

2004 Audi A4

ENGINE 1.8 Liter 4-Cyl. 5V Turbo Engine Mechanical, Engine Code(s): AMB

Injection/ignition system	Bosch Motronic
Knock control	yes
On Board Diagnostic	yes
Oxygen sensor control	yes
Catalytic converter	yes
Charging	yes

*Standard unleaded RON 91 also permitted, however reduced power.

Engine code	AMB
Exhaust gas recirculation	no
Intake manifold change-over function	no
Camshaft timing control	yes
Secondary air system	yes
Valve timing	
at 1 mm valve lift and 0 mm valve clearance	
Intake opens after TDC	18 °
Intake closes after BDC	28 °
Exhaust opens before BDC	28 °
Exhaust closes before TDC	8 °

10 - ENGINE - ASSEMBLY

ENGINE, REMOVING AND INSTALLING

Engine, removing and installing

CAUTION: Before beginning repairs on the electrical system:

Obtain the anti-theft radio security code.

Switch the ignition off.

Disconnect the battery Ground (GND) strap.

On vehicles equipped with Audi Telematics by OnStar, switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery --> **91 - COMMUNICATION**

After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to Repair Article and/or Owners Manual.

After reconnecting vehicle battery on vehicles equipped with Audi

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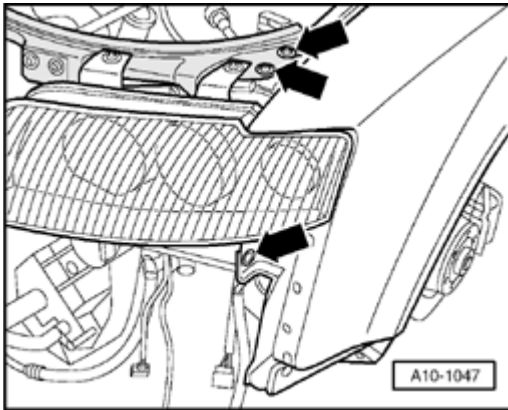


Fig. 23: Unbolting Lock Carrier On Left/Right

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt lock carrier on left and right - arrows -.

NOTE:

- A second technician is required to remove the lock carrier.
- Place lock carrier in a secure position.

- Remove lock carrier.

Vehicles with automatic transmission

NOTE:

- Observe the rules for cleanliness when working on an automatic transmission:
- -->
 - 37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING for 5 SPD. AUTOMATIC TRANSMISSION 01V
 - 37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
 - 37 CONTROLS, HOUSING for AUTOMATIC TRANSMISSION 09L, FOUR-WHEEL DRIVE

- Place drip tray underneath.

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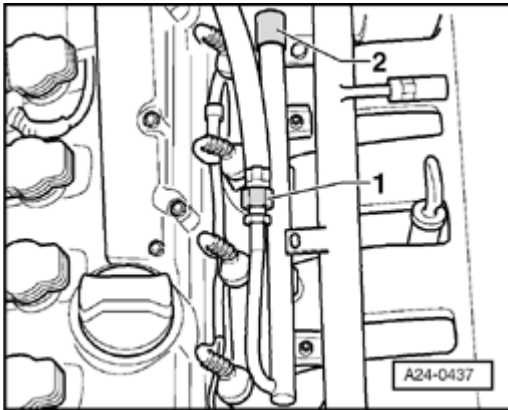


Fig. 54: Disconnecting Fuel Supply Line And Set Aside
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten union nut of fuel supply line - 1 - to 22 Nm.

Vehicles as of 07.03

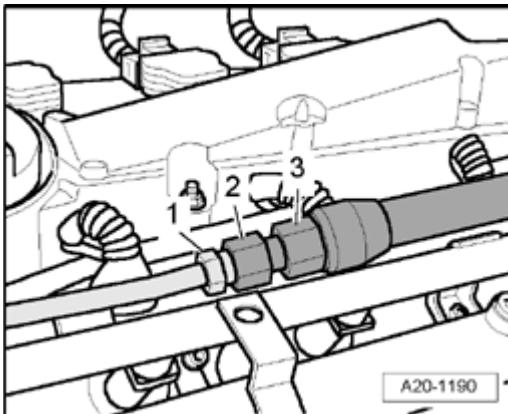


Fig. 55: Counterholding Using An Open-End Wrench At Each Hex Head & Unscrew Union Nut
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure fuel hose to connection on fuel rail pipe. To do so, counterhold using an open-end wrench at each hex head - 1 - and - 3 - and tighten union nut - 2 - to 22 Nm.

All

Electrical connections and routing:

--> Electrical Wiring Diagrams, Troubleshooting and Component Locations

CAUTION: Boost-starting using a battery charger may damage vehicle control modules.

See Caution for connecting Telematics battery --> **Engine, removing and installing**

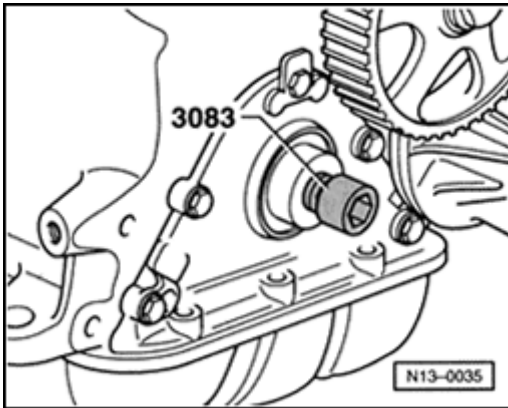


Fig. 113: Screwing Phillips-Head Bolt From 3083 Into Crankshaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Before installing oil seal extractor, screw Phillips-head bolt from 3083 into crankshaft as far as it will go.
- Remove inner part of oil seal extractor 2085 two turns (approx. 3 mm) out of outer part and lock with knurled screw.

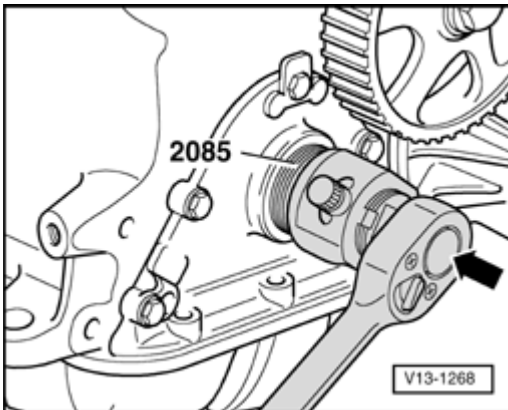


Fig. 114: Identifying Seal Puller 2085
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lubricate threaded head of oil seal extractor, place in position and exerting firm pressure, screw as far as possible into oil seal.
- Loosen knurled screw and turn inner part against crankshaft until oil seal is pulled out.
- Clamp flats of oil seal extractor in vise. Remove oil seal with pliers.
- Clean contact surface and sealing surface.

Installing

NOTE:

- **Do not oil sealing lip of oil seal.**

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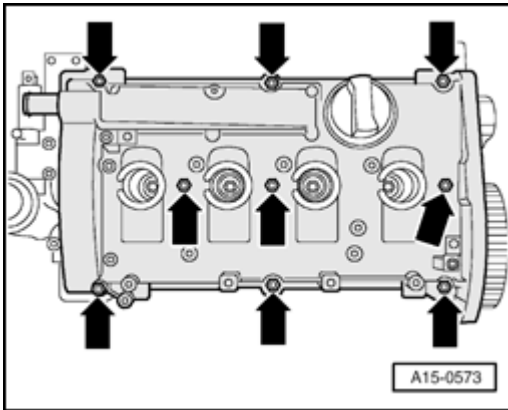


Fig. 154: Cylinder Head Cover Nuts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen nuts - **arrows** - on cylinder head cover and remove cylinder head cover.

Installing

Install in reverse order, paying attention to the following:

NOTE:

- Replace gaskets and sealing rings.
- Replace cylinder head cover gaskets if damaged.

- First tighten inner nuts for cylinder head cover, then tighten outer nuts in diagonal sequence.
- Ensure that top section of toothed belt guard is seated correctly.

Tightening torques

Component	Nm
Cylinder head cover to cylinder head	10
Crankcase breather line to cylinder head cover	10
Secondary air line to cylinder head cover	10
Hose clamps	2

Cylinder head, removing

Conditions

- Engine in vehicle.
- Lock carrier in service position --> **Lock carrier, moving to service position.**

NOTE:

- All cable ties unfastened or cut open on removal are to be re-attached in same position on installation.

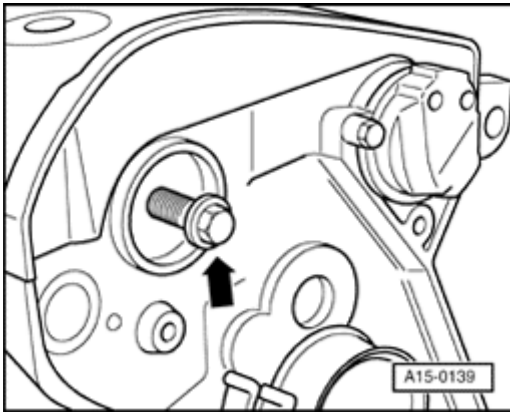


Fig. 180: Camshaft Gear Retaining Bolt Installed Into Camshaft To Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- To guide oil seal extractor, screw bolt for camshaft sprocket - **arrow** - into camshaft as far as it will go by hand.
- Remove inner part of oil seal extractor 2085 two turns (approx. 3 mm) out of outer part and lock with knurled screw.

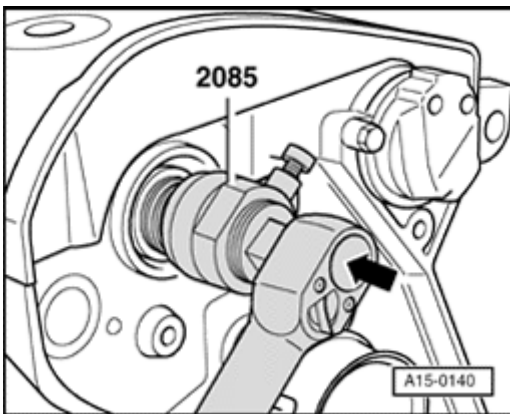


Fig. 181: Positioning And Screwing Bolt Into Oil Seal As Far As Possible With Forced Pressure
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lubricate threaded head of oil seal extractor 2085 , place in position and exerting firm pressure screw as far as possible into oil seal.
- Loosen knurled screw and turn inner part against camshaft until oil seal is pulled out.
- Clamp flats of oil seal extractor in vise. Remove oil seal with pliers.

Installing

NOTE:

- **Do not oil sealing lip of oil seal.**

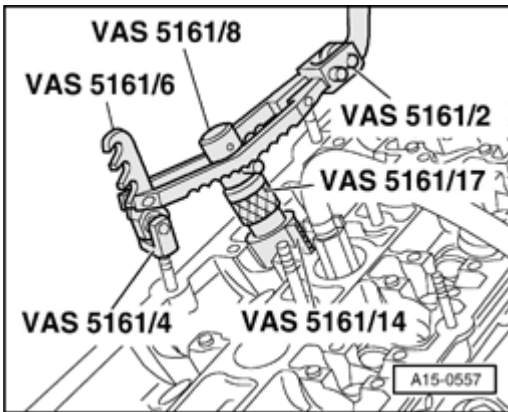


Fig. 215: Screwing Snap-In Device VAS5161/6 With Attaching Fork VAS5161/4 Onto Stud On Cylinder Head

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw snap-in device VAS5161/6 with attaching fork VAS5161/4 onto stud on cylinder head.
- Push guide bushing VAS5161/14 as far as it will go into valve lifter guide on valve to be removed.
- Installed position: Checkered areas must be at right angle to direction of travel
- Push knurled spacer ring VAS5161/17 onto cartridge VAS5161/8.
- Push cartridge into guide bushing.
- Attach pressure fork VAS5161/2 to snap-in device VAS5161/6 and press cartridge downward.
- Simultaneously, turn knurled screw of cartridge clockwise until ends engage in valve keepers.
- Move knurled screw back and forth slightly so that valve keepers are pressed apart and taken up into cartridge.
- Release pressure fork.
- Remove cartridge with spacer ring, guide bushing, valve head and valve spring.

Intake side

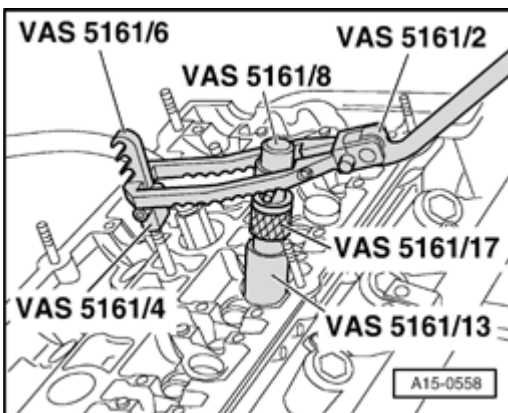


Fig. 216: Releasing Pressure Fork

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15 - Suction line

- Clean strainer if soiled

16 - Baffle plate

17 - 16 Nm

18 - 15 Nm

- Tighten in stages and diagonally
- Note tightening sequence *Install oil pan immediately and tighten bolts in sequence shown:* under **Installing**

19 - 40 Nm

20 - Sealing ring

- Replace

21 - Oil drain plug, 30 Nm

22 - Gasket

- Always replace

23 - Oil return line

- From turbocharger

24 - 10 Nm

Oil spray jet and pressure relief valve

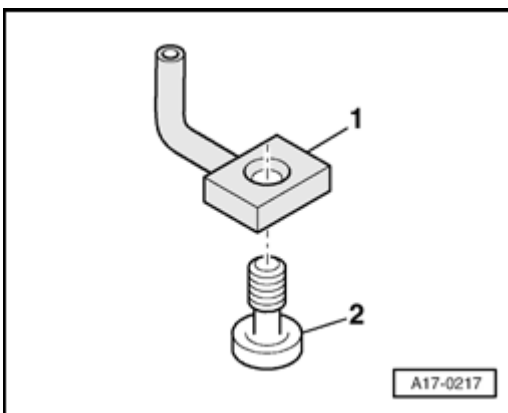


Fig. 235: Oil Spray Jet And Pressure Relief Valve
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- Switching point of oil pressure switch can be reached when engine is cranked on starter motor, so watch tester and LED while starting engine.

Black oil pressure switch

- LED should light up at 1.2 to 1.6 bar

If LED does not light up:

- Replace oil pressure switch.

Checking oil pressure

- Disconnect wire from oil pressure switch.

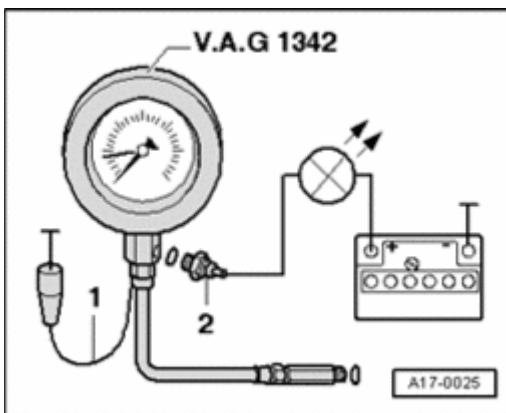


Fig. 265: Connecting Oil Pressure Tester V.A.G 1342 With Adapter V.A.G 1342/14 To Bore For Oil Pressure Switch

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove oil pressure switch and screw in oil pressure tester VAG1342.
- Screw oil pressure switch - 2 - into VAG1342.
- Start engine (engine oil temperature approx. 80 °C).
- Oil pressure at idling speed: 1.0 bar
- Oil pressure at 3000 RPM: 3.5 to 4.5 bar

If readings do not match specifications:

- Pressure relief valve or oil pump faulty, replace oil pump --> **Oil pump, removing and installing.**

Engine oil

The vehicle is filled at the factory with a high-quality multi-grade oil which can be used all year round except in extremely cold climates.

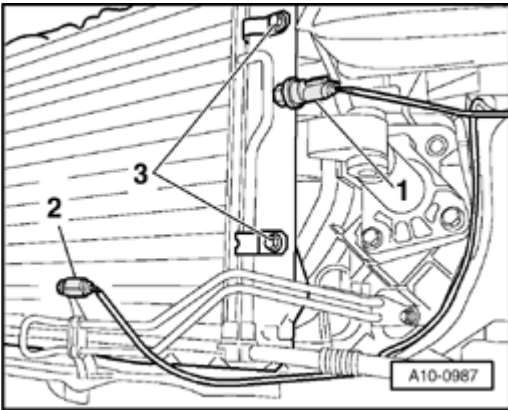


Fig. 277: Unbolting Condenser From Radiator

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt condenser - **arrows** - from radiator.

NOTE:

- To prevent damage to condenser and refrigerant lines/hoses ensure that lines and hoses are not stretched, kinked or bent.

- Carefully swivel condenser downward and set down.

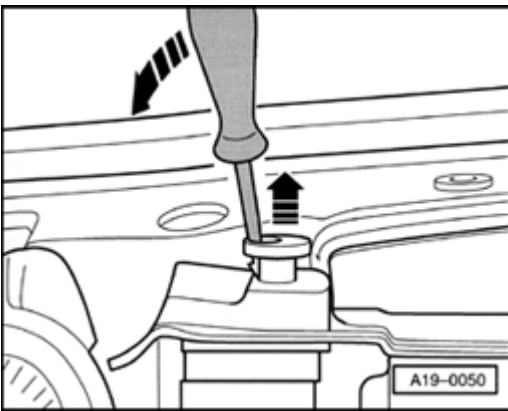


Fig. 278: Releasing Two Retaining Bolts For Radiator And Pulling Out Upward

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release two retaining bolts for radiator and pull out upward - **arrows** -.
- Swivel radiator forward out of lock carrier and lift out.

Installing

Install in reverse order, paying attention to the following:

- Fill coolant system --> **Cooling system, draining and filling.**
- Install front bumper: -->
 - **63 BUMPER**

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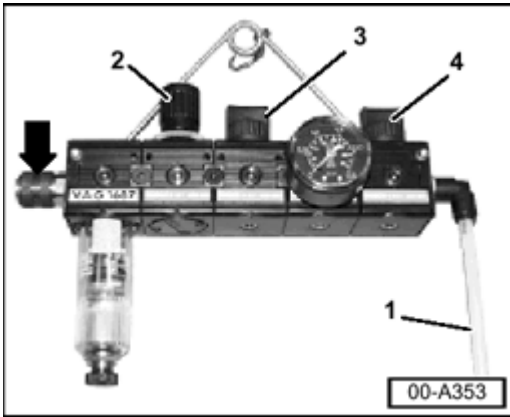


Fig. 296: Special Tool VAG1687 Charge Air System Tester Preliminary Set-Up
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Back off pressure regulator knob - **2** - of VAG1687 fully to protect gauge when shop air supply is applied to assembly.
- Close valve - **3** - before gauge.
- Close valve - **4** - after gauge.

The shop air supply line will later be attached to the inlet of VAG1687.

- Remove female fitting from tester - **arrow** - and install an appropriate "male" air fitting that will connect to your shop air supply line (--> WARNING!).

WARNING: Use only approved air fittings to adapt shop air supply line to VAG 1687 tester.

Special tool VAG 1687/1 pressure adapter, installing (1.8L Turbo)

- Separate intake hose from Mass Air Flow (MAF) sensor assembly.

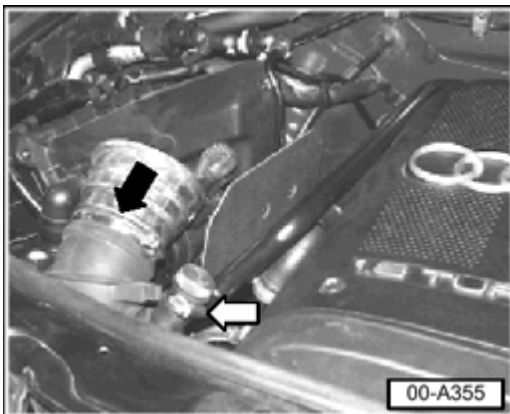


Fig. 297: Special Tool VAG 1687/1 Pressure Adapter, Installing (1.8L Turbo)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Fig. 307: Connect Test Hose To Valve Connection**Courtesy of VOLKSWAGEN UNITED STATES, INC.**

- Connect test hose to valve connection marked with - **arrow** -.
- Start Output Diagnostic Test Mode and actuate Recirculating valve for turbocharger N249.

Indicated on display

Output Diagnostic Test Mode -->
Recirculating valve for turbocharger -N249

- Valve must click...
- ..and must open and close (can be checked by blowing into test hose).

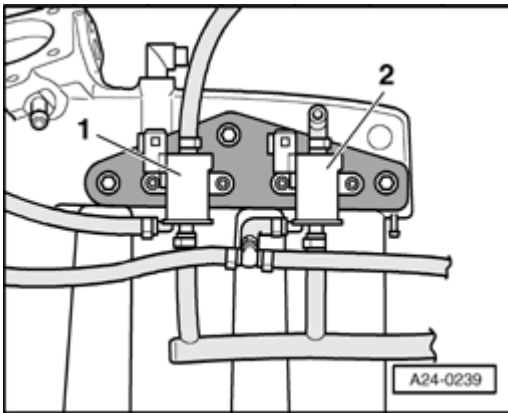
If valve does not click:

- Check internal resistance of valve.

If valve does not open or close properly:

- Replace Recirculating valve for turbocharger N249.

Checking internal resistance

**Fig. 308: Identifying Secondary Air Injection (AIR) Solenoid Valve -N112-****Courtesy of VOLKSWAGEN UNITED STATES, INC.**

- Disconnect connector from Recirculating valve for turbocharger N249- - **1** -.

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen securing bolts of tensioning roller for ribbed belt of air conditioning compressor - **arrows** - , loosen ribbed belt and remove.

CAUTION: Air conditioner refrigerant circuit must not be opened.

- Remove air conditioning compressor from bracket and secure to body with wire.

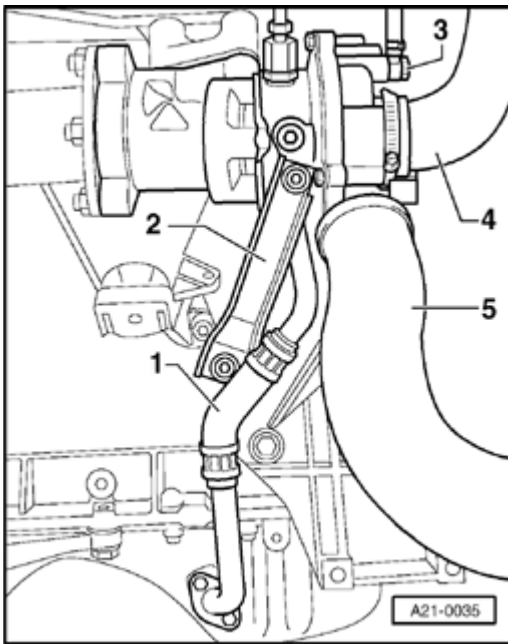


Fig. 330: Identifying Turbocharger Bracket, Oil Return Line, Air Hoses & Banjo Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt turbocharger bracket - **2** -.
- Unbolt oil return line - **1** - from turbocharger and move it clear to one side.
- Remove air hoses - **4** - and - **5** - from turbocharger.
- Unscrew - **3** - for pressure line.

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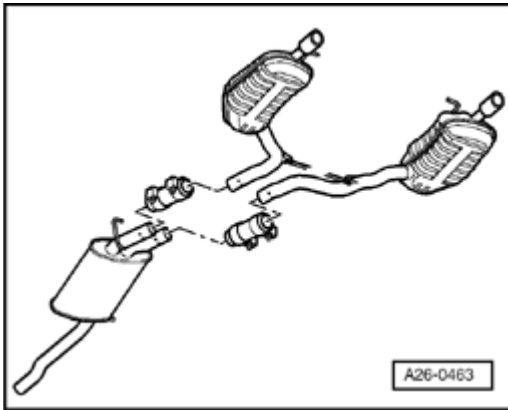


Fig. 350: Position Center Of Clamp Strap Over Saw-Cut
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- When installing, position center of clamp strap over saw-cut.
- Installed position of clamp **Installed position of rear clamps**
- Align exhaust system stress-free --> **Exhaust system - vehicles with front wheel drive, aligning stress-free.**
- Tighten bolted connections on clamp evenly to 40 Nm.

Vehicles with all wheel drive

- Cut through exhaust pipe squarely using body saw, e.g. VAG1523A , at position indicated by punch marks.

CAUTION: Wear safety goggles.

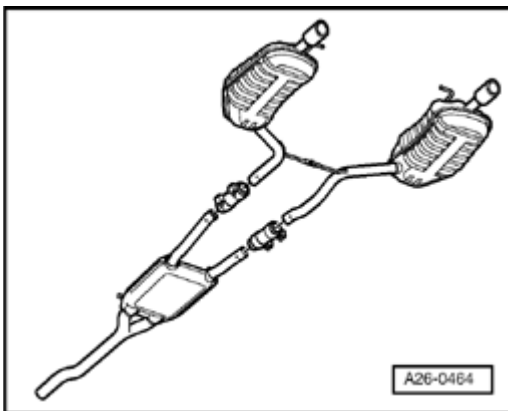


Fig. 351: Positioning Center Of Clamp Strap Over Saw-Cut
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- When installing, position center of clamp strap over saw-cut.

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Fig. 393: Identifying 2-Pin Electrical Connector & Terminals

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect voltage tester VAG1527B to contact 1 (positive) and 2 of connector.
- Start output Diagnostic Test Mode and actuate Secondary Air Injection (AIR) solenoid valve N112.
- LED must flash

If LED does not flash or if it is permanently lit:

- Connect test box VAG1598/31 to engine control module wiring harness. Engine control module must not be connected. --> **24 - MULTIPOINT FUEL INJECTION (MPI)**

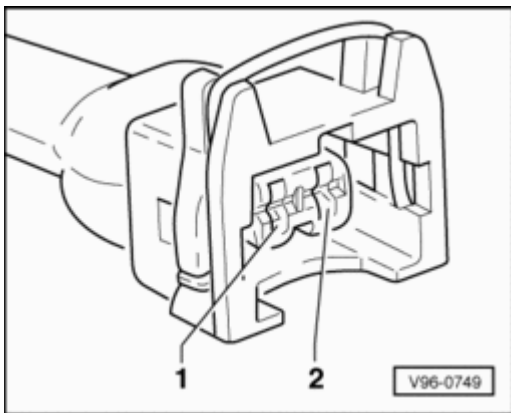


Fig. 394: Identifying 2-Pin Electrical Connector & Terminals

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check for open circuit and short to Ground/positive in following wiring connection:

Connector contact	Test box VAG1598/31 socket
2	9

- If necessary, eliminate open circuit/short circuit.

If wiring is OK:

- Replace engine control module.

Secondary Air Injection (AIR) pump relay J299 and Secondary Air Injection (AIR) pump motor V101 , checking