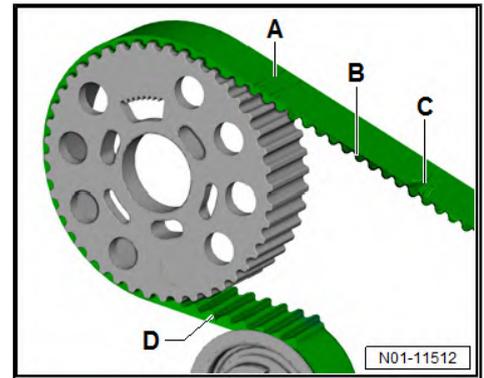




When checking condition, the following is especially to be looked for:

- ◆ -A- Cracks, cross-sectional breaks, cracks (coating)
- ◆ -B- Side contact
- ◆ -C- Fraying of cord strands
- ◆ -D- Cracks (in teeth base)
- ◆ Layer separation (toothed belt body, tensile cords)
- ◆ Surface cracks (synthetic coating)
- ◆ Traces of oil and grease



**i** Note

*If faults are found, always renew toothed belt. This can avoid breakdowns and malfunctions. The replacement of a toothed belt is a repair measure.*

#### 4.55 Camshaft drive belt: renewing (2.0 l petrol engines only)

– Procedure ⇒ Rep. gr. 15

#### 4.56 Spark plugs: renewing

- ◆ Spark plugs: renewing, engine code AXA ⇒ [page 149](#)
- ◆ Spark plugs: renewing, engine codes BDL, BKK, BDM ⇒ [page 150](#)
- ◆ Renewing spark plugs, engine codes CJK A, CJK B ⇒ [page 152](#)

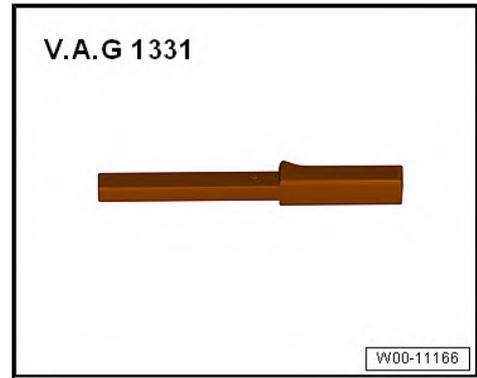
#### Special tools and workshop equipment required

- ◆ Spark plug socket and extension - 3122 B -

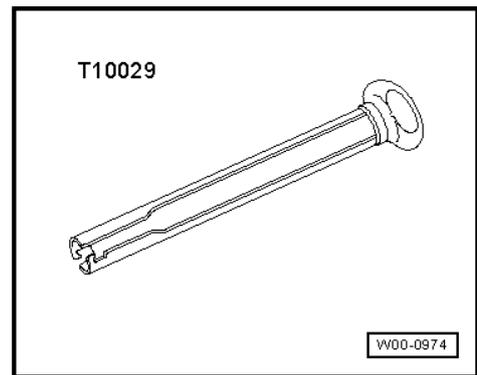




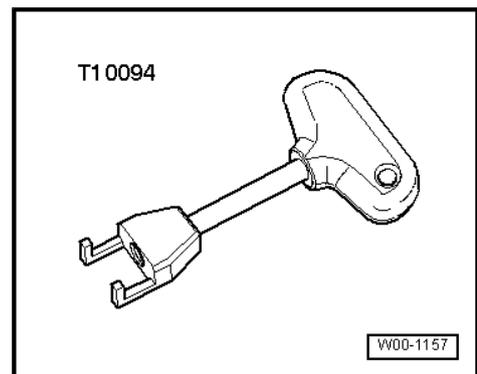
- ◆ Torque wrench - V.A.G 1331- (5-50 Nm)



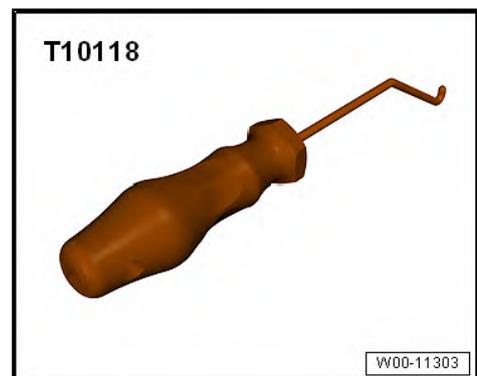
- ◆ Assembly tool - T10029 -



- ◆ Puller - T10094 -

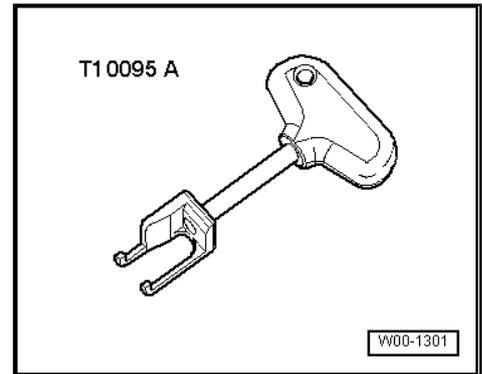


- ◆ Assembly tool - T10118-

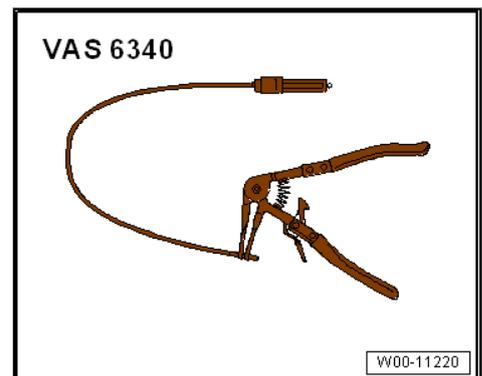




- ◆ Puller - T10095/A-



- ◆ Spring-type clip pliers - VAS 5024/A- or hose clip pliers - VAS 6340-



- ◆ Spark plug connector pliers - Hazet 1849
- ◆ Data sheets for exhaust emissions test

#### 4.56.1 Spark plugs: renewing, engine code AXA



*It is not necessary to remove the upper part of intake manifold!*

Carry out the following procedure:

##### Removing

- If fitted, remove engine cover panel ⇒ [page 103](#) .
- Detach connector injector valve for cylinder 2 - N31- and injector valve for cylinder 3 - N32- -2-.



- Pull off spark plug connector - P- -1- using assembly tool - T10029 - .

**i** Note

Use spark plug connector pliers - Hazet 1849 - for the 3rd cylinder if necessary.

- Unscrew spark plugs using spark plug socket - 3122 B- .

**Installing**

**i** Note

◆ Spark plug designation and specified torques ⇒ Ignition system, glow plug system; Rep. gr. 28

◆ Observe relevant disposal regulations.

- Firmly screw in new spark plugs using spark plug socket and extension - 3122 B- .
- Attach connectors to spark plugs by hand. They must be felt to engage.

**i** Note

Observe firing order ⇒ Ignition system, glow plug system; Rep. gr. 28 ; Test data, spark plugs

- Attach connectors for injector valve for cylinder 2 - N31- and injector valve for cylinder 3 - N32- -2-.
- Fit engine cover if there is one.

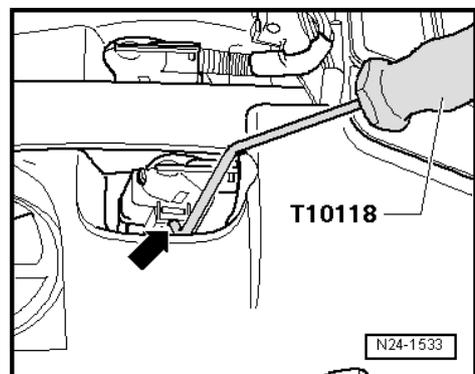
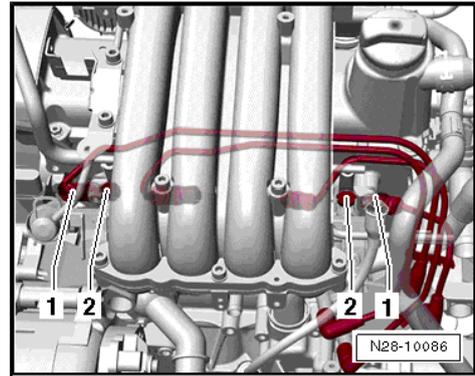
## 4.56.2 Renewing spark plugs, engine codes BDL, BKK, BDM

### Removing

- Remove engine cover panel ⇒ [page 103](#) .

Release connector lock:

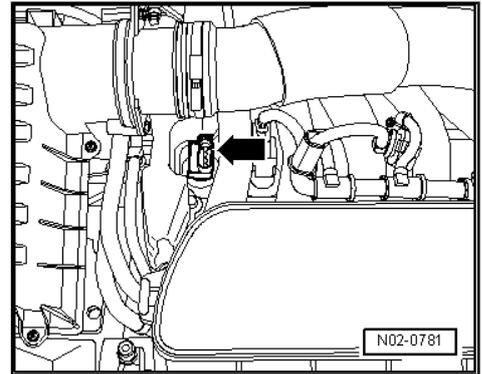
- Apply assembly tool - T10118- to connector lock -arrow- and carefully pull upwards until connector lock releases.



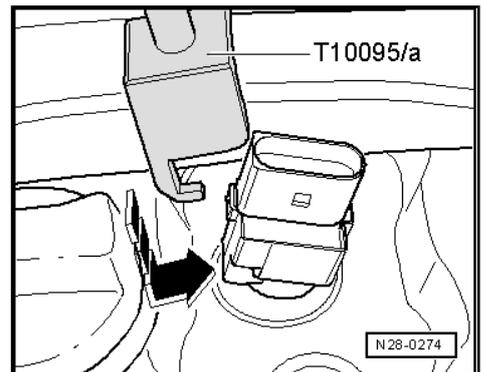


- Pull off connectors 1 to 6 for ignition coils with output stages upwards -arrow-.
- Before pulling off, note positions of ignition coils with output stages relative to connectors.

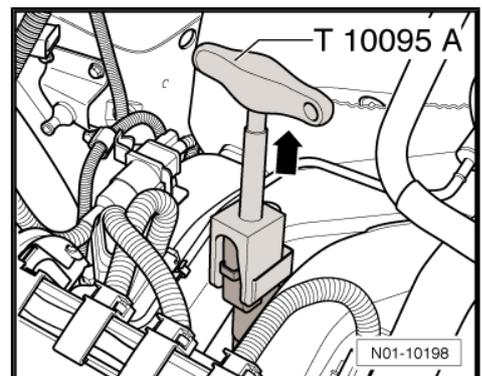
The flat side of the connector must align with the flat side of ignition coil with final output stage.



- Slide puller - T10095 A- from the flat side of the connector in -direction of arrow- onto ignition coil with final output stage.

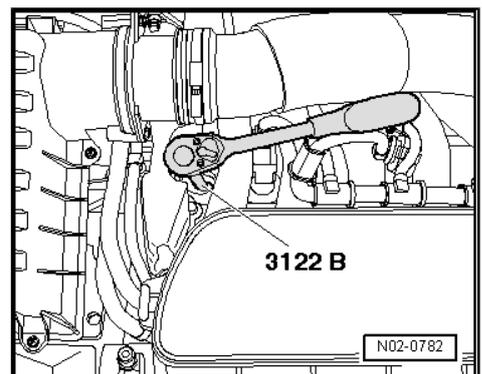


- Pull out ignition coil with final output stage upwards vertically -arrow-.



- Unscrew spark plugs using spark plug socket - 3122B- .

### Installing





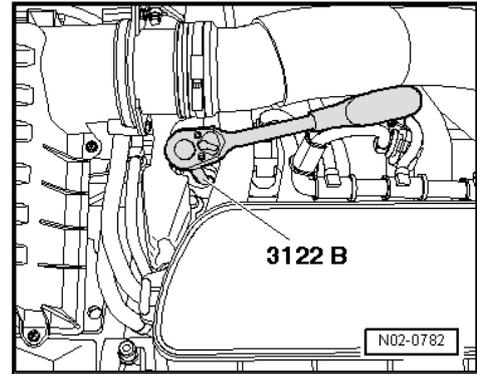
- Screw in new spark plugs using spark plug socket and extension - 3122B- .



**Note**

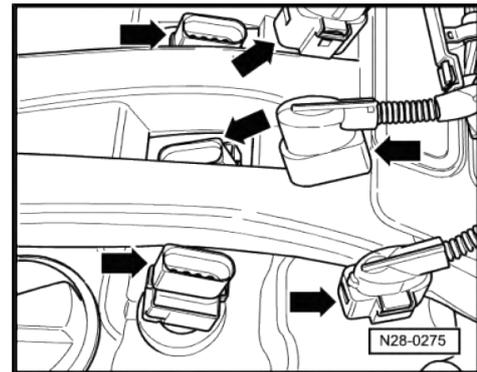
*Observe specified torque!*

- Carefully set ignition coils with final output stages onto spark plugs by hand.



The flat sides of connectors must align -arrows-.

- Attach connectors 1 to 6 again.
- Install engine cover panel.



### 4.56.3 Renewing spark plugs, engine codes CJK A, CJK B

Carry out the following procedure:

**Removing**

- If fitted, remove engine cover panel => [page 103](#) .



**Note**

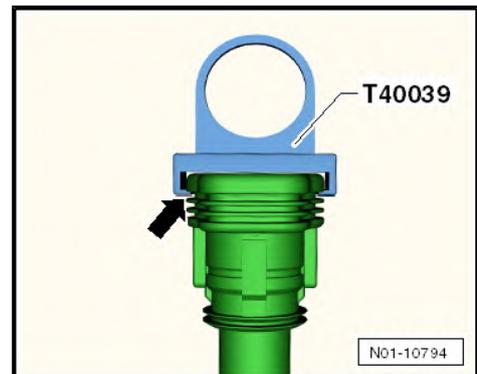
- ◆ *To pull off spark plugs, fit puller - T40039- on the top, thick »rib« -arrow- of ignition coil with final output stage.*
- ◆ *If the lower »ribs« are used, they could be damaged.*

The spark plugs are located below the ignition coils with output stages.



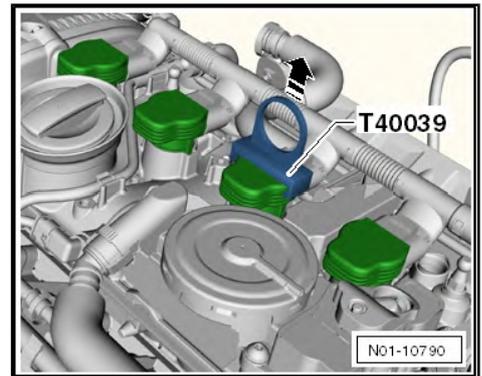
**Note**

*Note installation position of ignition coil with output stage.*

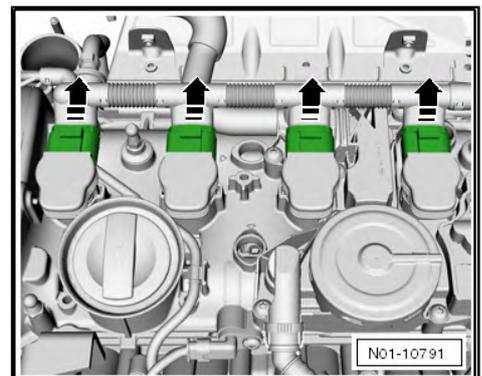




- Using puller - T40039- , pull all ignition coils with output stage approx. 30 mm out of cylinder head (direction of -arrow-).
- Push connector in direction of ignition coil with final output stage.



- Release lock on connector and pull connector off in -direction of arrow-.
- Remove ignition coil 1 with final output stage - N70- , ignition coil 2 with final output stage - N127- , ignition coil 3 with final output stage - N291- and ignition coil 4 with final output stage - N292- and screw out spark plugs with spark plug socket and extension - 3122 B - .



### Installing

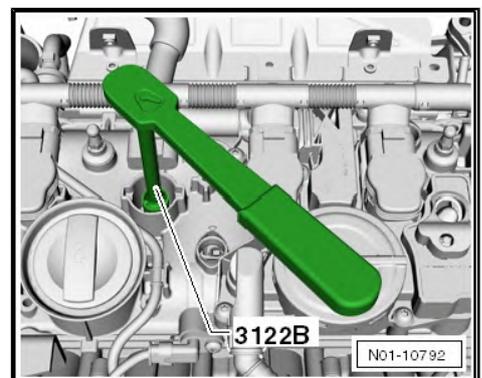
#### Note

- ◆ *Spark plug designation and torque setting => Power unit; Rep. gr. 28 ; Test data, spark plugs*
- ◆ *Observe relevant disposal regulations.*

- Screw in new spark plugs with spark plug socket and extension - 3122B- hand-tight and then tighten firmly to specified torque.

#### Note

- ◆ *When new spark plugs are fitted, it is necessary to regrease ignition coil 1 with final output stage - N70- , ignition coil 2 with final output stage - N127- , ignition coil 3 with final output stage - N291- and ignition coil 4 with final output stage - N292- with spark plug connector grease - G 052 141 A2- .*
- ◆ *It is not necessary to regrease new ignition coils with final output stage.*





- Apply a thin »bead« of spark plug connector grease - G 052 141 A2- to the circumference of the sealing hose of the ignition coil with output stage -arrow-.



#### Note

The »bead of grease «must be 1 to 2 mm thick.

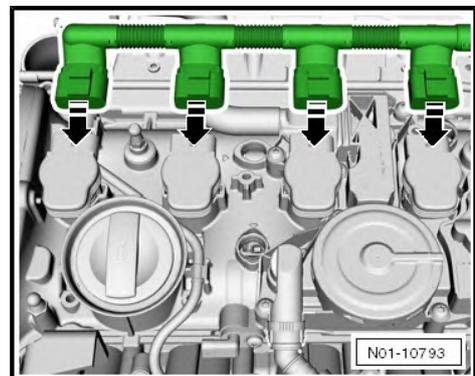
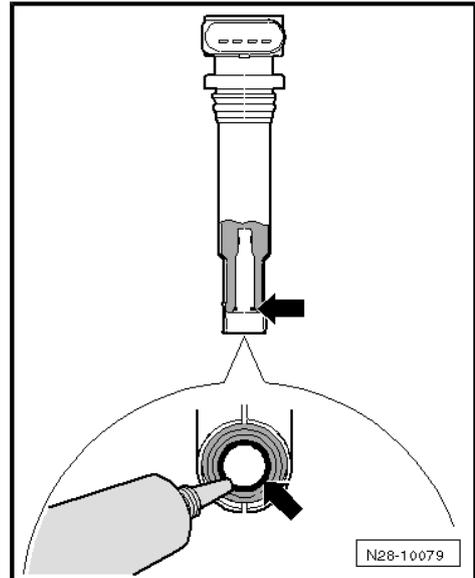
- Insert ignition coil 1 with final output stage - N70- , ignition coil 2 with final output stage - N127- , ignition coil 3 with final output stage - N291- and ignition coil 4 with final output stage - N292- into cylinder head.
- Align ignition coil 1 with final output stage - N70- , ignition coil 2 with final output stage - N127- , ignition coil 3 with final output stage - N291- and ignition coil 4 with final output stage - N292- in the relevant recesses in the cylinder head cowl.
- Fit all connectors onto ignition coils with final output stage -arrows-.
- Push ignition coils with output stages onto spark plugs by hand as far as stop.



#### Note

They must be felt to engage.

- Fit engine cover if there is one => [page 103](#) .



## 4.57 Interior monitoring and anti-tow alarm: Activate

When the interior monitoring and anti-tow alarm are deactivated by the manufacturer, this prevents the alarm system from being activated during transportation from the manufacturer to the dealership.

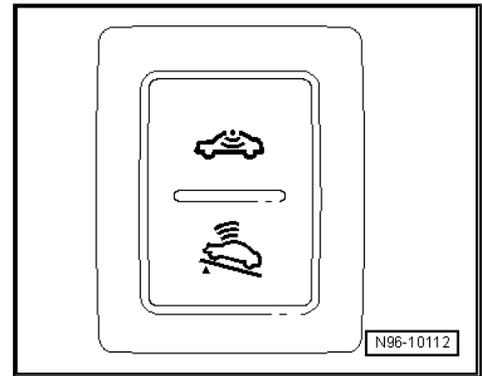
In the framework of the delivery inspection, a check must be made to see whether the "Transport mode" is still active. In this case, the interior monitoring and the anti-tow alarm must be reactivated.

Carry out the following procedure:

- Lock the vehicle (all locks in "SAFE").
- Press the top area on the switch for interior monitoring three times - E183- 3 times.



- The pushbutton for deactivating the vehicle inclination sender - E360- is used to activate interior monitoring and the anti-tow alarm.



#### 4.58 Sunroof: checking function, cleaning and greasing guide rails

Perform the following steps:

- Check function of sliding roof.
- Clean guide rails -arrows- and lubricate with grease ⇒ Electronic parts catalogue "ETKA" .



#### 4.59 Removing and installing noise insulation

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1783-





- Unscrew bolts -2-.
- If fitted, pull off noise insulation -1- in direction of -arrow-.



#### Note

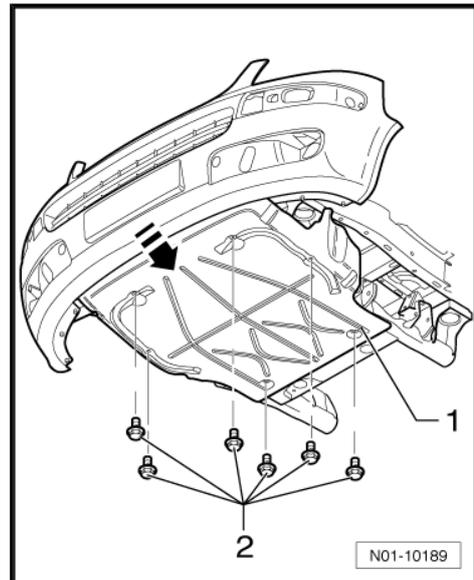
The remaining assembly steps are basically a reverse of the dismantling procedure.



#### WARNING

It is only permissible to use the bolts -2- once or, if re-use is unavoidable, they must be secured with locking fluid - D 000 600 A2- .

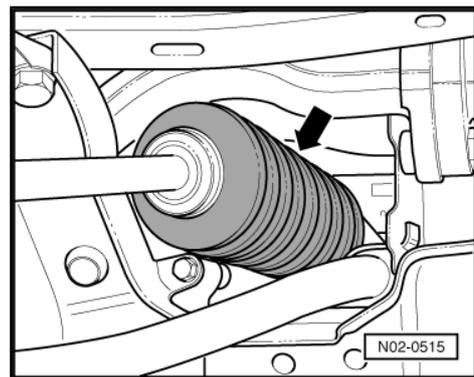
- Tighten bolts to 12 Nm torque.



### 4.60 Steering: Check bellows/boots for leaks and damage

Carry out the following procedure:

- Check bellows of steering -arrows- for leaks and damage on respective side.



### 4.61 Elastic drive coupling: Renew

- ◆ Renewing elastic drive coupling on alternator ⇒ [page 156](#)
- ◆ Renewing elastic drive coupling on air conditioner compressor ⇒ [page 156](#)

#### 4.61.1 Renewing elastic drive coupling on alternator

- Removal and installation of the torsion elastic clutch is described in Workshop Manual ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing torsion elastic clutch on alternator .

#### 4.61.2 Renewing elastic drive coupling on air conditioner compressor

- Removal and installation of the torsion elastic clutch is described in Workshop Manual ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Renewing torsion elastic clutch .

### 4.62 Freewheel: Renew

- ◆ Alternator freewheel: Renew ⇒ [page 157](#)



- ◆ Freewheel on air conditioner compressor: Renew  
⇒ [page 157](#)

#### 4.62.1 Alternator freewheel: Renew

- Procedure ⇒ Rep. gr. 27

#### 4.62.2 Freewheel on air conditioner compressor: Renew

- Procedure ⇒ Rep. gr. 87

#### 4.63 All-wheel drive coupling: changing oil



Note

*Only the oil is changed but not the filter.*



#### WARNING

*Observe technical product information "TPI 2020175"*

*Risk of interchanging drain plugs on all-wheel drive coupling and final drive during maintenance and repair work. This TPI is only applicable for T5 4Motion vehicles.*

- *Only applies to vehicles up to and including model year 2010.*

- Procedure ⇒ Propshaft shaft and final drive, rear; Rep. gr. 39

#### 4.64 Toothed belt drive for coolant pump: renew.

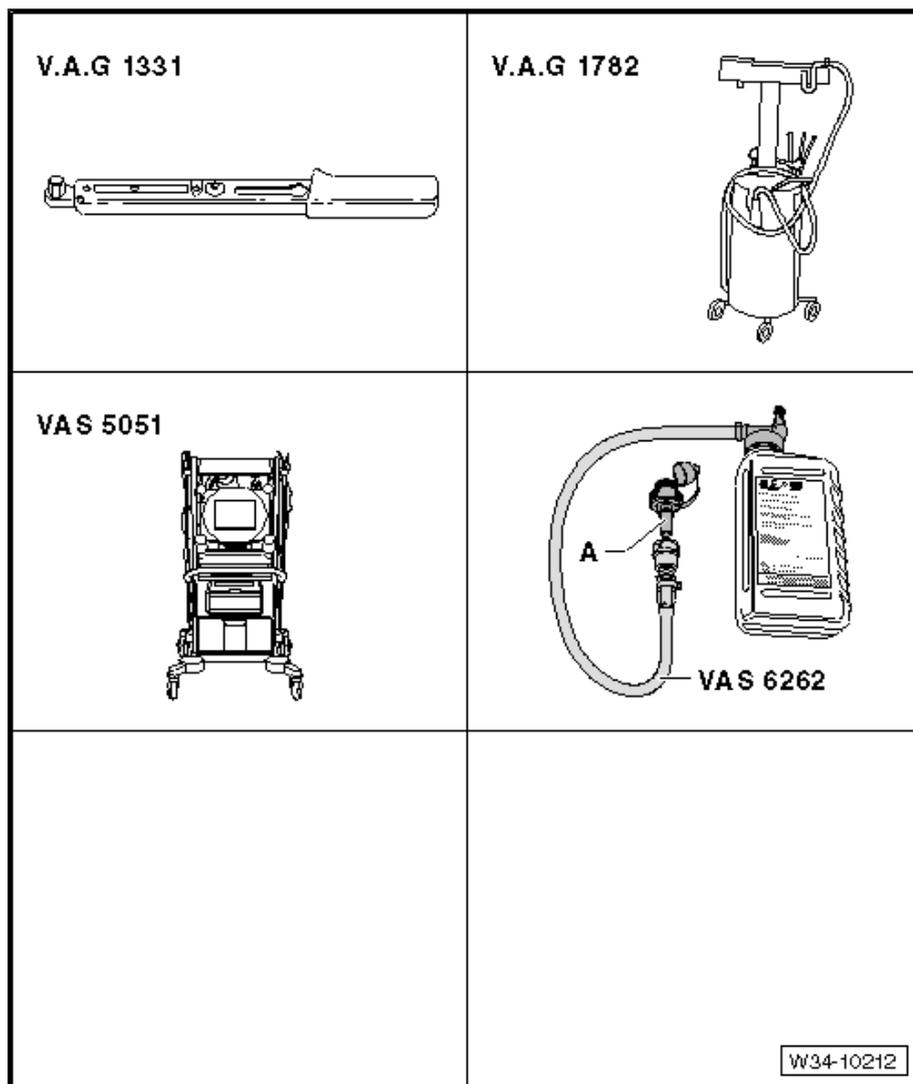
- You can find the operating instruction in the Repair Manual ⇒ Rep. gr. 19 ; Coolant pump/coolant regulator unit; Removing and installing toothed belt for coolant pump .

#### 4.65 Toothed belt pulley for coolant pump: Renew

- You can find the operating instruction in the Repair Manual ⇒ Rep. gr. 19 ; Coolant pump/coolant regulator unit; Removing and installing toothed belt for coolant pump .

#### 4.66 Dual clutch gearbox (DSG): Change oil

- ◆ Dual clutch gearbox (DSG), check oil level ⇒ [page 161](#)
- ◆ Install oil level pipe ⇒ [page 163](#)



#### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-
- ◆ Vehicle diagnostic tester
- ◆ Adapter for oil filling - VAS 6262 A-
- ◆ Used oil collection and extraction unit - V.A.G 1782- or used oil collection and extraction unit - VAS 6622A-
- ◆ Oil spill cloth - VAS 6204/1-
- ◆ Safety goggles
- ◆ Acid-resistant protective gloves

#### Conditions

- ◆ Engine switched off
- ◆ Vehicle level, all mountings of lifting platform evenly at same height
- ◆ Noise insulation removed
- ◆ Selector lever at "P"
- ◆ Vehicle diagnostic tester connected



- ◆ At the start of work, the oil temperature must not be higher than 50°C.

#### Procedure

#### Note

- ◆ *When working on gearboxes, observe the rules regarding cleanliness.*
- ◆ *Observe the instructions for dual clutch gearboxes "Oil disposal regulations"*
- ◆ *It is only permissible to use the oil which is available as a spare part for the dual clutch gearbox. Other oils cause functional problems or failure of the gearbox.*



#### WARNING

***Risk of injury from hot gearbox oil!***

- ◆ *Wear safety goggles.*
- ◆ *Wear acid-resistant protective gloves.*

- Connect vehicle diagnostic tester , and identify vehicle in Guided Functions.
- Select Dual clutch gearbox.
- Select Check oil level.

#### Note

*If the oil temperature is higher than 45°C, allow gearbox to cool down.*

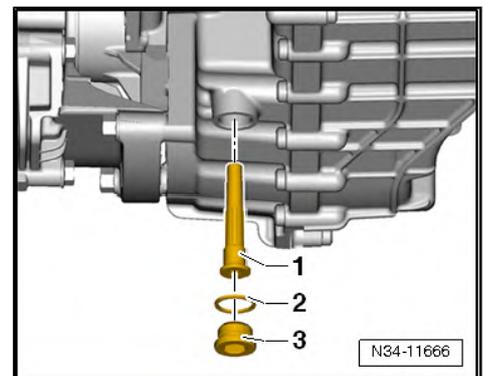


#### WARNING

***Danger of gearbox damage!***

***It is not permissible to start the engine if there is no oil in the gearbox.***

- Engine is off. Do not start engine!
- Unscrew oil drain plug -3-.
- Unscrew oil level pipe -1-, and allow oil to run out.
- Renew oil seal -2-.
- Screw in oil level pipe -1- hand-tight. When doing so, observe screw-in depth ⇒ [page 163](#) .





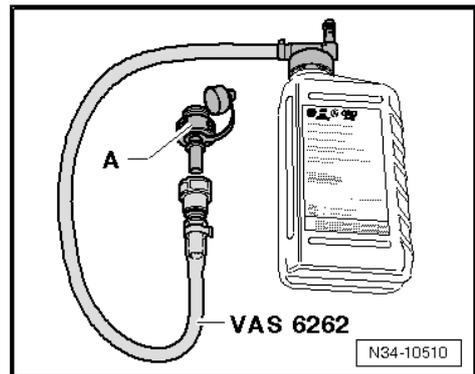
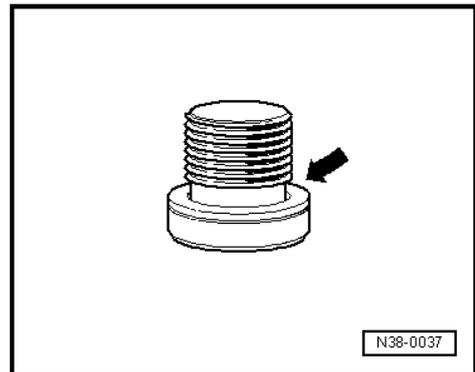
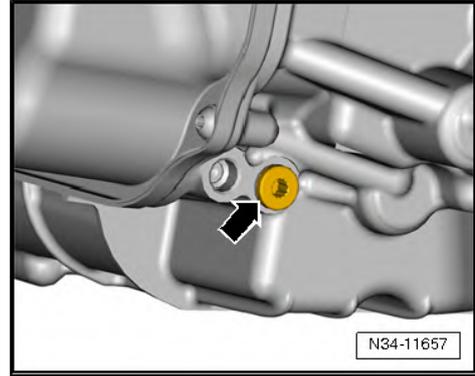
- Unscrew oil drain plug -arrow- of mechatronic unit.



**Note**

*A further approx. 1.2 litres of oil will run out.*

- Renew oil seal -arrow- of bolt.
- Fit new seal onto oil drain plug -arrow- of mechatronic unit, and screw in oil drain plug to specified torque.
- Screw adapter -A- from adapter for oil filling - VAS 6262 A- hand-tight into inspection hole.





- Shake bottles before opening them.
- Fill 6.0 litres of oil.

Hold the bottle upside down higher than the gearbox, with hose connected and tap open, to allow the oil to run out of the bottle and into the gearbox.

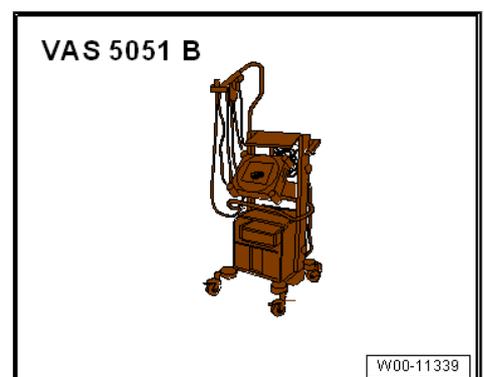
- To change bottle, shut off tap, or hold adapter for oil filling - VAS 6262 A- higher than gearbox.
- Start the engine.
- Depress brake pedal, select each selector lever position for about 3 seconds, then move lever back to »P«.
- Do NOT switch off engine.
- With engine running, bring oil temperature to 40°C.
- With engine running, disconnect quick-release coupling of adapter for oil filling - VAS 6262 A- .
- Allow surplus oil to drain out.
- As soon as oil no longer runs out but starts to drip, unscrew adapter for oil filling - VAS 6262 A- .
- Check oil level ⇒ [page 161](#) .



#### 4.66.1 Checking dual clutch gearbox (DSG) oil level

##### Special tools and workshop equipment required

- ◆ Vehicle diagnostic tester - VAS 5051B-



- ◆ Torque wrench - V.A.G 1331-



##### Conditions

- ◆ Vehicle level, all mountings of lifting platform evenly at same height
- ◆ If part of equipment, noise insulation removed



- ◆ Engine is idling and selector lever is at "P"
- ◆ Vehicle diagnosis, testing and information system - VAS 5051B- is connected
- ◆ Gearbox temperature: 35-45°C

#### Procedure

Proceed as follows:

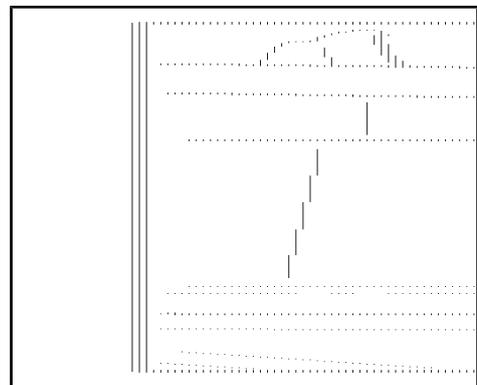
- Using vehicle diagnosis, testing and information system - VAS 5051B- , identify vehicle in Guided Functions.
- Dual clutch gearbox
- Checking oil level



#### Note

*If the oil temperature is higher than 45 °C, allow gearbox to cool down.*

- Remove oil drain plug -arrow-.



- Renew oil seal -arrow- of bolt.



#### Note

*CAUTION! A small gush of oil comes out of the oil level pipe every 30 seconds.*

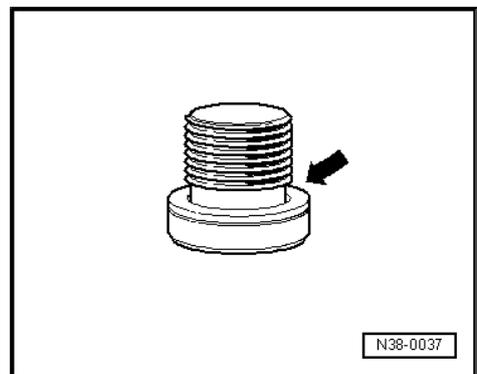
Excess oil drains off, the oil level is OK. Replenish if necessary.



#### Note

*Even at a low oil level, a small amount of oil comes out of the pipe at first because it fills up during operation of the vehicle.*

- After checking oil level, close oil drain plug -arrow-, and tighten to specified torque.





**Specified torque: 45 Nm**



**Note**

*IN AN EMERGENCY - if the gearbox temperature cannot be measured:*

- ◆ It is sufficient if the gearbox is “hand-warm” and the gears have been operating beforehand.



**Note**

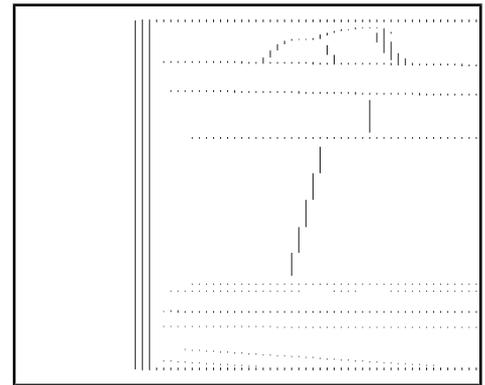
*IN AN EMERGENCY - if there is no oil for filling up (only check of oil level):*

- ◆ Unscrew the oil level pipe a max. of 3 turns at an oil temperature of 40 °C.
- ◆ The oil level is OK if oil runs out continuously and not only every 30 seconds due to the cooling pulse.
- ◆ Tighten oil level pipe again (5 Nm), and replenish the lost oil via the bleeder hole.

## 4.66.2 Installing oil level pipe

**Special tools and workshop equipment required**

- ◆ Torque wrench - V.A.G 1331-



- ◆ Caliper gauge, digital, 150 mm - VAS 6335-

or

- ◆ Depth gauge, digital - VAS 6320-

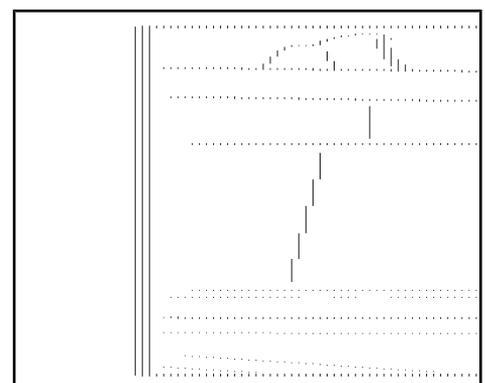
If installing latest oil level pipe, proceed as follows:

- ◆ Specified torque: 3 Nm
- ◆ Check whether oil level pipe is deep enough in its thread. Control dimension: 12.4 + 0.2 mm -a- between top end of oil level pipe and place where drain plug stops when screwed in
- ◆ If necessary, keep turning oil level pipe “CAREFULLY” until it is screwed in in acc. with control dimension



**Note**

*The oil level pipe can break between the thread and the collar.*





## 5 Exhaust emissions test



### Note

- ◆ Please observe the country-specific laws and regulations.
- ◆ The following exhaust emissions test description is applicable only in countries where no specific exhaust emission regulations have to be adhered to.

### Exhaust emissions test intervals

Vehicles with regulated catalytic converter or vehicles with diesel engine:

- ◆ 3 years after initial registration and then every 2 years.
- ◆ Valid for Germany: Vehicles for commercial passenger transport, e.g. taxis have to be checked every 12 months.

Exhaust emissions test for petrol engines ⇒ [page 164](#)

Exhaust emissions test for diesel engines ⇒ [page 166](#)

### 5.1 Exhaust emissions test for petrol engines

#### Special tools and workshop equipment required

- ◆ Exhaust gas testing station L - VAS 7320 A-



### Note

- ◆ The following description refers to vehicles fitted with "On-board diagnosis" OBD.
- ◆ The OBD monitors all components and part systems influencing the exhaust emissions quality.
- ◆ It is possible to carry out an exhaust emissions test only when all units of the emissions testing station are connected properly and joined to each other according to the operating instructions.
- ◆ All work to be performed is displayed by the emissions testing station.

#### Test requirements

- All test conditions and data required for exhaust emissions test are found on EET data sheet for the respective engine.
- For bar code reading the EET data sheet must be printed out.
- Automatic gearbox: selector lever in position "P" or "N".
- Manual gearbox: gear lever in neutral
- Parking brake applied
- Perform exhaust emissions test according to instructions on display.

#### Vehicle data input

- Enter the following data:
  - ◆ Registration number
  - ◆ Key numbers



- ◆ Vehicle identification number
- ◆ Fuel type
- ◆ Mileage

The following vehicle data can be found in the vehicle registration certificate part 1:

- ◆ Registration number: "e.g. WOB-HH 1234"
- ◆ Emission key number "Field 14.1 (code for field 14)"
- ◆ Vehicle manufacturer: "Field 2", "Field 2.1 (code for field 2)"
- ◆ Vehicle identification number "field E"
- ◆ Type and version "Field D2 (type only)", "Field 2.2 (code for field D.2)"

### Specified data input for EET

There are different ways to enter the specified data:

- ◆ 1. By manual input
- ◆ 2. By bar code input from EET data sheet
- ◆ 3. Through ELSA web service



#### Note

- ◆ *To use the ELSA web service, the exhaust gas testing station L which is used for the exhaust emissions test must be integrated in the workshop network.*
- ◆ *The ELSA web service automatically transmits the data for the specific vehicle via the network to the respective mask.*

Manual specified data input for EET:



#### Note

*All test conditions and data required for exhaust emissions test can be found in the ⇒ Data sheets for exhaust emissions test for respective engine.*

- Perform manual data input according to instructions on display.
- Enter displayed values on EET data sheet in column "Test values for exhaust emissions test" on display as follows:
  - 1 - Test speed (idling speed)
  - 2 - Warm-up phase for catalytic converter
  - 3 - Engine temperature
  - 4 - Increased idling speed
  - 5 - CO content at increased idling speed
  - 6 - Lambda at increased idling speed
  - 7 - Idling speed
  - 8 - Select regulating probe type; either "Step-type probe" or "Broad-band probe".
  - 9 - Lambda probe value

Specified data input for EET as bar code:



- If specified data for EET are available as bar code, read bar code of EET data sheet with bar code reader.

All data required are shown on display.

### Inspection

- Inspect all exhaust emissions relevant components.
- Check if exhaust system is fitted and complete and check for leaks and damage.

### Procedure

- Follow instructions from exhaust gas testing station .

## 5.2 Exhaust emissions test for diesel engines

### Special tools and workshop equipment required

- ◆ Exhaust gas testing station L - VAS 7320 A-



### Note

- ◆ *The following description refers to vehicles fitted with "On-board diagnosis" OBD.*
- ◆ *The OBD monitors all components and part systems influencing the exhaust emissions quality.*
- ◆ *It is possible to carry out an exhaust emissions test only when all units of the emissions testing station are connected properly and joined to each other according to the operating instructions.*
- ◆ *All work to be performed is displayed by the emissions testing station .*

### Test requirements

- All test conditions and data required for exhaust emissions test are found on EET data sheet for the respective engine.
- For bar code reading of specified data for EET, the EET data sheet must be printed out.
- Automatic gearbox: selector lever in position "P" or "N".
- Manual gearbox: gear lever in neutral
- Parking brake applied
- Perform exhaust emissions test according to instructions on display.

### Vehicle data input

- Enter the following data:
  - ◆ Registration number
  - ◆ Key numbers
  - ◆ Vehicle identification number
  - ◆ Fuel type
  - ◆ Mileage

The following vehicle data can be found in the vehicle registration certificate part 1:

- ◆ Registration number: "e.g. WOB-HH 1234"



- ◆ Emission key No. "field 14.1 (code for field 14)"
- ◆ Vehicle manufacturer: "Field 2", "Field 2.1 (code for field 2)"
- ◆ Vehicle identification number "field E"
- ◆ Type and version "Field D2 (type only)", "Field 2.2 (code for field D.2)"

#### Specified data input for EET

There are different ways to enter the specified data:

- ◆ 1. By manual input
- ◆ 2. By bar code input from EET data sheet
- ◆ 3. Through ELSA web service



#### Note

- ◆ *If there is no ESP to deactivate the engine speed limiter, the rev limit can be measured using the engine speed limited by the control unit. To do this, all the EET specifications must be entered manually.*
- ◆ *To use the ELSA web service, the exhaust gas testing station L which is used for the exhaust emissions test must be integrated in the workshop network.*
- ◆ *The ELSA web service automatically transmits the data for the specific vehicle via the network to the respective mask.*

Manual specified data input for EET:

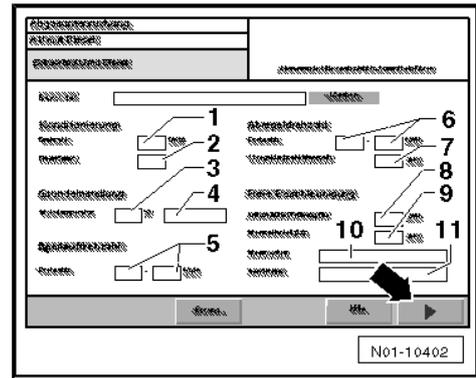


#### Note

- ◆ *All test conditions and data required for exhaust emissions test can be found in the ⇒ Data sheets for exhaust emissions test for respective engine.*
- ◆ *If the engine speed limiter cannot be deactivated, enter the value  $2500 \pm 200$  rpm in the box for rev limit and 2500 in the box for engine speed for conditioning.*



- Perform manual data input according to instructions on display.
- Enter displayed values on EET data sheet in column "Test values for exhaust emissions test" on display as follows:
  - 1 - Speed for conditioning
  - 2 - Number of throttle bursts for conditioning
  - 3 - Engine oil temperature (min. value)
  - 4 - Select engine oil temperature measurement procedure
  - 5 - Idling speed
  - 6 - Governed speed
  - 7 - Governed speed measuring period (1 second)
  - 8 - Type plate value ⇒ [page 168](#)
  - 9 - Select probe type (No. of probe)
  - 10 - Select measuring mode
  - 11 - Measured period portion



#### Note

- ◆ *When performing the exhaust emissions test, the respective engineer must always use the vehicle-specific exhaust emissions limit value indicated on the type plate.*
- ◆ *If no value is indicated on the type plate, the opacity figure specified by the manufacturer and indicated in ELSA must be used.*
- ◆ *If no value is indicated on the type plate and no opacity figure has been specified by the manufacturer, the statutory opacity figures ( $2.5\text{ m}^{-1}$  or  $1.5\text{ m}^{-1}$ , depending on date of initial registration) must be used.*
- ◆ *For all Euro-6-vehicles an opacity figure of max.  $0.5\text{ m}^{-1}$  applies.*

Specified data input for EET as bar code:

- If specified data for EET are available as bar code, read bar code of EET data sheet with bar code reader.

If the opacity figure on the EET data sheet is different from the value indicated on the type plate, enter the type plate value manually.

#### Inspection

- Inspect all exhaust emissions relevant components.
- Check if exhaust system is fitted and complete and check for leaks and damage.

#### Procedure

- Follow instructions from exhaust gas testing station .



## Evaluation



### Note

- ◆ *If the exhaust emissions test was performed with an active rev limiter, enter the following in the test log:*
- ◆ *“The governed speed test was performed with an automatic engine speed limit of 2500 rpm.”*