

# 1 General information

(AIGG000720; Edition 11.2015)

Change history ⇒ [page 1](#)

Engine number ⇒ [page 1](#)

Vehicle identification number ⇒ [page 4](#)

Vehicle data sticker ⇒ [page 4](#)

## 1.1 --- Change history ---

N o.	Date	Chapter	Changes made
5	02.11.2015	Various chapters on stock vehicles	New chapter
		Various chapters on Delivery Inspection	New chapter
		Overview of engines	Chapter deleted. An overview of engines (including adjustment values of tester for oil level indicator T40178) can be found in the Workshop Manual under ⇒ Power unit; Rep. gr. 00 ; Technical data
4	26.05.2015	Engine, gearbox, final drive and steering: checking for leaks and damage ⇒ <a href="#">page 54</a>	Procedure modified to include: Removing noise insulation for certain service procedures
		Headlights: checking for correct adjustment ⇒ <a href="#">page 61</a>	List of required tools modified
		Cooling system: checking anti-freeze and coolant level, and correcting if necessary ⇒ <a href="#">page 97</a>	Note added warning against overfilling coolant expansion tank
		Fuel tank: adding fuel additive ⇒ <a href="#">page 116</a>	Procedure modified
		Poly V-belts for ancillaries and all pulleys: renewing ⇒ <a href="#">page 127</a>	Chapter added
3	02.03.2015	Rear spoiler hinges: lubricating ⇒ <a href="#">page 59</a>	New chapter

### Note

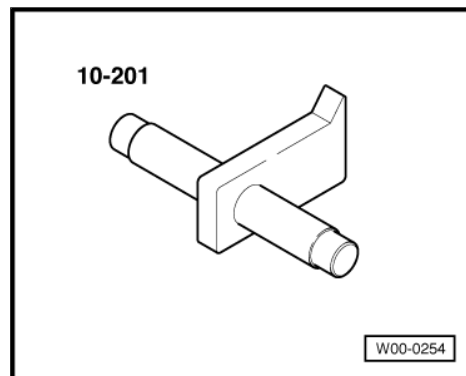
*For greater clarity, only the last three updates to the document are listed.*

## 1.2 Engine number

### Note

*The engine number consists of the engine code letters (3 or 4 characters) and the serial number.*

- ◆ Counterhold tool - 10 - 201-



### Removing

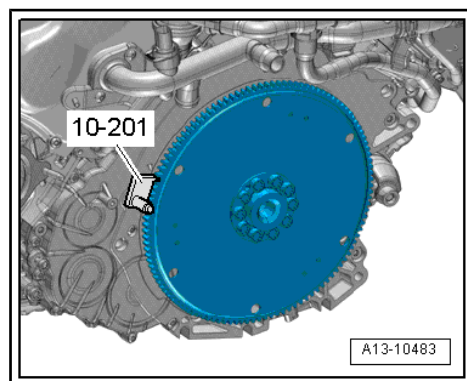
- Gearbox removed ⇒ Rep. gr. 34 ; Removing and installing gearbox; Removing gearbox or ⇒ Rep. gr. 37 ; Removing and installing gearbox; Removing gearbox .
- Insert counterhold tool - 10 - 201- to slacken bolts.



#### Caution

*Take care not to damage outer surface of bearing flange on drive plate.*

- ◆ *Use a multi-point socket bit with a length of at least 40 mm to slacken and tighten the drive plate bolts.*



- Remove bolts and take off drive plate.

### Installing

Installation is carried out in the reverse order; note the following:

- Tightening torque  
⇒ ["2.1 Exploded view - drive plate", page 99](#)



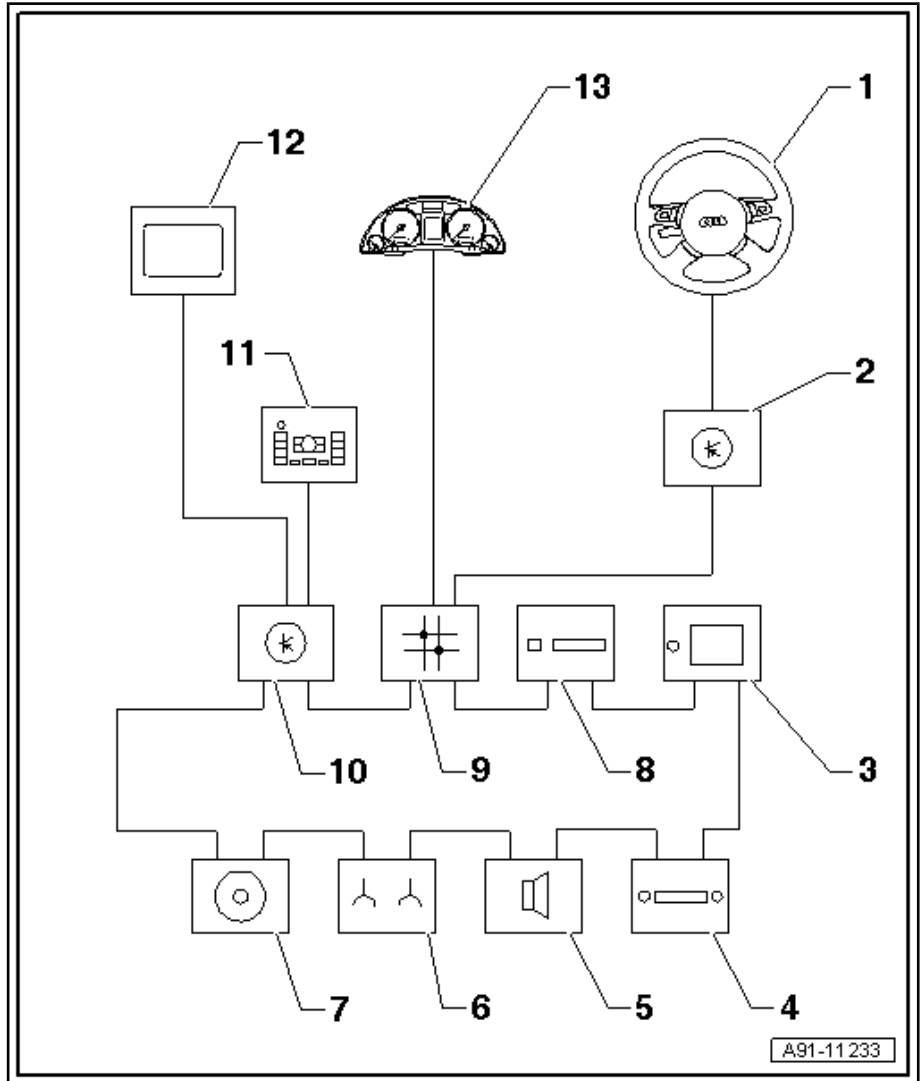
#### Note

- ◆ *Renew the bolts tightened with specified tightening angle.*
- ◆ *Vehicles with manual gearbox: A needle bearing is fitted in the drive plate. Before installing, check that the needle bearing is fitted. Removing and installing needle bearing in drive plate (pressing in and out) ⇒ [page 102](#) .*
- Observe dowel pin when installing drive plate.
- Fit counterhold tool - 10 - 201- the other way round to tighten bolts.

## 2.3 Renewing crankshaft oil seal (gearbox end)

Special tools and workshop equipment required

- 1 - Multi-function steering wheel
- 2 - Steering column electronics control unit - J527- on steering column on steering column switch
- 3 - TV tuner - R78- behind luggage compartment side trim (left-side)
- 4 - Navigation system with CD drive control unit - J401- behind luggage compartment side trim (left-side)
- 5 - Digital sound package control unit - J525- behind luggage compartment side trim (left-side)
- 6 - Connection for external audio sources - R199- in glove box
- 7 - CD changer - R41- in dash panel
- Connection for external audio sources - R199- (AUX IN) in centre console storage compartment
- 8 - Radio - R- behind luggage compartment side trim (left-side)
- 9 - Data bus diagnostic interface - J533- behind glove box (left-side)
- 10 - Control unit for front display and information control panel - J523- behind centre console (top)
- 11 - Multimedia system operating unit - E380- in centre console
- 12 - Display unit for front information display and operating unit control unit - J685- in dash panel (centre)
- 13 - Control unit in dash panel insert - J285- in dash panel



**Notes on MOST bus**

In addition to the CAN bus, the fibre optic data bus "MOST bus" is used.

A "fibre optic cable" is used as the connecting cable. The fibre optic cables are fitted in corrugated tubes for protection.

Renew the complete fibre optic cable whenever possible.

It is important to ensure that the end faces of the connectors do not become dirty.

## 1.7.2 Removing and installing inner bracket for headlight housing, gas discharge headlights - vehicles from model year 2012 onwards, USA vehicles from model year 2013 onwards

### Removing

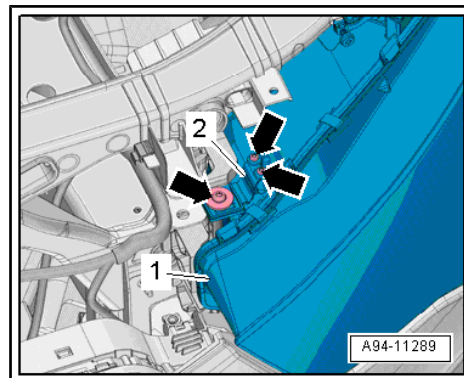
- Remove lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Exploded view - lock carrier .
- Remove bolts -arrows-.
- Lift bracket -2- off headlight housing -1-.

### Installing

- Tightening torque  
⇒ ["1.1.8 Exploded view - gas discharge headlight, vehicles from model year 2012 onwards, USA vehicles from model year 2013 onwards", page 129](#)

Installation is carried out in the reverse order; note the following:

- Install lock carrier cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Exploded view - lock carrier .



## 1.8 Removing and installing bracket (top) for headlight housing

⇒ ["1.8.1 Removing and installing bracket \(top\) for headlight housing, halogen headlights - vehicles from model year 2012 onwards, USA vehicles from model year 2013 onwards", page 148](#)

⇒ ["1.8.2 Removing and installing bracket \(top\) for headlight housing, gas discharge headlights - vehicles from model year 2012 onwards, USA vehicles from model year 2013 onwards", page 148](#)

### 1.8.1 Removing and installing bracket (top) for headlight housing, halogen headlights - vehicles from model year 2012 onwards, USA vehicles from model year 2013 onwards

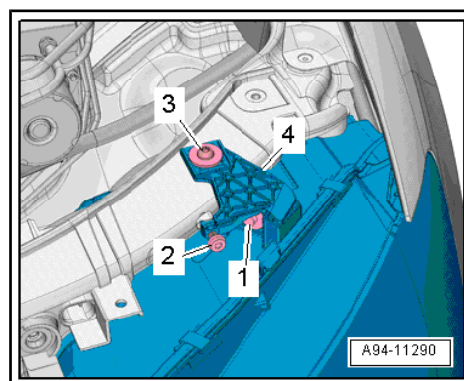
#### Removing

- Remove bolts -2, 3-.
- Unscrew bolt -1- and pull out as far as possible.
- Remove bracket -4- upwards from headlight housing.
- Bolt can only be removed together with bracket.

#### Installing

- Tightening torque  
⇒ ["1.1.5 Exploded view - halogen headlight, vehicles from model year 2012 onwards, USA vehicles from model year 2013 onwards", page 121](#)

Install in reverse order.



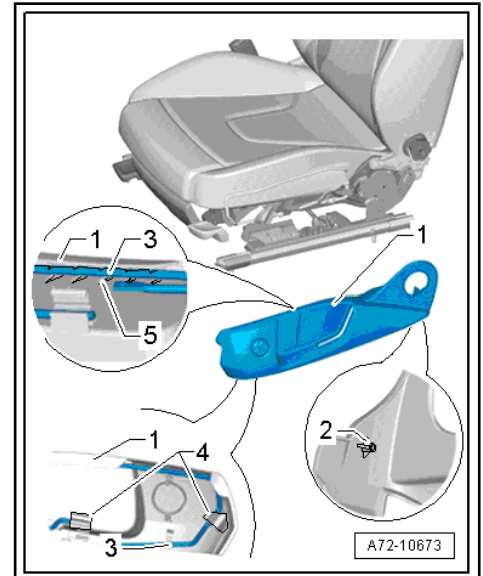
### 1.8.2 Removing and installing bracket (top) for headlight housing, gas discharge headlights - vehicles from model year

### Installing

Install in reverse order of removal; note the following:

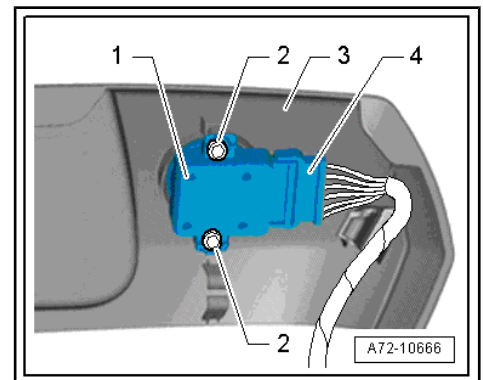
#### Note

- ◆ Make sure lug -2- is correctly positioned.
- ◆ Make sure trim -1- (sill side) is properly engaged at retaining bracket -3- and that lockable clips -4- are fastened.



#### Note

Make sure wire is as close as possible to connector -4-.



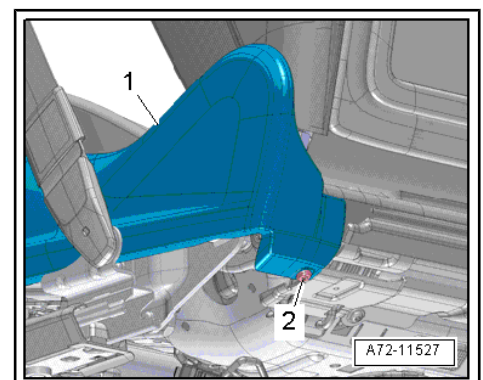
## 2.53.2 Removing and installing trim (sill side) - standard/sports seat with electric adjustment, convenience seat, super sports seat

#### Note

Removal and installation can be carried out with the front seat installed.

### Removing

- Move seat to highest position.
- Remove spreader rivet -2- at trim (sill side) -1-.





**DANGER!**

*Risk of fatal injury if high-voltage components are damaged.*

*Observe the following when working in the vicinity of high-voltage components or wiring:*

- ◆ *It is not permitted to use cutting or forming tools, other sharp-edged tools or heat sources such as welding, brazing, soldering, hot air or thermal bonding equipment.*
- ◆ *Before starting work, visually inspect the high-voltage components in the areas involved.*
- ◆ *Before working in the engine compartment, visually inspect the power and control electronics for electric drive - JX1- , electric drive motor - V141- , air conditioner compressor - V470- and high-voltage wiring.*
- ◆ *Before working on the vehicle underbody, visually inspect the high-voltage wiring and covers.*
- ◆ *Before working on the rear section of the vehicle, visually inspect the high-voltage wiring and the electro-box with the maintenance connector for high-voltage system - TW - .*
- ◆ *Visually inspect all potential equalisation lines.*

*Check the following when making the visual inspection:*

- ◆ *There must be no external damage on any component.*
- ◆ *The insulation of the high-voltage wiring and potential equalisation lines must not be damaged.*
- ◆ *There must be no unusual deformation of the high-voltage wiring.*
- ◆ *All high-voltage components must be identified by a red warning sticker.*

**Removing**

- Switch off ignition.
- Remove luggage compartment floor => General body repairs, interior; Rep. gr. 70 ; Luggage compartment trim panels; Exploded view - luggage compartment floor .
- Move battery cooling module to service position => [page 665](#) .
- Unscrew nuts -2- and -3- and press heat shield slightly to the left.
- Carefully release fasteners -arrows- of plastic ring and press condensation drain into battery recess.
- Detach condensation drain from retaining bracket.

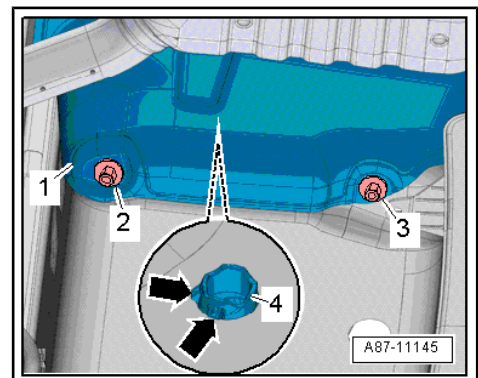
**Installing**

Install in reverse order of removal; note the following.



**Note**

- ◆ *Renew the condensation drain if the plastic ring is damaged.*
- ◆ *Seal the plastic ring with silicone compound if slightly out of shape.*



## 7 Drive shaft

⇒ „7.1 General notes:“, page 240

⇒ „7.2 Loosening and tightening bolt securing drive shaft to wheel hub“, page 240

⇒ „7.3 Removing and installing drive shaft“, page 241

⇒ „7.4 Exploded view of drive shaft with 88 mm dia. outer constant velocity joint and 100 mm dia. inner sliding constant velocity joint“, page 243

⇒ „7.5 Exploded view of drive shaft with 100 mm dia. outer constant velocity joint and 108 mm dia. inner sliding constant velocity joint“, page 245 .

⇒ „7.6 Exploded view of drive shaft with 88/98 mm dia. outer sliding constant velocity joint and 100/108 mm dia. inner sliding constant velocity joint (with cap)“, page 247

⇒ „7.7 Servicing outer constant velocity joint (88 mm or 100 mm dia.)“, page 249

⇒ „7.8 Servicing inner sliding constant velocity joint (100 mm or 108 mm dia.)“, page 251

⇒ „7.9 Servicing outer sliding constant velocity joint (88 mm or 98 mm dia.)“, page 256

⇒ „7.10 Servicing inner sliding constant velocity joint with cap (100 mm or 108 mm dia.)“, page 259

⇒ „7.11 Checking outer constant velocity joint“, page 265

⇒ „7.12 Checking inner sliding CV joint“, page 266

### 7.1 General notes:

Wheel bearings must not be subjected to load after loosening bolt securing drive shaft at wheel hub.

If the wheel bearings are subjected to the full weight of the vehicle they will be overloaded, resulting in reduced service life. Therefore please note the following:

◆ Procedure for slackening bolt

Do not attempt to move the vehicle without the drive shafts fitted; this would result in wheel bearing damage. If the vehicle does have to be moved, always note the following points:

- Fit an outer joint in place of the drive shaft.
- Tighten bolt securing outer joint to wheel hub to 200 Nm.

Do not let drive shaft hang down under its own weight when performing repair work, as otherwise excessive bending could damage inner CV joint.

### 7.2 Loosening and tightening bolt securing drive shaft to wheel hub

Special tools and workshop equipment required

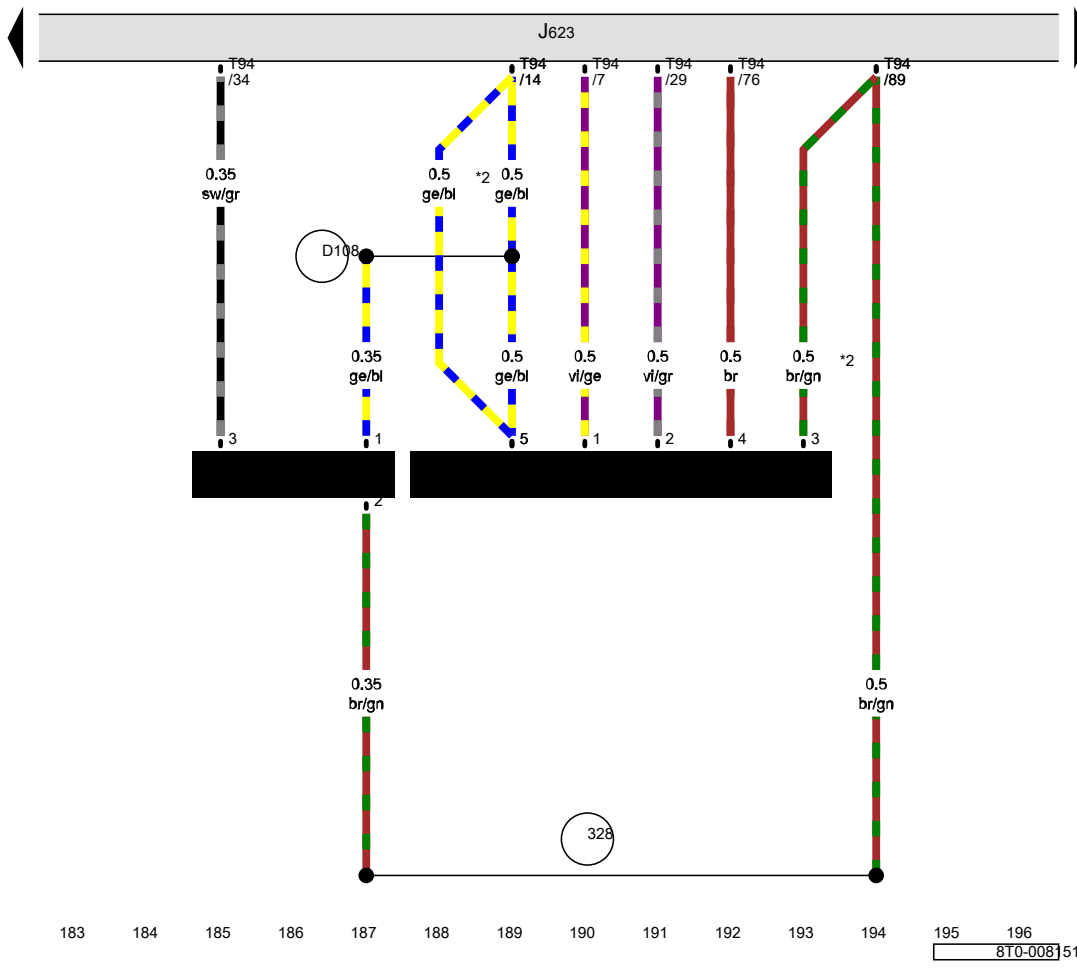
Exhaust gas pressure sensor 1, Engine control unit, Turbocharger 1 control unit

- G450 Exhaust gas pressure sensor 1
- J623 Engine control unit
- J724 Turbocharger 1 control unit
- T94 94-pin connector

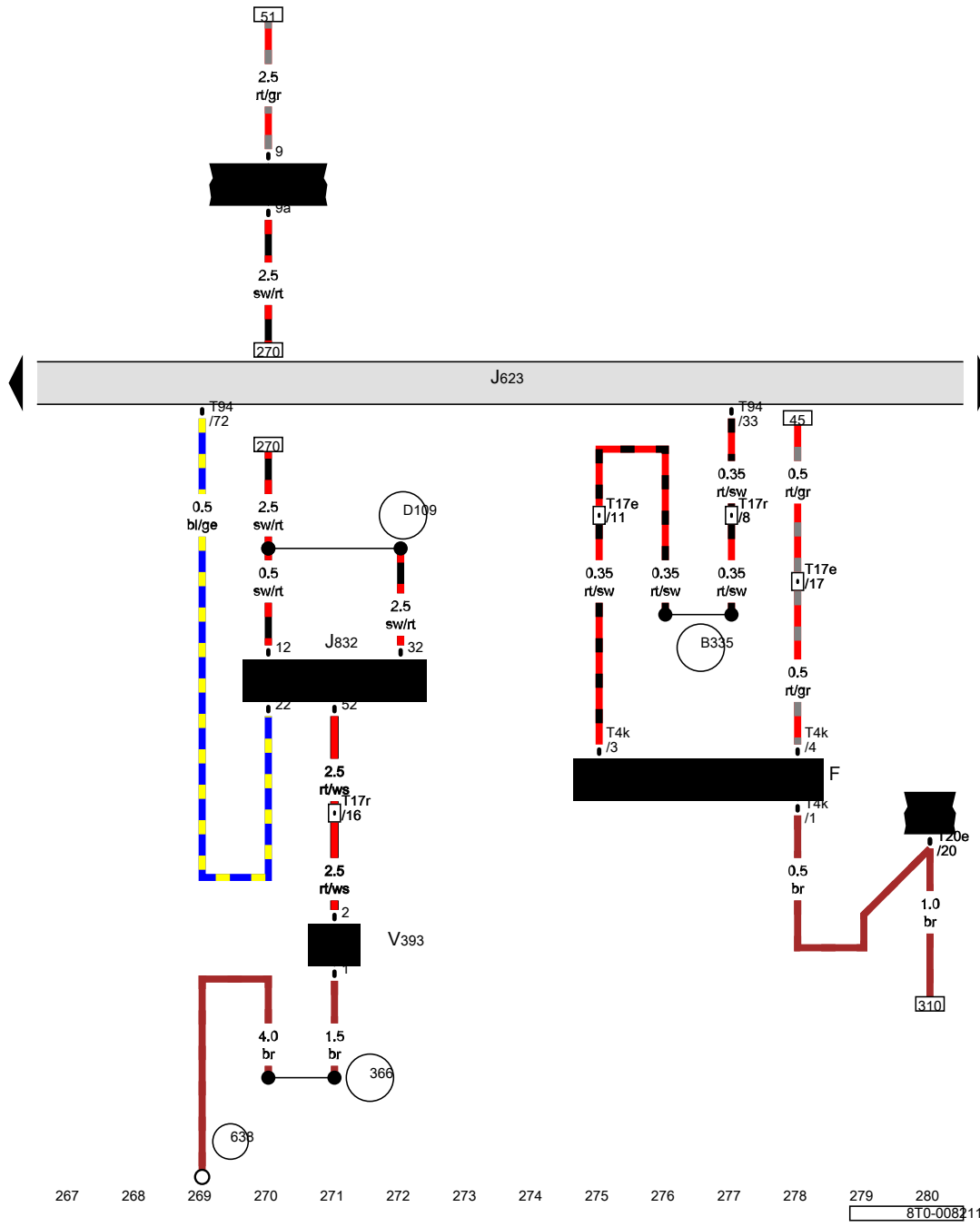
328 Earth connection 2 (sender earth), in engine compartment wiring harness

D108 Connection 6 in engine compartment wiring harness

- \* Only models with automatic gearbox
- \*2 According to equipment







**Brake light switch, Engine control unit, Supplementary fuel pump**

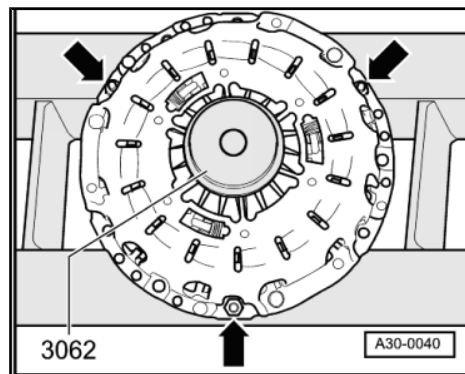
- F Brake light switch
- J255 Climatronic control unit
- J623 Engine control unit
- J832 Relay for supplementary fuel pump
- SB9 Fuse 9 on fuse holder B
- T4k 4-pin connector
- T17e 17-pin connector, red
- T17r 17-pin connector, white
- T20e 20-pin connector
- T94 94-pin connector
- V393 Supplementary fuel pump

- 366 Earth connection 1, in main wiring harness
- 638 Earth point, on right A-pillar
- B335 Connection 1 (54), in main wiring harness
- D109 Connection 7 in engine compartment wiring harness
- \* Solenoid coil for brake light sensor

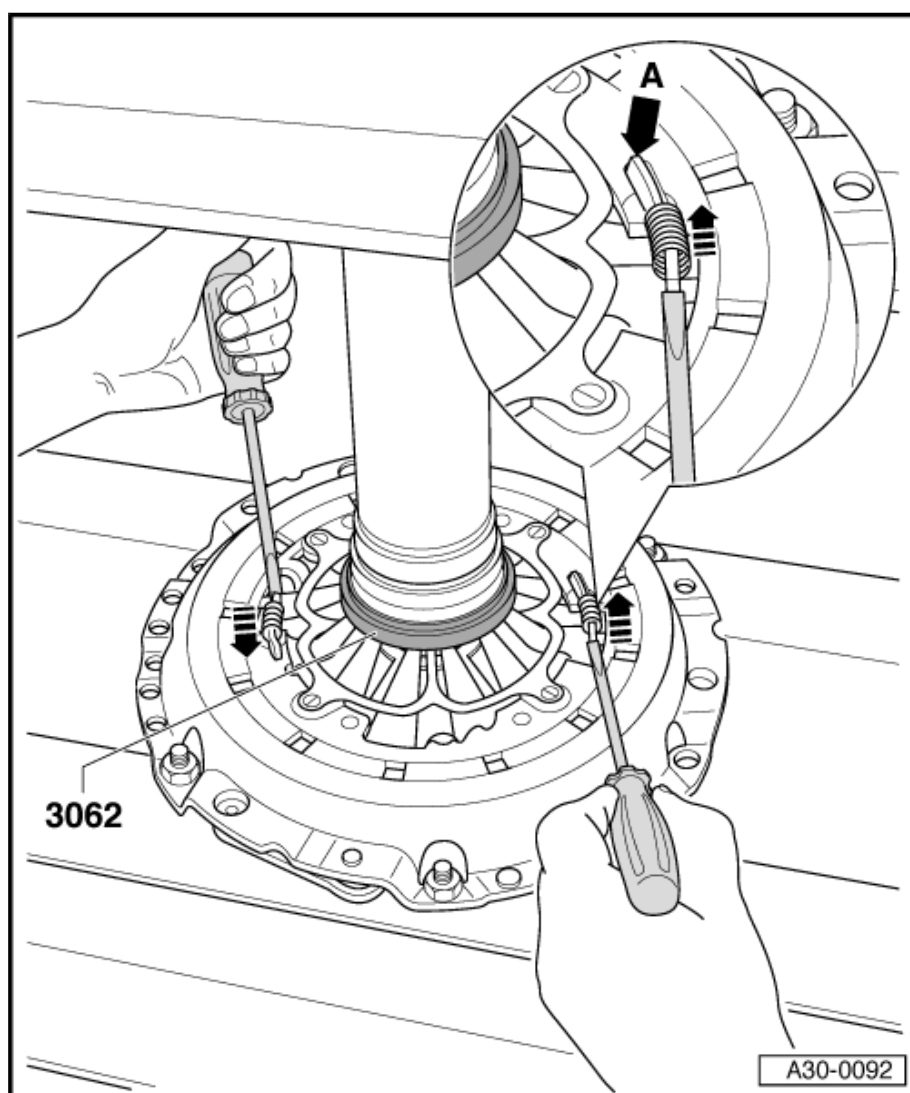
- ws = white
- sw = black
- ro = red
- br = brown
- gn = green
- bl = blue
- gr = grey
- li = purple
- ge = yellow
- or = orange
- rs = pink

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- Place the pressure plate onto the press so that only the 3 bolt heads -arrows- make contact.
- Position thrust pad - 3062- in the centre of the pressure plate.



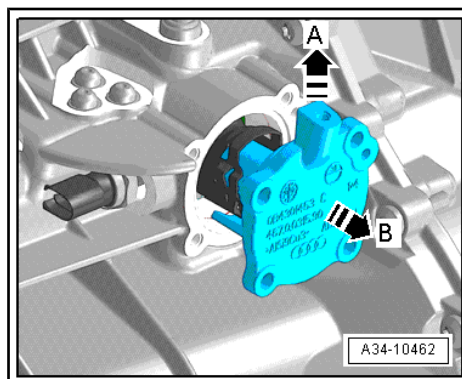
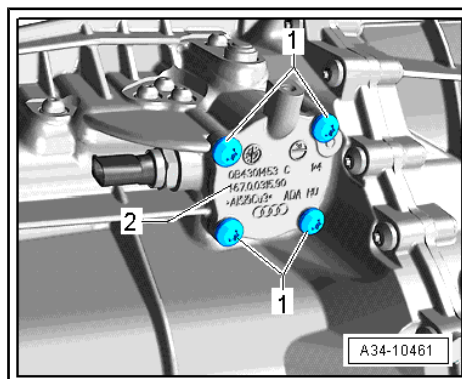
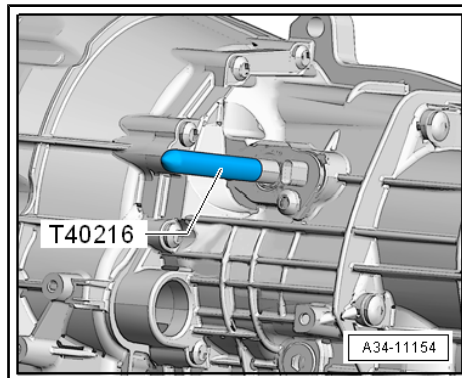
**Do not use force when performing the following steps, as this could cause the forks on the adjuster ring to break off.**



- Apply two screwdrivers to the forks on the adjuster ring. Use the press to apply pressure to the pressure plate until it is just possible to move the adjuster ring.
- Using the two screwdrivers, turn back the adjuster ring evenly in the direction of the -arrows- until it reaches the stop -arrow A-.

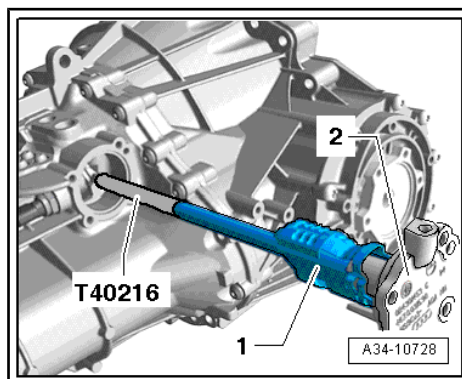
### Removing

- Screw guide pin - T40216- onto selector shaft.
- Remove bolts -1- and carefully lever off selector shaft cover -2-.
- Lift selector shaft slightly -arrow A- and pull it out -arrow B-.



### Installing

- Apply sealing paste - AMV 188 001 02- evenly and not too thickly onto sealing surface between selector mechanism cover and gearbox cover.
- Screw guide pin - T40216- onto selector shaft -1-.



## 2.7 Intake manifold (bottom section) with fuel rail - exploded view

### 1 - Intake manifold (bottom section)

- Removing and installing (left and right)  
⇒ [page 27](#)

### 2 - Sleeve

### 3 - Fuel pressure sender - G247-

- 20 Nm

### 4 - Bracket

### 5 - Bolt

- 9 Nm

### 6 - High-pressure pipe

**⚠ WARNING**

*The fuel system operates at extremely high pressure. This can cause injury. The fuel pressure in the high-pressure section of the injection system must be reduced to a residual pressure prior to opening the system.*

- Reducing fuel pressure in high-pressure section of injection system  
⇒ [page 3](#)
- Do not alter shape
- Do NOT bend open retainer for fuel pipe
- If retainer has been bent open or fuel pipe has to be renewed, retainer must also be renewed
- Tightening ⇒ [page 25](#)

### 7 - Bolt

- 9 Nm

### 8 - Threaded connection

- 40 Nm

### 9 - Stud

### 10 - Nut

- 9 Nm

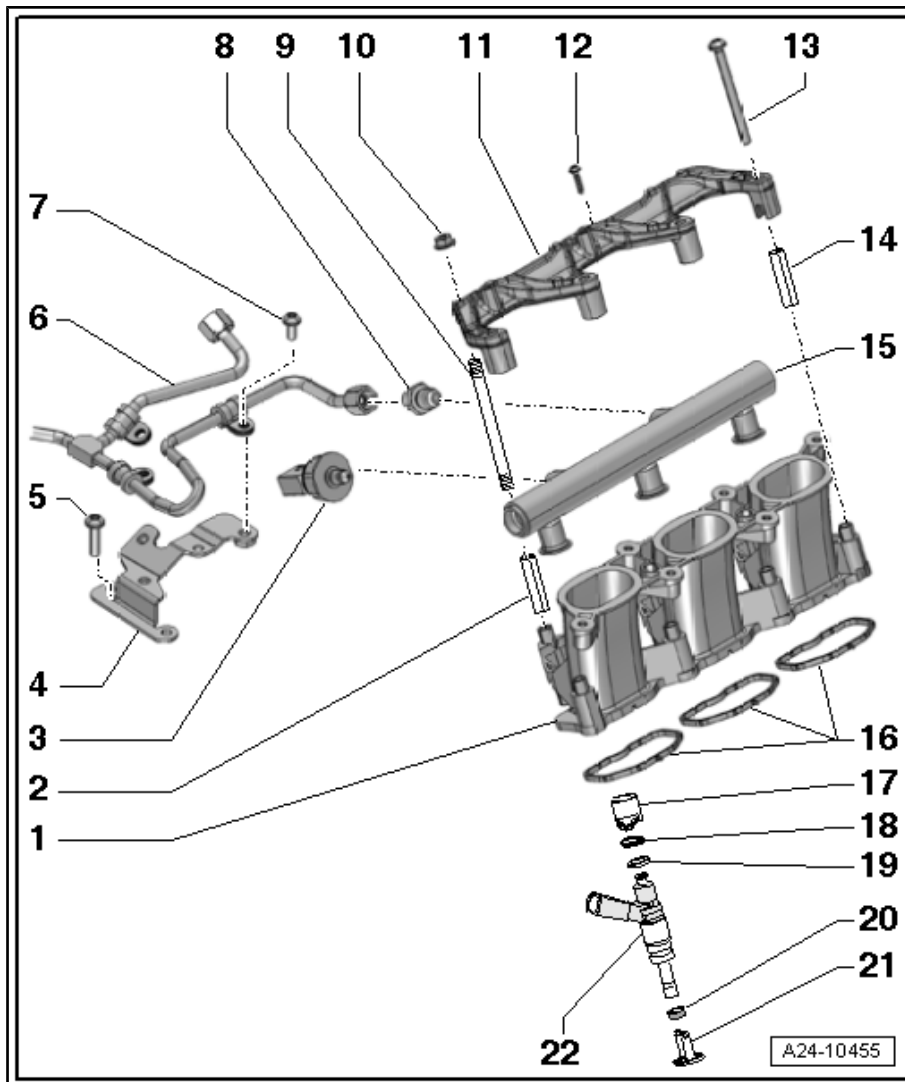
### 11 - Retainer for fuel rail

### 12 - Bolt

- 2.5 Nm

### 13 - Bolt

- 9 Nm



# 01 – Self-diagnosis, electrical checks

## 1 General notes on wiper and washer systems

### 1.1 General notes and technical data

Wiper systems only work when terminal 15 is energised.

The rain sensor is activated by setting the intermittent wiper switch -E22- to the position "intermittent wipe".

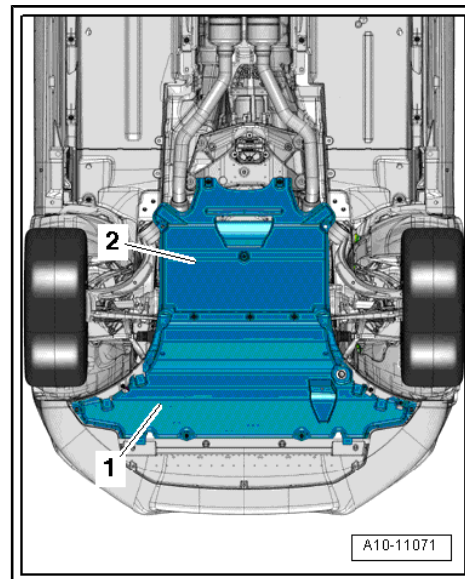
The pauses during intermittent wiping depend on the road speed.

### 1.2 Components used

Component:	Comments:
Rain and light sensor -G397-	Not standard equipment
Washer fluid level sender -G33-	Only fitted in vehicles with on-board computer or driver information system
Wiper motor control unit -J400-	
Headlight washer system pump -V11-	Only fitted in vehicles with headlight washer system
Rear window wiper motor -V12-	Only fitted in Avant vehicles
Washer pump -V5-	Dual pump fitted in vehicles with rear window wiper; mono pump fitted in vehicles without rear window wiper
Control unit in dash panel insert -J285-	
Onboard supply control unit -J519-	
Steering column electronics control unit -J527-	
Bonnet contact switch -F266-	
Intermittent wiper switch -E22-	
Left washer jet heater element -Z20-	
Right washer jet heater element -Z21-	

## 1.4 Removing and installing engine speed sender - G28-

### Removing

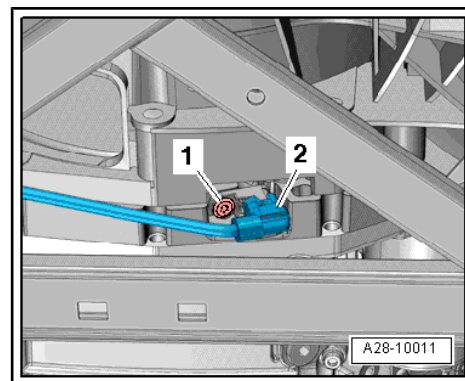


- Remove rear noise insulation panel -2- ⇒ Rep. gr. 66 .
- Unplug electrical connector -2-.
- Unscrew bolt -1- and detach engine speed sender - G28- downwards.

### Installing

Install in reverse order.

- Tightening torque  
 ⇒ ["1.2 Exploded view - glow plugs, Hall sender, engine speed sender", page 80](#)
- Install noise insulation ⇒ Rep. gr. 66 .



## 1.5 Removing and installing Hall sender - G40-

### Removing

- Pull off engine cover panel ⇒ [page 20](#) .
- Unplug electrical connector -3-.
- Unscrew bolt -1- and remove Hall sender - G40- -item 2-.

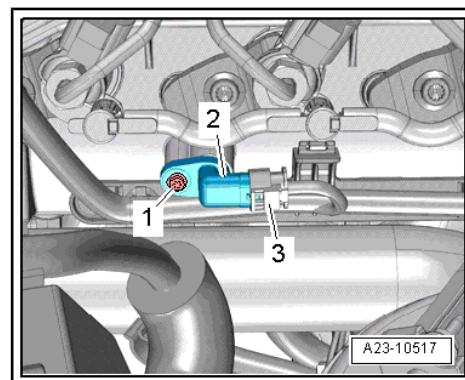
### Installing

Installation is carried out in the reverse order; note the following:

 **Note**

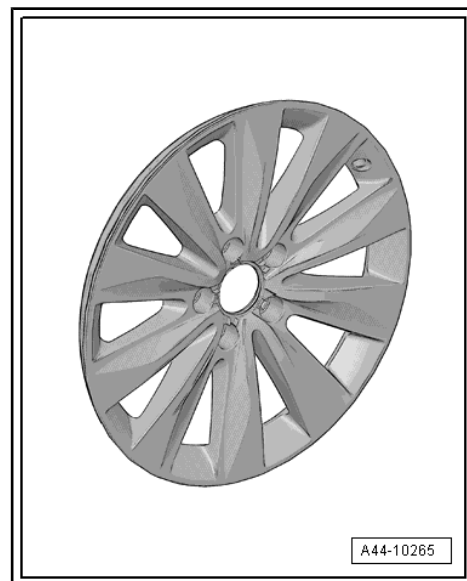
*Fit new O-ring.*

- Tightening torque  
 ⇒ ["1.2 Exploded view - glow plugs, Hall sender, engine speed sender", page 80](#)



 **Note**

- ◆ *On rims with bonded wheel trims, take care not to scratch the wheel trims.*
- ◆ *Wheel trims have a very sensitive surface.*
- ◆ *If a wheel trim is damaged, the rim must be renewed.*
- ◆ *The wheel trim cannot be renewed.*
- ◆ Position wheel on wheel hub and secure by hand with two opposing wheel bolts.
- ◆ Screw in remaining wheel bolts by hand. They should screw in easily. Make sure the bores are exactly centralised.
- ◆ If necessary lift the wheel slightly and tighten two wheel bolts lightly by hand.
- ◆ When fitting the wheel, screw in all wheel bolts uniformly by hand.
- ◆ Tighten the wheel bolts diagonally using, for example, a four-arm wheel nut wrench, to about 30 Nm.



 **Note**

*Make sure that the correct type of wheel bolts are fitted; refer to ⇒ Electronic parts catalogue .*



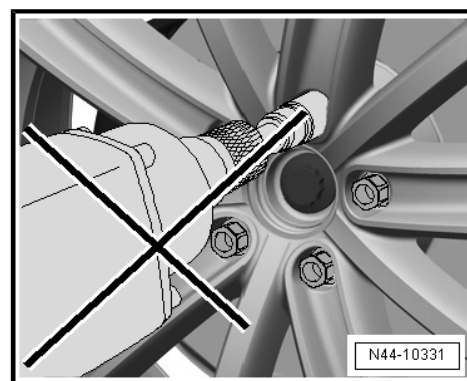
**WARNING**

***Do not use an impact wrench to screw in the wheel bolts.***

- If necessary, take the weight off the wheel by lifting it slightly.
- Lower vehicle to floor and tighten all wheel bolts in diagonal sequence to final specified torque.

⇒ [“3 Tightening torques for wheel bolts”, page 6](#)

- Lower vehicle onto its wheels. ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. gr. 44 ; Wheels, tyres, vehicle geometry



## 13.5 Removing and fitting run-flat tyres



**Caution**

***Run-flat tyres must only be fitted on vehicles with Tyre Pressure Monitoring System/Tyre Pressure Loss Indicator.***

⇒ [“3 Tightening torques for wheel bolts”, page 6](#)