

2012 - Mazda6 - Engine

NO.23 A/ C DOES NOT WORK SUFFICIENTLY [MZR 2.5]

23	A/C DOES NOT WORK SUFFICIENTLY
DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C is turned on.
POSSIBLE CAUSE	• PCM or climate control unit DTC is stored. • Refrigerant pressure sensor malfunction • Improper refrigerant charging amount • Seized A/C compressor • 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 circuit in wiring harness between A/C relay and PCM terminal 1I • Open circuit 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 - Retrieve the PCM and climate control unit DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) (See DTC DISPLAY.) - Are there any DTCs displayed?	Yes	Go to the appropriate DTC inspection. (See DTC TABLE [MZR 2.5] .) (See DTC TABLE .)
		No	Go to the next step.
2	DETERMINE IF MALFUNCTION CAUSE IS A/ C REQUEST SIGNAL OR MAGNET CLUTCH DRIVE SIGNAL - Access the PCM PID ACCS using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Start the engine and idle it. - Turn the PID ACCS to ON from OFF using the M-MDS simulation function. - Is the magnetic clutch engaged?	Yes	Go to the next step.
		No	Go to Step 13.
3	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SIGNAL OR OTHER - Access the PCM PID AC_REQ using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Start the engine and idle it. - Monitor the PID AC_REQ 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 [MZR 2.5].)	Yes	Go to the next step.
		No	Full-auto air conditioner: - Go to Step 6. Manual air conditioner: - Go to Step 7.
4	DETERMINE IF MALFUNCTION CAUSE IS REFRIGERANT PRESSURE SENSOR OR OTHER	Yes	Go to Step 13.

	Access the PCM PID COLP using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Monitor the COLP PID while turning on and off the air conditioner by switching the control panel. - Is the PID value normal? (See PCM INSPECTION [MZR 2.5].)	No	Go to the next step.
5	INSPECT REFRIGERANT PRESSURE SENSOR - Inspect the refrigerant pressure sensor. (See REFRIGERANT PRESSURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) - Is the refrigerant pressure sensor normal?	Yes Inspect for following: - Refrigerant charging amount - Magnetic clutch for seizure Repair or replace the malfunctioning part according to the inspection results.	No Inspect the following: - A/C switch is stuck open. - pen circuit in wiring harness between the refrigerant pressure sensor and PCM terminal 1J - Open circuit in wiring harness between front blower motor and resistor (If the front blower motor does not operate.) - Evaporator temperature sensor and climate control unit Repair or replace the malfunctioning part according to the inspection results.
6	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SENSOR OR OTHER (FULL-AUTO AIR CONDITIONER) Access the climate control unit PID EVAP_TEMP using the M-MDS. (See PID/ DATA MONITOR	Yes Go to Step 9.	No Go to Step 8.

	DISPLAY.) • Monitor the EVAP_TEMP PID while turning on and off the air conditioner by switching the control panel. • Is the PID value normal?		
7	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 11.
		No	Go to the next step.
8	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].) • Is the evaporator temperature sensor normal?	Yes	Inspect for open or short circuit between evaporator temperature sensor and climate control unit. Repair or replace suspected wiring harness and connector. • If normal, replace the climate control unit. (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
		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] .)
9	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 A/C request signal from climate control unit or transmit it to PCM.) (See INSTRUMENT CLUSTER REMOVAL/ INSTALLATION .)
		No	Go to the next step.
10	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.
		No	Replace the climate control unit. (A/C switch malfunction or climate control unit does not determine A/C request or transmit the A/C request signal.) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER] .)
11	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 control panel. - Is the voltage change in specified according to air control panel switching? (See CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)	Yes	Replace the instrument cluster. (Instrument cluster does not receive A/C request signal from climate control unit or transmit it to PCM.) (See INSTRUMENT CLUSTER REMOVAL/ INSTALLATION .)
		No	Go to the next step.

	Specification • Turn on the A/C: Below 1.0 V • Turn off the A/C: Approx. 5 V		
12	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 open or short circuit detected?	Yes	Repair or replace suspected wiring harness and connector.
		No	Replace the climate control unit. (A/C switch malfunction or climate control unit does not determine A/C request or transmit the A/C request signal.) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER] .)
13	DETERMINE IF MALFUNCTION CAUSE IS A/ C CONTROL SIGNAL OR MAGNETIC CLUTCH • Start the engine and idle it. • Turn the PID ACCS to ON from OFF using the M-MDS simulation function. • Measure the voltage between magnetic clutch terminal A and body ground. • Is the voltage specified? Specification • 10.5 V or more	Yes	Go to the next step.
		No	Go to Step 15.
14	INSPECT MAGNETIC CLUTCH GROUND CIRCUIT FOR OPEN CIRCUIT • Verify continuity between magnetic clutch terminal A and body ground. • Is there any continuity?	Yes	Replace the A/C compressor. (See A/ C COMPRESSOR REMOVAL/ INSTALLATION .)
		No	Repair or replace suspected wiring harness and/or poor contact ground points.
15	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.
16	INSPECT A/ C RELAY CONTROL CIRCUIT FOR OPEN CIRCUIT • Switch the ignition to off.	Yes	Inspect for open circuit in followings: • Between ignition switch *1 *2

	• Disconnect the A/C relay and PCM connectors. • Verify continuity between A/C relay and PCM terminal 1I (wiring harness-side). • Is there any continuity?		(IG2) /IG2 relay and A/C relay • Between battery positive terminal and A/C relay • Between A/C relay and magnetic clutch Repair or replace suspected wiring harness and connector.
		No	Repair or replace suspected wiring harness and connector.
17	• Verify test results. ▪ If normal, return to diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [MZR 2.5].) ▪ 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.		

*1

Without advanced keyless entry and push button start system

*2

With advanced keyless entry and push button start system

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DESCRIPTION	• A/C compressor magnetic clutch does not engage when A/C is turned on.
POSSIBLE CAUSE	• PCM or climate control unit DTC is stored. • Refrigerant pressure sensor malfunction • Improper refrigerant charging amount • Seized A/C compressor • 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 circuit in wiring harness between A/C relay and PCM terminal 1I • Open circuit 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 - Retrieve the PCM and climate control unit DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) (See DTC DISPLAY.) - Are there any DTCs displayed?	Yes	Go to the appropriate DTC inspection. (See DTC TABLE [MZR 2.5] .) (See DTC TABLE .)
		No	Go to the next step.
2	DETERMINE IF MALFUNCTION CAUSE IS A/ C REQUEST SIGNAL OR MAGNET CLUTCH DRIVE SIGNAL - Access the PCM PID ACCS using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Start the engine and idle it. - Turn the PID ACCS to ON from OFF using the M-MDS simulation function. - Is the magnetic clutch engaged?	Yes	Go to the next step.
		No	Go to Step 13.
3	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SIGNAL OR OTHER - Access the PCM PID AC_REQ using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Start the engine and idle it. - Monitor the PID AC_REQ 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 [MZR 2.5].)	Yes	Go to the next step.
		No	Full-auto air conditioner: - Go to Step 6. Manual air conditioner: - Go to Step 7.
4	DETERMINE IF MALFUNCTION CAUSE IS REFRIGERANT PRESSURE SENSOR OR OTHER	Yes	Go to Step 13.

	Access the PCM PID COLP using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) • Monitor the COLP PID while turning on and off the air conditioner by switching the control panel. • Is the PID value normal? (See PCM INSPECTION [MZR 2.5].)	No	Go to the next step.
5	INSPECT REFRIGERANT PRESSURE SENSOR • Inspect the refrigerant pressure sensor. (See REFRIGERANT PRESSURE SENSOR INSPECTION [FULL-AUTO AIR CONDITIONER].) (See REFRIGERANT PRESSURE SENSOR INSPECTION [MANUAL AIR CONDITIONER].) • Is the refrigerant pressure sensor normal?	Yes	Inspect for following: • Refrigerant charging amount • Magnetic clutch for seizure Repair or replace the malfunctioning part according to the inspection results.
		No	Inspect the following: • A/C switch is stuck open. • pen circuit in wiring harness between the refrigerant pressure sensor and PCM terminal 1J • Open circuit in wiring harness between front blower motor and resistor (If the front blower motor does not operate.) • Evaporator temperature sensor and climate control unit Repair or replace the malfunctioning part according to the inspection results.
6	DETERMINE IF MALFUNCTION CAUSE IS EVAPORATOR TEMPERATURE SENSOR OR OTHER (FULL-AUTO AIR CONDITIONER) • Access the climate control unit PID EVAP_TEMP using the M-MDS. (See PID/ DATA MONITOR	Yes	Go to Step 9.
		No	Go to Step 8.

	DISPLAY.) • Monitor the EVAP_TEMP PID while turning on and off the air conditioner by switching the control panel. • Is the PID value normal?		
7	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 11.
		No	Go to the next step.
8	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].) • Is the evaporator temperature sensor normal?	Yes	Inspect for open or short circuit between evaporator temperature sensor and climate control unit. Repair or replace suspected wiring harness and connector. • If normal, replace the climate control unit. (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER].)
		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] .)
9	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 A/C request signal from climate control unit or transmit it to PCM.) (See INSTRUMENT CLUSTER REMOVAL/ INSTALLATION .)
		No	Go to the next step.
10	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.
		No	Replace the climate control unit. (A/C switch malfunction or climate control unit does not determine A/C request or transmit the A/C request signal.) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [FULL-AUTO AIR CONDITIONER] .)
11	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 control panel. - Is the voltage change in specified according to air control panel switching? (See CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)	Yes	Replace the instrument cluster. (Instrument cluster does not receive A/C request signal from climate control unit or transmit it to PCM.) (See INSTRUMENT CLUSTER REMOVAL/ INSTALLATION .)
		No	Go to the next step.

	Specification • Turn on the A/C: Below 1.0 V • Turn off the A/C: Approx. 5 V		
12	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 open or short circuit detected?	Yes	Repair or replace suspected wiring harness and connector.
		No	Replace the climate control unit. (A/C switch malfunction or climate control unit does not determine A/C request or transmit the A/C request signal.) (See CLIMATE CONTROL UNIT REMOVAL/ INSTALLATION [MANUAL AIR CONDITIONER] .)
13	DETERMINE IF MALFUNCTION CAUSE IS A/ C CONTROL SIGNAL OR MAGNETIC CLUTCH • Start the engine and idle it. • Turn the PID ACCS to ON from OFF using the M-MDS simulation function. • Measure the voltage between magnetic clutch terminal A and body ground. • Is the voltage specified? Specification • 10.5 V or more	Yes	Go to the next step.
		No	Go to Step 15.
14	INSPECT MAGNETIC CLUTCH GROUND CIRCUIT FOR OPEN CIRCUIT • Verify continuity between magnetic clutch terminal A and body ground. • Is there any continuity?	Yes	Replace the A/C compressor. (See A/ C COMPRESSOR REMOVAL/ INSTALLATION .)
		No	Repair or replace suspected wiring harness and/or poor contact ground points.
15	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.
16	INSPECT A/ C RELAY CONTROL CIRCUIT FOR OPEN CIRCUIT • Switch the ignition to off.	Yes	Inspect for open circuit in followings: • Between ignition switch *1 *2

	• Disconnect the A/C relay and PCM connectors. • Verify continuity between A/C relay and PCM terminal 1I (wiring harness-side). • Is there any continuity?		(IG2) /IG2 relay and A/C relay • Between battery positive terminal and A/C relay • Between A/C relay and magnetic clutch Repair or replace suspected wiring harness and connector.
		No	Repair or replace suspected wiring harness and connector.
17	• Verify test results. ▪ If normal, return to diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [MZR 2.5].) ▪ 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

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With advanced keyless entry and push button start system