

2012 - Mazda6 - Engine

NO.23 A/ C DOES NOT WORK SUFFICIENTLY [MZI 3.7 V6]

23	A/C DOES NOT WORK SUFFICIENTLY
DESCRIPTION	• A/C compressor magnetic clutch does not engage when the A/C switch is turned on.
POSSIBLE CAUSE	• PCM, climate control unit or instrument cluster DTC is stored. • Refrigerant pressure sensor malfunction • Improper refrigerant charging amount • Seized magnetic clutch • Evaporator temperature sensor malfunction • Open or short circuit in wiring harness between evaporator temperature sensor and climate control unit • Instrument cluster malfunction (Does not receive A/C request signal from climate control unit or transmit it to PCM.) • Information display malfunction • Climate control unit malfunction (A/C switch malfunction or climate control unit does not determine A/C request or transmit the A/C request signal.) • Open or short circuit in wiring harness between climate control unit terminal 1L and instrument cluster terminal 1A (Manual air conditioner) • Magnetic clutch malfunction • Open circuit in wiring harness between magnetic clutch terminal A and body ground • A/C relay malfunction • Open or short circuit in wiring harness between A/C relay and PCM terminal 1W • Open in wiring harness between ignition switch (IG2)^{*1}/IG2 relay^{*2} and A/C relay • Open circuit in wiring harness between battery positive terminal and A/C relay • Open circuit in wiring harness between A/C relay and magnetic clutch

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	VERIFY PCM AND CLIMATE CONTROL UNIT DTC - Switch the ignition to ON (Engine off). - Retrieve the PCM and EATC DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) (See DTC DISPLAY.) - Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See DTC TABLE [MZI 3.7 V6].) (See DTC TABLE.)
		No	No DTC is displayed: Go to the next step.
2	DETERMINE IF MALFUNCTION CAUSE IS MAGNETIC CLUTCH OR OTHER - Disconnect the magnetic clutch connector. - Start the engine and turn A/C switch on by switching the control panel. - Measure the voltage between magnetic clutch terminal A (wiring harness-side) and body ground. - Is the voltage specified? Specification 10.5 V or more	Yes	Go to Step 6.
		No	Go to the next step.
3	DETERMINE IF MALFUNCTION CAUSE IS A/ C REQUEST SIGNAL OR MAGNET CLUTCH DRIVE SIGNAL - Access and monitor the PCM PID ACCS using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Start the engine and idle it. - Monitor the PID ACCS while turning on and off the air conditioner by switching the control panel. - Does the PID change according to air control panel switching? (See PCM INSPECTION [MZI 3.7 V6].)	Yes	Go to the next step.
		No	Go to Step 7.

4	INSPECT A/ C RELAY - Inspect the A/C relay. (See RELAY INSPECTION.) - Is the A/C relay normal?	Yes	Go to the next step.
		No	Replace the A/C relay.
5	DETERMINE IF MALFUNCTION CAUSE IS A/ C RELAY CONTROL CIRCUIT OR OTHER - Switch the ignition to off. - Disconnect the A/C relay and PCM connectors. - Verify continuity between A/C relay and PCM terminal 1W (wiring harness-side). - Is there continuity?	Yes	Inspect for open circuit in followings: - Between ignition switch*1/IG2*2 and A/C relay - Between battery positive terminal and A/C relay - Between A/C relay and magnetic clutch Repair or replace suspect wiring harness and connector.
		No	Repair or replace suspect wiring harness and connector.
6	INSPECT MAGNETIC CLUTCH GROUND CIRCUIT - Verify continuity between magnetic clutch terminal A (wiring harness-side) and body ground. - Is there any continuity?	Yes	Replace the A/C compressor. (Magnetic clutch open) (See A/ C COMPRESSOR REMOVAL/ INSTALLATION .)
		No	Repair or replace suspect wiring harness and/or poor contact at ground points.
7	DETERMINE IF MALFUNCTION CAUSE IS REFRIGERANT PRESSURE SENSOR OR OTHER - Access the PCM PID ACP_PRESS using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Monitor the PID ACP_PRESS while turning on and off the air conditioner by switching the control panel. - Is the PID value normal? (See PCM INSPECTION [MZI 3.7 V6].)	Yes	Full-auto air conditioner: - Go to Step 9. Manual air conditioner: - Go to Step 10.
		No	Go to the next step.
INSPECT REFRIGERANT PRESSURE SENSOR			

8	- Inspect the refrigerant pressure sensor. (See REFRIGERANT PRESSURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) - Is the refrigerant pressure sensor normal?	Yes	Inspect for following: - Refrigerant charging amount - Magnetic clutch seizure Repair or replace the malfunctioning part according to the inspection results.
9	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SENSOR OR OTHER - Access and monitor the EATC PID EVAP_TEMP using the M-MDS. (See PID/ DATA MONITOR DISPLAY.) - Is the PID EVAP_TEMP value normal? (See PID/ DATA MONITOR TABLE.)	Yes	Go to Step 12.
10	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SENSOR OR OTHER (MANUAL AIR CONDITIONER) - Remove the climate control unit. (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].) - Reconnect the climate control unit connector. - Measure the voltage at the climate control unit terminal 1P. - Is the voltage within the specified? (See CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)	Yes	Go to Step 14.
11	INSPECT EVAPORATOR TEMPERATURE SENSOR - Inspect the evaporator temperature sensor. (See EVAPORATOR TEMPERATURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) (See EVAPORATOR TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].)	Yes	Replace the climate control module. (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER] .) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER] .)

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	Is the evaporator temperature sensor normal?	No	Replace the evaporator temperature sensor. (See EVAPORATOR TEMPERATURE SENSOR REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].) (See EVAPORATOR TEMPERATURE SENSOR REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
12	DETERMINE IF MALFUNCTION CAUSE IS INSTRUMENT CLUSTER OR OTHER (FULL-AUTO AIR CONDITIONER) - Verify the information display indication of A/C system while turning on and off the air conditioner by switching the control panel. - Does the information display indicate properly?	Yes	Replace the instrument cluster. (instrument cluster does not receive the A/C request signal from climate control unit or transmit it to PCM.) (See INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Go to the next step.
13	DETERMINE IF MALFUNCTION CAUSE IS CLIMATE CONTROL UNIT OR OTHER (FULL-AUTO AIR CONDITIONER) - Inspect the information display. (See INFORMATION DISPLAY INPUT/ OUTPUT CHECK MODE.) - Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
		No	Replace the climate control unit. (A/C switch malfunction or climate control unit does not determine the A/C request or transmit A/C request signal.) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
14	DETERMINE IF MALFUNCTION CAUSE IS INSTRUMENT CLUSTER OR OTHER (MANUAL AIR CONDITIONER) - Remove the climate control unit. (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].) - Reconnect the climate control unit connector. - Start the engine and idle it. - Measure the voltage at the climate control unit terminal 1L while turning on and off the air conditioner by switching the	Yes	Replace the instrument cluster. (Instrument cluster does not receive the A/C request signal from climate control unit or transmit it to PCM.) (See INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)
		No	Go to the next step.

	control panel. - Is the voltage change in specified according to air control panel switching? (See CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].) Specification - Turn on the A/C: Below 1.0 V - Turn off the A/C: Approx. 5.0 V		
15	DETERMINE IF MALFUNCTION CAUSE IS A/ C REQUEST SIGNAL RELATED WIRING HARNESS OR CLIMATE CONTROL UNIT (MANUAL AIR CONDITIONER) - Inspect for open or short circuit between climate control unit terminal 1L and instrument cluster terminal 1A. - Is there any malfunction?	Yes	Repair or replace suspect wiring harness and connector.
		No	Replace the climate control unit. (A/C switch malfunction or climate control unit does not determine the A/C request or transmit the A/C request signal.) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
16	Verify test results. - If normal, return to diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [MZI 3.7 V6].) - If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. - If vehicle is repaired, troubleshooting completed. - If vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.		

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without advanced keyless entry and push button start system

*2

with advanced keyless entry and push button start system

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Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	VERIFY PCM AND CLIMATE CONTROL UNIT DTC - Switch the ignition to ON (Engine off). - Retrieve the PCM and EATC DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) (See DTC DISPLAY.) - Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See DTC TABLE [MZI 3.7 V6].) (See DTC TABLE.)
		No	No DTC is displayed: Go to the next step.
2	DETERMINE IF MALFUNCTION CAUSE IS MAGNETIC CLUTCH OR OTHER - Disconnect the magnetic clutch connector. - Start the engine and turn A/C switch on by switching the control panel. - Measure the voltage between magnetic clutch terminal A (wiring harness-side) and body ground. - Is the voltage specified? Specification 10.5 V or more	Yes	Go to Step 6.
		No	Go to the next step.
3	DETERMINE IF MALFUNCTION CAUSE IS A/ C REQUEST SIGNAL OR MAGNET CLUTCH DRIVE SIGNAL - Access and monitor the PCM PID ACCS using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Start the engine and idle it. - Monitor the PID ACCS while turning on and off the air conditioner by switching the control panel. - Does the PID change according to air control panel switching? (See PCM INSPECTION [MZI 3.7 V6].)	Yes	Go to the next step.
		No	Go to Step 7.

4	INSPECT A/ C RELAY - Inspect the A/C relay. (See RELAY INSPECTION.) - Is the A/C relay normal?	Yes	Go to the next step.
		No	Replace the A/C relay.
5	DETERMINE IF MALFUNCTION CAUSE IS A/ C RELAY CONTROL CIRCUIT OR OTHER - Switch the ignition to off. - Disconnect the A/C relay and PCM connectors. - Verify continuity between A/C relay and PCM terminal 1W (wiring harness-side). - Is there continuity?	Yes	Inspect for open circuit in followings: - Between ignition switch*1/IG2*2 and A/C relay - Between battery positive terminal and A/C relay - Between A/C relay and magnetic clutch Repair or replace suspect wiring harness and connector.
		No	Repair or replace suspect wiring harness and connector.
6	INSPECT MAGNETIC CLUTCH GROUND CIRCUIT - Verify continuity between magnetic clutch terminal A (wiring harness-side) and body ground. - Is there any continuity?	Yes	Replace the A/C compressor. (Magnetic clutch open) (See A/ C COMPRESSOR REMOVAL/ INSTALLATION .)
		No	Repair or replace suspect wiring harness and/or poor contact at ground points.
7	DETERMINE IF MALFUNCTION CAUSE IS REFRIGERANT PRESSURE SENSOR OR OTHER - Access the PCM PID ACP_PRESS using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Monitor the PID ACP_PRESS while turning on and off the air conditioner by switching the control panel. - Is the PID value normal? (See PCM INSPECTION [MZI 3.7 V6].)	Yes	Full-auto air conditioner: - Go to Step 9. Manual air conditioner: - Go to Step 10.
		No	Go to the next step.
INSPECT REFRIGERANT PRESSURE SENSOR			

8	- Inspect the refrigerant pressure sensor. (See REFRIGERANT PRESSURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) - Is the refrigerant pressure sensor normal?	Yes	Inspect for following: - Refrigerant charging amount - Magnetic clutch seizure Repair or replace the malfunctioning part according to the inspection results.
9	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SENSOR OR OTHER - Access and monitor the EATC PID EVAP_TEMP using the M-MDS. (See PID/ DATA MONITOR DISPLAY.) - Is the PID EVAP_TEMP value normal? (See PID/ DATA MONITOR TABLE.)	Yes	Go to Step 12.
10	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SENSOR OR OTHER (MANUAL AIR CONDITIONER) - Remove the climate control unit. (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].) - Reconnect the climate control unit connector. - Measure the voltage at the climate control unit terminal 1P. - Is the voltage within the specified? (See CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)	Yes	Go to Step 14.
11	INSPECT EVAPORATOR TEMPERATURE SENSOR - Inspect the evaporator temperature sensor. (See EVAPORATOR TEMPERATURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) (See EVAPORATOR TEMPERATURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].)	Yes	Replace the climate control module. (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER] .) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER] .)

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	Is the evaporator temperature sensor normal?	No	Replace the evaporator temperature sensor. (See EVAPORATOR TEMPERATURE SENSOR REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].) (See EVAPORATOR TEMPERATURE SENSOR REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
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		No	Go to the next step.
13	DETERMINE IF MALFUNCTION CAUSE IS CLIMATE CONTROL UNIT OR OTHER (FULL-AUTO AIR CONDITIONER) - Inspect the information display. (See INFORMATION DISPLAY INPUT/ OUTPUT CHECK MODE.) - Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
		No	Replace the climate control unit. (A/C switch malfunction or climate control unit does not determine the A/C request or transmit A/C request signal.) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].)
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		No	Go to the next step.

	control panel. - Is the voltage change in specified according to air control panel switching? (See CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].) Specification - Turn on the A/C: Below 1.0 V - Turn off the A/C: Approx. 5.0 V		
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