

G - TESTS W/CODES - 6-CYL

Article Text

1993 Mazda MX-3

For NONE

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ARTICLE BEGINNING

1993 ENGINE PERFORMANCE
Mazda Self-Diagnostics

MX-3 1.8L

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 appropriate H - TEST W/O CODES article for diagnosis by symptom (i.e., ROUGH IDLE, NO START, etc.).

SELF-DIAGNOSTIC SYSTEM

Hard Failures

Hard failures cause malfunction indicator light (CHECK ENGINE) to illuminate and remain on until problem 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, commonly known as limp-in mode, the vehicle runs but driveability will not be optimum.

Intermittent Failures

Intermittent failures may cause CHECK ENGINE light to flicker or illuminate and go out after the intermittent fault goes away. However, the corresponding trouble code will be retained in ECU memory. If related fault does not reoccur within a certain time frame, related trouble code will be erased from ECU memory. Intermittent failures may be caused by a sensor, connector or wiring related problems. See INTERMITTENTS in H - TESTS W/O CODES article.

RETRIEVING CODES

Accessing Trouble Codes

1) Using jumper wire, connect self-diagnostic connector terminals TEN and GND. See Fig. 1. Connector is located at back of left front wheelwell.

2) With ignition on and engine stopped, observe malfunction indicator light (CHECK ENGINE). Note trouble codes. Check TROUBLE CODE IDENTIFICATION chart for possible cause. If light remains on continuously, MIL circuit is grounded or ECU is defective. If no codes are found, go to J - PIN VOLTAGE CHARTS article.

Memorized vs. Non-Memorized Codes

Some sensor or circuit failures are stored in ECU and are known as memorized codes. While other circuit failures, called non-memorized codes, are not stored. Non-memorized codes can be retrieved if ignition is not turned off before accessing codes.

NOTE: To access non-memorized trouble codes, DO NOT stop engine. Connect jumper wire across self-diagnostic connector terminals TEN and GND. Observe MIL and note trouble codes.

AFTER-REPAIR PROCEDURE

After indicated service or replacement is performed, clear codes. See CLEARING CODES. Recheck ECU memory. No codes should be present. If codes are present, see appropriate trouble code chart under CODE CHARTS to repair vehicle.

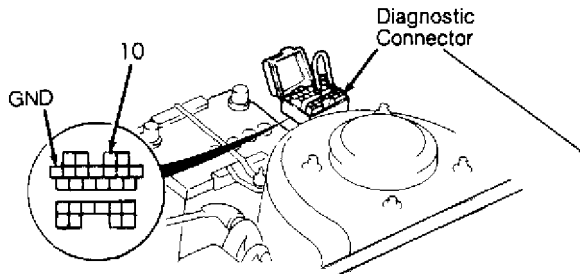


Fig. 1: Locating Self-Diagnostic Connector
Courtesy of Mazda Motors Corp.

CLEARING CODES

Clearing Trouble Codes

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













2) Ground test connector with jumper wire. Turn ignition on, but DO NOT start engine for 6 seconds. Start engine and run at 2000 RPM for 2 minutes. Verify no codes are displayed.

CODE CHARTS

NOTE: See J - PIN VOLTAGE CHARTS article to identify ECU connector terminals.

NOTE: Trouble Codes 6, 12, 55, 57, 58, 60, 61, 62 and 63 are automatic transmission-related problems. If codes are present, see appropriate TRANSMISSION SERVICE & REPAIR article.

TROUBLE CODE IDENTIFICATION












No.	Indicator flashing pattern	Diagnosed circuit	Condition	Point	Memorized	Page
02	ON  OFF	NE2 signal crank angle sensor 2	No NE2 signal	<ul style="list-style-type: none"> Crank angle sensor 2 connector Wiring from crank angle sensor 2 to ECU Crank angle sensor 2 	Yes	F2-79
03	ON  OFF	G signal crank angle sensor 1	No. G signal input while a specified number of Ne1 or Ne2 signal pulses are input	<ul style="list-style-type: none"> Distributor connector Wiring from main relay to distributor Wiring from distributor to ECU Crank angle sensor 1 	Yes	F2-80
04	ON  OFF	NE1 signal crank angle sensor	No NE1 signal	<ul style="list-style-type: none"> Crank angle sensor 1 	Yes	F2-81
05	ON  OFF	Knock sensor	Open or short circuit	<ul style="list-style-type: none"> Knock sensor connector Wiring from knock sensor to ECU Knock sensor 	Yes	F2-82
08	ON  OFF	Airflow meter	Short circuit	<ul style="list-style-type: none"> Airflow meter connector Wiring from airflow meter to ECU Airflow meter 	Yes	F2-83
09	ON  OFF	Water thermosensor		<ul style="list-style-type: none"> Water thermosensor connector Wiring from water thermosensor to ECU Water thermosensor resistance 	Yes	F2-84
10	ON  OFF	Intake air thermosensor	Open or short circuit	<ul style="list-style-type: none"> Airflow meter connector Wiring from airflow meter to ECU Intake air thermosensor resistance 	Yes	F2-85
12	ON  OFF	Throttle sensor		<ul style="list-style-type: none"> Throttle sensor connector Wiring from throttle sensor to ECU Throttle sensor 	Yes	F2-86
14	ON  OFF	Atmospheric pressure sensor		<ul style="list-style-type: none"> ECU 	Yes	F2-87
15	ON  OFF	Oxygen sensor (Left side)	Sensor output continues less than 0.55V 100 sec. after engine exceeds 1,500 rpm	<ul style="list-style-type: none"> Oxygen sensor connector Wiring from oxygen sensor to ECU Oxygen sensor 	Yes	F2-87
16	ON  OFF	EGR position sensor	Open or short circuit	<ul style="list-style-type: none"> EGR position sensor connector Wiring from EGR position sensor to ECU EGR position sensor 	Yes	F2-88
17	ON  OFF	Feed Back system (Left side)	Sensor output not changed 50 sec. after engine exceeds 1,500 rpm	<ul style="list-style-type: none"> Fuel pressure Injection fuel leakage Ignition system Air leakage ECU 	Yes	F2-89

G - TESTS V

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Fig. 2: Trouble Code Identification
Courtesy Of Mazda Motors Corp.

No.	Indicator flashing pattern	Diagnosed circuit	Condition	Point	Memorized	Page
23	ON  OFF	Oxygen sensor (Right side)	Sensor output continues less than 0.55V 100 sec. after engine exceeds 1,500 rpm	<ul style="list-style-type: none"> Oxygen sensor connector Wiring from oxygen sensor to ECU Oxygen sensor 	Yes	F2-89
24	ON  OFF	Feed Back system (Right side)	Sensor output not changed 50 sec. after engine exceeds 1,500 rpm	<ul style="list-style-type: none"> Fuel pressure Injection fuel leakage Ignition system Air leakage ECU 	Yes	F2-89
25	ON  OFF	Solenoid valve (pressure regulator control)	Open or short circuit	<ul style="list-style-type: none"> Solenoid valve connection Wiring from solenoid valve to ECU Solenoid valve continuity 	No	F2-91
26	ON  OFF	Solenoid valve (purge control)		<ul style="list-style-type: none"> Solenoid valve connection Wiring from solenoid valve to ECU Solenoid valve continuity 	No	F2-91
28	ON  OFF	Solenoid valve (EGR-Vacume)		<ul style="list-style-type: none"> Solenoid valve connection Wiring from solenoid valve to ECU Solenoid valve continuity 	No	F2-92
29	ON  OFF	Solenoid valve (EGR-VENT)		<ul style="list-style-type: none"> Solenoid valve connection Wiring from solenoid valve to ECU Solenoid valve continuity 	No	F2-92
34	ON  OFF	Idle speed control (ISC valve)		<ul style="list-style-type: none"> ISC valve connector Wiring from ISC valve to ECU ISC valve continuity 	No	F2-93
41	ON  OFF	Solenoid valve (VRIS 1)		<ul style="list-style-type: none"> Solenoid valve connection Wiring from solenoid valve to ECU Solenoid valve continuity 	No	F2-94
46	ON  OFF	Solenoid valve (VRIS 2)		<ul style="list-style-type: none"> Solenoid valve connection Wiring from solenoid valve to ECU Solenoid valve continuity 	No	F2-94
67	ON  OFF	Electrical Cooling fan relay No.2		<ul style="list-style-type: none"> Fan relay connector Wiring from relay to ECU Fan relay 	No	F2-95
89	ON  OFF	Water thermosensor (fan)		<ul style="list-style-type: none"> Water thermosensor connector Wiring from water thermosensor to ECU Water thermosensor resistance 	Yes	F2-96

* Detects malfunction of water thermosensor (fan), when coolant temperature above 60°C (140°F)

92J25030

Fig. 3: Trouble Code Identification (Cont.)
Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 2 (NE2 SIGNAL - DISTRIBUTOR)

TROUBLE CODE NO. 2 (NE₂ SIGNAL - DISTRIBUTOR)

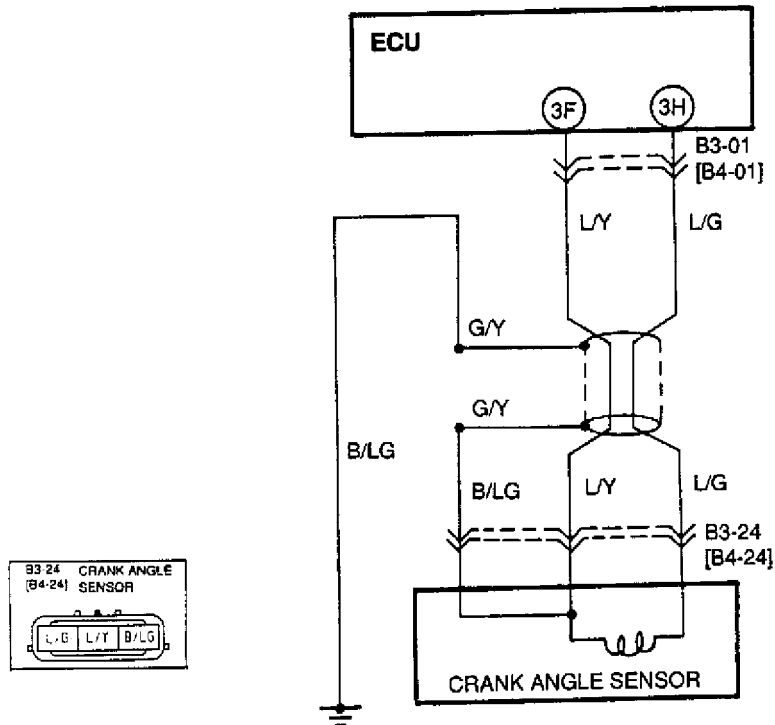
G - TESTS

CODE No.	02 (CRANK ANGLE SENSOR No2 SIGNAL)		
STEP	INSPECTION	ACTION	
1	Is there poor connection in crank angle sensor circuit?	Yes	Repair or replace
		No	Go to next step
2	Disconnect connector from ECU. Is resistance of connection between 3F (L/Y) and 3H (L/G) terminal OK? Resistance: 520-580 ohms	Yes	Go to next step
		No	Go to Step 4
3	Is there continuity of connector between ground and 3F or ground and 3H terminal? (At harness side)	Yes	Check for short circuit in wiring from crank angle sensor to 3F or 3H terminal
		No	Replace ECU
4	Is resistance of crank angle sensor OK? Resistance: 520-580 ohms	Yes	Check for open circuit in wiring from ECU to crank angle sensor
		No	Replace crank angle sensor

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Fig. 4: Trouble Code No. 2 - Diagnostic Flowchart
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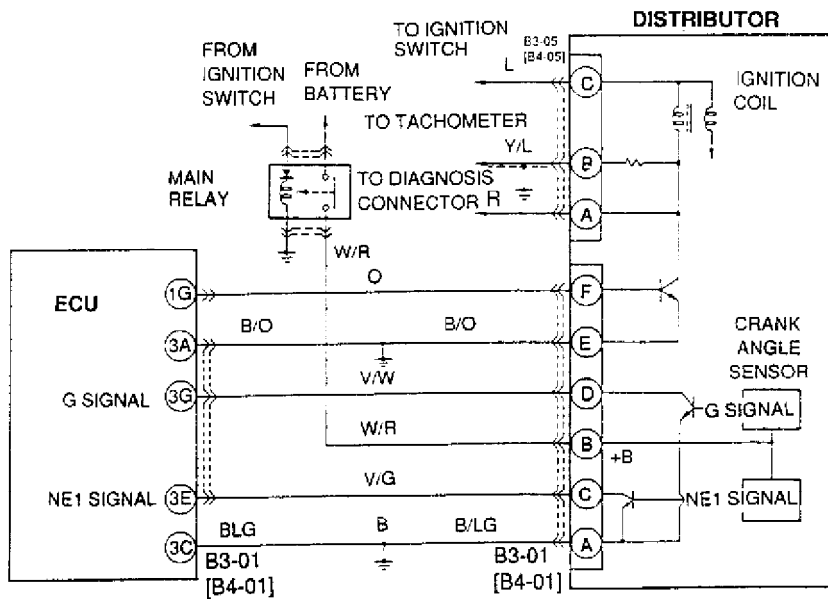
Fig. 5: Trouble Code No. 2 - Schematic
Courtesy Of Mazda Motors Corp.

TRUBLE CODE NO. 3 (G SIGNAL - DISTRIBUTOR)

CODE No.	03 (CRANK ANGLE SENSOR G SIGNAL)	
STEP	INSPECTION	ACTION
1	Is there poor connection in distributor circuit?	Yes : Repair or replace connector
		No : Go to next step
2	Is Code No. 04 also present?	Yes : Go to next step
		No : Go to Step 5
3	Is there continuity between distributor terminal-wire (B/LG) and ground?	Yes : Go to next step
		No : Check for open circuit in wiring from distributor to ground
4	Is there battery voltage at distributor terminal-wire (B/W)?	Yes : Go to next step
		No : Check for open circuit in wiring from distributor to main relay
5	Is there approx. 5V at distributor terminal-wire (L)? (At harness-side connector with disconnected)	Yes : Replace distributor
		No : Go to next step
6	Is there approx. 5V at ECU terminal 3G? (With distributor connector disconnected)	Yes : Check for short on open circuit in wiring from distributor to ECU terminal 3G
		No : Replace ECU

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Fig. 6: Trouble Code No. 3 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.



92E25035

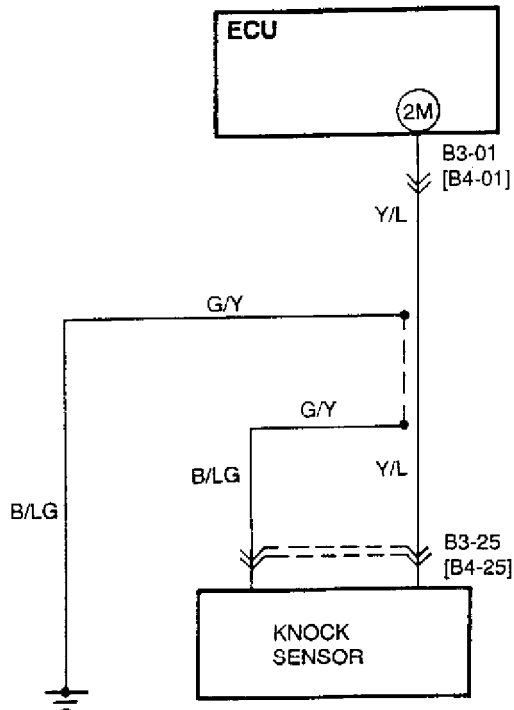
Fig. 7: Trouble Code No. 3 - Schematic
Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 4 (NE1 SIGNAL - DISTRIBUTOR)

CODE No.	04 (CRANK ANGLE SENSOR Ne1 SIGNAL)		
STEP	INSPECTION		ACTION
1	Is there poor connection in distributor circuit?	Yes	Repair or replace connector
		No	Go to next step
2	Is Code No. 04 also present?	Yes	Go to next step
		No	Go to Step 5
3	Is there continuity between distributor terminal-wire (B/LG) and ground?	Yes	Go to next step
		No	Check for open circuit in wiring from distributor to ground
4	Is there battery voltage at distributor terminal-wire (B/W)?	Yes	Go to next step
		No	Check for open circuit in wiring from distributor to main relay
5	Is there approx. 5V at distributor terminal-wire (G/W)? (AT harness-side connector with disconnected)	Yes	Replace distributor
		No	Go to next step
6	Is there approx. 5V at ECU terminal 3G? (With distributor connector disconnected)	Yes	Check for short on open circuit in wiring from distributor to ECU terminal 3E
		No	Replace ECU

92D25034

Fig. 8: Trouble Code No. 4 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.



92G25037

Fig. 11: Trouble Code No. 5 - Schematic
 Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 8 (AIRFLOW METER)

CODE No.	08 (AIRFLOW METER)											
STEP	INSPECTION		ACTION									
1	Does airflow meter circuit have a poor connection?	Yes	Repair or replace connector									
		No	Go to next step									
2	Is Code No. 10 also present?	Yes	Look for open circuit in wiring from airflow meter wire-terminal (B/LG) to ground									
		No	Go to next step									
3	Is resistance of airflow meter OK?	Yes	Go to next step									
		No	Replace airflow meter									
<table border="1"> <tr> <td>Airflow meter</td> <td>Fully closed (Ω)</td> <td>Fully open (Ω)</td> </tr> <tr> <td>B (LG/R)—A (R)</td> <td>20—600</td> <td>20—1,000</td> </tr> <tr> <td>B (LG/R)—D (B/BR)</td> <td colspan="2">200—400</td> </tr> </table>		Airflow meter	Fully closed (Ω)	Fully open (Ω)	B (LG/R)—A (R)	20—600	20—1,000	B (LG/R)—D (B/BR)	200—400			
Airflow meter	Fully closed (Ω)	Fully open (Ω)										
B (LG/R)—A (R)	20—600	20—1,000										
B (LG/R)—D (B/BR)	200—400											
4	Does wire harness between airflow meter and ECU have continuity?	Yes	Go to next step									
		No	Repair or replace wire harness									
<table border="1"> <tr> <td>Airflow meter</td> <td>ECU</td> </tr> <tr> <td>B (LG/R)</td> <td>21 (LG/R)</td> </tr> <tr> <td>A (R)</td> <td>2B (R)</td> </tr> </table>		Airflow meter	ECU	B (LG/R)	21 (LG/R)	A (R)	2B (R)					
Airflow meter	ECU											
B (LG/R)	21 (LG/R)											
A (R)	2B (R)											
5	Are ECU terminal 3D, 21, and 2B voltages OK? ★ - SEE PIN VOLTAGE CHARTS ARTICLE.	Yes	Replace ECU									
		No	Look for a short circuit in wiring from airflow meter to ECU									

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92H25038

Fig. 12: Trouble Code No. 8 - Diagnostic Flowchart
 Courtesy Of Mazda Motors Corp.

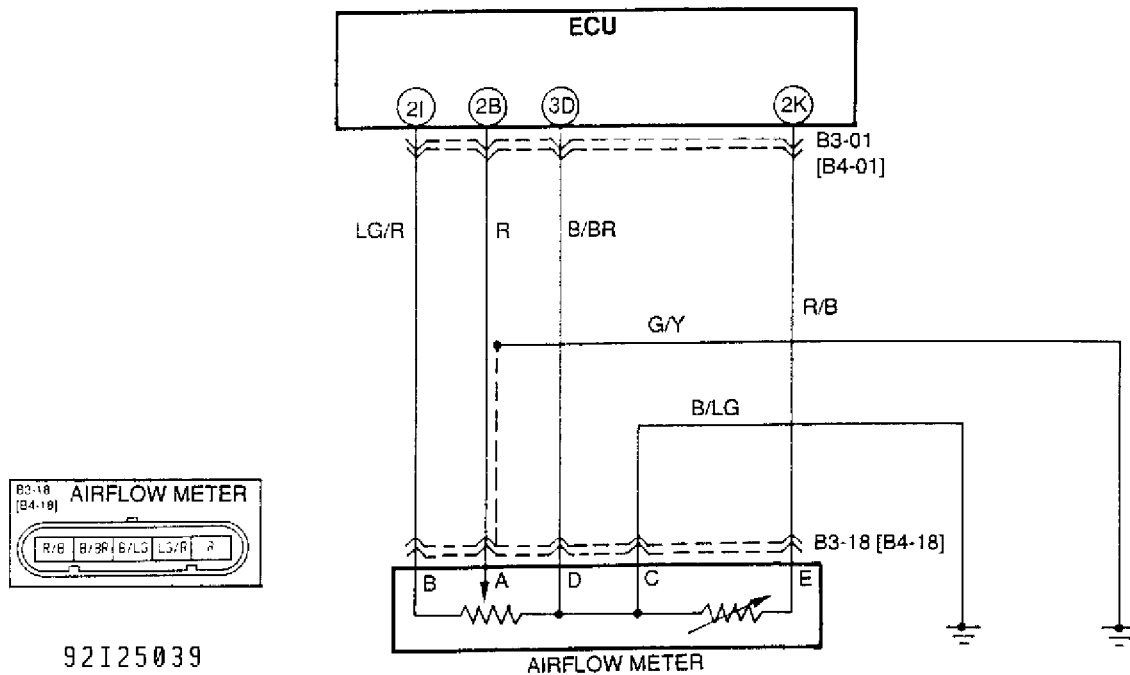


Fig. 13: Trouble Code No. 8 - Schematic
 Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 9 (COOLANT THERMOSENSOR)

TROUBLE CODE NO. 9 (COOLANT THERMOSENSOR)

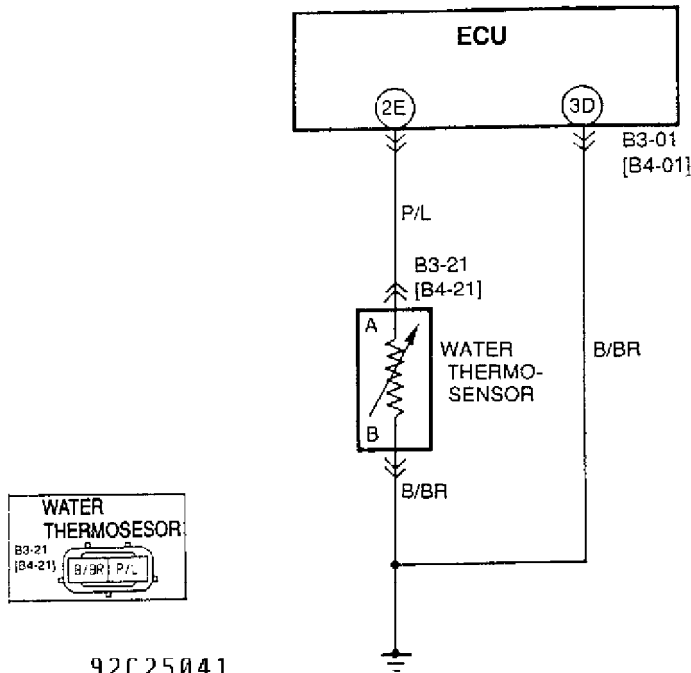
CODE No.	09 (WATER THERMOSENSOR)									
STEP	INSPECTION	ACTION								
1	Does the water thermosensor circuit have a poor connection?	Yes Repair or replace connector								
		No Go to next step								
2	Does the wire harness between the water thermosensor and ECU have continuity?	Yes Go to next step								
		No Repair or replace								
	<table border="1"> <tr> <th>Water thermosensor</th> <th>ECU</th> </tr> <tr> <td>A (P/L)</td> <td>2E (P/L)</td> </tr> <tr> <td>B (B/BR)</td> <td>3D (B/BR)</td> </tr> </table>	Water thermosensor	ECU	A (P/L)	2E (P/L)	B (B/BR)	3D (B/BR)			
Water thermosensor	ECU									
A (P/L)	2E (P/L)									
B (B/BR)	3D (B/BR)									
3	Is resistance of water thermosensor OK?	Yes Go to next step								
		No Replace water thermosensor								
	<table border="1"> <tr> <th>Coolant temp.</th> <th>Resistance (kΩ)</th> </tr> <tr> <td>-20°C (-4°F)</td> <td>14.6—17.8</td> </tr> <tr> <td>20°C (68°F)</td> <td>2.21—2.69</td> </tr> <tr> <td>80°C (176°F)</td> <td>0.29—0.35</td> </tr> </table>	Coolant temp.	Resistance (kΩ)	-20°C (-4°F)	14.6—17.8	20°C (68°F)	2.21—2.69	80°C (176°F)	0.29—0.35	
Coolant temp.	Resistance (kΩ)									
-20°C (-4°F)	14.6—17.8									
20°C (68°F)	2.21—2.69									
80°C (176°F)	0.29—0.35									
4	Is same Code No. present following after-repair procedure? ¹	Yes Go to next step								
		No Water thermosensor and circuit OK								
5	Are ECU terminal 2E and 3D voltage OK?	Yes Replace ECU								
		No Look for a short circuit in wiring from water thermosensor to ECU								

¹ - See AFTER-REPAIR PROCEDURE under SELF-DIAGNOSTIC SYSTEM.

* - See PIN VOLTAGE CHARTS article.

93C80384

Fig. 14: Trouble Code No. 9 - Diagnostic Flowchart
 Courtesy Of Mazda Motors Corp.



92C25041

Fig. 15: Trouble Code No. 9 - Schematic
Courtesy Of Mazda Motors Corp.

TRUBLE CODE NO. 10 (INTAKE AIR THERMOSENSOR)

TRUBLE CODE NO. 10 (INTAKE AIR THERMOSENSOR)

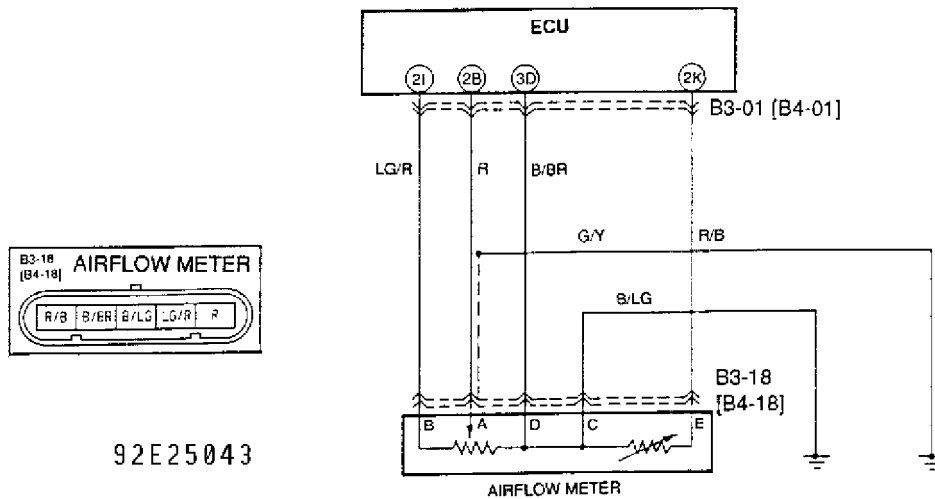
CODE No.	10 (INTAKE AIR THERMOSENSOR — IN AIRFLOW METER)										
STEP	INSPECTION	ACTION									
1	Does intake air thermostat circuit have a poor connection?	Yes	Repair or replace connector								
		No	Go to next step								
2	Is Code No. 8 also present?	Yes	Look for an open circuit in wiring from airflow meter terminal wires (B/LG) and (B/BR) to ground								
		No	Go to next step								
3	Does the wire harness between intake air thermostat and ECU have continuity?	Yes	Go to next step								
		No	Repair or replace								
	<table border="1"> <tr> <td>Intake air thermostat (In airflow meter)</td> <td>ECU</td> </tr> <tr> <td>D (B/BR)</td> <td>3D (B/BR)</td> </tr> <tr> <td>E (R/B)</td> <td>2K (R/B)</td> </tr> </table>	Intake air thermostat (In airflow meter)	ECU	D (B/BR)	3D (B/BR)	E (R/B)	2K (R/B)				
Intake air thermostat (In airflow meter)	ECU										
D (B/BR)	3D (B/BR)										
E (R/B)	2K (R/B)										
4	Is resistance of airflow meter between terminals C (B/BR) and G (R/B) is OK?	Yes	Go to next step								
		No	Replace airflow meter								
	<table border="1"> <tr> <td>Temperature</td> <td>Resistance (kΩ)</td> </tr> <tr> <td>-20°C</td> <td>13.6—18.4</td> </tr> <tr> <td>20°C</td> <td>2.21—2.69</td> </tr> <tr> <td>60°C</td> <td>0.493—0.667</td> </tr> </table>	Temperature	Resistance (kΩ)	-20°C	13.6—18.4	20°C	2.21—2.69	60°C	0.493—0.667		
Temperature	Resistance (kΩ)										
-20°C	13.6—18.4										
20°C	2.21—2.69										
60°C	0.493—0.667										
5	Is same Code No. present following after-repair procedure? ¹	Yes	Go to next step								
		No	Intake air thermostat and circuit OK								
6	Are ECU terminals 2K and 3D voltages OK?	Yes	Replace ECU								
		No	Look for a short circuit wiring from intake air thermostat to ECU								

¹ - See AFTER-REPAIR PROCEDURE under SELF-DIAGNOSTIC SYSTEM.

* - See PIN VOLTAGE CHARTS article.

93D80385

Fig. 16: Trouble Code No. 10 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.



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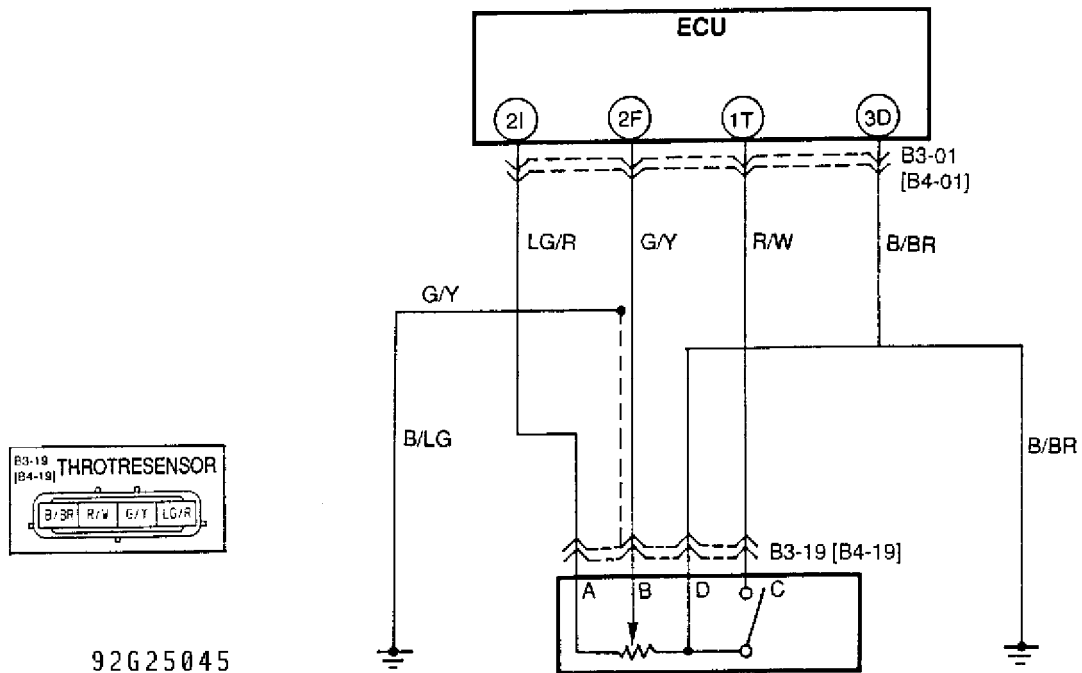
Fig. 17: Trouble Code No. 10 - Schematic
Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 12 (THROTTLE SENSOR)

CODE No.	12 (THROTTLE SENSOR)									
STEP	INSPECTION	ACTION								
1	Does throttle sensor circuit have a poor connection?	Yes	Repair or replace connector							
		No	Go to next step							
2	Does wire harness between throttle sensor and ECU have continuity?	Yes	Go to next step							
		No	Repair or replace							
<table border="1"> <tr> <td>Throttle sensor</td> <td>ECU</td> </tr> <tr> <td>A (LG/R)</td> <td>2I (LG/R)</td> </tr> <tr> <td>B (G/Y)</td> <td>2M (G/Y)</td> </tr> <tr> <td>D (B/BR)</td> <td>2D (B/BR)</td> </tr> </table>		Throttle sensor	ECU	A (LG/R)	2I (LG/R)	B (G/Y)	2M (G/Y)	D (B/BR)	2D (B/BR)	
Throttle sensor	ECU									
A (LG/R)	2I (LG/R)									
B (G/Y)	2M (G/Y)									
D (B/BR)	2D (B/BR)									
3	Are resistances between terminals B (G/Y) and D (B/BR) OK?	Yes	Go to next step							
		No	Adjust or replace throttle sensor							
<table border="1"> <tr> <td>Throttle valve</td> <td>Resistance</td> </tr> <tr> <td>Fully closed</td> <td>Below 1 kΩ</td> </tr> <tr> <td>Fully open</td> <td>Approx. 5 kΩ</td> </tr> </table>		Throttle valve	Resistance	Fully closed	Below 1 kΩ	Fully open	Approx. 5 kΩ			
Throttle valve	Resistance									
Fully closed	Below 1 kΩ									
Fully open	Approx. 5 kΩ									
4	Is ECU terminal 2F voltage OK? ★ - SEE PIN VOLTAGE CHARTS ARTICLE.	Yes	Replace ECU							
		No	Look for short circuit in wiring from throttle sensor to ECU							

92F25044

Fig. 18: Trouble Code No. 12 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.



92G25045

Fig. 19: Trouble Code No. 12 - Schematic
Courtesy Of Mazda Motors Corp.

TRouble CODE NO. 14 (ATMOSPHERIC PRESSURE SENSOR)

* Replace the ECU.

TRouble CODE NO. 15 (OXYGEN SENSOR)

CODE No.	15 and/or 23 (OXYGEN SENSOR — INACTIVATION)		
Note			
• If Code no. 15 and 17 are both present, first perform the checking procedure for Code No. 17.			
STEP	INSPECTION	ACTION	
1	Does oxygen sensor circuit have a poor connection?	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	Does the wire harness between oxygen sensor and ECU terminal (left bank 2D, right bank 2d) have continuity?	Yes	Go to next step
		No	Repair or replace
4	Is ECU terminal (left bank 2D, right bank 2d) voltage OK?	Yes	Go to next step
		No	Look for a short circuit in wiring from oxygen sensor to ECU
5	Is sensitivity of oxygen sensor OK? ★ - SEE PIN VOLTAGE CHARTS ARTICLE.	Yes	Replace ECU
		No	Try a known good oxygen sensor; does condition improve?

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92I25047

Fig. 20: Trouble Code No. 15 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.

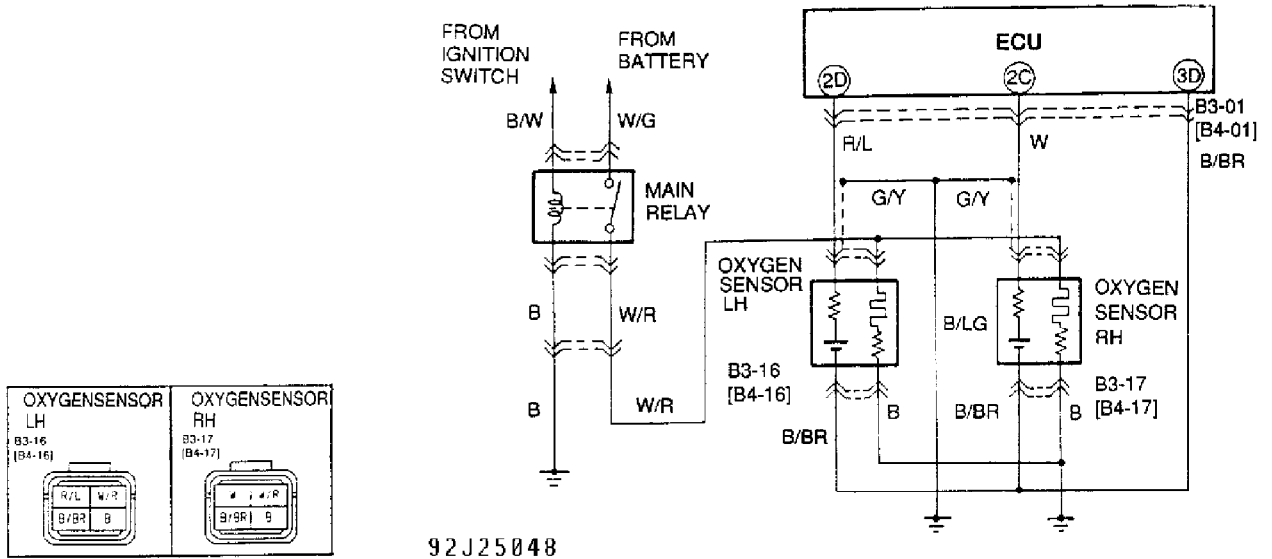


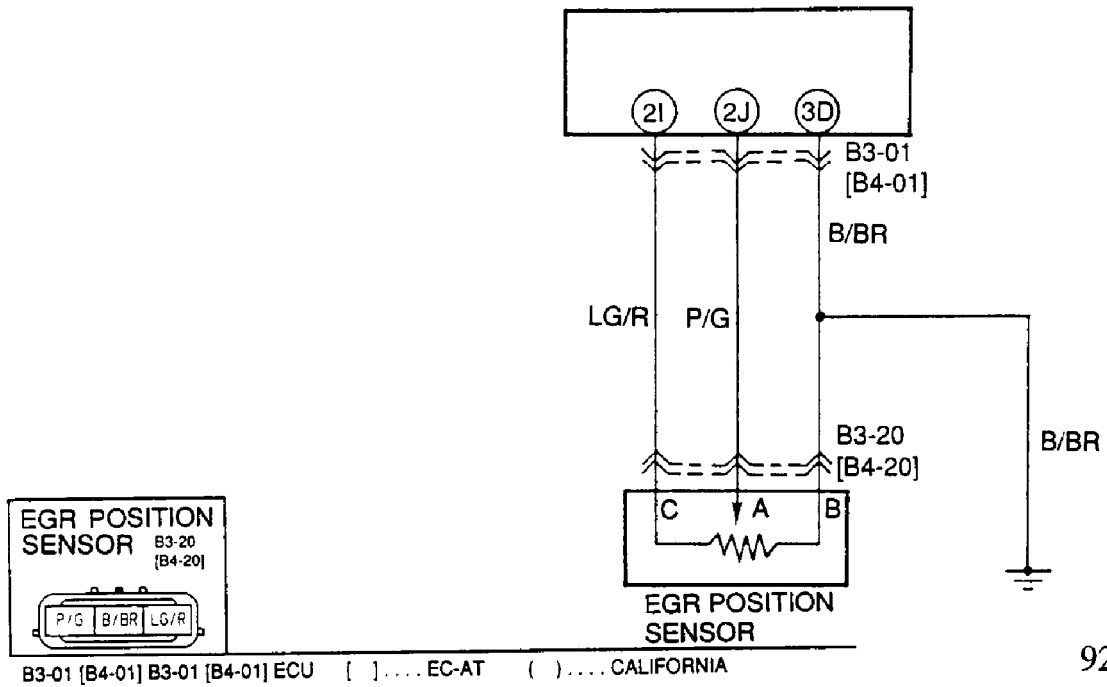
Fig. 21: Trouble Code No. 15 - Schematic
 Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 16 (EGR POSITION SENSOR)

CODE No.	16 (EGR POSITION SENSOR)												
STEP	INSPECTION	ACTION											
1	Does EGR position sensor circuit have a poor connection?	Yes	Repair or replace connector										
		No	Go to next step										
2	Is EGR control valve OK? <small>see page F2-127</small>	Yes	Go to next step										
		No	Replace EGR control valve										
3	Is resistance of EGR position sensor OK? Resistance: (B) ↔ (C) Approx. 5 kΩ (A) ↔ (C) 0.7—5 kΩ (A) ↔ (B) 0.7—5 kΩ	Yes	Go to next step										
		No	Replace EGR control valve										
4	Is there continuity between EGR position and ECU?	Yes	Go to next step										
		<table border="1" style="width: 100%;"> <thead> <tr> <th>EGR position sensor</th> <th>ECU</th> </tr> </thead> <tbody> <tr> <td>(A) (P/G wire)</td> <td>2J</td> </tr> <tr> <td>(B) (B/BR wire)</td> <td>3D</td> </tr> <tr> <td>(C) (LG/R wire)</td> <td>2I</td> </tr> </tbody> </table>		EGR position sensor	ECU	(A) (P/G wire)	2J	(B) (B/BR wire)	3D	(C) (LG/R wire)	2I	No	Check for open circuit in wiring from EGR position sensor to ECU
		EGR position sensor	ECU										
(A) (P/G wire)	2J												
(B) (B/BR wire)	3D												
(C) (LG/R wire)	2I												
		Yes	Go to next step										
5	Is there 4.5—5.5V at C terminal of EGR position sensor connector?	Yes	Go to next step										
		No	Check for short circuit in wiring from EGR position sensor terminal C to ECU										
6	Is ECU terminal 2J voltage OK? ★ - SEE PIN VOLTAGE CHARTS ARTICLE.	Yes	Replace ECU										
		No	Short circuit in wiring harness EGR position sensor terminal A to ECU										

92A25049

Fig. 22: Trouble Code No. 16 - Diagnostic Flowchart
 Courtesy Of Mazda Motors Corp.



92E25050

Fig. 23: Trouble Code No. 16 - Schematic
 Courtesy Of Mazda Motors Corp.

TRouble CODES NO. 17 & 24 (FEEDBACK SYSTEM)

TROUBLE CODES NO. 17 & 24 (FEEDBACK SYSTEM)

CODE No.	17 and/or 24 (FEEDBACK SYSTEM)		
STEP	INSPECTION	ACTION	
1	Is same Code No. present following after-repair procedure? ¹	Yes	Go to next step
		No	Does the oxygen sensor circuit have a poor connection? ⇨ If not, perform troubleshooting Code No. 15
2	Does monitor lamp of Self-Diagnosis Checker illuminate at idle after the engine has been warmed up and at 2500—3000 rpm for 3 min	Yes	Go to next step Note • A/F mixture rich
		No	Go to Step 5 Note • A/F mixture is lean or misfire is occurring
3	Is fuel line pressure correct at idle? Fuel line pressure: 255—314 kPa (2.6—3.2 Kg/cm ² , 37—46 psi) (vacuum hose to pressure regulator disconnected)	Yes	Go to next step
		No	High pressure Is fuel return hose clogged or restricted? ⇨ If not, replace pressure regulator
4	Check injector for fuel leakage?	Yes	Replace injector
		No	Is water thermosensor OK? ⇨ If it is, replace ECU ⇨ If it is not, replace it
5	Disconnect each high tension lead at idle; does engine speed decrease equally at each cylinder?	Yes	Go to next step
		No	Go to Step 8
6	Is fuel line pressure correct at idle? Fuel line pressure: 255—314 kPa (2.6—3.2kg/cm ² , 37—46 psi) (vacuum hose from pressure regulator disconnected)	Yes	Go to next step
		No	Low pressure Check fuel line pressure while pinching fuel return hose ⇨ If it quickly increases, check pressure regulator ⇨ If it gradually increases, check for clogging between fuel pump and pressure regulator If hose is not clogged, check fuel pump maximum pressure
7	Check intake air system components for air leakage	Yes	Go to Step 11
		No	Replace
8	Is there a misfire of a dead cylinder from Step 5 inspection?	Yes	Repair or replace ignition system
		No	Go to next step
9	Is there an injector operating sound at idle of dead cylinder from Step 5 inspection?	Yes	Go to next step
		No	Is there V _s at the injector connector? ⇨ If there is, replace injector ⇨ If there is not, look for a short or open circuit in the wire harness
10	Replace injector at dead cylinder from Step 5 inspection. Is same Code No. present following after-repair procedure? ¹	Yes	Go to next step
		No	Removed injector at fault
11	Try a known-good ECU. Does condition improve? If it does, replace ECU. If it does not, check power and ground connections.		

¹ - See AFTER-REPAIR PROCEDURE under SELF-DIAGNOSTIC SYSTEM.

93E80386

Fig. 24: Trouble Codes No. 17 & 24 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 25 (PRESSURE REGULATOR SOLENOID VALVE)

G - TESTS V

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CODE No.	25 (SOLENOID VALVE -- PRESSURE REGULATOR CONTROL)	
STEP	INSPECTION	ACTION
1	Disconnect connector from ECU; is battery voltage at ECU terminal 3M wire (G/O) with ignition switch ON?	Yes Does the ECU terminal connector have a poor connection? ⇨ If not, repair or replace the ECU ⇨ If it does, repair or replace the connector
		No Go to next step
2	In the same condition as step 1, is there battery voltage at solenoid valve connector terminal wire (W/R)?	Yes Repair or replace wire
		No Go to next step
3	Is solenoid valve OK?	Yes Look for a short or open circuit in wiring from main relay (FUEL INJ relay) to solenoid valve
		No Replace solenoid valve

92G25052

Fig. 25: Trouble Code No. 25 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.

TRUBLE CODE NO. 26 (PURGE CONTROL SOLENOID VALVE)

CODE No.	26 (SOLENOID VALVE -- PURGE CONTROL)	
STEP	INSPECTION	ACTION
1	Disconnect connector from ECU; is battery voltage at ECU terminal 2O wire (G/O) with ignition switch ON?	Yes Does the ECU terminal connector have a poor connection? ⇨ If not, replace the ECU ⇨ If it does, repair or replace the connector
		No Go to next step
2	In the same condition as Step 1; is there battery voltage at solenoid valve connector terminal wire (W/R)?	Yes Repair or replace wire
		No Go to next step
3	Is solenoid valve OK?	Yes Look for a short or open circuit in wiring from the main relay (FUEL INJ relay) to the solenoid valve
		No Replace solenoid valve

92F25283

Fig. 26: Trouble Code No. 26 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.

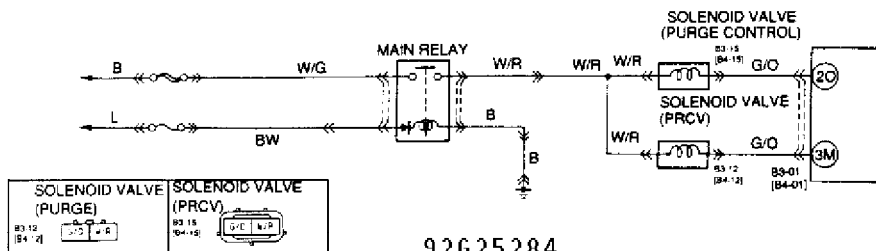


Fig. 27: Trouble Code No. 26 - Schematic
Courtesy Of Mazda Motors Corp.

TRUBLE CODE NO. 28 (EGR VACUUM VALVE SOLENOID)

CODE No.		28 (SOLENOID VALVE — EGR — VACUUM)	
STEP	INSPECTION		ACTION
1	Disconnect from ECU; is there battery voltage at ECU terminal 30 wire (W/V) with ignition switch ON?	Yes	Does the ECU terminal connector have a poor connection? ⇨ If not, replace the ECU ⇨ If it does, repair or replace the connector
		No	Go to next step
2	In the same condition as Step 1, is there battery voltage at solenoid valve connector terminal wire?	Yes	Repair or replace wire
		No	Go to next step
3	Is solenoid valve OK?	Yes	Look for a short or open circuit in wiring from main relay (FUEL INJ relay) to solenoid valve
		No	Replace solenoid valve

92H25285

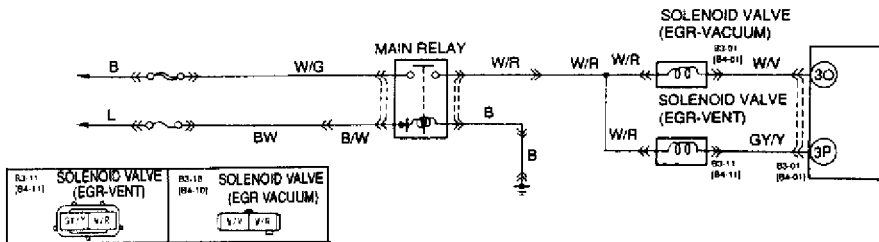
Fig. 28: Trouble Code No. 28 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.

TRUBLE CODE NO. 29 (EGR VENT VALVE SOLENOID)

CODE No.		29 (SOLENOID VALVE — EGR — VENT)	
STEP	INSPECTION		ACTION
1	Disconnect from ECU; is there battery voltage at ECU terminal 3P wire (GY/Y) with ignition switch ON?	Yes	Does the ECU terminal have a poor connection? ⇨ If not, replace the ECU ⇨ If it does, repair or replace the connector
		No	Go to next step
2	In the same condition as Step 1 is there battery voltage at solenoid valve connector terminal wire?	Yes	Repair or replace wire
		No	Go to next step
3	Is solenoid valve OK?	Yes	Look for a short or open circuit in wiring from main relay (FUEL INJ relay) to solenoid valve
		No	Replace solenoid valve

92I25286

Fig. 29: Trouble Code No. 29 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.



92J25287

Fig. 30: Trouble Code No. 29 - Schematic

TRUBLE CODE NO. 34 (IDLE SPEED CONTROL)

CODE No.		34 (ISC VALVE)	
STEP	INSPECTION		ACTION
1	Disconnect connector from ECU; is there battery voltage at ECU terminal 3Q wire (L/O) with ignition switch ON?	Yes	Check ECU terminal for poor connection <ul style="list-style-type: none"> ↳ If OK, replace ECU ↳ If not OK, repair or replace connector
		No	Go to next step
2	In the same condition as Step 1, is there battery voltage at idle-up solenoid valve connector terminal-wires (L/O) and (L/O)?	Yes	Repair or replace wire (L/O)
		No	Go to next step
3	Does ISC valve have correct resistance? Resistance: 10.7—12.3 [at 20°C (68°F)]	Yes	Look for a short or open circuit in wiring from main relay (FUEL INJ relay) to ISC valve
		No	Replace ISC valve

92A25288

Fig. 31: Trouble Code No. 34 - Diagnostic Flowchart
 Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 41 (VARIABLE INERTIA CHARGING SYSTEM SOLENOID 1)

CODE No.		41 (SOLENOID VALVE — VRIS 1)	
STEP	INSPECTION		ACTION
1	Disconnect connector from ECU; is there battery voltage at ECU terminal 3I wire (O/G) with ignition switch ON?	Yes	Check ECU terminal connector for poor connection <ul style="list-style-type: none"> ↳ If OK, replace ECU ↳ If not OK, repair or replace connector
		No	Go to next step
2	In same condition as Step 1, is there battery voltage at solenoid valve connector terminal wire (W/R)?	Yes	Repair or replace wire (B/R)
		No	Go to next step
3	Is solenoid valve OK?	Yes	Look for a short or open circuit in wiring from main relay to solenoid valve
		No	Replace solenoid valve

92B25289

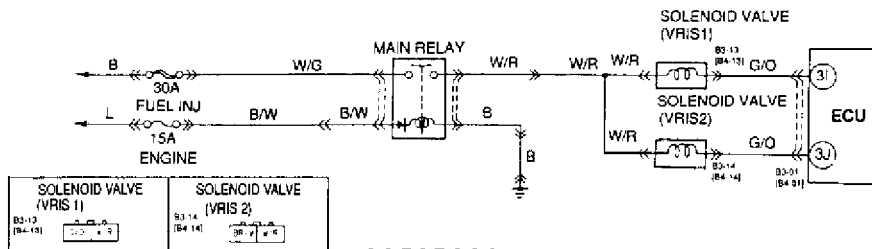
Fig. 32: Trouble Code No. 41 - Diagnostic Flowchart
 Courtesy Of Mazda Motors Corp.

TROUBLE CODE NO. 46 (VARIABLE INERTIA CHARGING SYSTEM SOLENOID 2)

CODE No.		46 (SOLENOID VALVE - VRIS 2)	
STEP	INSPECTION		ACTION
1	Disconnect connector from ECU; is there battery voltage at ECU terminal 3J wire (BR/W) with ignition switch ON?	Yes	Check ECU terminal connector for poor connection ⇒ If OK, replace ECU ⇒ If not OK, repair or replace connector
		No	Go to next step
2	In same condition as Step 1, is there battery voltage at solenoid valve connector terminal wire (W/R)?	Yes	Repair or replace wire
		No	Go to next step
3	Is solenoid valve OK?	Yes	Look for a short or open circuit in wiring from main relay (FUEL INJ relay) to solenoid valve
		No	Replace solenoid valve

92E25290

Fig. 33: Trouble Code No. 46 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.



92F25291

Fig. 34: Trouble Code No. 46 - Schematic
Courtesy Of Mazda Motors Corp.

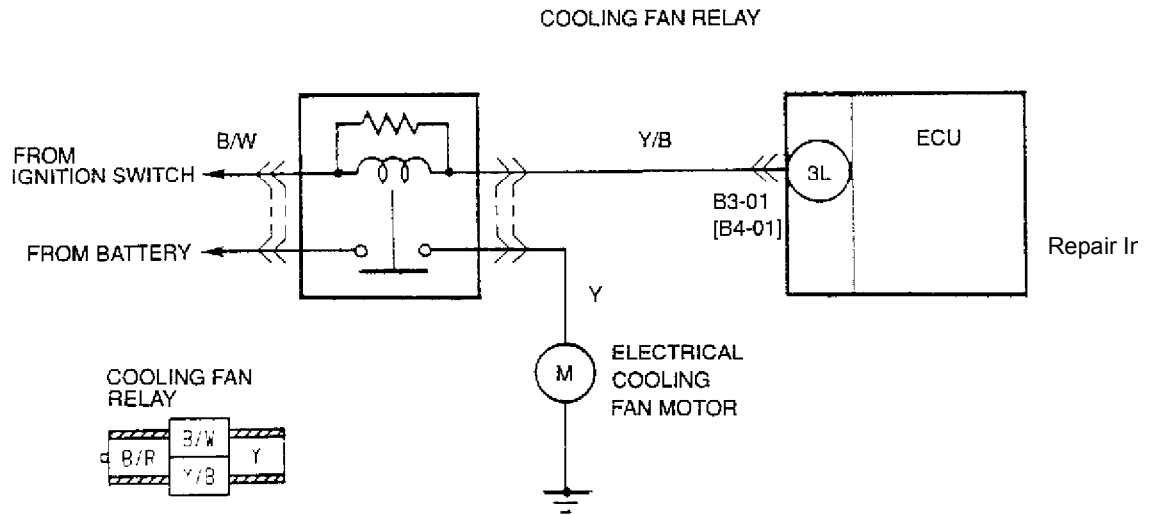
TRUBLE CODE NO. 67 (ELECTRICAL COOLING FAN RELAY)

CODE No.		67 (ELECTRICAL COOLING FAN RELAY)	
STEP	INSPECTION		ACTION
	Disconnect connector from ECU; is there battery voltage at ECU terminal 3L wire with ignition switch ON?	Yes	Check ECU terminal connector for poor connection ⇨ If OK, replace ECU ⇨ If not OK, repair replace connector
		No	Go to next step
	In same condition as Step 1, is there battery voltage at solenoid valve connector terminal wire Y/B?	Yes	Repair or replace wire Y/B
		No	Go to next step
	In same condition as Step 1, is there battery voltage at solenoid valve connector terminal wire W/R?	Yes	Go to next step
		No	Look fan short circuit in wiring from main relay to electrical cooling fan relay
	There continuity at cooling fan relay connector (Y/B) and (B/W)?	Yes	Look for a short circuit in wiring from electrical cooling fan relay to ECU
		No	Replace electrical cooling fan relay

92G25292

Fig. 35: Trouble Code No. 67 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.

G - TESTS W



92H25293

Fig. 36: Trouble Code No. 67 - Schematic
Courtesy Of Mazda Motors Corp.

TRouble CODE NO. 69 (COOLANT THERMOSENSOR)

TROUBLE CODE NO. 69 (COOLANT THERMOSENSOR)

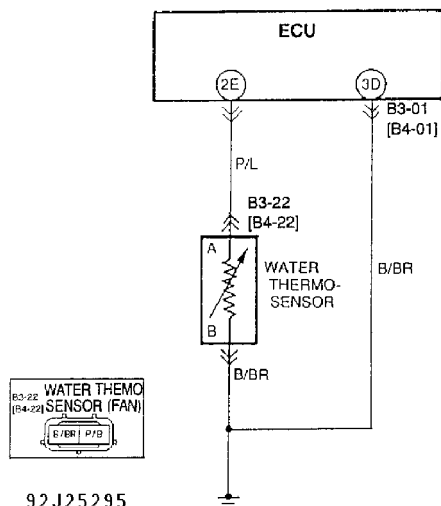
CODE No.	69 (WATER THERMOSENSOR)										
STEP	INSPECTION	ACTION									
1	Does the water thermosensor circuit have a poor connection?	Yes	Repair or replace connector								
		No	Go to next step								
2	Does the wire harness between the water thermosensor and ECU have continuity?	Yes	Go to next step								
		No	Repair or replace								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">Water thermosensor</th> <th style="width: 50%;">ECU</th> </tr> <tr> <td style="text-align: center;">A (P/L)</td> <td style="text-align: center;">2E (P/L)</td> </tr> <tr> <td style="text-align: center;">B (B/BR)</td> <td style="text-align: center;">3D (B/BR)</td> </tr> </table>		Water thermosensor	ECU	A (P/L)	2E (P/L)	B (B/BR)	3D (B/BR)		
Water thermosensor	ECU										
A (P/L)	2E (P/L)										
B (B/BR)	3D (B/BR)										
3	Is resistance of water thermosensor OK?	Yes	Go to next step								
		No	Replace water thermosensor								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">Coolant temp.</th> <th style="width: 50%;">Resistance (kΩ)</th> </tr> <tr> <td style="text-align: center;">91°C (195°F)</td> <td style="text-align: center;">1.70—1.84</td> </tr> <tr> <td style="text-align: center;">97°C (207°F)</td> <td style="text-align: center;">1.42—1.53</td> </tr> <tr> <td style="text-align: center;">108°C (226°F)</td> <td style="text-align: center;">1.03—1.11</td> </tr> </table>		Coolant temp.	Resistance (kΩ)	91°C (195°F)	1.70—1.84	97°C (207°F)	1.42—1.53	108°C (226°F)	1.03—1.11
		Coolant temp.	Resistance (kΩ)								
91°C (195°F)	1.70—1.84										
97°C (207°F)	1.42—1.53										
108°C (226°F)	1.03—1.11										
No	Replace water thermosensor										
4	Is same Code No. present following after-repair procedure? ¹	Yes	Go to next step								
		No	Water thermosensor and circuit OK								
5	Are ECU terminal 2E and 3D voltage OK? *	Yes	Replace ECU								
		No	Look for a short circuit in wiring from water thermosensor to ECU								

¹ - See AFTER-REPAIR PROCEDURE under SELF-DIAGNOSTIC SYSTEM.

* - See PIN VOLTAGE CHARTS article.

93F80387

Fig. 37: Trouble Code No. 69 - Diagnostic Flowchart
Courtesy Of Mazda Motors Corp.



G - TESTS V 92J25295

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Fig. 38: Trouble Code No. 69 - Schematic
Courtesy Of Mazda Motors Corp.

SUMMARY

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

END OF ARTICLE