RENAULT

Workshop Repair Manual

Technical Note 3736A

Diesel Engine G9T - G9U
High Pressure - Common Rail
4 cast iron cylinders

Vehicle	*Type*	*Engine*
Master	**XDXG** **XDXN** **XDXN** **XDXM** **XDXU - XDXM** **XDXM** **XDXU** **XDXV**	**G9T 720** **G9T 722** **G9T 750** **G9U 720** **G9U 724** **G9U 750** **G9U 754**
Espace (JE0X)	**XE0K - XE0S**	**G9T 710**
Espace IV	**JK0H**	**G9T 742, 743**
Laguna II	**XG0F**	**G9T 700, 702, 703**
Vel Satis	**BJ0E - BJ0F - BJ0G - BJ0M** **BJ0F - BJ0G** **BJ0F**	**G9T 702** **G9T 700, 701** **G9T 703**
Avantime	**DE01**	**G9T 712**
Trafic	**XLXD**	**G9U 730**

Supersedes Workshop Repair Manual MOT. G9T

77 11 321 202 **APRIL 2003** **EDITION ANGLAISE**

"The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The methods may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed."

Contents

USING THE MANUAL

There are two main sections in this manual:
– **technical specifications,**
– **overhauling the engine.**

For repairing vehicle components, refer to the **Workshop Repair Manual** and **Technical Notes** for the vehicle.

UNITS OF MEASUREMENT

– All dimensions are given in millimetres (**mm**) (unless stated otherwise).
– Tightening torques are expressed in decaNewtonmetres (**daNm**).
  Reminder: **1 daNm = 1.02 m.kg**.
– Pressures in **bar**
  Reminder: **1 bar = 100,000 Pa**.

TOLERANCES

Tightening torques given without a tolerance must be accurate to within:
– in **Degrees (±3°)**.
– in **daNm (±10 %)**.

OPERATION

The "**Common Rail**" high pressure direct injection system is a sequential diesel fuel injection system (based on the petrol engine multipoint injection system).

This new injection system reduces operating noise, reduces the volume of pollutant gases and particles and produces high engine torque at low engine speeds thanks to a pre-injection process.

The low pressure pump (also called the booster pump) supplies the high pressure pump via the pressure regulator filter then the fuel filter **during the starting phase only**, at a pressure of between **2** and **4 bar**.

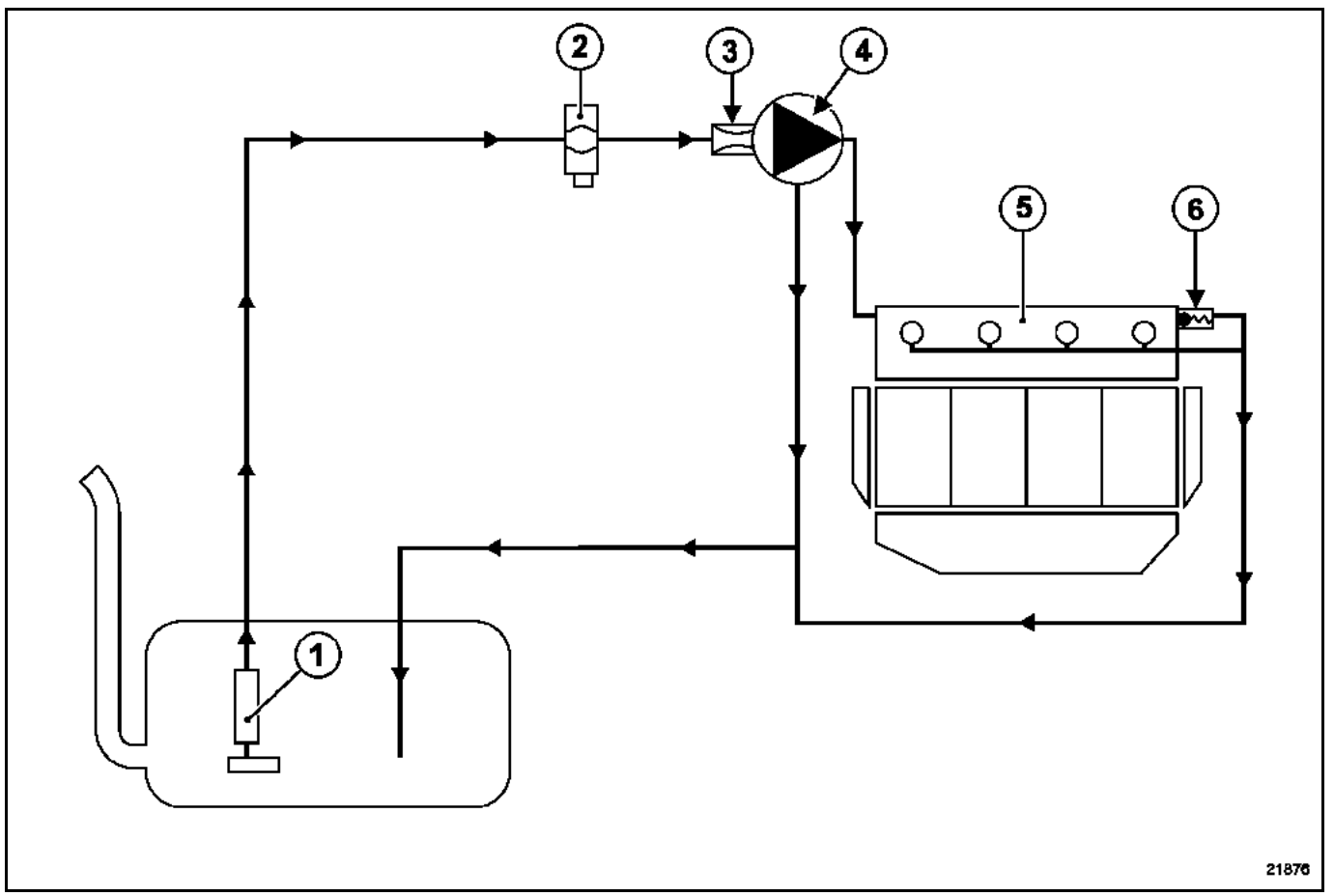
The **high pressure** pump generates the high pressure, which is transmitted to the injector rail. The pressure regulator located on the pump modulates the high pressure pump supply flow. The rail supplies each injector through a steel pipe.

The computer:
– determines the injection pressure value necessary for the engine to run correctly and then controls the pressure regulator. It checks that the pressure value is correct by analysing the value transmitted by the pressure sensor located on the rail,
– determines the injection timing necessary to deliver the right quantity of diesel fuel and the moment when injection should start,
– electrically controls each injector individually after determining these two values.

The flow injected into the engine is determined by:
– the duration of injector control,
– the injector opening and closing speed,
– the needle stroke (determined by the type of injector),
– the injector nominal hydraulic flow (determined by the type of injector),
– the high pressure rail pressure, regulated by the computer.

THE CLEANLINESS AND SAFETY ADVICE SPECIFIED IN THIS DOCUMENT MUST BE FOLLOWED DURING ANY WORK CARRIED OUT ON THE HIGH PRESSURE INJECTION SYSTEM.

OPERATING DIAGRAM



DESCRIPTION

The circuit comprises:
– a "pump-sender" supply unit (**1**) (located in the fuel tank),
– a fuel filter (**2**),
– a high pressure regulator (**3**) mounted on the pump,
– a high pressure pump (**4**),
– an injector rail (**5**) fitted with a diesel fuel pressure sensor and a pressure limiter (**6**),
– four solenoid injectors,
– various sensors,
– an injection computer.

Dismantling the interior of the high pressure pump and the injectors is prohibited.

CLEANLINESS ADVICE THAT MUST BE FOLLOWED WHEN WORKING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination

The system is highly sensitive to contamination. The risks caused by contamination are:
– damage to or destruction of the high pressure injection system,
– a component seizing up or leaking.

All After Sales operations must be performed under very clean conditions. This means that no impurities (particles a few microns in size) should penetrate the system during dismantling or get into the circuits via the fuel unions.

The cleanliness guidelines must be applied from the filter through to the injectors.

WHAT ARE THE SOURCES OF CONTAMINATION?

Contamination is caused by:
– metal or plastic chips,
– paint,
– fibres;
  ● cardboard,
  ● from brushes,
  ● from paper,
  ● from clothing,
  ● from cloths.
– foreign bodies such as hair,
– ambient air,
– etc.

WARNING
Cleaning the engine using a high pressure washer is prohibited because of the risk of damaging connections. Furthermore, moisture may collect in connectors and cause electrical connection problems.

ADVICE TO BE FOLLOWED <u>BEFORE ANY WORK IS CARRIED OUT</u> ON THE INJECTION SYSTEM

● Protect the accessories and timing belts, the electrical accessories (starter, alternator, electric power assisted steering pump) and the mating face to prevent diesel fuel spilling onto the clutch friction plate.

● Ensure that you have the caps for the unions to be opened (bag of caps sold by the Parts Department - part no. **77 01 206 381**).
Caps are to be used once only. After use, they must be discarded (once used they are soiled and cleaning is not sufficient to make them reusable).
Unused caps must be discarded.

● Ensure that you have resealable plastic bags for storing removed parts. Parts store in these will be less prone to contamination. These bags are single use; after use they must be discarded.

● Ensure that you have lint-free cleaning cloths (part no. **77 11 211 707**). **Using a normal cloth or paper for cleaning purposes is prohibited.** These are not lint-free and may contaminate the system fuel circuit.
Each cloth must be used once only.

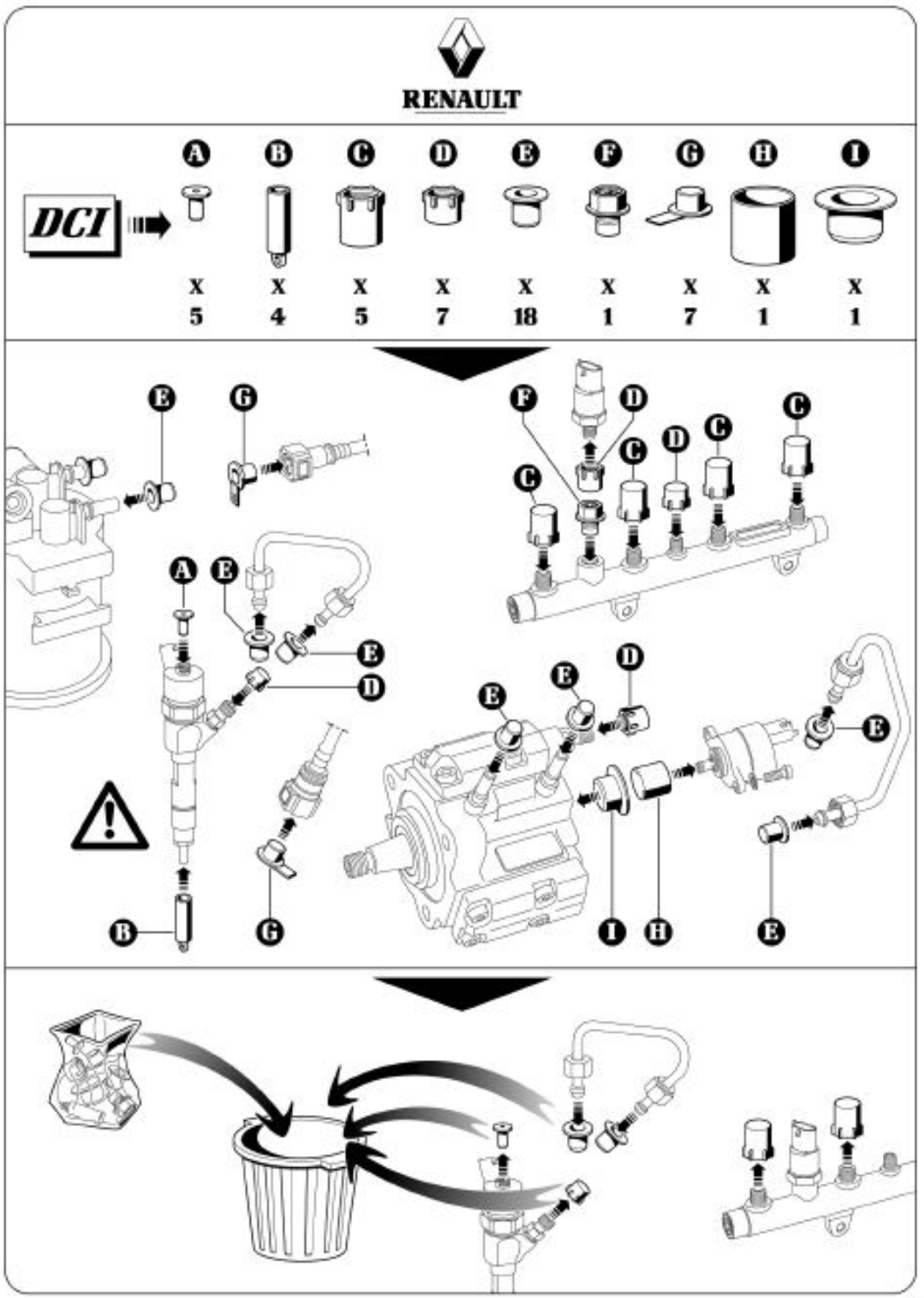
CLEANING ADVICE TO BE FOLLOWED BEFORE CARRYING OUT ANY WORK ON THE FUEL CIRCUIT

- Use fresh thinner for each operation (used thinner is contaminated). Pour it into an uncontaminated container.
- For each operation, use a clean brush which is in good condition (the brush must not lose any hairs).
- Use a brush and thinner to clean the unions to be opened.
- Blow compressed air over the cleaned parts (tool and workbench, and the parts, unions and injection system area). Check that no bristles have been left behind.
- Wash your hands before and during the operation if necessary.
- When wearing leather protective gloves, cover them with latex gloves.

ADVICE TO BE FOLLOWED DURING THE OPERATION

- As soon as the circuit is open, all openings must be plugged to prevent system contamination. The caps to be used are available from the **Parts Department** (part no. **77 01 206 381**). They must not be reused under any circumstances.
- Close the resealable bag, even if it has to be reopened shortly afterwards. The ambient atmosphere carries impurities.
- All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been plugged.
- Using a brush, thinner, air gun, swab or normal cloth is strictly prohibited once the circuit has been opened. These items could allow contamination to enter the system.
- If a component is being replaced, the new component must not be removed from its packaging until it is ready to be fitted on the vehicle.

CAP FITTING INSTRUCTIONS (part no. **77 01 206 381**)



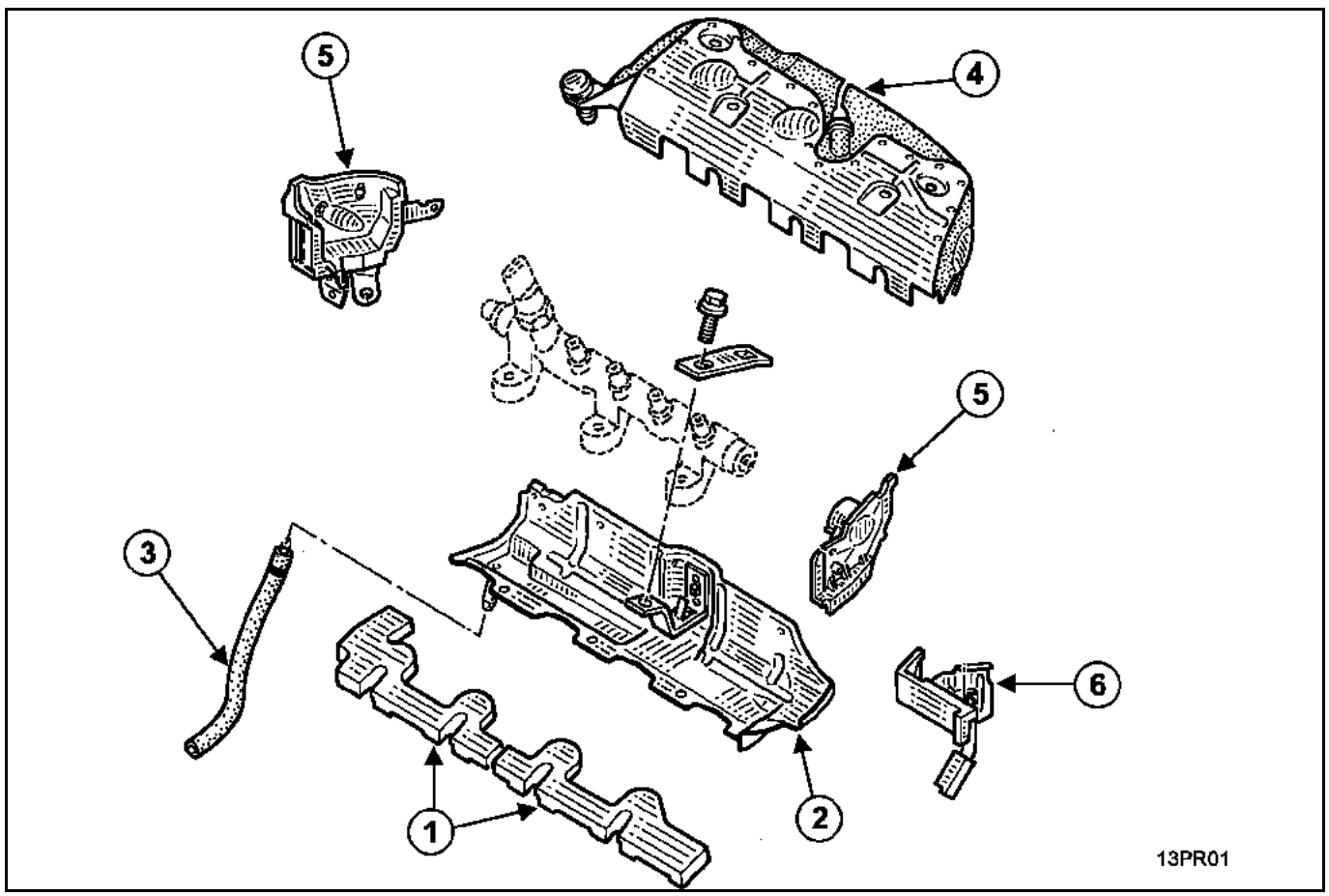
RAIL PROTECTOR

Model 1

General information

The rail protector isolates the high pressure injection system from the engine compartment.

IMPORTANT
This rail protector ensures safe operation and requires special attention when being fitted.



To fulfil its safety function, the rail protector must consist of:
– two soundproofing pads (**1**), to be replaced if they are damaged or soaked with diesel fuel,
– a lower metal protector (**2**) mounted between the rail and the cylinder head,
– a diesel fuel drain pipe (**3**), to be replaced if damaged or soaked with diesel fuel,
– a rubber flap (**4**) mounted on the metal protector and the rocker cover,
– two side partitions (**5**),
– a partition (**6**) mounted on the rocker cover (on some versions),
– two clips for fixing the side partitions to the rubber flap.

Whenever working on the rail protector, make sure the system components are fitted properly after refitting.

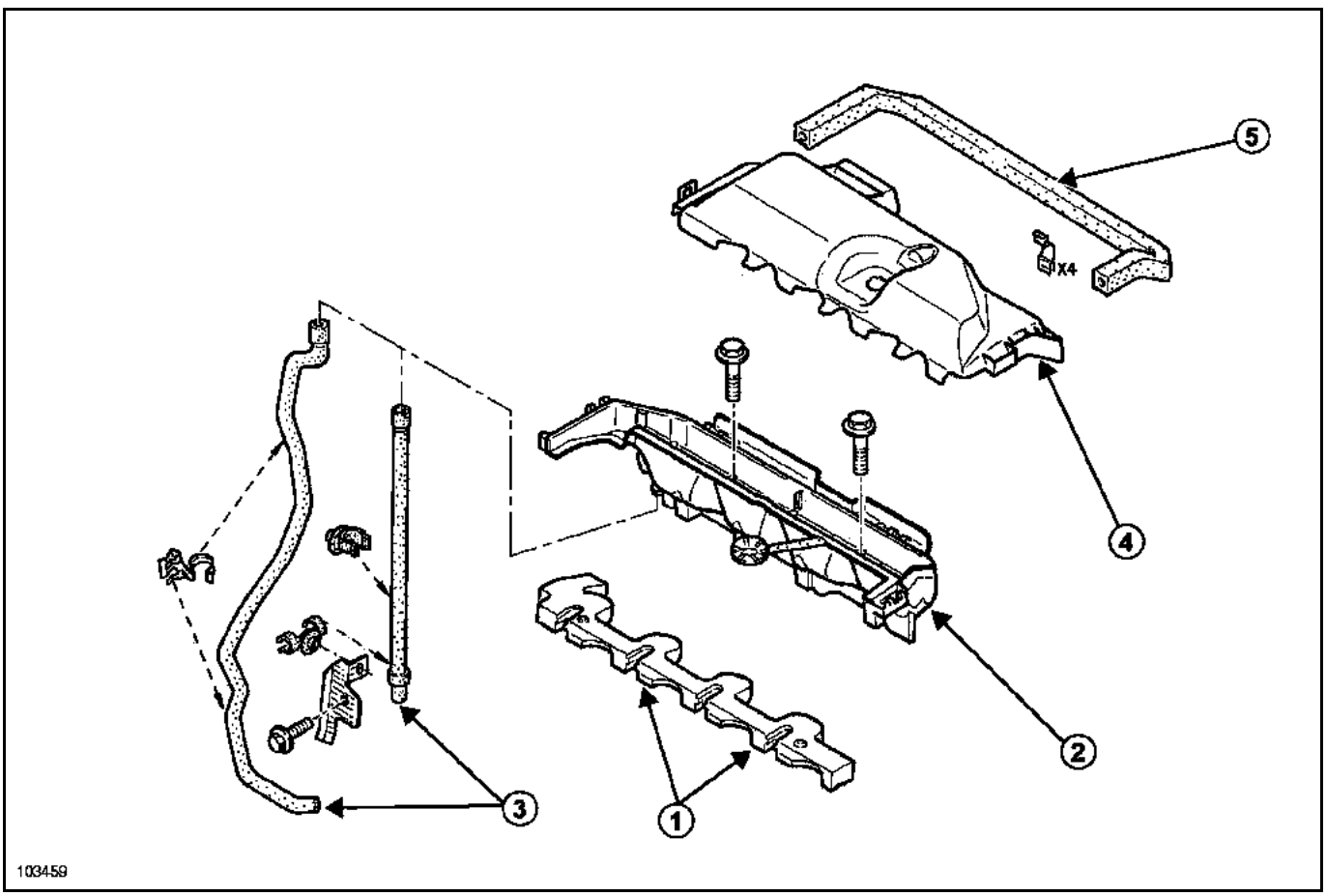
IMPORTANT
Failure to comply with these instructions may have serious safety-related consequences.

Model 2

General information

The model two rail protector fulfils the same function as model one. This protector is a development which optimises the protection function of the high pressure injection system.

IMPORTANT
The rail protector ensures safe operation and requires special attention when being fitted.



To fulfil its safety function, the rail protector must consist of:
– two soundproofing pads (**1**) to be replaced if they are damaged or soaked with diesel fuel,
– a lower aluminium protector (**2**) mounted between the rail and the cylinder head,
– a diesel fuel drain pipe (**3**), to be replaced if damaged or soaked with diesel fuel,
– a plastic cover (**4**) mounted on the aluminium protector,
– a seal (**5**) to prevent leaks between the cover and rail protector.

Whenever working on the rail protector, make sure the system components are fitted properly after refitting.

IMPORTANT
Failure to comply with these instructions may have serious safety-related consequences.