

# Mazda6 Workshop Manual Supplement

## FOREWORD

This manual contains on-vehicle service and diagnosis for the Mazda6.

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

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**Mazda Motor Corporation  
HIROSHIMA, JAPAN**

## APPLICATION:

This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

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There are explanation given only for the sections marked with shadow ( **■** ).

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## VEHICLE IDENTIFICATION NUMBERS (VIN)

### European (L.H.D. U.K.) specs.

JMZ GG12R20#	100001—
JMZ GG12T20#	100001—
JMZ GG14R20#	100001—
JMZ GG14T20#	100001—
JMZ GY19R20#	100001—
JMZ GY19T20#	100001—

## RELATED MATERIALS

<b>Mazda6 Training Manual</b> (European (L.H.D. U.K.), GCC specs.)	3359-1*-02C
<b>Mazda6 Workshop Manual</b> (European (L.H.D. U.K.), GCC specs.)	1730-1*-02C
<b>Mazda6 Workshop Manual Supplement</b> (European (L.H.D. U.K.), GCC specs.)	1749-1*-02G
<b>Mazda6 Workshop Manual Supplement</b> (European (L.H.D. U.K.), GCC specs.)	1776-10-03G
<b>Engine Workshop Manual MZR-CD (RF Turbo)</b>	1744-1E-02D
<b>Manual Transaxle Workshop Manual A65M-R</b>	1739-1E-02D
<b>Mazda6 Wiring Diagram</b> (European (L.H.D.), GCC specs.)	5558-1*-02G
<b>Mazda6 Wiring Diagram Supplement</b> (European (L.H.D.), GCC specs.)	5575-10-03A
<b>Mazda6 Wiring Diagram</b> (U.K. specs.)	5559-1*-02G
<b>Mazda6 Wiring Diagram Supplement</b> (U.K. specs.)	5576-10-03A
<b>Mazda6 Bodyshop Manual</b> (European (L.H.D. U.K.), GCC specs.)	3360-1*-02C
<b>Mazda6 Bodyshop Manual Supplement Wagon</b> (European (L.H.D. U.K.), Australian, General (L.H.D. R.H.D.) specs.)	3368-1*-02I
<b>EOBD Training Manual</b> (General (L.H.D. R.H.D.) specs.)	3345-1*-00B

\* : Indicates the printing location  
E: Europe  
0: Japan

## **WARNING**

Servicing a vehicle can be dangerous. If you have not received service-related training, the risks of injury, property damage, and failure of servicing increase. The recommended servicing procedures for the vehicle in this workshop manual were developed with Mazda-trained technicians in mind. This manual may be useful to non-Mazda trained technicians, but a technician with our service-related training and experience will be at less risk when performing service operations. However, all users of this manual are expected to at least know general safety procedures.

This manual contains "Warnings" and "Cautions" applicable to risks not normally encountered in a general technician's experience. They should be followed to reduce the risk of injury and the risk that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that the "Warnings" and "Cautions" are not exhaustive. It is impossible to warn of all the hazardous consequences that might result from failure to follow the procedures.

The procedures recommended and described in this manual are effective methods of performing service and repair. Some require tools specifically designed for a specific purpose. Persons using procedures and tools which are not recommended by Mazda Motor Corporation must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.

The contents of this manual, including drawings and specifications, are the latest available at the time of printing, and Mazda Motor Corporation reserves the right to change the vehicle designs and alter the contents of this manual without notice and without incurring obligation.

Parts should be replaced with genuine Mazda replacement parts or with parts which match the quality of genuine Mazda replacement parts. Persons using replacement parts of lesser quality than that of genuine Mazda replacement parts must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.

Mazda Motor Corporation is not responsible for any problems which may arise from the use of this manual. The cause of such problems includes but is not limited to insufficient service-related training, use of improper tools, use of replacement parts of lesser quality than that of genuine Mazda replacement parts, or not being aware of any revision of this manual.

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## HOW TO USE THIS MANUAL

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### HOW TO USE THIS MANUAL

#### RANGE OF TOPICS

- This manual indicates only changes/additions, as it is supplemental to the related materials. Therefore it may not contain the necessary reference service procedures to perform the service indicated in this manual.

B6E201000001101

# VIN CODE

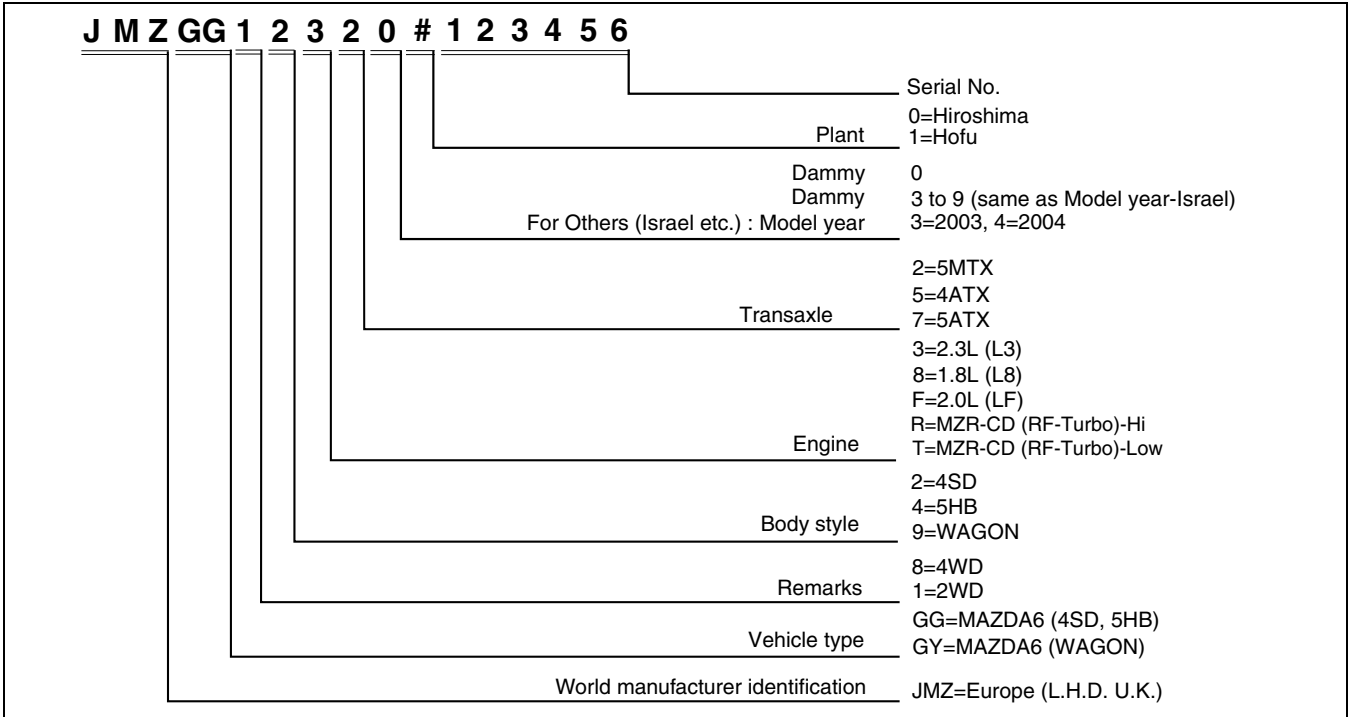
## VIN CODE

### VIN CODE

B6E200800021101

European (L.H.D. U.K.) specs.

GI



B6E2008W001

## NEW STANDARDS

### NEW STANDARDS

#### NEW STANDARDS TABLE

B6E202800020101

- The following is a comparison of the previous standard and the new standard.

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
AP	Accelerator Pedal	—	Accelerator Pedal	
ACL	Air Cleaner	—	Air Cleaner	
A/C	Air Conditioning	—	Air Conditioning	
BARO	Barometric Pressure	—	Atmospheric Pressure	
B+	Battery Positive Voltage	V <sub>B</sub>	Battery Voltage	
—	Brake Switch	—	Stoplight Switch	
—	Calibration Resistor	—	Corrected Resistance	#6
CMP sensor	Camshaft Position Sensor	—	Crank Angle Sensor	
CAC	Charge Air Cooler	—	Intercooler	
CLS	Closed Loop System	—	Feedback System	
CTP	Closed Throttle Position	—	Fully Closed	
—	Closed Throttle Position Switch	—	Idle Switch	
CPP	Clutch Pedal Position	—	Clutch Position	
CIS	Continuous Fuel Injection System	EGI	Electronic Gasoline Injection System	
CS sensor	Control Sleeve Sensor	CSP sensor	Control Sleeve Position Sensor	#6
CKP sensor	Crankshaft Position Sensor	—	Crank Angle Sensor 2	
DLC	Data Link Connector	—	Diagnosis Connector	
DTM	Diagnostic Test Mode	—	Test Mode	#1
DTC	Diagnostic Trouble Code	—	Service Code(s)	
DI	Distributor Ignition	—	Spark Ignition	
DLI	Distributorless Ignition	—	Direct Ignition	
EI	Electronic Ignition	—	Electronic Spark Ignition	#2
ECT	Engine Coolant Temperature	—	Water Thermo	
EM	Engine Modification	—	Engine Modification	
—	Engine Speed Input Signal	—	Engine RPM Signal	
EVAP	Evaporative Emission	—	Evaporative Emission	
EGR	Exhaust Gas Recirculation	—	Exhaust Gas Recirculation	
FC	Fan Control	—	Fan Control	
FF	Flexible Fuel	—	Flexible Fuel	
4GR	Fourth Gear	—	Overdrive	
—	Fuel Pump Relay	—	Circuit Opening Relay	#3
FSO solenoid	Fuel Shut Off Solenoid	FCV	Fuel Cut Valve	#6
GEN	Generator	—	Alternator	
GND	Ground	—	Ground/Earth	
HO2S	Heated Oxygen Sensor	—	Oxygen Sensor	With heater
IAC	Idle Air Control	—	Idle Speed Control	
—	IDM Relay	—	Spill Valve Relay	#6
—	Incorrect Gear Ratio	—	—	
—	Injection Pump	FIP	Fuel Injection Pump	#6
—	Input/Turbine Speed Sensor	—	Pulse Generator	
IAT	Intake Air Temperature	—	Intake Air Thermo	
KS	Knock Sensor	—	Knock Sensor	
MIL	Malfunction Indicator Lamp	—	Malfunction Indicator Light	
MAP	Manifold Absolute Pressure	—	Intake Air Pressure	
MAF sensor	Mass Air Flow Sensor	—	Airflow Sensor	
MFI	Multiport Fuel Injection	—	Multiport Fuel Injection	
OBD	On Board Diagnostic	—	Diagnosis/Self Diagnosis	

## NEW STANDARDS

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
OL	Open Loop	—	Open Loop	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multiport Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1–2 Shift Solenoid Valve	
—	Shift Solenoid B	—	Shift A Solenoid Valve	
—		—	2–3 Shift Solenoid Valve	
—	Shift Solenoid C	—	Shift B Solenoid Valve	
—		—	3–4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP sensor	Throttle Position Sensor	—	Throttle Sensor	
TCV	Timer Control Valve	TCV	Timing Control Valve	#6
TCC	Torque Converter Clutch	—	Lockup Position	
TCM	Transmission (Transaxle) Control Module	—	EC-AT Control Unit	
—	Transmission (Transaxle) Fluid Temperature Sensor	—	ATF Thermosensor	
TR	Transmission (Transaxle) Range	—	Inhibitor Position	
TC	Turbocharger	—	Turbocharger	
VSS	Vehicle Speed Sensor	—	Vehicle Speed Sensor	
VR	Voltage Regulator	—	IC Regulator	
VAF sensor	Volume Air Flow Sensor	—	Airflow Meter	
WU-TWC	Warm Up Three Way Catalytic Converter	—	Catalytic Converter	#5
WOT	Wide Open Throttle	—	Fully Open	

#1 : Diagnostic trouble codes depend on the diagnostic test mode.

#2 : Controlled by the PCM

#3 : In some models, there is a fuel pump relay that controls pump speed. That relay is now called the fuel pump relay (speed).

#4 : Device that controls engine and powertrain

#5 : Directly connected to exhaust manifold

#6 : Part name of diesel engine



## ABBREVIATIONS

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### ABBREVIATIONS

#### ABBREVIATIONS TABLE

B6E203000011101

CAN	Controller Area Network
IDM	Injector Driver Module
KOEO	Key On Engine Off
KOER	Key Off Engine Running
OFF	Switch Off
ON	Switch On
PID	Parameter Identification
SW	Switch
TCV	Timer Control Valve
VBC	Variable Boost Control
VSC	Variable Swirl Control
WDS	Worldwide Diagnostic System

# SCHEDULED MAINTENANCE

## SCHEDULED MAINTENANCE

### SCHEDULED MAINTENANCE TABLE

B6E203400013101

**For Europe (L.H.D. U.K.)**

**Chart symbols:**

**I** : Inspect and clean, repair, adjust, or replace if necessary.

**R** : Replace

**C** : Clean

**Remarks:**

- The ignition and fuel systems are highly important to the emission control system and to efficient engine operation. All inspections and adjustments must be made by an expert repairer, we recommend an Authorized Mazda Repairer.
- After the described period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked\* in the maintenance chart.

\*1: If the vehicle is operated under any of the following conditions, change the engine oil and oil filter every 10,000 km (6,250 miles) or shorter.

- a. Driving in dusty conditions.
- b. Extended periods of idling or low speed operation.
- c. Driving for long period in cold temperatures or driving regularly at short distance only.

\*2: Also inspect and adjust the power steering and air conditioner drive belts, if installed.

\*3: If the brakes are used extensively (for example, continuous hard driving or mountain driving) or if the vehicle is operated in extremely humid climates, change the brake fluid annually.

\*4: If the vehicle is operated in very dusty or sandy areas, clean and if necessary, replace the air cleaner element more often than the recommended intervals.

\*5: Replacement of the timing belt is required at every 100,000 km (62,500 miles). Failure to replace the timing belt may result in damage to the engine.

\*6: Replacement of the timing belt is required at every 120,000 km (75,000 miles). Failure to replace the timing belt may result in damage to the engine.

\*7: If the vehicle is operated under any of the following conditions, change the rear differential oil every 45,000 km (27,000 miles).

- a. Towing a trailer or using a car - top carrier
- b. Driving in dusty, sandy or wet condition
- c. Extended periods of idling or low speed operation
- d. Repeated short trips of less than 16 km (10 miles)

\*8: If this component has been submerged in water, the oil should be changed.

Maintenance Item	Maintenance Interval (Number of months or km (miles), whichever comes first)									
	Months	12	24	36	48	60	72	84	96	108
	×1000 km	20	40	60	80	100	120	140	160	180
	×1000 miles	12.5	25	37.5	50	62.5	75	87.5	100	112.5
<b>GASOLINE ENGINE</b>										
Engine valve clearance	Audible inspect every 120,000 km (75,000 miles), if noisy, adjust									
Spark plugs	Replace every 100,000 km (62,500 miles)									
Air cleaner element	*4			R			R			R
Evaporative system (if installed)				I			I			I
<b>DIESEL ENGINE</b>										
Engine valve clearance		I					I			
Engine timing belt	Finland, Sweden, Norway*5	Replace every 100,000 km (62,500 miles)								
	Others*6	Replace every 120,000 km (75,000 miles)								
Fuel filter				R			R			R
Fuel injection system		I		I			I			I
Air cleaner element	*4	C	C	R	C	C	R	C	C	R
E.G.R. system				I			I			I
<b>GASOLINE and DIESEL ENGINE</b>										
Engine oil	*1	R	R	R	R	R	R	R	R	R
Engine oil filter	*1	R	R	R	R	R	R	R	R	R
Drive belts	*2			I			I			I
Cooling system (including coolant level adjustment)			I		I		I		I	
Engine coolant		Replace at first 4 years or 100,000 km (62,500 miles); after that, every 2 years								

## SCHEDULED MAINTENANCE

Maintenance Item	Maintenance Interval (Number of months or km (miles), whichever comes first)									
	Months	12	24	36	48	60	72	84	96	108
	×1000 km	20	40	60	80	100	120	140	160	180
	×1000 miles	12.5	25	37.5	50	62.5	75	87.5	100	112.5
Fuel lines & hoses		I			I		I		I	
Battery electrolyte level & specific gravity		I	I	I	I	I	I	I	I	I
Brake fluid	*3		R		R		R		R	
Brake lines, hoses & connections		I	I	I	I	I	I	I	I	I
Parking brake		I	I	I	I	I	I	I	I	I
Power brake unit & hoses		I	I	I	I	I	I	I	I	I
Disc brakes		I	I	I	I	I	I	I	I	I
Power steering fluid, lines, hoses, and connections		I	I	I	I	I	I	I	I	I
Steering operation & linkages			I		I		I		I	
Manual transaxle oil						R				
Automatic transaxle fluid level				I			I			I
Rear differential oil (for 4WD)							*7	*8		
Transfer oil (for 4WD)							*8			
Front & rear suspension & ball joints			I		I		I		I	
Drive shaft dust boots			I		I		I		I	
Exhaust system and heat shields					I				I	
Cabin air filter (if installed) (pollen filter)			R		R		R		R	
Body condition (for rust, corrosion & perforation)		Inspect annually								
Tires (including spare tyre) (with inflation pressure adjustment)		I	I	I	I	I	I	I	I	I

### Scheduled Maintenance Service (Specific Work Required)

- The specific work required for each maintenance item is listed in the following table. (Please refer to the section applicable to the model serviced.)

#### For Europe (L.H.D. U.K.)

Bold frames: New item

Maintenance Item	Specific Work Required
<b>ENGINE</b>	
Engine valve clearance	Measure clearance
Drive belts	Inspect for wear, cracks and fraying, and check tension. Replace drive belt.
Engine timing belt	Replace engine timing belt.
Engine oil	Replace engine oil and inspect for leakage.
Oil filter	Replace oil filter and inspect for leakage.
<b>COOLING SYSTEM</b>	
Cooling system (including coolant level adjustment)	Check coolant level and quality, and inspect for leakage.
Engine coolant	Replace coolant.
<b>FUEL SYSTEM</b>	
Air cleaner element	Inspect for dirt, oil and damage. Clean air cleaner element (by blowing air). Replace air cleaner element.
Fuel filter	Replace fuel filter.
Fuel lines & hoses	Inspect for cracks, leakage and loose connection.
Fuel injection system (for MZR-CD (RF Turbo))	Update to injection amount correction with WDS. (see W/M)
<b>IGNITION SYSTEM (FOR GASOLINE)</b>	
Spark plugs	Inspect for wear, damage, carbon, high-tension lead condition and measure plug gap. Replace spark plugs.
<b>EMISSION CONTROL SYSTEM</b>	
Evaporative system (for gasoline)	Check system operation (see W/M), vapor lines, vacuum fitting hoses and connection.
E.G.R. system (MZR-CR (RF Turbo))	Check system operation (see W/M), vacuum fitting hoses and connection. Update to MAF correction for E.G.R control with WDS. (see W/M)

## SCHEDULED MAINTENANCE

Maintenance Item	Specific Work Required
<b>ELECTRICAL SYSTEM</b>	
Battery electrolyte level & specific gravity	Check level and specific gravity.
<b>CHASSIS &amp; BODY</b>	
Brake fluid	Check fluid level and inspect for leakage. Replace brake fluid.
Brake lines, hoses & connections	Inspect for cracks, damage, chafing, corrosion, scars, swelling and fluid leakage.
Parking brake	Check lever stroke.
Power brake unit & hoses	Check vacuum lines, connections and check valve for improper attachment, air tightness, cracks chafing and deterioration.
Disc brakes	Test for judder and noise. Inspect caliper for correct operation and fluid leakage, brake pads for wear. Check disc plate condition and thickness.
Power steering fluid & lines	Check fluid level and lines for improper attachment, leakage, cracks, damage, loose connections, chafing and deterioration.
Power steering fluid	Check fluid level.
Power steering system & hoses	Check lines for improper attachment, leakage, cracks, damage, loose connections, chafing and deterioration.
Steering operation & gear housing	Check that the steering wheel has the specified play. Be sure to check for changes, such as excessive play, hard steering or strange noises. Check gear housing and boots for looseness, damage and grease/gear oil leakage.
Steering linkages tie rod ends & arms	Check ball joint, dust cover and other components for looseness, wear, damage and grease leakage.
Front & rear suspension ball joints	Inspect for grease leakage, cracks, damage and looseness.
Manual transmission/transaxle oil	Check oil level and inspect for leakage. Replace manual transmission/transaxle oil.
Automatic transmission/transaxle fluid level	Check fluid level.
Rear differential oil	Check oil level and inspect for leakage. Replace rear differential oil.
Transfer oil (for 4x4)	Check oil level and inspect for leakage. Replace transfer oil.
Drive shaft dust boots	Inspect for grease leakage, cracks, damage and looseness.
Body condition (for rust, corrosion & perforation)	Inspect body surface for paint damage, rust, corrosion and perforation.
Exhaust system and heat shields	Inspect for damage, corrosion, looseness of connections and gas leakage.
Tires (including spare tire) (with inflation pressure adjustment)	Check air pressure and inspect tires for tread wear, damage and cracks; and wheels for damage and corrosion.
<b>AIR CONDITIONER SYSTEM (IF EQUIPPED)</b>	
Cabin air filter	Replace cabin air filter.

GI

# FUEL AND EMISSION CONTROL SYSTEMS

## [MZR-CD (RF Turbo)]

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## OUTLINE

### OUTLINE

#### OUTLINE OF CONSTRUCTION

B6E400218881101

- The fuel and emission control system is essentially carried over from that of the previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine models, except for the following features. (See Mazda6 Workshop Manual Supplement 1749-1\*-02G.)

#### FEATURES

B6E400218881102

##### Improved Emission Performance

- A EGR valve position sensor has been adopted.

##### Improved Serviceability

- The number of DTCs has been increased to provide more detail information.
- The DTC troubleshooting procedures have been renewed due to the adoption of the diagnostic test mode and OBD drive mode.
- The PID item has been added.
- The simulation item has been added.

F2

#### SPECIFICATIONS

B6E400218881103

Item		New Mazda6 (GG, GY)	Previous Mazda6 (GG, GY)
		MZR-CD (RF Turbo)	
Air cleaner element	Type	Non woven fabric (dry)	
Supercharger	Type	Turbocharger	
Glow plug	Type	Metal	
Pump	Type	Supply pump	
Fuel tank	Capacity (L {US gal, Imp gal})	64 {17, 14}	
Catalyst	Type	Warm up oxidation catalyst, Oxidation catalyst	
EGR control	Type	Duty control	
PCV system	Type	Closed	





## OUTLINE

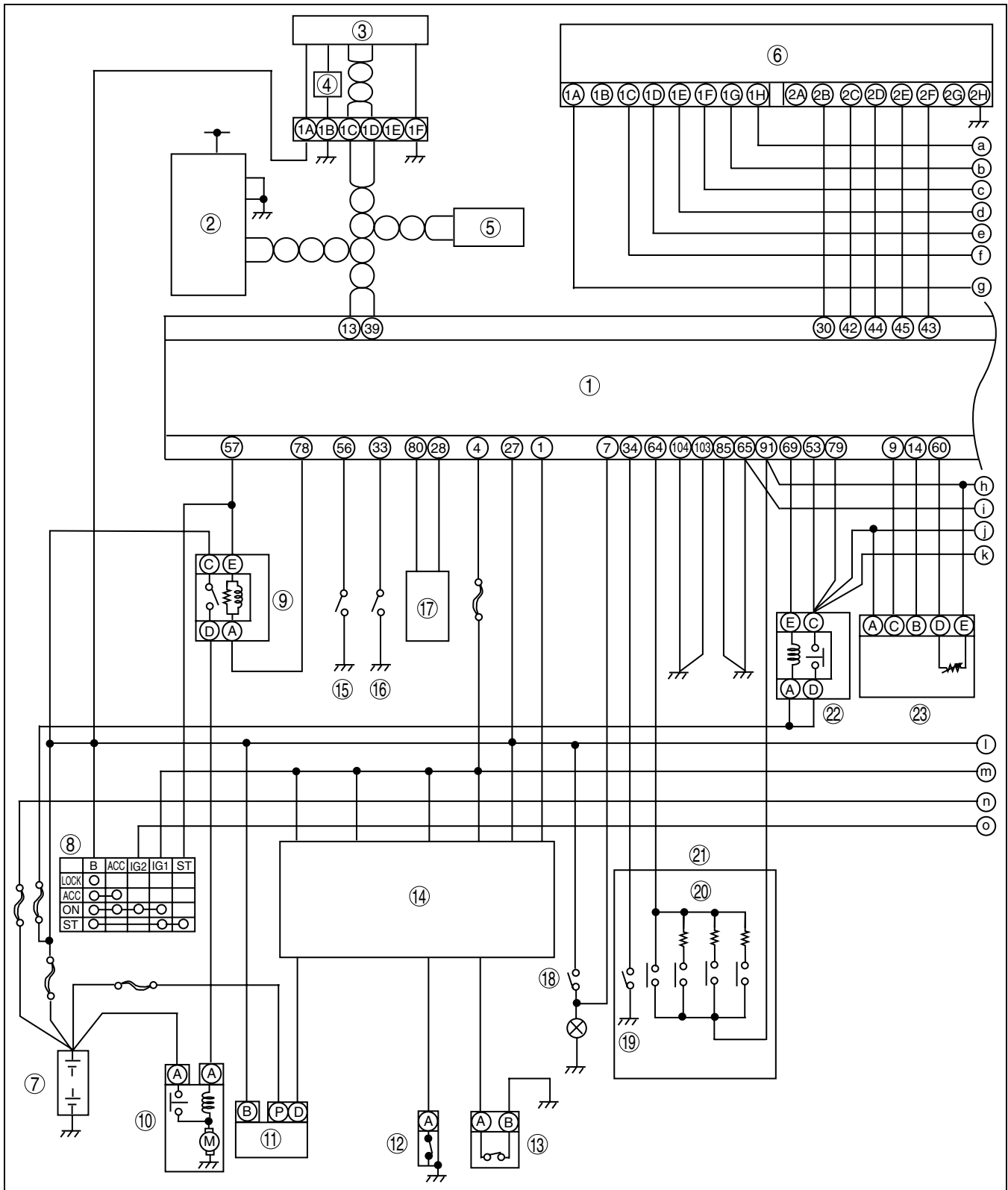
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31	Glow plug
32	Fuel injector
33	ECT sensor
34	Calibration resistor
35	CMP sensor
36	Warm up oxidation catalytic converter
37	Oxidation catalytic converter
38	Silencer
39	Vacuum pump
40	CKP sensor
41	Idle switch
42	APP sensor
43	Glow plug relay
44	IDM
45	PCM
46	BARO sensor
47	PCM control relay
48	Engine switch
49	Starter (starter signal)
50	Neutral switch
51	Clutch switch
52	A/C switch
53	CAN bus
54	To PCM
55	EGR valve position sensor
56	DLC-2
57	Fuel flow

# OUTLINE

## CONTROL SYSTEM WIRING DIAGRAM

B6E400218881105



A6E40022002

1	PCM
2	DLC-2
3	Water heater unit
4	Fuel pump
5	Other unit
6	IDM

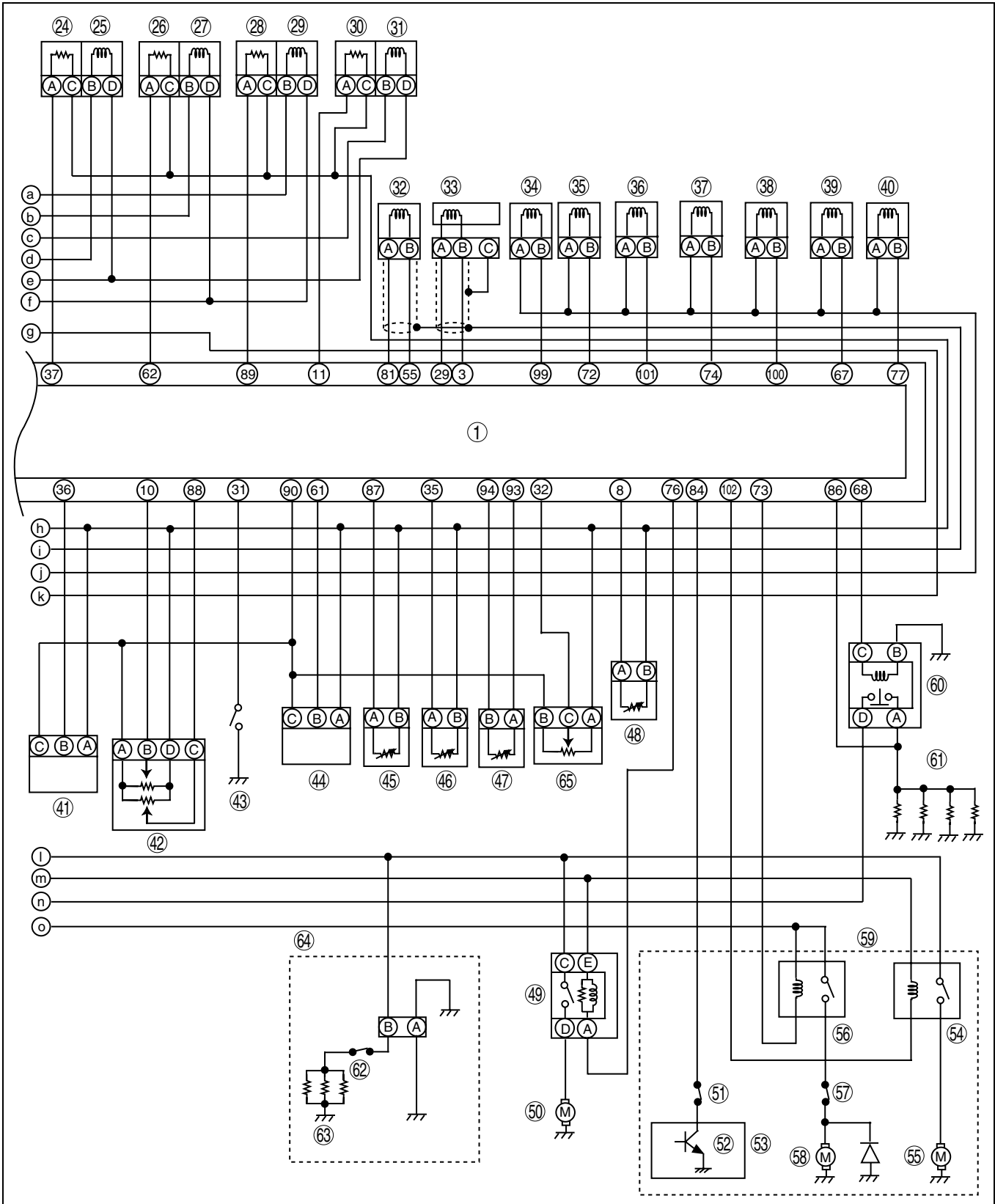
7	Battery
8	Engine switch
9	Starter relay
10	Starter
11	Generator
12	Oil pressure switch

## OUTLINE

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13	Sedimentor switch
14	Instrument cluster
15	Neutral switch
16	Clutch switch
17	Coil
18	Brake switch
19	Brake switch 2
20	Cruise control switch
21	With cruise control system
22	PCM control relay
23	MAF/IAT sensor

# OUTLINE



B6E4002W001

24	Calibration resistor No.1
25	Fuel injector No.1
26	Calibration resistor No.2
27	Fuel injector No.2
28	Calibration resistor No.3
29	Fuel injector No.3