

# G - TESTS W/CODES

## 1991 Mazda Miata

1990-91 ENGINE PERFORMANCE  
Self-Diagnostics

Mazda; Miata

### SELF-DIAGNOSTIC SYSTEM INTRODUCTION

If no faults were found while performing F - BASIC TESTING proceed with self-diagnostics. If no fault codes or only pass codes are present after entering self-diagnostics, proceed to H - TESTS W/O CODES article for diagnosis by symptom (i.e. ROUGH IDLE, NO START, etc.).

### HARD FAILURES

Hard failures cause malfunction light to illuminate and remain on until the malfunction is repaired. If light comes on and remains on (light may flash) during vehicle operation, cause of malfunction must be determined using diagnostic (code) charts. If a sensor fails, control unit will use a substitute value in its calculations to continue engine operation. In this condition, vehicle is functional, but loss of good driveability will most likely be encountered.

### INTERMITTENT FAILURES

Intermittent failures may cause malfunction light to flicker or illuminate and go out after the intermittent fault goes away. The corresponding trouble code, however, will be retained in control unit memory. If related fault does not reoccur within a certain time frame, related trouble code will be erased from control unit memory. Intermittent failures may be caused by sensor, connector or wiring related problems. See INTERMITTENTS in TROUBLE SHOOTING (NO CODES) section.

### RETRIEVING CODES

#### TROUBLE CODE ACCESS

1) Use Self Diagnostic Checker (49 H018 9A1) and System Selector (49 B019 9A0) to retrieve trouble codes. Connect one lead of self diagnostic checker to ground and the other to system selector. Connect system selector to diagnostic connector. See Fig. 1.

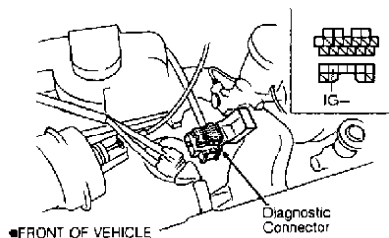


Fig. 1: Self Diagnostic Connector Location  
Courtesy of Mazda Motors Corp.

2) With ignition on and engine stopped, observe Check Engine or MIL light. Note trouble codes. Check TROUBLE CODE IDENTIFICATION

table for possible cause. If light remains on continuously, MIL circuit is grounded or ECU is defective.

## CLEARING CODES

### CLEARING TROUBLE CODES

1) Disconnect negative battery cable for at least 5 seconds. Reconnect battery cable.

2) Ground test connector with jumper wire. Turn ignition on and verify no codes are displayed.

## SUMMARY

If no fault codes (or only pass codes) are present, proceed to H - TESTS W/O CODES for diagnosis by symptom (i.e. ROUGH IDLE, NO START, etc.).

## TROUBLE CODE IDENTIFICATION CHART

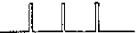
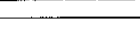



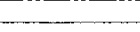


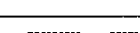

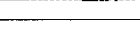

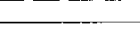

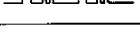

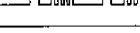




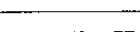

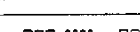
Code Numbers		Sensor or subsystem	Self-diagnosis	Fail-safe
Code No.	Malfunction display Pattern of output signal (Self-Diagnosis Checker)			
01	ON  OFF 	Ignition pulse	No IGT-signal	—
02	ON  OFF 	Ne-signal	No Ne-signal	—
03	ON  OFF 	G-signal	No G-signal	—
08	ON  OFF 	Airflow meter	Open or short circuit	Basic fuel injection amount fixed as for two driving modes (1) Idle switch: ON (2) Idle switch: OFF
09	ON  OFF 	Water thermosensor	Open or short circuit	Maintains constant 20°C (68°F) command
10	ON  OFF 	Intake air thermosensor (Airflow meter)	Open or short circuit	Maintains constant 20°C (68°F) command
12	ON  OFF 	Throttle sensor	Open or short circuit	Maintains constant command of throttle valve fully open
14	ON  OFF 	Atmospheric pressure sensor	Open or short circuit	Maintains constant command of sea level pressure
15	ON  OFF 	Oxygen sensor	Sensor output continues less than 0.55V 180 sec. after engine exceeds 1,500 rpm	Cancels engine feedback operation
17	ON  OFF 	Feedback system	Sensor output continues unchanged 20 sec. after engine exceeds 1,500 rpm	Cancels engine feedback operation
26	ON  OFF 	Solenoid valve (Purge control)	—	—
34	ON  OFF 	ISC valve		—

Fig. 2: Trouble Code Identification Chart  
Courtesy of Mazda Motors Corp.

## CODE 1: IGNITION SIGNAL

### Trouble Code No. 1 (Ignition Signal)

STEP	INSPECTION	ACTION							
1	Are there any poor connections at ignition coil connectors and igniter connectors?	Yes	Repair or replace connector						
		No	Go to next step						
2	Does tachometer operates?	Yes	Go to next step						
		No	Check for open circuit in wiring from igniter to ECU terminal 21						
3	Is resistance of ignition coil OK? Resistance: Primary 0.78—0.94Ω Secondary 11.2—15.2 kΩ	Yes	Go to next step						
		No	Replace ignition coil ★						
4	Is there continuity between ignition coil and igniter? <table><tr><td>Ignition coil</td><td>Igniter</td></tr><tr><td>A (W)</td><td>A (W)</td></tr><tr><td>B (Y)</td><td>H (Y)</td></tr></table>	Ignition coil	Igniter	A (W)	A (W)	B (Y)	H (Y)	Yes	Go to next step
		Ignition coil	Igniter						
A (W)	A (W)								
B (Y)	H (Y)								
		No	Check for open circuit in wiring from ignition coil to igniter						
5	Is ignition coil terminal wire (L) voltage OK? ★	Yes	Go to next step						
		No	Check for open circuit in wiring from ignition coil to ignition switch						
6	Is igniter terminal wire (L) voltage OK? ★	Yes	Go to next step						
		No	Check for open circuit in wiring from igniter to ignition switch						
7	Is there continuity between igniter and ground?	Yes	Go to next step						
		No	Check for open circuit in wiring from igniter to ground						
8	Check igniter ★	Yes	Replace ECU ★						
		No	Replace igniter ★						

Fig. 3: Code 1: Ignition Signal Chart  
Courtesy of Mazda Motors Corp.

### CODE 2: NE SIGNAL-CRANK ANGLE

Trouble Code No. 2 (Ne Signal-Crank Angle)							
STEP	INSPECTION	ACTION					
1	Are there any poor connections in crank angle sensor circuit?	Yes	Repair or replace connector				
		No	Go to next step				
2	Is Code No.03 present at same time?	Yes	Go to next step				
		No	Go to Step 5				
3	Is there continuity between crank angle sensor terminal wire (B/LG) and ground?	Yes	Go to next step				
		No	Check for open circuit in wiring from crank angle sensor to ground				
4	Is there battery voltage at crank angle sensor terminal wire (W/R)?	Yes	Go to next step				
		No	Check for open circuit in wiring from crank angle sensor to main relay				
5	Is there continuity between crank angle sensor and ECU?	Yes	Go to next step				
	<table><tr><td>Crank angle sensor</td><td>ECU</td></tr><tr><td>C (W)</td><td>2E</td></tr></table>	Crank angle sensor	ECU	C (W)	2E	No	Check for open circuit in wiring from crank angle sensor to ECU
Crank angle sensor	ECU						
C (W)	2E						
6	Is there approx. 5V at ECU terminal 2E? (With crank angle sensor connector disconnected)	Yes	Go to next step				
		No	Replace ECU ★				
7	Is there approx. 5V at crank angle sensor terminal-wire (W)? (At harness-side connector with connector disconnected)	Yes	Replace crank angle sensor ★				
		No	Check for short circuit in wiring from crank angle sensor to ECU				

★ - See PIN VOLTAGES and SENSOR OPERATING RANGE Charts

Fig. 4: Code 2: NE Signal-Crank Angle Chart  
Courtesy of Mazda Motors Corp.

### CODE 3: G-SIGNAL-CRANK ANGLE

### Trouble Code No. 3 (G Signal-Crank Angle)

STEP	INSPECTION	ACTION				
1	Are there any poor connections in crank angle sensor circuit?	Yes	Repair or replace connector			
		No	Go to next step			
2	Is Code No.02 also present?	Yes	Go to next step			
		No	Go to Step 5			
3	Is there continuity between crank angle sensor terminal-wire (B/LG) and ground?	Yes	Go to next step			
		No	Check for open circuit in wiring from crank angle sensor to ground			
4	Is there battery voltage at crank angle sensor terminal-wire (W/R)?	Yes	Go to next step			
		No	Check for open circuit in wiring from crank angle sensor to main relay			
5	Is there continuity between crank angle sensor and ECU?	Yes	Go to next step			
	<table><tr><td>Crank angle sensor</td><td>ECU</td></tr><tr><td>D (Y/L)</td><td>2G</td></tr></table>	Crank angle sensor	ECU	D (Y/L)	2G	No
Crank angle sensor	ECU					
D (Y/L)	2G					
6	Is there approx. 5V at ECU terminal 2E? (With crank angle sensor connector disconnected)	Yes	Go to next step			
		No	Replace ECU ★			
7	Is there approx. 5V at crank angle sensor terminal-wire (Y/L)? (At harness-side connector with connector disconnected)	Yes	Replace crank angle sensor ★			
		No	Check for short circuit in wiring from crank angle sensor to ECU			

Fig. 5: Code 3: G-Signal-Crank Angle Chart  
Courtesy of Mazda Motors Corp.

### CODE 8: AIRFLOW SENSOR

Trouble Code No. 8 (Airflow Meter)													
STEP	INSPECTION		ACTION										
1	Are there any poor connections in airflow meter circuit?		Yes	Repair or replace connector									
			No	Go to next step									
2	Is Code No.10 present at same time?		Yes	Check for open circuit in wiring from airflow meter terminal-wire (B/LG) to ground									
			No	Go to next step									
3	Is resistance of airflow meter OK? <table border="1"><tr><td>Airflow meter</td><td>Fully closed <math>\Omega</math></td><td>Fully open <math>\Omega</math></td></tr><tr><td>D (LG/R)-F (G/Y)</td><td>200—500</td><td>20—1,000</td></tr><tr><td>D (LG/R)-C (B/LG)</td><td colspan="2">200—400</td></tr></table>		Airflow meter	Fully closed $\Omega$	Fully open $\Omega$	D (LG/R)-F (G/Y)	200—500	20—1,000	D (LG/R)-C (B/LG)	200—400		Yes	Go to next step
			Airflow meter	Fully closed $\Omega$	Fully open $\Omega$								
			D (LG/R)-F (G/Y)	200—500	20—1,000								
			D (LG/R)-C (B/LG)	200—400									
No	Replace airflow meter ★												
4	Is there continuity between airflow meter connector and ECU? <table border="1"><tr><td>Airflow meter</td><td>ECU</td></tr><tr><td>D (LG/R)</td><td>2K</td></tr><tr><td>F (G/Y)</td><td>2O</td></tr></table>		Airflow meter	ECU	D (LG/R)	2K	F (G/Y)	2O	Yes	Go to next step			
			Airflow meter	ECU									
			D (LG/R)	2K									
			F (G/Y)	2O									
No	Check for open circuit in wiring from airflow meter to ECU												
5	Are ECU terminals 2D and 2K voltages OK? ★		Yes	Replace ECU									
			No	Check for short circuit in wiring from airflow meter to ECU									

★ - See PIN VOLTAGES and SENSOR OPERATING RANGE Charts.

Fig. 6: Code 8: Airflow Meter Chart  
Courtesy of Mazda Motors Corp.

### CODE 9: COOLANT THERMOSENSOR

### Trouble Code No. 9 (Coolant Thermosensor)

STEP	INSPECTION	ACTION									
1	Are there any poor connections in water thermosensor circuit?	Yes	Repair or replace connector								
		No	Go to next step								
2	Is there continuity between water thermosensor and ECU? <table border="1"><tr><td>Water thermosensor</td><td>ECU</td></tr><tr><td>A (L/W)</td><td>2Q</td></tr><tr><td>B (B/LG)</td><td>2D</td></tr></table>	Water thermosensor	ECU	A (L/W)	2Q	B (B/LG)	2D	Yes	Go to next step		
		Water thermosensor	ECU								
A (L/W)	2Q										
B (B/LG)	2D										
No	Check for open circuit in wiring from water thermosensor to ECU										
3	Is resistance of water thermosensor OK? <table border="1"><tr><td>Coolant temp.</td><td>Resistance</td></tr><tr><td>-20°C ( -4°F)</td><td>14.6—17.8 kΩ</td></tr><tr><td>20°C ( 68°F)</td><td>2.2—2.7 kΩ</td></tr><tr><td>80°C (176°F)</td><td>290—350Ω</td></tr></table>	Coolant temp.	Resistance	-20°C ( -4°F)	14.6—17.8 kΩ	20°C ( 68°F)	2.2—2.7 kΩ	80°C (176°F)	290—350Ω	Yes	Go to next step
		Coolant temp.	Resistance								
-20°C ( -4°F)	14.6—17.8 kΩ										
20°C ( 68°F)	2.2—2.7 kΩ										
80°C (176°F)	290—350Ω										
No	Replace water thermosensor ★										
4	Is same Code No. present after performing after-repair procedure? ★	Yes	Go to next step								
		No	Water thermosensor and circuit OK								
5	Are ECU terminals 2Q and 2D voltages OK? ★	Yes	Replace ECU ★								
		No	Check for short circuit in wiring from water thermosensor to ECU								

Fig. 7: Code 9: Coolant Thermosensor Chart  
Courtesy of Mazda Motors Corp.

### CODE 10: INTAKE AIR THERMOSENSOR

#### Trouble Code No. 10 (Intake Air Thermosensor)

STEP	INSPECTION	ACTION													
1	Are there any poor connections in intake air thermosensor circuit?	Yes	Repair or replace connector												
		No	Go to next step												
2	Is there continuity between intake air thermosensor (in airflow meter) and ECU?	Yes	Go to next step												
		No	Check for open circuit in wiring from intake air thermosensor (in airflow meter) to ECU												
	<table><tr><td>Intake air thermosensor</td><td>ECU</td></tr><tr><td>C (B/LG)</td><td>2D</td></tr><tr><td>G (R/G)</td><td>2P</td></tr></table>	Intake air thermosensor	ECU	C (B/LG)	2D	G (R/G)	2P								
Intake air thermosensor	ECU														
C (B/LG)	2D														
G (R/G)	2P														
3	Is resistance of intake air thermosensor (in airflow meter) OK?	Yes	Go to next step												
		No	Replace airflow meter												
	<table><tr><td>Terminal</td><td>Temperature</td><td>Resistance</td></tr><tr><td>C (B/RG)</td><td>-20°C ( -4°F)</td><td>13.6—18.4 kΩ</td></tr><tr><td>-G (R/G)</td><td>20°C ( 68°F)</td><td>2.21—2.69 kΩ</td></tr><tr><td></td><td>60°C (140°F)</td><td>493—667Ω</td></tr></table>	Terminal	Temperature	Resistance	C (B/RG)	-20°C ( -4°F)	13.6—18.4 kΩ	-G (R/G)	20°C ( 68°F)	2.21—2.69 kΩ		60°C (140°F)	493—667Ω		
Terminal	Temperature	Resistance													
C (B/RG)	-20°C ( -4°F)	13.6—18.4 kΩ													
-G (R/G)	20°C ( 68°F)	2.21—2.69 kΩ													
	60°C (140°F)	493—667Ω													
4	Is same Code No. present after performing after-repair procedure? ★	Yes	Go to next step												
		No	Intake air thermosensor and circuit OK												
5	Are engine control unit terminals 2P and 2D voltages ★ OK?	Yes	Replace ECU ★												
		No	Check for short circuit in wiring from intake air thermosensor to ECU												

Fig. 8: Code 10: Intake Air Thermosensor Chart  
Courtesy of Mazda Motors Corp.

### CODE 12: THROTTLE SENSOR

NOTE: Information not available from manufacturer.

## CODE 14: ATMOSPHERIC PRESSURE SENSOR

Replace ECU.

## CODE 15: OXYGEN SENSOR

### Trouble Code No. 15 (Oxygen Sensor)

<b>Note</b> ■ If Code Nos. 15 and 17 are both present, first perform the checking procedure for Code No. 17			
STEP	INSPECTION	ACTION	
1	Are there any poor connections in oxygen sensor circuit?	Yes	Repair or replace connector
		No	Go to next step
2	Is oxygen sensor output voltage OK?	Yes	Go to next step
		No	Replace oxygen sensor
3	Is there continuity between oxygen sensor and ECU terminal 2N?	Yes	Go to next step
		No	Check for open circuit in wiring from oxygen sensor to ECU
4	Is ECU terminal 2N voltage OK?	Yes	Go to next step
		No	Check for short circuit in wiring from oxygen sensor to ECU
5	Is sensitivity of oxygen sensor OK?	Yes	Replace ECU
		No	Replace oxygen sensor

Fig. 9: Code 15: Oxygen Sensor Chart  
Courtesy of Mazda Motors Corp.

## CODE 17: FEEDBACK SYSTEM

### Trouble Code No. 17 (Feedback System)

STEP	INSPECTION	ACTION
1	Warm up engine and run it at 2,500—3,000 rpm for 3 min.	
2	Does monitor lamp of Self-Diagnosis Checker illuminate at idle?	Yes
		No
3	Are spark plugs clean?	Yes
		No
4	Is oxygen sensor voltage OK?	Yes
		No
5	Is same Code No. present after performing after-repair procedure?	Yes
		No
6	Is there continuity between oxygen sensor and ECU terminal 2N?	Yes
		No
7	Is ECU terminal 2N voltage OK? ★	Yes
		No

Fig. 10: Code 17: Feedback System Chart  
Courtesy of Mazda Motors Corp.

## CODE 26: PURGE CONTROL SOLENOID VALVE

### Trouble Code No. 26 (Purge Control Solenoid Valve)

STEP		INSPECTION	ACTION					
1		Are there any poor connections in solenoid valve circuit?	Yes	Repair or replace connector				
			No	Go to next step				
2		Is resistance of solenoid valve OK?  <b>Resistance: 25 ± 2Ω</b>	Yes	Go to next step				
			No	Replace solenoid valve				
3		Is there battery voltage at terminal wire (W/R) of solenoid valve circuit?	Yes	Go to next step				
			No	Check for open circuit in wiring from solenoid valve to main relay				
4		Is there continuity between solenoid valve and ECU? <table border="1"><tr><td>Solenoid valve</td><td>ECU</td></tr><tr><td>B (Y/R)</td><td>2X</td></tr></table>	Solenoid valve	ECU	B (Y/R)	2X	Yes	Go to next step
			Solenoid valve	ECU				
B (Y/R)	2X							
No	Check for open circuit in wiring from solenoid valve to ECU							
5		Is ECU terminal (2X) voltage OK? ★	Yes	Replace ECU				
			No	Check for short circuit in wiring from solenoid valve to ECU				

★ - See PIN VOLTAGES and SENSOR OPERATING RANGE Charts.

Fig. 11: Code 26: Purge Control Solenoid Valve Chart  
Courtesy of Mazda Motors Corp.

### CODE 34: IDLE SPEED CONTROL (ISC)

#### Trouble Code 34 (Idle Speed Control)

STEP	INSPECTION	ACTION					
1	Are there any poor connections in ISC valve circuit?	Yes	Repair or replace connector				
		No	Go to next step				
2	Is resistance of ISC valve OK?  <b>Resistance: 12 ± 1Ω</b>	Yes	Go to next step				
		No	Replace ISC valve				
3	Is there battery voltage at terminal-wire (W/R) of ISC valve circuit?	Yes	Go to next step				
		No	Check for open circuit in wiring from ISC valve to main relay				
4	Is there continuity between ISC valve and ECU? <table border="1"><tr><td>ISC valve</td><td>ECU</td></tr><tr><td>B (L/O)</td><td>2W</td></tr></table>	ISC valve	ECU	B (L/O)	2W	Yes	Go to next step
		ISC valve	ECU				
B (L/O)	2W						
No	Check for open circuit in wiring from ISC valve to ECU						
5	Is ECU terminal 2W voltage OK? ★	Yes	Replace ECU				
		No	Check for short circuit in wiring from ISC valve to ECU				

★ - See PIN VOLTAGES and SENSOR OPERATING RANGE Charts.

Fig. 12: Code 34: Idle Speed Control (ISC) Chart  
Courtesy of Mazda Motors Corp.