Repair Manual
Audi TT 2007 ➤

Fuel Injection and Ignition									
Engine ID	CEP B								

Edition 05.2011

List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups

Repair Group

24 - Multiport Fuel Injection

28 - Ignition/Glow Plug System

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

Contents

24 – Multiport Fuel Injection

1 General Information

1.1 Clean Working Conditions

Even a little contamination can lead to faults. When working on the fuel supply and on the fuel injection system, observe the following guidelines for a clean working environment:

- Before loosening, connections and surrounding areas must be cleaned thoroughly with engine or brake cleaner, and then cleaned area must be dried completely.
- Plug open lines and connections immediately with appropriate protective caps.
- Place removed parts on a clean surface and cover them. Use lint-free cloths.
- Carefully cover over opened components or seal, if repairs are not performed immediately.
- Only install clean components: Remove the replacement parts from their packaging just prior to installing them. Do not use parts that have been stored loose (for example in tool boxes etc.).
- When the system is open: Do not work with compressed air. Do not move vehicle unless absolutely necessary.
- Protect the disconnected connectors from dirt and moisture and only connect them when they are dry.

1.2 On Board Diagnostics

- The engine control module is equipped with On Board Diagnostics (OBD). Before repairs such as fault finding, check the DTC memory first. Also the vacuum hoses and connections must be checked (unmetered air).
- Fuel hoses in engine compartment must only be secured with spring-type clips. The use of clamp or screw type clips is not permissible.
- For the electric components to work properly, a voltage of at least 11.5 Volts is required.
- Do not use sealants containing silicone. Traces of silicone components which are sucked into the engine are not burned there, and they damage the oxygen sensors.
- The vehicles have a crash fuel shut-off. This is intended to reduce the risk of vehicle fire following a crash by switching off the Fuel Pump (FP) via the Fuel Pump (FP) Control Module.

1.3 Safety Precautions

1.3.1 Fuel System

WARNING

There is a risk of injury because the fuel is under very high pressure.

- *Fuel system is under pressure! Fuel pressure must be reduced to a residual pressure before opening high pressure area of injection system. Refer to ⇒ "1.3.3 Releasing Pressure in High Pressure Area", page 3 .*
- *After reducing high pressure, connection should be opened immediately. To do this, place a cloth around the connection to reduce residual pressure (approximately 7 bar).*

Caution

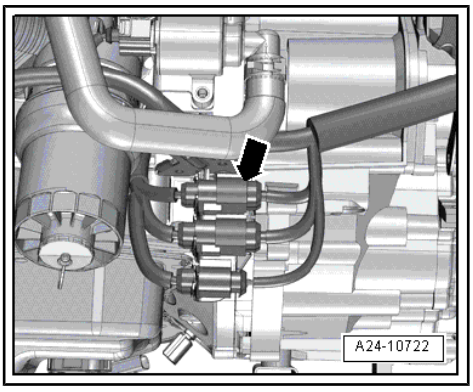
Risk of destroying electronic components when disconnecting the battery.

- *Observe measures for disconnecting battery.*

– Disconnect the battery. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .

1.3.2 Ignition System

To reduce the risk of personal injury and/or damage to the fuel injection and ignition system, always observe the following:



- Individuals with a pacemaker must not stay in the danger area of high voltage systems, for example ignition system, xenon light.
- Fuel lines must not be opened when the engine is running.
- Only disconnect and reconnect wires for injection and ignition system, including test leads, when ignition is switched off.
- It is possible that the control module will recognize a malfunction and store a DTC during some tests. After completing all checks and repairs, check the DTC memory and erase the memory, if necessary.
- If the DTC memory was erased, a new readiness code must be generated.
- Cleaning the engine should only be performed with ignition switched off.
- If the engine is to be cranked at starting RPM without starting (for example, for a compression test), disconnect the four ignition coil connectors.
- Disconnect the connector -arrow- from the fuel injectors.

1.3.3 Releasing Pressure in High Pressure Area

WARNING

There is a risk of injury because the fuel is under very high pressure.

- ***The fuel injection system is separated into a high-pressure section (maximum approximately 140 bar) and a low-pressure section (approximately 7 bar).***
- ***Before opening high pressure parts, for example removing high pressure pump, fuel rail, fuel injectors, fuel pipes or the fuel pressure sensor -G247- , the fuel pressure in the high pressure area must be reduced to a residual pressure of approximately 7 bar. The procedure for this is as follows.***

High Fuel Pressure, Reducing

– Connect a vehicle diagnosis tester.
– Start the engine and run at idle speed.
– Select “engine electronics“ in OBD.
– Then select “Measured values“ read out.
– Select measured value block 140.
– With the engine is running at idle, the fuel pressure will be displayed in the display field 3.
– Remove the fuse from the Fuel Pump (FP) control module - J538- with the engine idling. Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations.

Note

By removing the fuse, the voltage supply to terminal 30 for the FP control module is interrupted.

– Check the fuel pressure on the diagnostic system.

- The fuel pressure decreases rapidly because the mechanical high pressure pump is no longer supplied with fuel by the fuel pump -G23- .

– Switch the ignition off as soon as the fuel pressure drops to approximately 8 bar.

Note

The fuel pressure must not drop below 6 bar, because otherwise the engine will shut off (risk of catalytic converter damage).

WARNING

Do not let fuel come into contact with skin.

- ***The fuel lines will continue to be filled with fuel, but will no longer be under high pressure. Wear protective goggles and protective clothing when opening the fuel system.***
- ***Before opening the high pressure system, place a cloth around the connection.***

– After reducing the fuel pressure, place a clean cloth around the connection and open the high pressure system immediately. Escaping fuel must be absorbed.

Note

If the high pressure system is not opened immediately, the pressure will increase because of post-heating.

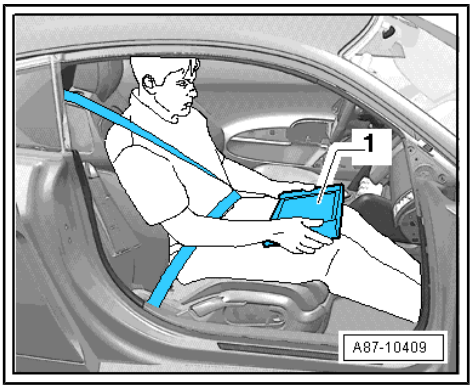
Final Procedures

– Install the fuse.

– Erase the DTC memory and generate the readiness code in the engine control module in “Guided Functions“.

1.3.4 Test and Measuring Instruments during Test Drive

If special testing equipment is required during road test, note the following:



WARNING

Improperly secured testing and measuring equipment and distraction during a road test increase the risk of an accident.

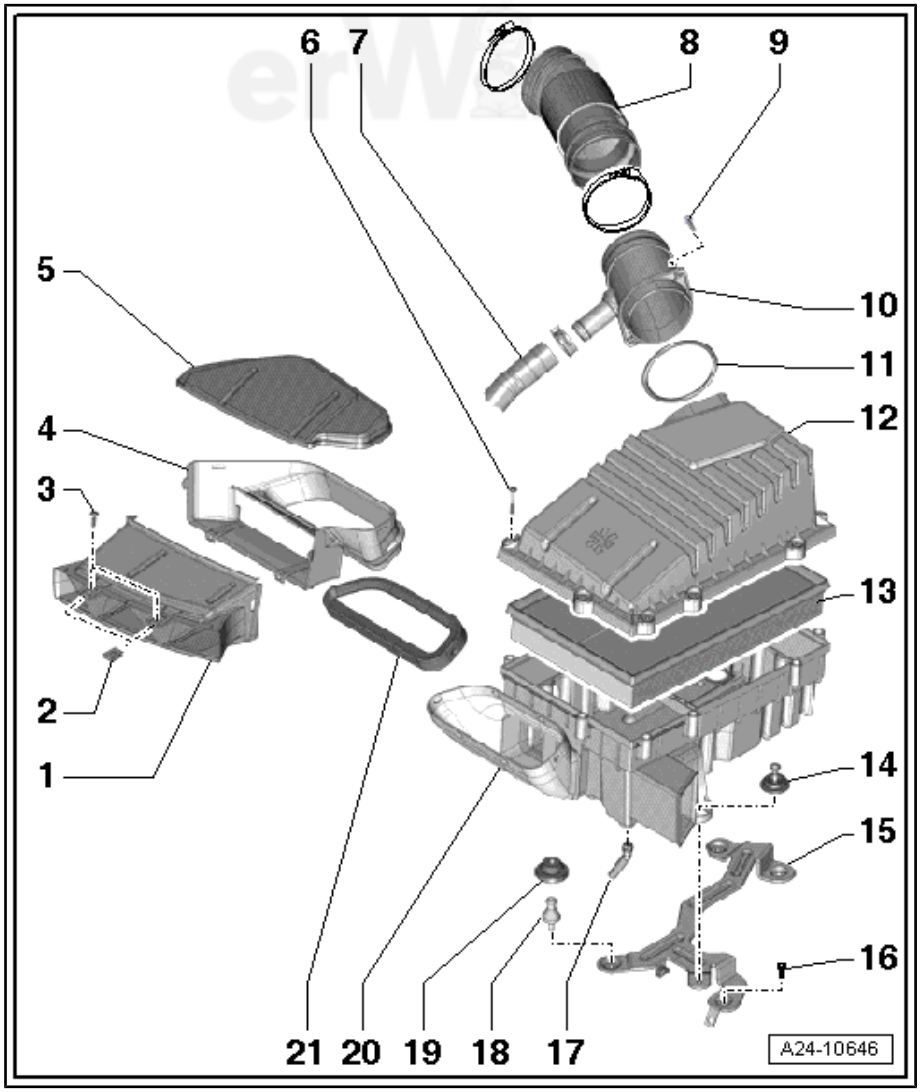
The passenger airbag could pose a risk if it deploys in a collision.

- *Operating testing equipment while driving causes it to shift position.*
- *There is an increased risk of injury due to unsecured testing equipment.*

- *Position passenger's seat as far back as possible.*
- *The following vehicle diagnosis testers may NOT be used: VAS 5051 , VAS 5051B .*
- *Testing and measuring instruments -1- must lay flat on the passenger's thighs and be operated by him or her, as shown in the illustration as shown in the function test manual.*

2 Description and Operation

2.1 Air Filter Overview



1 - Front Air Guide

- ❑ Clean off dirt, leaves and salt residue

2 - Clip Nut

3 - Bolt

- ❑ 1.5 Nm

4 - Air Guide Lower Section

- ❑ Clean off dirt, leaves and salt residue

5 - Air Duct Cover

6 - Bolt

- ❑ 5 Nm

7 - Hose

- ❑ For crankcase ventilation

8 - Air Guide Hose

9 - Bolt

- ❑ 3 Nm

10 - Air Guide Pipe

11 - Seal

- ❑ Replace if damaged

12 - Air Filter Upper Section

- ❑ Clean off dirt, leaves and salt residue.

13 - Air Filter

- ❑ Always use an original air filter
- ❑ Removing and installing, refer to ⇒ “5.1 Air Filter“, page 27
- ❑ Observe change intervals, refer to the Maintenance Procedures Rep. Gr. 03

14 - Bolt

- ❑ 10 Nm
- ❑ With permanent rubber grommet

15 - Bracket

- ❑ For the air filter housing

16 - Bolt

- ❑ 10 Nm
- ❑ With permanent rubber grommet

17 - Water Drain

- ❑ Clean

18 - Retaining Pin

- ❑ 10 Nm

19 - Rubber Grommet

20 - Air Filter Housing Lower Section

- ❑ Clean off dirt, leaves and salt residue.
- ❑ Removing and installing, refer to ⇒ "5.2 Air Filter Housing", page 29

21 - Gasket

- ❑ Fastened inside the air filter housing lower section

2.2 Component Location Overview

Engine Intake Side

1 - Intake Manifold Runner Control Valve -N316-

2 - Low Fuel Pressure Sensor -G410-

- ❑ 10 Nm

3 - Cylinder 2 Fuel Injector -N31-

- ❑ Removing and installing, refer to ⇒ "5.4 Fuel Injectors", page 33

4 - Cylinder 1 Fuel Injector -N30-

5 - Camshaft Position (CMP) Sensor -G40-

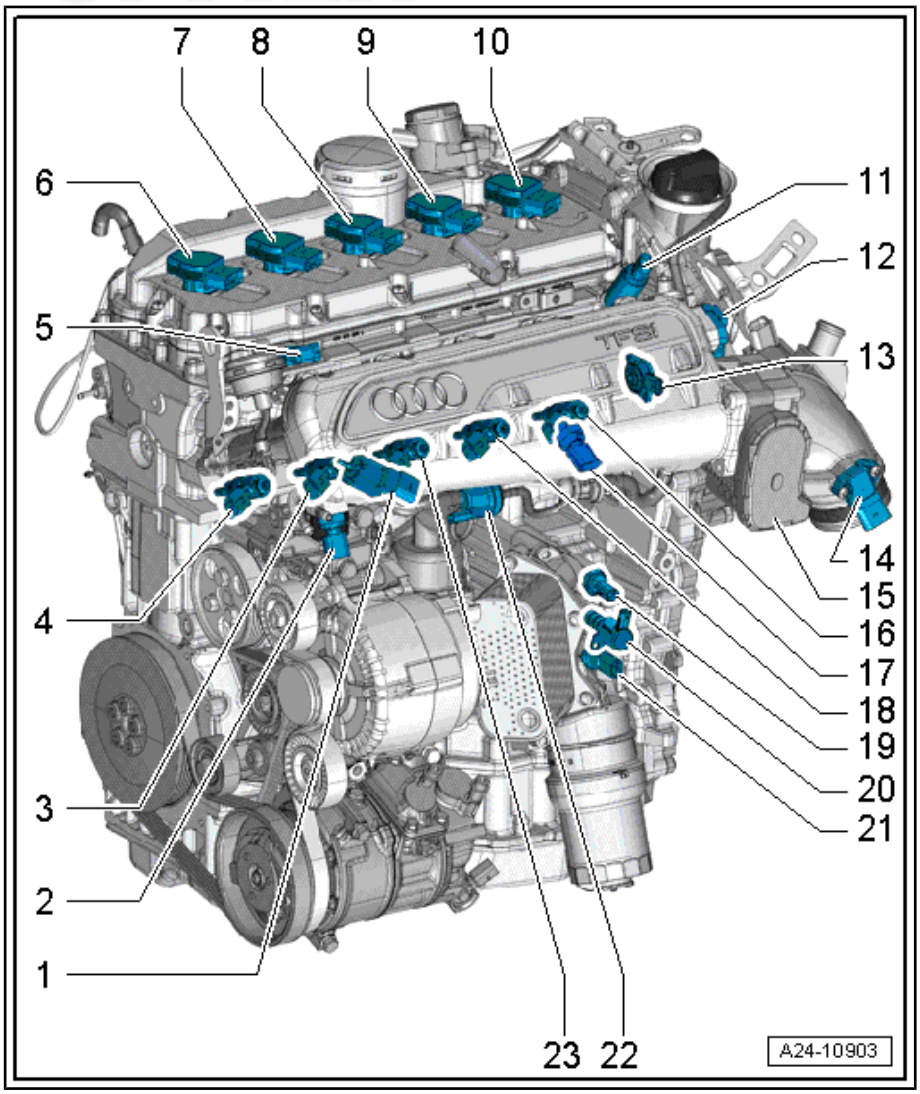
- ❑ Intake side
- ❑ Removing and installing, refer to ⇒ "4.3 Camshaft Position Sensor G40 / Camshaft Position Sensor 3 G300 ", page 60
- ❑ 9 Nm

6 - Ignition Coil 1 with Power Output Stage -N70-

- ❑ Removing and installing, refer to ⇒ "4.1 Ignition Coils", page 59

7 - Ignition Coil 2 with Power Output Stage -N127-

8 - Ignition Coil 3 with Power



Output Stage -N291-

9 - Ignition Coil 4 with Power Output Stage -N292-

10 - Ignition Coil 5 with Power Output Stage -N323-

11 - Camshaft Adjustment Valve 1 -N205-

- 2.5 Nm
- Installed location, refer to ⇒ Fig. "" Camshaft Adjustment Valve 1 -N205- "" , page 12
- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 15 ; Removal and Installation

12 - Intake Air Temperature (IAT) Sensor -G42- / Manifold Absolute Pressure (MAP) Sensor -G71-

- Removing and installing, refer to ⇒ "5.11 Intake Air Temperature Sensor and Manifold Absolute Pressure Sensor", page 46

13 - Intake Manifold Runner Position Sensor -G336-

- After replacing, perform an "Adaptation" in "Guided Fault Finding" under "Adapting position sensor for channel separating plates"

14 - Charge Air Pressure Sensor -G31- / Intake Air Temperature (IAT) Sensor 2 -G299-

- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Removal and Installation

15 - Throttle Valve Control Module -J338-

- With Electronic Power Control (EPC) throttle drive -G186- , EPC throttle drive angle sensor 1 -G187- and EPC throttle drive angle sensor 2 -G188-
- Removing and installing, refer to ⇒ "5.13 Throttle Valve Control Module J338 ", page 48
- After replacing, perform an "Adaptation" in "Guided Functions"

16 - Cylinder 5 Fuel Injector -N83-

17 - Fuel Pressure Sensor -G247-

- Removing and installing, refer to ⇒ "5.5 Fuel Pressure Sensor G247 ", page 36

18 - Cylinder 4 Fuel Injector -N33-

19 - Oil Pressure Switch -F1- from approximately 27 September 2010 Oil Pressure Switch -F22-

- Component location, refer to ⇒ Fig. ""Oil Pressure Control"" , page 13
- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 17 ; Removal and Installation

20 - Oil Pressure Regulation Valve -N428-

- Component location, refer to ⇒ Fig. ""Oil Pressure Control"" , page 13
- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 17 ; Removal and Installation

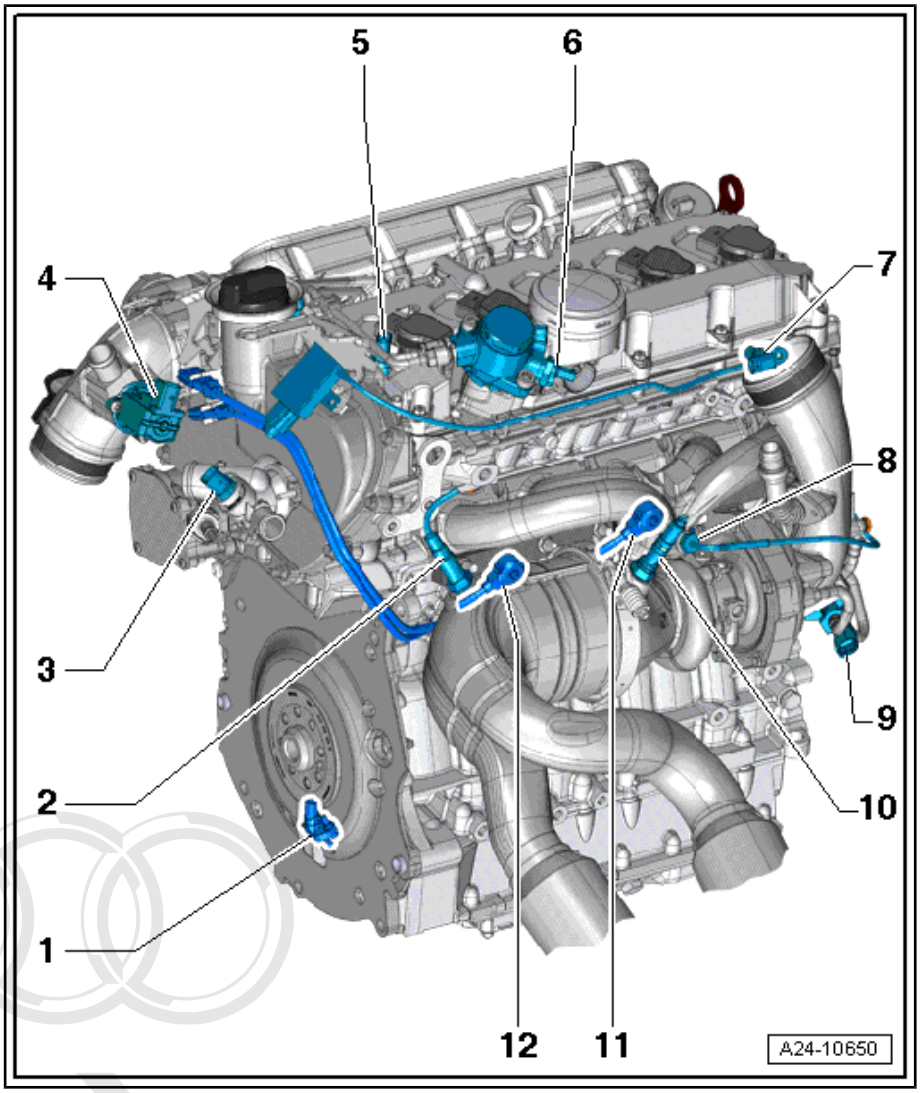
21 - Reduced Oil Pressure Switch -F378-

- Component location, refer to ⇒ Fig. ""Oil Pressure Control"" , page 13
- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 17 ; Removal and Installation

22 - Evaporative Emission (EVAP) Canister Purge Regulator Valve 1 -N80-

23 - Cylinder 3 Fuel Injector -N32-

Engine Exhaust Side



1 - Engine Speed (RPM) Sensor -G28-

- ❑ Removing and installing, refer to ⇒ “4.4 Engine Speed Sensor G28 “, page 61

2 - Oxygen Sensor (O2S) after Three Way Catalytic Converter (TWC) -G130- with Heater for Oxygen Sensor (O2S) 1 after Catalytic Converter -Z29-

- ❑ Connector location, refer to ⇒ Fig. ““Component Location: Heated Oxygen Sensor Connectors““ , page 11
- ❑ Removing and installing, refer to ⇒ “5.12 Oxygen Sensor after Three Way Catalytic Converter G130 with Heater for Oxygen Sensor 1 after Catalytic Converter Z29 “, page 46

3 - Coolant Temperature Sensor -G62-

- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 19 ; Removal and Installation

4 - Turbocharger Recirculating Valve -N249-

- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Removal and Installation

5 - Exhaust Camshaft Adjustment Valve 1 -N318-

- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 15 ; Removal and Installation

6 - Fuel Metering Valve -N290-

- ❑ One unit with high pressure pump
- ❑ Cannot be replaced individually

7 - Camshaft Position (CMP) Sensor 3 -G300-

- ❑ Exhaust side
- ❑ Removing and installing, refer to ⇒ “4.3 Camshaft Position Sensor G40 / Camshaft Position Sensor 3 G300 “, page 60

8 - Exhaust Gas Temperature (EGT) Sensor 1 -G235-

- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 26 ; Removal and Installation

9 - Wastegate Bypass Regulator Valve -N75-

10 - Heated Oxygen Sensor (HO2S) -G39- before Catalytic Converter with Oxygen Sensor (O2S) Heater -Z19-

- ❑ Connector location, refer to ⇒ Fig. ““Component Location: Heated Oxygen Sensor Connectors““ , page 11
- ❑ Removing and installing, refer to ⇒ “5.6 Heated Oxygen Sensor (HO2S) G39 with Oxygen Sensor (O2S) Heater Z19 “, page 37

11 - Knock Sensor (KS) 1 -G61-

- ❑ Connector location, refer to ⇒ Fig. ““Component Location: Knock Sensor Connectors““ , page 11

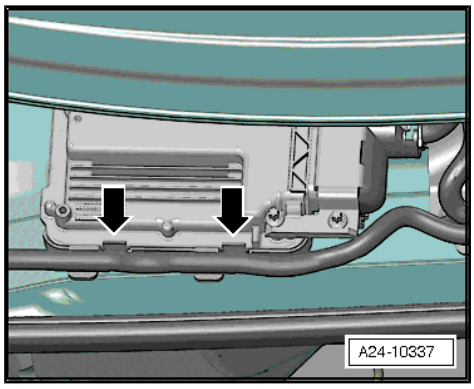
- ❑ Removing and installing, refer to ⇒ “4.2 Knock Sensors G61 / Knock Sensors 2 G66 “, page 59

12 - Knock Sensor (KS) 2 -G66-

- ❑ Connector location, refer to ⇒ Fig. ““Component Location: Knock Sensor Connectors““ , page 11
- ❑ Removing and installing, refer to ⇒ “4.2 Knock Sensors G61 / Knock Sensors 2 G66 “, page 59

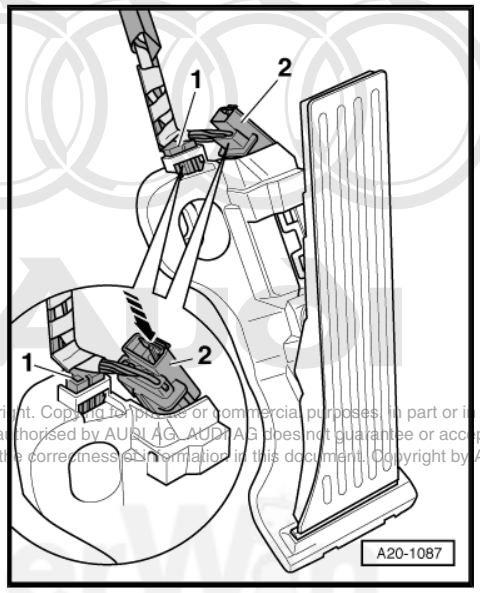
Location Engine Control Module (ECM) -J623-

- ♦ In E-box, plenum chamber.
- ♦ Removing and installing, refer to ⇒ “5.3 Engine Control Module J623 “, page 29 .



Component Location of Accelerator Pedal Position Sensor -G79- with Accelerator Pedal Position Sensor 2 -G185-

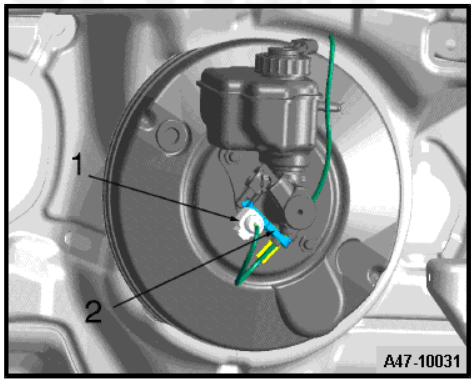
- ♦ One unit with accelerator pedal module.
- ♦ Removing and installing accelerator pedal module. Refer to ⇒ Fuel Supply System; Rep. Gr. 20 ; Removal and Installation .



Component Location: Brake Lamp Switch -F- with Brake Pedal Switch -F47-

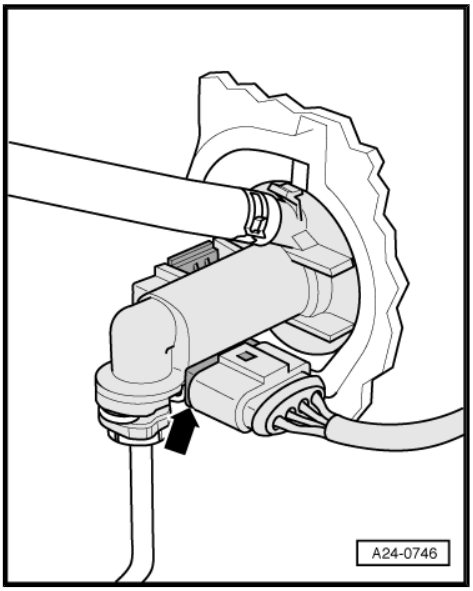
1 - Brake lamp switch -F- , brake pedal switch -F47-

- ♦ On the master brake cylinder.
- ♦ Removing and installing, refer to ⇒ Brake System; Rep. Gr. 47 ; Removal and Installation .



Component Location of Clutch Position Sensor -G476-

- On clutch master cylinder -arrow-.
- Removing and installing, refer to ⇒ Manual Transmission; Rep. Gr. 30 ; Removal and Installation .

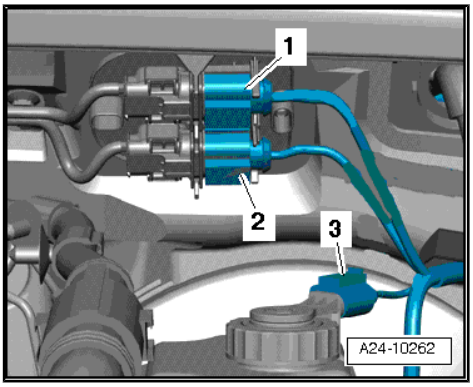


Component Location: Heated Oxygen Sensor Connectors

1 - For Heated Oxygen Sensor (HO2S) -G39- before catalytic converter with Oxygen Sensor (O2S) heater -Z19-

2 - For Oxygen Sensor (O2S) after Three Way Catalytic Converter (TWC) -G130- with Heater for Oxygen Sensor (O2S) 1 after catalytic converter -Z29-

- On the plenum chamber bulkhead

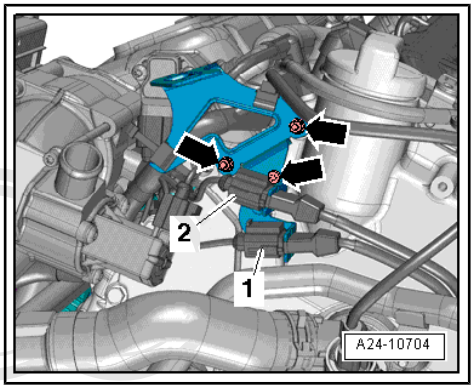


Component Location: Knock Sensor Connectors

1 - For Knock Sensor (KS) 2 -G66-

2 - For Knock Sensor (KS) 1 -G61-

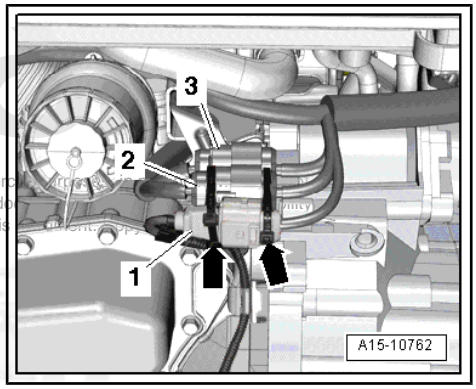
- On the cylinder head cover



Component Location: Connectors on the Cylinder Head

1 - For the RPM sensor

3 - For fuel injectors

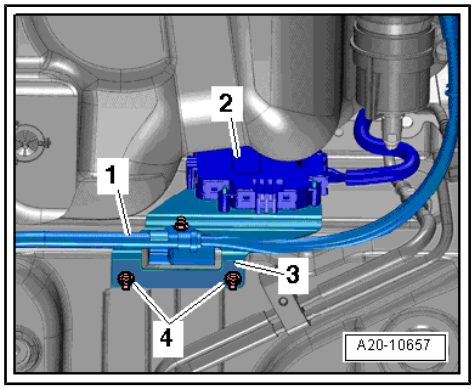


Installation Location Fuel Pump (FP) Control Module -J538-

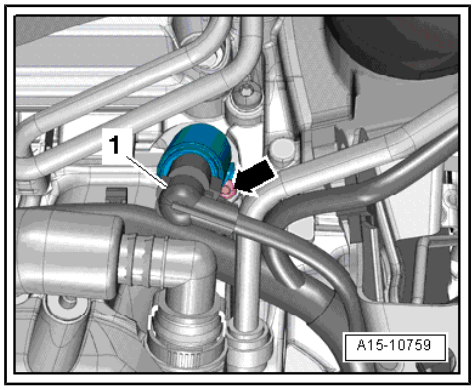
2 - FP control module

3 - Bracket

- On the underbody in front of the fuel tank



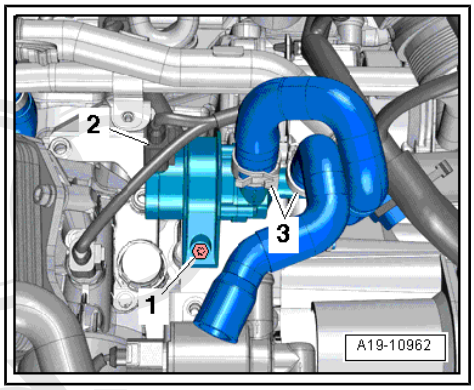
Camshaft Adjustment Valve 1 -N205-



Location After-Run Coolant Pump -V51-

2 - After-run coolant pump

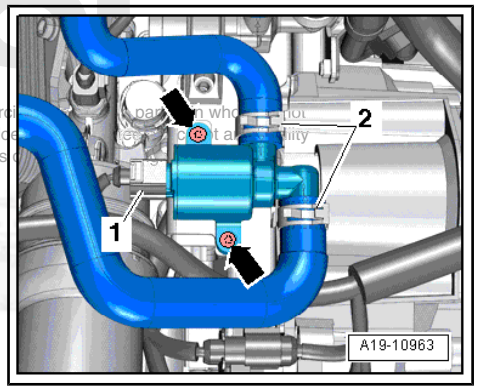
- On the cylinder block, intake side



Component Location: Cooling Circuit Solenoid Valve -N492-

1 - Cooling circuit solenoid valve

- On the cylinder block, intake side

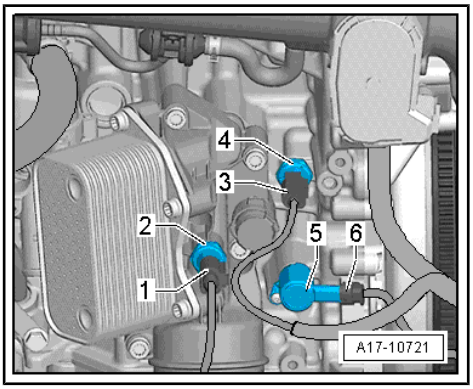


Oil Pressure Control

2 - Reduced oil pressure switch -F378-

4 - Oil pressure switch -F22-

5 - Oil pressure regulation valve -N428-

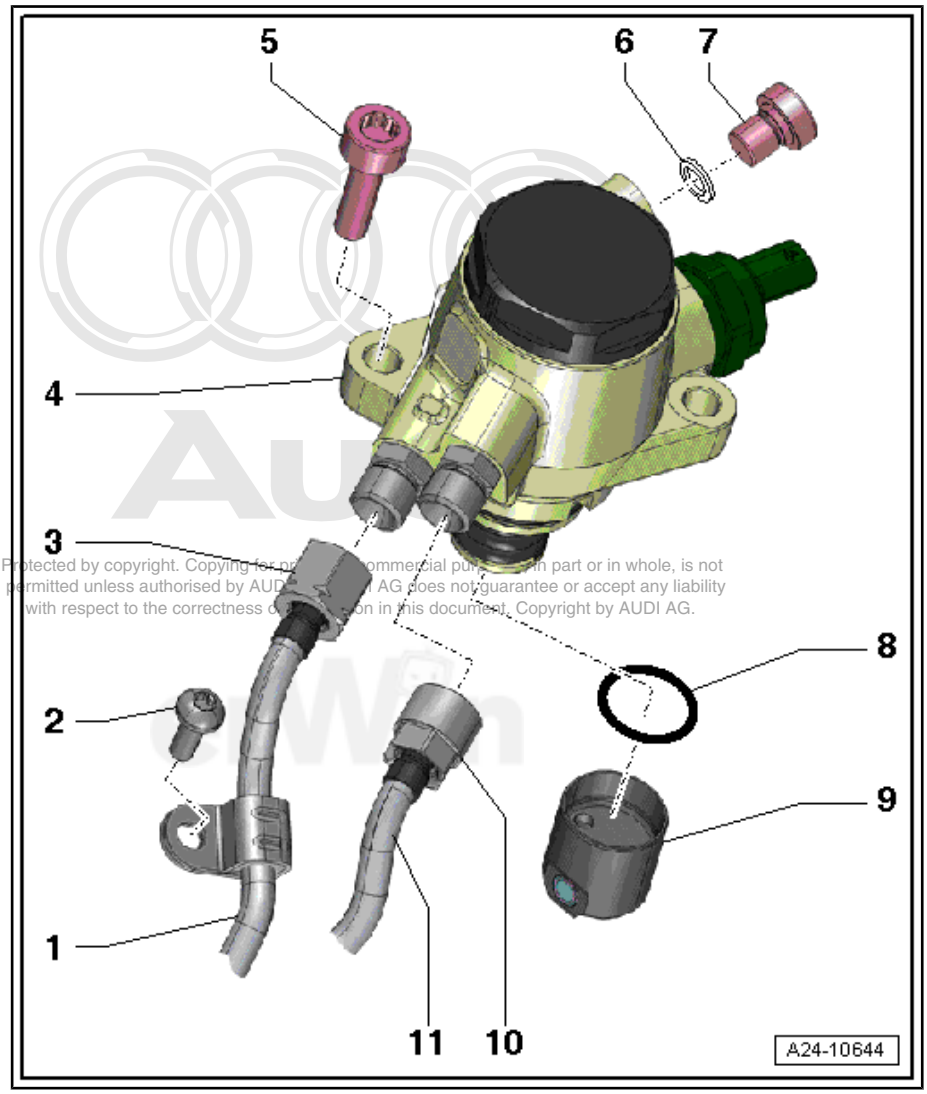


2.3 High Pressure Pump Overview

1 - High-Pressure Line

> **WARNING**
> *There is a risk of injury because the fuel is under high pressure.*
> *Let the fuel pressure come down before opening any high pressure components in the fuel injection system.*

- ❑ Reduce the fuel pressure in the high pressure area. Refer to ⇒ "1.3.3 Releasing Pressure in High Pressure Area", page 3 .
- ❑ Illustration does not correspond to version in vehicle
- ❑ Tighten the connection to 40 Nm. Check the line torque every time before installing the fuel line.
- ❑ Connectors should not show any signs of damage
- ❑ Do not change the shape of the line
- ❑ Lubricate the threads lightly
- ❑ Removing and installing, refer to ⇒ "5.7 High Pressure Pipe", page 38



2 - Bolt

- ❑ 9 Nm

3 - Union Nut

- ❑ 27 Nm
- ❑ Connectors should not show any signs of damage

4 - High Pressure Pump

- ❑ Removing and installing, refer to ⇒ "5.8 High Pressure Pump", page 40

5 - Bolt

- ❑ 20 Nm

6 - Seal

- ❑ Replace

7 - Drain Plug

- ❑ 15 Nm
- ❑ Replace

8 - O-ring

- ❑ Replace

9 - Roller Tappet

10 - Union Nut

- ❑ 27 Nm
- ❑ Connectors should not show any signs of damage

11 - Fuel Supply Line

2.4 Intake Manifold Lower Section, Fuel Rail and Fuel Injectors Overview

1 - Bolt

- ❑ 9 Nm

2 - High Pressure Pipe

- ❑ 27 Nm

> **WARNING**
> *There is a risk of injury because the fuel is under very high pressure. Let the fuel pressure come down before opening any high pressure components in the fuel injection system.*

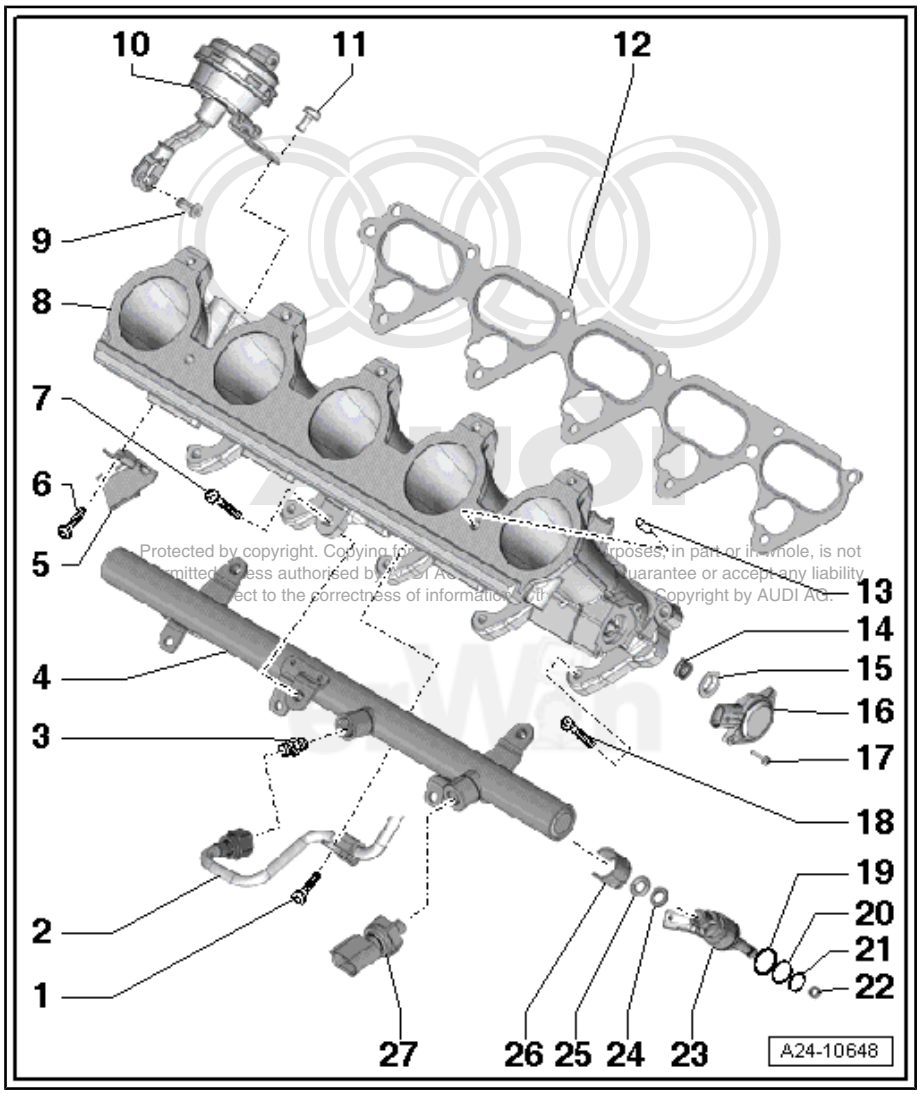
- ❑ Reduce the fuel pressure in the high pressure area. Refer to ⇒ “1.3.3 Releasing Pressure in High Pressure Area“, page 3 .
- ❑ Connectors should not show any signs of damage
- ❑ Do not change the shape of the line
- ❑ Install the high pressure pipe. Refer to ⇒ “5.7 High Pressure Pipe“, page 38 .

3 - Threaded Connection

- ❑ 27 Nm

4 - Fuel Rail

- ❑ Removing and installing, refer to ⇒ “5.9 Intake Manifold, Lower Section, with Fuel Rail“, page 41



5 - Bracket

6 - Bolt

- 9 Nm

7 - Bolt

- 9 Nm

8 - Intake Manifold Lower Section

- With intake manifold flap vacuum actuator
- Removing and installing, refer to ⇒ “5.9 Intake Manifold, Lower Section, with Fuel Rail“, page 41

9 - Mounting Pin

10 - Vacuum Actuator

11 - Bolt

- 9 Nm

12 - Gasket

- Replace

13 - Fitting Pin

14 - Seal

15 - Washer

16 - Intake Manifold Runner Position Sensor -G336-

- After replacing, perform an “Adaptation“ in “Guided Fault Finding“ under “Adapting position sensor for channel separating plates“

17 - Bolt

- 2.5 Nm

18 - Bolt

- 9 Nm

19 - Upper Sealing Washer

20 - Lower Sealing Washer

21 - Locking Ring

22 - Combustion Chamber Seal

- Do not grease ring or treat with any other lubricant
- Removing and installing, refer to ⇒ “5.4 Fuel Injectors“, page 33

23 - Fuel Injector

- Removing and installing, refer to ⇒ “5.4 Fuel Injectors“, page 33

24 - Spacer Ring

- Replace if damaged

25 - O-ring

- Replace
- Coat with clean engine oil

26 - Support Ring

- Replace
- The fuel rail wields force via the support ring to hold the fuel injector tightly in the cylinder head.
- Clipped to -23-

27 - Fuel Pressure Sensor -G247-

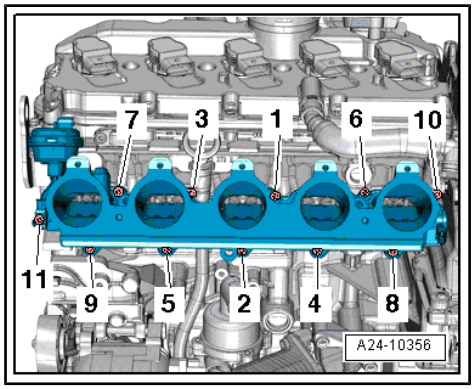
- 27 Nm
- Removing and installing, refer to ⇒ “5.5 Fuel Pressure Sensor G247 “, page 36

Intake Manifold Lower Section - Tightening Specification and Tightening Sequence

– Tighten the bolts and nuts on the intake manifold lower section in 2 steps in the following sequence: -1 through 11-.

♦ First tightening: 7 Nm

♦ Second tightening: 9 Nm



2.5 Intake Manifold, Upper Section Overview

1 - Gasket

❑ Replace

2 - Throttle Valve Control Module -J338-

❑ Removing and installing, refer to ⇒ “5.13 Throttle Valve Control Module J338 “, page 48

❑ After replacing, perform an “Adaptation“ in “Guided Functions“

3 - Non-Return Valve

4 - Bolt

❑ 9 Nm

5 - Evaporative Emission (EVAP) Canister Purge Regulator Valve 1 -N80-

6 - Bracket

7 - Bolt

❑ 9 Nm

8 - Intake Manifold Upper Section

❑ Removing and installing, refer to ⇒ “5.10 Intake Manifold, Upper Section“, page 44

9 - Bolt

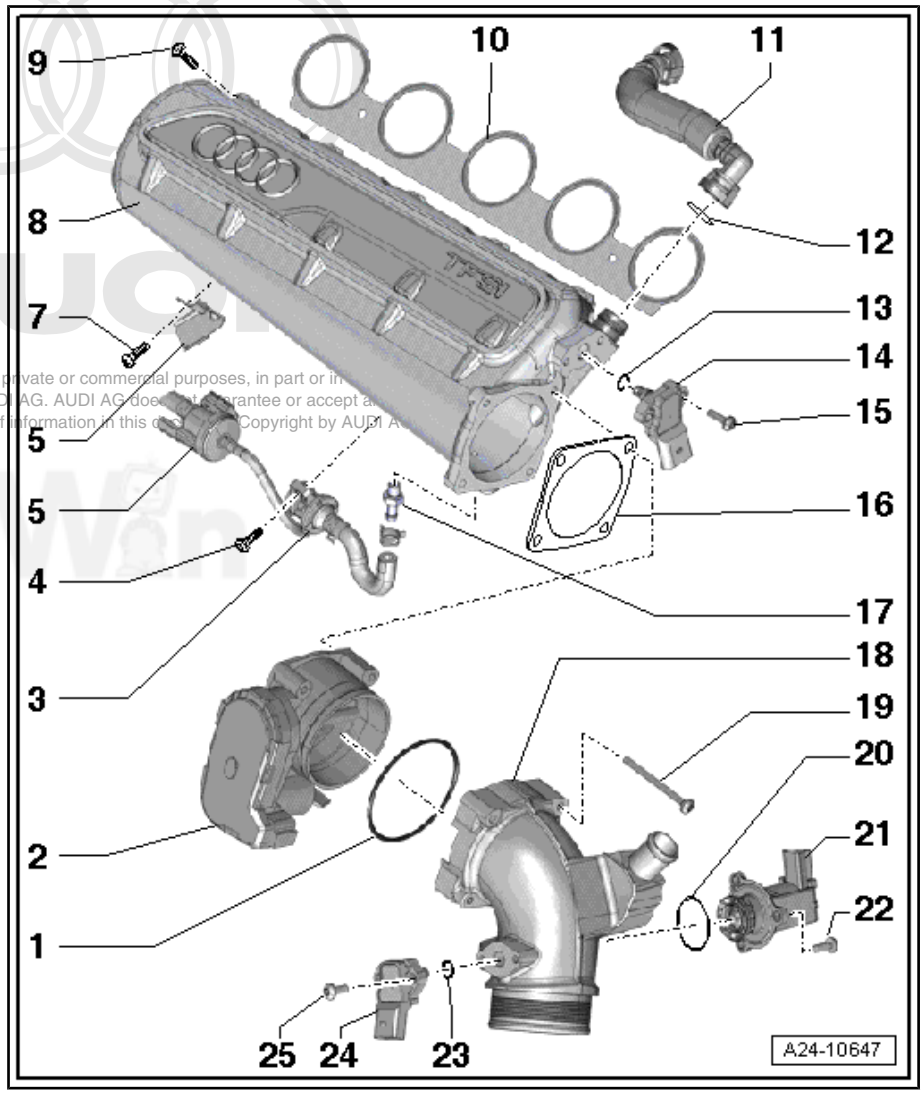
❑ Tightening specification and sequence, refer to ⇒ Fig. ““Intake Manifold Upper Section Tightening Specification and Sequence““ , page 17

10 - Gasket

❑ Replace

11 - Hose

❑ For crankcase ventilation



12 - O-ring

- ❑ Replace

13 - O-ring

- ❑ Replace

14 - Intake Air Temperature (IAT) Sensor -G42- / Manifold Absolute Pressure Sensor -G71-

- ❑ Removing and installing, refer to
⇒ “5.11 Intake Air Temperature Sensor and Manifold Absolute Pressure Sensor“, page 46

15 - Bolt

- ❑ 9 Nm

16 - Gasket

- ❑ Replace

17 - Threaded Piece

- ❑ 20 Nm
- ❑ Install with locking compound; for the correct locking compound refer to the Electronic Parts Catalog (ETKA)

18 - Intake Tube

19 - Bolt

- ❑ 9 Nm

20 - O-ring

- ❑ Replace

21 - Turbocharger Recirculating Valve -N249-

- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Removal and Installation

22 - Bolt

- ❑ 9 Nm

23 - O-ring

- ❑ Replace

24 - Charge Air Pressure Sensor -G31- / Intake Air Temperature (IAT) Sensor 2 -G299-

- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Removal and Installation

25 - Bolt

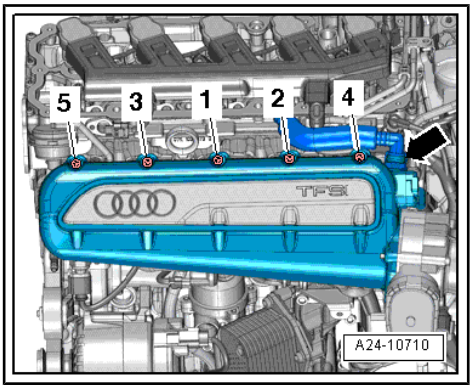
- ❑ 9 Nm

Intake Manifold Upper Section Tightening Specification and Sequence

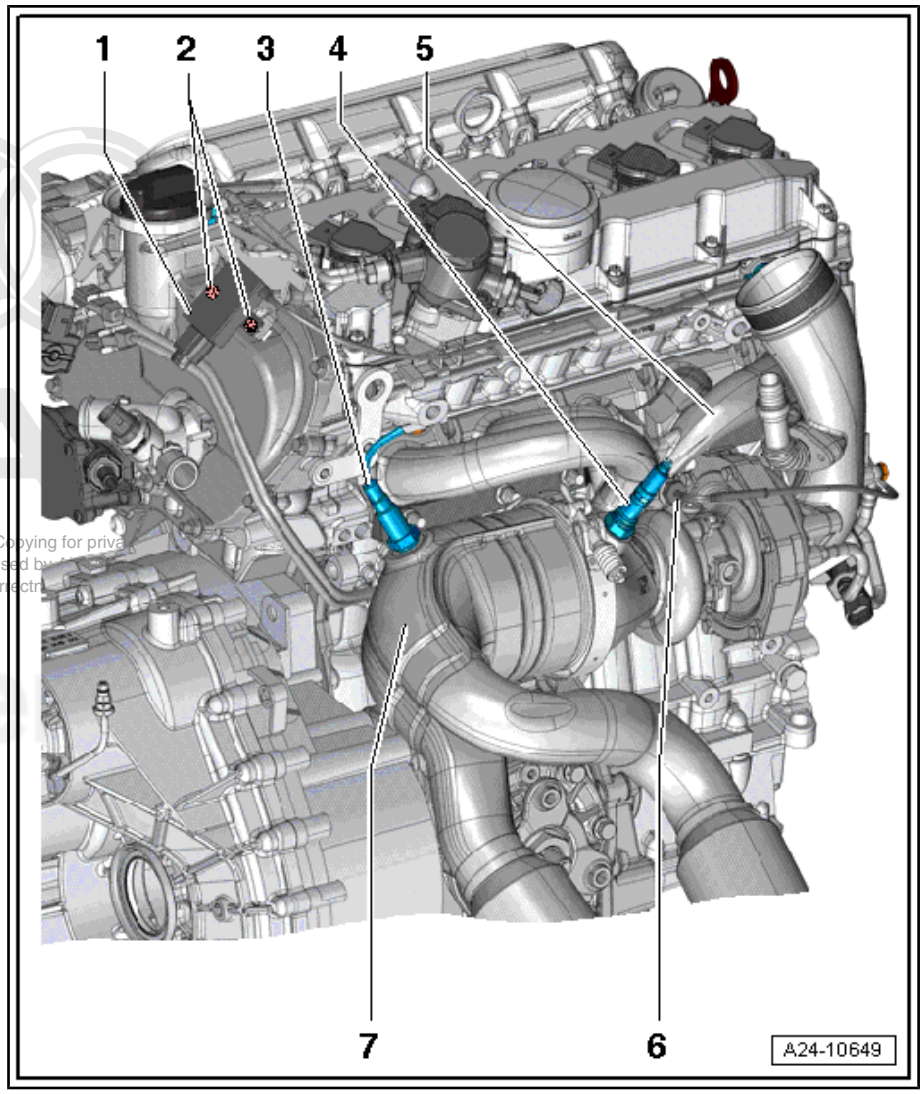
– Tighten intake manifold bolts in sequence -1 through 5-.

♦ First tightening: Install all the way in by hand.

♦ Second tightening: 9 Nm



2.6 Oxygen Sensors Overview



1 - Electrical Harness Connector

- For Exhaust Gas Temperature (EGT) sensor 1 -G235-

2 - Bolts

- 5 Nm

3 - Oxygen Sensor (O2S) after Three Way Catalytic Converter -G130- with Heater for Oxygen Sensor 1 after Catalytic Converter -Z29-

- 55 Nm
- Removing and installing, refer to ⇒ "5.12 Oxygen Sensor after Three Way Catalytic Converter G130 with Heater for Oxygen Sensor 1 after Catalytic Converter Z29 ", page 46

4 - Heated Oxygen Sensor (HO2S) -G39- with Oxygen Sensor (O2S) Heater -Z19-

- 55 Nm
- Removing and installing, refer to ⇒ "5.6 Heated Oxygen Sensor (HO2S) G39 with Oxygen Sensor (O2S) Heater Z19 ", page 37

5 - Turbocharger

6 - Exhaust Gas Temperature (EGT) Sensor 1 -G235-

- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 26 ; Removal and Installation

7 - Primary Catalytic Converter

Note

- *New oxygen sensors are coated with assembly paste; the paste must not get into slots of oxygen sensor body.*
- *For a used oxygen sensor, only coat threads with hot bolt paste. This paste must not come into contact with oxygen sensor slots. Hot bolt paste, refer to the Electronic Parts Catalog (ETKA).*
- *Electrical wire of the oxygen sensor must always be secured in the same position when installing so that contact with the exhaust pipe is avoided.*

3 Specifications

⇒ "3.1 Fastener Tightening Specifications", page 19

3.1 Fastener Tightening Specifications

Components	Fastener Size	Nm
Air Filter Housing Lower Section	-	10
Air Filter Upper Section	-	5
Air Guide Pipe	-	3
Bracket for Air Filter Housing		
-Bolt	-	10
-Retaining Pin	-	10
Bracket to Intake Manifold Lower Section	-	9
Bracket to Intake Manifold Upper Section	-	9
Camshaft Adjustment Valve 1	-	2.5
Camshaft Position (CMP) Sensor	-	9
Charge Air Pressure Sensor/Intake Air Temperature Sensor 2	-	9
Drain Plug[1]	-	15
Electrical Harness Connector for Exhaust Gas Temperature (EGT) Sensor 1	-	5
Front Air Guide	-	1.5
Fuel Pressure Sensor	-	27
Fuel Supply Line, Union Nut	-	27
High-Pressure Line		
-Bolt	-	9
-Union nut	-	27
Low Fuel Pressure Sensor	-	10
High Pressure Pipe	-	9
High Pressure Pump	-	20
Intake Air Temperature Sensor/Manifold Absolute Pressure Sensor	-	9
Intake Manifold Lower Section	-	9
Intake Manifold Runner Position Sensor	-	2.5
Intake Tube	-	9
Non-Return Valve	-	9
Oxygen Sensor	-	55
Threaded Connection	-	27
Threaded Piece[2]	-	20
Turbocharger Recirculating Valve	-	9
Vacuum Actuator	-	9

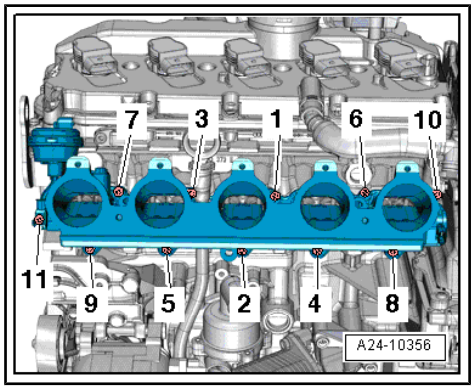
- [1] Replace
- [2] Install with locking compound

Intake Manifold Lower Section - Tightening Specification and Tightening Sequence

– Tighten the bolts and nuts on the intake manifold lower section in 2 steps in the following sequence: -1 through 11-.

♦ First tightening: 7 Nm

♦ Second tightening: 9 Nm

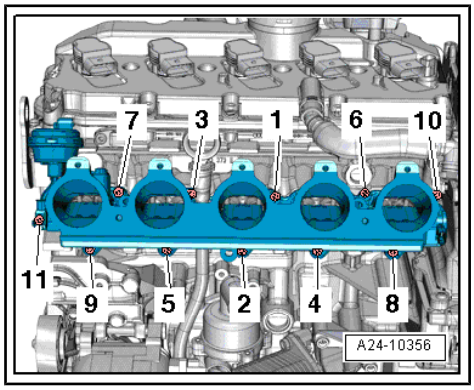


Intake Manifold Lower Section - Tightening Specification and Tightening Sequence

– Tighten the bolts and nuts on the intake manifold lower section in 2 steps in the following sequence: -1 through 11-.

♦ First tightening: 7 Nm

♦ Second tightening: 9 Nm

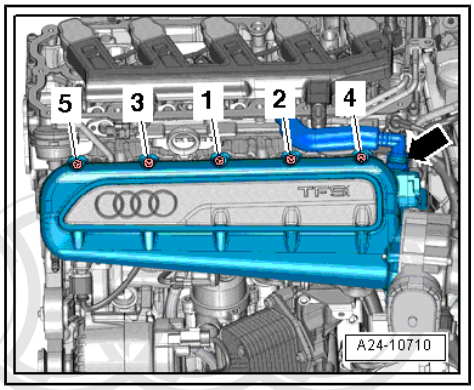


Intake Manifold Upper Section Tightening Specification and Sequence

– Tighten intake manifold bolts in sequence -1 through 5-.

♦ First tightening: Install all the way in by hand.

♦ Second tightening: 9 Nm



4 Diagnosis and Testing

⇒ “4.1 Fuel Pressure and Residual Pressure before High Pressure Pump, Checking“, page 21

⇒ “4.2 Vacuum System, Checking“, page 24

⇒ “4.3 Wiring and Components, Checking with Test Box 105 Pin V.A.G 1598/42 “, page 24

4.1 Fuel Pressure and Residual Pressure before High Pressure Pump, Checking

Special tools and workshop equipment required

- Fuel Inj. Pressure Gauge-CIS -V.A.G 1318-
- Adapter -V.A.G 1318/11-
- Adapter -V.A.G 1318/17A-
- Fuel Line Feed Adapter -V.A.G 1318/23-
- Remote Control Connection -V.A.G 1348/3A- with Remote Control for VAG1348 -V.A.G 1348/3-3-
- Connector Test Set -V.A.G 1594C-
- Measuring container, fuel-resistant

Test Conditions

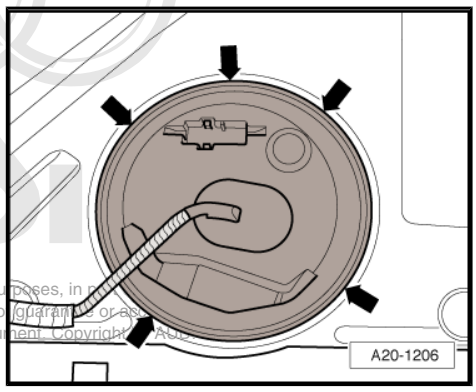
- Battery voltage at least 12.5 Volts.
- Fuel filter OK.
- Fuel tank minimum $^1/_4$ full.
- Fuel Pump (FP) control module -J538- OK; checking
- Ignition switched off

Fuel Pressure, Checking

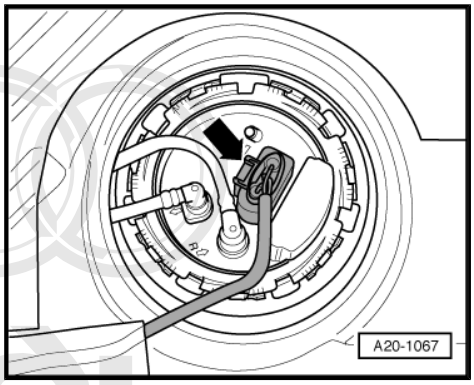
– TT Coupe: Remove the rear bench seat. Refer to ⇒ Body Interior; Rep. Gr. 72 ; Removal and Installation .

– TT Roadster: Remove the right rear panel trim panel. Refer to Trim, Roadster in ⇒ Body Interior; Rep. Gr. 70 ; Removal and Installation .

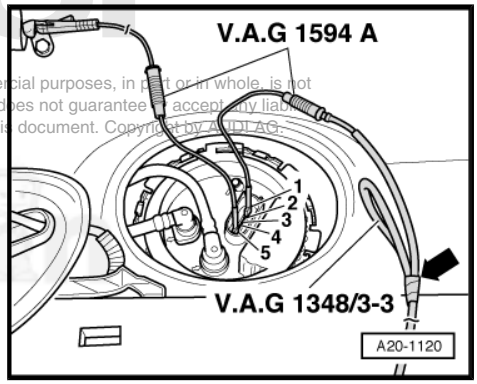
– Unclip the retainers -arrows- of the cover for sealing flange.



– Disconnect the connector -arrow- from the locking flange.



– Connect the -V.A.G 1348/3A- with -V.A.G 1348/3-3- with an adapter cable from -V.A.G 1594C- at terminal -1-.
– Cover the second connector terminal of the -V.A.G 1348/3-3- with insulating tape to prevent short circuit -arrow-.
– Connect contact -5- to vehicle Ground (GND) using a jumper cable from the -V.A.G 1594C- .
– Connect the alligator clamp to the battery positive (positive terminal inside the engine compartment).
– Remove the fuel cap from the fuel filler tube.

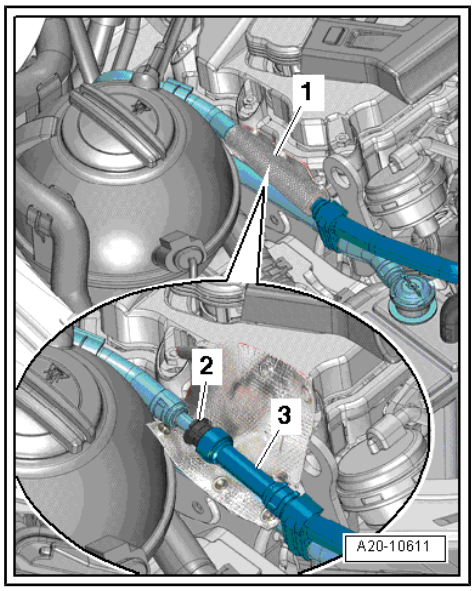


– Disengage the fuel supply line from the bracket and remove the heat shield boot -1-.

WARNING

There is a risk of injury because the fuel is under high pressure.

- *To reduce pressure in fuel system, lay a clean cloth around the connector and carefully loosen connector.*



– Remove the release ring -2- and disconnect the fuel supply line -3-.
– Seal off all open lines and connections with clean plugs.

– Attach the -V.A.G 1318/23- and -V.A.G 1318/17A- to the -V.A.G 1318- .

– Mount the -V.A.G 1318/17A- on the pull-off fuel supply line.

– Attach -V.A.G 1318/11- to the -V.A.G 1318- .

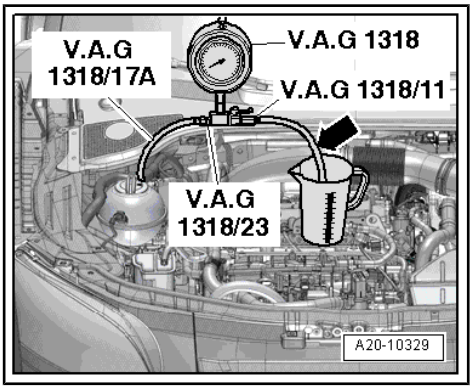
– Push an assisting hose -arrow- onto it and hold it into a measuring container.

– Open shut-off valve on the pressure gauge.

• The lever points in the direction of flow.

– Press remote control switch until pressure increase is no longer observed on -V.A.G 1318- .

• Specified value: approximately 6 bar (4 to 8 bar) positive pressure



If the specified value is not reached, check the fuel pump delivery rate. Refer to ⇒ Fuel Supply System; Rep. Gr. 20 ; Diagnosis and Testing .

Residual Pressure, Checking

– Check for leaks and residual pressure by watching for the pressure on the -V.A.G 1318- to decrease.

• After 10 minutes there must be a residual pressure of at least 3.0 bar.

If the holding pressure drops below 3 bar:

♦ Check the threaded connection between the -V.A.G 1318- and the fuel supply line for leaks.

♦ Check the -V.A.G 1318- for leaks.

♦ Check fuel lines and their connections for leaks.

♦ Replace the fuel filter with an integrated fuel pressure regulator. Refer to ⇒ Fuel Supply System; Rep. Gr. 20 ; Removal and Installation .

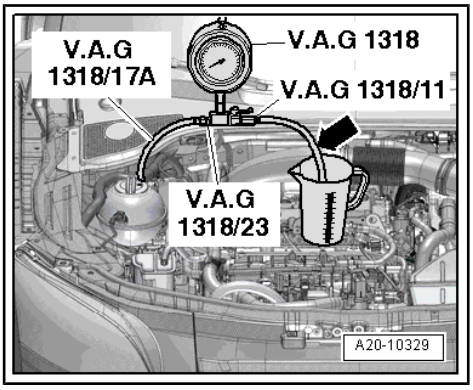
♦ If the fuel filter is OK, replace the fuel pump. Refer to ⇒ Fuel Supply System; Rep. Gr. 20 ; Removal and Installation .

Assembling

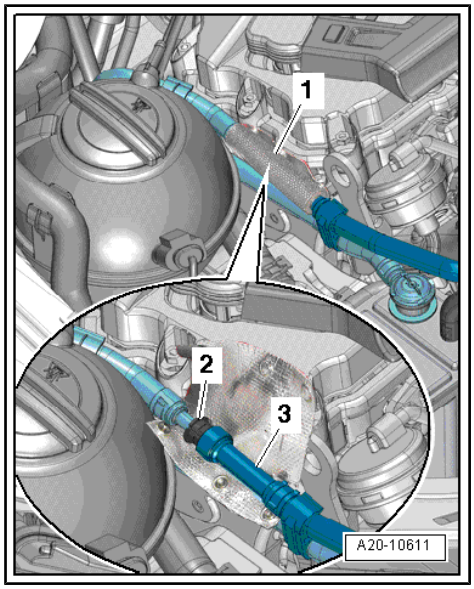
Assemble in reverse order of disassembling. Note the following:

Note

Before disconnecting the pressure gauge, release pressure by opening shut-off valve. Hold the hose in a measuring container -arrow-.



– Connect the fuel supply line -3-. Check for cleanliness and leaks.
– Engage the fuel supply line in the bracket and install the heat shield boot -1-.
– TT Coupe: Install the rear bench seat. Refer to ⇒ Body Interior; Rep. Gr. 72 ; Removal and Installation .
– TT Roadster: Install the right rear panel trim panel. Refer to ⇒ Body Interior; Rep. Gr. 70 ; Removal and Installation .



4.2 Vacuum System, Checking

Special tools and workshop equipment required

♦ Hand Vacuum Pump -VAS 6213-

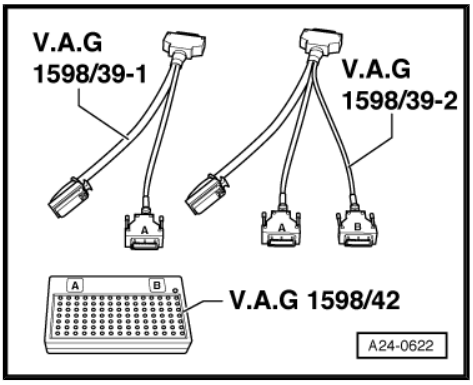
Procedure

– Check all vacuum lines in the vacuum system for:
♦ Cracks
♦ Damage caused by animals
♦ Crimps
♦ Leaks
– Check the vacuum line leading to and from the solenoid valve.
– If there is a fault stored in the DTC memory, check the vacuum lines for the named component, but also all the vacuum lines to the other components.
– If using the -VAS 6213- does not produce any pressure or if the pressure drops again right away, then check the hand vacuum pump and the connection hoses for leaks.

4.3 Wiring and Components, Checking with Test Box 105 Pin -V.A.G 1598/42-

Special tools and workshop equipment required

♦ Adapter -V.A.G 1598/39-1-
♦ Adapter -V.A.G 1598/39-2-
♦ Test Box 105 Pin -V.A.G 1598/42-



Note

- *The test box has 105 terminals. The connection cable can be separated from the test box. This means that as new Engine Control Module (ECM) connectors are introduced in the future, only a new cable must be designed and no longer the entire test box.*
- *The smaller of the two connectors on the ECM is assigned with terminals 1 to 60. The larger of the two connectors is assigned with terminals 1 to 94.*
- *For testing at the 60-pin harness connection, the -V.A.G 1598/39-1- is connected to the test box with connector "A". Components of the 60-pin harness connection. Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations.*
- *For testing at the 94-pin harness connection, the -V.A.G 1598/39-2- is connected to the test box with connectors "A and B". Components of the 94-pin harness connection. Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations.*
- *The -V.A.G 1598/42- is designed so that it can be connected simultaneously to the ECM harness and the ECM itself.*
- *This is advantageous because electronic engine control remains fully functional (for example measurement of signals with engine running) when the test box is attached.*
- *The procedures will indicate whether the ECM is to remain connected to the test box or not.*

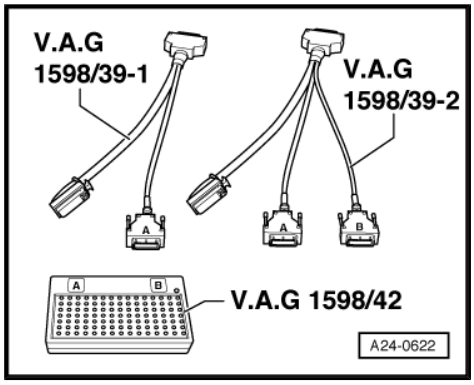
The ECM must be removed to disconnect the ECM harness connectors. Refer to
⇒ "5.3 Engine Control Module J623 ", page 29 .

Caution

Risk of destroying electrical components.

- ***Before connecting test leads, switch on respective measuring range and observe the test conditions.***

– Connect the -V.A.G 1598/42- to the wiring harness using -V.A.G 1598/39-1- or -V.A.G 1598/39-2- . Connect test box ground clip to battery negative terminal. The procedure will indicate whether the ECM is to be connected to the test box or not.
– Perform the test as described in the corresponding repair procedure.



Installing the ECM

Installation is performed in reverse order, ECM must be installed with the protective housing. New shear bolts must be used.

Perform the following work after the ECM is reconnected:

– Check the DTC memory.

Note

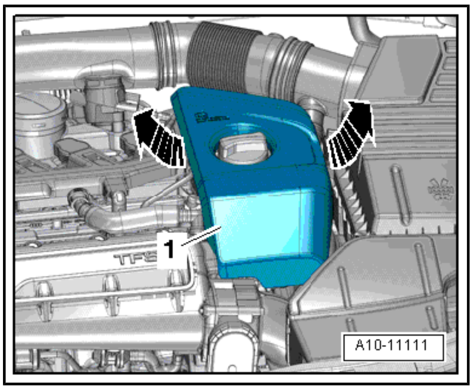
The diagnostic system will try to erase all DTC memories for all control modules when "Guided Fault Finding" has ended. If unsuccessful, then all the faults stored in the DTC memory must corrected until the DTC memory can be erased.

5 Removal and Installation

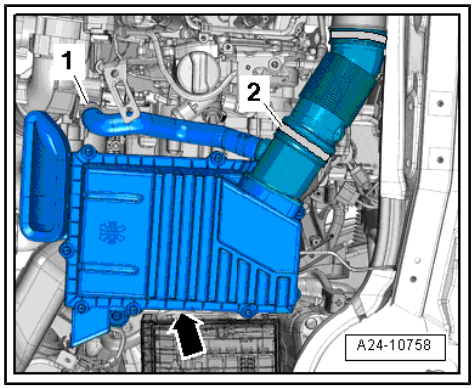
5.1 Air Filter

Removing

– Remove the engine cover -1- upward -arrows-.



– Remove all the screws from the air filter housing upper section and then remove the air filter housing upper section -arrow- upward.
– Remove air filter insert.



Installing

Install in reverse order of removal. Note the following:

- For the correct tightening specifications, refer to ⇒ “2.1 Air Filter Overview“, page 6 .

Note

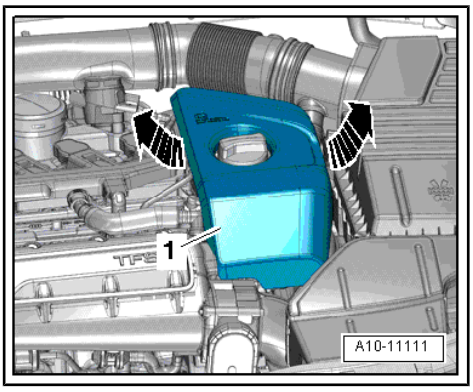
- *Always use an original air filter.*
- *Air filter housing must be clean on the inside.*
- *Note the following when blowing out air filter housing with compressed air: Cover the air guide pipes, etc. with clean clothes.*
- *The hose connections as well as the air guide pipes and hoses must be free of oil and grease before installing.*
- *When installing, do not use any lubricants containing silicone.*
- *Secure all hose connections with hose clamps of the same type as those equipped by the factory. Refer to the Electronic Parts Catalog (ETKA).*
- *In order to be able to securely mount the air guide hoses on their connectors, spray the screws on the previously used clamps with a rust remover.*

– Clean the water drain hose (the small hole in the lower air filter section) using compressed air.
– Clean the air filter housing (upper and lower section) of salt residue, dirt or leaves (if necessary, by extracting).
– Check the air guide hoses (clean air side) for salt residue, dirt and leaves.
– Check air duct from lock carrier to air filter housing for dirt and leaves.
– Mount the air filter centered into the air filter housing lower section mount.
– Carefully position the upper section of the air filter hosing on the lower section. Make sure the upper section of the air filter does not sit at an angle on top of the air filter (pay attention to the sealing lip on the air filter).

5.2 Air Filter Housing

Removing

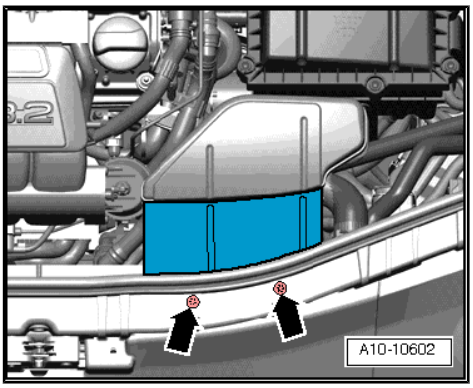
– Remove the engine cover -1- upward -arrows-.



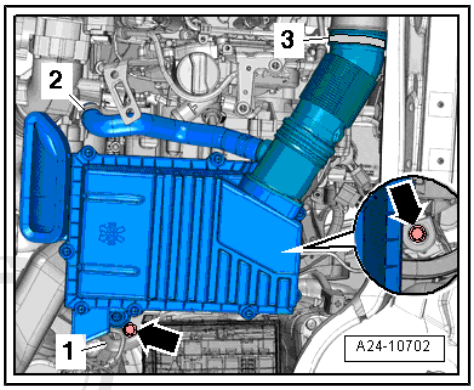
Note

When installing, bring all cable ties back to the same positions.

– Remove the bolts -arrows- and air guide.



– Loosen the clamps -2 and 3- and remove the air guide hoses.
– Free up the wiring harness -1- on the air filter housing bracket.
– Remove the bolts -arrows- and the air filter housing.



Installing

Install in reverse order of removal. Note the following:

- For the correct tightening specifications, refer to ⇒ “2.1 Air Filter Overview“, page 6 .

Note

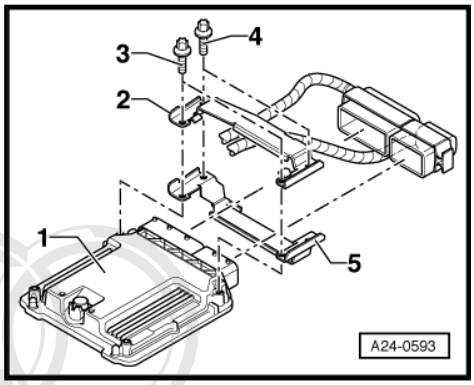
- *The hose connections as well as the air guide pipes and hoses must be free of oil and grease before installing.*
- *When installing, do not use any lubricants containing silicone.*
- *Secure all hose connections with hose clamps of the same type as those equipped by the factory. Refer to the Electronic Parts Catalog (ETKA).*
- *In order to be able to securely mount the air guide hoses on their connectors, spray the screws on the previously used clamps with a rust remover.*

– Check air duct from lock carrier to air filter housing for dirt and leaves.

5.3 Engine Control Module -J623-

Special tools and workshop equipment required

- Hot Air Blower -VAS 1978/14A- with nozzle attachment from the Wiring Harness Repair Set -VAS 1978 B-
- Small commercially available locking pliers



Note

- *Some Engine Control Modules (ECMs) are not equipped with a protective housing. The removal and installation of the protective housing depends on the engine and transmission combination.*
- *The ECM -1- has a protective housing -2 and 5-. To make removing the shear bolts -4- for the retaining tabs -2- more difficult, the threads are coated with locking compound.*
- *To disconnect the connectors from the ECM (for example to connect the test box or to replace the ECM), the protective housing must be removed.*

Removing

– Select “replace engine control module“ in “Guided Functions“ on the Vehicle diagnostic tester if the engine control module was replaced.

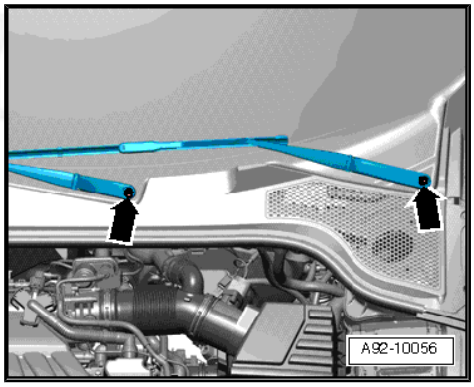
– Turn off the ignition and remove the key.

– Pry off the caps on the windshield wiper arms using a screwdriver.

– Loosen the nuts -arrows- by several turns.

– Loosen the windshield wiper arms from the wiper axle by tilting them slightly.

– Remove the nuts and remove the windshield wiper arms from the wiper axles.



Note

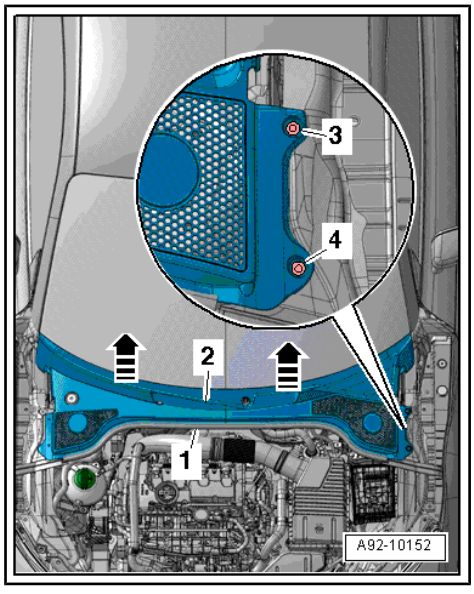
If wiper arm cannot be removed in this way, use a standard puller.

– Remove gasket -1-.

Caution

The plenum chamber cover could be damaged.

- ***Coat the bond between the windshield and the plenum chamber cover with soapy water.***



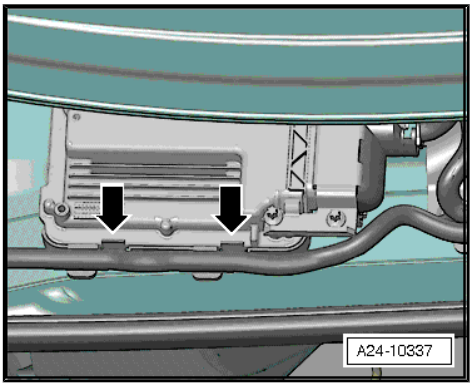
– Carefully remove the plenum chamber cover -2- starting upward starting at the edge of the window -arrows-.

Note

Ignore -3 and 4-.

– Free up engine wiring harness on the back of the plenum chamber bulkhead.

– Open clips -arrows- and remove ECM.

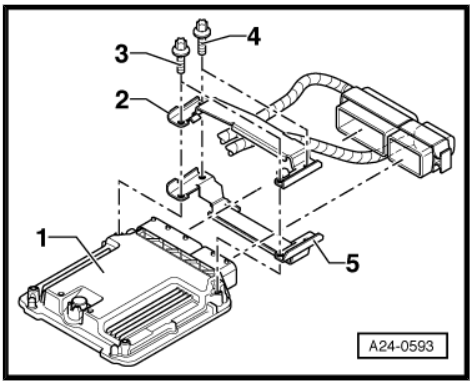


Additional steps if there is a protective housing installed:

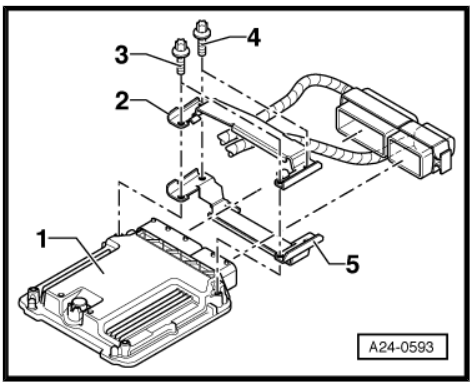
Note

Cover painted surfaces with a cloth to protect against scratches.

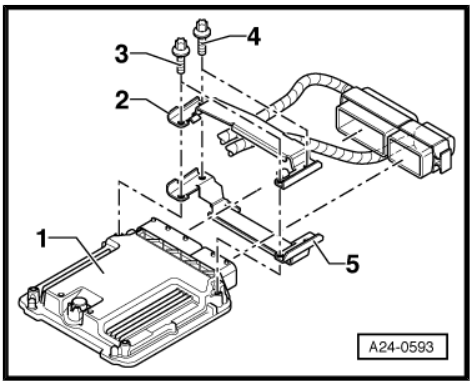
To increase the difficulty with which the ECM connectors can be accessed, the ECM is secured in a metal housing with retaining tabs and shear bolts.



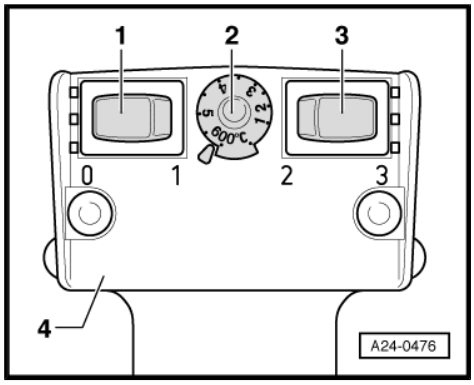
The threads of the shear bolts -4- (that are not installed in ECM) are coated with a locking compound. For this reason, the threads must be heated with the heat gun to remove both bolts.



The threads of both shear bolts -3- (that are installed in the ECM) are not coated with a locking compound. The threads in the ECM housing must not be heated and do not require to be heated (unintentional heating of the ECM).



Set the adjustment on the heat gun as shown in the illustration, with the temperature potentiometer -2- set to maximum heat and the two-stage airflow switch -3- set to level 3.

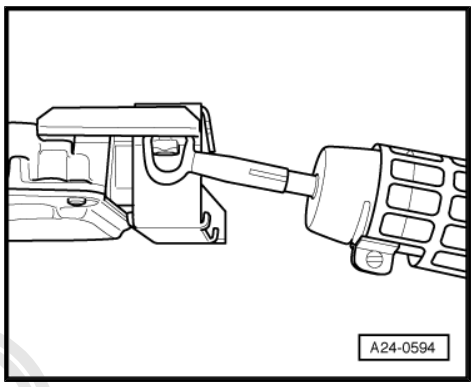


WARNING

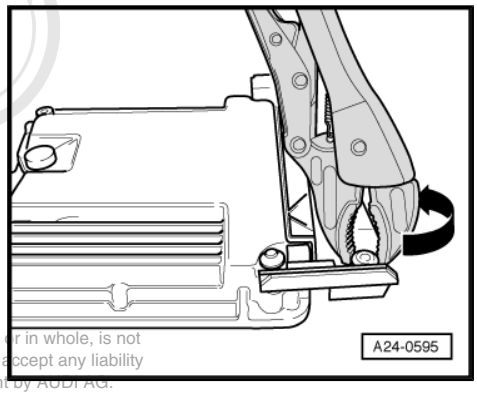
By heating the threads, the retaining tabs, shear bolts and parts of the metal housing become very hot. Do not burn yourself on this! Make sure that only the threads are heated as much as possible, and not any of the surrounding parts. Possibly cover these parts.

Warm threads on connector side of the shear bolts as shown in illustration.

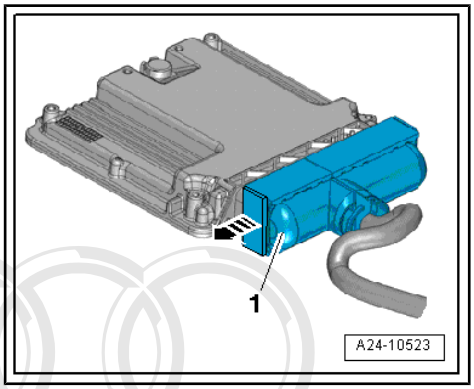
Switch on heat gun and heat the bolt for approximately 20 to 30 seconds.



- Remove shear bolts with suitable locking pliers (see direction of -arrow-).
- The shear bolts installed in the ECM do not need to be heated for removal. They can be removed without heat.
- Disconnect metal retainers from the connectors.
- Remove both bolts from the ECM.



– Disengage the connectors from the ECM and disconnect the connector.
– Remove the used ECM and connect the new ECM.



Note

When the connector is disconnected from the ECM, adaptation values are erased but the content of the DTC memory remains intact.

Installing

Install in reverse order of removal. Note the following:

– The ECM must be installed with a housing.
– Clean threaded holes for shear bolts of locking compound residue. Cleaning can be performed with a thread cutter (tap).
– Use new shear bolts.

Perform the following step after installing a new engine control module:

– Activate the ECM in “Guided Functions“ under “replace engine control module“. To do this, use a vehicle diagnostic tester.
– Install wiper arms. Refer to ⇒ Electrical Equipment; Rep. Gr. 92 ; Removal and Installation .

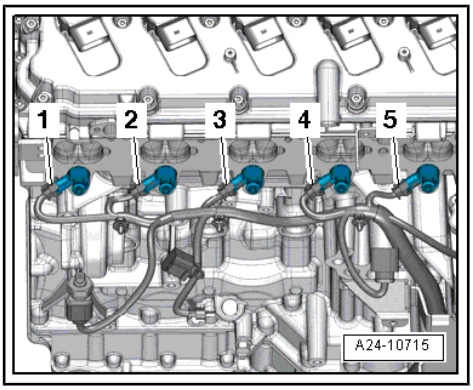
5.4 Fuel Injectors

Special tools and workshop equipment required

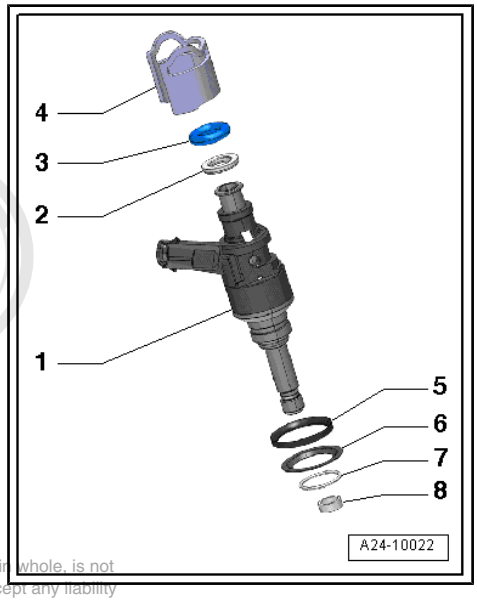
♦ Tool Set -T10133-

Removing

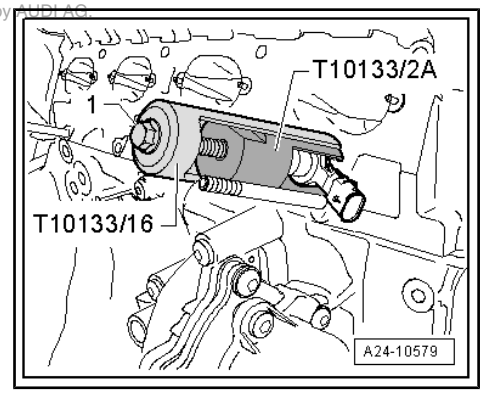
– Remove the upper section of the intake manifold. Refer to ⇒ “5.10 Intake Manifold, Upper Section“, page 44 .
– Remove the intake manifold lower section. Refer to ⇒ “5.9 Intake Manifold, Lower Section, with Fuel Rail“, page 41 .
– Disconnect the connectors -1 through 5- from the fuel injectors.



– Remove the ring -4- from the fuel injector -1-.



– Place the puller -T10133/2A- on the groove on the fuel injector.
– Mount the removal tool -T10133/16- on the puller.
– Turn the bolt and remove the fuel injector -1-.
– Repeat this on each fuel injector.
– Remove the intake manifold lower section gasket.



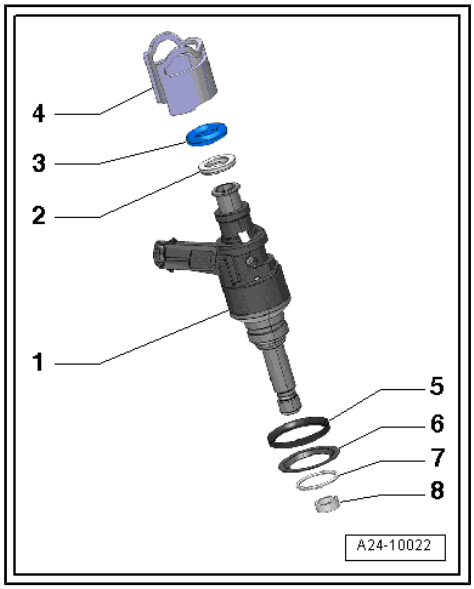
Disassemble the Fuel Injector.

– Remove the O-ring -3- and spacer ring -2- from the fuel injector -1-.
– Remove the circlip -7- and upper sealing washer -5- and lower sealing washer -6-.
– Carefully remove the old combustion chamber ring -8- by cutting the sealing ring with a knife and prying it open with a small screwdriver.

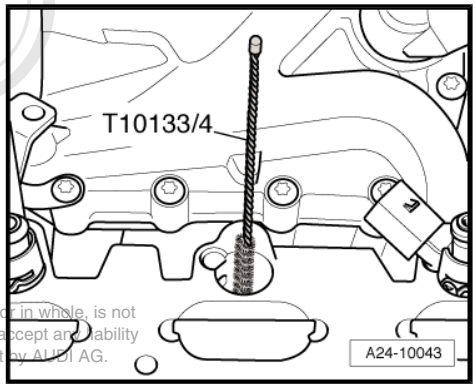
Note

Make sure that the groove of the fuel injector does not become damaged. If the groove is damage, the fuel injector must be replaced.

Installing



– Clean the hole inside the cylinder head with a nylon cylinder brush -T10133/4- .

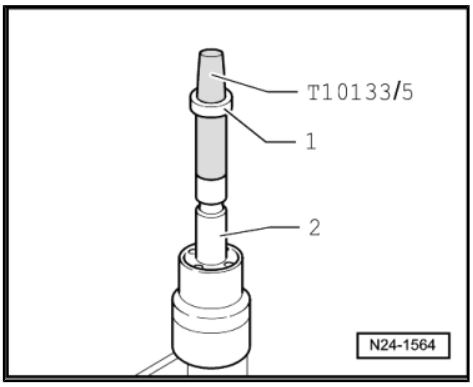


Note

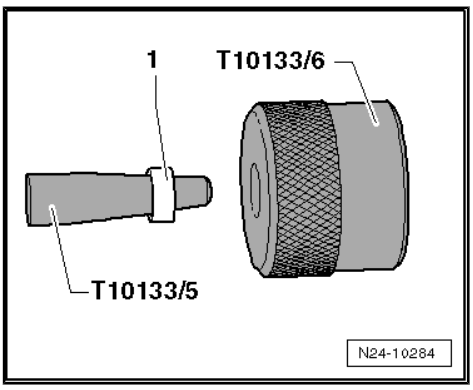
- *Replace the combustion chamber seal and O-ring.*
- *Replace the sealing ring if it is damaged.*

– Before installing the new combustion chamber seal, the seal groove and the shaft of the fuel injector must be cleaned of combustion residue using a clean rag.

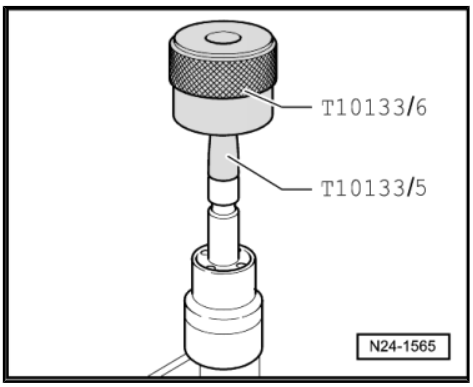
– Place the assembly cone -T10133/5- with the new combustion chamber seal -1- onto the fuel injector -2-.



– Slide combustion chamber seal with assembly sleeve -T10133/6- as far as possible onto assembly cone -T10133/5- .



– Turn the guide sleeve -T10133/6- and the combustion chamber seal until they slide into the groove.

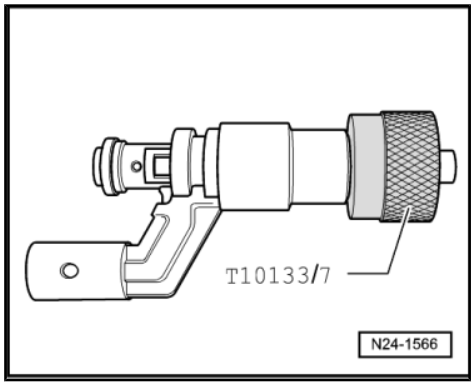


Note

When pushing the combustion chamber seal onto the fuel injector, the seal spreads open. Therefore after pushing it on, it must be tightened again in 2 steps, as follows.

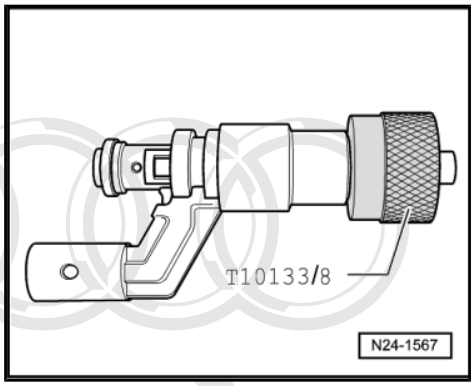
– Press the calibration sleeve -T10133/7- with a gentle turning movement (approximately 180°) all the way onto the fuel injector.

– Turn the -T10133/7- in the opposite direction and remove it.



– Press the calibration sleeve -T10133/8- with a gentle turning movement (approximately 180°) all the way onto the fuel injector.

– Turn the -T10133/8- in the opposite direction and remove it.



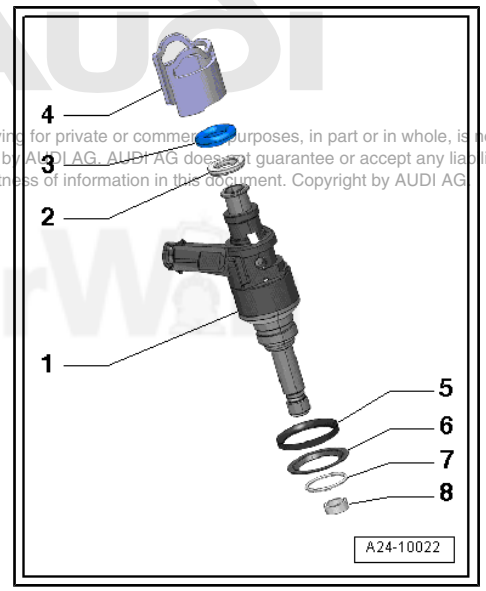
– Coat the new O-ring -3- with clean engine oil before installing the fuel injector -1-.

Note

The combustion chamber seal -8- must not be oiled.

– Install the gasket for the intake manifold lower section.

– Press the fuel injector by hand into the bore in the cylinder head (free of oil and grease) until it stops. Make sure fuel injectors are positioned correctly in the cylinder head.



Note

- *The fuel injector must not be difficult to install. If necessary, wait as the combustion chamber seal continues to pull itself together.*
- *Make sure the fuel injector is positioned correctly in the cylinder head.*

- The electrical connection of the fuel injector must engage in the intended recess of the cylinder head.

– Install the lower intake manifold section. Refer to ⇒ “5.9 Intake Manifold, Lower Section, with Fuel Rail“, page 41 .

– Install the upper section of the intake manifold. Refer to ⇒ “5.10 Intake Manifold, Upper Section“, page 44 .

5.5 Fuel Pressure Sensor -G247-

Special tools and workshop equipment required

- Assembly Tool -T10118-

♦ Double Hexagon Socket, 1/2", 27 mm -VAS 5301/7- or a commercially available 27 mm socket

Removing

WARNING

There is a risk of injury because the fuel is under very high pressure.

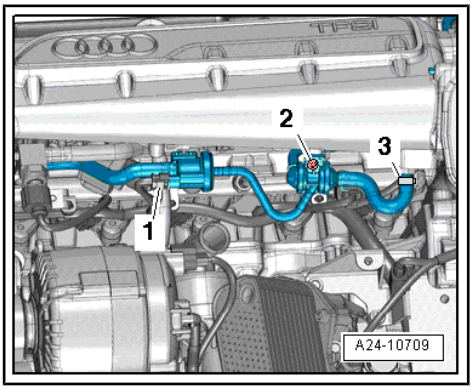
- ♦ ***Let the fuel pressure come down before opening any high pressure components in the fuel injection system.***

– Reduce fuel pressure in high pressure area.

– Disengage Evaporative Emission (EVAP) canister purge regulator valve 1 -N80- -1-.

– Remove the bolt -2-.

– Loosen the clamp -3- and remove the hose.

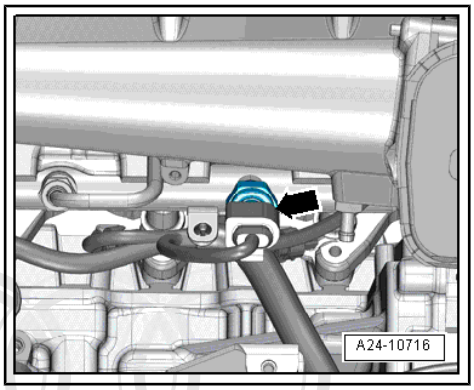


Note

Place a cloth underneath to catch any fuel.

– Disconnect electrical connector -arrow-.

– Remove the fuel pressure sensor using the -VAS 5301/7- .



Installing

Install in reverse order of removal.

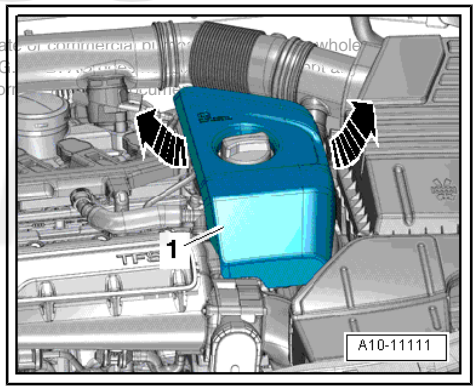
5.6 Heated Oxygen Sensor (HO2S) -G39- with Oxygen Sensor (O2S) Heater -Z19-

Special tools and workshop equipment required

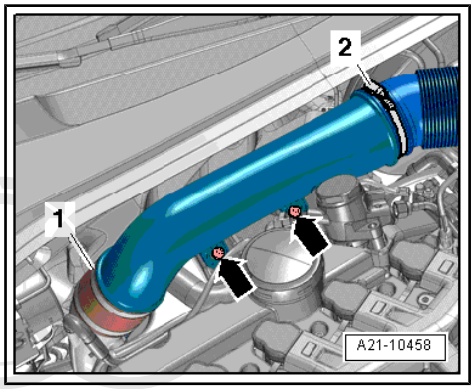
♦ Ring Spanner 7-Piece Set -3337-

Removing

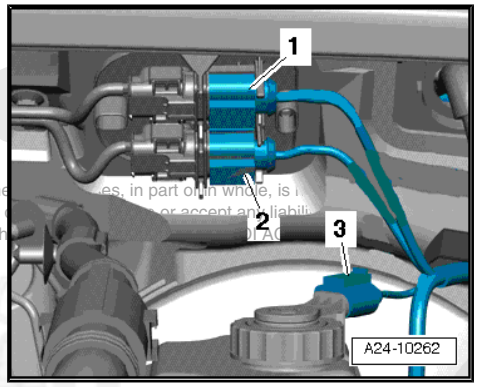
– Remove the engine cover -1- upward -arrows-.



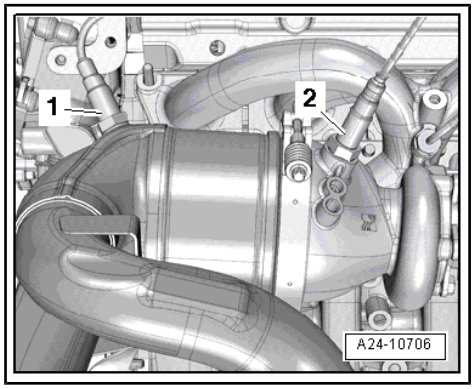
– Remove the bolts -arrows-.
– Open the clamps -1 and 2- and remove the air guide pipe.



– Remove and disconnect the connector -1- for the HO2S.



– Remove the HO2S -2- using a tool from the -3337- .



Installing

Install in reverse order of removal. Note the following:

Note

- *New oxygen sensors are coated with assembly paste; the paste must not get into slots of oxygen sensor body.*
- *For a used oxygen sensor, only coat threads with hot bolt paste. This paste must not come into contact with oxygen sensor slots. Hot bolt paste, refer to the Electronic Parts Catalog (ETKA).*
- *Electrical wire of oxygen sensor must always be secured in the same position when installing so that contact with the exhaust pipe is avoided.*

- Tightening specification, refer to ⇒ "2.6 Oxygen Sensors Overview", page 18 .

– Install the air guide pipe. Refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Description and Operation .

5.7 High Pressure Pipe

Special tools and workshop equipment required

- Torque Wrench 5-50 Nm -V.A.G 1331-
- Tool Insert, AF 17 -V.A.G 1331/6-
- Puller -T10055-

Removing

WARNING

There is a risk of injury because the fuel is under very high pressure.

- *Let the fuel pressure come down before opening any high pressure components in the fuel injection system.*

– Reduce fuel pressure in high pressure area. Refer to ⇒ “1.3.3 Releasing Pressure in High Pressure Area“, page 3 .

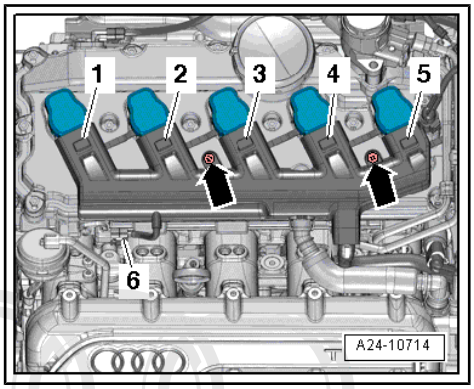
– Remove the upper section of the intake manifold. Refer to ⇒ “5.10 Intake Manifold, Upper Section“, page 44 .

– Remove the bolts -arrows-.

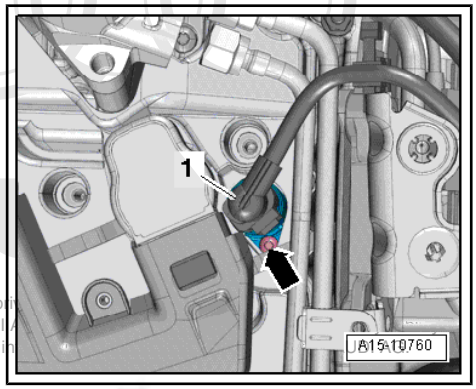
– Disconnect the connector -6- from Camshaft Position (CMP) sensor 3 -G300- .

– Release the connectors and remove them from the ignition coils -1 through 5-.

– Move the wiring harness to the left.



– Disconnect the connector -1- on the exhaust camshaft adjustment valve 1 -N318- .



Note

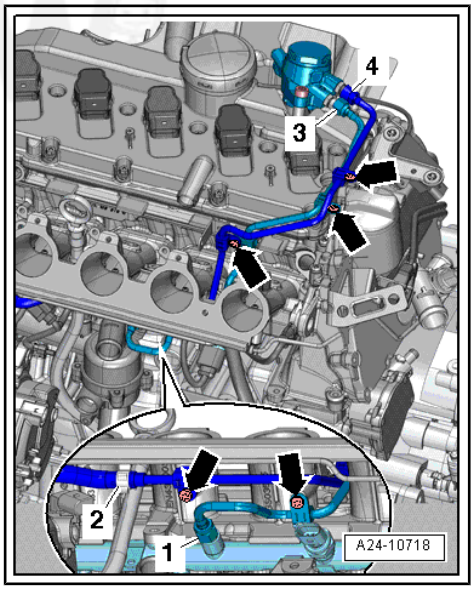
Ignore -arrow-.

– Remove the bolts -arrows- and union nut -4-.

– Loosen the clamp -2- and remove the fuel hose.

– Remove the fuel supply line.

– Remove the union nuts -1 and 3- and the high pressure pipe.

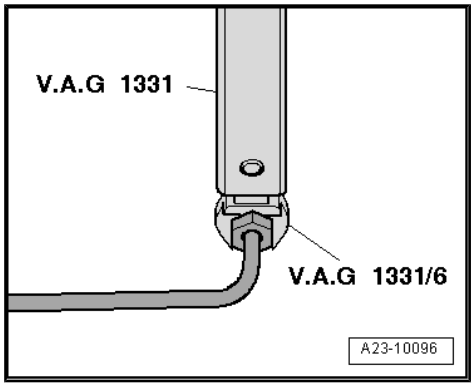


Installing

Note

- *High pressure line connections must not show any signs of damage.*
- *Do not change the shape of the high pressure pipe.*

– First tighten the union nut by hand making sure that it contacts the high pressure line free-of-stress.
– Counter hold using an open end wrench on the threaded connection and tighten the union nut using a -V.A.G 1331- and a -V.A.G 1331/6- .



• For the correct tightening specifications, refer to ⇒ “2.3 High Pressure Pump Overview“, page 13
– First tighten the bolt of the retaining strap, after that, the high pressure line is tightened.
– Install the upper section of the intake manifold. Refer to ⇒ “5.10 Intake Manifold, Upper Section“, page 44 .

5.8 High Pressure Pump

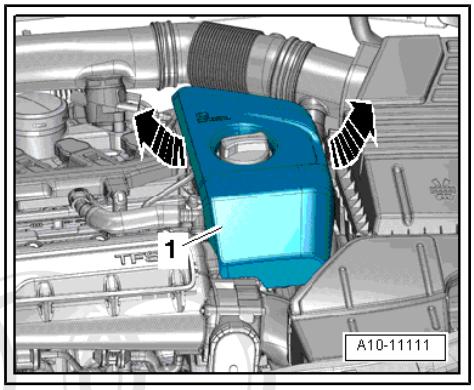
Removing

WARNING

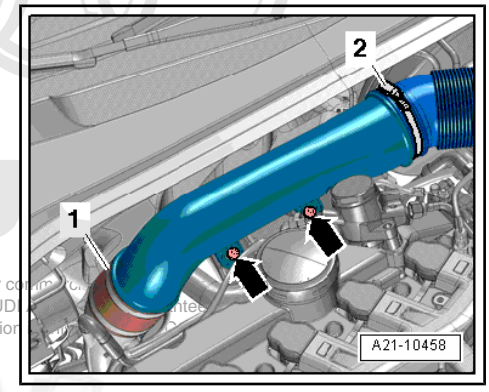
There is a risk of injury because the fuel is under very high pressure.

- ***Let the fuel pressure come down before opening any high pressure components in the fuel injection system.***

– Reduce fuel pressure in high pressure area. Refer to ⇒ “1.3.3 Releasing Pressure in High Pressure Area“, page 3 .
– Remove the engine cover -1- upward -arrows-.



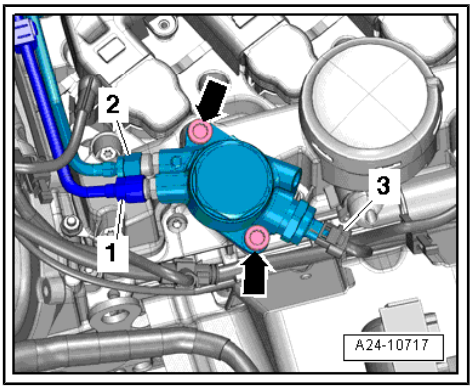
– Remove the bolts -arrows-.
– Open the clamps -1 and 2- and remove the air guide pipe.



Note

Place a cloth underneath to catch any fuel.

– Remove the union nuts -1 and 2-.
– Disconnect the connector -3- from the fuel metering valve - N290- .
– Remove the bolts -arrows-.
– Push the fuel lines away and remove the high pressure pump.



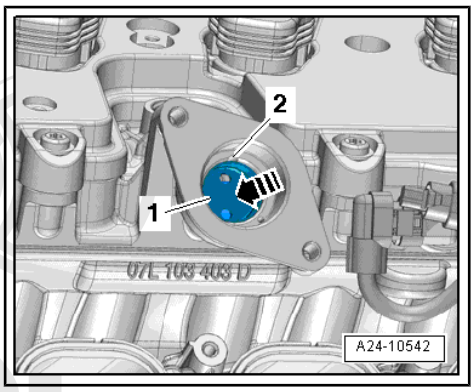
Installing

Install in reverse order of removal. Note the following:

Note

- *Replace the high pressure pump O-ring.*
- *High pressure line connections must not show any signs of damage.*

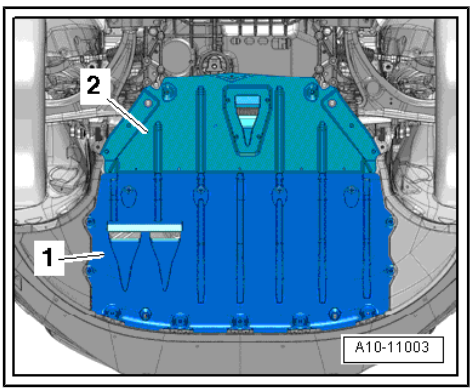
– Check the plunger -1- for damage and replace it if necessary.
– Coat the roller tappet with oil and insert it with its guide -2- into the cylinder head -arrow-.
– Insert the high pressure pump and press it down into its guide until it stops.
– Tighten the bolt hand-tight and in small steps.
– Tighten the bolt to the tightening specification alternating from side to side.
• Tightening specification, refer to ⇒ “2.3 High Pressure Pump Overview“, page 13 .
– Install the air guide pipe. Refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Description and Operation .



5.9 Intake Manifold, Lower Section, with Fuel Rail

Removing

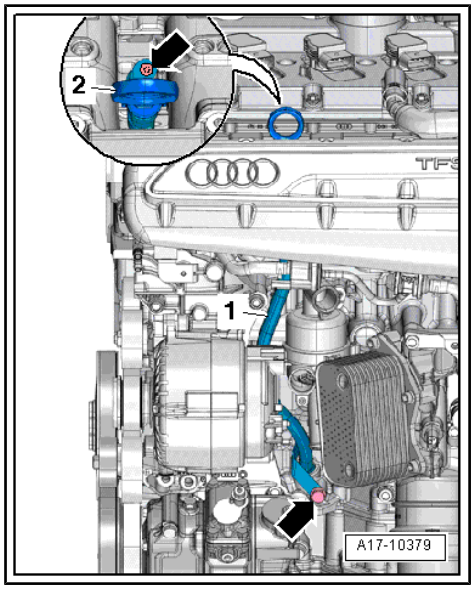
– Remove the upper section of the intake manifold. Refer to ⇒ “5.10 Intake Manifold, Upper Section“, page 44 .
– Remove the high pressure pipe. Refer to ⇒ “5.7 High Pressure Pipe“, page 38 .
– Remove the front noise insulation -1-. Refer to Underbody Trim Panels in ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



Note

When installing, bring all cable ties back to the same positions.

– Remove the oil dipstick -2-.
– Remove the bolts -arrows- and then remove the oil dipstick tube -1- upward.



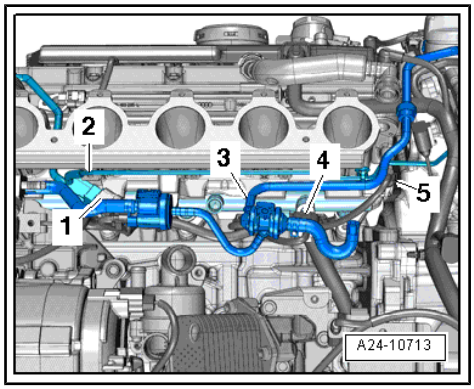
– Disconnect the connectors:

1 - Intake manifold runner control valve -N316-

4 - Fuel Pressure Sensor -G247-

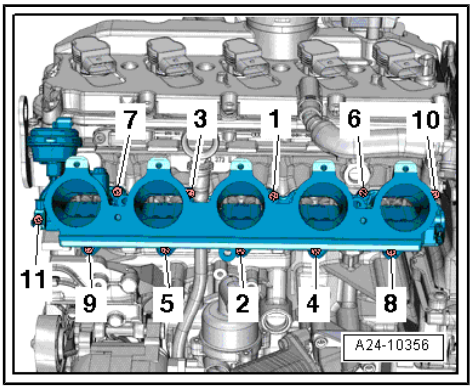
5 - Intake Manifold Runner Position Sensor -G336-

– Disconnect and free up the vacuum hose -2- and hose -3- from the EVAP canister.
– Free up electrical wiring harness.



– Loosen the bolts in sequence -11 to 1-.

– Remove the bolt and intake manifold lower section.



Caution

The engine could be destroyed.

- *To prevent small parts from accidentally entering the engine through the opening in the timing chain compartment, cover the opening with a clean cloth.*

Note

It is necessary to remove the fuel injectors in order to remove the intake manifold lower section gasket.

– Remove the fuel injectors. Refer to
⇒ “5.4 Fuel Injectors“, page 33 .

Installing

Install in reverse order of removal. Note the following:

- Tightening specification, refer to
⇒ Fig. ““Intake Manifold Lower Section - Tightening Specification and Tightening Sequence““ , page 16 .

Note

- *Replace the seals and O-rings.*
- *Install the fuel injectors after installing the intake manifold lower section gasket.*

– Install the fuel injectors. Refer to
⇒ “5.4 Fuel Injectors“, page 33 .

– Tighten the oil dipstick guide tube. Refer to ⇒ Engine Mechanical; Rep. Gr. 17 ; Specifications .

– Install the high pressure pipe. Refer to
⇒ “5.7 High Pressure Pipe“, page 38 .

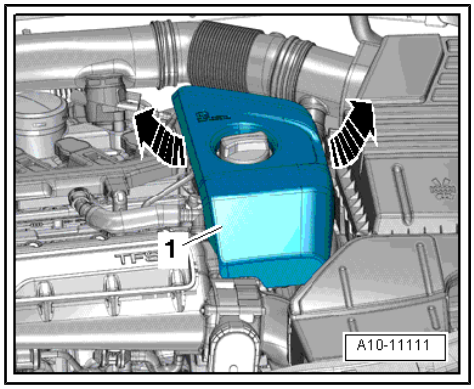
– Install the upper section of the intake manifold. Refer to
⇒ “5.10 Intake Manifold, Upper Section“, page 44 .

– Install the noise insulation. Refer to Underbody Trim Panels in ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

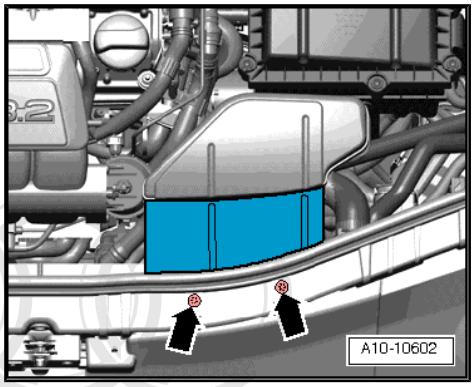
5.10 Intake Manifold, Upper Section

Removing

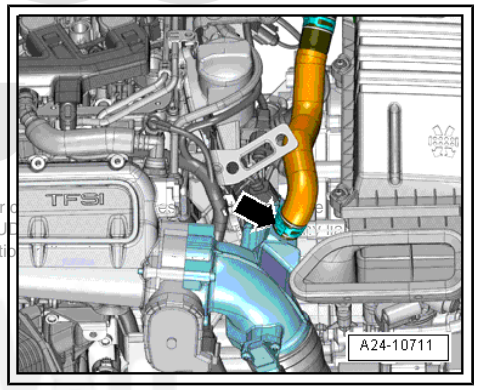
– Remove the engine cover -1- upward -arrows-.



– Remove the bolts -arrows- and the air guide.



– Loosen the hose clamp -arrow- and remove the air guide hose.

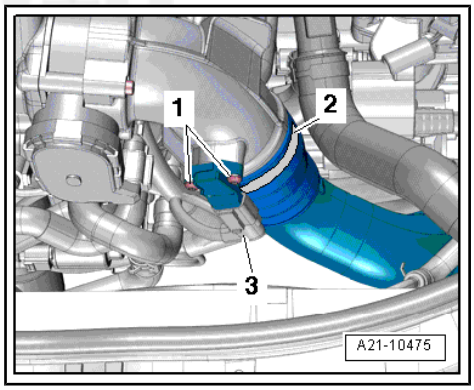


– Loosen the hose clamp -2-.

– Disconnect the connector -3- from the charge air pressure sensor -G31- / Intake Air Temperature (IAT) sensor 2 -G299- .

Note

Ignore -1-.

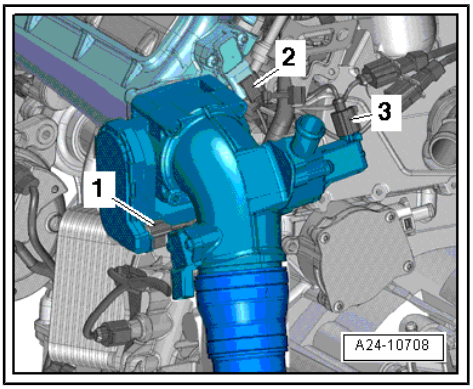


– Disconnect the connectors:

1 - Throttle valve control module -J338-

2 - Intake air temperature sensor -G42- / manifold absolute pressure sensor -G71-

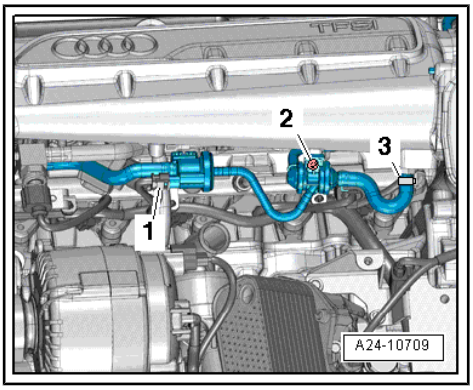
3 - Turbocharger recirculating valve -N249-



– Disengage Evaporative Emission (EVAP) canister purge regulator valve 1 -N80- -1-.

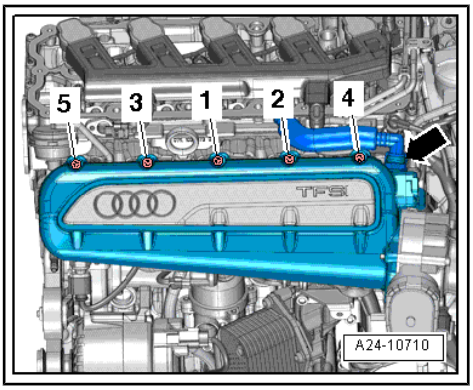
– Remove the bolt -2-.

– Loosen the clamp -3- and remove the hose.



– Press the release buttons and remove the crankcase ventilation hose -arrow-.

– Remove the bolts -1 through 5- and the intake manifold upper section.



Caution

The engine could be destroyed.

- ***To prevent small parts from accidentally entering the engine through the opening in the timing chain compartment, cover the opening with a clean cloth.***

Installing

Install in reverse order of removal. Note the following:

- For the correct tightening specifications, refer to ⇒ “2.5 Intake Manifold, Upper Section Overview”, page 16.

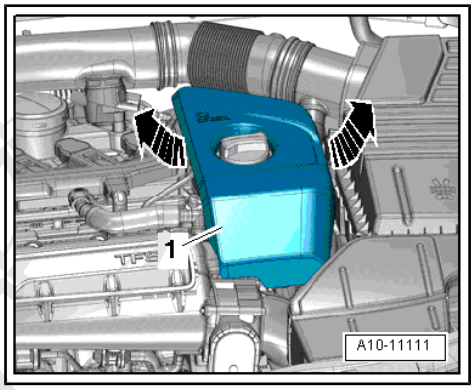
Note

- *Replace the seal and O-ring.*
- *The hose connections as well as the air guide pipes and hoses must be free of oil and grease before installing.*
- *When installing, do not use any lubricants containing silicone.*
- *Secure all hose connections with hose clamps of the same type as those equipped by the factory. Refer to the Electronic Parts Catalog (ETKA).*
- *In order to be able to securely mount the air guide hoses on their connectors, spray the screws on the previously used clamps with a rust remover.*

5.11 Intake Air Temperature Sensor and Manifold Absolute Pressure Sensor

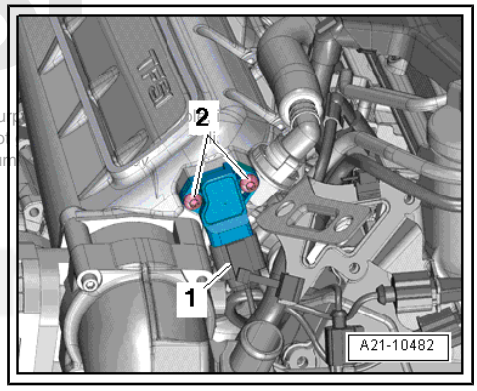
Removing

– Remove the engine cover -1- upward -arrows-.



– Disconnect the connector -1-.

– Remove the bolts -2- and then remove the Intake Air Temperature (IAT) sensor -G42- / Manifold Absolute Pressure (MAP) sensor -G71- .



Installing

Install in reverse order of removal. Note the following:

Note

Replace the O-ring.

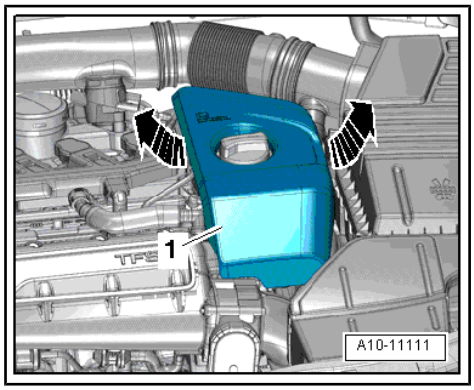
5.12 Oxygen Sensor after Three Way Catalytic Converter -G130- with Heater for Oxygen Sensor 1 after Catalytic Converter -Z29-

Special tools and workshop equipment required

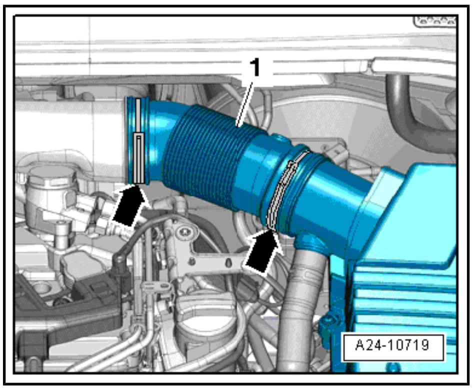
♦ Ring Spanner 7-Piece Set -3337-

Removing

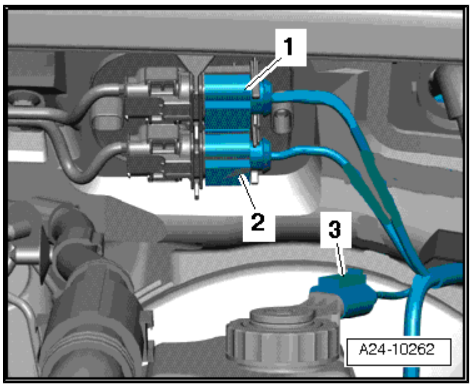
– Remove the engine cover -1- upward -arrows-.



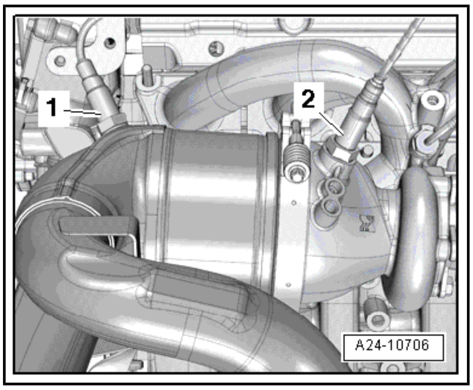
– Loosen the clamps -arrows- and remove the air guide pipe -1-.



– Remove the electrical connector -2- for the Oxygen Sensor (O2S) behind Three Way Catalytic Converter (TWC) -G130- from the bracket and disconnect it.



– Remove the Heated Oxygen Sensor (HO2S) -G130- -1- using a tool from the -3337- .



Installing

Install in reverse order of removal. Note the following:

• Tightening specification, refer to ⇒ “2.6 Oxygen Sensors Overview“, page 18 .

Note

♦ *New oxygen sensors are coated with assembly paste; the paste must not get into slots of oxygen sensor body.*

♦ *For a used oxygen sensor, only coat threads with hot bolt paste. This paste must not come into contact with oxygen sensor slots. Hot bolt paste, refer to the Electronic Parts Catalog (ETKA).*

♦ *Electrical wire of oxygen sensor must always be secured in the same position when installing so that contact with the exhaust pipe is avoided.*

♦ *The hose connections as well as the air guide pipes and hoses must be free of oil and grease before installing.*

♦ *When installing, do not use any lubricants containing silicone.*

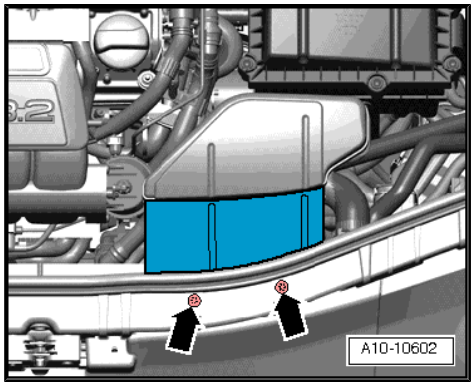
♦ *Secure all hose connections with hose clamps of the same type as those equipped by the factory. Refer to the Electronic Parts Catalog (ETKA).*

♦ *To mount the charge hoses on their connectors securely, spray the bolts on the used clamps with rust remover before installing.*

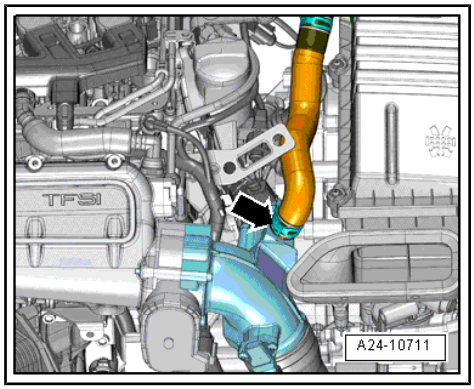
5.13 Throttle Valve Control Module -J338-

Removing

– Remove the bolts -arrows- and the air guide.



– Loosen the hose clamp -arrow- and remove the air guide hose.

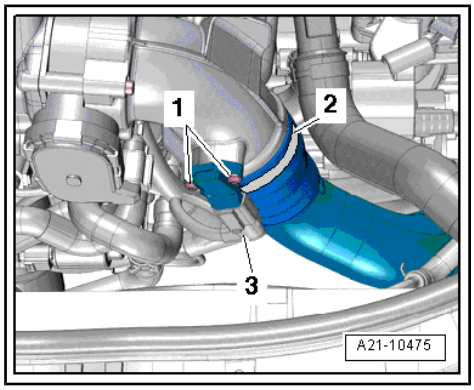


– Loosen the hose clamp -2-.

– Disconnect the connector -3- from the charge air pressure sensor -G31- / Intake Air Temperature (IAT) sensor 2 -G299- .

Note

Ignore -1-.



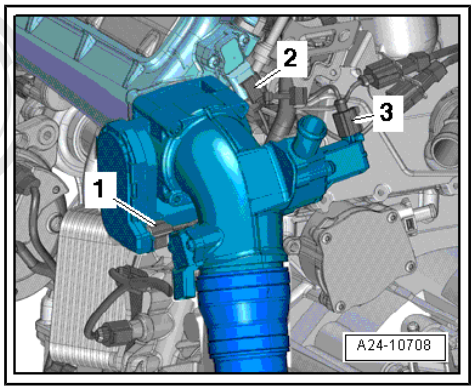
– Disconnect the connectors:

1 - Throttle valve control module

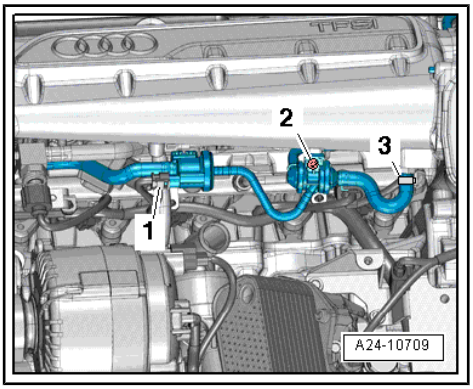
3 - Turbocharger recirculating valve -N249-

Note

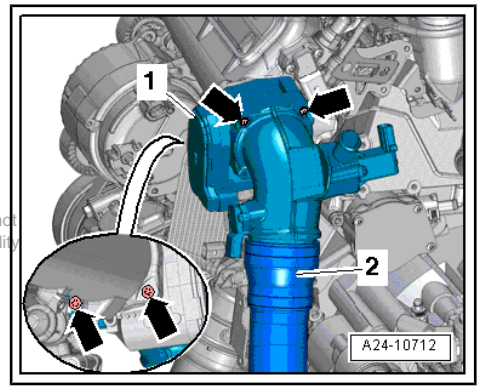
Ignore -2-.



– Disengage Evaporative Emission (EVAP) canister purge regulator valve 1 -N80- -1-.
– Remove the bolt -2-.
– Loosen the clamp -3- and remove the hose.



– Remove the bolts -arrows- and then remove the throttle valve control module -1- and connection from the air guide hose -2-.



Installing

Install in reverse order of removal. Note the following:

- For the correct tightening specifications, refer to ⇒ “2.5 Intake Manifold, Upper Section Overview“, page 16

Note

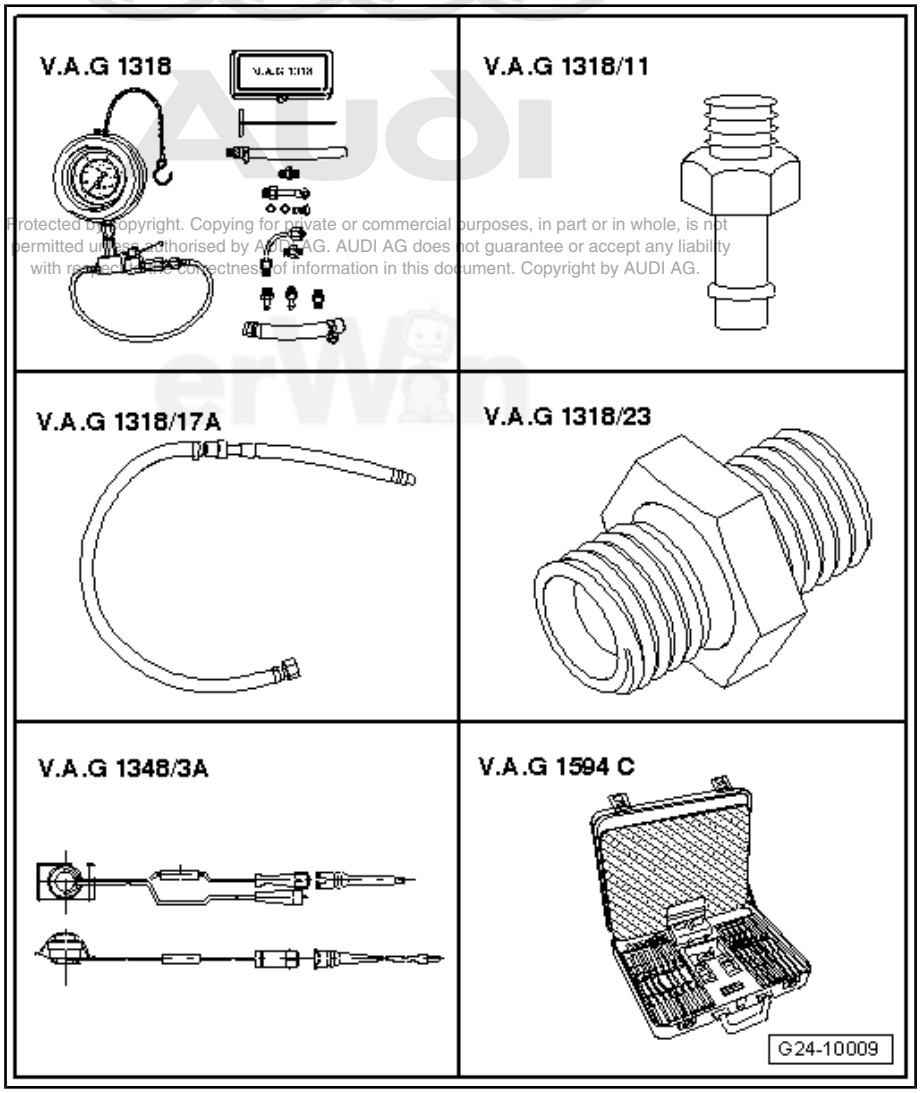
- *Replace the seal and O-ring.*
- *The hose connections as well as the air guide pipes and hoses must be free of oil and grease before installing.*
- *When installing, do not use any lubricants containing silicone.*
- *Secure all hose connections with hose clamps of the same type as those equipped by the factory. Refer to the Electronic Parts Catalog (ETKA).*
- *In order to be able to securely mount the air guide hoses on their connectors, spray the screws on the previously used clamps with a rust remover.*

– After replacing, perform an “adaptation“ in “Guided Functions“ -VAS 5051B- .

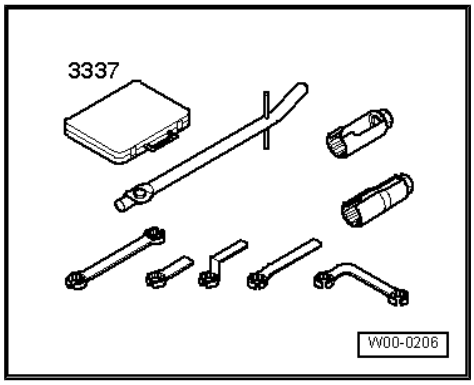
6 Special Tools

Special tools and workshop equipment required

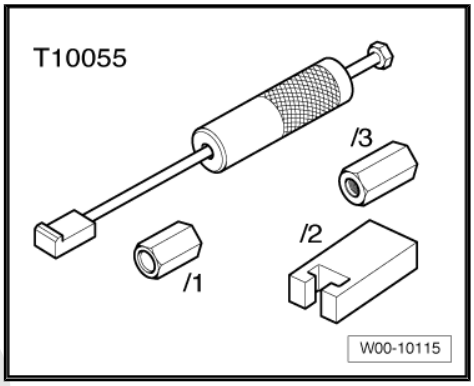
- Fuel Inj. Pressure Gauge-CIS -V.A.G 1318-
- Adapter -V.A.G 1318/11-
- Adapter -V.A.G 1318/17A-
- Fuel Line Feed Adapter -V.A.G 1318/23-
- Remote Control Connection -V.A.G 1348/3A- with Remote Control for VAG 1348 -V.A.G 1348/3-3-
- Connector Test Set -V.A.G 1594C-



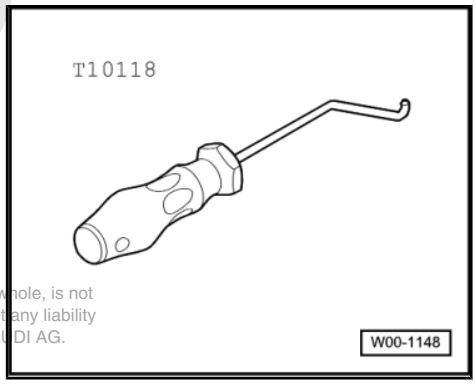
- Ring Spanner 7-Piece Set -3337-



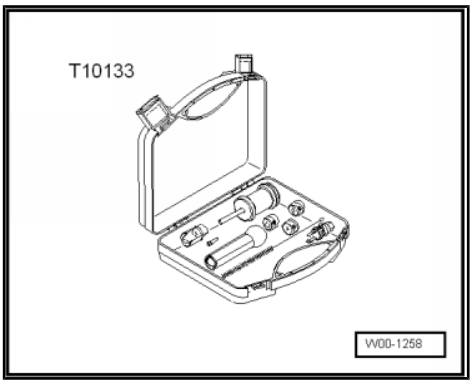
- Puller -T10055-



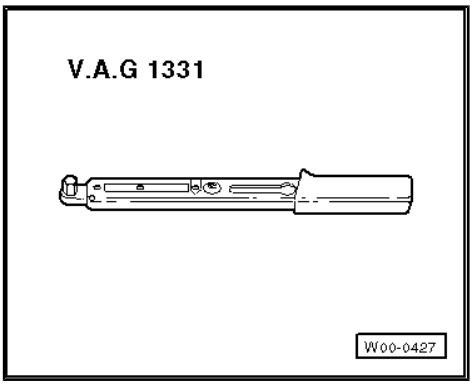
- Assembly Tool -T10118-



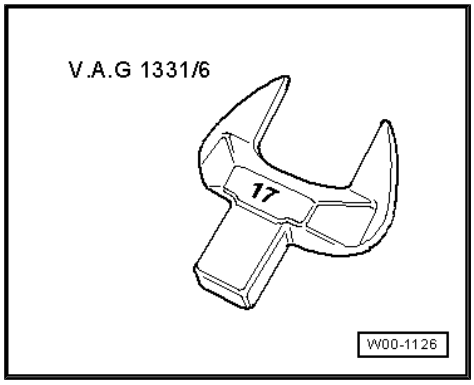
- Tool Set -T10133-



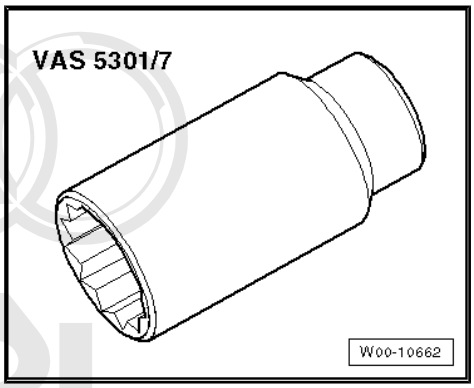
- Torque Wrench 5-50 Nm -V.A.G 1331-



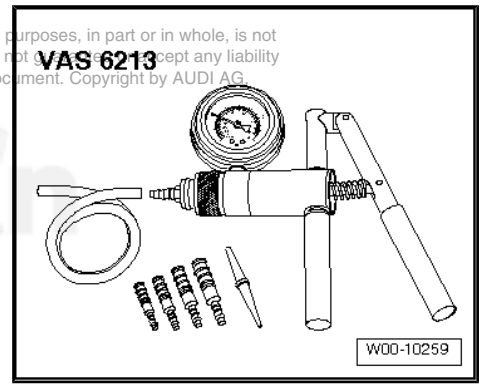
- Tool Insert, AF 17 -V.A.G 1331/6-



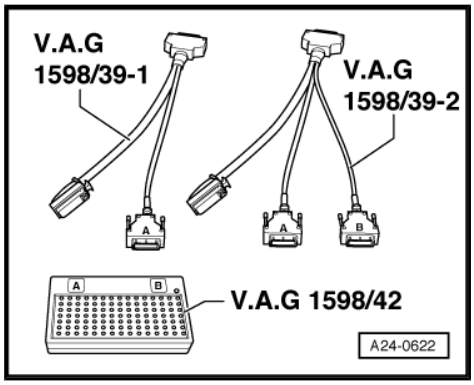
- Double Hexagon Socket, 1/2", 27 mm -VAS 5301/7- or a commercially available 27 mm socket



- Hand Vacuum Pump -VAS 6213-

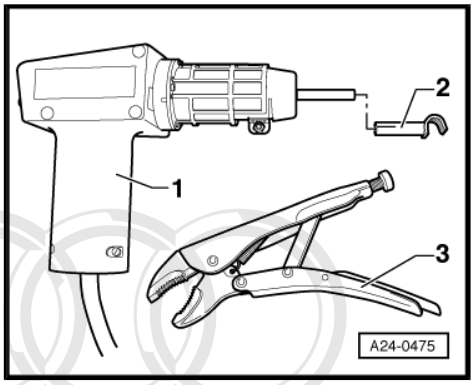


- Adapter -V.A.G 1598/39-1-
- Adapter -V.A.G 1598/39-2-
- Test Box 105 Pin -V.A.G 1598/42-



- Hot Air Blower -VAS 1978/14A- -1- with nozzle attachment -2- from the Wiring Harness Repair Set -VAS 1978 B-

- Small commercially available locking pliers -3-



28 – Ignition/Glow Plug System

1 General Information

⇒ “1.1 Ignition System“, page 54

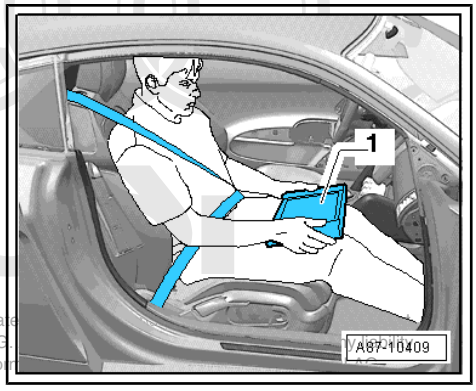
⇒ “1.2 Safety Precautions“, page 55

1.1 Ignition System

- The Engine Control Module (ECM) is equipped with On Board Diagnostics (OBD). Before repairs such as fault finding, check the Diagnostic Trouble Code (DTC) memory first.
- For the electric components to work properly, a voltage of at least 11.5 Volts is required.
- It is possible that the control module will recognize a malfunction and store a DTC during some tests. After completing all checks and repairs, check the DTC memory and erase the memory, if necessary.
- If the engine only starts briefly and then turns off again after troubleshooting, repair or checking of the components, it may be that the immobilizer is blocking the ECM. DTC memory must then be checked and if necessary, control module must be adapted.

1.2 Safety Precautions

If special testing equipment is required during road test, note the following:



WARNING

Improperly secured testing and measuring equipment and distraction during a road test increase the risk of an accident.

The passenger airbag could pose a risk if it deploys in a collision.

- *Operating testing equipment while driving causes it to shift position.*
- *There is an increased risk of injury due to unsecured testing equipment.*

- *Position passenger's seat as far back as possible.*
- *The following vehicle diagnosis testers may NOT be used: VAS 5051 , VAS 5051B .*
- *Testing and measuring instruments -1- must lay flat on the passenger's thighs and be operated by him or her, as shown in the illustration as shown in the function test manual.*

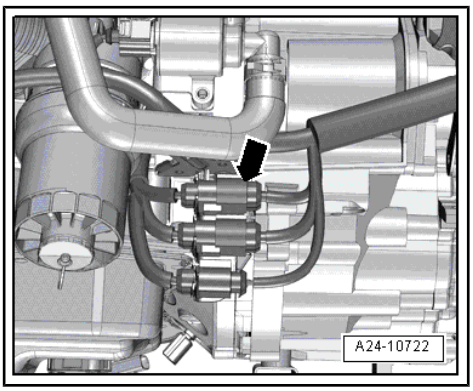
Caution

Risk of destroying electronic components when disconnecting the battery.

- *Observe measures for disconnecting battery.*

– Disconnect the battery. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .

To reduce the risk of personal injury and/or damage to the fuel injection and ignition system, always observe the following:

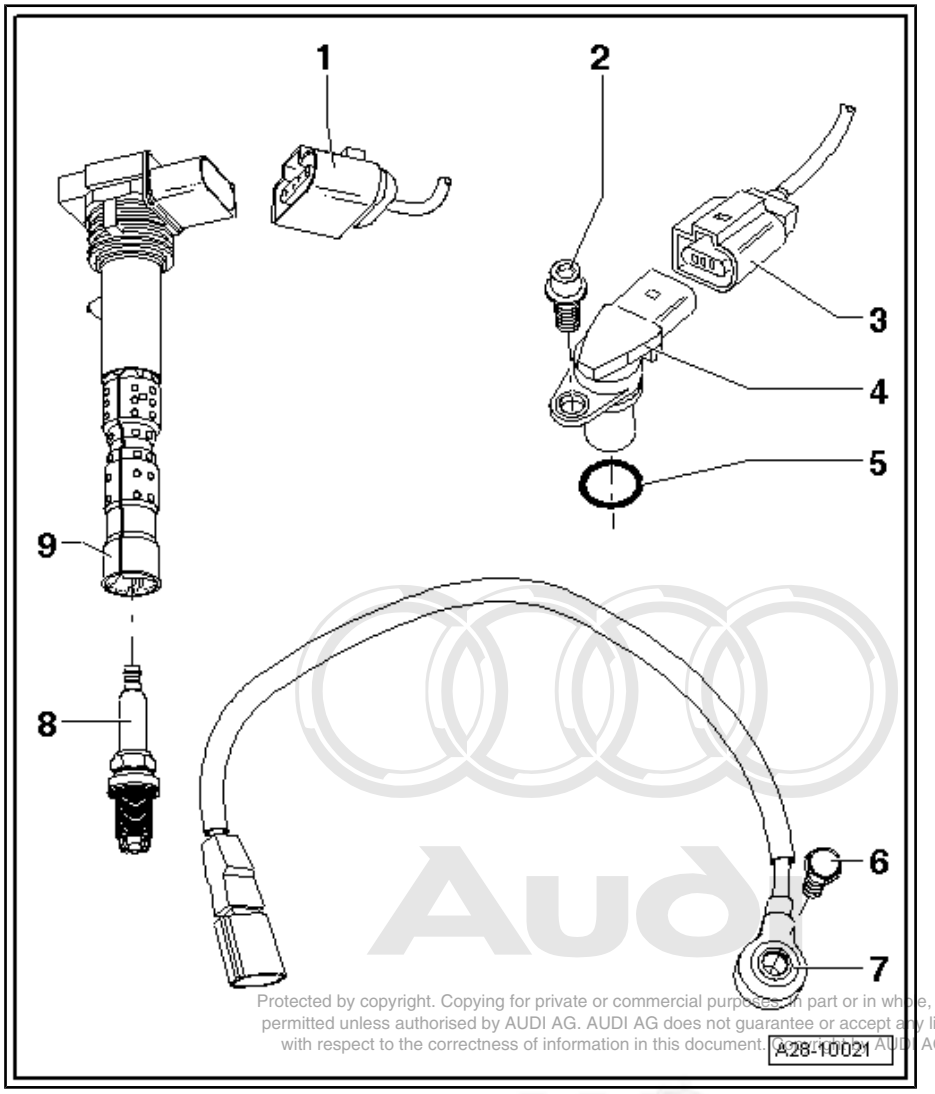


- Do not touch or remove ignition wires when the engine is running or turning at starter speed.
- Always switch ignition off before disconnecting or reconnecting wires for the ignition system, including high voltage wiring and test leads.
- Cleaning the engine should only be performed with ignition turned off.
- If the engine is to be cranked at starting RPM without starting (for example, for a compression test), disconnect the four ignition coil connectors.
- Disconnect the connector -arrow- from the fuel injectors.

2 Description and Operation

⇒ “2.1 Ignition Overview“, page 56

2.1 Ignition Overview



1 - 4-Pin Harness Connector

- For the ignition coil

2 - Bolt

- 9 Nm

3 - 3-Pin Harness Connector

- For Camshaft Position (CMP) sensor

4 - Camshaft Position (CMP) Sensor

- CMP sensor -G40-
- CMP sensor 3 -G300-
- Removing and installing, refer to ⇒ “4.3 Camshaft Position Sensor G40 / Camshaft Position Sensor 3 G300 “, page 60

5 - O-ring

- Replace if damaged
- Coat with clean engine oil

6 - Bolt

- 20 Nm
- Tightening specifications affect function of Knock Sensor (KS)

7 - Knock Sensor

- Knock Sensor (KS) 1 -G61-
- Knock Sensor (KS) 2 -G66-
- The contact surfaces between the knock sensor and cylinder block must be free of corrosion, dirt and grease.
- Removing and installing, refer to ⇒ “4.2 Knock Sensors G61 / Knock Sensors 2 G66 “, page 59

8 - Spark Plug

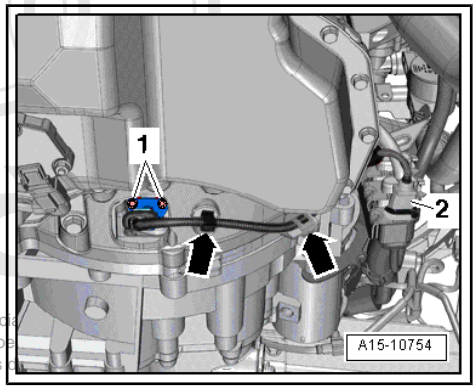
- 30 Nm
- Removing and installing with the spark plug removal tool -3122 B- . Refer to the Maintenance Procedures Rep. Gr. 03

9 - Ignition Coil

- Ignition Coil 1 with Power Output Stage -N70-
- Ignition Coil 2 with Power Output Stage -N127-
- Ignition Coil 3 with Power Output Stage -N291-
- Ignition Coil 4 with Power Output Stage -N292-
- Ignition Coil 5 with Power Output Stage -N323-
- Removing and installing, refer to ⇒ “4.1 Ignition Coils“, page 59

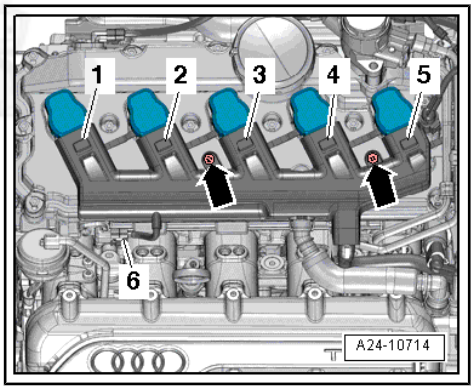
Engine Speed Sensor -G28- Tightening Specification

– Tighten the bolts -1- to 5 Nm.



Ignition Coil Connectors - Tightening Specification

– Tighten bolts -arrows- to 5 Nm.



3 Specifications

⇒ “3.1 Fastener Tightening Specifications“, page 58

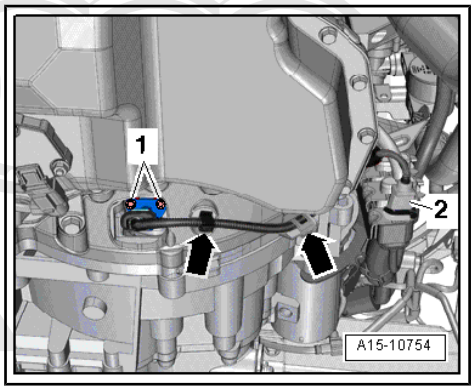
⇒ “3.2 Test Data“, page 58

3.1 Fastener Tightening Specifications

Components	Fastener Size	Nm
Camshaft Position (CMP) Sensor	-	9
Knock Sensor	-	20
Spark Plug	-	30

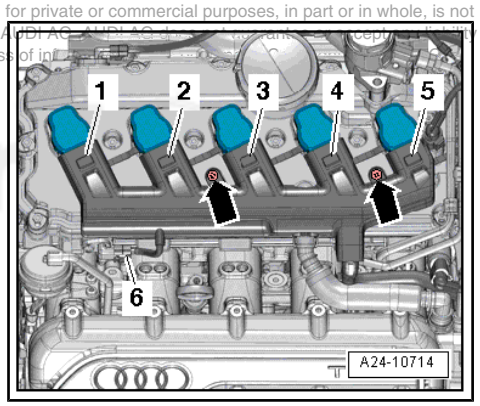
Engine Speed (RPM) Sensor -G28- Tightening Specification

– Tighten the bolts -1- to 5 Nm.



Ignition Coil Connectors - Tightening Specification

– Tighten bolts -arrows- to 5 Nm.



3.2 Test Data

Engine Data		2.5L / 4V Engine
Idle speed (not adjustable)		
Ignition timing		Not adjustable, regulated by the control module
Ignition/Glow Plug System		Single coil ignition system with 5 ignition coils (output stages integrated) that are connected directly to spark plugs via the ignition cables.
Spark plugs	Names	⇒ Data sheets for exhaust emission test
	Tightening Specifications	Refer to the Maintenance Procedures Rep. Gr. 03
Ignition sequence		1-2-4-5-3

4 Removal and Installation

⇒ “4.3 Camshaft Position Sensor G40 / Camshaft Position Sensor 3 G300 “, page 60

⇒ “4.4 Engine Speed Sensor G28 “, page 61

⇒ “4.1 Ignition Coils“, page 59

⇒ “4.2 Knock Sensors G61 / Knock Sensors 2 G66 “, page 59

4.1 Ignition Coils

Special tools and workshop equipment required

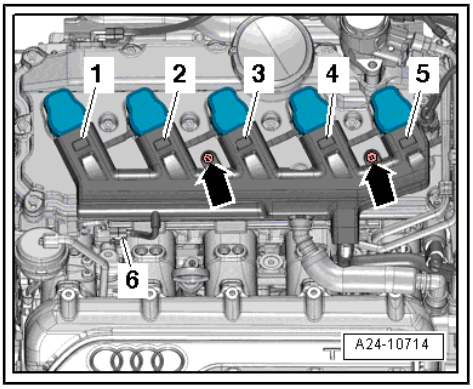
- Ignition Coil Puller -T40039-

Removing

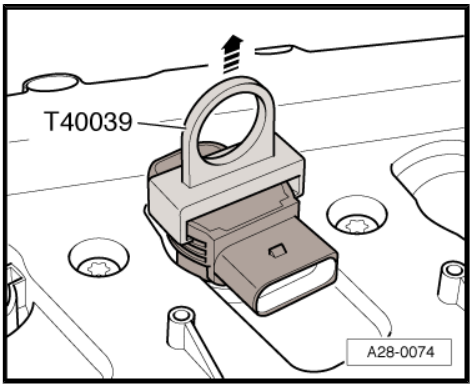
– Disconnect the connector -6- from Camshaft Position (CMP) sensor 3 -G300- .

– Remove the bolts -arrows-.

– Release the connectors and remove them from the ignition coils -1 through 5-.



– Push the -T40039- onto the ignition coil with power output stage and remove the ignition coil -arrow-.



Installing

– Install all the ignition coils loosely into the spark plug shaft.

– Align and connect the ignition coils to the connectors all at the same time.

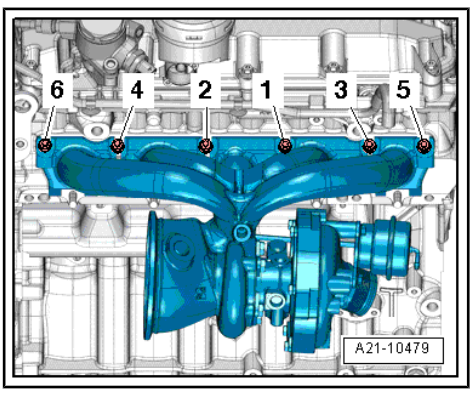
– Push the ignition coils evenly onto the spark plugs by hand (do not use a hammer).

– Attach the ignition coil wiring guide to the cylinder head cover. Refer to ⇒ Fig. ““Ignition Coil Connectors - Tightening Specification““ , page 57 .

4.2 Knock Sensors -G61- / Knock Sensors 2 -G66-

Removing

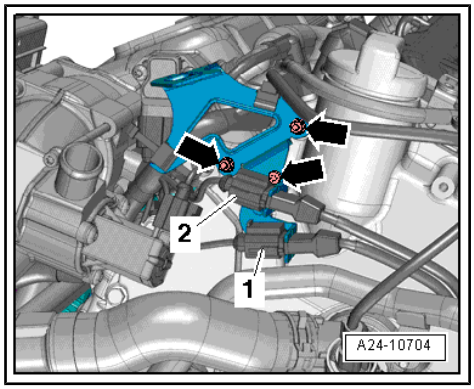
– Remove the turbocharger. Refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Removal and Installation .



– Remove the electrical connectors from the bracket and disconnect:

1 - For Knock Sensor (KS) 2 -G66-

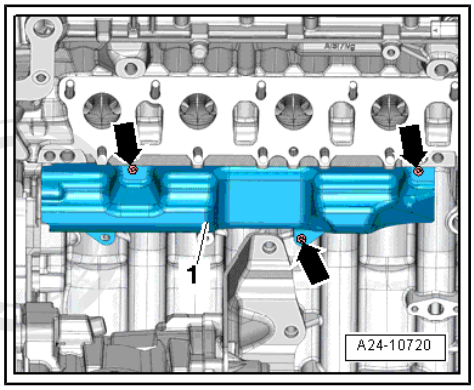
2 - For Knock Sensor (KS) 1 -G61-



Note

Ignore -arrows-.

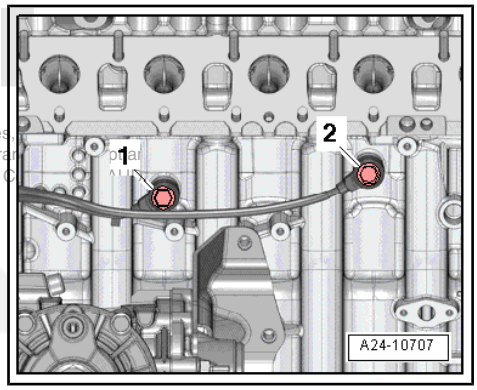
– Remove the bolts -arrows- and the heat shield -1-.



– Remove the bolt and the knock sensor.

1 - KS 2

2 - KS 1



Installing

Install in reverse order of removal. Note the following:

- Tightening specification, refer to ⇒ “2.1 Ignition Overview“, page 56 .

– Install the turbocharger. Refer to ⇒ Engine Mechanical; Rep. Gr. 21 ; Removal and Installation .

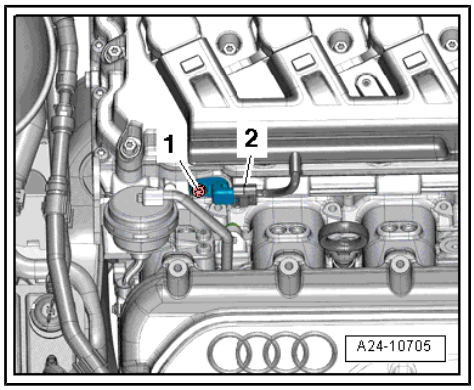
4.3 Camshaft Position Sensor -G40- / Camshaft Position Sensor 3 -G300-

Removing

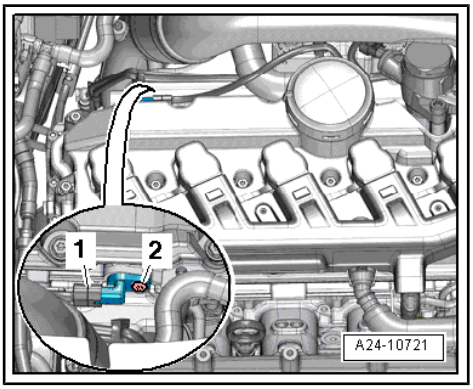
Camshaft Position (CMP) Sensor -G40-

– Disconnect the connector -2-.

– Remove the bolt -1- and CMP Sensor.



Camshaft Position (CMP) Sensor 3 -G300-



– Disconnect the connector -1-.
– Remove the bolt -2- and CMP Sensor 3.

Installing

Install in reverse order of removal. Note the following:

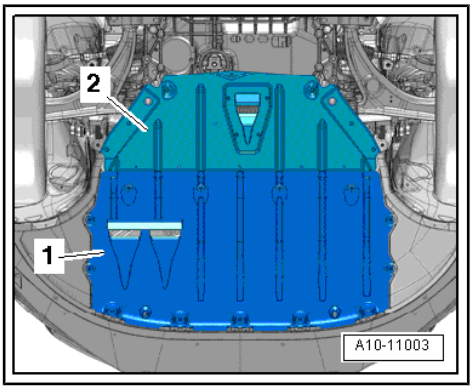
Note

Replace the O-rings.

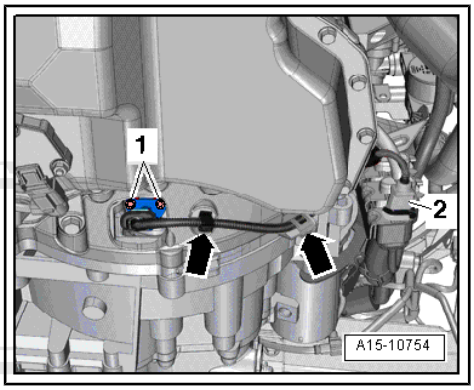
- Tightening specification, refer to ⇒ "2.1 Ignition Overview", page 56 .

4.4 Engine Speed Sensor -G28-

Removing



– Remove the front noise insulation -1-. Refer to Underbody Trim Panels in ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



– Free up electrical connector -2- and disconnect.
– Free up electrical wiring harness -arrows-.
– Remove the bolts -1- and the Engine Speed (RPM) sensor -G28- .

Installing

Install in reverse order of removal. Note the following:

- Tightening specification, refer to ⇒ Fig. "" Engine Speed Sensor -G28- Tightening Specification"" , page 57 .

Note

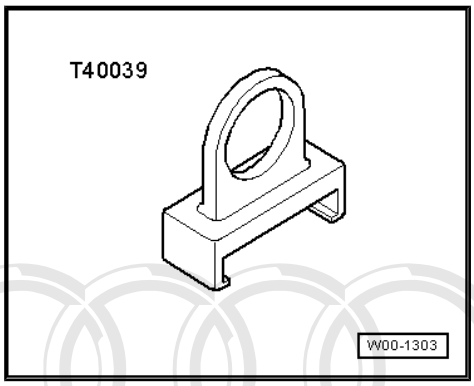
When installing, bring all cable ties back to same positions.

– Install the noise insulation. Refer to Underbody Trim Panels in ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

5 Special Tools

Special tools and workshop equipment required

- Ignition Coil Puller -T40039-



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Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Audi retailer or other qualified shop. We especially urge you to consult an authorized Audi retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Audi.

- Disconnect the battery negative terminal (ground strap)whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.

- Audi is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Audi retailer parts department for the latest information.

- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the VAG 1551 Scan Tool (ST).

- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.

- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.

- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.

- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from being fully alert.

- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.

- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.

- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.

next

Cautions & Warnings

- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.

- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.

- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.

- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly, do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Audi specifications. Makeshift tools, parts and procedures will not make good repairs.

- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.

- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.

- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.

- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.

- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.

- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.

- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.

back next

Cautions & Warnings

- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).

- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Audi Service technicians should test, disassemble or service the airbag system.

- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.

- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Audi Service technicians using the VAG 1551 Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.

- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.

- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.

back OK