



Diesel Direct Fuel Injection System, servicing

The control module for Diesel Direct fuel injection system is equipped with a DTC memory. Before and after repairs or adjustments, the DTC memory must be checked ⇒ [23-2, Engine control module DTC memory, checking and erasing](#) .

Observe the safety precautions ⇒ [23-1, Safety precautions](#) .

Observe the rules for cleanliness ⇒ [23-1, Rules for cleanliness](#) .

Intake manifold with motor for intake flap, assembly overview ⇒ [23-1, Intake manifold with motor for intake flap, assembly overview](#) .

Air filter, assembly overview ⇒ [23-1, Air filter, assembly overview](#) .

Pump-Injector unit, assembly overview ⇒ [23-1, Pump-Injector unit, assembly overview](#) .

Safety precautions

Warning!

When doing any repair work, especially in the engine compartment, pay attention to the following due to clearance issues:

- ***Route all the various lines (e.g. for fuel, hydraulics, EVAP system, coolant, refrigerant, brake fluid and vacuum lines and hoses) and electrical wiring so that the original positions are restored.***
- ***Ensure sufficient clearance to all moving or hot components.***

Observe the following if test and measuring instruments are required during a test drive:

- Test and measuring instruments must be secured to rear seat and operated by a 2nd person from this location.

If test and measuring instruments are operated from the front passenger seat and the vehicle is involved in an

accident, there is a possibility that the person sitting in this seat may receive serious injuries when the airbag is triggered.

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

- Only disconnect and reconnect wires for glow plug and fuel injection systems, including test leads, when ignition is turned off.
- If engine is to be cranked at starting RPM without starting, e.g. for a compression test, separate the connection for Pump-Injector unit at cylinder head.
- Obtain radio code for radios with anti-theft coding before disconnecting battery.
- Always switch ignition off before disconnecting or connecting battery, as failure to do so may damage the control module for Diesel Direct Fuel Injection System.

Rules for cleanliness

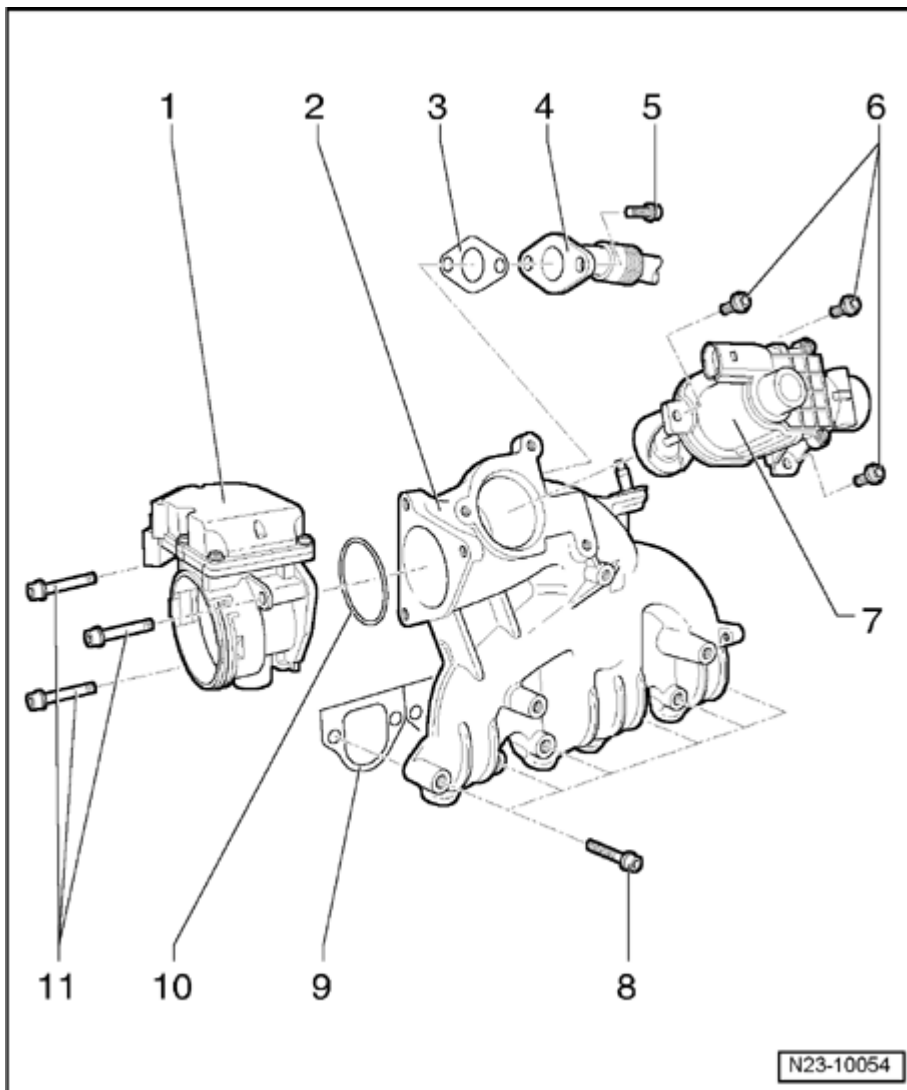
When working on the fuel supply/injection system, pay careful attention to the following "6 rules" :

- Thoroughly clean all connections and the surrounding area before disconnecting.
- Place parts that have been removed on a clean surface and cover them. Do not use fluffy cloths!
- Carefully cover over opened components or seal, if repairs are not performed immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation. Do not use parts that have been stored loose (e.g. in tool boxes etc.).
- When the system is open: Avoid working with compressed air if possible. Do not move vehicle unless absolutely necessary.

- Do not let diesel fuel flow onto coolant hoses. If necessary, the hoses must be cleaned again immediately. Replace corroded hoses.

Intake manifold with motor for intake flap, assembly overview

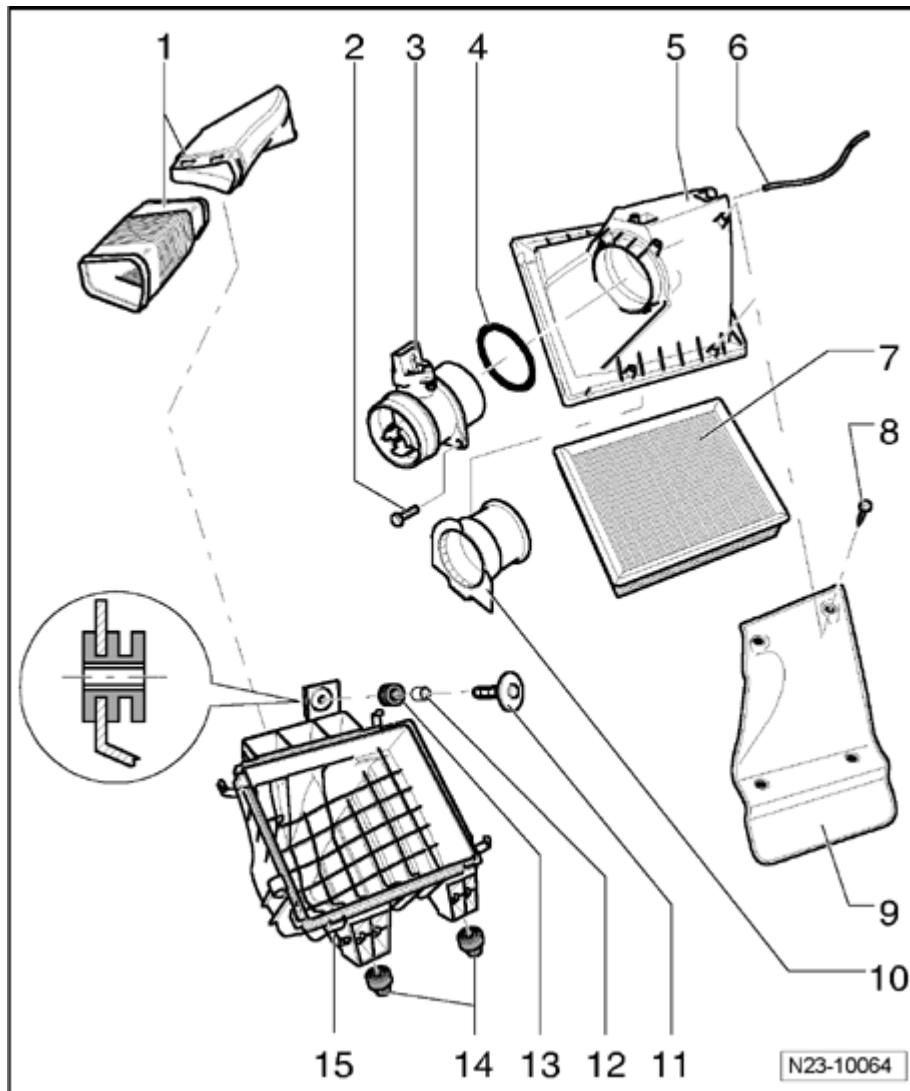
When the engine is switched off, the intake manifold flap closes for approx. 3 seconds and then opens again. This reduces the stop jolt.



- Intake Flap Motor V157
- Intake manifold
- Seal
 - Replace
- Connecting pipe

- For Exhaust Gas Recirculation (EGR) system
- 25 Nm
- 10 Nm
- **EGR Potentiometer G212**
 - Removing and installing ⇒ [26-2, Exhaust Gas Recirculation \(EGR\), assembly overview](#)
- 25 Nm
- **Seal**
 - Replace
- **Oil seal**
 - Replace
- 10 Nm

Air filter, assembly overview



- **Air ducts**

- To lock carrier

- **3.5 Nm**

- **Mass Air Flow (MAF) Sensor G70**

- **Oil seal**

- **Air filter upper part**

- **Vacuum hose**

- To Wastegate Bypass
Regulator Valve N75

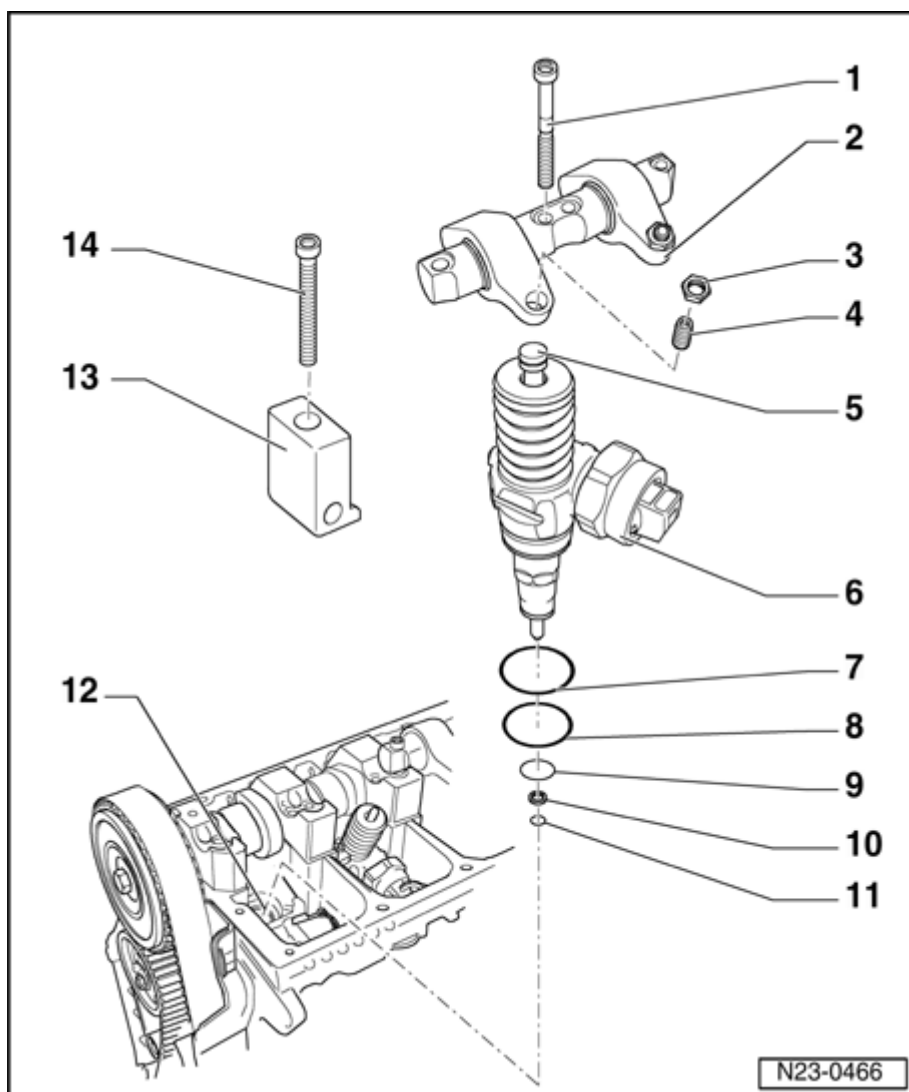
- **Filter element**

- **2.5 Nm**

- Heat shield
- Connection
- 10 Nm
- Spacing sleeve
- Rubber grommet
- Rubber buffer
- Air filter lower part

Pump-Injector unit, assembly overview

- Observe rules of cleanliness ⇒ [20-1, Rules for cleanliness](#)
- Always replace sealing rings and O-rings

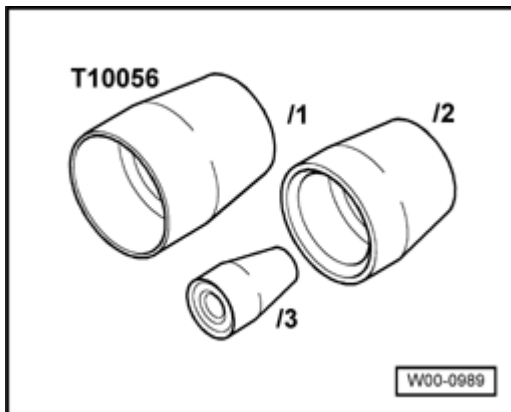


- **20 Nm plus an additional $\frac{1}{4}$ turn (90 °)**
 - Replace
- **Rocker lever shaft**
 - With rocker lever
 - Removing and installing ⇒ [23-1, Pump-Injector unit, removing and installing](#) , Pump-Injector unit, removing and installing
- **Lock nut, 30 Nm**
- **Adjustment screw**
 - Replace
- **Ball pin**
 - Replace
- **Pump-Injector unit**
 - Removing and installing ⇒ [23-1, Pump-Injector unit, removing and installing](#)
- **O-ring**
 - Replacing ⇒ [23-1, O-ring for Pump-Injector unit, removing and installing](#) , O-ring for Pump-Injector unit, removing and installing
- **O-ring**
 - Replacing ⇒ [23-1, O-ring for Pump-Injector unit, removing and installing](#) , O-ring for Pump-Injector unit, removing and installing
- **O-ring**

- Replacing ⇒ [23-1, O-ring for Pump-Injector unit, removing and installing](#) , O-ring for Pump-Injector unit, removing and installing
- **Heat protection seal**
 - Replace
- **Circlip**
- **Cylinder head**
- **Tension block**
- **12 Nm plus an additional $\frac{3}{4}$ turn (270 °)**
 - Replace

O-ring for Pump-Injector unit, removing and installing

Special tools, testers and auxiliary items required



- Assembly sleeves T10056

Removing

- Pry old O-rings off extremely carefully from Pump-Injector unit.

Note:

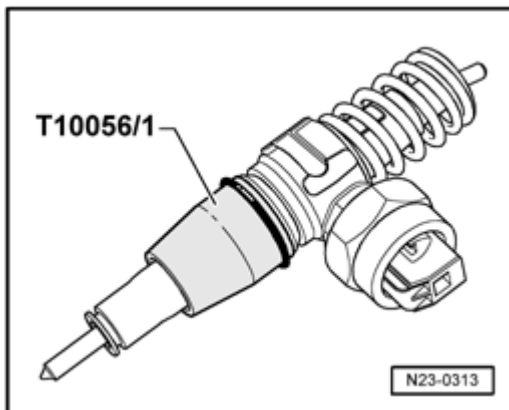
- *It is extremely important to ensure that no burrs develop at the O-ring seat.*

Installing

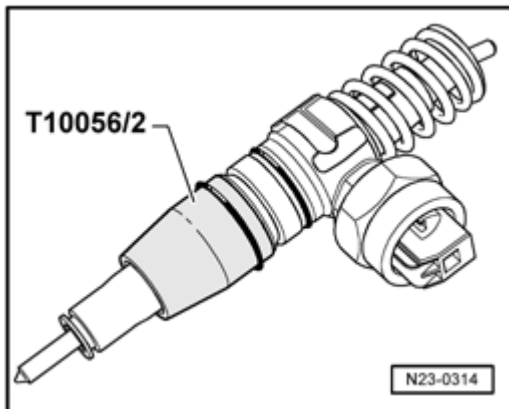
Note:

- *Always use the assembly sleeves when installing the O-rings. Not using them may cause the O-rings to be damaged during installation.*
- *There has been a gradual introduction of O-rings without differing color identification. Make sure the O-rings are correctly positioned in the grooves: the ring size decreases toward the nozzle.*
- *Avoid a rolling motion when pushing the O-rings on. The O-rings must not be twisted when seated in the Pump-Injector unit.*

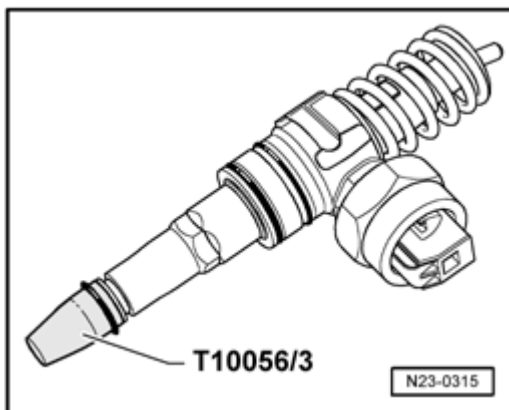
- Pull off heat protection seal together with securing ring.
- Thoroughly clean seating surfaces for O-rings on Pump-Injector unit.



- Press assembly sleeve T10056/1 onto Pump-Injector unit up to stop.
- Carefully push upper, thicker O-ring onto assembly sleeve and into seat of Pump-Injector unit.
- Remove assembly sleeve.

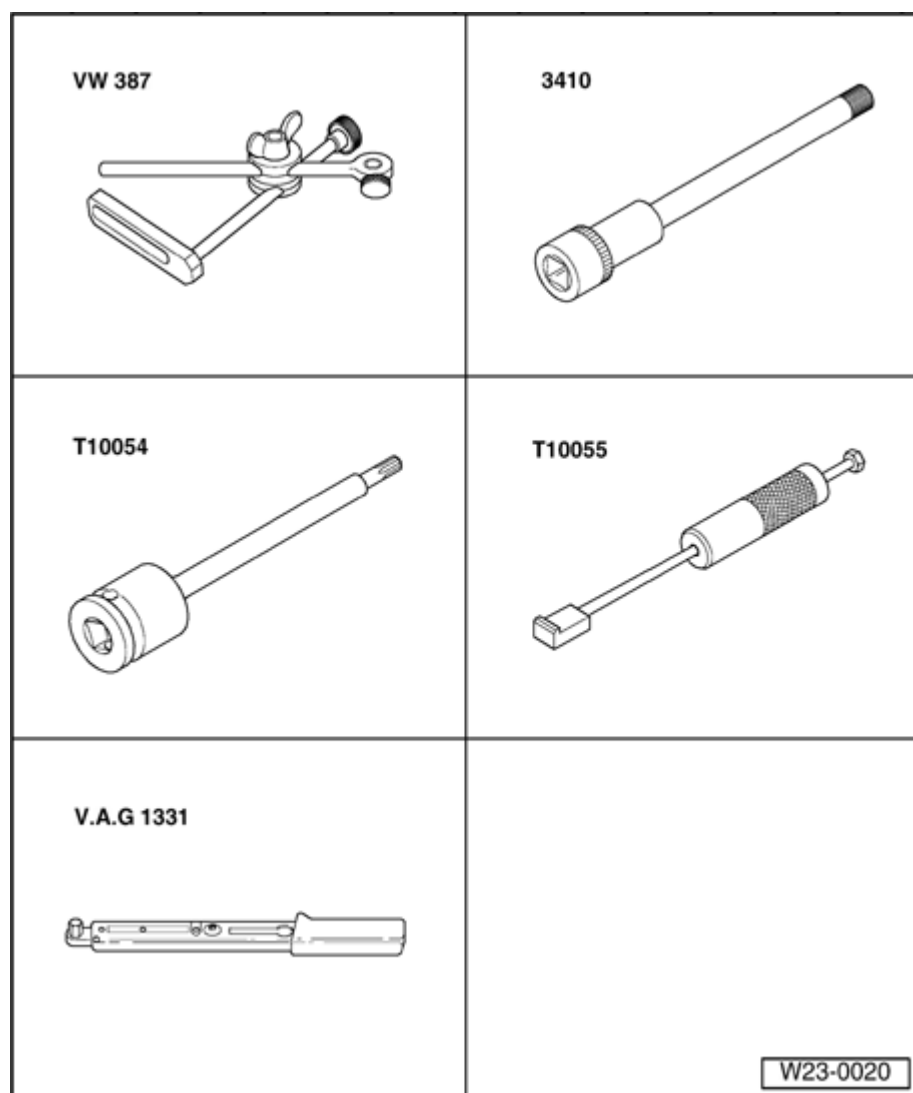


- Press assembly sleeve T10056/2 onto Pump-Injector unit up to stop.
- Carefully push middle, thinner O-ring onto assembly sleeve and into seat of Pump-Injector unit.
- Remove assembly sleeve.



- Press assembly sleeve T10056/3 onto Pump-Injector unit up to stop.
- Carefully push lower O-ring onto assembly sleeve and into seat of Pump-Injector unit.
- Remove assembly sleeve.
- Push on a new heat protection seal together with securing ring.

Pump-Injector unit, removing and installing



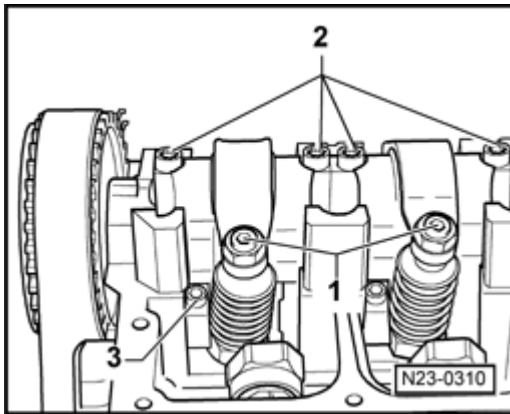
Special tools, testers and auxiliary items required

- Dial gauge holder VW 387
- Hex ball socket 3410
- Hex ball socket T10054
- Removal tool T10055
- Torque wrench (5 to 50 Nm) V.A.G 1331

Removing

- Remove upper toothed belt guard.

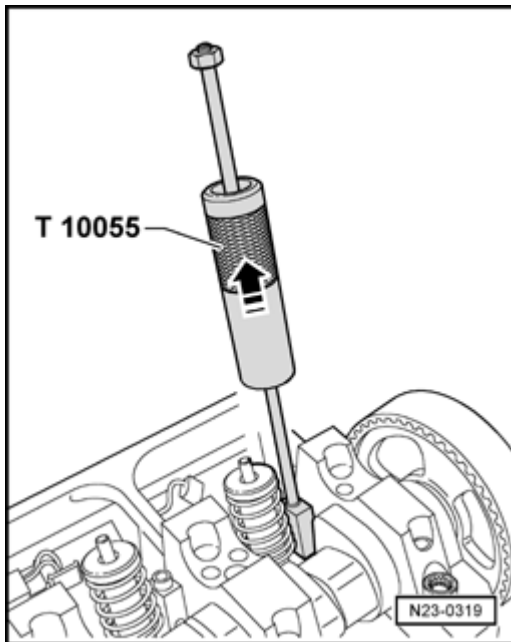
- Remove cylinder head cover ⇒ [Item - 12 -](#).
- Turn crankshaft until cam lobe pair for respective Pump-Injector unit point upward equally.



- Loosen lock nut of adjustment screw - **1** - and remove adjustment screw.
- Loosen bolts - **2** - for rocker lever shaft from outside toward inside, using socket insert 3410 and remove rocker lever shaft.
- Loosen bolt - **3** - for tension block, using socket insert T10054 and remove tension block.
- Remove connector from Pump-Injector unit. Carefully slide a small screwdriver down center of housing until securing tab is released and connector can be pulled free. To avoid canting, support opposite side of connector with light finger pressure.

Note:

- *Observe the cylinder allocation of the Pump-Injector units.*



- Set removal tool T10055 in place of tension block into side slit of Pump-Injector unit.

- Pull Pump-Injector unit upward and out of its seat in cylinder head through careful tapping movements.

Installing

Note:

- *For every procedure that requires adjustment of the Pump-Injector unit, the adjustment screw in the rocker lever and the ball pin of the pump-injector unit must be replaced.*
- *New Pump-Injector units come equipped with O-rings and heat protection seal.*

- Replace Pump-Injector O-rings and heat protection seal
⇒ [23-1, O-ring for Pump-Injector unit, removing and installing](#) .

- Before installing Pump-Injector unit, verify that sealing rings, heat protection seal and securing ring are correctly installed in their seats.

Note:

- *The seals must not be twisted.*

- Lubricate seals and insert Pump-Injector unit with extreme caution into its seat in cylinder head.

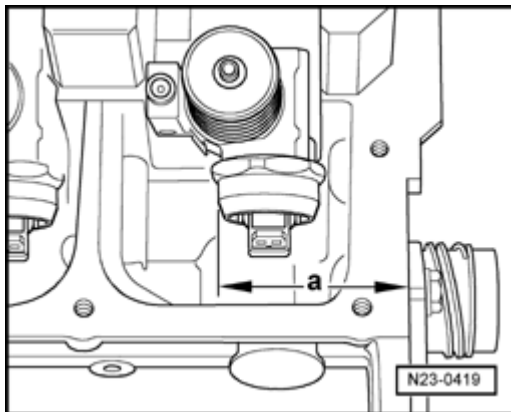
- By applying uniform pressure, push Pump-Injector unit into cylinder head seat up to limit stop.
- Set tension block into side slit of Pump-Injector unit.

Note:

- *If the Pump-Injector unit is not positioned at a right angle to the tension block, the bolt can loosen and thereby result in damages to the Pump-Injector unit and cylinder head.*

Align the pump-injector unit as follows:

- Screw new bolt into tension block just far enough so that Pump-Injector unit can still be slightly turned.
- Now, align Pump-Injector unit at a right angle to bearing blocks of camshaft.

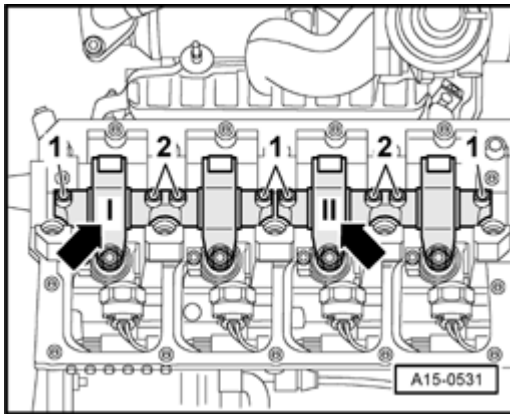


- Using a caliper gauge (measuring range at least 400 mm), check dimension "a" from outer edge of cylinder head to round surface of pump-injector unit.

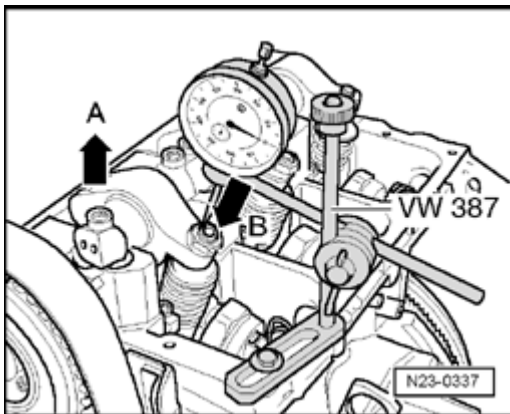
Cylinder	Dimension "a"
1	333.0 ± 0.8 mm
2	245.0 ± 0.8 mm
3	153.6 ± 0.8 mm
4	65.6 ± 0.8 mm

- Align Pump-Injector unit, if necessary, and fasten bolt as follows: 12 Nm plus 270 ° ($\frac{3}{4}$ turn). (Turning further may be performed in several steps.)

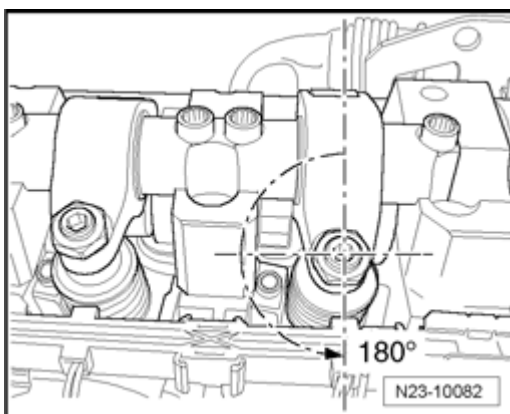
- Set rocker lever shaft in place and fasten new bolts as follows:



- First, fasten inner bolts - **2** - , then outer bolts - **1** - uniformly hand-tight. Then, tighten in same order to 20 Nm plus 90° ($\frac{1}{4}$ turn) uniformly.



- Place a dial gauge as shown onto adjustment screw of Pump-Injector unit.
- Turn crankshaft in engine running direction until roller of rocker lever is positioned on tip of cam lobe. Roller side - **arrow A** - is positioned at highest point, dial gauge - **arrow B** - is positioned at lowest point.
- Remove dial gauge.
- Turn adjustment screw in rocker lever until considerable resistance is felt (Pump-Injector unit is on limit stop).



- Turn adjustment screw 180 ° back from limit stop.
- Hold adjustment screw in this position and fasten lock nut to 30 Nm.
- Connect connector to Pump-Injector unit.
- Install cylinder head cover ⇒ [Item - 1 -](#).
- Install toothed belt guard.



Engine control module

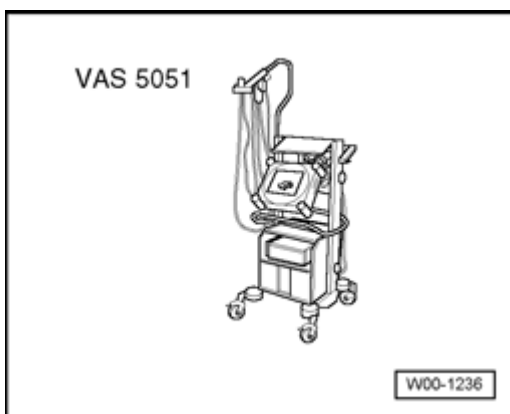
Diagnostic Trouble Code (DTC) memory of Engine Control Module (ECM), checking and erasing ⇒ [23-2, Engine control module DTC memory, checking and erasing](#) .

Adapting functions and components ⇒ [23-2, Adapting functions and components](#) .

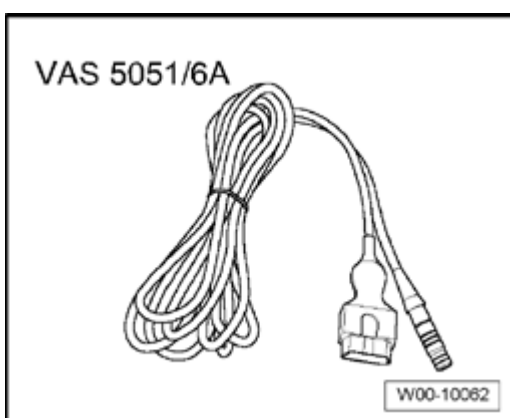
Engine Control Module (ECM), removing and installing ⇒ [23-2, Engine Control Module \(ECM\), removing and installing](#) .

Engine control module DTC memory, checking and erasing

Special tools, testers and auxiliary items required



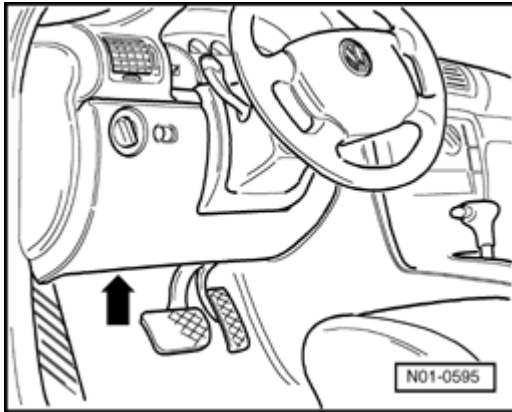
- Vehicle diagnosis, testing, and information system VAS 5051



- Diagnostic cable VAS 5051/6A

Work sequence

- Connect vehicle diagnosis, testing and information system VAS 5051 as follows:



- Connect diagnostic cable VAS 5051/6A connector to Data Link Connector (DLC) - **arrow** - .

- Start engine and run at idle speed.

Only when engine does not start:

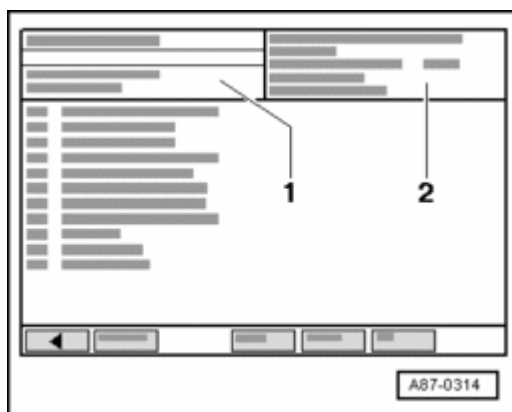
- Switch ignition on.

Selecting operating mode

- Press button on display for "Vehicle On Board Diagnostic (OBD)" .

Selecting vehicle system

- Press button "01 - Engine electronics" on display.



The control module identification with code - **2** - as well as chassis number and immobilizer identification number will be indicated on the display.

Note:

- A print-out is available. Press the *Print* button if required.

Selecting diagnosis function

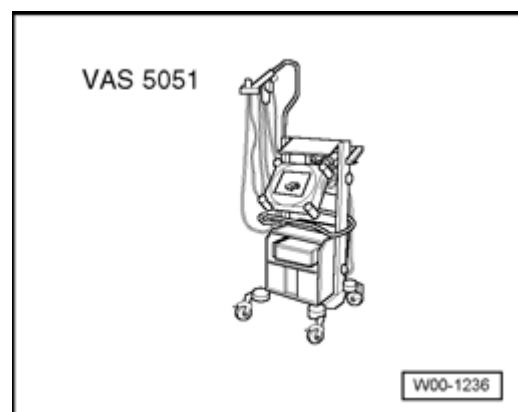
- Press button "02 - Check DTC memory" on display.
- If no malfunction is stored in engine control module, "0 DTC(s) detected" is displayed.

If malfunctions are stored in the engine control module, these are shown one below another on the display

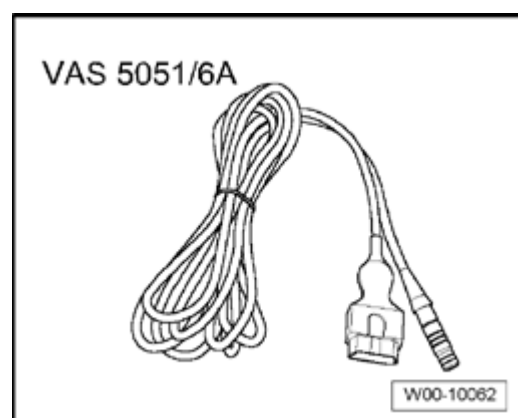
- Press ← key.
- Press button "05 - Erase DTC memory" on display.
- Press function "06 - End output" .

Adapting functions and components

Special tools, testers and auxiliary items required



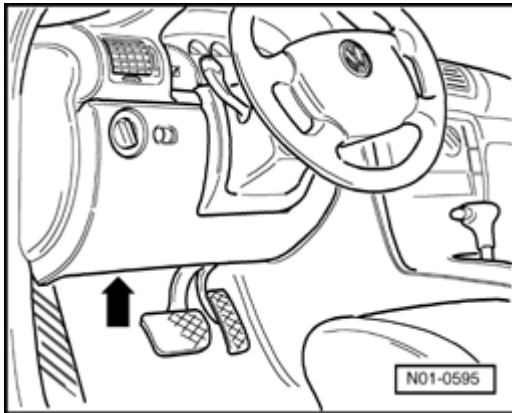
- Vehicle diagnosis, testing, and information system VAS 5051



- Diagnostic cable VAS 5051/6A

Work sequence

- Connect vehicle diagnosis, testing and information system VAS 5051 as follows:



- Connect diagnostic cable VAS 5051/6A connector to Data Link Connector (DLC) - **arrow** - .

On vehicle diagnosis, testing, and information system VAS 5051 , select "guided fault finding" .

Once all control modules have been checked:

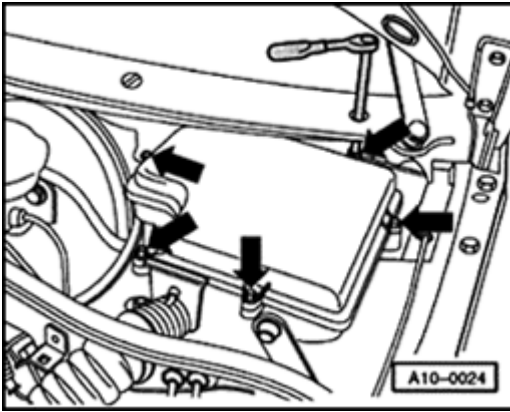
- Press "Go to" button
- Select "Function/component selection"
- Select "Drivetrain"
- Select "Engine code"
- Select "01-Systems capable of On Board Diagnostic (OBD)"
- Select "engine management system"
- Select "Functions"
- Select "Function or component"

Engine Control Module (ECM), removing and installing

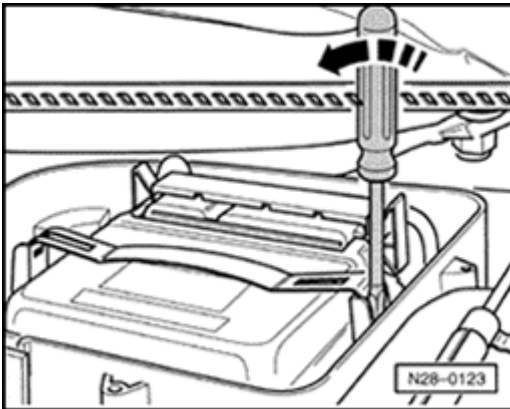
- Before removing Engine Control Module (ECM), check control module identification and coding ⇒ [23-2, Engine control module DTC memory, checking and erasing](#) , DTC memory of Engine Control Module (ECM), checking and erasing.

Work sequence

- Switch off ignition.



- Remove cover from E-box.



- Unclip retaining clip for Engine Control Module (ECM).
- Release connector from engine control module and pull off.
- Remove old control module and install new control module.
- Verify old coding and adapt new control module ⇒ [23-2, Adapting functions and components](#) , Adapting functions and components.
- Read DTC memory of new Engine Control Module (ECM) and, if necessary, erase DTC memory ⇒ [23-2, Engine control module DTC memory, checking and erasing](#) .
- Test drive vehicle.
- Check ECM DTC memory again.