

CRUISE CONTROL SYSTEM

Article Text

1993 Mazda 929

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ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT

Mazda Cruise Control System

929

DESCRIPTION & OPERATION

System uses an electric motor actuator to control throttle position, maintaining desired vehicle speed. Based on various inputs, cruise control unit controls operation of actuator motor. See ELECTRICAL COMPONENT LOCATIONS table.

When main switch is in ON position, system is ready to be engaged. Cruise control switch sets or adjusts desired speed. Cruise control switch contains SET, COAST, RESUME and ACCEL switches (and CANCEL switch on some models). System will not operate at speeds less than 25 MPH.

To engage system, accelerate to desired speed and momentarily activate SET switch. To disengage system, apply brakes, press clutch pedal (M/T) or turn main switch to OFF position.

To accelerate from a set cruising speed, activate ACCEL switch until vehicle speed is as desired, then turn off ACCEL switch. To decrease speed, activate COAST switch until vehicle speed is as desired, then turn off COAST switch. To resume previous set speed, activate RESUME switch (previous set speed cannot be resumed if system was disengaged using main switch).

If a fault occurs, cruise control unit stores a self-diagnostic code in memory. See RETRIEVING FAULT CODES under SYSTEM TESTING. Self-diagnostic system also includes an inspection mode that can be initiated to check individual components and their circuits. See INITIATING INSPECTION MODE under SYSTEM TESTING.

NOTE: System uses 2 switches to determine if brakes are being applied: cruise brake switch (dedicated to cruise control system) and brakelight switch (part of brakelight system).

NOTE: On vehicles with automatic overdrive transmission, if speed drops 5 MPH less than set speed, cruise control unit cancels or prevents OD transmission function. When vehicle speed returns to within 2 MPH of set speed for at least 20 seconds, OD transmission function is restored.

ELECTRICAL COMPONENT LOCATIONS TABLE

AA

Component	Location
-----------	----------

Cruise Control Unit	Behind Left Kick Panel
---------------------------	------------------------

Neutral Switch (M/T)	
----------------------	--

Park/Neutral (Inhibitor)	
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Switch (A/T)	On Right Side Of Transmission
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Transmission PCM	Behind Right Kick Panel
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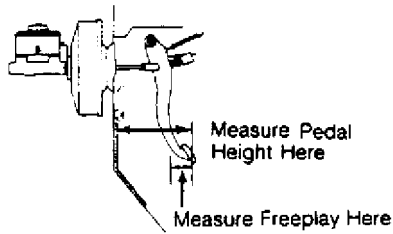


Fig. 1: Measuring Brake & Clutch Pedal Height
Courtesy of Mazda Motors Corp.

CLUTCH SWITCH

Loosen clutch switch adjustment nuts. Rotate clutch switch until distance between carpet and center of clutch pedal pad at firewall is within specification. See CLUTCH PEDAL HEIGHT table. See Fig. 1. Tighten clutch switch adjustment nuts.

SYSTEM TESTING

1) If vehicle speed cannot be set or controlled, check for fault codes and initiate inspection mode (inspection codes). See RETRIEVING FAULT CODES and INITIATING INSPECTION MODE.

2) If no fault codes are set and all inspection codes are okay, check components in the following order: main switch, cruise control unit, cruise brake switch, brakelight switch, clutch switch (M/T), cruise control switch, actuator and vehicle speed sensor. See COMPONENT TESTING.

RETRIEVING FAULT CODES

1) Go to next step.

2) Turn ignition on. Turn main switch to ON position. Ensure cruise indicator light comes on. If indicator light does not come on, repair it before continuing.

3) Activate RESUME switch for at least 3 seconds. Indicator light will come on for 3 seconds, then go out for 2 seconds. After this, light will flash codes (if stored). See FAULT CODE DIRECTORY. If no fault codes are stored, light will not flash. To exit self-diagnostics, drive vehicle at a speed greater than 10 MPH or turn main switch to OFF position. Ensure light goes off.

FAULT CODE DIRECTORY

A list of fault codes with the appropriate diagnosis follows. A long pause separates codes. On 2-digit codes, a short pause separates each digit of the code (example of Code 15: long flash, short pause, 5 short flashes).

Fault Code 01

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Check wiring harness leading to actuator, brakelight switch and cruise brake switch. Check actuator. See ACTUATOR under COMPONENT TESTING. Check cruise brake switch and brakelight switch. See CRUISE BRAKE SWITCH and BRAKELIGHT SWITCH under COMPONENT TESTING.

Fault Code 05

Check STOP fuse. Check wiring between STOP fuse and cruise control unit.

Fault Code 07

Check cruise brake switch and brakelight switch. See CRUISE BRAKE SWITCH and BRAKELIGHT SWITCH under COMPONENT TESTING.

Fault Code 11

Check cruise control switch. See CRUISE CONTROL SWITCH under COMPONENT TESTING.

Fault Code 12

Check cruise control switch. See CRUISE CONTROL SWITCH under COMPONENT TESTING.

Fault Code 15

Check for defective cruise control unit. See CRUISE CONTROL UNIT under COMPONENT TESTING.

INITIATING INSPECTION MODE

1) Leave electrical connector attached to cruise control unit.

NOTE: There is no wire in terminal "D" of cruise control unit connector. Push test light probe through connector cavity until probe contacts terminal on cruise control unit.

2) Shift transmission into Drive or Reverse (any gear except Neutral on M/T). Turn ignition on. Ensure main switch is in OFF position (indicator light must be off). Simultaneously activate RESUME switch and turn MAIN switch to ON position. Ensure cruise indicator light comes on. Inspection mode is now initiated. Go to INSPECTION CODE DIRECTORY.

INSPECTION CODE DIRECTORY

A list of inspection codes follows. Beginning with Inspection Code 21, perform procedure listed after each code. If system is operating properly, indicator light will flash code. If light does not flash code, inspect system as described. To exit self-diagnostics, turn main switch to OFF position or turn ignition off.

Inspection Code 21

Press SET/COAST button. If Code 21 does not flash, check cruise control switch. See CRUISE CONTROL SWITCH under COMPONENT

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EXCEPT MX-6 & 626

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Fig. 2: Actuator Connector Terminal ID

Courtesy of Mazda Motors Corp.

Function Test

Observe actuator arm when battery voltage is connected across specified terminals of actuator connector. See Fig. 2. If actuator arm does not function as specified, replace actuator.

ACTUATOR FUNCTION TEST TABLE

AA

Application	Actuator Arm Result
-------------	---------------------

Apply 12 Volts To Terminals "B" & "D"	
& Ground Terminals "A" & "C"	Pull

Apply 12 Volts To Terminals "B" & "D"	
& Ground Terminal "C"	Hold

Apply 12 Volts To Terminals "A" & "D"	
& Ground Terminals "B" & "C"	Extend

Disconnect All Voltage & Ground	Release
---------------------------------------	---------

AA

BRAKELIGHT SWITCH

NOTE: Brakelight switch can be distinguished from cruise brake switch by color of wires connected to switch. See BRAKELIGHT & CRUISE BRAKE SWITCHES IDENTIFICATION table.

Disconnect brakelight switch connector. Check continuity between brakelight switch connector terminals with brake pedal in specified position. See BRAKELIGHT SWITCH CONTINUITY TEST table. If continuity is not as specified, replace brakelight switch.

BRAKELIGHT SWITCH CONTINUITY TEST TABLE

AA

Pedal Position	Specification
----------------	---------------

Released	No Continuity
----------------	---------------

Pressed	Continuity
---------------	------------

AA

BRAKELIGHT & CRUISE BRAKE SWITCHES IDENTIFICATION TABLE

AA

Application	Wire Colors
-------------	-------------

Brakelight Switch	Green/Yellow & White/Green
-------------------------	----------------------------

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Switch Position	Ohms
1	1000
2	1000
3	1000
4	1000
5	1000
6	1000
7	1000
8	1000
9	1000
10	1000
11	1000
12	1000
13	1000
14	1000
15	1000
16	1000
17	1000
18	1000
19	1000
20	1000
21	1000
22	1000
23	1000
24	1000
25	1000
26	1000
27	1000
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76	1000
77	1000
78	1000
79	1000
80	1000
81	1000
82	1000
83	1000
84	1000
85	1000
86	1000
87	1000
88	1000
89	1000
90	1000
91	1000
92	1000
93	1000
94	1000
95	1000
96	1000
97	1000
98	1000
99	1000
100	1000

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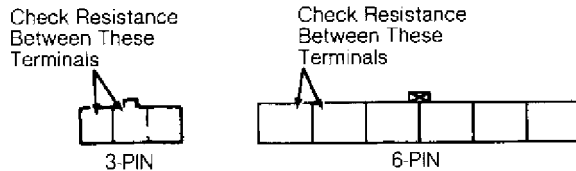
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No Buttons Pressed	Infinite Ohms
RESUME/ACCEL	910 Ohms
SET/COAST	240 Ohms
CANCEL	0 Ohms
AA	



93E83323

Fig. 3: Cruise Control Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

CRUISE CONTROL UNIT

Turn ignition on. Check voltage at cruise control unit connector terminals with electrical connector attached (backprobe terminals). See Fig. 6. If voltages are not as specified, check appropriate circuit and component. If circuit and component are okay, replace cruise control unit.

MAIN SWITCH

Disconnect main switch connector. With main switch in specified position, check continuity between main switch connector terminals. See MAIN SWITCH CONTINUITY TEST table. See Fig. 4. If continuity is not as specified, replace main switch.

MAIN SWITCH CONTINUITY TEST TABLE

AA	
Switch Position	Continuity Between Terminals
OFF	"A" & "F"; (1) "B" & "C"
ON	"A" & "B"; (1) "B" & "C"

(1) - Apply battery voltage across these terminals to test switch backlighting or indicator light.

AA



93D00722

Fig. 4: Main Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

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VEHICLE SPEED SENSOR

NOTE: If speedometer operates, vehicle speed sensor is okay.

Speedometer Needle Moves But Fluctuates Or Is Inaccurate

Disconnect vehicle speed sensor connector. Connect AC voltmeter (5-volt scale) across vehicle speed sensor connector terminals. See Fig. 5. Slowly turn rear wheels. If voltage pulses are detected, vehicle speed sensor is okay. If voltage pulses are not detected, replace vehicle speed sensor.

Speedometer Needle Does Not Move

Remove vehicle speed sensor. Turn shaft gear by hand. See Fig. 5. If magnetic resistance is not felt, replace vehicle speed sensor. If magnetic resistance is felt, measure resistance across vehicle speed sensor connector terminals. If resistance is about 290 ohms at 68°F (20°C), vehicle speed sensor is okay. If resistance is not as specified, replace vehicle speed sensor.

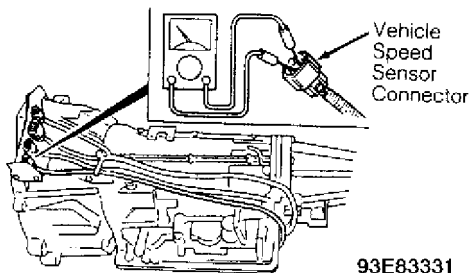


Fig. 5: Checking Vehicle Speed Sensor
Courtesy of Mazda Motors Corp.

VOLTAGE TEST CHARTS

CRUISE CONTROL SYSTEM

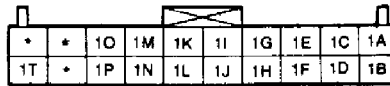
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CRUISE CONTROL UNIT VOLTAGE TEST CHART (929)

	Pin	Circuit	Test Conditions ¹ (Voltage)
Light Green/Black	1A	Actuator Motor	Main Switch Off (0); Main Switch On (Battery)
Red/Blue	1B	Actuator Motor	Main Switch Off (0); Main Switch On (Battery)
Yellow/Black	1C	Actuator Clutch	Main Switch Off (0); Main Switch On (8.5-9.5)
Gray	1D	CRUISE Indicator Light	Light Off (Battery); Light On (0)
Blue/Red	1E	Main Switch	Main Switch Off (Battery)
Light Green/Red	1F	Main Switch	Main Switch On (Battery)
Violet	1G	Transmission PCM	All Conditions (Battery)
Yellow	1H	Cruise Brake Switch	Release Pedal (8.5-9.5); Depress Pedal (Battery)
Black/Yellow	1J	Inhibitor Switch	Trans. In Park Or Neutral (0); Except Park Or Neutral (Battery)
Green/Yellow	1K	STOP Fuse	All Conditions (Battery)
White/Green	1M	Brakelight Switch	Release Pedal (0); Depress Pedal (Battery)
Blue/White	1N	Cruise Control Switch	Main Switch On. (4.5-5.5); Press SET Button (1.5-2.5); Press RESUME Button (2.5-3.5); Press CANCEL Button (0)
Brown/White	1O	Actuator Clutch	Main Switch Off (0); Main Switch On (9)
Green/Red	1P	Vehicle Speed Sensor	Rotate Rear Wheels (Fluctuating 0-5)
Black	1T	Ground	All Conditions (0)

¹ - Turn ignition on, unless specified otherwise.

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Fig. 6: Cruise Control Unit Voltage Test Chart
Courtesy of Mazda Motors Corp.

WIRING DIAGRAMS

Refer to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE