

# Section 8A1 Fuel System

## ATTENTION

Before performing any service operation or other procedure described in this Section, refer to Section 00 Warnings, Cautions and Notes for correct workshop practices with regard to safety and/or property damage.

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## 1 General Information — Sedan, Wagon and Utility

The 75-litre fuel tank is a high-density multi-layer polyethylene construction with an integral fuel filler neck. The fuel tank is fitted under the load compartment floor and is supported by three mounting straps that differ marginally between the different body styles.

The 70-litre fuel tank fitted to utility models is a pressed steel construction, with a separate fuel filler neck. The filler neck is made up of a steel pipe lower section bolted to the tank, a flexible rubber centre section with hose clamps either end and a steel upper pipe that incorporates the filler neck vent fitting and counter-siphon measures. The fuel tank is fitted underneath the load floor front panel assembly and is retained by bolts and washers.

A seal is fitted around the fuel filler neck where it protrudes through the vehicle body. The fuel tank is not repairable on any model and, if damaged, must be replaced.

An in-tank, modular fuel pump and sender assembly is used in all fuel tanks. The modular fuel pump and sender assembly incorporates a fuel reservoir, the fuel sender, jet pump and the electric fuel pump. In sedan, wagon and all-wheel drive wagon models, a rollover valve is also included; in the utility model, a rollover valve is fitted directly to the tank.

The modular fuel pump and sender unit incorporates a pressure regulator; the modular fuel pump and sender is serviced as a complete assembly only.

Quick-connect fittings are used for all fuel line connections, including the modular fuel pump and sender assembly, evaporative emission control canister, fuel filter and the fuel feed line at both the fuel tank and engine ends.

Servicing details for these and other fuel tank and fuel line related items are covered in this Section.

For additional information regarding the pressure regulator and fuel system electrical diagnostic procedures not contained in this Section, refer to:

- [Section 6C1-3 Engine Management – V6 – Service Operations](#), or
- [Section 6C3-3 Powertrain Management GEN III – V8 – Service Operations](#).

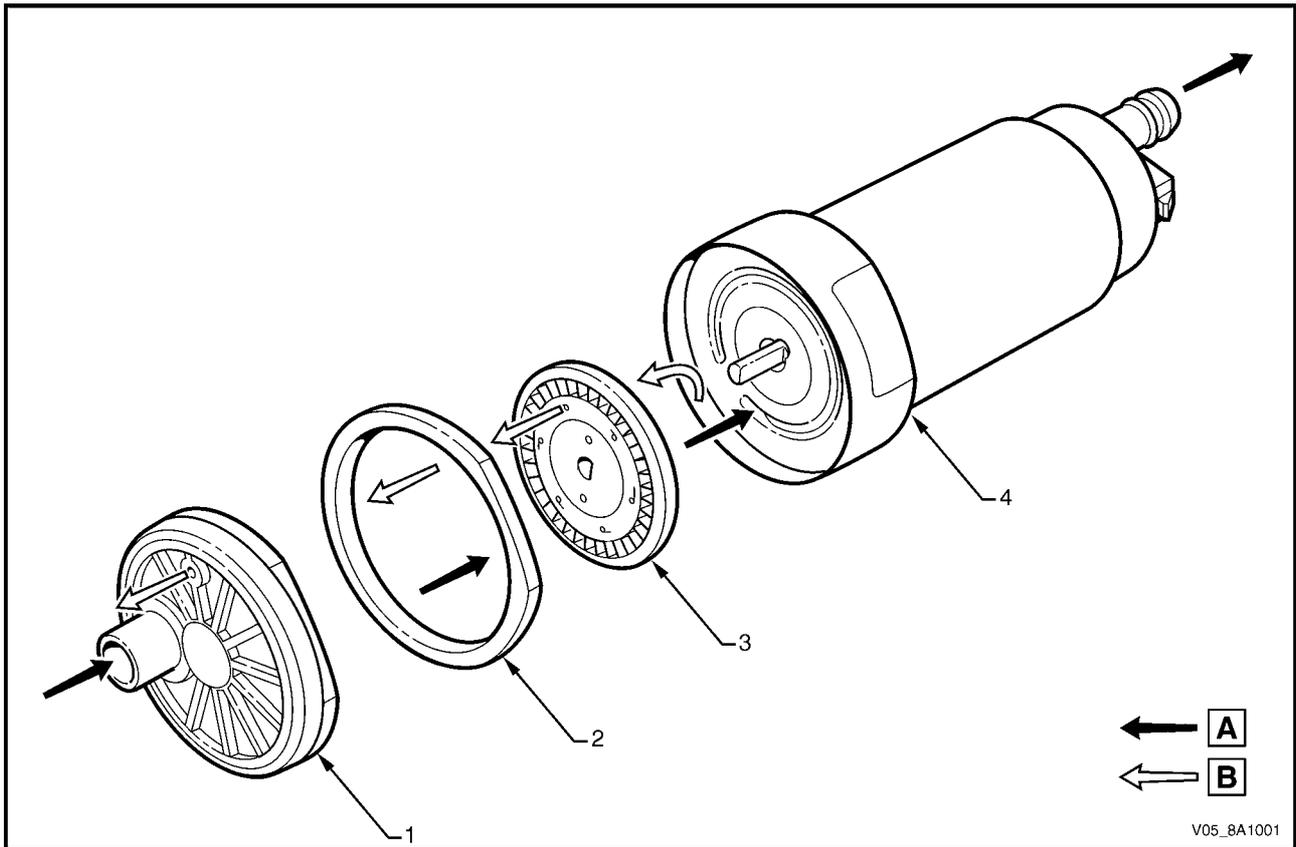
## 1.1 Modular Fuel Pump and Sender Assembly

The modular fuel pump and sender assembly is designed to maintain an optimum fuel level in the reservoir. This ensures a continuous fuel flow under all fuel level conditions and vehicle attitudes. The modular fuel pump and sender assembly also provides an accurate means of measuring fuel level within the fuel tank.

### Fuel Pump

#### Single Turbine Fuel Pump

Figure 8A1 – 1 details fuel flow through the single turbine fuel pump.



**Figure 8A1 – 1**

**Legend**

- |   |  |
|---|--|
| <p><b>A</b> Fuel</p> <p><b>B</b> Vapour out</p> | <p>1 Inlet Body</p> <p>2 Impeller Housing</p> <p>3 Impeller</p> <p>4 Fuel Pump Housing</p> |
|---|--|

Fuel (A) is drawn into the modular fuel pump and sender assembly reservoir from the fuel tank, through the primary umbrella valve (5) and into the fuel pump impeller, via the internal strainer (4) at the fuel pump (1) inlet. At the impeller, vapour (C) is separated from the fuel. The vapour is ejected from the fuel pump into the reservoir via a port next to the fuel pump inlet.

High-pressure fuel then flows through the end cap, the lower connector and the flexible pipe. From the flexible pipe, fuel exits the modular fuel pump and sender assembly through the fuel feed port and flows on to the externally-mounted fuel filter and the engine.

A fuel pressure regulator (2) is located in the modular fuel pump and sender assembly; fuel not used by the engine (B) is returned to the modular fuel pump and sender assembly via the fuel return line and the fuel return port in the modular fuel pump and sender assembly cover. The return fuel enters the jet pump standpipe (3) of the reservoir via the return fuel tube.

Vehicle fuel line pressure is maintained by a pressure regulator (2) located within the modular fuel pump and sender assembly.

When the engine is switched off, the reservoir remains full of fuel, due to the action of the primary umbrella valve. At high fuel levels, fuel tank overflow enters the reservoir over the top of the reservoir. Fuel level in the reservoir is also maintained by returned engine fuel.

Electrical power is supplied to the fuel pump by a connector secured to the modular fuel pump and sender assembly cover. An internal harness (not shown) assembly completes the connection to the pump.

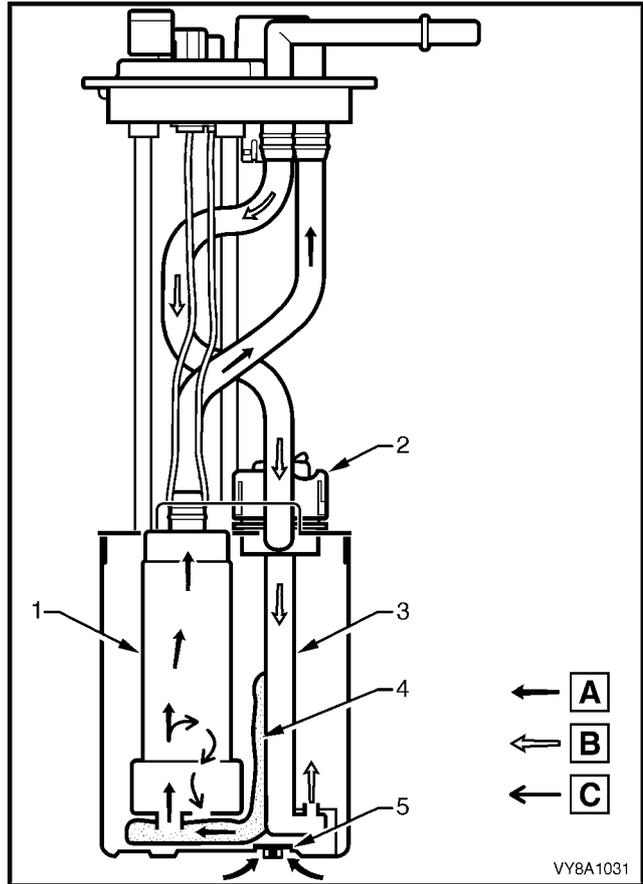


Figure 8A1 – 2

### Single Line Fuel Delivery System

Fuel from the single turbine fuel pump is forced through the flexible pipe and exits the modular fuel pump and sender assembly through the fuel feed port in the modular fuel pump and sender assembly cover. Fuel then flows through the fuel filter (5) mounted to a bracket (3) secured to the floor pan. From here, fuel is directed through the fuel filter T-piece (2) and the flexible fuel feed hose (1) and on to the engine bay and fuel rail. When fuel line pressure exceeds 410 kPa, the pressure regulator in the modular fuel pump and sender assembly opens, allowing excess fuel at system pressure to return to the fuel tank via the fuel return line (4). This process occurs continuously while the fuel pump is operating.

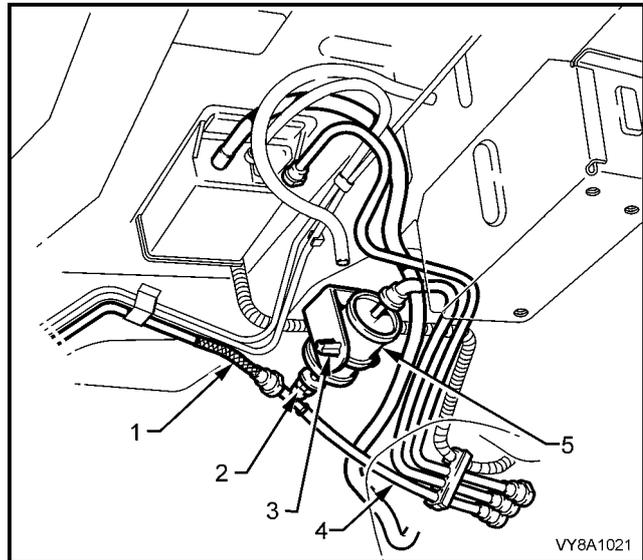


Figure 8A1 – 3

### Pressure Regulator

The pressure regulator is a diaphragm-operated relief valve located in the modular fuel pump and sender assembly. On one side of the diaphragm, fuel is subject to fuel pump pressure; on the other side, fuel is subject to ambient tank pressure combined with mechanical spring pressure. The pressure regulator maintains a controlled pressure at the injectors at all times by regulating fuel flow into the fuel return line.

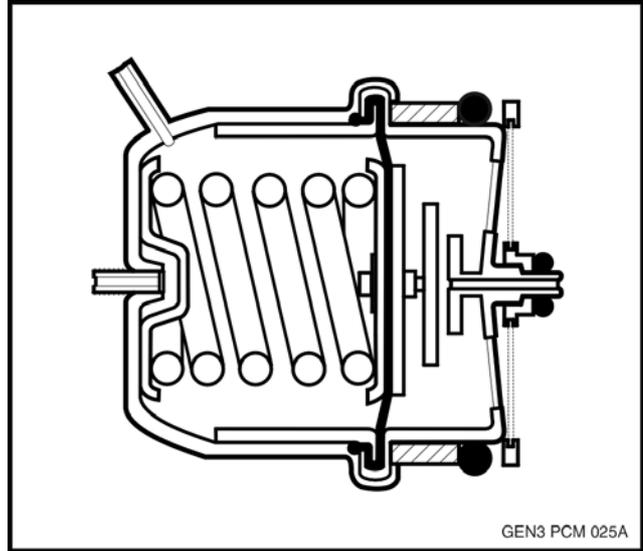


Figure 8A1 - 4

### Fuel Level Sender Assembly

The fuel level sender assembly consists of a ceramic variable resistor card (1), detachable nylon wiper piece (2), fuel level sender float and arm (3), and a wiring harness (4). These components convert the fuel level in the fuel tank into a variable electrical signal that provides the fuel level information on the fuel gauge in the instrument panel.

The fuel level sender assembly mounting is part of the modular fuel pump and sender assembly moulding. The fuel level sender assembly is attached to the mounting and is secured with a retainer. Two wires connect the ceramic variable resistor card to the modular fuel pump and sender assembly wiring harness.

The ceramic variable resistor card varies the resistance, dependent upon the position of the fuel level sender float and arm, and sends that signal via hard wire to the instrument cluster. This resistance signal changes relative to the wiper contact position on the conductive bars of the ceramic variable resistor card.

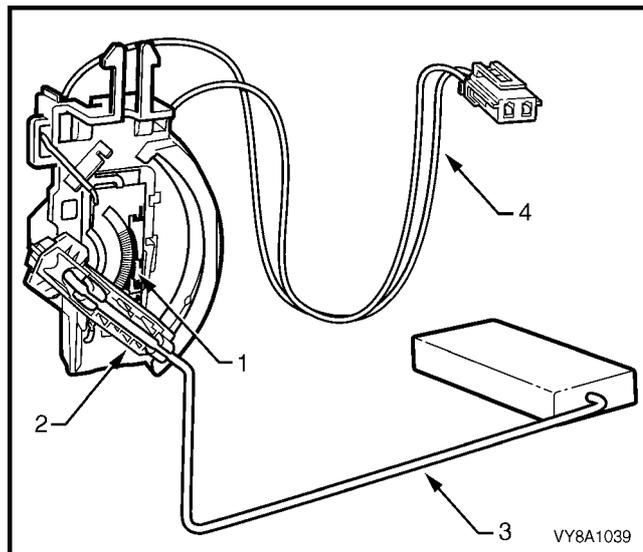


Figure 8A1 - 5

## Rollover Valve

The modular fuel pump and sender assembly fitted to the sedan, wagon and all-wheel drive wagon models incorporates a rollover valve. The rollover valve limits vapour venting to the evaporative emission control canister using a fixed-sized orifice that is normally open (View A). If the vehicle rolls over (View B), the fuel tank vent line to the evaporative emission control canister is safely shut off by the rollover valve, preventing liquid fuel from flooding the evaporative emission control canister.

### NOTE

The rollover valve fitted to sedan, wagon and all-wheel drive wagon models is not serviceable separately. If it is faulty, the modular fuel pump and sender assembly must be replaced.

### NOTE

The rollover valve in utility models is fitted directly onto the tank.

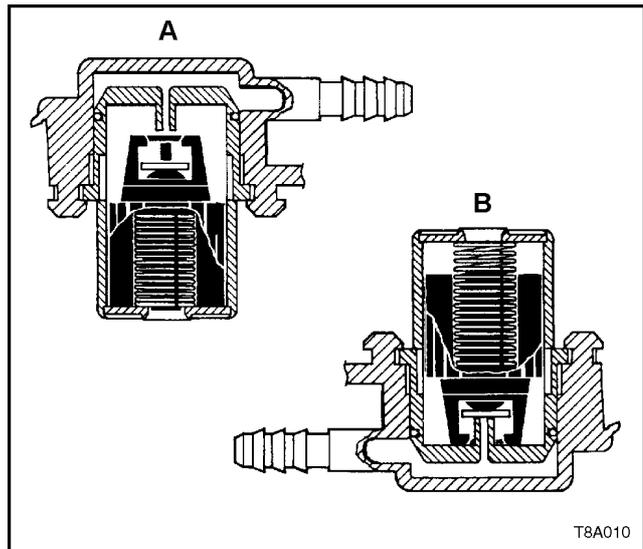


Figure 8A1 - 6

## 1.2 Fuel Filler Cap

The fuel filler cap is a 'screw on' type with a ratcheting feature to prevent over-tightening. When installing the fuel filler cap, tighten it until a ratcheting (clicking) sound is audible, indicating it is tightened properly.

### CAUTION

If a replacement fuel filler cap is required, use only the correct black fuel cap. Using an incorrect cap causes the emission control system to malfunction.

### NOTE

Vehicles using unleaded fuel have 'UNLEADED FUEL ONLY' embossed into the top of the fuel filler cap.

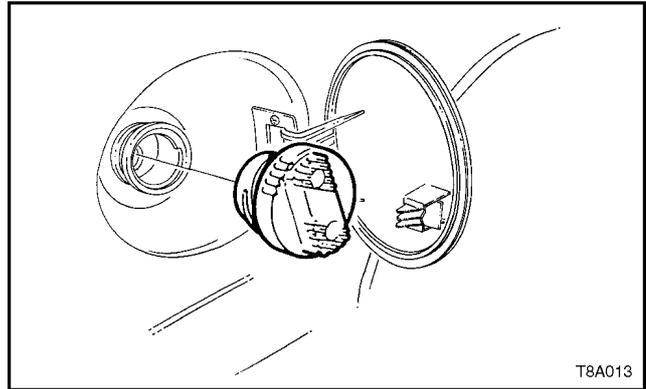


Figure 8A1 - 7

### NOTE

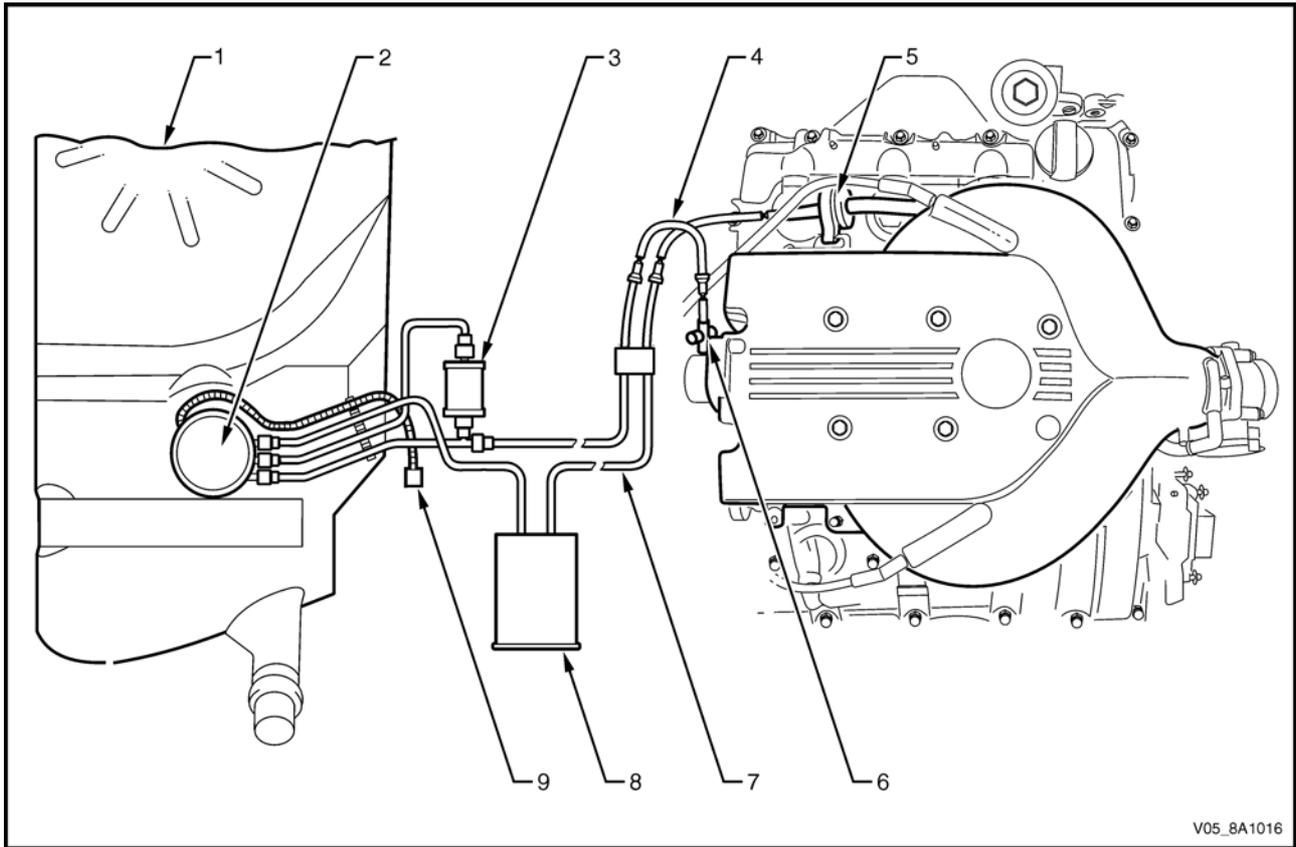
Refer to Figure 8A1 - 7 the fuel filler door and cap arrangement for the wagon; the arrangement is similar for the sedan, all-wheel drive wagon and utility.

### 1.3 System Components

The Fuel Control System consists of the following components, refer to Figure 8A1 – 8 (for vehicles fitted with a V6 engine) or Figure 8A1 – 9 (for vehicles fitted with a GEN III V8 engine):

- fuel tank;
- modular fuel pump and sender assembly, containing:
  - pressure regulator,
  - fuel pump assembly, and
  - jet pump;
- fuel filter;
- fuel pump electrical connector;
- evaporative emission control canister;
- fuel rail;
- evaporative emission control canister purge line;
- evaporative emission control canister purge solenoid;
- fuel feed line;
- either:
  - engine control module (ECM) on vehicles fitted with a V6 engine, or
  - powertrain control module (PCM) on vehicles fitted with a GEN III V8 engine;
- fuel pump relay; and
- injectors.

**V6 Engine**

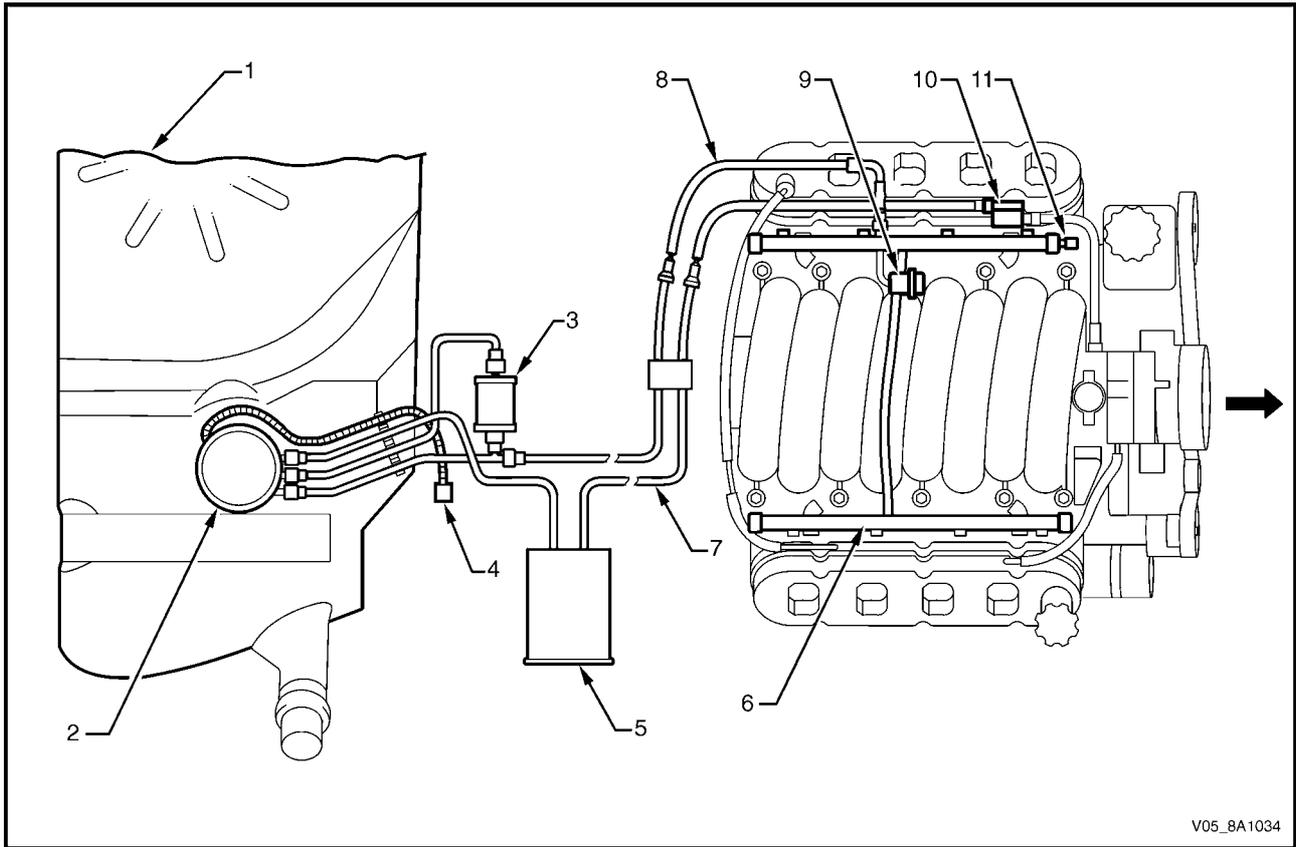


**Figure 8A1 – 8**

**Legend**

- |   |  |   |   |   |                                       |
|---|--|---|---|---|---------------------------------------|
| 1 | Fuel Tank  | 4 | Fuel Feed Line  | 7 | Fuel Vapour Line                      |
| 2 | Modular Fuel Pump and Sender Assembly (including Pressure Regulator) | 5 | Evaporative Emission Control Canister Purge Solenoid          | 8 | Evaporative Emission Control Canister |
| 3 | Fuel Filter  | 6 | Evaporative Emission Control Canister Purge Line Service Port | 9 | Fuel Pump Electrical Connector        |

**GEN III V8 Engine**



**Figure 8A1 - 9**

**Legend**

- |  |   |  |
|--|---|--|
| 1 Fuel Tank  | 5 Evaporative Emission Control Canister | 9 Fuel Pulse Dampener  |
| 2 Modular Fuel Pump and Sender Assembly (including Pressure Regulator) | 6 Fuel Rail                             | 10 Evaporative Emission Control Canister Purge Solenoid          |
| 3 Fuel Filter  | 7 Fuel Vapour Line                      | 11 Evaporative Emission Control Canister Purge Line Service Port |
| 4 Fuel Pump Electrical Connector                                       | 8 Fuel Feed Line                        |  |

## 2 General Information — Coupe

The 70-litre pressed steel fuel tank is enclosed by a two-piece high-density multi-layer polyethylene shell, refer to Figure 8A1 – 10. The fuel tank is fitted immediately behind the rear seat and is accessed through the rear compartment. The fuel tank is held in place by two mounting straps. The fuel filler neck located in the rear right-hand quarter panel is attached to the vehicle body with three fastening nuts at the fuel filler opening.

The fuel tank is not repairable and, if damaged, must be replaced.

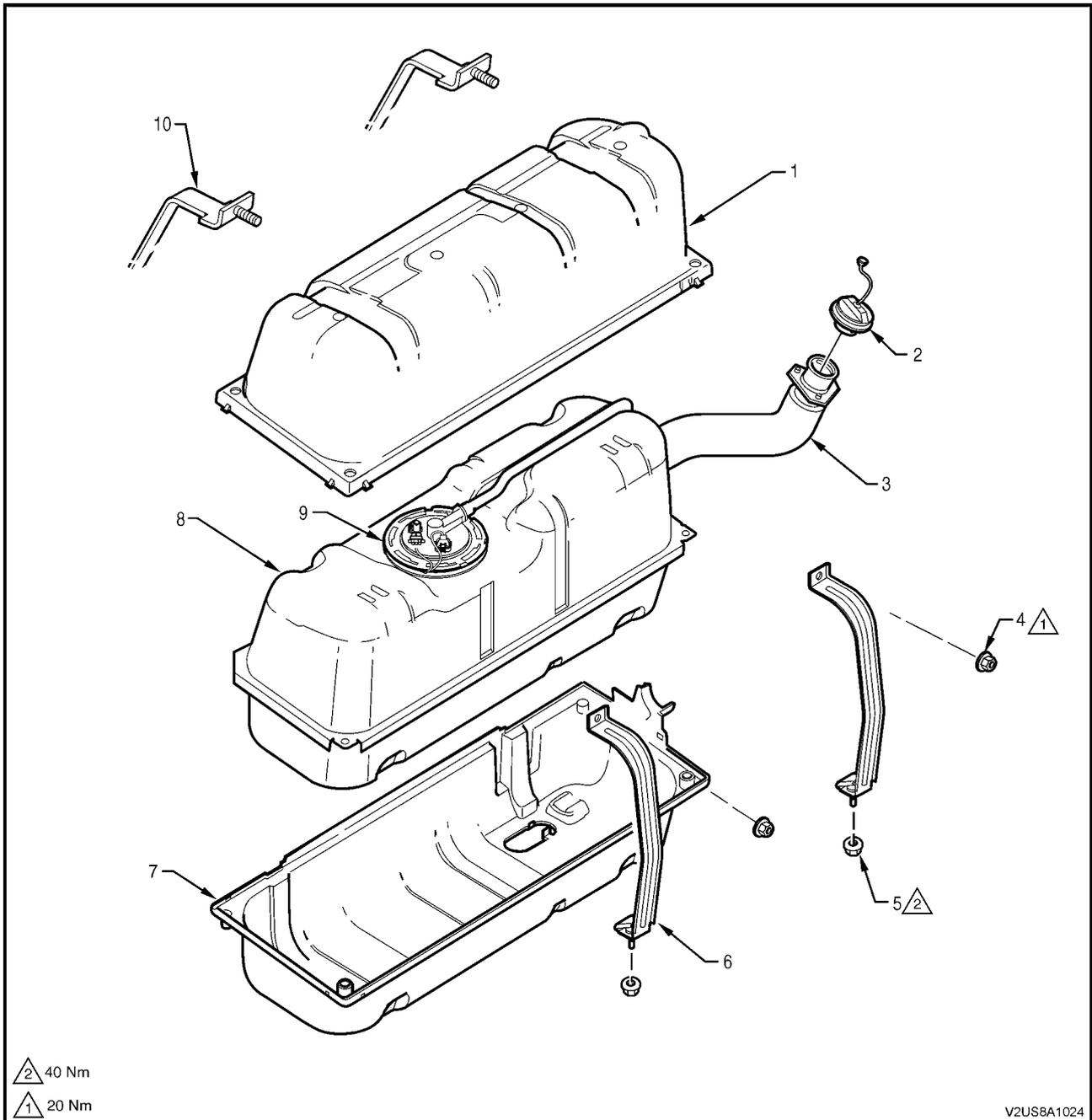


Figure 8A1 – 10

**Legend**

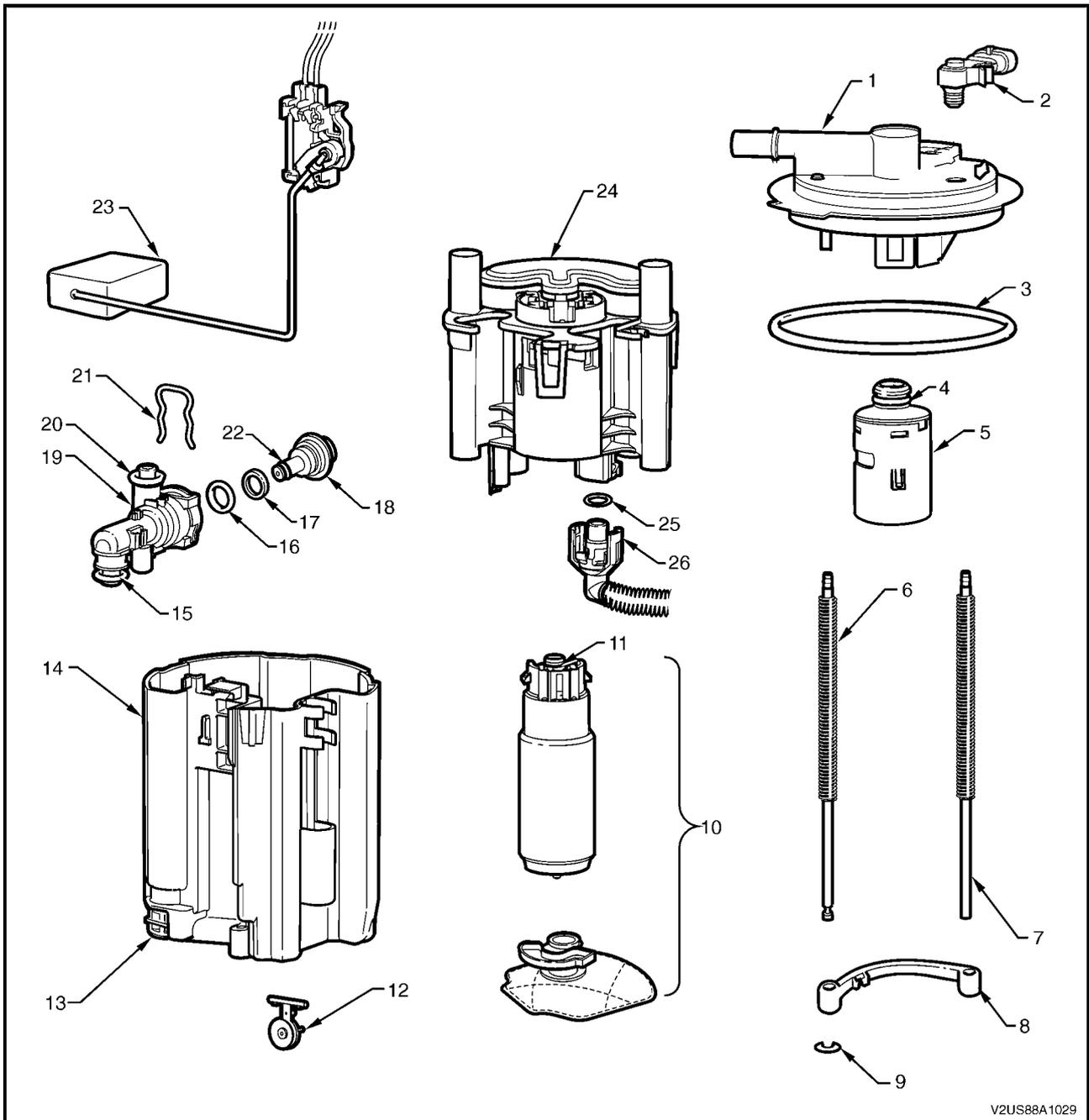
- |   |  |
|---|--|
| 1 Fuel Tank Shell – Upper               | 6 Fuel Tank Mounting Strap (rear facing)   |
| 2 Fuel Filler Cap                       | 7 Fuel Tank Shell – Lower                  |
| 3 Fuel Filler Neck Assembly             | 8 Fuel Tank                                |
| 4 Mounting Strap Nut – Upper (2 places) | 9 Modular Fuel Pump and Sender Assembly    |
| 5 Mounting Strap Nut – Lower (2 places) | 10 Fuel Tank Mounting Strap (front facing) |

An in-tank modular fuel pump and sender assembly is attached from the top of the fuel tank and incorporates a modular fuel pump assembly, a suction filter and fuel filter, a reservoir, fuel level sender assembly, pressure regulator and reservoir jet pump. A fuel fill limiter vent valve (FLVV) and fuel tank pressure sensor is incorporated into the modular fuel pump and sender cover assembly. The following items of the modular fuel pump and sender assembly are serviceable items:

- fuel pump and strainer assembly,
- fuel filter,
- fuel level sender assembly,
- fuel pressure regulator,
- fuel fill limiter vent valve,
- fuel tank pressure sensor,
- modular fuel pump and sender assembly O-ring, and
- modular fuel pump and sender assembly shaft circlip.

Refer to Figure 8A1 – 11 for an exploded view of the modular fuel pump and sender assembly.

For additional information regarding fuel system electrical diagnostic procedures not contained in this Section, refer to [Section 6C3-3 Powertrain Management GEN III – V8 – Service Operations](#). For information regarding service intervals of fuel tank components, refer to [Section 0B Lubrication and Service](#).



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Figure 8A1 - 11

**Legend**

- |   |   |    |                                       |    |                            |
|---|---|----|---------------------------------------|----|----------------------------|
| 1 | Modular Fuel Pump and Sender Assembly Cover | 10 | Fuel Pump and Suction Filter Assembly | 18 | Pressure Regulator         |
| 2 | Fuel Tank Pressure Sensor                   | 11 | O-ring                                | 19 | Pressure Regulator Holder  |
| 3 | O-ring                                      | 12 | Flapper Valve                         | 20 | O-ring                     |
| 4 | O-ring                                      | 13 | Reservoir Jet Pump                    | 21 | Retaining Clip             |
| 5 | Fuel Fill Limiter Vent Valve                | 14 | Reservoir                             | 22 | O-ring                     |
| 6 | Spring (2 places)                           | 15 | O-ring                                | 23 | Fuel Level Sender Assembly |
| 7 | Shaft (2 places)                            | 16 | O-ring                                | 24 | Fuel Filter Assembly       |
| 8 | Wiring Ground Bridge                        | 17 | Nylon Spacer                          | 25 | O-ring                     |
| 9 | Circlip                                     |    |                                       | 26 | Fuel Outlet Connector      |

## 2.1 Modular Fuel Pump and Sender Assembly

The modular fuel pump and sender assembly maintains an optimum fuel level in the reservoir. This ensures a continuous fuel flow under all fuel level conditions and vehicle attitudes. The modular fuel pump and sender assembly also provides an accurate means of measuring the fuel level within the fuel tank.

### Single Turbine Fuel Pump

The fuel pump is incorporated into the modular fuel sender assembly and is an electric, high-pressure, single-turbine design, refer to Figure 8A1 – 12. The fuel pump provides fuel to the fuel rail assembly at a specified flow and pressure.

The fuel pump delivers a constant flow of fuel to the engine, even during low fuel conditions or aggressive vehicle manoeuvres. The powertrain control module (PCM) controls the electric fuel pump operation through the fuel pump relay.

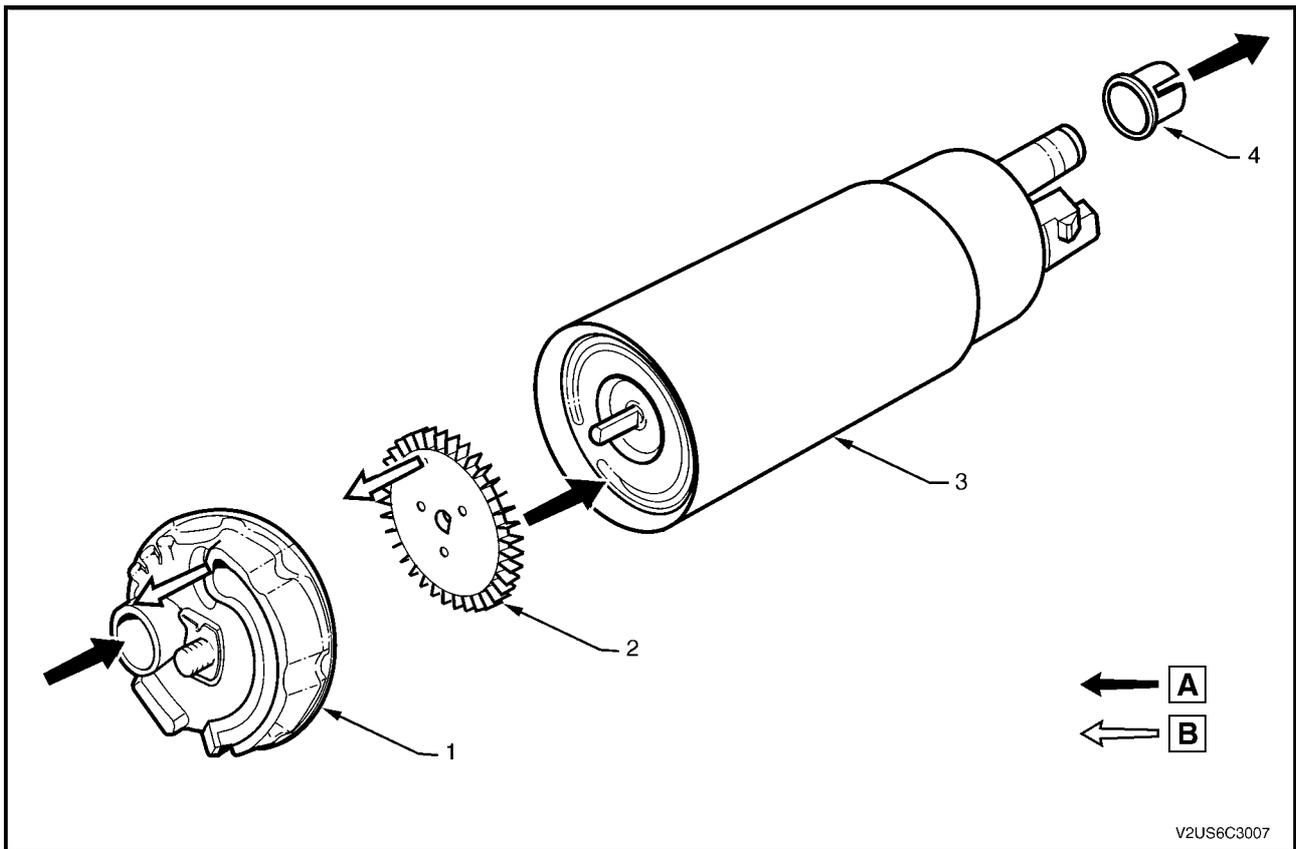


Figure 8A1 – 12

**Legend**

- |   |  |
|---|--|
| <p><b>A</b> Fuel</p> <p><b>B</b> Vapour Out</p> | <p>1 Fuel Pump End Cap</p> <p>2 Impeller</p> <p>3 Fuel Pump Body</p> <p>4 Fuel Pump Outlet O-ring Collar</p> |
|---|--|

### Functional Description of Modular Fuel Pump and Sender Assembly

Fuel is pumped from the fuel tank to the engine via an internal pump in the modular fuel pump and sender assembly.

Fuel in the reservoir (1) is drawn through the suction filter (2) and fuel pump (3), driven by a constant-speed motor. Fuel flows under pressure through the fuel filter assembly (4) and flexible pipe (5), exits the modular fuel pump and sender assembly through the fuel feed port on the modular fuel pump and sender assembly cover, then through fuel lines into the engine.

When the engine is operating, fuel flows through the pressure regulator holder (6); if fuel pressure increases, the pressure regulator (7) bleeds fuel back into the reservoir. Fuel from the pressure regulator holder flows through the reservoir jet pump (8) and flapper valve (9) into the reservoir. This flow ensures the reservoir is always full of fuel; the flapper valve prevents fuel from exiting the reservoir when the engine is turned off.

At high fuel levels, the modular fuel pump and sender assembly is immersed in fuel. At low fuel levels, the fuel level is to the top of the reservoir.

Electrical power is supplied to the fuel pump by an integral connector on the modular fuel pump and sender assembly cover. An internal harness assembly completes the connection to the pump.

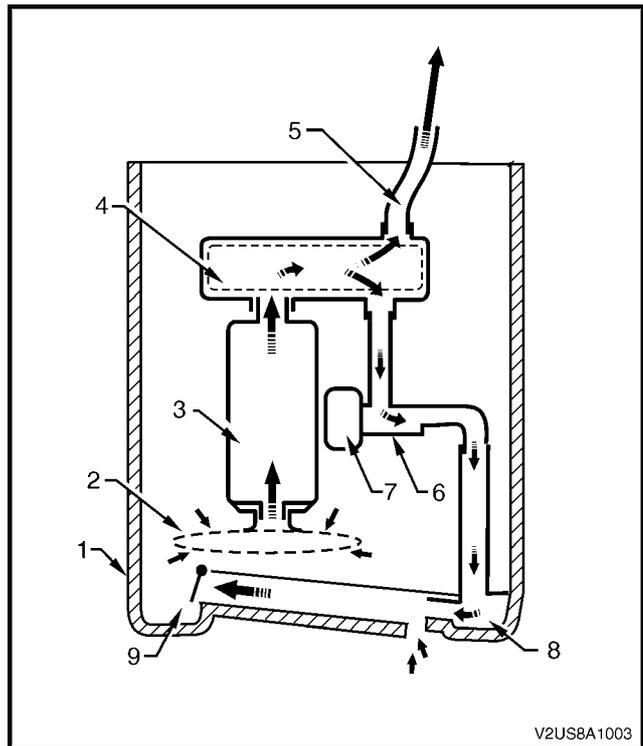


Figure 8A1 - 13

### Fuel Limiter Vent Valve

A fuel limiter vent valve is incorporated into the modular fuel pump and sender cover assembly. The fuel limiter vent valve controls the fuel tank fill level by closing the primary vent from the fuel tank and prevents fuel from exiting the fuel tank via the pipe to the evaporative emission control canister. The fuel limiter vent valve also provides fuel spillage protection if the vehicle rolls over by closing the vapour path from the fuel tank to the evaporative emission control canister.

### Fuel Tank Pressure Sensor

A fuel tank pressure sensor is mounted on the modular fuel tank and sender assembly cover. When the powertrain control module (PCM) commands a vacuum into the fuel system to check for leaks, the fuel tank pressure sensor induces a potential voltage that fluctuates according to the pressure change in the fuel tank. The change in voltage is monitored by the PCM via a circuit carried through the body wiring harness and fuel tank wiring harness.

### Pressure Regulator

The pressure regulator is a diaphragm-operated relief valve located in the modular fuel pump and sender assembly. The pressure regulator maintains a controlled pressure at the injectors at all times by regulating fuel flow into the fuel feed line.

Fuel flows from the fuel pump, through the fuel filter assembly and exits into the fuel feed line or pressure regulator entry port (A). When pressure builds in the fuel feed line, the diaphragm and valve (1) is progressively pushed out, allowing fuel to exit through the port (B). The valve is normally closed by mechanical spring pressure (C). Fuel exiting the pressure regulator is directed into the reservoir jet pump to provide continuous fuel circulation.

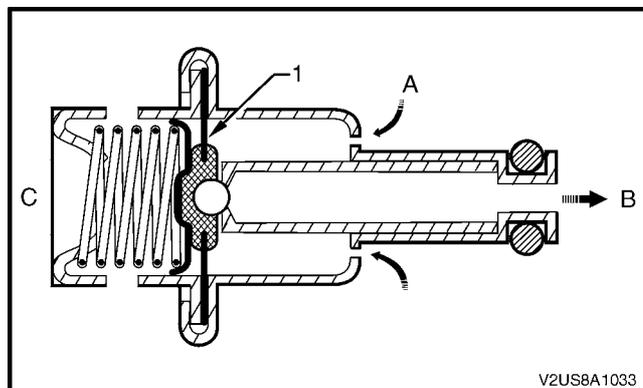


Figure 8A1 - 14

### Suction Filter

The suction filter connects onto the fuel pump inlet port on the end cap of the fuel pump assembly and consists of a finely-woven plastic filter. The suction filter is fastened to the fuel pump end cap with a metal speed clip fastener.

The suction filter strains contaminants from the reservoir and also acts to 'wick' the fuel. The suction filter is serviced as part of the fuel pump and filter assembly. Fuel blockage at the suction filter indicates an abnormal amount of sediment in the fuel tank that should be removed before reinstalling the fuel tank into the vehicle, refer to 6.3 Fuel Tank.

### Fuel Filter Assembly

The fuel filter assembly is contained within the modular fuel pump and sender assembly reservoir and forms the housing for the fuel pump. The fuel filter consists of a paper element that traps particles in the fuel that may damage the fuel injection system. The fuel filter withstands maximum fuel system pressure, changes in temperature and exposure to fuel additives.

### Fuel Level Sender Assembly

The fuel level sender assembly consists of a fuel level sender float and arm (1), a ceramic variable resistor card (2) and a detachable nylon wiper piece (3), refer to Figure 8A1 – 15. The ceramic variable resistor card is attached to a plastic card holder (4) that attaches to the reservoir (6). These components convert the fuel level in the fuel tank into a variable electrical signal that provides the fuel level information on the fuel gauge in the instrument panel. This resistance signal changes relative to the wiper contact position on the conductive bars of the ceramic variable resistor card.

The fuel level sender assembly mounting is part of the reservoir moulding. Two wires (5) connect the ceramic variable resistor card to the modular fuel pump and sender assembly wiring harness.

The ceramic variable resistor card varies the resistance (dependent upon the position of the fuel level sender float and arm) and sends that signal via hard wire to the powertrain control module. The powertrain control module averages out any slosh variation in the fuel tank and sends this signal to the fuel level indicator on the fuel gauge in the instrument panel.

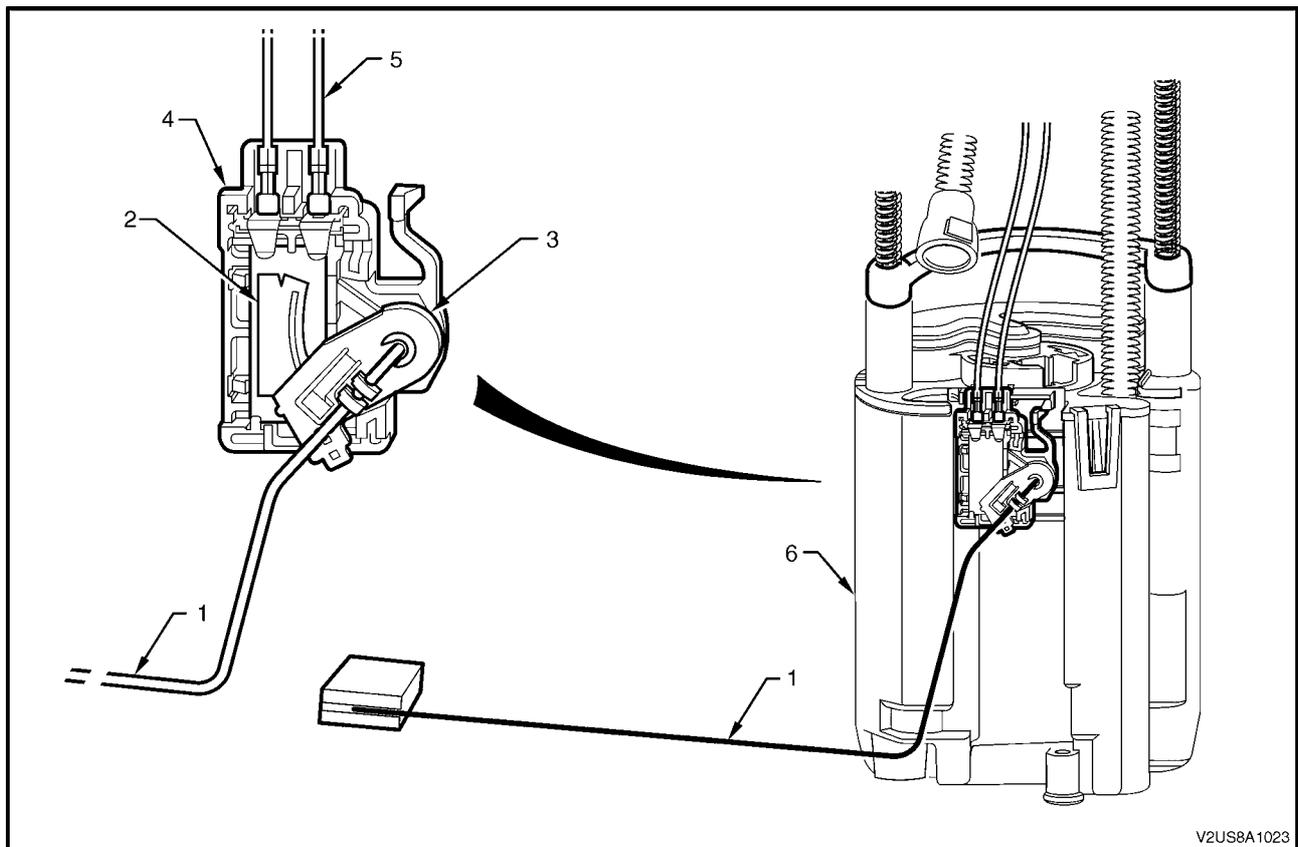


Figure 8A1 – 15

**Legend**

- |   |                                 |   |               |
|---|---------------------------------|---|---------------|
| 1 | Fuel Level Sender Float and Arm | 4 | Card Holder   |
| 2 | Ceramic Variable Resistor Card  | 5 | Circuit Wires |
| 3 | Nylon Wiper                     | 6 | Reservoir     |

## 2.2 System Components

Refer to Figure 8A1 – 16 for general components of the fuel control systems. A 2.1 litre three-port evaporative emission control canister is mounted on a bracket underneath the vehicle. The evaporative emission control canister can not be repaired and is serviced only as a complete assembly. The evaporative emission control canister stores fuel vapour from the fuel tank via the fuel tank vent line and releases it to the engine via the evaporative emission control canister purge line. An evaporative emission control canister purge line service port is attached along the fuel vapour canister purge line in the engine bay. An evaporative emission control canister purge solenoid is installed downstream of the service port and controls the flow of fuel vapour released into the intake manifold. A fuel tank vent line is routed from the evaporative emission control canister to an evaporative emission control canister purge solenoid that controls fresh air flow into the evaporative emission control canister. The evaporative emission control canister purge solenoid is mounted to the inside of the rear right-hand side quarter panel and is accessible from underneath the vehicle, refer to [Section 6C3-3 Powertrain Management GEN III – V8 – Service Operations](#) for detailed information on these systems.

Various styles of quick-connect fittings are used at most fuel line connections, including the modular fuel pump and sender assembly, evaporative emission control canister, and fuel filter and fuel feed line at both the fuel tank and engine ends.

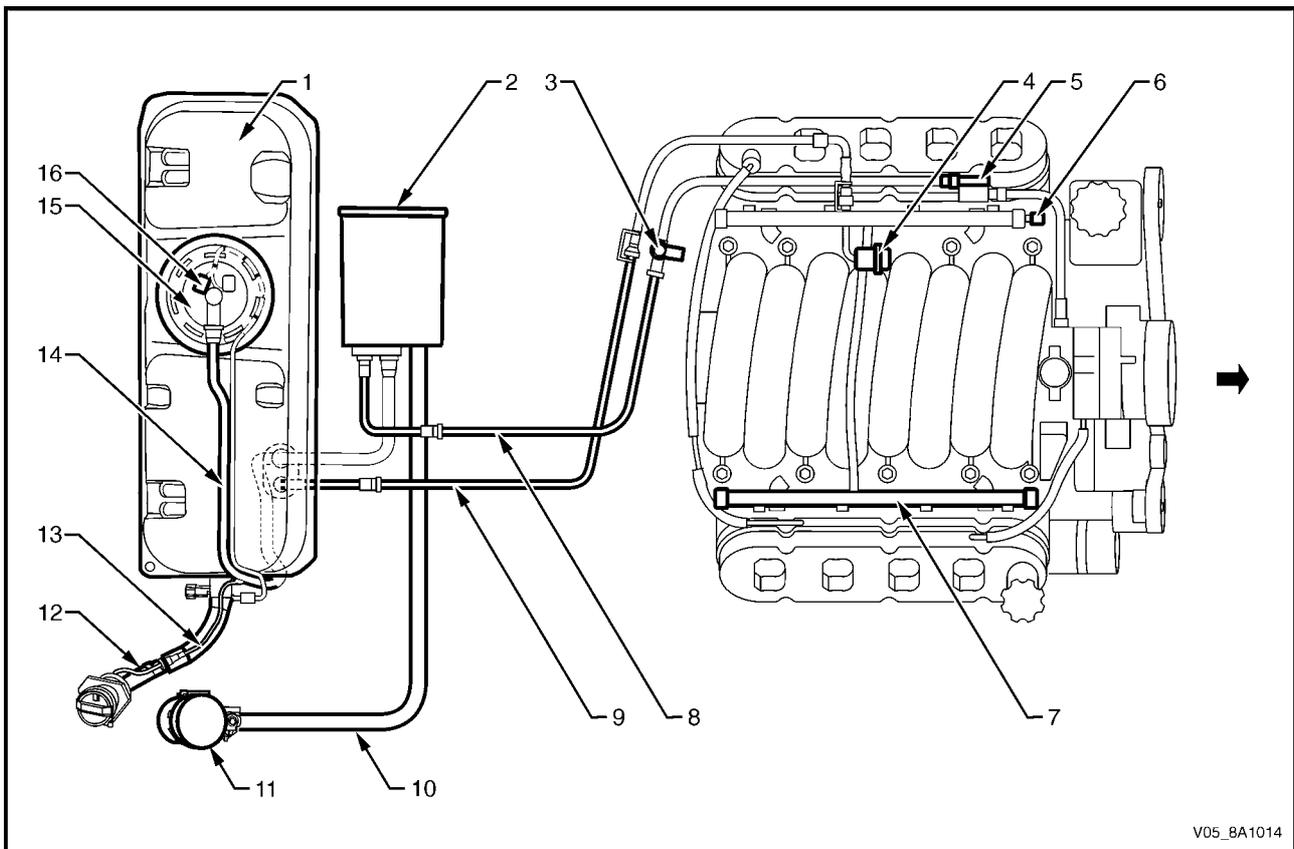


Figure 8A1 – 16

### Legend

- |  |  |
|--|--|
| 1 Fuel Tank  | 9 Fuel Feed Line   |
| 2 Evaporative Emission Control Canister                | 10 Evaporative Emission Control Canister Vent Line         |
| 3 Service Port   | 11 Evaporative Emission Control Canister Vent Solenoid     |
| 4 Fuel Pulse Dampener                                  | 12 Fuel Filler Neck  |
| 5 Evaporative Emission Control Canister Purge Solenoid | 13 Fuel Filler Neck Vapour Recirculation Line              |
| 6 Fuel Pressure Check Schrader Valve                   | 14 Fuel Tank Vent Line                                     |
| 7 Fuel Rail  | 15 Modular Fuel Pump and Sender Assembly                   |
| 8 Evaporative Emission Control Canister Purge Line     | 16 Modular Fuel Pump and Sender Assembly Harness Connector |

### 3 General Information — Regular Cab and Crew Cab

The 68.5-litre fuel tank (1) is a 'W'-type high-density multi-layer polyethylene construction with a separate fuel filler neck, refer to Figure 8A1 – 17. The fuel filler neck consists of a flexible rubber centre section (2) with hose clamps either end and a steel upper pipe (3) that incorporates the filler neck vent fitting and counter-siphon mechanism, and an earthing wire (4). The fuel tank is fitted on a removable frame underneath the load floor front panel assembly. The fuel tank is retained by two steel mounting straps (5) that fit into keyed steel risers (6) welded to the forward chassis crossmember. Both steel mounting straps are anchored with a nut and spring washer to studs (7) welded to the rear chassis crossmember.

The fuel filler neck is fixed to a support bracket (8) bolted to the chassis on Regular Cab vehicles (and on Crew Cab vehicles with the 'delete tub' option). The fuel tank is not repairable and, if damaged, must be replaced. A rollover valve (9) is fitted directly into the top of the fuel tank, but is not serviceable.

Refer to [7.3 Fuel Tank Support Straps](#) for information on the removable frame underneath the fuel tank.

Quick-connect fittings are used on the fuel feed line (10) at both the modular fuel pump and sender assembly (11) and engine ends. Quick-connect fittings are also used on the fuel tank vent line (12) and the evaporative emission control canister purge line (13) at the evaporative emission control canister (14).

The in-tank, modular fuel pump and sender assembly, refer to Figure 8A1 – 18, includes a fuel pump and suction filter assembly (6), pressure regulator (12), reservoir (9), fuel level sender assembly (19), reservoir jet pump (9) and cover (1).

Servicing details for these and other fuel tank and fuel line related items are covered in this Section.

Both the fuel pump and suction filter assembly, and the fuel level sender assembly are serviceable items. For service intervals of these items, refer to [Section 0B Lubrication and Service](#).

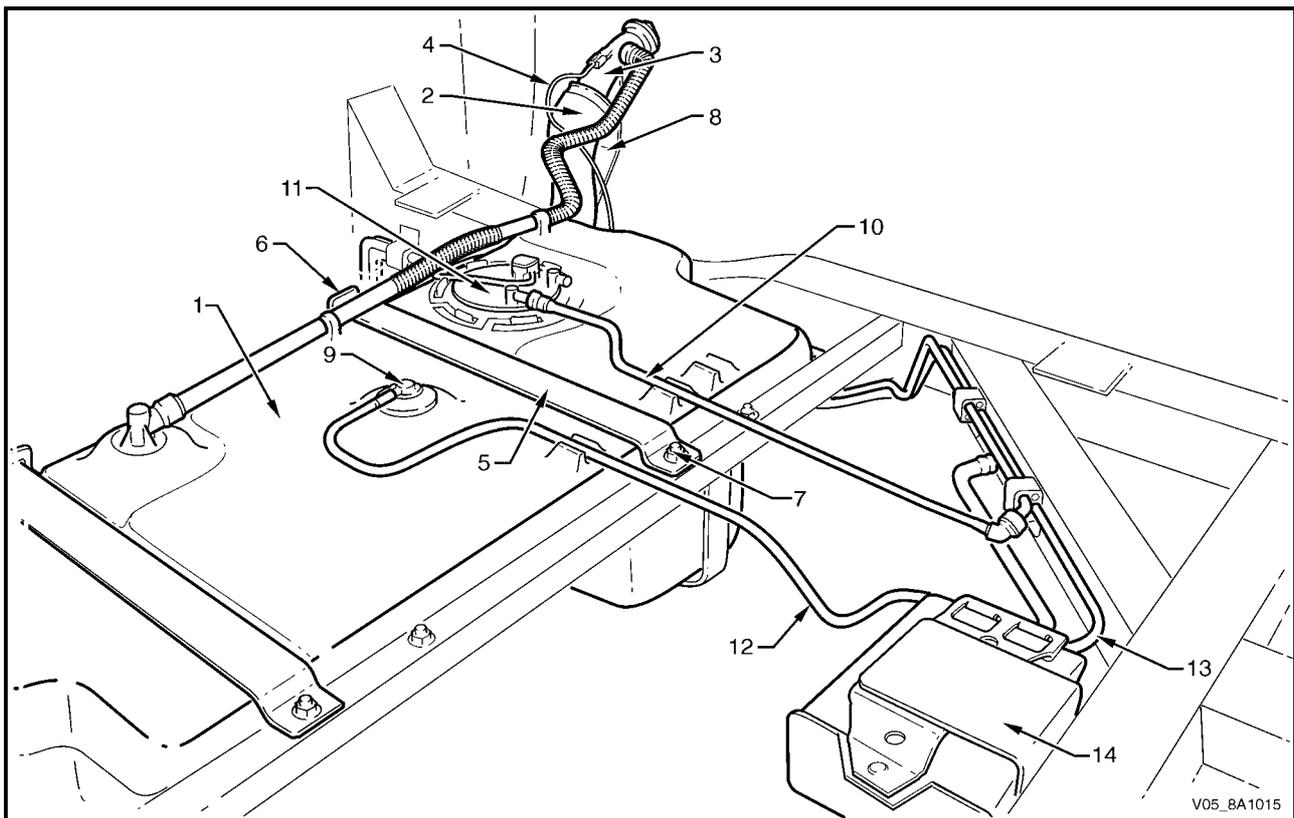
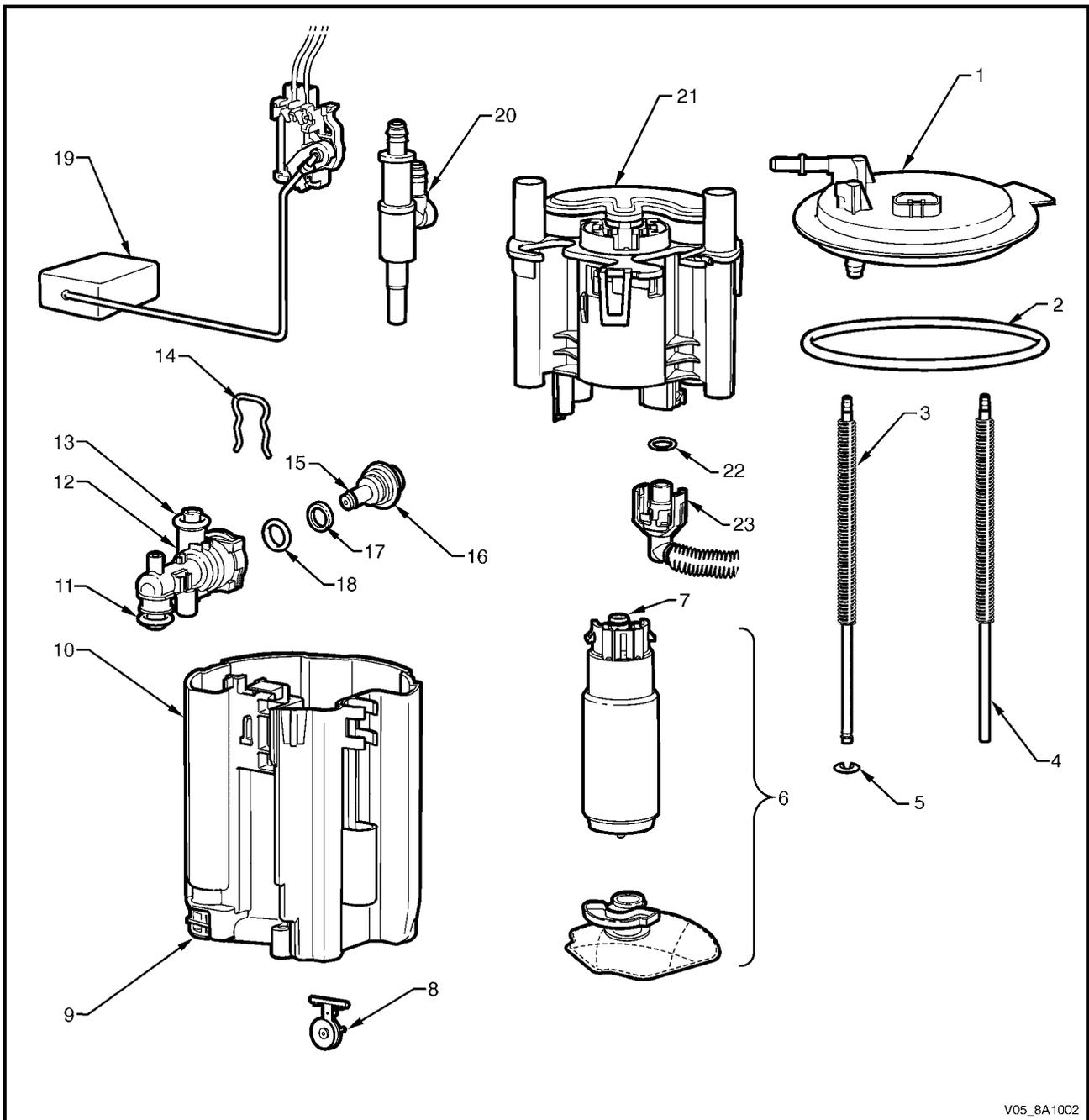


Figure 8A1 – 17

**Legend**

- |   |  |   |
|---|--|---|
| 1 Fuel Tank                                       | 6 Fuel Tank Mounting Strap Front Anchoring Point | 11 Modular Fuel Pump and Sender Assembly            |
| 2 Fuel Filler Neck Flexible Rubber Centre Section | 7 Stud (2 places)                                | 12 Fuel Tank Vent Line                              |
| 3 Fuel Filler Neck Steel Upper Pipe               | 8 Fuel Inlet Support Bracket                     | 13 Evaporative Emission Control Canister Purge Line |
| 4 Earthing Wire                                   | 9 Rollover Valve                                 | 14 Evaporative Emission Control Canister            |
| 5 Fuel Tank Mounting Strap (2 places)             | 10 Fuel Feed Line                                |   |



V05\_8A1002

Figure 8A1 – 18

**Legend**

- |   |   |    |                           |    |                            |
|---|---|----|---------------------------|----|----------------------------|
| 1 | Modular Fuel Pump and Sender Assembly Cover | 8  | Flapper Valve             | 16 | Pressure Regulator         |
| 2 | O-ring                                      | 9  | Reservoir Jet Pump        | 17 | Nylon Spacer               |
| 3 | Spring (2 places)                           | 10 | Reservoir                 | 18 | O-ring                     |
| 4 | Shaft (2 places)                            | 11 | O-ring                    | 19 | Fuel Level Sender Assembly |
| 5 | Circlip                                     | 12 | Pressure Regulator Holder | 20 | Transfer Jet Pump          |
| 6 | Fuel Pump and Suction Filter Assembly       | 13 | O-ring                    | 21 | Fuel Filter Assembly       |
| 7 | O-ring                                      | 14 | Retaining Clip            | 22 | O-ring                     |
|   |   | 15 | O-ring                    | 23 | Fuel Outlet Connector      |

For additional information regarding the pressure regulator and fuel system electrical diagnostic procedures not contained in this Section, refer to:

- [Section 6C1-1 Engine Management – V6 – General Information](#), or
- [Section 6C3-1 Powertrain Management GEN III – V8 – General Information](#).

### 3.1 Modular Fuel Pump and Sender Assembly

The modular fuel pump and sender assembly maintains an optimum fuel level in the reservoir. This ensures a continuous fuel flow under all fuel level conditions and vehicle attitudes. The modular fuel pump and sender assembly also provides an accurate means of measuring the fuel level within the fuel tank.

#### Single Turbine Fuel Pump

Refer to Figure 8A1 – 19 for an illustration showing fuel flow through the single turbine fuel pump.

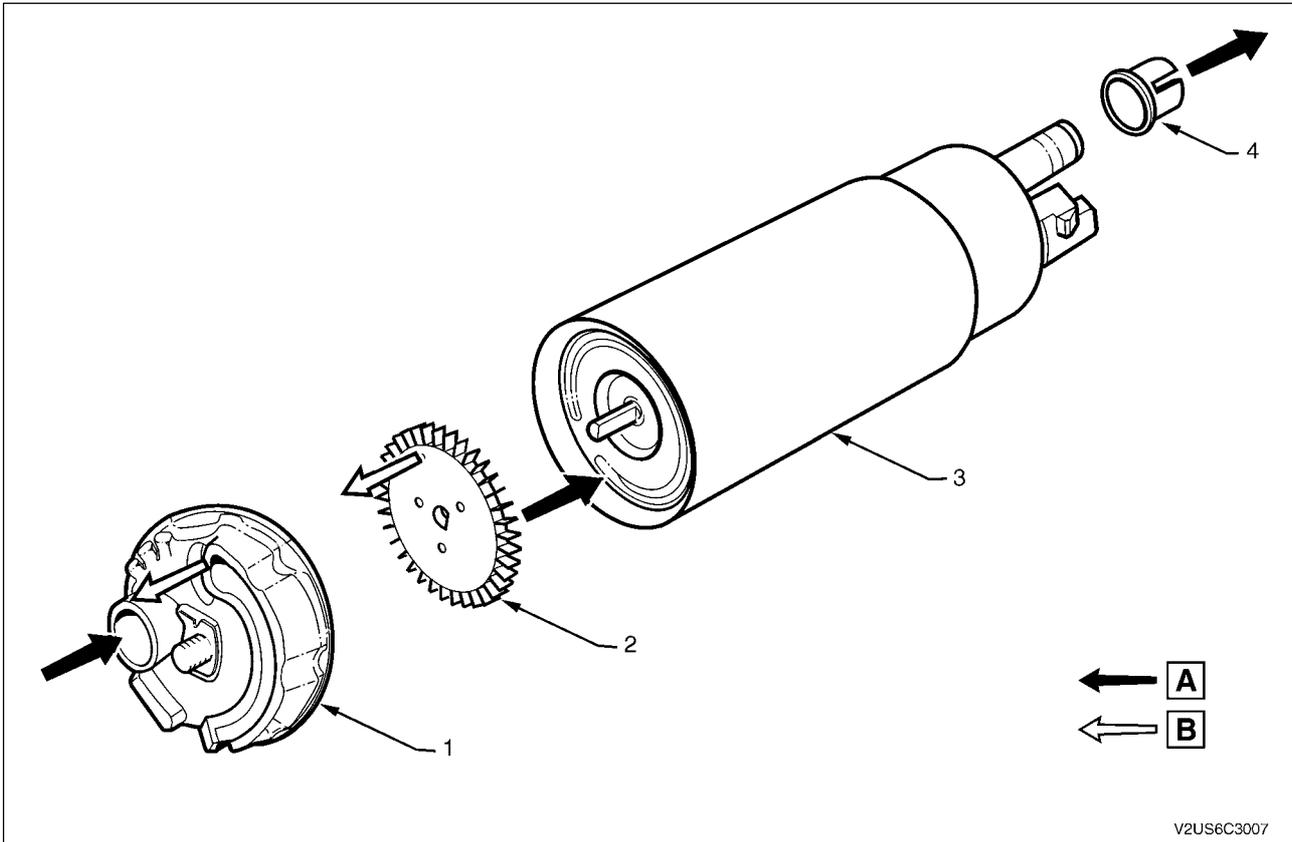


Figure 8A1 – 19

**Legend**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li><b>A</b> Fuel</li> <li><b>B</b> Vapour Out</li> </ul> | <ul style="list-style-type: none"> <li>1 Fuel Pump End Cap</li> <li>2 Impeller</li> <li>3 Fuel Pump Body</li> <li>4 Fuel Pump Outlet O-ring Collar</li> </ul> |
|--|---|

### Functional Description of Modular Fuel Pump and Sender Assembly

Fuel is pumped from the fuel tank to the engine via an internal pump in the modular fuel pump and sender assembly.

Fuel in the reservoir (1) is drawn through the suction filter (2) and fuel pump (3), driven by a constant-speed motor. Fuel flows under pressure through the fuel filter assembly (4) and flexible pipe (5), exits the modular fuel pump and sender assembly through the fuel feed port on the modular fuel pump and sender assembly cover, then through fuel lines into the engine.

When the engine is operating, fuel flows through the pressure regulator holder (6); if fuel pressure increases, the pressure regulator (7) limits the fuel flow. Fuel is drawn from the other side of the fuel tank baffle via the low fuel level fuel feed pipe (8), then through the transfer jet pump (9). Fuel from the pressure regulator holder also flows through the reservoir jet pump (10) and flapper valve (11) into the reservoir. This flow ensures the reservoir is always full of fuel; the flapper valve prevents fuel from exiting the reservoir when the engine is turned off.

At high fuel levels, the modular fuel pump and sender assembly is immersed in fuel. At low fuel levels, the fuel level is to the top of the reservoir.

Electrical power is supplied to the fuel pump by an integral connector on the modular fuel pump and sender assembly cover. An internal harness assembly completes the connection to the pump.

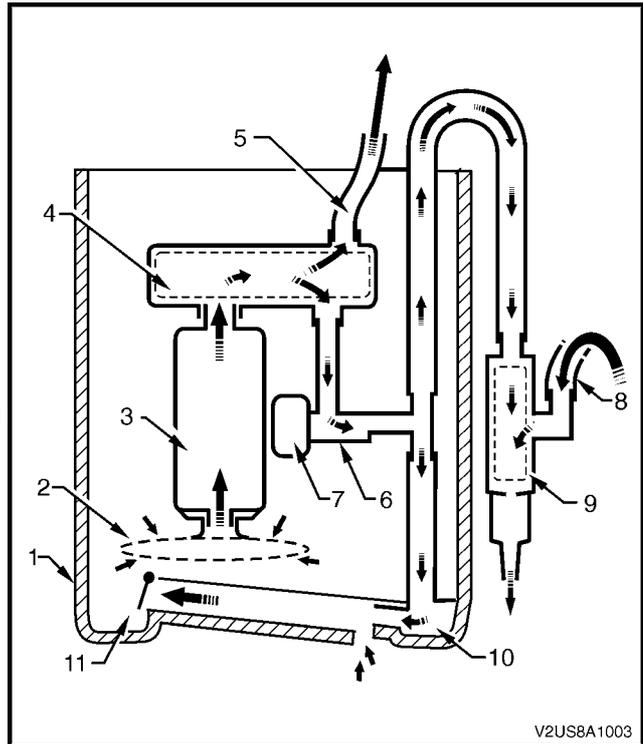


Figure 8A1 – 20

### Single Line Fuel Delivery System

Fuel is directed from the modular fuel pump and sender assembly, then through the flexible fuel feed line (1) and on to the engine bay and fuel rail.

When fuel feed line pressure exceeds 400 kPa (+/-3 kPa), the pressure regulator in the modular fuel pump and sender assembly opens, allowing excess fuel at system pressure to return to the modular fuel pump and sender assembly via the reservoir jet pump. This process occurs continuously while the pump is operating.

A three-port evaporative emission control canister (2) is mounted in a bracket on a chassis crossmember behind the fuel tank. The evaporative emission control canister stores fuel tank vapour via the fuel tank vent line (3) and releases it to the fuel vapour overload breather pipe (4).

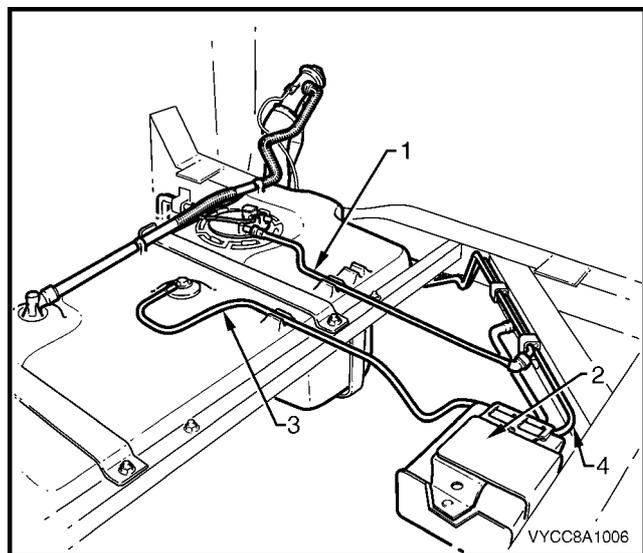


Figure 8A1 – 21

### Pressure Regulator

The pressure regulator is a diaphragm-operated relief valve in the modular fuel pump and sender assembly reservoir. The pressure regulator maintains a controlled pressure at the injectors at all times by regulating fuel flow into the fuel feed line.

Fuel flows from the fuel pump, through the fuel filter assembly and exits into the fuel feed line or pressure regulator entry port (A). When pressure builds in the fuel feed line, the diaphragm and valve (1) is progressively pushed out, allowing fuel to exit through the port (B). The valve is normally closed by mechanical spring pressure (C). Fuel exiting the pressure regulator is directed into the transfer jet pump and reservoir jet pump to provide continuous fuel circulation.

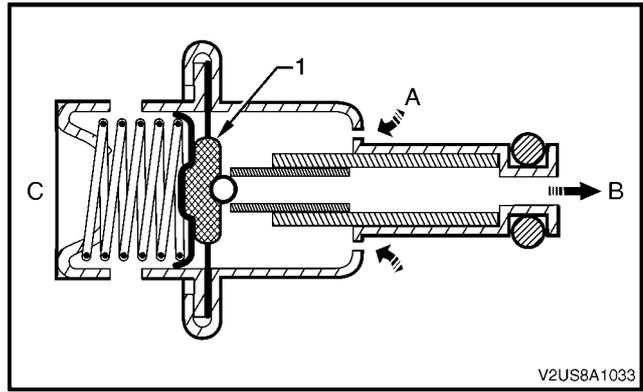


Figure 8A1 – 22

### Suction Filter

The suction filter connects onto the fuel pump inlet port on the end cap of the fuel pump assembly and consists of a finely woven plastic filter. The suction filter is fastened to the fuel pump end cap with a metal speed clip fastener.

The suction filter strains contaminants from the reservoir and also acts to 'wick' the fuel. The suction filter is serviced as part of the complete fuel pump and filter assembly. Fuel stoppage at the strainer indicates an abnormal amount of sediment in the fuel tank that should be removed before reinstalling the fuel tank into the vehicle, refer to 7.2 Fuel Tank.

### Fuel Filter Assembly

The fuel filter assembly is contained within the modular fuel pump and sender assembly reservoir and forms the housing for the fuel pump. The fuel filter consists of a paper element that traps particles in the fuel that may damage the fuel injection system. The fuel filter withstands maximum fuel system pressure, changes in temperature and exposure to fuel additives.

### Fuel Level Sender Assembly

The fuel level sender assembly consists of a ceramic variable resistor card (1), detachable nylon wiper piece (2) and a fuel level sender float and arm (3). These components convert the fuel level in the fuel tank into a variable electrical signal that provides the fuel level information on the fuel gauge in the instrument panel.

The fuel level sender assembly mounting is part of the modular fuel pump and sender assembly reservoir moulding. The fuel level sender assembly is attached to the mounting and is secured with a retainer. Two wires connect the ceramic variable resistor card to the modular fuel pump and sender assembly wiring harness.

The ceramic variable resistor card varies the resistance, dependent upon the position of the fuel level sender float and arm, and sends that signal via hard wire to the instrument cluster. This resistance signal changes relative to the wiper contact position on the conductive bars of the ceramic variable resistor card.

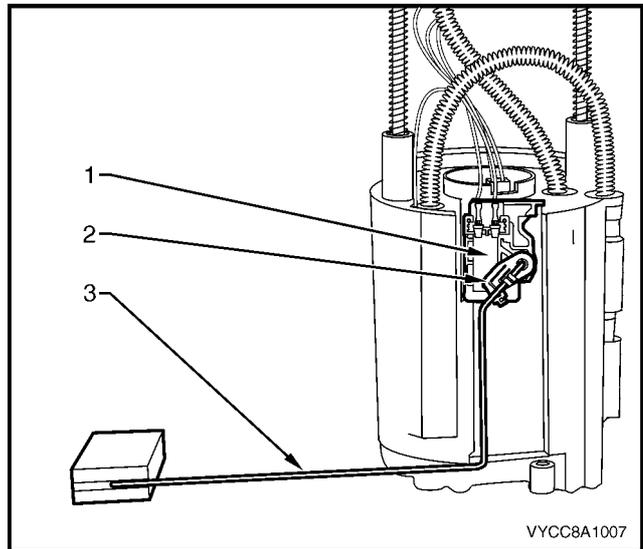


Figure 8A1 – 23

## Rollover Valve

The fuel tank incorporates a rollover valve. The rollover valve limits vapour venting to the evaporative emission control canister using a fixed-sized orifice that is normally open (View A). If the vehicle rolls over (View B), the fuel tank vent line to the evaporative emission control canister is safely shut off by the rollover valve, preventing liquid fuel from flooding the evaporative emission control canister.

### NOTE

The rollover valve is fitted directly onto the tank and is not serviceable separately. If it is faulty, the tank (with a new rollover valve fitted) must be replaced.

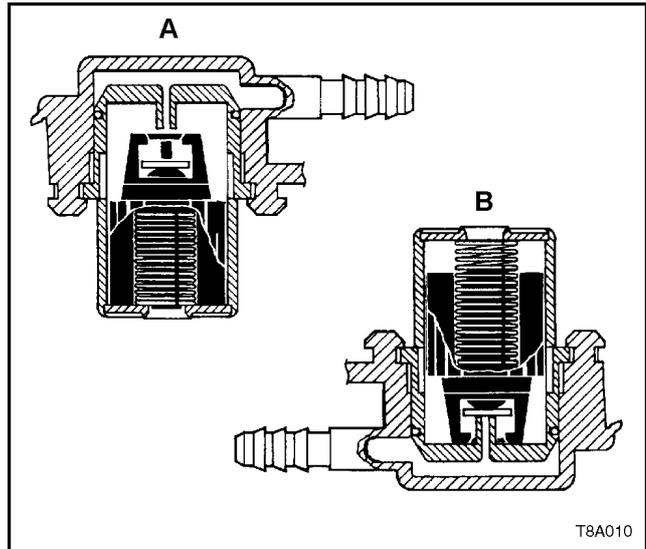


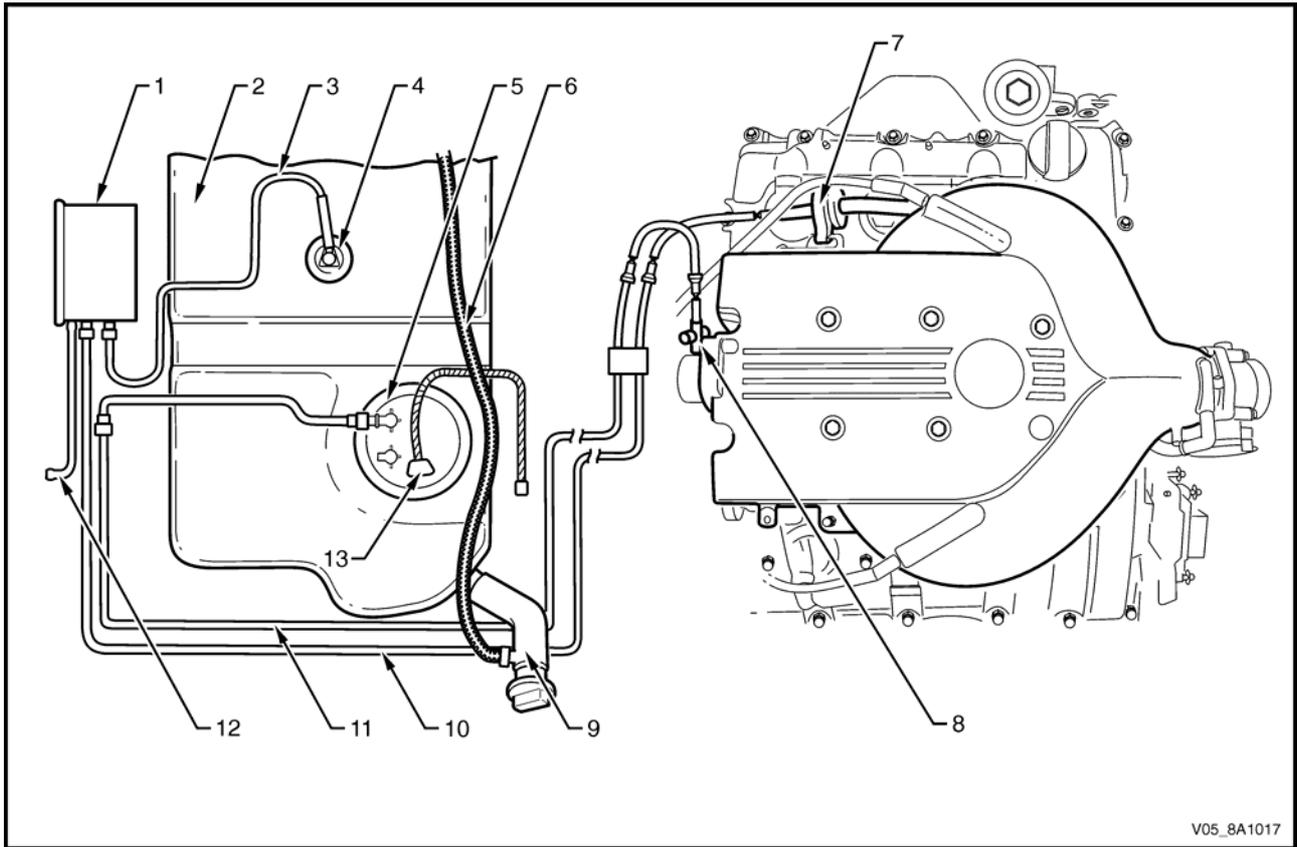
Figure 8A1 - 24

## 3.2 System Components

The pressure regulator is located in the modular fuel pump and sender assembly. The fuel return line port on the modular fuel pump and sender assembly cover is plugged. The Fuel Control System consists of the following components, refer to Figure 8A1 – 25 for vehicles fitted with a V6 engine), or Figure 8A1 – 26 (for vehicles fitted with a GEN III V8 engine):

- evaporative emission control canister;
- fuel tank;
- fuel tank vent line;
- rollover valve;
- modular fuel pump and sender assembly, consisting of:
  - modular fuel pump and sender assembly cover,
  - sleeve rods and retaining springs,
  - reservoir,
  - fuel pump and suction filter assembly,
  - fuel level sender assembly,
  - reservoir jet pump (integral with reservoir),
  - valve and cap,
  - transfer jet pump,
  - pressure regulator,
  - fuel pipes, and
  - wiring harness and connectors;
- inlet breather pipe;
- evaporative emission control canister purge solenoid;
- fuel pressure check Schrader valve;
- fuel rail;
- modular fuel pump and sender assembly harness connector;
- fuel vapour overload breather pipe;
- fuel feed line;
- evaporative emission control canister purge line;
- fuel filler neck;
- fuel rail;
- either:
  - engine control module (ECM) on vehicles fitted with a V6 engine, or
  - powertrain control module (PCM) on vehicles fitted with a GEN III V8 engine;
- fuel pump relay; and
- injectors.

**V6 Engine**

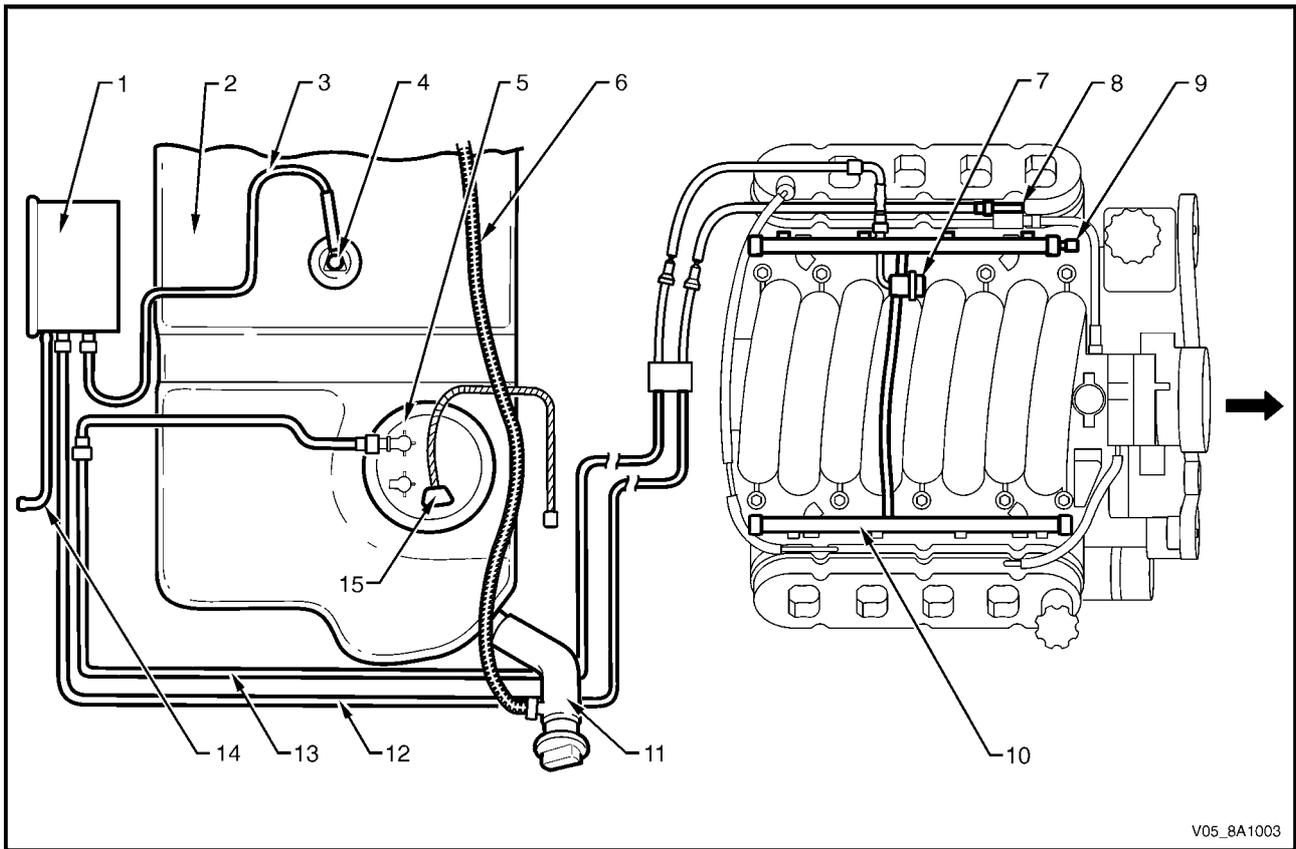


**Figure 8A1 – 25**

**Legend**

- |   |                                       |    |   |    |   |
|---|---------------------------------------|----|---|----|---|
| 1 | Evaporative Emission Control Canister | 7  | Evaporative Emission Control Canister Purge Solenoid          | 11 | Fuel Feed Line  |
| 2 | Fuel Tank                             | 8  | Evaporative Emission Control Canister Purge Line Service Port | 12 | Fuel Vapour Overload Breather Pipe                      |
| 3 | Fuel Tank Vent Line                   | 9  | Fuel Filler Neck  | 13 | Modular Fuel Pump and Sender Assembly Harness Connector |
| 4 | Rollover Valve                        | 10 | Evaporative Emission Control Canister Purge Line              |    |   |
| 5 | Modular Fuel Pump and Sender Assembly |    |   |    |   |
| 6 | Inlet Breather Pipe                   |    |   |    |   |

**GEN III V8 Engine**



V05\_8A1003

**Figure 8A1 – 26**

**Legend**

- |   |                                       |    |  |    |   |
|---|---------------------------------------|----|--|----|---|
| 1 | Evaporative Emission Control Canister | 6  | Inlet Breather Pipe                                  | 11 | Fuel Filler Neck  |
| 2 | Fuel Tank                             | 7  | Fuel Pulse Dampener                                  | 12 | Evaporative Emission Control Canister Purge Line        |
| 3 | Fuel Tank Vent Line                   | 8  | Evaporative Emission Control Canister Purge Solenoid | 13 | Fuel Feed Line  |
| 4 | Rollover Valve                        | 9  | Fuel Pressure Check Schrader Valve                   | 14 | Fuel Vapour Overload Breather Pipe                      |
| 5 | Modular Fuel Pump and Sender Assembly | 10 | Fuel Rail  | 15 | Modular Fuel Pump and Sender Assembly Harness Connector |

## 4 System Checks

### 4.1 Fuel System Depressurisation

#### WARNING

To reduce the risk of fire or personal injury, depressurise the fuel system before servicing any fuel system components.

- 1 Turn the ignition switch off.
- 2 Remove the fuel pump fuse and fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 3 Loosen the fuel filler cap to relieve the fuel tank vapour pressure.
- 4 With the throttle closed, crank the engine.

#### NOTE

The engine may start and operate until the fuel remaining in the fuel delivery system depletes.

- 5 When the engine stops, crank the engine for another 10 seconds to ensure the fuel feed line pressure has been fully relieved.
- 6 Clean the area around the fuel pressure test point.

#### CAUTION

A small amount of fuel may be released when pressing on the Schrader valve. Cover the fitting with a shop towel to absorb any fuel spillage before removing the Schrader valve sealing cap. After the fuel pressure relief procedure, place the soiled towel in an approved container for disposal.

- 7 At the fuel pressure test point (2), remove the Schrader valve sealing cap (1), refer to Figure 8A1 – 27 (for vehicles fitted with a V6 engine) or Figure 8A1 – 28 (for vehicles fitted with a GEN III V8 engine).

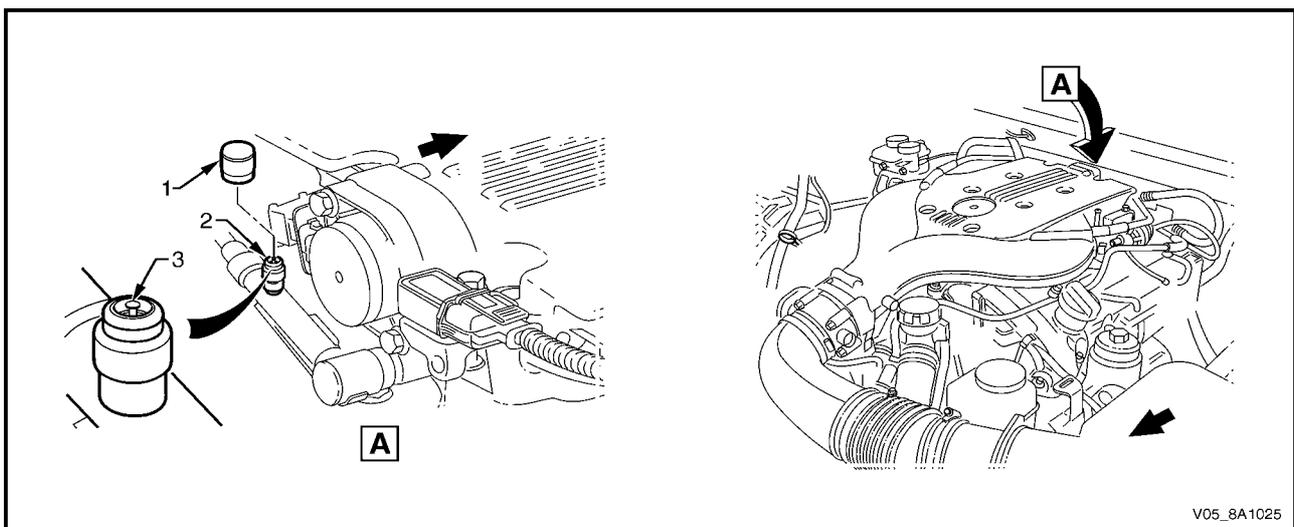


Figure 8A1 – 27

#### Legend

- |   |                            |   |                |
|---|----------------------------|---|----------------|
| 1 | Schrader Valve Sealing Cap | 3 | Schrader Valve |
| 2 | Pressure Test Point        |   |                |

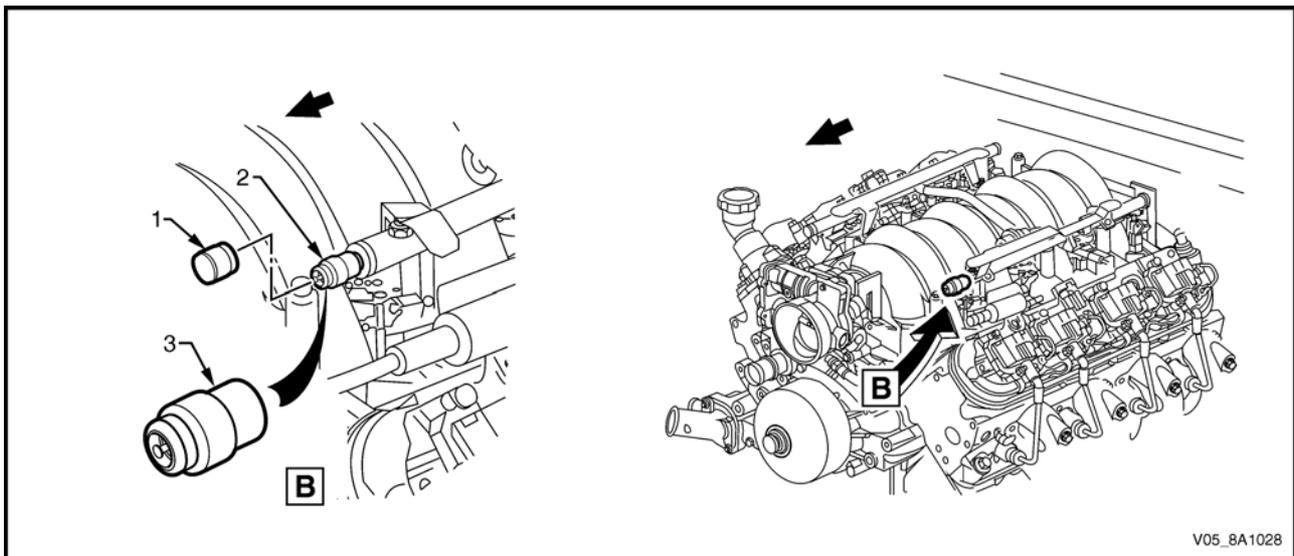


Figure 8A1 – 28

**Legend**

- |   |                            |   |                |
|---|----------------------------|---|----------------|
| 1 | Schrader Valve Sealing Cap | 3 | Schrader Valve |
| 2 | Pressure Test Point        |   |                |

**WARNING**

**Wear safety glasses when performing the fuel pressure relief procedure.**

- 8 Use a small screwdriver to press the Schrader valve (3).
- 9 Remove the soiled shop towel and place in an approved container.

**Repressurise**

- 1 Reinstall the fuel pump relay and fuel pump fuse.
- 2 Perform the following procedure to inspect for leaks at the fuel pressure test point:
  - a Turn the ignition switch on for two seconds.
  - b Turn the ignition switch off for 10 seconds.
  - c Turn the ignition switch on.
  - d Check for leaks at the fuel pressure test point.
- 3 Tighten the fuel filler cap.
- 4 Start the engine and recheck for leaks.
- 5 Reinstall the Schrader valve sealing cap.

## 4.2 Fuel Pressure Test

### WARNING

To reduce the risk of fire or personal injury, depressurise the fuel system before servicing any fuel system components, refer to [4.1 Fuel System Depressurisation](#).

### Installation

- 1 Turn the ignition switch off.
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

### WARNING

A small amount of fuel may be released when connecting the fuel pressure gauge to the fuel pressure test point. Cover the fittings with a shop towel to absorb any fuel spillage before connecting the fuel pressure gauge. After the fuel pressure test procedure, place the soiled towel in an approved container for disposal.

- 3 At the fuel pressure test point, remove the Schrader valve sealing cap.
- 4 Connect the fuel pressure gauge (1) (tool No. J 34730-1A) to the fuel gauge Schrader fitting adapter (2) (tool No. AU453), then install to the fuel pressure test port (3). Wrap a shop towel around the fitting while connecting the fuel pressure gauge to avoid and/or capture any fuel spillage.
- 5 Route the bleed hose of the fuel gauge into an approved fuel container.

### NOTE

Figure 8A1 - 29 shows a fuel pressure test on a V6 engine. Refer to Figure 8A1 - 28 for the location of the Schrader valve fitted to a GEN III V8 engine.

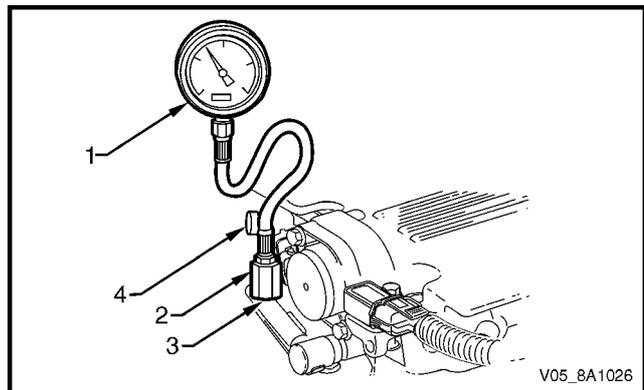


Figure 8A1 - 29

### CAUTION

After connecting the fuel pressure gauge and pressurising the fuel system, inspect for fuel leaks at the fuel pressure gauge and the fuel pressure test point.

- 6 Either:  
Using Tech 2, enable the fuel pump to pressurise the fuel system, refer to [Section 0C Tech 2](#). Inspect for fuel leaks at the fuel pressure gauge and fuel pressure test point, then bleed the air from the fuel pressure gauge.  
or:  
Reinstall the fuel pump relay and fuel pump fuse, then open the fuel gauge bleed valve (4) to bleed the air from the fuel pressure gauge, refer to Figure 8A1 - 29.
- 7 Remove and place the shop towel in an approved container.

## Test

- 1 Start the engine and record the fuel pressure.
- 2 Turn the ignition switch off.
- 3 If required, perform any tests and/or diagnostic procedures:
  - For the fuel system leak test, refer to [4.3 Fuel Leak Test](#).
  - For the fuel injector leak-down test (for vehicles fitted with a V6 engine), refer to [Section 6C1-3 Engine Management – V6 – Service Operations](#).
  - For the fuel injector leak-down test (for vehicles fitted with a GEN III V8 engine), refer to [Section 6C3-3 Powertrain Management GEN III – V8 – Service Operations](#).
- 4 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

## Removal

- 1 Turn the ignition switch off.
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

### WARNING

**After relieving the fuel system pressure, a small amount of fuel may be released when servicing the fuel lines or connections. Cover the fittings with a shop towel before disconnecting. This catches any leaking fuel. Place the soiled towel in an approved container when disconnection is completed.**

- 3 Wrap a shop towel around the fuel pressure test point to absorb any fuel spillage.
- 4 Remove the fuel pressure gauge and drain any fuel remaining in the fuel pressure gauge into an approved fuel container.
- 5 Remove the shop towel and place in an approved container.
- 6 Repressurise the fuel system, refer to Repressurise.
- 7 Road-test the vehicle and check for correct operation.

## 4.3 Fuel Leak Test

### V6 Engine

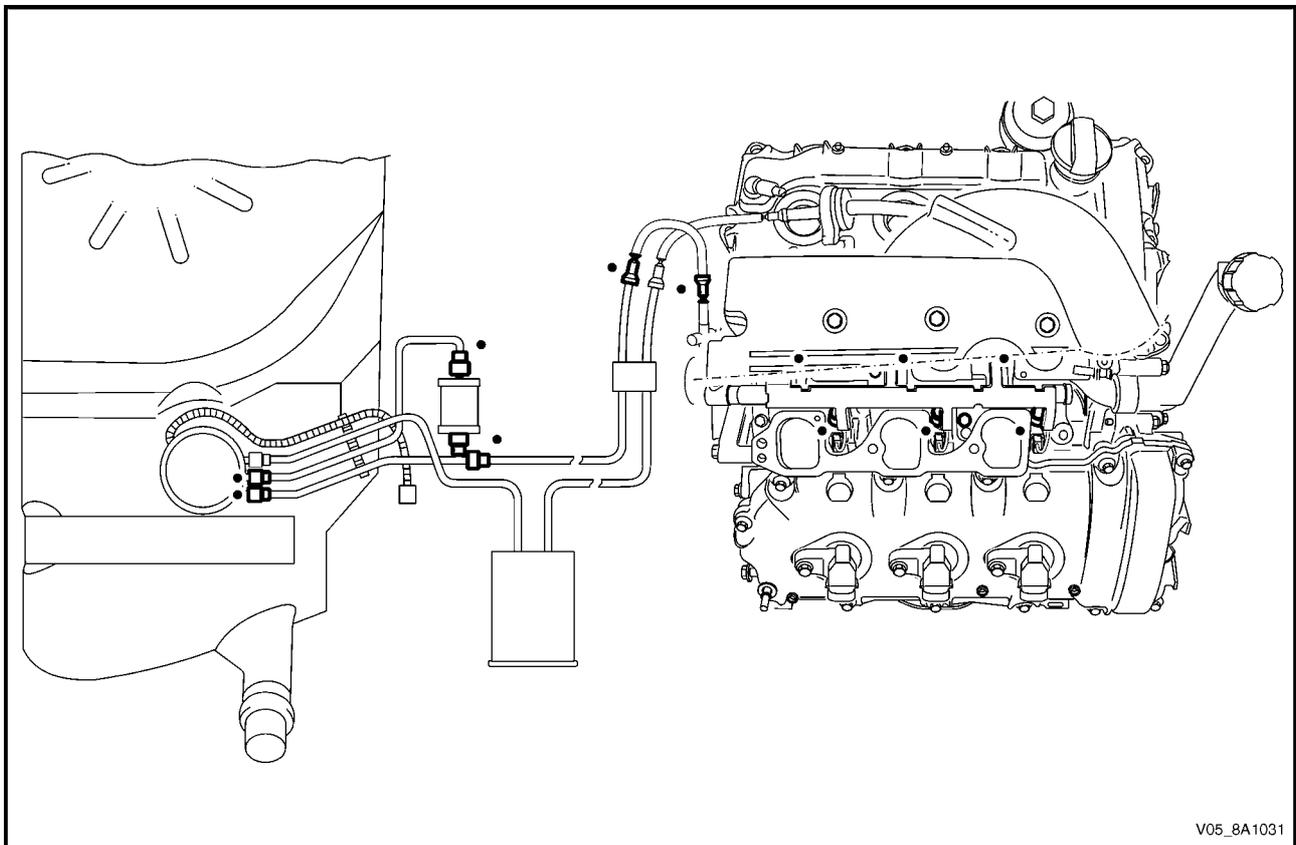
#### CAUTION

After installing any fuel system component and before starting the engine, check the fuel system for leaks.

#### NOTE

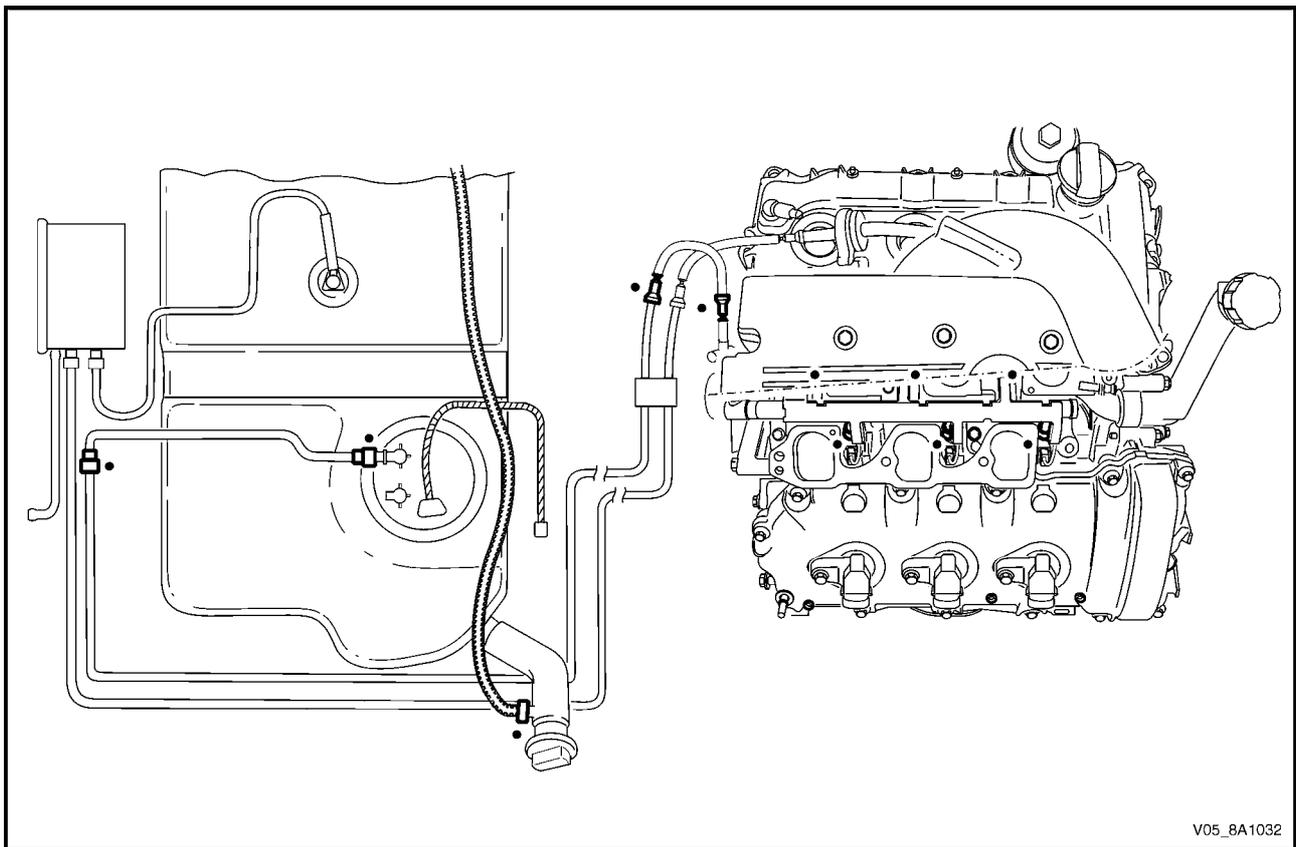
For the fuel injector leak-down test (for vehicles fitted with a V6 engine), refer to [Section 6C1-3 Engine Management – V6 – Service Operations](#).

- 1 Remove both engine dress covers, refer to [Section 6A1 Engine Mechanical – V6 Engine](#).
- 2 Turn the ignition switch on for two seconds.
- 3 Turn the ignition switch off for 10 seconds.
- 4 Turn the ignition switch on.
- 5 Check for fuel leaks, particularly at points marked ● (that is, quick-connect fittings, fuel pulse dampener, fuel rails, fuel injectors, Schrader valve and evaporative emission control canister purge solenoid):
  - For Sedan, Wagon and AWD Wagon, refer to Figure 8A1 – 30. (The Utility is not shown, but is similar to the layout shown in Figure 8A1 – 30.)
  - For Regular Cab and Crew Cab vehicles, refer to Figure 8A1 – 31.



V05\_8A1031

Figure 8A1 – 30



**Figure 8A1 – 31**

- 6 Replace any faulty components and repeat step 2 to step 5 inclusive.
- 7 Replace all engine components removed to perform the fuel leak test, refer to [Section 6C1-3 Engine Management – V6 – Service Operations](#).
- 8 Reinstall both engine dress covers, refer to [Section 6A1 Engine Mechanical – V6 Engine](#).

## GEN III V8 Engine

### CAUTION

After installing any fuel system component and before starting the engine, check the fuel system for leaks.

### NOTE

For the fuel injector leak-down test (for vehicles fitted with a GEN III V8 engine), refer to [Section 6C3-3 Powertrain Management GEN III – V8 – Service Operations](#).

- 1 Remove both engine dress covers, refer to [Section 6A3 Engine Mechanical – GEN III V8](#).
- 2 Turn the ignition switch on for two seconds.
- 3 Turn the ignition switch off for 10 seconds.
- 4 Turn the ignition switch on.
- 5 Check for fuel leaks, particularly at points marked ● (that is, quick-connect fittings, fuel pulse dampener, fuel rails, fuel injectors, Schrader valve and fuel vapour canister purge solenoid):
  - For Sedan, Wagon and AWD Wagon, refer to Figure 8A1 – 32. (The Utility is not shown, but is similar to the layout shown in Figure 8A1 – 32.)
  - For Coupe, refer to Figure 8A1 – 33.
  - For Regular Cab and Crew Cab vehicles, refer to Figure 8A1 – 34.

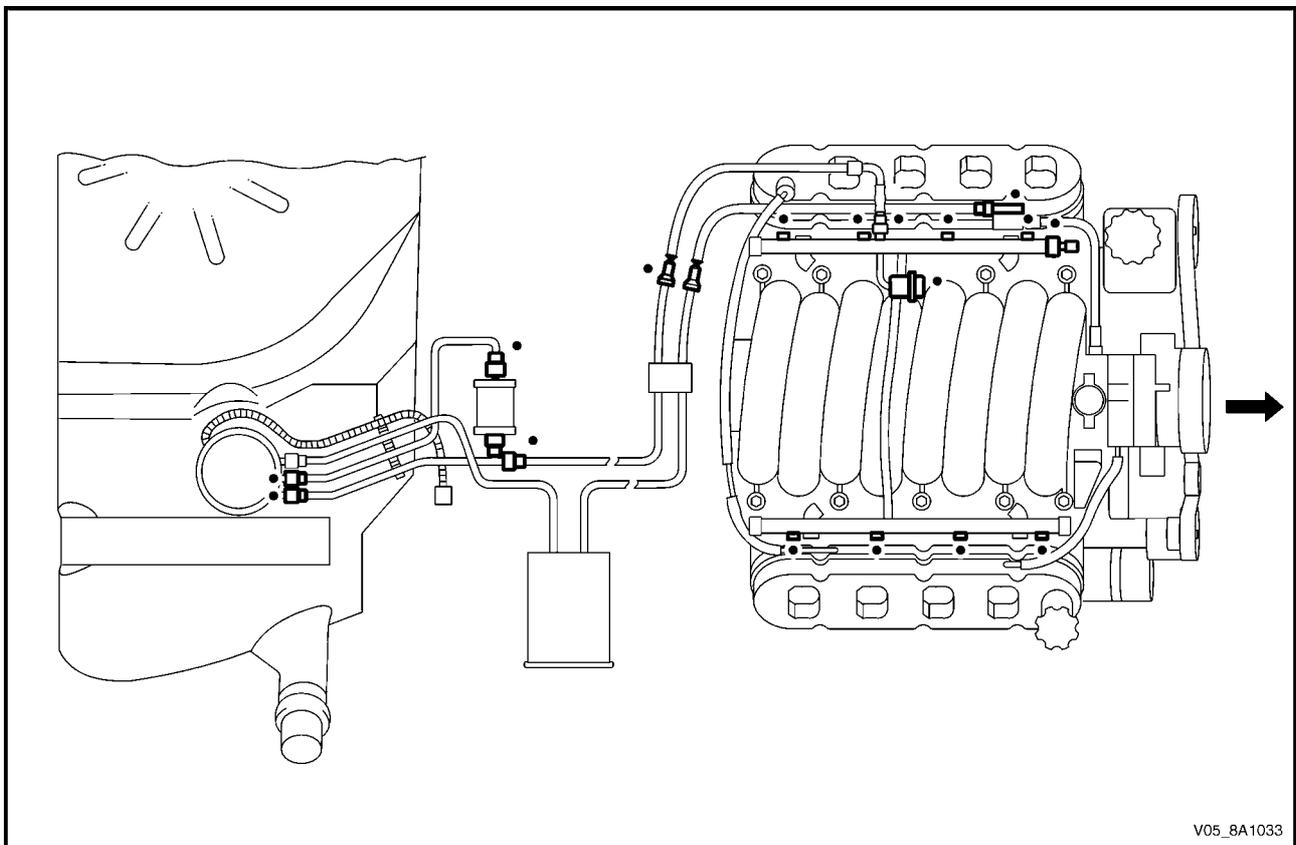
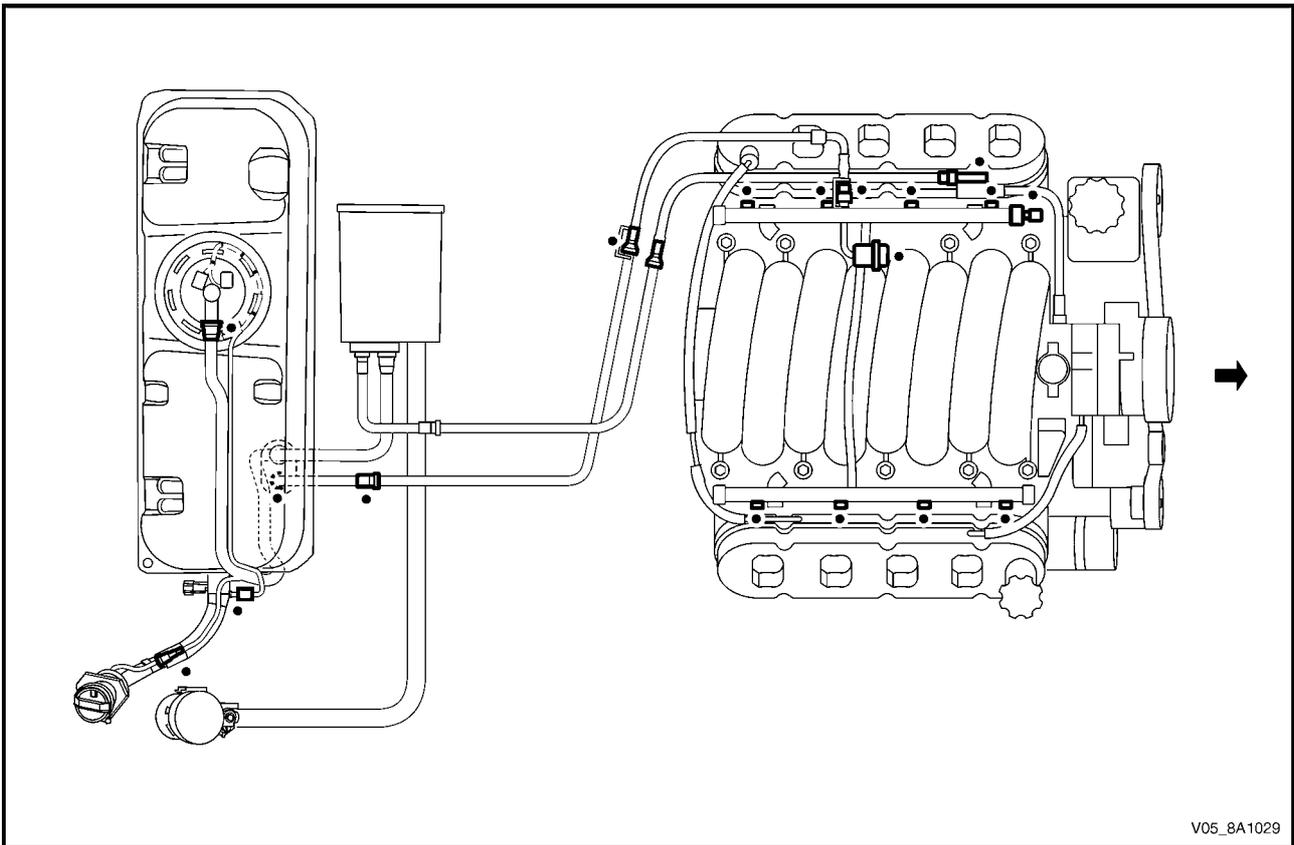
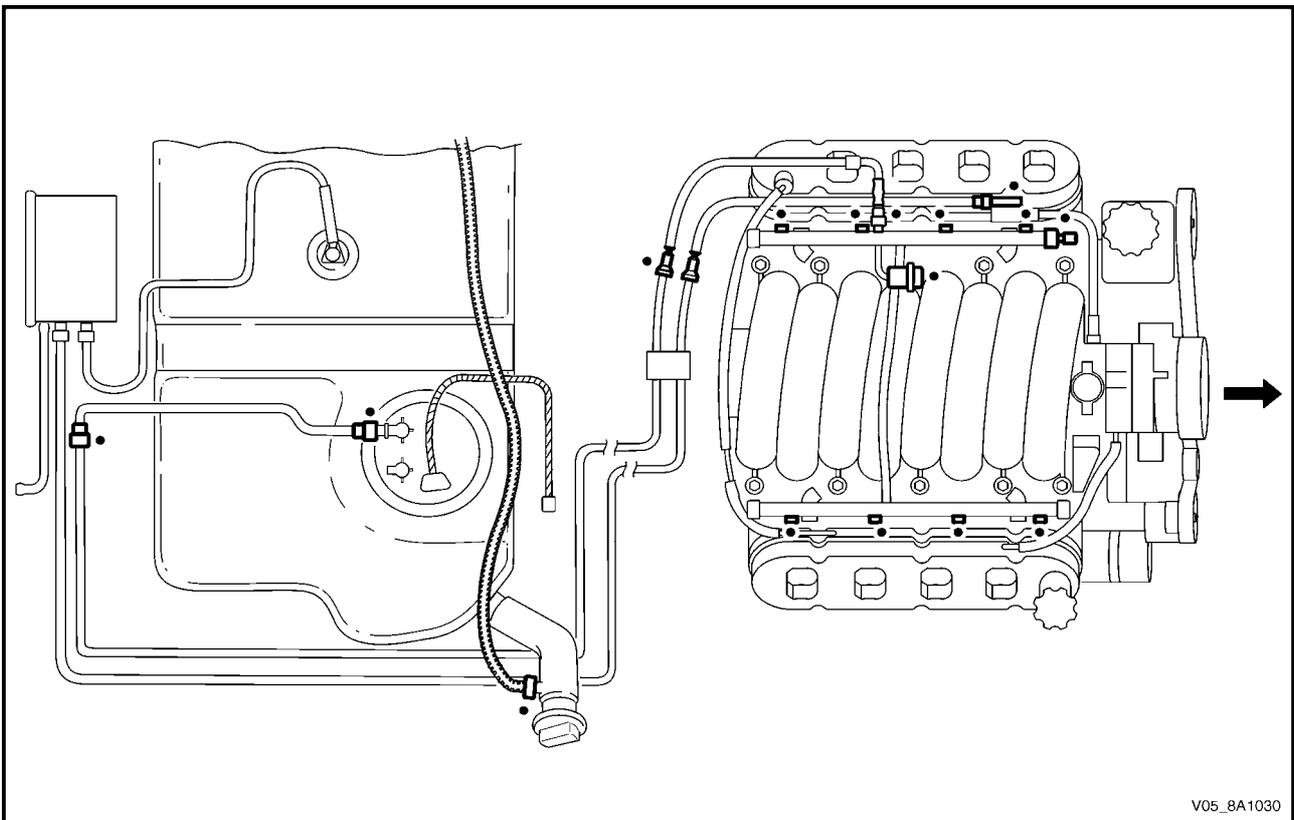


Figure 8A1 – 32



V05\_8A1029

Figure 8A1 - 33



V05\_8A1030

Figure 8A1 - 34

- 6 Replace any faulty components and repeat step 2 to step 5 inclusive.
- 7 Replace all engine components removed to perform the fuel leak test, refer to [Section 6C3-3 Powertrain Management GEN III - V8 - Service Operations](#).
- 8 Reinstall both engine dress covers, refer to [Section 6A3 Engine Mechanical - GEN III V8](#).

## 5 Service Operations — Sedan, Wagon and Utility

### 5.1 Quick-connect Fittings

#### Quick-connect Fittings (Metal Collar)

##### Remove

**WARNING**

To reduce the risk of fire or personal injury, relieve the fuel system pressure before servicing any fuel system components, refer to [4.1 Fuel System Depressurisation](#).

- 1 If fitted, slide the dust cover from the quick-connect fitting.

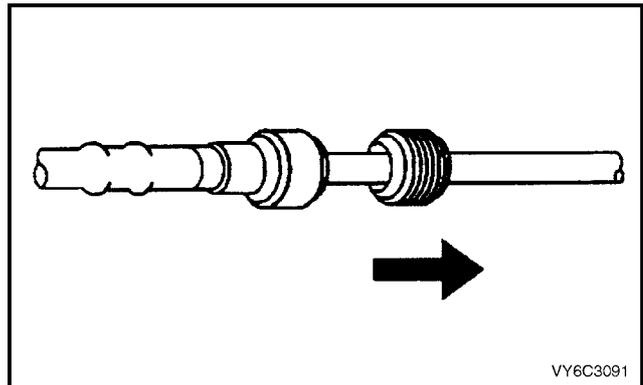


Figure 8A1 - 35

- 2 Grasp both sides of the quick-connect fitting. Twist the female side of the quick-connect fitting 1/4 turn in each direction to loosen any dirt.

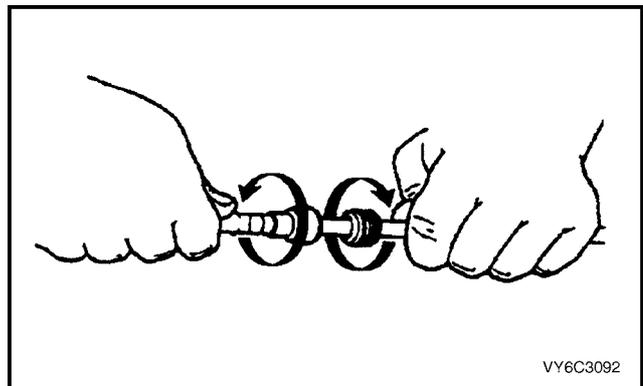


Figure 8A1 - 36

**WARNING**

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 3 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

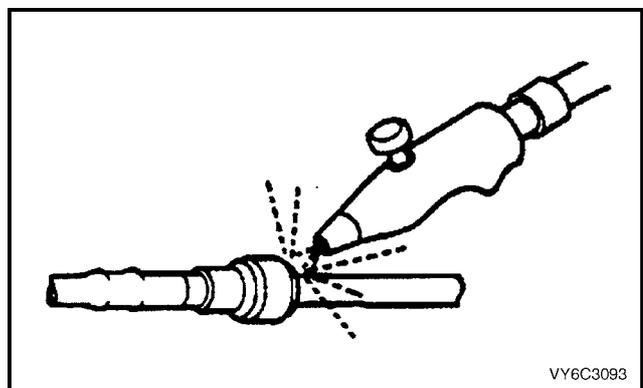


Figure 8A1 - 37

- 4 Choose the correct tool (1) to disconnect the quick-connect fitting, refer to Tool Nos. 7370 and 7371. Insert the tool into the female connector, then push inward to release the locking tabs.

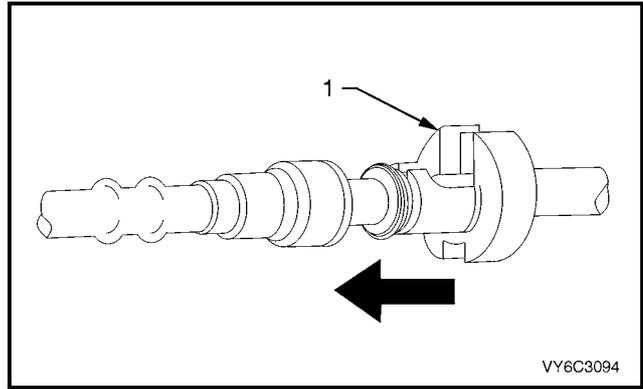


Figure 8A1 - 38

- 5 Pull the quick-connect fitting apart.

**NOTE**

If it is necessary to remove rust or burrs from a fuel pipe, use emery cloth in a radial motion with the fuel pipe end to prevent damage to the O-ring sealing surface.

- 6 Using a clean shop towel to wipe off the male pipe end.
- 7 Inspect both ends of the fitting for dirt and burrs. Clean or replace the components as required.

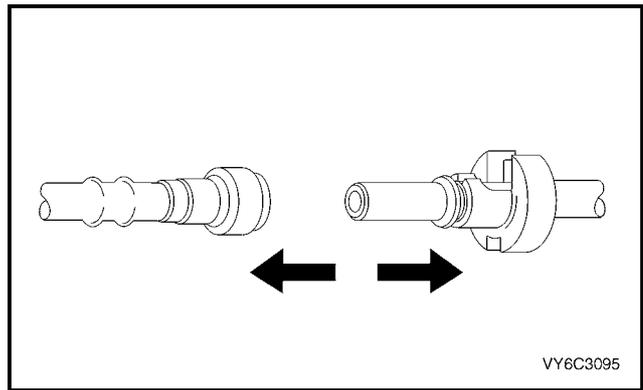


Figure 8A1 - 39

**Reinstall**

**CAUTION**

During normal operation, the O-ring located in the female connector swells. To ensure proper fitting, lubricate the male pipe end before assembly.

- 1 Apply a few drops of clean engine oil to the male pipe end.

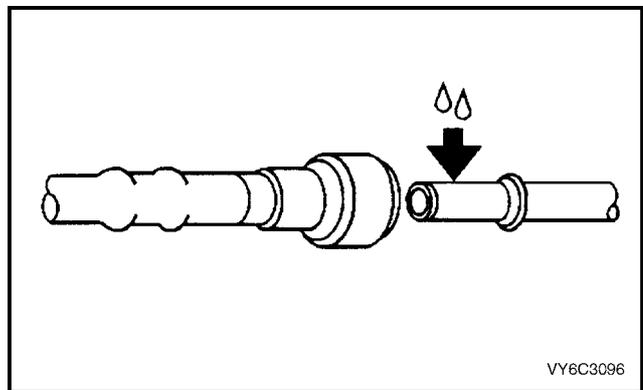


Figure 8A1 - 40

- 2 Push both sides of the quick-connect fitting together to snap the retaining tabs into place.

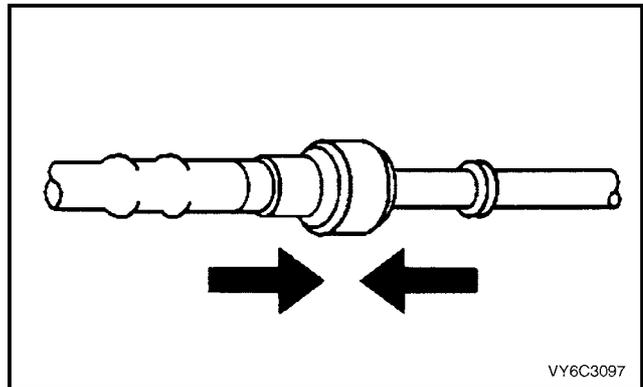


Figure 8A1 - 41

- 3 After installation, pull on both sides of the quick-connect fitting to ensure the connection is secure.

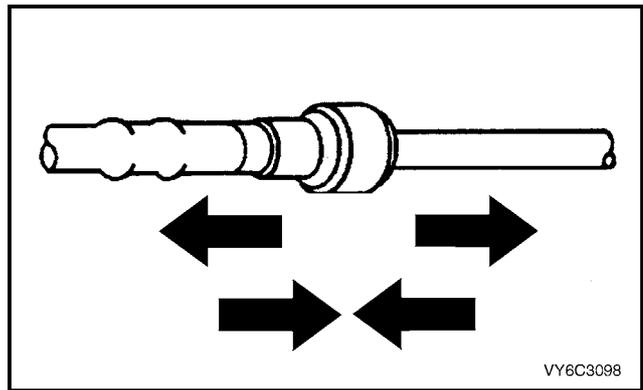


Figure 8A1 - 42

- 4 Reposition the dust cover over the quick-connect fitting (if fitted).

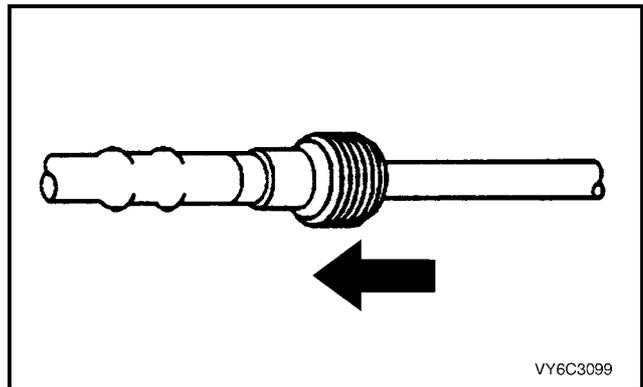


Figure 8A1 - 43

## Quick-connect Fittings (Plastic Collar)

### Remove

#### WARNING

To reduce the risk of fire or personal injury, relieve the fuel system pressure before servicing any fuel system components, refer to [4.1 Fuel System Depressurisation](#).

- 1 Grasp both sides of the quick-connect fitting. Twist the female side of the quick-connect fitting 1/4 turn in each direction to loosen any dirt.

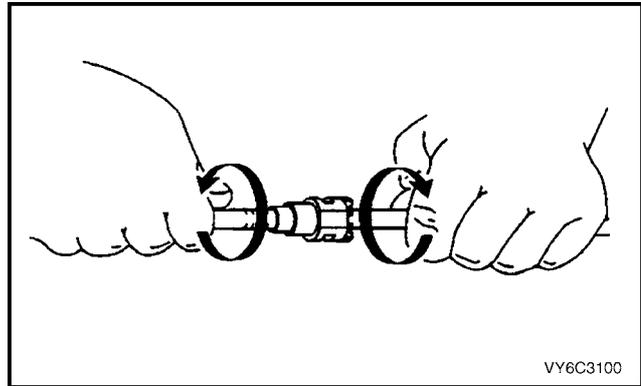


Figure 8A1 - 44

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 2 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

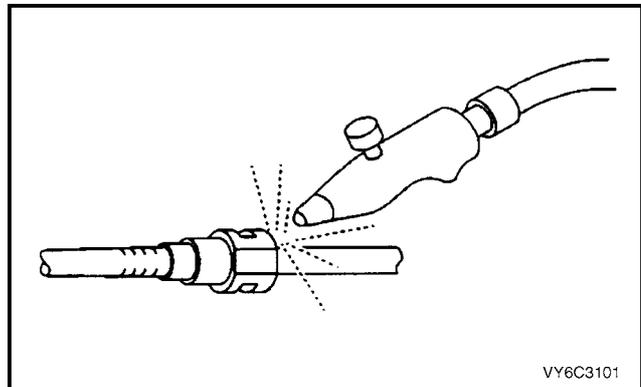


Figure 8A1 - 45

- 3 Squeeze the plastic retainer release tabs.

#### NOTE

Alternatively, use tool No. AU533 to release the quick connect fitting:

- red = 5/16-inch fittings (fuel vapour lines), or
- blue = 3/8-inch fittings (fuel feed lines).

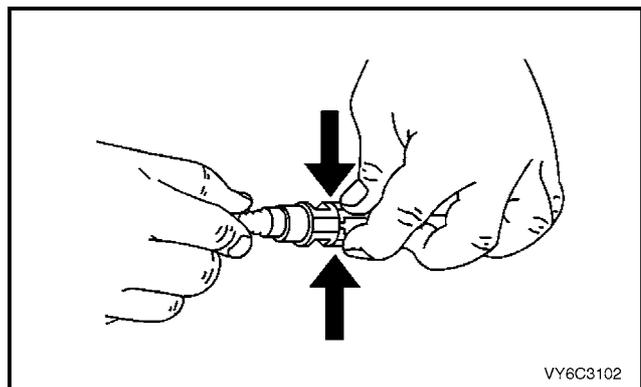


Figure 8A1 - 46

- 4 Pull the quick-connect fitting apart.

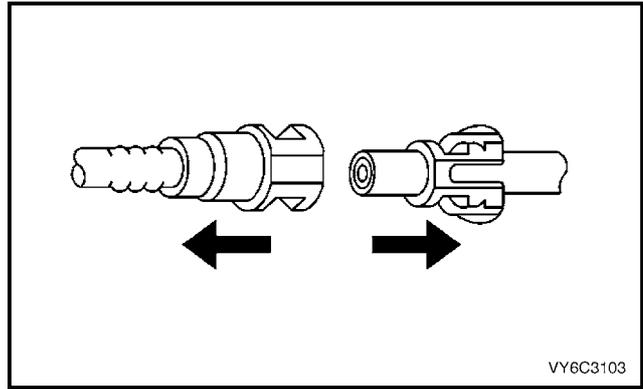


Figure 8A1 - 47

**Reinstall**

**CAUTION**

During normal operation, the O-ring located in the female connector swells. To ensure proper fitting, lubricate the male pipe end before assembly.

- 1 Apply a few drops of clean engine oil to the male pipe end.

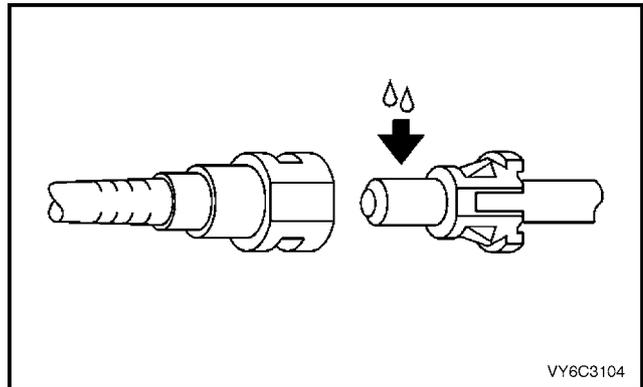


Figure 8A1 - 48

- 2 Push both sides of the quick-connect fitting together to snap the retaining tabs into place.

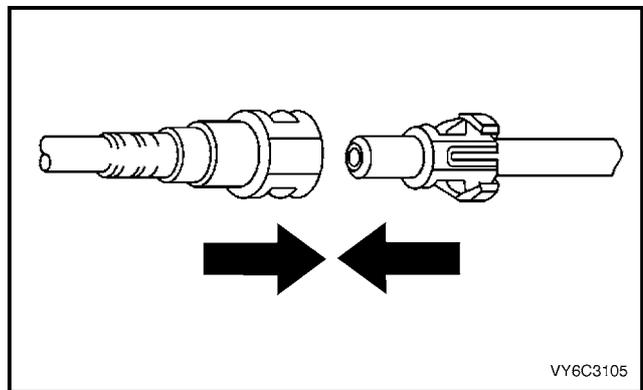


Figure 8A1 - 49

- 3 After installation, pull on both sides of the quick-connect fitting to ensure the connection is secure.

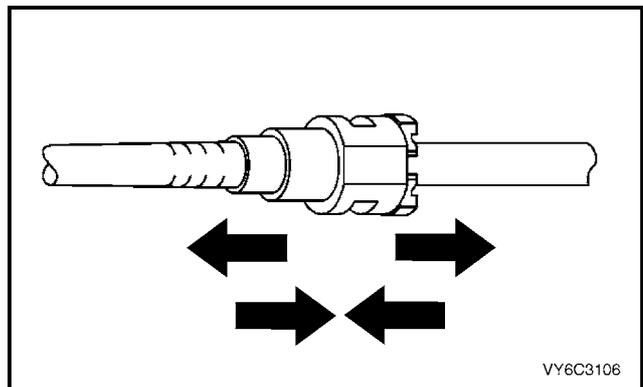


Figure 8A1 - 50

## Tool No. AU533

This procedure describes the removal of the quick-connect fittings on the fuel filter using tool No. AU533. This procedure also applies to other quick-connect fittings.

### Remove

- 1 Grasp both sides of the quick-connect fitting. Twist the quick-connect fitting one quarter of a turn in each direction to loosen any dirt within the quick-connect fitting.

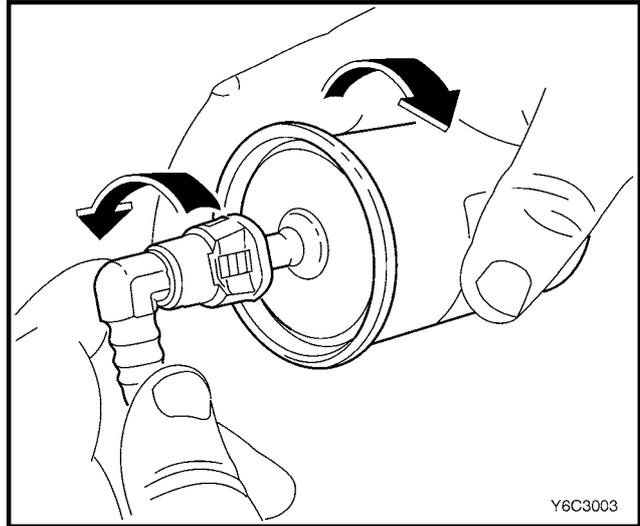


Figure 8A1 - 51

### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 2 Using compressed air, blow any dirt out of the quick-connect fitting.

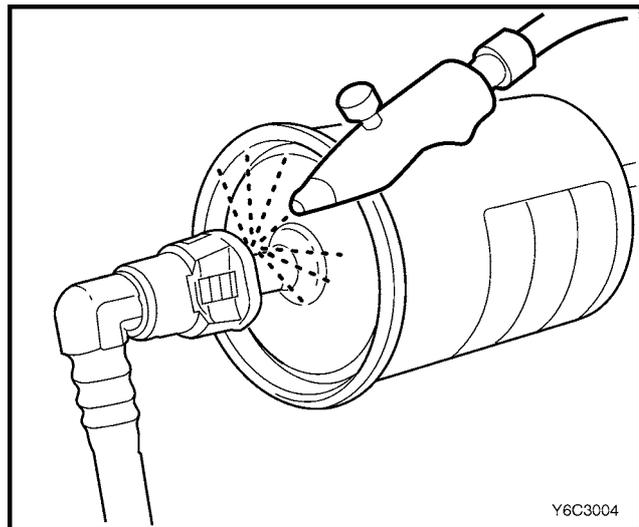


Figure 8A1 - 52

- 3 Grasp the female part and firmly support the male part.
- 4 Squeeze the plastic retainer release tabs (1) on each side of the quick-connect fitting while pushing the quick-connect fitting firmly inwards to release any tension on the release tabs.

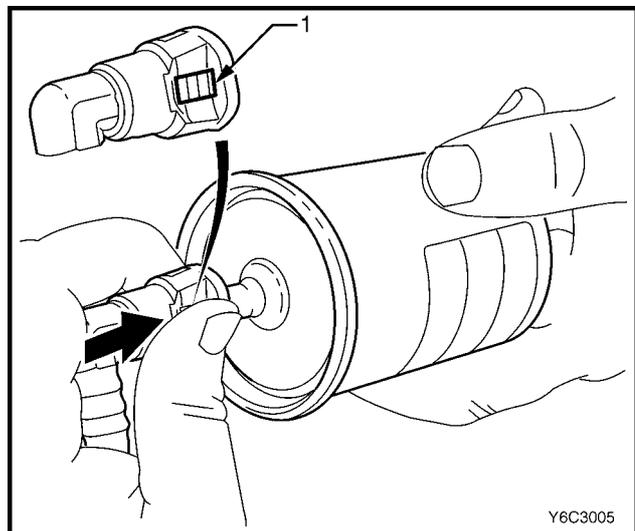


Figure 8A1 - 53

- 5 While pressing the release tabs, pull the quick-connect fitting apart.

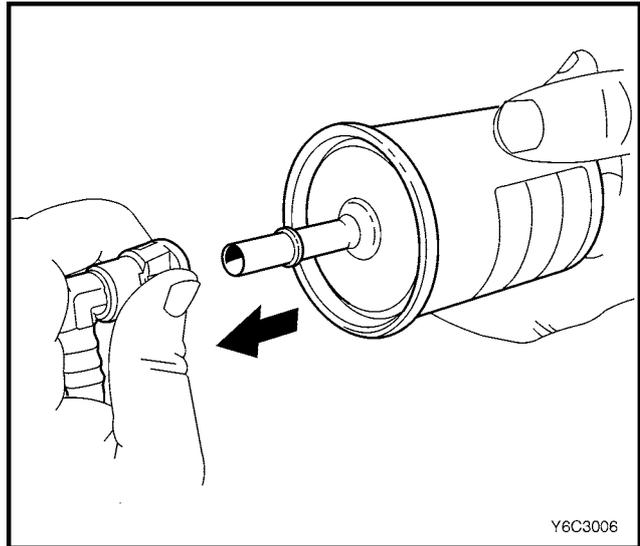


Figure 8A1 - 54

- 6 Alternatively, for step 3 to step 5 inclusive, use tool No. AU533 (1) to squeeze the release tabs and release the quick-connect fittings.

**NOTE**

Tool No. AU533 will work only with retainer tabs that sit proud of the connector body. Some filter connectors have flush retainers that can be pressed only by hand.

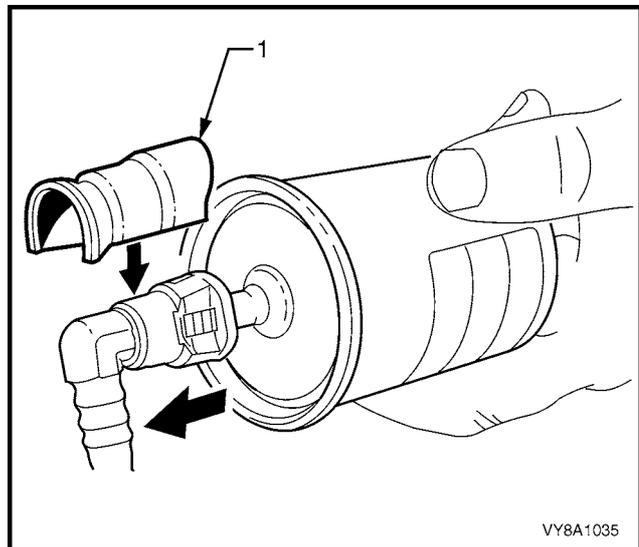


Figure 8A1 - 55

**Reinstall**

**CAUTION**

Before connecting quick-connect fittings, apply a few drops of clean engine oil to the male part. This ensures proper connection and prevents a possible fuel leak. During normal operation, the O-ring located in the female part swells and may prevent proper reconnection if not lubricated.

- 1 Apply a few drops of clean engine oil to each male part.

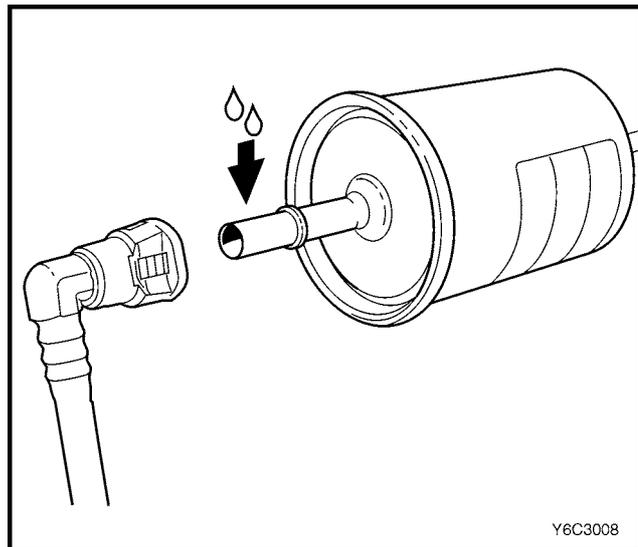


Figure 8A1 - 56

- 2 Push both parts of the quick-connect fitting together so the retaining tabs snap into place.

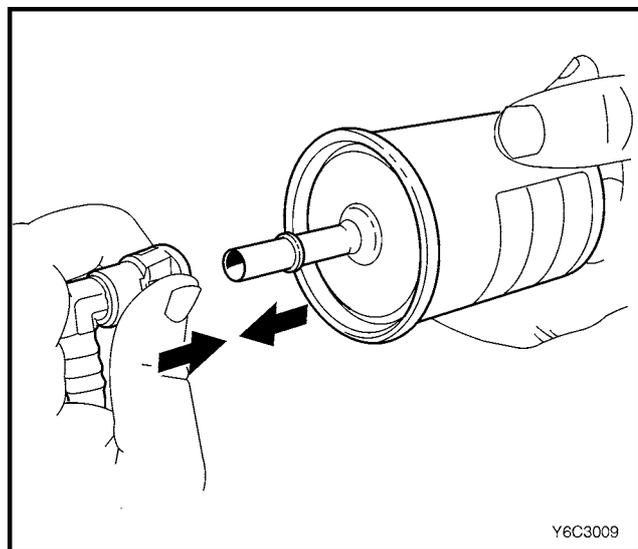


Figure 8A1 - 57

- 3 After installation, pull and push on the quick-connect fitting to ensure the connection is secure.

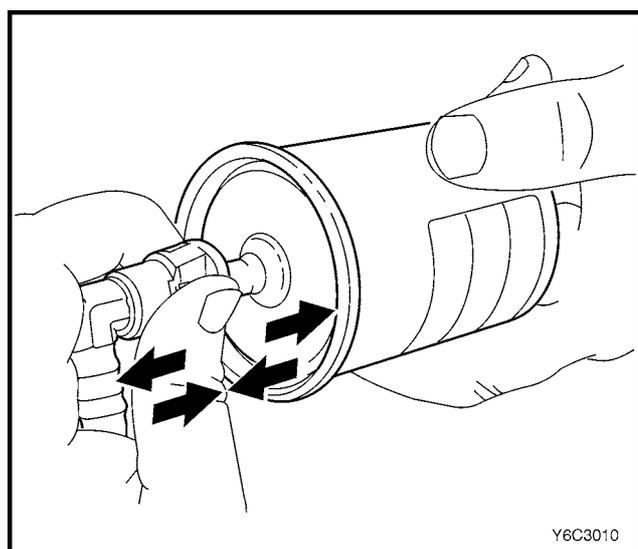


Figure 8A1 - 58

## Tool Nos. 7370 and 7371

### Remove

Use tool Nos. 7370 and 7371 to disconnect the fuel lines at the engine as follows:

- 1 Open the quick-connect release tool (2) and place it over the fuel line (1).
- 2 Close the quick-connect release tool and pull it into the fuel line quick-connect fitting to disconnect the fuel line from the fuel pipe.

#### NOTE

Do not disconnect the fuel lines at the fuel rail. If the fuel lines are removed from the fuel rail, the fuel lines must be replaced.

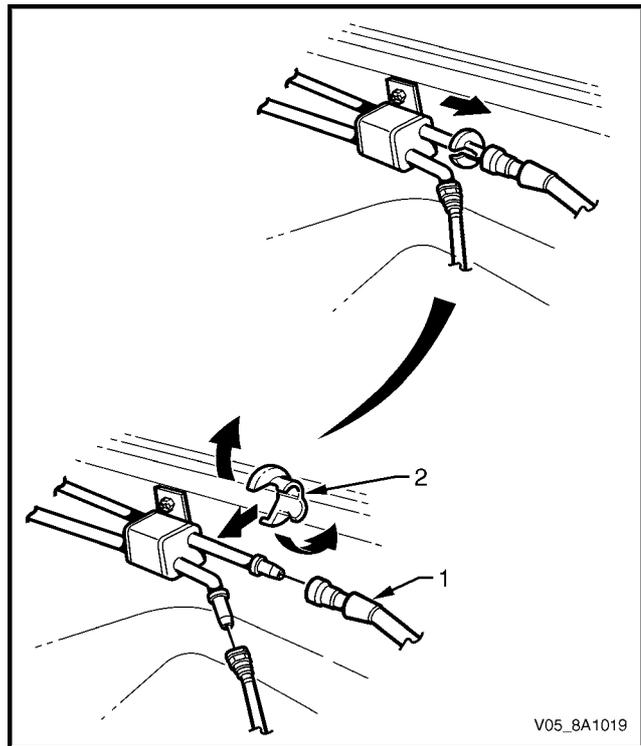


Figure 8A1 - 59

### Reinstall

Reinstallation of the disconnected quick-connect fittings using tool Nos. 7370 and 7371 is the same as for tool No. AU533, refer to Tool No. AU533.

## 5.2 Fuel Tank — Sedan and Wagon

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 12O Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

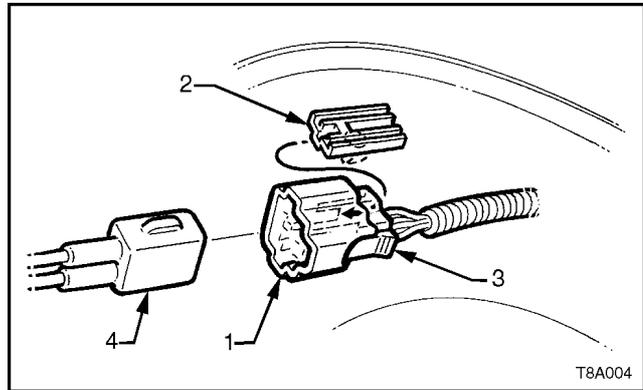
Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Siphon the fuel tank, using commercially-available equipment.
- 4 Raise the vehicle, preferably on a hoist, refer to [Section 0A General Information](#).
- 5 Remove the right-hand rear wheelhouse liner, refer to [Section 1A1 Body](#).

**CAUTION**

**Before proceeding, clean all traces of dirt and other foreign material from the top of the fuel tank, near the modular fuel pump and sender assembly.**

- 6 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.
- 7 Remove the fuel pump electrical connector (1) from its mounting (2) by pulling it forward to dislodge the assembled connector. After releasing, press the locking tab (3) and separate the connector halves (1 and 4).
- 8 Place a drain tray under the fuel filter area.



**Figure 8A1 – 60**

**WARNING**

**Fuel can spill from the disconnected filter.**

- 9 If required, remove the fuel filter (7) by disconnecting the fuel feed line quick-connect fitting (8), refer to Figure 8A1 – 61. Press both fuel filter strap retaining tangs (5), then remove the fuel filter from the bracket.
- 10 Disconnect the fuel filter T-piece quick-connect fitting (4). Support the fuel filter during removal.
- 11 Disconnect the quick-connect fittings to the evaporative emission control canister (1) by pushing inwards to release the seal pressure; press the side tangs of the quick-connect fitting, then pull to disconnect. Alternatively, use tool No. AU533 to assist in pressing the tangs on the quick-connect fittings, refer to Tool No. AU533. Support the fuel filter during removal.
- 12 Disconnect the fuel vapour canister breather hose from the evaporative emission control canister (2).
- 13 Disconnect the quick-connect fitting (3) at the flexible pipe and fuel filter T-piece, by supporting the quick-connect fitting while pulling the fuel feed line from the quick-connect fitting.

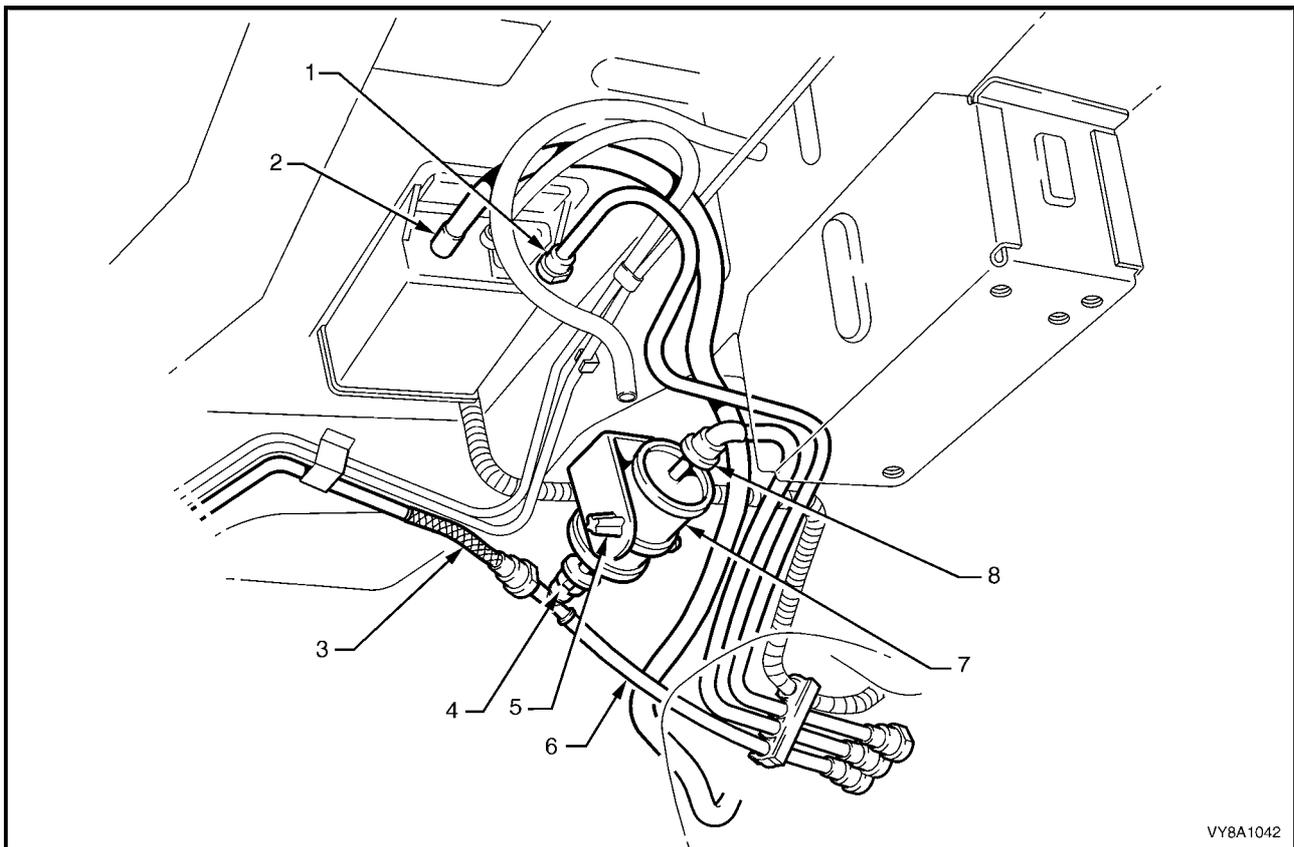


Figure 8A1 – 61

**Legend**

1	Fuel Tank Vapour Line to Evaporative Emission Control Canister Quick-connect	5	Fuel Filter Strap Retaining Tang
2	Evaporative Emission Control Canister Breather Hose	6	Fuel Return Line
3	Flexible Fuel Feed Line	7	Fuel Filter
4	Fuel Filter T-piece Quick-connect	8	Fuel Feed Line Quick-connect

- 14 Disconnect the filler neck ground strap from the spade connector (9, in view A and view E), located under the front mounting bolt (4, in view A) of the right-hand fuel tank mounting strap (3, in view A), refer to Figure 8A1 – 62.
- 15 While supporting the fuel tank in the centre, remove the fuel tank mounting straps:
  - a Remove the centre fuel tank mounting strap (2, view D) by removing the rear retaining nut (5) and washer (10), then unhook the centre fuel tank mounting strap from the front support (view C).
  - b Remove the bolt at the front (view A) and unhook the right-hand fuel tank mounting strap from the rear support (view B), then remove the right-hand fuel tank mounting strap (3).
  - c Remove the left-hand fuel tank mounting strap (1) by unscrewing the bolt and washer from each end (view C and view D).
- 16 Lower the left-hand side of the fuel tank from the vehicle to release the fuel filler neck from the body opening. When released, continue lowering the fuel tank.

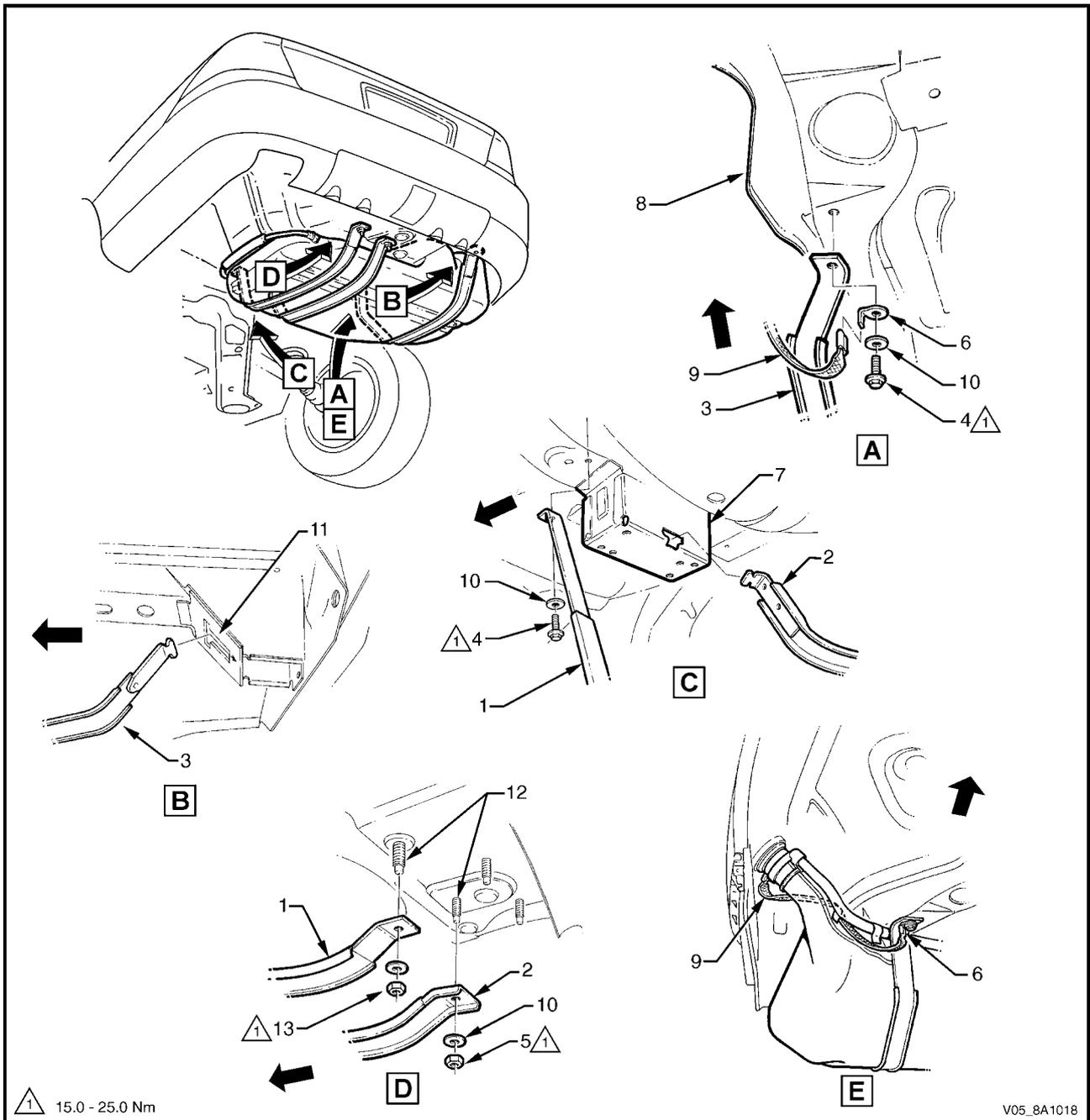


Figure 8A1 - 62

Legend

- |   |   |   |  |    |                                    |
|---|---|---|--|----|------------------------------------|
| 1 | Left-hand Fuel Tank Mounting Strap            | 5 | Centre Fuel Tank Mounting Strap Rear Attaching Nut | 9  | Filler Neck Ground Strap           |
| 2 | Centre Fuel Tank Mounting Strap               | 6 | Ground Strap Spade Connector                       | 10 | Tank Strap Support Washer          |
| 3 | Right-hand Fuel Tank Mounting Strap           | 7 | Front Support                                      | 11 | Rear Support                       |
| 4 | Left-hand Fuel Tank Mounting Strap Front Bolt | 8 | Rear Longitudinal Extension                        | 12 | Fuel Tank Reinforcement Studs      |
|   |   |   |  | 13 | Left-hand Strap Rear Attaching Nut |

## Reinstall

Reinstallation of the fuel tank is the reverse of the removal procedure, noting the following:

- 1 Check the insulation has not dislodged from the top of the fuel tank.
- 2 Lift the fuel tank, with the insulator attached, into position reinserting the fuel filler neck into the body opening. Raise the fuel tank into place.
- 3 Fit the fuel tank mounting straps in the following order, refer to Figure 8A1 – 62:
  - a Loosely reattach the two outer fuel tank mounting straps (1, in view D and 3, in view A), ensuring the ground strap spade connector (6, in view A) is fitted correctly.
  - b Ensure the filler neck seal is correctly located in the body opening.
  - c While pushing the fuel tank firmly to the right-hand side, tighten the front bolt (4, in view C) and rear nut (1, in view D) for the left-hand fuel tank mounting strap.
  - d Tighten the front mounting bolt (4, in view A) on the right-hand fuel tank mounting strap (3, in view A).
  - e Hook the centre fuel tank mounting strap (2, in view D) into the front retainer (7, in view C), and replace the nut and washer (5, in view D).
- 4 Tighten all fuel tank mounting strap fasteners to the correct torque specification.

Fuel tank mounting strap nut and bolt torque specification ..... 15.0 – 25.0 Nm
---

- 5 Replace the fuel pump electrical connector, ensuring both locking tabs are in place. Engage the fuel pump electrical connector to its mounting foot and push rearwards to engage the locking tabs.

### WARNING

**Install the fuel filter with the flow arrow on its body pointing in the same direction as the fuel flow to the front of the vehicle.**

- 6 Install the disconnected quick-connect fittings to the fuel filter and evaporative emission control canister. Refer to Figure 8A1 – 61 for the correct component routeings using the following sequence:
  - a evaporative emission control canister breather hose (2) to evaporative emission control canister;
  - b fuel tank vent line (1) to evaporative emission control canister;
  - c fuel feed line (3) to flexible pipe quick-connect;
  - d fuel filter to fuel filter T-piece quick-connect (4), then fuel filter strap retainer (5) to fuel filter bracket; and
  - e fuel filter to fuel feed line quick-connect (8).
- 7 Install the right-hand rear wheelhouse liner, refer to [Section 1A1 Body](#).
- 8 Before starting the vehicle, perform a fuel system leak test, refer to [4.3 Fuel Leak Test](#).

## 5.3 Fuel Tank — Utility

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 12O Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).
- 3 Remove the load floor front panel assembly, refer to [Section 1B Sheetmetal](#).
- 4 Remove the screws (2) securing the load compartment side panel inner front cover (1), refer to Figure 8A1 – 63.
- 5 Disconnect the modular fuel pump and sender assembly harness connector (4).
- 6 Tag the fuel feed line (3) and fuel return line (6) connections located on top of the fuel tank.

#### NOTE

For identification purposes, the fuel return line is tagged with a white band near the connector at the top of the fuel tank.

- 7 Tag the fuel tank vent line (5) on top of the fuel tank and disconnect by pulling the fuel tank vent line from the rollover valve.

**NOTE**

The fuel feed line has green retainer tabs.

- 8 Disengage the fuel return line (6) and the fuel feed line (3) quick-connect fittings using tool No. AU533, refer to Tool No. AU533.
- 9 Remove the modular fuel pump and sender assembly, refer to [5.6 Modular Fuel Pump and Sender Assembly — Utility](#).

**WARNING**

**Never drain or store fuel into an open container, due to the possibility of fire or explosion.**

- 10 Drain the fuel tank by pumping or siphoning fuel through the hole in the fuel tank (from which the modular fuel pump and sender assembly was removed) using commercially-available equipment.

**NOTE**

A permanent floodgate restriction in the lower fuel filler neck prevents the fuel tank from being drained through the filler aperture.

- 11 Remove the four mounting nuts (7), then remove the fuel tank by manipulating the filler neck free from the filler neck grommet and past the inner quarter panel.
- 12 Remove the fuel tank isolator rubbers (9) and place in a safe location away from the immediate worksite.

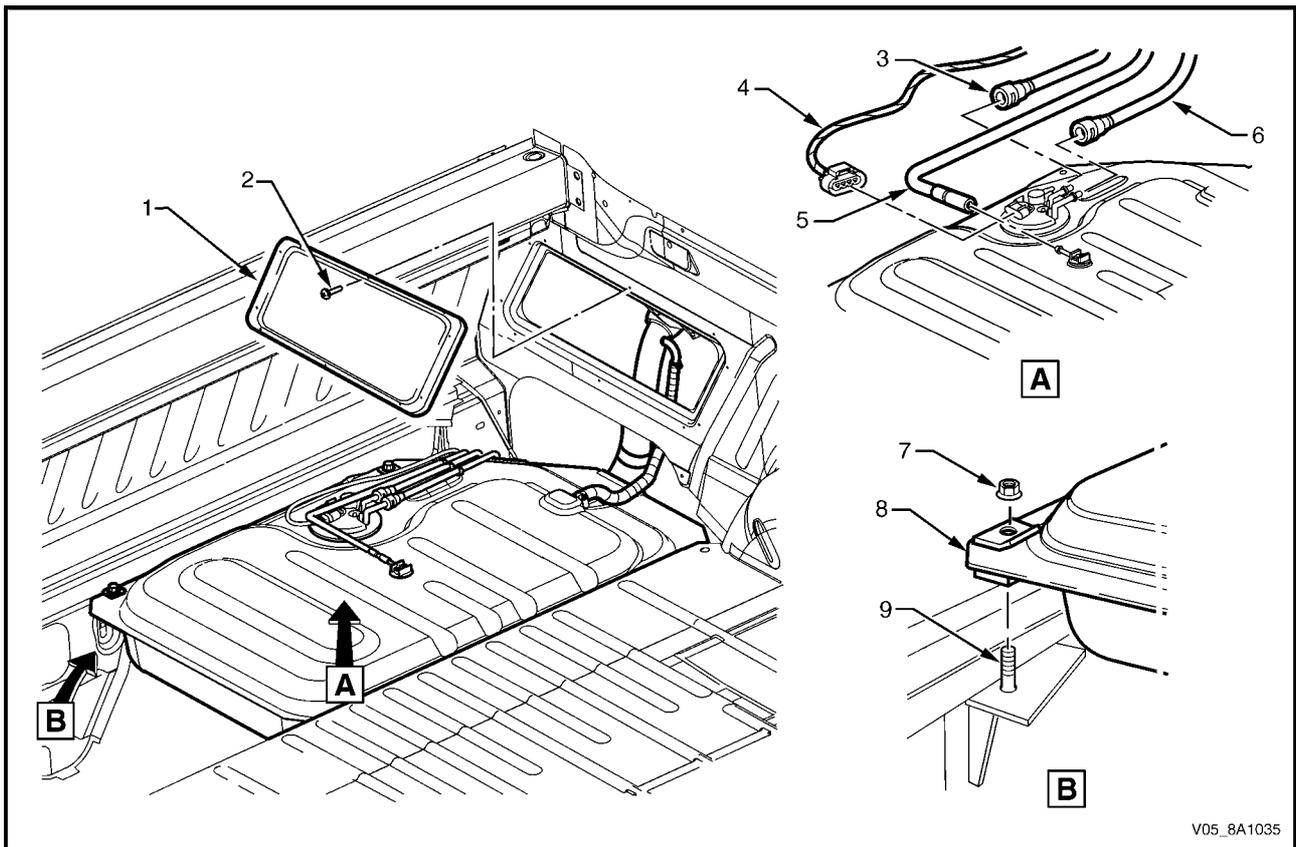


Figure 8A1 – 63

**Legend**

- |   |                       |             |
|---|-----------------------|-------------|
| 1 Side Panel Inner Front Cover                            | 5 Fuel Tank Vent Line | 8 Fuel Tank |
| 2 Side Panel Screw (10 places)                            | 6 Fuel Return Line    | 9 Stud      |
| 3 Fuel Feed Line  | 7 Mounting Nut        |             |
| 4 Modular Fuel Pump and Sender Assembly Harness Connector |                       |             |

## Reinstall

Reinstallation of the fuel tank is the reverse of the removal procedure, noting the following:

The connections for the fuel tank vent line are shown in View A, refer to Figure 8A1 – 63. Tighten all mounting nuts to the correct torque specification.

Fuel tank mounting nut torque specification .....	15.0 – 20.0 Nm
--	----------------

## 5.4 Fuel Filter

### Replace

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### CAUTION

The fuel filter removal and installation procedure must be performed correctly. Failure to adhere to these instructions may result in permanent damage to the flexible fuel feed line, resulting in unnecessary parts replacement and expense.

#### NOTE

For details on disconnecting the quick-connect fittings from the fuel filter, refer to [5.1 Quick-connect Fittings](#).

- 1 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

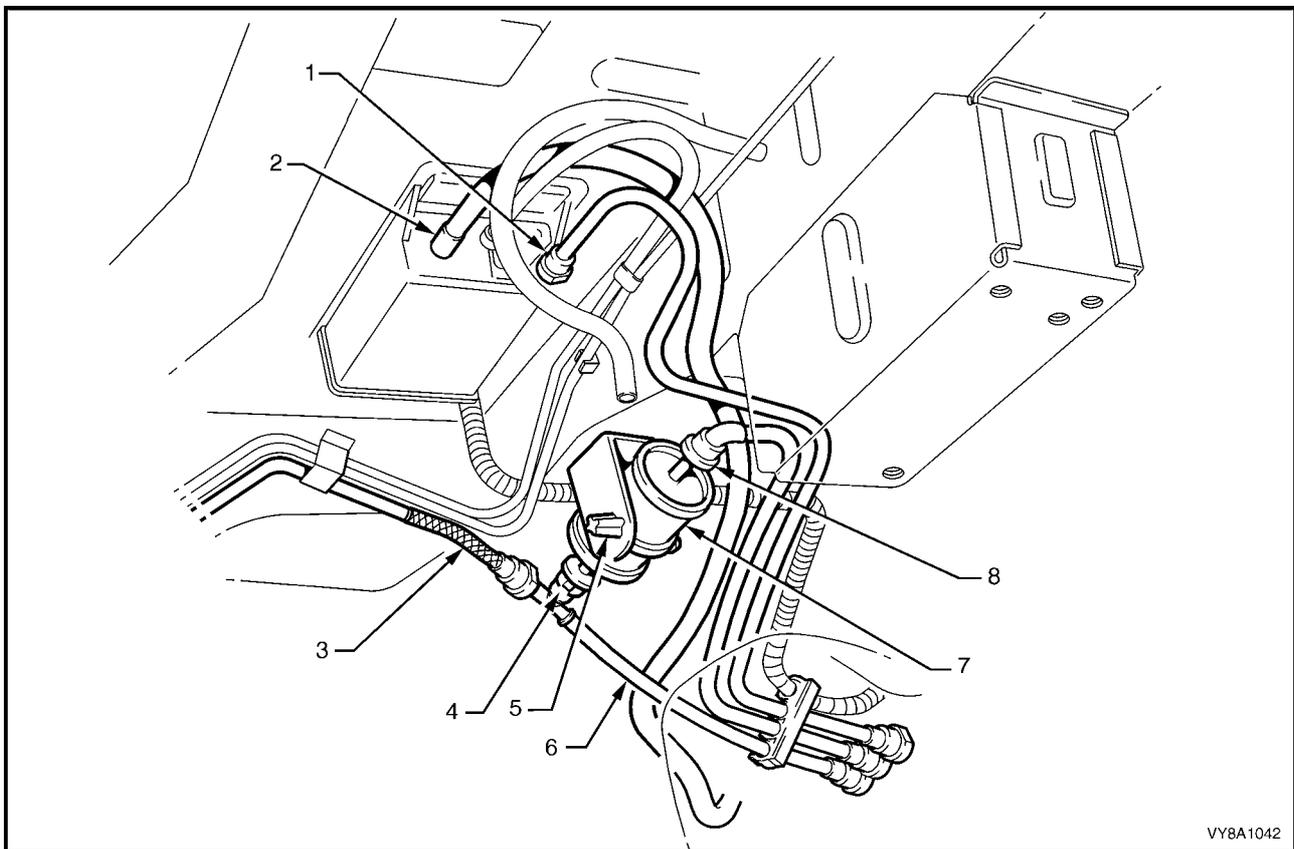
- 2 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.
- 3 Push the fuel feed line quick-connect fitting (8) towards the filter and press the retainers together to disconnect it from the fuel filter (7), refer to Figure 8A1 – 64. Alternatively, use tool No. AU533 to assist in pressing the quick-connect fitting locking tangs, refer to Tool No. AU533. Support the fuel filter during removal.

- 4 Press the fuel filter strap retaining tangs (5) on the retainer strap, then remove the filter from the bracket.
- 5 To avoid permanent damage to the flexible fuel feed line at the fuel filter T-piece end of the filter, support the fuel filter T-piece then press the filter into it while releasing the quick-connect fitting (4). Alternatively, fit the tool No. AU533 over the fuel filter T-piece connector to press the quick-connect fitting locking tangs, refer to Tool No. AU533.
- 6 Remove the fuel filter and retainer strap from the vehicle.

**NOTE**

Replacement fuel filters are supplied with a retainer strap. Use only fuel filters with conductive plastic retainer straps to ensure high-voltage static electricity is dissipated without sparking.

- 7 Attach the support strap onto a replacement fuel filter and, while supporting the fuel filter T-piece, push the fuel filter into the fuel filter T-piece quick-connect fitting until fully seated.
- 8 Install the filter strap retainer to the bracket. Install the quick-connect fitting to the remaining end of the filter.
- 9 Check each connector by firmly tugging on each one to ensure it is in the locked position.
- 10 Before starting the vehicle, perform a fuel system leak test, refer to [4.3 Fuel Leak Test](#).



**Figure 8A1 – 64**

**Legend**

- |  |                                    |
|--|------------------------------------|
| 1 Fuel Tank Vapour Line to Evaporative Emission Control Canister Quick-connect | 5 Fuel Filter Strap Retaining Tang |
| 2 Evaporative Emission Control Canister Breather Hose                          | 6 Fuel Return Line                 |
| 3 Flexible Fuel Feed Line  | 7 Fuel Filter                      |
| 4 Fuel Filter T-piece Quick-connect  | 8 Fuel Feed Line Quick-connect     |

## 5.5 Modular Fuel Pump and Sender Assembly — Sedan and Wagon

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air directly onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Siphon the fuel tank, using commercially-available equipment.
- 4 Remove the fuel tank, refer to [5.2 Fuel Tank — Sedan and Wagon](#).

**CAUTION**

Before proceeding, clean all traces of dirt and other foreign material from the top of the fuel tank, near the modular fuel pump and sender assembly.

- 5 Use compressed air to ensure all dirt and foreign materials are removed from all fuel connections before disconnecting the parts.

**WARNING**

Fuel can spill from the disconnected modular fuel pump and sender assembly.

- 6 Disconnect the modular fuel pump and sender assembly harness connector (1).
- 7 Tag the fuel feed line connecting the fuel feed port (2) on the modular fuel pump and sender assembly cover.
- 8 Tag the fuel return port (3) on the modular fuel pump and sender assembly cover.
- 9 Tag the fuel tank vent line (4) on the modular fuel pump and sender assembly cover.

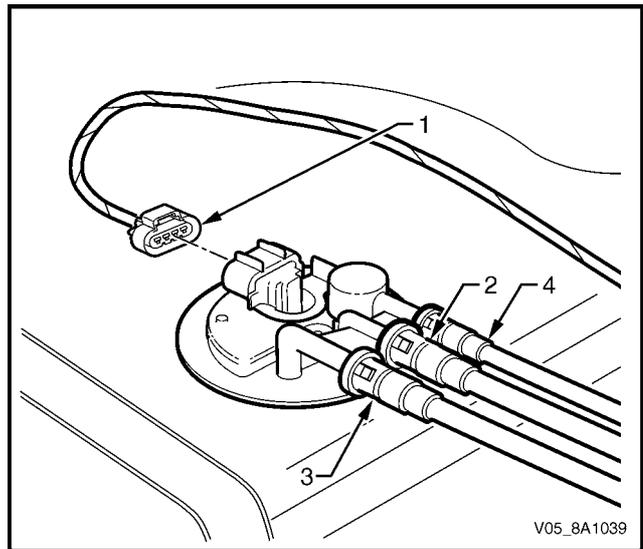


Figure 8A1 - 65

- 10 Disengage the fuel return line quick-connect fitting (1) using tool No. AU533 (3/8-inch), refer to Tool No. AU533.
- 11 Disengage the fuel feed line quick-connect fitting (2) using tool No. AU533 (3/8-inch), refer to Tool No. AU533.
- 12 Disengage the fuel tank vent line quick-connect fitting (3) using tool No. AU533 (5/16-inch), refer to Tool No. AU533.

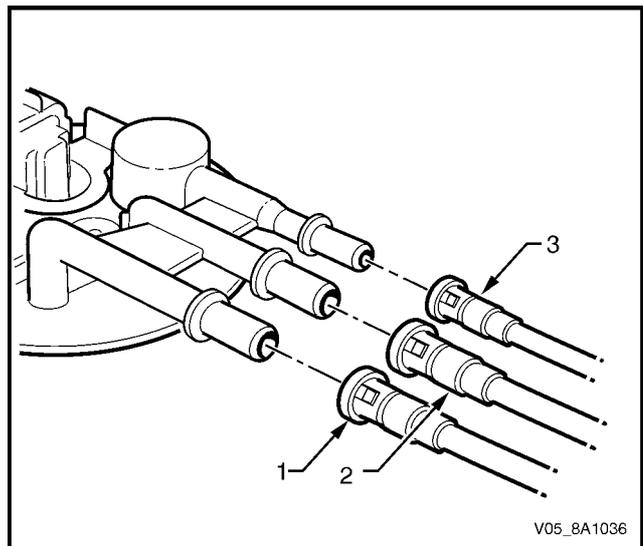


Figure 8A1 - 66

**CAUTION**

Ensure tool No. AU469 is seated firmly and positively in the modular fuel pump and sender assembly cover retainer lock ring while removing the modular fuel pump and sender assembly.

**CAUTION**

Assistance will be required to hold the tank in position during this procedure; if not held adequately, you may slip and damage the modular fuel pump and sender assembly.

- 13 Using tool No. AU469 (3) and a half-inch breaker bar (1), remove the modular fuel pump and sender assembly cover retainer lock ring (2) by turning it anticlockwise.

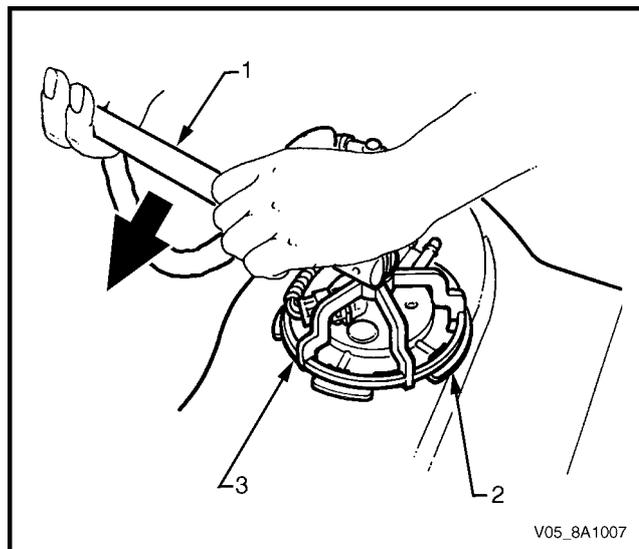


Figure 8A1 - 67

- 14 Remove the modular fuel pump and sender assembly cover retainer lock ring.

**NOTE**

The modular fuel pump and sender assembly cover springs up when the retainer is removed.

**WARNING**

The reservoir will be full of fuel. When the modular fuel pump and sender assembly is removed from the fuel tank, pour any remaining fuel in the reservoir into a suitable container. Do not drain or store fuel into an open container, due to the possibility of fire or explosion.

- 15 Place the modular fuel pump and sender assembly cover retainer lock ring (1) in a safe location away from the immediate worksite.
- 16 Carefully lift the modular fuel pump and sender assembly from the fuel tank, taking care not to:
  - damage the fuel level sender float and arm (2), and
  - spill any fuel remaining in the reservoir.

**NOTE**

The fuel sender float arm is not serviced separately. If damaged, it is replaced as part of the fuel level sender assembly.

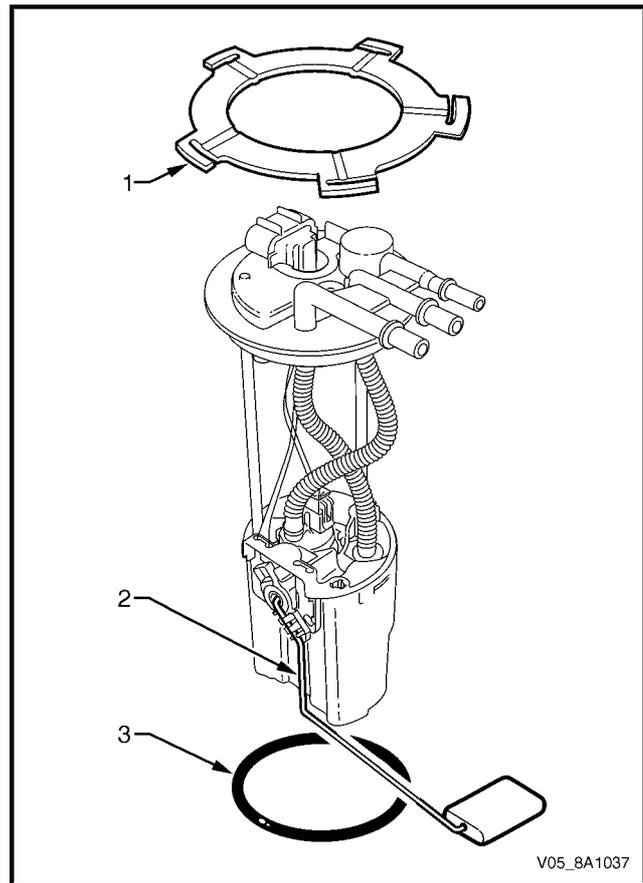


Figure 8A1 – 68

**WARNING**

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

- 17 Remove and discard the O-ring (3), refer to Figure 8A1 – 68.
- 18 Place a suitable material over the opening in the fuel tank to prevent any foreign matter from entering the fuel system.

## Test

- 1 Measure the resistance across terminals 2 and 3 of the fuel pump motor connector. Take the following measurements:
  - a With the float arm assembly in the empty position, the resistance should be approximately 250  $\Omega$ .
  - b With the float arm assembly rotated to the full position, the resistance should be approximately 40  $\Omega$ .
- 2 If the resistance at either of these positions is not within tolerance, replace the fuel level sender assembly.

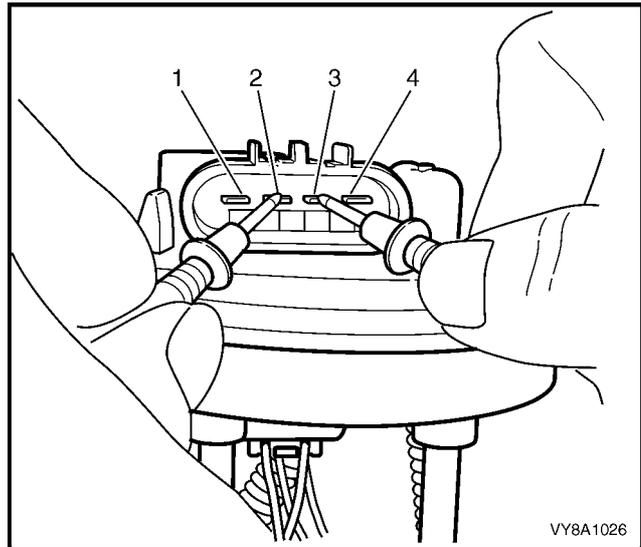


Figure 8A1 – 69

## Reinstall

Reinstallation of the modular fuel pump and sender assembly is the reverse of the removal procedure, noting the following:

- 1 Fit a new O-ring (3) to the modular fuel pump and sender assembly, refer to Figure 8A1 – 68.
- 2 Install the modular fuel pump and sender assembly into the fuel tank, taking care not to damage the fuel sender float or arm.
- 3 Ensure the locator in the pump cover engages in the slot in the fuel tank opening.
- 4 Install the modular fuel pump and sender assembly retainer lock ring (1).

## 5.6 Modular Fuel Pump and Sender Assembly — Utility

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air directly onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Siphon the fuel tank, using commercially-available equipment.
- 4 Remove the load floor front panel assembly, refer to [Section 1B Sheetmetal](#).
- 5 Remove the screws (2) securing the load compartment side panel inner front cover (1), refer to [Figure 8A1 – 63](#).

**CAUTION**

Before proceeding, clean all traces of dirt and other foreign material from the top of the fuel tank, near the modular fuel pump and sender assembly.

- 6 Use compressed air to ensure all dirt and foreign materials are removed from all fuel connections before disconnecting the parts.
- 7 Remove the fuel pump electrical connector (1) from its mounting (2) on the panel behind the side panel inner front cover by pulling it forward to dislodge the assembled connector. After releasing, press the locking tab (3) and separate the connector halves (1 and 4).
- 8 Place a drain tray under the fuel filter area.

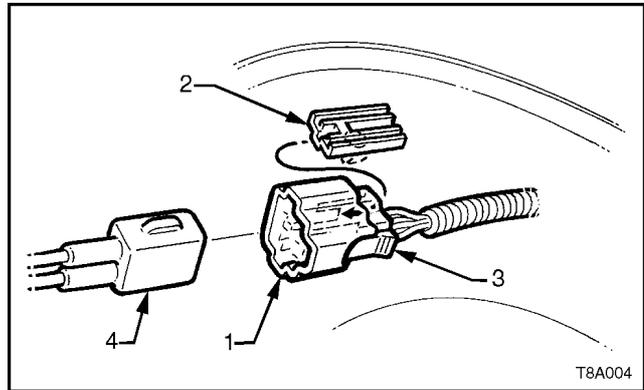


Figure 8A1 - 70

**WARNING**

Fuel can spill from the disconnected modular fuel pump and sender assembly.

- 9 Disconnect the modular fuel pump and sender assembly harness connector (1).
- 10 Tag the fuel feed line connecting the fuel feed port (2) on the modular fuel pump and sender assembly cover.
- 11 Tag the fuel return port (3) on the modular fuel pump and sender assembly cover.

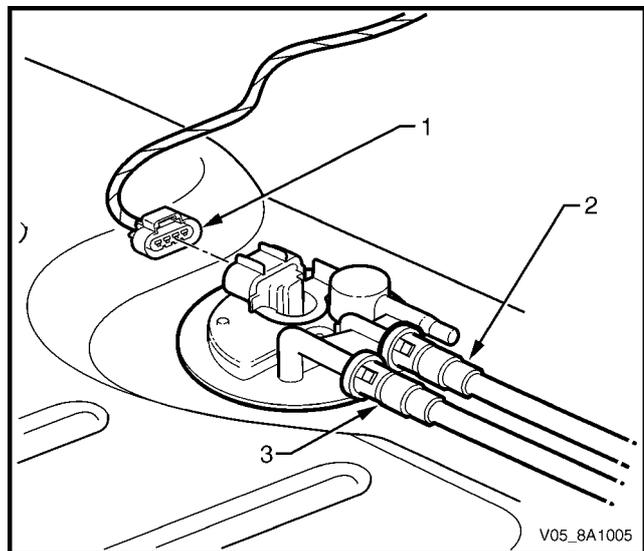


Figure 8A1 - 71

- 12 Tag the fuel tank vent line (5) on top of the fuel tank and disconnect by pulling the fuel tank vent line from the rollover valve, refer to [Figure 8A1 - 63](#).

- 13 Disengage the fuel return line quick-connect fitting (1) using tool No. AU533 (3/8-inch), refer to Tool No. AU533.
- 14 Disengage the fuel feed line quick-connect fitting (2) using tool No. AU533 (3/8-inch), refer to Tool No. AU533.

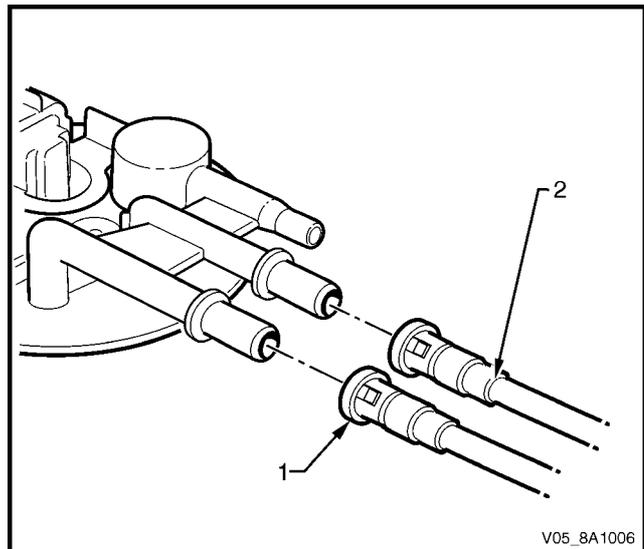


Figure 8A1 - 72

**CAUTION**

Ensure the internal circlip pliers are seated firmly and positively in the modular fuel pump and sender assembly cover circlip.

- 15 Using a pair of internal circlip pliers, remove the modular fuel pump and sender assembly circlip.

**NOTE**

The modular fuel pump and sender assembly springs up when the circlip is removed.

**WARNING**

The reservoir will be full of fuel. When the modular fuel pump and sender assembly is removed from the fuel tank, pour any remaining fuel in the reservoir into a suitable container. Do not drain or store fuel into an open container, due to the possibility of fire or explosion.

- 16 Place the modular fuel pump and sender assembly circlip (1) in a safe location away from the immediate worksite.
- 17 Carefully lift the modular fuel pump and sender assembly from the fuel tank, taking care not to:
  - damage the fuel level sender float and arm (2), and
  - spill any fuel remaining in the reservoir.

**NOTE**

The fuel sender float arm is not serviced separately. If damaged, it is replaced as part of the fuel level sender assembly.

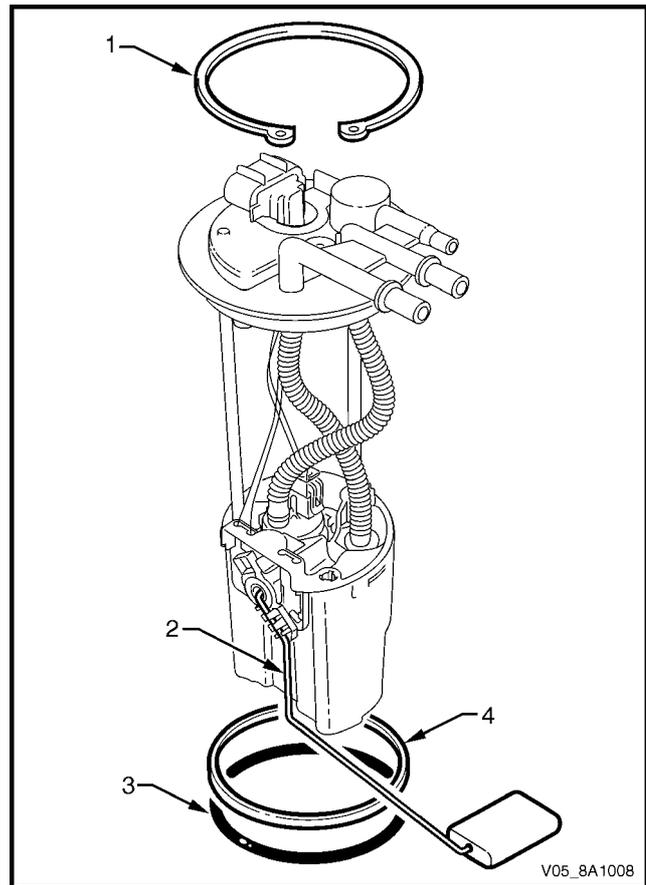


Figure 8A1 – 73

**WARNING**

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

- 18 Remove the spacer (4) and place it in a safe location away from the immediate worksite, refer to Figure 8A1 – 73.
- 19 Remove and discard the O-ring (3).
- 20 Place a suitable material over the opening in the fuel tank to prevent any foreign matter from entering the fuel system.

**Test**

For the test procedure of the modular fuel pump and sender assembly, refer to [5.5 Modular Fuel Pump and Sender Assembly — Sedan and Wagon](#).

## Reinstall

Reinstallation of the modular fuel pump and sender assembly is the reverse of the removal procedure, noting the following:

- 1 Ensure the spacer (4) is fitted to the modular fuel pump sender assembly, refer to Figure 8A1 – 73.
- 2 Fit a new O-ring (3) to the modular fuel pump and sender assembly.
- 3 Install the modular fuel pump and sender assembly into the fuel tank, taking care not to damage the fuel sender float or arm.
- 4 Ensure the locator in the pump cover engages in the slot in the fuel tank opening.
- 5 Install the modular fuel pump and sender assembly circlip (1).

## 5.7 Rollover Valve — Utility

### Remove

- 1 Remove the load floor front panel assembly, refer to [Section 1B Sheetmetal](#).
- 2 Pull the fuel tank vent line from the rollover valve (1).
- 3 Apply a downward pressure on the rollover valve and rotate it anticlockwise approximately 30°.
- 4 Remove the rollover valve from the fuel tank.
- 5 Place a suitable material over the opening in the fuel tank to prevent any foreign matter from entering the fuel tank.

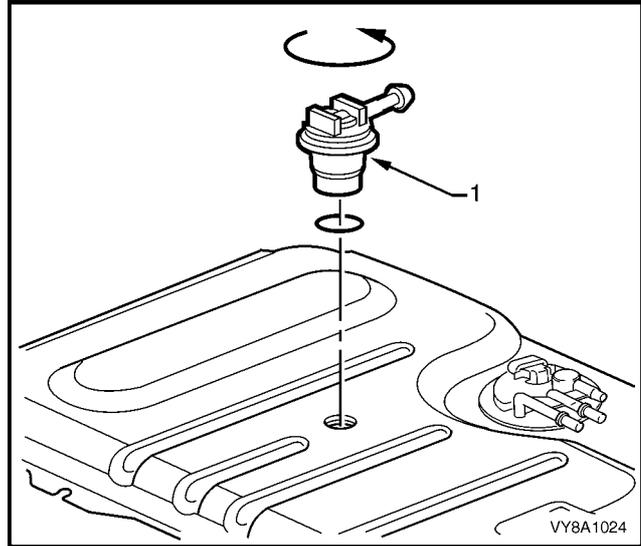


Figure 8A1 – 74

### Test

- 1 Remove the rollover valve from the fuel tank.

### WARNING

**Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.**

- 2 Clean the rollover valve with compressed air.

### NOTE

Do not use compressed air for the following procedure.

- 3 With the rollover valve upright, blow nitrogen at low pressure into the outlet pipe. The nitrogen should pass through the valve and out the inlet holes in the bottom.
- 4 Continue to blow nitrogen into the outlet pipe and slowly rotate the rollover valve. At approximately 90° of rotation:
  - a the internal check valve should operate with an audible click, then
  - b nitrogen should stop passing through the valves.

### Reinstall

### CAUTION

**If the tested rollover valve is faulty, replace it with a serviceable item.**

Reinstallation of the rollover valve is the reverse of the removal procedure.

## 5.8 Fuel Pipes

### Sedan and Wagon

#### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Raise the vehicle, preferably on a hoist, refer to [Section 0A General Information](#).

#### CAUTION

Before proceeding, clean all traces of dirt and other foreign material from the fuel pipes.

- 4 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.
- 5 If required, remove the stone guards and fuel pipes. Use the following illustrations showing the fuel pipe layout and location of other items relating to the fuel system as a guide, refer to Figure 8A1 – 75 and Figure 8A1 – 76.

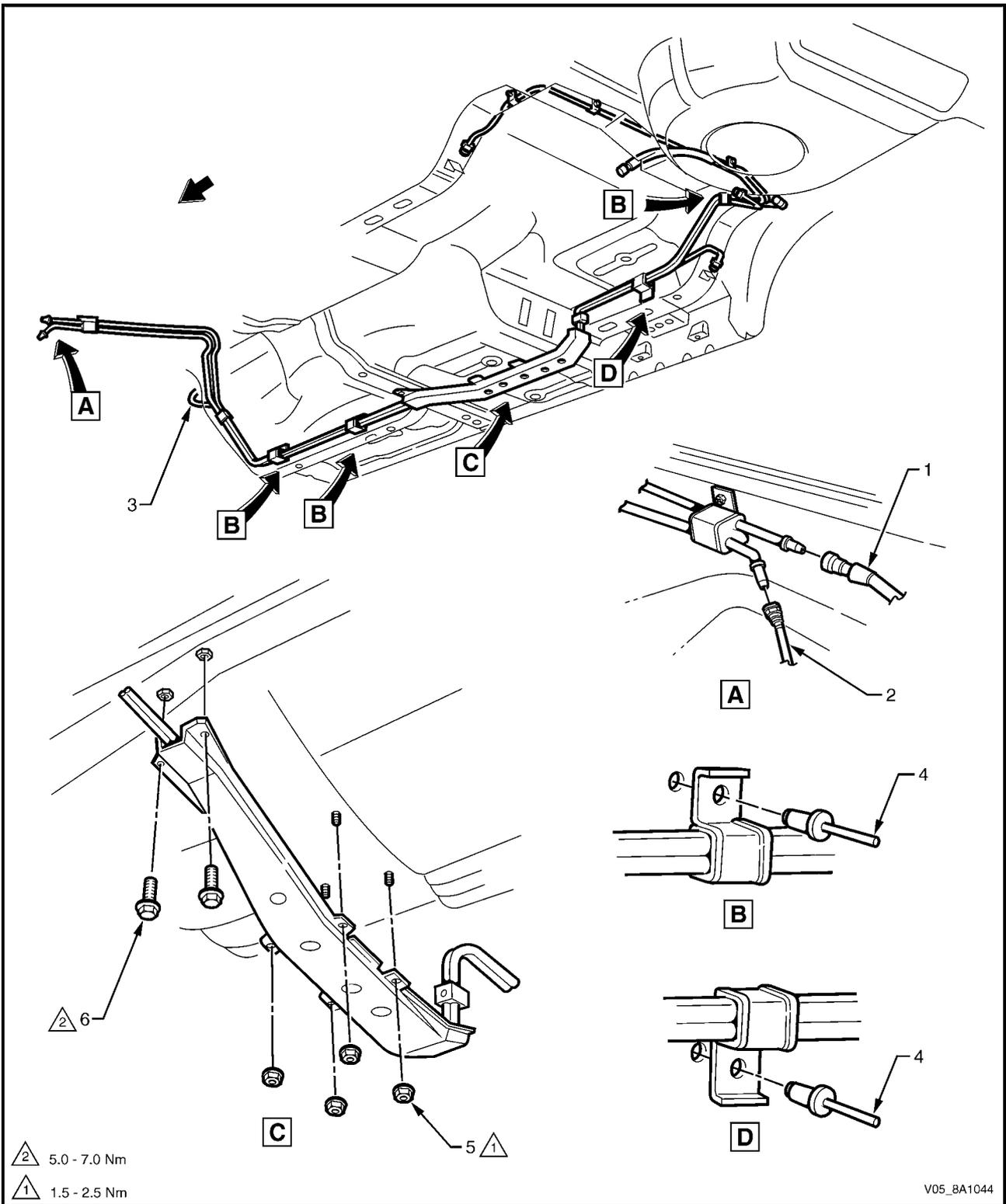


Figure 8A1 – 75

Legend

- |   |                              |   |                             |   |                           |
|---|------------------------------|---|-----------------------------|---|---------------------------|
| 1 | Fuel Feed / Fuel Return Line | 3 | Brake Fluid Pipe            | 5 | Stone Guard Securing Nut  |
| 2 | Fuel Vapour Line             | 4 | Fuel Line Bracket Pop Rivet | 6 | Stone Guard Securing Bolt |

NOTE

Use tool No. 7371 to remove the fuel feed line (1) quick-connect fitting, refer to Figure 8A1 – 75. Use tool No. AU533 to remove the fuel vapour line quick-connect fitting (2), refer to Tool No. AU533.

**Reinstall**

**CAUTION**

**Ensure the rubber in the fuel line brackets is in good condition before proceeding. If not, replace the affected bracket.**

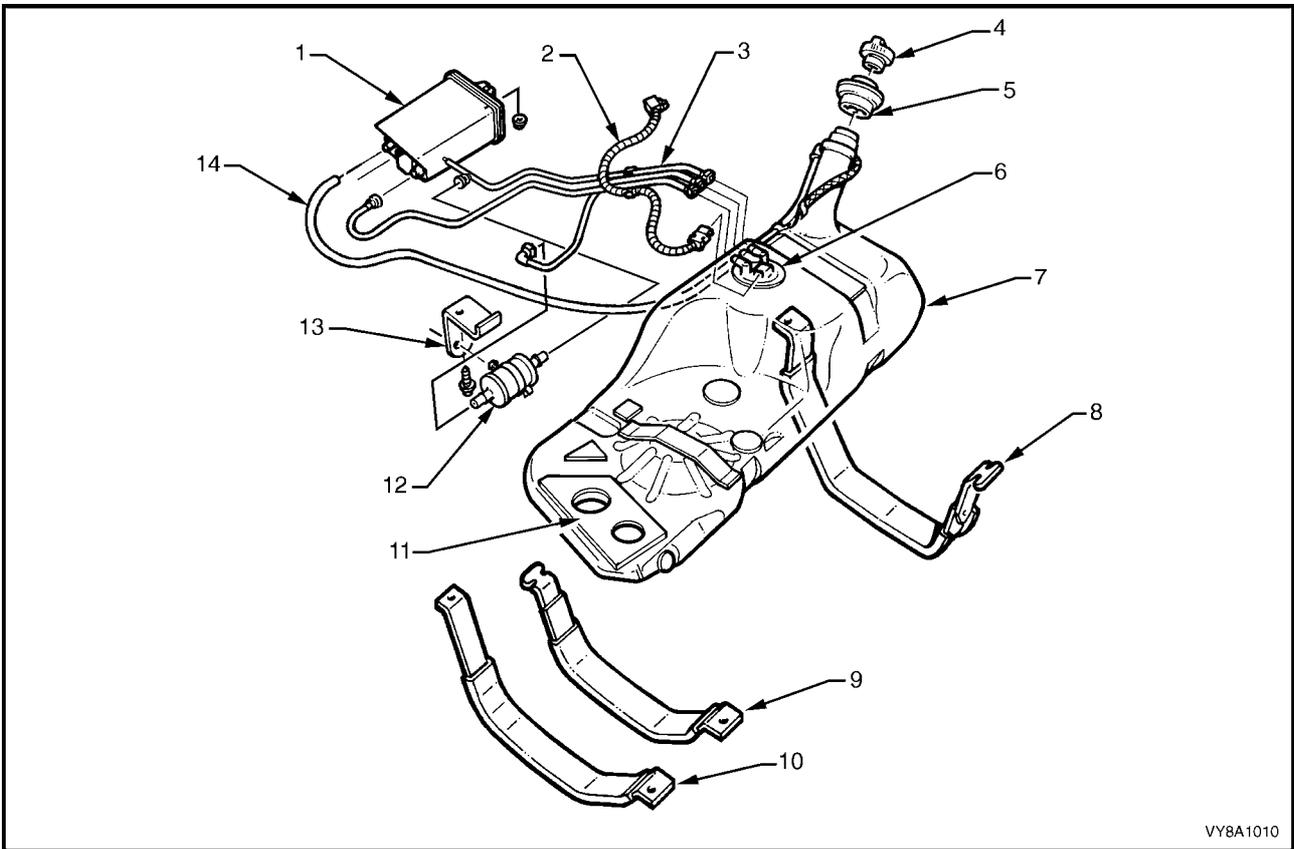
Reinstallation of the stone guards and fuel pipes is the reverse of the removal procedure, noting the following:

- 1 Tighten the stone guard securing nuts to the correct torque specification.

Stone guard securing nut torque specification ..... 1.5 – 2.5 Nm
---

- 2 Tighten the stone guard securing bolts to the correct torque specification.

Stone guard securing bolt torque specification ..... 5.0 – 7.0 Nm
--



**Figure 8A1 – 76**

**Legend**

- |   |  |  |
|---|--|--|
| 1 Evaporative Emission Control Canister | 6 Modular Fuel Pump and Sender Assembly    | 10 Left-hand Side Fuel Tank Mounting Strap |
| 2 Electrical Harness Connector          | 7 Fuel Tank                                | 11 Insulator Kit                           |
| 3 Fuel Return Line                      | 8 Right-hand Side Fuel Tank Mounting Strap | 12 Fuel Filter                             |
| 4 Fuel Filler Cap                       | 9 Centre Fuel Tank Mounting Strap          | 13 Fuel Filter Mounting Bracket            |
| 5 Fuel Filler Neck Insulator            |  | 14 Filler Neck Breather Hose               |

## Utility

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Raise the vehicle, preferably on a hoist, refer to [Section 0A General Information](#).

#### CAUTION

Before proceeding, clean all traces of dirt and other foreign material from the fuel pipes.

- 4 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

- 5 If required, remove the stone guards and fuel pipes. Use the following illustrations showing the fuel pipe layout and location of other items relating to the fuel system as a guide, refer to [Figure 8A1 – 63](#), Figure 8A1 – 77 and Figure 8A1 – 78.

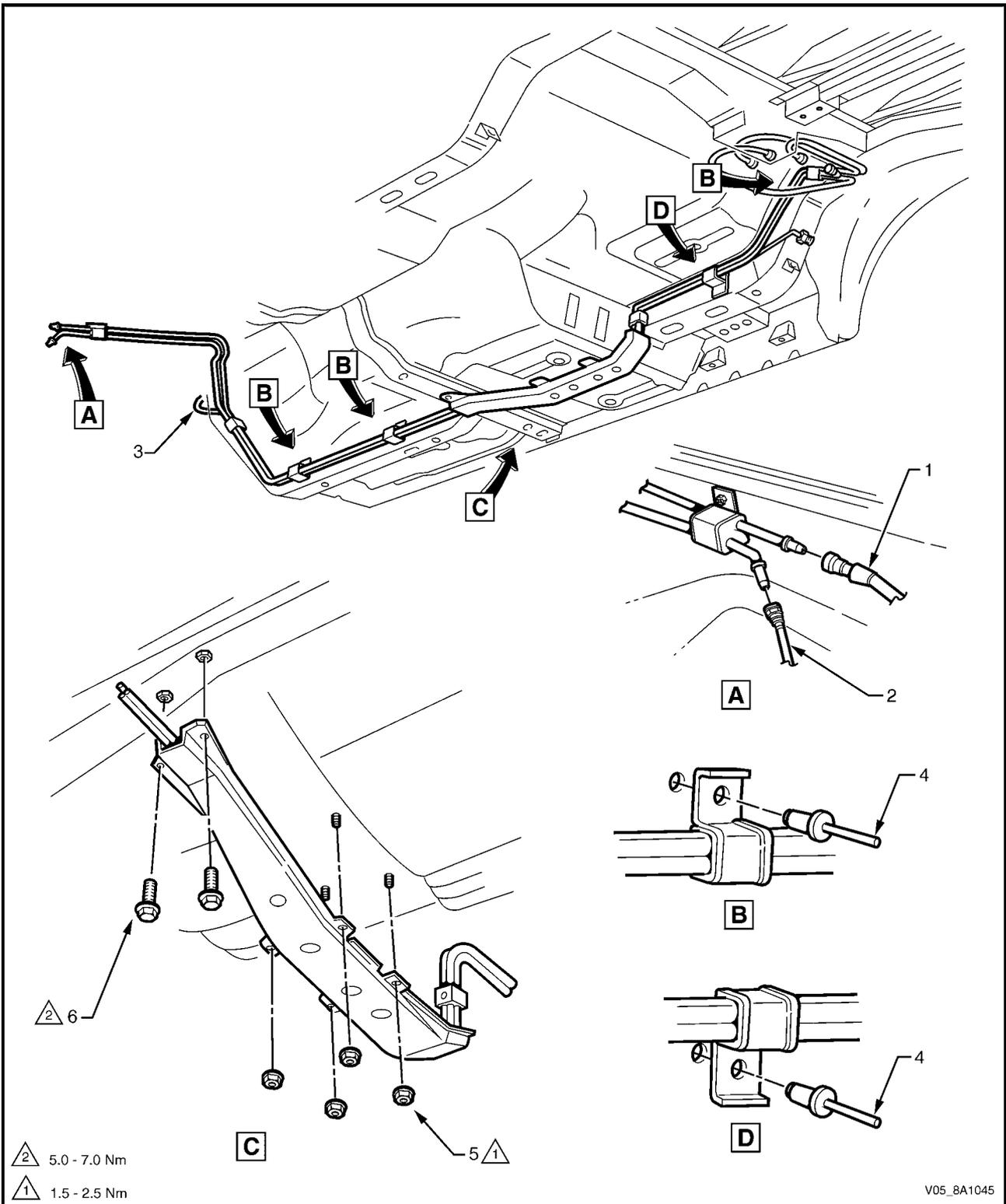


Figure 8A1 – 77

**Legend**

- |                                |                               |                             |
|--------------------------------|-------------------------------|-----------------------------|
| 1 Fuel Feed / Fuel Return Line | 3 Brake Fluid Pipe            | 5 Stone Guard Securing Nut  |
| 2 Fuel Vapour Line             | 4 Fuel Line Bracket Pop Rivet | 6 Stone Guard Securing Bolt |

**NOTE**

Use tool No. 7371 to remove the fuel feed line (1) quick-connect fitting, refer to Figure 8A1 - 77. Use tool No. AU533 to remove the fuel vapour line quick-connect fitting (2), refer to Tool No. AU533.

**Reinstall**

**CAUTION**

Ensure the rubber in the fuel line brackets is in good condition before proceeding. If not, replace the affected bracket.

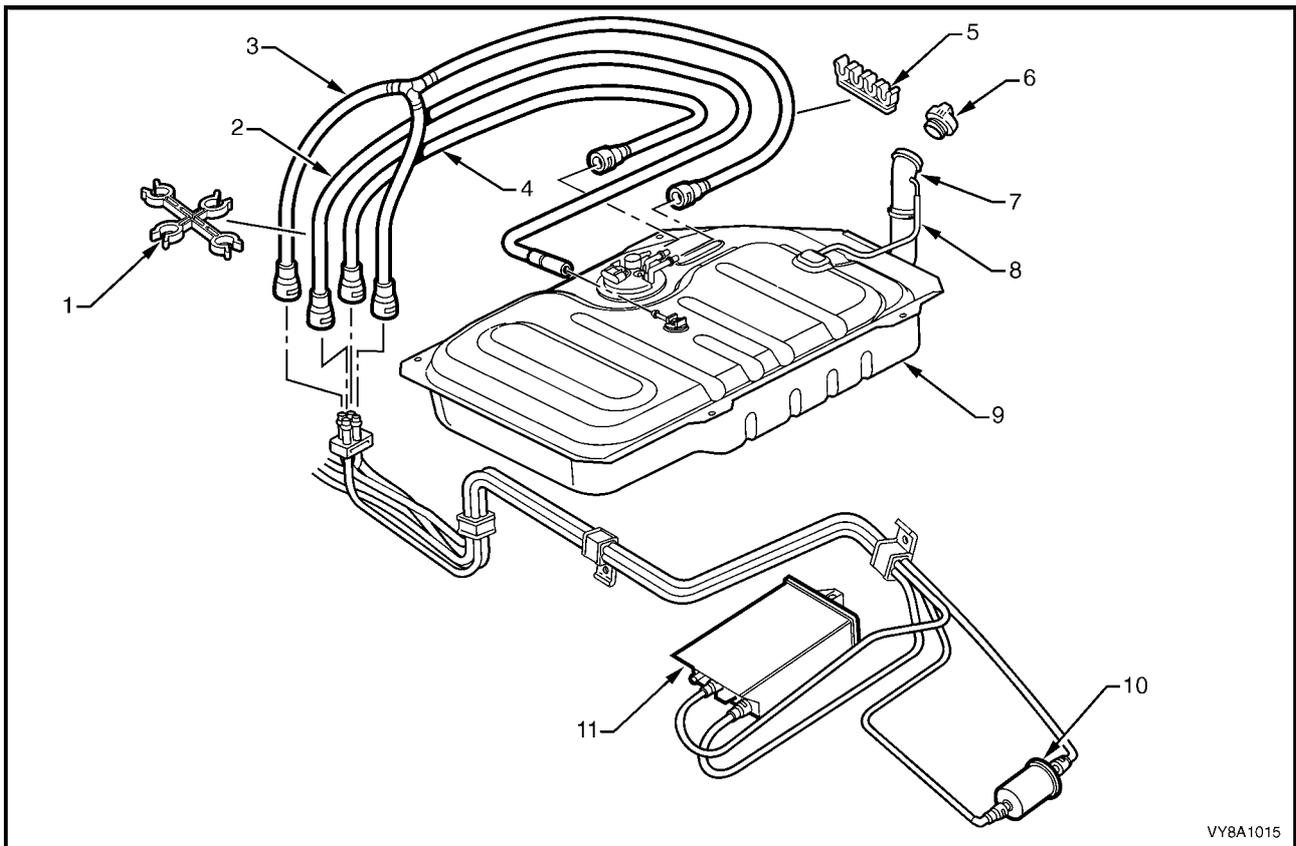
Reinstallation of the stone guards and fuel pipes is the reverse of the removal procedure, noting the following:

- 1 Tighten the stone guard securing nuts to the correct torque specification.

Stone guard securing nut torque specification .....	1.5 – 2.5 Nm
---	--------------

- 2 Tighten the stone guard securing bolts to the correct torque specification.

Stone guard securing bolt torque specification .....	5.0 – 7.0 Nm
--	--------------



**Figure 8A1 - 78**

**Legend**

1	Mounting Clip	5	Mounting Clip	9	Fuel Tank
2	Fuel Vapour Hose	6	Fuel Filler Cap	10	Fuel Filter
3	Fuel Return Line	7	Fuel Filler Neck	11	Evaporative Emission Control Canister
4	Fuel Feed Line	8	Fuel Tank Vent Hose		

## 5.9 Evaporative Emission Control Canister

### Remove

- 1 Disconnect the evaporative emission control canister purge line (1) by using the following procedure:
  - a Grasp both sides of the quick-connect fitting. Twist the connector 1/4 turn in each direction in order to loosen any dirt within the quick-connect fitting.

#### WARNING

**Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.**

- b Using compressed air, blow any dirt out of the quick-connect fitting.
- c Grasp the quick-connect fitting and push it towards the canister.
- d Squeeze the quick-connect fitting to release the retaining tabs, then pull back on the connector to remove the canister purge line from the canister.

- 2 Disconnect the fuel tank vent line (1) by using the following procedure:
  - a Grasp both sides of the quick-connect fitting. Twist the connector 1/4 turn in each direction in order to loosen any dirt within the quick-connect fitting.

#### WARNING

**Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.**

- b Using compressed air, blow any dirt out of the quick connect fitting.
- c Grasp the quick-connect fitting and push it towards the canister.
- d Squeeze the quick-connect fitting to release the retaining tabs, then pull back on the connector to remove the tank vent line from the canister.

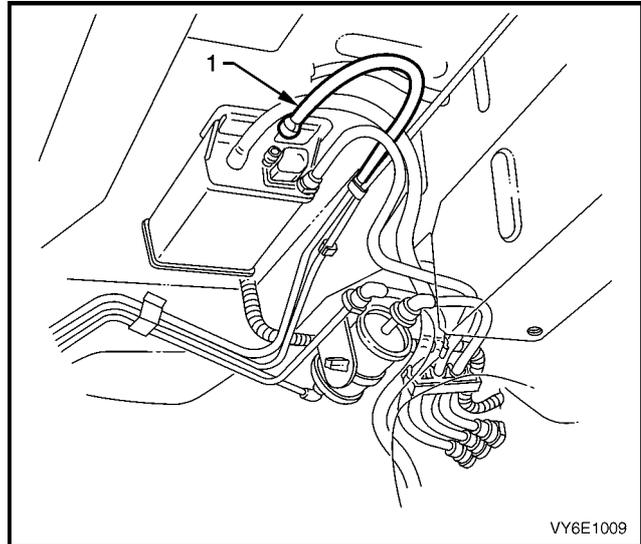


Figure 8A1 - 79

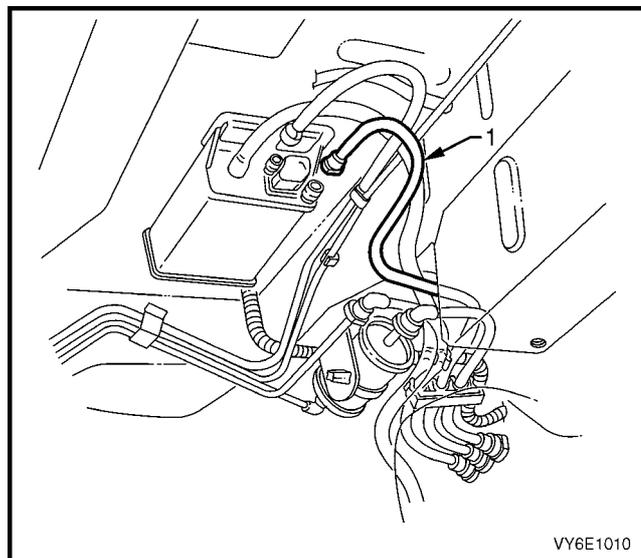
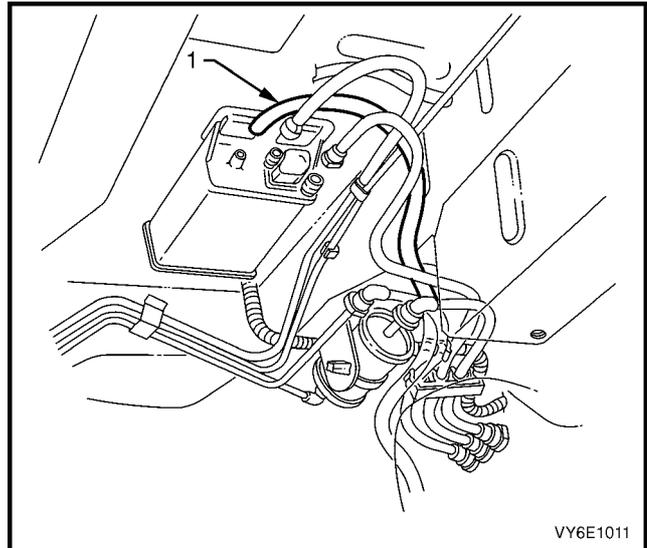
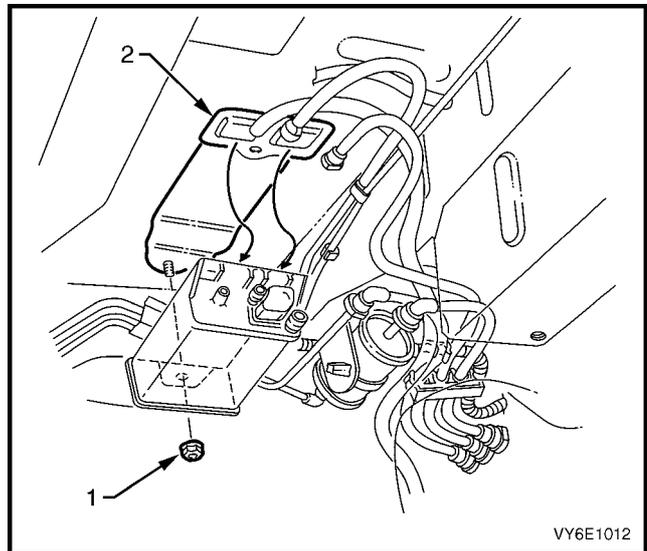


Figure 8A1 - 80

- 3 Remove the canister vent line (1) from the canister by twisting and pulling it off.

**Figure 8A1 - 81**

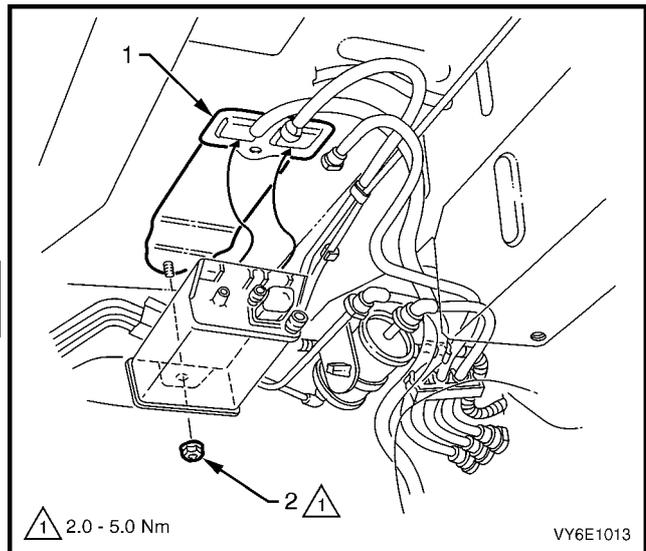
- 4 Remove the canister retaining nut (1).
- 5 Remove the canister from the retaining stud and then slide the canister out of the retainer (2).

**Figure 8A1 - 82**

**Reinstall**

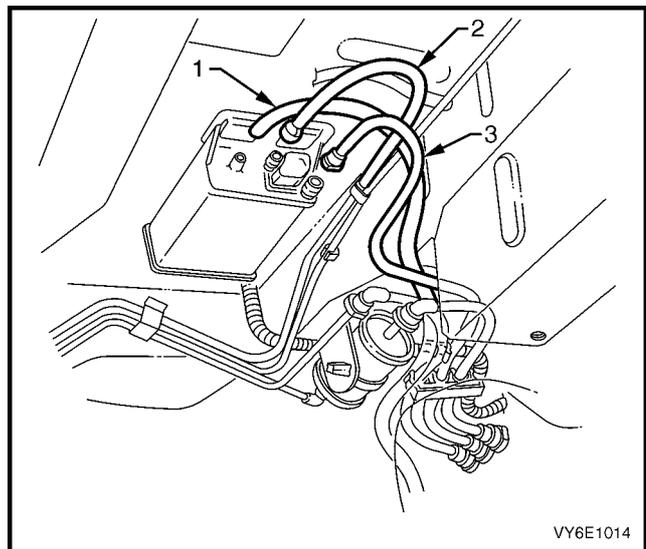
- 1 Hoist the vehicle, refer to [Section 0A General Information](#).
- 2 Reinstall the canister into the retainer (1) and over the retaining stud.
- 3 Reinstall the canister retaining nut (2), then hand-tighten.
- 4 Push the canister toward the centre of the vehicle and tighten the canister retaining nut to the specified torque.

Evaporative emission control canister retaining nut torque specification .....2.0 – 5.0 Nm



**Figure 8A1 – 83**

- 5 Reinstall the canister vent line (1).
- 6 Align the canister purge line quick-connect (2) with the canister purge line port. Push the quick-connect firmly onto the port.
- 7 Align the fuel tank vent line quick-connect (3) with the fuel tank vent port. Push the quick-connect firmly onto the port.
- 8 After installation, pull on each quick-connect to ensure the connections are secure and locked in position.



**Figure 8A1 – 84**

## Service Checks

- 1 Remove the canister, refer to [5.9 Evaporative Emission Control Canister](#).
- 2 Shake the canister. There should be no audible sound of carbon movement.
- 3 Using low pressure compressed air (20–35 kPa), blow into the tank vent port (3). Check that air flows freely from the canister vent port (1). Block the canister vent port (1); air should flow from the canister purge port (2).
- 4 If airflow through the canister vent port (1) is limited, clean the atmospheric filter by blocking off the fuel tank vent port (3) and blow compressed air at approximately 300 kPa through the canister purge port (2).
- 5 Check airflow through the filter as in step 3. If airflow through the canister vent port (1) is still limited, replace the canister.

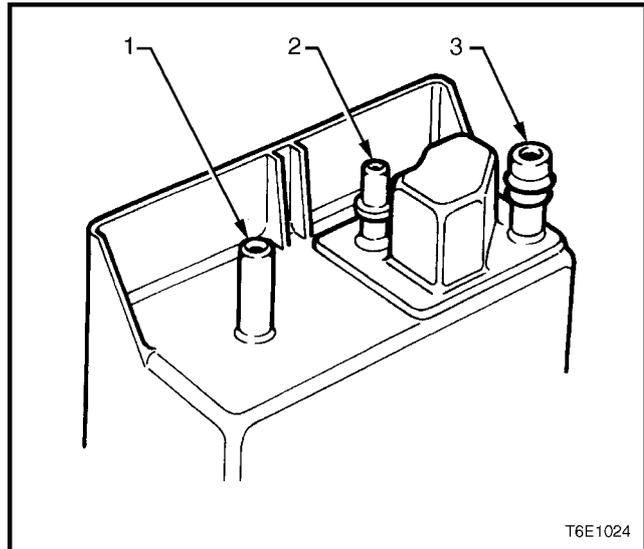


Figure 8A1 – 85

- 6 Block the canister vent port (1) and the canister purge port (2). Apply low-pressure compressed air (20–35 kPa) to the tank vent port (3). If any air leaks from the canister (that is, around the ports or seams), replace the canister.

### NOTE

In dusty areas, an alternative is to block the canister purge port (2). Blow air through the canister vent (1) port and check that air is expelled through the tank vent port (3).

## 6 Service Operations — Coupe

### 6.1 Quick-connect Fittings

#### Quick-connect Fittings (Metal Collar)

##### Remove

### WARNING

To reduce the risk of fire or personal injury, relieve the fuel system pressure before servicing any fuel system components, refer to [4.1 Fuel System Depressurisation](#).

- 1 If fitted, slide the dust cover from the quick-connect fitting.

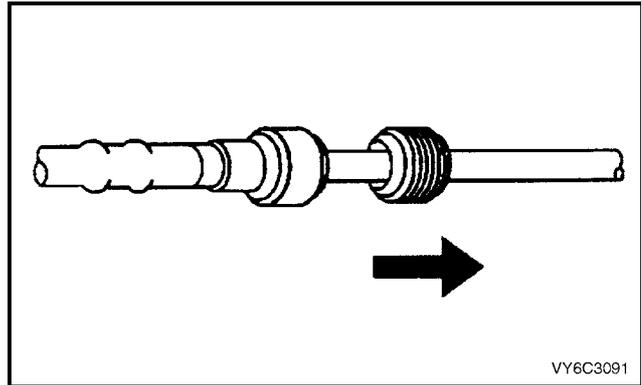


Figure 8A1 – 86

- 2 Grasp both sides of the quick-connect fitting. Twist the female side of the quick-connect fitting 1/4 turn in each direction to loosen any dirt.

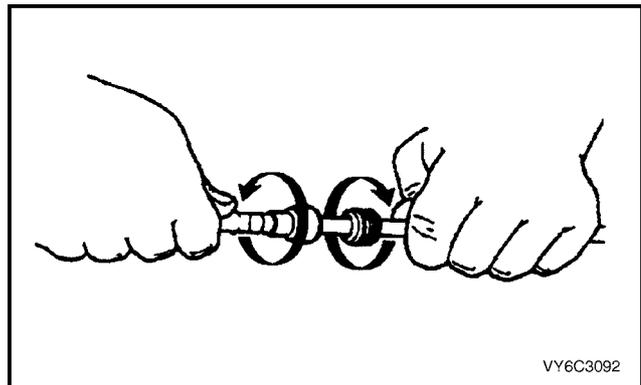


Figure 8A1 – 87

### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 3 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

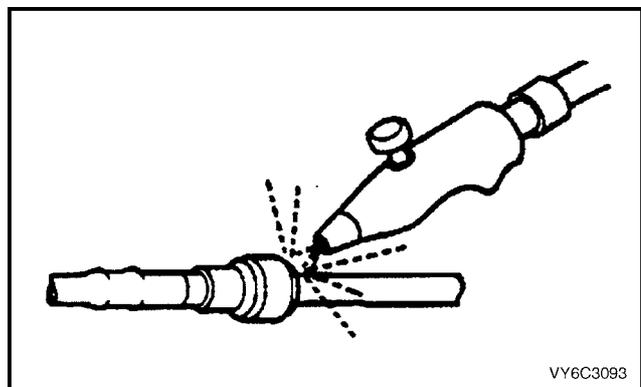


Figure 8A1 – 88

- 4 Choose the correct tool (1) to disconnect the quick-connect fitting, refer to Tool Nos. 7370 and 7371. Insert the tool into the female connector, then push inward to release the locking tabs.

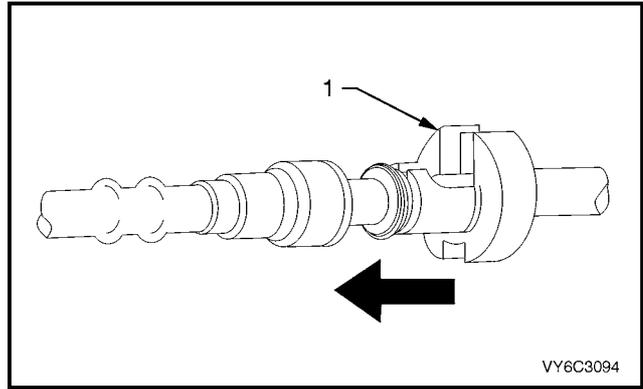


Figure 8A1 - 89

- 5 Pull the quick-connect fitting apart.

**NOTE**

If it is necessary to remove rust or burrs from a fuel pipe, use emery cloth in a radial motion with the fuel pipe end to prevent damage to the O-ring sealing surface.

- 6 Using a clean shop towel to wipe off the male pipe end.
- 7 Inspect both ends of the fitting for dirt and burrs. Clean or replace the components as required.

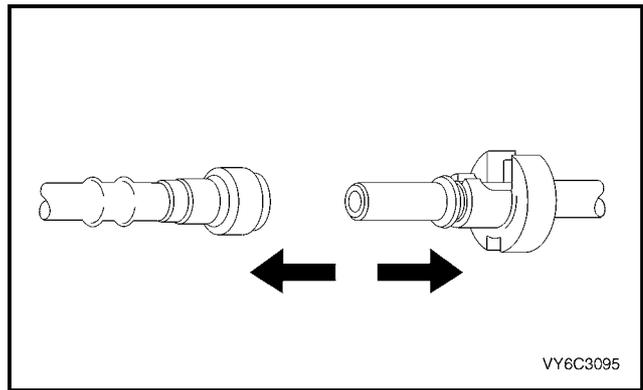


Figure 8A1 - 90

**Reinstall**

**CAUTION**

During normal operation, the O-ring located in the female connector swells. To ensure proper fitting, lubricate the male pipe end before assembly.

- 1 Apply a few drops of clean engine oil to the male pipe end.

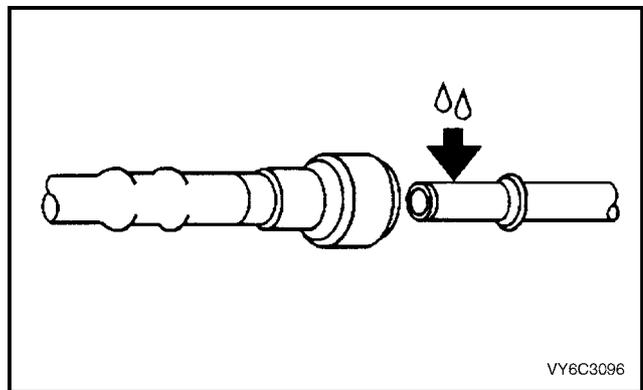


Figure 8A1 - 91

- 2 Push both sides of the quick-connect fitting together to snap the retaining tabs into place.

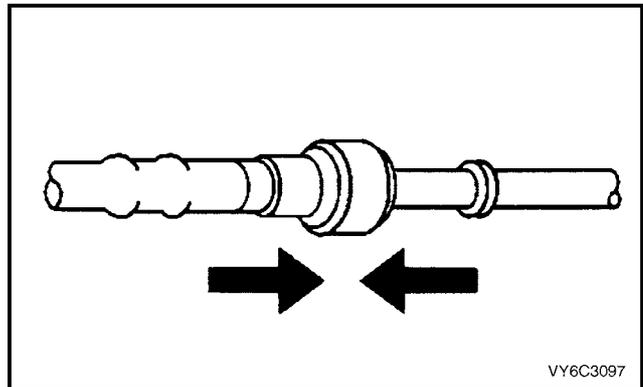


Figure 8A1 - 92

- 3 After installation, pull on both sides of the quick-connect fitting to ensure the connection is secure.

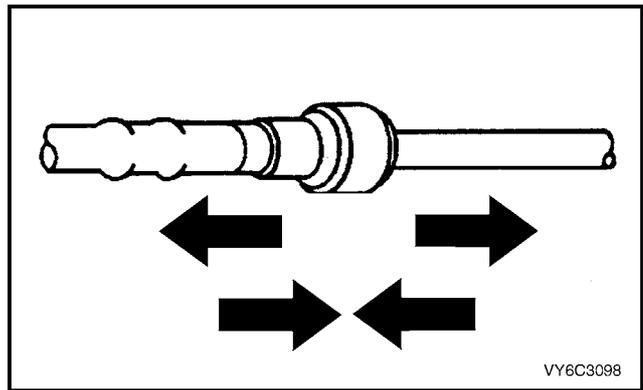


Figure 8A1 - 93

- 4 Reposition the dust cover over the quick-connect fitting (if fitted).

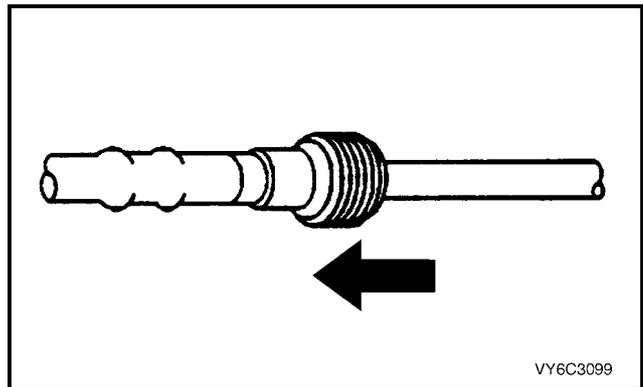


Figure 8A1 - 94

## Quick-connect Fittings (Plastic Collar)

### Remove

#### WARNING

To reduce the risk of fire or personal injury, relieve the fuel system pressure before servicing any fuel system components, refer to [4.1 Fuel System Depressurisation](#).

- 1 Grasp both sides of the quick-connect fitting. Twist the female side of the quick-connect fitting 1/4 turn in each direction to loosen any dirt.

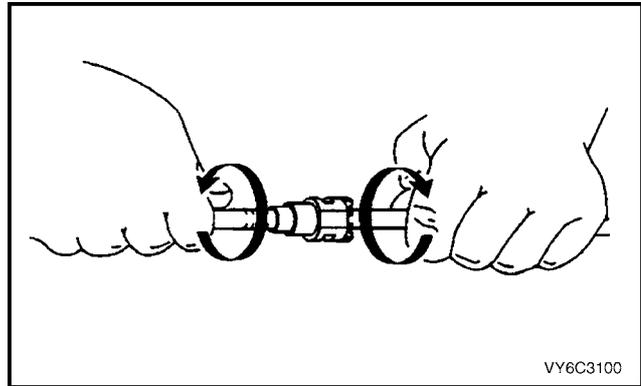


Figure 8A1 - 95

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 2 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

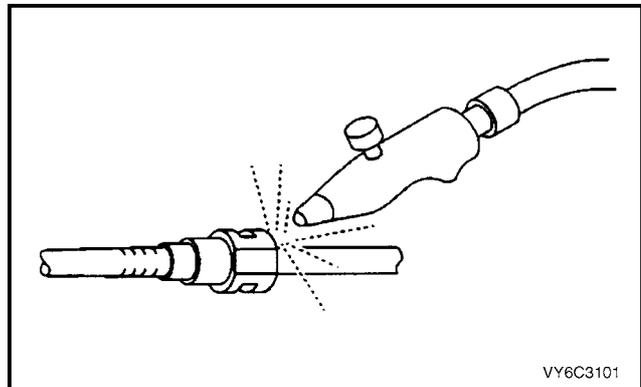


Figure 8A1 - 96

- 3 Squeeze the plastic retainer release tabs.

#### NOTE

Alternatively, use tool No. AU533 to release the quick connect fitting:

- red = 5/16-inch fittings (fuel vapour lines), or
- blue = 3/8-inch fittings (fuel feed lines).

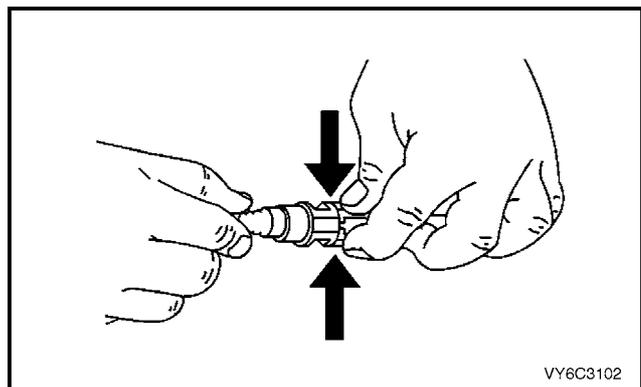


Figure 8A1 - 97

- 4 Pull the quick-connect fitting apart.

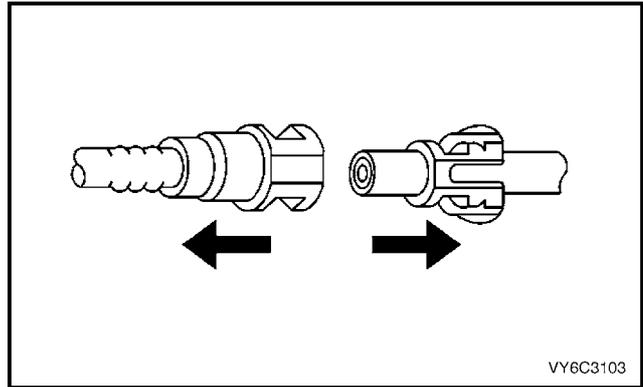


Figure 8A1 - 98

**Reinstall**

**CAUTION**

During normal operation, the O-ring located in the female connector swells. To ensure proper fitting, lubricate the male pipe end before assembly.

- 1 Apply a few drops of clean engine oil to the male pipe end.

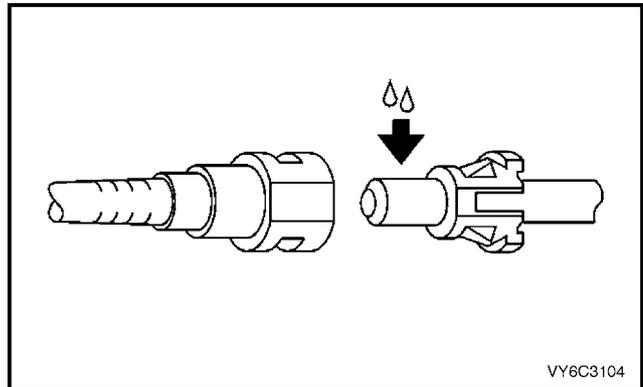


Figure 8A1 - 99

- 2 Push both sides of the quick-connect fitting together to snap the retaining tabs into place.

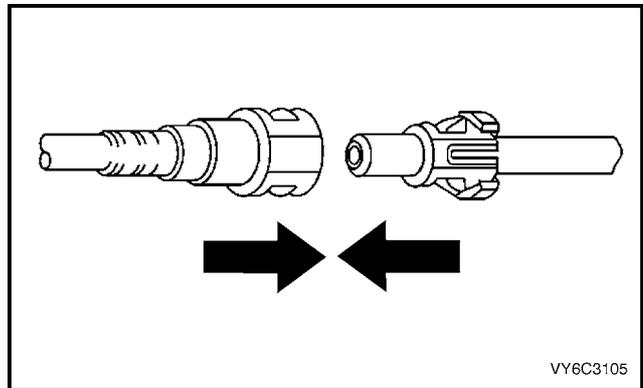


Figure 8A1 - 100

- 3 After installation, pull on both sides of the quick-connect fitting to ensure the connection is secure.

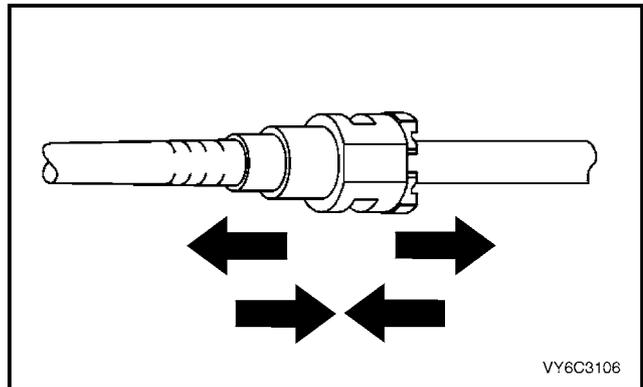


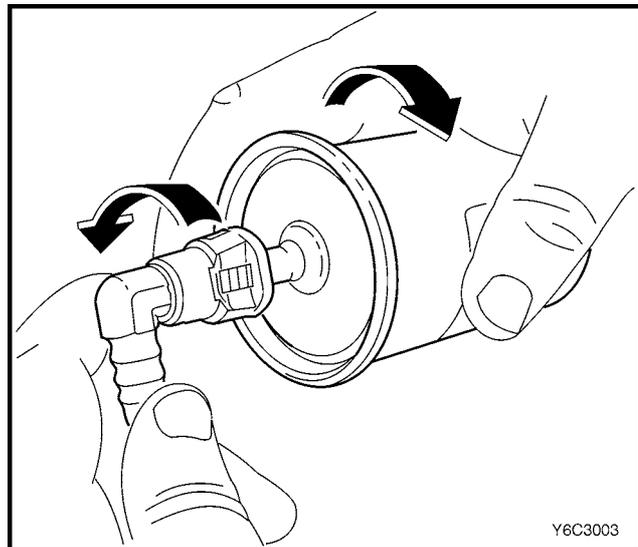
Figure 8A1 - 101

**Tool No. AU533**

This procedure describes the removal of the quick-connect fittings on the fuel filter using tool No. AU533. This procedure also applies to other quick-connect fittings.

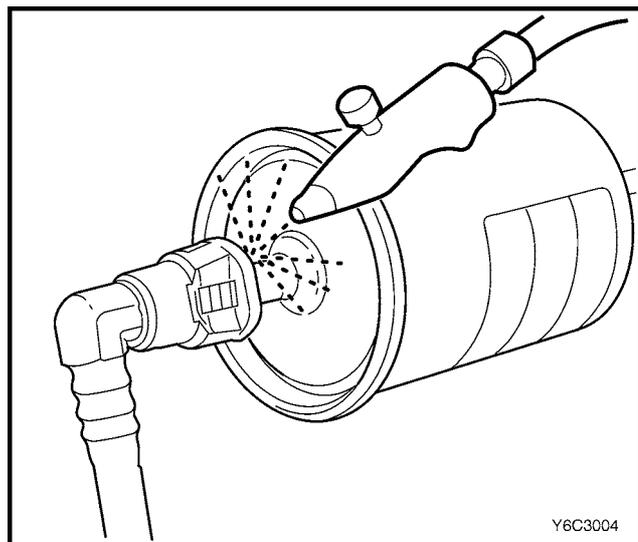
**Remove**

- 1 Grasp both sides of the quick-connect fitting. Twist the quick-connect fitting one quarter of a turn in each direction to loosen any dirt within the quick-connect fitting.

**Figure 8A1 - 102****WARNING**

**Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.**

- 2 Using compressed air, blow any dirt out of the quick-connect fitting.

**Figure 8A1 - 103**

- 3 Grasp the female part and firmly support the male part.
- 4 Squeeze the plastic retainer release tabs (1) on each side of the quick-connect fitting while pushing the quick-connect fitting firmly inwards to release any tension on the release tabs.

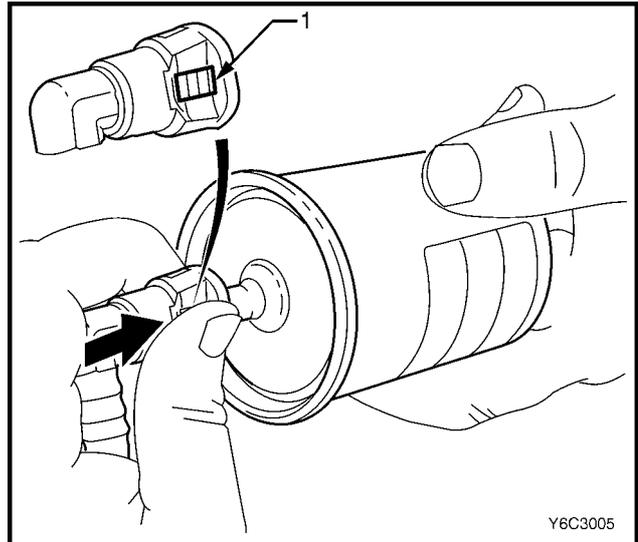


Figure 8A1 - 104

- 5 While pressing the release tabs, pull the quick-connect fitting apart.

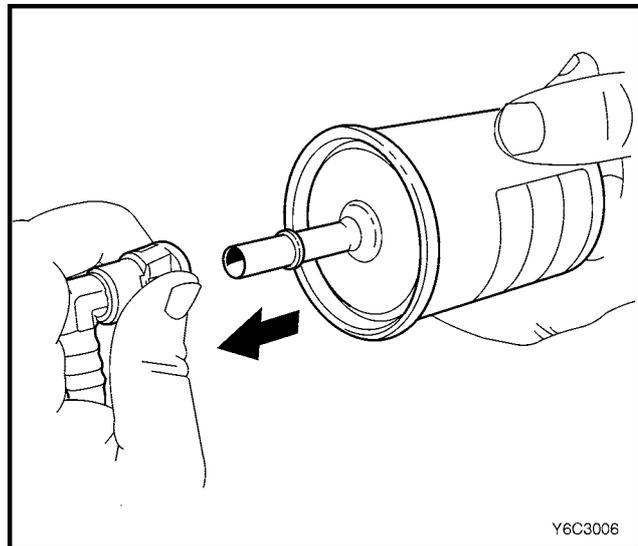


Figure 8A1 - 105

- 6 Alternatively, for step 3 to step 5 inclusive, use tool No. AU533 (1) to squeeze the release tabs and release the quick-connect fittings.

**NOTE**

Tool No. AU533 will work only with retainer tabs that sit proud of the connector body. Some filter connectors have flush retainers that can be pressed only by hand.

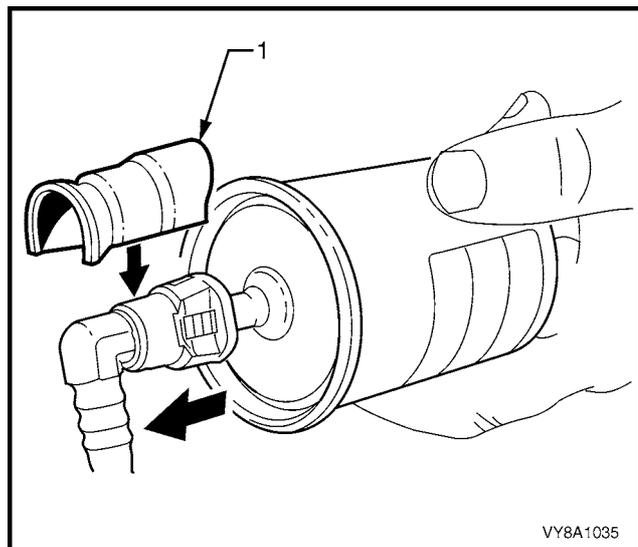
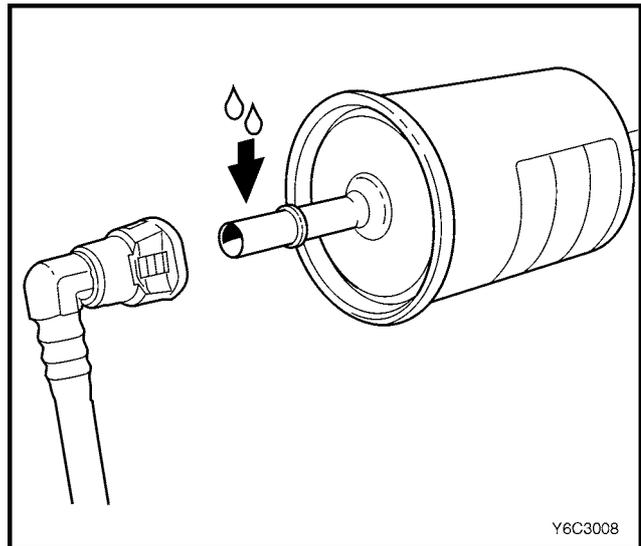


Figure 8A1 - 106

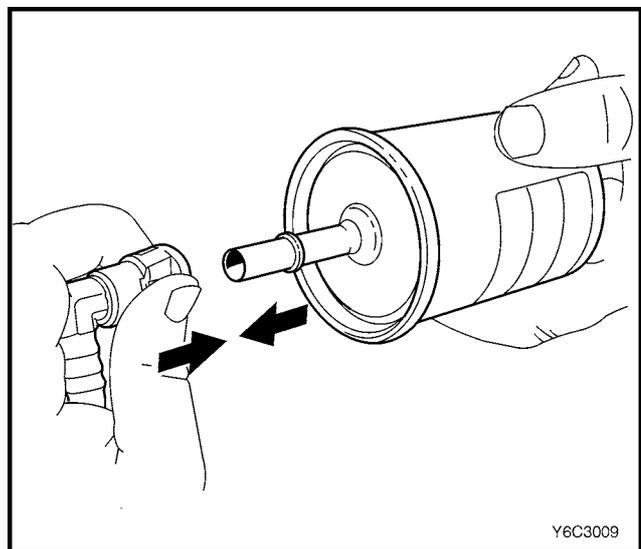
**Reinstall****CAUTION**

Before connecting quick-connect fittings, apply a few drops of clean engine oil to the male part. This ensures proper connection and prevents a possible fuel leak. During normal operation, the O-ring located in the female part swells and may prevent proper reconnection if not lubricated.

- 1 Apply a few drops of clean engine oil to each male part.

**Figure 8A1 - 107**

- 2 Push both parts of the quick-connect fitting together so the retaining tabs snap into place.

**Figure 8A1 - 108**

- 3 After installation, pull and push on the quick-connect fitting to ensure the connection is secure.

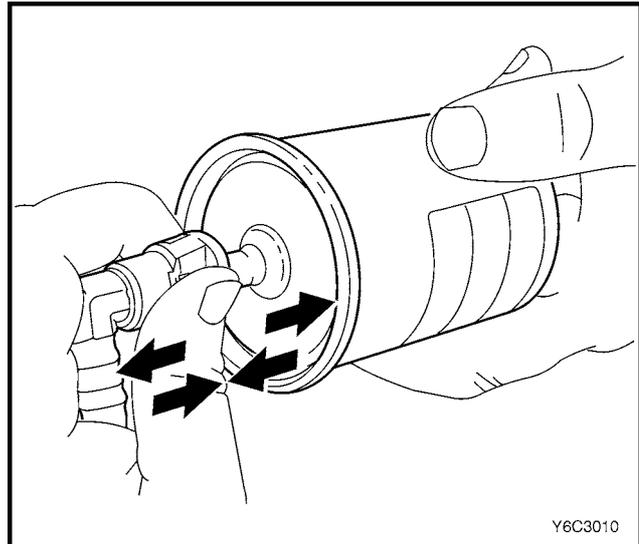


Figure 8A1 – 109

### Tool Nos. 7370 and 7371

#### Remove

Use tool Nos. 7370 and 7371 to disconnect the fuel lines at the engine as follows:

- 1 Open the quick-connect release tool (2) and place it over the fuel line (1).
- 2 Close the quick-connect release tool and pull it into the fuel line quick-connect fitting to disconnect the fuel line from the fuel pipe.

#### NOTE

Do not disconnect the fuel lines at the fuel rail. If the fuel lines are removed from the fuel rail, the fuel lines must be replaced.

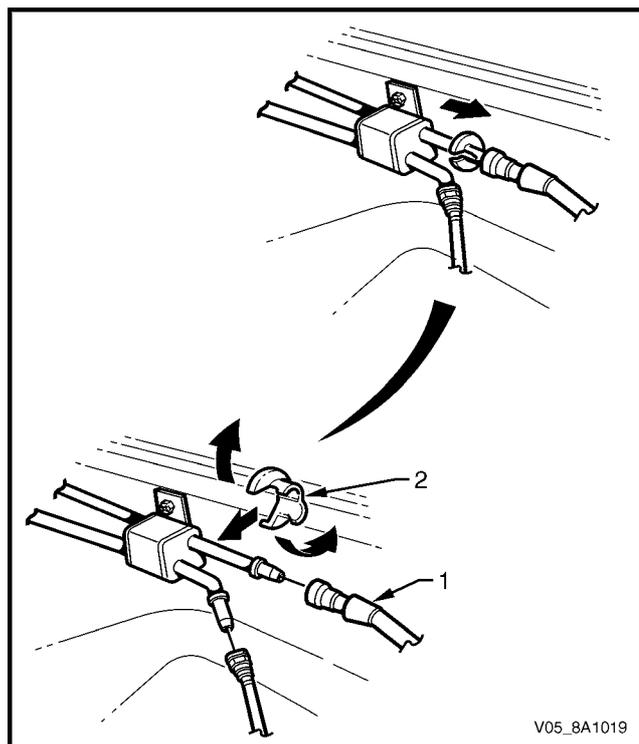


Figure 8A1 – 110

#### Reinstall

Reinstallation of the disconnected quick-connect fittings using tool Nos. 7370 and 7371 is the same as for tool No. AU533, refer to Tool No. AU533.

## 6.2 Fuel Tank Siphon Procedure

### WARNING

Fuel vapour remains in the modular fuel pump and sender assembly and fuel lines that can be spilled during service operations. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

For an exploded view of fuel tank components, refer to [Figure 8A1 – 10](#).

- 1 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).
- 2 Reinstall the fuel pump relay, refer to [Section 12O Fuses, Relays and Wiring Harnesses](#).

### CAUTION

Disconnecting the battery affects certain vehicle electronic systems. Refer to [Section 00 Warnings, Cautions and Notes](#) before dis-connecting the battery.

- 3 Disconnect the negative battery terminal.
- 4 Remove the fuel filler cap.

**NOTE**

Lubricate the fuel siphon hose with J36850 TransJel Transmission Assembly Lubricant or equivalent to aid hose insertion. Use only an approved lubricant.

- 5 Install J44284-2 flapper door holder (2) into the fuel filler neck to hold the door open.

**WARNING**

**Do not siphon, drain or store fuel into an open container, due to the possibility of fire or explosion, or contamination. Always use and approved fuel storage container.**

- 6 Insert the J45004-1 fuel tank siphon hose (1) into the fuel tank filler neck and gradually twist it until the tip of the hose meets the fuel tank check valve (3) and continues to the bottom of the fuel tank.
- 7 Use a hand-operated or air-operated pump device to siphon as much fuel through the fuel fill pipe as possible.

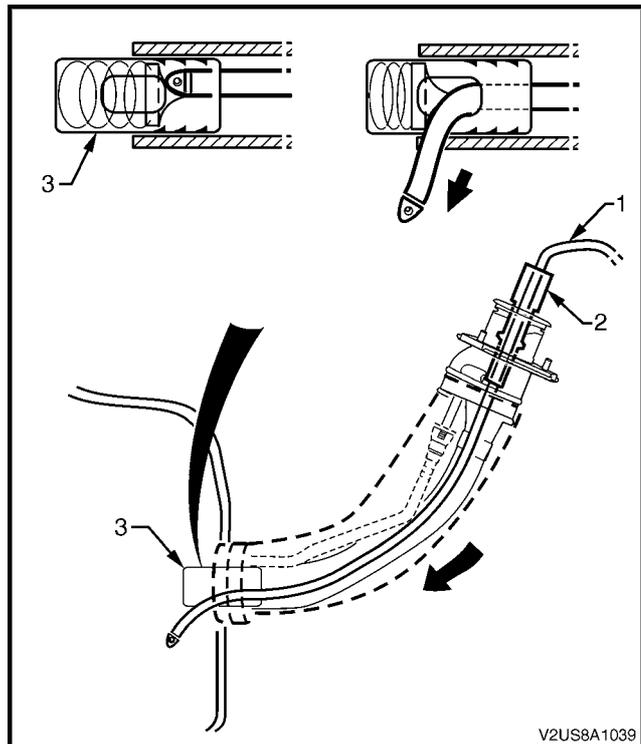


Figure 8A1 - 111

**WARNING**

**Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.**

**CAUTION**

**Do not use excessive force when removing the fuel siphon hose from the fuel filler neck. If the fuel siphon hose gets stuck upon removal, gently twist and tug the fuel siphon hose back and forth until it releases.**

**NOTE**

If fuel does not siphon from the fuel tank, the fuel siphon hose may have entered the fuel tank through a roof-facing check valve opening. If required, insert the J45004-1 fuel siphon hose (1) into the fuel tank filler neck, refer to Figure 8A1 - 111, but twist the fuel siphon hose 90° as it slides down the filler neck. This enables the fuel siphon hose to enter the fuel tank through a floor-facing check valve opening.

**NOTE**

The siphon procedure will not remove all fuel from the fuel tank. If required, fuel remaining in the fuel tank may be siphoned out through the top of the fuel tank, once the modular fuel pump and sender assembly is removed from the tank, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

- 8 Remove the siphon equipment.

## 6.3 Fuel Tank

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

For an exploded view of fuel tank components, refer to [Figure 8A1 - 10](#).

- 1 Siphon as much fuel as possible from the fuel tank, refer to [6.2 Fuel Tank Siphon Procedure](#).
- 2 Remove the frame assembly to access the fuel tank, refer to [Section 1A1 Body](#).
- 3 Disconnect the body wiring harness to fuel tank wiring harness connector (1) by pressing the release tang on the inboard face of the connector and pulling the connector from the fuel tank wiring harness connector (2).

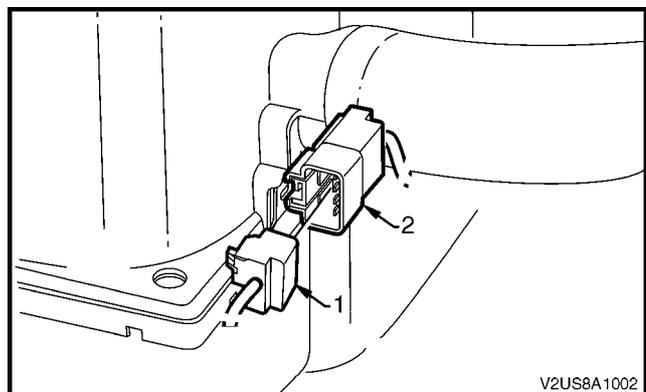
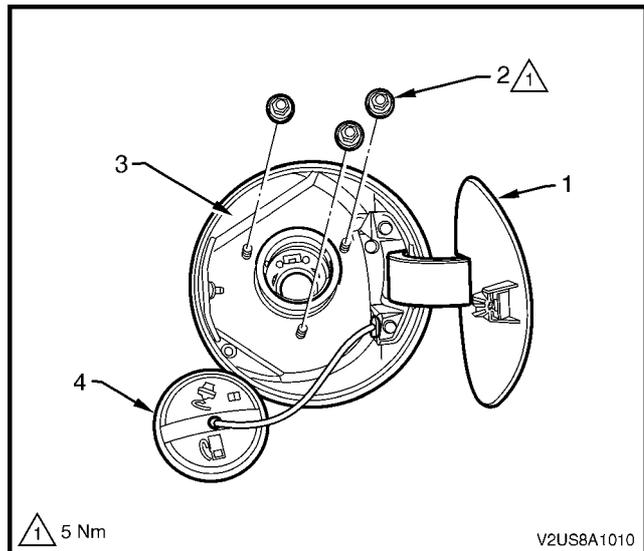


Figure 8A1 - 112

- 4 From behind the fuel filler door (1), unscrew the fuel filler cap (4) and cover the end of the fuel filler neck with a suitable material to prevent foreign objects from entering the fuel tank.
- 5 Remove the three nuts (2) securing the fuel filler neck to the fuel filler pocket (3).

**Figure 8A1 – 113**

- 6 From underneath the vehicle, refer to Figure 8A1 – 114:
  - a Disconnect the fuel feed line quick-connect fitting (1) using tool No. AU533 (3/8-inch), refer to Tool No. AU533.
  - b Disconnect the fuel tank to fuel feed line quick-connect fitting (2) and place the feed line in a safe location away from the immediate worksite.
  - c Remove the fuel tank vent line quick-connect fitting (3).

**NOTE**

After removing the fuel tank vent line quick-connect fitting (1), it may be necessary to tug the fuel tank vent line downwards to clear the quick-connect fitting from the underbody panelling. This enables enough room to disconnect the quick-connect fitting.

**NOTE**

For general information on correct servicing procedures using quick-connect fittings, refer to [6.1 Quick-connect Fittings](#).

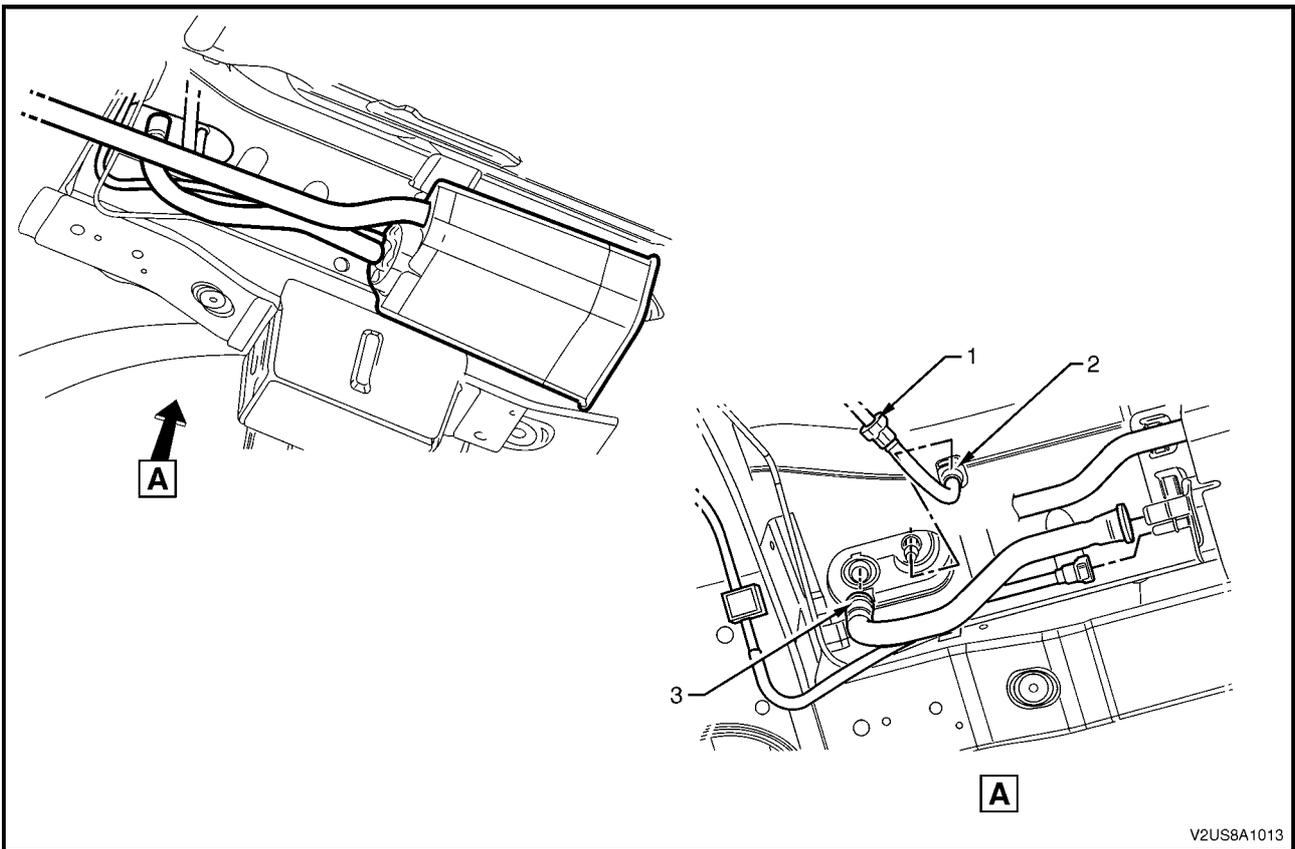


Figure 8A1 - 114

**Legend**

- |   |  |
|---|--|
| <p>1 Fuel Feed Line Quick-connect Fitting</p> <p>2 Fuel Tank to Fuel Feed Line Quick-connect Fittings</p> | <p>3 Fuel Tank Vent Line Quick-connect Fitting</p> |
|---|--|

- d If required, remove the rear underbody air deflector to vehicle fastening bolts and nuts to allow the rear underbody air deflector to be pulled down. This allows improved access to the fuel tank lower mounting strap nuts (1), refer to [Section 1A1 Body](#).

**NOTE**

The rear underbody air deflector is shown fully removed for visual purposes only. Full removal of the rear underbody air deflector is not essential for this procedure.

- 7 Lower the vehicle. From within the rear compartment, remove both fuel tank upper mounting strap nuts (1) and remove both mounting straps (3), refer to Figure 8A1 - 116.

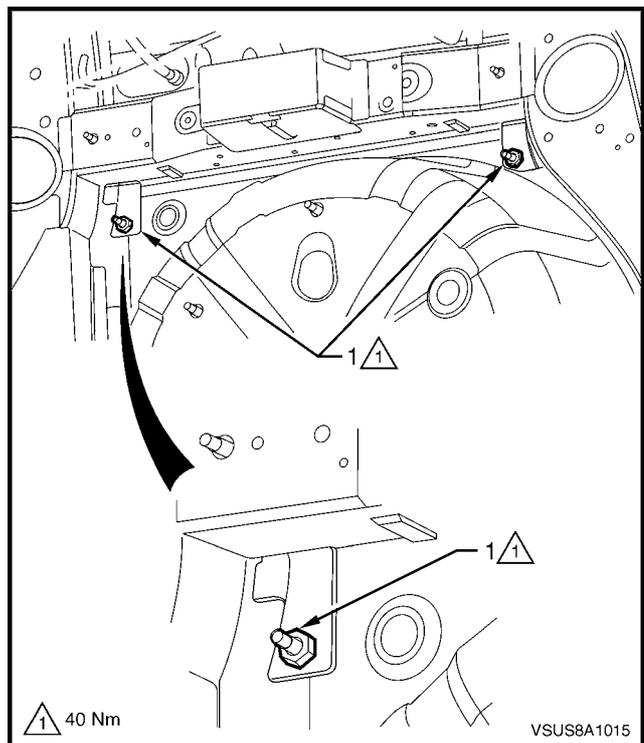


Figure 8A1 - 115

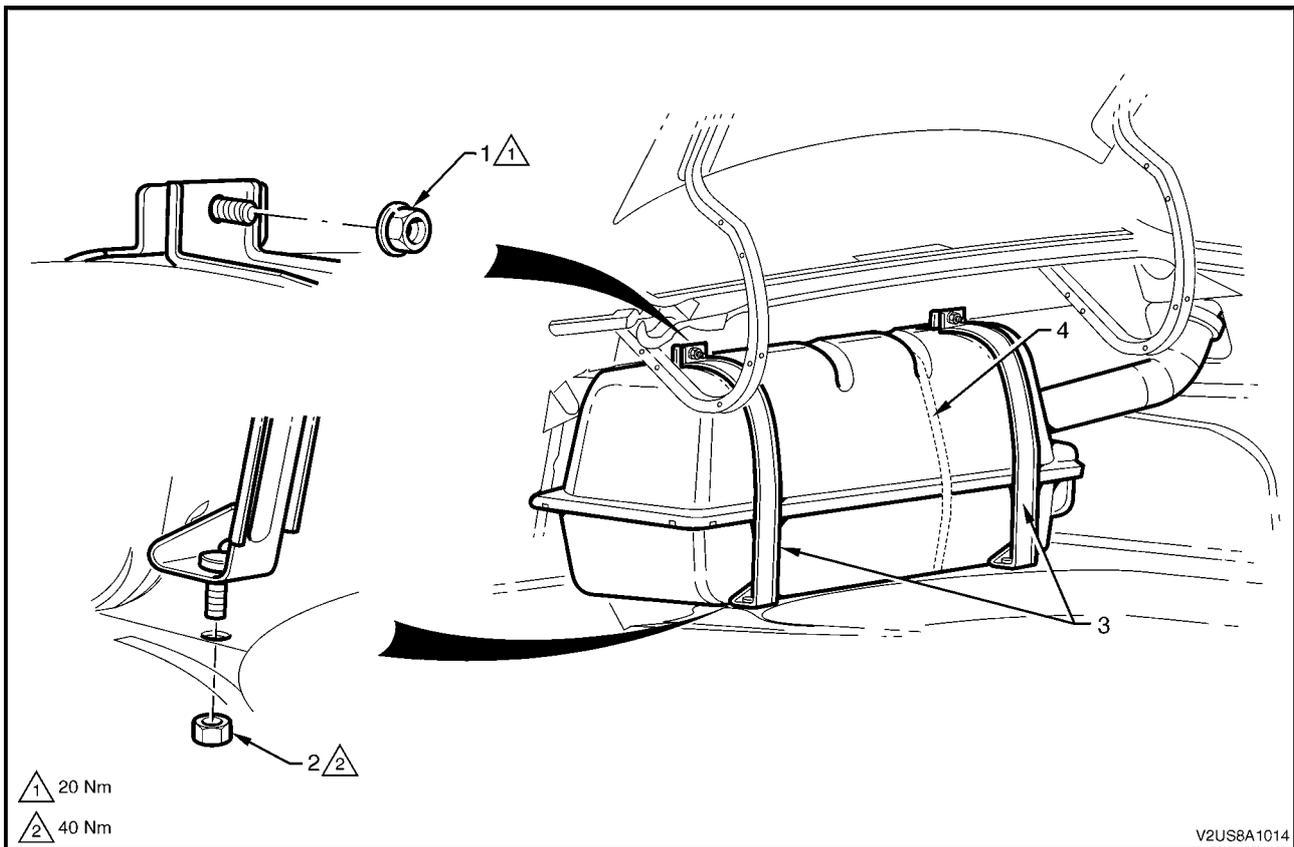


Figure 8A1 – 116

**Legend**

- |   |   |   |                |
|---|---|---|----------------|
| 1 | Mounting Strap Upper Fastening Nut (2 places) | 3 | Mounting Strap |
| 2 | Mounting Strap Lower Fastening Nut (2 places) | 4 | Shipping Strap |

**WARNING**

**The fuel tank will still contain fuel and may be heavy. Ensure appropriate workshop lifting practices are used during removal of the fuel tank.**

- 8 With the assistance of another person, remove the fuel tank and fuel filler neck from the vehicle.
- 9 If installed, cut and dispose of the shipping strap (4), refer to Figure 8A1 – 116.

**NOTE**

The shipping strap is used for fuel tank shipping purposes only and does not require reinstallation.

- 10 Unclip the fuel tank to body wiring harness connector (1) from its mounting clip (2) that connects onto the lower plastic fuel tank shell.

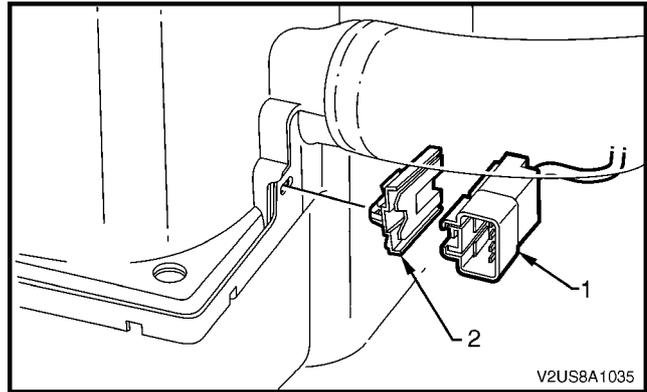


Figure 8A1 - 117

- 11 Using keystone clamp pliers J22610 (1), position the jaws across the clamp ear (2) and cut through to release both clamps (3 and 4). Dispose of the used clamp.

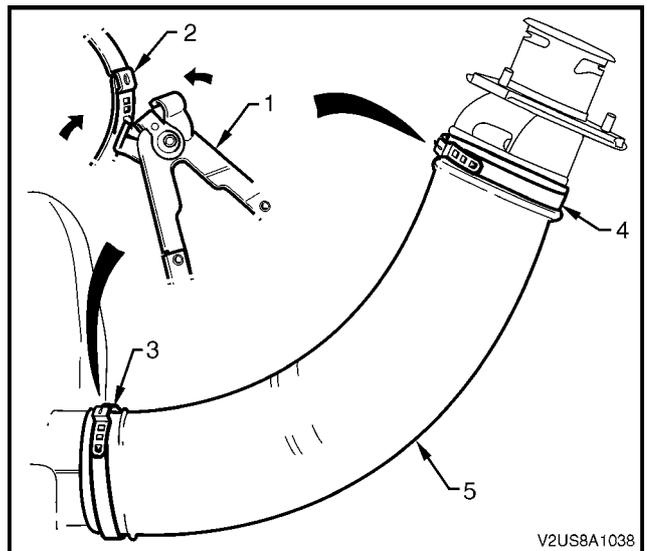


Figure 8A1 - 118

- 12 Manipulate the Santoprene® hose (1) away from the filler neck flange moulding (2) and down the fuel filler neck.
- 13 Disconnect the fuel tank vapour recirculation line quick-connect fitting (4). If required, use tool No. AU533 to assist disconnection of quick-connect fitting, refer to Tool No. AU533.

**NOTE**

For information on quick-connect fittings, refer to [6.1 Quick-connect Fittings](#).

- 14 Manipulate the Santoprene® hose away from the fuel tank cover flange (3).

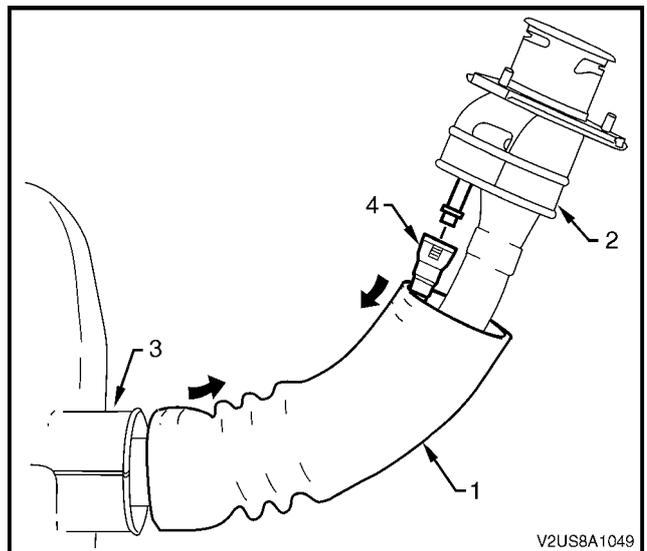


Figure 8A1 - 119

- 15 Wedge a large flat-bladed screwdriver between the side skirting of each of the upper and lower plastic fuel tank shells (1 and 2), and pull the eight clipping points (4) free to separate and remove the upper plastic fuel tank shell.
- 16 Lift and remove the fuel tank (3) from the lower plastic fuel tank shell.

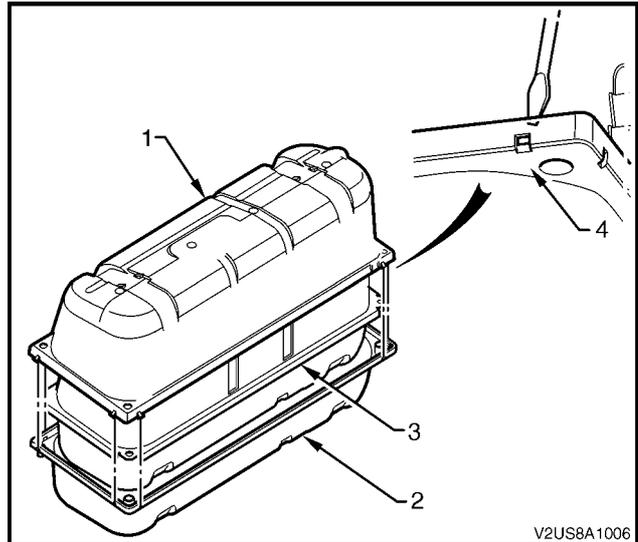


Figure 8A1 - 120

- 17 If removal of the fuel filler neck assembly is required, loosen the hose-clamp (2) attaching the fuel tank filler neck throat to the fuel filler neck flexible hose and prise the flexible hose (1) from the fuel tank filler neck throat (3). Place the fuel filler neck assembly, Santoprene® hose and hose-clamp in a safe location away from the immediate worksite.
- 18 Cover the fuel tank filler neck throat with a suitable material to prevent foreign objects from entering the fuel tank.

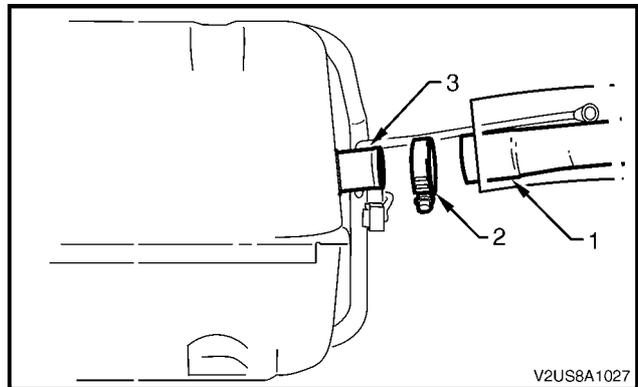


Figure 8A1 - 121

- 19 If disassembly of the fuel filler neck assembly is required, loosen the hose-clamp (1) attaching the flexible hose to the fuel filler neck pipe (2). Pull the flexible hose and fuel filler neck pipe apart to separate.
- 20 Cover the fuel tank opening with a suitable material to prevent foreign objects from entering the fuel tank.

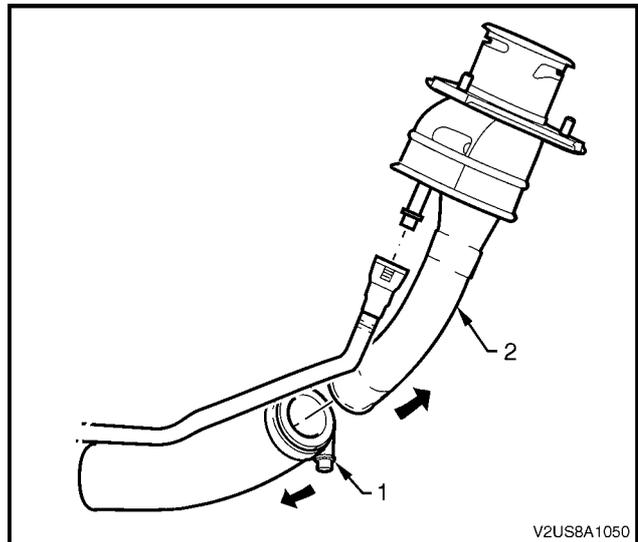


Figure 8A1 - 122

- 21 Disconnect the fuel tank pressure sensor connector (1), the fuel pump connector (2) and the fuel vapour line quick-connect (3), using tool No. AU533 (3/8-inch), from the modular fuel pump and sender assembly cover (4), refer to Tool No. AU533.
- 22 Cover the fuel vapour line quick-connect fitting with a suitable material to prevent foreign objects from entering the fuel tank.

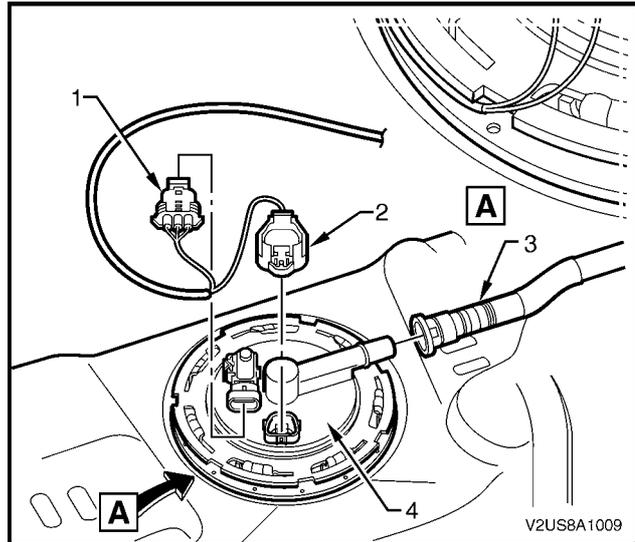


Figure 8A1 – 123

- 23 Remove the flanged nut (1) securing the modular fuel pump and sender assembly ground terminal (2) to the fuel tank flange stud (3) and remove the fuel tank wiring harness.

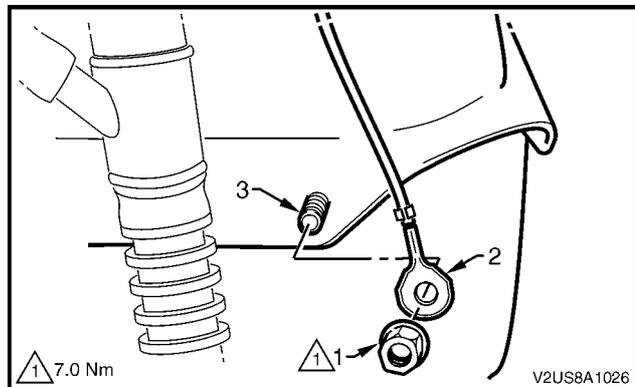


Figure 8A1 – 124

- 24 If required, remove the modular fuel pump and sender assembly, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

## WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

## Reinstall

Reinstallation of the fuel tank is the reverse of the removal procedure, noting the following:

- 1 Tighten the modular fuel pump and sender assembly earthing terminal nut to the correct torque specification.

Fuel pump and sender assembly earthing terminal nut torque specification .....	7.0 Nm
--	--------

- 2 When installing the fuel tank assembly into the lower plastic fuel tank shell, ensure the fuel vapour recirculation line outlet is positioned through the slot provided in the lower plastic fuel tank shell.
- 3 Fit each end of the Santoprene® hose over the fuel tank cover flange and filler neck flange, and locate new ear-type clamps at each end. Use keystone clamp pliers (tool No. J22610 or equivalent) to crimp the clamp ears to fasten.
- 4 Tighten both fuel tank upper mounting strap nuts to the correct torque specification.

Fuel tank upper mounting strap fastening nut torque specification .....	20.0 Nm
---	---------

- 5 Tighten both fuel tank lower mounting strap nuts to the correct torque specification.

Fuel tank lower mounting strap fastening nut torque specification .....	40.0 Nm
---	---------

- 6 Tighten the three nuts securing the fuel filler neck to the fuel filler pocket to the correct torque specification.

Fuel filler neck to fuel filler pocket fastening nut torque specification .....	5.0 Nm
---	--------

- 7 Fully install the fuel filler cap onto the fuel filler neck.
- 8 Before starting the vehicle, perform a fuel system leak test, refer to [4.3 Fuel Leak Test](#).

## 6.4 Fuel Filler Neck Assembly

### **WARNING**

To reduce the risk of fuel spillage in the rear compartment, do not remove the fuel filler neck assembly without also removing the fuel tank. Removal and disassembly of the fuel filler neck assembly from the fuel tank forms part of the fuel tank removal procedure, refer to [6.3 Fuel Tank](#).

## 6.5 Modular Fuel Pump and Sender Assembly

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the modular fuel pump and sender assembly and fuel lines that can be spilled during service operations. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

#### WARNING

Removal of the fuel tank from the vehicle is recommended for this service procedure to reduce the risk of fuel spillage within the rear luggage compartment, refer to [6.3 Fuel Tank](#).

#### CAUTION

Before proceeding, clean all traces of dirt and other foreign material from the top of the fuel tank, near the modular fuel pump and sender assembly. Use compressed air to ensure all dirt and foreign materials are removed from all appropriate fuel system connectors before disconnection.

- 1 Remove the fuel tank assembly from the vehicle to access the modular fuel pump and sender assembly and remove the upper fuel tank plastic shell, refer to 6.3 Fuel Tank.
- 2 Disconnect the fuel tank pressure sensor connector, fuel pump connector and fuel vapour line quick-connect fitting from the modular fuel pump and sender assembly cover, refer to 6.3 Fuel Tank.

**CAUTION**

Ensure tool No. J45722 is seated firmly and positively in the modular fuel pump and sender assembly cover retainer lock ring while removing the modular fuel pump and sender assembly.

**CAUTION**

Assistance will be required to hold the tank in position during this procedure; if not held adequately, you may slip and damage the modular fuel pump and sender assembly.

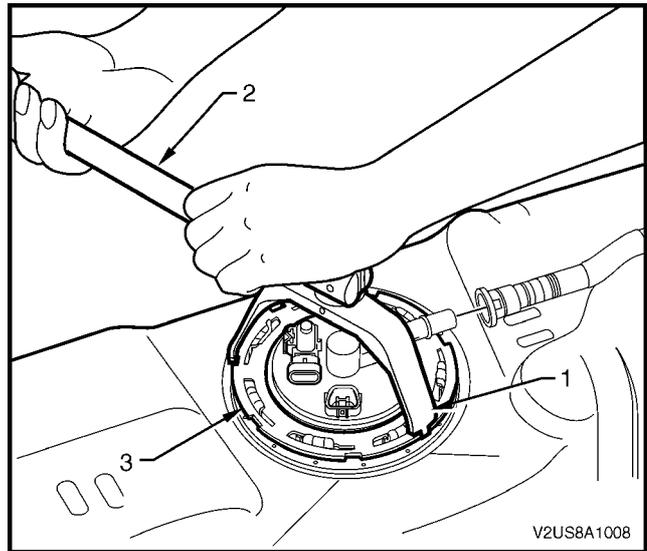


Figure 8A1 - 125

- 3 Using tool No. J45722 (1) and a half-inch breaker bar (2), remove the modular fuel pump and sender assembly cover retainer lock ring (3) by turning it anticlockwise.
- 4 Remove the modular fuel pump and sender assembly cover retainer lock ring.

**NOTE**

The modular fuel pump and sender assembly cover springs up when the retainer is removed.

- 5 Partially lift the modular fuel pump and sender assembly away from the fuel tank, taking care not to damage the fuel level sender assembly.
- 6 Disconnect the fuel vapour line quick-connect fitting (1) from the underside of the modular fuel pump and sender assembly cover.

**NOTE**

If required, use tool No. AU533 to remove the fuel vapour line quick-connect fitting, refer to Tool No. AU533.

- 7 Reach into the fuel tank opening and disconnect the fuel feed line quick-connect fitting (2).

**WARNING**

The reservoir will be full of fuel. When the modular fuel pump and sender assembly is removed from the fuel tank, pour any remaining fuel in the reservoir into a suitable container. Do not drain or store fuel into an open container, due to the possibility of fire or explosion.

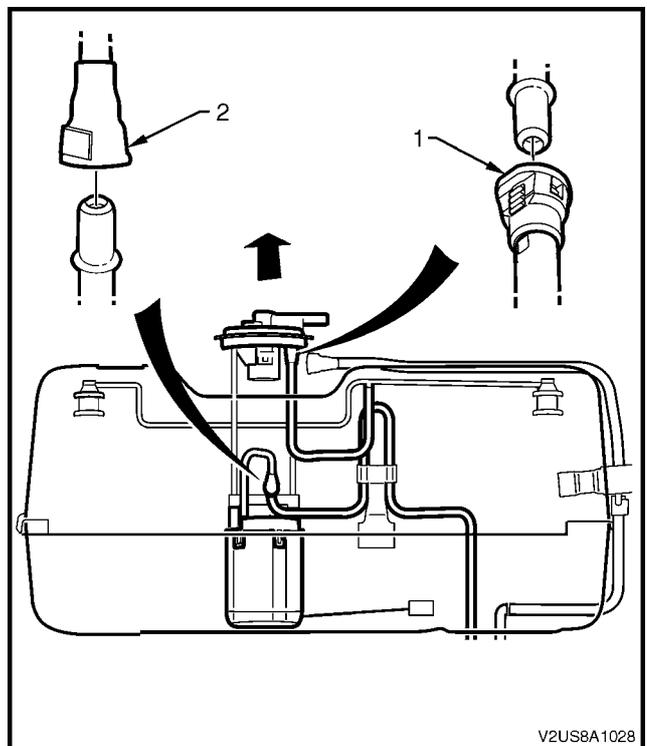


Figure 8A1 - 126

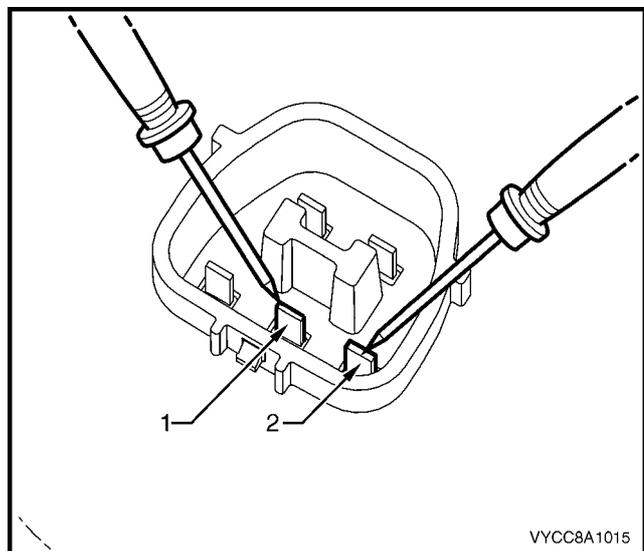
**WARNING**

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

- 8 Remove the modular fuel pump and sender assembly.
- 9 Remove and discard the O-ring.
- 10 Check the underside of the reservoir to ensure there are three rubber isolator feet attached to the bottom. If one or more are missing, retrieve each from within the fuel tank and reinstall.

**Test**

- 1 Measure the resistance across the positive (1) and negative (2) fuel level sender terminals of the fuel pump motor connector. Take the following measurements:
  - a With the fuel level sender assembly in the empty position, the resistance should be  $40\ \Omega$  ( $\pm 2.5\ \Omega$ ).
  - b With the fuel level sender assembly rotated to full position, the resistance should be  $248\ \Omega$  ( $\pm 3.5\ \Omega$ ).
- 2 If the resistance at either of these positions is not within tolerance, replace the fuel level sender assembly, refer to [6.6 Fuel Level Sender Assembly](#).

**Figure 8A1 - 127**

## Disassemble

**CAUTION**

Do not touch the ceramic variable resistor card; if it is touched inadvertently, clean it immediately with isopropyl alcohol.

- 1 Prise the tang open that holds the fuel level sender float and arm onto the nylon wiper piece.
- 2 Lift the fuel level sender float and arm away from the nylon wiper piece and place in a safe location away from the immediate worksite.

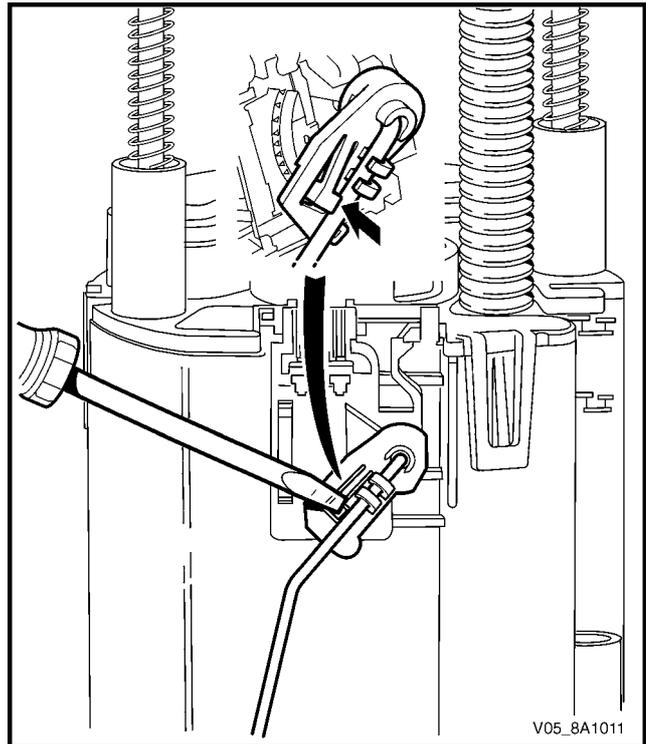


Figure 8A1 - 128

- 3 Lift the nylon wiper piece off the ceramic variable resistor card holder, then place in a safe location away from the immediate worksite.

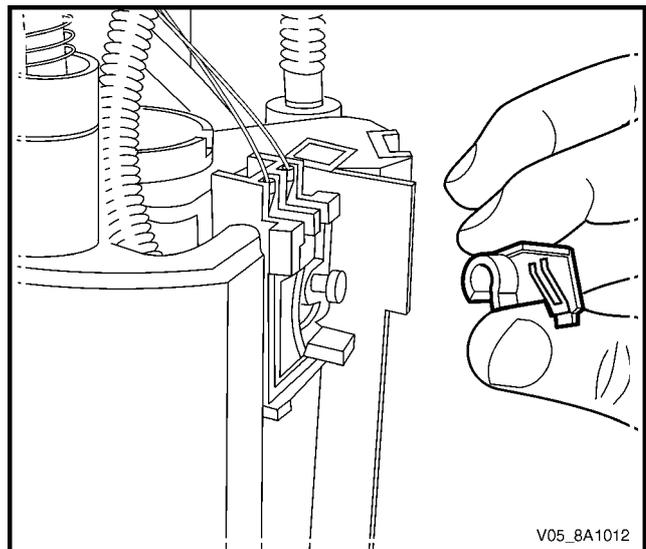


Figure 8A1 - 129

- 4 Remove the 3-pin connector (the fuel level sender assembly wires) from underneath the modular fuel pump and sender assembly cover.

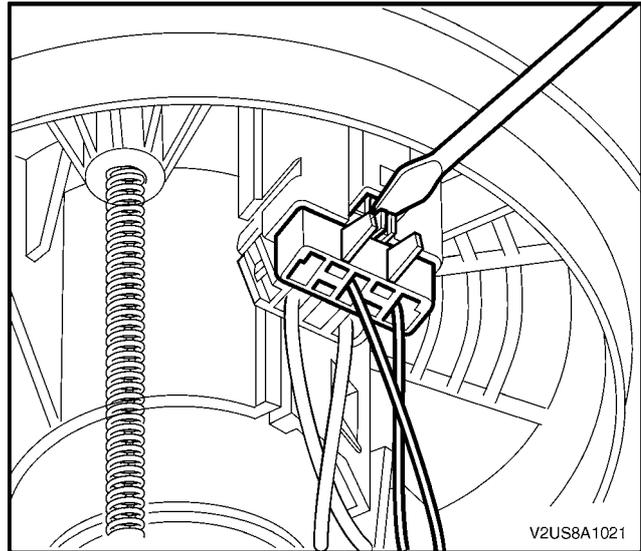


Figure 8A1 - 130

- 5 Remove the 2-pin connector (the fuel pump motor wires) from underneath the modular fuel pump and sender assembly cover.

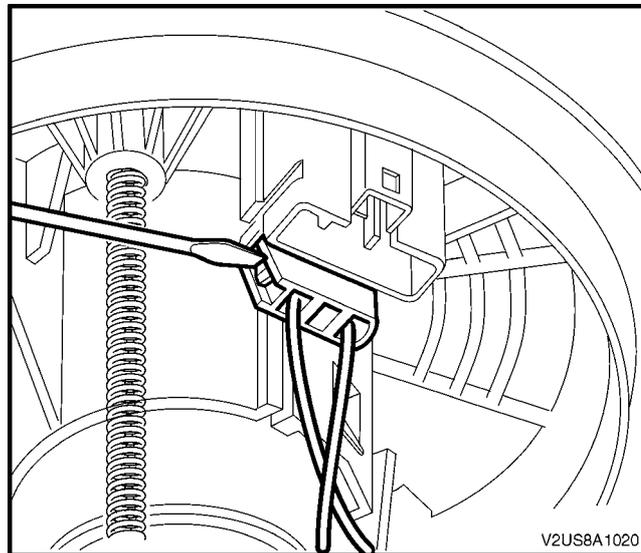


Figure 8A1 - 131

- 6 Press in the tang retaining the 2-pin connector on the fuel pump and suction filter assembly, then remove the connector.

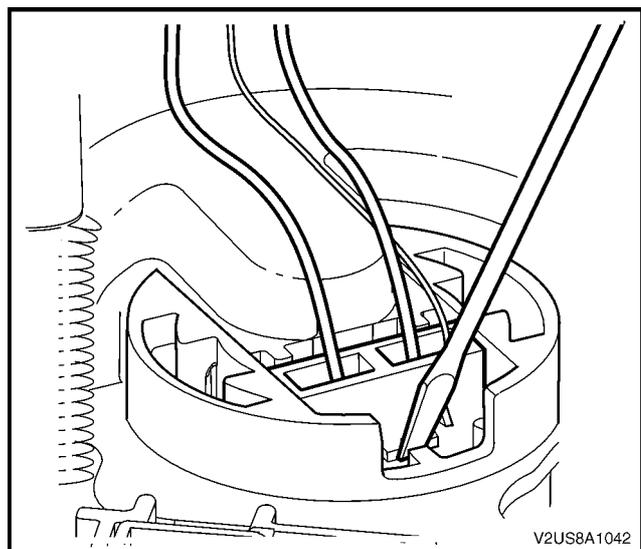


Figure 8A1 - 132

- 7 Prise the tang open that holds the ceramic variable resistor card holder (1) to the side of the reservoir, then lift it off the reservoir.

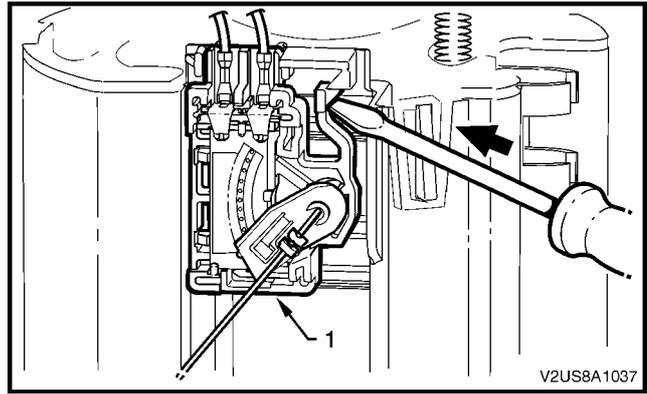


Figure 8A1 - 133

- 8 Prise the four tangs (1) with a flat-bladed screwdriver, then remove the fuel pump and suction filter assembly, and modular fuel pump and sender assembly cover from the reservoir.

**NOTE**

Another person may have to assist in removing the fuel pump and suction filter assembly from the reservoir.

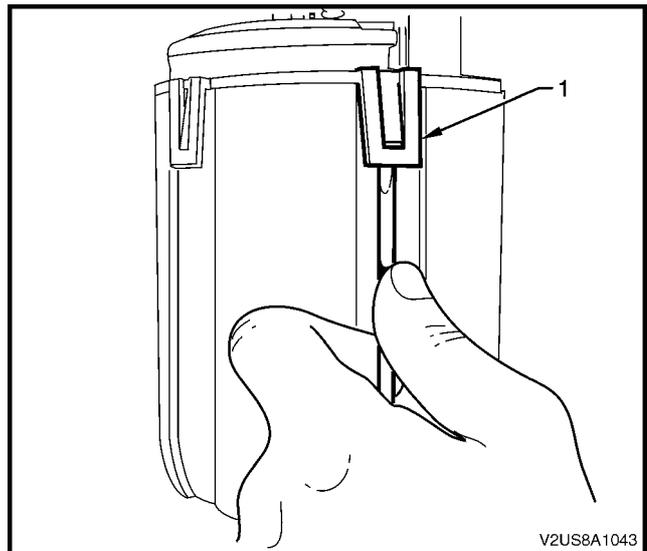


Figure 8A1 - 134

**CAUTION**

Do not bend the spade connector on the pressure regulator holder; this can be easily damaged or broken.

- 9 Pull the modular fuel pump and sender assembly cover, pressure regulator holder (1), and fuel pump and suction filter assembly from the reservoir body (2).

**NOTE**

Some difficulty may be experienced when lifting these items from the reservoir body due to the limited space available.

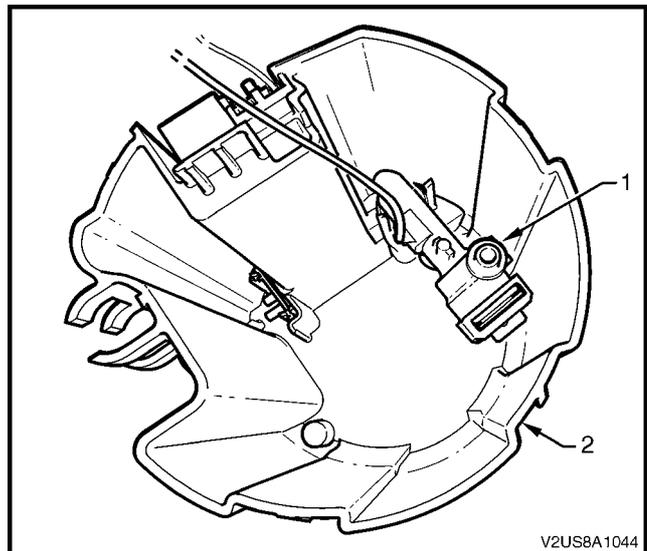


Figure 8A1 - 135

- 10 Remove and discard the O-ring from the bottom of the pressure regulator holder.

**NOTE**

The O-ring may be lodged in the reservoir body.

- 11 Remove and discard the O-ring from the top of the pressure regulator holder.

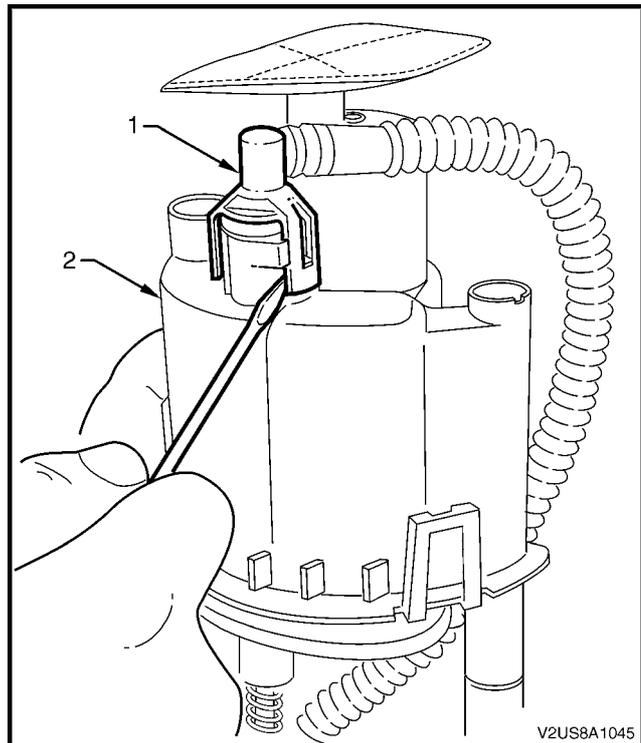
**NOTE**

The O-ring may be lodged in the base of the fuel pump and suction filter assembly.

- 12 Prise open both tangs on the fuel outlet connector (1) on the bottom of the fuel pump and suction filter assembly, then remove the fuel outlet pipe from the fuel pump and suction filter assembly.
- 13 Remove and discard the O-ring from the fuel feed line outlet underneath the fuel pump and suction filter assembly.

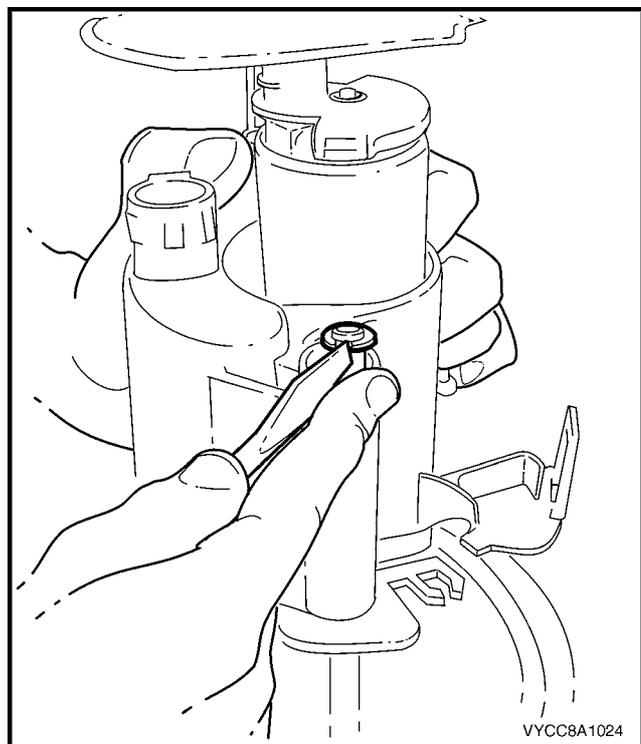
**NOTE**

The O-ring may remain in the base of the fuel pump and suction filter assembly.



**Figure 8A1 - 136**

- 14 Push the fuel pump and suction filter assembly down the sprung shafts and remove the circlip (only one shaft is fitted with a circlip) from the end of the shaft. Place the circlip in a safe location away from the immediate worksite.



**Figure 8A1 - 137**

## Reassemble

The procedure for reassembling the modular fuel pump and sender assembly is the reverse of the disassembly procedure, noting the following:

- 1 Locate and press the fuel outlet connector to its position on the bottom of the fuel pump and suction filter assembly, refer to Figure 8A1 – 136.
- 2 Locate and push the modular fuel pump and sender assembly cover down the sprung shafts, then press the circlip into the slot provided at the tip of one of the shafts.
- 3 Fit a new O-ring onto the bottom of the pressure regulator holder, refer to [Figure 8A1 – 144](#). Firmly press the pressure regulator holder into position inside the reservoir, refer to Figure 8A1 – 135.
- 4 Ensure the wires to both electrical connectors and the ceramic variable resistor card are inboard of the fuel feed pipe.
- 5 Ensure the wires to the ceramic variable resistor card and both connectors do not interfere when reassembling the fuel pump and suction filter assembly into the reservoir.

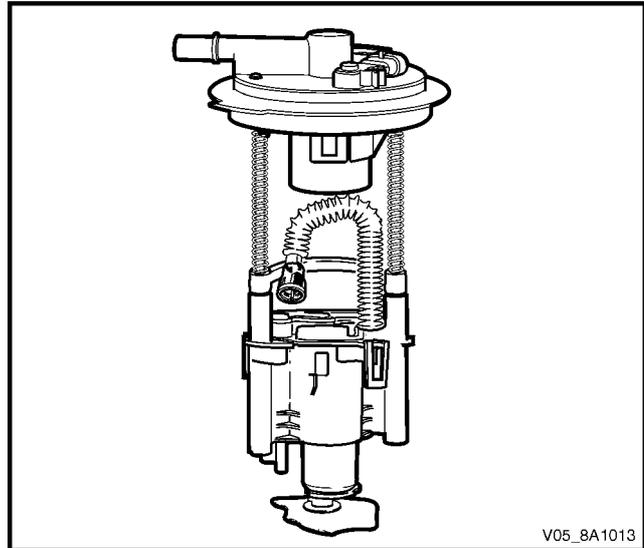


Figure 8A1 – 138

## Reinstall

Reinstallation of the modular fuel pump and sender assembly is the reverse of the removal procedure, noting the following:

### CAUTION

When installing the modular fuel pump and sender assembly, use only the custom-sized O-rings supplied with the modular fuel pump and sender assembly replacement parts kit. Do not use off-the-shelf O-rings; refer to [6.11 Modular Fuel Pump and Sender Assembly O-rings](#) for O-ring specifications.

- 1 Position a new O-ring seal in the fuel tank recess.
- 2 Rest the modular fuel pump and sender assembly on a flat surface.
- 3 Measure the distance between the bottom of the fuel sender float and the flat surface.
- 4 Ensure the bottom of the fuel level sender float is a nominal 7–14 mm above the surface. If not, carefully bend the fuel level sender float arm to achieve the required distance.

### NOTE

Do not damage the fuel level sender float and arm when placing the modular fuel pump and sender assembly into the fuel tank.

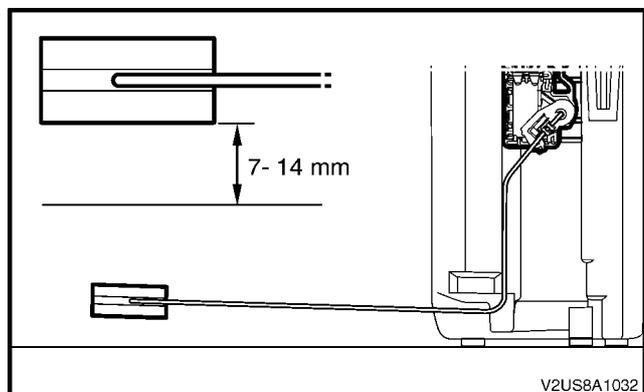


Figure 8A1 – 139

- 5 Install the modular fuel pump and sender assembly into the fuel tank, taking care not to damage the fuel level sender float and arm.

- 6 Ensure the locator in the modular fuel pump and sender assembly cover engages in the slot in the fuel tank opening.

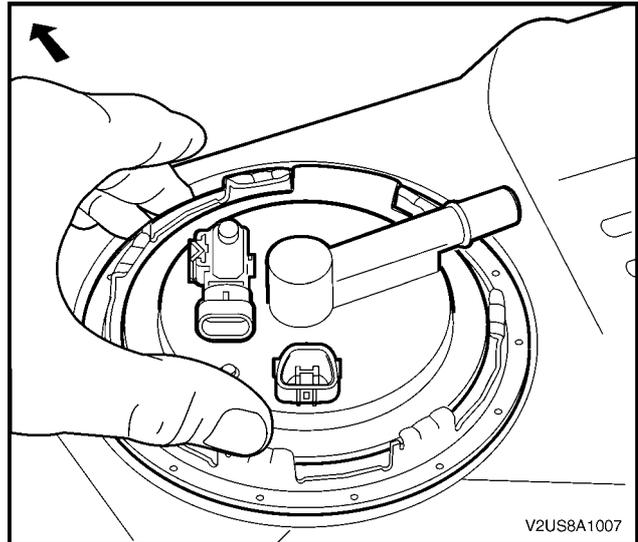


Figure 8A1 – 140

### WARNING

Ensure the lock ring is installed correctly. Incorrect installation of the modular fuel pump and sender assembly retainer could cause fuel vapour leakage.

### CAUTION

Ensure tool No. J45722 is seated firmly and positively in the modular fuel pump and sender assembly cover retainer lock ring while tightening the modular fuel pump and sender assembly.

### CAUTION

Assistance will be required to hold the tank in position during this procedure; if not held adequately, you may slip and damage the modular fuel pump and sender assembly.

- 7 Using tool No. J45722 (1) and a half-inch breaker bar (2), install the modular fuel pump and sender assembly cover retainer lock ring (3) by turning it clockwise, refer to [Figure 8A1 – 125](#).
- 8 Install the fuel tank pressure sensor connector (1), fuel pump connector (2) and fuel vapour line quick-connect fitting (3) to the modular fuel pump and sender assembly cover (4), refer to [Figure 8A1 – 123](#).
- 9 Tighten the modular fuel pump and sender assembly cover retainer lock ring.

## 6.6 Fuel Level Sender Assembly

The fuel level sender assembly is serviced as a complete assembly and attaches to the side of the modular fuel pump and sender assembly reservoir. Testing, removal and reinstallation of the fuel level sender assembly are contained within the modular fuel pump and sender assembly service procedures, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

## 6.7 Suction Filter

The suction filter is attached by an 'easy washer' to the fuel pump end cap. The suction filter is accessible after removal of the fuel pump and fuel filter from the modular fuel pump and sender assembly reservoir.

### Remove

- 1 Remove the modular fuel pump and sender assembly from the fuel tank, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).
- 2 Disassemble the fuel pump and suction filter assembly, and modular fuel pump and sender assembly cover from the reservoir, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).
- 3 Using a suitable blade or a flat-bladed screwdriver, remove the 'easy washer' (1) from the fuel pump end cap post.
- 4 Remove the suction filter (2).

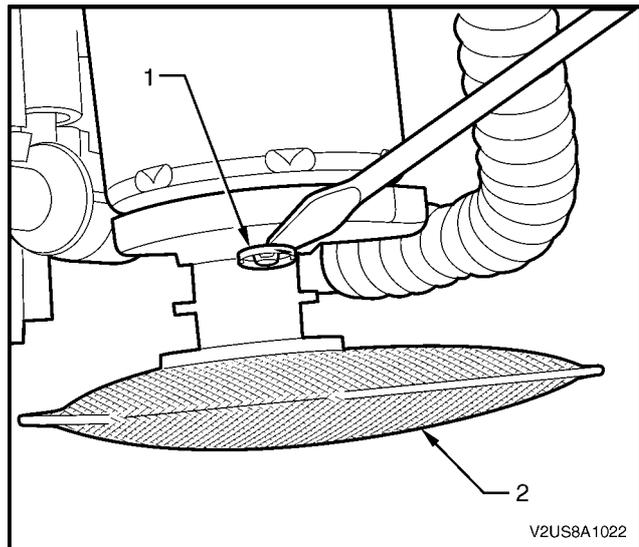


Figure 8A1 - 141

### Reinstall

Reinstallation of the suction filter is the reverse of the removal procedure, noting the following:

**CAUTION**

**Check the 'easy washer' for serviceability and replace if required.**

Ensure the 'easy washer' is firmly installed along the fuel pump end cap post and firmly pressed up against the suction filter moulding.

## 6.8 Modular Fuel Pump

The modular fuel pump is contained within the fuel filter assembly.

### Remove

- 1 Remove the suction filter, refer to [6.7 Suction Filter](#).
- 2 Remove the modular fuel pump from the fuel filter assembly, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).
- 3 Disassemble the modular fuel pump and sender assembly, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

#### CAUTION

**Do not overtighten the vice grips as this may damage the fuel pump.**

- 4 Clamp the protruding end of the fuel pump body (1) in a soft-jawed vice (2) to support the modular fuel pump and fuel filter assembly (3) in place.
- 5 Insert a medium-sized flat-bladed screwdriver through each of the service holes in the fuel filter assembly.
- 6 Slide the screwdriver blade between the fuel pump end cap and the internal fuel filter clips that hold the fuel pump body in place.

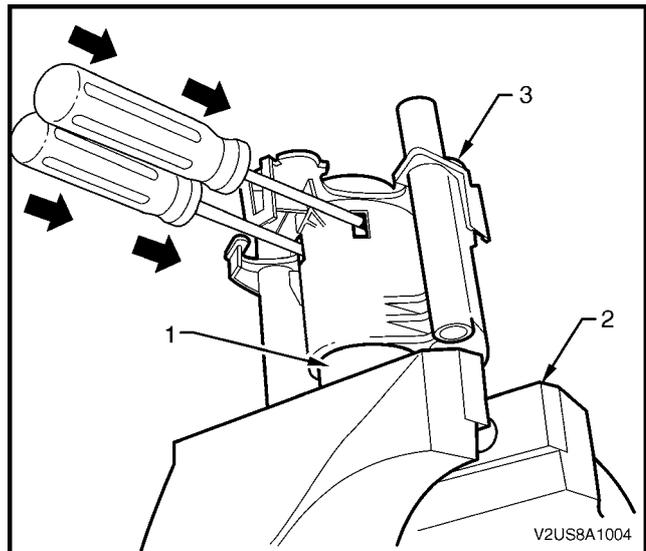


Figure 8A1 - 142

- 7 Push the screwdrivers in far enough so the internal fuel filter clips are deflected just free of each of the fuel pump end cap retainer shoulders.
- 8 While holding the screwdrivers in place with one hand, manipulate the fuel filter assembly upwards to separate it from the fuel pump.

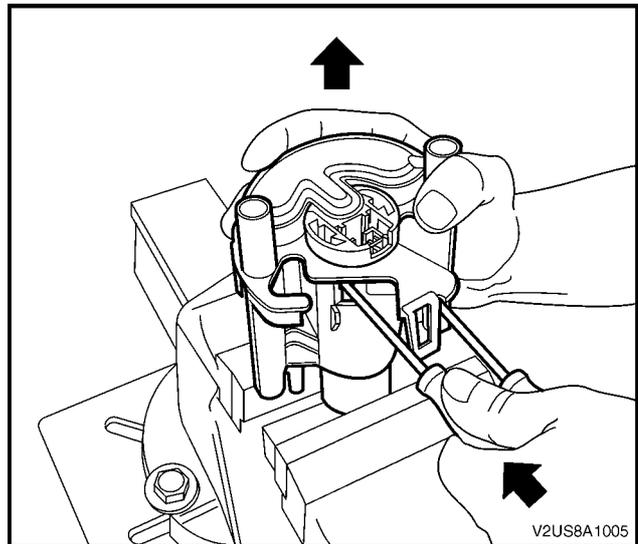


Figure 8A1 - 143

## Reinstall

Reinstallation of the modular fuel pump is the reverse of the removal procedure, noting the following:

**CAUTION**

Do not use any tool that may damage either the fuel pump body or the fuel filter assembly.

**CAUTION**

Check the 'easy washer' for serviceability and replace if required.

**CAUTION**

When installing the modular fuel pump and sender assembly, use only the custom-sized O-rings supplied with the modular fuel pump and sender assembly replacement parts kit. Do not use off-the-shelf O-rings; refer to [6.11 Modular Fuel Pump and Sender Assembly O-rings](#) for O-ring specifications.

- 1 Ensure the 'easy washer' is firmly installed along the fuel pump end cap post and firmly pressed up against the suction filter moulding.
- 2 Using hands only, locate the fuel pump body in its correct orientation into the fuel filter assembly.
- 3 Push the fuel pump body firmly into place and lock the fuel pump into the fuel filter assembly.
- 4 Reassemble the modular fuel pump and sender assembly, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).
- 5 Reinstall the modular fuel pump and sender assembly, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

## 6.9 Fuel Filter Assembly

### NOTE

The fuel filter assembly is part of the modular fuel pump and sender assembly and is not repairable. If the fuel filter assembly becomes unserviceable, replace the modular fuel pump and sender assembly, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

## 6.10 Pressure Regulator

### Remove

#### CAUTION

Refer to [6.11 Modular Fuel Pump and Sender Assembly O-rings](#) for O-ring service part specifications.

- 1 Remove the modular fuel pump and sender assembly from the fuel tank, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).
- 2 Remove the modular fuel pump and sender assembly cover from the reservoir, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).
- 3 Remove the pressure regulator holder, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

#### CAUTION

Do not bend the spade connector on the pressure regulator holder; this can be easily damaged or broken.

#### NOTE

The pressure regulator can be removed without:

- disassembling and removing the fuel level sensor assembly, or
- disconnecting the fuel pump motor or fuel level sensor patch wiring harness connectors.

- 4 Remove the spade connector from the terminal connector moulding (9) of the pressure regulator holder using a pair of long-nose pliers.
- 5 Remove the retaining clip (6) from the top of the pressure regulator holder and place in a safe location away from the immediate worksite.
- 6 Using a flat-bladed screwdriver, prise the pressure regulator (4) from the pressure regulator holder (1).
- 7 If required, remove the nylon spacer (3), and remove and tag the O-ring (2).
- 8 If required, remove and tag all O-rings (7 and 8, and 5) and place in a safe location away from the immediate worksite.

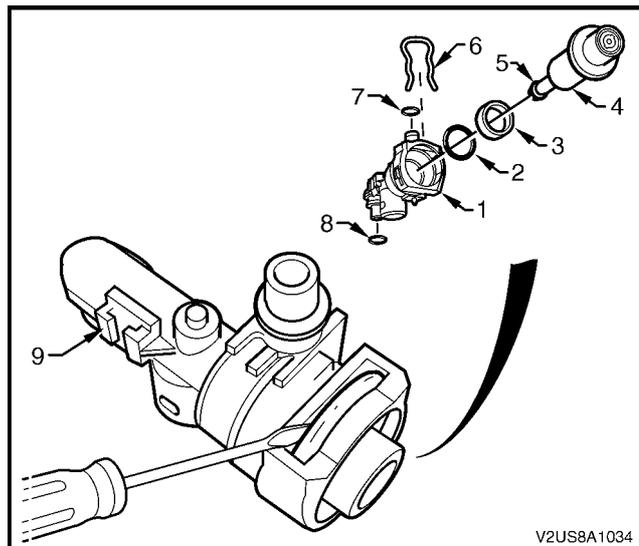


Figure 8A1 - 144

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## Reinstall

Reinstallation of the pressure regulator is the reverse of the removal procedure, noting the following:



When installing the modular fuel pump and sender assembly, use only the custom-sized O-rings supplied with the modular fuel pump and sender assembly replacement parts kit. Do not use off-the-shelf O-rings; refer to [6.11 Modular Fuel Pump and Sender Assembly O-rings](#) for O-ring specifications.

### 6.11 Modular Fuel Pump and Sender Assembly O-rings

O-rings seal various connections in the modular fuel pump and sender assembly, and are made of a special material. Always service the O-ring seals with the correct service part as provided with the service kit. Refer to Figure 8A1 – 145 to identify O-ring service part specifications.

O-ring Specifications		
O-ring	a (mm)	b (mm)
1	8.20	3.50
2	7.52	3.53
3	15.4	2.90
4	4.25	2.60
5	8.20	3.50
6	8.20	3.50
7	8.20	3.50

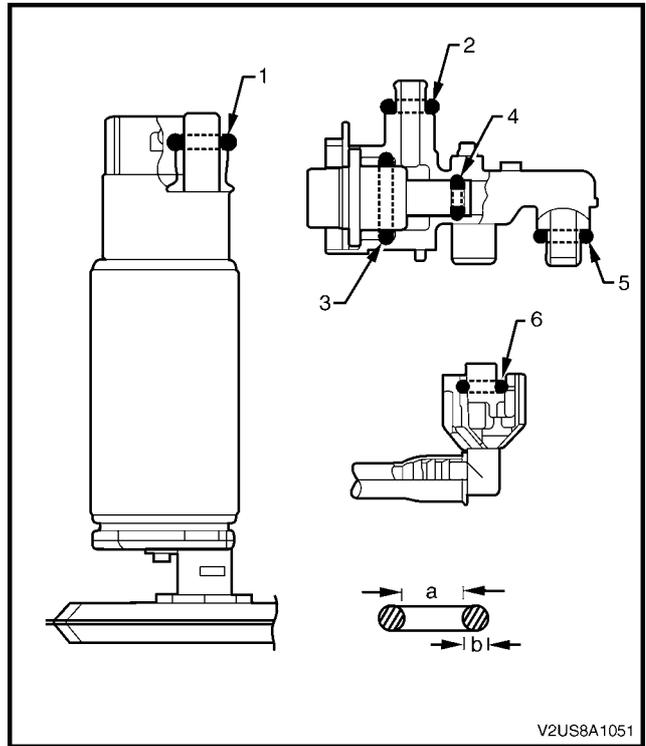


Figure 8A1 – 145

## 6.12 Fuel Tank Pressure Sensor

The fuel tank pressure sensor is press-fitted to the modular fuel pump and sender assembly cover. To access the fuel tank pressure sensor for servicing, removal of the fuel tank from the vehicle is recommended. For information on fuel tank pressure sensor and fuel tank leak test diagnostics, refer to 4.3 Fuel Leak Test.

### Remove

- 1 Remove the fuel tank from the vehicle.
- 2 Remove the modular fuel pump and sender assembly from the fuel tank, refer to 6.5 Modular Fuel Pump and Sender Assembly.

#### CAUTION

Do not pull or lever the fuel tank pressure sensor from the connector end as damage may occur to the fuel tank pressure sensor body.

#### NOTE

The pressure regulator can be removed without:

- disassembling and removing the fuel level sensor assembly, or
- disconnecting the fuel pump motor or fuel level sensor patch wiring harness connectors.

- 3 Grasp the modular fuel pump and sender assembly cover (1) and, from underneath, apply thumb pressure (3) to the opening port (2) of the fuel tank pressure sensor. To aid removal, pull the head of the fuel tank pressure sensor directly away from the modular fuel pump and sender assembly cover.

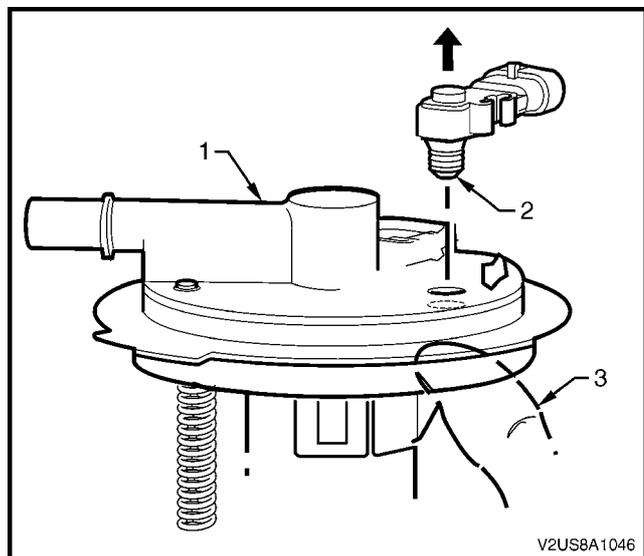


Figure 8A1 - 146

### Reinstall

Reinstallation of the fuel tank pressure sensor is the reverse of the removal procedure, noting the following:

- 1 Check the rubber seal around the collar of the fuel tank pressure sensor opening port (2) for damage. If required, replace the fuel tank pressure sensor, refer to Figure 8A1 - 146.
- 2 Align the fuel tank pressure sensor with the opening port and guide support of the modular fuel pump and sender assembly cover, and press firmly into place.

## 6.13 Fuel Fill Limiter Vent Valve Assembly

The fill limiter vent valve assembly is clipped underneath the modular fuel pump and sender assembly cover.

### NOTE

To access the fuel fill limiter vent valve assembly during servicing, removal of the fuel tank from the vehicle is recommended.

### NOTE

The fuel fill limiter vent valve assembly is serviced as a complete assembly and further disassembly after removal from the modular fuel pump and sender assembly is not required.

### Remove

- 1 Remove the fuel tank assembly from the vehicle, refer to [6.3 Fuel Tank](#).
- 2 Remove the modular fuel pump and sender assembly from the fuel tank, refer to [6.5 Modular Fuel Pump and Sender Assembly](#).

### NOTE

The fuel fill limiter vent valve assembly can be removed without:

- disassembling and removing the fuel level sensor assembly, or
- disconnecting the fuel pump motor or fuel level sensor patch wiring harness connectors.

- 3 Lever both the modular fuel pump and sender assembly cover tangs (1) clear of the fuel fill limiter vent valve locators (2) while pulling the fuel fill limiter vent valve assembly (3) out to remove. If required, use a flat-bladed screwdriver to assist leverage of the tangs.

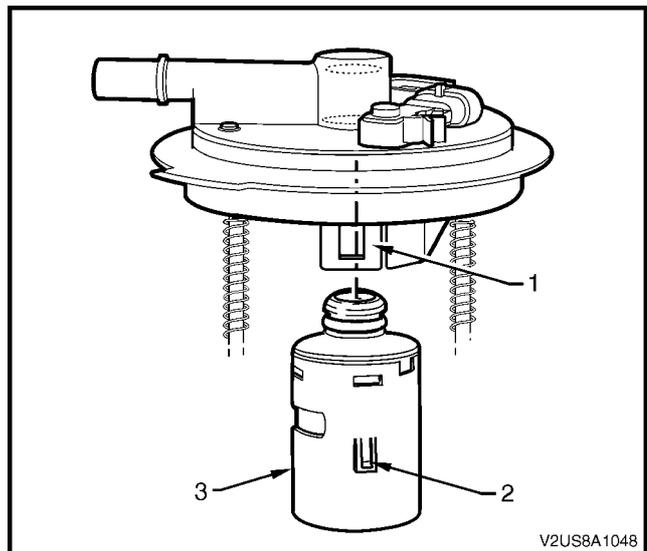


Figure 8A1 - 147

### Reinstall

Reinstallation of the fill limiter vent valve assembly is the reverse of the removal procedure, noting the following:

Ensure correct alignment of the fuel fill limiter vent valve into the modular fuel pump and sender assembly cover before pressing firmly to click into place.

## 6.14 Fuel Filler Cap

The fuel filler cap is a 'screw on' type, with an integrated tightening torque limiting mechanism. When installing the fuel filler cap, tighten it until a ratcheting (clicking) sound is audible, indicating the fuel filler cap is properly tightened. The fuel filler cap is tethered to the fuel filler pocket. The fuel filler cap requires a quarter of a turn to be removed.

### Remove

#### WARNING

If the fuel filler cap needs replacing, use only a 'screw on' fuel tank filler cap with an integrated tightening torque limiting mechanism. Failure to use the correct fuel tank filler cap can result in a serious malfunction of the emission control system.

- 1 Untwist and remove the fuel filler cap (1) from the fuel filler neck opening.
- 2 Using a flat-bladed screwdriver, prise the fuel filler cap tether line fastener (2) from its mounting hole.
- 3 Cover the fuel filler opening with a suitable material to prevent foreign objects from entering the fuel tank.

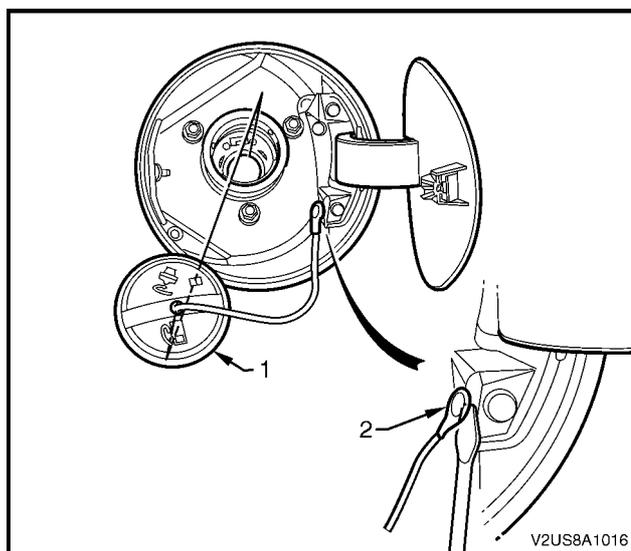


Figure 8A1 - 148

### Reinstall

Reinstallation of the fuel filler cap is the reverse of the removal procedure, noting the following:

#### NOTE

Check the fuel filler cap for serviceability and replace if required.

## 6.15 Fuel Pipes

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Raise the vehicle, preferably on a hoist, refer to [Section 0A General Information](#).

#### CAUTION

Before proceeding, clean all traces of dirt and other foreign material from the fuel pipes.

- 4 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.
- 5 If required, remove the stone guards and fuel pipes. Use the following illustrations showing the fuel pipe layout and location of other items relating to the fuel system as a guide, refer to Figure 8A1 – 149 and Figure 8A1 – 150.

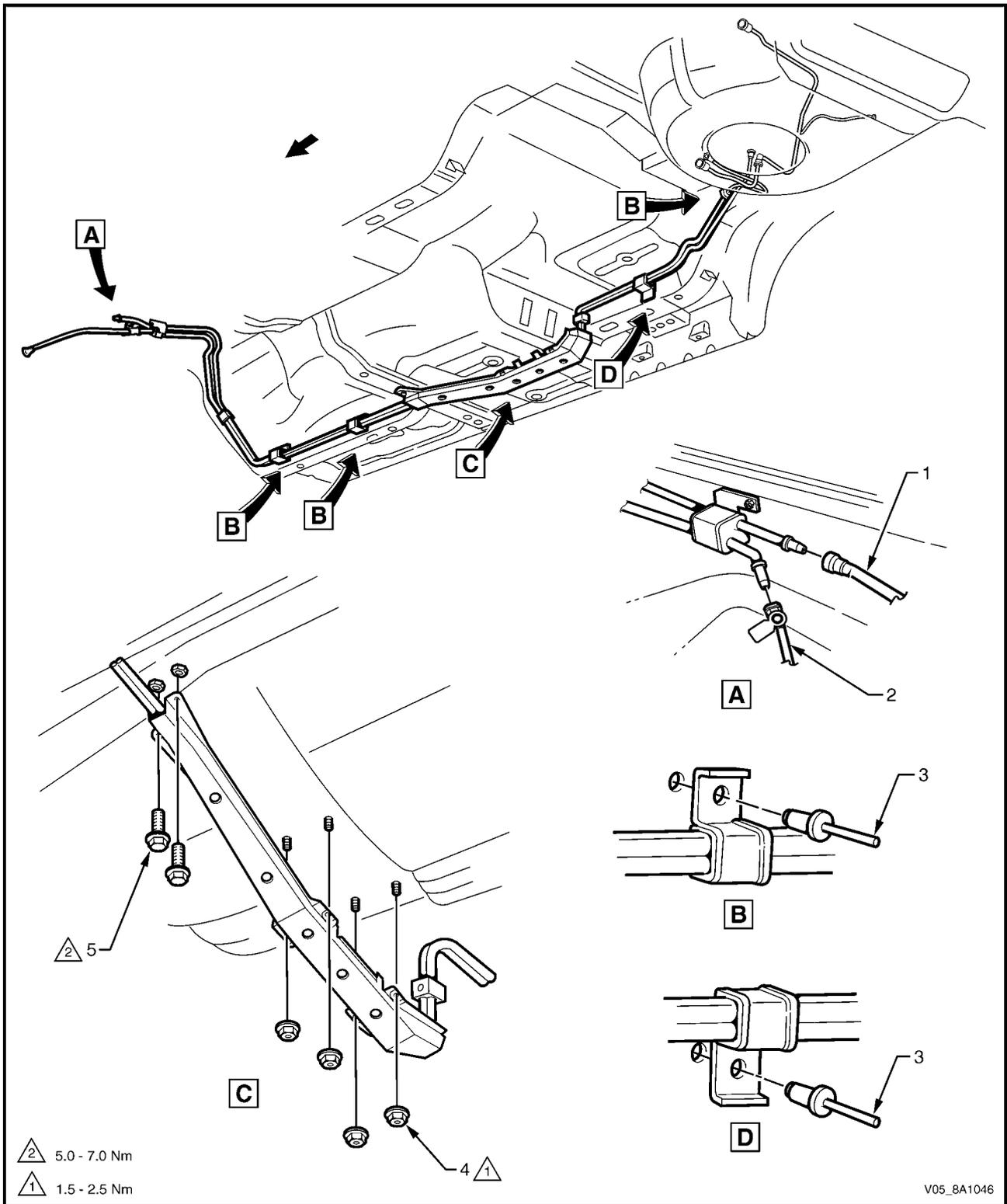


Figure 8A1 - 149

**Legend**

- |   |  |   |                                     |   |                                      |
|---|--|---|-------------------------------------|---|--------------------------------------|
| 1 | Fuel Feed Line                                   | 3 | Fuel Line Bracket Blind Rivet       | 5 | Stone Guard Securing Bolt (2 places) |
| 2 | Evaporative Emission Control Canister Purge Line | 4 | Stone Guard Securing Nut (4 places) |   |                                      |

**NOTE**

Use tool No. 7371 to remove the fuel feed line (1) quick-connect fitting, refer to Figure 8A1 - 149. Use tool No. AU533 to remove the fuel vapour line quick-connect fitting (2), refer to Tool No. AU533.

## Reinstall

**CAUTION**

Ensure the rubber in the fuel line brackets is in good condition before proceeding. If not, replace the affected bracket.

Reinstallation of the stone guards and fuel pipes is the reverse of the removal procedure, noting the following:

- 1 Tighten the stone guard securing nuts to the correct torque specification.

Stone guard securing nut torque specification .....	1.5 – 2.5 Nm
--	--------------

- 2 Tighten the stone guard securing bolts to the correct torque specification.

Stone guard securing bolt torque specification .....	5.0 – 7.0 Nm
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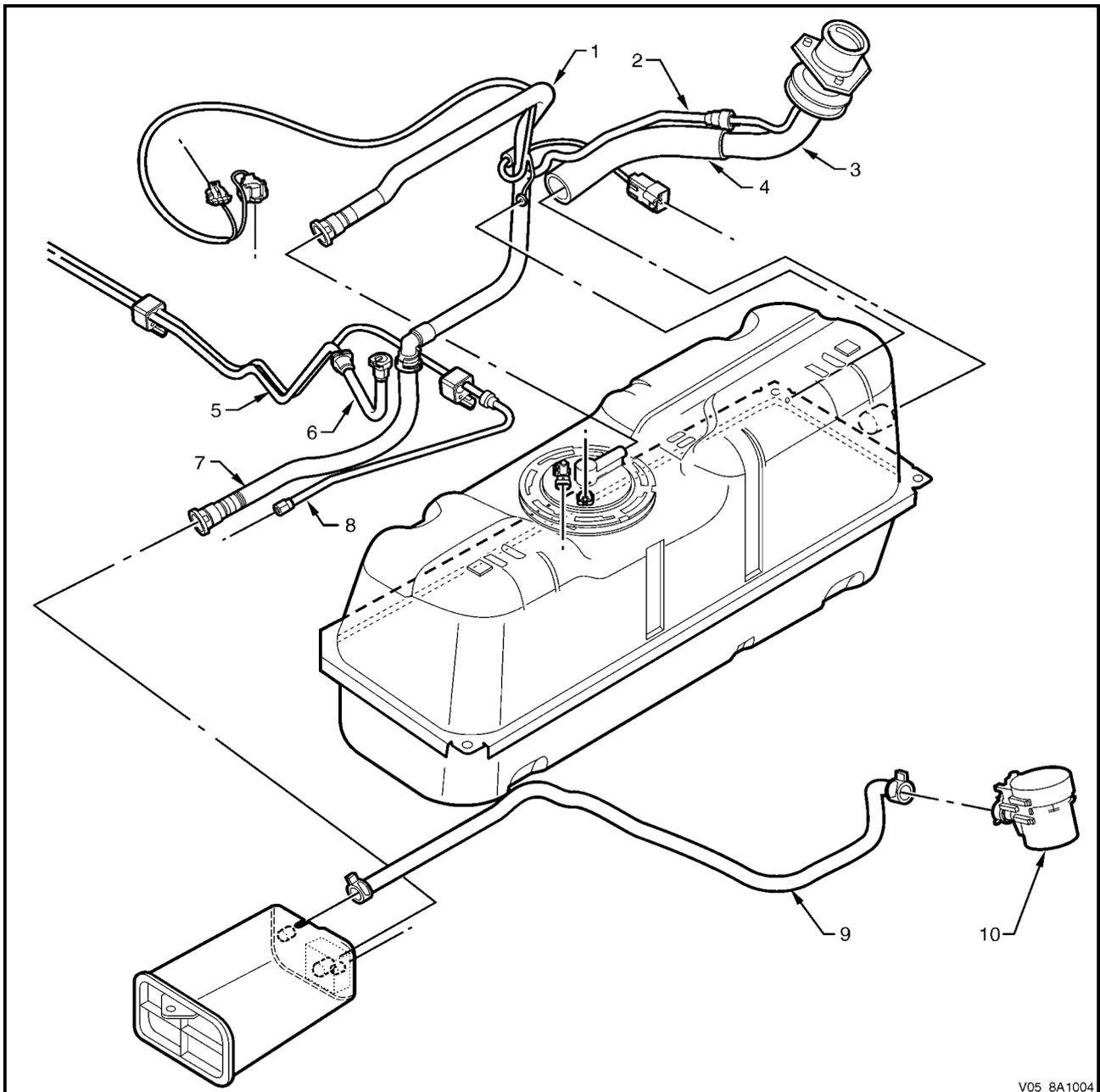


Figure 8A1 – 150

**Legend**

1	Fuel Vapour Line (upstream)	6	Fuel Feed Line Extension Elbow
2	Fuel Vapour Recirculation Line	7	Fuel Vapour Line (downstream)
3	Fuel Filler Neck	8	Fuel Vapour Purge Line
4	Fuel Filler Hose	9	Fuel Vapour Vent Line
5	Fuel Feed Line	10	Fuel Vapour Vent Solenoid

## 7 Service Operations — Regular Cab and Crew Cab, and Crew Cab with 'Delete Tub' Option

### 7.1 Quick-connect Fittings

#### Quick-connect Fittings (Metal Collar)

##### Remove

### WARNING

To reduce the risk of fire or personal injury, relieve the fuel system pressure before servicing any fuel system components, refer to [4.1 Fuel System Depressurisation](#).

- 1 If fitted, slide the dust cover from the quick-connect fitting.

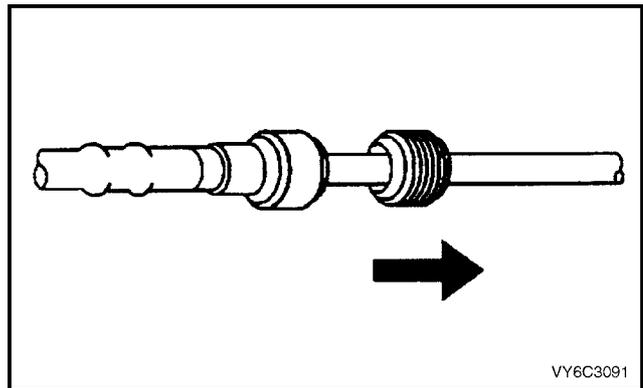


Figure 8A1 – 151

- 2 Grasp both sides of the quick-connect fitting. Twist the female side of the quick-connect fitting 1/4 turn in each direction to loosen any dirt.

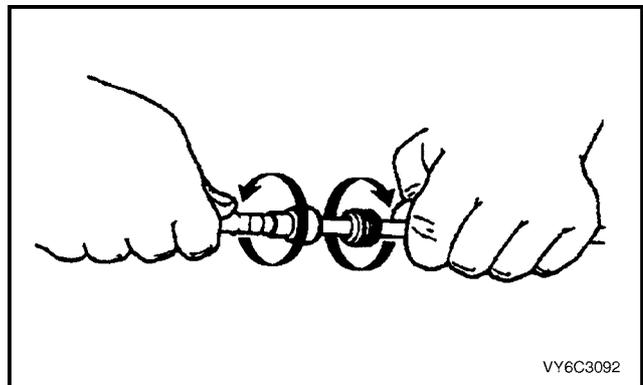


Figure 8A1 – 152

### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 3 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

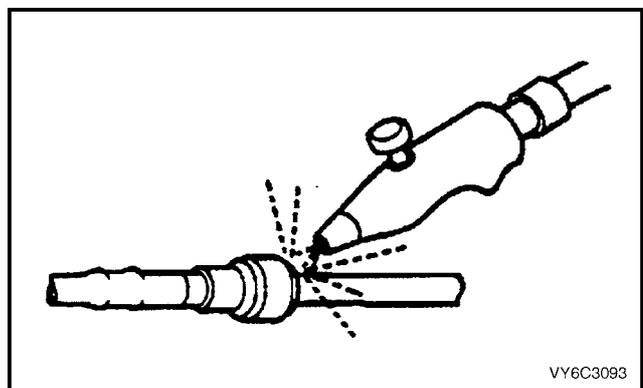


Figure 8A1 – 153

- 4 Choose the correct tool (1) to disconnect the quick-connect fitting, refer to Tool Nos. 7370 and 7371. Insert the tool into the female connector, then push inward to release the locking tabs.

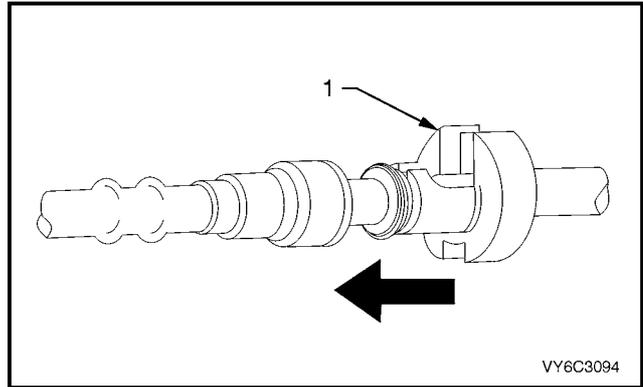


Figure 8A1 - 154

- 5 Pull the quick-connect fitting apart.

**NOTE**

If it is necessary to remove rust or burrs from a fuel pipe, use emery cloth in a radial motion with the fuel pipe end to prevent damage to the O-ring sealing surface.

- 6 Using a clean shop towel to wipe off the male pipe end.
- 7 Inspect both ends of the fitting for dirt and burrs. Clean or replace the components as required.

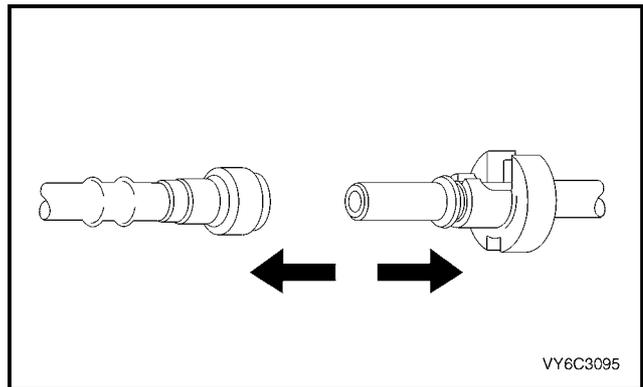


Figure 8A1 - 155

**Reinstall**

**CAUTION**

During normal operation, the O-ring located in the female connector swells. To ensure proper fitting, lubricate the male pipe end before assembly.

- 1 Apply a few drops of clean engine oil to the male pipe end.

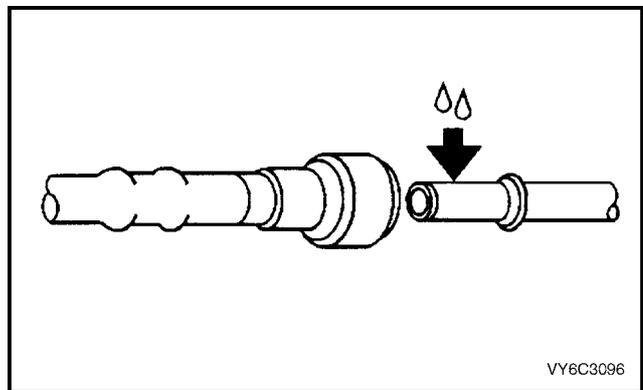


Figure 8A1 - 156

- 2 Push both sides of the quick-connect fitting together to snap the retaining tabs into place.

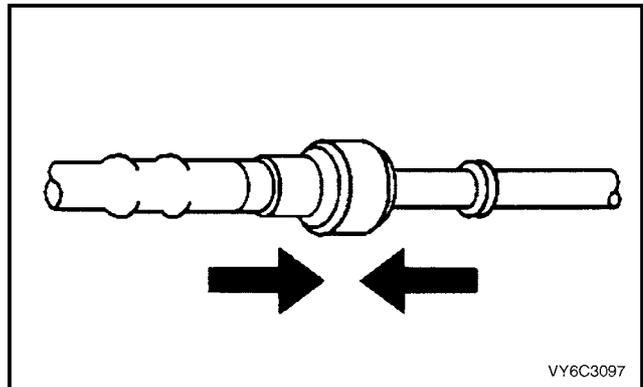
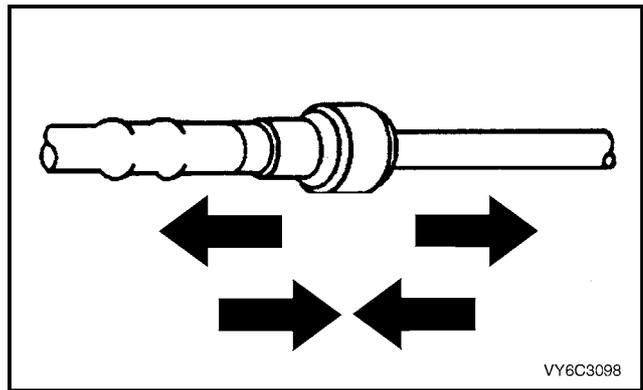


Figure 8A1 - 157

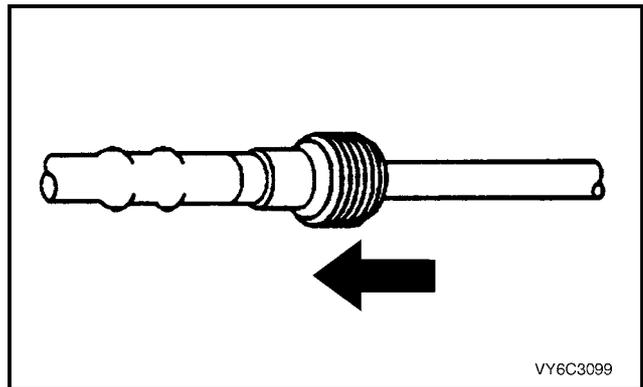
- 3 After installation, pull on both sides of the quick-connect fitting to ensure the connection is secure.



VY6C3098

Figure 8A1 - 158

- 4 Reposition the dust cover over the quick-connect fitting (if fitted).



VY6C3099

Figure 8A1 - 159

## Quick-connect Fittings (Plastic Collar)

### Remove

#### WARNING

To reduce the risk of fire or personal injury, relieve the fuel system pressure before servicing any fuel system components, refer to [4.1 Fuel System Depressurisation](#).

- 1 Grasp both sides of the quick-connect fitting. Twist the female side of the quick-connect fitting 1/4 turn in each direction to loosen any dirt.

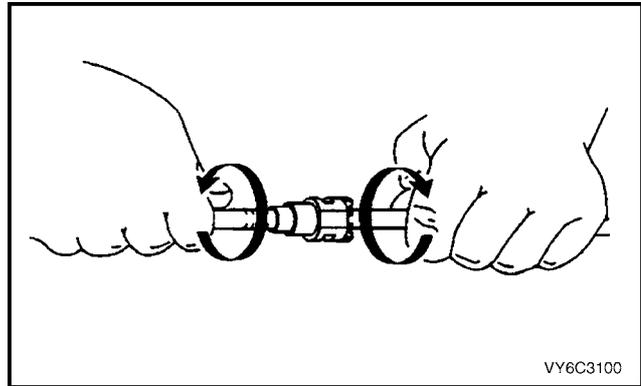


Figure 8A1 – 160

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 2 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

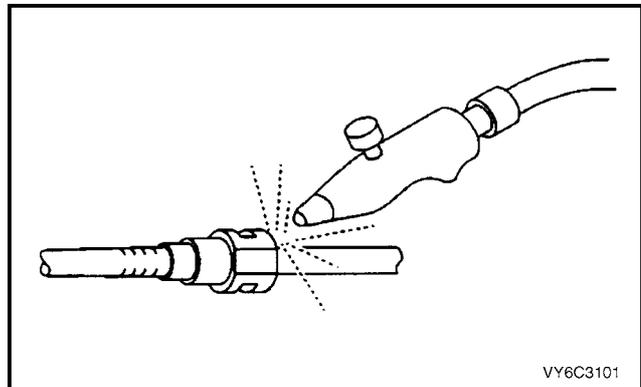


Figure 8A1 – 161

- 3 Squeeze the plastic retainer release tabs.

#### NOTE

Alternatively, use tool No. AU533 to release the quick connect fitting:

- red = 5/16-inch fittings (fuel vapour lines), or
- blue = 3/8-inch fittings (fuel feed lines).

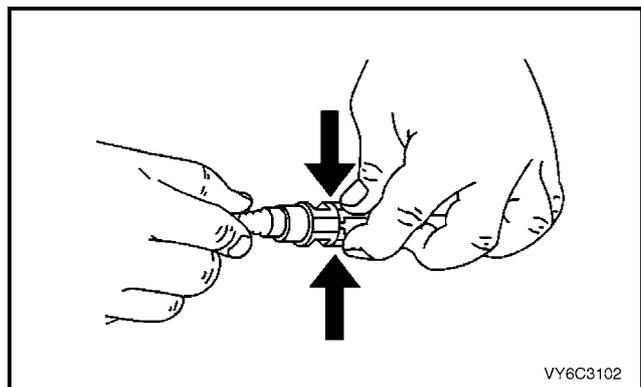


Figure 8A1 – 162

- 4 Pull the quick-connect fitting apart.

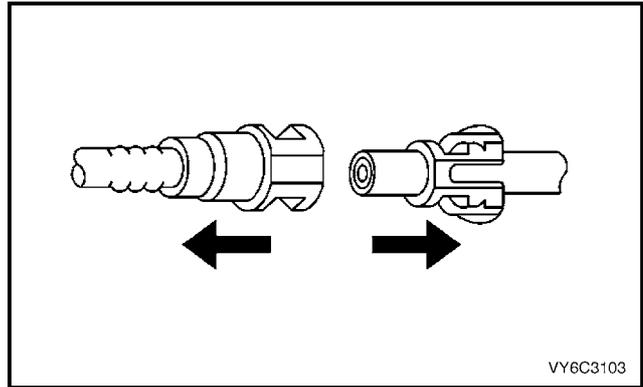


Figure 8A1 - 163

**Reinstall**

**CAUTION**

During normal operation, the O-ring located in the female connector swells. To ensure proper fitting, lubricate the male pipe end before assembly.

- 1 Apply a few drops of clean engine oil to the male pipe end.

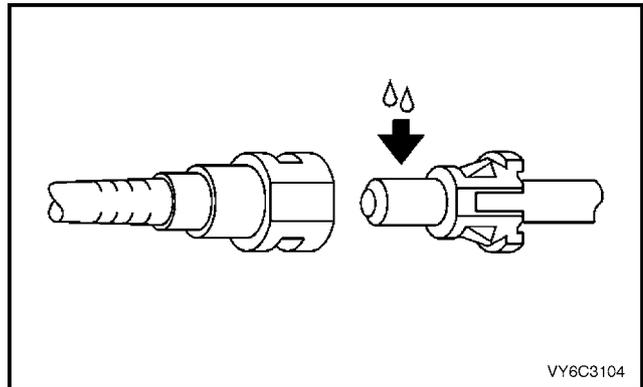


Figure 8A1 - 164

- 2 Push both sides of the quick-connect fitting together to snap the retaining tabs into place.

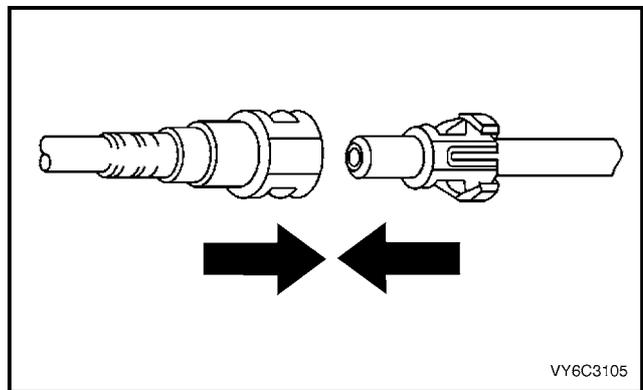


Figure 8A1 - 165

- 3 After installation, pull on both sides of the quick-connect fitting to ensure the connection is secure.

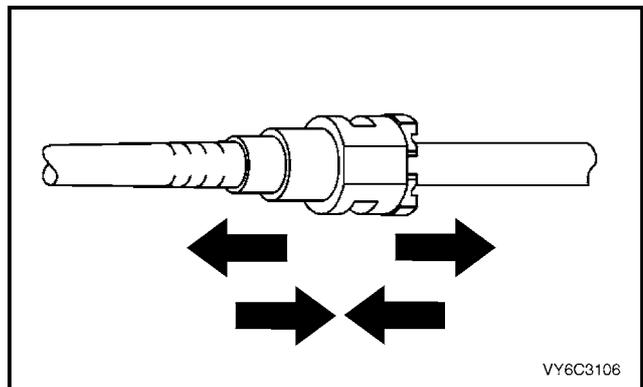


Figure 8A1 - 166

**Tool No. AU533**

This procedure describes the removal of the quick-connect fittings on the fuel filter using tool No. AU533. This procedure also applies to other quick-connect fittings.

**Remove**

- 1 Grasp both sides of the quick-connect fitting. Twist the quick-connect fitting one quarter of a turn in each direction to loosen any dirt within the quick-connect fitting.

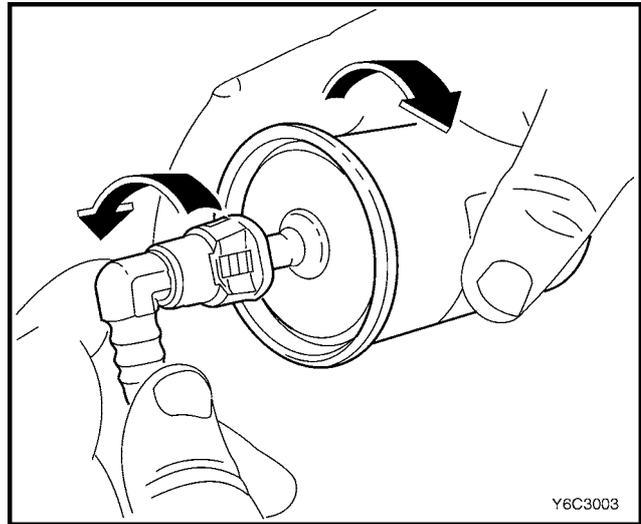


Figure 8A1 - 167

**WARNING**

**Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.**

- 2 Using compressed air, blow any dirt out of the quick-connect fitting.

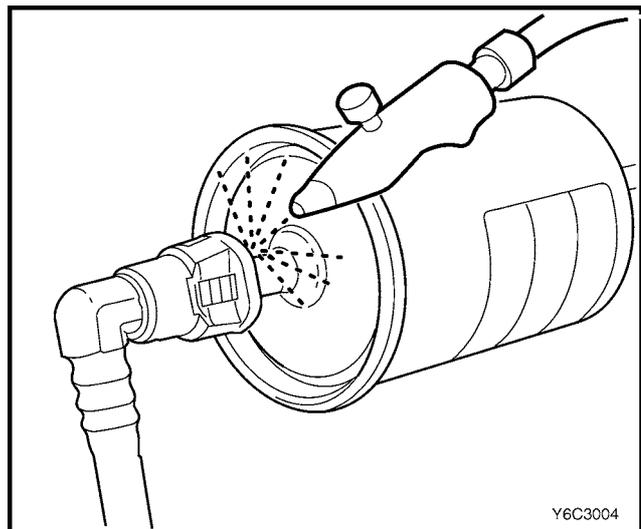


Figure 8A1 - 168

- 3 Grasp the female part and firmly support the male part.
- 4 Squeeze the plastic retainer release tabs (1) on each side of the quick-connect fitting while pushing the quick-connect fitting firmly inwards to release any tension on the release tabs.

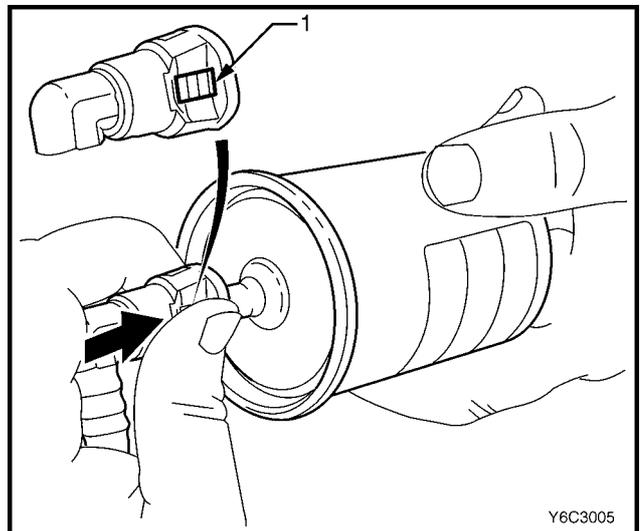


Figure 8A1 - 169

- 5 While pressing the release tabs, pull the quick-connect fitting apart.

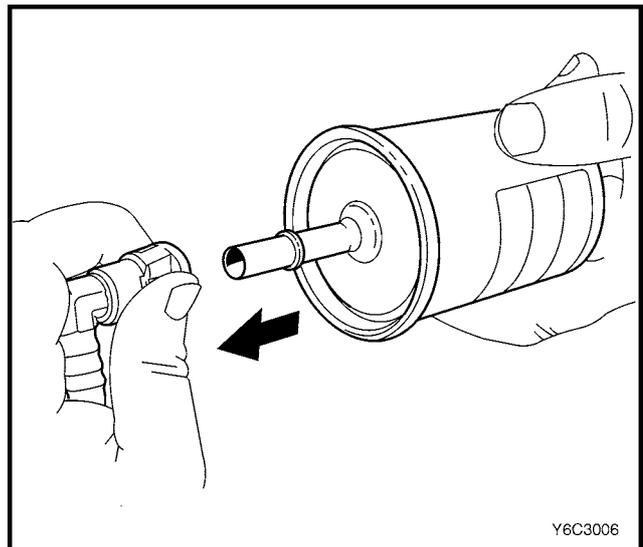


Figure 8A1 - 170

- 6 Alternatively, for step 3 to step 5 inclusive, use tool No. AU533 (1) to squeeze the release tabs and release the quick-connect fittings.

**NOTE**

Tool No. AU533 will work only with retainer tabs that sit proud of the connector body. Some filter connectors have flush retainers that can be pressed only by hand.

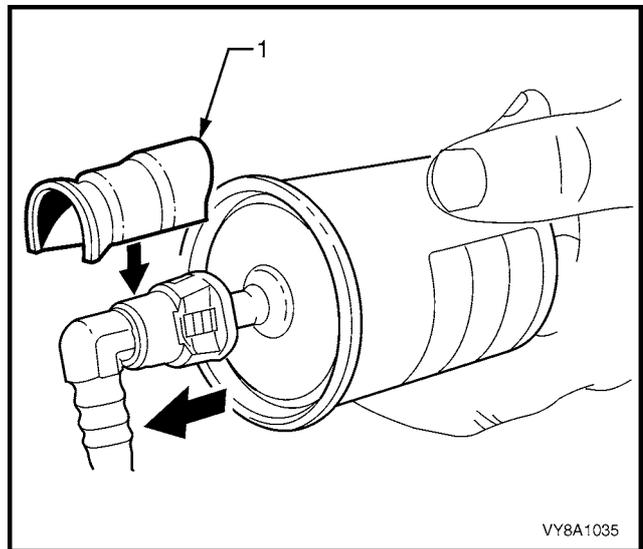
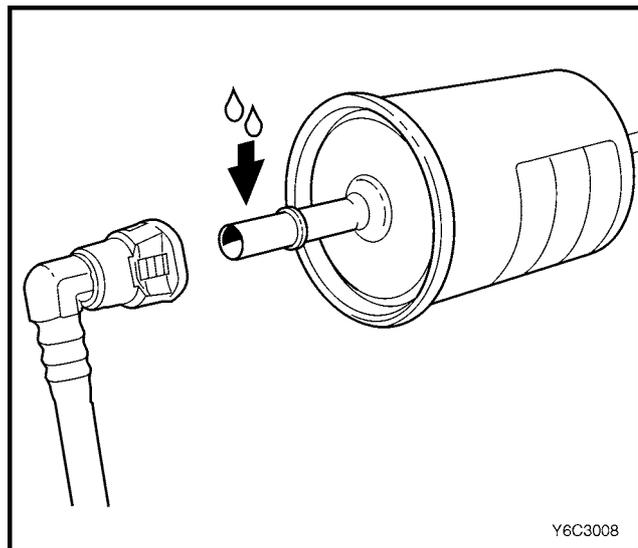


Figure 8A1 - 171

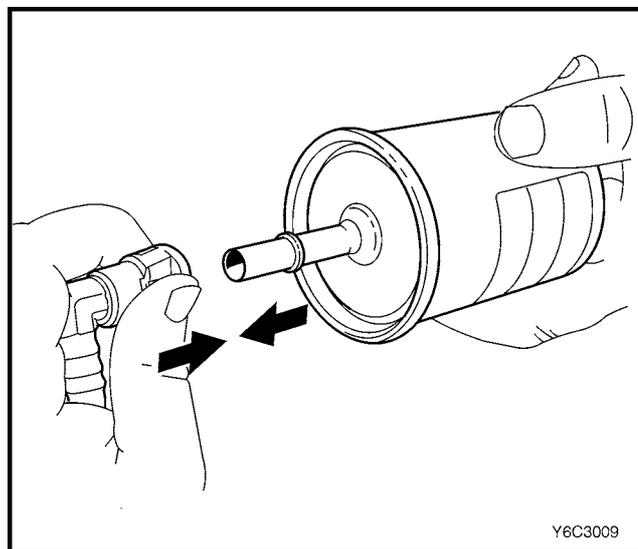
**Reinstall****CAUTION**

Before connecting quick-connect fittings, apply a few drops of clean engine oil to the male part. This ensures proper connection and prevents a possible fuel leak. During normal operation, the O-ring located in the female part swells and may prevent proper reconnection if not lubricated.

- 1 Apply a few drops of clean engine oil to each male part.

**Figure 8A1 - 172**

- 2 Push both parts of the quick-connect fitting together so the retaining tabs snap into place.

**Figure 8A1 - 173**

- 3 After installation, pull and push on the quick-connect fitting to ensure the connection is secure.

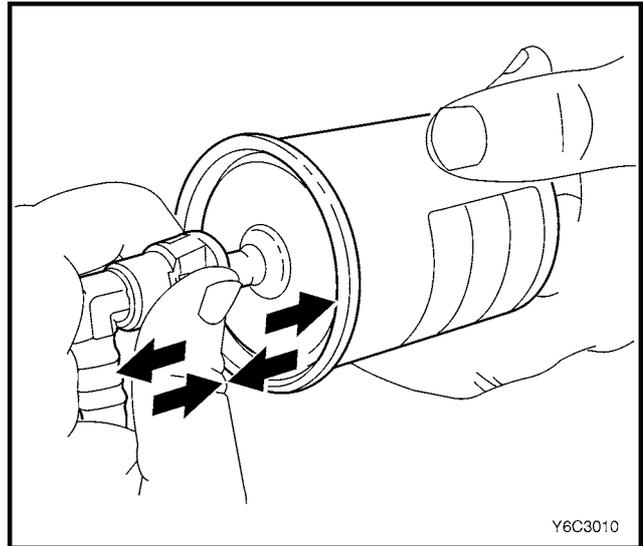


Figure 8A1 - 174

**Tool Nos. 7370 and 7371**

**Remove**

Use tool Nos. 7370 and 7371 to disconnect the fuel lines at the engine as follows:

- 1 Open the quick-connect release tool (2) and place it over the fuel line (1).
- 2 Close the quick-connect release tool and pull it into the fuel line quick-connect fitting to disconnect the fuel line from the fuel pipe.

**NOTE**

Do not disconnect the fuel lines at the fuel rail. If the fuel lines are removed from the fuel rail, the fuel lines must be replaced.

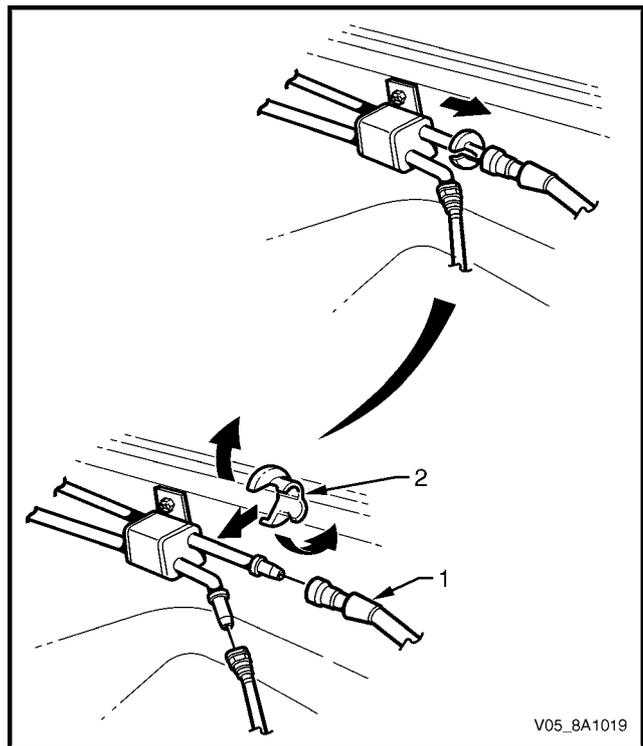


Figure 8A1 - 175

**Reinstall**

Reinstallation of the disconnected quick-connect fittings using tool Nos. 7370 and 7371 is the same as for tool No. AU533, refer to Tool No. AU533.

## 7.2 Fuel Tank

### Regular Cab and Crew Cab with 'Delete Tub' Option

#### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).
- 2 Remove the fuel pump relay, refer to [Section 12O Fuses, Relays and Wiring Harnesses](#).
- 3 Remove the tray, refer to [Section 1B1 Tray](#).
- 4 Use compressed air to ensure all dirt and foreign materials are removed from all fuel connections before the parts are disconnected, refer to Figure 8A1 – 176.
- 5 Disconnect the modular fuel pump and sender assembly harness connector (3), refer to Figure 8A1 – 176.
- 6 Tag, remove and cover the following items with a suitable material to prevent foreign objects from entering:
  - a the fuel feed line (6),

#### NOTE

For information on quick-connect fittings, refer to [7.1 Quick-connect Fittings](#).

- b inlet breather pipe (9) from the vapour collector, and
- c fuel tank vent line (12).

- 7 Remove the modular fuel pump and sender assembly (4), refer to [7.5 Modular Fuel Pump and Sender Assembly](#).

**WARNING**

**Never drain or store fuel into an open container, due to the possibility of fire or explosion.**

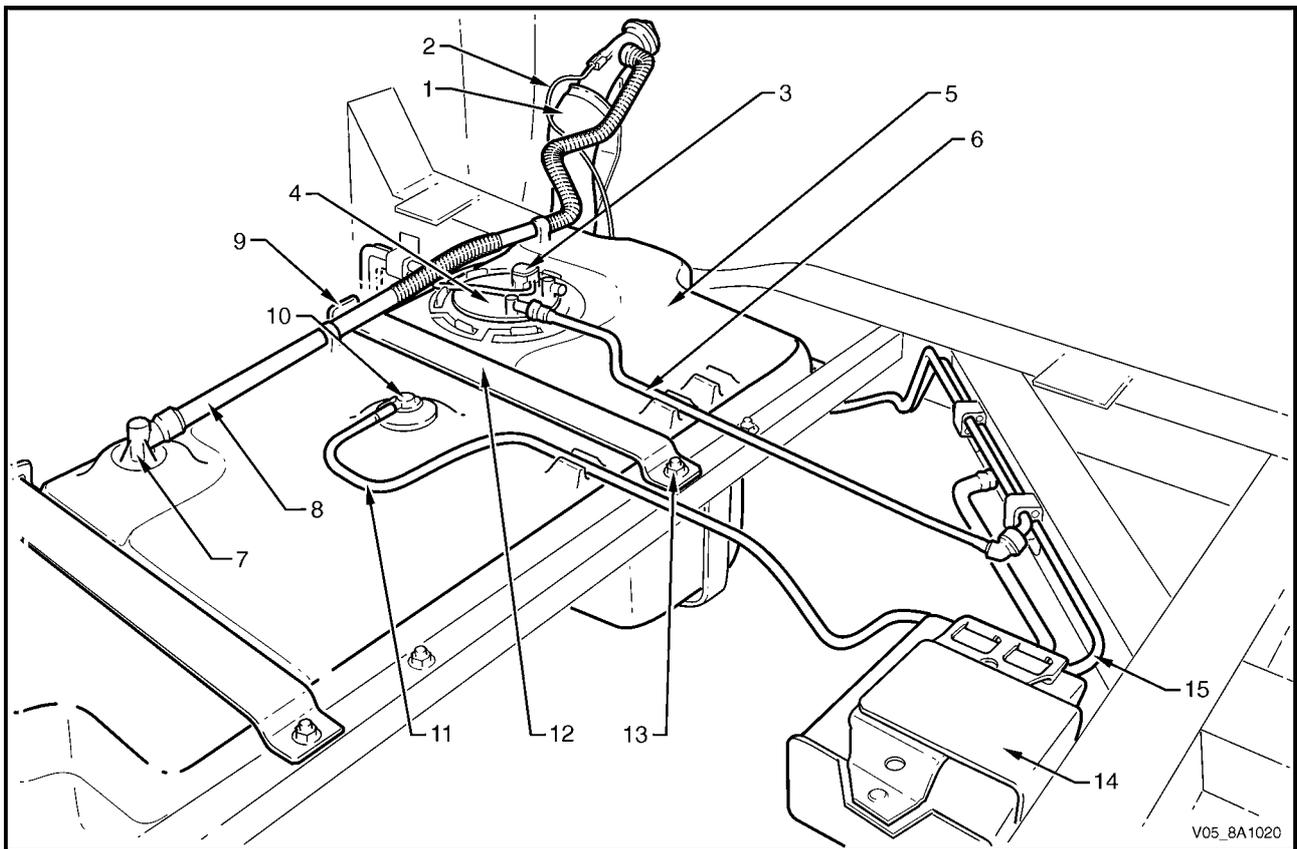
**WARNING**

**Ensure fuel is pumped or siphoned from both sides of the baffle in the fuel tank.**

- 8 Drain the fuel tank by pumping or siphoning fuel through the hole in the fuel tank (from which the modular fuel pump and sender assembly was removed) using commercially-available equipment.

**NOTE**

A permanent floodgate restriction in the lower fuel filler neck prevents the fuel tank from being drained through the filler aperture.



**Figure 8A1 – 176**

**Legend**

- |   |  |   |
|---|--|---|
| 1 Fuel Filler Neck  | 6 Fuel Feed Line                                 | 11 Fuel Tank Vent Line                              |
| 2 Earthing Wire   | 7 Vapour Collector                               | 12 Fuel Tank Mounting Strap (2 places)              |
| 3 Modular Fuel Pump and Sender Assembly Harness Connector | 8 Inlet Breather Pipe                            | 13 Stud (2 places)                                  |
| 4 Modular Fuel Pump and Sender Assembly                   | 9 Fuel Tank Mounting Strap Front Anchoring Point | 14 Evaporative Emission Control Canister            |
| 5 Fuel Tank   | 10 Rollover Valve                                | 15 Evaporative Emission Control Canister Purge Line |

- 9 Remove the grounding wire (1) from the spade connector on the fuel filler neck.
- 10 Remove the grounding wire from the spade connector screw mounting on the chassis member.
- 11 Place the grounding wire in a safe location away from the immediate worksite.
- 12 Loosen the screw clamp holding the flexible fuel inlet pipe (2) onto the fuel filler neck.
- 13 Use compressed air to ensure all dirt and foreign materials are removed from the inlet breather pipe (3) and fuel filler neck.
- 14 Remove the quick-connect fitting holding the inlet breather pipe onto the fuel filler neck.
- 15 Cover the flexible fuel inlet pipe and inlet breather pipe with a suitable material to prevent foreign objects from entering.

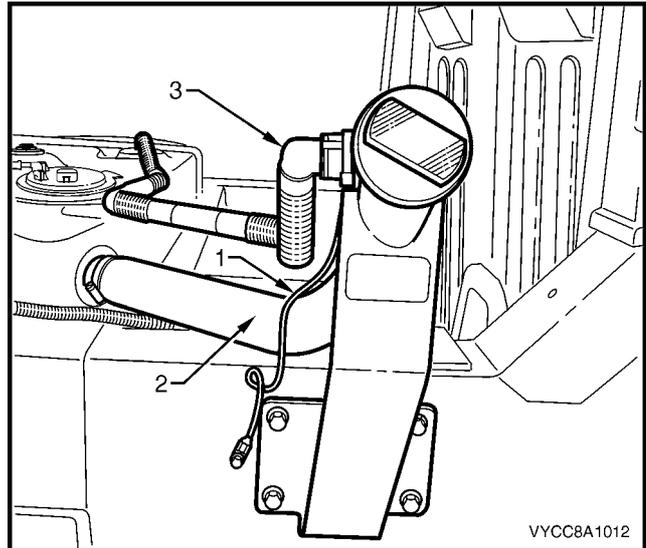


Figure 8A1 - 177

- 16 If required, remove the support bracket, refer to [7.4 Support Bracket](#).
- 17 Remove the nuts from both fuel tank mounting strap studs (13), refer to Figure 8A1 - 176.
- 18 Lift the fuel tank mounting straps away from the front anchoring points (9) and place in a safe location away from the immediate worksite.
- 19 Remove the fuel tank from its support frame.

**Reinstall**

Reinstallation of the fuel tank is the reverse of the removal procedure, noting the following:

- 1 Ensure all parts are dust-free and clean before reinstalling.
- 2 Tighten both fuel tank mounting strap nuts to the correct torque specification.

Fuel tank mounting strap nut torque specification .....20.0 – 25.0 Nm
--

- 3 Before starting the vehicle, perform a fuel system leak test, refer to [4.3 Fuel Leak Test](#).

## Crew Cab

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).
- 2 Remove fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 3 Remove the front inner side panel cover from the rear body to enable access to the fuel filler neck, refer to [Section 1B Sheetmetal](#).
- 4 Remove the quick-connect fitting attaching the inlet breather pipe to the fuel filler neck, refer to [7.14 Fuel Filler Neck and Splash Guard](#) and Figure 8A1 – 178.
- 5 Cover the end of the inlet breather pipe and the inlet breather pipe connection on the fuel filler neck with a suitable material to prevent foreign objects from entering.
- 6 Remove the rear body, refer to [Section 1B Sheetmetal](#).
- 7 Use compressed air to ensure all dirt and foreign materials are removed from all fuel connections before the parts are disconnected, refer to Figure 8A1 – 178.
- 8 Disconnect the modular fuel pump and sender assembly harness connector (1).
- 9 Tag, remove and cover the following items with a suitable material to prevent foreign objects from entering:
  - a the fuel feed line (5),

#### NOTE

For information on quick-connect fittings used on Regular Cab and Crew Cab vehicles, refer to [7.1 Quick-connect Fittings](#).

- b the inlet breather pipe (7) from the vapour collector, and
- c the fuel tank vent line (10).

- 10 Remove the modular fuel pump and sender assembly (3), refer to 7.5 Modular Fuel Pump and Sender Assembly.

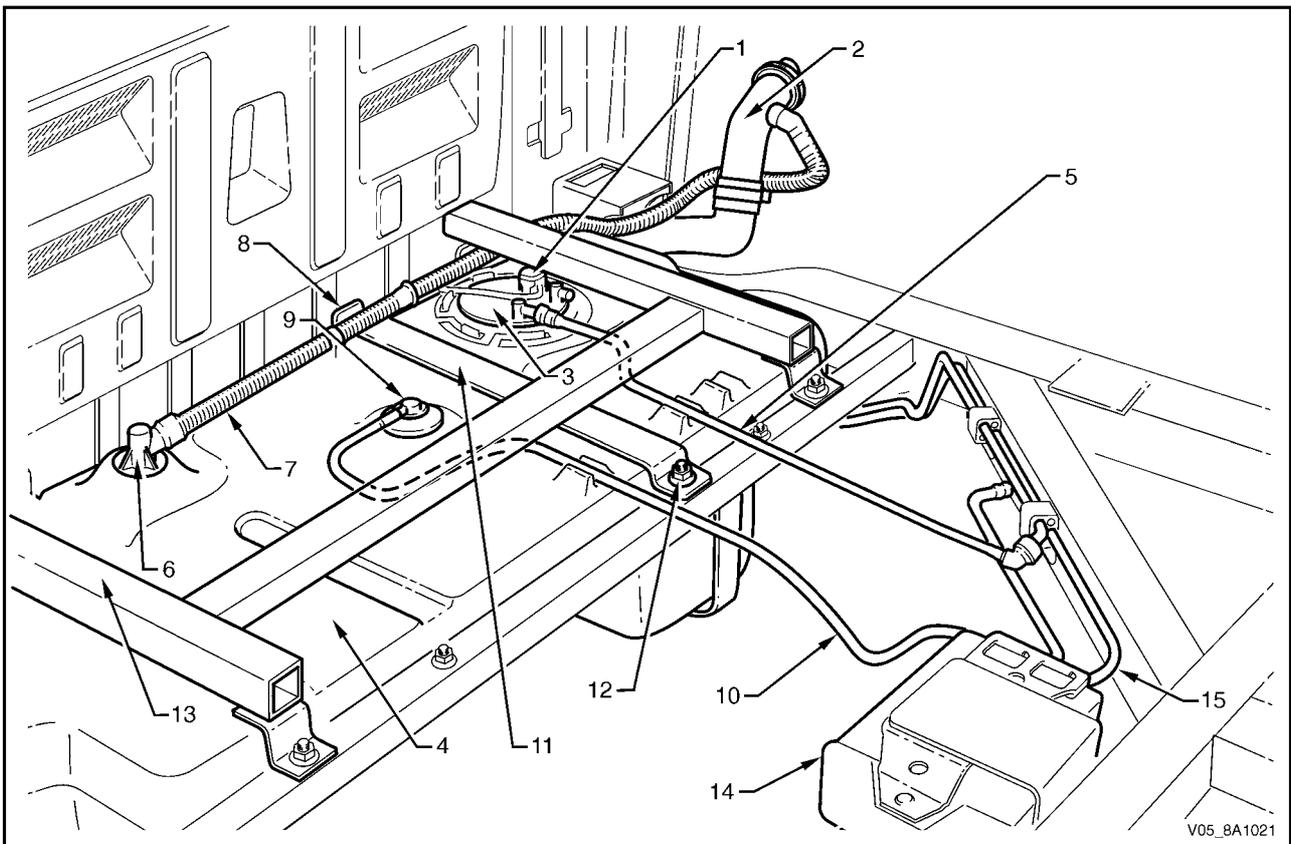
**WARNING**

**Ensure fuel is pumped or siphoned from both sides of the baffle in the fuel tank.**

- 11 Drain the fuel tank by pumping or siphoning fuel through the hole in the fuel tank (from which the modular fuel pump and sender assembly was removed) using commercially-available equipment.

**NOTE**

A permanent floodgate restriction in the lower fuel filler neck prevents the fuel tank from being drained through the filler aperture.



**Figure 8A1 – 178**

**Legend**

- |   |   |   |   |    |  |
|---|---|---|---|----|--|
| 1 | Modular Fuel Pump and Sender Assembly Harness Connector | 6 | Vapour Collector  | 10 | Fuel Tank Vent Line                              |
| 2 | Fuel Filler Neck  | 7 | Inlet Breather Pipe                                       | 11 | Fuel Tank Mounting Strap (1 place)               |
| 3 | Modular Fuel Pump and Sender Assembly                   | 8 | Fuel Tank Mounting Strap Front Anchoring Point (3 places) | 12 | Stud (3 places)                                  |
| 4 | Fuel Tank   | 9 | Rollover Valve  | 13 | Fuel Tank 'H'-frame (1 place)                    |
| 5 | Fuel Feed Line  |   |   | 14 | Evaporative Emission Control Canister            |
|   |   |   |   | 15 | Evaporative Emission Control Canister Purge Line |

- 12 Loosen the screw clamp from the fuel tank end of the flexible fuel filler neck.
- 13 Remove the flexible fuel filler neck from the fuel tank.
- 14 Cover the flexible fuel filler neck with a suitable material to prevent foreign objects from entering.
- 15 Remove both nuts from the fuel tank 'H'-frame (13), refer to Figure 8A1 – 178.

- 16 Remove the nut from the centre fuel tank mounting strap (11).
- 17 Lift the fuel tank 'H'-frame away from the front anchoring points and place in a safe location away from the immediate worksite.
- 18 Lift the fuel tank mounting strap away from the front anchoring point and place in a safe location away from the immediate worksite.
- 19 Remove the fuel tank from its support frame.

**Reinstall**

Reinstallation of the fuel tank is the reverse of the removal procedure, noting the following:

- 1 Ensure all parts are dust-free and clean before reinstalling.
- 2 Tighten the fuel tank 'H'-frame nuts to the correct torque specification.
- 3 Tighten the fuel tank mounting strap nut to the correct torque specification.

Fuel tank 'H'-frame nut torque specification .....	20.0 – 25.0 Nm
Fuel tank mounting strap nut torque specification .....	20.0 – 25.0 Nm

- 4 Before starting the vehicle, perform a fuel system leak test, refer to [4.3 Fuel Leak Test](#).

### 7.3 Fuel Tank Support Straps

#### Remove

- 1 Remove the fuel tank, refer to 7.2 Fuel Tank.
- 2 Remove the rear park brake cable(s) from the fuel tank support straps, refer to Section 5A Service and Park Braking System.
- 3 Remove the intermediate muffler, refer to Section 8B Exhaust System.
- 4 Remove the heat shield from the left fuel tank support strap, refer to Section 8B Exhaust System.
- 5 Remove the fuel tank support straps and place the nuts (1), four places, in a safe location away from the immediate worksite.

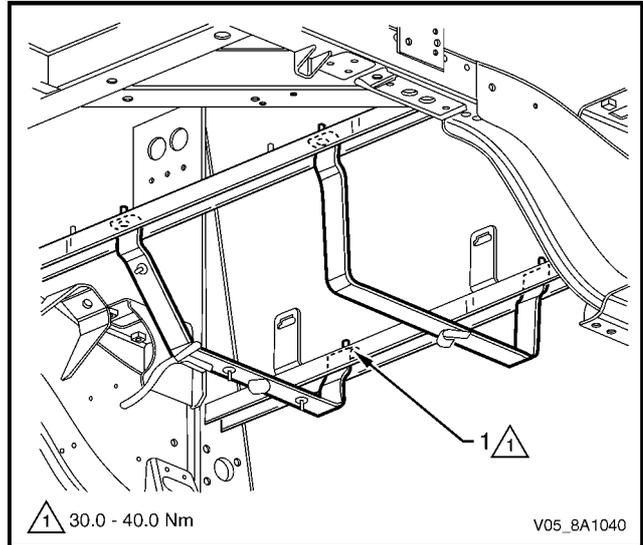


Figure 8A1 - 179

#### Reinstall

Reinstallation of the fuel tank support straps is the reverse of the removal procedure, noting the following:

- 1 Ensure all parts are dust-free and clean before reinstalling.
- 2 Tighten the nuts that secure the fuel tank support straps to the correct torque specification.

Fuel tank support strap attaching nut torque specification .....30.0 – 40.0 Nm
---

## 7.4 Support Bracket

### Remove

#### **WARNING**

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### **WARNING**

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### **WARNING**

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### **WARNING**

Wear safety glasses when using compressed air. Do not blow compressed air directly onto any body part.

#### **WARNING**

Ensure fuel is pumped or siphoned from both sides of the baffle in the fuel tank.

- 1 Remove the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 2 Drain the fuel tank by pumping or siphoning fuel through the hole in the fuel tank (from which the modular fuel pump and sender assembly was removed) using commercially-available equipment.

#### **NOTE**

A permanent floodgate restriction in the lower fuel filler neck prevents the fuel tank from being drained through the filler aperture.

- 3 Remove the grounding wire (1) from the spade connector on the fuel filler neck.
- 4 Remove the grounding wire from the spade connector screw mounting on the chassis member.
- 5 Place the grounding wire in a safe location away from the immediate worksite.
- 6 Loosen the screw clamp holding the flexible fuel inlet pipe (2) onto the fuel filler neck.
- 7 Use compressed air to ensure that all dirt and foreign materials are removed from the inlet breather pipe (3) and fuel filler neck.
- 8 Remove the quick-connect fitting holding the inlet breather pipe onto the fuel filler neck.
- 9 Cover the flexible fuel inlet pipe and inlet breather pipe with a suitable material to prevent foreign objects from entering.

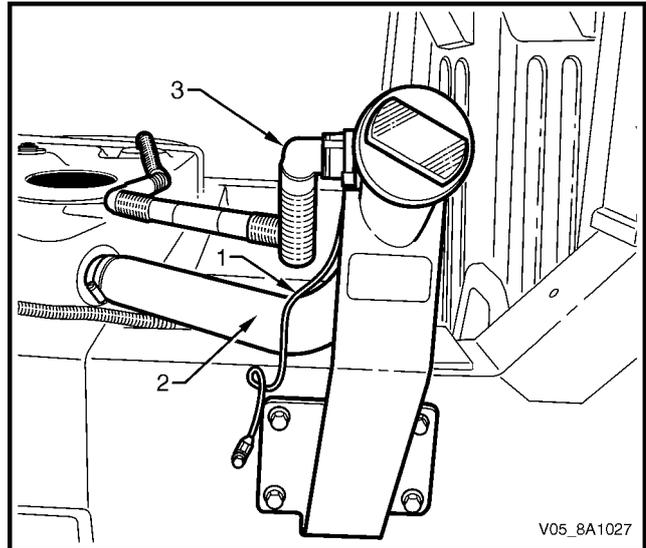


Figure 8A1 - 180

- 10 Remove both screw clamps (1) holding the flexible fuel inlet pipe onto the fuel filler neck.
- 11 Remove the screw (2), four places, holding the support bracket backing plate onto the chassis.
- 12 Cover the flexible fuel filler neck with a suitable material to prevent foreign objects from entering.

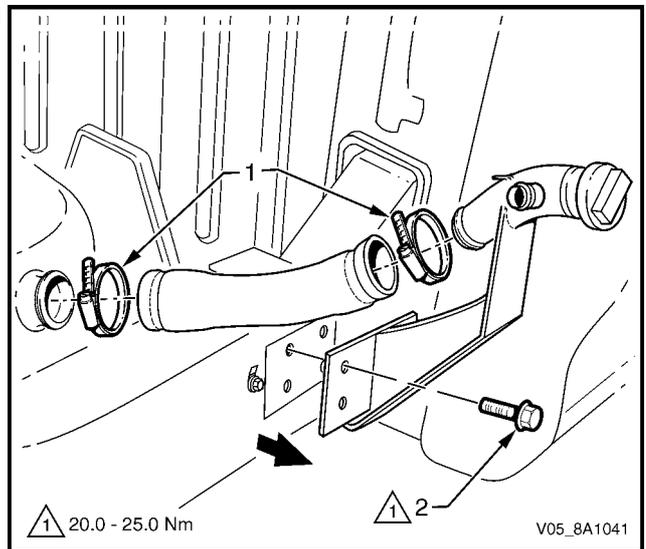


Figure 8A1 - 181

**Reinstall**

Reinstallation of the support bracket is the reverse of the removal procedure, noting the following:

- 1 Ensure all parts are dust-free and clean before reinstalling.
- 2 Tighten the screws that secure the support bracket backing plate on the chassis to the correct torque specification.

Support bracket backing plate attaching screw torque specification .....	20.0 - 25.0 Nm
--	----------------

## 7.5 Modular Fuel Pump and Sender Assembly

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air directly onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 12O Fuses, Relays and Wiring Harnesses](#).
- 2 Remove the tray, refer to [Section 1B1 Tray](#).
- 3 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.

#### CAUTION

Before proceeding, clean all traces of dirt and other foreign material from the top of the fuel tank, near the modular fuel pump and sender assembly.

- 4 Disconnect the modular fuel pump and sender assembly harness connector (1).
- 5 Tag the fuel feed line connecting the fuel feed port (2) on the modular fuel pump and sender assembly cover.

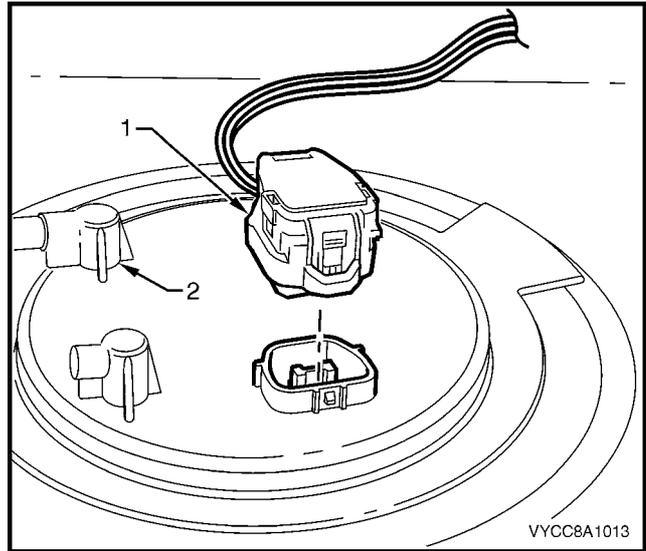


Figure 8A1 - 182

- 6 Disengage the fuel feed line quick-connect fitting (1) using tool No. AU533 (3/8-inch).

**NOTE**

For information on quick-connect fittings for Regular Cab and Crew Cab vehicles, refer to Tool No. AU533.

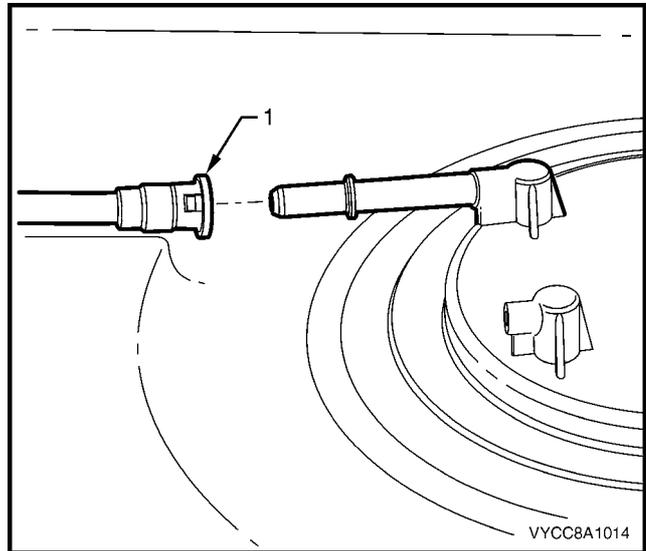


Figure 8A1 - 183

**CAUTION**

Ensure tool No. J45722 is seated firmly and positively in the modular fuel pump and sender assembly cover retainer lock ring while removing the modular fuel pump and sender assembly.

- 7 Using tool No. J45722 (1) and a half-inch breaker bar (2), remove the modular fuel pump and sender assembly cover retainer lock ring (3) by turning it anticlockwise.
- 8 Remove the modular fuel pump and sender assembly cover retainer lock ring.

**NOTE**

The modular fuel pump and sender assembly cover springs up when the retainer is removed.

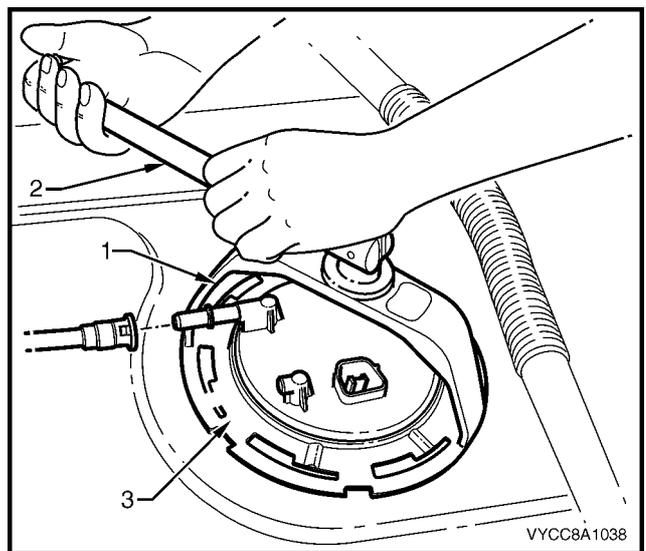


Figure 8A1 - 184

**WARNING**

The reservoir will be full of fuel. When the modular fuel pump and sender assembly is removed from the fuel tank, pour any remaining fuel in the reservoir into a suitable container. Do not drain or store fuel into an open container, due to the possibility of fire or explosion.

- 9 Carefully lift the modular fuel pump and sender assembly from the fuel tank, taking care not to:
- damage the fuel level sender float and arm, and
  - spill any fuel remaining in the reservoir.

**NOTE**

The fuel sender float arm is not serviced separately. If damaged, it is replaced as part of the fuel level sender assembly.

**WARNING**

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

- 10 Remove and discard the O-ring and spacer.
- 11 Place a suitable material over the opening in the fuel tank to prevent any foreign matter from entering the fuel system.

**Test****Fuel Level Sender**

- 1 Measure the resistance across the positive (1) and negative (2) fuel level sender terminals of the fuel pump motor connector. Take the following measurements:
  - a With the fuel level sender assembly in the empty position, the resistance should be  $248.5 \Omega$  ( $\pm 3.3 \Omega$ ).
  - b With the fuel level sender assembly rotated to the full position, the resistance should be  $40 \Omega$  ( $\pm 2.5 \Omega$ ).
- 2 If the resistance at either of these positions is not within tolerance, replace the fuel level sender assembly, refer to [7.7 Fuel Level Sender Assembly](#).

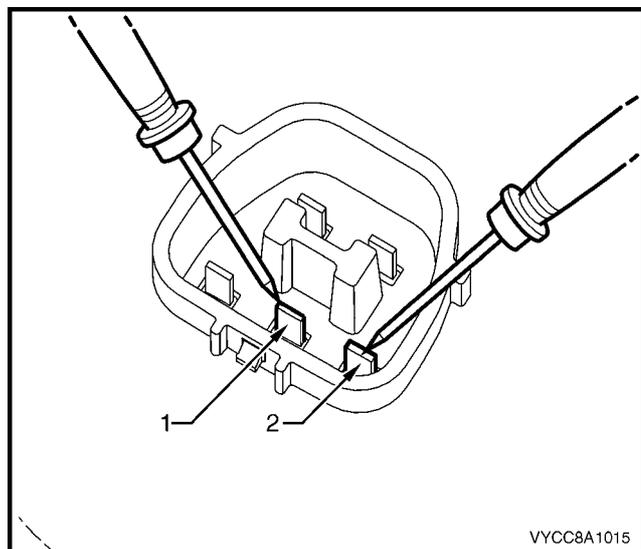


Figure 8A1 - 185

## Disassemble

**CAUTION**

Do not touch the ceramic variable resistor card; if it is touched inadvertently, clean it immediately with isopropyl alcohol.

- 1 Prise the tang open that holds the fuel level sender float and arm onto the nylon wiper piece.
- 2 Lift the fuel level sender float and arm away from the nylon wiper piece and place in a safe location away from the immediate worksite.

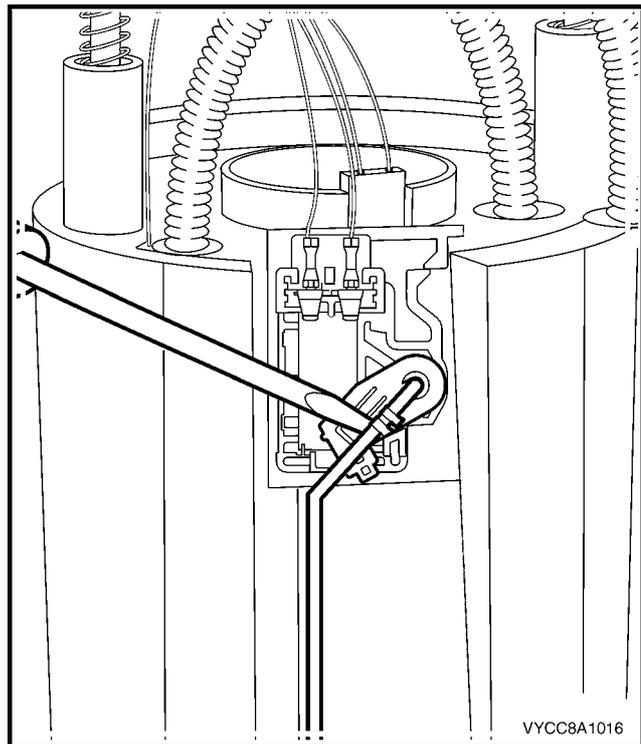


Figure 8A1 - 186

- 3 Lift the nylon wiper piece off the ceramic variable resistor card holder, then place in a safe location away from the immediate worksite.

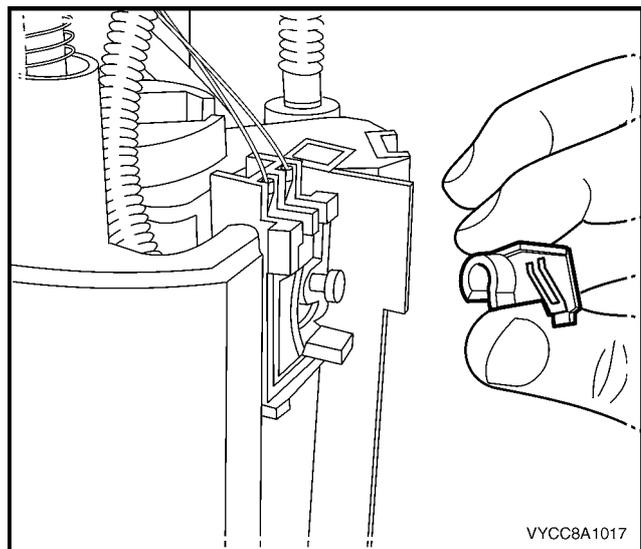


Figure 8A1 - 187

- 4 Remove the 3-pin connector (the fuel level sender assembly wires) from underneath the modular fuel pump and sender assembly cover.

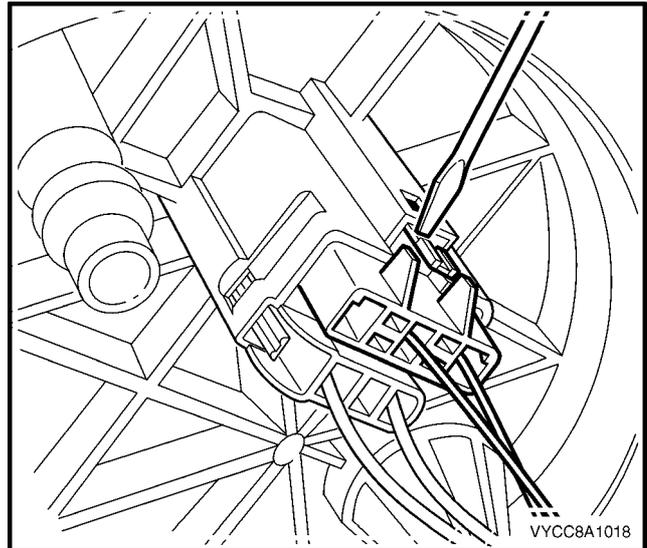


Figure 8A1 - 188

- 5 Remove the 2-pin connector (the fuel pump motor wires) from underneath the modular fuel pump and sender assembly cover.

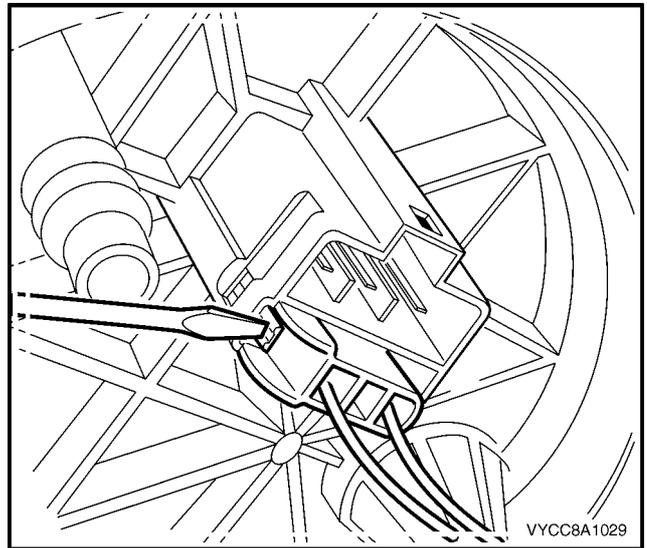


Figure 8A1 - 189

- 6 Prise the transfer jet pump from the clips, then remove from the reservoir.

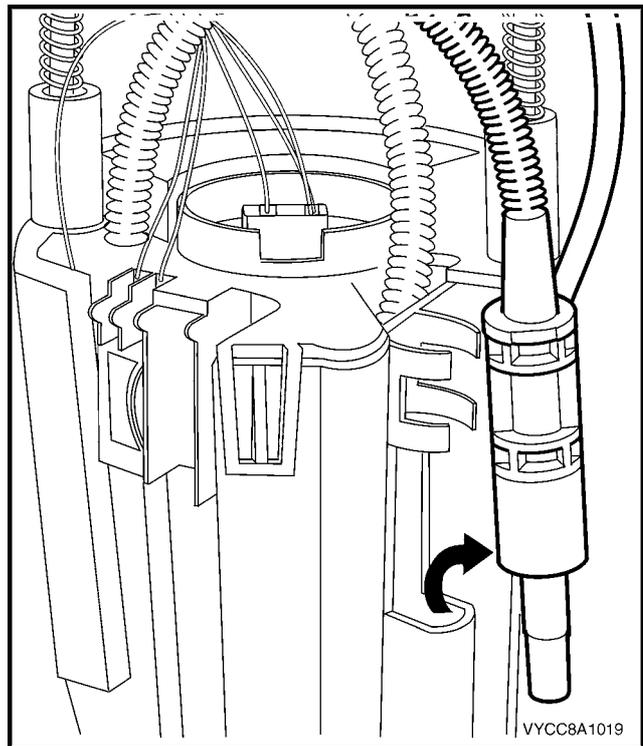


Figure 8A1 - 190

- 7 Press in the tang retaining the 2-pin connector on the fuel pump and suction filter assembly, then remove the connector.

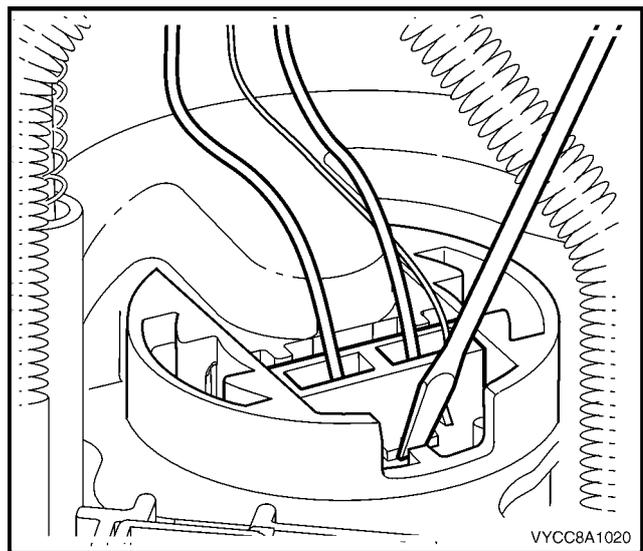


Figure 8A1 - 191

- 8 Prise the tang open that holds the ceramic variable resistor card holder to the side of the reservoir, then lift it off the reservoir.

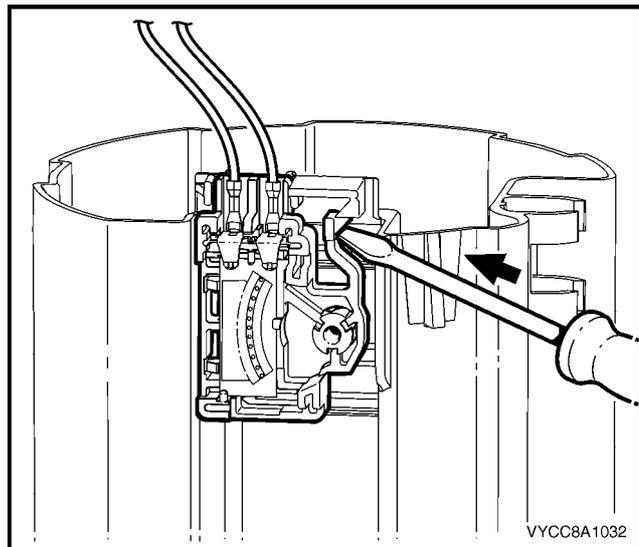


Figure 8A1 - 192

- 9 Prise the four tangs with a flat-bladed screwdriver, then remove the fuel pump and suction filter assembly, and modular fuel pump and sender assembly cover from the reservoir.

**NOTE**

Another person may have to assist in removing the fuel pump and suction filter assembly from the reservoir.

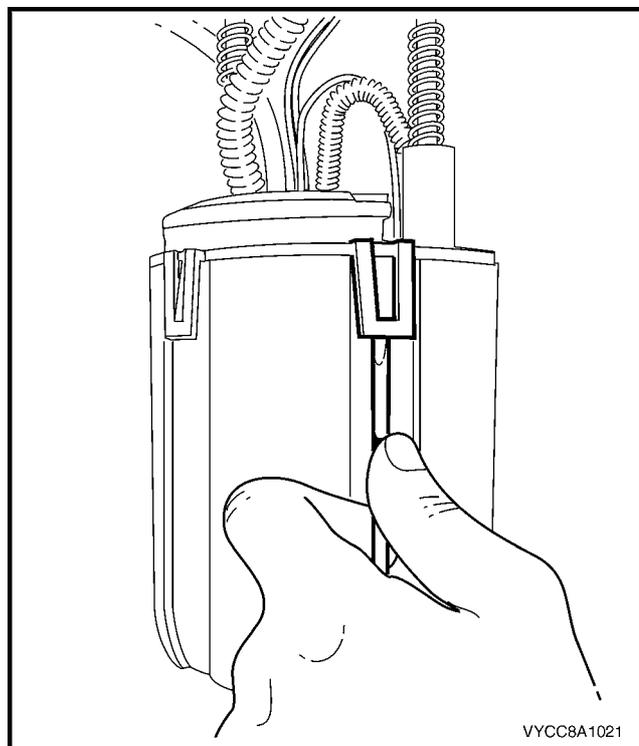


Figure 8A1 - 193

**CAUTION**

Do not bend the spade connector on the pressure regulator holder; this can be easily damaged or broken.

- 10 Pull the modular fuel pump and sender assembly cover, fuel pump and suction filter assembly, pressure regulator holder and fuel feed pipe from the reservoir body.

**NOTE**

Some difficulty may be experienced when lifting these items from the reservoir body due to the limited space available.

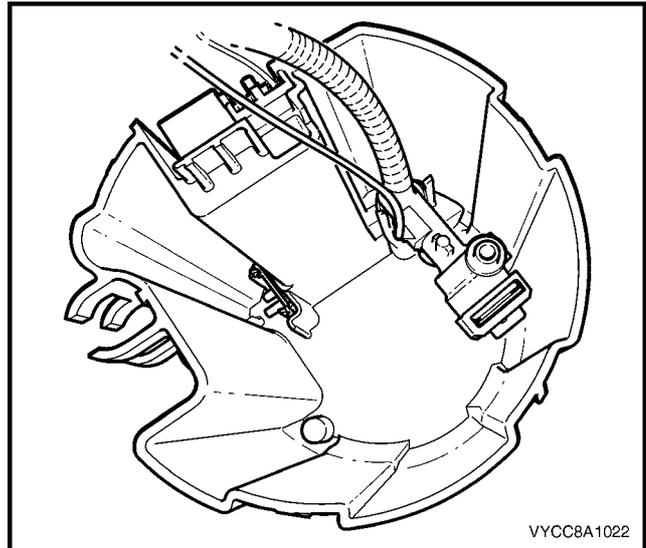


Figure 8A1 - 194

- 11 Remove and discard the O-ring (1) from the bottom of the pressure regulator holder.

**NOTE**

The O-ring may be lodged in the reservoir body.

- 12 Remove and discard the O-ring (2) from the top of the pressure regulator holder.

**NOTE**

The O-ring may be lodged in the base of the fuel pump and suction filter assembly.

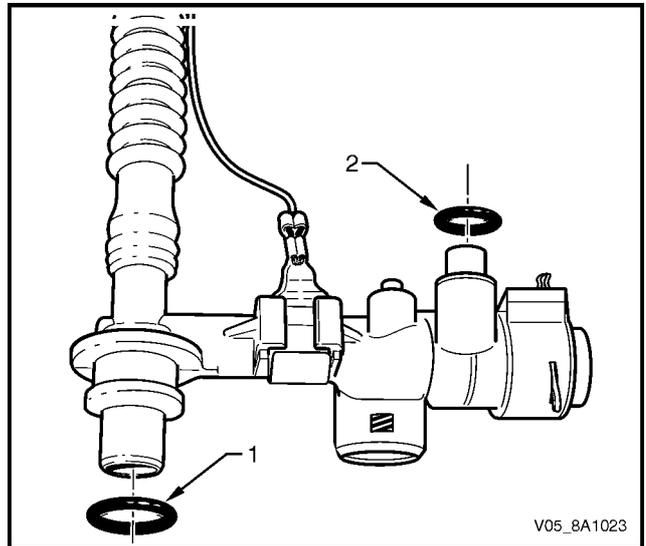
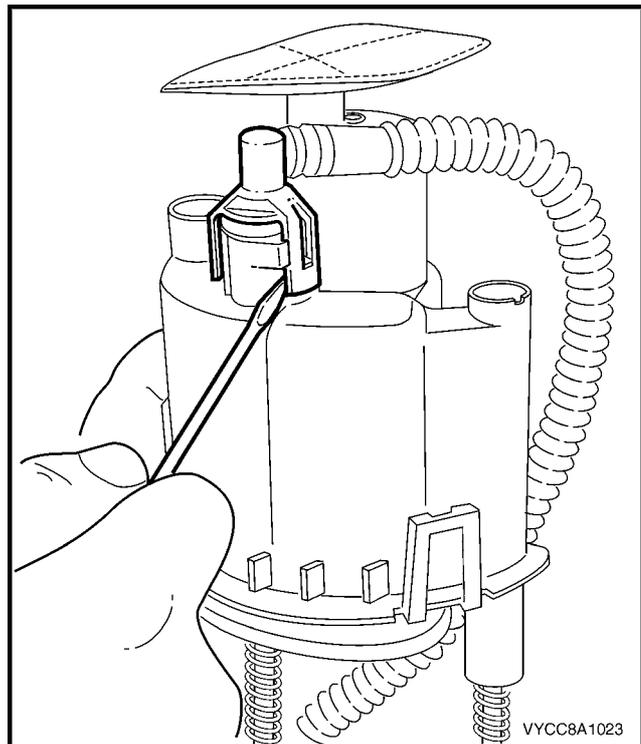


Figure 8A1 - 195

- 13 Prise open both tangs on the fuel outlet connector on the bottom of the fuel pump and suction filter assembly, then remove the fuel outlet pipe from the fuel pump and suction filter assembly.
- 14 Remove and discard the O-ring from the fuel feed line outlet underneath the fuel pump and suction filter assembly.

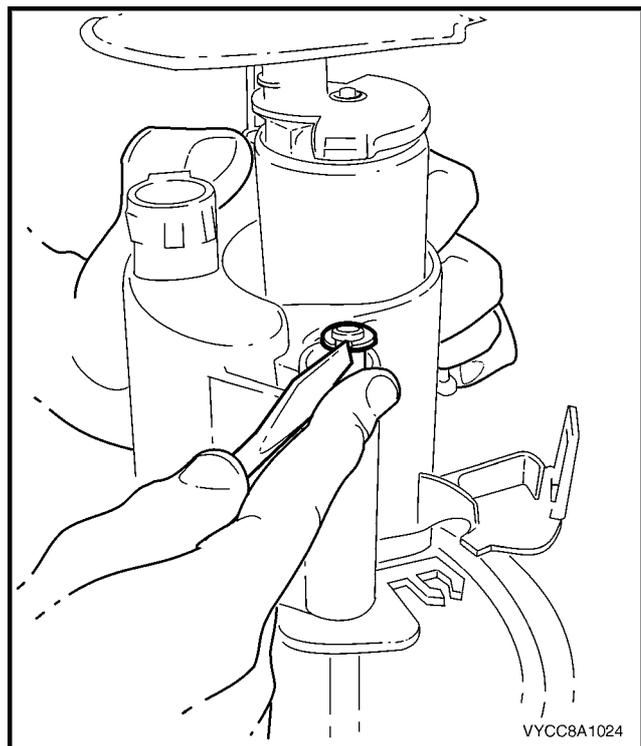
**NOTE**

The O-ring may remain in the base of the fuel pump and suction filter assembly.



**Figure 8A1 - 196**

- 15 Push the fuel pump and suction filter assembly down the sprung shafts and remove the circlip (only one shaft is fitted with a circlip) from the end of the shaft. Place the circlip in a safe location away from the immediate worksite.



**Figure 8A1 - 197**

## Reassemble

Reassembly is the reverse of the disassembly procedure, noting the following:

- 1 Locate and press the fuel outlet connector to its position on the bottom of the fuel pump and suction filter assembly. (Loop the fuel outlet pipe through the recess near the right-side top when the fuel filter assembly is on the side facing away from you.)

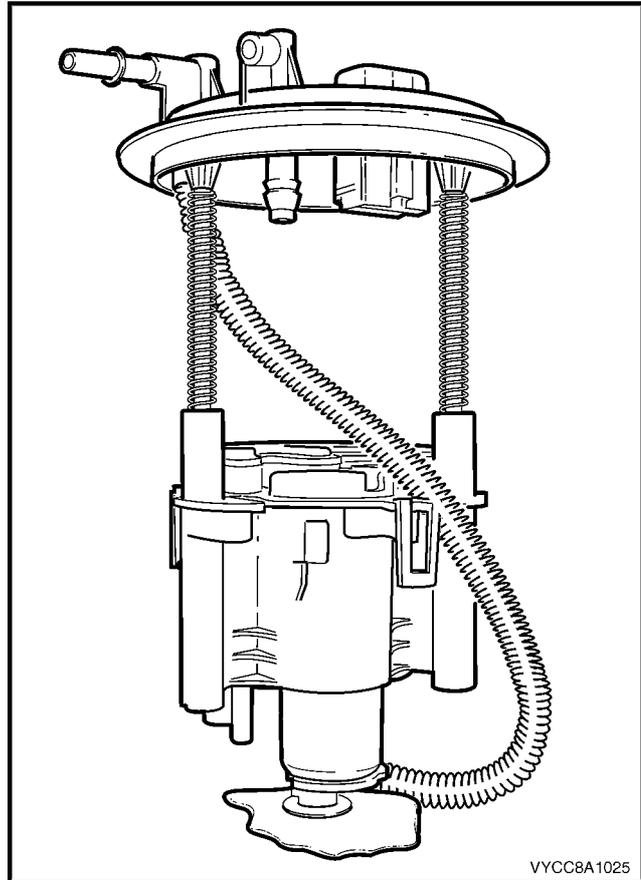


Figure 8A1 - 198

- 2 Ensure the wires to both electrical connectors, the ceramic variable resistor card and the pressure regulator and are inboard of the fuel feed pipe.
- 3 Ensure the wires to both electrical connectors, the ceramic variable resistor card and the pressure regulator do not interfere when reassembling the fuel pump and suction filter assembly into the reservoir.

## Reinstall

Reinstallation of the modular fuel pump and sender assembly is the reverse of the removal procedure, noting the following:

- 1 Position a new O-ring seal in the fuel tank recess.
- 2 Rest the modular fuel pump and sender assembly on a flat surface.
- 3 Measure the distance between the centre of the fuel sender float and the flat surface.
- 4 Ensure the centre of the fuel level sender float is a nominal 18.5 mm above the surface. If not, carefully bend the fuel level sender float arm to achieve the required distance.

### NOTE

Do not damage the fuel level sender float and arm when placing the modular fuel pump and sender assembly into the fuel tank.

- 5 Ensure the low fuel level feed pipe is located in the fuel tank correctly (that is, on the side of the baffle furthest away from the modular fuel pump and sender assembly).
- 6 Ensure the locator in the modular fuel pump and sender assembly cover engages in the slot in the fuel tank opening.

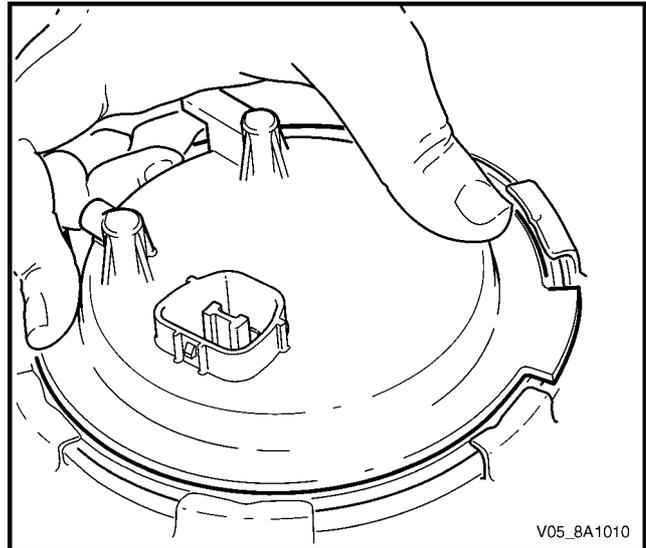


Figure 8A1 – 199

### WARNING

Ensure the retainer lock ring is installed correctly. Incorrect installation of the modular fuel pump and sender assembly retainer could cause fuel vapour leakage.

### CAUTION

Ensure tool No. J45722 is seated firmly and positively in the modular fuel pump and sender assembly cover retainer lock ring while tightening the modular fuel pump and sender assembly.

- 7 Using tool No. J45722 (1) and a half-inch breaker bar (2), install the modular fuel pump and sender assembly cover retainer lock ring (3) by turning it clockwise, refer to [Figure 8A1 – 184](#).
- 8 Install the modular fuel pump and sender assembly harness connector (1), refer to [Figure 8A1 – 182](#).
- 9 Install the fuel feed line quick-connect fitting (1) to the modular fuel pump and sender assembly cover, refer to [Figure 8A1 – 183](#).
- 10 Tighten the modular fuel pump and sender assembly cover retainer lock ring.

## 7.6 Fuel Filter Assembly

### NOTE

The fuel filter assembly is part of the modular fuel pump and sender assembly and is not repairable. If the fuel filter assembly becomes unserviceable, replace the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).

## 7.7 Fuel Level Sender Assembly

### Disassemble

- 1 Remove the modular fuel pump and sender assembly from the fuel tank, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).

**CAUTION**

Do not touch the ceramic variable resistor card; if it is touched inadvertently, clean it immediately with isopropyl alcohol.

- 2 Prise the tang open that holds the fuel level sender float and arm onto the nylon wiper piece.
- 3 Lift the fuel level sender float and arm away from the nylon wiper piece and place in a safe location away from the immediate worksite.

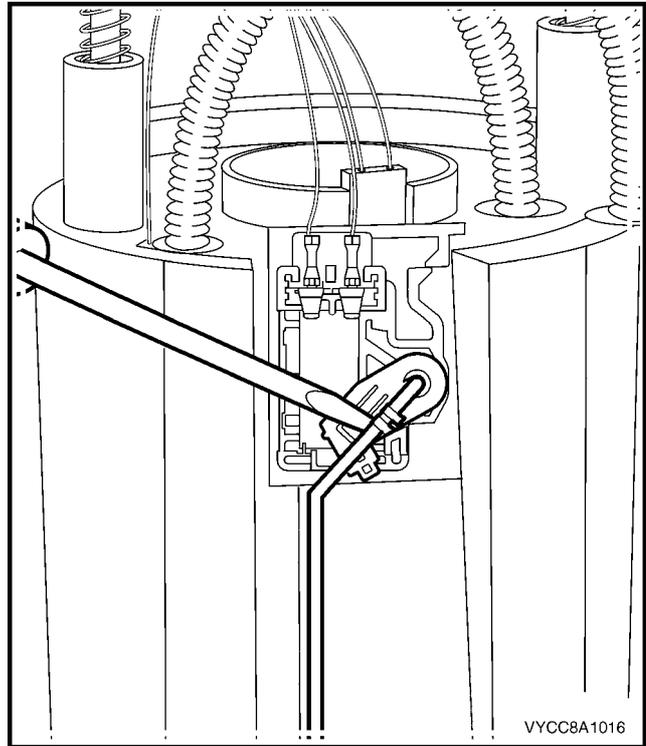


Figure 8A1 - 200

- 4 Lift the nylon wiper piece off the ceramic variable resistor card holder, then place in a safe location away from the immediate worksite.

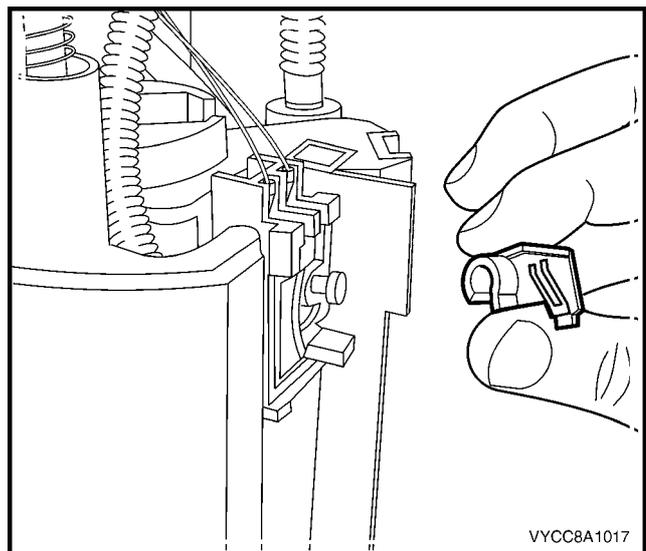
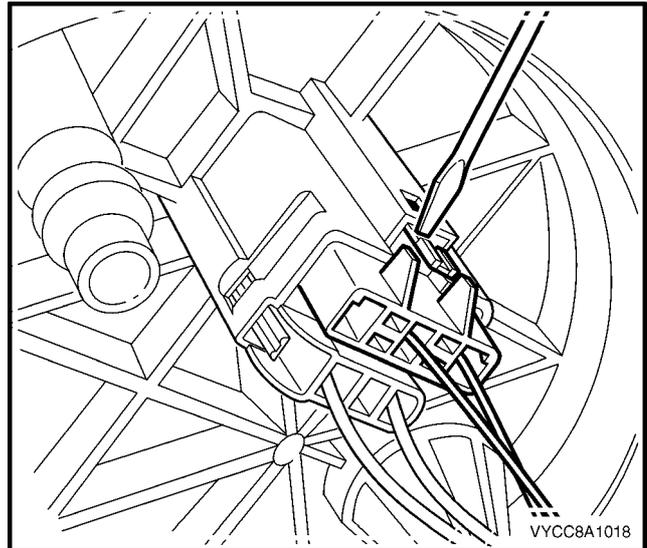


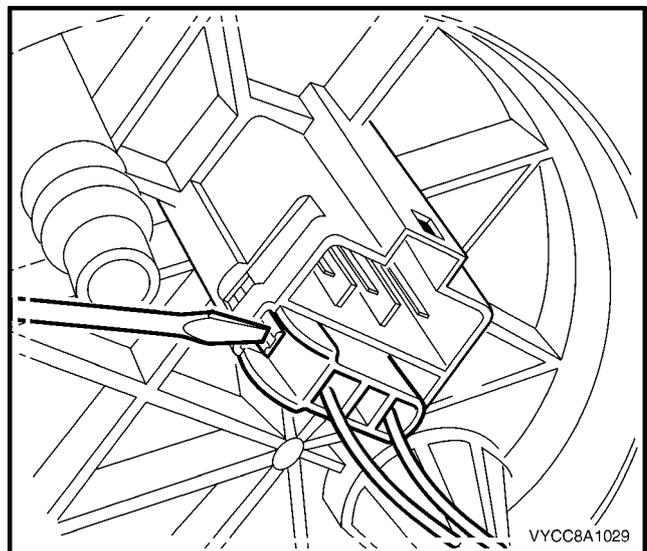
Figure 8A1 - 201

- 5 Remove the 3-pin connector (the fuel level sender assembly wires) from underneath the modular fuel pump and sender assembly cover.



**Figure 8A1 - 202**

- 6 Remove the 2-pin connector (the fuel pump motor wires) from underneath the modular fuel pump and sender assembly cover.



**Figure 8A1 - 203**

- 7 Prise the transfer jet pump from the clips, then remove from the reservoir.

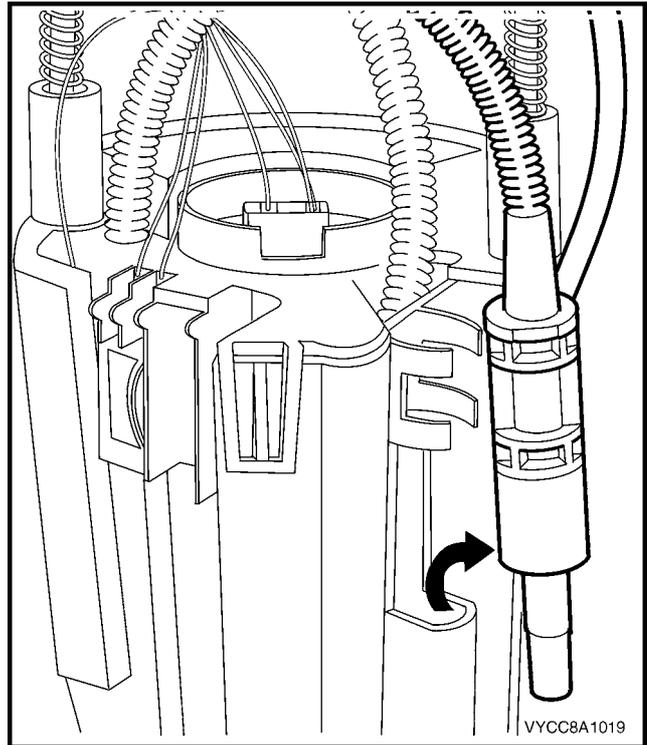


Figure 8A1 - 204

- 8 Press in the tang retaining the 2-pin connector on the fuel pump and suction filter assembly, then remove the connector.

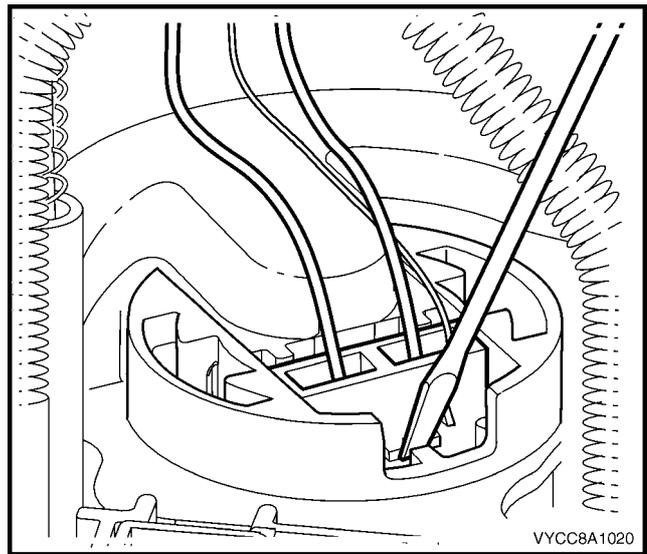


Figure 8A1 - 205

- 9 Prise the tang open that holds the ceramic variable resistor card holder to the side of the reservoir, then lift it off the reservoir.

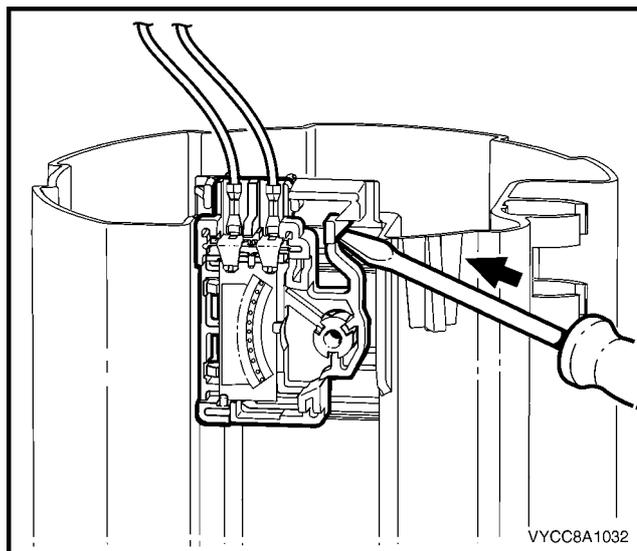


Figure 8A1 - 206

- 10 Prise the four tangs with a flat-bladed screwdriver, then remove the fuel pump and suction filter assembly, and modular fuel pump and sender assembly cover from the reservoir.

**NOTE**

Another person may have to assist in removing the fuel pump and suction filter assembly from the reservoir.

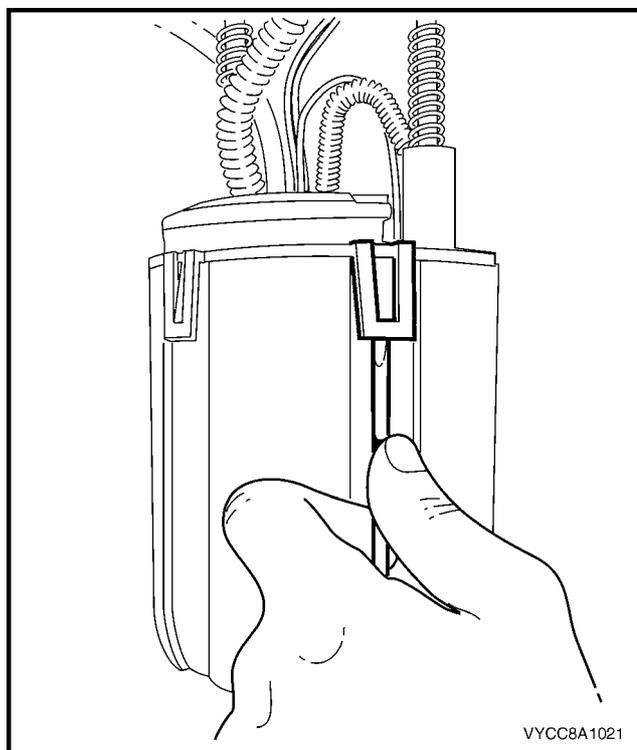


Figure 8A1 - 207

- 11 Pull the modular fuel pump and sender assembly cover, fuel pump and suction filter assembly, pressure regulator holder and fuel feed pipe from the reservoir body.

**NOTE**

Some difficulty may be experienced when lifting these items from the reservoir body due to the limited space available.

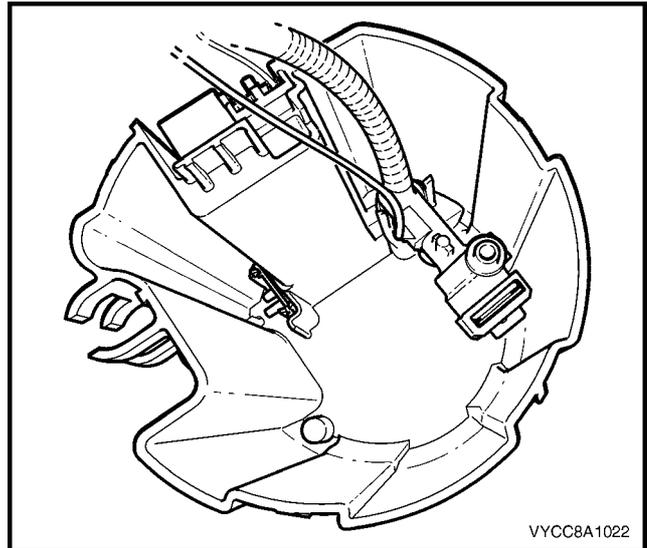


Figure 8A1 - 208

- 12 Remove and discard the O-ring (1) from the bottom of the pressure regulator holder.

**NOTE**

The O-ring may be lodged in the reservoir body.

- 13 Remove and discard the O-ring (2) from the top of the pressure regulator holder.

**NOTE**

The O-ring may be lodged in the base of the fuel pump and suction filter assembly.

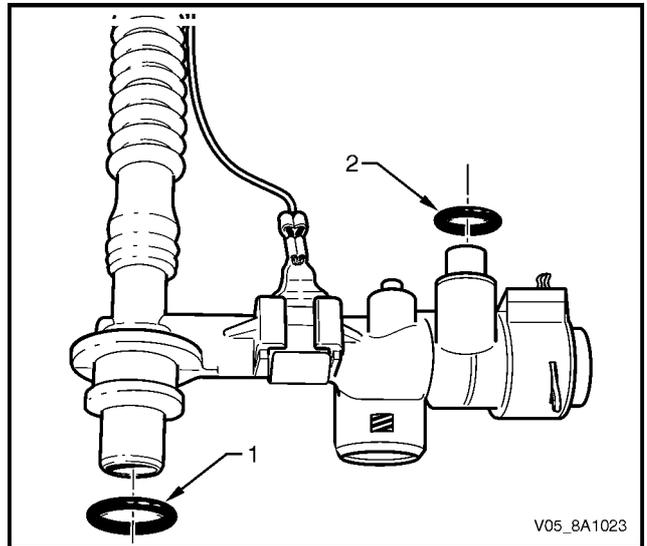


Figure 8A1 - 209

**CAUTION**

Do not bend the spade connector on the pressure regulator holder; this can be easily damaged or broken.

- 14 Remove the spade connector from the pressure regulator holder.

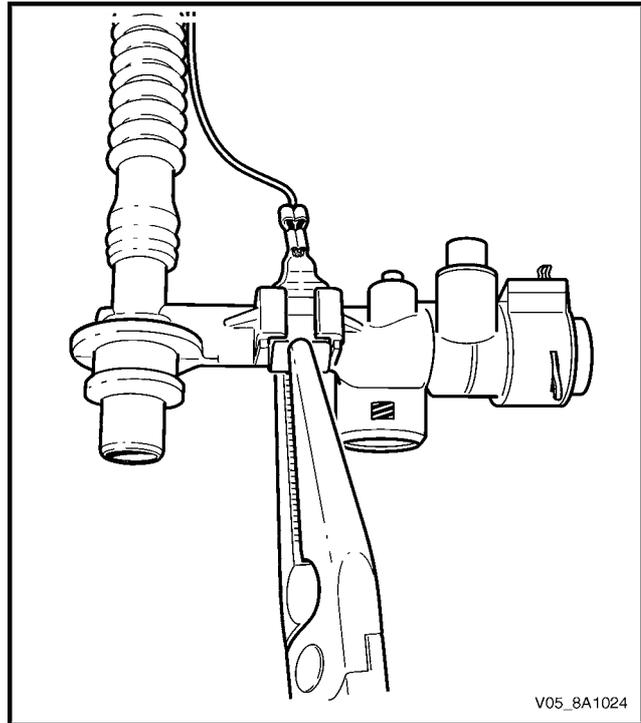


Figure 8A1 - 210

**Reassemble**

Reassembly is the reverse of the disassembly procedure, noting the following:

**CAUTION**

Do not touch the ceramic variable resistor card; if it is touched inadvertently, clean it immediately with isopropyl alcohol.

**NOTE**

Do not separate the fuel level sender float arm from the nylon wiper piece on the replacement fuel level sender assembly.

## 7.8 Pressure Regulator

### Remove

- 1 Remove the modular fuel pump and sender assembly from the fuel tank, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 2 Disassemble the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 3 Remove the retaining clip (4) from the top of the pressure regulator holder and place in a safe location away from the immediate worksite.
- 4 Using a flat-bladed screwdriver, prise the pressure regulator (3) from the pressure regulator holder (1).
- 5 Remove the nylon spacer (2) from the pressure regulator holder and place in a safe location away from the immediate worksite.

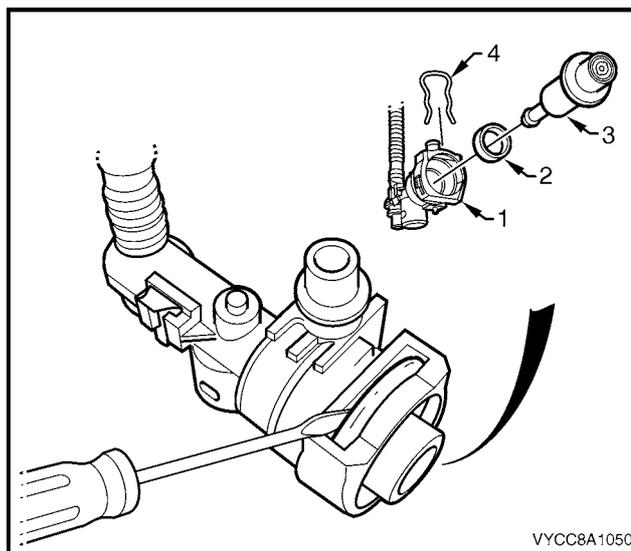


Figure 8A1 - 211

### Reinstall

Reinstallation of the pressure regulator is the reverse of the removal procedure, noting the following:

#### CAUTION

When installing the modular fuel pump and sender assembly, use only the custom-sized O-rings supplied with the modular fuel pump and sender assembly replacement parts kit. Do not use off-the-shelf O-rings; refer to [6.11 Modular Fuel Pump and Sender Assembly O-rings](#) for O-ring specifications.

## 7.9 Suction Filter

The suction filter is attached by an 'easy washer' to the fuel pump end cap. The suction filter is accessible after removing the fuel pump and fuel filter from the modular fuel pump and sender assembly reservoir.

### Remove

- 1 Remove the modular fuel pump and sender assembly from the fuel tank, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 2 Disassemble the fuel pump and suction filter assembly, and modular fuel pump and sender assembly cover from the reservoir, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 3 Using a suitable blade or a flat-bladed screwdriver, remove the 'easy washer' (1) from the fuel pump end cap post.
- 4 Remove the suction filter (2).

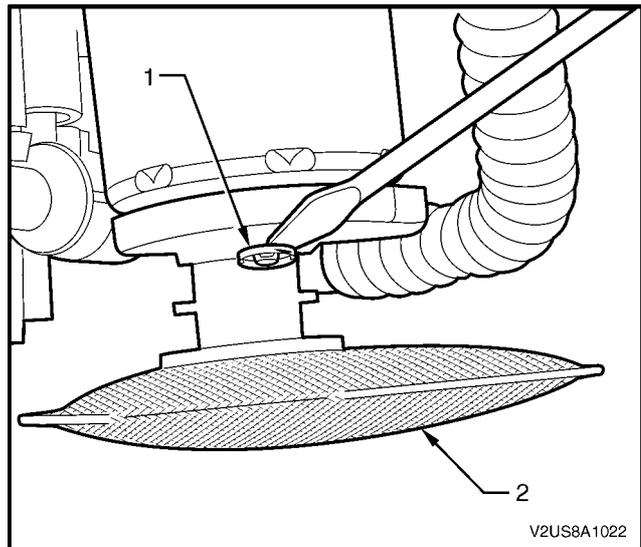


Figure 8A1 - 212

### Reinstall

Reinstallation of the suction filter is the reverse of the removal procedure, noting the following:

**CAUTION**

**Check the 'easy washer' for serviceability and replace if required.**

Ensure the 'easy washer' is firmly installed along the fuel pump end cap post and firmly pressed up against the suction filter moulding.

## 7.10 Modular Fuel Pump

The modular fuel pump is contained within the fuel filter assembly.

### Remove

- 1 Remove the suction filter, refer to [7.9 Suction Filter](#).
- 2 Remove the fuel pump and suction filter assembly from the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 3 Disassemble the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).

**CAUTION**

**Do not overtighten the vice grips as this may damage the fuel pump.**

- 4 Clamp the protruding end of the fuel pump body (1) in a soft-jawed vice (2) to support the modular fuel pump and fuel filter assembly (3) in place.
- 5 Insert a medium-sized flat-bladed screwdriver through each of the service holes in the fuel filter assembly.
- 6 Slide the screwdriver blade between the fuel pump end cap and the internal fuel filter clips that hold the fuel pump body in place.

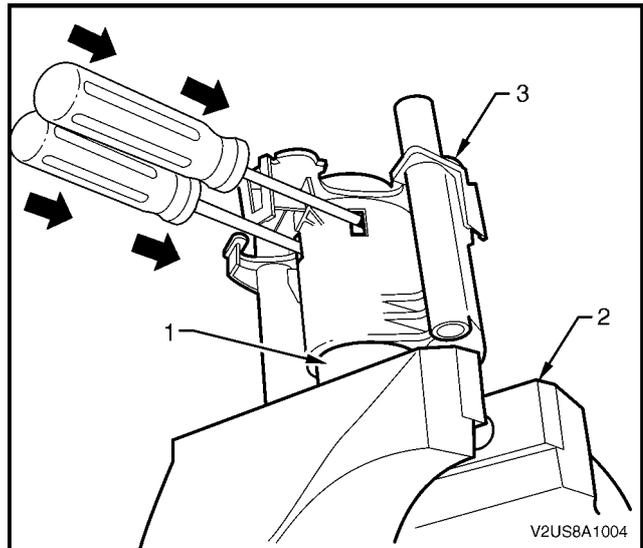


Figure 8A1 - 213

- 7 Push the screwdrivers in far enough so the internal fuel filter clips are deflected just free of each of the fuel pump end cap retainer shoulders.
- 8 While holding the screwdrivers in place with one hand, manipulate the fuel filter assembly upwards to separate it from the fuel pump.

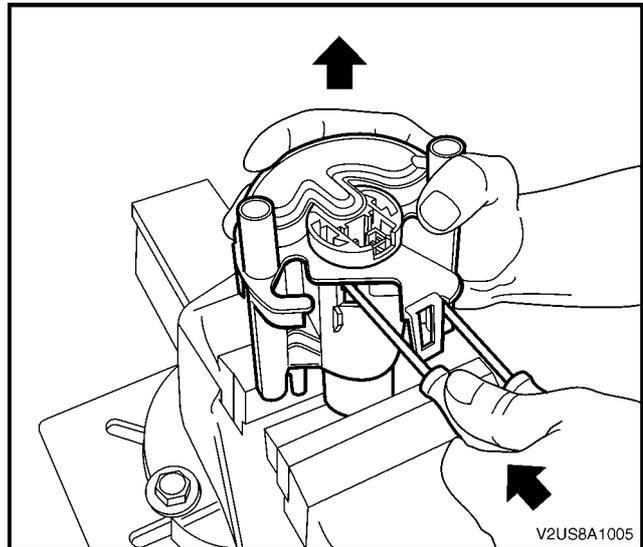


Figure 8A1 - 214

## Reinstall

Reinstallation of the modular fuel pump is the reverse of the removal procedure, noting the following:

**CAUTION**

Do not use any tool that may damage either the fuel pump body or the fuel filter assembly.

**CAUTION**

Check the 'easy washer' for serviceability and replace if required.

**CAUTION**

When installing the modular fuel pump and sender assembly, use only the custom-sized O-rings supplied with the modular fuel pump and sender assembly replacement parts kit. Do not use off-the-shelf O-rings; refer to [6.11 Modular Fuel Pump and Sender Assembly O-rings](#) for O-ring specifications.

- 1 Ensure the 'easy washer' is firmly installed along the fuel pump end cap post and firmly pressed up against the suction filter moulding.
- 2 Using hands only, locate the fuel pump body in its correct orientation into the fuel filter assembly.
- 3 Push the fuel pump body firmly into place and lock the fuel pump into the fuel filter assembly.
- 4 Reassemble the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 5 Reinstall the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).

## 7.11 Rollover Valve

### NOTE

The rollover valve is welded to the top of the fuel tank and is not a serviceable item. If the rollover valve becomes unserviceable, the fuel tank must be replaced, refer to [7.2 Fuel Tank](#).

## 7.12 Fuel Pipes

### Regular Cab and Crew Cab with 'Delete Tub' Option

#### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Raise the vehicle, preferably on a hoist, refer to [Section 0A General Information](#).

#### CAUTION

Before proceeding, clean all traces of dirt and other foreign material from the fuel pipes.

- 4 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.
- 5 If required, remove the stone guards and fuel pipes. Use the following illustration showing the fuel pipe layout and location of other items relating to the fuel system as a guide, refer to Figure 8A1 – 215.

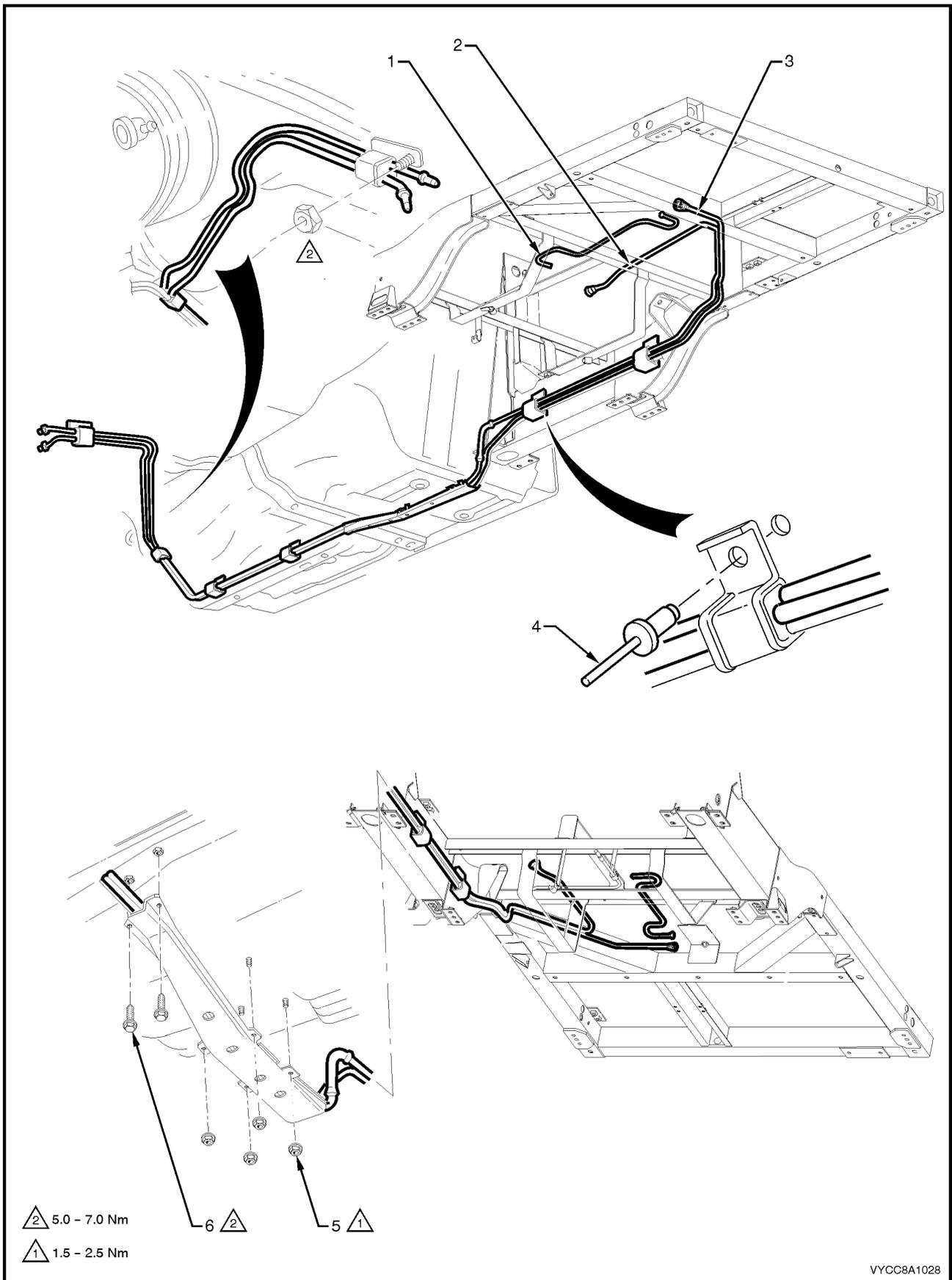


Figure 8A1 - 215

**Legend**

- |                       |   |  |
|-----------------------|---|--|
| 1 Fuel Tank Vent Line | 3 Evaporative Emission Control Canister | 5 Stone Guard Securing Nut (4 places)  |
| 2 Fuel Feed Line      | Purge Line                              | 6 Stone Guard Securing Bolt (2 places) |
|                       | 4 Fuel Line Bracket Blind Rivet         |  |

**Reinstall**

**CAUTION**

**Ensure the rubber in the fuel line brackets is in good condition before proceeding. If not, replace the affected bracket.**

Reinstallation of the stone guards and fuel pipes is the reverse of the removal procedure, noting the following:

- 1 Tighten the stone guard securing nuts to the correct torque specification.

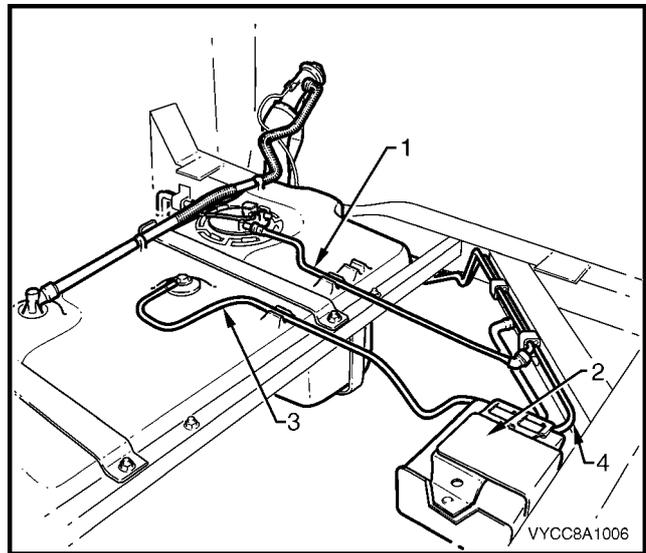
Stone guard securing nut torque specification .....	1.5 – 2.5 Nm
--	--------------

- 2 Tighten the stone guard securing bolts to the correct torque specification.

Stone guard securing bolt torque specification .....	5.0 – 7.0 Nm
---	--------------

**NOTE**

Use tool No. AU533 to remove the fuel feed line (1) quick-connect fitting, refer to Tool No. AU533.



**Figure 8A1 – 216**

**Legend**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1 Fuel Feed Line</li> <li>2 Evaporative Emission Control Canister</li> </ol> | <ol style="list-style-type: none"> <li>3 Fuel Tank Vent Line</li> <li>4 Evaporative Emission Control Canister Purge Line</li> </ol> |
|---|---|

## Crew Cab

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.

- 1 Remove the fuel pump relay, refer to [Section 120 Fuses, Relays and Wiring Harnesses](#).
- 2 Depressurise the fuel system, refer to [4.1 Fuel System Depressurisation](#).

#### WARNING

Never drain or store fuel into an open container, due to the possibility of fire or explosion.

- 3 Raise the vehicle, preferably on a hoist, refer to [Section 0A General Information](#).

#### CAUTION

Before proceeding, clean all traces of dirt and other foreign material from the fuel pipes.

- 4 Use compressed air to ensure that all dirt and foreign materials are removed from all fuel connections before the parts are disconnected.
- 5 If required, remove the stone guards and fuel pipes. Use the following illustration showing the fuel pipe layout and location of other items relating to the fuel system as a guide, refer to Figure 8A1 – 217.

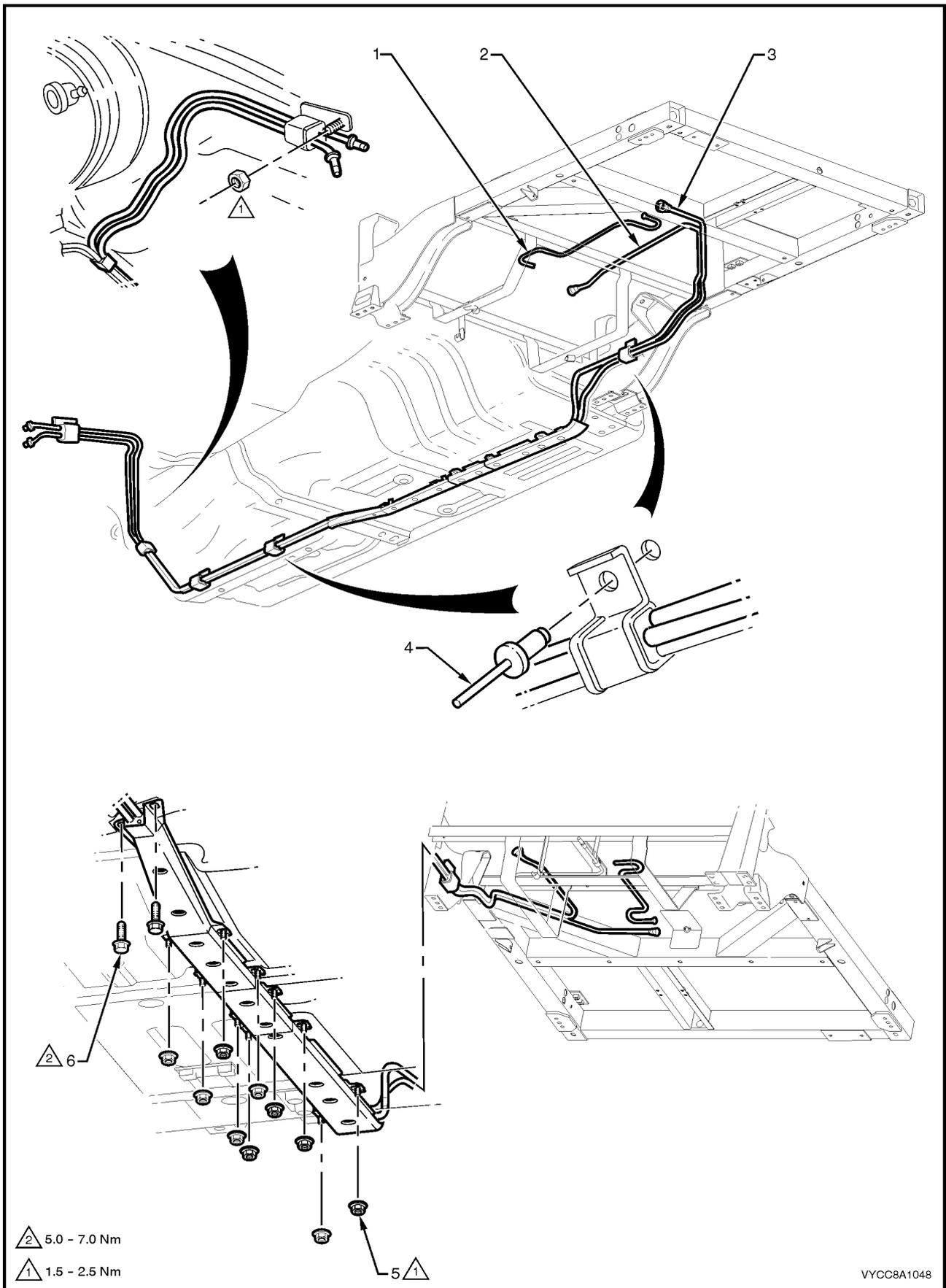


Figure 8A1 - 217

Legend

- |   |                     |   |                                       |   |                                      |
|---|---------------------|---|---------------------------------------|---|--------------------------------------|
| 1 | Fuel Tank Vent Line | 3 | Evaporative Emission Control Canister | 5 | Stone Guard Securing Nut (10 places) |
| 2 | Fuel Feed Line      |   | Purge Line                            | 6 | Stone Guard Securing Bolt (2 places) |
|   |                     | 4 | Fuel Line Bracket Blind Rivet         |   |                                      |

**Reinstall**

**CAUTION**

**Ensure the rubber in the fuel line brackets is in good condition before proceeding. If not, replace the affected bracket.**

Reinstallation of the stone guards and fuel pipes is the reverse of the removal procedure, noting the following:

- 1 Tighten the stone guard securing nuts to the correct torque specification.

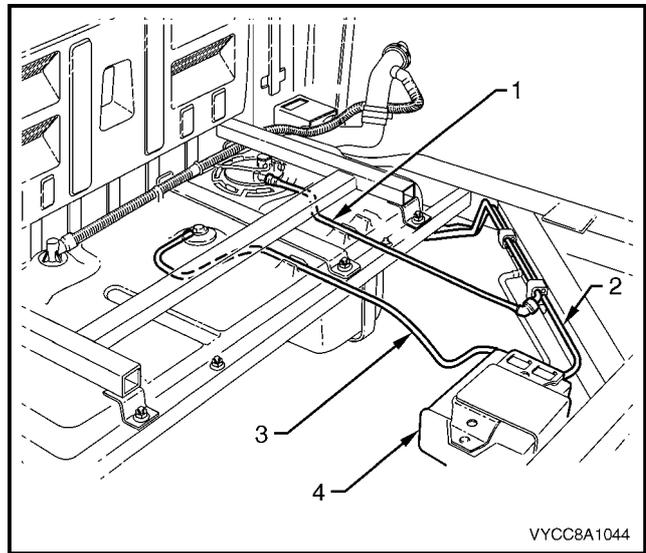
Stone guard securing nut torque specification .....	1.5 – 2.5 Nm
--	--------------

- 2 Tighten the stone guard securing bolts to the correct torque specification.

Stone guard securing bolt torque specification .....	5.0 – 7.0 Nm
---	--------------

**NOTE**

Use tool No. AU533 to remove the fuel feed line (1) quick-connect fitting, refer to Tool No. AU533.



**Figure 8A1 – 218**

**Legend**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1 Fuel Feed Line</li> <li>2 Evaporative Emission Control Canister Purge Line</li> </ol> | <ol style="list-style-type: none"> <li>3 Fuel Tank Vent Line</li> <li>4 Evaporative Emission Control Canister</li> </ol> |
|--|--|

## 7.13 Evaporative Emission Control Canister

### Remove

- 1 Hoist the vehicle, refer to [Section 0A General Information](#).
- 2 If required, remove the evaporative emission control canister vent line (1) from the chassis by pulling it out of the hole in the chassis.

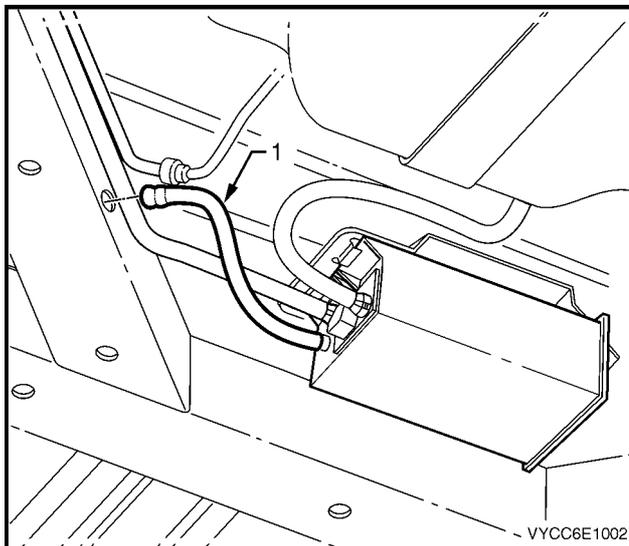


Figure 8A1 – 219

- 3 Disconnect the canister purge line (1) by grasping both sides of the quick-connect fitting. Twist the connector 1/4 turn in each direction to loosen any dirt within the quick-connect fitting.

### WARNING

**Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.**

- 4 Using compressed air, blow any dirt out of the quick-connect fitting.

5 Either:

- Disconnect using tool No. AU533, refer to Tool No. AU533.
- Disconnect without using tool No. AU533:

- (1) Grasp the quick-connect fitting and push it towards the canister.
- (2) Squeeze the quick-connect fitting to release the retaining tabs, then pull back on the connector to remove the canister purge line from the canister.

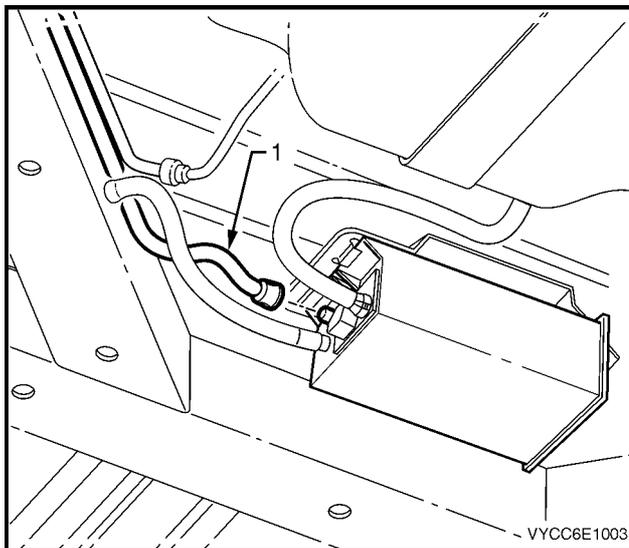


Figure 8A1 – 220

- 6 Disconnect the fuel tank vent line (1) by grasping both sides of the quick-connect fitting. Twist the connector 1/4 turn in each direction to loosen any dirt within the quick-connect fitting.

**WARNING**

**Wear safety glasses when using compressed air. Do not blow compressed air onto any body part.**

- 7 Using compressed air, blow any dirt out of the quick-connect fitting.
- 8 Disconnect the quick-connect fitting by pushing it towards the canister.
- 9 Squeeze the quick-connect fitting to release the retaining tabs, then pull back on the connector to remove the canister purge line from the canister.
- 10 Remove the canister vent line (1) from the canister by twisting and pulling it off.

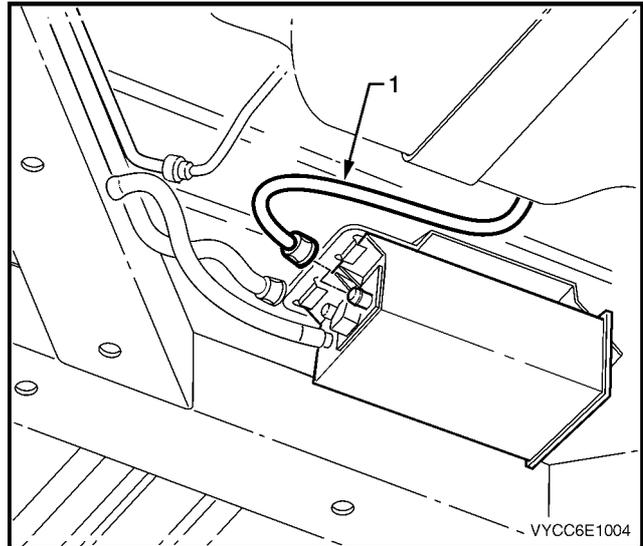


Figure 8A1 - 221

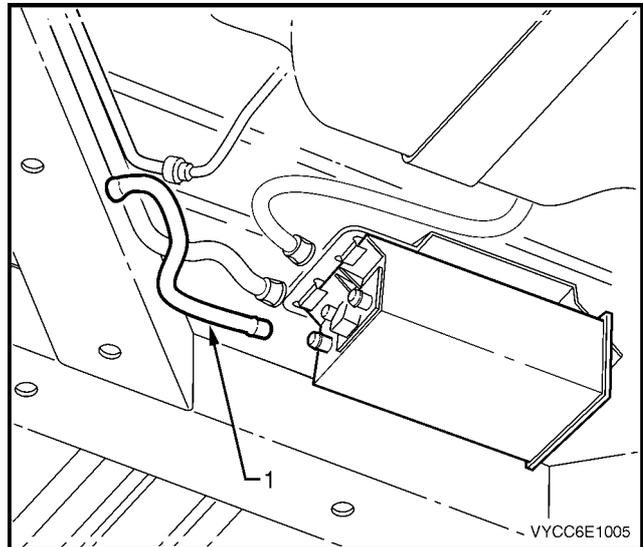


Figure 8A1 - 222

- 11 Remove the canister retaining nut (1).
- 12 Remove the canister from the retaining stud, then slide the canister out of the retainer (2).

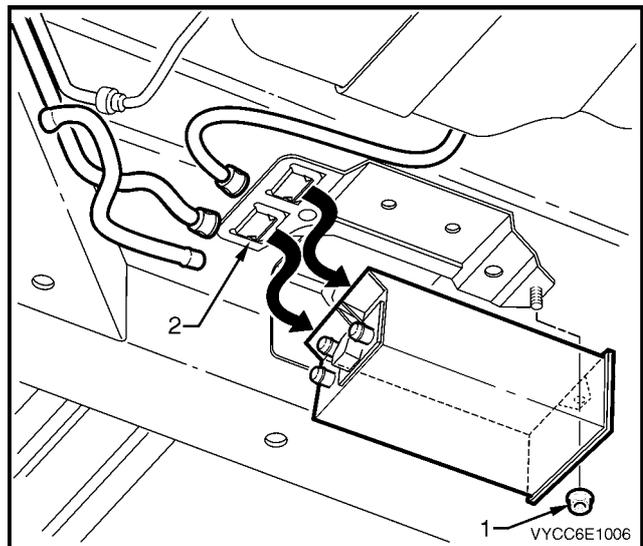
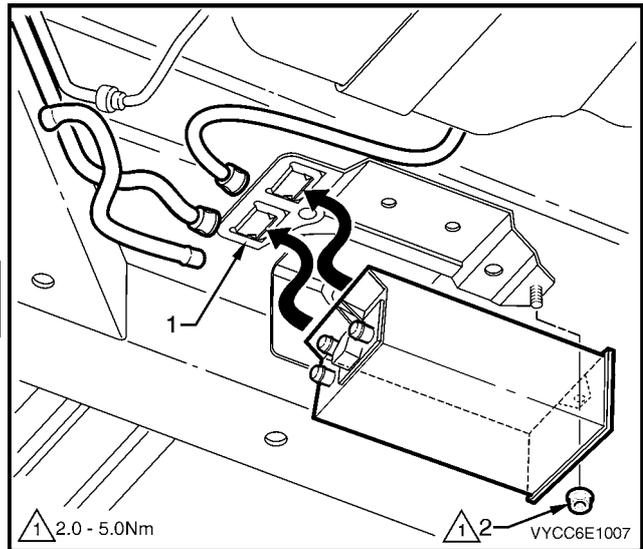


Figure 8A1 - 223

**Reinstall**

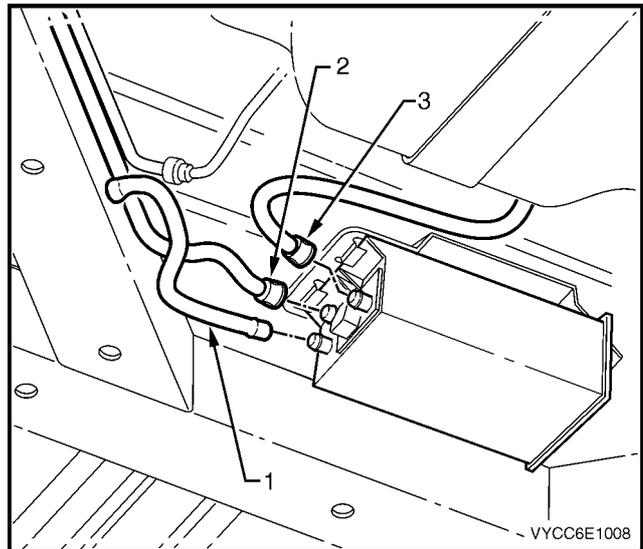
- 1 Hoist the vehicle, refer to [Section 0A General Information](#).
- 2 Reinstall the canister into the retainer (1) and over the retaining stud.
- 3 Reinstall the canister retaining nut (2), then hand-tighten.
- 4 Push the canister toward centre of the vehicle and tighten the canister retaining nut to the specified torque.

Evaporative emission control canister retaining nut torque specification ..... 2.0 - 5.0 Nm



**Figure 8A1 - 224**

- 5 Reinstall the canister vent line (1).
- 6 Align the canister purge line quick-connect (2) with the canister purge line port. Push the quick-connect firmly onto the port.
- 7 Align the fuel tank vent line quick-connect (3) with the fuel tank vent port. Push the quick-connect firmly onto the port.
- 8 After installation, pull on each quick-connect to ensure the connections are secure and locked in position.



**Figure 8A1 - 225**

## 7.14 Fuel Filler Neck and Splash Guard (Crew Cab Only)

### Remove

#### WARNING

A depressurised fuel system contains fuel in the fuel filter and fuel lines that can be spilled during service operations.

#### WARNING

Fuel vapour remains in the fuel tank even when completely empty. Seal all openings in the fuel tank using suitable material or a plastic plug. Ensure no naked flames or other ignition sources are nearby. Ensure all cellular phones (and transmission devices that may cause any metal objects to become unintentional receiving antennas) are switched off.

#### WARNING

Place a dry chemical (Class B) fire extinguisher nearby before performing any on-vehicle service procedures. Failure to follow these precautions may result in personal injury.

#### WARNING

Wear safety glasses when using compressed air. Do not blow compressed air directly onto any body part.

#### WARNING

Ensure fuel is pumped or siphoned from both sides of the baffle in the fuel tank.

- 1 Remove the modular fuel pump and sender assembly, refer to [7.5 Modular Fuel Pump and Sender Assembly](#).
- 2 Drain the fuel tank by pumping or siphoning fuel through the hole in the fuel tank (from which the modular fuel pump and sender assembly was removed) using commercially-available equipment.

#### NOTE

A permanent floodgate restriction in the lower fuel filler neck prevents the fuel tank from being drained through the filler aperture.

- 3 Remove the grommet (1) from the left side of the fuel filler splash guard.
- 4 Remove both screws (2) from the fuel filler door opening.
- 5 Prise the circlip (3) from the fuel filler splash guard and place in a safe location away from the immediate worksite.
- 6 Use compressed air to ensure that all dirt and foreign materials are removed from the fuel filler cap and fuel filler neck.
- 7 Remove the fuel filler cap from the fuel filler neck.
- 8 Remove the fuel filler splash guard by pulling it over the fuel filler neck.
- 9 Replace the fuel filler cap onto the fuel filler neck.

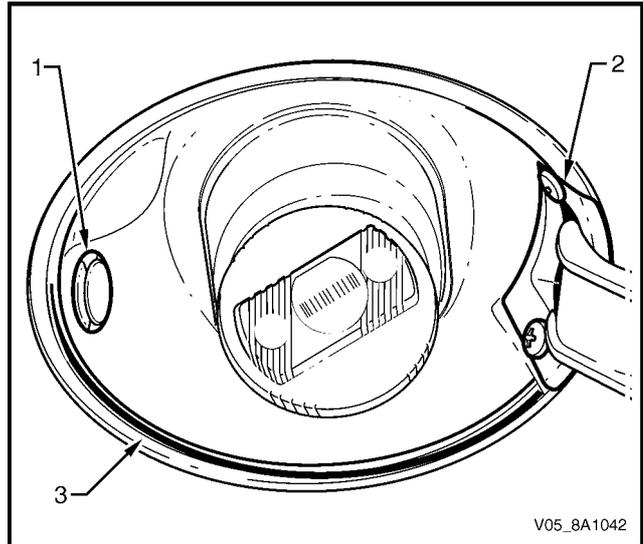


Figure 8A1 – 226

- 10 Remove the front inner side panel cover, refer to [Section 1B Sheetmetal](#).
- 11 Loosen and remove the screw clamp (1) holding the flexible fuel inlet pipe onto the fuel filler neck.
- 12 Loosen and remove the quick-connect fitting (2) holding the inlet breather pipe onto the fuel filler neck.
- 13 Cover the flexible fuel inlet pipe and inlet breather pipe with a suitable material to prevent foreign objects from entering.

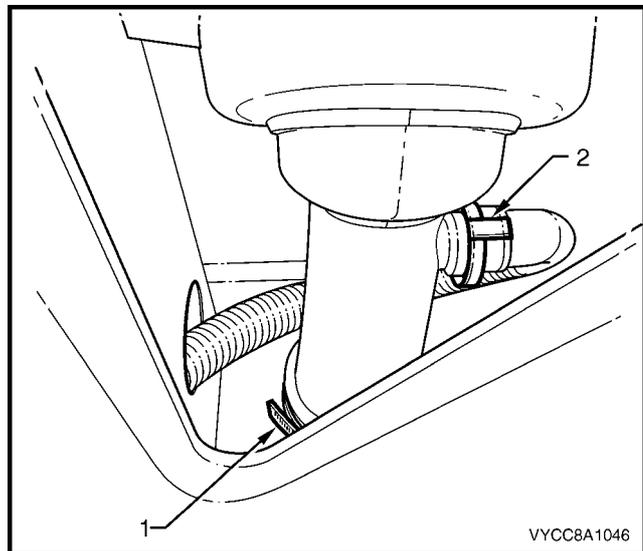


Figure 8A1 – 227

## Reinstall

Reinstallation of the fuel filler neck and splash guard is the reverse of the removal procedure, ensuring all parts are dust-free and clean before reinstalling.

## 8 Specifications — Sedan, Wagon and Utility

### Fuel Tank Capacity:

Sedan and Wagon ..... 75 litres

Utility ..... 70 litres

### Fuel Tank Material:

Sedan and Wagon ..... High-density multi-layer polyethylene

Utility ..... Pressed Steel

### Fuel Filler Location:

All Models ..... Right-hand rear quarter panel

### Fuel Pump Type:

..... Single Turbine

### Fuel Pump Location:

All Models ..... In tank

### Fuel Pump Regulated Pressure:

..... approx. 410 kPa at idle

### Minimum Fuel Pump Flow Capacity (at Regulated Pressure):

V6 Engine ..... 1.7 L/min @ 13.5 volts

GEN III V8 Engine ..... 2.5 L/min @ 13.5 volts

### Fuel Pump Current Draw (Steady State at Regulated Pressure):

V6 Engine ..... 7.4 Amps maximum

GEN III V8 Engine ..... 9.6 Amps maximum

## 9 Specifications — Coupe

**Fuel Tank Capacity:**

..... 70 litres

**Fuel Tank Material:**

..... Pressed steel with high-density multi-layer polyethylene shell

**Fuel Filler Location:**

..... Right-hand rear quarter panel

**Fuel Pump Type:**

..... Single Turbine

**Pressure Regulator Location:**

..... Inside modular fuel pump and sender assembly

**Fuel Pump Location:**

..... Inside modular fuel pump and sender assembly

**Fuel Pump Regulated Pressure:**

..... approx. 410 kPa at idle

**Minimum Fuel Pump Flow Capacity (at Regulated Pressure):**

..... 2.95 L/min @ 13.5 volts

..... 2.33 L/min @ 12 volts

**Fuel Pump Current Draw (Steady State at Regulated Pressure):**

..... 11.0 Amps maximum

## 10 Specifications — Regular Cab and Crew Cab

**Fuel Tank Capacity:**

..... 68.5 litres

**Fuel Tank Material:**

..... 'W'-type high-density multi-layer polyethylene

**Fuel Filler Location:**

..... Attached to support bracket underneath right side of tray

**Fuel Pump Type:**

..... Single turbine

**Pressure Regulator Location:**

V6 Engine ..... Engine bay

GEN III V8 Engine ..... Modular fuel pump and sender assembly

**Fuel Pump Location:**

..... In fuel tank

**Fuel Pump Regulated Pressure:**

..... approx. 410 kPa at idle

**Minimum Fuel Pump Flow Capacity (at Regulated Pressure):**

..... 2.95 L/min @ 13.5 volts

**Fuel Pump Current Draw (Steady State at Regulated Pressure):**

..... 11.0 Amps maximum

**O-rings:**

Pressure regulator (P/N 195306-0010) ..... 4.25 mm i.d.

Pressure regulator holder — top (P/N 195506-0150)..... 7.52 mm i.d.

Pressure regulator holder — bottom (P/N 167529-0010)..... 8.2 mm i.d.

Fuel pump outlet (P/N 167529-0010)..... 8.2 mm i.d.

Pressure regulator (P/N 195306-0110) ..... 15.4 mm i.d.

## 11 Torque Wrench Specifications — Sedan, Wagon and Utility

Fuel Tank Mounting Strap Nuts/Bolts (Sedan and Wagon) .....	15.0 – 25.0 Nm
Fuel Tank Mounting Nut (Utility) .....	15.0 – 20.0 Nm
Stone Guard Securing Nut .....	1.5 – 2.5 Nm
Stone Guard Securing Bolt .....	5.0 – 7.0 Nm
Evaporative Emission Control Canister Mounting Nut .....	2.0 – 5.0 Nm

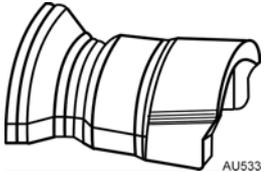
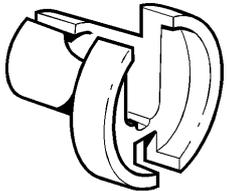
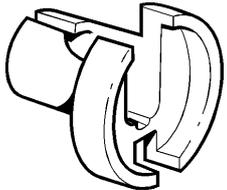
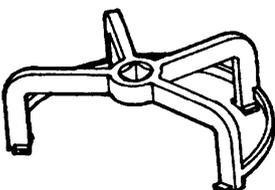
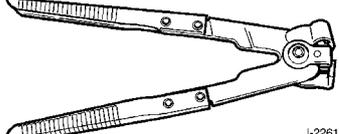
## 12 Torque Wrench Specifications — Coupe

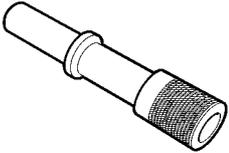
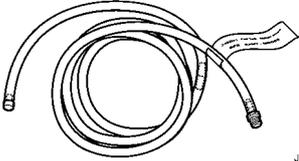
Fuel Pump and Sender Assembly Earthing Terminal Nut .....	7.0 Nm
Fuel Tank Mounting Strap Nut – Upper .....	20.0 Nm
Fuel Tank Mounting Strap Nut – Lower .....	40.0 Nm
Fuel Filler Neck to Fuel Filler Pocket Mounting Nut.....	5.0 Nm
Mounting Nut .....	5.0 – 8.0 Nm
Stone Guard Securing Bolt.....	5.0 – 7.0 Nm
Stone Guard Securing Nut .....	1.5 – 2.5 Nm

### 13 Torque Wrench Specifications — Regular Cab and Crew Cab

Fuel Tank Mounting Strap Nuts .....	20.0 – 25.0 Nm
Fuel Tank Support Strap Attaching Nuts .....	30.0 – 40.0 Nm
Support Bracket Backing Plate Attaching Screws .....	20.0 – 25.0 Nm
Fuel Tank 'H'-frame Nut.....	20.0 – 25.0 Nm
Fuel Tank Mounting Strap Nut.....	20.0 – 25.0 Nm
Stone Guard Securing Nut .....	1.5 – 2.5 Nm
Stone Guard Securing Bolt.....	5.0 – 7.0 Nm
Evaporative Emission Control Canister Mounting Nut.....	2.0 – 5.0 Nm

## 14 Special Tools

Tool Number	Illustration	Description	Tool Classification
AU533	 <p style="text-align: right; font-size: small;">AU533</p>	<p><b>Quick-connect Fitting Release Tool</b></p> <p>Released in two sizes:</p> <ul style="list-style-type: none"> <li>• red for 5/16-inch fittings (fuel vapour lines), and</li> <li>• blue for 3/8-inch fittings (fuel feed lines).</li> </ul> <p>Commercially available under P/N A USP45.</p> <p>Previously released.</p>	Desirable
7370	 <p style="text-align: right; font-size: small;">T6A3295</p>	<p><b>Quick-connect Release Tool — 5/16-inch</b></p> <p>Used for releasing fuel line quick connects at the dash panel and fuel rail connections, after the fuel system has been depressurised.</p> <p>Previously released.</p>	Mandatory
7371	 <p style="text-align: right; font-size: small;">T6A3295</p>	<p><b>Quick-connect Release Tool — 3/8-inch</b></p> <p>Used for releasing fuel line quick connects at the dash panel and fuel rail connections, after the fuel system has been depressurised.</p> <p>Previously released.</p>	Mandatory
AU469 (J39765)		<p><b>Modular Fuel Pump and Sender Assembly Remover / Installer. (Sedan, Wagon and Utility)</b></p> <p>Previously released.</p>	Mandatory
J45722	 <p style="text-align: right; font-size: small;">V2US8A1031a</p>	<p><b>Modular Fuel Pump and Sender Assembly Lock Ring Remove and Install Tool. (Coupe, Regular Cab and Crew Cab)</b></p> <p>Previously released.</p>	Mandatory
J22610	 <p style="text-align: right; font-size: small;">J-22610</p>	<p><b>Keystone Clamp Pliers</b></p> <p>Used to remove and fasten ear-type clamps.</p>	Available
J36850	 <p style="text-align: right; font-size: small;">J36850</p>	<p><b>TransJel Lubricant</b></p> <p>Used to lubricate fuel tank siphon hose during fuel tank drain/siphon procedures.</p>	Desirable

Tool Number	Illustration	Description	Tool Classification
J44284-2	 <p style="text-align: right; font-size: small;">J44284-2</p>	<p style="text-align: center;"><b>Fuel Flapper Door Holder</b></p> <p>Holds open the fuel filler neck flapper door to allow the fuel tank siphon hose to be fed down into the fuel filler neck.</p>	Mandatory
J45004-1	 <p style="text-align: right; font-size: small;">J45004</p>	<p style="text-align: center;"><b>Fuel Tank Siphon Hose</b></p> <p>Flexible fuel siphoning hose with grounding wire and threaded vacuum pump fitting.</p>	Mandatory