



TRAINING MANUAL

Mazda2 Facelift

ZOOM-ZOOM

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Training Services

The logo features the text "ZOOM-ZOOM" in a stylized, italicized font. The text is white and set against a blue background that has a yellow-to-blue gradient. The letters are slightly blurred, giving a sense of motion.

Title	Section
General Information	00
Engine	01
Appendix	
Abbreviations	

00

General Information

00 General Information

General	1
Key Dates	1
Product Changes For New Mazda2 Facelift	1
Safety, Security, Others	1
Exterior.....	2
Interior.....	4
Audio System.....	6
Exterior Lighting	8
Retractable key	10

General

Key Dates

- Production start for Mazda2 Facelift is 1st September 2005
- Press Launch for Mazda2 Facelift is in September 2005
- Sales start for Mazda2 Facelift is in November 2005

Product Changes For New Mazda2 Facelift

Safety, Security, Others

DSC For All Engines

- **DSC (Dynamic Stability Control)** is now available for 1.25l MZI and 1.4l MZI (was only available for 1.6l MZI and 1.4l MZ-CD); DSC can not be combined with **ASM (Automated Shift Manual Transmission)**

Single Stage Airbag

- Cross-carline action to replace current dual stage airbag systems by single stage systems

Double Locking Deleted

- Double locking is not available anymore for left-hand drive vehicles

Retractable Key

- Cross-carline action to replace the current remote control and key

Euro 4 Compliant Diesel Engine

- 1.4l MZ-CD now meets Euro 4 emission legislation requirements
- ASM is not available anymore for 1.4l MZ-CD

CD Player Available As Factory Option

- CD player is now available as factory option (new generation audio unit)

Revised Audio Steering Switches

- Cross-carline action to harmonize functionality of the audio switch and improve usability of the system

General Information

Exterior

New Front And Rear Lamps

- Projector-type front lamps
- Clear-type rear lamps

All New 16 Inch Alloy Wheel

- Completely new design
- Available as factory option (not on 1.25l MZI engine)

New Design 15 Inch Alloy Wheel

- Replacement for current 15 inch alloy wheel (carry over design from special model)

C-Pillar Black Out

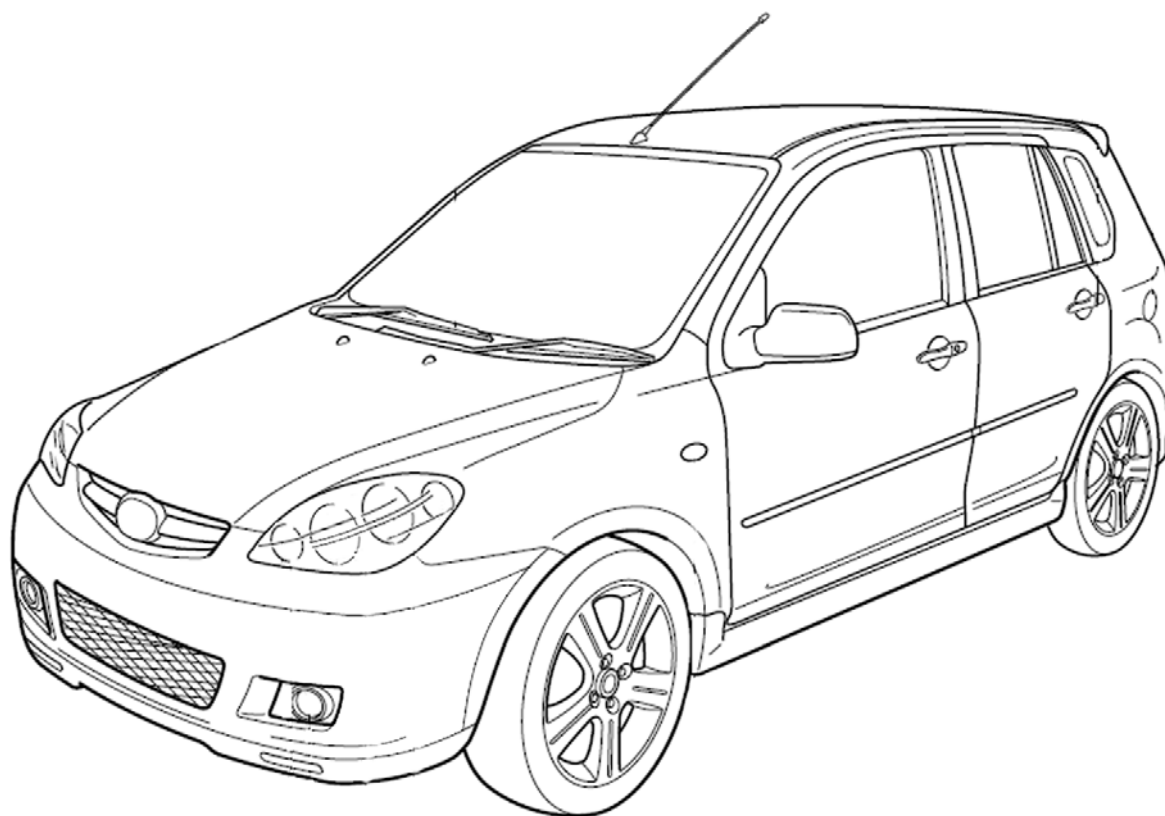
- Standard on all Mazda2 to visually lower the rear of the car, giving a more sporty appearance

New Design Fog Lamps

- Round-type design to replace current square shape fog lamp
- Gives a better integration with the new front lights

Three New Exterior Colours

- Sea Grey 33T (launch colour for Sport configuration) to replace Magnum Grey
- Breeze 33V (launch colour for basic configuration) to replace Vitro Green
- Kelp 33W to replace Flare



M2FL_00001

General Information

Interior

Changed Interior Colour And Trim For Sport Configuration

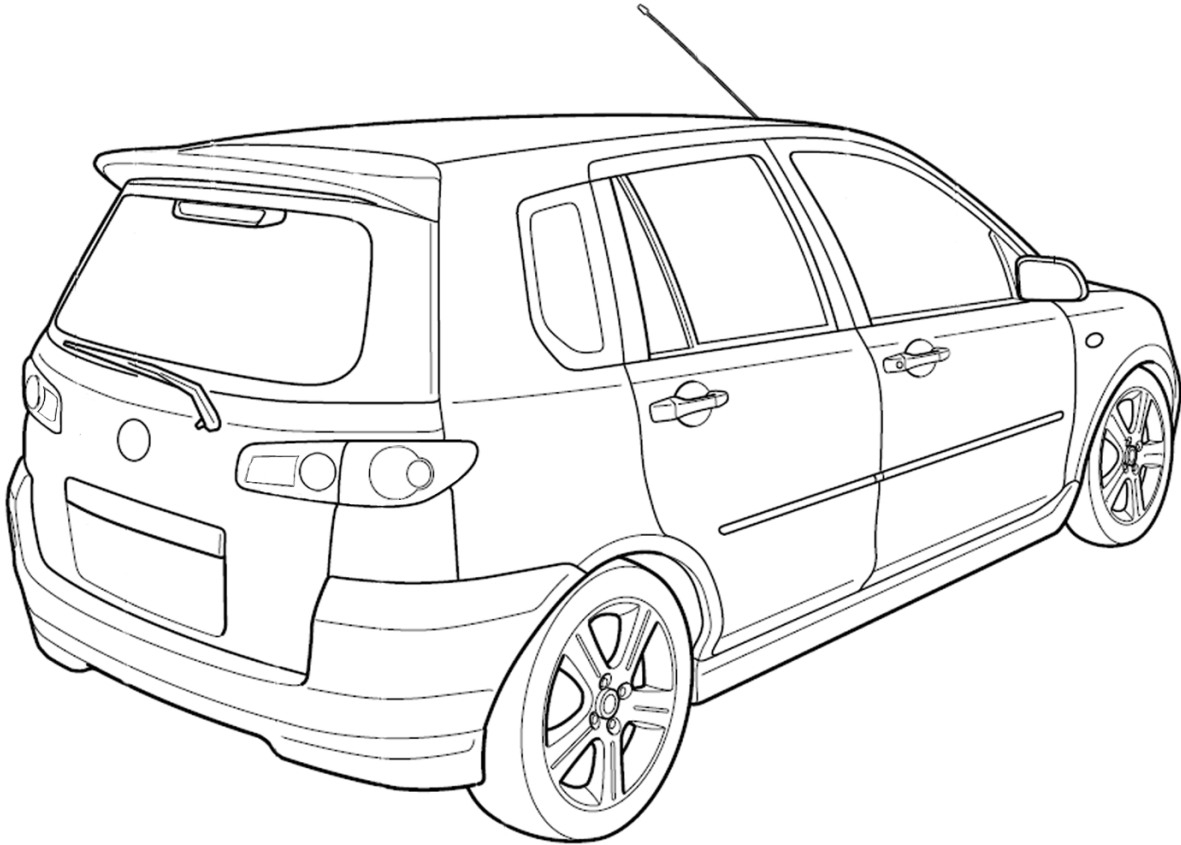
- Seat main and bolster fabric replaced by a new material (Black)
- Black/Blue fabric not available anymore for Sport configuration

Changed Interior Colour And Trim For Basic Configuration

- Current Dark Grey environment colour replaced by Lunar Grey
- Seat main fabric replaced by a new material (Lunar Grey)
- Seat bolster fabric is carried over, but the colour is changed to Lunar Grey

Addition Of 2nd Colour And Trim For Basic Configuration

- Second Black trim level introduced to basic configuration (similar to Black trim from Sport configuration, but without leather steering wheel, silver colored steering switches and shift patterns)
- Black trim on basic configuration (for left-hand drive vehicles in conjunction with side airbags, only)

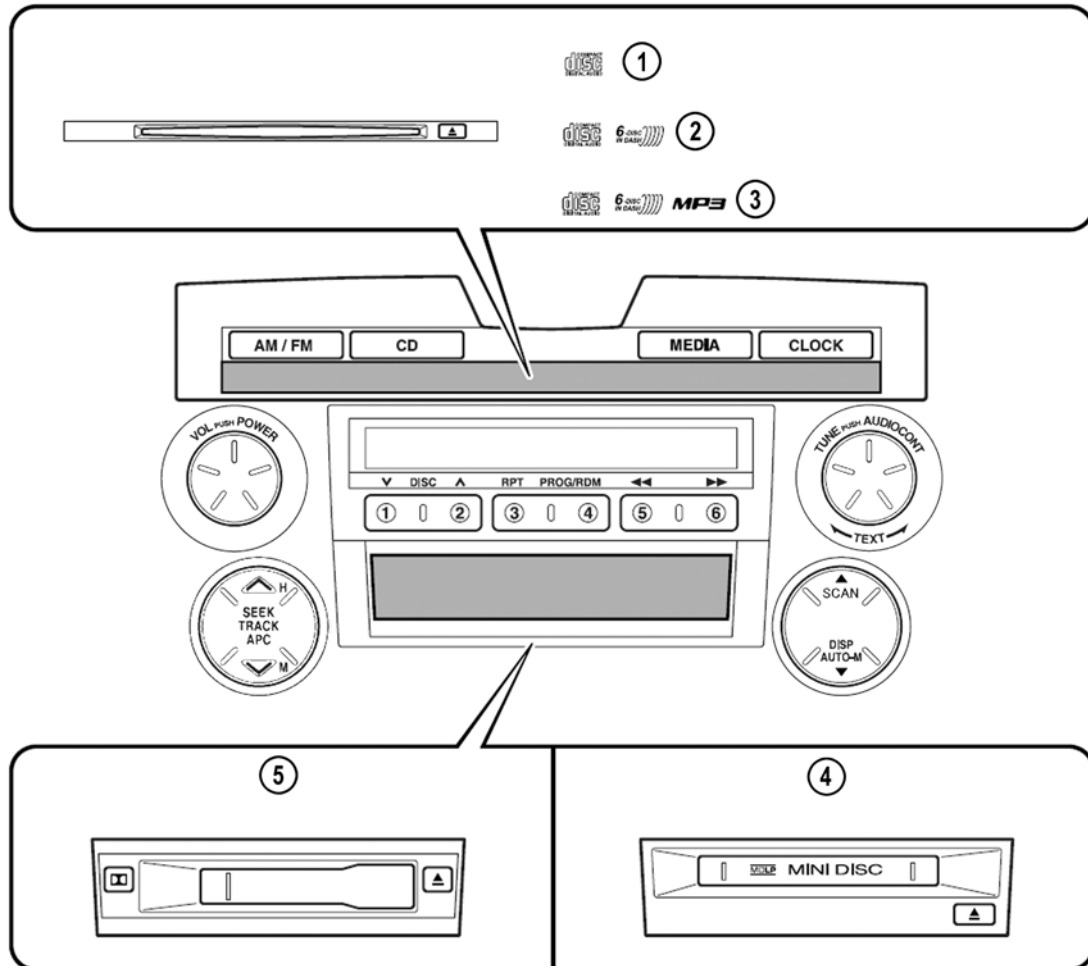


M2FL_00002

General Information

Audio System

- The new generation audio system is also introduced on Mazda2 Facelift. Since the CD player is part of the base module, this feature is now available as factory option (rather than dealer-fit option).

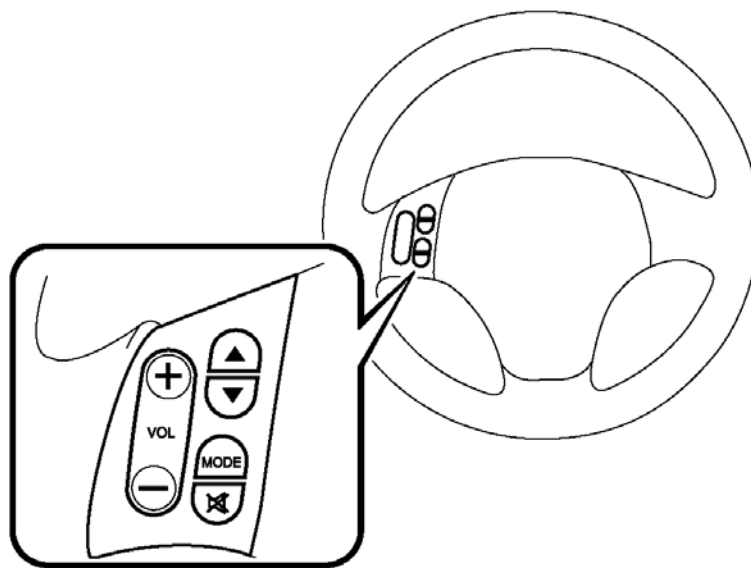


M2FL_00003

- | | | | |
|---|---|---|-----------------------|
| 1 | CD player | 4 | Mini Disc (MD) player |
| 2 | In-dash CD changer (music CD player) | 5 | Cassette tape player |
| 3 | In-dash CD changer (music CD/MP3 CD player) | | |

Revised audio steering switches

- To harmonize the functionality of the audio switches of all Mazda vehicles, the former P•SET switch has been replaced by a seek down switch (▽). The functionality has been changed slightly.
- When listening to the radio:
 - Press the seek switch (Δ, ▽), the radio switches to the next/previous stored station in the order that it was stored (1 - 6).
 - Press the seek switch (Δ, ▽) for about 2 seconds until a beep sound is heard to seek all usable stations at a higher or lower frequency whether programmed or not.
- When playing a cassette tape:
 - Press the seek switch (Δ), release, and it will advance to the next selection.
 - Press the seek switch (▽), release, and it will repeat the selection being played.
- When playing a CD or MD:
 - Press the seek switch (Δ) to skip to the next track.
 - Press the seek switch (▽) to repeat the current track.



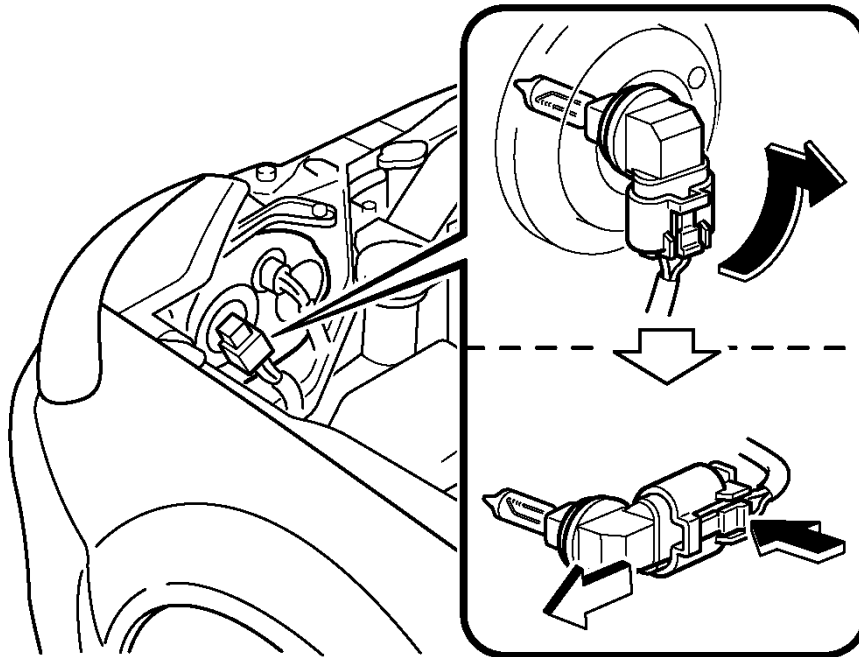
M2FL_00004

General Information

Exterior Lighting

Headlamps

- The new designed headlamps use separate lamps for main beam and dipped beam:
 - projector optics and H7 55W bulbs for dipped beam
 - free form reflectors and HB3 60W bulbs for main beam

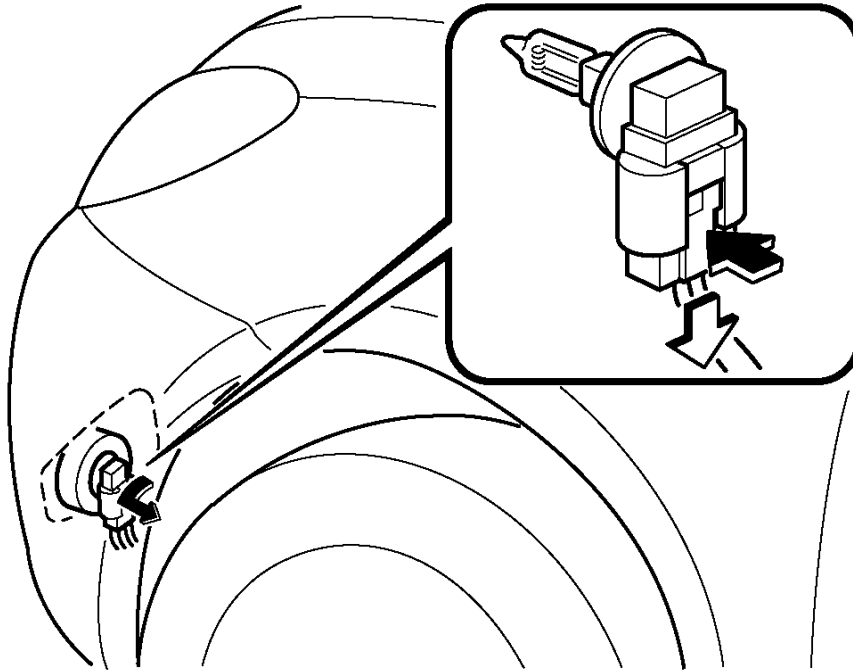


Bulb removal (HB3 bulb shown)

M2FL_00005

Fog lamps

- The fog lamps have been re-designed. The bulb type HB4 51W has been carried over from the previous design.
- The HB4 bulbs use bayonet-type sockets. After releasing a wire clip, the HB4 bulbs can be removed like the HB3 bulbs.



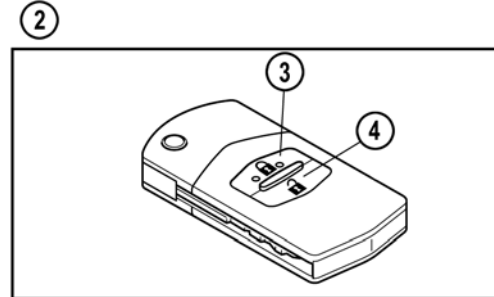
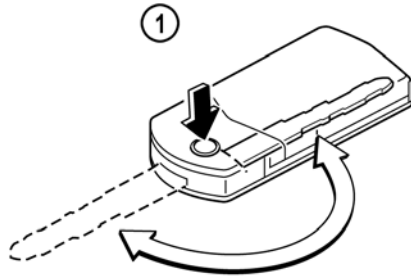
M2FL_00006

Fog lamp bulb removal

General Information

Retractable key

- The retractable "Jack Knife" key has been adopted for Mazda2 Facelift.



M2FL_00007

- 1 Retractable key
- 2 Keyless transmitter

- 3 Lock button
- 4 Unlock button

01

Engine

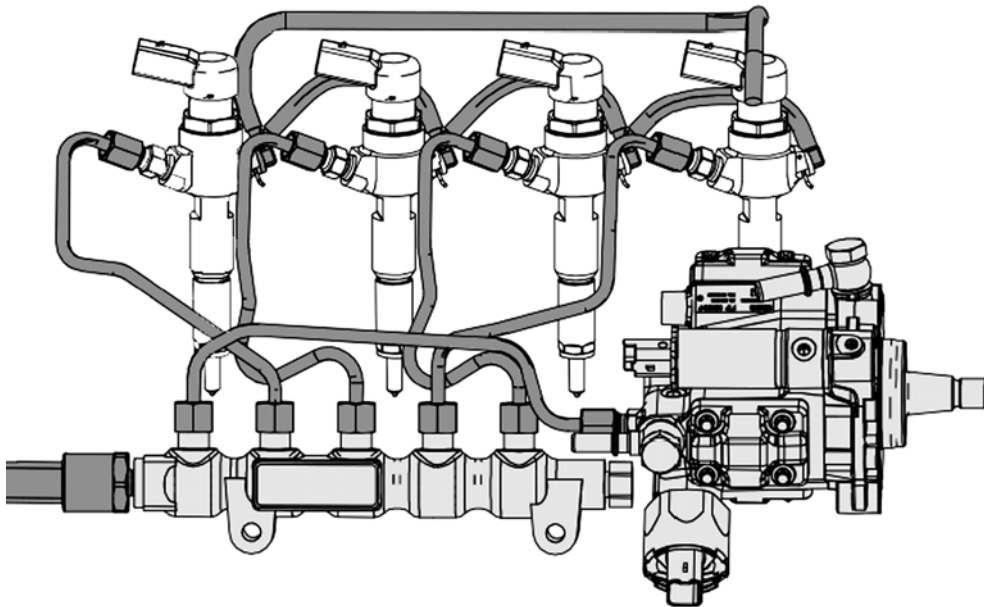
01 Engine

Diesel Engine

General	1
Injectors	2
Intake-air System	4
Parts Location	4
Exhaust Gas Recirculation System	5
EGR Valve	5
EGR Valve Position Sensor	7
EGR Cooler.....	8
Intake Shutter Valve.....	8
Diagnostics	9
Glow Plug Control Module	10

General

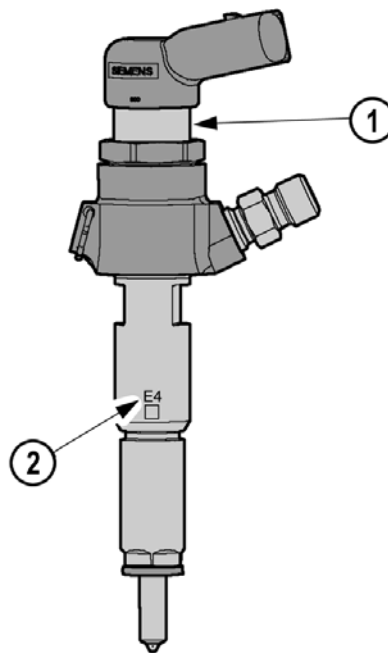
- The 1.4 MZ-CD Diesel engine of the Mazda2 Facelift basically has been carried over from the previous Mazda2. In order to comply with Euro 4 emission legislation the engine has been upgraded as follows:
 - new injectors
 - revised intake air system
 - revised **EGR** (**E**xhaust **G**as **R**ecirculation) system
 - revised **PCM** (**P**owertrain **C**ontrol **M**odule)



M2FL_01001

Injectors

- The injectors have been basically carried over from the previous 1.4 MZ-CD Diesel engine. They are piezo-type injectors, which consist of nozzle body with nozzle needle, hydraulic servo system and piezo actuator.
- Since the Diesel engine of the Mazda2 Facelift meets Euro 4 emission regulations, it uses injectors with a different spray hole diameter. In order to distinguish between injectors for Euro 3 vehicles and injectors for Euro 4 vehicles, an injector classification code ("E3" for Euro 3 vehicles and "E4" for Euro 4 vehicles) is stamped onto the injector shaft.



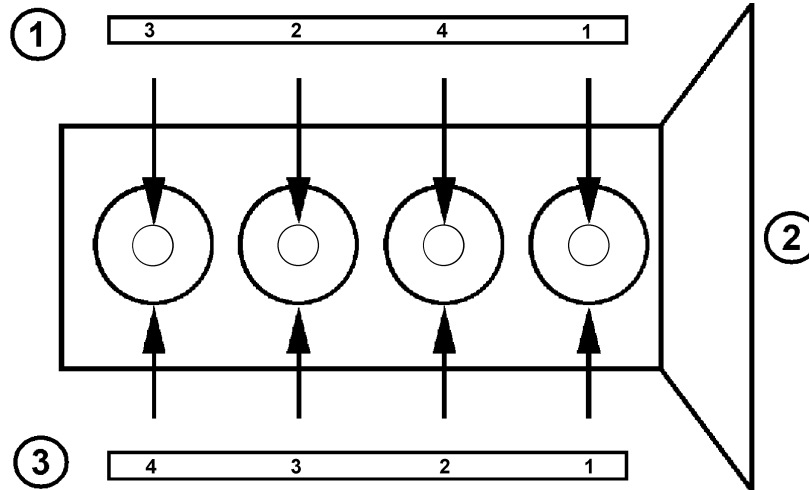
M2FL_01002

1 Injector

2 Injector classification code

NOTE: Never disconnect any connectors of the piezo-type injectors (such as injector connectors, PCM connectors etc.) while the engine is running. If there is an open circuit at an injector, the corresponding piezo actuator may remain extended for a certain time so that the nozzle needle stays open. This would result in continuous injection and hence in engine damage.

- The injectors are numbered according to the firing order (e.g. injector No.2 is located at cylinder No.3). On the 1.4 MZ-CD engine the cylinder No.1 is located next to the transmission (French-style cylinder numbering).



M2FL_01003

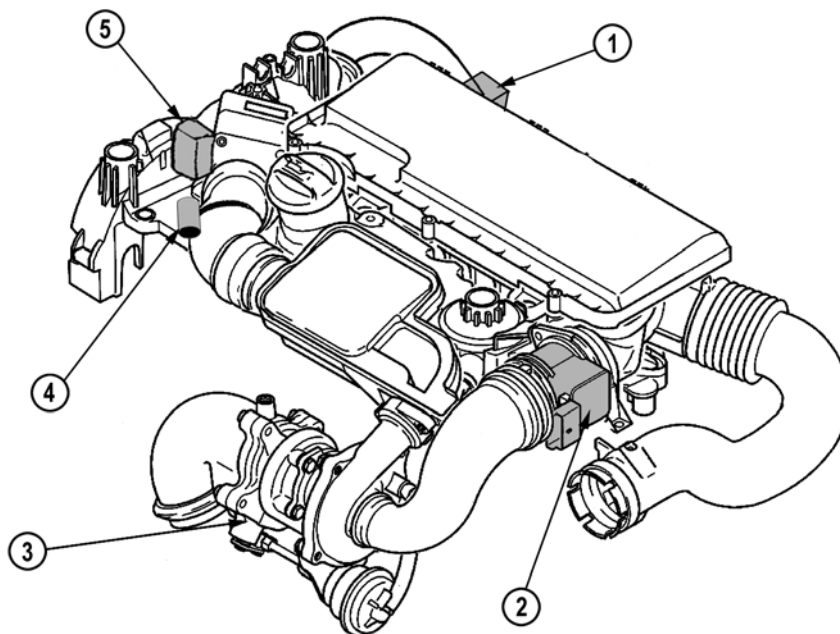
1 Injector numbering
2 Transmission

3 Cylinder numbering

Intake-air System

- In order to comply with Euro 4 emission legislation, the intake-air system of the 1.4 MZ-CD Diesel engine of the Mazda2 Facelift has been revised as follows:
 - **MAP (Manifold Absolute Pressure)** sensor has been added
 - new hot film-type **MAF (Mass Air Flow)** sensor (instead of hot wire-type) with integrated **IAT (Intake Air Temperature)** sensor
 - additional IAT sensor
 - **ISV (Intake Shutter Valve)** has been introduced for upgrading the EGR system
- The operation of MAP sensor, MAF sensor, IAT sensor and the actuation of the ISV can be monitored using the Datalogger function of the **WDS (Worldwide Diagnostic System)**.

Parts Location



M2FL_01004

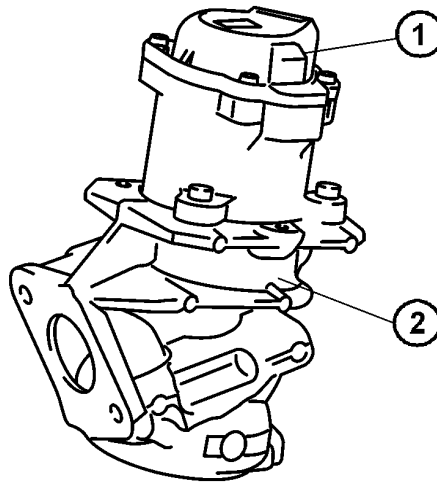
- | | | | |
|---|------------------------------|---|----------------------|
| 1 | MAP sensor | 4 | IAT sensor |
| 2 | Hot film-type MAF sensor | 5 | Intake shutter valve |
| 3 | Fixed geometry turbo charger | | |

Exhaust Gas Recirculation System

- For meeting the Euro 4 emission regulations the exhaust gas recirculation system of the Mazda2 Facelift with 1.4 MZ-CD Diesel engine has the following new features:
 - EGR valve with **DC (Direct Current)** motor and position sensor
 - EGR cooler
 - ISV with DC motor

EGR Valve

- For more precise exhaust gas admeasurement the previous pneumatic EGR valve has been replaced by an electrically operated EGR valve.
- The EGR valve is located at the rear side of the engine and is connected to the exhaust manifold via an EGR duct integrated in the cylinder head.
- It uses a DC motor for actuation. A cam plate transforms the rotational movement of the motor into an axial movement of the EGR valve. An **EGRVP (EGR Valve Position)** sensor is installed for monitoring the valve position.

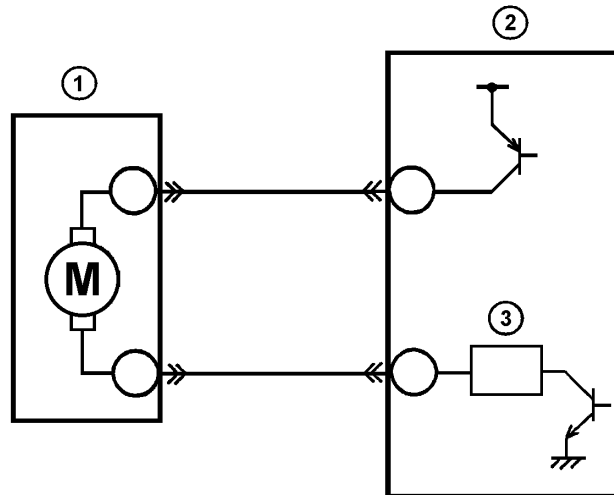


M2FL_01005

1 DC motor with EGRVP sensor

2 EGR valve housing

- The position of the EGR valve is controlled by the PCM, which activates the DC motor via a duty signal.



M2FL_01006

1 DC motor
2 PCM

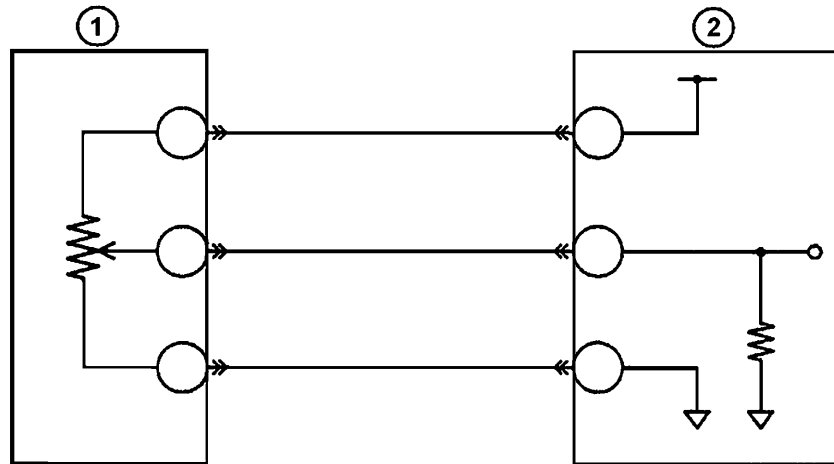
3 Current detection circuit

- At low engine speed the PCM controls the DC motor with a large duty cycle, so that the EGR valve opens and exhaust gas is recirculated.
- At high engine speed the PCM controls the DC motor with a small duty cycle, so that the EGR valve closes and no exhaust gas is recirculated.
- In order to remove any carbon deposits from the EGR valve seat a cleaning mode is activated each time the ignition is switched off. Therefore, the PCM actuates the EGR valve so that it is moved from the fully open position to the fully closed position several times. This process takes approx. 30 s.

NOTE: If the engine coolant temperature is below -5°C , the EGR cleaning mode is cancelled as the EGR valve could be frozen and would not move.

EGR Valve Position Sensor

- The EGRVP sensor is integrated in the DC motor and detects its position by a sliding contact potentiometer. When the EGR valve opens the resistance of the potentiometer rises. The sensor supplies the PCM with an analogue voltage signal between 0...5V.



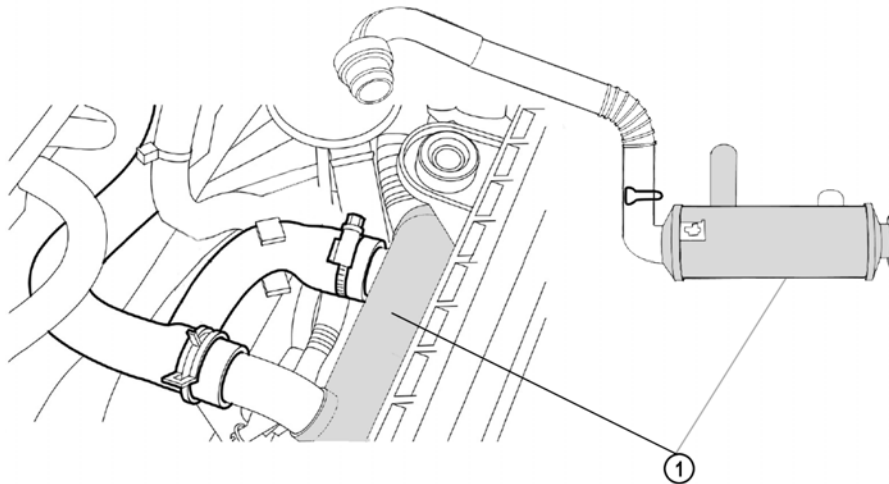
M2FL_01007

1 EGRVP sensor

2 PCM

EGR Cooler

- The EGR cooler is located at the rear side of the engine and is connected to the exhaust manifold via the EGR valve.

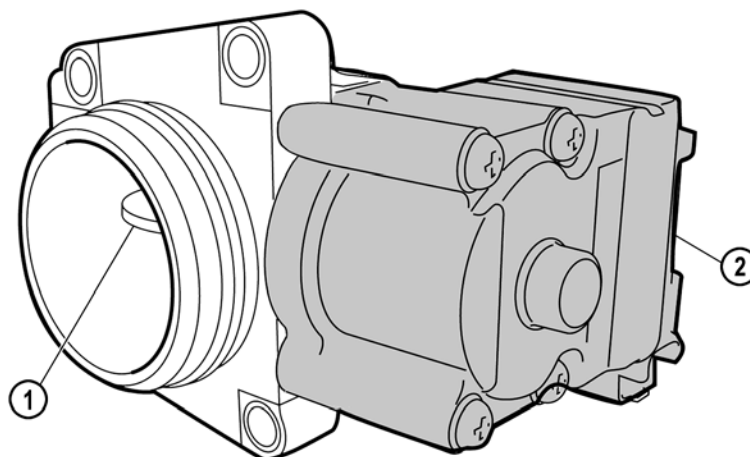


M2FL_01008

- 1 EGR cooler

Intake Shutter Valve

- The ISV (also termed as EGR throttle valve) is driven by a DC motor. It forms a restriction in the intake-air system to provide suction to enable EGR.

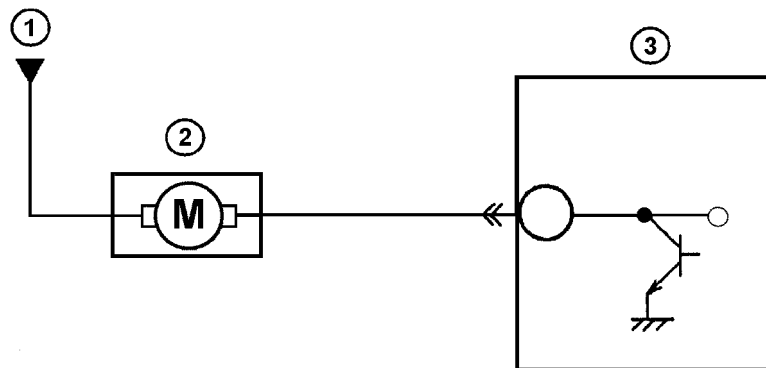


M2FL_01009

- 1 ISV

- 2 DC motor

- The position of the ISV is controlled by the PCM, which activates the DC motor via a duty signal.



M2FL_01010

- | | | | |
|---|------------------------|---|-----|
| 1 | From PCM control relay | 3 | PCM |
| 2 | DC motor | | |

- When the required EGR rate is high the PCM controls the DC motor with a large duty cycle. As a result, the ISV closes partly, reducing the cross-section of the intake pipe. Thus, a vacuum is generated in the intake manifold and a large amount of exhaust gas can be recirculated.
- When the required EGR rate is low the PCM controls the DC motor with a small duty cycle. As a result, the ISV opens, making the complete cross-section of the intake pipe available. Thus atmosphere or boost pressure is generated in the intake manifold (depending on the operating conditions) and only a small amount of exhaust gas can be recirculated.
- The PCM controls the DC motor by a duty signal of 0V/12V.

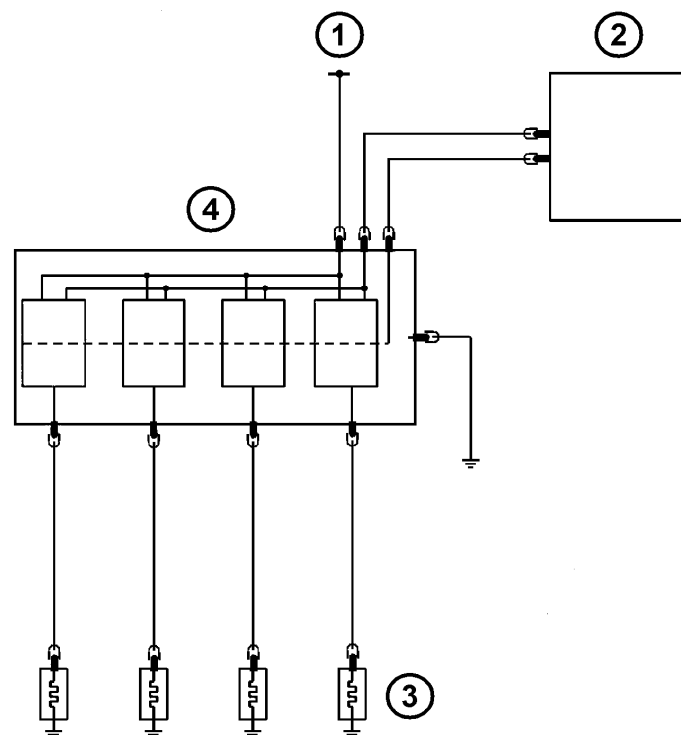
NOTE: If the ISV system fails, the ISV remains in the open position (by spring force) in which no vacuum is produced.

Diagnostics

- The EGR system can be checked as follows:
 - monitoring the intake air amount with WDS via the **PID (Parameter Identification) MAF (g/s)** against EGR valve actuation
 - monitoring the EGR DC motor with WDS via the PID **EGRDC** (% duty cycle)
 - monitoring the ISV motor with WDS via the PID **EGR TV** (% duty cycle)
 - checking the voltage signal at the EGR DC motor
 - checking the voltage signal at the ISV DC motor

Glow Plug Control Module

- Since the introduction of **EOBD (European On-Board Diagnostics)** for Diesel engines, a glow plug control module with separate power supply terminals for each glow plug is used for the 1.4 MZ-CD Diesel engine of the Mazda2.
- The PCM sends a ground signal to the glow plug control module, which actuates the glow plugs accordingly. In addition, the glow plug control module detects the voltage and the current output to the glow plugs, and sends a feedback signal to the PCM to facilitate failure detection.



M2FL_01011

- | | | | |
|---|--------------|---|--------------------------|
| 1 | From battery | 3 | Glow plugs |
| 2 | PCM | 4 | Glow plug control module |

- The function of the glow plugs can be checked as follows:
 - checking the voltage of the glow plugs
 - checking the resistance of the glow plugs
 - monitoring the glow plug control module with WDS via the PID **GPC** (On/Off)
 - checking the control signal at the glow plug control module
 - checking the feedback signal at the PCM

Mazda2 Product Changes History

Date	Item
Jan-03	<ul style="list-style-type: none"> Job#1 (production start)
Feb-03	<ul style="list-style-type: none"> Diesel (Stage3) production start. (Only MT model)
Mar-03	Product changes for Sport grade as follows: <ul style="list-style-type: none"> Addition of black/ black seat Change to shift knob with silver plates
Sep-03	<ul style="list-style-type: none"> ASM production start Deletion of the cabin air filter for vehicles without air-conditioner Addition of silver rings around the front cup-holders for sport grade
Oct-03	<ul style="list-style-type: none"> Complying with Diesel EOBD
Jan-04	<ul style="list-style-type: none"> Vehicle weight change due to change of the method to weigh the vehicle for the certification
Feb-04	<p>Deletion of the following features:</p> <ul style="list-style-type: none"> Spot lamp (all) Panel light control (all) Double stitches in seat (Basic model) Front speakers (Audio less models) Passenger seat back folding (Basic model) PTC heater (Diesel models for Germany and Austria) <p>Start Special Version production with following features:</p> <ul style="list-style-type: none"> New designed 15 inch alloy wheels with 195/50R15 tires. (Opt for UK) Dark blue seat fabric and door panel garnish CD player Air conditioner Coloured outer mirrors Coloured outer door handle Colour-keyed floor mats Chrome exhaust pipe (only for 15 inch wheel model)
Jul-04	<ul style="list-style-type: none"> ABS standardized for the following countries: Austria, Belgium, Germany, Denmark, Spain, France, Greece, Italy, Luxemburg, Netherlands, Portugal, UK, Ireland
Sep-04	<ul style="list-style-type: none"> Deletion of roof rail Change to new design ignition key
Nov-04	<ul style="list-style-type: none"> Foot rest standardized for all vehicles with ASM

Appendix

Mar-05	<ul style="list-style-type: none">• Reduction of scuff plate and tonneau cover colour availability (grey dropped, only black available for all models)• Front seat recliner wheel material changed• Radio display frame and audio/heater switch colour change (from yellow to grey)• 14 inch tire speed range for 1.6 GE changed from "H" to "T"
Jul-05	<ul style="list-style-type: none">• New design rear view mirror

List of Abbreviations

ASM	A utomated S hift M anual T ransmission
CD	C ompact D isc
DC	D irect C urrent
DSC	D ynamic S tability C ontrol
EGR	E xhaust G as R ecirculation
EGRVP	E xhaust G as R ecirculation V alve P osition
EOBD	E uropean O n- B oard D iagnostics
IAT	I ntake A ir T emperature
ISV	I ntake S hutter V alve
MAF	M ass A ir F low
MAP	M anifold A bsolute P ressure
MD	M ini D isc
MP3	M oving P icture Experts G roup L ayer- 3 A udio (audio file format/extension)
PCM	P owertrain C ontrol M odule
PID	P arameter I dentification
WDS	W orldwide D iagnostic S ystem

List of Abbreviations
