

## Workshop Manual

Golf 2013 ➤ , Golf 2017 ➤ ,  
 Golf Sportsvan 2015 ➤ ,  
 Golf Sportsvan 2018 ➤ ,  
 Golf Variant 2014 ➤ ,  
 Golf Variant 2017 ➤ , Polo 2014 ➤ ,  
 Polo 2018 ➤ , T-Cross 2019 ➤ ,  
 T-Roc 2018 ➤ , Touran 2016 ➤ ,  
 up! 2017 ➤

**3-cylinder direct injection engine (1.0-l engine, 4 V, EA 211, turbocharger)**

Engine ID	CHZ B	CHZ C	CHZ D	CHZ A	CHZ F	CHZJ	CHZL	CHZ K	DKJA
	DKR A	DKLA	DKLB	DKL C	DKR C	DKR F	DKR B		

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## List of Workshop Manual Repair Groups

### Repair Group

- 00 - Technical data
- 10 - Removing and installing engine
- 13 - Crankshaft group
- 15 - Cylinder head, valve gear
- 17 - Lubrication
- 19 - Cooling
- 21 - Turbocharging/supercharging
- 24 - Mixture preparation - injection
- 26 - Exhaust system
- 28 - Ignition system



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



## Contents

<b>00 - Technical data</b>	<b>1</b>
<b>1 Safety information</b>	<b>1</b>
1.1 Safety regulations for working on fuel supply	1
1.2 Safety measures when working on vehicles with start/stop system	1
1.3 Safety precautions when using testers and measuring instruments during a road test	2
1.4 Safety precautions when working on the cooling system	2
1.5 Safety precautions when working on ignition system	2
1.6 Safety precautions when working on exhaust system	3
<b>2 Identification</b>	<b>5</b>
2.1 Engine number/engine data	5
<b>3 Repair notes</b>	<b>13</b>
3.1 Rules for cleanliness	13
3.2 General information	13
3.3 General repair instructions	14
3.4 Foreign objects in engine	14
3.5 Contact corrosion	14
3.6 Routing and attachment of lines	15
3.7 Fitting radiator and condensers	15
3.8 Checking vacuum system	15
<b>10 - Removing and installing engine</b>	<b>16</b>
<b>1 Removing and installing engine</b>	<b>16</b>
1.1 Removing engine	16
1.2 Separating engine and gearbox	62
1.3 Securing engine on engine and gearbox support	66
1.4 Installing engine	69
<b>2 Assembly mountings</b>	<b>81</b>
2.1 Assembly overview - assembly mountings	81
2.2 Removing and installing engine mounting	90
2.3 Removing and installing gearbox mounting	93
2.4 Removing and installing pendulum support	96
2.5 Supporting engine in installation position	98
2.6 Adjusting assembly mountings	129
2.7 Checking adjustment of assembly mountings (engine and gearbox mountings)	131
<b>13 - Crankshaft group</b>	<b>133</b>
<b>1 Cylinder block (pulley end)</b>	<b>133</b>
1.1 Assembly overview - poly V-belt drive	133
1.2 Removing and installing poly-V belt	137
1.3 Removing and installing tensioner for poly V-belt	140
1.4 Removing and installing vibration damper	140
1.5 Removing and installing engine support	143
1.6 Renewing crankshaft oil seal - belt pulley end	146
<b>2 Cylinder block, gearbox end</b>	<b>149</b>
2.1 Assembly overview - cylinder block, gearbox end	149
2.2 Removing and installing flywheel	150
2.3 Removing and installing sealing flange on gearbox side	151
<b>3 Crankshaft</b>	<b>159</b>
3.1 Crankshaft dimensions	159
3.2 Renewing needle bearing in crankshaft	159
<b>4 Pistons and conrods</b>	<b>162</b>
4.1 Assembly overview - pistons and conrods	162



4.2	Removing and installing pistons	164
4.3	Checking pistons and cylinder bores	165
4.4	Separating new conrod	167
4.5	Checking radial clearance of conrods	167
4.6	Removing and installing oil spray jets	167
4.7	Setting piston to TDC position	168
<b>15</b>	<b>Cylinder head, valve gear</b>	<b>171</b>
<b>1</b>	<b>Cylinder head</b>	<b>171</b>
1.1	Assembly overview - cylinder head	171
1.2	Assembly overview - camshaft housing	173
1.3	Removing and installing cylinder head	175
1.4	Removing and installing camshaft housing	178
1.5	Checking compression	181
<b>2</b>	<b>Toothed belt drive</b>	<b>184</b>
2.1	Assembly overview - toothed belt cover	184
2.2	Assembly overview - toothed belt	185
2.3	Removing and installing toothed belt	186
2.4	Preassembling and installing test tool VAS 611 007	192
2.5	Checking valve timing	199
2.6	Adjusting valve timing	201
2.7	Removing toothed belt from camshaft	210
<b>3</b>	<b>Valve gear</b>	<b>216</b>
3.1	Assembly overview - valve gear	216
3.2	Measuring axial play of camshaft	217
3.3	Removing and installing camshaft oil seal	218
3.4	Removing and installing camshaft adjuster	223
3.5	Removing and installing camshaft control valve 1 N205	231
3.6	Removing and installing exhaust camshaft control valve 1 N318	233
3.7	Removing and installing valve stem seals	234
<b>4</b>	<b>Inlet and exhaust valves</b>	<b>244</b>
4.1	Checking valve guides	244
4.2	Checking valves	244
4.3	Valve dimensions	245
<b>17</b>	<b>Lubrication</b>	<b>246</b>
<b>1</b>	<b>Sump, oil pump</b>	<b>246</b>
1.1	Assembly overview - sump/oil pump	246
1.2	Engine oil:	250
1.3	Removing and installing sump	250
1.4	Removing and installing oil pump	254
1.5	Removing and installing oil level and oil temperature sender G266	256
<b>2</b>	<b>Engine oil cooler</b>	<b>257</b>
2.1	Assembly overview - engine oil cooler	257
2.2	Removing and installing engine oil cooler	258
<b>3</b>	<b>Crankcase ventilation</b>	<b>259</b>
3.1	Assembly overview - crankcase breather system	259
3.2	Removing and installing oil separator	260
<b>4</b>	<b>Oil filter, oil pressure switch</b>	<b>263</b>
4.1	Assembly overview - oil filter/oil pressure switch	263
4.2	Removing and installing oil pressure sender G10	264
4.3	Checking oil pressure and oil pressure switch	265
4.4	Removing and installing oil filter housing	265
4.5	Removing and installing oil pressure regulating valve N428	266





<b>19 - Cooling</b>	<b>268</b>
<b>1 Cooling system/coolant</b>	<b>268</b>
1.1 Connection diagram - coolant hoses	268
1.2 Checking cooling system for leaks	269
1.3 Draining and adding coolant	272
<b>2 Coolant pump, regulation of cooling system</b>	<b>292</b>
2.1 Assembly overview - coolant pump, thermostat	292
2.2 Assembly overview - electric coolant pump	294
2.3 Assembly overview - coolant temperature sender	296
2.4 Removing and installing electric coolant pump	297
2.5 Removing and installing coolant pump	300
2.6 Removing and installing thermostat	304
2.7 Removing and installing toothed belt pulley for coolant pump	307
2.8 Removing and installing coolant temperature sender G62	307
2.9 Removing and installing radiator outlet coolant temperature sender G83	310
<b>3 Coolant pipes</b>	<b>315</b>
3.1 Assembly overview - coolant pipes	315
3.2 Removing and installing coolant pipes	315
<b>4 Radiator, radiator fan</b>	<b>317</b>
4.1 Assembly overview - radiator/radiator fan	317
4.2 Assembly overview - radiator cowl and radiator fan	326
4.3 Assembly overview - radiator blind	329
4.4 Removing and installing radiator	331
4.5 Removing and installing water radiator for charge air cooling circuit	350
4.6 Removing and installing radiator cowl	354
4.7 Removing and installing radiator fan V7	359
4.8 Removing and installing radiator blind	360
4.9 Removing and installing radiator blind control motor V544	362
<b>21 - Turbocharging/supercharging</b>	<b>366</b>
<b>1 Turbocharger</b>	<b>366</b>
1.1 Assembly overview - turbocharger	366
1.2 Removing and installing turbocharger	368
1.3 Removing and installing charge pressure positioner V465	374
1.4 Removing and installing connection for turbocharger	375
<b>2 Charge air system</b>	<b>378</b>
2.1 Assembly overview - charge air system	378
2.2 Removing and installing charge air cooler	380
2.3 Removing and installing charge pressure sender GX26	383
2.4 Checking charge air system for leaks	383
2.5 Removing and installing air pipe	385
<b>24 - Mixture preparation - injection</b>	<b>388</b>
<b>1 Injection system</b>	<b>388</b>
1.1 Overview of fitting locations - injection system	388
<b>2 Injectors</b>	<b>400</b>
2.1 Assembly overview - fuel rail with injectors	400
2.2 Removing and installing fuel rail	402
2.3 Removing and installing injectors	403
2.4 Cleaning injectors	408
<b>3 Air filter</b>	<b>410</b>
3.1 Assembly overview - air filter housing	410
3.2 Removing and installing air filter housing	416
3.3 Removing air duct on lock carrier	419



<b>4</b>	<b>Intake manifold</b>	<b>421</b>
4.1	Assembly overview - intake manifold	421
4.2	Removing and installing intake manifold	422
4.3	Removing and installing throttle valve module GX3	428
4.4	Cleaning throttle valve module GX3	429
<b>5</b>	<b>Senders and sensors</b>	<b>431</b>
5.1	Assembly overview - actuator for structure-borne sound R214 and control unit for structure-borne sound J869	431
5.2	Removing and installing fuel pressure sender G247	432
5.3	Checking fuel pressure sender G247	433
5.4	Removing and installing intake manifold sender GX9	434
5.5	Removing and installing exhaust gas pressure sensor 1 G450	435
<b>6</b>	<b>Engine control unit</b>	<b>437</b>
6.1	Assembly overview - engine control unit	437
6.2	Removing and installing engine (motor) control unit J623	440
<b>7</b>	<b>High-pressure pump</b>	<b>449</b>
7.1	Assembly overview - high-pressure pump	449
7.2	Removing and installing high-pressure pump	450
7.3	Removing and installing high-pressure pipe	451
<b>8</b>	<b>Lambda probe</b>	<b>453</b>
8.1	Assembly overview - Lambda probe	453
8.2	Removing and installing Lambda probe	454
<b>26</b>	<b>Exhaust system</b>	<b>457</b>
<b>1</b>	<b>Exhaust pipes and silencers</b>	<b>457</b>
1.1	Assembly overview - silencers	457
1.2	Separating exhaust pipes from silencers	465
1.3	Removing and installing silencer	469
1.4	Aligning exhaust system free of stress	478
1.5	Checking exhaust system for leaks	478
1.6	Installation position of clamp	479
<b>2</b>	<b>Emission control</b>	<b>482</b>
2.1	Assembly overview - emission control	482
2.2	Removing and installing catalytic converter	489
2.3	Removing and installing particulate filter	492
<b>28</b>	<b>Ignition system</b>	<b>493</b>
<b>1</b>	<b>Ignition system</b>	<b>493</b>
1.1	Assembly overview - ignition system	493
1.2	Removing and installing ignition coils with output stage	494
1.3	Removing and installing knock sensor 1 G61	497
1.4	Removing and installing Hall sender	498
1.5	Removing and installing engine speed sender G28	499



## 00 – Technical data

### 1 Safety information

(VRL012767; Edition 02.2019)

⇒ [“1.1 Safety regulations for working on fuel supply”, page 1](#)

⇒ [“1.2 Safety measures when working on vehicles with start/stop system”, page 1](#)

⇒ [“1.3 Safety precautions when using testers and measuring instruments during a road test”, page 2](#)

⇒ [“1.4 Safety precautions when working on the cooling system”, page 2](#)

⇒ [“1.5 Safety precautions when working on ignition system”, page 2](#)

⇒ [“1.6 Safety precautions when working on exhaust system”, page 3](#)

#### 1.1 Safety regulations for working on fuel supply

**Risk of injury from highly pressurised fuel.**

The fuel system is pressurised. Injury from fuel spray possible.

Before opening the fuel system:

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

#### **Danger of fire caused by escaping fuel**

When the battery is connected and the driver door opens, the door contact switch activates the fuel pump. Escaping fuel can ignite and cause a fire.

- Disconnect voltage supply to fuel pump before opening the fuel system.

#### 1.2 Safety measures when working on vehicles with start/stop system

**Risk of injury due to unexpected motor start**

If the vehicle's start/stop system is activated, the engine can start unexpectedly. A message in the dash panel insert indicates whether the start/stop system is activated.

Deactivate start/stop system by switching off the ignition.



### 1.3 Safety precautions when using testers and measuring instruments during a road test

#### Risk of injury caused by unsecured testing and measuring instruments

When the front passenger airbag is triggered in an accident, insufficiently secured testing and measuring instruments become dangerous projectiles.

- Secure testing and measuring instruments on the rear seat.
- or
- Have a second person operate the test and measuring equipment on the rear seat.

### 1.4 Safety precautions when working on the cooling system

#### Danger of scalding by hot coolant

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

### 1.5 Safety precautions when working on ignition system

#### Risk of injury due to electric shock

The ignition system is under high voltage when the engine is running. Touching the ignition system may result in an electric shock.

- Do not touch or disconnect ignition cables when the engine is running or being turned at starter speed.

#### Risk of damage to components

Connecting or disconnecting electric cables or washing the engine while it is running may damage components.

- Switch off the ignition before connecting or disconnecting electric cables.
- Switch off the ignition before washing the engine.



## 1.6 Safety precautions when working on exhaust system

### Risk of poisoning due to chemical substances

Exhaust gas temperature senders may contain chemical substances. There is a risk of poisoning or injuries to respiratory system.

- Never open an exhaust gas temperature sender by cutting, sawing or any other means.

### Risk of injury due to hot condensate and particles in the exhaust system.

The exhaust system could contain hot condensate and/or particles. There is a risk of injury to the eyes, skin and respiratory system, as well as poisoning.

- Always wear protective gloves and eye protection when cutting the exhaust system.
- When cutting, use an extraction system or otherwise ensure sufficient ventilation.







## 2 Identification

⇒ **"2.1 Engine number/engine data", page 5**

### 2.1 Engine number/engine data

The engine code and the engine number can be found on the sticker -arrow- on the upper toothed belt guard.

The engine code is also on the vehicle data sticker and on the crankcase above the gearbox.

The engine number consists of up to 9 characters (alphanumeric). The first part (maximum 3 characters) makes up the "engine code", and the second part (6 characters), the "serial number". If more than 999,999 engines were produced with the same code letters, the first of the six digits is replaced by a letter.

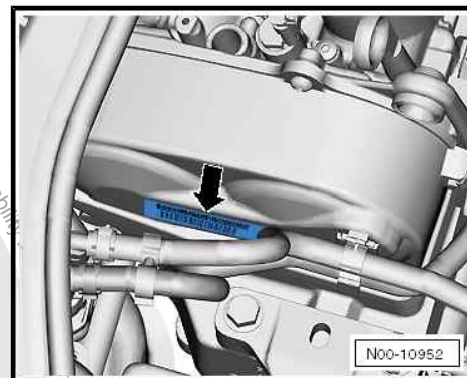
#### Engine code

Four-place engine codes are being introduced, starting with letter "C". The first 3 places show the mechanical design of engine and are stamped on the engine as previously. The fourth digit denotes the performance and torque rating of the engine and depends on the engine control unit - J623- . The four-digit engine code can be found on the type plate, the vehicle data label and on the engine control unit.



#### Note

*Fitting locations of vehicle data sticker ⇒ Maintenance ; Booklet ; Vehicle data sticker .*





## Engine data

Co- des	CH ZA	CH ZB	CH ZC	CH ZD	CH ZF	CH ZJ	CH ZK	CH ZL	DK JA	DK RA
M an uf ac tur ed		12. 14 ▶	12. 14 ▶							
G ol f 2 0 1 3 ▶				05. 15 ▶						
G ol f E st at e 2 0 1 4 ▶				05. 15 ▶						
G ol f S V 2 0 1 5 ▶				05. 15 ▶						
G ol f S V 2 0 1 8 ▶			11. 17 ▶		11. 17 ▶		11. 17 ▶			08. 18 ▶
u p! 2 0 1 7 ▶	05. 16 ▶									11. 17 ▶
G ol f 2 0 1 7 ▶			10. 16 ▶		02. 17 ▶		02. 17 ▶			08. 18 ▶





Co- des	CH ZA	CH ZB	CH ZC	CH ZD	CH ZF	CH ZJ	CH ZK	CH ZL	DK JA	DK RA
G o l f E s t a t e 2 0 1 7 ➤ P o l o 2 0 1 8 ➤ T - R o c 2 0 1 8 ➤ T - C r o s s ➤			10. 16 ➤		02. 17 ➤					08. 18 ➤
						09. 17 ➤		09. 17 ➤	09. 17 ➤	08. 18 ➤
						11. 17 ➤				08. 18 ➤
										12. 18 ➤
Ex h a u s t e m i s s i o n s t a n d a r d	EU 6	EU 6	EU 6	EU 6	EU 6	EU 6	EU 6	EU 6	EU 6	EU 6
Di s p l a c e m e n t	999	999	999	999	999	999	999	999	999	999
Po w e r	66/ 500 0 ... 550 0	70/ 500 0 ... 550 0	81/ 550 0	85/ 500 0-5 500	63/ 500 0-5 500	85/ 500 0-5 500	63/ 500 0-5 500	70/ 500 0 ... 550 0	85/ 500 0-5 500	85/ 500 0-5 500



Co- des		CH ZA	CH ZB	CH ZC	CH ZD	CH ZF	CH ZJ	CH ZK	CH ZL	DK JA	DK RA
To rq ue	N m at rp m	160 / 150 0 ... 350 0	160 / 150 0 ... 350 0	200 / 150 0 ... 350 0	200 / 200 0 ... 350 0	160 / 150 0 ... 350 0	200 / 200 0 ... 350 0	175 / 200 0 ... 300 0	175 / 200 0 ... 350 0	200 / 200 0 ... 350 0	200 / 200 0 ... 350 0
Bo re	Di a m et er , m m	74. 5	74. 5	74. 5	74. 5	74. 5	74. 5	74. 5	74. 5	74. 5	74. 5
St ro ke	m m	76. 4	76. 4	76. 4	76. 4	76. 4	76. 4	76. 4	76. 4	76. 4	76. 4
C o m p r e s s i o n r a t i o		10. 5	10. 5	10. 5	10. 5	10. 5	10. 5	10. 5	10. 5	10. 5	10. 5
R O N	At le a st	95	95	95	95	95	95	95	95	95	95
Igni- tion/ injec- tion sys- tem		FSI	FSI	FSI	FSI	FSI	FSI	FSI	FSI	FSI	FSI
Ex- haust gas recir- cula- tion		no	no	no	no	no	no	no	no	no	no
Ex- haust gas tem- pera- ture regu- lation		no	no	no	no	no	no	no	no	no	no
Char- ging		Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger	Tur bo- cha rger
Knoc- k con- trol		1 sen sor	1 sen sor	1 sen sor	1 sen sor	1 sen sor	1 sen sor	1 sen sor	1 sen sor	1 sen sor	1 sen sor
Char- ge air cool- ing		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes



Co- des	CH ZA	CH ZB	CH ZC	CH ZD	CH ZF	CH ZJ	CH ZK	CH ZL	DK JA	DK RA
Lamb da regu- lation	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter	La mb da pro be be- fore cat- alyti c con ver- ter La mb da pro be af- ter cat- alyti c con ver- ter
Cam- shaft tim- ing ad- just- ment	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e	In- let sid e Ex- hau st sid e
Vari- able in- take mani- fold	no	no	no	no	no	no	no	no	no	no
Sec- on- dary air sys- tem	no	no	no	no	no	no	no	no	no	no
Valve s per cylin- der	4	4	4	4	4	4	4	4	4	4
Firing order	1-2- 3	1-2- 3	1-2- 3	1-2- 3	1-2- 3	1-2- 3	1-2- 3	1-2- 3	1-2- 3	1-2- 3



Codes	DKLA	DKLB	DKLC	DKRC	DKRF	DKRB
Manufac- tured						
Polo 2014 ➤						
Golf 2013 ➤						
Golf Estate 2014 ➤						
Golf SV 2015 ➤						
Golf SV 2018 ➤		08.18		07.18	08.18	
up! 2017 ➤			09.18			
Golf 2017 ➤		08.18		07.18	08.18	
Golf Estate 2017 ➤		08.18		07.18	08.18	
Polo 2018 ➤	08.18				08.18	
T-Roc 2018 ➤					08.18	
T-Cross ➤	12.18					
Toucan 2016 ➤						01.19
Exhaust emission standard	EU6	EU6	EU6	EU6	EU6	
Displacement	999	999	999	999	999	



Codes	DKLA	DKLB	DKLC	DKRC	DKRF	DKRB
Pow er kW at rpm	70/500 0 ... 5500	63/500 0 ... 5500	66/500 0 ... 5500	81/500 0-5500	85/500 0-5500	
Tor- que Nm at rpm	175/20 00 ... 3500	175/15 00 ... 3000	160/15 00 ... 3000	200/20 00 ... 3500	200/20 00 ... 3500	
Bore Dia met er, mm	74.5	74.5	74.5	74.5	74.5	
Stro ke mm	76.4	76.4	76.4	76.4	76.4	
Com pres sion ratio	10.5	10.5	10.5	10.5	10.5	
RO N At lea st	95	95	95	95	95	
Ignition/ injection system	FSI	FSI	FSI	FSI	FSI	
Exhaust gas recir- culation	no	no	no	no	no	
Exhaust gas tem- perature regula- tion	no	no	no	no	no	
Charging	Turbo- charg- er	Turbo- charg- er	Turbo- charg- er	Turbo- charg- er	Turbo- charg- er	
Knock control	1 sen- sor	1 sen- sor	1 sen- sor	1 sen- sor	1 sen- sor	
Charge air cool- ing	yes	yes	yes	yes	yes	
Lambda regula- tion	Lamb- da probe before cata- lytic con- verter Lamb- da probe after cata- lytic con- verter	Lamb- da probe before cata- lytic con- verter Lamb- da probe after cata- lytic con- verter	Lamb- da probe before cata- lytic con- verter Lamb- da probe after cata- lytic con- verter	Lamb- da probe before cata- lytic con- verter Lamb- da probe after cata- lytic con- verter	Lamb- da probe before cata- lytic con- verter Lamb- da probe after cata- lytic con- verter	
Camshaft timing ad- justment	Inlet side Ex- haust side	Inlet side Ex- haust side	Inlet side Ex- haust side	Inlet side Ex- haust side	Inlet side Ex- haust side	
Variable intake manifold	no	no	no	no	no	



Codes	DKLA	DKLB	DKLC	DKRC	DKRF	DKRB
Secondary air system	no	no	no	no	no	
Valves per cylinder	4	4	4	4	4	
Firing order	1-2-3	1-2-3	1-2-3	1-2-3	1-2-3	



## 3 Repair notes

⇒ ["3.1 Rules for cleanliness", page 13](#)

⇒ ["3.2 General information", page 13](#)

⇒ ["3.3 General repair instructions", page 14](#)

⇒ ["3.4 Foreign objects in engine", page 14](#)

⇒ ["3.5 Contact corrosion", page 14](#)

⇒ ["3.6 Routing and attachment of lines", page 15](#)

⇒ ["3.7 Fitting radiator and condensers", page 15](#)

⇒ ["3.8 Checking vacuum system", page 15](#)

### 3.1 Rules for cleanliness

Even slight soiling can cause faults. When working on the fuel supply, injection and turbocharger system, pay careful attention to the following rules of cleanliness:

- ◆ Carefully clean connection points and the surrounding area with engine cleaner or brake cleaner and dry thoroughly before opening.
- ◆ Seal open pipes and connections immediately with clean plugs for example from the engine bung set - VAS 6122- .
- ◆ Place removed parts on a clean surface and cover them over. Use lint-free cloths only.
- ◆ If repair work cannot be performed immediately, carefully cover or seal components.
- ◆ Install only clean parts; do not remove new parts from packaging until immediately before installing. Do not use parts that have been stored outside of their packaging (e.g. in tool boxes).
- ◆ If system is open, do not work with compressed air. Try not to move the vehicle.
- ◆ Make sure that no fuel gets onto the fuel hoses. Should this occur, the fuel hoses must be cleaned immediately.
- ◆ Protect disconnected electrical connectors from dirt and water, and reconnect them only when dry.

### 3.2 General information

- ◆ The engine control unit has a self-diagnosis capability. Interrogate the event memory before performing repairs and before fault finding. Also check the vacuum hoses and connections (unmetered air).
- ◆ For trouble-free operation of electrical components, a voltage of at least 11.5 volts is necessary.
- ◆ Do not use sealants containing silicone. Particles of silicone drawn into the engine will not be burnt in the engine and damage the Lambda probe.
- ◆ Vehicles are fitted with a crash fuel shut-off circuit. The risk of a fire after a crash is diminished by the fuel pump relay switching off the fuel pump.
- ◆ The system also improves the starting characteristics of the engine. When the driver door is opened, the fuel pump is activated for 2 seconds in order to build up pressure in the fuel system, observe safety precautions  
⇒ ["1.1 Safety regulations for working on fuel supply", page 1](#) .



### 3.3 General repair instructions

- ♦ Clean tools and workbench etc. before working on injection system.
- ♦ If the high-pressure lines are not renewed, the existing high-pressure lines must be labelled before removal.
- ♦ High-pressure fuel lines must always be re-installed in their original positions (i.e. on the same cylinder).
- ♦ Align high-pressure lines so that they are not subjected to stress . First tighten all unions hand-tight and then tighten to torque.
- ♦ Never attempt to reshape high-pressure lines.
- ♦ When working on any parts of the high-pressure fuel system, tools may only be used for loosening and tightening pipe unions. All other components must always be removed and installed by hand without using tools or other equipment.
- ♦ All cable ties that are opened or cut through during removal must be fitted/renewed in the same position during installation.
- ♦ Fuel hoses in engine compartment must be secured only with spring-type clips. The use of crimp-type or screw-type clips is not permissible.

### 3.4 Foreign objects in engine

- ♦ When performing assembly work on the engine, all open passages in the intake and exhaust systems must always be sealed with suitable plugs to prevent foreign particles from entering the engine. Use engine bung set - VAS 6122- .
- ♦ To prevent subsequent damage when a cylinder bank is damaged mechanically, check the intake and exhaust sections as well as the combustion chambers of the opposite cylinder bank for foreign bodies.



#### Note

*In the event of mechanical damage on turbocharger, proceed according to chapter  
⇒ ["1.2 Removing and installing turbocharger", page 368](#) .*

### 3.5 Contact corrosion

Contact corrosion can occur if unsuitable screws, bolts, nuts or washers are used.

For this reason, only screws, bolts, nuts and washers with a special surface coating have been fitted.

In addition, rubber, plastic and adhesives are made of non-conductive materials.

If there is any doubt about the suitability of parts, a general rule is to use new parts ⇒ Electronic Parts Catalogue .

#### Observe the following:

- ♦ Use only genuine parts as these have been tested and are compatible with aluminium.
- ♦ The use of genuine parts is always recommended.
- ♦ Damage resulting from contact corrosion is not covered by the warranty.





### 3.6 Routing and attachment of lines

- ◆ To prevent interchanging and to maintain the original installation position, mark the fuel, hydraulic system, vacuum and ACF system pipes or any wiring for example prior to removal. Make sketches or take photographs if necessary.
- ◆ To avoid damaging pipes and wires, ensure adequate clearance from all moving or hot components in the engine compartment on account of the confined space.

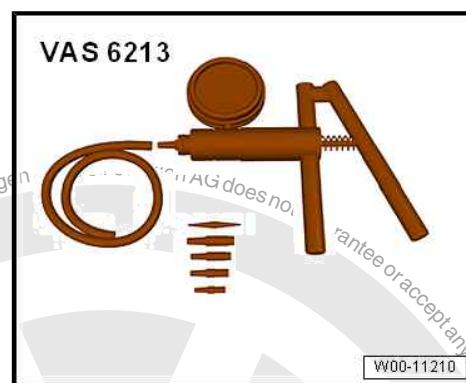
### 3.7 Fitting radiator and condensers

Even when correctly installed, radiator and condenser may show slight marks on plates. This does not mean that these components have been damaged. Minor indentations such as these are not a reason to renew either the radiator or condenser.

### 3.8 Checking vacuum system

#### Special tools and workshop equipment required

- ◆ Hand operated vacuum pump - VAS 6213-



#### Sequence of operations

- Check all vacuum lines throughout entire vacuum system for:
  - ◆ Cracks
  - ◆ Marten bites
  - ◆ Crushing
  - ◆ Porous areas and other leaks
- Check vacuum line to solenoid valve and from solenoid valve to relevant component.
- If an entry is stored in the event memory, check all vacuum lines leading to the corresponding component and also check the remaining vacuum lines leading to other components.
- If pressure cannot be built-up using hand vacuum pump - VAS 6213- or pressure immediately drops again, check hand vacuum pump and connecting hoses for leaks.



## 10 – Removing and installing engine

### 1 Removing and installing engine

⇒ [“1.1 Removing engine”, page 16](#)

⇒ [“1.2 Separating engine and gearbox”, page 62](#)

⇒ [“1.3 Securing engine on engine and gearbox support”, page 66](#)

⇒ [“1.4 Installing engine”, page 69](#)

#### 1.1 Removing engine

⇒ [“1.1.1 Removing engine, Polo 2014 ►”, page 16](#)

⇒ [“1.1.2 Removing engine, Golf, Golf Estate, SV, Touran”, page 26](#)

⇒ [“1.1.3 Removing engine, up!”, page 38](#)

⇒ [“1.1.4 Removing engine, Polo 2018, T-Cross”, page 46](#)

⇒ [“1.1.5 Removing engine, T-Roc”, page 54](#)

##### 1.1.1 Removing engine, Polo 2014 ►



# Special tools and workshop equipment required

<p><b>80-200</b></p> 	<p><b>VA S 5085</b></p> 
<p><b>VA S 6122</b></p> 	<p><b>VA S 6208</b></p> 
<p><b>VA S 6362</b></p> 	<p><b>VA S 6931</b></p>  <p>G10-10105</p>
<p><b>T10060 A</b></p>  <p>W00-11211</p>	
<p><b>T10483</b></p>  <p>W00-10999</p>	



- ◆ Release lever - 80-200-
- ◆ Stepladder - VAS 5085- , or a commercially available stepladder
- ◆ Engine bung set - VAS 6122-
- ◆ Drip tray for workshop hoist - VAS 6208-
- ◆ Spring-type clip pliers - VAS 6362-
- ◆ Engine and gearbox jack - VAS 6931-
- ◆ Locking pin - T10060A-
- ◆ Engine support - T10483-
- ◆ Protective mat - VAS 531003- (not illustrated)
- ◆ Safety goggles
- ◆ Safety gloves

### Sequence of operations



#### Note

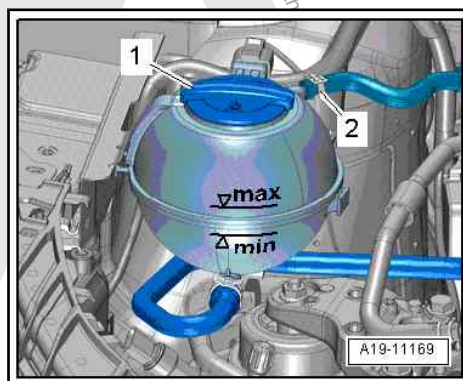
- ◆ *The engine is removed downwards together with the gearbox.*
- ◆ *Attach cable ties in all the same places when installing.*

### CAUTION

**On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.**

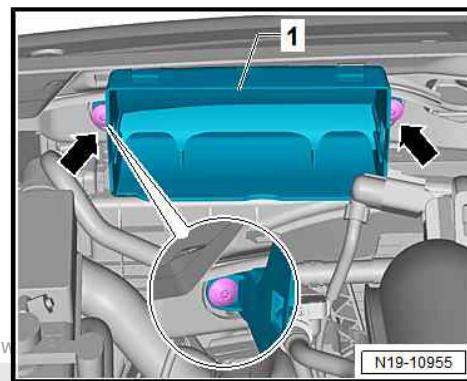
**Skin and other parts of the body may be scalded.**

- Wear protective gloves.
  - Wear protective goggles.
  - Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.
- 
- Open cap -1- on coolant expansion tank.
  - Remove coolant hoses. To do this, loosen hose clips -2-.
  - Remove air filter housing.  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)

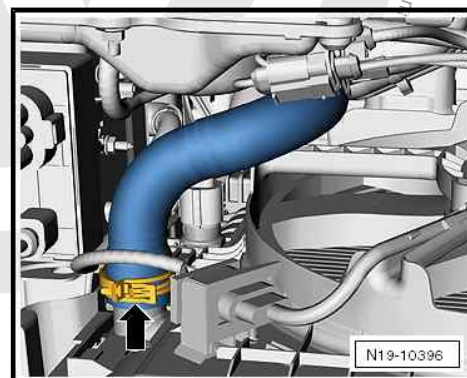
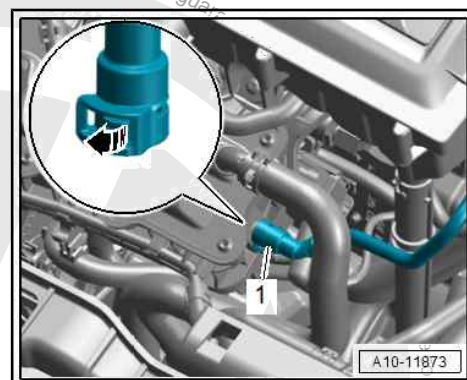




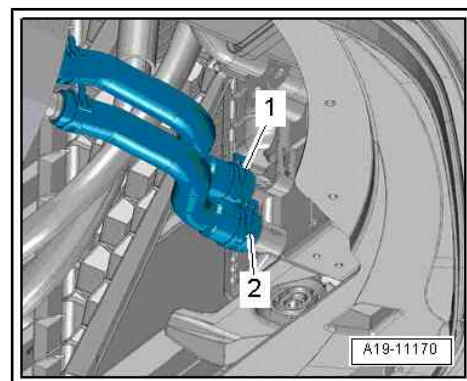
- Unscrew bolts -arrows- from mounting -1- for air duct.
- Pull out mounting for air duct.



- Release catch -arrow- and disconnect vacuum hose -1-.
- Disconnect earth wire from battery terminal ⇒ Electrical system; Rep. gr. 27 ; Battery, Disconnecting and connecting battery .
- Remove battery tray. ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove front wheels.
- Remove left and right front wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing front wheel housing liner .
- Place drip tray - VAS 6208 - beneath engine.
- Remove lower left coolant hose from radiator.
- To do this, loosen hose clip -arrow-, and drain coolant.



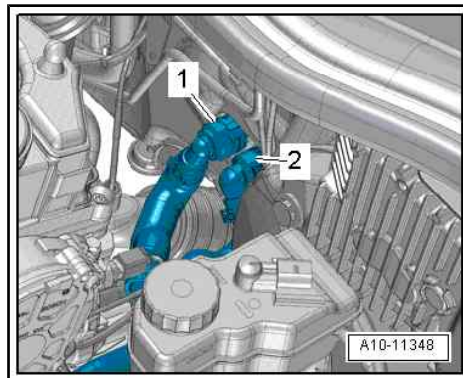
- Remove lower right coolant hoses from radiator.
- To do this, release hose clips -1 and 2-, and drain any remaining coolant.







- Place drip tray for workshop hoist - VAS 6208- under point of separation.
- Disconnect coolant hoses from heat exchanger for heater. Lift retaining clips -1, 2- to do this.
- Hold coolant hoses downwards to allow coolant to drain.



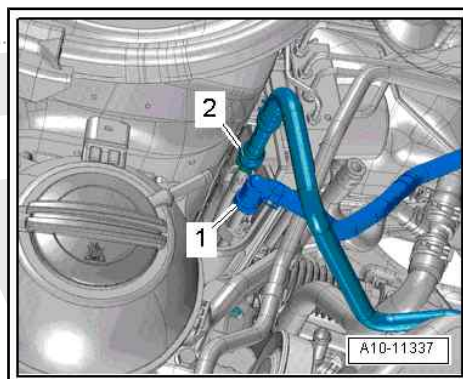
- Press release tabs, and remove vacuum hose -1- from activated charcoal filter.
- Press release tabs and disconnect fuel supply line -2-.

**CAUTION**

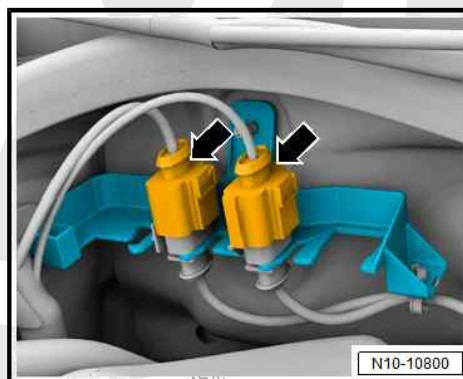
The fuel system is pressurised.

Danger of injury through fuel spray.

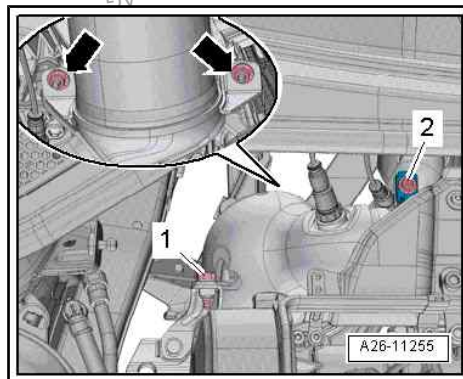
- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



- Seal open lines and unions with clean plugs from engine sealing plug set - VAS 6122- .
- Disconnect connectors -arrows- and unclip wiring harness from retainer.
- Unclip line guides for lambda probes from vehicle.

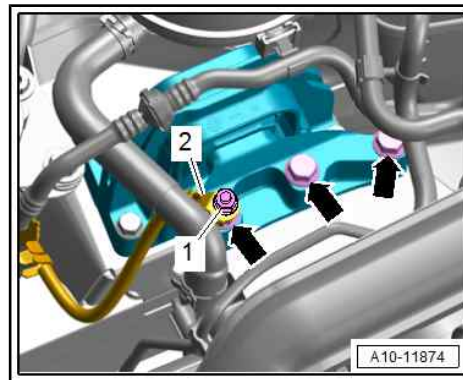


- Unscrew bolt -2- and remove screw-type clip.
- Unscrew bolt -1- and nuts -arrows-, and secure catalytic converter to vehicle.





- Unscrew nut -1-, and lay earth wire -2- to one side.
- Unscrew bolts -arrows- for engine mounting support arm by about 2 turns.

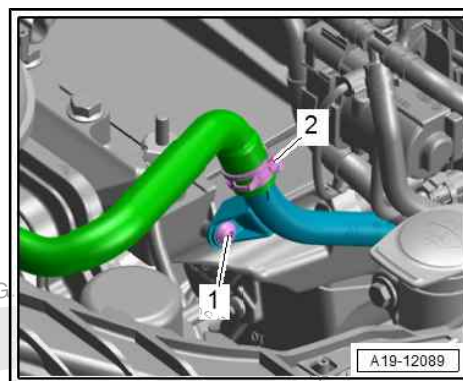


- Release hose clip -2- and detach coolant hose.

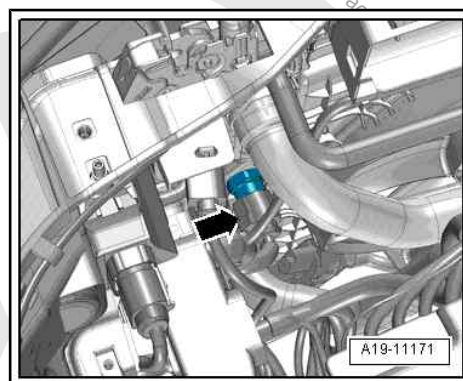


#### Note

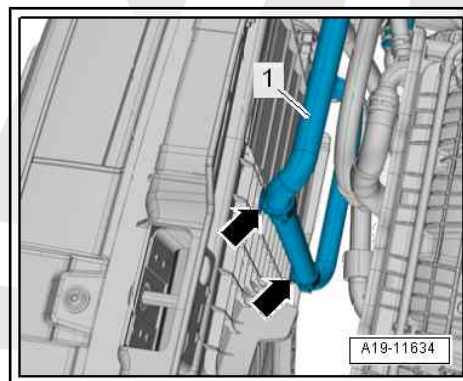
*Disregard -item 1-.*



- Disconnect connector -arrow- on radiator outlet coolant temperature sender - G83- .

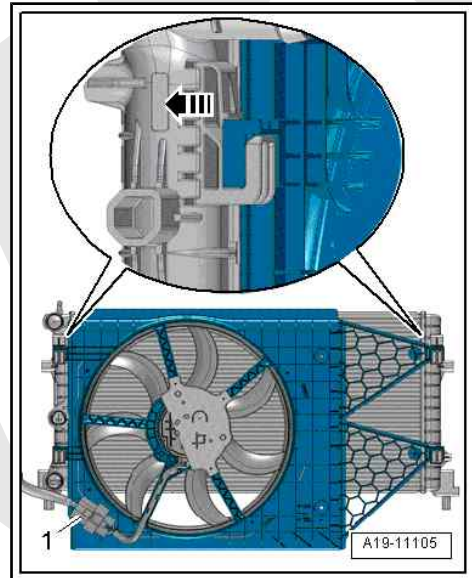


- Move coolant hose -1- clear -arrows-.

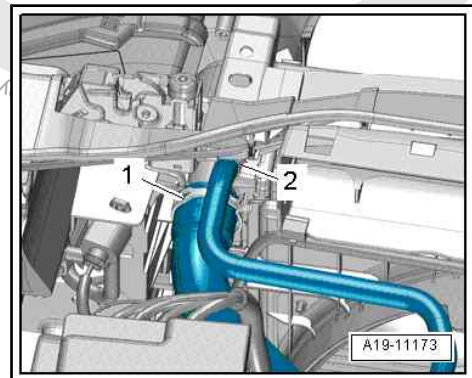




- Separate connector -1- for radiator fan.
- Simultaneously press locking tabs on left and right of radiator cowl -arrow-.
- Pull radiator cowl upwards off radiator, and remove it downwards.



- Remove coolant hoses from radiator at top left, releasing clips -1 and 2- to do so.



- Cover radiator using protective mat - VAS 531003- .



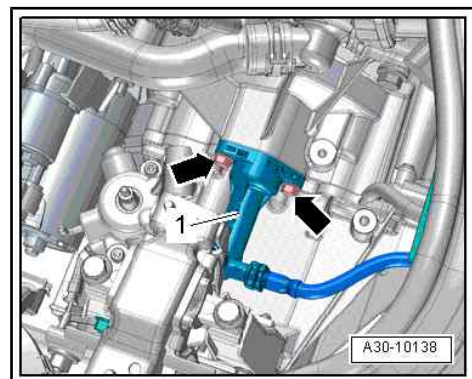
- Unscrew bolts -arrows-, remove clutch slave cylinder -1-, and lay it aside. Do not open the pipe/hose system.



#### Note

*Do not operate clutch pedal when clutch slave cylinder is removed.*

- Disconnect connectors at front of gearbox:
  - 2 - for starter
  - 3 - for gearbox neutral position sender - G701-

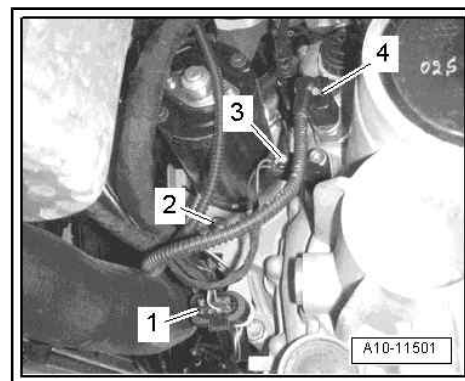




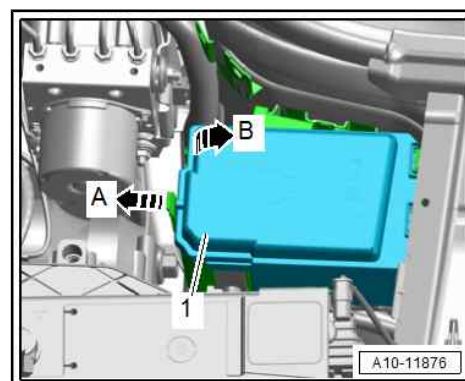


#### 4 - for reversing light switch - F4-

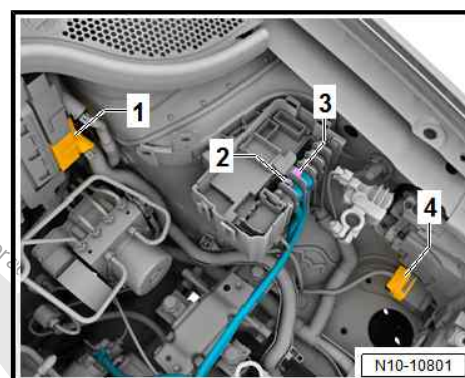
- Remove electrical connector -1- from bracket and disconnect.
- Remove gear selector cable and gate selector cable from gearbox, unbolt cable support bracket, and lay it to one side together with cables ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism .



- Release catches -arrow A-.
- Open electronics box cover -1-, and remove it in direction of -arrow B-.
- Release and pull off lower connector -1- on engine control unit - J623- .  
⇒ ["6.2 Removing and installing engine \(motor\) control unit J623", page 440](#)



- Disconnect electrical connector -4-.
- Unscrew bolts -2 and 3-, remove wires, and lay them to one side.
- Detach engine wiring harness using removal lever - 80-200- , and place it on engine.



#### Note

Disregard -item 1-.

#### Vehicles with air conditioner compressor



#### Note

*If a used poly V-belt runs in the opposite direction when it is re-fitted, this can cause breakage.*

- When reinstalling, mark direction of rotation of a used poly V-belt with chalk or felt-tipped pen.
- To slacken poly V-belt, turn tensioning element in -direction of arrow-.

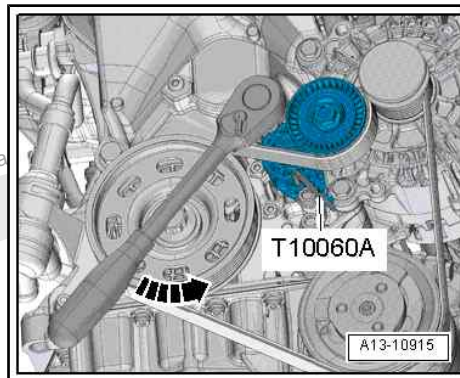


- Remove poly V-belt from poly V-belt pulley on air conditioner compressor.
- Use the locking pin - T10060A- to lock the tensioner.
- Remove poly V-belt.
- Separate connector -1- on air conditioning compressor regulating valve - N280- .

### ⚠ CAUTION

Risk of freezing injury caused by refrigerant.

- Do not open refrigerant circuit of air conditioning system.

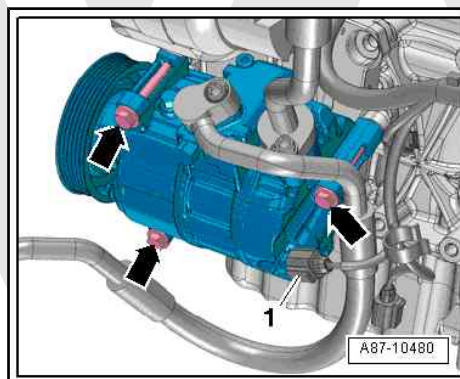


- Unscrew bolts -arrows- for air conditioning compressor.

### ⓘ NOTICE

Risk of damage to refrigerant lines from rupture of inner foil.

- Never bend refrigerant lines to a radius tighter than  $r < 100$  mm.
- Remove air conditioner compressor (with refrigerant lines connected), and secure it to vehicle.



### Continued for all vehicles

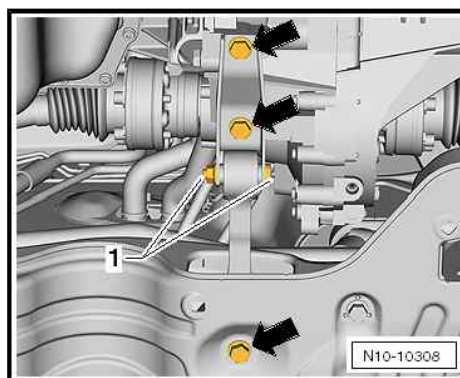
- Pull off connector for oil level and oil temperature sender - G266-  
⇒ ["1.5 Removing and installing oil level and oil temperature sender G266", page 256](#) .
- Remove right and left drive shafts ⇒ Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .



### Note

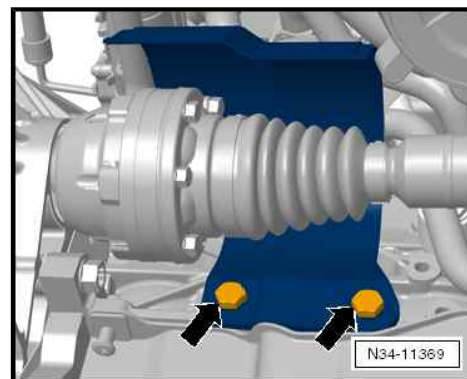
*The threaded connection -1- must not be loosened.*

- Unscrew bolts -arrow- and remove pendulum support.

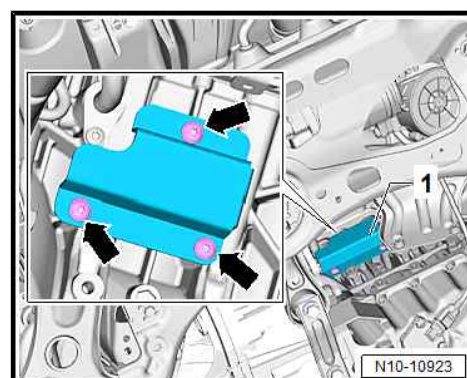




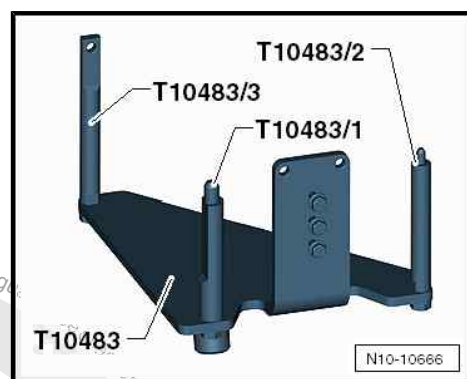
- If fitted: remove bolts -arrows- and detach heat shield for drive shaft (right-side).



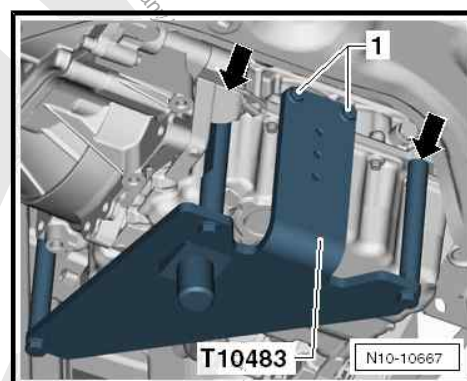
- Unscrew bolts -arrows-, and remove heat shield -1- of knock sensor 1 - G61- .
- Disconnect connector on knock sensor 1 - G61- .
- Unbolt retainer for wiring harness on »radiator end« from cylinder block.



To lower the engine/gearbox assembly, use engine support - T10483- with adapter - T10483/1- , adapter - T10483/2- and adapter - T10483/3- .

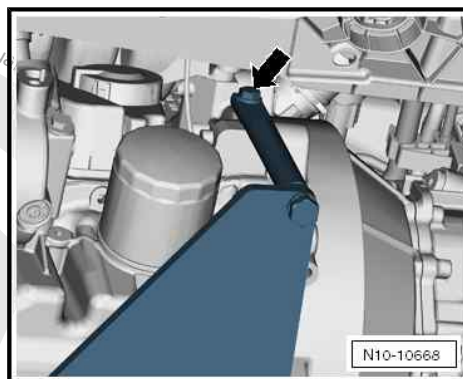


- Push engine support - T10483- to stop into holes -arrows- in cylinder block.
- At first, tighten bolts -1- hand-tight.

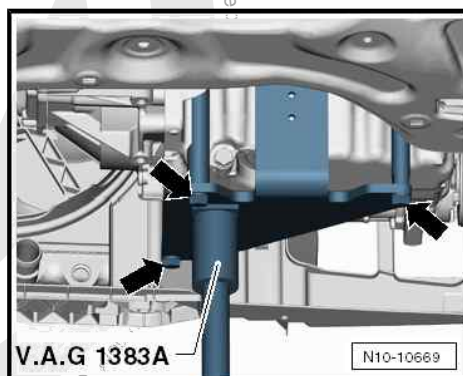




- Initially, tighten bolts -arrow- by hand.



- Tighten bolts -arrows- to 20 Nm.
- Tighten all bolts of engine support - T10483- on cylinder block to 20 Nm.
- Fit engine and gearbox jack - VAS 6931- to engine support - T10483- , and raise engine/gearbox assembly slightly.
- Use a stepladder to unscrew the bolts for engine/gearbox mounting.

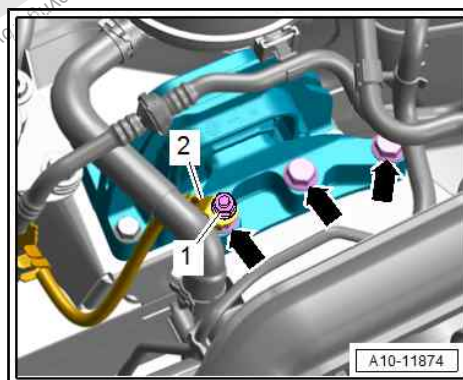


- Unscrew bolts -arrows- for support arm of gearbox mounting completely.
- Unscrew bolts -arrows- for gearbox mounting.



#### Note

- ♦ Risk of damage to the vacuum lines, electrical wiring or the engine compartment.
  - ♦ Check that all vacuum lines and electrical wiring between engine, gearbox, subframe and body have been detached.
  - ♦ When lowering, carefully guide engine/gearbox assembly with assembly carrier out of engine compartment.
- Pull engine/gearbox assembly as far as possible towards the front, and lower it gradually.

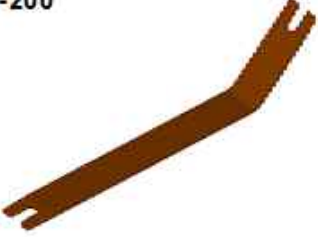

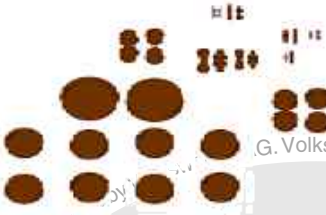

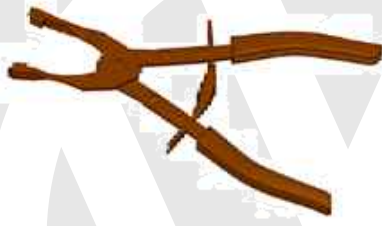







## 1.1.2 Removing engine, Golf, Golf Estate, SV, Touran





# Special tools and workshop equipment required

<p><b>80-200</b></p> 	<p><b>VA S 5085</b></p> 
<p><b>VA S 6122</b></p> 	<p><b>VA S 6208</b></p> 
<p><b>VA S 6362</b></p> 	<p><b>VA S 6931</b></p>  <p>G10-10105</p>
<p><b>2024 A/1</b></p>  <p>W00-11178</p>	<p><b>T10060 A</b></p>  <p>W00-11211</p>
<p><b>T10483</b></p> <p>1. Removing and installing engine</p> 	<p><b>27</b></p> 



- ◆ Release lever - 80-200-
- ◆ Stepladder - VAS 5085- , or a commercially available stepladder
- ◆ Engine bung set - VAS 6122-
- ◆ Drip tray for workshop hoist - VAS 6208-
- ◆ Spring-type clip pliers - VAS 6362-
- ◆ Engine and gearbox jack - VAS 6931-
- ◆ Extension -2024 A /1- of lifting tackle - 2024 A-
- ◆ Locking pin - T10060A-
- ◆ Engine support - T10483-
- ◆ Protective mat - VAS 531003- (not illustrated)
- ◆ Safety goggles
- ◆ Safety gloves

### Sequence of operations



#### Note

- ◆ *The engine is removed downwards together with the gearbox.*
- ◆ *Attach cable ties in all the same places when installing.*



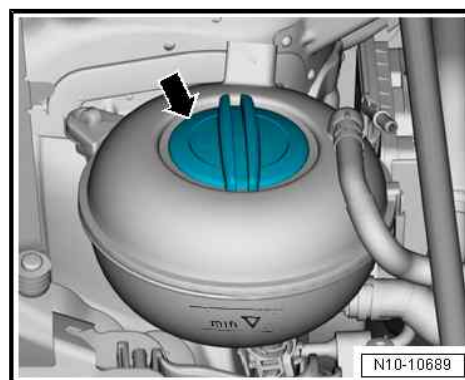
#### CAUTION

On a warm engine, the cooling system is under high pressure.  
Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Open filler cap -arrow- for coolant expansion tank.
- Remove air filter housing.  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)
- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Remove battery tray. ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray
- Remove air duct on lock carrier ⇒ [page 419](#) .





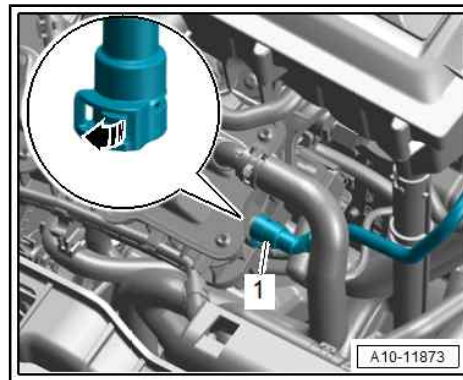
- Release catch -arrow- and disconnect vacuum hose -1-.

### ⚠ CAUTION

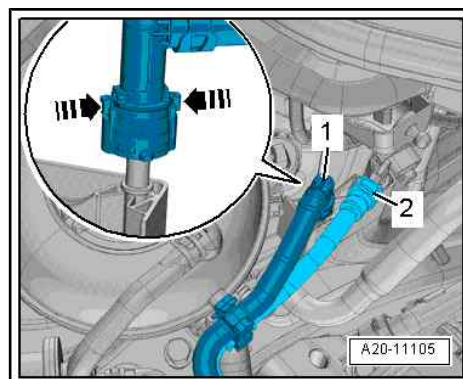
The fuel system is pressurised.

Danger of injury through fuel spray.

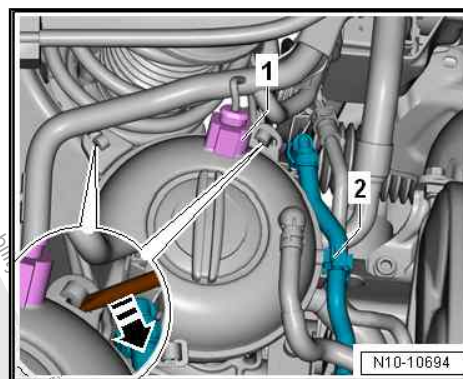
- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



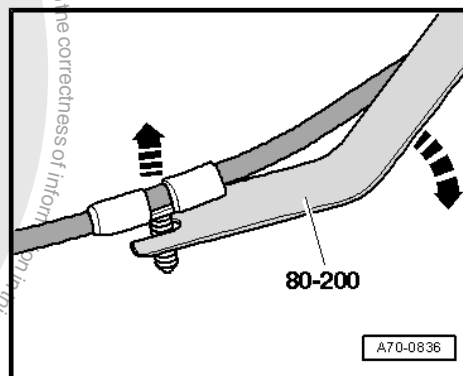
- Open plug-in connectors -1- and -2- of fuel lines, and pull off fuel lines. Disconnect plug-in connectors ⇒ Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .



- Release and pull off electrical connector -1-.
- Disconnect bracket -2- with fuel hoses.
- Use a screwdriver to release catch -arrow-, and place coolant expansion tank on engine.
- Seal open lines and unions with clean plugs from engine sealing plug set - VAS 6122- .
- Remove vacuum pump for brakes - V192- ⇒ Brake system; Rep. gr. 47 ; Vacuum system; Removing and installing electric vacuum pump (for brakes) .

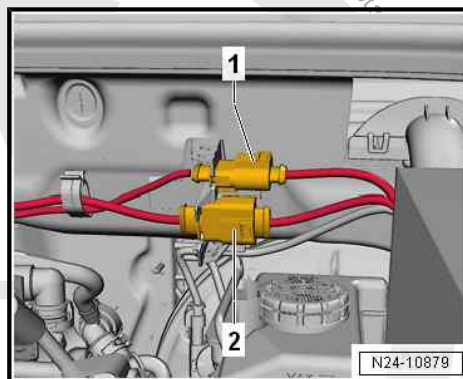


- Use removal lever - 80 - 200- to detach the clips.

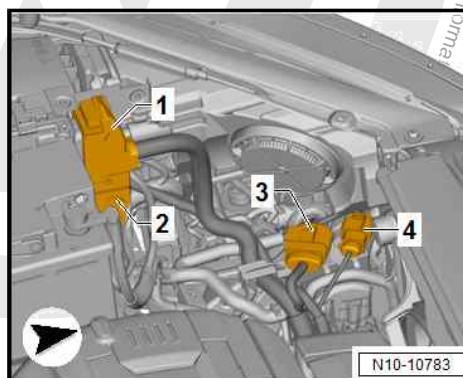




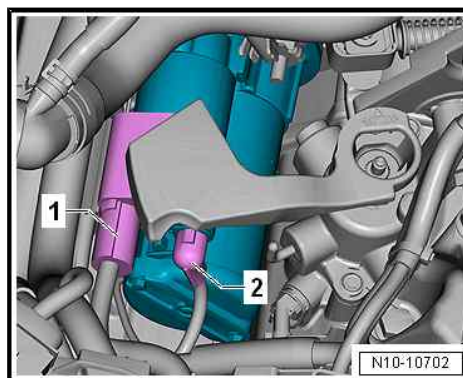
- Disconnect connectors -1- and -2-, and unclip wiring harness from retainer.
- Unclip line guides for lambda probes from vehicle.



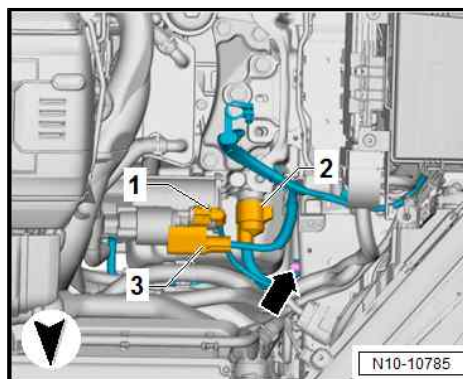
- Release and pull off connectors -2- on engine control unit - J623- ➔ **"6 Engine control unit", page 437** .
- Remove electrical connectors -3- and -4- from retainer and disconnect.
- Move electrical lines free.



- Disconnect electrical connector -2-.
- Push back cover for battery positive terminal -1-, and unbolt battery positive cable from starter solenoid switch.



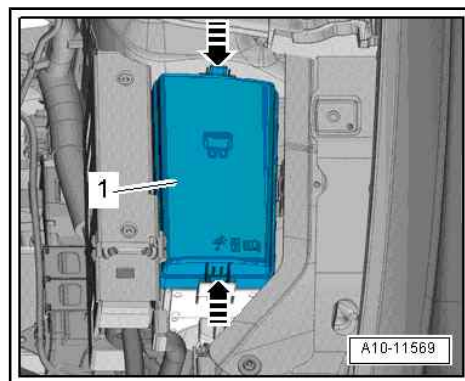
- Unscrew earth wire on body -arrow-.



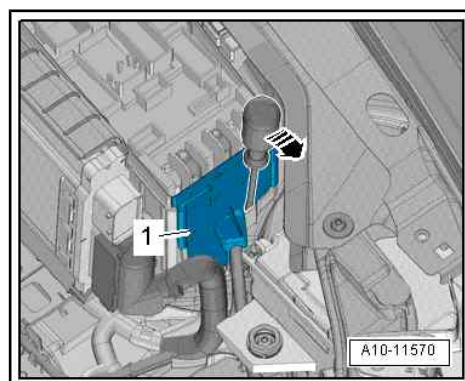




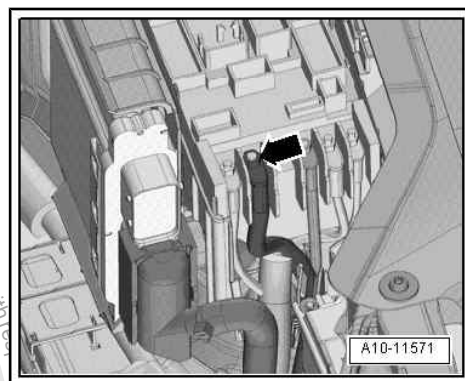
- Release catches -arrows- and detach cover -1- for electronics box in engine compartment.



- Release catch using a screwdriver -arrow- and detach cover -1- for electronics box in engine compartment upwards.



- Remove nut -arrow-, detach electrical wiring and move clear.

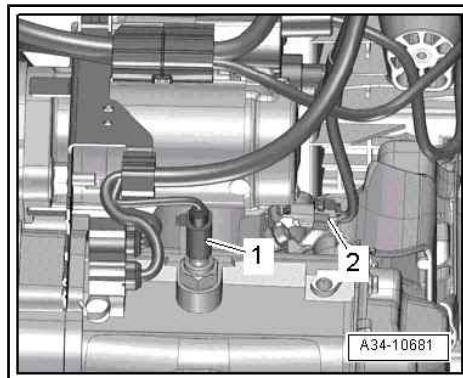




- Release and pull off electrical connector -2-.
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Release and pull off connector -1- working from below.

### Manual gearbox

- Remove selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .
- Remove clutch slave cylinder ⇒ Rep. gr. 30 ; Clutch mechanism; Removing and installing clutch slave cylinder.

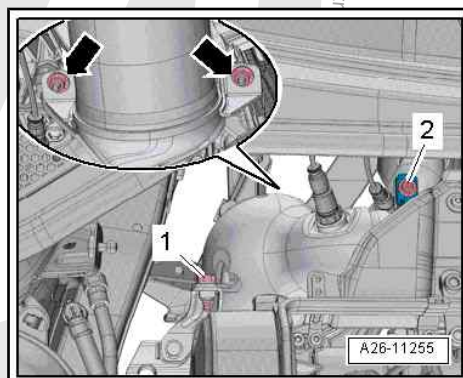


### Dual clutch gearbox

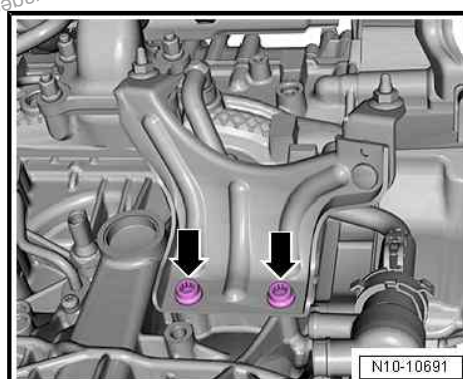
- Release and pull off connector for mechatronic unit for dual clutch gearbox - J743- ⇒ Rep. gr. 34 ; Mechatronic unit .
- Remove selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .

### Continued for all vehicles

- Remove front wheel on left and right. ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels, tyres; Wheel change .
- Remove left and right front wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing front wheel housing liner .
- Unscrew bolt -2- and remove screw-type clip.
- Unscrew bolt -1- and nuts -arrows-, and secure catalytic converter to vehicle.



- Undo bolts -arrow- and remove bracket.
- Remove radiator cowl  
⇒ ["4.6 Removing and installing radiator cowl", page 354](#) .





- Attach protective mat - VAS 531003- to vehicle as shown in illustration.

#### Vehicles with air conditioner compressor

- Remove poly V-belt  
⇒ [“1.2 Removing and installing poly-V belt”, page 137](#) .

#### CAUTION

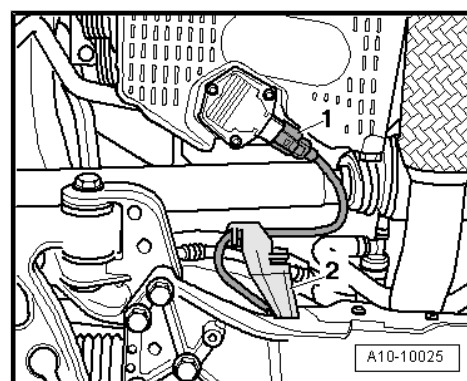
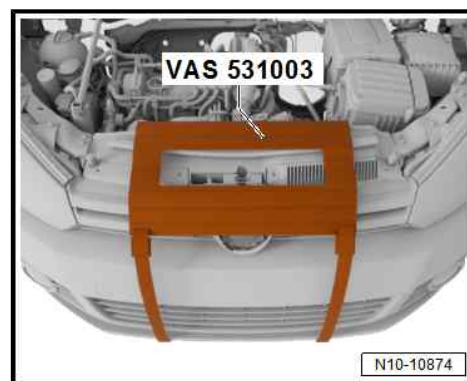
**Risk of freezing injury caused by refrigerant.**

- Do not open refrigerant circuit of air conditioning system.

- Remove air conditioner compressor with refrigerant lines connected from engine ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Removing air conditioner compressor from and installing to bracket .
- Remove air conditioner compressor (with refrigerant lines connected), and secure it to longitudinal member.

#### Continued for all vehicles

- Release and pull off electrical connector -1-.
- Detach bracket -2- from subframe.
- Remove pendulum support  
⇒ [“2.4 Removing and installing pendulum support”, page 96](#) .
- Remove right and left drive shafts ⇒ Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .

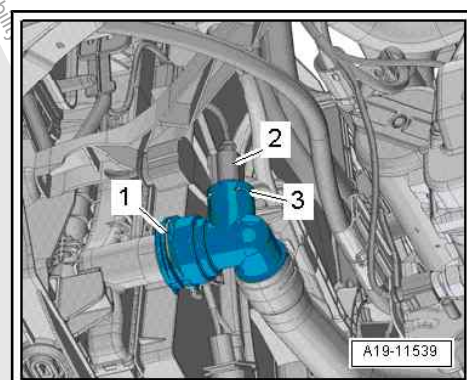


- Release and pull off connector -2- on radiator outlet coolant temperature sender - G83- .

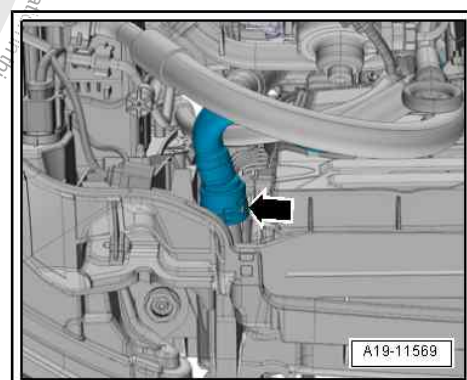
Place drip tray for workshop hoist - VAS 6208- underneath.

Drain coolant

⇒ [“1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ➤ , T-Roc, T-Cross, Touran”, page 279](#) .

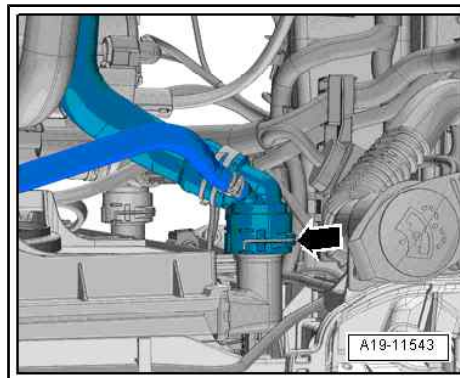


- Lift retaining clip -arrow- and disconnect coolant hose (top right) from water radiator for charge air cooling circuit.

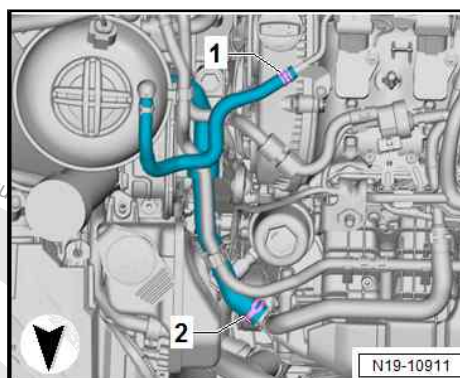




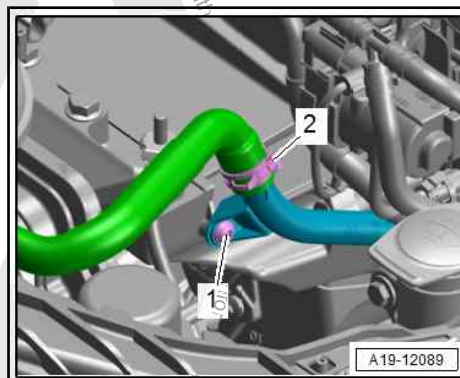
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.



- Remove coolant hose -1- on coolant expansion tank.

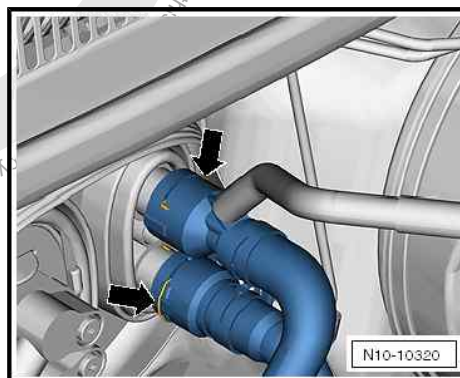


- Release hose clip -2- and detach coolant hose.



#### Vehicles with no auxiliary heater

- Lift retaining clips -arrows- and disconnect coolant hoses from heat exchanger for heater.

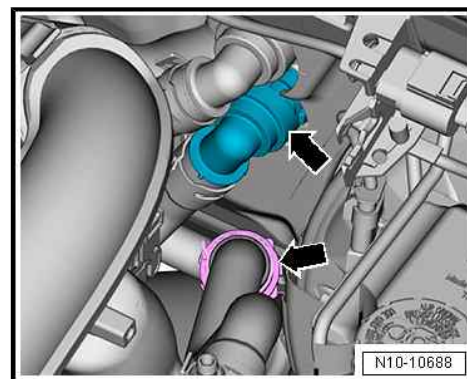






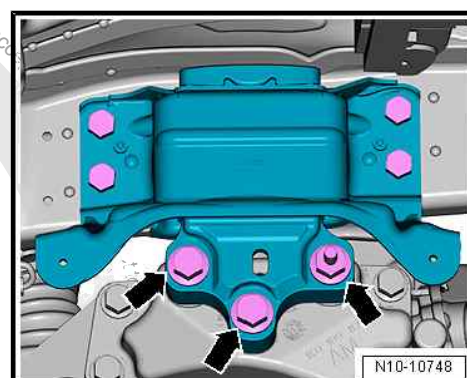
### Vehicles with auxiliary heater

- Release retaining clip and hose clip and pull off both coolant hoses -arrows-.
- Hold coolant hoses downwards to allow coolant to drain.

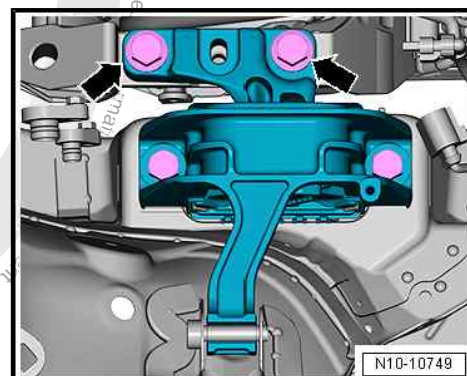


### Continued for all vehicles

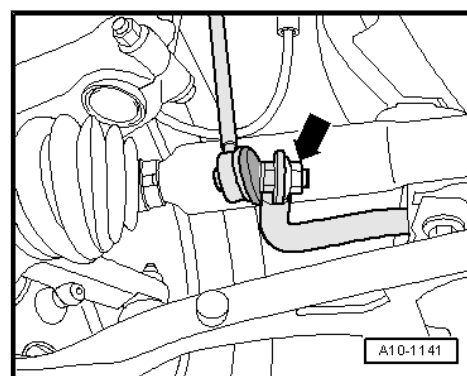
- Unscrew bolts -arrows- for gearbox mounting approx. 2 turns.



- Unscrew bolts -arrows- for engine mounting approx. 2 turns.

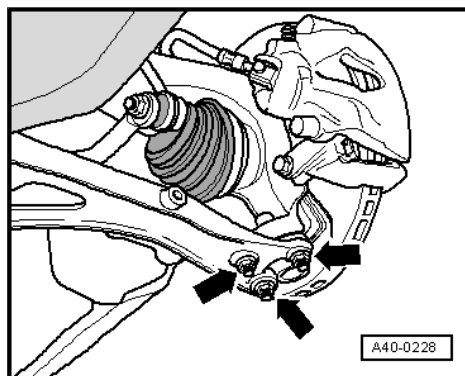


- Unscrew nuts for coupling rod -arrow- on left and right of anti-roll bar.

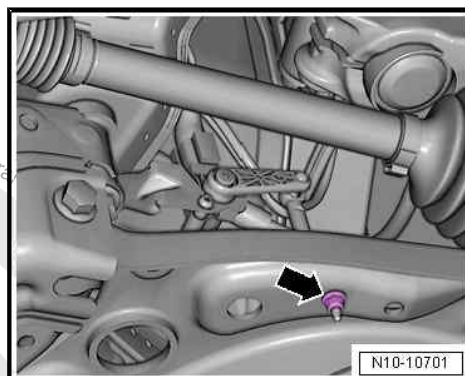




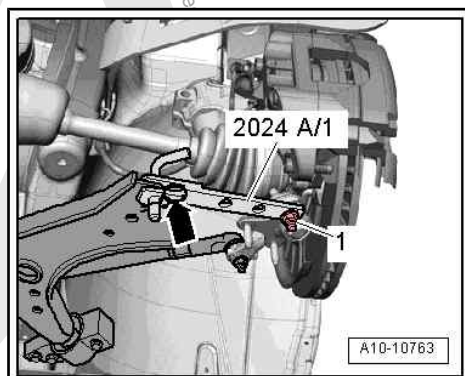
- Unscrew nuts -arrows- for swivel joint on left and right.



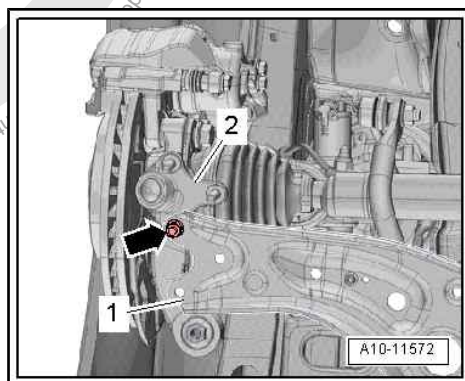
- If fitted, unscrew bolt -arrow- on bracket for front left vehicle level sender - G78- .
- Detach swivel joint from transverse link on left and right.



- Swivel front left suspension strut outwards and support with extension -2024 A /1- , as shown in illustration.
- Secure locking pin and swivel joint with locating pin -arrow- and nut -1- .

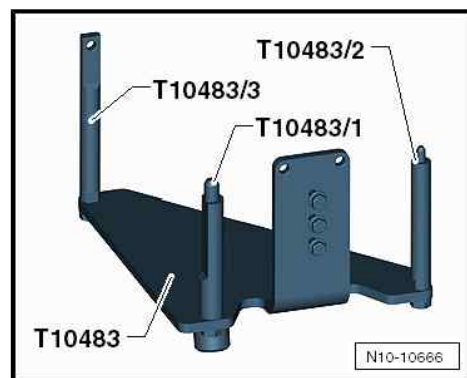


- Secure swivel joint -2- (right-side) to transverse link -1- with nut -arrow-, as shown in illustration.

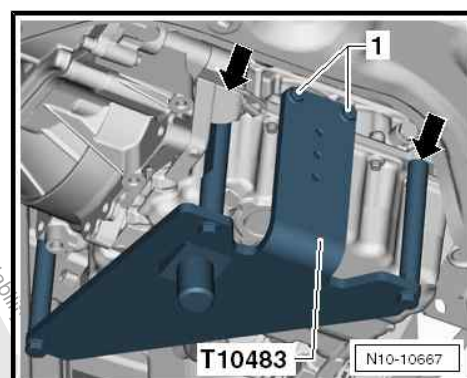




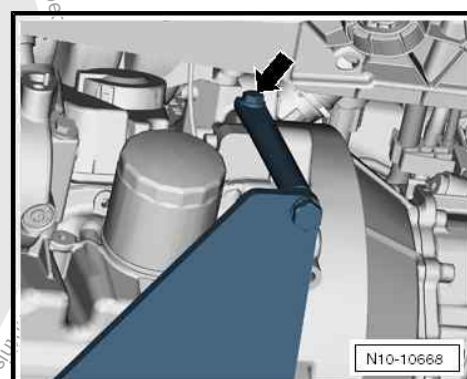
To lower the engine/gearbox assembly, use engine support - T10483- with adapter - T10483/1- , adapter - T10483/2- and adapter - T10483/3- .



- Push engine support - T10483- to stop into holes -arrows- in cylinder block.
- At first, tighten bolts -1- hand-tight.



At first, tighten bolt -arrow- hand-tight.

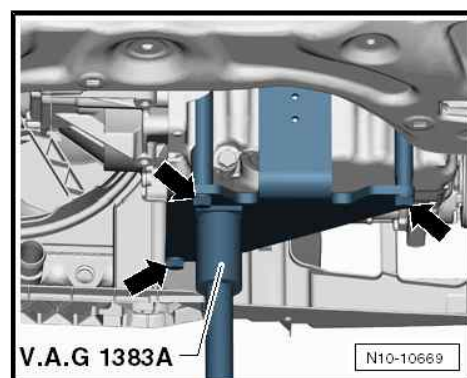


- Tighten bolts -arrows- to 20 Nm.
- Tighten all bolts of engine support - T10483- on cylinder block to 20 Nm.
- Fit engine and gearbox jack - VAS 6931- to engine support - T10483- , and raise engine/gearbox assembly slightly.



#### Note

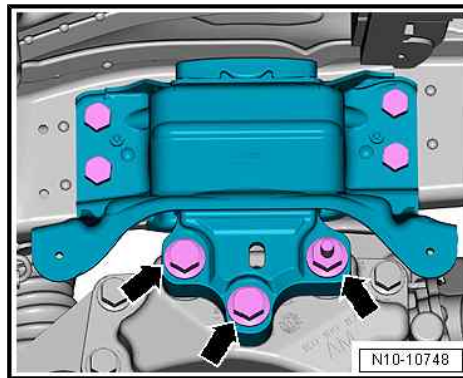
*Use a stepladder to unscrew the bolts for engine/gearbox mounting.*







- Unscrew bolts -arrows- for gearbox mounting completely.

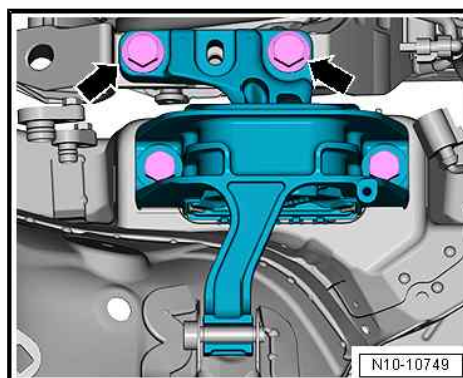


- Unscrew bolts -arrows- for support arm of gearbox mounting completely.



#### Note

- ♦ Risk of damage to the vacuum lines, electrical wiring or the engine compartment.
- ♦ Check that all vacuum lines and electrical wiring between engine, gearbox, subframe and body have been detached.
- ♦ When lowering, carefully guide engine/gearbox assembly with assembly carrier out of engine compartment.

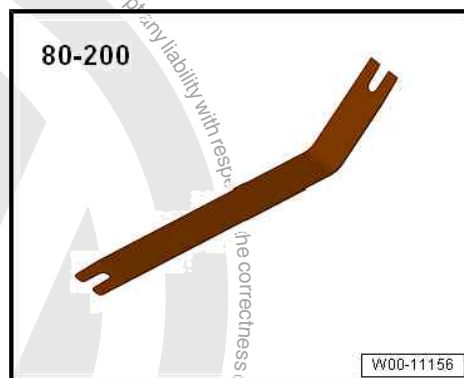


- Pull engine/gearbox assembly as far as possible towards the front, and lower it gradually.

### 1.1.3 Removing engine, up!

#### Special tools and workshop equipment required

- ♦ Release lever - 80-200-

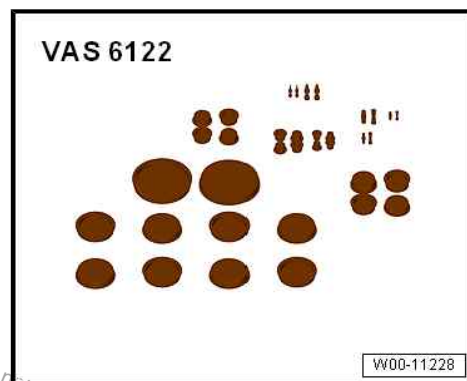


- ♦ Engine and gearbox jack - V.A.G 1383 A- or engine and gearbox jack - VAS 6931-





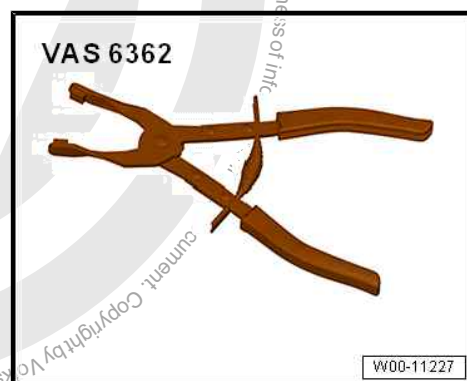
- ◆ Engine bung set - VAS 6122-



- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Spring-type clip pliers - VAS 6362-



- ◆ Engine support - T10483-



- ◆ Adapters - T10483/1-
- ◆ Adapters - T10483/2-
- ◆ Adapters - T10483/3-
- ◆ Commercially available stepladder
- ◆ Safety goggles



- ◆ Safety gloves

## Sequence of operations



### Note

- ◆ The engine is removed downwards together with the gearbox.
- ◆ Attach cable ties in all the same places when installing.

- Open cap -1- of coolant expansion tank -2-.

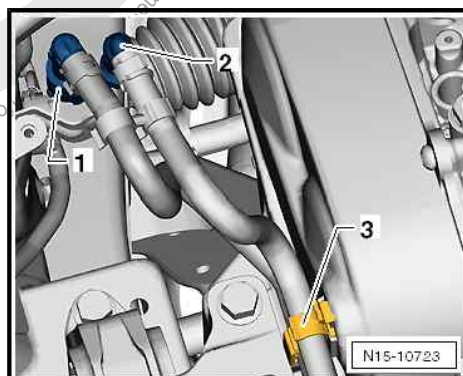
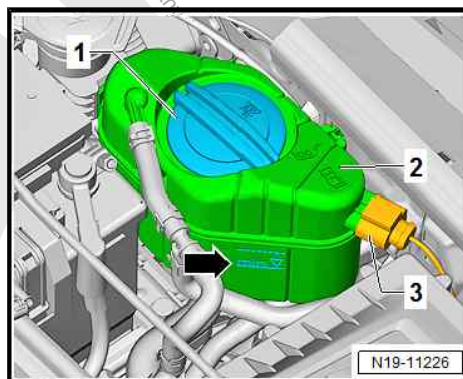


### CAUTION

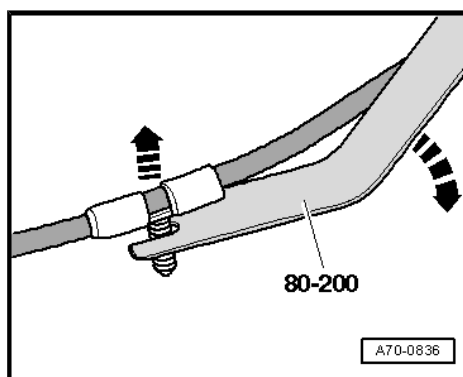
On a warm engine, the cooling system is under high pressure.  
Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
  - Wear protective goggles.
  - Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.
- 
- Remove air filter housing  
⇒ [“3.2.2 Removing and installing air filter housing, up!”](#),  
[page 417](#) .
  - Remove air pipe  
⇒ [“2.5 Removing and installing air pipe”](#), [page 385](#) .
  - Release and pull off fuel supply line -1- and breather line  
-2- ⇒ Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in  
connectors .
  - Remove battery and battery tray ⇒ [Electrical system](#); Rep. gr.  
27 ; Battery; Removing and installing battery tray .

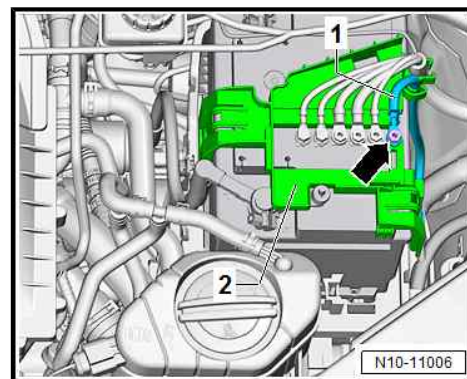


- Use removal lever - 80 - 200- to detach the clips.

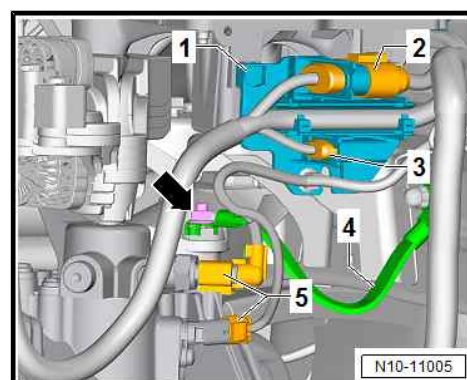




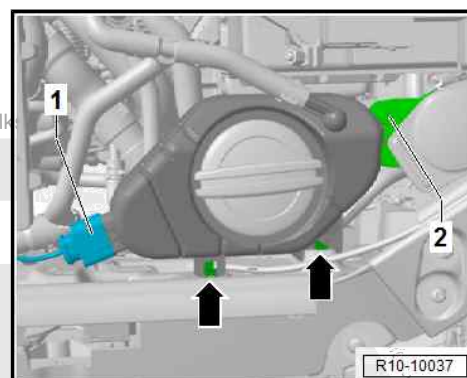
- Unscrew line -1- on holder -2- -arrow-.



- Open cable ties of line retainer on battery tray -1- and lay engine wiring harness aside.
- Release, pull off and unclip electrical connector -2-.
- If fitted, release, pull off and unclip electrical connector -3-.
- Release and pull off electrical connectors -5-.
- Remove earth connection -4- on gearbox support. Unscrew nut -arrow- to do so.
- If necessary, remove holder -1-. Unscrew nut to do so.
- Bring lock carrier into service position ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier - bringing lock carrier into service position and moving it back .



- Release and pull off connector -1- on coolant expansion tank.
- Unclip filler neck -2- for washer fluid reservoir.
- Release and detach coolant expansion tank on lock carrier -arrows-.
- Place coolant expansion tank on engine.

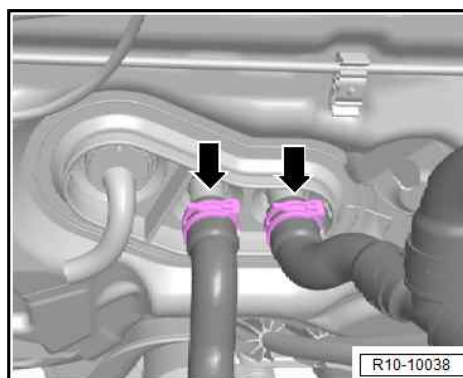
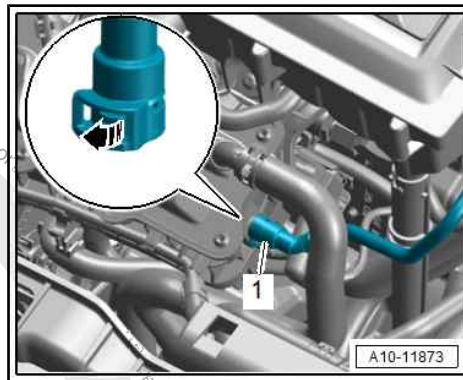


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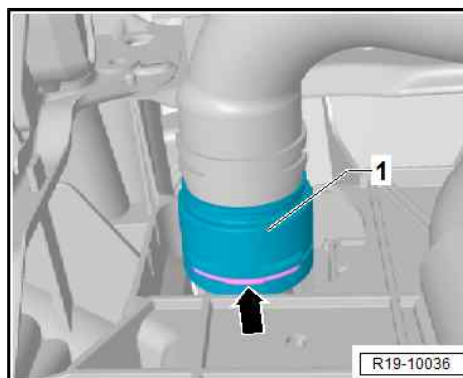




- Open vacuum line fastener -1- on intake manifold and pull off vacuum line.
- Guide out vacuum line and lay aside.
- Remove starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter .
- Remove cables with cable support bracket ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism .
- Detach selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism
- Remove clutch slave cylinder with hydraulic unit attached ⇒ Rep. gr. 30 ; Clutch mechanism; Removing and installing clutch slave cylinder .
- Unclip hydraulic line on gearbox support.
- Raise and tie clutch slave cylinder with hydraulic unit connected.
- Remove left and right front wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing front wheel housing liner .
- Release and pull off connector on engine control unit - J623- ⇒ ["6.2.2 Removing and installing engine control unit J623, up!", page 441](#) .
- Unclip engine wiring harness and lay to one side.
- Place engine wiring harness on engine.
- Drain coolant  
⇒ ["1.3.3 Draining and adding coolant, up!", page 285](#) .
- Release clamps -arrows- and pull off coolant hoses from connections on bulkhead.

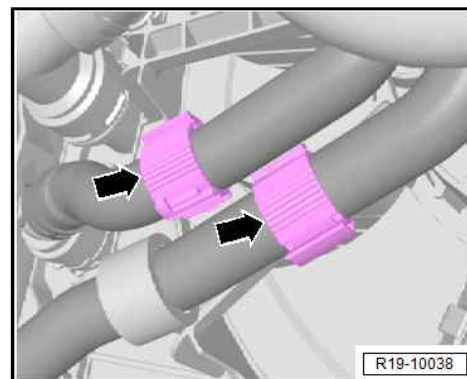


- Detach retaining clip -arrow- and disconnect coolant hose -1- from top left of radiator.
- Drain coolant.

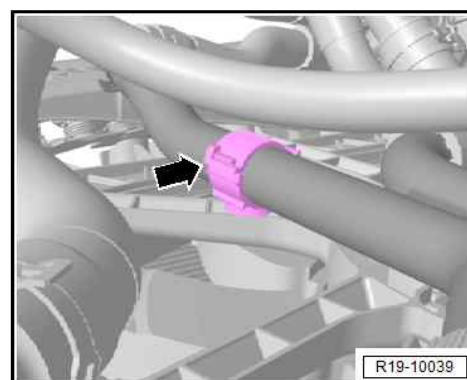




- Release and open retainers -arrows- and detach coolant hoses.



- Release and open retainers -arrow- and detach coolant hose.
- Remove right noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .

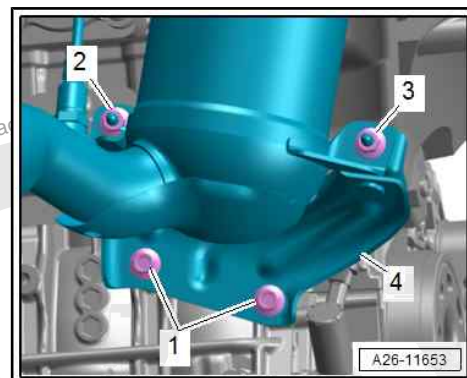


- Remove pendulum support  
⇒ [“2.4.3 Removing and installing pendulum support, up!”](#),  
[page 98](#) .
- Remove heat shield for drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft heat shield .
- Remove left and right drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview - drive shaft .

- Remove catalytic converter  
⇒ [“2.2 Removing and installing catalytic converter”](#),  
[page 489](#) .
- Unscrew bolts -1- and remove bracket -4- for catalytic converter.

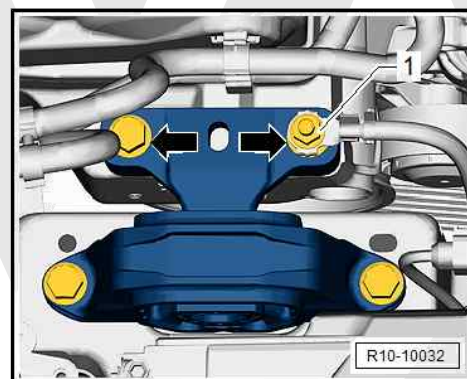
#### Vehicles with air conditioner:

- Remove air conditioner compressor from bracket ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Removing and installing air conditioner compressor on bracket .
- Remove alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator



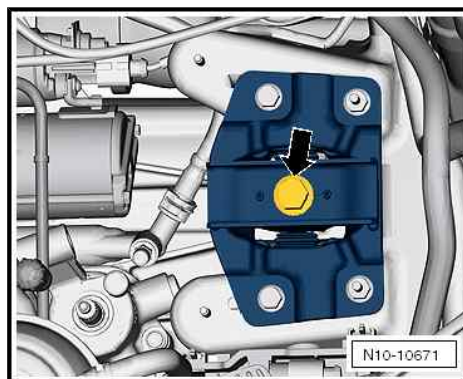
#### Continued for all vehicles:

Unscrew bolts -arrows- on engine mounting approx. 2 turns.

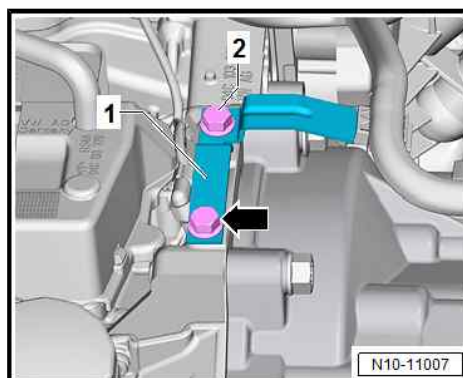




- Unscrew bolt -arrow- on gearbox mounting approx. 2 turns.

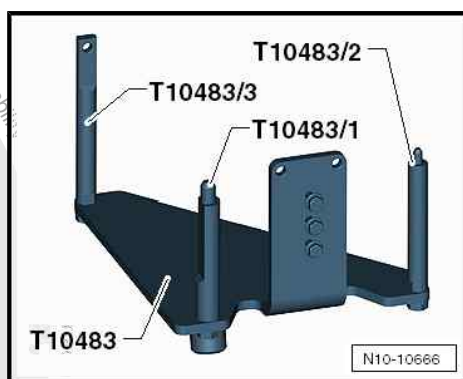


- Remove bolt -arrow- for line retainer -1-.



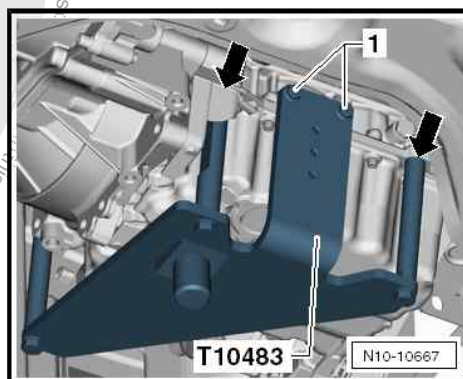
- Assemble engine support - T10483- with adapter - T10483/1- adapter - T10483/2- and adapter - T10483/3- as shown in illustration.

- Tighten bolts by hand first.



Push engine support - T10483- to stop into holes -arrows- in cylinder block.

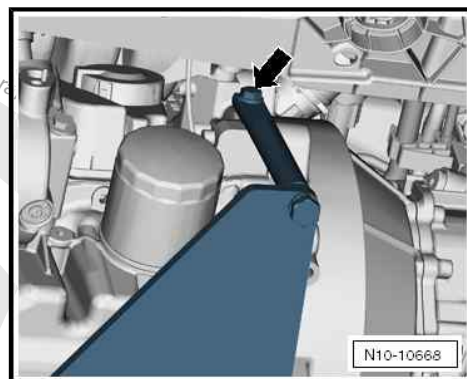
- Then screw bolts -1- hand-tight first in holes for drive shaft heat shield.







- Screw bolt -arrow- hand-tight first in hole for line retainer.

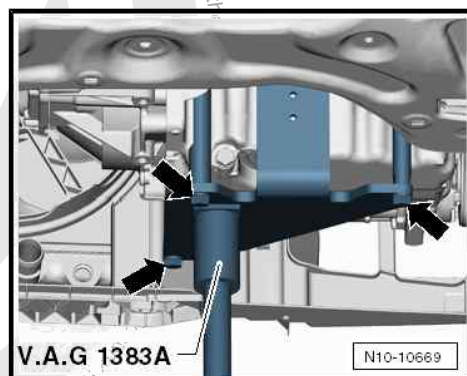


- Tighten bolts -arrows- to 20 Nm.
- Tighten all bolts of engine support - T10483- on cylinder block to 20 Nm.
- Fit engine and gearbox jack - VAS 6931- to engine support - T10483- and raise engine/gearbox assembly slightly.

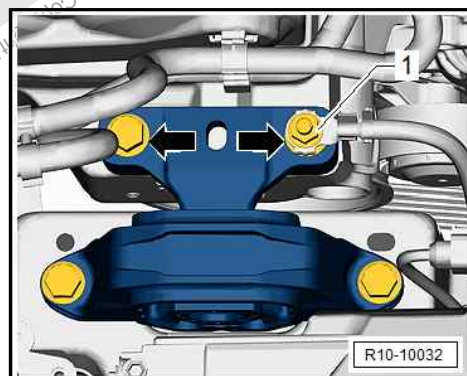


#### Note

*To unscrew bolts for assembly mounting use commercially available stepladder.*



- Unscrew bolts -arrows- on engine mounting.



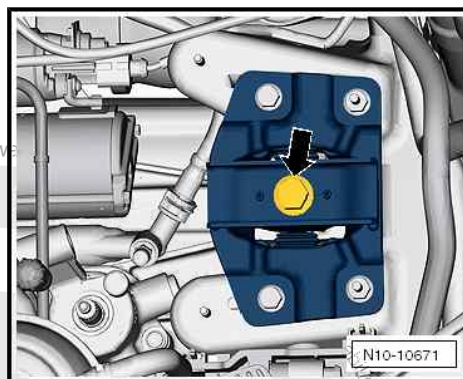


- Unscrew bolt -arrow- on gearbox mounting.



#### Note

- ♦ Risk of damage to the vacuum lines or electrical wiring as well as damage to the engine compartment.
- ♦ Check that all vacuum lines and electrical wiring between engine, gearbox, subframe and body have been detached.
- ♦ When lowering, carefully guide engine/gearbox assembly with assembly carrier out of engine compartment.
- ♦ When lifted out, the engine/gearbox assembly must be carefully guided to prevent damage to the bodywork.



- First lower engine/gearbox assembly slightly.
- Carefully lower engine and gearbox.
- Guide engine side of engine/gearbox assembly past air conditioner compressor.
- Guide gearbox side of engine/gearbox assembly past side member.
- Lower engine/gearbox assembly further.

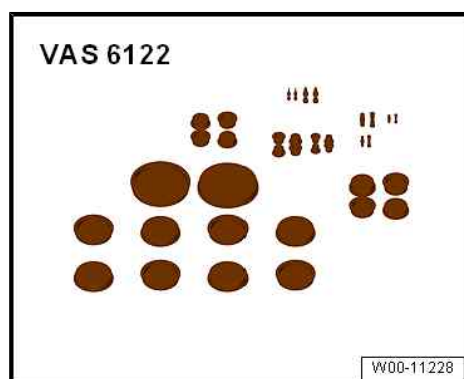
### 1.1.4 Removing engine, Polo 2018, T-Cross

#### Special tools and workshop equipment required

- ♦ Engine and gearbox jack - VAS 6931-



- ♦ Engine bung set - VAS 6122-





- ◆ Drip tray for workshop hoist - VAS 6208-

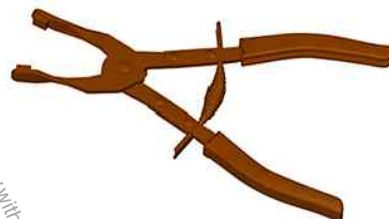
**VAS 6208**



W00-11209

- ◆ Spring-type clip pliers - VAS 6362-

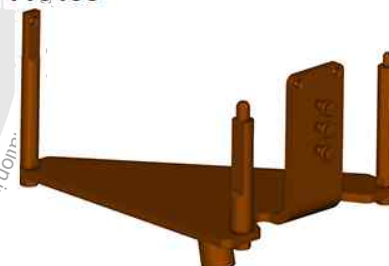
**VAS 6362**



W00-11227

- ◆ Engine support - T10483-

**T10483**



W00-11832

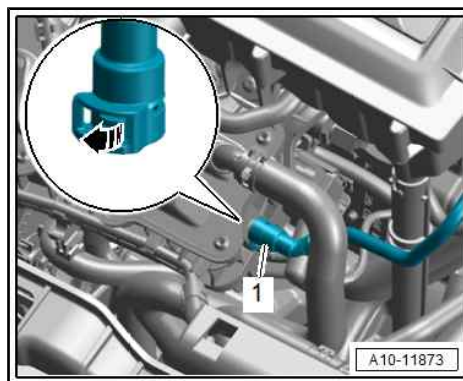
- ◆ Protective mat - VAS 531 003-

#### Removing

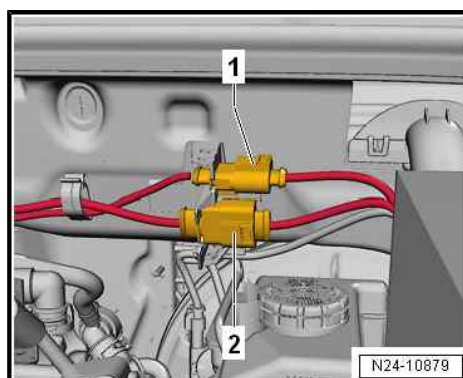
- Remove air duct on lock carrier ⇒ [page 419](#) .
- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Remove air filter housing  
⇒ [“3.2.1 Removing and installing air filter housing, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 416](#) .



- Release retaining tab -arrow- and pull off vacuum hose -1-.
- Seal all open lines and unions with clean plugs from engine bung set - VAS 6122- .

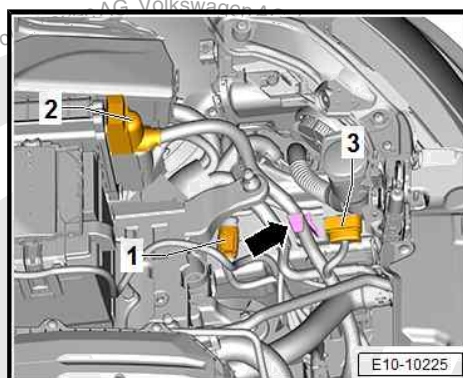


- Separate electrical connectors -1- and -2-.
- Move wiring harness clear.

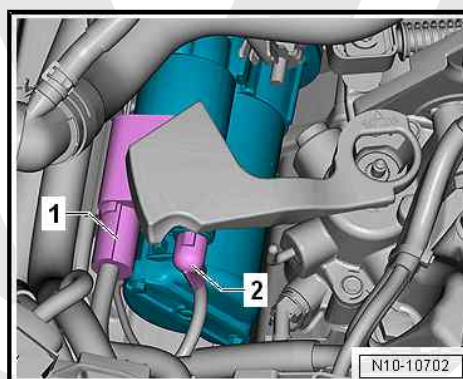


- Remove protective housing from engine control unit - J623-  
⇒ [“6.2.3 Removing and installing engine control unit J623 with protective housing, Golf, Golf Estate, Golf SV, Polo 2018 ➤ T-Roc, T-Cross, Touran”, page 442](#) .

- Unplug electrical connectors -1, 2, 3-.
- Lay wiring harness -arrows- aside.
- Unbolt earth wire from body.
- Move wiring harness clear.



- Disconnect electrical connector -2-.
- Detach cover -1- and unbolt battery positive cable from starter.







### Vehicles with manual gearbox

- Remove selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .
- Unscrew bolts -arrows-
- Remove clutch slave cylinder -1- and place to one side.



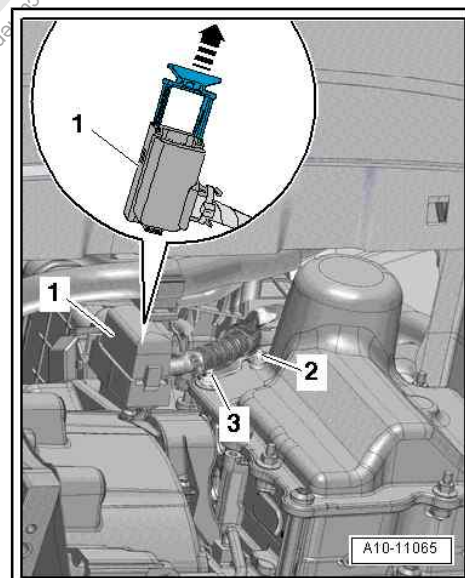
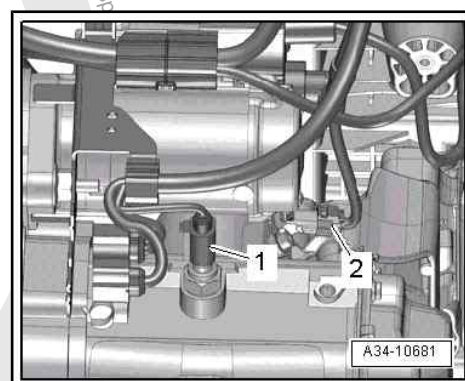
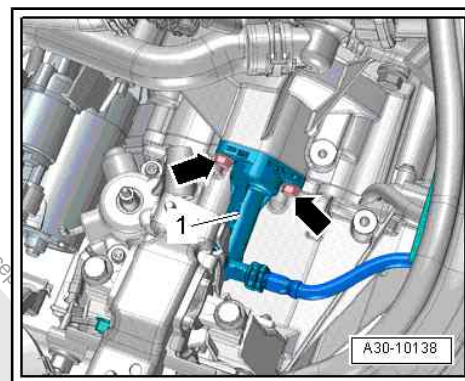
#### Note

*Do not operate clutch pedal when clutch slave cylinder is removed.*

- Separate electrical connectors -1- and -2-.

### Vehicles with dual clutch gearbox

- Disconnect electrical connector -1- of mechatronic unit for dual clutch gearbox - J743- .
- Remove selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .





### Continued for all vehicles

- Drain coolant  
⇒ "1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ➤ , T-Roc, T-Cross, Touran", page 279 .

- Release retaining clips -arrows-.
- Pull coolant hoses off heat exchanger.

### ⚠ CAUTION

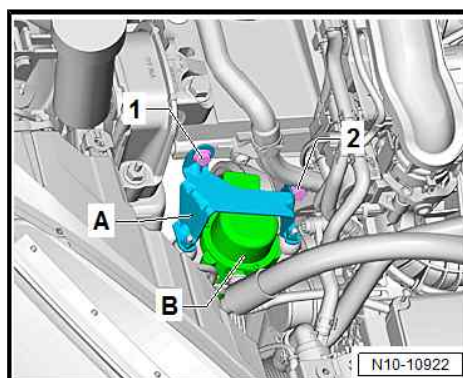
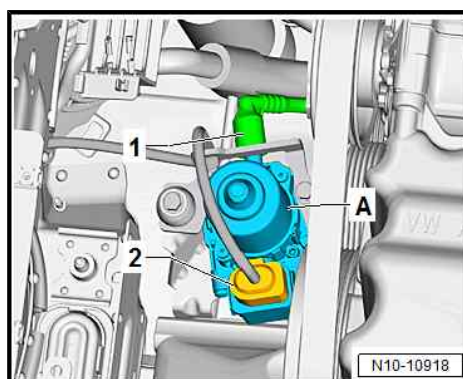
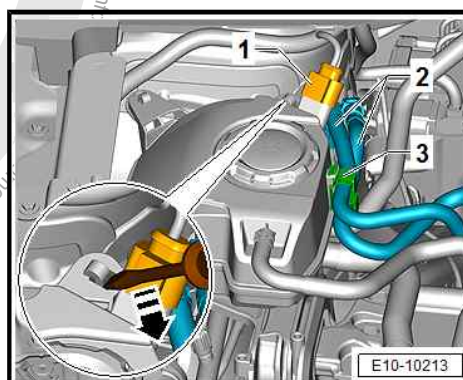
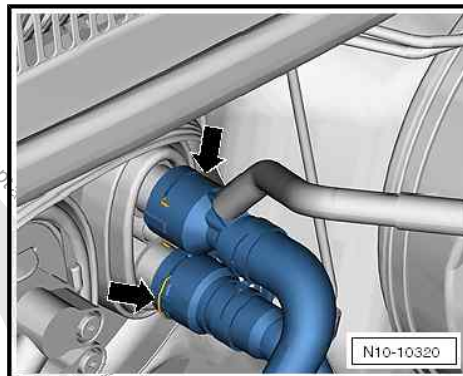
The fuel system is pressurised.  
Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Open retainer -3-.
- Release fuel hoses -2- and pull off.
- Lay fuel hoses -2- to one side.
- Disconnect electrical connector -1-.
- Release retaining tabs in direction of -arrow- and place coolant expansion tank aside.

- Pull off vacuum pipe -1-.
- Disconnect connector -2- on vacuum pump for brakes - V192-A-.

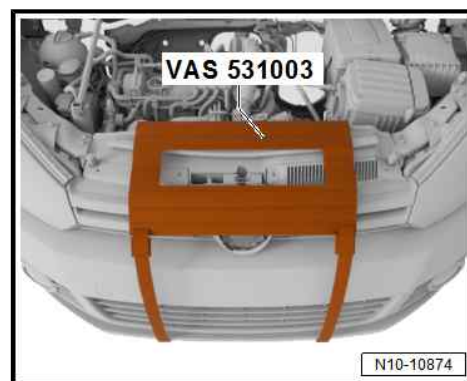
- Unscrew bolts -1- and -2-.
- Remove bracket -A- with vacuum pump -B-.



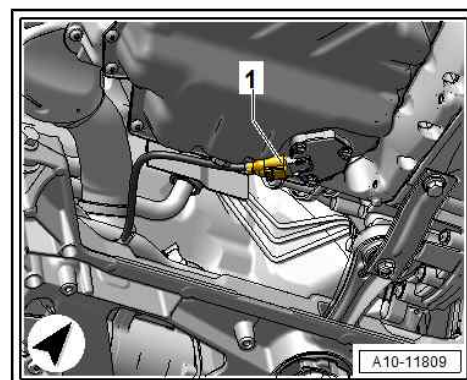




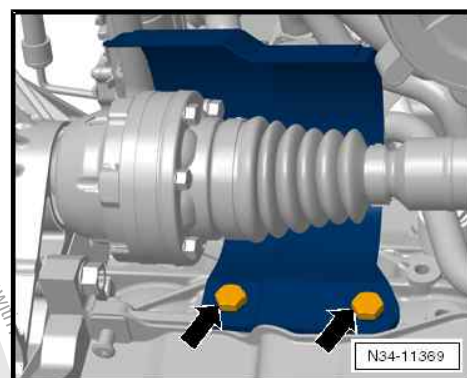
- Remove radiator cowl  
⇒ [“4.6.4 Removing and installing radiator cowl, Polo 2018 ➤, T-Cross”, page 357](#) .
- Attach protective mat - VAS 531003- to vehicle as shown in illustration.
- If present, remove air conditioner compressor from bracket ⇒ Heating, air conditioning system; Rep. gr. 87 ; Air conditioner compressor; Removing air conditioner compressor from and installing on bracket .



- Disconnect electrical connector -1-.
- Remove pendulum support  
⇒ [“2.4.2 Removing and installing pendulum support, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 97](#) .



- Unscrew bolts -arrows-.
- Remove heat shield.
- Remove left and right drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Remove left wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing front wheel housing liner .

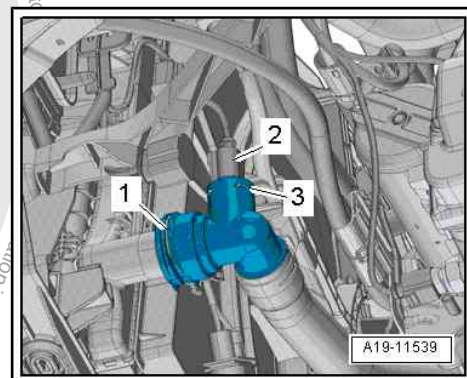


- Separate electrical connector -2- from radiator outlet coolant temperature sender - G83- .



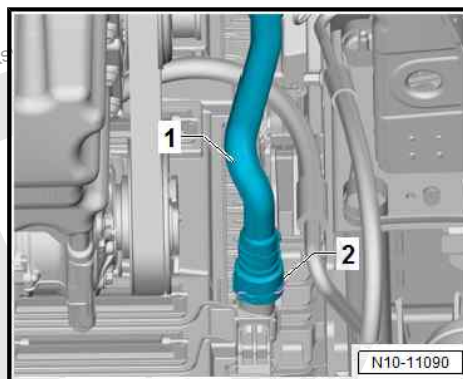
#### Note

Disregard items -1- and -3-.

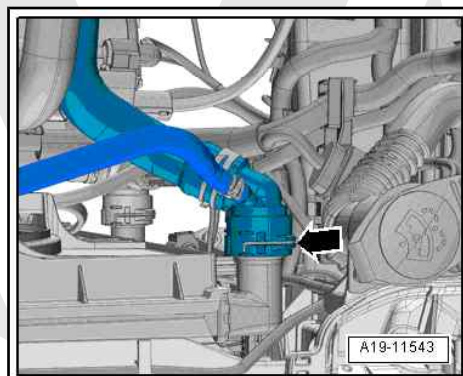




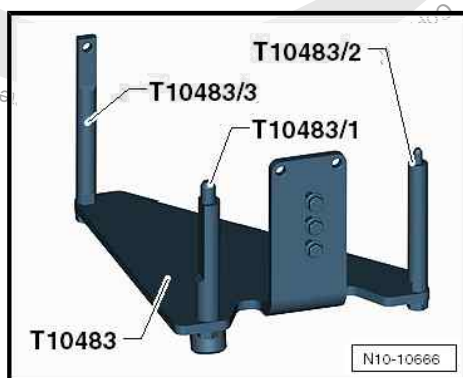
- Release retaining clip -2-.
- Pull off coolant hose -1-.



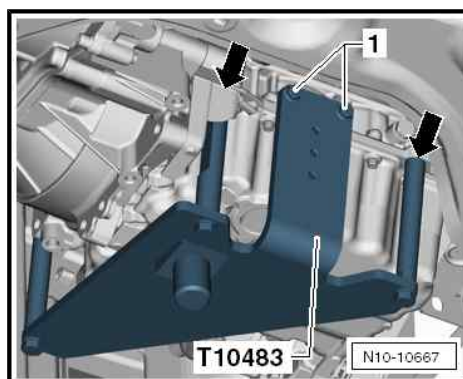
- Release retaining clip -arrow-.
- Pull off coolant hose.
- Remove catalytic converter  
⇒ ["2.2 Removing and installing catalytic converter", page 489](#).



- Secure adapter - T10483/1- , adapter - T10483/2- and adapter - T10483/3- on engine support - T10483- .

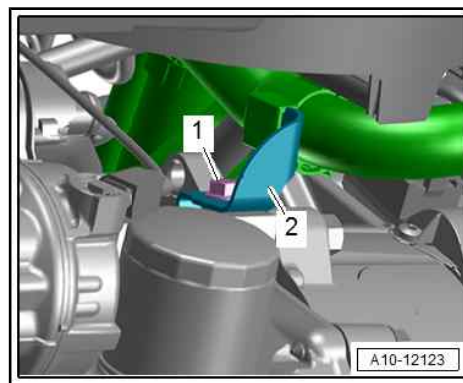


- Insert engine support - T10483- in holes -arrows- in cylinder block as far as stop.
- At first, tighten bolts -1- hand-tight.

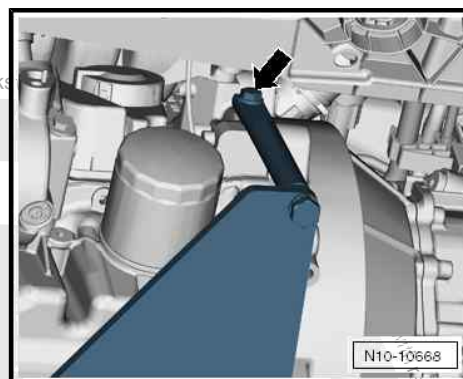




- Unscrew bolt -1-.
- Push bracket -2- to one side.



- At first, tighten bolt -arrow- hand-tight.

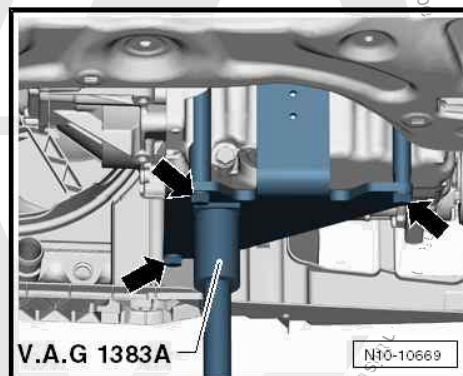


- Tighten bolts -arrows- to 20 Nm.
- Tighten all bolts of engine support - T10483- on cylinder block to 20 Nm.
- Position engine and gearbox jack - VAS 6931- on engine support - T10483- .

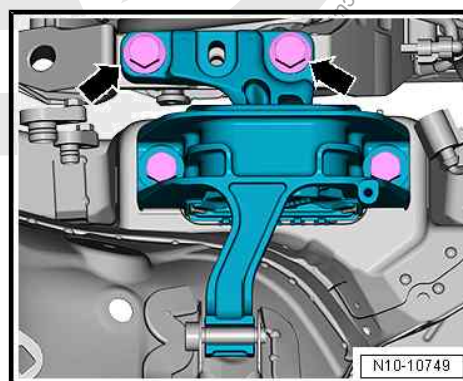


#### Note

*The diagram still shows the old engine and gearbox jack - V.A.G 1383 A- .*

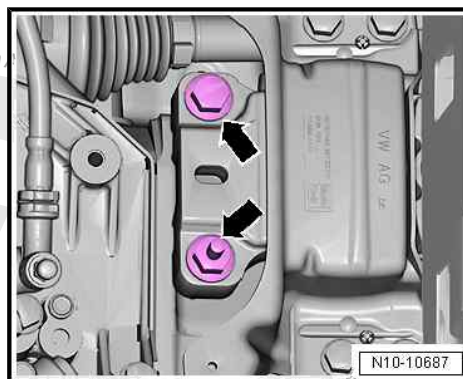


- Unscrew bolts -arrows-. Use a stepladder to do this.





- Unscrew bolts -arrows-.
- Check that all electrical connectors, vacuum lines or coolant hoses are detached.
- With the aid of a second mechanic, carefully guide out engine/gearbox assembly downwards out of engine compartment.



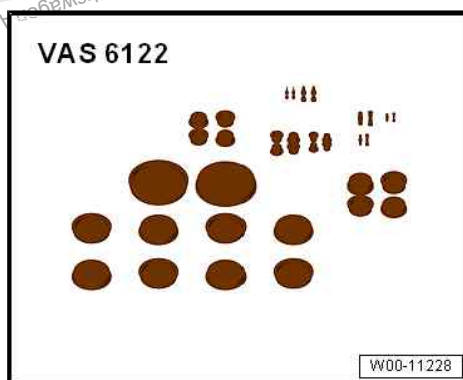
## 1.1.5 Removing engine, T-Roc

### Special tools and workshop equipment required

- ♦ Engine and gearbox jack - VAS 6931-



- ♦ Engine bung set - VAS 6122-



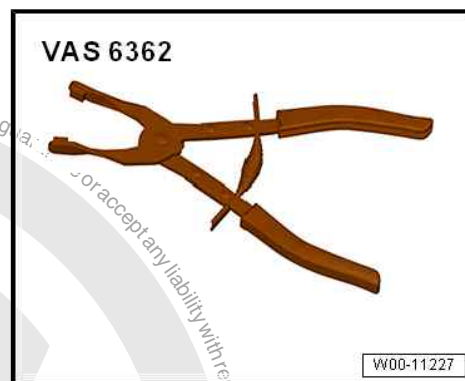
- ♦ Drip tray for workshop hoist - VAS 6208-







◆ Spring-type clip pliers - VAS 6362-



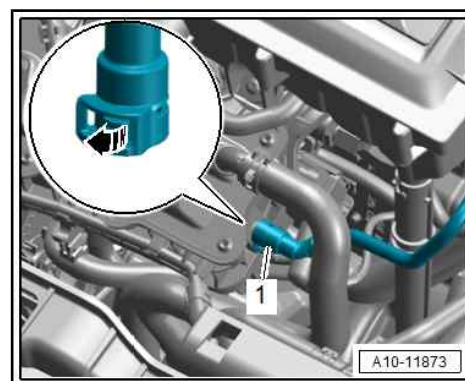
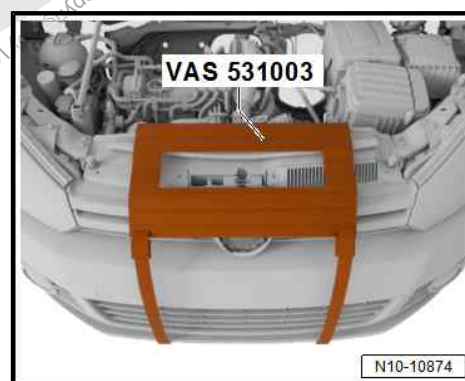
◆ Engine support - T10483-



◆ Protective mat - VAS 531 003-

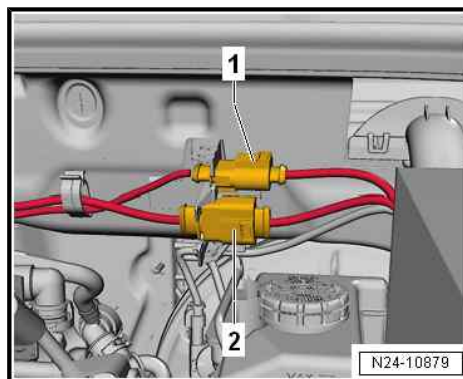
**Removing**

- Remove radiator cowl  
⇒ ["4.6.5 Removing and installing radiator cowl, T-Roc", page 358](#) .
- Attach protective mat - VAS 531003- to vehicle as shown in illustration.
- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Remove air filter housing  
⇒ ["3.2.1 Removing and installing air filter housing, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 416](#) .
- Release retaining tab -arrow- and pull off vacuum hose -1-.
- Seal all open lines and unions with clean plugs from engine block set - VAS 6122- .

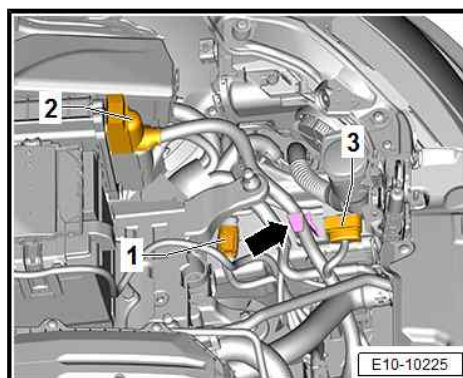




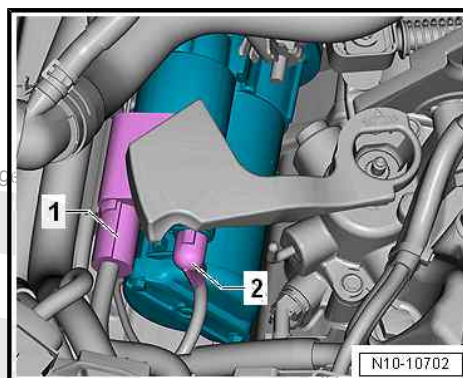
- Separate electrical connectors -1- and -2-.
- Move wiring harness clear.



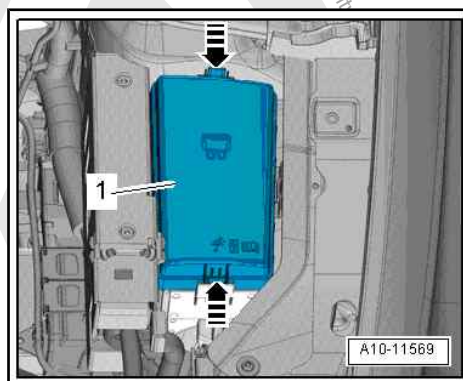
- Remove protective housing from engine control unit - J623-  
⇒ [“6.2.3 Removing and installing engine control unit J623 with protective housing, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 442](#) .
- Unplug electrical connectors -1, 2, 3-.
- Lay wiring harness -arrows- aside.
- Unbolt earth wire from body.
- Move wiring harness clear.



- Disconnect electrical connector -2-.
- Detach cover -1- and unbolt battery positive cable from starter.



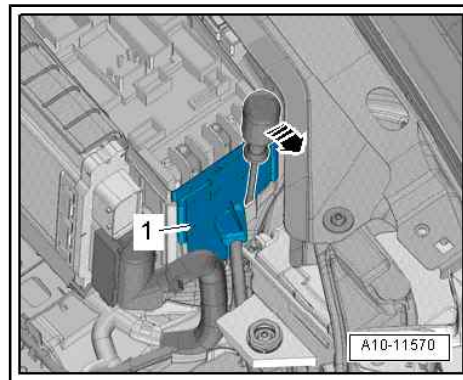
- Release catches -arrows- and detach cover -1- for electronics box in engine compartment.



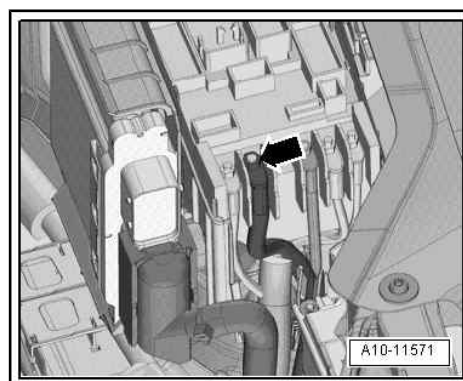




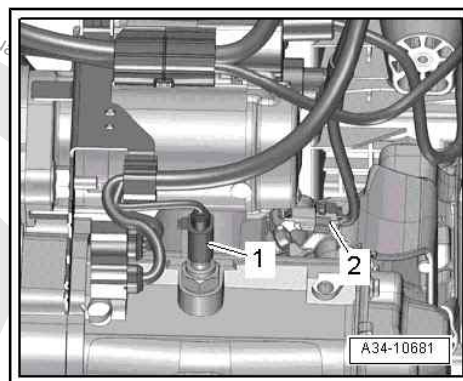
- Release catch using a screwdriver -arrow- and detach cover -1- for electronics box in engine compartment upwards.



- Remove nut -arrow-, detach electrical wiring and move clear.



- Release and pull off electrical connector -2-.
- Remove selector mechanism from gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Removing and installing selector mechanism .

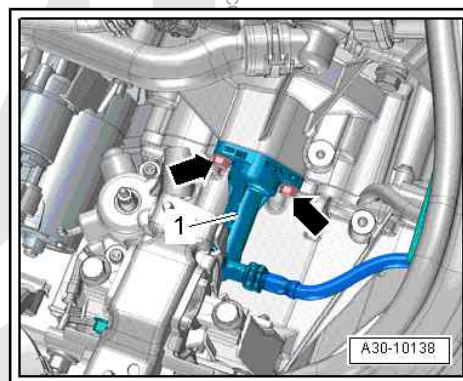


- Unscrew bolts -arrows-.
- Remove clutch slave cylinder -1- and place to one side.



#### Note

*Do not operate clutch pedal when clutch slave cylinder is removed.*





- Release retaining clips -arrows-.
- Pull coolant hoses off heat exchanger.

**CAUTION**

The fuel system is pressurised.

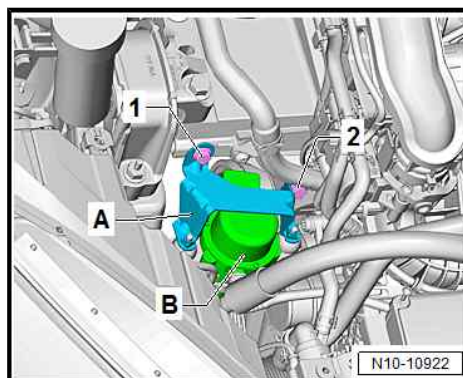
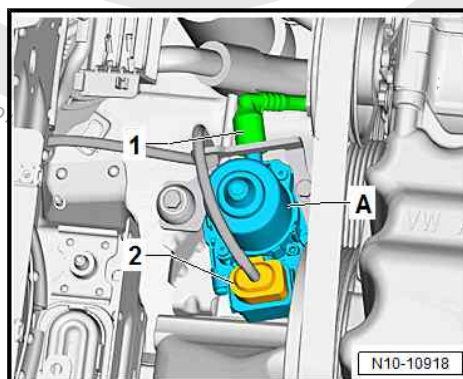
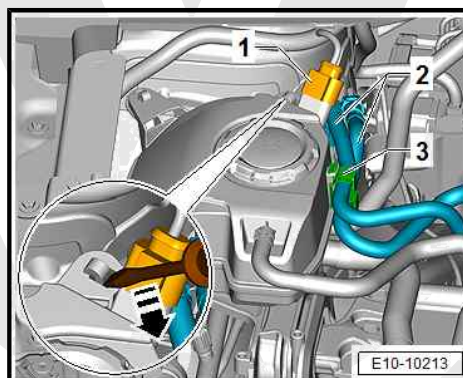
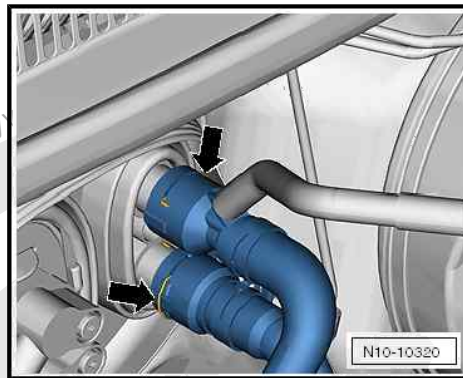
Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Open retainer -3-.
- Release fuel hoses -2- and pull off.
- Lay fuel hoses -2- to one side.
- Disconnect electrical connector -1-.
- Release retaining tabs in direction of -arrow- and place coolant expansion tank aside.

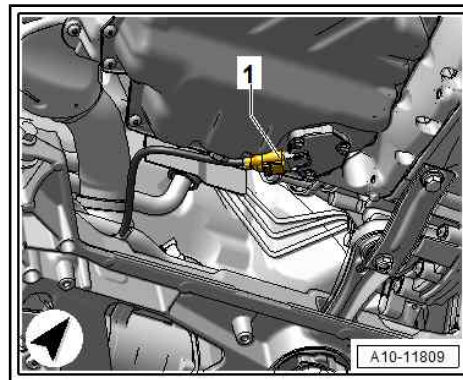
- Pull off vacuum pipe -1-.
- Disconnect connector -2- on vacuum pump for brakes - V192-A-.

- Unscrew bolts -1- and -2-.
- Remove bracket -A- with vacuum pump -B-.
- Remove air conditioner compressor from bracket => Heating, air conditioning system; Rep. gr. 87 ; Air conditioner compressor; Removing air conditioner compressor from and installing on bracket .

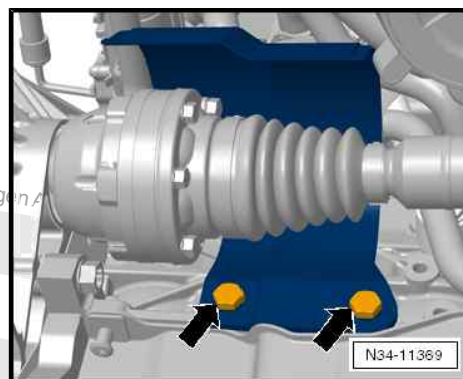




- Disconnect electrical connector -1-.
- Remove pendulum support  
⇒ ["2.4.2 Removing and installing pendulum support, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 97](#).



- Unscrew bolts -arrows-.
- Remove heat shield.
- Remove left and right drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Remove left wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing front wheel housing liner .

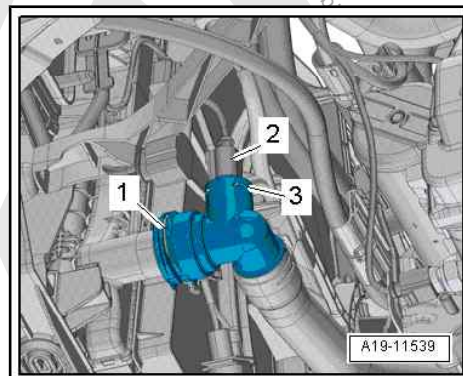


- Separate electrical connector -2- from radiator outlet coolant temperature sender - G83-

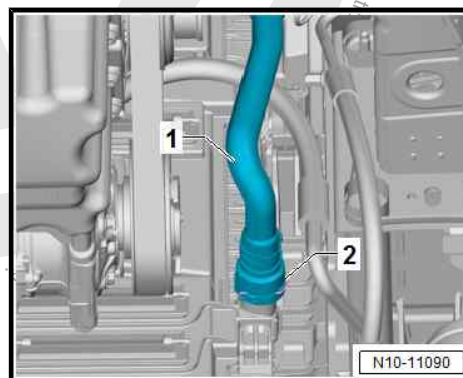


#### Note

Disregard items -1- and -3-.



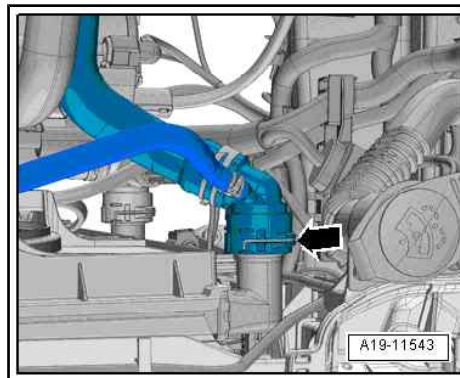
- Release retaining clip -2-.
- Pull off coolant hose -1-.



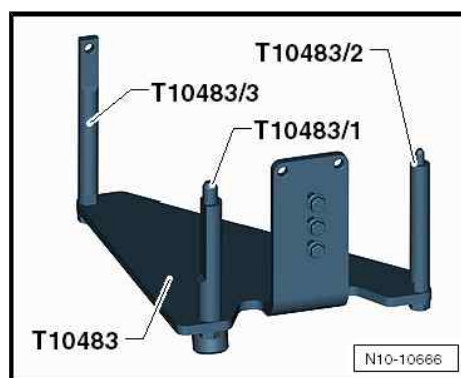




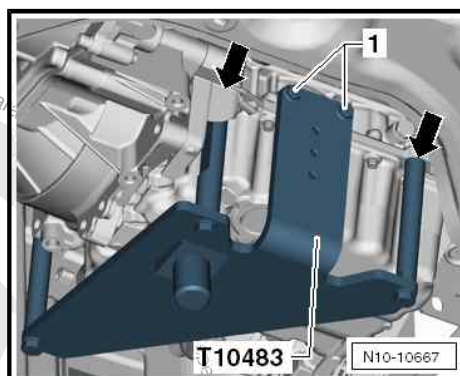
- Release retaining clip -arrow-.
- Pull off coolant hose.
- Remove catalytic converter  
⇒ ["2.2 Removing and installing catalytic converter", page 489](#).



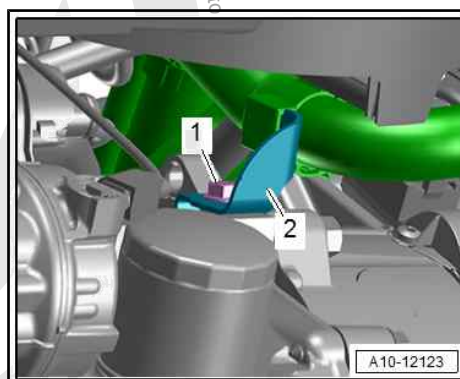
- Secure adapter - T10483/1- , adapter - T10483/2- and adapter - T10483/3- on engine support - T10483- .



- Insert engine support - T10483- in holes -arrows- in cylinder block as far as stop.
- At first, tighten bolts -1- hand-tight.

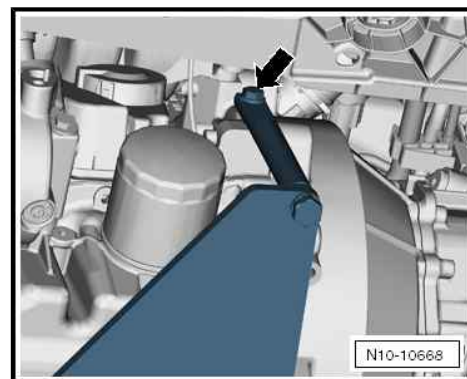


- Unscrew bolt -1-.
- Push bracket -2- to one side.





- At first, tighten bolt -arrow- hand-tight.

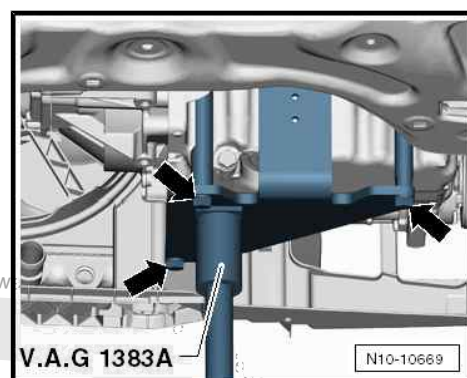


- Tighten bolts -arrows- to 20 Nm.
- Tighten all bolts of engine support - T10483- on cylinder block to 20 Nm.
- Position engine and gearbox jack - VAS 6931- on engine support - T10483- .

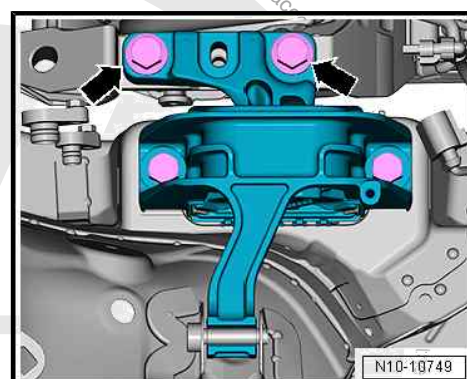


#### Note

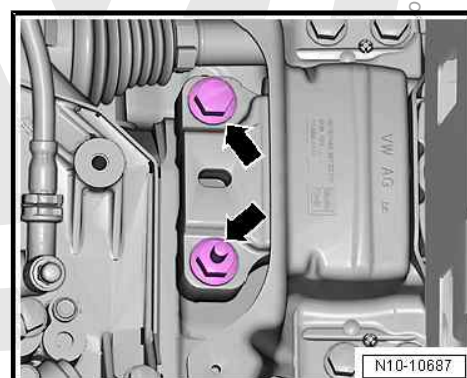
*The diagram still shows the old engine and gearbox jack - V.A.G 1383 A- .*



- Unscrew bolts -arrows-. Use a stepladder to do this.



- Unscrew bolts -arrows-.
- Check that all electrical connectors, vacuum lines or coolant hoses are detached.
- With the aid of a second mechanic, carefully guide out engine/ gearbox assembly downwards out of engine compartment.





## 1.2 Separating engine and gearbox

⇒ **"1.2.1 Separating engine and gearbox, vehicles with manual gearbox, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 62**

⇒ **"1.2.2 Separating engine and gearbox, vehicles with dual clutch gearbox, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 63**

⇒ **"1.2.3 Separating engine and gearbox, up!", page 65**

### 1.2.1 Separating engine and gearbox, vehicles with manual gearbox, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran

#### Special tools and workshop equipment required

◆ Hook - 10 - 222 A /12-



◆ Workshop hoist - VAS 6100-



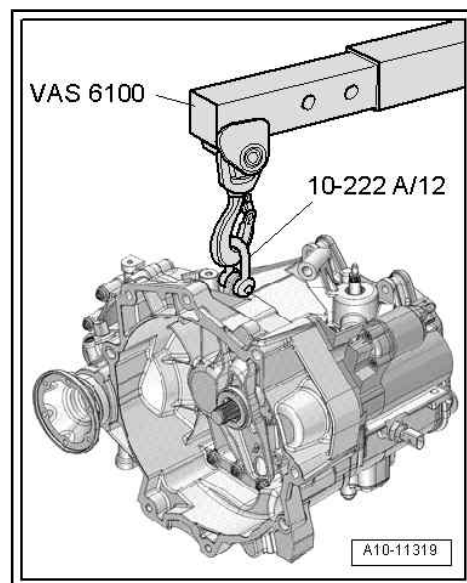
#### Sequence of operations

- Engine/gearbox assembly removed and attached to engine bracket - T10483- .
- Remove starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter .





- Install shackle - 10-222A/12- to gearbox.
- Attach workshop hoist - VAS 6100- to shackle - 10-222A/12- .



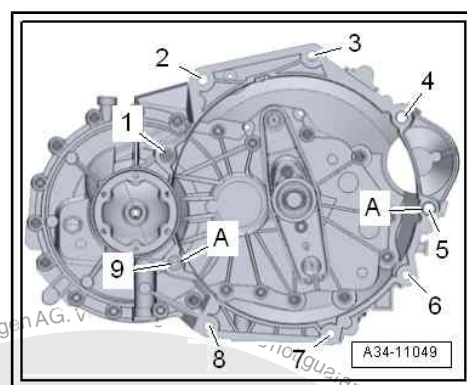
- Unscrew bolts -1, 2, 3- and -6 ... 9- from threaded connection between gearbox and engine.



#### Note

*Disregard -items 4, 5- and -A-.*

- Pull gearbox off engine.



## 1.2.2 Separating engine and gearbox, vehicles with dual clutch gearbox, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran

### Special tools and workshop equipment required

- ◆ Shackle - 10 - 222 A /12-





◆ Workshop hoist - VAS 6100-



**Sequence of operations**

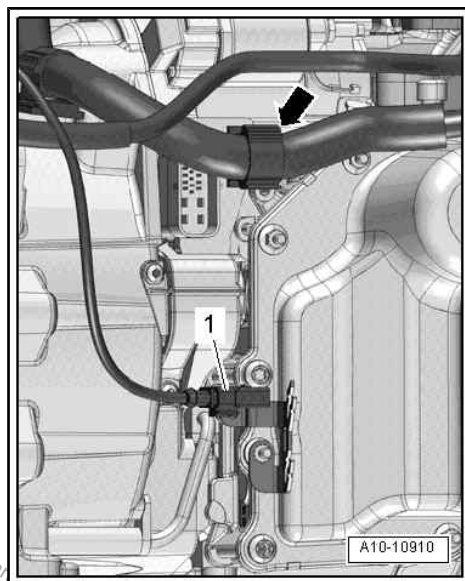
- Engine/gearbox assembly removed and attached to engine bracket - T10497- .
- Move clear wiring harness -arrow-.



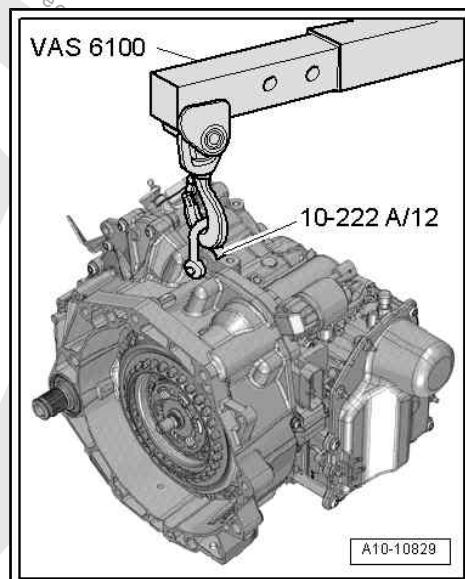
**Note**

*Disregard -item 1-*.

- Remove starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter .



- Secure gearbox to workshop hoist - 10 - 222 A /12- using shackle - VAS 6100- .





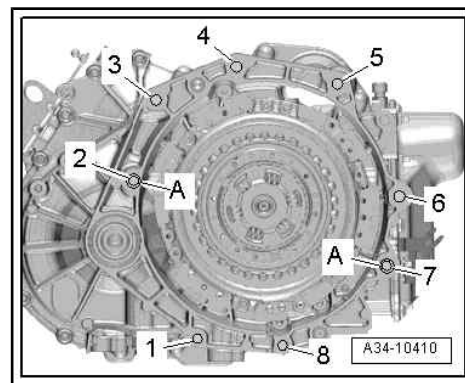
- Unscrew bolts -1 to 8- securing gearbox to engine.



#### Note

*Disregard -item A-.*

- Pull gearbox off engine.



## 1.2.3 Separating engine and gearbox, up!

Special tools and workshop equipment required

- ◆ Shackle - 10-222A/12-

10-222 A/12



W00-11341

- ◆ Workshop hoist - VAS 6100-

VAS 6100



W00-11307

- ◆ Lifting tackle - 2024A-

2024A



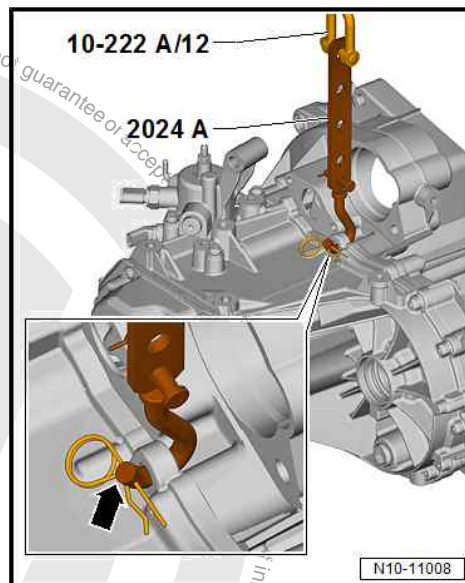
W00-11727

### Sequence of operations

- Engine/gearbox assembly removed and attached to engine bracket - T10483- .



- Detach one hook from lifting tackle - 2024A-
- Fit hook of lifting tackle - 2024A- to gearbox as shown in illustration, and secure connection with a split pin -arrow-.
- Shackle - 10-222A/12- fitted to hook.
- Attach workshop hoist - VAS 6100- to shackle - 10-222A/12- .
- Raise gearbox slightly with workshop hoist - VAS 6100- .



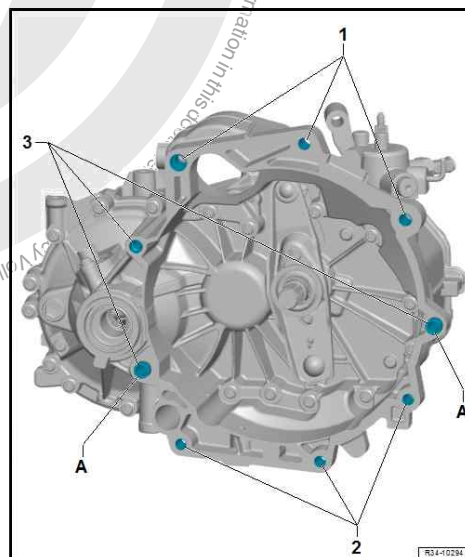
- Unscrew bolts -1, 2, 3-.



#### Note

Disregard -item A-.

- Pull gearbox off engine.



### 1.3 Securing engine on engine and gearbox support

Special tools and workshop equipment required

- ♦ Engine and gearbox support - VW 540-





◆ Lifting tackle - 2024 A-



◆ Engine and gearbox support - VAS 6095-



◆ Workshop hoist - VAS 6100-



**Sequence of operations**

- Engine removed ⇒ [“1.1 Removing engine”, page 16](#)
- Gearbox detached from engine  
⇒ [“1.2 Separating engine and gearbox”, page 62](#) .





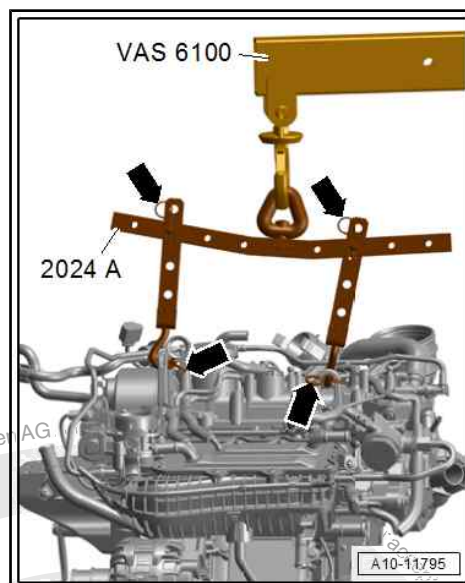
- Secure lifting tackle - 2024 A- on engine, and attach it to workshop hoist - VAS 6100- as shown in illustration.



#### Note

- ◆ *Be aware of danger from loose lifting tackle components.*
- ◆ *In order to match the lifting tackle to the centre of gravity of the engine, the holes in the hook rail must be allocated as shown in the illustration.*
- ◆ *The support hooks and retaining pins on the lifting tackle must be secured with locking pins -arrows-.*

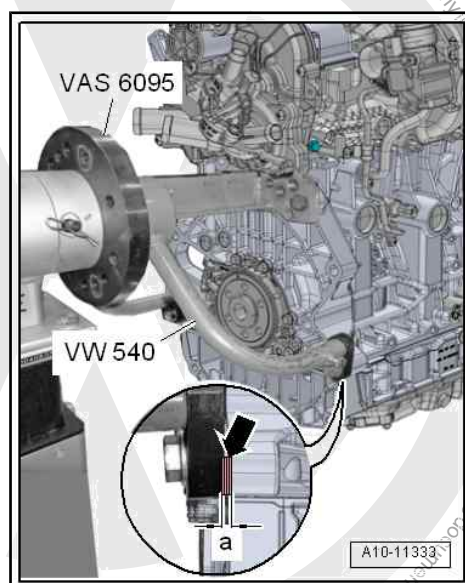
- Lift engine off T10483 using workshop hoist - VAS 6100- .



- Secure engine to engine and gearbox bracket - VAS 6095- with engine and gearbox support - VW 540- , as shown in illustration.

- Insert spacers -arrow-.

- Dimension -a- = 10 mm.





## 1.4 Installing engine

⇒ ["1.4.1 Installing engine, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Touran", page 69](#)

⇒ ["1.4.2 Installing engine, up!", page 73](#)

⇒ ["1.4.3 Installing engine, Polo 2018 ➤, T-Cross", page 75](#)

⇒ ["1.4.4 Installing engine, T-Roc", page 78](#)

### 1.4.1 Installing engine, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Touran

#### Sequence of operations



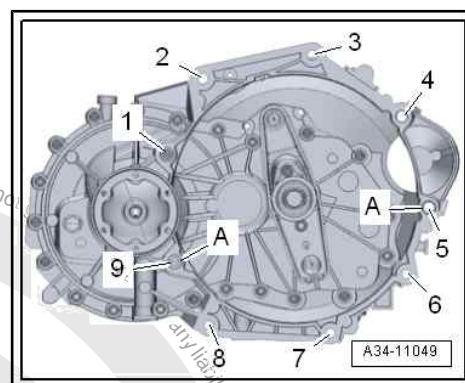
#### Note

- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Renew self-locking nuts and bolts, and seals, O-rings and gaskets.*
- ◆ *Secure all hose connections with the hose clips corresponding to original equipment ⇒ [Electronic Parts Catalogue](#) .*
- ◆ *Attach cable ties in all the same places when installing.*

– Install intermediate plate ⇒ [page 150](#) .

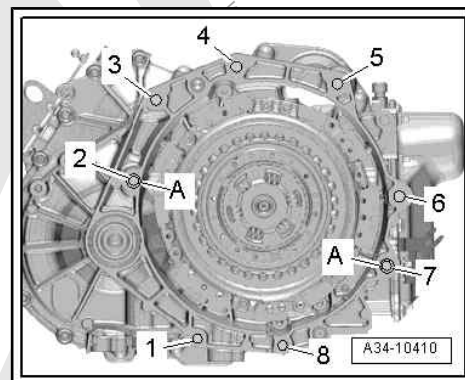
#### Vehicles with manual gearbox:

- If there are no dowel sleeves -A- in the cylinder block for centring the engine and gearbox, insert new dowel sleeves.
- If a needle bearing is fitted in crankshaft, remove needle bearing  
⇒ ["3.2 Renewing needle bearing in crankshaft", page 159](#) .



#### Vehicles with dual clutch gearbox:

- If there are no dowel sleeves -A- in the cylinder block for centring the engine and gearbox, insert new dowel sleeves.
- If no needle bearing is fitted in crankshaft, install needle bearing  
⇒ ["3.2 Renewing needle bearing in crankshaft", page 159](#) .



#### Continued for all vehicles:

- Tighten gearbox to engine.
- Install gearbox support  
⇒ ["2.1 Assembly overview - assembly mountings", page 81](#) .
- Take up engine/gearbox assembly with engine support T10483 .
- Guide engine/gearbox assembly into body.



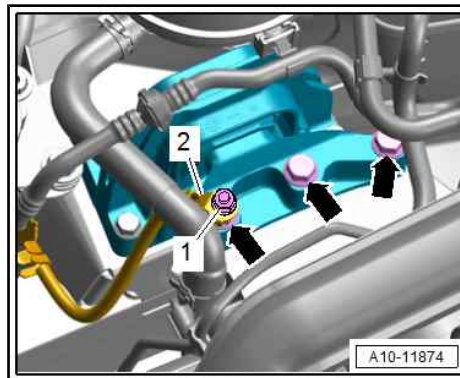
#### Polo 2014 ►

- First screw in bolts -arrows- for support arm of engine mounting as far as stop by hand.

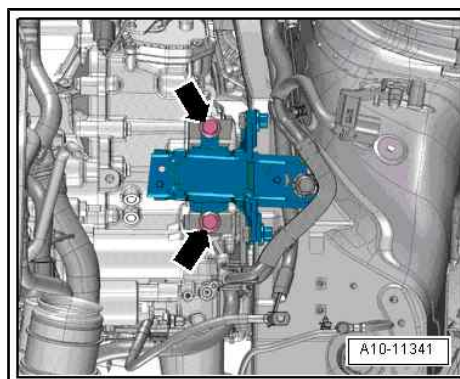


#### Note

*-Items 1 and 2- can be disregarded.*

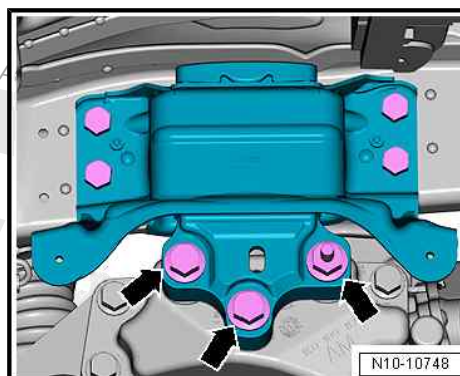


- First screw bolts -arrows- for gearbox mountings into stop by hand.



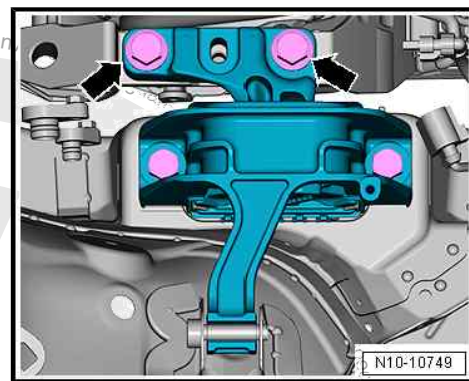
#### Golf, Golf Estate, Golf SV

- First screw bolts -arrows- for gearbox mountings into stop by hand.



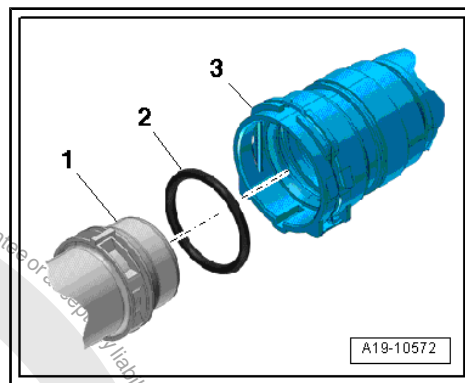


- First screw in bolts -arrows- for support arm of engine mounting as far as stop by hand.
- Remove engine bracket - T10483- from engine.
- Install starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Assembly overview - starter .
- Bleed clutch mechanism ⇒ Rep. gr. 30 ; Clutch mechanism; Bleeding clutch mechanism.
- Install cables with cable support bracket ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector cables .
- Install catalytic converter  
⇒ ["2.2 Removing and installing catalytic converter", page 489](#) .
- Install drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview - drive shaft .
- Install pendulum support  
⇒ ["2.4 Removing and installing pendulum support", page 96](#) .
- Install transverse link, swivel joint and coupling rod ⇒ Running gear, axles, steering; Rep. gr. 40 ; Lower transverse link, swivel joint; Assembly overview - lower transverse link, swivel joint .
- Install air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Assembly overview - drive unit of air conditioner compressor .
- Install poly V-belt  
⇒ ["1.2 Removing and installing poly-V belt", page 137](#) .
- Install radiator cowl  
⇒ ["4.6 Removing and installing radiator cowl", page 354](#) .
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install battery tray. ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray
- Observe measures required after connecting battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Install throttle valve module - J338-  
⇒ ["4.3 Removing and installing throttle valve module GX3", page 428](#) .
- Install engine control unit - J623-  
⇒ ["6 Engine control unit", page 437](#) .





- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Install wheel housing liners ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Assembly overview - front wheel housing liner .
- Install front wheels.
- Install air filter housing  
⇒ ["3.2 Removing and installing air filter housing", page 416](#) .
- Check oil level ⇒ Maintenance ; Booklet 819 .



#### Note

- ♦ Risk of damage to control units caused by overvoltage.
- ♦ Never use battery charging equipment for boost starting.



#### Note

Never reuse old coolant.

- Add coolant ⇒ ["1.3 Draining and adding coolant", page 272](#) .

#### Specified torques



#### Note

- ♦ The specified torques are only valid for nuts and bolts which have been slightly greased, oiled, phosphate-treated or black-oxidized.
- ♦ Additional lubricant such as engine oil or gear oil may be used, but do not use lubricant containing graphite.
- ♦ Do not use degreased parts.
- ♦ Tolerance for specified torques  $\pm 15\%$ .

Component		Nm
Bolts and nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65

- ♦ Assembly mountings  
⇒ ["2.1 Assembly overview - assembly mountings", page 81](#) .
- ♦ Securing gearbox to engine ⇒ Rep. gr. 34 ; Removing and installing gearbox; Specified torques for gearbox .

Component	Specified torque
Securing bolt for securing vacuum pump to engine support	20 Nm
Securing bolts for heat shield of knock sensor 1 - G61-	12 Nm





## 1.4.2 Installing engine, up!



### Note

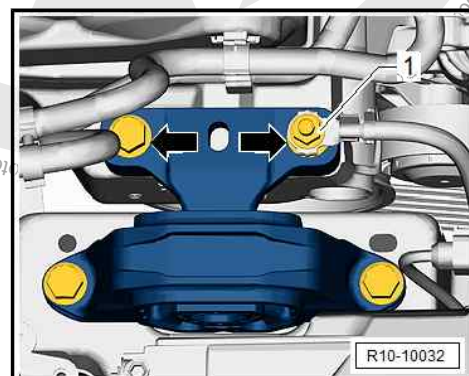
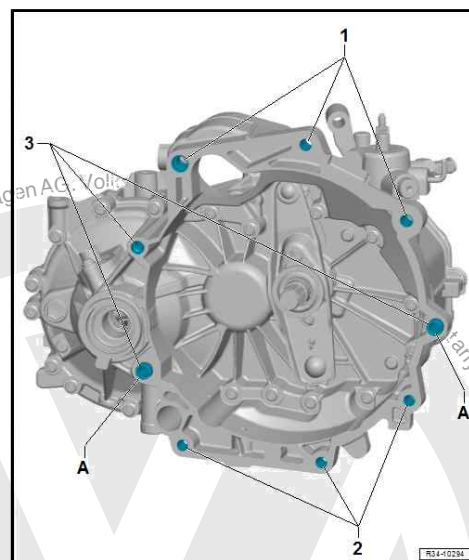
- ◆ Renew bolts that are tightened with turning further angle.
- ◆ Renew self-locking nuts and bolts, and seals, O-rings and gaskets.
- ◆ Secure all hose connections with the hose clips corresponding to original equipment ⇒ *Electronic Parts Catalogue* .
- ◆ All cable ties must be secured again in the same position on installation.

- Install intermediate plate ⇒ [page 150](#) .
- If a needle bearing is fitted in crankshaft, remove needle bearing  
⇒ [“3.2 Renewing needle bearing in crankshaft”, page 159](#) .
- Mount gearbox on engine.
- If there are no dowel sleeves -A- in the cylinder block for centring the engine and gearbox, insert new dowel sleeves.

Item	Bolt	Quantity	Nm
1	M12 x 60	3	80
2	M 10 x 55	3	40
3	M12 x 70	3	80

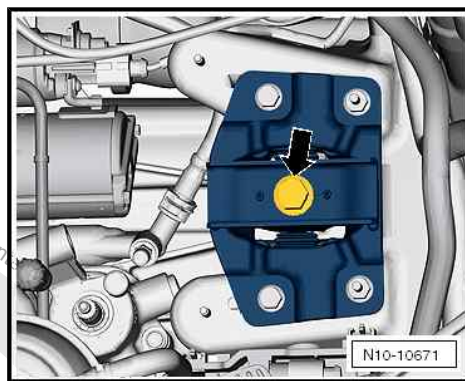
Item -A- for dowel sleeves for centring

- Securely bolt gearbox to engine ⇒ Rep. gr. 34 ; Removing and installing gearbox; Specified torques for gearbox .
- If fitted, install gearbox support ⇒ Rep. gr. 34 ; Assembly mountings; Assembly overview - assembly mountings .
- Support engine/gearbox assembly with engine support T10483 and take up weight with engine and gearbox jack - VAS 6931- .
- Guide engine/gearbox assembly into body.
- Guide engine side of engine/gearbox assembly past air conditioner compressor.
- Guide gearbox side of engine/gearbox assembly past side member.
- Bring engine/gearbox assembly into installation position using engine and gearbox jack - VAS 6931- .
- First screw bolts -arrows- for engine mountings into stop by hand.





- First screw in bolt -arrow- for gearbox mounting onto stop by hand.
- Remove engine bracket - T10483- from engine.
- Adjust assembly mountings and tighten  
⇒ ["2.6.2 Adjusting assembly mountings, up!"](#), [page 130](#) .
- Install starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Assembly overview - starter
- Install cable with cable support bracket ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism .
- Fit selector mechanism to gearbox ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism
- Install clutch slave cylinder ⇒ Rep. gr. 30 ; Clutch mechanism; Removing and installing clutch slave cylinder .
- Install front left and right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing front wheel housing liner .
- Attach connector to engine control unit - J623-  
⇒ ["6.2.2 Removing and installing engine control unit J623, up!"](#), [page 441](#) .
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Bleed clutch mechanism ⇒ Rep. gr. 30 ; Clutch mechanism; Bleeding clutch mechanism .
- Install catalytic converter  
⇒ ["2.2 Removing and installing catalytic converter"](#), [page 489](#) .
- Install drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview, drive shaft .
- Install pendulum support  
⇒ ["2.4.3 Removing and installing pendulum support, up!"](#), [page 98](#) .
- Connect coolant hoses with plug-in connector ⇒ [page 323](#) .
- Return lock carrier to service position ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Moving to and back from service position .



#### Vehicles with air conditioner:

- Install alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .
- Mount air conditioner compressor on bracket ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Removing and installing air conditioner compressor on bracket .
- Install poly V-belt  
⇒ ["1.2 Removing and installing poly-V belt"](#), [page 137](#) .

#### Continued for all vehicles:

- Install battery and battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Install air filter housing  
⇒ ["3.2.2 Removing and installing air filter housing, up!"](#), [page 417](#) .



- Install air pipe  
⇒ [“2.5 Removing and installing air pipe”, page 385](#) .
- Add coolant  
⇒ [“1.3.3 Draining and adding coolant, up!”, page 285](#) .
- Check oil level ⇒ Maintenance ; Booklet .

#### Specified torques:

- ◆ ⇒ [“2.1.3 Assembly overview – assembly mountings, up!”, page 86](#)
- ◆ ⇒ [“1.1 Assembly overview - poly V-belt drive”, page 133](#)
- ◆ ⇒ [“4.1.3 Assembly overview - radiator/radiator fan, up!”, page 322](#)
- ◆ ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ◆ ⇒ [“2.1 Assembly overview - charge air system”, page 378](#)
- ◆ ⇒ [“4.1 Assembly overview - intake manifold”, page 421](#)
- ◆ ⇒ [“6.1.2 Assembly overview - engine control unit, up!”, page 438](#)
- ◆ ⇒ [“8.1 Assembly overview - Lambda probe”, page 453](#)
- ◆ ⇒ [“1.1.4 Assembly overview - silencers, up!”, page 463](#)
- ◆ ⇒ [“2.1.1 Assembly overview - emission control, Polo 2014 ►, up!”, page 482](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview - drive shaft
- ◆ ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Assembly overview - lock carrier
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation
- ◆ ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Assembly overview - bumper cover
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Assembly overview- front wheel housing liner
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Battery; Assembly overview - battery
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Alternator; Exploded view - alternator
- ◆ ⇒ Electrical system; Rep. gr. 27 ; Starter; Assembly overview - starter
- ◆ ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism
- ◆ ⇒ Rep. gr. 34 ; Removing and installing gearbox; Specified torques for gearbox
- ◆ ⇒ Rep. gr. 34 ; Assembly mountings; Assembly overview - assembly mountings
- ◆ ⇒ Rep. gr. 34 ; Selector mechanism; Assembly overview - selector mechanism
- ◆

### 1.4.3 Installing engine, Polo 2018 ►, T-Cross

#### Special tools and workshop equipment required



- ◆ Engine and gearbox jack - VAS 6931-



- ◆ Spring-type clip pliers - VAS 6362-



- ◆ Engine support - T10483-

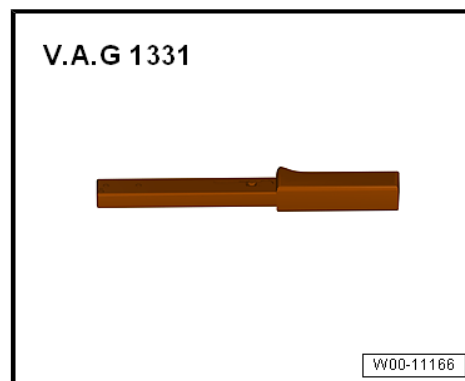


- ◆ Torque wrench - V.A.G 1332-





- ◆ Torque wrench - V.A.G 1331-



## Installing

Install in reverse order of removal, observing the following:

- Bring engine/gearbox assembly into installation position using engine and gearbox jack - VAS 6931-.
- Tighten bolts for engine mountings, gearbox mountings and pendulum support by hand initially.
- Adjust assembly mountings and tighten ⇒ [page 129](#).
- Renew all bolts that are tightened with a turning further angle after each removal.
- Renew self-locking nuts and bolts as well as gaskets, seals and O-rings after each removal.
- Hose unions, air pipes and hoses must be free of oil and grease before installation.
- Fit the cable ties in the original position when installing.
- Route lines of any kind and cables so that original routing is restored.
- Ensure that there is sufficient clearance to all moving or hot components.
- Add coolant ⇒ [page 279](#).
- Check fuel system for leaks.

## Specified torques

- ◆ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)
- ◆ ⇒ [“2.1 Assembly overview - emission control”, page 482](#)
- ◆ ⇒ [“3.1.4 Assembly overview - air filter housing, Polo 2018”, page 413](#)
- ◆ Battery; Assembly overview - battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Assembly overview - battery
- ◆ Air conditioner compressor; Assembly overview - air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Assembly overview - drive unit of air conditioner compressor
- ◆ Assembly overview - drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview - drive shaft
- ◆ Noise insulation; Assembly overview - noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation





Component		Property class 8.8 Nm	Property class 10.9 Nm
Bolts and nuts	M4	2	3.5
	M5	4	7
	M6	8	12
	M8	20	30
	M10	40	55
	M12	70	100

#### 1.4.4 Installing engine, T-Roc

##### Special tools and workshop equipment required

- ♦ Engine and gearbox jack - VAS 6931-



- ♦ Spring-type clip pliers - VAS 6362-



- ♦ Engine support - T10483-





◆ Torque wrench - V.A.G 1332-

V.A.G 1332



W00-11165

◆ Torque wrench - V.A.G 1331-

V.A.G 1331



W00-11166

## Installing

Install in reverse order of removal, observing the following:

- Bring engine/gearbox assembly into installation position using engine and gearbox jack - VAS 6931- .
- Tighten bolts for engine mountings, gearbox mountings and pendulum support by hand initially.
- Adjust assembly mountings and tighten  
⇒ [“2.6.1 Adjusting assembly mountings, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 129](#) .
- Renew all bolts that are tightened with a turning further angle after each removal.
- Renew self-locking nuts and bolts as well as gaskets, seals and O-rings after each removal.
- Hose unions, air pipes and hoses must be free of oil and grease before installation.
- Fit the cable ties in the original position when installing.
- Route lines of any kind and cables so that original routing is restored.
- Ensure that there is sufficient clearance to all moving or hot components.
- Add coolant  
⇒ [“1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 279](#) .
- Check fuel system for leaks.

## Specified torques

- ◆ ⇒ [“2.1.4 Assembly overview - assembly mountings, Polo 2018 ►, T-Roc, T-Cross”, page 88](#)



- ◆ ⇒ [“2.1.2 Assembly overview - emission control, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross”, page 484](#)
- ◆ ⇒ [“3.1.2 Assembly overview - air filter housing, Golf, Golf Estate, Golf SV, T-Roc, Touran”, page 411](#)
- ◆ Battery; Assembly overview - battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Assembly overview - battery
- ◆ Air conditioner compressor; Assembly overview - air conditioner compressor ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Assembly overview - drive unit of air conditioner compressor
- ◆ Assembly overview - drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview - drive shaft
- ◆ Noise insulation; Assembly overview - noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation

Component		Property class 8.8 Nm	Property class 10.9 Nm
Bolts and nuts	M4	2	3.5
	M5	4	7
	M6	8	12
	M8	20	30
	M10	40	55
	M12	70	100





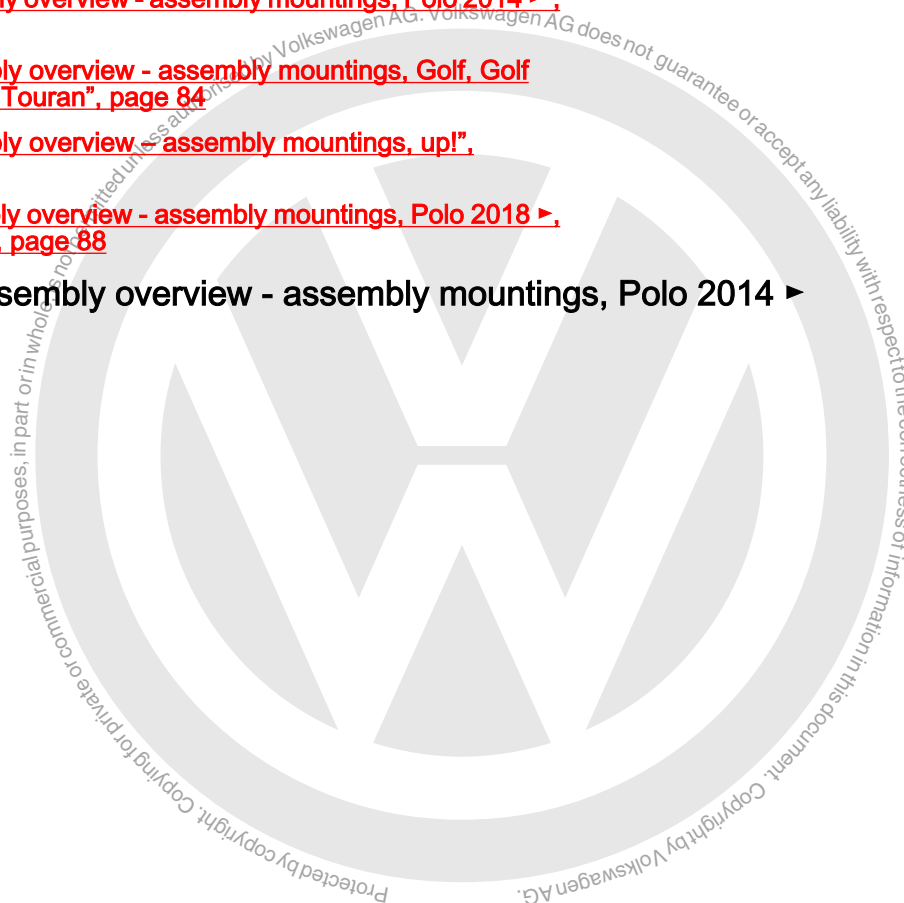
## 2 Assembly mountings

- ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)
- ⇒ [“2.2 Removing and installing engine mounting”, page 90](#)
- ⇒ [“2.3 Removing and installing gearbox mounting”, page 93](#)
- ⇒ [“2.4 Removing and installing pendulum support”, page 96](#)
- ⇒ [“2.5 Supporting engine in installation position”, page 98](#)
- ⇒ [“2.6 Adjusting assembly mountings”, page 129](#)
- ⇒ [“2.7 Checking adjustment of assembly mountings \(engine and gearbox mountings\)”, page 131](#)

### 2.1 Assembly overview - assembly mountings

- ⇒ [“2.1.1 Assembly overview - assembly mountings, Polo 2014 ►”, page 81](#)
- ⇒ [“2.1.2 Assembly overview - assembly mountings, Golf, Golf Estate, Golf SV, Touran”, page 84](#)
- ⇒ [“2.1.3 Assembly overview - assembly mountings, up!”, page 86](#)
- ⇒ [“2.1.4 Assembly overview - assembly mountings, Polo 2018 ►, T-Roc, T-Cross”, page 88](#)

#### 2.1.1 Assembly overview - assembly mountings, Polo 2014 ►





### 1 - Engine support

- ☐ Specified torque and tightening sequence  
⇒ [page 83](#)

### 2 - Bolt

- ☐ Renew after removal
- ☐ Tightening sequence  
⇒ [page 83](#)

### 3 - Engine mounting

- ☐ With support arm
- ☐ Do not separate engine mounting and support arm
- ☐ Removing and installing  
⇒ [“2.2 Removing and installing engine mounting”, page 90](#)

### 4 - Bolt

- ☐ Renew after removal
- ☐ 20 Nm +90°

### 5 - Bolt

- ☐ Renew after removal
- ☐ 30 Nm +90°

### 6 - Centre hex stud

- ☐ Renew after removal
- ☐ 30 Nm +90°

### 7 - Earth strap

- ☐ Make sure the contact surfaces are free of dirt and corrosion
- ☐ Clean as necessary

### 8 - Nut

- ☐ For securing earth strap
- ☐ 20 Nm

### 9 - Bolt

- ☐ Renew after removal
- ☐ 40 Nm +90°

### 10 - Gearbox mounting

- ☐ With support arm
- ☐ Removing and installing ⇒ [“2.3 Removing and installing gearbox mounting”, page 93](#)

### 11 - Bolt

- ☐ Renew after removal
- ☐ 50 Nm +90°

### 12 - Bolt

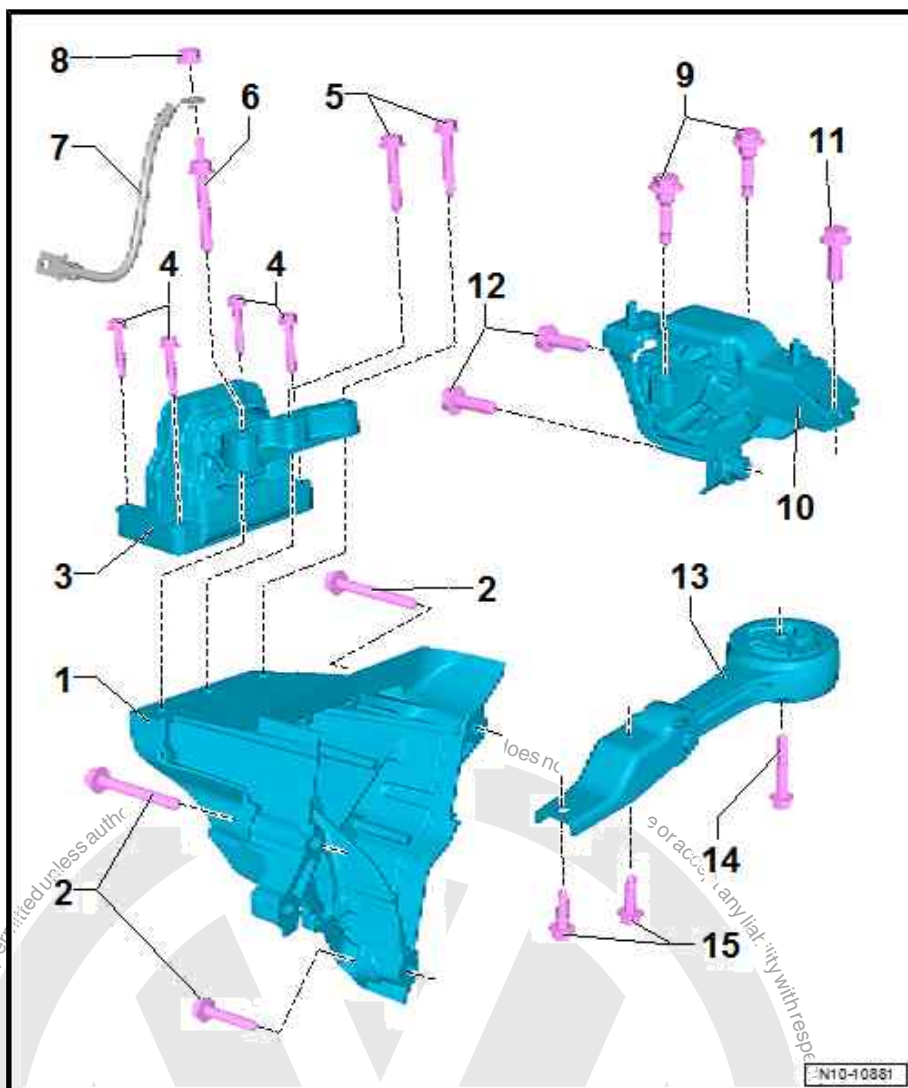
- ☐ Specified torque ⇒ Rep. gr. 34 ; Assembly mountings; Assembly overview - assembly mountings

### 13 - Pendulum support

- ☐ Removing and installing ⇒ [“2.4 Removing and installing pendulum support”, page 96](#)

### 14 - Bolt

- ☐ Renew after removal
- ☐ 40 Nm +90°







## 15 - Bolt

- ☐ Renew after removal
- ☐ 30 Nm +90°

### Engine support - specified torque and installation sequence

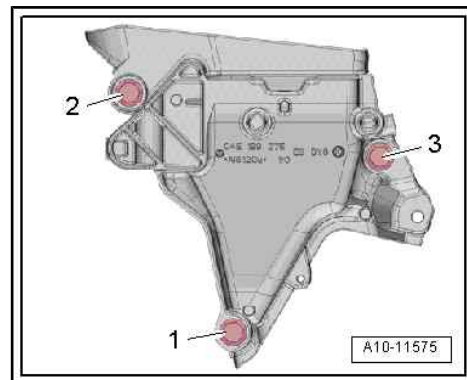


#### Note

- ◆ *If specified torque and tightening sequence are not adhered to, used bolts may become loose.*
- ◆ *Renew bolts that are tightened with turning further angle.*

– Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1.	-1 ... 3-	7 Nm
2.	-1 ... 3-	40 Nm
3.	-1 ... 3-	Turn 90° further





## 2.1.2 Assembly overview - assembly mountings, Golf, Golf Estate, Golf SV, Touran

### 1 - Bolt

- ☐ Renew
- ☐ Tightening sequence  
⇒ [page 85](#)

### 2 - Engine support

- ☐ Specified torque and tightening sequence  
⇒ [page 85](#)

### 3 - Engine mounting

- ☐ With support arm
- ☐ Removing and installing  
⇒ ["2.2 Removing and installing engine mounting", page 90](#)

### 4 - Bolt

- ☐ Renew
- ☐ 40 Nm +90°

### 5 - Bolt

- ☐ Renew
- ☐ 20 Nm +90°

### 6 - Bolt

- ☐ 8 Nm

### 7 - Bracket

### 8 - Bolt

- ☐ Renew
- ☐ 60 Nm +90°

### 9 - Pendulum support

- ☐ Removing and installing  
⇒ ["2.4 Removing and installing pendulum support", page 96](#)

### 10 - Bolt

- ☐ Renew
- ☐ 130 Nm +90°

### 11 - Bolt

- ☐ Renew
- ☐ 50 Nm +90°

### 12 - Bolts

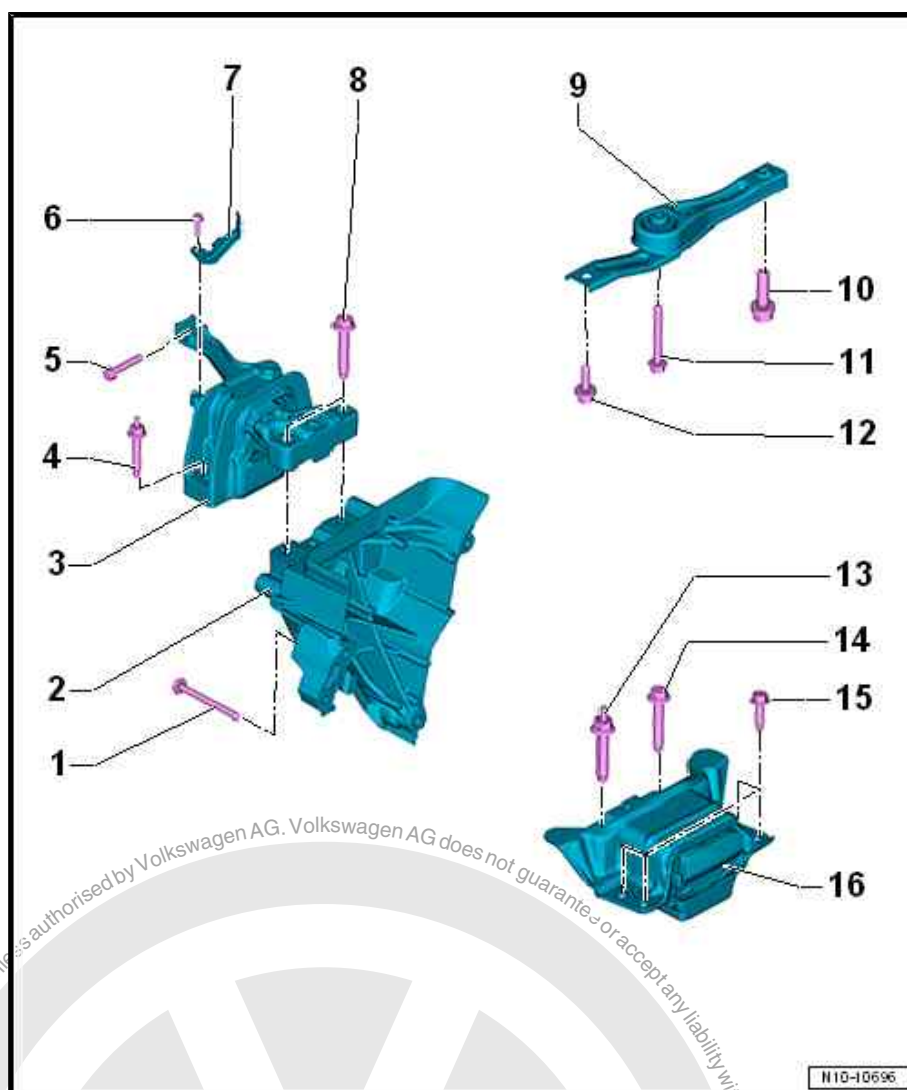
- ☐ Renew
- ☐ 50 Nm +90°

### 13 - Bolt

- ☐ Renew
- ☐ 60 Nm +90°

### 14 - Bolt

- ☐ Qty. 2
- ☐ Renew





- ☐ 60 Nm +90°

#### 15 - Bolt

- ☐ Renew
- ☐ 50 Nm +90°

#### 16 - Gearbox mounting

- ☐ With support arm
- ☐ Removing and installing ⇒ [“2.3 Removing and installing gearbox mounting”, page 93](#)

### Engine support - specified torque and installation sequence

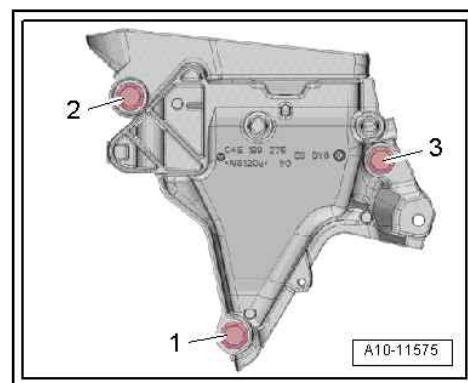


#### Note

- ◆ If specified torque and tightening sequence are not adhered to, used bolts may become loose.
- ◆ Renew bolts that are tightened with turning further angle.

– Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1.	1 ... 3-	7 Nm
2.	-1 ... 3-	40 Nm
3.	-1 ... 3-	Turn 90° further





## 2.1.3 Assembly overview – assembly mountings, up!

### 1 - Engine mounting

- ❑ Removing and installing  
⇒ [“2.2.3 Removing and installing engine mounting, up!”](#), page 92

### 2 - Bolt

- ❑ Qty. 2
- ❑ Renew after removal
- ❑ M10 x 50
- ❑ 40 Nm +90°

### 3 - Bolt

- ❑ Renew after removal
- ❑ Bolt: M12 60 Nm +90°
- ❑ Centre hex stud: M10 40 Nm +90°

### 4 - Bolt

- ❑ Renew after removal
- ❑ M12 x 60
- ❑ 60 Nm +90°

### 5 - Engine support

- ❑ Removing and installing  
⇒ [“1.5 Removing and installing engine support”](#), page 143
- ❑ Specified torque and tightening sequence  
⇒ [page 87](#)

### 6 - Bolt

- ❑ Qty. 2
- ❑ Renew after removal
- ❑ Specified torque and tightening sequence ⇒ [page 87](#)

### 7 - Bolt

- ❑ Qty. 2
- ❑ Renew after removal
- ❑ M8 x 25
- ❑ 20 Nm +90°

### 8 - Centre hex stud

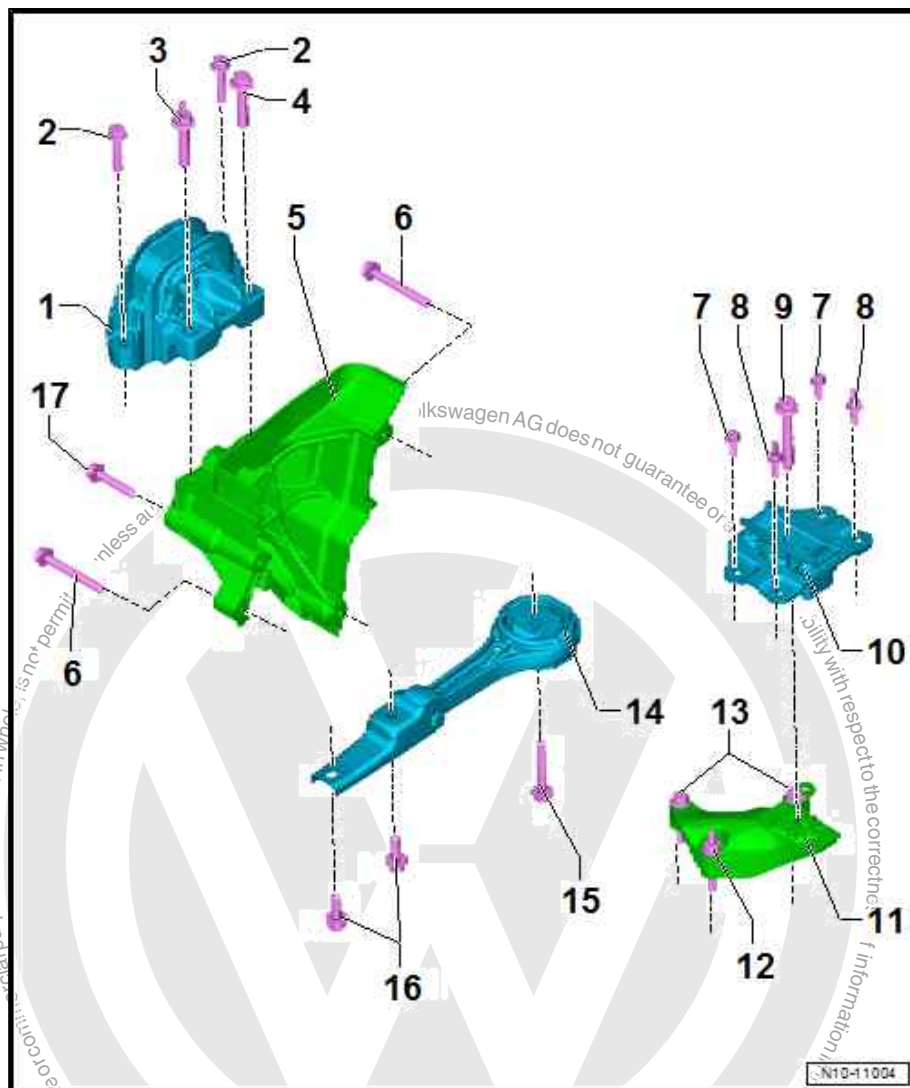
- ❑ Qty. 2
- ❑ Renew after removal
- ❑ M8 x 25
- ❑ 20 Nm +90°

### 9 - Bolt

- ❑ Renew after removal
- ❑ M12 x 1.5 x 85
- ❑ 60 Nm +180°

### 10 - Gearbox mounting

- ❑ Removing and installing ⇒ [“2.3.3 Removing and installing gearbox mountings, up!”](#), page 95





## 11 - Gearbox support

- ☐ Removing and installing ⇒ Rep. gr. 34 ; Assembly mountings; Assembly overview - assembly mountings

## 12 - Centre hex stud

- ☐ Renew after removal
- ☐ M10 x 55
- ☐ 40 Nm +90°

## 13 - Bolt

- ☐ Qty. 2
- ☐ Renew after removal
- ☐ M10 x 55
- ☐ 40 Nm +90°

## 14 - Pendulum support

- ☐ Removing and installing ⇒ [“2.4.3 Removing and installing pendulum support, up!”, page 98](#)

## 15 - Bolt

- ☐ Renew after removal
- ☐ 50 Nm +180°

## 16 - Bolt

- ☐ Qty. 2
- ☐ Renew after removal
- ☐ M10 x 35
- ☐ 50 Nm +90°

## 17 - Bolt

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ⇒ [page 87](#)

## Engine support - specified torque and installation sequence

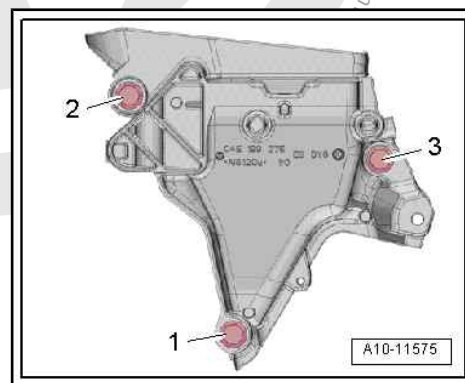


### Note

- ◆ *If specified torque and tightening sequence are not adhered to, used bolts may become loose.*
- ◆ *Renew bolts that are tightened with turning further angle.*

– Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque/turning further angle
1.	-1 ... 3-	7 Nm
2.	-1 ... 3-	40 Nm
3.	-1 ... 3-	Turn 90° further







## 2.1.4 Assembly overview - assembly mountings, Polo 2018 ►, T-Roc, T-Cross

### 1 - Bolts

- ☐ Renew after removal
- ☐ Qty. 3
- ☐ Specified torque and tightening sequence [⇒ page 89](#)

### 2 - Engine support

- ☐ Removing and installing [⇒ page 143](#)

### 3 - Engine mounting

- ☐ Removing and installing [⇒ page 91](#)

### 4 - Bolts

- ☐ Renew after removal
- ☐ Qty. 2
- ☐ 40 Nm +90°

### 5 - Bolt

- ☐ Renew after removal
- ☐ 20 Nm +90°

### 6 - Nut

- ☐ Renew after removal
- ☐ Depending on equipment

### 7 - Bolts

- ☐ Renew after removal
- ☐ Qty. 2
- ☐ 60 Nm +90°

### 8 - Pendulum support

- ☐ Removing and installing [⇒ page 97](#)

### 9 - Bolt

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence [⇒ page 89](#)

### 10 - Bolt

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence [⇒ page 89](#)

### 11 - Bolt

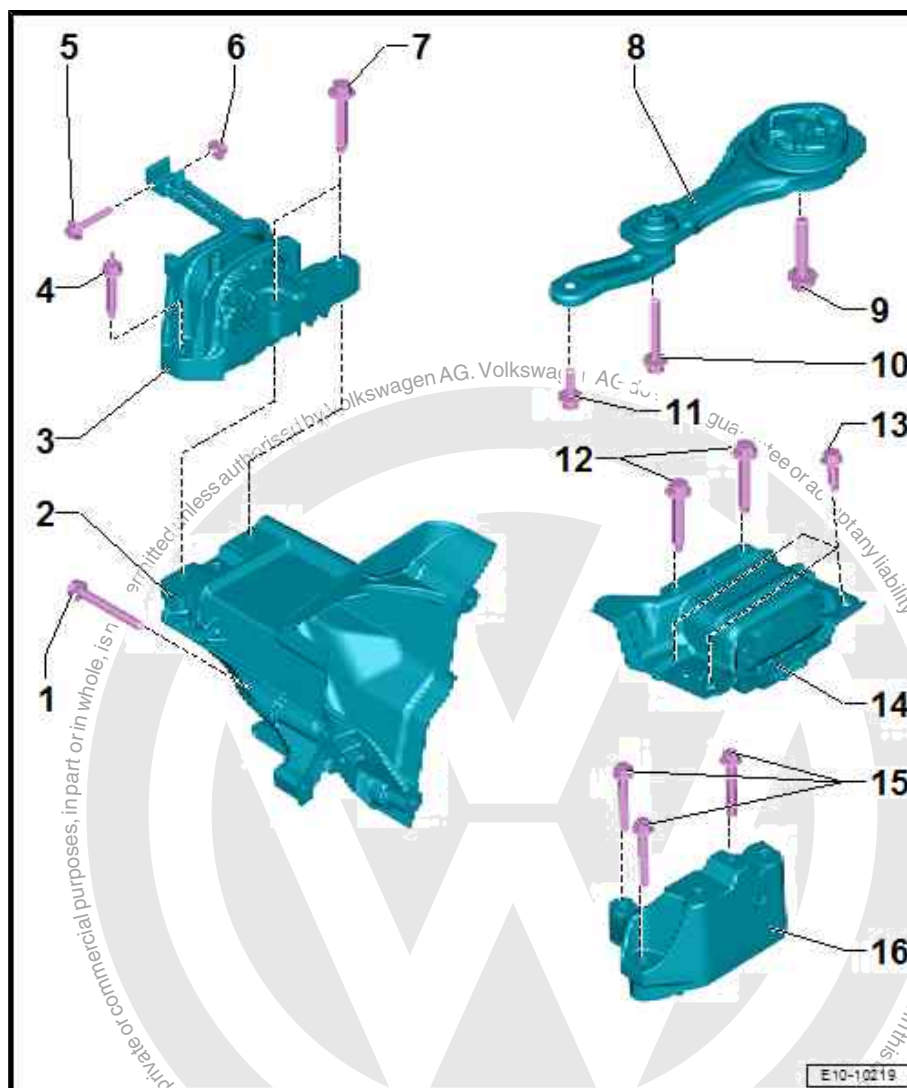
- ☐ Renew after removal
- ☐ Specified torque and tightening sequence [⇒ page 89](#)

### 12 - Bolts

- ☐ Renew after removal
- ☐ Qty. 2
- ☐ 60 Nm +90°

### 13 - Bolts

- ☐ Renew after removal
- ☐ Qty. 4





- ☐ 50 Nm +90°

#### 14 - Gearbox mounting

- ☐ Removing and installing ➔ [page 94](#)

#### 15 - Bolts

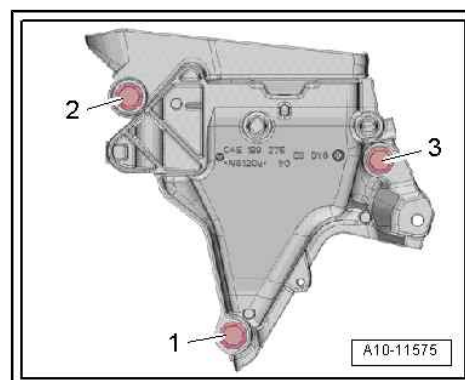
- ☐ Renew after removal
- ☐ Qty. 3
- ☐ 40 Nm +90°

#### 16 - Gearbox bracket

#### Engine support - specified torque and installation sequence

- Tighten bolts in the sequence shown:

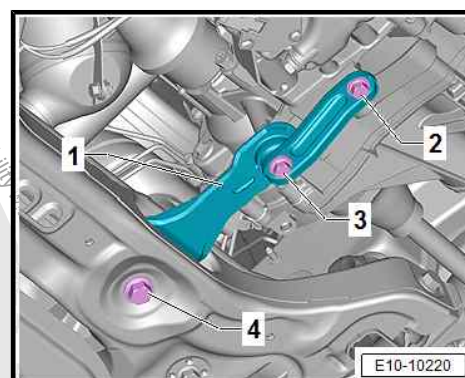
Stage	Bolts	Specified torque/turning further angle
1.	-1 ... 3-	7 Nm
2.	-1 ... 3-	40 Nm
3.	-1 ... 3-	Turn 90° further



#### Pendulum support - specified torque and tightening sequence

- Tighten bolts in the sequence shown:

Stage	Bolts	Specified torque/turning further angle
1.	-2- and -3-	50 Nm
2.	-4-	130 Nm
3.	-2- and -3-	Turn 90° further





## 2.2 Removing and installing engine mounting

⇒ [“2.2.1 Removing and installing engine mounting, Polo 2014 ➤”, page 90](#)

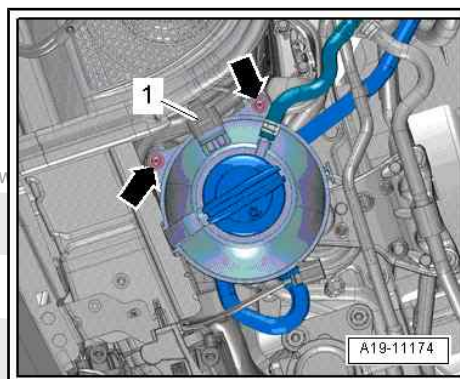
⇒ [“2.2.2 Removing and installing engine mounting, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 91](#)

⇒ [“2.2.3 Removing and installing engine mounting, up!”, page 92](#)

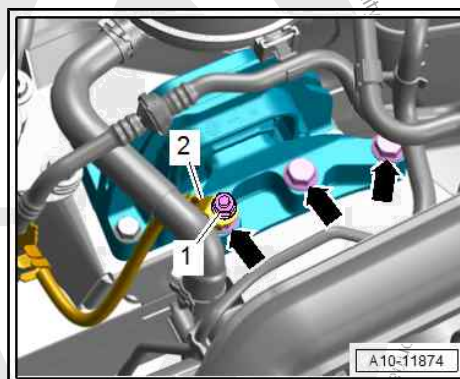
### 2.2.1 Removing and installing engine mounting, Polo 2014 ➤

#### Removing

- Unscrew bolts -arrows-.
- Lift coolant expansion tank until connector is accessible.
- Disconnect connector -1- for coolant shortage indicator switch - F66- , and lay coolant expansion tank to one side.
- Support engine in installation position.  
⇒ [“2.5 Supporting engine in installation position”, page 98](#)



- Unscrew nut -1-, and lay earth wire -2- to one side.
- Unscrew bolts -arrows- for gearbox mounting support arm.



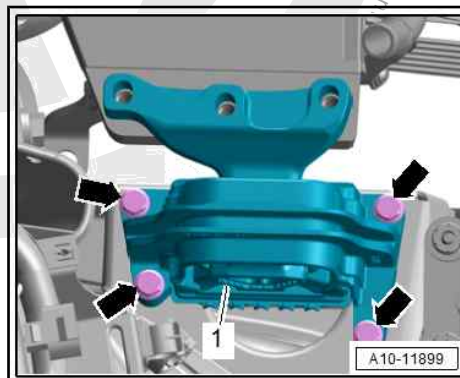
- Unscrew bolts -arrows- and remove engine mounting -1-.

#### Installing



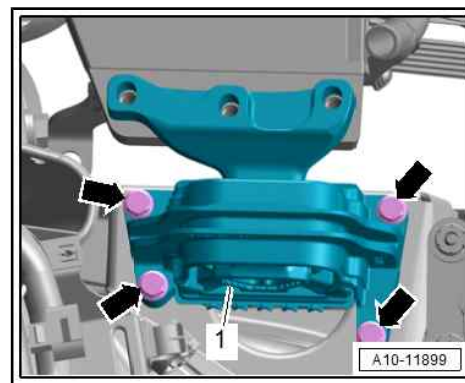
#### Note

- ♦ If specified torque and tightening sequence are not adhered to, used bolts may become loose.
- ♦ Renew bolts that are tightened with turning further angle.

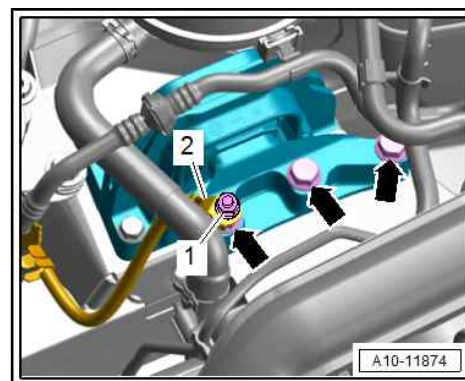




- Place engine mounting -1- onto longitudinal member.
- First screw in bolts -arrows- as far as stop by hand.
- Tighten bolts  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#).



- First screw in bolts -arrows- for support arm of engine mounting as far as stop by hand.
- Make sure support arm is not twisted when bolts are tightened.
- Tighten bolts -arrows-  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#).
- Fit earth strap -2- to stud, start nut -1-, and tighten it.  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)
- Remove support bracket.  
⇒ [“2.5 Supporting engine in installation position”, page 98](#)



Further installation is carried out in reverse order of removal, observing the following:

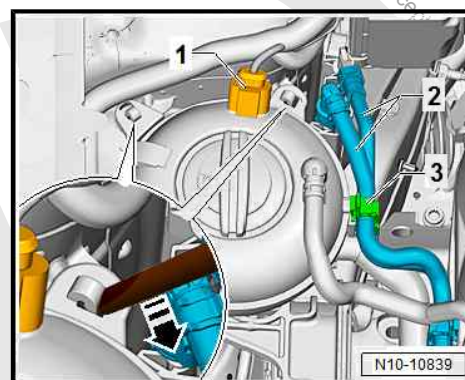
#### Specified torques

- ◆ Securing bolts and securing nuts  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)

## 2.2.2 Removing and installing engine mounting, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran

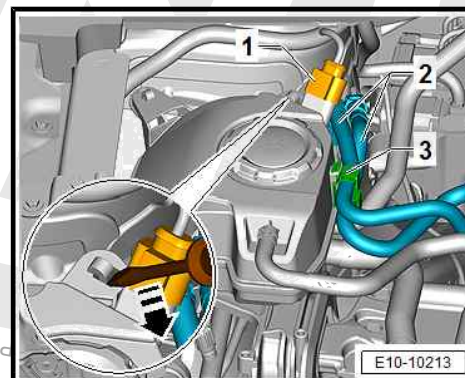
### Removing

- Pull off connector -1-.
- Open locking element -3-, and move hoses -2- of activated charcoal filter clear to one side.
- Using a screwdriver, release fasteners -arrow-, and lay coolant expansion tank to one side.



### Polo 2018 ►, T-Cross

- Open retainer -3-.
- Lay fuel hoses -2- to one side.
- Disconnect electrical connector -1-.
- Release retaining tabs in direction of -arrow- and place coolant expansion tank aside.







### Continued for all vehicles

- Support engine in installation position.  
⇒ [“2.5 Supporting engine in installation position”, page 98](#)
- Unscrew bolts -arrows- and remove engine mounting -1-.

### Installing



#### Note

- ♦ *If specified torque and tightening sequence are not adhered to, used bolts may become loose.*
- ♦ *Renew bolts that are tightened with turning further angle.*

Install in reverse order of removal.

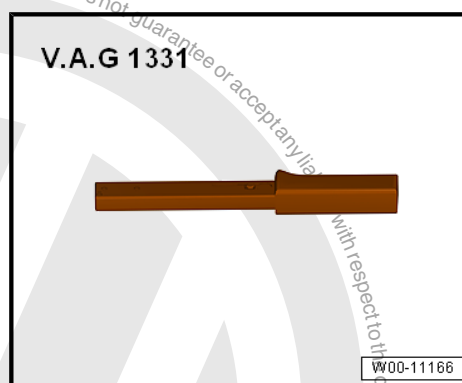
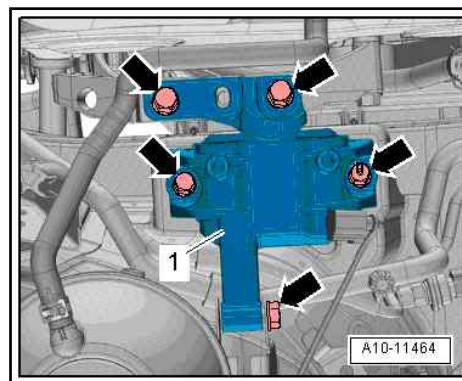
### Specified torques

- ♦ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)

## 2.2.3 Removing and installing engine mounting, up!

### Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1331-



- Support engine in its installation position  
⇒ [“2.5.3 Supporting up! engine in installation position, on right of camshaft housing”, page 105](#) .
- Unscrew earth wire -1-.

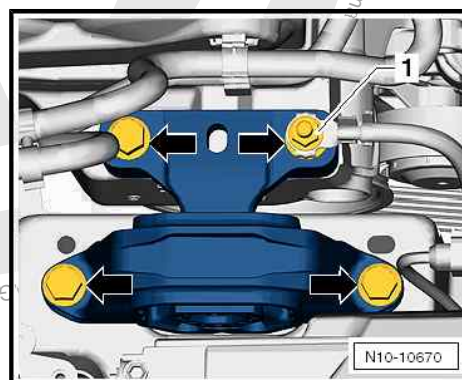
Unscrew securing bolts -arrows- and remove assembly mounting on engine side.

Further assembly is basically a reverse of the dismantling sequence.



#### Note

- ♦ *The engine mounting must be free of tension when pre-tightening bolts.*
- ♦ *The final specified torque must not be applied until the vehicle has been lowered completely.*



### Specified torques

- ♦ ⇒ [“2.1.3 Assembly overview – assembly mountings, up!”, page 86](#)





## 2.3 Removing and installing gearbox mounting

⇒ [“2.3.1 Removing and installing gearbox mounting, manual gearbox, Polo 2014 ➤”, page 93](#)

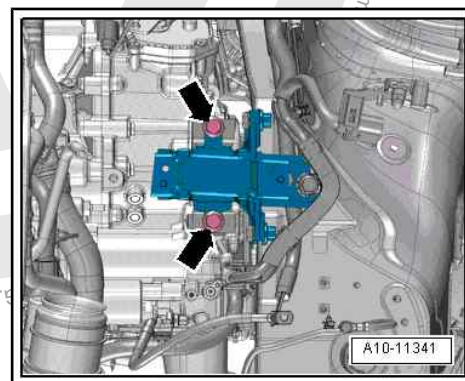
⇒ [“2.3.2 Removing and installing gearbox mounting, manual gearbox, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 94](#)

⇒ [“2.3.3 Removing and installing gearbox mountings, up!”, page 95](#)

### 2.3.1 Removing and installing gearbox mounting, manual gearbox, Polo 2014 ➤

#### Removing

- Support engine in installation position.  
⇒ [“2.5 Supporting engine in installation position”, page 98](#)
- Disconnect earth wire from battery terminal ⇒ Electrical system; Rep. gr. 27 ; Battery, Disconnecting and connecting battery .
- Remove battery tray. ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray
- Unscrew bolts -arrows- for gearbox mounting.



- Unscrew bolts -arrows A, B and C-, and remove gearbox mounting.

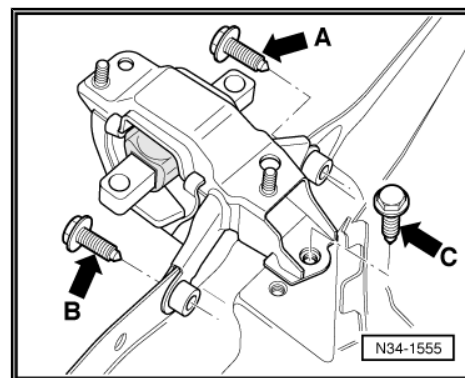
#### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *If specified torque and tightening sequence are not adhered to, used bolts may become loose.*
- ◆ *Renew bolts that are tightened with turning further angle.*
- Install battery tray. ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray
- Connect earth wire to battery terminal ⇒ Electrical system; Rep. gr. 27 ; Battery, Disconnecting and connecting battery .
- Remove support bracket.  
⇒ [“2.5 Supporting engine in installation position”, page 98](#)



#### Specified torques

- ◆ Gearbox mounting - specified torque and tightening sequence  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)



## 2.3.2 Removing and installing gearbox mounting, manual gearbox, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran

### Removing

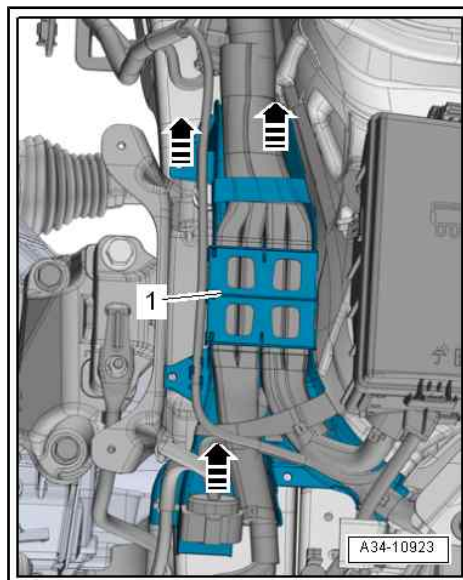
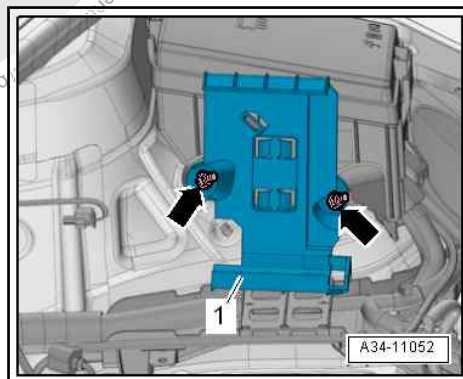
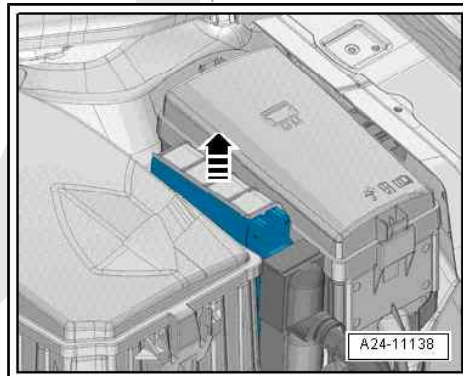
- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Release fastener -arrow-, detach engine control unit - J623- and place to one side.
- Remove engine control unit  
⇒ [“6.2 Removing and installing engine \(motor\) control unit J623”, page 440](#) .
- Unscrew nuts -arrows- and remove bracket -1-.



### Note

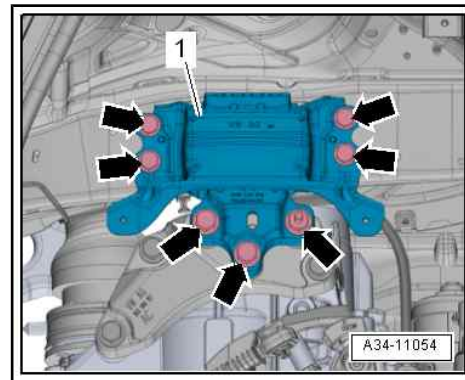
*Different types of brackets are fitted depending on version.*

- Unclip wire guide -1- upwards -arrows-, and push it slightly to one side.
- Support engine in its installation position  
⇒ [“2.5 Supporting engine in installation position”, page 98](#) .





- Remove bolts -arrows- and detach gearbox mounting -1-.



### Polo 2018 ➤, T-Cross

- Unscrew bolts -arrows-.
- Remove gearbox mounting -1-.

### Continued for all vehicles

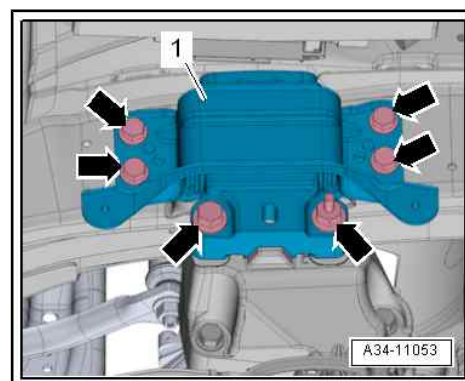
#### Installing

Install in reverse order of removal, observing the following:



#### Note

*Renew bolts that are tightened with specified further tightening angle.*



- Gearbox support and support arm of gearbox mounting must be perfectly parallel to each other before screwing in bolts -arrows 1-.
- If necessary, lift gearbox at rear using trolley jack.
- Do not remove support bracket - 10 - 222 A- until the bolts securing the assembly mounting have been tightened to specified torque.
- Lift gearbox with spindle of support bracket until gearbox support makes contact with support arm of gearbox mounting.
- Remove support bracket - 10 - 222 A- from engine.

#### Specified torques

- ◆ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ ⇒ Electrical system; Rep. gr. 27; Battery; Assembly overview - battery
- ◆ ⇒ [“6.2 Removing and installing engine \(motor\) control unit J623”, page 440](#)

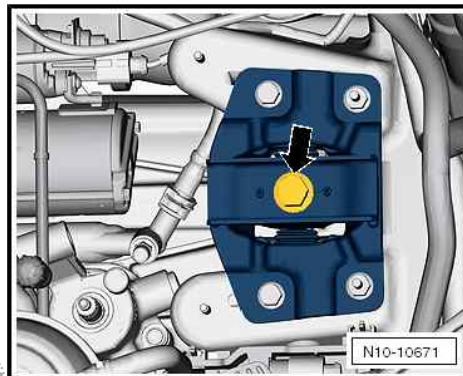
## 2.3.3 Removing and installing gearbox mountings, up!

### Removing

- Remove battery tray ⇒ Electrical system; Rep. gr. 27; Battery; Removing and installing battery tray .
- Support engine in its installation position  
⇒ [“2.5.4 Supporting engine in installation position, up!, on camshaft housing \(left-side\)”, page 108](#) .



- Unscrew bolt -arrow- from gearbox mounting.



- Unscrew bolts -1-, and remove gearbox mounting.

### Installing

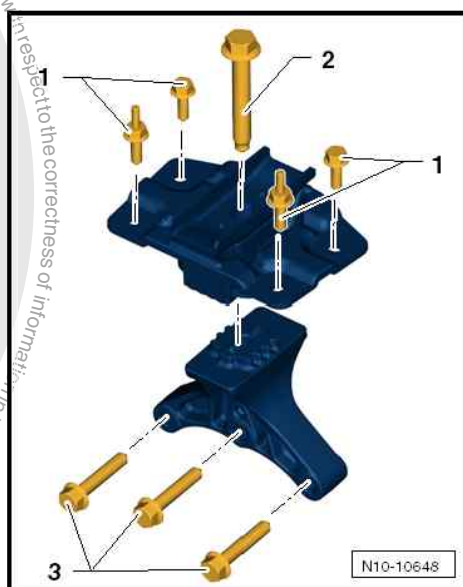
Install in reverse order of removal, observing the following:

Risk of damaging thread in gearbox support if bolts are started at an angle.

- Lift gearbox with spindle of support bracket until gearbox support makes contact with gearbox mounting.
- Checking adjustment of assembly mountings  
⇒ [“2.7.2 Checking assembly mounting settings, up!”](#), [page 132](#) .
- Remove support bracket - 10 - 222 A- from engine.

### Specified torques

- ♦ ⇒ [“2.1.3 Assembly overview – assembly mountings, up!”](#), [page 86](#)
- ♦ ⇒ Electrical system; Rep. gr. 27 ; Battery; Assembly overview - battery



## 2.4 Removing and installing pendulum support

⇒ [“2.4.1 Removing and installing pendulum support, Polo 2014 ►”](#), [page 96](#)

⇒ [“2.4.2 Removing and installing pendulum support, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”](#), [page 97](#)

⇒ [“2.4.3 Removing and installing pendulum support, up!”](#), [page 98](#)

### 2.4.1 Removing and installing pendulum support, Polo 2014 ►

#### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .



#### Note

*The threaded connection -1- must not be loosened.*





- Unscrew bolts -arrow- and remove pendulum support.

### Installing

Install in reverse order of removal, observing the following:



### Note

- ◆ *If specified torque and tightening sequence are not adhered to, used bolts may become loose.*
- ◆ *Renew bolts that are tightened with turning further angle.*

- Bolt pendulum support first to gearbox and then to subframe.

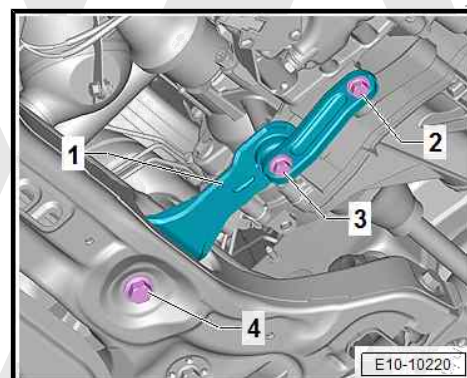
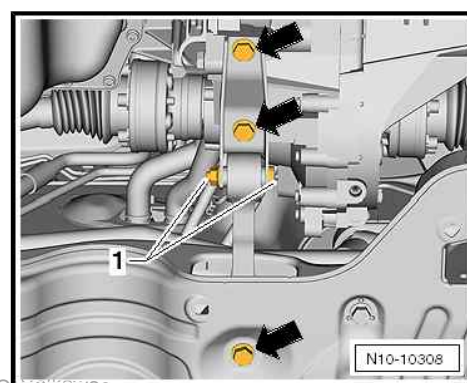
### Specified torques

- ◆ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)

## 2.4.2 Removing and installing pendulum support, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran

### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Unscrew bolts -2, 3, 4-.
- Pull out pendulum support -1- from subframe.



### Installing

Install in reverse order of removal, observing the following:

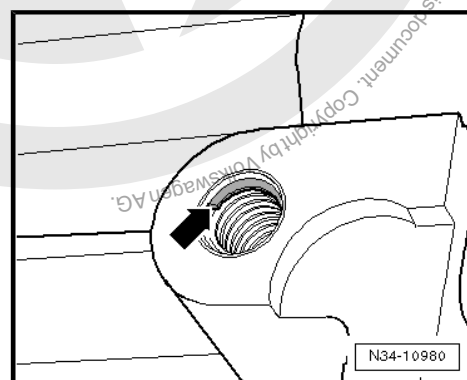


### Note

- ◆ *There are threaded inserts, e.g. “Heli-Coil” in the bolting holes for the pendulum support.*
- ◆ *Identification: shoulder along beginning of thread -arrow-.*

### Specified torques

- ◆ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)







### 2.4.3 Removing and installing pendulum support, up!

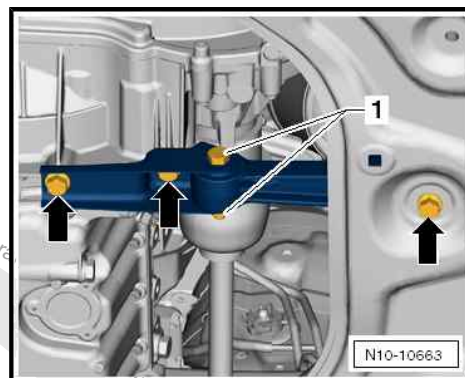
- Remove securing bolts -arrows- of pendulum support.
- The threaded connection -1- must not be loosened.

#### Installing

Install in reverse order of removal, observing the following:

#### Specified torques

- ♦ ⇒ [“2.1.3 Assembly overview – assembly mountings, up!”](#), page 86



## 2.5 Supporting engine in installation position

⇒ [“2.5.1 Supporting engine in installation position, Polo 2014 ►”](#), page 98

⇒ [“2.5.2 Supporting engine in installation position, Golf, Golf Estate, Golf SV”](#), page 100

⇒ [“2.5.3 Supporting up! engine in installation position, on right of camshaft housing”](#), page 105

⇒ [“2.5.4 Supporting engine in installation position, up!, on camshaft housing \(left-side\)”](#), page 108

⇒ [“2.5.5 Supporting engine in installation position, Polo 2018 ►, manual gearbox”](#), page 111

⇒ [“2.5.6 Supporting engine in installation position, Polo 2018 ►, dual clutch gearbox”](#), page 114

⇒ [“2.5.7 Supporting engine in installation position, T-Roc”](#), page 117

⇒ [“2.5.8 Supporting engine in installation position, T-Cross”](#), page 120

⇒ [“2.5.9 Supporting engine in installation position, Touran”](#), page 122

### 2.5.1 Supporting engine in installation position, Polo 2014 ►

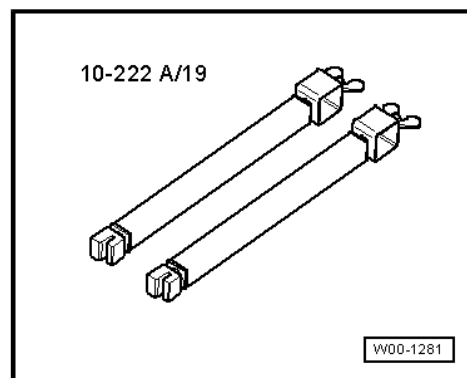
#### Special tools and workshop equipment required

- ♦ Support - 10 - 222 A-

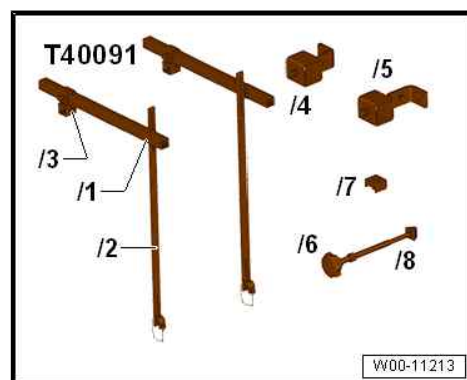




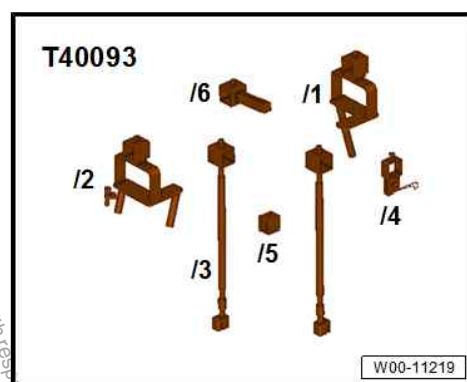
◆ Adapter - 10-222A/19-



◆ Engine support basic set - T40091-



◆ -T40093/6- from engine support supplement set - T40093-



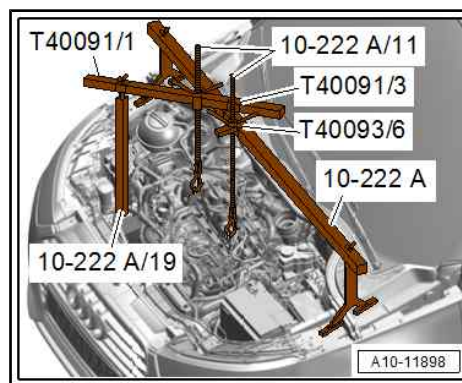
◆ Release tool - T10527-





### Sequence of operations

- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .
- Remove air pipe  
⇒ [“2.5 Removing and installing air pipe”, page 385](#) .
- Place support bracket - 10-222A- onto upper edges of right and left vertical plates and onto right longitudinal member.
- Attach hook of spindles - 10-222A/11- to engine lifting eyes.
- Take up weight of engine/gearbox assembly on spindles, but do not lift it.



### Assembling

Install in reverse order of removal.

### Specified torques

- ◆ Securing bolts for air filter housing  
⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)

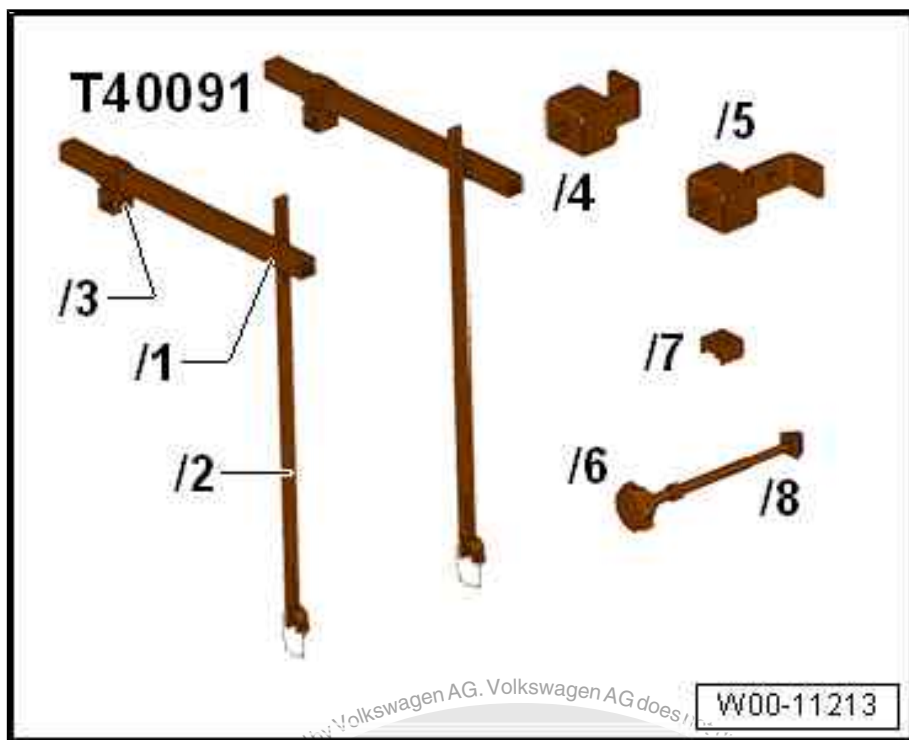
## 2.5.2 Supporting engine in installation position, Golf, Golf Estate, Golf SV

### Special tools and workshop equipment required

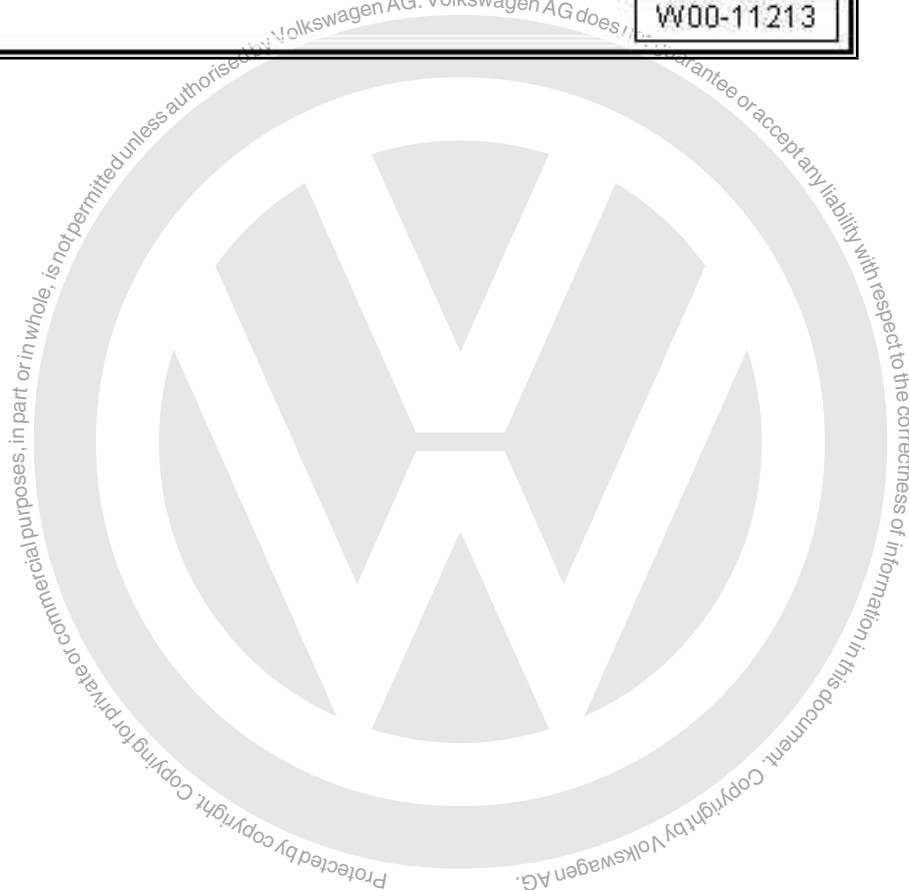
- ◆ Support - 10 - 222 A-

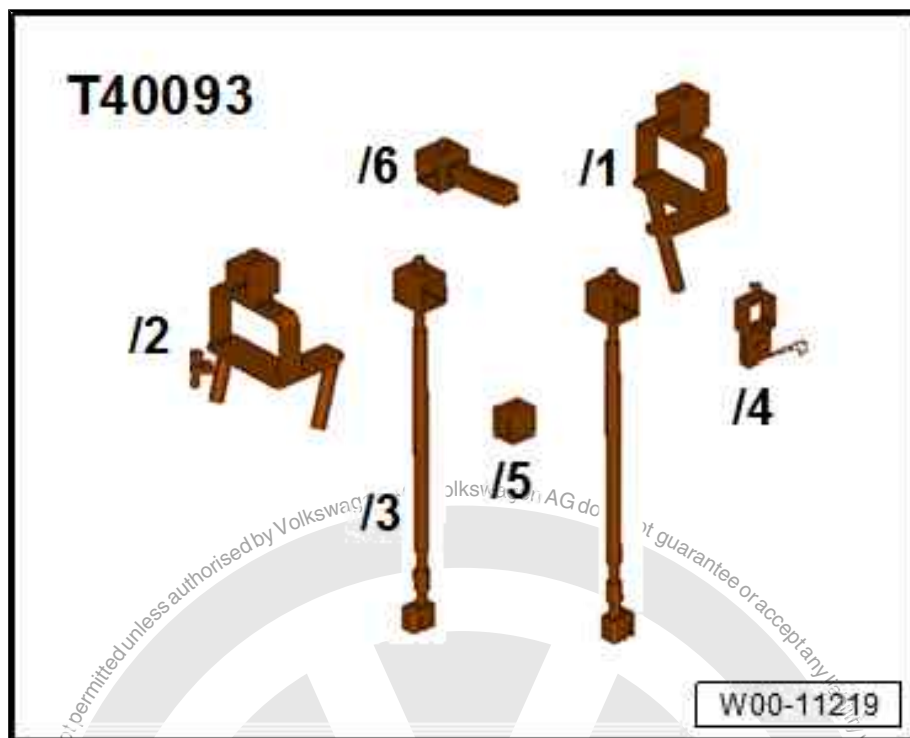


- ◆ Shackle - 10 - 222 A /12-
- ◆ Adapter - 10 - 222 A /18-
- ◆ Adapter - 10 - 222 A /29-



- ◆ Adapter - T40091/1-
- ◆ Adapter - T40091/3-





- ◆ Adapter - T40093/3-
- ◆ Adapter - T40093/3-6-
- ◆ Release tool - T10527-





### Check adapters - T40093/3-6- and modify as necessary

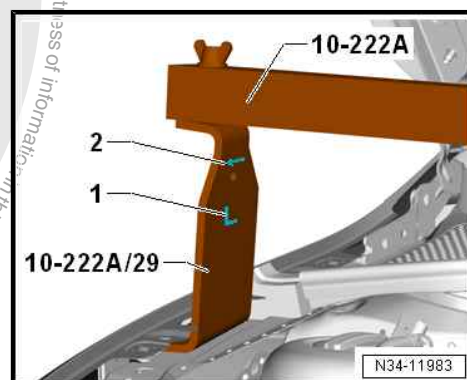
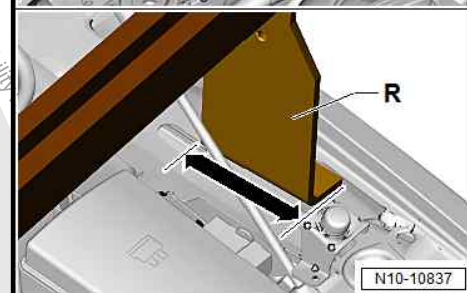
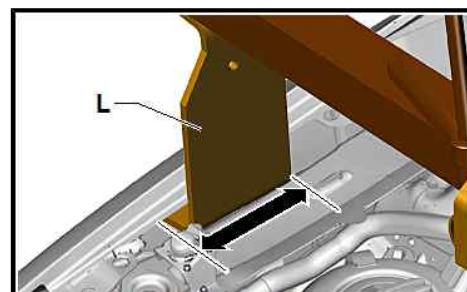
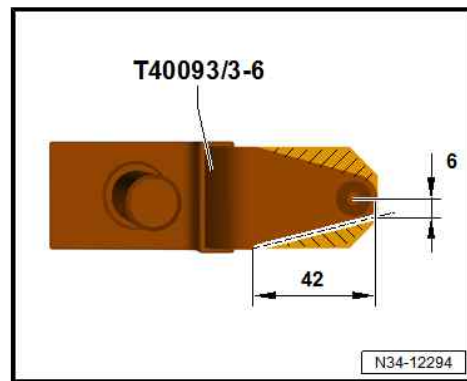
- If necessary, cut off the marked area.
- Round off front edges.
- Protect adapter against corrosion.
- Then, mark adapters - T40093/3-6- as -T40093/3-6A- .

### Sequence of operations

- Remove air filter housing.  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#)
- Remove air intake pipe.  
⇒ [“2.5 Removing and installing air pipe”, page 385](#)
- On both sides of vehicle, insert adapters - 10 - 222 A /29- between wing mounting flange and sheet metal for mounting wing underneath it.
- ◆ Installation position:

Adapter -L- is to be inserted on “right” side of vehicle ( adapter -arrow- is engaged in recess of wing)

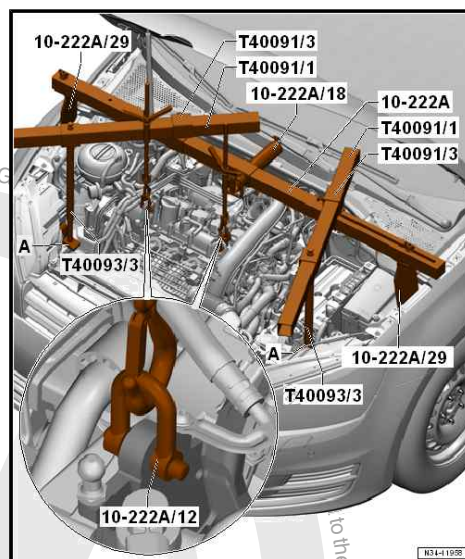
Adapter “R” is to be inserted on “left” side of vehicle ( adapter -arrow- is engaged in recess of wing)



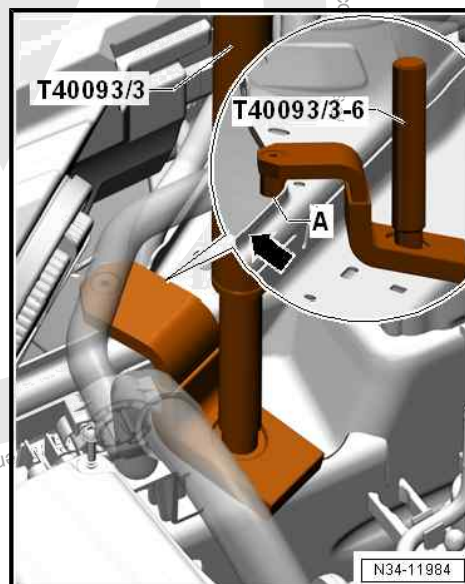
- Arrow -2- on adapter - 10 - 222 A /29- always points in direction of travel.
- Fit adapter - 10 - 222 A /29- onto the load-bearing part of the upper wheel housing longitudinal member.



- Push adapter - 10 - 222 A /18- and two connecting pieces - T40091/3- onto support bracket - 10-222 A- .
- Secure support bracket - 10-222 A- to adapters - 10 - 222 A / 29- .

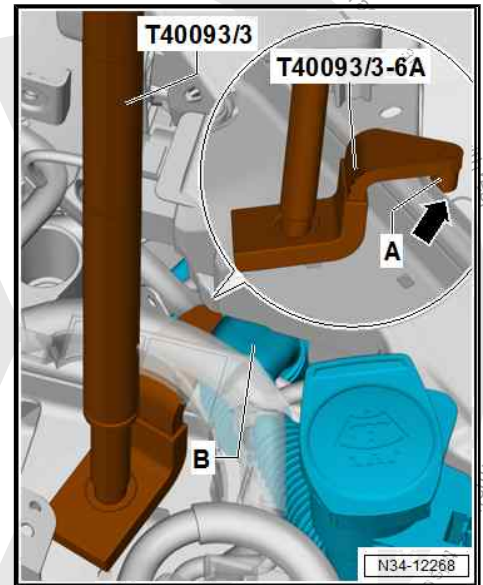


- A- = adapter - T40093/3-6- .
- Place adapters - T40093/3-6- onto right longitudinal member.
- If necessary, carefully unclip any pipes for air conditioning system in front area. Do not disconnect pipe/hose system ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; System overview - refrigerant circuit .
- The adapters - T40093/3-6- lock with pin -A- behind web of longitudinal member -arrow-.





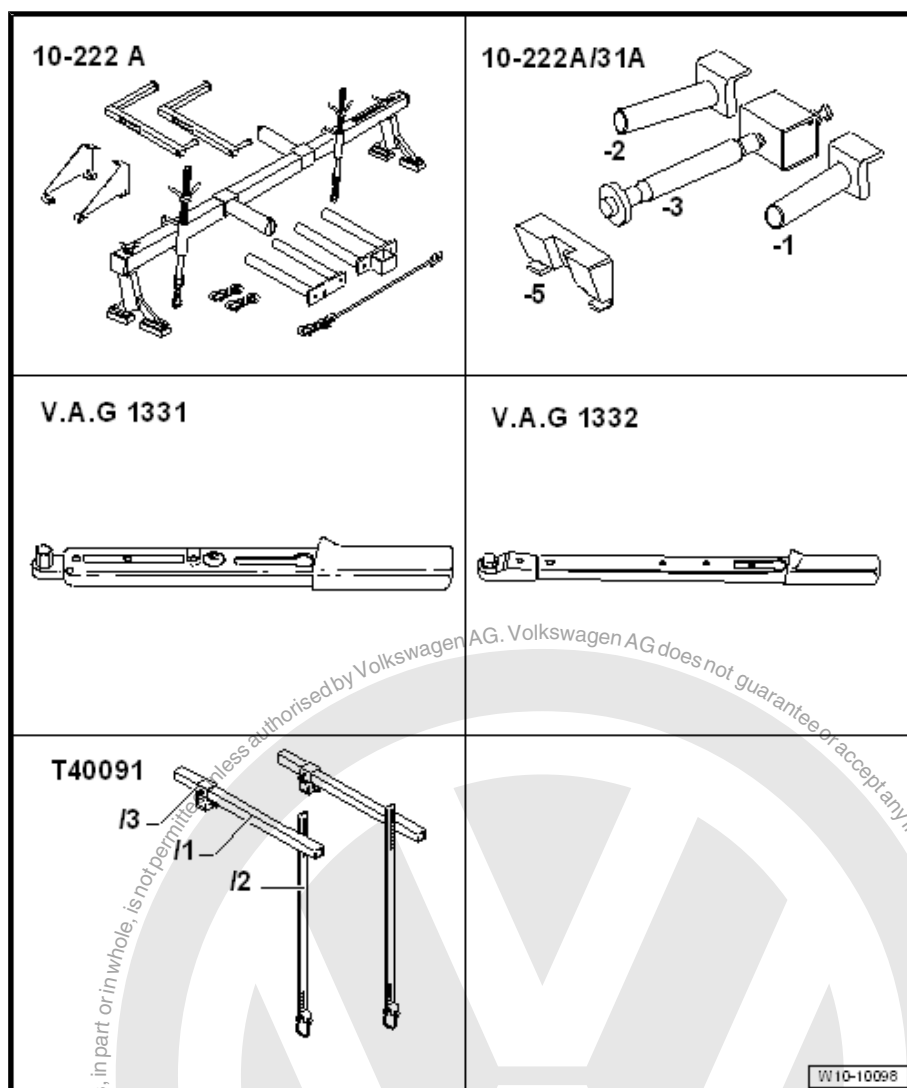
- Fit adapter -T40093/3-6A- -A- to left longitudinal member.
- If fitted, pull off electrical lines in front area of web on left longitudinal member. Do not disconnect pipe/hose system.
- Place adapter -T40093/3-6A- onto left longitudinal member.
- Place adapter - T40093/3-6A- on left longitudinal member right behind filler pipe for washer fluid reservoir -B-.
- The adapter - T40093/3-6A- locks with pin -A- behind web of longitudinal member -arrow-.
- Bolt on spindle from engine support supplement set - T40093 / 3- .
- Connect spindle from engine support supplement set - T40093 /3- via square section tube - T40091/1- to engine support bracket - 10-222 A- and fasten the connection.
- Then, attach spindles in lifting eyes of engine. If necessary, use the shackles - 10 - 222 A /12- for this.
- Take up weight of engine/gearbox assembly and support bracket on spindles .



#### Specified torques

- ◆ Securing bolts for air filter housing  
⇒ ["3.1 Assembly overview - air filter housing", page 410](#)

### 2.5.3 Supporting up! engine in installation position, on right of camshaft housing



#### Special tools and workshop equipment required

- ◆ Support - 10-222 A-
- ◆ Adapter - 10 - 222 A /3-
- ◆ Adapter - 10 - 222 A /31-1-
- ◆ Adapter - 10 - 222 A /31-2-
- ◆ Joints - T40091/3-
- ◆ Square tube - T40091/1-
- ◆ Support - 10 - 222 A /31-3-
- ◆ Adapter - 10 - 222 A /31-5-
- ◆ Shackle - 10 - 222 A /12-
- ◆ Torque wrench - V.A.G 1331-
- ◆ Torque wrench - V.A.G 1332-



### Check tools, and prepare them as necessary:

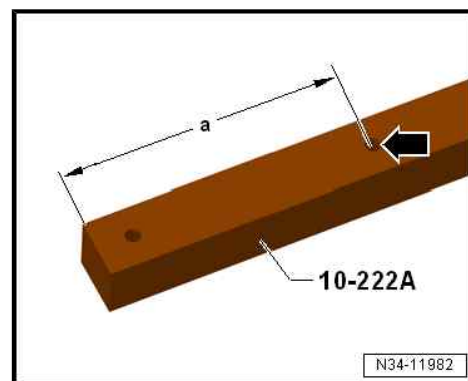
- If engine support bracket - 10 - 222 A- does not yet have hole (marked with -arrow-), the hole must now be drilled into engine support bracket.
- Dimension -a- = 225 mm.
- Hole  $\varnothing$  = 12.5 mm.

### Sequence of operations

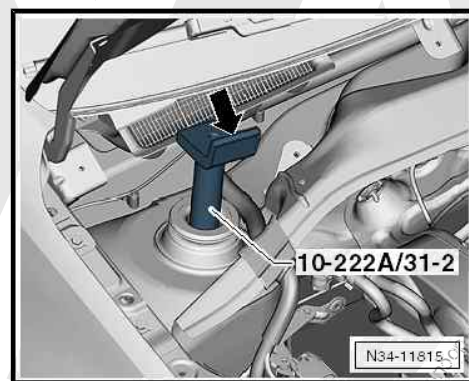
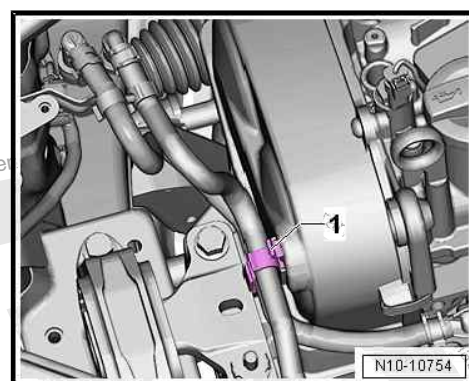


#### Note

*The securing bolts for the assembly mountings must be removed only if the engine is supported in installation position using the support bracket - 10-222 A- !*



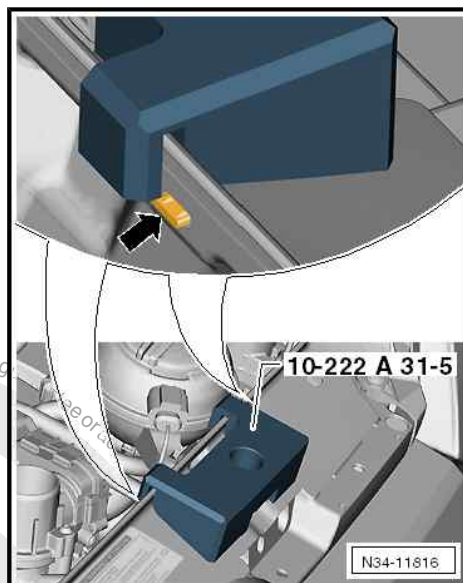
- Unclip coolant hoses from retainer -1-.
- Remove air filter housing  
⇒ ["3.2 Removing and installing air filter housing", page 416](#) .
- Remove air pipe  
⇒ ["2.5 Removing and installing air pipe", page 385](#) .
- Wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.
- Plenum chamber cover ⇒ General body repairs; exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover
- Remove caps from shock absorbers ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper suspension link; Assembly overview - suspension strut, upper suspension link .
- Fit adapter - 10 - 222 A /31-1- and adapter - 10 - 222 A /31-2- onto suspension strut supports.
- Angled pieces of adapters -arrow- point towards engine compartment.
- Pull bonnet seal off lock carrier.



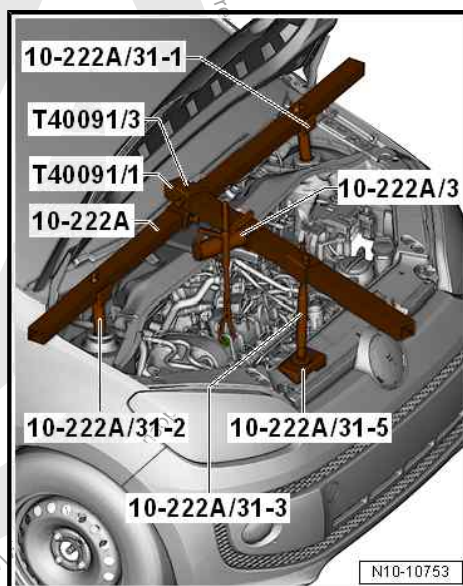




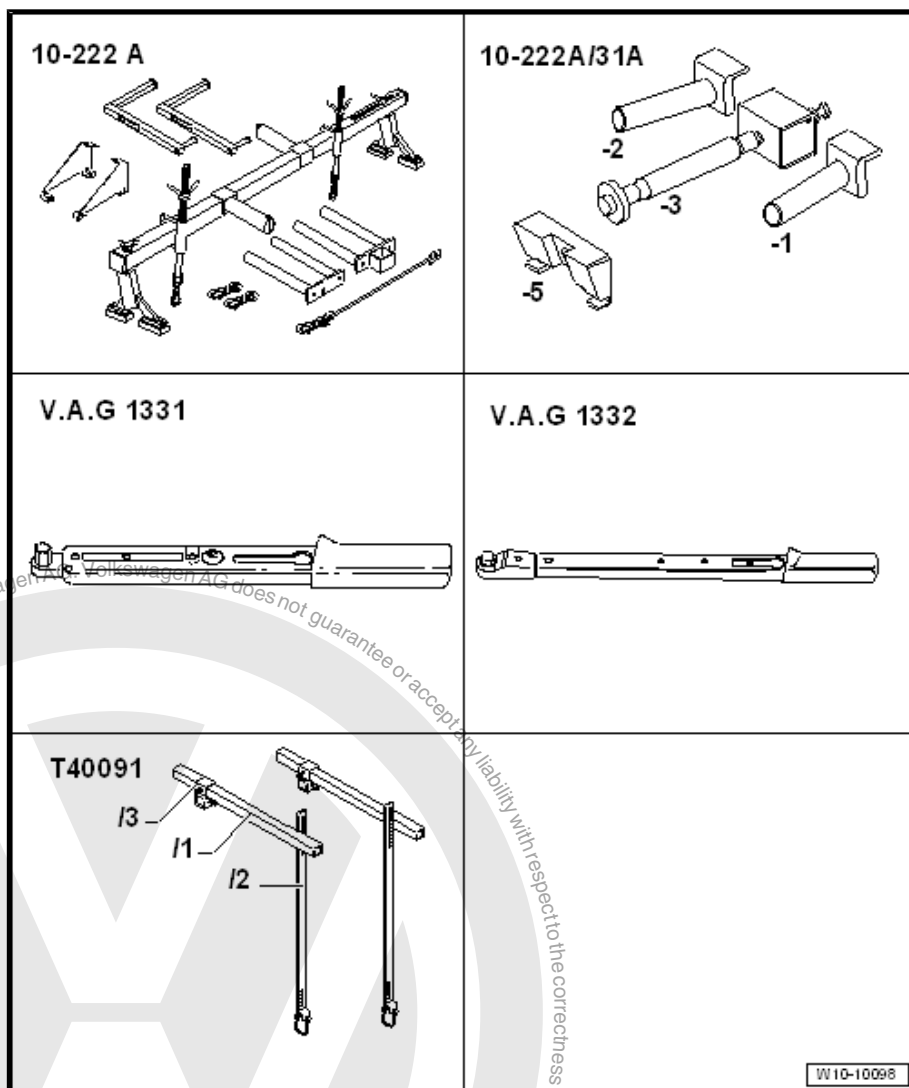
- Position support bracket - 10-222A/31-5- on lock carrier as shown in illustration.
- Attach support bracket - 10-222A/31-5- at rear to lock carrier as shown in illustration.
- Observe angled pieces -arrow- on lock carrier.



- Fit support bracket as shown.
- Slide connecting piece - T40091/3- onto support bracket - 10-222 A-.
- Bolt support bracket - 10-222 A- to adapter - 10 - 222 A /31-1- and to adapter - 10 - 222 A /31-2- .
- Push square tube - T40091/1- into mounting of support - 10 - 222 A /31-3-.
- Push adapter - 10 - 222 A /3- onto square tube - T40091/1- .
- Insert support - 10 - 222 A /31-3- into mounting - 10-222A/ 31-5- as shown in illustration.
- Screw shackles -10 - 222 A /12- onto support eyes on right-hand side.
- Attach spindle - 10-222A- to adapter - 10 - 222 A /3- .
- Hook spindle - 10-222A- onto shackle - 10 - 222 A /12- on right side.
- Align support bracket; support bracket - 10-222A/31-5- can be moved on lock carrier during alignment.
- Tighten all threaded connections of support bracket.
- Take up weight of engine/gearbox assembly on spindle .



## 2.5.4 Supporting engine in installation position, up!, on camshaft housing (left-side)



#### Special tools and workshop equipment required

- ◆ Support - 10-222 A-
- ◆ Adapter - 10 - 222 A /3-
- ◆ Adapter - 10 - 222 A /31-1-
- ◆ Adapter - 10 - 222 A /31-2-
- ◆ Joints - T40091/3-
- ◆ Square tube - T40091/1-
- ◆ Support - 10 - 222 A /31-3-
- ◆ Adapter - 10 - 222 A /31-5-
- ◆ Shackle - 10 - 222 A /12-
- ◆ Torque wrench - V.A.G 1331-
- ◆ Torque wrench - V.A.G 1332-



### Check tools, and prepare them as necessary:

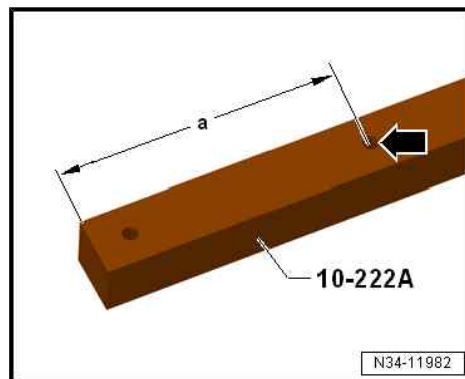
- If engine support bracket - 10 - 222 A- does not yet have hole (marked with -arrow-), the hole must now be drilled into engine support bracket.
- Dimension -a- = 225 mm.
- Hole  $\varnothing$  = 12.5 mm.

### Sequence of operations

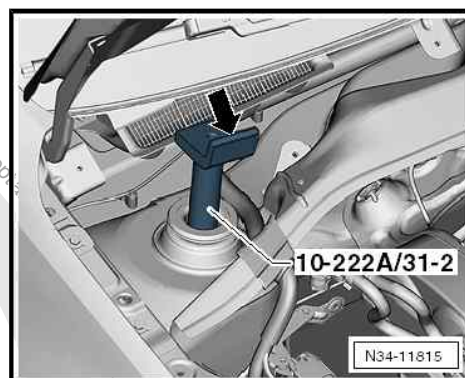
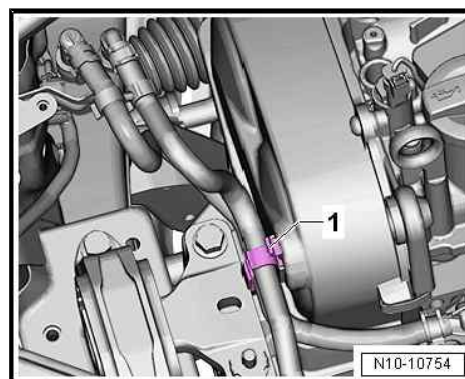


#### Note

*The securing bolts for the assembly mountings must be removed only if the engine is supported in installation position using the support bracket - 10-222 A- !*

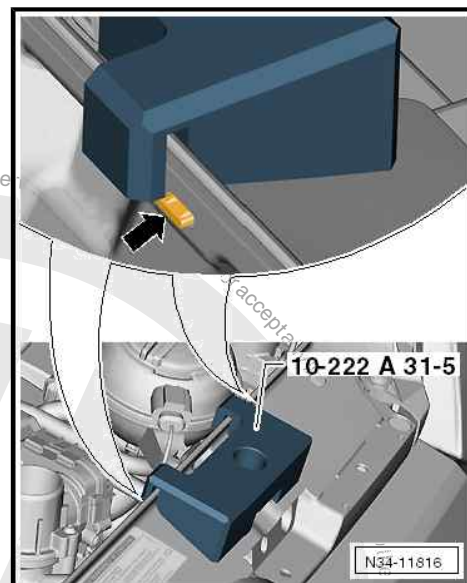


- Unclip coolant hoses from retainer -1-.
- Remove air filter housing  
⇒ ["3.2 Removing and installing air filter housing", page 416](#) .
- Remove air pipe  
⇒ ["2.5 Removing and installing air pipe", page 385](#) .
- Wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .
- Plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Bulkhead; Removing and installing plenum chamber cover
- Remove caps from shock absorbers ⇒ Running gear, axles, steering; Rep. gr. 40 ; Suspension strut, upper suspension link; Assembly overview - suspension strut, upper suspension link .
- Fit adapter - 10 - 222 A /31-1- and adapter - 10 - 222 A /31-2- onto suspension strut supports.
- Angled pieces of adapters -arrow- point towards engine compartment.
- Pull bonnet seal off lock carrier.

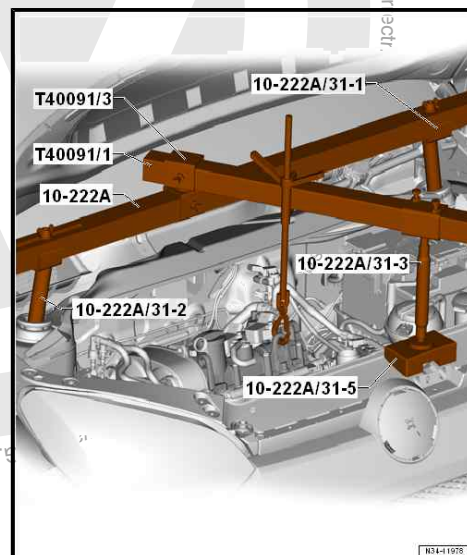




- Position support bracket - 10-222A/31-5- on lock carrier as shown in illustration.
- Observe angled pieces -arrow- on lock carrier.
- Attach support bracket - 10-222A/31-5- at rear to lock carrier as shown in illustration.



- Fit support bracket, and attach it to left lifting eye as shown in illustration.
- Slide connecting piece T40091/3- onto support bracket - 10-222 A- .
- Bolt support bracket - 10-222 A- to adapter - 10 - 222 A /31-1- and to adapter - 10 - 222 A /31-2- .
- Push square tube - T40091/1- into mounting of support - 10 - 222 A /31-3- .
- Push adapter - 10 - 222 A /3- onto square tube - T40091/1- .
- Insert support - 10 - 222 A /31-3- into mounting - 10-222A/ 31-5- as shown in illustration.
- Screw shackle - 10 - 222 A /12- into support eye on left side.
- Attach spindle - 10-222A- to adapter - 10 - 222 A /3- .
- Attach spindle - 10-222A- to shackle - 10 - 222 A /12- on left side.
- Align support bracket; support bracket - 10-222A/31-5- can be moved on lock carrier during alignment.
- Tighten all threaded connections of support bracket.
- Take up weight of engine/gearbox assembly on spindle .

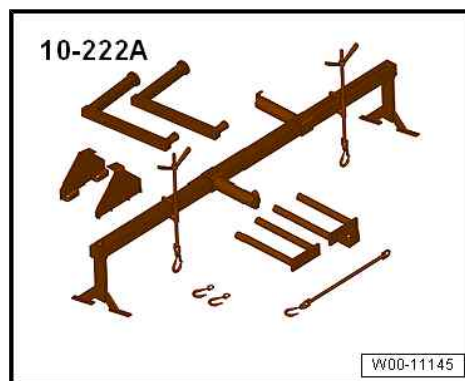


## 2.5.5 Supporting engine in installation position, Polo 2018 ►, manual gearbox

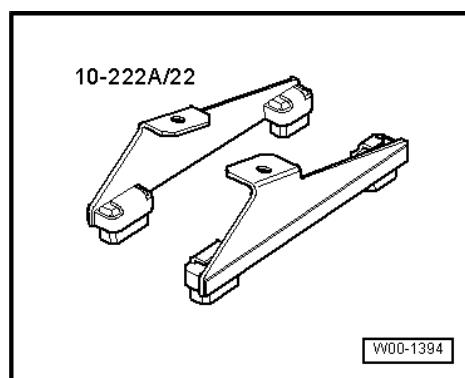
Special tools and workshop equipment required



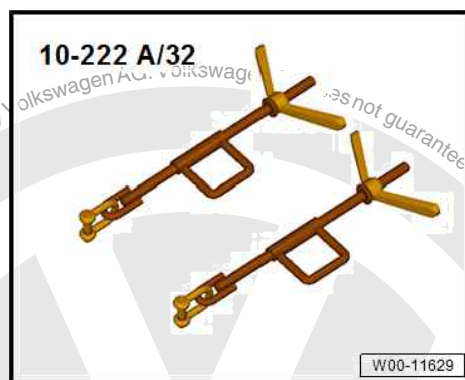
◆ Support - 10 - 222 A-



◆ Adapter - 10-222A/22-



◆ Adapter - 10-222A/32-



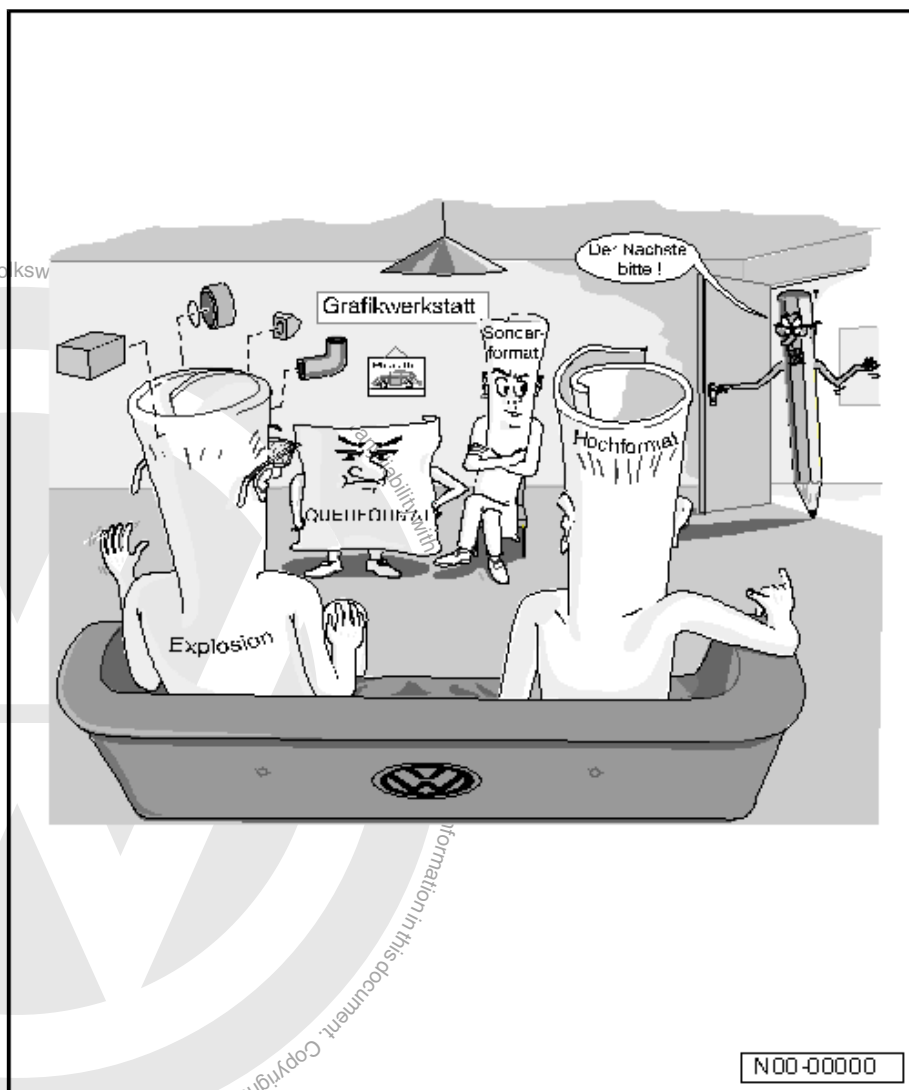
◆ Shackle - 10-222A/12-



**Sequence of operations**

- Remove air filter housing  
⇒ ["3.2.1 Removing and installing air filter housing, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 416](#) .





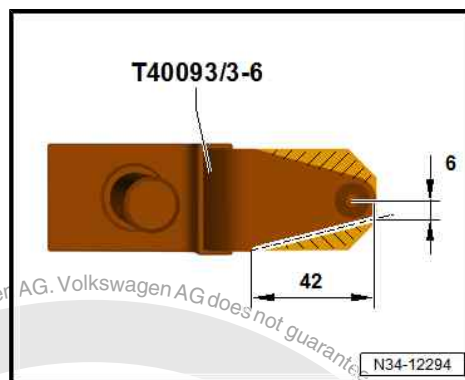
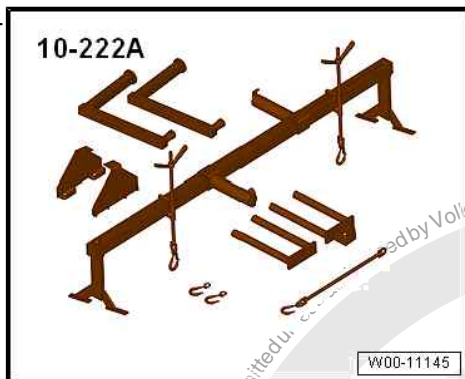
- Secure support bracket - 10 - 222 A- -1- with adapters - 10-222A/22- -2-, adapter - 10-222A/32- -3- and shackle - 10-222A/12- -4- on cylinder head -5- as shown.
- Take up weight of engine/gearbox assembly.



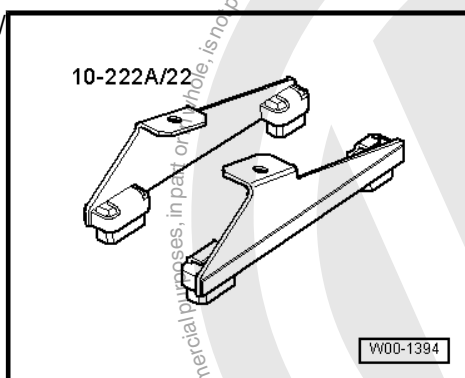
## 2.5.6 Supporting engine in installation position, Polo 2018 ➤, dual clutch gearbox

Special tools and workshop equipment required

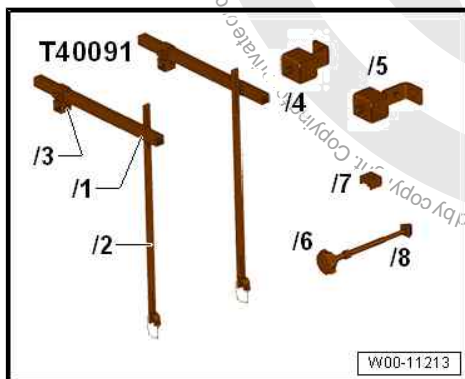
- ◆ Support - 10 - 222 A-



- ◆ Adapter - 10 - 222 A / 22-



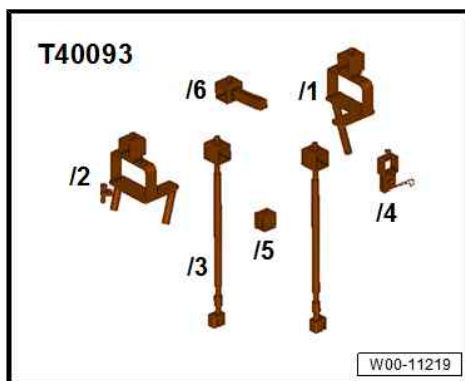
- ◆ Square tube - T40091/1-



- ◆ Joints - T40091/3-



- ◆ Spindle - T40093 /3- of engine support supplement set - T40093-



- ◆ Adapters - T40093/3-6- (check and modify if necessary)



- ◆ Or adapter - T40093/3-6A-

**Check adapters - T40093/3-6- and modify as necessary**

- If necessary, cut off the marked area.
- Round off front edges.
- Protect adapter against corrosion.
- Then, mark adapters - T40093/3-6- as - T40093/3-6A- .

At a later point, support bracket - 10-222 A- will be fitted onto longitudinal members with adapters - T40093/3-6A- .

- To prevent damage to the longitudinal members, wrap the front section of the adapters - T40093/3-6A- with textile-reinforced adhesive tape ⇒ Electronic parts catalogue (ETKA chemical substances) .



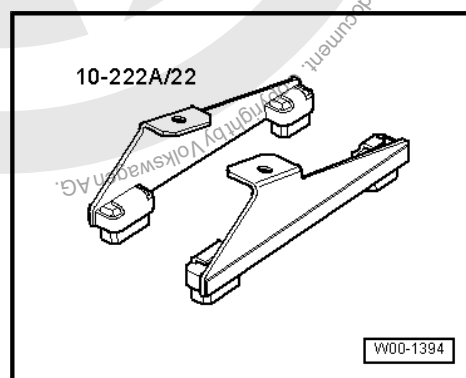
## Sequence of operations

- Remove air filter housing  
⇒ [“3.2.1 Removing and installing air filter housing, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 416](#) .

- Fit support bracket - 10-222 A- as follows:

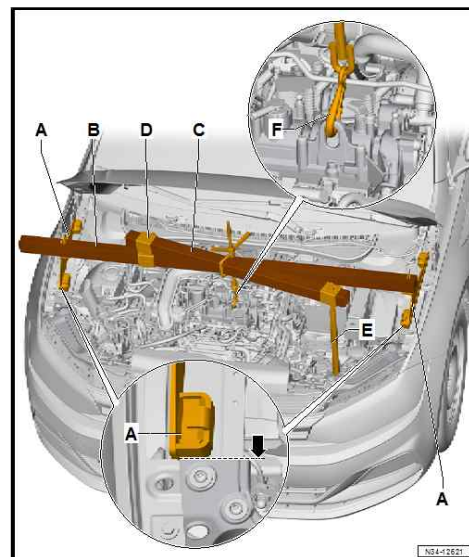
### Required material:

- ◆ 2 x adapters - 10 - 222 A /22-
- ◆ Shackle - 10 - 222 A / 12- (required when spindle of support bracket cannot be hooked into lifting eye of engine).
- ◆ Square tube - T40091/1-
- ◆ Connector - T40091/3-
- ◆ Spindle - T40093 /3-
- ◆ Adapter - T40093/3-6- (check and modify if necessary ⇒ [page 115](#) )
- ◆ Or adapter - T40093/3-6A-
- On both sides of vehicle, locate adapters - 10 - 222 A /22-A- on longitudinal members behind carrier plate for headlight -arrow-.

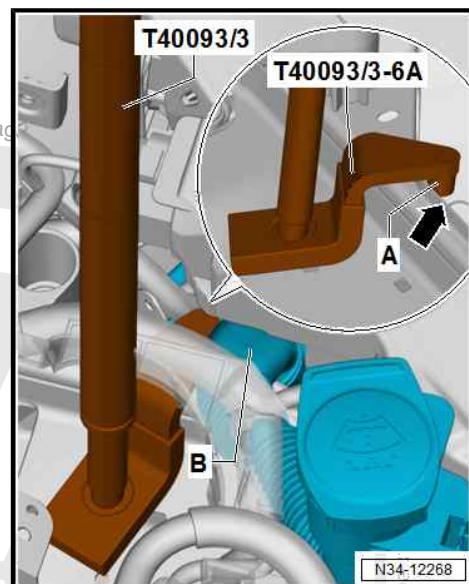




- Push connector - T40091/3- -D- onto support bracket - 10-222 A- -B-.
- Secure support bracket - 10-222 A- -B- to adapters - 10 - 222 A /22- -A-.



- Locate adapter - T40093/3-6A- on left longitudinal member directly behind filler pipe for washer fluid reservoir.
- Adapter - T40093/3-6- is locked with pin -A- behind flange of longitudinal member -arrow-.
- Bolt on spindle - T40093 /3- -E- (⇒ previous illustration).
- Now connect square tube -C- with spindle of support bracket - 10-222 A- to connecting piece -D- and spindle -E-, and tighten connection.
- Then attach spindle -F- to lifting eyes of engine. If required, use shackle - 10 - 222 A /12- -A-.
- Take up weight of engine/gearbox assembly and support bracket on spindles .



## 2.5.7 Supporting engine in installation position, T-Roc

### Special tools and workshop equipment required

- ◆ Support - 10 - 222 A-







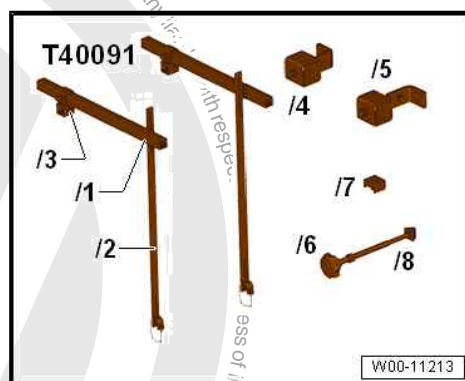
◆ Adapter - 10-222A/35-



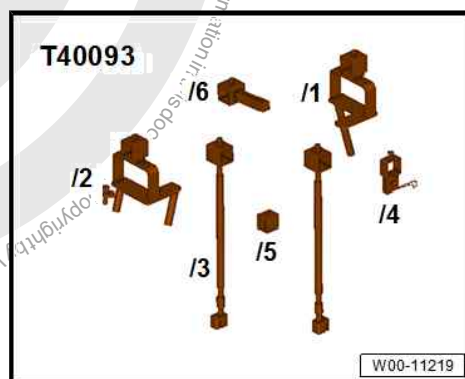
◆ Adapter - 10-222A/18-



◆ Engine support basic set - T40091-

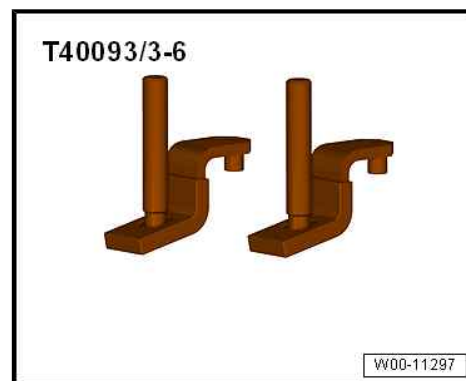


◆ Spindle - T40093/3-





◆ Adapter - T40093/3-6A-



### Sequence of operations

- Remove air filter housing  
⇒ ["3.2.1 Removing and installing air filter housing, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 416](#) .
- Remove air pipe  
⇒ ["2.5 Removing and installing air pipe", page 385](#) .

- Fit support bracket - 10-222 A- as follows:

A - Adapter - 10-222A/35-

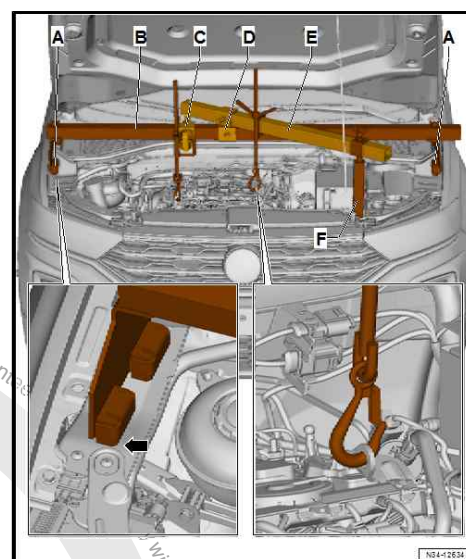
B - Support bracket - 10 - 222 A-

C - Adapter - 10-222A/18-

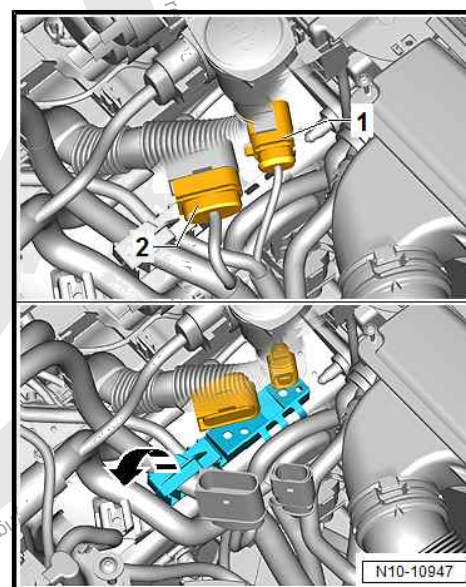
D - Engine support basic set - T40091/3-

E - Engine support basic set - T40091/1-

F - Spindle - T40093/3- with adapter - T40093/3-6A-

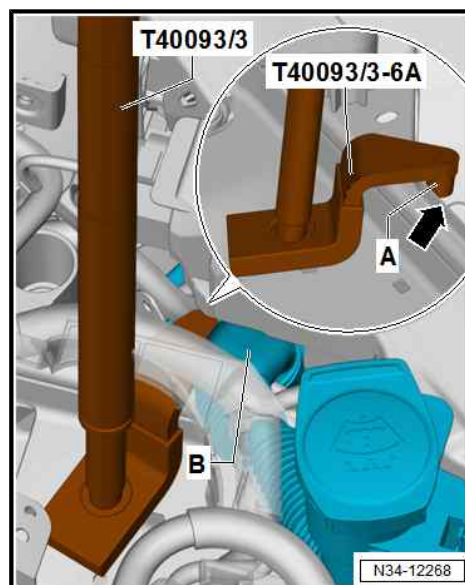


- Release and pull off connectors -1- and -2- on left longitudinal member.
- Release connector on retainer and unclip.
- Open locking element on retainer -arrow- on longitudinal member.
- Expose wiring harness leading to engine control unit on bracket.
- Expose positive wire to fuse carrier on bracket.
- Unclip wiring harness leading to engine control unit from bracket and on battery tray. Use release tool - T10236- for this.
- Lay wiring harnesses aside.
- Use release tool - T10236- to unclip bracket on longitudinal member and swivel to right.





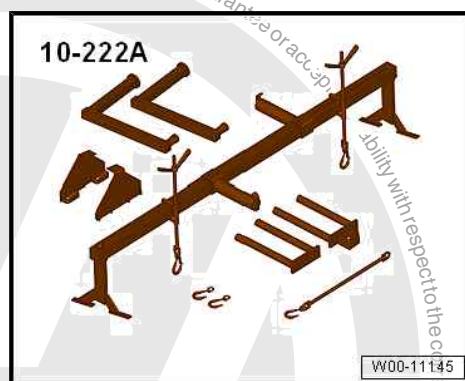
- Place adapter - T40093/3-6A- onto left longitudinal member, right behind filler pipe for washer fluid reservoir.
- Adapter - T40093/3-6- is locked with pin -A- behind flange of longitudinal member -arrow-.
- Take up weight of engine/gearbox assembly and support bracket on spindles .



## 2.5.8 Supporting engine in installation position, T-Cross

### Special tools and workshop equipment required

- ◆ Support - 10 - 222 A-

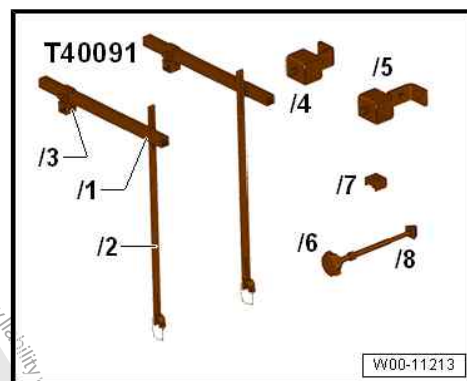


- ◆ Adapter - 10-222A/35-

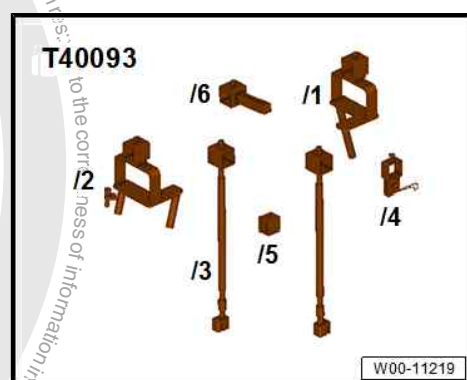




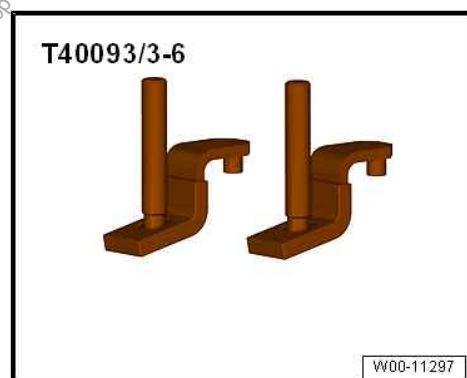
◆ Engine support basic set - T40091-



◆ Spindle - T40093/3-



◆ Adapter - T40093/3-6A-

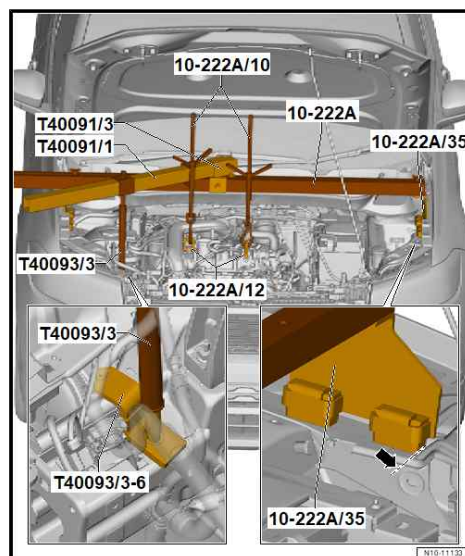


**Setting up support bracket:**

- Remove air filter housing.  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)
- Unclip refrigerant line from right longitudinal member and from retainer.



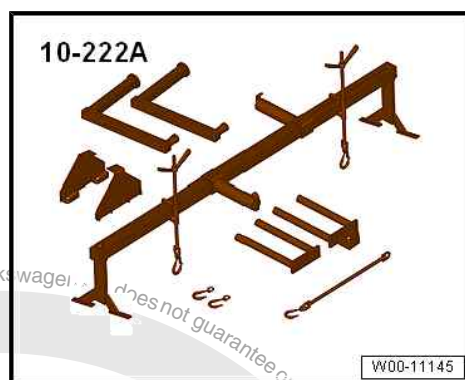
- Push connecting piece - T40091/3- and hook - 10-222A/10- onto support bracket - 10-222 A- .
- Bolt support bracket - 10-222 A- to adapter - 10 - 222 A /35- , and fit it on vehicle.
- Push adapters - 10 - 222 A /35- up to bead -arrow- of headlight carrier.
- Fit adapter -T40093/3-6A- with support - T40093/3- onto right longitudinal member.
- Push square tube - T40091/1- into mounting - T40093/3- .
- Push hook - 10-222A/10- onto square tube - T40091/1- .
- Push square tube - T40091/1- into connecting piece - T40091/3- .
- Attach shackles - 10 - 222 A /12- to lifting eyes of engine.
- Attach hooks - 10-222A/10- to shackles - 10 - 222 A /12- .



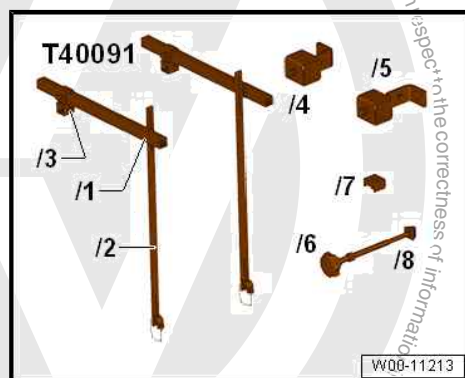
## 2.5.9 Supporting engine in installation position, Touran

### Special tools and workshop equipment required

- ◆ Support - 10 - 222 A-



- ◆ Shackle - 10 - 222 A /12-
- ◆ Adapter - 10 - 222 A /18-
- ◆ Adapter - 10 - 222 A /29-
- ◆ Adapter - T40091/1-

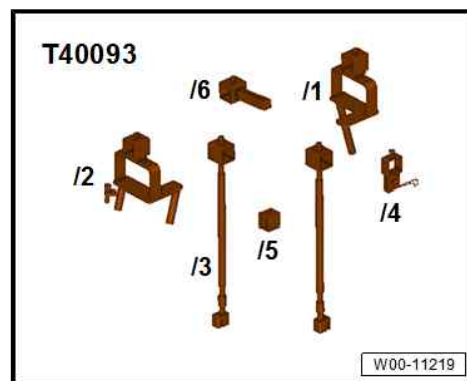


- ◆ Adapter - T40091/3-

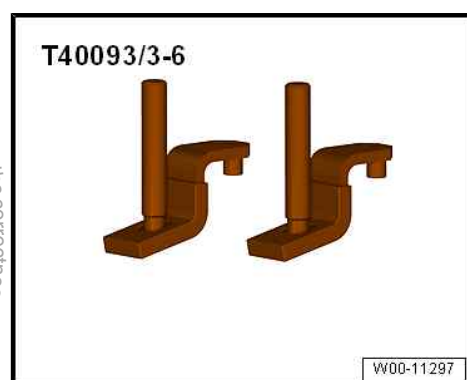




◆ Adapter - T40093/3-



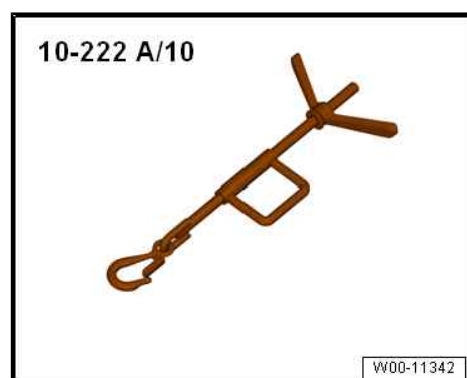
◆ Adapter - T40093/3-6-



◆ Adapter - 10-222A/29-



◆ Spindle - 10 - 222 A /10-





◆ Shackle - 10 - 222 A /12-

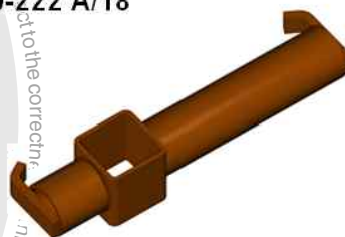
10-222 A/12



W00-11341

◆ Adapter - 10 - 222 A /18-

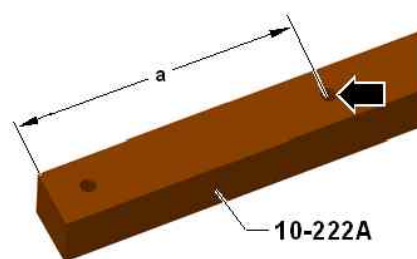
10-222 A/18



W00-11306

**Preparing support bracket - 10 - 222 A- :**

- If support bracket - 10 - 222 A- does not yet have a hole (marked with -arrow-), drill it into support bracket accordingly.
- Dimension -a- = 225 mm.
- Hole  $\varnothing$  = 12.5 mm.



N34-11982

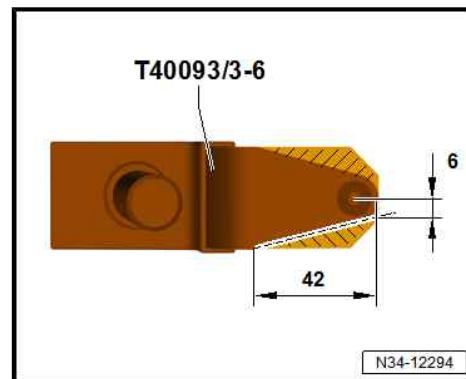


### Check adapters - T40093/3-6- and modify as necessary

- If necessary, cut off the marked area.
- Round off front edges.
- Protect adapter against corrosion.
- Then, mark adapters - T40093/3-6- as -T40093/3-6A- .

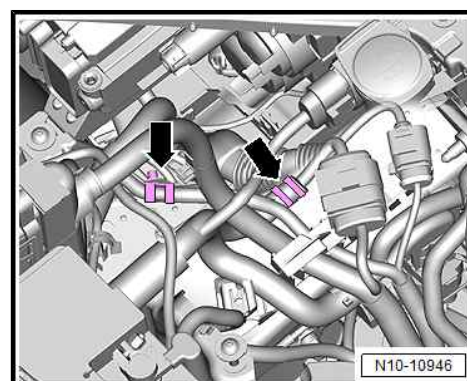
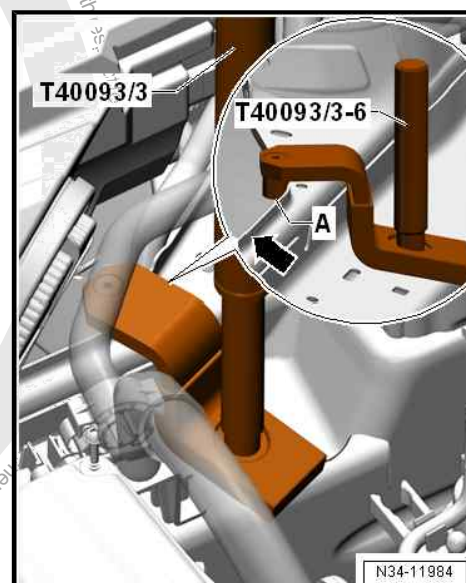
At a later point, support bracket - 10-222 A- will be fitted onto longitudinal members with adapters - T40093/3-6A- .

- To prevent damage to the longitudinal members, wrap the front section of the adapters - T40093/3-6A- with textile-reinforced adhesive tape ⇒ Electronic parts catalogue (ETKA chemical substances) .



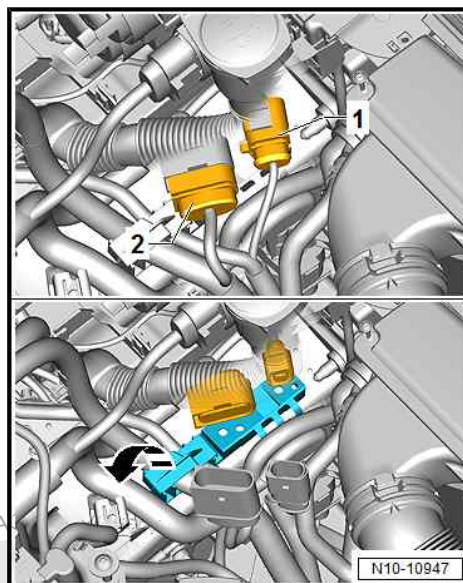
### Setting up support bracket:

- Remove air filter housing.  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)
- On both sides of vehicle, insert adapters - 10 - 222 A /29- between wing mounting flange and sheet metal for mounting wing underneath it.
- Fit adapter -T40093/3-6A- with support - T40093/3- onto right longitudinal member.
- If fitted, pull off electrical lines in front area of web on right longitudinal member -arrow-. Do not disconnect pipe/hose system.
- Unclip refrigerant line from retainer.
- Place adapter -T40093/3-6A- onto right longitudinal member.
- The adapter -T40093/3-6A- is locked with the pin -A- behind the flange of the longitudinal member -arrow-.
- Unclip wires -arrows- in front area of longitudinal member on left side. Use release tool - T10236- for this.

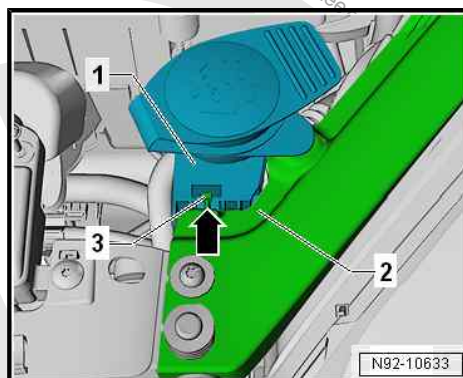




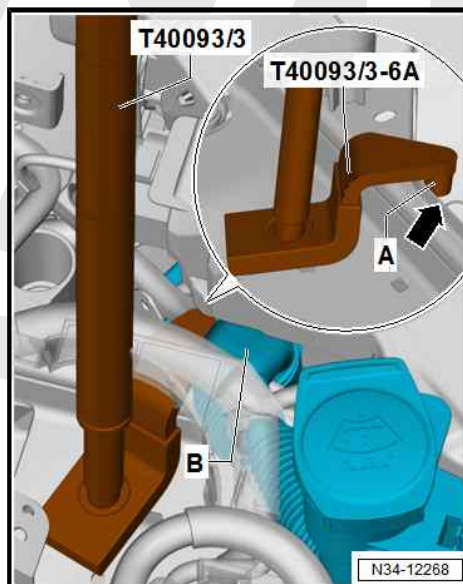
- Release and pull off connectors -1- and -2-.
- Release connector on retainer and unclip.
- Open locking element on retainer -arrow- on longitudinal member.
- Expose wiring harness for engine control unit on bracket.
- Expose positive wire for fuse carrier on bracket.
- Unclip wiring harness leading to engine control unit from bracket and on battery tray. Use release tool - T10236- for this.
- Lay wiring harnesses aside.
- Use release tool - T10236- to unclip bracket on longitudinal member and swivel to right.



- Remove filler neck -1- at top on lock carrier -2-.
- To do this, release locking lug -3- in direction of -arrow-.
- Pull filler neck -1- upwards out of mounting.



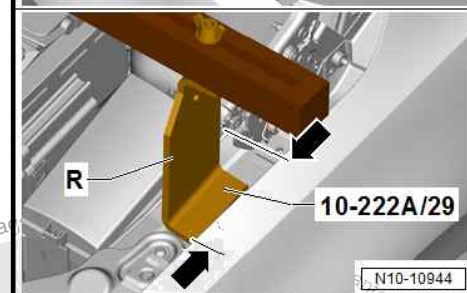
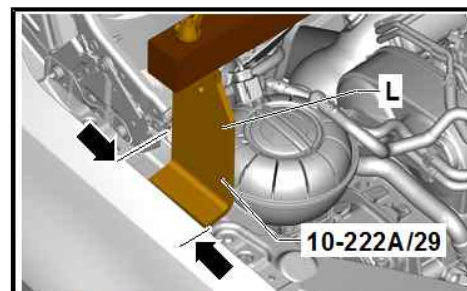
- Fit adapter -T40093/3-6A- -A- to left longitudinal member.
- Guide adapter - T40093/3-6A- below filler pipe of washer fluid reservoir.
- Place adapter - T40093/3-6A- onto left longitudinal member.
- Adapter - T40093/3-6A- must engage with pin -A- behind web of longitudinal member -arrow-.
- If necessary, push adapter - T40093/3-6A- into correct position.
- Note lines and retainers.



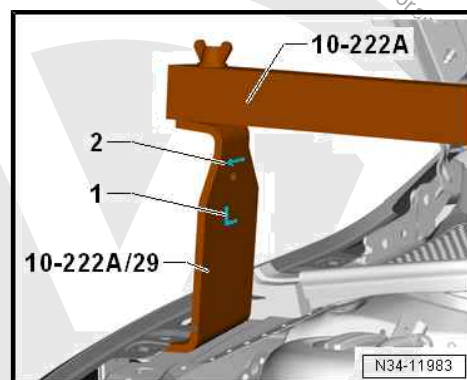


#### Installation position of adapters - 10 - 222 A /29- :

- ◆ “L” adapter is installed on “right” side of vehicle.
- ◆ “R” adapter is inserted on “left” side of vehicle.
- ◆ On both sides of vehicle, insert adapters - 10 - 222 A /29- between wing mounting flange and sheet metal for mounting wing underneath it.



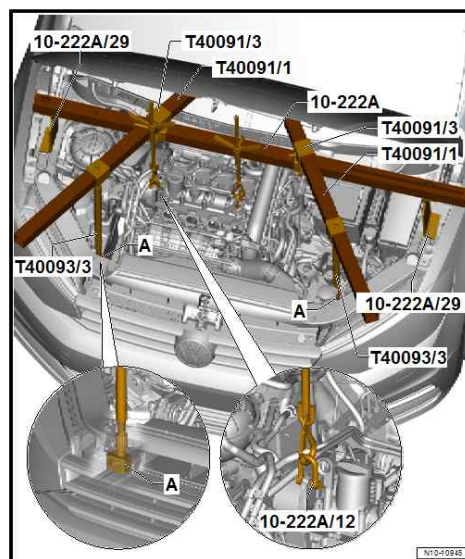
- Arrow -2- on adapter - 10 - 222 A /29- always points in direction of travel.
- Fit adapter - 10 - 222 A /29- onto the load-bearing part of upper wheel housing longitudinal member.







- Slide connecting piece - T40091/3- onto support bracket - 10-222 A- .
- Slide spindle - 10-222A- onto engine support bracket - 10-222 A- as shown.
- Slide additional connecting piece - T40091/3- onto support bracket - 10-222 A- .
- Securing bolts for connecting piece - T40091/3- point in direction of travel.
- Place support bracket - 10 - - 222 A /29- on longitudinal members.
- Screw together square tube - 10 - 222 A- and adapter - 10 - 222 A /29- as described ⇒ [page 127](#) .
- Push square tube - T40091/1- on right side into support - T40093/3- .
- Push spindle - 10-222A- on right side onto square tube - T40091/1- as shown.
- Push square tube - T40091/1- on right side into connecting piece - T40091/3- .
- Push square tube - T40091/1- on left side into support - T40093/3- .
- Push square tube - T40091/1- on left side into connecting piece - T40091/3- .
- Bolt one shackle - 10 - 222 A /12- to each of the two engine lifting eyes.
- Hook spindle - 10-222A- onto shackle - 10 - 222 A /12- on right side.
- Attach spindle - 10-222A- to shackle - 10 - 222 A /12- on left side.
- Align support bracket.
- Tighten all threaded connections of support bracket.
- Take up weight of engine/gearbox assembly slightly with spindle; do not lift.





## 2.6 Adjusting assembly mountings

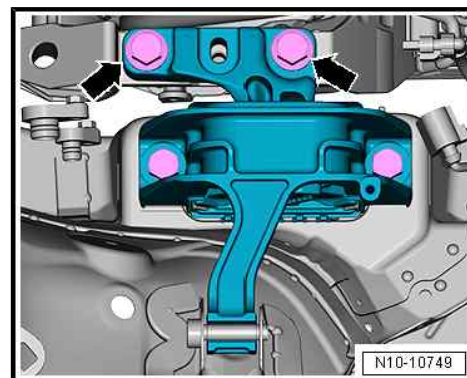
⇒ [“2.6.1 Adjusting assembly mountings, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 129](#)

⇒ [“2.6.2 Adjusting assembly mountings, up!”, page 130](#)

### 2.6.1 Adjusting assembly mountings, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran

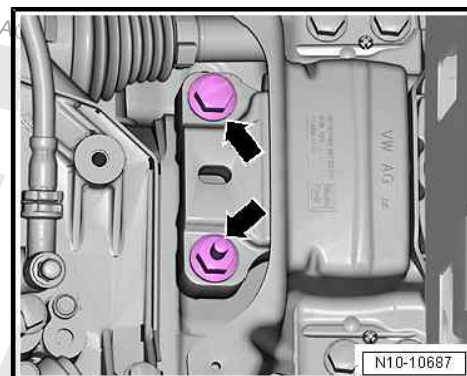
#### Sequence of operations

- Remove battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .
- Support engine in its installation position  
⇒ [“2.5.2 Supporting engine in installation position, Golf, Golf Estate, Golf SV”, page 100](#) .
- Unscrew engine mounting bolts -arrows- one after the other and renew them (if not already renewed when installing engine).
- First screw bolts in loosely.



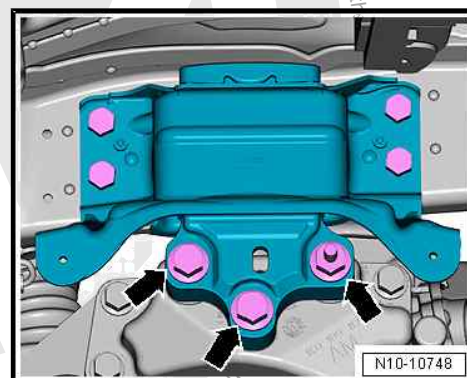
#### Vehicles with 2 gearbox securing bolts:

- Unscrew bolts -arrows- for gearbox mounting -1- in succession and renew (if not already carried out on installing engine).
- First screw bolts in loosely.



#### Vehicles with 3 gearbox securing bolts:

- Unscrew gearbox mounting bolts -arrows- one after the other, and renew them (if not already renewed when installing engine).
- First screw bolts in loosely.





#### Continued for all vehicles:

- Using assembly lever, adjust engine/gearbox assembly so that specifications listed below are attained:
- Distance -a- between engine support -2- and engine mounting -1- must be 10 mm.
- Side surface of engine support -2- must be located parallel to support arm of engine mounting -1-.
- Dimension -b- must be identical at front and rear.



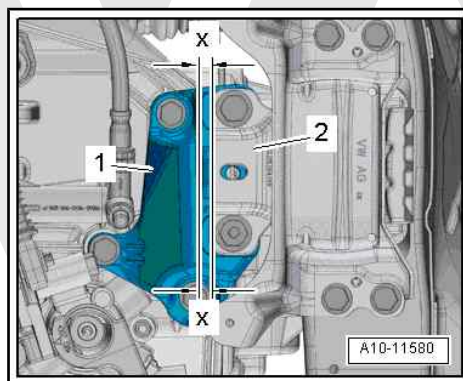
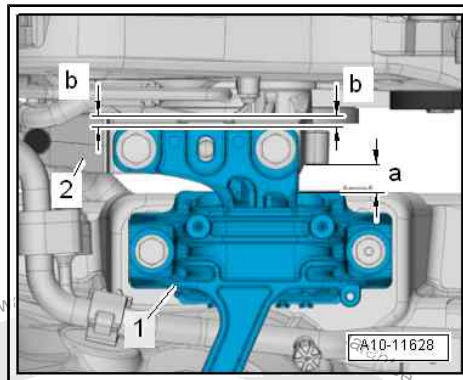
#### Note

Distance -a- = 10 mm can also be checked with a metal rod of suitable size, or similar.

- Tighten bolts for engine mounting.

#### Vehicles with 2 gearbox securing bolts:

- On the gearbox side, ensure that the edges of the support arm -2- and gearbox support -1- are parallel.
- Distance -x- = distance -x-.
- Tighten bolts for gearbox mounting.



#### Vehicles with 3 gearbox securing bolts:

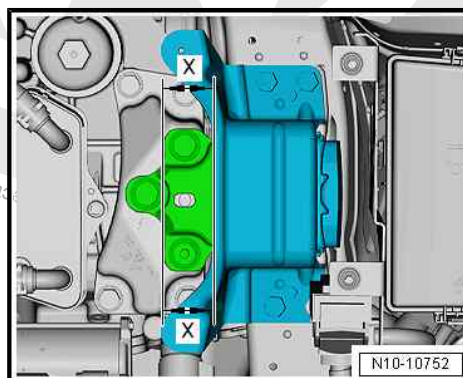
- On the gearbox side, ensure that the edges of the support arm and gearbox support are parallel.
- Distance -x- = distance -x-.

#### Installing:

Install in reverse order of removal.

#### Specified torques

- ♦ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)
- ♦ ⇒ [“2.1 Assembly overview - charge air system”, page 378](#)
- ♦ ⇒ Electrical system; Rep. gr. 27 ; Battery; Assembly overview - battery
- ♦ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ♦ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)



## 2.6.2 Adjusting assembly mountings, up!

#### Sequence of operations

- Support engine in its installation position  
⇒ [“2.5.3 Supporting up! engine in installation position, on right of camshaft housing”, page 105](#) .
- Renew assembly mounting bolts one after the other (if not already carried out), and tighten them by hand.

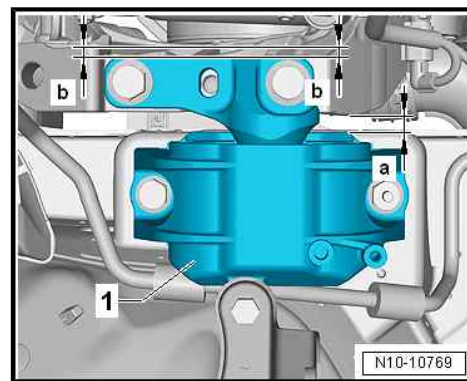


- The dimension -a- between engine support and right longitudinal member must be even at front and rear.
- Tighten bolts for assembly mounting.

The remaining installation steps are carried out in the reverse order of removal.

#### Specified torques

- ◆ ⇒ [“2.1.3 Assembly overview – assembly mountings, up!”](#), page 86



## 2.7 Checking adjustment of assembly mountings (engine and gearbox mountings)

⇒ [“2.7.1 Checking adjustment of assembly mountings, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran”](#), page 131

⇒ [“2.7.2 Checking assembly mounting settings, up!”](#), page 132

### 2.7.1 Checking adjustment of assembly mountings, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran

#### Sequence of operations

The following specifications must be obtained:

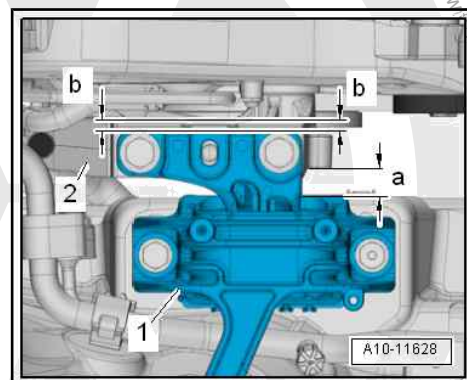
- Distance -a- between engine support -2- and engine mounting -1- must be 10 mm.
- Side surface of engine support -2- must be located parallel to support arm of engine mounting -1-.
- Dimension -b- must be identical at front and rear.



#### Note

*Distance -a- = 10 mm can also be checked with a metal rod of suitable size, or similar.*

- If the dimension is too small or too high, adjust assembly mountings ⇒ [“2.6 Adjusting assembly mountings”](#), page 129 .







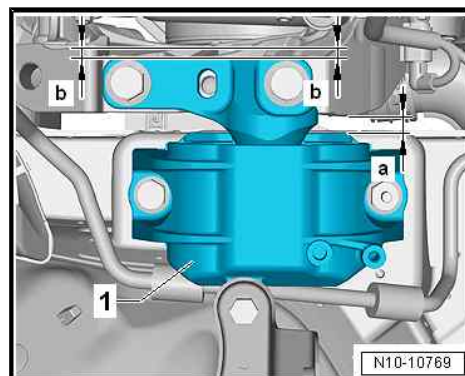
## 2.7.2 Checking assembly mounting settings, up!

### Sequence of operations

- The dimension -a- between engine support and right longitudinal member must be even at front and rear.

**If there is a noise problem (engine or gearbox contacts longitudinal member when travelling around bends)**

- Adjusting assembly mountings  
⇒ ["2.6 Adjusting assembly mountings", page 129](#) .







## 13 – Crankshaft group

### 1 Cylinder block (pulley end)

⇒ [“1.1 Assembly overview - poly V-belt drive”, page 133](#)

⇒ [“1.2 Removing and installing poly-V belt”, page 137](#)

⇒ [“1.3 Removing and installing tensioner for poly V-belt”, page 140](#)

⇒ [“1.4 Removing and installing vibration damper”, page 140](#)

⇒ [“1.5 Removing and installing engine support”, page 143](#)

⇒ [“1.6 Renewing crankshaft oil seal - belt pulley end”, page 146](#)

#### 1.1 Assembly overview - poly V-belt drive

⇒ [“1.1.1 Assembly overview - poly V-belt drive, vehicles without air conditioner compressor”, page 133](#)

⇒ [“1.1.2 Assembly overview - poly V-belt drive, vehicles with air conditioner compressor”, page 135](#)

##### 1.1.1 Assembly overview - poly V-belt drive, vehicles without air conditioner compressor





#### 1 - Bolt

- ☐ Renew
- ☐ Use counter-hold tool - T10475- to loosen and tighten
- ☐ 150 Nm +180°

#### 2 - Vibration damper

- ☐ Removing and installing  
⇒ ["1.4 Removing and installing vibration damper"](#), page 140

#### 3 - Poly V-belt

- ☐ Check for wear
- ☐ Before removing, mark direction of rotation with chalk or felt-tipped pen
- ☐ The length of the poly V-belt must be determined according to the ⇒ [Electronic Parts Catalogue](#) depending on the version of overrunning alternator pulley.
- ☐ Do not kink
- ☐ Poly V-belt routing  
⇒ [page 138](#)
- ☐ Removing and installing  
⇒ ["1.2 Removing and installing poly-V belt"](#), page 137
- ☐ When installing, make sure it is properly seated on pulleys.

#### 4 - Bolt

- ☐ Renew
- ☐ 20 Nm +90°

#### 5 - Tensioning device for poly V-belt

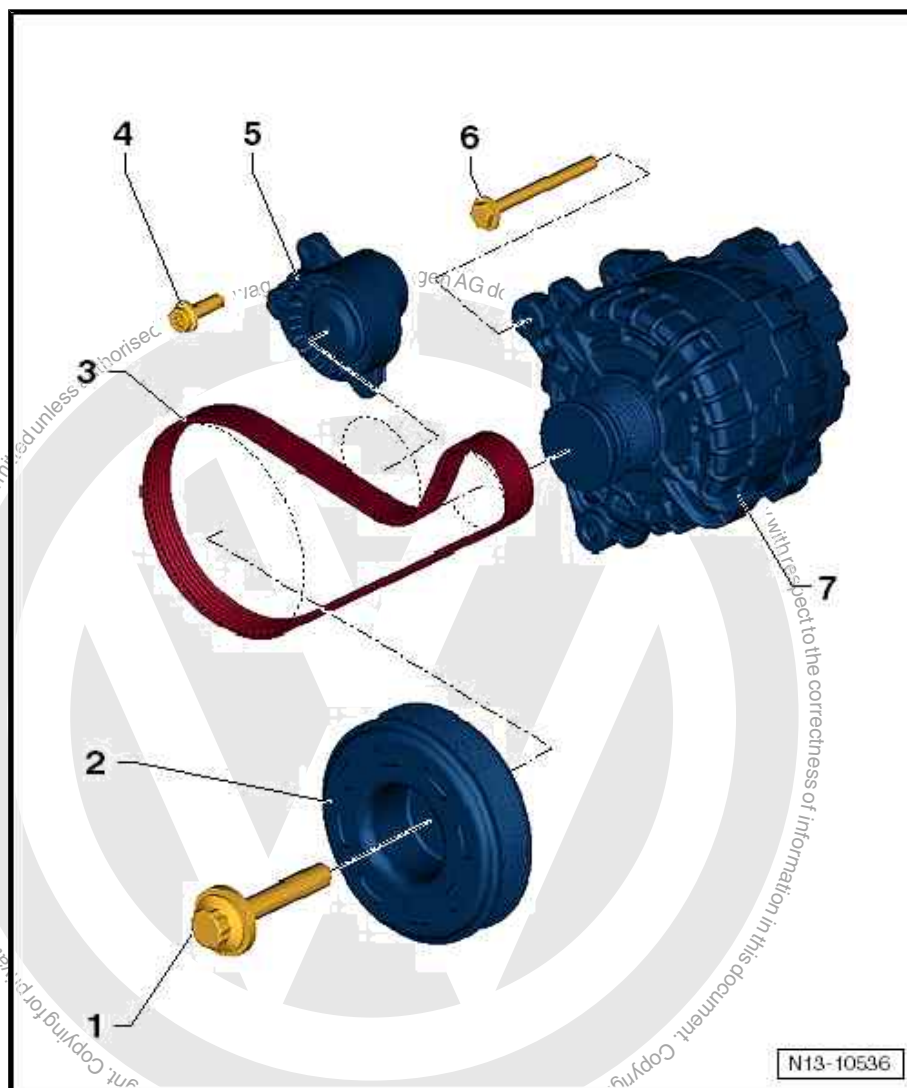
- ☐ Pivot with socket to slacken poly V-belt
- ☐ Lock with locking pin - T10060 A- .
- ☐ Removing and installing ⇒ ["1.3 Removing and installing tensioner for poly V-belt"](#), page 140

#### 6 - Bolt

- ☐ Specified torque ⇒ [Electrical system](#); Rep. gr. 27 ; Alternator; Assembly overview - alternator

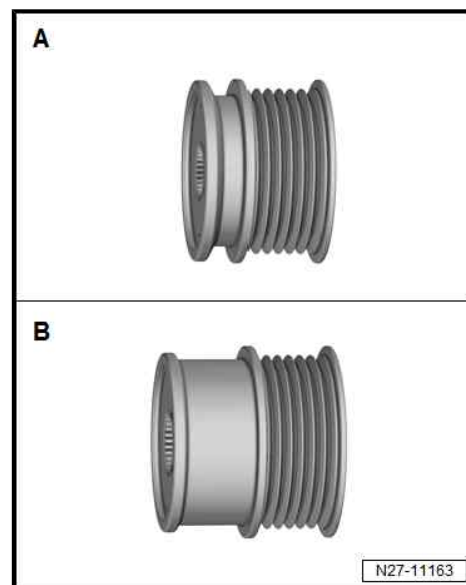
#### 7 - Alternator

- ☐ Removing and installing ⇒ [Electrical system](#); Rep. gr. 27 ; Alternator; Removing and installing alternator
- ☐ With freewheel
- ☐ Various versions of the overrunning alternator pulley, -A- or -B-, may be fitted depending on the type and version of alternator. Allocation ⇒ [page 135](#) .
- ☐ The length of the poly V-belt must be determined according to the ⇒ [Electronic Parts Catalogue](#) depending on the version of overrunning alternator pulley.





## Allocation of overrunning alternator pulley



## 1.1.2 Assembly overview - poly V-belt drive, vehicles with air conditioner compressor

### 1 - Poly V-belt

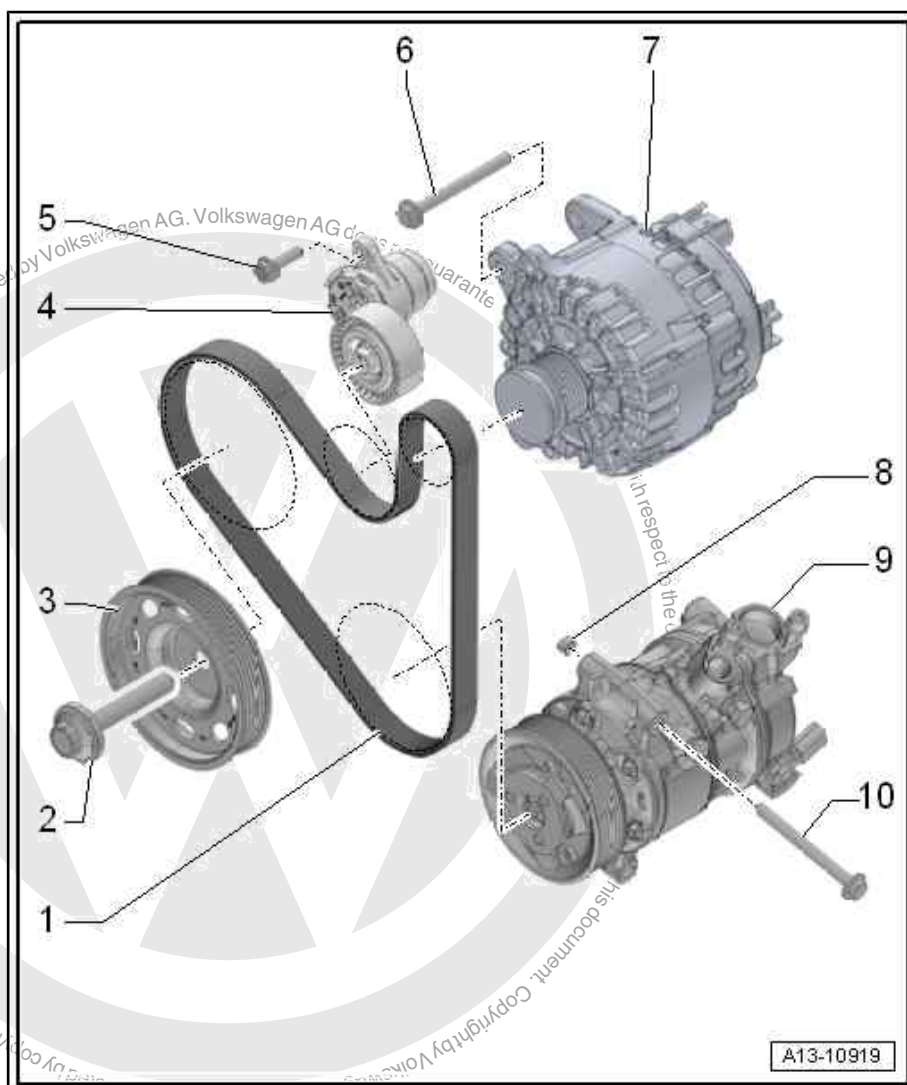
- ☐ Check for wear
- ☐ Before removing, mark direction of rotation with chalk or felt-tipped pen
- ☐ The length of the poly V-belt must be determined according to the ⇒ Electronic Parts Catalogue depending on the version of overrunning alternator pulley.
- ☐ Do not kink
- ☐ Poly V-belt routing  
⇒ [page 139](#)
- ☐ Removing and installing  
⇒ ["1.2.1 Removing and installing poly V-belt, vehicles without air conditioner compressor", page 137](#)
- ☐ When installing, make sure it is properly seated on pulleys.

### 2 - Bolt

- ☐ Renew
- ☐ Use counter-hold tool - T10475- to loosen and tighten
- ☐ 150 Nm +180°

### 3 - Vibration damper

- ☐ Removing and installing  
⇒ ["1.4 Removing and installing vibration damper", page 140](#)





#### 4 - Tensioning device for poly V-belt

- ☐ Pivot with socket to slacken poly V-belt
- ☐ Lock with locking pin - T10060 A- .
- ☐ Removing and installing ⇒ ["1.3 Removing and installing tensioner for poly V-belt", page 140](#)

#### 5 - Bolt

- ☒ Renew
- ☐ 20 Nm +90°

#### 6 - Bolt

- ☐ Specified torque ⇒ Electrical system; Rep. gr. 27 ; Alternator; Assembly overview - alternator

#### 7 - Alternator

- ☐ Removing and installing ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator
- ☐ With freewheel
- ☐ Various versions of the overrunning alternator pulley, -A- or -B-, may be fitted depending on the type and version of alternator. Allocation ⇒ [page 136](#) .
- ☐ The length of the poly V-belt must be determined according to the ➤ Electronic Parts Catalogue depending on the version of overrunning alternator pulley.

#### 8 - Dowel sleeve

- ☐ For air conditioner compressor.

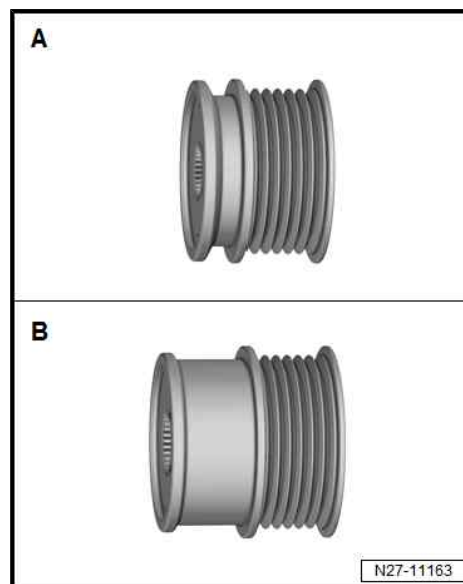
#### 9 - Air conditioner compressor

- ☐ Do not unscrew or disconnect refrigerant lines
- ☐ Removing and installing ⇒ Heating, air conditioning system; Rep. gr. 87 ; Air conditioner compressor; Removing and installing air conditioner compressor from and to bracket

#### 10 - Bolt

- ☐ Specified torque ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Assembly overview - drive unit of air conditioner compressor .

#### Allocation of overrunning alternator pulley





## 1.2 Removing and installing poly-V belt

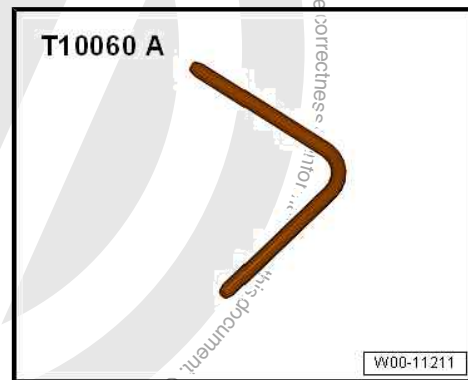
⇒ ["1.2.1 Removing and installing poly V-belt, vehicles without air conditioner compressor", page 137](#)

⇒ ["1.2.2 Removing and installing poly V-belt, vehicles with air conditioner compressor", page 138](#)

### 1.2.1 Removing and installing poly V-belt, vehicles without air conditioner compressor

Special tools and workshop equipment required

- ◆ Locking pin - T10060 A-



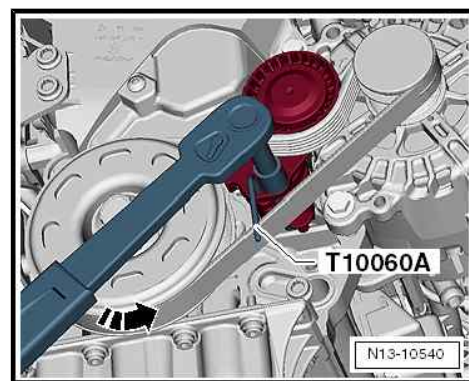
#### Removing

upl:

- Remove right noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .

Continued for all vehicles:

- Before removing, mark direction of rotation of poly V-belt with chalk or felt-tipped pen for re-installation.
- To slacken poly V-belt turn tensioning device in direction of -arrow-.
- Lock tensioning device in place with locking pin - T10060 A- .
- Remove poly V-belt.





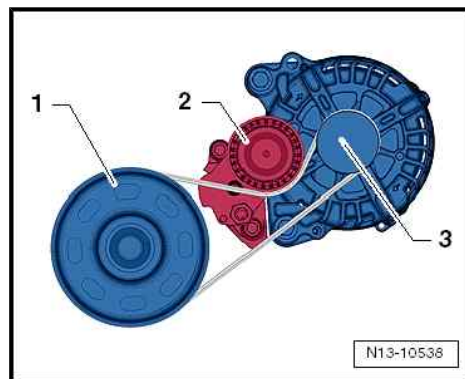


## Installing

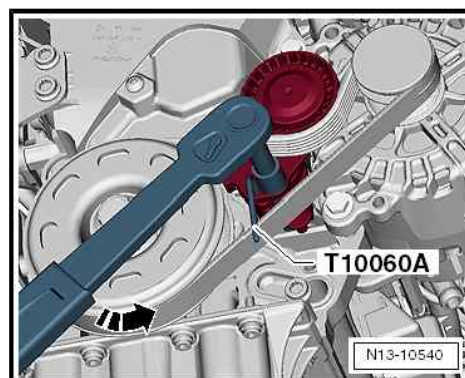
Install in reverse order of removal, observing the following:

- Fit poly V-belt as shown in illustration.

- 1 - Pulley
- 2 - Tensioning device for poly V-belt
- 3 - Alternator



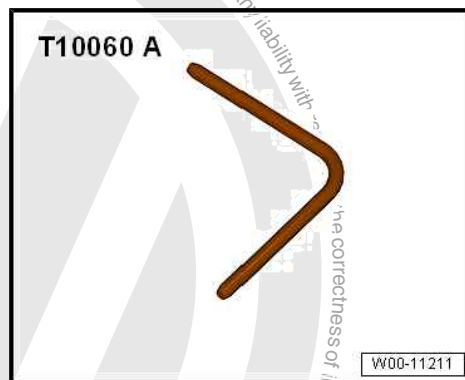
- Turn tensioning device in -direction of arrow-, and pull out locking pin - T10060 A- .
- Release tensioner.
- Check that poly V-belt is properly seated.
- Start engine and check that poly V-belt runs properly.



## 1.2.2 Removing and installing poly V-belt, vehicles with air conditioner compressor

### Special tools and workshop equipment required

- ♦ Locking pin - T10060 A-



## Removing

up!:

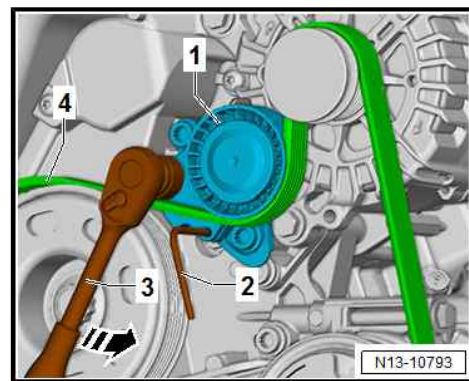
- Remove right noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .

### Continued for all vehicles:

- Before removing, mark direction of rotation of poly V-belt with chalk or felt-tipped pen for re-installation.



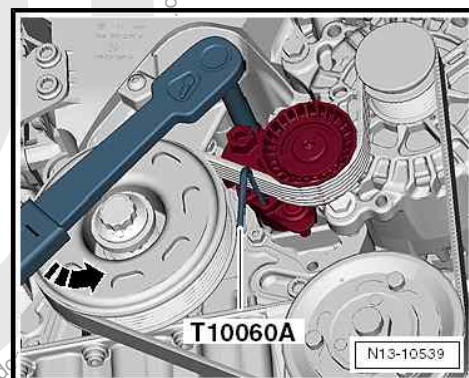
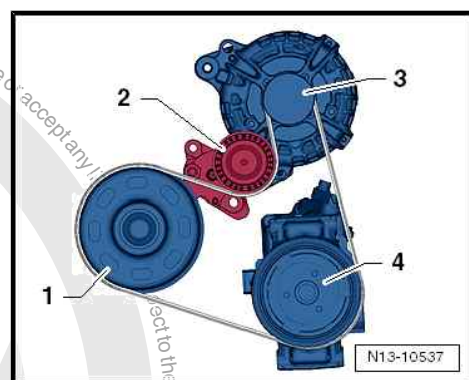
- Fit tool -3- onto hexagon of tensioner -1-.
- To slacken poly V-belt push tool -3- in -direction of arrow-.
- Lock tensioner -1- in place with locking pin - T10060 A- -2-.
- Remove poly V-belt -4-.



## Installing

Install in reverse order of removal, observing the following:

- Fit poly V-belt as shown in illustration.
- 1 - Pulley
  - 2 - Tensioning device for poly V-belt
  - 3 - Alternator
  - 4 - Air conditioner compressor
- Turn tensioning device in -direction of arrow-, and pull out locking pin - T10060 A- .
  - Release tensioner.
  - Check that poly V-belt is properly seated.
  - Start engine and check that poly V-belt runs properly.





## 1.3 Removing and installing tensioner for poly V-belt

⇒ [“1.3.1 Removing and installing tensioner for poly V-belt, vehicles without air conditioner compressor”, page 140](#)

⇒ [“1.3.2 Removing and installing tensioner for poly V-belt, vehicles with air conditioner compressor”, page 140](#)

### 1.3.1 Removing and installing tensioner for poly V-belt, vehicles without air conditioner compressor

#### Removing

- Remove poly V-belt from tensioner  
⇒ [“1.2.1 Removing and installing poly V-belt, vehicles without air conditioner compressor”, page 137](#) .

Remove bolts -arrows- and detach poly V-belt tensioner -1-.

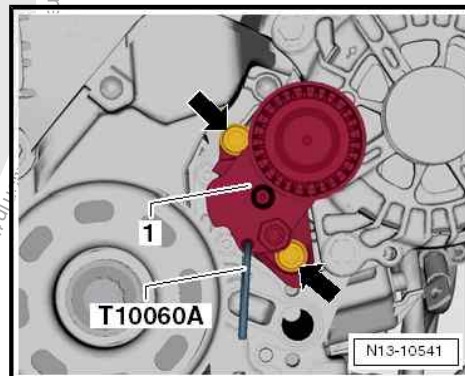
#### Installing

Install in reverse order of removal, observing the following:

- Install poly V-belt  
⇒ [“1.2.1 Removing and installing poly V-belt, vehicles without air conditioner compressor”, page 137](#) .

#### Specified torques

- Securing bolts  
⇒ [“1.1.1 Assembly overview - poly V-belt drive, vehicles without air conditioner compressor”, page 133](#)



### 1.3.2 Removing and installing tensioner for poly V-belt, vehicles with air conditioner compressor

#### Removing

- Remove poly V-belt from tensioner  
⇒ [“1.2.2 Removing and installing poly V-belt, vehicles with air conditioner compressor”, page 138](#) .
- Remove bolts -arrows- and detach poly V-belt tensioner -1-.

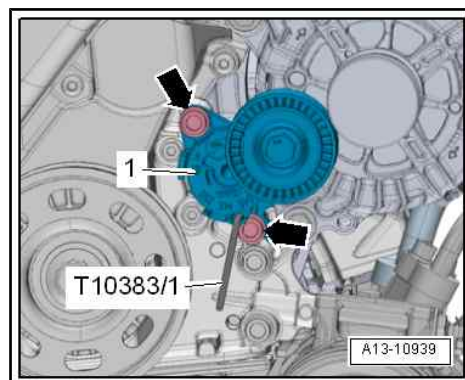
#### Installing

Install in reverse order of removal, observing the following:

- Install poly V-belt  
⇒ [“1.2.2 Removing and installing poly V-belt, vehicles with air conditioner compressor”, page 138](#) .

#### Specified torques

- Securing bolts  
⇒ [“1.1.2 Assembly overview - poly V-belt drive, vehicles with air conditioner compressor”, page 135](#)



## 1.4 Removing and installing vibration damper

Special tools and workshop equipment required



◆ Counter-hold tool - T10475-



Preparing counterhold tool - T10475-



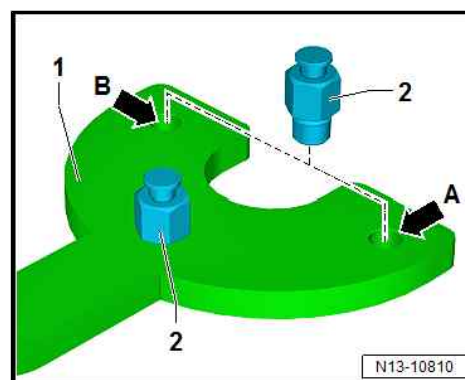
Note

- ◆ Different types of vibration damper can be installed.
- ◆ For this reason, the counterhold tool - T10475- must be adapted to the holes of the respective vibration damper.

Version 1

- Convert counterhold tool - T10475- -1- with inserts -T10475/2- -2-.

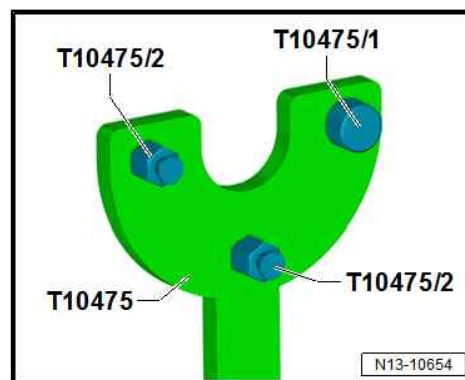
Version 2



- Convert counterhold tool - T10475- with inserts -T10475/1- and -T10475/2- as shown in illustration.
- To do this, use hole -A- or -B- of counter-hold tool - T10475- -1- depending on type of vibration damper.

Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove poly V-belt  
⇒ ["1.2 Removing and installing poly-V belt", page 137](#) .
- Convert counterhold tool - T10475- with inserts -T10475/1- and -T10475/2- as shown in illustration.
- Move crankshaft and camshafts to »TDC position«  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .







- Loosen bolt -arrow- for vibration damper using counterhold - T10475- .
- Unscrew bolt and remove vibration damper.

**NOTICE**

**Risk of damage to engine caused by incorrect valve timing.**

- Do not turn crankshaft out of TDC position.



**Note**

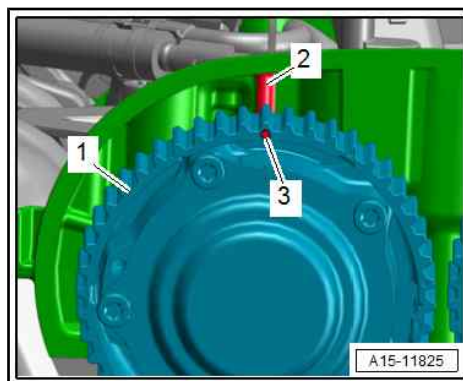
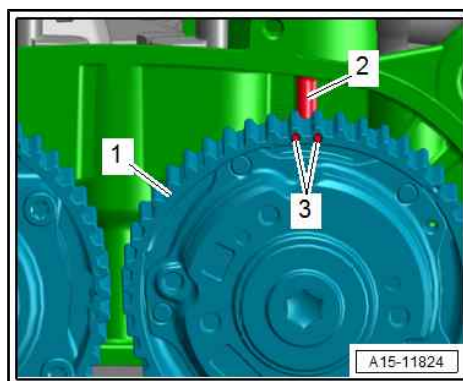
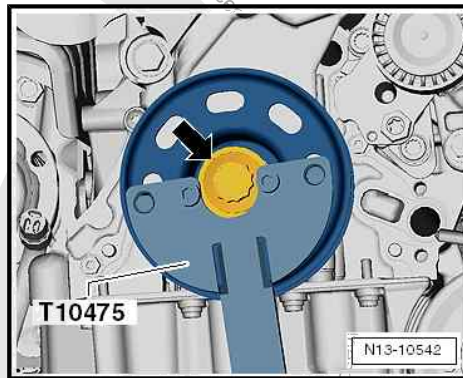
- ◆ To avoid disturbing valve timing, do not turn the crankshaft when the vibration damper has been removed.
- ◆ If the vibration damper cannot be reinstalled immediately, temporarily lock the crankshaft pulley in place using the centre bolt.

**Installing**

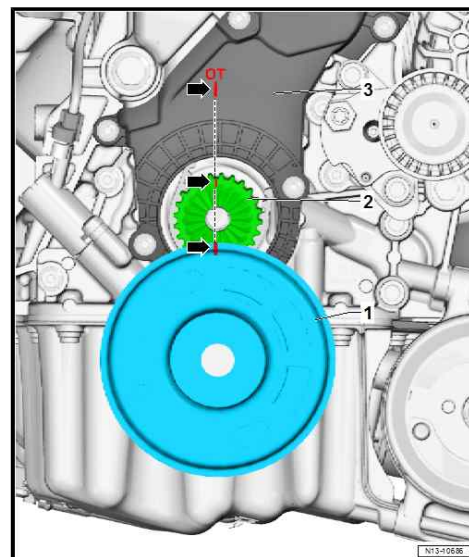


**Note**

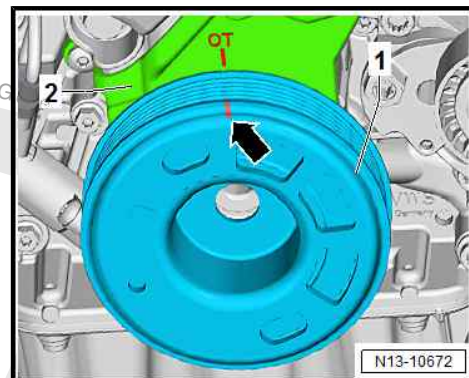
- ◆ Renew bolts that are tightened with turning further angle.
- ◆ All contact surfaces between bolt, poly V-belt pulley and crankshaft sprocket must be free of oil and grease.







- The markings -3- on the inlet cam actuator -1- must be properly aligned with web -2- on the camshaft housing.
- The marking -3- on the exhaust cam actuator -1- must be properly aligned with web -2- on the camshaft housing.
- Check the position of the crankshaft before fitting the vibration damper -1-.
- The marking on the crankshaft pulley -2- must be properly aligned with the »TDC marking« on the lower toothed belt guard -3-.
- The marking -arrow- on the vibration damper -1- must be properly aligned with the »TDC marking« on the lower toothed belt cover -2-.



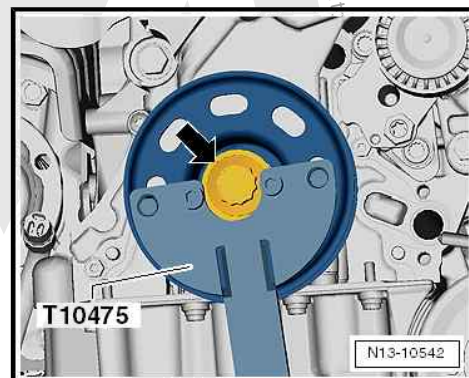
- Fit vibration damper, oil threads of bolt for vibration damper and screw it in to stop by hand.
- Tighten bolt -arrow- for vibration damper using counterhold - T10475- .

Further installation is carried out in reverse order of removal, observing the following:

- Install poly V-belt  
⇒ ["1.2 Removing and installing poly-V belt", page 137](#) .

#### Specified torques

- ◆ Securing bolt for vibration damper  
⇒ ["1.1 Assembly overview - poly V-belt drive", page 133](#)
- ◆ Securing bolts for noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation

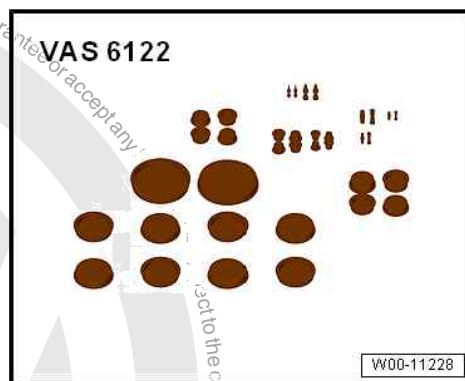


## 1.5 Removing and installing engine support

Special tools and workshop equipment required

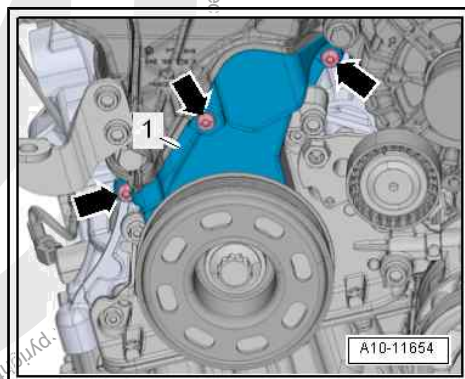


♦ Engine bung set - VAS 6122-



**Removing**

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation
- Removing engine mounting  
⇒ ["2.2 Removing and installing engine mounting", page 90](#) .
- Remove tensioner for poly V-belt  
⇒ ["1.3 Removing and installing tensioner for poly V-belt", page 140](#) .
- Remove bolts -arrows- for toothed belt cover (bottom) -1-.
- Unscrew bolts -2-, and remove bracket -1-.

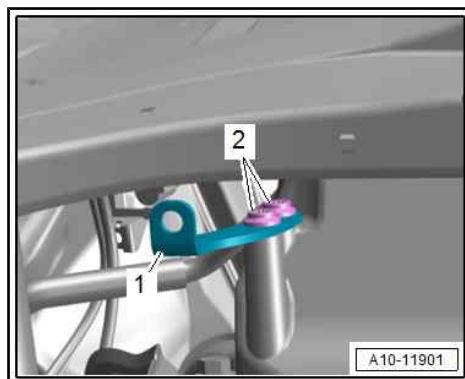


**⚠ CAUTION**

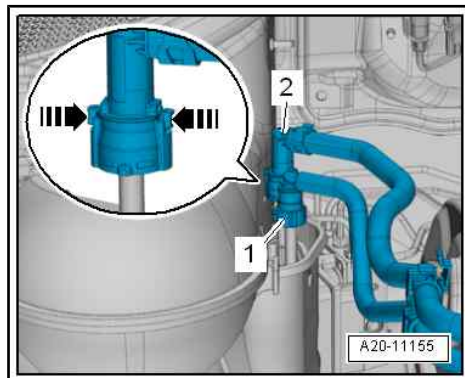
The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

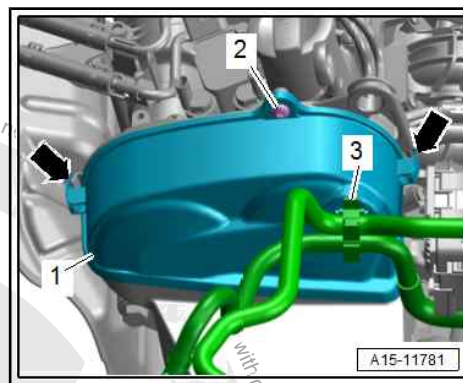


- Disconnect fuel supply line -1-; to do so, push connection piece downwards, then press release tabs -arrows-.
- Pull off connection piece, keeping release tabs depressed.
- Press release tab on hose -2- connected to activated charcoal filter.
- Disconnect hose and move it clear.
- Seal open lines and connections with clean plugs from engine bung set - VAS 6122- .

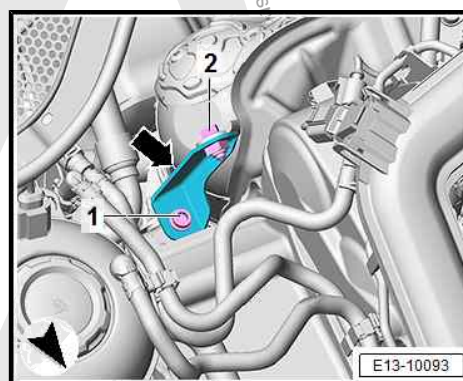




- Detach hoses from retainer -3-.
- Unscrew bolt -2-.
- Release clips -arrows- and remove upper toothed belt guard -1-.



- Unscrew bolts -1- and -2-.
- Remove bracket -arrow-.



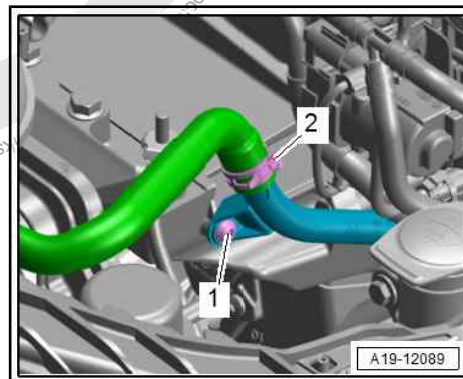
- Unscrew bolt -1-.



#### Note

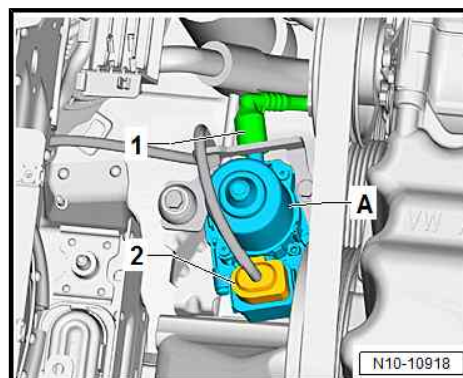
*Disregard -item 2-.*

- Detach alternator from bracket, and tie it up ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .



**Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran**

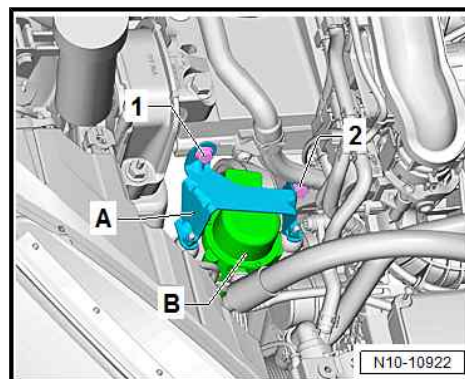
- Disconnect vacuum hose -1- and connector -2- from vacuum pump for brakes - V192- -A-.







- Loosen bolts -1- and -2-, and unscrew them.
- Remove bracket -A- with vacuum pump -B-.



#### Continued for all vehicles

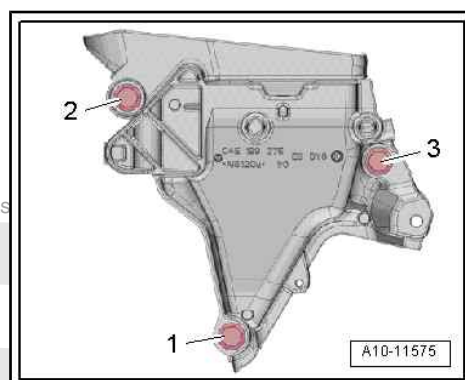
- Unscrew bolts -1, 2, 3-.
- Remove engine support.

#### Installing

Install in reverse order of removal.

#### Specified torques

Component	Specified torque
Securing bolt for securing vacuum pump to engine support	20 Nm



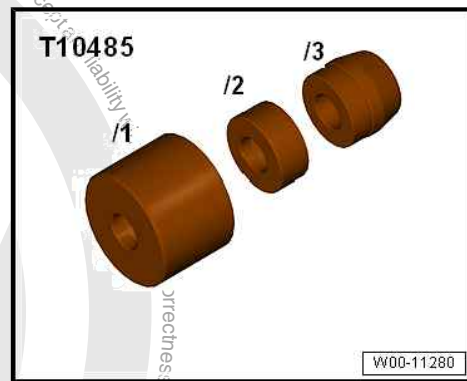
- ◆ Securing bolts for engine mounting and console for engine mounting  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)
- ◆ Securing bolts for tensioning roller  
⇒ [“1.1 Assembly overview - poly V-belt drive”, page 133](#)
- ◆ Securing bolts for lower toothed belt guard  
⇒ [“2.1 Assembly overview - toothed belt cover”, page 184](#)
- ◆ Securing bolts for coolant pipe  
⇒ [“3.1 Assembly overview - coolant pipes”, page 315](#)
- ◆ Securing bolt for air filter housing  
⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ Securing bolts for bracket  
⇒ [“2.1 Assembly overview - emission control”, page 482](#)
- ◆ Securing bolts for alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Assembly overview - alternator
- ◆ Securing bolts for noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation

## 1.6 Renewing crankshaft oil seal - belt pulley end

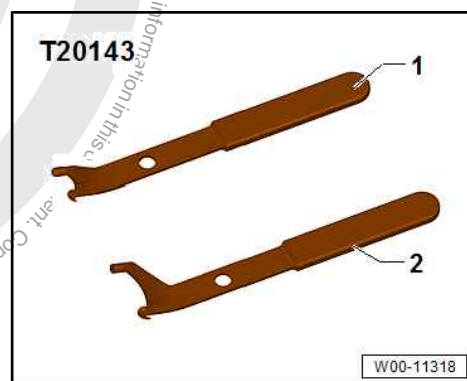
Special tools and workshop equipment required



◆ Assembly tool - T10485-



◆ Extractor hook - T20143-



**Sequence of operations**

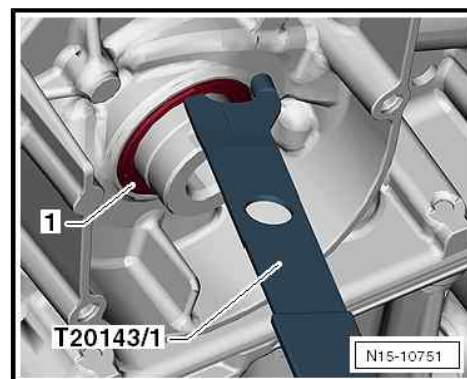
- Remove toothed belt  
⇒ ["2.3 Removing and installing toothed belt", page 186](#) .



**Note**

*To avoid disturbing valve timing, do not turn crankshaft out of "TDC" position when poly V-belt pulley is removed.*

- Remove seal -1- using extractor hook - T20143/1- .



**Installing**

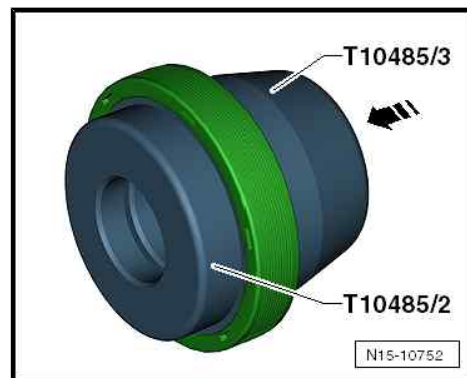
- Clean contact surface and sealing surface.



**Note**

*Do not lubricate new oil seal.*

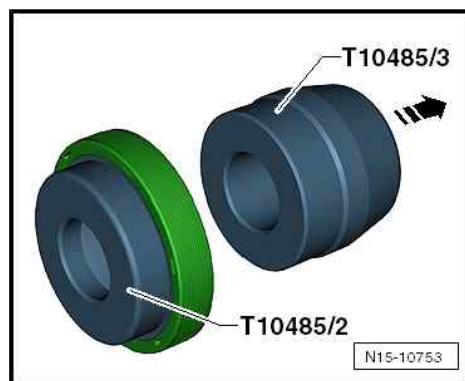
- Put together assembly sleeves - T10485/2- and -T10485/3- in -direction of arrow-.
- Fitting position: closed side of oil seal faces guide sleeve.
- Fit new seal in direction of -arrow- over fitting sleeve - T10485/3- onto assembly sleeve - T10485/2- .



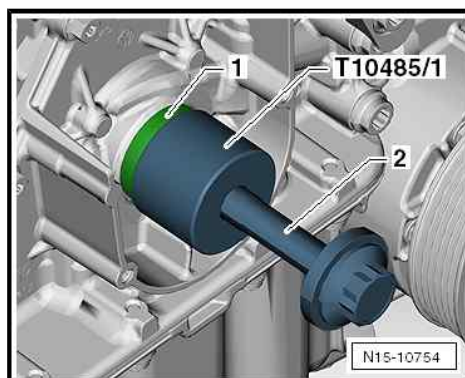




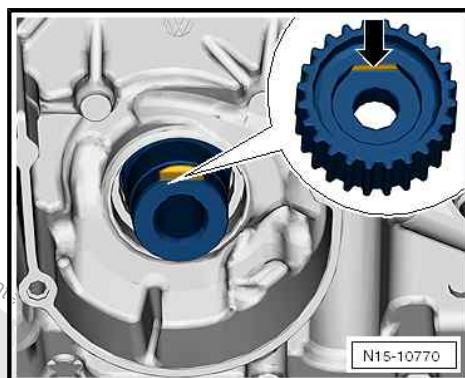
- Pull off assembly sleeve - T10485/3- in -direction of arrow-.



- Fit assembly sleeve - T10485/2- with seal -1- onto crankshaft stub.
- Draw in thrust piece - T10485/1- to stop with securing bolt of vibration damper -2-.



- Fit crankshaft sprocket onto crankshaft.
- The machined surface -arrow- of crankshaft pulley must be positioned over the machined surface of the crankshaft journal.
- Contact surface between poly V-belt pulley and crankshaft toothed belt pulley must be free of oil and grease.
- Install toothed belt  
⇒ ["2.3 Removing and installing toothed belt", page 186](#) .



Further assembly is basically a reverse of the dismantling sequence.

#### Specified torques:

- ◆ Crankcase plug: 30 Nm



## 2 Cylinder block, gearbox end

⇒ [“2.1 Assembly overview - cylinder block, gearbox end”, page 149](#)

⇒ [“2.2 Removing and installing flywheel”, page 150](#)

⇒ [“2.3 Removing and installing sealing flange on gearbox side”, page 151](#)

### 2.1 Assembly overview - cylinder block, gearbox end



#### Note

For assembly work, secure engine to engine and gearbox support  
⇒ [“1.3 Securing engine on engine and gearbox support”, page 66](#).

#### 1 - Bolt

- ☐ Renew after removal
- ☐ 60 Nm +90°

#### 2 - Flywheel

- ☐ Removing and installing  
⇒ [“2.2 Removing and installing flywheel”, page 150](#)
- ☐ Can only be fitted in one position

#### 3 - Sender wheel

- ☐ For engine speed sender - G28-
- ☐ Removing and installing  
⇒ [“2.3 Removing and installing sealing flange on gearbox side”, page 151](#)

#### 4 - Engine speed sender - G28-

- ☐ Removing and installing  
⇒ [“1.5 Removing and installing engine speed sender G28”, page 499](#)
- ☐ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

#### 5 - Bolt

- ☐ Specified torque  
⇒ [Item 15 \(page 494\)](#)

#### 6 - Dowel pin

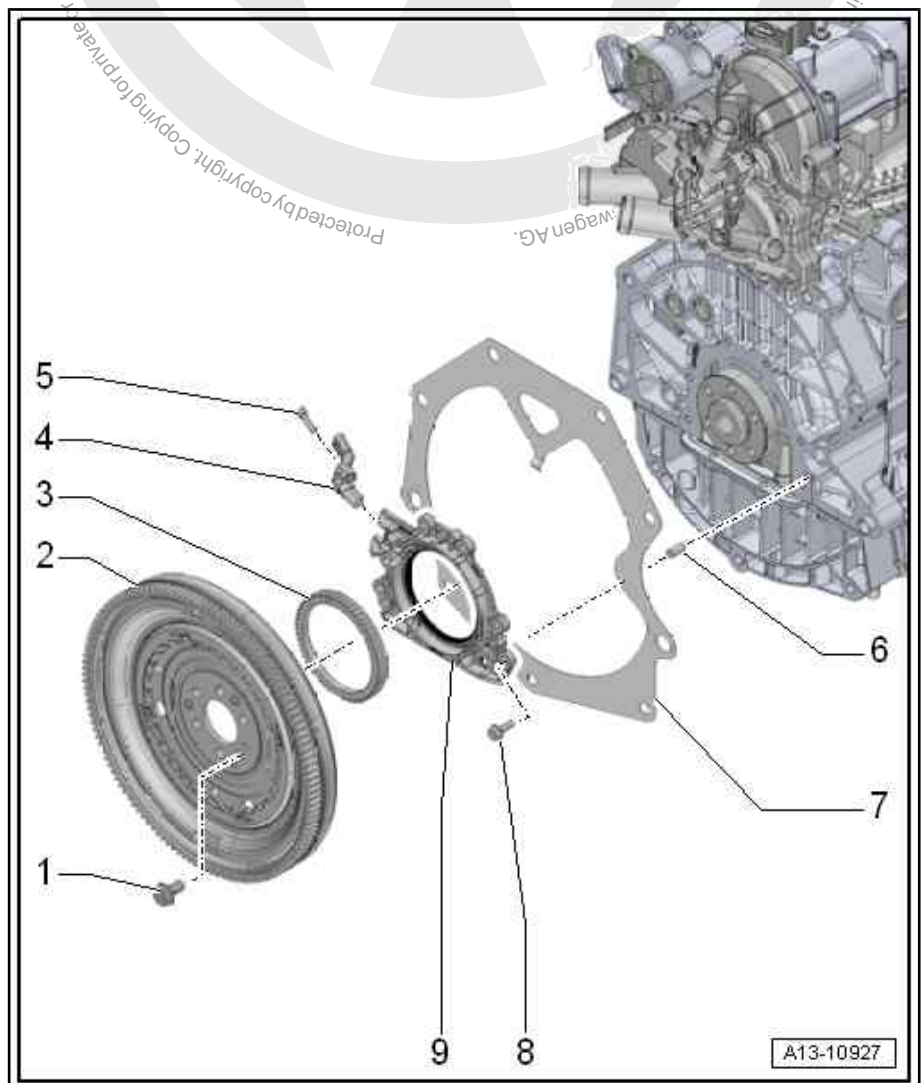
- ☐ Qty. 2

#### 7 - Intermediate plate

- ☐ Do not damage or bend when assembling.
- ☐ Installing ⇒ [page 150](#)

#### 8 - Bolt

- ☐ Specified torque and tightening sequence ⇒ [page 150](#)





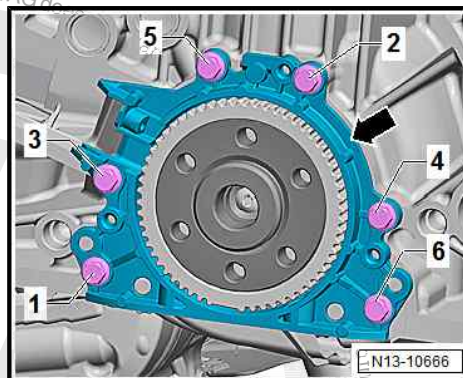
## 9 - Sealing flange, gearbox side

- ☐ With shaft seal
- ☐ Renewing ⇒ ["2.3 Removing and installing sealing flange on gearbox side", page 151](#)

### Sealing flange on gearbox side - specified torque and tightening sequence

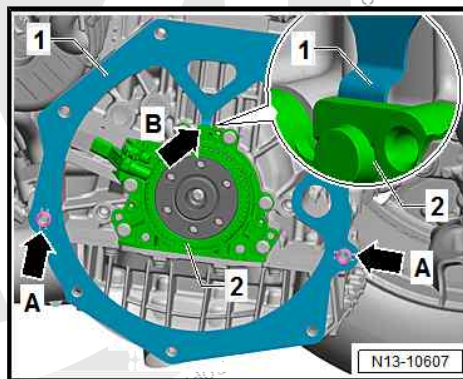
- Tighten bolts -1- to -6- in stages as follows:

Stage	Bolts	Specified torque
1.	-1- to -6-	Screw onto stop by hand
2.	-1- to -6-	In diagonal sequence and in stages; final torque 10 Nm



### Install intermediate plate

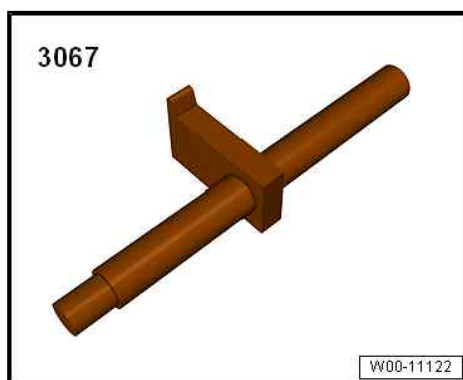
- Attach intermediate plate -1- to sealing flange -2- -arrow B-.
- Slide intermediate plate onto dowel sleeves -arrows A-.



## 2.2 Removing and installing flywheel

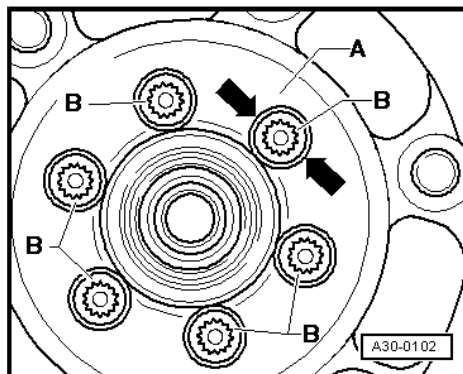
### Special tools and workshop equipment required

- ♦ Counter-hold tool - 3067-



### Removing

- Gearbox removed
- Screw out bolts -B- not with an air wrench or power impact wrench but by hand.
- When removing the bolts, make sure that the bolt heads do not come into contact with the flywheel.
- Rotate dual-mass flywheel -A- so that bolts -B- align centrally with the holes -arrows-.





- Insert counterhold - 3067- in hole on cylinder block -item B-.
- Loosen and remove flywheel bolts.

### Installing

Install in reverse order of removal, observing the following:



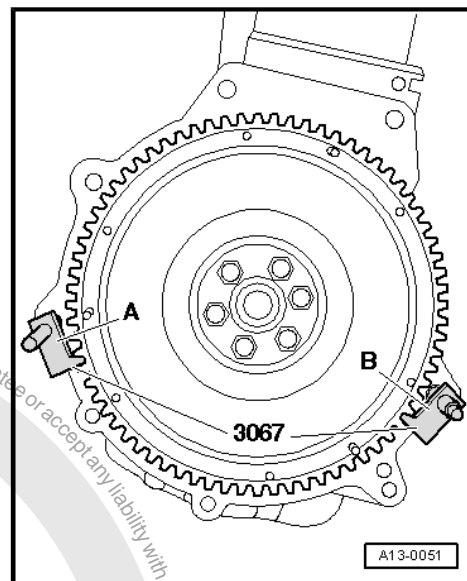
#### Note

- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Flywheel with sender wheel can only be fitted in one position.*

- Insert counterhold - 3067- in hole in cylinder block -item A-.

### Specified torques

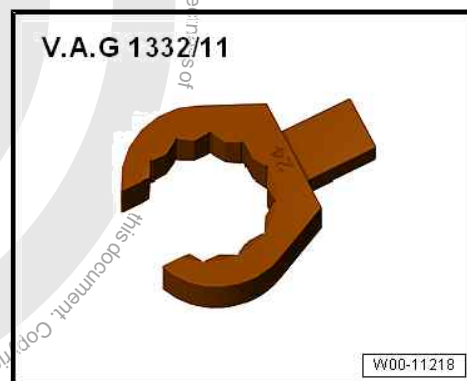
- ◆ Securing bolts for flywheel  
⇒ ["2.1 Assembly overview - cylinder block, gearbox end", page 149](#)



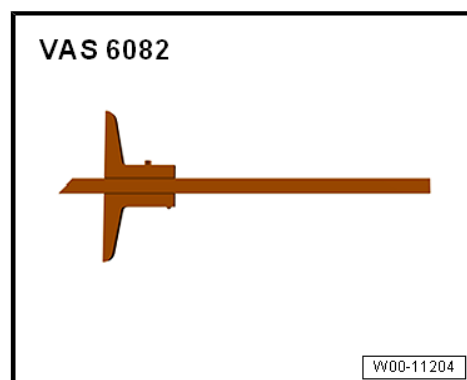
## 2.3 Removing and installing sealing flange on gearbox side

### Special tools and workshop equipment required

- ◆ Flared ring spanner tool insert AF 24 - V.A.G 1332/11-



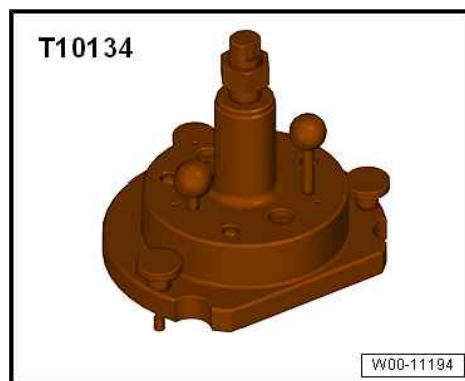
- ◆ Depth gauge - VAS 6082-







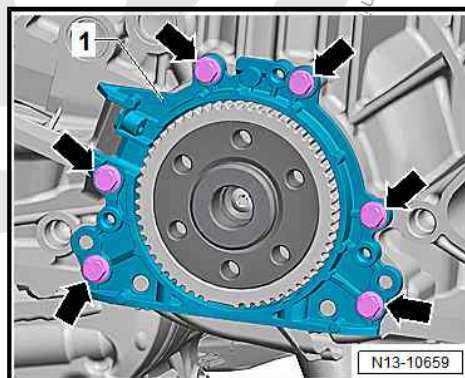
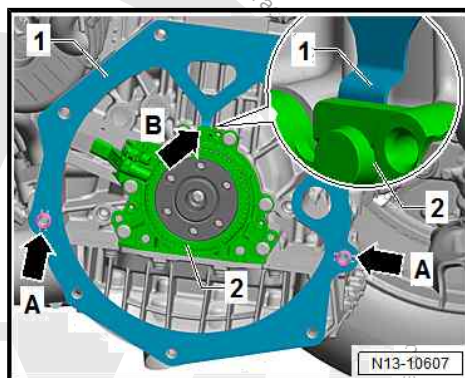
- ◆ Assembly tool - T10134-



- ◆ Bolt M6×35 (qty. 3)
- ◆ Hexagon key

### Sequence of operations

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Removing gearbox ⇒ Rep. gr. 34 ; Removing and installing gearbox .
- Remove clutch ⇒ Rep. gr. 30 ; Removing and installing clutch .
- Remove flywheel  
⇒ ["2.2 Removing and installing flywheel", page 150](#) .
- Remove intermediate plate -1- from dowel sleeves -arrows A-.
- Guide intermediate plate -1- upwards.
- While doing so, pull retaining lug -arrow B- of intermediate plate -1- out of recess behind sealing flange.
- Turn crankshaft to "TDC" position  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .
- Remove sump.  
⇒ ["1.3 Removing and installing sump", page 250](#)
- Remove engine speed sender - G28-  
⇒ ["1.5 Removing and installing engine speed sender G28", page 499](#) .
- Unscrew bolts -arrows- for sealing flange -1-.







- To press off, screw 3 M6 x 35 bolts -arrows- into sealing flange -1-.



#### Note

*The sealing flange -1- is pressed off crankshaft -3- together with the sender wheel -2-.*

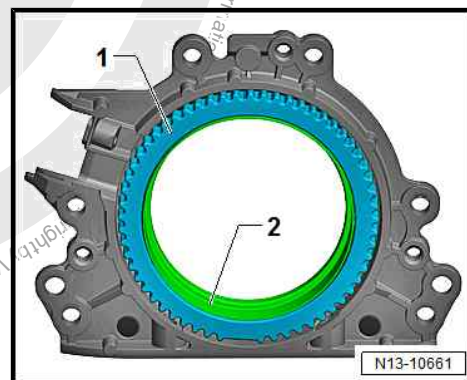
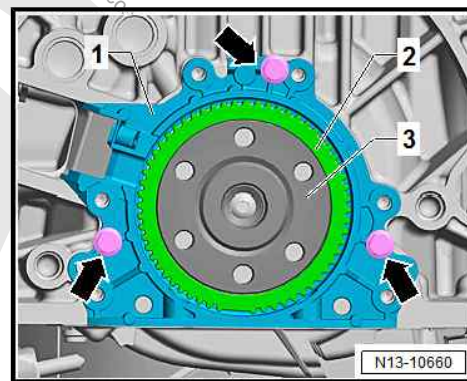
- Screw bolts alternately into sealing flange not more than  $\frac{1}{2}$  turn at a time.
- Remove sealing flange -1- together with sender wheel -2-.

#### Pressing in sealing flange with sender wheel



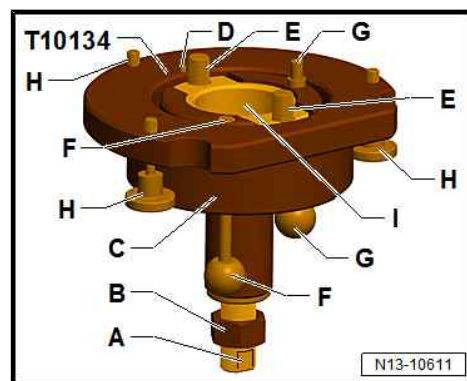
#### Note

- ◆ *The sealing flange with a PTFE seal is equipped with a sealing lip support ring -2-. This support ring serves as a fitting sleeve and must not be removed prior to installation.*
- ◆ *Sealing flange and sender wheel -1- must not be separated or turned after removal from packaging.*
- ◆ *The sender wheel -1- is held in its installation position on the locating pin of the assembly tool - T10134- ➔ [page 153](#).*
- ◆ *Sealing flange and oil seal form one unit and must only be renewed together with the sender wheel.*
- ◆ *The assembly tool - T10134- is held in its position relative to the crankshaft by a guide pin inserted into a hole in the crankshaft ➔ [page 153](#).*



#### Set-up of assembly tool - T10134- :

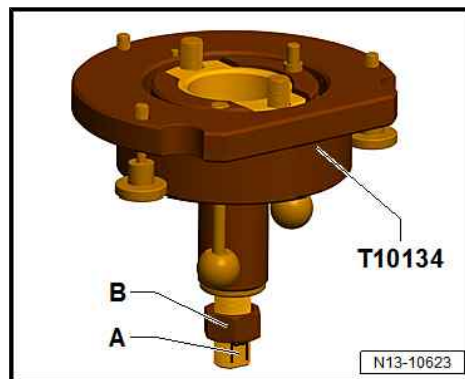
- A - Clamping surface
- B - Nut
- C - Assembly housing
- D - Locating pin
- E - Hexagon socket head bolt (qty. 2)
- F - Guide pin for petrol engines (red knob)
- G - Guide pin for diesel engines (black knob)
- H - Knurled screws (qty. 3)
- I - Inner part



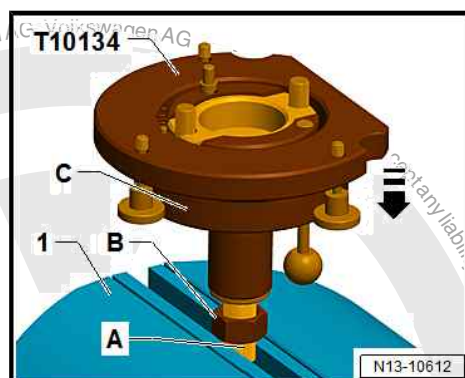


#### Fitting sealing flange with sender wheel on assembly tool - T10134- :

- Screw on nut -B- until just before it touches the clamping surface -A- of the threaded spindle.



- Clamp assembly device - T10134- at clamping surface -A- of threaded spindle in a vice -1-.
- Push assembly housing -C- downwards until it rests against nut -B-.
- Inner part of assembly tool and assembly housing must be at same height.

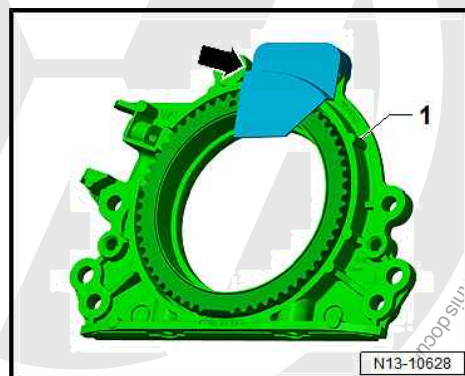


- If fitted, remove securing clip -arrow- from new sealing flange -1-.

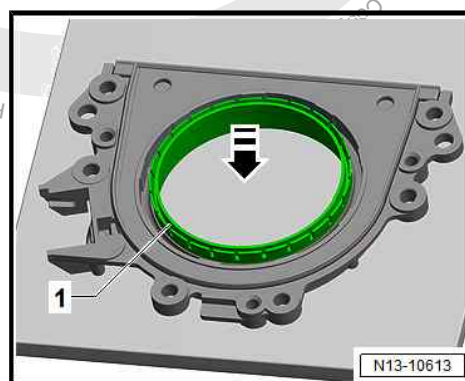


#### Note

*Do not take the sender wheel out of the sealing flange.*

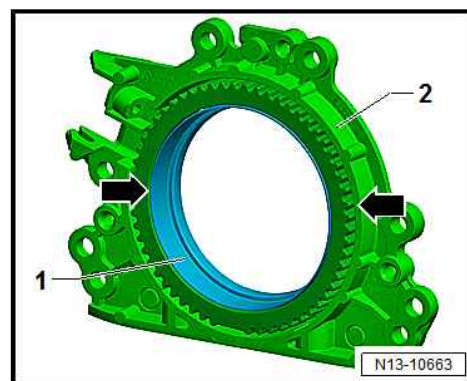


- Place sealing flange with front side facing down on a clean level surface.
- Push sealing lip support ring -1- downwards in -direction of arrow- until it rests against flat surface.





- Upper edge of sealing lip support ring -1- and front edge of sealing flange -2- must align -arrows-.

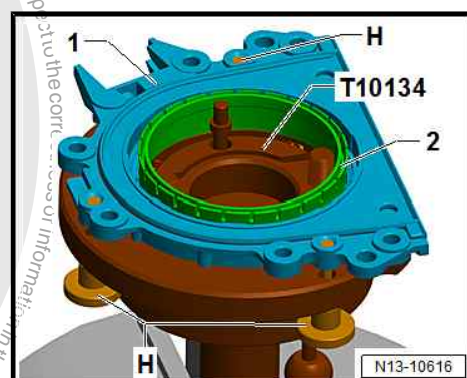
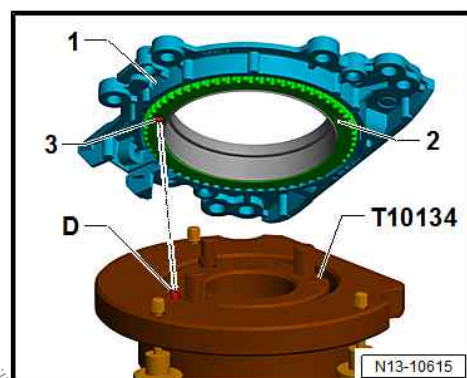


- Place sealing flange -1- with front side facing downwards onto assembly tool - T10134- so that locating pin -D- is seated in hole -3- in sender wheel hole -2-.



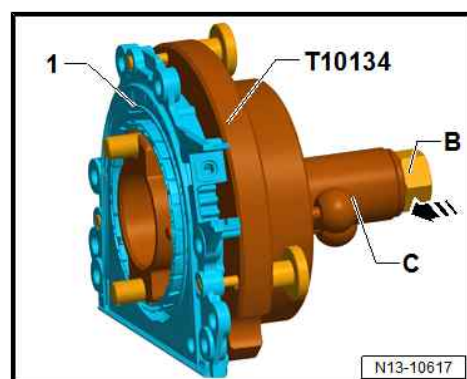
#### Note

- ◆ The sealing flange can be supplied in different versions.
- ◆ On some versions, the »TDC position hole« -3- is not in the requisite TDC position -D-.
- If the position -3- is not correct in relation to the locating pin -D-, carefully rotate the sender wheel -2- with support ring.
- The sealing flange must rest flat against the assembly tool.
- Screw knurled screws -H- into sealing flange -1-.
- Press sealing flange -1- and sealing lip support ring -2- against surface of assembly tool - T10134- whilst tightening knurled screws.
- This prevents the locating pin from slipping out of the sender wheel hole.
- When installing sealing flange, ensure that sender wheel remains fixed in assembly tool.



#### Mounting assembly tool - T10134- with sealing flange -1- on crankshaft flange:

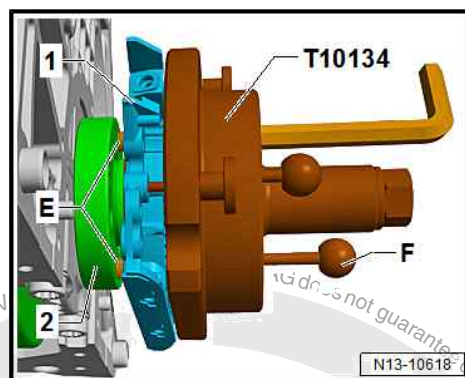
- The crankshaft flange must be free of grease and oil.
- Engine is at "TDC" position  
⇒ **"4.7 Setting piston to TDC position" page 168**.
- Screw on nut -B- until it reaches end of threaded spindle.
- Press threaded spindle of assembly tool - T10134- in -direction of arrow-, until nut -B- rests against assembly housing -C-.
- Align flat side of assembly housing to sealing surface of cylinder block on sump side.



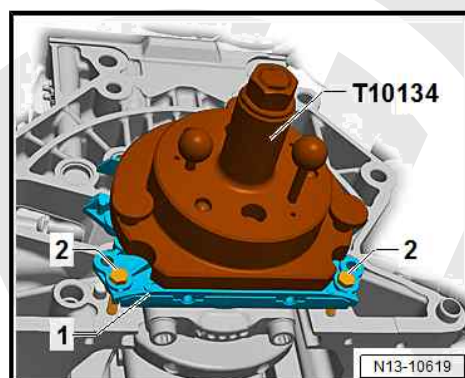




- Attach assembly tool - T10134- together with sealing flange -1- to crankshaft flange -2-.
- To do this, screw hexagon socket head bolts -E- into crankshaft flange (approx. 5 full turns) using a hexagon key.
- Push guide pin for petrol engines (red knob) -F- into crankshaft flange.



- To guide sealing flange -1-, screw 2 M6 x 35 mm bolts -2- into cylinder block.



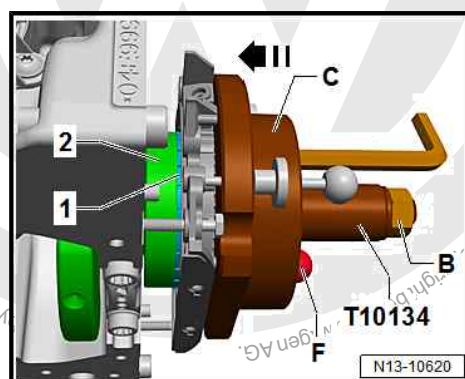
#### Bolting assembly tool - T10134- onto crankshaft flange:

- Push assembly housing -C- by hand in -direction of arrow- until sealing lip support ring -1- rests against crankshaft flange -2-.
- Make sure that guide pin for petrol engines (red knob) -F- is properly seated in hole in crankshaft. This ensures that the sender wheel reaches its final installation position.



#### Note

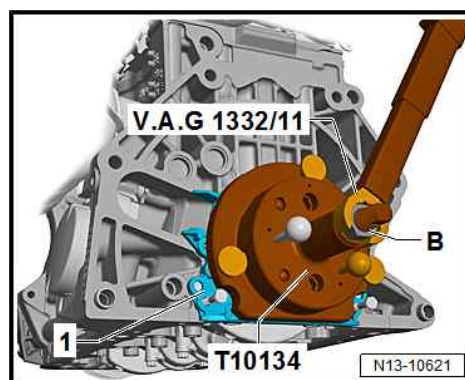
*The guide pin for diesel engines (black knob) must not be inserted in threaded hole of crankshaft.*



- Tighten the two hexagon socket head bolts of assembly tool hand-tight.
- Screw nut -B- by hand onto threaded spindle until it rests against assembly housing -C-.

#### Pressing sender wheel onto crankshaft flange using assembly tool - T10134- :

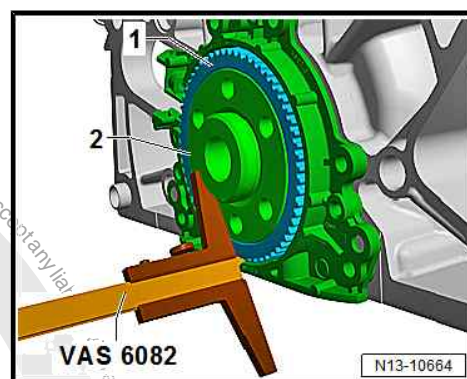
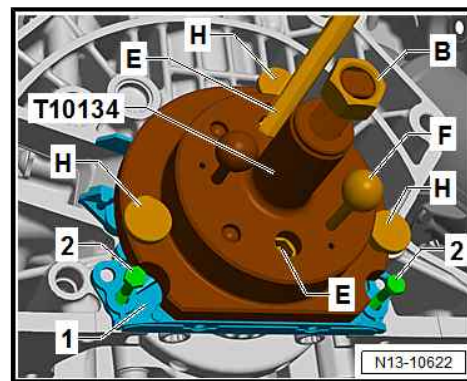
- Tighten nut -B- of assembly tool - T10134- to 35 Nm.
- After the nut has been tightened to 35 Nm, a small air gap must still be present between cylinder block and sealing flange -1-.



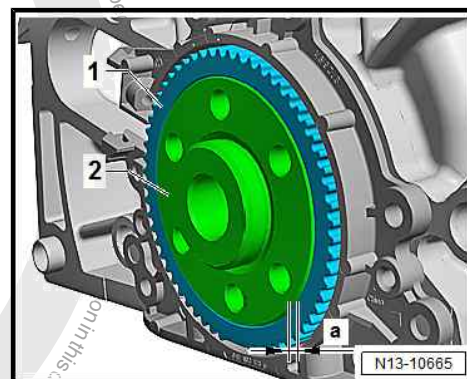


### Checking sender wheel installation position on crankshaft:

- Screw on nut -B- until it reaches end of threaded spindle.
- Unscrew the two bolts -2- from cylinder block.
- Pull guide pin for petrol engines (red knob) -F- out of crankshaft flange.
- Unscrew knurled screws -H- from sealing flange -1-.
- Unbolt assembly tool - T10134- from crankshaft flange, unscrewing hexagon socket head bolts -E- from crankshaft flange.
- Remove sealing lip support ring.
- Position depth gauge - VAS 6082- on crankshaft flange -2-.

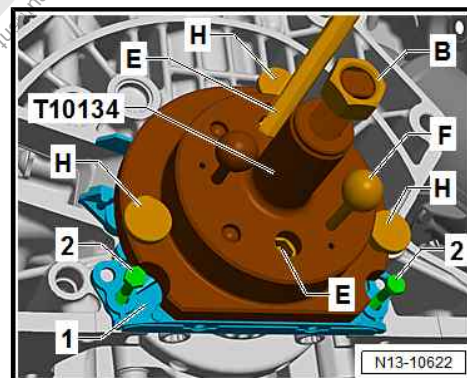


- Measure distance -a- between crankshaft flange -2- and sender wheel -1-.
- Specification: dimension -a- = 0.5 mm
- If specification is not achieved, press sender wheel further in ➔ [page 157](#) .
- If specification is achieved, proceed with subsequent work steps ➔ [page 158](#) .



### Re-pressing sender wheel:

- Secure assembly tool - T10134- on crankshaft flange -1-.
- Make sure that locating pin of assembly tool - T10134- is properly seated in sender wheel hole.
- Tighten hexagon socket head bolts -E- by hand.
- Push assembly tool - T10134- by hand against sealing flange -1-.
- Screw nut -B- by hand onto threaded spindle until it rests against assembly tool - T10134- .
- Push guide pin for petrol engines (red knob) -F- into crankshaft flange.
- Screw knurled screws -H- into sealing flange -1-.
- To guide sealing flange, screw 2 M6 x 35 mm bolts -2- into cylinder block.







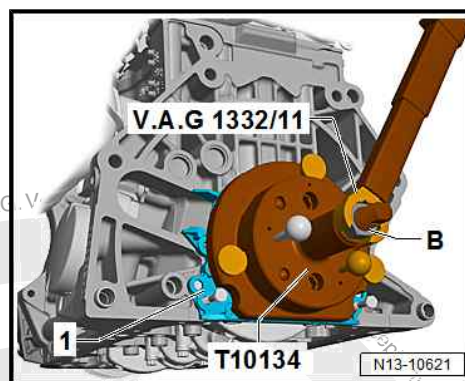
- Tighten nut -B- of assembly tool - T10134- to 40 Nm.
- Check sender wheel installation position on the crankshaft again ⇒ [page 157](#) .
- If the specification is not achieved, tighten nut of assembly tool - T10134- to 45 Nm.
- Check sender wheel installation position on the crankshaft again ⇒ [page 157](#) .

#### Assembling:

- Tighten bolts for sealing flange in diagonal sequence.
- Install sump  
⇒ [“1.3 Removing and installing sump”, page 250](#) .
- Install intermediate plate ⇒ [page 150](#) .
- Install flywheel  
⇒ [“2.2 Removing and installing flywheel”, page 150](#) .
- Check valve timing  
⇒ [“2.5 Checking valve timing”, page 199](#) .

#### Specified torques

- ◆ ⇒ [Fig. “Sealing flange on gearbox side - specified torque and tightening sequence”](#) , page 150
- ◆ ⇒ [“2.1 Assembly overview - cylinder block, gearbox end”, page 149](#)
- ◆ Engine speed sender - G28-  
⇒ [“1.1 Assembly overview - ignition system”, page 493](#)





## 3 Crankshaft

⇒ [“3.1 Crankshaft dimensions”, page 159](#)

⇒ [“3.2 Renewing needle bearing in crankshaft”, page 159](#)

### 3.1 Crankshaft dimensions



#### Note

- ◆ Risk of deformation of bearing pedestals.
- ◆ The crankshaft must not be removed.
- ◆ Just loosening the bolts of the crankshaft bearing cap will cause deformation of the cylinder block bearing pedestals.
- ◆ This deformation will cause a reduction of the bearing clearance.
- ◆ Even if the bearing shells are not renewed, bearing damage could occur due to a different bearing clearance.
- ◆ If the bearing cap bolts are loosened, the cylinder block must be renewed complete with the crankshaft.
- ◆ Measuring the main bearing clearance is not possible with normal workshop equipment.

Honing dimension	Conrod journal diameter mm
Basic dimension	47.80 -0.022 -0.037

### 3.2 Renewing needle bearing in crankshaft

Only vehicles with a dual clutch gearbox

Special tools and workshop equipment required

- ◆ Counter support, e.g. KUKKO 22-1 - VAS 251 621-





◆ Internal puller - VAS 251 635-



◆ Drift - VW 207 C-



### Removing

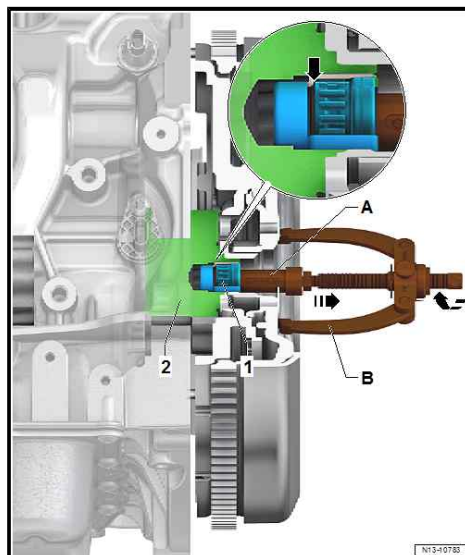
- Remove gearbox ⇒ Rep. gr. 34 ; Removing and installing gearbox; Removing gearbox .

### Condition:

- The front edges of the inner puller must be free of chips.

### Pulling out needle roller bearing

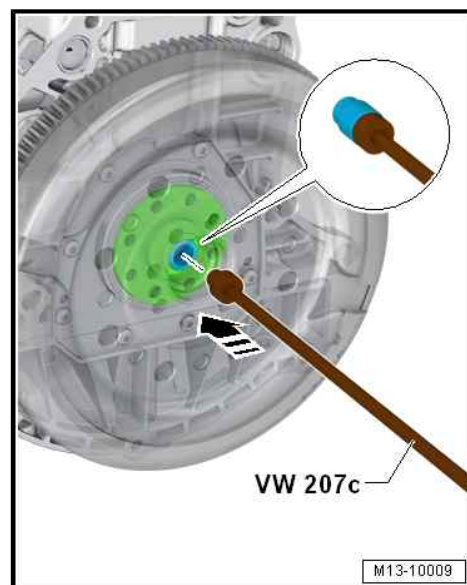
- Pull out needle bearing -1- with internal puller - VAS 251 635- -A- and counter support, e.g. KUKKO 22-1 - VAS 251 621- -B- from crankshaft -2-.
- The internal puller must be positioned behind the needle-and-cage assembly -arrow-.





### Installing

- Clean bearing seat in crankshaft and apply as thin coating of grease.
- Drive needle bearing into crankshaft to installation depth using drift - VW 207 C- .



Installation depth: dimension -a- = 2.0 mm



### Note

*If the needle bearing is inadvertently driven in too far, it must be renewed because it will be damaged when it is pulled out again.*





## 4 Pistons and conrods

⇒ [“4.1 Assembly overview - pistons and conrods”, page 162](#)

⇒ [“4.2 Removing and installing pistons”, page 164](#)

⇒ [“4.3 Checking pistons and cylinder bores”, page 165](#)

⇒ [“4.4 Separating new conrod”, page 167](#)

⇒ [“4.5 Checking radial clearance of conrods”, page 167](#)

⇒ [“4.6 Removing and installing oil spray jets”, page 167](#)

⇒ [“4.7 Setting piston to TDC position”, page 168](#)

### 4.1 Assembly overview - pistons and conrods



#### Note

*All bearing points and running surfaces must be oiled before assembly.*

#### 1 - Locking ring

- ❑ Renew after removal

#### 2 - Piston pin

- ❑ If difficult to remove, heat piston to 60°C.
- ❑ Removing and installing  
⇒ [“4.2 Removing and installing pistons”, page 164](#)

#### 3 - Piston

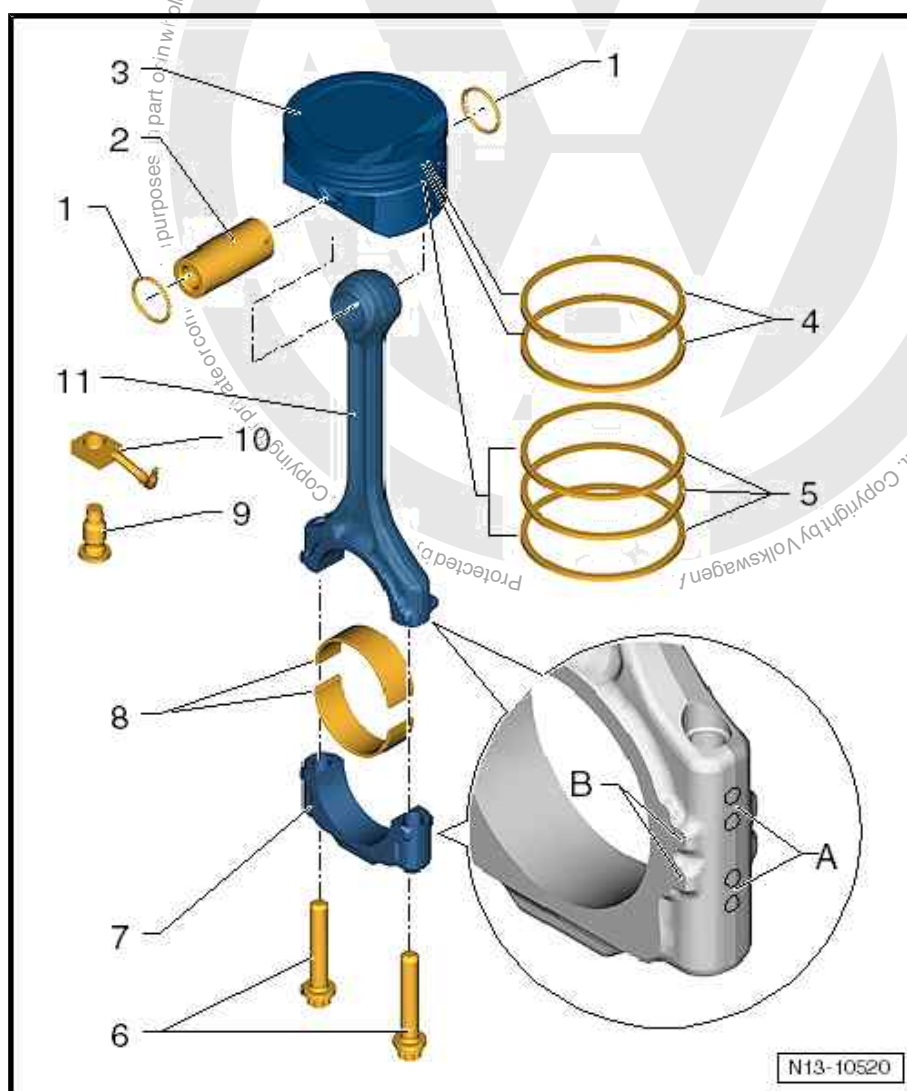
- ❑ Checking  
⇒ [“4.3 Checking pistons and cylinder bores”, page 165](#)
- ❑ Mark installation position and cylinder number  
⇒ [page 164](#)
- ❑ Arrow on piston crown points to belt pulley end.
- ❑ Install using piston ring clamp.

#### 4 - Compression rings

- ❑ Offset gaps by 120°
- ❑ Remove and install compression rings with piston ring pliers.
- ❑ “TOP” faces towards piston crown.
- ❑ Checking ring gap  
⇒ [page 166](#) .
- ❑ Checking ring-to-groove clearance  
⇒ [page 166](#) .

#### 5 - Oil scraper rings

- ❑ Carefully remove and install 3-part oil scraper rings by hand.







- ☐ Checking ring gap ⇒ [page 166](#) .
- ☐ Ring-to-groove clearance not measurable.

#### 6 - Conrod bolt

- ☐ Renew
- ☐ To measure radial clearance, tighten to corresponding specified torque but not further.
- ☐ Oil threads and contact surface
- ☐ 30 Nm +90° further

#### 7 - Conrod bearing cap

- ☐ Observe installation position
- ☐ The caps only fit in one position and only on the appropriate conrod due to the breaking procedure (cracking) separating the cap from the conrod.
- ☐ Mark with cylinder number prior to removal -A-.
- ☐ Installation position: Mark -B- points to belt pulley end (if mark is missing, mark before removing).

#### 8 - Bearing shell

- ☐ Fitting position ⇒ [page 164](#)
- ☐ Do not interchange used bearing shells.
- ☐ Insert bearing shells centrally.

Checking radial clearance with Plastigage:

- ☐ New: 0.020 ... 0.060 mm
- ☐ Wear limit: 0.070 mm
- ☐ Do not rotate crankshaft when checking radial clearance.

#### 9 - Pressure relief valve

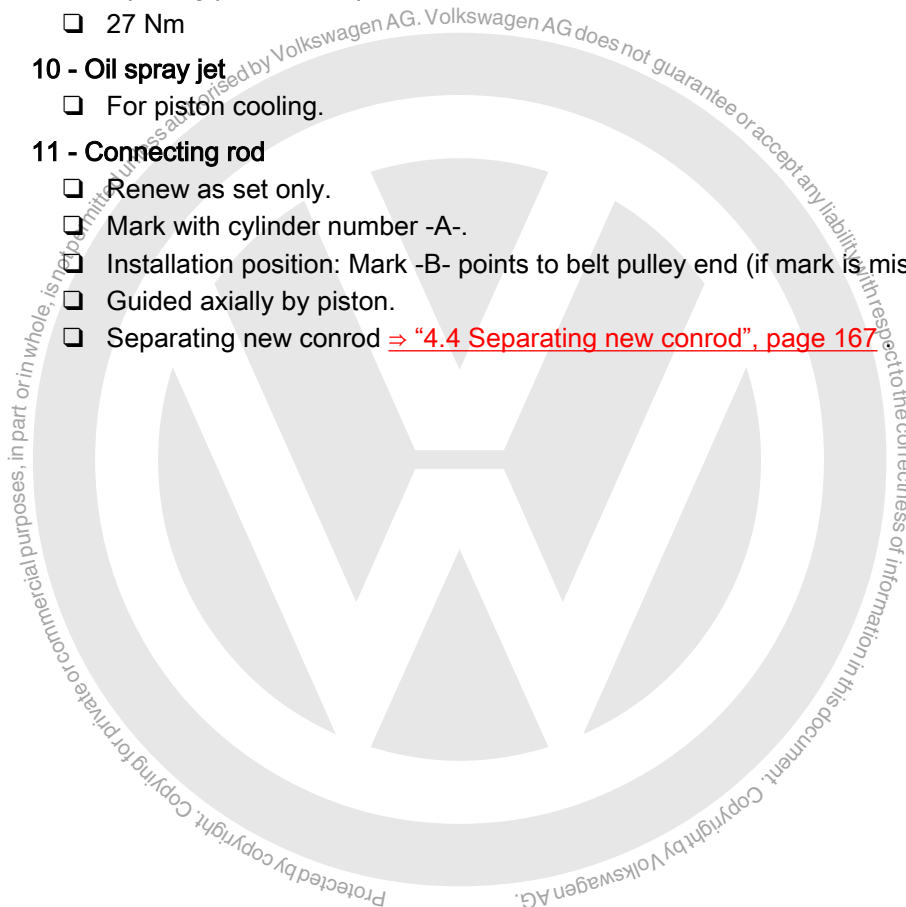
- ☐ Opening pressure of pressure relief valve: 1.8 ... 2.2 bar
- ☐ 27 Nm

#### 10 - Oil spray jet

- ☐ For piston cooling.

#### 11 - Connecting rod

- ☐ Renew as set only.
- ☐ Mark with cylinder number -A-.
- ☐ Installation position: Mark -B- points to belt pulley end (if mark is missing, mark before removing).
- ☐ Guided axially by piston.
- ☐ Separating new conrod ⇒ ["4.4 Separating new conrod", page 167](#)



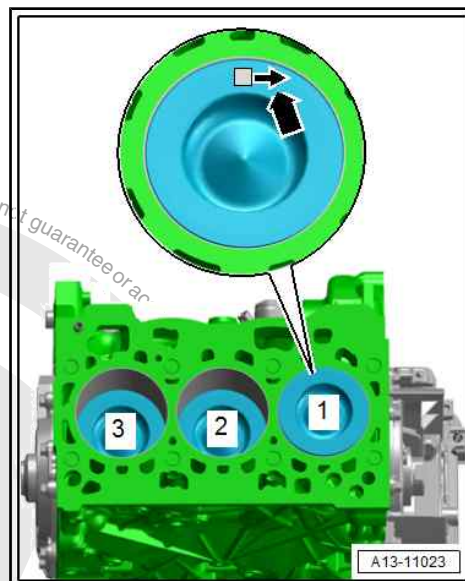


## Installation position and allocation of piston to cylinder



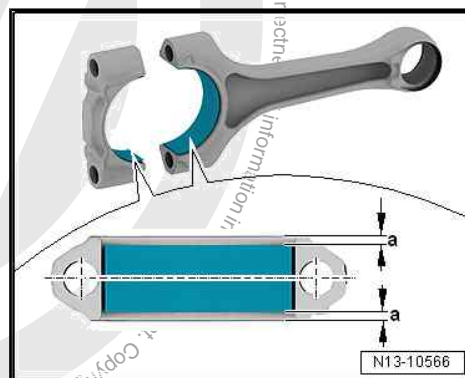
### Note

- ◆ Risk of damage to piston crown.
- ◆ If worn pistons are to be reinstalled, mark their allocation to the cylinder on the piston crown. Use paint for this.
- ◆ Do not use indentation, scratches, notches, or similar to mark piston crown.
- Arrow on piston crown points to pulley end -arrow-.



## Bearing shells - installation position

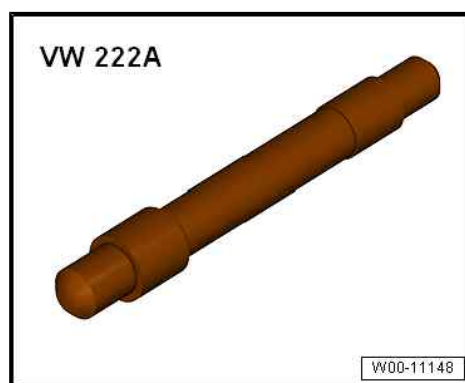
- Centre bearing shells on conrod and on conrod bearing cap.
- Distance -a- = distance -a-.



## 4.2 Removing and installing pistons

### Special tools and workshop equipment required

- ◆ Drift - VW 222 A-



- ◆ Piston ring clamp, commercially available

### Removing

- Removing cylinder head.  
⇒ ["1.3 Removing and installing cylinder head", page 175](#)
- Remove sump  
⇒ ["1.3 Removing and installing sump", page 250](#) and baffle plate.
- Mark piston installation position and corresponding cylinder number.



- Mark installation position and matching of cylinder and conrod bearing cap to conrod ⇒ [Item 7 \(page 163\)](#) .
- Remove conrod bearing cap and withdraw piston and conrod upwards.



#### Note

*If the piston pin is difficult to move, heat the piston to approx. 60° C.*

- Remove retaining ring from piston pin eye.
- Drive out piston pin using drift - VW 222 A- .

#### Installing

Install in reverse order of removal, observing the following:



#### Note

*Renew bolts that are tightened with turning further angle.*

- Oil running surfaces of bearing shells.
- Install piston with commercially available piston ring clamp, noting installation position ⇒ [page 164](#) .
- Install conrod bearing cap, noting installation position ⇒ [Item 7 \(page 163\)](#) .
- Install cylinder head  
⇒ [“1.3 Removing and installing cylinder head”, page 175](#) .
- Install sump  
⇒ [“1.3 Removing and installing sump”, page 250](#)

#### Specified torques

- ◆ ⇒ [“4.1 Assembly overview - pistons and conrods”, page 162](#)

### 4.3 Checking pistons and cylinder bores

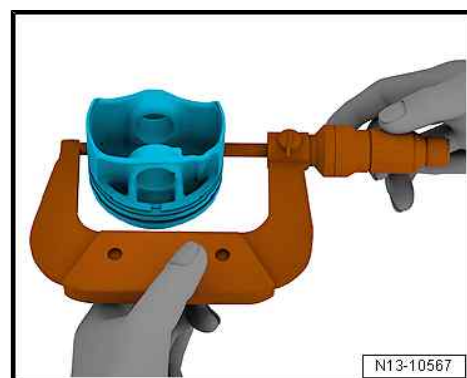
#### Special tools and workshop equipment required

- ◆ External micrometer 50-75 mm - VAS 6070-

#### Checking piston

- Using an external micrometre, measure approx. 10 mm from lower edge, offset 90° from piston pin axis.
- Maximum deviation from nominal dimension: 0.04 mm.

Piston diameter, mm	
Specification	74.42 <sup>1)</sup>
<ul style="list-style-type: none"> <li>• <sup>1)</sup> Dimensions not including coating (thickness 0.018 mm on each side).</li> </ul>	

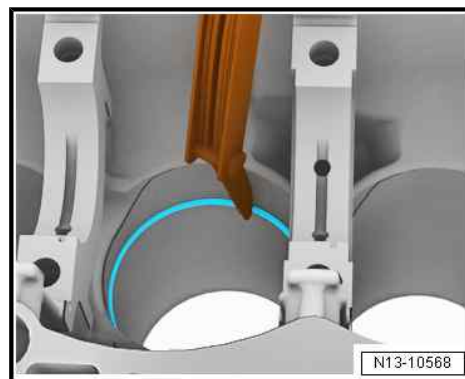




### Measuring piston ring gap

- Push piston ring at right angles to cylinder wall from above down into cylinder bore to approx. 15 mm from bottom end of cylinder.
- Push in using a piston without piston rings.

Piston ring	New mm	Wear limit mm
compression ring	0.20 + 0.15	1.0
Oil scraper ring	0.20 + 0.20	3.0



### Measuring ring-to-groove clearance

- Clean annular groove of piston before check.

Piston ring	New mm	Wear limit mm
1st compression ring	0.05 ... 0.09	0.15
2nd compression ring	0.03 ... 0.07	0.15
Oil scraper rings	Cannot be measured	



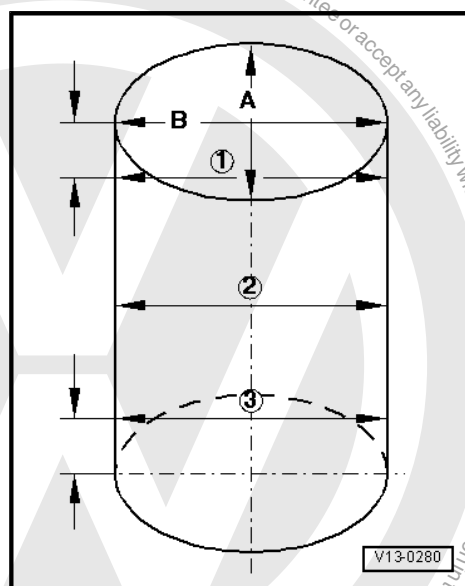
### Measuring cylinder bore

#### NOTICE

**Risk of damage to the surface of the cylinder bore caused by incorrect machining.**

- Do not machine cylinder bore (reboring, honing, grinding) with workshop equipment.
- Using cylinder gauge - VAS 6078, take measurements at 3 positions diagonally in lateral direction -A- and longitudinal direction -B-.
- Maximum deviation from nominal dimension: 0.05 mm.

	Cylinder bore diameter, mm
Specification	74.5
Maximum dimension	74.515
Minimum dimension	74.505



#### Note

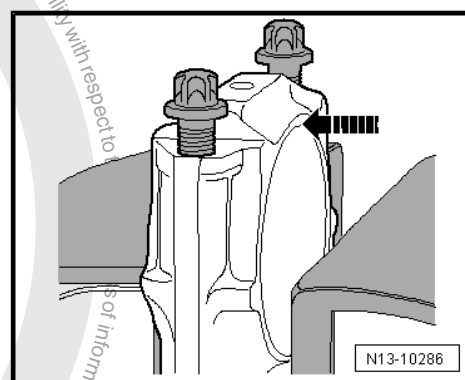
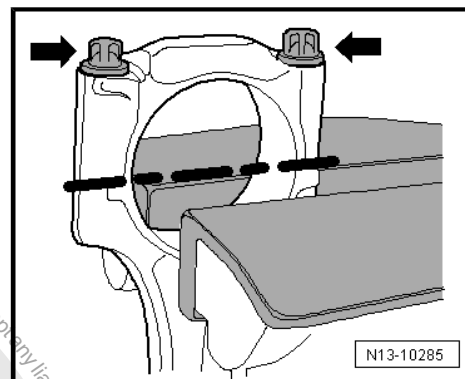
*Do not measure cylinder bores when cylinder block is mounted on engine and gearbox support - VAS 6095- , as measurements may be incorrect.*



## 4.4 Separating new conrod

On new conrods it is possible that the breaking point is not fully separated. Proceed as follows if the conrod bearing cap cannot be removed by hand:

- To avoid damage, gently clamp conrod in a vice with protection jaws, as shown in illustration.
- Clamp conrod below dashed line.
- Unscrew bolts -arrows- around 5 turns.
- Using a plastic hammer, carefully knock against conrod bearing cap -arrow- until it is loose.



## 4.5 Checking radial clearance of conrods

### Special tools and workshop equipment required

- ◆ Plastigage

### Sequence of operations

- Remove conrod bearing cap.
- Clean bearing cap and bearing journal.
- Place a Plastigage corresponding to the width of the bearing on the journal or into the bearing shells.
- Fit conrod bearing cap and tighten it using old bolts  
⇒ [Item 6 \(page 163\)](#) . When tightening, make sure not to rotate crankshaft.
- Remove conrod bearing cap again.
- Compare width of Plastigage with the measurement scale.
- Radial clearance: 0.028 to 0.065 mm.
- Renew conrod bolts.

## 4.6 Removing and installing oil spray jets

### Special tools and workshop equipment required

- ◆ Hexagon key - T10545-

### Removing

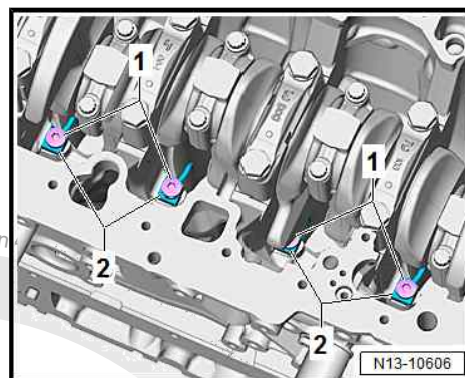
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Remove sump  
⇒ ["1.3 Removing and installing sump", page 250](#) .
- Turn crankshaft via vibration damper securing bolt in direction of engine rotation until the respective bolt is accessible.





## Note

- ◆ *The crank web of the respective cylinder must be positioned so that the socket - T10545- can be inserted vertically in the pressure relief valve.*
- ◆ *Furthermore, the splines of the socket - T10545- and of the pressure relief valve must engage properly.*
- Unscrew pressure relief valve -1- using Torx bit T40 - T10545- .
- Remove oil spray jets -2-.



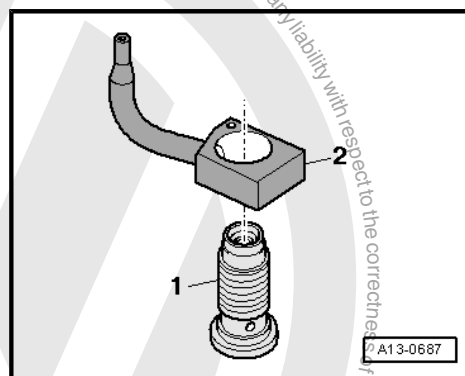
## Installing



### NOTICE

**Risk of damage to oil spray jets caused by deformation.**

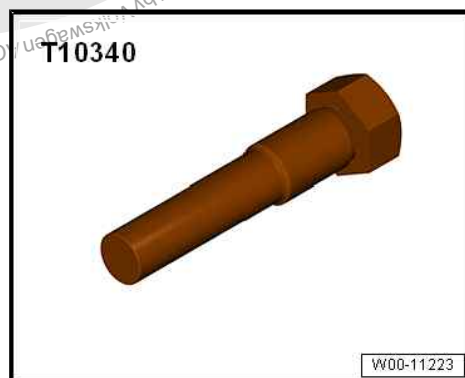
- Do not bend oil spray jets.
- 1 - Bolt with pressure relief valve, 27 Nm
- 2 - Oil spray jet (for cooling of pistons)
- Installation position: align leading edge of oil spray jet arrow with machined surface of cylinder block.
- Install sump  
⇒ ["1.3 Removing and installing sump", page 250](#) .
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview – noise insulation .



## 4.7 Setting piston to TDC position

### Special tools and workshop equipment required

- ◆ Locating bolt - T10340-





## Sequence of operations

Setting piston from cylinder no. 1 to TDC position ➔ [page 169](#)

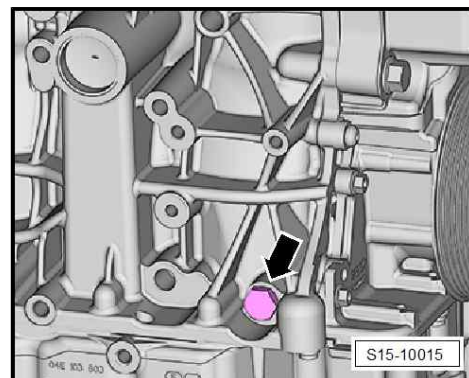
Setting piston from cylinder no. 1 to TDC position for repair work on toothed belt drive and for setting valve timing ➔ [page 170](#)

Setting piston from cylinder no. 1 to TDC position

- Remove noise insulation ➔ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Place a cloth underneath to catch any engine oil which may drain out.
- Unscrew plug -arrow- from back of cylinder block.

### up! Cross

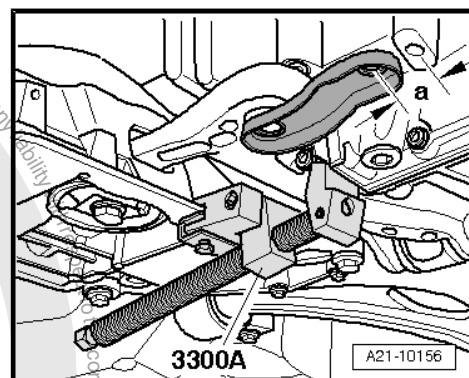
- Remove pendulum support ➔ [page 96](#)
- Push engine/gearbox assembly forwards with engine support - 3300 A-



### Vehicles with manual gearbox

- Lower vehicle onto floor.

### Continued for all vehicles

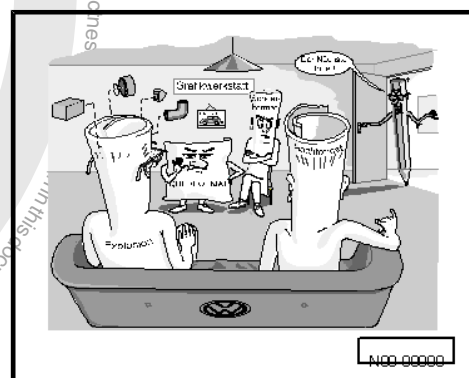


- Screw locking pin - T10340- -A- into cylinder block as far as stop and tighten to 30 Nm.
- Bolt head of locking pin - T10340- -A- must contact cylinder block when doing this.



### Note

*If the locking pin - T10340- -A- cannot be screwed in as far as stop, this indicates that the crankshaft is not in the correct position.*



- Unscrew locking pin - T10340- -A-.
- Turn crankshaft 90° in direction of rotation of engine.
- Screw locking pin - T10340- -A- into cylinder block as far as stop and tighten to 30 Nm.
- Rotate crankshaft in normal direction of rotation as far as stop. The locking pin - T10340- -A- now rests against the crank web.



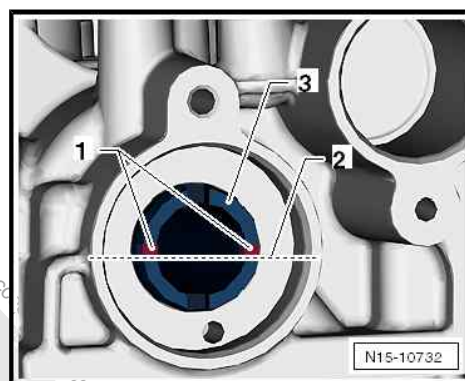
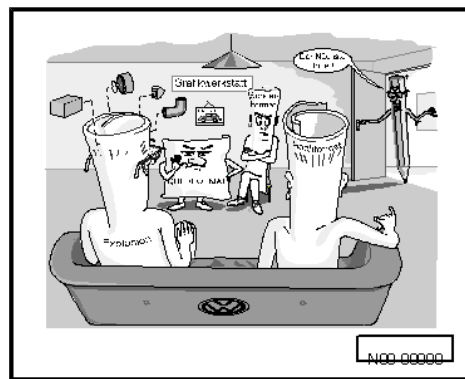
### Note

*Locking pin - T10340- -A- locks crankshaft in direction of engine rotation only.*



### Setting piston from cylinder no. 1 to TDC position for repair work on toothed belt drive and for setting valve timing

- Set piston from cylinder no. 1 to TDC position ⇒ [page 169](#) .
- Remove air filter housing  
⇒ ["3.2 Removing and installing air filter housing", page 416](#) .
- Unclip wiring harness -3- and place to one side.
- Unscrew bolts -1-.
- Place a cloth underneath to catch any oil which may drain out.
- Take off cap -5-.
- Pull off pipe -2-.
- Remove toothed belt cover -4-.



- Grooves -1- of inlet camshaft -3- are positioned above the horizontal camshaft centre line -2-.
- Grooves -1- of exhaust camshaft are positioned above horizontal camshaft centre line -2-.
- The centre-line of the holes close to hub of the gear -3- is slightly above the grooves.

### Specified torques

- ◆ ⇒ ["1.2 Assembly overview - camshaft housing", page 173](#)
- ◆ ⇒ ["2.1 Assembly overview - coolant pump, thermostat", page 292](#)
- ◆ ⇒ ["3.1 Assembly overview - air filter housing", page 410](#)





## 15 – Cylinder head, valve gear

### 1 Cylinder head

⇒ [“1.1 Assembly overview - cylinder head”, page 171](#)

⇒ [“1.2 Assembly overview - camshaft housing”, page 173](#)

⇒ [“1.3 Removing and installing cylinder head”, page 175](#)

⇒ [“1.4 Removing and installing camshaft housing”, page 178](#)

⇒ [“1.5 Checking compression”, page 181](#)

#### 1.1 Assembly overview - cylinder head



##### Note

- ◆ *If an exchange cylinder head is installed, all the contact surfaces between the supporting elements, roller rocker fingers and the running surfaces of the camshaft must be oiled before the cylinder head cover is fitted.*
- ◆ *Do not remove the plastic packing pieces for protecting the open valves until immediately before fitting cylinder head.*
- ◆ *If the cylinder head is renewed, the coolant and engine oil must be renewed as well.*





## 1 - Cylinder head gasket

- ☐ Renewing  
⇒ ["1.3 Removing and installing cylinder head"](#),  
page 175
- ☐ Observe installation position: part number  
faces towards cylinder  
head

## 2 - Cylinder head

- ☐ Removing and installing  
⇒ ["1.3 Removing and installing cylinder head"](#),  
page 175
- ☐ Check for distortion  
⇒ [page 173](#) .

## 3 - Bolt

- ☐ Renew after removal
- ☐ Note sequence when  
loosening ⇒ [page 176](#) .
- ☐ Specified torque and  
tightening sequence  
⇒ [page 172](#)

## 4 - Seal

- ☐ Renew after removal

## 5 - Camshaft case

- ☐ Removing and installing  
⇒ ["1.4 Removing and installing camshaft housing"](#),  
page 178

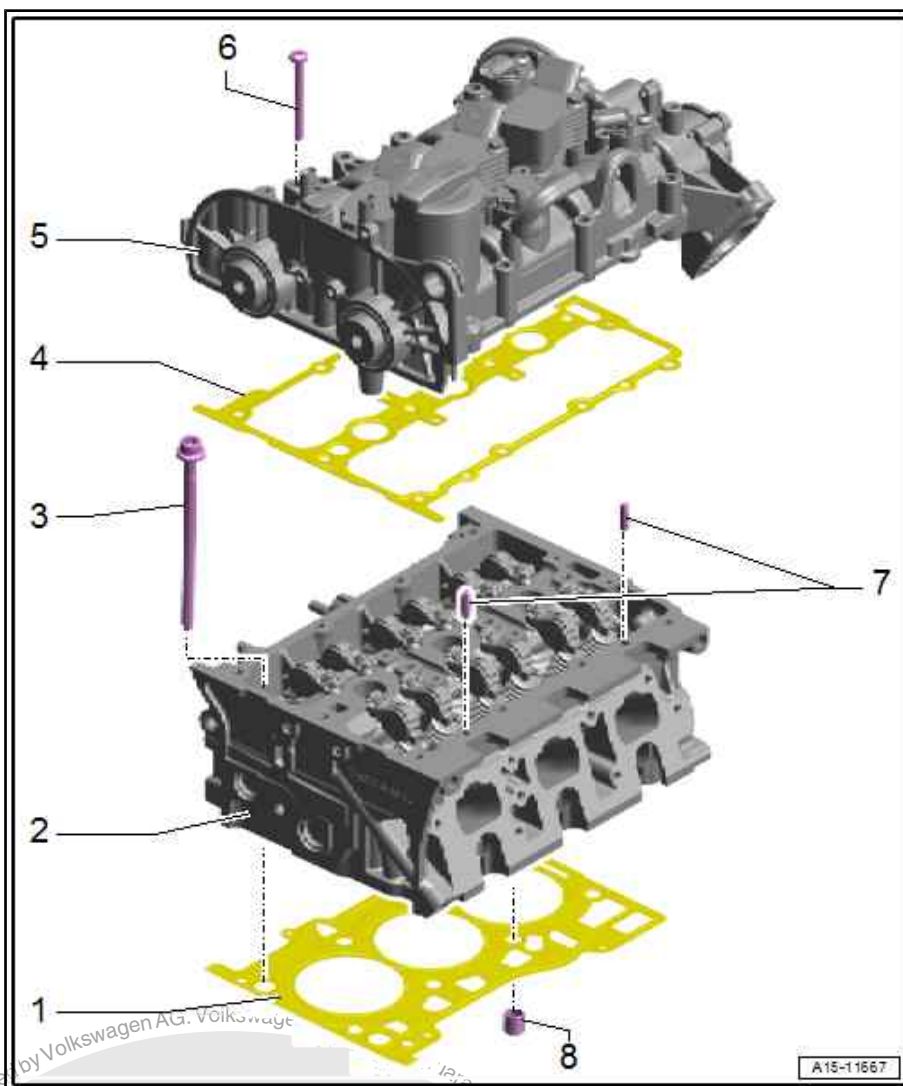
## 6 - Bolt

- ☐ Specified torque and  
tightening sequence  
⇒ [page 175](#)

## 7 - Dowel pins

## 8 - Dowel sleeve

- ☐ Qty. 2



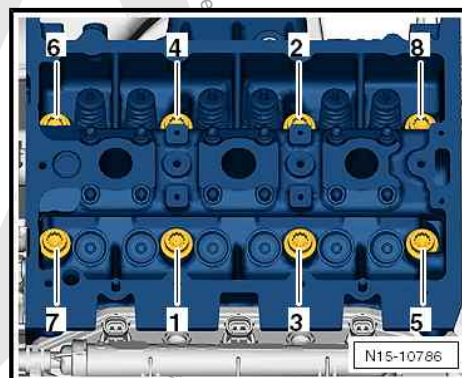
## Cylinder head specified torque and sequence



### Note

*Bolts that are tightened with turning further angle must be renewed after each removal.*

Bolt	Specified torque	Note
Stage 1	40 Nm	Renew bolts
Stage 2	Turn 90° further	With rigid spanner
Stage 3	Turn 90° further	With rigid spanner
Stage 4	Turn 90° further	With rigid spanner



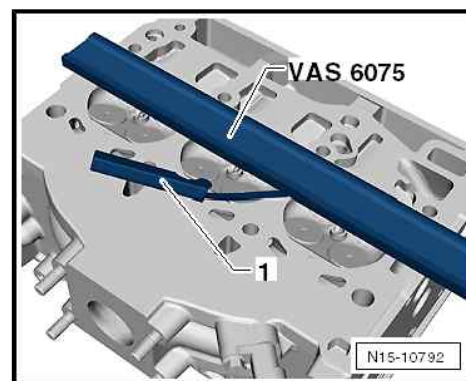
- Tighten bolts in stages and in the sequence as shown:





## Checking cylinder head for distortion

- Use straight edge 500 mm - VAS 6075- and feeler gauge to measure cylinder head for distortion at several points.
- Max. permissible distortion: 0.05 mm



## 1.2 Assembly overview - camshaft housing

### 1 - Seal

- ☐ Renew after removal

### 2 - Seal

- ☐ For inlet camshaft (pulley end)
- ☐ Renewing  
⇒ [“3.3.1 Removing and installing camshaft oil seal, inlet camshaft”, page 218](#)

### 3 - Seal

- ☐ For exhaust camshaft (pulley end)
- ☐ Renewing  
⇒ [“3.3.2 Removing and installing camshaft oil seal, exhaust camshaft, pulley end”, page 220](#)

### 4 - Camshaft case

- ☐ Removing and installing  
⇒ [“1.4 Removing and installing camshaft housing”, page 178](#)

### 5 - Bolt

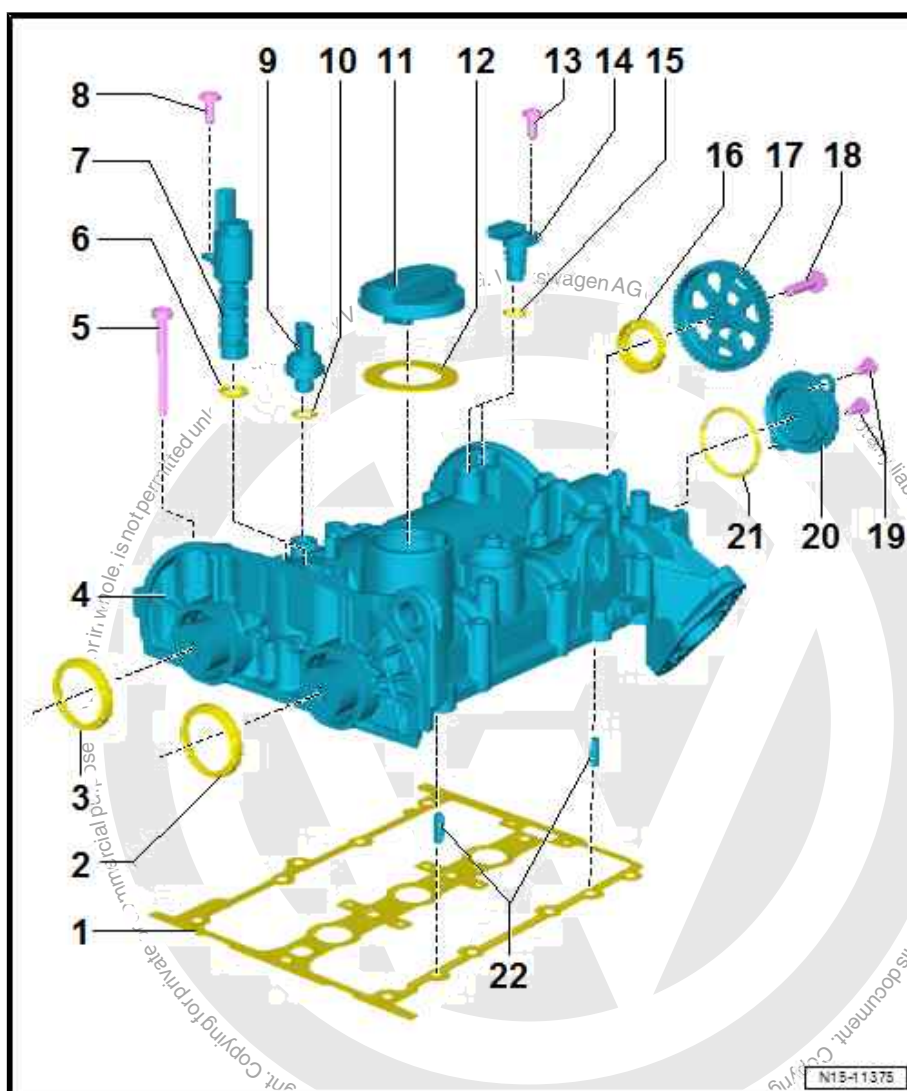
- ☐ Specified torque and tightening sequence  
⇒ [page 175](#)

### 6 - O-ring

- ☐ Check O-ring for damage.
- ☐ O-ring not available as a separate part; renew together with camshaft control valve 1 - N205- if damaged.

### 7 - Camshaft adjustment valve

- ☐ Inlet side: camshaft control valve 1 - N205-
- ☐ Removing and installing ⇒ [“3.5 Removing and installing camshaft control valve 1 N205”, page 231](#)
- ☐ Exhaust side camshaft control valve 1 - N318-
- ☐ Removing and installing  
⇒ [“3.6 Removing and installing exhaust camshaft control valve 1 N318”, page 233](#)





## 8 - Bolt

- ☐ 8 Nm

## 9 - Exhaust gas pressure sensor 1 - G450-

- ☐ Only fitted in vehicles with particulate filter
- ☐ Removing and installing  
⇒ ["5.5 Removing and installing exhaust gas pressure sensor 1 G450", page 435](#)
- ☐ Renew after removal
- ☐ 25 Nm

## 10 - Seal

- ☐ Only fitted in vehicles with particulate filter
- ☐ To be renewed only in conjunction with exhaust gas pressure sensor 1 - G450-

## 11 - Cap

## 12 - Seal

- ☐ For sealing cover

## 13 - Bolt

- ☐ 8 Nm

## 14 - Hall sender

- ☐ Inlet side Hall sender - G40-
- ☐ Exhaust side Hall sender 3 - G300-
- ☐ Assembly overview ⇒ ["1.1 Assembly overview - ignition system", page 493](#)

## 15 - O-ring

- ☐ Renew after removal

## 16 - Seal

- ☐ For exhaust camshaft, gearbox end
- ☐ Renewing  
⇒ ["3.3.3 Removing and installing camshaft oil seal, exhaust camshaft gearbox end", page 221](#)

## 17 - Crankshaft

- ☐ For coolant pump
- ☐ Removing and installing  
⇒ ["2.7 Removing and installing toothed belt pulley for coolant pump" page 307](#)

## 18 - Bolt

- ☒ Renew
- ☐ 20 Nm +90°

## 19 - Bolt

- ☐ 8 Nm

## 20 - Cap

## 21 - O-ring

- ☐ Renew after removal

## 22 - Dowel pins



## Camshaft housing - specified torque and tightening sequence

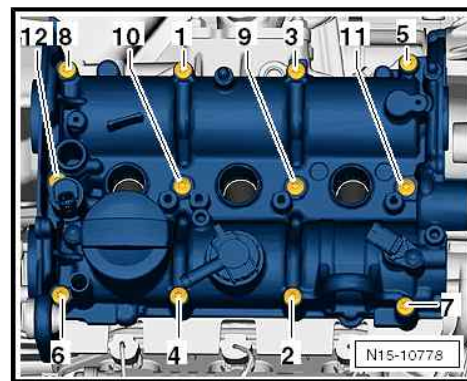


### Note

*Renew bolts (stretch bolts) that are tightened with turning further angle after each removal.*

- Tighten bolts in stages and in the sequence as shown:

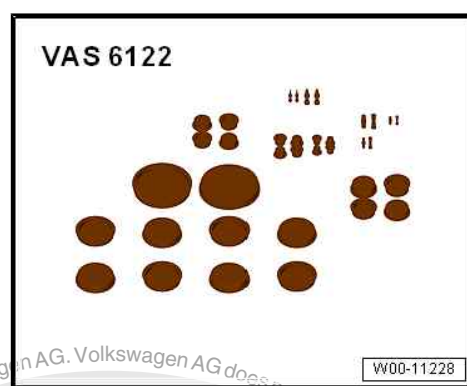
Component	Specified torque	Note
Bolts -1 ... 12-	10 Nm +180° further	Renew



## 1.3 Removing and installing cylinder head

### Special tools and workshop equipment required

- ◆ Engine bung set - VAS 6122-



### Removing



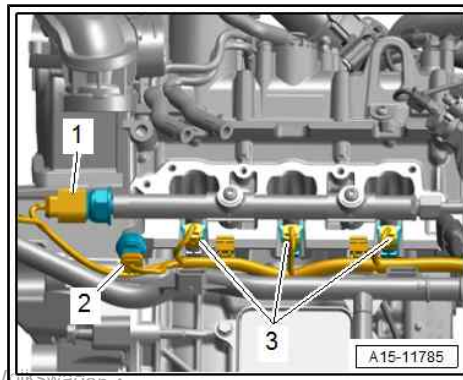
### Note

- ◆ Seal open channels of intake and exhaust system with suitable plugs from engine bung set - VAS 6122.
- ◆ Cover the openings in the gearbox with a cloth to prevent any coolant or other liquids from getting into the clutch housing.
- ◆ Fit the cable ties in the original position when installing.
- ◆ All heat insulation sleeves must be secured in the same position on installation.
- Remove camshaft housing  
⇒ [“1.4 Removing and installing camshaft housing”, page 178](#).
- Remove intake manifold  
⇒ [“4.2 Removing and installing intake manifold”, page 422](#).
- Remove turbocharger.  
⇒ [“1.2 Removing and installing turbocharger”, page 368](#)

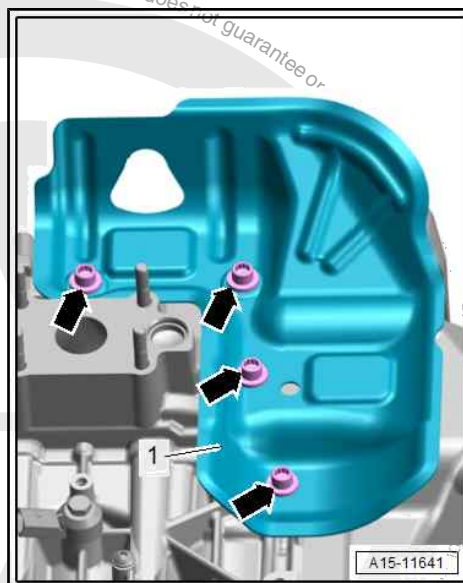


– Disconnect connectors:

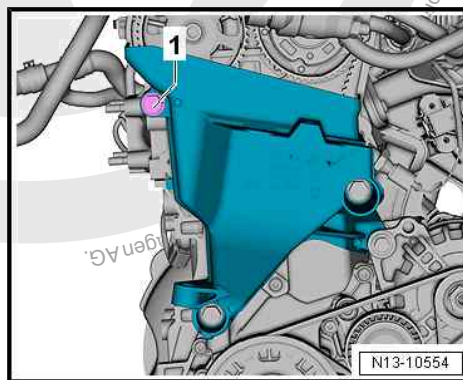
- 1 - On fuel pressure sender - G247-
- 2 - On oil pressure sender - G10-
- 3 - At injectors -N30- , -N31- and -N32-



– Unscrew bolts -arrows- and remove heat shield -1-



– Unscrew bolt -1- from engine support.



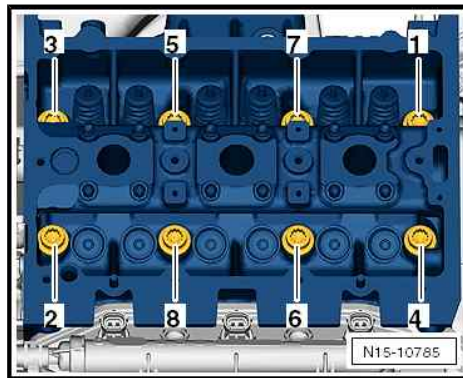
– Loosen cylinder head bolts in the sequence -1 to 8- and unscrew.



#### Note

*Avoid any damage to the cylinder head and valves. Place the cylinder head on a soft foam surface.*

- Remove cylinder head, and place it on a soft surface. Use a suitable foam surface for this.
- Remove any coolant residue on the pistons and cylinder wall immediately with a cloth.



#### Installing





#### Note

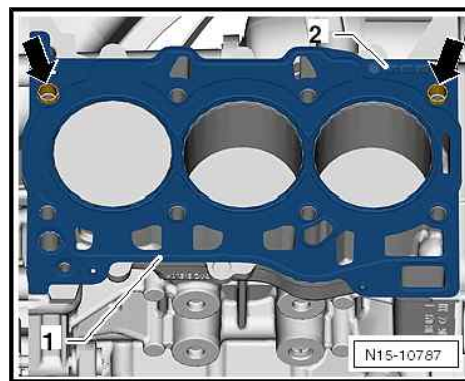
- ◆ *Do not use sandpaper, grinding wheels, abrasive or scour pads or any other sanding or abrasive media.*
- ◆ *Sealing surface (see photo) must not project.*
- ◆ *Discolouration (dark spots, see photo) need not be removed.*
- ◆ *When removing the sealant residue, make sure no loose particles get into the open channels of the engine.*
- ◆ *Ensure that all adjacent workspaces are clean, and that none of the above mentioned sanding or abrasive media are used.*
- ◆ *Using unauthorised sanding or abrasive media may lead to secondary damage such as, for example, damage to the turbocharger or the conrod bearings.*
- Do not use any other means rather than the contour blade set - VAS 852 005- or a commercially available razor blade scraper to remove the sealant residue from the cylinder head and cylinder block.
- The sealing surfaces must not be damaged.
- There must be no oil or coolant in the bolt pockets.
- Do not remove new cylinder head gasket from packaging until it is ready to be fitted.
- If a new cylinder head is installed, contact surfaces between roller rocker fingers and running surface of cam must be oiled.
- Handle the cylinder head gasket very carefully to prevent damage to the silicone coating or the indented area of the gasket.
- Turn the crankshaft carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.
- When the cylinder head or cylinder head gasket is renewed, the entire coolant and the engine oil must be changed.
- Remove any loose remains using a lint-free cloth.
- Renew self-locking nuts as well as gaskets, seals and O-rings.
- Renew cylinder head gasket.







- Fit cylinder head gasket -1-.
- ♦ Pay attention to dowel sleeves -arrows- in cylinder block.
- ♦ Check installation position of cylinder head gasket. The part number -2- should be legible from the inlet side.
- If crankshaft has since been turned, position cylinder number 1 piston to TDC and then turn crankshaft back slightly.
- Fit cylinder head.
- Insert cylinder head bolts, and tighten them by hand.
- Tighten bolts for cylinder head ⇒ [page 172](#) .



#### Note

*After repair work it is not necessary to retighten the cylinder head bolts.*

Further installation is carried out in reverse order of removal, observing the following:

- Install turbocharger.  
⇒ [“1.2 Removing and installing turbocharger”, page 368](#)
- Install camshaft housing  
⇒ [“1.4 Removing and installing camshaft housing”, page 178](#) .
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Change engine oil ⇒ Maintenance ; Booklet 819 .
- Fill cooling system with fresh coolant  
⇒ [“1.3 Draining and adding coolant”, page 272](#) .

#### Specified torques

- ♦ ⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)
- ♦ ⇒ [“1.1 Assembly overview - cylinder head”, page 171](#)
- ♦ ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ♦ ⇒ [“4.1 Assembly overview - intake manifold”, page 421](#)

## 1.4 Removing and installing camshaft housing

### Removing

- Remove coolant pump  
⇒ [“2.5 Removing and installing coolant pump”, page 300](#) .
- Remove ignition coils  
⇒ [“1.2 Removing and installing ignition coils with output stage”, page 494](#) .
- Remove toothed belt from camshafts  
⇒ [“2.7 Removing toothed belt from camshaft”, page 210](#) .
- Remove high-pressure pipe  
⇒ [“7.3 Removing and installing high-pressure pipe”, page 451](#) .



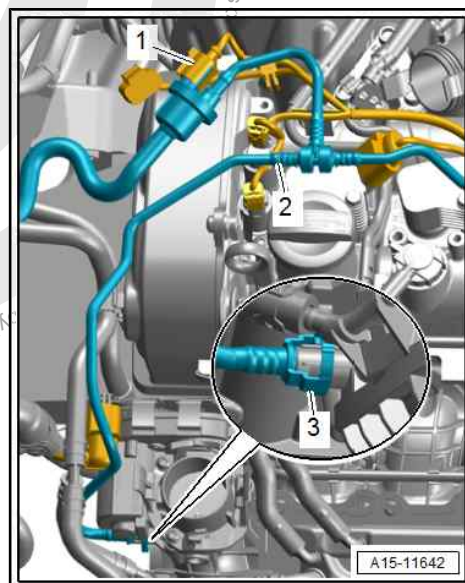
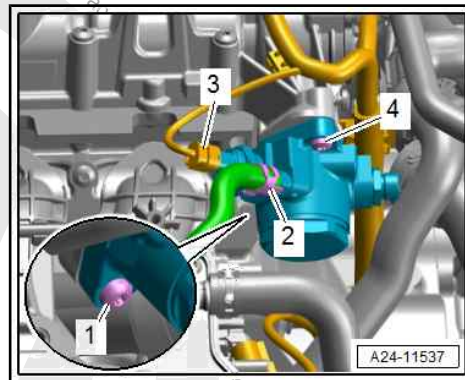
- Disconnect electrical connector -3-.
- Release hose clip -2- and disconnect hose.



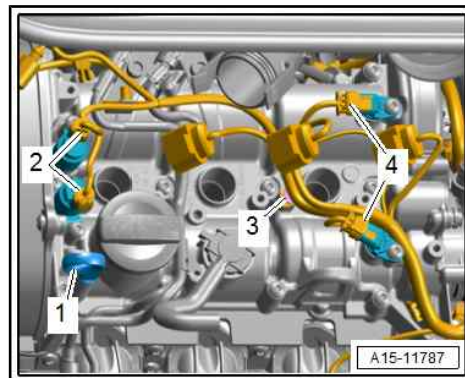
#### Note

-Items 1, 4- can be disregarded.

- Separate connector -1- from activated charcoal filter solenoid valve 1 - N80- .
- Remove line -2- for activated charcoal filter system. To do this, press release button -3- on both sides.
- Push line -2- for activated charcoal filter system to right.



- Disconnect electrical connector:
- ◆ -2- for camshaft control valve 1 - N205- / for exhaust camshaft control valve 1 - N318-
- ◆ -4- for Hall sender - G40- / Hall sender 3 - G300-
- Unscrew bolt -3-.
- Move clear electrical wiring harness, and lay it to the left side.

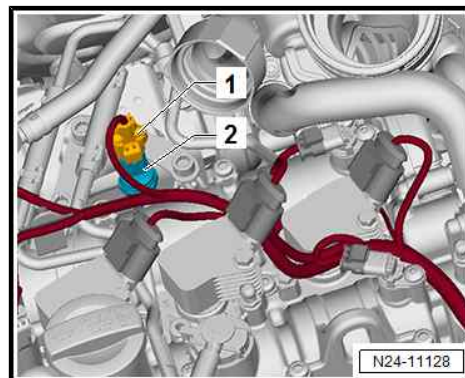


#### Vehicles with particulate filter:

- Disconnect electrical connector -1- from exhaust gas pressure sensor 1 - G450- -2-.

#### Continued for all:

- Pull out dipstick -1-.



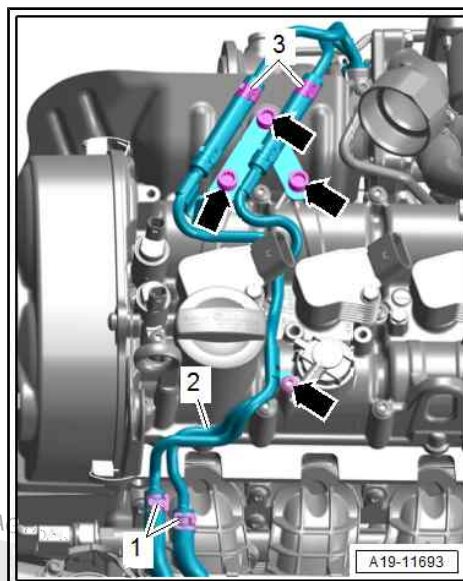


- Unscrew bolts -arrows-.
- Release hose clip -3- and remove coolant hose.
- Swivel coolant lines -2- towards front.

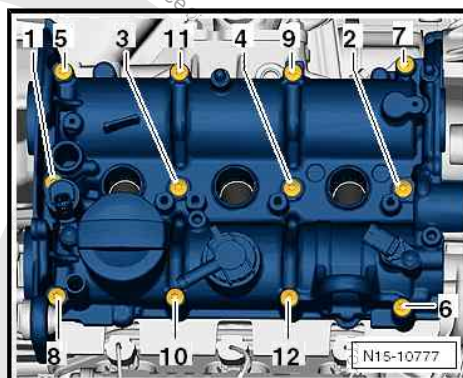


#### Note

Item -1- does not need to be opened.



- Loosen bolts for camshaft housing in the sequence -1 to 12- and unscrew.
- Lift camshaft housing vertically off cylinder head.
- Remove gasket.
- Mark allocation of roller rocker fingers and compensation elements for reinstallation.
- Remove roller rocker fingers together with compensation elements and place them on a clean surface.

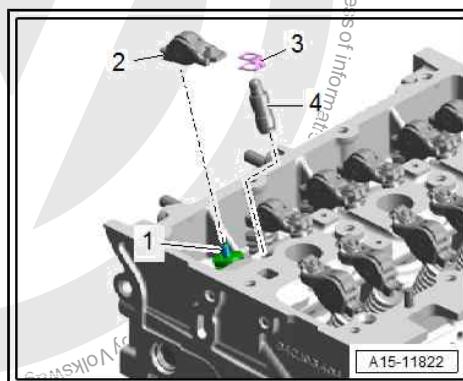


#### Installing



#### Note

- ◆ Renew bolts that are tightened with turning further angle.
- ◆ Renew seal and O-ring after removal.
- Check if all roller rocker fingers -2- are seated properly on end of valve stem -1- and if they are secured properly to the corresponding compensation elements -4- by means of securing clips -3-.
- Remove any oil and grease from sealing surfaces.



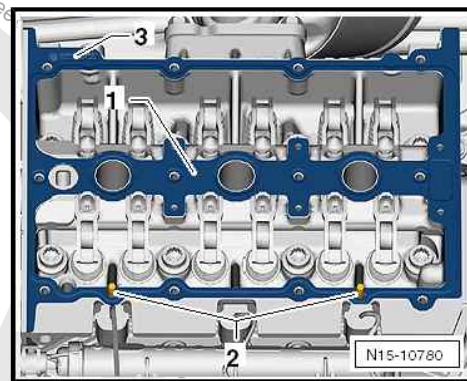


- Fit new gasket -1- onto dowel pins -2-.
- Part number -3- of gasket must be readable from above.
- Check »TDC« position of camshafts and crankshaft  
⇒ [“4.7 Setting piston to TDC position”, page 168](#) .



#### Note

- ◆ Risk of roller rocker fingers slipping off valve stem ends and compensation elements.
- ◆ Slowly fit camshaft housing vertically from above onto cylinder head.
- Fit camshaft housing onto dowel pins -arrows-.



#### Note

Note different bolt lengths.

- Tighten bolts for camshaft housing ⇒ [page 175](#) .

Perform further installation in reverse order, paying attention to the following:

- Install high-pressure pipe  
⇒ [“7.3 Removing and installing high-pressure pipe”, page 451](#) .
- Install toothed belt  
⇒ [“2.3 Removing and installing toothed belt”, page 186](#) .
- Install ignition coils  
⇒ [“1.2 Removing and installing ignition coils with output stage”, page 494](#) .
- Install coolant pump  
⇒ [“2.5 Removing and installing coolant pump”, page 300](#) .
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - valve gear”, page 216](#)
- ◆ ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ ⇒ [“3.1 Assembly overview - coolant pipes”, page 315](#)

## 1.5 Checking compression

Special tools and workshop equipment required





- ◆ Spark plug socket - 3122 B-



- ◆ Compression tester - V.A.G 1763-



- ◆ Adapter - V.A.G 1763/12- (not illustrated)

#### Sequence of operations

- Engine oil temperature at least 30 °C.
- Battery voltage at least 12.5 V.
- Remove ignition coils  
⇒ [“1.2 Removing and installing ignition coils with output stage”, page 494](#).





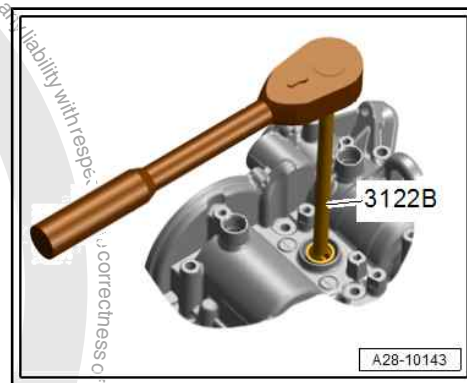
- Unscrew spark plugs using spark plug socket and extension - 3122 B- .

upl:

- Screw adapter - V.A.G 1763 /12- into spark plug thread, and tighten it slightly.
- Bolt compression tester - V.A.G 1763- to adapter - V.A.G 1763 /12- .

**Continued for all vehicles:**

- Check compression pressure using compression tester - V.A.G 1763- ; refer to ⇒ Operating instructions .
- Have a second mechanic press down accelerator completely and simultaneously operate starter until pressure no longer increases on tester display.
- Repeat procedure on each cylinder.



Compression pressures	bar
New	10.0 ... 15.0
Wear limit	7.0
Maximum difference between cylinders	3.0

### Assembling

Assembly is carried out in reverse sequence; note the following:

- Install spark plugs ⇒ Maintenance ; Booklet 819 .
- Install ignition coils  
⇒ "1.2 Removing and installing ignition coils with output stage", page 494 .
- Clear any entries in event memory which may have been stored when checking ⇒ Vehicle diagnostic tester, Read event memory, then Generate readiness code.



## 2 Toothed belt drive

⇒ [“2.1 Assembly overview - toothed belt cover”, page 184](#)

⇒ [“2.2 Assembly overview - toothed belt”, page 185](#)

⇒ [“2.3 Removing and installing toothed belt”, page 186](#)

⇒ [“2.4 Preassembling and installing test tool VAS 611 007”, page 192](#)

⇒ [“2.5 Checking valve timing”, page 199](#)

⇒ [“2.6 Adjusting valve timing”, page 201](#)

⇒ [“2.7 Removing toothed belt from camshaft”, page 210](#)

### 2.1 Assembly overview - toothed belt cover

1 - Lower toothed belt guard

2 - Bolt

□ 8 Nm

3 - Engine support

□ Specified torque and tightening sequence  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)

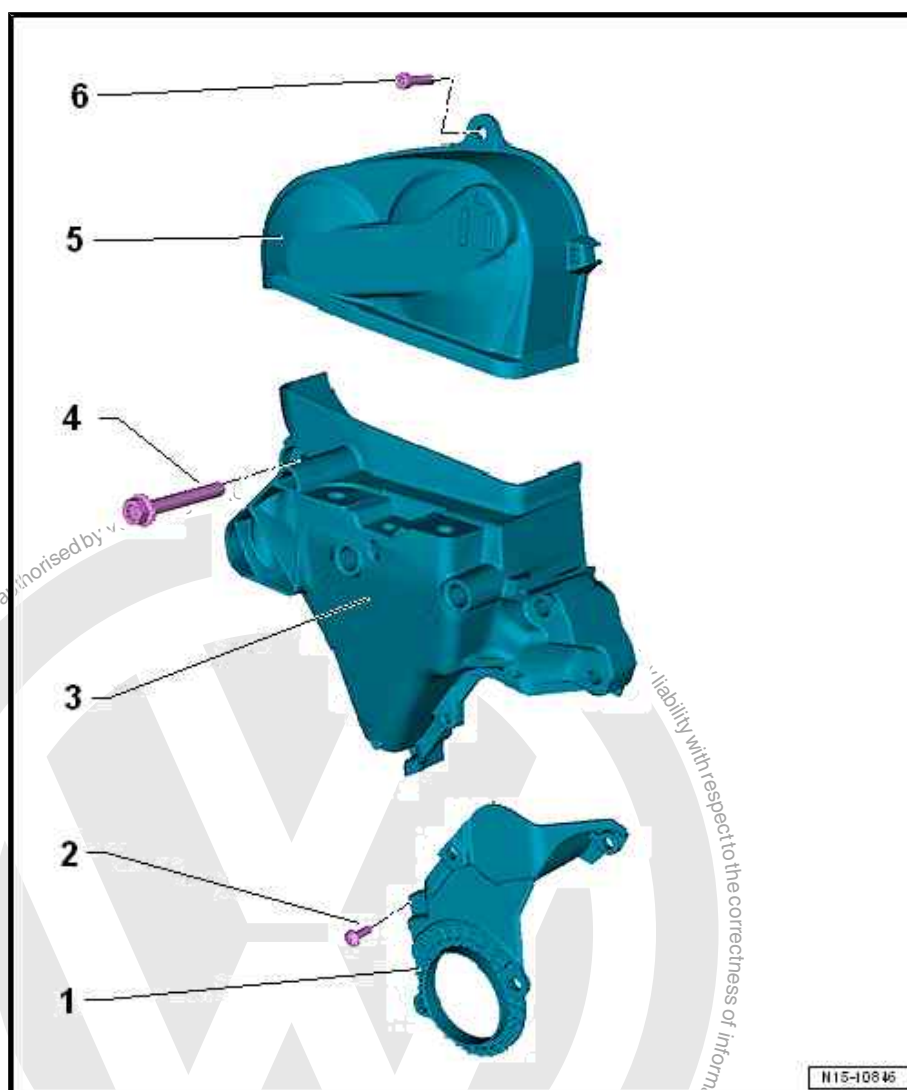
4 - Bolt

□ Specified torque and tightening sequence  
⇒ [“2.1 Assembly overview - assembly mountings”, page 81](#)

5 - Upper toothed belt guard

6 - Bolt

□ 8 Nm





## 2.2 Assembly overview - toothed belt

### 1 - Toothed belt

- ☐ Do not bend toothed belt further than the specified bend radius  
⇒ [page 215](#)
- ☐ Before removing, mark direction of rotation with chalk or felt-tipped marker pen.
- ☐ Detaching from camshaft  
⇒ ["2.7 Removing toothed belt from camshaft", page 210](#)
- ☐ Removing and installing  
⇒ ["2.3 Removing and installing toothed belt", page 186](#)
- ☐ Adjusting valve timing  
⇒ ["2.6 Adjusting valve timing", page 201](#)

### 2 - Bolt

- ☐ 25 Nm
- ☐ When setting the specified torque on the torque wrench - VAS 6583-, the length indicated on the insert tool - T10500- must be entered in the torque wrench.

### 3 - Tensioning pulley

- ☐ Removal and installation involve removing engine support  
⇒ ["1.5 Removing and installing engine support", page 143](#).

### 4 - Bolt

- ☐ Renew after removal
- ☐ 8 Nm +45°

### 5 - Cap

### 6 - O-ring

- ☐ Check for damage, and renew if necessary; see ⇒ Electronic parts catalogue (ETKA)

### 7 - Bolt

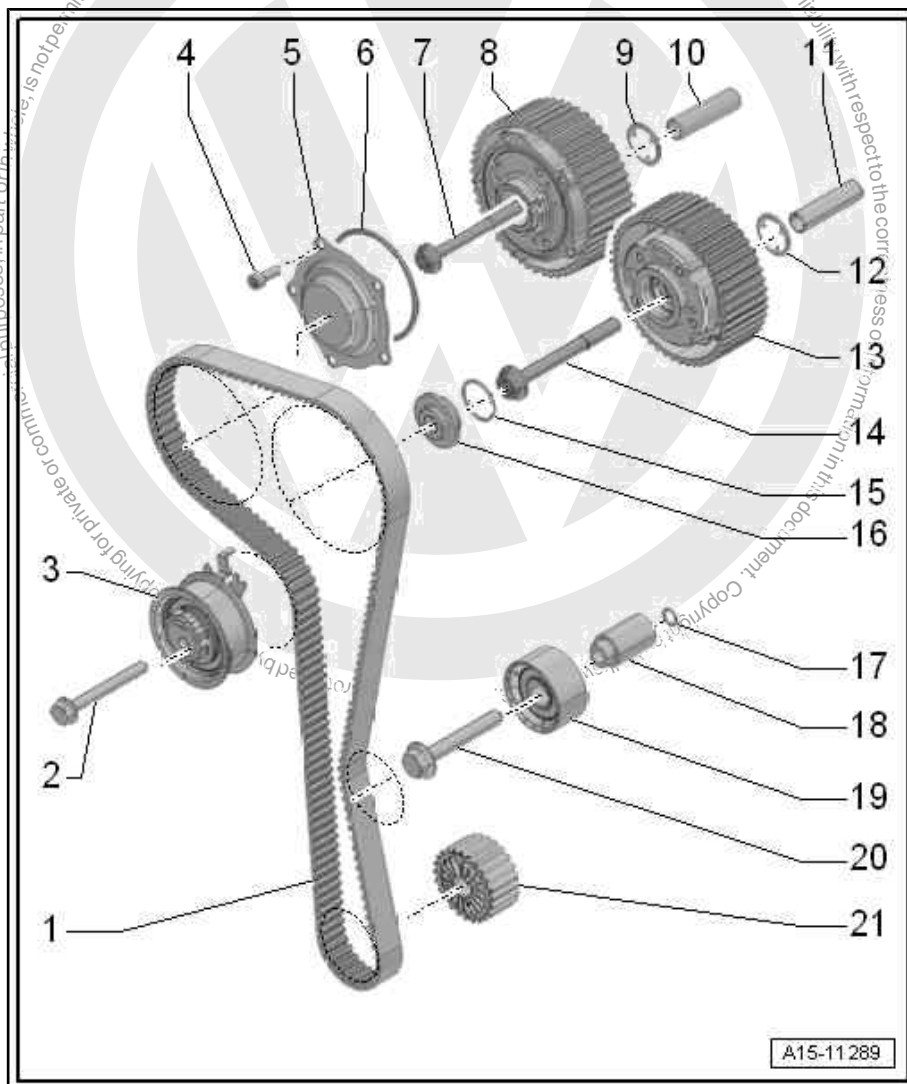
- ☐ Renew after removal
- ☐ 50 Nm +135°

### 8 - Exhaust camshaft toothed belt pulley

- ☐ With camshaft adjuster
- ☐ Removing and installing ⇒ ["3.4 Removing and installing camshaft adjuster", page 223](#)

### 9 - Diamond-coated washer

- ☐ Renew after removal





**10 - Guide bush**

**11 - Guide bush**

**12 - Diamond-coated washer**

- ☐ Renew after removal

**13 - Inlet camshaft toothed belt pulley**

- ☐ With camshaft adjuster
- ☐ Removing and installing ⇒ [“3.4 Removing and installing camshaft adjuster”, page 223](#)

**14 - Bolt**

- ☐ Renew after removal
- ☐ 50 Nm +135°

**15 - O-ring**

- ☐ Check for damage, and renew if necessary; see ⇒ Electronic parts catalogue (ETKA)

**16 - Plug**

- ☐ 20 Nm

**17 - O-ring**

- ☐ Captive, supplied with “item 19”.
- ☐ Renew after removal

**18 - Spacer sleeve**

- ☐ Supplied with item “19”.

**19 - Idler roller**

**20 - Bolt**

- ☐ 40 Nm

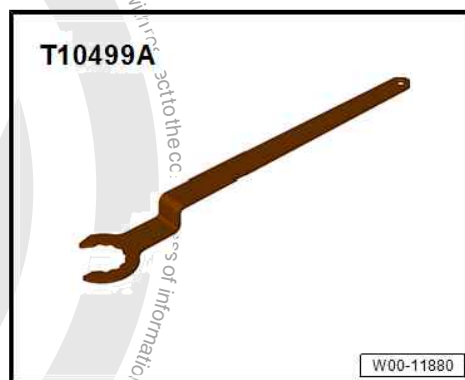
**21 - Crankshaft pulley**

- ☐ Contact surface between toothed belt pulley and crankshaft must be free from oil
- ☐ Can only be fitted in one position

## 2.3 Removing and installing toothed belt

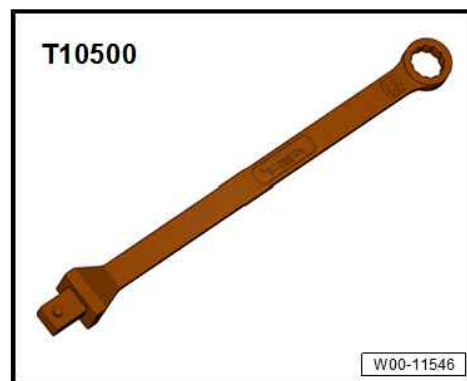
### Special tools and workshop equipment required

- ◆ Special wrench - T10499A-





- ◆ Insert tool - T10500-



- ◆ Counter-hold tool - T10475-



- ◆ Camshaft clamp T10494-



- ◆ Torque wrench - VAS 6583-







◆ Locating bolt - T10340-



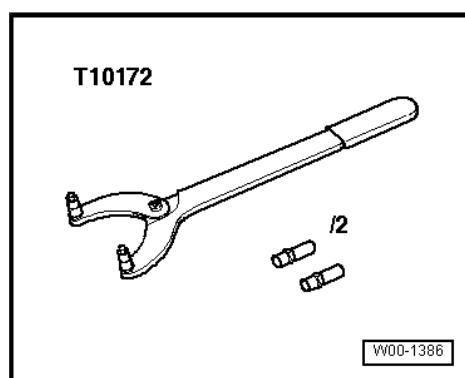
◆ Assembly tool - T10476A-



◆ Counter-hold tool - T10554-

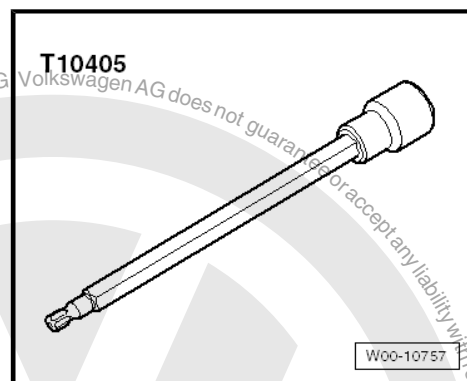


◆ Counter-hold tool - T10172-



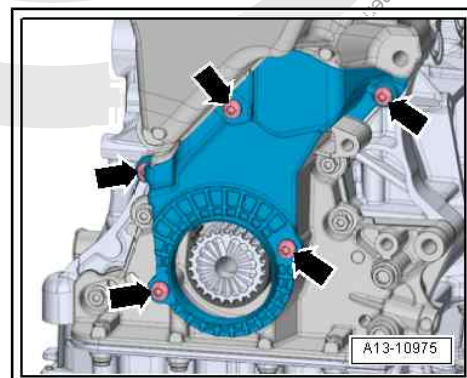


- ◆ Socket Torx T 30 - T10405-



## Removing

- Mark direction of rotation of toothed belt with marker.
- When securing bolts are loosened or tightened, make absolutely sure that camshaft pulleys are secured with counterhold tool - T10172- .
- The camshaft clamp - T10494- must not be subjected to load when camshaft pulleys are being tightened.
- Remove toothed belt from camshaft.  
⇒ ["2.7 Removing toothed belt from camshaft", page 210](#)
- Remove vibration damper.  
⇒ ["1.4 Removing and installing vibration damper", page 140](#)
- Unscrew bolts -arrows- and remove toothed belt guard.



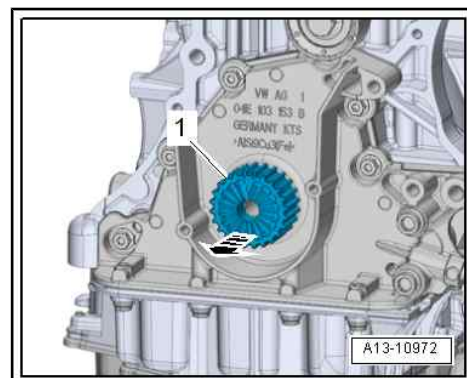
- Detach crankshaft pulley -1- -arrow-.

## Installing



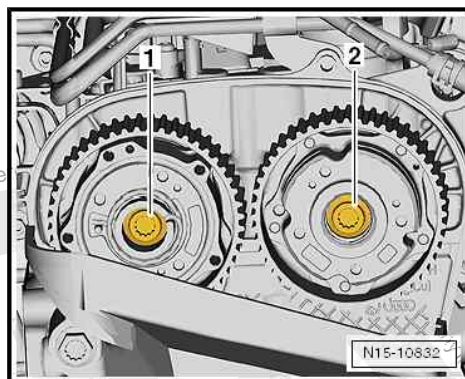
### Note

- ◆ *Renew bolts that are tightened with turning further angle.*
- ◆ *Check O-ring of plug and cap for damage, and renew if necessary; see ⇒ [Electronic parts catalogue \(ETKA\)](#) .*
- Make sure that the piston in cylinder no. 1 is at TDC position  
⇒ [page 168](#) .





- Fit new bolts -1, 2- for camshaft pulleys, but do not tighten.
- It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.

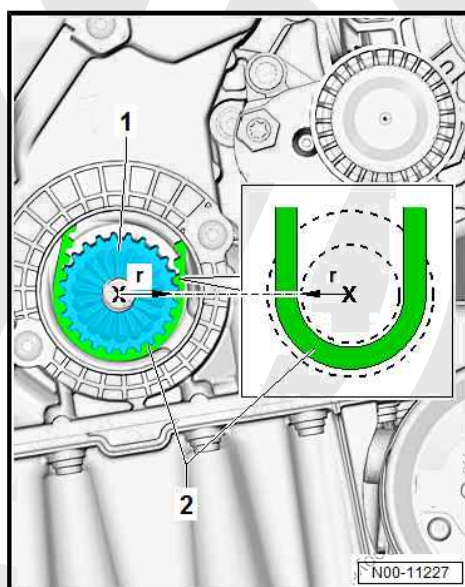


Observe bend radius of toothed belt -2-:

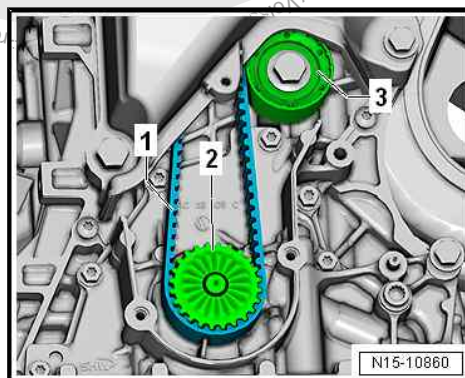
**NOTICE**

Risk of damage to toothed belt by bending it excessively. The toothed belt is made of glass fibre fabric which will be damaged if it is bent excessively.

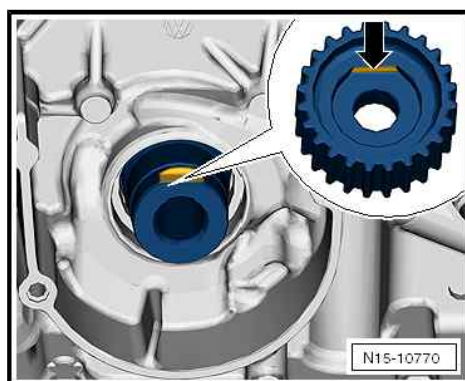
- Never bend toothed belt to a radius less than  $r = 25 \text{ mm}$ .



- Fit toothed belt -1- together with crankshaft pulley -2- onto crankshaft journal.



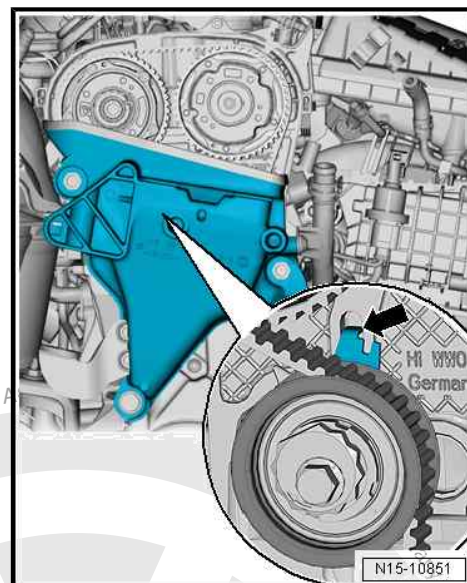
- Observe the following points when fitting the crankshaft pulley.
- The contact surface between vibration damper and crankshaft toothed belt pulley must be free of oil and grease.
- The machined surface -arrow- of crankshaft pulley must be positioned over the machined surface of the crankshaft journal.





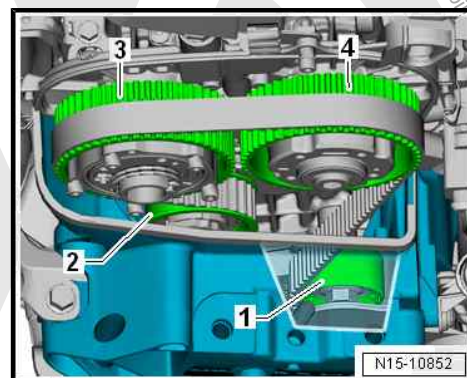


- Ensure that sheet-metal tab -arrow- of tensioning roller engages in cast notch in cylinder head.



#### Fit toothed belt in prescribed sequence:

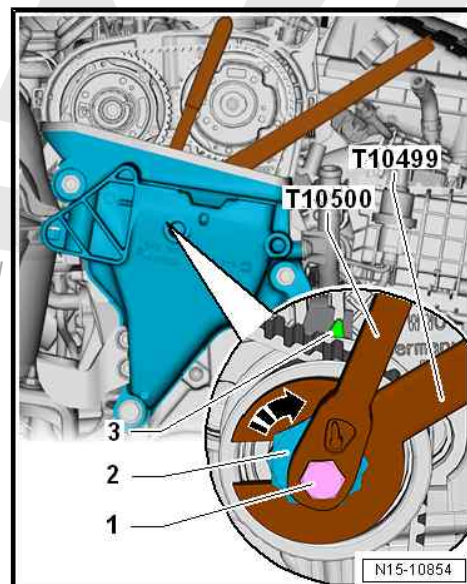
- Pull toothed belt upwards and fit on idler pulley -1-, tensioning roller -2- and camshaft toothed belt pulleys -3- and -4-.



- Using special wrench 30 mm - T10499- , turn eccentric adjuster -2- of tensioning roller in direction of -arrow- until adjustment indicator -3- is positioned approx. 10 mm to the right of adjustment window.
- Turn eccentric adjuster back until adjustment indicator is positioned exactly in adjustment window.

Risk of damage to engine due to incorrect tightening torque.

- Torque wrench - VAS 6583- must be used for tightening.
- When setting the specified torque on the torque wrench - VAS 6583- , the length indicated on insert tool, 13 mm - T10500- must be entered in the torque wrench.
- Hold eccentric in that position and tighten bolt -1-.
- To do this, use insert tool, 13 mm - T10500- with torque wrench - VAS 6583- .



#### Note

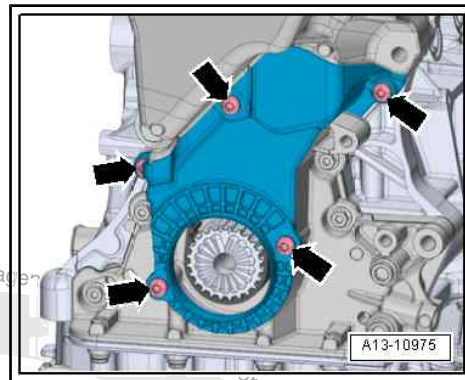
*Turning the engine further or running the engine may lead to slight differences in the position of the adjustment indicator -3- in relation to the adjustment window. This does not affect the toothed belt tension.*



- Install lower toothed belt guard -arrows-.
- Install vibration damper  
⇒ ["1.4 Removing and installing vibration damper", page 140](#) .
- Adjust valve timing ⇒ ["2.6 Adjusting valve timing", page 201](#) .

#### Specified torques

- ◆ Crankshaft pulley centre bolt - vibration damper  
⇒ ["1.1 Assembly overview - poly V-belt drive", page 133](#)
- ◆ Securing bolts for toothed belt guard  
⇒ ["2.1 Assembly overview - toothed belt cover", page 184](#)



## 2.4 Preassembling and installing test tool - VAS 611 007-

⇒ ["2.4.1 Preassembling test tool VAS 611 007", page 192](#)

⇒ ["2.4.2 Installing test tool VAS 611 007", page 195](#)

⇒ ["2.4.3 Teaching-in test tool VAS 611 007 electronically and performing basic setting", page 197](#)

### 2.4.1 Preassembling test tool - VAS 611 007-

#### Special tools and workshop equipment required

- ◆ Tester for checking elongation of chain links - VAS 611 007-



#### Sequence of operations

Test tool - VAS 611 007-





**A - Angle sensor - VAS 611 007/1-**

- ☐ Specified torque brake:  
11 Nm

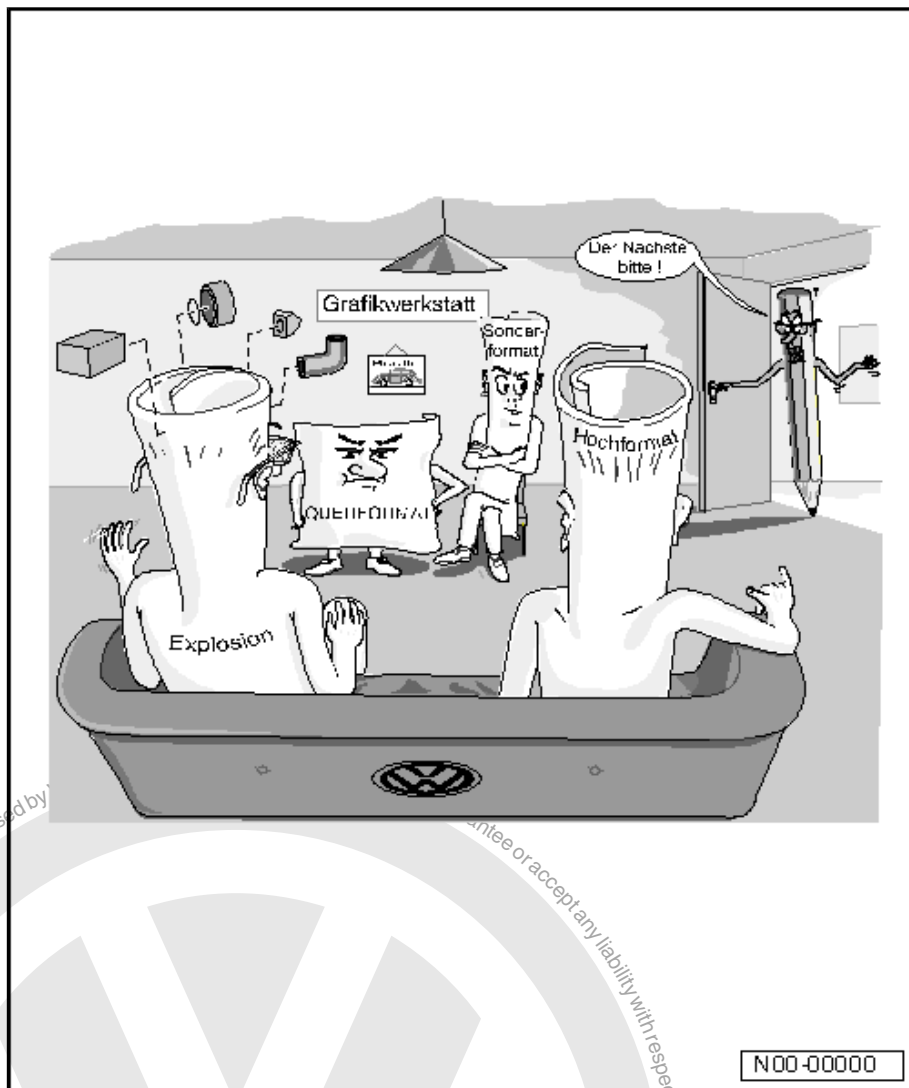
**B - Lock ring - VAS 611 007/2-**

**C - Clamping ring - VAS 611 007/3-**

**D - Adapter for camshaft housing - VAS 611 007/8-**

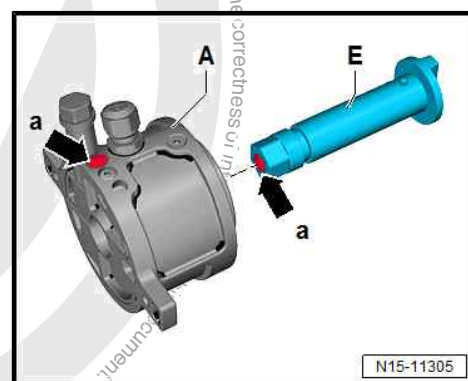
**E - Adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10-**

- ☐ Adapter for angle sensor - VAS 611 007/9- blue
- ☐ Adapter for angle sensor - VAS 611 007/10- red



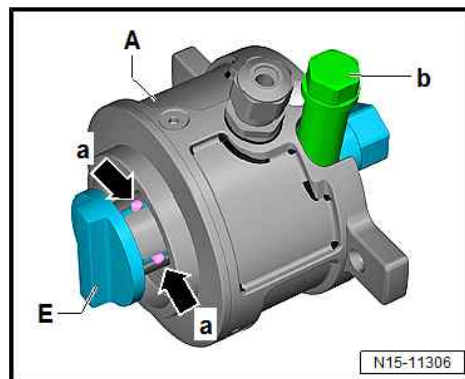
**Preassembling test tool - VAS 611 007-**

- Before inserting adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- in angle sensor - VAS 611 007/1- -A-, verify correct allocation in accordance with colour coding -a-.
- Insert adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- in angle sensor - VAS 611 007/1- -A-

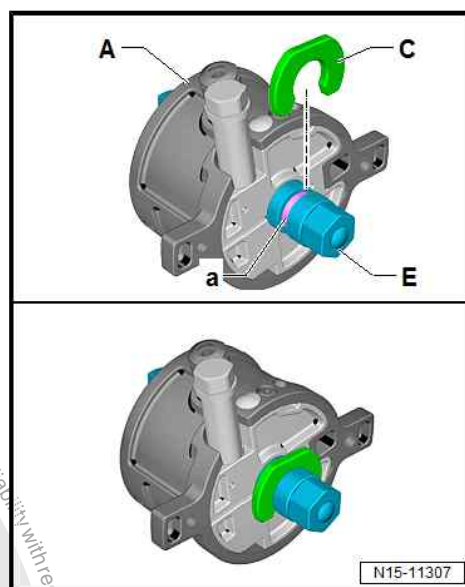




- Note position of dowel pins -a- when installing.
- Adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- only fit in one position.
- Make sure that brake -b- is released. Do not apply force.
- Insert adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- as far as stop in angle sensor - VAS 611 007/1- -A-.



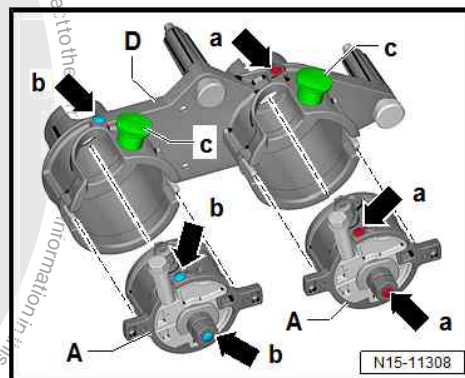
- Secure clamping ring - VAS 611 007/3- -C- in groove -a- from adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E-.



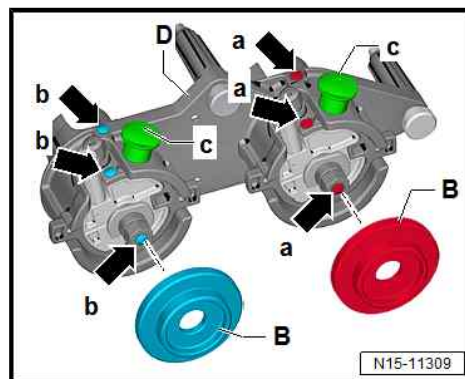
Insert angle sensor - VAS 611 007/1- -A- with red colour coding on side marked red -arrows a- of adapter for camshaft housing - VAS 611 007/8- -D-. To do this, release locking pins -c- by pulling them upwards.

Insert angle sensor - VAS 611 007/1- -A-, and push it in until locking pin can be heard to engage.

Repeat procedure with angle sensor - VAS 611 007/1- -A- with blue colour coding -arrows b-.

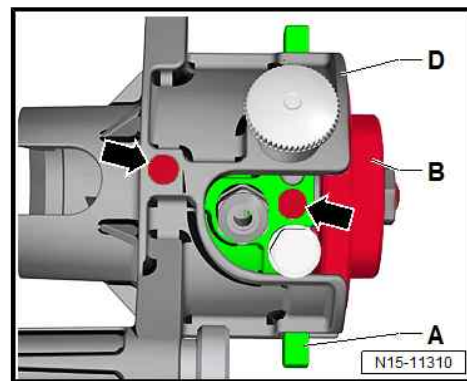


- Screw in locking ring - VAS 611 007/2- red and blue -B- approx. 2 turns. Note colour coding -arrows a- and -arrows b- when doing this.





- Screw in lock ring - VAS 611 007/2- -B- max. 2 turns by hand.
- Make sure that the shaft is free to move.
- Adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- should turn easily.



## 2.4.2 Installing test tool - VAS 611 007-

### Special tools and workshop equipment required

- ◆ Tester for checking elongation of chain links - VAS 611 007-



### Sequence of operations

- Preassemble test tool - VAS 611 007-  
⇒ [“2.4.1 Preassembling test tool VAS 611 007”, page 192](#).
- Teach-in test tool - VAS 611 007- electronically and perform basic setting  
⇒ [“2.4.3 Teaching-in test tool VAS 611 007 electronically and performing basic setting”, page 197](#).
- Turn adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- until display is set to approx. 0°.
- Perform the preliminary work for checking the valve timing  
⇒ [“2.5 Checking valve timing”, page 199](#).
- Make sure that the piston in cylinder no. 1 is at TDC position  
⇒ [“4.7 Setting piston to TDC position”, page 168](#).
- Make sure that brakes on angle sensor - VAS 611 007/1- are released on both sides ⇒ [page 194](#).

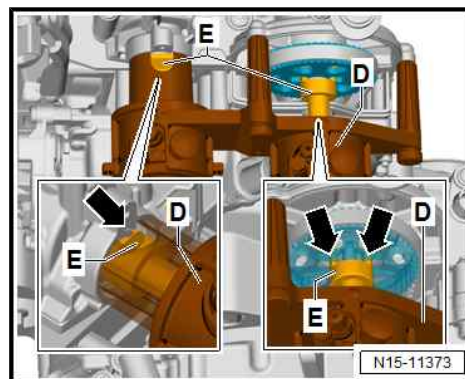


### Note

*Before positioning the test tool - VAS 611 007- against the camshaft housing, the grooves of the camshafts must be checked for damage.*



- Align adapter for angle sensor -E- by hand with grooves of camshafts -arrows-.
- Check proper alignment through recess, and adapt position by turning.

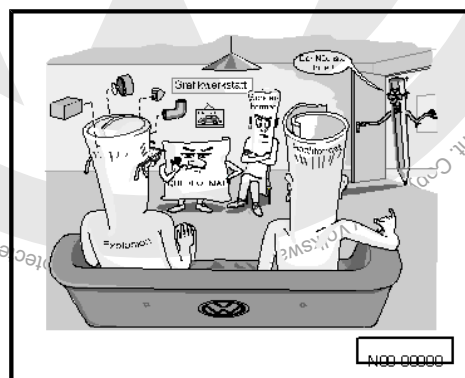
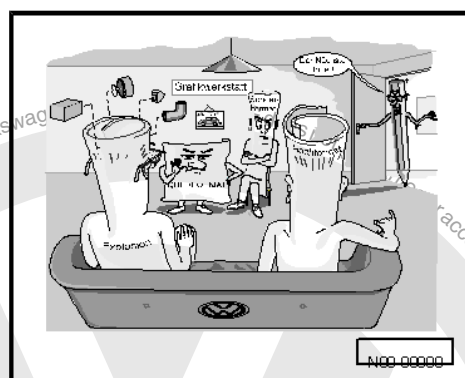


- Fit adapter for camshaft housing - VAS 611 007/8- -D- to camshaft housing, and slide it on.
- Tighten knurled screws -arrows a- alternately by hand.
- Make sure that adapter for camshaft housing - VAS 611 007/8- -D- is properly seated.



#### Note

- ◆ If camshaft housing adapter - VAS 611 007/8- -D- touches the housing of the coolant pump, the basic setting of the coolant pump is incorrect.
- ◆ In this case, correct adjustment or testing of the valve timing is not possible.
- ◆ The coolant pump must be removed and readjusted ⇒ ["2.5 Removing and installing coolant pump", page 300](#).
- Test tool - VAS 611 007- must rest flush against camshaft housing.
- Make sure that brakes on angle sensor - VAS 611 007/1- are released on both sides ⇒ [page 194](#).
- Tighten locking ring - VAS 611 007/2- -B- on both sides evenly by hand. When doing this, ensure that camshaft housing adapter - VAS 611 007/8- -D- always lies flat against camshaft housing -1-.



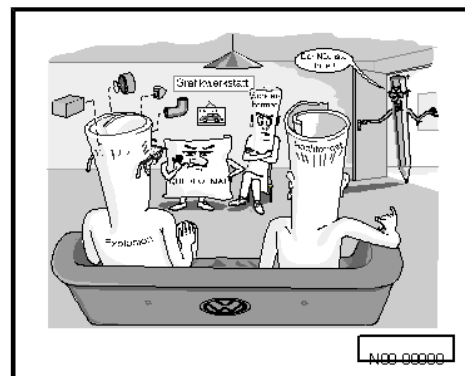


- Camshaft housing adapter - VAS 611 007/8- -D- should not lift off of camshaft housing -1-.

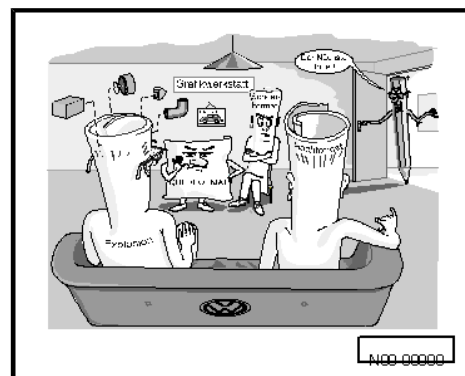


#### Note

The correct preload is achieved when the camshaft housing adapter - VAS 611 007/8- lies flat -a- against the camshaft housing.



- Make sure that brakes -a- are released on both sides.



### 2.4.3 Teaching-in test tool - VAS 611 007- electronically and performing basic setting

#### Special tools and workshop equipment required

- ◆ Tester for checking elongation of chain links - VAS 611 007-

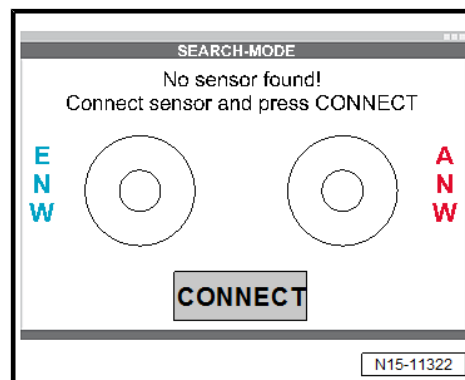


#### Sequence of operations

- Connect electronic measuring equipment of test tool - VAS 611 007- ⇒ Operating manual .
- Perform software installation of test tool - VAS 611 007- ⇒ Operating manual .
- Start test program ⇒ Operating manual .

If angle sensors are not connected, message shown in illustration is displayed.

- Connect test tool - VAS 611 007- , and press **CONNECT**.







If test tool - VAS 611 007- is connected, display is as shown:

ANW - Exhaust camshaft, red

ENW - Inlet camshaft, blue

- Turn adapter for angle sensor - VAS 611 007/10- red -E- for exhaust camshaft.

If OK is displayed, exhaust camshaft has been taught-in.

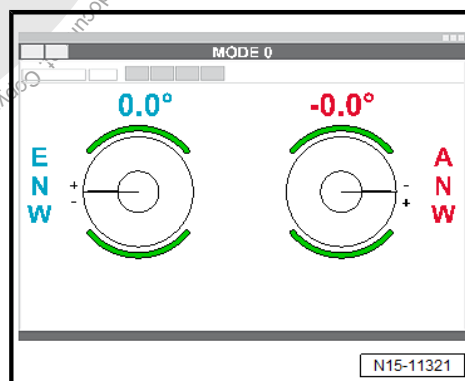
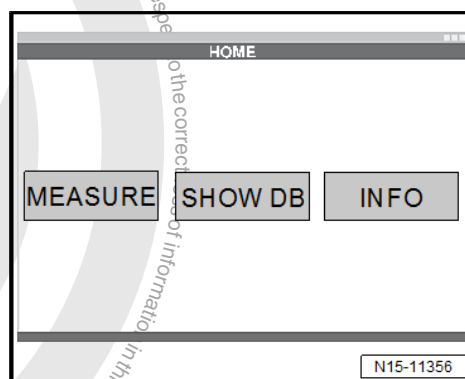
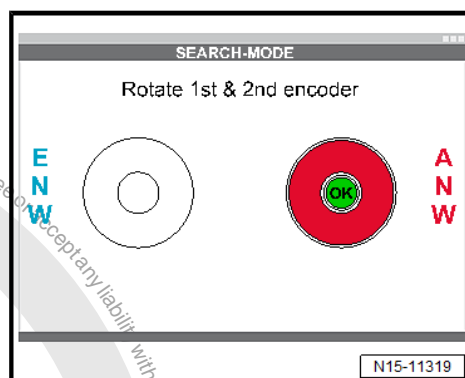
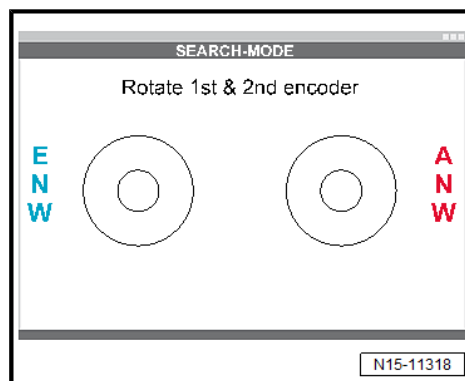
- Turn adapter for angle sensor - VAS 611 007/9- blue -E- for inlet camshaft.

If display is as shown in illustration, exhaust camshaft has been taught-in.

- Select function **MEASURE**.

If display is as follows:

- Check valve timing.  
⇒ [“2.5 Checking valve timing”, page 199](#).



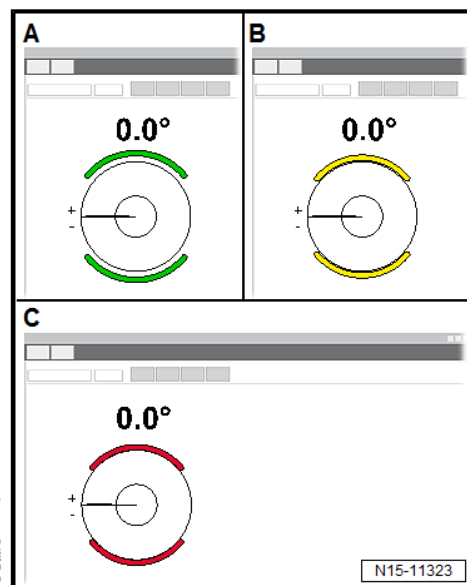


- Make sure that brake indicator on display is green.
- It must not be yellow or red.

A - Green, brake is released

B - Yellow, brake is applied

C - Red, brake has been tightened to torque



## 2.5 Checking valve timing

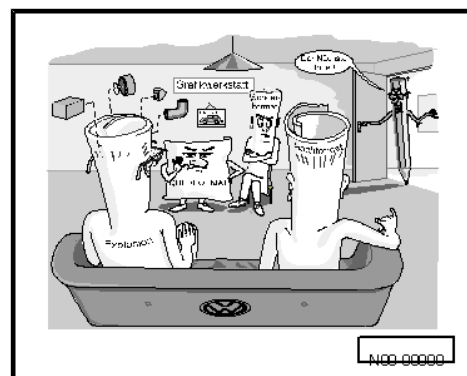
### Special tools and workshop equipment required

- ◆ Tester for checking elongation of chain links - VAS 611 007-



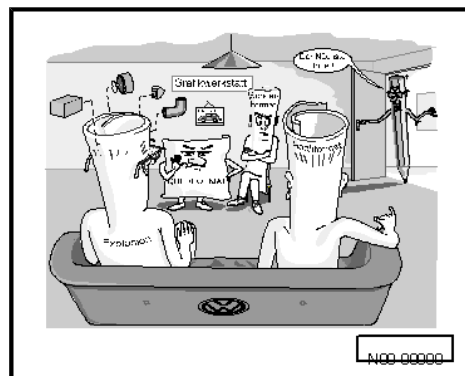
### Sequence of operations

- Toothed belt installed.
- Remove air filter housing  
⇒ ["3.2 Removing and installing air filter housing", page 416](#) .
- Drain coolant  
⇒ ["1.3 Draining and adding coolant", page 272](#) .
- Unscrew bolts -2-.
- Remove cover for thermostat housing -1-.

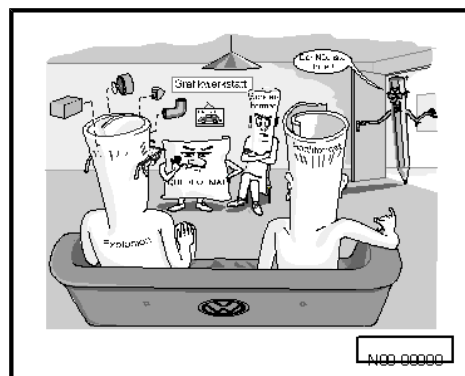




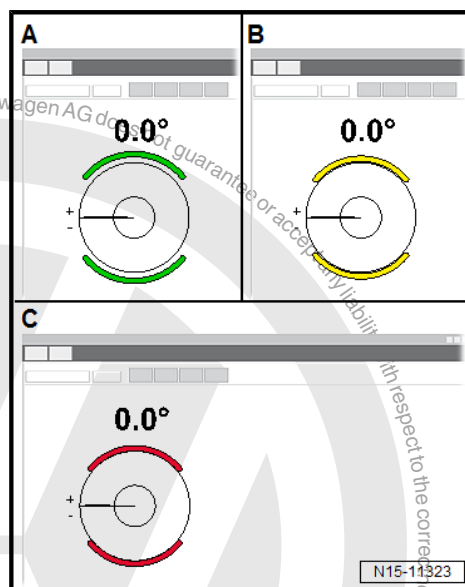
- Unclip wiring harness -3- and place to one side.
- Unscrew bolts -1-.
- Place a cloth underneath to catch any oil which may drain out.
- Take off cap -5-.
- Pull off pipe -2-.
- Remove toothed belt cover -4-.



- Set piston for cylinder no. 1 to TDC position  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .
- Preassemble test tool - VAS 611 007-  
⇒ ["2.4.1 Preassembling test tool VAS 611 007", page 192](#) .
- Install test tool - VAS 611 007-  
⇒ ["2.4.2 Installing test tool VAS 611 007", page 195](#) .
- Make sure that brakes -a- are released on both sides.



- Make sure that brake indicator on display is green -A-.
- It must not be yellow or red.

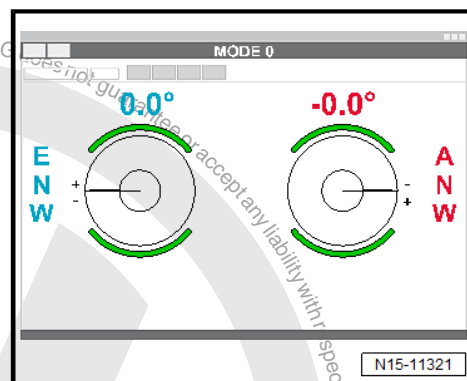


- Unscrew locking pin - T10340- -A-.
- Turn crankshaft 2 turns in direction of rotation of engine.
- Screw in locking pin - T10340- -A-.
- Set piston for cylinder no. 1 to TDC position  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .





- Read valve timing angles on display, and compare values with specifications.



#### Specified values

Inlet camshaft	Exhaust camshaft
$+1.1^\circ \pm 1.5^\circ$	$+0.8^\circ \pm 1.5^\circ$

#### ! NOTICE

Adjust valve timing as precisely as possible. The settings must be as close to the specifications as possible.

The valve timing must not be outside the tolerance limits.

- If necessary, adjust timing  
⇒ [“2.6 Adjusting valve timing”, page 201](#).

Assembly is carried out in reverse sequence; note the following:

- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#).

#### Specified torques

- ◆ ⇒ [“2.1 Assembly overview - coolant pump, thermostat”, page 292](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)

Component	Specified torque
Bolt for TDC hole in cylinder block	30 Nm

## 2.6 Adjusting valve timing

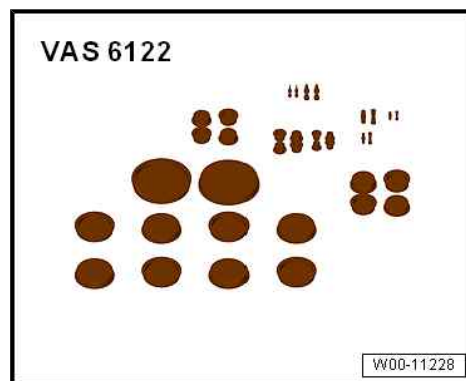
#### Special tools and workshop equipment required

- ◆ Locating bolt - T10340-





♦ Engine bung set - VAS 6122-



### Sequence of operations

- Toothed belt installed

**If the toothed belt has already been removed and reinstalled in the context of another repair measure:**

- camshaft adjuster securing bolts are not pre-tightened.
- Tighten exhaust camshaft securing bolt to specified initial torque. [⇒ page 230](#)
- Tighten inlet camshaft securing bolt to specified initial torque. [⇒ page 226](#)



#### Note

*If the securing bolt for the exhaust camshaft has already been replaced, the replacement of the securing bolt can be ignored in the following procedure.*

### Checking valve timing without removal of toothed belt

- Check valve timing [⇒ “2.5 Checking valve timing”, page 199](#) .
- Set piston for cylinder no. 1 to TDC position [⇒ page 168](#) .
- Do not relieve tension from toothed belt, and do not remove toothed belt from camshafts when adjusting valve timing. Only loosen camshaft adjuster.
- Loosen camshaft adjuster on inlet side  
[⇒ “3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 223](#) .
- Loosen camshaft adjuster on exhaust side  
[⇒ “3.4.2 Removing and installing camshaft adjuster for exhaust camshaft”, page 227](#) .



#### NOTICE

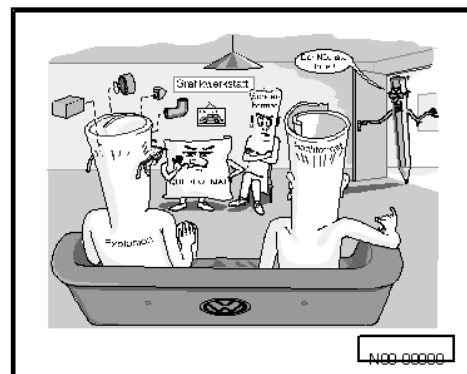
**Risk of damage to engine caused by incorrect valve timing.**

- Do not turn crankshaft out of TDC position.
- Place a cloth under the camshaft adjusters and over tensioning roller to catch the engine oil which runs out.
- The contact points between the toothed belt and components - such as camshaft pulleys, tensioning roller and idler pulley - must be kept free of oil.
- Catch any engine oil which runs out immediately, and remove it.



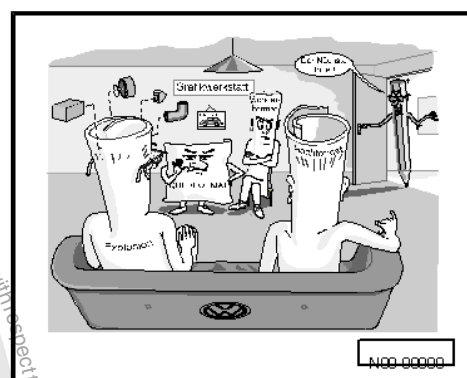


- Remove any engine oil which ran out from camshaft adjusters after the engine has been cranked.
- Make sure that the piston in cylinder no. 1 is at TDC position  
⇒ [“4.7 Setting piston to TDC position”, page 168](#) .
- Renew bolts -3- and -4- and screw in loosely  
⇒ [“3.4 Removing and installing camshaft adjuster”, page 223](#) .
- It should still be possible to turn camshaft adjusters -1- and -2- on camshafts.

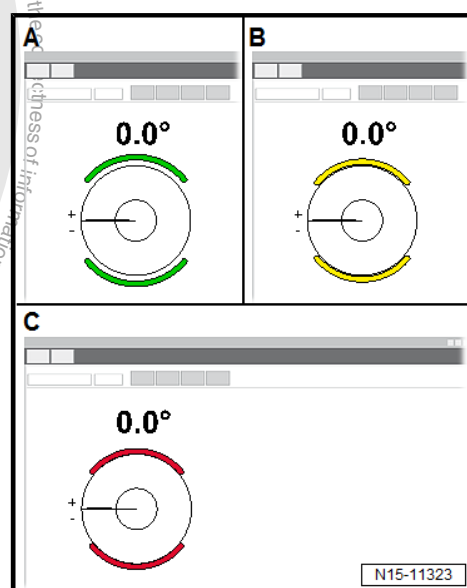


### Setting camshafts to 0°

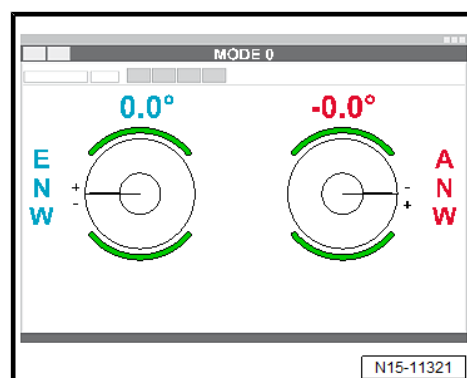
- Make sure that bolts -a- for brakes are released on both sides.



- Make sure that brake indicator on display is green -A-.
- It must not be yellow or red.



- Set both camshafts to 0.0°.



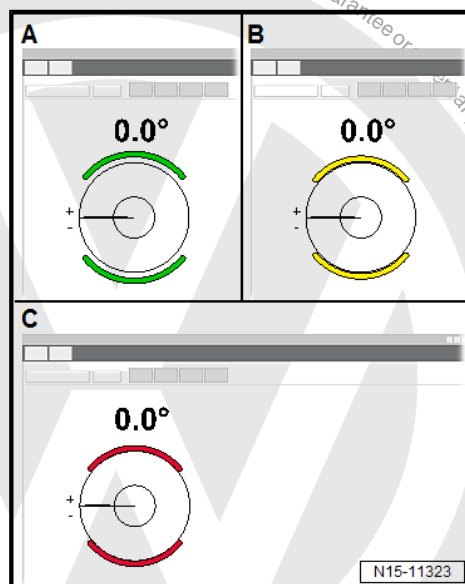
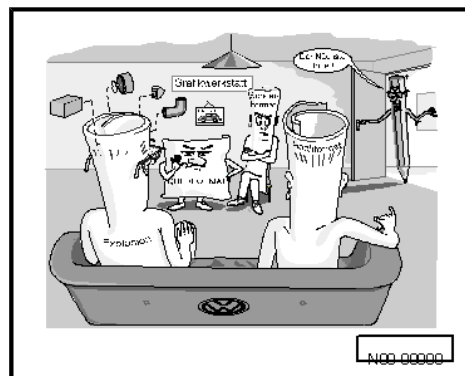


- To do this, turn camshafts with adapter for angle sensor - VAS 611 007/5- -E-.
- Hold camshafts via adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10- -E- in 0.0° position with a wrench.

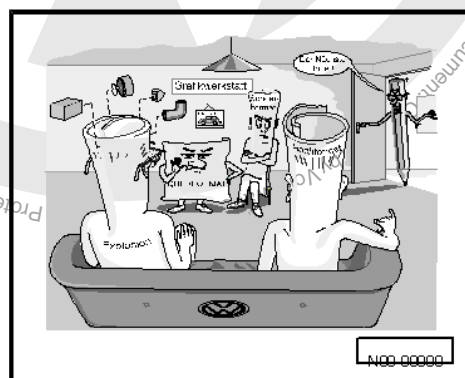


#### Note

- ♦ *The camshafts tend to turn.*
  - ♦ *Use a hexagon key to hold the camshafts in 0.0° position.*
  - ♦ *Always remove the hexagon key after the camshafts have been tightened.*
- Tighten brakes after adjustment has been completed.
  - Tighten bolts -a- for brakes to 11 Nm on both sides.
  - Make sure that brake indicator on display is red -C-.
  - It must not be yellow or green.

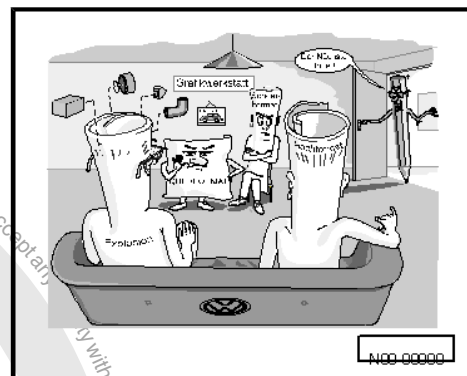


- Unscrew locking pin - T10340- -A-.
- Tighten camshaft adjuster on inlet camshaft to specified initial torque  
⇒ ["3.4.1 Removing and installing camshaft adjuster for inlet camshaft", page 223](#) .
- Tighten camshaft adjuster on exhaust camshaft to specified initial torque  
⇒ ["3.4.2 Removing and installing camshaft adjuster for exhaust camshaft", page 227](#) .

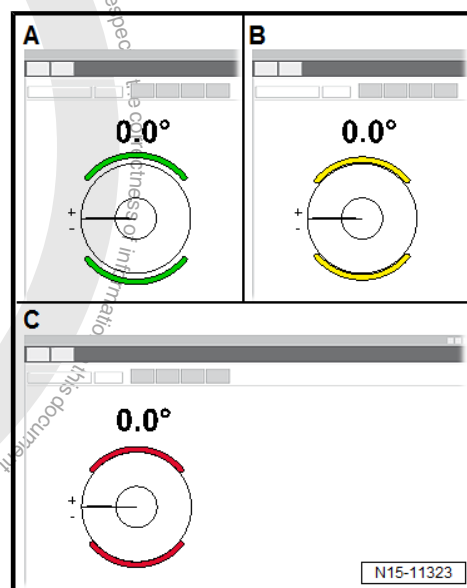




- Make sure that bolts -a- for brakes are released on both sides.



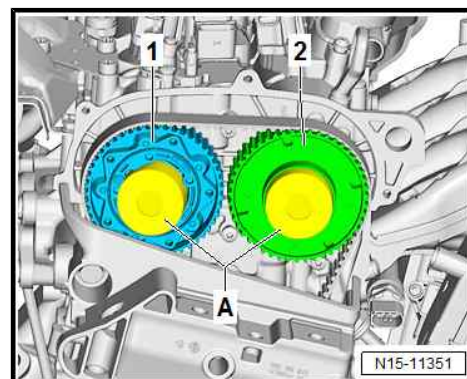
- Make sure that brake indicator on display is green -A-.
- It must not be yellow or red.



- Seal camshaft adjusters -1- and -2- using suitable plugs -A- from engine bung set - VAS 6122- .
- Fit a piece of paper -A- into plugs to catch the engine oil.
- The plug for the camshaft adjuster -1- on exhaust side must be pushed in slightly.
- Turn crankshaft 2 turns in direction of rotation of engine.

#### Determining correction angle

- Screw in locking pin - T10340- .
- Set piston for cylinder no. 1 to TDC position  
⇒ [“4.7 Setting piston to TDC position”, page 168](#) .
- Read valve timing on display and write down values.



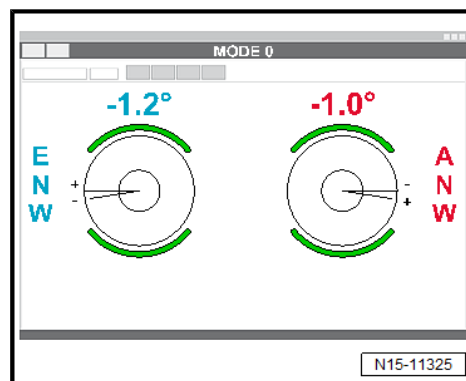


## 1. Measurement example: value reading



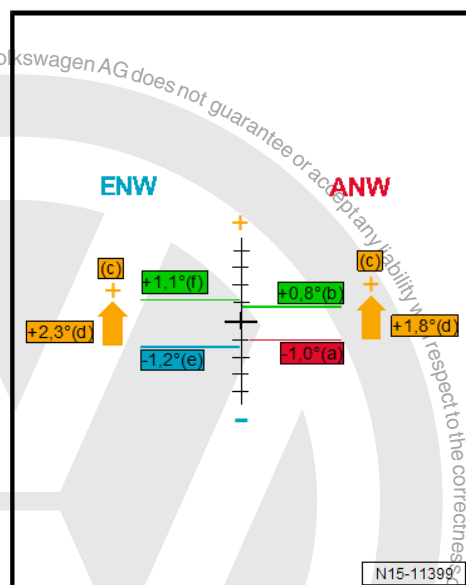
### Note

- ◆ The correction angle is determined for each individual vehicle.
- ◆ The value read after the engine has been cranked is used for determining the correction angle.
- ◆ Note the algebraic signs of the values.
- ◆ The correction angle results from the difference between the specification and the value which has been read after the crankshaft has been cranked twice.
- ◆ The correction angle is used to adjust the valve timing.
- ◆ The difference between the actual value (read after 2 full revolutions of the engine) and the specification (see table) is calculated.
- ◆ The result is the correction angle to be set, with the corresponding algebraic sign/direction of rotation.



Example:

Index	Explanation
e	Inlet camshaft - actual value (after 2 full revolutions of the engine)
f	Inlet camshaft - specification (+/- tolerance)
c	Direction of correction (+/-)
d	Correction value - correction angle
a	Exhaust camshaft - actual value (after 2 full revolutions of the engine)
b	Exhaust camshaft - specification (+/- tolerance)



Angle in °	Inlet camshaft	Exhaust camshaft
Specified value	+1.1°±1.5°	+0.8°±1.5°

- Set determined correction angle for camshafts.

### Setting valve timing with correction angle

- Place a cloth underneath camshaft adjuster to catch any engine oil which runs out.
- Remove plug taken from engine bung set - VAS 6122- from camshaft adjusters.
- Remove paper from plugs and camshaft adjusters.
- Clean camshaft adjusters with a cleaning cloth, and remove as much engine oil as possible.
- Loosen camshaft adjuster on inlet side  
⇒ ["3.4.1 Removing and installing camshaft adjuster for inlet camshaft", page 223](#) .

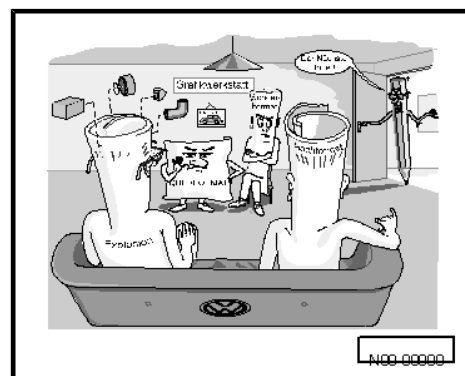


- Loosen camshaft adjuster on exhaust side  
⇒ ["3.4.2 Removing and installing camshaft adjuster for exhaust camshaft", page 227](#) .

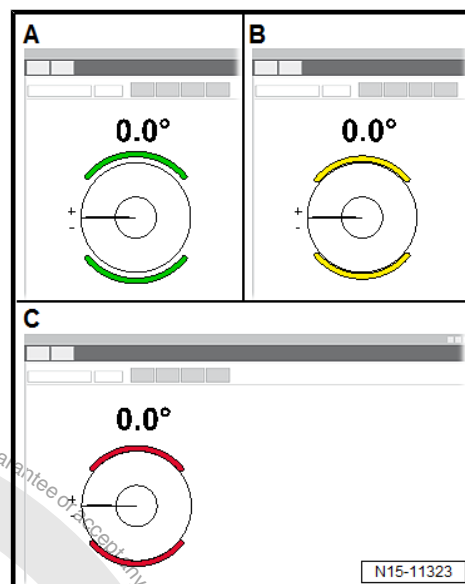
**NOTICE**

Risk of damage to engine caused by incorrect valve timing.

- Do not turn crankshaft out of TDC position.
- Make sure that the piston in cylinder no. 1 is at TDC position  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .
- Make sure that bolts -a- for brakes are released on both sides.



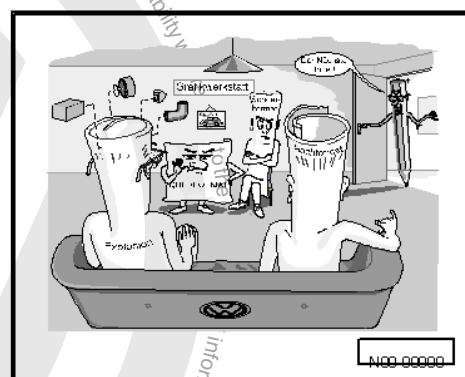
- Make sure that brake indicator on display is green -A-.
- It must not be yellow or red.



- Set the two camshafts to the determined correction angle  
⇒ [page 205](#)
- To do this, turn camshafts with adapter for angle sensor - VAS 611 007/9- and adapter for angle sensor - VAS 611 007/10-E-.

If the valve timing has been set:

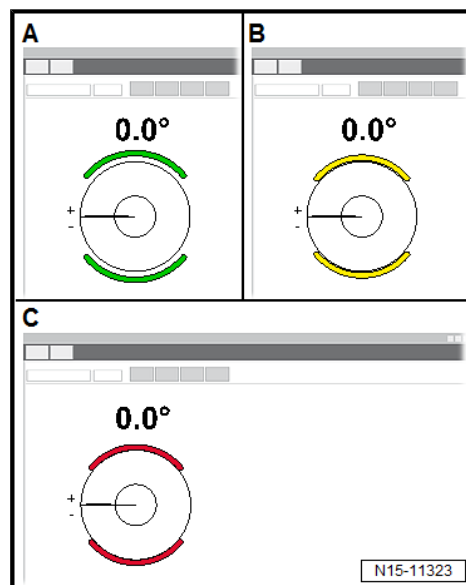
- Tighten bolts -a- for brakes to 11 Nm on both sides.



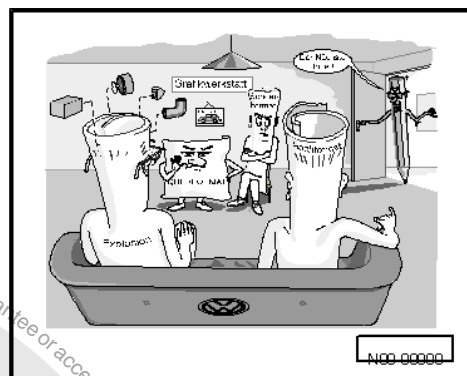




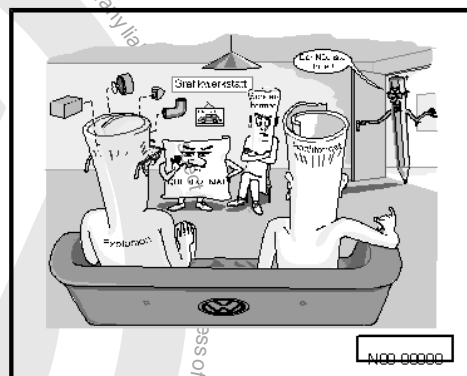
- Make sure that brake indicator on display is red -C-.
- It must not be yellow or green.



- Unscrew locking pin - T10340- -A-.
- Tighten camshaft adjuster on inlet camshaft to specified initial torque  
⇒ ["3.4.1 Removing and installing camshaft adjuster for inlet camshaft", page 223](#) .
- Tighten camshaft adjuster on exhaust camshaft to specified initial torque  
⇒ ["3.4.2 Removing and installing camshaft adjuster for exhaust camshaft", page 227](#)

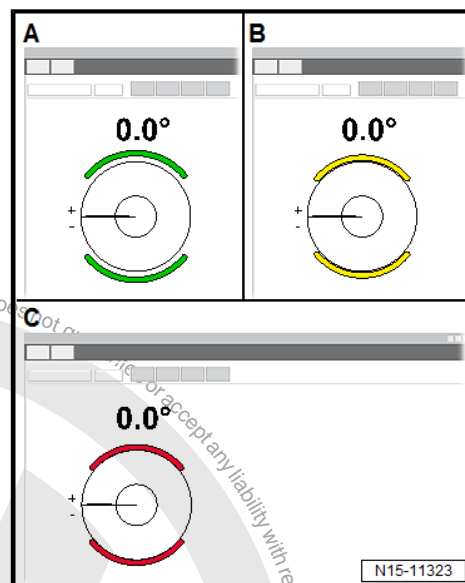


- Release brakes -a- on both sides.

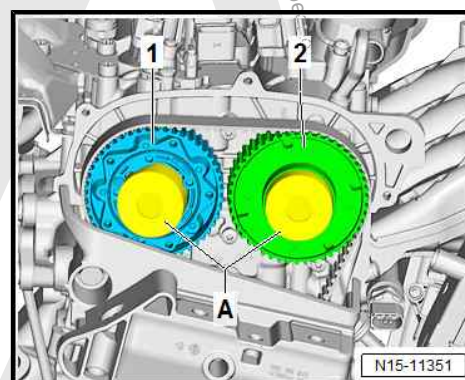




- Make sure that brake indicator on display is green -A-.
- It must not be yellow or red.



- Seal camshaft adjusters -1- and -2- using suitable plugs -A- from engine bung set - VAS 6122- .
- Fit a new piece of paper into plugs -A- to catch the engine oil.
- The plug for the camshaft adjuster -1- on exhaust side must be pushed in slightly.
- Turn crankshaft 2 turns in direction of rotation of engine.
- Screw in locking pin - T10340- .
- Set piston for cylinder no. 1 to TDC position  
⇒ [“4.7 Setting piston to TDC position”, page 168](#) .
- Check valve timing ⇒ [“2.5 Checking valve timing”, page 199](#) .



#### ! NOTICE

Adjust valve timing as precisely as possible. The settings must be as close to the specifications as possible.

The valve timing must not be outside the tolerance limits.

- Read valve timing, and compare it with specifications.

Specified angle in °

Inlet camshaft	Exhaust camshaft
+1.1° ±1.5°	+0.8° ±1.5°

- If necessary, adjust timing again  
⇒ [“2.6 Adjusting valve timing”, page 201](#) .

Assembly is carried out in reverse sequence; note the following:

- Unscrew locking pin - T10340- .
- Make sure that brakes are released on both sides.
- Tighten camshaft adjuster on inlet camshaft to specified final torque  
⇒ [“3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 223](#) .
- Tighten camshaft adjuster on exhaust camshaft to specified final torque



⇒ [“3.4.2 Removing and installing camshaft adjuster for exhaust camshaft”, page 227](#) .

### Specified torques

- ◆ ⇒ [“2.2 Assembly overview - toothed belt”, page 185](#)
- ◆ ⇒ [“3.1 Assembly overview - valve gear”, page 216](#)
- ◆ ⇒ [“2.1 Assembly overview - coolant pump, thermostat”, page 292](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)

## 2.7 Removing toothed belt from camshaft

### Special tools and workshop equipment required

- ◆ Special wrench - T10499A-



- ◆ Insert tool - T10500-



- ◆ Counter-hold tool - T10475-





◆ Camshaft clamp - T10494-

**T10494**



W00-11287

◆ Torque wrench - VAS 6583-

**VAS 6583**



W00-11263

◆ Counter-hold tool - T10554-

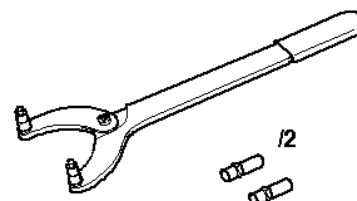
**T10554**



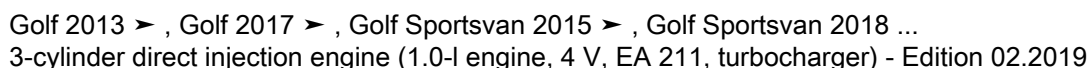
W00-11743

◆ Counter-hold tool - T10172-

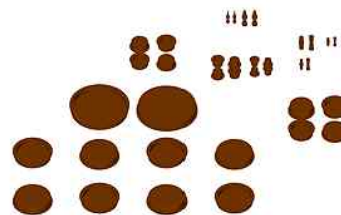
**T10172**



W00-1386



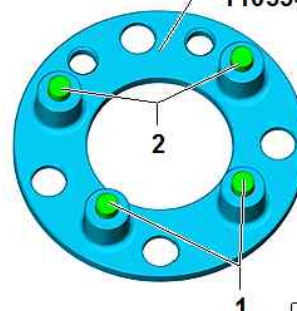
**VAS 6122**



W00-11228

-T10554

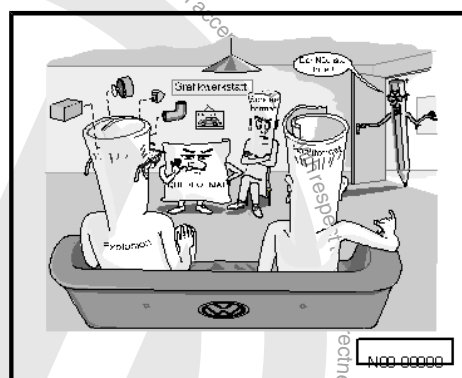
- The pins -1- and -2- are located at different distances to the counter-hold tool - T10554- .
- The counter-hold tool - T10554- can be inserted in only one position.
- Fit counter-hold tool - T10554- so that it rests flat against camshaft adjusters.



N15-11138

**Note**

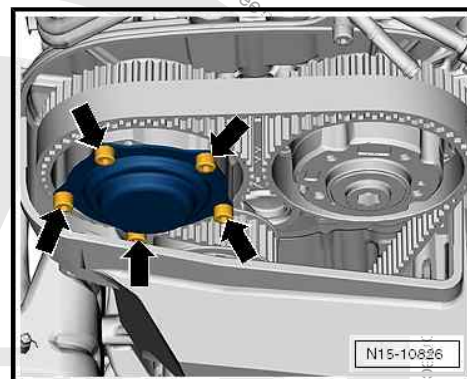
- ◆ *Protect the toothed belt from escaping engine oil.*
- ◆ *Seal camshaft adjusters immediately using suitable plug from engine bung set - VAS 6122- .*
- Place a cloth underneath to catch escaping engine oil.
- Thoroughly clean any cavities which have been filled with engine oil.
- Set engine to “TDC for cylinder no. 1”  
⇒ “4.7 Setting piston to TDC position”, page 168 .
- Unscrew bolt -1-.
- Release clips -2-.
- Unclip retainer -4-.
- Remove toothed belt cover -3-.







- Unscrew bolts -arrows- of exhaust camshaft.
- The camshaft must be turned to gain access to all bolts.
- Remove camshaft clamp - T10494- before turning camshaft.
- After camshaft clamp - T10494- has been removed, turn camshaft until all remaining bolts have been reached.
- Remove cover from camshaft adjuster of exhaust camshaft.
- Set engine to "TDC for cylinder no. 1", and insert camshaft clamp - T10494-  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .

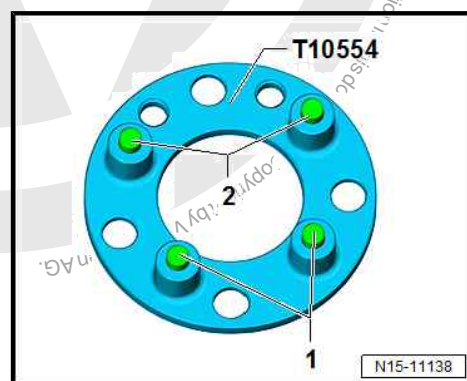


#### Note

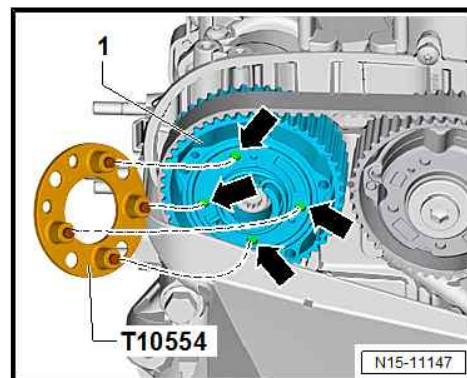
*Do not use camshaft clamp - T10494- as a counterhold.*

#### Exhaust camshaft:

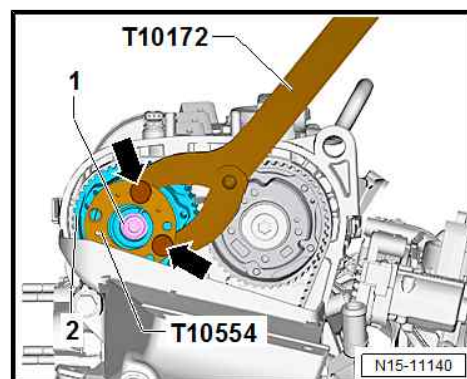
- Guide in counter-hold tool - T10554- between camshaft adjuster and engine support.
- To do this, initially guide through counter-hold tool - T10554- between pins -2- on camshaft adjuster.



- Turn counter-hold tool - T10554- so that it can be inserted in holes -arrows- as shown in illustration.
- Fit counter-hold tool - T10554- so that it rests flat against camshaft adjuster -1-.



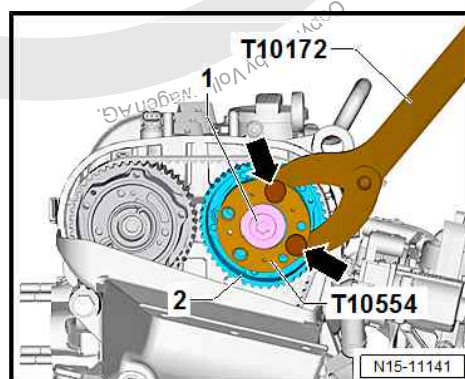
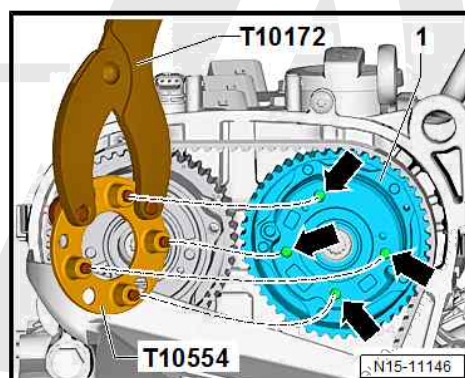
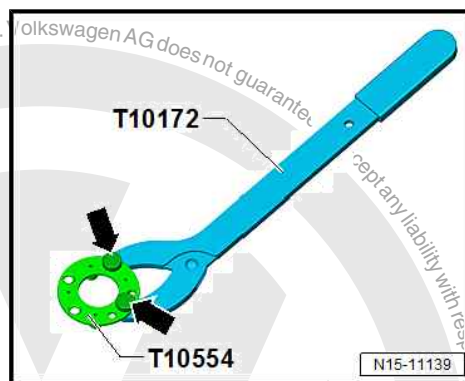
- Loosen bolt -1- one turn. Hold camshaft pulley in place using counter-hold tool - T10554- and counter-hold tool - T10172- .





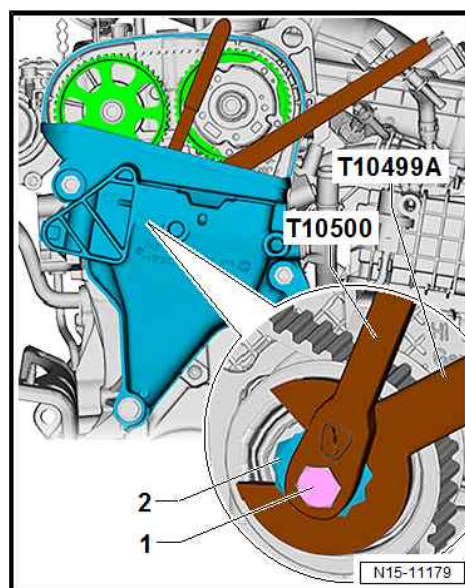
### Inlet camshaft

- Assemble tools as shown in illustration.
- Bolt on counter-hold tool - T10172- and counter-hold tool - T10554- with knurled screws -arrows-.
- Fit counter-hold tool - T10554- with counter-hold tool - T10172- to camshaft pulley -1- as shown in illustration.
- The pins must be inserted properly into holes -arrows-.
- Fit counter-hold tool - T10554- so that it rests flat against camshaft adjuster -1-.
- Secure camshaft against turning with counterhold - T10554- and counterhold - T10172- .
- Unscrew plug -1- for camshaft pulley on inlet camshaft.
- Use counter-hold tool - T10554- with counter-hold tool - T10172- to do this.
- Loosen bolt -1- one turn. Hold camshaft pulley in place using counter-hold tool - T10554- and counter-hold tool - T10172- .



### Continuation for both sides

- Place special wrench, 30 mm - T10499A- on eccentric adjuster -2- of tensioning roller.
- Loosen bolt -1- using insert tool, 13 mm - T10500- .
- Release tensioning roller on eccentric adjuster -2- using special wrench, 30 mm - T10499A- .
- Remove toothed belt from camshaft pulleys.





## Bend radius of toothed belt

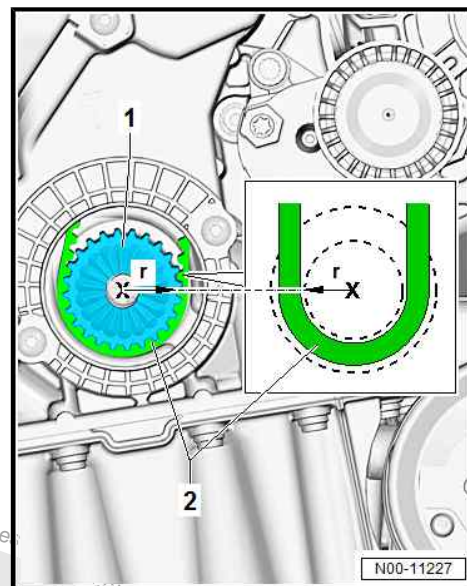
### ! NOTICE

Risk of damage to toothed belt by bending it excessively. The toothed belt is made of glass fibre fabric which will be damaged if it is bent excessively.

- Never bend toothed belt to a radius less than  $r = 25 \text{ mm}$ .
- The bend radius - $r$ - on the toothed belt -2- should therefore never be below 25 mm (approx. half the diameter of gear -1- on crankshaft).
- Install toothed belt  
⇒ [“2.3 Removing and installing toothed belt”, page 186](#) .

## Specified torques

- ◆ ⇒ [“2.2 Assembly overview - toothed belt”, page 185](#)
- ◆ ⇒ [“3.1 Assembly overview - valve gear”, page 216](#)
- ◆ ⇒ [“3.1 Assembly overview - crankcase breather system”, page 259](#)
- ◆ ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ◆ ⇒ [“2.1 Assembly overview - charge air system”, page 378](#)







## 3 Valve gear

⇒ [“3.1 Assembly overview - valve gear”, page 216](#)

⇒ [“3.2 Measuring axial play of camshaft”, page 217](#)

⇒ [“3.3 Removing and installing camshaft oil seal”, page 218](#)

⇒ [“3.4 Removing and installing camshaft adjuster”, page 223](#)

⇒ [“3.5 Removing and installing camshaft control valve 1 N205”, page 231](#)

⇒ [“3.6 Removing and installing exhaust camshaft control valve 1 N318”, page 233](#)

⇒ [“3.7 Removing and installing valve stem seals”, page 234](#)

### 3.1 Assembly overview - valve gear

#### 1 - Inlet valve

- ☐ Do not rework. Only lap-ping in is permitted.
- ☐ Valve dimensions  
⇒ [“4.3 Valve dimensions”, page 245](#)
- ☐ Checking valve guides  
⇒ [“4.1 Checking valve guides”, page 244](#)

#### 2 - Outlet valve

- ☐ Do not rework. Only lap-ping in is permitted.
- ☐ Valve dimensions  
⇒ [“4.3 Valve dimensions”, page 245](#)
- ☐ Checking valve guides  
⇒ [“4.1 Checking valve guides”, page 244](#)

#### 3 - Cylinder head

- ☐ Removing and installing  
⇒ [“1.3 Removing and installing cylinder head”, page 175](#)
- ☐ Check for distortion  
⇒ [page 173](#)

#### 4 - Valve stem seal

- ☐ Renewing  
⇒ [“3.7 Removing and installing valve stem seals”, page 234](#)

#### 5 - Valve springs

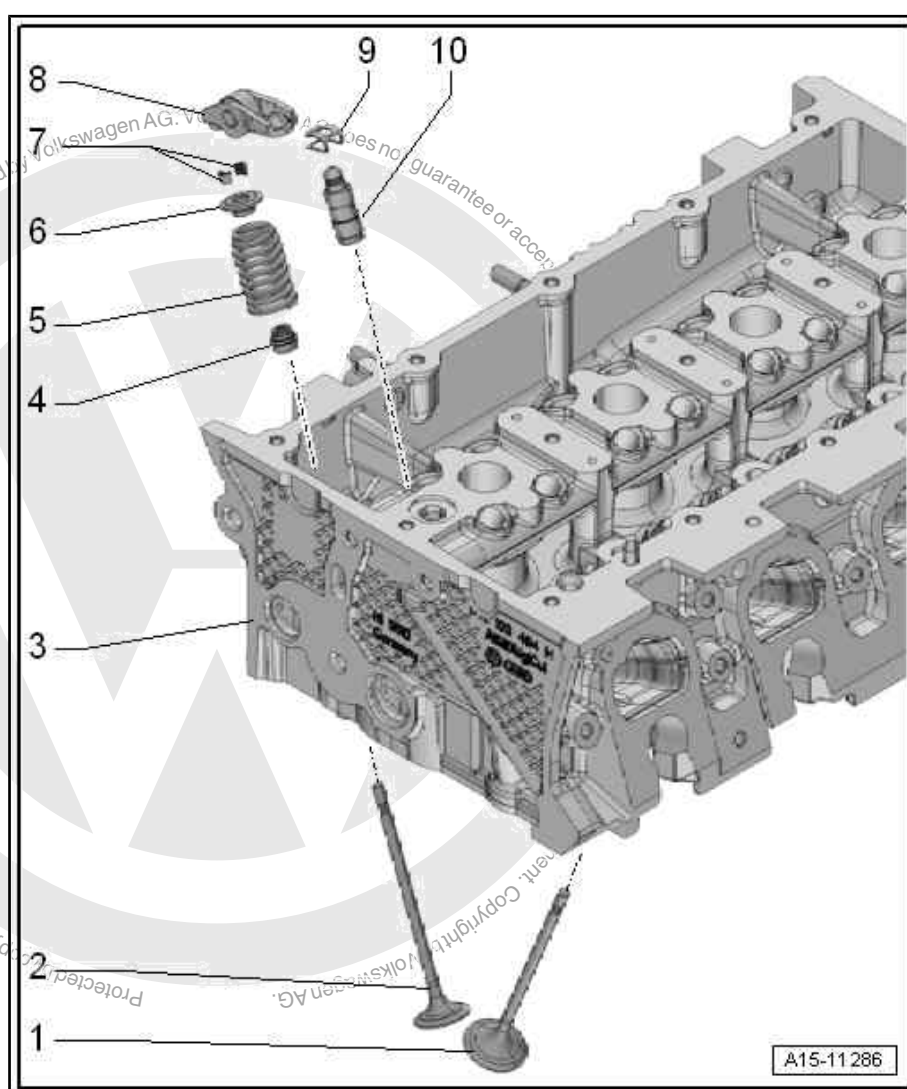
- ☐ Fitting position  
⇒ [page 217](#)

#### 6 - Valve spring plate

#### 7 - Valve cotters

#### 8 - Roller rocker fingers

- ☐ Removing and installing ⇒ [“1.4 Removing and installing camshaft housing”, page 178](#)
- ☐ Mark installation position for re-installation.
- ☐ Check roller bearing for ease of movement.





- ☐ Lubricate contact surfaces before installing.

### 9 - Retaining clip

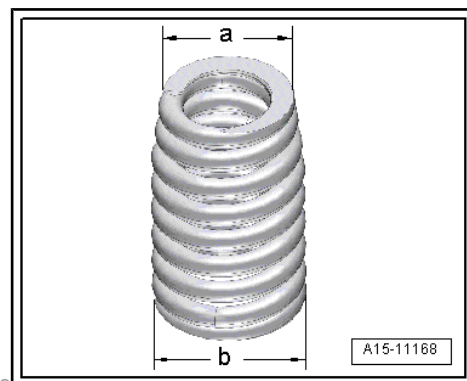
- ☐ For hydraulic compensation element.

### 10 - Hydraulic compensation element

- ☐ Do not interchange
- ☐ Oil contact surface

### Installation position of valve spring

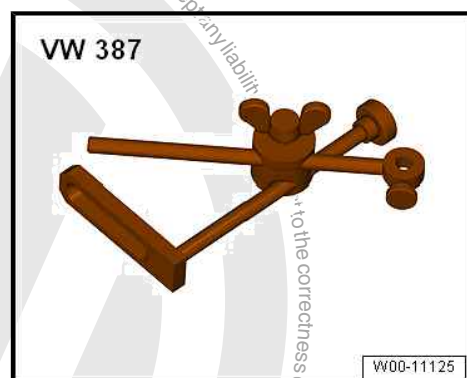
- End with small diameter -a- points towards valve spring plate.
- End with diameter -b- points towards cylinder head.



## 3.2 Measuring axial play of camshaft

### Special tools and workshop equipment required

- ◆ Universal dial gauge holder - VW 387-



- ◆ Dial gauge - VAS 6079-

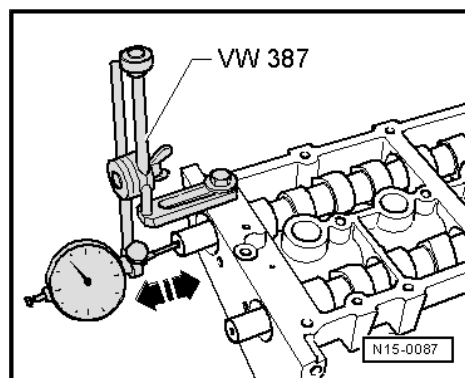






## Sequence of operations

- Remove camshaft housing  
⇒ [“1.4 Removing and installing camshaft housing”, page 178](#).
- Secure universal dial gauge bracket - VW 387- together with dial gauge - VAS 6080- to camshaft housing as shown in illustration.
- Press camshaft against dial gauge by hand.
- Set dial gauge to “0”.
- Press camshaft away from dial gauge and read off value:



Axial clearance:

- Wear limit: 0.25 mm.

## 3.3 Removing and installing camshaft oil seal

⇒ [“3.3.1 Removing and installing camshaft oil seal, inlet camshaft”, page 218](#)

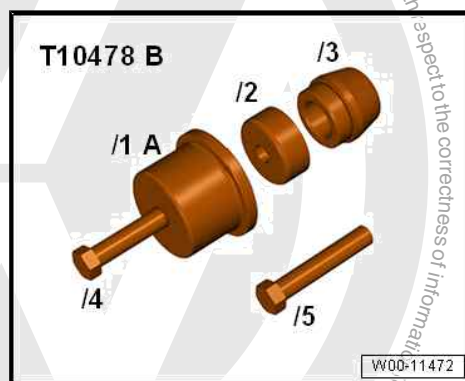
⇒ [“3.3.2 Removing and installing camshaft oil seal, exhaust camshaft, pulley end”, page 220](#)

⇒ [“3.3.3 Removing and installing camshaft oil seal, exhaust camshaft, gearbox end”, page 221](#)

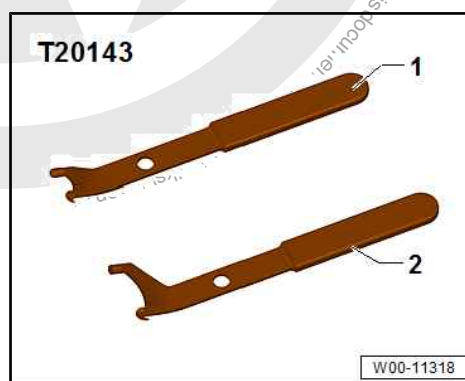
### 3.3.1 Removing and installing camshaft oil seal, inlet camshaft

Special tools and workshop equipment required

- ◆ Assembly tool - T10478 B-



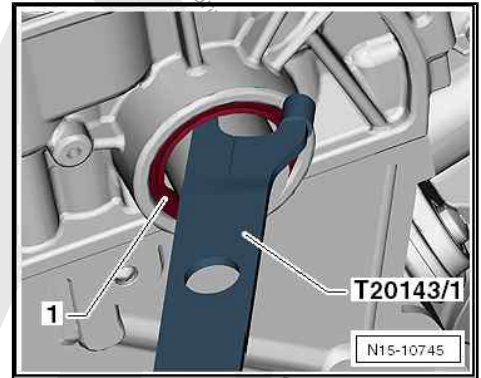
- ◆ Extractor hook - T20143-





## Removing

- Remove toothed belt from camshafts  
⇒ [“2.7 Removing toothed belt from camshaft”, page 210](#) .
- Remove camshaft adjuster for inlet camshaft  
⇒ [“3.4.1 Removing and installing camshaft adjuster for inlet camshaft”, page 223](#) .
- Pull out oil seal -1- using extractor tool -T20143/1- .



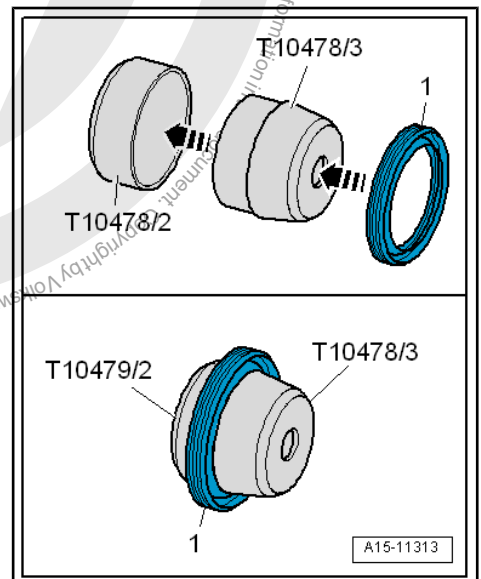
## Installing



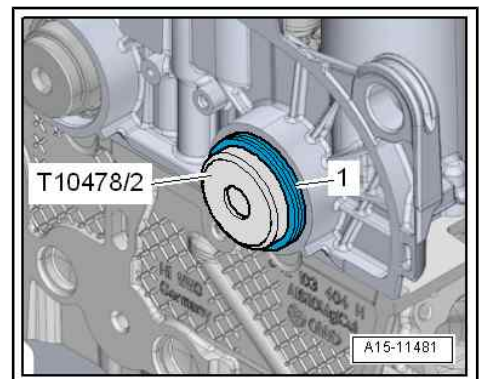
### Note

*Do not lubricate new oil seal.*

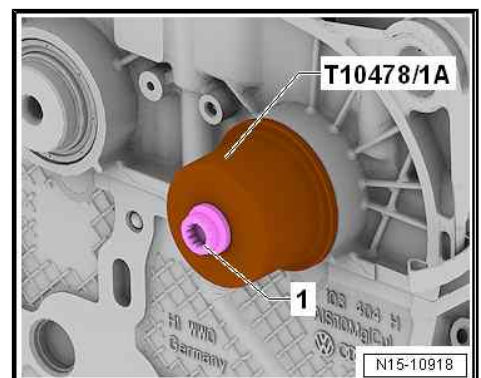
- Slide oil seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2- .
- Fitting position: closed side of oil seal faces guide sleeve.
- Separate fitting sleeve and guide sleeve.



- Fit guide sleeve -T10478/2- with oil seal -1- onto camshaft.



- Draw in seal to stop using thrust piece -T10478/1A- and bolt -1- for camshaft pulley.
- Install toothed belt  
⇒ [“2.3 Removing and installing toothed belt”, page 186](#) .

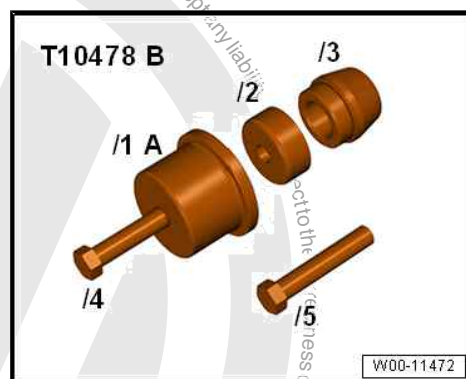




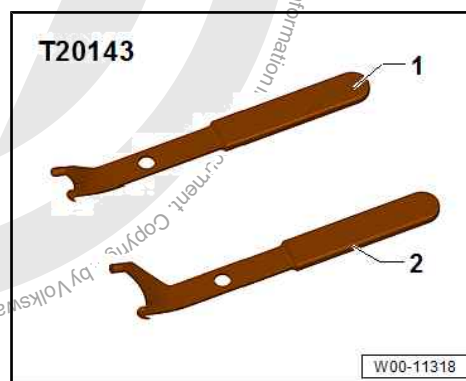
### 3.3.2 Removing and installing camshaft oil seal, exhaust camshaft, pulley end

#### Special tools and workshop equipment required

- ◆ Assembly tool - T10478 B-

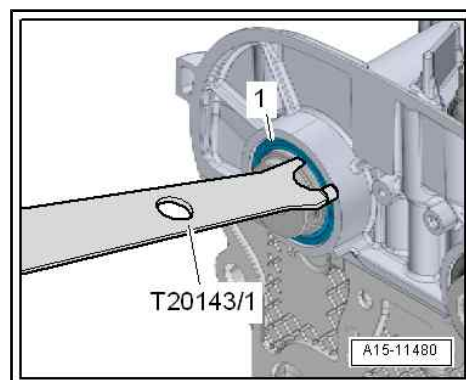


- ◆ Extractor hook - T20143-



#### Removing

- Remove toothed belt from camshafts  
⇒ [“2.7 Removing toothed belt from camshaft”, page 210](#) .
- Remove engine support  
⇒ [“1.5 Removing and installing engine support”, page 143](#) .
- Remove camshaft adjuster for exhaust camshaft  
⇒ [“3.4.2 Removing and installing camshaft adjuster for exhaust camshaft”, page 227](#) .
- Pull out oil seal -1- using extractor tool -T20143/1- .





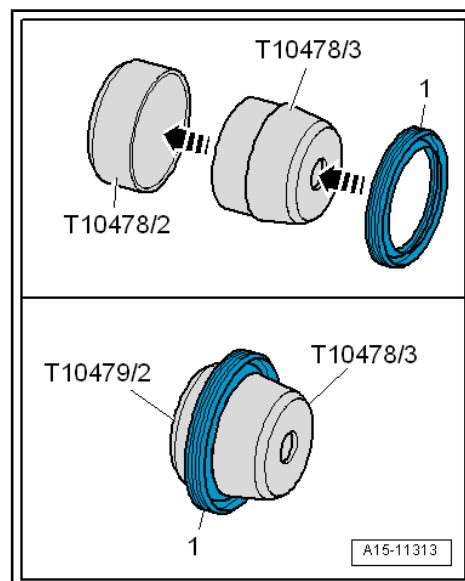
## Installing



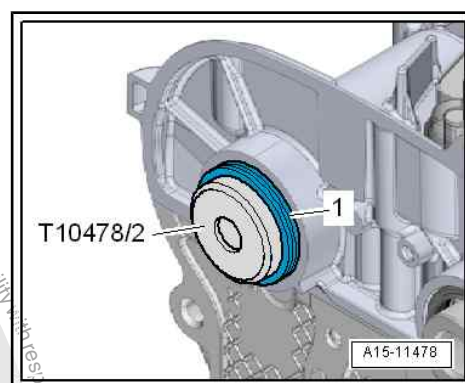
### Note

*Do not lubricate new oil seal.*

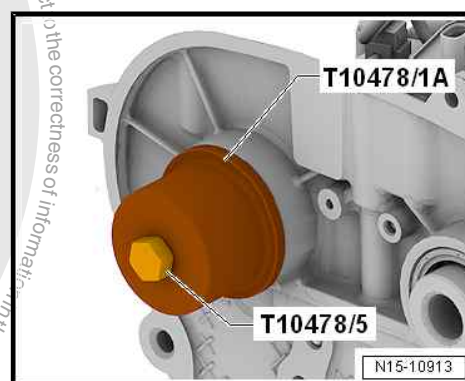
- Slide oil seal -1- over fitting sleeve -T10478/3- onto guide sleeve -T10478/2- .
- Fitting position: closed side of oil seal faces guide sleeve.
- Separate fitting sleeve and guide sleeve.



- Fit guide sleeve -T10478/2- with oil seal -1- onto camshaft.



- Pull in thrust piece -T10478/1A- with bolt -T10478/5- as far as stop.
- Install toothed belt  
⇒ [“2.3 Removing and installing toothed belt”, page 186](#) .
- Installing engine support  
⇒ [“1.5 Removing and installing engine support”, page 143](#) .

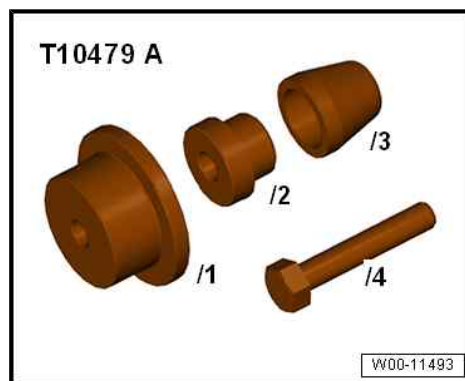


### 3.3.3 Removing and installing camshaft oil seal, exhaust camshaft, gearbox end

Special tools and workshop equipment required



◆ Assembly tool - T10479A-



◆ Extractor hook - T20143-



### Removing

- Remove coolant pump pulley  
⇒ ["2.7 Removing and installing toothed belt pulley for coolant pump", page 307](#)
- Carefully slide extractor tool -T20143/1- between camshaft and oil seal -1-.
- Pry out oil seal.



#### Note

*Risk of chemical damage to the coolant pump gasket caused by oil entering between the coolant pump and the cylinder head.*

- Cover coolant pump with a cloth.

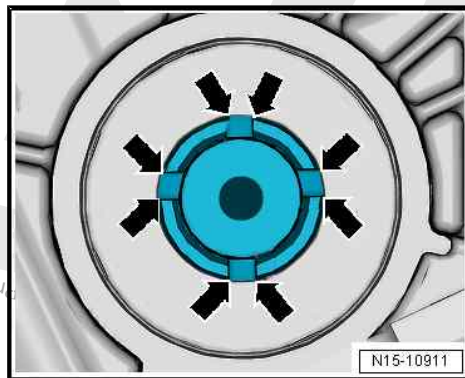
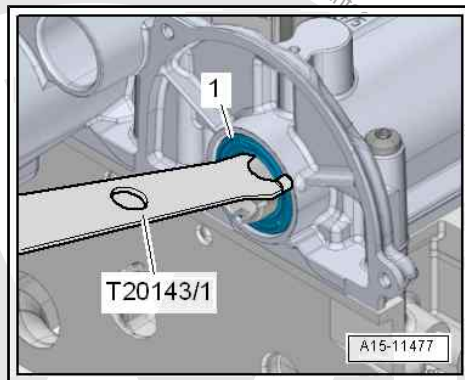
### Installing

- Remove any burrs in outer area of grooves in exhaust camshaft -arrows- using fine sandpaper "220" 1000 grade".



#### Note

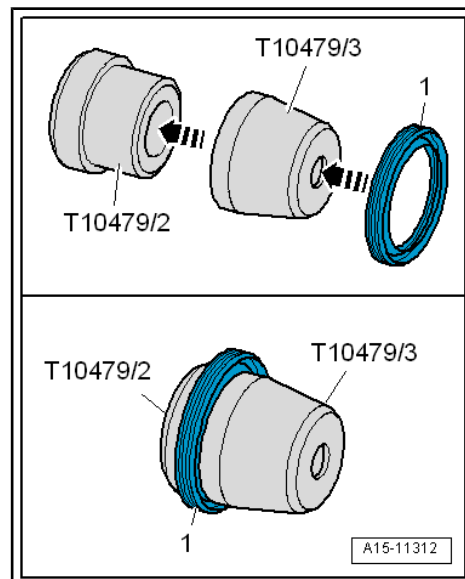
*Do not lubricate new oil seal.*



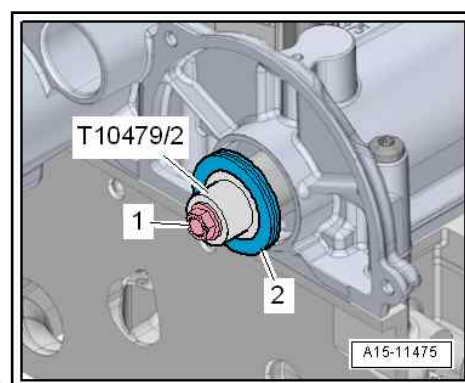




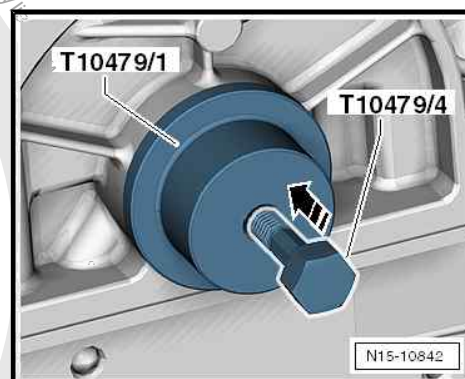
- Slide seal -1- over fitting sleeve - T10479/3- onto guide sleeve - T10479/2- .
- Installation position: closed side of oil seal faces towards guide sleeve - T10479/2- .
- Separate fitting sleeve - T10479/3- from guide sleeve - T10479/2- .
- Fit guide sleeve - T10479/2- together with oil seal centrally on camshaft.



- Secure guide sleeve onto camshaft using bolt -1- for coolant pump drive sprocket.
- Slide oil seal onto camshaft and unbolt guide sleeve.



- Pull in oil seal onto stop using press tool -T10479/1- and bolt -T10479/4- .
- Install coolant pump pulley  
⇒ ["2.7 Removing and installing toothed belt pulley for coolant pump", page 307](#)



### 3.4 Removing and installing camshaft adjuster

⇒ ["3.4.1 Removing and installing camshaft adjuster for inlet camshaft", page 223](#)

⇒ ["3.4.2 Removing and installing camshaft adjuster for exhaust camshaft", page 227](#)

#### 3.4.1 Removing and installing camshaft adjuster for inlet camshaft

Special tools and workshop equipment required



◆ Assembly tool - T10476A-



◆ Counter-hold tool - T10554-

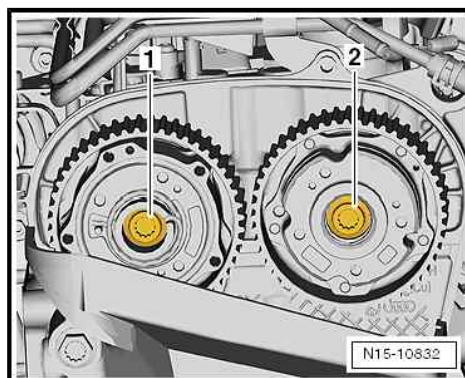


◆ Counter-hold tool - T10172A-



## Removing

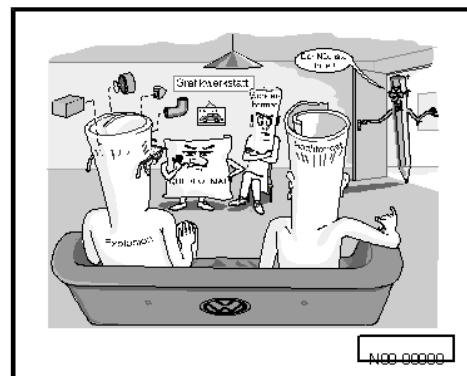
- Set engine to "TDC for cylinder no. 1"  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .
- Remove toothed belt from camshafts  
⇒ ["2.7 Removing toothed belt from camshaft", page 210](#) .
- Secure camshaft against turning with counterhold - T10554- and counterhold - T10172- .
- Unscrew bolt -2- for camshaft adjuster of inlet camshaft.
- Remove camshaft adjuster of inlet camshaft.
- Seal camshaft adjusters immediately using suitable plug from engine bung set - VAS 6122- .





## Installing

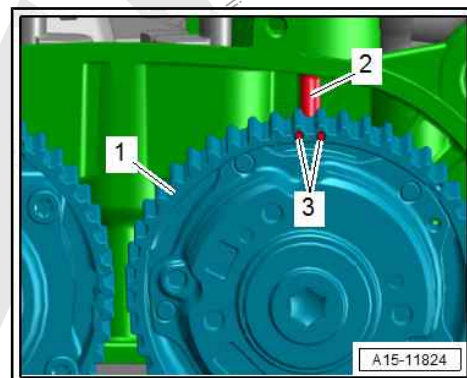
- Install camshaft adjuster.
- Renew bolts -3- and -4- for camshaft adjusters, and screw them in loosely.
- It should just be possible to turn camshaft pulleys -1- and -2- on camshafts but no rocking is permissible.
- Camshafts are located in “TDC” position.
- The camshaft pulleys are properly aligned with each other.
- Crankshaft is in “TDC position”.



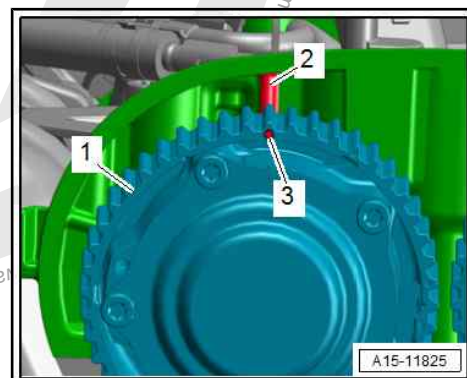
## Note

- ◆ Renew bolts that are tightened with turning further angle.
- ◆ Check O-ring of plug and cap for damage, and renew if necessary; see ⇒ *Electronic parts catalogue (ETKA)*.
- ◆ Ensure that guide sleeve ~~⇒ item 11 (page 186)~~ is refitted.

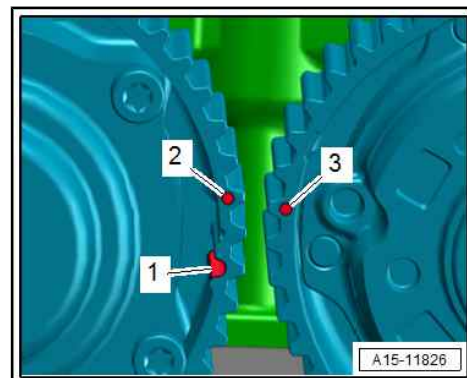
- Centre marks -3- of inlet camshaft pulley -1- relative to web -2- on camshaft housing.



- Centre marks -3- of exhaust camshaft pulley -1- relative to web -2- on camshaft housing.

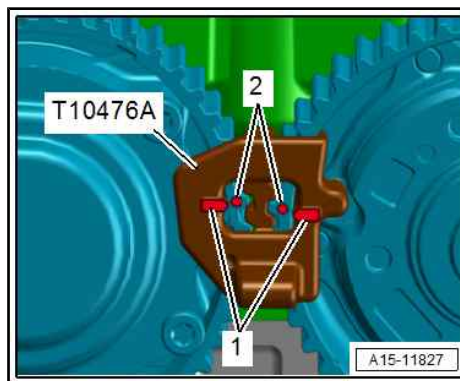


- The items -2- and -3- must be slightly offset.
- Groove -1- is used to check whether the assembly tool - T10476A- has been inserted correctly.

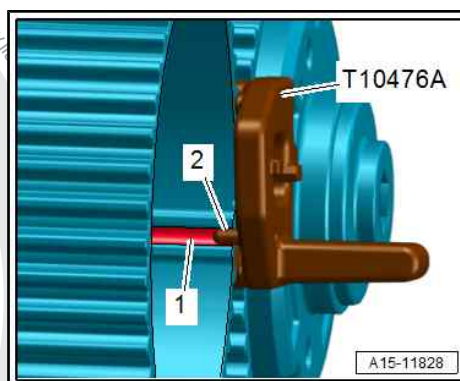




- Insert assembly tool - T10476A- between camshaft pulleys.
- The markings -1- on the assembly tool - T10476A- must be aligned with markings -2- on the camshaft pulleys.



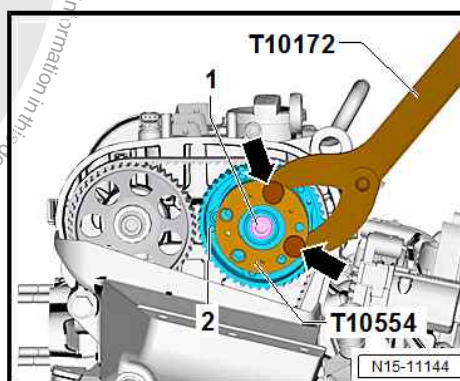
- Insert assembly tool - T10476A- to stop.
- Dowel pin -2- of assembly tool - T10476A- must engage in groove of exhaust camshaft pulley -1-.
- Fit toothed belt onto camshafts  
⇒ ["2.7 Removing toothed belt from camshaft", page 210](#) .



### Pre-tightening

- Hold inlet camshaft in position using counter-hold tool - T10554- and counter-hold tool - T10172- .
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.

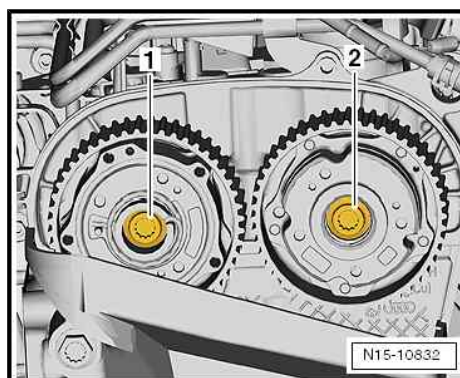
Stage	Securing bolt for camshaft adjuster, inlet side	Specified torque
1.	-1-	18 Nm
2.	-1-	50 Nm



- Hold exhaust camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .

- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.

Stage	Securing bolt for camshaft adjuster, outlet side	Specified torque
1.	-1-	18 Nm
2.	-1-	50 Nm



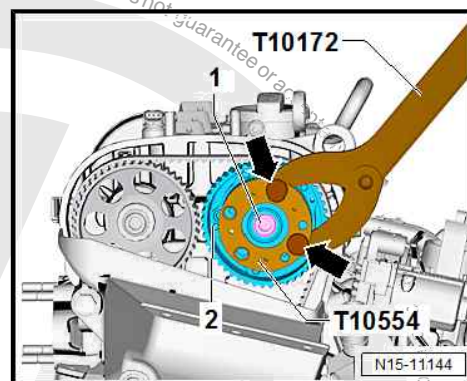




### Tightening to final specified torque

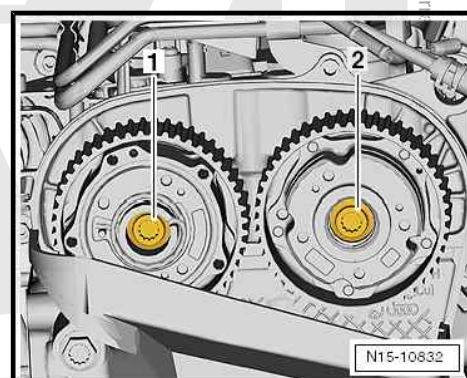
- Tighten bolt -1- for camshaft adjuster to final specified torque.

Stage	Securing bolt for camshaft adjuster, inlet side	Angle to turn bolts
1.	-1-	135°



- Tighten securing bolt for camshaft adjuster on exhaust side -1- to final torque setting.

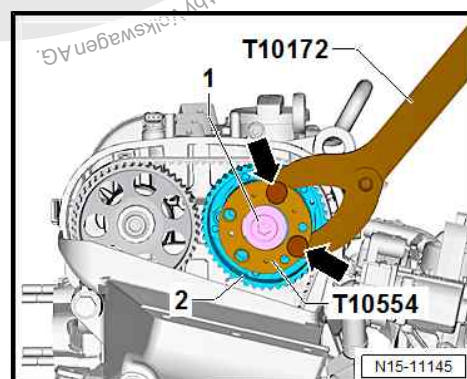
Stage	Securing bolt for camshaft adjuster	Angle to turn bolts
1.	-1-	135°



- Hold inlet camshaft in position using counter-hold tool -T10554- and counter-hold tool -T10172-.

- Screw in plug -1-, and tighten it to specified torque.

Stage	Plug for camshaft adjuster	Specified torque
1.	-1-	20 Nm



### Assembling

Assembly is carried out in reverse sequence; note the following:



#### Note

*Make sure to remove the camshaft clamp and the crankshaft locking pin before cranking the engine.*

### Specified torques

- ◆ ⇒ [“2.2 Assembly overview - toothed belt”, page 185](#)
- ◆ ⇒ [“3.1 Assembly overview - valve gear”, page 216](#)

## 3.4.2 Removing and installing camshaft adjuster for exhaust camshaft

Special tools and workshop equipment required





◆ Assembly tool - T10476A-



◆ Counter-hold tool - T10554-

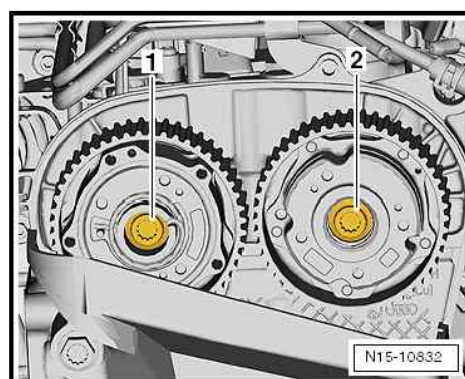


◆ Counter-hold tool - T10172A-



## Removing

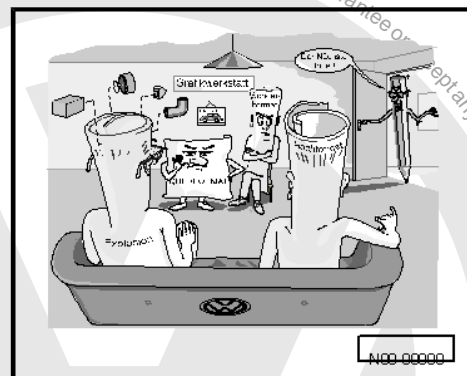
- Set engine to "TDC for cylinder no. 1"  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .
- Remove toothed belt from camshafts  
⇒ ["2.7 Removing toothed belt from camshaft", page 210](#) .
- Secure camshaft against turning with counterhold - T10554- and counterhold - T10172- .
- Unscrew bolt -1- for camshaft adjuster of exhaust camshaft.
- Remove engine support  
⇒ ["1.5 Removing and installing engine support", page 143](#) .
- Remove camshaft adjuster of exhaust camshaft.
- Seal camshaft adjusters immediately using suitable plug from engine bung set - VAS 6122- .





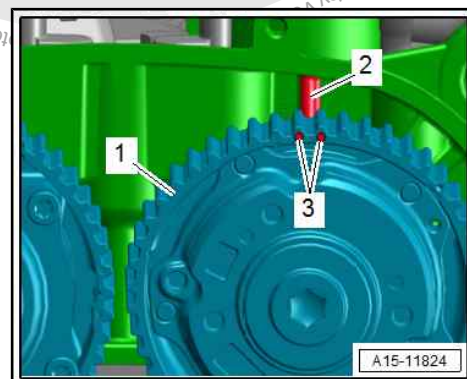
## Installing

- Install camshaft adjuster.
- Renew bolts -3- and -4- for camshaft adjusters, and screw them in loosely.
- It should just be possible to turn camshaft pulleys -1- and -2- on camshafts but no rocking is permissible.
- Camshafts are located in “TDC” position.
- The camshaft pulleys are properly aligned with each other.
- Crankshaft is in “TDC position”.

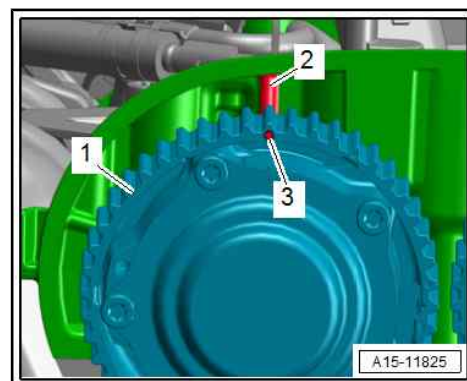


### Note

- ◆ *It should just be possible to turn camshaft pulleys on camshafts but no rocking is permissible.*
  - ◆ *Renew bolts that are tightened with turning further angle.*
  - ◆ *Check O-ring of plug and cap for damage, and renew if necessary; see ⇒ [Electronic parts catalogue \(ETKA\)](#).*
  - ◆ *Make sure to reinstall the guide sleeve  
⇒ [Item 10 \(page 186\)](#).*
- Centre marks -3- of inlet camshaft pulley -1- relative to web -2- on camshaft housing.

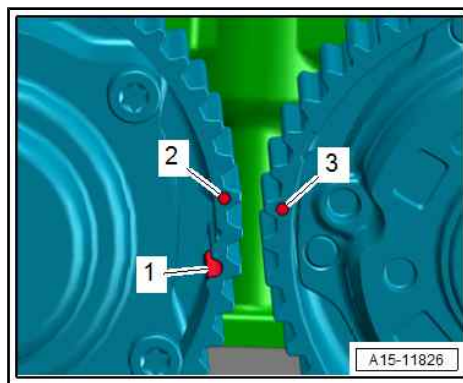


- Centre marks -3- of exhaust camshaft pulley -1- relative to web -2- on camshaft housing.

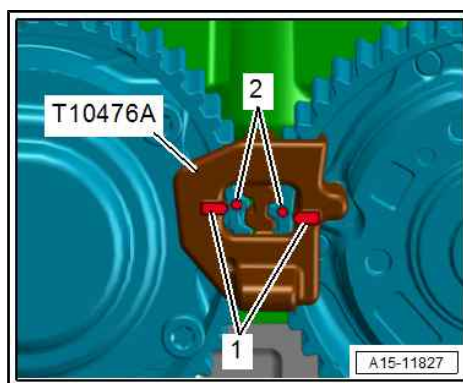




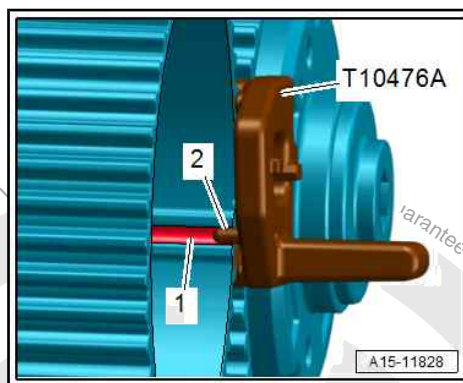
- The items -2- and -3- must be slightly offset.
- Groove -1- is used to check whether the assembly tool - T10476A- has been inserted correctly.



- Insert assembly tool - T10476A- between camshaft pulleys.
- The markings -1- on the assembly tool - T10476A- must be aligned with markings -2- on the camshaft pulleys.



- Insert assembly tool - T10476A- to stop.
- Dowel pin -2- of assembly tool - T10476A- must engage in groove of exhaust camshaft pulley -1-.
- Fit toothed belt onto camshafts  
⇒ [“2.7 Removing toothed belt from camshaft”, page 210](#) .

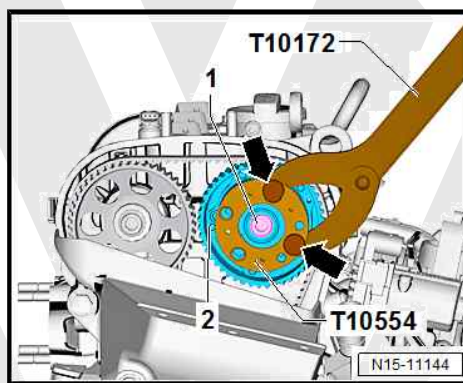


### Pre-tightening

- Hold inlet camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .
- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.

Stage	Securing bolt for camshaft adjuster, inlet side	Specified torque
1.	-1-	18 Nm
2.	-1-	50 Nm

- Hold exhaust camshaft in position using counterhold tool - T10554- and counterhold tool - T10172- .

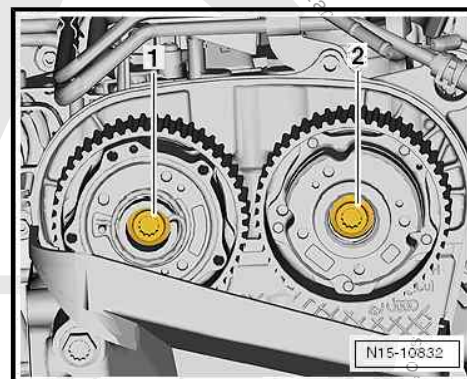






- Pre-tighten bolt -1- to specified pre-tightening torque in two stages.

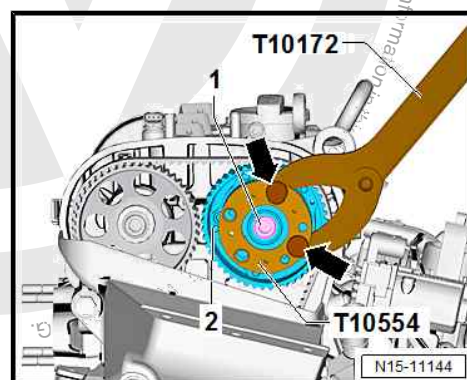
Stage	Securing bolt for camshaft adjuster, outlet side	Specified torque
1.	-1-	18 Nm
2.	-1-	50 Nm



#### Tightening to final specified torque

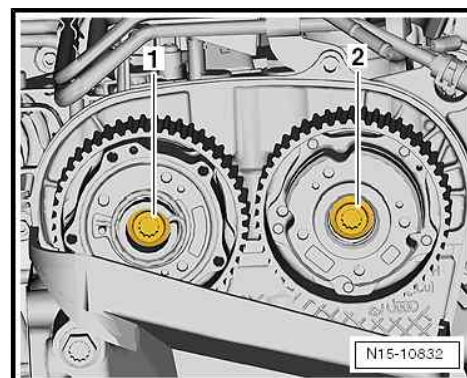
- Tighten bolt -1- for camshaft adjuster to final specified torque.

Stage	Securing bolt for camshaft adjuster, inlet side	Angle to turn bolts
1.	-1-	135°

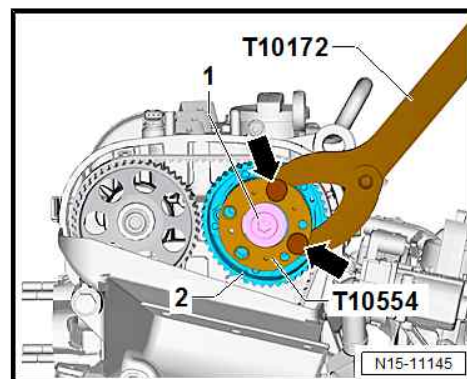


- Tighten securing bolt for camshaft adjuster on exhaust side -1- to final torque setting.

Stage	Securing bolt for camshaft adjuster	Angle to turn bolts
1.	-1-	135°



- Hold inlet camshaft in position using counter-hold tool - T10554- and counter-hold tool - T10172- .



- Screw in plug -1-, and tighten it to specified torque.

Stage	Plug for camshaft adjuster	Specified torque
1.	-1-	20 Nm

#### Assembling

Install in reverse order of removal, observing the following:



#### Note

*Make sure to remove the camshaft clamp and the crankshaft locking pin before cranking the engine.*

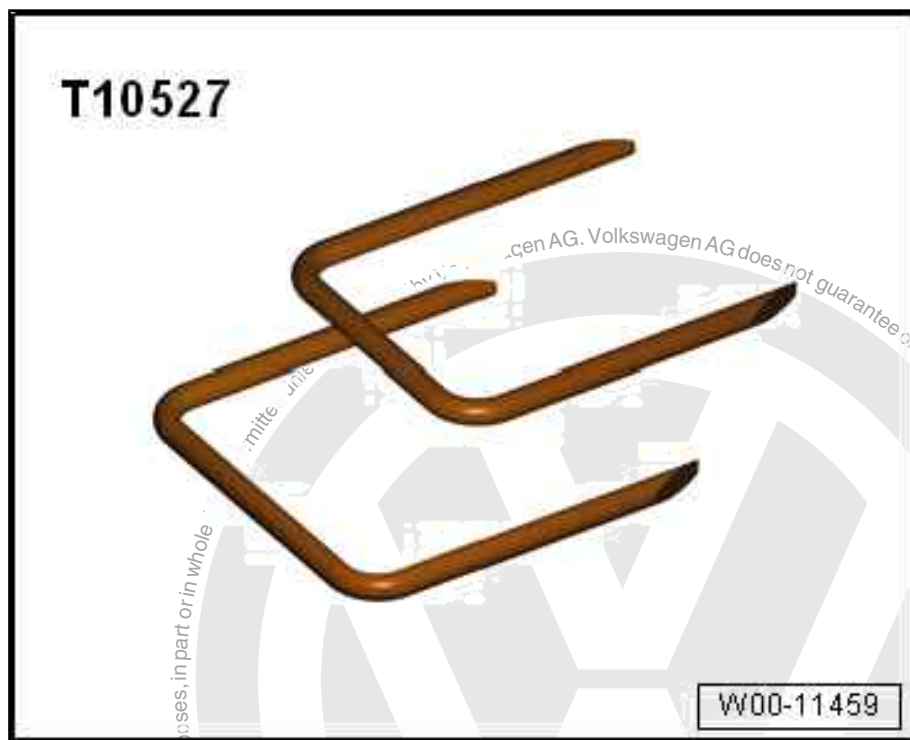
#### Specified torques

- ◆ ⇒ [“2.2 Assembly overview - toothed belt”, page 185](#)
- ◆ ⇒ [“3.1 Assembly overview - valve gear”, page 216](#)

### 3.5 Removing and installing camshaft control valve 1 - N205-



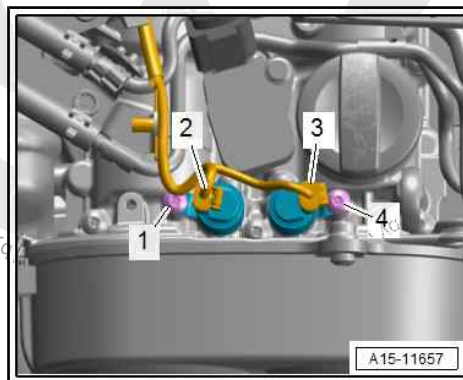
### Special tools and workshop equipment required



#### ◆ Release tool - T10527-

#### Removing

- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .
- Removing and installing air intake pipe  
⇒ [“2.5 Removing and installing air pipe”, page 385](#) .
- Disconnect relevant connector -2- or -3-.
- Unscrew bolt -1- and remove exhaust camshaft control valve 1 - N318- .
- Unscrew bolt -4-, and remove inlet camshaft control valve 1 - N205- .



#### Installing

Install in reverse order of removal, observing the following:



#### Note

*Renew O-ring.*

#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - valve gear”, page 216](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ ⇒ [“2.1 Assembly overview - charge air system”, page 378](#)





## 3.6 Removing and installing exhaust camshaft control valve 1 - N318-

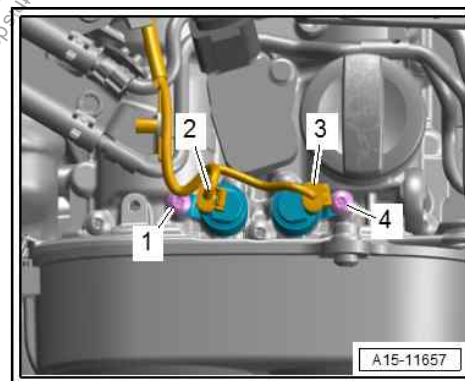
Special tools and workshop equipment required



◆ Release tool - T10527-

### Removing

- Remove air filter housing  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)
- Removing and installing air intake pipe  
⇒ ["2.5 Removing and installing air pipe", page 385](#)
- Disconnect relevant connector -2- or -3-
- Unscrew bolt -1- and remove exhaust camshaft control valve 1 - N318- .
- Unscrew bolt -4-, and remove inlet camshaft control valve 1 - N205- .



### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ Check O-ring for damage.
- ◆ If it is damaged, renew it together with camshaft control valve 1 - N205- .
- ◆ The O-ring cannot be renewed individually.

### Specified torques

- ◆ ⇒ ["3.1 Assembly overview - valve gear", page 216](#)
- ◆ ⇒ ["3.1 Assembly overview - air filter housing", page 410](#)
- ◆ ⇒ ["2.1 Assembly overview - charge air system", page 378](#)



## 3.7 Removing and installing valve stem seals

⇒ ["3.7.1 Removing and installing valve stem seals \(cylinder head installed\)", page 234](#)

⇒ ["3.7.2 Removing and installing valve stem seals \(cylinder head removed\)", page 239](#)

### 3.7.1 Removing and installing valve stem seals (cylinder head installed)

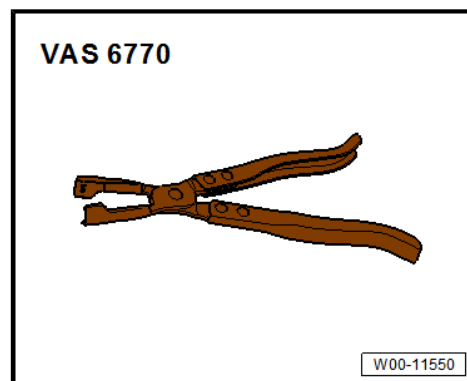
Special tools and workshop equipment required

- ◆ Spark plug socket - 3122 B-
- ◆ Removal and installation device for valve cotters - VAS 5161A- with guide plate - VAS 5161A/32- .
- ◆ Valve stem seal fitting tool - 3365-





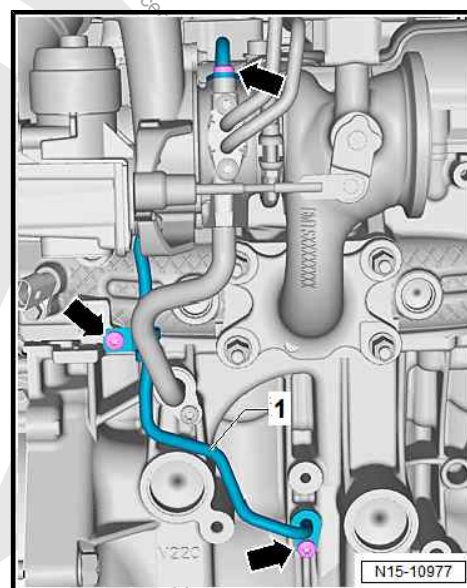
- ◆ Valve stem pliers - VAS 6770-



- ◆ Adapter - VAS 5161A/35- (not illustrated)

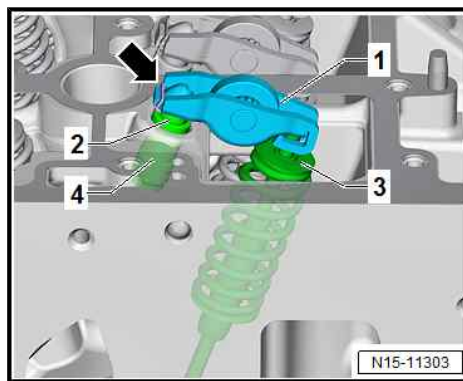
### Sequence of operations

- Remove plenum chamber cover. ⇒ General body repairs, exterior; Rep. gr. 50 ; Plenum chamber bulkhead; Removing and installing plenum chamber cover
- Remove engine control unit  
⇒ ["6.1 Assembly overview - engine control unit", page 437](#)
- Remove plenum chamber bulkhead. ⇒ General body repairs, exterior; Rep. gr. 50 ; Plenum chamber bulkhead; Removing and installing plenum chamber bulkhead
- Remove camshaft housing  
⇒ ["1.4 Removing and installing camshaft housing", page 178](#) .
- Unscrew spark plugs with spark plug socket - 3122 B- .
- Remove lambda probe 1 before catalytic converter - GX10-  
⇒ ["8.2 Removing and installing Lambda probe", page 454](#)
- Remove heat shield for drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft heat shield .
- Unscrew bolts -arrows-, and remove oil supply line -1-.





- Mark allocation of roller rocker fingers -1-, hydraulic compensation element -4- and valves -3- for reinstallation.

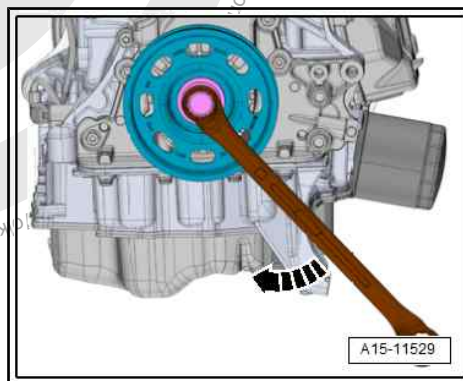
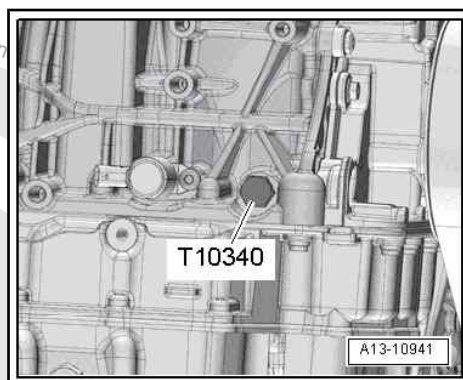


- Unscrew locking pin - T10340 -
- Set piston of respective cylinder to "bottom dead centre".



#### Note

- ◆ The pistons of cylinders no. 1 and no. 4 are at »TDC« position after the camshaft housing has been removed.
- ◆ The pistons of cylinders no. 2 and no. 3 are at »bottom dead centre« position after the camshaft housing has been removed.
- ◆ Crank engine via crankshaft half a turn in direction of engine rotation. The pistons for cylinders no. 1 and no. 4 are at »bottom dead centre« position.
- ◆ When cranking the engine, hold and guide the toothed belt by hand to prevent it from being damaged.
- Insert a screwdriver with a shaft length of at least 250 mm into spark plug hole so that it contacts piston crown.
- Turn crankshaft in direction of engine rotation -arrow- until piston of respective cylinder is at "BDC".



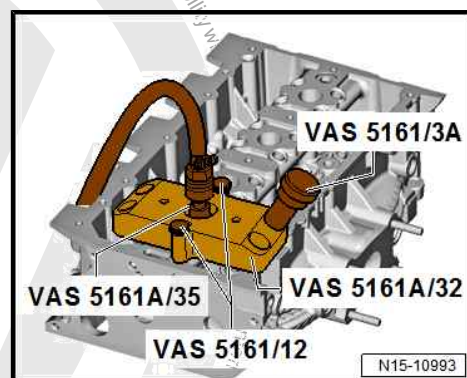


The screwdriver moves in the -direction of the arrow-.

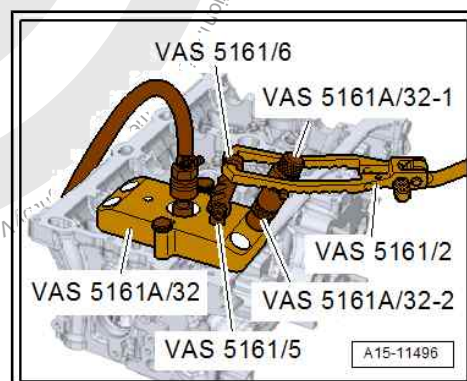
- The "BDC" has been reached before the screwdriver starts moving back in opposite direction.



- Fit guide plate -VAS 5161A/32- onto cylinder head and secure with knurled screws -VAS 5161/12- .
- Screw adapter - VAS 5161A/35- into the respective spark plug thread hand-tight.
- Connect adapter to compressed air supply using a commercially available union and apply pressure continuously.
- Minimum pressure: 6 bar.
- Insert punch -VAS 5161/3A- into guide plate. Use a plastic hammer to knock loose the firmly seated valve cotters.



- Screw toothed piece -VAS 5161/6- with hooking fork - VAS 5161/5- into guide plate.
- Slide sleeve -VAS 5161A/32-1- onto assembly cartridge and insert cartridge into guide plate -VAS 5161A/32-2- .
- Attach pressure fork -VAS 5161/2- to toothed piece and press assembly cartridge down.
- At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.
- Move knurled screw back and forth to press apart valve cotters and capture them in assembly cartridge.
- Release pressure fork.
- Remove installation cartridge.
- Unbolt guide plate and move to side.
- The compressed air hose remains connected.
- Remove valve spring and valve spring plate.







- Pull off valve stem seal using valve stem pliers - VAS 6770- .

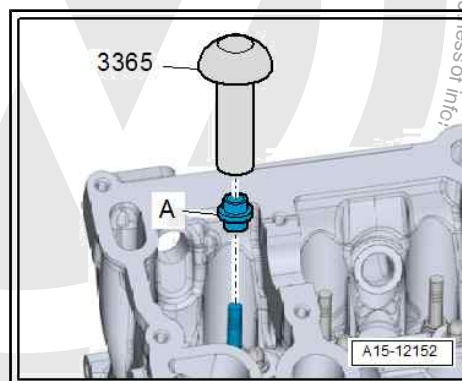


#### Note

- ♦ *Slowly push valve stem seals as far as stop.*
- ♦ *Seal oil passages of cylinder head with a lint-free cloth.*

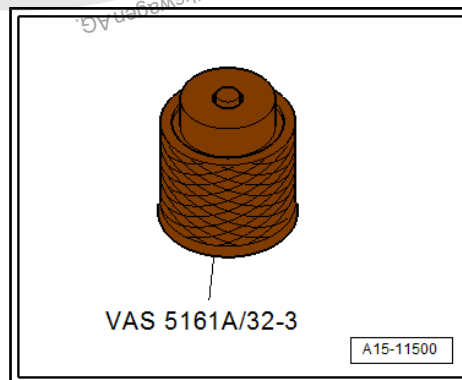


- Lightly oil sealing lip of valve stem seal -A-.
- Carefully press valve stem oil seal -A- onto valve guide using valve stem seal fitting tool - 3365- .



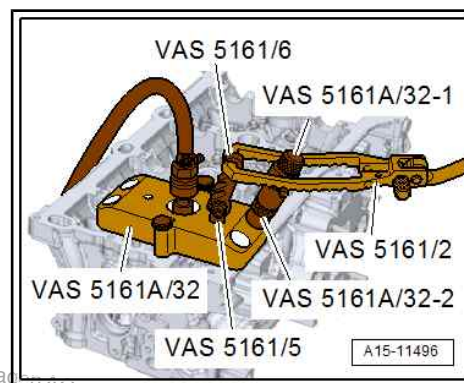
#### If valve cotters have been removed from assembly cartridge:

- First, insert valve cotters into insertion device - VAS 5161 A/ 32-3- .
- Press down spring washer until three grooves are visible.
- Fit valve cotters into grooves.
- Larger diameter of valve cotters faces upwards.
- Release the spring washer. The spring force pushes the washer back upwards and holds the valve cotters in place.
- Press assembly cartridge - VAS 5161A/32-1- onto insert tool - VAS 5161A/32-3- from above, and pick up valve cotters.
- Insert valve spring and valve spring plate. For installation position of valve spring refer to [⇒ page 217](#) .
- To do this, move knurled screw back and forth to press apart valve cotters and capture them in assembly cartridge.





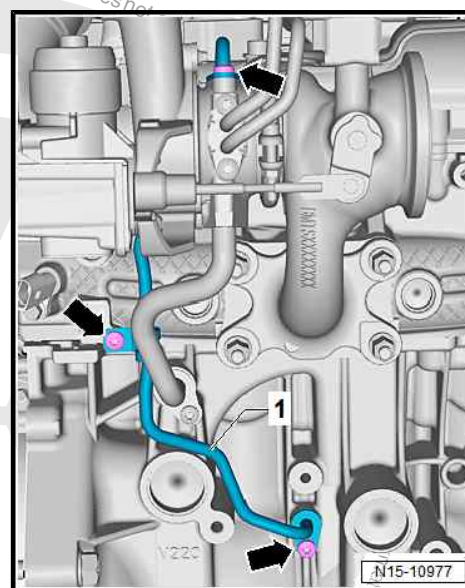
- Bolt guide plate -VAS 5161A/32- onto cylinder head again.
- Insert assembly cartridge -VAS 5161A/32-1- with sleeve -VAS 5161A/32-2- into guide plate.
- Press pressure fork downwards and pull knurled screw upwards, turning it clockwise and anticlockwise. This inserts the valve cotteners.
- Reduce pressure on pressure fork whilst pulling on knurled screw.
- Repeat procedure on each valve.



## Assembling

Assembly is carried out in the reverse order, note the following:

- Install oil supply line -1-, and tighten bolts -arrows- hand-tight.
- Install lambda probe 1 before catalytic converter - GX10-  
⇒ ["8.2 Removing and installing Lambda probe", page 454](#) .
- Install plenum chamber bulkhead. ⇒ General body repairs, exterior; Rep. gr. 50 ; Plenum chamber bulkhead; Removing and installing plenum chamber bulkhead
- Install engine control unit  
⇒ ["6.2 Removing and installing engine \(motor\) control unit J623", page 440](#)
- Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Plenum chamber bulkhead; Removing and installing plenum chamber cover
- Install camshaft housing  
⇒ ["1.4 Removing and installing camshaft housing", page 178](#) .
- Install spark plugs  
⇒ ["1.1 Assembly overview - ignition system", page 493](#) .



## Specified torques

- ◆ ⇒ ["1.1 Assembly overview - turbocharger", page 366](#)
- ◆ ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview - drive shaft

## 3.7.2 Removing and installing valve stem seals (cylinder head removed)

### Special tools and workshop equipment required

- ◆ Valve stem seal fitting tool - 3365-





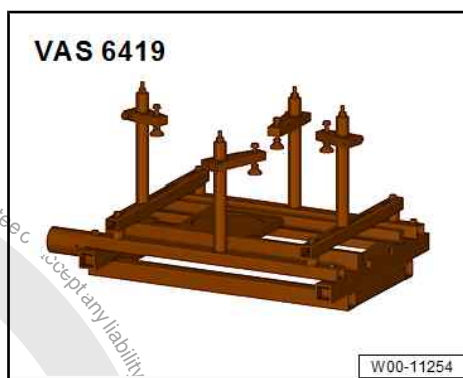
- ◆ Removal and installation device for valve cotters - VAS 5161 A- with set -VAS 5161/32-



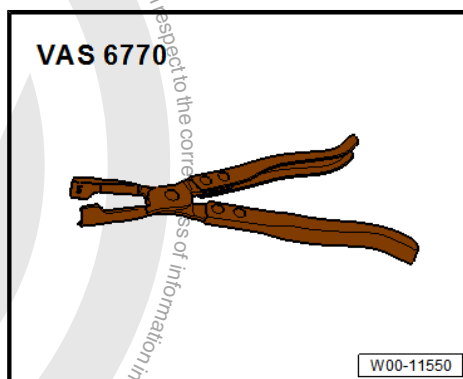
- ◆ Engine and gearbox support - VAS 6095-



- ◆ Cylinder head tensioning device - VAS 6419-



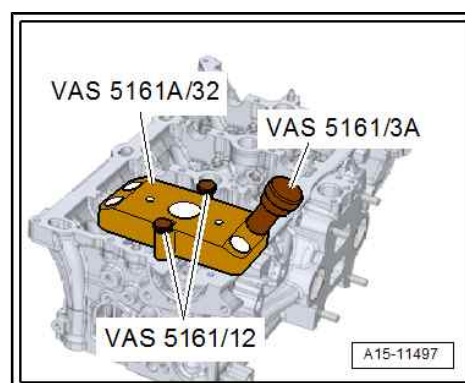
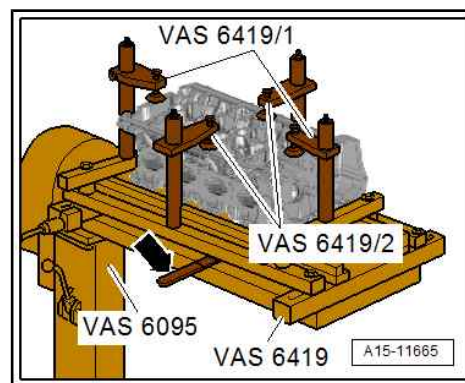
- ◆ Valve stem pliers - VAS 6770-





## Sequence of operations

- Insert cylinder head tensioning device - VAS 6419- into engine and gearbox support - VAS 6095- .
- Tension cylinder head on cylinder head tensioning device as shown in illustration.
- Connect cylinder head tensioning device to compressed air.
- Use lever -arrow- to slide air cushion under combustion chamber from which valve stem seals are to be removed.
- Allow compressed air to flow into air cushion until it lies against valve disc.
- Place guide plate -VAS 5161 A/32- onto cylinder head. Secure using knurled screws -VAS 5161/12- .
- Insert punch -VAS 5161/3A- into guide plate. Use a plastic hammer to knock loose the firmly seated valve cotters.



- Screw toothed piece -VAS 5161/6- with hooking fork - VAS 5161/5- into guide plate.
- Slide sleeve -VAS 5161 A/32-1- onto assembly cartridge and insert cartridge into guide plate -VAS 5161 A/32-2- .
- Attach pressure fork -VAS 5161/2- to toothed piece and press assembly cartridge down.

At the same time, turn knurled screw of assembly cartridge clockwise until tips engage in valve cotters.

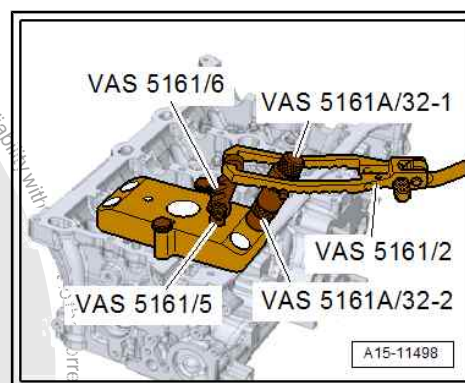
Move knurled screw back and forth to press apart valve cotters and capture them in assembly cartridge.

Release pressure fork.

Remove installation cartridge.

Unbolt guide plate and move to side.

- Remove valve spring and valve spring plate.







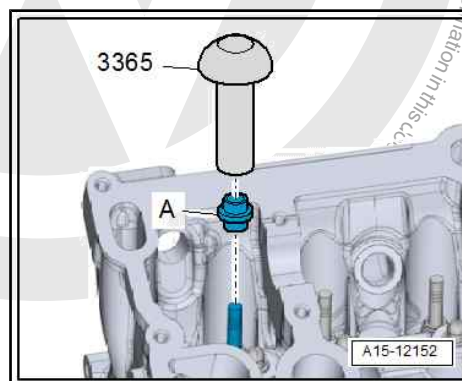
- Pull off valve stem seal using valve stem pliers - VAS 6770- .



#### Note

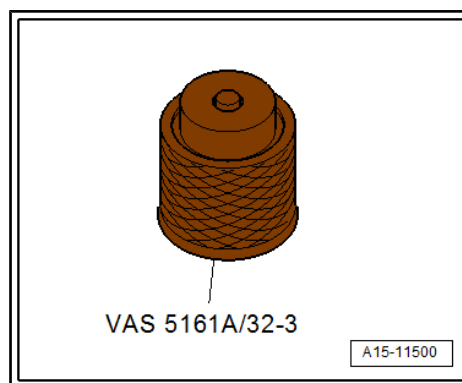
*Risk of damage when installing valve stem seals.*

- Lightly oil sealing lip of valve stem seal -A-.
- Carefully press valve stem oil seal -A- onto valve guide using valve stem seal fitting tool - 3365- .



#### If valve cotters have been removed from assembly cartridge:

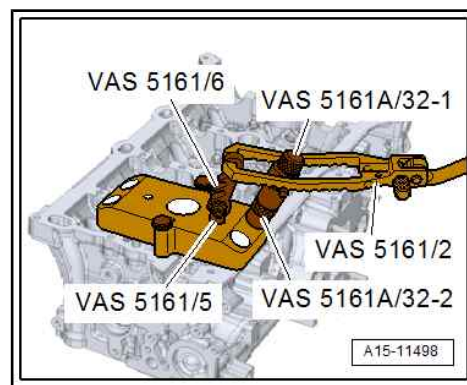
- First, insert valve cotters into insertion device - VAS 5161 A/ 32-3- .
- Press down spring washer until three grooves are visible.
- Fit valve cotters into grooves.
- Larger diameter of valve cotters faces upwards.
- Release the spring washer. The spring force pushes the washer back upwards and holds the valve cotters in place.
- Press assembly cartridge - VAS 5161A/32-1- onto insertion device from above, and pick up valve cotters.
- Insert valve spring and valve spring plate. For installation position of valve spring refer to ⇒ [page 217](#) .
- To do this, move knurled screw back and forth to press apart valve cotters and capture them in assembly cartridge.







- Bolt guide plate -VAS 5161 A/32- onto cylinder head again.
- Insert assembly cartridge -VAS 5161 A/32-1- with sleeve -VAS 5161 A/32-2- into guide plate.
- Press pressure fork downwards and pull knurled screw upwards, turning it clockwise and anticlockwise. This inserts the valve cotters.
- Reduce pressure on pressure fork whilst pulling on knurled screw.
- Repeat procedure on each valve.
- Install cylinder head  
⇒ ["1.3 Removing and installing cylinder head", page 175](#) .





## 4 Inlet and exhaust valves

⇒ ["4.1 Checking valve guides", page 244](#)

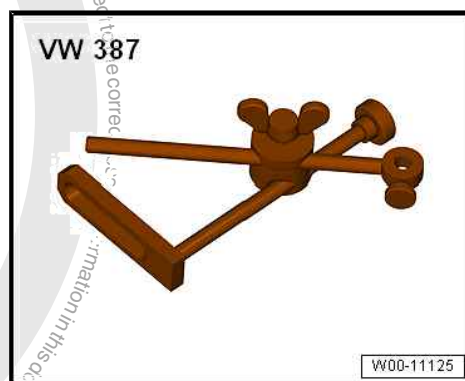
⇒ ["4.2 Checking valves", page 244](#)

⇒ ["4.3 Valve dimensions", page 245](#)

### 4.1 Checking valve guides

Special tools and workshop equipment required

◆ Universal dial gauge bracket - VW 387-



◆ Dial gauge - VAS 6079-



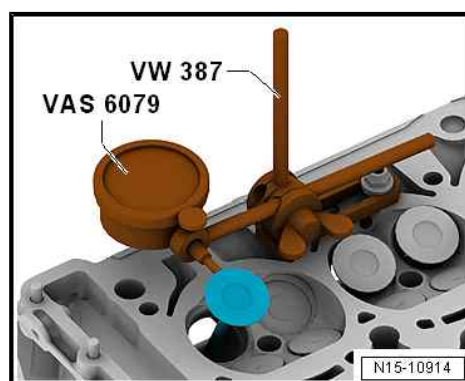
#### Test sequence

- Insert valve in guide. Valve stem end must be flush with guide. On account of differing stem diameters, only use inlet valve in inlet valve guide and exhaust valve in exhaust valve guide.
- Determine rock.
- Wear limit: 0.5 mm.
- If the wear limit is exceeded, repeat the measurement with new valves.
- Renew cylinder head if wear limit is still exceeded.



#### Note

*Valve guides cannot be exchanged.*



### 4.2 Checking valves

- Check for scoring on valve stems and valve seat surfaces.
- Exchange valve if significant scoring can be seen.



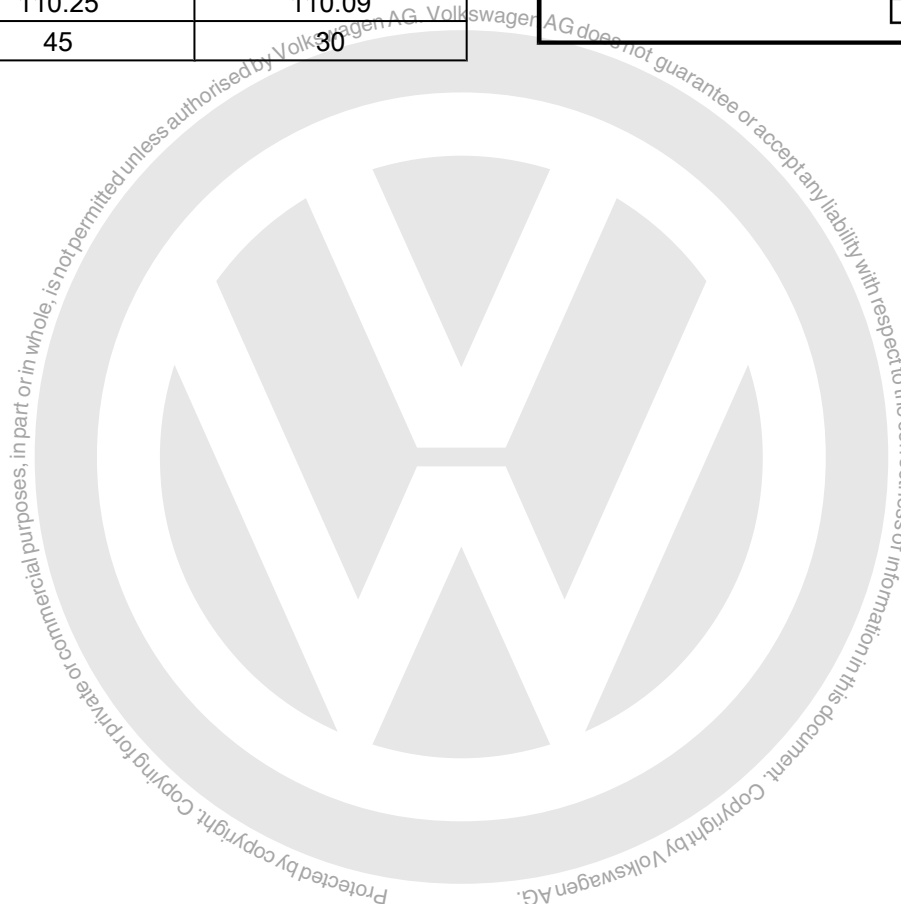
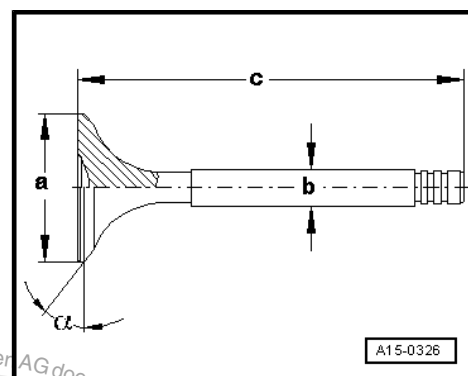
## 4.3 Valve dimensions



### Note

*Never rework the inlet and exhaust valves. Only lapping-in is permitted.*

Dimension		Inlet valve	Outlet valve
Ø a	mm	28.5	25.0
Ø b	mm	4.973	4.963
c	mm	110.25	110.09
α	°	45	30





## 17 – Lubrication

### 1 Sump, oil pump

⇒ [“1.1 Assembly overview - sump/oil pump”, page 246](#)

⇒ [“1.2 Engine oil:”, page 250](#)

⇒ [“1.3 Removing and installing sump”, page 250](#)

⇒ [“1.4 Removing and installing oil pump”, page 254](#)

⇒ [“1.5 Removing and installing oil level and oil temperature sender G266”, page 256](#)

#### 1.1 Assembly overview - sump/oil pump



##### Note

- ♦ *Finding metal shavings or a large quantity of small metal particles during engine repair could indicate that the crankshaft bearings or conrod bearings are damaged. To avoid any subsequent damage, the following work must be carried out following the repair: carefully clean oil channels and renew oil spray jets, engine oil cooler and oil filter.*
- ♦ *Oil spray jet and pressure relief valve*  
⇒ [“4.6 Removing and installing oil spray jets”, page 167](#) .



## 1 - Sump

- ☐ Removing and installing  
⇒ ["1.3 Removing and installing sump", page 250](#)
- ☐ Tighten loosened connecting union for oil filter  
⇒ [Fig. "Tightening connecting union for oil filter", page 249](#)

## 2 - Bolt

- ☐ Renew after removal
- ☐ Tightening sequence  
⇒ [page 248](#)

## 3 - Seal

- ☐ Renew in the case of oil drain plug with non-captive seal

## 4 - Oil drain plug

- ☐ With captive seal on new vehicles  
⇒ [page 249](#)
- ☐ To be renewed on 1st oil change ⇒ [page 249](#)
- ☐ Oil drain plug with non-captive seal installed on first oil change is to be reused ⇒ [page 249](#)
- ☐ 30 Nm

## 5 - Oil intake tube

- ☐ Clean strainer if soiled

## 6 - Bolt

- ☐ 8 Nm

## 7 - Seal

- ☐ Renew after removal

## 8 - Seal

- ☐ Renewing ⇒ ["1.6 Renewing crankshaft oil seal - belt pulley end", page 146](#)

## 9 - Bolt

- ☐ Specified torques and installation sequence ⇒ [page 248](#) .

## 10 - Oil pump

- ☐ Removing and installing ⇒ ["1.4 Removing and installing oil pump", page 254](#)

## 11 - Dowel sleeve

- ☐ Qty. 2

## 12 - Seal

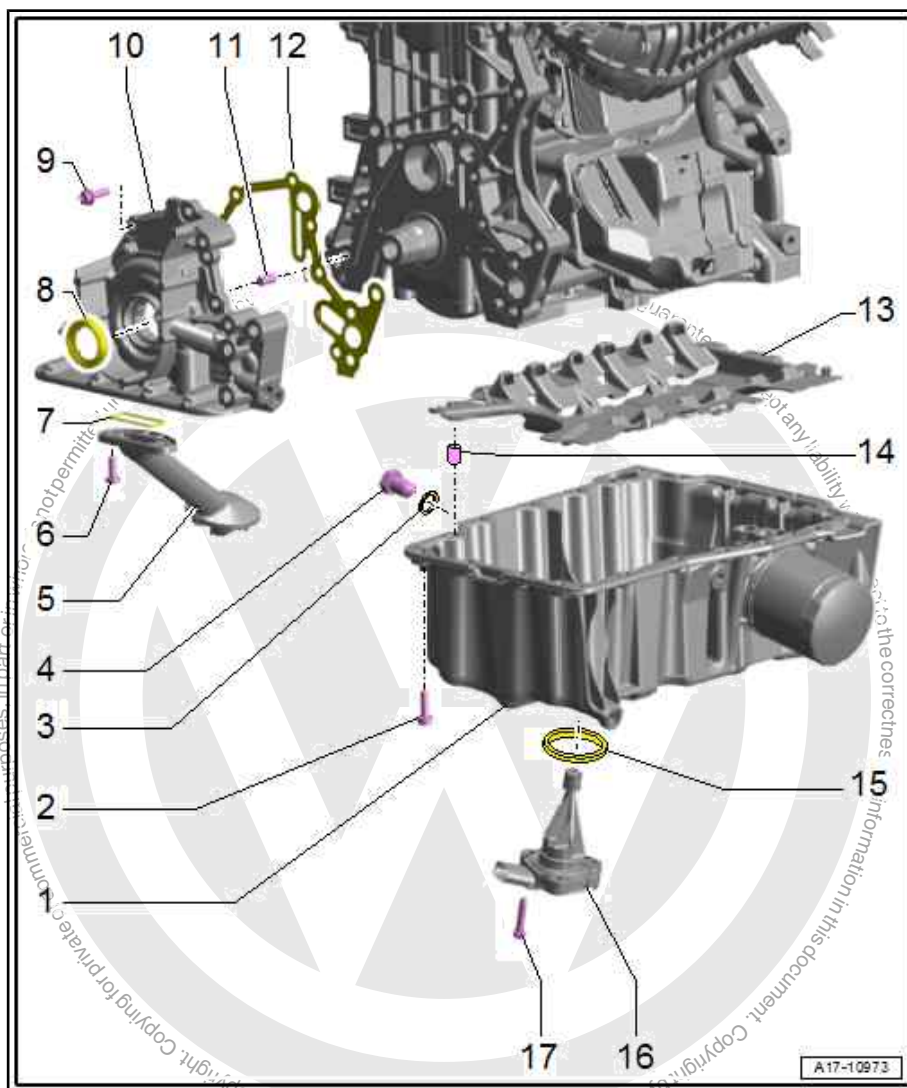
- ☐ Renew after removal

## 13 - Baffle plate

## 14 - Dowel pin

## 15 - Seal

- ☐ Renew after removal







## 16 - Oil level and oil temperature sender - G266-

- ❑ Removing and installing

⇒ ["1.5 Removing and installing oil level and oil temperature sender G266 ", page 256](#)

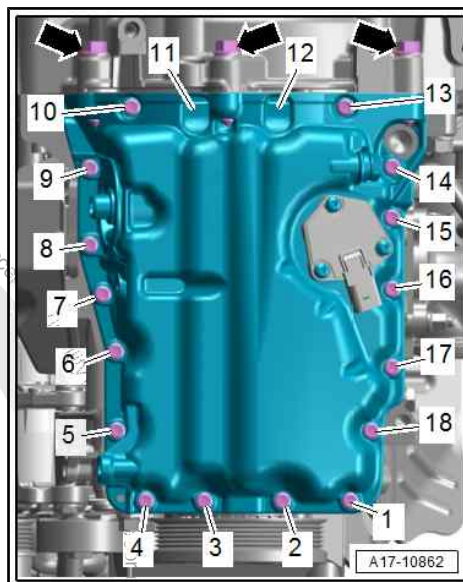
## 17 - Bolt

- ❑ 9 Nm

### Sump - specified torque and tightening sequence

- Tighten bolts in stages in the sequence shown.

Stage	Bolts	Specified torque
1.	-1 ... 18-	Screw onto stop by hand
2.	-1 ... 18-	12 Nm



### Oil pump - specified torque and tightening sequence

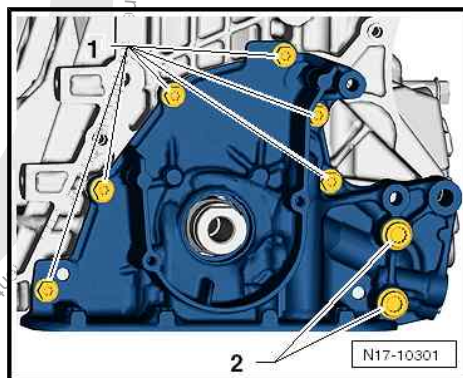


#### Note

*Renew bolts that are tightened with turning further angle.*

- Tighten bolts in stages in the sequence shown.

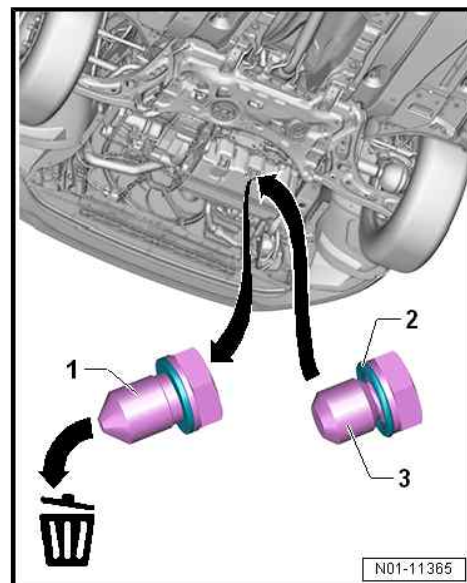
Stage	Bolts	Specified torque/turning further angle
1.	-1, 2-	8 Nm
2.	-1-	Turn 90° further
3.	-2-	20 Nm





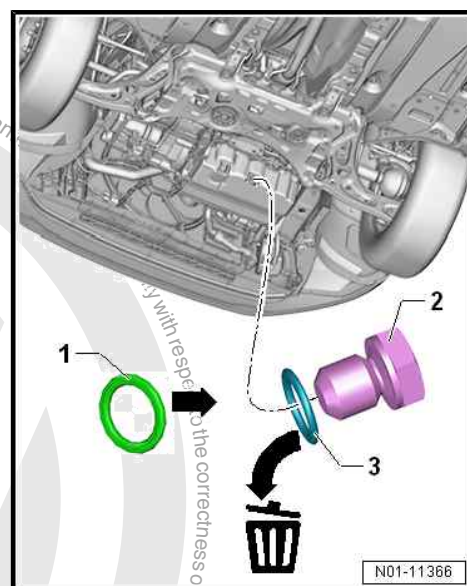
### Oil drain plug with captive seal (factory-installed)

- On first oil change, oil drain plug with captive seal -1- is disposed of.
- Fit new oil drain plug -3- with renewable seal -2-.



### Oil drain plug with renewable seal (all future oil change services)

- Unscrew oil drain plug -2-, and dispose of old seal -3-.
- New oil seal -1- can be renewed individually when oil is changed in the future.

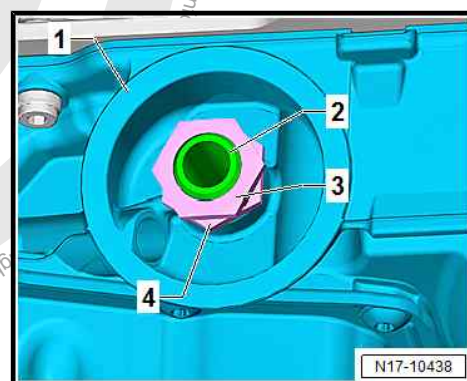


### Tightening connecting union for oil filter

- If the connecting union -2- in the top section of sump -1- is loose, retighten it as described below.

#### Use only the two nuts -3 and 4- for this procedure.

- Hexagon nut - 068 115 723- , qty. 2, ⇒ Electronic Parts Catalogue
- Screw nuts -3- and -4- onto connecting union -2-, and counterlock them.
- Tighten connecting union -2- using nut -3-.
- Loosen the two nuts and remove them, taking care not to loosen the connecting union.



### Specified torques

Connecting union	Specified torque
-2-	50 Nm



## 1.2 Engine oil:



### Note

- ♦ *Risk of damage to catalytic converter.*
- ♦ *Oil level must not be above "max." mark.*

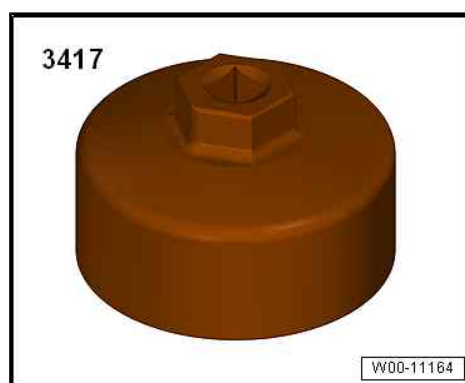
Capacities and specifications ⇒ Maintenance ; Booklet ; Engine oil: Capacities and specifications .

Check engine oil level ⇒ Maintenance ; Booklet ; Engine oil level: Checking .

## 1.3 Removing and installing sump

### Special tools and workshop equipment required

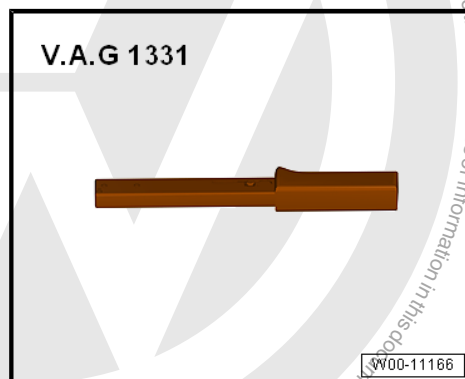
- ♦ Oil filter tool - 3417-



- ♦ Hexagon key - T10058-

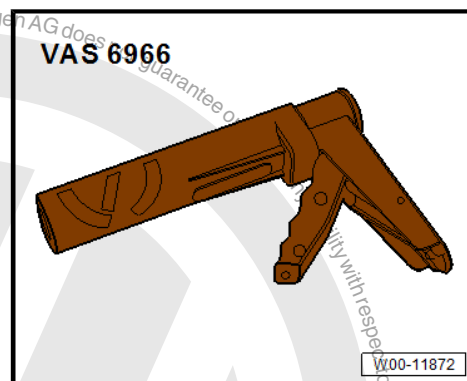


- ♦ Torque wrench - V.A.G 1331-





- ◆ Applicator gun - VAS 6966-



- ◆ Hand drill with plastic brush
- ◆ Scraper
- ◆ Silicone sealant → Electronic parts catalogue

### Removing

- Engine oil drained ⇒ Maintenance ; Booklet 819 .

### ! NOTICE

**Risk of damage to refrigerant lines from rupture of inner foil.**

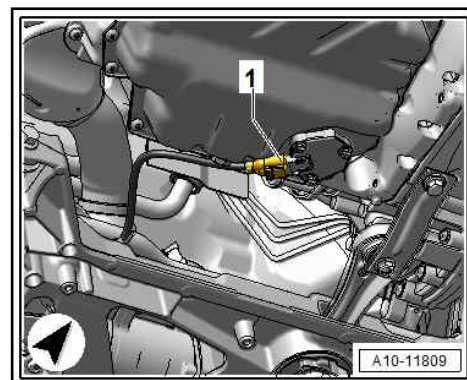
- Never bend refrigerant lines to a radius tighter than  $r < 100$  mm.



### Note

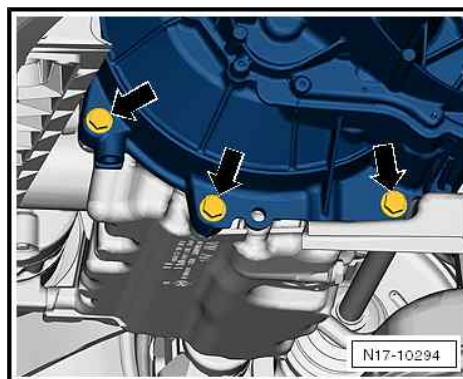
*The air conditioning system lines must not be opened.*

- Remove poly V-belt.  
⇒ ["1.2 Removing and installing poly-V belt", page 137](#)
- Remove air conditioner compressor: ⇒ Heating, air conditioning; Rep. gr. 87 ; Air conditioner compressor; Removing and installing air conditioner compressor .
- Secure air conditioner compressor to lock carrier.
- If fitted, separate electrical connector -1- on oil level and oil temperature sender - G266- .

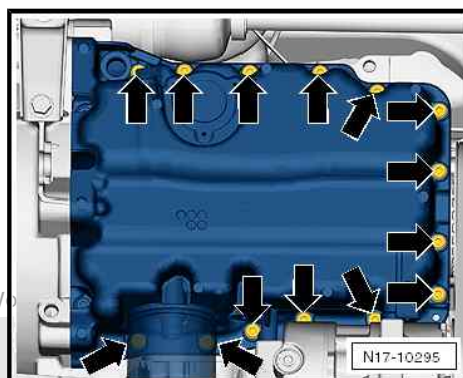




- Remove securing bolts -arrows- for gearbox.



- Unscrew all sump securing bolts -arrows-.

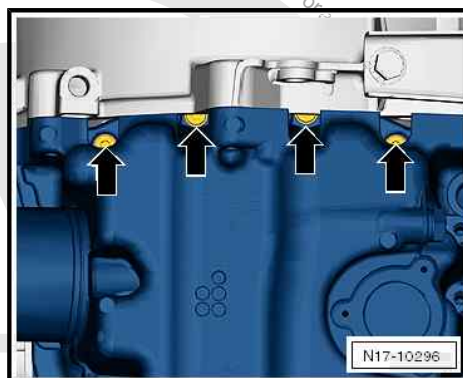


- Unscrew sump securing bolts on gearbox side -arrows- using Allen key, long reach 5 mm - T10058-



#### Note

- ◆ The sump is sealed with liquid sealant.
- ◆ When hardened, the sealant has a high adhesive strength.
- ◆ Carefully separate sump from cylinder block.

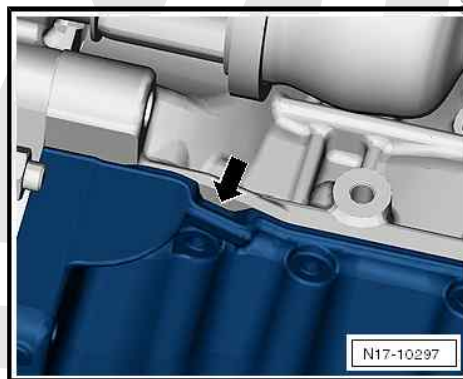


- Carefully lever off sump from cylinder block at recess -arrow- using assembly lever.
- Remove sump. Loosen sump with light blows of a rubber headed hammer if necessary.



#### Note

To prevent particles from entering the lubrication system, cover the open parts of the engine.





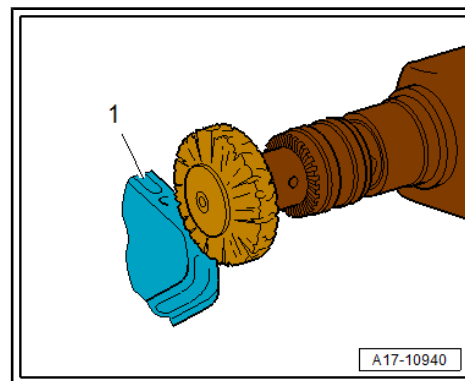


## Installing

### CAUTION

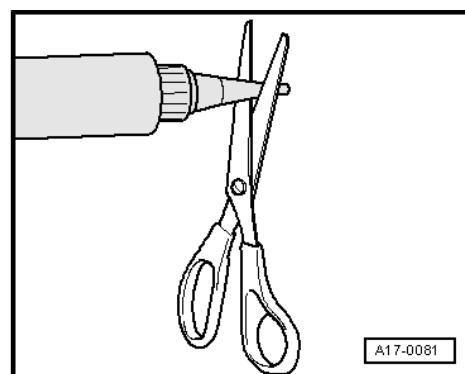
Risk of eye injury caused by sealant residue.

- Wear protective goggles.
- Remove sealant residue from sump using rotating plastic brush.
- Remove any oil and grease from sealing surfaces.



### Note

Check the expiry date of the sealant.

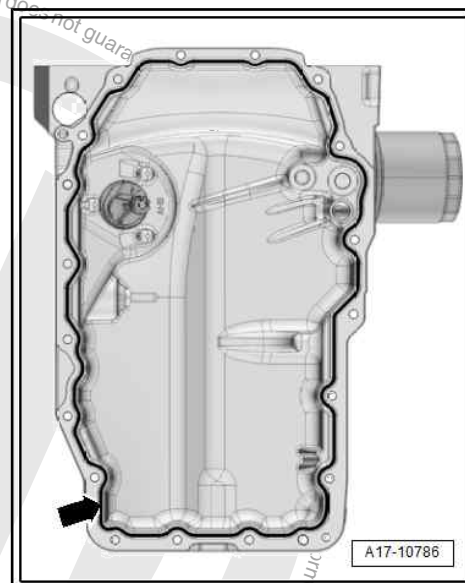


- Cut off nozzle on tube at front marking (Ø of nozzle approx. 2 mm).
- Apply sealant in a bead -arrow- to clean sealing surface of bottom section of sump using applicator gun - VAS 6966- .



### Note

- ◆ Danger of blocking lubrication system with excess sealant.
- ◆ Do not apply sealant bead thicker than specified.





- Thickness of sealant bead: 2 to 3 mm.
- Run bead along inner side of bolt holes -arrows-.
- Apply the sealant bead with particular care around the sealing flange.
- Oil sump must be installed within 5 minutes after applying sealant.
- Position oil sump and tighten bolts . ➔ [page 248](#)
- Allow sealant to dry for approx. 30 minutes after installing sump. Only then fill with engine oil.

Oil capacities ➔ Maintenance ; Booklet "Capacities and specifications"

Engine oil specifications ➔ Maintenance ; Booklet "Capacities and specifications"

- Replenish engine oil and check oil level.



#### Note

*The oil level must remain below the max. mark - danger of damage to catalytic converter!*

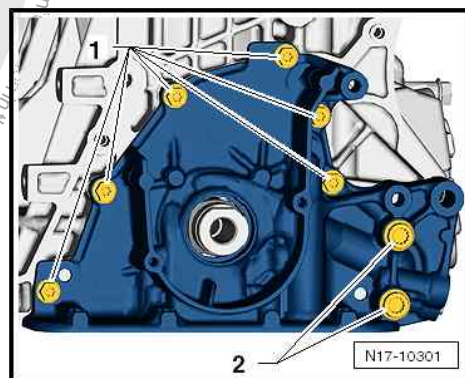
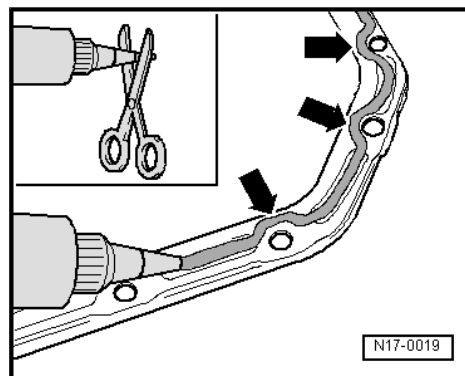
#### Specified torques

- ♦ Securing bolts for air conditioner compressor ➔ Heating, air conditioning system; Rep. gr. 87; Air conditioner compressor; Removing and installing air conditioner compressor

## 1.4 Removing and installing oil pump

### Removing

- Disconnect battery ➔ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Remove alternator ➔ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .
- Take off toothed belt.  
➔ ["2.3 Removing and installing toothed belt", page 186](#)
- Remove sump.  
➔ ["1.3 Removing and installing sump", page 250](#)
- Remove oil seal  
➔ ["1.6 Renewing crankshaft oil seal - belt pulley end", page 146](#)
- Unscrew bolts -1 and 2-, and pull oil pump in a straight line off dowel pins.
- Remove gasket.





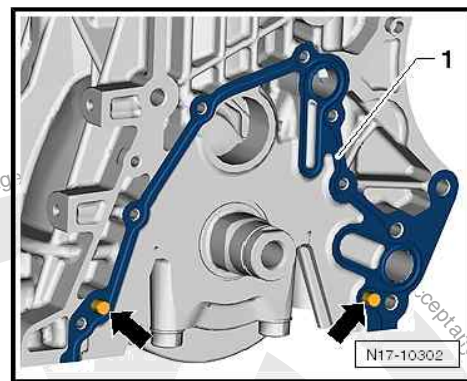
## Installing

Install in reverse order of removal, observing the following:



### Note

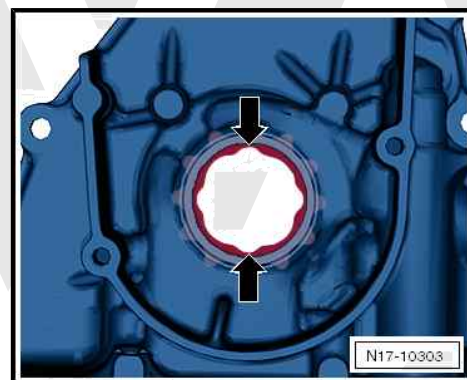
- ◆ *Renew bolts that are tightened with turning further angle after each removal.*
- ◆ *Renew seals.*
- Check whether dowel pins -arrows- for centring oil pump and cylinder block are present. Renew any missing dowel pins.
- Fit new gasket -1-.
- To check oil pump for ease of movement, turn bearing -arrows- with one finger.



### Note

*Renew sluggish oil pump.*

- Rotate oil pump gear to a position where 2 opposing notches -arrows- are aligned vertically.
- Fit oil pump, and tighten bolts ⇒ [page 248](#)
- Insert new oil seal  
⇒ [“1.6 Renewing crankshaft oil seal - belt pulley end”, page 146](#) .
- Install sump  
⇒ [“1.3 Removing and installing sump”, page 250](#) .
- Install toothed belt  
⇒ [“2.3 Removing and installing toothed belt”, page 186](#) .
- Install alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .
- Connect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .
- Replenish engine oil, and check oil level ⇒ Maintenance ; Booklet ; Engine oil: capacities and specifications .



## Specified torques

- ◆ Securing bolts for sump  
⇒ [“1.1 Assembly overview - sump/oil pump”, page 246](#)
- ◆ Securing bolts for alternator ⇒ Rep. gr. 27 ; Alternator; Assembly overview - alternator



## 1.5 Removing and installing oil level and oil temperature sender - G266-

### Removing

- Engine oil drained ⇒ Maintenance ; Booklet 819 .
- Disconnect electrical connector -2-.
- Unscrew bolts -1- and remove oil level and oil temperature sender - G266- -item 3-.

### Installing

Install in reverse order of removal, observing the following:



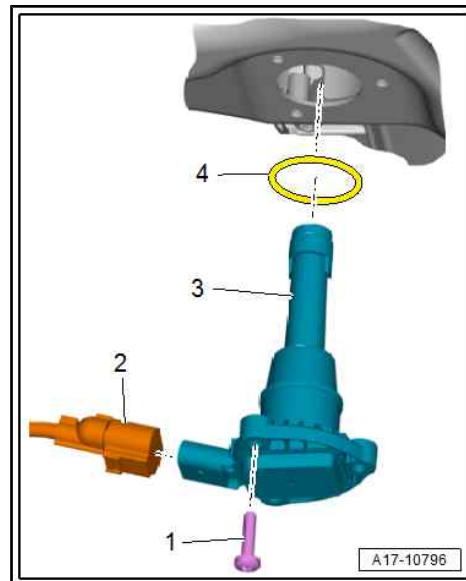
#### Note

*Renew oil seal -4-.*

- Replenish engine oil, and check oil level ⇒ Maintenance ; Booklet ; Engine oil: capacities and specifications .

### Specified torques

- ◆ Securing bolts  
⇒ ["1.1 Assembly overview - sump/oil pump", page 246](#)





## 2 Engine oil cooler

⇒ [“2.1 Assembly overview - engine oil cooler”, page 257](#)

⇒ [“2.2 Removing and installing engine oil cooler”, page 258](#)

### 2.1 Assembly overview - engine oil cooler

#### 1 - Bolt

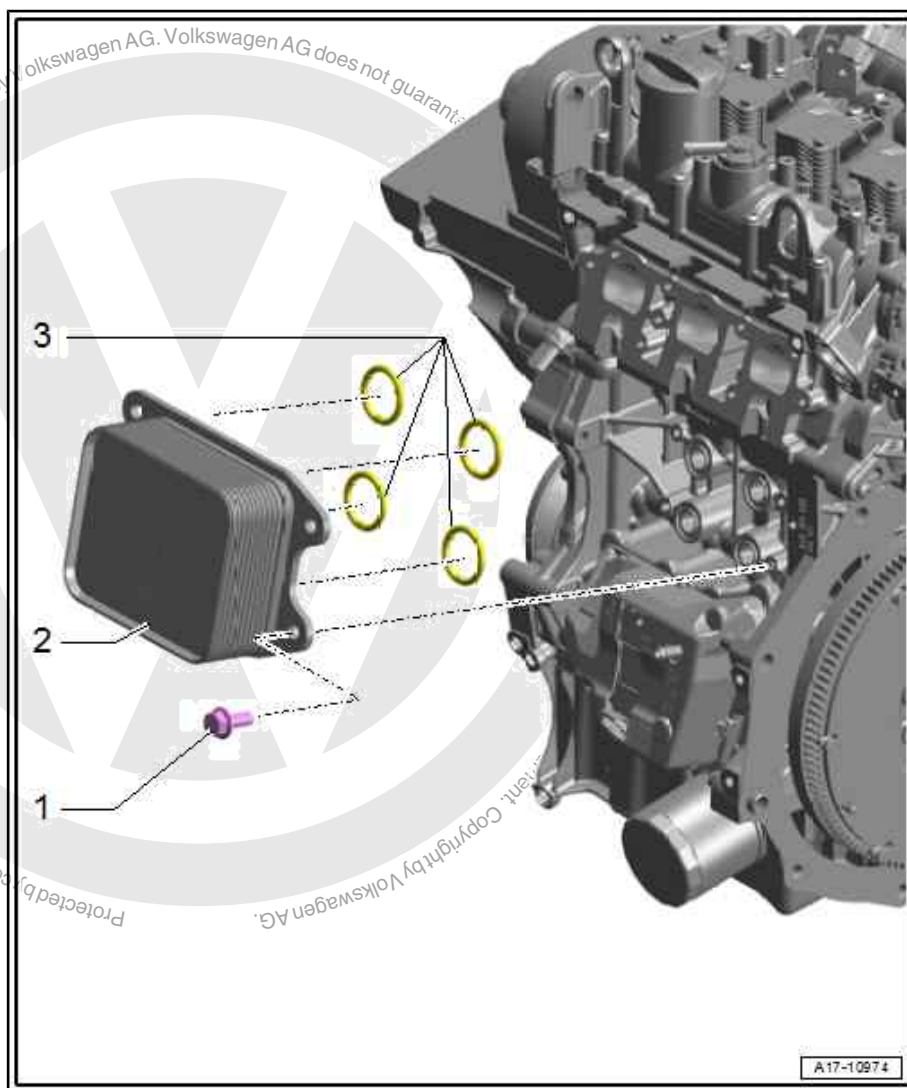
- ☐ Renew after removal
- ☐ 8 Nm +90°

#### 2 - Engine oil cooler

- ☐ Observe notes  
⇒ [“2.2 Removing and installing engine oil cooler”, page 258](#)
- ☐ Removing and installing  
⇒ [“2.2 Removing and installing engine oil cooler”, page 258](#)
- ☐ Renew coolant after replacing

#### 3 - Oil seals

- ☐ Renew after removal







## 2.2 Removing and installing engine oil cooler

### Removing

- Remove intake manifold  
⇒ [“4.2 Removing and installing intake manifold”, page 422](#) .
- Unscrew bolts -arrows- and detach engine oil cooler -1-.

### Installing

Install in reverse order of removal, observing the following:

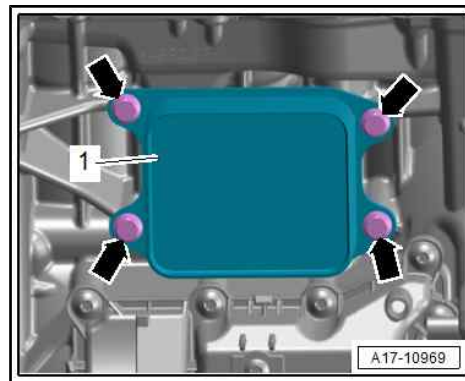


#### Note

- ◆ *Renew seals.*
- ◆ *Never reuse old coolant.*
- Install intake manifold  
⇒ [“4.2 Removing and installing intake manifold”, page 422](#) .
- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

### Specified torques

- ◆ Securing bolts for engine oil cooler  
⇒ [“2.1 Assembly overview - engine oil cooler”, page 257](#)
- ◆ Securing bolts for intake manifold  
⇒ [“4.1 Assembly overview - intake manifold”, page 421](#)





### 3 Crankcase ventilation

⇒ [“3.1 Assembly overview - crankcase breather system”, page 259](#)

⇒ [“3.2 Removing and installing oil separator”, page 260](#)

#### 3.1 Assembly overview - crankcase breather system

##### 1 - Bolt

- ☐ Self-locking
- ☐ Renew
- ☐ 9 Nm

##### 2 - Oil separator

- ☐ Removing and installing  
⇒ [“3.2 Removing and installing oil separator”, page 260](#)
- ☐ Renew if damaged

##### 3 - Cover

- ☐ For oil separator

##### 4 - Hose

- ☐ For crankcase ventilation.

##### 5 - O-ring

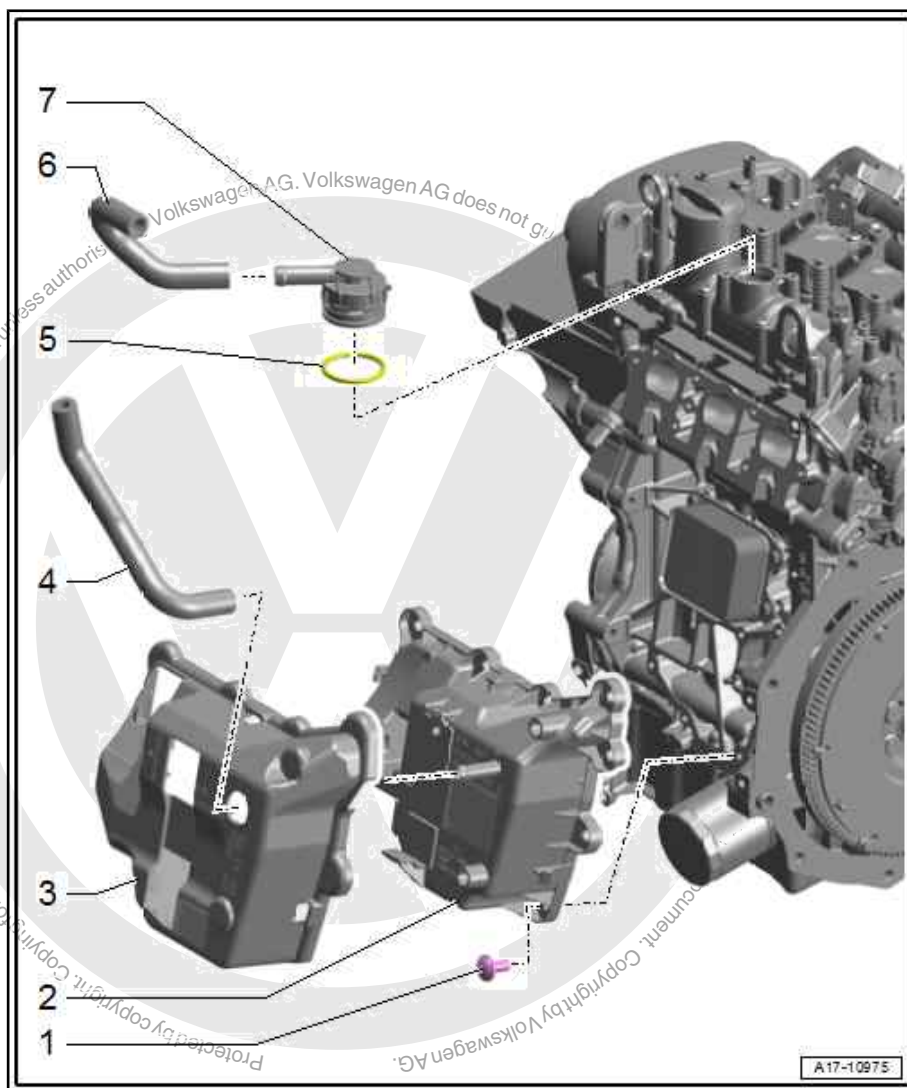
- ☐ Renew
- ☐ Moisten with oil before installing

##### 6 -

- ☐ For crankcase ventilation.

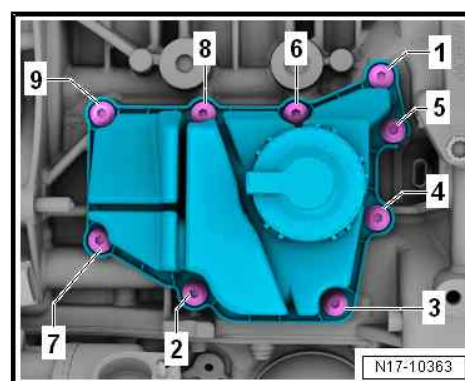
##### 7 - Union

- ☐ Check for correct positioning



#### Oil separator - specified torque and sequence

- Tighten bolts in the sequence -1 ... 9- to 9 Nm.

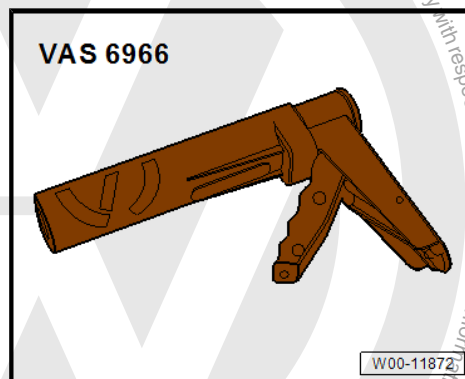




## 3.2 Removing and installing oil separator

### Special tools and workshop equipment required

- ◆ Applicator gun - VAS 6966-



- ◆ Hand drill with plastic brush attachment
- ◆ Safety goggles
- ◆ M6 x 20 mm studs
- ◆ Sealant ⇒ Electronic Parts Catalogue

### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

### up!:

- Bring lock carrier into service position ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier .

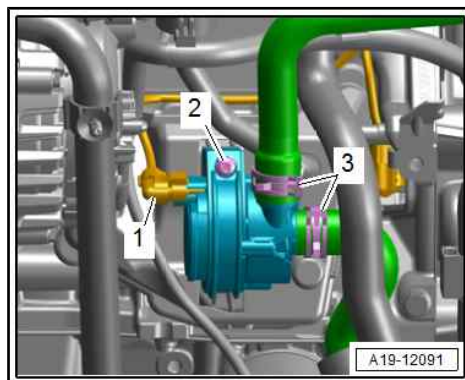
### Continued for all vehicles

- Remove alternator ⇒ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .
- Disconnect electrical connector -1-.
- Unscrew bolt -2- and press charge air cooling pump - V188- to one side.

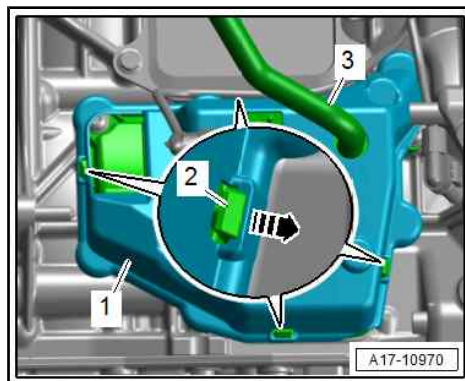


### Note

Disregard -item 3-.



- Pull off crankcase breather hose -3-.
- Release fasteners -2- on cover -1- for oil separator in direction of -arrow-, and remove cover.





- Loosen and unscrew bolts in the sequence -9 to 1-.
- Carefully release oil separator from bonded joint.



#### Note

- ◆ *Danger of soiling lubrication system.*
- ◆ *Cover open parts of engine.*

#### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Danger of leaks due to damaged sealing surfaces*
- ◆ *Do not clean sealing surfaces with a flat scraper or similar mechanical means.*

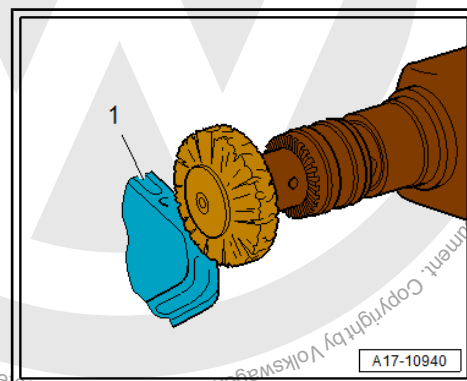
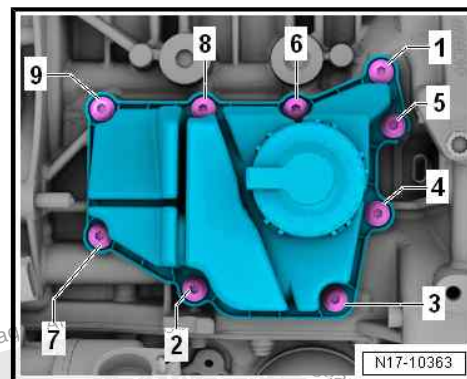


#### CAUTION

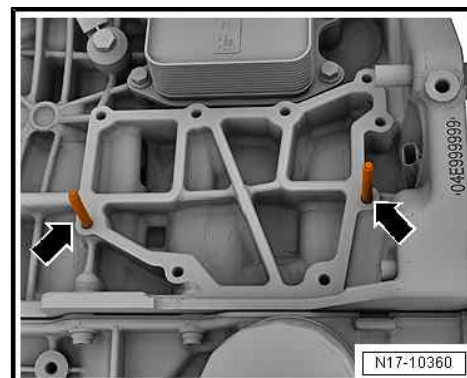
**Risk of eye injury caused by sealant residue.**

- **Wear protective goggles.**

- Remove sealant residue from oil separator -1- and cylinder block using rotating plastic brush.
- Remove any oil and grease from sealing surfaces.



- Screw 2 studs a few turns into holes -arrows-.





#### Note

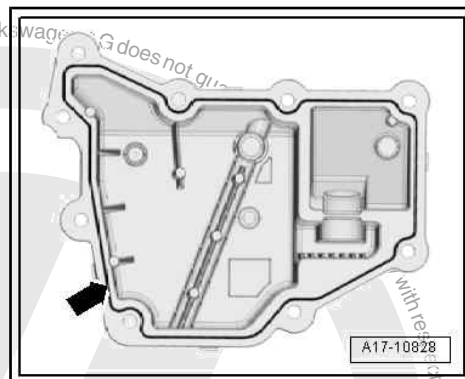
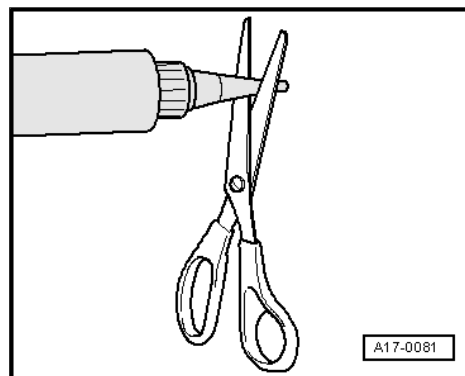
*Check the expiry date of the sealant.*

- Cut off nozzle on tube at front marking (Ø of nozzle approx. 2 mm).



#### Note

- ◆ *Danger of blocking lubrication system with excess sealant.*
- ◆ *Do not apply sealant bead thicker than specified.*
- Thickness of sealant bead: 2 to 3 mm.
- The oil separator must be installed within 5 minutes after applying the sealant.
- Apply bead of sealant -arrow- onto clean sealing surface of oil separator using applicator gun - VAS 6966- as illustrated.

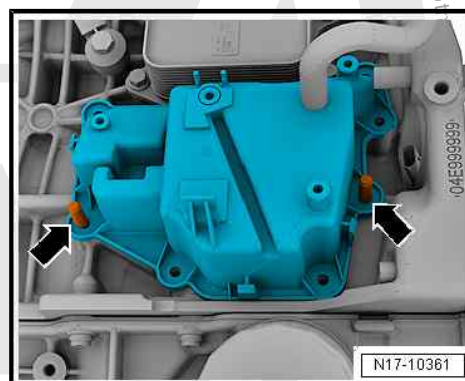


- Fit oil separator onto studs, and position it on crankcase.
- Unscrew studs.
- Tighten securing bolts in sequence given to specified torque  
⇒ [page 259](#).

Continue installation in reverse order of removal.

#### Specified torques

- ◆ Securing bolts for alternator ⇒ Rep. gr. 27 ; Alternator; Assembly overview - alternator
- ◆ ⇒ [“2.2 Assembly overview - electric coolant pump”, page 294](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation







## 4 Oil filter, oil pressure switch

⇒ [“4.1 Assembly overview - oil filter/oil pressure switch”, page 263](#)

⇒ [“4.2 Removing and installing oil pressure sender G10”, page 264](#)

⇒ [“4.3 Checking oil pressure and oil pressure switch”, page 265](#)

⇒ [“4.4 Removing and installing oil filter housing”, page 265](#)

⇒ [“4.5 Removing and installing oil pressure regulating valve N428”, page 266](#)

### 4.1 Assembly overview - oil filter/oil pressure switch

#### 1 - Oil filter

- ☐ Observe notes  
⇒ [“1.1 Assembly overview - sump/oil pump”, page 246](#)
- ☐ Removing and installing  
⇒ [“4.4 Removing and installing oil filter housing”, page 265](#)
- ☐ Tighten loosened connecting union for oil filter  
⇒ [Fig. “Tightening connecting union for oil filter”, page 249](#)

#### 2 - Connecting union

- ☐ If the connecting union for oil filter in sump became loose  
⇒ [page 264](#)

#### 3 - Oil pressure sender - G10-

- ☐ Switch pressure 0.3 to 0.6 bar
- ☐ Insulation black
- ☐ Check in [Guided fault finding](#) ⇒ Vehicle diagnostic tester
- ☐ Removing and installing  
⇒ [“4.2 Removing and installing oil pressure sender G10”, page 264](#)
- ☐ 20 Nm

#### 4 - Seal

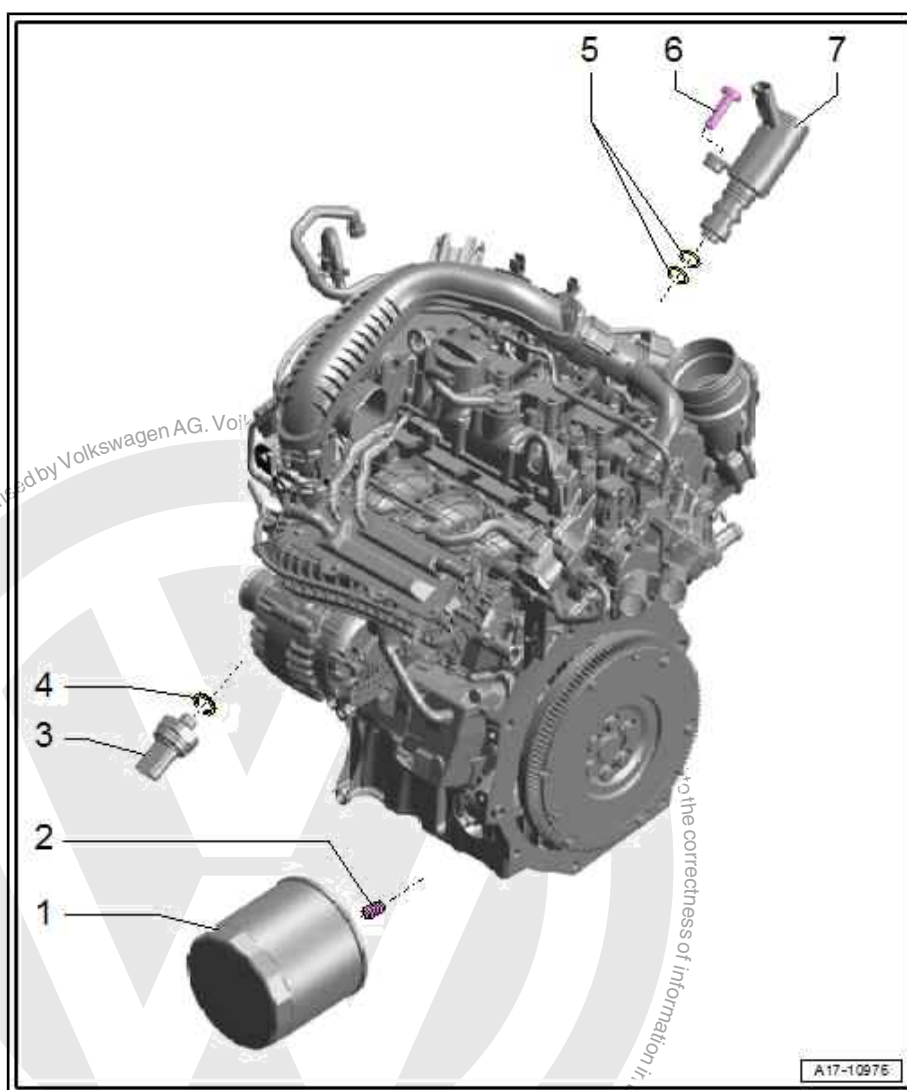
- ☐ Renew after each removal ⇒ [Electronic parts catalogue](#)

#### 5 - O-ring

- ☐ Not available as individual part.
- ☐ In case of leakage, renew valve ⇒ [Item 7 \(page 264\)](#)

#### 6 - Bolt

- ☐ 8 Nm





## 7 - Valve for oil pressure control - N428-

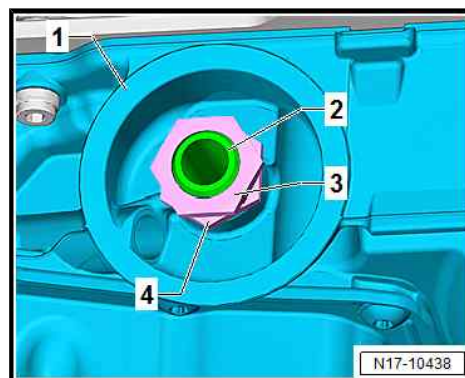
- ❑ Removing and installing  
⇒ ["4.5 Removing and installing oil pressure regulating valve N428", page 266](#)
- ❑ Renew valve for oil pressure control - N428- if there is swarf in the engine oil system ⇒ Electronic parts catalogue

### Tightening connecting union for oil filter

- If the connecting union -2- in the top section of sump -1- is loose, retighten it as described below.

Use only the two nuts -3 and 4- for this procedure.

- Hexagon nuts - 068 115 723- , qty. 2 ⇒ Electronic Parts Catalogue
- Screw nuts -3- and -4- onto connecting union -2-, and counterlock them.
- Tighten connecting union -2- using nut -3-.
- Loosen the two nuts and remove them, taking care not to loosen the connecting union.



### Specified torque

Connecting union	Specified torque
-2-	50 Nm

## 4.2 Removing and installing oil pressure sender - G10-

### Special tools and workshop equipment required

- ◆ Jointed wrench 24 mm - T40175-



### Removing



#### Note

Attach all heat-shielding sleeves in the same places when installing.

- Remove alternator ➤ Electrical system; Rep. gr. 27 ; Alternator; Removing and installing alternator .
- Lay fuel hose -2- at intake manifold to one side.



- Disconnect electrical connector -3-.
- Place a cloth underneath to catch escaping engine oil.
- Unscrew oil pressure sender - G10- -1- using articulated wrench, 24 mm - T40175- .

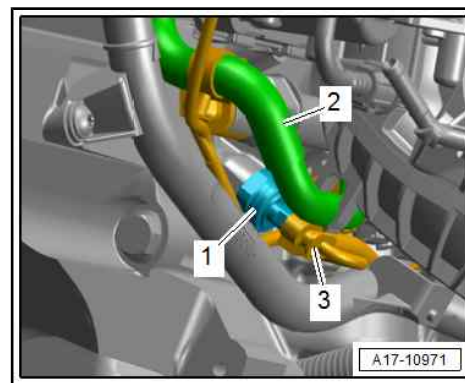
### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Always renew the seal of the oil pressure sender - G10- after disassembly.⇒ Electronic parts catalogue*
- ◆ *Insert the new oil pressure sender - G10- immediately in bore to avoid loss of oil.*
- Check oil level ⇒ Maintenance ; Booklet 819 .



### Specified torques

- ◆ Specified torque for oil pressure switch  
⇒ [“4.1 Assembly overview - oil filter/oil pressure switch”, page 263](#)
- ◆ Securing bolts for alternator ⇒ Rep. gr. 27 ; Alternator; Assembly overview - alternator

## 4.3 Checking oil pressure and oil pressure switch



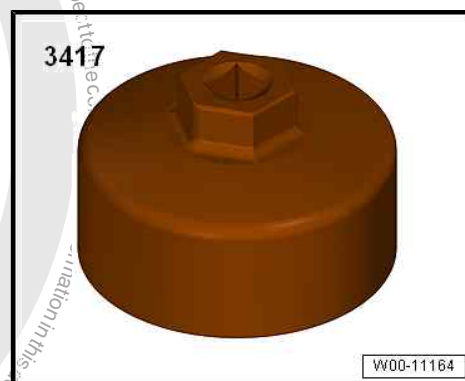
#### Note

- ◆ *The oil pressure sender - G10- is installed to the engine.*
- ◆ *The oil pressure sender - G10- can be diagnosed.*
- ◆ *The oil pressure sender is checked using ⇒ Vehicle diagnostic tester.*
- ◆ *Any issues are stored in the event memory.*

## 4.4 Removing and installing oil filter housing

### Special tools and workshop equipment required

- ◆ Oil filter tool - 3417-





## Removing

- Drain engine oil.
- Remove oil filter -arrow- using oil filter tool - 3417- .

## Installing

- Fill oil filter with engine oil and tighten it to specified torque using oil filter tool - 3417- ➔ [page 266](#) .



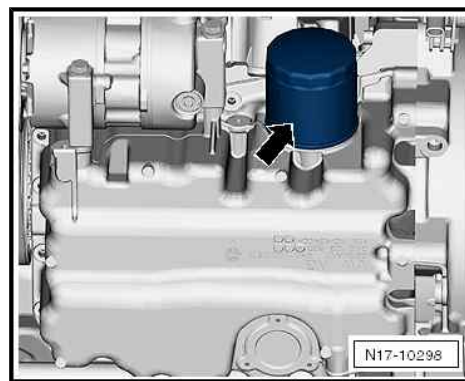
### Note

*If the connecting union for oil filter in sump became loose  
➔ [page 264](#) .*

- Replenish engine oil, and check oil level ➔ Maintenance ; Booklet ; Engine oil: capacities and specifications .

## Specified torque for oil filter

Component	Specified torque	Conditions
Oil filter	20 Nm	Coat gasket with engine oil.



## 4.5 Removing and installing oil pressure regulating valve - N428-

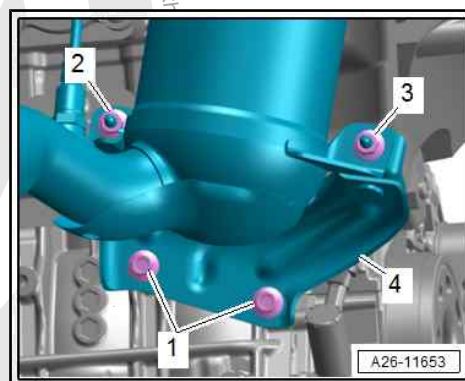
### Removing



### Note

*Attach all heat-shielding sleeves in the same places when installing.*

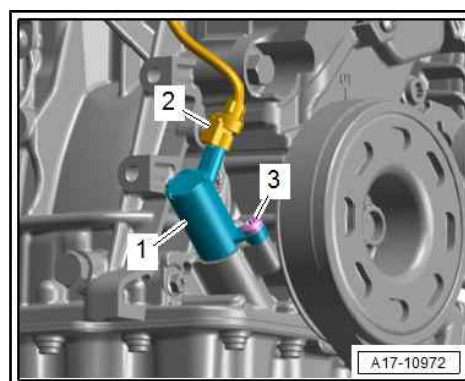
- Remove noise insulation ➔ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Unscrew bolts -1- and nuts -2 and 3-, and remove bracket -4- for catalytic converter.
- Detach heat insulation sleeves.
- Disconnect electrical connector -2-.



### Note

*Place a cloth underneath to catch escaping engine oil.*

- Unscrew bolt -3-, and pull off valve for oil pressure control - N428- -1-.





## Installing

Install in reverse order of removal, observing the following:

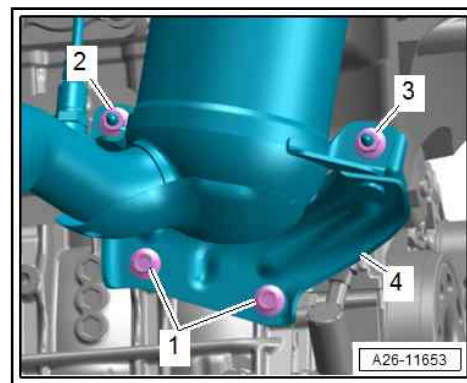


### Note

- ◆ *In case of leaks, valve for oil pressure control - N428- must be renewed.*
- ◆ *Seals are not available separately.*
- Bring bracket for catalytic converter in installation position.
- Screw in bolts -1- and nuts -2 and 3- as far as stop by hand.
- Tighten threaded connections for bracket -4-.

### Specified torques

- ◆ ➤ [“4.1 Assembly overview - oil filter/oil pressure switch”, page 263](#)
- ◆ ➤ [“2.1 Assembly overview - emission control”, page 482](#)







## 19 – Cooling

### 1 Cooling system/coolant

⇒ “1.1 Connection diagram - coolant hoses”, page 268

⇒ “1.2 Checking cooling system for leaks”, page 269

⇒ “1.3 Draining and adding coolant”, page 272

#### 1.1 Connection diagram - coolant hoses



##### Note

- ◆ Blue = large coolant circuit.
- ◆ Red = small coolant circuit.
- ◆ Orange = Charge air cooling circuit.
- ◆ Brown = heater circuit.
- ◆ The arrows point in the direction of coolant flow.

1 - Radiator for charge air cooling circuit

2 - Non-return valve

3 - Charge air cooler

□ In intake manifold

4 - Cylinder head/cylinder block

5 - Coolant expansion tank

□ With cap

6 - Cap

□ For coolant expansion tank

□ Design may vary depending on model year

□ Check pressure relief valve ⇒ page 272

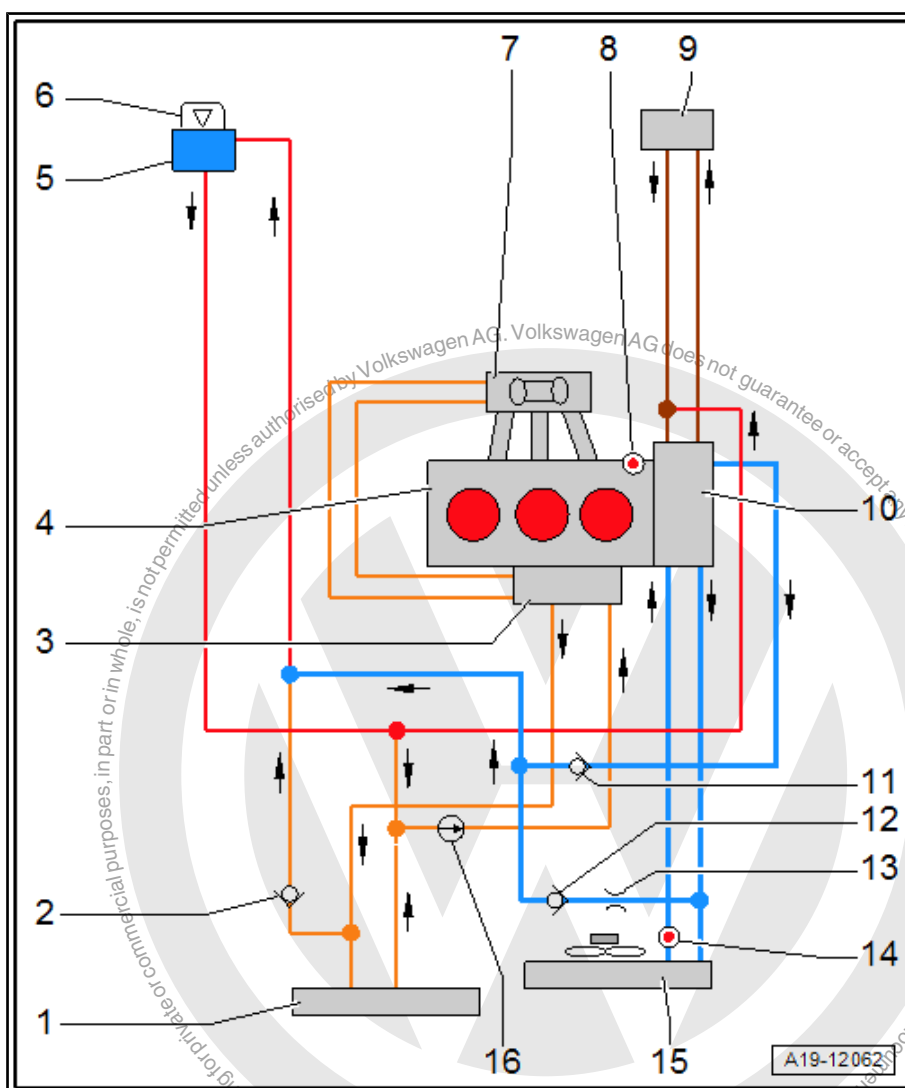
7 - Turbocharger

8 - Radiator outlet coolant - G62-

9 - Heat exchanger for heater

10 - Coolant pump

□ With thermostat housing





11 - Non-return valve

12 - Non-return valve

13 - Restrictor

14 - Radiator outlet coolant  
temperature sender - G83-

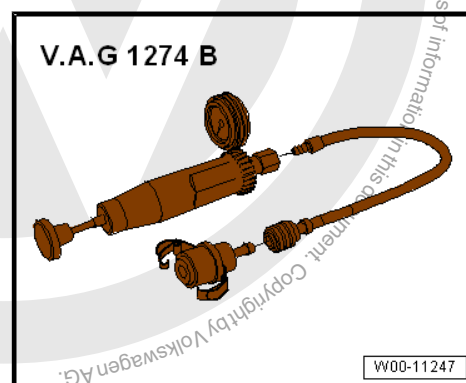
15 - Radiator for engine cool-  
ant

16 - Charge air cooling pump - V188-

## 1.2 Checking cooling system for leaks

Special tools and workshop equipment required

- ♦ Cooling system tester - V.A.G 1274 B-



- ♦ Adapter for cooling system tester - V.A.G 1274/8-



- ♦ Adapter for cooling system tester - V.A.G 1274/9-





## Self-test of cooling system tester - V.A.G 1274 B-



### Note

*To perform the leakage test correctly, first run a self-test on the cooling system tester - V.A.G 1274 B-.*

- Operate pump plunger of cooling system tester - V.A.G 1274 B- repeatedly until a pressure of 3.0 bar has built up on cooling system tester.
- Observe pressure on pressure gauge of cooling system tester for 30 seconds.

**If no pressure builds up or if the pressure drops again:**

The cooling system tester - V.A.G 1274 B- is leaking and should not be used.

### Checking cooling system for leaks

- Engine at operating temperature.



### CAUTION

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

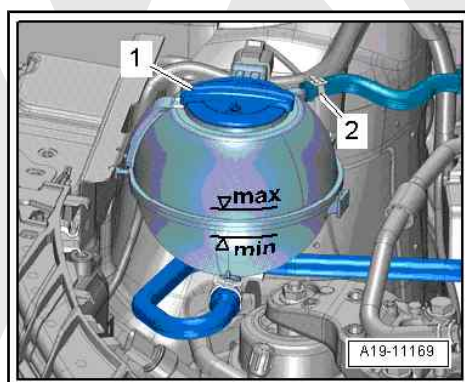
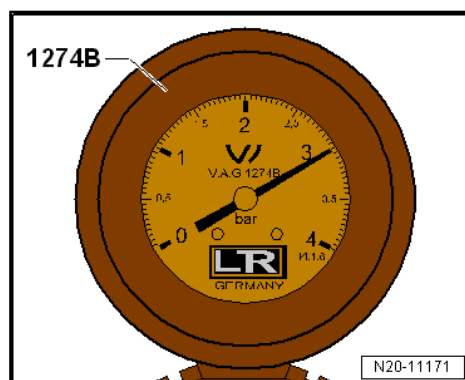
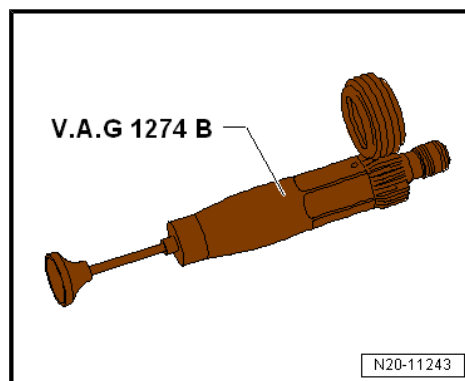
Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

### Sequence of operations

#### Polo 2014 ►

- Open cap -1- on coolant expansion tank.





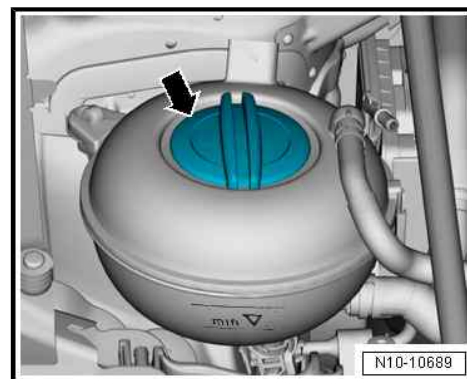
## Golf, Golf Estate, Golf SV, T-Roc, Touran



### Note

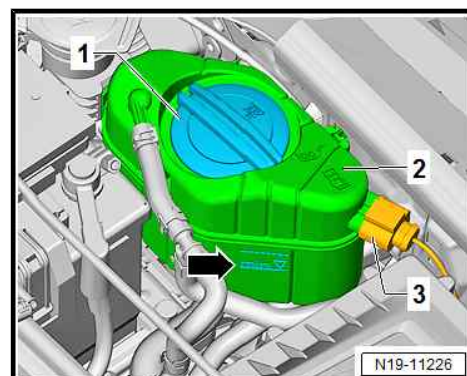
*Different caps might be installed depending on the model year.*

- Open filler cap -arrow- for coolant expansion tank.



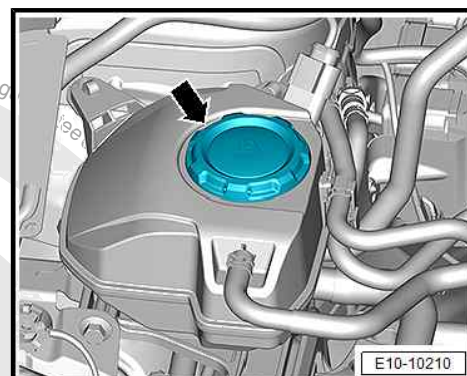
up!:

- Open cap -1- of coolant expansion tank -2-.



## Polo 2018 ➤, T-Cross

- Open cap -arrow-.



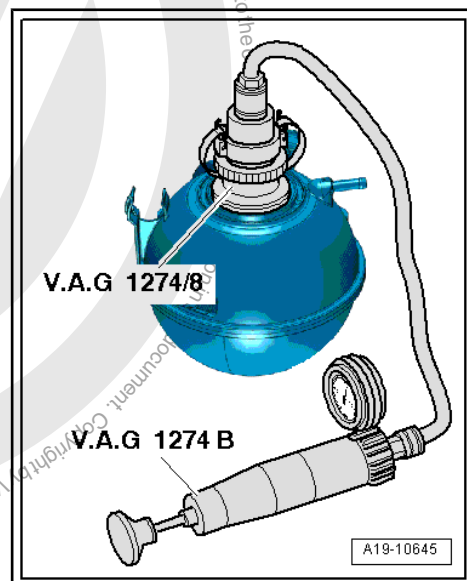
### Continued for all vehicles

- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/8- to coolant expansion tank.
- Using hand pump on tester, build up a pressure of approx. 1.5 bar.
- The pressure must not drop by more than 0.2 bar within 10 minutes.
- If pressure drops by more than 0.2 bar, locate leaks and rectify faults.



### Note

- ◆ A pressure drop of 0.2 bar within 10 minutes is caused by the coolant cooling down.
- ◆ The colder the engine, the lower the pressure loss.
- ◆ If necessary, repeat the check while the engine is cold.





#### Check pressure relief valve in cap.

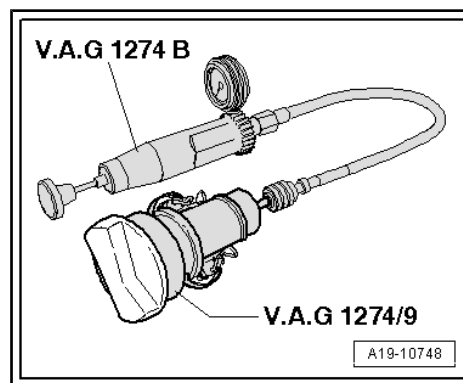
- Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/9- onto coolant filler cap.
- Build up pressure using hand pump of cooling system tester.

#### Blue cap

- ◆ The pressure relief valve must open at a pressure of 1.4 bar.

#### Black cap

- ◆ The pressure relief valve must open at a pressure of 1.6 to 1.8 bar.



### 1.3 Draining and adding coolant

⇒ ["1.3.1 Draining and adding coolant, Polo 2014 ►", page 272](#)

⇒ ["1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ►, T-Roc, T-Cross, Touran", page 279](#)

⇒ ["1.3.3 Draining and adding coolant, up!", page 285](#)

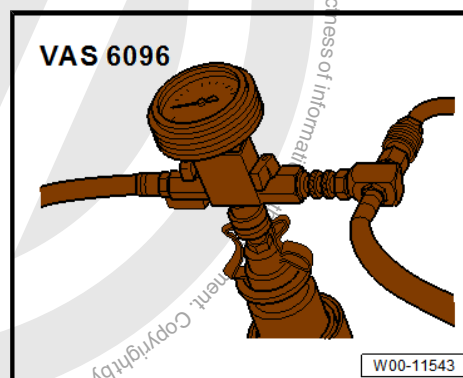
#### 1.3.1 Draining and adding coolant, Polo 2014 ►

##### Special tools and workshop equipment required

- ◆ Adapter for cooling system tester - V.A.G 1274/8-



- ◆ Coolant system charge unit - VAS 6096-







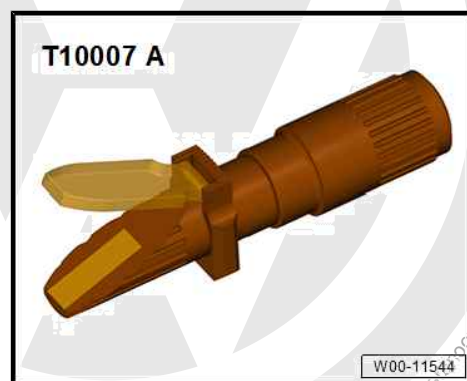
- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Spring-type clip pliers - VAS 6362-



- ◆ Refractometer - T10007 A-

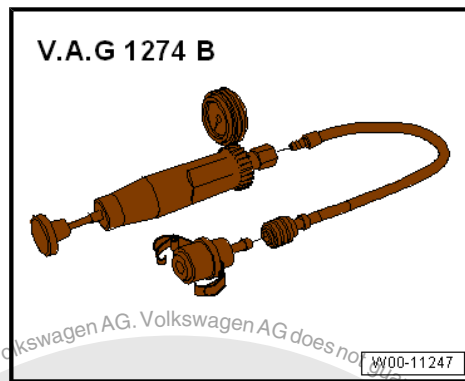


- ◆ Release tool - VAS 531 001-





♦ Cooling system tester - V.A.G 1274 B-



- ♦ Safety goggles
- ♦ Safety gloves

Draining

**CAUTION**

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- Open cap -1- on coolant expansion tank.



**Note**

Disregard -item 2-.

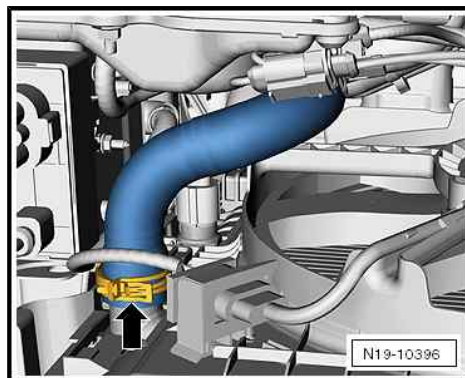
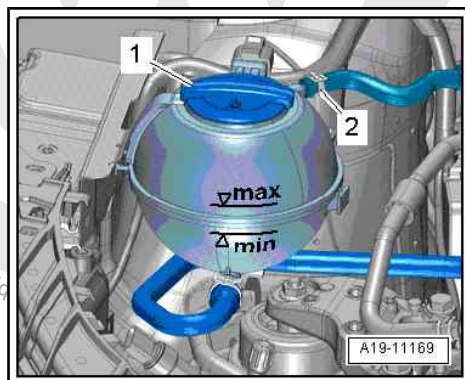
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .



**Note**

Collect drained coolant in a clean container for re-use or disposal.

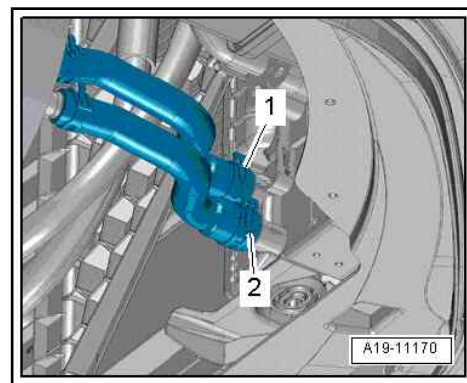
- Place drip tray - VAS 6208- beneath engine.
- Remove lower left coolant hose from radiator. To do this, release hose clip -arrow- using hose clip pliers - VAS 6362- .





- Remove lower right coolant hoses from radiator. To do this, loosen hose clips -1 and 2-.

#### Filling



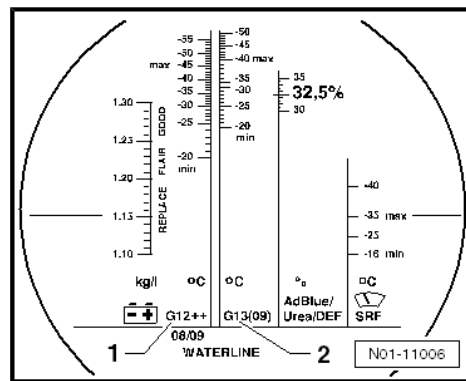


## Note

- ◆ The water used for mixing has a major influence on the effectiveness of the coolant. Because the water quality differs from country to country and even from region to region, the quality of the water to be used in the cooling system has been specified by Volkswagen. Distilled water fulfils all requirements. Therefore, only ever use distilled water when mixing coolant for topping up or renewing coolant.
- ◆ Use only coolant additives which conform with the ⇒ Electronic parts catalogue (ETKA) . Other coolant additives may reduce corrosion protection substantially. The resulting damage could lead to loss of coolant and subsequent severe damage to the engine.
- ◆ Mixed in the proper proportions, coolant inhibits frost and corrosion damage as well as scaling. Such additives also raise the boiling point of the coolant. For this reason, the cooling system must be filled all-year-round with coolant additives.
- ◆ Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.
- ◆ ONLY refractometer - T10007A- may be used for determining current anti-freeze value.
- ◆ Frost protection must be guaranteed down to  $-25^{\circ}\text{C}$  as a minimum and, in countries with arctic conditions, down to approx.  $-36^{\circ}\text{C}$ . Increasing the frost protection is permissible only if climatic conditions require stronger frost protection. It may, however, be increased only to a maximum of  $-48^{\circ}\text{C}$ . Otherwise, the cooling effect will be impaired.
- ◆ Do not reduce the coolant concentration by adding water even in warmer seasons and in warmer countries. Frost protection must be guaranteed down to at least  $-25^{\circ}\text{C}$ .
- ◆ Read off anti-freeze figures for respective replenished coolant additives.
- ◆ The temperature read off the refractometer - T10007A- corresponds the »ice flocculation point«. Flakes of ice may start forming in the coolant below this temperature.
- ◆ Never reuse old coolant.
- ◆ Use only a water/coolant additive mixture as a slip agent for coolant hoses.

## Coolant mixture ratio

- Coolant (40%) and distilled water (60%) for frost protection to  $-25^{\circ}\text{C}$
- Coolant (50 %) and distilled water (50 %) for frost protection to  $-36^{\circ}\text{C}$
- Coolant: ⇒ Electronic Parts Catalogue





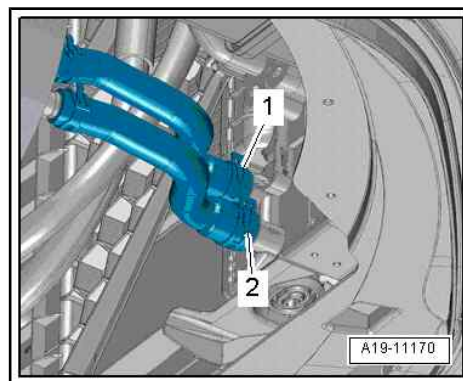
## Sequence of operations

- Connect coolant hoses to water radiator for charge air cooler using hose clips -1 and 2-.

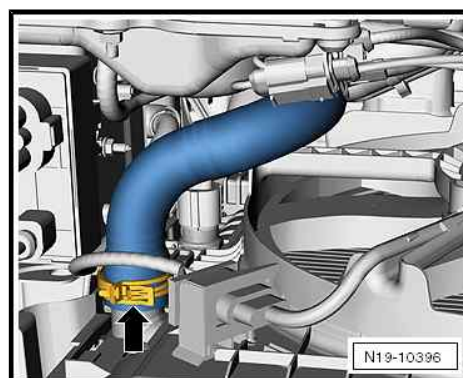


### Note

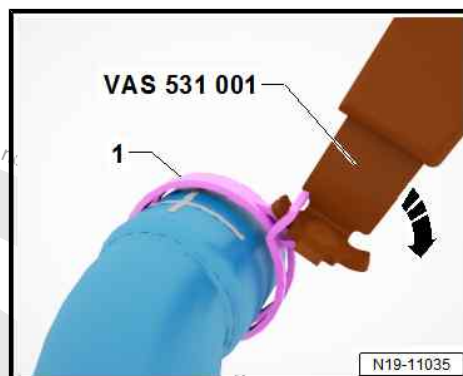
*The design of the clip -arrow- is different from that of conventional clips and requires a special tool for the clip to be engaged.*



- Push coolant hose with clip -arrow- onto radiator at bottom.



- Engage clip -1- in direction of -arrow- using release tool - VAS 531 001- .



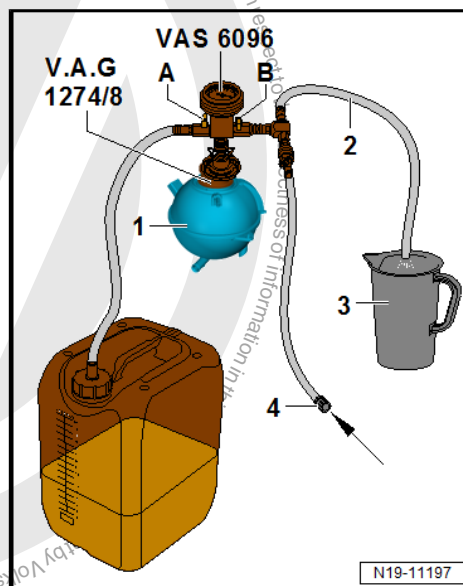
- Fill coolant expansion tank of -VAS 6096- with at least 8 litres of pre-mixed coolant in correct mixture ratio:
- Screw adapter for cooling system tester - V.A.G 1274/8- onto coolant expansion tank.
- Connect cooling system charge unit - VAS 6096- to adapter - V.A.G 1274/8-
- Feed vent hose -2- into a small container -3-.



### Note

*Exhaust air takes a slight quantity of coolant along with it; this should be collected.*

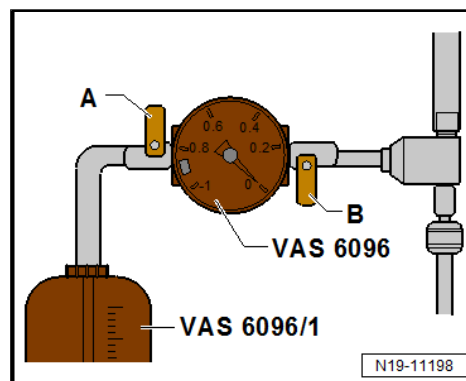
- Close valves -A- and -B- (turn lever transverse to direction of flow to do this).
- Connect hose -4- to compressed air.
- Pressure: 6 to 10 bar.





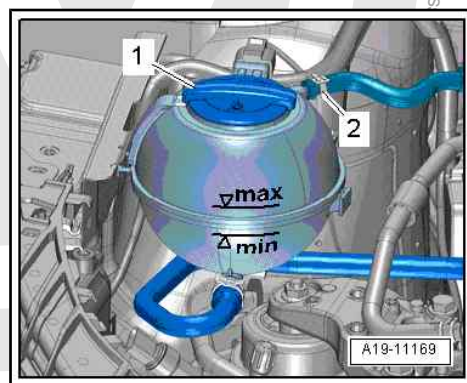


- Open valve -B-; turn lever in direction of flow to do this.
- The suction-jet pump reduces pressure in the cooling system to below atmospheric pressure. The needle on the gauge should move into the green zone.
- Also briefly open valve -A- (turn lever in direction of flow to do this) so that hose on coolant expansion tank of cooling system charge unit -VAS 6096- fills with coolant.
- Close valve -A- again.
- Leave valve -B- open for a further 2 minutes.
- The suction-jet pump will continue generating a vacuum in the cooling system. The needle on the gauge must remain in the green zone.
- Close valve -B-.
- The needle on the gauge must stay in the green zone. The low pressure in the cooling system is then sufficient for subsequent filling.



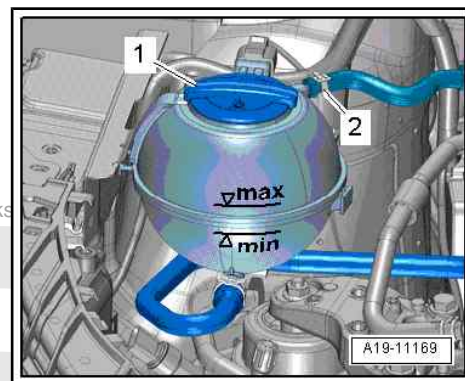
#### Note

- ◆ *If the needle does not reach the green zone, repeat the process.*
- ◆ *If vacuum drops, cooling system must be checked for leaks.*
- Pull off compressed air hose.
- Open valve -A-.
- The vacuum in the cooling system causes the coolant to be drawn out of the coolant expansion tank of -VAS 6096- ; the cooling system is then filled.
- Remove cooling system charge unit - VAS 6096- from coolant expansion tank.
- Fill coolant up to “max.” mark.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview – noise insulation .
- On vehicles with auxiliary heater, switch on auxiliary heater for about 30 seconds.
- Set temperature regulator to “HI”.
- Switch off air conditioner compressor (press **AC** button).
- LED in the button must not light up.
- Start engine and run it for max. 2 min. at a speed of approx. 1,500 rpm.
- Fill coolant up to the overflow hole of the coolant expansion tank while the engine is running.
- Tighten cap of coolant expansion tank until it engages.
- Run engine at idling speed until both large coolant hoses on radiator are heated up.
- Switch off engine and let it cool off.





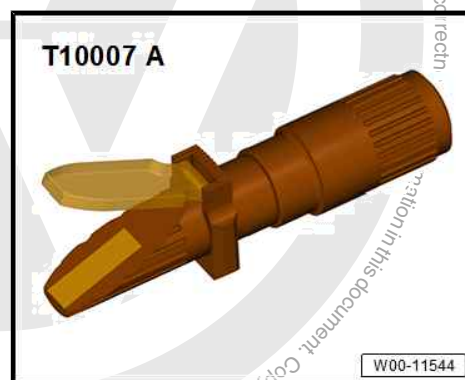
- Check coolant level.
- The coolant level must be between the “min. mark” and the “max. mark” when the engine is cold.
- When the engine is at operating temperature, it is permissible that the coolant level is at the “max. mark” or above.
- Fill more coolant if necessary.



### 1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ►, T-Roc, T-Cross, Touran

#### Special tools and workshop equipment required

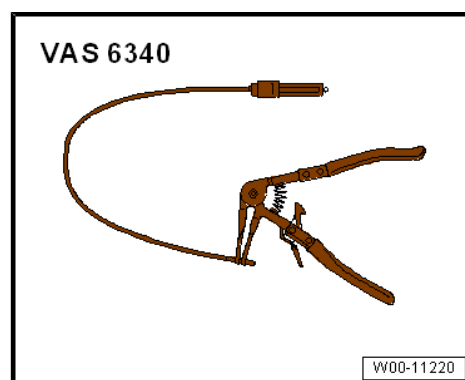
- ◆ Refractometer - T10007A-



- ◆ Drip tray for workshop hoist - VAS 6208-

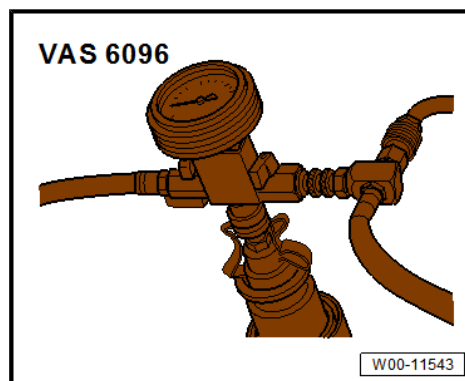


- ◆ Hose clamp pliers - VAS 6340-





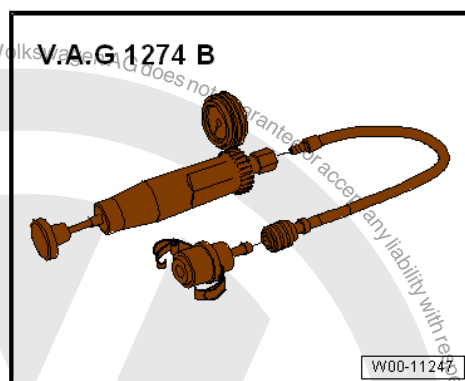
- ◆ Coolant system charge unit - VAS 6096-



- ◆ Adapter for cooling system tester - V.A.G 1274/8-



- ◆ Cooling system tester - V.A.G 1274 B-



- ◆ Safety goggles
- ◆ Safety gloves

#### Draining

#### ⚠ CAUTION

On a warm engine, the cooling system is under high pressure.  
Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

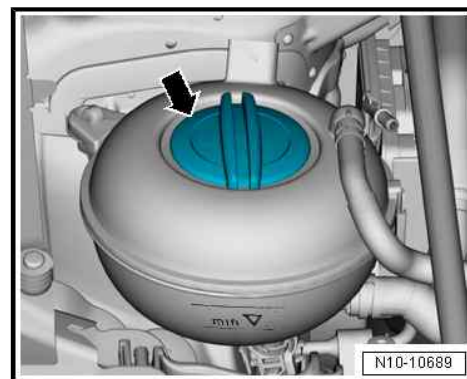


- Open filler cap -arrow- for coolant expansion tank.



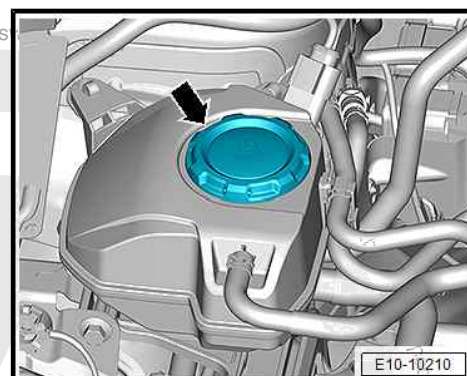
#### Note

*Different caps might be installed depending on the model year.*



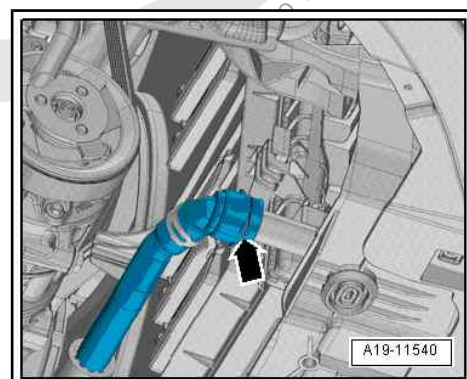
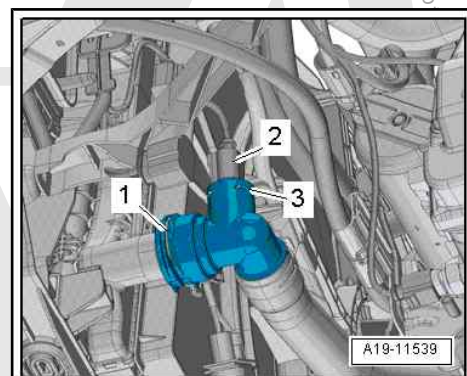
#### Polo 2018 ►

- Open cap -arrow-.



#### Continued for all vehicles

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Place drip tray for workshop hoist - VAS 6208- underneath.
- Disconnect connector -2- from radiator outlet coolant temperature sender - G83- -3-.
- Pull out retaining clip -1-, and remove lower left coolant hose from radiator.
- Drain coolant.
- Release retaining clip -arrow-, and disconnect lower right coolant hose from water radiator for charge air cooling circuit.
- Allow remaining coolant to drain out.



#### Filling



## Note

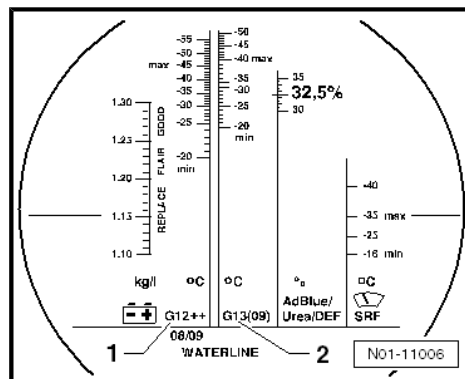
- ◆ The water used for mixing has a major influence on the effectiveness of the coolant. Because the water quality differs from country to country and even from region to region, the quality of the water to be used in the cooling system has been specified by Volkswagen. Distilled water fulfils all requirements. Therefore, only ever use distilled water when mixing coolant for topping up or renewing coolant.
- ◆ Use only coolant additives which conform with the ⇒ Electronic parts catalogue (ETKA) . Other coolant additives may reduce corrosion protection substantially. The resulting damage could lead to loss of coolant and subsequent severe damage to the engine.
- ◆ Mixed in the proper proportions, coolant inhibits frost and corrosion damage as well as scaling. Such additives also raise the boiling point of the coolant. For this reason, the cooling system must be filled all-year-round with coolant additives.
- ◆ Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.
- ◆ ONLY refractometer - T10007A- may be used for determining current anti-freeze value.
- ◆ Frost protection must be guaranteed down to  $-25^{\circ}\text{C}$  as a minimum and, in countries with arctic conditions, down to approx.  $-36^{\circ}\text{C}$ . Increasing the frost protection is permissible only if climatic conditions require stronger frost protection. It may, however, be increased only to a maximum of  $-48^{\circ}\text{C}$ . Otherwise, the cooling effect will be impaired.
- ◆ Do not reduce the coolant concentration by adding water even in warmer seasons and in warmer countries. Frost protection must be guaranteed down to at least  $-25^{\circ}\text{C}$ .
- ◆ Read off anti-freeze figures for respective replenished coolant additives.
- ◆ The temperature read off the refractometer - T10007A- corresponds the »ice flocculation point«. Flakes of ice may start forming in the coolant below this temperature.
- ◆ Never reuse old coolant.
- ◆ Use only a water/coolant additive mixture as a slip agent for coolant hoses.

## Coolant mixture ratio

Frost protection to	Coolant additive concentration	Coolant additive <sup>1)</sup>	Distilled water <sup>1)</sup>
$-25^{\circ}\text{C}$	40%	3.2 l	4.8 l
$-36^{\circ}\text{C}$	50%	4.0 l	4.0 l

<sup>1)</sup> The quantity of coolant can vary depending on the vehicle equipment.

- Coolant: ⇒ Electronic Parts Catalogue .

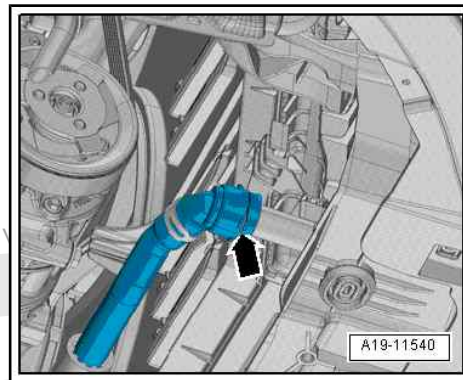






## Sequence of operations

- Connect coolant hose with plug-in connector to radiator (bottom left)  
⇒ ["4.1 Assembly overview - radiator/radiator fan", page 317](#) .
- Connect coolant hose to water radiator for charge air cooling circuit (bottom right) -arrow-.



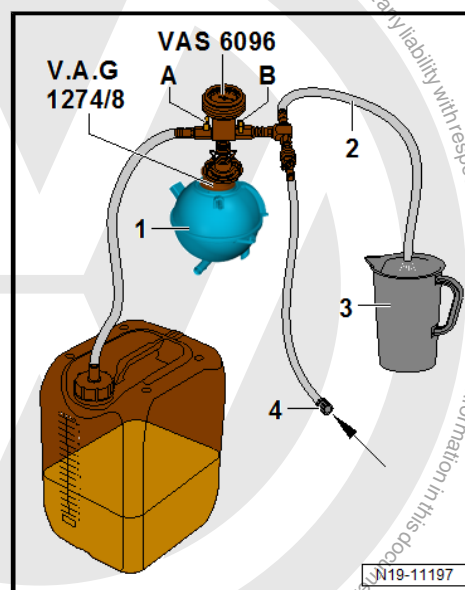
- Fill coolant reservoir of -VAS 6096- with at least 10 litres of pre-mixed coolant in correct mixture ratio:
- Screw adapter for cooling system tester - V.A.G 1274/8- onto coolant expansion tank.
- Connect cooling system charge unit - VAS 6096- to adapter - V.A.G 1274/8- .
- Feed vent hose -2- into a small container -3-.



### Note

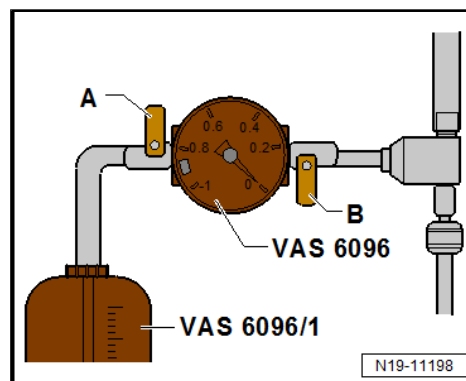
*Exhaust air takes a slight quantity of coolant along with it; this should be collected.*

- Close valves -A- and -B- (turn lever transverse to direction of flow to do this).
- Connect hose -4- to compressed air.
- Pressure: 6 to 10 bar.



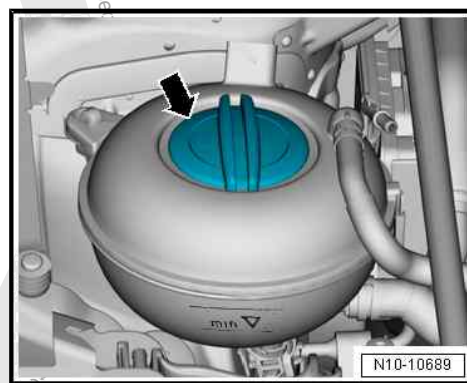


- Open valve -B-; turn lever in direction of flow to do this.
- The suction-jet pump reduces pressure in the cooling system to below atmospheric pressure. The needle on the gauge must remain in the green zone.
- Also briefly open valve -A- (turn lever in direction of flow to do this) so that hose on -VAS 6096- coolant reservoir fills with coolant.
- Close valve -A- again.
- Leave valve -B- open for a further 2 minutes.
- The suction-jet pump will continue generating a vacuum in the cooling system. The needle on the gauge must remain in the green zone.
- Close valve -B-.
- The needle on the gauge must stay in the green zone. The vacuum in the cooling system is then sufficient for subsequent filling.



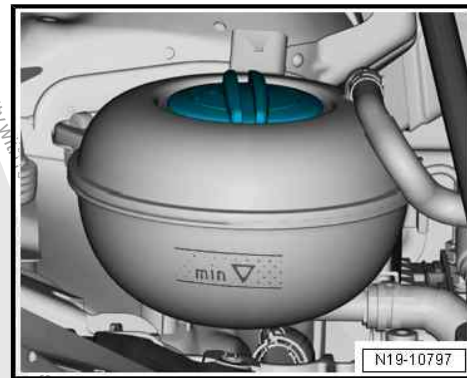
#### Note

- ◆ *If the needle does not reach the green zone, repeat the process.*
- ◆ *If the vacuum drops, the cooling system must be checked for leaks.*
- Pull off compressed air hose.
- Open valve -A-.
- Vacuum in cooling system causes coolant to be extracted from -VAS 6096- coolant reservoir and coolant system to be filled.
- Remove cooling system charge unit - VAS 6096- from coolant expansion tank.
- Fill coolant up to “max.” mark.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview – noise insulation .
- On vehicles with auxiliary heater, switch on auxiliary heater for about 30 seconds.
- Set temperature regulator to “HI”.
- Switch off air conditioner compressor (press **AC** button).
- LED in the button must not light up.
- Tighten cap of coolant expansion tank until it engages.
- Start engine and run alternately at approx. 1500 rpm to maximum of 2800 rpm until radiator fan starts operating.
- Switch off engine and let it cool off.





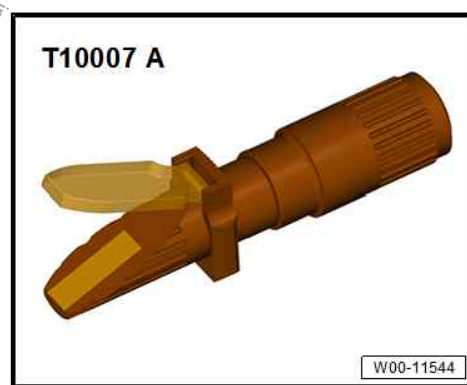
- Check coolant level.
  - Screw adapter for cooling system tester - V.A.G 1274/8- again onto expansion tank.
- Use cooling system tester - V.A.G 1274 B- to apply a pressure of 1 bar to the cooling system.
- With the engine running, fill coolant up to approx. 5 mm above max. mark.
  - The coolant level must be between the “min. mark” and the “max. mark” when the engine is cold.
  - When the engine is at operating temperature, it is permissible that the coolant level is at the “max. mark” or above.



### 1.3.3 Draining and adding coolant, up!

#### Special tools and workshop equipment required

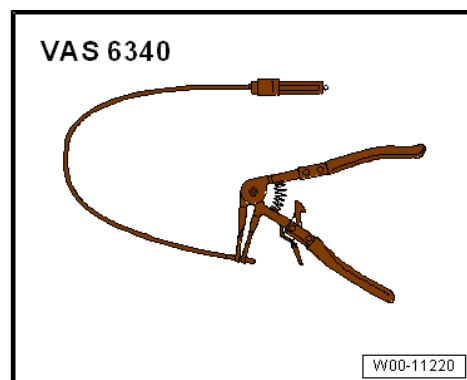
- ◆ Refractometer - T10007A-



- ◆ Drip tray for workshop hoist - VAS 6208-

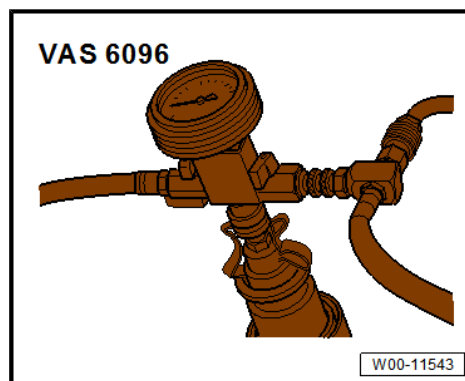


- ◆ Hose clamp pliers - VAS 6340-





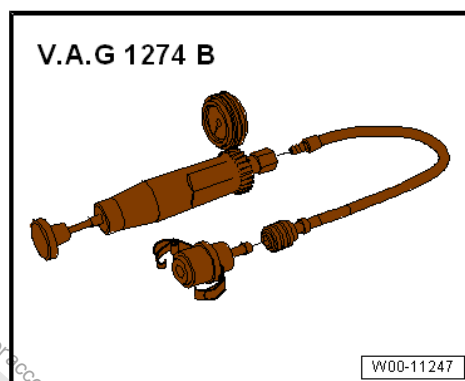
- ◆ Coolant system charge unit - VAS 6096-



- ◆ Adapter for cooling system tester - V.A.G 1274/8-



- ◆ Cooling system tester - V.A.G 1274 B-



- ◆ Safety goggles
- ◆ Safety gloves

#### Draining

#### CAUTION

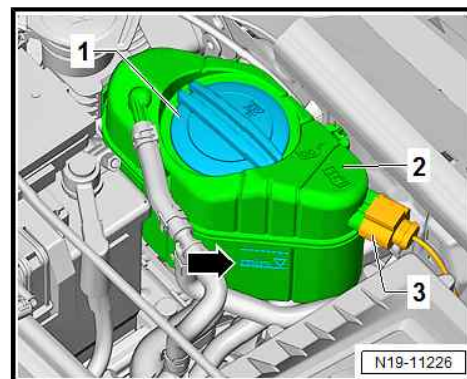
On a warm engine, the cooling system is under high pressure.  
Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

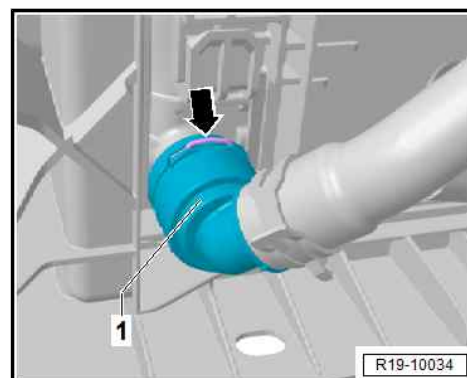
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.



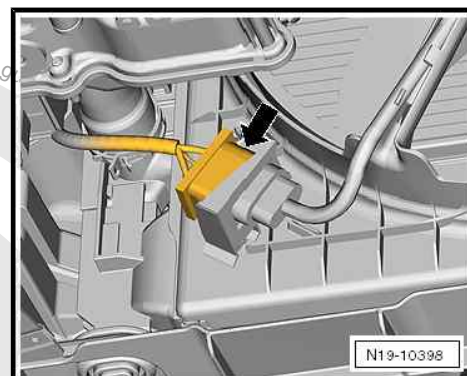
- Open cap -1- of coolant expansion tank -2-.
- Place drip tray for workshop hoist - VAS 6208- underneath.



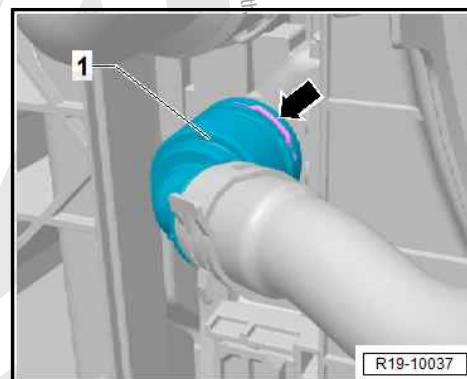
- Lift up retaining clip -arrow-.
- Remove lower right coolant hose from radiator for charge air cooling circuit.
- Drain coolant.



- Release connector -arrow- and pull off.



- Release retaining clip -arrow- and disconnect upper coolant hose from radiator for charge air cooling circuit.
- Allow remaining coolant to drain out.

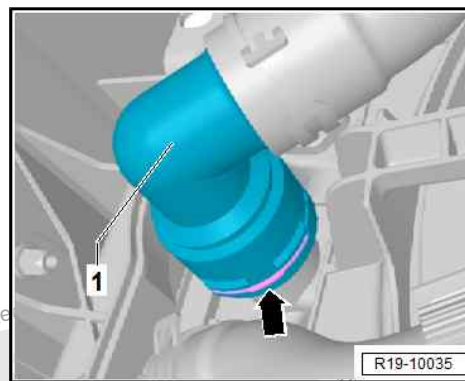






- Release retaining clip -arrow- and remove lower left coolant hose from radiator.
- Drain coolant.

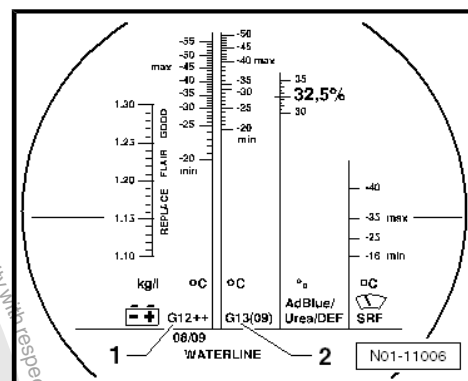
### Filling





## Note

- ◆ The water used for mixing has a major influence on the effectiveness of the coolant. Because the water quality differs from country to country and even from region to region, the quality of the water to be used in the cooling system has been specified by Volkswagen. Distilled water fulfils all requirements. Therefore, only ever use distilled water when mixing coolant for topping up or renewing coolant.
- ◆ Use only coolant additives which conform with the ⇒ Electronic parts catalogue (ETKA) . Other coolant additives may reduce corrosion protection substantially. The resulting damage could lead to loss of coolant and subsequent severe damage to the engine.
- ◆ Mixed in the proper proportions, coolant inhibits frost and corrosion damage as well as scaling. Such additives also raise the boiling point of the coolant. For this reason, the cooling system must be filled all-year-round with coolant additives.
- ◆ Because of its high boiling point, the coolant improves engine reliability under heavy loads, particularly in countries with tropical climates.
- ◆ ONLY refractometer - T10007A- may be used for determining current anti-freeze value.
- ◆ Frost protection must be guaranteed down to -25°C as a minimum and, in countries with arctic conditions, down to approx. -36°C. Increasing the frost protection is permissible only if climatic conditions require stronger frost protection. It may, however, be increased only to a maximum of -48°C. Otherwise, the cooling effect will be impaired.
- ◆ Do not reduce the coolant concentration by adding water even in warmer seasons and in warmer countries. Frost protection must be guaranteed down to at least -25°C.
- ◆ Read off anti-freeze figures for respective replenished coolant additives.
- ◆ The temperature read off the refractometer - T10007A- corresponds the »ice flocculation point«. Flakes of ice may start forming in the coolant below this temperature.
- ◆ Never reuse old coolant.
- ◆ Use only a water/coolant additive mixture as a slip agent for coolant hoses.



## Coolant mixture ratio

Frost protection to	Coolant additive concentration	Coolant additive <sup>1)</sup>	Distilled water <sup>1)</sup>
-25°C	40%	3.2 l	4.8 l
-36°C	50%	4.0 l	4.0 l

<sup>1)</sup> The quantity of coolant can vary depending on the vehicle equipment.

- Coolant: ⇒ Electronic Parts Catalogue .

## Sequence of operations

- Join coolant hoses with plug-in connectors  
⇒ ["4.1.3 Assembly overview - radiator/radiator fan, up!"](#), page 322 .



- Fill coolant reservoir of -VAS 6096- with at least 10 litres of pre-mixed coolant in correct mixture ratio:
- Screw adapter for cooling system tester - V.A.G 1274/8- onto coolant expansion tank.
- Connect cooling system charge unit - VAS 6096- to adapter - V.A.G 1274/8- .
- Feed vent hose -2- into a small container -3-.



#### Note

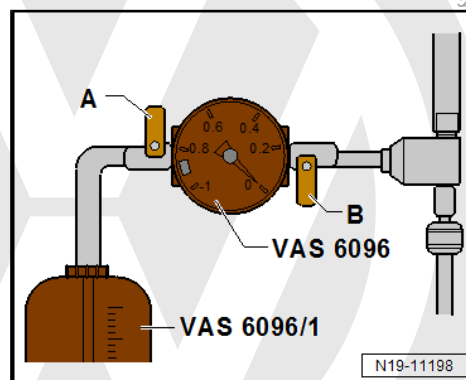
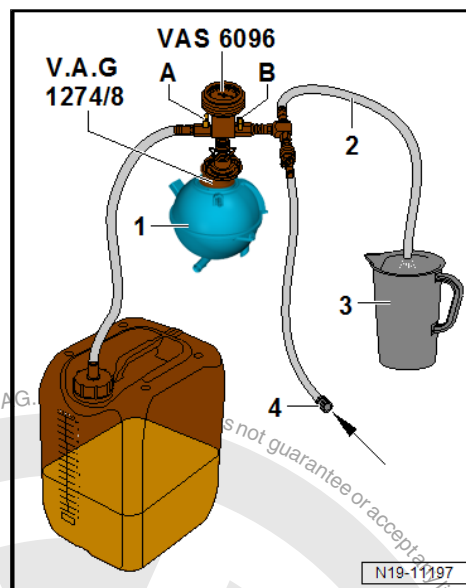
*Exhaust air takes a slight quantity of coolant along with it; this should be collected.*

- Close valves -A- and -B- (turn lever transverse to direction of flow to do this).
- Connect hose -4- to compressed air.
- Pressure: 6 to 10 bar.
- Open valve -B-; turn lever in direction of flow to do this.
- The suction-jet pump reduces pressure in the cooling system to below atmospheric pressure. The needle on the gauge must remain in the green zone.
- Also briefly open valve -A- (turn lever in direction of flow to do this) so that hose on -VAS 6096- coolant reservoir fills with coolant.
- Close valve -A- again.
- Leave valve -B- open for a further 2 minutes.
- The suction-jet pump will continue generating a vacuum in the cooling system. The needle on the gauge must remain in the green zone.
- Close valve -B-.
- The needle on the gauge must stay in the green zone. The vacuum in the cooling system is then sufficient for subsequent filling.



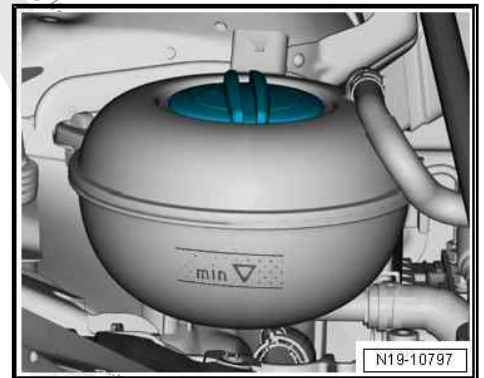
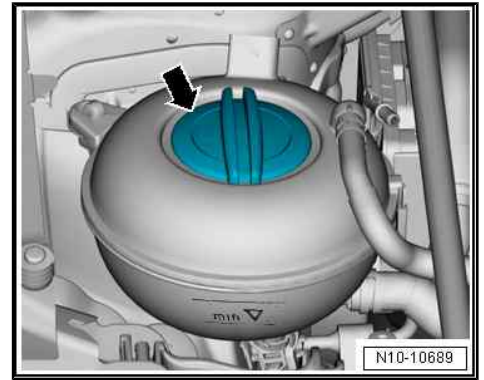
#### Note

- ◆ *If the needle does not reach the green zone, repeat the process.*
- ◆ *If the vacuum drops, the cooling system must be checked for leaks.*
- Pull off compressed air hose.
- Open valve -A-.
- Vacuum in cooling system causes coolant to be extracted from -VAS 6096- coolant reservoir and coolant system to be filled.
- Remove cooling system charge unit - VAS 6096- from coolant expansion tank.





- Fill coolant up to "max." mark.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview – noise insulation .
- On vehicles with auxiliary heater, switch on auxiliary heater for about 30 seconds.
- Set temperature regulator to "HI".
- Switch off air conditioner compressor (press **AC** button).
- LED in the button must not light up.
- Tighten cap of coolant expansion tank until it engages.
- Start engine and run alternately at approx. 1500 rpm to maximum of 2800 rpm until radiator fan starts operating.
- Switch off engine and let it cool off.
- Check coolant level.
- Screw adapter for cooling system tester - V.A.G 1274/8- again onto expansion tank.
- Use cooling system tester - V.A.G 1274 B- to apply a pressure of 1 bar to the cooling system.
- With the engine running, fill coolant up to approx. 5 mm above max. mark.
- The coolant level must be between the "min. mark" and the "max. mark" when the engine is cold.
- When the engine is at operating temperature, it is permissible that the coolant level is at the "max. mark" or above.





## 2 Coolant pump, regulation of cooling system

⇒ [“2.1 Assembly overview - coolant pump, thermostat”, page 292](#)

⇒ [“2.2 Assembly overview - electric coolant pump”, page 294](#)

⇒ [“2.3 Assembly overview - coolant temperature sender”, page 296](#)

⇒ [“2.4 Removing and installing electric coolant pump”, page 297](#)

⇒ [“2.5 Removing and installing coolant pump”, page 300](#)

⇒ [“2.6 Removing and installing thermostat”, page 304](#)

⇒ [“2.7 Removing and installing toothed belt pulley for coolant pump”, page 307](#)

⇒ [“2.8 Removing and installing coolant temperature sender G62”, page 307](#)

⇒ [“2.9 Removing and installing radiator outlet coolant temperature sender G83”, page 310](#)

### 2.1 Assembly overview - coolant pump, thermostat

#### 1 - Thermostat housing

- ❑ Removing and installing  
⇒ [“2.5 Removing and installing coolant pump”, page 300](#)

#### 2 - Thermostat

- ❑ For cylinder block coolant circuit
- ❑ Version I: commencement of opening approx. 80°C
- ❑ Version II: commencement of opening approx. 105°C
- ❑ Removing and installing  
⇒ [“2.6.2 Removing and installing thermostat for cylinder block coolant circuit”, page 306](#)

#### 3 - Seal

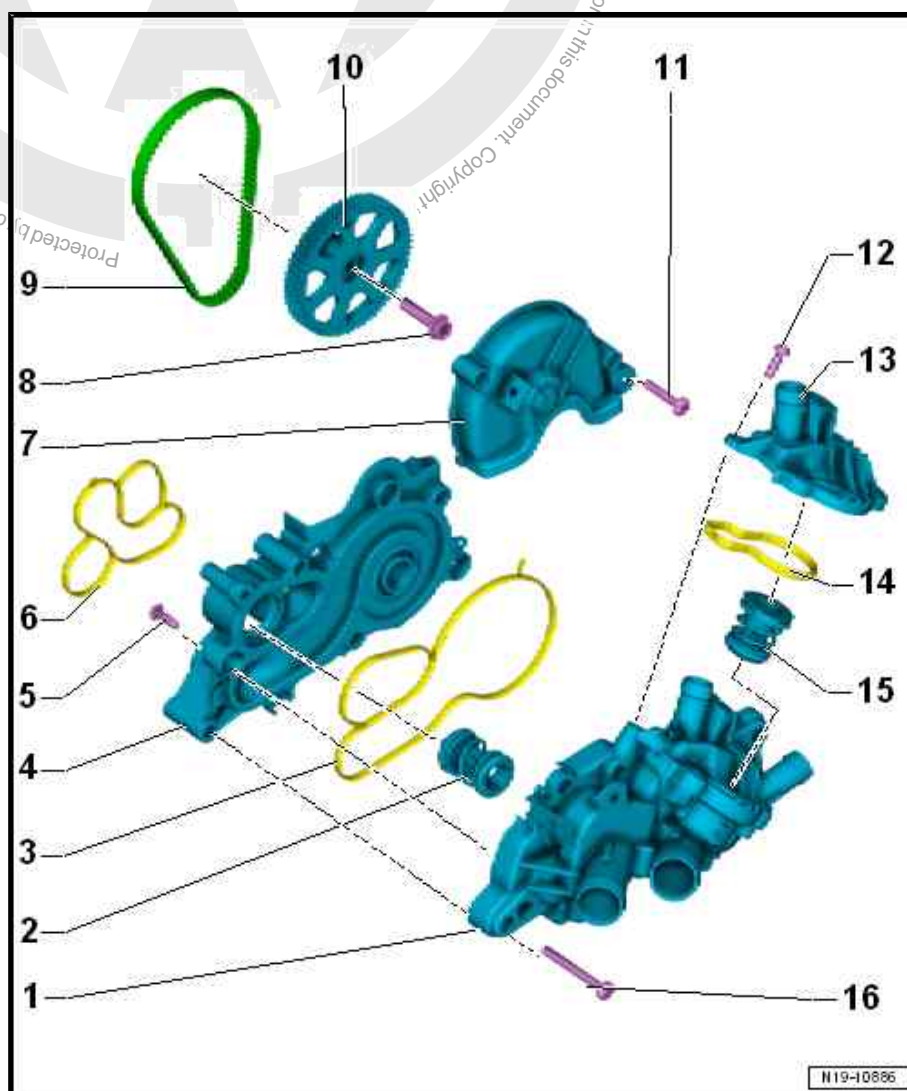
- ❑ Renew after removal

#### 4 - Coolant pump

- ❑ Removing and installing  
⇒ [“2.5 Removing and installing coolant pump”, page 300](#)
- ❑ Renew toothed belt as well when renewing coolant pump

#### 5 - Bolt

- ❑ Thread-cutting
- ❑ Fit and screw in bolt by hand so that it screws into old thread Then







tighten bolt to torque.

- ☐ Specified torque and tightening sequence ⇒ [page 294](#)

#### 6 - Seal

- ☐ Renew after removal

#### 7 - Toothed belt guard

- ☐ For toothed belt for coolant pump

#### 8 - Bolt

- ☐ Renew after removal
- ☐ 20 Nm +90°

#### 9 - Toothed belt

- ☐ For coolant pump
- ☐ Always renew after removing

#### 10 - Coolant pump pulley

- ☐ For coolant pump
- ☐ Removing and installing  
⇒ [“2.7 Removing and installing toothed belt pulley for coolant pump”, page 307](#)
- ☐ Fitting position ⇒ [page 307](#)
- ☐ Apply sealant when installing

#### 11 - Bolt

- ☐ 8 Nm

#### 12 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand so that it screws into old thread Then tighten bolt to torque.
- ☐ Specified torque and tightening sequence ⇒ [page 294](#)

#### 13 - Cover

- ☐ For thermostat

#### 14 - Seal

- ☐ Renew after removal

#### 15 - Thermostat

- ☐ For main coolant circuit (radiator)
- ☐ Version I: commencement of opening approx. 87 °C
- ☐ Version II: commencement of opening approx. 97 °C
- ☐ Removing and installing  
⇒ [“2.6.1 Removing and installing thermostat for main coolant circuit \(radiator\)”, page 304](#)
- ☐ Fitting position ⇒ [page 294](#)

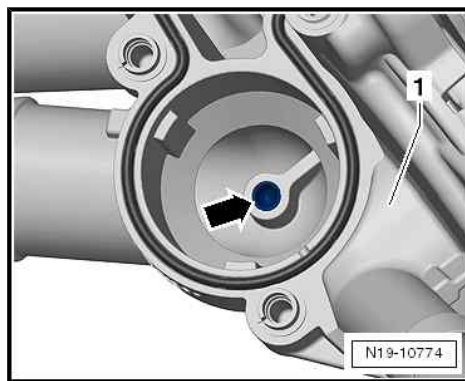
#### 16 - Bolt

- ☐ Specified torque and tightening sequence ⇒ [page 302](#)



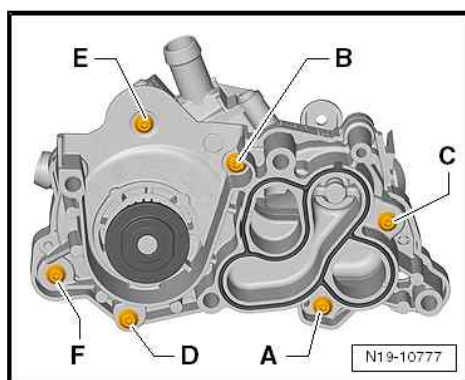
### Installation position of thermostat for large cooling circuit

- Must be positioned with centring pin in guide -arrow- in thermostat housing.



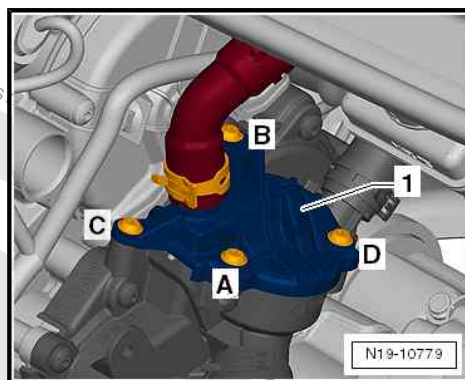
### Thermostat housing to coolant pump - specified torque and sequence

- Tighten bolts in the sequence -A ... F- to 7 Nm.



### Cover for thermostat to thermostat housing - specified torque

- Tighten bolts for cap -1- in sequence -A ... D- to 7 Nm.



## 2.2 Assembly overview - electric coolant pump



**1 - Charge air cooling pump - V188-**

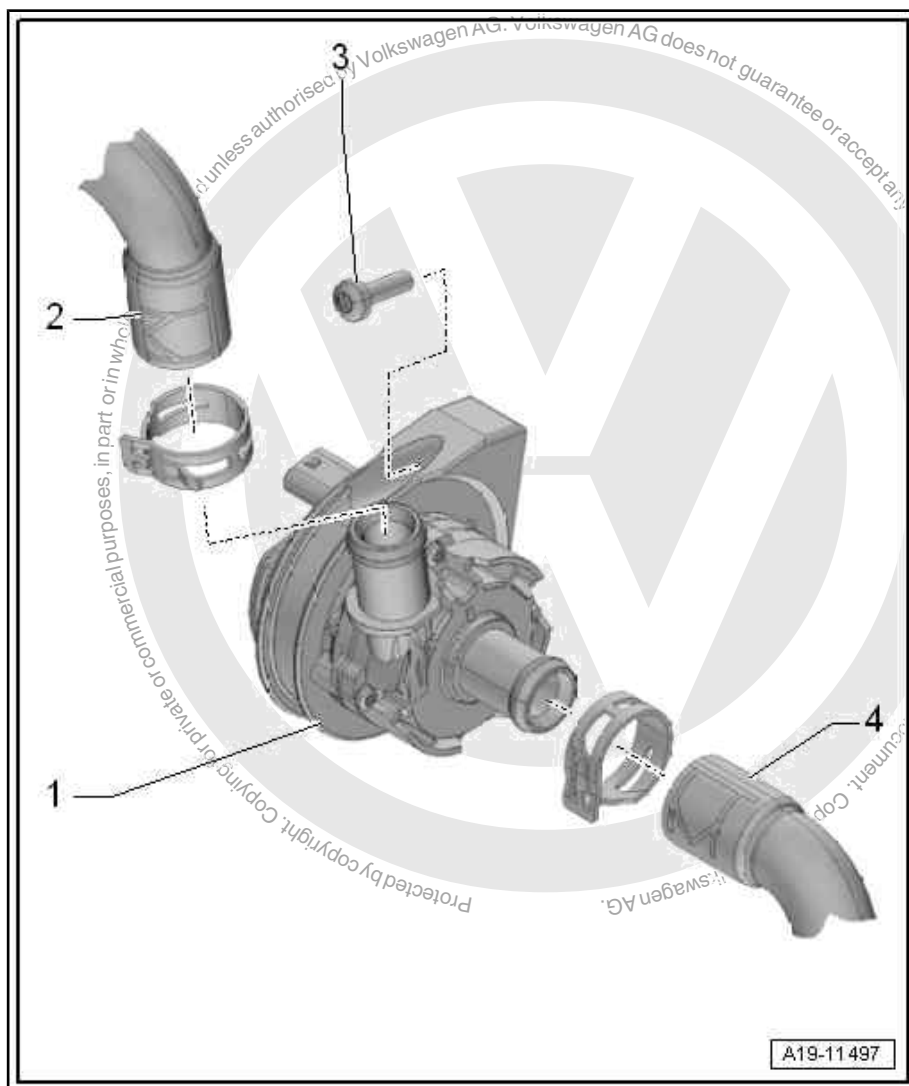
- ☐ with holder
- ☐ Removing and installing  
⇒ ["2.4 Removing and installing electric coolant pump", page 297](#)

**2 - Coolant hose**

**3 - Bolt**

- ☐ 8 Nm

**4 - Coolant hose**





## 2.3 Assembly overview - coolant temperature sender

⇒ [“2.3.1 Assembly overview - coolant temperature sender, Polo 2014 ►, up!”](#), page 296

⇒ [“2.3.2 Assembly overview - coolant temperature sender, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”](#), page 297

### 2.3.1 Assembly overview - coolant temperature sender, Polo 2014 ►, up!

1 - Radiator/cooler

2 - Support ring

3 - O-ring

- ☐ Renew after removal

4 - Radiator outlet coolant - G62-

- ☐ Removing and installing  
⇒ [“2.8 Removing and installing coolant temperature sender G62”](#),  
page 307

5 - Bolt

- ☐ 8 Nm

6 - Cylinder head

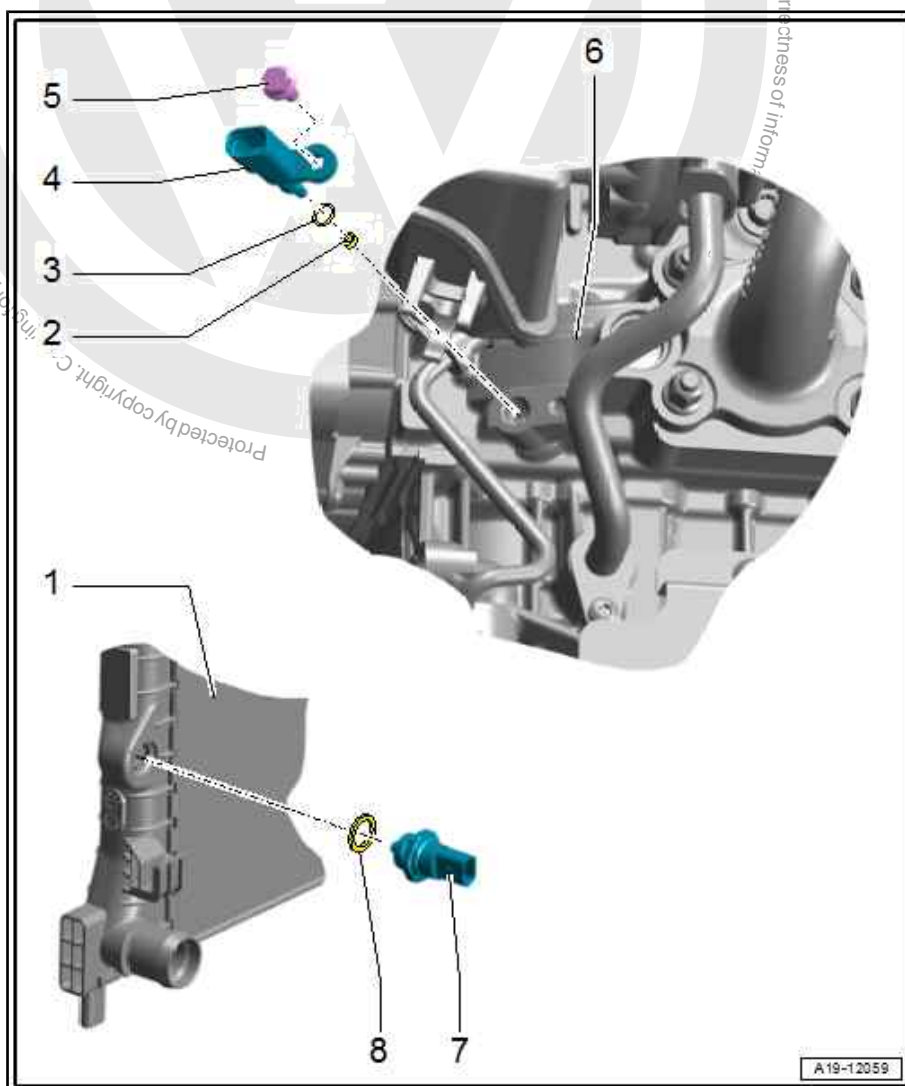
7 - Radiator outlet coolant temperature sender - G83-

- ☐ Removing and installing  
⇒ [“2.9 Removing and installing radiator outlet coolant temperature sender G83”](#),  
page 310

- ☐ Specified torque  
⇒ [Item 5 \(page 318\)](#)

8 - Seal

- ☐ Renew
- ☐ Installation is vehicle-specific
- ☐ For allocation refer to ⇒  
Electronic parts catalogue (ETKA) .



A19-12059



## 2.3.2 Assembly overview - coolant temperature sender, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran

### 1 - O-ring

- ☐ Renew

### 2 - Radiator outlet coolant temperature sender - G83-

- ☐ Removing and installing  
⇒ ["2.9 Removing and installing radiator outlet coolant temperature sender G83"](#),  
[page 310](#)

### 3 - Support ring

### 4 - O-ring

- ☐ Renew

### 5 - Radiator outlet coolant - G62-

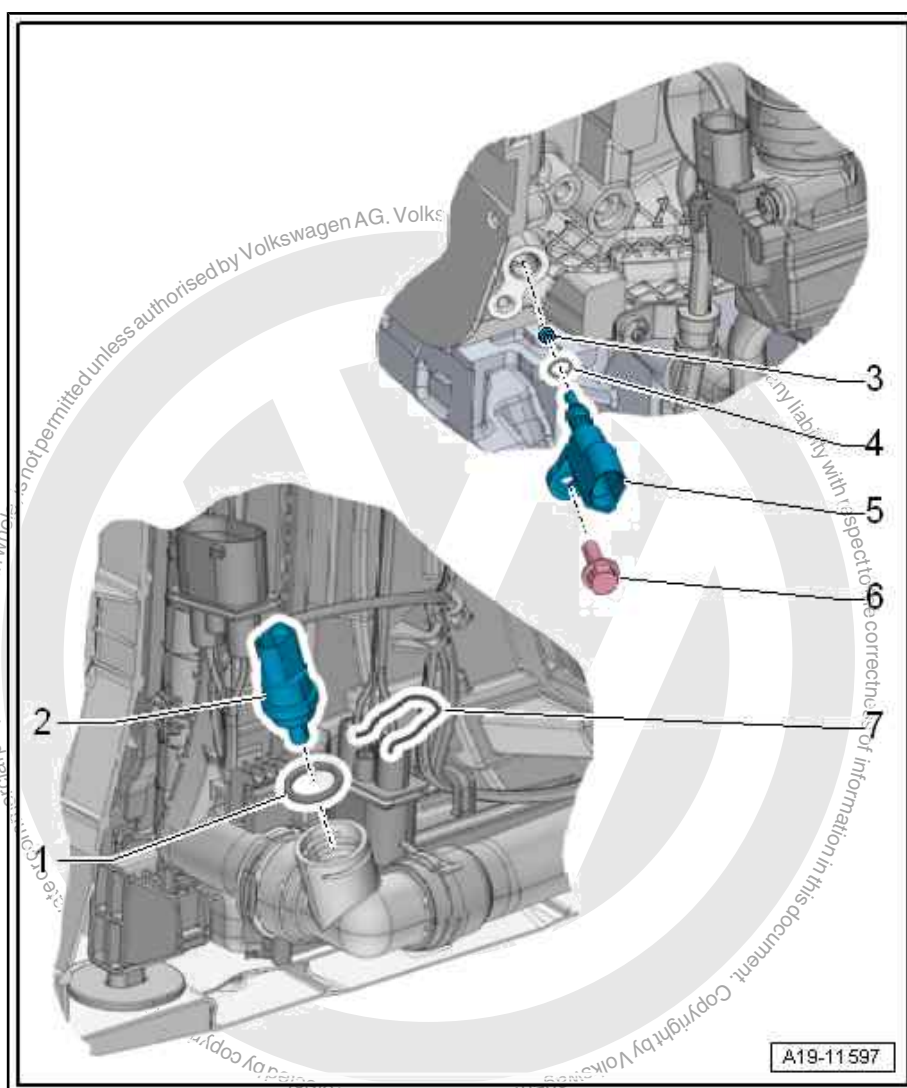
- ☐ Removing and installing  
⇒ ["2.8 Removing and installing coolant temperature sender G62"](#),  
[page 307](#)

### 6 - Bolt

- ☐ 8 Nm

### 7 - Retaining clip

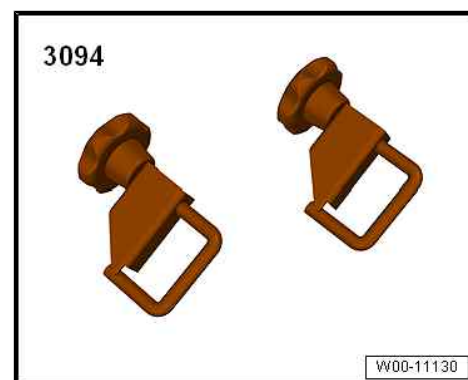
- ☐ Check for firm seating



## 2.4 Removing and installing electric coolant pump

### Special tools and workshop equipment required

- ◆ Hose clamps to 25 mm - 3094-







- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Spring-type clip pliers - VAS 6362-



## Removing

### ⚠ CAUTION

On a warm engine, the cooling system is under high pressure.  
Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

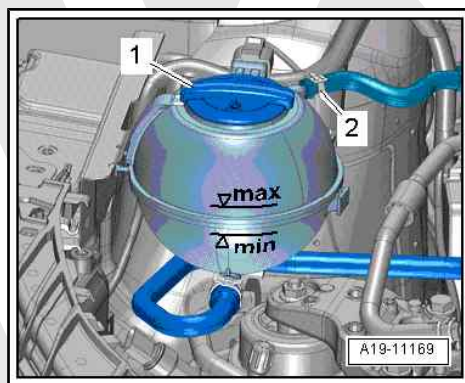
## Polo 2014 ►

- Open cap -1- on coolant expansion tank.



### Note

Disregard -item 2-.





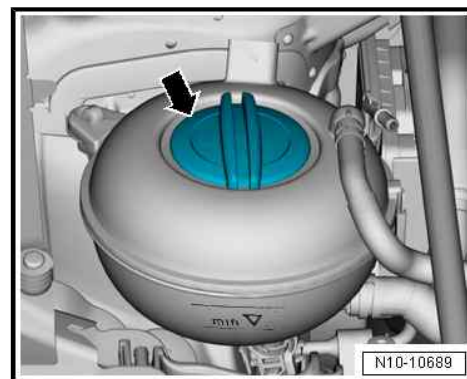
## Golf, Golf Estate, Golf SV, T-Roc, Touran



### Note

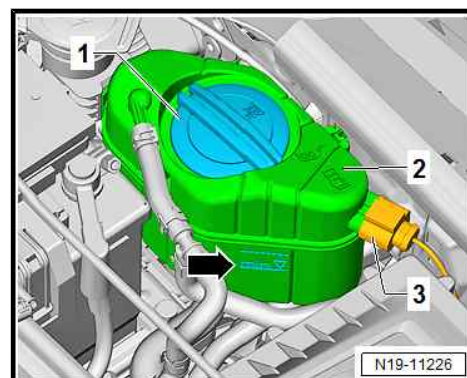
*Different caps might be installed depending on the equipment year.*

- Open filler cap -arrow- for coolant expansion tank.



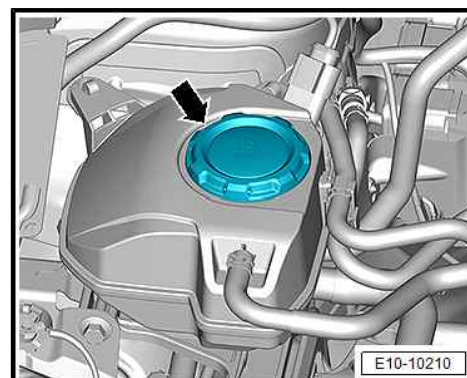
### upl:

- Open cap -1- of coolant expansion tank -2-.
- Bring lock carrier into service position ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier .



## Polo 2018 ➤, T-Cross

- Open cap -arrow-.



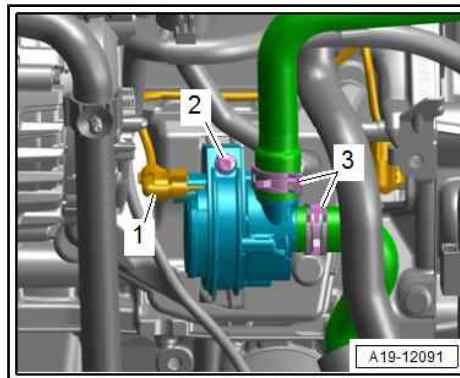


### Continued for all vehicles

- Place drip tray for workshop hoist - VAS 6208- underneath.
- Release and pull off electrical connector -1-.
- Clamp off coolant hoses on charge air cooling pump - V188- using hose clamps up to 25 mm - 3094- .
- Release hose clip -3- and remove coolant hose.
- Unscrew bolt -2- and remove charge air cooling pump - V188- .

### Installing

Install in reverse order of removal, observing the following:



### Note

- ♦ *Secure all hose connections with hose clips corresponding to the series equipment ⇒ [Electronic parts catalogue](#).*

- ♦ *Never reuse old coolant.*

- Check coolant level  
⇒ [“1.3 Draining and adding coolant”, page 272](#) .

### Specified torques

- ♦ ⇒ [“2.2 Assembly overview - electric coolant pump”, page 294](#)

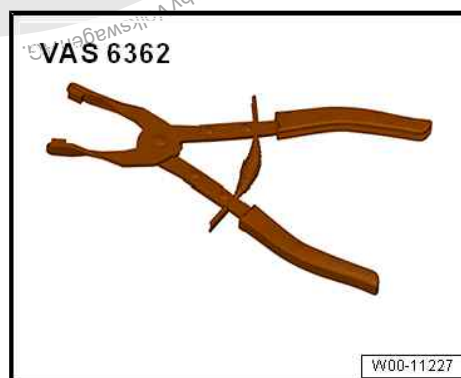
## 2.5 Removing and installing coolant pump

### Special tools and workshop equipment required

- ♦ Torque wrench - VAS 6583-

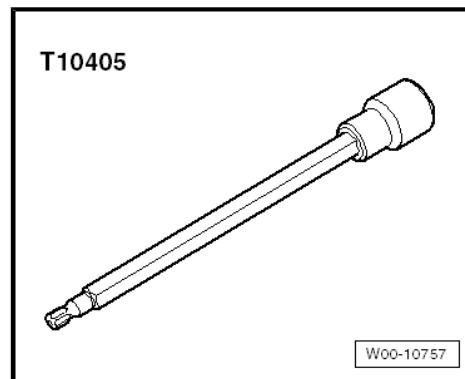


- ♦ Spring-type clip pliers - VAS 6362-





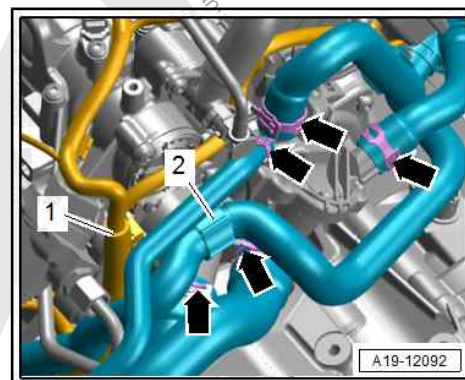
- ◆ Socket Torx T 30 - T10405-



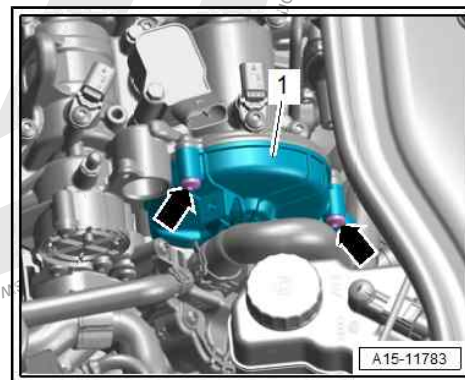
- ◆ Release tool - VAS 531 001-

### Removing

- Remove air filter housing.  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)
- Seal all openings in charge and intake air system using plugs from engine bung set - VAS 6122- .
- Drain coolant  
⇒ ["1.3 Draining and adding coolant", page 272](#) .
- Remove connection for turbocharger  
⇒ ["1.4 Removing and installing connection for turbocharger", page 375](#) .
- Move clear electrical wiring harness -1- and coolant hose -2-.
- Release hose clips -arrows- and detach coolant hoses.



- Unscrew bolts -arrows-, and remove toothed belt guard -1- for coolant pump toothed belt.







- Loosen and unscrew bolts in the sequence -5- to -1-.
- Detach coolant pump with toothed belt.

### Installing

Further installation is carried out in reverse order of removal, observing the following:



#### Note

- ◆ *Renew seals.*
- ◆ *Renew the toothed belt as well.*
- ◆ *Secure all hose connections with hose clips corresponding to the series equipment → [Electronic parts catalogue](#) .*

- Ensure proper seating of gaskets -arrows-.
- Lubricate seal for coolant pump lightly with coolant.



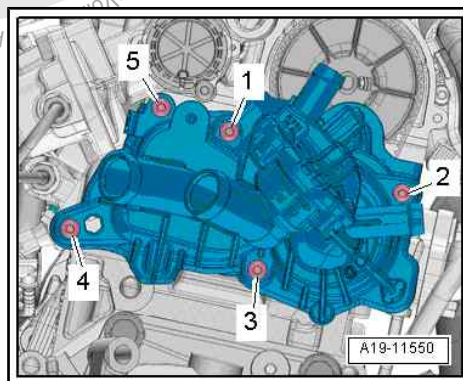
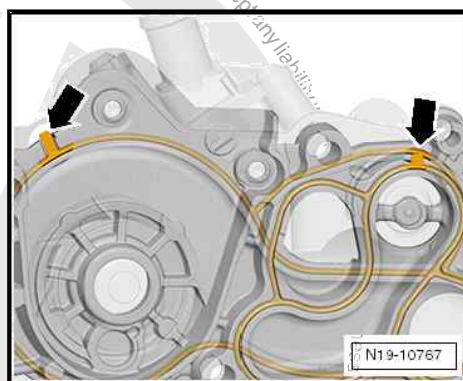
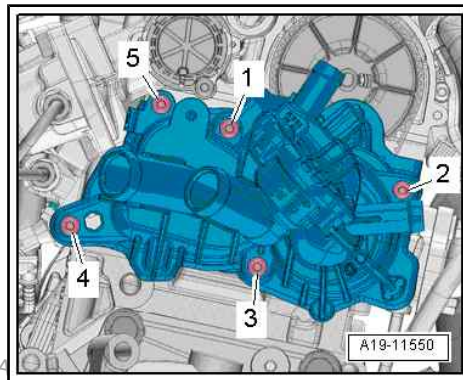
#### Note

- ◆ *Risk of premature wear of toothed belt or coolant pump.*
- ◆ *Always adhere to the sequence of work steps given below when installing the coolant pump.*
- ◆ *This ensures that the toothed belt is correctly tensioned.*
- ◆ *The following work steps must be carried out with the aid of a 2nd mechanic.*

- Used toothed belts must be renewed after each removal.
- Set No. 1 cylinder to TDC.  
⇒ ["4.7 Setting piston to TDC position", page 168](#) .
- Fit toothed belt so that it is centred and move coolant pump into installation position.
- Mount coolant pump on cylinder head with securing bolts.
- Pre-tighten bolts in the specified sequence:

Stage	Bolts	Specified torque
1.	-1 ... 5-	Screw onto stop by hand
2.	-1 ... 5-	10 Nm

- Loosen all bolts again by one turn.





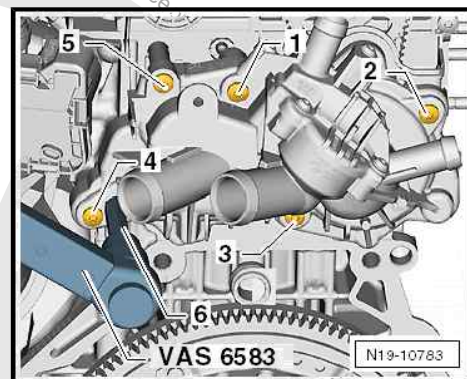


- Apply torque wrench -VAS 6583- with hexagon key (10 mm) -item 6- to coolant pump.
- Using hexagon on coolant pump, preload coolant pump in clockwise direction to 30 Nm using 10 mm hexagon socket -6-, extension and torque wrench - VAS 6583- .
- For ease of use, fit torque wrench - VAS 6583- on vertically.



#### Note

- ◆ Do not support torque wrench with your other hand.
- ◆ To ensure the poly V-belt is not over-tensioned, do not »push the torque wrench again« after the specified torque has been achieved.
- ◆ Have a second mechanic tighten securing bolts -2-, -1- and -5- to specified torque, while holding the torque wrench - VAS 6583- to the specified torque.
- Pre-load coolant pump.
- While doing so, have a second mechanic re-tighten coolant pump securing bolts in anti-clockwise direction to 10 Nm, starting with bolts -2-, -1- and -5- (»stage 3«).
- The required belt tension is reached by tightening securing bolts -2-, -1- and -5-.
- After securing bolts have been tightened initially, torque wrench - VAS 6583- can be removed.
- Then tighten securing bolts (»stage 4«).



Stage	Bolts	Specified torque
3.	-2, 1, 5-	10 Nm
4.	-3, 4, 5, 1, 2-	12 Nm



#### Note

Never reuse old coolant.

- Add coolant ⇒ ["1.3 Draining and adding coolant", page 272](#) .

#### Specified torques

- ◆ Securing bolts for crankcase breather hose  
⇒ ["1.1 Assembly overview - turbocharger", page 366](#)
- ◆ Securing bolts for coolant pump toothed belt guard  
⇒ ["2.1 Assembly overview - coolant pump, thermostat", page 292](#)
- ◆ Intake connecting pipe of turbocharger  
⇒ ["1.1 Assembly overview - turbocharger", page 366](#)
- ◆ Air filter housing  
⇒ ["3.1 Assembly overview - air filter housing", page 410](#)



## 2.6 Removing and installing thermostat

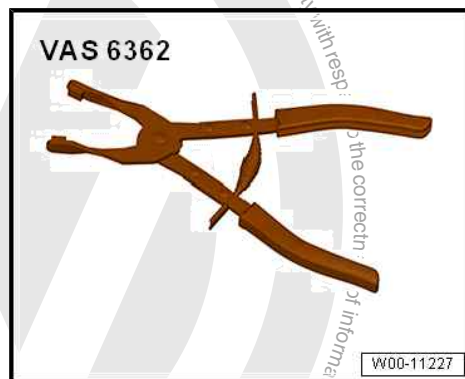
⇒ [“2.6.1 Removing and installing thermostat for main coolant circuit \(radiator\)”, page 304](#)

⇒ [“2.6.2 Removing and installing thermostat for cylinder block coolant circuit”, page 306](#)

### 2.6.1 Removing and installing thermostat for main coolant circuit (radiator)

Special tools and workshop equipment required

◆ Spring-type clip pliers - VAS 6362-



◆ Special wrench - T10508



#### Removing

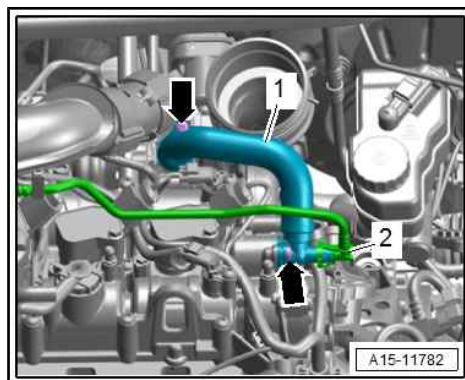
- Remove air filter housing.  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#)
- Drain coolant  
⇒ [“1.3 Draining and adding coolant”, page 272](#) .
- Press release tabs on both sides, and disconnect hose -2- for activated charcoal filter.



#### Note

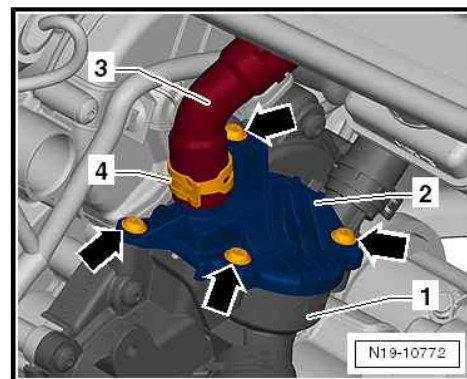
*Risk of chemical damage to the coolant pump gasket caused by oil entering between the coolant pump and the cylinder head.*

- Cover coolant pump with a cloth.
- Unscrew bolts -arrows-, and remove crankcase breather hose -1-.

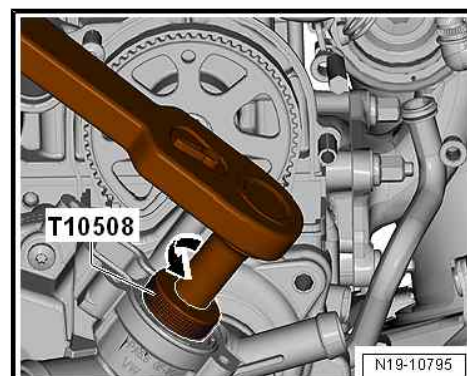




- Remove coolant hose -3- from turbocharger connection.
- Release hose clip -4- and detach coolant hose -3-.
- Remove bolts -arrows- and detach cover -2- from thermostat housing -1-.



- Using special wrench - T10508- , turn thermostat in direction of -arrow- and remove.



## Installing

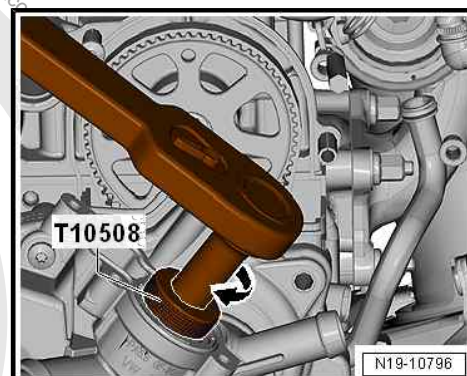
Install in reverse order of removal, observing the following:



### Note

*Renew seals.*

- Moisten gasket with coolant.
- Installation position of thermostat ⇒ [page 294](#) .
- Using special wrench - T10508- , fit thermostat, push it down slightly and turn in direction of -arrow- as far as stop.



### Note

*Never reuse old coolant.*

- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

## Specified torques

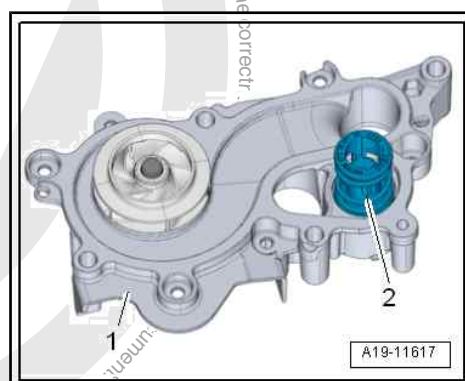
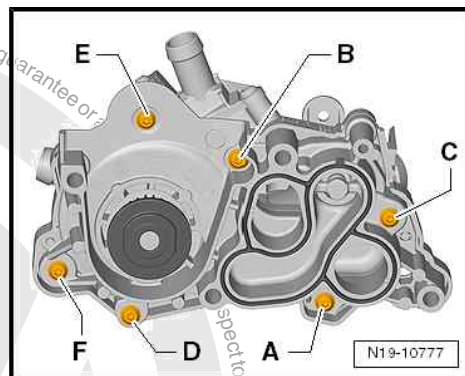
- ◆ ⇒ Fig. ““Cover for thermostat to thermostat housing - specified torque””, [page 294](#)
- ◆ Intake connecting pipe of turbocharger  
⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ◆ Air filter housing  
⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)



## 2.6.2 Removing and installing thermostat for cylinder block coolant circuit

### Removing

- Remove coolant pump  
⇒ [“2.5 Removing and installing coolant pump”, page 300](#) .
- Unscrew bolts in the sequence -F to A-.
- Detach coolant pump from thermostat housing.
- Detach thermostat -2- from coolant pump -1-.



### Installing

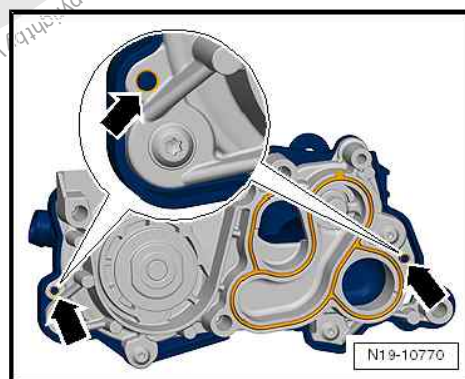
Install in reverse order of removal, observing the following:



#### Note

*Renew seals.*

- Moisten gasket with coolant.
- Fit thermostat housing onto coolant pump.
- Centring pins on thermostat must be fitted in guides -arrows- on coolant pump.
- Tighten bolts for thermostat housing ⇒ [page 294](#) .
- Install coolant pump  
⇒ [“2.5 Removing and installing coolant pump”, page 300](#) .



#### Note

*Never reuse old coolant.*

- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

### Specified torques

- ♦ ⇒ Fig. [“Thermostat housing to coolant pump - specified torque and sequence”](#) , page 294

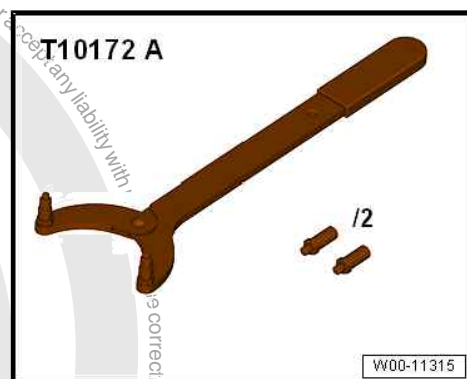




## 2.7 Removing and installing toothed belt pulley for coolant pump

### Special tools and workshop equipment required

- ◆ Counterhold - T10172 A- with adapter -T10172/2-



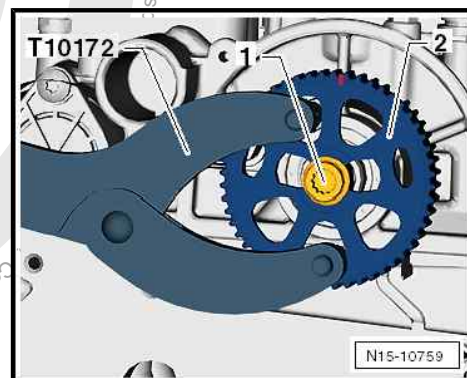
### Removing

- Remove coolant pump  
⇒ ["2.5 Removing and installing coolant pump", page 300](#) .
- Loosen bolt -1- using counterhold - T10172- with adapters - T10172/2- .
- Unscrew bolt and remove toothed belt pulley -2-.

### Installing

Install in reverse order of removal, observing the following:

- Fit toothed belt pulley:

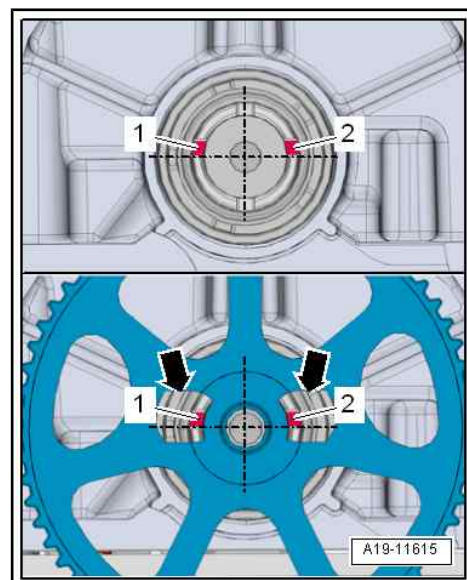


### Position of camshaft recesses:

- The grooves -1- and -2- in the camshaft are arranged asymmetrically.
- Cut-outs -arrows- in toothed belt pulley are also arranged asymmetrically.
- Fit toothed belt pulley onto camshaft so that the asymmetrical notches of the camshaft are fully centred within the cut-outs of the toothed belt pulley.
- Install coolant pump  
⇒ ["2.5 Removing and installing coolant pump", page 300](#)

### Specified torque

- ◆ ⇒ ["2.1 Assembly overview - coolant pump, thermostat", page 292](#)



## 2.8 Removing and installing coolant temperature sender - G62-

### Special tools and workshop equipment required





- ◆ Drip tray for workshop hoist - VAS 6208-



## Removing

- Engine cold.

### ⚠ CAUTION

On a warm engine, the cooling system is under high pressure. Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with a cloth and opening it carefully.

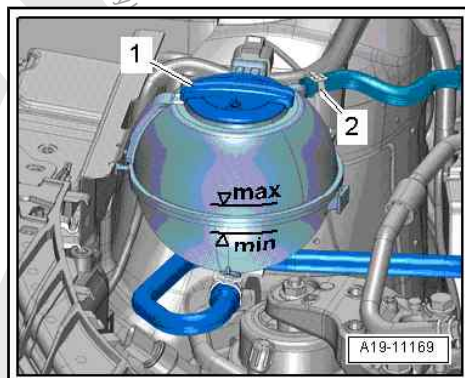
## Polo 2014 ➤

- To relieve residual pressure in cooling system, open filler cap -1- on coolant expansion tank briefly and then close cap again (it should click into place).



### Note

Disregard item 2-.



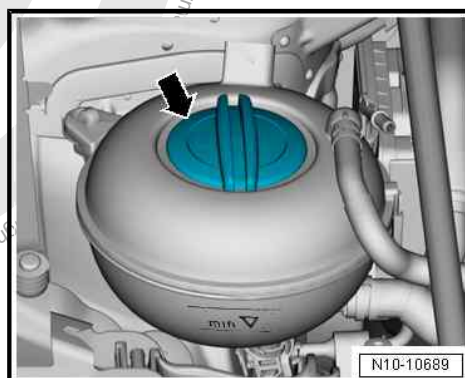
## Golf, Golf Estate, Golf SV, T-Roc, Touran



### Note

Different caps might be installed depending on the equipment year.

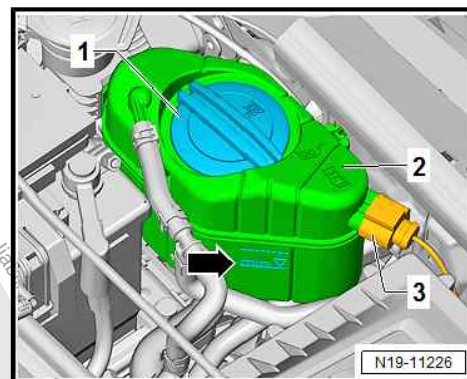
- Briefly open cap -arrow- of coolant expansion tank to reduce residual pressure in cooling system, and then tighten cap again until it engages.





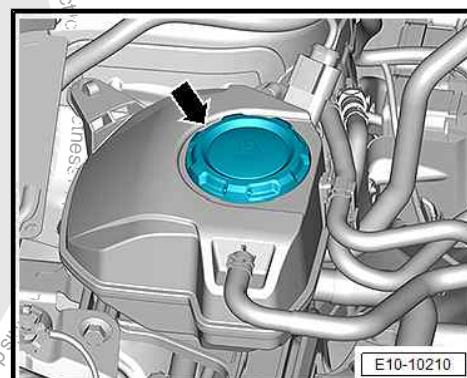
up!:

- To relieve residual pressure in cooling system, open filler cap  
-1- on coolant expansion tank -2- briefly and then close cap  
again (it should click into place).



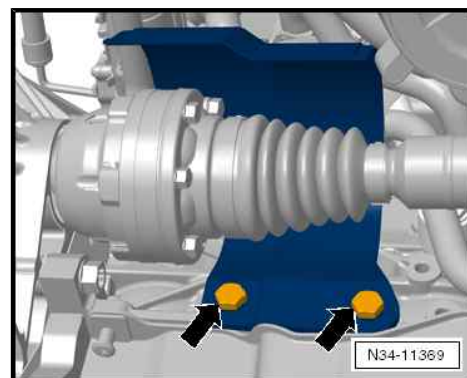
#### Polo 2018 ►, T-Cross

Open cap -arrow-.



#### Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross

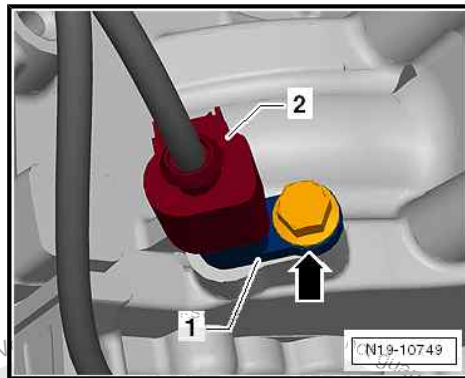
- Remove noise insulation ⇒ General body repairs, exterior;  
Rep. gr. 66 ; Noise insulation; Assembly overview - noise in-  
sulation .
- If fitted: remove bolts -arrows- and detach heat shield for drive  
shaft (right-side).





### Continued for all vehicles

- Place a cloth underneath to catch any escaping coolant.
- Place drip tray for workshop hoist - VAS 6208- underneath.
- Open and remove thermal protection from connector -2-.
- Release and pull off electrical connector -2-.
- Unscrew bolt -arrow-, and pull off coolant temperature sender - G62- -item 1-.



### Note

- ♦ If O-ring -3- with support ring -4- remains lodged in cylinder head, lift out O-ring with support ring using a piece of wire.
- ♦ To avoid loss of coolant, insert new coolant temperature sender - G62- immediately into cylinder head.

### Installing

Install in reverse order of removal, observing the following:



### Note

Renew O-ring.

- Check coolant level  
⇒ [“1.3 Draining and adding coolant”, page 272](#) .

### Specified torques

- ♦ ⇒ [“2.3 Assembly overview - coolant temperature sender”, page 296](#)
- ♦ Drive shaft heat shield ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Assembly overview - drive shaft

## 2.9 Removing and installing radiator outlet coolant temperature sender - G83-

⇒ [“2.9.1 Removing and installing radiator outlet coolant temperature sender G83 , Polo 2014 ►”, page 310](#)

⇒ [“2.9.2 Removing and installing radiator outlet coolant temperature sender G83 , Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 311](#)

⇒ [“2.9.3 Removing and installing radiator outlet coolant temperature sender G83 , up!”, page 313](#)

### 2.9.1 Removing and installing radiator outlet coolant temperature sender - G83- , Polo 2014 ►

#### Removing

- Engine cold.



## ⚠ CAUTION

On a warm engine, the cooling system is under high pressure.  
Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

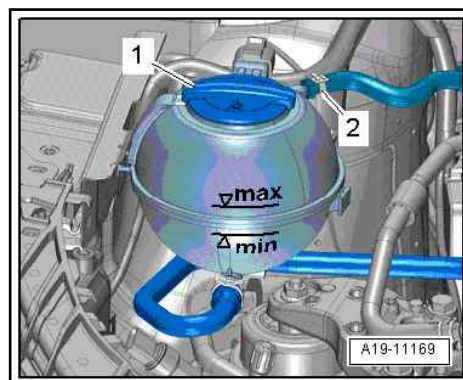
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with cloths and opening it carefully.

- In order to relieve residual pressure in cooling system, briefly open filler cap -1- of coolant expansion tank and then screw on tightly again until it latches into place.



### Note

Disregard -item 2-.



- Separate electrical connector -arrow-.



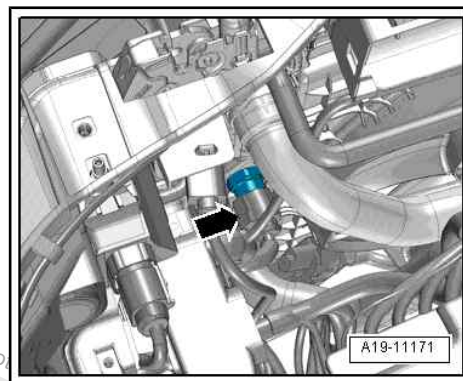
### Note

Place a cloth underneath to catch escaping coolant.

- Unscrew radiator outlet coolant temperature sender - G83- .

## Installing

Install in reverse order of removal, observing the following:



### Note

- ◆ If fitted, renew O-ring
- ◆ To avoid loss of coolant, screw in new radiator outlet coolant temperature sender - G83- immediately.

- Check coolant level  
⇒ ["1.3 Draining and adding coolant", page 272](#) .

## Specified torques

- ◆ ⇒ ["2.3 Assembly overview - coolant temperature sender", page 296](#)

## 2.9.2 Removing and installing radiator outlet coolant temperature sender - G83- , Golf, Golf Estate, Golf SV, Polo 2018 ➤ , T-Roc, T-Cross, Touran

### Removing

- Engine cold.





**⚠ CAUTION**

On a warm engine, the cooling system is under high pressure.  
Danger of scalding by steam and hot coolant.

Skin and other parts of the body may be scalded.

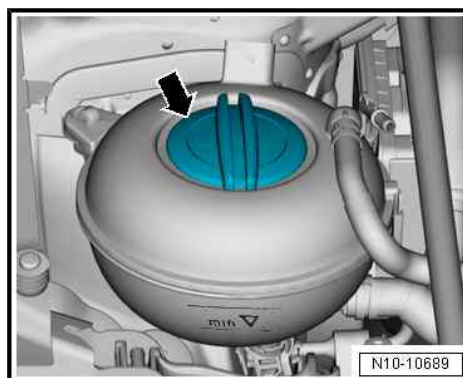
- Wear protective gloves.
- Wear protective goggles.
- Reduce excess pressure by covering cap of coolant expansion tank with a cloth and opening it carefully.

- Briefly open cap -arrow- of coolant expansion tank to reduce residual pressure in cooling system, and then tighten cap again until it engages.



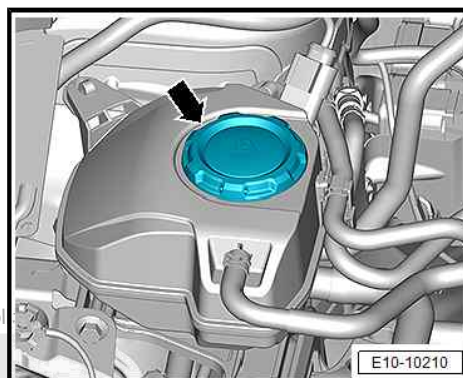
**Note**

*Different caps might be installed depending on the equipment year.*



**Polo 2018 ➤, T-Cross**

- Open cap -arrow-.







### Continued for all vehicles

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Disconnect electrical connector -2-.



#### Note

*Place a cloth underneath to catch escaping coolant.*

- Pull off retaining clip -1- and pull radiator outlet coolant temperature sender - G83- out of connection -3-.

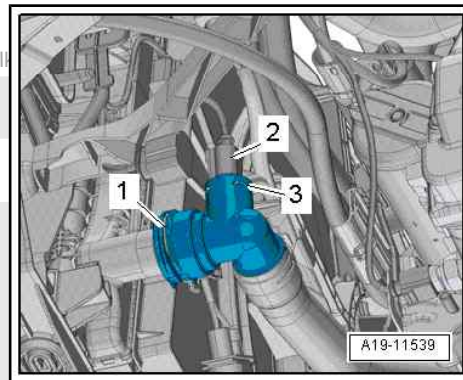
### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew O-ring.*
- ◆ *Insert new coolant temperature sender - G62- immediately into connection in order to avoid loss of coolant.*
- Install front noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Check coolant level  
⇒ [“1.3 Draining and adding coolant”, page 272](#)



## 2.9.3 Removing and installing radiator outlet coolant temperature sender - G83- , up!

### Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist - VAS 6208-

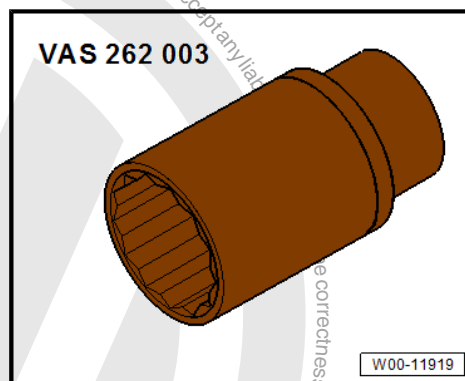
VAS 6208



W00-11209

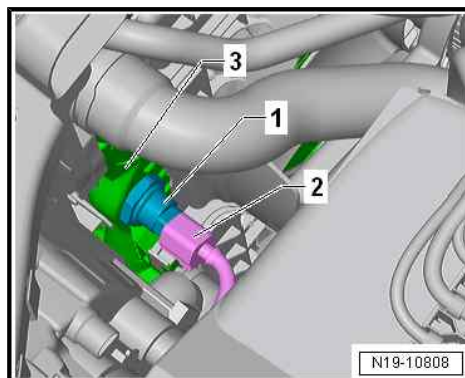
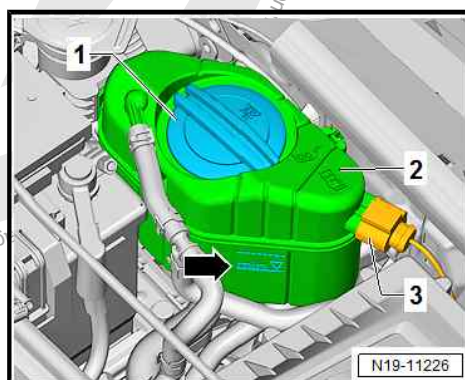


◆ Socket - VAS 262 003-



### Removing

- Engine cold.
  - To relieve residual pressure in cooling system, open filler cap -1- on coolant expansion tank -2- briefly and then close cap again.
  - Release and pull off connector -1- on coolant expansion tank.
  - Unclip filler neck -2- for washer fluid reservoir.
  - Release and detach coolant expansion tank on lock carrier -arrows-.
  - Place drip tray for workshop hoist - VAS 6208- underneath.
- 
- Release and pull off connector -2- on radiator outlet coolant temperature sender - G83- -1-.
  - Use cloth to catch escaping coolant.
  - Unscrew radiator outlet coolant temperature sender - G83- using socket AF 29 - VAS 262 003- .



### Note

*Insert new coolant temperature sender - G62- immediately to prevent large-scale coolant loss.*

### Installing

Install in reverse order of removal, observing the following:

- Check coolant level  
⇒ ["1.3.3 Draining and adding coolant, up!", page 285](#) .

### Specified torque:

- ◆ ⇒ ["4.1.3 Assembly overview - radiator/radiator fan, up!", page 322](#)



## 3 Coolant pipes

⇒ [“3.1 Assembly overview - coolant pipes”, page 315](#)

⇒ [“3.2 Removing and installing coolant pipes”, page 315](#)

### 3.1 Assembly overview - coolant pipes



#### Note

*The arrows on the coolant pipes and on the ends of coolant hoses must be aligned with each other.*

1 - Coolant hose

2 - Coolant pipe

- ☐ Removing and installing  
⇒ [“3.2 Removing and installing coolant pipes”, page 315](#)

- ☐ Not for up!

3 - Bolt

- ☐ 8 Nm

4 - Coolant hose

5 - Coolant hoses

6 - Coolant line

- ☐ Clipped onto intake manifold (top)

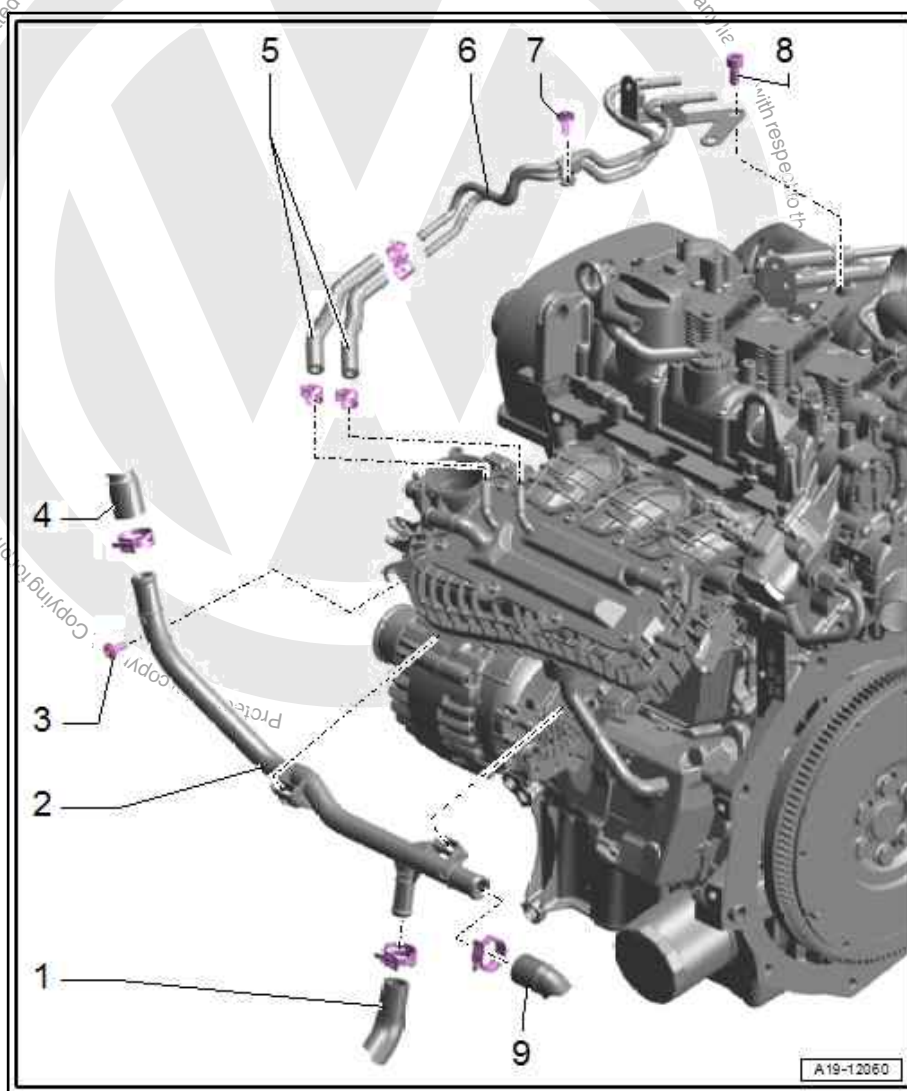
7 - Bolt

- ☐ 9 Nm

8 - Bolt

- ☐ Specified torque  
⇒ [Item 6 \(page 366\)](#)

9 - Coolant hose



### 3.2 Removing and installing coolant pipes

#### Removing

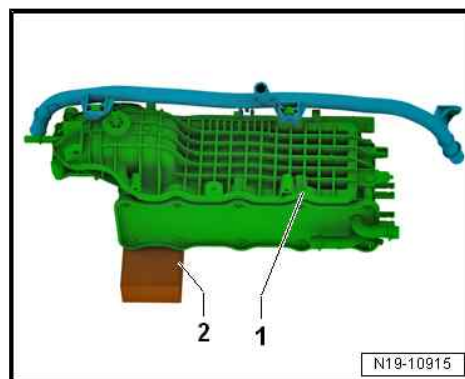
- Remove intake manifold  
⇒ [“4.2 Removing and installing intake manifold”, page 422](#) .



#### Note

- ♦ Risk of damage to intake manifold and coolant pipe.
- ♦ This procedure requires extreme caution.

- Lay intake manifold -1- on the workbench as shown.

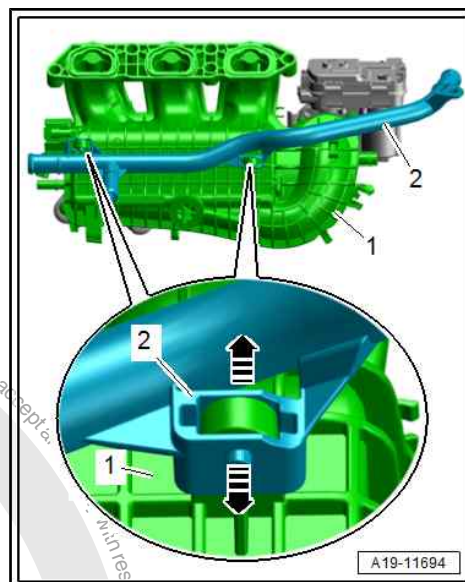


- Place e.g. a block of wood -2- under the intake manifold as an underlay.
- Carefully release catches -arrows-, and pull coolant pipe -2- off intake manifold -1-.

#### Installing

Further installation is carried out in reverse order of removal, observing the following:

- Push coolant pipe onto intake manifold until it audibly engages.



#### Note

- ♦ Renew seals and O-rings.
- ♦ Secure all hose connections with hose clips corresponding to the series equipment ⇒ *Electronic parts catalogue*.

- Install intake manifold  
⇒ ["4.2 Removing and installing intake manifold", page 422](#).
- Check coolant level.  
⇒ ["4.3 Draining and adding coolant", page 272](#)

#### Specified torques

- ♦ ⇒ ["4.1 Assembly overview - intake manifold", page 421](#)



## 4 Radiator, radiator fan

⇒ [“4.1 Assembly overview - radiator/radiator fan”, page 317](#)

⇒ [“4.2 Assembly overview - radiator cowl and radiator fan”, page 326](#)

⇒ [“4.3 Assembly overview - radiator blind”, page 329](#)

⇒ [“4.4 Removing and installing radiator”, page 331](#)

⇒ [“4.5 Removing and installing water radiator for charge air cooling circuit”, page 350](#)

⇒ [“4.6 Removing and installing radiator cowl”, page 354](#)

⇒ [“4.7 Removing and installing radiator fan V7”, page 359](#)

⇒ [“4.8 Removing and installing radiator blind”, page 360](#)

⇒ [“4.9 Removing and installing radiator blind control motor V544”, page 362](#)

### 4.1 Assembly overview - radiator/radiator fan

⇒ [“4.1.1 Assembly overview - radiator, radiator fan, Polo 2014 ►”, page 317](#)

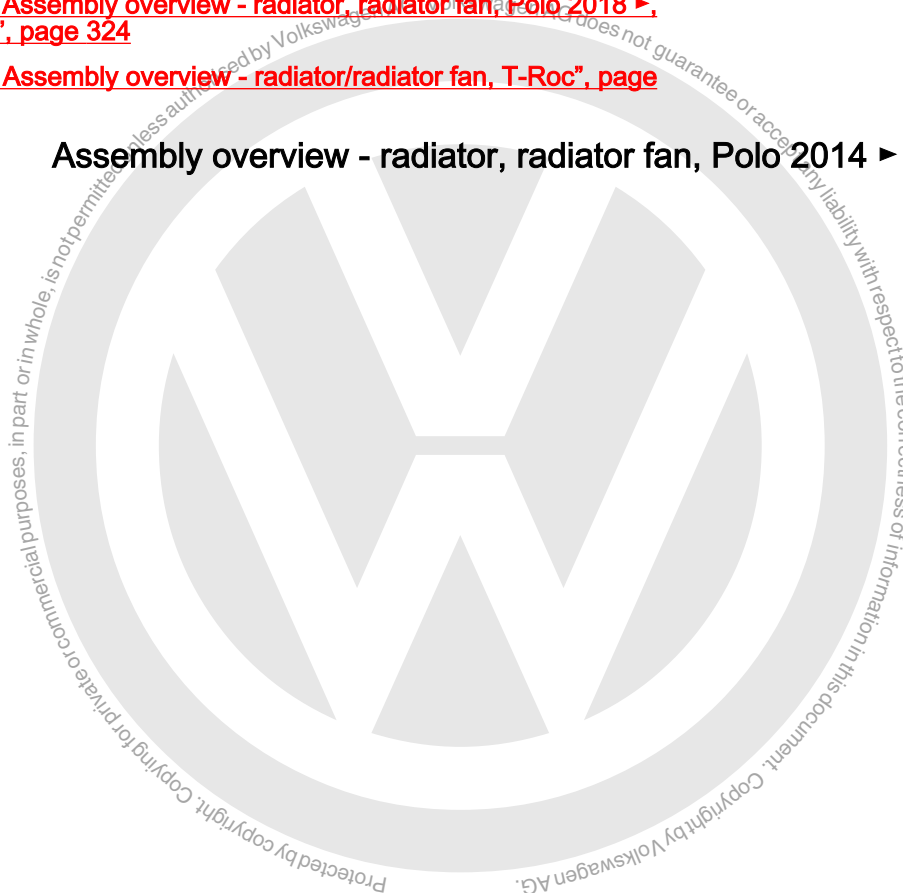
⇒ [“4.1.2 Assembly overview - radiator, radiator fan, Golf, Golf Estate, Golf SV, Touran”, page 320](#)

⇒ [“4.1.3 Assembly overview - radiator/radiator fan, up!”, page 322](#)

⇒ [“4.1.4 Assembly overview - radiator, radiator fan, Polo 2018 ►, T-Cross”, page 324](#)

⇒ [“4.1.5 Assembly overview - radiator/radiator fan, T-Roc”, page 325](#)

#### 4.1.1 Assembly overview - radiator, radiator fan, Polo 2014 ►







#### 1 - Coolant hoses

- ❑ For coolant circuit of charge air cooler

#### 2 - Air duct

#### 3 - Water radiator for charge air cooler

- ❑ Radiator and water radiator for charge air cooling circuit are removed together
- ❑ After renewing, renew entire coolant.
- ❑ Removing and installing ⇒ ["4.4 Removing and installing radiator", page 331](#)

#### 4 - Lower coolant hose

- ❑ Use release tool - VAS 531 001- to lock.
- ❑ Clamp moulded

#### 5 - Radiator outlet coolant temperature sender - G83-

- ❑ Removing and installing ⇒ ["2.9 Removing and installing radiator outlet coolant temperature sender G83", page 310](#)
- ❑ 35 Nm

#### 6 - Seal

- ❑ Renew after removal

#### 7 - Upper coolant hose

- ❑ Use release tool - VAS 531 001- to lock.
- ❑ Clamp moulded

#### 8 - Air duct

#### 9 - Coolant hose

- ❑ To coolant expansion tank
- ❑ Use release tool - VAS 531 001- to lock.
- ❑ Clamp moulded

#### 10 - Radiator for engine coolant

- ❑ Removing and installing ⇒ ["4.4 Removing and installing radiator", page 331](#)
- ❑ After renewing, renew entire coolant.

#### 11 - Condenser

- ❑ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser

#### 12 - Bolt

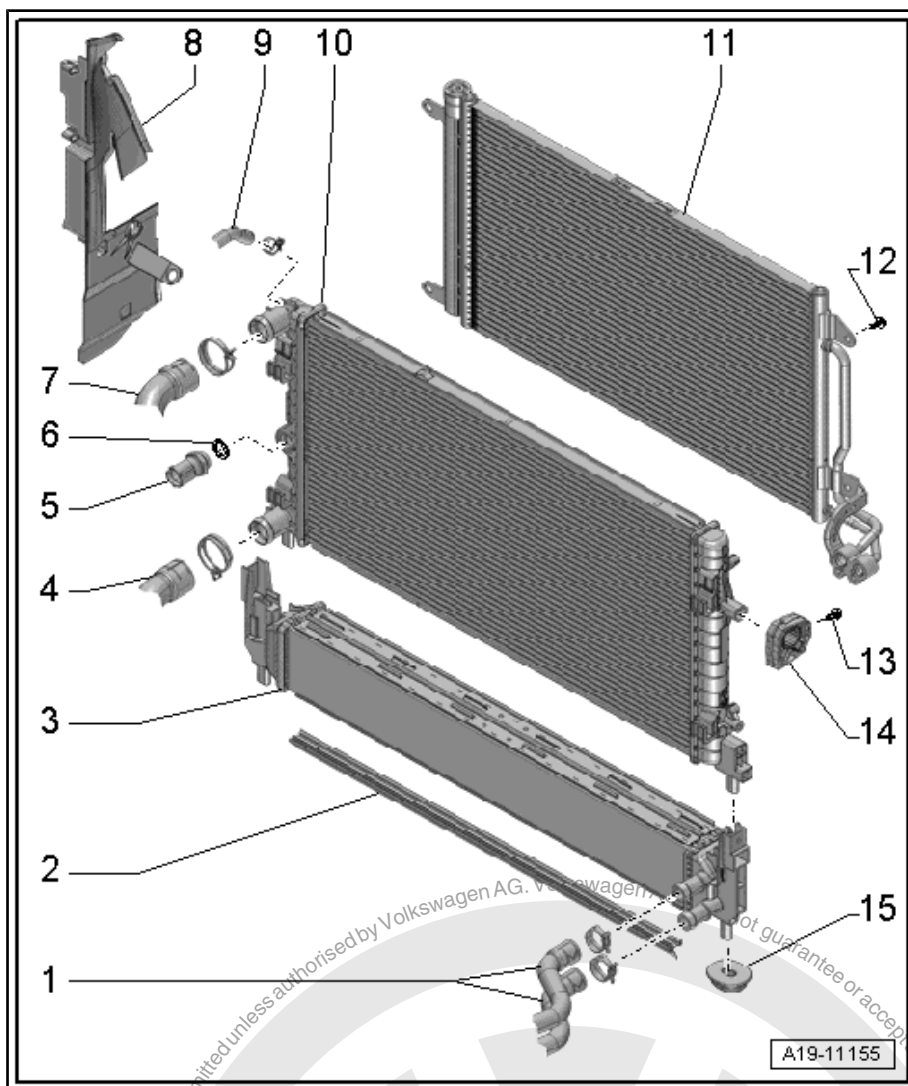
- ❑ Specified torque ⇒ Heating, air conditioning system; Rep. gr. 87 ; Refrigerant circuit; Assembly overview - condenser

#### 13 - Bolt

- ❑ 5 Nm

#### 14 - Bracket

- ❑ Observe installation position





## 15 - Bracket

- ☐ For water radiator for charge air cooler

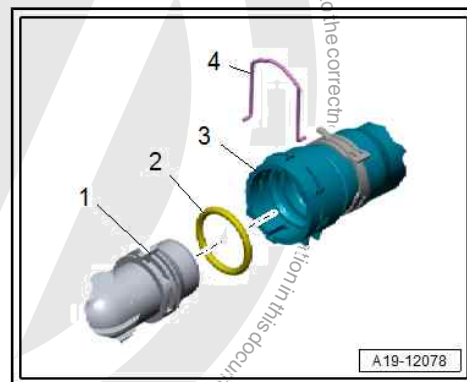
### Connecting coolant hose with plug-in connectors



#### Note

*Renew retaining clip -4- if damaged.*

- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Push coolant hose onto coolant pipe -1- until it audibly engages.
- Push coolant hose further on, and pull it back then to check if plug-in connector is engaged securely.





## 4.1.2 Assembly overview - radiator, radiator fan, Golf, Golf Estate, Golf SV, Touran

### 1 - Radiator for engine coolant

- ☐ Removing and installing  
⇒ ["4.4 Removing and installing radiator", page 331](#)
- ☐ Renew coolant after replacing

### 2 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ⇒ [page 321](#)

### 3 - Retaining clip

### 4 - O-ring

- ☐ Renew

### 5 - Radiator outlet coolant temperature sender - G83-

- ☐ Removing and installing  
⇒ ["2.9.2 Removing and installing radiator outlet coolant temperature sender G83", Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 311](#)

### 6 - O-ring

- ☐ Renew

### 7 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ⇒ [page 321](#)

### 8 - O-ring

- ☐ Renew

### 9 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ⇒ [page 321](#)

### 10 - Air duct

### 11 - Air duct

### 12 - Rubber mounting

- ☐ For radiator

### 13 - Radiator for charge air cooling circuit

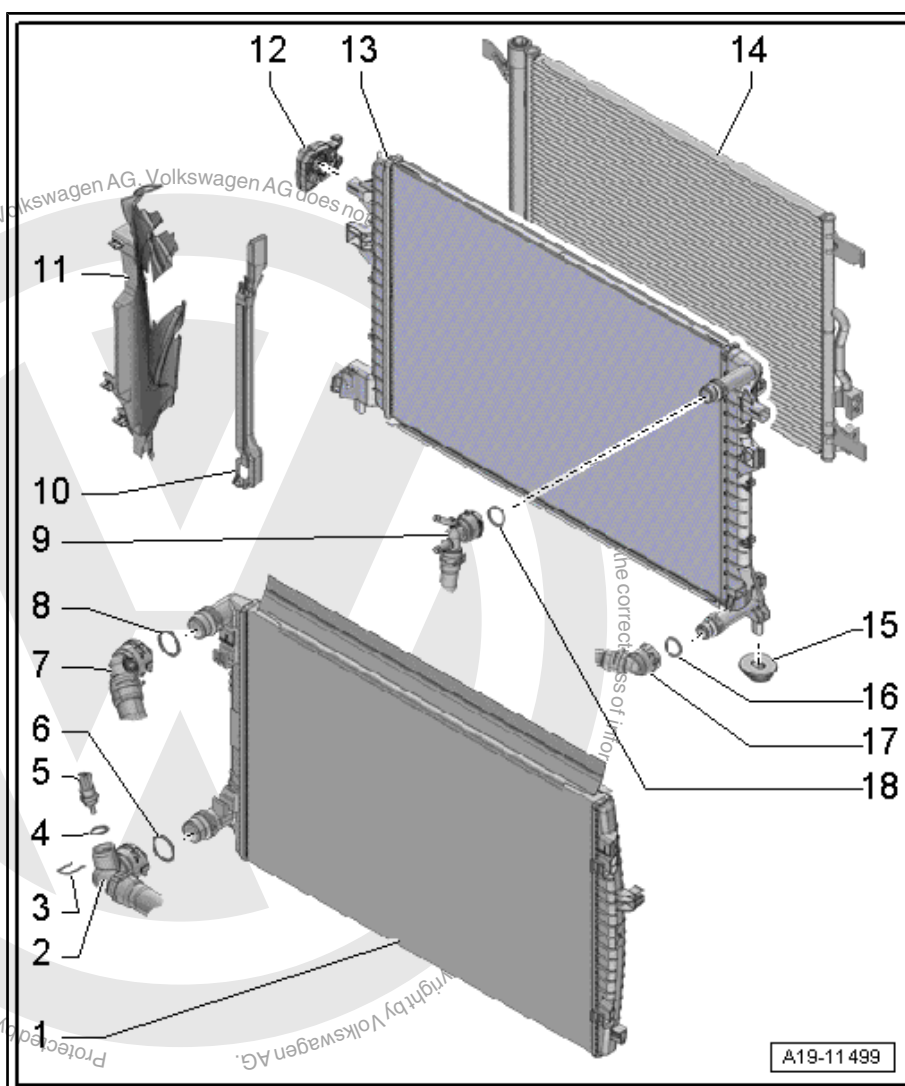
- ☐ Removing and installing ⇒ ["4.4 Removing and installing radiator", page 331](#)

### 14 - Condenser

- ☐ Removing and installing ⇒ Heating, air conditioning; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser

### 15 - Rubber mounting

- ☐ For radiator



A19-11499



#### 16 - O-ring

- ☐ Renew

#### 17 - Coolant hose

- ☐ Pull out retaining clip to remove
- ☐ Connect ➔ [page 321](#)

#### 18 - O-ring

- ☐ Renew

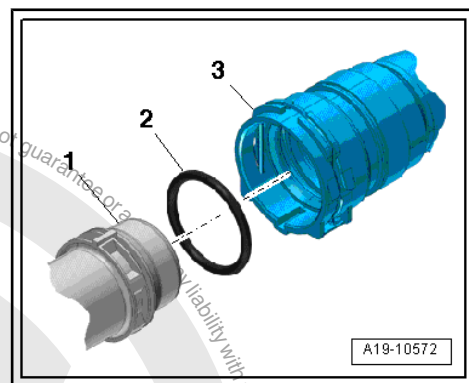


#### Note

*The markings »arrows« on the coolant pipes and on the ends of the hoses must align.*

#### Connecting coolant hose with plug-in connector

- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Push coolant hose into connection -1- until it audibly engages.
- Press again on coolant hose and check plug-in connector is engaged correctly by pulling hose back.





### 4.1.3 Assembly overview - radiator/radiator fan, up!

#### 1 - Lower radiator mounting

- Ensure proper seating.

#### 2 - Radiator for charge air cooling circuit

- Removing and installing  
⇒ [“4.5.2 Removing and installing cooler for charge air cooling circuit, up!”](#), page 353

#### 3 - Radiator outlet coolant temperature sender - G83-

- Assembly overview -  
⇒ [“2.3.1 Assembly overview - coolant temperature sender, Polo 2014 ►, up!”](#), page 296
- Removing and installing  
⇒ [“2.9.3 Removing and installing radiator outlet coolant temperature sender G83, up!”](#), page 313

- 35 Nm

#### 4 - Seal

- Not fitted

#### 5 - Bolt

- Number is vehicle-specific
- 5 Nm

#### 6 - Upper radiator mounting

- Ensure proper seating.

#### 7 - Radiator/cooler

- Removing and installing  
⇒ [“4.4.3 Removing and installing radiator, up!”](#), page 335

#### 8 - Coolant expansion tank

- Fitting position ⇒ [page 323](#)

#### 9 - Cap

- For coolant expansion tank
- with pressure relief valve
- Checking ⇒ [page 272](#)

#### 10 - Electrical connector

#### 11 - Coolant hose

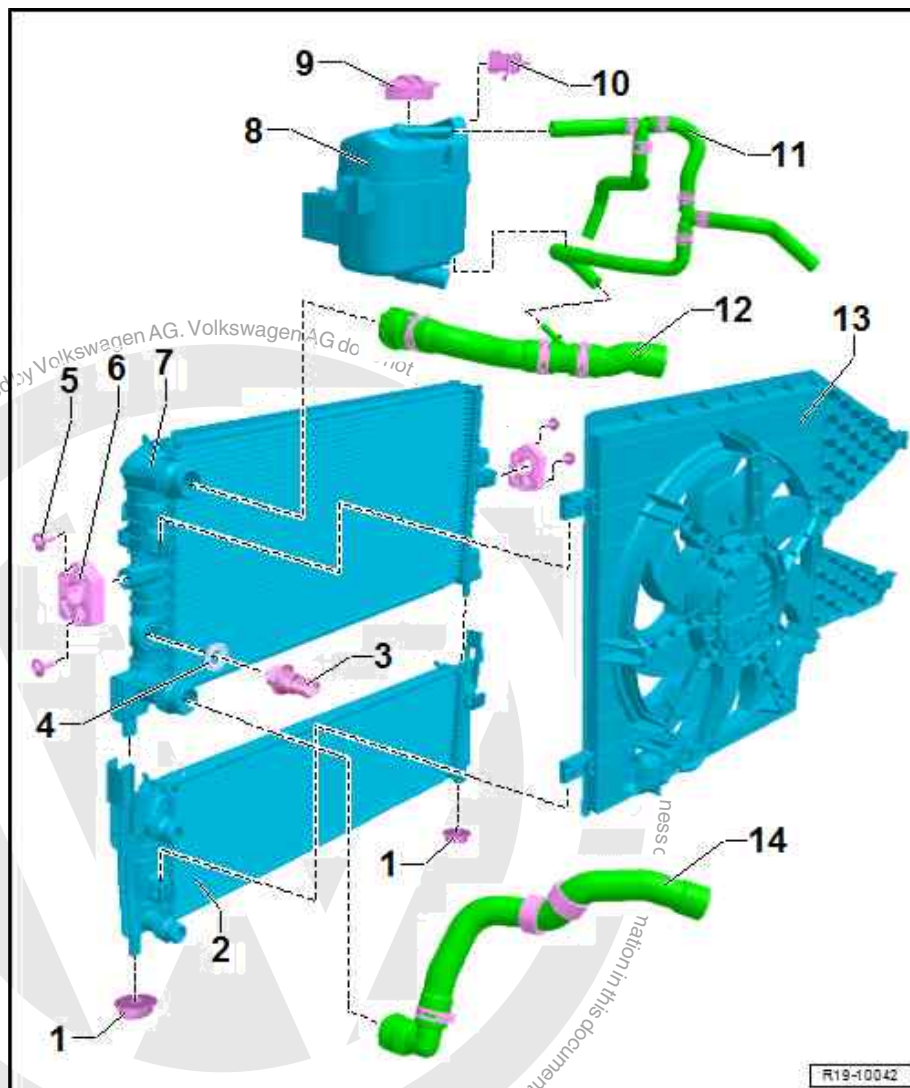
- Schematic diagram ⇒ [“1.1 Connection diagram - coolant hoses”, page 268](#)
- Connecting coolant hose with plug-in connector to radiator ⇒ [page 323](#)

#### 12 - Coolant hose

- Schematic diagram ⇒ [“1.1 Connection diagram - coolant hoses”, page 268](#)
- Connecting coolant hose with plug-in connector to radiator ⇒ [page 323](#)

#### 13 - Radiator cowl

- Assembly overview - ⇒ [“4.2.3 Assembly overview - radiator cowl and radiator fan, up!”](#), page 328
- Removing and installing ⇒ [“4.6.3 Removing and installing radiator cowl, up!”](#), page 356





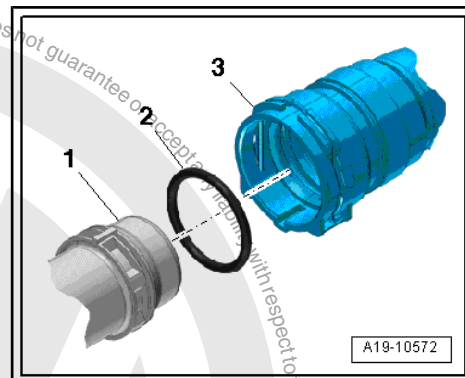


## 14 - Coolant hose

- ❑ Schematic diagram ➔ ["1.1 Connection diagram - coolant hoses", page 268](#)
- ❑ Connecting coolant hose with plug-in connector to radiator ➔ [page 323](#)

### Connecting coolant hose with plug-in connector

- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Push coolant hose into connection -1- until it audibly engages.
- Press again on coolant hose and check plug-in connector is engaged correctly by pulling hose back.



### Installation position of coolant expansion tank

- 1 - Coolant expansion tank
- 2 - Lock carrier
- 3 - Electrical connector
- 4 - Coolant hose
- 5 - Clip

Pfeile - Mountings, supports and retainers

- Ensure proper seating in mountings.



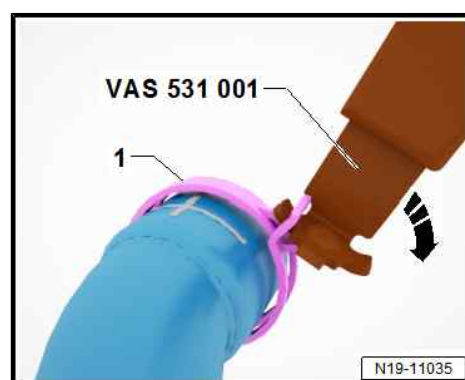
### Releasing pretensioned spring-type clips

- Insert release tool - VAS 531 001- into spring-type clip -1- as shown in illustration.
- Release catch in -direction of arrow-.



#### Note

*The position in which the tool is inserted depends on the installation position of the spring-type clip.*





#### 4.1.4 Assembly overview - radiator, radiator fan, Polo 2018 ►, T-Cross

##### 1 - Air duct

- ☐ Left

##### 2 - Condenser

- ☐ Removing and installing  
⇒ Heating, air conditioning; Rep. gr. 87 ;  
Refrigerant circuit; Removing and installing condenser

##### 3 - Air duct

- ☐ Right

##### 4 - Radiator mounting

- ☐ Qty. 2

##### 5 - Bonded rubber bush

- ☐ Qty. 2

##### 6 - Oil seals

- ☐ Renew after removal
- ☐ Qty. 4

##### 7 - Coolant hose

##### 8 - Coolant hose

##### 9 - Radiator for engine coolant

- ☐ With water radiator for charge air cooling circuit
- ☐ Removing and installing  
⇒ [page 339](#)

##### 10 - Coolant hose

##### 11 - Retaining clip

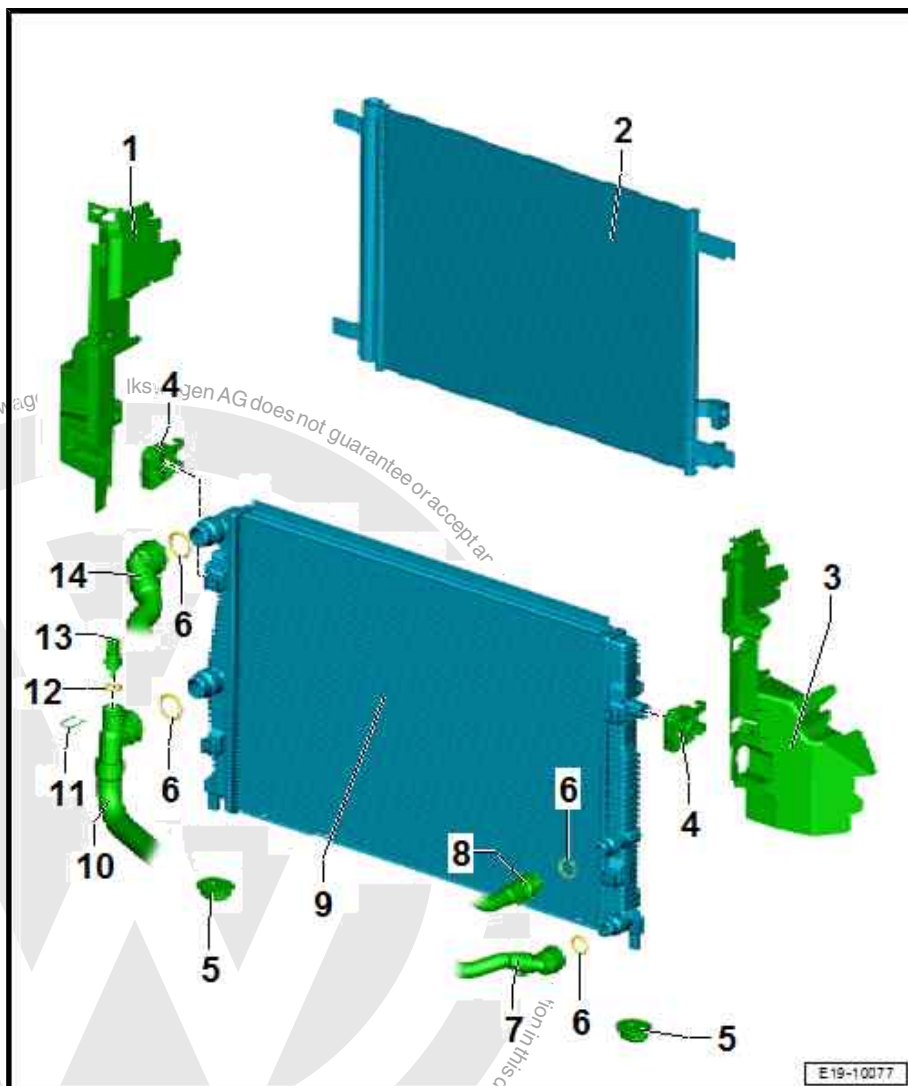
##### 12 - Seal

- ☐ Renew after removal

##### 13 - Radiator outlet coolant temperature sender - G83-

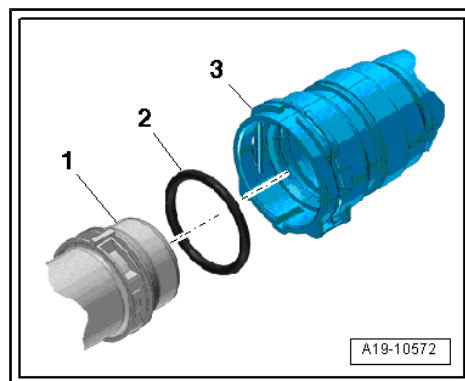
- ☐ Removing and installing ⇒ [page 311](#)

##### 14 - Coolant hose



#### Connecting coolant hose with plug-in connector

- Remove old O-ring -2- in coolant hose -3-.
- Moisten new O-ring with coolant and insert into coolant hose.
- Push coolant hose into connection -1- until it audibly engages.
- Press again on coolant hose and check plug-in connector is engaged correctly by pulling hose back.





#### 4.1.5 Assembly overview - radiator/radiator fan, T-Roc

##### 1 - Condenser

- ☐ Removing and installing  
⇒ Heating, air conditioning; Rep. gr. 87 ;  
Refrigerant circuit; Removing and installing  
condenser

##### 2 - Bolts

- ☐ Qty. 2
- ☐ 5 Nm

##### 3 - Radiator mounting

- ☐ Qty. 2

##### 4 - Air duct

- ☐ Left

##### 5 - Radiator for engine coolant

- ☐ Removing and installing  
⇒ [page 331](#)

##### 6 - Seal

##### 7 - Water radiator for charge air cooling circuit

- ☐ Radiator and water radiator for charge air cooling circuit are removed together
- ☐ After renewing, renew entire coolant.
- ☐ Removing and installing  
⇒ [“4.4.5 Removing and installing radiator, T-Roc”, page 344](#)

##### 8 - Lower radiator mounting

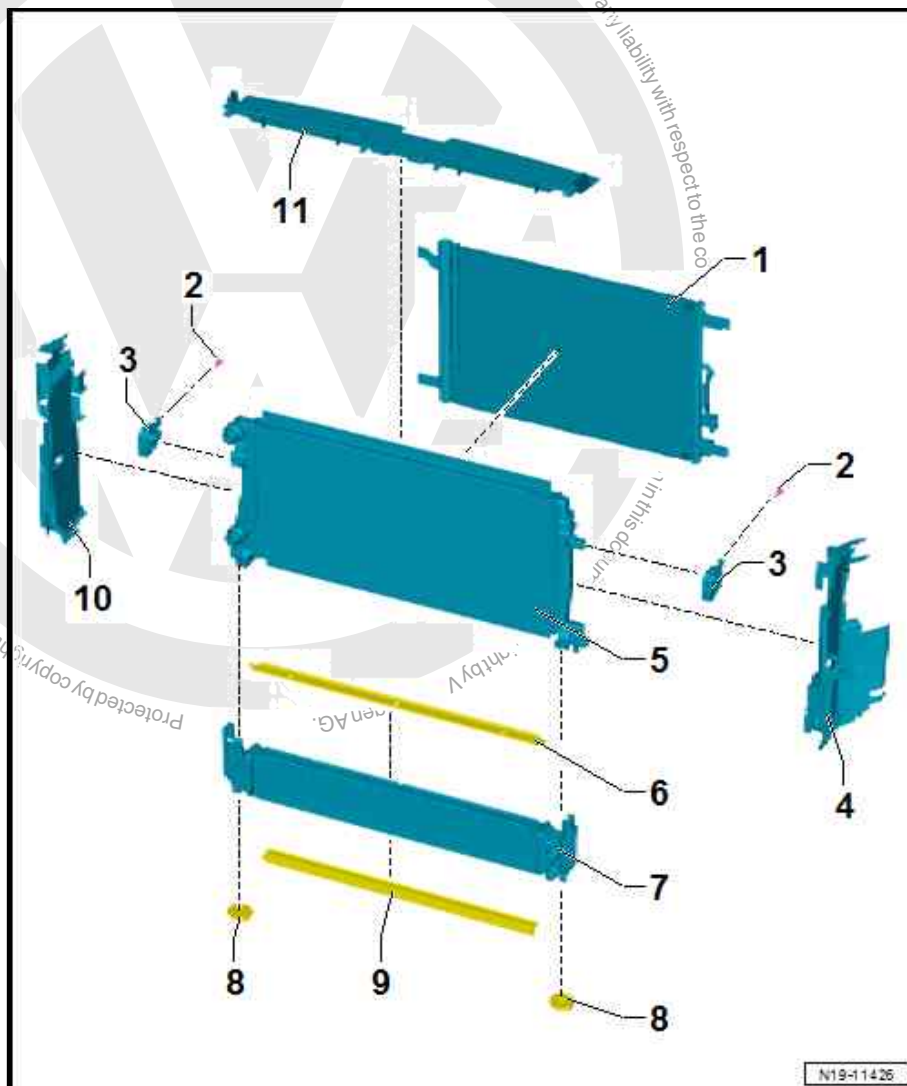
- ☐ Qty. 2
- ☐ Ensure it is properly seated.

##### 9 - Air duct

##### 10 - Air duct

- ☐ Right

##### 11 - Air duct





## 4.2 Assembly overview - radiator cowl and radiator fan

⇒ [“4.2.1 Assembly overview - radiator cowl and radiator fan, Polo 2014 ►”, page 326](#)

⇒ [“4.2.2 Assembly overview - radiator cowl and radiator fan, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 327](#)

⇒ [“4.2.3 Assembly overview - radiator cowl and radiator fan, up!”, page 328](#)

### 4.2.1 Assembly overview - radiator cowl and radiator fan, Polo 2014 ►

#### 1 - Pin

- ☐ For spreader clip

#### 2 - Air duct ring

- ☐ For radiator fan
- ☐ Depending on version

#### 3 - Radiator fan - V7-

- ☐ With radiator fan control unit - J293-
- ☐ Removing and installing  
⇒ [“4.7 Removing and installing radiator fan V7”, page 359](#)

#### 4 - Radiator cowl

- ☐ Removing and installing  
⇒ [“4.6 Removing and installing radiator cowl”, page 354](#)

#### 5 - Ram air flap

#### 6 - Fastener

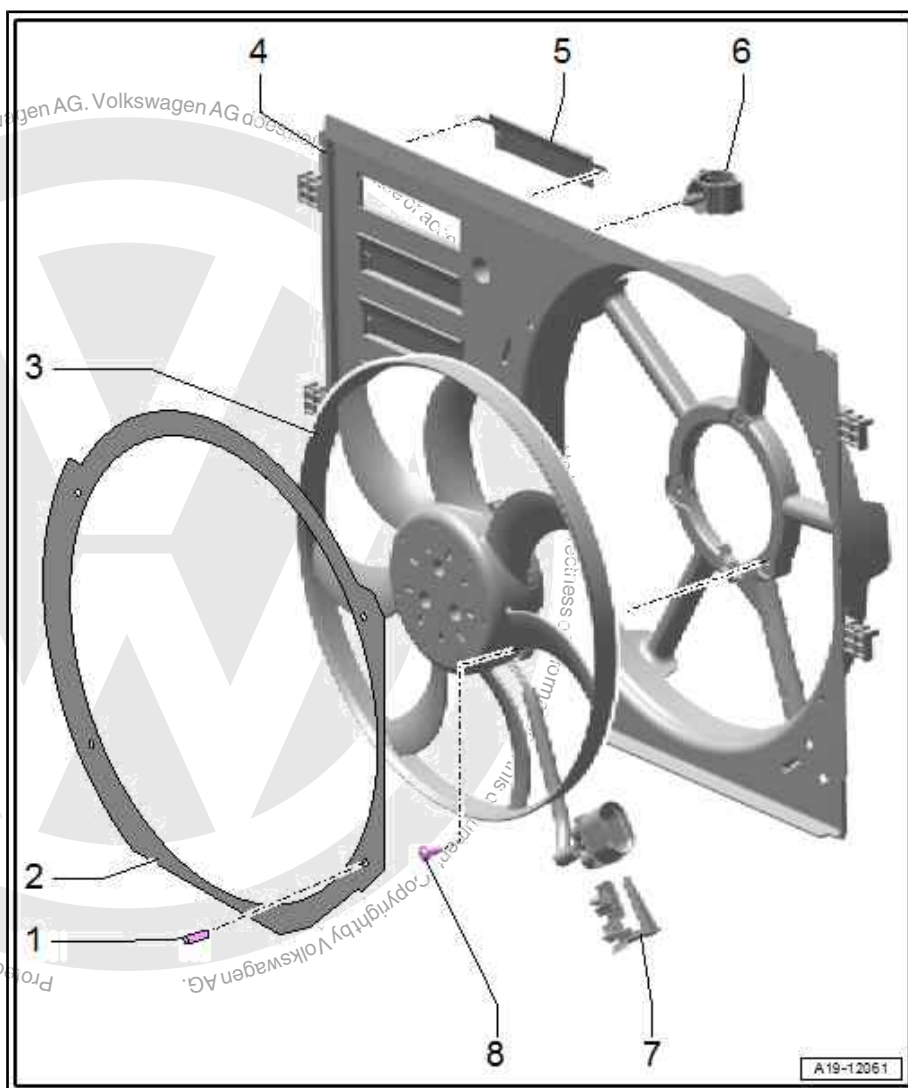
- ☐ For coolant hose

#### 7 - Bracket

- ☐ For electrical connector.

#### 8 - Bolt

- ☐ 1.5 Nm







## 4.2.2 Assembly overview - radiator cowl and radiator fan, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran

### 1 - Bolt

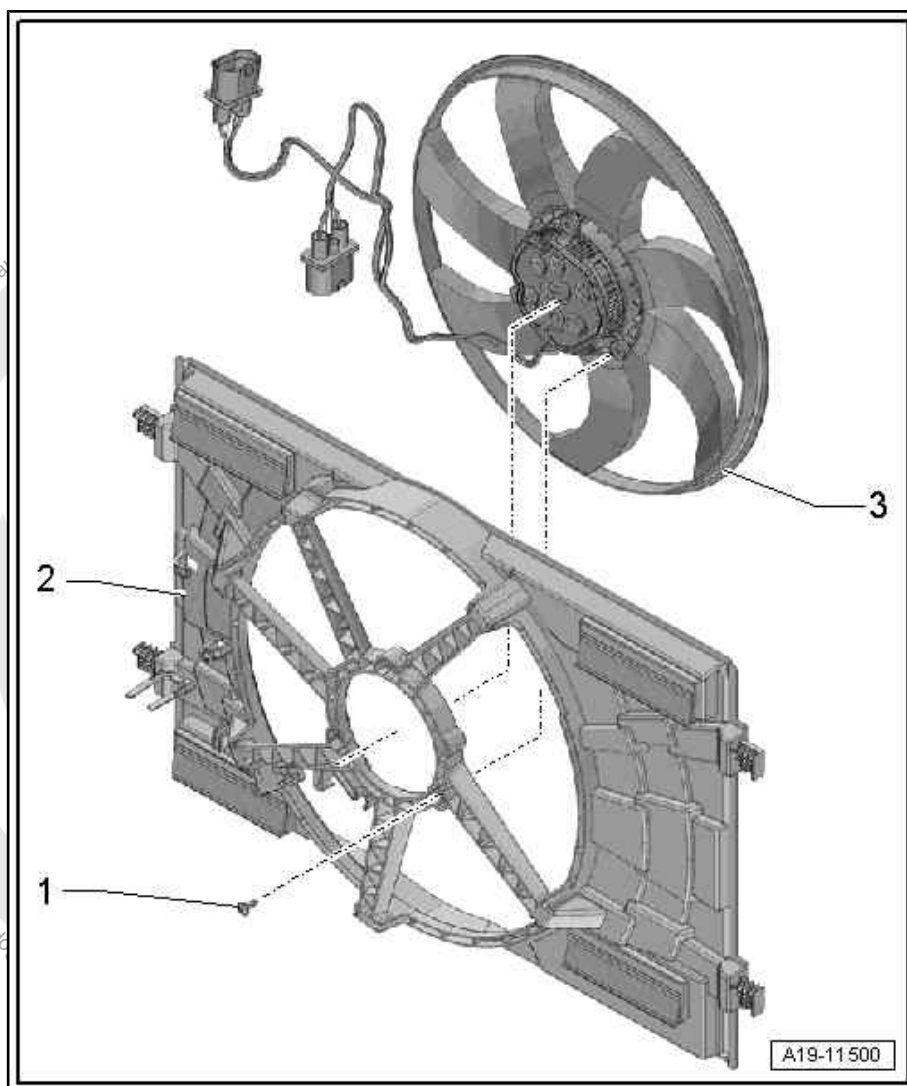
- 5 Nm

### 2 - Radiator cowl

- Removing and installing  
⇒ ["4.6 Removing and installing radiator cowl"](#),  
[page 354](#)

### 3 - Radiator fan - V7-

- Removing and installing  
⇒ ["4.7 Removing and installing radiator fan V7"](#),  
[page 359](#)







## 4.2.3 Assembly overview - radiator cowl and radiator fan, up!

### 1 - Radiator fan - V7-

- ❑ Removing and installing  
⇒ [“4.7.3 Removing and installing radiator fan V7, up!”](#), page 360

### 2 - Radiator cowl

- ❑ Removing and installing  
⇒ [“4.6.3 Removing and installing radiator cowl, up!”](#), page 356

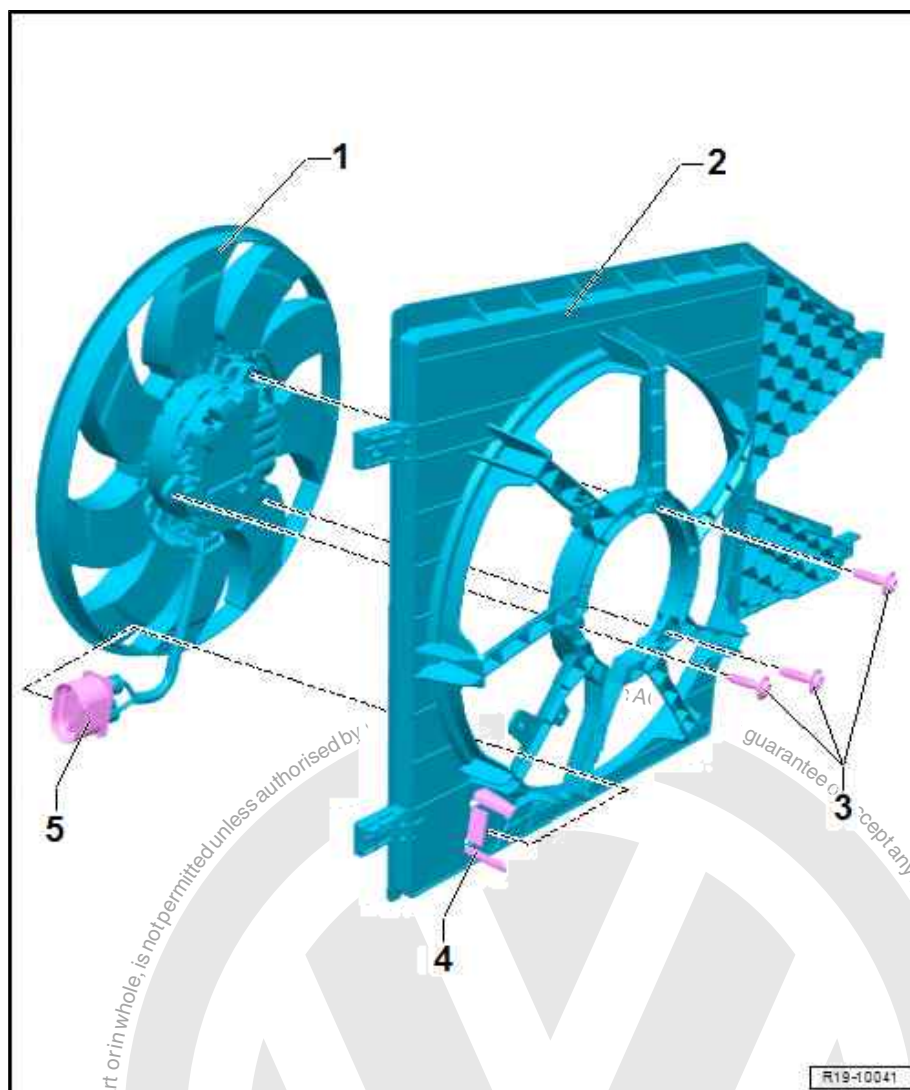
### 3 - Bolt

- ❑ 1.5 Nm

### 4 - Bracket

- ❑ For electrical connector.

### 5 - Connector





## 4.3 Assembly overview - radiator blind

⇒ ["4.3.1 Assembly overview - radiator blind", page 329](#)

⇒ ["4.3.2 Assembly overview - components of radiator blind", page 330](#)

### 4.3.1 Assembly overview - radiator blind

#### 1 - Bumper carrier

- ❑ Assembly overview ⇒  
General body repairs,  
exterior; Rep. gr. 50 ;  
Lock carrier; Assembly  
overview - lock carrier

#### 2 - Rear seal

#### 3 - Radiator blind control motor - V544-

- ❑ Removing and installing  
⇒ ["4.9 Removing and installing radiator blind control motor V544", page 362](#)

#### 4 - Locking lugs

- ❑ For seals

#### 5 - Ambient temperature sensor - G17-

- ❑ Fitting location  
⇒ [Item 12 \(page 330\)](#)
- ❑ Clipped into front seal
- ❑ ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

#### 6 - Radiator blind

- ❑ Removing and installing  
⇒ ["4.8 Removing and installing radiator blind", page 360](#)

#### 7 - Connector contact

- ❑ For radiator blind control motor - V544-
- ❑ Secured to lock carrier.
- ❑ ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

#### 8 - Bracket

- ❑ For securing connector contact to lock carrier ⇒ [Item 7 \(page 329\)](#)

#### 9 - Bolt

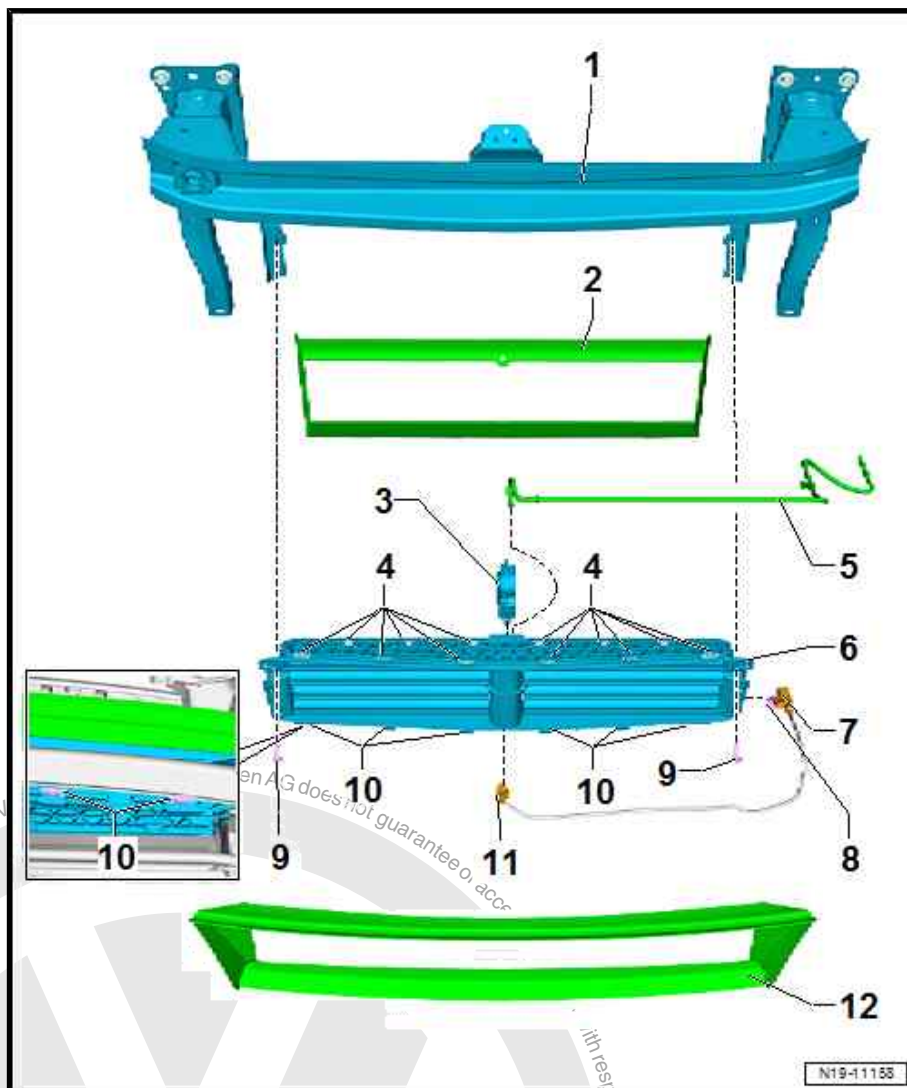
- ❑ Qty. 2
- ❑ 8 Nm

#### 10 - Wiring harness

- ❑ For radiator blind control motor - V544-
- ❑ ⇒ Current flow diagrams, Electrical fault finding and Fitting locations

#### 11 - Locking lugs

- ❑ For seals

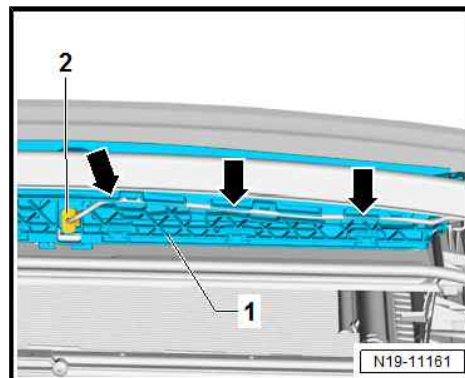




## 12 - Front seal

### Routing cables/lines on radiator blind

- Wiring harness -2- for radiator blind control motor - V544- is clipped into frame of radiator blind -1- -arrows-.



## 4.3.2 Assembly overview - components of radiator blind

### 1 - Connection

### 2 - Bolt

- 1.5 Nm

### 3 - Radiator blind control motor - V544-

- Removing and installing  
⇒ [“4.9 Removing and installing radiator blind control motor V544”](#),  
[page 362](#)

### 4 - Flaps

- Note arrangement  
⇒ [page 331](#)

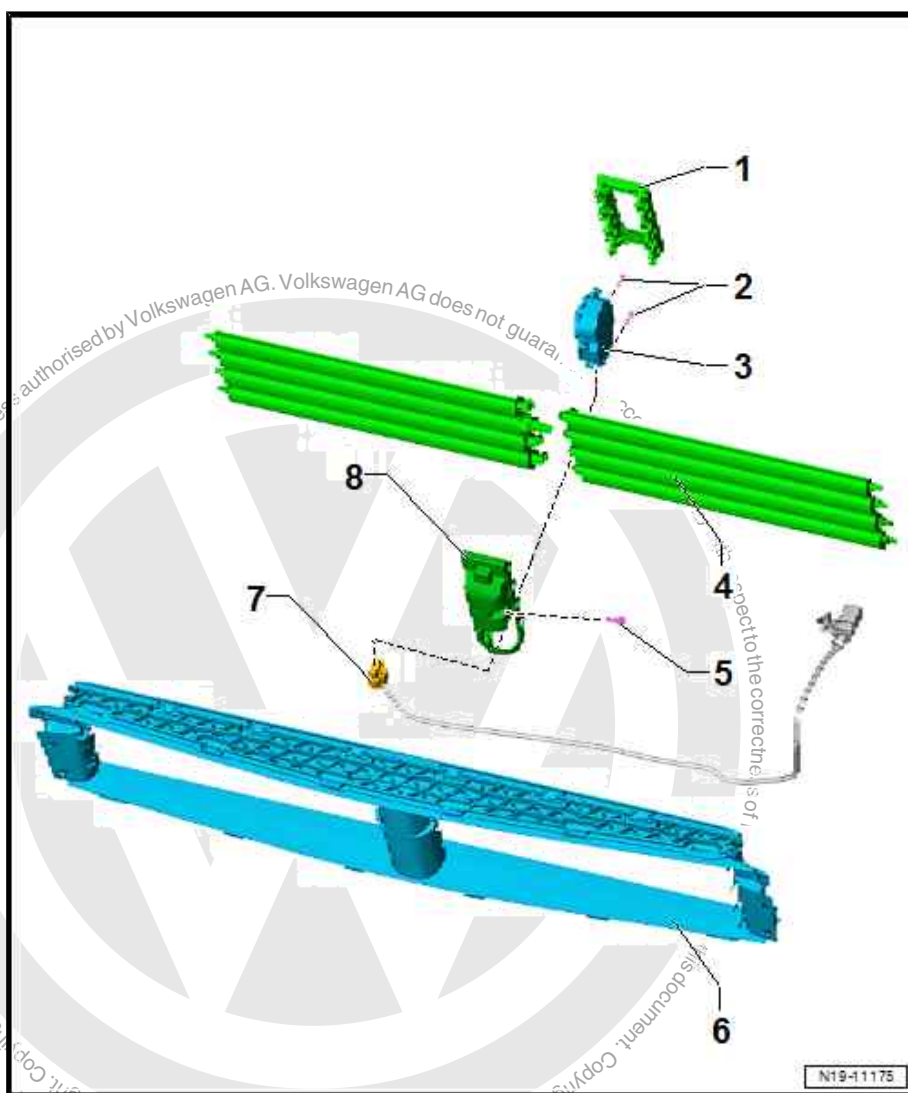
### 5 - Bolt

- 1.5 Nm

### 6 - Frame

### 7 - Wiring harness

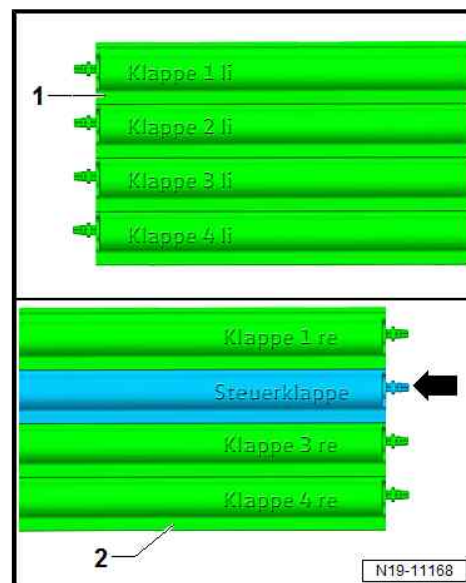
### 8 - Engine mounting





## Arrangement of louvres

- 1 - Left flaps
- 2 - Right flaps
- Pfeil - Control flap



## 4.4 Removing and installing radiator

⇒ ["4.4.1 Removing and installing radiator, Polo 2014 ➤", page 331](#)

⇒ ["4.4.2 Removing and installing radiator, Golf, Golf Estate, Golf SV, Touran", page 334](#)

⇒ ["4.4.3 Removing and installing radiator, up!", page 335](#)

⇒ ["4.4.4 Removing and installing radiator, Polo 2018 ➤", page 339](#)

⇒ ["4.4.5 Removing and installing radiator, T-Roc", page 344](#)

⇒ ["4.4.6 Removing and installing radiator, T-Cross", page 346](#)

### 4.4.1 Removing and installing radiator, Polo 2014 ➤

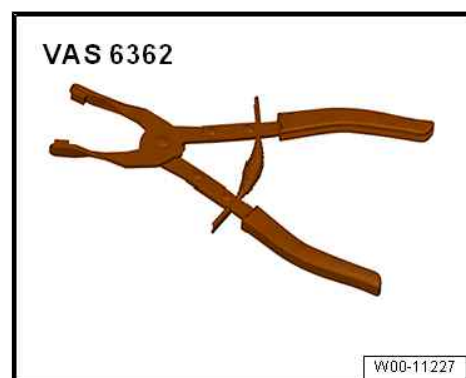


#### Note

Radiator and water radiator for charge air cooling circuit are removed together.

#### Special tools and workshop equipment required

- ◆ Spring-type clip pliers - VAS 6362-



- ◆ Release tool - VAS 531 001- (not illustrated)





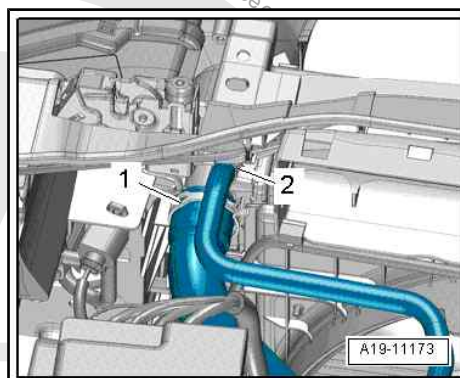
## Removing

### CAUTION

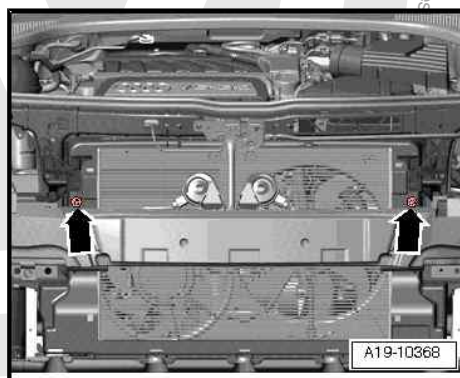
Danger of injury; the radiator fans can run at any time.

- Separate electrical connectors.

- Drain coolant  
⇒ ["1.3 Draining and adding coolant", page 272](#) .
- Remove bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Body - front; Removing and installing bumper cover.
- Remove radiator cowl  
⇒ ["4.6 Removing and installing radiator cowl", page 354](#) .
- Detach coolant hoses on top left of radiator. To do this, loosen hose clips -1 and 2- using hose clip pliers - VAS 6362- .



- Unscrew bolts -arrows-.
- Tilt top of radiator slightly backwards.
- Raise radiator, disengage from lower mounting points and push backwards.



## Vehicles with air conditioner:



### Note

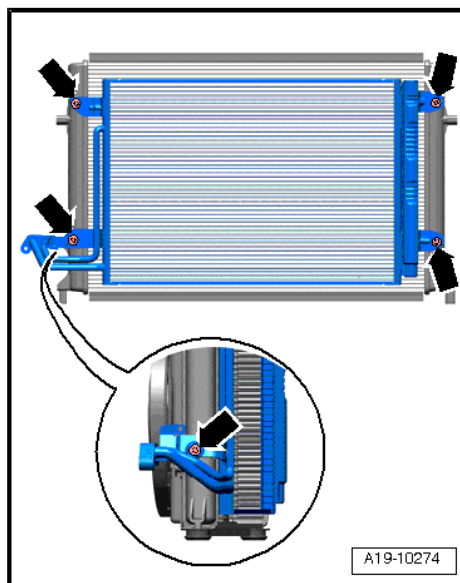
*Do not open the air conditioner refrigerant circuit.*

- Unscrew bolts -arrows-.

### NOTICE

Risk of damage to refrigerant lines from rupture of inner foil.

- Never bend refrigerant lines to a radius tighter than  $r < 100$  mm.
- Place condenser in bonnet lock latch at front and secure with cable ties to prevent it from falling.







### Continued for all vehicles:

- Release catches on water radiator for charge air cooler -1-  
-arrows A-.
- Pull water radiator for charge air cooler off radiator -2-  
-arrow B-, and detach it -arrow C-.
- Remove both radiators.

### Installing

Install in reverse order of removal, observing the following:



#### Note

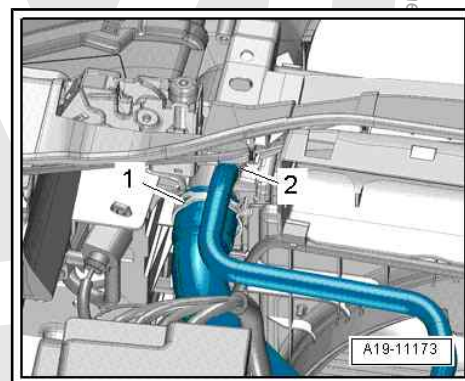
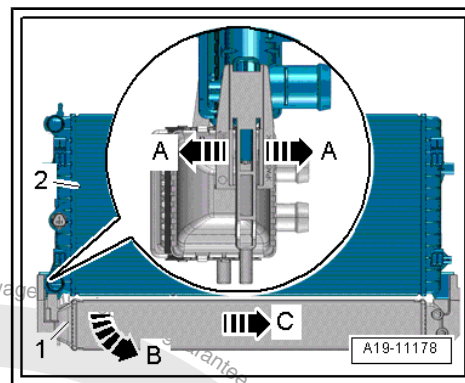
- ◆ If there are minor dents in the fins, refer to  
⇒ [“3.7 Fitting radiator and condensers”, page 15](#).
- ◆ Renew O-rings.



#### Note

The design of the clips -1 and 2- is different from that of conventional clips and requires a special tool for the clips to be engaged.

- Push coolant hoses with hose clips -1 and 2- onto radiator at top.



- Engage clips -1- in direction of -arrow- using release tool - VAS 531 001-.
- Vehicles with air conditioning system: Install condenser ⇒ Heating, air conditioning system; Rep. gr. 87 ; Refrigerant circuit; Removing and installing condenser .
- Install radiator cowl  
⇒ [“4.6 Removing and installing radiator cowl”, page 354](#) .
- Install front bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Assembly overview - bumper cover .



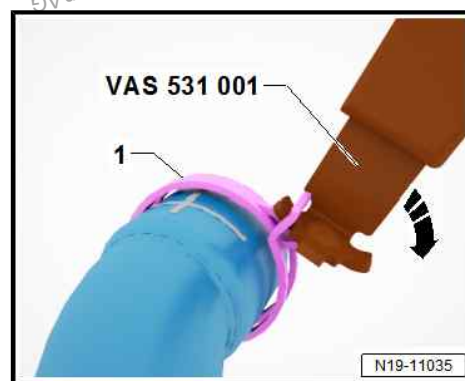
#### Note

Never reuse old coolant.

- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

### Specified torques

- ◆ ⇒ [“4.1 Assembly overview - radiator/radiator fan”, page 317](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)





## 4.4.2 Removing and installing radiator, Golf, Golf Estate, Golf SV, Touran

Special tools and workshop equipment required

- ♦ Drip tray for workshop hoist - VAS 6208-



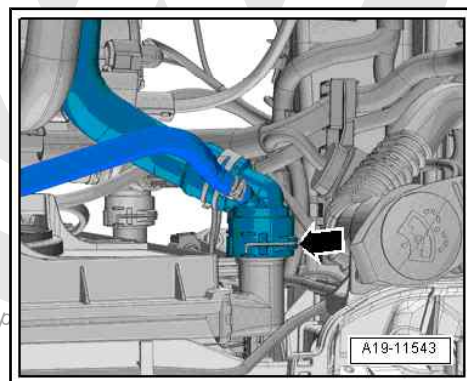
### Removing

#### CAUTION

Danger of injury; the radiator fans can run at any time.

- Separate electrical connectors.

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .
- Drain coolant  
⇒ ["1.3 Draining and adding coolant", page 272](#) .
- Remove radiator cowl  
⇒ ["4.6.2 Removing and installing radiator cowl, Golf, Golf Estate, Golf SV, Touran", page 356](#) .
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.





- Press locking lug on left of radiator and pull top of radiator to rear.
- Press catches for right radiator, and pull radiator at top towards rear.
- Lift coolant radiator upwards off charge air cooling circuit radiator.
- Remove radiator downwards.

### Installing

Install in reverse order of removal. During this procedure, observe the following:



### Note

- ◆ *If there are minor dents in the fins, refer to ➔ [“3.7 Fitting radiator and condensers”, page 15](#).*
- ◆ *Renew O-rings after removal.*
- ◆ *If the radiator has been renewed, renew the entire coolant.*
- Position radiator at an angle in lower mounting of charge air cooler. Engage radiator/cooler with one another. Ensure proper engagement by pulling.
- Install radiator cowl  
➔ [“4.6.2 Removing and installing radiator cowl, Golf, Golf Estate, Golf SV, Touran”, page 356](#).
- Connect coolant hose with plug-in connector ➔ [page 321](#).
- Add coolant ➔ [“1.3 Draining and adding coolant”, page 272](#).

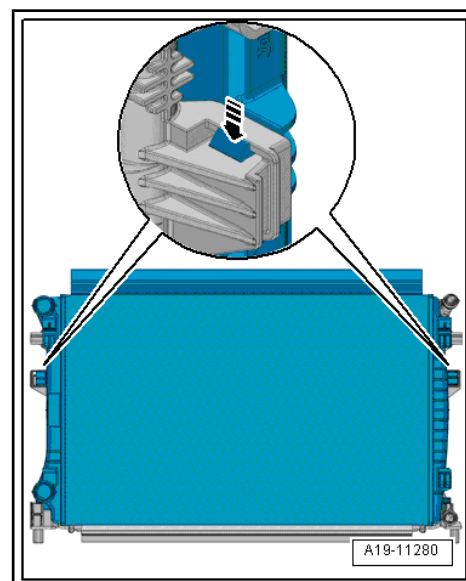
### Specified torques

- ◆ ➔ [“4.1.2 Assembly overview - radiator, radiator fan, Golf, Golf Estate, Golf SV, Touran”, page 320](#)
- ◆ ➔ [“4.2.2 Assembly overview - radiator cowl and radiator fan, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 327](#)

## 4.4.3 Removing and installing radiator, up!

### Special tools and workshop equipment required

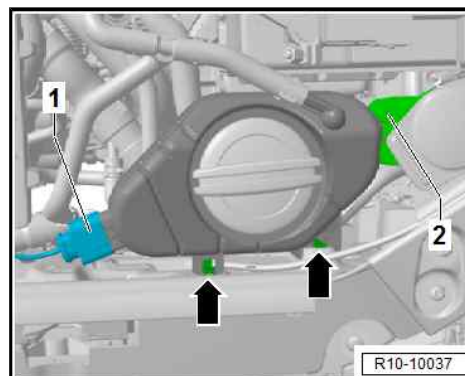
- ◆ Drip tray for workshop hoist - VAS 6208-



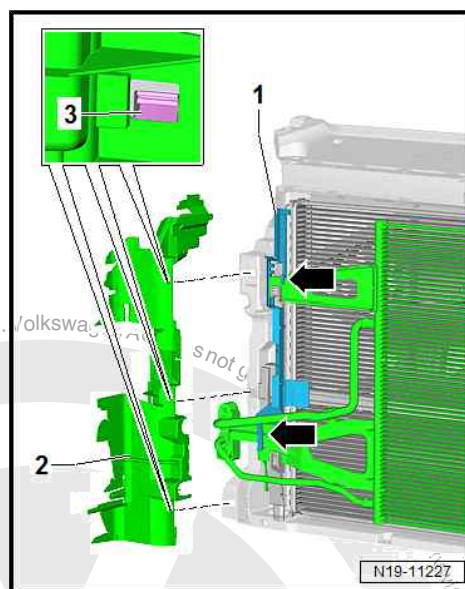
- ◆ Release tool - VAS 531 001-
- Remove front right noise insulation ➔ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .



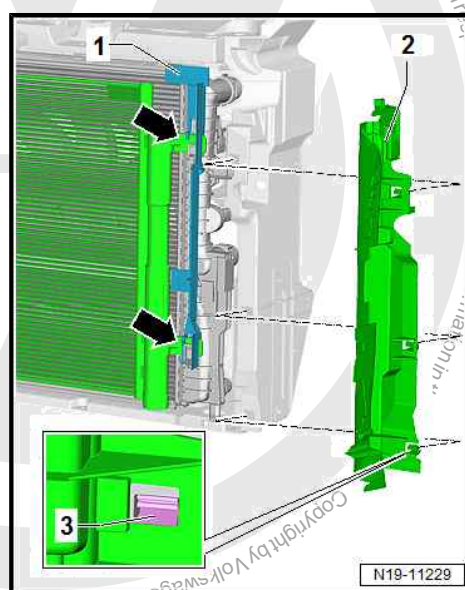
- Remove front bumper ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing bumper cover .
- Drain coolant  
⇒ ["1.3 Draining and adding coolant", page 272](#) .
- Release and pull off connector -1- on coolant expansion tank.
- Unclip filler neck -2- for washer fluid reservoir.
- Release and detach coolant expansion tank on lock carrier -arrows-.
- Remove front bumper support ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper .



- Unclip right-hand air duct -2-. To do this, release fastener -3-.
- Release sealing strip -1- and remove -arrows-.

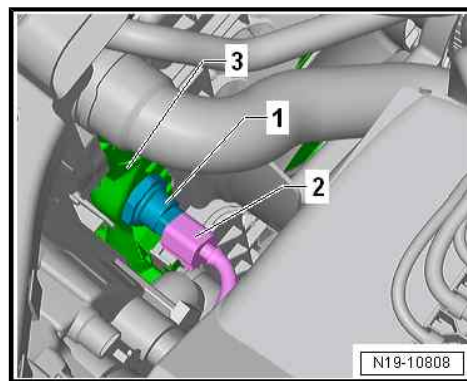


- Unclip left air duct -2-. To do this, release fastener -3-.
- Release sealing strip -1- and remove -arrows-.

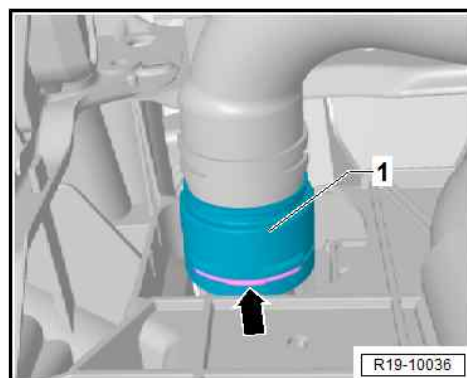




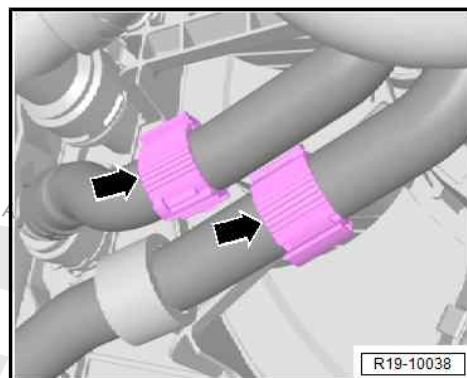
- Release and pull off connector -2- on radiator outlet coolant temperature sender - G83- -1-.



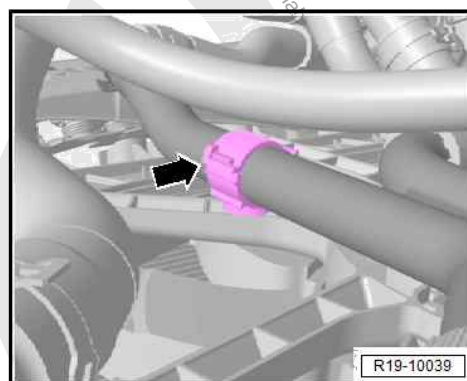
- Detach retaining clip -arrow- and disconnect coolant hose -1- from top left of radiator.
- Drain coolant.



- Release and open retainers -arrows- and detach coolant hoses.



- Release and open retainers -arrow- and detach coolant hose.







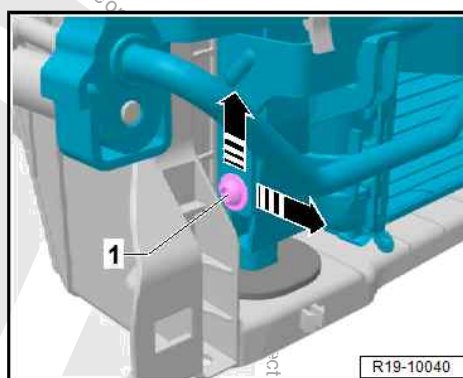
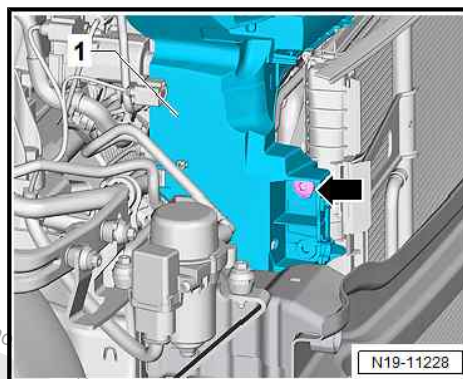
- Unscrew bolts -arrow- for left and right radiator mountings.



#### Note

*There may also be 2 bolts installed on each side.*

- Pull out radiator with radiator mountings on lock carrier.



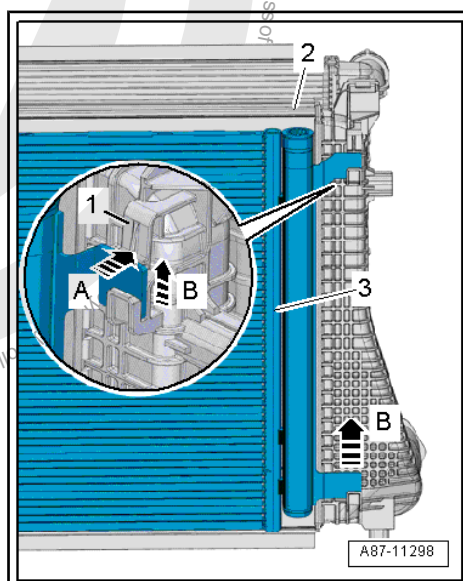
#### Vehicles with air conditioner:

- Swing out top of radiator sufficiently so that radiator can be pulled up slightly.
- Unscrew bolt -1-

- Release retaining clips -1- in direction of -arrow A- at top left and right.
- Pull condenser 3- upwards from mountings -arrows B-.
- Have a second mechanic swing condenser forwards and hold.

#### Continued for all vehicles:

- Swing out top of radiator at lock carrier further and pull out of lower radiator brackets.
- Remove radiator.
- Secure condenser to lock carrier.



#### Installing

Install in reverse order of removal. During this procedure, observe the following:

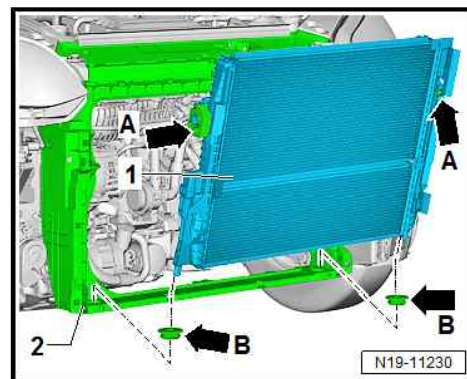


#### Note

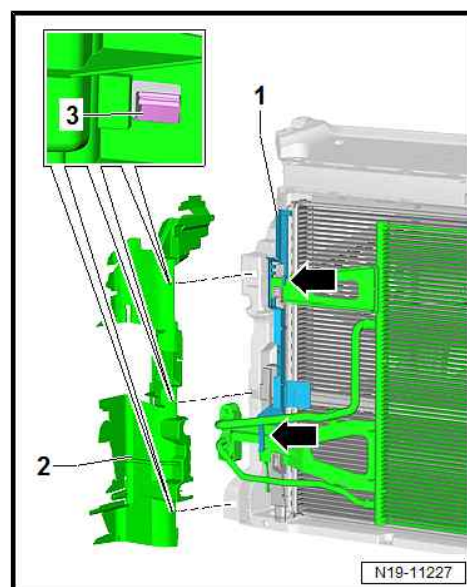
- ♦ *If there are minor dents in the fins, refer to ["3.7 Fitting radiator and condensers", page 15](#).*
- ♦ *Renew O-rings after removal.*
- ♦ *If the radiator has been renewed, renew the entire coolant.*



- Ensure proper seating of radiator mountings -arrow B- in lock carrier -2-.
- Place radiator -1- at an angle in lower mountings -arrow B- in lock carrier -2-.
- Tilt radiator backwards.
- Insert upper radiator mountings -arrow A- in supports of lock carrier.



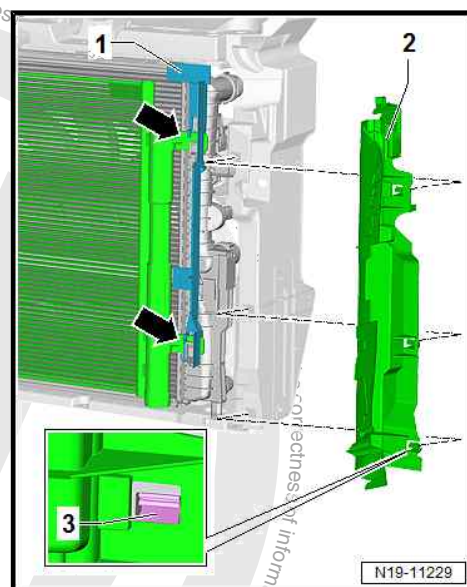
- Ensure air duct -2- and right sealing strip -1- are seated correctly.



- Ensure air duct -2- and left sealing strip -1- are seated correctly.
- Join coolant hoses with plug-in connectors ⇒ [page 323](#) .
- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

#### Specified torques

- ◆ ⇒ [“4.1.3 Assembly overview - radiator/radiator fan, up!”](#), [page 322](#)
- ◆ ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation
- ◆ ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing bumper cover
- ◆ ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper .



#### 4.4.4 Removing and installing radiator, Polo 2018 ➤

##### Special tools and workshop equipment required



- ◆ Drip tray for workshop hoist - VAS 6208-



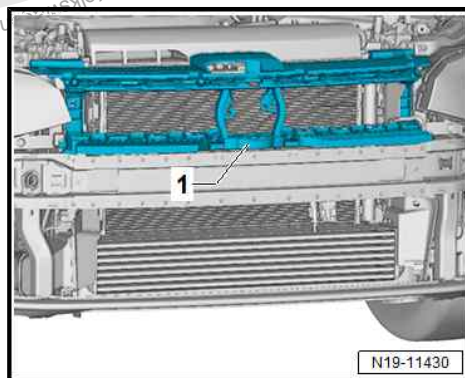
## Removing

### ⚠ CAUTION

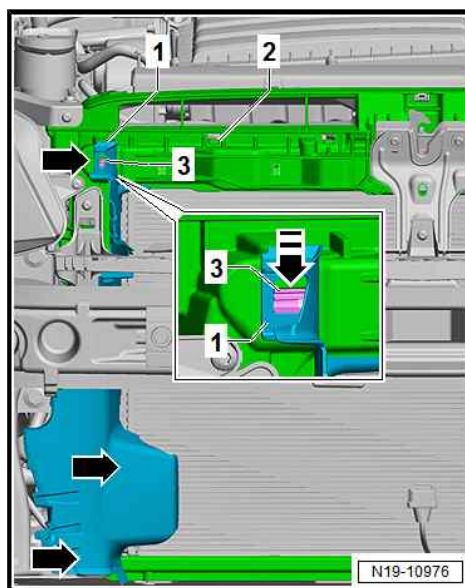
Danger of injury; the radiator fans can run at any time.

- Separate electrical connectors.

- Remove radiator cowl  
⇒ ["4.6 Removing and installing radiator cowl", page 354](#) .
- Remove bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Body - front; Removing and installing bumper cover .
- Remove assembly frame -1- ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier, Assembly overview - lock carrier .



- To do this, unclip air ducts -1- on both sides from lock carrier -2-.
- Release all fasteners -arrows- and pull off air ducts.



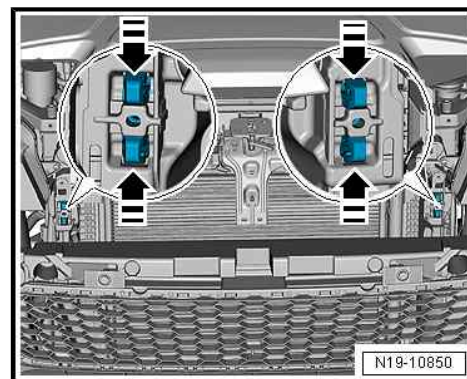


- Using diagonal pliers, pinch off fasteners -arrows- for radiator mounting on left and right.

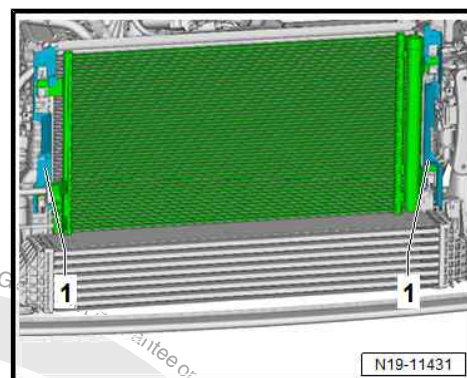


#### Note

*The radiator mounting will be reused when reinstalling the radiator. It will then be bolted to lock carrier. For bolts, refer to ⇒ Electronic Parts Catalogue (ETKA) .*



- Push radiator upwards slightly towards engine and remove sealing strips -1- on both sides.



- Swivel radiator -1- backwards and pull out from radiator mountings -2-.
- Have a second mechanic pull out condenser -3- from radiator -1- and secure to body.
- Remove radiator -1-.

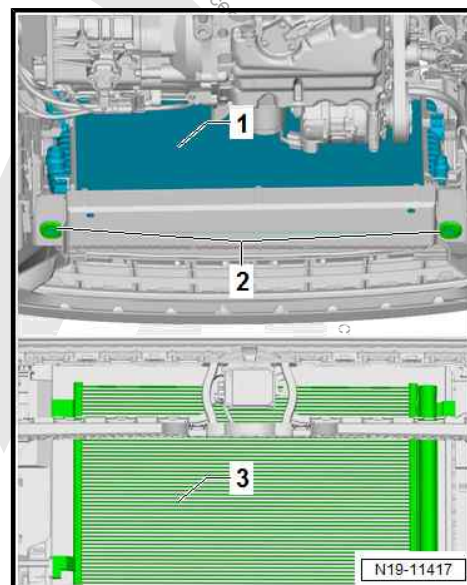
#### Installing

Install in reverse order of removal, observing the following:



#### Note

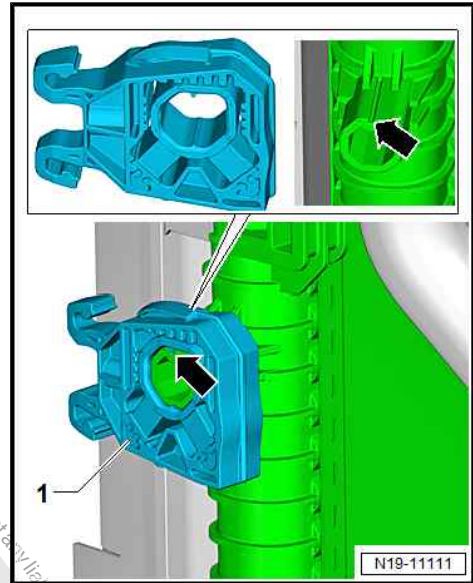
- ◆ If there are minor dents in the fins, refer to ⇒ [page 15](#) .
- ◆ Renew O-rings after removal.



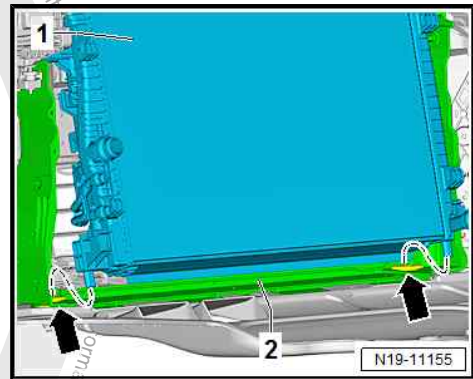




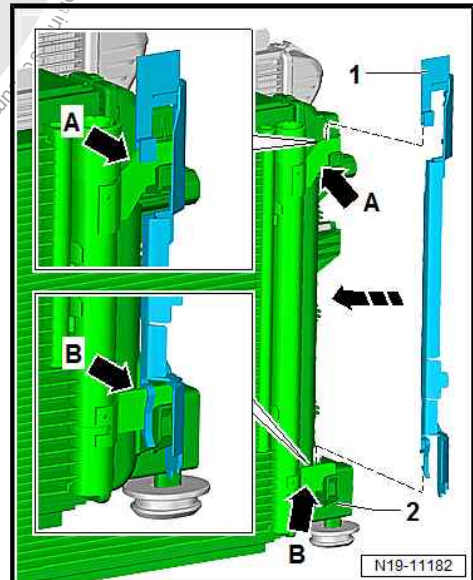
- Fit radiator mounting -1- onto charge air cooler. When doing so, note the installation position -arrow-.



- Insert radiator into mountings -arrows- in lock carrier.
- Swing radiator into lock carrier. Ensure proper seating of radiator mountings in lock carrier.
- Attach condenser to radiator, and engage it.



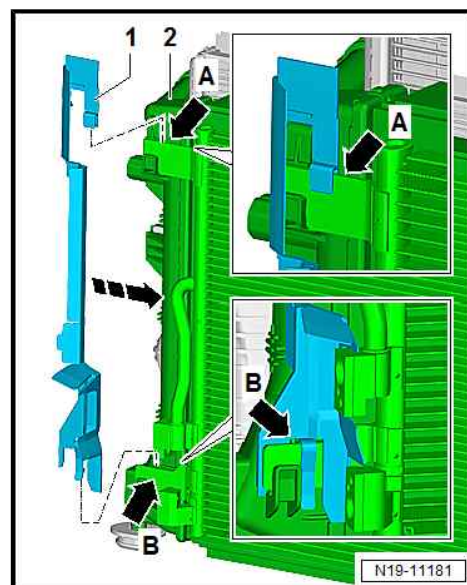
- Secure sealing strip on right as shown.



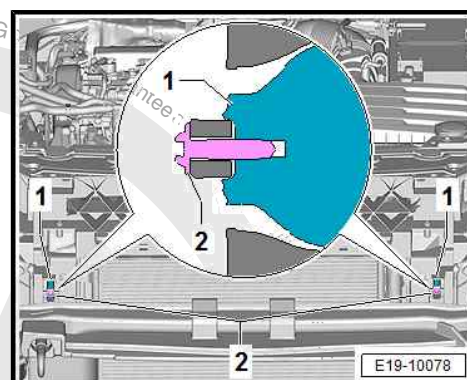




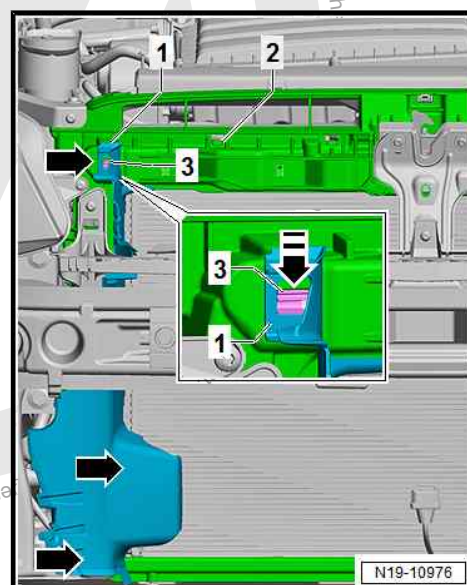
- Secure sealing strip on left as shown.



- If fastener was cut off, bolt radiator mountings to lock carrier. Use new bolts -2- → Electronic parts catalogue (ETKA) .



- Install air ducts -1- on both sides.





- Install assembly frame -1- ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier, Assembly overview - lock carrier.
- Install front bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing bumper cover .
- Install radiator cowl  
⇒ ["4.6 Removing and installing radiator cowl", page 354](#) .
- Connect coolant hose with plug-in connector ⇒ [page 324](#) .
- If radiator has been renewed, renew entire coolant.
- Add coolant ⇒ [page 272](#) .

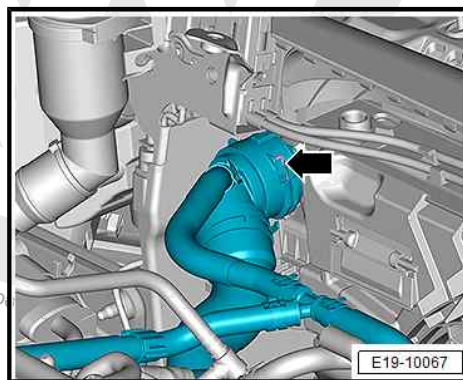
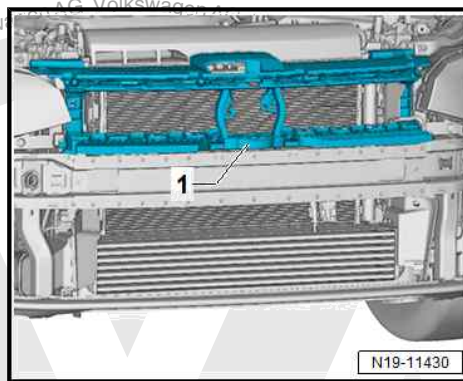
#### Specified torques

- ♦ ⇒ ["4.1.4 Assembly overview - radiator, radiator fan, Polo 2018 ➤, T-Cross", page 324](#)

### 4.4.5 Removing and installing radiator, T-Roc

#### Removing

- Remove bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Body - front; Removing and installing bumper cover .
- Remove radiator cowl  
⇒ ["4.6.5 Removing and installing radiator cowl, T-Roc", page 358](#) .
- Drain coolant  
⇒ ["1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 279](#) .
- Release clip -arrow-.
- Pull coolant hose on top left off radiator.
- Release and detach air ducts -1...3-.

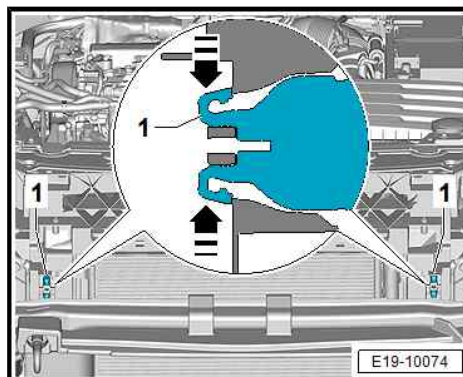


- Release locking lugs -arrows- of radiator mountings -1- on left and right, or pinch them off using side cutters.



#### Note

After the locking lugs have been pinched off, secure the radiator mountings with bolts as per ⇒ *Electronic parts catalogue (ETKA)* .



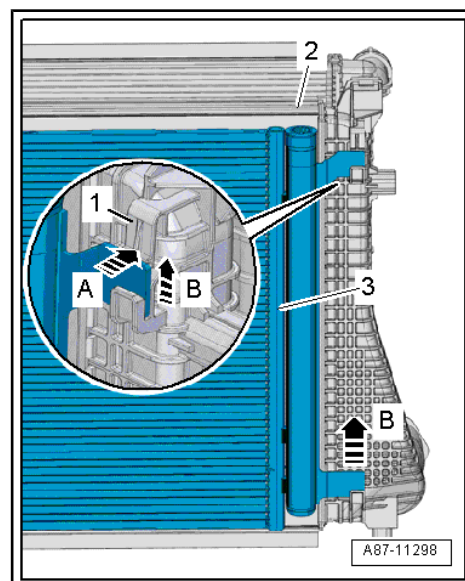


### Vehicles with air conditioning system

- Push radiator -2- at top slightly in direction of engine.
- Release locking lugs -1- on left and right in direction of -arrow A-.
- Pull condenser -3- in direction of -arrow B-, and detach it from radiator.
- Tie up condenser -3- on lock carrier.

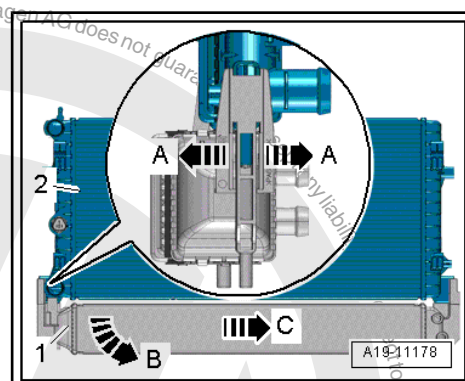
### Continued for all vehicles

- Pull radiator at bottom out of mountings.
- Remove radiator and water radiator for charge air cooling circuit.



### Separating radiator and water radiator for charge air cooling circuit

- Release locking lugs on water radiator for charge air cooling circuit -1- in direction of -arrow A-.
- Pull water radiator for charge air cooling circuit -1- off radiator -2- -arrow B-, and detach it -arrow C-.
- Remove both radiators.



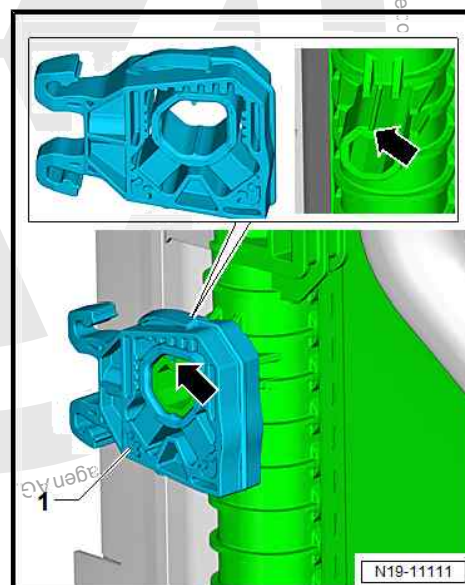
### Installing

Install in reverse order of removal, observing the following:



#### Note

- ♦ If there are minor dents in the fins, refer to ⇒ "3.7 Fitting radiator and condensers", page 15.
- ♦ Renew O-rings after removal.
- Fit radiator mountings -1- on left and right onto radiator. When doing so, note the installation position -arrows-.

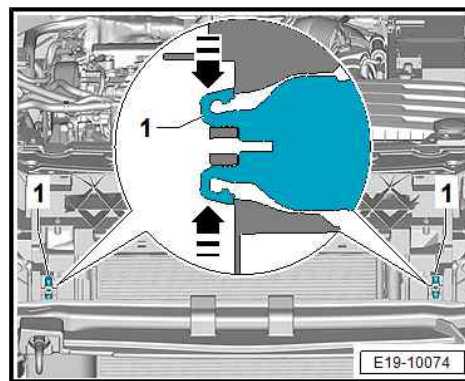






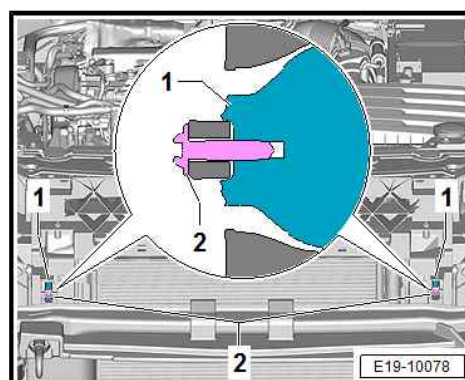
#### When radiator mountings are not secured with bolts

- Ensure proper seating of radiator mountings -1- in lock carrier.



#### When radiator mountings are secured with bolts

- If the locking lugs of radiator mountings -1- have been pinched off, use bolts -2- → Electronic parts catalogue (ETKA) .
- If radiator has been renewed, renew entire coolant.
- Add coolant  
⇒ [“1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 279](#) .



#### Specified torques

- ◆ ⇒ [“4.1.5 Assembly overview - radiator/radiator fan, T-Roc”, page 325](#)

### 4.4.6 Removing and installing radiator, T-Cross

#### Special tools and workshop equipment required

- ◆ Drip tray for workshop hoist - VAS 6208-



#### Removing

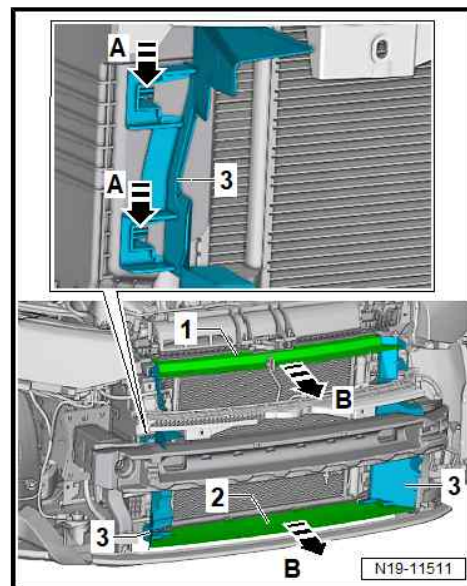
##### CAUTION

**Danger of injury; the radiator fans can run at any time.**

- Separate electrical connectors.
- Remove radiator cowl  
⇒ [“4.6 Removing and installing radiator cowl”, page 354](#) .
- Remove bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Body - front; Removing and installing bumper cover .



- Pull off air ducts -1 and 2- towards front in direction of -arrow B-.
- Release all fasteners -arrows A-, pull off air ducts -3-, and remove them from behind lock carrier.



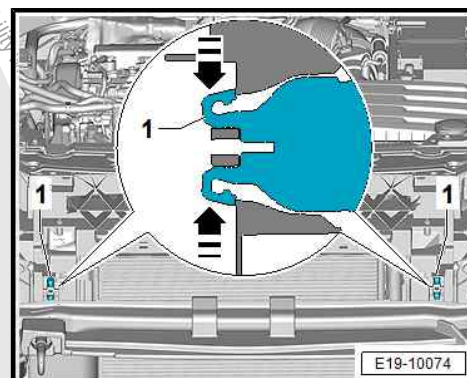
#### Vehicles with original radiator mounting carrier

- Release fasteners -arrows- of radiator mounting -1- or cut through with side cutters.



#### Note

*The radiator mounting carrier will be reused during installation. It will then be bolted to the lock carrier. For bolts, refer to ➤ Electronic Parts Catalogue (ETKA).*

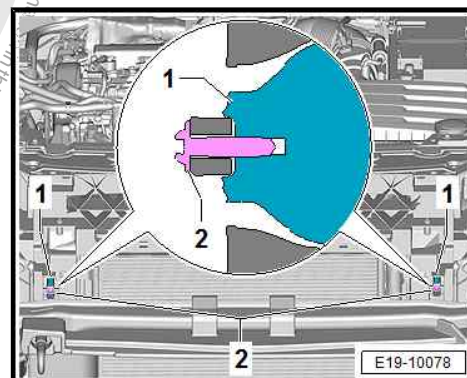


#### Vehicles with bolted radiator mounting carrier

- Unscrew bolts -2- of radiator mounting carrier -1-.

#### Continued for all vehicles

- Tilt radiator towards engine as far as possible.







- Press fasteners -arrow A- on both sides to release.
- Push condenser -1- upwards in direction of -arrow B-, and suspend it with lines connected.
- Remove radiator -2- upwards.

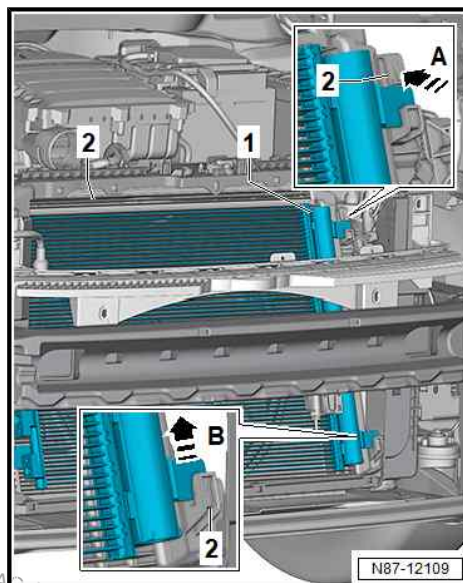
### Installing

Install in reverse order of removal, observing the following:

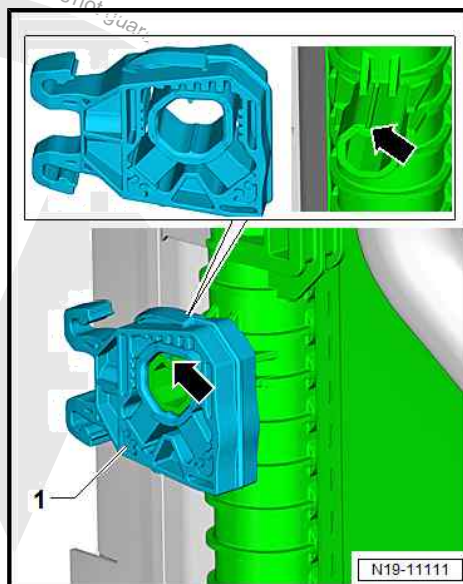


#### Note

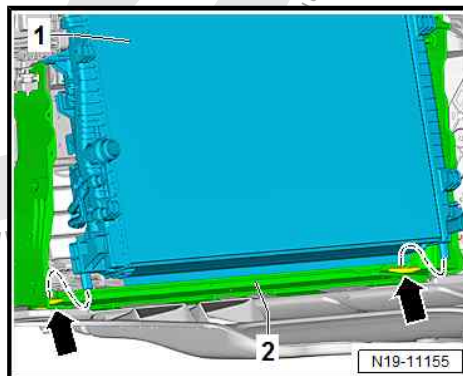
- ♦ If there are minor dents in the fins, refer to ➔ [page 15](#).
- ♦ Renew O-rings after removal.



- Fit radiator mounting -1- onto charge air cooler. When doing so, note the installation position -arrow-.



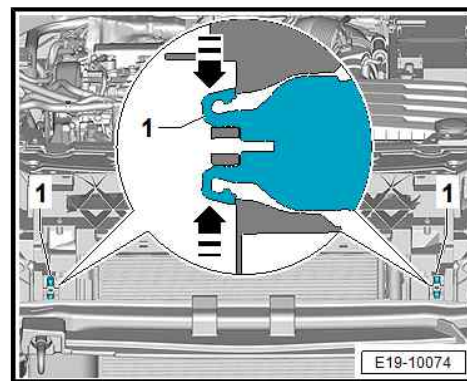
- Insert radiator into mountings -arrows- in lock carrier.
- Swing radiator into lock carrier. Ensure proper seating of radiator mountings in lock carrier.
- Attach condenser to radiator, and engage it.





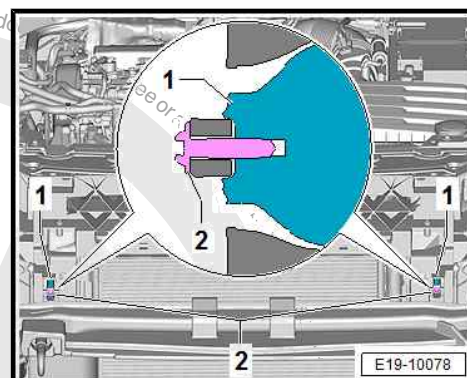
### When radiator mountings are not secured with bolts

- Ensure proper seating of radiator mountings -1- in lock carrier.



### When radiator mountings are secured with bolts

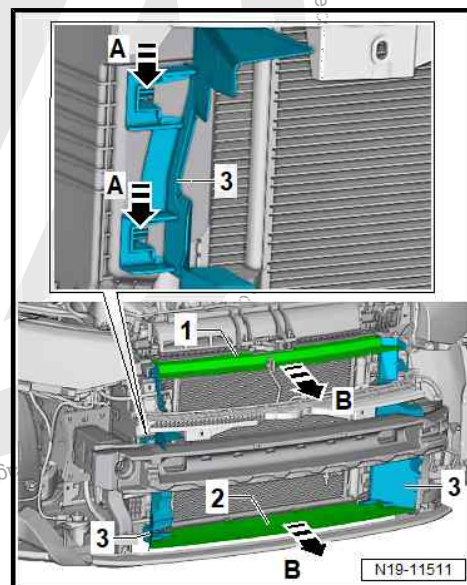
- If the locking lugs of radiator mountings -1- have been pinched off, use bolts -2- → Electronic parts catalogue (ETKA) .



- Install air ducts -3-, and engage fasteners -arrow A-.
- Clip in air ducts -1 and 2- on both sides.
- Install radiator cowl  
⇒ [“4.6 Removing and installing radiator cowl”, page 354](#) .
- Install front bumper cover ⇒ General body repairs, exterior;  
Rep. gr. 63 ; Front bumper; Removing and installing bumper  
cover .
- Connect coolant hose with plug-in connector ⇒ [page 324](#) .
- If radiator has been renewed, renew entire coolant.
- Add coolant ⇒ [page 272](#) .

### Specified torques

- ◆ ⇒ [“4.1.4 Assembly overview - radiator, radiator fan, Polo 2018 ➤, T-Cross”, page 324](#)





## 4.5 Removing and installing water radiator for charge air cooling circuit

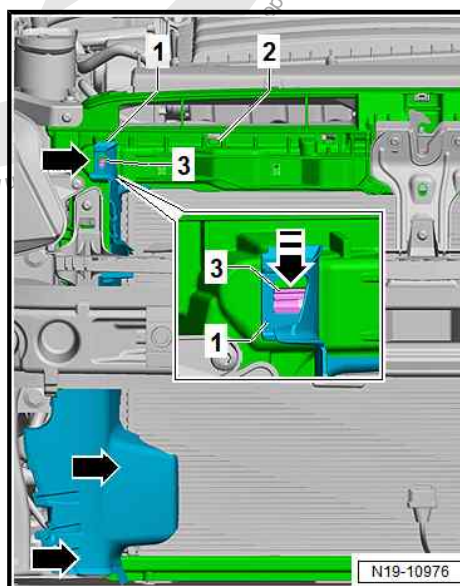
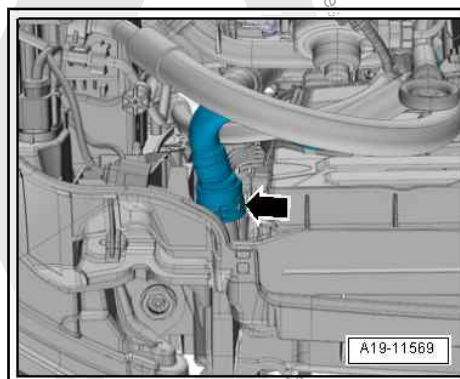
⇒ [“4.5.1 Removing and installing water radiator for charge air cooling circuit, Golf, Golf Estate, Golf SV, Touran”, page 350](#)

⇒ [“4.5.2 Removing and installing cooler for charge air cooling circuit, up!”, page 353](#)

### 4.5.1 Removing and installing water radiator for charge air cooling circuit, Golf, Golf Estate, Golf SV, Touran

#### Removing

- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#)
- Remove radiator cowl  
⇒ [“4.6 Removing and installing radiator cowl”, page 354](#)
- Removing radiator  
⇒ [“4.4.2 Removing and installing radiator, Golf, Golf Estate, Golf SV, Touran”, page 334](#)
- Remove front bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing bumper cover .
- Lift retaining clip -arrow- and disconnect coolant hose (top left) from radiator.
- Remove centre guide ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Assembly overview - lock carrier .
- Unclip air ducts -1- on both sides from lock carrier -2- -arrows-.
- To do this, release catches -3- in -direction of arrow-, and pull off air ducts.







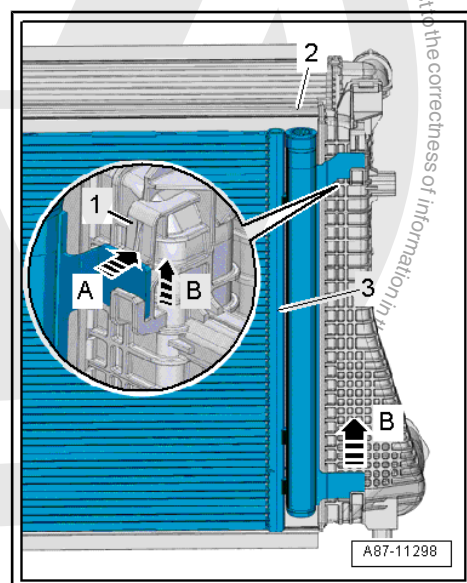
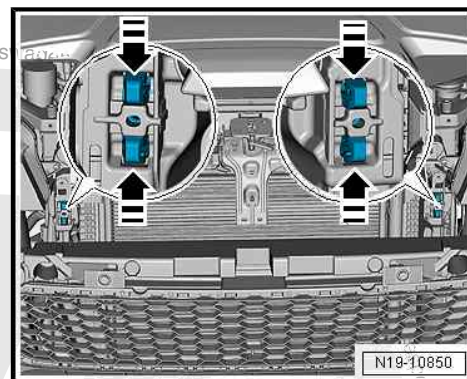
- Using diagonal pliers, pinch off fasteners -arrows- for radiator mounting on left and right. Push radiator at top slightly towards engine.



#### Note

*The radiator mounting will be reused when reinstalling the radiator. It will then be bolted to lock carrier. For bolts, refer to ➔ Electronic Parts Catalogue (ETKA).*

- Release retaining clips -1- in -direction of arrow A-.
- Pull condenser -3- upwards out of mountings on water radiator for charge air cooling circuit -2- -arrows B-.
- Secure condenser to lock carrier.

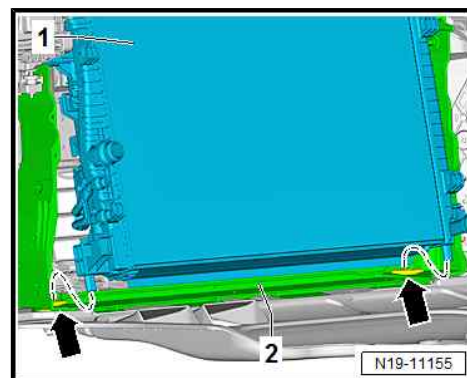
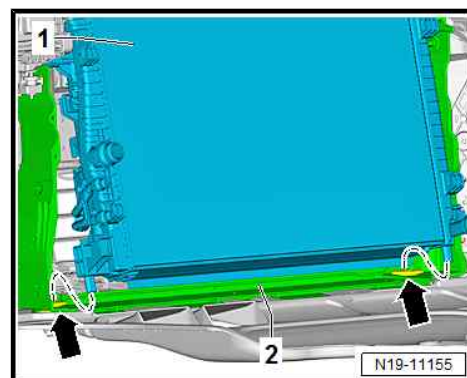


- Lift water radiator for charge air cooling circuit -1- at bottom out of radiator mountings -arrows-.
- Remove radiator downwards.

#### Installing

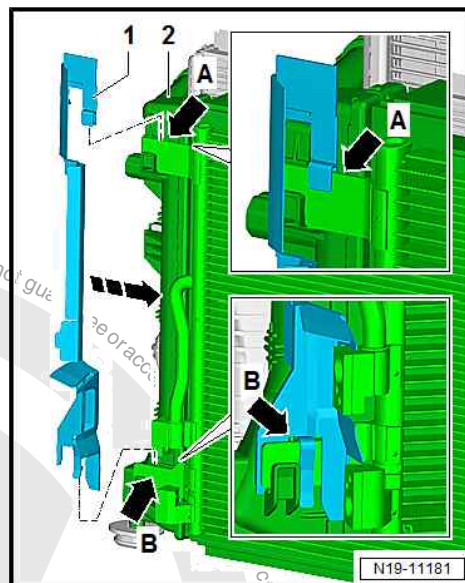
Install in reverse order of removal, observing the following:

- If there are minor dents in the fins, refer to ➔ ["3.7 Fitting radiator and condensers", page 15](#).
- Renew O-rings.
- Insert water radiator for charge air cooling circuit -1- at bottom into radiator mounting -arrows-.

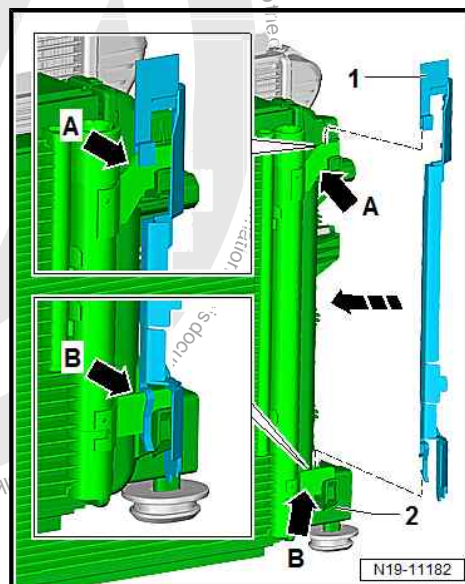




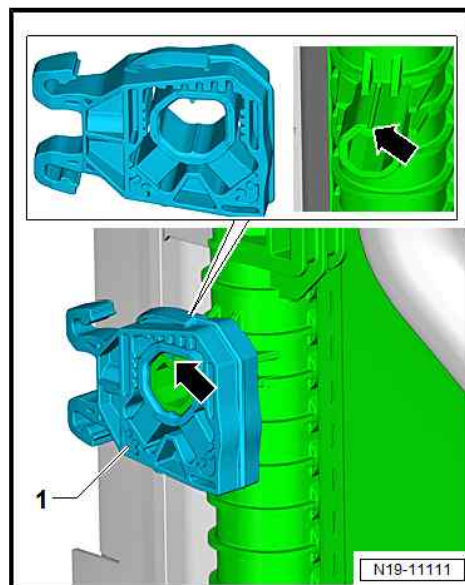
- Install sealing strip -1- on right between radiator and condenser -2- as shown -arrow A- and -arrow B-.



- Install sealing strip -1- on left between radiator and condenser -2- as shown -arrow A- and -arrow B-.



- Fit radiator mounting -1- onto charge air cooler. When doing so, note the installation position -arrow-.
- Swing charge air cooler together with radiator into lock carrier. Ensure proper seating of radiator mountings in lock carrier.







- Use bolts -arrows- to secure radiator mountings, whose fasteners have been pinched off, to lock carrier. For bolts, refer to ➔ Electronic Parts Catalogue (ETKA) .

Bolts	Specified torque
-Arrows-	5 Nm

- Install radiator. Ensure proper engagement by pulling.
- Install front bumper cover ➔ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing bumper cover .
- Install radiator cowl  
➔ [“4.6.2 Removing and installing radiator cowl, Golf, Golf Estate, Golf SV, Touran”, page 356](#) .
- Connect coolant hose with plug-in connector ➔ [page 321](#) .
- Add coolant ➔ [“1.3 Draining and adding coolant”, page 272](#) .

#### Specified torques

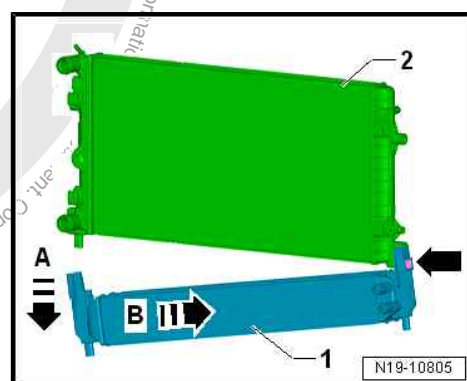
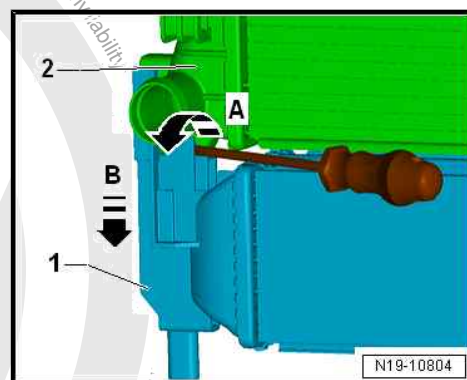
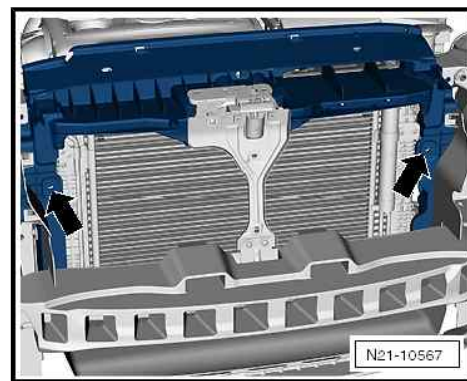
- ◆ ➔ [“4.1.2 Assembly overview - radiator, radiator fan, Golf, Golf Estate, Golf SV, Touran”, page 320](#)

### 4.5.2 Removing and installing cooler for charge air cooling circuit, up!

- Removing radiator  
➔ [“4.4.3 Removing and installing radiator, up!”, page 335](#) .
- Push a wide flat-bladed screwdriver at front and rear into left catch on water radiator for charge air cooling circuit -1-.
- Open latch by turning screwdriver in -direction of arrow A-.
- In this position, slightly pull water radiator for charge air cooling circuit -1- on left side in -direction of arrow B- off radiator -2-.
- Lower water radiator for charge air cooling circuit -1- further in -direction of arrow A-.
- At the same time, push radiator for charge air cooling circuit -1- in -direction of arrow B-.
- Detach water radiator for charge air cooling circuit -1- on right from mounting -arrow- on radiator -2-.
- Remove water radiator for charge air cooling circuit -1- downwards.

#### Installing

Install in reverse order of removal. During this procedure, observe the following:



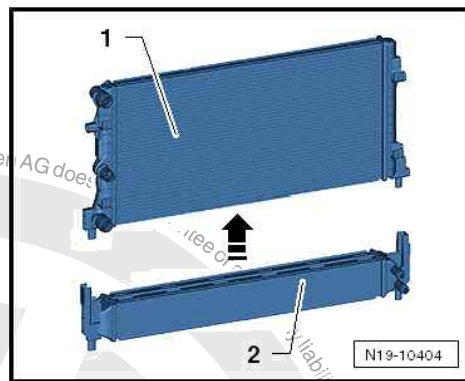


- Insert water radiator for charge air cooling circuit -2- into right mounting.
- Properly engage water radiator for charge air cooling circuit -2- in -direction of arrow- in mountings on radiator -1-.
- Check firm seating by pulling on it.



#### Note

- ◆ If there are minor dents in the fins, refer to  
⇒ [“3.7 Fitting radiator and condensers”, page 15](#).
- ◆ Renew O-rings.



## 4.6 Removing and installing radiator cowl

⇒ [“4.6.1 Removing and installing radiator cowl, Polo 2014 ►”, page 354](#)

⇒ [“4.6.2 Removing and installing radiator cowl, Golf, Golf Estate, Golf SV, Touran”, page 356](#)

⇒ [“4.6.3 Removing and installing radiator cowl, up!”, page 356](#)

⇒ [“4.6.4 Removing and installing radiator cowl, Polo 2018 ►, T-Cross”, page 357](#)

⇒ [“4.6.5 Removing and installing radiator cowl, T-Roc”, page 358](#)

### 4.6.1 Removing and installing radiator cowl, Polo 2014 ►

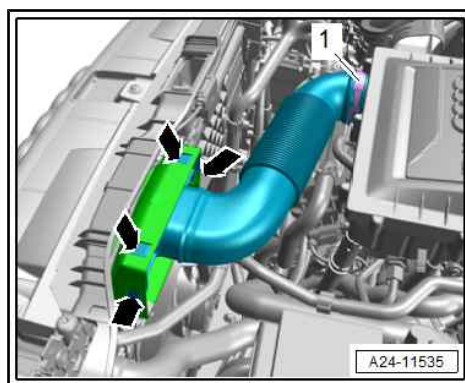
#### Removing



#### CAUTION

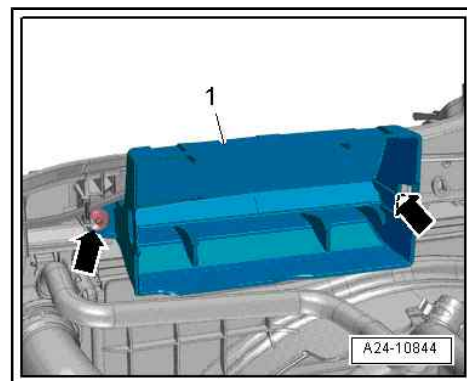
Danger of injury; the radiator fans can run at any time.

- Separate electrical connectors.
- Release fasteners -arrows- and remove air duct.
- Release hose clip -1-.

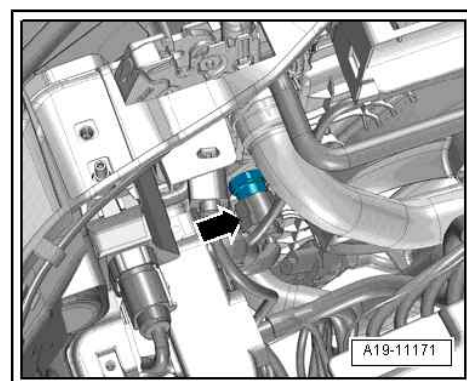




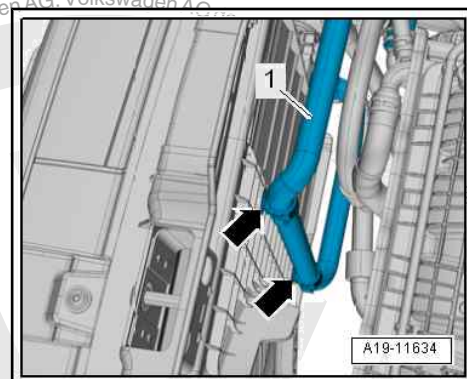
- Unscrew bolts -arrows-, and remove air duct -1-.



- Disconnect connector -arrow- on radiator outlet coolant temperature sender - G83- .



- Move clear coolant hose -1- on radiator cowl -arrows-.



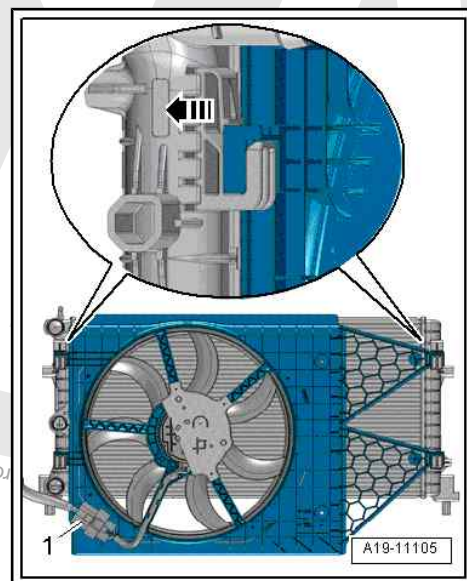
- Disconnect connector -1- for radiator fan at bottom of radiator cowl.
- Simultaneously press locking tabs on left and right of radiator cowl -arrow-, and lift radiator cowl off radiator.

### Installing

Install in reverse order of removal, observing the following:

### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)





## 4.6.2 Removing and installing radiator cowl, Golf, Golf Estate, Golf SV, Touran

### Removing

#### ⚠ CAUTION

Danger of injury; the radiator fans can run at any time.

- Separate electrical connectors.

- Remove air duct on lock carrier ➔ [page 419](#) .
- Separate connector -3- for radiator fan.
- Simultaneously press locking tabs on left and right of radiator cowl -A- in direction of -arrow-.
- Lift radiator cowl upwards out of mountings -arrows- from radiator.
- Carefully remove radiator cowl downwards.

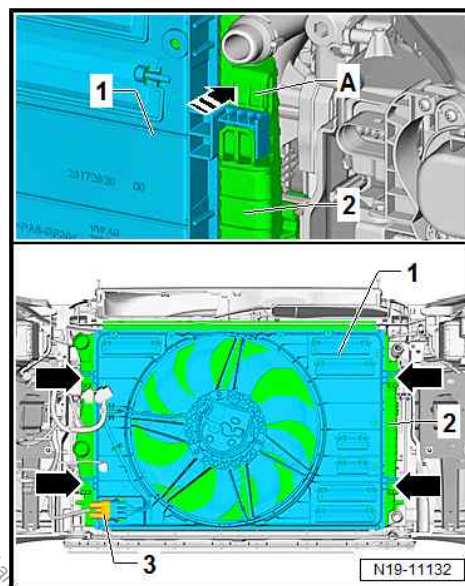
### Installing

Install in reverse order of removal, observing the following:

- Electrical connections and routing ➔ Current flow diagrams, Electrical fault finding and Fitting locations.
- Add coolant ➔ [“1.3 Draining and adding coolant”, page 272](#) .

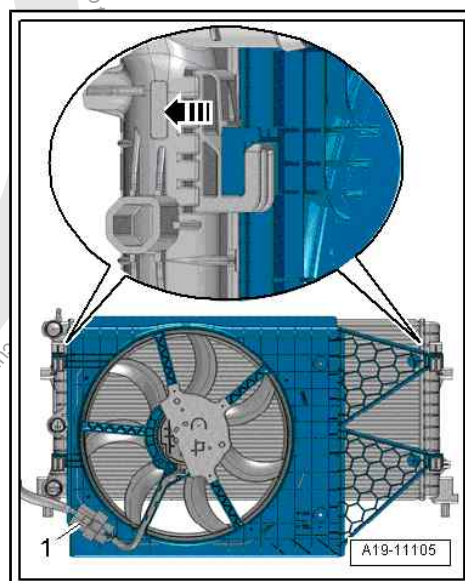
### Specified torques

- ♦ ➔ [“3.1 Assembly overview - air filter housing”, page 410](#)



## 4.6.3 Removing and installing radiator cowl, up!

- Removing radiator  
➔ [“4.4.3 Removing and installing radiator, up!”, page 335](#) .
- Press left and right locking tabs for upper radiator cowl -arrow- simultaneously.





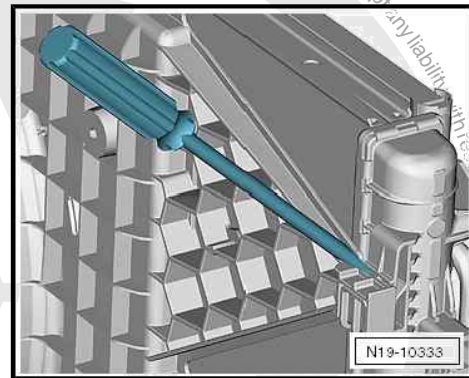


- Use a screwdriver to release.
- Pull out radiator cowl from mountings.

#### Installing

Install in reverse order of removal, observing the following:

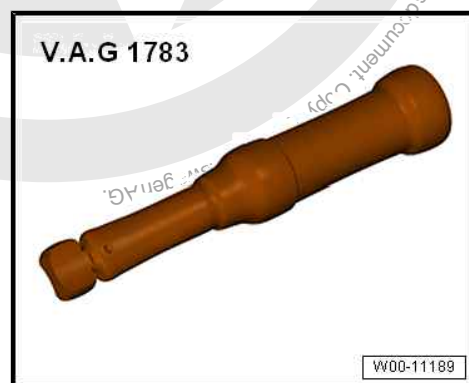
- Ensure that radiator cowl engages correctly.



### 4.6.4 Removing and installing radiator cowl, Polo 2018 ➤, T-Cross

#### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1783-



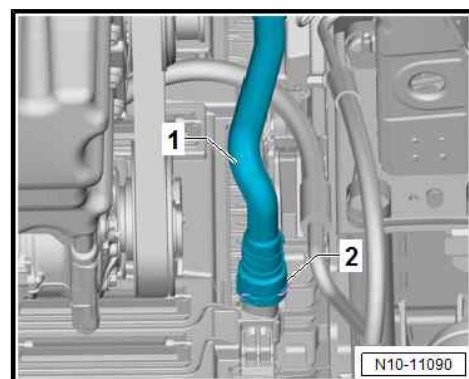
#### Removing

- Remove air duct on lock carrier ➔ [page 419](#) .
- Drain coolant  
➔ [“1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 279](#) .

#### **CAUTION**

**Danger of injury; the radiator fans can run at any time.**

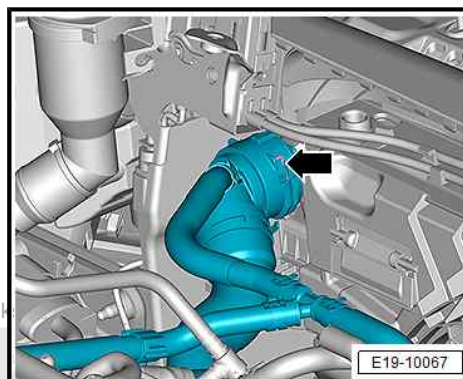
- **Separate electrical connectors.**
- Release retaining clip -2-.
- Pull off coolant hose -1-.







- Release retaining clip -arrow-.
- Pull off upper left coolant hose.

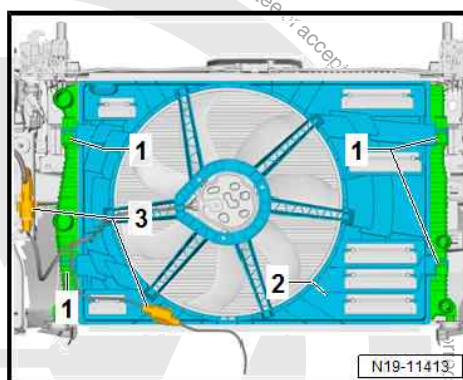


- Disconnect electrical connectors -3-.
- Release mountings -1-.
- Remove radiator cowl -2- from mountings -1-.

### Installing

Install in reverse order of removal, observing the following:

- Add coolant  
⇒ ["1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 279](#) .



### Specified torques

- ◆ ⇒ ["3.1.2 Assembly overview air filter housing, Golf, Golf Estate, Golf SV, T-Roc, Touran", page 411](#)

## 4.6.5 Removing and installing radiator cowl, T-Roc

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1783-



### Removing

- Remove air duct on lock carrier ⇒ [page 419](#) .
- Drain coolant  
⇒ ["1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ➤, T-Roc, T-Cross, Touran", page 279](#) .

### ⚠ CAUTION

Danger of injury; the radiator fans can run at any time.

- Separate electrical connectors.



- Disconnect electrical connectors -3-.
- Release mountings -1-.
- Remove radiator cowl -2- from mountings -1-.

### Installing

Install in reverse order of removal, observing the following:

- Add coolant  
⇒ [“1.3.2 Draining and filling coolant, Golf 2013, Golf 2017, Golf Estate 2014, Golf Estate 2017, Golf SV 2015, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 279](#).

### Specified torques

- ◆ ⇒ [“4.2.2 Assembly overview - radiator cowl and radiator fan, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 327](#)

## 4.7 Removing and installing radiator fan - V7-

⇒ [“4.7.1 Removing and installing radiator fan V7 , Polo 2014 ►”, page 359](#)

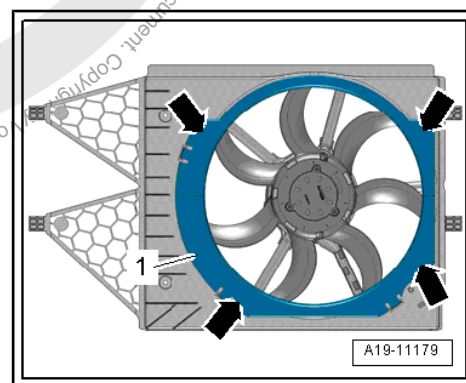
⇒ [“4.7.2 Removing and installing radiator fan V7 , Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 360](#)

⇒ [“4.7.3 Removing and installing radiator fan V7 , up!”, page 360](#)

### 4.7.1 Removing and installing radiator fan - V7- , Polo 2014 ►

#### Removing

- Remove radiator cowl  
⇒ [“4.6 Removing and installing radiator cowl”, page 354](#).
- Push through clamping pins -arrows-, and remove fan ring -1-.



- Remove electric cable -1- from cable guide.
- Unscrew nuts -arrows-, and remove radiator fan - V7- .

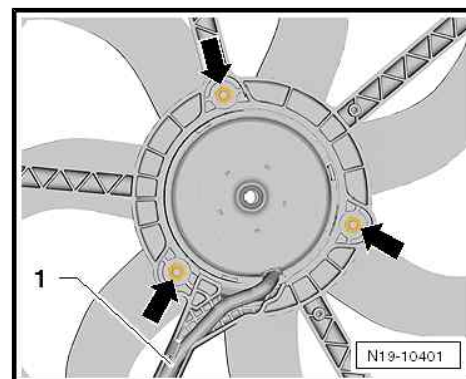
#### Installing

Install in reverse order of removal, observing the following:

- Install radiator cowl  
⇒ [“4.6 Removing and installing radiator cowl”, page 354](#).

#### Specified torques

- ◆ ⇒ [“4.1 Assembly overview - radiator/radiator fan”, page 317](#)





## 4.7.2 Removing and installing radiator fan - V7- , Golf, Golf Estate, Golf SV, Polo 2018 ➤ , T-Roc, T-Cross, Touran

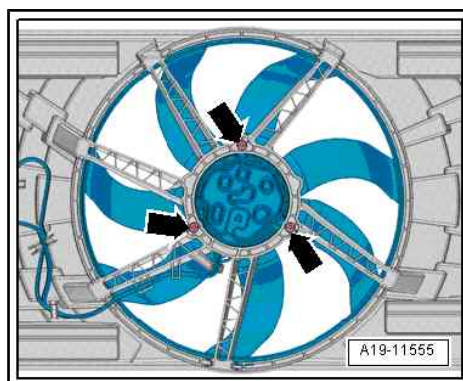
### Removing



#### Note

Attach cable ties in all the same places when installing.

- Remove radiator cowl  
⇒ [“4.6.5 Removing and installing radiator cowl, T-Roc”, page 358](#) .
- Move wiring harness clear.
- Unscrew bolts -arrows-.
- Remove radiator fan - V7- .



### Installing

Install in reverse order of removal, observing the following:

#### Specified torques

- ♦ ⇒ [“4.1 Assembly overview - radiator/radiator fan”, page 317](#)

## 4.7.3 Removing and installing radiator fan - V7- , up!

- Remove radiator cowl  
⇒ [“4.6.3 Removing and installing radiator cowl, up!”, page 356](#) .
- Remove electric cable -1- from cable guide.
- Unclip connector on bottom right of radiator cowl.
- Unscrew bolts -arrows- and remove radiator fan - V7- .

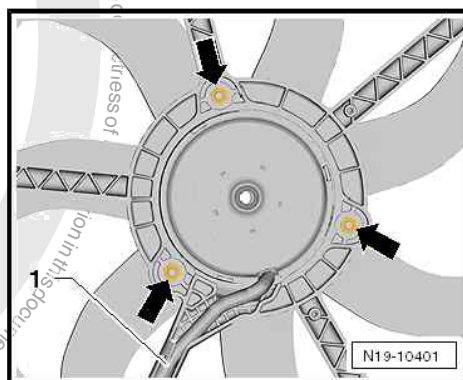
### Installing

Install in reverse order of removal, observing the following:

- Install radiator cowl  
⇒ [“4.6.3 Removing and installing radiator cowl, up!”, page 356](#) .

#### Specified torques

- ♦ ⇒ [“4.2.3 Assembly overview - radiator cowl and radiator fan, up!”, page 328](#)

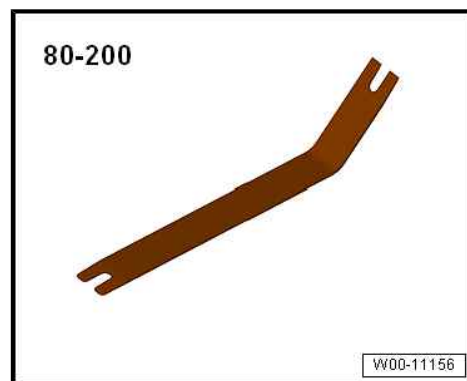


## 4.8 Removing and installing radiator blind

Special tools and workshop equipment required



◆ Release lever - 80 - 200-

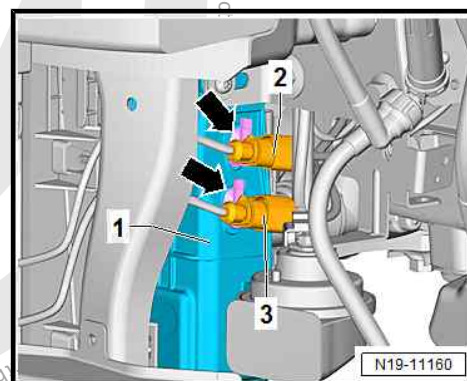


◆ Removal wedge - 3409-

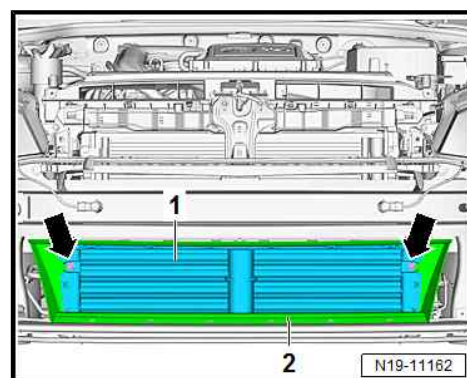


**Removing:**

- Remove noise insulation ⇒ Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Remove front bumper cover ⇒ General body repairs, exterior; Rep. gr. 63 ; Front bumper; Removing and installing bumper cover .
- Release and pull off connectors -2- and -3-.
- Unclip bracket -arrows- from front end -1-.



- Unscrew bolts -arrows-.
- Pull radiator blind -1- together with seal -2- towards front.
- Secure radiator blind -1- to prevent it from falling.







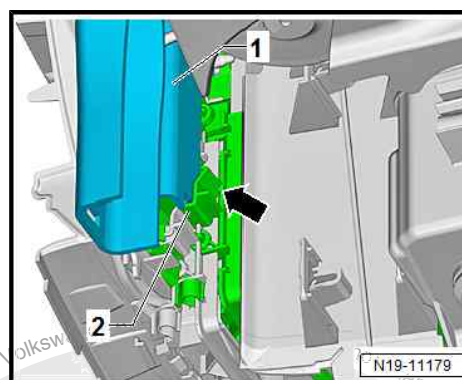
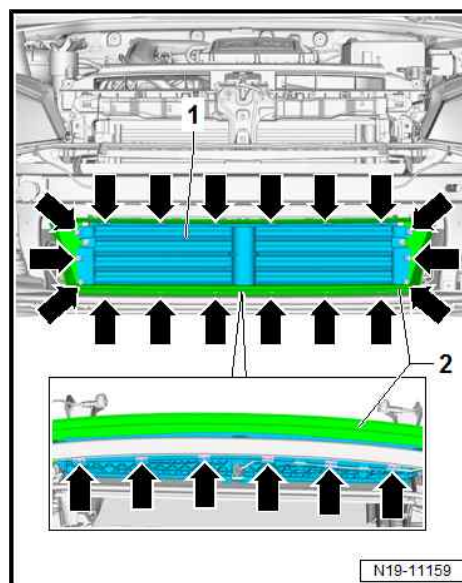
- Unclip seal -2- on retaining tabs -arrows-.
- Remove seal -2- from radiator blind -1-.
- Remove radiator blind -1- downwards.

#### Installing:

Install in reverse order of removal. Observe the following:

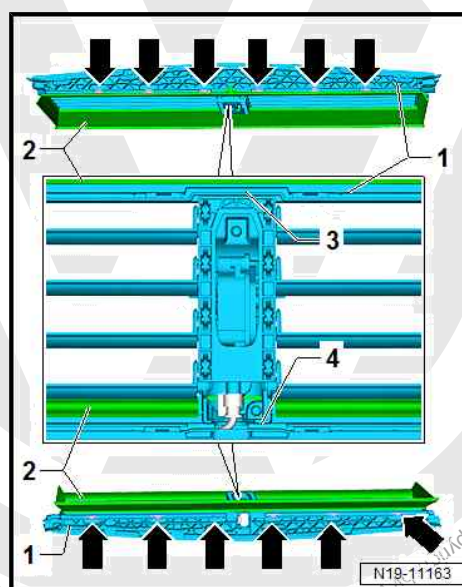
- Make sure that the guides of radiator blind -2- are properly seated on bumper carrier -1- -arrow-.
- After replacing radiator blind, a basic setting must be performed.
- Use ⇒ Vehicle diagnostic tester for this.
- Clear event memory ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu options on ⇒ Vehicle diagnostic tester:

◆ 0001 - Radiator blind control motor adaption - V544



## 4.9 Removing and installing radiator blind control motor - V544-

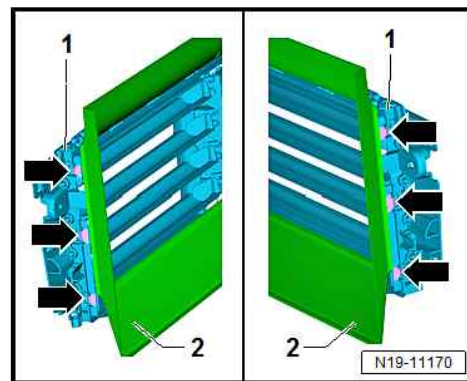
- Remove radiator blind  
⇒ ["4.8 Removing and installing radiator blind", page 360](#) .
- Unclip seal -2- at top and bottom on retaining tabs -arrows-.
- Pull seal -2- off radiator blind -1-.



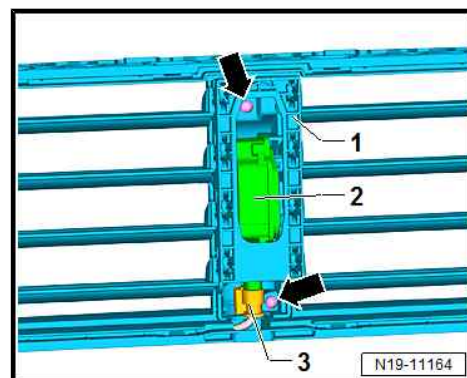




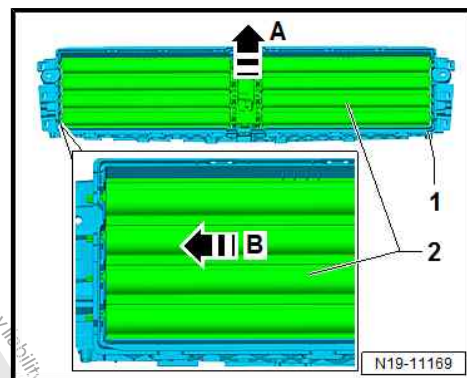
- Unclip seal -2- on left and right on retaining tabs -arrows-.
- Remove seal -2- from radiator blind -1-.



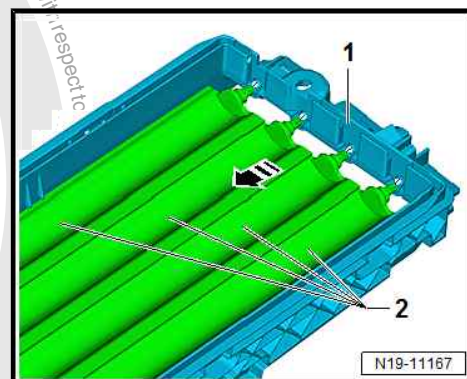
- Set flaps of radiator blind to open position as shown in illustration.
- To do this, move connecting piece -1-.
- Release and pull off connector -3-.
- Unscrew bolts -arrows-.



- Lift radiator blind control motor - V544- together with flaps upwards out of motor mounting ⇒ [Item 3 \(page 330\)](#) .
- Push radiator blind control motor - V544- with flaps -2- as far to the left as possible -arrow B-.

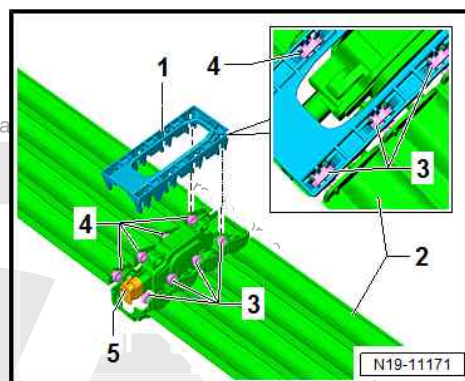


- Lever flaps -2- on right side out of frame -1-.

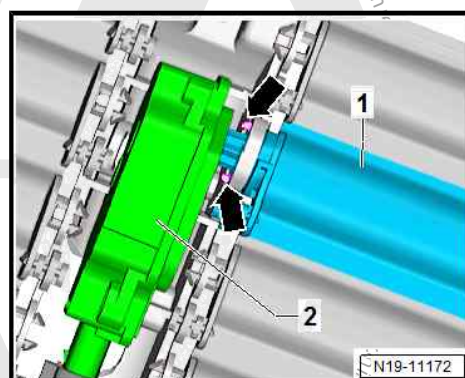




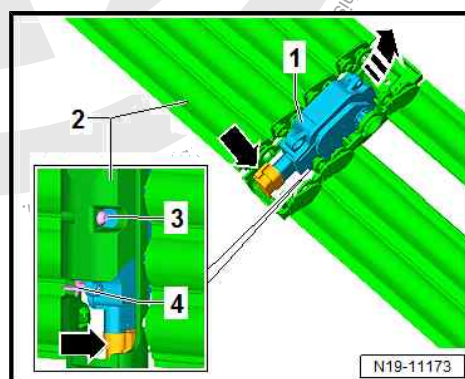
- Mark installation position of connecting piece -1-.
- Use connector contact -5- as a reference.
- Lever connecting piece -1- off guide rollers -3- and -4- of flaps -2-.



- Pull control flap -1- off radiator blind control motor - V544- -2-.
- To do this, release retaining clips -arrows-.



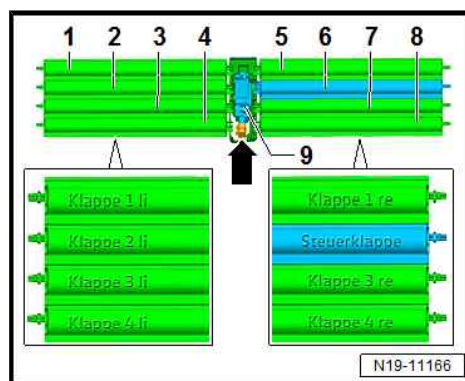
- If fitted, unscrew bolt -3-.
- Carefully swing radiator blind control motor - V544- upwards in -direction of arrow-.
- Pull radiator blind control motor - V544- off pin -4-.
- If necessary, release flaps on motor mounting, and remove them ➔ [Item 8 \(page 330\)](#) .



### Installing

Install in reverse order of removal. Observe the following:

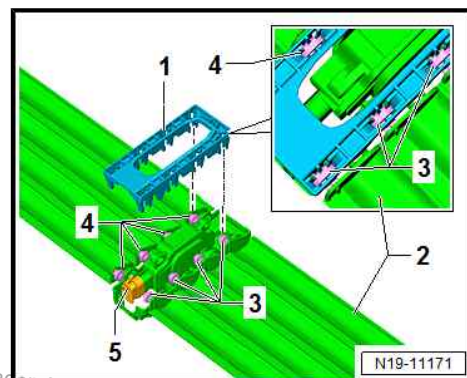
- Insert flaps -1- to -8- as shown in illustration, and engage them.
- Insert control flap -6-, and engage it.
- Note position of connector contact -arrow- when installing. The connector contact must face downwards.
- Note arrangement of flaps. The flaps are located on top of one another.
- The upper flaps rest on the flaps located below them.



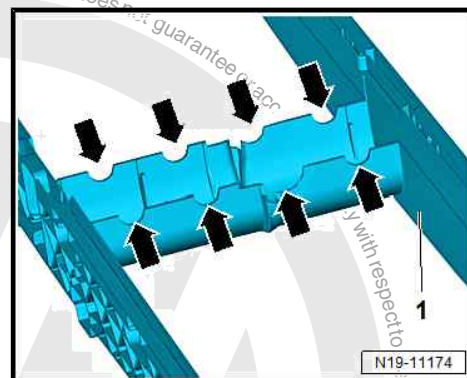
Num-ber	Left flaps	Num-ber	Right flaps
1	Flap 1, left	5	Flap 1, right
2	Flap 2, left	6	Control flap
3	Flap 3, left	7	Flap 3, right
4	Flap 4, left	8	Flap 4, right



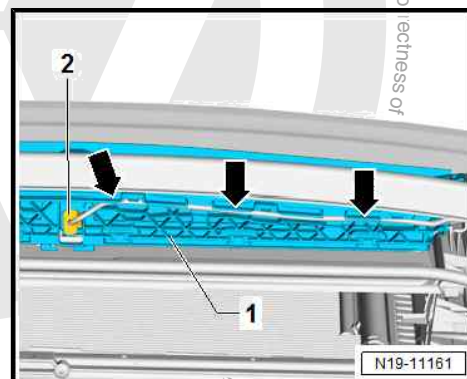
- Fit connecting piece -1- in correct installation position.
- Use the marking made beforehand or the connector contact -arrow- as a reference.
- Make sure that the connecting piece is properly seated on guide rollers.
- Insert flaps with radiator blind control motor - V544- into frame.
- Bolt on radiator blind control motor - V544- , and connect connector.



- Insert radiator blind control motor - V544- with flaps into frame -1-.
- Make sure that the flaps of radiator blind control motor - V544- are properly seated in mountings -arrows-.

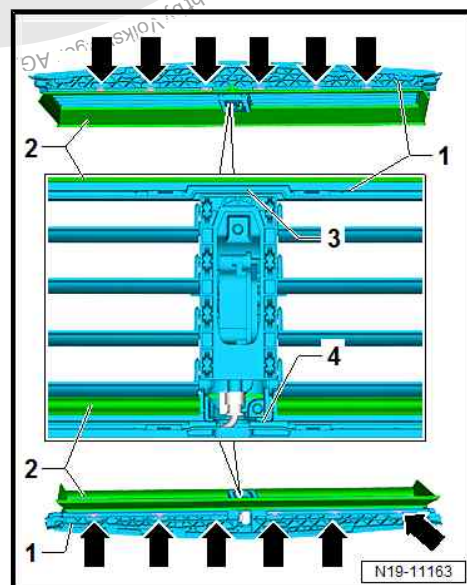


- Connect connector -2-.
- Clip in wiring harness -arrows-.



- Fit seal -2- to frame of radiator blind -1-.
- When doing this, make sure it is properly positioned at recesses -3- and -4-.
- Clip in seal -2-.
- After replacing radiator blind control motor - V544- , a basic setting must be performed.
- Use ⇒ Vehicle diagnostic tester for this.
- Clear event memory ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu options on ⇒ Vehicle diagnostic tester:

- ◆ 0001 - Radiator blind control motor adaption - V544







## 21 – Turbocharging/supercharging

### 1 Turbocharger

⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)

⇒ [“1.2 Removing and installing turbocharger”, page 368](#)

⇒ [“1.3 Removing and installing charge pressure positioner V465”, page 374](#)

⇒ [“1.4 Removing and installing connection for turbocharger”, page 375](#)

#### 1.1 Assembly overview - turbocharger

##### Part 1

##### 1 - Connection

##### 2 - Bolt

- 8 Nm

##### 3 - O-ring

- Renew after removal
- Before installing, lightly moisten O-ring with clean engine oil

##### 4 - Seal

- Renew after removal

##### 5 - Bracket

- For coolant lines

##### 6 - Bolt

- 20 Nm

##### 7 - Turbocharger

- Can only be renewed together with exhaust manifold
- Removing and installing  
⇒ [“1.2 Removing and installing turbocharger”, page 368](#)

##### 8 - Nut

- Renew after removal
- 25 Nm

##### 9 - Lock nut

- For charge pressure positioner - V465-
- 10 Nm

##### 10 - Operating lever

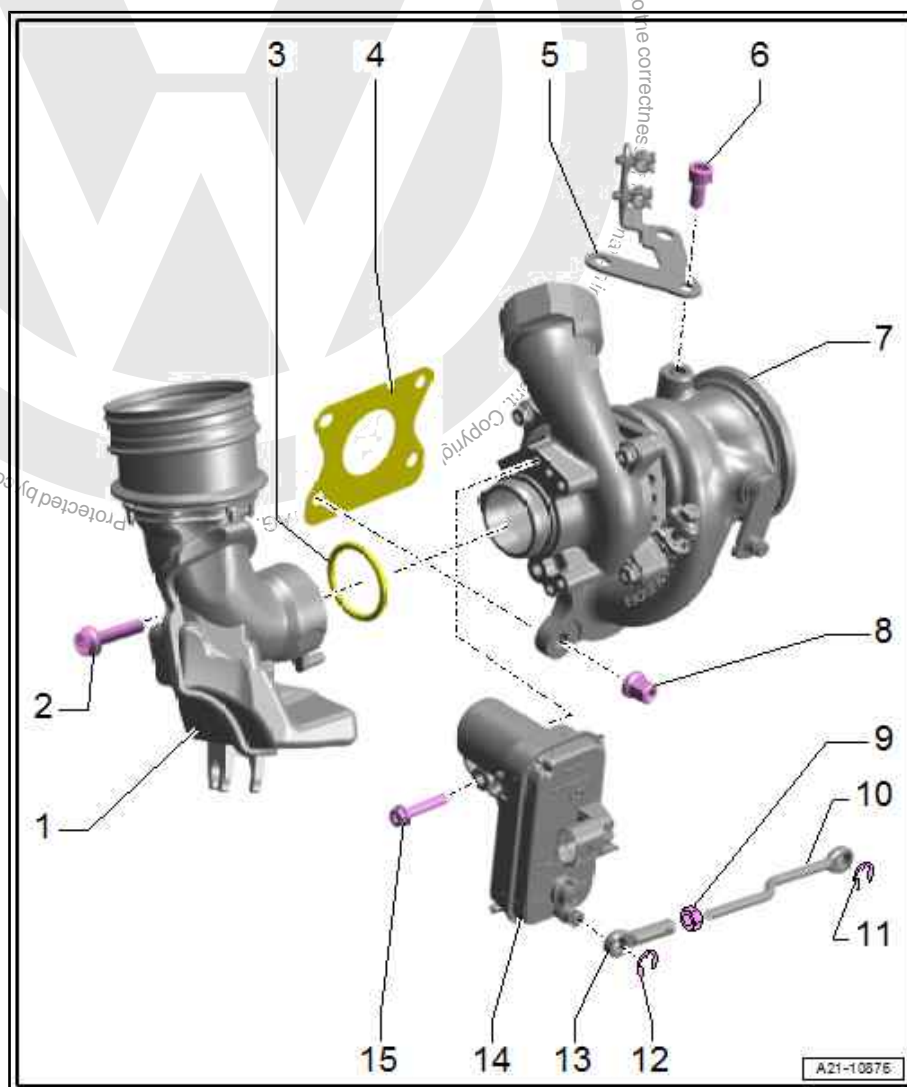
- For charge pressure positioner - V465-

##### 11 - Retaining clip

##### 12 - Retaining clip

##### 13 - Operating lever

- For charge pressure positioner - V465-





## 14 - Charge air pressure controller - V465-

- ☐ Removing and installing ⇒ ["1.3 Removing and installing charge pressure positioner V465", page 374](#)

## 15 - Bolt

- ☐ Qty. 3 ⇒ Electronic parts catalogue (ETKA) .
- ☐ 8 Nm + 45°



### Note

*If at least one of the bolts became loose, all 3 bolts must be renewed.*

## Part 2

### 1 - Turbocharger

- ☐ Removing and installing  
⇒ ["1.2 Removing and installing turbocharger", page 368](#)

### 2 - O-ring

- ☐ Renew after removal

### 3 - Bolt

- ☐ 9 Nm

### 4 - Bolt

- ☐ 20 Nm

### 5 - Oil supply line

### 6 - O-ring

- ☐ Renew after removal

### 7 - Bolt

- ☐ 9 Nm

### 8 - O-ring

- ☐ If damaged, renew crankcase breather hose  
⇒ [Item 10 \(page 367\)](#)
- ☐ Before installing, lightly moisten O-ring with clean engine oil

### 9 - Bolt

- ☐ 8 Nm

### 10 - Hose

- ☐ For crankcase ventilation.

### 11 - Bolt

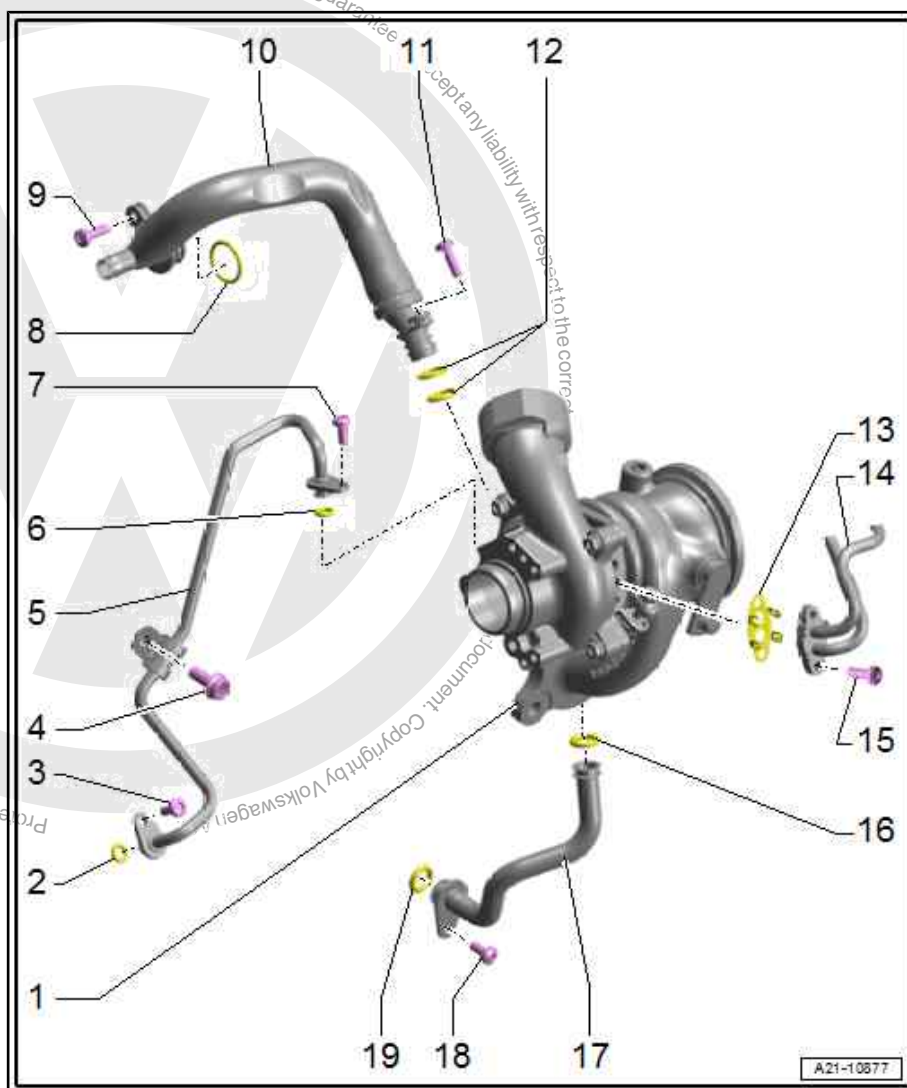
- ☐ 8 Nm

### 12 - O-ring

- ☐ If damaged, renew crankcase breather hose ⇒ [Item 10 \(page 367\)](#)
- ☐ Before installing, lightly moisten O-ring with clean engine oil

### 13 - Seal

- ☐ Renew after removal







#### 14 - Coolant lines

- ☐ Supply and return

#### 15 - Bolt

- ☐ 8 Nm

#### 16 - O-ring

- ☐ Renew after removal

#### 17 - Oil return line

#### 18 - Bolt

- ☐ 9 Nm

#### 19 - O-ring

- ☐ Renew after removal

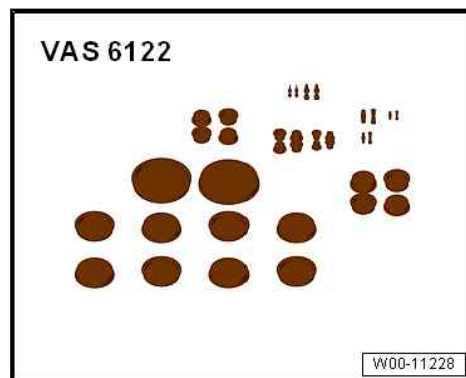
## 1.2 Removing and installing turbocharger

### Special tools and workshop equipment required

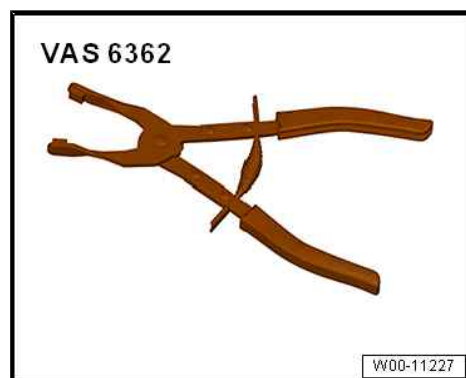
- ◆ Hose clamps to 25 mm - 3094-



- ◆ Engine bung set - VAS 6122-

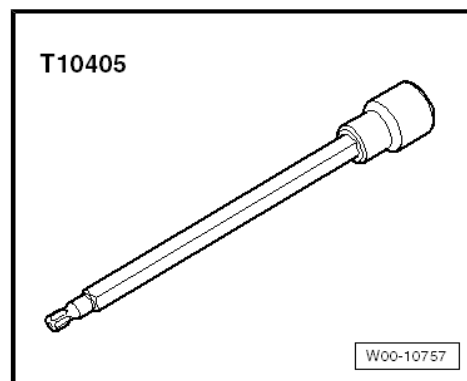


- ◆ Spring-type clip pliers - VAS 6362-

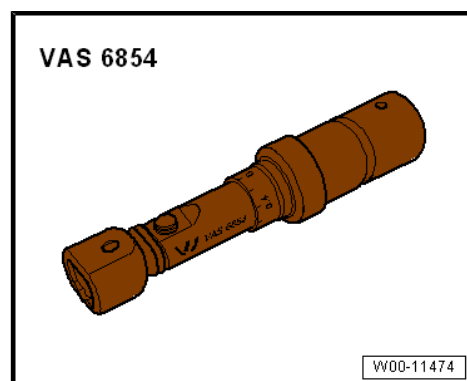




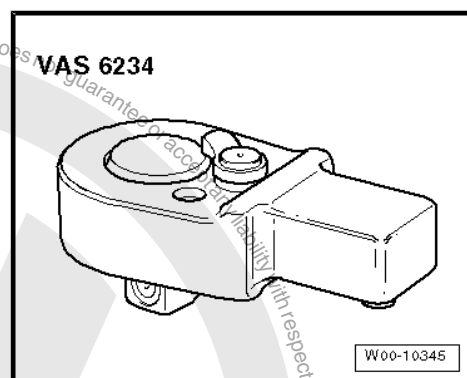
- ◆ Socket Torx T 30 - T10405-



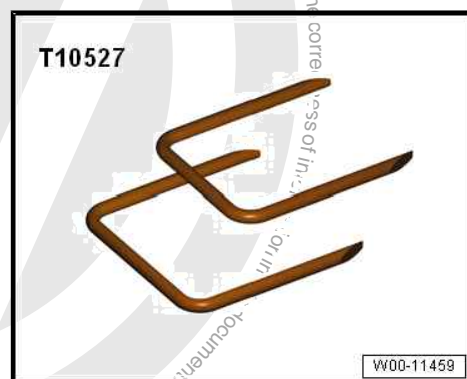
- ◆ Torque wrench - VAS 6854-



- ◆ Ratchet insert 1/4" - VAS 6234-



- ◆ Release tool - T10527-





- ◆ Socket XZN 10 - T10501-

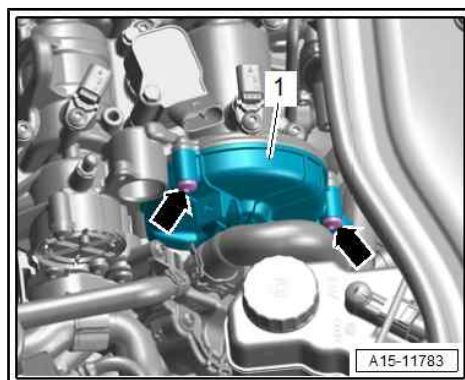


## Removing



### Note

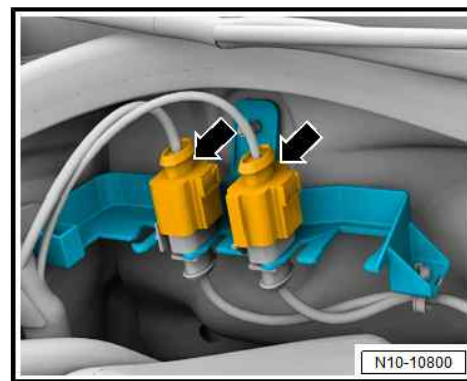
- ◆ *Attach all heat-shielding sleeves in the same places when installing.*
- ◆ *If a mechanical fault is discovered on the turbocharger (e.g. a destroyed compressor impeller), it is not sufficient to just renew the turbocharger. To avoid any subsequent damage, the following work must be carried out:*
- ◆ *Check air filter housing, air filter element and air inlet hoses for contamination.*
- ◆ *Check the whole charge air path and charge air cooler for foreign objects.*
- ◆ *If foreign objects are discovered in the charge air system, clean the charge air path and, if necessary, renew the charge air cooler.*
- Remove air pipe  
⇒ ["2.5 Removing and installing air pipe", page 385](#) .
- Remove air filter housing  
⇒ ["3.2 Removing and installing air filter housing", page 416](#) .
- Remove connection for turbocharger  
⇒ ["1.4 Removing and installing connection for turbocharger", page 375](#) .
- Unscrew bolts -arrows-, and remove toothed belt guard -1- for coolant pump toothed belt.





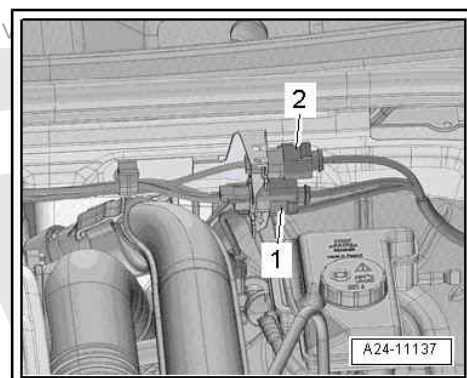
#### Polo 2014 ►

- Disconnect connectors of lambda probe 1 after catalytic converter - GX7- and lambda probe 1 before catalytic converter - GX10- -arrows-.



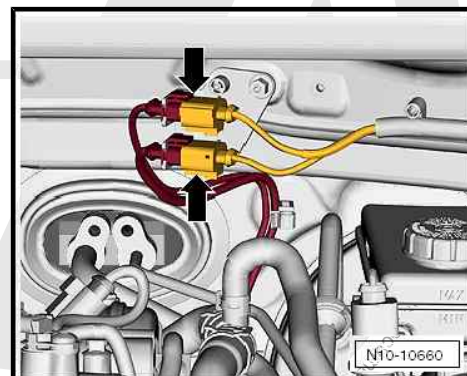
#### Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, Touran

- Disconnect connectors of lambda probe 1 after catalytic converter - GX7- -1- and lambda probe 1 before catalytic converter - GX10- -2-.



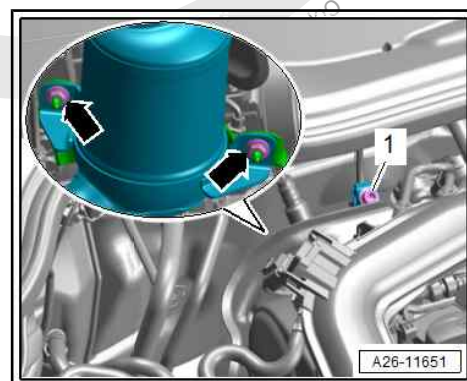
upl:

- Release and pull off electrical connectors -arrows- for lambda probe 1 after catalytic converter - GX7- and lambda probe 1 before catalytic converter - GX10- .
- Remove connection between charge pressure pipe and turbocharger ⇒ [Item 16 \(page 379\)](#).



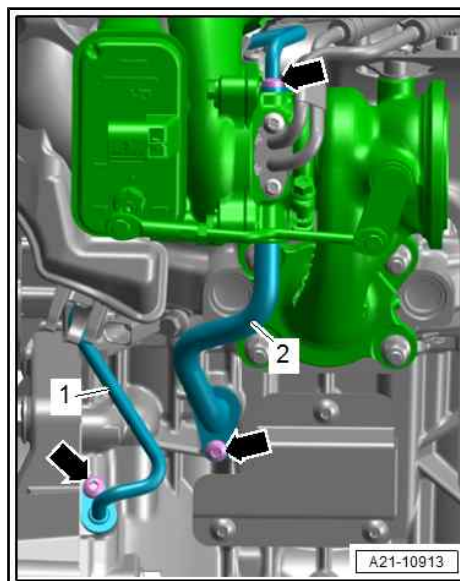
#### Continued for all vehicles

- Open screw-type clip -1-, and position it on intake funnel of catalytic converter.
- Unscrew nuts -arrows-, and tie up catalytic converter.

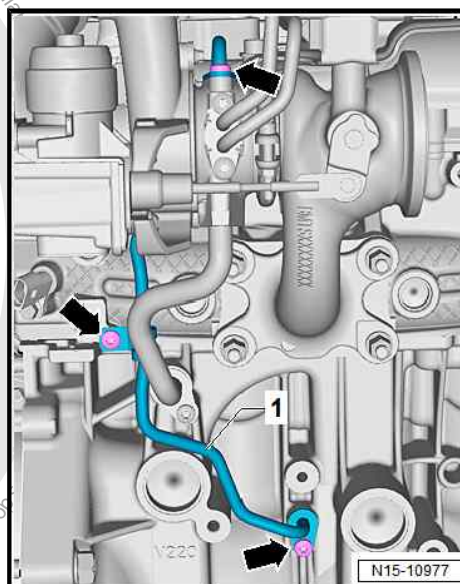




- Unscrew bolt -arrows- for oil return line -2-.
- Pull out and remove oil return line from turbocharger.



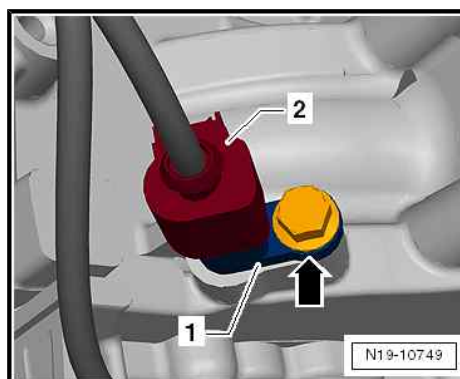
- Unscrew bolts -arrows- for oil supply line.
- Guide out oil supply line -1- and remove.



- Open and remove thermal protection from connector -2- for coolant temperature sender - G62- .
- Release and pull off electrical connector -2-.

**up!:**

- Remove charge pressure positioner - V465-  
⇒ ["1.3 Removing and installing charge pressure positioner V465", page 374](#) .

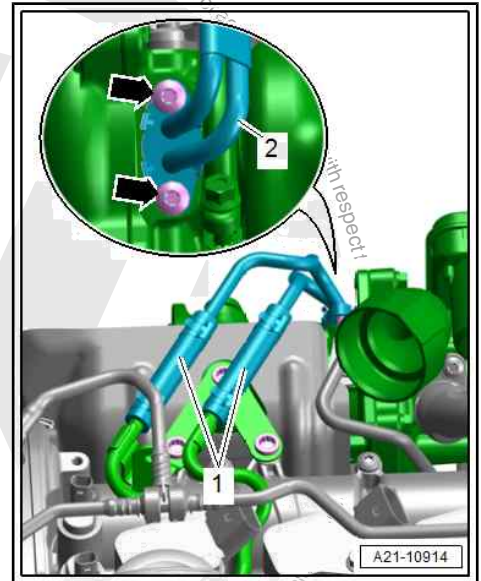




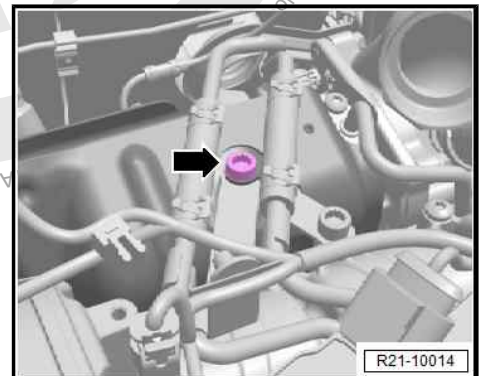


**Continued for all vehicles:**

- Clamp off coolant hoses -1- with hose clips, up to 25 mm - 3094- .
- Unscrew bolts -arrows-, and swivel coolant lines -2- to one side.



- Unscrew bolt -arrow-.



**Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran**

- Release and pull off connector -2-.

**Continued for all vehicles:**

- Unscrew nuts -arrows- and remove turbocharger -1-.

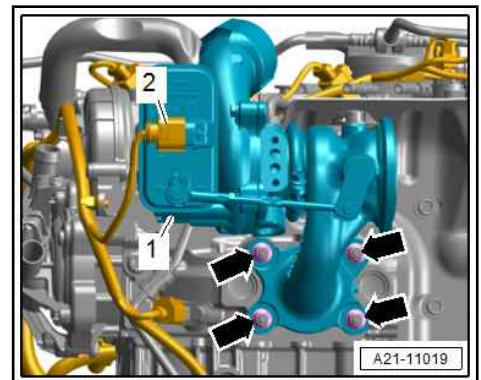
**Installing**

Install in reverse order of removal, observing the following:



**Note**

- ◆ *Renew seals, nuts and O-rings.*
- ◆ *Fill turbocharger with engine oil at connection for oil supply line.*
- ◆ *Secure all hose connections with hose clips corresponding to the series equipment ➔ Electronic parts catalogue .*
- ◆ *After installing turbocharger, run engine for about 1 minute at idling speed to ensure that oil is supplied to the turbocharger. Do not rev up immediately.*





- If a turbocharger already used is being reinstalled, insert screwdriver -2- into groove -arrow- on turbocharger, and lever out seal -1-.
- Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronics boxes; Overview of fitting locations - relay carriers, fuse carriers, electronics boxes and ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.



#### Note

*Never reuse old coolant.*

- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

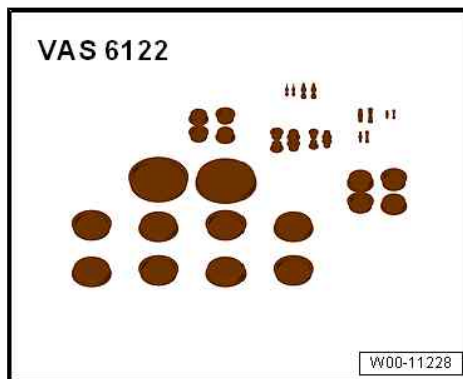
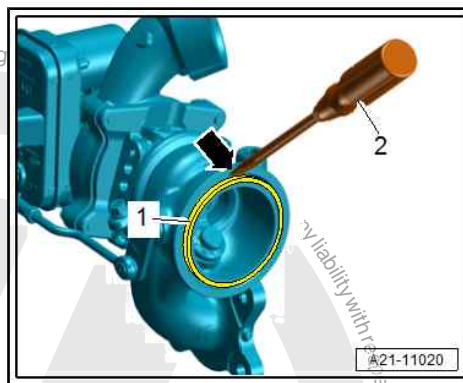
#### Specified torques

- ◆ Toothed belt guard  
⇒ [“2.1 Assembly overview - coolant pump, thermostat”, page 292](#)
- ◆ Air filter housing  
⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ◆ Tightening sequence for catalytic converter  
⇒ [“2.1 Assembly overview - emission control”, page 482](#)

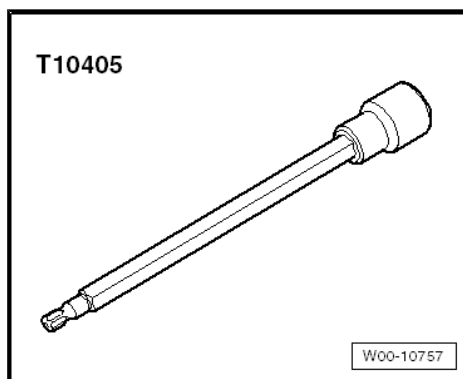
### 1.3 Removing and installing charge pressure positioner - V465-

#### Special tools and workshop equipment required

- ◆ Engine bung set - VAS 6122-



- ◆ Socket Torx T 30 - T10405-





## Removing

- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .
- Remove connection for turbocharger  
⇒ [“1.4 Removing and installing connection for turbocharger”, page 375](#) .

**Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran**

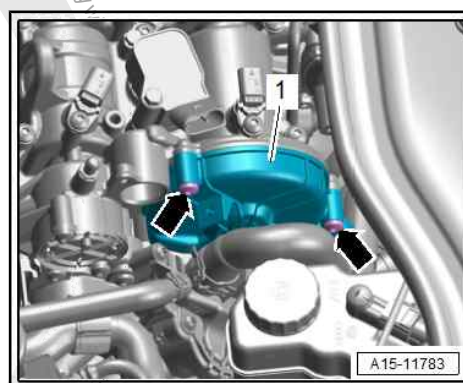
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .

upl:

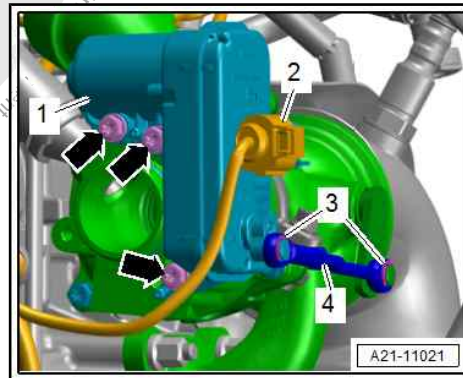
- Remove air pipe  
⇒ [“2.5 Removing and installing air pipe”, page 385](#) .

## Continued for all vehicles

- Unscrew bolts -arrows-, and remove toothed belt guard -1- for coolant pump toothed belt.



- Pull off securing clips -3-, and remove operating lever -4-.
- Unscrew bolts -arrows-.
- Separate electrical connector -2- and remove charge pressure positioner - V465- -1-.



## Installing

Install in reverse order of removal, observing the following:



**Note**

*Renew O-rings after removal.*

- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu option on ⇒ Vehicle diagnostic tester:

◆ 0001 - Adaption charge pressure positioner - V465

## Specified torques

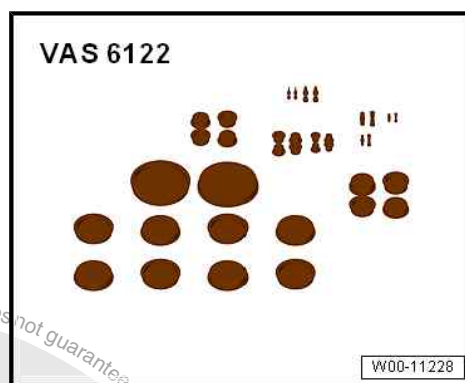
- ◆ ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ◆ ⇒ [“2.1 Assembly overview - coolant pump, thermostat”, page 292](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)

## 1.4 Removing and installing connection for turbocharger

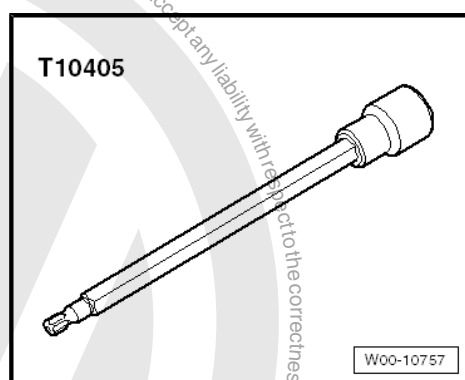
Special tools and workshop equipment required



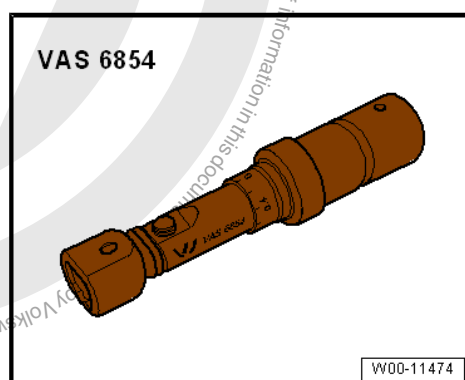
- ◆ Engine bung set - VAS 6122-



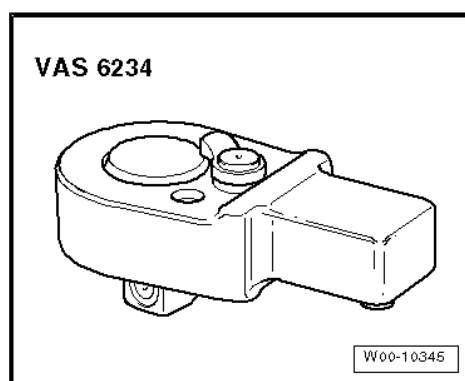
- ◆ Socket Torx T 30 - T10405-



- ◆ Torque wrench - VAS 6854-



- ◆ Ratchet insert 1/4" - VAS 6234-





## Removing

- Remove air pipe  
⇒ [“2.5 Removing and installing air pipe”, page 385](#) .
- Press release tabs on both sides, and disconnect hose -2- for activated charcoal filter.



### Note

*Risk of chemical damage to the coolant pump gasket caused by oil entering between the coolant pump and the cylinder head.*

- Cover coolant pump with a cloth.
- Unscrew bolts -arrows-, and remove crankcase breather hose -1-.
- Move clear wiring harness -2- and coolant hose -4-, and push them aside.
- Unscrew bolt -1- using torque wrench - VAS 6854- , 1/4" ratchet - VAS 6234- and socket T 30 - T10405- .
- Pull resonator -3- towards left off turbocharger, and carefully remove it upwards.

## Installing

Install in reverse order of removal, observing the following:

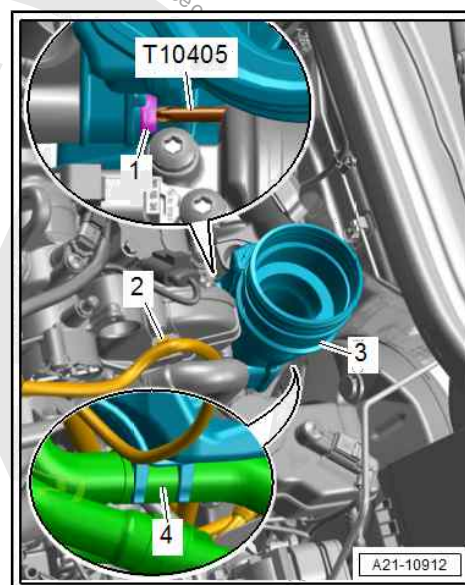
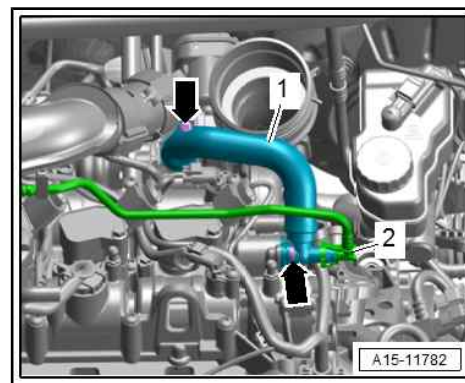


### Note

*Renew O-rings.*

## Specified torques

- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)







## 2 Charge air system

⇒ [“2.1 Assembly overview - charge air system”, page 378](#)

⇒ [“2.2 Removing and installing charge air cooler”, page 380](#)

⇒ [“2.3 Removing and installing charge pressure sender GX26 ”, page 383](#)

⇒ [“2.4 Checking charge air system for leaks”, page 383](#)

⇒ [“2.5 Removing and installing air pipe”, page 385](#)

### 2.1 Assembly overview - charge air system



#### Note

*Check all air hoses and pipes to make sure they are firmly seated and not leaking before carrying out tests or repairs.*

#### 1 - Seal

- ☐ Renew after removal

#### 2 - Sealing lip

- ☐ Renew after removal
- ☐ Before installing, moisten lightly with clean engine oil.

#### 3 - Charge air cooler

- ☐ Removing and installing  
⇒ [“2.2 Removing and installing charge air cooler”, page 380](#)
- ☐ Change coolant after renewing
- ☐ Position of coolant connections varies

#### 4 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand so that it screws into old thread. Then tighten bolt to torque.
- ☐ 15 Nm

#### 5 - Coolant hose

#### 6 - Coolant hoses

#### 7 - Intake manifold

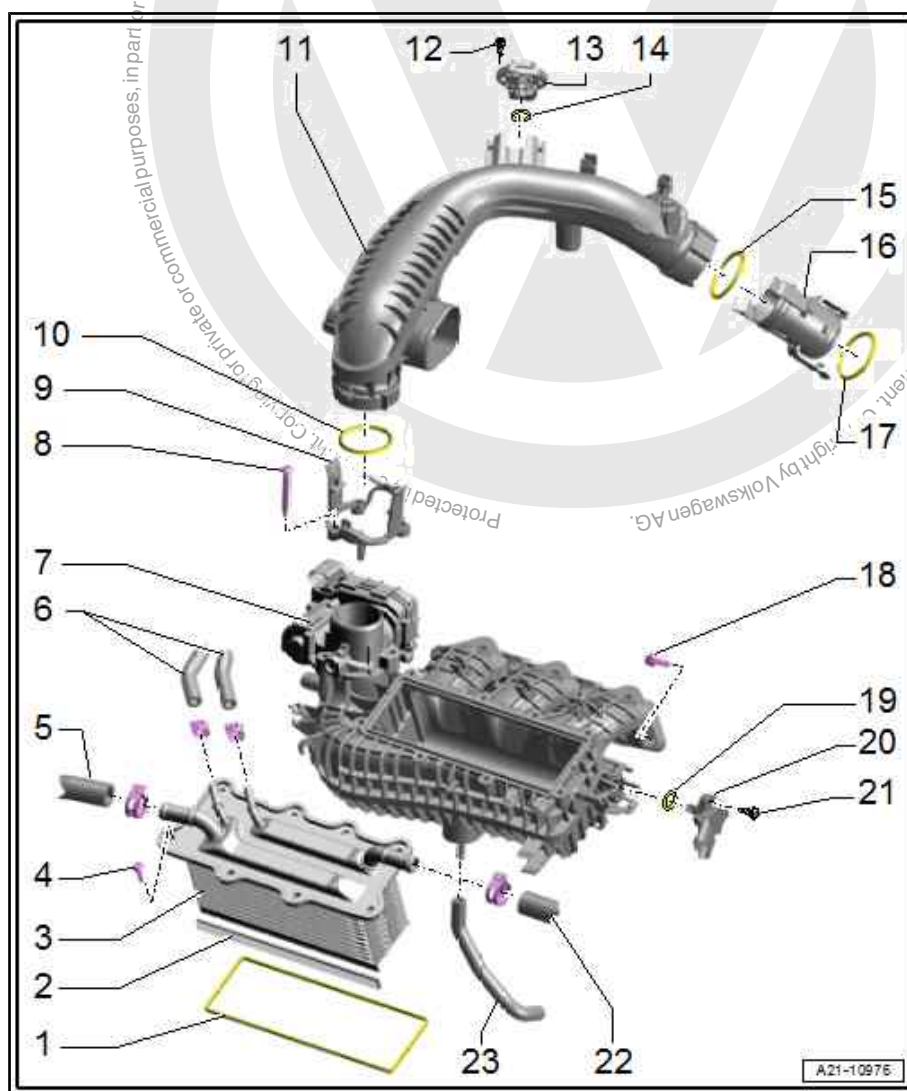
Removing and installing  
⇒ [“4.2 Removing and installing intake manifold”, page 422](#)

#### 8 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand so that it screws into old thread. Then tighten bolt to torque.
- ☐ 7 Nm

#### 9 - Retaining clip

- ☐ For air intake pipe





#### 10 - O-ring

- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

#### 11 - Air intake pipe

- ☐ Removing and installing ⇒ ["2.5 Removing and installing air pipe", page 385](#)

#### 12 - Bolt

- ☐ Repair solution for retaining tab when broken off
- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand so that it screws into old thread Then, tighten bolt to specified torque.
- ☐ 7 Nm

#### 13 - Charge air pressure sender - GX26-

- ☐ Consisting of

Charge pressure sender - G31-

Intake air temperature sender - G42-

- ☐ Removing and installing ⇒ ["2.3 Removing and installing charge pressure sender GX26 ", page 383](#)

#### 14 - O-ring

- ☐ Renew after removal

#### 15 - O-ring

- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

#### 16 - Union

#### 17 - O-ring

- ☐ Renew after removal
- ☐ Before installing, lightly moisten O-ring with clean engine oil

#### 18 - Bolt

- ☐ Specified torque and tightening sequence ⇒ [page 422](#)

#### 19 - O-ring

- ☐ Renew after removal

#### 20 - Intake manifold sender - GX9-

- ☐ Consisting of

Intake air temperature sender 2 - G299-

Intake manifold pressure sender - G71-

- ☐ Removing and installing ⇒ ["5.4 Removing and installing intake manifold sender GX9 ", page 434](#)

#### 21 - Bolt

- ☐ Repair solution for retaining tab when broken off
- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand so that it screws into old thread Then, tighten bolt to specified torque.
- ☐ 7 Nm

#### 22 - Coolant hose

#### 23 - Hose

- ☐ For crankcase ventilation.



## 2.2 Removing and installing charge air cooler

⇒ [“2.2.1 Removing and installing charge air cooler, Polo, Golf, Golf Estate, Golf SV, T-Roc, T-Cross, Touran”, page 380](#)

⇒ [“2.2.2 Removing and installing charge air cooler, up!”, page 381](#)

### 2.2.1 Removing and installing charge air cooler, Polo, Golf, Golf Estate, Golf SV, T-Roc, T-Cross, Touran

#### Special tools and workshop equipment required

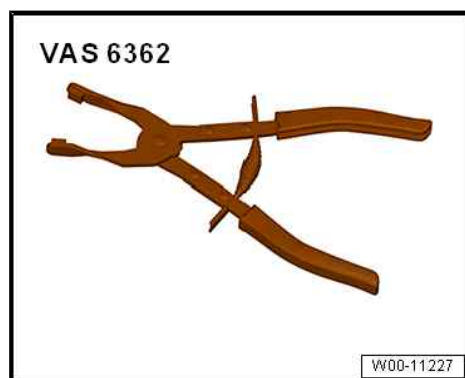
- ◆ Hose clamps to 25 mm - 3094-



- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Spring-type clip pliers - VAS 6362-



#### Removing

- Remove air intake pipe.  
⇒ [“2.5 Removing and installing air pipe”, page 385](#)
- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .



#### Note

Place a cloth underneath to catch any escaping coolant.

- Place drip tray for workshop hoist - VAS 6208- underneath.
- Clamp off coolant hoses on charge air cooler using hose clamps, up to 25 mm - 3094- .
- Release hose clips -1, 2-, and remove coolant hoses.
- Unscrew bolts -arrows- and remove charge air cooler.

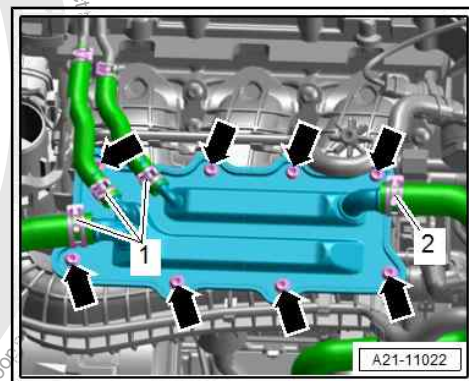
#### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ If there are minor dents in the fins, refer to  
⇒ ["3.7 Fitting radiator and condensers", page 15](#) .
- ◆ Renew seals.
- ◆ Secure all hose connections with hose clips comparable to production standard ⇒ *Electronic parts catalogue*
- Check coolant level  
⇒ ["1.3 Draining and adding coolant", page 272](#) .



#### Note

Never reuse old coolant.

#### Specified torques

- ◆ ⇒ ["2.1 Assembly overview - charge air system", page 378](#)
- ◆ ⇒ ["3.1 Assembly overview - air filter housing", page 410](#)

## 2.2.2 Removing and installing charge air cooler, up!

#### Special tools and workshop equipment required

- ◆ Hose clamps to 25 mm - 3094-

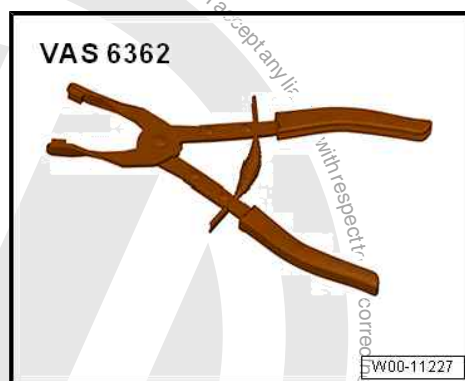




- ◆ Drip tray for workshop hoist - VAS 6208-



- ◆ Spring-type clip pliers - VAS 6362-



## Removing

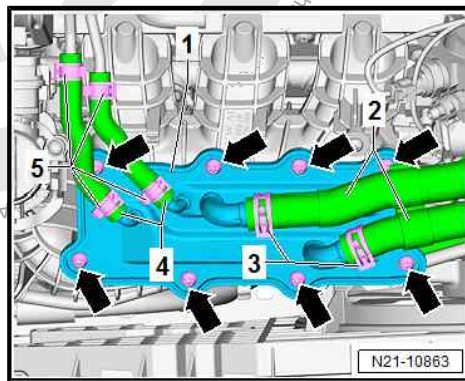
- Remove intake manifold  
⇒ ["4.2.2 Removing and installing intake manifold, up!"](#),  
[page 425](#) .
- With intake manifold removed, unscrew bolts -arrows-, and  
remove charge air cooler from intake manifold.

## Installing

Install in reverse order of removal, observing the following:

### Note

- ◆ If there are minor dents in the fins, refer to  
⇒ ["3.7 Fitting radiator and condensers"](#), [page 15](#) .
- ◆ Secure all hose connections with hose clips comparable to  
production standard ⇒ *Electronic parts catalogue*



- Renew seals.
- Check coolant level  
⇒ ["1.3 Draining and adding coolant"](#), [page 272](#) .

### Note

*Never reuse old coolant.*

## Specified torques

- ◆ ⇒ ["2.1 Assembly overview - charge air system"](#), [page 378](#)
- ◆ ⇒ ["3.1 Assembly overview - air filter housing"](#), [page 410](#)
- ◆ ⇒ ["4.1 Assembly overview - intake manifold"](#), [page 421](#)





## 2.3 Removing and installing charge pressure sender - GX26-

Charge pressure sender - GX26- consists of:

- ◆ Charge pressure sender - G31-
- ◆ Intake air temperature sender - G42-

### Removing

- Disconnect electrical connector -1-.

### Version -A-

- Release fasteners -arrows-, and remove charge pressure sender - GX26- .

### Version -B-

- Unscrew bolts -2- and remove charge pressure sender - GX26- .

### Installing

Install in reverse order of removal, observing the following:



### Note

- ◆ Renew O-ring.
- ◆ If fasteners on the air intake pipe have broken off, secure the charge pressure sender - GX26- using suitable bolts -2- as per ⇒ *Electronic Parts Catalogue*

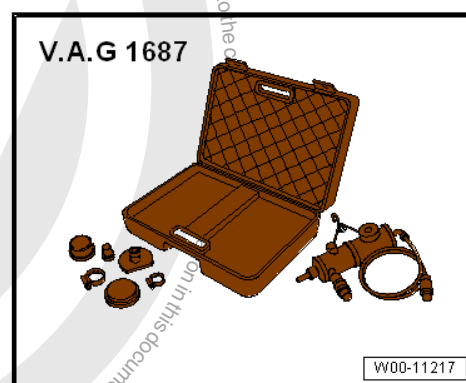
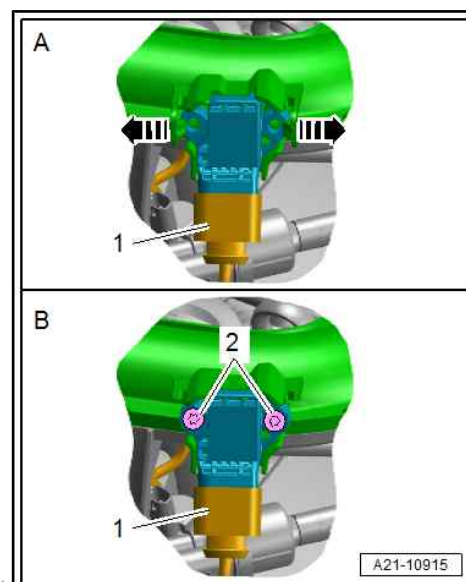
### Specified torques

- ◆ ⇒ [Item 12 \(page 379\)](#)

## 2.4 Checking charge air system for leaks

### Special tools and workshop equipment required

- ◆ Charge air system tester - V.A.G 1687-





### Sequence of operations

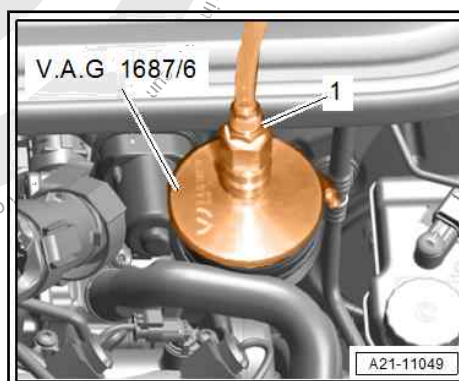
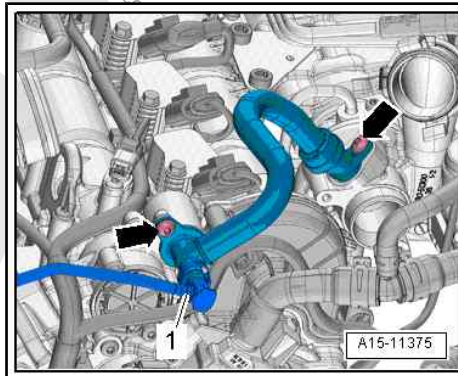
- Remove air filter housing.  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)
- Press release tabs and disconnect hose -1- for activated charcoal filter.



#### Note

*Risk of chemical damage to coolant pump seal from oil ingress between coolant pump and cylinder head.*

- Unscrew bolts -arrows- and remove crankcase breather hose.
- Seal opening in turbocharger with suitable bung from engine bung set - VAS 6122- .
- Fit end seal - V.A.G 1687/6- to connection.
- Connect hose -1- of charge air system tester -V.A.G 1687- to end seal - V.A.G 1687/6- .





Prepare charge air system tester - V.A.G 1687- as follows:

- Completely unscrew pressure regulating valve -2-, close valves -3- and -4-.
- To turn pressure regulating valve -2-, rotary knob must be pulled upwards.
- Connect charge air system tester - V.A.G 1687- to compressed air -1- via commercial adapter.



#### Note

*If there is water in inspection glass, drain via drain screw -6-.*

- Open valve -3-.



#### Note

- ◆ *Risk of damage because pressure is set too high.*
- ◆ *The pressure must not exceed 0.5 bar.*
- Adjust pressure to 0.5 bar with pressure control valve -2-.
- Open valve -4- and wait until test circuit is full. If necessary, adjust pressure to 0.5 bar.
- Check charge air system for leaks by listening, touching, with commercially available leak detector spray or using ultrasonic tester - V.A.G 1842- .



#### Note

- ◆ *A small amount of air escapes through the valves and enters the engine. Therefore a holding pressure test is not possible.*
- ◆ *How to use the ultrasonic tester -V.A.G 1842- → operating instructions*
- ◆ *Before removing the adapter, release pressure in the test circuit by pulling off hose coupling.*

### Assembling

Assembly is carried out in reverse sequence; note the following:



#### Note

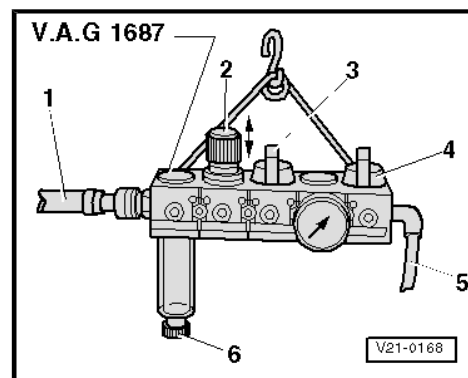
- ◆ *Renew seal and O-rings.*
- ◆ *Secure all hose connections with hose clips corresponding to the series equipment → Electronic parts catalogue .*

### Specified torques

- ◆ [“3.1 Assembly overview - air filter housing”, page 410](#)

## 2.5 Removing and installing air pipe

Special tools and workshop equipment required

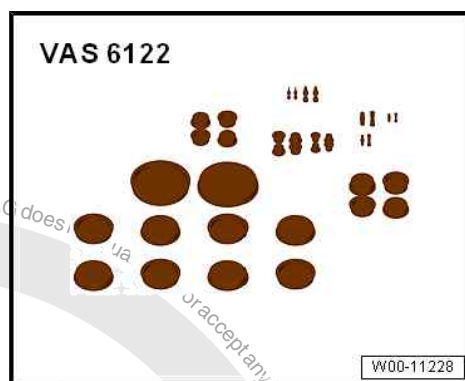




- ◆ Release tool - T10527-



- ◆ Engine bung set - VAS 6122-

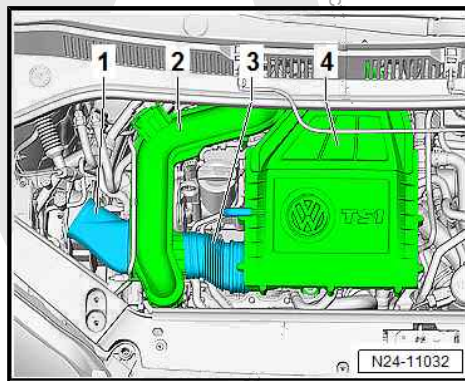


## Removing

- Remove air filter  
⇒ ["3.2 Removing and installing air filter housing", page 416](#) .

## up!:

- Pull off intake connecting pipe -1-.
- Remove air duct -3- between air filter housing -4- and air intake pipe -2-.





#### Continued for all vehicles:

- Disconnect connector -1- for charge pressure sender - GX26- , and move clear electrical wiring.
- Lay aside hoses and lines -arrows- at air intake pipe -2-.
- Release fasteners using release tool - T10527- , and remove air intake pipe.
- Seal open connections using clean plugs from engine bung set - VAS 6122- .

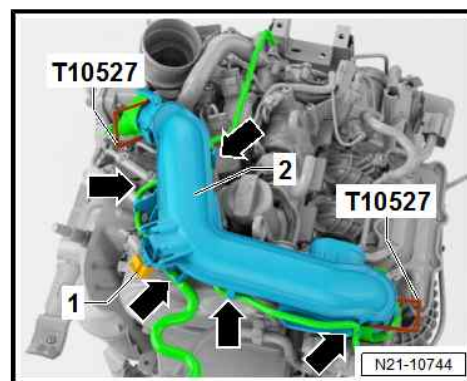
#### Installing

Install in reverse order of removal, observing the following:

- Renew seals after removal.
- Before installing, lightly coat seals with clean engine oil.
- Renew any retaining tabs that have been damaged.
- If retaining tabs of charge pressure sender - GX26- have broken off, sensor can be secured using 2 bolts ⇒ Electronic Parts Catalogue .

#### Specified torques:

- ◆ Securing bolts for sensor ⇒ [Item 12 \(page 379\)](#)
- ◆ Securing bolt for air filter housing  
⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)







## 24 – Mixture preparation - injection

### 1 Injection system

⇒ [“1.1 Overview of fitting locations - injection system”, page 388](#)

#### 1.1 Overview of fitting locations - injection system

⇒ [“1.1.1 Overview of fitting locations - engine compartment, Polo 2014 ►”, page 388](#)

⇒ [“1.1.2 Overview of fitting locations - engine compartment, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 391](#)

⇒ [“1.1.3 Overview of fitting locations - engine compartment, up!”](#), page 394

⇒ [“1.1.4 Overview of fitting locations on engine \(from above\)”, page 396](#)

⇒ [“1.1.5 Overview of fitting locations - engine from above, with particulate filter”, page 397](#)

⇒ [“1.1.6 Overview of fitting locations – engine, rear”, page 398](#)

⇒ [“1.1.7 Overview of fitting locations – engine, front”, page 399](#)

#### 1.1.1 Overview of fitting locations - engine compartment, Polo 2014 ►



**1 - Charge air pressure sender - GX26-**

Consisting of:

- ◆ Charge pressure sender - G31-
- ◆ Intake air temperature sender - G42-

**2 - Lambda probe 1 before catalytic converter - GX10-**

Consisting of:

- ◆ Lambda probe - G39-
- ◆ Lambda probe heater - Z19-

- ☐ Assembly overview  
⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)

**3 - Lambda probe 1 after catalytic converter - GX7-**

Consisting of:

- ◆ Lambda probe after catalytic converter - G130-
- ◆ Lambda probe 1 heater after catalytic converter - Z29-

- ☐ Assembly overview  
⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)

**4 - Accelerator position sender - G79- / accelerator position sender 2 - G185- .**

- ☐ Fitting location  
⇒ [page 390](#)

**5 - Brake light switch - F- / brake pedal switch - F47-**

- ☐ Fitting location ⇒ [page 390](#)

**6 - Engine control unit - J623-**

- ☐ Removing and installing ⇒ ["6.2 Removing and installing engine \(motor\) control unit J623", page 440](#)

**7 - Clutch position sender - G476-**

- ☐ Fitting location ⇒ [page 390](#)

**8 - Gearbox neutral position sender - G701- / reversing light switch - F4-**

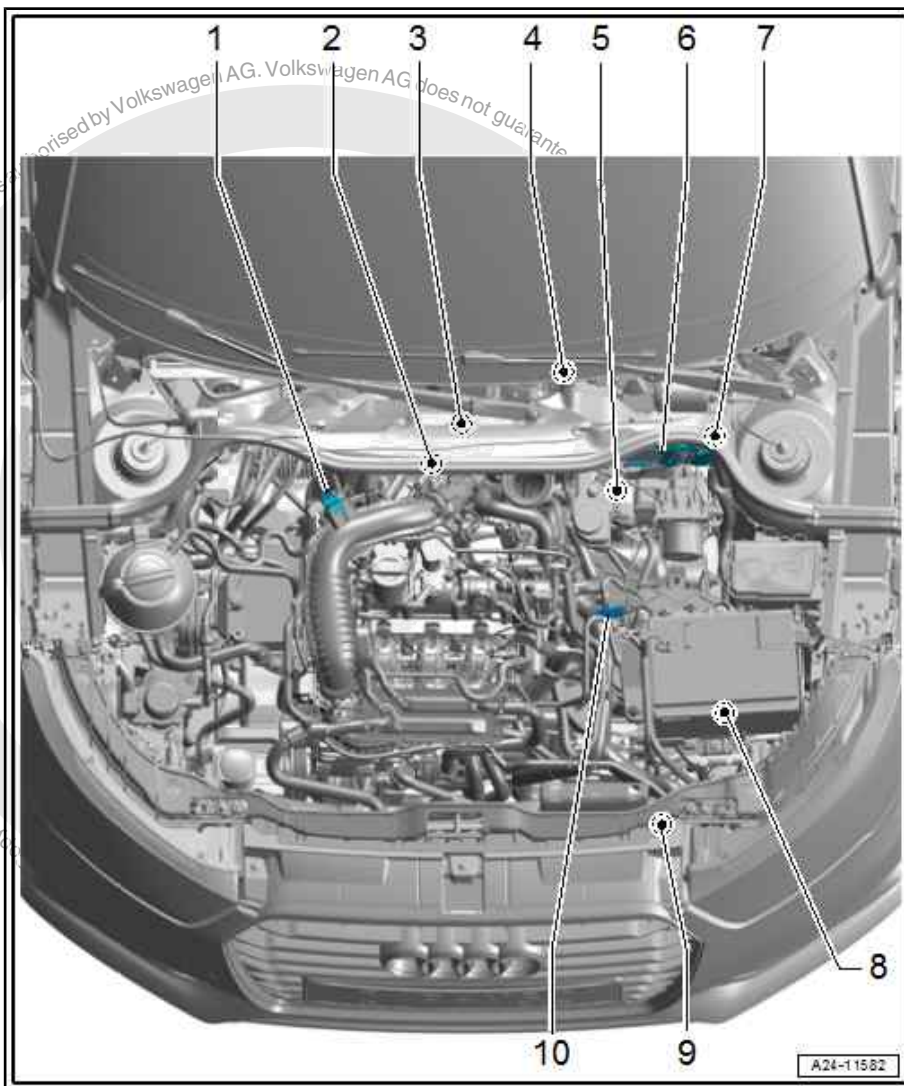
- ☐ Fitting location ⇒ [page 391](#)

**9 - Radiator outlet coolant temperature sender - G83-**

- ☐ Assembly overview ⇒ ["2.3 Assembly overview - coolant temperature sender", page 296](#)

**10 - Press sensor for brake servo - G294-**

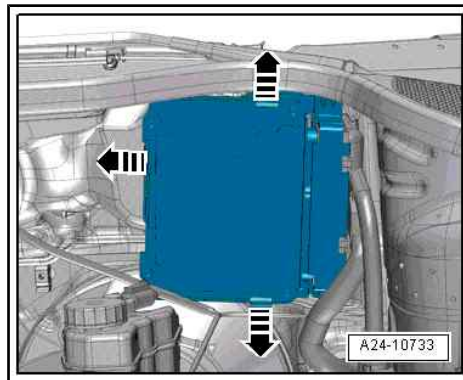
- ☐ Fitting location ⇒ [page 391](#)





### Fitting location of engine control unit - J623-

- ◆ At plenum chamber bulkhead on left



### Accelerator position sender - G79- and accelerator position sender 2 - G185-

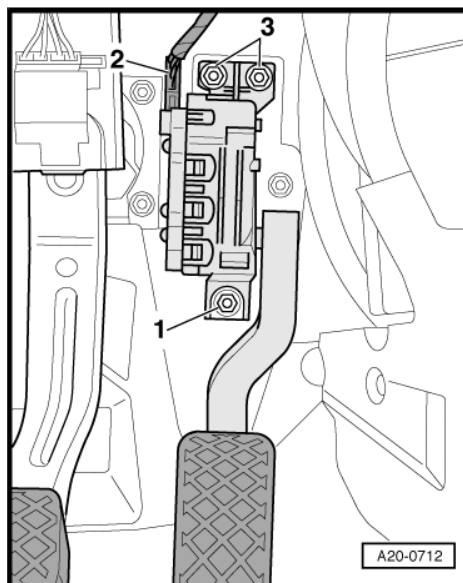
- ◆ In accelerator pedal module.
- 2 - Connector for accelerator pedal module



#### Note

*The accelerator position sender - G79- and accelerator position sender 2 - G185- are integrated in the accelerator pedal module and cannot be renewed individually.*

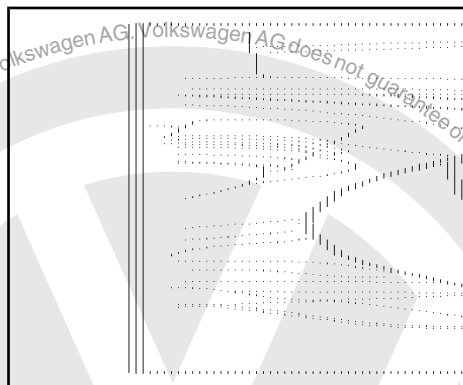
Removing and installing ⇒ Rep. gr. 20 ; Accelerator mechanism;  
Removing and installing accelerator pedal module with accelerator position sender -G79- / -G185-



### Location of brake light switch - F- / brake pedal switch - F47-

- ◆ On main brake cylinder.
- C - Brake light switch - F- / brake pedal switch - F47-

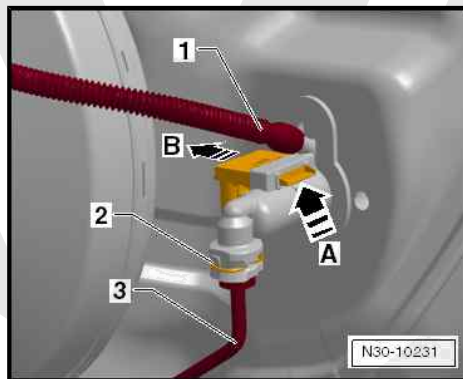
Removing and installing ⇒ Rep. gr. 45 ; Sensors; Removing and installing brake light switch



### Location of clutch position sender - G476-

- ◆ On clutch master cylinder near brake servo

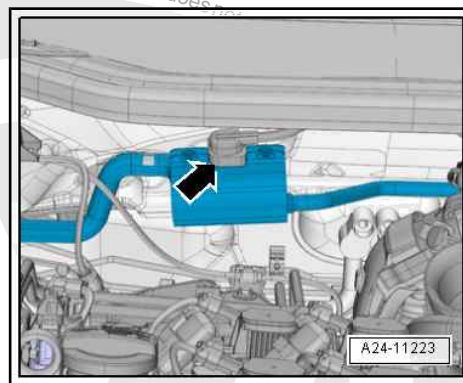
Removing and installing ⇒ Rep. gr. 30 ; Clutch mechanism; Removing and installing clutch position sender - G476-





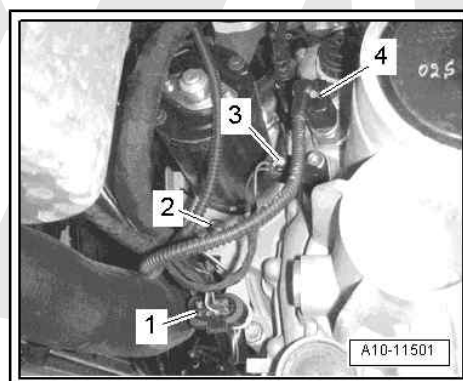
#### Fitting location of brake servo pressure sensor - G294-

- ◆ At plenum chamber partition panel -arrow-



#### Fitting location of gearbox neutral position sender - G701-

- ◆ On gearbox (front left)
- 3 - Electrical connector for gearbox neutral position sender - G701-
- 4 - Electrical connector for reversing light switch - F4-



### 1.1.2 Overview of fitting locations - engine compartment, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran





**1 - Charge air pressure sender - GX26-**

Consisting of:

- ◆ Charge pressure sender - G31-
- ◆ Intake air temperature sender - G42-

**2 - Lambda probe 1 before catalytic converter - GX10-**

Consisting of:

- ◆ Lambda probe - G39-
- ◆ Lambda probe heater - Z19-

- Assembly overview  
⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)

**3 - Lambda probe 1 after catalytic converter - GX7-**

Consisting of:

- ◆ Lambda probe after catalytic converter - G130-
- ◆ Lambda probe 1 heater after catalytic converter - Z29-

- Assembly overview  
⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)

**4 - Vacuum sender - G608-**

- Fitting location  
⇒ [page 394](#)

**5 - Accelerator position sender - G79- / accelerator position sender 2 - G185- .**

- Fitting location ⇒ [page 390](#)

**6 - Clutch position sender - G476-**

- Fitting location ⇒ [page 393](#)

**7 - Engine control unit - J623-**

- Removing and installing ⇒ ["6.2 Removing and installing engine \(motor\) control unit J623", page 440](#)

**8 - Radiator outlet coolant temperature sender - G83-**

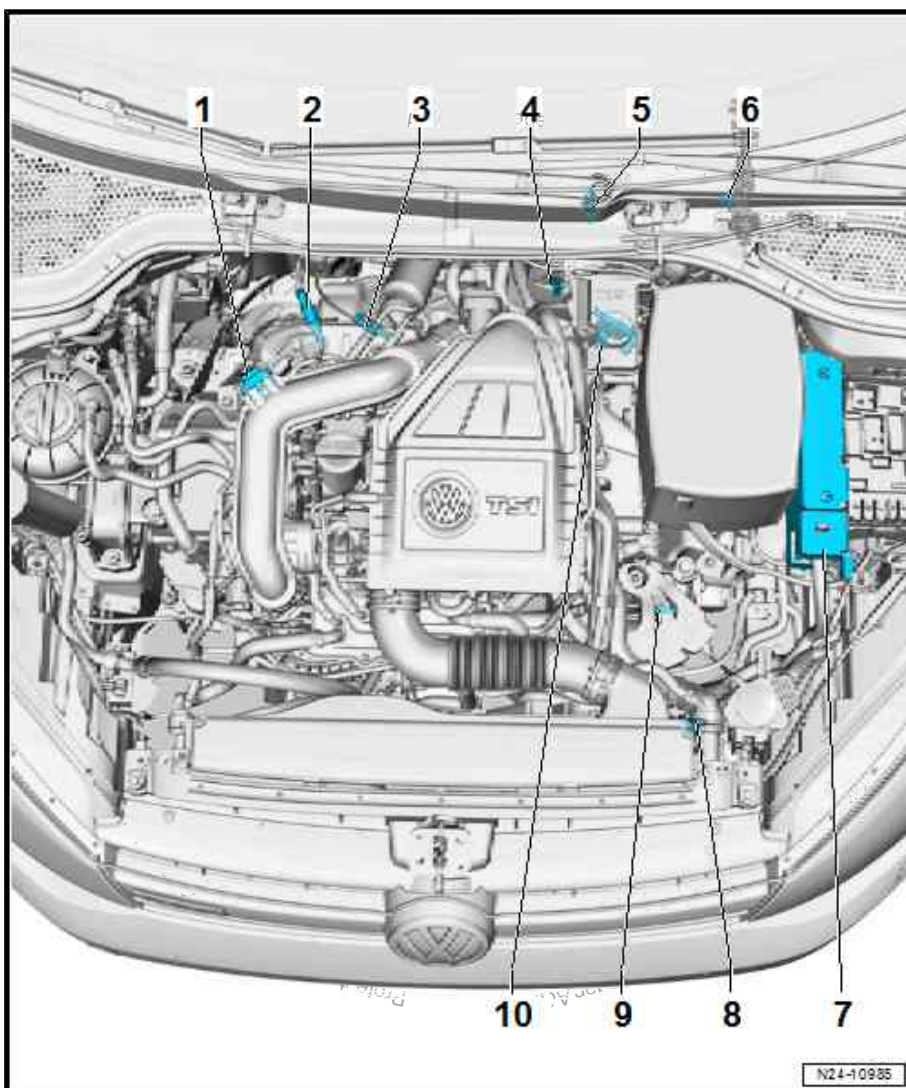
- Assembly overview ⇒ ["2.3 Assembly overview - coolant temperature sender", page 296](#)

**9 - Gearbox neutral position sender - G701- / reversing light switch - F4-**

- Fitting location ⇒ [page 391](#)

**10 - Brake light switch - F- / brake pedal switch - F47-**

- Fitting location ⇒ [page 390](#)

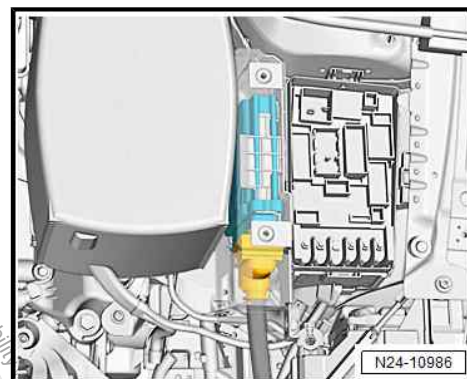






### Fitting location of engine control unit - J623-

- ◆ Between battery and fuse carrier on left in engine compartment



### Fitting location -A- of accelerator position sender - G79- and accelerator position sender 2 - G185-

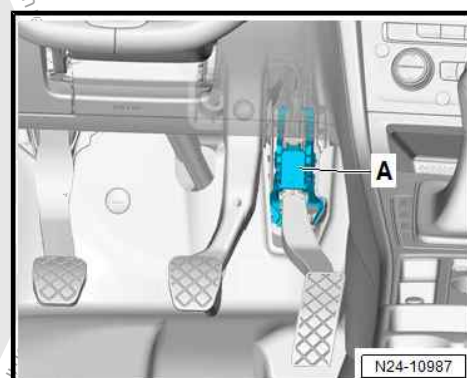
- ◆ In accelerator pedal module.



#### Note

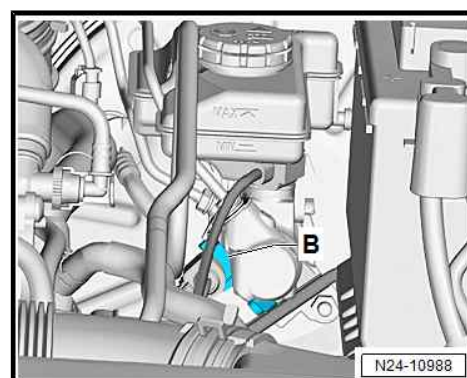
*The accelerator position sender - G79- and accelerator position sender 2 - G185- are integrated in the accelerator pedal module and cannot be renewed individually.*

- Removing and installing accelerator position sender 2 - G79- and accelerator position sender - G185- -A- ⇒ Rep. gr. 20 ; Accelerator mechanism; Removing and installing accelerator pedal module with accelerator position sender -G79- / -G185-



### Fitting location -B- of brake light switch - F- / brake pedal switch - F47-

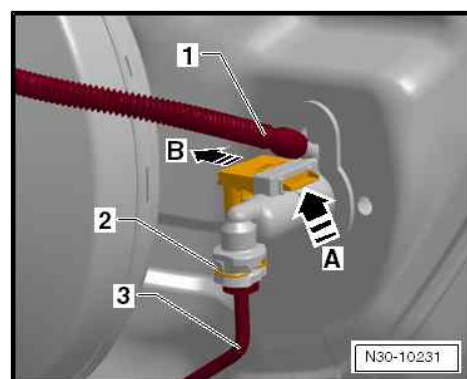
- ◆ On main brake cylinder.
- Removing and installing brake light switch - F- / brake pedal switch - F47- -B-. ⇒ Rep. gr. 45 ; Sensors; Removing and installing brake light switch



### Location of clutch position sender - G476-

- ◆ On clutch master cylinder near brake servo

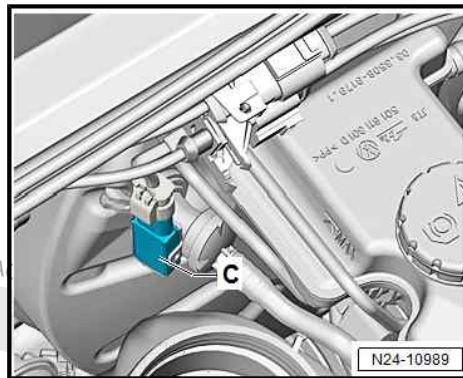
Removing and installing ⇒ Rep. gr. 30 ; Clutch mechanism; Removing and installing clutch position sender - G476-





#### Fitting location of vacuum sender - G608- -C-

- ◆ On brake servo

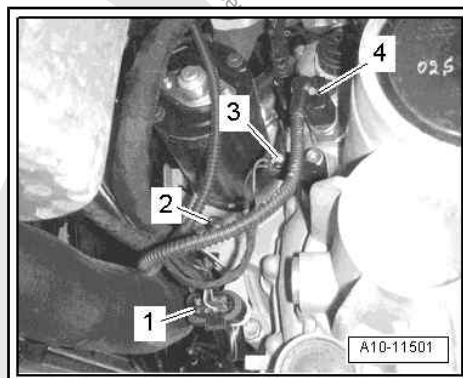


#### Fitting location of gearbox neutral position sender - G701-

- ◆ On gearbox (front left)

3 - Electrical connector for gearbox neutral position sender - G701-

4 - Electrical connector for reversing light switch - F4-



### 1.1.3 Overview of fitting locations - engine compartment, up!



# 1 - Ethanol concentration sender - G708-

## 2 - Charge air pressure sender - GX26-

Consisting of:

- ◆ Charge pressure sender - G31-
- ◆ Intake air temperature sender - G42-
- ◆ Removing and installing  
⇒ ["2.3 Removing and installing charge pressure sender GX26", page 383](#)

## 3 - Lambda probe 1 after catalytic converter - GX7-

Consisting of:

- ◆ Lambda probe after catalytic converter - G130-
- ◆ Lambda probe 1 heater after catalytic converter - Z29-
- Assembly overview  
⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)
- Removing and installing  
⇒ ["8.2 Removing and installing Lambda probe", page 454](#)

## 4 - Lambda probe 1 before catalytic converter - GX10-

Consisting of:

- ◆ Lambda probe - G39-
- ◆ Lambda probe heater - Z19-
- Assembly overview ⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)
- Removing and installing ⇒ ["8.2 Removing and installing Lambda probe", page 454](#)

## 5 - Gas pedal module - GX2-

□ Consisting of:

Acceleration pedal position sender - G79-

Accelerator position sender 2 - G185-

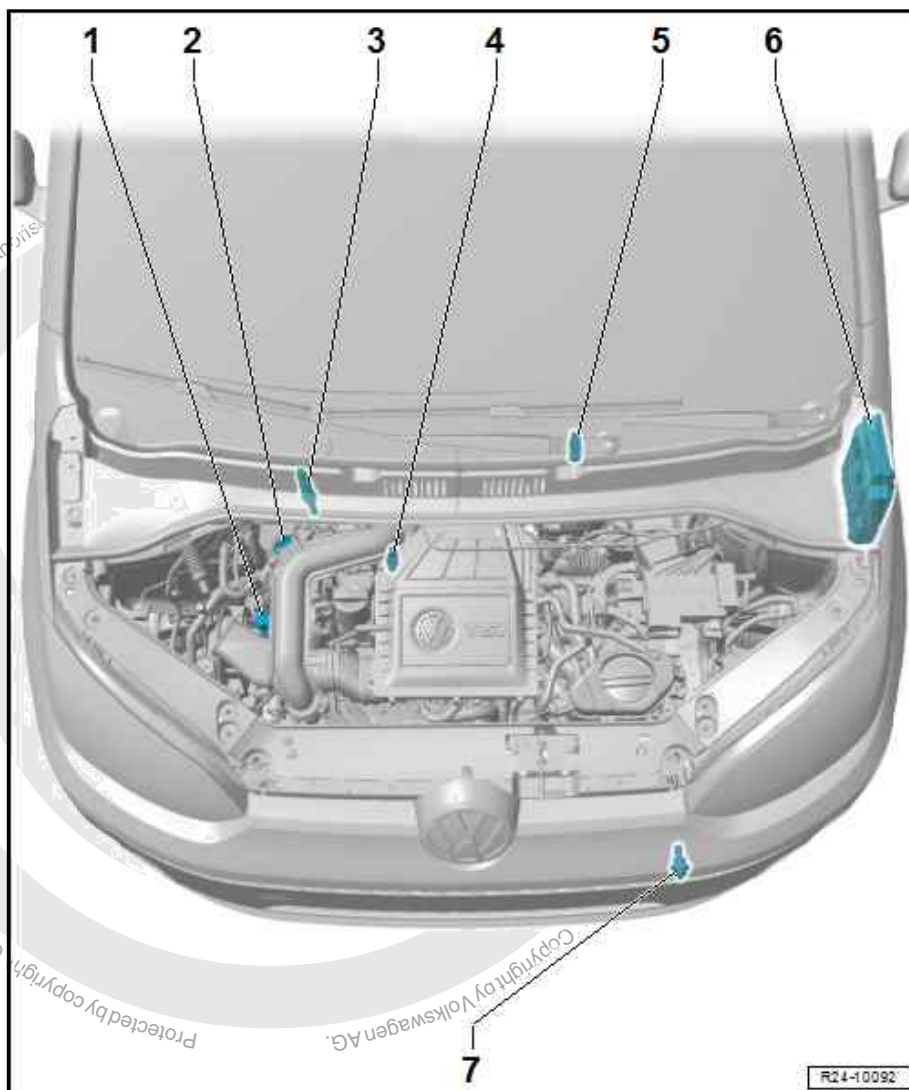
- The accelerator position senders are integrated in the accelerator pedal module and cannot be renewed individually
- Assembly overview - ⇒ Rep. gr. 20 ; Accelerator mechanism; Assembly overview - accelerator pedal module
- Removing and installing ⇒ Rep. gr. 20 ; Accelerator mechanism; Removing and installing accelerator module

## 6 - Engine control unit - J623-

- Assembly overview - ⇒ ["6.1.2 Assembly overview - engine control unit, up!", page 438](#)
- Removing and installing ⇒ ["6.2.2 Removing and installing engine control unit J623 , up!", page 441](#)

## 7 - Radiator outlet coolant temperature sender - G83-

- Assembly overview - ⇒ ["2.3 Assembly overview - coolant temperature sender", page 296](#)





- ❑ Removing and installing  
⇒ [“2.9.3 Removing and installing radiator outlet coolant temperature sender G83 , up!”](#), page 313

## 1.1.4 Overview of fitting locations on engine (from above)

### 1 - Inlet camshaft control valve 1 - N205-

- ❑ Assembly overview  
⇒ [“3.1 Assembly overview - valve gear”](#), page 216

### 2 - Exhaust camshaft control valve 1 - N318-

- ❑ Assembly overview  
⇒ [“3.1 Assembly overview - valve gear”](#), page 216

### 3 - Activated charcoal filter solenoid valve 1 - N80-

### 4 - Ignition coil 1 with output stage - N70-

- ❑ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”](#), page 493

### 5 - Ignition coil 2 with output stage - N127-

- ❑ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”](#), page 493

### 6 - Ignition coil 3 with output stage - N291-

- ❑ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”](#), page 493

### 7 - Hall sender 3 - G300-

- ❑ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”](#), page 493

### 8 - Hall sender - G40- (camshaft position sensor)

- ❑ Assembly overview ⇒ [“1.1 Assembly overview - ignition system”](#), page 493

### 9 - Fuel metering valve - N290-

- ❑ Assembly overview ⇒ [“7.1 Assembly overview - high-pressure pump”](#), page 449

### 10 - Injector, cylinder 3 - N32-

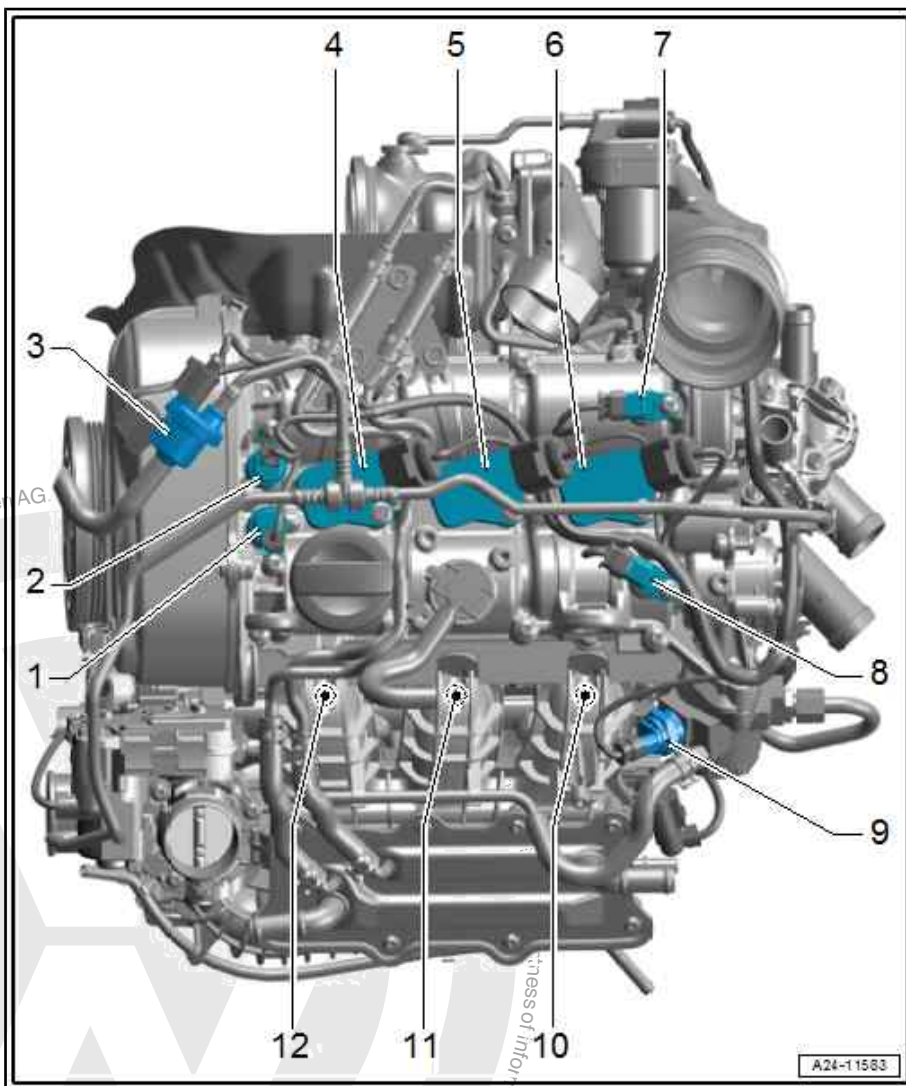
- ❑ Assembly overview ⇒ [“2.1 Assembly overview - fuel rail with injectors”](#), page 400

### 11 - Injector, cylinder 2 - N31-

- ❑ Assembly overview ⇒ [“2.1 Assembly overview - fuel rail with injectors”](#), page 400

### 12 - Injector, cylinder 1 - N30-

- ❑ Assembly overview ⇒ [“2.1 Assembly overview - fuel rail with injectors”](#), page 400





## 1.1.5 Overview of fitting locations - engine from above, with particulate filter

### 1 - Inlet camshaft control valve 1 - N205-

- ☐ Assembly overview  
⇒ [“3.1 Assembly overview - valve gear”, page 216](#)

### 2 - Exhaust camshaft control valve 1 - N318-

- ☐ Assembly overview  
⇒ [“3.1 Assembly overview - valve gear”, page 216](#)

### 3 - Activated charcoal filter solenoid valve 1 - N80-

### 4 - Ignition coil 1 with output stage - N70-

- ☐ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

### 5 - Exhaust gas pressure sensor 1 - G450-

- ☐ Assembly overview  
⇒ [“1.2 Assembly overview - camshaft housing”, page 173](#)

### 6 - Ignition coil 2 with output stage - N127-

- ☐ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

### 7 - Ignition coil 3 with output stage - N291-

- ☐ Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

### 8 - Hall sender 3 - G300-

- ☐ Assembly overview ⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

### 9 - Hall sender - G40- (camshaft position sensor)

- ☐ Assembly overview ⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

### 10 - Fuel metering valve - N290-

- ☐ Assembly overview ⇒ [“7.1 Assembly overview - high-pressure pump”, page 449](#)

### 11 - Injector, cylinder 3 - N32-

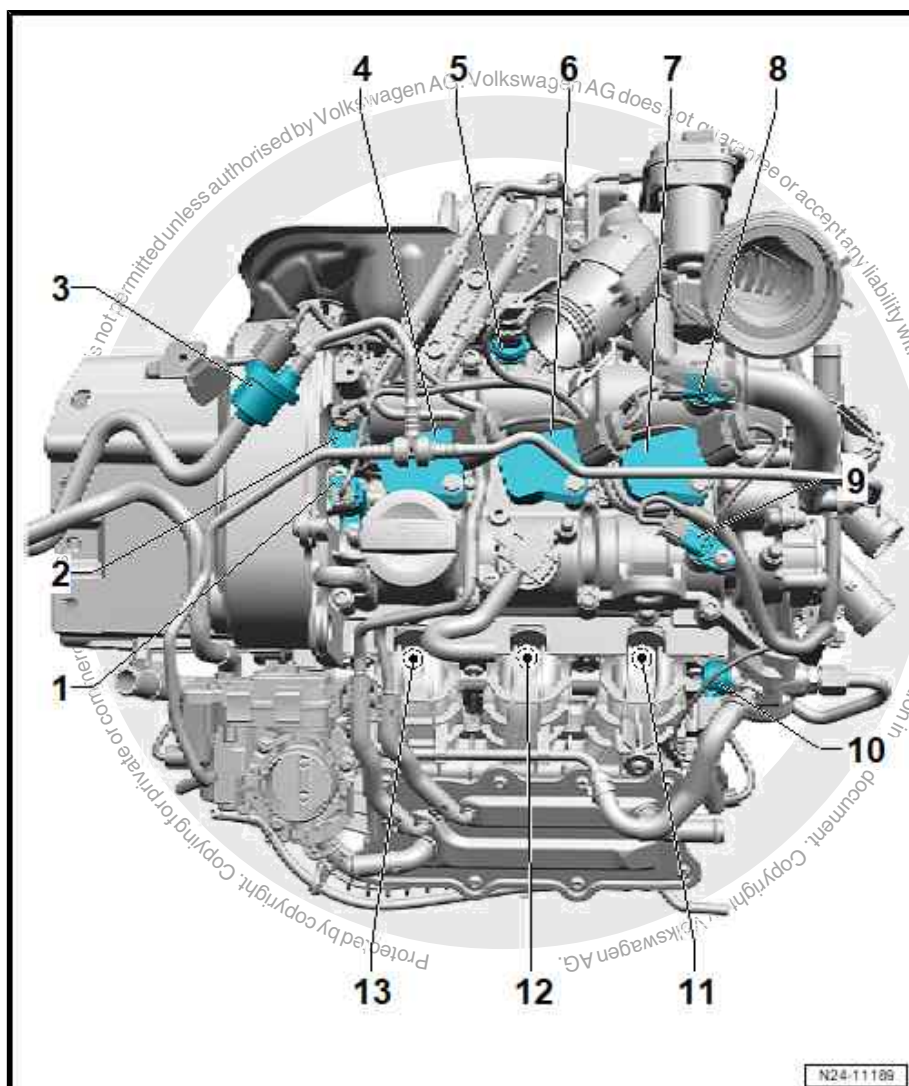
- ☐ Assembly overview ⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)

### 12 - Injector, cylinder 2 - N31-

- ☐ Assembly overview ⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)

### 13 - Injector, cylinder 1 - N30-

- ☐ Assembly overview ⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)



N24-11189





## 1.1.6 Overview of fitting locations – engine, rear

### 1 - Oil level and oil temperature sender - G266-

- Assembly overview  
⇒ [“1.1 Assembly overview - sump/oil pump”, page 246](#)

### 2 - Knock sensor 1 - G61-

- Assembly overview  
⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

### 3 - Radiator outlet coolant - G62-

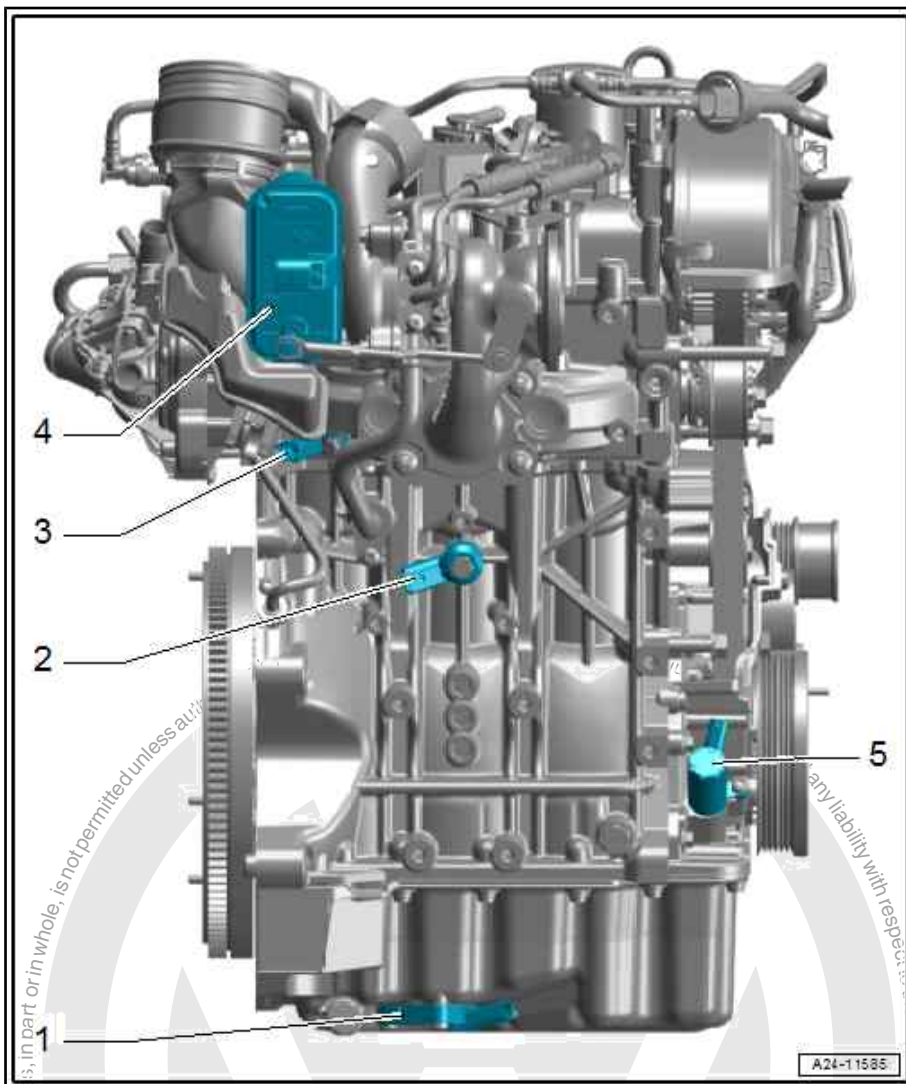
- Assembly overview  
⇒ [“2.3 Assembly overview - coolant temperature sender”, page 296](#)

### 4 - Charge air pressure controller - V465-

- Assembly overview  
⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)

### 5 - Valve for oil pressure control - N428-

- Assembly overview  
⇒ [“4.1 Assembly overview - oil filter/oil pressure switch”, page 263](#)



## 1.1.7 Overview of fitting locations – engine, front

### 1 - Oil pressure sender - G10-

- Assembly overview  
⇒ [“4.1 Assembly overview - oil filter/oil pressure switch”, page 263](#)

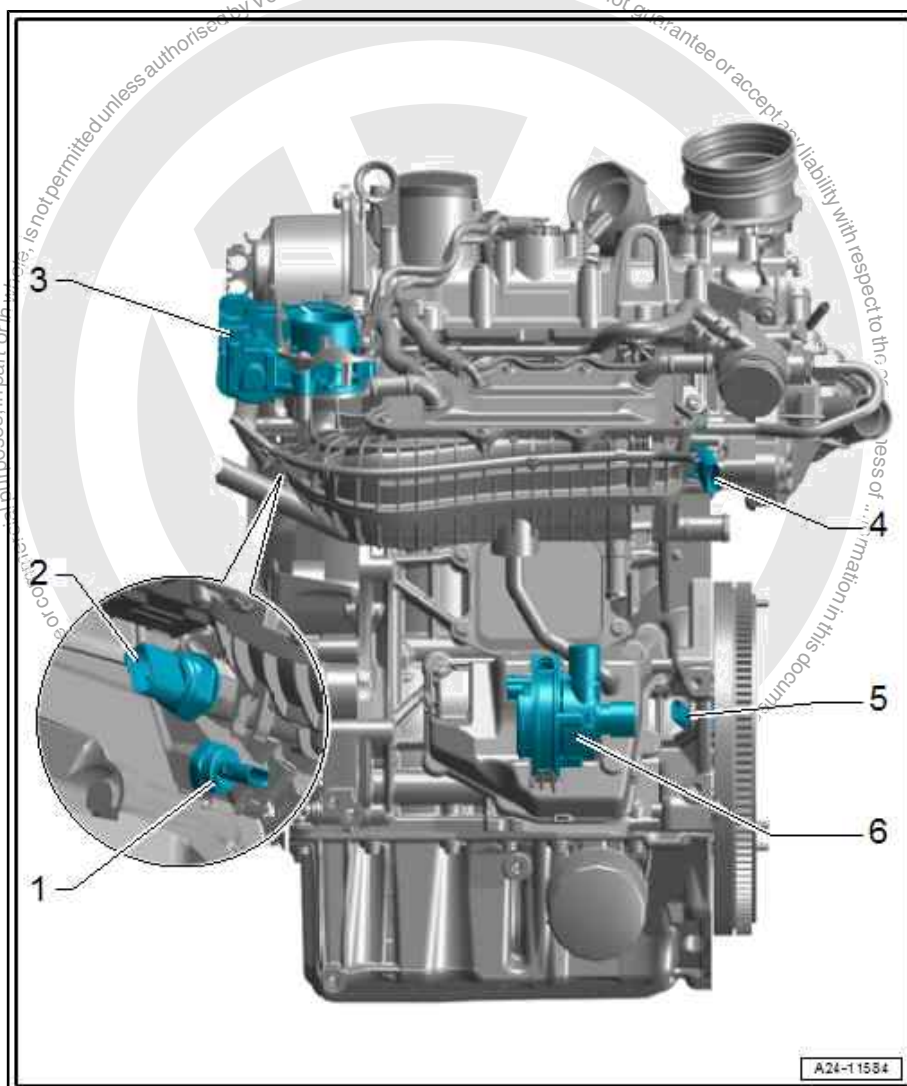
### 2 - Fuel pressure sender - G247-

- Assembly overview  
⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)

### 3 - Throttle valve module - GX3-

Consisting of:

- ◆ Throttle valve module - J338-
- ◆ Throttle valve drive for electronic power control - G186-
- ◆ Throttle valve drive angle sender 1 for electronic power control - G187-
- ◆ Throttle valve drive angle sender 2 for electronic power control - G188-
- ◆ Removing and installing  
⇒ [“4.3 Removing and installing throttle valve module GX3”, page 428](#)
- ◆ Cleaning  
⇒ [“4.4 Cleaning throttle valve module GX3”, page 429](#)
- ◆ Assembly overview  
⇒ [“4.1 Assembly overview - intake manifold”, page 421](#)



### 4 - Intake manifold sender - GX9-

Consisting of:

- ◆ Intake air temperature sender 2 - G299-
- ◆ Intake manifold pressure sender - G71-
- ◆ Assembly overview ⇒ [“4.1 Assembly overview - intake manifold”, page 421](#)

### 5 - Engine speed sender - G28-

- Assembly overview ⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

### 6 - Charge air cooling pump - V188-

- Assembly overview ⇒ [“2.2 Assembly overview - electric coolant pump”, page 294](#)



## 2 Injectors

⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)

⇒ [“2.2 Removing and installing fuel rail”, page 402](#)

⇒ [“2.3 Removing and installing injectors”, page 403](#)

⇒ [“2.4 Cleaning injectors”, page 408](#)

### 2.1 Assembly overview - fuel rail with injectors

Version 1

#### 1 - Fuel distributor

- ❑ Removing and installing  
⇒ [“2.2 Removing and installing fuel rail”, page 402](#)

#### 2 - Bolt

- ❑ Renew after removal
- ❑ 8 Nm +90°

#### 3 - Fuel pressure sender - G247-

- ❑ Checking  
⇒ [“5.3 Checking fuel pressure sender G247”, page 433](#)
- ❑ Removing and installing  
⇒ [“5.2 Removing and installing fuel pressure sender G247”, page 432](#)
- ❑ Moisten taper and thread with clean engine oil
- ❑ 22 Nm

#### 4 - Support ring

- ❑ Renew after removal
- ❑ Fuel rail exerts force which secures injector in cylinder head via this support ring
- ❑ Clipped to -item 7-

#### 5 - O-ring

- ❑ Renew after removal
- ❑ Lubricate with clean engine oil

#### 6 - Spacer ring

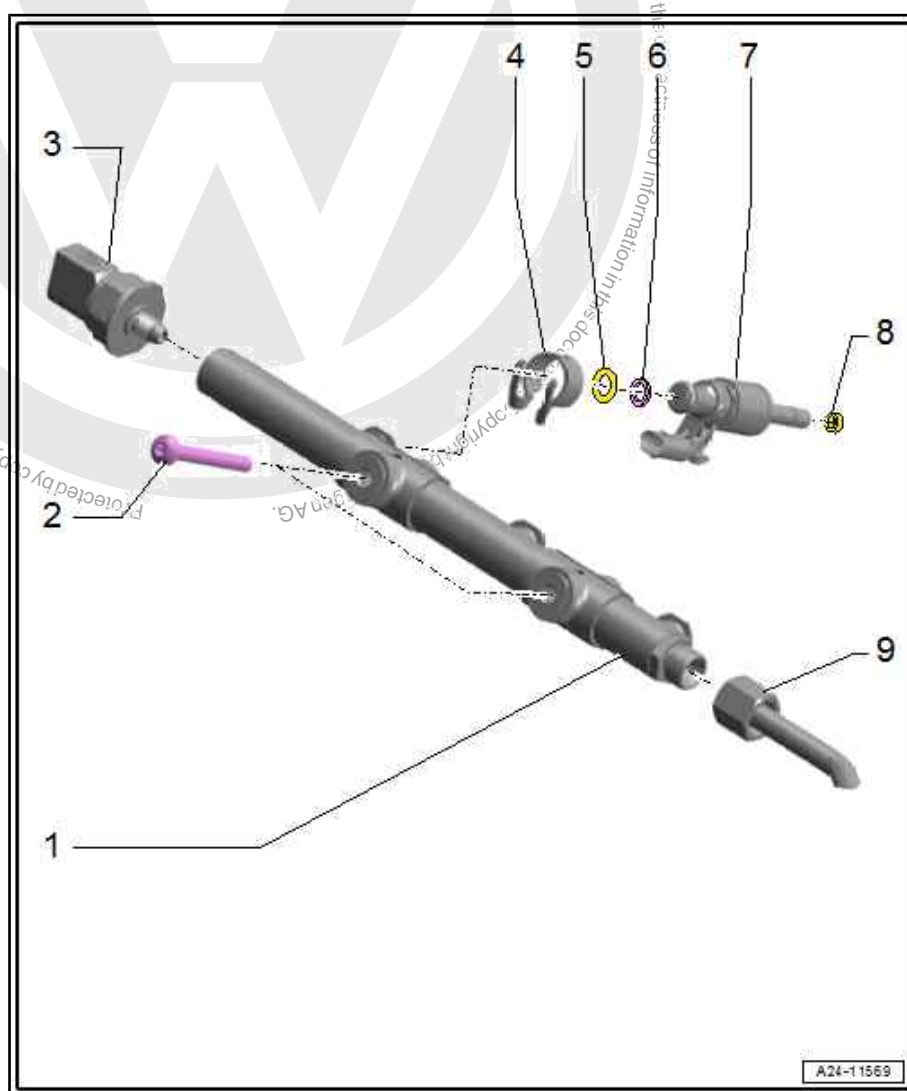
- ❑ Renew if damaged

#### 7 - Injection valve

- ❑ Removing and installing ⇒ [“2.3 Removing and installing injectors”, page 403](#)

#### 8 - Combustion chamber seal

- ❑ Do not treat with grease or other lubricant.
- ❑ Renewing ⇒ [“2.3 Removing and installing injectors”, page 403](#)





## 9 - High-pressure pipe

- ☐ Does not need to be replaced
- ☐ Before installing used high-pressure pipes, check thoroughly for leaks
- ☐ Do not alter shape.
- ☐ Removing and installing ⇒ [“7.3 Removing and installing high-pressure pipe”, page 451](#)
- ☐ Lubricate thread of union nuts with clean engine oil
- ☐ 16 Nm +45°

## Version 2

### 1 - Fuel distributor

- ☐ Removing and installing  
⇒ [“2.2 Removing and installing fuel rail”, page 402](#)

### 2 - Bolt

- ☐ Renew after removal
- ☐ 8 Nm +90°

### 3 - Fuel pressure sender - G247-

- ☐ Checking  
⇒ [“5.3 Checking fuel pressure sender G247”, page 433](#)
- ☐ Removing and installing  
⇒ [“5.2 Removing and installing fuel pressure sender G247”, page 432](#)
- ☐ Moisten taper and thread with clean engine oil
- ☐ 22 Nm

### 4 - Support ring

- ☐ Renew after removal
- ☐ Fuel rail exerts force which secures injector in cylinder head via this support ring
- ☐ Clipped to -item 7-

### 5 - O-ring

- ☐ Renew after removal
- ☐ Lubricate with clean engine oil

### 6 - Spacer ring

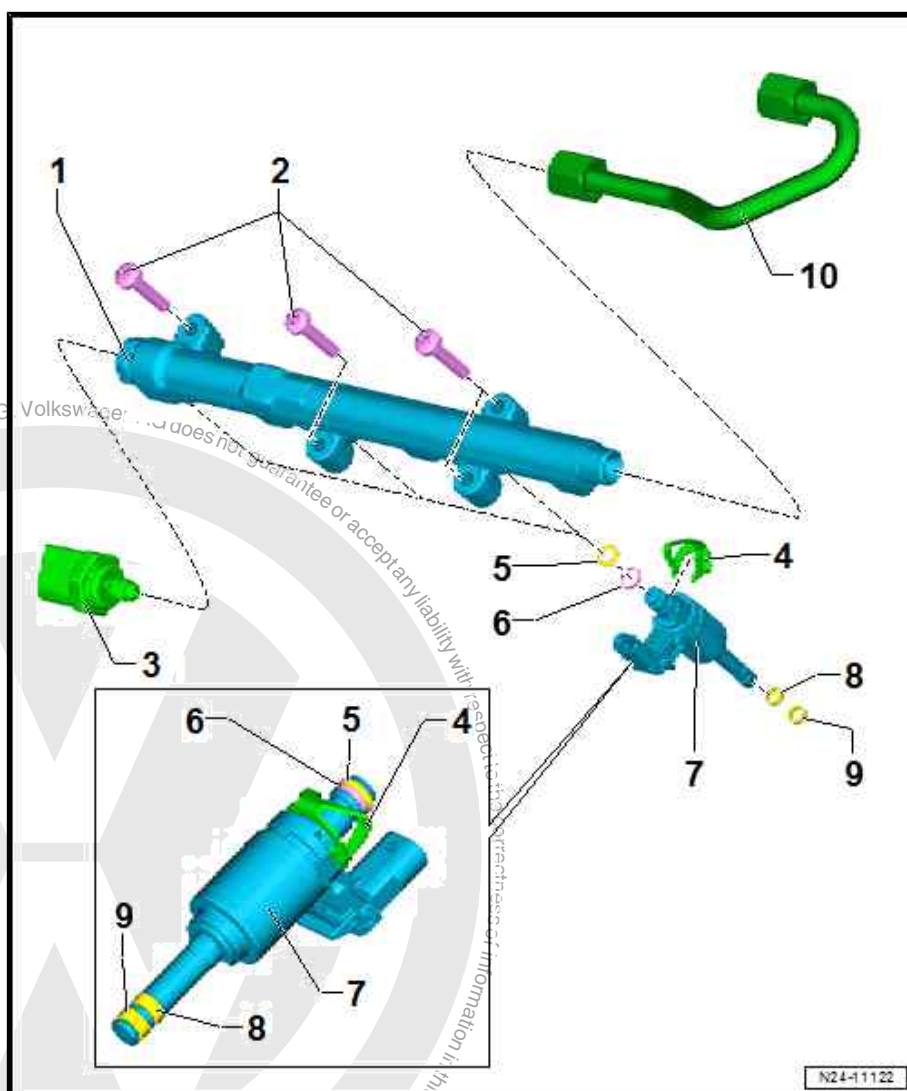
- ☐ Renew after removal

### 7 - Injection valve

- ☐ Removing and installing ⇒ [“2.3 Removing and installing injectors”, page 403](#)

### 8 - Combustion chamber seal

- ☐ Do not treat with grease or other lubricant.
- ☐ Renew after removal ⇒ [“2.3 Removing and installing injectors”, page 403](#)





## 9 - Combustion chamber seal

- ☐ Installed depending on model
- ☐ Do not treat with grease or other lubricant.
- ☐ Renew after removal ⇒ ["2.3 Removing and installing injectors", page 403](#)

## 10 - High-pressure pipe

- ☐ Does not need to be replaced
- ☐ Before installing used high-pressure pipes, check thoroughly for leaks
- ☐ Do not alter shape.
- ☐ Removing and installing ⇒ ["7.3 Removing and installing high-pressure pipe", page 451](#)
- ☐ 16 Nm +45°

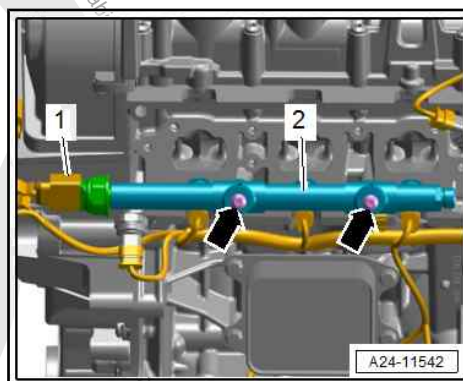
## 2.2 Removing and installing fuel rail

### Removing

- Remove intake manifold  
⇒ ["4.2 Removing and installing intake manifold", page 422](#)
- Remove high-pressure pipe  
⇒ ["7.3 Removing and installing high-pressure pipe", page 451](#) .
- Seal line so that fuel system is not contaminated by dirt.

### Version 1

- Disconnect electrical connector -1-.
- Unscrew bolts -arrows-, and carefully pull fuel rail -2- off injectors.







## Version 2

- Disconnect electrical connector -arrows-.
- Unscrew bolts -2- and carefully pull off fuel rail -1- from injectors.

## Installing

Install in reverse order of removal, observing the following:



### Note

Renew O-ring ⇒ [Item 5 \(page 400\)](#) .

- Apply mountings on fuel rail onto injectors.
- Press fuel rail onto injectors as far as stop (first on right side, then on left side).
- Press down fuel rail evenly and insert bolts 2 threads deep.
- Tighten bolts to specified torque.
- Install high-pressure pipe  
⇒ [“7.3 Removing and installing high-pressure pipe”, page 451](#) .

Install intake manifold

⇒ [“4.2 Removing and installing intake manifold”, page 422](#) .

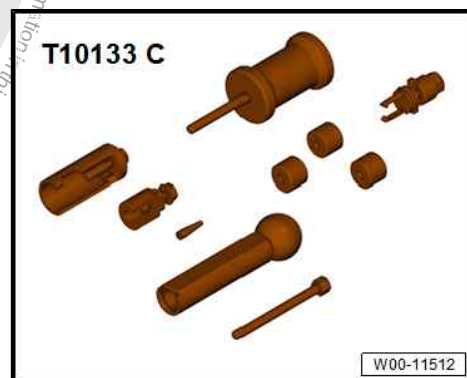
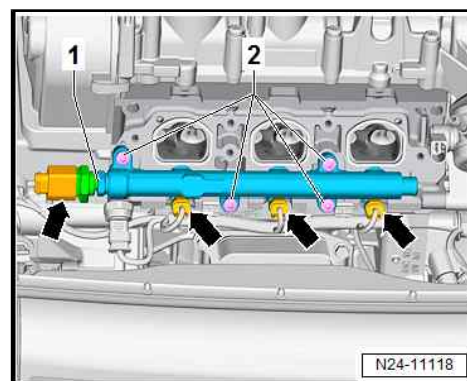
## Specified torques

- ◆ ⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)

## 2.3 Removing and installing injectors

### Special tools and workshop equipment required

- ◆ Tool set for FSI engines - T10133 C- with -T10133/16A- and T10133/19-



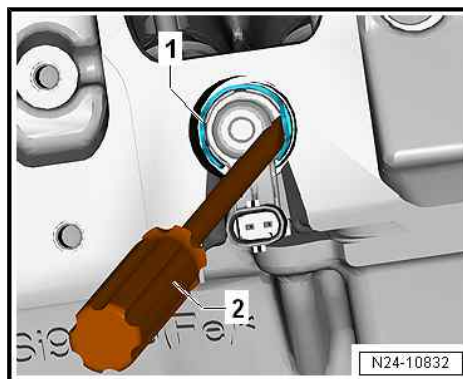
### Note

*Injectors must only be removed when the engine is cold.*

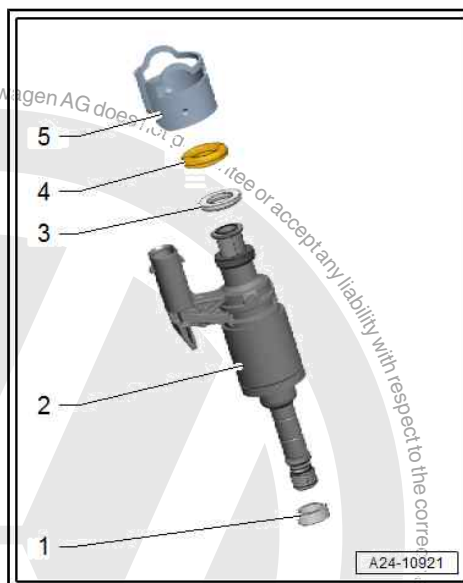


## Removing

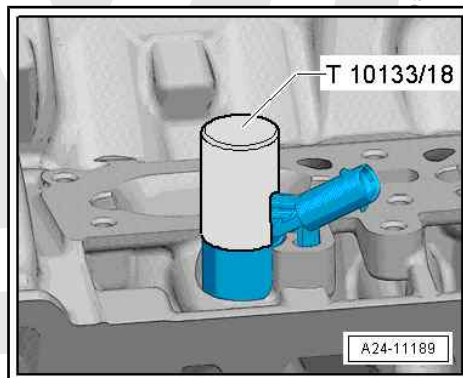
- Removing fuel rail  
⇒ ["2.2 Removing and installing fuel rail", page 402](#) .
- Unplug electrical connector from corresponding injector.
- Lever support ring -1- off injector using a screwdriver -2-.



- Remove O-ring -4- from injector -2-.



- Fit impact sleeve -T10133/18- over injector.



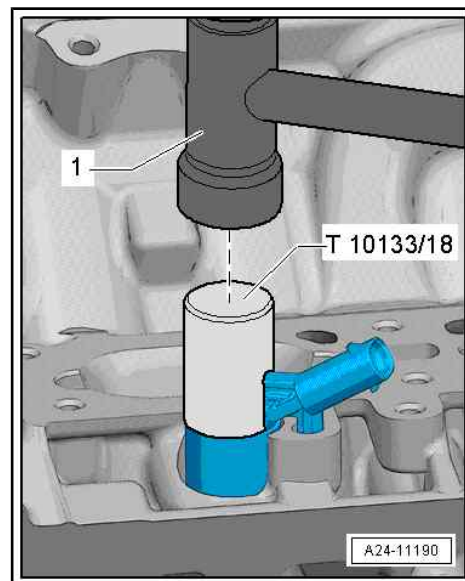


- Carefully loosen injector with light blows of a plastic hammer -1- onto impact sleeve.



#### Note

- ◆ Use a torque wrench to pull out the injector.
- ◆ Set the torque wrench to 5 Nm.
- ◆ If the torque limit is exceeded, the injector may become damaged.

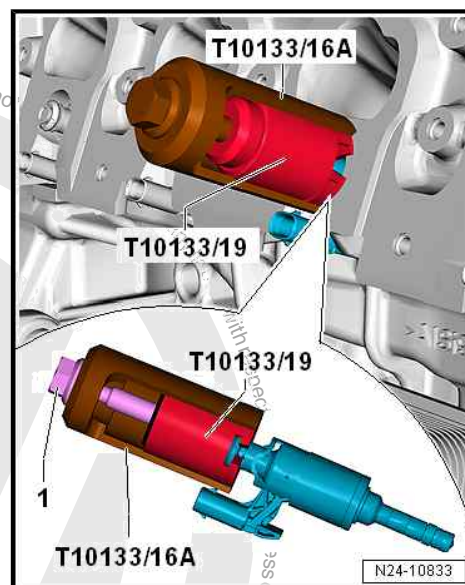


- Fit puller -T10133/19- to groove on injector.
- Fit removing tool -T10133/16A- to puller.
- Pull out injector by screwing in bolt -1- on puller.
- If the torque limit of »5 Nm« has been reached and the injector still can't be pulled out, remove the puller.
- Use the impact sleeve again to loosen the injector.
- Repeat the procedure on each injector.



#### Note

*The combustion chamber ring seal must always be renewed prior to reinstalling the injector.*





### Dismantling injectors:

- Pull support ring -5- and spacer ring -3- off injector -2-.
- Carefully remove old combustion chamber seal -1-. To do so, cut the ring open using a knife, or spread it with a small screwdriver, and pull it off towards front.



#### Note

*Take care not to damage the groove of injector. The injector must be renewed if the groove is damaged.*

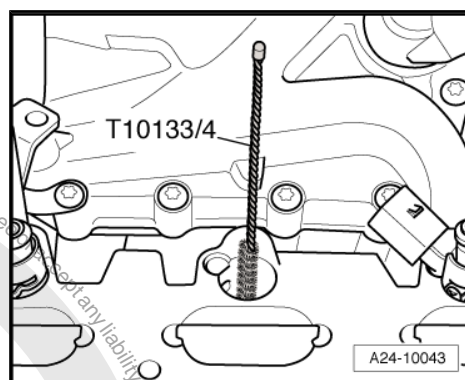
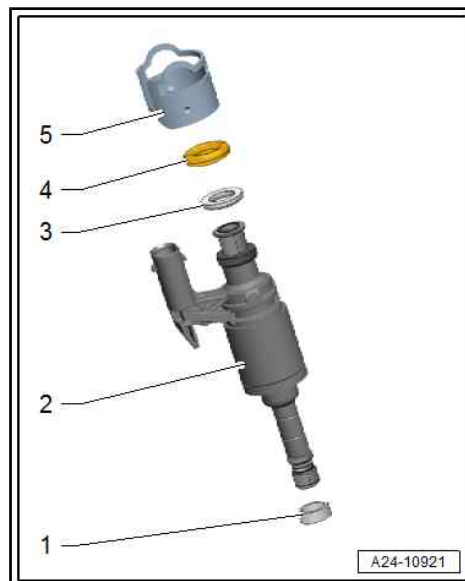
### Installing



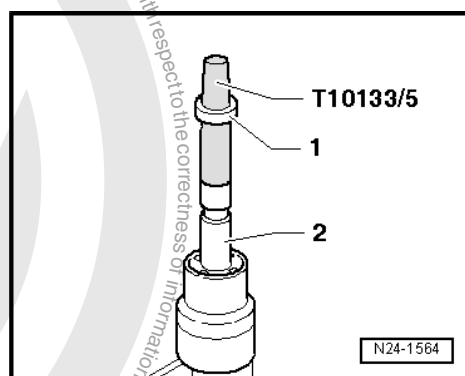
#### Note

- ◆ Use the entire repair kit when installing.
- ◆ Renew support rings after each removal.
- ◆ Renew combustion chamber seal before reinstalling the injector.
- ◆ Lightly lubricate the new O-rings for injectors with clean engine oil.
- ◆ Renew spacer ring if damaged.

- Clean hole in cylinder head using nylon brush -T10133/4- .
- When reinstalling the injector, remove any combustion residue from groove for combustion chamber ring seal and from injector shaft using a clean cloth.

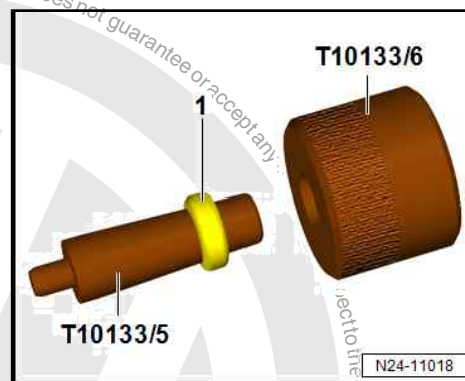


- Fit assembly cone -T10133/5- with a new combustion chamber seal -1- on injector -2-.

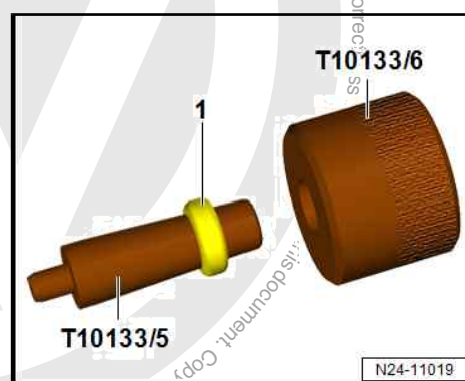




- Slide combustion chamber seal with assembly sleeve - T10133/6- onto assembly cone - T10133/5- as far as it will go.

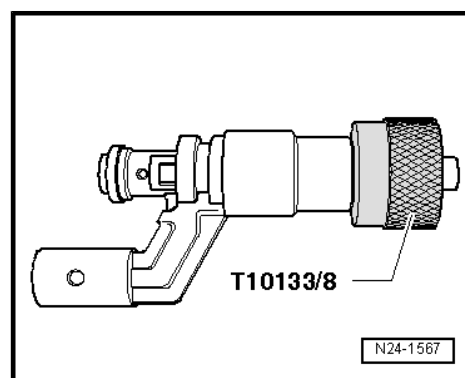
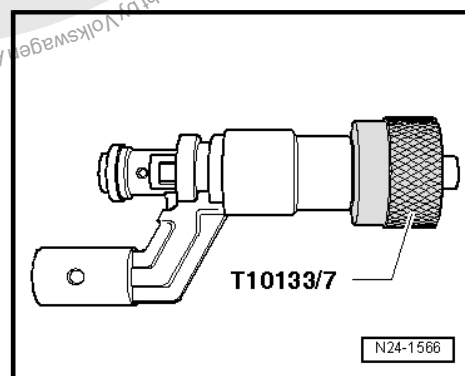


- Turn assembly sleeve - T10133/6- around and push combustion chamber ring seal into the respective groove.



#### Note

- ◆ *The combustion chamber ring seal is widened when it is pushed onto the injector. It must be compressed again after sliding on and this is done in two stages as described below.*
- ◆ *Push calibration sleeve - T10133/7- onto injector as far as stop and simultaneously turn it slightly (approx. 180°).*
- Pull calibration sleeve - T10133/7- off again, turning in opposite direction.
- Push calibration sleeve - T10133/8- onto injector as far as stop and simultaneously turn it slightly (approx. 180°).
- Pull calibration sleeve - T10133/8- off again, turning in opposite direction.







- Before installing injector -2- moisten new O-ring -4- with clean engine oil.

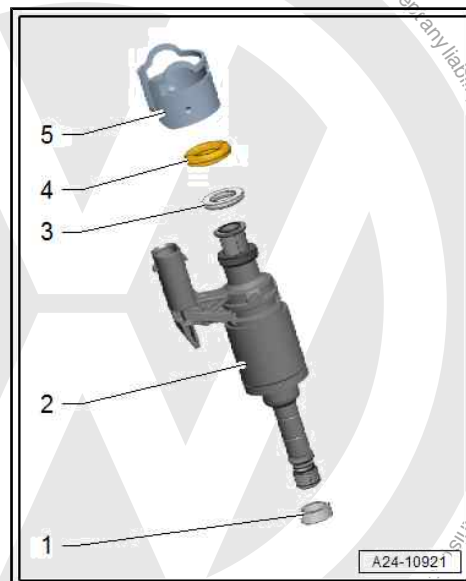


#### Note

*The combustion chamber seal -1- must not be lubricated.*

- Electrical connector of injector must engage in respective recess in cylinder head.
- It should be possible to insert the injector easily. If necessary, wait until the combustion chamber ring seal has contracted sufficiently.
- Push injector by hand as far as it will go into cylinder head bore (free of oil and grease). Ensure injectors are positioned correctly in cylinder head.
- Installing fuel rail  
⇒ ["2.2 Removing and installing fuel rail", page 402](#) .
- After renewing injectors, perform new adaption routine.
- Connect a ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu options on ⇒ Vehicle diagnostic tester:

◆ `0001 - Clear adaption values for injectors`



## 2.4 Cleaning injectors

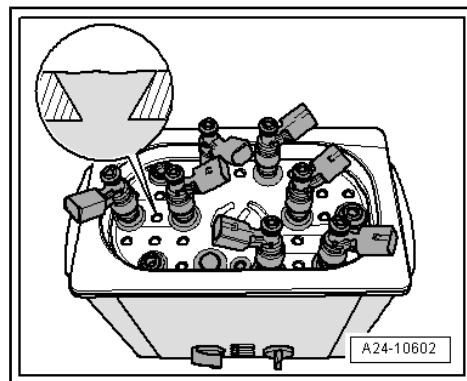
### Special tools and workshop equipment required

- ◆ Ultrasonic cleaning device - VAS 6418-
- ◆ Mounting plate for injection modules - VAS 6418/1-
- ◆ Cleaning fluid ⇒ Electronic Parts Catalogue



#### Note

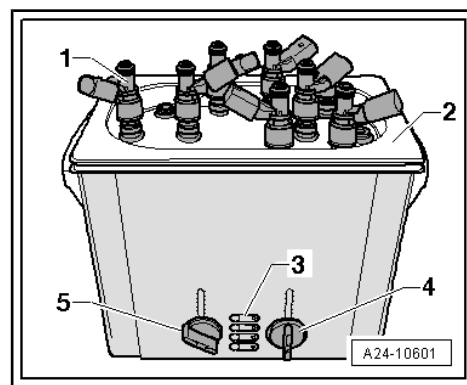
- ◆ *The ultrasonic unit must be filled with cleaning agent to upper edge of holes (see detail).*
- ◆ *Observe ultrasonic unit safety regulations and operating instructions.*





## Cleaning

- Remove injectors  
⇒ [“2.3 Removing and installing injectors”, page 403](#) .
- Insert injectors -1- all the way into mounting plate for injection modules - VAS 6418/1- -item 2-.
- Immerse injectors together with mounting plate for injection modules - VAS 6418/1- into cleaning fluid - VAS 6418/2- .
- Set rotary knob -4- to a temperature of 50°C.
- Set a cleaning time of 30 minutes with the rotating knob -5-.
- Switch on ultrasonic unit with button -3-.



### Note

*The time set starts to elapse as soon as a cleaning temperature of 50°C has been attained.*

- After cleaning, renew combustion chamber ring seal for each injector ⇒ [“2.3 Removing and installing injectors”, page 403](#) .



## 3 Air filter

⇒ ["3.1 Assembly overview - air filter housing", page 410](#)

⇒ ["3.2 Removing and installing air filter housing", page 416](#)

⇒ ["3.3 Removing air duct on lock carrier", page 419](#)

### 3.1 Assembly overview - air filter housing

⇒ ["3.1.1 Assembly overview - air filter housing, Polo 2014 ►", page 410](#)

⇒ ["3.1.2 Assembly overview - air filter housing, Golf, Golf Estate, Golf SV, T-Roc, Touran", page 411](#)

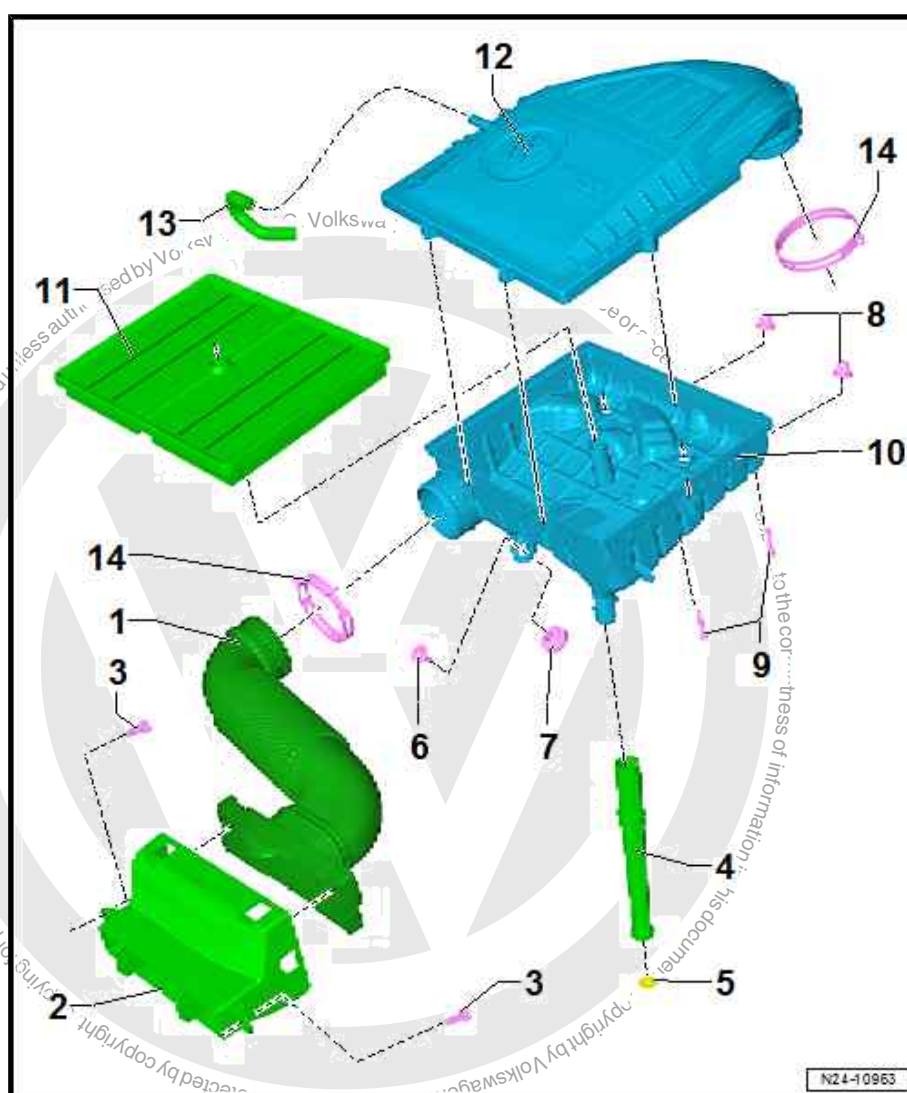
⇒ ["3.1.3 Assembly overview - air filter housing, up!", page 412](#)

⇒ ["3.1.4 Assembly overview - air filter housing, Polo 2018", page 413](#)

⇒ ["3.1.5 Assembly overview - air filter housing, T-Cross", page 415](#)

#### 3.1.1 Assembly overview - air filter housing, Polo 2014 ►

- 1 - Air intake hose
- 2 - Air duct
  - ☐ On lock carrier
- 3 - Bolt
  - ☐ 1.5 Nm
- 4 - Water drain hose
  - ☐ Cleaning
  - ☐ May also be installed on air duct -2-, depending on type and version.
- 5 - Strainer
- 6 - Bolt
  - ☐ 5 Nm
- 7 - Bump stop
  - ☐ Check for damage, and renew if necessary
  - ☐ Check for correct seating after installation
- 8 - Bump stop
  - ☐ Check for damage, and renew if necessary
  - ☐ Check for correct seating after installation
- 9 - Bolt
  - ☐ Qty. 9
  - ☐ 1.5 Nm
- 10 - Air filter lower part
  - ☐ Remove dirt, leaves and salt residues
- 11 - Air filter element
  - ☐ Use only genuine air filter elements ⇒ Electronic Parts Catalogue





- ☐ For change intervals refer to ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance ; Booklet 819

## 12 - Air filter upper part

- ☐ Remove dirt, leaves and salt residues

## 13 - Hose

- ☐ For crankcase ventilation.

## 14 - Clip

- ☐ When installing, ensure correct seating of spring-type clip on chamfer of hose

## 3.1.2 Assembly overview - air filter housing, Golf, Golf Estate, Golf SV, T-Roc, Touran

### 1 - Air filter upper part

- ☐ Remove dirt, leaves and salt residues

### 2 - Clip

- ☐ When installing, ensure correct seating of spring-type clip on chamfer of hose

### 3 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation

### 4 - Air filter lower part

- ☐ Remove dirt, leaves and salt residues

### 5 - Bolt

- ☐ Qty. 9
- ☐ 1.5 Nm

### 6 - Water drain hose

- ☐ Cleaning

### 7 - Strainer

### 8 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation

### 9 - Bolt

- ☐ 5 Nm

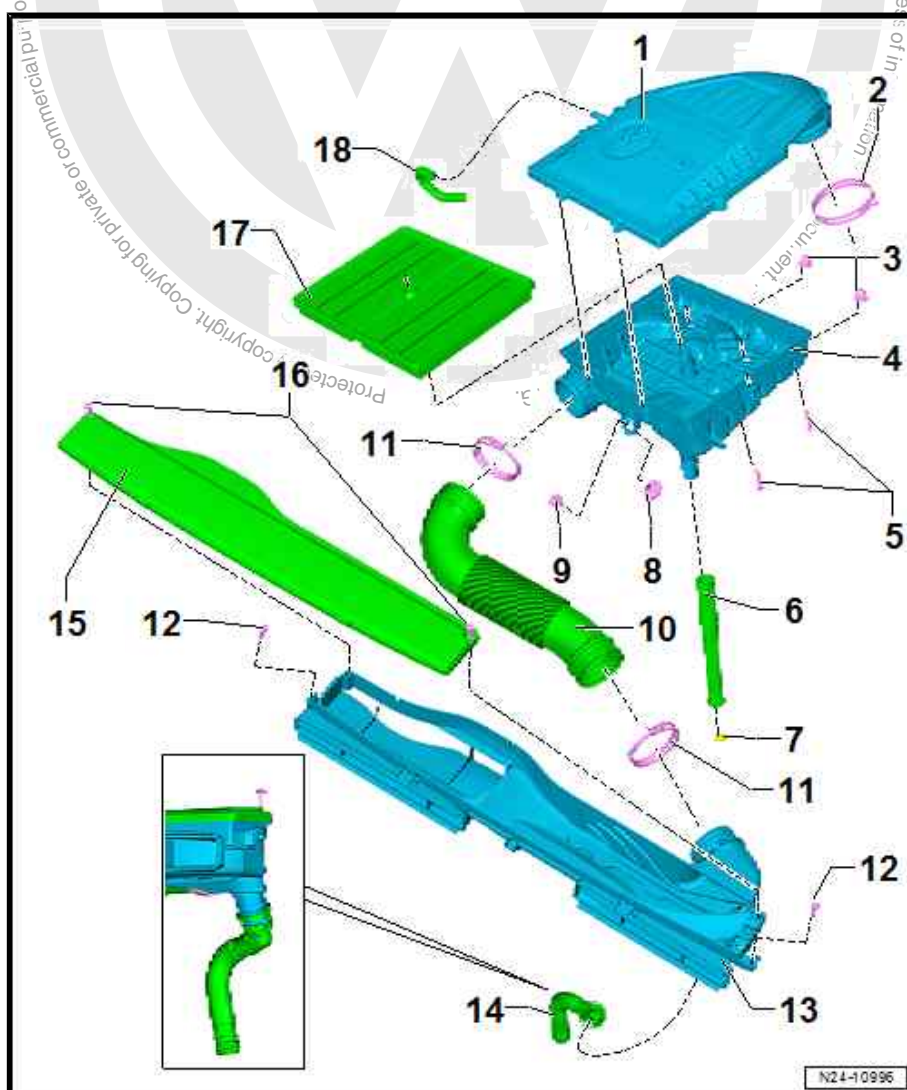
### 10 - Air intake hose

### 11 - Clip

- ☐ When installing, ensure correct seating of spring-type clip on chamfer of hose

### 12 - Bolt

- ☐ Qty. 2
- ☐ 2 Nm



N24-10996





### 13 - Air duct (bottom section)

- ☐ On lock carrier

### 14 - Water drain hose

- ☐ Cleaning

### 15 - Air duct (top section)

- ☐ On lock carrier

### 16 - Bolt

- ☐ Qty. 2
- ☐ 2 Nm

### 17 - Air filter element

- ☐ Use only genuine air filter elements ⇒ Electronic Parts Catalogue
- ☐ For change intervals refer to ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance ; Booklet 819

### 18 - Hose

- ☐ For crankcase ventilation.

## 3.1.3 Assembly overview - air filter housing, up!

### 1 - Air filter upper part

- ☐ Remove dirt, leaves and salt residues

### 2 - Clip

- ☐ When installing, ensure correct seating of spring-type clip on chamfer of hose

### 3 - Air filter element

- ☐ Use only genuine air filter elements ⇒ Electronic Parts Catalogue
- ☐ For change intervals refer to ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance ; Booklet 819

### 4 - Air filter lower part

- ☐ Remove dirt, leaves and salt residues

### 5 - Bolt

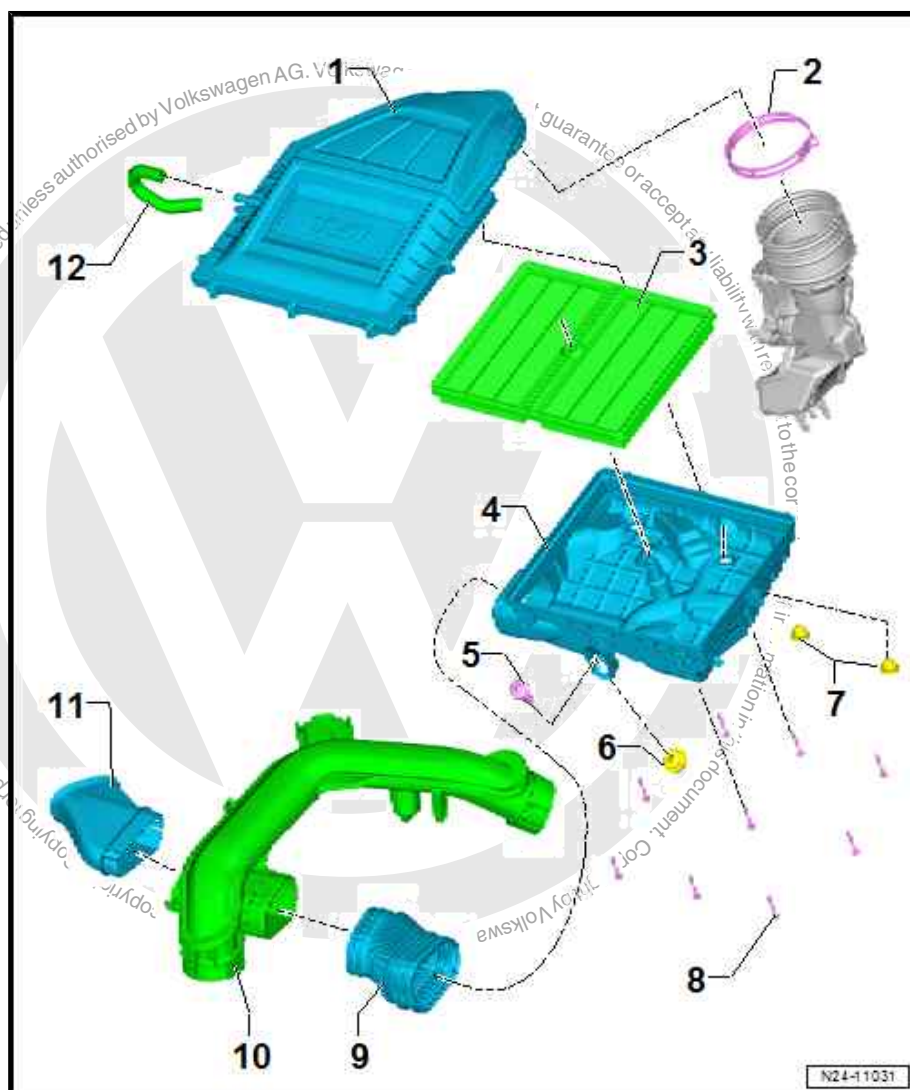
- ☐ 5 Nm

### 6 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation

### 7 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation







#### 8 - Bolt

- ☐ Qty. 9
- ☐ 1.5 Nm

#### 9 - Intake hose

- ☐

#### 10 - Air intake pipe

- ☐ Assembly overview - ➔ ["2.1 Assembly overview - charge air system", page 378](#)
- ☐ Removing and installing ➔ ["2.5 Removing and installing air pipe", page 385](#)

#### 11 - Intake connecting pipe

#### 12 - Hose

- ☐ For crankcase ventilation.

### 3.1.4 Assembly overview - air filter housing, Polo 2018

#### 1 - Air filter element

- ☐ Use only genuine air filter elements ➔ Electronic Parts Catalogue
- ☐ For change intervals refer to ➔ Maintenance tables
- ☐ Removing and installing ➔ Maintenance ; Booklet KJ1

#### 2 - Flexible pipe

- ☐ For crankcase ventilation.

#### 3 - Air filter upper part

- ☐ Remove dirt, leaves and salt residues

#### 4 - Clip

- ☐ When installing, ensure correct seating of spring-type clip on chamfer of hose

#### 5 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation

#### 6 - Bolt

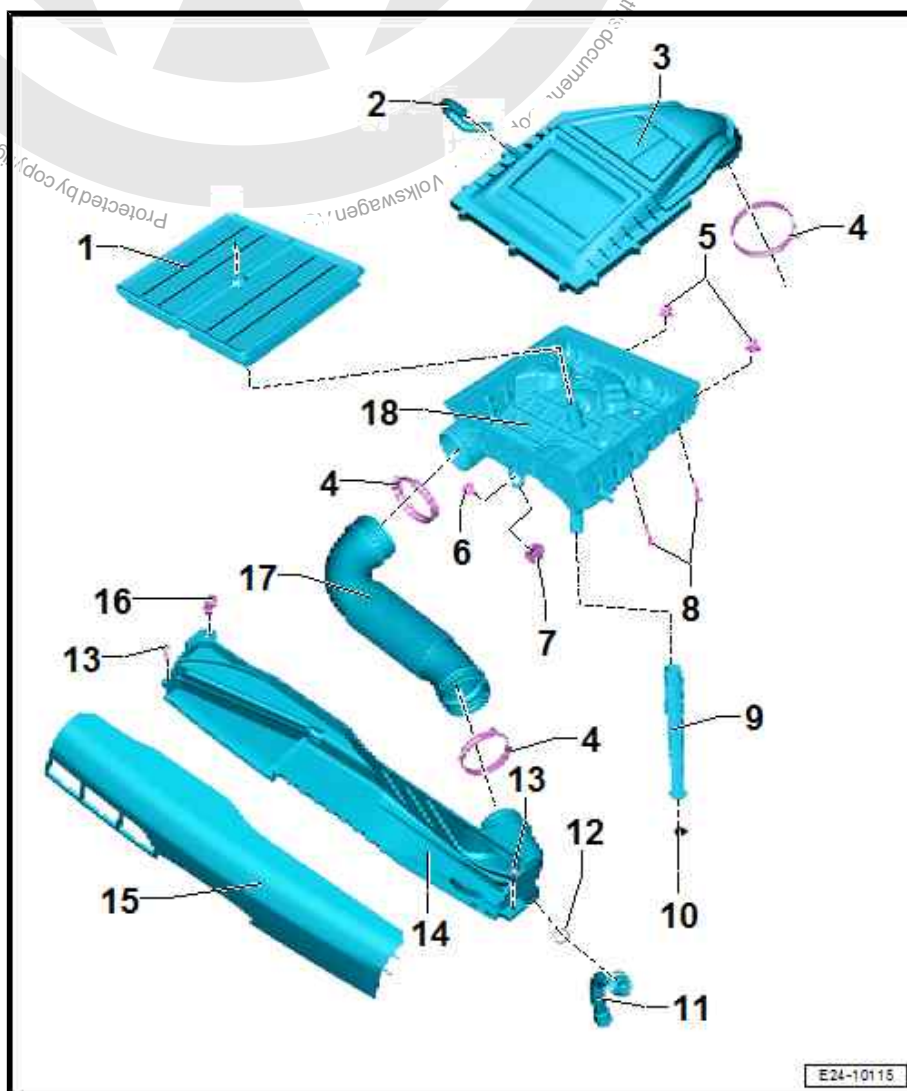
- ☐ 5 Nm

#### 7 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation

#### 8 - Bolt

- ☐ Qty. 9
- ☐ 1.5 Nm



E24-10115



**9 - Water drain hose**

- ☐ Cleaning

**10 - Strainer**

**11 - Water drain hose**

- ☐ Cleaning

**12 - O-ring**

- ☐ Renew if damaged

**13 - Bolt**

- ☐ Qty. 2
- ☐ 2 Nm

**14 - Air duct (bottom section)**

- ☐ On lock carrier
- ☐ Removing and installing ⇒ ["3.3 Removing air duct on lock carrier", page 419](#)

**15 - Air duct (top section)**

- ☐ On lock carrier
- ☐ Removing and installing ⇒ ["3.3 Removing air duct on lock carrier", page 419](#)

**16 - Securing element for bonnet rod**

**17 - Air intake hose**

- ☐ Note installation position

**18 - Air filter lower part**

- ☐ Remove dirt, leaves and salt residues





### 3.1.5 Assembly overview - air filter housing, T-Cross

#### 1 - Air filter element

- ☐ Use only genuine air filter elements ⇒ Electronic Parts Catalogue
- ☐ For change intervals refer to ⇒ Maintenance tables
- ☐ Removing and installing ⇒ Maintenance ; Booklet KJ1

#### 2 - Flexible pipe

- ☐ For crankcase ventilation.

#### 3 - Air filter upper part

- ☐ Remove dirt, leaves and salt residues

#### 4 - Clip

- ☐ When installing, ensure correct seating of spring-type clip on chamfer of hose

#### 5 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation

#### 6 - Bolt

- ☐ 5 Nm

#### 7 - Bump stop

- ☐ Check for damage, and renew if necessary
- ☐ Check for correct seating after installation

#### 8 - Bolt

- ☐ Qty. 9
- ☐ 1.5 Nm

#### 9 - Water drain hose

- ☐ Cleaning

#### 10 - Strainer

#### 11 - Water drain hose

- ☐ Cleaning

#### 12 - O-ring

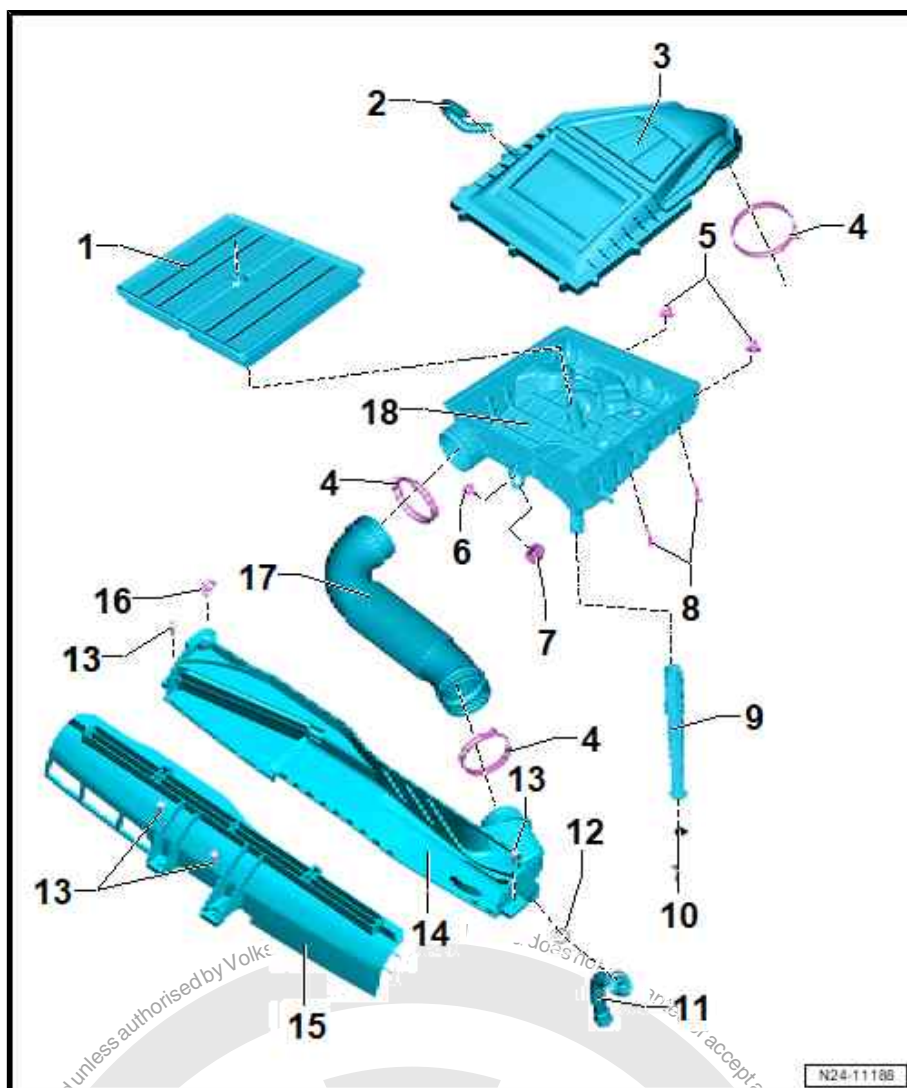
- ☐ Renew if damaged

#### 13 - Bolt

- ☐ Qty. 2
- ☐ 2 Nm

#### 14 - Air duct (bottom section)

- ☐ On lock carrier
- ☐ Removing and installing ⇒ ["3.3 Removing air duct on lock carrier", page 419](#)



N24-11188



### 15 - Air duct (top section)

- ☐ On lock carrier
- ☐ Removing and installing ⇒ [“3.3 Removing air duct on lock carrier”, page 419](#)

### 16 - Securing element for bonnet rod

### 17 - Air intake hose

- ☐ Note installation position

### 18 - Air filter lower part

- ☐ Remove dirt, leaves and salt residues

## 3.2 Removing and installing air filter housing

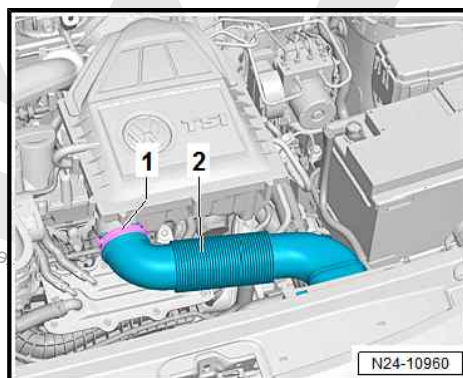
⇒ [“3.2.1 Removing and installing air filter housing, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 416](#)

⇒ [“3.2.2 Removing and installing air filter housing, up!”, page 417](#)

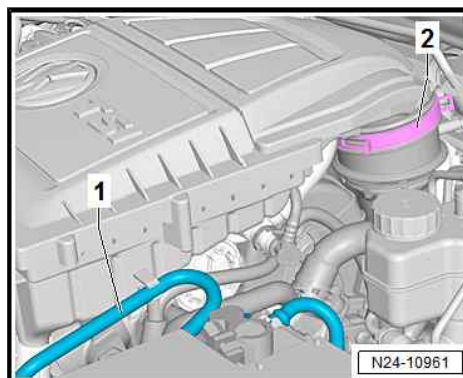
### 3.2.1 Removing and installing air filter housing, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran

#### Removing

- Loosen clip -1-, and pull down hose -2-.



- Unclip vacuum line -1- from air filter housing.
- Loosen clamp -2-.







- Pull crankcase breather hose off -1-.
- Unscrew bolt -2-, and slightly lift air filter.



#### Note

*There are vacuum lines attached to the bottom of the air filter housing.*

- Detach vacuum lines at bottom of air filter housing.
- Remove air filter housing upwards.

#### Installing



#### Note

- ◆ *If the air filter element is very dirty or wet, particles of dirt or water may reach the components and falsify the measured air mass value. This would lead to loss of power, since a smaller injection quantity is calculated.*
- ◆ *Make sure to use the genuine air filter element.*
- ◆ *A clean air filter housing is essential.*
- ◆ *Hose unions and air intake pipes and hoses must be free of oil and grease before installation.*
- ◆ *Use lubricant (silicone-free) to fit air hoses.*
- ◆ *Secure all hose connections with hose clips corresponding to the series equipment ➔ Electronic parts catalogue .*
- ◆ *To prevent malfunctions, cover critical parts of the engine air intake (air intake pipes etc.) with a clean cloth when blowing out the air filter housing with compressed air.*
- ◆ *Observe the regulations for disposal.*

Remove salt residues, dirt and leaves from top and bottom part of air filter housing using a vacuum cleaner.

- Blow out water drain with compressed air.

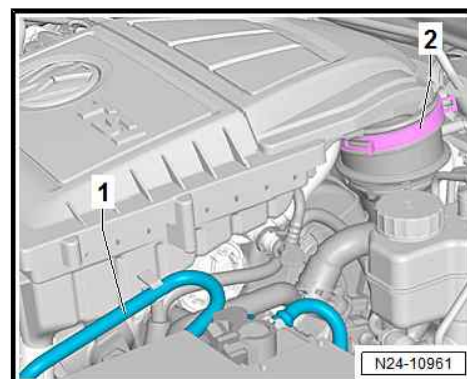
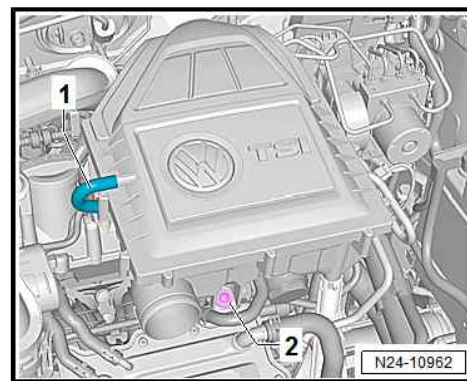
#### Specified torques

- ◆ Securing bolt for air filter housing  
⇒ ["3.1 Assembly overview - air filter housing", page 410](#)

### 3.2.2 Removing and installing air filter housing, up!

#### Removing

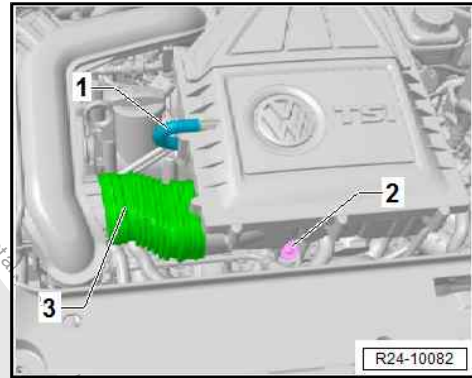
- Unclip vacuum line -1- from air filter housing.
- Release hose clip -2-.







- Pull off intake connecting pipe -3-.
- Pull crankcase breather hose off -1-.
- Unscrew bolt -2-, and slightly lift air filter.



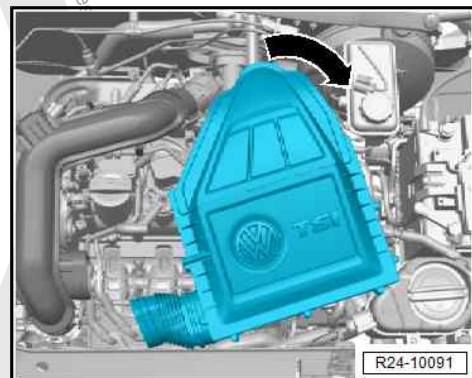
- Swing air filter housing to one side.
- Remove air filter housing upwards.

#### Installing



#### Note

- ◆ *If the air filter element is very dirty or wet, particles of dirt or water may reach the components and falsify the measured air mass value. This would lead to loss of power, since a smaller injection quantity is calculated.*
  - ◆ *Make sure to use the genuine air filter element.*
  - ◆ *A clean air filter housing is essential.*
  - ◆ *Hose unions and air intake pipes and hoses must be free of oil and grease before installation.*
  - ◆ *Use lubricant (silicone-free) to fit air hoses.*
  - ◆ *Secure all hose connections with hose clips corresponding to the series equipment ⇒ Electronic parts catalogue .*
  - ◆ *To prevent malfunctions, cover critical parts of the engine air intake (air intake pipes etc.) with a clean cloth when blowing out the air filter housing with compressed air.*
  - ◆ *Observe the regulations for disposal.*
- Remove salt residues, dirt and leaves from top and bottom part of air filter housing using a vacuum cleaner.
  - Blow out water drain with compressed air.



#### Specified torques

- ◆ Securing bolt for air filter housing  
⇒ ["3.1 Assembly overview - air filter housing", page 410](#)



### 3.3 Removing air duct on lock carrier

⇒ [“3.3.1 Removing air duct on lock carrier, Golf, Golf Estate, Golf SV, Touran”, page 419](#)

⇒ [“3.3.2 Removing air duct on lock carrier, Polo 2018”, page 419](#)

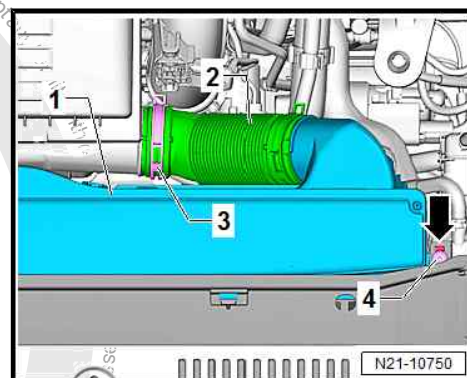
⇒ [“3.3.3 Removing air guide on lock carrier, T-Roc”, page 419](#)

⇒ [“3.3.4 Removing air duct on lock carrier, T-Cross”, page 420](#)

#### 3.3.1 Removing air duct on lock carrier, Golf, Golf Estate, Golf SV, Touran

##### Removing

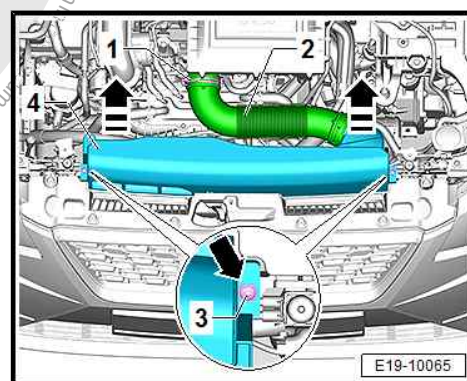
- Release hose clip -3-, and pull air hose -2- off air filter housing.
- Unscrew bolts -4- on both sides.
- Unclip air duct -1- from front end by releasing locking lugs -arrows-, and remove it.



#### 3.3.2 Removing air duct on lock carrier, Polo 2018

##### Removing

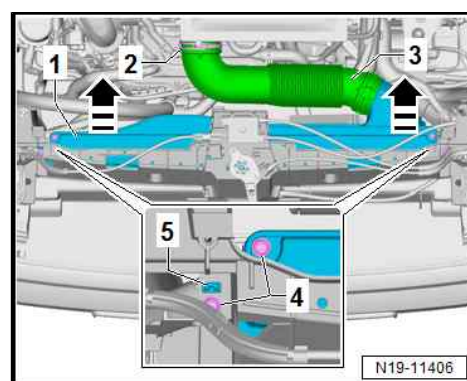
- Loosen clamp -1-, and pull hose -2- off air filter.
- Unscrew bolts -3-.
- Release retaining tabs -arrow-.
- Unclip air guide -4- and remove in direction of -arrow-.



#### 3.3.3 Removing air guide on lock carrier, T-Roc

##### Removing

- Remove radiator grille ⇒ General body repairs, exterior; Rep. gr. 66 ; Radiator grille/front panel; Removing and installing radiator grille .
- Loosen clamp -2-, and pull off hose -3-.
- Unscrew bolts -4-.
- Release locking lugs -5-, and remove air duct -1- in direction of -arrow-.

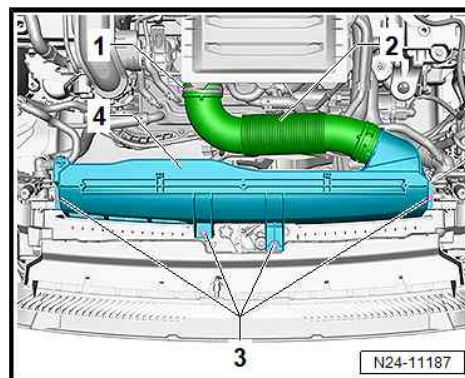




### 3.3.4 Removing air duct on lock carrier, T-Cross

#### Removing

- Remove radiator grille ⇒ General body repairs, exterior; Rep. gr. 66 ; Radiator grille/front panel; Removing and installing radiator grille .
- Loosen clamp -1-, and pull hose -2- off air filter.
- Unscrew bolts -3-, and remove air duct -4-.





## 4 Intake manifold

⇒ ["4.1 Assembly overview - intake manifold", page 421](#)

⇒ ["4.2 Removing and installing intake manifold", page 422](#)

⇒ ["4.3 Removing and installing throttle valve module GX3", page 428](#)

⇒ ["4.4 Cleaning throttle valve module GX3", page 429](#)

### 4.1 Assembly overview - intake manifold

#### 1 - Coolant pipe

- ☐ Clipped onto intake manifold.
- ☐ Not on up!

#### 2 - Bolt

- ☐ 8 Nm

#### 3 - Intake manifold

- ☐ Combined with charge air cooler
- ☐ Removing and installing  
⇒ ["4.2 Removing and installing intake manifold", page 422](#)

#### 4 - O-ring

- ☐ If damaged, renew entire vacuum line  
⇒ [Item 5 \(page 421\)](#)

#### 5 - Vacuum line

#### 6 - Throttle valve module - GX3-

- ☐ Removing and installing  
⇒ ["4.3 Removing and installing throttle valve module GX3", page 428](#)
- ☐ Cleaning  
⇒ ["4.4 Cleaning throttle valve module GX3", page 429](#)

#### 7 - Bolt

- ☐ Thread-cutting
- ☐ Fit and screw in bolt by hand so that it screws into old thread. Then tighten bolt to torque.
- ☐ 7 Nm

#### 8 - Retaining clip

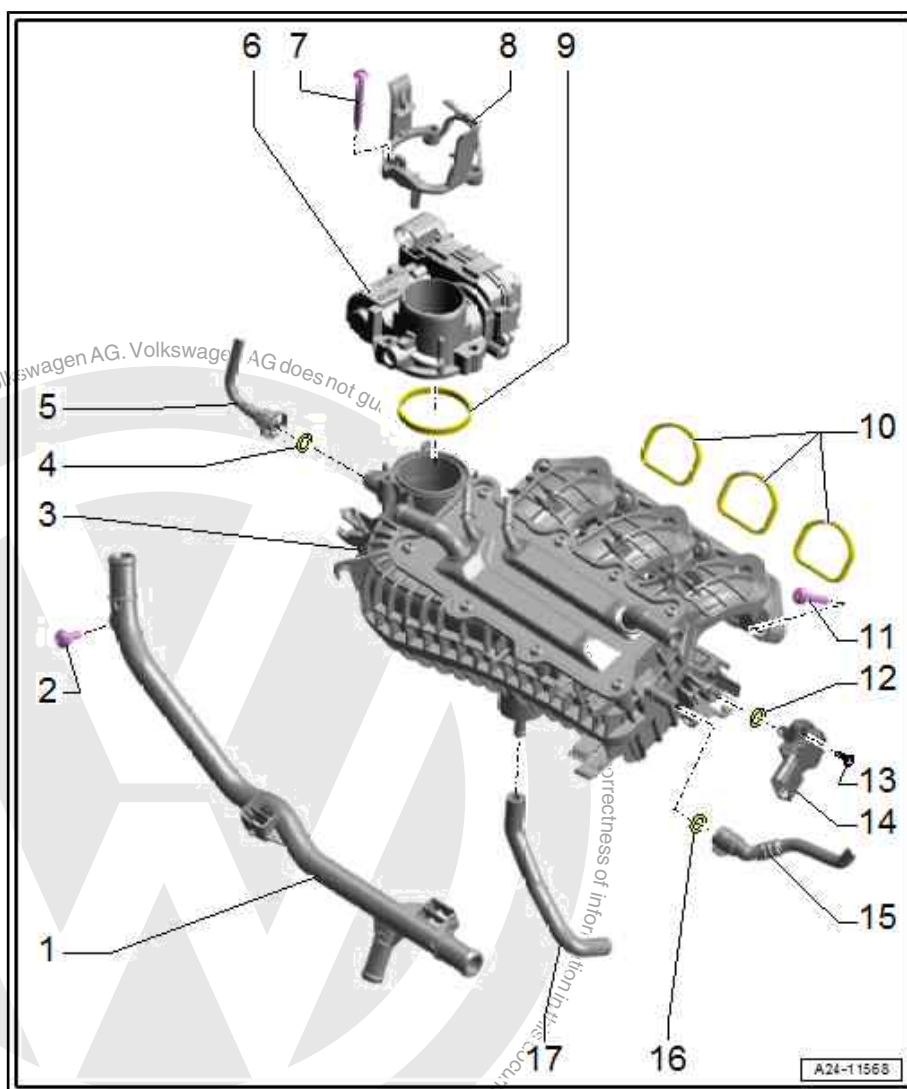
- ☐ For air intake pipe

#### 9 - O-ring

- ☐ Renew after removal

#### 10 - Seals

- ☐ Renew after removal





#### 11 - Bolt

- ❑ Specified torque and tightening sequence ⇒ [page 422](#)

#### 12 - O-ring

- ❑ Renew after removal

#### 13 - Bolt

- ❑ Repair solution when retaining tabs have broken off
- ❑ Thread-cutting
- ❑ Fit and screw in bolt by hand so that it screws into old thread Then tighten bolt to torque.
- ❑ 7 Nm

#### 14 - Intake manifold sender - GX9-

- ❑ Removing and installing ⇒ [“5.4 Removing and installing intake manifold sender GX9 ”, page 434](#)

#### 15 - Vacuum line

#### 16 - O-ring

- ❑ If damaged, renew entire vacuum line ⇒ [Item 15 \(page 422\)](#)

#### 17 - Hose

- ❑ For crankcase ventilation.

#### Intake manifold - specified torque and tightening sequence

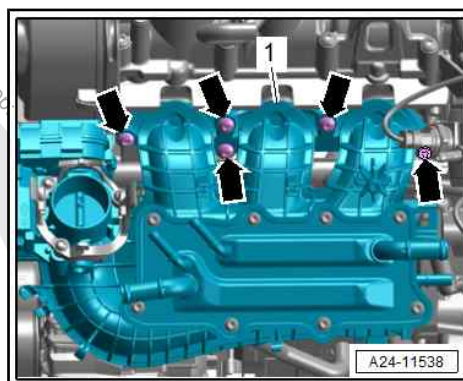
– Tighten bolts in stages as follows:

Stage	Bolts	Specified torque
1.	-Arrows-	Starting in centre, screw in bolts alternately by hand until they make contact
2.	-Arrows-	Starting in centre, screw in bolts alternately to 8 Nm



#### Note

-Items 1 and 2- can be disregarded.



## 4.2 Removing and installing intake manifold

⇒ [“4.2.1 Removing and installing intake manifold, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 422](#)

⇒ [“4.2.2 Removing and installing intake manifold, up!”, page 425](#)

### 4.2.1 Removing and installing intake manifold, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran

Special tools and workshop equipment required

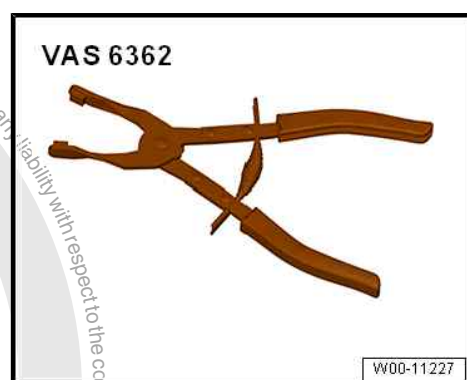




- ◆ Release tool - T10527-

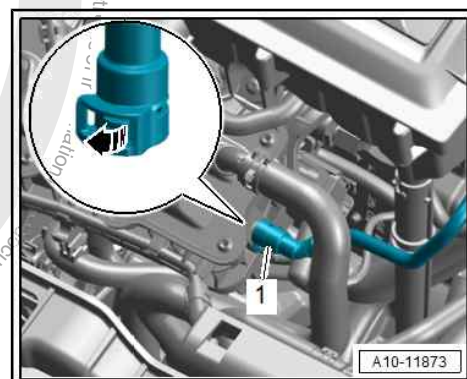


- ◆ Spring-type clip pliers - VAS 6362-



### Removing

- Drain coolant  
⇒ ["1.3 Draining and adding coolant", page 272](#) .
- Press release buttons -arrow-, and pull off line.
- Remove air intake pipe.  
⇒ ["2.5 Removing and installing air pipe", page 385](#)

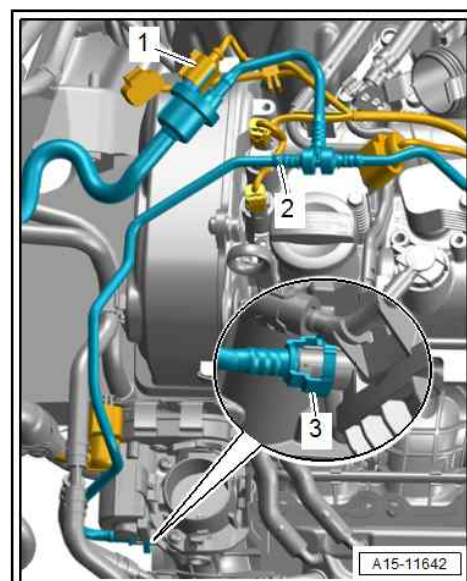


- Remove line -2- for activated charcoal filter system. To do this, press release button -3- on both sides.



### Note

Disregard -item 1-.



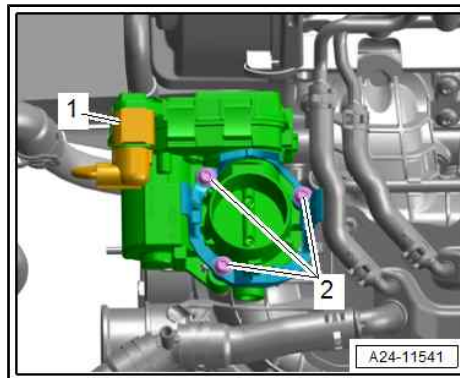


- Disconnect connector -1- for throttle valve module - GX3- .

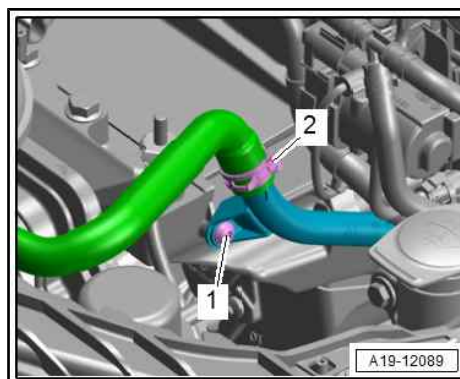


### Note

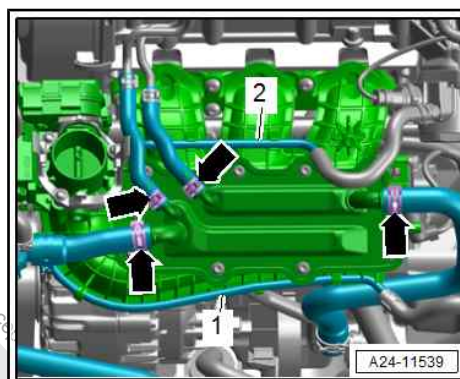
Disregard -item 2-.



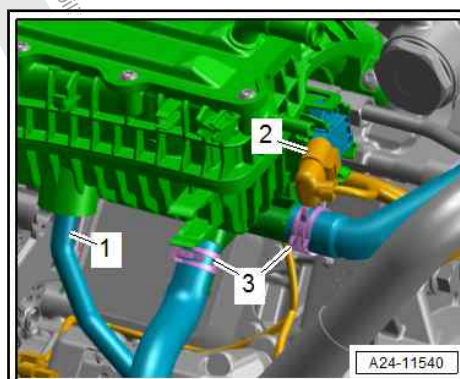
- Unscrew bolt -1-.
- Release hose clip -2- and detach coolant hose.



- Release hose clips -arrows- and detach coolant hoses.
- Lay fuel line -2- and coolant line -1- at intake manifold to one side.



- Disconnect connector -2- for intake manifold sender - GX9- .
- Pull off crankcase breather hose -1-.
- Release hose clip -3- and remove coolant hose.





- Unscrew bolts -arrows-.
- Remove intake manifold -1-.

### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew seals and O-rings.*
- ◆ *Never reuse old coolant.*
- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

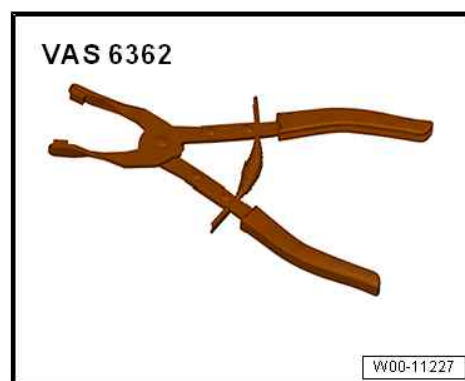
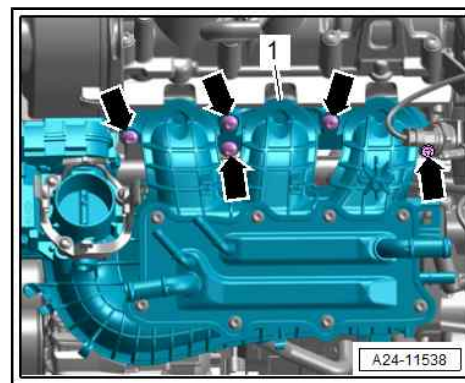
### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - coolant pipes”, page 315](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ ⇒ [“4.1 Assembly overview - intake manifold”, page 421](#)

## 4.2.2 Removing and installing intake manifold, up!

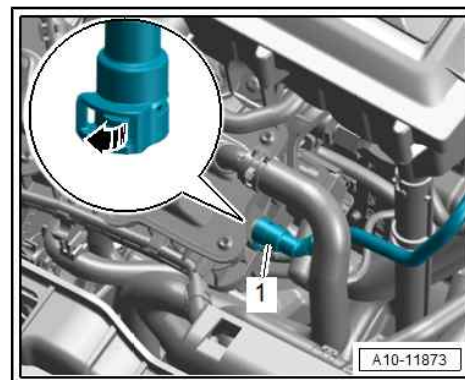
### Special tools and workshop equipment required

- ◆ Spring-type clip pliers - VAS 6362-



### Removing

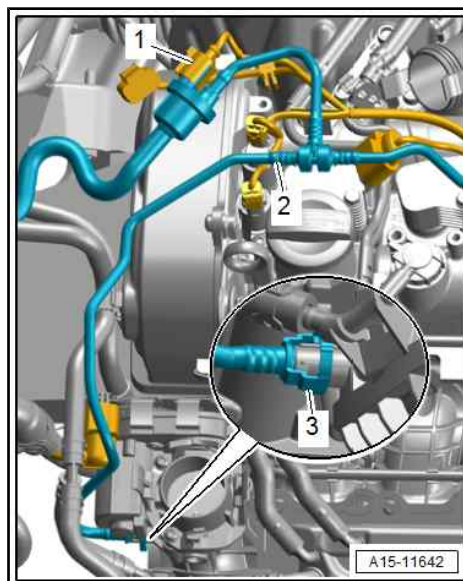
- Drain coolant  
⇒ [“1.3 Draining and adding coolant”, page 272](#) .
- Remove air pipe  
⇒ [“2.5 Removing and installing air pipe”, page 385](#) .
- Press release buttons -arrow-, and pull off line.



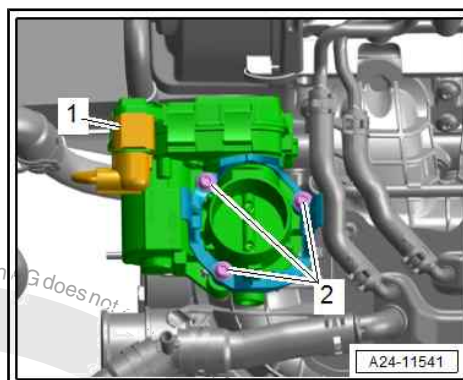




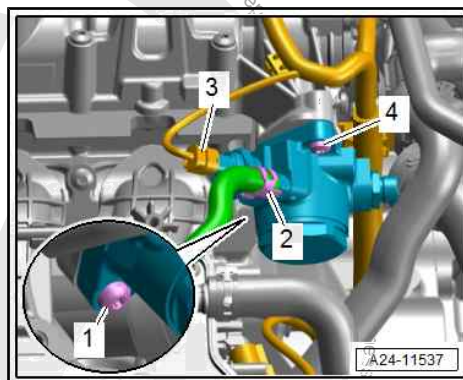
- Pull off line -2- for activated charcoal filter system on intake manifold.
- Press release buttons -3- on both sides to do this.



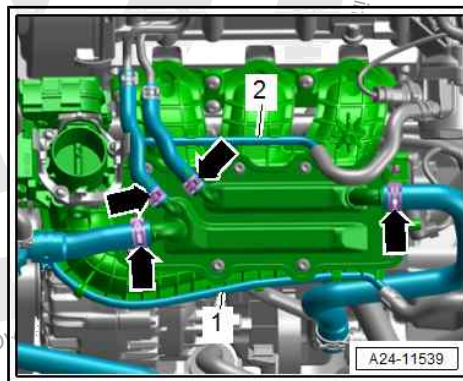
- Disconnect connector -1- for throttle valve module - GX3- .
- Unscrew bolts -2-, and detach throttle valve module - GX3- .



- Release hose clip -2- and detach fuel supply hose.
- Place a cloth underneath to catch escaping fuel.

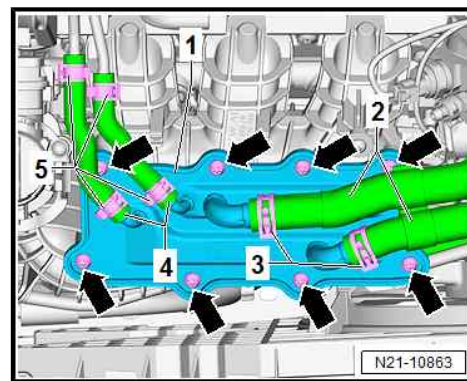


- Unclip fuel line -2- from intake manifold and lay aside.
- Unclip vacuum hose -1- and lay it to one side.
- Detach coolant hoses at bottom of intake manifold.

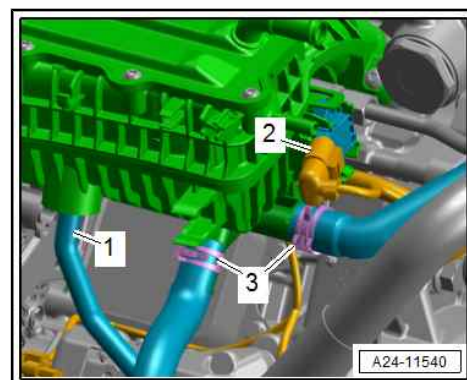




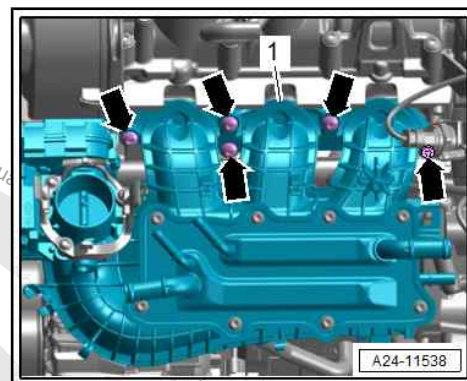
- Open hose clips -5-.
- Pull off coolant hoses -4-.
- Open hose clips -3-.
- Pull off coolant hoses -2- on intake manifold -1-.



- Disconnect connector -2- for intake manifold sender - GX9- .



- Unscrew bolts -arrows-.



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- Turn intake manifold in direction of arrow towards front and towards radiator cowl.
- Pull off hose -1- for crankcase breather and retainer for electrical wiring -2-.
- Guide out intake manifold upwards by turning.

### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew seals and O-rings.*
- ◆ *Never reuse old coolant.*
- Add coolant ⇒ [“1.3 Draining and adding coolant”, page 272](#) .

### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - coolant pipes”, page 315](#)
- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)
- ◆ ⇒ [“4.1 Assembly overview - intake manifold”, page 421](#)

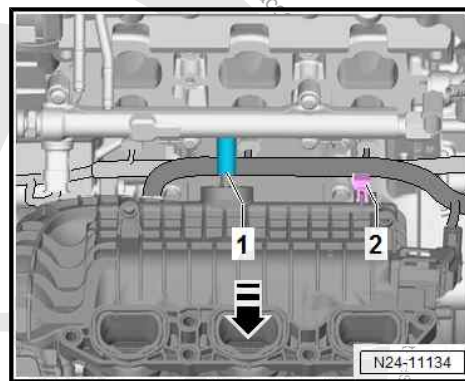
## 4.3 Removing and installing throttle valve module - GX3-

Throttle valve module - GX3- consists of

- ◆ Throttle valve module - J338-
- ◆ Throttle valve drive for electronic power control - G186-
- ◆ Throttle valve drive angle sender 1 for electronic power control - G187-
- ◆ Throttle valve drive angle sender 2 for electronic power control - G188-

### Special tools and workshop equipment required

- ◆ Release tool - T10527-





## Removing

- Remove air intake pipe.  
⇒ [“2.5 Removing and installing air pipe”, page 385](#)
- Disconnect connector -1- for throttle valve module - GX3- .
- Unscrew bolts -2- and remove throttle valve module - GX3- .

## Installing

Install in reverse order of removal, observing the following:



### Note

*Renew O-rings after removal.*

- After throttle valve control module - GX3- has been replaced, it must be re-adapted to engine control unit - J623- .
- Connect a ⇒ Vehicle diagnostic tester.
- Switch on ignition, and select and carry out following menu options on⇒ Vehicle diagnostic tester:

- ◆ `0001 - Engine electronics functions`
- ◆ `0001 - Basic setting`
- ◆ `0001 - Adaption of throttle valve module - J338`

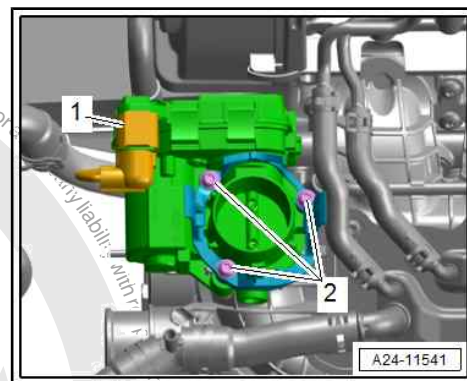
## Specified torques

- ◆ ⇒ [“4.1 Assembly overview, intake manifold”, page 421](#)

## 4.4 Cleaning throttle valve module - GX3-

### Special tools and workshop equipment required

- ◆ Acetone (commercially available)
- ◆ Brush





## Sequence of operations



### Note

- ◆ If a new engine control unit - J623- is installed, the throttle valve module must be adapted.
- ◆ Contamination and coking in end stop can result in incorrect adaptation values.
- ◆ When cleaning the throttle valve housing, take care not to scratch it.
- Remove throttle valve module - GX3-  
⇒ ["4.3 Removing and installing throttle valve module GX3 "](#),  
[page 428](#) .
- Open throttle valve by hand and lock it in open position with a wedge (plastic or wood) -arrow-.

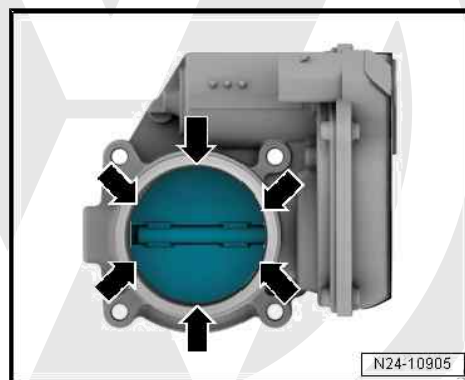
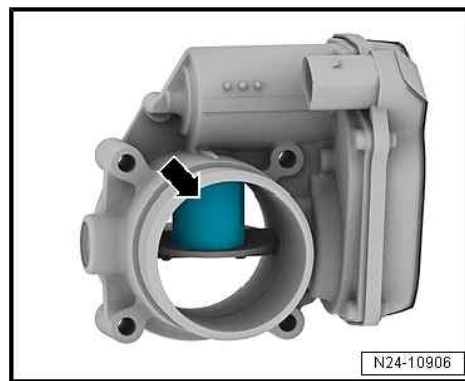
### CAUTION

**Risk of injury caused by acetone. Acetone is highly flammable and may cause eye and skin irritation.**

- Wear protective goggles.
- Wear protective gloves.

- Clean throttle valve housing thoroughly, especially around the points -arrows- where the throttle valve closes, using commercially available acetone and a small brush.
- Wipe the inside of the throttle valve housing with a lint-free cloth.
- Allow acetone to dry off completely.
- Install throttle valve module - GX3-  
⇒ ["4.3 Removing and installing throttle valve module GX3 "](#),  
[page 428](#) .
- Connect a ⇒ Vehicle diagnostic tester.
- Delete learnt values and adapt engine control unit - J623- to throttle valve module - GX3- .
- Switch on ignition, and select and carry out following menu options on⇒ Vehicle diagnostic tester:

- ◆ `0001 - Engine electronics functions`
- ◆ `0001 - Basic setting`
- ◆ `0001 - Adaption of throttle valve module - J338`



## 5 Senders and sensors

⇒ ["5.1 Assembly overview - actuator for structure-borne sound R214 and control unit for structure-borne sound J869", page 431](#)

⇒ ["5.2 Removing and installing fuel pressure sender G247", page 432](#)

⇒ ["5.3 Checking fuel pressure sender G247", page 433](#)

⇒ ["5.4 Removing and installing intake manifold sender GX9", page 434](#)

⇒ ["5.5 Removing and installing exhaust gas pressure sensor 1 G450", page 435](#)

### 5.1 Assembly overview - actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869-

#### 1 - Control unit for structure-borne sound - J869-

- ☐ Fitting location: in plenum chamber

#### Removing and installing

- Remove wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .
- Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 50 ; Plenum chamber bulkhead; Removing and installing plenum chamber cover .

#### 2 - Bracket for control unit for structure-borne sound - J869-

- ☐ is removed and installed together with the control unit for structure-borne sound - J869- .

#### 3 - Electrical connector

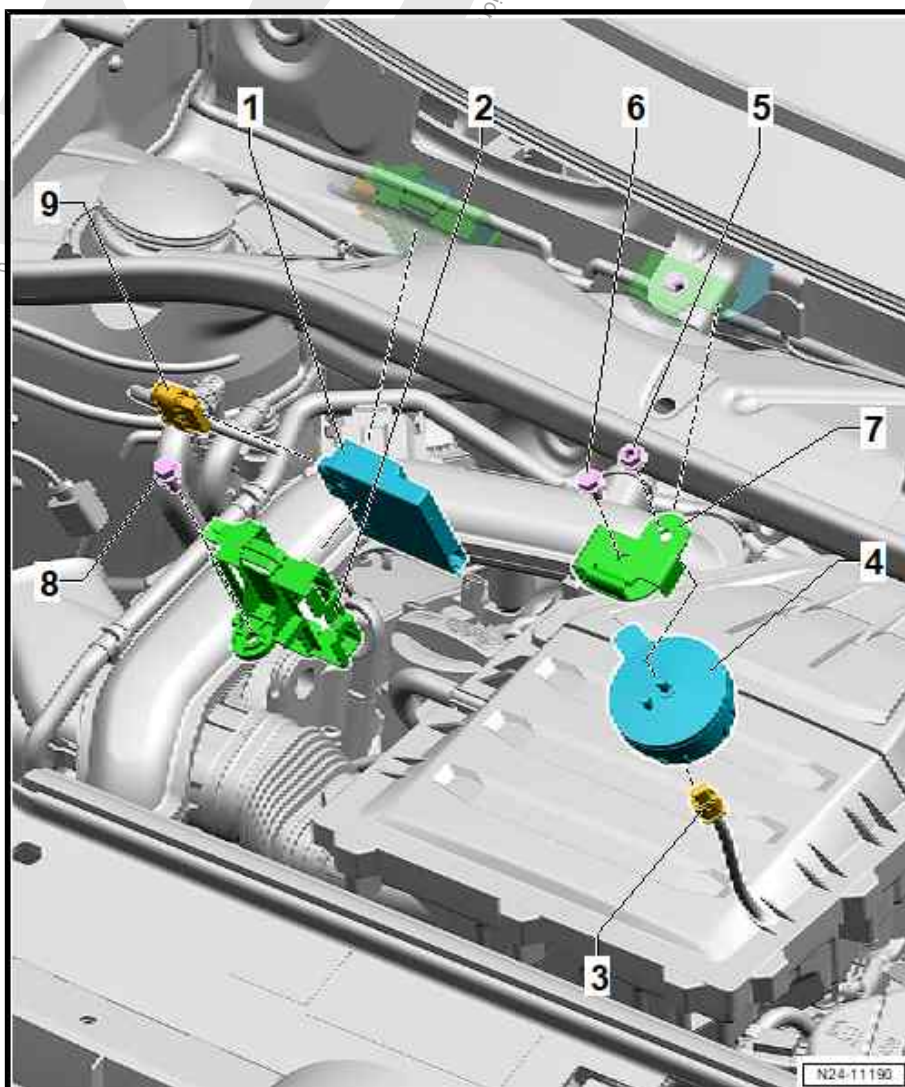
- ☐ for actuator for structure-borne sound - R214-

#### 4 - Actuator for structure-borne sound - R214-

- ☐ Fitting location: in plenum chamber

#### Removing and installing

- Remove wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .
- Remove plenum chamber cover and plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50 ; Plenum chamber bulkhead; Removing and installing plenum chamber cover .







**5 - Nut**

- ☐ 8 Nm

**6 - Bolt**

- ☐ 8 Nm

**7 - Bracket**

- ☐ for actuator for structure-borne sound - R214-

**8 - Bolt**

- ☐ 8 Nm

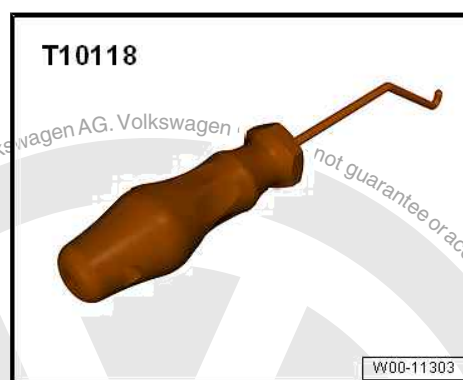
**9 - Electrical connector**

- ☐ for control unit for structure-borne sound - J869-

## 5.2 Removing and installing fuel pressure sender - G247-

### Special tools and workshop equipment required

- ◆ Assembly tool - T10118-
- ◆ Socket 27 mm - T40218- or commercially available 27 mm hexagon socket insert



### Removing

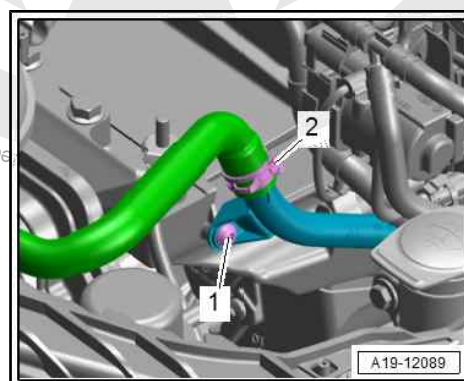
- Unscrew bolt -1- for coolant pipe at front.



**Note**

Disregard -item 2-.

- Move clear fuel hose, and press it to one side.







- Disconnect electrical connector -1-.



#### Note

*Place a cloth underneath to catch escaping fuel.*

- Unscrew fuel pressure sender - G247- -2- using socket 27 mm - T40218- .

#### Installing

Install in reverse order of removal, observing the following:



#### Note

*Moisten taper and thread with clean engine oil.*

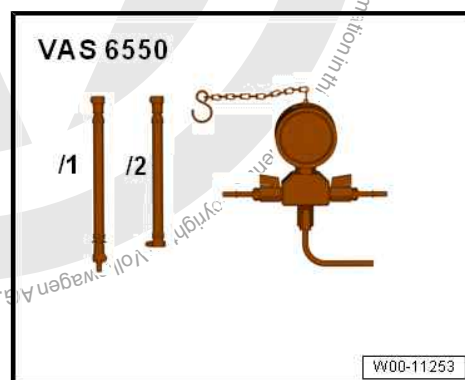
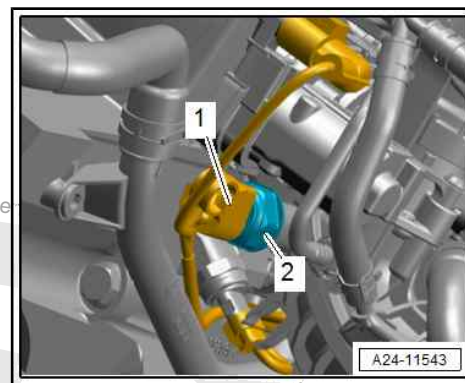
#### Specified torques

- ◆ ⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)
- ◆ ⇒ [“3.1 Assembly overview - coolant pipes”, page 315](#)

### 5.3 Checking fuel pressure sender - G247-

#### Special tools and workshop equipment required

- ◆ Pressure gauge - VAS 6550-



- ◆ Vehicle diagnostic tester

#### Sequence of operations

- 1/4 of fuel tank filled with fuel.



#### CAUTION

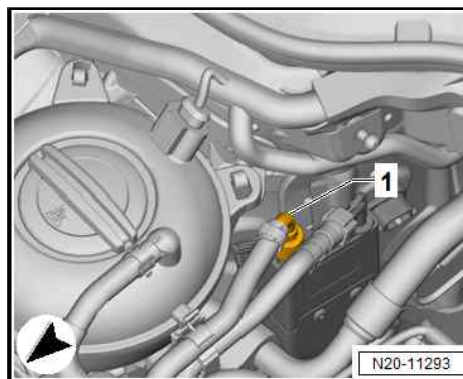
**The fuel system is pressurised.**

**Danger of injury through fuel spray.**

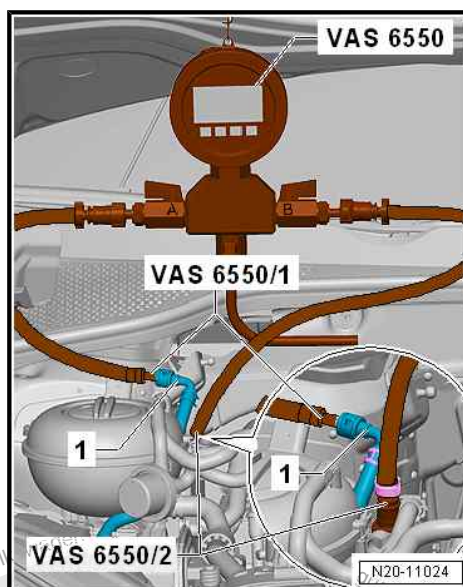
- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.



- Pull off supply line -1-. Disconnect plug-in connectors ⇒ Rep. gr. 20 ; Plug-in connectors; Disconnecting plug-in connectors .
- Collect escaping fuel with a cleaning cloth.

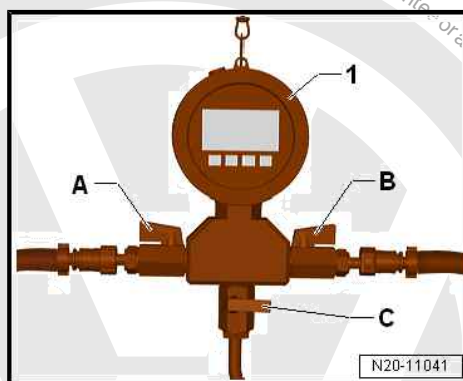


- Connect hose - VAS 6550/1- to connection -A- of pressure tester - VAS 6550- .
- Connect hose - VAS 6550/1- to fuel supply line -1- leading to engine.
- Connect hose - VAS 6550/2- to connection -B- of pressure tester - VAS 6550- .
- Use hose - VAS 6550- to connect fuel line leading to fuel tank with pressure tester - VAS 6550/2- .
- Ensure plug-in connector are secured properly by pulling.



- Ensure that drain tap -C- on pressure tester -1- is closed.
- Shut-off valves -A- and -B- on pressure tester -1- are open.
- Use ⇒ Vehicle diagnostic tester to check fuel pressure sender - G247- . To do this, select following function:

- ◆ Diagnosis-capable systems
- ◆ 0001 - Engine electronics
- ◆ 0001 - Repair groups
- ◆ 24 - Mixture preparation/injection
- ◆ G247 - Check fuel pressure sender



## 5.4 Removing and installing intake manifold sender - GX9-

Intake manifold sender - GX9- consists of:

- ◆ Intake air temperature sender 2 - G299-
- ◆ Intake manifold pressure sender - G71-

### Removing

- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .
- Disconnect electrical connector -1-.



#### Version A

- Release fasteners -arrows-, and remove intake manifold sender - GX9- .

#### Version B

- Unscrew bolts -2-, and remove intake manifold sender - GX9- .

#### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *Renew O-ring.*
- ◆ *If fasteners on the intake manifold have broken off, secure the intake manifold sender - GX9- using suitable bolts -2- as per ⇒ [Electronic Parts Catalogue](#)*

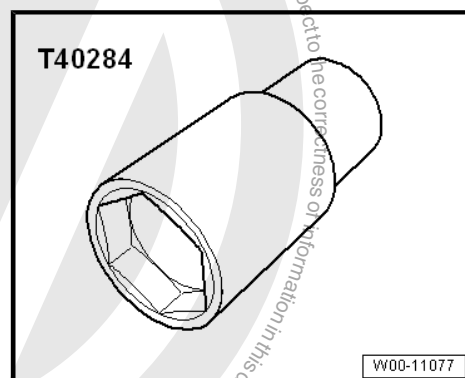
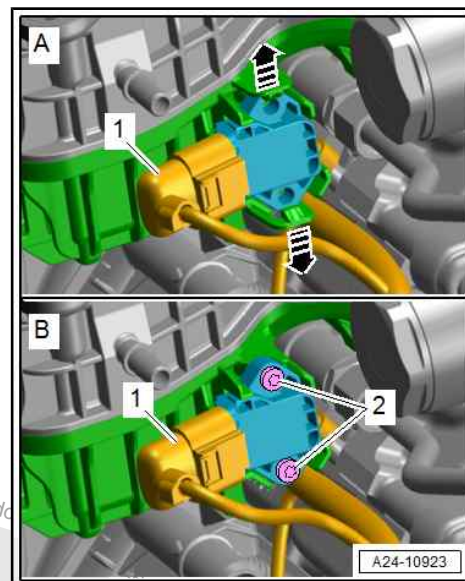
#### Specified torques

- ◆ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)

## 5.5 Removing and installing exhaust gas pressure sensor 1 - G450-

#### Special tools and workshop equipment required

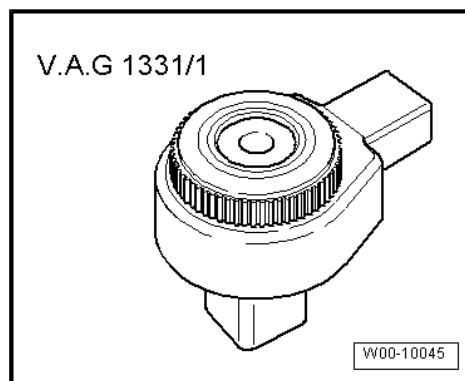
- ◆ Socket AF 24 - T40284-



- ◆ Torque wrench - V.A.G 1331



- ◆ Ratchet wrench - V.A.G 1331/1-



### Removing

- Remove air pipe  
⇒ ["2.5 Removing and installing air pipe", page 385](#) .
- Disconnect electrical connector -1-.
- Use socket, 24 mm - T40284- to unscrew exhaust gas pressure sensor 1 - G450- -2-.

### Installing

Install in reverse order of removal, observing the following:

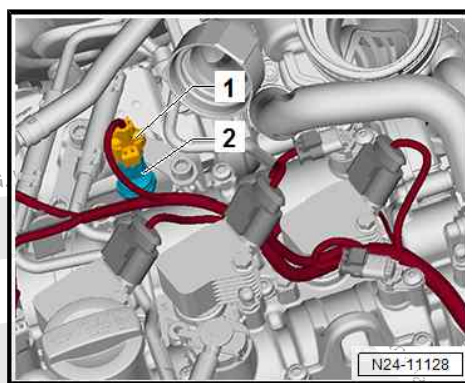


#### Note

- ◆ *Renew exhaust gas pressure sensor 1 - G450- after removal.*
- ◆ *Before installing the exhaust gas pressure sensor 1 - G450- , check hole in camshaft housing for soiling.*
- Install air pipe  
⇒ ["2.5 Removing and installing air pipe", page 385](#) .

### Specified torques:

- ◆ ⇒ ["1.2 Assembly overview - camshaft housing", page 173](#)



## 6 Engine control unit

⇒ [“6.1 Assembly overview - engine control unit”, page 437](#)

⇒ [“6.2 Removing and installing engine \(motor\) control unit J623”, page 440](#)

### 6.1 Assembly overview - engine control unit

⇒ [“6.1.1 Assembly overview - engine control unit, Polo 2014 ►”, page 437](#)

⇒ [“6.1.2 Assembly overview - engine control unit, up!”, page 438](#)

⇒ [“6.1.3 Assembly overview - engine control unit, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 439](#)

#### 6.1.1 Assembly overview - engine control unit, Polo 2014 ►

##### 1 - Bracket

##### 2 - Engine control unit - J623-

- ☐ Removing and installing  
⇒ [“6.2 Removing and installing engine \(motor\) control unit J623”, page 440](#)

##### 3 - Locking bar

- ☐ Removing and installing  
⇒ [“6.2.1 Removing and installing engine control unit J623, Polo 2014 ►”, page 440](#)

##### 4 - Bolt

- ☐ Tighten shear-head screws evenly until head shears off.
- ☐ For securing bracket to engine control unit
- ☐ Allocation ⇒ Electronic parts catalogue (ETKA)

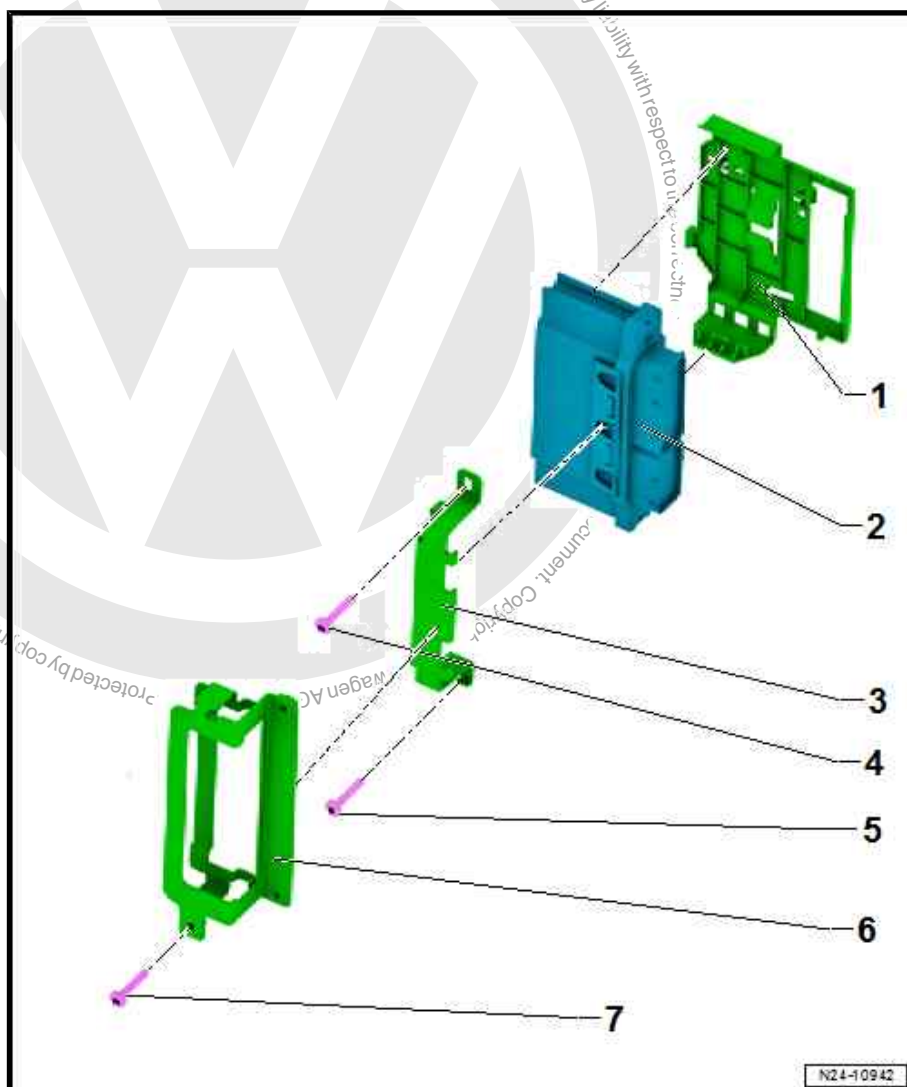
##### 5 - Bolt

- ☐ Tighten shear-head screws evenly until head shears off.
- ☐ Allocation ⇒ Electronic parts catalogue (ETKA)

##### 6 - Protective housing

##### 7 - Bolt

- ☐ Tighten shear-head screws evenly until head shears off.
- ☐ For securing bracket to engine control unit
- ☐ Allocation ⇒ Electronic parts catalogue (ETKA)







## 6.1.2 Assembly overview - engine control unit, up!

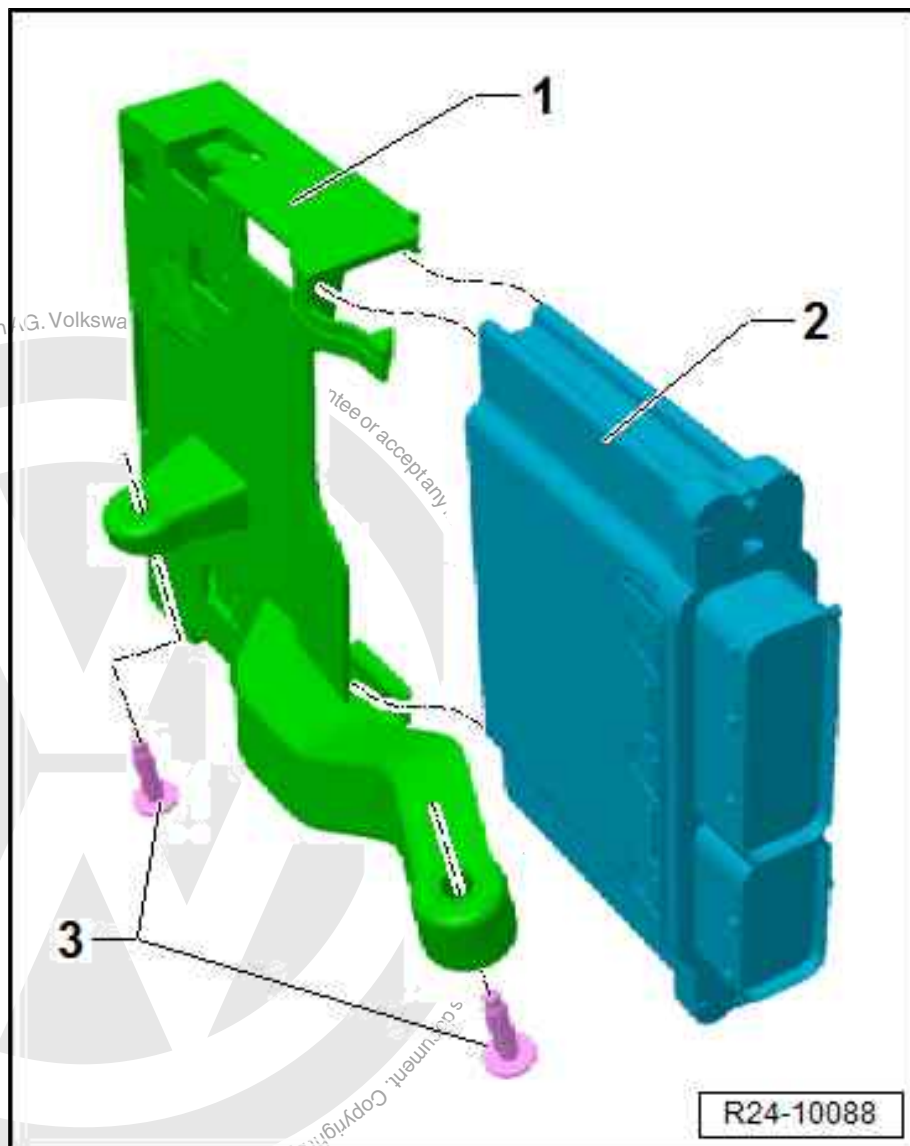
### 1 - Bracket

### 2 - Engine control unit - J623-

- ❑ Removing and installing  
⇒ ["6.2.2 Removing and installing engine control unit J623 , up!"](#),  
[page 441](#)

### 3 - Bolt

- ❑ 9 Nm





### 6.1.3 Assembly overview - engine control unit, Polo 2018 ►, T-Roc, T-Cross, Touran

1 - Bracket

2 - Nuts

□ Qty. 2

□ 8 Nm

3 - Protective housing

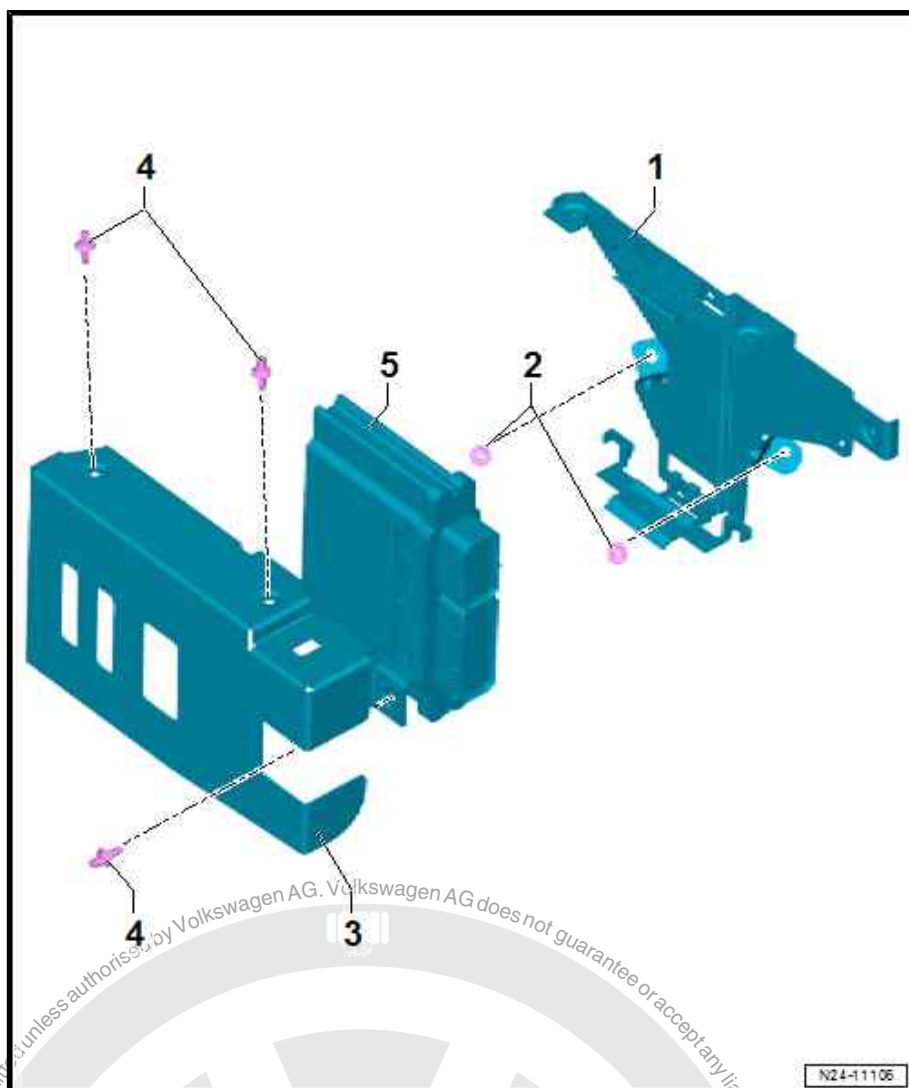
4 - Shear bolts

□ Qty. 3

5 - Engine control unit - J623-

□ Removing and installing

⇒ ["6.2.3 Removing and installing engine control unit J623 with protective housing, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran", page 442](#)



N24-11106



## 6.2 Removing and installing engine (motor) control unit - J623-

⇒ [“6.2.1 Removing and installing engine control unit J623 , Polo 2014 ►”, page 440](#)

⇒ [“6.2.2 Removing and installing engine control unit J623 , up!”, page 441](#)

⇒ [“6.2.3 Removing and installing engine control unit J623 with protective housing, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 442](#)

⇒ [“6.2.4 Removing and installing engine control unit J623 with metal locking plate, Golf, Golf Estate, Golf SV”, page 445](#)

⇒ [“6.2.5 Removing engine control unit J623 from protective housing, Golf, Golf Variant, Golf SV”, page 447](#)

### 6.2.1 Removing and installing engine control unit - J623- , Polo 2014 ►

#### Removing

- If engine control unit is renewed, select 0001 - Renew engine control unit function in ⇒ Vehicle diagnostic tester.
- Switch off ignition.



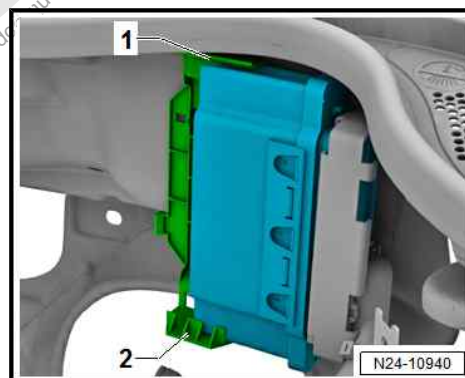
#### Note

- ♦ *If the engine (motor) control unit comes into contact with the positive battery terminal, permanent damage to the engine (motor) control unit will be the consequence.*
- ♦ *Therefore, disconnect the battery before removing the engine control unit ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .*
- Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and reconnecting battery .
- Release catches of holder -1- from engine control unit - J623- .
- Press down tab -2-, and remove engine control unit - J623- upwards.

#### Engine control unit with protective housing

- Disconnect engine control unit from protective housing  
⇒ [“6.2.5 Removing engine control unit J623 from protective housing, Golf, Golf Variant, Golf SV”, page 447](#) .

#### All versions





- Using a screwdriver, lever out locking bar -1- of upper wiring harness in direction of -arrow-.
- Using a screwdriver, lever out locking bars -2- of lower wiring harness in direction of -arrow-.
- Pull connectors off engine control unit.
- Remove engine control unit.

#### Installing

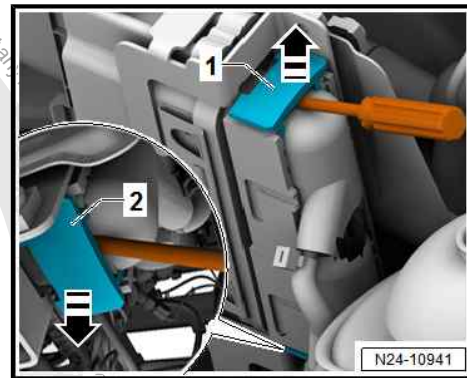
Install in reverse order of removal. During this procedure, observe the following:

#### Engine control unit with protective housing

- Secure engine control unit to protective housing  
➔ ["6.2.5 Removing engine control unit J623 from protective housing, Golf, Golf Variant, Golf SV", page 447](#)

After installing a new engine control unit, the following operations must be performed:

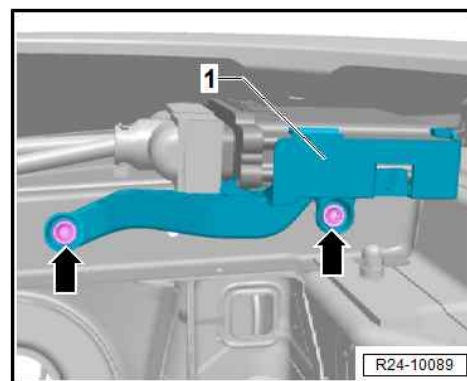
- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition, and select and carry out following menu options on Vehicle diagnostic tester:
  - ◆ 0001 - Renew engine control unit
  - ◆ 0001 - Adapt new engine control unit to immobiliser



## 6.2.2 Removing and installing engine control unit - J623- , up!

### Removing

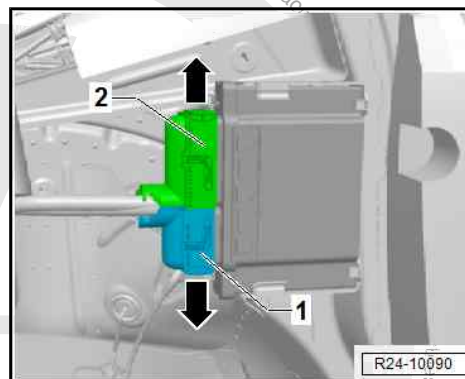
- If engine control unit is renewed, select 0001 - Renew engine control unit function in ⇒ Vehicle diagnostic tester.
- Switch off ignition and remove key from ignition lock.
- Remove front left wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Assembly overview - front wheel housing liner .
- Unscrew bolts -arrows-.
- Remove engine control unit - J623- with bracket -1-.



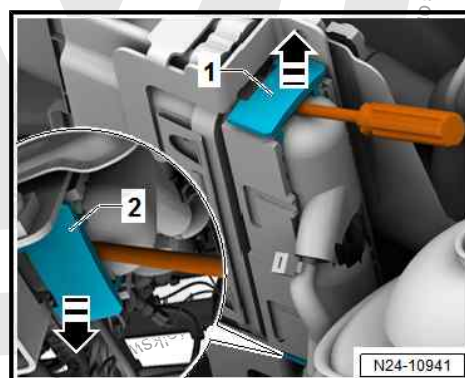


- Release and pull off connectors for engine (motor) control unit - J623- .

- 1 - Connector for vehicle wiring harness
- 2 - Connector for engine wiring harness



- To do this, pull out catch in direction of -arrow-.



- Press down locking element -arrows-.
- Pull off engine control unit - J623- from bracket in direction of -arrow-.

### Installing

Install in reverse order of removal, observing the following:

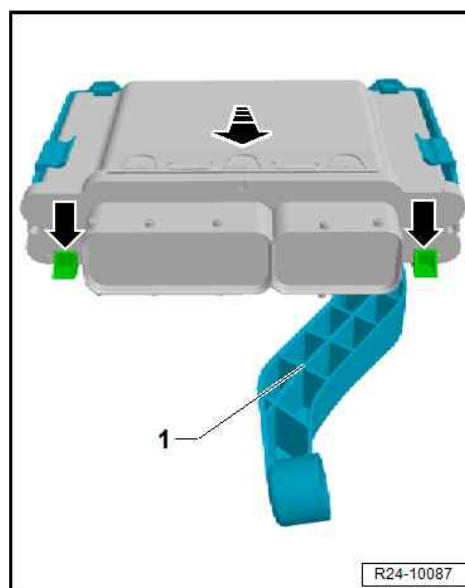
**After installing a new engine control unit, the following operations must be performed:**

- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu option on ⇒ Vehicle diagnostic tester:

◆ 0001 - Renew engine control unit

### Specified torque:

- ◆ ⇒ [“6.1.2 Assembly overview - engine control unit, up!”](#), page 438



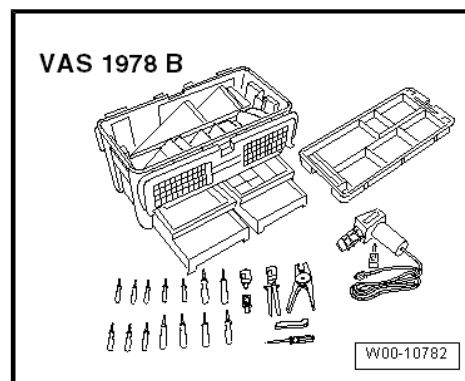
## 6.2.3 Removing and installing engine control unit - J623- with protective housing, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran

Special tools and workshop equipment required

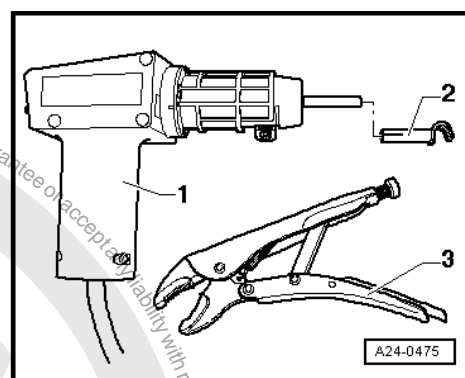




- ◆ Wiring harness repair set - VAS 1978 B-



- ◆ Hot air blower - VAS 1978/14A- -item 1- with nozzle -2- from wiring harness repair set - VAS 1978 B-



- ◆ Small grinder (commercially available)

- ◆ ⇒ Vehicle diagnostic tester

### Removing

- If engine control unit is renewed, select 0001 - Renew engine control unit function in ⇒ Vehicle diagnostic tester.
- Switch off ignition and remove key from ignition lock.



### Note

- ◆ If the engine (motor) control unit comes into contact with the positive battery terminal, permanent damage to the engine (motor) control unit will be the consequence.
- ◆ Therefore, make sure to disconnect the battery before removing the engine control unit.

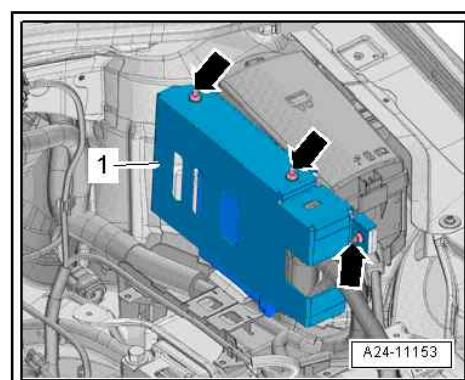
- Disconnect battery ⇒ Electrical system, Rep. gr. 27, Battery; Disconnecting and connecting battery .

To remove protective housing -1-, unscrew shear bolts -arrows- as follows:



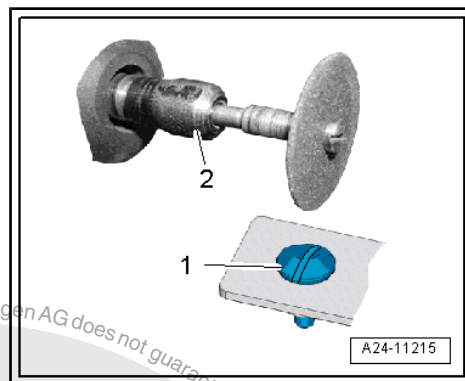
### Note

Cover the area around the engine control unit, and protect it from flying sparks.





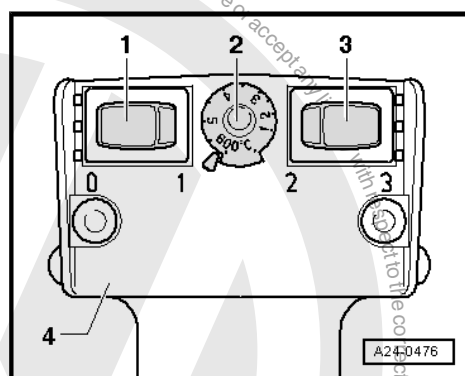
- Make groove (for a screwdriver) in head of shear bolt -1- using a small grinder -2-.



#### Note

*The threads of the shear bolts are secured with locking fluid. To unscrew these bolts, the threads must therefore be heated with the hot air blower.*

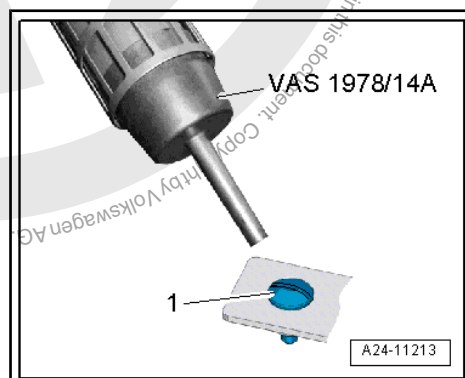
- Set the hot air blower as shown in illustration. Meaning potentiometer for temperature regulation -2- set to maximum heating power and 2-stage switch for air volume -3- set to position 3.



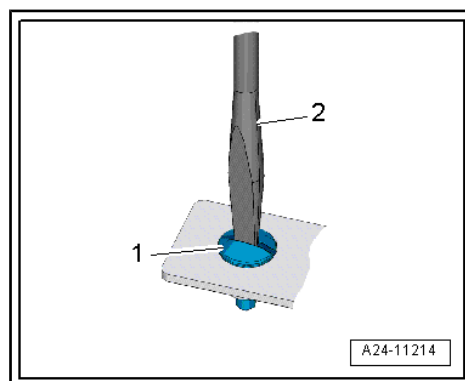
#### NOTICE

**Risk of damage to adjacent components caused by hot air blower. Risk of overheating.**

- If necessary, cover adjacent components.
- Heat head of shear bolt -1- for approx. 20 to 30 seconds.



- Unscrew shear bolt -1- with screwdriver -2-.





- Release fastener -arrow- and detach engine control unit -1-.
- Release and pull off connectors for engine (motor) control unit - J623- .

### Installing

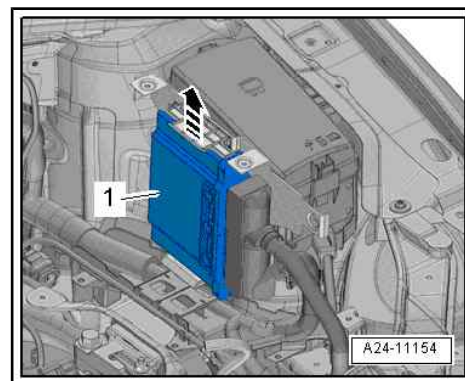
Install in reverse order of removal, observing the following:

- It is essential that the engine (motor) control unit - J623- be provided with the protective housing again.
- Clean the threaded holes for the shear-head bolts of locking compound residues. A thread chaser is suitable for cleaning.
- Use new shear-head bolts.

**After installing a new engine control unit, the following operations must be performed:**

- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu option on ⇒ Vehicle diagnostic tester:

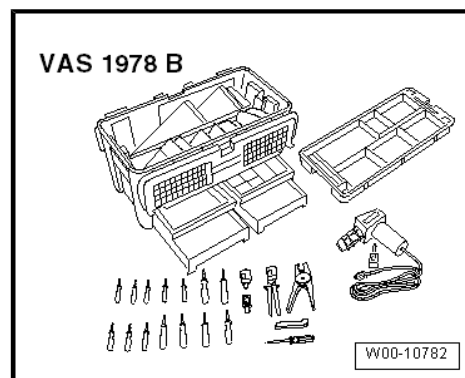
◆ 0001 - Renew engine control unit



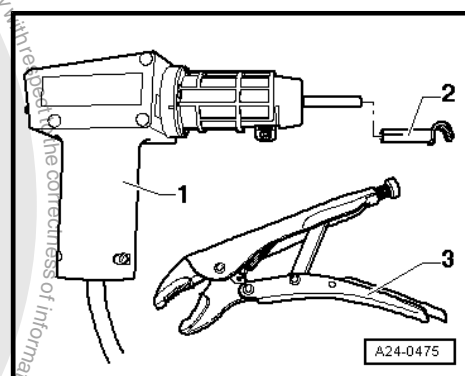
## 6.2.4 Removing and installing engine control unit - J623- with metal locking plate, Golf, Golf Estate, Golf SV

### Special tools and workshop equipment required

- ◆ Wiring harness repair set - VAS 1978 B-



- ◆ Hot air blower - VAS 1978/14A- -1- with nozzle attachment -2- from wiring harness repair set - VAS 1978 B-



- ◆ Small grinder (commercially available)
- ◆ ⇒ Vehicle diagnostic tester

### Removing

- If engine control unit is renewed, select 0001 - Renew engine control unit function in ⇒ Vehicle diagnostic tester.



- Switch off ignition and remove key from ignition lock.

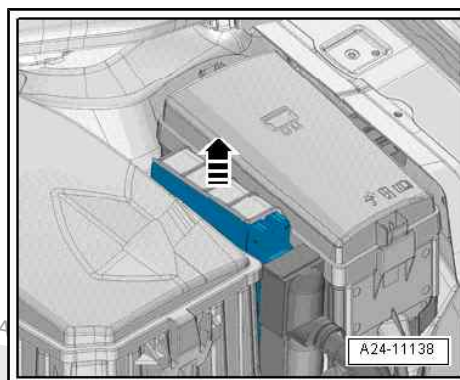


#### Note

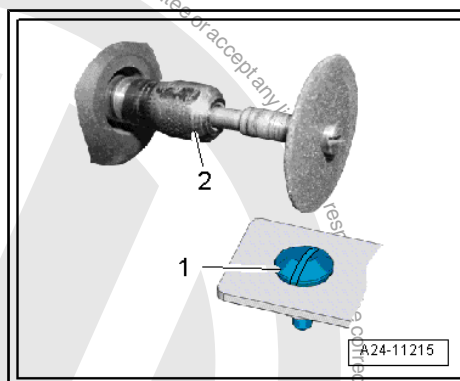
- ♦ *If the engine (motor) control unit comes into contact with the positive battery terminal, permanent damage to the engine (motor) control unit will be the consequence.*
- ♦ *Therefore, make sure to disconnect the battery before removing the engine control unit.*

Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery;  
Disconnecting and connecting battery .

- Release retaining clip -arrow- and take out engine control unit - J623- .



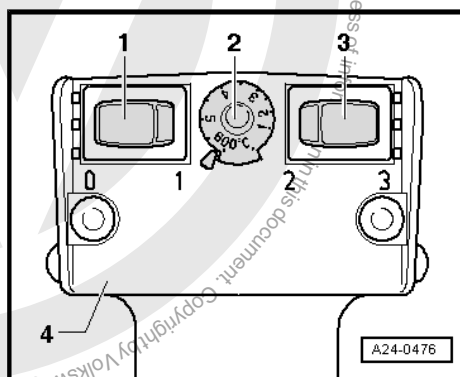
- Make groove (for a screwdriver) in head of shear bolt -1- using a small grinder -2-.



#### Note

*The threads of the shear bolts are secured with locking fluid. To unscrew these bolts, the threads must therefore be heated with the hot air blower.*

- Set the hot air blower as shown in illustration. Meaning potentiometer for temperature regulation -2- set to maximum heating power and 2-stage switch for air volume -3- set to position 3.



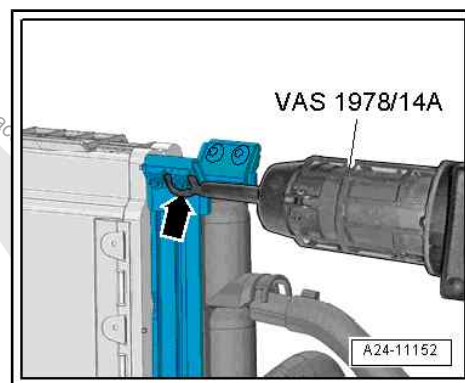
#### NOTICE

**Risk of damage to adjacent components caused by hot air blower. Risk of overheating.**

- If necessary, cover adjacent components.



- Hold hot air blower - VAS 1978/14A- with nozzle attachment -arrow- to thread of shear bolt and heat thread for about 20 to 30 seconds.

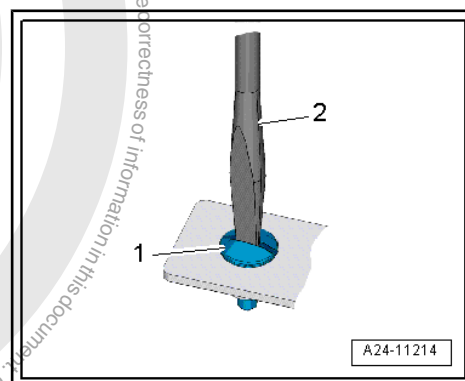


- Unscrew shear bolt -1- with screwdriver -2-.
- Detach metal locking plate from connectors for engine control unit - J623- .
- Release and pull off connectors.

### Installing

Install in reverse order of removal, observing the following:

- The metal locking plate must always be re-fitted on the engine control unit - J623- .
- Clean the threaded holes for the shear-head bolts of locking compound residues. A thread chaser is suitable for cleaning.
- Use new shear-head bolts.



**After installing a new engine control unit, the following operations must be performed:**

- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu option on ⇒ Vehicle diagnostic tester:

◆ 0001 - Renew engine control unit

## 6.2.5 Removing engine control unit - J623- from protective housing, Golf, Golf Variant, Golf SV

### Special tools and workshop equipment required

- ◆ Angle grinder e.g. axial grinder - VAS 6682-



### Note

*The protective housing is secured with shear-head bolts. The shear-head bolts cannot be removed without being damaged. Use e.g. the axial grinder - VAS 6682- or a commercially available angle grinder to remove the shear-head bolts. If the protective housing is damaged, it must be renewed.*

### Removing

- Remove engine control unit from holder  
⇒ "6.2 Removing and installing engine (motor) control unit J623", page 440 .
- Move clear wiring harness, and push it to one side as far as possible.



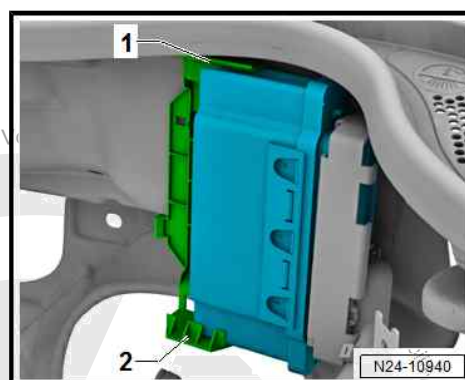
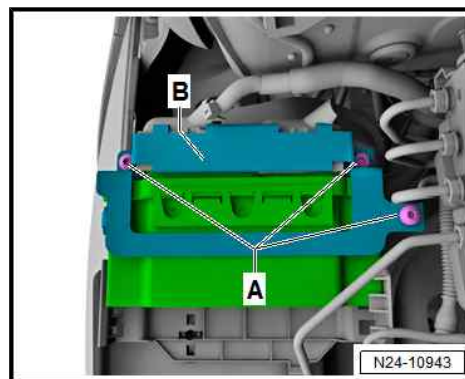


- Remove bolts -A-. Remove retainer -B-.
- Remove engine control unit from protective housing.

### Installing

Install in reverse order of removal. During this procedure, observe the following:

- Push engine control unit into protective housing as far as it will go.
- Fit locking element -B- onto protective housing, and secure it with new shear bolts -A- ⇒ Electronic Parts Catalogue (ET-KA) .
- First, insert engine control unit into tab -2- of holder.
- Push engine control unit into holder until upper tab -1- is engaged.



## 7 High-pressure pump

⇒ [“7.1 Assembly overview - high-pressure pump”, page 449](#)

⇒ [“7.2 Removing and installing high-pressure pump”, page 450](#)

⇒ [“7.3 Removing and installing high-pressure pipe”, page 451](#)

### 7.1 Assembly overview - high-pressure pump

#### 1 - Roller tappet

- ☐ When installing lubricate lightly with clean engine oil

#### 2 - O-ring

- ☐ Renew after removal
- ☐ When installing lubricate lightly with clean engine oil

#### 3 - High-pressure pump

- ☐ With fuel pressure regulating valve - N276 -
- ☐ Do not dismantle.
- ☐ Removing and installing  
⇒ [“7.2 Removing and installing high-pressure pump”, page 450](#)

#### 4 - High-pressure pipe

- ☐ Does not need to be replaced
- ☐ Before installing used high-pressure pipes, check thoroughly for leaks
- ☐ Do not alter shape.
- ☐ Removing and installing  
⇒ [“7.3 Removing and installing high-pressure pipe”, page 451](#)
- ☐ Lubricate thread of union nuts with clean engine oil
- ☐ 16 Nm +45°

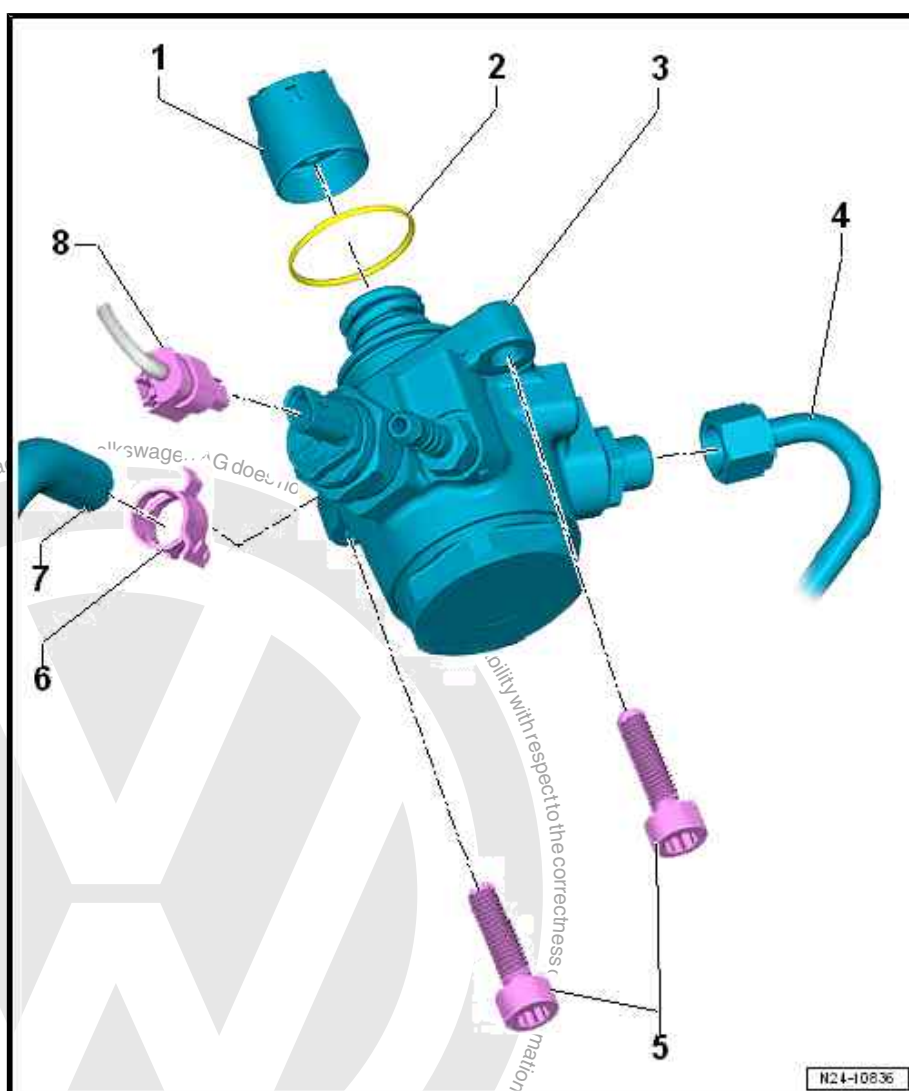
#### 5 - Bolt

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence for M6 threaded bolts ⇒ [page 450](#)
- ☐ Specified torque and tightening sequence for M8 threaded bolts ⇒ [page 450](#)

#### 6 - Hose clamp

#### 7 - Fuel return line

#### 8 - Electrical connector





## High-pressure pump - specified torque and tightening sequence



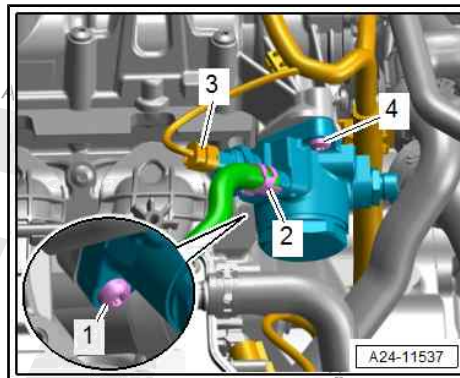
### Note

*Renew bolts that are tightened with turning further angle.*

Install high-pressure pump as follows to avoid deformation of the high-pressure pump flange:

Tighten M6 threaded bolts in stages as follows:

Stage	Bolts	Specified torque/turning further angle
1.	-1, 4-	Screw onto stop by hand
2.	-1, 4-	Tighten one turn alternately until flange of high-pressure pump makes contact with camshaft housing
3.	-1, 4-	M6 threaded bolts: 8 Nm
4.	-1, 4-	Turn 90° further



Tighten M8 threaded bolts in stages as follows:

Stage	Bolts	Specified torque/turning further angle
1.	-1, 4-	Screw onto stop by hand
2.	-1, 4-	Tighten one turn alternately until flange of high-pressure pump makes contact with camshaft housing
3.	-1, 4-	M8 threaded bolts: 20 Nm
4.	-1, 4-	Turn 90° further

## 7.2 Removing and installing high-pressure pump

### Removing

- Engine cold.
- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .
- Remove high-pressure pipe  
⇒ [“7.3 Removing and installing high-pressure pipe”, page 451](#) .
- Disconnect electrical connector -3-.



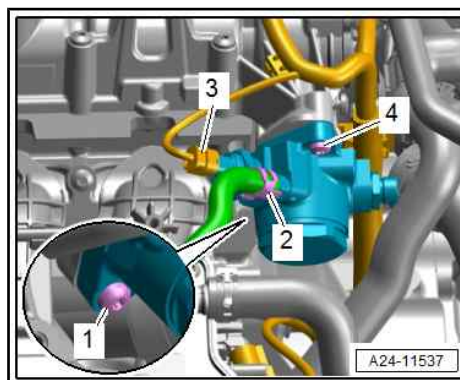
### Note

*Place a cloth underneath to catch escaping fuel.*

- Release hose clip -2- and detach fuel supply hose.
- Unscrew bolts -1 and 4-, and remove high-pressure pump with roller tappet.

### Installing

- Check roller tappet for damage and renew if necessary.
- Moisten roller tappet -1- with clean engine oil.
- Insert oiled roller tappet -1- into camshaft housing.





- Turn crankshaft in direction of engine rotation until roller tappet is at bottom dead centre.

### Note

*Renew O-ring.*

- Insert new, lubricated O-ring -2- in groove of high-pressure pump -3-.

### Note

*If the high-pressure pump is tightened unevenly (i.e. canted), it may become damaged.*

- Fit high-pressure pump, and initially and alternately hand-tighten bolts -1 and 4-.
- Tighten bolts -1 and 4- to final specified torque ➔ [page 450](#) .
- Push on fuel hose, and secure it with hose clip -2-.
- Connect connector -3-.
- Install high-pressure pipe  
➔ [“7.3 Removing and installing high-pressure pipe”, page 451](#) .
- Install air filter housing  
➔ [“3.2 Removing and installing air filter housing”, page 416](#) .
- Check fuel system for leaks.

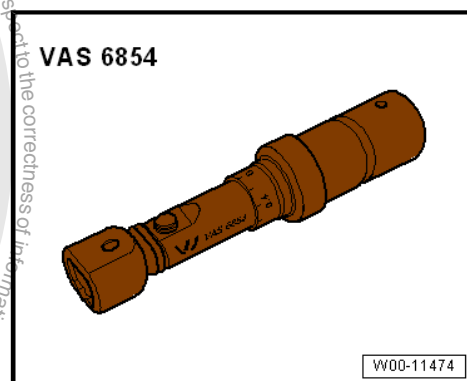
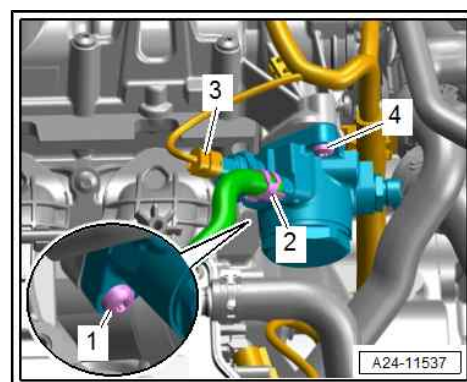
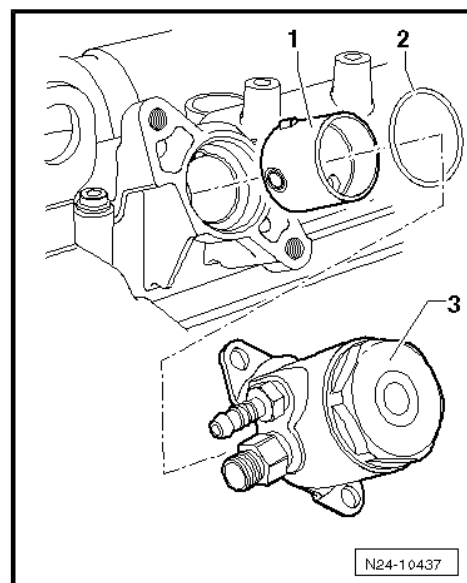
### Specified torques

- ◆ ➔ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)
- ◆ ➔ [“7.1 Assembly overview - high-pressure pump”, page 449](#)
- ◆ ➔ [“3.1 Assembly overview - air filter housing”, page 410](#)

## 7.3 Removing and installing high-pressure pipe

### Special tools and workshop equipment required

- ◆ Torque wrench - VAS 6854-





- ◆ Tool set - T10395A-



### Removing

- Remove air filter housing  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#) .

### ⚠ CAUTION

The fuel system is pressurised.

Danger of injury through fuel spray.

- Wear protective goggles.
- Wear protective gloves.
- To release pressure, wrap a clean cloth around the connection and carefully loosen the connection.

- Unscrew union nuts -arrows- and detach high-pressure pipe.

### Installing



### Note

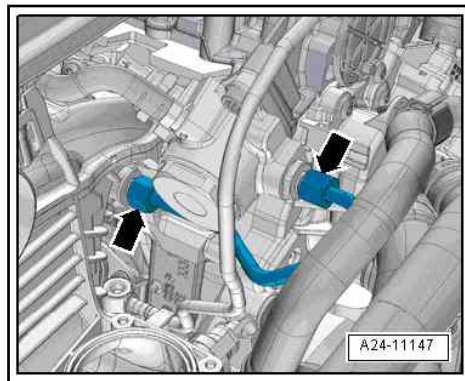
- ◆ *High-pressure pipe does not need to be renewed after removal.*
- ◆ *If used high-pressure pipes are installed, they must be checked thoroughly for leaks.*

Install in reverse order of removal, observing the following:

- Lubricate thread of union nuts with clean engine oil.
- Hand-tighten union nuts for high-pressure pipe (make sure that pipe is not under stress).
- Tighten union nuts using torque wrench - VAS 6854- and insert - T10395/3- .

### Specified torques

- ◆ ⇒ [“7.1 Assembly overview - high-pressure pump”, page 449](#)
- ◆ ⇒ [“2.1 Assembly overview - fuel rail with injectors”, page 400](#)







## 8 Lambda probe

⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)

⇒ ["8.2 Removing and installing Lambda probe", page 454](#)

### 8.1 Assembly overview - Lambda probe



#### Note

- ◆ *New lambda probes are coated with an assembly paste. This paste must not get into the slots on the Lambda probe body.*
- ◆ *In the case of a used Lambda probe, grease only the thread with high-temperature paste. This paste must not get into the slots on the Lambda probe body. High-temperature paste ⇒ [Electronic parts catalogue](#) .*
- ◆ *During installation, the electrical connecting cable of the Lambda probe must be secured at the same points. The wire must be prevented from touching the exhaust pipe.*

#### 1 - Lambda probe 1 after catalytic converter - GX7-

- ☐ Consisting of:  
Lambda probe after catalytic converter - G130-  
Lambda probe 1 heater after catalytic converter - Z29-

- ☐ Removing and installing  
⇒ ["8.2 Removing and installing Lambda probe", page 454](#)

- ☐ 55 Nm

#### 2 - Electrical connector

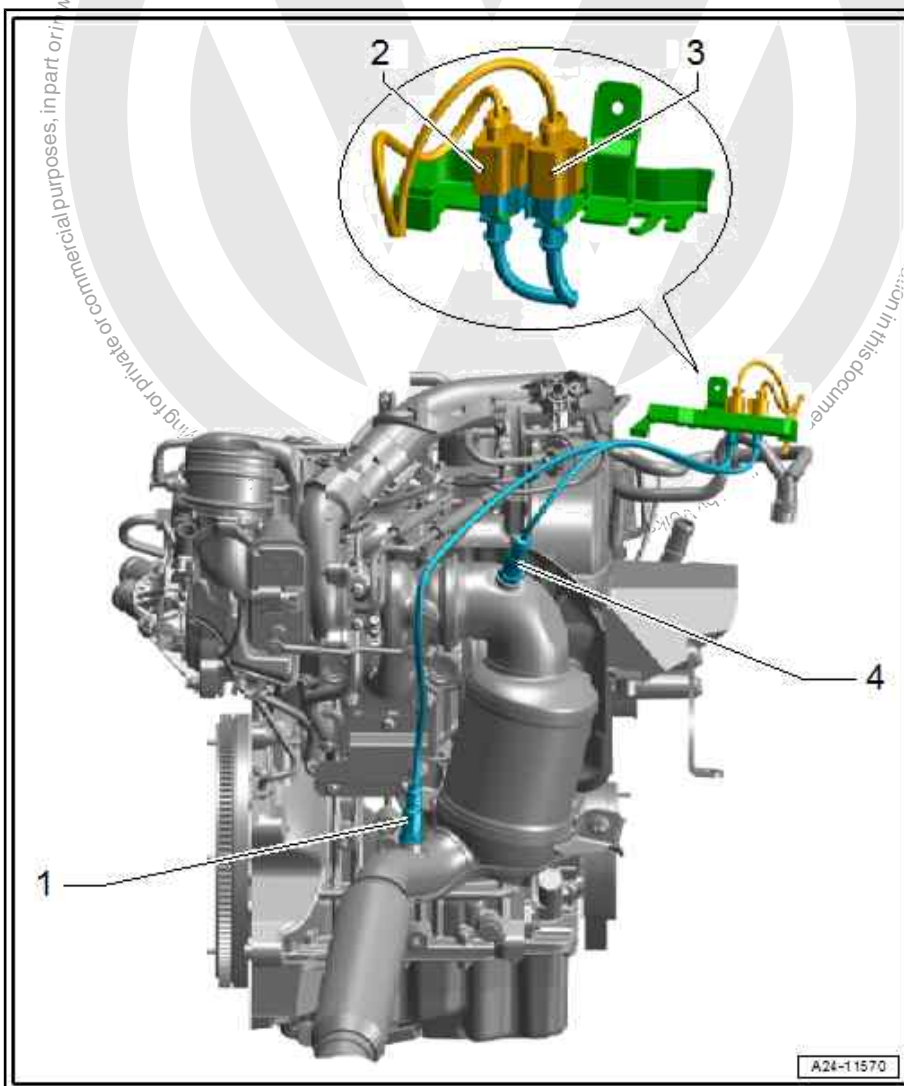
- ☐ For Lambda probe 1 before catalytic converter - GX10- .

#### 3 - Electrical connector

- ☐ For Lambda probe 1 after catalytic converter - GX7- .

#### 4 - Lambda probe 1 before catalytic converter - GX10-

- ☐ Consisting of:  
Lambda probe - G39-  
Lambda probe heater - Z19-
- ☐ Removing and installing  
⇒ ["8.2 Removing and installing Lambda probe", page 454](#)
- ☐ 55 Nm

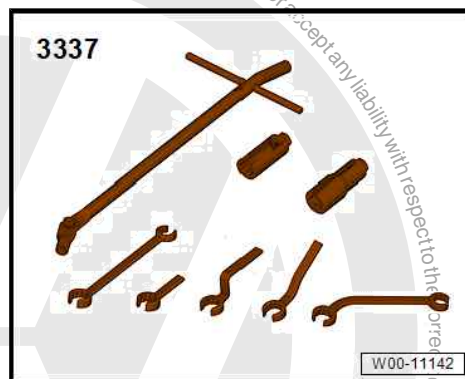




## 8.2 Removing and installing Lambda probe

### Special tools and workshop equipment required

- ◆ Lambda probe open ring spanner set - 3337-



Lambda probe 1 before catalytic converter - GX10- consists of

- ◆ Lambda probe - G39-
- ◆ Lambda probe heater - Z19-

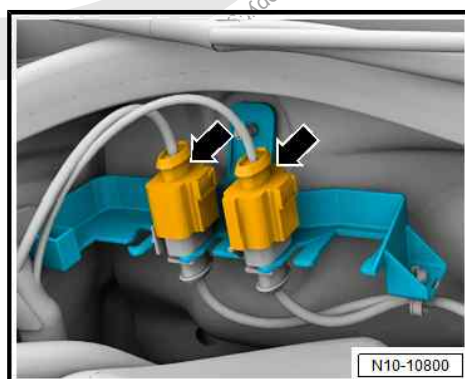
Lambda probe 1 after catalytic converter - GX7- consists of

- ◆ Lambda probe after catalytic converter - G130-
- ◆ Lambda probe 1 heater after catalytic converter - Z29-

### Removing

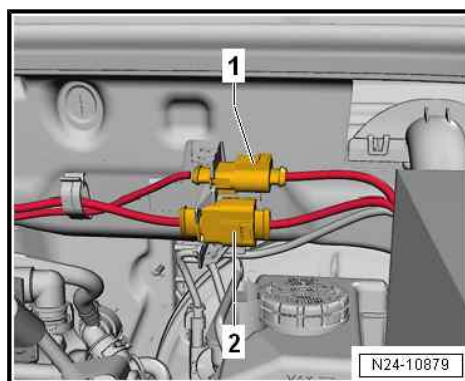
#### Polo 2014 ►

- Disconnect corresponding connector -arrow-:
- Lay wiring harness to one side.



#### Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross

- Release, pull off and detach electrical connector -1 and 2- respectively.
- Lay wiring harness to one side.





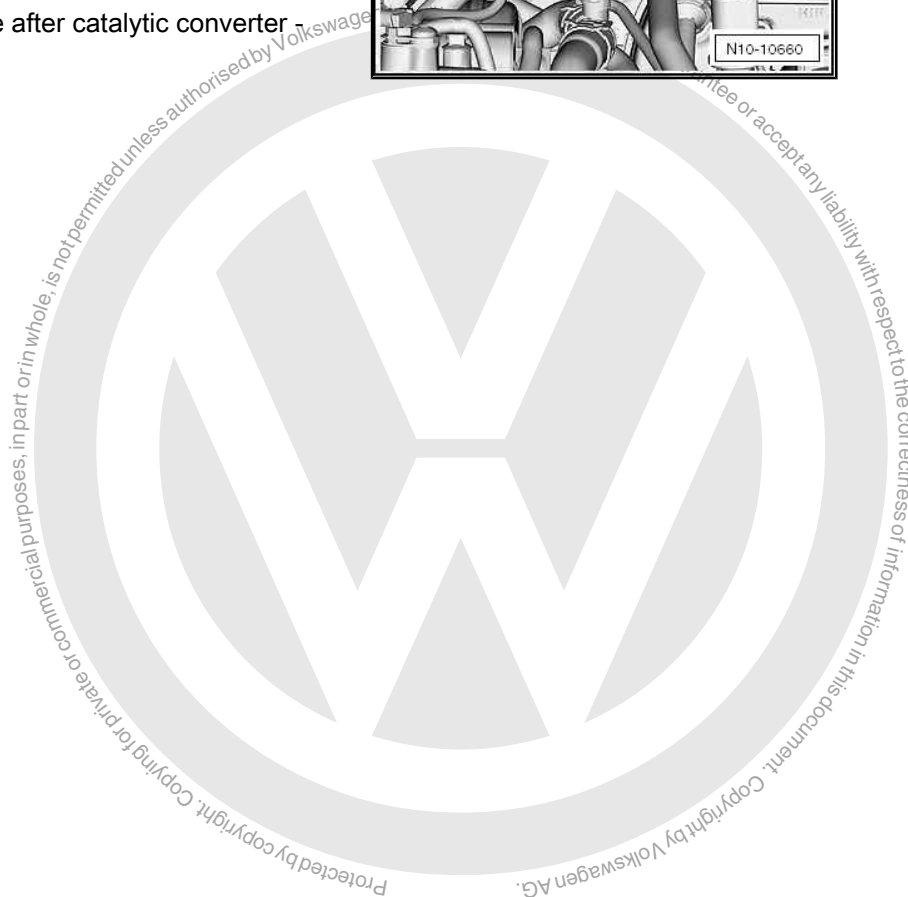
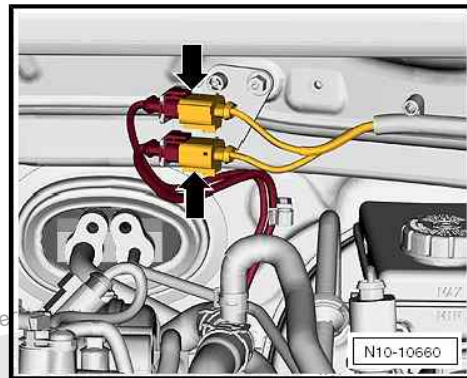
up!:

- Release, pull off and detach electrical connectors -arrows- for lambda probe 1 after catalytic converter - GX7- and lambda probe 1 before catalytic converter - GX10- respectively.
- Lay wiring harness to one side.

#### Continued for all vehicles

Steckerfarbe braun - Lambda probe before catalytic converter - GX10-

Steckerfarbe schwarz - Lambda probe after catalytic converter - GX7-





- Unscrew corresponding Lambda probe using a tool from Lambda probe open ring spanner set - 3337- .

1 - Lambda probe 1 after catalytic converter - GX7-

2 - Lambda probe 1 before catalytic converter - GX10-

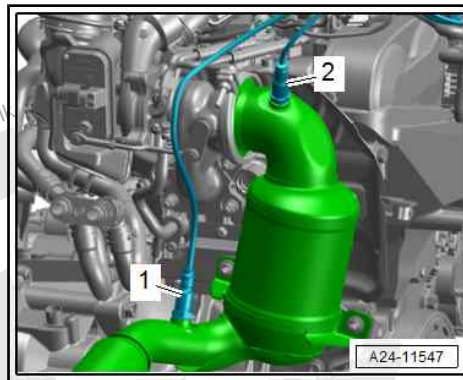
### Installing

Install in reverse order of removal, observing the following:



#### Note

- ◆ *New lambda probes are coated with an assembly paste. This paste must not get into the slots on the Lambda probe body.*
- ◆ *In the case of a used Lambda probe, grease only the thread with high-temperature paste. This paste must not get into the slots on the Lambda probe body. High-temperature paste → Electronic parts catalogue .*
- ◆ *During installation, the electrical connecting cable of the Lambda probe must be secured at the same points. The wire must be prevented from touching the exhaust pipe.*



### Golf, Golf SV and Golf Estate as of July 2015, Polo 2018 ►, T-Roc, T-Cross

- If lambda probe has been renewed, erase learnt values and adapt lambda probe to engine control unit using a vehicle diagnostic tester .
- Switch on ignition, and select following menu option on → Vehicle diagnostic tester:

- ◆ 0001 - Lambda probe adaption



#### Note

*Adaptation of the lambda probes older than July 2015 is not possible.*

### Polo 2014 ►, up!



#### Note

- ◆ *The Guided Functions option is not available.*
- ◆ *If there is an entry the in event memory, erase it.*

### Continued for all vehicles

#### Specified torques

- ◆ ⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)



## 26 – Exhaust system

### 1 Exhaust pipes and silencers

- ⇒ [“1.1 Assembly overview - silencers”, page 457](#)
- ⇒ [“1.2 Separating exhaust pipes from silencers”, page 465](#)
- ⇒ [“1.3 Removing and installing silencer”, page 469](#)
- ⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#)
- ⇒ [“1.5 Checking exhaust system for leaks”, page 478](#)
- ⇒ [“1.6 Installation position of clamp”, page 479](#)

#### 1.1 Assembly overview - silencers

- ⇒ [“1.1.1 Assembly overview - silencers, Polo 2014 ►”, page 457](#)
- ⇒ [“1.1.2 Assembly overview - silencers, Golf, Golf SV, T-Roc, Touran”, page 459](#)
- ⇒ [“1.1.3 Assembly overview silencers, Golf Estate”, page 461](#)
- ⇒ [“1.1.4 Assembly overview - silencers, up!”, page 463](#)
- ⇒ [“1.1.5 Assembly overview - silencers, Polo 2018 ►, T-Cross”, page 465](#)

##### 1.1.1 Assembly overview - silencers, Polo 2014 ►



#### Note

- ◆ *After working on the exhaust system, ensure that the system is not under tension*
- ◆ *and that there is sufficient clearance to the bodywork.*
- ◆ *If necessary, loosen double clamp(s). Align silencer and exhaust pipe so that sufficient clearance is maintained to the bodywork and the support rings are evenly loaded.*
- ◆ *Renew self-locking nuts.*
- ◆ *Before installing, coat threads of lock nuts and stud bolts with high-temperature paste - N 052.112.00- according to TL 521 12.*





### 1 - Clamping sleeve

- ☐ Fitting position  
⇒ ["1.6 Installation position of clamp", page 479](#)
- ☐ Position ⇒ [page 479](#)
- ☐ Specified torque  
⇒ [page 480](#)

### 2 - Tunnel cross-piece

- ☐ Note installation position (mark before removal, if necessary).
- ☐ Removing and installing  
⇒ Rep. gr. 66 ; Underbody cladding; Removing and installing tunnel cross-piece

### 3 - Securing nuts

- ☐ 20 Nm

### 4 - Front silencer

### 5 - Bracket

### 6 - Bolts

- ☐ 23 Nm

### 7 - Mounting

- ☐ Renew if damaged

### 8 - Coupling point

- ☐ Separating  
⇒ ["1.2 Separating exhaust pipes from silencers", page 465](#)

### 9 - Rear silencer

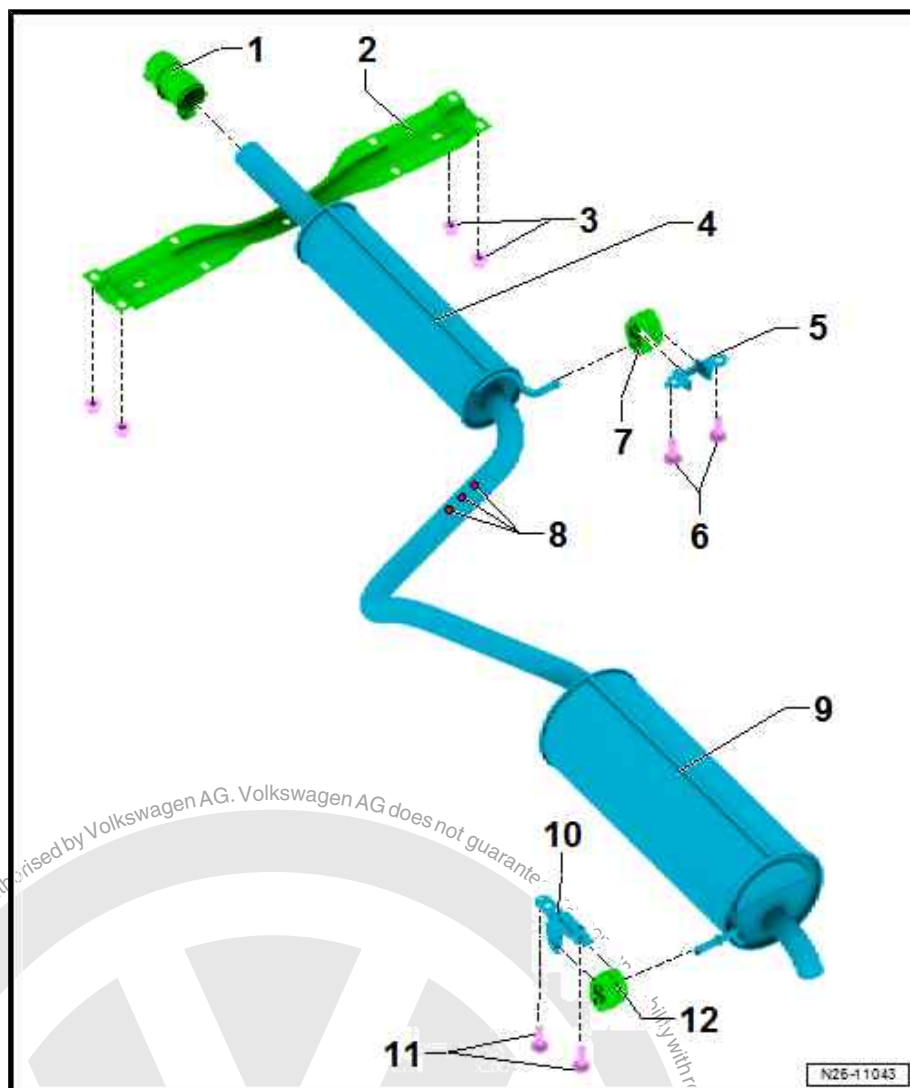
### 10 - Bracket

### 11 - Securing bolts

- ☐ 23 Nm

### 12 - Mounting

- ☐ Renew if damaged



## 1.1.2 Assembly overview - silencers, Golf, Golf SV, T-Roc, Touran

### 1 - Retainer

- ☐ Renew if damaged

### 2 - Bolt

- ☐ 20 Nm

### 3 - Mounting »A«

- ☐ Renew if damaged
- ☐ Only for rear silencer
- ☐ Aligning ⇒ [page 460](#)

### 4 - Rear silencer

- ☐ Combined in one unit with front silencer as original equipment. Can be renewed individually for repair purposes.
- ☐ Removing and installing ⇒ ["1.3 Removing and installing silencer", page 469](#)
- ☐ Separating exhaust pipes from silencers ⇒ ["1.2 Separating exhaust pipes from silencers", page 465](#)
- ☐ Aligning exhaust system free of tension ⇒ ["1.4 Aligning exhaust system free of stress", page 478](#)

### 5 - Rear clamp

- ☐ Align exhaust system free of tension before tightening ⇒ ["1.4 Aligning exhaust system free of stress", page 478](#)

- ☐ Fitting position ⇒ [page 460](#)
- ☐ Tighten threaded connections evenly.

### 6 - Nut

- ☐ 30 Nm

### 7 - Retainer

- ☐ Renew if damaged

### 8 - Bolt

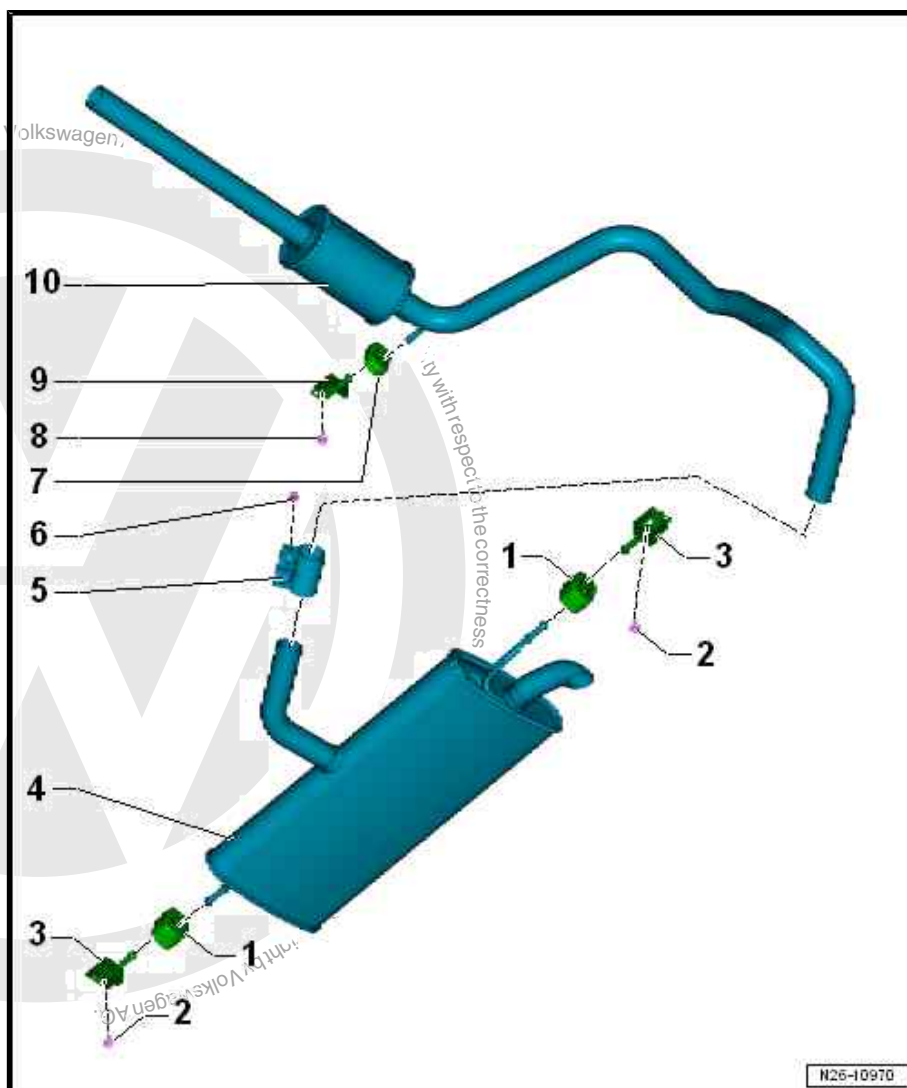
- ☐ 20 Nm +90°

### 9 - Mounting »B«

- ☐ Renew if damaged
- ☐ Only for front silencer
- ☐ Aligning ⇒ [page 460](#)

### 10 - Front silencer

- ☐ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ☐ Removing and installing ⇒ ["1.3 Removing and installing silencer", page 469](#)

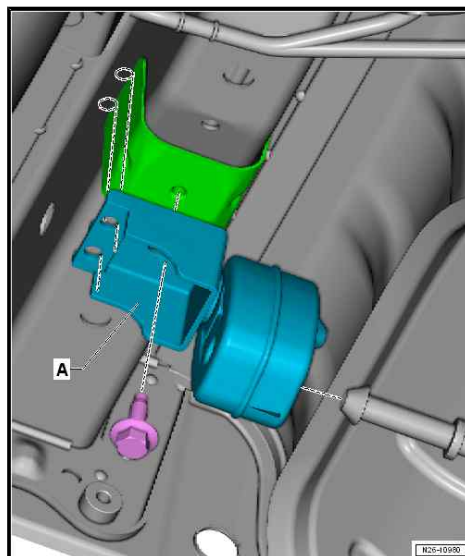




- ❑ Separating exhaust pipes from silencers ⇒ [“1.2 Separating exhaust pipes from silencers”, page 465](#)
- ❑ Aligning exhaust system free of tension ⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#) .

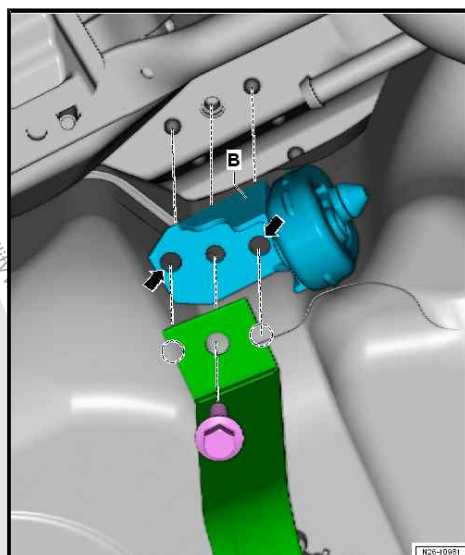
### Aligning mounting »A«

- Pre-tighten bolt.
- Align mounting at elongated hole as necessary.
- Using blunt side of commercially available 8 mm drill bit, align holes of mounting -A- centrally and perpendicular to longitudinal member.
- Then tighten to specified torque.



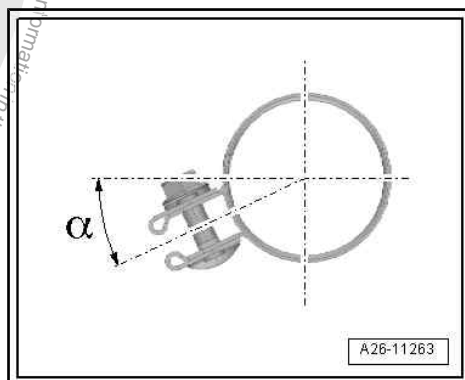
### Aligning mounting »B«

- Pre-tighten bolt.
- Align mounting at elongated hole as necessary.
- Using blunt end of commercially available 8 mm drill bit, align holes -arrows- of mounting -B- centrally and parallel to longitudinal member.
- Then tighten to specified torque.



### Installation position of rear clamp

- Fit clamp in position shown.
- Installation position of clamp  
⇒ [“1.6 Installation position of clamp”, page 479](#)





### 1.1.3 Assembly overview silencers, Golf Estate

#### 1 - Front silencer

- ☐ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ☐ Removing and installing ⇒ ["1.3 Removing and installing silencer", page 469](#)
- ☐ Separating exhaust pipes from silencers ⇒ ["1.2 Separating exhaust pipes from silencers", page 465](#)
- ☐ Aligning exhaust system free of tension ⇒ ["1.4 Aligning exhaust system free of stress", page 478](#).

#### 2 - Retainer

- ☐ Renew if damaged

#### 3 - Mounting »A«

- ☐ Renew if damaged
- ☐ Aligning ⇒ [page 462](#)

#### 4 - Bolt

- ☐ M8 x 25
- ☐ 20 Nm

#### 5 - Nut

- ☐ 30 Nm

#### 6 - Rear clamp

- ☐ Align exhaust system free of tension before tightening ⇒ ["1.4 Aligning exhaust system free of stress", page 478](#).
- ☐ Fitting position ⇒ [page 463](#)
- ☐ Tighten threaded connections evenly.

#### 7 - Mounting »B«

- ☐ Renew if damaged
- ☐ Aligning ⇒ [page 462](#)

#### 8 - Bolt

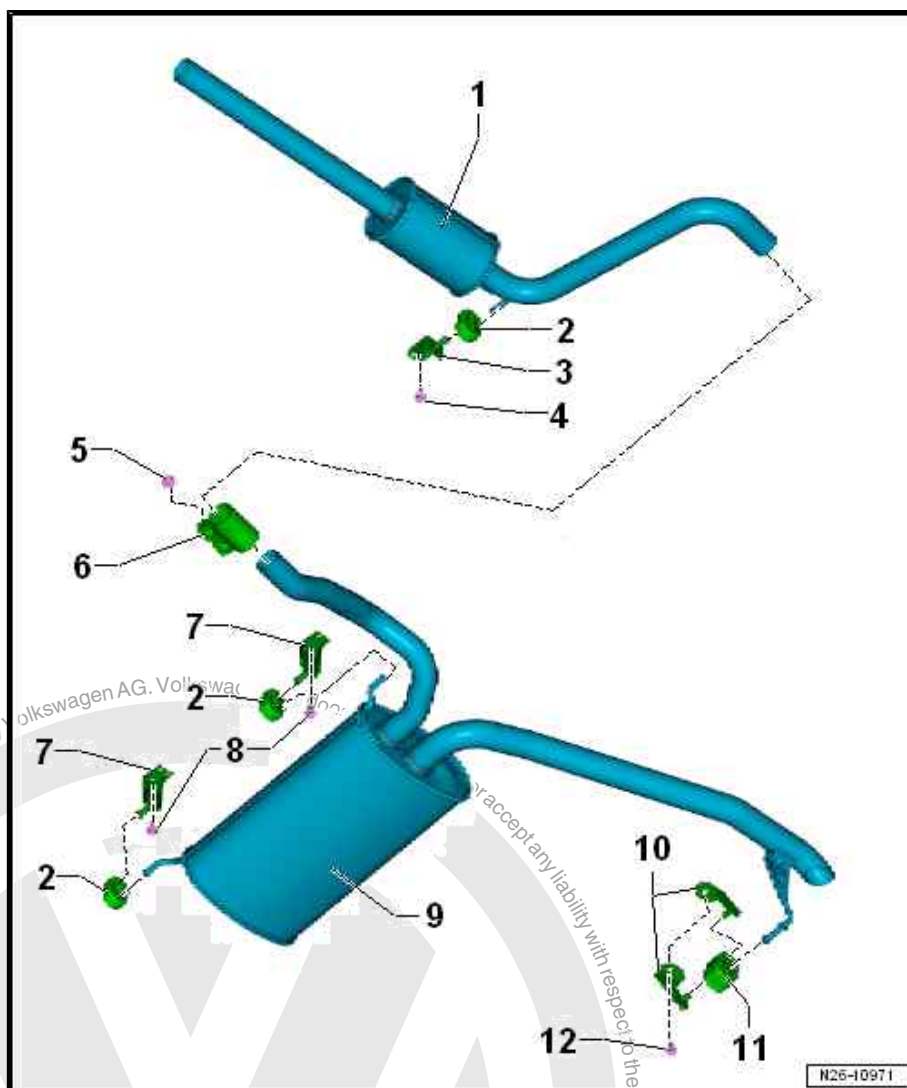
- ☐ M8 x 25
- ☐ 20 Nm

#### 9 - Rear silencer

- ☐ Combined in one unit with front silencer as original equipment. Can be renewed individually for repair purposes.
- ☐ Removing and installing ⇒ ["1.3 Removing and installing silencer", page 469](#)
- ☐ Separating exhaust pipes from silencers ⇒ ["1.2 Separating exhaust pipes from silencers", page 465](#)
- ☐ Aligning exhaust system free of tension ⇒ ["1.4 Aligning exhaust system free of stress", page 478](#).

#### 10 - Mounting »C«

- ☐ Renew if damaged





- ❑ Aligning ➔ [page 463](#)

## 11 - Retainer

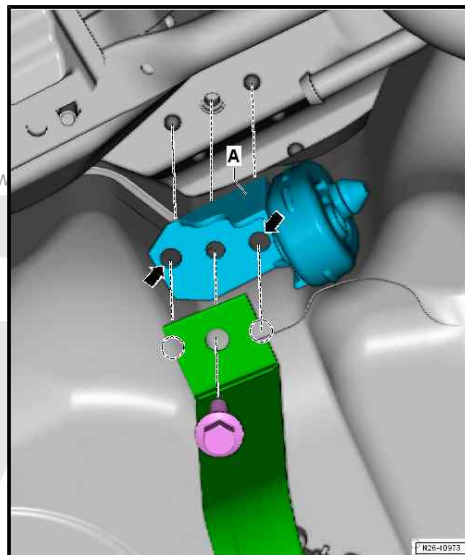
- ❑ Renew if damaged

## 12 - Bolt

- ❑ M8 x 25
- ❑ 20 Nm

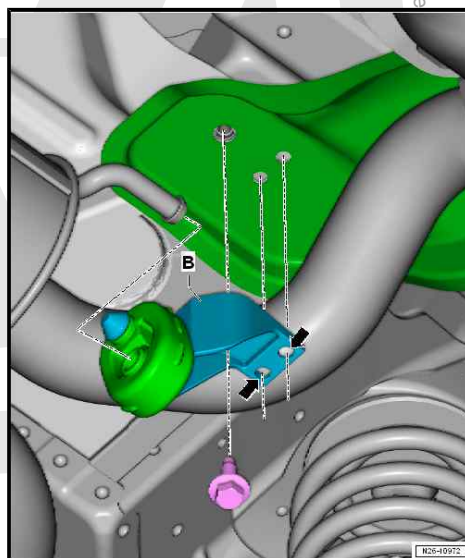
### Aligning mounting »A«

- Pre-tighten bolt.
- Align mounting at elongated hole as necessary.
- Using blunt end of commercially available 8 mm drill bit, align holes -arrows- of mounting -A- centrally and parallel to longitudinal member.
- Then tighten to specified torque.



### Aligning mounting »B«

- Pre-tighten bolt.
- Align mounting at elongated hole as necessary.
- Align holes -arrows- of mounting -B- centrally using blunt side of commercially available 8 mm drill bit.
- Then tighten to specified torque.

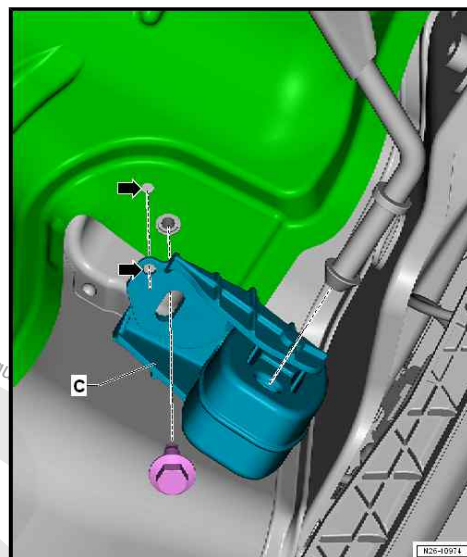






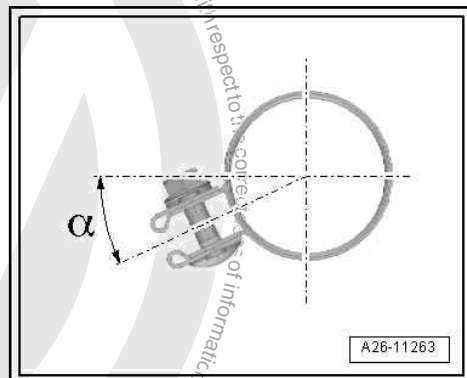
### Mounting »C«

- Pre-tighten bolt.
- Align mounting at elongated hole as necessary.
- Align holes -arrows- of mounting -C- centrally using blunt end of commercially available 8 mm drill bit.
- Then tighten to specified torque.



### Installation position of rear clamp

- Fit clamp in position shown.
- Installation position of clamp  
⇒ ["1.6 Installation position of clamp", page 479](#)



## 1.1.4 Assembly overview - silencers, up!



**1 - Silencer with exhaust tail pipe**

**2 - Tunnel cross-piece**

- ☐ Note installation position (mark before removal, if necessary).

**3 - Nut**

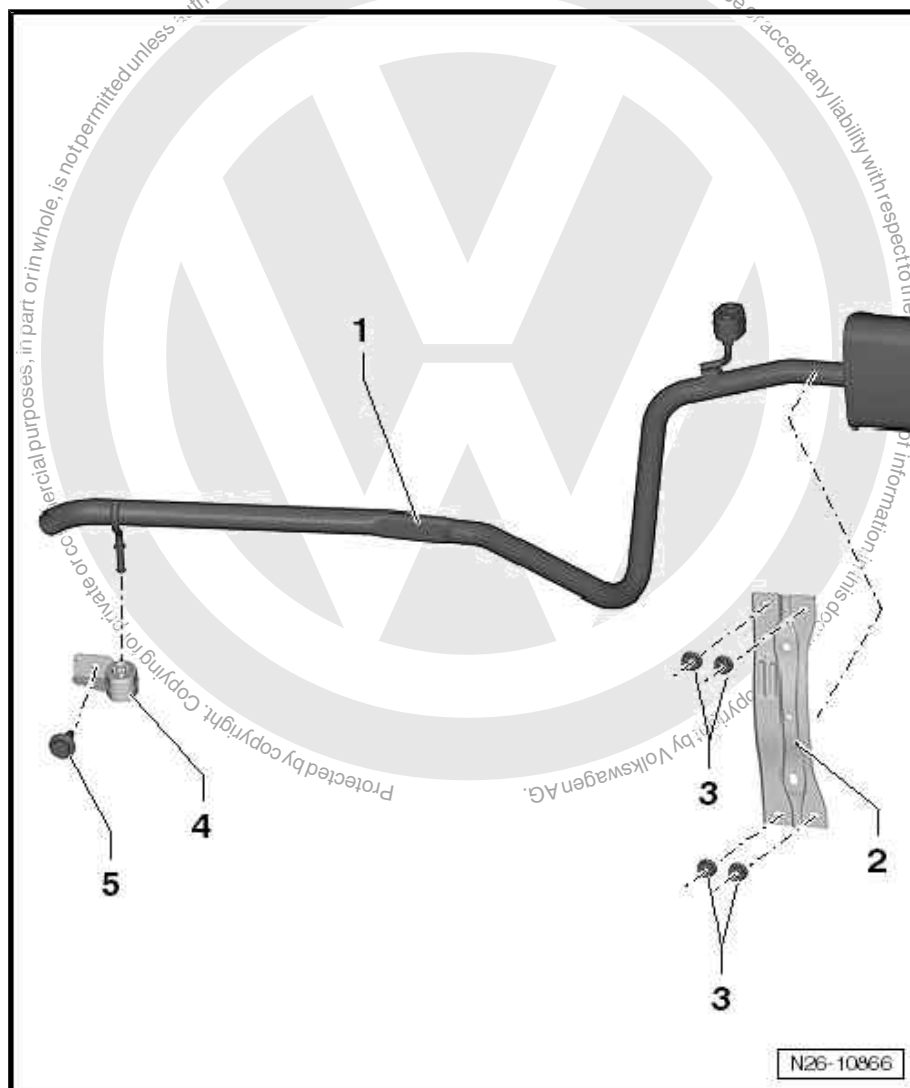
- ☐ 20 Nm

**4 - Rear mounting**

- ☐ Renew if damaged

**5 - Bolt**

- ☐ 23 Nm





## 1.1.5 Assembly overview - silencers, Polo 2018 ►, T-Cross

### 1 - Clamping sleeve

- ☐ Fitting position

⇒ [page 479](#)

- ☐ Specified torque

⇒ [page 480](#)

### 2 - Front silencer

- ☐ Removing and installing

⇒ [page 471](#)

### 3 - Retaining ring

### 4 - Bracket

### 5 - Bolts

- ☐ Number depends on equipment
- ☐ 20 Nm

### 6 - Coupling point

- ☐ Disconnecting

⇒ [page 465](#)

### 7 - Rear silencer

- ☐ Removing and installing

⇒ [page 475](#)

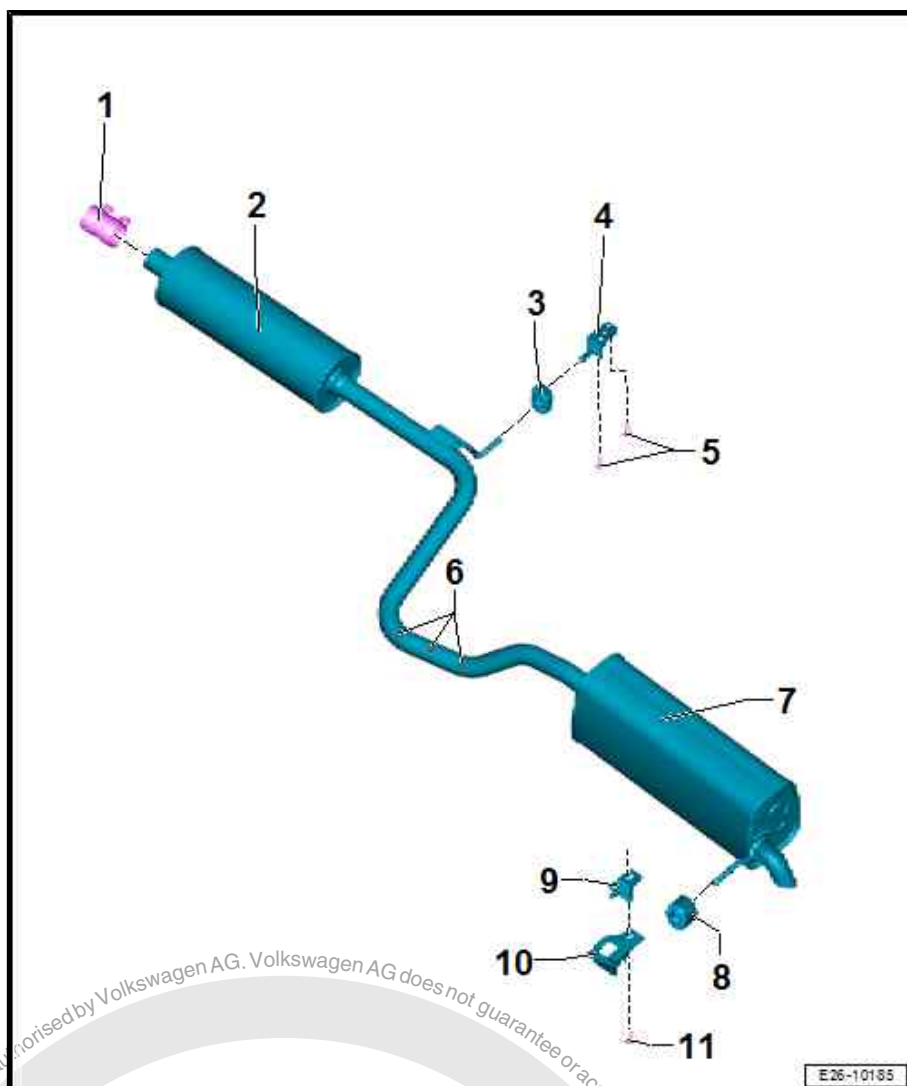
### 8 - Retaining ring

### 9 - Bracket

### 10 - Bracket

### 11 - Bolt

- ☐ 20 Nm



## 1.2 Separating exhaust pipes from silencers

⇒ ["1.2.1 Separating exhaust pipes from silencers, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran", page 465](#)

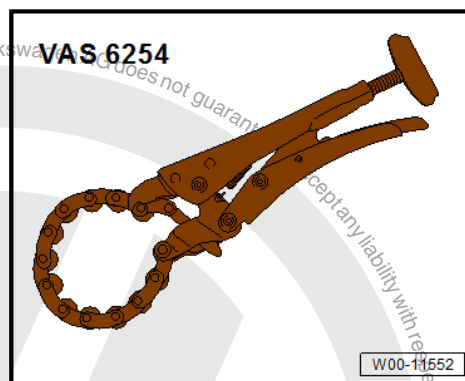
⇒ ["1.2.2 Separating exhaust pipes/silencers, up!", page 467](#)

### 1.2.1 Separating exhaust pipes from silencers, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran

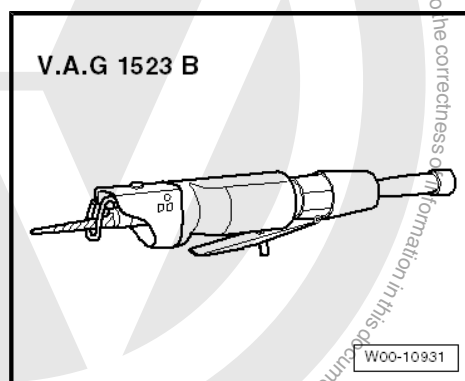
Special tools and workshop equipment required



- ◆ Chain-type pipe cutter - VAS 6254-



- ◆ Pneumatic sabre saw - V.A.G 1523B-



- ◆ Torque wrench - V.A.G 1331-



#### Sequence of operations

##### CAUTION

Risk of injury from swarf being flung into air.  
Irritation and injury to skin and eyes possible.

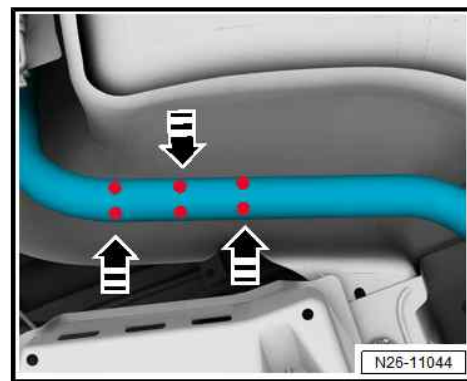
- Wear protective goggles.
- Wear protective gloves.

- ◆ Separating points are provided in the exhaust system for the individual removal of exhaust system parts.
- ◆ The separating points are indicated with markings on the outside of the exhaust pipe.



### Separating point on rear silencer

- Cut through exhaust pipe at centre separating point  
-upper arrow- at right angles, e.g. with pneumatic sabre saw - V.A.G 1523B- or chain pipe cutter - VAS 6254- .
- Position repair double clamp centrally between outer markings  
-lower arrow-.
- Take installation position of clamp into account  
⇒ ["1.6 Installation position of clamp", page 479](#)



## 1.2.2 Separating exhaust pipes/silencers, up!

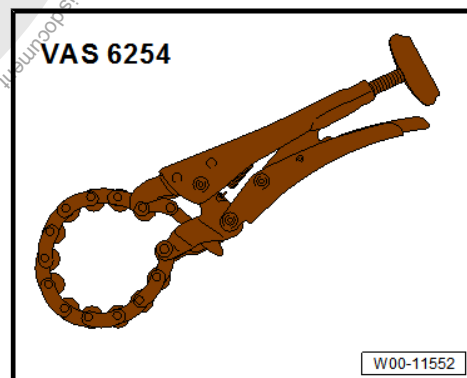


### Note

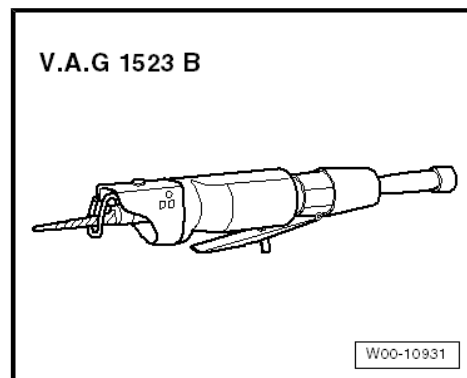
- ◆ *After working on the exhaust system, ensure that the system is not under tension*
- ◆ *and that there is sufficient clearance to the bodywork.*
- ◆ *If necessary, loosen double clamp(s). Align silencer and exhaust pipe so that sufficient clearance is maintained to the bodywork and the support rings are evenly loaded.*
- ◆ *Renew self-locking nuts.*
- ◆ *Before installing, coat threads of lock nuts and stud bolts with high-temperature paste - N 052.112.00- according to TL 521 12.*

### Special tools and workshop equipment required

- ◆ Chain-type pipe cutter - VAS 6254-



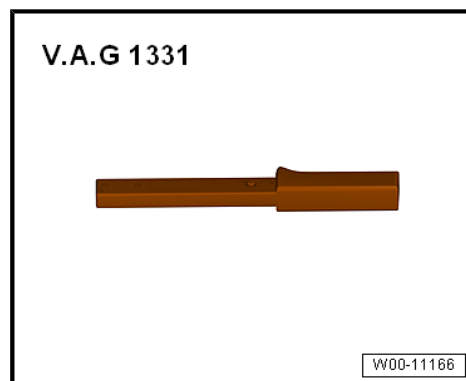
- ◆ Pneumatic sabre saw - V.A.G 1523A-







- ◆ Torque wrench - V.A.G 1331-



### CAUTION

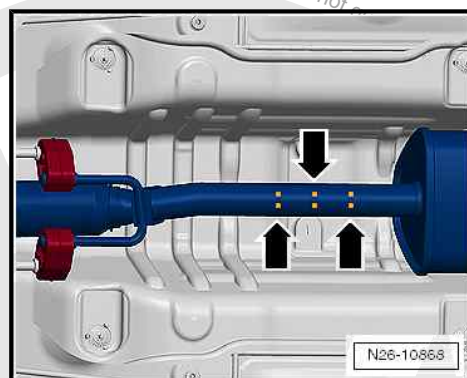
Risk of injury from swarf being flung into air.  
Irritation and injury to skin and eyes possible.

- Wear protective goggles.
- Wear protective gloves.

- ◆ Separating points are provided in the exhaust system for the individual removal of exhaust system parts.
- ◆ The separating points are indicated with markings on the outside of the exhaust pipe.

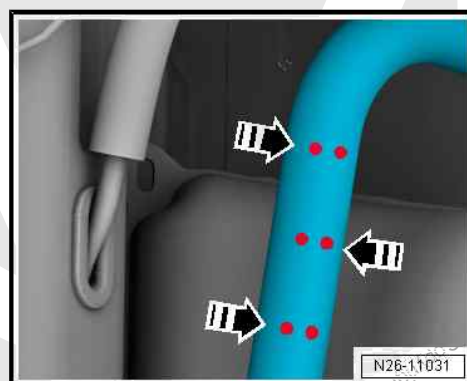
#### Coupling point between catalytic converter and silencer:

- Cut through exhaust pipe at centre separating point -upper arrow- at right angles, e.g. with pneumatic sabre saw - V.A.G 1523A- or chain pipe cutter - VAS 6254- .
- Position repair double clamp centrally between outer markings -lower arrow-.
- Take installation position of clamp into account  
⇒ ["1.6.2 Installation position of clamp, up!"](#), page 480 .



#### Separating point on exhaust pipe

- Cut through exhaust pipe at centre separating point -right arrow- at right angles e.g. with pneumatic sabre saw - V.A.G 1523A- or chain pipe cutter - VAS 6254- .
- Position repair double clamp centrally between outer markings -left arrow-.
- Take installation position of clamp into account  
⇒ ["1.6.2 Installation position of clamp, up!"](#), page 480 .





## 1.3 Removing and installing silencer

⇒ ["1.3.1 Removing and installing front silencer, Polo 2014 ►", page 469](#)

⇒ ["1.3.2 Removing and installing front silencer, Golf, Golf Estate, Golf SV, T-Roc, Touran", page 470](#)

⇒ ["1.3.3 Removing and installing front silencer, Polo 2018 ►, T-Cross", page 471](#)

⇒ ["1.3.4 Removing and installing rear silencer, Polo 2014 ►", page 472](#)

⇒ ["1.3.5 Removing and installing rear silencer, Golf, Golf Estate, Golf SV, T-Roc, Touran", page 474](#)

⇒ ["1.3.6 Removing and installing rear silencer, Polo 2018 ►, T-Cross", page 475](#)

⇒ ["1.3.7 Removing and installing silencer, up!", page 476](#)

⇒ ["1.3.8 Align end exhaust pipes", page 478](#)

### 1.3.1 Removing and installing front silencer, Polo 2014 ►

Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



#### Removing

##### CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.

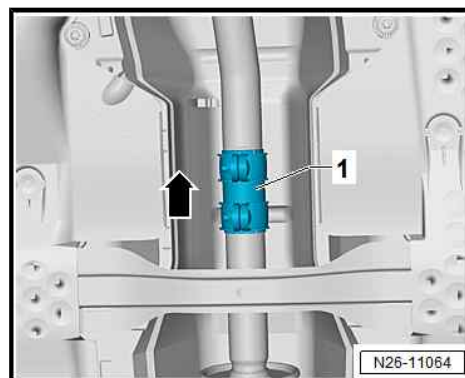
#### Separating point without clamp

- Separate rear silencer from front silencer  
⇒ ["1.2 Separating exhaust pipes from silencers", page 465](#)



### Separating point with clamp

- Loosen clamp -1- between catalytic converter and front silencer, and push it in direction of travel -arrow-.
- Loosen clamp between front and rear silencer, and push it in opposite direction of travel.



- Bend heat shield -1- in direction of -arrow-.
- Bracket -2- needs to be guided past heat shield -1-.
- Unscrew bolts -3- from bracket -2-. Guide bracket -2- past heat shield -1-.
- Detach front silencer, and guide it out.

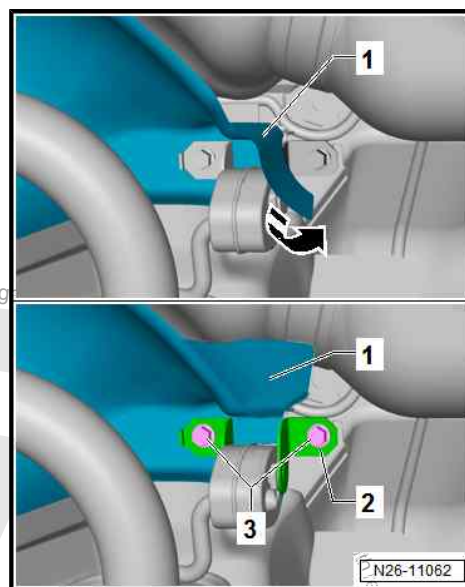
### Installing

Install in reverse order of removal, observing the following:

- Align exhaust system free of stress.  
⇒ ["1.4 Aligning exhaust system free of stress", page 478](#)
- Note installation position of clamps  
⇒ ["1.6 Installation position of clamp", page 479](#).

### Specified torques

- Securing bolts for bracket  
⇒ ["1.1 Assembly overview - silencers", page 457](#)
- Bolts for clamp ⇒ [page 480](#)



## 1.3.2 Removing and installing front silencer, Golf, Golf Estate, Golf SV, T-Roc, Touran

### Removing

#### ⚠ CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second mechanic for the following work.

- If fitted, remove rear left underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding .
- Remove rear tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding.

### Separating point without clamp

- Separate silencers  
⇒ ["1.2 Separating exhaust pipes from silencers", page 465](#)

### Separating point with clamp

- Loosen clamp at rear, and push it to rear.
- Detach front silencer from rubber mounting.



- Loosen clamp -arrow- at front, and push it forwards.
- Remove front silencer.

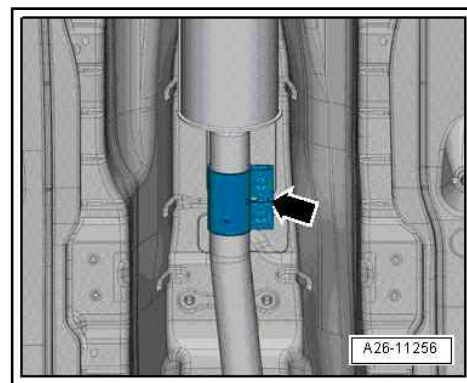
#### Installing

Install in reverse order of removal, observing the following:

- Align exhaust system free of stress  
⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#) .

#### Specified torques

- ⇒ [“1.1 Assembly overview - silencers”, page 457](#)
- ⇒ [“2.1 Assembly overview - emission control”, page 482](#)
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding



### 1.3.3 Removing and installing front silencer, Polo 2018 ➤, T-Cross

#### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



#### Removing

- If fitted, remove middle underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding; Removing and installing underbody cladding .
- If fitted, remove rear left underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding; Removing and installing underbody cladding .
- Remove rear tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding; Removing and installing tunnel cross-piece .

#### CAUTION

**Danger of severe burns from hot exhaust system.**  
**Risk of burns to hands and other parts of body.**

- Allow exhaust system to cool.

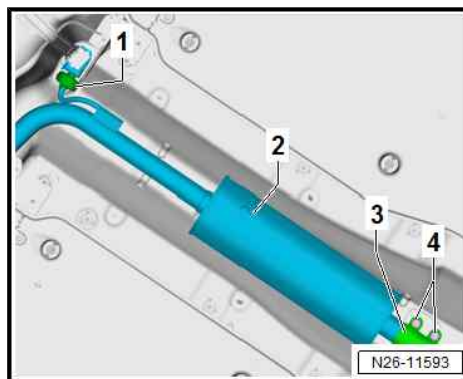


- Loosen nuts -4-.
- Push clamp -3- forwards.
- Disconnect exhaust pipe/rear silencer.  
⇒ ["1.2 Separating exhaust pipes from silencers", page 465](#)

**CAUTION**

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.



- Disengage retaining ring -1-.
- Remove front silencer -2- with aid of second mechanic.

**Installing**

Install in reverse order of removal, observing the following:

- Note installation position of clamp.  
⇒ ["1.6 Installation position of clamp", page 479](#)
- Align exhaust system free of stress.  
⇒ ["1.4 Aligning exhaust system free of stress", page 478](#)

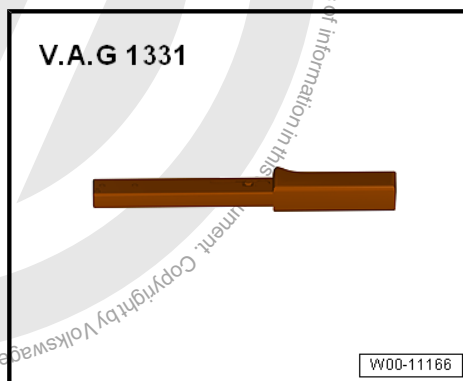
**Specified torques**

- ⇒ ["1.1.5 Assembly overview - silencers, Polo 2018 ►, T-Cross", page 465](#)

### 1.3.4 Removing and installing rear silencer, Polo 2014 ►

**Special tools and workshop equipment required**

- ◆ Torque wrench - V.A.G 1331-



**Removing**

**CAUTION**

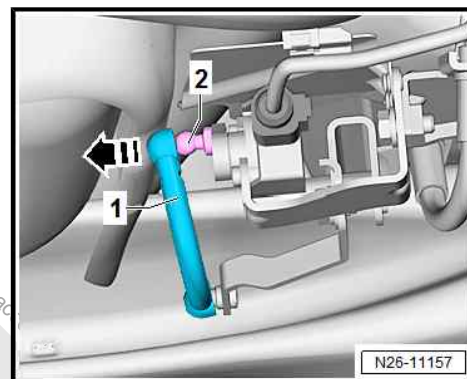
Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.





- Lever the lever -1- off ball head -2- of rear left vehicle level sender - G76- in direction of -arrow-.

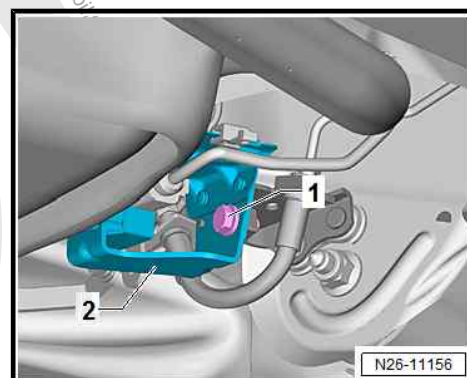


- Unscrew bolt -1-, and attach bracket -2- on one side.

#### Separating point without clamp

- Separate silencers  
⇒ [“1.2 Separating exhaust pipes from silencers”, page 465](#)

#### Separating point with clamp

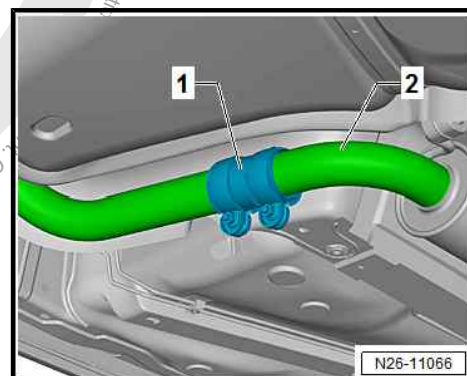


- Unbolt bracket on rear silencer, and remove it.
- Loosen clamp -1-, and push it to one side towards front silencer -2-.

#### Continued for all vehicles

- Remove rear silencer.

#### Installing



Install in reverse order of removal, observing the following:

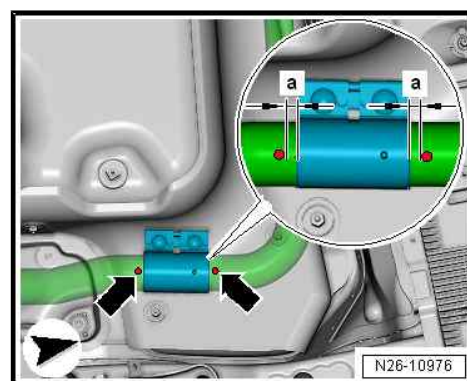
- Note installation position of clamp  
⇒ [“1.6 Installation position of clamp”, page 479](#) .



#### Note

*Make sure to obtain the dimension -a = approx. 5 mm- between the marks -arrows-.*

- Align exhaust system free of stress.  
⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#)



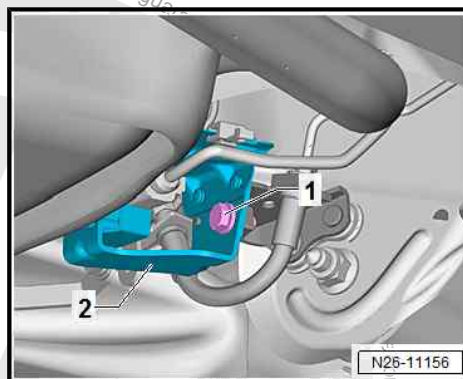


- Tighten securing bolt -1- for bracket of rear left vehicle level sender - G76- to specified torque ➔ [page 474](#) .

#### Specified torques

Component	Specified torque
Securing bolt for rear left vehicle level sender - G76-	20 Nm

- Securing bolts for bracket ➔ ["1.1 Assembly overview - silencers", page 457](#)
- Bolts for clamp ➔ [page 480](#)



### 1.3.5 Removing and installing rear silencer, Golf, Golf Estate, Golf SV, T-Roc, Touran

#### Removing

- If fitted, remove rear left underbody cladding ➔ General body repairs, exterior; Rep. gr. 66, Underbody cladding .

#### ⚠ CAUTION

Risk of accident caused by high weight of silencers.

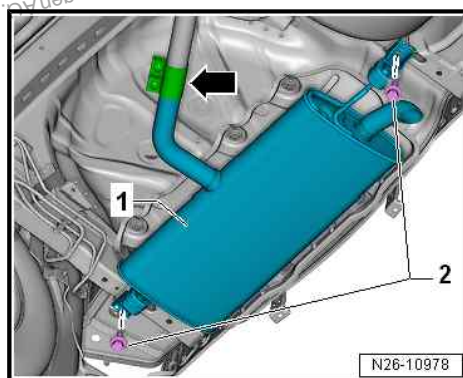
- Seek help from a second a mechanic for the following work.

#### Coupling point without clamp, Golf Saloon, Golf SV, T-Roc, Touran

- Separate silencers ➔ ["1.2 Separating exhaust pipes from silencers", page 465](#)

#### Separating point with clamp

- Loosen clamp -arrow-, and push it forwards.
- Remove bolt -2- on both sides.
- Remove rear silencer -1-.



#### Note

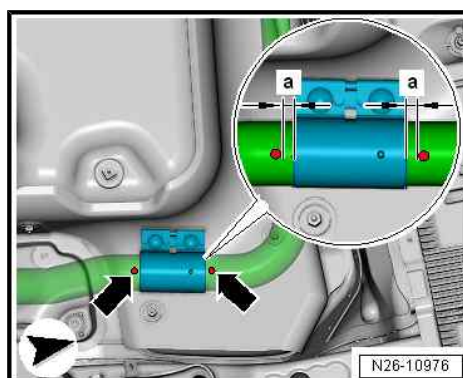
- ♦ The position of the coupling point may vary slightly, depending on the vehicle type.
- ♦ Pay attention to the marking of the coupling points ➔ [page 467](#) .

#### Coupling point without clamp, Golf Estate

- Separate silencers ➔ ["1.2 Separating exhaust pipes from silencers", page 465](#)

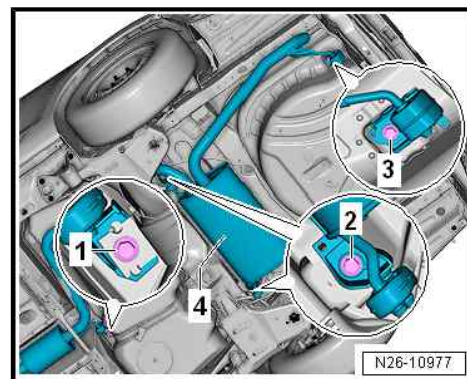
#### Separating point with clamp

- Loosen clamp -arrows-, and push it forwards.





- Unscrew bolts -1- and -2-.
- Unscrew bolt -3-, and remove rear silencer -4-.



### Installing

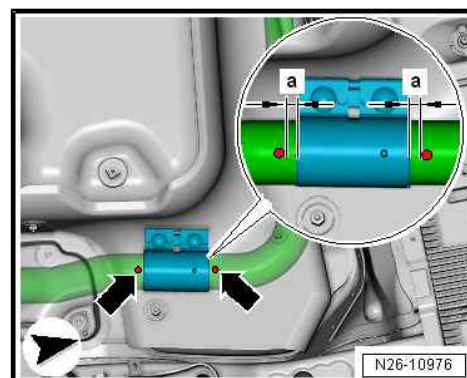
Install in reverse order of removal, observing the following:



#### Note

*Make sure to obtain the same distance -dimension a- to the marks -arrows-.*

- Align exhaust system free of stress  
⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#) .



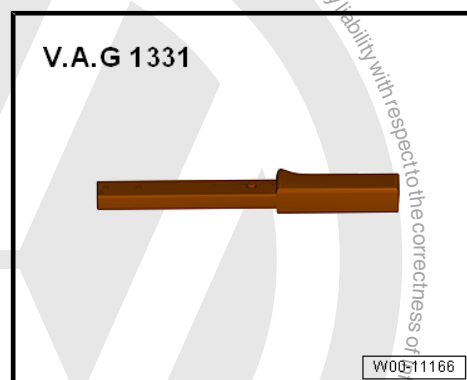
### Specified torques

- ⇒ [“1.1 Assembly overview - silencers”, page 457](#)
- ⇒ [“2.1 Assembly overview - emission control”, page 482](#)
- ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding

## 1.3.6 Removing and installing rear silencer, Polo 2018 ➤, T-Cross

### Special tools and workshop equipment required

- ◆ Torque wrench - V.A.G 1331-



### Removing

- If fitted, remove rear left underbody cladding ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding; Removing and installing underbody cladding



### ⚠ CAUTION

Danger of severe burns from hot exhaust system.

Risk of burns to hands and other parts of body.

- Allow exhaust system to cool.

- Disconnect exhaust pipe/rear silencer.  
⇒ [“1.2 Separating exhaust pipes from silencers”, page 465](#)

### ⚠ CAUTION

Risk of accident caused by high weight of silencers.

- Seek help from a second a mechanic for the following work.

- Unscrew bolt -1-.
- Remove rear silencer -2- with aid of second mechanic.

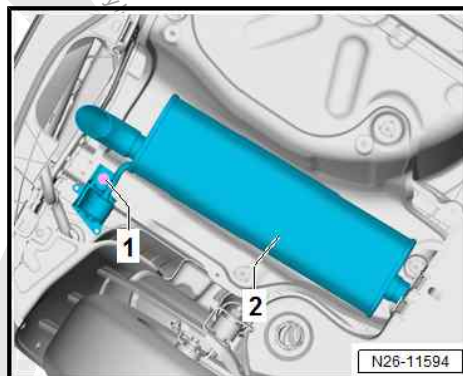
### Installing

Install in reverse order of removal, observing the following:

- Note installation position of clamp.  
⇒ [“1.6 Installation position of clamp”, page 479](#) .
- Align exhaust system free of stress.  
⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#) .

### Specified torques

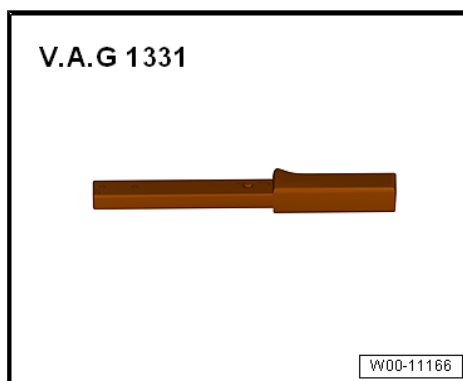
- ⇒ [“1.1.5 Assembly overview - silencers, Polo 2018 ➤, T-Cross”, page 465](#)



## 1.3.7 Removing and installing silencer, up!

Special tools and workshop equipment required

- ♦ Torque wrench - V.A.G 1331-



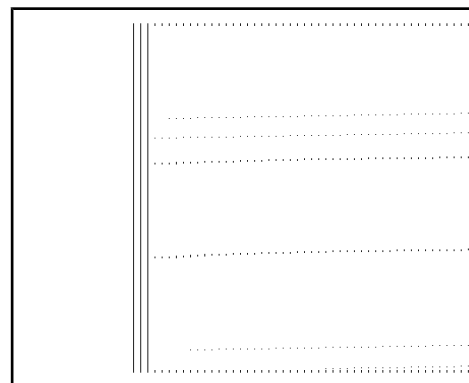
### Removing

- If necessary, disconnect exhaust system  
⇒ [“1.2.2 Separating exhaust pipes/silencers, up!”, page 467](#) .

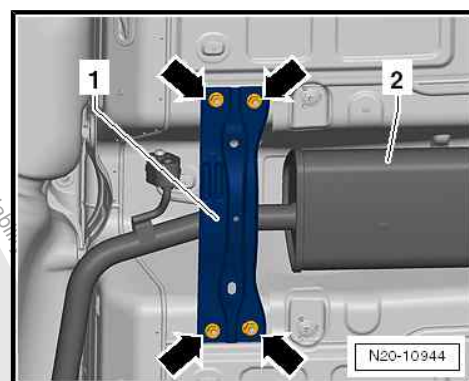




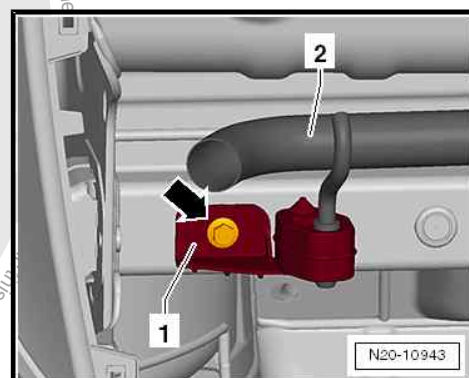
- If fitted, loosen clamp -arrows-.



- Remove cross strut -1- from underbody -2-.
- Remove nuts -arrows-.



- Remove rear bracket -1- for exhaust system -2-.
- Unscrew bolt -arrow-.



#### Note

*The aid of a 2nd mechanic is required to remove the silencer.*

- Remove silencer.

#### Installing

Install in reverse order of removal. During this procedure, observe the following:

Note installation position of clamp

⇒ ["1.6.2 Installation position of clamp, up!", page 480](#).



#### Note

- ◆ *After working on the exhaust system, ensure that the system is not under stress and that there is sufficient clearance to the bodywork. If necessary, loosen double clamp and align silencer and exhaust pipe so that sufficient clearance is maintained to the bodywork and the support rings are evenly loaded.*
- ◆ *Renew self-locking nuts.*
- ◆ *Before installing, coat threads of lock nuts and stud bolts with high-temperature paste - N 052.112.00- according to TL 521 12.*

#### Specified torque:

- ◆ ⇒ ["1.1.4 Assembly overview - silencers, up!", page 463](#)





### 1.3.8 Align end exhaust pipes

#### Setting dimensions Golf, Golf Estate, Golf SV, Polo 2014 ➤

- Unfasten rear silencer mounting to align tailpipes.
- Align rear silencer maintaining distance -a- and -b- between bumper cut-out and exhaust pipe.

Dimension a: 25 mm

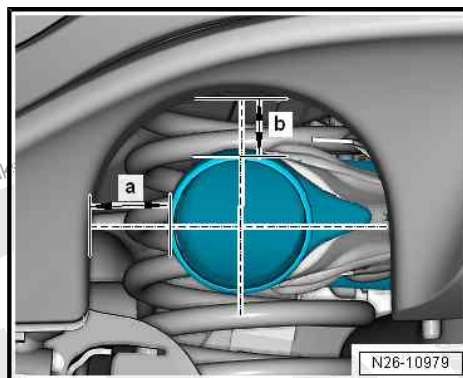
Dimension b: 30 mm

#### upl:

- Loosen silencer mounting to align.
- Align silencer so that tailpipe is located centrally in recess.

#### Specified torques

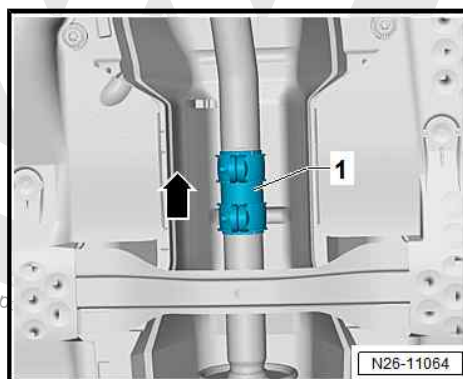
- ◆ ⇒ [“1.1 Assembly overview - silencers”, page 457](#)
- ◆ ⇒ [“1.6.1 Installation position of clamp, Golf, Golf Estate, Golf SV, Polo 2014 ➤, Polo 2018 ➤, T-Roc, T-Cross, Touran”, page 479](#)
- ◆ ⇒ [“1.6.2 Installation position of clamp, upl, page 480](#)



### 1.4 Aligning exhaust system free of stress

#### Sequence of operations

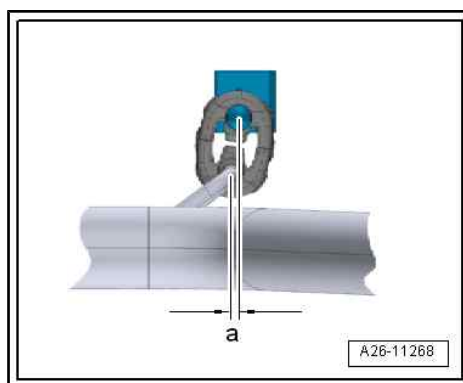
- The exhaust system must be aligned when cold.
- Loosen bolt connections for front clamp -arrow-



- Push exhaust system towards front of vehicle until preloading at mounting for exhaust pipe -a- = 5 mm.
- Install front clamp.  
⇒ [“1.6 Installation position of clamp”, page 479](#)

#### Specified torques

- ◆ Clamp ⇒ [page 480](#)



### 1.5 Checking exhaust system for leaks

#### Sequence of operations

- Start engine, and run at idling speed.
- Seal end exhaust pipes with cloths or plugs, for example, for the duration of the leakage test.
- Check (by listening) points of connection between exhaust manifold and the cylinder head, between turbocharger and front exhaust pipe etc. to make sure there are no leaks.



- Repair any leaks found.

## 1.6 Installation position of clamp

⇒ [“1.6.1 Installation position of clamp, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran”, page 479](#)

⇒ [“1.6.2 Installation position of clamp, up!”, page 480](#)

### 1.6.1 Installation position of clamp, Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran



#### Note

*Make sure to use clamps with continuous clip only.*

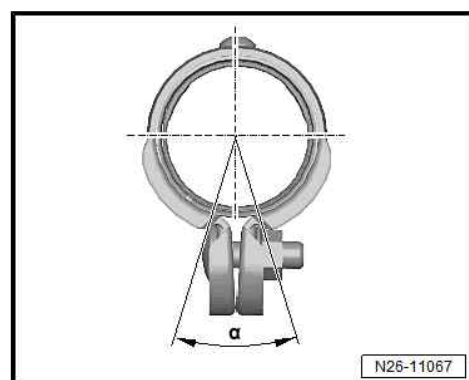
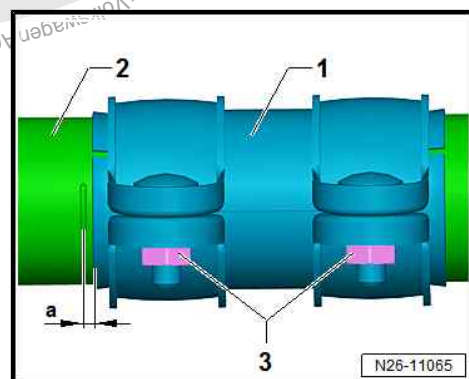
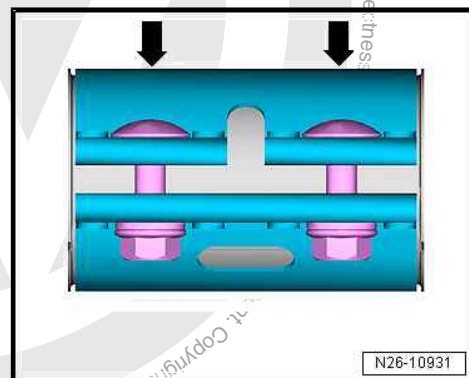
#### Position of clamp

Make sure that installation dimension -a- is obtained.

a - Distance to marking: approx. 5 mm

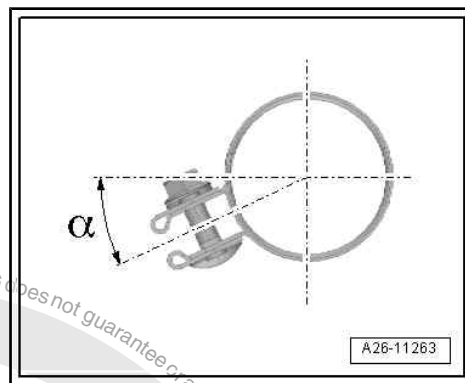
- 1 - Clamping sleeve
- 2 - Front exhaust pipe
- 3 - Securing nut

#### Installation position of clamp





- Polo 2014 ➤: angle  $-\alpha-$  (= approx.  $15^\circ$ ) must not be exceeded.
- Bolted connection faces downwards (towards the road).
- Golf, Golf Estate, Golf SV: angle  $-\alpha-$  (= approx.  $70^\circ$ ) must not be exceeded.



### Specified torques

Component	Specified torque
Clamping sleeve	30 Nm

## 1.6.2 Installation position of clamp, up!



### Note

*Note introduction of clamps with continuous clip.*

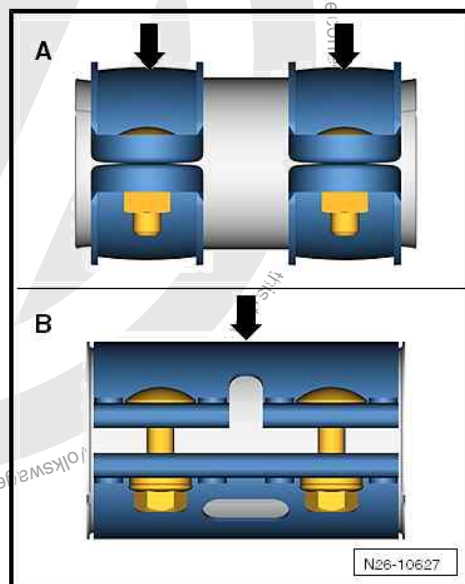
### Specified torque and mounting dimensions of clamping sleeve.

Clamp -A- with 2 individual clips.

Specified torque: 25 Nm.

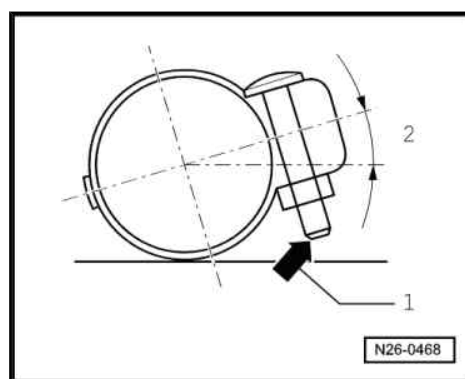
Clamp -B- with continuous clip.

Specified torque 35 Nm



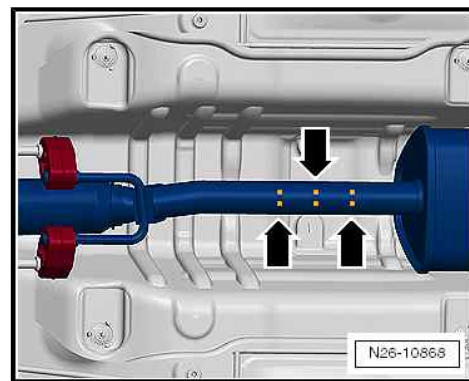
### Installation position of front clamp

- Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.
- Threaded connection faces right



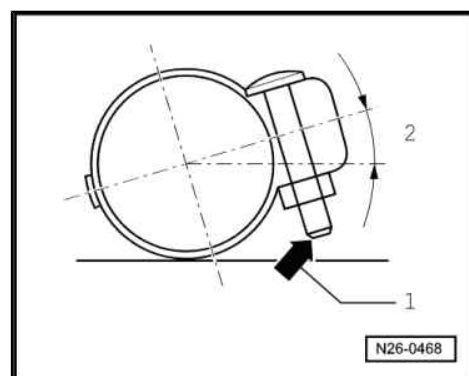


- Clamp should be installed so that markings on exhaust pipe -outer arrows- align with ends of clamp.

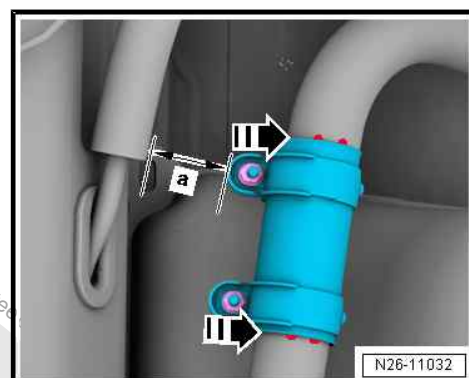


#### Installation position of rear clamp

- Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.



- The clamp should be installed such that the markings on the exhaust pipe -arrow- align with the ends of the clamp.
- Bolted connection must point forwards.
- Dimension -a- =26.5 mm must be observed.





## 2 Emission control

⇒ [“2.1 Assembly overview - emission control”, page 482](#)

⇒ [“2.2 Removing and installing catalytic converter”, page 489](#)

⇒ [“2.3 Removing and installing particulate filter”, page 492](#)

### 2.1 Assembly overview - emission control

⇒ [“2.1.1 Assembly overview - emission control, Polo 2014 ►, up!”, page 482](#)

⇒ [“2.1.2 Assembly overview - emission control, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross”, page 484](#)

#### 2.1.1 Assembly overview - emission control, Polo 2014 ►, up!

##### 1 - Retaining loop

- ☐ Renew if damaged

##### 2 - Front exhaust pipe with catalytic converter

- ☐ Do not bend flexible joint more than 10°. Otherwise, it can be damaged.
- ☐ Install flexible joint so that it is not under tension
- ☐ Take care not to damage wire mesh on decoupling element.
- ☐ Protect catalytic converter from damage by knocks and impact
- ☐ Removing and installing  
⇒ [“2.2 Removing and installing catalytic converter”, page 489](#)
- ☐ Do not remove protective packaging from replacement part until you are ready to fit the flexible joint
- ☐ Aligning exhaust system free of tension  
⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#)
- ☐ If a particulate filter is installed, the learnt values must be adapted with  
⇒ Vehicle diagnostic tester via [Guided Engine Functions](#)

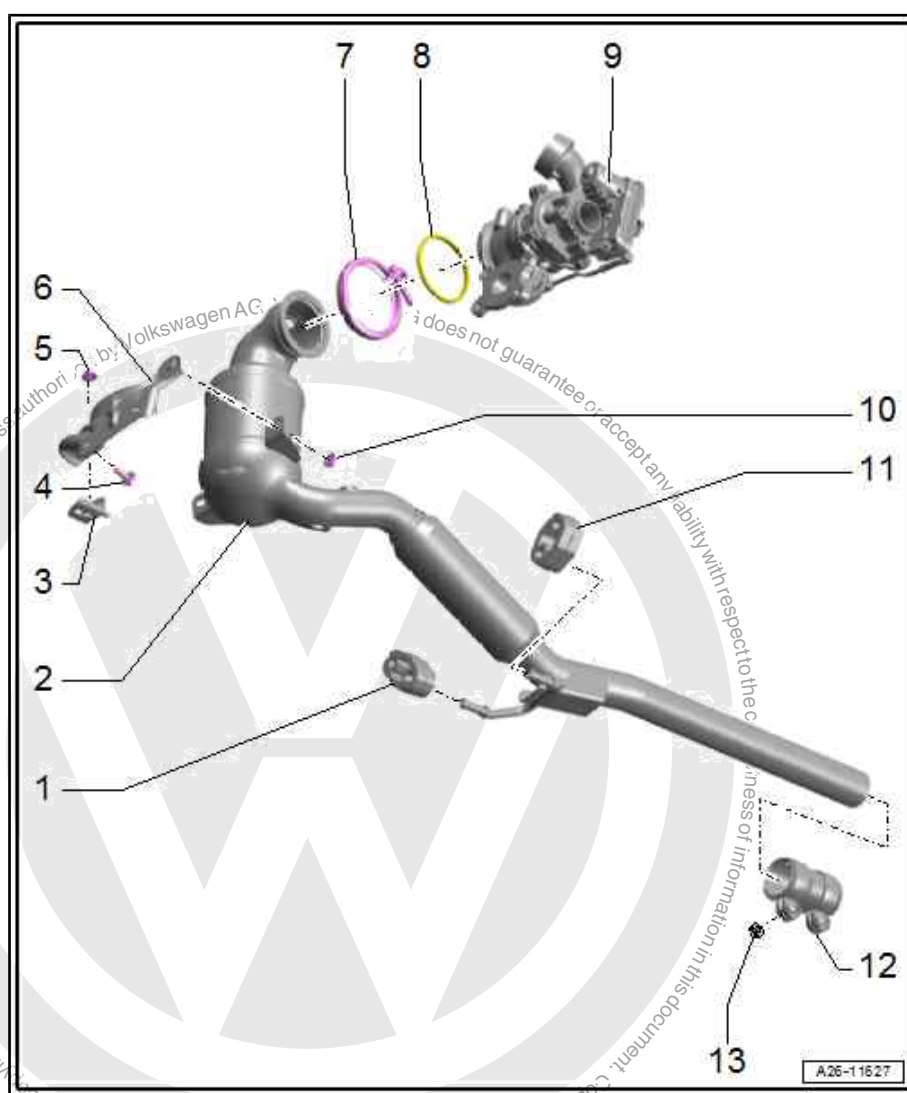
Adapt particulate filter learnt values after renewing.

##### 3 - Bracket

- ☐ Renew if damaged

##### 4 - Bolt

- ☐ 20 Nm







## 5 - Nut

- ☐ Specified torque and tightening sequence ⇒ [page 483](#)

## 6 - Bracket

## 7 - Screw-type clamp

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ⇒ [page 483](#)
- ☐ Observe correct position ⇒ [page 490](#)

## 8 - Seal

- ☐ Renew after removal

## 9 - Turbocharger

## 10 - Nut

- ☐ Specified torque and tightening sequence ⇒ [page 483](#)

## 11 - Retaining loop

- ☐ Renew if damaged

## 12 - Clamping sleeve

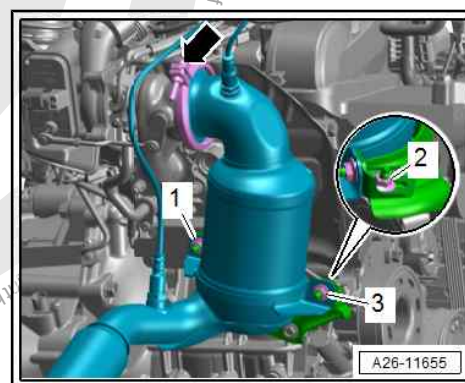
- ☐ Align exhaust system free of tension before tightening  
⇒ ["1.4 Aligning exhaust system free of stress", page 478](#) .
- ☐ Fitting position ⇒ ["1.6 Installation position of clamp", page 479](#)
- ☐ Tighten threaded connections evenly.

## 13 - Nut

- ☐ 23 Nm

## Installing catalytic converter - specified torque and tightening sequence

1.	- Fit catalytic converter to turbocharger, attach screw-type clip -arrow- without tightening	
2.	- Screw on nuts -1, 2 and 3- loosely by hand.	• It should still be possible to move catalytic converter and bracket.
3.	- Tighten screw-type clip -arrow-	15 Nm
4.	- Tighten bolts and nuts in the sequence -1 ... 3-	20 Nm





## 2.1.2 Assembly overview - emission control, Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross

### Part 1, catalytic converter and attachments

#### 1 - Bolt

- ☐ 20 Nm

#### 2 - Mounting

- ☐ Renew if damaged

#### 3 - Nut

- ☐ Specified torque and tightening sequence  
⇒ [page 485](#)

#### 4 - Bolt

- ☐ 20 Nm

#### 5 - Nut

- ☐ Specified torque and tightening sequence  
⇒ [page 485](#)

#### 6 - Bracket

#### 7 - Bracket

#### 8 - Bolt

- ☐ Specified torque and tightening sequence  
⇒ [page 485](#)

#### 9 - Bolt

- ☐ Specified torque and tightening sequence  
⇒ [page 485](#)

#### 10 - Front exhaust pipe with catalytic converter

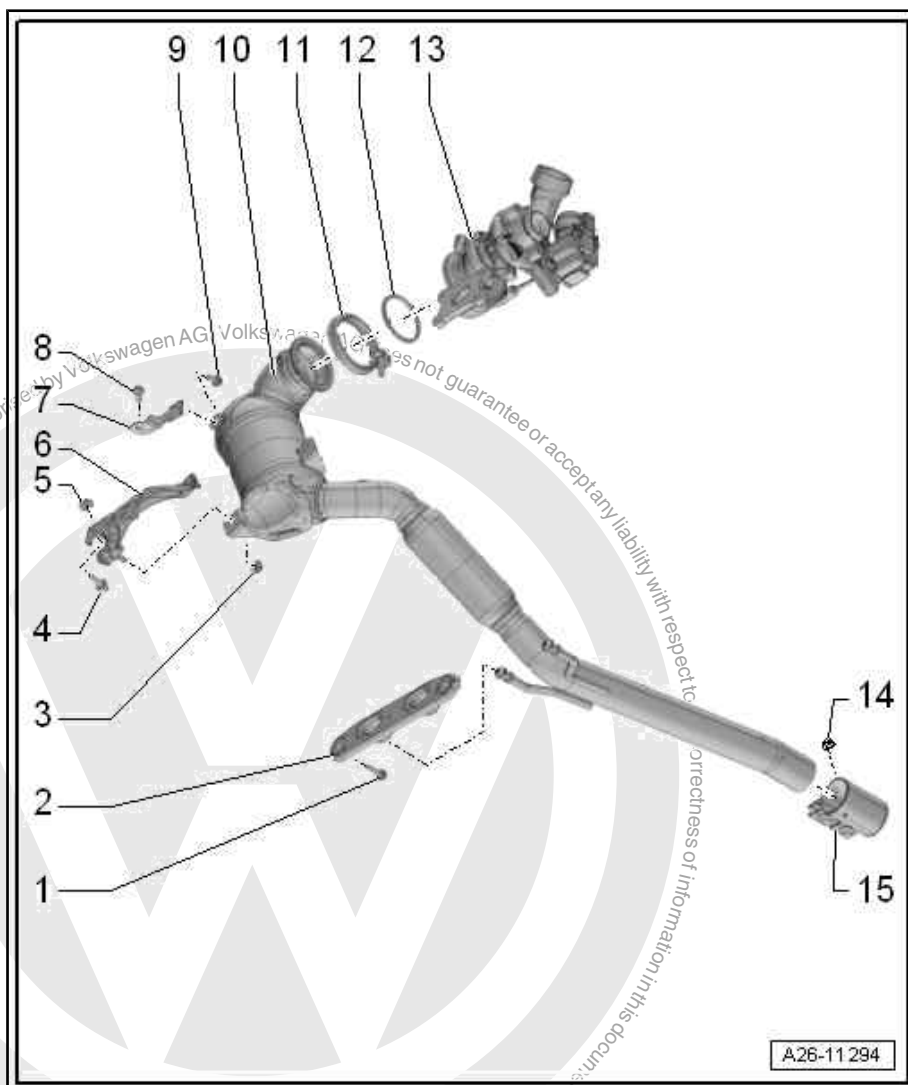
- ☐ Do not bend flexible joint more than 10°. Otherwise, it can be damaged.
- ☐ Install flexible joint so that it is not under tension
- ☐ Take care not to damage wire mesh on decoupling element.
- ☐ Protect catalytic converter from damage by knocks and impact
- ☐ Removing and installing ⇒ ["2.2 Removing and installing catalytic converter", page 489](#)
- ☐ Do not remove protective packaging from replacement part until you are ready to fit the flexible joint
- ☐ Aligning exhaust system free of tension ⇒ ["1.4 Aligning exhaust system free of stress", page 478](#) .
- ☐ If a particulate filter is installed, the learnt values must be adapted with ⇒ Vehicle diagnostic tester via [Guided Engine Functions](#) [Adapt particulate filter learnt values](#) after renewing.

#### 11 - Screw-type clamp

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence ⇒ [page 485](#)
- ☐ Observe correct position ⇒ [page 490](#)

#### 12 - Seal

- ☐ Renew





### 13 - Turbocharger

- ☐ Removing and installing ⇒ [“1.2 Removing and installing turbocharger”, page 368](#)
- ☐ Specified torque and tightening sequence ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)

### 14 - Nut

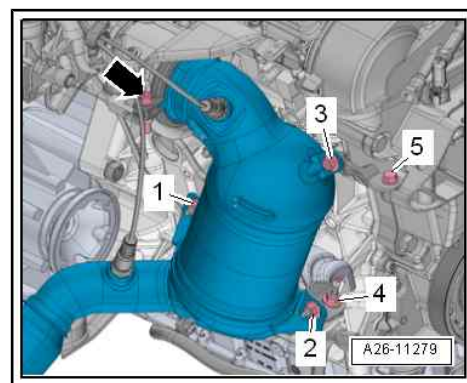
- ☐ 30 Nm

### 15 - Front clamp

- ☐ Align exhaust system free of tension before tightening  
⇒ [“1.4 Aligning exhaust system free of stress”, page 478](#) .
- ☐ Fitting position ⇒ [page 479](#)
- ☐ Tighten threaded connections evenly.

### Installing catalytic converter - specified torque and sequence

1.	– Fit catalytic converter to turbocharger, attach screw-type clip -arrow- without tightening	
2.	– Loosely screw in bolts -3, 5- and bolts -1, 2, 4- by hand	• It should still be possible to move catalytic converter and bracket.
3.	– Tighten screw-type clip -arrow-	15 Nm
4.	– Tighten bolts and nuts in the sequence -1 ... 5-	20 Nm



### Part 2, Brackets and heat shields





**1 - Heat shield**

- ☐ For engine
- ☐ Renew if damaged

**2 - Bolts**

- ☐ Qty. 4
- ☐ 20 Nm

**3 - Bracket**

**4 - Bolts**

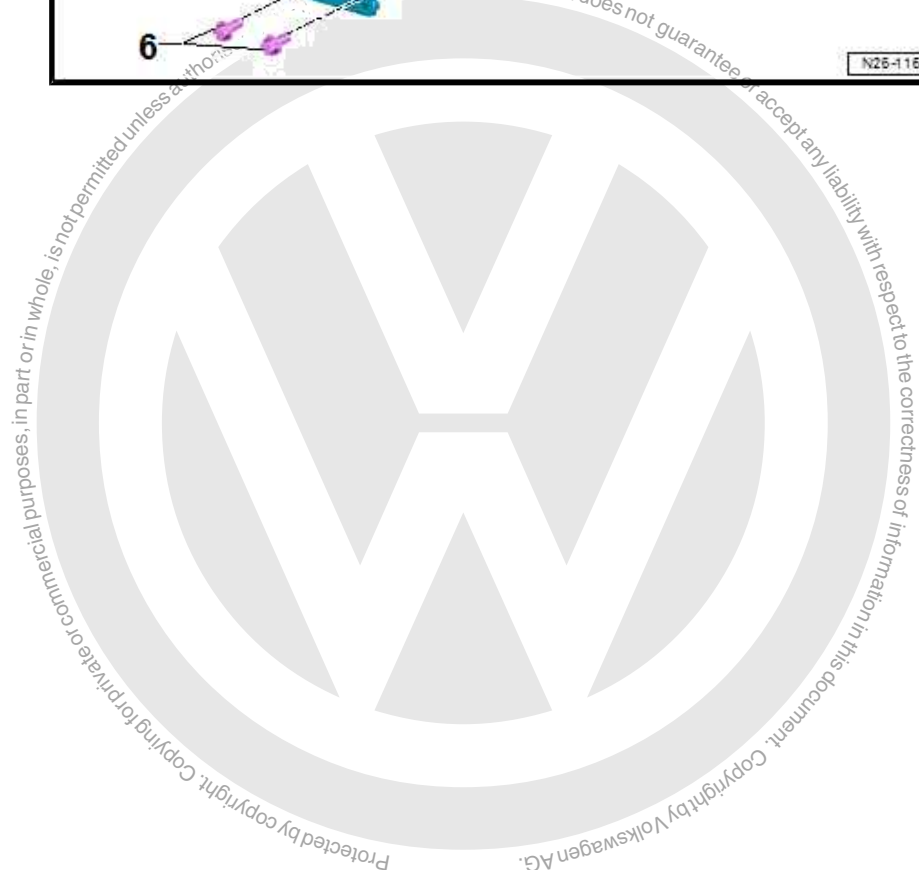
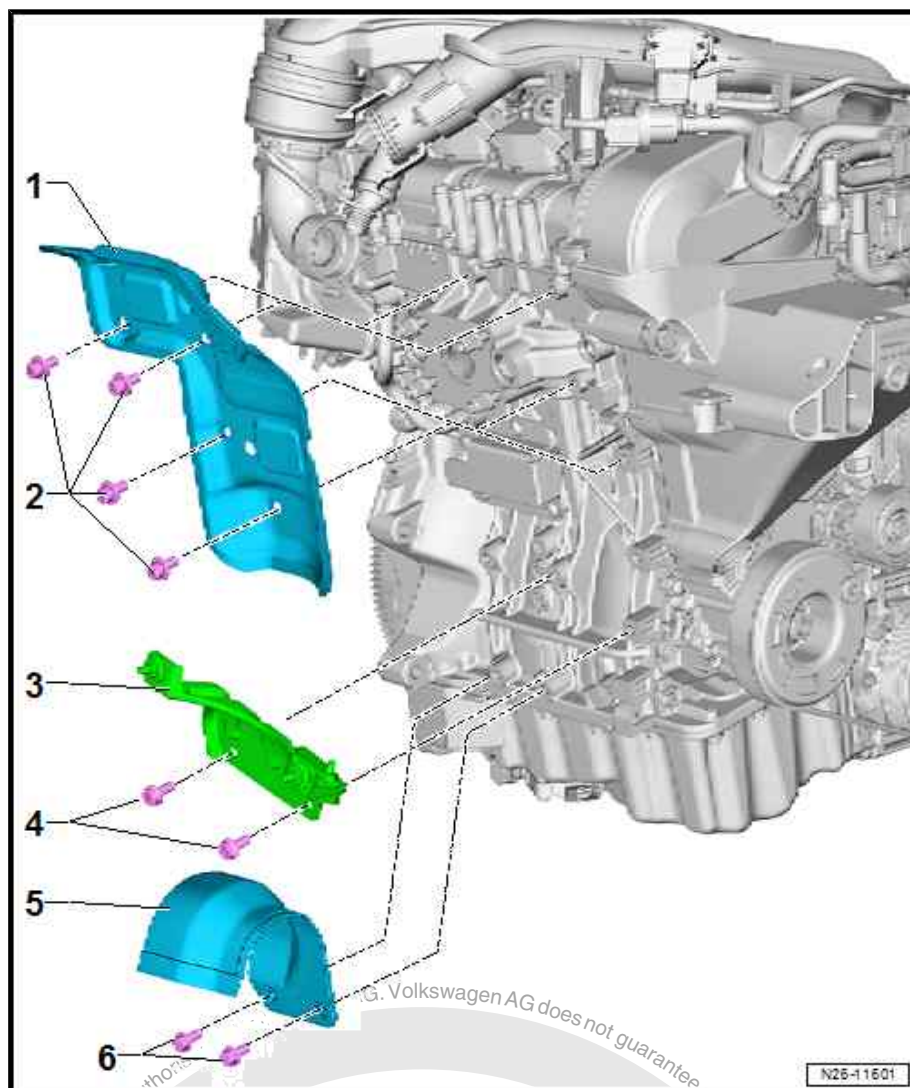
- ☐ Qty. 2
- ☐ 20 Nm

**5 - Heat shield**

- ☐ For drive shaft
- ☐ Renew if damaged

**6 - Bolts**

- ☐ Qty. 2
- ☐ 25 Nm





## 2.1.3 Assembly overview - emission control with petrol particulate filter, Golf, Golf Estate, Golf SV, Polo 2018 ➤, T-Roc, T-Cross, Touran

### Part 1, catalytic converter and attachments

#### 1 - Bolt

- ☐ 20 Nm
- ☐ Specified torque and tightening sequence  
⇒ Fig. "Installing catalytic converter - specified torque and tightening sequence:", page 488

#### 2 - Bracket

#### 3 - Bolt

- ☐ 20 Nm
- ☐ Specified torque and tightening sequence  
⇒ Fig. "Installing catalytic converter - specified torque and tightening sequence:", page 488

#### 4 - Lambda probe 1 before catalytic converter - GX10-

- ☐ Consisting of:  
Lambda probe - G39-  
Lambda probe heater - Z19-
- ☐ Assembly overview  
⇒ page 453
- ☐ Removing and installing  
⇒ page 454
- ☐ 55 Nm

#### 5 - Lambda probe 1 after catalytic converter - GX7-

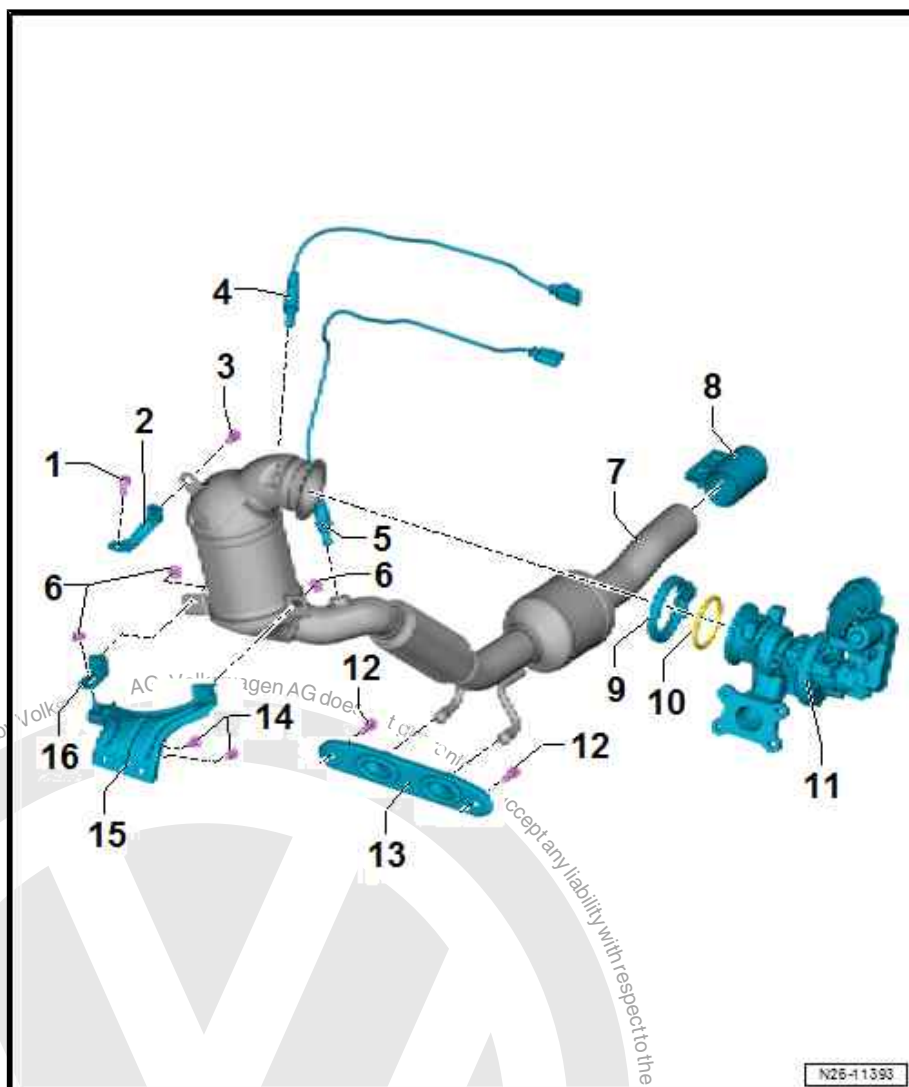
- ☐ Consisting of:  
Lambda probe after catalytic converter - G130-  
Lambda probe 1 heater after catalytic converter - Z29-
- ☐ Assembly overview ⇒ page 453
- ☐ Removing and installing ⇒ page 454
- ☐ 55 Nm

#### 6 - Nut

- ☐ 20 Nm
- ☐ Specified torque and tightening sequence  
⇒ Fig. "Installing catalytic converter - specified torque and tightening sequence:", page 488

#### 7 - Front exhaust pipe

- ☐ With petrol particulate filter and catalytic converter.
- ☐ Do not bend flexible joint more than 10°. Otherwise, it can be damaged.
- ☐ Install flexible joint so that it is not under tension
- ☐ Take care not to damage wire mesh on decoupling element.







- ☐ Protect catalytic converter from damage by knocks and impact
- ☐ Removing and installing ⇒ [“2.2 Removing and installing catalytic converter”, page 489](#)
- ☐ Do not remove protective packaging from replacement part until you are ready to fit the flexible joint
- ☐ Aligning exhaust system free of tension ⇒ [page 478](#) .

#### 8 - Clamping sleeve

- ☐ Align exhaust system free of tension before tightening ⇒ [page 478](#)
- ☐ Fitting position ⇒ [page 457](#)
- ☐ Tighten threaded connections evenly.
- ☐ Specified torque ⇒ [page 457](#)

#### 9 - Screw-type clamp

- ☐ Renew after removal
- ☐ Specified torque and tightening sequence  
⇒ [Fig. “Installing catalytic converter - specified torque and tightening sequence:” , page 488](#)

#### 10 - Seal

- ☐ Renew after removal
- ☐ Removing and installing ⇒ [page 374](#)

#### 11 - Turbocharger

- ☐ Assembly overview ⇒ [“1.1 Assembly overview - turbocharger”, page 366](#)
- ☐ Removing and installing ⇒ [“1.2 Removing and installing turbocharger”, page 368](#)

#### 12 - Bolt

- ☐ 20 Nm
- ☐ Specified torque and tightening sequence  
⇒ [Fig. “Installing catalytic converter - specified torque and tightening sequence:” , page 488](#)

#### 13 - Bracket

- ☐ Renew if damaged

#### 14 - Bolt

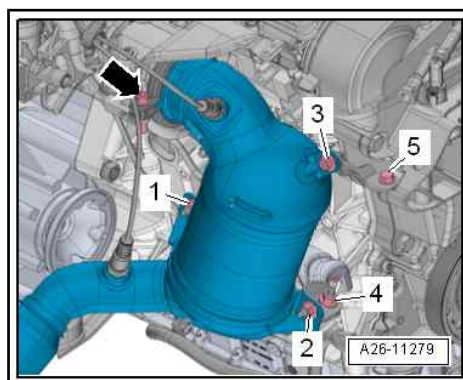
- ☐ 20 Nm
- ☐ Specified torque and tightening sequence  
⇒ [Fig. “Installing catalytic converter - specified torque and tightening sequence:” , page 488](#)

#### 15 - Bracket

#### 16 - Bracket

### Installing catalytic converter - specified torque and tightening sequence:

1.	- Fit catalytic converter to turbocharger and fit screw-type clip -arrow- without tightening	
2.	- Loosely screw in bolts -3, 5- and bolts -1, 2, 4- by hand	• It should still be possible to move catalytic converter and bracket.
3.	- Tighten screw-type clip -arrow-	15 Nm
4.	- Tighten bolts and nuts in the sequence -1 ... 5-	20 Nm



### Part 2, Brackets and heat shields



#### 1 - Heat shield

- ☐ For engine
- ☐ Renew if damaged

#### 2 - Bolts

- ☐ Qty. 4
- ☐ 20 Nm

#### 3 - Bracket

#### 4 - Bolts

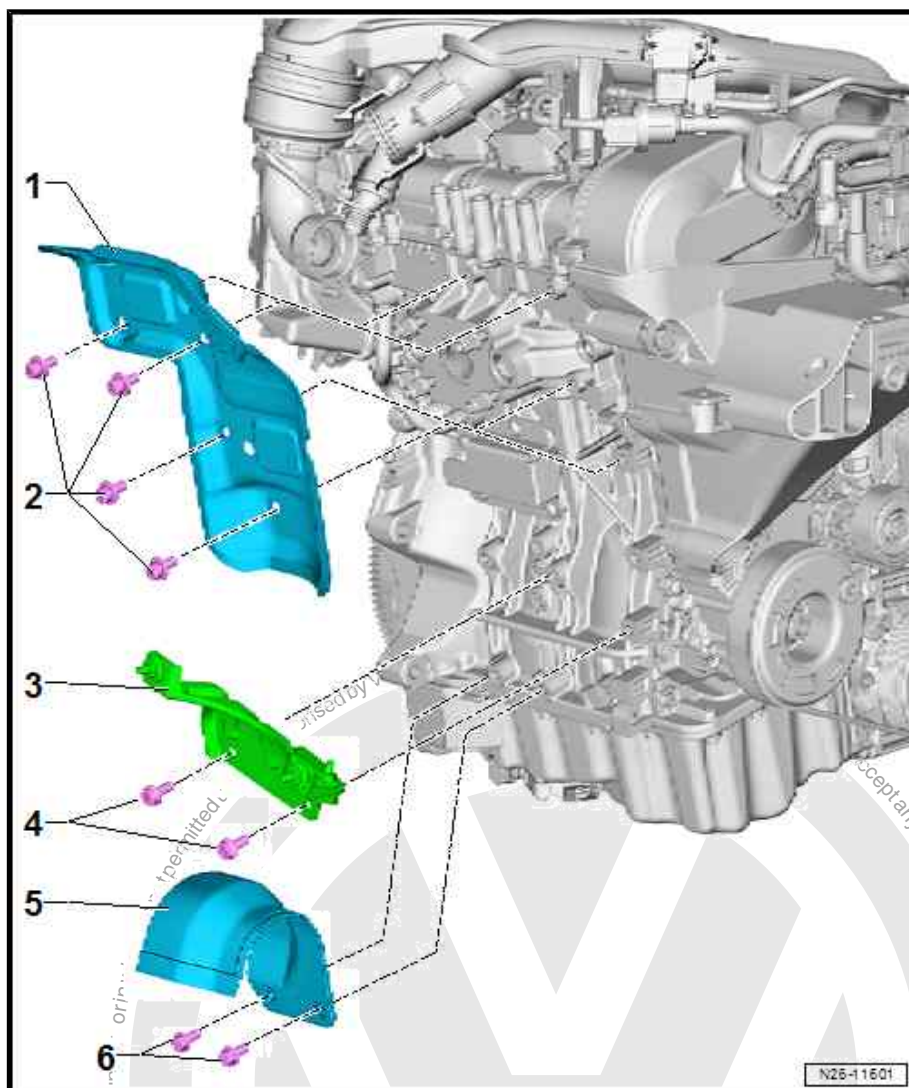
- ☐ Qty. 2
- ☐ 20 Nm

#### 5 - Heat shield

- ☐ For drive shaft
- ☐ Renew if damaged

#### 6 - Bolts

- ☐ Qty. 2
- ☐ 25 Nm



## 2.2 Removing and installing catalytic converter

### Removing



#### Note

- ◆ The catalytic converter is removed together with the front exhaust pipe.
- ◆ Attach cable ties in all the same places when installing.

### up!

- Remove front right noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Assembly overview - noise insulation .



### Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran

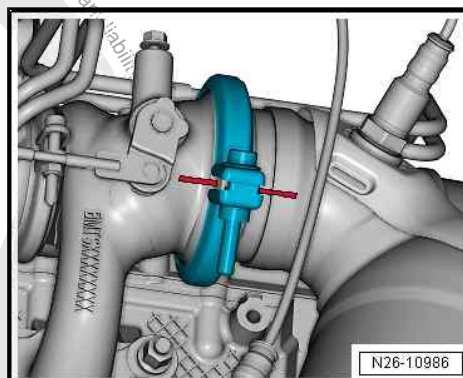
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66; Noise insulation; Assembly overview - noise insulation.

#### Clamp position



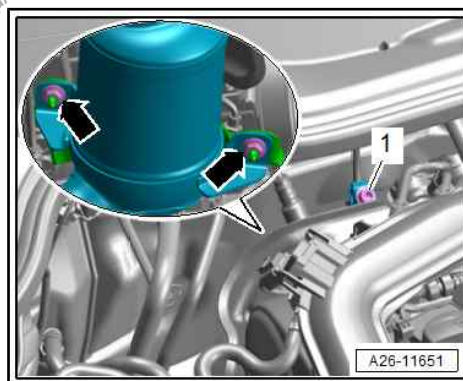
#### Note

- ◆ Installation position of clamp may vary depending on vehicle model.
  - ◆ Prior to loosening the connection between the catalytic converter and the turbocharger, mark the position of the clamp ⇒ [page 490](#).
  - ◆ The mark is to be made on the component opposite to the component to be renewed.
  - ◆ Make sure that the clamp is fitted at the same position on re-installation.
- Mark installation position of clamp.



#### Continued for all vehicles

- Remove Lambda probes  
⇒ [“8.2 Removing and installing Lambda probe”, page 454](#).
- Open screw-type clip -1-, and position it on intake funnel of catalytic converter.
- Unscrew nuts -arrows-.



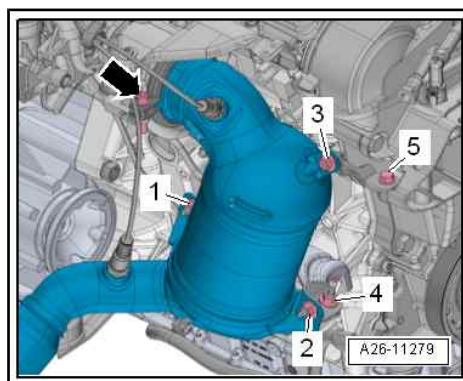
### Polo 2018 ►, T-Roc, T-Cross, Touran

- Unscrew bolt -5-.



#### Note

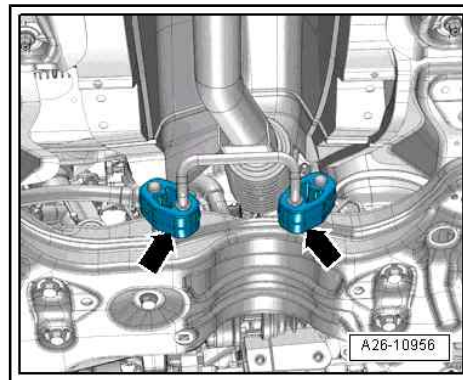
Disregard items -1, 2, 3, 4- and -arrow-.





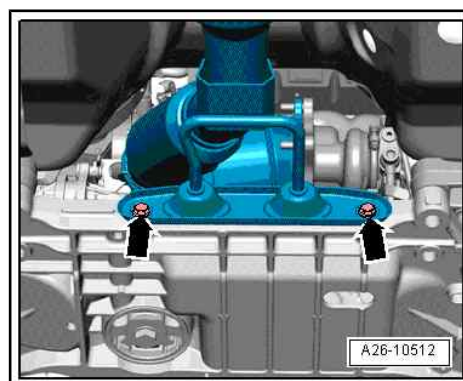
#### Polo 2014 ►, up!

- Detach catalytic converter with front exhaust pipe from rubber mountings -arrows-.



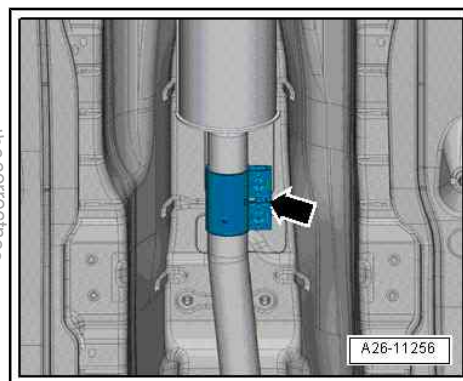
#### Golf, Golf Estate, Golf SV, Polo 2018 ►, T-Roc, T-Cross, Touran

- Unscrew bolts -arrows-.



#### Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran

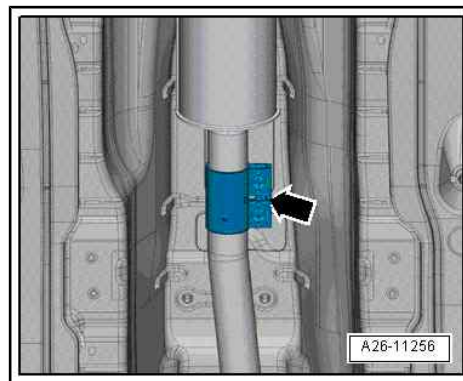
- If necessary, remove rear tunnel cross-piece ⇒ General body repairs, exterior; Rep. gr. 66 ; Underbody cladding .
- Loosen clamp -arrow-, and push it to rear.



#### up!

Remove heat shield for right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft heat shield .

- If not yet done, separate exhaust system ⇒ "1.2.2 Separating exhaust pipes/silencers, up!", page 467 .
- If exhaust system is already separated, loosen clamp -arrow- and push forwards.
- Guide out catalytic converter with front exhaust pipe between engine, subframe and body by twisting.



#### Continued for all vehicles:

- Detach catalytic converter with front exhaust pipe.





## Installing

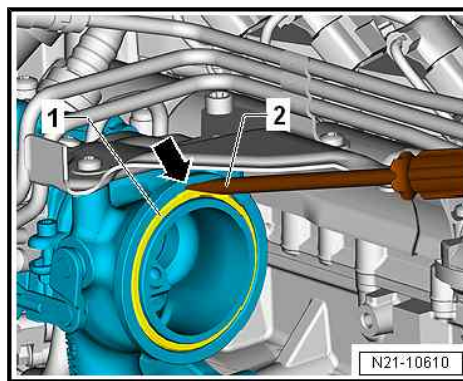
Install in reverse order of removal, observing the following:



### Note

*Renew seals/gaskets and self-locking nuts.*

- Insert screwdriver -2- into groove -arrow- on turbocharger, and lever out seal -1-.
- Observe installation position of clamp ⇒ [page 490](#) .
- Align exhaust system free of stress.  
⇒ ["1.4 Aligning exhaust system free of stress", page 478](#)



## Vehicles with particulate filter:

- If the particulate filter was renewed, the ash load must be reset using ⇒ Vehicle diagnostic tester.

◆ [Guided Engine Functions](#)

◆ [Adapt particulate filter learned values](#)

## Specified torques

- ◆ Specified torques and tightening sequence for catalytic converter:  
⇒ ["2.1 Assembly overview - emission control", page 482](#)
- ◆ ⇒ ["8.1 Assembly overview - Lambda probe", page 453](#)
- ◆ ⇒ ["1.6 Installation position of clamp", page 479](#)

## 2.3 Removing and installing particulate filter



### Note

- ◆ *The removal and installation procedure for the particulate filter is the same as that for the catalytic converter. Therefore, only removal and installation of the catalytic converter is described*  
⇒ ["2.2 Removing and installing catalytic converter", page 489](#) .
- ◆ *If the particulate filter was renewed, the ash load must be reset using ⇒ Vehicle diagnostic tester.*





## 28 – Ignition system

### 1 Ignition system

⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

⇒ [“1.2 Removing and installing ignition coils with output stage”, page 494](#)

⇒ [“1.3 Removing and installing knock sensor 1 G61”, page 497](#)

⇒ [“1.4 Removing and installing Hall sender”, page 498](#)

⇒ [“1.5 Removing and installing engine speed sender G28”, page 499](#)

#### 1.1 Assembly overview - ignition system

##### 1 - Spark plug

- ☐ Remove and install with spark plug socket and extension - 3122 B-
- ☐ Renew ⇒ Maintenance ; Booklet 819 .
- ☐ Change interval ⇒ Maintenance tables
- ☐ 22 Nm

##### 2 - Ignition coil with output stage

- ◆ For No. 1 cylinder: ignition coil 1 with output stage - N70-
- ◆ For No. 2 cylinder: ignition coil 2 with output stage - N127-
- ◆ For No. 3 cylinder: ignition coil 3 with output stage - N291-
- ☐ Removing and installing ⇒ [“1.2 Removing and installing ignition coils with output stage”, page 494](#)

##### 3 - Bolt

- ☐ 8 Nm

##### 4 - Knock sensor 1 - G61-

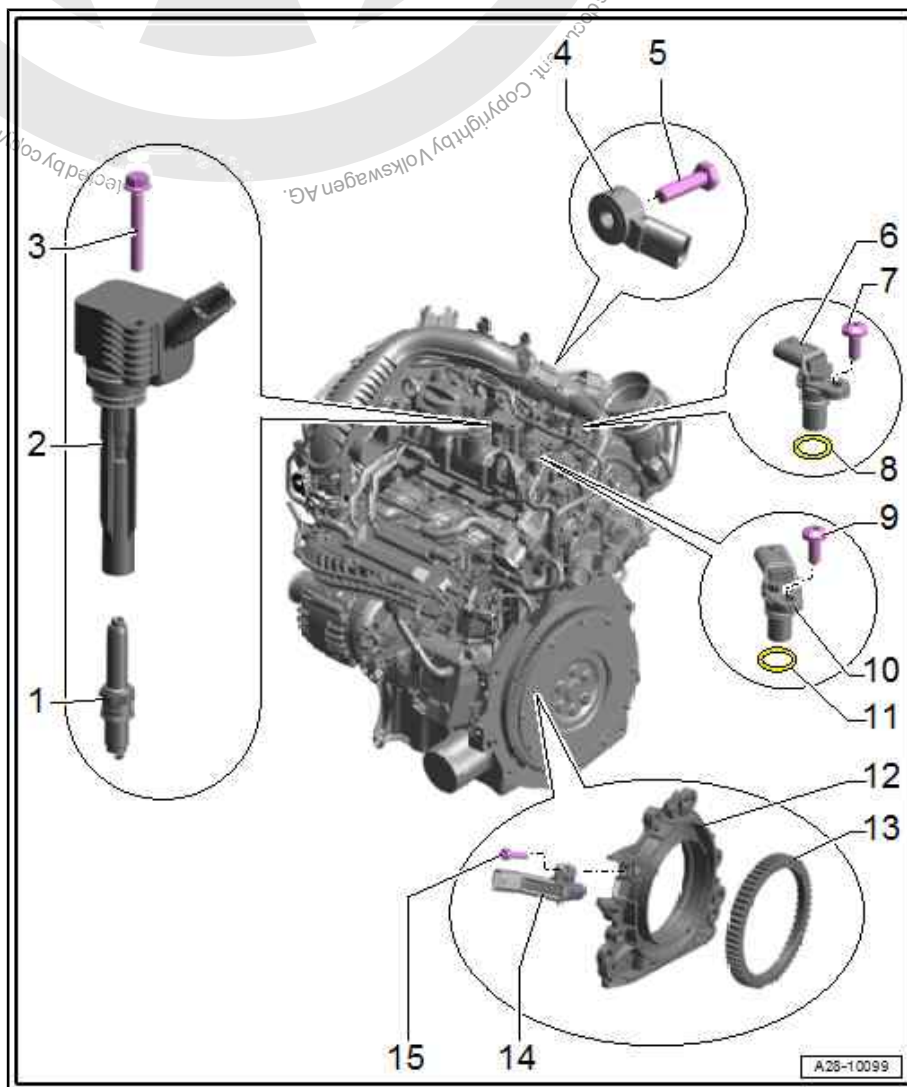
- ☐ Removing and installing ⇒ [“1.3 Removing and installing knock sensor 1 G61”, page 497](#)

##### 5 - Bolt

- ☐ The specified torque influences the function of the knock sensor.
- ☐ 20 Nm

##### 6 - Hall sender 2 - G163-

- ☐ Camshaft position sender, exhaust side
- ☐ Removing and installing ⇒ [“1.4 Removing and installing Hall sender”, page 498](#)





**7 - Bolt**

- ☐ 8 Nm

**8 - O-ring**

- ☐ Renew if damaged

**9 - Bolt**

- ☐ 8 Nm

**10 - Hall sender - G40-**

- ☐ Camshaft position sender, inlet side
- ☐ Removing and installing ⇒ ["1.4 Removing and installing Hall sender", page 498](#)

**11 - O-ring**

- ☐ Renew if damaged

**12 - Sealing flange, gearbox side**

- ☐ Removing and installing ⇒ ["2.3 Removing and installing sealing flange on gearbox side", page 151](#)

**13 - Sender wheel**

- ☐ For engine speed sender - G28-
- ☐ Removing and installing ⇒ ["2.3 Removing and installing sealing flange on gearbox side", page 151](#)

**14 - Engine speed sender - G28-**

- ☐ Removing and installing ⇒ ["1.5 Removing and installing engine speed sender G28 ", page 499](#)

**15 - Bolt**

- ☐ 4.5 Nm

## 1.2 Removing and installing ignition coils with output stage

### Special tools and workshop equipment required

- ◆ Puller - T10530-





## Removing



### Note

- ◆ The ignition coils are easier to remove when the engine is warm.
- ◆ The grease used during the first installation of the ignition coils makes it easier to remove the spark plug connectors when the engine is warm.
- ◆ When installing used ignition coils with output stage, the ignition coils must be lubricated with silicone paste ⇒ Electronic parts catalogue (ETKA) .
- ◆ Ignition coils with output stage and spark plug connectors are available individually for repairs ⇒ Electronic parts catalogue (ETKA)

### upl

- Remove air intake pipe.  
⇒ [“2.5 Removing and installing air pipe”, page 385](#)
- Remove air filter housing.  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#)

Continued for Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran, ignition coil “cyl. 1”:

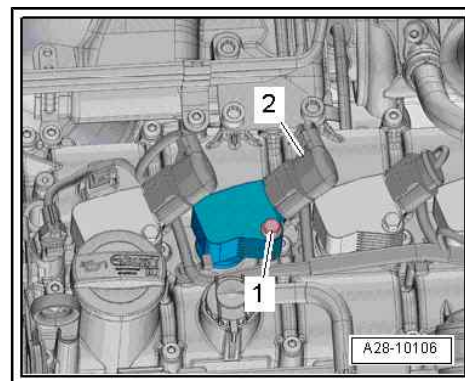
- Remove air intake pipe.  
⇒ [“2.5 Removing and installing air pipe”, page 385](#)

Continued for Golf, Golf Estate, Golf SV, Polo 2014 ►, Polo 2018 ►, T-Roc, T-Cross, Touran, ignition coils “cyl. 2, 3”:

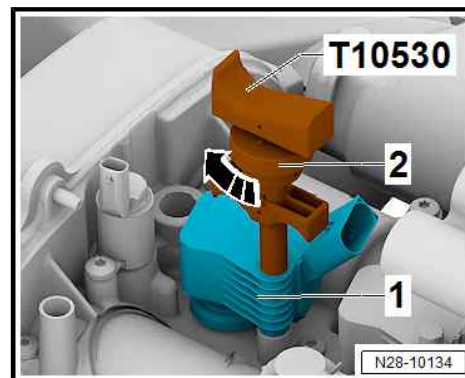
- Remove air filter housing.  
⇒ [“3.2 Removing and installing air filter housing”, page 416](#)

Continued for all ignition coils and all vehicles:

- Disconnect electrical connector -2-.
- Unscrew bolt -1-.

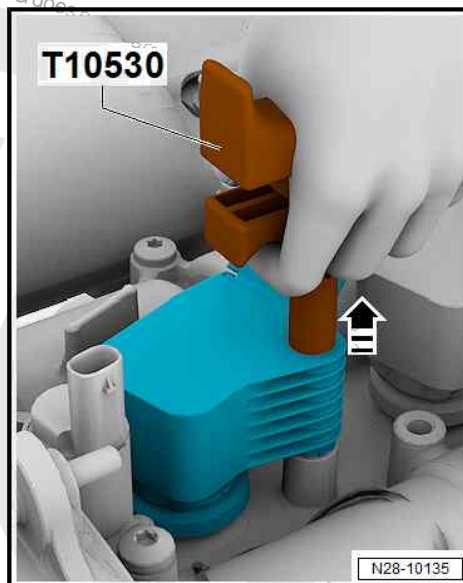


- Push puller - T10530- as far as stop into hole in ignition coil -1-.
- Tighten knurled nut -2- in -direction of arrow-.





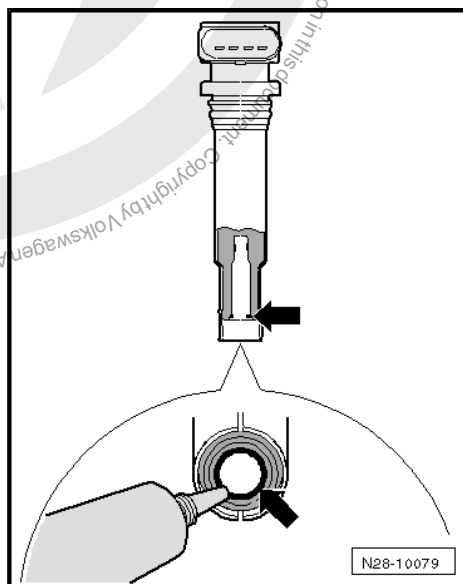
- Pull ignition coil out of camshaft housing in -direction of arrow- using puller - T10530- .



### Installing

Install in reverse order of removal, observing the following:

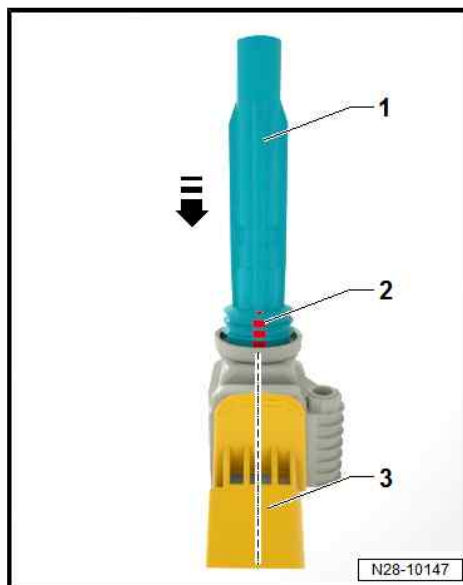
- Apply a thin bead of silicone around sealing hose -arrows- of ignition coil ⇒ Electronic parts catalogue (ETKA) .



- Fit spark plug connector -1- by hand onto ignition coil as far as stop
- The vent drilling -2- must be centred relative to connector housing -3- while doing so.
- Insert all ignition coils loosely into spark plug hole.
- Align ignition coils with connectors and simultaneously push all connectors onto ignition coils.
- Press ignition coils evenly onto spark plugs by hand (do not use tools).

### Specified torques

- ♦ ⇒ [“1.1 Assembly overview - ignition system”, page 493](#)
- ♦ ⇒ [“3.1 Assembly overview - air filter housing”, page 410](#)

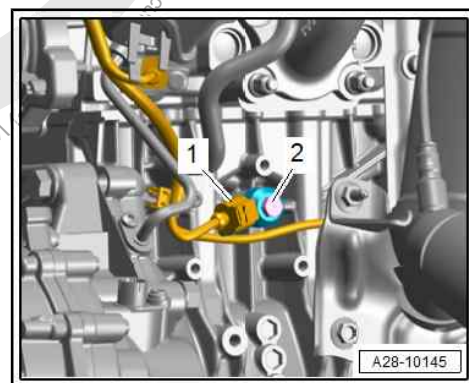
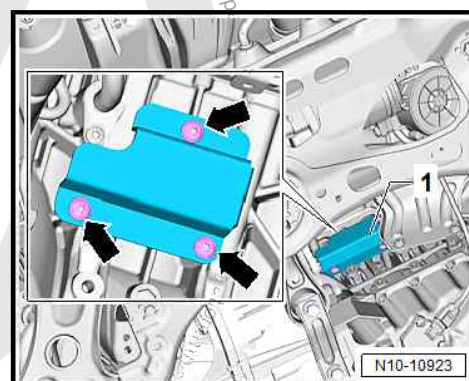
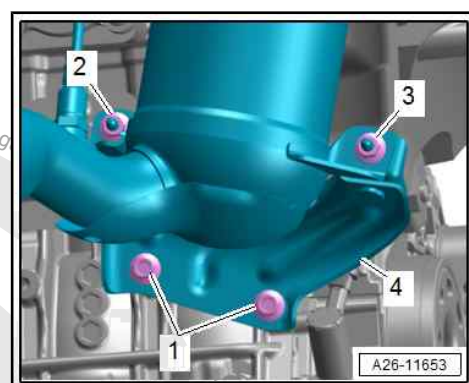
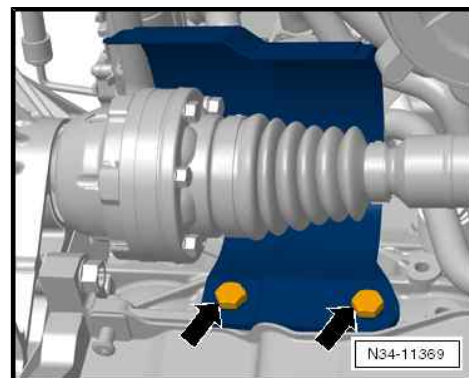




## 1.3 Removing and installing knock sensor 1 - G61-

### Removing

- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Unscrew bolts -arrows-.
- Remove heat shield for right drive shaft.
- Unscrew bolts -1- and nuts -2 and 3-, and remove bracket -4- for catalytic converter.
- Unscrew bolts -arrows- and remove heat shield -1-.
- Remove heat-shield sleeve.
- Disconnect electrical connector -1-.
- Unscrew bolt -2- and remove knock sensor 1 - G61- .







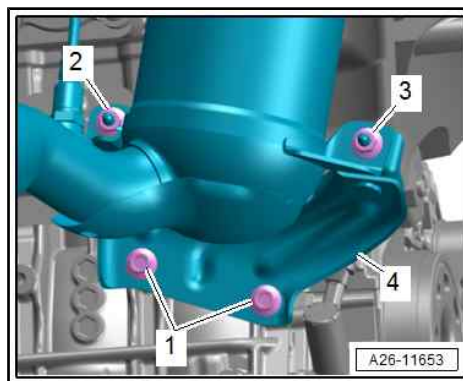
## Installing

Install in reverse order of removal, observing the following:

- Bring bracket for catalytic converter in installation position.
- Screw in bolts -1- and nuts -2 and 3- as far as stop by hand.
- Tighten threaded connection for bracket -4-  
⇒ ["2.1 Assembly overview - emission control", page 482](#) .

## Specified torques

Component	Specified torque
Securing bolts for heat shield of knock sensor 1 - G61-	12 Nm



♦ ⇒ ["1.1 Assembly overview - ignition system", page 493](#)

♦ ⇒ ["2.1 Assembly overview - emission control", page 482](#)

## 1.4 Removing and installing Hall sender

### Removing

- Remove air filter housing.  
⇒ ["3.2 Removing and installing air filter housing", page 416](#)

### Hall sender - G40- :

- Disconnect electrical connector -3-.
- Unscrew bolt -4- and remove Hall sender - G40- .

### Hall sender 2 - G163- :

- Disconnect electrical connector -1-.
- Unscrew bolt -2- and remove Hall sender 2 - G163- .

### Installing

Install in reverse order of removal.



### Note

*Renew O-rings after removal.*

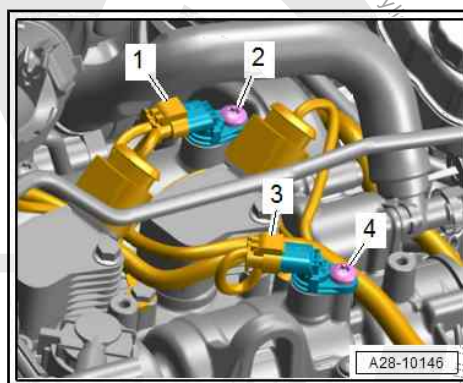
- Connect ⇒ Vehicle diagnostic tester.
- Switch on ignition, select and execute following menu options  
on ⇒ Vehicle diagnostic tester:

♦ 0001 Hall sender adaption

## Specified torques

♦ ⇒ ["1.1 Assembly overview - ignition system", page 493](#)

♦ ⇒ ["3.1 Assembly overview - air filter housing", page 410](#)





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

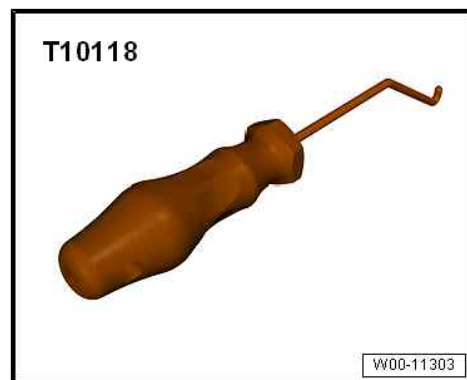
⇒ [“1.5.1 Removing and installing engine speed sender G28 , Golf, Golf Estate, Golf SV, Polo 2014 ➤, up!, T-Roc, Touran”, page 499](#)

⇒ [“1.5.2 Removing and installing engine speed sender G28 , Polo 2018 ➤, T-Cross”, page 501](#)

### 1.5.1 Removing and installing engine speed sender - G28- , Golf, Golf Estate, Golf SV, Polo 2014 ➤, up!, T-Roc, Touran

Special tools and workshop equipment required

- ◆ Assembly tool - T10118-



- ◆ Socket, 4 mm - T10370-



#### Removing

##### up!

- Move to service position ⇒ General body repairs, exterior; Rep. gr. 50 ; Lock carrier; Moving to and back from service position .



### Continued for all vehicles

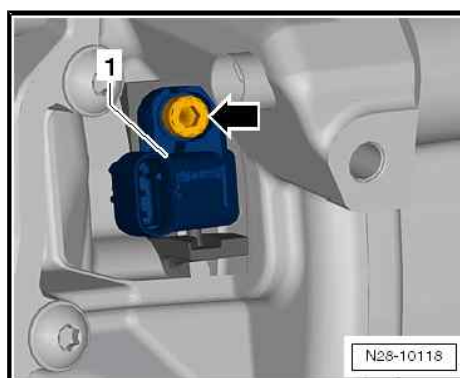
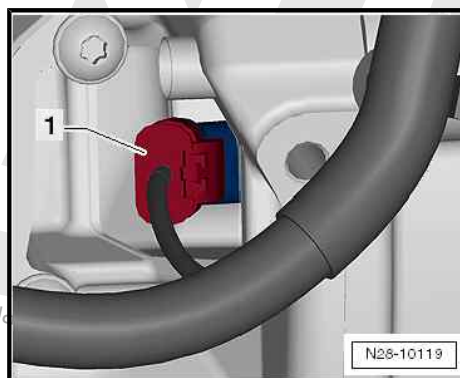
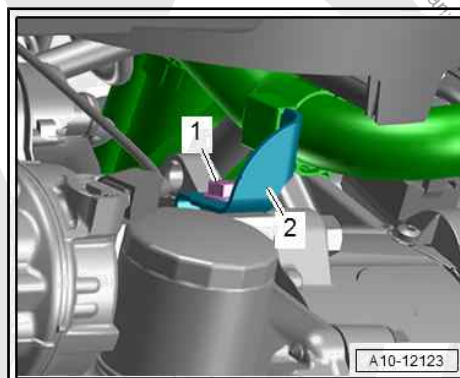
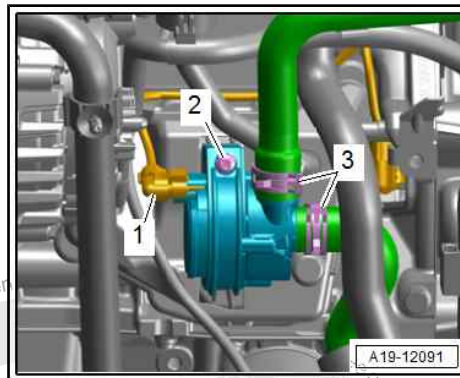
- Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Disconnect electrical connector -1-.
- Unscrew bolt -2- and press charge air cooling pump - V188- to one side.



### Note

Disregard -item 3-.

- Unscrew bolt -1-.
- Push retainer -2- with coolant hose to one side.
- Release and separate connector -1-. To do this, use spring-type clip pliers - T10118- .
- Unscrew bolt -arrow- using 4 mm socket insert - T10370- . Remove engine speed sender - G28- -1-.





## Installing

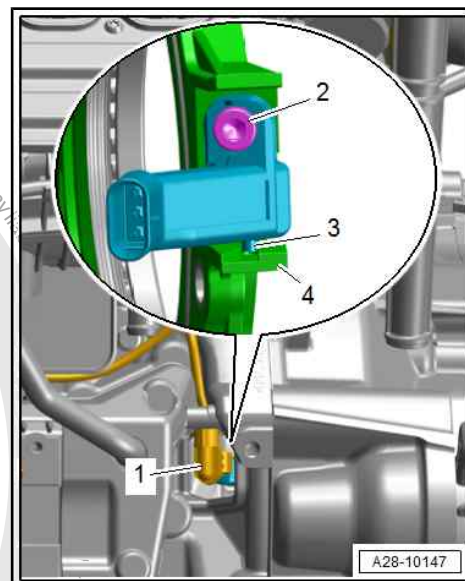
Install in reverse order of removal, observing the following:

- Bring engine speed sender - G28- in installation position making sure that guide -3- engages in sealing flange -4-.
- Tighten bolt -2-, and connect connector -1-.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

## Specified torques

◆ ⇒ [“1.1 Assembly overview - ignition system”, page 493](#)

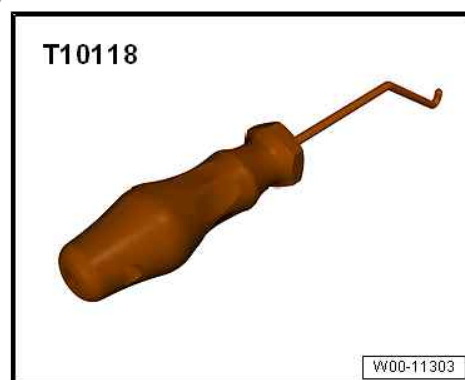
◆ ⇒ [“2.2 Assembly overview - electric coolant pump”, page 294](#)



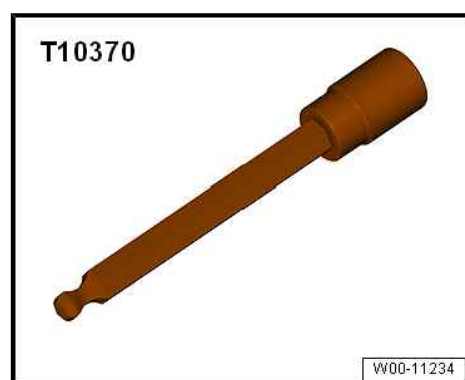
## 1.5.2 Removing and installing engine speed sender - G28- , Polo 2018 ► , T-Cross

### Special tools and workshop equipment required

- ◆ Assembly tool - T10118-



- ◆ Socket, 4 mm - T10370-



## Removing

- Remove air duct on lock carrier ⇒ [page 419](#) .

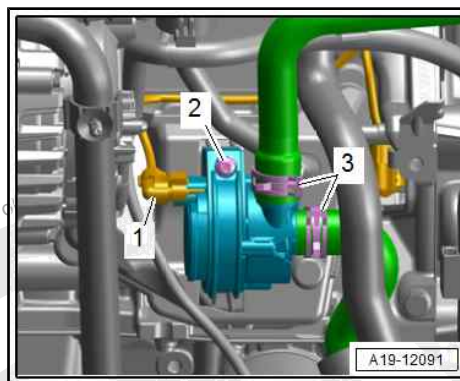


- Disconnect electrical connector -1-.
- Unscrew bolt -2- and press charge air cooling pump - V188- to one side.

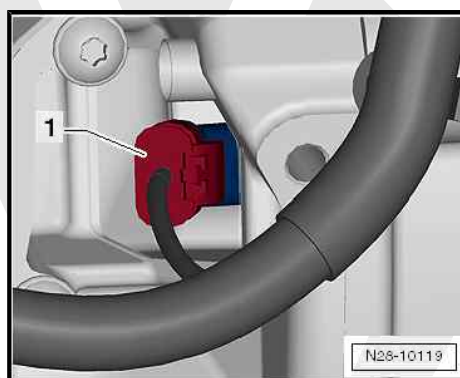


#### Note

Disregard -item 3-.



- Release and separate electrical connector -1-. To do this, use spring-type clip pliers - T10118- .



- Unscrew bolt -arrow- using 4 mm socket insert - T10370- .  
Remove engine speed sender - G28- -1-.

#### Installing

Install in reverse order of removal, observing the following:

#### Specified torques

- ◆ ⇒ ["1.1 Assembly overview - ignition system", page 493](#)
- ◆ ⇒ ["2.2 Assembly overview - electric coolant pump", page 294](#)

