

## DESCRIPTION AND OPERATION

### Two Pack

Can also contain harmful and toxic unreacted resins and resin hardening agents. The manufacturers instructions should be followed. See also Resin-based Adhesives and Isocyanate Adhesives and Sealers under Adhesives and Sealers.

Spraying should preferably be carried out in exhausted ventilated booths removing vapor and spray mists from the breathing zone. Individuals working in booths should wear appropriate respiratory protection. Those doing small-scale repair work in the open workshop should wear air-fed respirators.

### Pressurized Equipment

See High Pressure Air, Lubrication and Oil Test Equipment.

### Solder

Solders are mixtures of metals such that the melting point of the mixture is below that of the constituent metals (normally lead and tin). Solder application does not normally give rise to toxic lead fumes, provided a gas/air flame is used. Oxy-acetylene flames should not be used, as they are much hotter and will cause lead fumes to be produced.

Some fumes may be produced by the application of any flame to surfaces coated with grease, and inhalation of these should be avoided.

Removal of excess solder should be undertaken with care, to make sure that fine lead dust is not produced, which can give toxic effects if inhaled. Respiratory protection may be necessary.

Solder spillage and filings should be collected and removed promptly to prevent general air contamination by lead.

High standards of personal hygiene are necessary in order to avoid ingestion of lead or inhalation of solder dust from clothing.

### Solvents

See also Chemical Materials, Fuels (Kerosene), Fire.

For example acetone, white spirit, toluene, xylene, trichloroethane.

Used in cleaning and dewaxing materials, paints, plastics, resins and thinners.

Some may be highly flammable or flammable.

Skin contact will degrease the skin and may result in irritation and dermatitis following repeated or prolonged contact. Some can be absorbed through the skin in toxic or harmful quantities.

Splashes in the eye may cause severe irritation and could lead to loss of vision.

Brief exposure of high concentrations of vapors or mists will cause eye and throat irritation, drowsiness, dizziness, headaches and, in the worst circumstances, unconsciousness.

Repeated or prolonged exposure to excessive but lower concentrations of vapors or mists, for which there might not be adequate warning indications, can cause more serious toxic or harmful effects.

Aspiration into the lungs, for example through vomiting, is the most serious consequence of swallowing.

Avoid splashes to the skin, eyes and clothing. Wear protective gloves, goggles and clothing if necessary.

Make sure there is good ventilation when in use, avoid breathing fumes, vapors and spray mists and keep containers tightly sealed. Do not use in confined spaces.

When spraying materials containing solvents, for example paints, adhesive, coatings, use extraction ventilation or personal respiratory protection in the absence of adequate general ventilation.

Do not apply heat or flame except under specific and detailed manufacturers instructions.

### Sound Insulation

See Fibre Insulation, Foams.

### Suspended Loads

 **CAUTION: Never improvise lifting tackle.**

There is always a danger when loads are lifted or suspended. Never work under an unsupported, suspended or raised load, for example a suspended engine.

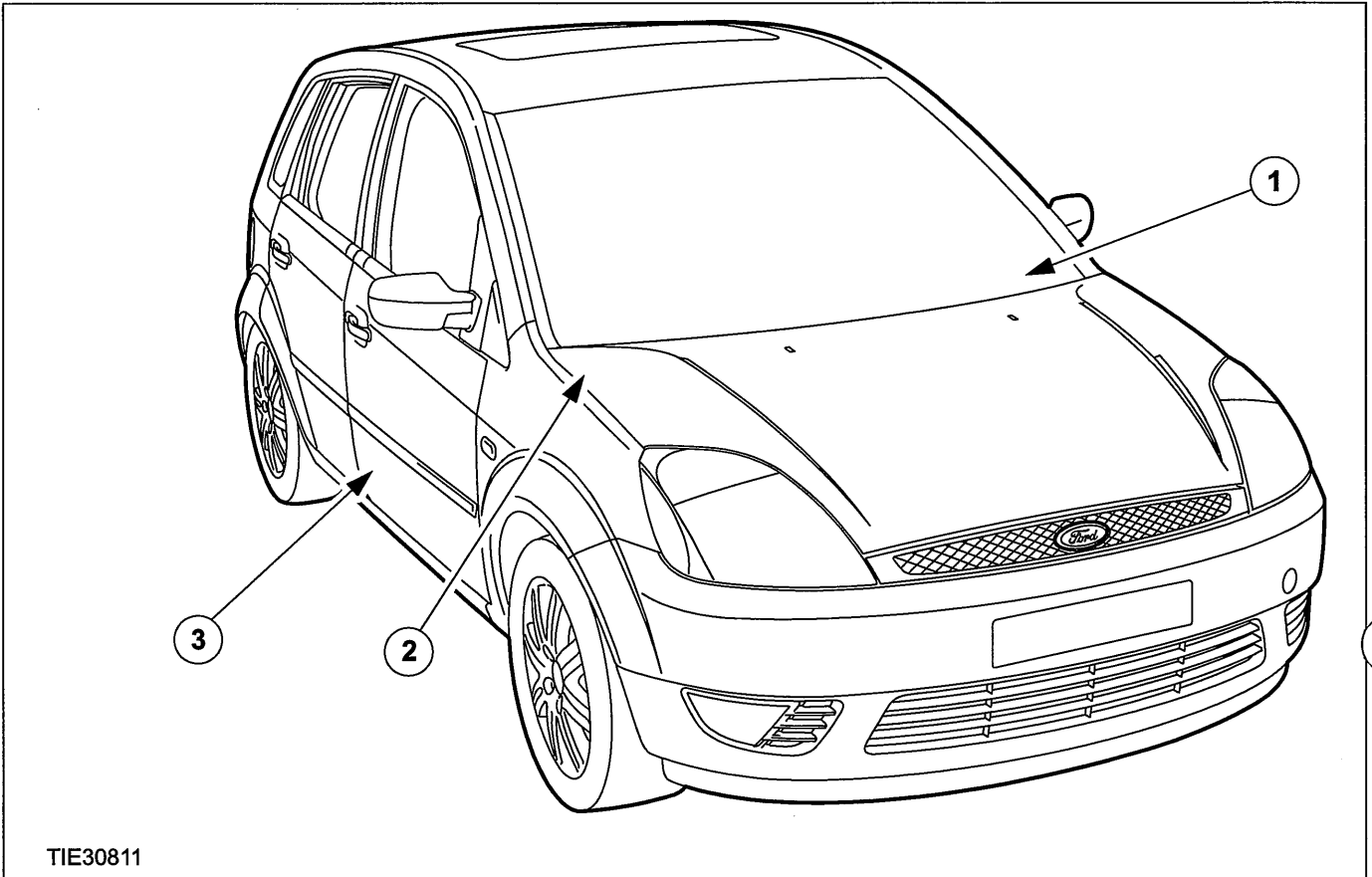
Always make sure that lifting equipment such as jacks, hoists, axle stands and slings are adequate and suitable for the job, in good condition and regularly maintained.

**DESCRIPTION AND OPERATION**

**Identification Codes**

The vehicle identification plate (VIN plate) is located on the right-hand B-pillar. The codes stamped or printed on the VIN plate during production enable the precise details of the vehicle build specification to be established. The vehicle

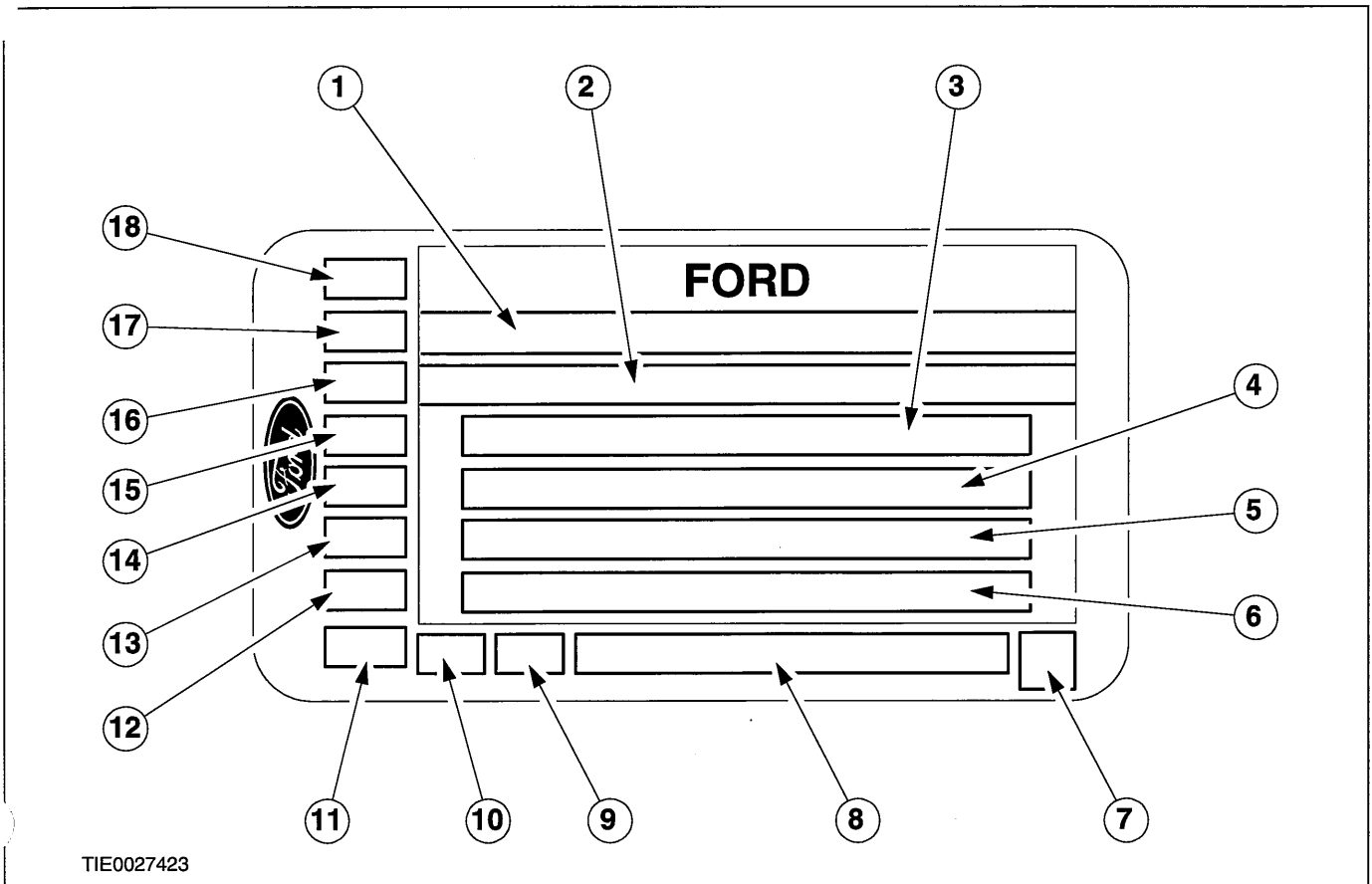
identification number (VIN) may also be viewed through the windshield or in the engine compartment where it is stamped onto the suspension strut top mount.



Item	Description
1	Visible VIN
2	VIN on the suspension strut top mount
3	VIN plate

**DESCRIPTION AND OPERATION**

**Vehicle Certification Label (Typical) or VIN Plate**



TIE0027423

Item	Description
1	National or whole vehicle type approval
2	VIN
3	Gross vehicle mass (GVM)
4	Gross train mass (GTM)
5	Maximum permissible front axle mass
6	Maximum permissible rear axle mass
7	Smoke value (diesel only)
8	Model body or type
9	Model type

Item	Description
10	Door combination
11	Exhaust emission level codes
12	Body color codes
13	Interior trim codes
14	Transaxle final drive ratio
15	Transaxle codes
16	Engine codes
17	Hand of drive
18	Axle mounting (Transit only)

**Items 1 to 6: Vehicle Certification Label**

Item	Details
Item 1: National or whole vehicle type approval	A unique code required by legislation in certain territories.
Item 2: VIN	Vehicle identification number.
Item 3: GVM	Indicates maximum legal laden mass, in territories where this is required.

**SPECIFICATIONS****Front Wheel Alignment (at curb weight)**

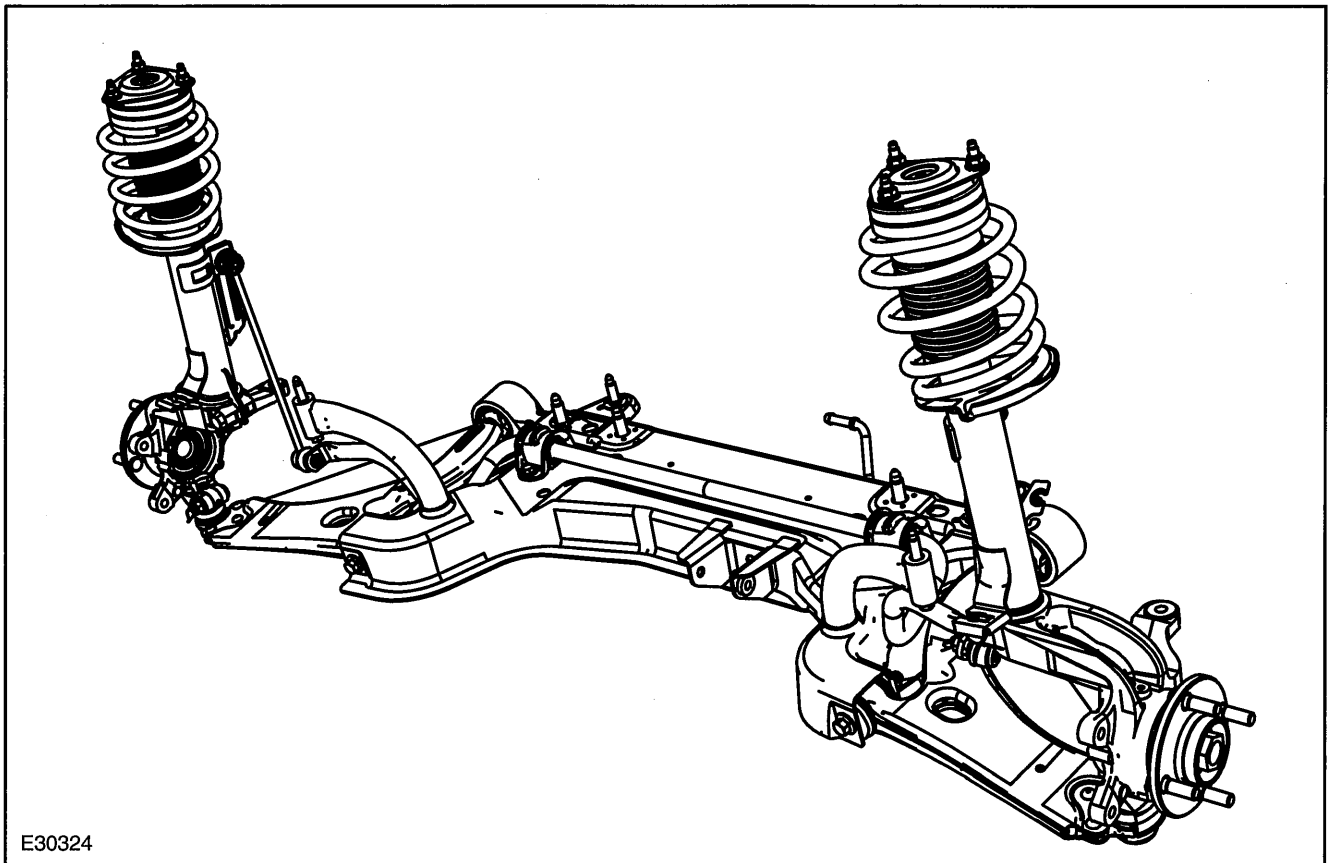
Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°38' to 2°38'	3°38'	1°00'
	Decimal degrees	4.64° to 2.64°	3.64°	1.00°
Camber angle	Degrees and minutes	0°36' to -1°54'	-0°39'	1°15'
	Decimal degrees	0.60° to -1.90°	-0.65°	1.25°
Total toe	mm	3.1 Toe in ± 2.2	3.1 Toe in ± 1.0	-
	Degrees and minutes	0°30' Toe in ± 0°21'	0°30' Toe in ± 0°10'	-
	Decimal degrees	0.50° Toe in ± 0.35°	0.50° Toe in ± 0.17°	-

**Front Wheel Alignment (at curb weight) – ST150**

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°47' to 2°47'	3°47'	1°00'
	Decimal degrees	4.78° to 2.78°	3.78°	1.00°
Camber angle	Degrees and minutes	0°02' to -2°28'	-1°13'	1°15'
	Decimal degrees	0.03° to -2.47°	-1.22°	1.25°
Total toe	mm	1.1 Toe in ± 2.4	1.1 Toe in ± 1.2	-
	Degrees and minutes	0°09' Toe in ± 0°20'	0°09' Toe in ± 0°10'	-
	Decimal degrees	0.15° Toe in ± 0.34°	0.15° Toe in ± 0.17°	-

**Front Wheel Alignment (at curb weight) - 3-Door Sport**

Description		Tolerance Range	Setting or Nominal	Maximum Variance Left or Right
Caster angle	Degrees and minutes	4°39' to 2°34'	3°37'	1°00'
	Decimal degrees	4.65° to 2.57°	3.61°	1.00°
Camber angle	Degrees and minutes	0°25' to -2°08'	-0°52'	1°15'
	Decimal degrees	0.41° to -2.13°	-0.86°	1.25°
Total toe	mm	3.1 Toe in ± 2.2	3.1 Toe in ± 1.0	-
	Degrees and minutes	0°30' Toe in ± 0°21'	0°30' Toe in ± 0°10'	-
	Decimal degrees	0.50° Toe in ± 0.35°	0.50° Toe in ± 0.17°	-

**DESCRIPTION AND OPERATION****Front Suspension****Overview**

**NOTE:** During installation of the front wheel bearing it is important to adhere to the specified installation position, as the anti-lock brake system ( ABS ) sensor ring is located in the wheel bearing. A coloured rubber ring is provided to indicate the correct installation position. If the wheel bearing were to be installed incorrectly then this would cause failure of the ABS .

A newly developed Mc-Pherson front suspension with L-shaped lower arms is used. These lower suspension arms are linked via large rubber mountings to a reinforced and extremely rigid front axle crossmember.

The ball head between the lower suspension arm and the suspension strut is secured with three rivets. Toe-in is adjusted via adjustable track rods. The lower suspension arms can only be replaced as a complete unit.

## REMOVAL AND INSTALLATION

## Lower Arm(14 706 0)

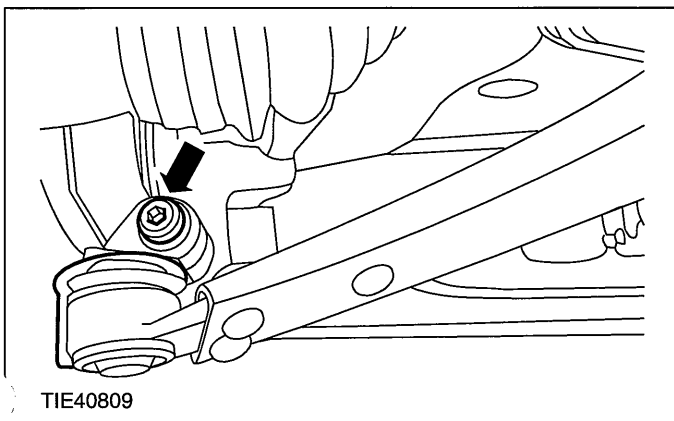
## Removal

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

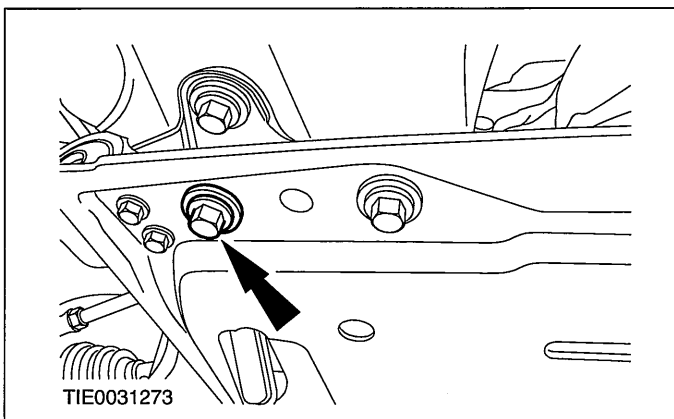
2. **CAUTION:** Protect the ball joint seal using a soft cloth to prevent damage.

Detach the lower arm ball joint from the wheel knuckle.

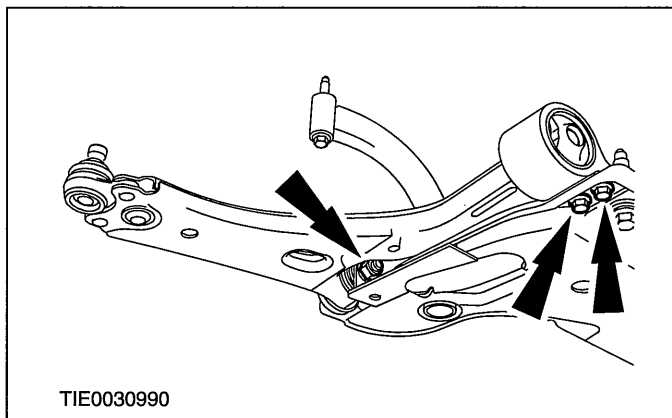
- Remove the heat shield.



3. Remove the crossmember outer retaining bolt.

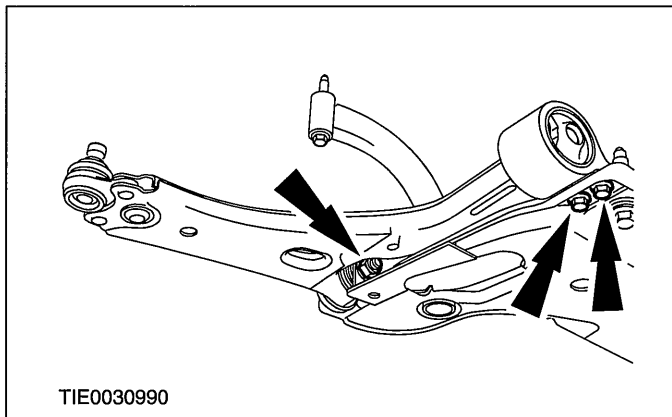


4. Remove the lower arm.

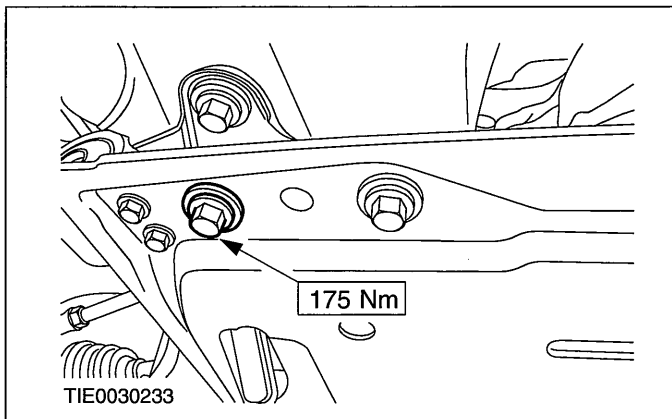


## Installation

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.



3. **CAUTION:** Make sure the heat shield is installed to prevent damage to the ball joint.

## REMOVAL AND INSTALLATION

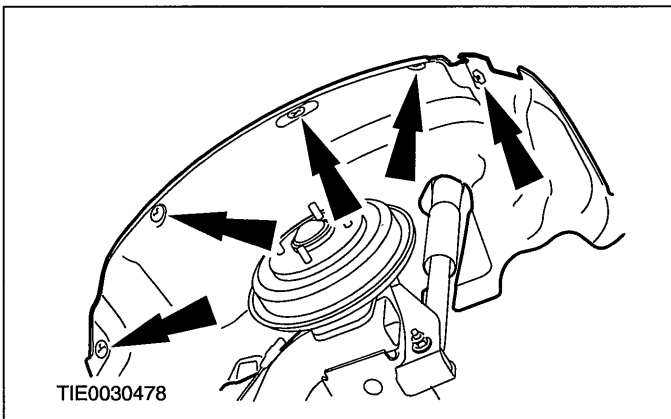
## Rear Shock Absorber(15 791 0)

## General Equipment

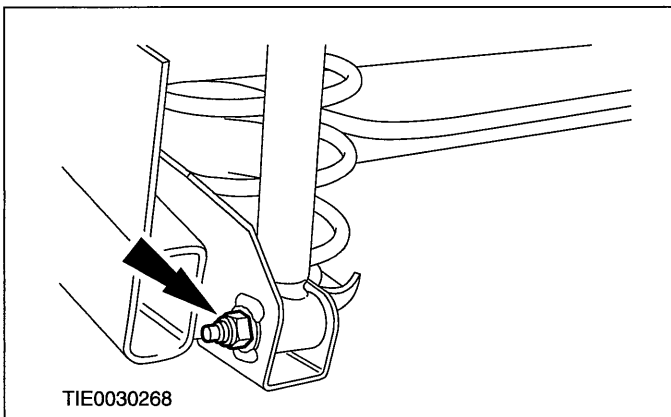
Transmission jack

## Removal

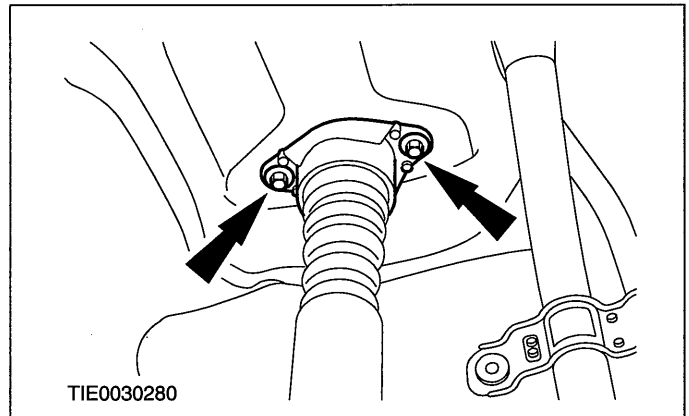
1. Remove the wheel and tire. For additional information, refer to Section 204-04 [Wheels and Tires].
2. Detach the fender splash shield from the fender.



3. Using a suitable transmission jack, support the beam axle.
4. Detach the shock absorber from the beam axle.

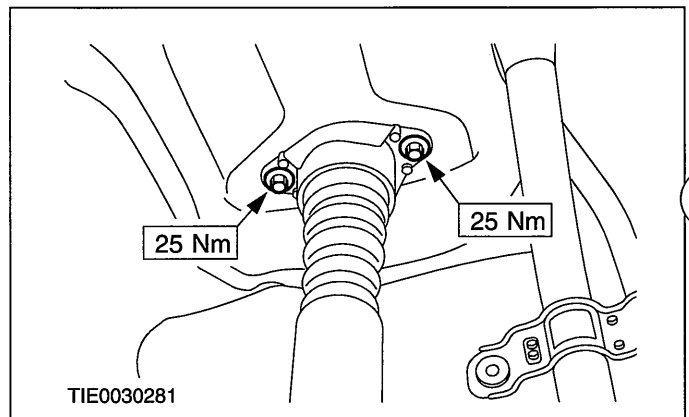


5. Remove the shock absorber.

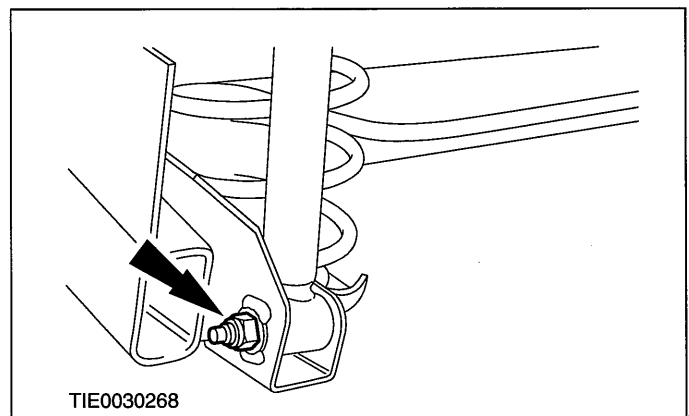


## Installation

1. Attach the shock absorber to the body.



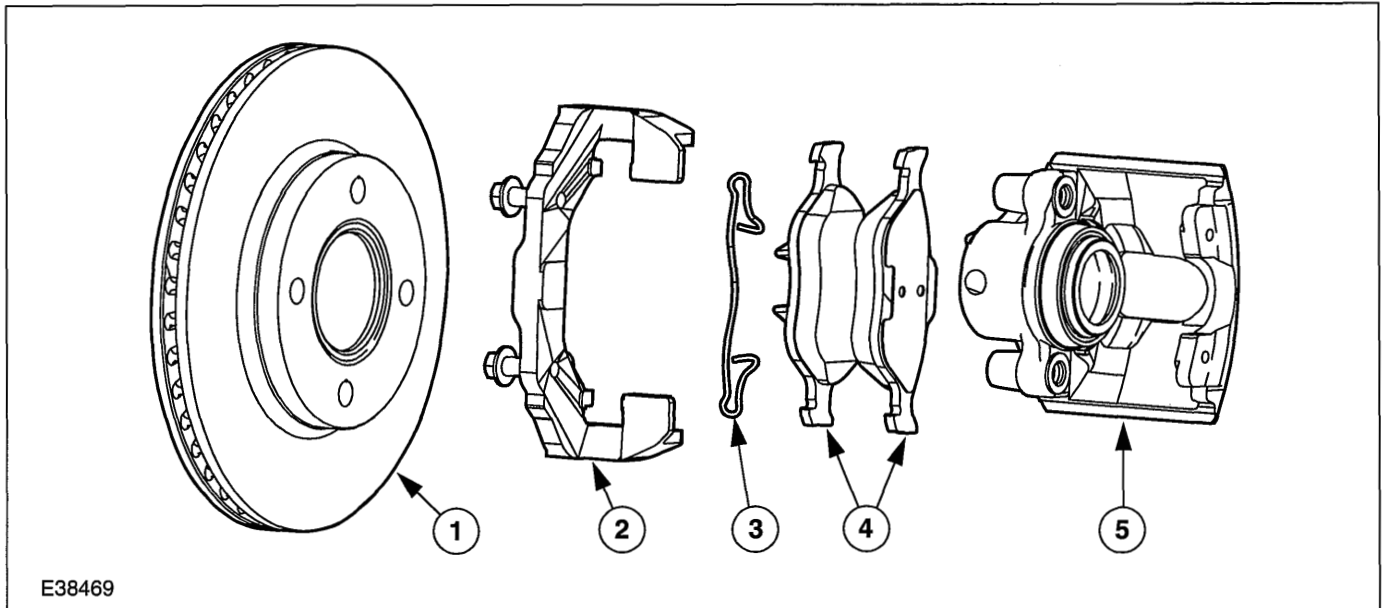
2. **NOTE:** Do not fully tighten the shock absorber lower mounting bolt at this stage. Install the shock absorber.



## DESCRIPTION AND OPERATION

## Front Disc Brake

## Overview



Item	Description
1	Brake disc
2	Brake back plate assembly
3	Retaining spring clip
4	Brake pads
5	Brake caliper

The front brake system has internally ventilated brake discs and a single-piston floating caliper.

The front disc brakes are the same on all vehicles, irrespective of the vehicle specifications.

Please refer to the "General Specifications" section for the dimensions of the brake discs.

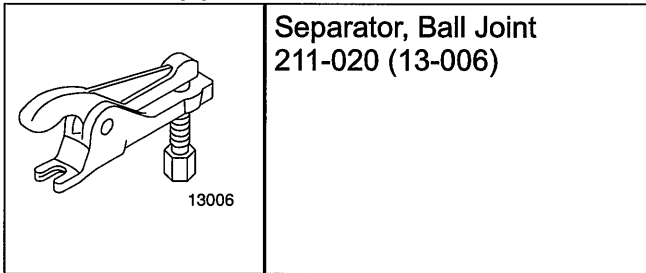
The piston of the brake caliper has a diameter of 54 mm.



REMOVAL AND INSTALLATION

Tie Rod End(13 273 0)

Special Tool(s)



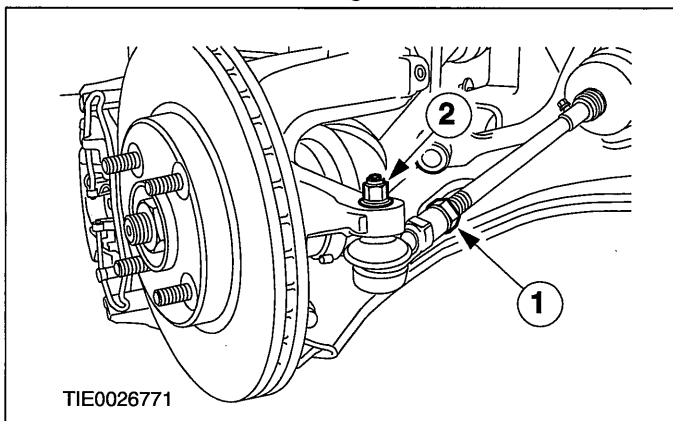
Removal

1. Remove the wheel and tire. For additional information, refer to Section 204-00 [Suspension System - General Information].
2. **CAUTION:** Leave the tie-rod end retaining nut in place to protect the ball joint stud.

**NOTE:** Use a 5 mm Allen key to prevent the ball joint stud from rotating.

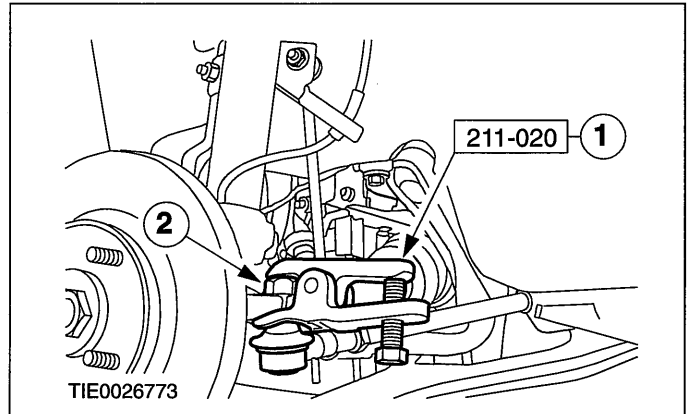
Loosen the tie-rod end locknut and the tie-rod end retaining nut.

1. Loosen the locknut.
2. Loosen the retaining nut.

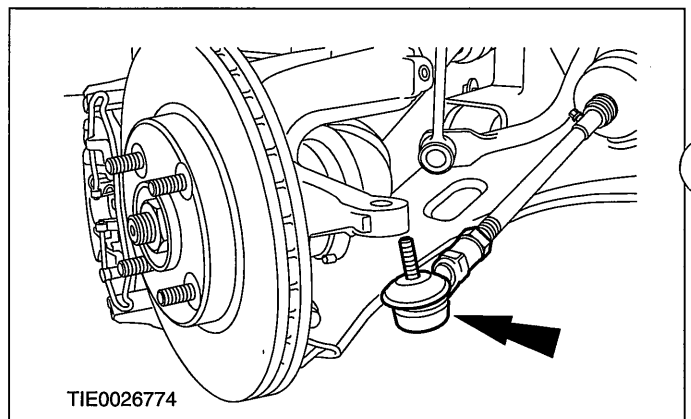


3. **CAUTION:** Protect the ball joint seal using a soft cloth to prevent damage. Using the special tool, detach the tie-rod end from the wheel knuckle.
  1. Release the tie-rod end.

2. Remove and discard the tie-rod end retaining nut.

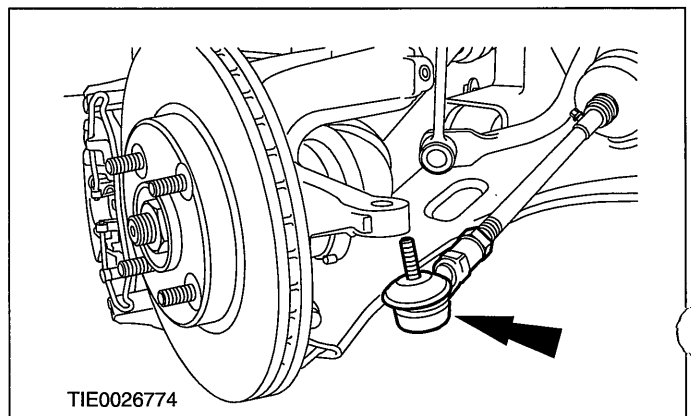


4. **NOTE:** Make a note of the number of turns used to remove the tie-rod end. Remove the tie-rod end.



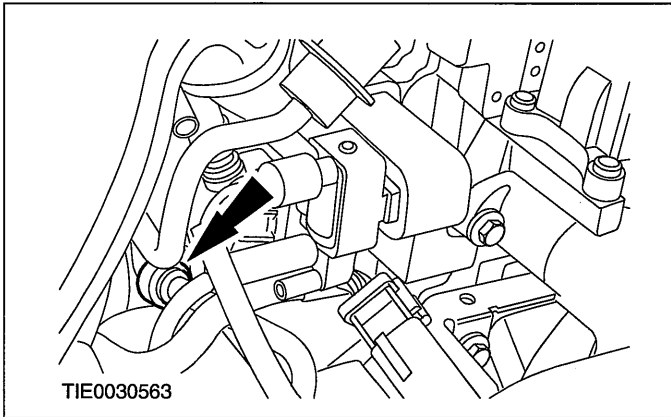
Installation

1. **NOTE:** Install the tie-rod end using the same number of turns used to remove it. Install the tie-rod end.

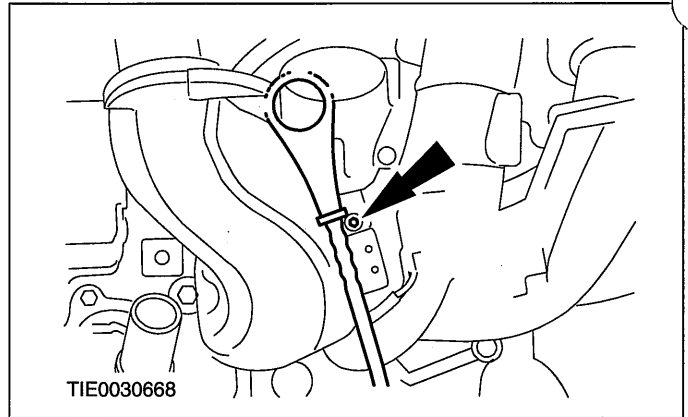


**IN-VEHICLE REPAIR**

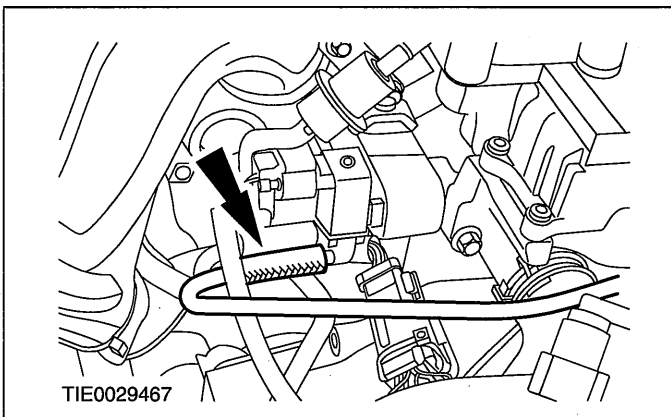
**9. Disconnect the brake booster vacuum line from the intake manifold.**



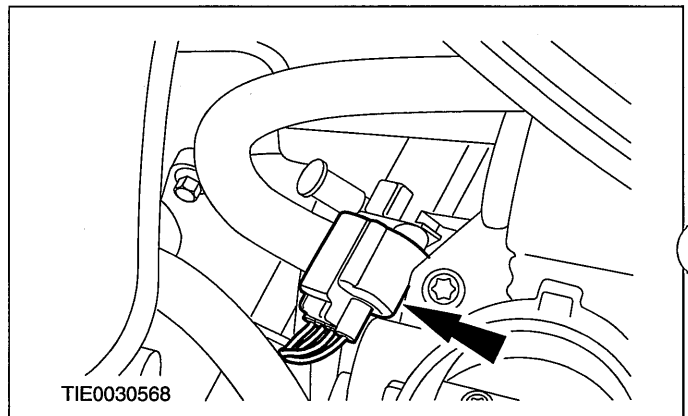
**12. Detach the oil level indicator tube from the intake manifold.**



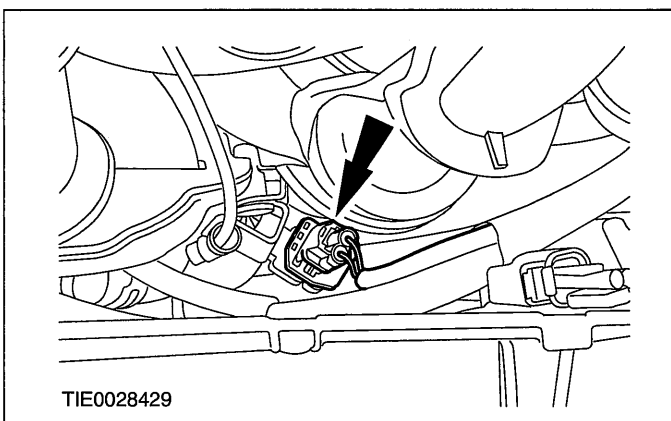
**10. Disconnect the evaporate emission (EVAP) hose from the EVAP valve.**



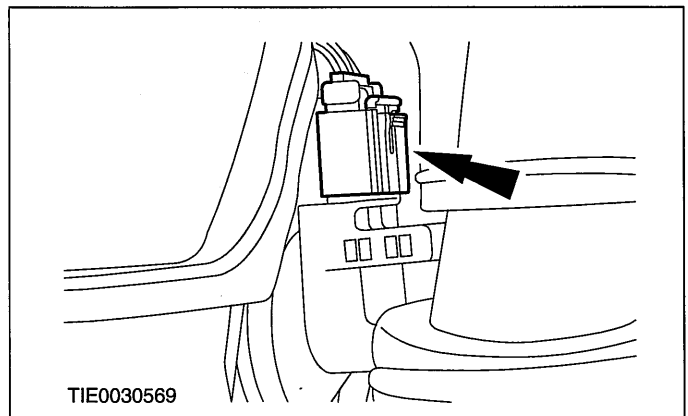
**13. Disconnect the temperature and manifold absolute pressure (T-MAP) sensor electrical connector.**



**11. Disconnect the knock sensor (KS) electrical connector.**

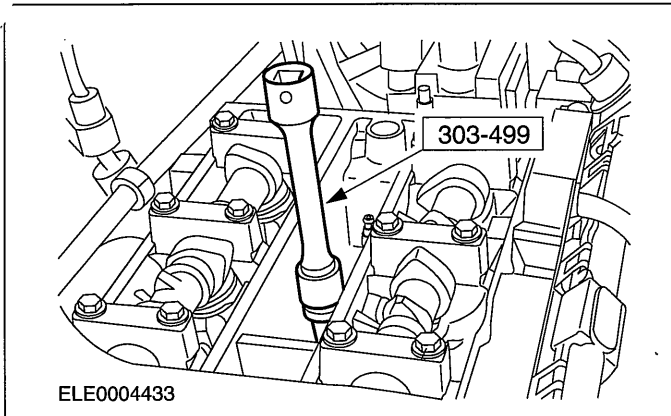


**14. Disconnect the throttle plate control motor (DC-ISC) electrical connector.**



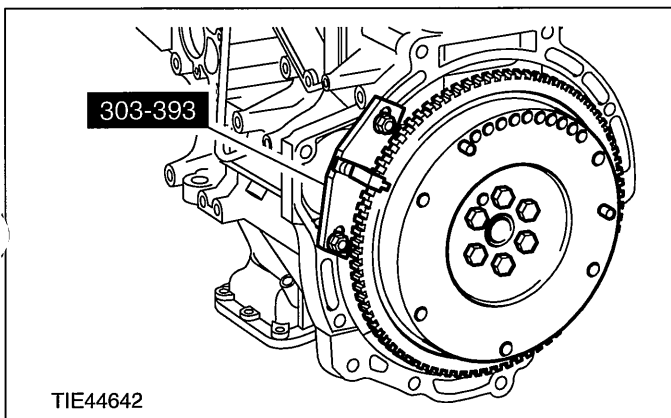
**DISASSEMBLY**

19. Using the special tool, remove the spark plugs.



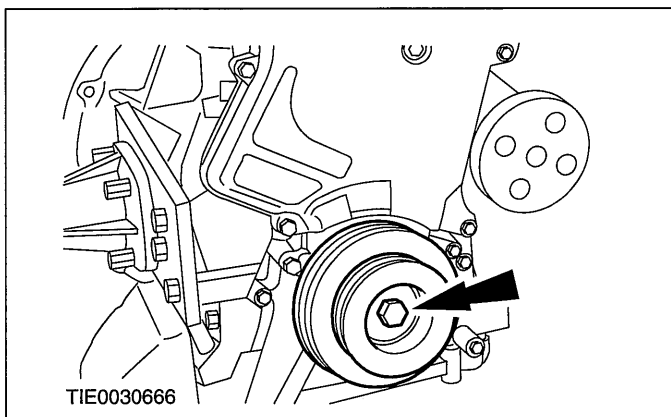
20. Set the crankshaft to approximately 20 degrees before TDC.

21. Using the special tool, lock the crankshaft.

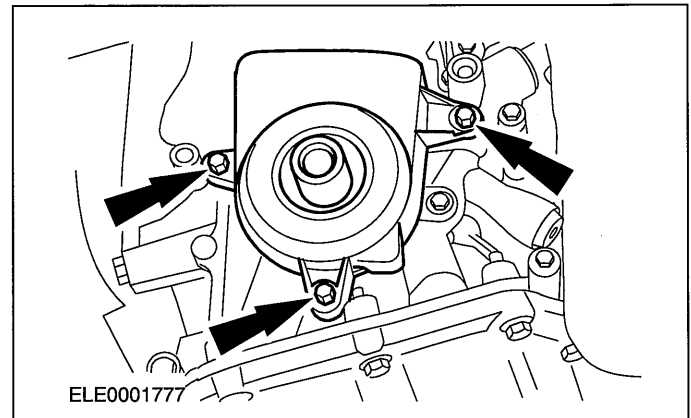


22. Remove the crankshaft pulley.

- Discard the bolt.



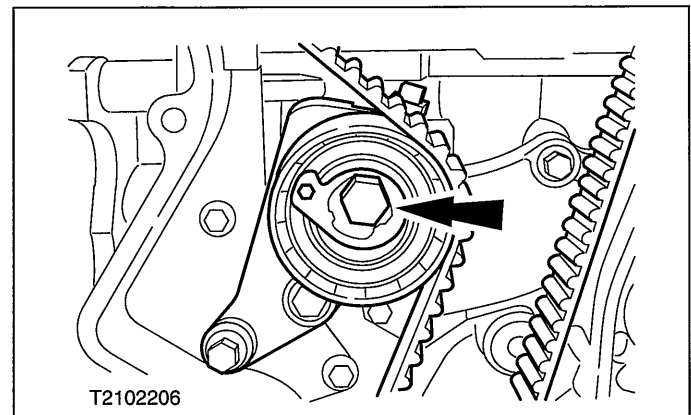
23. Remove the timing belt lower cover.



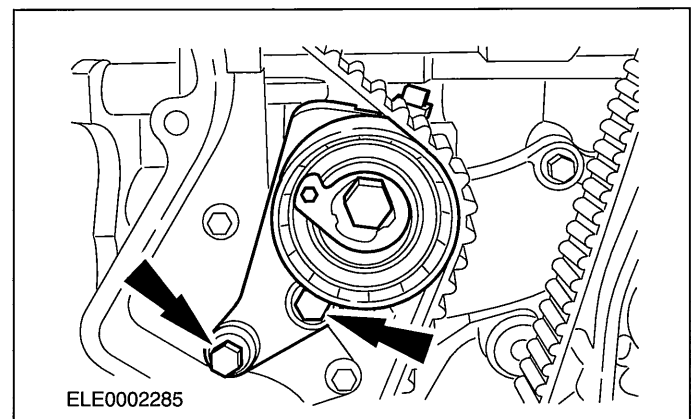
Engines with eccentric cam timing belt tensioner

24. Slacken the timing belt tensioner and remove the timing belt.

- Discard the timing belt.



25. Remove the timing belt tensioner.

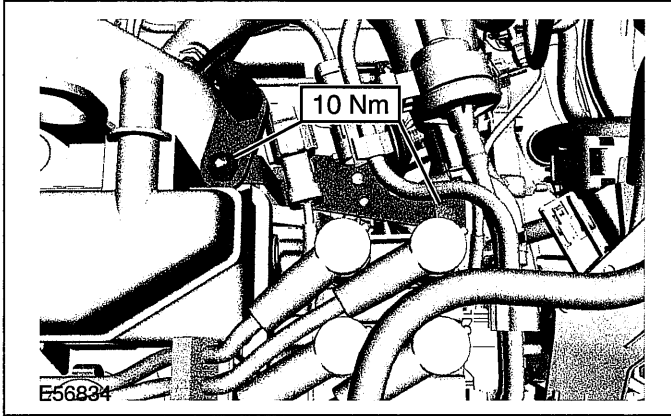


Engines with slotted bracket timing belt tensioner

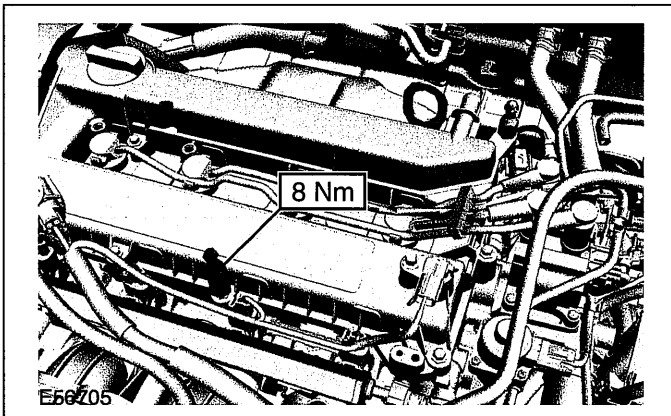
26. Remove the timing belt tensioner and the timing belt.

## IN-VEHICLE REPAIR

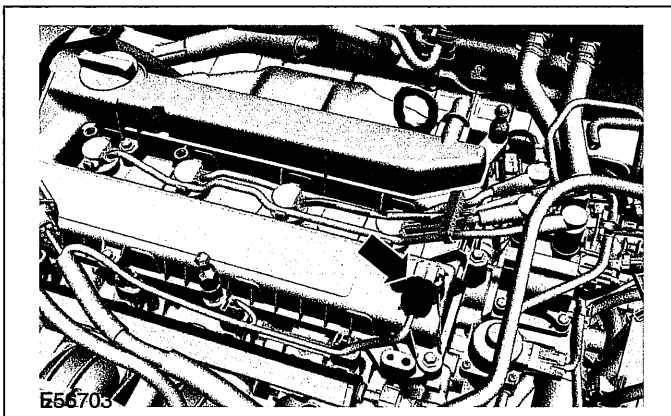
37. Install the EVAP valve bracket.



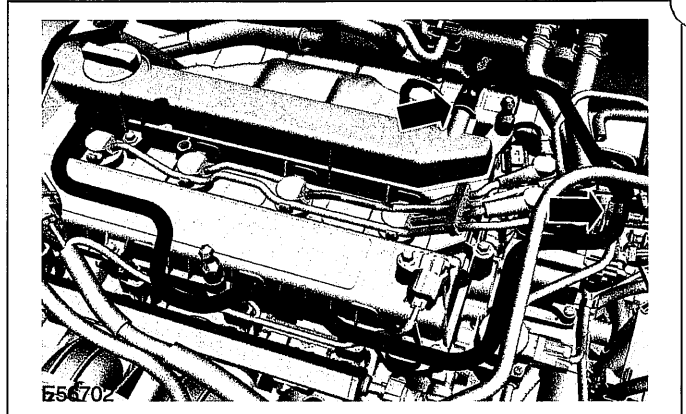
38. Install the air cleaner retainer.



39. Connect the camshaft position (CMP) sensor connector.

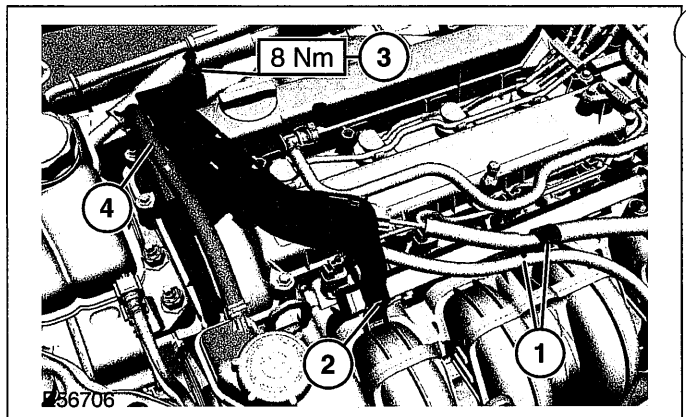


40. Attach the positive crankcase ventilation (PCV) hose to the valve cover.



41. Attach the engine wiring harness to the valve cover.

1. Clip on the engine wiring harness at the intake pipe.
2. Clip on the engine wiring harness bracket at the intake pipe.
3. Install the air cleaner retainer.
4. Connect the power steering fluid return line to the retaining clip.



42. Install the air cleaner.

For additional information, refer to: Air Cleaner - 2.0L Duratec-HE (MI4) (303-12 Intake Air Distribution and Filtering, Removal and Installation).

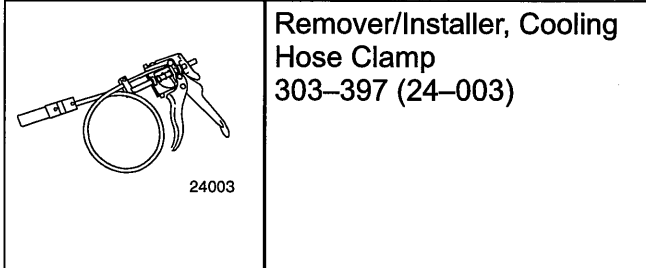
43. Connect the battery ground cable.

For additional information, refer to: Battery Disconnect (414-01 Battery, Mounting and Cables, General Procedures).

## REMOVAL AND INSTALLATION

### Thermostat — 1.25L Duratec-16V (Sigma)/1.4L Duratec-16V (Sigma)/1.6L Duratec-16V (Sigma)(24 454 0)

#### Special Tool(s)



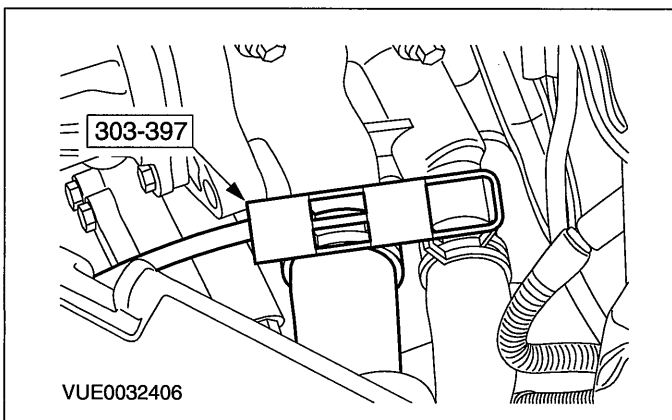
#### Removal

##### 1. Drain the cooling system.

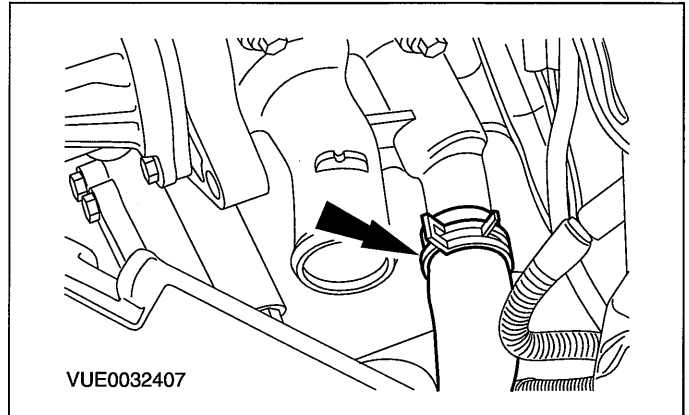
For additional information, refer to **Cooling System Draining, Filling and Bleeding** in this section.

##### 2. Remove the generator. For additional information, refer to Section 414-02 [Generator and Regulator].

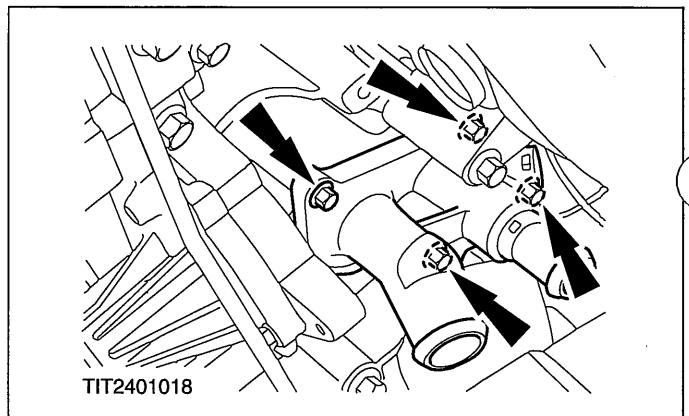
##### 3. Using the special tool, disconnect the radiator lower hose from the thermostat housing.



##### 4. Disconnect the heater hose from the thermostat housing.

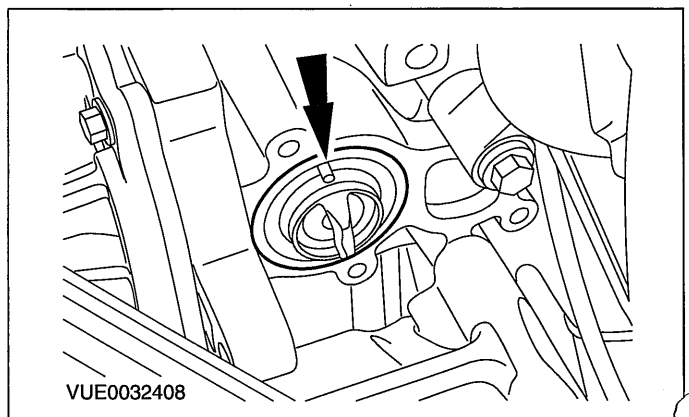


##### 5. Remove the thermostat housing.



##### 6. NOTE: The thermostat is installed with the jiggle pin at the top.

Remove the thermostat.



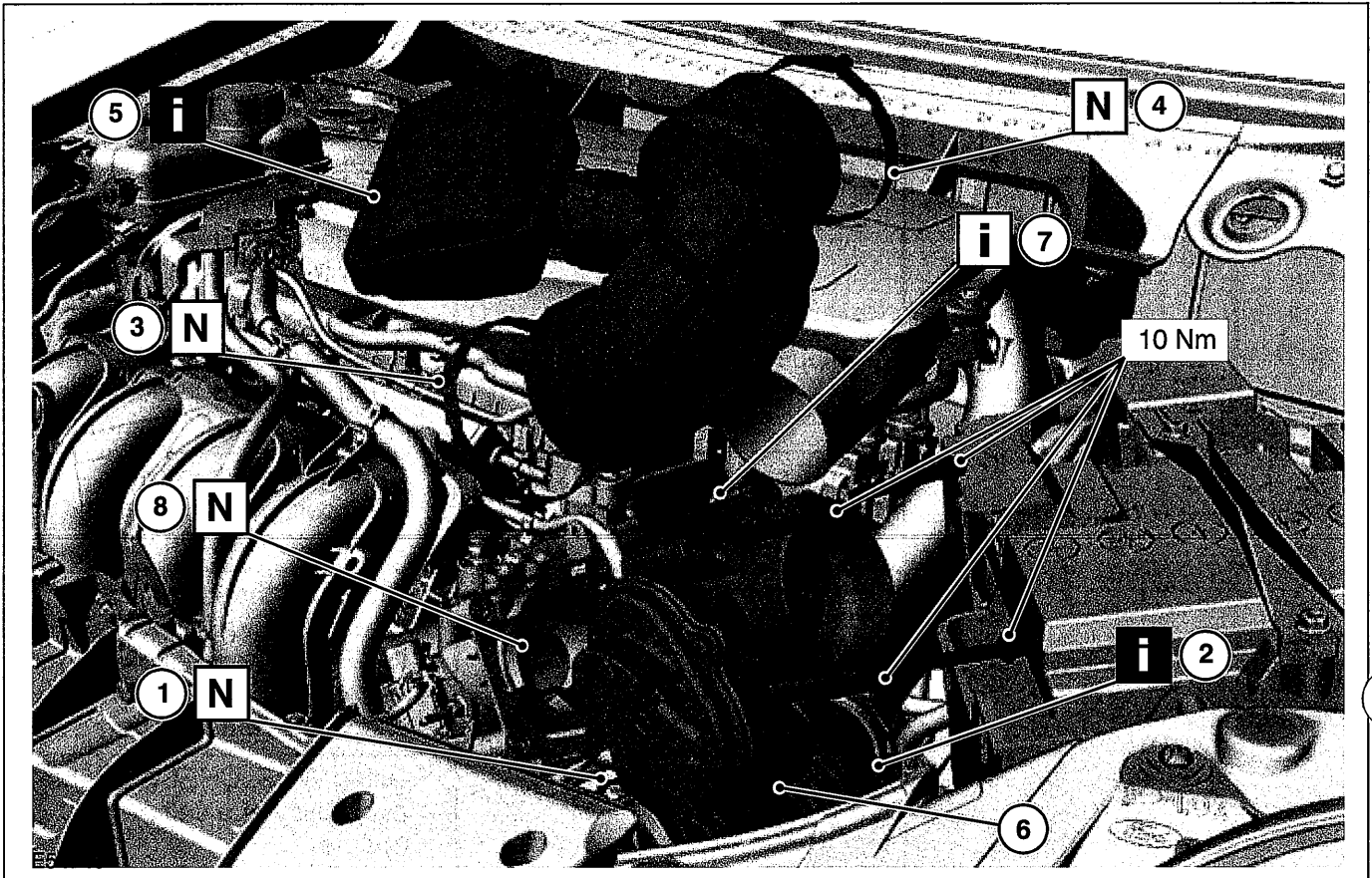
#### Installation

##### 1. To install, reverse the removal procedure.

REMOVAL AND INSTALLATION

Throttle Body

1. Remove the components in the order indicated in the following illustration(s) and table(s).



Item	Description
1	Air cleaner intake pipe retaining clip
2	Air cleaner intake pipe See Removal Detail
3	Air cleaner outlet pipe retaining clip
4	Air cleaner outlet pipe retaining clip
5	Air cleaner outlet pipe and resonator See Removal Detail
6	Throttle body electrical connector
7	Throttle body

Item	Description
	See Installation Detail
8	Throttle body gasket

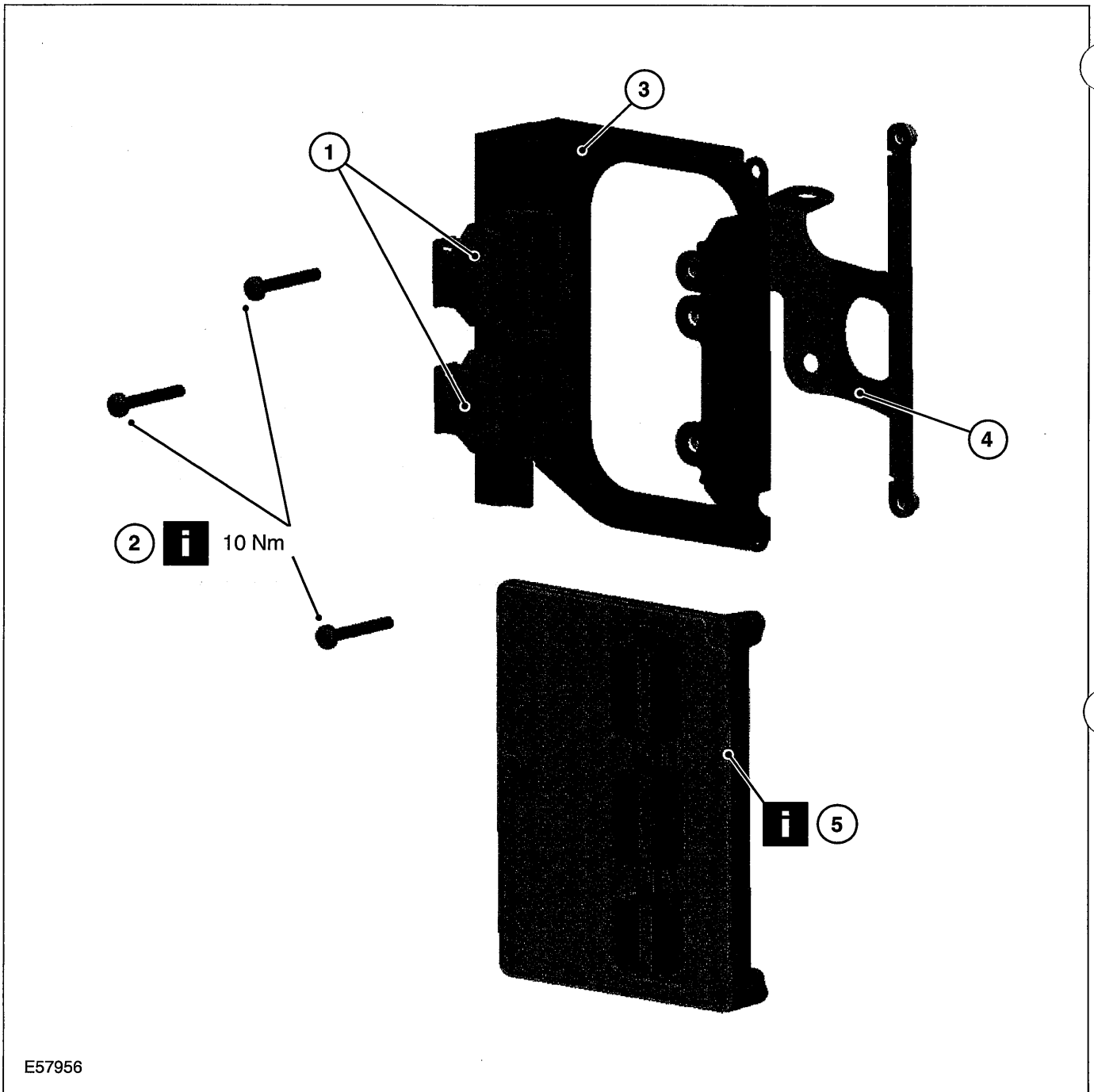
2. To install, reverse the removal procedure.
3. **NOTE:** Do not press the accelerator pedal during the initialization period as this will prevent the complete initialization of the throttle body.  
  
Turn the ignition key to position II and wait for one minute to initialize the throttle body.
4. Turn the ignition key to the OFF position.

Removal Details

Item 2 Air cleaner intake pipe

1. Detach the air cleaner intake pipe from the air cleaner intake pipe duct.

REMOVAL AND INSTALLATION



E57956

Item	Description
1	PCM electrical connectors
2	PCM retaining bolts See Removal Detail
3	PCM retaining bracket
4	PCM mounting bracket
5	PCM

Item	Description
	See Removal Detail

4. To install, reverse the removal procedure.

**NOTE:** If a new PCM is being installed connect WDS. Download the PCM configuration information using the programmable modules installation routine after the installation of the PCM.

Removal Details