT 883 (PK/LB) (Continued)**	
	• Measure the voltage between A/C control relay socket pin 3, circuit 883 (PK/LB) and ground.  A0013810 • **Is the voltage greater than 10 volts?**	**Yes** GO to **I19**. **No** REPAIR circuit 883 (PK/LB) for an open. TEST the system for normal operation.
I19	**CHECK CIRCUIT 321 (GY/WH)**	
	• Measure the resistance between A/C control relay socket pin 5, circuit 321 (GY/WH) and A/C compressor clutch field coil C1110-1, circuit 321 (GY/WH).  A0013809 • **Is the resistance less than 5 ohms?**	**Yes** GO to **I21**. **No** REPAIR circuit 321 (GY/WH) for an open. TEST the system for normal operation.
I20	**CHECK THE A/C COMPRESSOR CLUTCH AIR GAP**	
	• Measure the A/C compressor clutch air gap at three equally spaced locations between the clutch hub and the A/C compressor clutch pulley.  A0031504 • **Is the A/C compressor clutch air gap greater than 0.030 in (0.75 mm)?**	**Yes** ADJUST the A/C compressor clutch gap. REFER to Air Conditioning (A/C) Clutch Air Gap Adjustment . TEST the system for normal operation. **No** INSTALL a new A/C compressor clutch field coil. TEST the system for normal operation.

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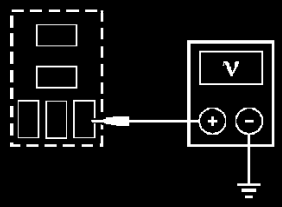
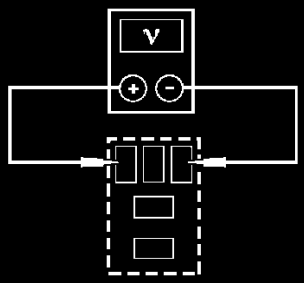
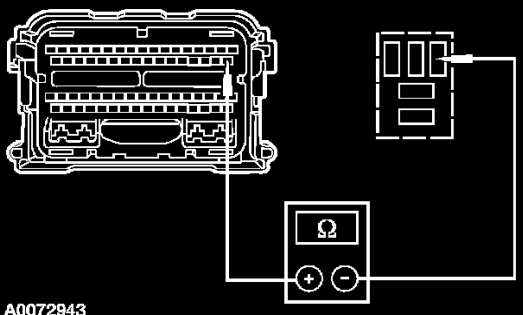
DIAGNOSIS AND TESTING (Continued)

PINPOINT TEST I: THE AIR CONDITIONING (A/C) IS INOPERATIVE/DOES NOT OPERATE CORRECTLY (Continued)

Test Step		Result / Action to Take
I21	CHECK CIRCUIT 391 (RD/YE) • Disconnect: PCM C175b. • Key in ON position. • Measure the voltage between A/C control relay socket pin 2, circuit 391 (RD/YE) and ground.  A0048578 • **Is the voltage greater than 10 volts?**	**Yes** GO to **I22.** **No** REPAIR circuit 391 (RD/YE) for a open. TEST the system for normal operation.
I22	CHECK THE WAC OUTPUT FROM THE PCM • Key in START position. • Measure the voltage between A/C control relay socket pin 1, circuit 331 (PK/YE) and pin 2, circuit 391 (RD/YE).  A0048579 • **Is the voltage greater than 10 volts?**	**Yes** INSTALL a new A/C control relay. TEST the system for normal operation. **No** GO to **I23.**
I23	CHECK CIRCUIT 331 (PK/YE) • Key in OFF position. • Disconnect: PCM C175b. • Measure the resistance between A/C control relay socket pin 1, circuit 331 (PK/YE) and PCM C175b-18, circuit 331 (PK/YE).  A0072943 • **Is the resistance less than 5 ohms?**	**Yes** INSTALL a new PCM. TEST the system for normal operation. **No** REPAIR circuit 331 (PK/YE) for an open. CLEAR the DTCs. TEST the system for normal operation.

Test I21-I23

Normal Operation

Under normal operation, when A/C is requested, a message is sent over the UBP bus to the instrument cluster, then from the instrument cluster through the CAN bus to the PCM (EATC systems) or sends voltage to the instrument cluster through circuit 348 (VT) then a message from the instrument cluster through the CAN bus to the PCM (EMTC systems). Voltage is provided to the A/C pressure cutoff switch through circuit 295 (LB/PK). The PCM receives input from the A/C pressure cutoff switch through circuit 441 (RD/YE) and through the A/C cycling switch to circuit 347 (BK/YE).

The PCM provides a ground for the A/C clutch relay coil through circuit 331 (PK/YE). The A/C clutch relay coil receives ignition voltage through circuit 391 (RD/YE). Ignition voltage for the A/C clutch relay switch is provided through circuit 883 (PK/LB). When the relay is activated, ignition voltage is supplied to the A/C clutch solenoid through circuit 321 (GY/WH). Ground is supplied for the A/C clutch through circuit 57 (BK).

Possible Causes

- An open in circuit 441 (RD/YE), 348 (VT), 883 (PK/LB), 295 (LB/PK), 347 (BK/YE), 57 (BK), 391 (RD/YE), 321 (GY/WH) or 331 (PK/YE).
- PCM.
- (EATC systems) EATC module.
- (EMTC systems) EMTC module.
- A/C cycling switch.
- A/C pressure cutoff switch.
- A/C compressor clutch field coil.
- A/C control relay.
- A/C clutch air gap.