


REMOVAL AND INSTALLATION CLUTCH MASTER CYLINDER UID=G152706

2003.50 Mazda2



Removal

CAUTION:  If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.

All vehicles

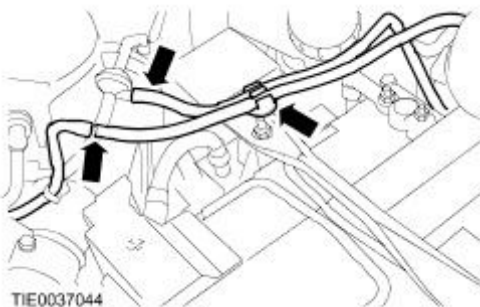
1. Using a suitable syringe, remove brake fluid from the brake fluid reservoir until the brake fluid level is at the MIN mark.

Right-hand drive vehicles

2. Remove the air cleaner. For additional information, refer to Section [303-12](#). [Intake Air Distribution and Filtering, REMOVAL AND INSTALLATION, Air Cleaner - 1.25L/1.4L/1.6L] For additional information, refer to Section [303-12](#). [Intake Air Distribution and Filtering, REMOVAL AND INSTALLATION, Air Cleaner - 1.4L Diesel]

Left-hand drive vehicles

3. Disconnect the two vacuum hoses.
 - Detach the vacuum hoses from the battery clamp clip.



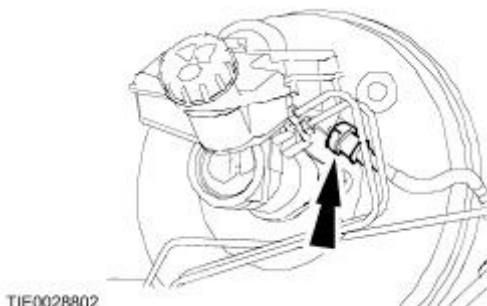
4. Remove the battery tray.

All vehicles

5. **NOTE:** Plug the brake fluid reservoir to prevent fluid loss or dirt ingress.

Disconnect the clutch master cylinder supply hose from the brake fluid reservoir.

- Push the clip to release the clutch master cylinder supply hose.



6. Remove the clutch master cylinder supply hose.

- Release the clutch master cylinder supply hose retaining clip.

DESCRIPTION AND OPERATION
BRAKE BOOSTER
UID=G163289

2003.50 Mazda2



Emergency brake assistant (EBA)

As ABS braking systems have become widespread, it has emerged that because of incorrect use of the brakes, many drivers are losing the safety benefit which ABS provides.

Drivers are applying the brakes too timidly. Because of this, the Anti-lock Braking System (ABS) does not engage, and the maximum braking effect is not achieved.

The EBA recognises from the driver's manner of braking that an emergency situation is occurring, and automatically applies full braking power.

This occurs in a matter of milliseconds, which is faster than the driver could do it.

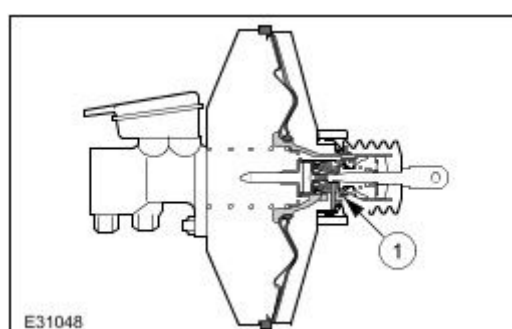
Furthermore, it was observed that after the first heavy application of the brake pedal, the driver releases the pressure on the pedal too early.

The EBA ensures that the ABS effect still continues when the pedal pressure would normally lie below the ABS range of control. The system is available as an option depending on market and vehicle variant.

Depending on driving manner, EBA results in a reduction in braking distance of 15% for experienced drivers, to over 40% for average drivers.

Because EBA decelerates the vehicle up to the wheel locking limit, emergency brake assist is only used in vehicles with ABS.

Components



Item	Part Number	Description
1	-	EBA

EBA operates purely mechanically, and is completely integral with the brake servo.

Brake servo units with and without EBA are externally identical. For identification purposes, brake servo units with EBA carry a white sticker showing a large letter "A".

The tandem master cylinder is the same for vehicles with or without EBA.

Function

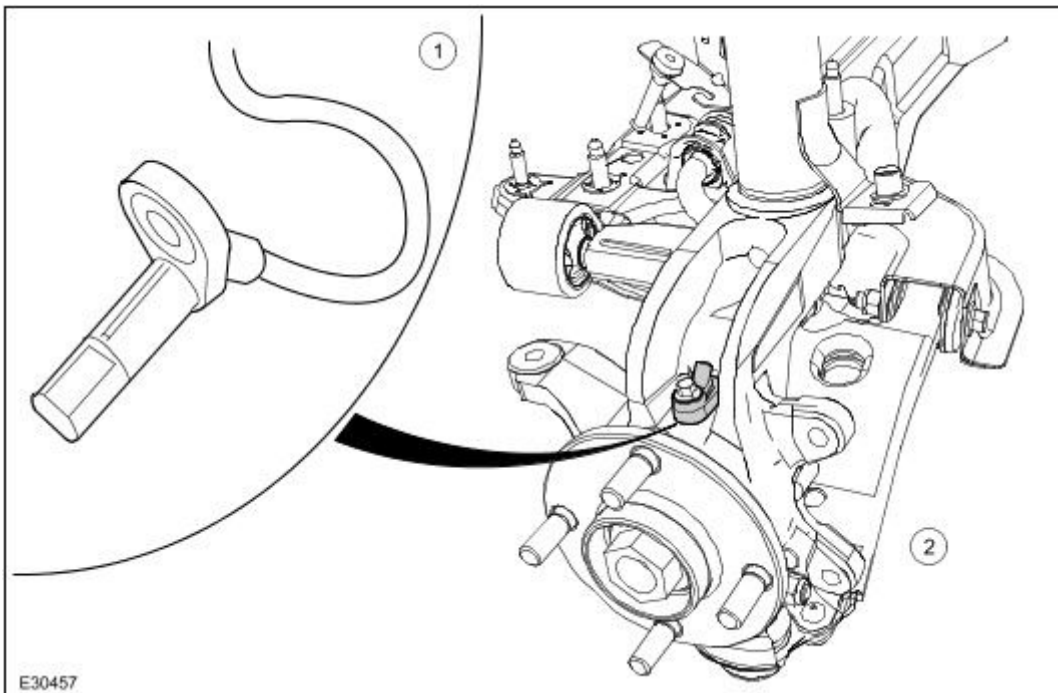
In normal braking situations, the brake servo with EBA operates in the same way as a

The ABS control unit actuates the ABS warning lamp in the instrument cluster via the CAN databus.

The MK60 ABS is a 4/3 system. This means that the wheel speed is measured individually for each wheel (4 wheel speed sensors).

ABS controlled braking is provided individually for the front wheels and jointly for the two rear wheels (3 control channels; select-low control), i.e. the ABS control for the rear wheels is governed by the wheel closest to locking up.

Wheel speed sensors



Item	Part Number	Description
1	-	Sensor
2	-	Installation position.

NOTE: The wheel speed sensors must not be checked for voltage with an ohmmeter.

The wheel speed sensors are active sensors. They are supplied with a voltage from the ABS control unit after the ignition is switched on.

The pulses are picked up from a mechanically encoded ring, which is built into the wheel bearings on the front wheels while for the rear wheels it is a metal ring which is mounted on the stub axle.

The registered wheel speed is converted into a digital (square-wave) signal by the electronics integrated in the sensor and is then transmitted to the ABS control unit.

Data transmissions to the ABS control unit take place via a 2-stranded connecting cable.

It also supplies the vehicle speed signal, which is calculated from the wheel speed sensor signals. This is transmitted via the CAN bus to the Powertrain Control Module (PCM)

The ABS control unit can be diagnosed via the Data Link Connector (DLC).

The hydraulic unit is pre-filled for service.

**DESCRIPTION AND OPERATION
HEALTH AND SAFETY PRECAUTIONS
UID=G17372**

2003.50 Mazda2

**Introduction**

Many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health. This subsection lists, alphabetically, some of these hazardous operations and the materials and equipment associated with them. Precautions necessary to avoid these hazards are identified.

The list is not exhaustive and all operations and procedures, and the handling of materials, should be carried out with health and safety in mind.

Before using any product the Materials Safety Data Sheet supplied by the manufacturer or supplier should be consulted.

Acids and Alkalis

See also Battery Acids.

For example caustic soda, sulphuric acid.

Used in batteries and cleaning materials.

Irritant and corrosive to the skin, eyes, nose and throat. Cause burns. Can destroy ordinary protective clothing.

Avoid splashes to the skin, eyes and clothing. Wear suitable protective impervious apron, gloves and goggles. Do not breath mists.

Make sure access to eye wash bottles, shower and soap are readily available for splashing accidents.

Display Eye Hazard sign.

Air Bags

See also Fire, Chemical Materials.

Highly flammable, explosive – observe No Smoking policy.

Used as a safety restraint system mounted in the steering wheel and passenger side of the instrument panel.

The inflator contains a high-energetic propellant which, when ignited, produces a VERY HOT GAS (2500°C).


The gas generant used in air bags is Sodium Azide. This material is hermetically sealed in the module and is completely consumed during deployment. No attempt should be made to open an air bag inflator as this will lead to the risk of exposure to Sodium Azide. If a gas generator is ruptured, full protective clothing should be worn when dealing with the spillage.

After normal deployment, gloves and safety goggles must be worn during the handling process.

**DESCRIPTION AND OPERATION
STANDARD WORKSHOP PRACTICES
UID=G17373****2003.50 Mazda2****Vehicle in Workshop**

When working on a vehicle in the workshop always make sure that:

- the parking brake is applied or the wheels are securely chocked to prevent the vehicle moving forwards or backwards.
- the key is removed from key operated hood locks before any work is carried out around the front of the vehicle.
- if the engine is to be run, there is adequate ventilation, or an extraction hose to remove exhaust fumes.
- there is adequate room to raise the vehicle and remove the wheels, if necessary.
- fender covers are always fitted if any work is to be carried out in the engine compartment.
- the battery is disconnected if working on the engine, underneath the vehicle, or if the vehicle is raised.

CAUTION:  When electric arc welding on a vehicle, always disconnect the generator wiring to prevent the possibility of a surge of current causing damage to the internal components of the generator.

- If using welding equipment on the vehicle, a suitable fire extinguisher is readily available.

Alternative Fuel

WARNING:  When servicing the fuel system always follow the recommended procedures. Failure to follow these instructions may result in personal injury.

If the odor of liquefied petroleum gas (LPG) or compressed natural gas (CNG) is present in the air in the workshop, warn all persons in the area to:

- extinguish all flames and lighted tobacco.
- shut off electrical and air powered equipment.
- evacuate the area.
- ventilate the area.
- contact the fire control authorities.
- remove the vehicle to a dedicated, ventilated area.


Alternative Fuel – Do's

**DESCRIPTION AND OPERATION
ROAD/ROLLER TESTING
UID=G17375****2003.50 Mazda2**

Road or roller testing may be carried out for various reasons and a procedure detailing pre-test checks, engine starting and stopping, pre-driving checks, on-test checks and final checks to be completed on completion of the test is given below.

Unless complete vehicle performance is being checked, the full road test procedure need not be carried out. Instead, those items particularly relevant to the system(s) being checked can be extracted.

Pre-Test Checks

WARNING:  If the brake system hydraulic fluid level is low, pedal travel is excessive or a hydraulic leak is found, do not attempt to road test the vehicle until the reason for the low fluid level, excessive pedal travel or hydraulic leak is found and rectified.

It is suggested that pre-test checks and functional tests of those systems and circuits which affect the safe and legal operations of the vehicle, such as brakes, lights and steering, should always be carried out before the road or roller test.

With the ignition switched off, check:

- the engine oil level.
- the engine coolant level.
- the tires, for correct pressure, compatible types and tread patterns, and wear within limits.
- that there is sufficient fuel in the tank to complete the test.
- all around the engine, transmission and under the vehicle for oil, coolant, hydraulic and fuel leaks. Make a note of any apparent leaks and wipe off the surrounding areas to make it easier to identify the extent of the leak on completion of the test.

Starting the Engine

NOTE: On initial drive away from cold and within the first 1.5 km (1 mile), do not depress the accelerator pedal beyond half travel until the vehicle has attained a minimum speed of 25 km/h (15 miles/h). Never operate at high engine speed or with the accelerator pedal at full travel whilst the engine is cold.

With the ignition switched off, check:

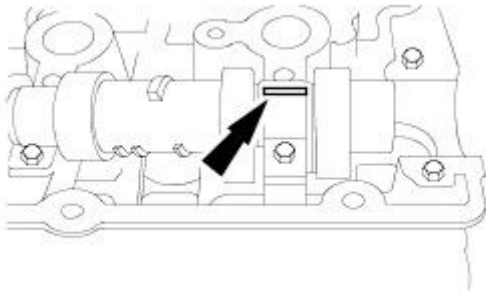
- that the parking brake is applied.
- that the gear lever is in the neutral position.
- that all instrument gauges (except fuel gauge) read zero.

With the ignition switched on, check:

- that the ignition controlled warning lamps are illuminated.

GENERAL PROCEDURES CAMSHAFT BEARING JOURNAL CLEARANCE UID=G17621

2003.50 Mazda2



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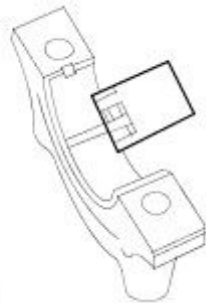
1. NOTE: Make sure that the following stages are followed exactly. The tappets or followers must be removed to carry out this measurement.

NOTE: Make sure that the camshaft is to specification.

NOTE: The bearing caps and journals should be free from engine oil and dirt.

Position a width of plastigage on the bearing cap.

- Insert the camshaft, without lubrication, into the cylinder head.
 - Position a plastigage strip, which should be equal to the width of the bearing cap, on the bearing journal.
- 2.** Following the tightening specification, install the camshaft bearing caps. Refer to the corresponding Section 303-01.
- 3. NOTE:** Do not strike the bearing caps.
- Remove the camshaft bearing caps, refer to the corresponding Section 303-01.
- 4.** Using the **Plastigage**, read off the measurement.



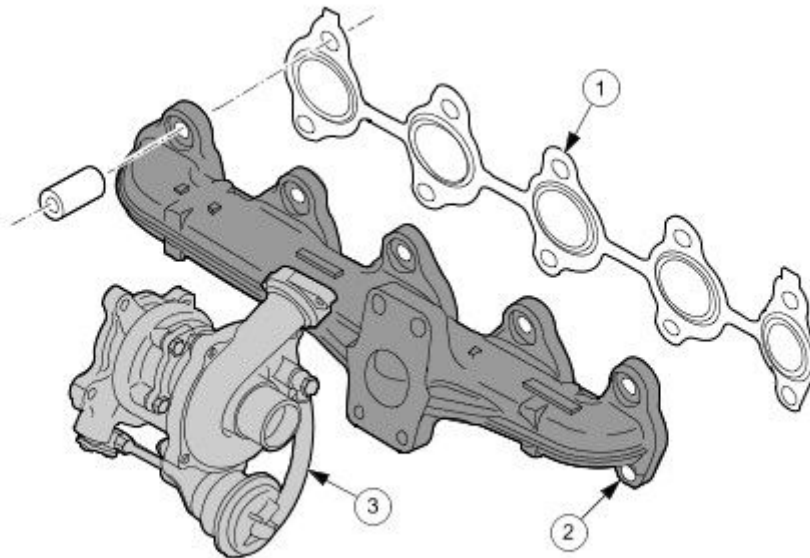
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- Compare the width of plastigage with the plastigage scale.
- The value that is read off is the bearing clearance.



DESCRIPTION AND OPERATION
TURBOCHARGER
UID=G179027

2003.50 Mazda2



E30019

Item	Part Number	Description
1	-	Steel gasket
2	-	Exhaust gas recirculation (EGR) flange on the exhaust manifold
3	-	Turbocharger

The exhaust manifold is made of cast iron. It has flanges for the turbocharger and the EGR .

The turbocharger comprises of the parts for the turbine and the impeller, which are mounted together on a shared shaft.

The bearings of the turbocharger are lubricated with engine oil.

The turbine uses the flow of exhaust gases as a source of energy to drive the impeller. The impeller draws in air via the air intake system and supplies it under pressure to the intake manifold.

The turbocharger operates with fixed turbine geometry and generates a boost pressure of up to 1.0 bar.




REMOVAL AND INSTALLATION LOWER ARM UID=G183757

2003.50 Mazda2



Removal

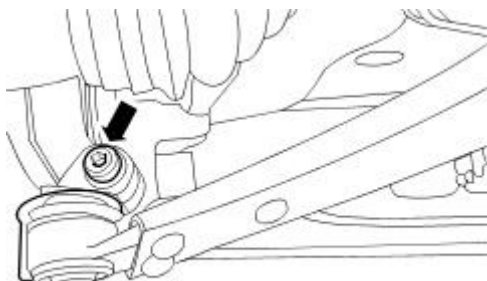
1. Remove the wheel and tire. For additional information, refer to Section 204-04.

2. **CAUTION:**  Protect the ball joint seal using a soft cloth to prevent damage. Detach the lower arm ball joint from the wheel knuckle.

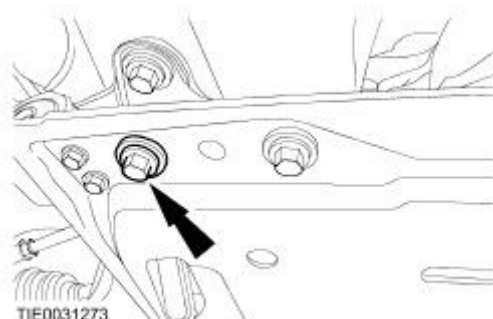
- Remove the heat shield.

3. Remove the crossmember outer retaining bolt.

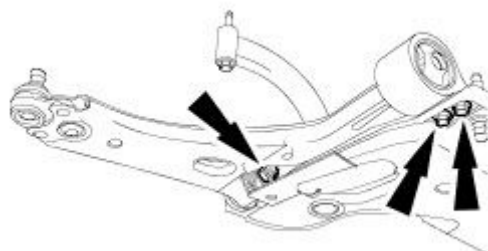
4. Remove the lower arm.



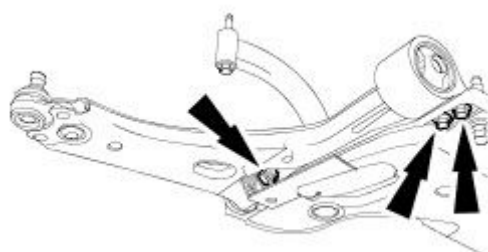
TIE40809



TIE0031273



TIE0030990

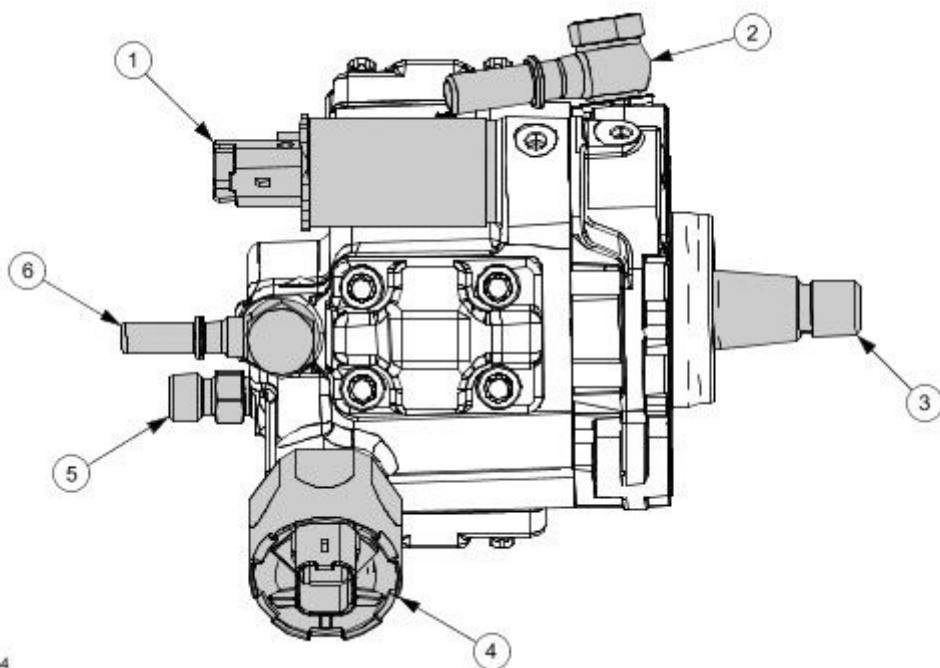


TIE0030990

Installation

1. **NOTE:** Do not fully tighten the lower arm to crossmember retaining bolts at this stage. Install the lower arm.

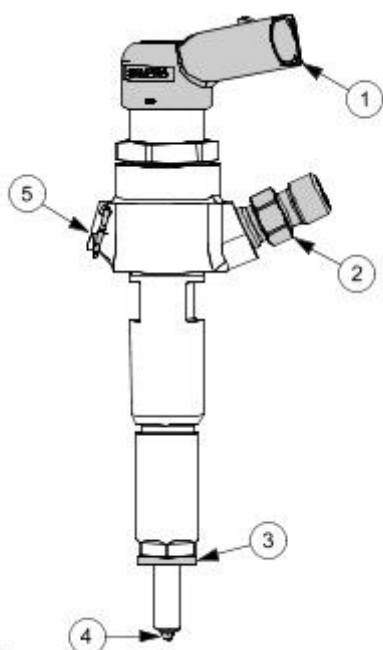
2. Install the crossmember outer retaining bolt.



E30554

Item	Part Number	Description
1	-	Fuel metering valve
2	-	Inlet (from filter)
3	-	Drive shaft
4	-	Fuel pressure regulator
5	-	Outlet (high pressure)
6	-	Return

Injectors



E30557

Item	Part Number	Description
1	-	Wiring harness electrical connector
2	-	High pressure line union

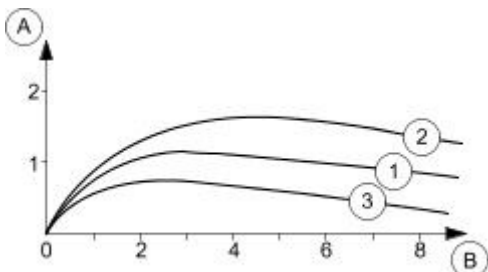
**DESCRIPTION AND OPERATION
CLUTCH
UID=G251010**

2003.50 Mazda2



Self-adjusting clutch

Advantages of the self-adjusting clutch



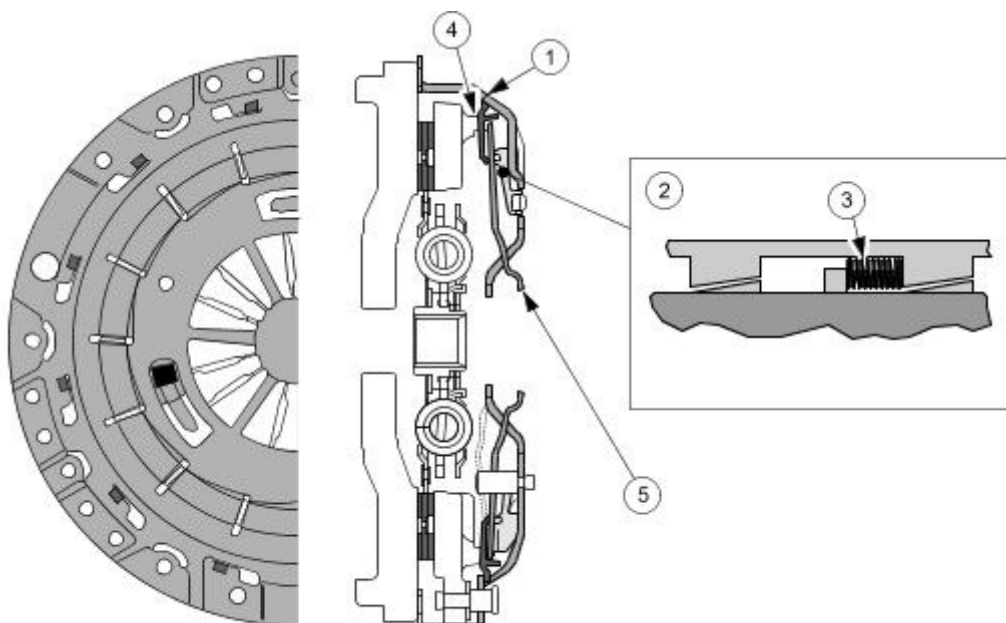
E38655

Item	Part Number	Description
A	-	Release force in kN
B	-	Release travel in mm
1	-	Conventional clutch - condition when new
2	-	Conventional clutch - after wear
3	-	Self-adjusting clutch

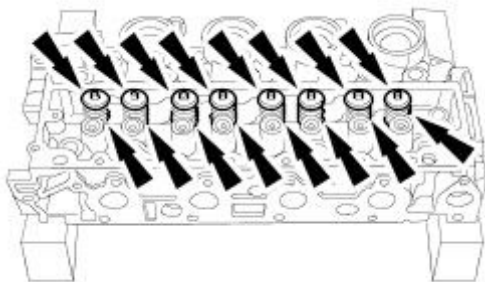
The self-adjusting clutch has the following advantages over conventionally designed clutches:

- * lower release forces, which remain constant over the service life and thus ensure high driving comfort throughout the entire service life
- * increased wear reserve and therefore greater service life due to the automatic wear adjustment

Function

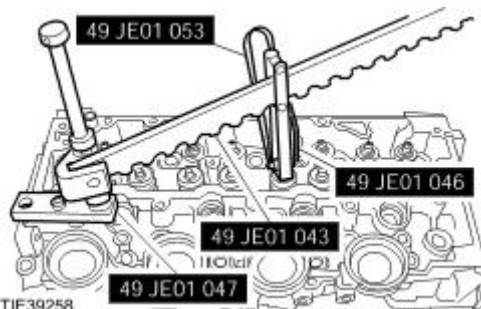


E38656



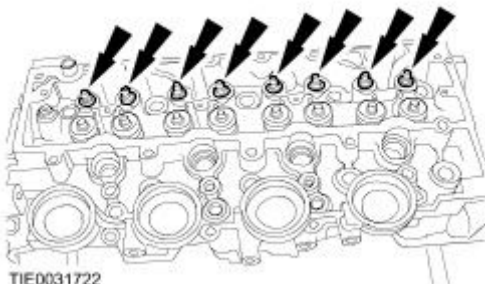
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10. Using the special tools, install the valve collets.



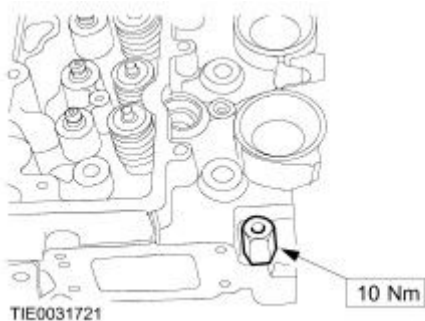
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11. Install the hydraulic lash adjusters.



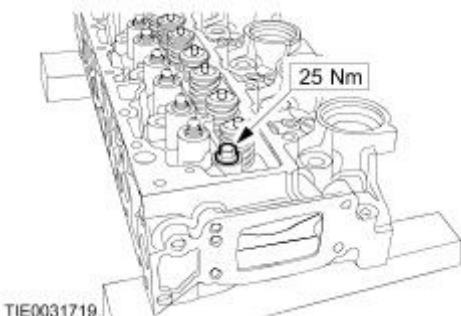
TIE0031722

12. Install the fuel filter support nut.



TIE0031721

13. Install the oil pressure relief valve.



TIE0031719

14. NOTE: Install a new exhaust gas recirculation (EGR) valve gasket. Install the EGR valve.

**GENERAL PROCEDURES
ELECTRONIC LEAK DETECTION
UID=G289981**

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Special Tool(s)



R-134a refrigerant station / Digital multimeter / Refrigerant identifier

49 C061 0A0A

WARNING:  Good ventilation before leak detection is necessary in the area where it is to be performed. If the surrounding air is contaminated with refrigerant gas, the leak detector will indicate this gas all the time. Odors from other chemicals such as antifreeze, diesel fuel, disc brake cleaner, or other cleaning solvents can cause the same problem. While leak detection air movement must be prevented.


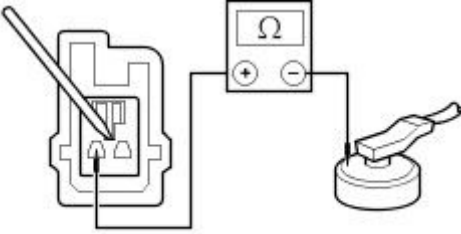
1. CAUTION:  The refrigerant identification equipment must be used before the manifold gauge set is installed, otherwise the manifold gauge may become contaminated. Contaminated refrigerant must be disposed of as special waste. The manufacturer's instructions must be followed when working with the service unit.

NOTE: Both manifold gauges should indicate 4,1-5,5 bar at 24°C with the engine off.

Attach the R-134a refrigerant station to the service gauge port valves.

1. For the leak test, close the manual valves on the gauge set.
2. If little or no pressure is indicated, charge the system with approx. 300g of refrigerant. For additional information, refer to [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) in this section.
2. Use R-134a Automatic Calibration Halogen Leak Detector to leak test the refrigerant system. Follow the instructions included with leak detector for handling and operation techniques.
3. If a leak is found, recover the A/C system. For additional information, refer to [Air Conditioning \(A/C\) System Recovery, Evacuation and Charging](#) in this section.



CONDITIONS	DETAILS/RESULTS/ACTIONS
T1: CHECK THE PASSENGER AIR BAG FIRST STAGE CIRCUIT RESISTANCE	
	<p>1 Deactivate the supplemental restraint system. REFER to Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS) in this section.</p> <p>2 Key in ON position.</p> <p>3 Carry out the self-test with the simulators installed.</p> <p>Does the system prove out correctly?</p> <p>Yes</p> <p>GO to T2.</p> <p>No</p> <p>GO to T3.</p>
T2: CHECK THE PASSENGER AIR BAG MODULE SQUIB RESISTANCE	
<p>WARNING:  Do not proceed with the test unless using WDS. Failure to follow this instruction may result in personal injury.</p>	
<p>NOTE: Using a suitable non-conducting tool, disable the shorting bar in the test and deployment lead connector.</p>	
	<p>1 Connect the Test and Deployment Lead to the passenger air bag module - first stage.</p> <p>2 Select DMM specific on WDS.</p> <p>3 Connect the Test and Deployment Lead to WDS.</p> <p>4 Measure the resistance between each of the terminals and the air bag module casing.</p> <p>5 Connect the Test and Deployment Lead to the passenger air bag module - second stage.</p>
 <p>TIE41007</p>	<p>6 Measure the resistance between each of the terminals and the air bag module casing.</p>
	<p>Are the resistances greater than 10,000 ohms?</p> <p>Yes</p> <p>REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. REFER to Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS) in this section.</p> <p>No</p> <p>INSTALL a new passenger air bag module. REFER to Passenger Air Bag Module in this section. REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. REFER to Air Bag and Safety Belt Pretensioner Supplemental Restraint System (SRS) in this section.</p>
T3: CHECK THE PASSENGER AIR BAG FIRST STAGE WIRING HARNESS FOR A SHORT TO GROUND	
	<p>1 Key in OFF position.</p> <p>2 Disconnect Restraints Control Module S1-01.</p>

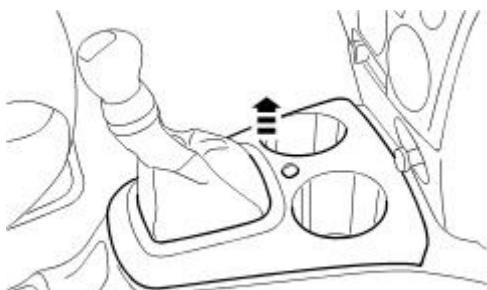
REMOVAL AND INSTALLATION GEARSHIFT LEVER UID=G327209

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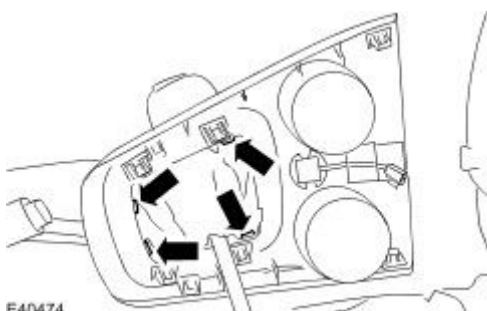


Removal

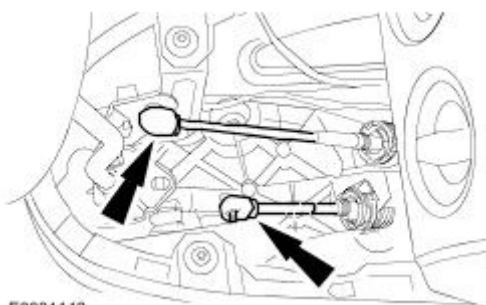
1. Detach the gearshift trim panel from the floor console.
2. Remove the gearshift trim panel.
 - Detach the gearshift boot from the trim panel.
3. Detach the gearshift cables from the gearshift lever.
4. Detach the gearshift cables from the retaining bracket.
 - Turn the abutment sleeves clockwise.
5. Remove the gearshift lever front retaining bolts.



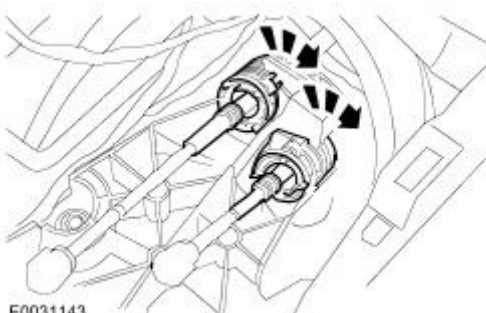
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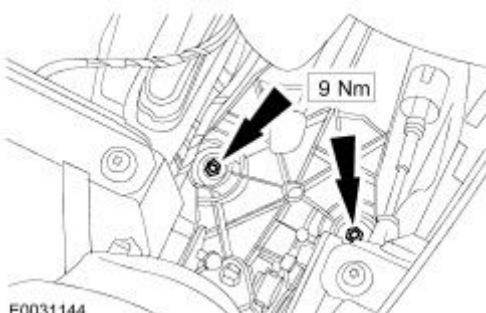
E40474



E0031142



E0031143



E0031144