Workshop Manual

CC 2010 ➤ , Eos 2006 ➤ , Golf 2004 ➤ , Golf 2009 ➤ , Passat 2006 ➤ , Passat CC 2009 ➤ , Scirocco 2009 ➤ , Tiguan 2008 ➤

4-cyl. injection engine (1.8 and 2.0 l engine, chain drive)									
Engine ID	CAW A	CAW B	CBF A	CCT A	CCT B	BZB	CGY A	CCZ B	CCZ A
	CDA A	CCZ C	CDA B	CCZ D					

Edition 02.2017

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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
20 - Fuel supply system
21 - Turbocharging/supercharging
24 - Mixture preparation - injection
26 - Exhaust system
28 - Ignition system

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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.

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Contents

00 - Technical data 1
1 **Engine number** 1
2 **Engine data** 2

10 - Removing and installing engine 4
1 **Removing and installing engine** 4
1.1 Removing engine 5
1.2 Separating gearbox from engine and assembling 15
1.3 Securing engine to assembly stand 18
1.4 Installing engine 19
2 **Assembly mountings** 21
2.1 Assembly overview - assembly mountings (Golf, Eos, Passat, CC, Scirocco) 21
2.2 Assembly overview - assembly mountings (Tiguan) 23
2.3 Checking adjustment of assembly mountings (engine and gearbox mountings) 24
2.4 Adjusting assembly mountings (Passat 2006 ▸, CC) 24
2.5 Adjusting assembly mountings (Golf, Eos, Scirocco) 28
2.6 Adjusting assembly mounting (Tiguan) 32

13 - Crankshaft group 36
1 **Cylinder block (pulley end)** 36
1.1 Assembly overview - poly V-belt drive 36
1.2 Removing and installing poly-V belt 38
1.3 Removing and installing tensioner for poly V-belt (Passat 2006 ▸, CC) 39
1.4 Removing and installing tensioner for poly V-belt (Golf, Eos, Scirocco) 42
1.5 Removing and installing tensioner for poly V-belt (Tiguan) 46
1.6 Removing and installing bracket for ancillaries 49
1.7 Removing and installing vibration damper 50
1.8 Renewing oil seal for vibration damper 57
2 **Cylinder block, gearbox end** 60
2.1 Assembly overview - sealing flange on gearbox side and dual-mass flywheel/drive plate 60
2.2 Removing and installing dual-mass flywheel 61
2.3 Removing and installing drive plate 62
2.4 Removing and installing sealing flange on gearbox side 64
3 **Crankshaft** 71
3.1 Assembly overview - crankshaft 71
3.2 Pulling needle bearing out of and driving into crankshaft 74
3.3 Crankshaft dimensions 76
3.4 Measuring axial clearance of crankshaft 76
3.5 Measuring radial clearance of crankshaft 77
4 **Pistons and conrods** 79
4.1 Assembly overview - pistons and conrods 79
4.2 Removing and installing pistons 82
4.3 Checking pistons and cylinder bores 83
4.4 Separating new conrod 85
4.5 Checking radial clearance of conrods 86

15 - Cylinder head, valve gear 87
1 **Chain drive** 87
1.1 Assembly overview - timing chain covers 87
1.2 Removing and installing camshaft control valve 1 N205 90
1.3 Removing and installing upper timing chain cover 90

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1.4 Removing and installing lower timing chain cover (Passat, CC) . . . 92
1.5 Removing and installing lower timing chain cover (Golf, Eos, Scirocco) . . . 98
1.6 Removing and installing bottom timing chain cover (Tiguan) . . . 105
1.7 Camshaft timing chain - exploded view . . . 111
1.8 Removing and installing camshaft timing chain . . . 113
1.9 Assembly overview - drive chain for balance shaft . . . 125
1.10 Removing and installing drive chain for balance shaft . . . 127
1.11 Removing and installing inlet side balance shaft . . . 127
1.12 Removing and installing exhaust side balance shaft . . . 130
1.13 Checking valve timing . . . 133

2 Cylinder head . . . 135
2.1 Assembly overview - cylinder head . . . 135
2.2 Renewing oil non-return valve in cylinder head . . . 138
2.3 Removing and installing engine cover . . . 139
2.4 Removing and installing cylinder head . . . 140
2.5 Checking compression . . . 176
2.6 Removing and installing vacuum pump . . . 178

3 Valve gear . . . 180
3.1 Assembly overview - valve gear . . . 180
3.2 Removing and installing camshaft . . . 183
3.3 Checking axial clearance of camshafts . . . 198
3.4 Renewing valve stem seals . . . 198
3.5 Checking valve guides . . . 202

17 - Lubrication . . . 204

1 Sump and oil pump . . . 204
1.1 Assembly overview - sump, oil pump . . . 204
1.2 Removing and installing coarse oil separator . . . 207
1.3 Removing and installing lower part of sump . . . 207
1.4 Removing and installing oil pump . . . 210
1.5 Removing and installing upper part of sump . . . 212
1.6 Removing and installing oil pressure control valve N428 (engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB) . . . 216

2 Engine oil: . . . 218

3 Oil filter, engine oil cooler and oil pressure switch (engine codes CAWA, CAWB, CBFA, CCTA, CCTB, BZB, CGYA) . . . 219
3.1 Assembly overview - oil filter, engine oil cooler and oil pressure switch F1 . . . 219
3.2 Removing and installing engine oil cooler . . . 220
3.3 Checking oil pressure and oil pressure switch . . . 221

4 Oil filter, engine oil cooler and oil pressure switch (engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB) . . . 223
4.1 Assembly overview - oil filter, engine oil cooler . . . 223
4.2 Removing and installing engine oil cooler . . . 224
4.3 Removing and installing oil pressure switch F1 . . . 225
4.4 Removing and installing oil pressure switch for reduced oil pressure F378 . . . 226
4.5 Checking oil pressure and oil pressure switch . . . 227

19 - Cooling . . . 232

1 Cooling system . . . 232
1.1 Coolant hose connection diagram . . . 232
1.2 Draining and adding coolant . . . 235
1.3 Checking cooling system for leaks . . . 240

2 Coolant pump, thermostat, coolant pipes . . . 243
2.1 Assembly overview - coolant pump, thermostat . . . 243
2.2 Removing and installing coolant pump . . . 245

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2.3 Removing and installing toothed belt for coolant pump . . . 247
2.4 Renewing oil seal for coolant pump drive . . . 249
2.5 Removing and installing thermostat . . . 250
2.6 Removing and installing coolant temperature sender G62 . . . 253
2.7 Assembly overview - coolant pipes . . . 255
2.8 Removing and installing front coolant pipes . . . 256
2.9 Removing and installing small coolant pipe . . . 259
2.10 Continued coolant circulation pump V51 - exploded view . . . 261
2.11 Removing and installing continued coolant circulation pump V51 . . . 262
3 Radiator and radiator fans . . . 264
3.1 Assembly overview - radiator, fan cowl and radiator fan (Passat, CC, Golf, Eos, Scirocco) . . . 264
3.2 Assembly overview - radiator, radiator cowl and radiator fan (Tiguan) . . . 266
3.3 Removing and installing radiator cowl . . . 267
3.4 Removing and installing radiator fan V7 and radiator fan 2 V177 . . . 268
3.5 Removing and installing radiator (Passat, CC, Golf, Eos, Scirocco) . . . 269
3.6 Removing and installing radiator (Tiguan) . . . 269

20 - Fuel supply system . . . 272
1 Safety precautions . . . 272
1.1 Safety regulations for working on fuel supply . . . 272
2 Rules for cleanliness . . . 274
3 Fuel tank (Passat, CC) . . . 275
3.1 Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA, CDAB) . . . 275
3.2 Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB) . . . 276
3.3 Emptying fuel tank . . . 277
3.4 Removing and installing fuel tank . . . 281
4 Fuel tank (Golf, Scirocco) . . . 285
4.1 Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA) . . . 285
4.2 Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB) . . . 287
4.3 Draining fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA) . . . 289
4.4 Emptying fuel tank (engine codes CBFA, CCTA, CCTB) . . . 293
4.5 Removing and installing fuel tank . . . 295
5 Fuel tank (Tiguan) . . . 299
5.1 Assembly overview - fuel tank . . . 299
5.2 Emptying fuel tank . . . 301
5.3 Removing and installing fuel tank . . . 304
6 Fuel tank (Eos) . . . 308
6.1 Assembly overview - fuel tank (engine codes CAWA, CAWB, CCZA, CCZB) . . . 308
6.2 Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB) . . . 310
6.3 Emptying fuel tank . . . 312
6.4 Removing and installing fuel tank . . . 316
7 Repairing fuel supply (Passat, CC) . . . 320
7.1 Removing and installing fuel delivery unit . . . 320
7.2 Removing and installing fuel gauge sender G . . . 324
7.3 Checking fuel pump . . . 325
8 Repairing fuel supply system (Golf, Eos, Scirocco) . . . 340
8.1 Removing and installing fuel delivery unit . . . 340
8.2 Removing and installing fuel gauge sender G . . . 343
8.3 Checking fuel pump G6 . . . 344
9 Repairing fuel supply (Tiguan) . . . 360
9.1 Removing and installing fuel delivery unit . . . 360
9.2 Removing and installing fuel gauge sender G . . . 363

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9.3 Removing and installing suction-jet pump, fuel filter and pressure limitation valve 364
9.4 Removing and installing fuel gauge sender 2 G169 366
9.5 Removing and installing fuel pump control unit J538 367
9.6 Checking fuel pump 368
10 Electronic power control (EPC) 382
10.1 Assembly overview - accelerator module 382
10.2 Removing and installing accelerator pedal module 382
11 Activated charcoal filter system (Passat, CC, Tiguan) 385
11.1 Assembly overview - activated charcoal filter system (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB) 385
11.2 Assembly overview - activated charcoal filter system (engine codes CBFA, CCTA, CCTB) 386
11.3 Checking fuel tank breather (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB) 388
11.4 Check fuel system for leaks (engine codes CBFA, CCTA, CCTB) 390
12 Activated charcoal filter system (Golf, Eos, Scirocco with engine codes CAWA, CAWB, BZB, CGYA, CCZA, CCZB, CDAA) 398
12.1 Assembly overview - activated charcoal filter system 398
12.2 Checking fuel tank breather 399
13 Activated charcoal filter system (Golf, Eos with engine code CBFA, CCTA, CCTB) 402
13.1 Overview of activated charcoal filter system 402
13.2 Assembly overview - activated charcoal filter system (Golf) 404
13.3 Assembly overview - activated charcoal filter system (Eos) 405
13.4 Removing and installing activated charcoal filter 406
13.5 Removing and installing fuel system diagnostic pump V144 (Golf) 407
13.6 Removing and installing fuel system diagnostic pump V144 (Eos) 408
13.7 Checking fuel system for leaks 408

21 - Turbocharging/supercharging 416
1 Exhaust turbocharger 416
1.1 Assembly overview - turbocharger 416
1.2 Fitting hose connections with plug-in connectors 423
1.3 Removing and installing turbocharger 424
1.4 Checking vacuum unit for turbocharger 431
1.5 Adjusting turbocharger vacuum unit (engine codes BZB, CGYA, CDAA, CDAB) 432
1.6 Removing and installing vacuum unit for turbocharger 436
2 Charge air system 437
2.1 Assembly overview - charge air cooling (Passat, CC, Tiguan, Eos) 437
2.2 Assembly overview - charge air cooler (Golf, Scirocco) 438
2.3 Assembly overview - sound generator (Golf, Scirocco) 440
2.4 Actuator for structure-borne sound R214 and control unit for structure-borne sound J869 440
2.5 Turbocharging - overview 443
2.6 Removing and installing charge air cooler (Golf, Eos) 443
2.7 Removing and installing charge air cooler (Passat, CC, Scirocco) 445
2.8 Removing and installing charge air cooler, Tiguan 446
2.9 Removing and installing charge air duct to sound generator (Golf, Scirocco) 447
2.10 Checking charge air system for leaks 448

24 - Mixture preparation - injection 451
1 Safety precautions and rules for cleanliness 451
1.1 General information on self-diagnosis 451
2 Injection system 452
2.1 Technical data 452
2.2 Overview of fitting locations 452
2.3 Assembly overview - air filter 458

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2.4 Removing and installing air filter housing . . . 459
2.5 Removing and installing air filter element . . . 460
2.6 Removing and installing air mass meter G70 . . . 461
2.7 Assembly overview - intake manifold . . . 461
2.8 Assembly overview - fuel rail . . . 464
2.9 Removing and installing intake manifold with fuel rail . . . 465
2.10 Removing and installing injectors . . . 472
2.11 Renewing Teflon seal on injector . . . 475
2.12 Cleaning injectors . . . 477
2.13 Removing and installing fuel pressure sender G247 . . . 478
2.14 Removing and installing throttle valve module J338 . . . 479
2.15 Cleaning throttle valve module J338 . . . 480
2.16 Assembly overview - high-pressure pump with fuel pressure regulating valve N276 . . . 481
2.17 Removing and installing high-pressure pump . . . 483

3 Checking components . . . 485
3.1 Checking fuel pressure sender G247 . . . 485
3.2 Checking intake manifold change-over . . . 487

4 Engine control unit J623 (Passat, CC up to 11/10) . . . 490
4.1 Removing and installing engine control unit . . . 490
4.2 Removing and installing engine control unit with protective housing . . . 491

5 Engine control unit J623 (Golf, Eos to 11/08) . . . 493
5.1 Removing and installing engine control unit . . . 493
5.2 Removing and installing engine control unit with protective housing . . . 493

6 Engine control unit J623 (Golf, Eos, Scirocco from 11/08; CC from 11/10) . . . 497
6.1 Removing and installing engine control unit . . . 497
6.2 Removing and installing engine control unit with protective housing . . . 498

7 Engine control unit J623 (Tiguan) . . . 502
7.1 Removing and installing engine control unit . . . 502
7.2 Removing and installing engine control unit with protective housing . . . 503

8 Engine control unit J623 (Scirocco to 11/08) . . . 505
8.1 Removing and installing engine control unit . . . 505
8.2 Removing and installing engine control unit with protective housing . . . 506

26 - Exhaust system . . . 508

1 Exhaust system (Passat, CC) . . . 508
1.1 Assembly overview - exhaust system (engine codes BZB, CAWA, CAWB, CGYA) . . . 508
1.2 Assembly overview - exhaust system (engine codes CCTA, CCTB, CCZA, CDAA, CDAB) . . . 510
1.3 Assembly overview - exhaust system (engine code CBFA) . . . 512
1.4 Separating centre and rear silencers . . . 513
1.5 Aligning exhaust system free of stress . . . 515
1.6 Installation position and specified torque of clamp . . . 516
1.7 Removing and installing catalytic converters with front exhaust pipe . . . 517
1.8 Check exhaust system for leaks . . . 519

2 Exhaust system (Golf, Eos, Scirocco) . . . 520
2.1 Assembly overview - exhaust system (engine code CAWB) . . . 520
2.2 Assembly overview - exhaust system (Golf 2004 ►, Eos, Scirocco, engine codes CCTA, CCZA, CCZB) . . . 523
2.3 Assembly overview - exhaust system (engine code CBFA) . . . 525
2.4 Assembly overview - exhaust system (Golf 2009►, engine codes CCZA, CCZB) . . . 527
2.5 Assembly overview - exhaust system (Golf 2009 ►, engine codes CCTA, CDAA) . . . 529
2.6 Separating centre and rear silencers . . . 530
2.7 Aligning exhaust system free of stress . . . 531
2.8 Installation position and specified torque of clamp . . . 532
2.9 Removing and installing catalytic converters with front exhaust pipe . . . 533

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2.10 Check exhaust system for leaks . . . 535
3 Exhaust system (Tiguan) . . . 537
3.1 Assembly overview – exhaust system (engine codes CCTA, CCTB, CCZA, CCZB, CCZC, CCZD) . . . 537
3.2 Assembly overview - exhaust system (engine codes CAWB, CCZA) . . . 540
3.3 Separating centre and rear silencers . . . 541
3.4 Aligning exhaust system free of stress . . . 542
3.5 Removing and installing catalytic converters with front exhaust pipe . . . 543
3.6 Installation position and specified torque of clamp . . . 547
3.7 Check exhaust system for leaks . . . 548
4 Secondary air system - engine code CBFA . . . 549
4.1 Assembly overview - secondary air system . . . 549
4.2 Removing and installing secondary air pump motor V101 . . . 549
4.3 Removing and installing secondary air inlet valve N112 . . . 550

28 - Ignition system . . . 552
1 Repairing ignition system . . . 552
1.1 General notes on ignition system . . . 552
1.2 Safety precautions . . . 552
1.3 Assembly overview - ignition system . . . 553
1.4 Removing and installing ignition coils with output stage . . . 553
1.5 Removing and installing knock sensor 1 G61 . . . 555
1.6 Removing and installing engine speed sender G28 . . . 555
1.7 Test data, spark plugs . . . 556

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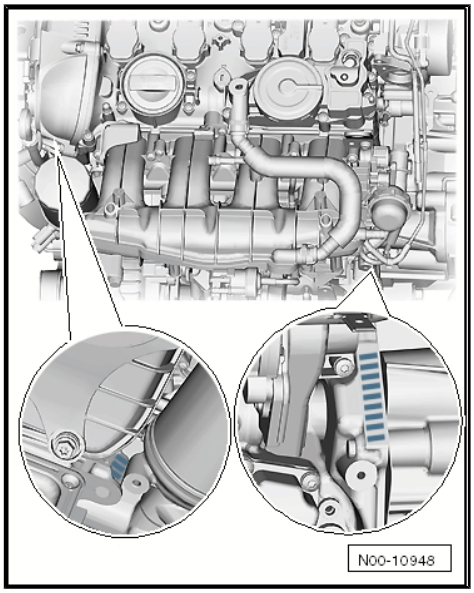
00 – Technical data

1 Engine number

(VRL010102; Edition 02.2017)

The engine number (“code letters” and “serial number”) can be found at the joint between the engine and gearbox.

The engine code is also stamped on the cylinder block behind the oil filter.



Vehicles with four digit engine codes

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 shows the engine output and torque and varies according to engine control unit. The four-digit engine code can be found on the identification plate and on the vehicle data sticker. It can also be read from the engine control unit.

Note

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

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2 Engine data

Code	BZB	CAWA	CAWB	CBFA	CCTA	CCTB
Manufactured from						
Golf 2004 ►	---	---	05.08 ►	03.08 ►	03.08 ►	---
Eos	---	---	05.08 ►	05.08 ►	05.08 ►	--
Tiguan	---	02.08 ►	02.08 ►	---	01.08 ►	05.08 ►
Scirocco	---	---	05.08 ►	---	---	---
Passat 2006 ►	11.07 ►	---	03.08 ►	03.08 ►	03.08 ►	03.08 ►
CC	03.08 ►	---	05.08 ►	10.09 ►	06.08 ►	---
Golf 2009 ►	---	---	---	07.09 ►	07.09 ►	---
Exhaust emission standard	EU 4	EU 4	EU 4	SULEV	ULEV 2	ULEV 2
Displacement l	1.8	2.0	2.0	2.0	2.0	2.0
Power kW at rpm	118/5000	125/5500	147/5100	147/5100	147/5100	125/5500
Torque Nm at rpm	250/1500	280/1700	280/1700	280/1700	280/1700	280/1500
Bore Diameter, mm	82.5	82.5	82.5	82.5	82.5	82.5
Stroke mm	84.1	92.8	92.8	92.8	92.8	92.8
Compression ratio	9.6:1	9.6:1	9.6:1	9.6:1	9.6:1	9.6:1
RON	95 [1)]	95	95	95	95	95
Ignition/injection system	FSI	FSI	FSI	FSI	FSI	FSI
Firing order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Charging	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger
Camshaft timing adjustment	Yes	Yes	Yes	Yes	Yes	Yes
Secondary air injection	No	No	No	Yes	No	No
Valves per cylinder	4	4	4	4	4	4
Oil pressure control	No	No	No	No	No	No

Code	CGYA	CCZA	CCZB	CCZC	CCZD	CDAA	CDAB
Manufactured from							
Golf 2004 ►	---	---	---	---	---	---	---
Eos	---	05.09 ►	10.09 ►	---	---	---	---
Tiguan	---	10.09 ►	05.11 ►	10.09 ►	05.11 ►	---	---
Scirocco	---	---	10.09 ►	---	---	---	---
Passat 2006 ►	11.08 ►	10.09 ►	---	---	---	10.09 ►	10.09 ►
CC	10.09 ►	10.09 ►	11.10 ►	---	---	10.09 ►	10.09 ►
Golf 2009 ►	---	---	01.09 ►	---	---	05.09 ►	---
Exhaust emission standard	EU 4	EU 5	EU 5	EU 5	EU 5	EU 5	EU 4
Displacement l	1.8	2.0	2.0	2.0	2.0	1.8	1.8
Power kW at rpm	112/5000	147/5100	155/5300	125/4300	132/4300	118/4500	112/5000
Torque Nm at rpm	250/1500	280/1700	280/1700	280/1700	280/1700	250/1500	250/1500
Bore Diameter, mm	82.5	82.5	82.5	82.5	82.5	82.5	82.5
Stroke mm	84.1	92.8	92.8	92.8	92.8	84.1	84.1
Compression ratio	9.6:1	9.6:1	9.6:1	9.6:1	9.6:1	9.6:1	9.6:1

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Code	CGYA	CCZA	CCZB	CCZC	CCZD	CDAA	CDAB
RON	95 1)	95	95	95	95	95 1)	95 1)
Ignition/injection system	FSI	FSI	FSI	FSI	FSI	FSI	FSI
Firing order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Charging	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger	Exhaust turbocharger
Camshaft timing adjustment	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secondary air injection	No	No	No	No	No	No	No
Valves per cylinder	4	4	4	4	4	4	4
Oil pressure control	No	Yes	Yes	Yes	Yes	Yes	Yes

1) Unleaded petrol RON 91 can also be used, though power is reduced

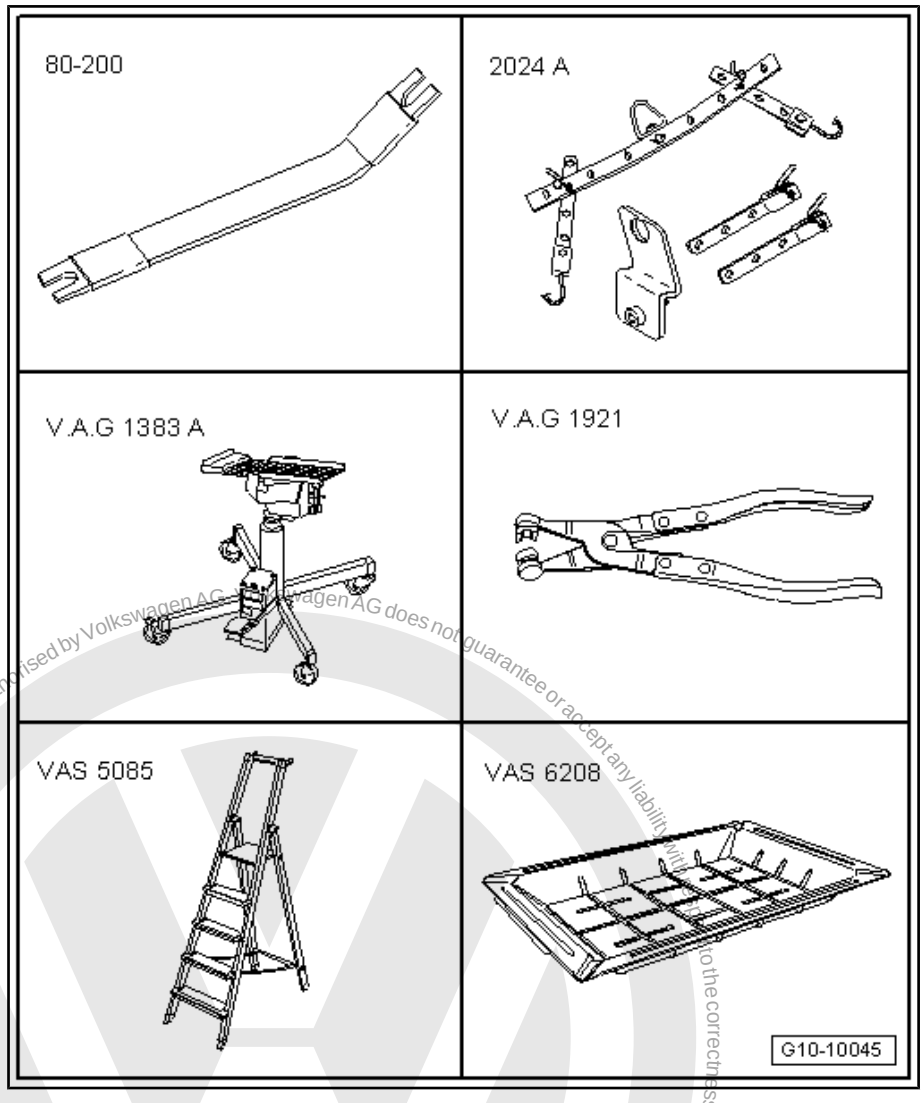
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10 – Removing and installing engine

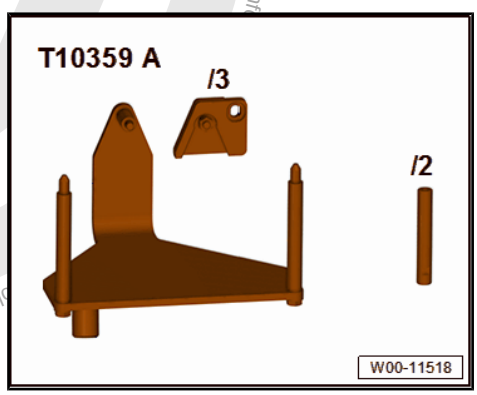
1 Removing and installing engine

Special tools and workshop equipment required

- Release lever - 80 - 200-
- Lifting tackle - 2024 A-
- Engine and gearbox jack - V.A.G 1383 A-
- Hose clip pliers - V.A.G 1921- or hose clip pliers - VAS 6362-
- Stepladder , commercially available
- Set of plugs for engine - VAS 6122-
- Drip tray for workshop hoist - VAS 6208-

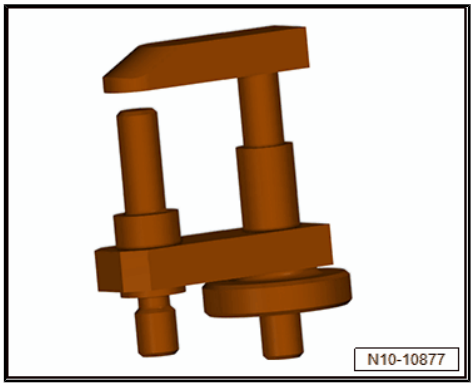


- Engine bracket - T10359 A- with pin - T10359/2-



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- Locking device from gearbox support - 3282-



Remove engine ⇒ page 5 .

Disconnecting gearbox from engine and assembling ⇒ page 15 .

Securing engine to assembly stand ⇒ page 18 .

Install engine ⇒ page 19 .

Assembly mountings ⇒ page 21 .

1.1 Removing engine

Note

- *The battery earth must be disconnected for continued work. Therefore, first check whether a coded radio is fitted. Then obtain anti-theft coding first if necessary.*
- *The engine is removed downwards together with the gearbox.*
- *All cable ties that are opened or cut through when the engine is removed must be renewed/replaced in the same position when the engine is installed.*

Caution

Observe the following points during all installation work, in particular in the engine compartment, due to the space limitations:

- ***Route all the various lines and electrical wiring so that they are in their original positions.***
- ***Ensure that there is sufficient clearance to all moving or hot components***

– Read event memories of all control units before removing ⇒ Vehicle diagnostic tester.

– Disconnect earth strap at battery with ignition switched off ⇒ Electrical system; Rep. gr. 27 ; Disconnecting and connecting battery.

– Remove engine cover panel ⇒ page 139 .

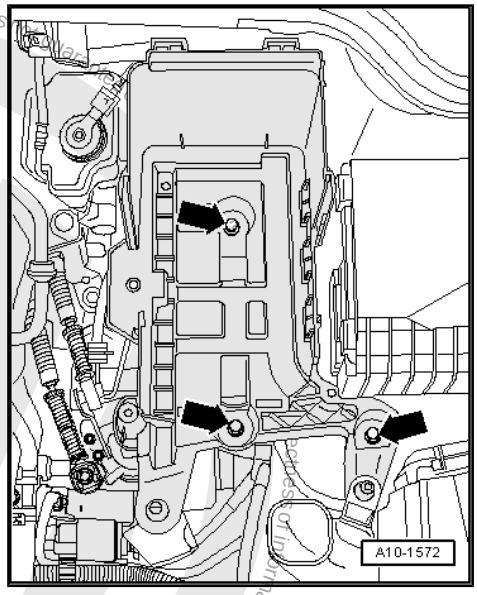
– Remove air filter ⇒ page 459 .

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– Remove battery and battery tray.

– Remove wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing windscreen wiper system; Removing and installing wiper arms .

– Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 64 ; Flush bonded windows; Assembly overview - plenum chamber cover .



Golf, Eos:

– Remove bulkhead plenum chamber ⇒ Body - front; Rep. gr. 50 ; Assembly overview - bulkhead plenum chamber .

– If fitted, remove charge air duct to sound generator ⇒ page 447 .

All:

– If fitted, release feed-through for engine wiring harness -arrow- and pull off upwards.

– Pull left engine wiring harness connector off at engine control unit.

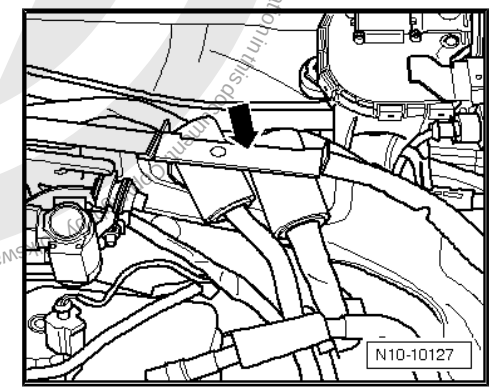
⇒ “4 Engine control unit J623 (Passat, CC up to 11/10)”, page 490

⇒ “5 Engine control unit J623 (Golf, Eos to 11/08)”, page 493

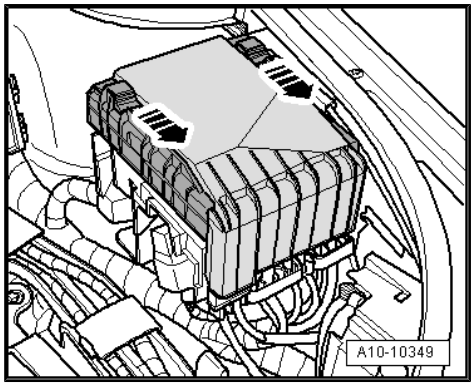
⇒ “6 Engine control unit J623 (Golf, Eos, Scirocco from 11/08; CC from 11/10)”, page 497

⇒ “7 Engine control unit J623 (Tiguan)”, page 502

⇒ “8 Engine control unit J623 (Scirocco to 11/08)”, page 505

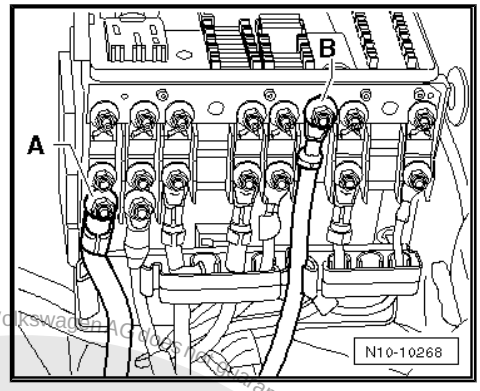


– Slide the two clips in the direction of the -arrows- and remove cover from electronics box in engine compartment.

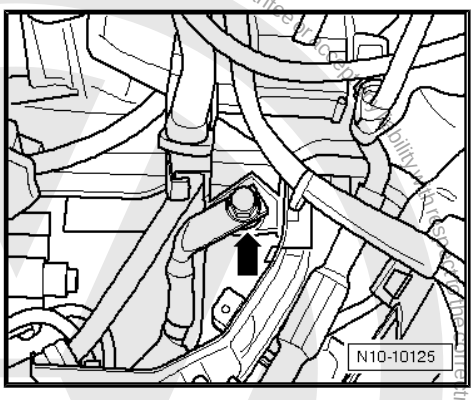


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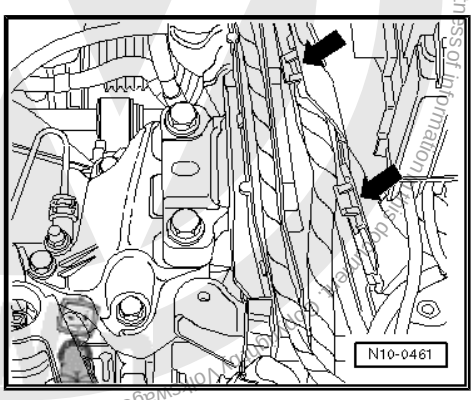
– Unscrew cable from alternator -A- and cable from battery -B- at fuse box.



– Unscrew earth cable from longitudinal member -arrow-.



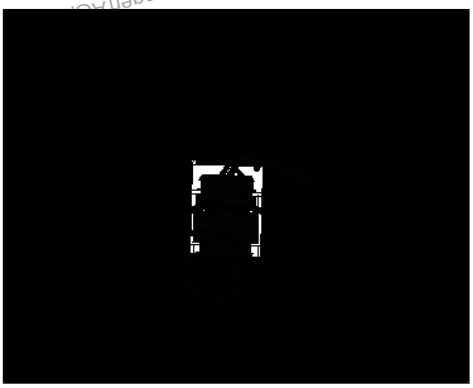
– Open cable duct latches on longitudinal member -arrows-.



– Expose electrical connector -1- and separate.
– Open wiring guide bracket located below -2-.
– Remove wiring harness for engine control unit from wiring duct and place on engine.

1.8 l vehicles with manual gearbox:

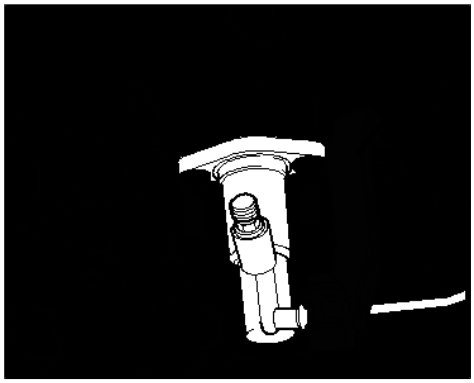
– Remove selector mechanism from gearbox ⇒ Rep. gr. 34 ; Removing and installing selector mechanism .



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– Remove brace -1-.

– Detach slave cylinder -arrows- and place to one side. Do not open pipes.



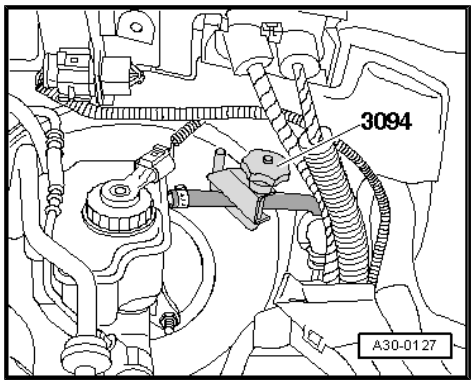
Caution

Do not press clutch pedal after removing slave cylinder. This can damage slave cylinder.

2.0 l vehicles with manual gearbox:

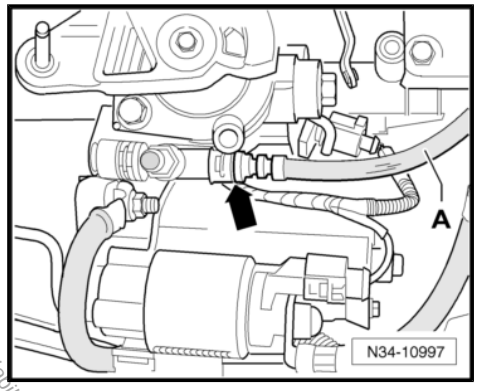
– Remove selector mechanism from gearbox ⇒ Rep. gr. 34 ; Removing and installing selector mechanism .

– Clamp off supply hose to master cylinder using hose clamp -3094- .



– Pull out clip -arrow- for pipe line to stop.

– Pull pipe line out from slave cylinder bleeder and seal it.



Caution

Do not depress clutch pedal any longer.

Vehicles with automatic gearbox:

– Remove selector lever cable from gearbox ⇒ Rep. gr. 37 ; Removing and installing gear change mechanism .

Vehicles with DSG®:

– Remove selector cable from gearbox ⇒ Power transmission; Rep. gr. 34 ; Selector mechanism; Removing and installing selector lever cable .

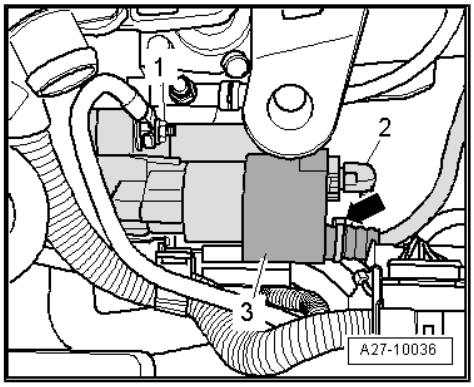
Tiguan with automatic gearbox:

– Remove lines leading to gear oil cooler from gearbox ⇒ Automatic gearbox; Rep. gr. 37 .

Continued for all vehicles:

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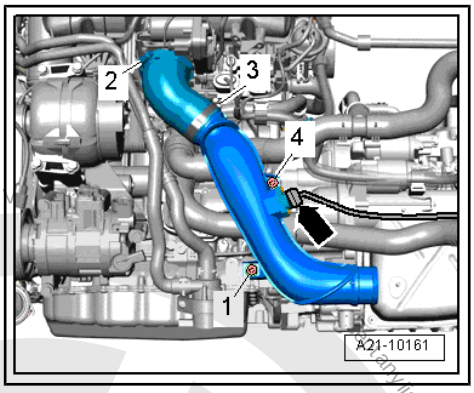
– Disconnect electrical connector -2-.



– Unscrew upper securing bolts for cowling -arrows-.



– Release hose clip -2-.
– Unscrew bolt -4-.
– Disconnect electrical connector -arrow- and move electrical wires clear.



WARNING

The cooling system is under pressure when the engine is hot!

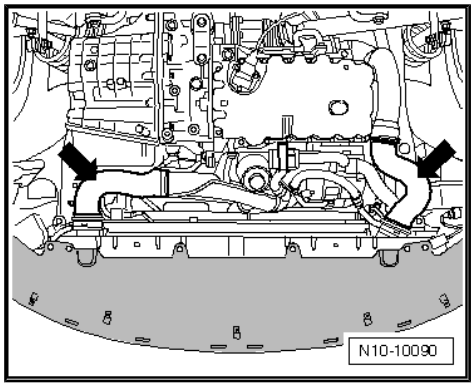
Danger of scalding due to steam and hot coolant.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Open filler cap on expansion tank.
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Assembly overview - noise insulation; noise insulation .
– Remove front part of wheel housing liners or front wheel housing liners ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

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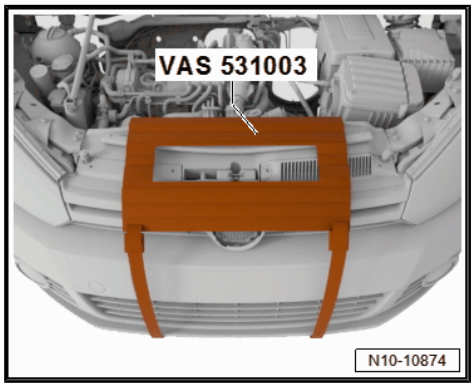
– Remove charge air hoses -arrows-.



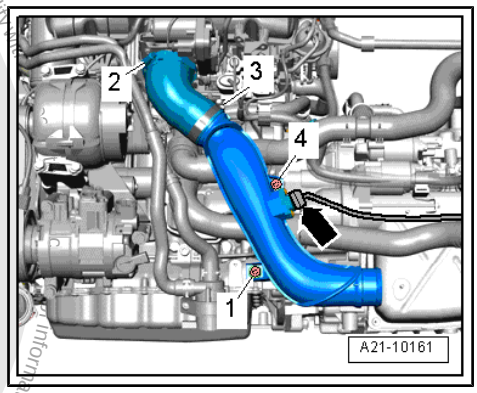
– Detach connector -1- and unscrew lower securing bolts -arrows- for cowling.
– Remove cowling downwards.



– Cover radiator using protective mat - VAS 531 003- .



– Remove bolt -1- and take out air pipe downwards.

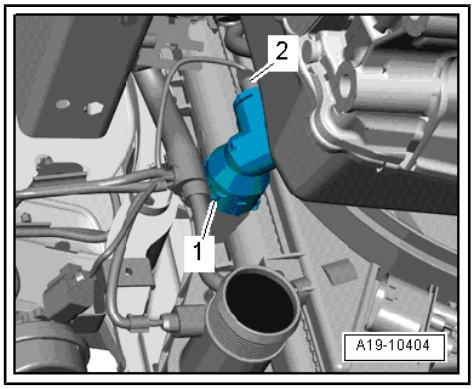


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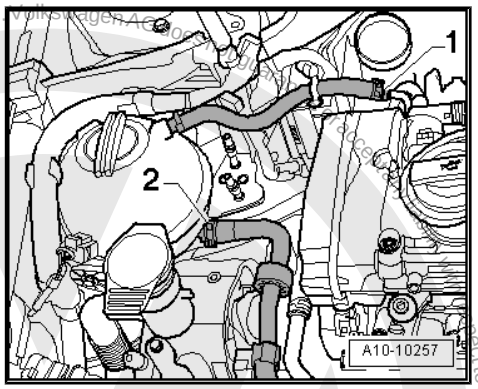
– Separate electrical connector -2- for radiator outlet coolant temperature sender - G83- .

– Place drip tray - VAS 6208- beneath engine.

– Drain coolant ⇒ page 235 .

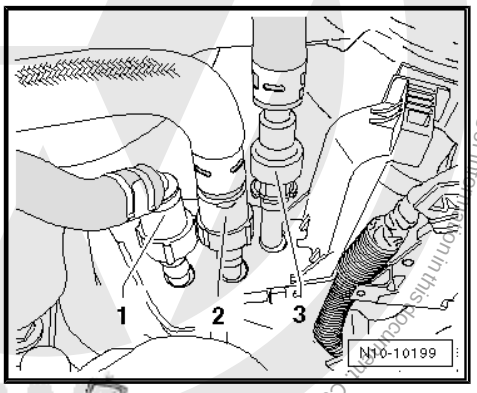


– Remove coolant hoses -1 and 2-.



WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.



– Separate existing lines from the fuel transfer point.

1) Breather hose

2) Vacuum line

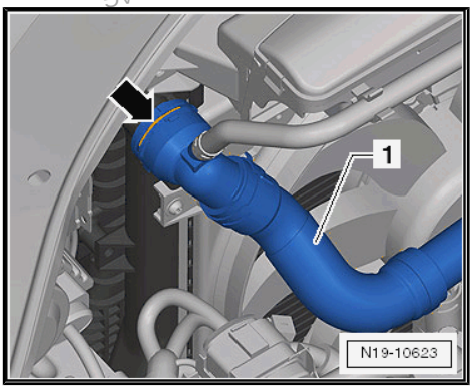
3) Fuel supply line

Golf, Passat, CC, Eos:

– Detach coolant hose at top of radiator -arrow-.

Tiguan:

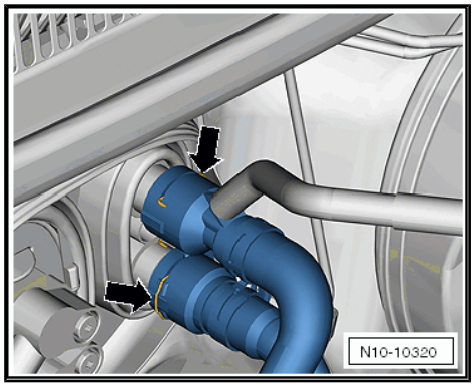
– Remove coolant from radiator on right-hand side and pull coolant off radiator on left-hand side.



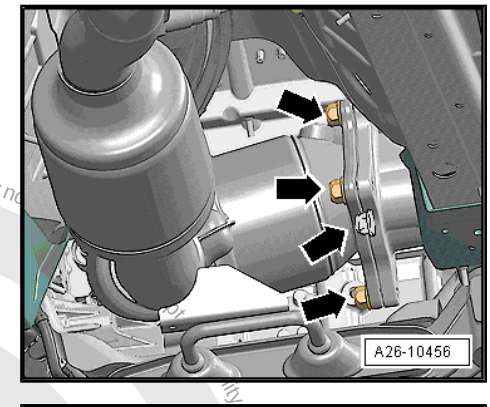
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All:

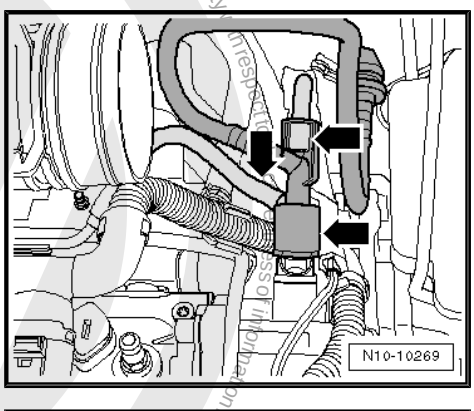
– Remove coolant hoses to heater heat exchanger -arrows-. Pull out locking bar slightly to do this.



– Remove nuts (accessible from above) -arrows- securing front exhaust pipe to turbocharger.

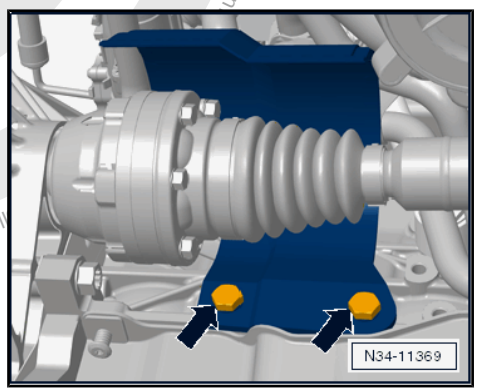


– Pull off vacuum hoses -arrows-.



Vehicles with front-wheel drive:

– Remove heat shield for drive shaft on right side -arrows-.



All:

– Remove drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Removing and installing drive shafts .

– Remove front exhaust pipe with catalytic converter:

Passat CC ⇒ page 517

Golf, Eos, Scirocco ⇒ page 533

Tiguan ⇒ page 543

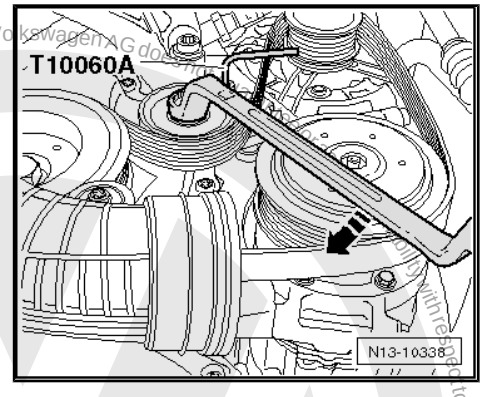
Caution

Danger of destruction due to reverse running direction in the case of a poly V-belt that has already run.

- ***Before removing the poly V-belt, use a piece of chalk or a felt pen to mark the running direction.***

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– Turn tensioner in direction of -arrow- to relieve tension on poly V-belt.
– Use the locking pin - T10060 A- to lock the tensioner.
– Remove poly V-belt.

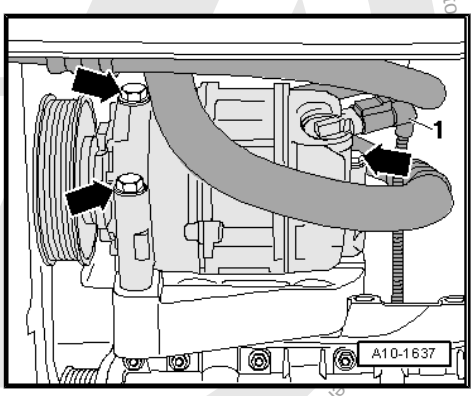


– Remove electrical connector -1- for control valve for compressor of air-conditioning system - N280- .

WARNING

Danger of injury due to coolant.

- *The air conditioner refrigerant circuit must not be opened.*



– Unscrew bolts -arrows- for air conditioning compressor.

Caution

Danger of damage to coolant lines and hoses.

- *Do not stretch, kink or bend refrigerant lines and hoses.*

– Fasten air-conditioning compressor together with connected coolant hoses to the longitudinal member above.

Golf, Eos, Scirocco:

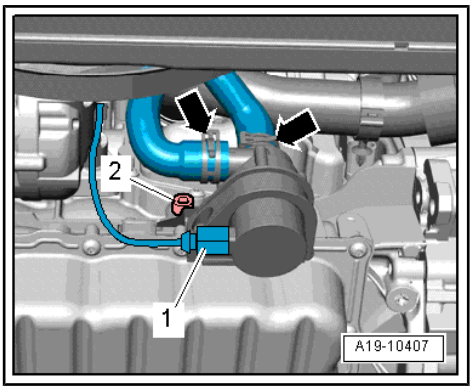
– Removing radiator ⇒ page 269 .
– Remove alternator - C- ⇒ Rep. gr. 27 .

All:

– Remove bolt -2- at bracket for coolant pump for continued circulation - V51- .

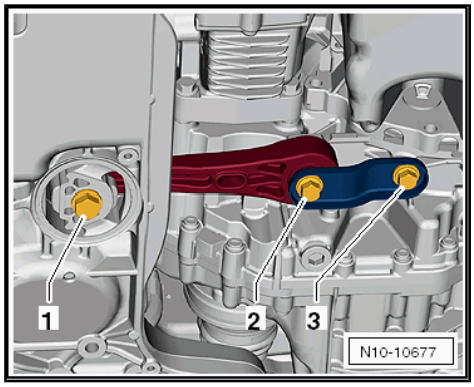
Note

The continued circulation coolant pump - V51- remains installed.



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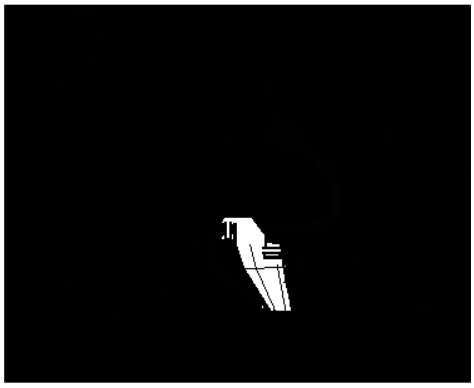
– First, undo bolt -1- and then bolts -2…3- and remove pendulum support.



– If fitted, unplug electrical connector -1- for oil level and oil temperature sender - G266- and unclip bracket -2- from subframe.

– Pull off or disconnect all other electrical connections from the engine and gearbox as necessary and lay open.

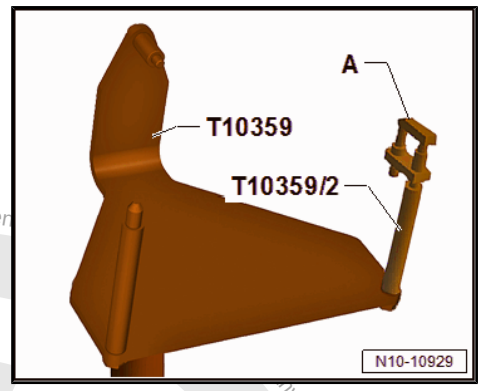
– Disconnect all connection, coolant, vacuum and intake hoses from engine.



Caution

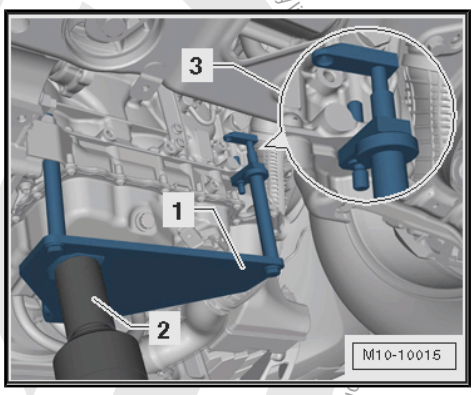
Always use the pin - T10359/2- and the securing element from gearbox support - 3282- . Otherwise the engine can tip.

• Screw pin - T10359- into engine support - T10359/2- and screw on safety support from gearbox support - 3282- -A-.



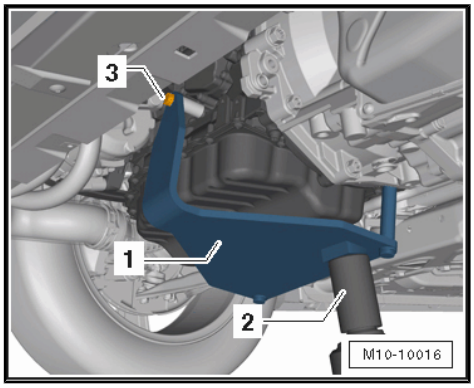
– Position engine bracket -T10359- -1- on engine and insert in mountings.

– Close safety support -3- to prevent engine from tilting out of engine support -T10359- .



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– Attach engine support -T10359- -1- with bolt -3- to cylinder block and tighten to approx. 20 Nm.



Note

Tapped hole for bolt -1- secures continued coolant circulation pump - V51- .

– Insert engine and gearbox jack - V.A.G 1383 A- in engine support -T10359- .

– Lift engine together with gearbox slightly.

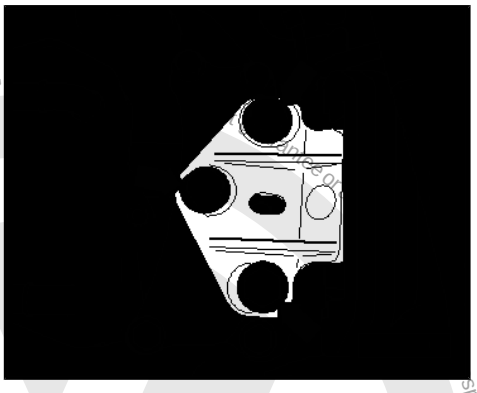
Note

Use a stepladder - VAS 5085- to unscrew the bolts for the assembly mountings.

– Unscrew bolts -arrows- of engine/gearbox support on the engine.



– Unscrew bolts -arrows- of engine/gearbox support on gearbox.



Note

- *Check that all hose and line connections between engine, gearbox and body have been detached.*
- *Engine with gearbox must be guided carefully when lowered to prevent damage.*

Dual clutch gearbox:

- Note the selector lever cable.

All:

– Pull engine with gearbox as far forwards and to the left as possible, and then lower gradually.

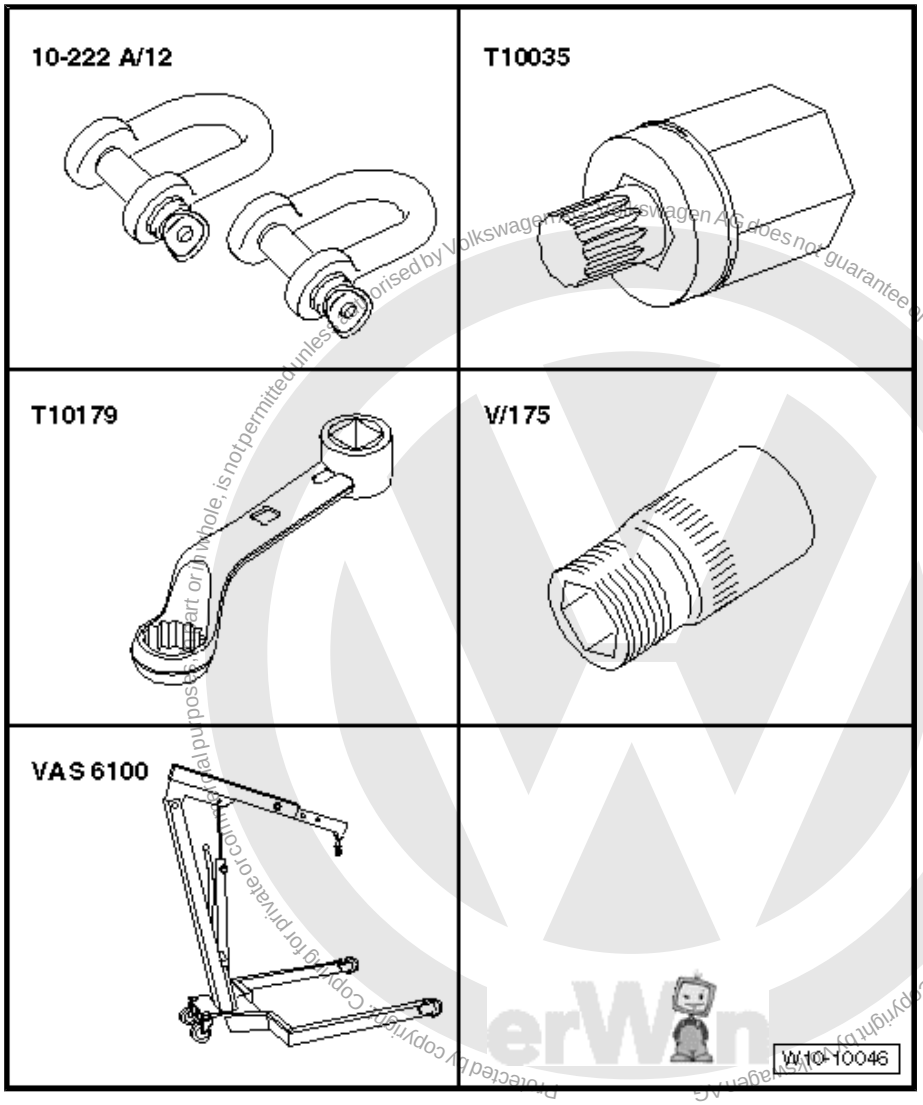
Secure engine on engine and gearbox support - VAS 6095- to carry out repairs ⇒ page 18 .

1.2 Separating gearbox from engine and assembling

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Special tools and workshop equipment required

- Shackle - 10 - 222 A /12-
- Workshop hoist - VAS 6100-
- Vehicles with automatic gearbox: insert tool AF 18 - T10179-
- Vehicles with automatic gearbox: insert tool - V/175-
- Vehicles with automatic gearbox: special wrench - T10035-



Separate gearbox from engine:

Conditions

- Engine with gearbox removed and secured on engine bracket - T10359- .

– Remove starter ⇒ Rep. gr. 27 ; Removing and installing starter .

Automatic gearbox and DSG®

– Remove coolant hoses (if any) from gearbox oil cooler and seal apertures.

Vehicles with all-wheel drive

– Remove bevel box (automatic gearbox) ⇒ Gearbox; Rep. gr. 39 .

– Remove bevel box (manual gearbox) ⇒ Gearbox; Rep. gr. 34 .

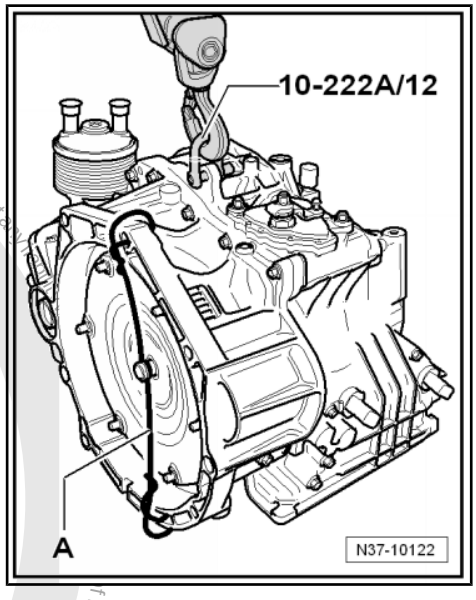
All

– Disconnect all electrical connections from gearbox to engine and move them to one side.

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– Secure gearbox to workshop hoist with shackle - 10 - 222 A / 12- , but do not raise.

– Remove upper engine/gearbox securing bolts.



Manual gearbox and DSG®

– Before now removing final securing bolts, support gearbox with workshop hoist.

– Remove lower engine/gearbox connecting bolts.

– Press gearbox off from engine, guiding the gearbox

Automatic gearbox

Bolts can be loosened with bit - T10179- . When tightening, however, note the lower tightening torque ⇒ 6-speed automatic gearbox 09G; Rep. gr. 37 ; Removing and installing gearbox .

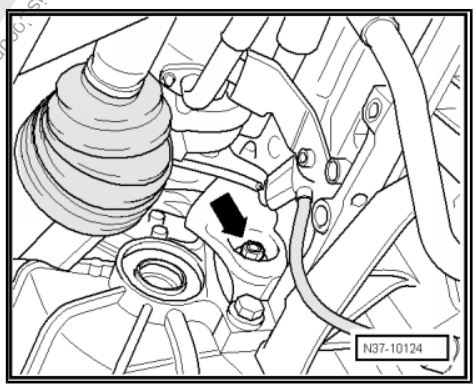
Socket - T10035- simplifies the work.

– Leave an easily accessible bolt in for safety purposes.

– Start with the two lower bolts.

The hole for removing the torque converter nut is covered with a rubber cap on the rear of the engine.

– Remove this cap.



– Remove 6 converter nuts -arrow- using insert - V/175- .

Note

- *Continue turning the engine carefully!*
- *When installing, pay particular attention to ensure the engine is turned carefully »while the gearbox is offered up to the engine«. The starter ring gear can be held from the outside with a screwdriver. The studs will then engage in the holes in the drive plate.*

– Before now removing the final connecting bolt, support gearbox with workshop hoist.

– Only now is the final bolt removed.

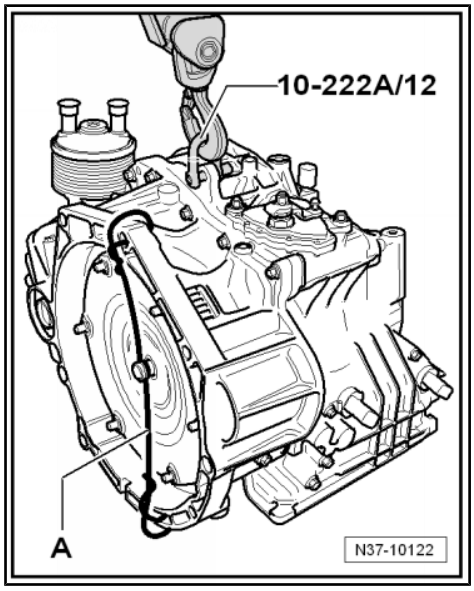
– Press gearbox off from engine, guiding the gearbox

Note

Observe torque converter. It must be removed together with gearbox.

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– During transportation, protect torque converter -arrow- from falling out, e.g. with a wire -A-.



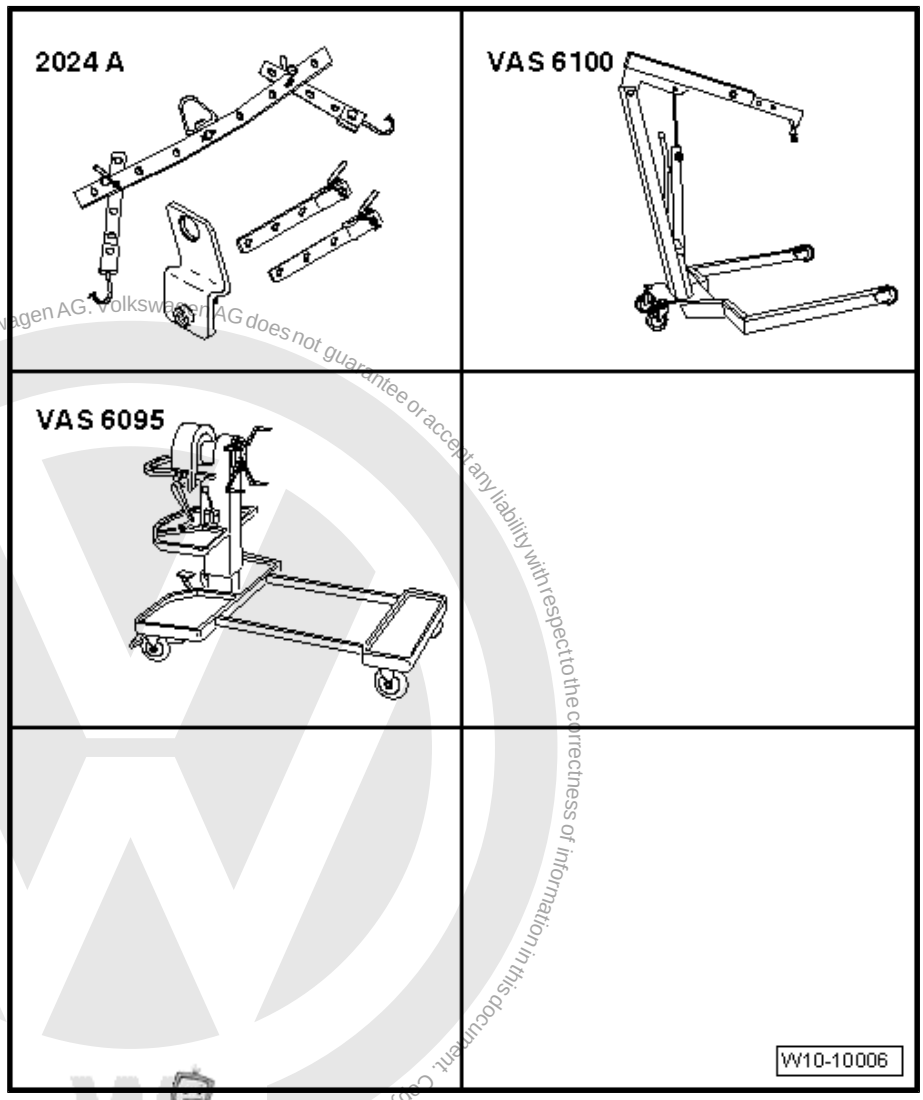
Installing

Assembly is carried out in the reverse order; in this case, note the specified torques in the relevant gearbox workshop manuals under »Removing and installing gearbox«.

1.3 Securing engine to assembly stand

Special tools and workshop equipment required

- Lifting tackle - 2024 A-
- Workshop hoist - VAS 6100-
- Engine and gearbox support - VAS 6095-



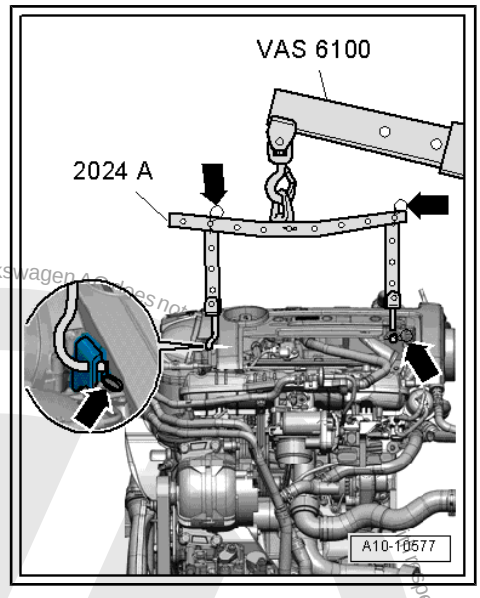
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Conditions

- Engine with gearbox removed and secured on engine bracket - T10359- .

– Separate gearbox from engine ⇒ page 15 .

– Attach lifting tackle - 2024 A- as shown and lift from engine and gearbox jack - VAS 6100- using workshop crane - V.A.G 1383 A- .



Caution

Use securing pins arrows on hooks and locking pins to avoid damage to engine.

– Secure engine to engine and gearbox support - VAS 6095- .

1.4 Installing engine

Assembly mountings ⇒ page 21 .

Install in the reverse order of removal, observing the following:

Caution

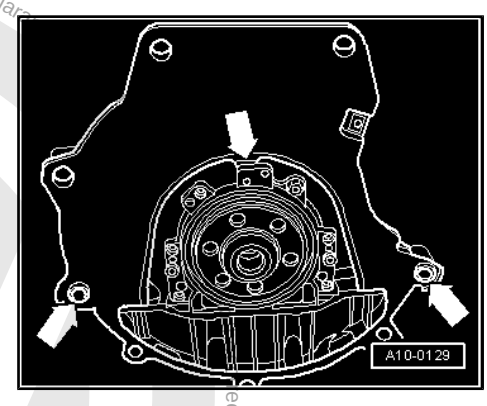
Observe the following points during all installation work, in particular in the engine compartment, due to the space limitations:

- ***Route all the various lines and electrical wiring so that they are in their original positions.***
- ***Ensure that there is sufficient clearance to all moving or hot components***

– Check dowel sleeves for centring engine/gearbox and renew if necessary.

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– Hook intermediate plate onto sealing flange and slide onto dowel sleeves -arrows-.



Vehicles with manual gearbox:

– Lightly grease input shaft splines with grease - G 000 100- .

– Check clutch and clutch actuation mechanism and install ⇒ Manual gearbox; Rep. gr. 30 ; Repairing clutch actuation mechanism .

Vehicles with DSG®:

– Renewing needle bearing in crankshaft ⇒ page 74 .

– Adjust selector lever cable following installation ⇒ Power transmission; Rep. gr. 34 ; Selector mechanism; Adjusting selector lever cable .

Continued for all vehicles:

– When installing the engine and gearbox assembly, make sure there is sufficient clearance to the subframe and radiator.

– Adjusting assembly mountings - Passat, CC ⇒ page 24 .

– Adjust assembly mounting - Golf ⇒ page 28 .

– Adjust assembly mounting - Tiguan ⇒ page 32 .

Note

Specified torques for assembly mountings ⇒ page 21 .

Electrical connections and routing ⇒ Electrical system; Rep. gr. 97 .

– Connect vehicle diagnostic tester :

– Read all event memories and clear any event entries that have been created during assembly.

– Perform road test.

– Then carry out the vehicle system test again and correct any faults that have been created.

Note

If the event memory was cleared, the readiness code must be generated ⇒ Vehicle diagnostic tester "Guided Functions".

Specified torques:

Bolted connection		Torque setting
Nuts and bolts	M6	10 Nm
	M7	15 Nm
	M8	25 Nm
	M10	40 Nm
	M12	60 Nm

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2 Assembly mountings

⇒ “2.1 Assembly overview - assembly mountings (Golf, Eos, Passat, CC, Scirocco)”, page 21 .

⇒ “2.2 Assembly overview - assembly mountings (Tiguan)”, page 23 .

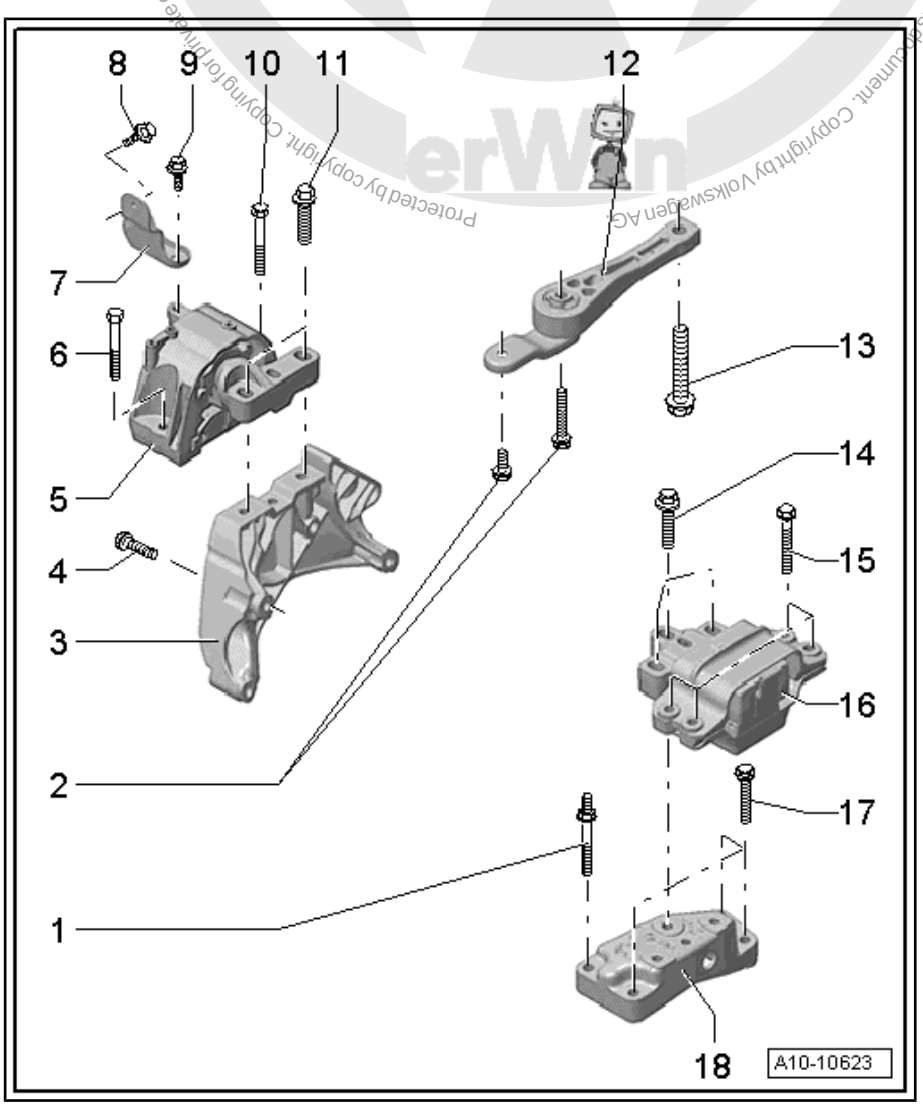
⇒ “2.3 Checking adjustment of assembly mountings (engine and gearbox mountings)”, page 24 .

⇒ “2.4 Adjusting assembly mountings (Passat 2006 ▸, CC)”, page 24 .

⇒ “2.5 Adjusting assembly mountings (Golf, Eos, Scirocco)”, page 28 .

⇒ “2.6 Adjusting assembly mounting (Tiguan)”, page 32 .

2.1 Assembly overview - assembly mountings (Golf, Eos, Passat, CC, Scirocco)



1 - Bolt
- ❑ Gearbox support to gearbox
- ❑ Specified torque ⇒ Rep. gr. 34

2 - Bolts
- ❑ Pendulum support to gearbox
- ❑ Torque setting ⇒ Running gear, axles, steering; Rep. gr. 40 ; Assembly overview - Subframe, anti-roll bar, suspension links

3 - Engine support

4 - Bolt
- ❑ Engine support to engine
- ❑ Renew
- ❑ 40 Nm + 180° ($^1/_2$ turn further)

5 - Engine mounting

6 - Bolt
- ❑ Engine mounting to body
- ❑ Renew
- ❑ 40 Nm + 90° ($^1/_4$ turn further)

7 - Support

8 - Bolt
- ❑ Support at engine mounting
- ❑ Renew
- ❑ 20 Nm + 90° ($^1/_4$ turn further)

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9 - Bolt

- ❑ Support to body
- ❑ Renew
- ❑ 20 Nm + 90° (1/4 turn further)

10 - Bolt

- ❑ Engine mounting to body
- ❑ Renew
- ❑ 40 Nm + 90° (1/4 turn further)

11 - Bolts

- ❑ Engine mounting to engine support
- ❑ Renew
- ❑ 60 Nm + 90° (1/4 turn further)

12 - Pendulum support

13 - Bolt

- ❑ Pendulum support to sub-frame
- ❑ Bolt pendulum support to gearbox and then to subframe.
- ❑ Renew
- ❑ 100 Nm + 90° (1/4 turn further)

14 - Bolt

- ❑ Gearbox mounting to gearbox support
- ❑ Renew
- ❑ 60 Nm + 90° (1/4 turn) further

15 - Bolt

- ❑ Gearbox mounting to body
- ❑ Renew
- ❑ 40 Nm + 90° (1/4 turn) further

16 - Gearbox mounting

- ❑ Illustration shows version for dual clutch gearbox.

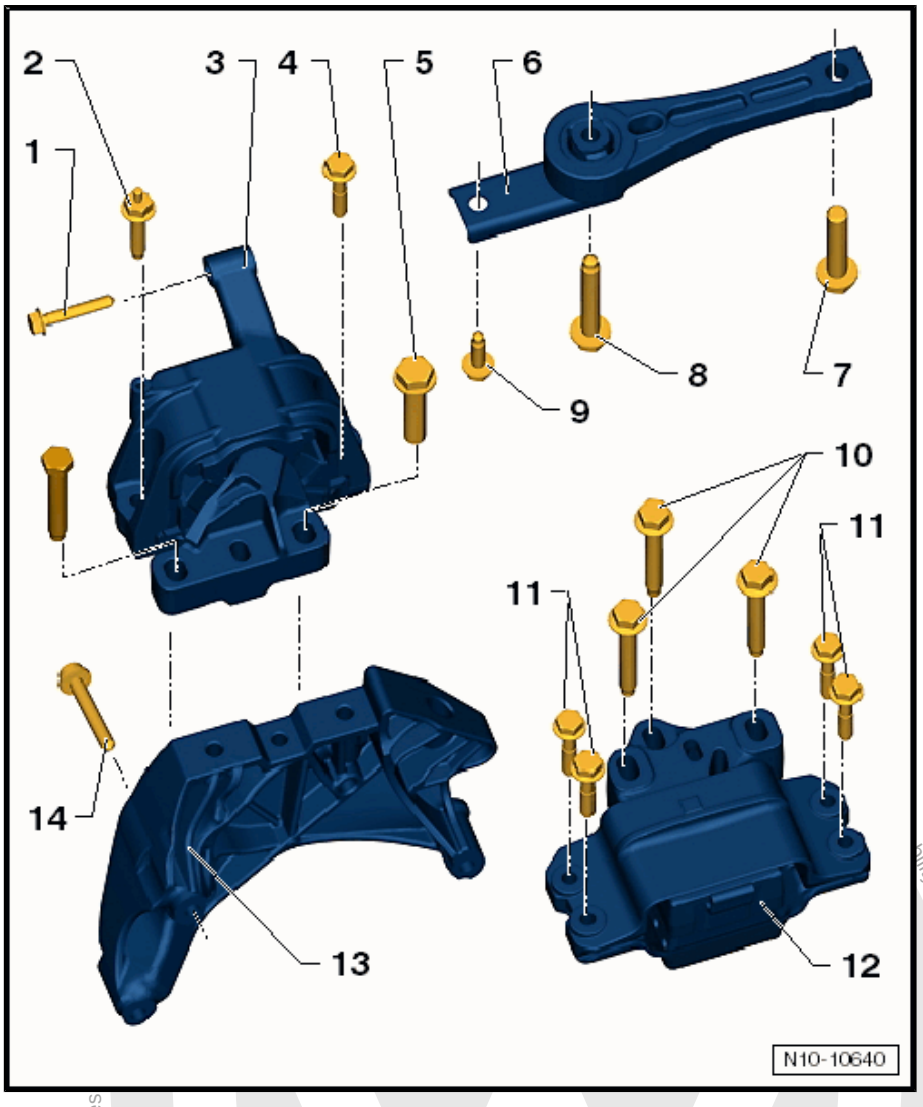
17 - Bolt

- ❑ Gearbox support to gearbox
- ❑ Specified torque ⇒ Rep. gr. 34

18 - Rear final drive support

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2.2 Assembly overview - assembly mountings (Tiguan)



1 - Bolt
- ❑ Renewing
- ❑ 20 Nm + 90° (1/4 turn) further

2 - Bolt
- ❑ Engine mounting to body
- ❑ Renew
- ❑ 40 Nm + 90° (1/4 turn further)

3 - Engine mounting

4 - Bolt
- ❑ Engine mounting to body
- ❑ Renew
- ❑ 40 Nm + 90° (1/4 turn further)

5 - Bolts
- ❑ Engine mounting to engine support
- ❑ Renew
- ❑ 60 Nm + 90° (1/4 turn further)

6 - Pendulum support

7 - Bolt
- ❑ Pendulum support to sub-frame
- ❑ Bolt pendulum support to gearbox and then to subframe.
- ❑ Renew
- ❑ 100 Nm + 90° (1/4 turn further)

8 - Bolt
- ❑ Pendulum support to gearbox
- ❑ Torque setting ⇒ Running gear, axles, steering; Rep. gr. 40 ; Assembly overview - Subframe, anti-roll bar, suspension links

9 - Bolt
- ❑ Pendulum support to gearbox
- ❑ Torque setting ⇒ Running gear, axles, steering; Rep. gr. 40 ; Assembly overview - Subframe, anti-roll bar, suspension links

10 - Bolts
- ❑ Gearbox mounting to gearbox
- ❑ Renew
- ❑ 60 Nm + 90° (1/4 turn) further

11 - Bolts
- ❑ Gearbox mounting to body
- ❑ Renew

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- ❑ 40 Nm + 90° (1/4 turn) further

12 - Gearbox mounting

- ❑ Illustration shows version for dual clutch gearbox.

13 - Engine support

14 - Bolts

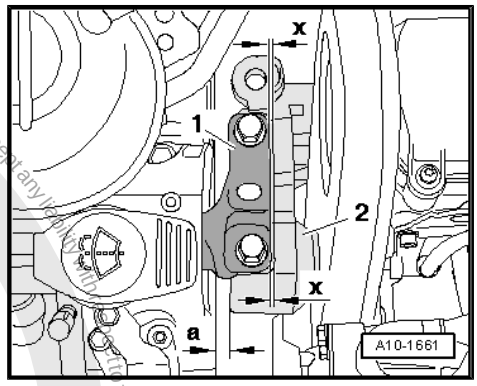
- ❑ Engine support to engine
- ❑ Renew
- ❑ 40 Nm + 180° ($^1/_2$ turn further)

2.3 Checking adjustment of assembly mountings (engine and gearbox mountings)

There must be a distance -a- of at least 10 mm between engine support and longitudinal member (right side).

The side surface of the engine support -2- should be located parallel to the support arm -1-.

– If the conditions are not met, the assembly mountings must be adjusted ⇒ page 21 .



2.4 Adjusting assembly mountings (Passat 2006 ▸, CC)

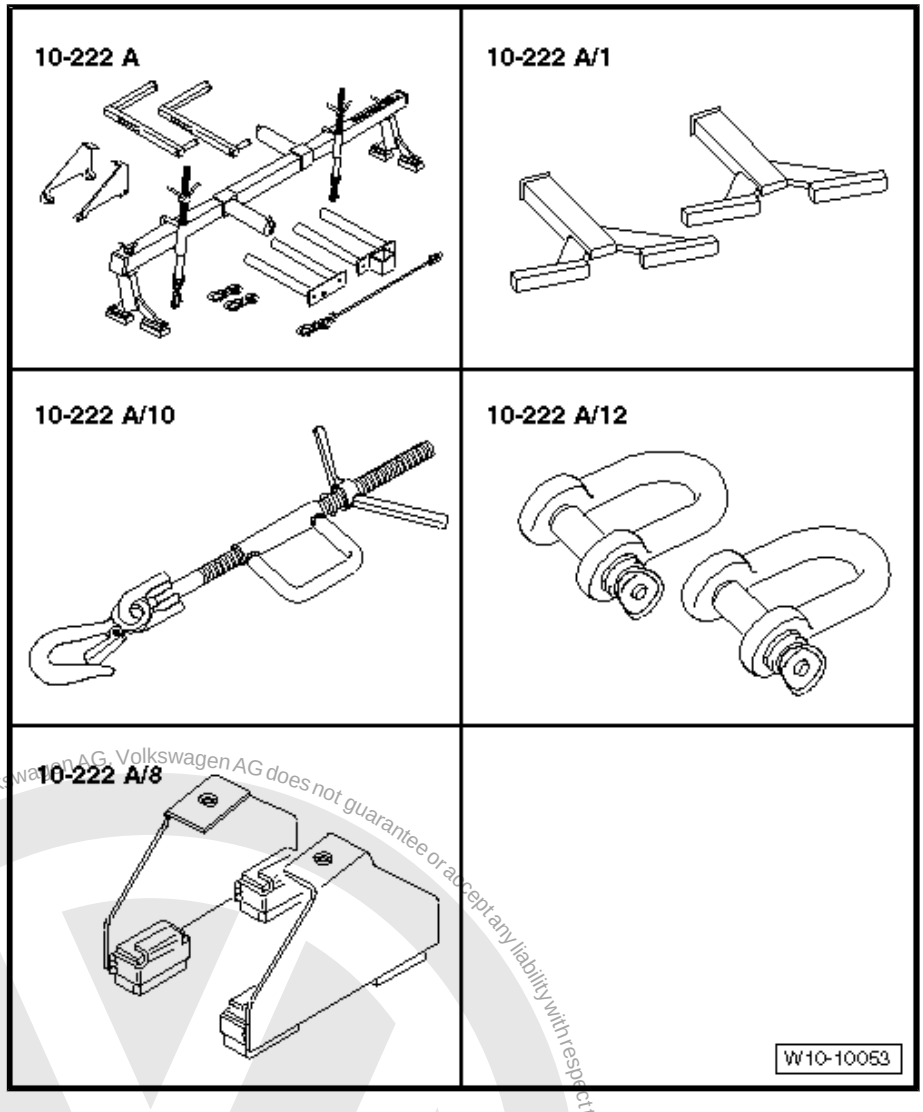
Note

If just the assembly mounting on the engine side is to be adjusted, one hook - 10 - 222 A /10- will suffice on the engine side. There is also no need to remove air filter, battery and battery carrier.

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Special tools and workshop equipment required

- ♦
- ♦ Support - 10 - 222 A-
- ♦ Hook - 10 - 222 A /10- , qty. 2
- ♦ Shackle - 10 - 222 A /12-
- ♦ Rack - 10 - 222 A /1-



Adjusting

Proceed as follows:

– Remove motor cover panel ⇒ page 139 .

– Remove air filter ⇒ page 459 .

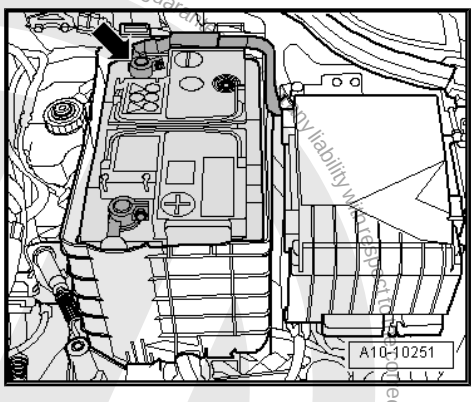
Caution

To prevent damage to the electronic components when disconnecting the battery:

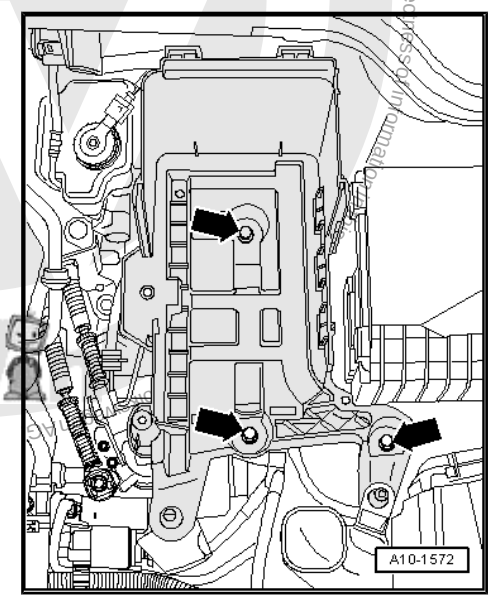
- ♦ ***Take the necessary measures when disconnecting the battery.***

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– Disconnect earth cable -arrow- from battery when ignition is switched off.
– Remove battery ⇒ Rep. gr. 27 .

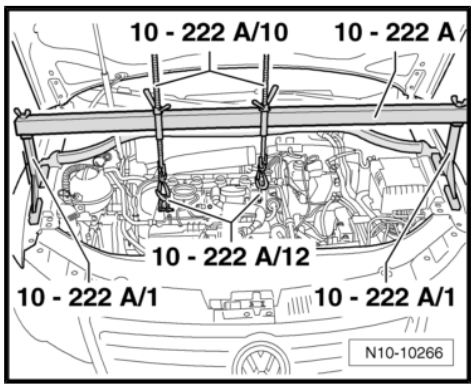


– Remove battery tray -arrows-.
– Fit support bracket - 10 - 222 A- , as shown, with the following tool parts.



Passat:

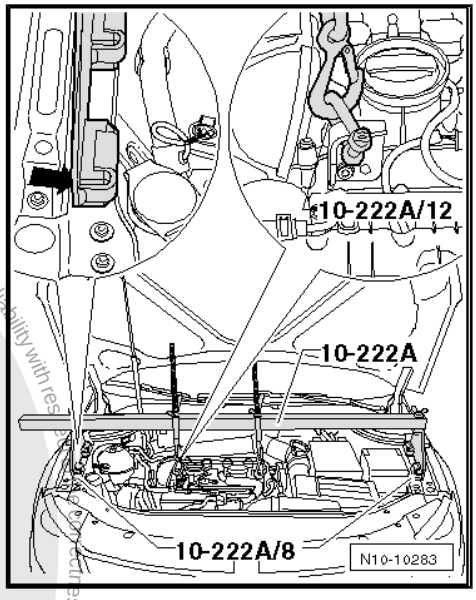
- Rack - 10 - 222 A /1- , qty. 2
- Hook - 10 - 222 A /10- , qty. 2
- Shackle - 10 - 222 A /12-



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CC:

- Adapter - 10 - 222 A /8- , qty. 2
- Hook - 10 - 222 A /10- , qty. 2
- Shackle - 10 - 222 A /12-



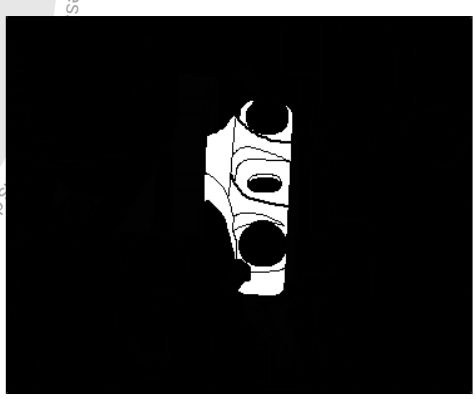
Note

- *The adapters - 10 - 222 A /8- must not be located on the screw plates of the wings, as this will otherwise cause damage to them.*
- *The shackle - 10 - 222 A /12- is needed so the engine is raised in its installation position and does not »fall back«.*

All:

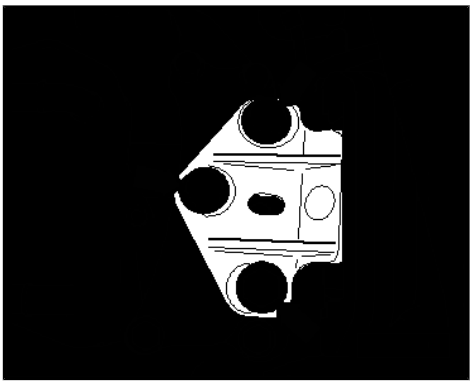
– Support engine with gearbox, but do not raise.

– Renew assembly mounting bolts -arrows- on engine side one after the other (if not already carried out during engine installation) and screw in hand-tight.



Vehicles with manual gearbox:

– Renew assembly mounting bolts -arrows- on gearbox side one after the other (if not already carried out during engine installation) and screw in hand-tight.



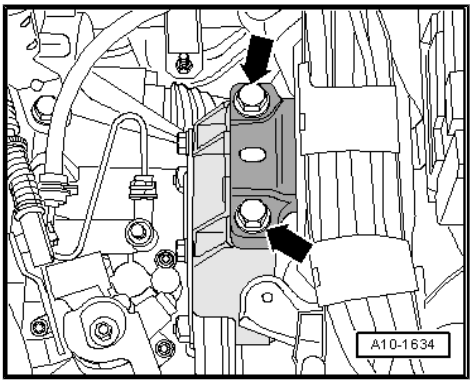
Vehicles with automatic gearbox

– Renew assembly mounting bolts -arrows- on gearbox side one after the other (if not already carried out during engine installation) and screw in hand-tight.

All:

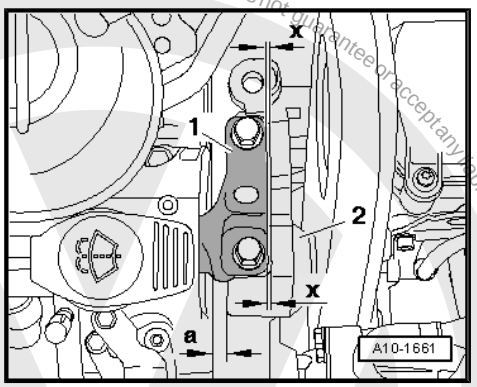
– Slacken bolts on left and right-hand support arms by about two turns each.

– Adjust assembly mounting and tighten securing bolts hand-tight.



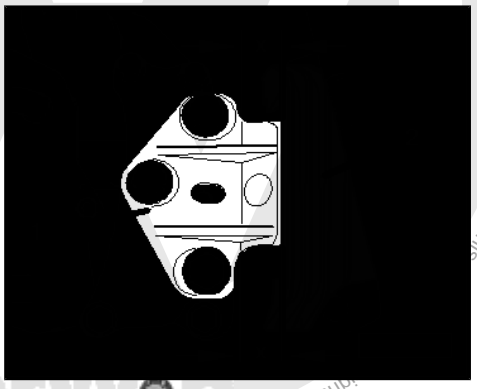
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- There must be a distance -a- of at least 10 mm between engine support and longitudinal member (right side).
- The side surface of the engine support -2- should be located parallel to the support arm -1-.



Vehicles with manual gearbox:

- Ensure that edges of support arm (on gearbox side) -1- and gearbox mounting -2- are parallel.
- Dimension -x- must be identical on both sides of mounting.



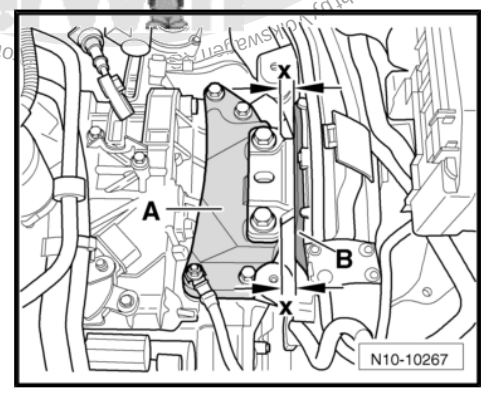
Vehicles with automatic gearbox:

- Ensure that edges of support arm (on gearbox side) -A- and gearbox mounting -B- are parallel.
- Dimension -x- must be identical on both sides of mounting.

All:

– Tighten bolts for assembly mounting to required specified torque ⇒ page 21 .

Continue installation in reverse order of removal.



2.5 Adjusting assembly mountings (Golf, Eos, Scirocco)

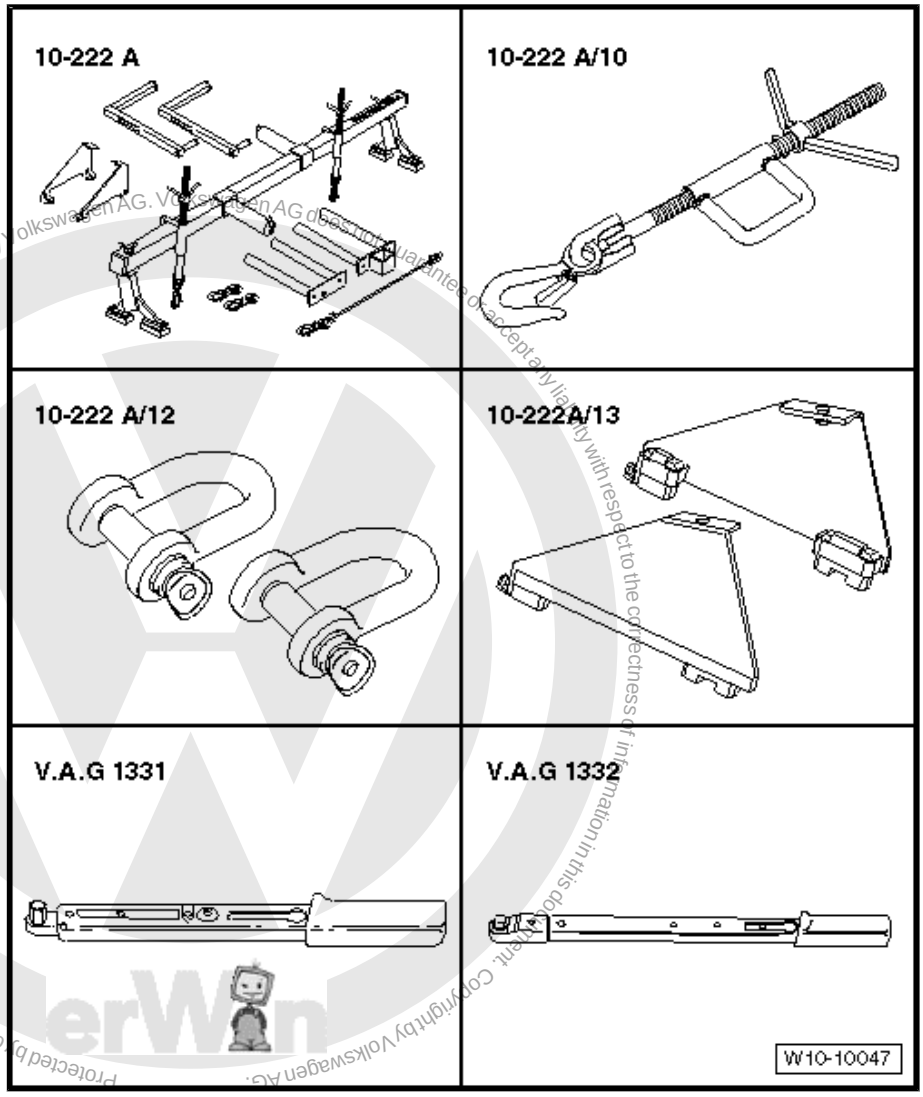
Note

If just the assembly mounting on the engine side is to be adjusted, one hook - 10 - 222 A /10- will suffice on the engine side. There is also no need to remove air filter, battery and battery carrier.

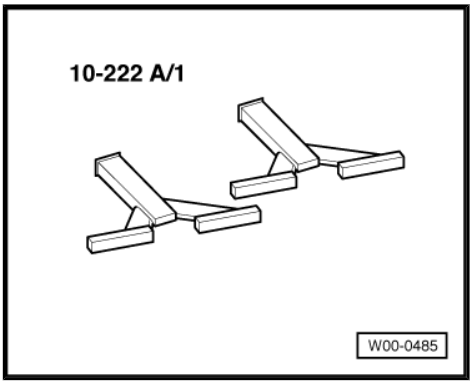
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Special tools and workshop equipment required

- Support - 10 - 222 A-
- Hook - 10 - 222 A /10- , qty. 2
- Shackle - 10 - 222 A /12-
- Torque wrench - V.A.G 1331-
- Torque wrench - V.A.G 1332-
- Golf: Adapter - 10 - 222 A / 13-



- Eos, Scirocco: Rack - 10 - 222 A /1-



Adjusting

Proceed as follows:

– Remove motor cover panel ⇒ page 139 .

– Remove air filter ⇒ page 459 .

– If fitted, remove charge air duct to sound generator ⇒ page 447 .

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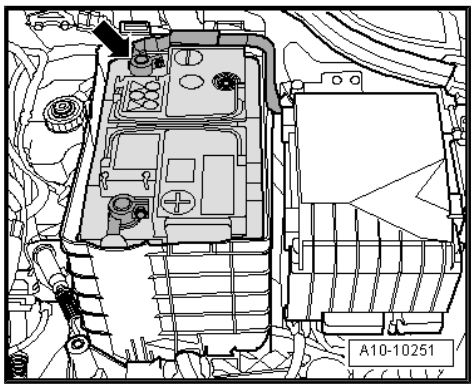
Caution

To prevent damage to the electronic components when disconnecting the battery:

- *Take the necessary measures when disconnecting the battery.*

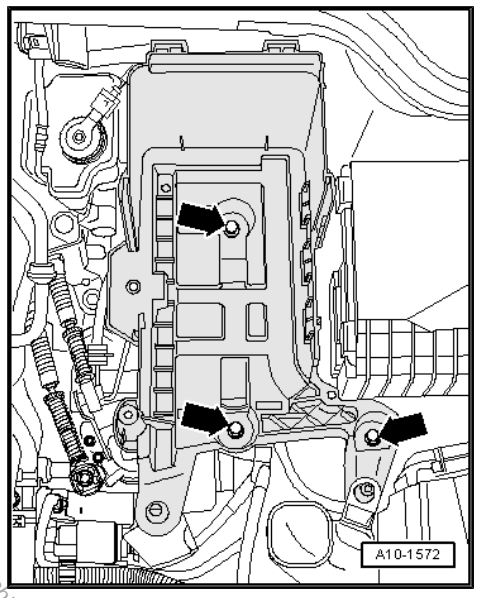
– Disconnect earth cable -arrow- from battery when ignition is switched off.

– Remove battery ⇒ Rep. gr. 27 .



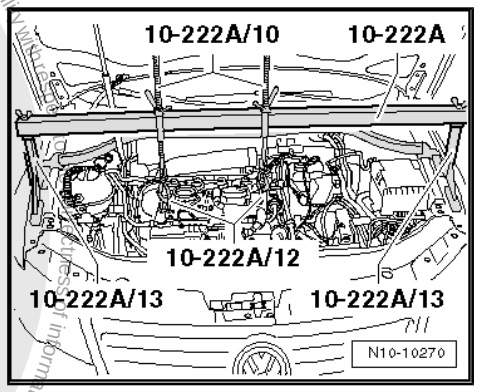
– Remove battery tray -arrows-.

– Fit support bracket - 10 - 222 A- with the following tool parts:



Golf:

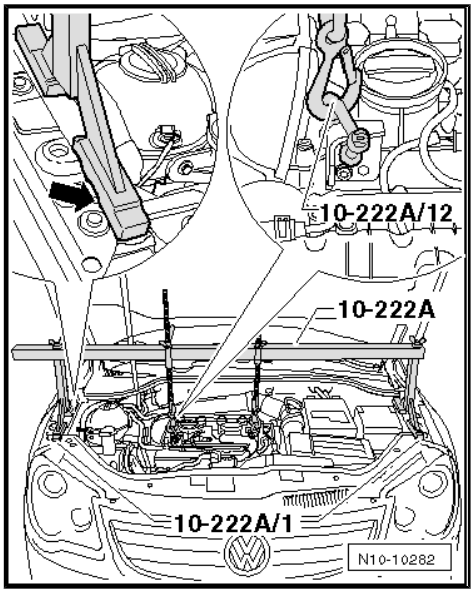
- Adapter - 10 - 222 A /13- , qty. 2
- Hook - 10 - 222 A /10- , qty. 2
- Shackle - 10 - 222 A /12- , qty. 2



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Eos, Scirocco:

- Rack - 10 - 222 A /1- , qty. 2
- Hook - 10 - 222 A /10- , qty. 2
- Shackle - 10 - 222 A /12-



Note

- *The rack feet - 10 - 222 A /1- must not be placed on the bolted on sheet metal of the wings, or these might be damaged.*
- *The shackle - 10 - 222 A /12- is needed so the engine is raised in its installation position and does not »fall back«.*

All:

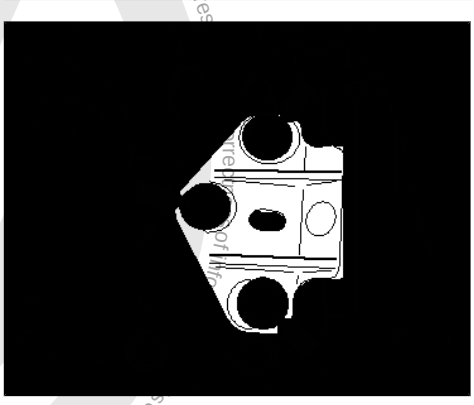
– Support engine with gearbox, but do not raise.

– Renew assembly mounting bolts -arrows- on engine side one after the other (if not already carried out during engine installation) and screw in hand-tight.



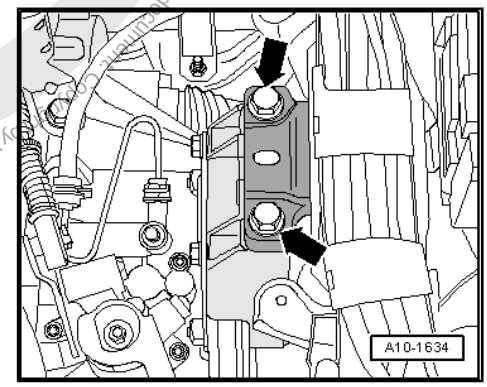
Vehicles with manual gearbox:

– Renew assembly mounting bolts -arrows- on gearbox side one after the other (if not already carried out during engine installation) and screw in hand-tight.



Vehicles with automatic gearbox

– Renew assembly mounting bolts -arrows- on gearbox side one after the other (if not already carried out during engine installation) and screw in hand-tight.



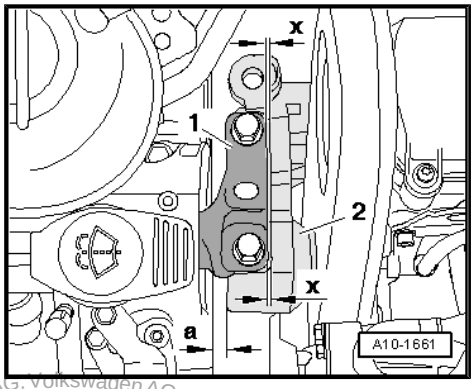
All:

– Slacken bolts on left and right-hand support arms by about two turns each.

– Adjust assembly mounting and screw in securing bolts hand-tight.

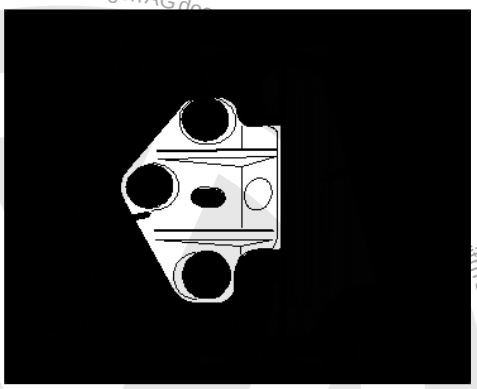
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- There must be a distance -a- of at least 10 mm between engine support and longitudinal member (right side).
- The side surface of the engine support -2- should be located parallel to the support arm -1-.



Vehicles with manual gearbox:

- Ensure that edges of support arm (on gearbox side) -1- and gearbox mounting -2- are parallel.
- Dimension -x- must be identical on both sides of mounting.

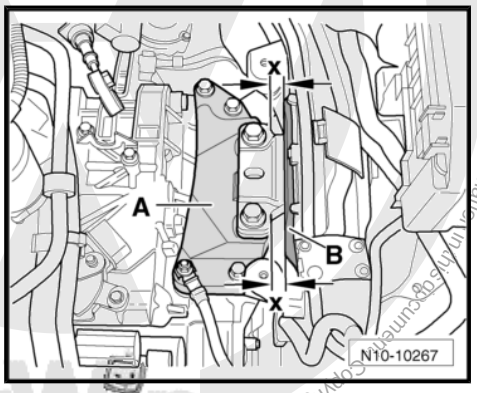


Vehicles with automatic gearbox:

- Ensure that edges of support arm (on gearbox side) -A- and gearbox mounting -B- are parallel.
- Dimension -x- must be identical on both sides of mounting.

All:

– Tighten bolts for assembly mounting to required specified torque ⇒ page 21 .

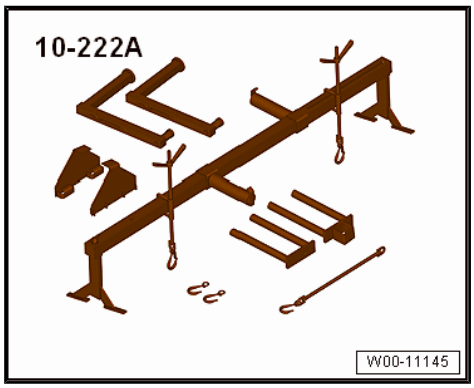


Continue installation in reverse order of removal.

2.6 Adjusting assembly mounting (Tiguan)

Special tools and workshop equipment required

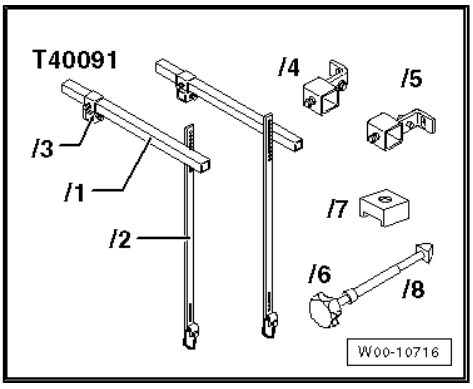
- Support - 10-222A-



- Shackle - 10-222A/12-
- Adapter - 10-222A/16-
- Adapter - 10-222A/18-

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- Adapter - 10-222A/22-
- Adapter - 10-222A/28-
- Square tube - T40091/1-



- Swivel joint - T40091/3-

Adjusting

Proceed as follows:

– Remove motor cover panel ⇒ page 139 .

– Remove air filter ⇒ page 459 .

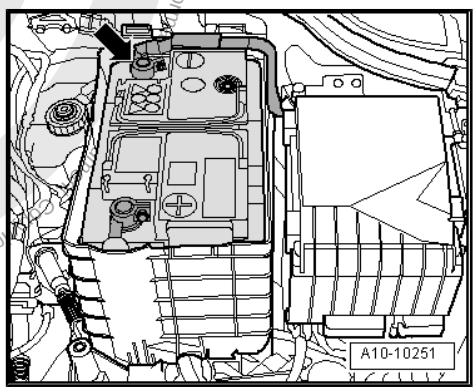
Caution

To prevent damage to the electronic components when disconnecting the battery:

- *Take the necessary measures when disconnecting the battery.*

– Disconnect earth cable -arrow- from battery when ignition is switched off.

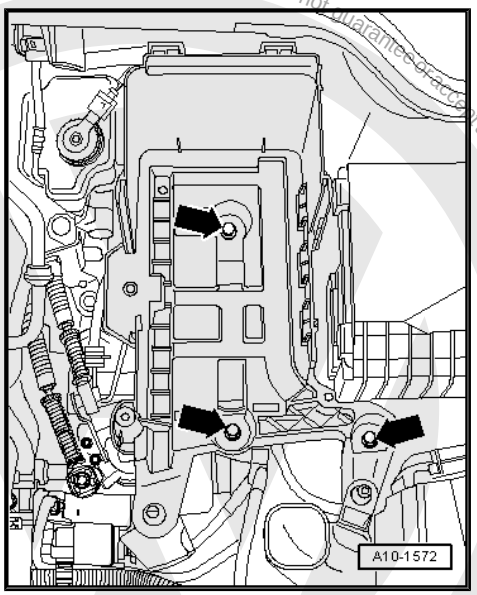
– Remove battery ⇒ Rep. gr. 27 .



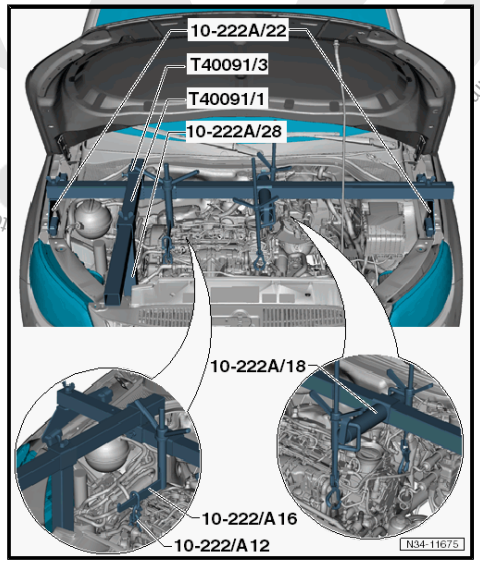
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– Remove battery tray -arrows-.



– Fit support bracket - 10 - 222 A- as shown. The rear spindle is not required. Attach hooks to support eyes on engine and support engine and gearbox.
– Support engine with gearbox, but do not raise.



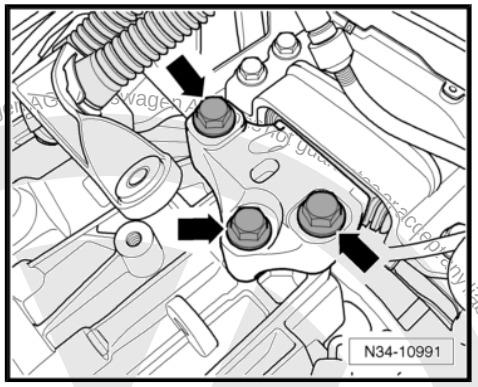
– Renew assembly mounting bolts -arrows- on engine side one after the other (if not already carried out during engine installation) and screw in hand-tight.



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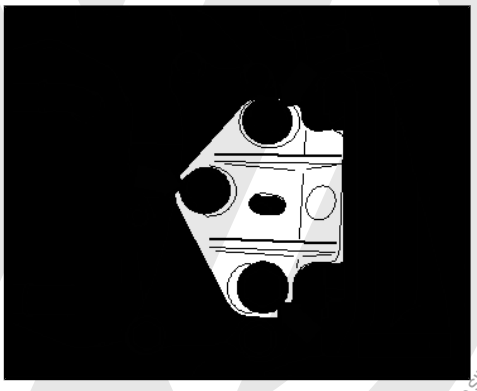
Vehicles with manual gearbox:

– Renew assembly mounting bolts -arrows- on gearbox side one after the other (if not already carried out during engine installation) and screw in hand-tight.



Vehicles with automatic gearbox:

– Renew assembly mounting bolts -arrows- in succession (if not already carried out on installing engine) and screw in hand-tight.



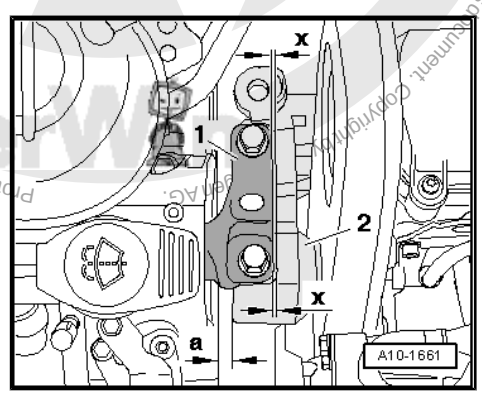
All:

– Slacken bolts on left and right-hand support arms by about two turns each.

– Adjust assembly mounting and screw in securing bolts hand-tight.

Assembly mounting on engine side:

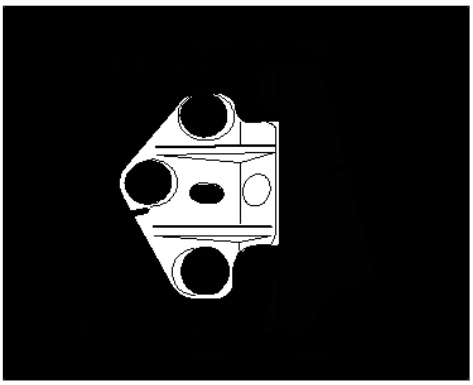
- There must be a distance -a- of at least 10 mm between engine support and longitudinal member (right side).
- The side surface of the engine support -2- should be located parallel to the support arm -1-.



Assembly mounting on gearbox side:

- Ensure that edges of support arm (on gearbox side) -1- and gearbox mounting -2- are parallel.
- Dimension -x- must be identical on both sides of mounting.

– Tighten bolts for assembly mounting to required specified torque ⇒ page 23 .



Continue installation in reverse order of removal.

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13 – Crankshaft group

1 Cylinder block (pulley end)

Assembly overview - poly V-belt drive ⇒ page 36 .

Removing and installing poly V-belt ⇒ page 38

Removing and installing tensioner for poly V-belt (Passat 2006 ➤, CC) ⇒ page 39 .

Removing and installing tensioner for poly V-belt (Golf, Eos, Scirocco) ⇒ page 42 .

Removing and installing tensioner for poly V-belt (Tiguan) ⇒ page 46 .

Removing and installing bracket for ancillary units ⇒ page 49 .

Removing and installing vibration damper ⇒ page 50

Renewing oil seal for vibration damper ⇒ page 57 .

1.1 Assembly overview - poly V-belt drive

1 - Vibration damper

- ❑ With poly V-belt pulley
- ❑ Removing and installing ⇒ page 50

2 - O-ring

- ❑ Renew

3 - Bolt

- ❑ Renew
- ❑ Removing and installing ⇒ page 50
- ❑ 150 Nm + 90° (1/4 turn) further
- ❑ Use counterhold - T10355- when loosening and tightening

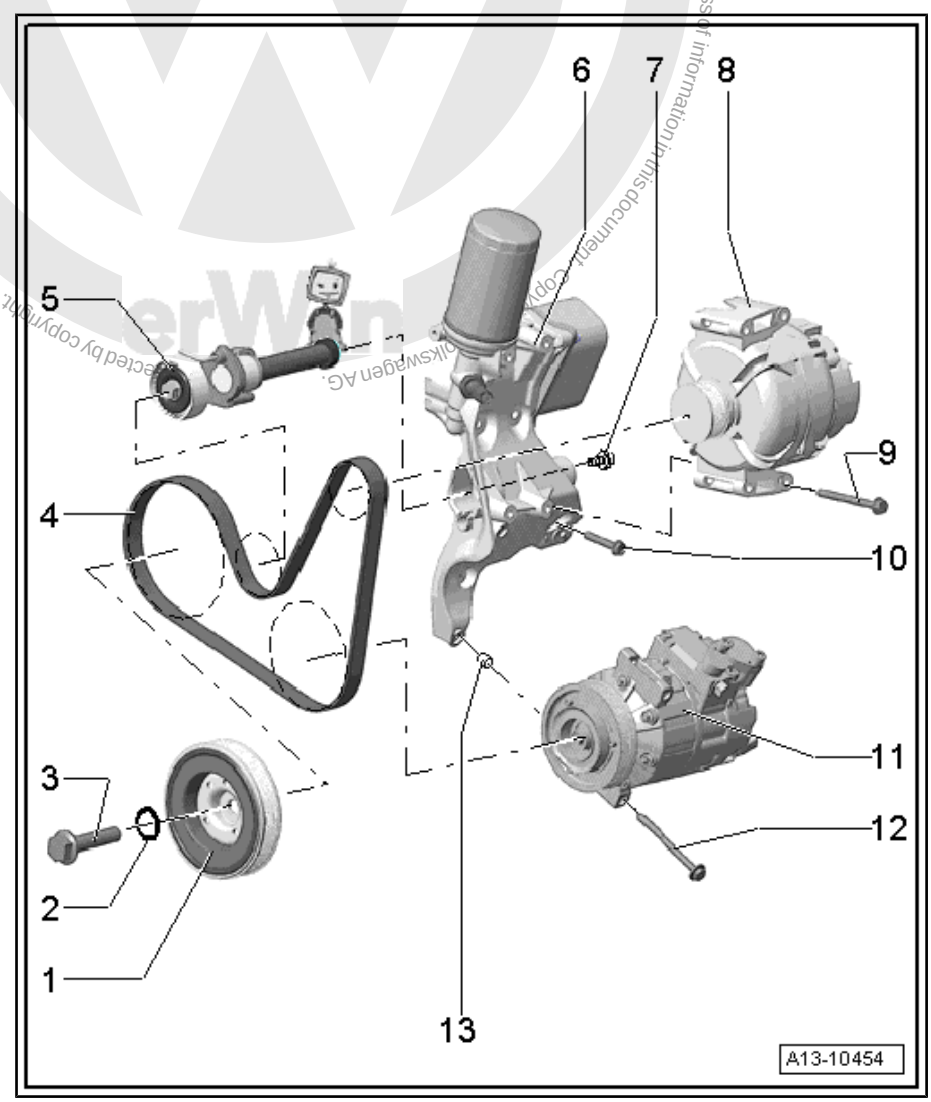
4 - Poly V-belt

- ❑ Check for wear
- ❑ Do not kink

Caution

Danger of destruction due to reverse running direction in the case of a poly V-belt that has already run.
Before removing the poly V-belt, use a piece of chalk or a felt pen to mark the running direction.

- ❑ Removing and installing ⇒ page 38
- ❑ When installing, make sure it is properly seated on pulleys.



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5 - Tensioning device for poly V-belt

- ❑ Swing with open-end spanner to slacken poly V-belt.
- ❑ Lock with locking pin - T10060 A- .
- ❑ Components of tensioner for poly V-belt ⇒ page 37
- ❑ Removing and installing (Passat, CC) ⇒ page 39
- ❑ Removing and installing (Golf, Eos, Scirocco) ⇒ page 42
- ❑ Removing and installing (Tiguan) ⇒ page 46

6 - Ancillary bracket

- ❑ With oil pressure switch - F1- , oil filter and engine oil cooler
- ❑ Removing and installing ancillary bracket ⇒ page 49 .
- ❑ Removing and installing engine oil cooler ⇒ page 220

7 - Bolt

- ❑ 10 Nm

8 - Alternator

- ❑ Removing and installing ⇒ Rep. gr. 27

9 - Bolt

- ❑ 23 Nm

10 - Bolt

- ❑ Tightening sequence ⇒ page 38

11 - Air conditioner compressor

- ❑ Do not unscrew or disconnect refrigerant lines
- ❑ Removing and installing ⇒ Rep. gr. 87

12 - Bolt

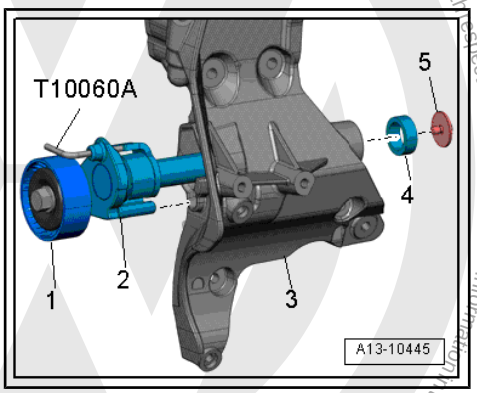
- ❑ 25 Nm

13 - Dowel sleeve

- ❑ For air conditioner compressor.

Components of tensioner for poly V-belt

1 - Tensioning device for poly V-belt
2 - Support element
3 - Ancillary bracket
4 - Centring sleeve
5 - Bolt



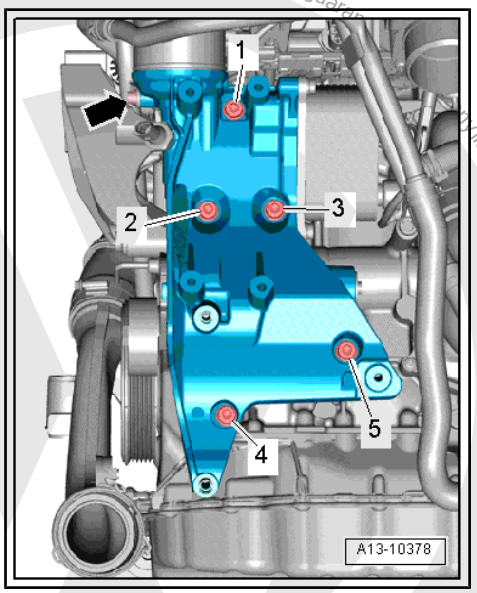
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Tightening sequence on bracket for ancillaries

– Fit ancillary bracket (start bolt -4- first).

– Tighten bolts in sequence -1 … 5- in 3 stages as follows:

1. Tighten bolts hand-tight.
2. Tighten bolts to 20 Nm.
3. Turn bolts 90° ($^1/_4$ turn) further.



1.2 Removing and installing poly-V belt

Removing

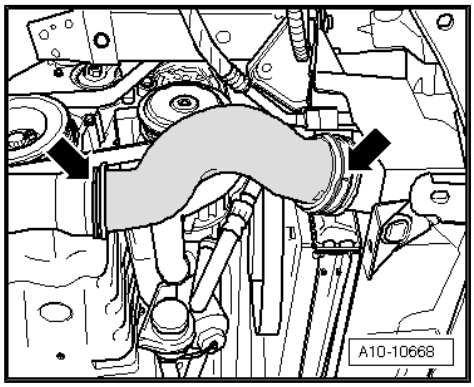
Caution

Danger of destruction due to reverse running direction in the case of a poly V-belt that has already run.

- ***Before removing the poly V-belt, use a piece of chalk or a felt pen to mark the running direction.***

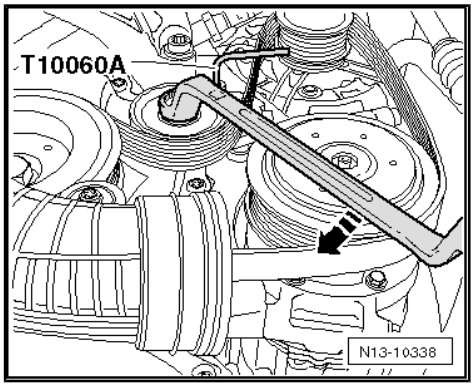
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

– Remove right air hose -arrows-.



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– Turn tensioner in direction of -arrow- to relieve tension on poly V-belt.
– Use the locking pin - T10060 A- to lock the tensioner.
– Remove poly V-belt.



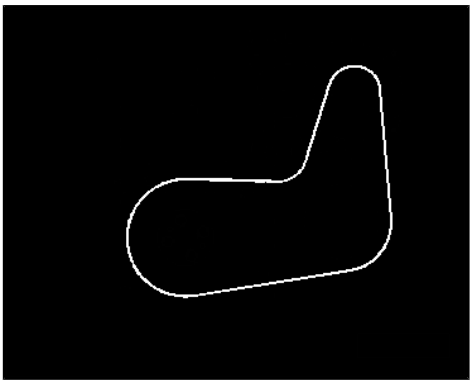
Installing

Install in reverse order of removal, observing the following.

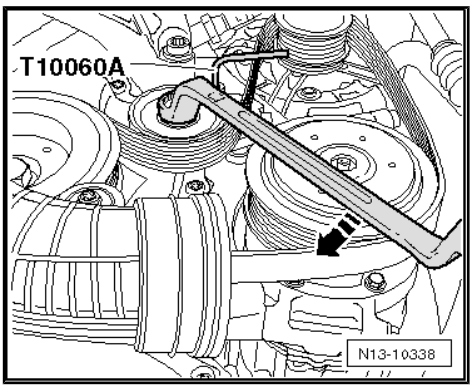
Note

Tighten alternator and air conditioner compressor mountings before fitting poly V-belt.

– Fit poly V-belt onto crankshaft pulley first, then onto air conditioner compressor and alternator.



– Turn tensioner slightly with ring spanner and remove locking pin - T10060 A- .
– Release tensioner.
– Check that poly V-belt is properly seated.
– Start engine and check that poly V-belt runs properly.

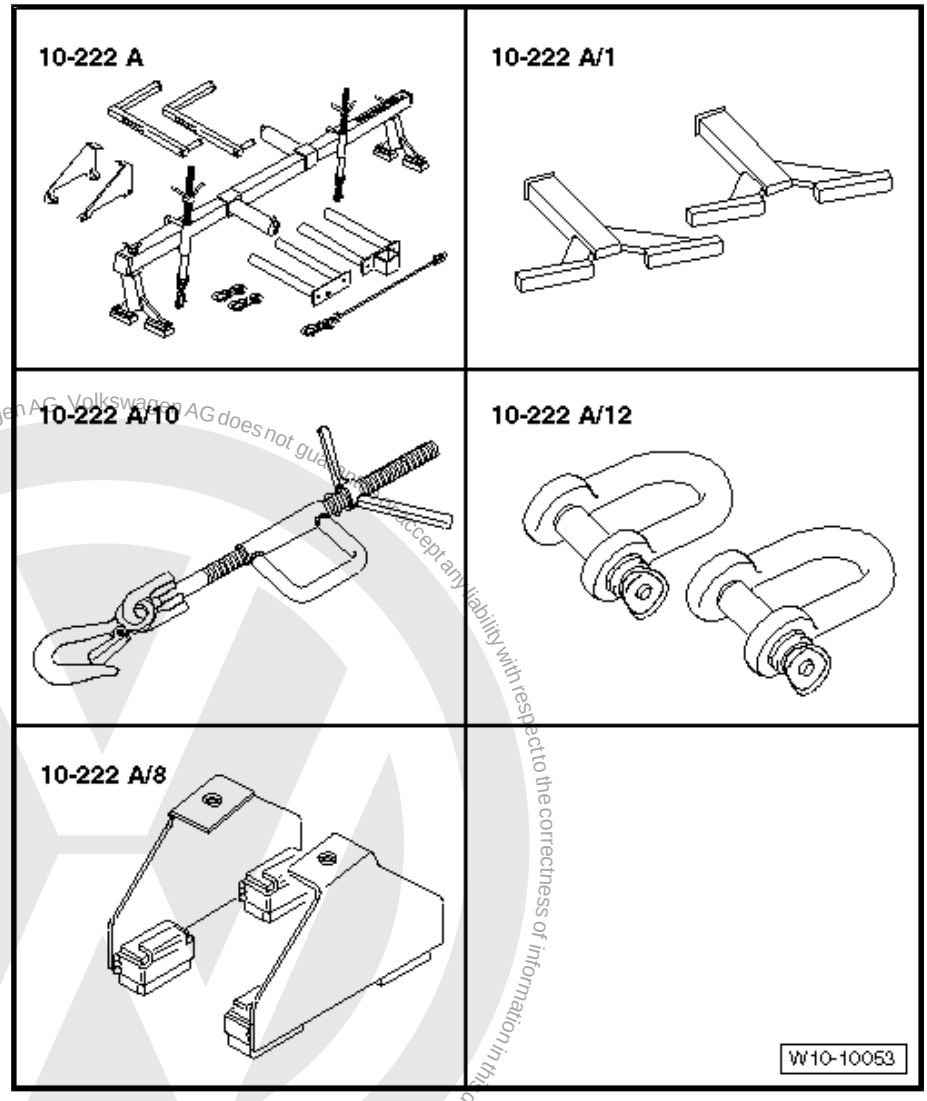


1.3 Removing and installing tensioner for poly V-belt (Passat 2006 ▸, CC)

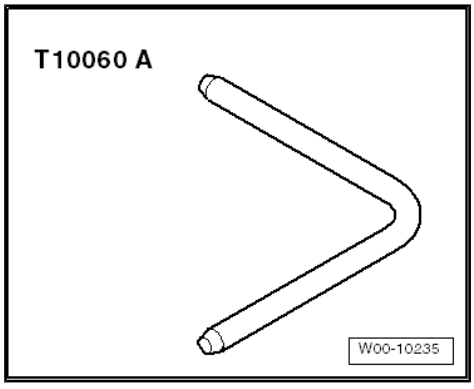
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Special tools and workshop equipment required

- ♦
- ♦ Support - 10 - 222 A-
- ♦ Hook - 10 - 222 A /10- , qty. 2
- ♦ Shackle - 10 - 222 A /12-
- ♦ Passat: frame - 10 - 222 A / 1-
- ♦ CC: Adapter - 10 - 222 A / 8-



- ♦ Pin - T10060 A-



Removing

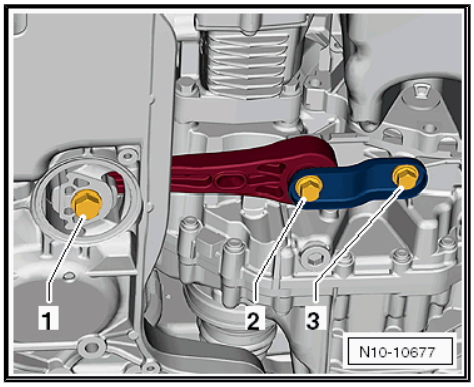
Proceed as follows:

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

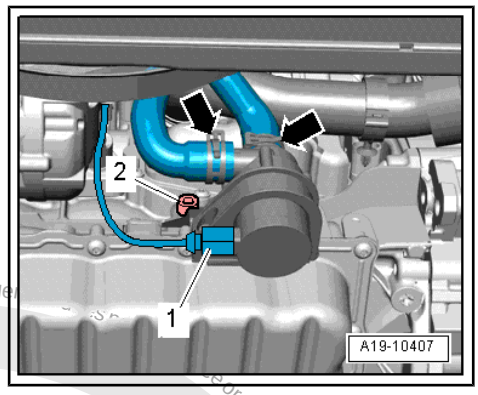
– Remove front part of right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

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– First, undo bolt -1- and then bolts -2…3- and remove pendulum support.



– Remove bolt -2- at bracket for coolant pump for continued circulation - V51- .

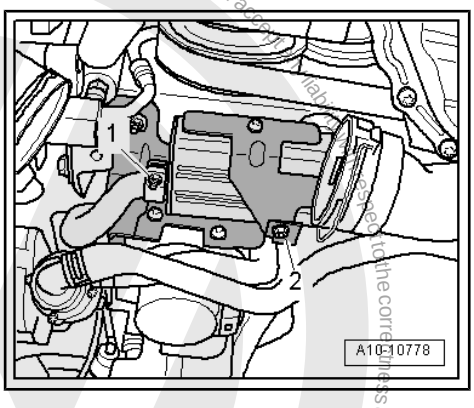


Vehicles with seat heating:

– Slacken clip -1- and remove bolt -2-.

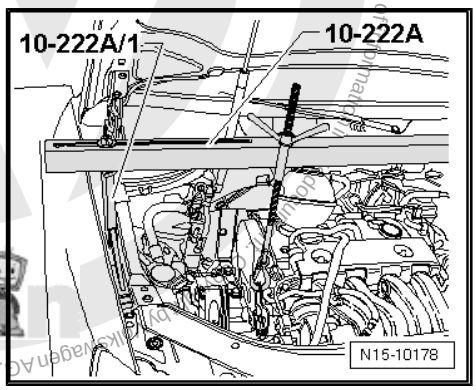
– Detach exhaust silencer for auxiliary heater.

– Fit support bracket - 10 - 222 A- with the following tool parts:



Passat:

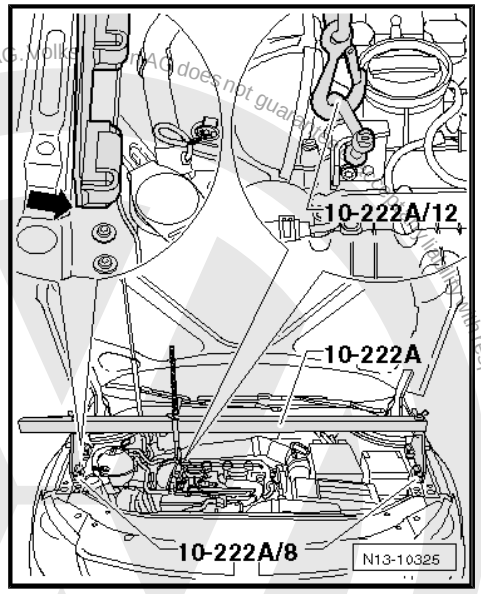
- Rack - 10 - 222 A /1- , qty. 2
- Hook - 10 - 222 A /10-



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CC:

- Adapter - 10 - 222 A /8- , qty. 2
- Hook - 10 - 222 A /10-
- Shackle - 10 - 222 A /12-



Note

- *The adapters - 10 - 222 A /8- must not be located on the screw plates of the wings, as this will otherwise cause damage to them.*
- *The shackle - 10 - 222 A /12- is needed so the engine is raised in its installation position and does not »fall back«.*

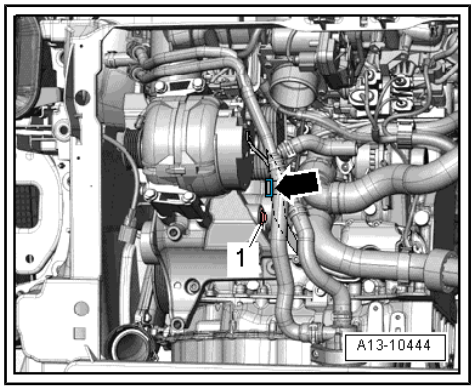
All:

– Take up weight of engine with spindle.



– Unscrew bolts -arrows- of engine/gearbox support on the engine.
– Lower engine approx. 55 mm.
– Remove poly V-belt ⇒ page 38 .

– Move electrical wiring harness clear -arrow-.
– Remove bolt -1- and take off tensioning device for poly V-belt from bracket for ancillaries.

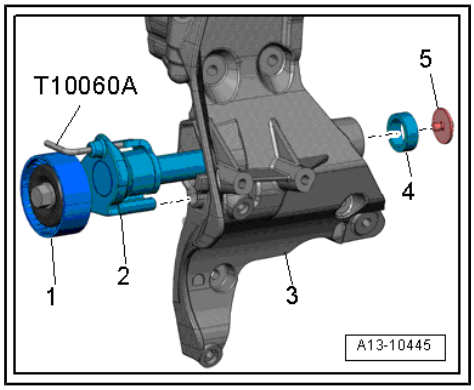


Installing

• Torque setting ⇒ page 36 .

Install in reverse order of removal, observing the following.

– Insert tensioner -1- for poly V-belt in ancillary bracket -3- and tighten bolt -5-.
• Note installation position of support element -2-: fit lug of support element in hole on bracket for ancillaries.
• Note position of centring sleeve -4-.
– Adjust assembly mountings ⇒ page 24 .

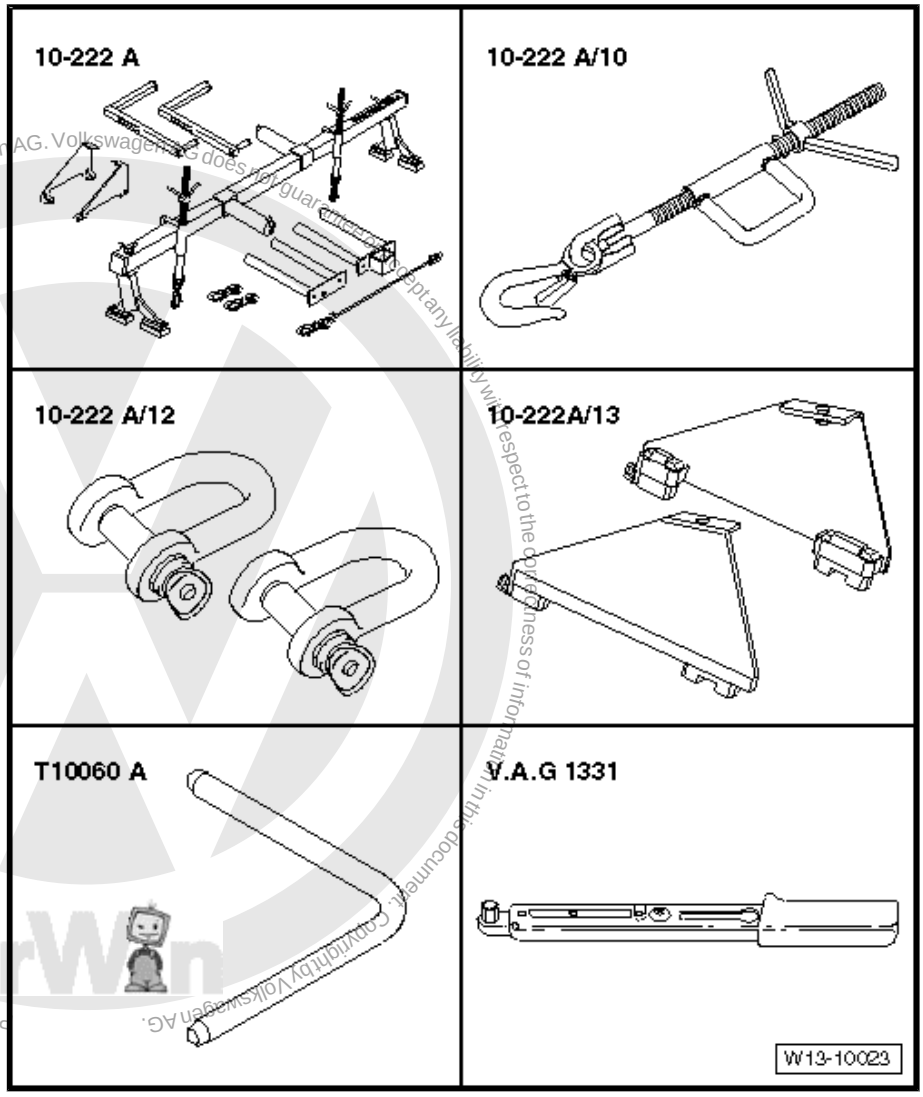


1.4 Removing and installing tensioner for poly V-belt (Golf, Eos, Scirocco)

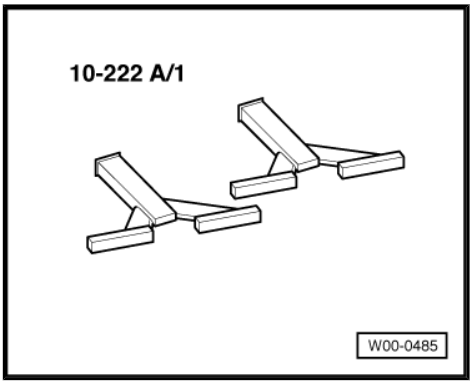
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Special tools and workshop equipment required

- Support - 10 - 222 A-
- Hook - 10 - 222 A /10-
- Shackle - 10 - 222 A /12-
- Pin - T10060 A-
- Torque wrench - V.A.G 1331-
- Golf: frame - 10 - 222 A /13-



- Eos, Scirocco: Rack - 10 - 222 A /1-



Removing

Proceed as follows:

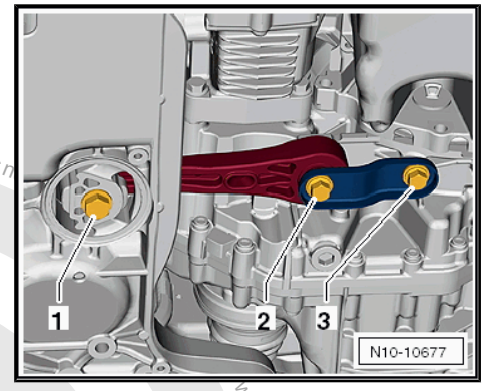
– If fitted, remove charge air duct to sound generator ⇒ page 447 .

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

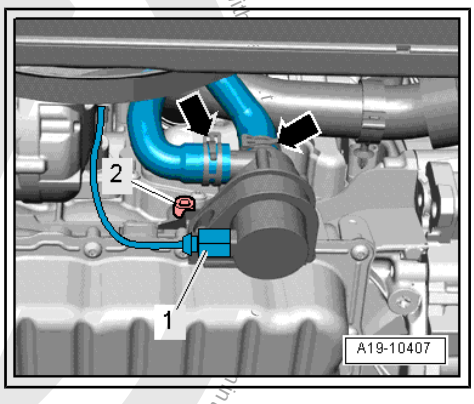
– Remove front right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

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– First, undo bolt -1- and then bolts -2…3- and remove pendulum support.



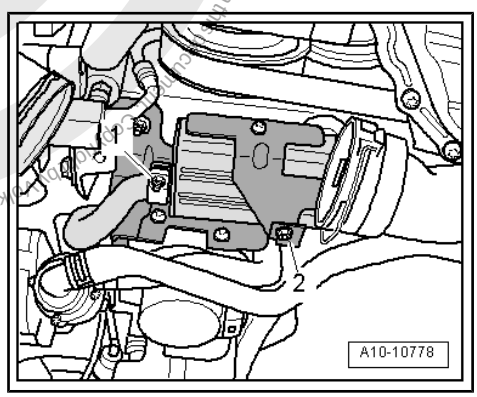
– Remove bolt -2- at bracket for coolant pump for continued circulation - V51- .



Vehicles with seat heating:

– Slacken clip -1- and remove bolt -2-.

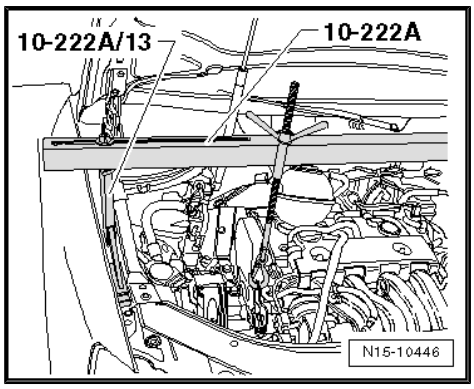
– Detach exhaust silencer for auxiliary heater.



Golf:

– Fit support bracket - 10 - 222 A- with the following tool parts:

- Rack - 10 - 222 A /13-
- Hook - 10 - 222 A /10-



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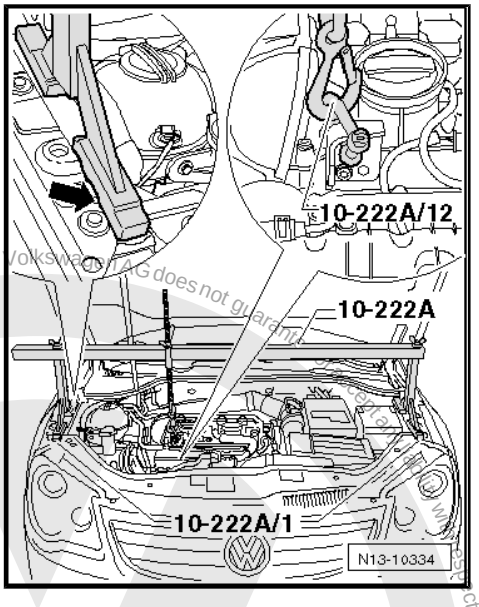
Eos, Scirocco:

– Fit support bracket - 10 - 222 A- with the following tool parts:

♦ Rack - 10 - 222 A /1-

♦ Hook - 10 - 222 A /10-

♦ Shackle - 10 - 222 A /12-



Note

♦ *The rack feet - 10 - 222 A /1- must not be placed on the bolted on sheet metal of the wings, or these might be damaged.*

♦ *The shackle - 10 - 222 A /12- is needed so the engine is raised in its installation position and does not »fall back«.*

All:

– Take up weight of engine with spindle.

– Remove poly V-belt ⇒ page 38 .

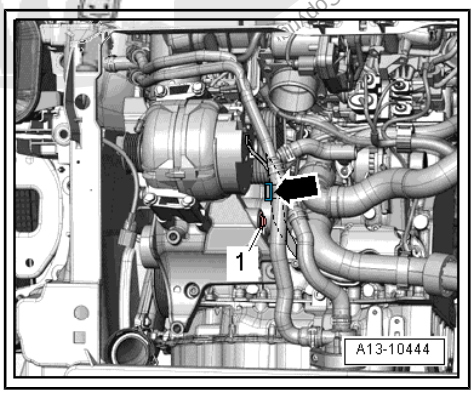
– Unscrew bolts -arrows- of engine/gearbox support on the engine.

– Lower engine approx. 55 mm.



– Move electrical wiring harness clear -arrow-.

– Remove bolt -1- and take off tensioning device for poly V-belt from bracket for ancillaries.



Installing

• Torque setting ⇒ page 36 .

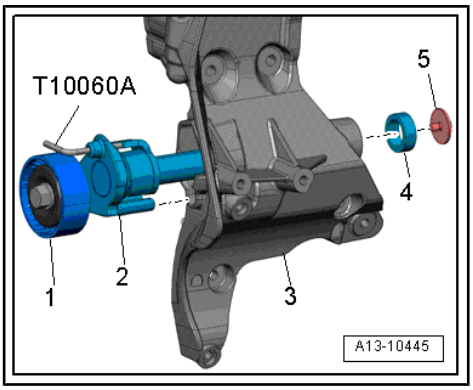
Install in reverse order of removal, observing the following.

– Insert tensioner -1- for poly V-belt in ancillary bracket -3- and tighten bolt -5-.

• Note installation position of support element -2-: fit lug of support element in hole on bracket for ancillaries.

• Note position of centring sleeve -4-.

– Adjust assembly mountings ⇒ page 28 .

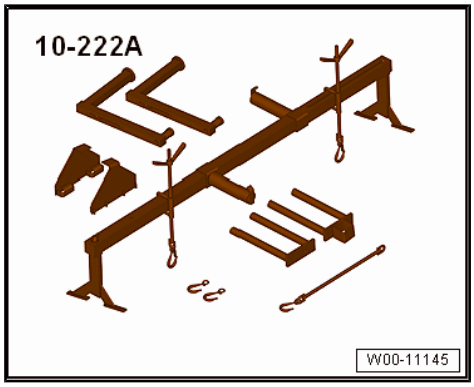


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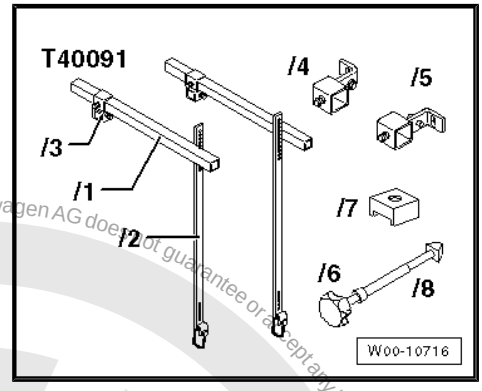
1.5 Removing and installing tensioner for poly V-belt (Tiguan)

Special tools and workshop equipment required

- Support - 10-222A-



- Shackle - 10-222A/12-
- Adapter - 10-222A/16-
- Adapter - 10-222A/18-
- Adapter - 10-222A/22-
- Adapter - 10-222A/28-
- Square tube - T40091/1-



- Swivel joint - T40091/3-

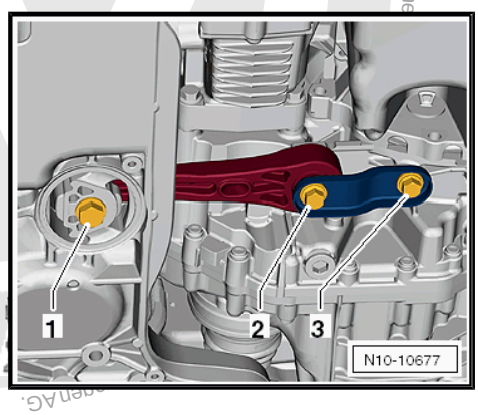
Removing

Proceed as follows:

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

– Remove front right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

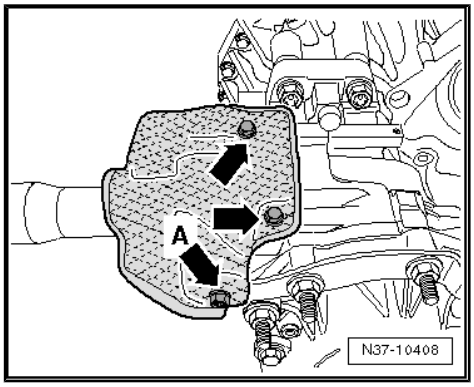
– First, undo bolt -1- and then bolts -2…3- and remove pendulum support.



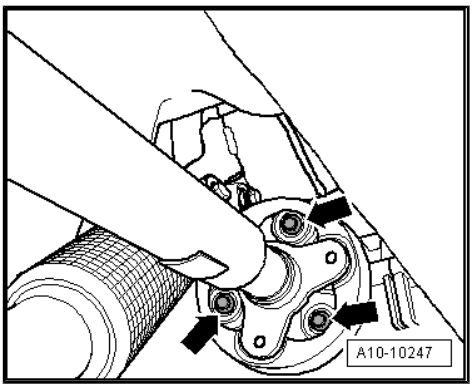
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Vehicles with all-wheel drive:

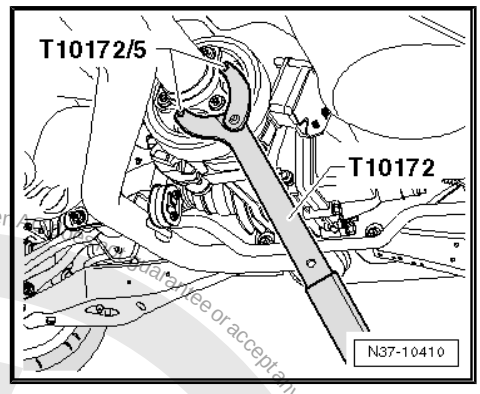
– Unscrew heat shield for flexible coupling.



– Mark position of propshaft with flexible coupling relative to output shaft of bevel box.
– Unbolt propshaft -arrows- and pull off from bevel box.

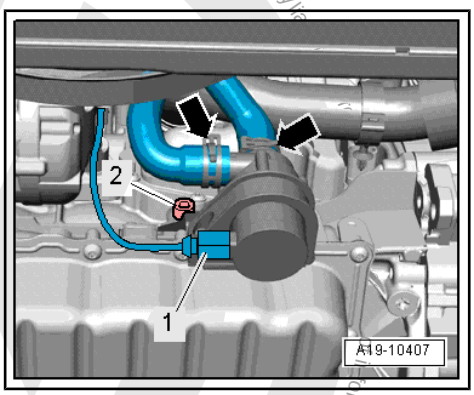


Counterhold at rear final drive when loosening or tightening propshaft.



All:

– Remove bolt -2- at bracket for coolant pump for continued circulation - V51- .



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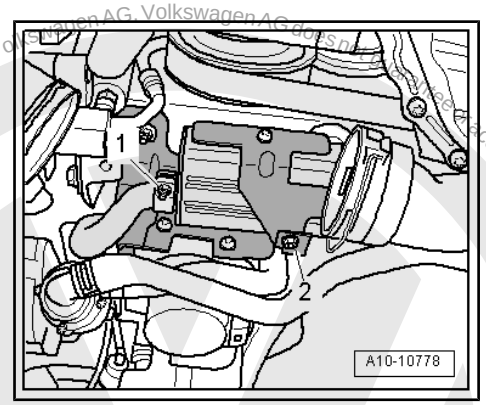
Vehicles with seat heating:

– Slacken clip -1- and remove bolt -2-.

– Detach exhaust silencer for auxiliary heater.

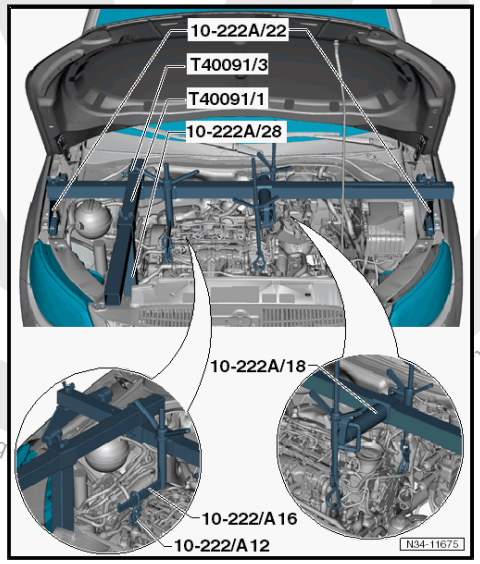
All:

– Remove motor cover panel ⇒ page 139 .



– Fit support bracket - 10 - 222 A- as shown. The rear spindle is not required. Attach hooks to support eyes on engine and support engine and gearbox.

– Take up weight of engine with spindle.



– Unscrew bolts -arrows- of engine/gearbox support on the engine.

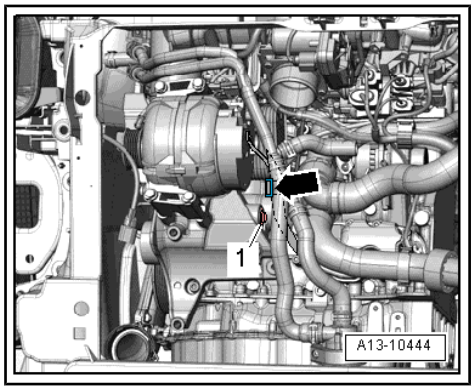
– Lower engine approx. 55 mm.

– Remove poly V-belt ⇒ page 38 .



– Move electrical wiring harness clear -arrow-.

– Remove bolt -1- and take off tensioning device for poly V-belt from bracket for ancillaries.



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Installing

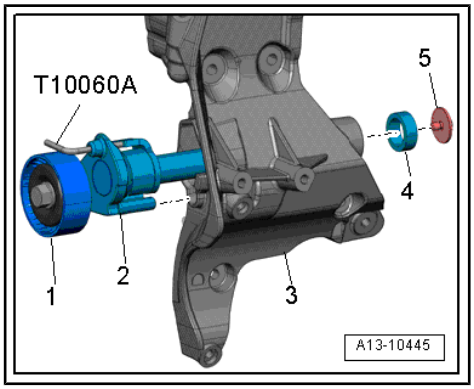
- Torque setting ⇒ page 36 .

Install in reverse order of removal, observing the following.

– Insert tensioner -1- for poly V-belt in ancillary bracket -3- and tighten bolt -5-.

- Note installation position of support element -2-: fit lug of support element in hole on bracket for ancillaries.
- Note position of centring sleeve -4-.

– Adjust assembly mountings ⇒ page 32 .



1.6 Removing and installing bracket for ancillaries

Removing

Proceed as follows:

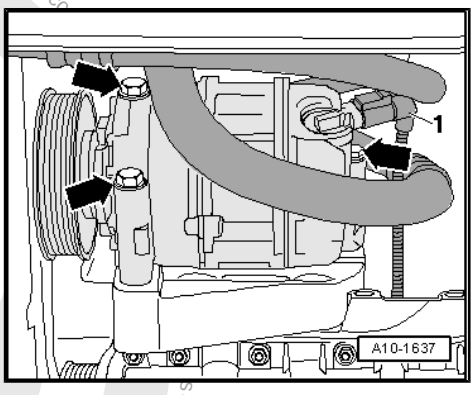
– Drain coolant ⇒ page 235 .

– Remove poly V-belt ⇒ page 38 .

– If fitted, remove charge air duct to sound generator ⇒ page 447 .

– Remove alternator ⇒ Rep. gr. 27 .

– Remove electrical connector -1- for control valve for compressor of air-conditioning system - N280- .



WARNING

Danger of injury due to coolant.

- *The air conditioner refrigerant circuit must not be opened.*

– Unscrew bolts -arrows- for air conditioning compressor.

Caution

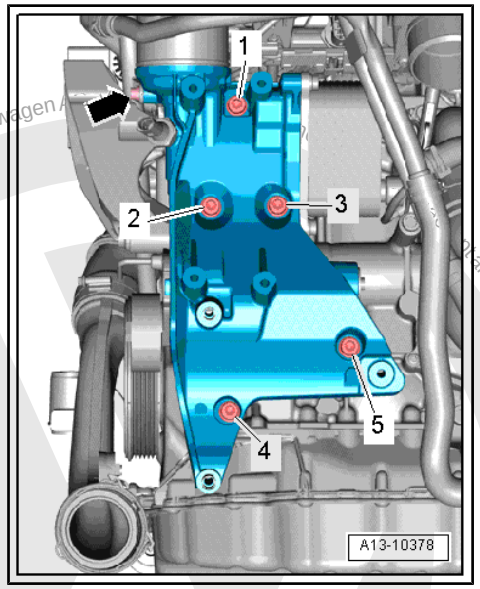
Danger of damage to coolant lines and hoses.

- *Do not stretch, kink or bend refrigerant lines and hoses.*

– Fasten air-conditioning compressor together with connected coolant hoses to the longitudinal member above.

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– Remove bolt -arrow- for dipstick guide tube.
– Unscrew bolts -1 … 5- and detach bracket for ancillary units from coolant pump housing.

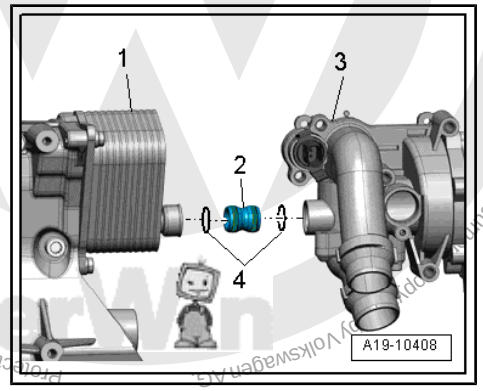


Installing

Note

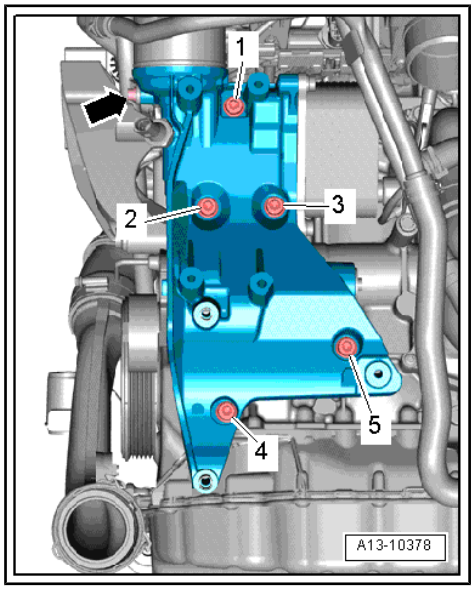
- *If a further tightening angle is specified for certain bolts, these must be renewed.*
- *Renew O-rings and gaskets.*

– Moisten O-rings -4- with coolant.
– Insert connecting piece -2- into coolant pump housing -3-.
– Push ancillary bracket -1- onto connecting piece -2-.



– Fit ancillary bracket (start bolt -4- first).
– Tighten bolts in sequence -1 … 5- in 3 stages as follows:

1. Tighten bolts hand-tight.
2. Tighten bolts to 20 Nm.
3. Turn bolts 90° ($^1/_4$ turn) further.



The remaining installation steps are carried out in the reverse sequence. Note the following:

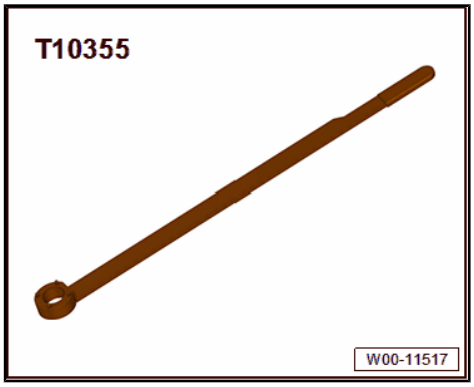
- Specified torques ⇒ page 36 .
- Install A/C compressor ⇒ Rep. gr. 87 .
- Install alternator ⇒ Rep. gr. 27 .

1.7 Removing and installing vibration damper

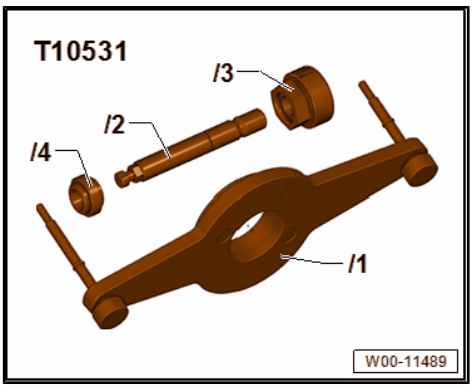
Special tools and workshop equipment required

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- Counterhold tool - T10355-



- Assembly tool - T10531-

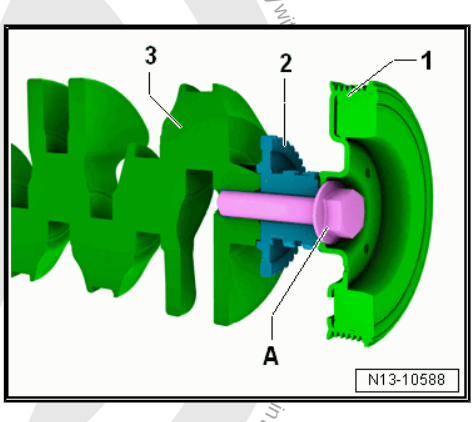


Components of assembly tool - T10531-:

- Support - T10531/1-
- Clamping pin - T10531/2-
- Turning over tool - T10531/3-
- Collar nut - T10531/4-

Note

The vibration damper securing bolt -A- is used to secure the vibration damper -1- and the timing chain sprocket -2- on crankshaft -3-. Before unscrewing the securing bolt, lock the timing chain sprocket in position relative to crankshaft as described below:



Removing:

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

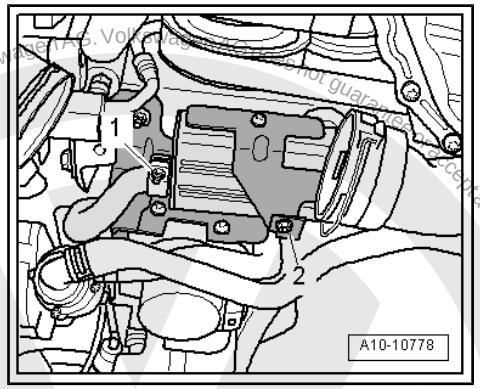
– Remove right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing wheel housing liner .

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Vehicles with seat heating:

– Slacken clip -1- and remove bolt -2-.

– Detach exhaust silencer for auxiliary heater.



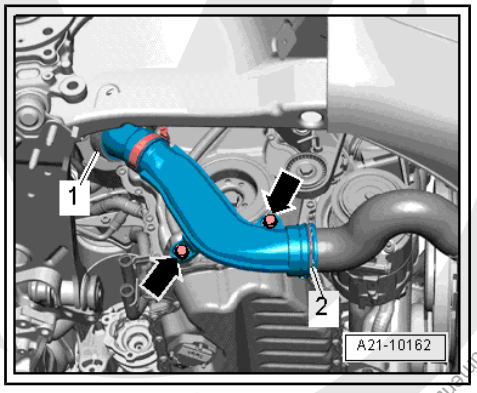
All:

– Remove bolts -arrows-.

– Remove air pipe (lift clips -items 1 and 2-).

– Remove poly V-belt ⇒ page 38 .

– Pull locking pin - T10060 A- out of tensioning device for poly V-belt.

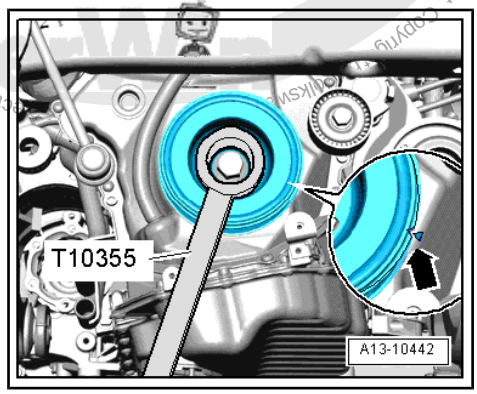


– Turn vibration damper to “TDC” position -arrow- using counterhold - T10355- .

- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).
- The marking on the cover is located at »4 o'clock position«.

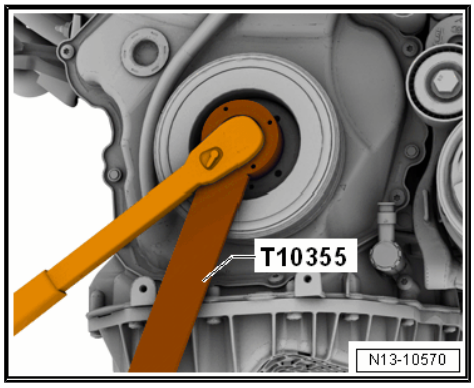
Caution

Initially, the vibration damper securing bolt must only be loosened by $^1/_2$ turn.



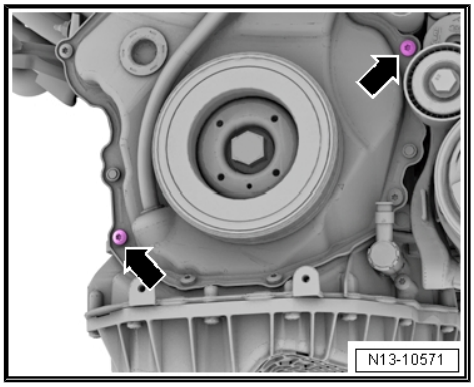
– Loosen vibration damper bolt by $^1/_2$ turn. To do this, use counter hold tool - T10355- .

– If vibration damper was turned while loosening bolt, reset TDC position.



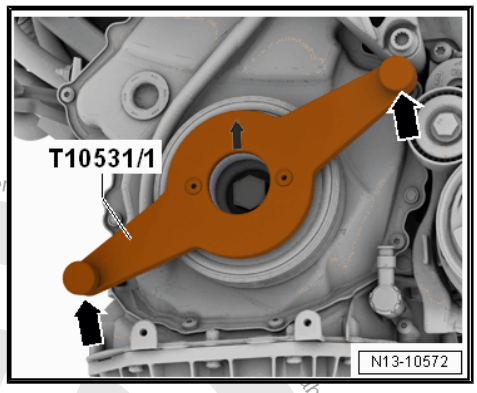
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– Unscrew the 2 timing chain cover securing bolts -arrows-, as shown in illustration. Bolts must be renewed.



– Fit support - T10531/1- to vibration damper, as shown in illustration, and tighten knurled screws -arrows- by hand.

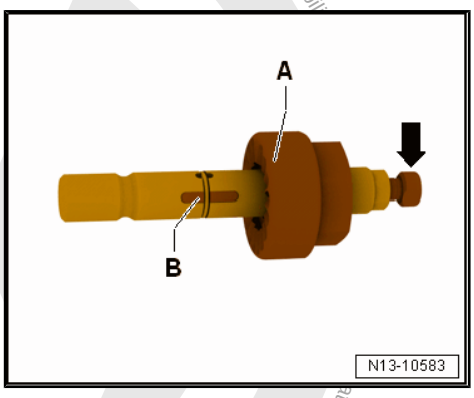
– Unscrew vibration damper bolt completely.



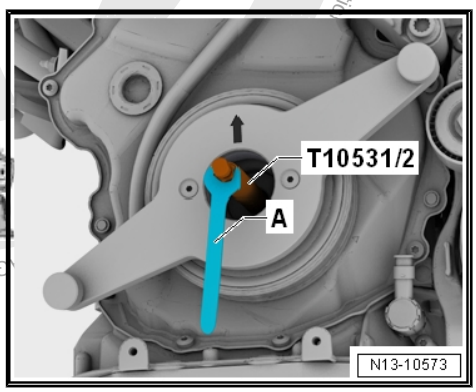
– Check if turning over tool -A- slides easily over clamping pieces -B-. If necessary, turn tensioning bolt -arrow-.

Note

Now, do not turn the tensioning bolt anymore, or the clamping pin - T10531/2- will be jammed when it is screwed into the crankshaft.

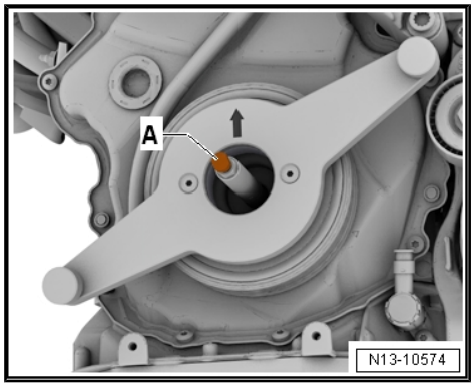


– Screw clamping pin - T10531/2- into crankshaft, and tighten it hand-tight with a 12 mm open-end spanner -A-.

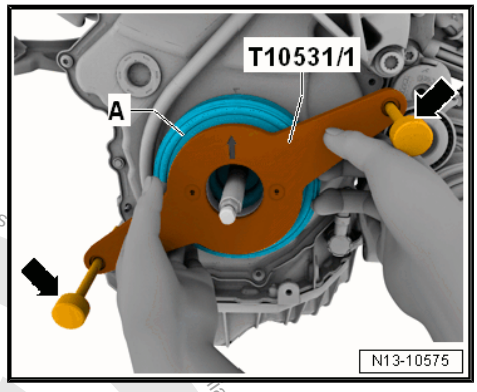


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– Tighten tensioning bolt -A- hand-tight. This will lock the chain sprocket in position relative to crankshaft.

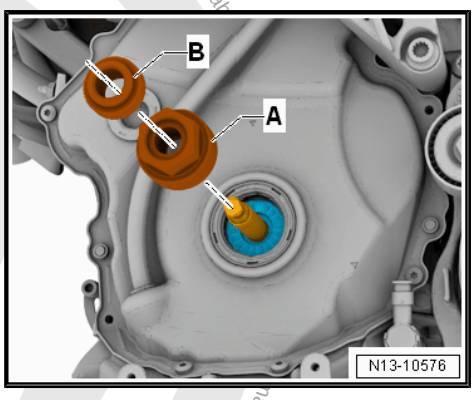


– Unscrew knurled screws -arrows-. Remove support -T10531/1- and vibration damper -A-.

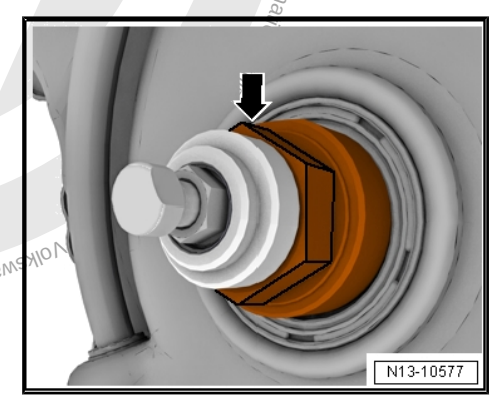


Turning crankshaft without vibration damper

– Fit turning over tool -A- on clamping pin. Pay attention to toothed contours of sprocket while doing so. In TDC position the flat section of the tool faces upwards. Tighten turning over tool with flange nut -B-.



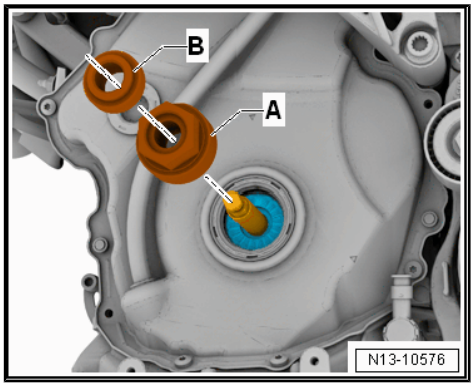
– Now, the crankshaft can be turned on hexagon -arrow-.



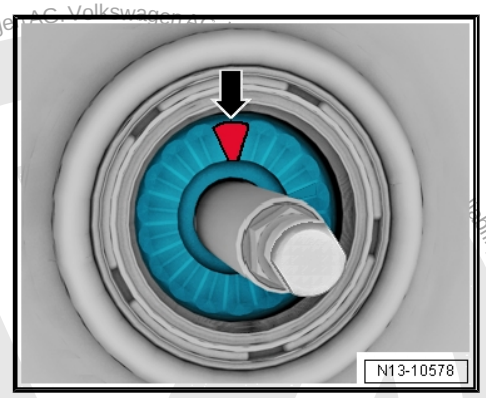
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Installing vibration damper

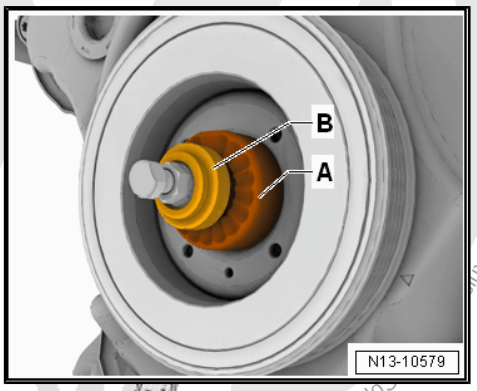
– If necessary, remove flange nut -B- and turning over tool -A- from clamping pin.



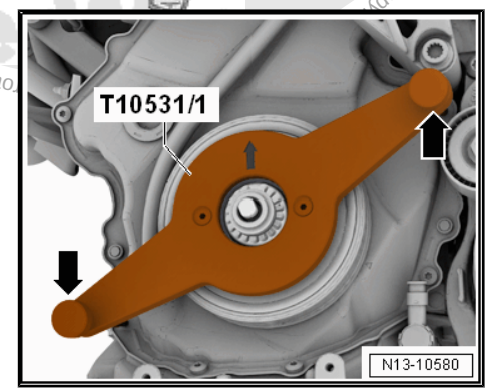
– Fit vibration damper in TDC position. Pay attention to teeth of chain sprocket -arrow- while doing so.



– Fit turning over tool -A- on clamping pin. The hexagon faces towards vibration damper while doing so. Screw on flange nut -B-. Move vibration damper slightly back and forth while doing so, in order to ensure that vibration damper is properly seated on teeth. Tighten flange nut, until vibration damper cannot be turned any more.

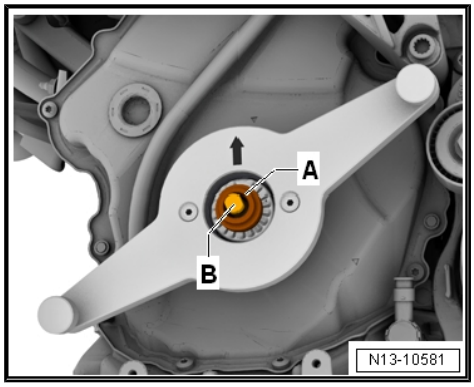


– Fit support - T10531/1- to vibration damper, as shown in illustration, and tighten knurled screws -arrows- by hand.

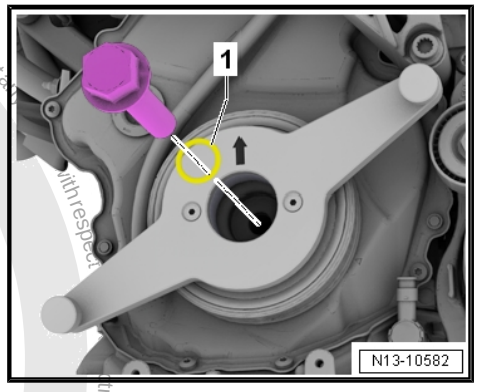


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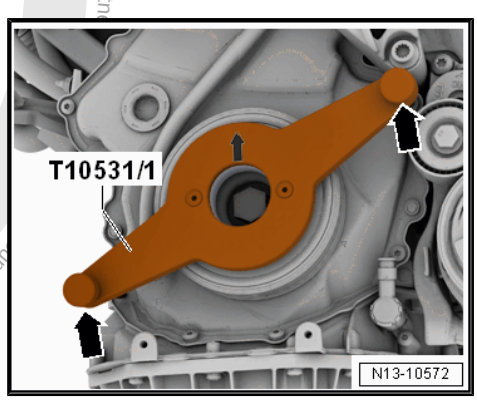
– Unscrew flange nut -A-, and loosen clamping pin -B-. Unscrew clamping pin , and remove it together with turning over tool .



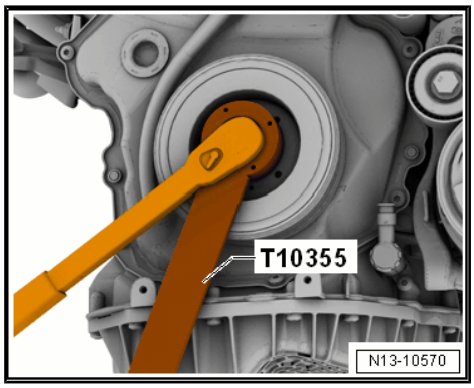
– Screw in new vibration damper bolt with lubricated O-ring -1- by hand.



– Unscrew knurled screws -arrows-, and remove support -T10531/1- .

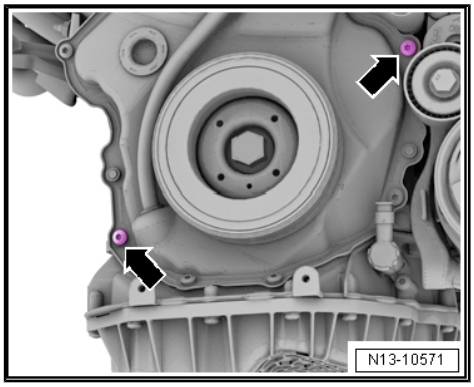


– Tighten vibration damper bolt using counter hold tool -T10355- .



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– Screw in new securing bolts -arrows-.



Further assembly is basically a reverse of the dismantling sequence.

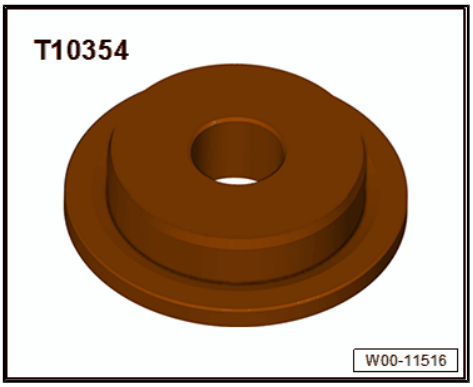
Torque settings

♦ ⇒ “1.1 Assembly overview - poly V-belt drive”, page 36

1.8 Renewing oil seal for vibration damper

Special tools and workshop equipment required

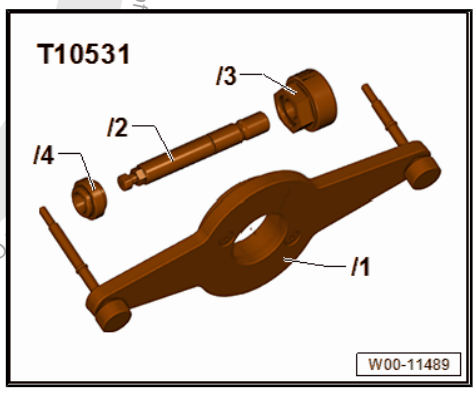
♦ Press tool - T10354-



♦ Thrust washer - T10375-

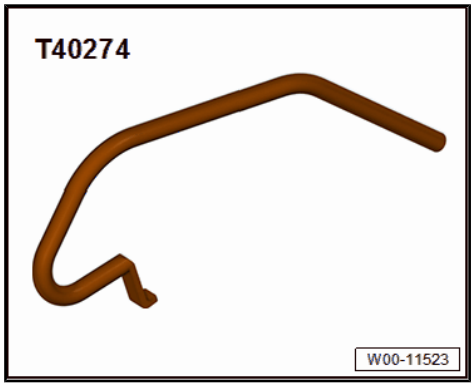


♦ Flange nut - 10531/4- from assembly tool - T10531-



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♦ Extractor hook - T40274-

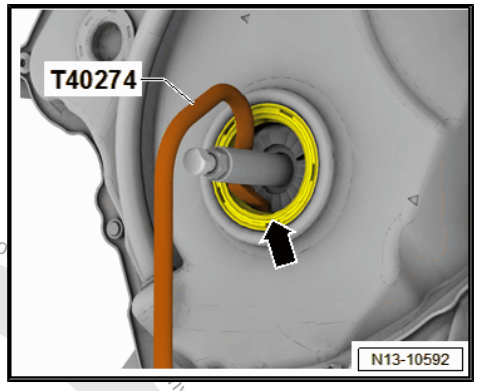


Removing

– Remove vibration damper ⇒ page 50 .

• Clamping pin - T10531/2- is inserted.

– Using extractor hook - T40274- , pull out seal -arrow-.

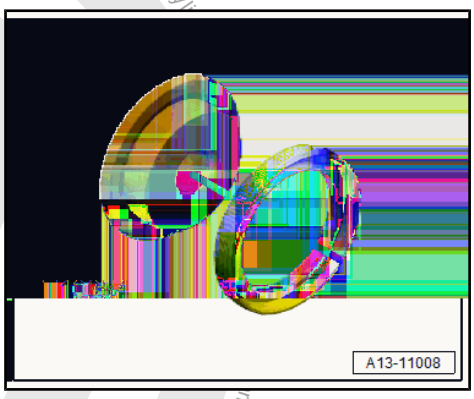


Installing

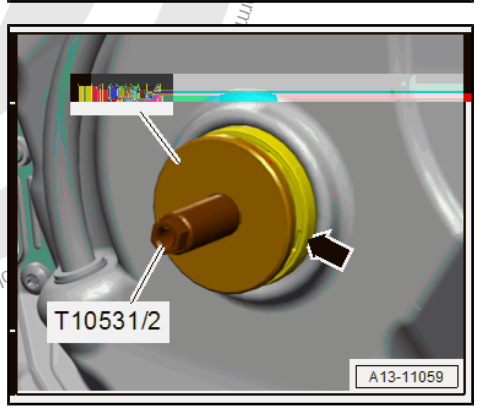
– Clean contact surface and sealing surface.

– Slide seal -arrow- onto thrust piece - T10354- .

• Closed side of oil seal faces towards thrust piece - T10354- .

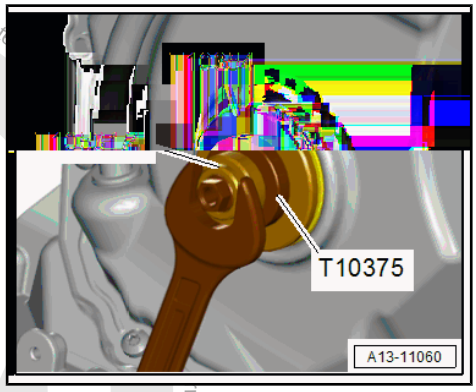


– Slide seal -arrow- with thrust piece - T10354- onto clamping pin - T10531/2- , and fit it to lower timing chain cover.



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– In addition, fit thrust pad - T10375- , and screw on flange nut - 10531/4- .
– Using open-end spanner, AF 21, tighten flange nut until seal has been pressed in as far as stop.



Note

- *Renew bolt for vibration damper.*
- *Renew O-ring.*

Further assembly is basically a reverse of the dismantling sequence. During this step, observe the following:

– Install vibration damper ⇒ page 50 .

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2 Cylinder block, gearbox end

Assembly overview - sealing flange on gearbox side and dual-mass flywheel/drive plate ⇒ page 60 .

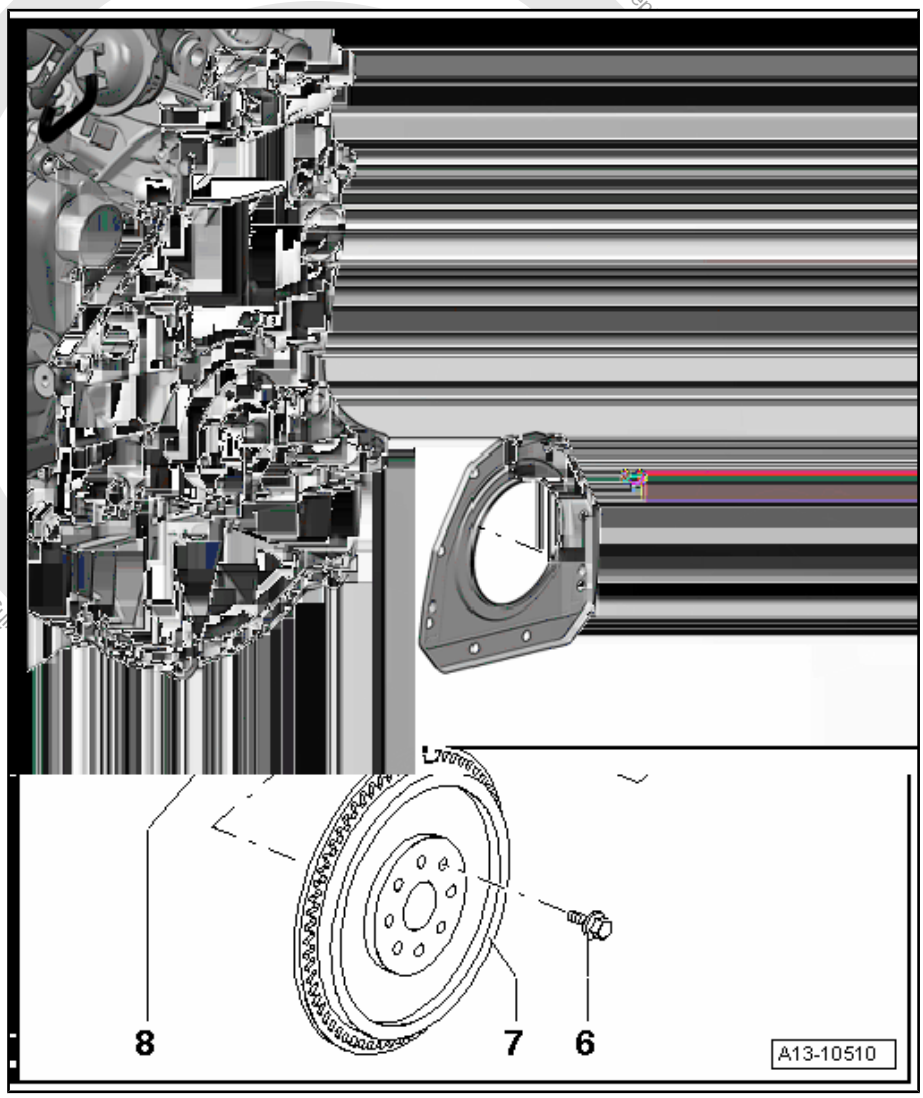
Removing and installing dual-mass flywheel ⇒ page 61 .

Removing and installing drive plate ⇒ page 62

Removing and installing sealing flange on gearbox side ⇒ page 64 .

2.1 Assembly overview - sealing flange on gearbox side and dual-mass flywheel/drive plate

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1 - Cylinder block

- ❑ Removing and installing crankshaft ⇒ page 71 .
- ❑ Dismantling and assembling pistons and conrods ⇒ page 79

2 - Dowel pin

- ❑ Not installed

3 - Sealing flange on gearbox side

- ❑ With seal
- ❑ Renew only as complete unit
- ❑ Removing and installing ⇒ page 64

4 - Bolt

- ❑ Tightening sequence ⇒ page 61

5 - Intermediate plate

- ❑ Must seat on dowel sleeves.
- ❑ Do not damage or bend when assembling.
- ❑ Is fitted onto sealing flange ⇒ page 61

6 - Bolt

- ❑ For dual-mass flywheel/drive plate
- ❑ 60 Nm + 90° ($^1/_4$ turn) further
- ❑ Renew

7 - Dual mass flywheel/drive plate

- ❑ Removing and installing dual-mass flywheel ⇒ page 61
- ❑ Removing and installing drive plate ⇒ page 62
- ❑ Drive plate installation position: »collar« points towards engine
- ❑ Can only be installed in one position, holes are offset.

8 - Dowel pin

- ❑ Not installed

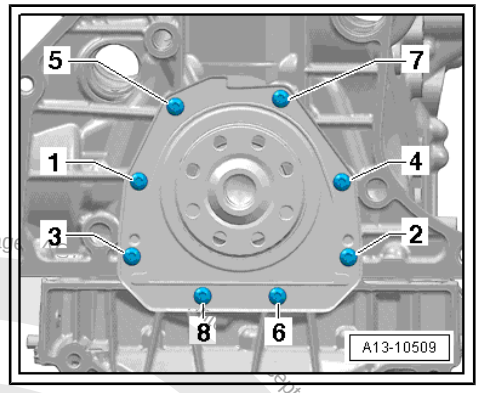
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Sealing flange at gearbox end - tightening sequence

– Tighten bolts -1 to 8- in the sequence shown:

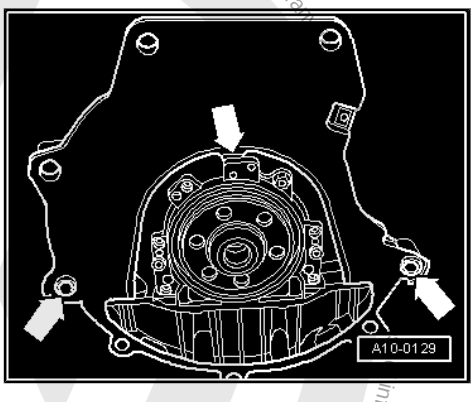
♦ 1. Screw in and tighten bolts by hand.

♦ 2. Tighten bolts to 9 Nm.



Installing intermediate plate

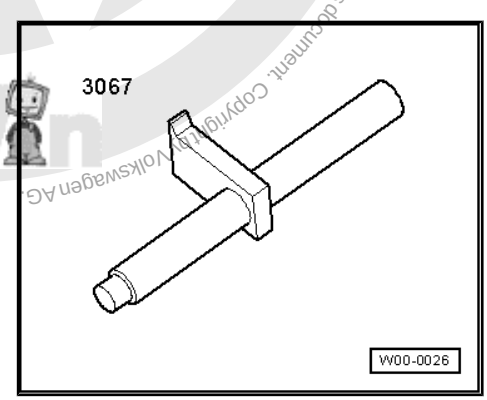
– Hook intermediate plate onto sealing flange and slide onto dowel sleeves -arrows-.



2.2 Removing and installing dual-mass flywheel

Special tools and workshop equipment required

♦ Counterhold tool - 3067-



Removing

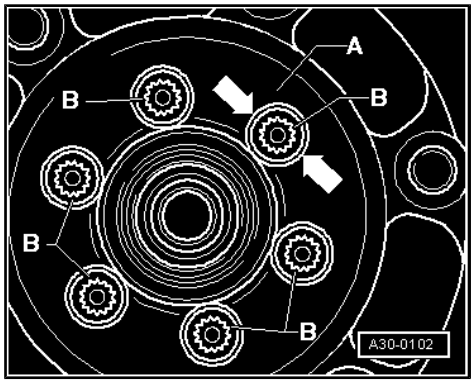
– Remove gearbox ⇒ Power transmission; Rep. gr. 37 ; Removing and installing gearbox .

Caution

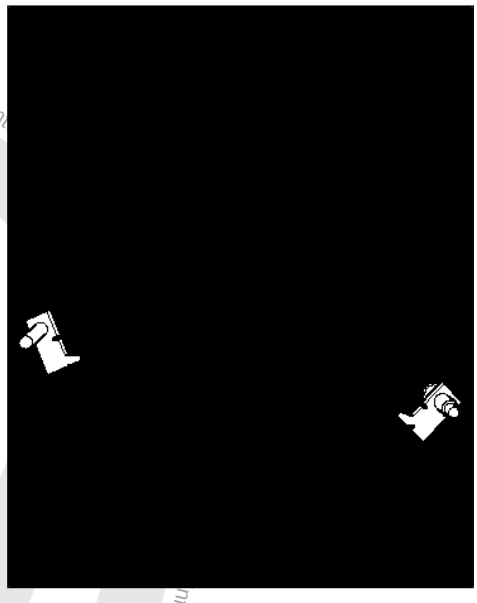
In order to avoid destruction of the dual-mass flywheel, you are not allowed to undo the bolts -B- with a pneumatic/impact screwdriver. It is only permissible to remove the bolts by hand.

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– Rotate the dual-mass flywheel -A- so that the bolts -B- align centrally with the holes -arrows-.
– When unscrewing bolts -B-, ensure that none of the bolt heads come into contact with the dual-mass flywheel -arrows-. The flywheel will otherwise be damaged when the bolts are unscrewed further.



– Insert counterhold - 3067- in hole on cylinder block -B-.
– Unscrew dual-mass flywheel.

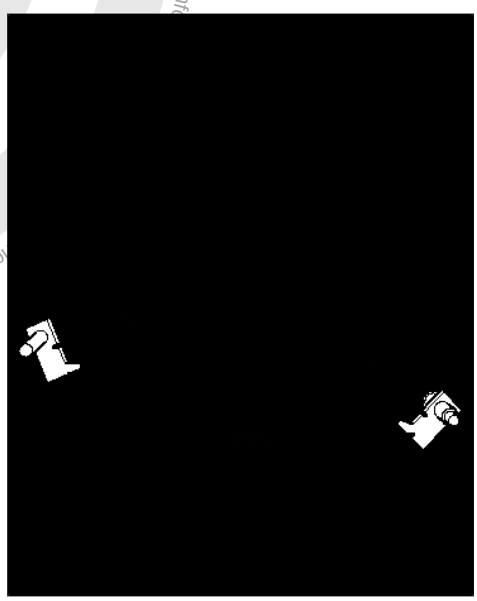


Installing

Install in the reverse order of removal, observing the following:

• Specified torque ⇒ Item 6 (page 60)
– Use new bolts for securing.

– Insert counter hold - 3067- in hole on cylinder block -A-.

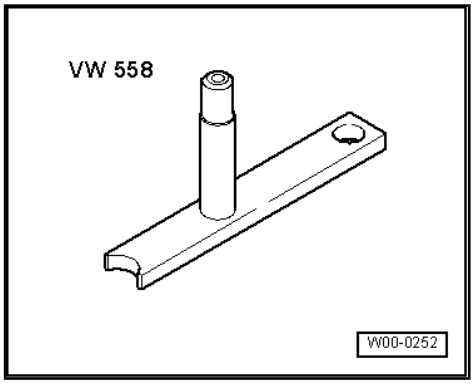


2.3 Removing and installing drive plate

Special tools and workshop equipment required

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- Counterhold tool - VW 558-



- Depth gauge
- Hexagon bolt M8×40 and hexagon nut M8

– Remove gearbox ⇒ Power transmission; Rep. gr. 37 ; Removing and installing gearbox .

Preparing counter hold tool - VW 558- :

– Tighten hexagon bolt M8x40 -A- with hexagon nut on clutch counter-hold tool - VW 558- .



Loosening and tightening drive plate:

– Insert counter hold - VW 558- in cylinder block and drive plate as shown.

Installation position of counter hold: -A- to loosen, -B- to tighten.



Installing drive plate:

– Fit drive plate without washer -A- first.

– Fit used securing bolts -3- and tighten to 30 Nm.



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– Check dimension between drive plate and cylinder block at three points and calculate average.



Note

Measure through hole in drive plate to milled surface of cylinder block. If measuring on the intermediate plate, the plate thickness must be taken into account.

- Specification measured without intermediate plate: 19.5… 21.1 mm
- Specification measured with intermediate plate: 18.8… 20.4 mm

If the specification is not reached, replace all securing bolts and tighten.

If specification is not attained:

– Remove drive plate again and fit shim -A-. Tighten bolts -3- again to 30 Nm.

– Repeat measurement. If the specification is not reached, replace all securing bolts and tighten.

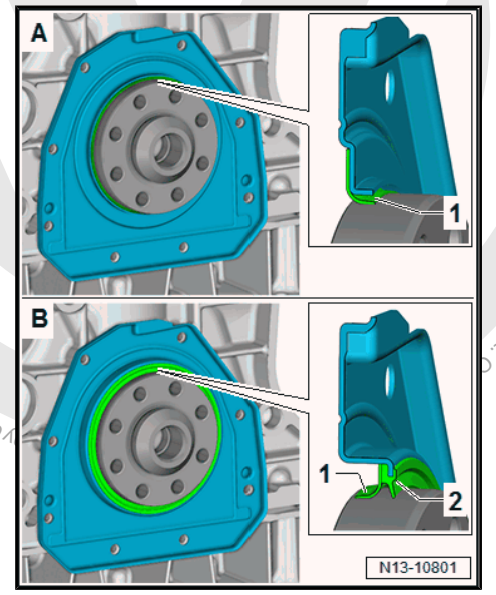
- Specified torque ⇒ Item 6 (page 60)



2.4 Removing and installing sealing flange on gearbox side

Note

- *There are 2 versions of the sealing flange. Check which version must be installed.*
- *Version -A-: Sealing lip -1- faces gearbox (outwards).*
- *Version -B-: Sealing lip -1- faces engine. This sealing flange also has a dust lip -2-.*



Removing and installing version -A- ⇒ page 64 .

Removing and installing version -B- ⇒ page 67 .

2.4.1 Removing and installing sealing flange on gearbox side, version A sealing lip faces outwards

Special tools and workshop equipment required

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- Assembly sleeve - T20097-

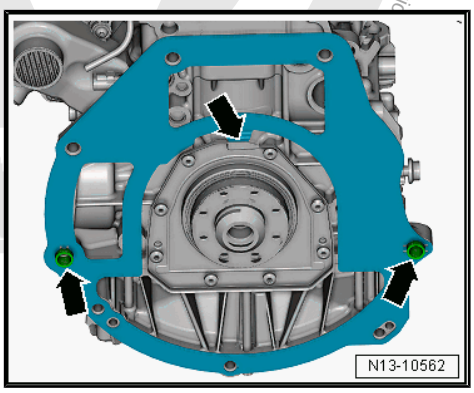


- Hand drill with plastic brush attachment
- Safety glasses
- Sealant ⇒ Electronic parts catalogue (ETKA)

Removing

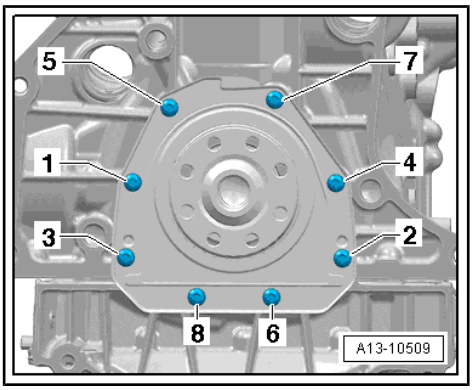
- Gearbox is removed.
- Dual mass flywheel removed ⇒ page 61 or drive plate removed ⇒ page 62 .

– Detach intermediate plate from sealing flange and dowel pins -arrows-.



– Unscrew bolts -1 to 8-.

– Remove sealing flange.



Installing

Note

- *Observe use-by date of silicone sealant.*
- *The sealing flange must be installed within 5 minutes of applying the silicone sealant.*
- *In order to prevent the lubrication system from being soiled with sealant residue cover the open section of the sump with a clean cloth.*

Caution

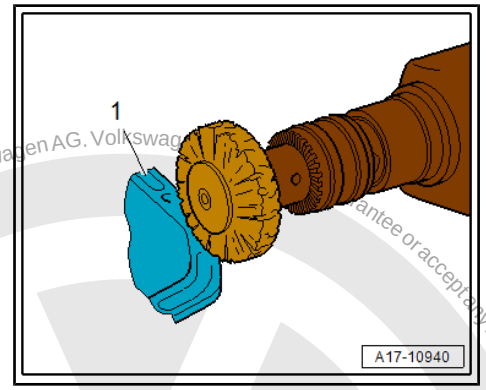
Risk of eye injury caused by sealant residue.

- ***Wear safety goggles.***

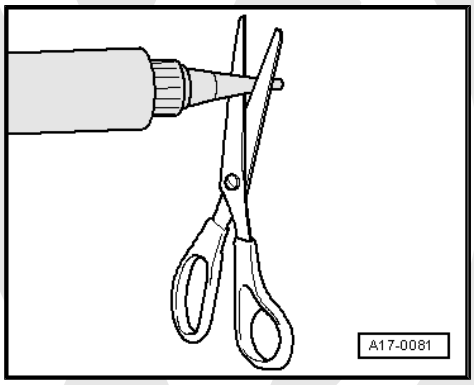
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– Remove sealant residue from cylinder block, e.g. with rotating plastic brush.

– Clean sealing surfaces. They must be oil and grease free.

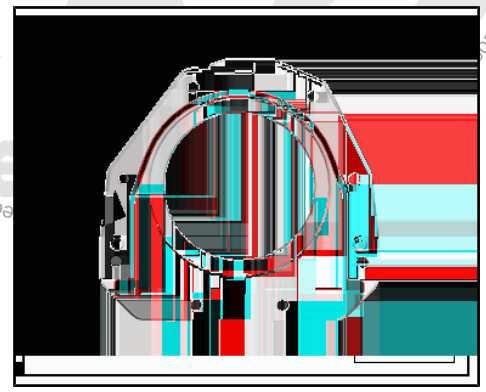


– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



– Apply silicone sealing compound bead, as shown in diagram, to clean sealing surface of sealing flange.

♦ Thickness of sealant bead: 2 to 3 mm



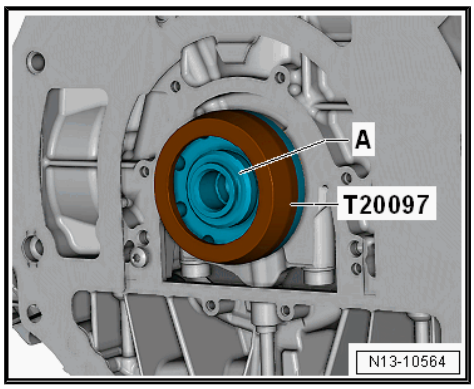
– Clean crankshaft pins carefully.

– Check assembly sleeve ; it must be free of any deformation or sharp edges.

– Fit assembly sleeve - T20097- onto crankshaft journal -A-.

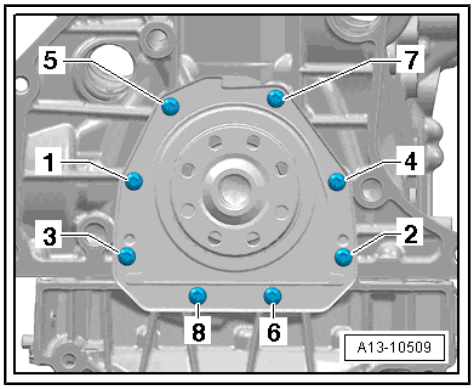
– Fit sealing flange over assembly sleeve - T20097- onto crankshaft journal.

– Remove assembly sleeve - T20097- .



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– Tighten new bolts evenly in the sequence shown.



Stage	Bolts	Specified torque/turning further angle
1.	-1 to 8-	Screw in by hand as far as stop
2.	-1 to 8-	9 Nm

Note

After installing the sealing flange, wait about 30 minutes for the sealant to dry. Only then fill with engine oil.

Further assembly is basically a reverse of the dismantling sequence.

Torque settings

- ⇒ "2.1 Assembly overview - sealing flange on gearbox side and dual-mass flywheel/drive plate", page 60

2.4.2 Removing and installing sealing flange on gearbox side, version B sealing lip faces engine

Special tools and workshop equipment required

- Assembly sleeve - T20097-

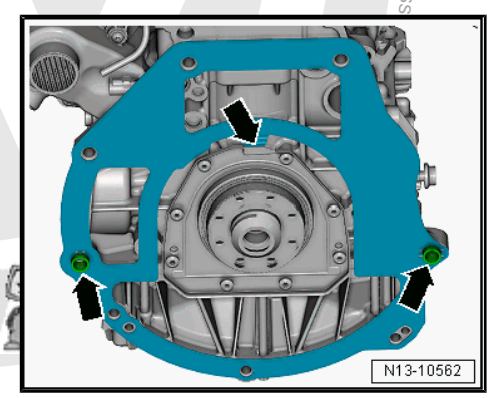


- Hand drill with plastic brush attachment
- Safety glasses
- Sealant ⇒ Electronic parts catalogue (ETKA)

Removing

- Gearbox is removed.
- Dual mass flywheel removed ⇒ page 61 or drive plate removed ⇒ page 62 .

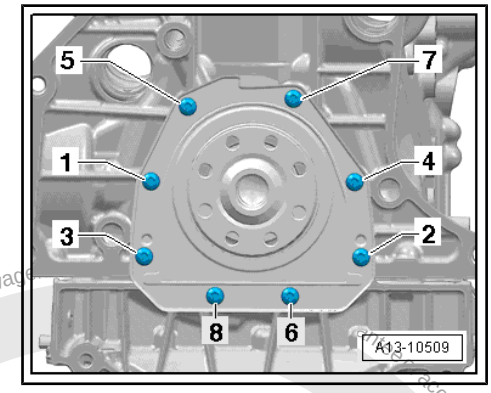
– Detach intermediate plate from sealing flange and dowel pins -arrows-.



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– Unscrew bolts -1 to 8-.

– Prise off sealing flange.



Installing

Note

- *Observe use-by date of silicone sealant.*
- *The sealing flange must be installed within 5 minutes of applying the silicone sealant.*
- *In order to prevent the lubrication system from being soiled with sealant residue cover the open section of the sump with a clean cloth.*

Caution

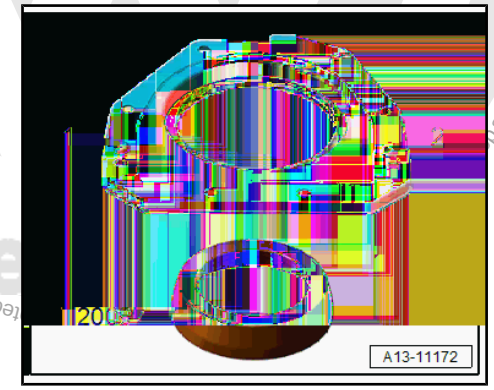
Risk of eye injury caused by sealant residue.

- ***Wear safety goggles.***

– Remove sealant remaining on cylinder block with flat scraper or rotating plastic brush.

– Clean sealing surfaces. They must be oil and grease free.

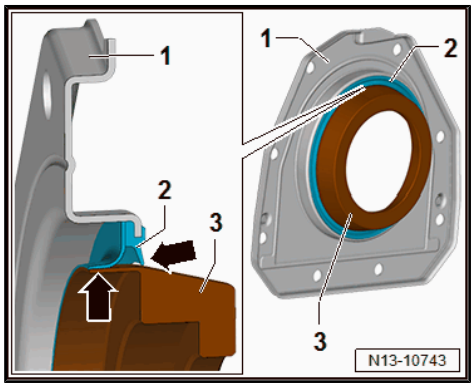
The sealing lip of the sealing flange must be »shaped« before installing.



– Check assembly sleeve ; it must be free of any deformation or sharp edges.

– Fit sealing flange onto assembly sleeve as shown.

- The smaller diameter of the assembly sleeve faces towards the seal.
- Centring cones -1- and -2- face upwards.
- Let the sealing flange settle on the assembly sleeve for about 5 minutes.



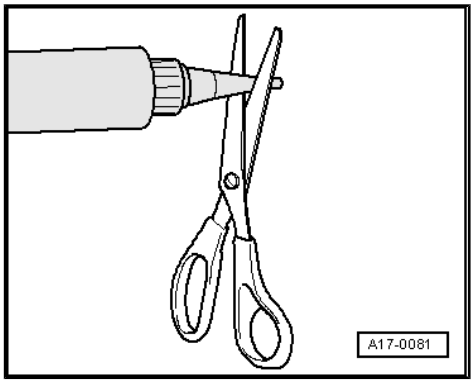
– Remove assembly sleeve again from the sealing flange and turn it over.

– Leading with small diameter, insert assembly sleeve -3- in sealing flange -1-.

– Make sure that the sealing lips -arrows- are in contact with the assembly sleeve as shown. Large sealing lip must point towards engine.

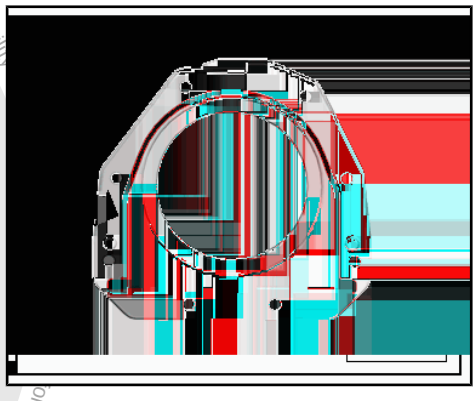
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– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



– Apply silicone sealant as shown to clean sealing surface of sealing flange.

◆ Thickness of sealant bead: 2 to 3 mm.



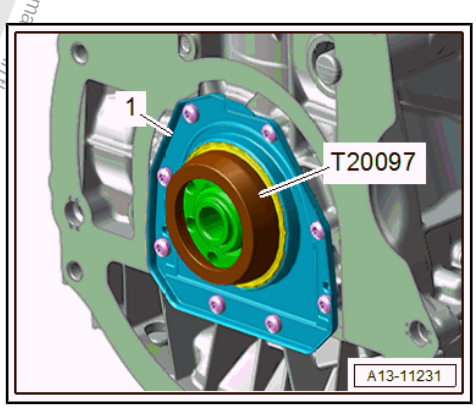
Note

◆ *The sealing flange must be installed within 5 minutes after applying the silicone sealant.*

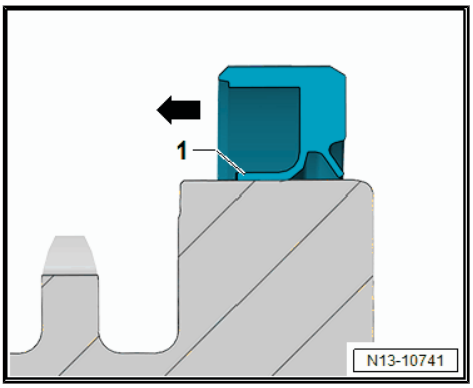
◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*

– Fit sealing flange -1- with assembly sleeve on crankshaft journal.

– Fit sealing flange -1-over assembly sleeve - T20097- onto crankshaft journal.

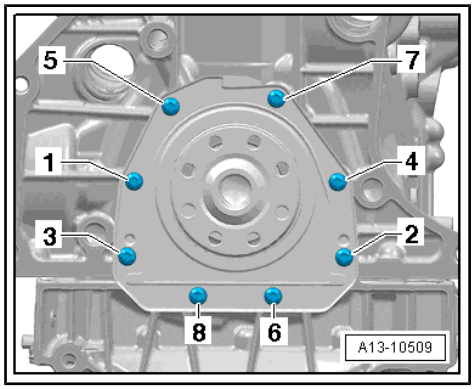


– Remove assembly sleeve - T20097- . Large sealing lip -1- must point towards engine.



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– Tighten new bolts evenly in the sequence shown.



Stage	Bolts	Specified torque/turning further angle
1.	-1 to 8-	Screw in by hand as far as stop
2.	-1 to 8-	9 Nm

Note

After installing the sealing flange, wait about 30 minutes for the sealant to dry. Only then fill with engine oil.

Further assembly is basically a reverse of the dismantling sequence.

Torque settings

- ⇒ “2.1 Assembly overview - sealing flange on gearbox side and dual-mass flywheel/drive plate”, page 60

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3 Crankshaft

Assembly overview - crankshaft ⇒ page 71 .

Tightening sequence - crankshaft ⇒ page 72 .

Removing and installing sender wheel ⇒ page 72 .

Allocation of crankshaft bearing shells ⇒ page 73 .

Pulling needle bearing out of and driving into crankshaft ⇒ page 74 .

Crankshaft dimensions ⇒ page 76 .

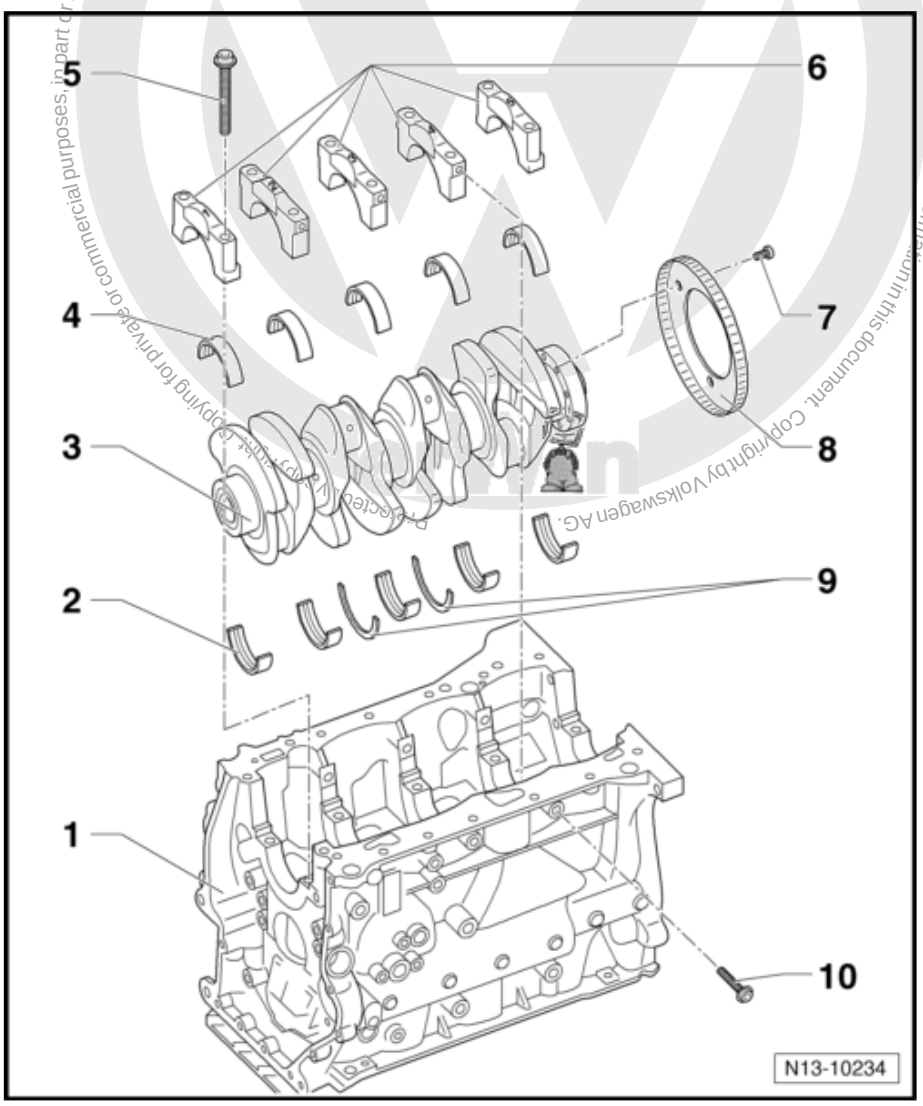
Measuring axial clearance of crankshaft ⇒ page 76 .

Measuring radial clearance of crankshaft ⇒ page 77 .

3.1 Assembly overview - crankshaft

Note

Secure engine to repair stand using engine and gearbox support - VAS 6095- when dismantling/assembling engine ⇒ page 18 .



1 - Cylinder block

- ❑ If the cylinder block is renewed, the bearing shells must be reallocated to cylinder block ⇒ page 73

2 - Bearing shell for cylinder block

- ❑ With oil groove.
- ❑ Do not interchange used bearing shells (mark).
- ❑ Marking of crankshaft bearing shells ⇒ page 73

3 - Crankshaft

- ❑ After removing, place it down so that the sender wheel -item 5- is not damaged and the crankshaft does not rest on the sender wheel
- ❑ If the crankshaft is renewed, the bearing shells must be reallocated to bearing cap ⇒ page 73
- ❑ Axial clearance ⇒ page 76
- ❑ Radial clearance ⇒ page 77
- ❑ Do not rotate crankshaft when checking radial clearance
- ❑ Crankshaft dimensions ⇒ page 76 .

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- ❑ Removing and installing ⇒ page 72

4 - Bearing shell

- ❑ Without oil groove.
- ❑ Do not interchange used bearing shells (mark).
- ❑ Marking of crankshaft bearing shells ⇒ page 73

5 - Bolt

- ❑ Note tightening sequence ⇒ page 72
- ❑ Renew

6 - Bearing cap

- ❑ Bearing cap 1: belt pulley end.
- ❑ Bearing shell retaining lugs in cylinder block and bearing caps must align.

7 - Bolt

- ❑ 10 Nm + 1/4 turn further (90°)
- ❑ Renew
- ❑ Sender wheel must be renewed if bolts are loosened ⇒ page 72

8 - Sender wheel

- ❑ For engine speed sender - G28-
- ❑ Can only be installed in one position, holes are offset.
- ❑ Always renew sender wheel if securing bolts have been unscrewed
- ❑ Removing and installing ⇒ page 72

9 - Thrust washers

- ❑ For bearing 3

10 - Bolt

- ❑ Note tightening sequence ⇒ page 72
- ❑ Renew

Crankshaft tightening sequence

– Tighten crankshaft bolts in the sequence -1 … 5- as follows:

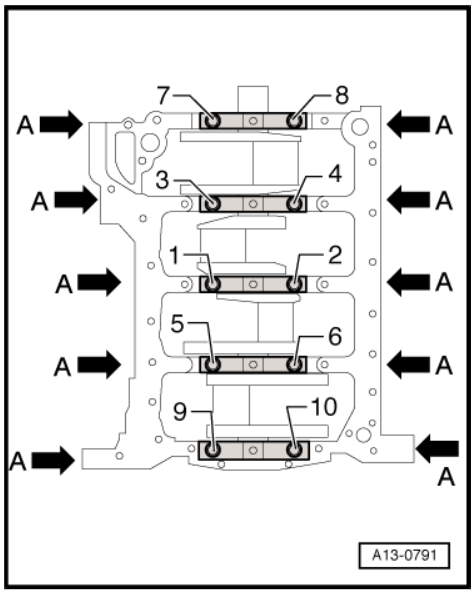
1 - Tighten bolts -1 to 10- and -arrows- by hand.

2 - Pre-tighten bolts -1 to 10- to 65 Nm.

3 - Turn bolts -1 to 10- 90° further using a rigid wrench.

4 - Pre-tighten bolts -arrows- to 20 Nm.

5 - Turn bolts -arrows- 90° further using a rigid wrench.



3.1.1 Removing and installing sender wheel

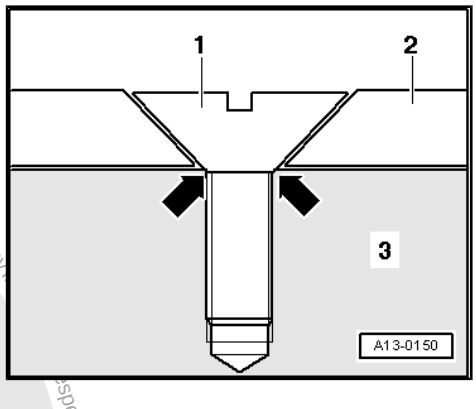
– Remove engine.

– Remove crankshaft sealing flange ⇒ page 64 .

– Remove upper part of sump ⇒ page 212 .

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– Remove camshaft timing chain and drive chain for balance shaft ⇒ page 113 .
– Unscrew conrod bearing cap.
– Remove crankshaft bearing cap.
– Remove crankshaft and unscrew sender wheel.
– Renew sender wheel -2- each time bolts -1- are loosened.



Note

- *The second time the bolts are tightened, the contact points in the sender wheel for the countersunk heads are deformed so far that the bolt heads seat on the crankshaft -3-, -arrows- and the sender wheel is »loose« under the bolts.*
- *Sender wheel can only be installed in one position. The holes are offset.*

- Specified torque ⇒ page 71

3.1.2 Allocation of crankshaft bearing shells (classification)

Bearing shells of the correct thickness are allocated to the cylinder block at the factory. Coloured dots are used to identify the thickness of the bearing shells.

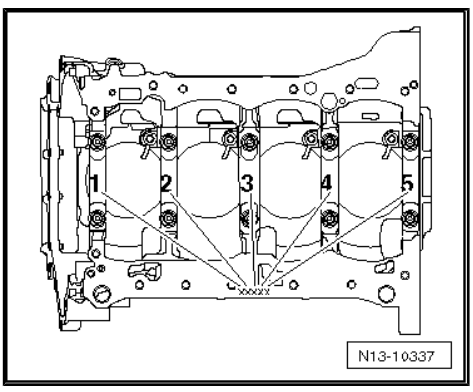
Which bearing shell is to be inserted at each place in the cylinder block (upper bearing shell) is marked by letters on the lower sealing surface or on the front side of cylinder block.

Which bearing shell is to be inserted at each place in bearing cap (lower bearing shell) is marked by letters on the crankshaft.

The first letter is allocated to bearing cap 1, the second to bearing cap 2, etc.

Cylinder block:

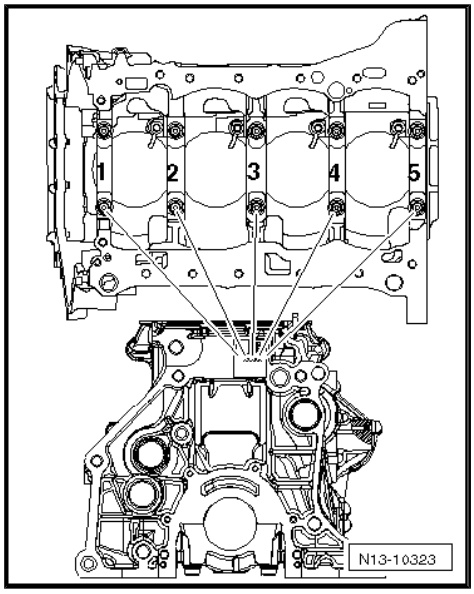
The marking on the cylinder block can be found engraved either in the sump sealing surface or in the front end (gearbox side) of the cylinder block.



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Identification on cylinder block is allocated to upper bearing shell (bearing shell for cylinder block).

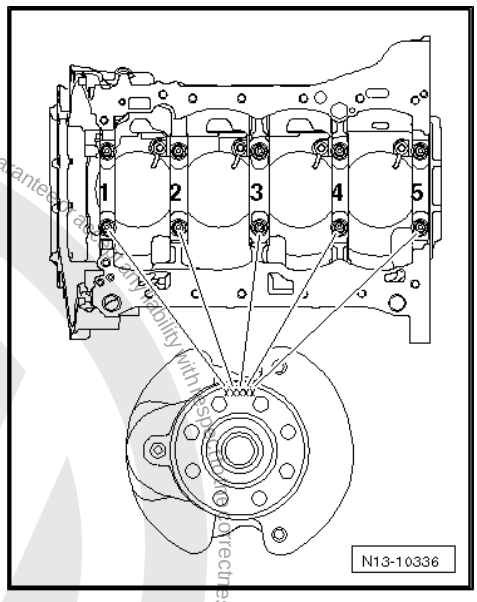
– Make a note of the letters and determine the colour marking for installation with regard to the table.



Crankshaft:

Identification on crankshaft is allocated to lower bearing shell (bearing shell for bearing cap).

– Make a note of the letters and determine the colour marking for installation with regard to the table.



S	=	black
R	=	red
G	=	yellow
B	=	blue
W	=	white

3.2 Pulling needle bearing out of and driving into crankshaft

Only vehicles with a dual clutch gearbox

Special tools and workshop equipment required

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



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♦ Internal puller - VAS 251 635-



♦ Drift - VW 207 C-



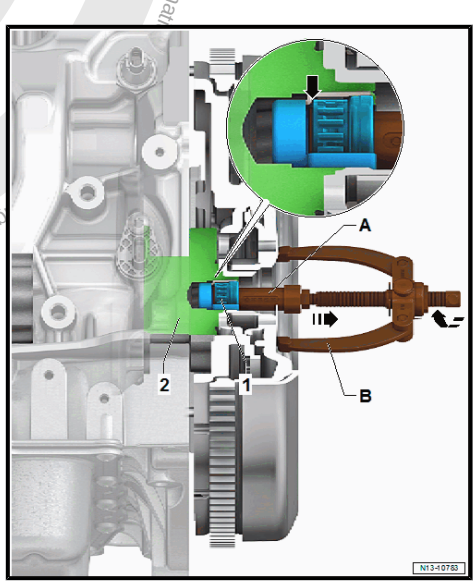
Condition:

- The front edges of the inner puller must not be chipped.
- Gearbox has been removed.

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-.

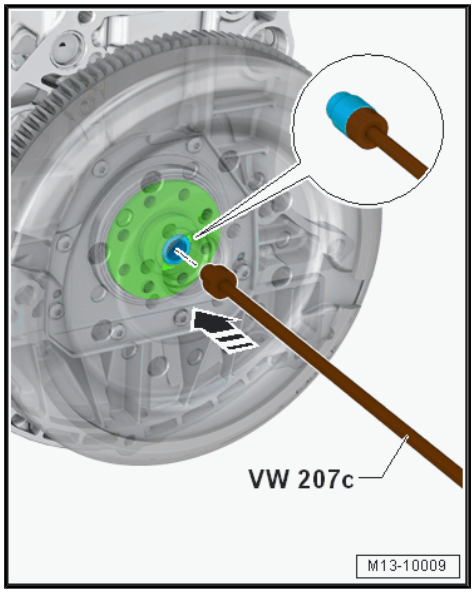


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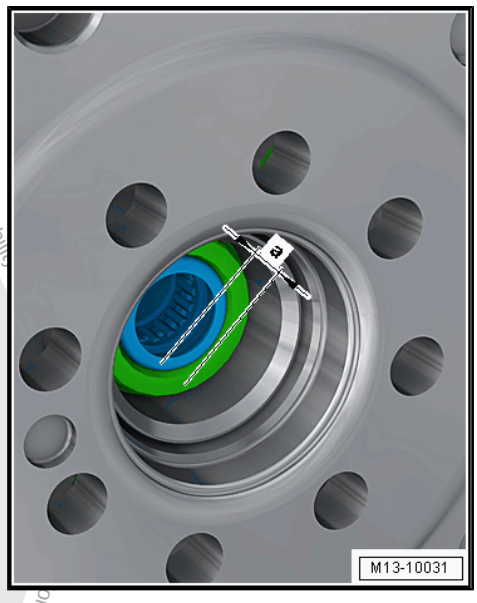
Installing

– 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.

3.3 Crankshaft dimensions

(Dimensions in mm)

Honing dimension 1)	Main journal Ø	Conrod journal Ø
Basic dimension	58.00	47.80

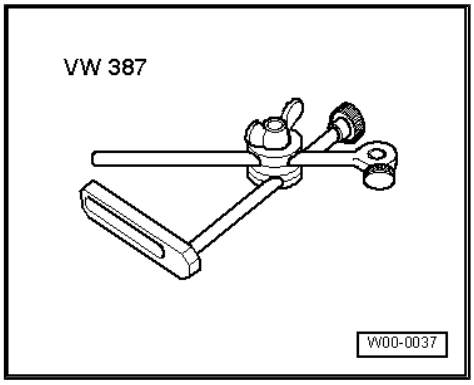
1) No provision has yet been made to recondition worn crankshafts.

3.4 Measuring axial clearance of crankshaft

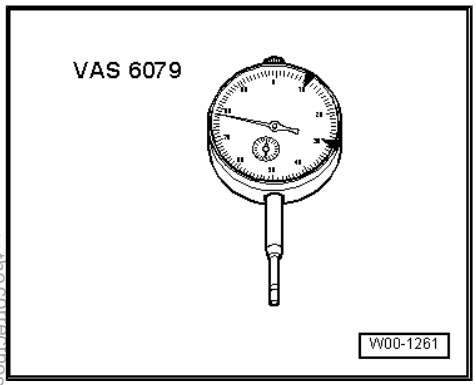
Special tools and workshop equipment required

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- Universal dial gauge holder - VW 387-



- Dial gauge - VAS 6079-

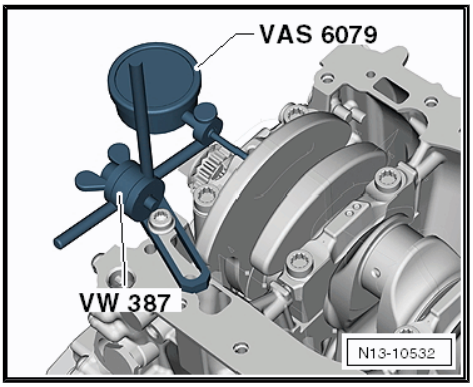


Sequence of operations

– Screw dial gauge - VAS 6079- with universal dial gauge holder - VW 387- onto cylinder block and set against crankshaft cheek with 2 mm projection.

– Push crankshaft against dial gauge by hand and set dial gauge to “0”.

– Press crankshaft away from dial gauge and read value.



Axial clearance:

- New: 0.07 to 0.23 mm.
- Wear limit: 0.30 mm.

3.5 Measuring radial clearance of crankshaft

Special tools and workshop equipment required

- Plastigage

Sequence of operations

Note

- *Do not interchange used bearings.*
- *Bearing shells worn down to nickel layer must be renewed.*

– Remove main bearing caps and clean bearing caps and journals.

– Place Plastigage onto bearing journal or into bearing shells according to width of bearing.

- The Plastigage must rest in the middle of the bearing shell.

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– Fit main bearing caps and tighten to 60 Nm without rotating crankshaft.
– Remove main bearing caps again.
– Compare width of Plastigage with measurement scale:

Radial clearance:

- New: 0.017 to 0.037 mm.
- Wear limit: 0.15 mm.

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4 Pistons and conrods

⇒ “4.1 Assembly overview - pistons and conrods”, page 79
⇒ “4.2 Removing and installing pistons”, page 82
⇒ “4.3 Checking pistons and cylinder bores”, page 83
⇒ “4.4 Separating new conrod”, page 85
⇒ “4.5 Checking radial clearance of conrods”, page 86

4.1 Assembly overview - pistons and conrods



1 - Bolts

- ❑ Renew after removal
- ❑ Apply engine oil to thread and contact surface
- ❑ Use old bolts to measure radial clearance.
- ❑ 45 Nm +90°

2 - Conrod bearing cap

- ❑ Observe installation position
- ❑ Conrod bearing cap only fits in one position and only on the appropriate conrod due to the breaking procedure (cracking) separating the cap from the conrod
- ❑ Mark allocation to cylinder and conrod in colour -A-
- ❑ Installation position: Marking -B- faces towards pulley end.
- ❑ Separating new conrod ⇒ page 85 .

3 - Bearing shells

- ❑ Fitting position ⇒ page 80
- ❑ Renew worn bearing shells
- ❑ Apply engine oil before installing
- ❑ Axial clearance

♦ New: 0.10 … 0.35 mm

♦ Wear limit: 0.40 mm

- ❑ Measuring radial clearance ⇒ page 86

4 - Connecting rod

- ❑ Renew as set only.
- ❑ Mark allocation to cylinder and to conrod bearing cap
- ❑ Installation position: Marking -B- faces towards pulley end.
- ❑ Separating new conrod ⇒ page 85 .
- ❑ Measuring radial clearance ⇒ page 86

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5 - Pressure relief valve

- ❑ 27 Nm

6 - Oil spray jet

- ❑ For piston cooling

7 - Retaining ring

- ❑ Renew after removal

8 - Piston pin

- ❑ Apply engine oil before installing

9 - Piston

- ❑ Installing with piston installation sleeve -T40347- ⇒ page 82
- ❑ Installation position: arrow on piston crown faces towards pulley end
- ❑ Mark allocation to cylinder
- ❑ Checking piston and cylinder bore ⇒ page 83

10 - Compression rings

- ❑ Offset gaps by 120°
- ❑ Installation position: “TOP” or “R” marking must face upwards towards piston crown.
- ❑ ⇒ Fig. ““Installing compression rings”“ , page 81
- ❑ ⇒ Fig. ““Checking piston ring gap”“ , page 84
- ❑ ⇒ Fig. ““Checking ring-to-groove clearance”“ page 84
- ❑ ⇒ Fig. ““Allocation of piston rings only in connection with 3-part oil scraper ring”“ , page 81

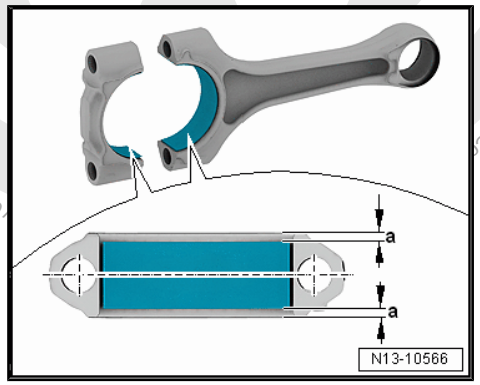
11 - Oil scraper ring

- ❑ 2 or 3 parts, depending on version
- ❑ Install in such a way that upper gap of three-part oil scraper ring is offset by 120° relative to adjacent compression ring
- ❑ ⇒ Fig. ““Checking piston ring gap”“ , page 84
- ❑ ⇒ Fig. ““Checking ring-to-groove clearance”“ , page 84
- ❑ ⇒ Fig. ““Installing oil scraper ring, 3-part”“ , page 81
- ❑ ⇒ Fig. ““Allocation of piston rings only in connection with 3-part oil scraper ring”“ , page 81

Bearing shells - installation position

– Position bearing shells in centre of conrod and conrod bearing cap when fitting.

Distance -a- must be identical on both sides.



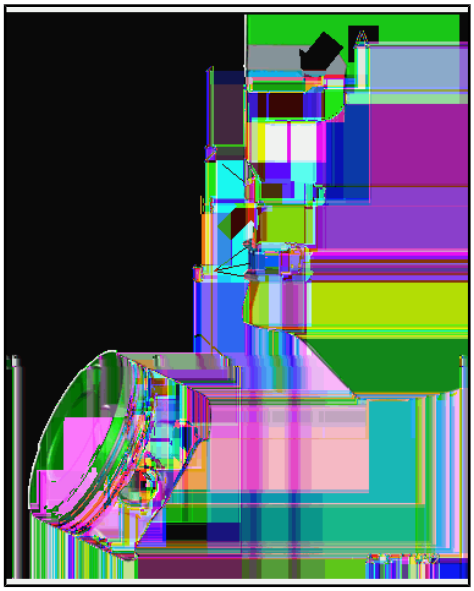
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Allocation of piston rings only in connection with 3-part oil scraper ring

1 - Compression ring with chamfer -arrow A- on upper inner side. »TOP« marking and lettering point inwards

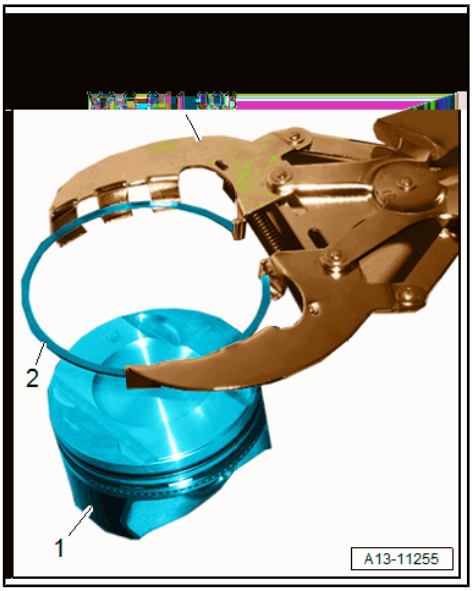
2 - Compression ring shoulder -arrow B- on lower outer side. »TOP« marking and lettering point inwards

3 - Oil scraper ring, three-part



Installing compression rings

- »TOP« marking and lettering point upwards.
- Compression ring -2- should not be opened using piston ring pliers -VAS 211 003- any further than necessary to just push it over piston -1-.



Installing oil scraper ring, 3-part

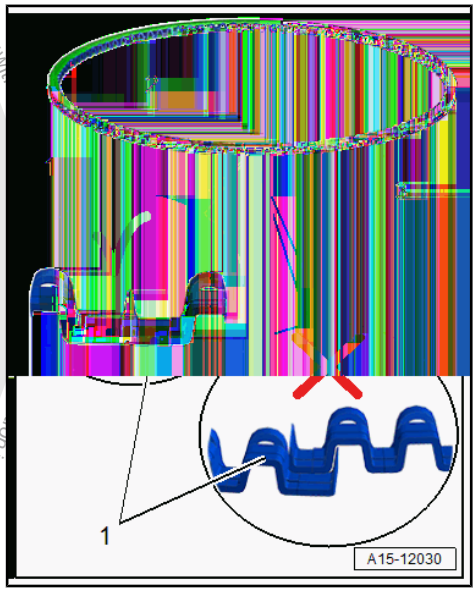
– Note installation position of spring:

- Butts of plates -2, 3- and spring -1- must have an offset of at least 90° to each other.

– Install by hand.

Installation sequence:

1. Insert spring -1- into groove.
2. Insert plate -3- in bottom of groove.
3. Insert plate -2- in top of groove.



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4.2 Removing and installing pistons

Note

If pistons with 3-part oil scraper ring are installed without the piston installation sleeve - T40347- , the oil scraper ring will be damaged.

Special tools and workshop equipment required

- Drift - VW 222 A-



- Piston installation sleeve - T40347- (not shown)

Removing

– Remove engine, and secure it to engine and gearbox support - VAS 6095- .

– Remove cylinder head ⇒ page 140 .

– Remove upper part of sump ⇒ page 212 .

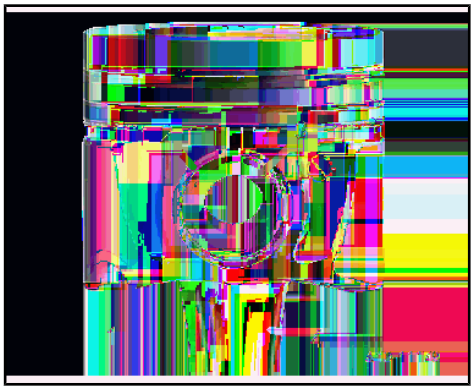
– Mark piston installation position and corresponding cylinder number.

– Mark conrod installation position and corresponding cylinder number ⇒ Item 4 (page 79) .

– Remove conrod bearing cap and withdraw piston and conrod upwards.

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– Remove circlip from piston pin eye.
– Remove retaining ring -2- from piston pin eye.
– Drive out piston pin -3- using drift - VW 222A- .



Note

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

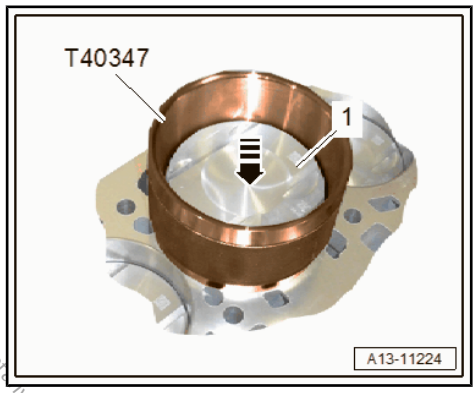
– Remove piston -1- from conrod -4-.

Installing

Install in the reverse order of removal, observing the following:

- Renew bolts that are tightened with turning further angle after each removal.
- Arrow on piston crown points to belt pulley end.

– Install oil scraper ring: procedure for 3-part oil scraper ring ⇒ page 81 .
– Install compression rings ⇒ page 81 .



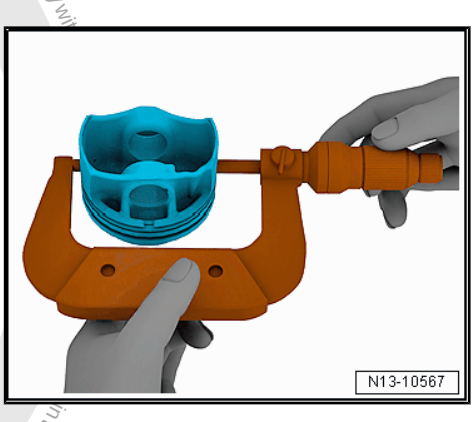
– Oil contact surfaces of bearing shells and cylinder wall with engine oil.
– Carefully push piston -1- into cylinder -arrow- by hand using piston installation sleeve -T40347- .
– Install conrod bearing cap, noting installation position ⇒ Item 2 (page 79) .
– Install cylinder head ⇒ page 140 .
– Install upper part of sump ⇒ page 212 .

Torque settings

◆ ⇒ page 79

4.3 Checking pistons and cylinder bores

Checking piston



Special tools and workshop equipment required

◆ Micrometre 75 - 100 mm - VAS 6071-

– Using a micrometer, measure approx. 15 mm from the lower edge, perpendicular to the piston pin axis.

◆ Difference between actual and nominal diameter max. 0.04 mm.

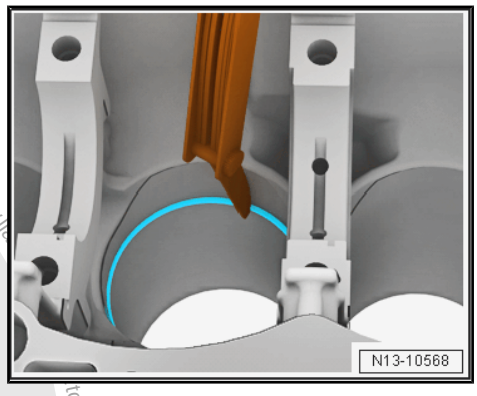
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		Piston Ø
Basic dimension	mm	82.42 1)

• 1) Dimensions without graphite coating (thickness 0.02 mm). The graphite coating will wear down.

Checking piston ring gap

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

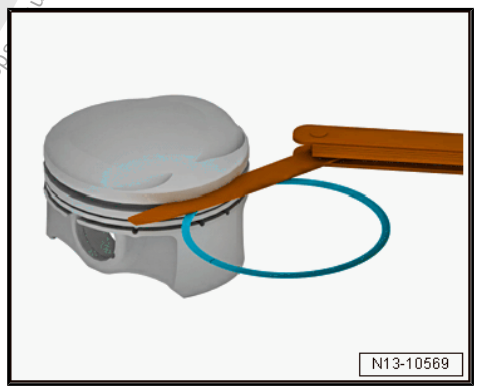


Piston ring gap in connection with two-part oil scraper ring	New	Wear limit
compression ring	0.20 … 0.40 mm	0.8 mm
Oil scraper ring	0.25 … 0.50 mm	0.8 mm

Piston ring gap in connection with three-part oil scraper ring	New	Wear limit
1st compression ring	0.30 … 0.40 mm	0.60 mm
2nd compression ring	0.40 … 0.50 mm	0.70 mm
Oil scraper ring	Cannot be measured	Cannot be measured

Checking ring-to-groove clearance

– Clean annular groove of piston before check.



Ring-to-groove clearance in connection with two-part oil scraper ring	New	Wear limit
1st compression ring	0.06 … 0.09 mm	0.20 mm
2nd compression ring	0.03 … 0.06 mm	0.15 mm
Oil scraper rings	Cannot be measured	

Ring-to-groove clearance in connection with three-part oil scraper ring	New	Wear limit
1st compression ring	Cannot be measured	
2nd compression ring	Cannot be measured	
Oil scraper rings	Cannot be measured	

Checking cylinder bores

Note

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

Special tools and workshop equipment required

♦ Cylinder gauge - VAS 6078-

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Caution

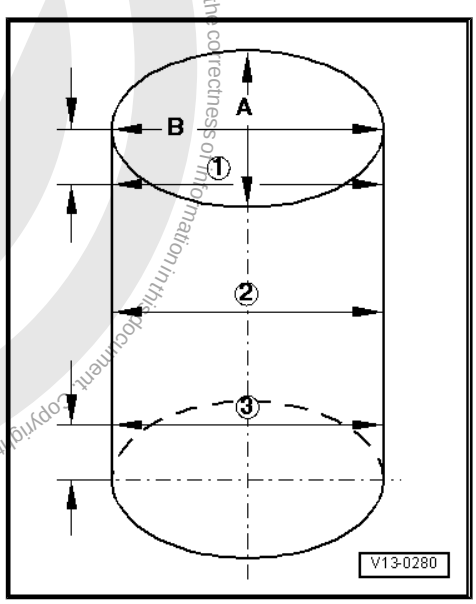
The cylinder bore may not be worked on (reboring, honing, grinding) may not be carried out using workshop tools! This will damage the surface of the cylinder bore.

– Take measurements at 3 positions in both lateral direction -A- and longitudinal direction -B-.

◆ Difference between actual and nominal diameter max. 0.08 mm

	Piston Ø	Cylinder bore Ø
Basic dimension mm	82.42 1)	82.51

• 1) Dimensions without graphite coating (thickness 0.02 mm). The graphite coating wears away.



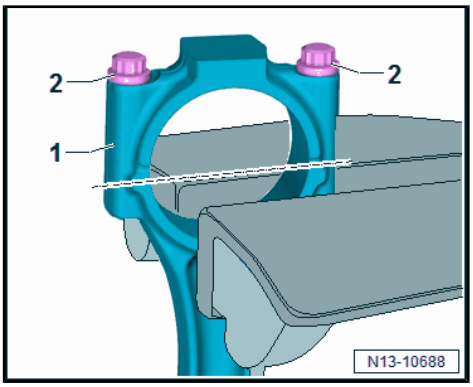
4.4 Separating new conrod

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

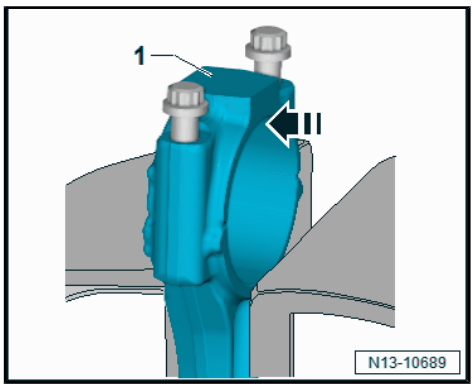
– Mark allocation of conrod to cylinder.

– Clamp conrod -1- in a vice below the dashed line using aluminium vice clamps.

– Unscrew both bolts -2- about 5 turns.



– Using a plastic hammer, carefully knock against conrod bearing cap in -direction of arrow- until it is loose.



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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 1 (page 79) . When tightening, make sure not to rotate crankshaft.

– Remove conrod bearing cap again.

– Compare width of Plastigage with the measurement scale.

Radial clearance:

- New: 0.02 to 0.06 mm
- Wear limit: 0.09 mm.

– Renew conrod bolts.

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15 – Cylinder head, valve gear

1 Chain drive

Assembly overview - timing chain covers ⇒ page 87 .

Removing and installing inlet camshaft control valve 1 - N205- ⇒ page 90 .

Removing and installing upper timing chain cover ⇒ page 90 .

Removing and installing lower timing chain cover (Passat, CC) ⇒ page 92 .

Removing and installing lower timing chain cover (Golf, Eos, Scirocco) ⇒ page 98 .

Removing and installing lower timing chain cover (Tiguan) ⇒ page 105 .

Assembly overview - camshaft timing chain ⇒ page 111 .

Removing and installing camshaft timing chain ⇒ page 113 .

Assembly overview – drive chain for balance shaft ⇒ page 125 .

Removing and installing drive chain for balance shaft ⇒ page 127 .

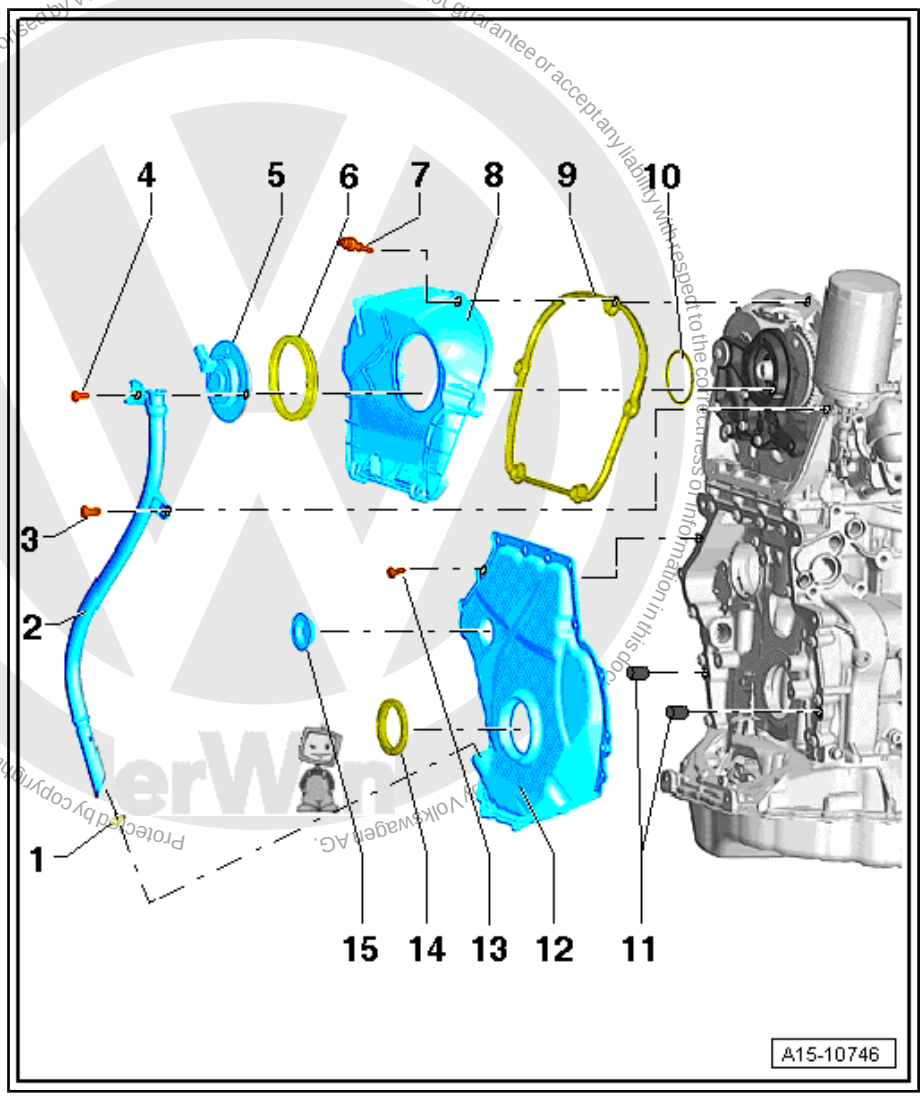
Removing and installing balance shaft for inlet camshaft ⇒ page 127 .

Removing and installing balance shaft for exhaust camshaft ⇒ page 130 .

Check valve timing ⇒ page 133 .

1.1 Assembly overview - timing chain covers

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1 - O-ring

- ❑ Renew
- ❑ Lubricate before assembling.

2 - Dipstick guide tube

3 - Bolt

- ❑ 9 Nm

4 - Bolt

- ❑ 9 Nm

5 - Inlet camshaft control valve 1 - N205-

- ❑ Removing and installing ⇒ page 90

6 - Sealing ring

- ❑ Lubricate before assembling.
- ❑ Renew if damaged
- ❑ To renew, remove cover

7 - Bolt

- ❑ Tightening sequence ⇒ page 90

8 - Timing chain cover (top)

- ❑ Removing and installing ⇒ page 90
- ❑ Tightening sequence ⇒ page 89

9 - Seal

- ❑ Renew if damaged

10 - O-ring

- ❑ Renew
- ❑ Lubricate before assembling.

11 - Dowel pins

- ❑ For centring cover

12 - Lower timing chain cover

- ❑ Tightening sequence for version with 15 bolts ⇒ page 89 .
- ❑ Tightening sequence for version with 8 bolts ⇒ page 89
- ❑ Removing and installing

  Passat CC ⇒ page 92

  Golf, Eos, Scirocco ⇒ page 98

  Tiguan ⇒ page 105

13 - Bolt

- ❑ Renew
- ❑ Tightening sequence for version with 15 bolts ⇒ page 89 .
- ❑ Tightening sequence for version with 8 bolts ⇒ page 89

14 - Oil seal

- ❑ For vibration damper.
- ❑ Renewing ⇒ page 57

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15 - Plugs

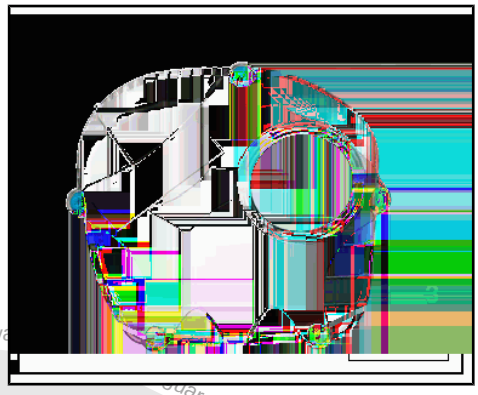
❑ Renew

Timing chain cover (top), tightening sequence

– Tighten bolts -1 to 5- in two stages in the sequence shown:

1 - Tighten bolts by hand.

2 - Tighten bolts to 9 Nm

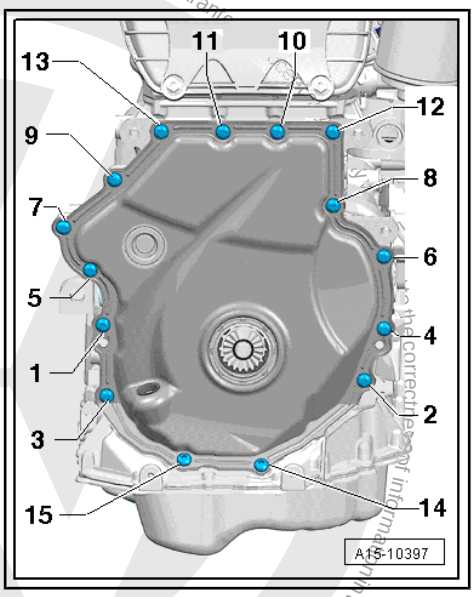


Lower timing chain cover - tightening sequence for version with 15 bolts

– Tighten bolts -1 to 15- in two stages in the sequence shown:

– 1. Tighten bolts to 8 Nm.

– 2. Turn bolts 45° further.

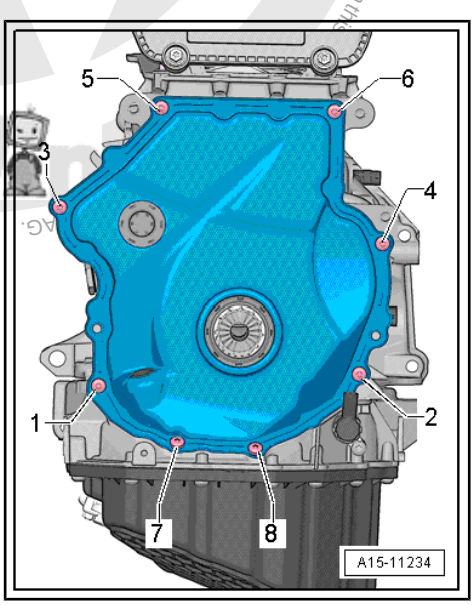


Lower timing chain cover – tightening sequence for version with 8 bolts

– Tighten bolts -1 to 8- in 2 stages in the sequence shown.

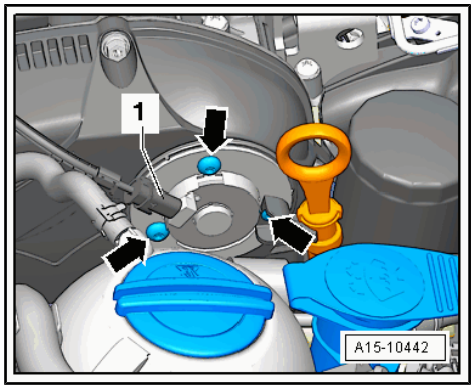
– 1. Tighten bolts to 8 Nm.

– 2. Turn bolts 45° further.



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1.2 Removing and installing camshaft control valve 1 - N205-



– If fitted, remove charge air duct to sound generator ⇒ page 447 .
– Detach connector from inlet camshaft control valve 1 - N205- -1-.
– Unscrew bolts -arrows- and remove inlet camshaft control valve 1 - N205- .

Installing

• Specified torque ⇒ page 87

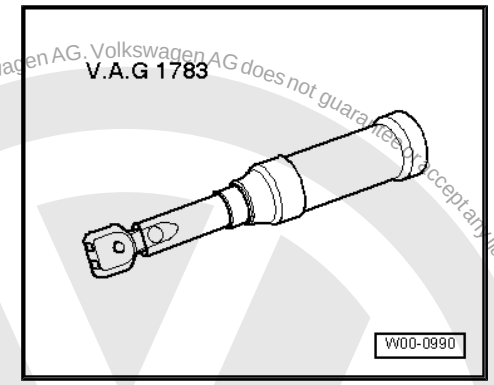
Install in reverse order of removal, observing the following.

– Lubricate seal and O-ring with engine oil.

1.3 Removing and installing upper timing chain cover

Special tools and workshop equipment required

♦ Torque wrench - V.A.G 1783-

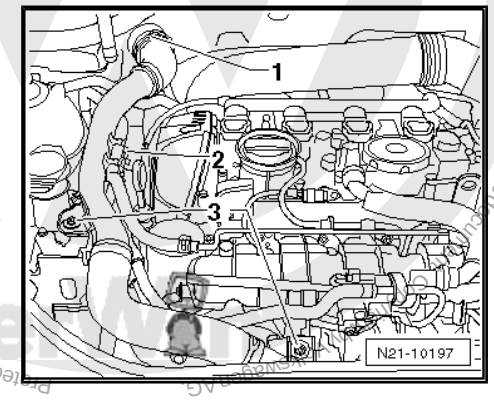


♦ Open-end spanner insert (10 mm) - V.A.G 1783/1-

Removing

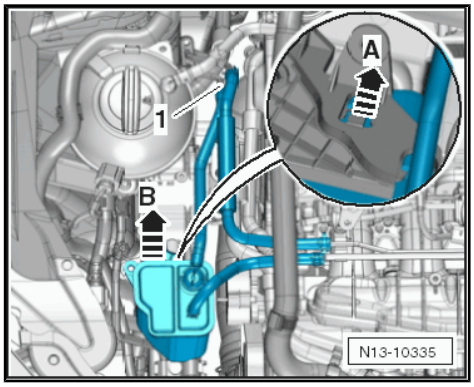
– Remove engine cover panel ⇒ page 139 .
– Only vehicles with sound generator: Open catch -1-, unclip fuel lines -2- and loosen bolt -3- on activated charcoal filter. Place charge air pipe to one side.

Vehicles with activated charcoal filter in engine compartment:



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– Pull off breather line -1-, release activated charcoal filter -A- and remove upwards -B-. Place activated charcoal filter to one side.

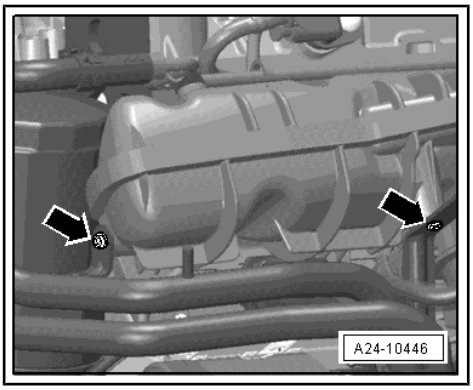


All:

– Unscrew coolant pipe bolts -arrows- from intake manifold.

– Push coolant hoses to one side and secure on engine mounting using cable ties.

– Removing inlet camshaft control valve 1 - N205- .



– Unscrew bolts -1…5- and remove upper timing chain cover.



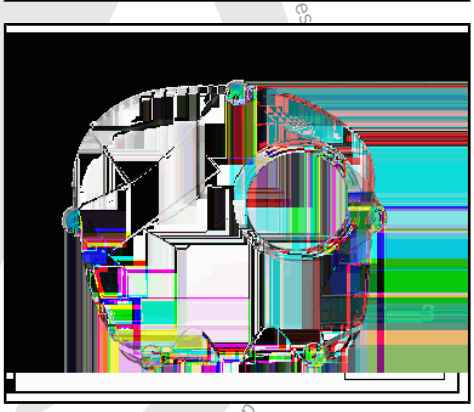
Note

Unscrew lower bolts -3- and -5- using an open-end spanner.

Installing:

– Lubricate gasket and O-ring with engine oil.

– Position cover on engine, ensuring that gasket is correctly seated.



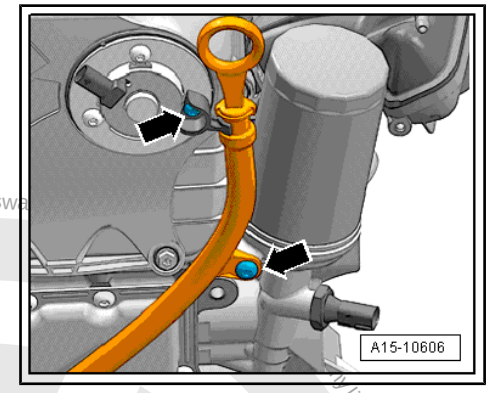
– Hand-tighten bolts -1 to 5- evenly in the sequence shown:

– Further tighten bolts to 9 Nm. Use torque wrench - V.A.G 1783- and open end spanner insert AF10 - V.A.G 1783/1- for bolts -3- and -5-.

– Install inlet camshaft control valve 1 - N205- ⇒ page 90 .

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– Tighten bolts -arrows- for guide tube.



Note

If the mounting holes don't align, check if the guide tube has been inserted to stop into the lower timing chain cover.

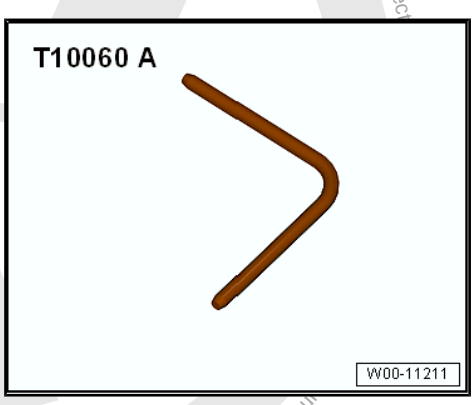
- Specified torques ⇒ page 87

Further assembly is basically a reverse of the dismantling sequence.

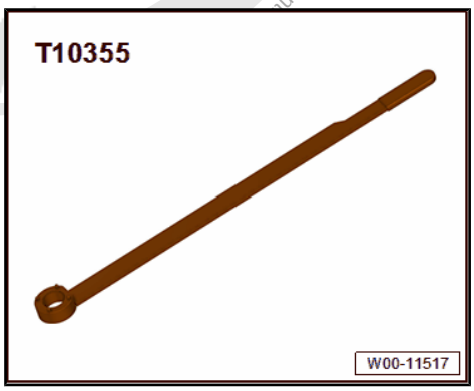
1.4 Removing and installing lower timing chain cover (Passat, CC)

Special tools and workshop equipment required

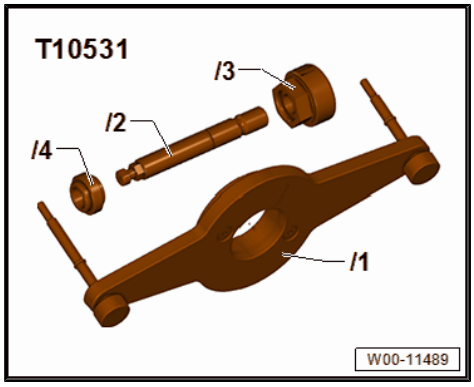
♦ Pin - T10060 A-



♦ Counterhold tool - T10355-

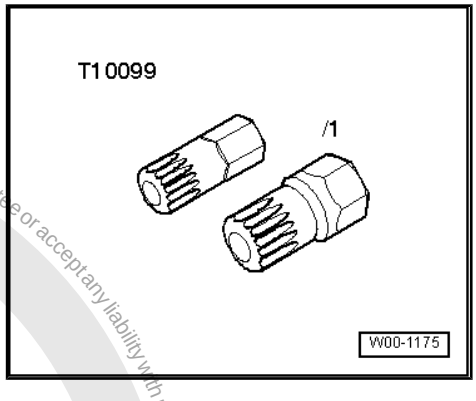


♦ Assembly tool - T10531-

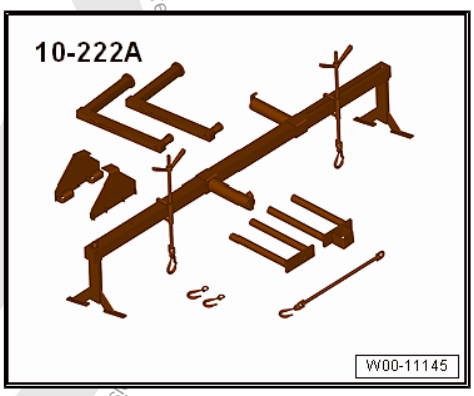


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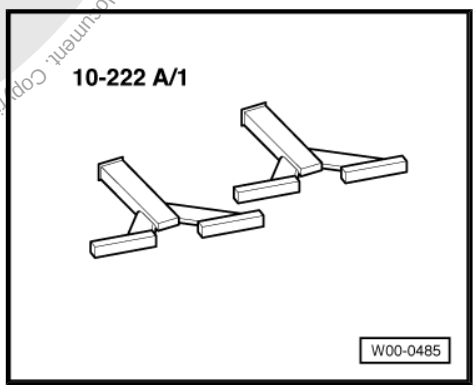
- Bits - T10099-



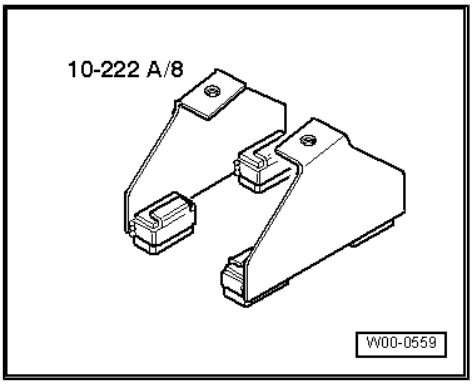
- Support - 10 - 222 A-



- Passat 2006▸: Rack - 10 - 222 A /1-



- CC: Adapter - 10 - 222 A /8-



- Silicone sealant - D 174 003 M2-

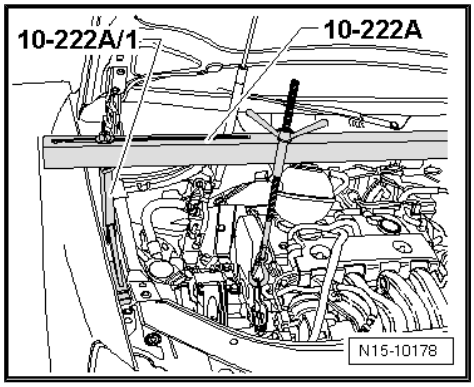
Removing

– Remove vibration damper ⇒ page 50 .
– Drain engine oil.
– Support engine in installation position.

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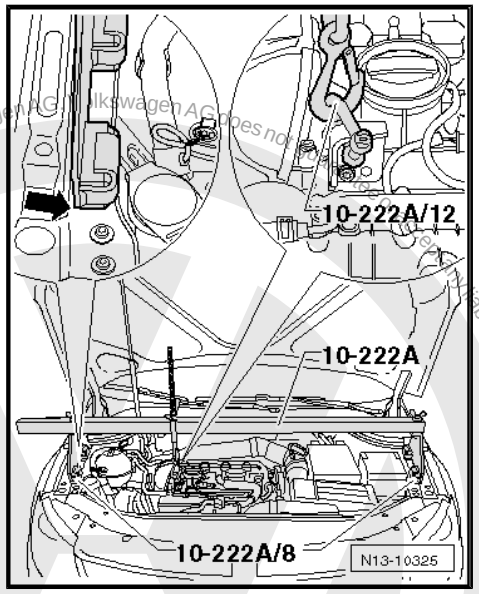
Passat 2006►:

- Rack - 10 - 222 A /1-
- Hook - 10 - 222 A /10-
- Shackle - 10 - 222 A /12-



CC:

- Adapter - 10 - 222 A /8-
- Hook - 10 - 222 A /10-
- Shackle - 10 - 222 A /12-



Note

- *The adapters - 10 - 222 A /8- must not be located on the screw plates of the wings, as this will otherwise cause damage to them.*
- *The shackle - 10 - 222 A /12- is needed so the engine is raised in its installation position and does not »fall back«.*

All:

– Take up weight of engine with spindle.

– Unscrew bolts -arrows- of engine/gearbox support on the engine.

– Removing engine mounting ⇒ page 21

– Raise engine approx. 50 mm and loosen upper engine support bolt.

– Now lower engine approx. 100 mm.

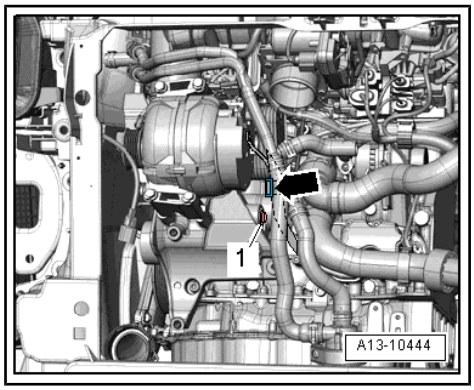


– Move electrical wiring harness clear -arrow-.

– Remove bolt -1- and take off tensioning device for poly V-belt from bracket for ancillaries.

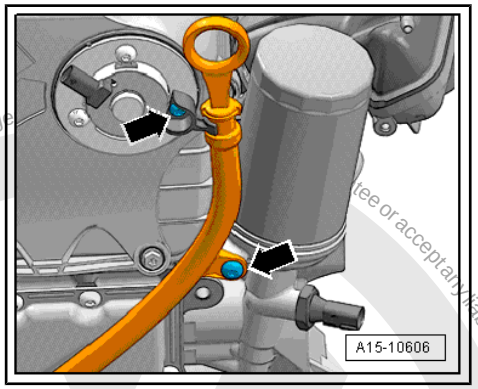
– Unscrew lower bolts for engine support using bits - T10099- .

– Remove engine support with bolts.

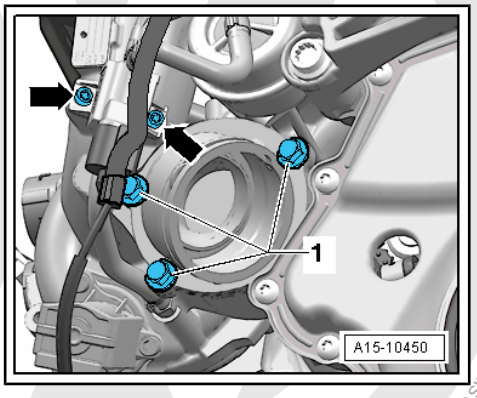


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– Remove bolts -arrows- and pull guide tube for oil dipstick out of timing chain cover.



– Remove charge pressure solenoid valve - N75- from turbocharger -arrows-.
– Remove turbocharger connection -1-.



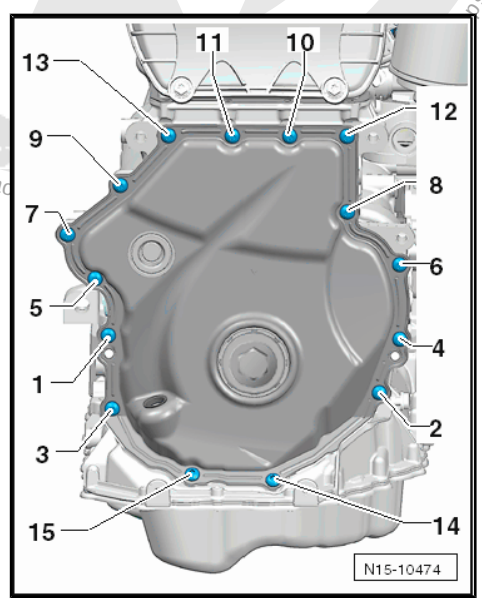
– Unscrew bolts -1 … 15-.

Note

Depending on version, the cover may be secured with only 8 bolts.

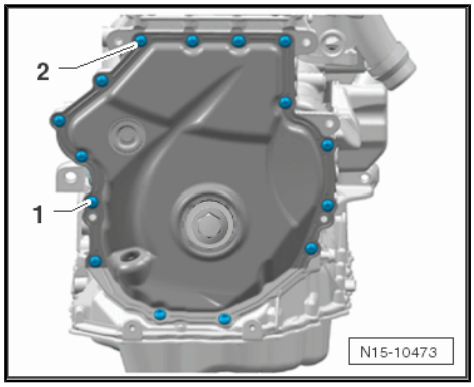
Caution

Risk of damaging lower timing chain cover. To prevent damaging the timing chain cover, apply tool only at the bolt holes.



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– Lever off lower timing chain cover, starting at points -1 and 2-.



Installing

- Specified torques ⇒ page 87
- Sealant: Silicone sealant - D 174 003 M2-

Note

- *If the cover was bent during removal, it must be renewed.*
- *Note expiry date of silicone sealant.*
- *The cover must be installed within 5 minutes after applying the silicone sealant.*
- *Renew bolts which must be tightened further to a torque angle.*
- *Renew seals, gaskets and self-locking nuts.*

Caution

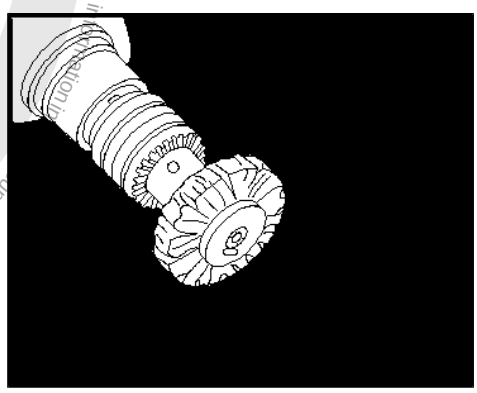
- ***Danger of contaminating lubrication system! Cover open parts of engine.***
- ***Wear safety goggles.***

– Remove sealant residues from cylinder block with a flat scraper.

– Mask oil seal on both sides with adhesive tape to make sure seal remains clean.

– Remove remaining sealant from cover, e.g. using rotating plastic brush.

– Clean sealing surfaces. They must be oil and grease free.



Checking cover for distortion:

– Fit cover using old bolts and tighten to 8 Nm.

– Use feeler gauge to measure distance between cover and housing (max. distance is 0.2 mm).

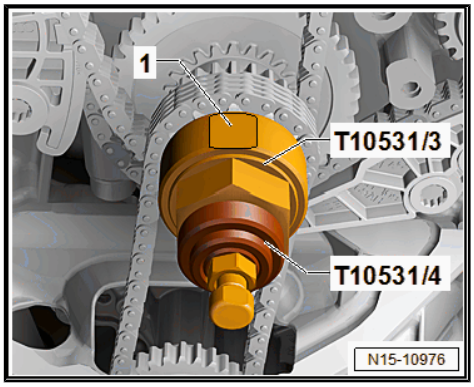
Note

- *Renew cover if distance exceeds 0.2 mm.*
- *It is not possible to measure distance between cover and sump (top section); check visually to ensure that sealing surface is even.*

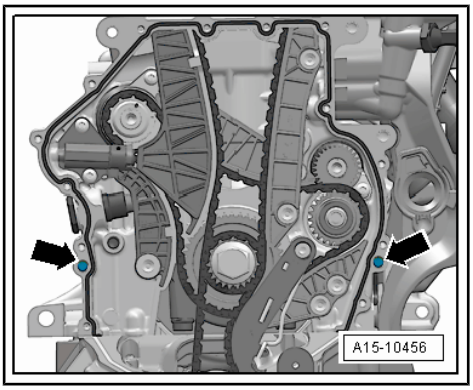
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Installing cover:

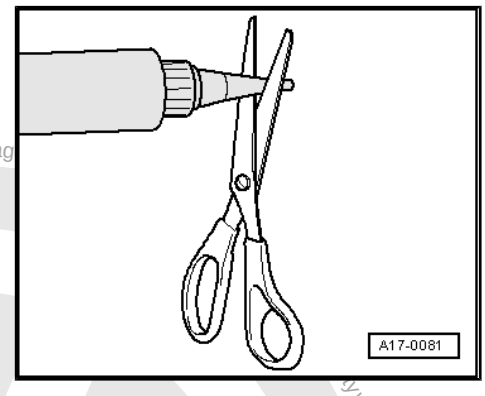
– If necessary, unscrew flange nut - T10531/4- , and remove turning over tool - T10531/3- .



– Check that both dowel pins for centring the cover -arrows- are fitted.



– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



Cover with 15 bolts

– Apply silicone sealant - D 174 003 M2- to clean sealing surface -arrow 1- and to edges -arrows 2- of new cover as shown in illustration.

♦ Thickness of sealant bead: 2 to 3 mm.

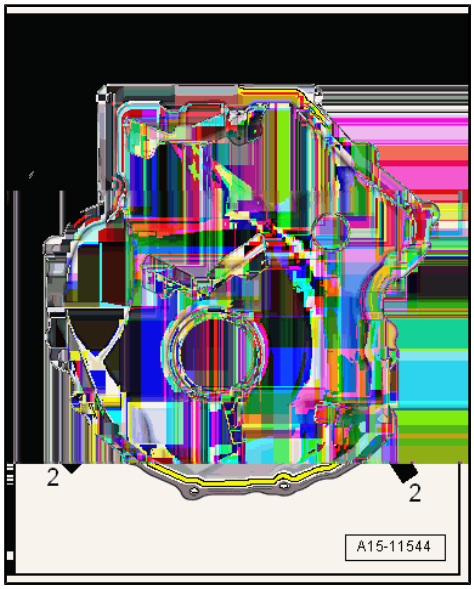


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Cover with 8 bolts

– Apply silicone sealant - D 174 003 M2- to clean sealing surface -arrow 1- and to edges -arrows 2- of new cover as shown in illustration.

◆ Thickness of sealant bead: 2 to 3 mm.



Note

◆ *The cover must be installed within 5 minutes after applying the silicone sealant.*

◆ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*

– Install cover immediately and tighten bolts:

◆ Cover, version with 15 bolts ⇒ page 89

◆ Cover, version with 8 bolts ⇒ page 89

– Install vibration damper ⇒ page 50 .

Further assembly is basically a reverse of the dismantling sequence.

Note

After fitting cover, let sealant dry for approx. 30 minutes. Only then fill with engine oil.

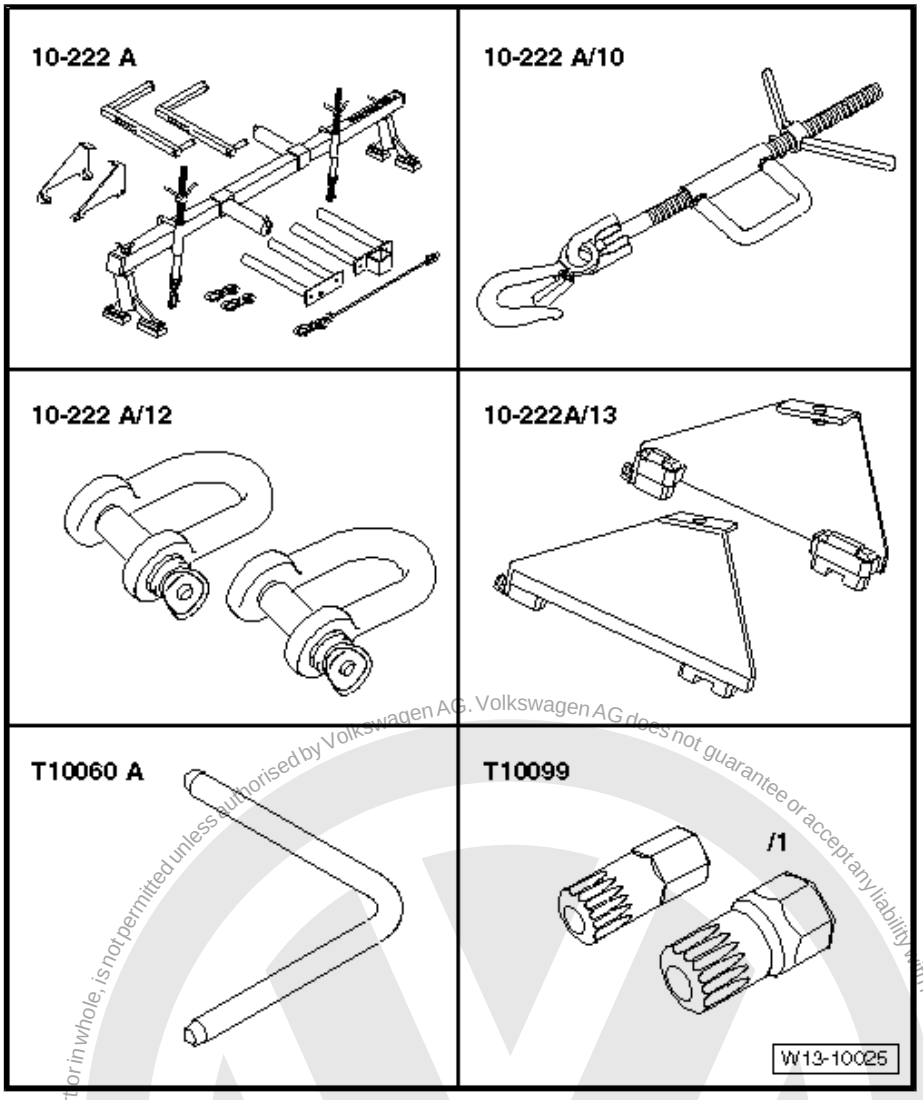
– Replenish engine oil and check oil level.

1.5 Removing and installing lower timing chain cover (Golf, Eos, Scirocco)

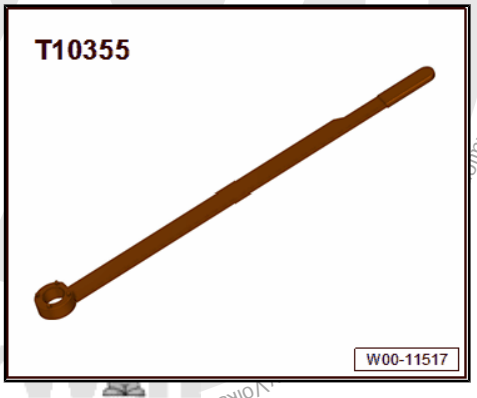
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Special tools and workshop equipment required

- Support - 10 - 222 A-
- Hook - 10 - 222 A /10-
- Shackle - 10 - 222 A /12-
- Pin - T10060 A-
- Bits - T10099-
- Golf: frame - 10 - 222 A /13-

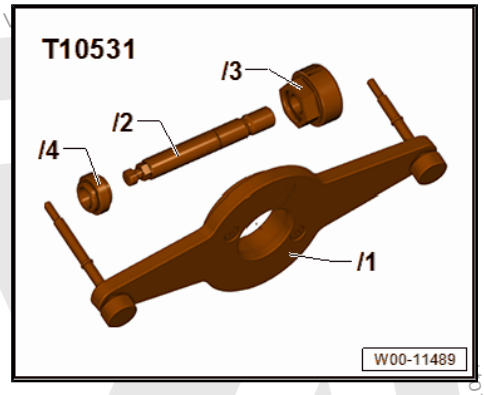


- Counterhold tool - T10355-

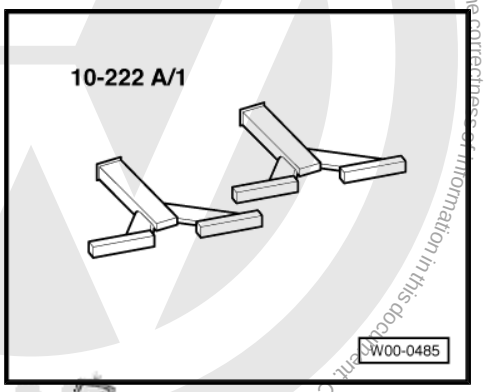


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- Assembly tool - T10531-



- Eos, Scirocco: Rack - 10 - 222 A /1-



Removing

– Remove vibration damper ⇒ page 50 .

– Drain engine oil.

Vehicles with sound generator:

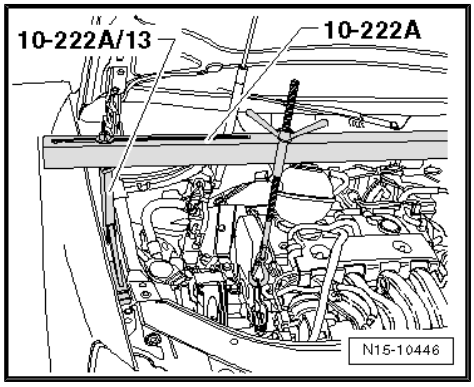
– Remove charge air duct to sound generator ⇒ page 447 .

All:

– Fit support bracket - 10 - 222 A- with the following tool parts:

Golf:

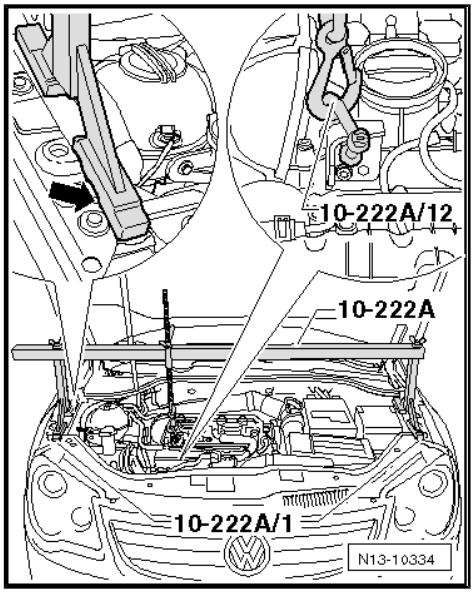
- Adapter - 10 - 222 A /13- , qty. 2
- Hook - 10 - 222 A /10-
- Shackle - 10 - 222 A /12-



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Eos, Scirocco:

- Rack - 10 - 222 A /1-
- Hook - 10 - 222 A /10-
- Shackle - 10 - 222 A /12-



Note

- *The rack feet - 10 - 222 A /1- must not be placed on the bolted on sheet metal of the wings, or these might be damaged.*
- *The shackle - 10 - 222 A /12- is needed so the engine is raised in its installation position and does not »fall back«.*

All:

– Take up weight of engine with spindle.

– Unscrew bolts -arrows- of engine/gearbox support on the engine.

– Removing engine mounting ⇒ page 21 .

– Raise engine approx. 50 mm and loosen upper engine support bolt.

– Now lower engine approx. 100 mm.

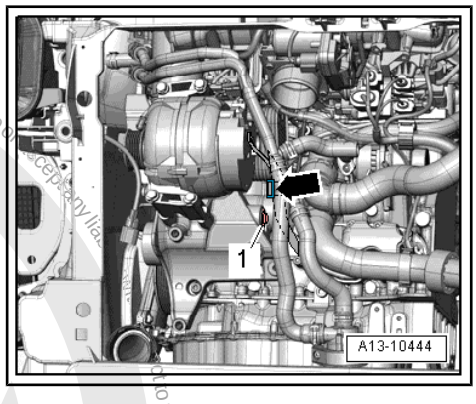


– Move electrical wiring harness clear -arrow-.

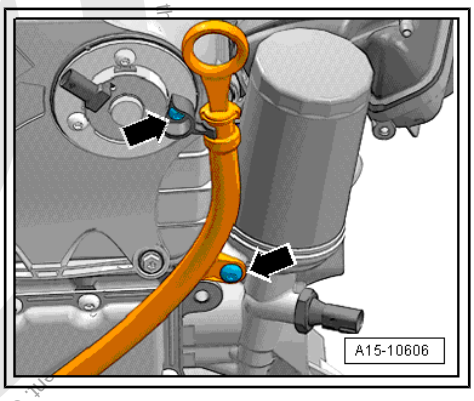
– Remove bolt -1- and take off tensioning device for poly V-belt from bracket for ancillaries.

– Unscrew lower bolts for engine support using bits - T10099- .

– Remove engine support with bolts.

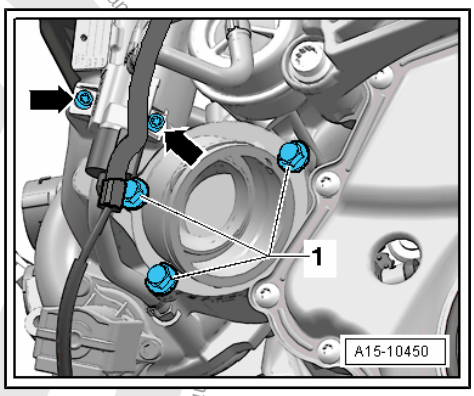


– Remove bolts -arrows- and pull guide tube for oil dipstick out of timing chain cover.



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– Remove charge pressure solenoid valve - N75- from turbocharger -arrows-.
– Remove turbocharger connection -1-.



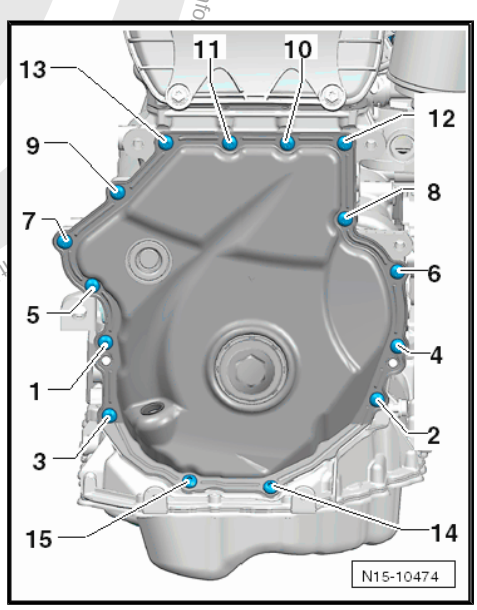
– Unscrew bolts -1 … 15-.

Note

Depending on version, the cover may be secured with only 8 bolts.

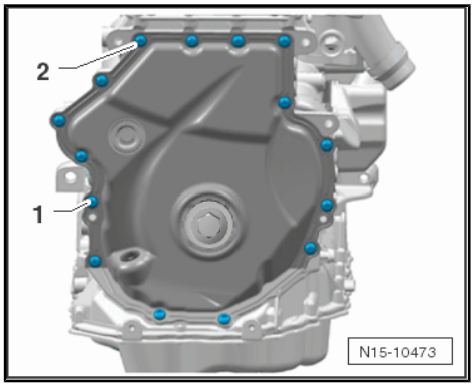
Caution

Risk of damaging lower timing chain cover. To prevent damaging the timing chain cover, apply tool only at the bolt holes.



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– Lever off lower timing chain cover, starting at points -1 and 2-.



Installing:

- Specified torques ⇒ page 87
- Sealant: Silicone sealant - D 174 003 M2-

Note

- *If the cover was bent during removal, it must be renewed.*
- *Note expiry date of silicone sealant.*
- *The cover must be installed within 5 minutes after applying the silicone sealant.*
- *Renew bolts which must be tightened further to a torque angle.*
- *Renew seals, gaskets and self-locking nuts.*

Caution

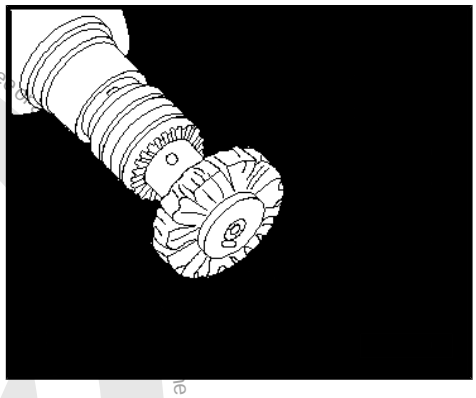
- ***Danger of contaminating lubrication system! Cover open parts of engine.***
- ***Wear safety goggles.***

– Remove sealant residues from cylinder block with a flat scraper.

– Mask oil seal on both sides with adhesive tape to make sure seal remains clean.

– Remove remaining sealant from cover, e.g. using rotating plastic brush.

– Clean sealing surfaces. They must be oil and grease free.



Checking cover for distortion:

– Fit cover using old bolts and tighten to 8 Nm.

– Use feeler gauge to measure distance between cover and housing (max. distance is 0.2 mm).

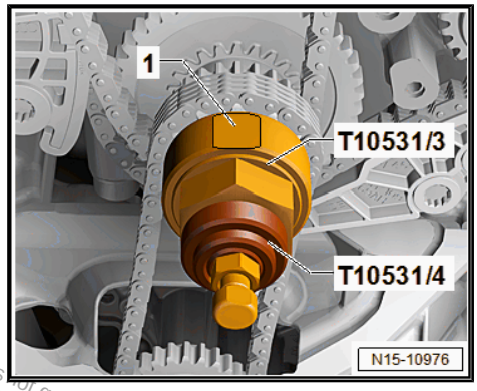
Note

- *Renew cover if distance exceeds 0.2 mm.*
- *It is not possible to measure distance between cover and sump (top section); check visually to ensure that sealing surface is even.*

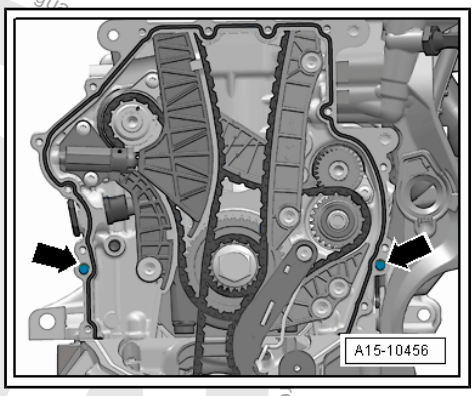
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Installing cover:

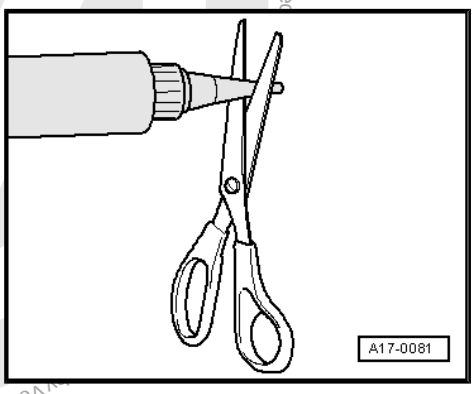
– If necessary, unscrew flange nut - T10531/4- , and remove turning over tool - T10531/3- .



– Check that both dowel pins for centring the cover -arrows- are fitted.



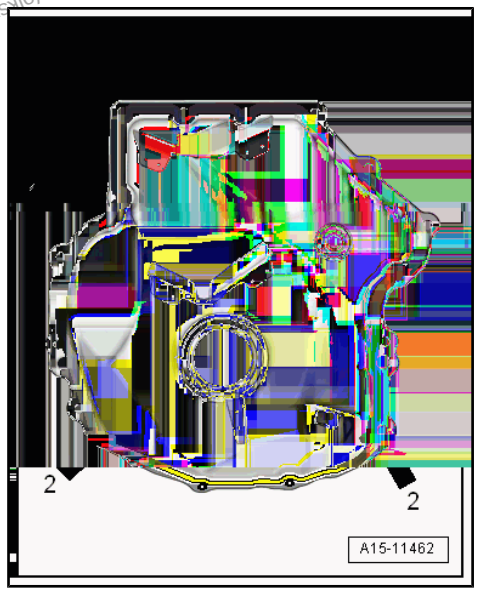
– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



Cover with 15 bolts

– Apply silicone sealant - D 174 003 M2- to clean sealing surface -arrow 1- and to edges -arrows 2- of new cover as shown in illustration.

♦ Thickness of sealant bead: 2 to 3 mm.

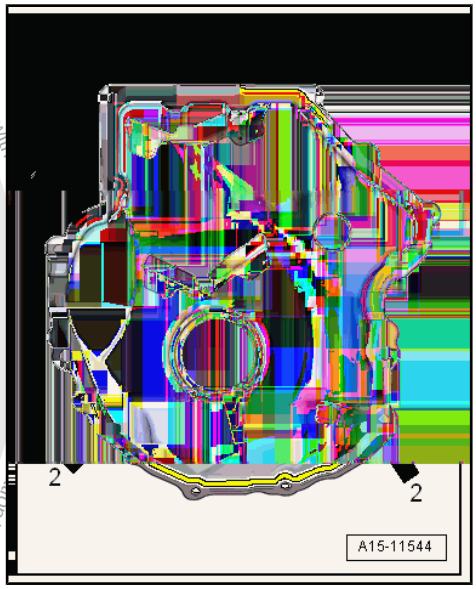


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Cover with 8 bolts

– Apply silicone sealant - D 174 003 M2- to clean sealing surface -arrow 1- and to edges -arrows 2- of new cover as shown in illustration.

♦ Thickness of sealant bead: 2 to 3 mm.



Note

♦ *The cover must be installed within 5 minutes after applying the silicone sealant.*

♦ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*

– Install cover immediately and tighten bolts:

♦ Cover, version with 15 bolts ⇒ page 89

♦ Cover, version with 8 bolts ⇒ page 89

– Install vibration damper ⇒ page 50 .

Further assembly is basically a reverse of the dismantling sequence.

Note

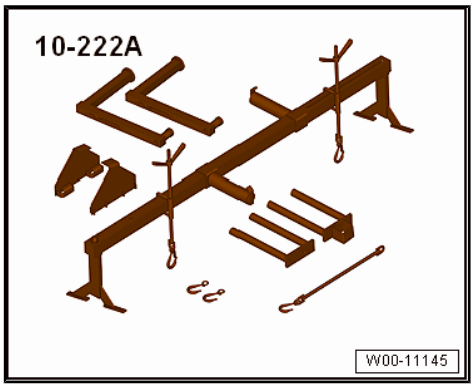
After fitting cover, let sealant dry for approx. 30 minutes. Only then fill with engine oil.

– Replenish engine oil and check oil level.

1.6 Removing and installing bottom timing chain cover (Tiguan)

Special tools and workshop equipment required

♦ Support - 10-222A-



♦ Shackle - 10-222A/12-

♦ Adapter - 10-222A/16-

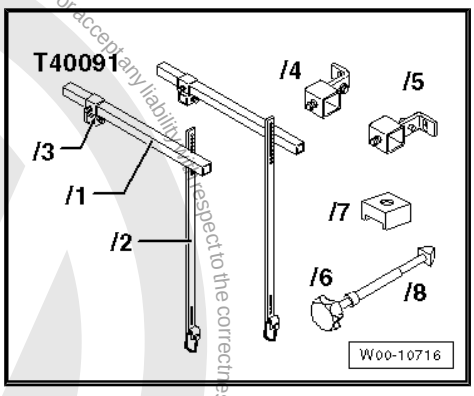
♦ Adapter - 10-222A/18-

♦ Adapter - 10-222A/22-

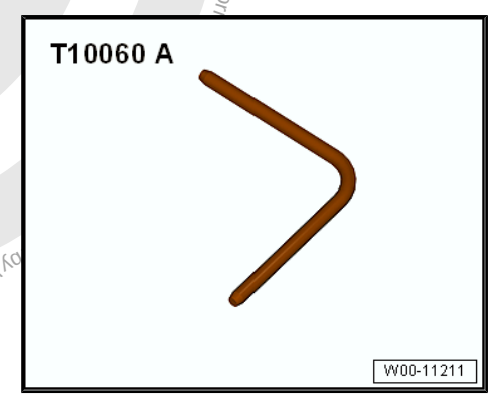
♦ Adapter - 10-222A/28-

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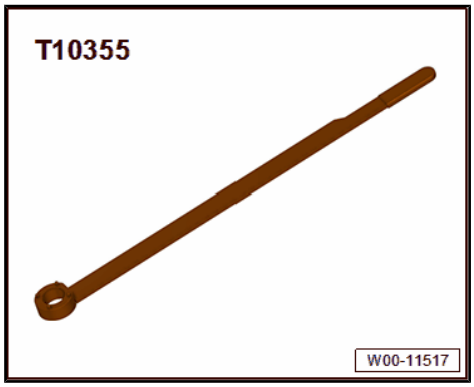
- Square tube - T40091/1-



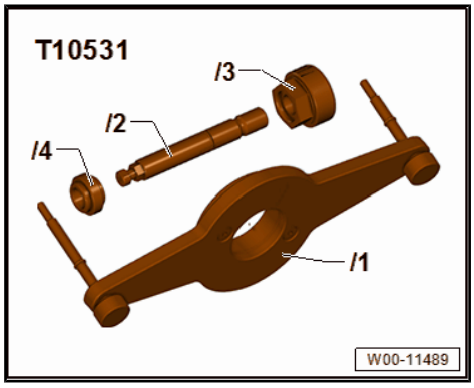
- Swivel joint - T40091/3-
- Pin - T10060 A-



- Counterhold tool - T10355-

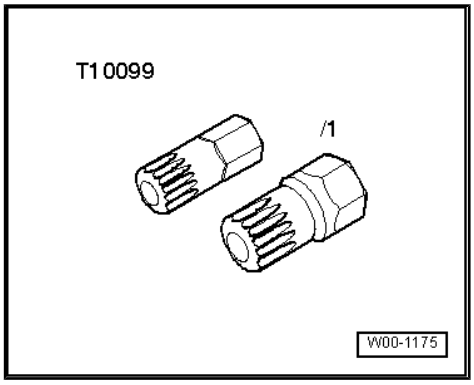


- Assembly tool - T10531-



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♦ Bits - T10099-



♦ Silicone sealant - D 174 003 M2-

Removing

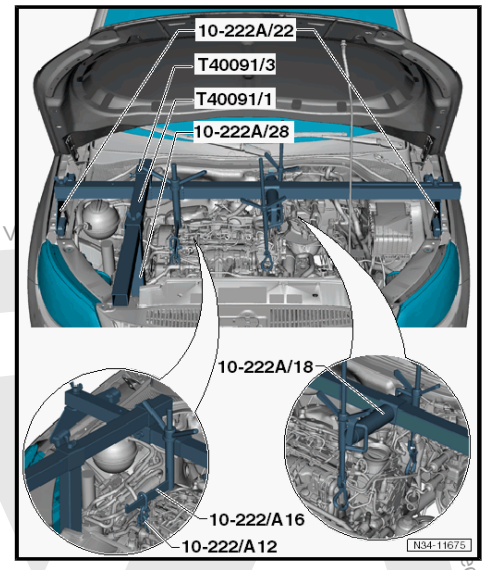
– Remove vibration damper ⇒ page 50 .

– Drain engine oil.

– Remove motor cover panel ⇒ page 139 .

– Fit support bracket - 10 - 222 A- as shown. The rear spindle is not required. Attach hooks to support eyes on engine and support engine and gearbox.

– Take up weight of engine with spindle.

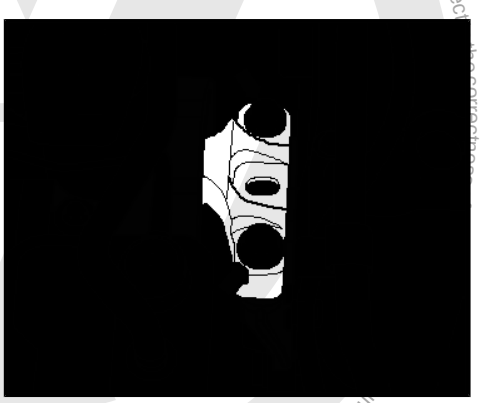


– Unscrew bolts -arrows- of engine/gearbox support on the engine.

– Removing engine mounting ⇒ page 21 .

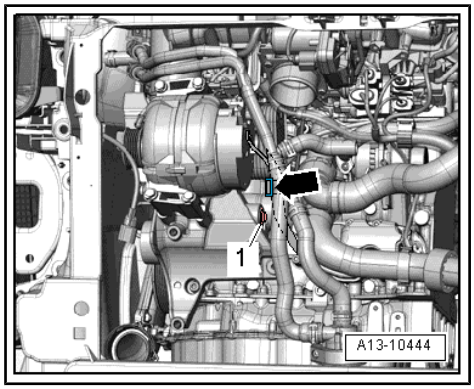
– Raise engine approx. 50 mm and loosen upper engine support bolt.

– Now lower engine approx. 100 mm.

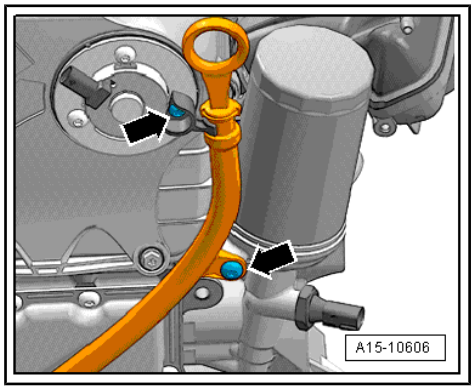


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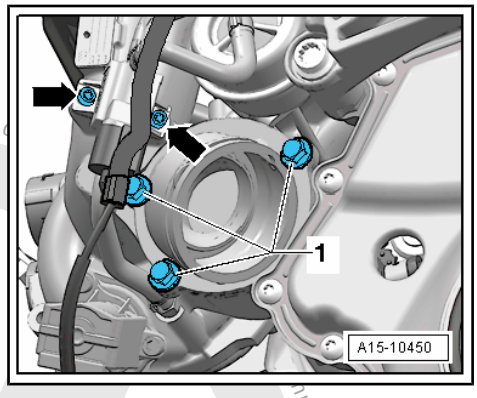
– Move electrical wiring harness clear -arrow-.
– Remove bolt -1- and take off tensioning device for poly V-belt from bracket for ancillaries.
– Unscrew lower bolts for engine support using bit - T10099- .
– Remove engine support with bolts.



– Remove bolts -arrows- and pull guide tube for oil dipstick out of timing chain cover.



– Remove charge pressure solenoid valve - N75- from turbocharger -arrows-.
– Remove turbocharger connection -1-.



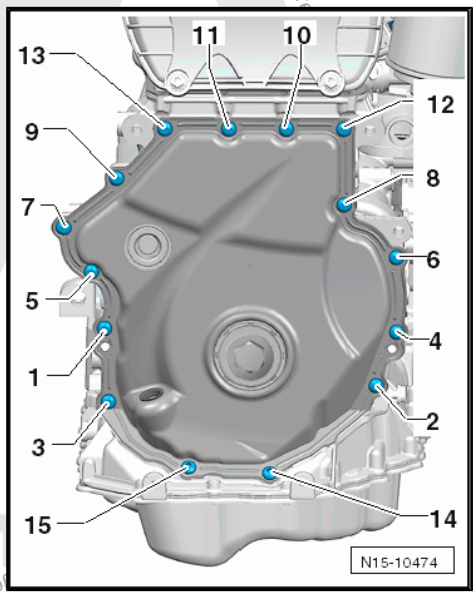
– Unscrew bolts -1 … 15-.

Note

Depending on version, the cover may be secured with only 8 bolts.

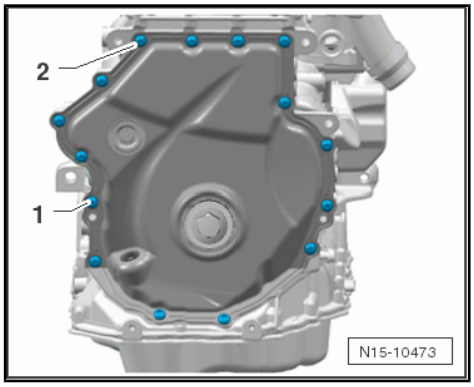
Caution

Risk of damaging lower timing chain cover. To prevent damaging the timing chain cover, apply tool only at the bolt holes.



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– Lever off lower timing chain cover, starting at points -1 and 2-.



Installing:

- Specified torques ⇒ page 87
- Sealant: Silicone sealant - D 174 003 M2-

Note

- *If the cover was bent during removal, it must be renewed.*
- *Note expiry date of silicone sealant.*
- *The cover must be installed within 5 minutes after applying the silicone sealant.*
- *Renew bolts which must be tightened further to a torque angle.*
- *Renew seals, gaskets and self-locking nuts.*

Caution

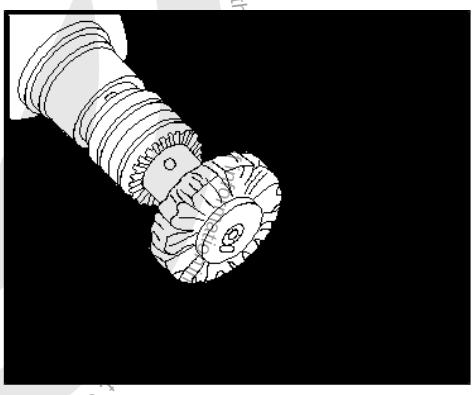
- ***Danger of contaminating lubrication system! Cover open parts of engine.***
- ***Wear safety goggles.***

– Remove sealant residues from cylinder block with a flat scraper.

– Mask oil seal on both sides with adhesive tape to make sure seal remains clean.

– Remove remaining sealant from cover, e.g. using rotating plastic brush.

– Clean sealing surfaces. They must be oil and grease free.



Checking cover for distortion:

– Fit cover using old bolts and tighten to 8 Nm.

– Use feeler gauge to measure distance between cover and housing (max. distance is 0.2 mm).

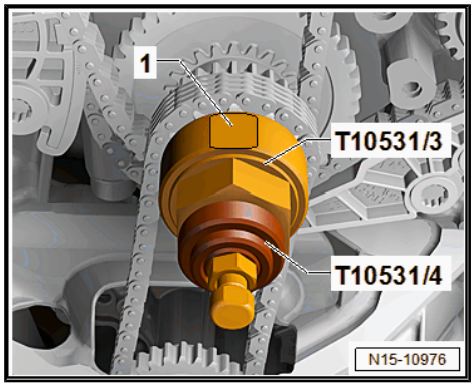
Note

- *Renew cover if distance exceeds 0.2 mm.*
- *It is not possible to measure distance between cover and sump (top section); check visually to ensure that sealing surface is even.*

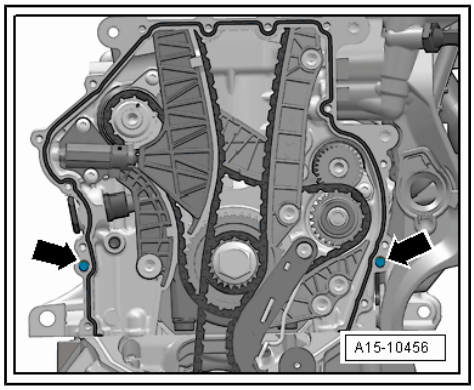
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Installing cover:

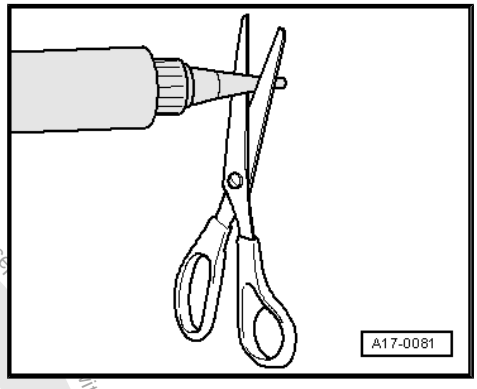
– If necessary, unscrew flange nut - T10531/4- , and remove turning over tool - T10531/3- .



– Check that both dowel pins for centring the cover -arrows- are fitted.



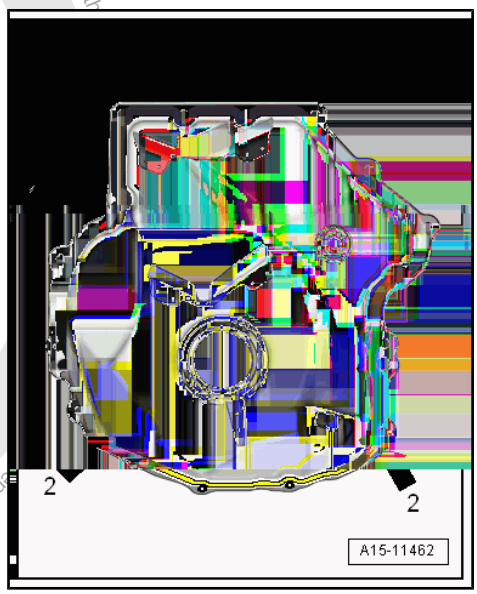
– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).



Cover with 15 bolts

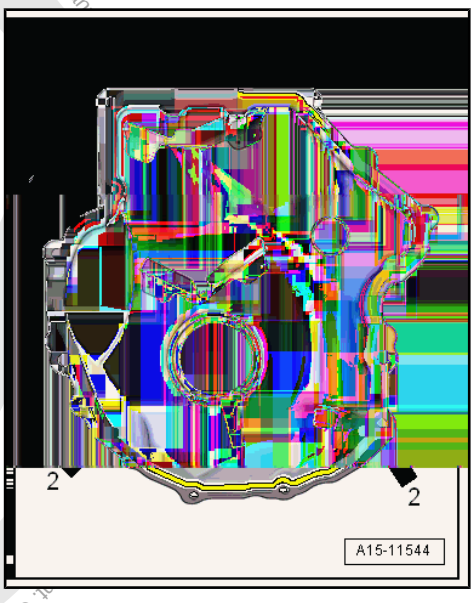
– Apply silicone sealant - D 174 003 M2- to clean sealing surface -arrow 1- and to edges -arrows 2- of new cover as shown in illustration.

♦ Thickness of sealant bead: 2 to 3 mm.



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Cover with 8 bolts



– Apply silicone sealant - D 174 003 M2- to clean sealing surface -arrow 1- and to edges -arrows 2- of new cover as shown in illustration.

♦ Thickness of sealant bead: 2 to 3 mm.

Note

♦ *The cover must be installed within 5 minutes after applying the silicone sealant.*

♦ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*

– Install cover immediately and tighten bolts:

♦ Cover, version with 15 bolts ⇒ page 89

♦ Cover, version with 8 bolts ⇒ page 89

– Install vibration damper ⇒ page 50 .

Further assembly is basically a reverse of the dismantling sequence.

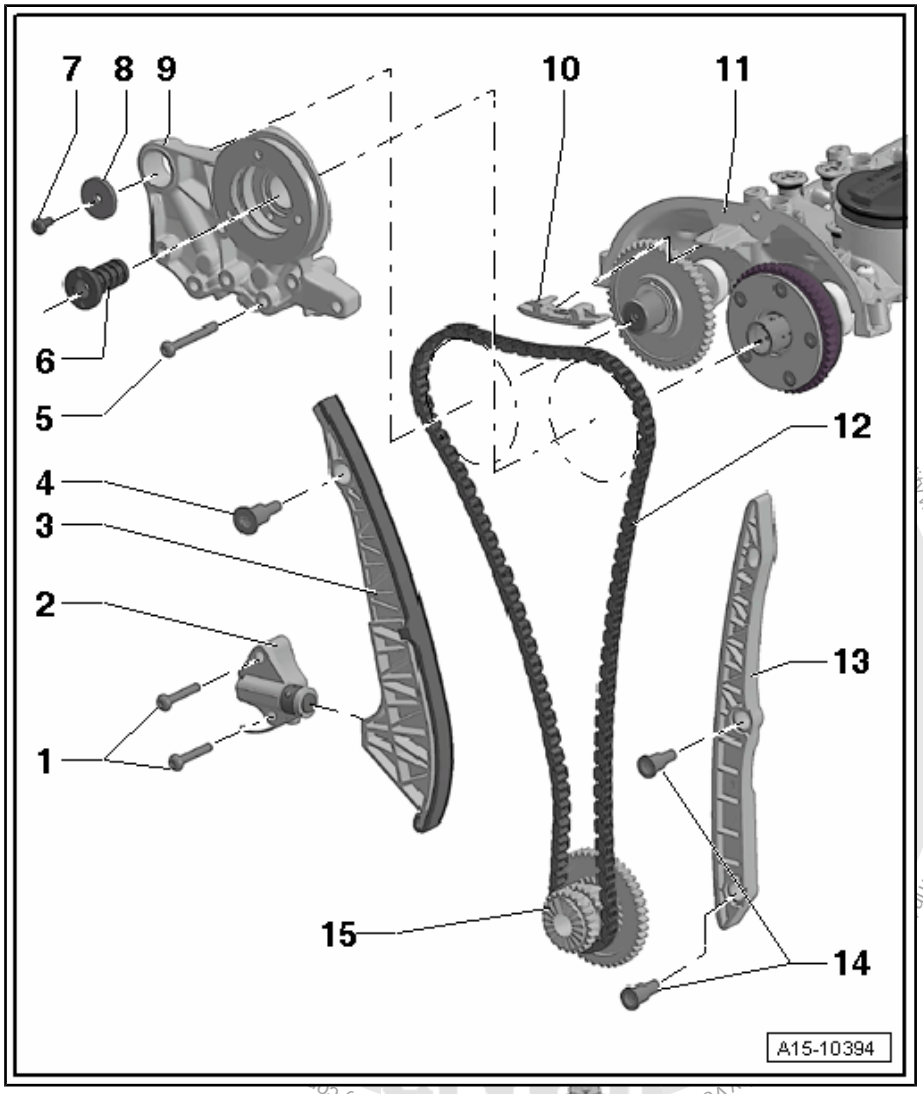
Note

After fitting cover, let sealant dry for approx. 30 minutes. Only then fill with engine oil.

– Replenish engine oil and check oil level.

1.7 Camshaft timing chain - exploded view

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1 - Bolt
- ❑ 9 Nm

2 - Chain tensioner
- ❑ Is spring-loaded
- ❑ Depending on version, secure with locking pin - T40011- or locking tool - T40267- .

3 - Tensioning rail for timing chain

4 - Guide pin
- ❑ 20 Nm

5 - Bolt
- ❑ 9 Nm

6 - Regulating valve
- ❑ Left-hand thread
- ❑ 35 Nm
- ❑ Remove with assembly tool - T10352-
- ❑ Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB: use assembly tool - T10352/1- to remove

7 - Bolt
- ❑ Renew
- ❑ M6: 8 Nm + 90° further
- ❑ M8: 20 Nm + 90° further

8 - Washer

9 - Bearing saddle

10 - Guide rail for camshaft timing chain

11 - Camshaft case

12 - Camshaft timing chain
- ❑ Before removing, mark running direction with paint
- ❑ Removing and installing ⇒ page 113

13 - Guide rail for camshaft timing chain

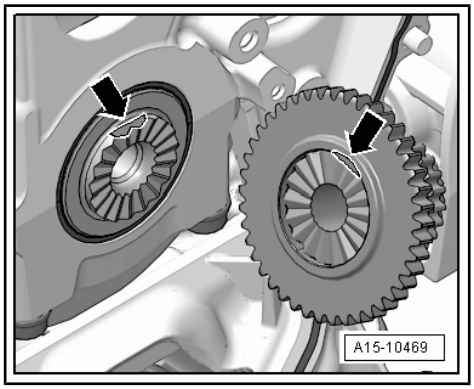
14 - Guide pin
- ❑ 20 Nm

15 - Chain sprocket
- ❑ Crankshaft
- ❑ Fitting position ⇒ page 113

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Crankshaft chain sprocket - installation position

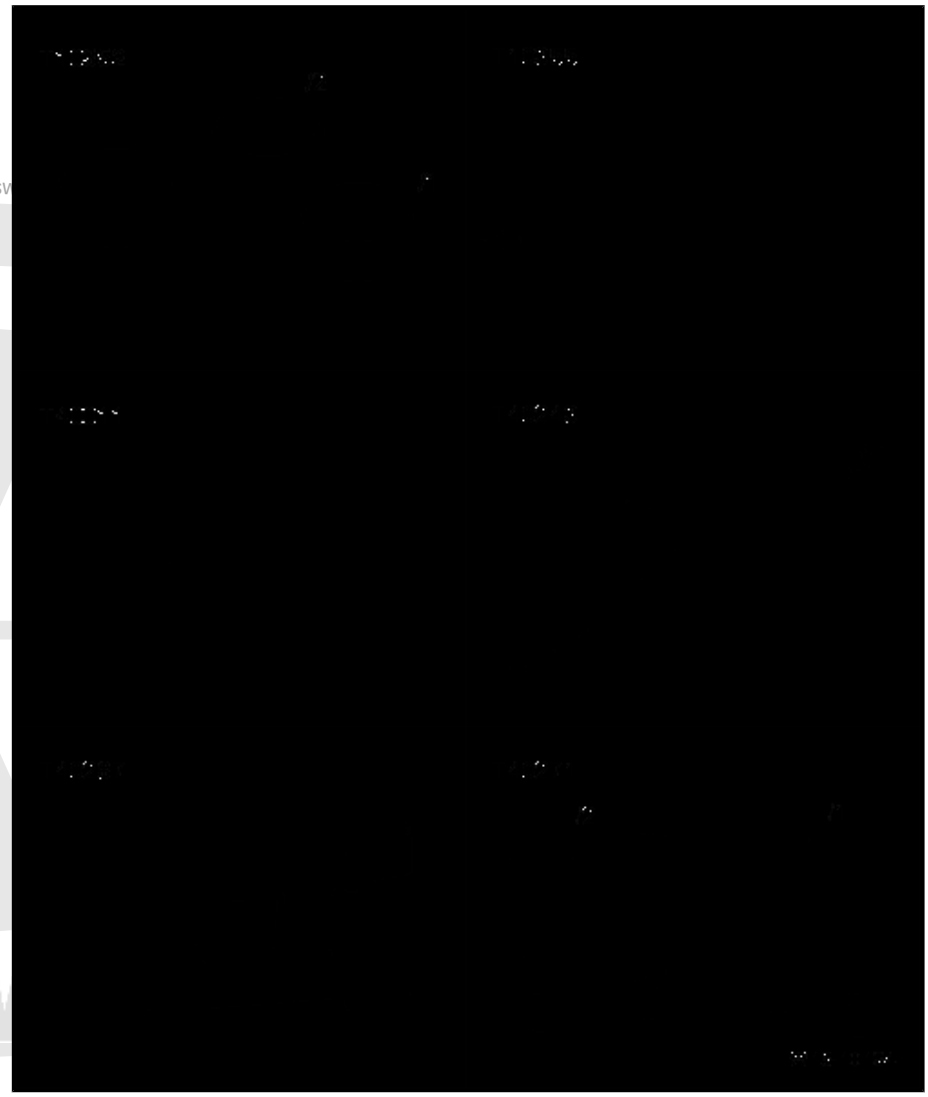
- The two sections -arrows- must be aligned.



1.8 Removing and installing camshaft timing chain

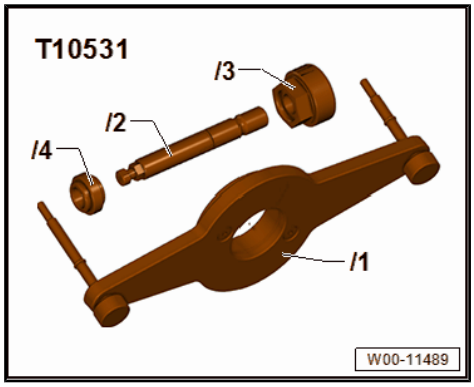
Special tools and workshop equipment required

- Assembly tool - T10352-
- Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB: assembly tool - T10352/1-
- Counterhold tool - T10355-
- Locking pin - T40011-
- Assembly lever - T40243-
- Locking tool - T40267-
- Camshaft clamp - T40271-



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- Assembly tool - T10531-



Components of assembly tool - T10531- :

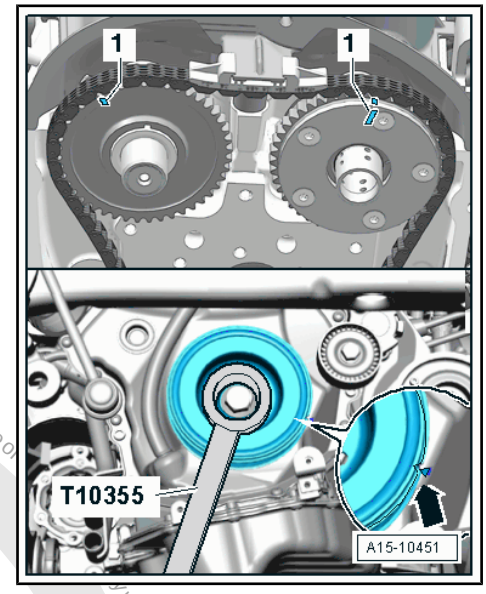
- Support - T10531/1-
- Clamping pin - T10531/2-
- Turning over tool - T10531/3-
- Collar nut - T10531/4-

Removing:

– Remove timing chain cover (top) ⇒ page 90 .

– Turn vibration damper to “TDC” position -arrow- using counterhold - T10355- .

- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).
- The markings -1- on the camshafts must face upwards.



– Remove vibration damper ⇒ page 50 .

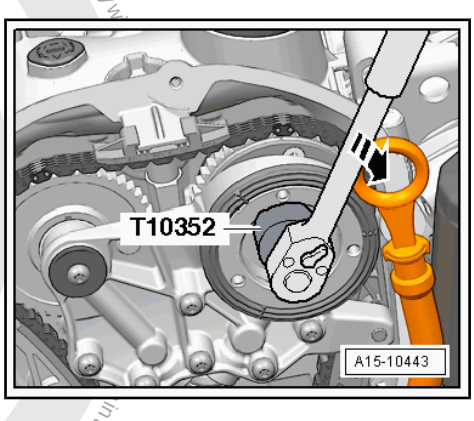
– Remove lower timing chain cover:

Passat CC ⇒ page 92

Golf, Eos, Scirocco ⇒ page 98

Tiguan ⇒ page 105

– Remove control valve using assembly tool - T10352- (engine codes CCZA, CCZB, CDAA, CDAB: assembly tool - T10352/1-) in -direction of arrow-.

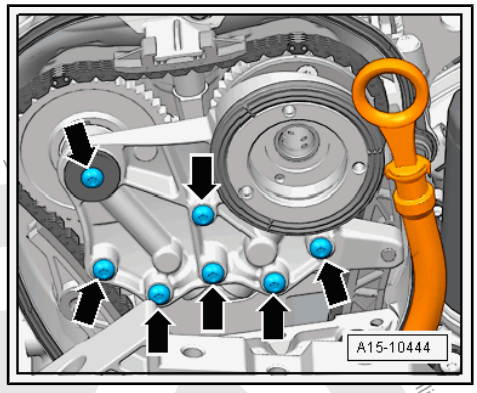


Caution

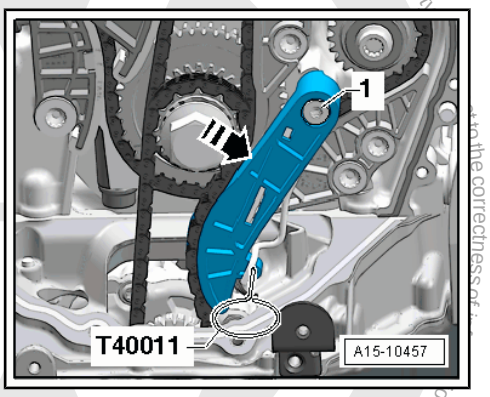
The control valve has a left-hand thread.

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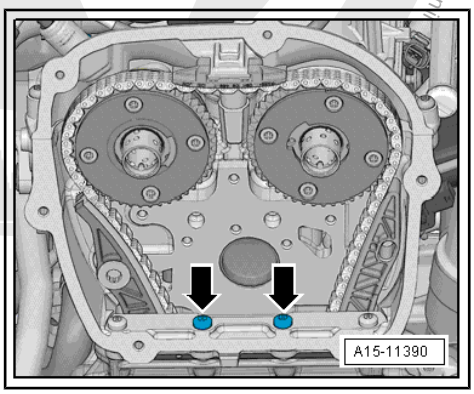
– Remove bolts -arrows- and detach bearing saddle.



– Press oil pump chain tensioner in direction of -arrow- and lock in place using locking pin - T40011- .
– Remove chain tensioner for drive chain -1-.



– Unscrew bolts -arrows-.



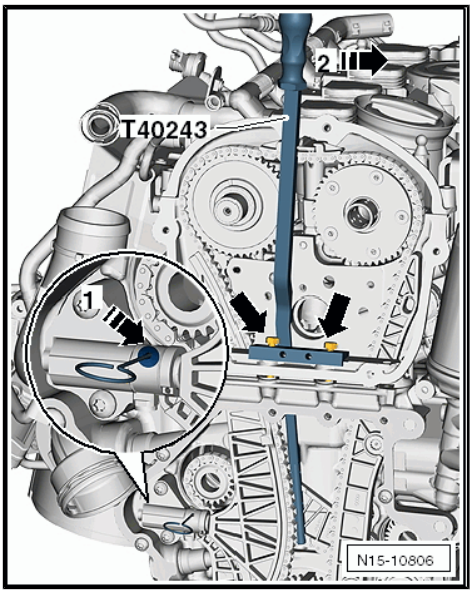
Depending on version, either of 2 different chain tensioners may be installed. Variant 1:

– Screw in lever - T40243- -arrows-.
– Raise locking element of chain tensioner -arrow 1-. To do this, grind the tip of the locking pin - T40011- to a point. A screwdriver with a blade width of approx. 1.5 mm can also be used.

Caution

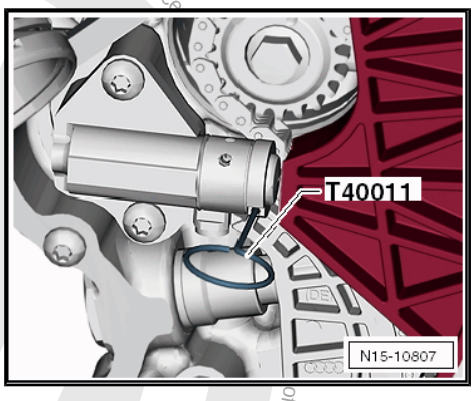
Avoid damage to chain tensioner! Proceed with great care.

– Slowly push valve lever - T40243- in -direction of arrow 2- and hold it in that position.



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– Secure chain tensioner with locking pin - T40011- .

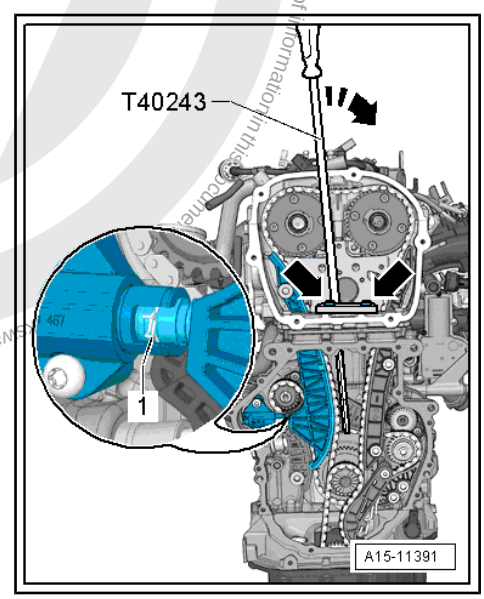


Version 2:

– Screw in lever - T40243- -arrows-.

– Press together retaining ring -1- of chain tensioner and hold it in that position.

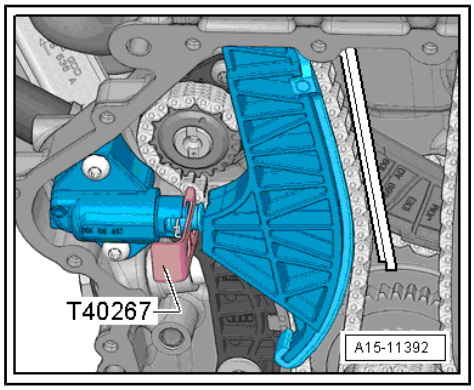
– Slowly push lever - T40243- in -direction of arrow-, and hold it in that position.



– Secure chain tensioner with locking pin - T40267- .

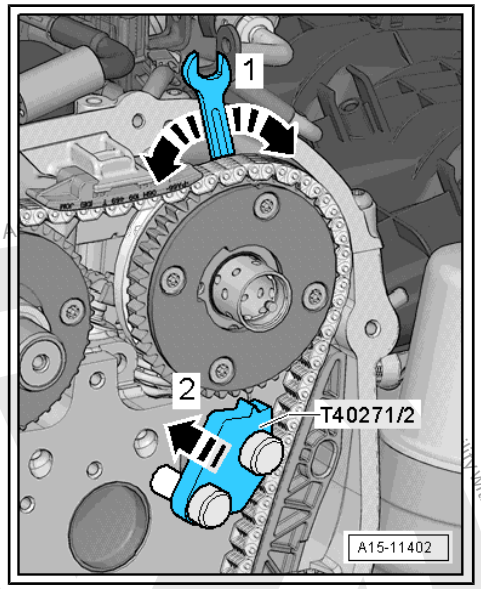
All

– Remove lever - T40243- .



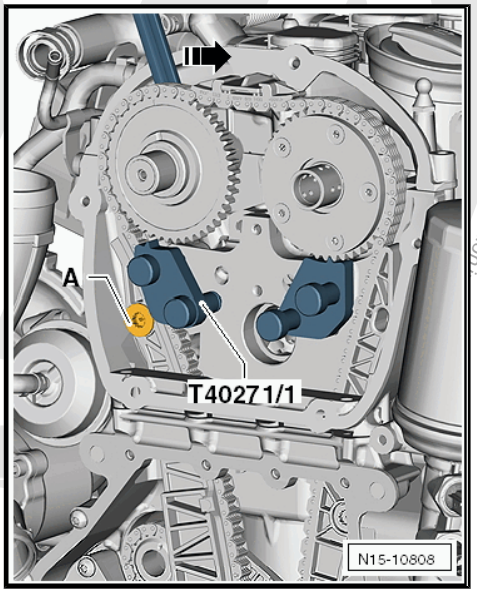
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– Bolt camshaft clamp - T40271/2- to cylinder head and insert it in direction of arrow -2- between teeth of sprocket. If necessary turn inlet camshaft slightly using spanner -1-.

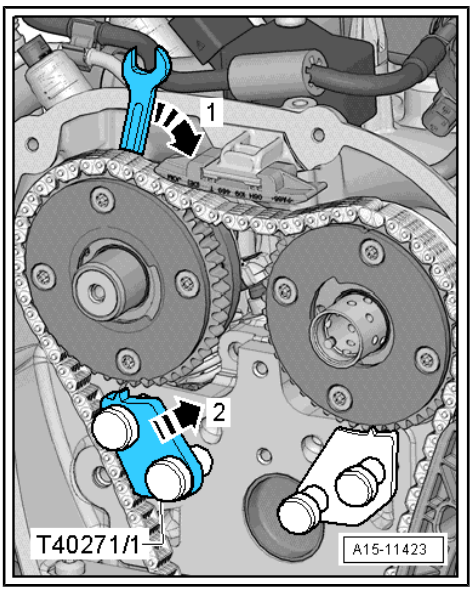


– Bolt camshaft clamp - T40271/1- to cylinder head. Brace camshaft clockwise -arrow- using open-end spanner.

– Unscrew bolt -A- and remove tensioning rail while continuing to brace camshaft.

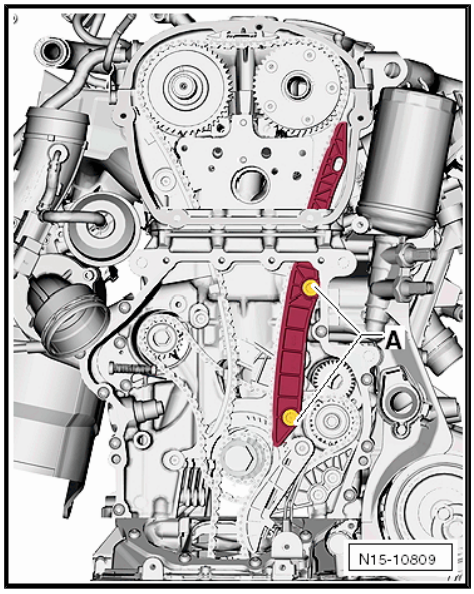


– Insert camshaft clamp - T40271/1- between teeth of sprocket -2-. If necessary, turn exhaust camshaft clockwise -1- until the camshaft clamp can be inserted. The camshaft timing chain between the sprockets must be »loose«.

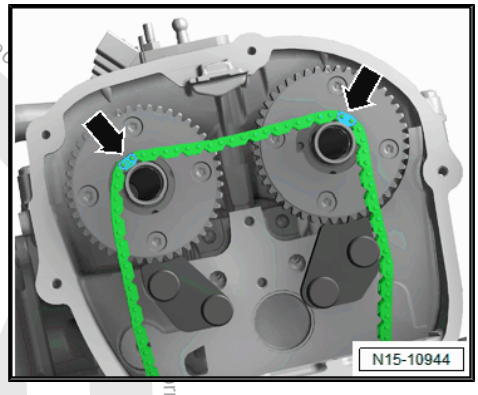


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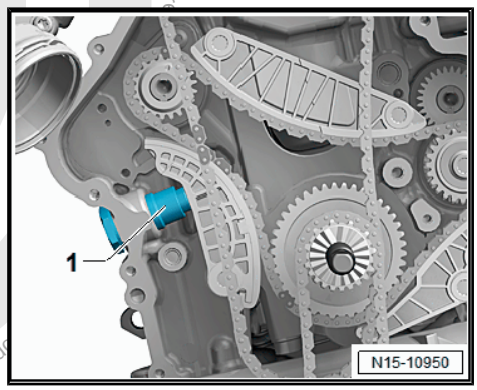
– Unscrew bolts -A- and remove guide rail for camshaft timing chain.



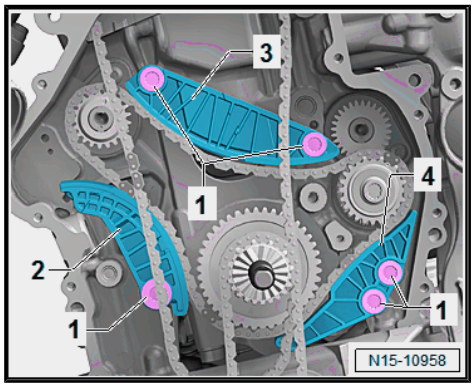
– Remove camshaft timing chain from camshaft sprockets and fit it onto camshaft journals -arrows-.



– Remove chain tensioner -1- for balance shaft drive chain.



– Unscrew bolts -1-. Remove tensioning rail -2- and guide rails -3- and -4-.

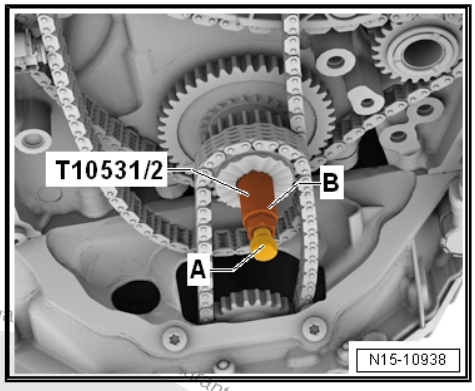


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– Loosen tensioning bolt -A-, and unscrew cotter pin -B-.

– Remove triple chain sprocket. To do this, remove drive chain for oil pump.

– Remove camshaft timing chain.

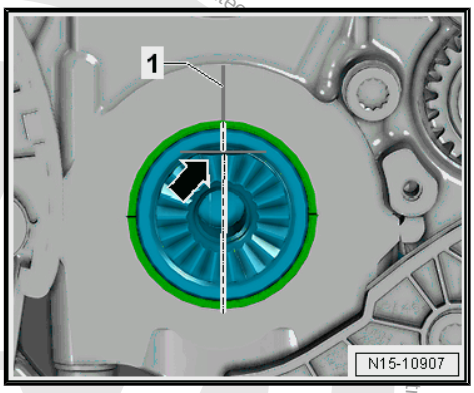


Installing

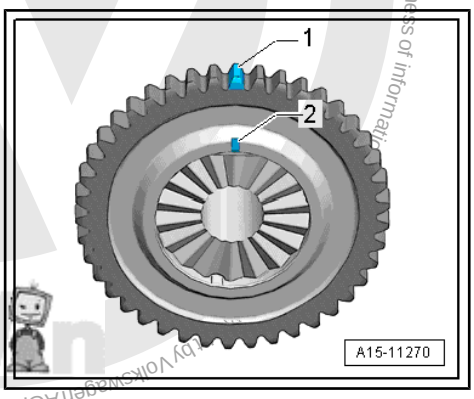
• Specified torques ⇒ page 111 .

– Check if crankshaft is positioned at TDC. The flat section on crankshaft -arrow- must be in horizontal position.

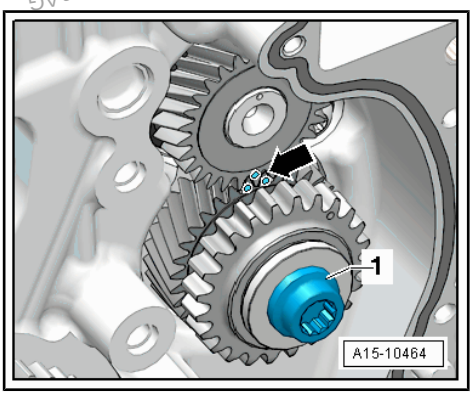
– Using a permanent felt tip marker, make a marking on cylinder block -1-, as shown in illustration.



– Mark tooth -1- of triple chain sprocket which is aligned with marking -2- using a permanent felt tip marker.

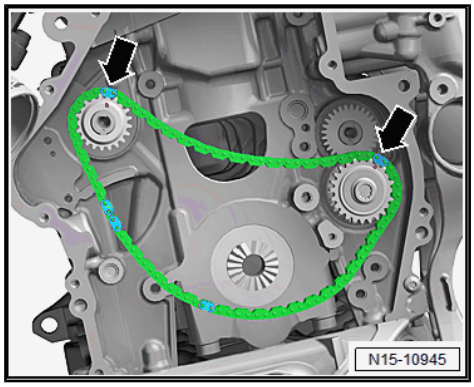


– Turn idler gear and balance shaft so that markings -arrow- are aligned as shown in illustration. Do not loosen bolt -1-. The markings on idler gear and balance shaft are difficult to see and align only after every 7th turn.

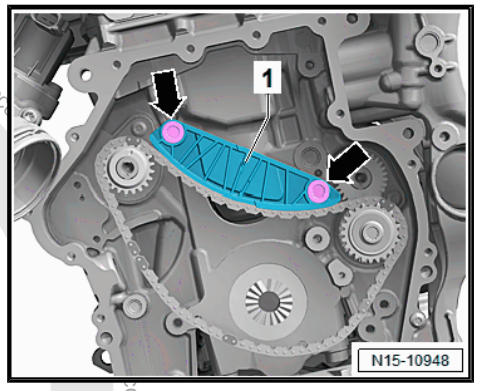


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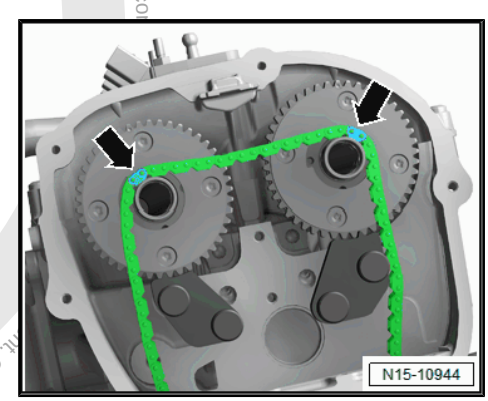
– Fit drive chain for balance shafts. Position chain links with coloured markings -arrows- at markings on chain sprockets.



– Install guide rail -1-, and tighten bolts -arrows-.

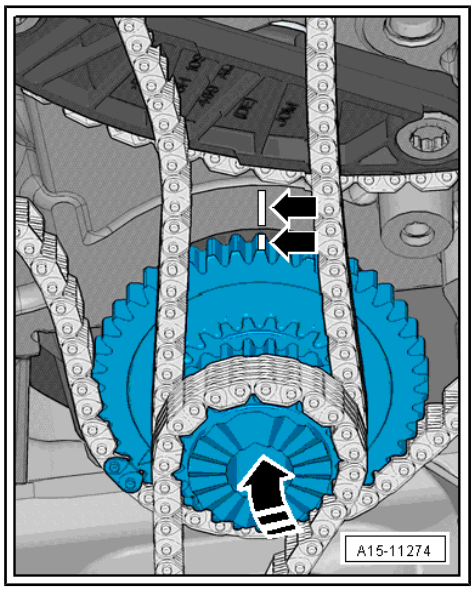


– Fit camshaft timing chain onto camshaft journals with coloured markings -arrows- properly aligned.



– Fit drive chain for oil pump onto triple chain sprocket.

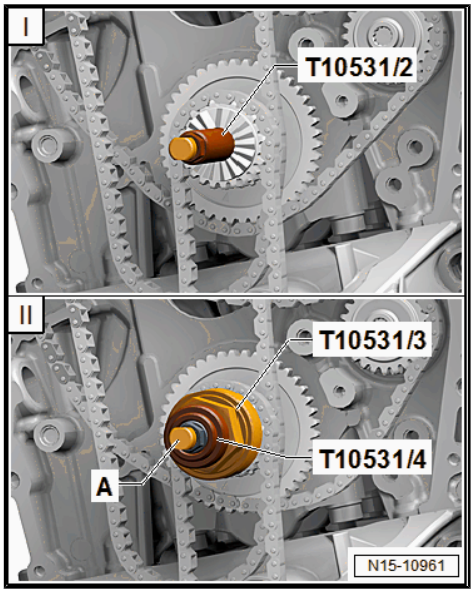
– Swing triple sprocket towards engine (-direction of arrow-), and fit it onto crankshaft. The markings -arrows- must align.



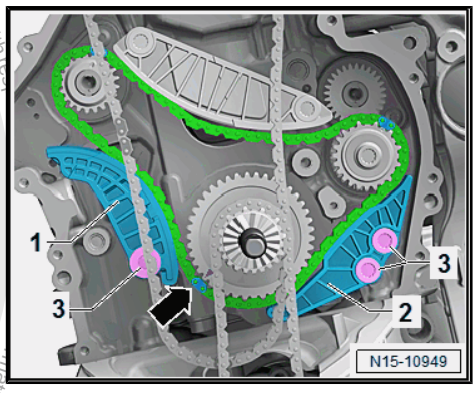
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I - Screw clamping pin - T10531/2- into crankshaft, and tighten it by hand.

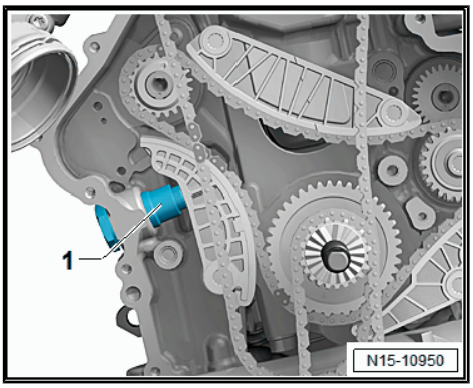
II - Fit turning over tool - T10531/3- . Screw on flange nut - T10531/4- by hand. Slightly move turning over tool back and forth with a 32 mm open-end spanner. While doing so, retighten flange nut until the chain sprocket is securely seated on the crankshaft splines. Now, tighten tensioning bolt -A-.



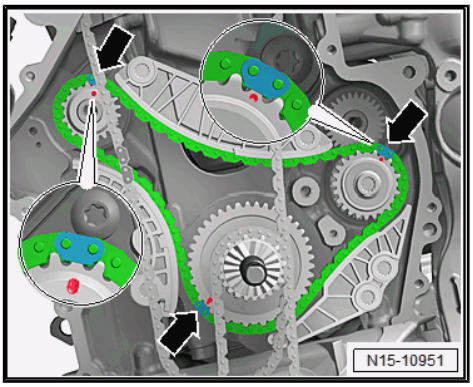
– Position link of drive chain for balance shafts with coloured marking -arrow- at marking of triple sprocket. Install tensioning rail -1- and guide rail -2-. Tighten bolts -3-.



– Install chain tensioner -1-.

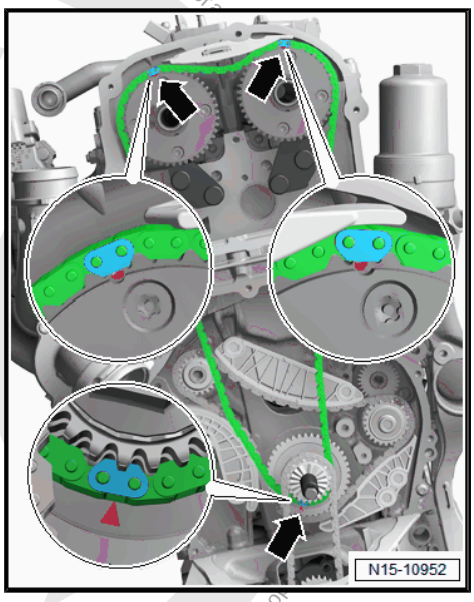


– Make sure that adjustment has been carried out correctly: chain links with coloured markings -arrows- must be positioned at markings on chain sprockets.

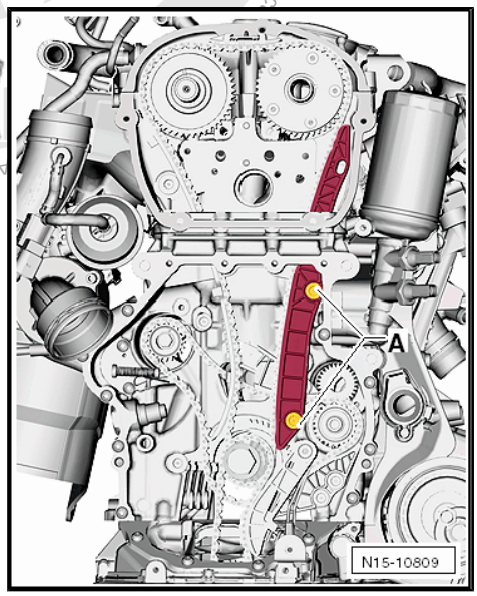


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– Fit camshaft timing chain on inlet camshaft, exhaust camshaft and crankshaft. Position chain links with coloured markings -arrows- at the markings on chain sprockets.



– Fit guide rail for camshaft timing chain and tighten bolts -A-.

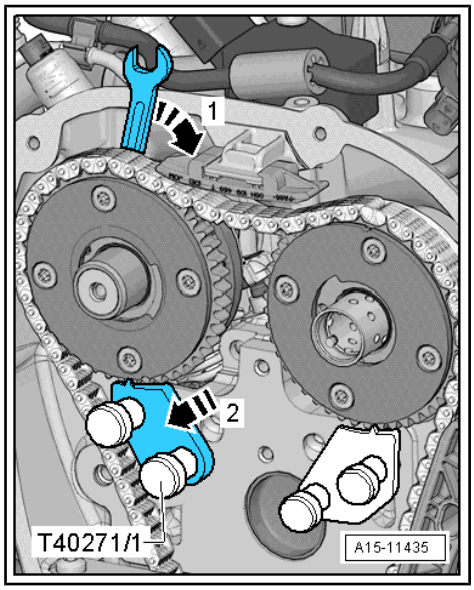


Note

Have a second mechanic hold the exhaust camshaft.

– Slowly turn exhaust camshaft in direction of arrow -1- until camshaft clamp - T40271/1- can be withdrawn from sprocket teeth.

– Carefully relieve load on camshaft until camshaft timing chain lies against upper guide rail. Hold camshaft in this position.

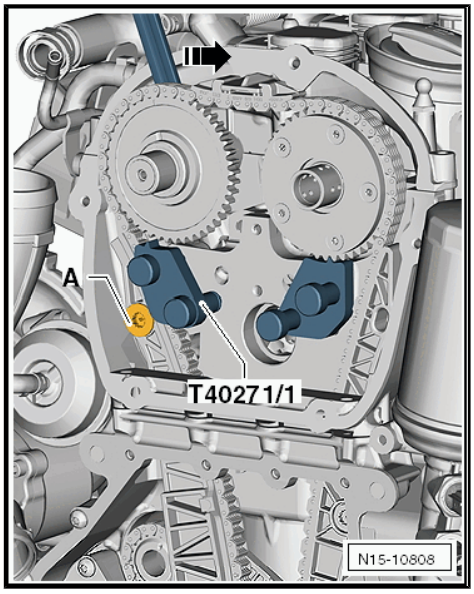


Caution

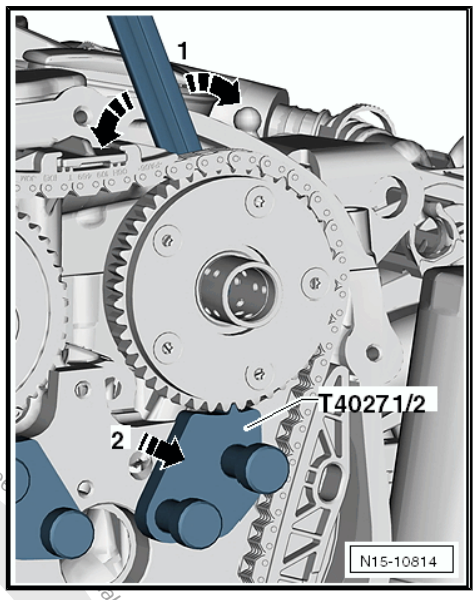
Before installing the tensioning plate it is essential to check whether the coloured chain link is still aligned with the crankshaft marking.

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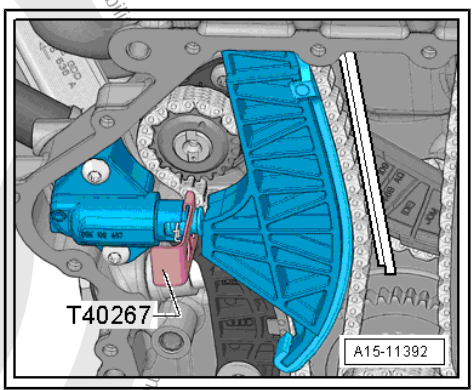
– Continue to hold camshaft and install tensioning rail for camshaft timing chain. Tighten bolt -A-.
– Remove camshaft clamp - T40271/1- .



– Slide camshaft clamp - T40271/2- out of sprocket teeth -2-, if necessary turning inlet camshaft slightly using spanner -1-.
– Remove camshaft clamp - T40271/2- .

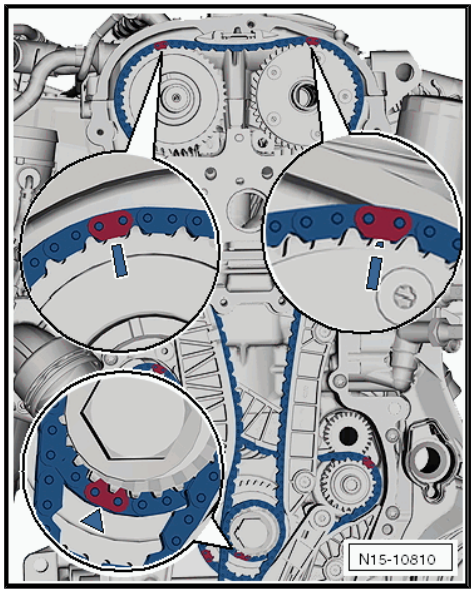


– Depending on version, remove locking pin - T40011- or locking tool - T40267- .

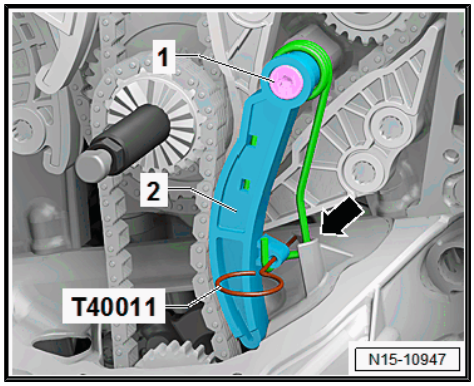


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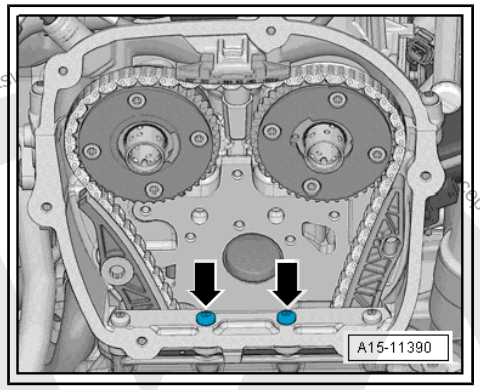
– Check position of coloured chain links relative to markings.



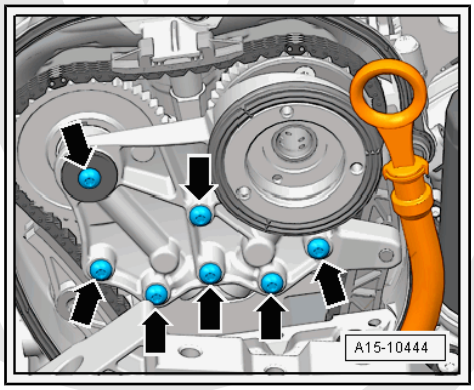
– Install chain tensioner -2-. The retaining clip -arrow- must be seated in recess in top section of sump. Tighten bolt -1-, and remove locking pin - T40011- .



– Screw in and tighten bolts -arrows-.

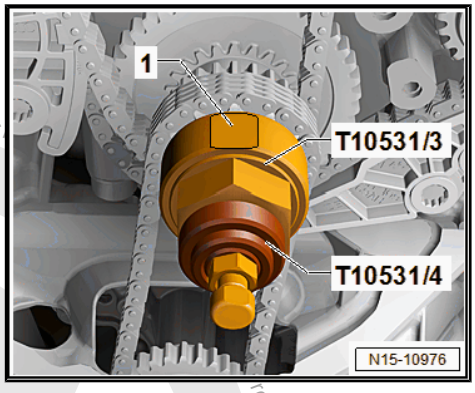


– Fit bearing saddle carefully. Do not cant bearing saddle! Screw in bolts -arrows- and tighten by hand.
– Tighten bolts -arrows- for bearing saddle ⇒ page 111 .
– Install control valve ⇒ Item 6 (page 112)



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– Using a 32 mm open-jaw spanner on assembly tool - T10531/3- , rotate crankshaft 2 full turns in direction of engine rotation. At “TDC position” the flat section -1- faces upwards.

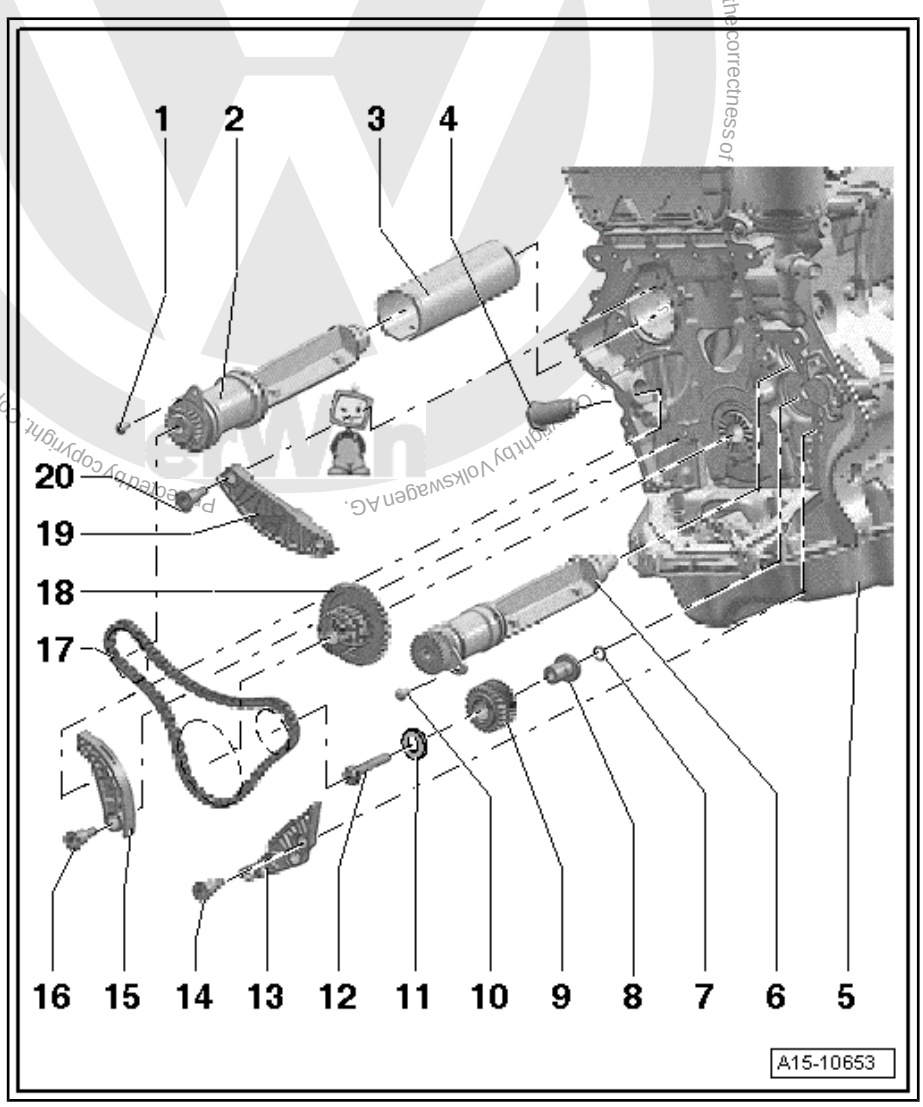


Note

Due to the ratio, the coloured chain links do not align with the markings any more after the engine has been turned.

Further assembly is basically a reverse of the dismantling sequence.

1.9 Assembly overview - drive chain for balance shaft



1 - Bolt
- ❑ 9 Nm

2 - Balancer shaft
- ❑ Renew after removing
- ❑ Exhaust side
- ❑ Lubricate bearing with engine oil
- ❑ Removing ⇒ page 130

3 - Tube for balancer shaft
- ❑ Fitting position ⇒ page 126

4 - Chain tensioner
- ❑ 85 Nm

5 - Cylinder block

6 - Balancer shaft
- ❑ Renew after removing
- ❑ Inlet side
- ❑ Lubricate bearing with engine oil
- ❑ Removing ⇒ page 127

7 - O-ring
- ❑ Lubricate with engine oil

8 - Locating pin
- ❑ Lubricate with engine oil
- ❑ Fitting position ⇒ page 126

9 - Intermediate shaft sprocket
- ❑ For balancer shaft.
- ❑ If the securing bolt has been loosened, the intermediate shaft sprocket must be renewed.

10 - Bolt
- ❑ 9 Nm

11 - Washer

12 - Securing bolt
- ❑ If the securing bolt has been loosened, the intermediate shaft sprocket must be renewed.
- ❑ Tightening sequence ⇒ page 127

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13 - Slide rail

❑ For drive chain.

14 - Guide pin

❑ 20 Nm

15 - Tensioning rail

❑ For drive chain.

16 - Guide pin

❑ 20 Nm

17 - Drive chain for balance shafts

❑ Removing and installing ⇒ page 127

18 - Chain sprocket

❑ Fitting position ⇒ page 113

19 - Slide rail

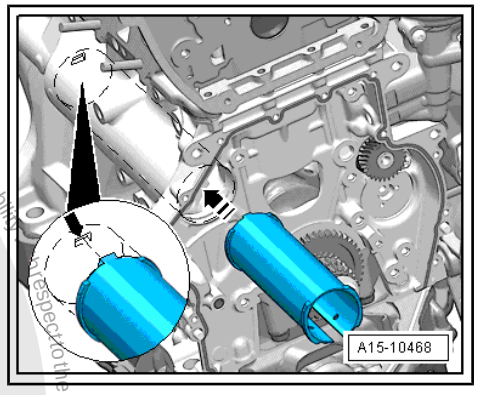
❑ For drive chain.

20 - Guide pin

❑ 20 Nm

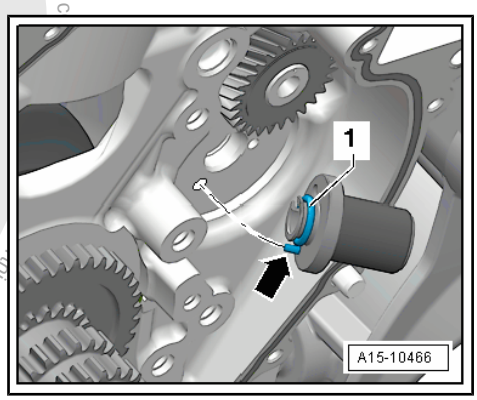
Tube for balancer shaft - installation position

- Lug on tube for balance shaft must engage in slot -arrow-.



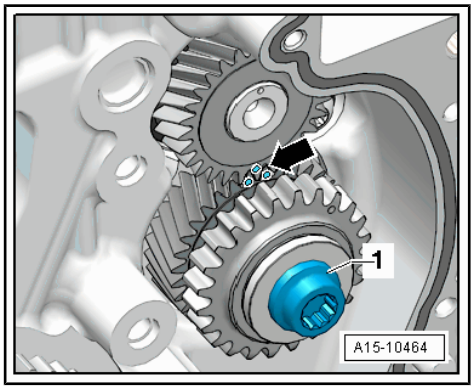
Bearing mounting - installation position

- Renew O-ring -1- and lubricate with oil
- Dowel pin -arrow- for bearing mounting must engage in bore in cylinder block
- Lubricate bearing mounting.



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Chain sprocket - tightening sequence



Caution

The intermediate shaft sprocket must be replaced. Otherwise no tooth backlash is set - engine damage. The new intermediate shaft sprocket is coated with a solid film lubricant that wears off after a short period and thus automatically sets the tooth backlash.

– Tighten bolt as follows:

1. Pre-tighten to 10 Nm using torque wrench.
2. Turn sprocket.

Chain sprocket must be without play; otherwise loosen bolt and tighten again.

3. Tighten to 30 Nm using torque wrench.
4. Use fixed wrench to turn 90° further.

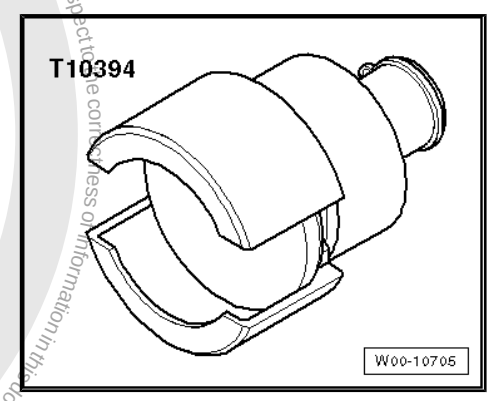
1.10 Removing and installing drive chain for balance shaft

The procedure "Removing and installing drive chain for balance shaft" is part of the procedure "Removing and installing camshaft timing chain" ⇒ page 113 .

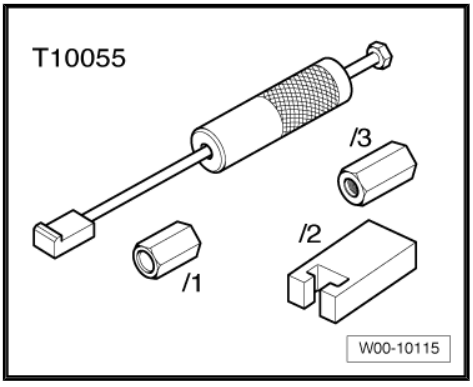
1.11 Removing and installing inlet side balance shaft

Special tools and workshop equipment required

♦ Puller - T10394-



♦ Puller - T10055-



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Note

The balance shaft must always be renewed after removing.

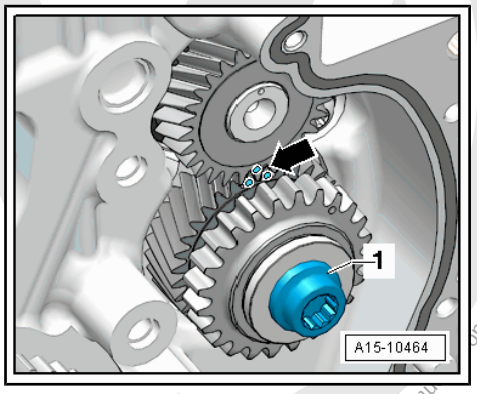
Removing:

– Remove toothed belt for coolant pump ⇒ page 247 .
– Remove timing chain cover (top) ⇒ page 90 .
– Remove lower timing chain cover:

  Passat CC ⇒ page 92

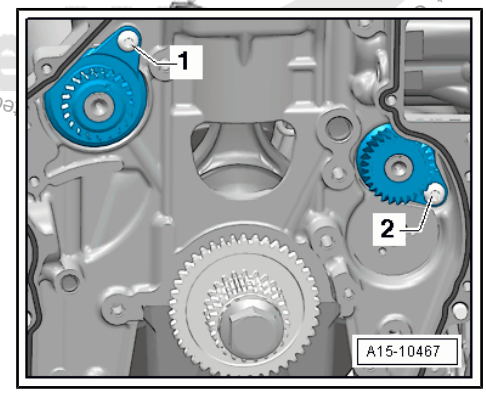
  Golf, Eos, Scirocco ⇒ page 98

  Tiguan ⇒ page 105
– Remove camshaft timing chain and drive chain for balance shaft ⇒ page 113 .
– Remove intermediate gear -1-.

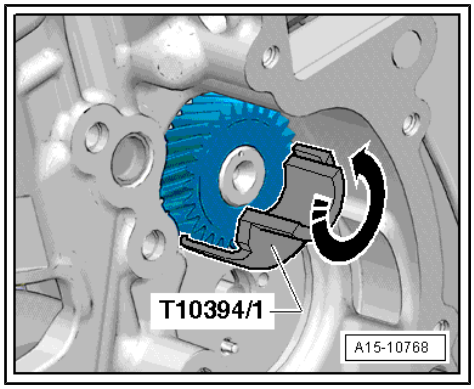


– Unscrew bolt -2- for inlet camshaft balance shaft and pull out balance shaft.

If balance shaft cannot be pulled out by hand, use puller - T10394- :

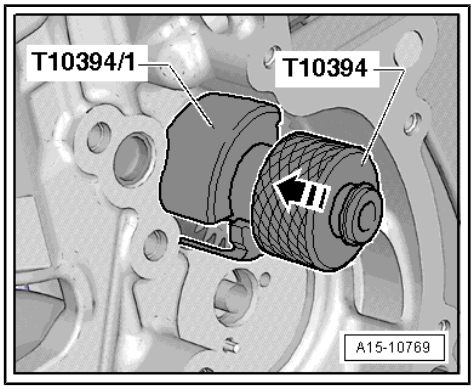


– Insert shell half - T10394/1- from puller - T10394- and turns upwards in direction of arrow.

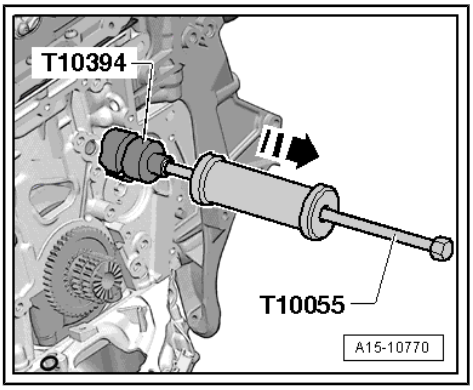


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– Insert puller - T10394- and push locking collar in -direction of arrow-.



– Screw puller - T10055- into puller - T10394- and force out balance shaft in -direction of arrow-.



Installing

Note

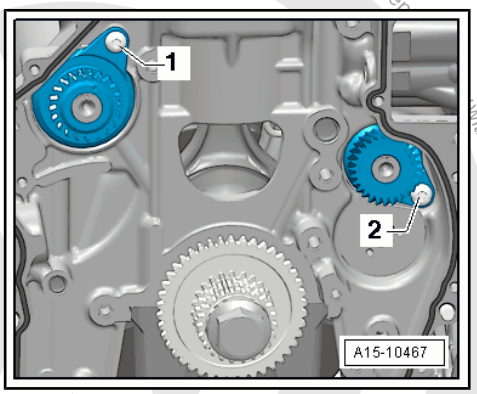
Due to the small amount of play between the balance shaft and cylinder block, the balance shaft may need to be installed chilled. Check whether the balance shaft can be fitted into the cylinder block without exerting force. If this is not the case, the balance shaft must be chilled before installing.

• Specified torques ⇒ page 125 .

– Place new balance shaft in freezer compartment for 30 minutes or spray with commercially available chilling spray.

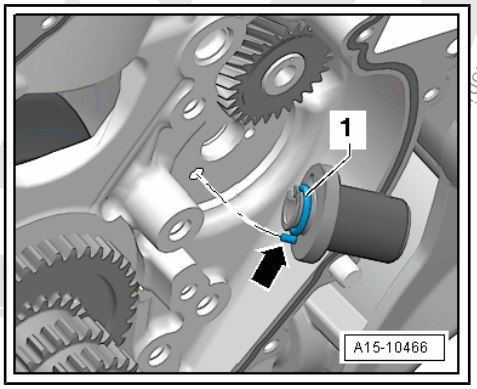
– Lubricate balancer shaft bearing with engine oil.

– Install new balancer shaft for inlet camshaft and tighten bolt -2-.



– Renew O-ring -1- and lubricate with engine oil.

– Lubricate bearing mounting with engine oil and insert -arrow-; bearing mounting must engage in bore in cylinder block.

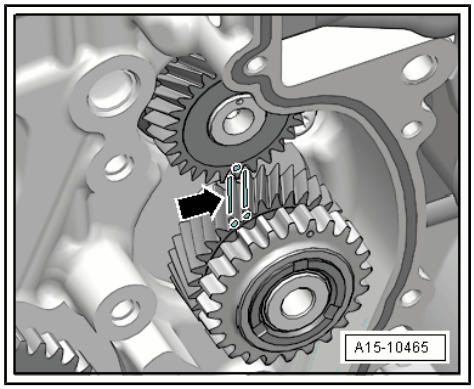


Caution

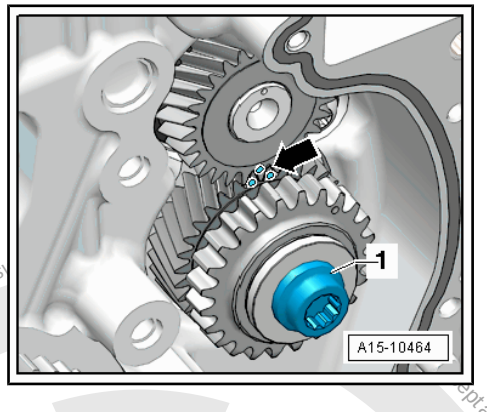
The intermediate shaft sprocket must be replaced. Otherwise no tooth backlash is set - engine damage. The new intermediate shaft sprocket is coated with a solid film lubricant that wears off after a short period and thus automatically sets the tooth backlash.

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– Mark faces of gear teeth of idler gear with paint -arrows-.
– Insert intermediate gear; marking on balance shaft must be positioned between markings on faces of gear teeth.



– Tighten bolt for sprocket -1-: tightening sequence ⇒ page 127 .
– Check markings on intermediate shaft sprocket/balancer shaft -arrow-.



Note

Due to the ratio, the markings align only after every 7th turn.

– Install drive chain for balance shaft and camshaft timing chain ⇒ page 119 .

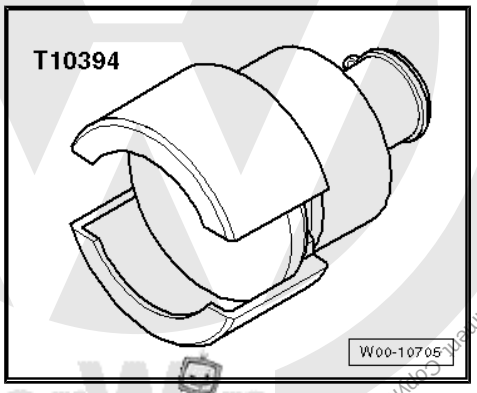
The remaining installation steps are carried out in the reverse sequence. Note the following:

– Renew oil seal for coolant pump drive ⇒ page 249 .

1.12 Removing and installing exhaust side balance shaft

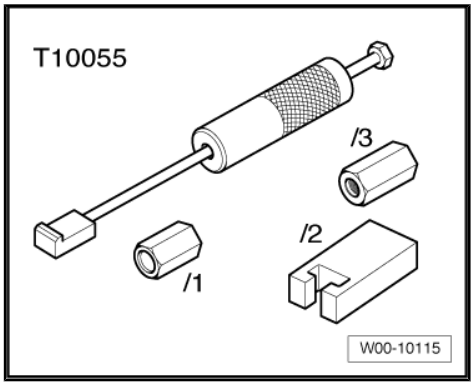
Special tools and workshop equipment required

♦ Puller - T10394-



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♦ Puller - T10055-



Note

The balance shaft must always be renewed after removing.

Removing:

– Remove timing chain cover (top) ⇒ page 90 .

– Remove lower timing chain cover:

Passat CC ⇒ page 92

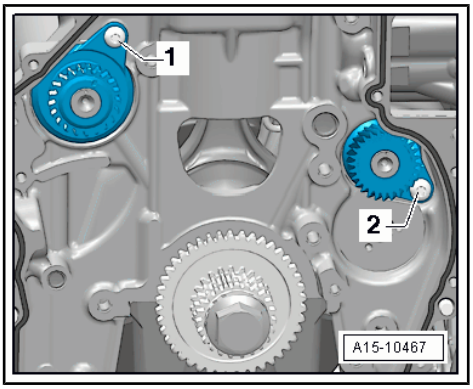
Golf, Eos, Scirocco ⇒ page 98

Tiguan ⇒ page 105

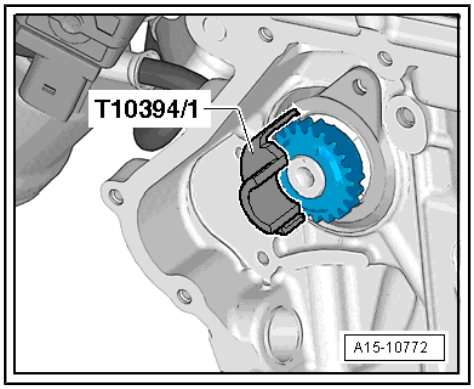
– Remove camshaft timing chain and drive chain for balance shaft ⇒ page 113 .

– Unscrew bolt -1- and pull out balance shaft.

If balance shaft cannot be pulled out by hand, use puller - T10394- :

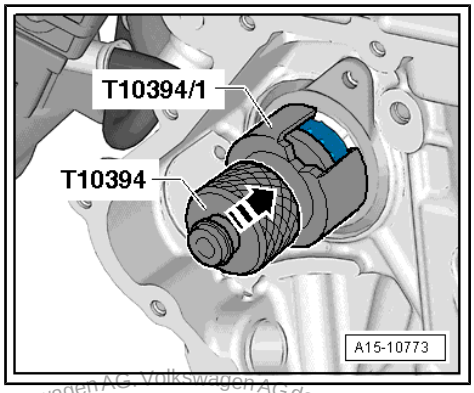


– Insert shell half -T10394/1- from puller - T10394- .



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– Insert puller - T10394- and push locking collar in -direction of arrow-.

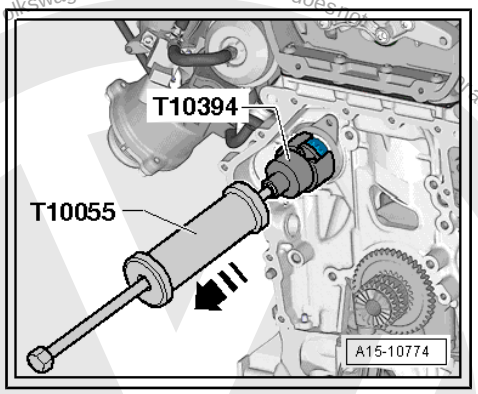


– Screw puller - T10055- into puller - T10394- and force out balance shaft.

Installing:

Note

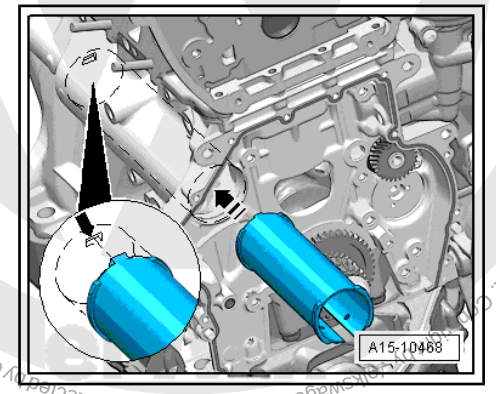
Due to the small amount of play between the balance shaft and cylinder block, the balance shaft may need to be installed chilled. Check whether the balance shaft can be fitted into the cylinder block without exerting force. If this is not the case, the balance shaft must be chilled before installing.



• Specified torques ⇒ page 125 .

– Check installation position of tube for balancer shaft -arrow-.

The lug -arrow- must be on top. It functions as an anti-twist device.



Note

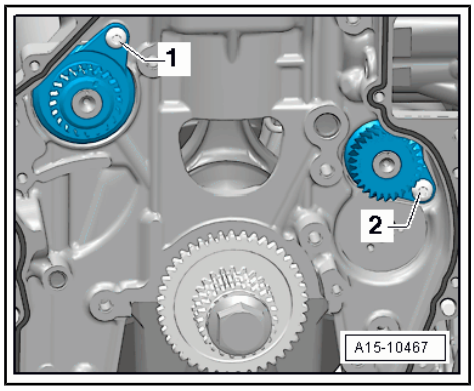
To get the tube into installation position, it must be squeezed together slightly. Insert 2-hole pin wrench - 3212- in front bores of tube and press together. Then insert pipe with 2-hole pin wrench - 3212- .

– Place new balance shaft in freezer compartment for 30 minutes or spray with commercially available chilling spray.

– Lubricate balancer shaft bearing with engine oil.

– Install balance shaft for exhaust camshaft.

– Before tightening bolt -1-, check that balance shaft rests flat against crankcase.



Note

If the balancer shaft does not rest flat, the pipe for balancer shaft must be inserted again.

– Install drive chain for balance shaft and camshaft timing chain ⇒ page 119 .

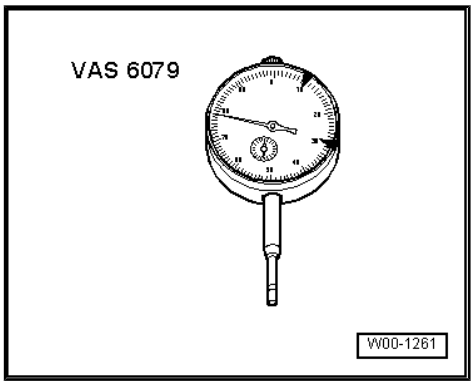
Further assembly is basically a reverse of the dismantling sequence.

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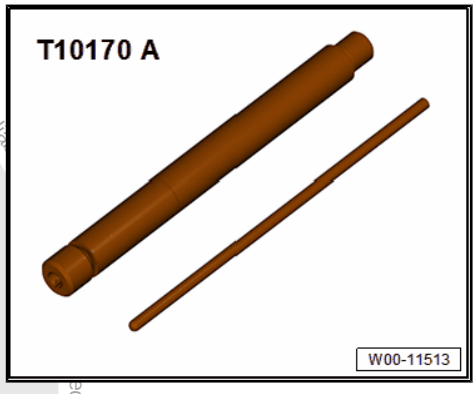
1.13 Checking valve timing

Special tools and workshop equipment required

- Dial gauge - VAS 6079-



- Dial gauge adapter - T10170 A-



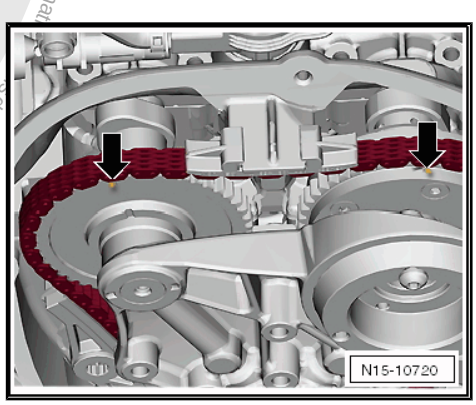
- Depth gauge

– Remove timing chain cover (top) ⇒ page 90 .

– Remove right wheel and right wheel housing liner.

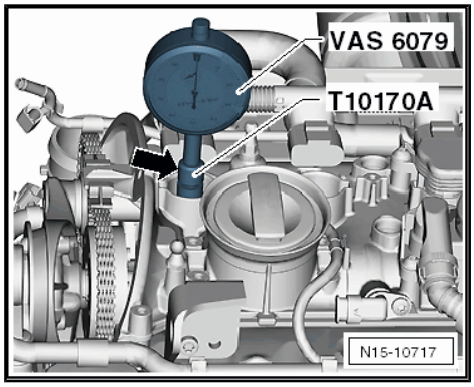
– Using 24 mm socket, turn crankshaft via vibration damper in normal direction of rotation until markings -arrows- are almost at top.

– Remove spark plug from cylinder 1.



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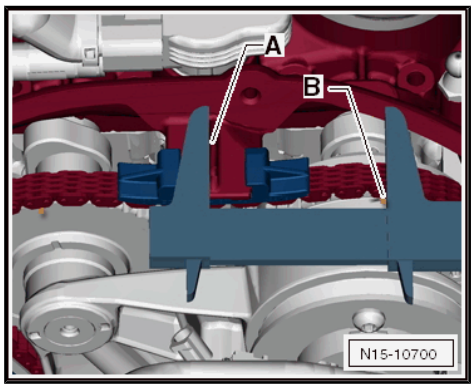
– Screw dial gauge adapter - T10170/A- into spark plug hole to stop.
– Insert dial gauge - VAS 6079- with extension - T10170A/1- as far as it will go and secure in place with self-locking nut -arrow-.
– Slowly turn crankshaft in engine DOR to maximum needle deflection. Once maximum needle deflection is reached (reverse point of needle), piston is at »TDC«.



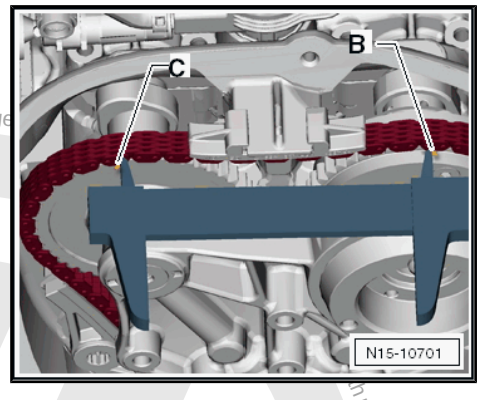
Note

If the crankshaft has been turned beyond »TDC« turn engine another two revolutions in direction of engine rotation. Do not turn engine in opposite direction of engine rotation!

– Measure distance from left outer edge of web -A- to marking -B- on inlet camshaft.
• Specification: 61 to 64 mm.



– If the specified value is achieved, measure the distance between the marking on the inlet camshaft -B- and the marking on the exhaust camshaft -C-.
• Specification: 124 to 126 mm



Note

An offset of one tooth results in a deviation of approx. 6 mm from the specified value. If an offset is found, the timing chain must be re-fitted.

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2 Cylinder head

Assembly overview - cylinder head ⇒ page 135 .

Removing and installing engine cover panel ⇒ page 139 .

Removing and installing cylinder head ⇒ page 140 .

Compression test ⇒ page 176 .

Removing and installing vacuum pump ⇒ page 178 .

2.1 Assembly overview - cylinder head

Note

- *If the cylinder head bolts have multi-point sockets and a shoulder, the camshafts must be removed before the cylinder head bolts are unscrewed.*
- *When assembling, renew self-locking nuts, bolts that are tightened by turning further angle, as well as seals and gaskets.*
- *The plastic protectors fitted to protect the open valves must only be removed immediately before fitting the cylinder head.*

1 - Cylinder head gasket
- ❑ Renew
- ❑ Observe installation position: Part number to cylinder head

2 - Bolt
- ❑ 25 Nm

3 - Transportation shackle

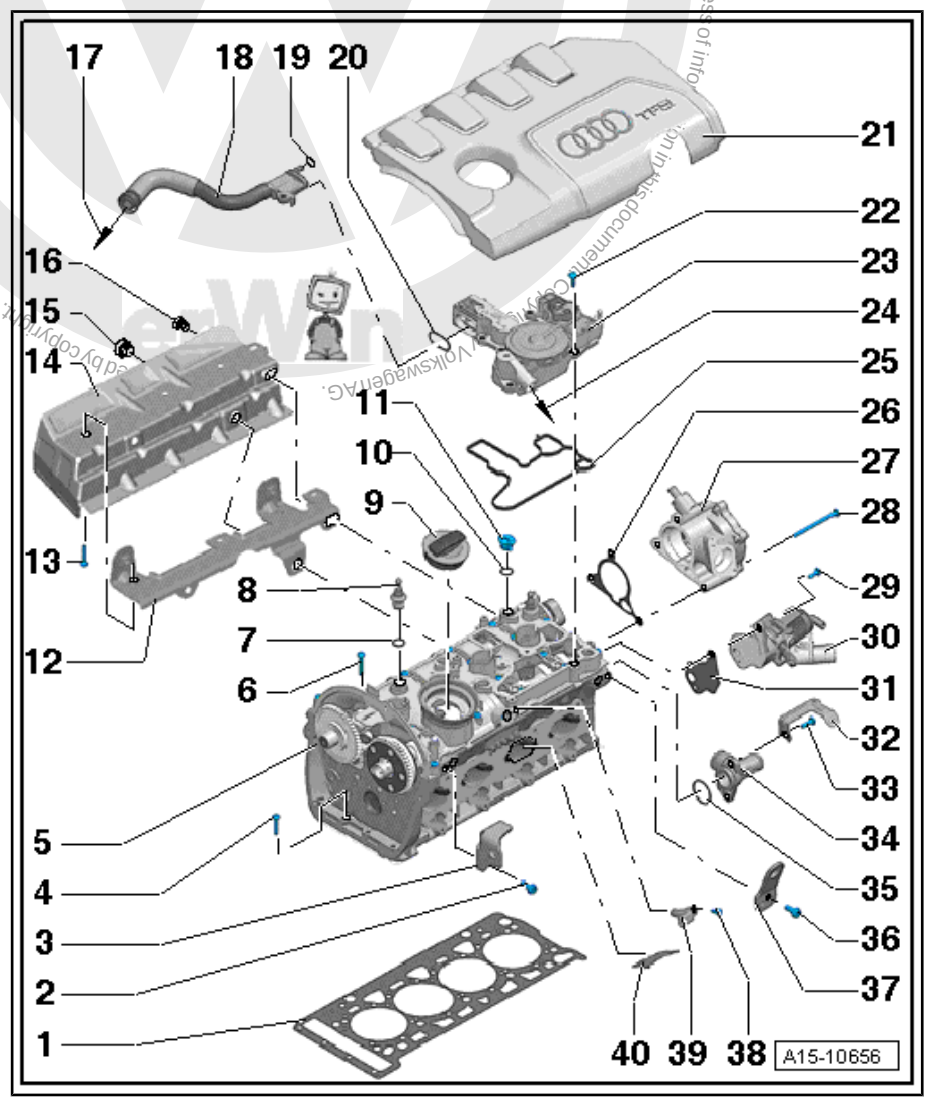
4 - Bolt
- ❑ Tightening sequence ⇒ page 138

5 - Cylinder head
- ❑ Removing and installing ⇒ page 140
- ❑ Check for distortion ⇒ page 138 .
- ❑ Renew oil non-return valve in cylinder head ⇒ page 138

6 - Cylinder head bolt
- ❑ Renew
- ❑ Note sequence when loosening ⇒ page 137 .
- ❑ Note correct sequence when tightening ⇒ page 138 .

7 - O-ring
- ❑ Renew
- ❑ Lubricate with engine oil

8 - Plugs
- ❑ 5 Nm



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- ❑ With ball head for engine cover panel

9 - Cap

- ❑ With seal

10 - O-ring

- ❑ Renew
- ❑ Lubricate with engine oil

11 - Plugs

12 - Holder

13 - Bolt

- ❑ 9 Nm

14 - Heat shield

15 - Bolt

- ❑ 20 Nm

16 - Bolt

- ❑ 20 Nm

17 - To intake hose/turbocharger

18 - Breather pipe

19 - O-ring

- ❑ No replacement part.

20 - Seal

- ❑ No replacement part.

21 - Motor cover

22 - Bolt

- ❑ Self-tapping
- ❑ Tightening sequence ⇒ page 137

23 - Crankcase ventilation

- ❑ Note correct sequence when tightening ⇒ page 137 .

24 - To intake manifold

25 - Seal

- ❑ Renew if damaged

26 - Seal

- ❑ Renew

27 - Vacuum pump

- ❑ Removing and installing ⇒ page 178

28 - Securing bolts for vacuum pump

- ❑ Engine codes CAWA, CAWB, CBFA, CCTA, CCTB, BZB, CGYA: 9 Nm
- ❑ Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB: 8 Nm + additional 180° turn

Renew after removal

29 - 9 Nm

- ❑ Only engine code CBFA

30 - Secondary air inlet valve - N112-

- ❑ Only engine code CBFA
- ❑ Removing and installing ⇒ page 550

31 - Seal

- ❑ Only engine code CBFA

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- ❑ Renew

32 - Retaining plate

33 - Bolt

- ❑ 9 Nm

34 - Union

- ❑ Engine code CBFA: before removal, secondary air inlet valve - N112- must be removed ⇒ page 550

35 - O-ring

- ❑ Renew
- ❑ Lubricate with coolant

36 - Bolt

- ❑ 25 Nm

37 - Transportation shackle

38 - Bolt

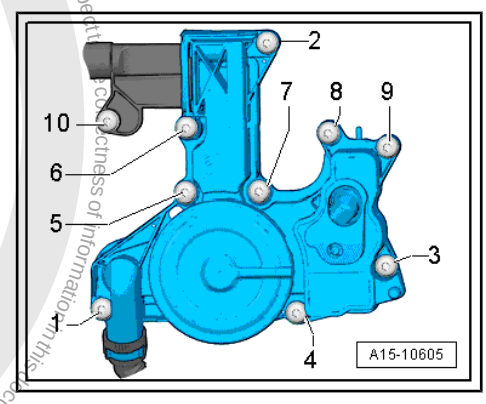
- ❑ 9 Nm

39 - Hall sender - G40-

40 - Partition

Crankcase breather system - tightening torque

– Tighten bolts for crankcase breather in the sequence -1 … 10- to 11 Nm.



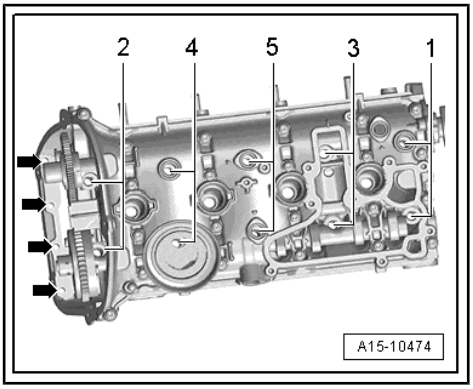
Loosening cylinder head bolts

Note

- ♦ *If the cylinder head bolts have multi-point sockets and a shoulder, the camshafts must be removed before the cylinder head bolts are unscrewed.*
- ♦ *If a cylinder head cover without sealing plugs for the cylinder head bolts -5- is installed, the camshafts must be removed.*

– Unscrew bolts -arrows-.

– Slacken cylinder head bolts in the sequence -1 … 5-.



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Cylinder head - tightening sequence, camshaft installed

– Tighten cylinder head bolts in the sequence -1 … 5- as follows:

1 - Tighten initially to 40 Nm using torque wrench

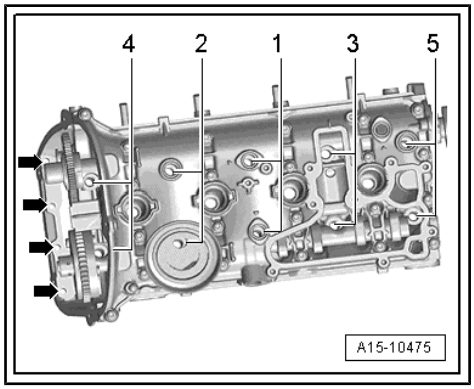
2 - Turn 90° further using rigid wrench

3 - Turn 90° further using rigid wrench

– Then tighten bolts -arrows-.

1 - Pre-tighten bolts to 8 Nm

2 - Turn bolts 90° further using rigid wrench



Cylinder head - tightening sequence, camshaft removed

– Tighten cylinder head bolts in the sequence -1 … 10- as follows:

1 - Tighten initially to 40 Nm using torque wrench

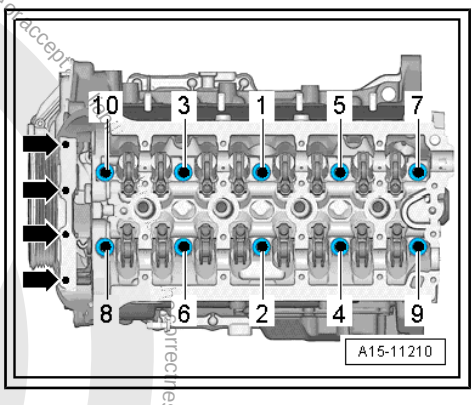
2 - Turn 90° further using rigid wrench

3 - Turn 90° further using rigid wrench

– Then tighten bolts -arrows-.

1 - Pre-tighten bolts to 8 Nm

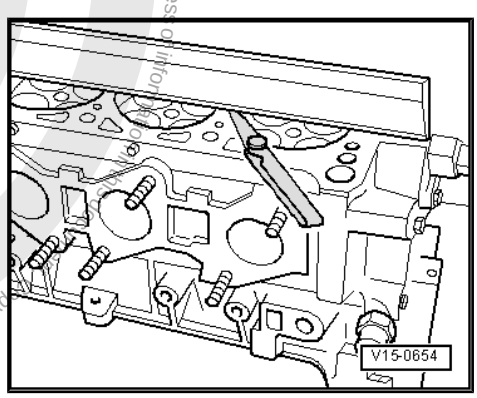
2 - Turn bolts 90° further using rigid wrench



Checking cylinder head for distortion

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

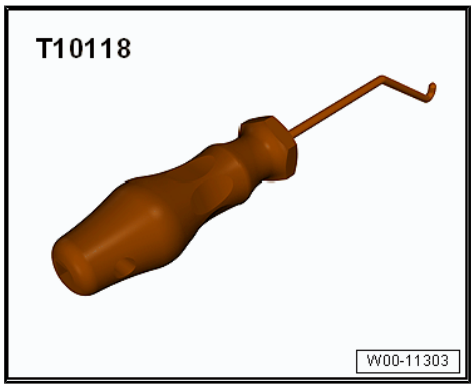
♦ Max. permissible distortion: 0.05 mm.



2.2 Renewing oil non-return valve in cylinder head

Special tools and workshop equipment required

♦ Hooks e.g. assembly tool - T10118-

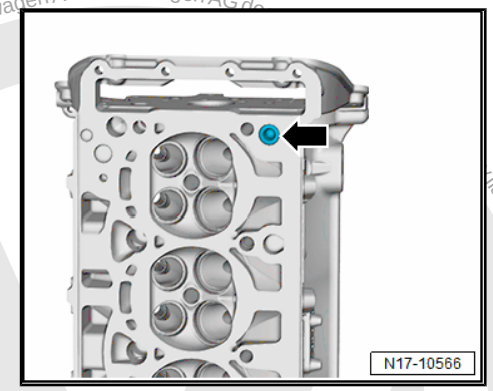


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Removing

– Remove cylinder head ⇒ page 140 .

– Pull out oil non-return valve -arrow- with a suitable hook, e.g. assembly tool - T10118- .



Installing

– Clean oil channels.

– Moisten seal for new oil non-return valve with clean engine oil.

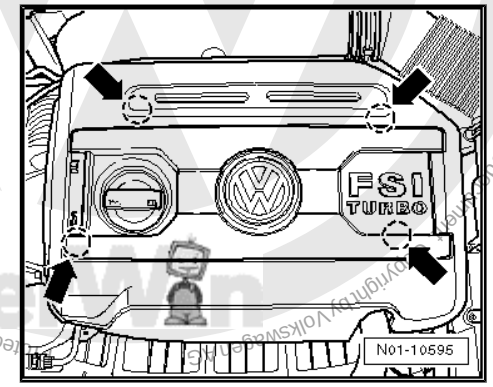
– Insert oil non-return valve by hand into cylinder head to stop.

– Install cylinder head ⇒ page 140 .

2.3 Removing and installing engine cover

Removing

– Pull engine cover panel off upwards at securing points -arrows-.

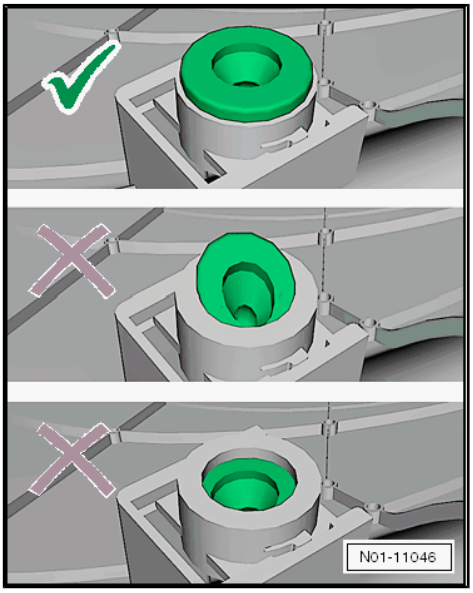


Installing

– When fitting, make sure that rubber buffers are correctly inserted in mountings.

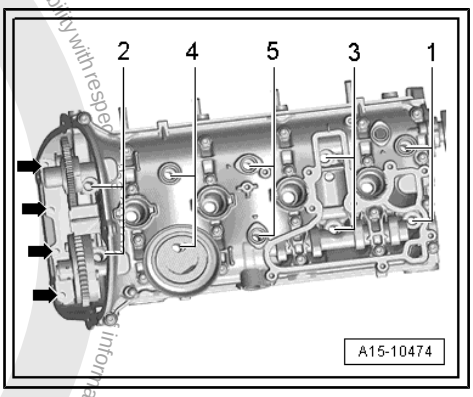
– Press engine cover panel back carefully into its retainers.

– To prevent damage, do not strike engine cover panel with the fist or a tool.



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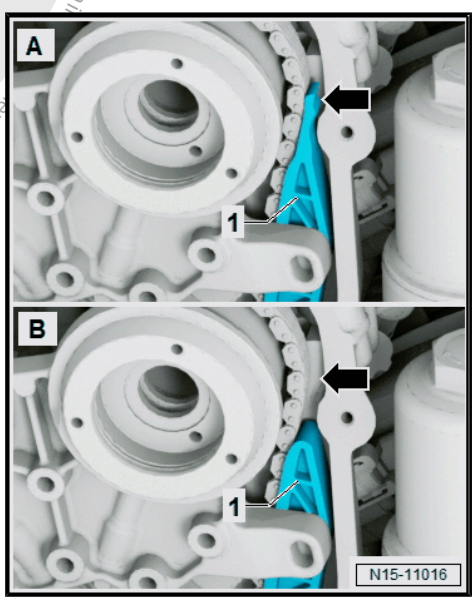
2.4 Removing and installing cylinder head



Note

- *If the cylinder head bolts have multi-point sockets and a shoulder, the camshafts must be removed before the cylinder head bolts are unscrewed.*
- *If cylinder head bolts with a multipoint socket head and shoulder are used for installation, the cylinder head bolts must be inserted before the camshafts are installed.*
- *If a cylinder head cover without sealing plugs for the cylinder head bolts -5- is or is going to be installed, the camshafts must be removed.*

Checking guide rail version:



Note

Depending on the respective repair work to be carried out and on the version of the guide rail, different procedures apply. Please check which guide rail is installed before starting work.

– Remove timing chain cover (top) ⇒ page 90 .

– Check guide rail -1- in area indicated by -arrow-.

A - Long guide rail

B - Short guide rail

Removing cylinder head, if a »short« guide rail is installed and the camshaft timing chain shall remain installed:

Procedure
⇒ “2.4.1 Removing and installing cylinder head”, page 140 .

Removing cylinder head, if a »short« guide rail is installed and the camshaft timing chain is to be removed as well:

Procedure
⇒ “2.4.2 Removing and installing cylinder head and camshaft timing chain”, page 163 .

Removing cylinder head, if a »long« guide rail is installed:

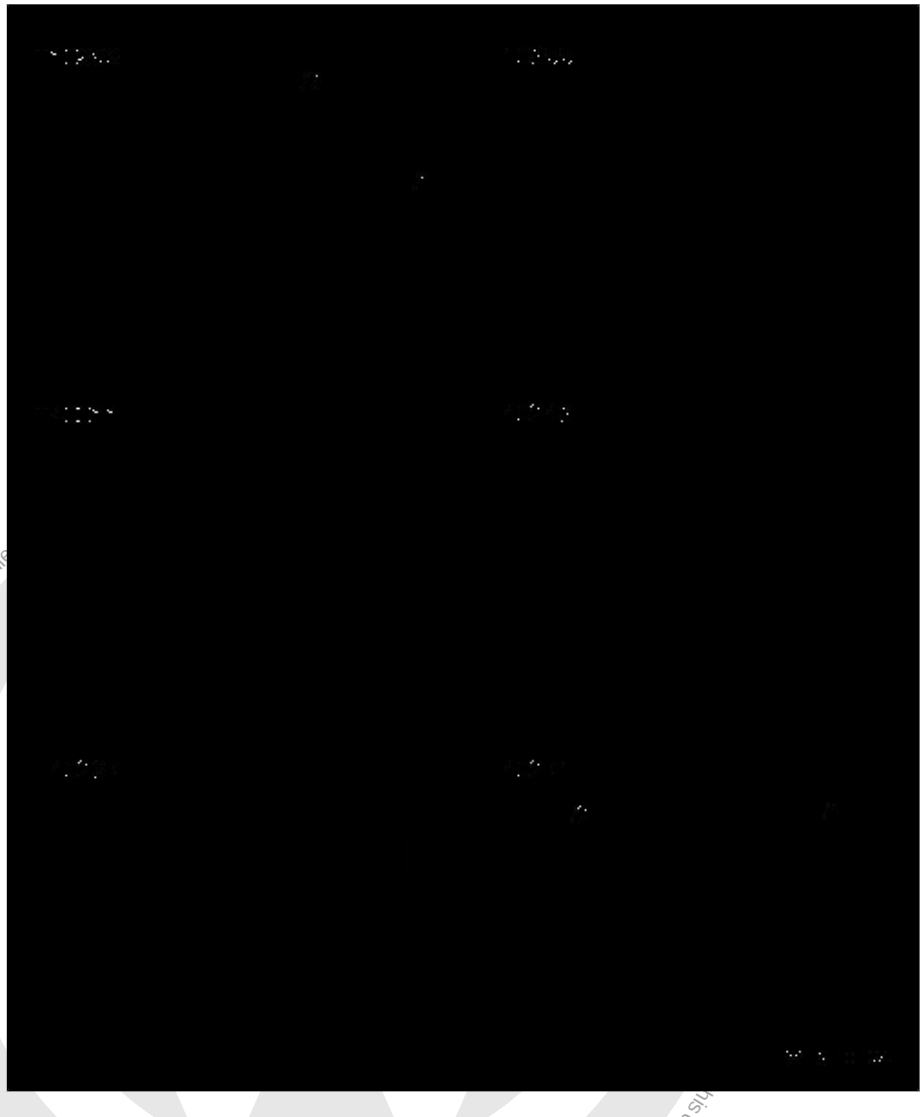
Procedure
⇒ “2.4.2 Removing and installing cylinder head and camshaft timing chain”, page 163 .

2.4.1 Removing and installing cylinder head

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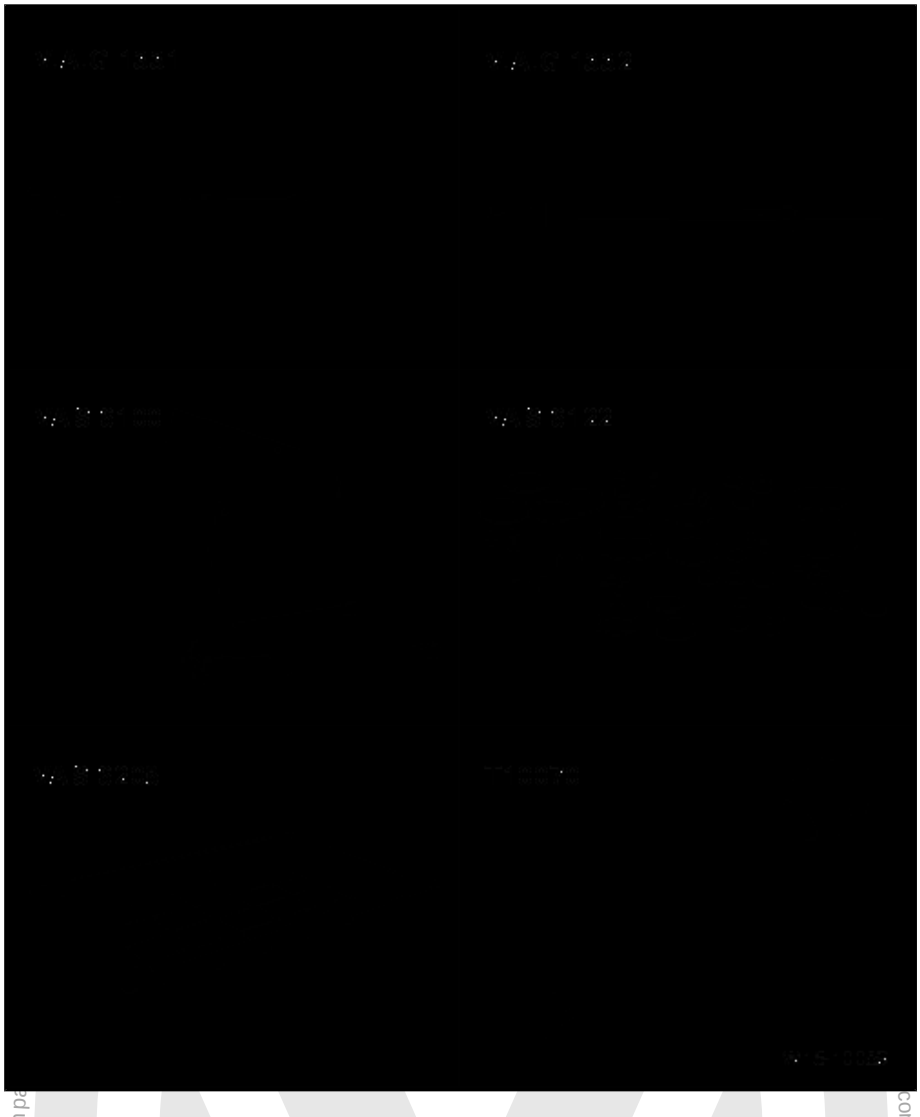
Special tools and workshop equipment required

- Assembly tool - T10352-
- Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB: assembly tool - T10352/1-
- Counterhold tool - T10355-
- Locking pin - T40011-
- Assembly lever - T40243-
- Locking tool - T40267-
- Camshaft clamp - T40271-

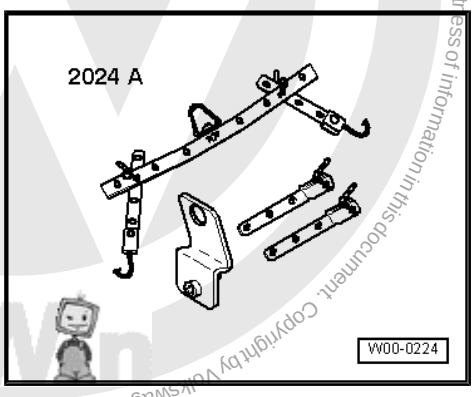


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- Torque wrench - V.A.G 1331-
- Torque wrench - V.A.G 1332-
- Workshop hoist - VAS 6100-
- Engine plug set - VAS 6122-
- Drip tray for workshop hoist - VAS 6208-
- Polydrive cylinder head bolts: Special wrench, long reach - T10070-
- Cylinder head bolts with multi-point socket: Multi-point socket 12 mm

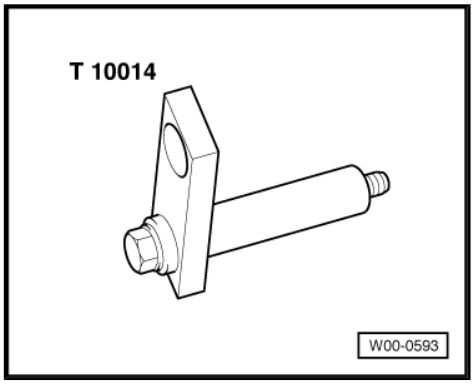


- Lifting tackle - 2024 A-

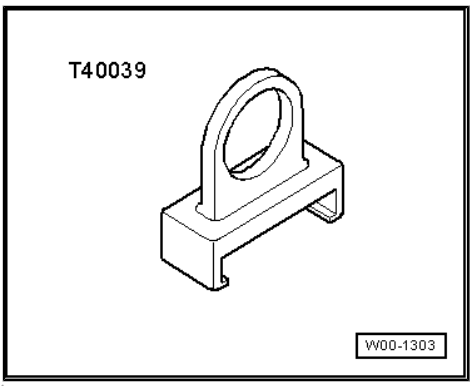


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- Holder - T10014-



- Puller - T40039-



Removing:

Note

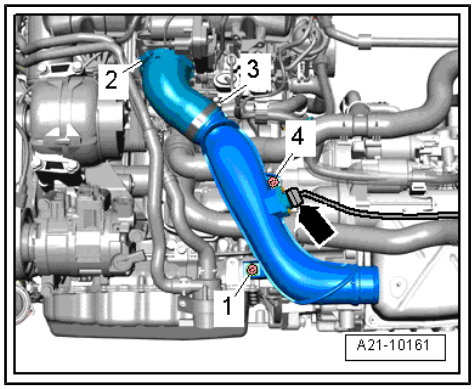
- *Fit cable ties in the original positions when installing.*
- *Always seal open channels of the intake and exhaust systems with suitable plugs. For example, those from engine bung set - VAS 6122- .*

– Pull off engine cover panel ⇒ page 139 .

– Remove air filter housing ⇒ page 459 .

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– Release hose clip -2-.
– Unscrew bolt -4-.
– Disconnect electrical connector -arrow- and move electrical wires clear.



WARNING

Danger of scalding due to steam and hot coolant.

On a warm engine, the cooling system is under high pressure.

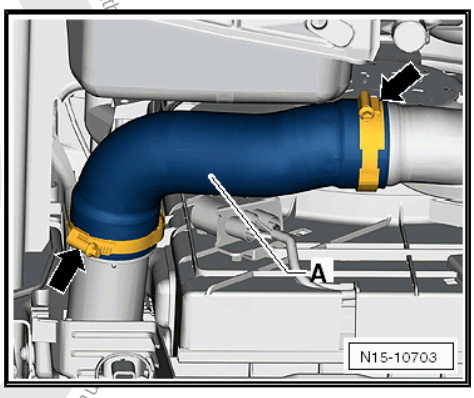
Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Open filler cap on expansion tank.
– Remove front exhaust pipe with catalytic converter:

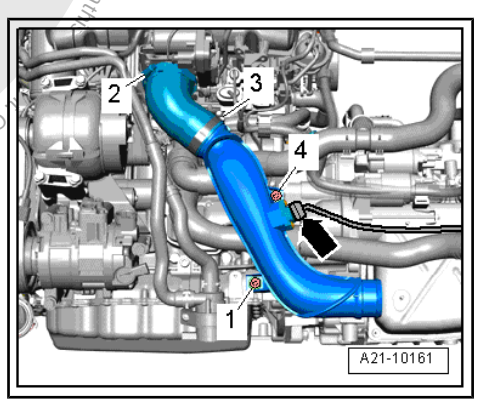
  Passat, CC ⇒ page 517

  Golf, Eos, Scirocco ⇒ page 533

  Tiguan ⇒ page 543
– Remove front right wheel.
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .
– Remove right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .
– Drain coolant ⇒ page 235 .
– Remove charge air hose -A-.

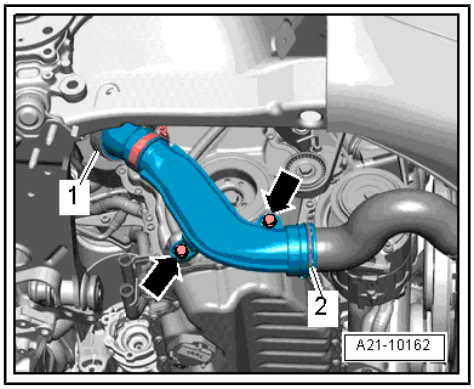


– Remove bolt -1- and take out air pipe downwards.

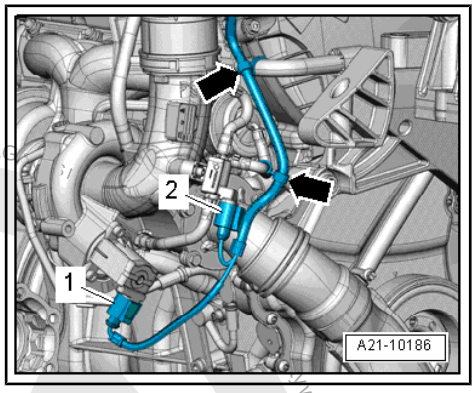


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– Remove bolts -arrows-.
– Remove air pipe (lift clips -items 1 and 2-).



– Separate electrical wiring connections -1 and 2- and place electrical wiring to one side -arrows-.

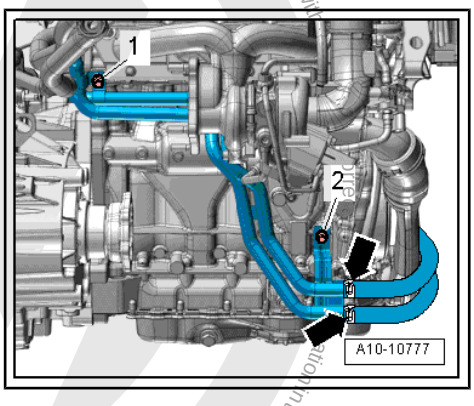


Vehicles with seat heating:

– Unscrew bolts -1 and 2- and move coolant pipes to the left.

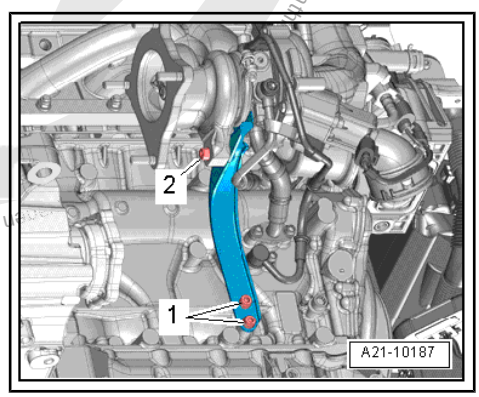
Vehicles with all-wheel drive:

– Remove right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Removing and installing drive shafts .



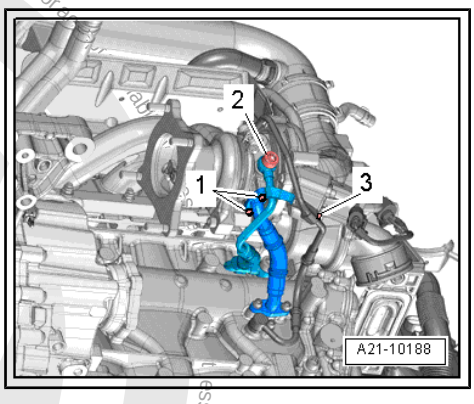
All vehicles:

– Remove bolts -1 and 2- and detach support for turbocharger.



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– Remove banjo bolt -2- and move coolant pipe clear to one side.



Vehicles with front-wheel drive:

– Remove bolts -1- on oil return line.

Vehicles with all-wheel drive:

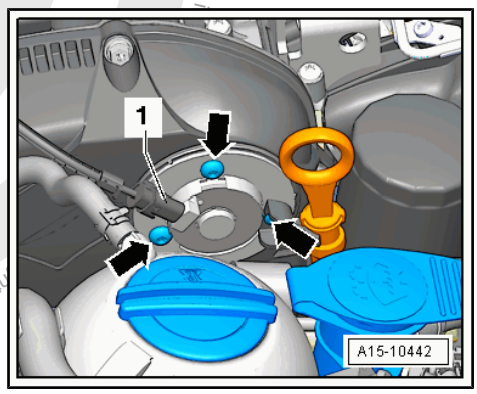
– Remove bolts of oil return line at crankcase.

All vehicles:

– Remove bolt -3- on oil supply line.

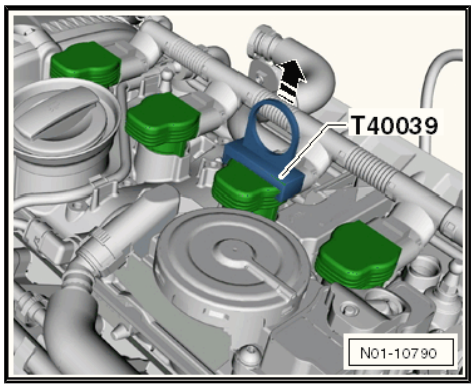
– Only vehicles with sound generator: Remove charge air duct to sound generator.

– Pull connector -1- off camshaft control valve 1 - N205- .



– Detach connectors from ignition coils and place wiring harness to one side.

– Remove ignition coils using puller - T40039- .

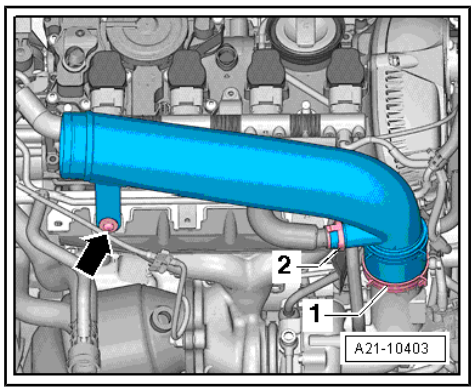


Engine codes BZB, CAWA, CAWB, CGYA, CDAA:

– Unscrew bolt -arrow- for air pipe.

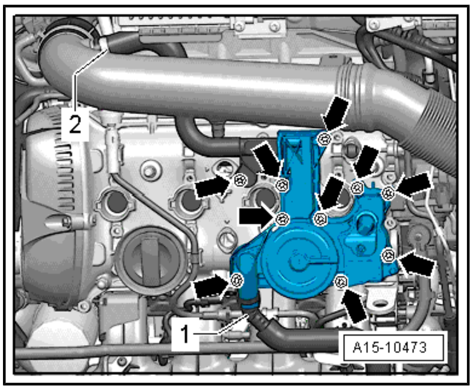
– Remove air pipe, loosening hose clip -1- to do so.

– Press release tabs -2-, and pull crankcase breather off air hose.



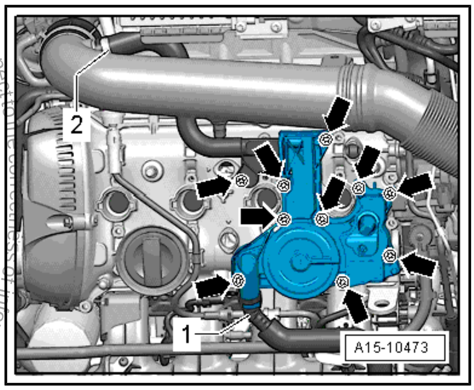
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– Disconnect crankcase breather hose -1-.
– Remove bolts -arrows- and remove crankcase breather.

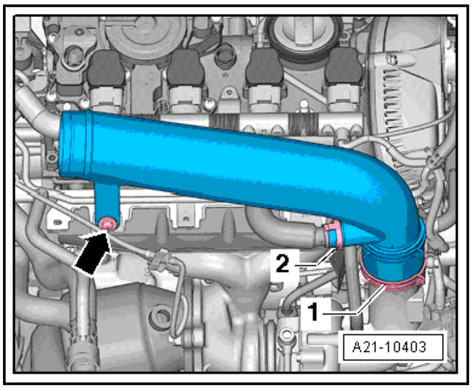


Engine codes CBFA, CCTA, CCTB:

– Disconnect crankcase breather hose -1-.
– Unscrew bolts -arrows-.

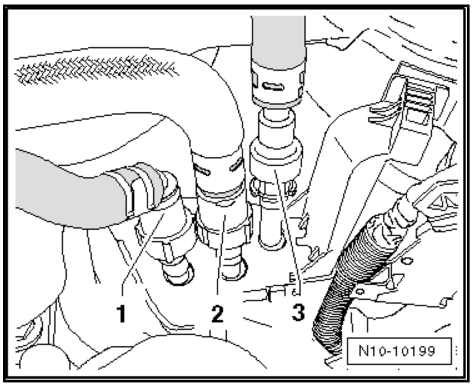


– Unscrew bolt -arrow- for air pipe.
– Loosen hose clip -1- and remove air pipe together with crankcase breather.



All:

> **WARNING**
>
> *The fuel line is under pressure.*
>
> *Fuel poses danger of injury to eyes and skin.*
>
> *Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.*

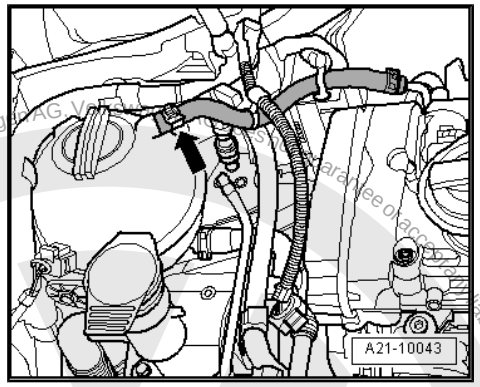


– Detach lines -1 to 3- from the fuel transfer point.
1) Breather hose
2) Vacuum line (only CBFA, CCTA, CCTB)
3) Fuel supply line

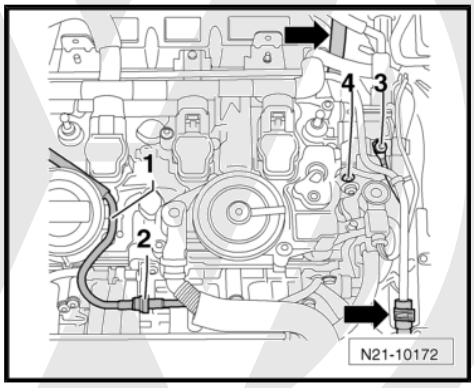
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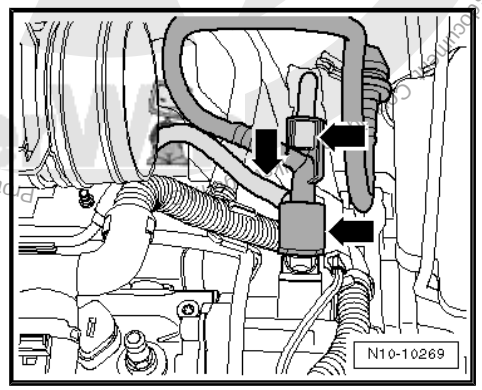
– Disconnect coolant line to coolant expansion tank -arrow-.



– Remove coolant hoses -arrows- from coolant pipe.
– Unbolt earth cable -3- and loosen bolt -4-.



– Pull off vacuum hoses -arrows-.



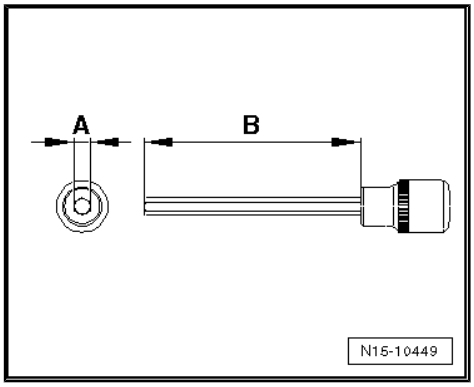
– Unscrew bolts -1…3- and remove heat shield together with coolant pipe.
– Unscrew oil supply line -4- from turbocharger.



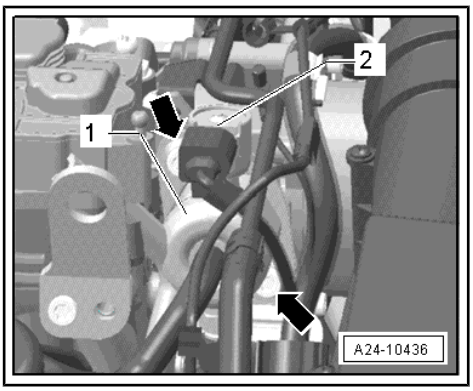
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Note

Unscrew bolt -2- from heat shield using a 6 mm hex key -A-. The hexagon faces must be at least 5 cm long -B-. A socket which tapers to 6 mm at the tip is too thick.

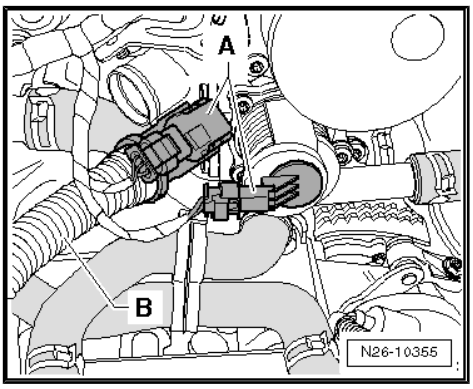


– Pull off electrical connector -2- from fuel pressure regulating valve - N276- .

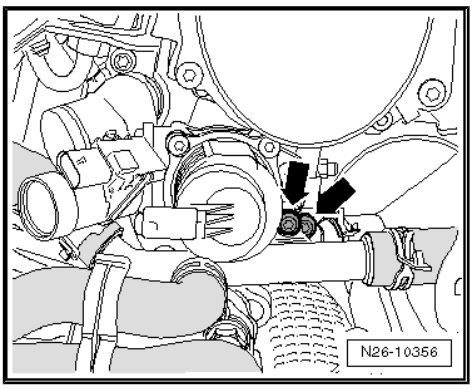


Engine code CBFA:

– Pull connector -A- and hose -B- from secondary air inlet valve - N112- .



– Loosen coolant pipe by unscrewing bolts -arrows-.



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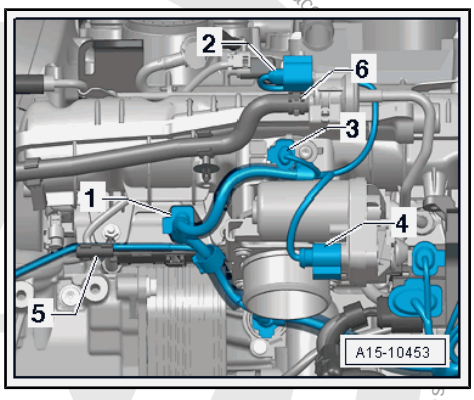
All:

– Pull coolant hose from union on side of cylinder head.

– Separate electrical connectors -1- to 4-.

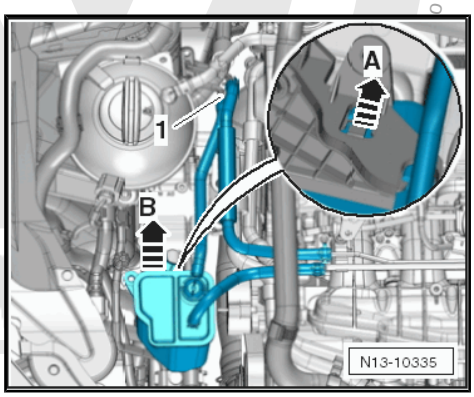
– Place electrical cable -5- to one side.

– Pull off vacuum line -6- leading to activated charcoal filter.



Golf, Scirocco:

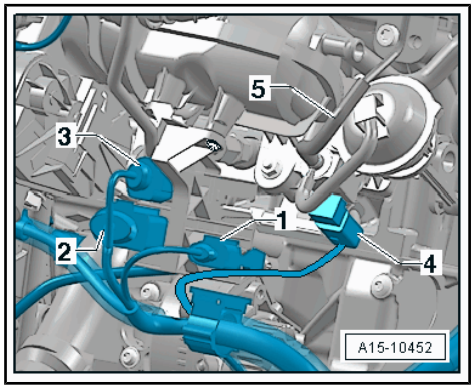
– Pull off breather line -1-, release activated charcoal filter -A- and remove upwards -B-.



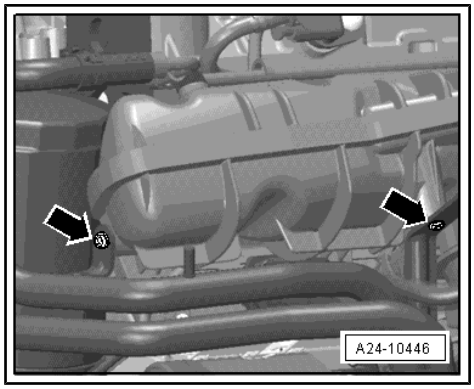
All:

– Separate electrical connectors -1- and pull out connectors from retainer.

– Separate electrical connectors -2 to 4-.



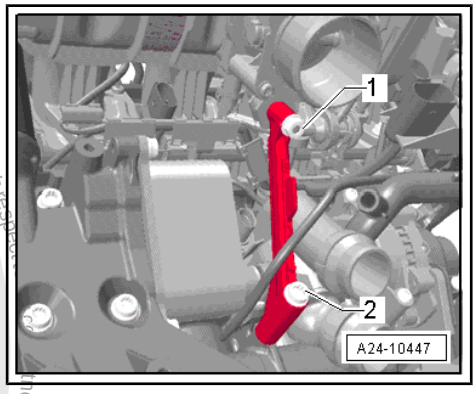
– Unscrew bolts -arrows- and detach coolant pipes from intake manifold.



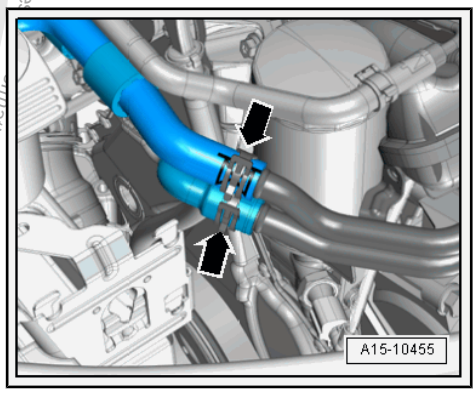
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– Remove intake manifold support (remove securing nut -1- and bolt -2-).

– Removing oil filter

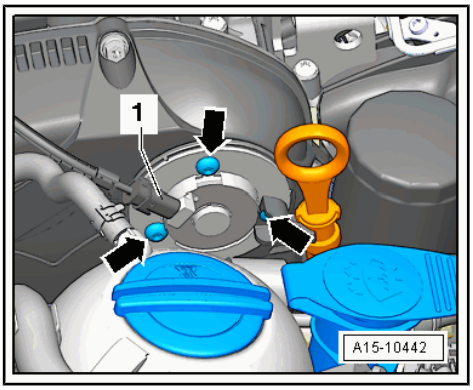


– Disconnect coolant hoses -arrows- and move clear.



– Unscrew bolts -arrows- and remove inlet camshaft control valve 1 - N205- .

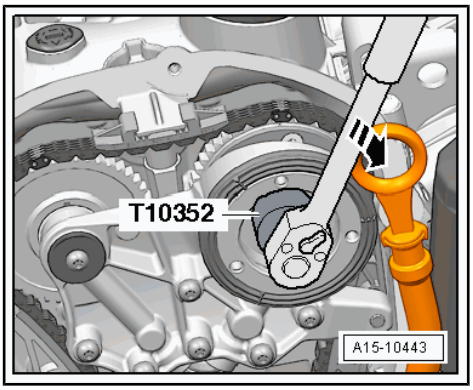
– Remove timing chain cover (top) ⇒ page 90 .



Caution

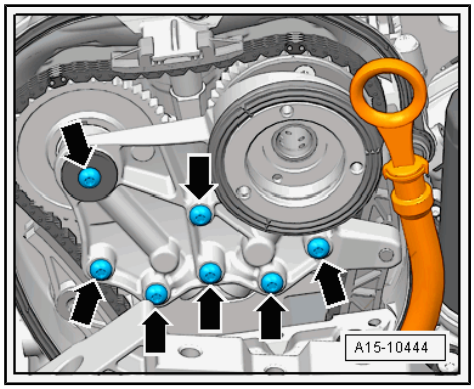
The control valve has a left-hand thread.

– Remove control valve using assembly tool - T10352- (engine codes CCZA, CCZB, CDAA, CDAB: assembly tool - T10352/1-) in -direction of arrow-.



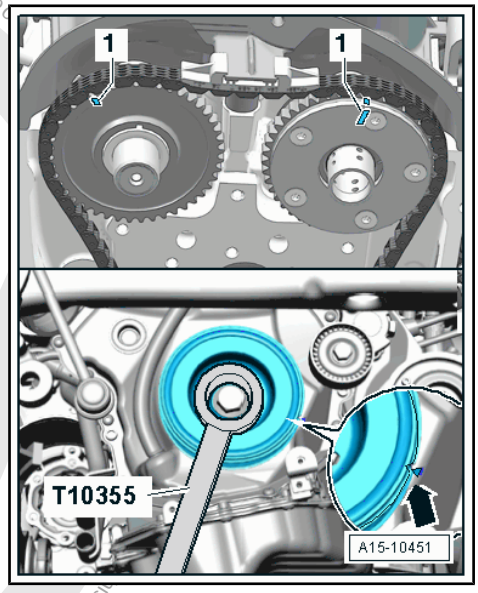
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– Remove bolts -arrows- and detach bearing saddle.



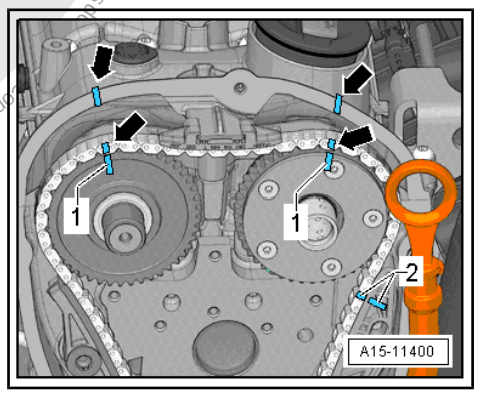
– Turn vibration damper to “TDC” position -arrow- using counterhold - T10355- .

- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).
- The markings -1- on the camshafts must face upwards.

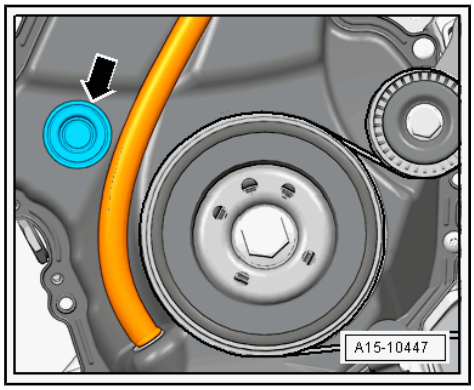


– Mark positions of sprocket markings -1- on camshaft timing chain and cylinder head -arrows- using a permanent felt tip marker.

– Also mark alignment of camshaft timing chain -2- relative to guide rail of camshaft timing chain using a permanent felt tip marker.

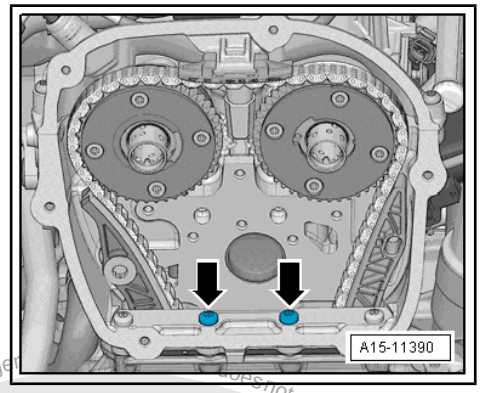


– Remove sealing plug -arrow-.

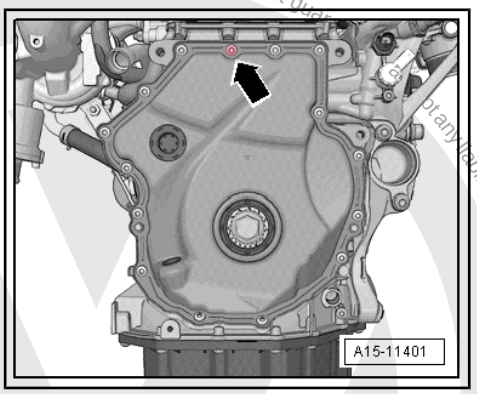


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– Unscrew bolts -arrows-.

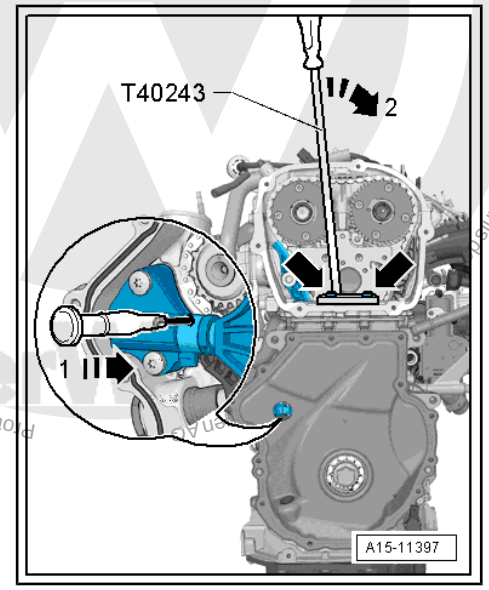


– Unscrew bolt -arrow-.



Depending on version, either of two different chain tensioners may be installed. Version 1:

– Screw in lever - T40243- -arrows-.



Note

- *If it is not possible to insert the lever - T40243- , the distance between the timing chain and the oil deflector on the lower cover is too small. It is then necessary to remove the lower cover.*
- *Passat, CC ⇒ page 92*
- *Golf, Eos, Scirocco ⇒ page 98*
- *Tiguan ⇒ page 105*

– Raise locking element of chain tensioner -arrow 1-. To do this, grind the tip of the locking pin - T40011- to a point. A screwdriver with a blade width of approx. 1.5 mm can also be used.

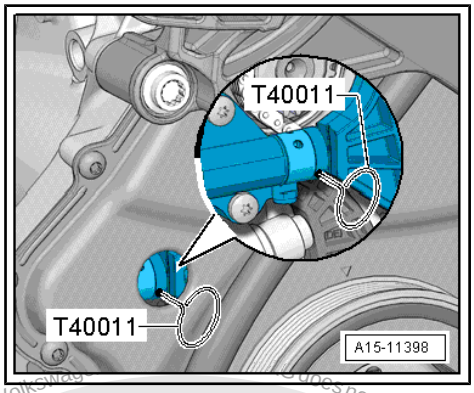
Caution

Avoid damage to chain tensioner! Proceed with great care.

– Slowly push valve lever - T40243- in -direction of arrow 2- and hold it in that position.

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– Secure chain tensioner with locking pin - T40011- .



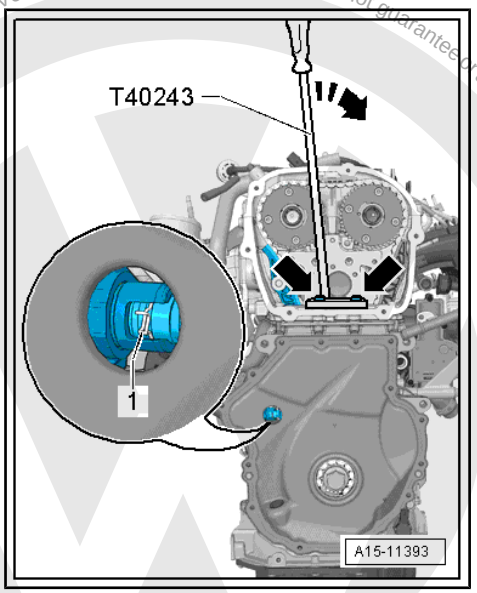
Version 2:

– Screw in lever - T40243- -arrows-.

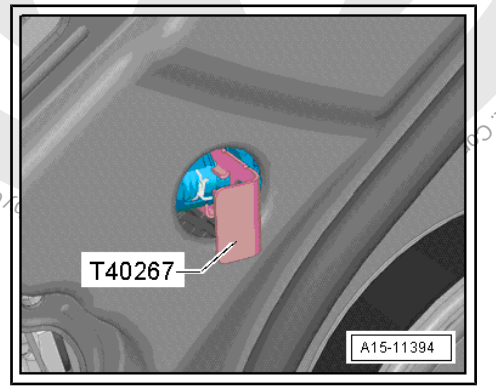
Note

- *If it is not possible to insert the lever - T40243- , the distance between the timing chain and the oil deflector on the lower cover is too small. It is then necessary to remove the lower cover.*
- *Passat, CC ⇒ page 92*
- *Golf, Eos, Scirocco ⇒ page 98*
- *Tiguan ⇒ page 105*

– Press together securing clip -arrow- of chain tensioner. Then, slowly push lever - T40243- in -direction of arrow- and hold it in that position.



– Secure chain tensioner with locking pin - T40267- .

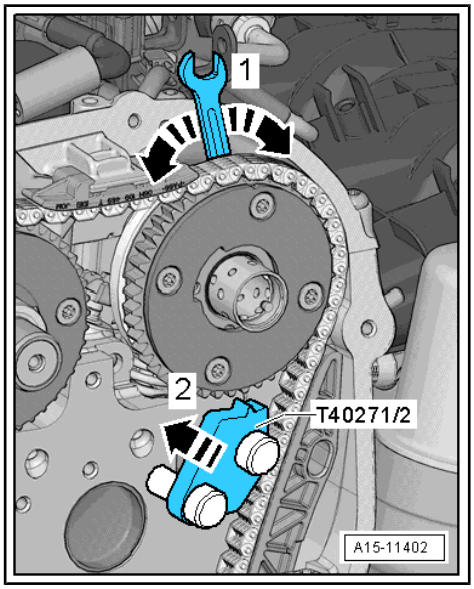


Continued for all:

– Remove lever - T40243- .

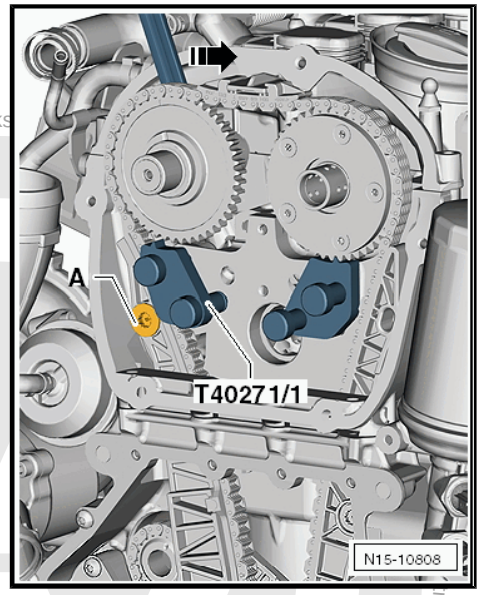
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– Bolt camshaft clamp - T40271/2- to cylinder head and insert it in direction of arrow -2- between teeth of sprocket. If necessary turn inlet camshaft in direction of arrow -1- using spanner.

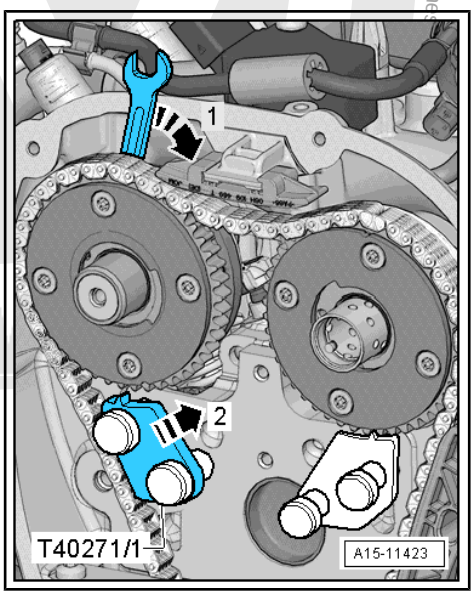


– Bolt camshaft clamp - T40271/1- to cylinder head. Counter-hold camshaft clockwise -arrow- using open-end spanner.

– Remove bolt -A- and take out tensioning rail downwards. In the process, continue to counterhold the camshaft.



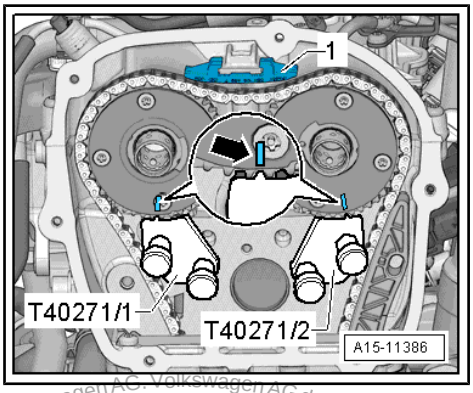
– Turn exhaust camshaft clockwise -1- until camshaft clamp - T40271/1- can be inserted into sprocket splines -2-.



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– Use screwdriver to release fastener and press off top guide rail towards front -1-. Mark position of sprockets -arrow- relative to camshaft clamp.

– Remove camshaft timing chain from camshaft sprockets.

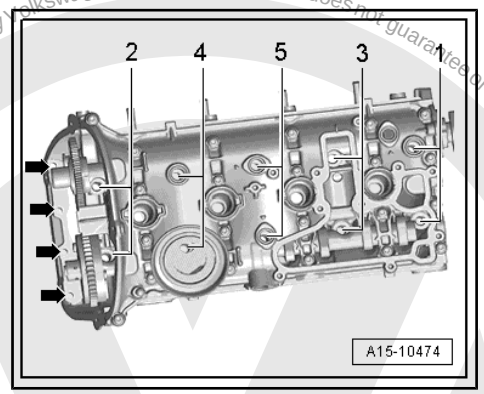


Caution

Avoid damage to valves and piston crowns.

- *Do not turn the crankshaft after the camshaft timing chain has been removed from the cylinder head.*

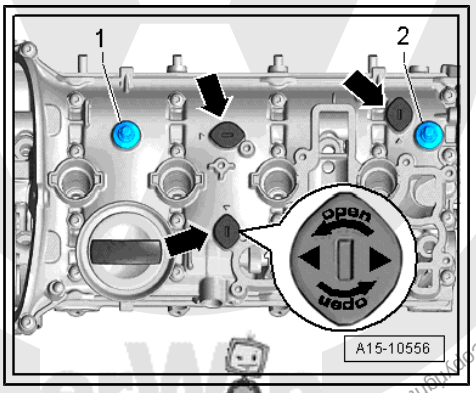
– If a cylinder head cover without sealing plugs for the cylinder head bolts -5- is installed, remove the camshafts ⇒ page 183 .



– If a cylinder head cover with sealing plugs for all cylinder head bolts is installed, turn sealing plugs -arrows- anti-clockwise in direction of -arrow- by 90° and remove.

– Unscrew ball head -1 … 2-.

– Remove filler cap.

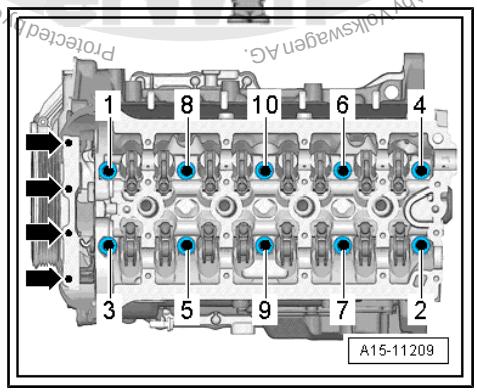


Multi-point socket head bolt with shoulder:

– Remove camshafts ⇒ page 183 .

– Unscrew bolts -arrows-.

– Unscrew and remove cylinder head bolts in the sequence -1 to 10-.

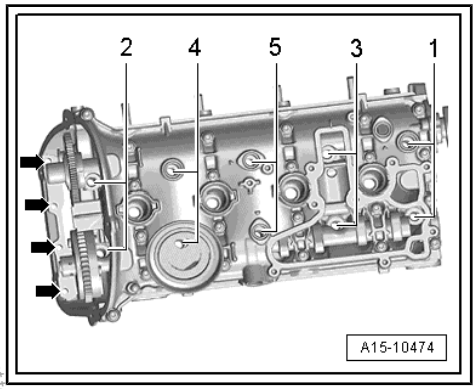


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Polydrive bolts:

– Unscrew bolts -arrows-.

– Unscrew cylinder head bolts using polydrive bit and socket - T10070- in sequence -1 to 5-.



Note

- *Make sure all hoses/pipes and wiring are removed.*
- *Ensure tensioning rail and guide rail are not damaged when lifting off cylinder head.*

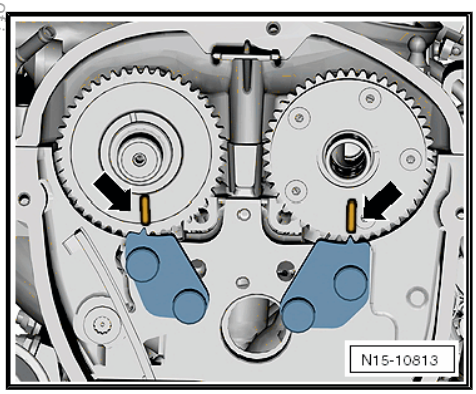
– Remove cylinder head.

– Place cylinder head onto soft surface (foam plastic).

Install cylinder head ⇒ page 160 .

If the camshafts are renewed, the markings which you applied earlier must be transferred. To do so, proceed as follows:

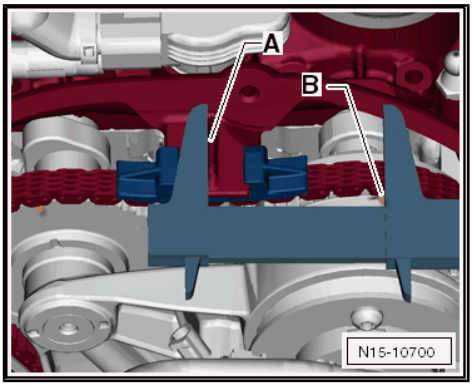
– Mark alignment of camshaft sprockets relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2- on removed cylinder head -arrow-.



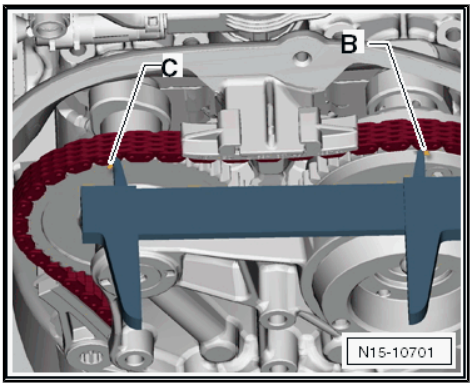
Note

The following measurement of distances is later used to check whether the markings have been correctly transferred.

– Measure distance from left outer edge of web -A- to marking -B- on inlet camshaft and record figure.

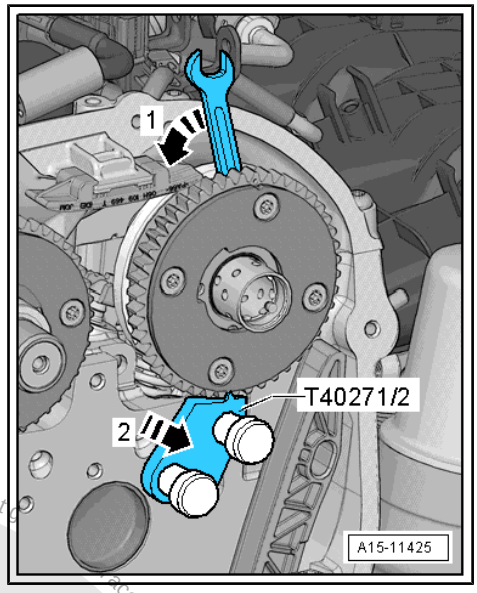


– Measure distance from marking on inlet camshaft -B- to marking on exhaust camshaft -C- and record figure.

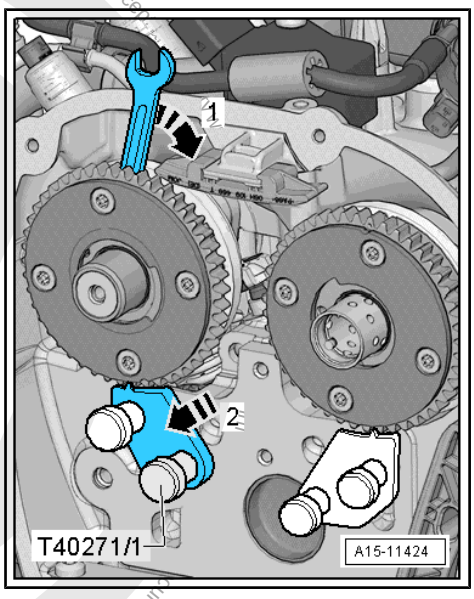


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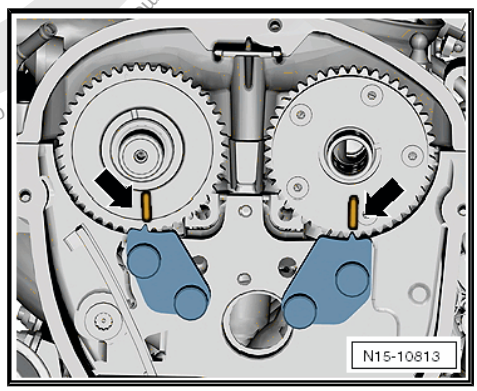
– Turn inlet camshaft in direction of arrow -1- using spanner, slide camshaft clamp - T40271/2- from between teeth of sprocket -2-and move camshaft into rest position.
– Remove camshaft clamp - T40271/2- .



– Turn exhaust camshaft in direction of arrow -1- using spanner, slide camshaft clamp - T40271/1- from between teeth of sprocket -2-and move camshaft into rest position.
– Remove camshaft clamp - T40271/1- .

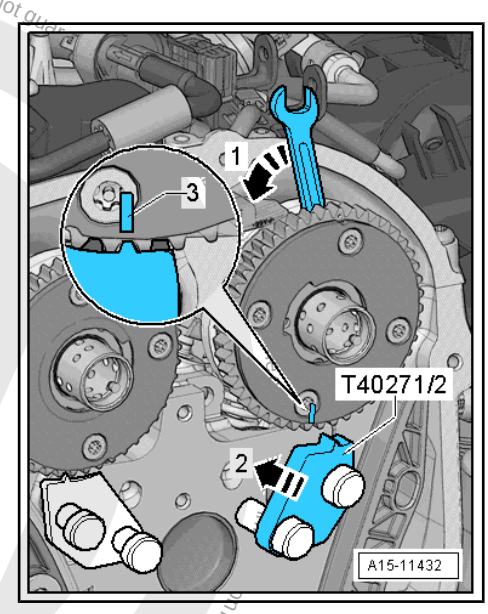


Now complete cylinder head which is to be installed and transfer markings applied when removing.

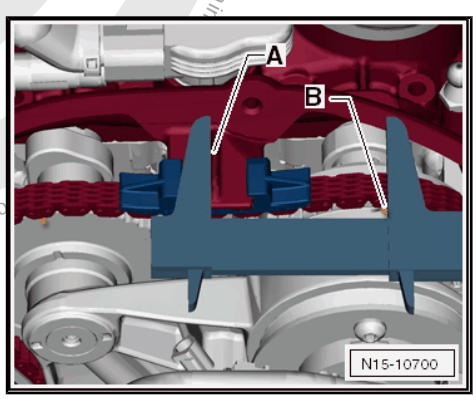


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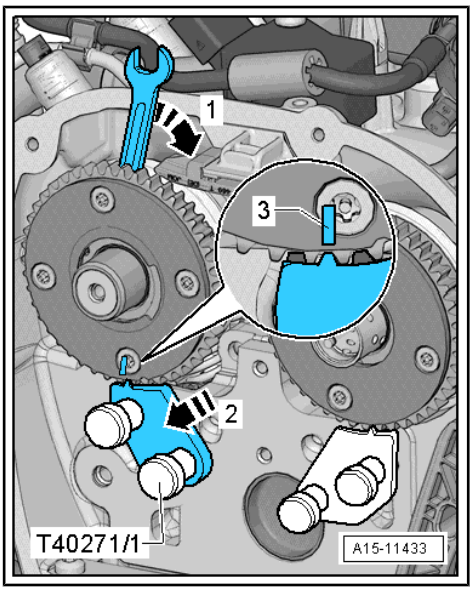
– Bolt camshaft clamp - T40271/2- to cylinder head to be installed.
– Turn inlet camshaft in direction of arrow -1- until marking -3- aligns with camshaft clamp - T40271/2- .
– Insert camshaft clamp - T40271/2- into teeth of sprocket -2-.



– Compare distance from left outer edge of web -A- to marking -B- with figure recorded earlier.

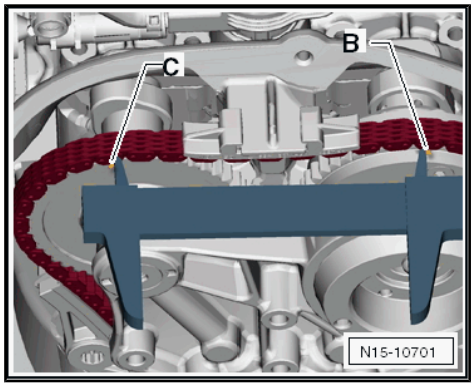


– Bolt camshaft clamp - T40271/1- to cylinder head.
– Turn exhaust camshaft in direction of arrow -1- until marking -3- aligns with camshaft clamp - T40271/1- .
– Insert camshaft clamp - T40271/1- into teeth of sprocket -2-.



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– Compare distance from marking on inlet camshaft -B- to marking on exhaust camshaft -C- with figure recorded earlier.



Installing cylinder head:

- Specified torques ⇒ page 135 .

Caution

Avoid damage to sealing surfaces.

- *Carefully remove sealant residue from cylinder head and cylinder block.*
- *Ensure that no long scores or scratches are made on the surfaces.*

Avoid damage to cylinder block.

- *No oil or coolant must be allowed to remain in the blind holes for the cylinder head bolts in the cylinder block.*

Ensure that cylinder head gasket seals properly:

- *Carefully remove remains of emery and abrasives.*
- *Do not remove new cylinder head gasket from packaging until it is ready to be fitted.*
- *Handle the cylinder head gasket very carefully to prevent damage to the silicone coating or the indented area of the gasket.*

Avoid damage to open valves.

- *When installing an exchange cylinder head, the plastic protectors fitted to protect the open valves should not be removed until the cylinder head is ready to be fitted.*

Avoid damage to valves and piston crowns after working on valve gear.

- *Turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*

Note

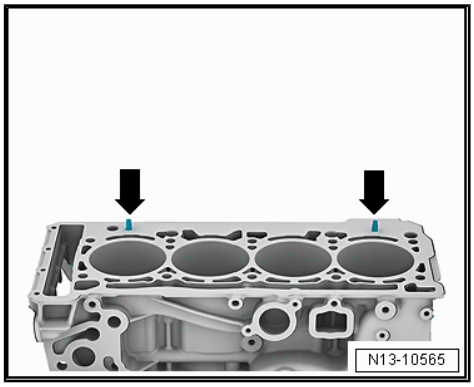
- *Renew bolts which must be tightened further to a torque angle.*
- *Renew self-locking nuts as well as gaskets, seals and O-rings.*
- *When installing a exchange cylinder head, the contact surfaces between hydraulic compensation elements, roller rocker fingers and cams must be oiled before installing the camshafts.*
- *Hose connections and air duct pipes must be free of oil and grease before assembly.*
- *Secure all hose connections with the same type of hose clips as original equipment ⇒ Electronic parts catalogue .*
- *In order to be in a position to securely attach the charge air hoses on their connections, the worm screws of the used hose clips have to the sprayed with penetrating spray before installing.*

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– Position cylinder head gasket.

♦ Note centring pins in cylinder block -arrows-.

♦ Check installation position of cylinder head gasket. Characteristic: the part number should be legible from the inlet side.



Caution

When turning the crankshaft, pull the timing chain upwards until taut so that it does not become jammed.

– 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 cylinder head:

Tightening sequence
⇒ Fig. ““Cylinder head - tightening sequence, camshaft installed”“ , page 138

Tightening sequence
⇒ Fig. ““Cylinder head - tightening sequence, camshaft removed”“ , page 138

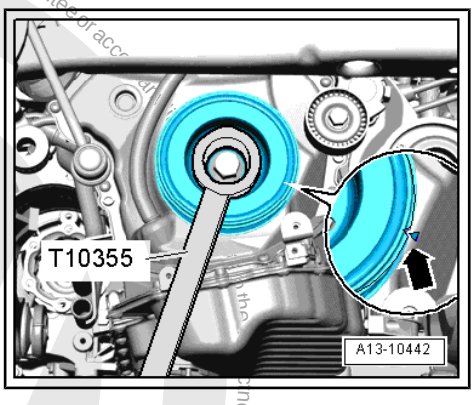
– Install camshafts if removed ⇒ page 183 .

Caution

When turning the crankshaft, pull the timing chain upwards until taut so that it does not become jammed.

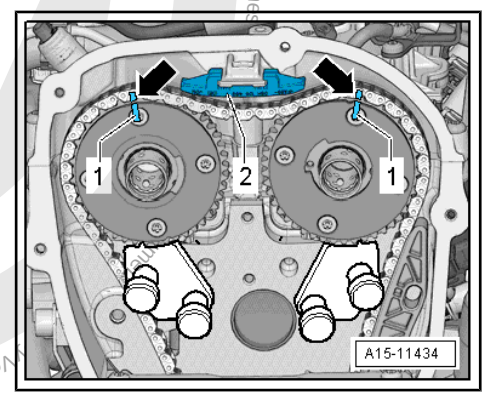
– Turn vibration damper to “TDC” position -arrow- using counterhold - T10355- .

• Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).



– Fit camshaft timing chain on sprockets. To do this, align markings on chain links -arrows- with markings on sprockets -1-.

– Install upper guide rail -2-.

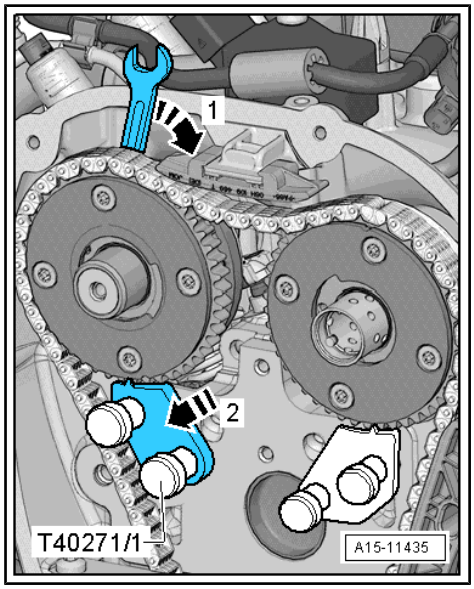


Note

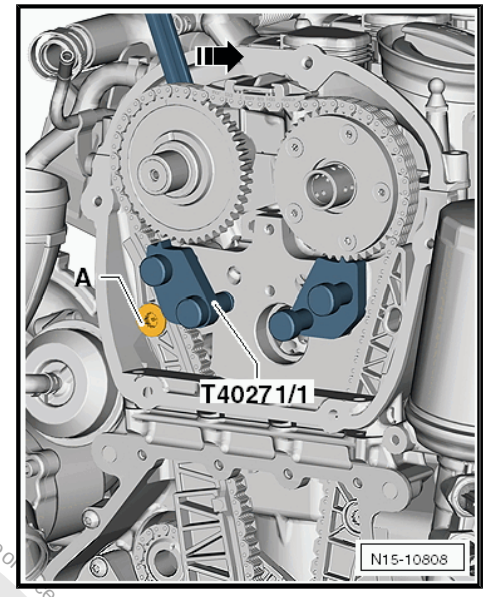
Have a second mechanic hold the exhaust camshaft.

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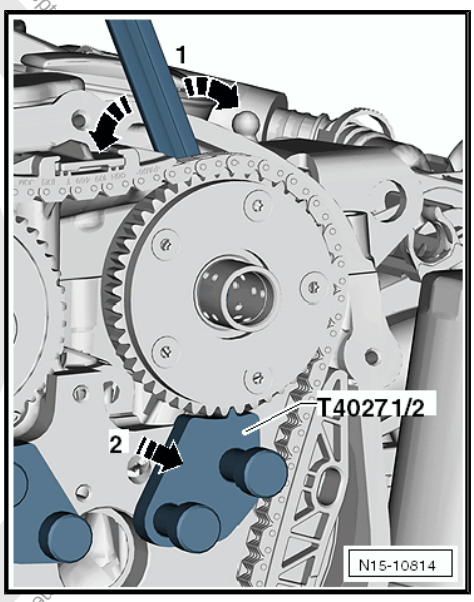
– Slowly turn exhaust camshaft in direction of arrow -1- until camshaft clamp - T40271/1- can be withdrawn from sprocket teeth -2-.
– Carefully relieve load on camshaft until camshaft timing chain lies against upper guide rail. Hold camshaft in this position.



– Continue to hold camshaft and install tensioning rail for camshaft timing chain. Tighten bolt -A-.
– Remove camshaft clamp - T40271/1- .

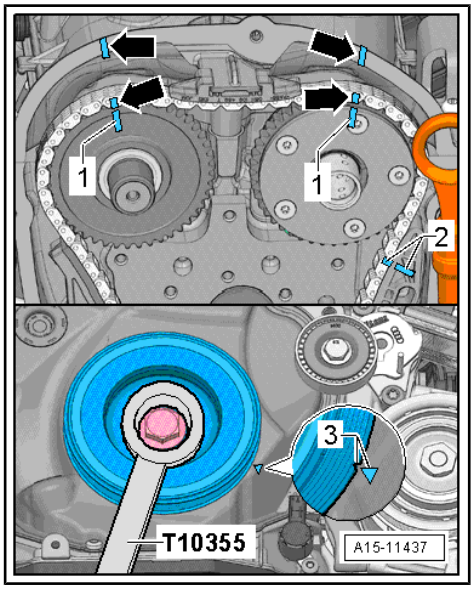


– Slide camshaft clamp - T40271/2- out of sprocket teeth -2-, if necessary turning inlet camshaft slightly using spanner -1-.
– Remove camshaft clamp - T40271/2- .



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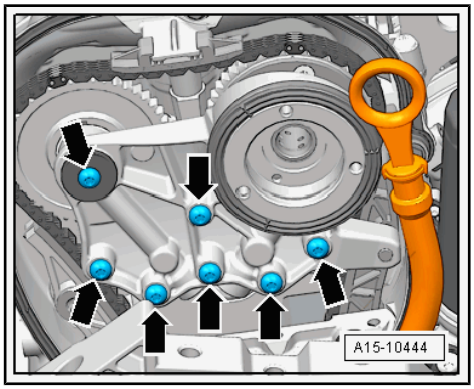
– Check markings. Markings on camshaft timing chain and cylinder head -arrows- must align with markings on sprockets -1-.
– Markings on camshaft timing chain and on guide rail of camshaft timing chain -2- must also align.
– Notch on vibration damper must align with marking on lower timing chain cover -3-.



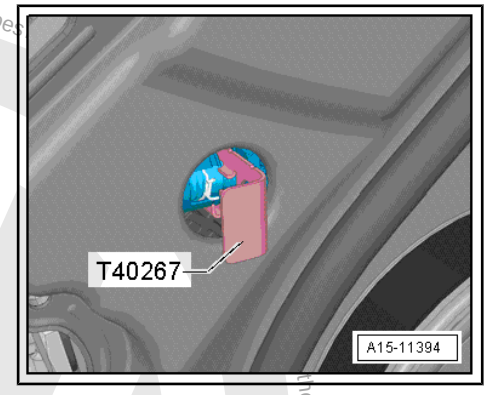
Note

If the previously marked markings are not visible anymore, check valve timing ⇒ page 133 .

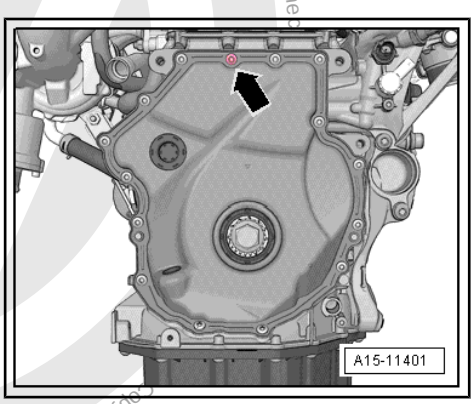
– Fit bearing saddle uniformly. Do not cant bearing saddle! Screw in bolts -arrows- and tighten by hand.
– Tighten bolts -arrows- for bearing saddle ⇒ page 111 .



– Depending on version, remove locking pin - T40011- or locking tool - T40267- .



– Screw in bolt -arrow-.
– Install control valve ⇒ Item 6 (page 112) .



Now continue installing in reverse order of removal, observing the following:

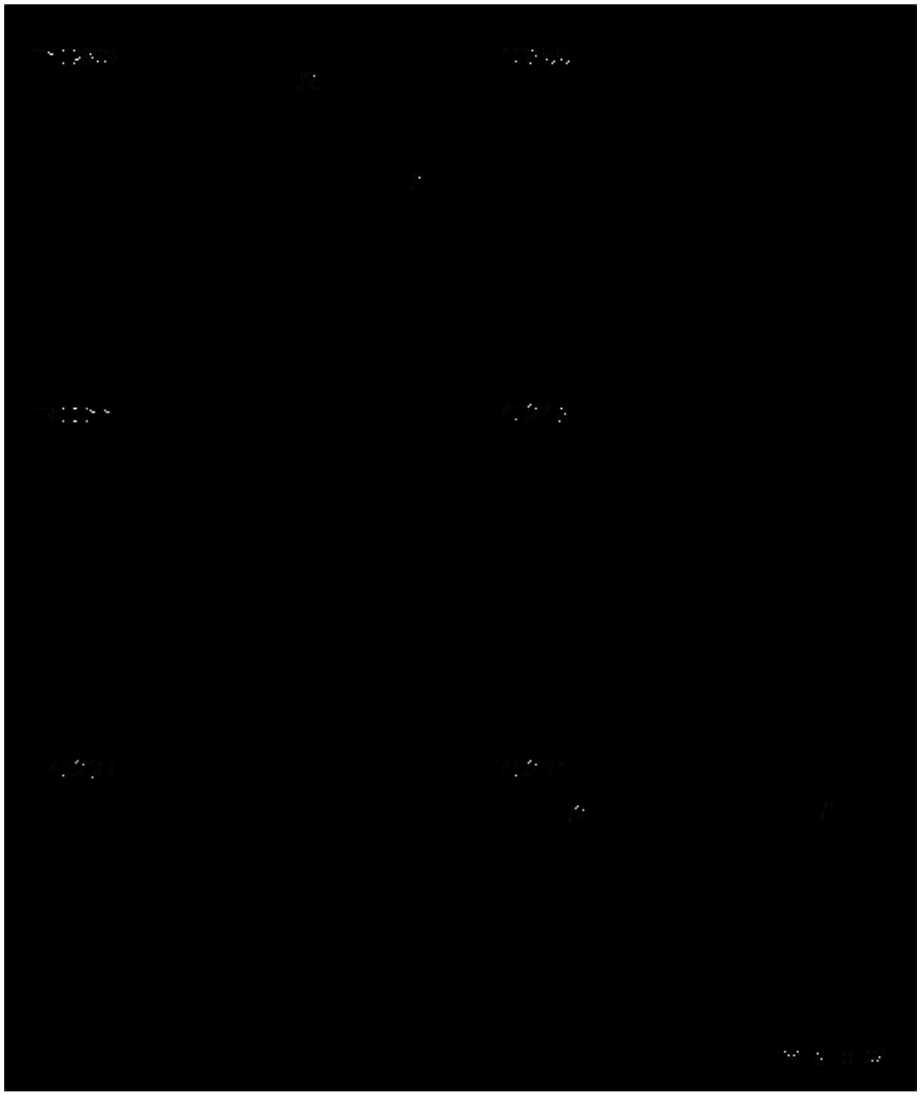
– Change engine oil.
– Add coolant ⇒ page 235 .

2.4.2 Removing and installing cylinder head and camshaft timing chain

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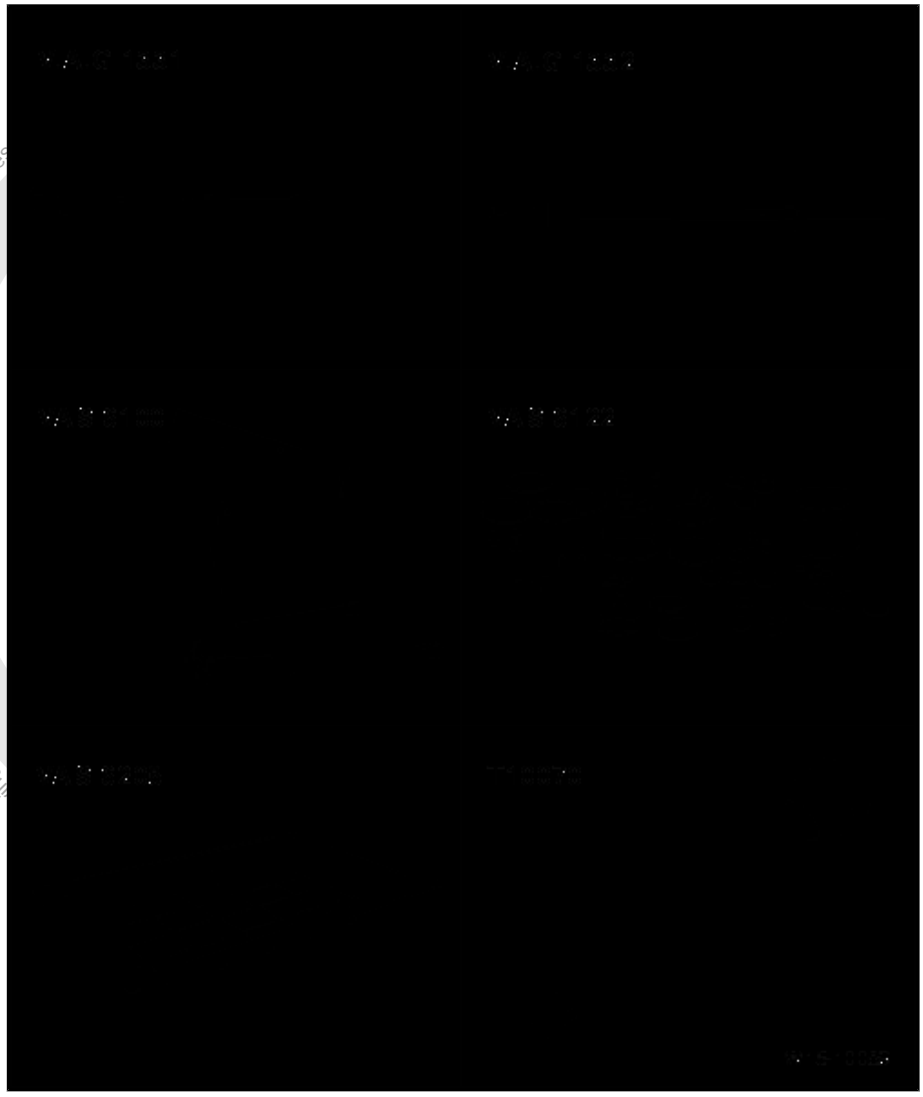
Special tools and workshop equipment required

- Assembly tool - T10352-
- Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB: assembly tool - T10352/1-
- Counterhold tool - T10355-
- Locking pin - T40011-
- Assembly lever - T40243-
- Locking tool - T40267-
- Camshaft clamp - T40271-

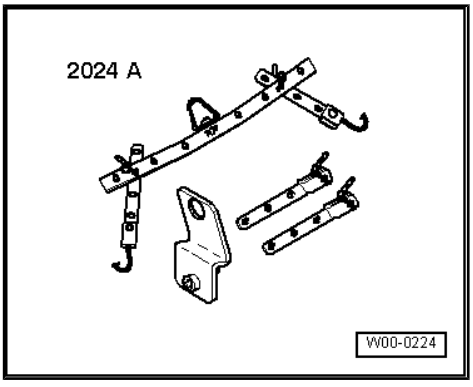


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- Torque wrench - V.A.G 1331-
- Torque wrench - V.A.G 1332-
- Workshop hoist - VAS 6100-
- Engine plug set - VAS 6122-
- Drip tray for workshop hoist - VAS 6208-
- Polydrive cylinder head bolts: Special wrench, long reach - T10070-
- Cylinder head bolts with multi-point socket: Multi-point socket 12 mm

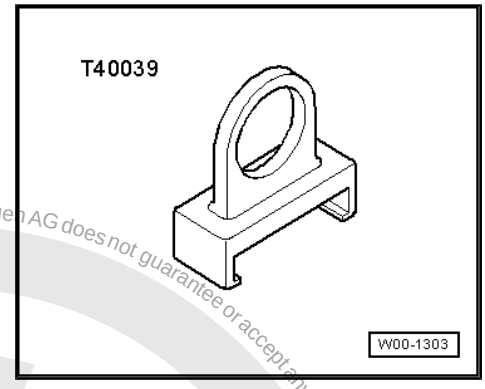


- Lifting tackle - 2024 A-



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- Puller - T40039-

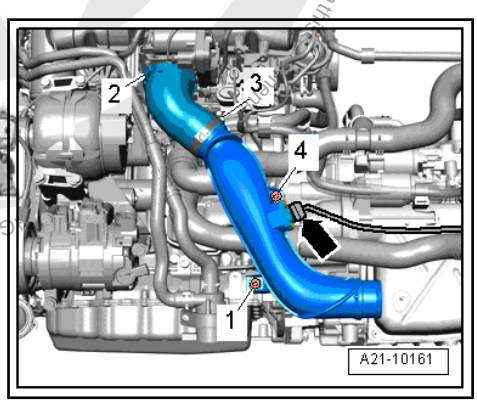


Removing:

Note

- *Before the cylinder head is removed, the engine support and engine mounting must be reinstalled temporarily, because the eyes of the support bracket are secured to the cylinder head.*
- *Fit the cable ties in the original position when installing.*
- *Seal open channels of intake and exhaust system with suitable plugs from engine bung set - VAS 6122- .*

– Pull off engine cover panel ⇒ page 139 .
– Remove air filter housing ⇒ page 459 .
– Release hose clip -2-.
– Unscrew bolt -4-.
– Disconnect electrical connector -arrow- and move electrical wires clear.



WARNING

Danger of scalding due to steam and hot coolant.

On a warm engine, the cooling system is under high pressure.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Open filler cap on expansion tank.
– Remove front exhaust pipe with catalytic converter:

  Passat, CC ⇒ page 517

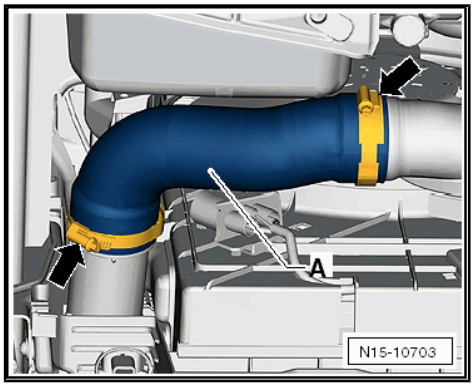
  Golf, Eos, Scirocco ⇒ page 533

  Tiguan ⇒ page 543
– Remove front right wheel.
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .
– Remove right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .
– Drain coolant ⇒ page 235 .

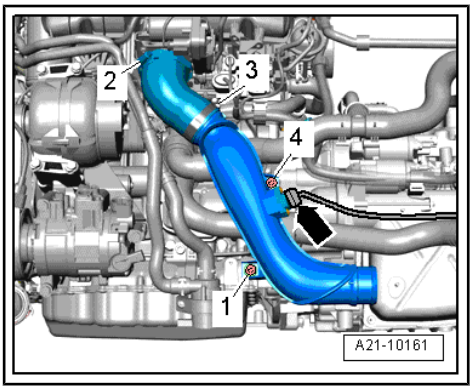
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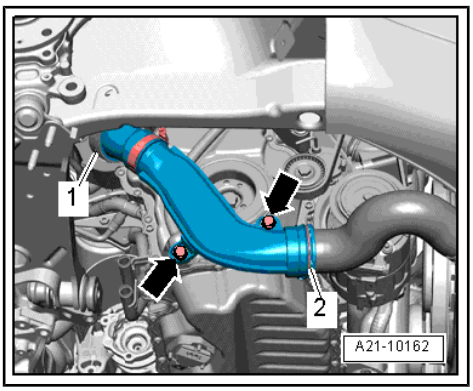
– Remove charge air hose -A-.



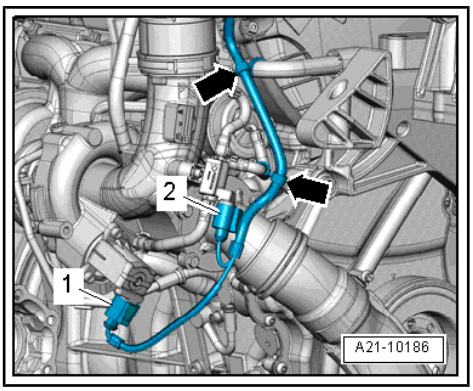
– Remove bolt -1- and take out air pipe downwards.



– Remove bolts -arrows-.
– Remove air pipe (lift clips -items 1 and 2-).



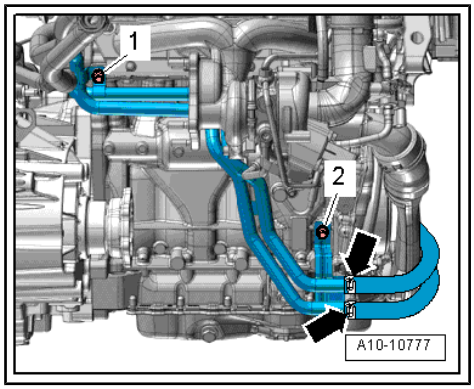
– Separate electrical wiring connections -1 and 2- and place electrical wiring to one side -arrows-.



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Vehicles with seat heating:

– Unscrew bolts -1 and 2- and move coolant pipes to the left.

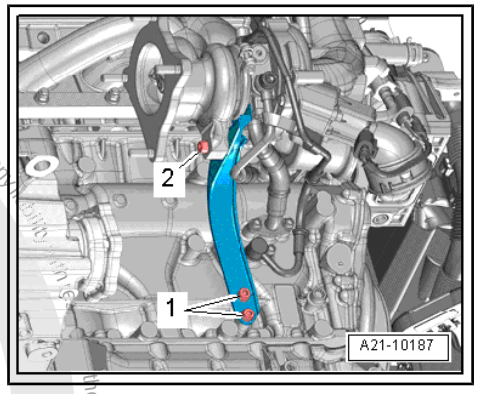


Vehicles with all-wheel drive:

– Remove right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Removing and installing drive shafts .

All vehicles:

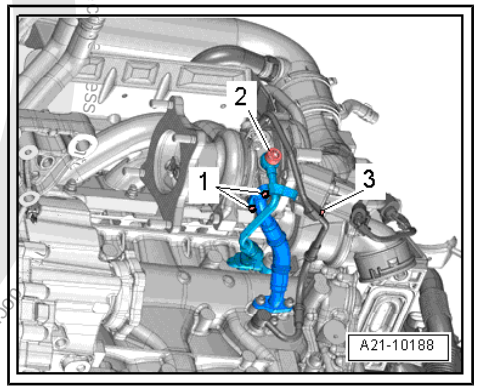
– Remove bolts -1 and 2- and detach support for turbocharger.



– Remove banjo bolt -2- and move coolant pipe clear to one side.

Vehicles with front-wheel drive:

– Remove bolts -1- on oil return line.



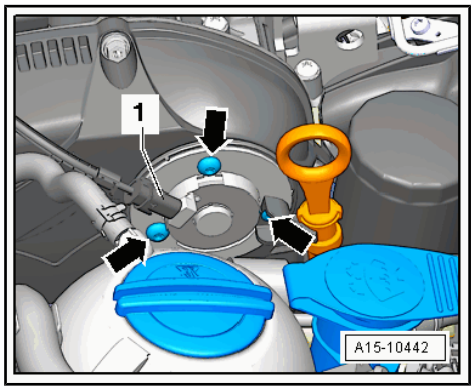
Vehicles with all-wheel drive:

– Remove bolts of oil return line at crankcase.

All vehicles:

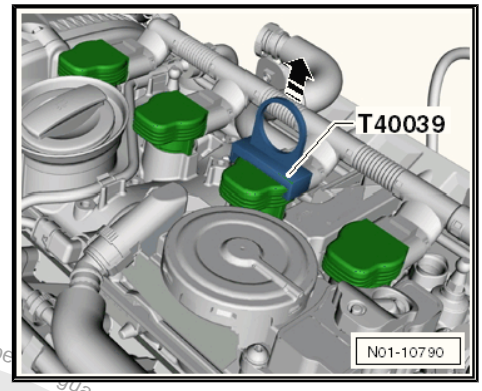
– Remove bolt -3- on oil supply line.

– Pull connector -1- off camshaft control valve 1 - N205-.



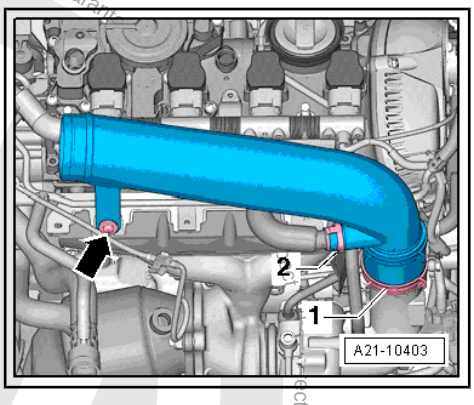
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– Detach connectors from ignition coils and place wiring harness to one side.
– Remove ignition coils using puller - T40039- .

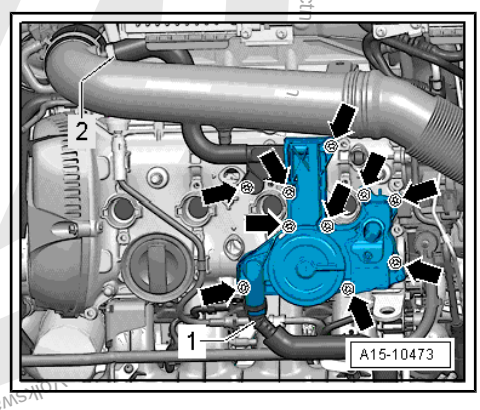


Engine codes BZB, CAWA, CAWB, CGYA, CDAA:

– Unscrew bolt -arrow- for air pipe.
– Remove air pipe, loosening hose clip -1- to do so.
– Press release tabs -2-, and pull crankcase breather off air hose.

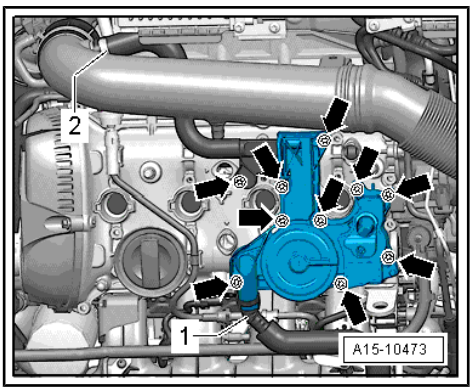


– Disconnect crankcase breather hose -1-.
– Remove bolts -arrows- and remove crankcase breather.



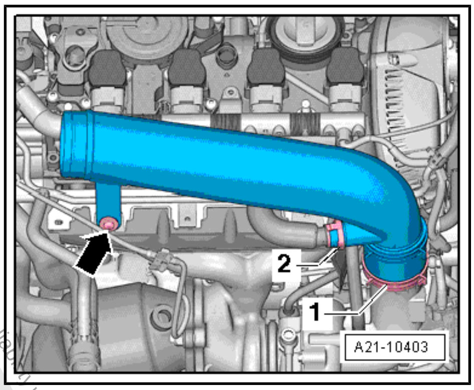
Engine codes CBFA, CCTA, CCTB:

– Disconnect crankcase breather hose -1-.
– Unscrew bolts -arrows-.



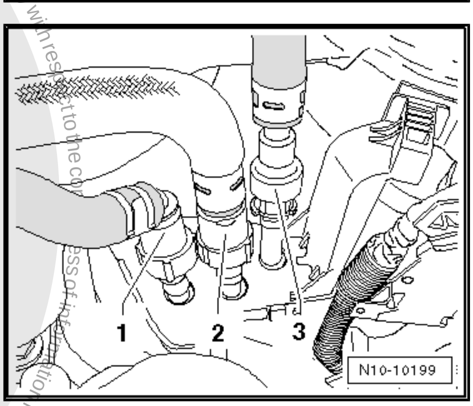
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– Unscrew bolt -arrow- for air pipe.
– Loosen hose clip -1- and remove air pipe together with crankcase breather.



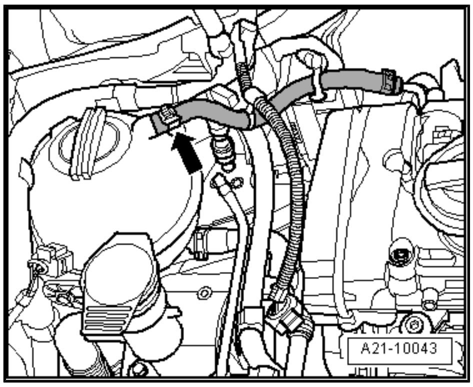
All:

> **WARNING**
>
> *The fuel line is under pressure.*
>
> *Fuel poses danger of injury to eyes and skin.*
>
> *Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.*

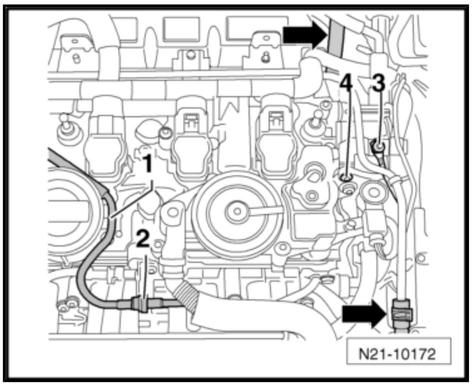


– Detach lines -1 to 3- from the fuel transfer point.
1) Breather hose
2) Vacuum line (only CBFA, CCTA, CCTB)
3) Fuel supply line

– Disconnect coolant line to coolant expansion tank -arrow-.



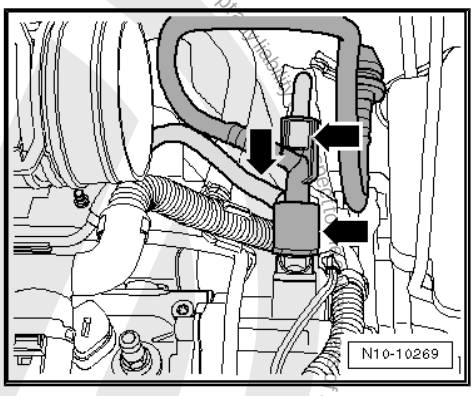
– Remove coolant hoses -arrows- from coolant pipe.
– Unbolt earth cable -3- and loosen bolt -4-.



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– Pull off vacuum hoses -arrows-.

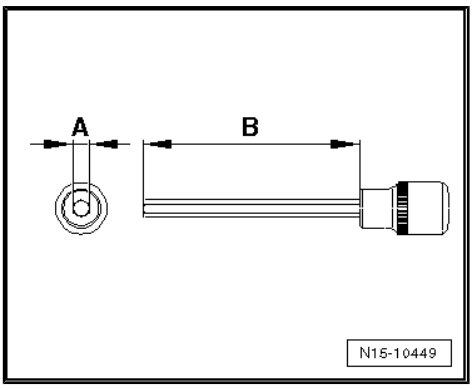


– Unscrew bolts -1…3- and remove heat shield together with coolant pipe.
– Unscrew oil supply line -4- from turbocharger.

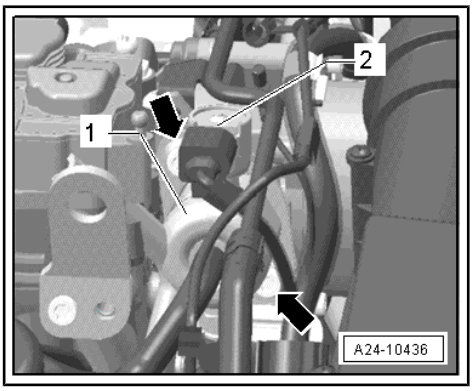


Note

Unscrew bolt -2- from heat shield using a 6 mm hex key -A-. The hexagon faces must be at least 5 cm long -B-. A socket which tapers to 6 mm at the tip is too thick.



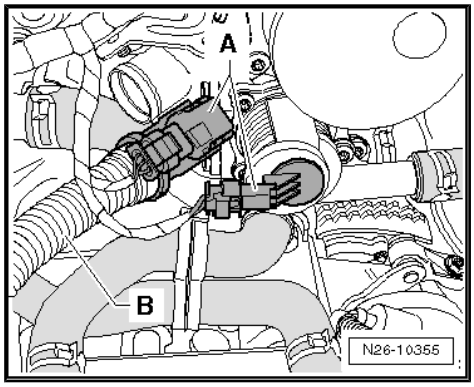
– Pull off electrical connector -2- from fuel pressure regulating valve - N276- .



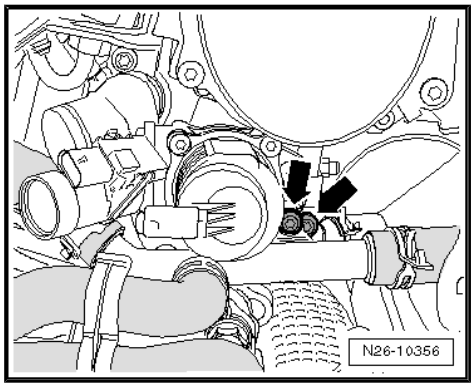
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Engine code CBFA:

– Pull connector -A- and hose -B- from secondary air inlet valve - N112- .

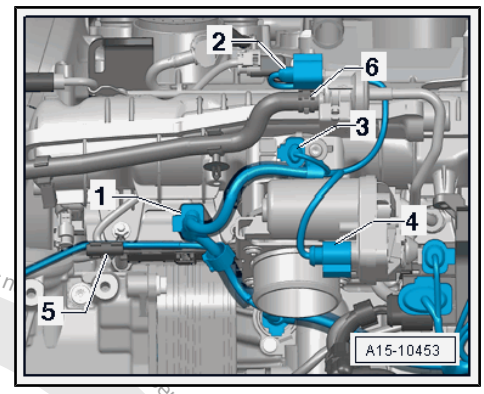


– Loosen coolant pipe by unscrewing bolts -arrows-.



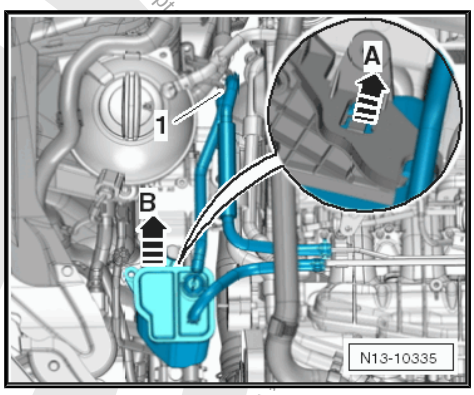
All:

– Pull coolant hose from union on side of cylinder head.
– Separate electrical connectors -1 to 4-.
– Expose electric cable -5-.
– Pull off vacuum line -6- leading to activated charcoal filter.



Golf, Scirocco:

– Pull off breather line -1-, release activated charcoal filter -A- and remove upwards -B-.

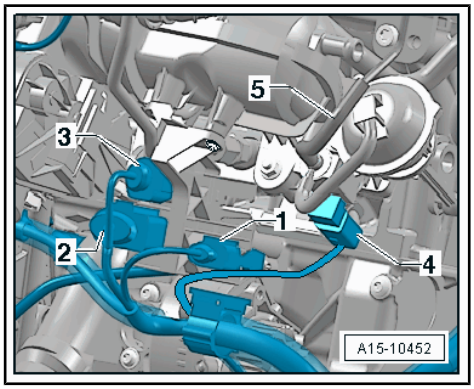


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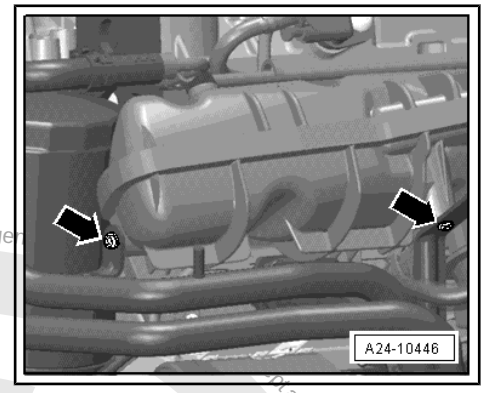
All:

– Disconnect electrical connectors -1- and detach connectors from retainer.

– Separate electrical connectors -2 to 4-.

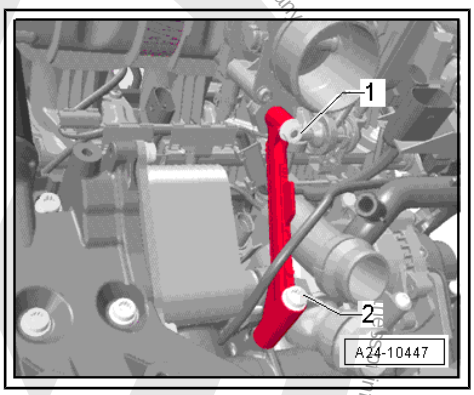


– Unscrew bolts -arrows- and detach coolant pipes from intake manifold.



– Remove intake manifold support (remove securing nut -1- and bolt -2-).

– Removing oil filter

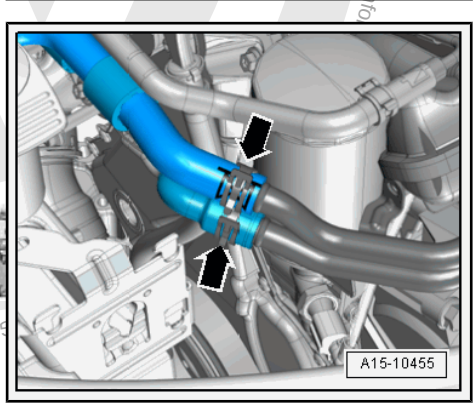


– Disconnect coolant hoses -arrows- and move clear.

– Remove camshaft timing chain ⇒ page 113 .

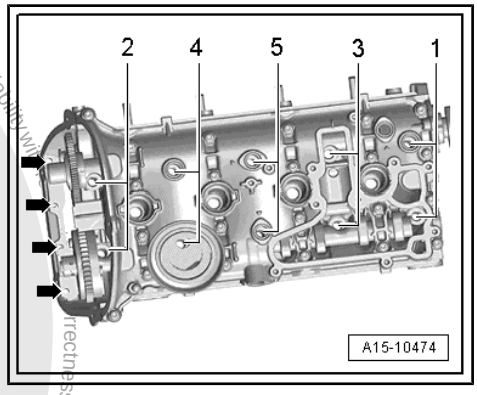
– Reinstall engine support and engine mounting, and tighten bolts by hand.

– Detach spindles of support bracket - 10 - 222 A- .

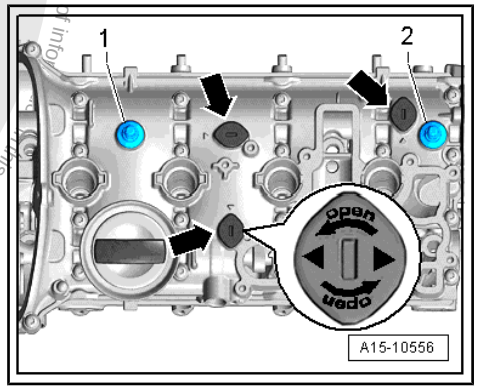


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– If a cylinder head cover without sealing plugs for the cylinder head bolts -5- is installed, remove the camshafts ⇒ page 183 .

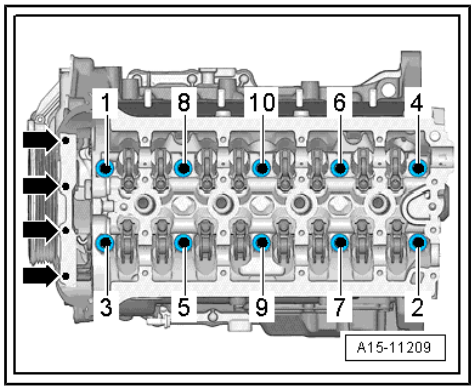


– If a cylinder head cover with sealing plugs for all cylinder head bolts is installed, turn sealing plugs -arrows- anti-clockwise in direction of -arrow- by 90° and remove.
– Unscrew ball head -1 … 2-.
– Remove filler cap.



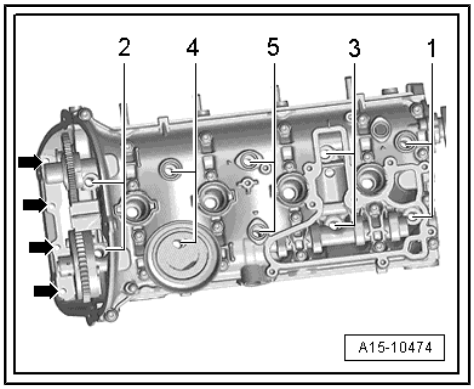
Multi-point socket head bolt with shoulder:

– Remove camshafts ⇒ page 183 .
– Unscrew bolts -arrows-.
– Unscrew and remove cylinder head bolts in the sequence -1 to 10-.



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Polydrive bolts:



– Unscrew bolts -arrows-.

– Unscrew cylinder head bolts using polydrive bit and socket - T10070- in sequence -1 to 5-.

Note

Make sure all hoses/pipes and wiring are removed.

– Remove cylinder head.

– Place cylinder head onto soft surface (foam plastic).

Installing cylinder head:

- Specified torques ⇒ page 135 .

Note

- *Replace bolts that are tightened with specified tightening angle.*
- *Renew gaskets, oil seals and self-locking nuts.*
- *Hose connections and air duct pipes must be free of oil and grease before assembly.*
- *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ Electronic parts catalogue .*
- *Spray the worm screws of the used hose clips with penetrating spray before installing.*

– Do not remove new cylinder head gasket from packaging until it is ready to be fitted. The silicone coating and the indented area of the cylinder head gasket must not be damaged.

– Carefully remove sealant residue from cylinder head and cylinder block. Ensure that no long scores or scratches are made on the surfaces, while doing so. Carefully remove remains of emery and abrasives.

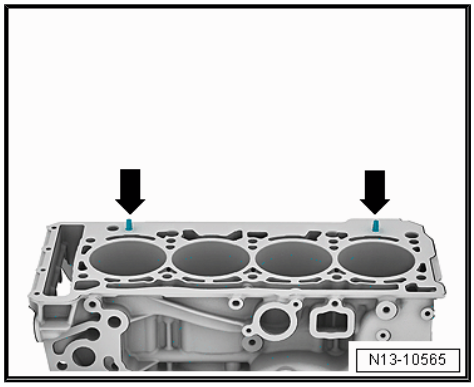
– Clean blind holes for cylinder head bolts. Blow out with compressed air if necessary.

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– Position cylinder head gasket.

♦ Note centring pins in cylinder block -arrows-.

♦ Check installation position of cylinder head gasket. Characteristic: the part number 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 cylinder head:

  Tightening sequence
  ⇒ Fig. ""Cylinder head - tightening sequence, camshaft installed"" , page 138

  Tightening sequence
  ⇒ Fig. ""Cylinder head - tightening sequence, camshaft removed"" , page 138

– Using support bracket - 10 - 222 A- , support engine in installation position again.

– Removing engine mounting and engine support.

– Install camshafts if removed ⇒ page 183 .

– Install drive chain for balance shaft and camshaft timing chain ⇒ page 119 .

The remaining assembly steps are basically a reverse of the dismantling procedure, when doing this note as follows:

– Change engine oil ⇒ Maintenance ; Booklet ; Engine oil: Draining; Renewing oil filter and replenishing engine oil.

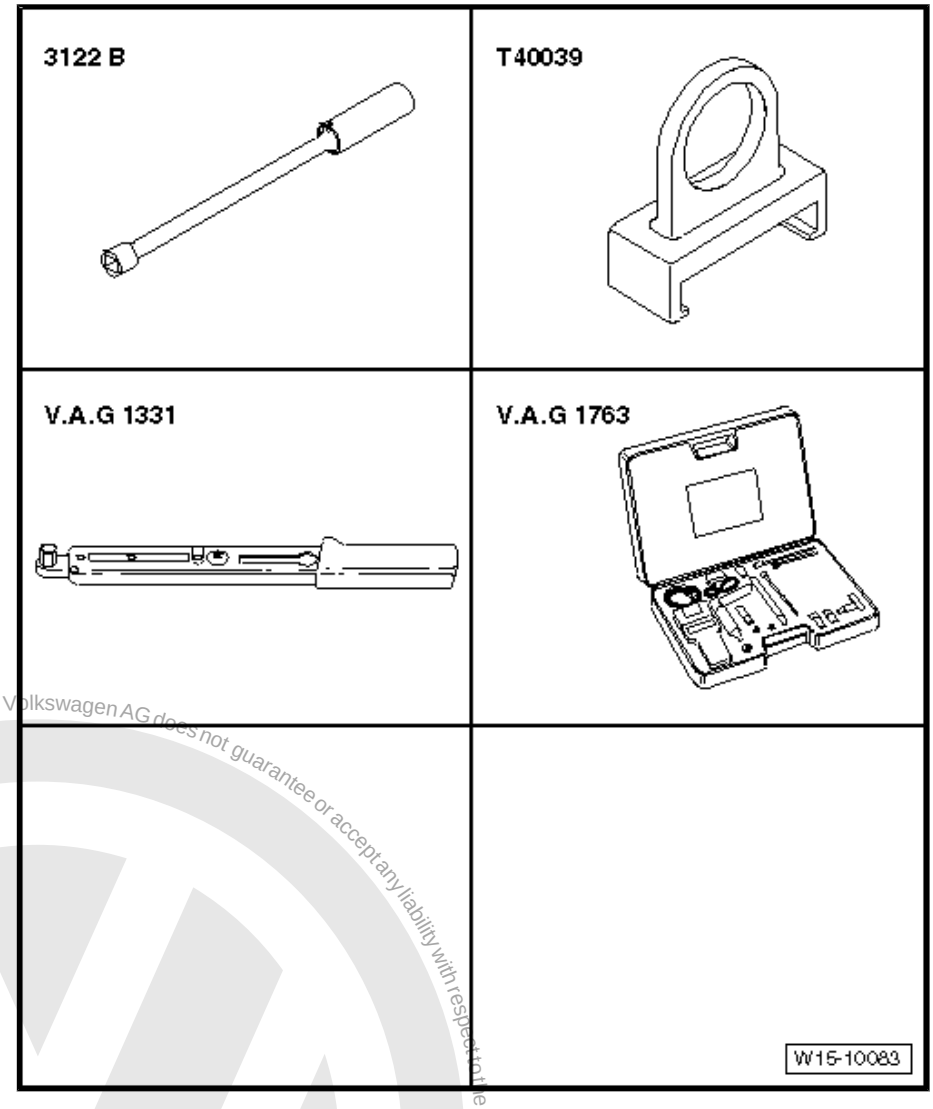
– Fill with new coolant ⇒ page 235 .

2.5 Checking compression

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Special tools and workshop equipment required

- Spark plug socket and extension - 3122 B-
- Puller - T40039-
- Torque wrench - V.A.G 1331-
- Compression tester - V.A.G 1763-
- Adapter - V.A.G 1381/5A-
- Adapter - V.A.G 1381/1-



Test sequence

Note

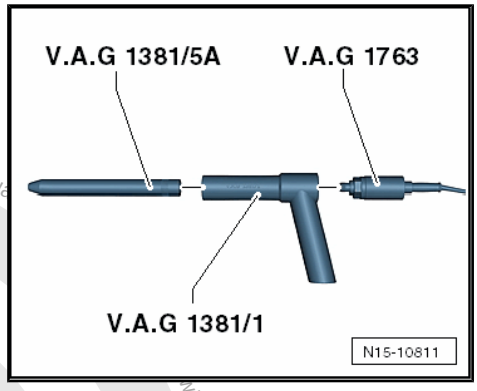
- *Observe all relevant safety precautions ⇒ page 552 .*
- *Engine oil temperature min. 30 °C*
- *Battery voltage at least 12.7 V*

Proceed as follows:

– Pull off engine cover panel ⇒ page 139 .
– Removing ignition coils with output stages ⇒ page 553 .
– Unscrew spark plugs using spark plug socket - 3122 B- .

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– Check compression using compression tester - V.A.G 1763- , adapter - V.A.G 1381/1- and adapter - V.A.G 1381/5A- .



Note

Using compression tester: ⇒ Operating instructions .

– Start engine until tester shows no further pressure increase.

Compression pressures:

New bar pressure	Wear limit bar pressure	Difference between cylinders bar pressure
11.0 to 14.0	7.0	max. 3.0

– Install spark plugs, specified torque ⇒ page 553 .

– Install ignition coils with output stages ⇒ page 553 .

Note

Faults will have been stored in the memory because connectors have been disconnected. Read and, if necessary, clear the event memory after the test.

– Read event memory of engine control unit ⇒ vehicle diagnostic tester .

2.6 Removing and installing vacuum pump

Removing:

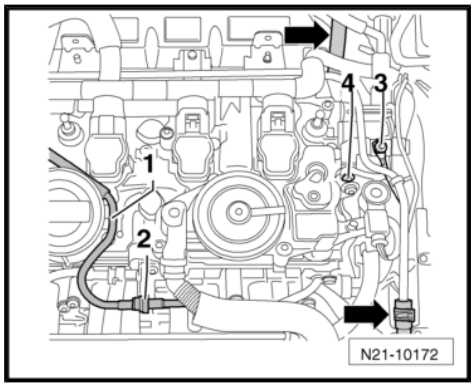
Proceed as follows:

– Remove motor cover panel ⇒ page 139 .

– Remove air filter ⇒ page 459 .

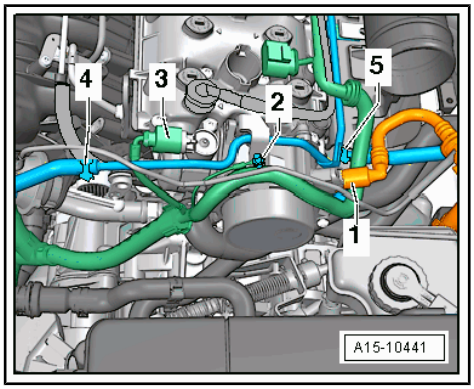
– Remove high-pressure pump with »roller tappet« ⇒ page 483 .

– Unbolt earth cable -3- and remove bolt -4-.

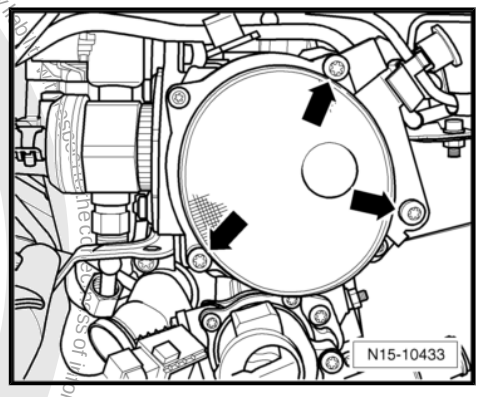


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– Remove vacuum hose -1- from vacuum pump.



– Unscrew bolts -arrows- and remove vacuum pump.



Note

The vacuum pump must not be dismantled.

Installing:

- Specified torques ⇒ page 135

Perform assembly in reverse order of removal, observing the following:

– Clean sealing surfaces.

– Position gasket on vacuum pump, insert 2 bolts and then position on cylinder head.

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3 Valve gear

Note

- *Cylinder head and cylinder head cover must be renewed together.*
- *After installing camshafts wait for approx. 30 minutes before starting engine. The hydraulic compensation elements must settle (otherwise valves will strike pistons).*
- *After working on the valve gear, turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*
- *Always renew gaskets and seals.*

Assembly overview - valve gear ⇒ page 180 .

Removing and installing camshafts ⇒ page 183 .

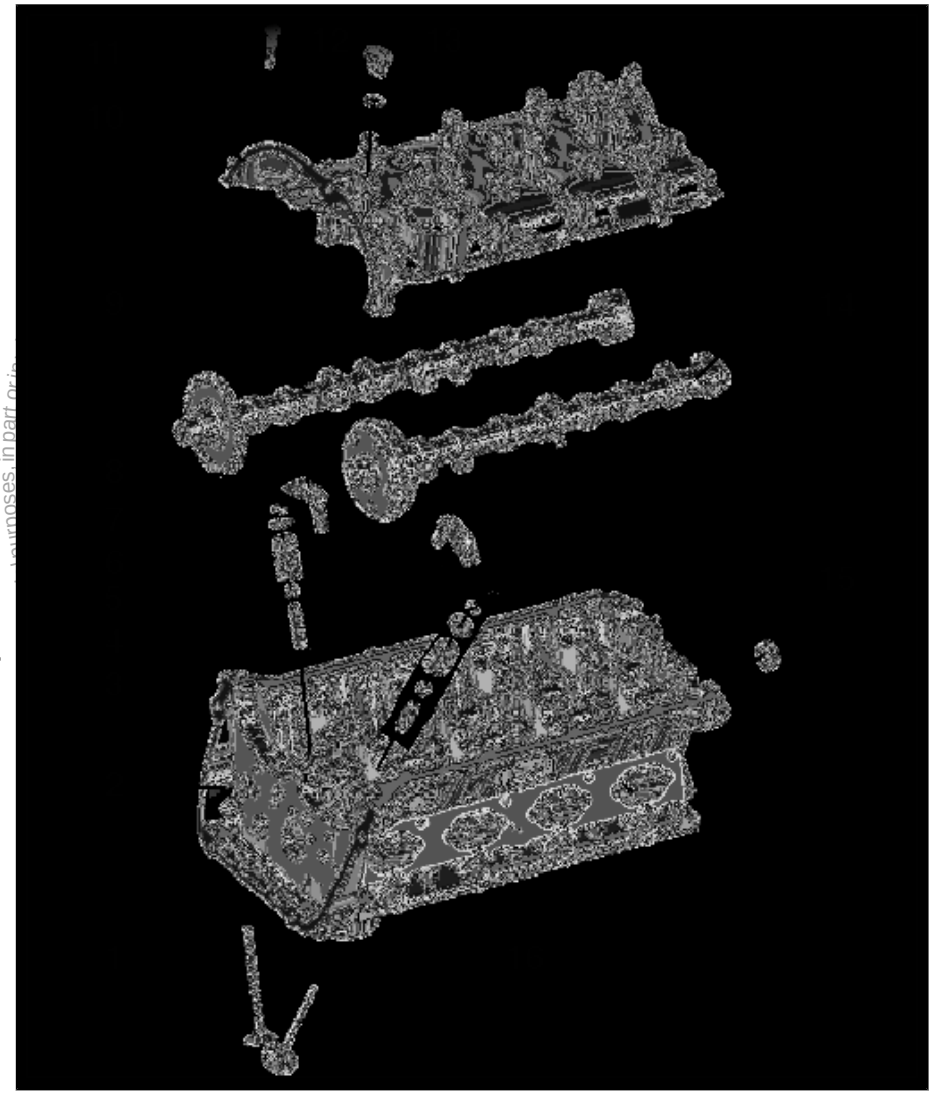
Checking axial clearance of camshafts ⇒ page 198 .

Renewing valve stem seals ⇒ page 198 .

Checking valve guides ⇒ page 202 .

3.1 Assembly overview - valve gear

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1 - Outlet valve

- ❑ Do not rework. Only lapping in is permitted.
- ❑ Valve dimensions ⇒ page 182
- ❑ Checking valve guides ⇒ page 202 .

2 - Cylinder head

- ❑ Renew oil non-return valve in cylinder head ⇒ page 138

3 - Valve guide

- ❑ Checking ⇒ page 202

4 - Valve stem seal

5 - Valve springs

6 - Valve spring plate

7 - Cotters

8 - Hydraulic compensation element

- ❑ Do not interchange
- ❑ Oil contact surfaces.

9 - Exhaust camshaft

- ❑ Check radial clearance with Plastigage (roller rocker fingers removed)
- ❑ Radial clearance with bearing ∅ of 24 mm: 0.024 … 0.066 mm
- ❑ Radial clearance with bearing ∅ of 32 mm: 0.030 … 0.051 mm
- ❑ Runout: max. 0.04 mm
- ❑ Removing and installing ⇒ page 183

10 - Cylinder head cover

- ❑ With integrated camshaft bearings.
- ❑ Clean sealing surface; reworking not permitted.
- ❑ Remove sealant residue.

11 - Bolt

- ❑ Renew
- ❑ Tightening sequence ⇒ page 182

12 - O-ring

- ❑ Renew
- ❑ Lubricate with engine oil

13 - Plugs

14 - Inlet camshaft

- ❑ Check radial clearance with Plastigage (roller rocker fingers removed)
- ❑ Radial clearance with bearing ∅ of 24 mm: 0.024 … 0.066 mm
- ❑ Runout: max. 0.04 mm
- ❑ Removing and installing ⇒ page 183

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15 - Cap

- ❑ Renew
- ❑ Removing sealing cap with cylinder head cover installed: pierce on one side with an awl and pry out
- ❑ Installing: press in 1 to 2 mm deep without sealant using thrust piece - T10174-

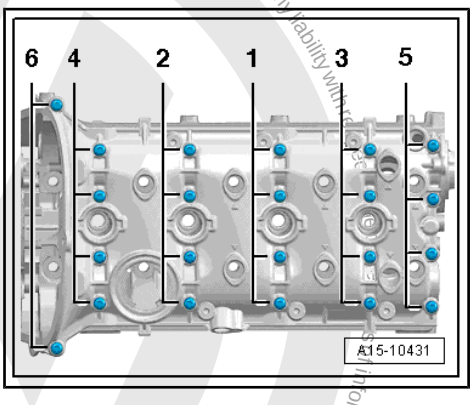
16 - Inlet valve

- ❑ Do not rework. Only lapping in is permitted.
- ❑ Valve dimensions ⇒ page 182
- ❑ Checking valve guides ⇒ page 202 .

Tightening sequence for cylinder head cover

– Renew bolts.

1. Fit bolts in the sequence -1 … 6- and hand-tighten in several stages.
2. Tighten bolts in the sequence -1 … 6- to 8 Nm using torque wrench.
3. Turn 90° further in the sequence -1 … 6- using a fixed wrench.



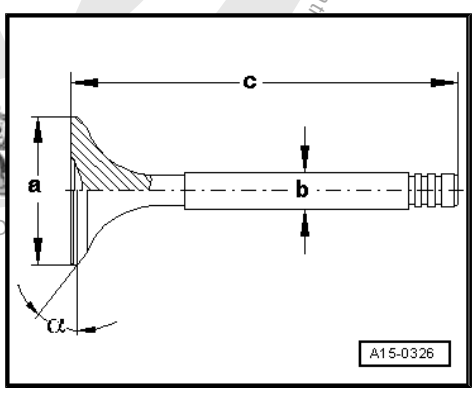
Note

Take care to keep retaining frame straight.

Valve dimensions

Note

Inlet and exhaust valves must not be reworked. Only lapping-in is permitted.



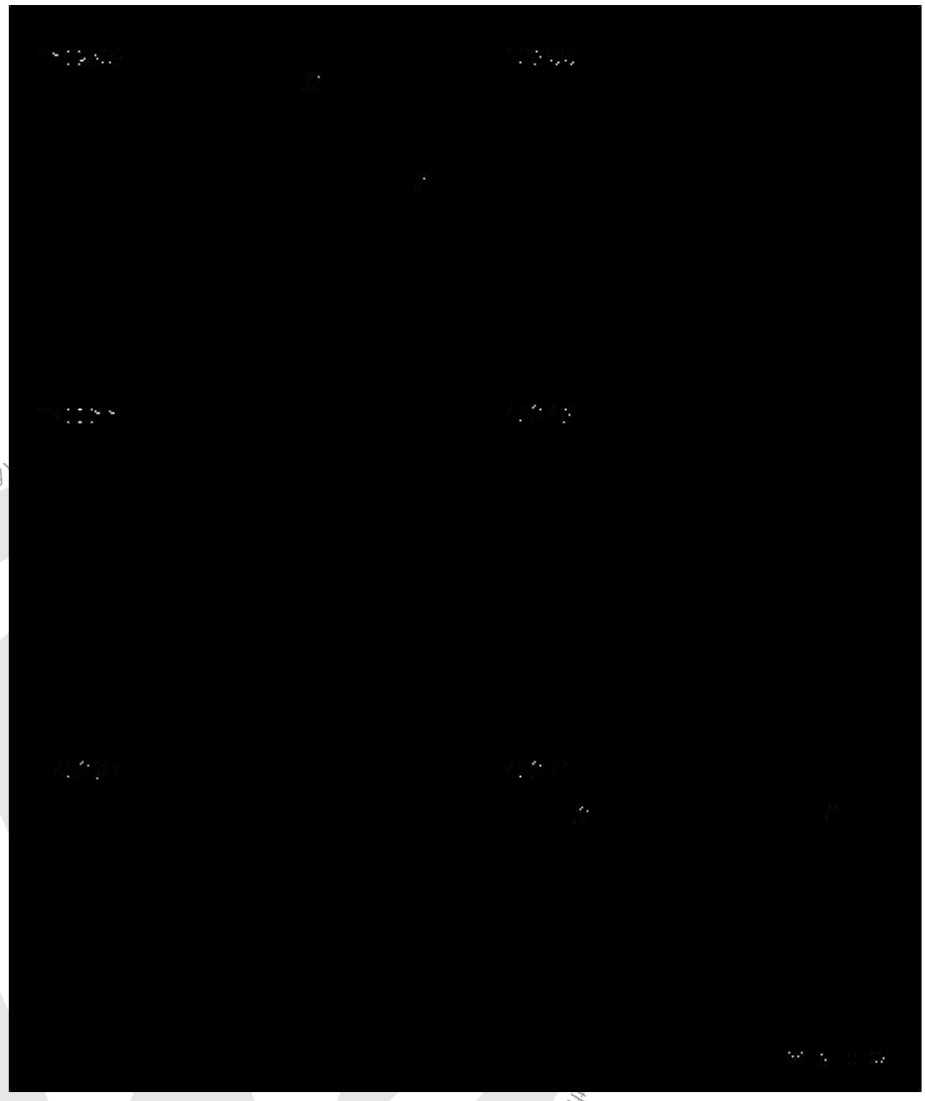
Dimension		Inlet valve	Outlet valve
∅ a	mm	33.85 ± 0.10	28.0 ± 0.1
∅ b	mm	5.98 ± 0.007	5.955 ± 0.007
c	mm	103.97	101.87
α	∠°	45	45

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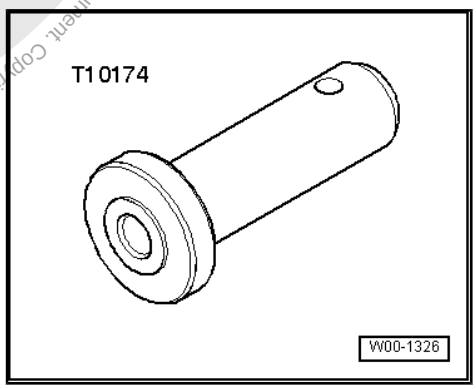
3.2 Removing and installing camshaft

Special tools and workshop equipment required

- Assembly tool - T10352-
- Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB: assembly tool - T10352/1-
- Counterhold tool - T10355-
- Locking pin - T40011-
- Assembly lever - T40243-
- Locking tool - T40267-
- Camshaft clamp - T40271-

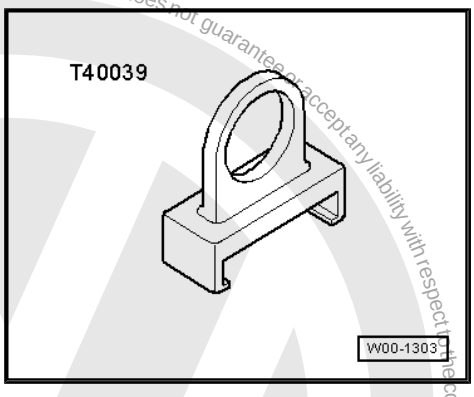


- Press tool - T10174-



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- Puller - T40039-



- Silicone sealant - D 154 103 A1-

Note

- *Sealing surfaces at bottom of cylinder head cover and top of cylinder head must not be machined.*
- *The camshaft bearings are integrated into the cylinder head and cylinder head cover. The camshaft timing chain must be relieved of tension before you remove the cylinder head cover.*
- *Renew sealing cap if cylinder head cover has been detached ⇒ Item 15 (page 182) .*
- *Fit cable ties in the original positions when installing.*

Removing:

– Pull off engine cover panel ⇒ page 139 .

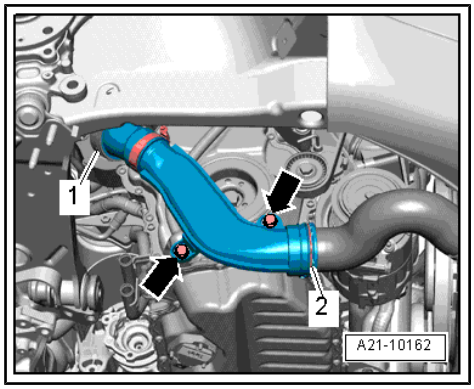
– Remove vacuum pump ⇒ page 178 .

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

– Remove right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Removing and installing wheel housing liner .

– Remove bolts -arrows-.

– Remove air pipe (lift clips -items 1 and 2-).

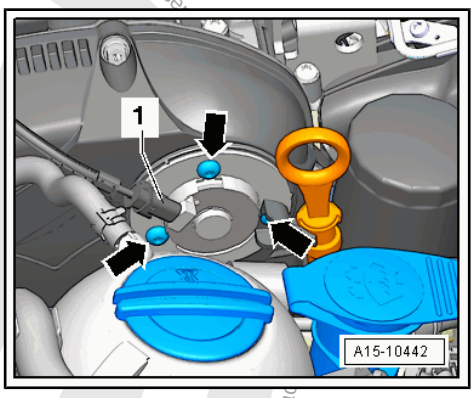


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– Detach connector -1- from camshaft control valve 1 - N205- .

– Unscrew bolts -arrows- and remove inlet camshaft control valve 1 - N205- .

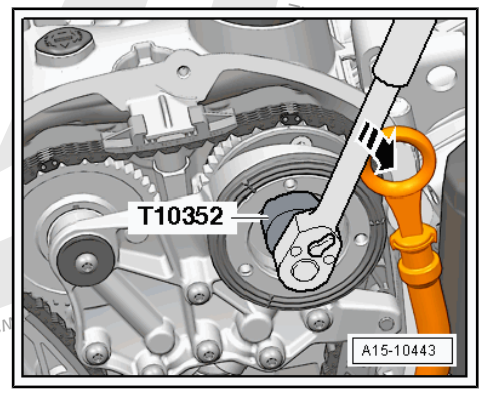
– Remove upper timing chain cover ⇒ page 90 .



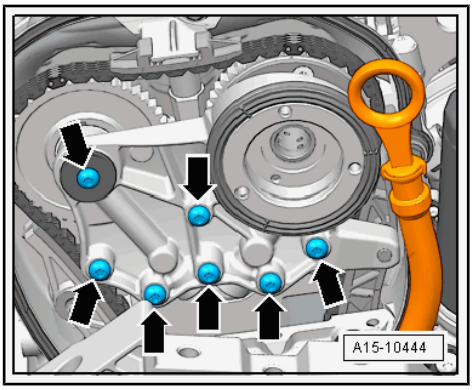
– Remove control valve using assembly tool - T10352- (engine codes CCZA, CCZB, CDAA, CDAB: assembly tool - T10352/1-) in -direction of arrow-.

Caution

The control valve has a left-hand thread.

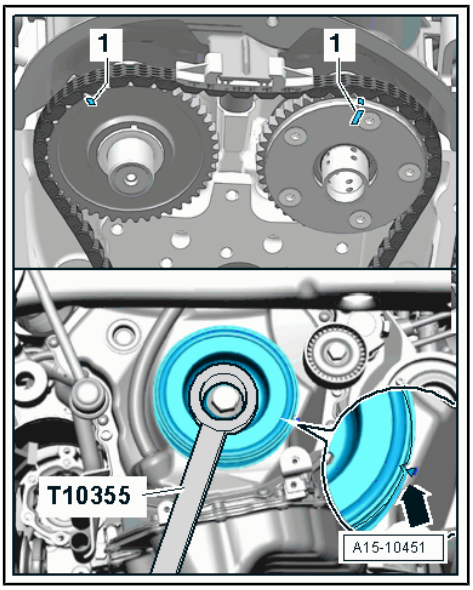


– Remove bolts -arrows- and detach bearing saddle.



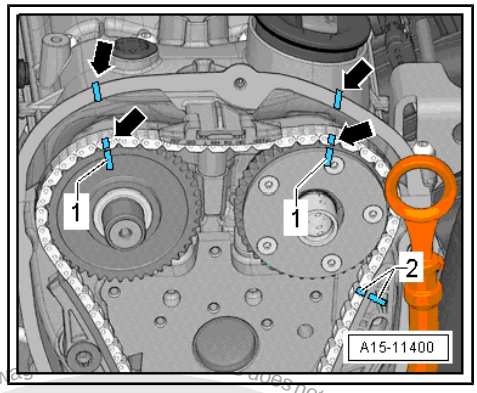
– Turn vibration damper to “TDC” position -arrow- using counterhold - T10355- .

- Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).
- The markings -1- on the camshafts must face upwards.

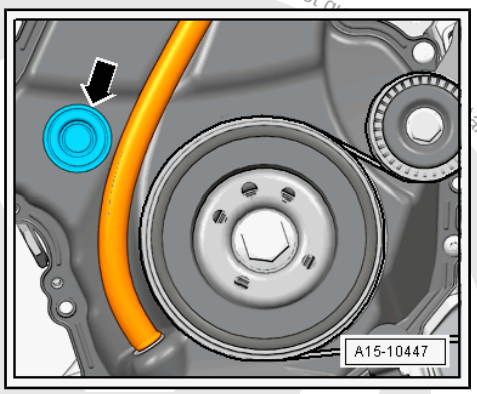


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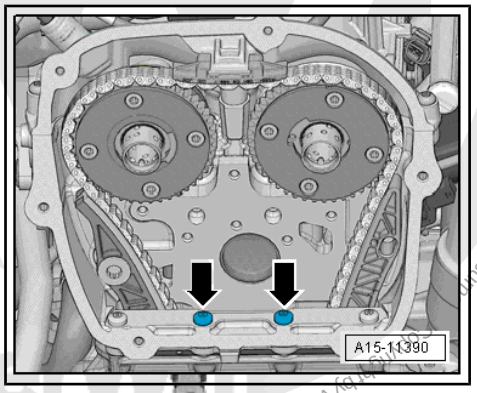
– Mark positions of sprocket markings -1- on camshaft timing chain and cylinder head -arrows- using a permanent felt tip marker.
– Also mark alignment of camshaft timing chain -2- relative to guide rail of camshaft timing chain using a permanent felt tip marker.



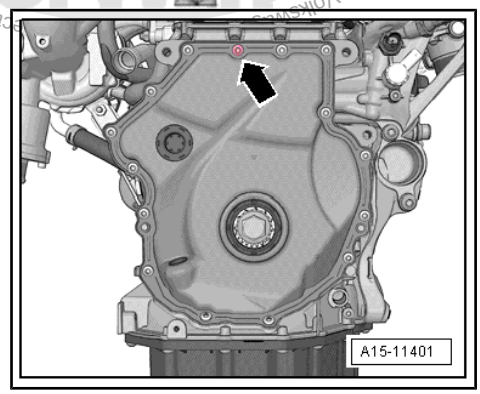
– Remove sealing plug -arrow-.



– Unscrew bolts -arrows-.



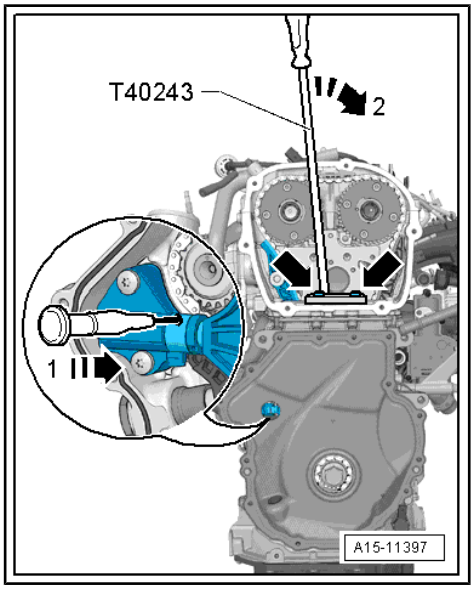
– Unscrew bolt -arrow-.



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Depending on version, either of two different chain tensioners may be installed. Version 1:

– Screw in lever - T40243- -arrows-.



Note

- *If it is not possible to insert the lever - T40243- , the distance between the timing chain and the oil deflector on the lower cover is too small. It is then necessary to remove the lower cover.*
- *Passat, CC ⇒ page 92*
- *Golf, Eos, Scirocco ⇒ page 98*
- *Tiguan ⇒ page 105*

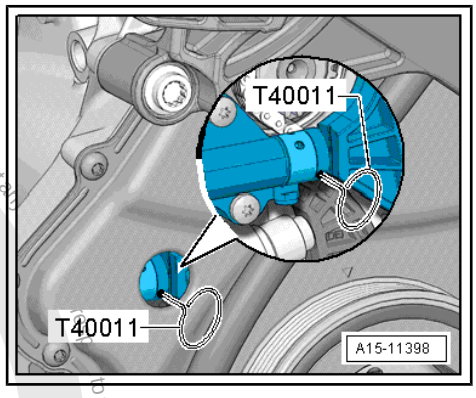
– Raise locking element of chain tensioner -arrow 1-. To do this, grind the tip of the locking pin - T40011- to a point. A screwdriver with a blade width of approx. 1.5 mm can also be used.

Caution

Avoid damage to chain tensioner! Proceed with great care.

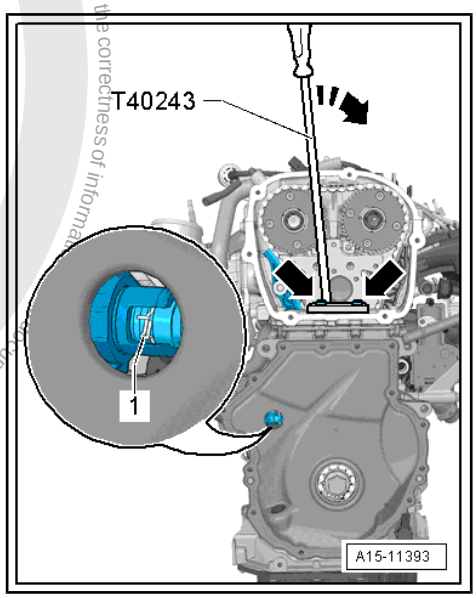
– Slowly push valve lever - T40243- in -direction of arrow 2- and hold it in that position.

– Secure chain tensioner with locking pin - T40011- .



Version 2:

– Screw in lever - T40243- -arrows-.



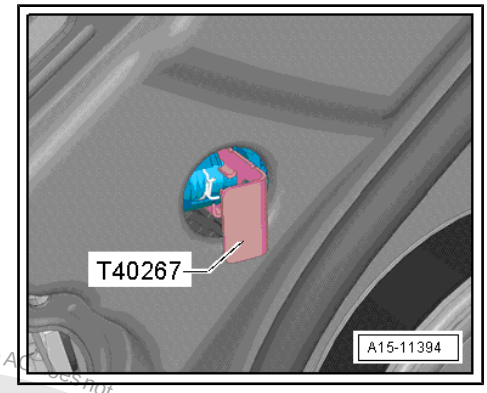
Note

- *If it is not possible to insert the lever - T40243- , the distance between the timing chain and the oil deflector on the lower cover is too small. It is then necessary to remove the lower cover.*
- *Passat, CC ⇒ page 92*
- *Golf, Eos, Scirocco ⇒ page 98*
- *Tiguan ⇒ page 105*

– Press together securing clip -arrow- of chain tensioner. Then, slowly push lever - T40243- in -direction of arrow- and hold it in that position.

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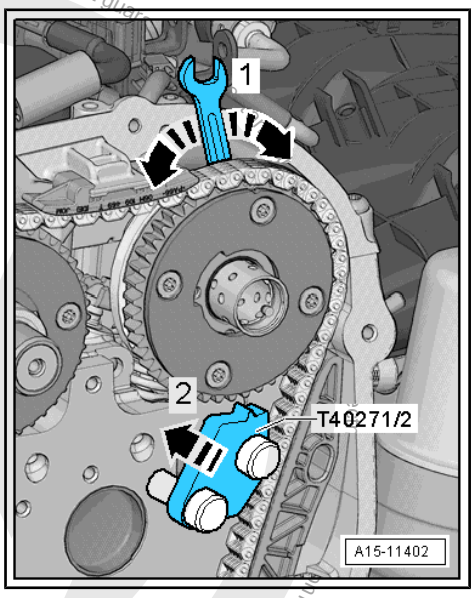
– Secure chain tensioner with locking pin - T40267- .



All

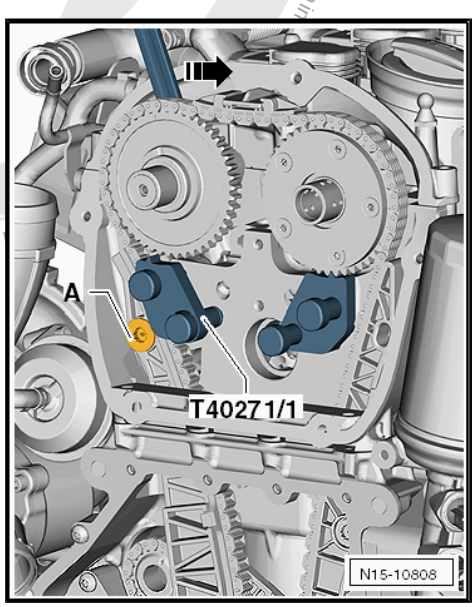
– Remove lever - T40243- .

– Bolt camshaft clamp - T40271/2- to cylinder head and insert it in direction of arrow -2- between teeth of sprocket. If necessary turn inlet camshaft slightly in direction of arrow -1- using spanner.



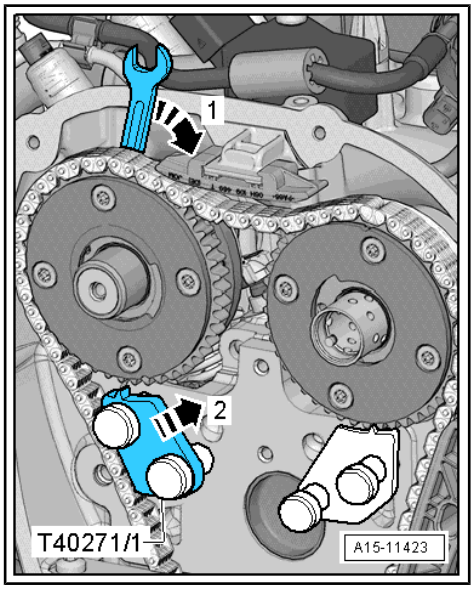
– Bolt camshaft clamp - T40271/1- to cylinder head. Counterhold camshaft clockwise -arrow- using open-end spanner.

– Remove bolt -A- and take out tensioning rail downwards. In the process, continue to counterhold the camshaft.



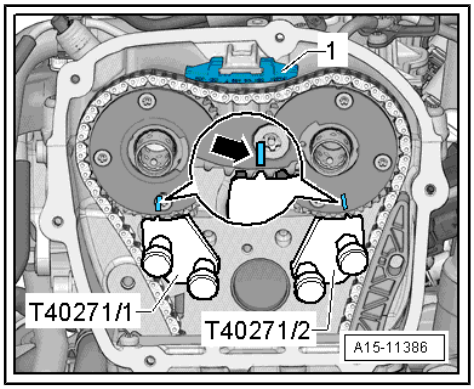
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– Turn exhaust camshaft clockwise -1- until camshaft clamp - T40271/1- can be inserted into sprocket splines.



– Use screwdriver to release fastener and press off top guide rail towards front -1-. Mark position of sprockets -arrow- relative to camshaft clamp.

– Remove camshaft timing chain from camshaft sprockets.



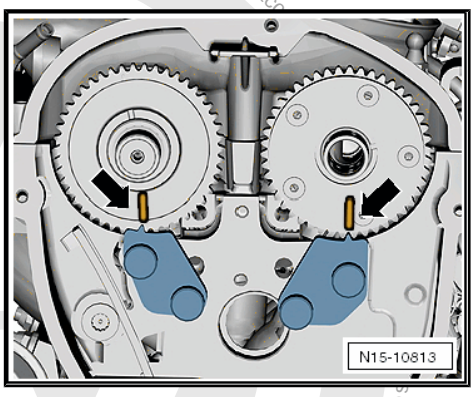
Caution

Risk of damaging valves, piston crowns and lower timing chain cover.

- *Ensure the timing chain is always under tension when turning the crankshaft.*
- *Plates to prevent the chain falling down are attached to the lower timing chain cover. If the crankshaft is turned when the chain is loose, the plates may bend.*

If the camshafts are renewed, the markings which you applied earlier must be transferred. To do so, proceed as follows:

– Before removing camshafts, mark alignment of camshaft sprockets relative to camshaft clamp - T40271/1- and camshaft clamp - T40271/2- -arrow-.

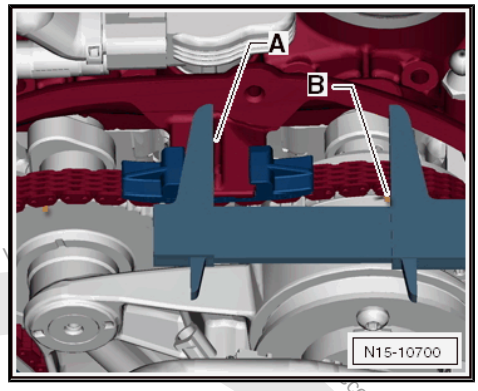


Note

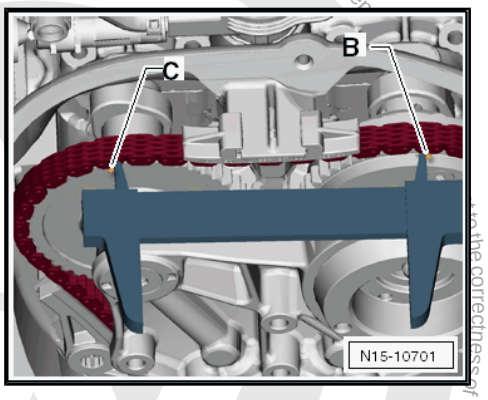
The following measurement of distances is later used to check whether the markings have been correctly transferred.

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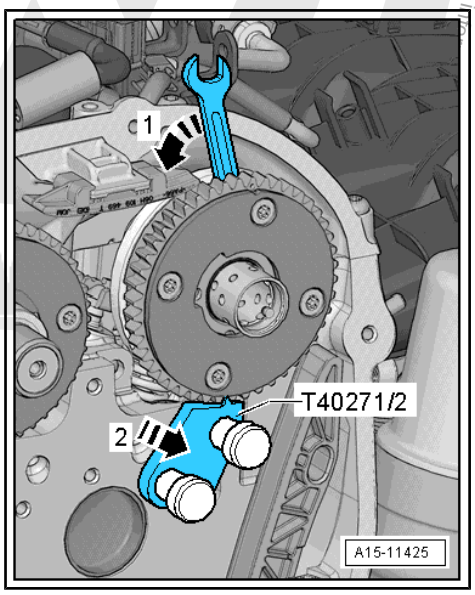
– Measure distance from left outer edge of web -A- to marking -B- on inlet camshaft and record figure.



– Measure distance from marking on inlet camshaft -B- to marking on exhaust camshaft -C- and record figure.



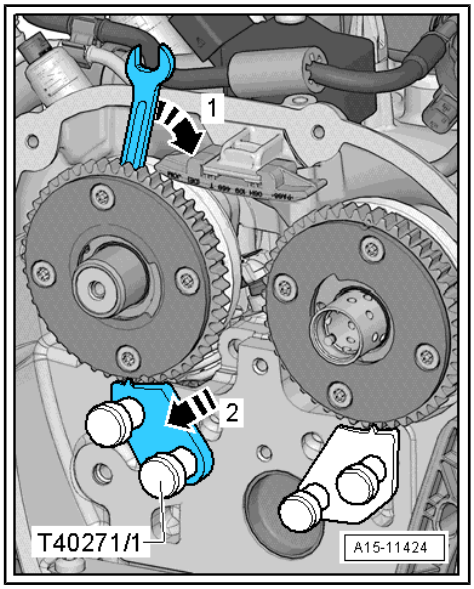
– Turn inlet camshaft in -direction of arrow 1- using spanner, remove camshaft clamp - T40271/2- in -direction of arrow 2- from between teeth of sprocket and bring camshaft into rest position.



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– Turn exhaust camshaft in -direction of arrow 1- using spanner, remove camshaft clamp - T40271/1- in -direction of arrow 2- from between teeth of sprocket and bring camshaft into rest position.

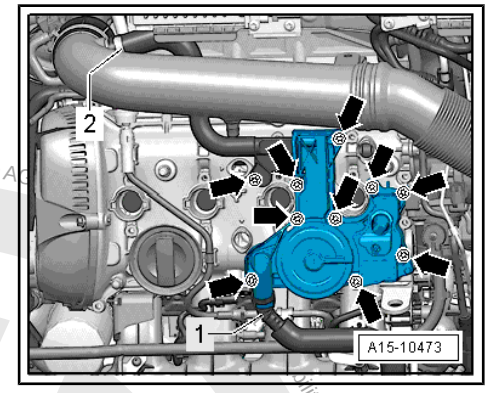
– Removing ignition coils with output stages ⇒ page 553 .



Engine codes CCZA, CCZB, CDAA, CDAB:

– Separate crankcase breather hoses -1 and 2-.

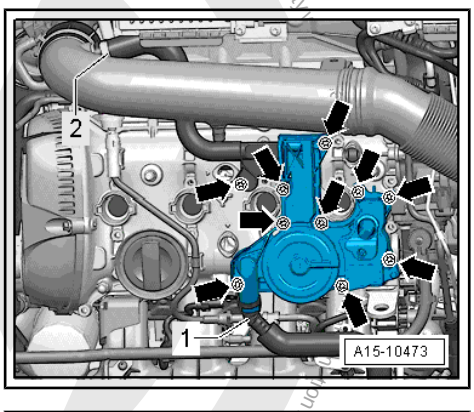
– Remove bolts -arrows- and remove crankcase breather.



Engine codes CBFA, CCTA:

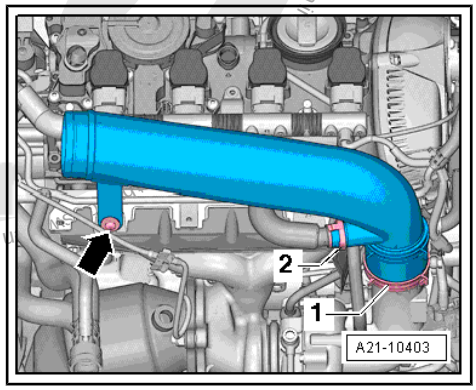
– Disconnect crankcase breather hose -1-.

– Unscrew bolts -arrows-.



– Unscrew bolt -arrow- for air pipe.

– Loosen hose clip -1- and remove air pipe together with crankcase breather.

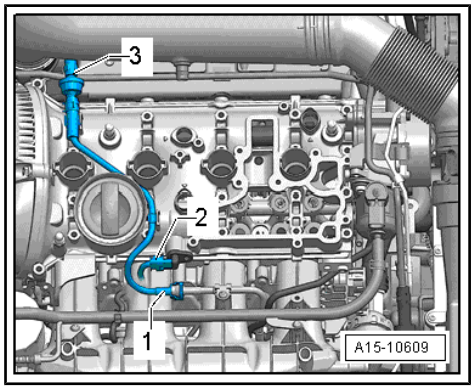


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All:

– Disconnect vacuum line -1- and move line to one side.

– Pull off connector -2- from Hall sender - G40- .

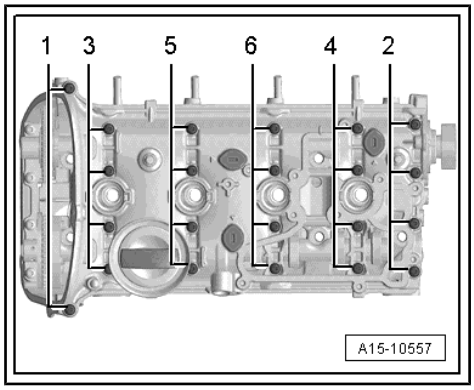


– Undo and remove cylinder head cover bolts in the sequence -1 … 6-.

– Remove cylinder head cover.

– Detach camshafts.

– Prevent dirt and residual sealant from entering cylinder head.



Installing camshafts

If new camshafts are to be fitted, transfer the markings which you made on the removed camshafts to the new ones.

• Specified torques ⇒ page 180

Note

- *After installing camshafts wait for approx. 30 minutes before starting engine. The hydraulic compensation elements must settle (otherwise valves will strike pistons).*
- *After working on the valve gear, turn the engine carefully at least 2 rotations to ensure that none of the valves make contact when the starter is operated.*
- *Sealing surfaces must be free of oil and grease.*
- *The pistons cannot be positioned at TDC.*
- *Ensure that all roller rocker fingers are properly seated on valve stem ends.*
- *Note expiry date of silicone sealant.*
- *The cover must be installed within 5 minutes after applying the silicone sealant.*
- *Prevent dirt and residual sealant from entering cylinder head.*

– Remove sealant remaining on cylinder head with flat scraper.

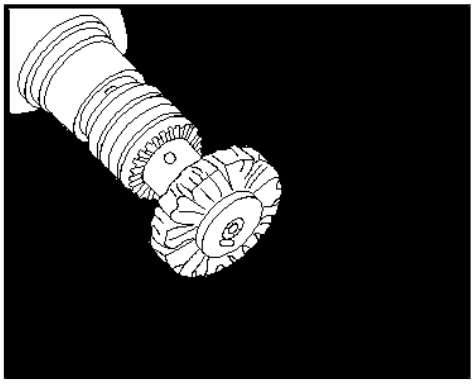
WARNING

Wear safety goggles.

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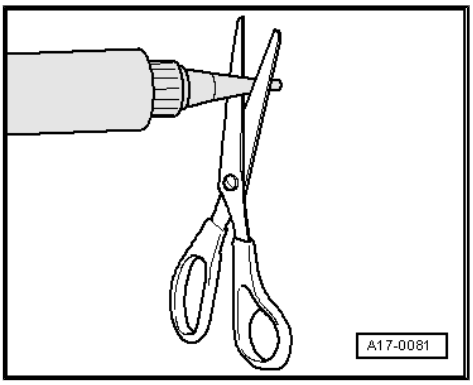
– Remove sealant left in groove of cylinder head cover and on sealing surfaces, e.g. using a rotating plastic brush.

– Clean sealing surfaces. They must be oil and grease free.



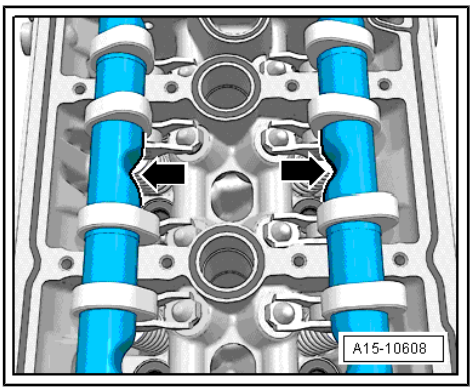
– Cut off nozzle on tube at front marking (∅ of nozzle approx. 2 mm).

– Oil running surfaces of both camshafts.



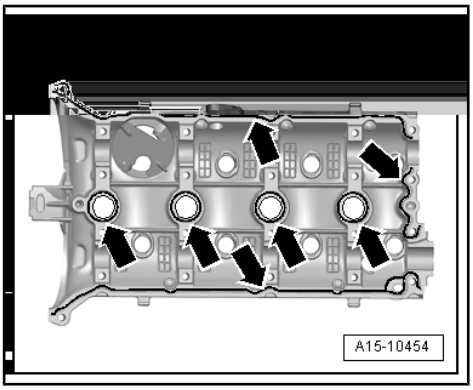
– Install camshafts in cylinder head. Recesses -arrows- must be vertical to each other.

– Renew bolts for cylinder head cover.



– Apply silicone sealant - D 154 103 A1- onto clean sealing surface of cylinder head cover, as illustrated -arrows-.

♦ Thickness of sealant bead: 2 to 3 mm.



Note

♦ *The cylinder head cover must be installed within 5 minutes after applying the silicone sealant.*

♦ *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*

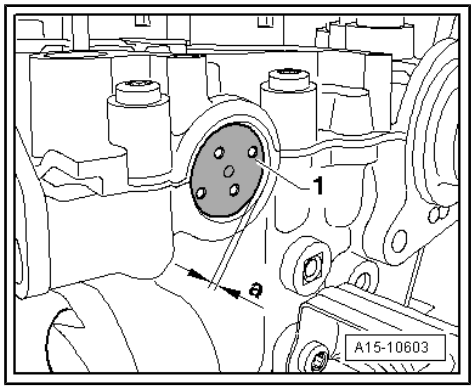
♦ *Check the expiry date of the sealant.*

– Tighten bolts in several stages; tightening sequence ⇒ page 182 .

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Note

- *Take care to keep cylinder head cover level.*
- *Use thrust piece - T10174- to drive in sealing cap -1- without sealant.*
- *Dimension -a-: 1 to 2 mm*



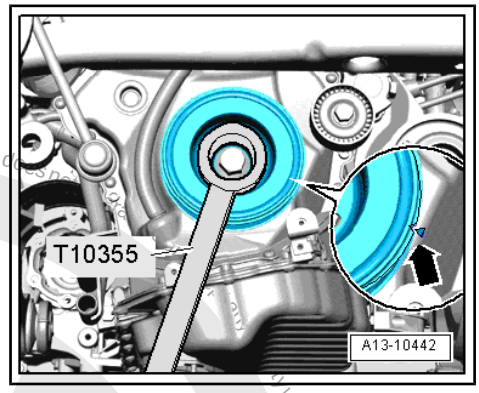
Caution

Risk of damaging valves, piston crowns and lower timing chain cover.

- ***Ensure the timing chain is always under tension when turning the crankshaft.***
- ***Plates to prevent the chain falling down are attached to the lower timing chain cover. If the crankshaft is turned when the chain is loose, the plates may bend.***

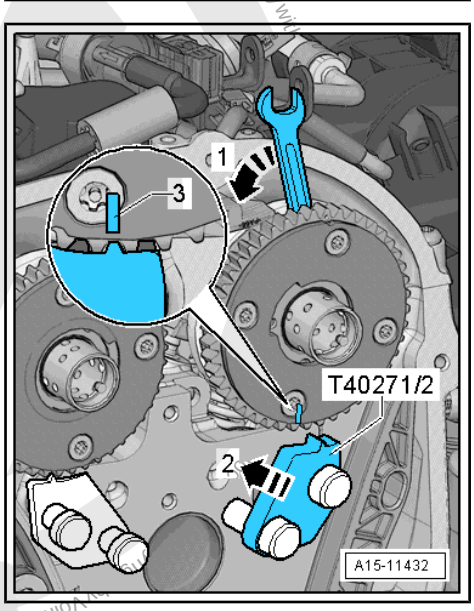
– Turn vibration damper to »TDC« position -arrow- using counterhold - T10355- .

• Notch on vibration damper must align with arrow marking on cover for timing chains (bottom).



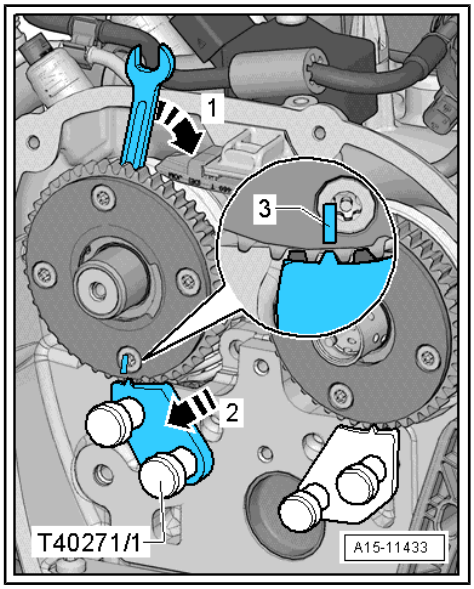
– Turn inlet camshaft in -direction of arrow 1- until marking -3- aligns with camshaft clamp - T40271/2- .

– Insert camshaft clamp - T40271/2- into teeth of sprocket -2-.



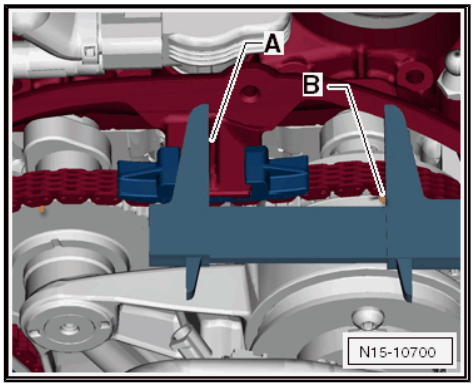
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– Turn exhaust camshaft in direction of arrow -1- until marking -3- aligns with camshaft clamp - T40271/1- .
– Insert camshaft clamp - T40271/1- in -direction of arrow 2- between teeth of sprocket.

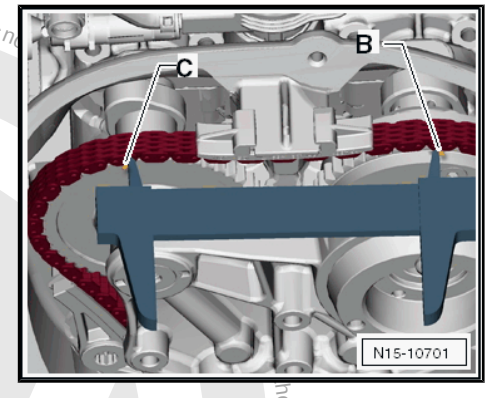


Procedure for new camshafts:

– Compare distance from left outer edge of web -A- to marking -B- with figure recorded earlier.

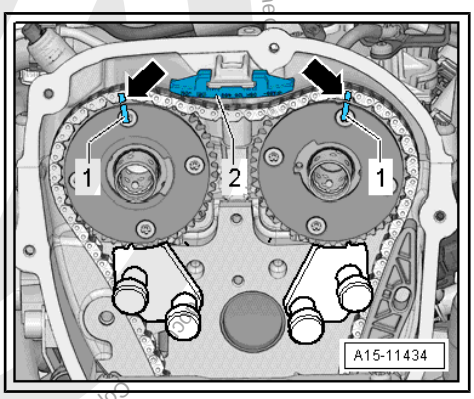


– Compare distance from marking on inlet camshaft -B- to marking on exhaust camshaft -C- with figure recorded earlier.



Continued for all:

– Fit camshaft timing chain on sprockets. To do this, align markings on chain links -arrows- with markings on sprockets -1-.
– Install upper guide rail -2-.

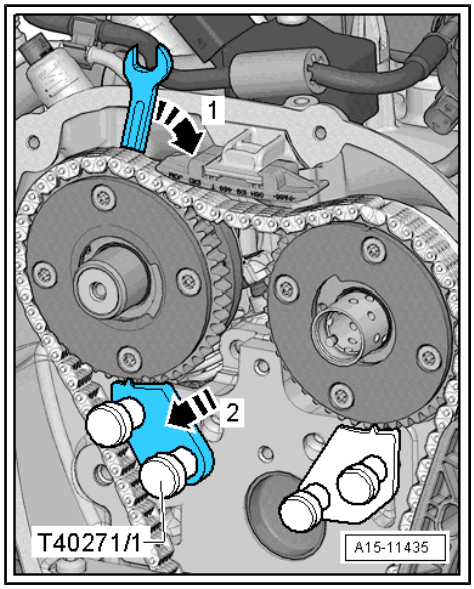


Note

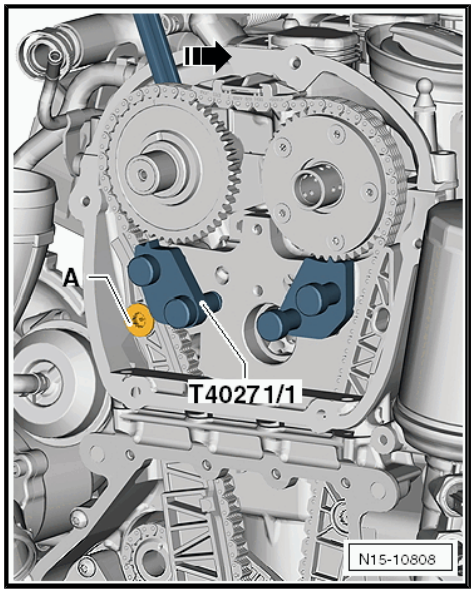
Have a second mechanic hold the exhaust camshaft.

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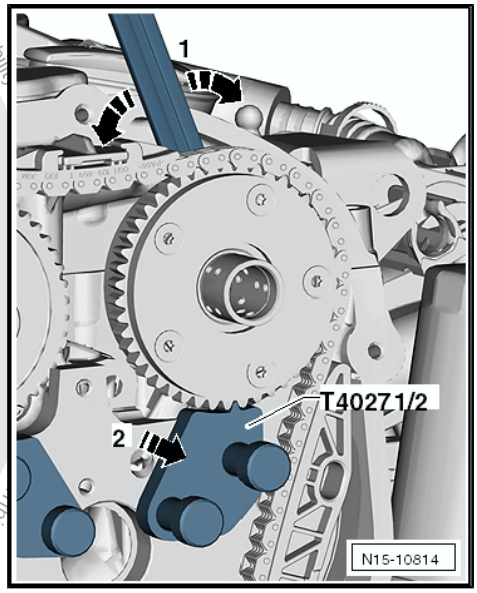
– Slowly turn exhaust camshaft in direction of arrow -1- until camshaft clamp - T40271/1- can be withdrawn from sprocket teeth.
– Carefully relieve load on camshaft until camshaft timing chain lies against upper guide rail. Hold camshaft in this position.



– Continue to hold camshaft and install tensioning rail for camshaft timing chain. Tighten bolt -A-.
– Remove camshaft clamp - T40271/1- .

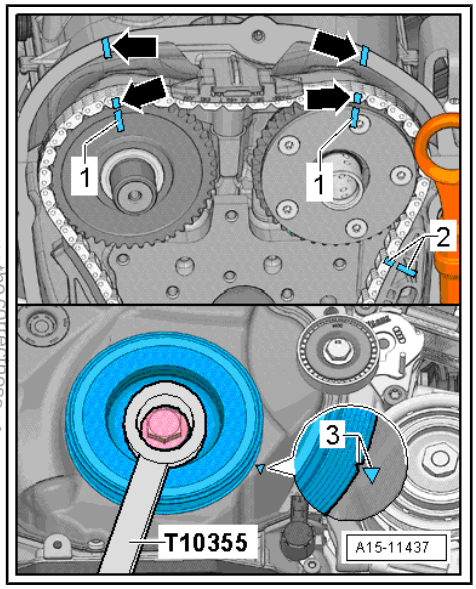


– Slide camshaft clamp - T40271/2- out of sprocket teeth -2-, if necessary turning inlet camshaft slightly using spanner -1-.
– Remove camshaft clamp - T40271/2- .



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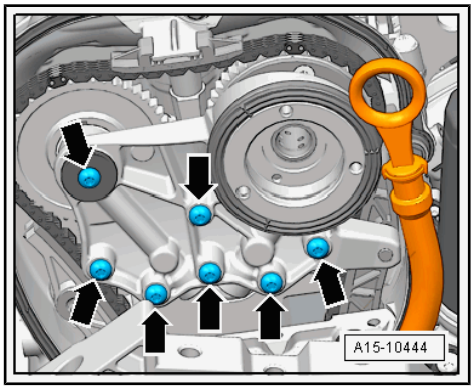
– Check valve timing. Markings on camshaft timing chain and cylinder head -arrows- must align with markings on sprockets -1-.
– Markings on camshaft timing chain and on guide rail of camshaft timing chain -2- must also align.
– Notch on vibration damper must align with marking on lower timing chain cover -3-.



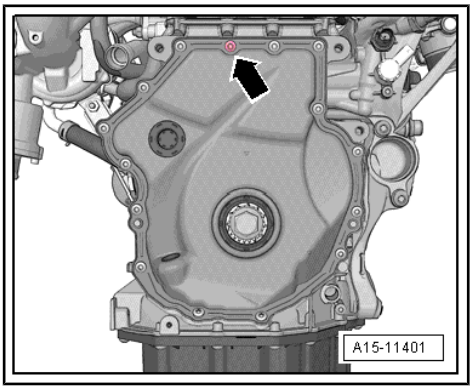
Note

If the previously marked markings are not visible anymore, check valve timing ⇒ page 133 .

– Fit bearing saddle carefully. Do not cant bearing saddle! Screw in bolts -arrows- and tighten by hand.
– Depending on version, remove locking pin - T40011- or locking tool - T40267- .
– Tighten bolts -arrows- for bearing saddle ⇒ page 111 .



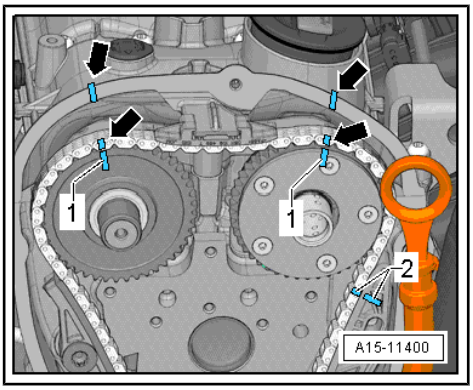
– Screw in bolt -arrow-.
– Install control valve ⇒ Item 6 (page 112) .



Note

If the markings on the camshaft timing chain and the guide rail -2- no longer align even though the engine is at »TDC«, the drive chain may have jumped on the crankshaft sprocket. Check valve timing ⇒ page 133 If the timing is not correct, the camshaft timing chain has to be taken off and fitted »again« ⇒ page 113 .

Further assembly is basically a reverse of the dismantling sequence.

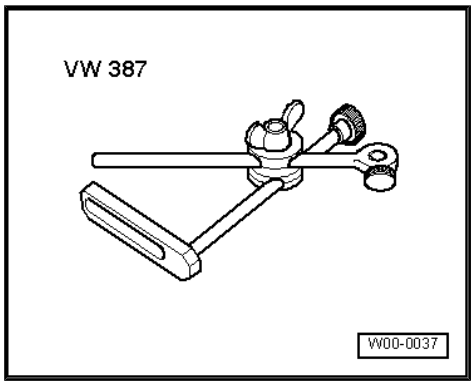


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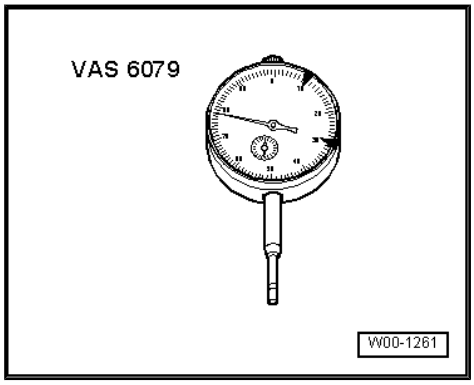
3.3 Checking axial clearance of camshafts

Special tools and workshop equipment required

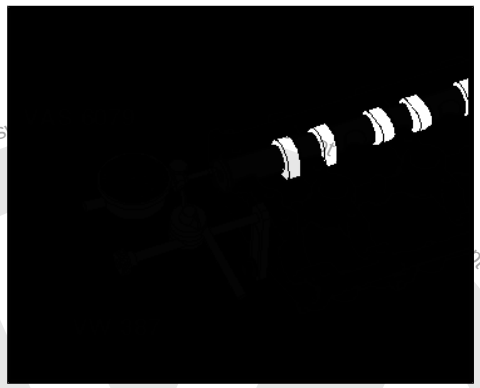
- Universal dial gauge holder - VW 387-



- Dial gauge - VAS 6079-



Test sequence



– Perform measurement with retaining frame removed.
– Fit camshaft to be tested in retaining frame.
– Attach dial gauge - VAS 6079- with universal dial gauge holder - VW 387- to cylinder head.
– Press camshaft against dial gauge by hand.
– Set dial gauge to “0”.
– Press camshaft away from dial gauge and read off value:

• Axial clearance: 0.05 to 0.17 mm

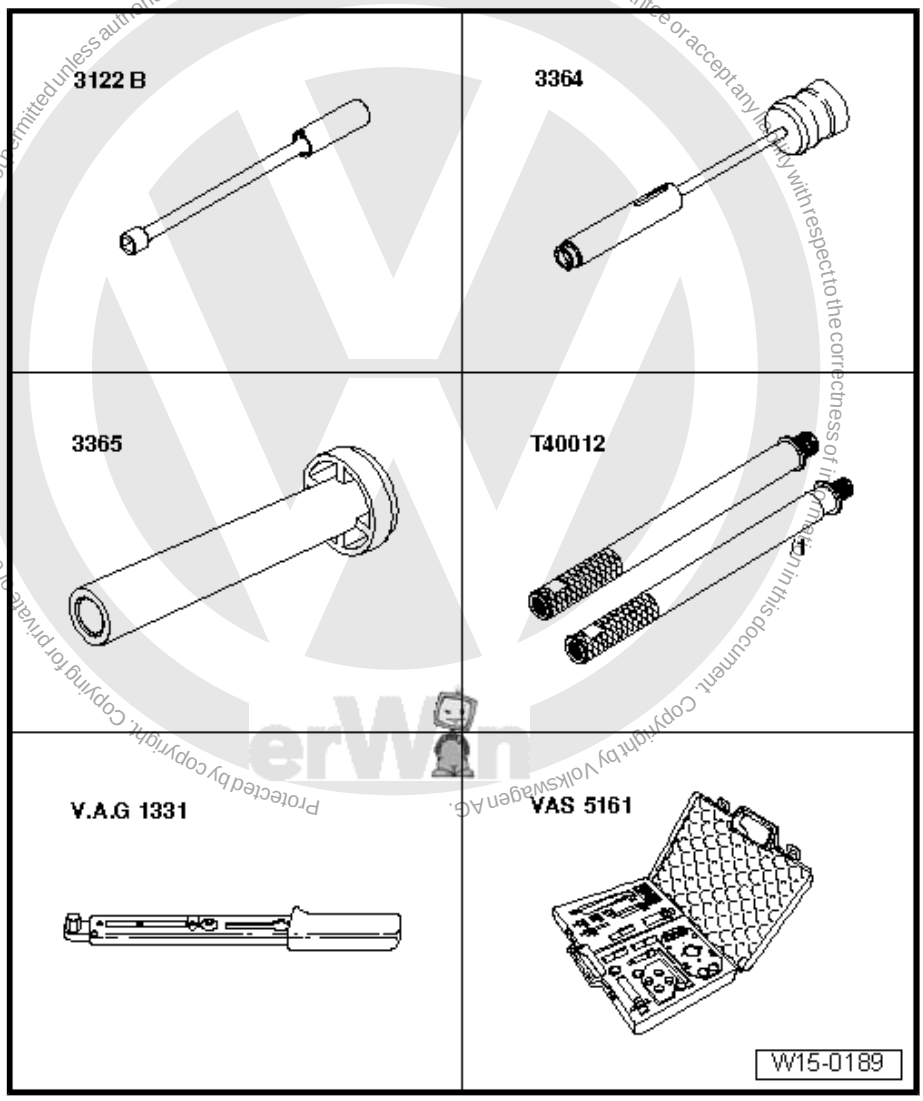
3.4 Renewing valve stem seals

(With cylinder head installed)

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Special tools and workshop equipment required

- Spark plug socket and extension - 3122 B-
- Valve stem seal puller - 3364-
- Valve stem seal fitting tool - 3365-
- Adapter - T40012-
- Torque wrench - V.A.G 1331-
- Removal and installation device - VAS 5161-
- Guide plate for 2.0 l and 3.0 l FSI engine - VAS 5161/19B-



Removing valve stem oil seals:

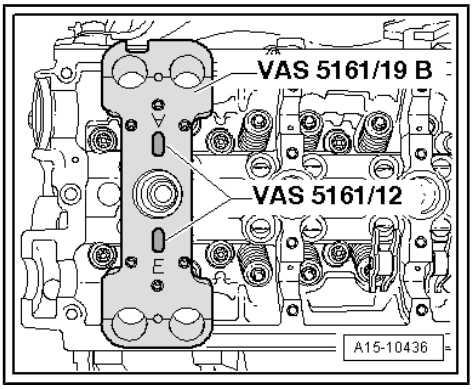
– Remove camshafts ⇒ page 183 .

– Remove roller rocker fingers and place onto a clean surface. When doing this, ensure that roller rocker fingers are not interchanged.

– Remove spark plug with spark plug socket and extension - 3122 B- .

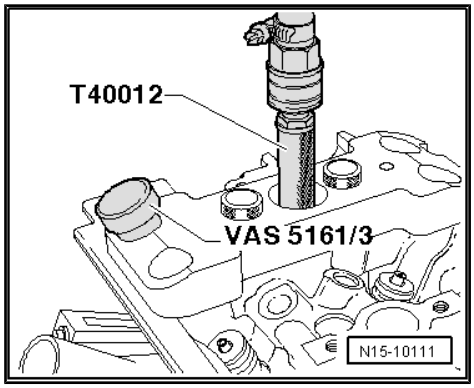
– Secure guide plate - VAS 5161/19B- with knurled screws - VAS 5161/12- to cylinder head as shown.

– Set piston of the respective cylinder to “bottom dead centre”.



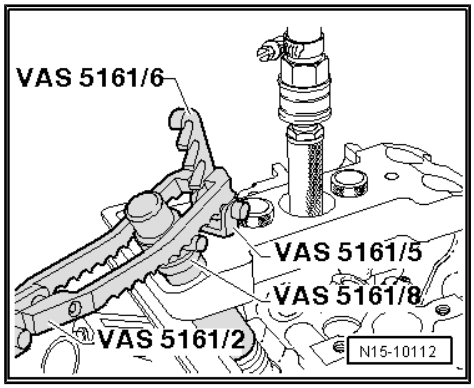
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– Screw adapter - T40012- into spark plug hole and connect to compressed air supply of at least 6 bar.
– Knock loose sticking valve cotters using punch - VAS 5161/3- and a plastic-headed hammer.



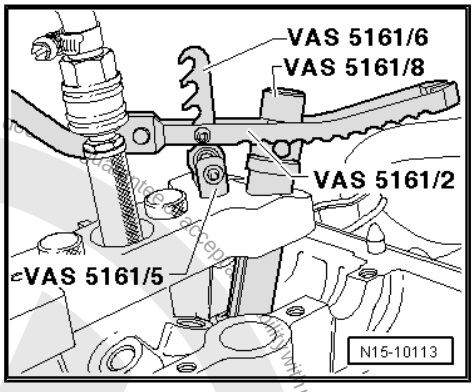
For inlet side

– Screw retainer - VAS 5161/6- with guide fork - VAS 5161/5- into centre thread of guide plate - VAS 5161/19B- .
– Insert assembly cartridge - VAS 5161/8- into guide plate - VAS 5161/19B- .
– Attach pressure fork - VAS 5161/2- to snap-in device - VAS 5161/6- .

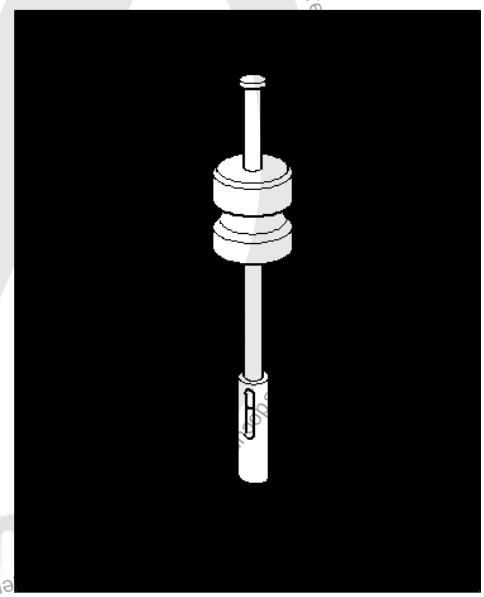


For exhaust side

– Screw retainer - VAS 5161/6- with guide fork - VAS 5161/5- into outer thread of guide plate - VAS 5161/19B- .
– Press down assembly cartridge - VAS 5161/8- . At the same time, turn knurled screw of assembly cartridge - VAS 5161/8- clockwise until ends engage in valve cotters.
– Move knurled screw back and forth lightly to press apart valve cotters and capture them in the assembly piece.
– Release the pressure fork - VAS 5161/2- .
– Remove assembly cartridge - VAS 5161/8- .

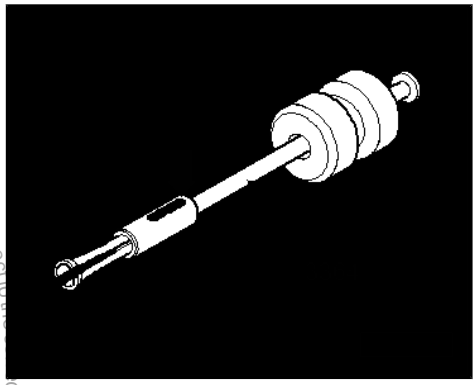


– Pull off valve stem seals using valve stem seal puller - 3364- .

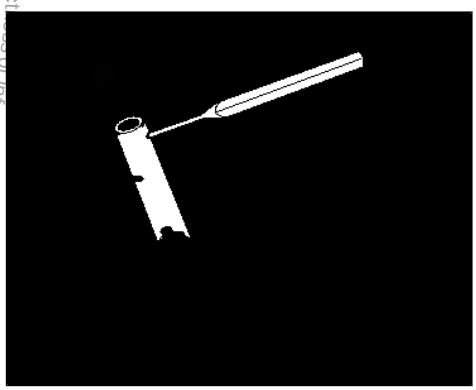


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– If valve stem seal puller - 3364- cannot be used due to restricted space, knock out pin -arrow- with a punch and remove the impact extractor attachment.

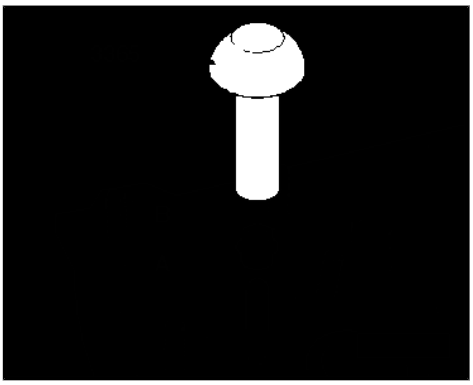


– Position lower part of valve stem seal puller - 3364- on valve stem seal.
– Insert a punch -1- through hole in lower section of puller.
– Apply a lever to puller device and pull out valve stem seal -arrow-.



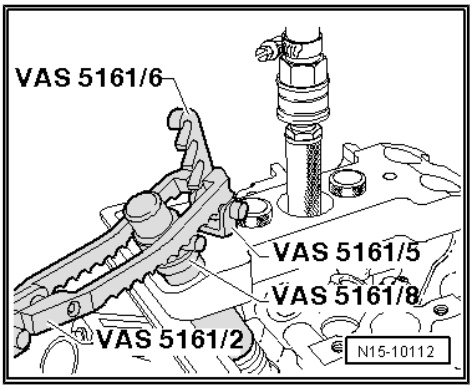
Installing valve stem seals:

– To prevent damage to new valve stem seals -B-, attach plastic sleeve -A- to valve stem.
– Lubricate sealing lip of valve stem oil seal -B-, place it in the valve stem oil seal fitting tool - 3365- and push carefully onto valve guide.
– Remove plastic sleeve -A-.
– Insert valve spring and valve spring plate.



Inlet side

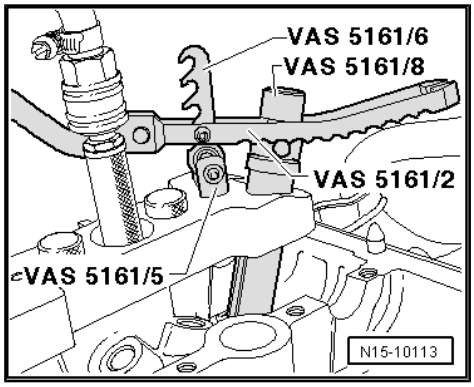
– Set up disassembly and assembly tool - VAS 5161- as shown.



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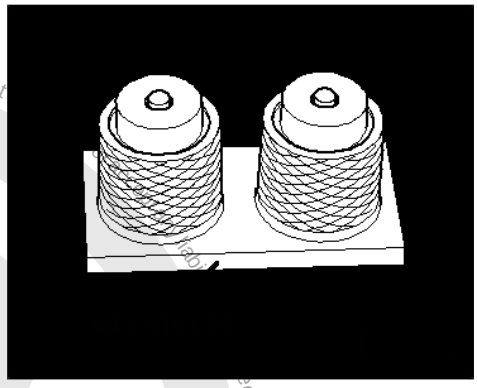
Exhaust side

– Set up disassembly and assembly tool - VAS 5161- as shown.



Note

- *If the valve cotters have been removed from the installation cartridge, they must first be inserted into the insertion device - VAS 5161/18- .*
- *Press assembly cartridge -VAS 5161/8- onto insertion device from above and pick up valve cotters.*



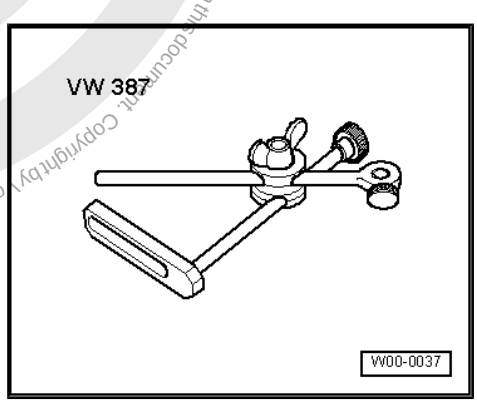
– Press assembly cartridge - VAS 5161/8- down using pressure fork - VAS 5161/2- and turn knurled screw of assembly cartridge back and forth while pulling upwards.
– Release the pressure fork - VAS 5161/2- with knurled screw still in pulled-out position.
– Disassemble removal and installation device - VAS 5161- as shown.

Further assembly is basically a reverse of the dismantling sequence.

3.5 Checking valve guides

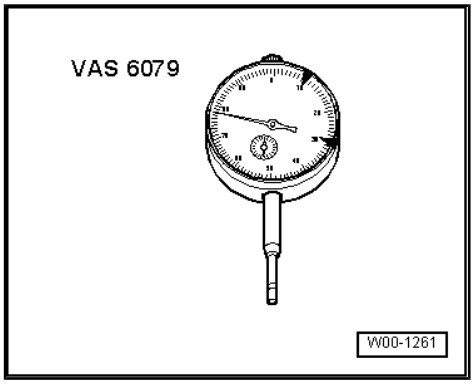
Special tools and workshop equipment required

- Universal dial gauge bracket - VW 387-



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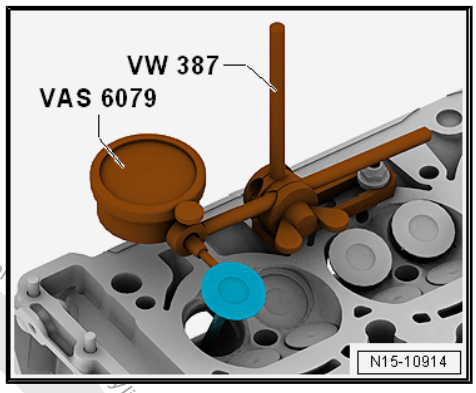
♦ Dial gauge - VAS 6079-



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 guide and exhaust valve in exhaust guide.

– Determine rock.



Wear limit

Inlet valve guide	Exhaust valve guide
0.80 mm	0.80 mm

Note

♦ *If the wear limit is exceeded, repeat the measurement with new valves. If the wear limit is exceeded again, renew the cylinder head.*

♦ *If the valve is to be renewed as part of a repair, use a new valve for the calculation.*

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17 – Lubrication

1 Sump and 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 prevent this from causing further damage, perform the following repairs:*
- *Thoroughly clean oil channels.*
- *Renew oil spray jets.*
- *Renew engine oil cooler.*
- *Renewing oil filter.*
- *The oil level must not be above the max. mark - danger of damage to catalytic converter!*

Assembly overview - sump, oil pump ⇒ page 204 .

Removing and installing coarse oil separator ⇒ page 207 .

Removing and installing lower part of sump ⇒ page 207 .

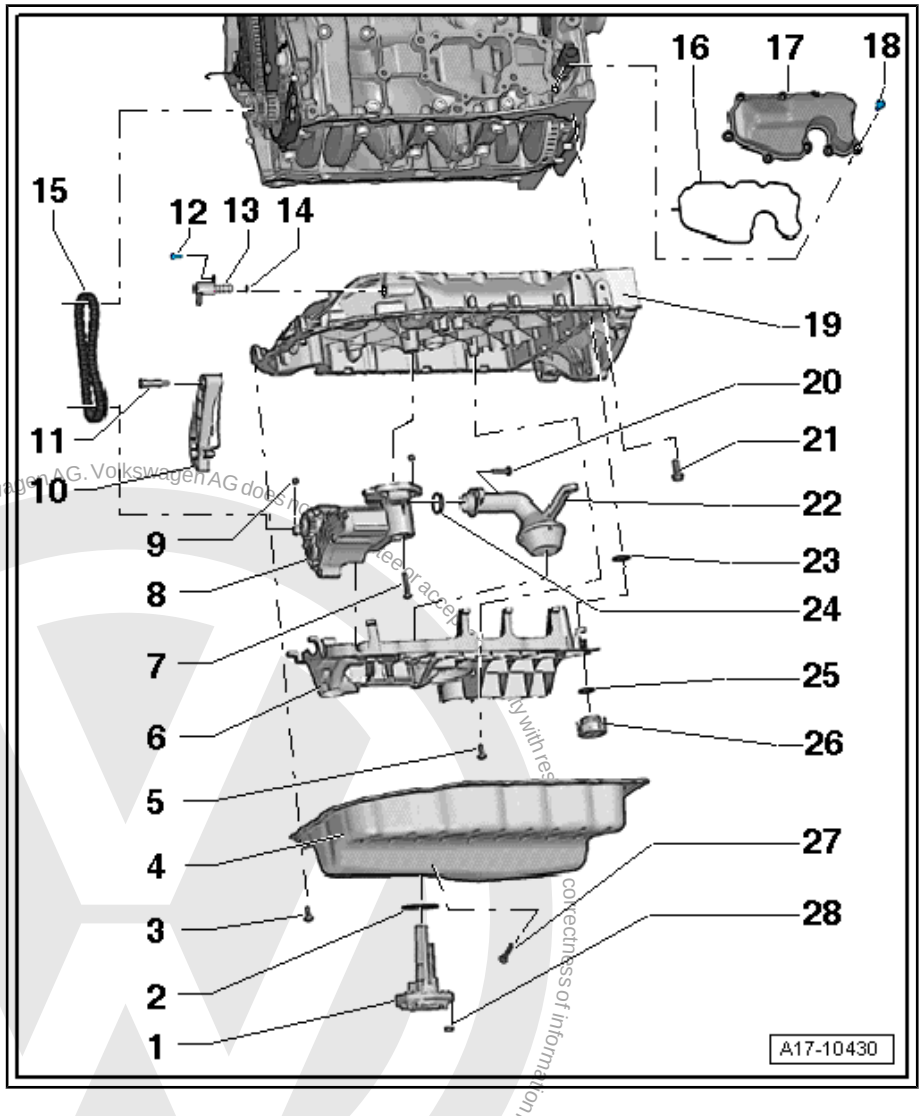
Removing and installing oil pump ⇒ page 210 .

Removing and installing sump upper part ⇒ page 212 .

Removing and installing oil pressure control valve - N428- (engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)
⇒ page 216 .

1.1 Assembly overview - sump, oil pump

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1 - Oil level and oil temperature sender - G266-

- ❑ Not in the case of engine codes CBFA, CCTA, CCTB

2 - Seal

- ❑ Renew

3 - Bolt

- ❑ Renew
- ❑ Tightening sequence ⇒ page 206

4 - Lower part of sump

- ❑ Removing and installing ⇒ page 207

5 - Bolt

- ❑ 9 Nm

6 - Baffle plate

- ❑ If the upper part of the sump is renewed, the baffle plate must also be renewed.

7 - Securing bolts for sump

- ❑ Specified torque:

  M6 = 9 Nm

  M8 = 20 Nm

8 - Oil pump

- ❑ Removing and installing ⇒ page 210

9 - Centring sleeve

10 - Chain tensioner

11 - Bolt

- ❑ 9 Nm

12 - Bolt

- ❑ Only engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB
- ❑ 9 Nm

13 - Valve for oil pressure control - N428-

- ❑ Only engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB
- ❑ Removing and installing ⇒ page 216 .

14 - O-ring

- ❑ Only engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB
- ❑ Renew

15 - Drive chain for oil pump

- ❑ Mark direction of rotation before removing.

16 - Seal

- ❑ Renew

17 - Coarse oil separator

- ❑ Removing and installing ⇒ page 207

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18 - Bolt

- ❑ Tightening sequence ⇒ page 207

19 - Upper part of sump

- ❑ Removing and installing ⇒ page 212

20 - Bolt

- ❑ 9 Nm

21 - Bolt

- ❑ Renew
- ❑ Tightening sequence ⇒ page 206

22 - Oil intake tube

- ❑ Clean strainer if soiled

23 - O-ring

- ❑ Renew

24 - O-ring

- ❑ Renew

25 - O-ring

- ❑ Renew

26 - Non-return valve

27 - Oil drain plug

- ❑ Renew
- ❑ 30 Nm

28 - Nut

- ❑ 9 Nm

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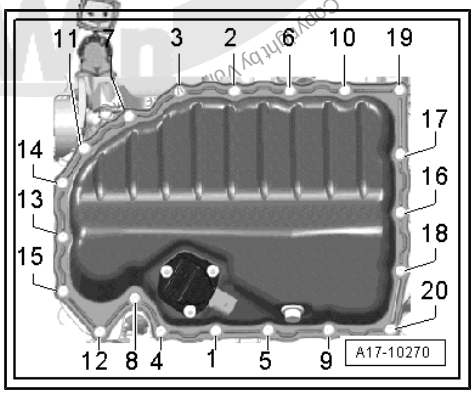
Tightening sequence for sump (bottom section)

– Tighten bolts in sequence -1 to 20- in 3 stages as follows:

1 - Tighten bolts hand-tight.

2 - Tighten bolts to 8 Nm.

3 - Turn bolts 45° further.



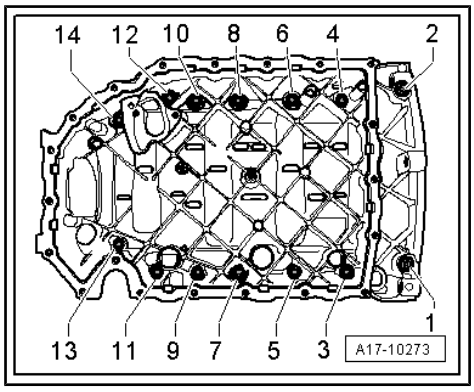
Tightening sequence for sump (top section)

– Tighten bolts in sequence -1 to 14- in 3 stages as follows:

1 - Tighten bolts hand-tight.

2 - Tighten bolts to 15 Nm.

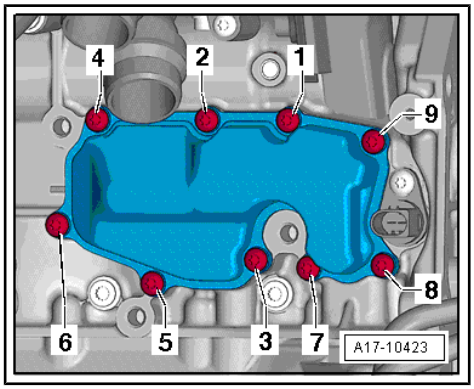
3 - Turn bolts 90° further.



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Tightening sequence for coarse oil separator

– Tighten bolts in the sequence -1 … 9- to 9 Nm.

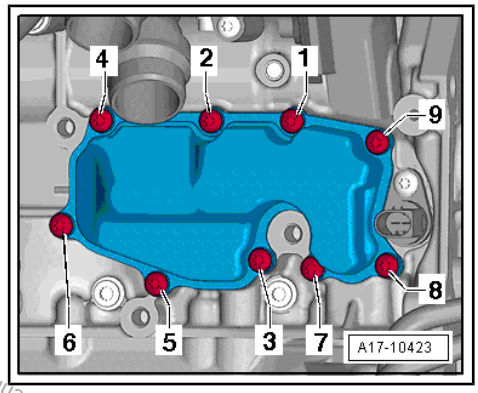


1.2 Removing and installing coarse oil separator

Removing

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

– Unscrew bolts -1 … 9- and remove coarse oil separator.



Caution

Danger of soiling lubrication system.

- *Close opening with clean cloth.*

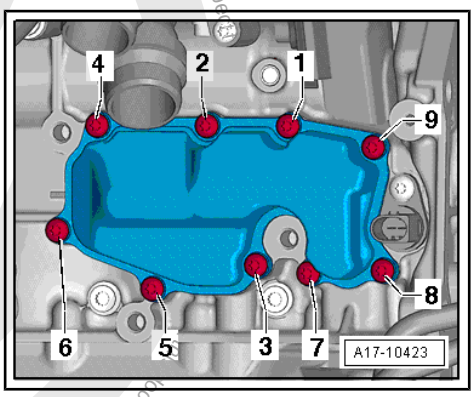
Installing

Note

- *Renew gaskets and seals.*
- *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ EKTA (Electronic parts catalogue) .*

Installation is basically carried out in the reverse sequence; note the following when doing this:

– Tighten bolts in the sequence -1 … 9- to 9 Nm.

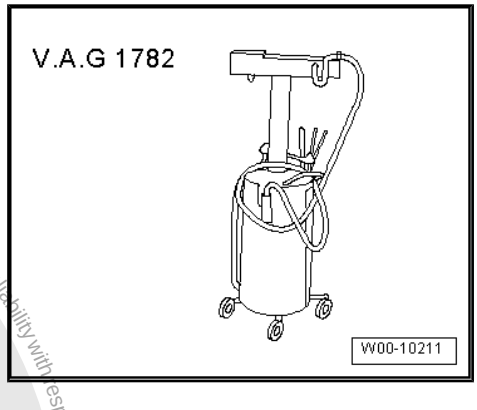


1.3 Removing and installing lower part of sump

Special tools and workshop equipment required

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- Used oil collector and extractor - V.A.G 1782-



- Hand drill with plastic brush
- Flat scraper
- Commercially available scraper
- Safety glasses
- Silicone sealant - D 174 003 M2-

Removing

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

– If fitted, disconnect electrical connector -1- for oil level and oil temperature sender - G266- .

– Drain engine oil.



Note

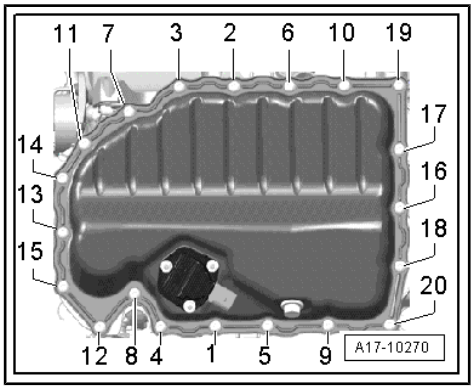
Please observe disposal instructions!

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– Remove bolts -1 to 20-.

– Carefully detach lower part of sump from adhesive bond using a commercially available scraper.

– Remove sump; if necessary, loosen using light blows with a rubber-headed hammer.



Installing

- Specified torques ⇒ page 204

Note

♦ *Note expiry date of silicone sealant.*

♦ *The sump must be installed within 5 minutes of applying silicone sealing compound.*

– Remove residual sealant from upper part of sump using a flat scraper.

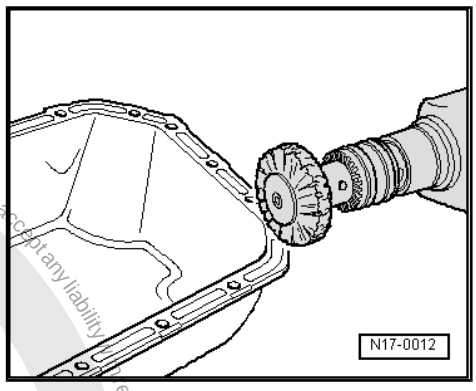
WARNING

Risk of eye injury.

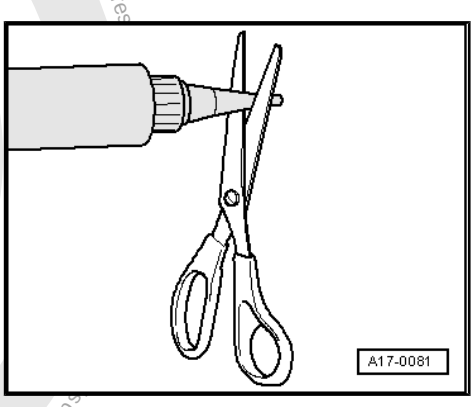
♦ ***Wear safety goggles.***

– Remove sealant residue from sump (bottom section) using a rotating plastic brush, for example.

– Clean sealing surfaces. They must be oil and grease free.

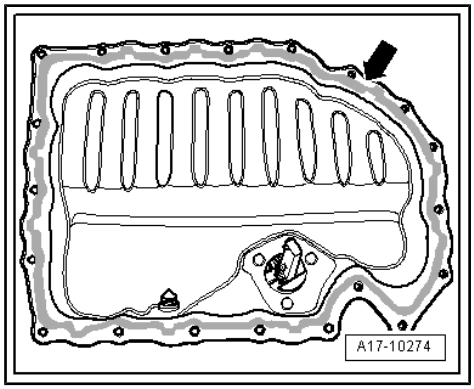


– Cut off nozzle on tube at front marking (∅ of nozzle approx. 3 mm).



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– Apply bead of silicone sealant - D 174 003 M2- to clean sealing surface of sump (bottom section), as illustrated.



Note

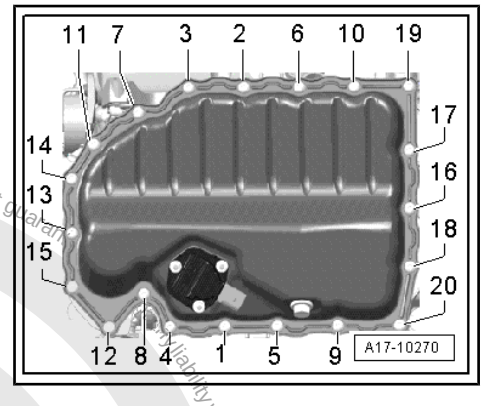
- *The sump must be installed within 5 minutes after applying the silicone sealant.*
- *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*
- Thickness of sealant bead: 2 to 3 mm.

– Fit bottom part of sump immediately and tighten bolts -1 to 20- in 3 stages as follows:

1 - Tighten bolts hand-tight.

2 - Tighten bolts to 8 Nm.

3 - Turn bolts 45° further.



Note

Let sealing compound dry for approx. 30 minutes after installing oil sump. Only then fill with engine oil.

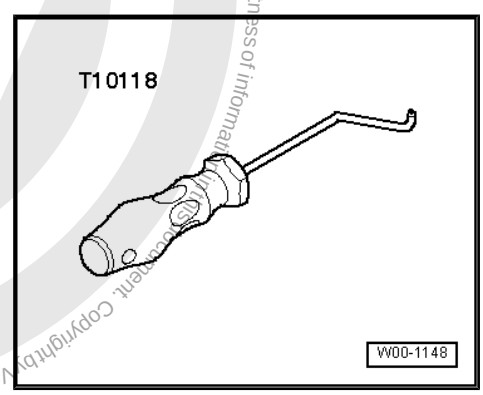
– Replenish engine oil, oil capacities ⇒ page 218 .

Further assembly is basically a reverse of the dismantling sequence.

1.4 Removing and installing oil pump

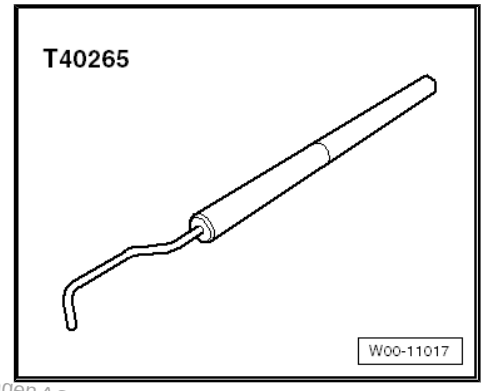
Special tools and workshop equipment required

- Assembly tool - T10118-



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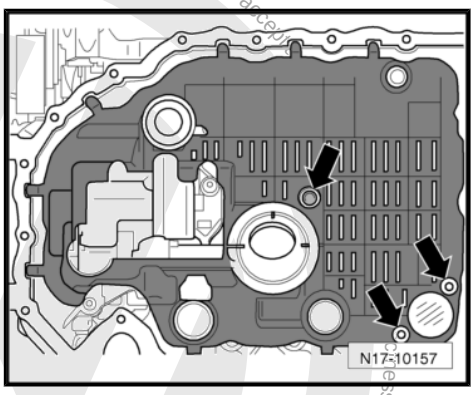
♦ Locking tool - T40265-



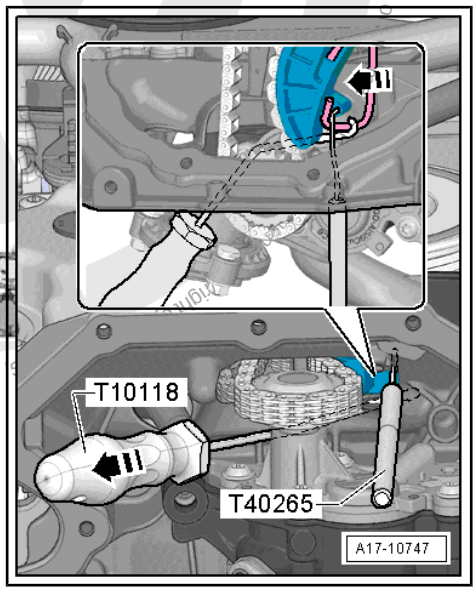
Removing:

– Remove sump (bottom section) ⇒ page 207 .

– Remove baffle plate -arrows-.



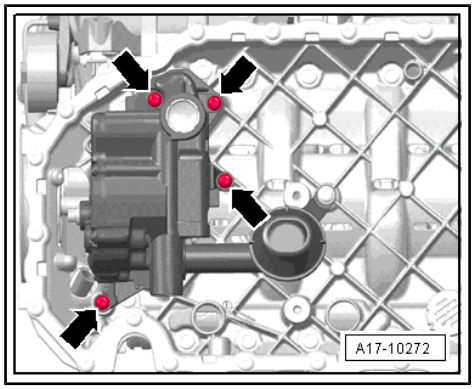
– Pull spring of chain tensioner in -direction of arrow- using assembly tool - T10118- and secure it with locking pin - T40265- .



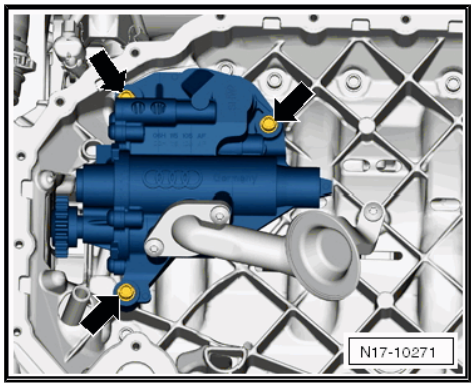
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– Unscrew bolts -arrows- and remove oil pump.

Engine codes CAWA, CAWB, CBFA, CCTA, CCTB, BZB, CGYA:



Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB:



Installing:

– Check that both centring sleeves for centring oil pump are present.

– Before installing oil pump, check strainer in oil suction pipe and oil galleries in upper part of sump for soiling.

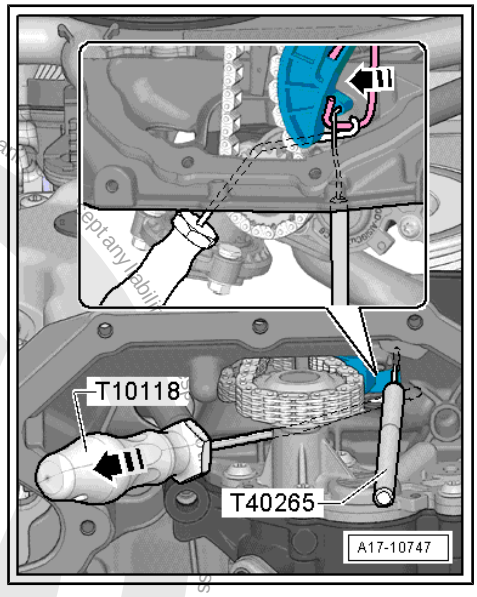
– Guide oil pump chain sprocket into drive chain and install oil pump.

Caution

Risk of damage to engine.

- ***The following work step must be performed to ensure that the chain tensioner spring jumps back to installation position:***

– Pull spring of chain tensioner in -direction of arrow- using assembly tool - T10118- and remove locking pin - T40265- .



Carry out the remaining installation in reverse sequence, noting the following:

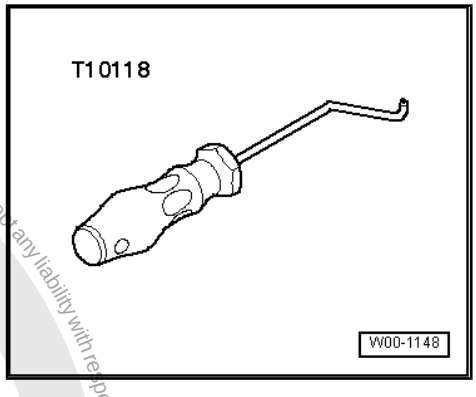
Specified torques
⇒ “1.1 Assembly overview - sump, oil pump”, page 204 .

1.5 Removing and installing upper part of sump

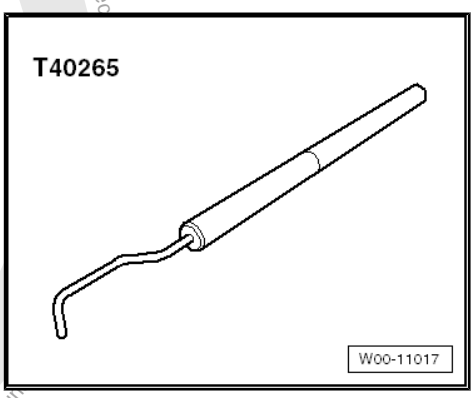
Special tools and workshop equipment required

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- Assembly tool - T10118-



- Locking tool - T40265-



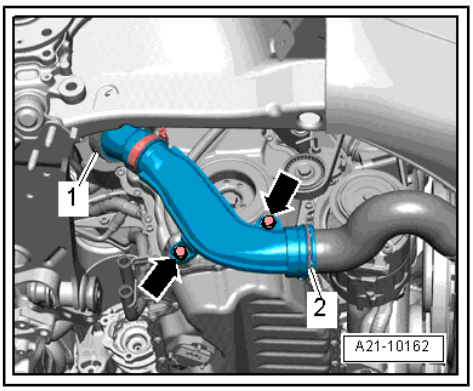
- Silicone sealant - D 174 003 M2-

Note

If the upper part of the sump is renewed, the baffle plate ⇒ Item 6 (page 205) must also be renewed.

Removing

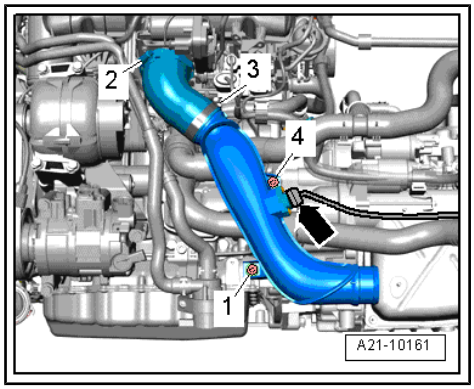
– Remove gearbox ⇒ Rep. gr. 34 .
– Remove oil pump ⇒ page 210 .
– Remove sealing flange on gearbox side ⇒ page 64 .
– Remove front part of right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .
– Remove bolts -arrows-.
– Lift clips -1 and 2- and remove air pipe.



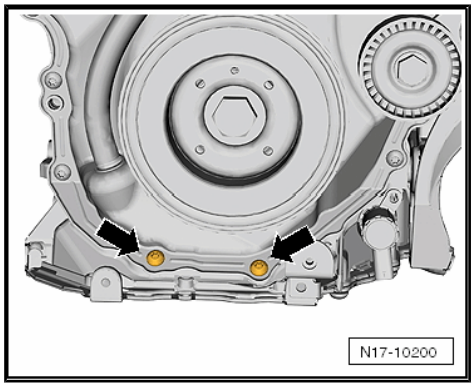
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– Remove bolt -1-.

– Unscrew cable retainer next to continued coolant circulation pump - V51- from upper part of sump.



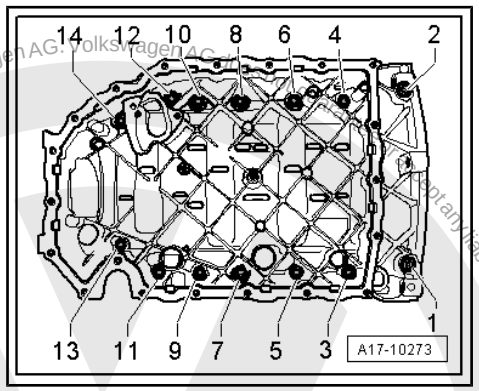
– Unscrew bolts -arrows-.



DANGER!

Danger of injury! When removing upper part of sump, spring of chain tensioner for oil pump drive jumps from upper part of sump to lower timing chain cover. When removing upper part of sump, do not grip between upper part of sump and lower timing chain cover.

– Remove bolts -1 to 14- and lever off upper part of sump.



Caution

Lever off upper part of sump on gearbox side first. When levering off, exercise caution to ensure the timing chain cover is not bent in the process.

Installing

- Specified torque ⇒ page 204

Note

- *Note expiry date of silicone sealant.*
- *The sump (top section) must be installed within 5 minutes after applying the silicone sealant.*

– Remove sealant residue from cylinder block with a flat scraper.

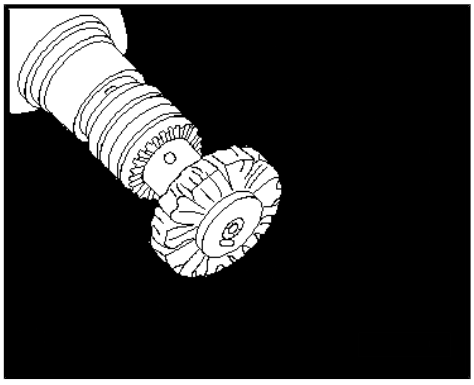
WARNING

Risk of eye injury.

- ***Wear safety goggles.***

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– Remove remaining sealant on sump (top section) and lower timing chain cover e.g. using rotating plastic brush.



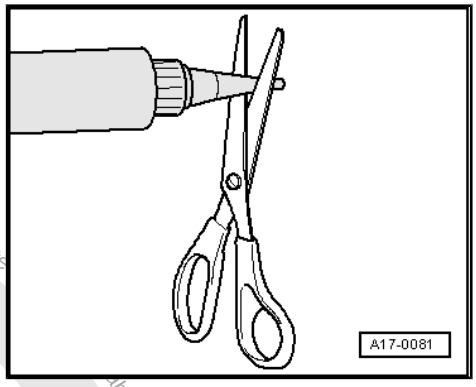
Note

Check timing chain cover for deformation. To do this, fit sump upper part first without sealant and check gap between cover and sump upper part. If deformation is evident and cover cannot be aligned, renew cover after top section of sump has been installed.

– Clean sealing surfaces. They must be oil and grease free.

– Check oil passages in top section of sump and in crankcase for soiling.

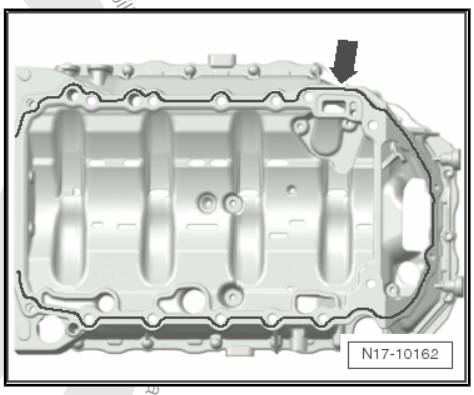
– Cut off nozzle on tube at front marking (∅ of nozzle approx. 3 mm).



Caution

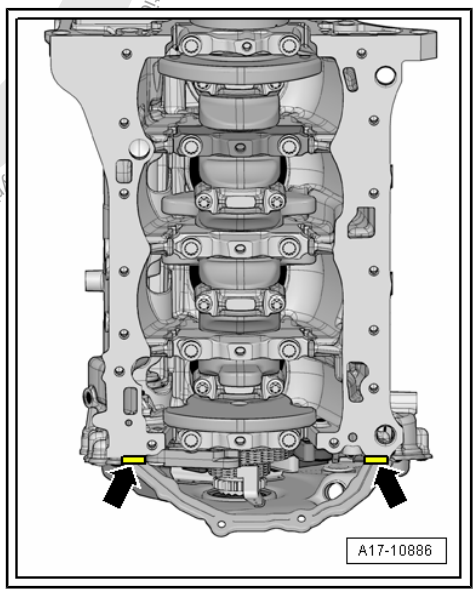
Danger of lubrication system becoming clogged due to excess sealant. Do not apply sealant bead thicker than specified.

– Apply silicone sealant - D 174 003 M2- onto clean sealing surface of upper part of sump, as illustrated -arrow-.



– Apply some additional silicone sealant - D 174 003 M2- between cylinder block and timing chain cover -arrows-.

- Thickness of sealant bead: 2 to 3 mm



Note

- *After applying the silicone sealant, the top part of the sump must be fitted within 5 minutes.*
- *The bead of sealant must not be thicker than specified, otherwise excess sealant can enter the sump and obstruct the strainer in the oil intake pipe.*

- Sump upper part and crankcase must be flush on gearbox side.

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– Fit upper part of sump straight away and tighten bolts -1 to 14- in 3 stages as follows:

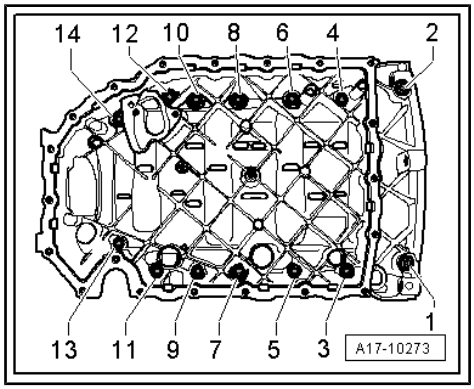
1 - Tighten bolts hand-tight.

2 - Tighten bolts to 15 Nm.

3 - Turn bolts 90° further.

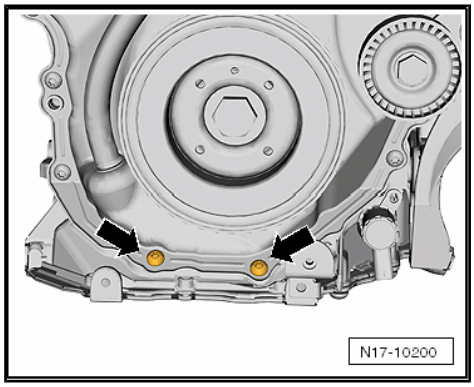
– Install bolts -arrows-.

Specified torque for cover with 15 bolts ⇒ page 89



Cover – tightening torque for version with 8 bolts ⇒ page 89

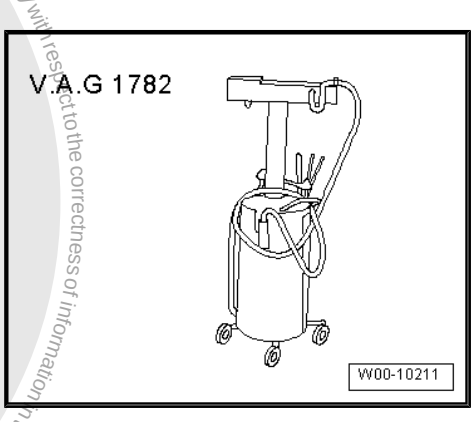
Further assembly is basically a reverse of the dismantling sequence.



1.6 Removing and installing oil pressure control valve - N428- (engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)

Special tools and workshop equipment required

♦ Used oil collector and extractor - V.A.G 1782-



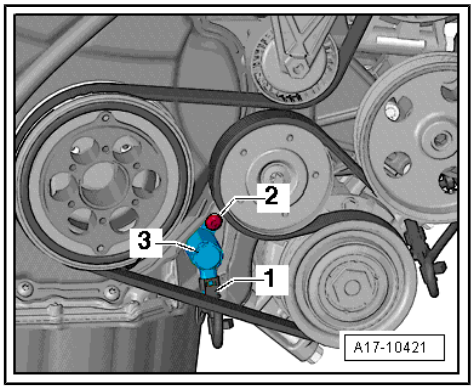
Removing:

– Remove noise insulation ⇒ Rep. gr. 66 .

– Place used oil collection and extraction unit - V.A.G 1782- under engine.

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– Disconnect connector -1-.
– Unscrew bolt -2- and pull off oil pressure control valve - N428- -3-.



Installing:

- Torque setting ⇒ Item 12 (page 205) .

Install in the reverse order of removal, observing the following:

♦ Renew O-ring.

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2 Engine oil:

Oil capacities:

With oil filter, 4.7 l

Without oil filter 4.2 l

The oil capacity was determined experimentally. Due to tolerances, the oil temperature and the drip time, the actual oil capacity may differ. The oil capacity also depends on the type of repair work which has been performed. The correct oil level is indicated by the marking on the dipstick.

Engine oil specifications ⇒ Maintenance ; Booklet : Service tables .

Change engine oil ⇒ Maintenance ; Booklet ; Engine oil: Drain or extract; renew oil filter and replenish engine oil .

Check oil level:

Note

The oil level must not be above the max. mark - danger of damage to catalytic converter!

Test conditions

- Engine oil temperature min. 60°C.
- Vehicle level.
- Wait a few minutes after switching engine off to allow oil to flow back into sump.

Test sequence

– Pull out dipstick, wipe off with a clean cloth and insert it again to stop.

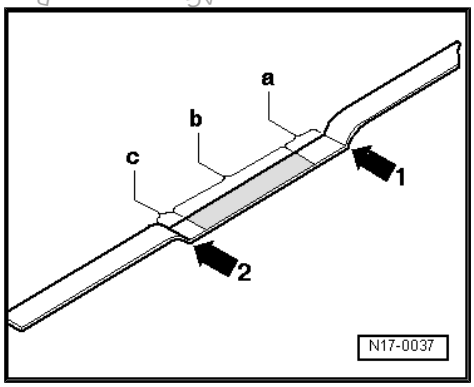
– Pull out dipstick again and read oil level.

Markings on dipstick:

a - Do not top up oil.

b - Oil may be replenished.

c - Oil must be added.



Note

The oil level must not be above the max. marking -arrow 1- and not below the min. marking -arrow 2-.

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3 Oil filter, engine oil cooler and oil pressure switch (engine codes CAWA, CAWB, CBFA, CCTA, CCTB, BZB, CGYA)

Assembly overview - oil filter, engine oil cooler and oil pressure switch - F1- ⇒ page 219 .

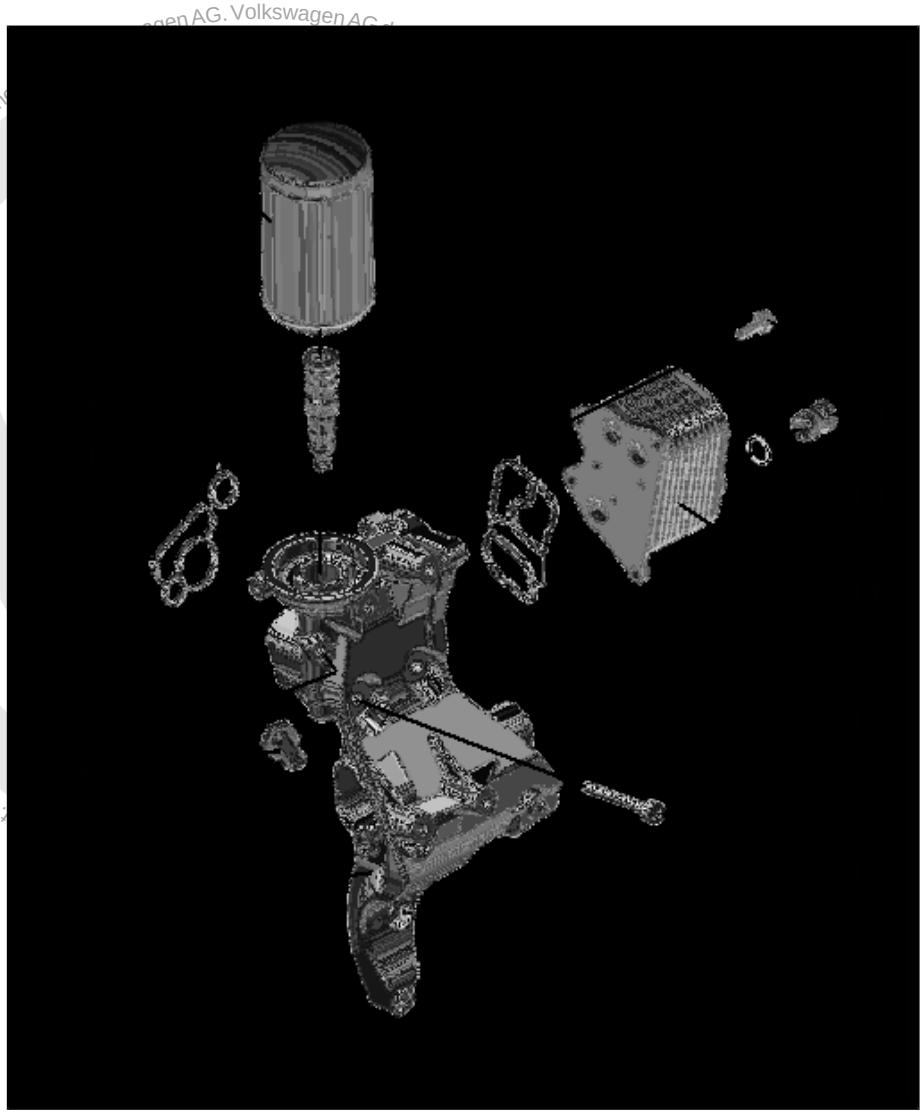
Removing and installing engine oil cooler ⇒ page 220 .

Removing and installing coarse oil separator ⇒ page 207 .

Checking oil pressure and oil pressure switch ⇒ page 221

Engine oil ⇒ page 218 .

3.1 Assembly overview - oil filter, engine oil cooler and oil pressure switch - F1-



1 - Ancillary bracket
- ❑ Removing and installing ⇒ page 49

2 - Oil pressure switch - F1-
- ❑ 1.4 bar - black
- ❑ Checking ⇒ page 221
- ❑ 20 Nm
- ❑ Remove with articulated wrench AF 24 - T40175-

3 - Seal
- ❑ Renew

4 - O-ring
- ❑ Renew

5 - O-ring
- ❑ Renew

6 - Valve unit

7 - Oil filters
- ❑ 22 Nm
- ❑ Remove and install with oil filter tool - 3417-

8 - Bolt
- ❑ 15 Nm

9 - Connection

10 - Sealing ring
- ❑ Renew

11 - Engine oil cooler
- ❑ Observe notes ⇒ page 204
- ❑ Ensure clearance to adjacent components
- ❑ Connection diagram for coolant hoses ⇒ page 232
- ❑ Removing and installing ⇒ page 220

12 - Seal
- ❑ Renew

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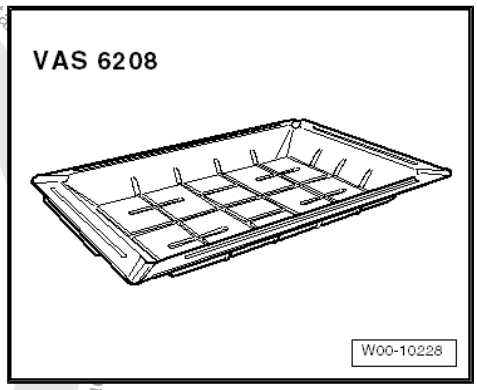
13 - Bolt

❑ Tightening sequence ⇒ page 38

3.2 Removing and installing engine oil cooler

Special tools and workshop equipment required

♦ Drip tray for workshop hoist - VAS 6208-



Removing

Proceed as follows:

WARNING

The cooling system is under pressure when the engine is hot!

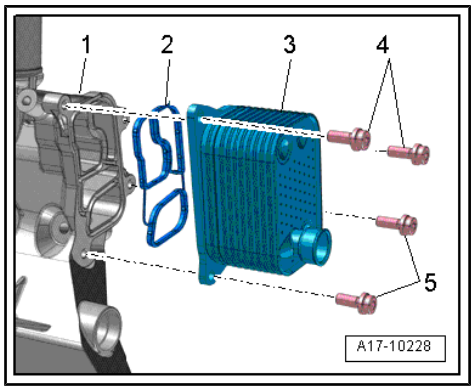
Danger of scalding due to steam and hot coolant.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Drain coolant ⇒ page 235 .

– Remove bracket for ancillaries ⇒ page 49 .

– Unscrew bolts -4 and 5- and remove engine oil cooler -3- together with seal -2-.



Installing

Install in the reverse order of removal, observing the following:

• Specified torques ⇒ page 219

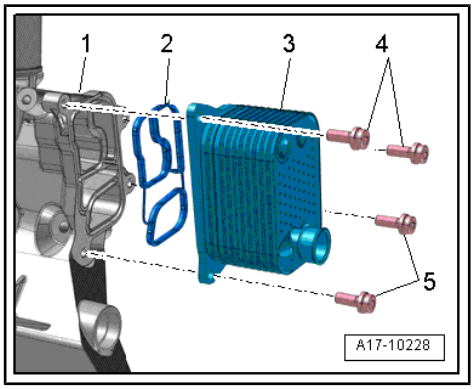
Note

♦ *Renew gaskets and seals.*

♦ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ EKTA (Electronic parts catalogue) .*

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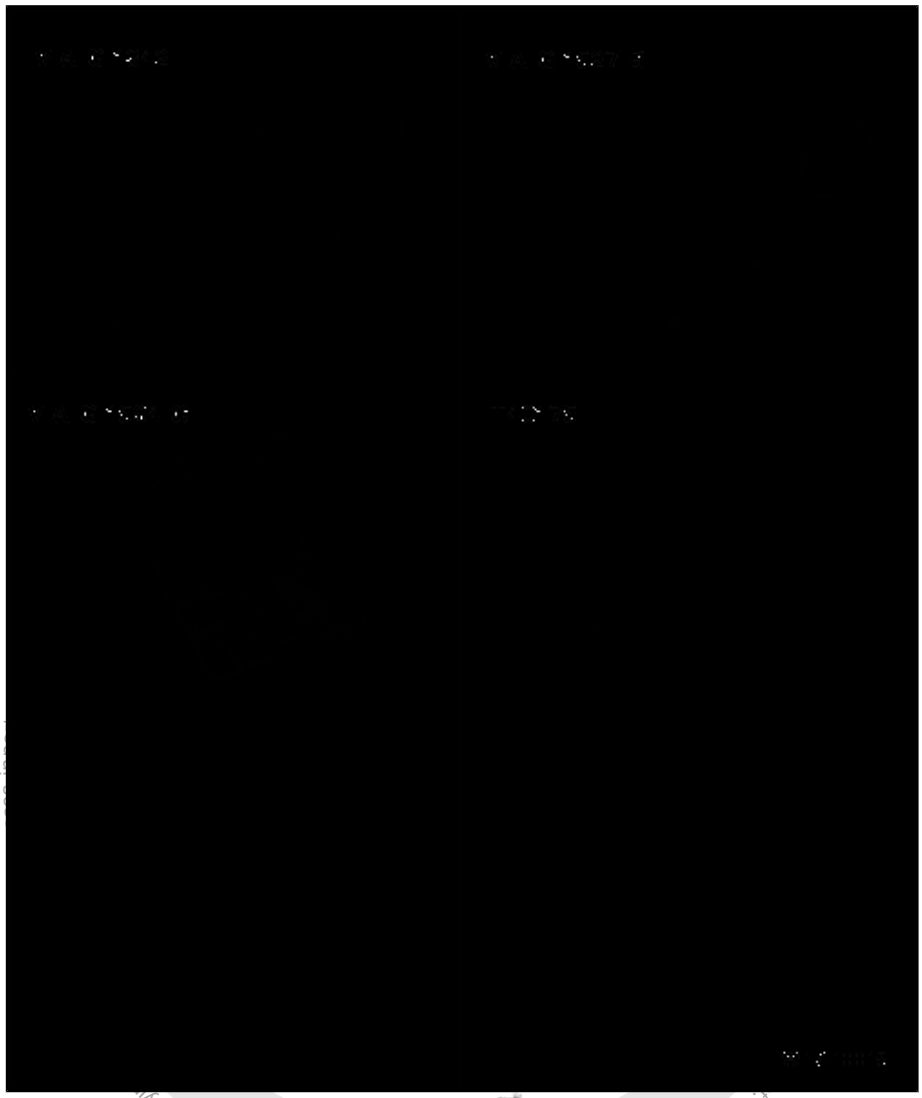
– Install engine oil cooler -3- with new seal -2-.



3.3 Checking oil pressure and oil pressure switch

Special tools and workshop equipment required

- Oil pressure tester - V.A.G 1342-
- Voltage tester - V.A.G 1527B-
- Adapter set - V.A.G 1594C-
- Jointed wrench 24 mm - T40175-



Conditions:

- Engine oil level OK.
- Engine oil temperature at least 80 °C (radiator fan must have run once)

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Note

Functional check and repair of the optical and acoustic oil pressure display: Current flow diagrams ⇒ Vehicle diagnostic tester "Function and component selection".

Test sequence

- Specified torque ⇒ Item 2 (page 219)

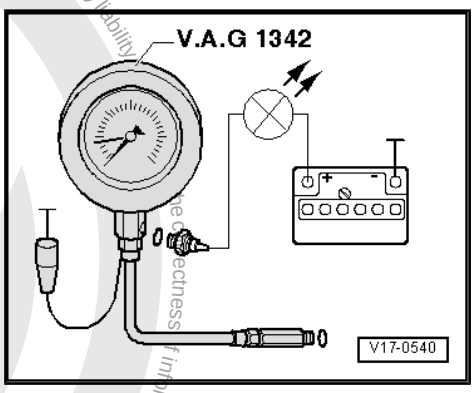
– Remove oil pressure switch - F1- and screw into tester.

– Screw tester into oil filter bracket in place of oil pressure switch.

– Connect brown wire of tester to earth (-).

– Connect voltage tester - V.A.G 1527B- to battery positive (+) and oil pressure switch using cables from auxiliary measuring set - V.A.G 1594C- . LED must remain off.

– If the LED lights up, renew 1.4 bar oil pressure switch - F1- .



If LED does not light up:

– Start engine and increase engine speed. At 1.2 to 1.6 bar, the LED must light up, otherwise renew oil pressure switch.

– Increase engine speed further.

- At 2000 rpm and an oil temperature of 80°C, the oil pressure should be between 2.0 to 4.5 bar.

If specification is not attained:

– Check strainer in oil suction pipe for contamination/soiling ⇒ Item 22 (page 206) .

Note

Mechanical damage, e.g. to bearings, could also be the cause for oil pressure being too low.

If no fault is found:

– Renew oil pump ⇒ page 210 .

If the specification is exceeded:

– Check oil channels.

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4 Oil filter, engine oil cooler and oil pressure switch (engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)

Assembly overview - oil filter, engine oil cooler ⇒ page 223 .

Removing and installing engine oil cooler ⇒ page 224 .

Removing and installing oil pressure switch - F1- ⇒ page 225 .

Removing and installing oil pressure switch for reduced oil pressure - F378- ⇒ page 226 .

Checking oil pressure and oil pressure switch ⇒ page 227

Engine oil ⇒ page 218 .

4.1 Assembly overview - oil filter, engine oil cooler

1 - Ancillary bracket
- ❑ Removing and installing ⇒ page 49

2 - Oil pressure switch - F1-
- ❑ Blue insulation
- ❑ Removing and installing ⇒ page 225
- ❑ Checking ⇒ page 227
- ❑ 20 Nm

3 - Oil pressure switch for reduced oil pressure - F378-
- ❑ Brown insulation
- ❑ Removing and installing ⇒ page 226
- ❑ Checking ⇒ page 227
- ❑ 20 Nm

4 - Seal
- ❑ Renew

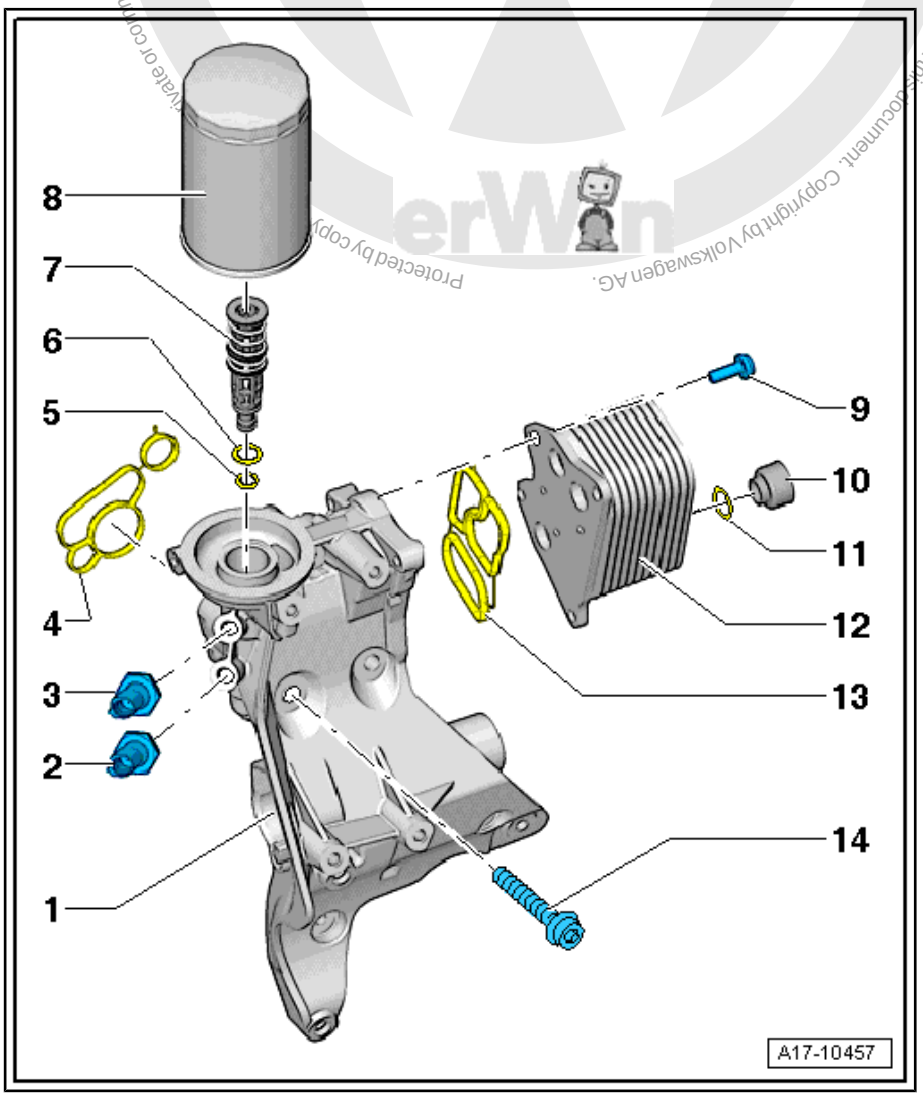
5 - O-ring
- ❑ Not replacement part. Include in items supplied with valve unit

6 - O-ring
- ❑ Not replacement part. Include in items supplied with valve unit

7 - Valve unit
- ❑ With O-rings

8 - Oil filters
- ❑ Remove and install with oil filter tool - 3417- .

9 - Bolt
- ❑ 15 Nm



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10 - Connection

11 - Sealing ring

- ❑ Renew

12 - Engine oil cooler

- ❑ Observe notes ⇒ page 204
- ❑ Ensure clearance to adjacent components
- ❑ Removing and installing ⇒ page 224

13 - Seal

- ❑ Renew

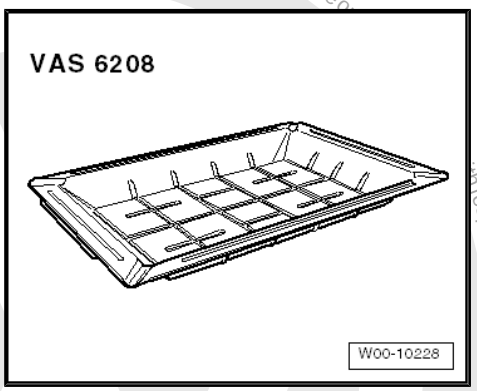
14 - Bolt

- ❑ Tightening sequence ⇒ page 38

4.2 Removing and installing engine oil cooler

Special tools and workshop equipment required

- ♦ Drip tray for workshop hoist - VAS 6208-



Removing

WARNING

The cooling system is under pressure when the engine is hot!

Danger of scalding due to steam and hot coolant.

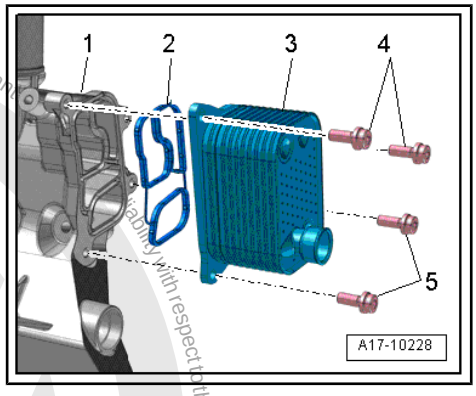
Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Drain coolant ⇒ page 235 .

– Remove bracket for ancillaries ⇒ page 49 .

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– Unscrew bolts -4 and 5- and remove engine oil cooler -3- together with seal -2-.



Installing

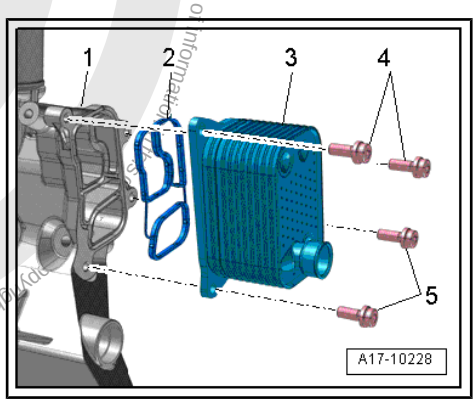
Install in the reverse order of removal, observing the following:

- Specified torques
  ⇒ “4.1 Assembly overview - oil filter, engine oil cooler”, page 223 .

Note

- *Renew gaskets and seals.*
- *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ EKTA (Electronic parts catalogue)*

– Install engine oil cooler -3- with new seal -2-.



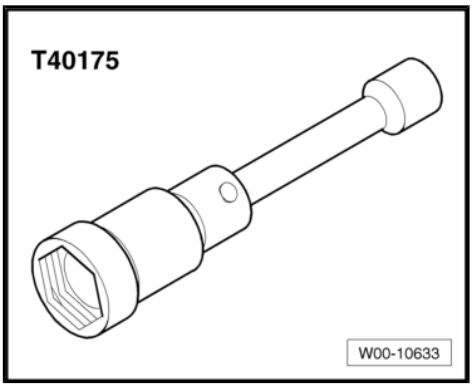
– Install bracket for ancillaries ⇒ page 49 .

– Add coolant ⇒ page 235 .

4.3 Removing and installing oil pressure switch - F1-

Special tools and workshop equipment required

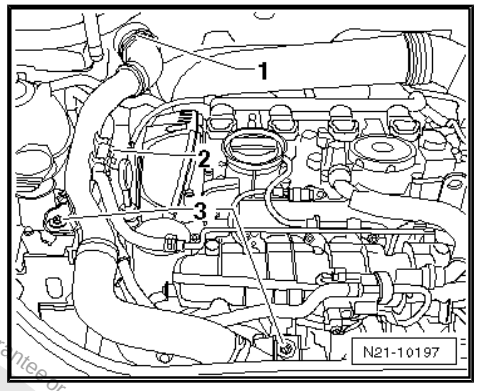
- Jointed wrench 24 mm - T40175-



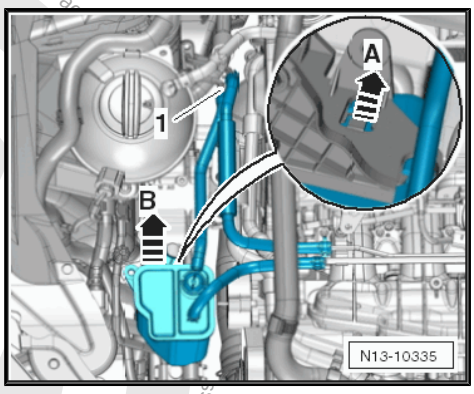
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Removing

– Only vehicles with sound generator: Open catch -1-, unclip fuel lines -2- and loosen bolt -3- on activated charcoal filter. Place charge air pipe to one side.



– Pull off breather line -1-, release activated charcoal filter -A- and remove upwards -B-. Place activated charcoal filter to one side.

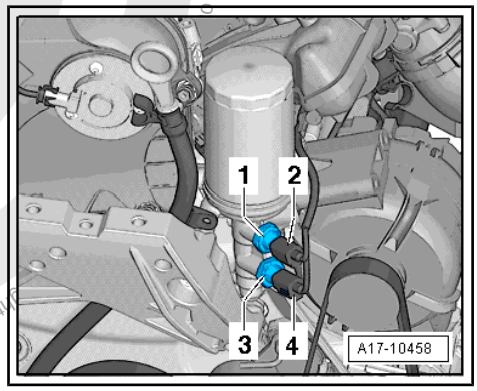


Note

Place a cloth underneath bracket for ancillaries to catch any escaping oil.

– Separate electrical connector -4- on oil pressure switch - F1- .

– Unscrew oil pressure switch -3-.



Installing

• Torque setting ⇒ page 223 .

Install in reverse order of removal, observing the following.

♦ Renew the seal.

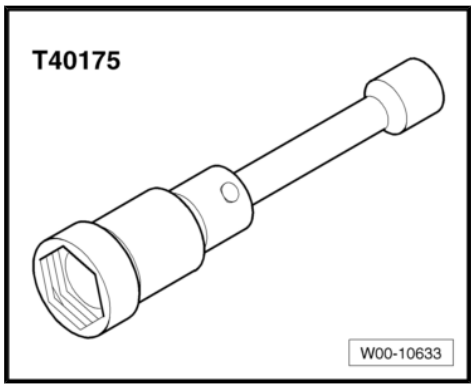
♦ Insert new oil pressure switch immediately in hole to avoid loss of oil.

♦ Check oil level.

4.4 Removing and installing oil pressure switch for reduced oil pressure - F378-

Special tools and workshop equipment required

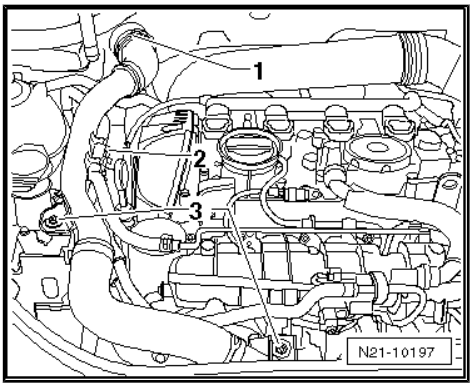
♦ Jointed wrench 24 mm - T40175-



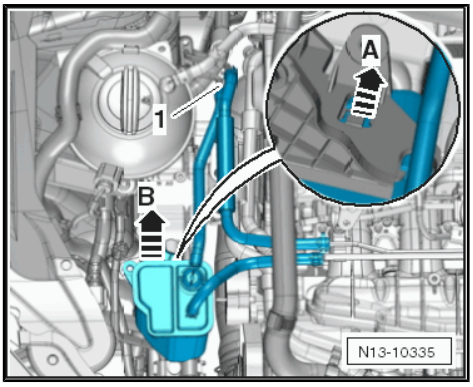
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Removing

– Only vehicles with sound generator: Open catch -1-, unclip fuel lines -2- and loosen bolt -3- on activated charcoal filter. Place charge air pipe to one side.



– Pull off breather line -1-, release activated charcoal filter -A- and remove upwards -B-. Place activated charcoal filter to one side.

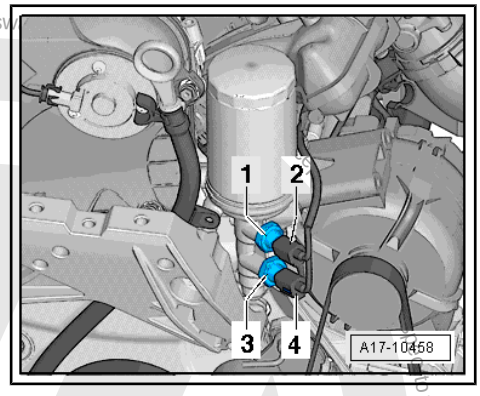


Note

Place a cloth underneath bracket for ancillaries to catch any escaping oil.

– Separate electrical connector -2- on oil pressure switch for reduced oil pressure - F378- .

– Unscrew oil pressure switch for reduced oil pressure - F378- -1-.



Installing

• Torque setting ⇒ page 223 .

Install in reverse order of removal, observing the following.

♦ Renew the seal.

♦ Insert new oil pressure switch immediately in hole to avoid loss of oil.

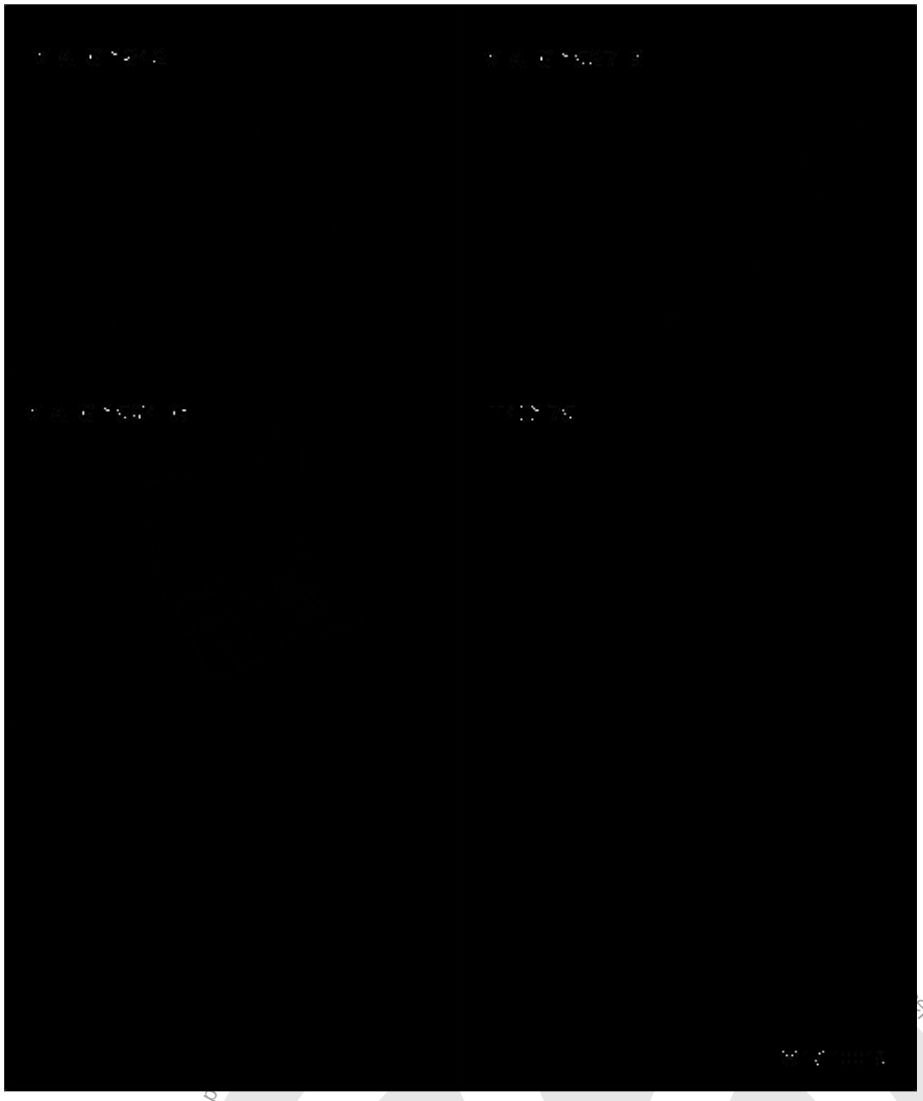
♦ Check oil level.

4.5 Checking oil pressure and oil pressure switch

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Special tools and workshop equipment required

- Oil pressure tester - V.A.G 1342-
- Voltage tester - V.A.G 1527B-
- Adapter set - V.A.G 1594C-
- Jointed wrench 24 mm - T40175-



Conditions:

- Engine oil level OK.
- Engine oil temperature at least 80 °C (radiator fan must have run once)

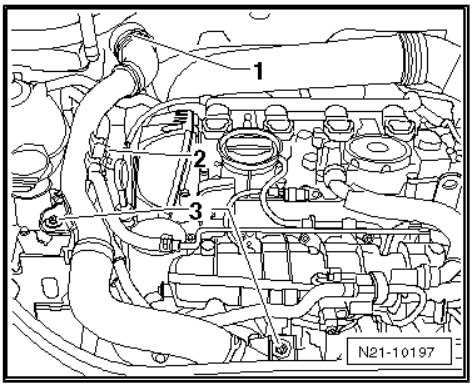
Note

Functional check and repair of the optical and acoustic oil pressure display: Current flow diagrams ⇒ Vehicle diagnostic tester "Function and component selection".

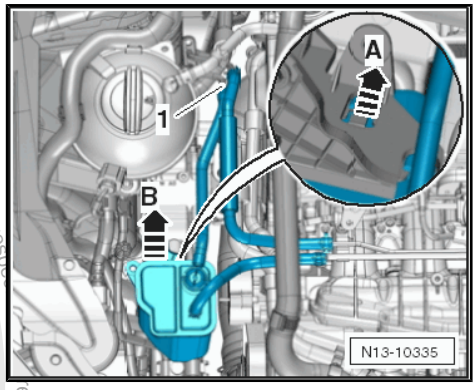
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Checking oil pressure:

– Only vehicles with sound generator: Open catch -1-, unclip fuel line -2- and loosen bolt -3- on activated charcoal filter. Place charge air pipe to one side.



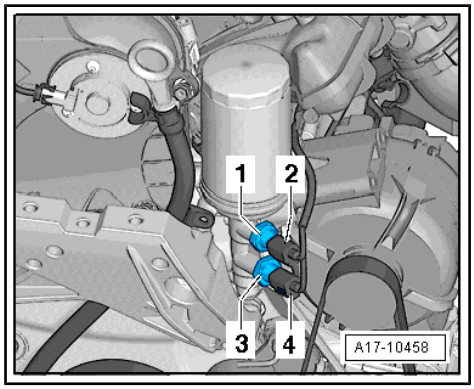
– Pull off breather line -1-, release activated charcoal filter -A- and remove upwards -B-. Place activated charcoal filter to one side.



Note

Place a cloth underneath bracket for ancillaries to catch any escaping oil.

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– Separate electrical connector -2- on oil pressure switch for reduced oil pressure - F378- (brown).
– Unscrew oil pressure switch for reduced oil pressure - F378- -1-.
– Screw oil pressure tester - V.A.G 1342- into oil filter bracket in place of the oil pressure switch.
– Screw oil pressure switch for reduced oil pressure - F378- in oil pressure tester - V.A.G 1342- .
– Reconnect charge air pipe and breather line for activated charcoal filter.
– Start the engine.
• Oil pressure at idling speed: 1.2…2.1 bar.
• Oil pressure at 2000 rpm: 1.6…2.1 bar.
• Oil pressure at 3500 rpm: 3.0 to 4.0 bar.

Note

During the first 1000 km, the oil pressure at 2000 rpm can be between 3.0 and 4.0 bar.

If specification is not attained:

– Check strainer in oil suction pipe for contamination/soiling ⇒ Item 22 (page 206) .
– Check oil pressure control valve - N428- ⇒ Vehicle diagnostic tester.

Note

Mechanical damage, e.g. to bearings, could also be the cause for oil pressure being too low.

If no fault is found:

– Renew oil pump ⇒ page 210

Check oil pressure switch for reduced oil pressure - F378- (brown):

– Switch off engine.

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– Connect brown wire of tester to earth (-).

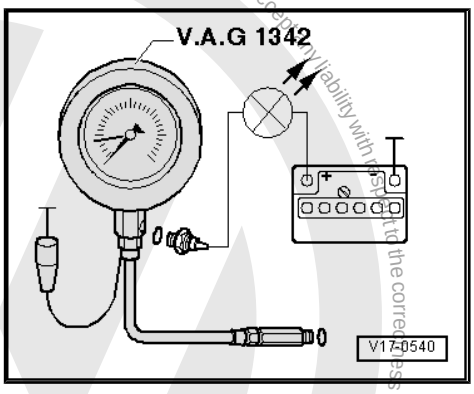
– Connect voltage tester - V.A.G 1527B- to battery positive (+) and oil pressure switch for reduced oil pressure - F378- (brown) using cables from auxiliary test set - V.A.G 1594C- .

• LED must remain off.

– If LED lights up, replace oil pressure switch for reduced oil pressure - F378- .

If LED does not light up:

– Start engine. At 0.55 to 0.85 bar, the LED must light up; otherwise renew oil pressure switch.



Checking oil pressure switch - F1- (blue):

– Switch off engine.

– Connect voltage tester - V.A.G 1527B- to battery positive (+) and oil pressure switch - V.A.G 1594C- (blue) using cables from auxiliary test set - F1- .

• LED must remain off.

– If LED lights up, replace pressure switch - F1- .

If LED does not light up:

– Start engine and increase engine speed. At 2.15 to 2.95 bar, the LED must light up, otherwise renew oil pressure switch.

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19 – Cooling

1 Cooling system

WARNING

The cooling system is under pressure when the engine is hot!

Danger of scalding due to steam and hot coolant.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

Note

- *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ EKTA (Electronic parts catalogue) .*
- *The arrow markings on coolant pipes and on ends of hoses must align when installing.*

Coolant hose schematic diagram ⇒ page 232

Draining and filling with coolant ⇒ page 235 .

Checking cooling system for leaks ⇒ page 240 .

1.1 Coolant hose connection diagram

Note

Inclusion of auxiliary heater in coolant circuit ⇒ Rep. gr. 82

Vehicles with manual gearbox

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1 - Radiator/cooler

2 - Continued coolant circulation pump - V51-

3 - Coolant pump

4 - Thermostat

5 - Engine oil cooler

6 - Cylinder head and cylinder block

7 - Exhaust turbocharger

8 - Coolant expansion tank

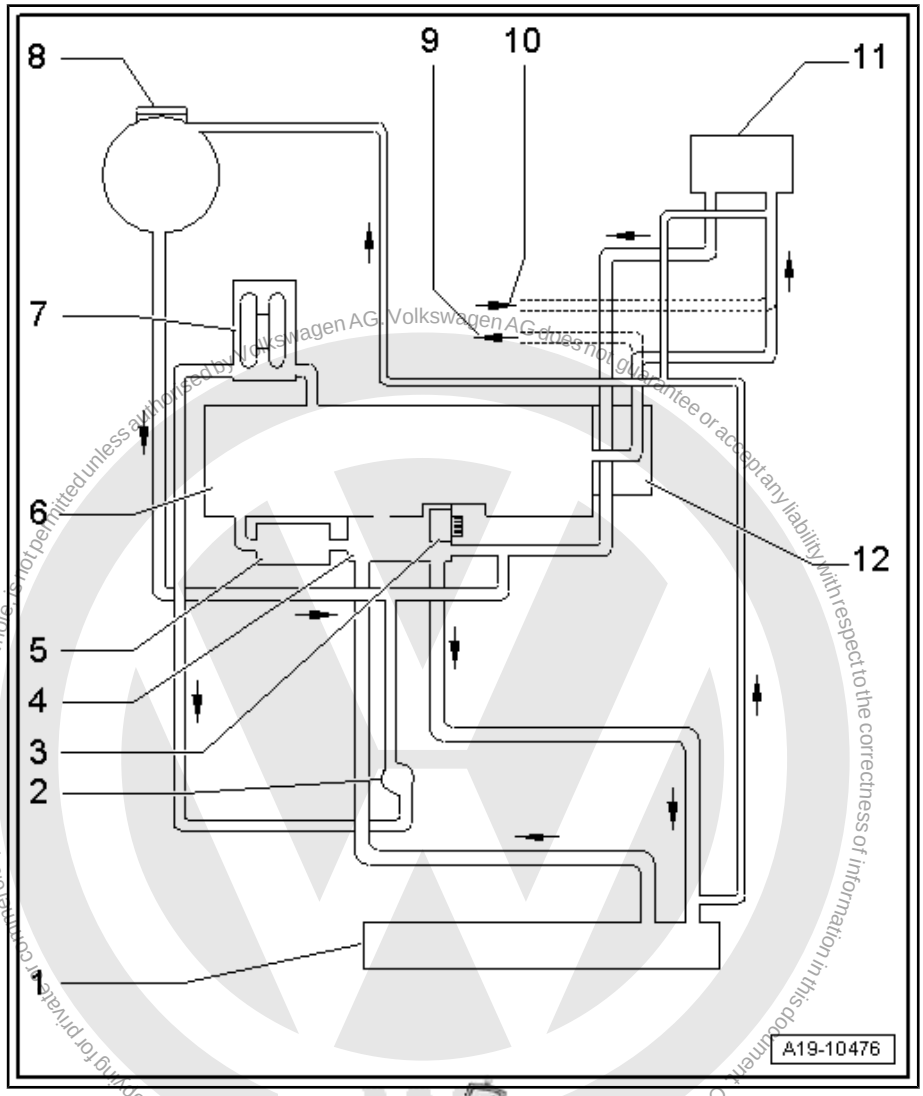
- ❑ With cap
- ❑ Checking pressure relief valve in filler cap ⇒ page 240 .

9 - To auxiliary heater

10 - From auxiliary heater

11 - Heat exchanger for heater

12 - Coolant connection



Vehicles with automatic gearbox

Note

Inclusion of auxiliary heater in coolant circuit ⇒ Rep. gr. 82

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1 - Radiator/cooler

2 - Continued coolant circulation pump - V51-

3 - Thermostat

4 - Coolant pump

5 - Engine oil cooler

6 - Cylinder head and cylinder block

7 - Exhaust turbocharger

8 - Coolant expansion tank

- With cap
- Checking pressure relief valve in filler cap ⇒ page 240 .

9 - To auxiliary heater

10 - From auxiliary heater

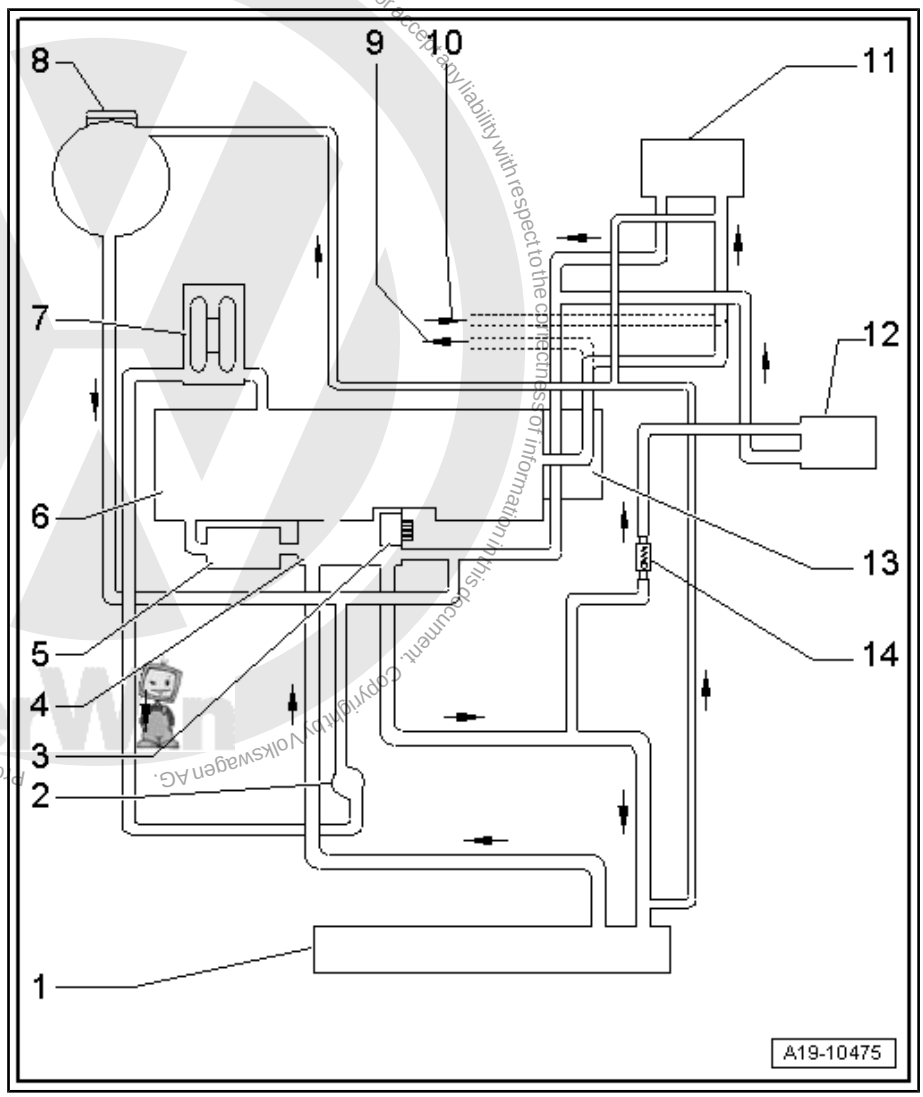
11 - Heat exchanger for heater

12 - Gear oil cooler

13 - Coolant connection

14 - Thermostat for gear oil cooler

- In some vehicles, the thermostat is located on the output side of the gear oil cooler.



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1.2 Draining and adding coolant

Special tools and workshop equipment required

- Adapter for cooling system tester - V.A.G 1274/8-
- Drip tray for workshop hoist - VAS 6208-
- Spring-type clip pliers - VAS 6362-
- Coolant system charge unit - VAS 6096-
- Refractometer - T10007 A-



Draining

WARNING

The cooling system is under pressure when the engine is hot!

Danger of scalding due to steam and hot coolant.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Open filler cap on expansion tank.

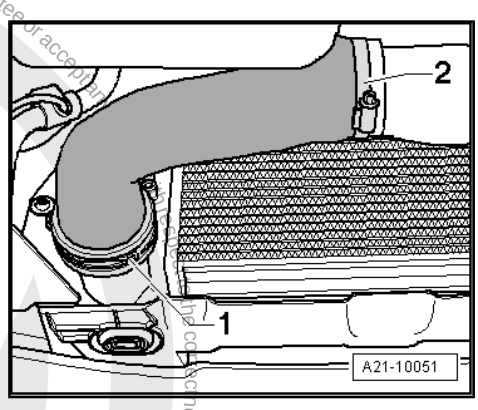
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

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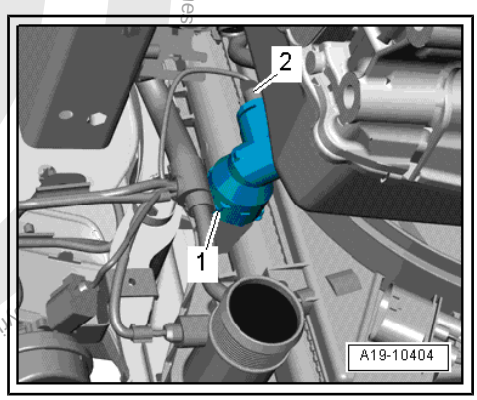
Passat, CC, Golf, Scirocco and Eos:

– Remove air hose -items 1 and 2- and seal charge air cooler with a clean cloth.

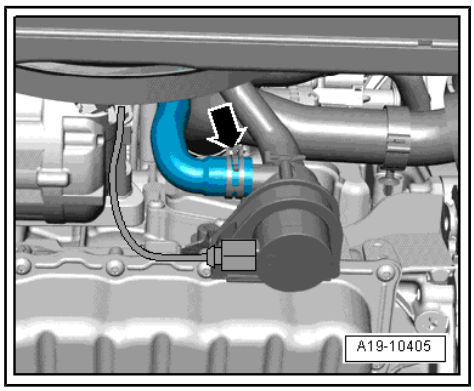
– Place drip tray - VAS 6208- beneath engine.



– Disconnect coolant hose -1- from bottom of radiator and drain off coolant.

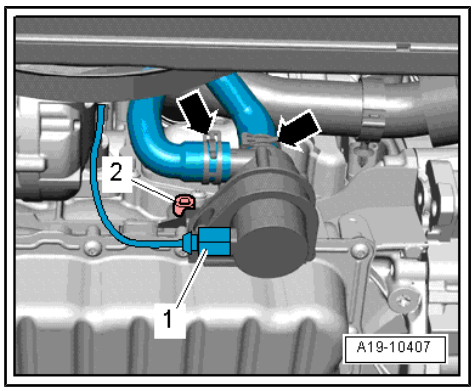


– Disconnect bottom coolant hose leading to continued coolant circulation pump - V51- -arrow- and drain off coolant.



Tiguan:

– Remove bolt -2- at bracket for coolant pump for continued circulation - V51- .

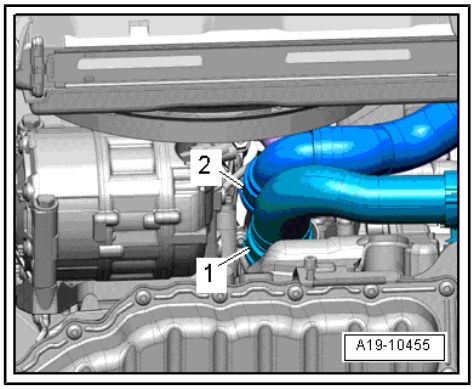


Note

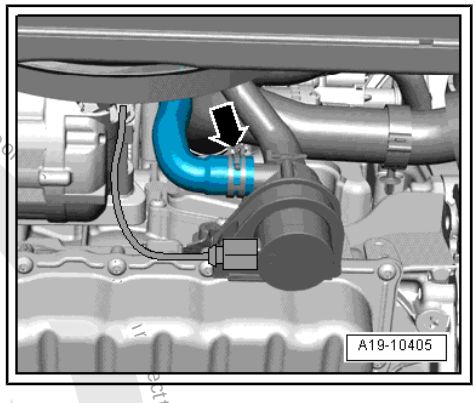
The continued circulation coolant pump - V51- remains installed.

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– Pull off coolant hose -1-.

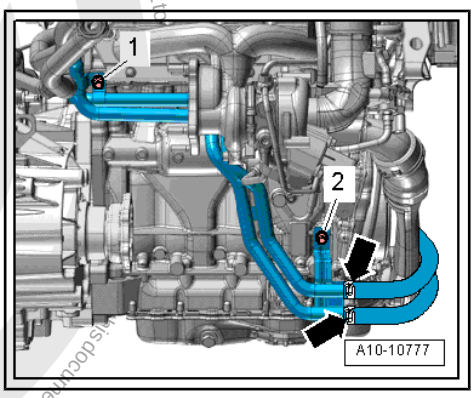


– Disconnect bottom coolant hose leading to continued coolant circulation pump - V51- -arrow- and drain off coolant.



Vehicles with seat heating:

– Disconnect coolant hoses -arrows- and drain off remaining coolant.



Filling:

Caution

Only distilled water may be used for mixing coolant additives. The use of distilled water ensures optimum protection against corrosion.

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Note

- *The water used for mixing has a major influence on the effectiveness of the coolant. Since water quality differs from country to country and even region to region, it is necessary to set a standard for the quality of water to be used. Distilled water fulfils all requirements. It is therefore recommended to 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 motor.*
- *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.*
- *The refractometer - T10007A- must be used to determine the 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.*
- *The coolant concentration must not be reduced 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.*

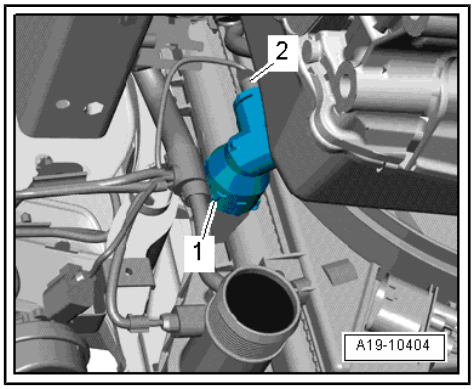
Recommended mixture ratios:

Frost protection to	Anti-freeze proportion	Coolant additive 1)	Distilled water 1)
-25 °C	40%	3.2 l	4.8 l
-36 °C	50%	4.0 l	4.0 l

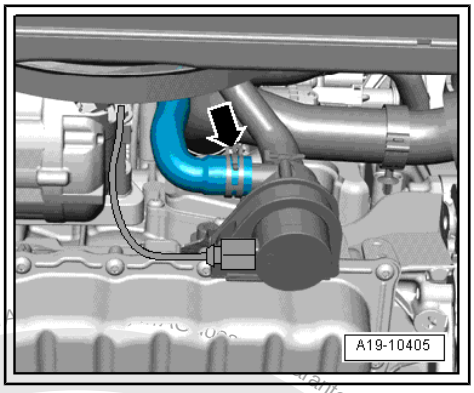
1) The quantity of coolant can vary depending on the vehicle equipment.

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– Connect bottom coolant hose -1- to radiator.
– Install air pipe.



– Connect the coolant hose to the continued circulation coolant pump - V51- -arrow-.



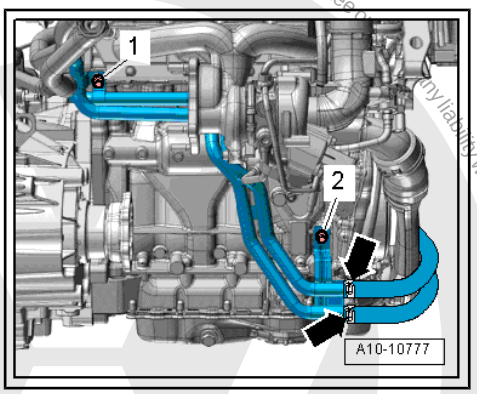
Vehicles with seat heating:

– Connect coolant hoses -arrows-.
– Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

All:

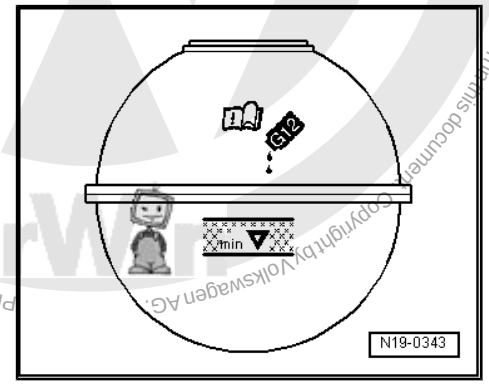
With cooling system charge unit - VAS 6096- :

– Screw adapter for cooling system tester - V.A.G 1274/8- onto expansion tank.
– Fill coolant circuit using cooling system charge unit - VAS 6096- ⇒ Operating instructions for cooling system charge unit VAS 6096.



Without cooling system charge unit - VAS 6096- :

– Slowly fill coolant to upper marking of shaded field on expansion tank.
– Fit expansion tank cap.
– Start engine and maintain an engine speed of about 2,000 rpm for about 3 minutes.
– Run engine until radiator fan - V7- cuts-in.



WARNING

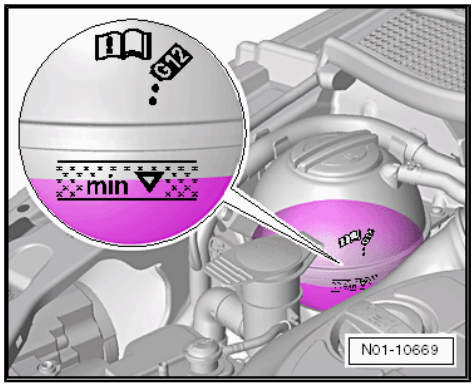
The cooling system is under pressure when the engine is hot!

Danger of scalding due to steam and hot coolant.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

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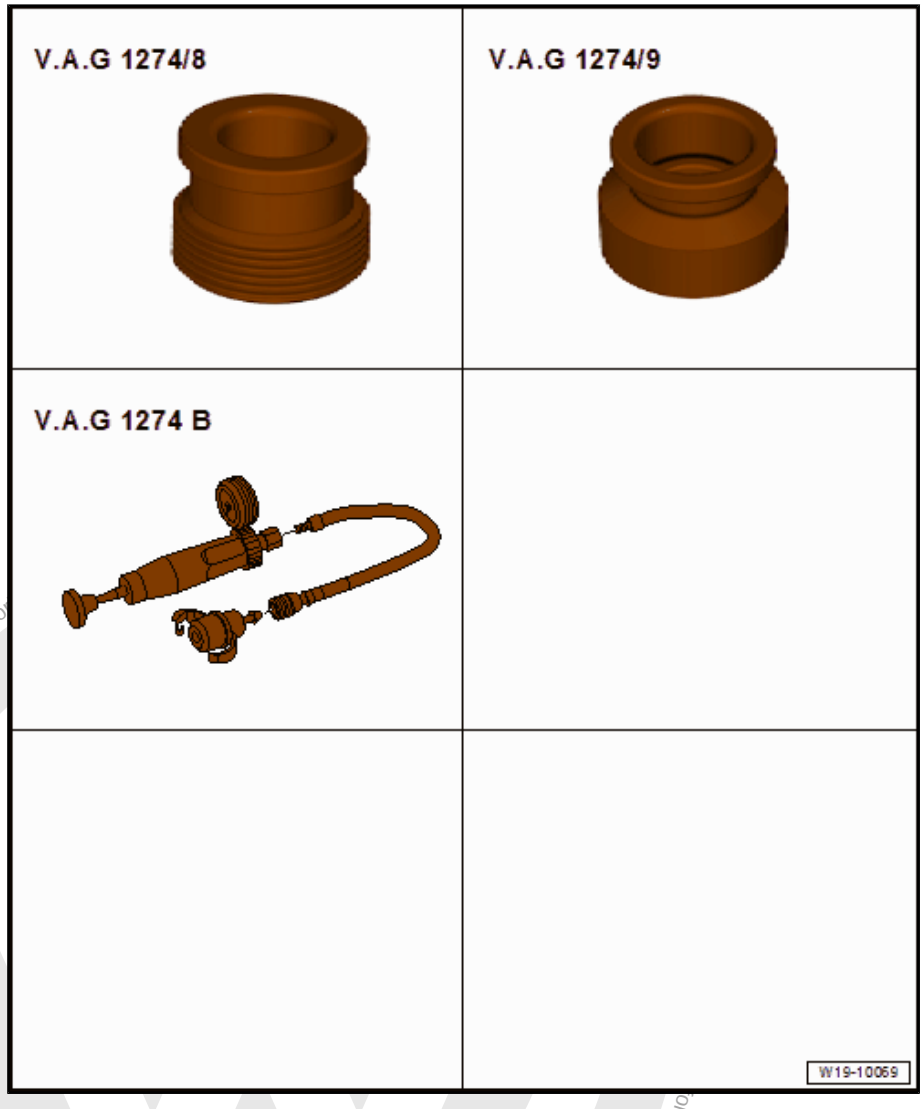
– Check coolant level and top up as needed. Once operating temperature has been reached, the coolant level must be at the upper mark; it should be in the middle of the shaded field when the engine is cold.



1.3 Checking cooling system for leaks

Special tools and workshop equipment required

- Adapter for cooling system tester - V.A.G 1274/8-
- Adapter for cooling system tester - V.A.G 1274/9-
- Cooling system tester - V.A.G 1274 B-



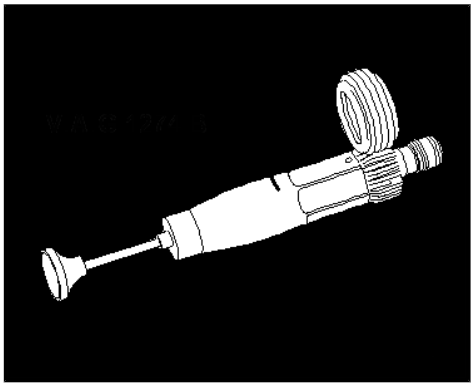
Note

To perform the leakage test correctly, first run a self-test on the cooling system tester - V.A.G 1274 B- .

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Self-test of cooling system tester - V.A.G 1274 B-

– Operate cooling system tester - V.A.G 1274 B- several times.

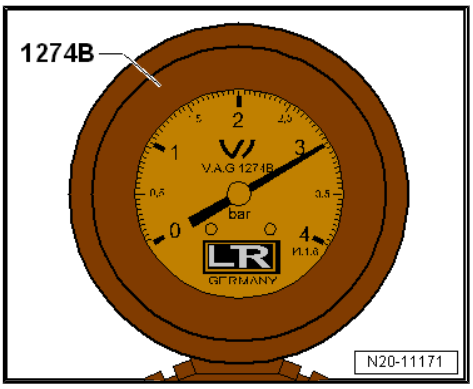


– Build up a pressure of 3.0 bar on cooling system tester .

– 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

Prerequisites for check

- Engine at operating temperature.

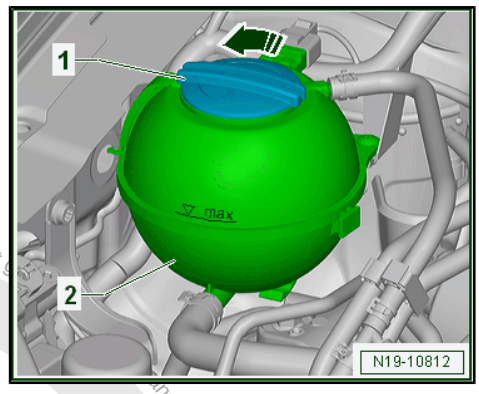
Test sequence

WARNING

The cooling system is under pressure when the engine is hot!

Danger of scalding due to steam and hot coolant.

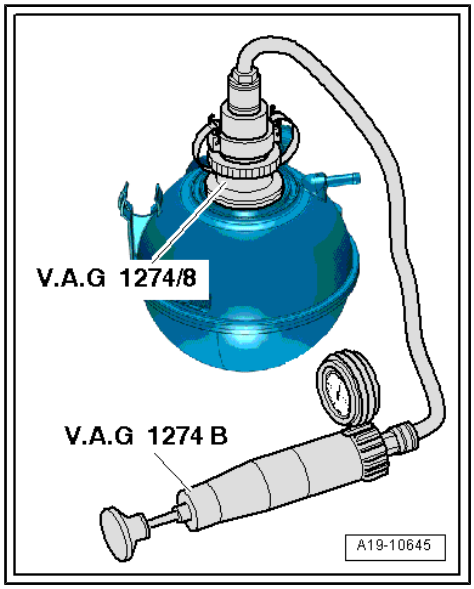
Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.



– Open filler cap -arrow- for coolant expansion tank.

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– Fit cooling system tester - V.A.G 1274 B- with adapter - V.A.G 1274/8- to coolant expansion tank.
– Build up pressure of approx. 1.5 bar using hand pump of cooling system tester.
• The pressure must not drop by more than 0.2 bar within 10 minutes.
– If the pressure drops by more than 0.2 bar, locate and rectify leaks.



Note

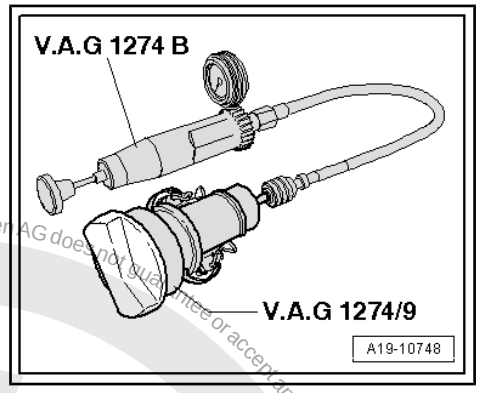
The pressure drop of 0.2 bar within 10 minutes depends on the how far the coolant can cool down. The colder the engine, the lower the pressure drop. If necessary, repeat the check while the engine is cold.

DANGER!

Risk of scalding! Before disconnecting cooling system tester - V.A.G 1274 B- from connecting hose or connector - V.A.G 1274 B/1- , always relieve existing pressure. To do this, press pressure relief valve on cooling system tester - V.A.G 1274 B- until pressure gauge displays value of »0«.

Checking pressure relief valve in filler 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.
• The pressure relief valve must open at a pressure of 1.4 to 1.6 bar.



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2 Coolant pump, thermostat, coolant pipes

Assembly overview - coolant pump, thermostat ⇒ page 243 .

Removing and installing coolant pump ⇒ page 245 .

Removing and installing toothed belt for coolant pump drive ⇒ page 247 .

Renew oil seal for coolant pump drive ⇒ page 249 .

Removing and installing thermostat ⇒ page 250 .

Removing and installing coolant temperature sender - G62- ⇒ page 253 .

Assembly overview - coolant pipes ⇒ page 255 .

Removing and installing front coolant pipes ⇒ page 256 .

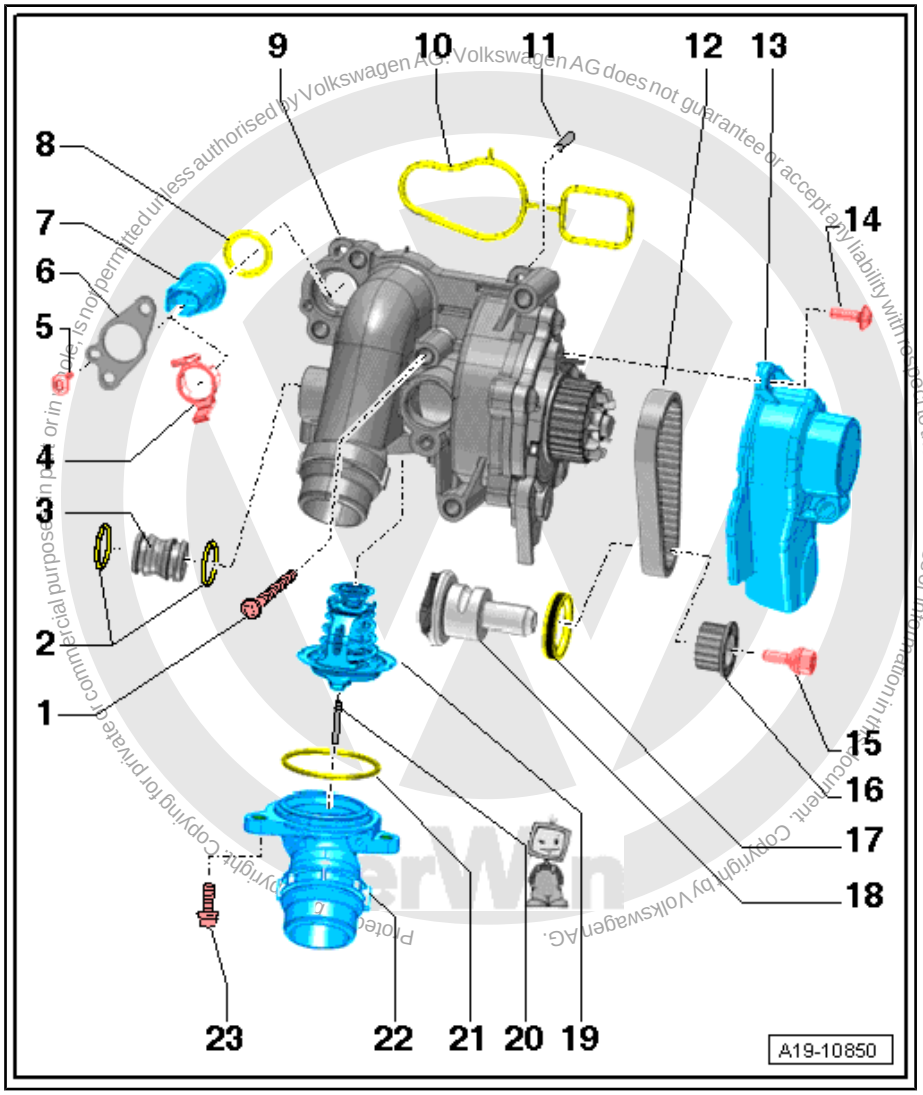
Removing and installing small coolant pipe ⇒ page 259 .

Assembly overview - continued coolant circulation pump - V51- ⇒ page 261 .

Removing and installing continued coolant circulation pump - V51- ⇒ page 262 .

2.1 Assembly overview - coolant pump, thermostat

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1 - Bolt
- ❑ 9 Nm
- ❑ Tightening sequence ⇒ page 245

2 - O-ring
- ❑ Renew

3 - Connection

4 - Retaining clip
- ❑ Only for inserted version.
- ❑ Ensure firm seating.

5 - Bolt
- ❑ 4 Nm
- ❑ Only for screwed version.

6 - Support plate
- ❑ Only for screwed version.

7 - Radiator outlet coolant - G62-
- ❑ Removing and installing ⇒ page 253

8 - O-ring
- ❑ Renew

9 - Coolant pump
- ❑ Removing and installing ⇒ page 245
- ❑ New coolant pump: remove protective cap

10 - Seal
- ❑ Renew

11 - Centring pin
- ❑ Qty. 2

12 - Toothed belt
- ❑ For coolant pump
- ❑ Removing and installing ⇒ page 247

13 - Toothed belt guard

14 - Bolt
- ❑ 9 Nm

15 - Bolt
- ❑ Left-hand thread
- ❑ Renew
- ❑ 10 Nm + 90° ($^1/_4$ turn further)

16 - Toothed belt drive sprocket
- ❑ Installation position: Collar on drive pulley faces gearbox

17 - Oil seal
- ❑ Renewing ⇒ page 249

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18 - Balancer shaft

19 - Thermostat

- ❑ The thermostat can be tested with the “Guided Fault Finding” under “Selection of functions and components”.
- ❑ Removing and installing ⇒ page 250
- ❑ Depending on version, map-controlled engine cooling system thermostat - F265-
- ❑ Removing and installing, vehicles with map-controlled engine cooling system thermostat - F265- ⇒ page 245

20 - Centring pin

- ❑ Not present with every version

21 - O-ring

- ❑ Renew

22 - Union

- ❑ Depending on version, map-controlled engine cooling system thermostat - F265- Identification: electrical connection on union

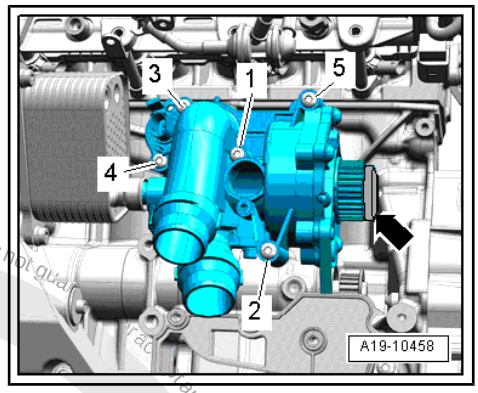
23 - Bolt

- ❑ 9 Nm

Tightening sequence for coolant pump

– Tighten bolts in the sequence -1 to 5-.

• 9 Nm



2.2 Removing and installing coolant pump

Removing

Tiguan:

– Remove intake manifold with fuel rail ⇒ page 465 .

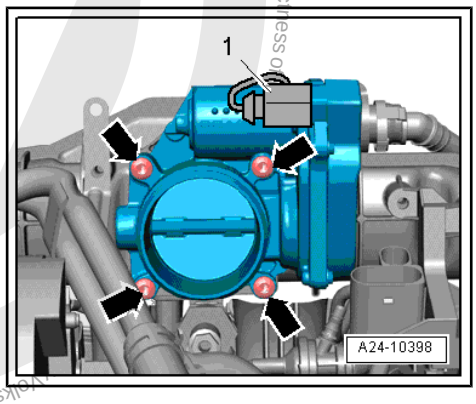
All vehicles:

– Remove small coolant pipe ⇒ page 259 .

– Separate electrical connector -1- on throttle valve module - J338- .

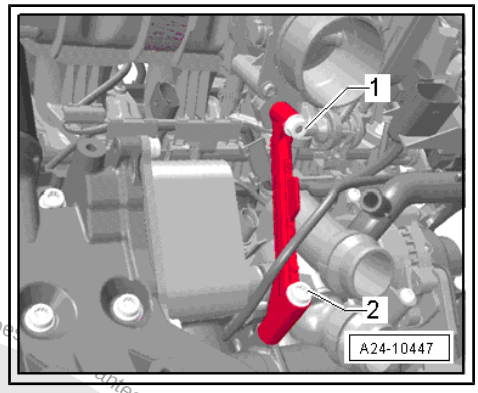
– Remove bolts -arrows- and detach throttle valve module - J338- .

– Remove toothed belt for coolant pump ⇒ page 247 .



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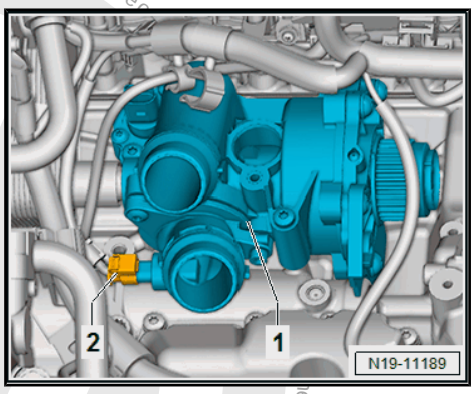
– Remove securing nut -1- and bolt -2- and remove intake manifold support.
– Unscrew bonded rubber mountings for intake manifold support at intake manifold.



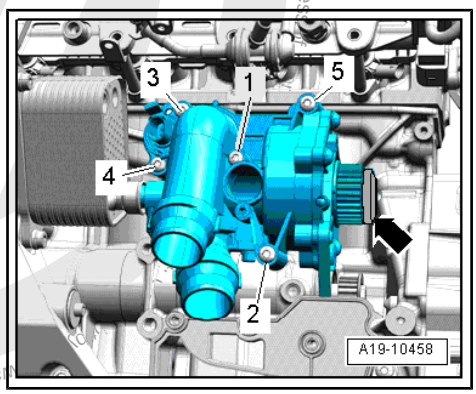
– If fitted, pull connector -2- off map-controlled engine cooling thermostat - F265- .
– Removing coolant temperature sender - G62- .

Inserted version ⇒ page 255 .

Screwed version ⇒ page 255 .



– Unscrew bolts -1 to 5-.
– Detach coolant pump from centring pin and pull off engine oil cooler.

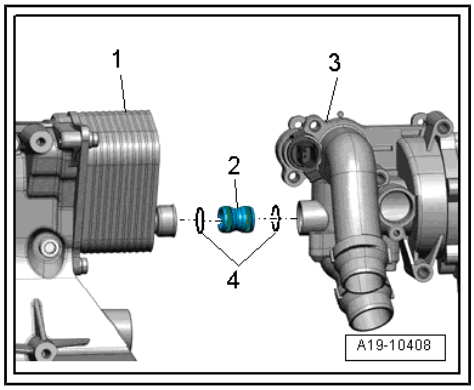


Installing

Note

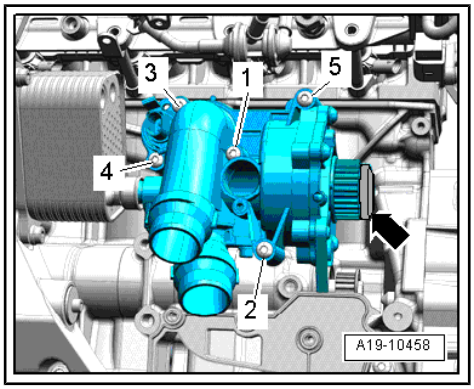
- *Renew seals and O-rings.*
- *Position the coolant pump without coolant temperature sender. The coolant temperature sender projects slightly from the coolant pump and makes it more difficult to position the coolant pump.*

– Moisten O-rings -4- with coolant.
– Check whether the two centring pins are fitted in the cylinder block; install if necessary.
– Fit connecting piece -2- into engine oil cooler -1-.
– First, push coolant pump -3- onto connecting piece and then fit it onto centring pin in cylinder block.
– Using a mirror, check that coolant pump is correctly »seated« on centring pins.



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– Tighten bolts in the sequence -1 to 5-.



Note

Remove protective cap -arrow- if fitting a new coolant pump.

– Install coolant temperature sender - G62- ⇒ page 253 .

Inserted version ⇒ page 255 .

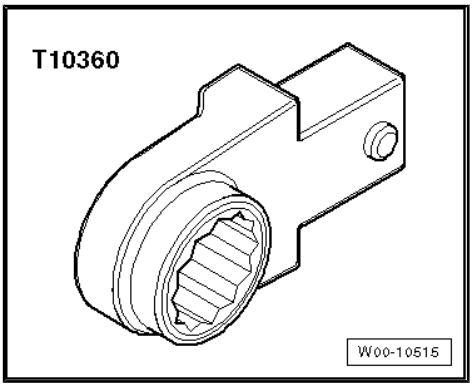
Screwed version ⇒ page 255 .

Further assembly is performed in the reverse order of removal.

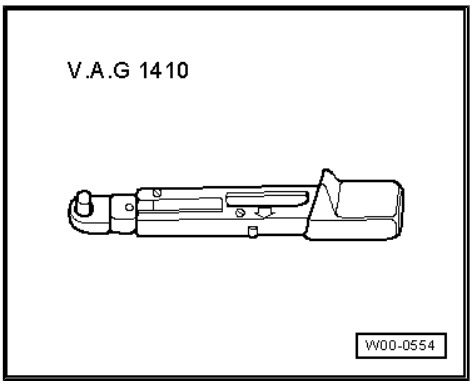
2.3 Removing and installing toothed belt for coolant pump

Special tools and workshop equipment required

♦ Insert tool - T10360-



♦ Torque wrench - V.A.G 1410-

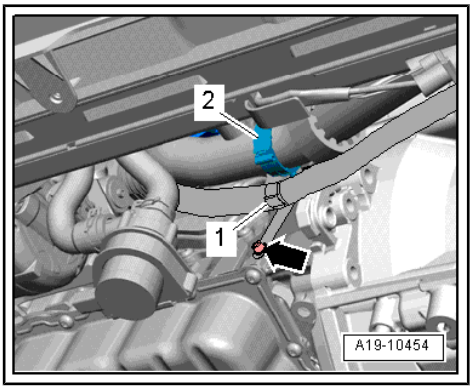


Removing

– Remove small coolant pipe ⇒ page 259 .

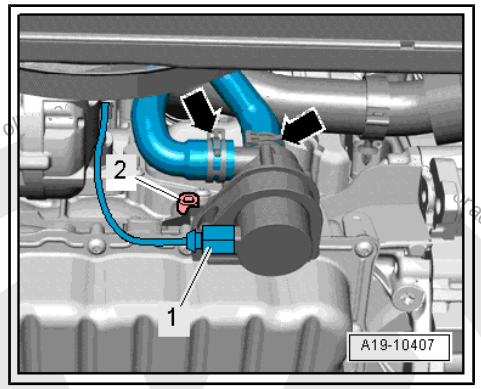
– Move coolant hose -2- and wiring harness -1- clear.

– Remove bolt -arrow- and remove bracket.

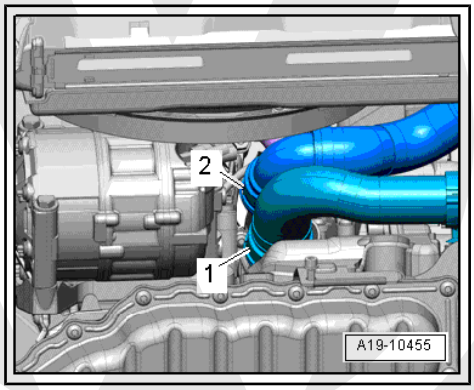


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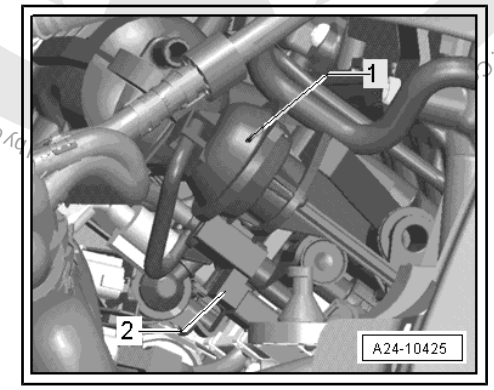
– Remove bolt -2- at bracket for coolant pump for continued circulation - V51- . Hoses -arrows- remain connected.



– Disconnect coolant hoses -1 and 2- and move clear to one side.



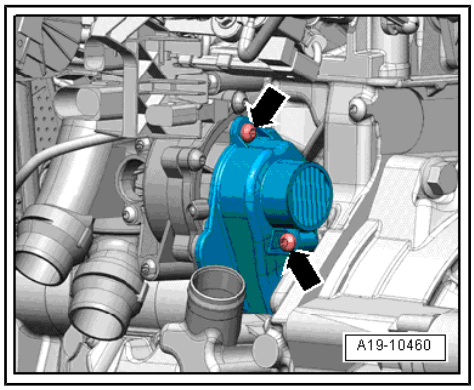
– Pull off intake manifold flap valve - N316- -2- (2.0 l engine) or unscrew (1.8 l engine) and place to one side.
– Release wiring harness, raise and secure with cable ties.



– Unscrew bolts -arrows- and remove toothed belt guard.

Caution

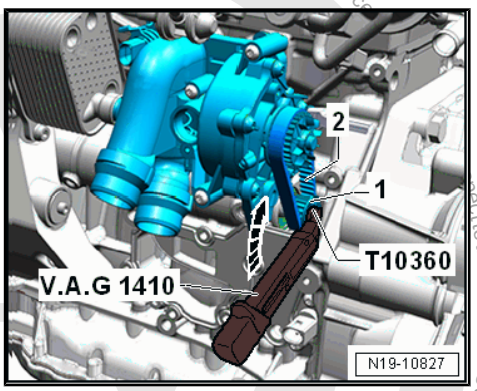
The drive sprocket bolt has a left-hand thread.



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– Use torque wrench - V.A.G 1410- and insert tool - T10360- to loosen bolt -1- on coolant pump drive sprocket clockwise. To do this, counterhold at crankshaft vibration damper from above, using hexagon socket insert AF 24.

– Unscrew bolt. Detach drive sprocket -1- and toothed belt -2-.



Installing

Install in reverse order of removal, observing the following.

– Renew drive sprocket bolt.

– Renew gaskets, seals and O-rings.

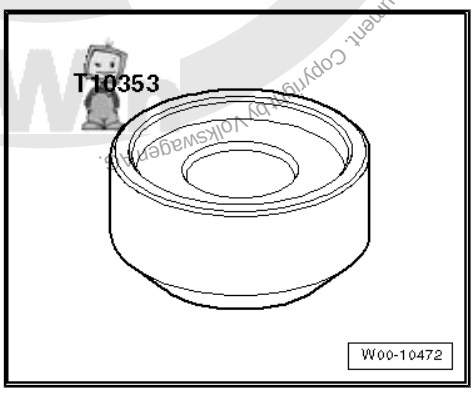
Installation position of drive gear: Collar on drive gear faces gearbox.

Specified torques ⇒ page 243 .

2.4 Renewing oil seal for coolant pump drive

Special tools and workshop equipment required

♦ Press tool -T10353-



Sequence of operations

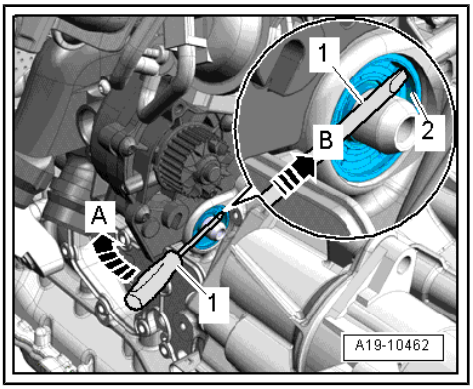
Proceed as follows:

– Remove toothed belt for coolant pump ⇒ page 247 .

– Press screwdriver -1- firmly onto section -2- of oil seal -arrow B-.

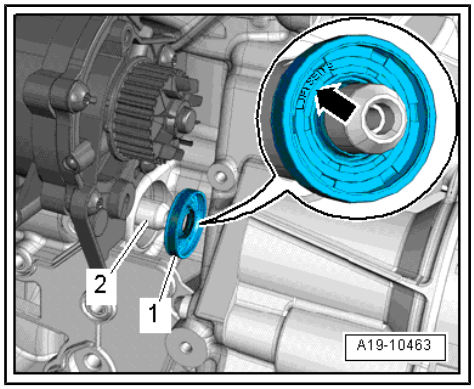
– Lever out oil seal -arrow A-.

– Clean contact surface and sealing surface.



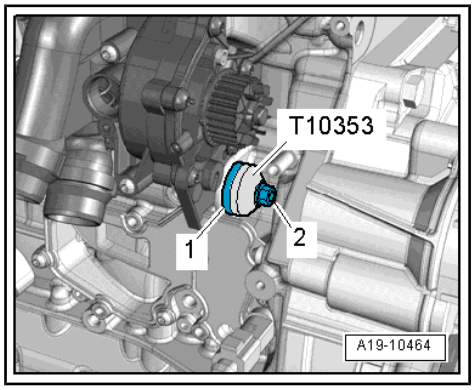
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– Lubricate sealing surface of balance shaft -2- with gear oil.
– Fit oil seal -1- onto balance shaft.
• The marking “Luftseite” (“outside”) -arrow- should be legible from the outside.



– Apply thrust piece -T10353- to oil seal -1- and press into cylinder block to stop using bolt -2-, taking care not to cant oil seal.
– Fit toothed belt for coolant pump ⇒ page 247 .

Further assembly is performed in the reverse order of removal.



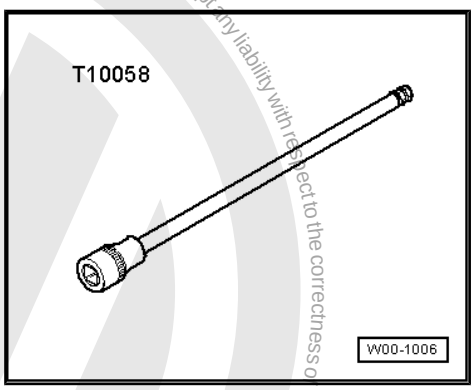
2.5 Removing and installing thermostat

Note

For vehicles with map-controlled engine cooling system thermostat, the coolant pump must be removed in order to remove the map-controlled engine cooling system thermostat - F265- (coolant thermostat) ⇒ page 245 .

Special tools and workshop equipment required

♦ Hexagon bit, long reach -T10058-



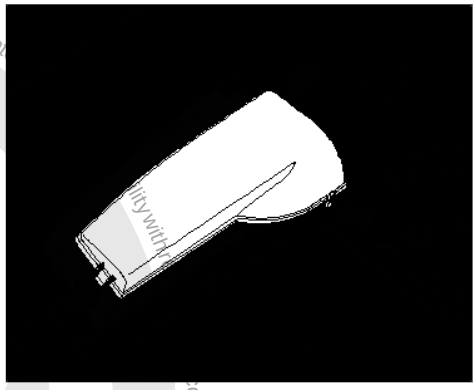
Removing

Proceed as follows:

– Drain coolant ⇒ page 235 .

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– Pull cover off air duct (release clips on sides) -arrows-.



– Release clips -arrows- air duct at the bottom and remove duct.
– Detach air duct at bottom together with air hose.

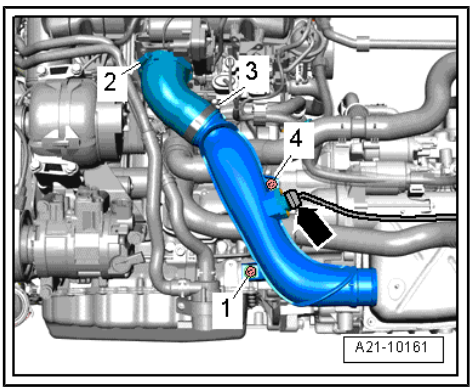


Vehicles with sound generator:

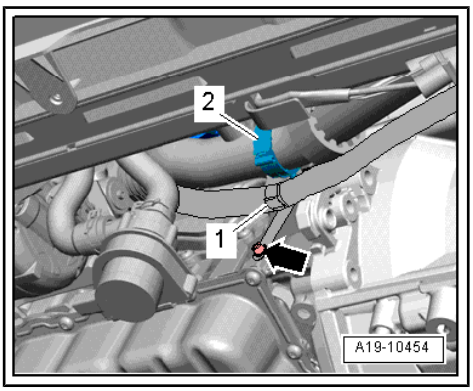
– Remove charge air duct to sound generator ⇒ page 447 .

All:

– Release hose clip -2-.
– Unscrew bolt -4-.
– Separate electrical connector -arrow-.
– Remove bolt -1- and take out air pipe downwards.

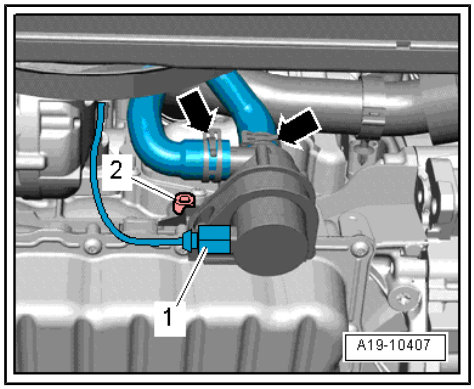


– Move coolant hose -2- and wiring harness -1- clear.
– Remove bolt -arrow- and remove bracket.



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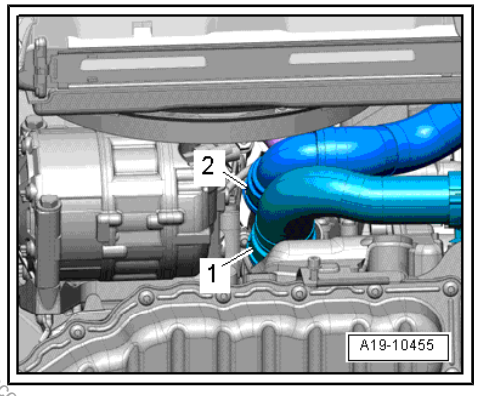
– Remove bolt -2- at bracket for coolant pump for continued circulation - V51- .



Note

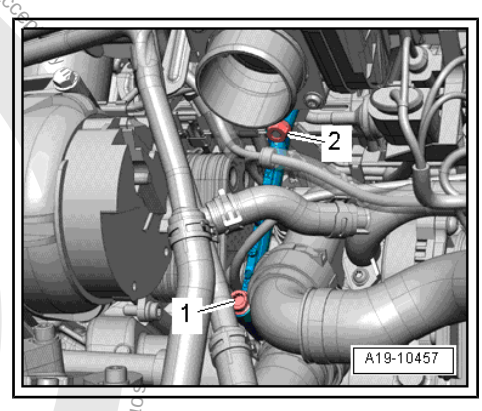
The continued circulation coolant pump - V51- remains installed.

– Disconnect coolant hoses -1 and 2- and move clear to one side.



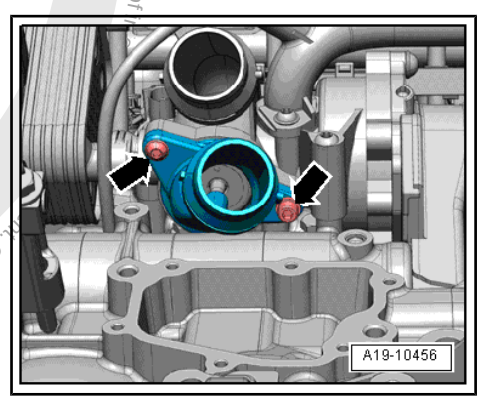
– Loosen nut -2-, remove bolt -1- and swivel support for intake manifold slightly to right.

– Remove coarse oil separator ⇒ page 207 .



– Unscrew bolts -arrows- and remove connection. Allen key, long, reach 5 mm - T10058- is helpful for right-hand bolt.

– Detach thermostat.



Installing

• Specified torques ⇒ page 243 .

Install in reverse order of removal, observing the following.

Note

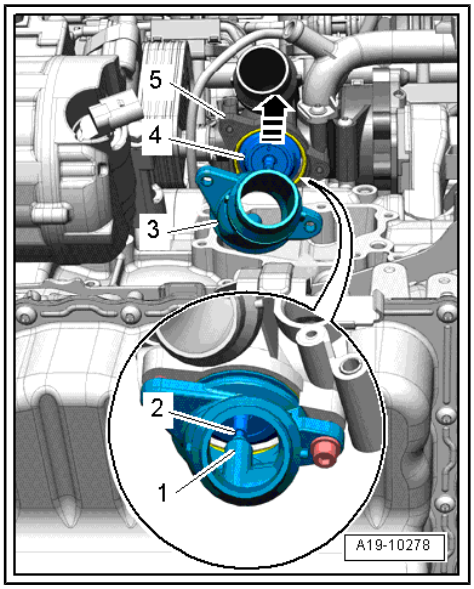
Renew gaskets, seals and O-rings.

– Clean sealing surface for O-ring.

– Moisten O-ring with coolant.

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– Insert thermostat -4- in coolant pump housing -5- and swivel forwards slightly -arrow-.
– Fit connection -3- carefully (insert centralising pin -2- in guide -1-).



Note

Depending on version, a thermostat without centring pin may be installed.

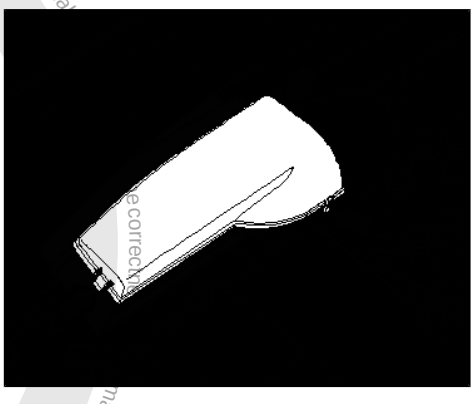
2.6 Removing and installing coolant temperature sender - G62-

Removing

Proceed as follows:

- Engine cold.

– Pull cover off air duct (release clips on sides) -arrows-.



– Release clips -arrows- air duct at the bottom and remove duct.
– Detach air duct at bottom together with air hose.



Vehicles with sound generator:

– Remove charge air duct to sound generator ⇒ page 447 .

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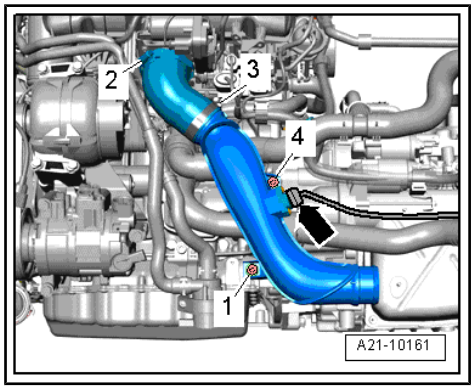
All:

– Release hose clip -2-.

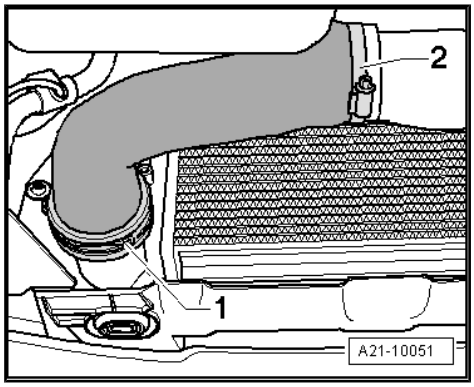
– Unscrew bolt -4-.

– Separate electrical connector -arrow-.

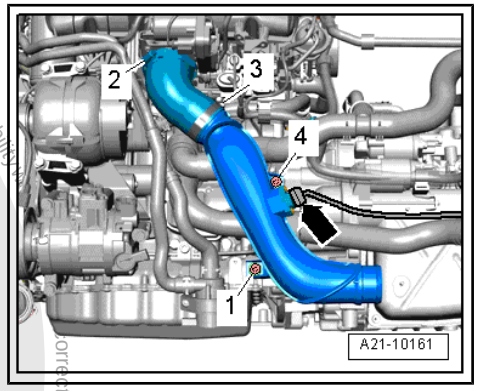
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .



– Remove air hose -items 1 and 2- and seal charge air cooler with a clean cloth.

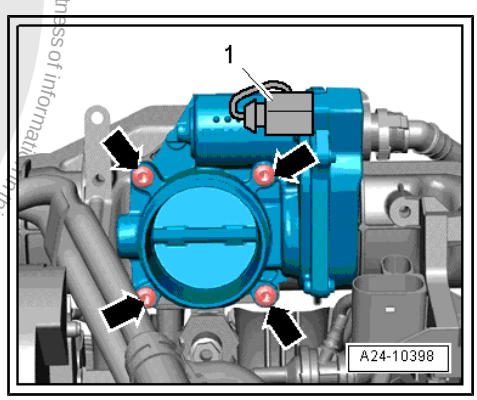


– Remove bolt -1- and take out air pipe downwards.



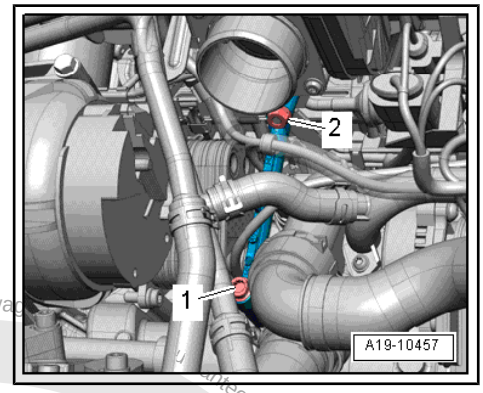
– Separate electrical connector -1- on throttle valve module - J338- .

– Remove bolts -arrows- and detach throttle valve module - J338- .



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– Remove support for intake manifold (remove nut -2- and bolt -1-).

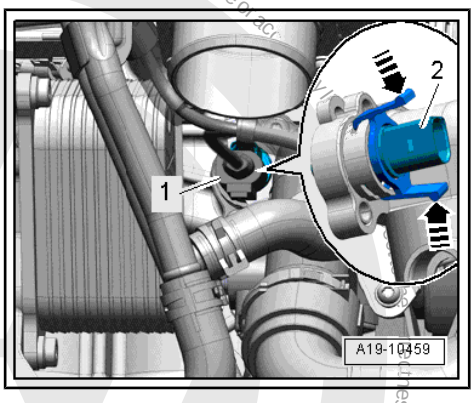


Coolant temperature sender - G62- with retaining clip:

– Disconnect electrical connector -1- at coolant temperature sender - G62- .

– Detach retaining clip (press release tabs -arrows-).

– Pull out coolant temperature sender - G62- .



Note

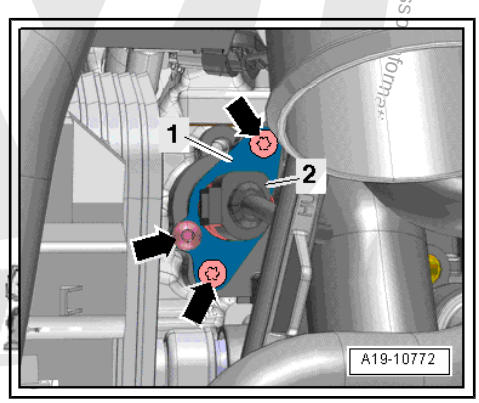
Insert new coolant temperature sender - G62- , with O-ring, immediately into union to avoid loss of coolant.

Coolant temperature sender - G62- with retaining plate:

– Disconnect electrical connector -2- at coolant temperature sender - G62- .

– Unscrew bolts -arrows- and remove retaining plate -1-.

– Pull out coolant temperature sender - G62- .



Note

Insert new coolant temperature sender - G62- , with O-ring, immediately into union to avoid loss of coolant.

Installing:

Install in reverse order of removal, observing the following.

- Renew O-ring.
- After completing repair: check coolant level.

2.7 Assembly overview - coolant pipes

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1 - Coolant pipes (front)
- ❑ Removing and installing ⇒ page 256

2 - Coolant hose
- ❑ From turbocharger

3 - Coolant hose
- ❑ To coolant expansion tank

4 - Bolt
- ❑ 3.5 Nm

5 - O-ring
- ❑ Renew

6 - Coolant hose
- ❑ To heat exchanger for heater unit.

7 - Small coolant pipe
- ❑ Removing and installing ⇒ page 259

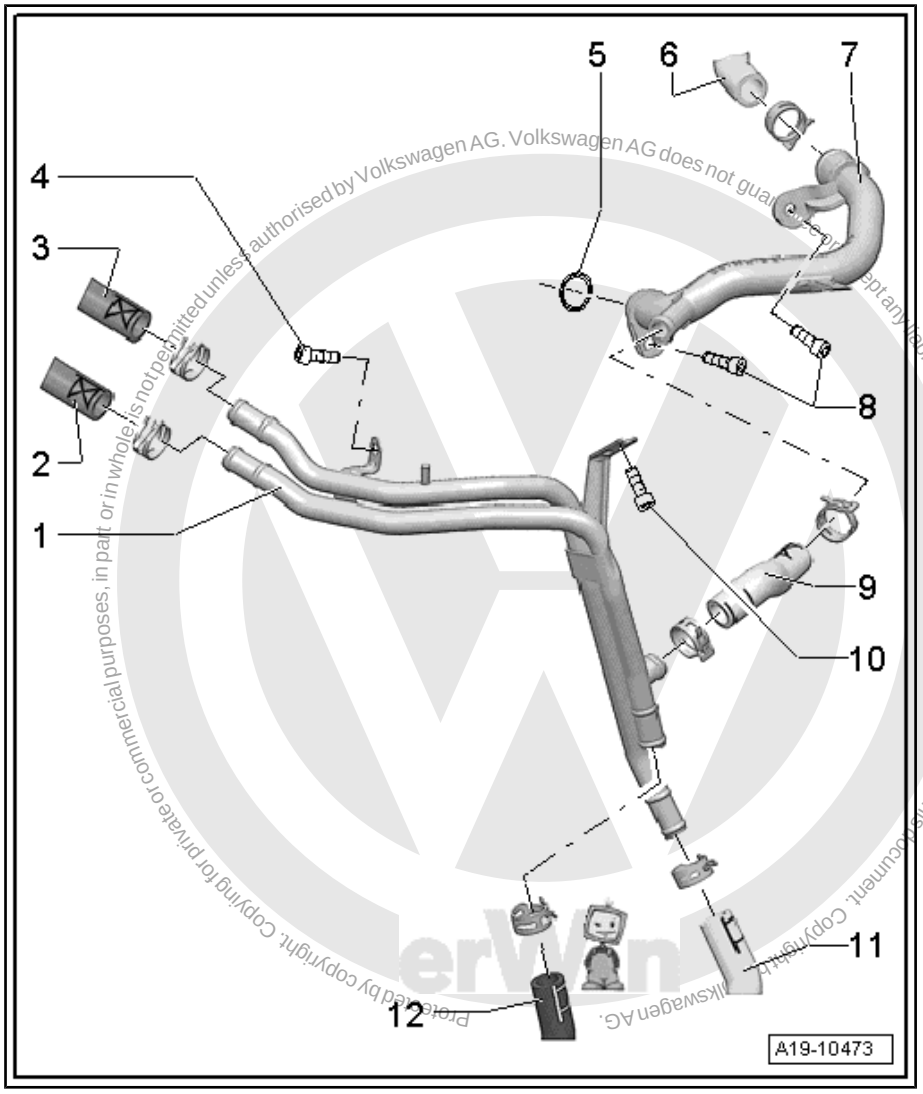
8 - Bolts
- ❑ 9 Nm

9 - Coolant hose

10 - Bolt
- ❑ 5 Nm

11 - Coolant hose
- ❑ From continued coolant circulation pump - V51- .

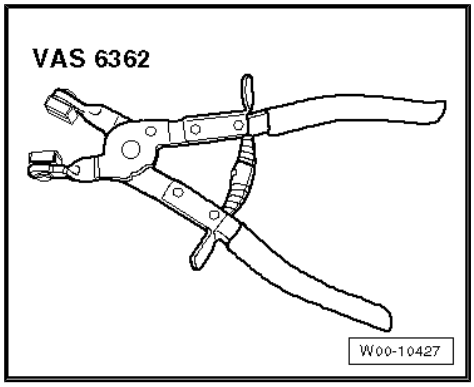
12 - Coolant hose
- ❑ To continued coolant circulation pump - V51- .



2.8 Removing and installing front coolant pipes

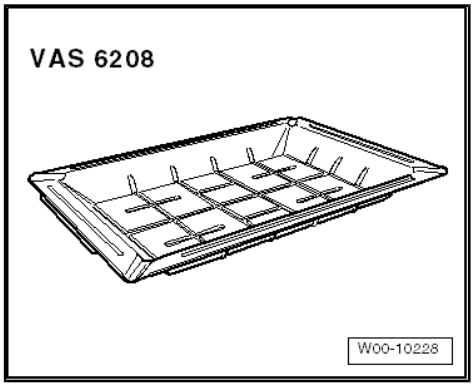
Special tools and workshop equipment required

- ♦ Spring-type clip pliers - VAS 6362-



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♦ Drip tray for workshop hoist - VAS 6208-



Removing

Proceed as follows:

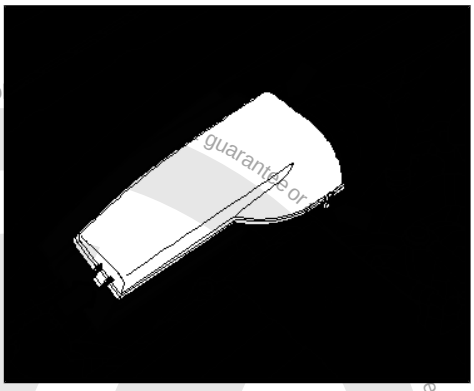
WARNING

The cooling system is under pressure when the engine is hot!

Danger of scalding due to steam and hot coolant.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Open filler cap on expansion tank.
– Pull cover off air duct (release clips on sides) -arrows-.



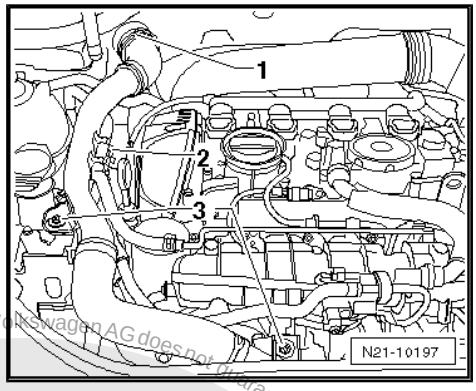
– Release clips -arrows- air duct at the bottom and remove duct.
– Detach air duct at bottom together with air hose.



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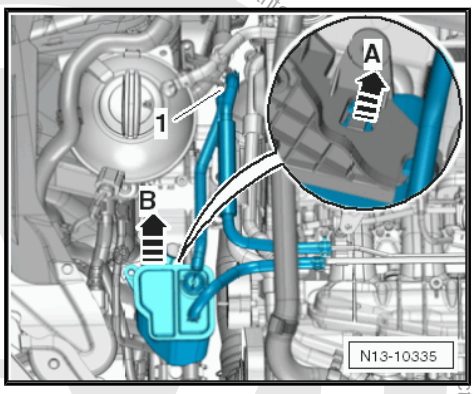
Vehicles with sound generator:

– Open latch -1-, unclip fuel lines -2- and slacken bolts -3-. Remove charge air pipe.



Vehicles with activated charcoal filter in engine compartment:

– Pull off breather line -1-, release activated charcoal filter -A- and remove upwards -B-. Place activated charcoal filter to one side.



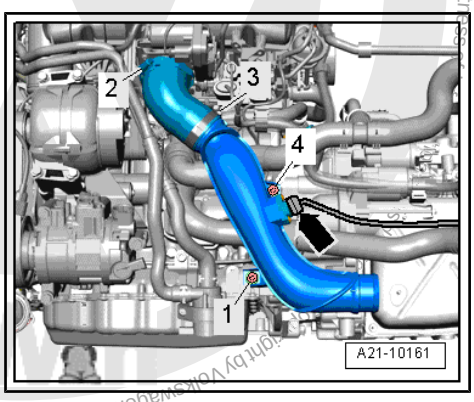
All:

– Release hose clip -2-.

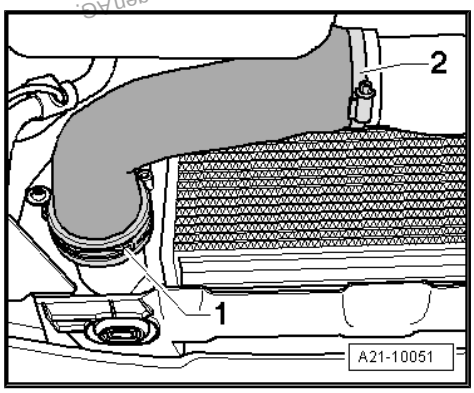
– Unscrew bolt -4-.

– Disconnect electrical connector -arrow- and move electrical wires clear.

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

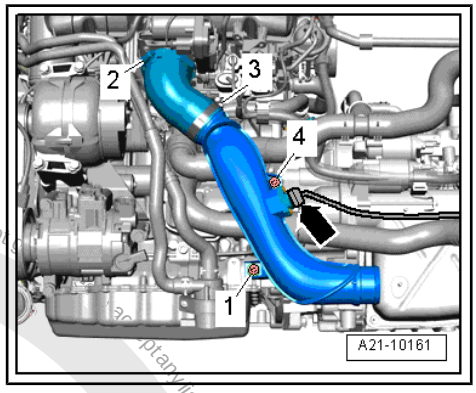


– Remove air hose -items 1 and 2- and seal charge air cooler with a clean cloth.



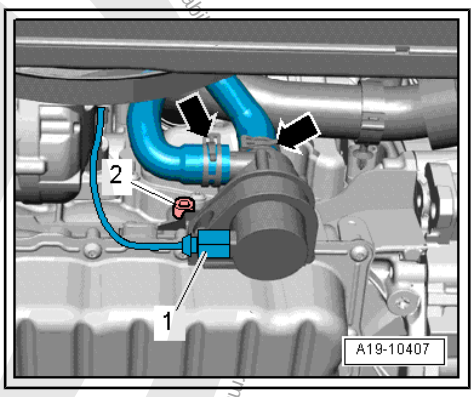
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– Remove bolt -1- and take out air pipe downwards.

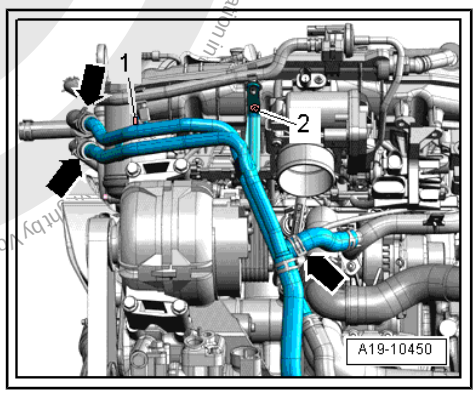


– Place drip tray - VAS 6208- beneath engine.

– Disconnect coolant hoses from continued coolant circulation pump - V51- -arrows-.



– Unscrew bolts -1 and 2- and disconnect coolant pipes (front) from coolant hoses -arrows-.



Installing

- Specified torques ⇒ page 255 .

Install in the reverse order of removal, observing the following:

Note

- *Renew gaskets and seals.*
- *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ EKTA (Electronic parts catalogue) .*

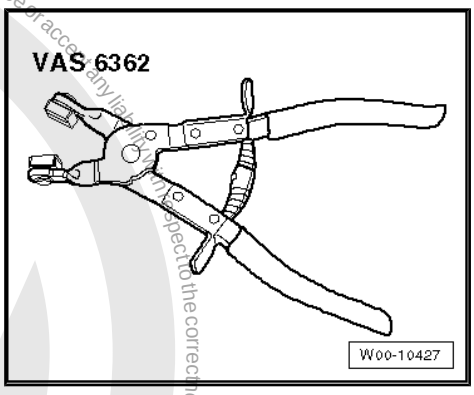
– Installing hose connections with plug-in connectors ⇒ page 423 .

2.9 Removing and installing small coolant pipe

Special tools and workshop equipment required

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- Spring-type clip pliers - VAS 6362-



Removing

Proceed as follows:

– Drain coolant ⇒ page 235 .

– Remove air filter ⇒ page 459 .

Vehicles with sound generator:

– Remove charge air duct to sound generator ⇒ page 447 .

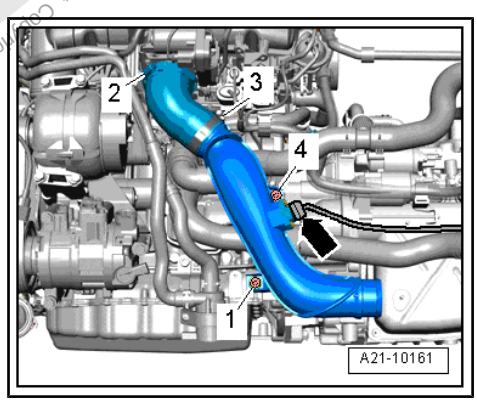
All:

– Release hose clip -2-.

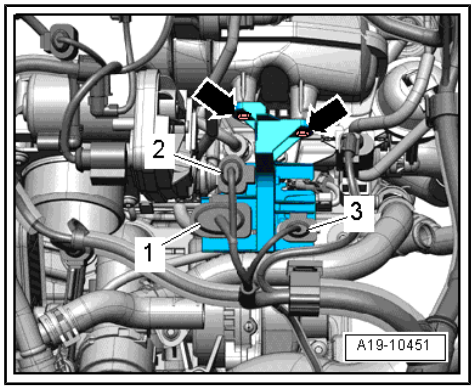
– Unscrew bolt -4-.

– Separate electrical connector -arrow-.

– Remove bolt -1- and take out air pipe downwards.

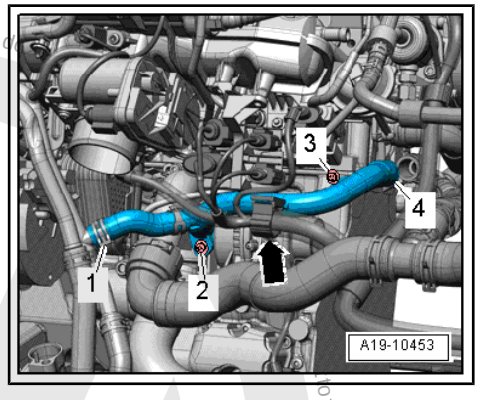


– Remove bolts -arrows- and detach electrical connectors -1 to 3- from retainer.



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– Place electrical wiring at small coolant pipe to one side -arrow-.
– Unscrew bolts -2 and 3-.
– Detach small coolant pipe from coolant pump and coolant hoses -1 and 4-.



Installing

- Specified torques ⇒ page 255 .

Install in the reverse order of removal, observing the following:

Note

Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ EKTA (Electronic parts catalogue) .

– Installing hose connections with plug-in connectors ⇒ page 423 .

2.10 Continued coolant circulation pump - V51- - exploded view

1 - Holder

2 - Bolt

❑ 40 Nm

3 - Coolant hose

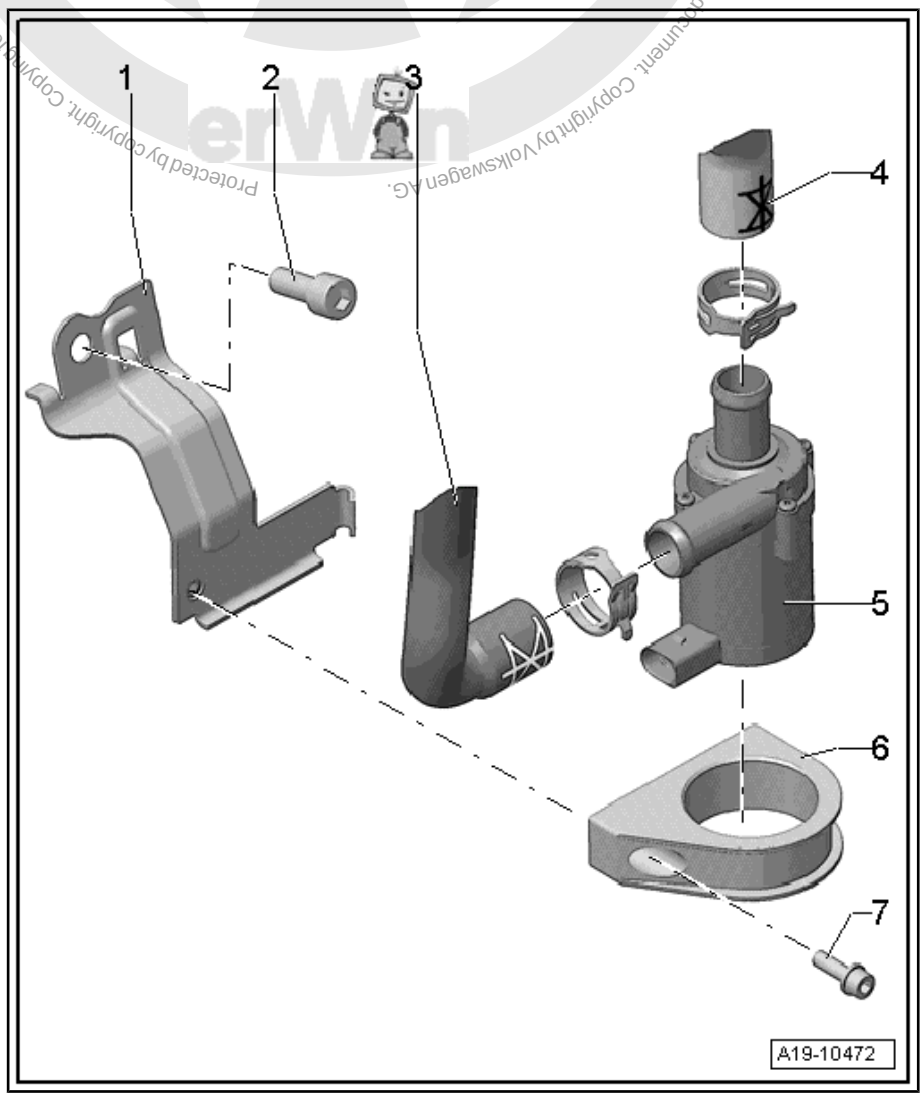
4 - Coolant hose

5 - Continued coolant circulation pump - V51-

6 - Holder

7 - Bolt

❑ 8 Nm

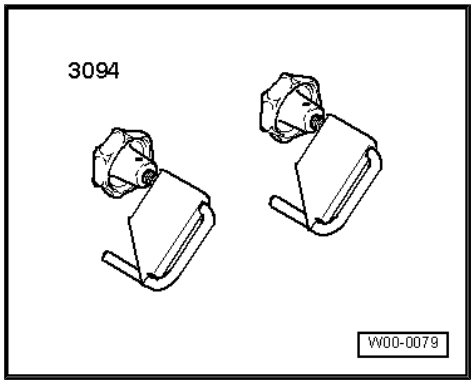


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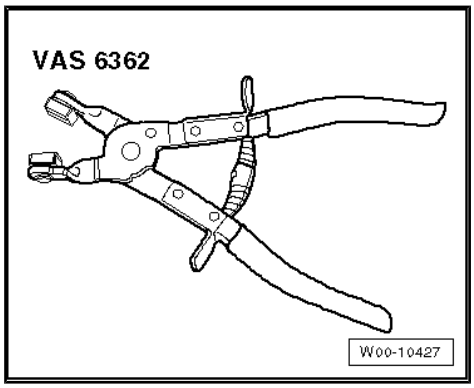
2.11 Removing and installing continued coolant circulation pump - V51-

Special tools and workshop equipment required

- Hose clamps to 25 mm - 3094-



- Spring-type clip pliers - VAS 6362-



Removing

Proceed as follows:

WARNING

The cooling system is under pressure when the engine is hot!

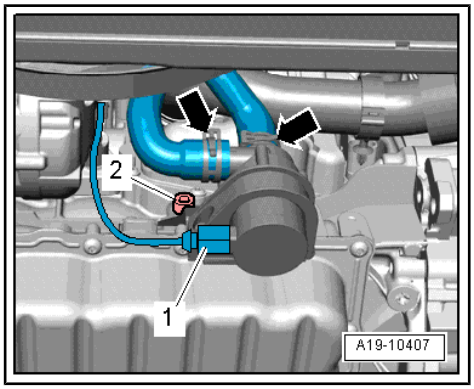
Danger of scalding due to steam and hot coolant.

Reduce excess pressure by covering the cap of the coolant expansion tank with cloths and opening it carefully.

– Open filler cap on expansion tank.

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50; Noise insulation .

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– Disconnect electrical connector -1- for continued circulation coolant pump - V51- .
– Place drip tray - VAS 6208- beneath engine.
– Clamp off coolant hoses -arrows- with hose clamps - 3094- .
– Disconnect coolant hoses from continued coolant circulation pump - V51- .
– Unscrew bolt -2- and detach continued coolant circulation pump - V51- .

Installing

• Specified torques ⇒ page 261 .

Install in reverse order of removal, observing the following.

– Check coolant level.

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3 Radiator and radiator fans

Assembly overview - radiator, fan cowl and radiator fan (Passat, CC, Golf, Eos, Scirocco) ⇒ page 264 .

⇒ “3.1.1 Installing radiator identification sensor G611 , engine code CBFA”, page 265

Assembly overview - radiator, radiator cowl and radiator fan (Tiguan) ⇒ page 266 .

Removing and installing radiator cowl ⇒ page 267 .

Removing and installing radiator fan - V7- and radiator fan 2 - V177- ⇒ page 268 .

Removing and installing radiator (Passat, CC, Golf, Eos, Scirocco) ⇒ page 269 .

Removing and installing radiator (Tiguan) ⇒ page 269 .

3.1 Assembly overview - radiator, fan cowl and radiator fan (Passat, CC, Golf, Eos, Scirocco)

1 - Radiator fan - V7-
- ❑ Removing and installing ⇒ page 268

2 - Nut
- ❑ 10 Nm

3 - Radiator cowl

4 - Lower coolant hose
- ❑ To connection for thermostat.

5 - Retaining clip

6 - Radiator outlet coolant temperature sender - G83-

7 - O-ring
- ❑ Renew if damaged

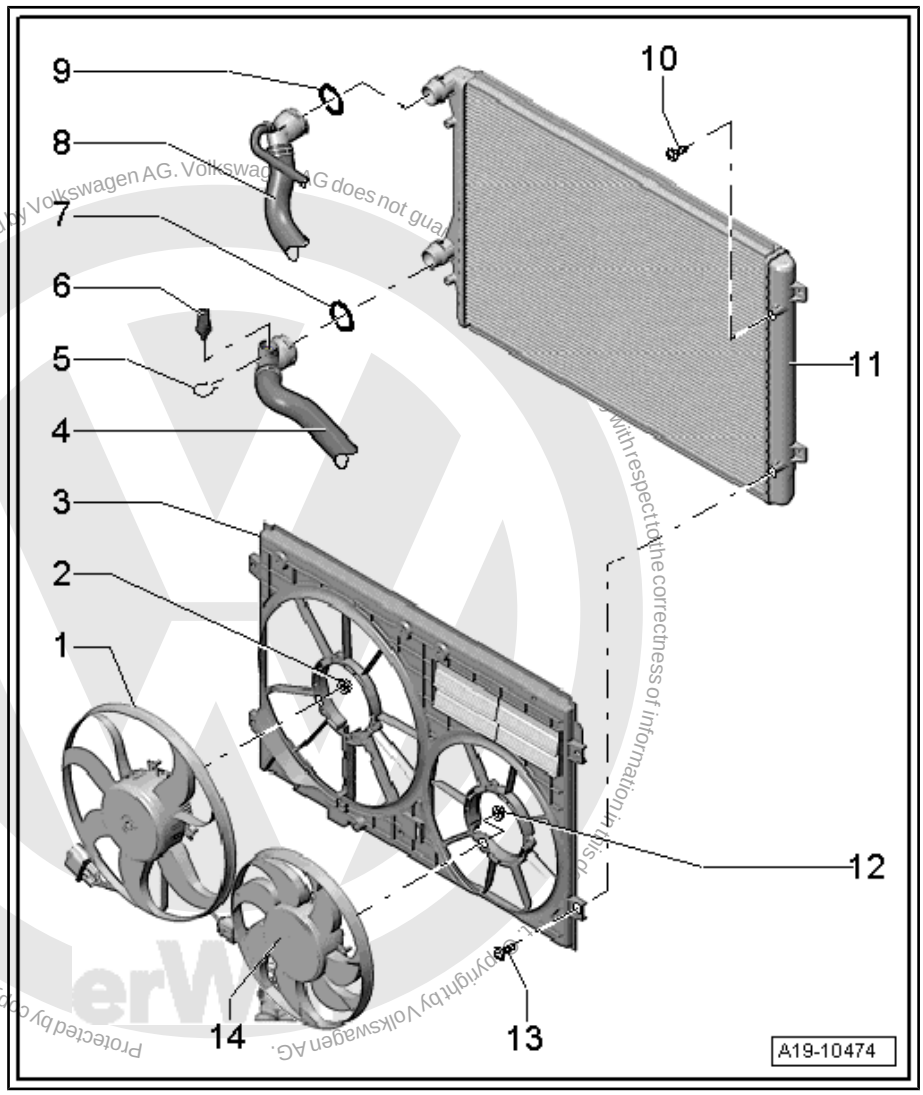
8 - Upper coolant hose
- ❑ From coolant pump

9 - O-ring
- ❑ Renew if damaged

10 - Bolt
- ❑ 5 Nm
- ❑ To charge air cooler

11 - Radiator/cooler
- ❑ Removing and installing ⇒ page 269
- ❑ Engine code CBFA: with radiator identification sensor - G611- ⇒ page 265

12 - Nut
- ❑ 10 Nm



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13 - Bolt

- ❑ 5 Nm
- ❑ To radiator

14 - Radiator fan 2 - V177-

- ❑ Removing and installing ⇒ page 268

3.1.1 Installing radiator identification sensor - G611-, engine code CBFA

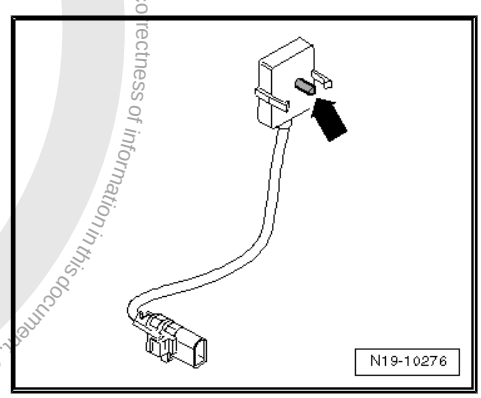
Note

- ♦ *Radiator identification sensor - G611- can only be renewed together with the radiator.*
- ♦ *The installation position of the radiator identification sensor - G611- depends on its version.*

Installing:

– Apply 2 grammes of adhesive - AMV 195 KD1 01- to cylindrical part of the new sensor -arrow-.

– Press new sender into retainer on radiator until it engages.

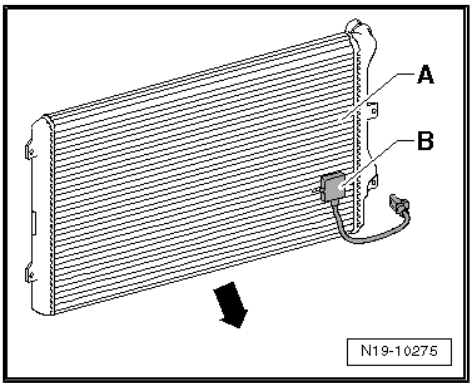


Installed at bottom:

-Arrow- points in direction of travel

-A- Radiator

-B- Radiator identification sensor - G611-

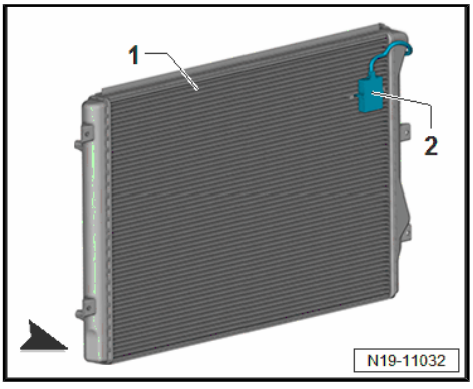


Installed at top:

-Arrow- points in direction of travel

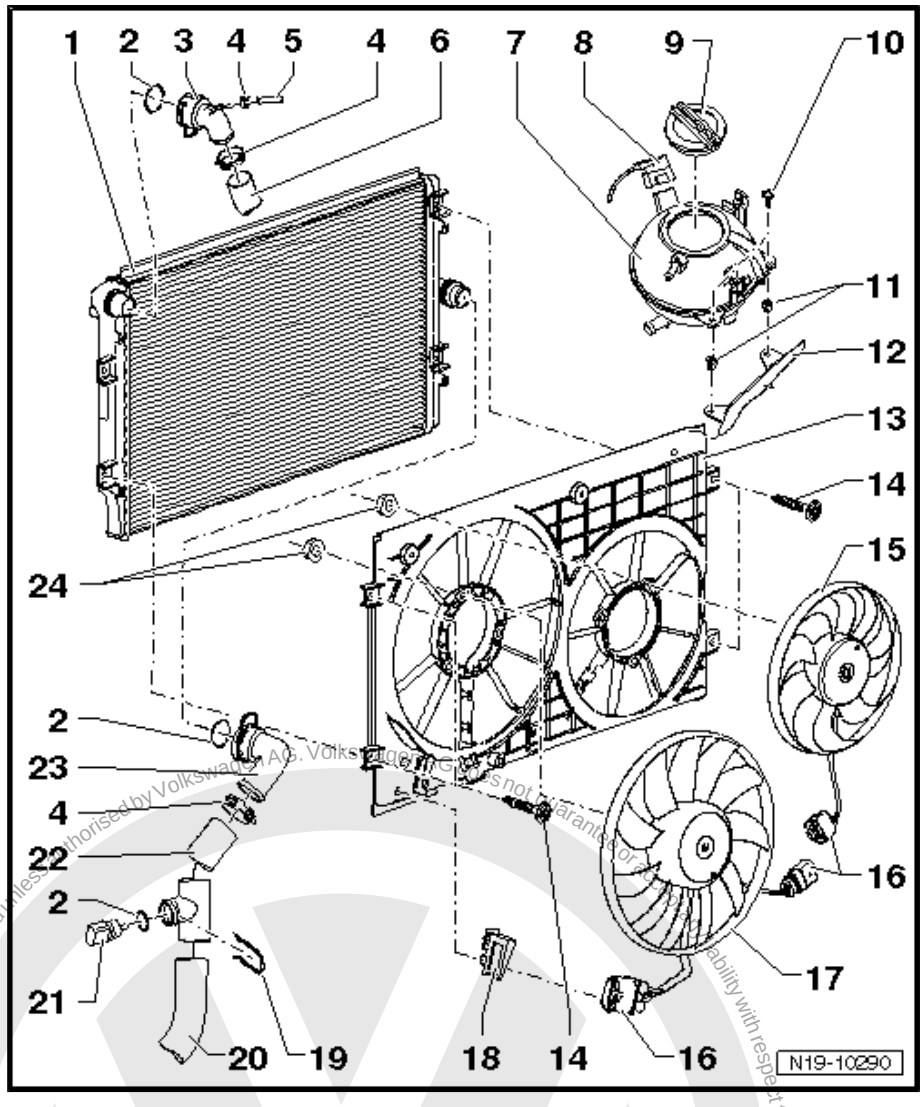
-1- radiator

-2- Radiator identification sensor - G611-



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3.2 Assembly overview - radiator, radiator cowl and radiator fan (Tiguan)



1 - Radiator/cooler

- ❑ Removing and installing ⇒ page 269

2 - O-ring

- ❑ Renew if damaged

3 - Union

- ❑ To remove, pull out retaining clip.

4 - Spring-type clip

- ❑ Remove and install with hose clip pliers - VAS 6340- .

5 - Coolant hose

- ❑ Connection diagram for coolant hoses ⇒ page 232

6 - Upper coolant hose

- ❑ To connection on cylinder head.
- ❑ Connection diagram for coolant hoses ⇒ page 232

7 - Expansion tank

- ❑ Check cooling system for leaks using cooling system tester - V.A.G 1274 B- and adapter for cooling system tester - V.A.G 1274/8-

8 - Connector

9 - Cap

- ❑ Check using cooling system tester - V.A.G 1274 B- and adapter for cooling system tester - V.A.G 1274/9-
- ❑ Pressure relief valve must open at pressure of 1.4 to 1.6 bar

10 - 5 Nm

11 - Plastic inserts

- ❑ For securing bolts.

12 - Holder

13 - Cowling

14 - 5 Nm

15 - Radiator fan 2 - V177-

- ❑ Removing and installing ⇒ page 268

16 - Connector

17 - Radiator fan - V7-

- ❑ With radiator fan control unit - J293- .

18 - Holder

- ❑ For connector.

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19 - Retaining clip

20 - Lower coolant hose

- ❑ To connection for thermostat.
- ❑ Connection diagram for coolant hoses ⇒ page 232

21 - Radiator outlet coolant temperature sender - G83-

22 - Lower coolant hose

- ❑ To connection for thermostat.
- ❑ Connection diagram for coolant hoses ⇒ page 232

23 - Union

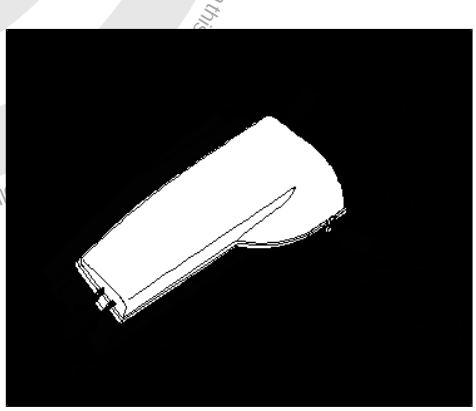
- ❑ To remove, pull out retaining clip.

24 - 10 Nm

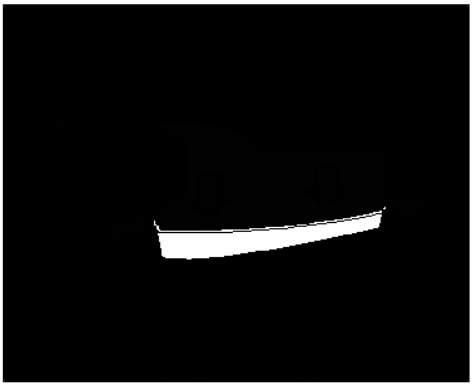
3.3 Removing and installing radiator cowl

Removing

– Pull cover off air duct (release clips on sides) -arrows-.



– Release clips -arrows- air duct at the bottom and remove duct.

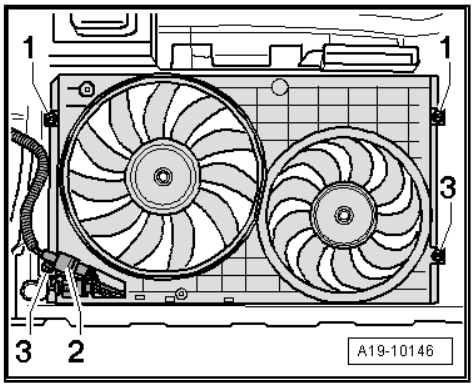


– Unscrew bolts -1- from above.

Note

The left bolt is located below the coolant union.

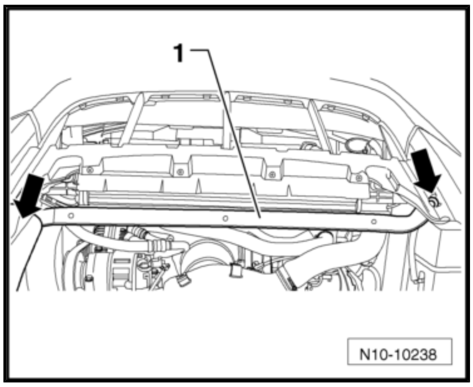
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .



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Tiguan

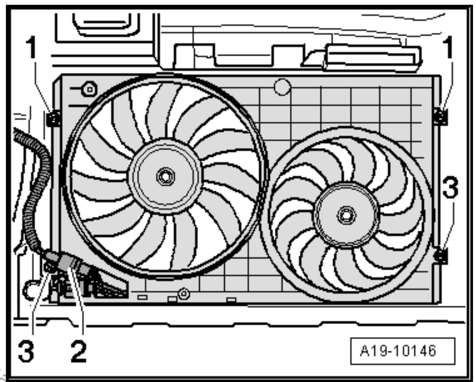
– Remove bracket -1- by unscrewing securing bolts -arrows-.



All

– Disconnect electrical connector -2-.

– Remove bolts -3- and take out air cowl downwards.



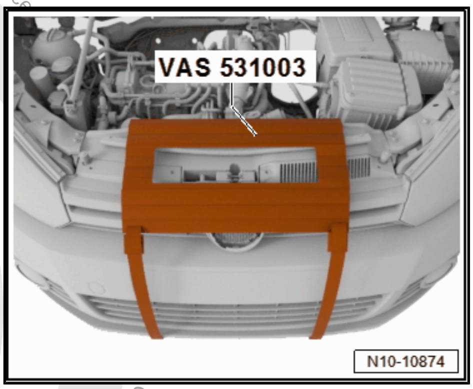
– Cover radiator using protective mat - VAS 531 003- .

Installing

Install in reverse order of removal, observing the following.

♦ Install radiator cowl from below.

♦ Specified torques ⇒ page 264 .



3.4 Removing and installing radiator fan - V7- and radiator fan 2 - V177-

Removing

Proceed as follows:

– Remove radiator cowl ⇒ page 267 .

– Disconnect connector -1-.

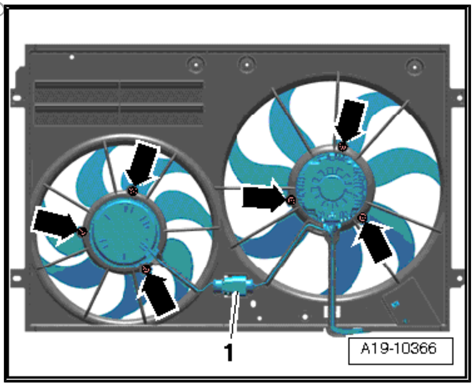
– Move electrical wiring clear.

– Unscrew nuts -arrows- and remove radiator fans.

Installing

Install in reverse order of removal.

• Specified torques ⇒ page 264 .



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3.5 Removing and installing radiator (Passat, CC, Golf, Eos, Scirocco)

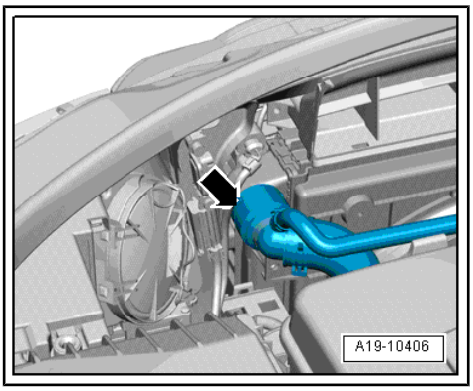
Removing

Proceed as follows:

– Drain coolant ⇒ page 235 .

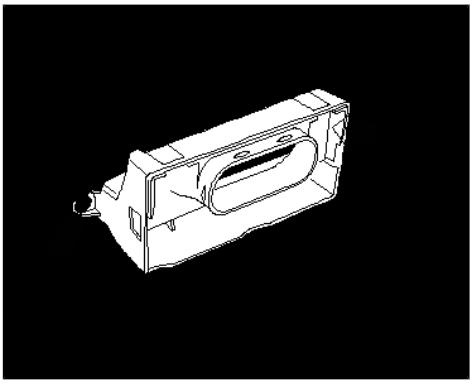
– Remove radiator cowl ⇒ page 267 .

– Detach top coolant hose from radiator -arrow-.

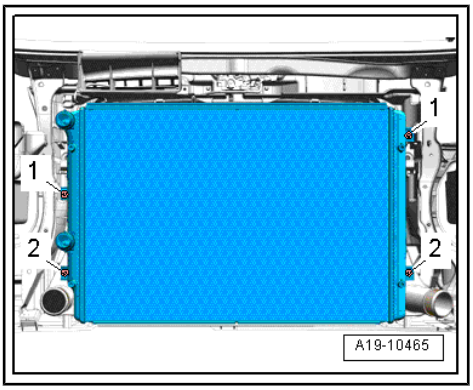


– Unscrew air duct from lock carrier -arrows- and remove air duct.

– Engine code CBFA: Disconnect connector for radiator identification sensor .



– Unscrew bolts -1 and 2- and remove radiator upwards.



Installing

Install in reverse order of removal.

- Specified torques ⇒ page 264 .

3.6 Removing and installing radiator (Tiguan)

Removing

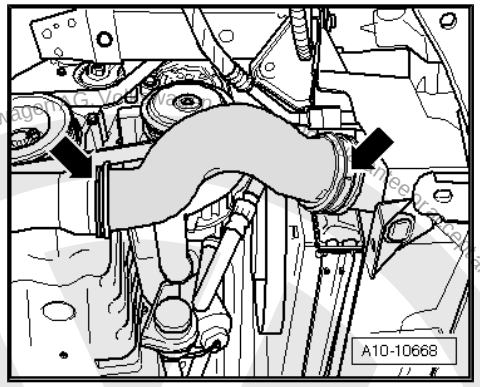
Proceed as follows:

– Drain coolant ⇒ page 235 .

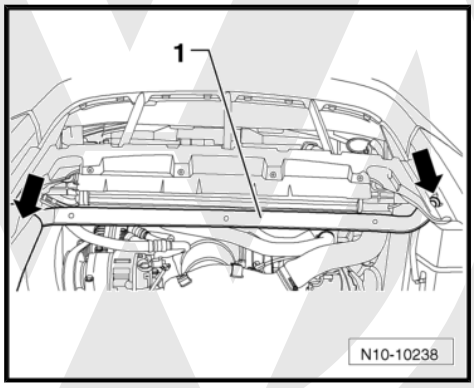
– Remove radiator cowl ⇒ page 267 .

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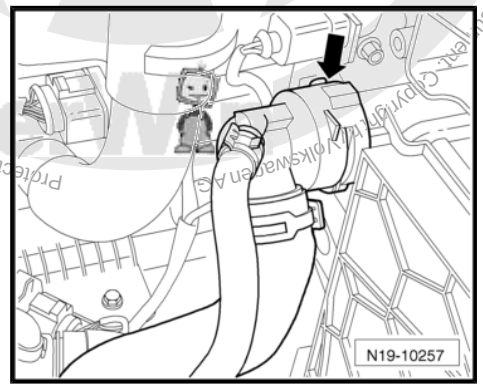
– Remove air hose -arrows- and seal charge air cooler with a clean cloth.



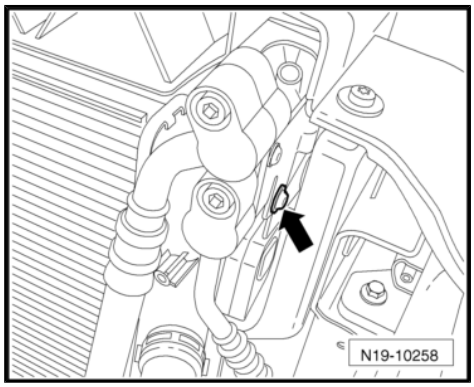
– Remove bracket -1- by unscrewing securing bolts -arrows-.



– Release retaining clip and pull connection -arrow- off radiator.
– Also pull off connection on right of radiator.

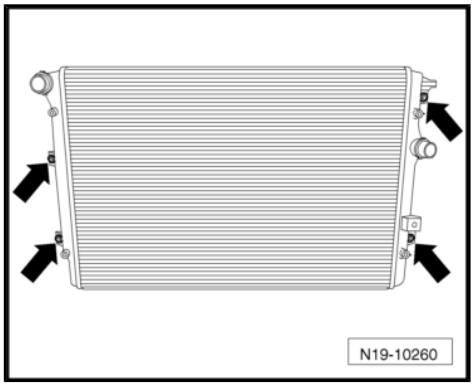


– Remove securing bolt -arrow-.



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– Unscrew bolts -arrows- and remove radiator downwards.



Installing

Install in reverse order of removal.

- Specified torques ⇒ page 266 .

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20 – Fuel supply system

1 Safety precautions

Safety precautions when working on fuel supply system
⇒ page 272 .

1.1 Safety regulations for working on fuel supply

WARNING

- *Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.*

For reasons of safety, the power supply to the fuel pump must be interrupted before the fuel system is opened. The fuel pump would otherwise be activated when the driver's door is opened. Use the following options to interrupt the power supply:

- *Disconnect battery*

Or

- *Removing fuse for fuel pump control unit - J538-*

Or

- *Pull off connector from fuel delivery unit flange or fuel pump control unit - J538-*

Caution

Observe the following points during all installation work, in particular in the engine compartment, due to the space limitations:

- *Route all the various lines and electrical wiring so that they are in their original positions.*
- *Ensure that there is sufficient clearance to all moving or hot components*

To prevent injuries to persons and/or damage to the injection and ignition system, the following must be observed:

- Do not touch or pull off ignition coils with output stage when engine is running or turning at starter speed.
- Switch off ignition before connecting or disconnecting injection and ignition system wiring as well as test instrument cables.

When removing and installing fuel gauge sender or fuel pump (fuel delivery unit) from a full or partly full fuel tank, observe the following:

- Before starting work, the extraction hose of a switched-on exhaust gas extraction system must be laid near to the assembly opening of the fuel tank. This draws away the fuel fumes that escape. If no exhaust gas extraction system is available, a radial fan with a displacement greater than 15 m^3/h can be used providing that motor is not in air flow.

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- Prevent skin contact with fuel! Wear fuel-resistant gloves!

Note the following if testers and measuring instruments have to be used during a road test:

- Test instruments and measuring equipment must always be secured to the rear seat and operated by a second person from this location.
- If test and measuring instruments are operated from front passenger seat and the vehicle is involved in an accident, there is a possibility that the person sitting in this seat may receive serious injuries when the airbag is triggered.

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2 Rules for cleanliness

When working on the fuel supply and injection system, pay careful attention to the following “5 rules”:

- Thoroughly clean all joints and surrounding areas before dismantling.
- Place removed parts on a clean surface and cover them over. Use lint-free cloths only!
- Carefully cover opened components or seal them if repairs cannot be carried out immediately.
- Install only clean parts; do not remove new parts from packaging until immediately before installing. Do not use parts that have been kept unpackaged (for example in toolboxes).
- If system is open: do not use compressed air if possible. Try not to move the vehicle.

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3 Fuel tank (Passat, CC)

Safety precautions when working on fuel supply system ⇒ page 272 .

Comply with rules for cleanliness ⇒ page 274 .

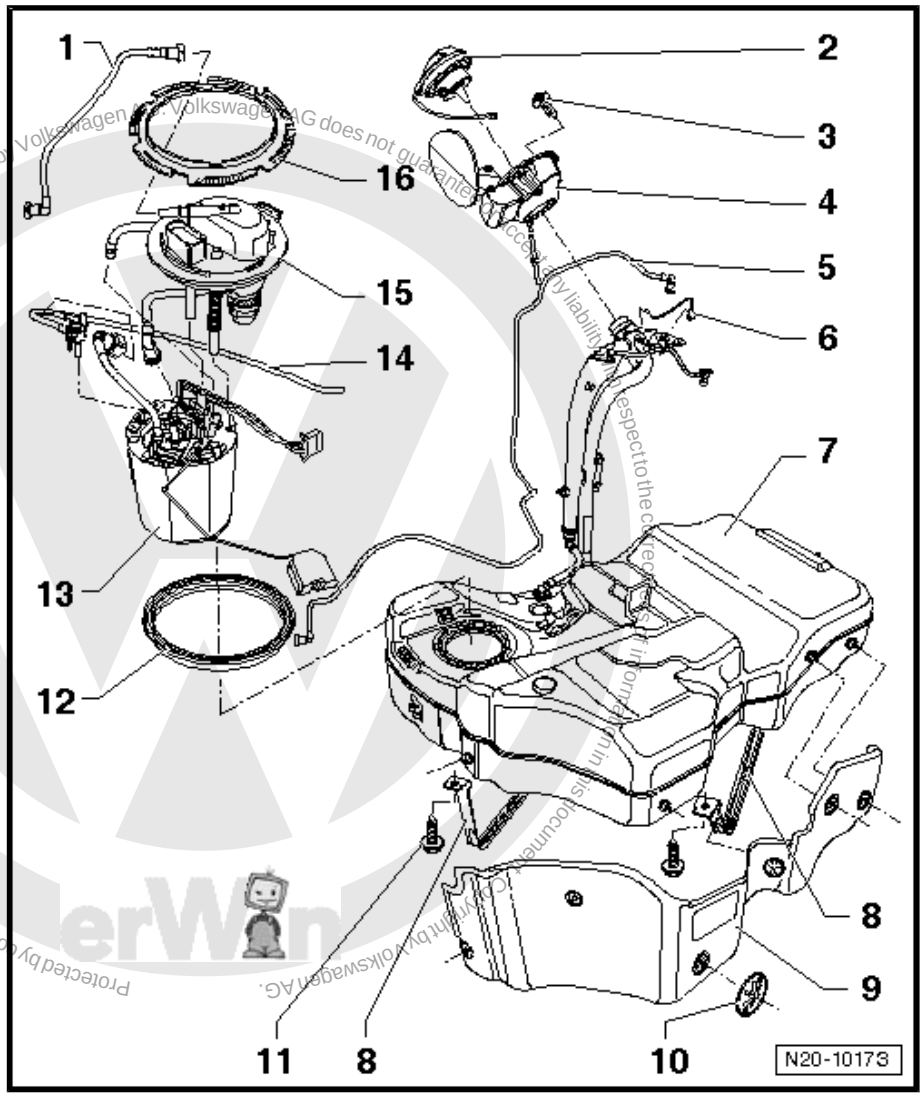
Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA, CDAB) ⇒ page 275 .

Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB) ⇒ page 276 .

Drain fuel tank ⇒ page 277 .

Removing and installing fuel tank ⇒ page 281 .

3.1 Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA, CDAB)



1 - Fuel line
- ❑ Ensure firm seating.
- ❑ Clipped onto fuel tank.

2 - Cap
- ❑ Renew if damaged

3 - Bolt, 1.5 Nm

4 - Tank flap unit
- ❑ With rubber cup.
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

5 - Breather hose
- ❑ Clipped onto fuel tank.
- ❑ Ensure firm seating.

6 - Earth connection
- ❑ Ensure firm seating.

7 - Fuel tank
- ❑ Emptying ⇒ page 277
- ❑ Removing and installing ⇒ page 281

8 - Tensioning strap

9 - Heat shield

10 - Clamping washer

11 - 25 Nm
- ❑ Renew
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening. Bolts ⇒ ETKA (Electronic parts catalogue) .

12 - Sealing ring
- ❑ Renew
- ❑ When installing, fit dry in fuel tank opening.

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- ❑ Moisten with fuel only when installing flange.

13 - Fuel delivery unit

- ❑ Removing and installing ⇒ page 320
- ❑ Checking fuel pump ⇒ page 325 .
- ❑ Removing and installing fuel gauge sender - G- ⇒ page 324
- ❑ Clean strainer if soiled

14 - Suction-jet pump

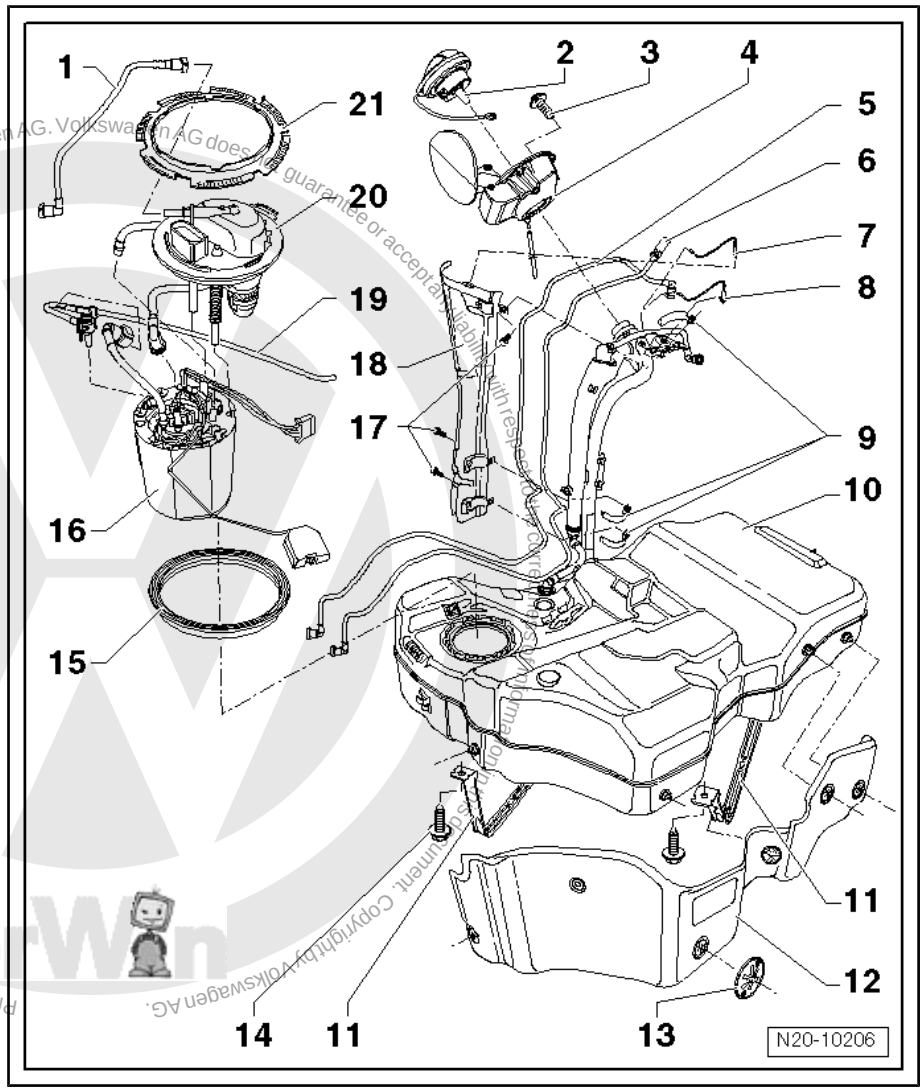
15 - Flange with fuel filter

- ❑ With 6.2 bar pressure relief valve
- ❑ Removing and installing ⇒ page 320

16 - Locking ring 110 Nm

- ❑ Ensure firm seating.
- ❑ Remove and install using wrench - T10202- .

3.2 Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB)



1 - Fuel line

- ❑ Ensure firm seating.

2 - Cap

- ❑ Renew if damaged

3 - Securing bolt

4 - Tank flap unit

- ❑ With rubber cup.
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

5 - Breather hose

- ❑ Clipped onto fuel tank.
- ❑ Ensure firm seating.

6 - Vacuum line

- ❑ Clipped onto fuel tank.
- ❑ Ensure firm seating.

7 - Earth connection

- ❑ To protective plate for filler neck.
- ❑ Ensure firm seating.

8 - Earth connection

- ❑ Ensure firm seating.
- ❑ Ensure good contact to body

9 - Clamp

10 - Fuel tank

- ❑ Emptying ⇒ page 277
- ❑ Removing and installing ⇒ page 281
- ❑ When removing, support using engine and gearbox jack - V.A.G 1383 A- .

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11 - Securing straps

12 - Heat shield

13 - Clamping washer

14 - 25 Nm

- ❑ Renew
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening. Bolts ⇒ ETKA (Electronic parts catalogue) .

15 - Sealing ring

- ❑ Renew
- ❑ When installing, fit dry in fuel tank opening.
- ❑ Moisten with fuel only when installing flange.

16 - Fuel delivery unit

- ❑ Removing and installing ⇒ page 320
- ❑ Checking fuel pump ⇒ page 325 .
- ❑ Removing and installing fuel gauge sender - G- ⇒ page 324
- ❑ Clean strainer if soiled

17 - Pop rivet

18 - Protective plate

- ❑ For filler neck.

19 - Suction-jet pump

20 - Flange with fuel filter

- ❑ With 6.2 bar pressure relief valve
- ❑ Removing and installing ⇒ page 320

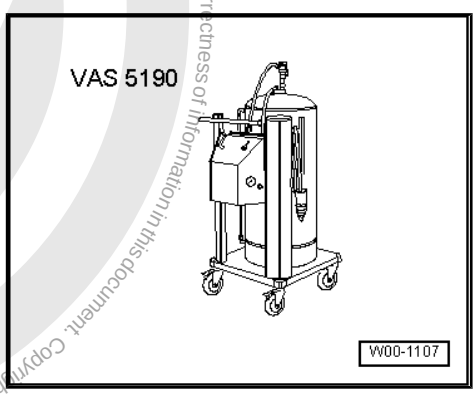
21 - Locking ring 110 Nm

- ❑ Ensure firm seating.
- ❑ Remove and install using wrench - T10202- .

3.3 Emptying fuel tank

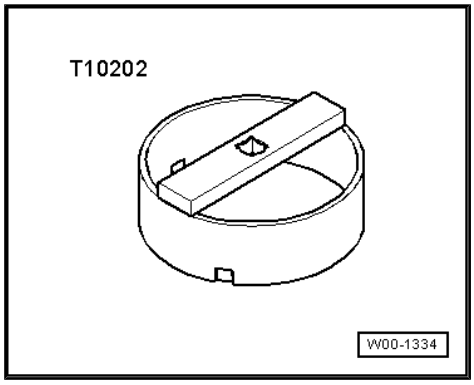
Special tools and workshop equipment required

- ♦ Fuel extraction unit - VAS 5190-



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- Special wrench - T10202-



- Torque wrench (40 to 200 Nm) - V.A.G 1332-

– Note safety precautions before beginning work ⇒ page 272 .

Emptying fuel tank with fuel pump intact ⇒ page 278 .

Emptying fuel tank if more than $^{3}/_{4}$ full ⇒ page 280

Emptying fuel tank if less than $^{3}/_{4}$ full ⇒ page 280

3.3.1 Emptying fuel tank when fuel pump is intact

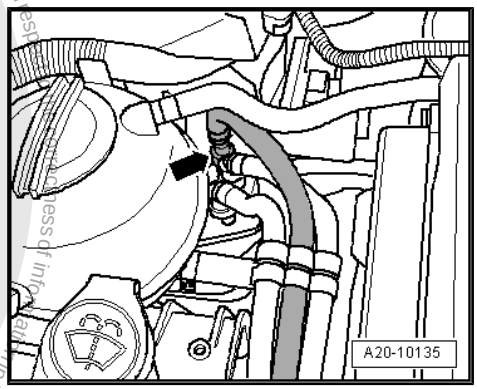
Special tools and workshop equipment required

- Adapter for fuel extraction - VAS 5190 /3-
- Test instrument adapter/DSO (5-pin) - VAS 5565-
- Remote control - V.A.G 1348/3A-

WARNING

- ***Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.***
- ***Connect fuel extractor - VAS 5190- earth cable to earth.***

– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.

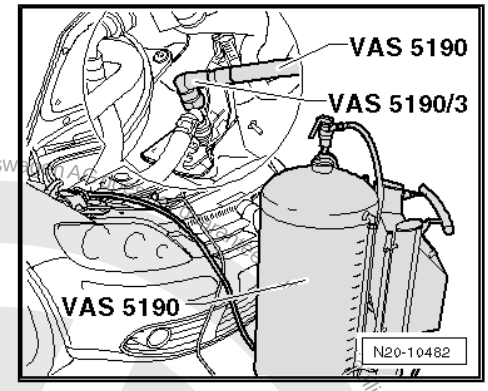


Note

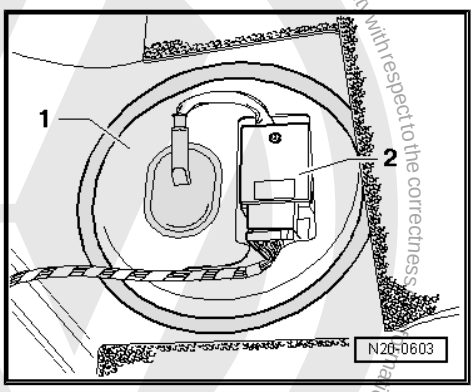
Press in securing ring to release the fuel lines.

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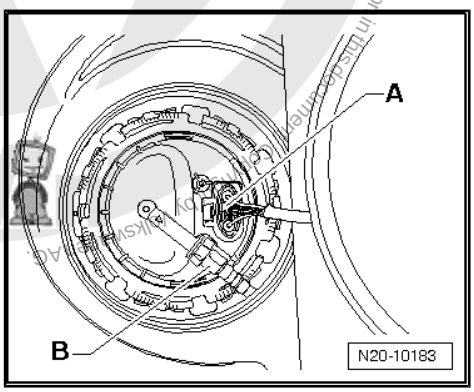
– Connect fuel extractor - VAS 5190- with adapter for fuel extractor - VAS 5190 /3- to fuel supply line.
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .



– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– Pull connector -A- off fuel delivery unit flange.

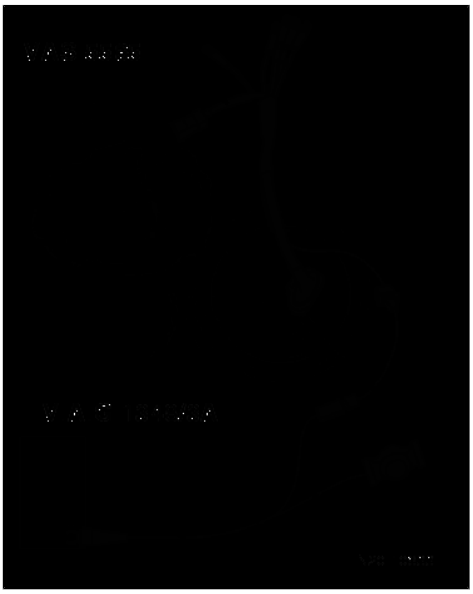


– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect remote control - V.A.G 1348/3A- to adapter - VAS 5565- and to battery positive (+).

Note

This step serves only to have the fuel pump running when the engine is stopped.

– Remove filler cap from fuel tank filler neck.
– Operate remote control - V.A.G 1348/3A- and shut-off tap on fuel extractor - VAS 5190- until fuel tank is empty.



Caution

Fuel pump must not run »dry«.

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3.3.2 Emptying fuel tank if it is more than 3/4 full

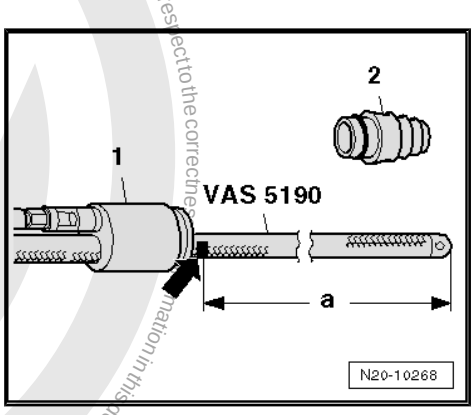
Caution

Secure earth wire of fuel extractor - VAS 5190- to a bare metal part of the body.

– Use insulating tape to mark the extraction hose -arrow- at a distance of -a- = 990 mm from the end of the hose.

– Remove filler cap from fuel tank filler neck.

– Push extraction hose into fuel tank until marking on hose coincides with filler neck.



Note

- *The shaft piece -1- is not used.*
- *There is a flap on the lower end of the fuel filler neck in the fuel tank which must not be damaged by the extraction hose. Therefore, only push the hose in as far as the marking.*

– Drain fuel tank as much as possible through fuel filler neck.

– Carefully pull out extraction hose.

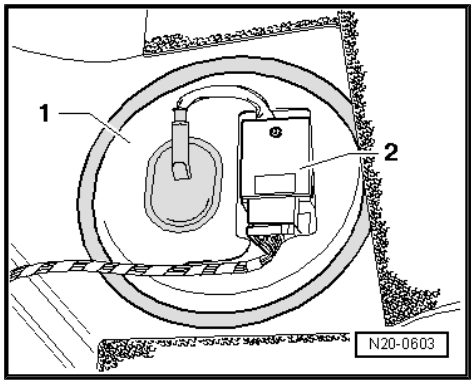
Note

- *When no more fuel is extracted, the tank is emptied just enough for the sender flange to be opened without danger. The tank may be removed while containing remaining fuel.*
- *Emptying the fuel tank completely ⇒ page 280 .*

3.3.3 Emptying fuel tank if it is less than 3/4 full

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.

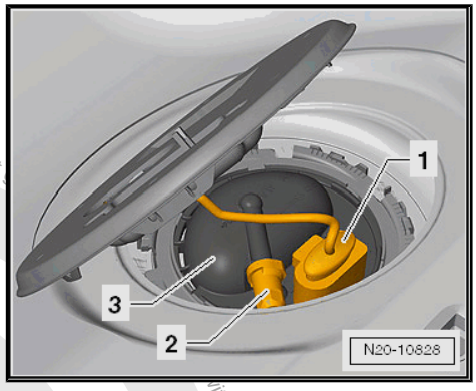


WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

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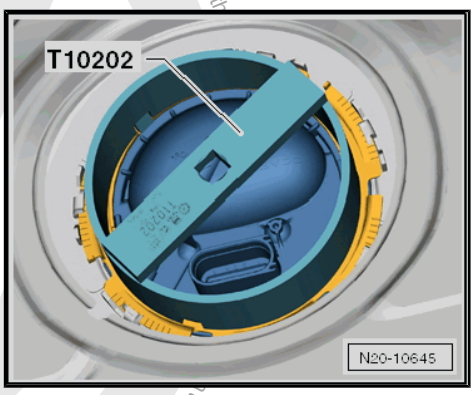
– Release connector -1- and fuel line -2- and pull them off flange -3-.



Note

- *Press in securing ring to release fuel line.*
- *On vehicles with auxiliary heater, the connector and the fuel line of the metering pump - V54- must also be disconnected.*

– Open locking ring using key - T10202- .



Caution

Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.

– Lift sender flange.

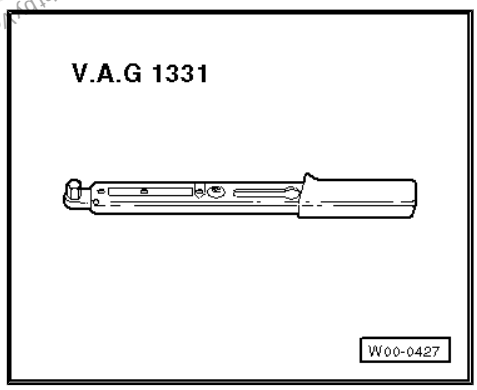
– Insert extraction hose of fuel extractor - VAS 5190- as deeply as possible into fuel tank and extract fuel.

If fuel tank needed only to be emptied, reinstall sender flange ⇒ page 320 .

3.4 Removing and installing fuel tank

Special tools and workshop equipment required

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



Remove fuel tank ⇒ page 281 .

Install fuel tank ⇒ page 284 .

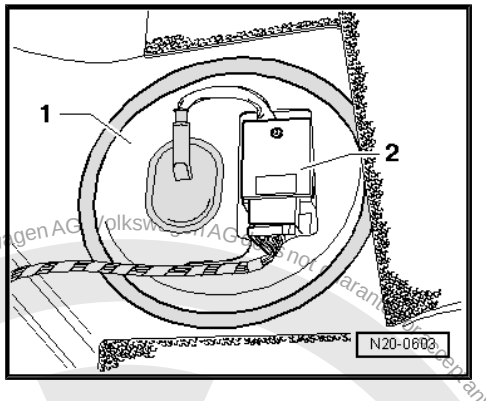
3.4.1 Removing fuel tank

Note

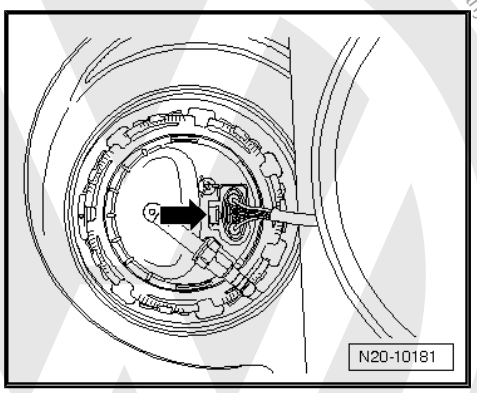
- *The rear axle must be lowered to remove the fuel tank.*
- *Note safety precautions before beginning work ⇒ page 272 .*
- *Observe rules for cleanliness ⇒ page 274 .*
- *Assembly overview - fuel tank ⇒ page 275 .*

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– If necessary, empty fuel tank using fuel extractor - VAS 5190- ⇒ page 277 .
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– Pull 5-pin connector -arrow- off flange.



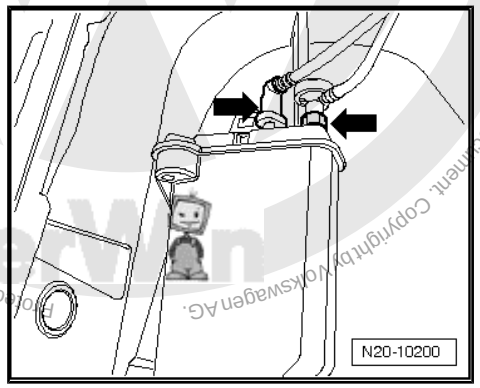
Note

For vehicles with auxiliary heater the metering pump - V54- connector must be separated additionally.

– Remove rear right wheel.
– Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

Engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA, CDAB:

– Pull breather line and pressure retention valve -arrows- off activated charcoal filter.

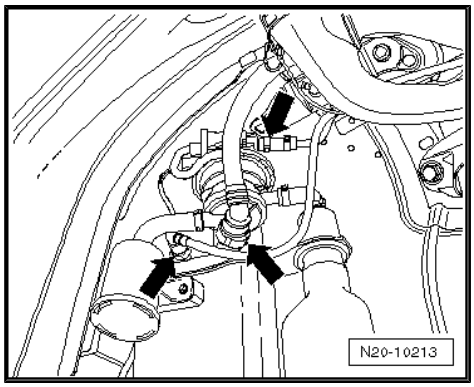


Note

Grasp securing ring (grey) on pressure retention valve and pull valve off upwards.

Engine codes CBFA, CCTA, CCTB:

– Pull breather lines and vacuum line -arrows- off activated charcoal filter.

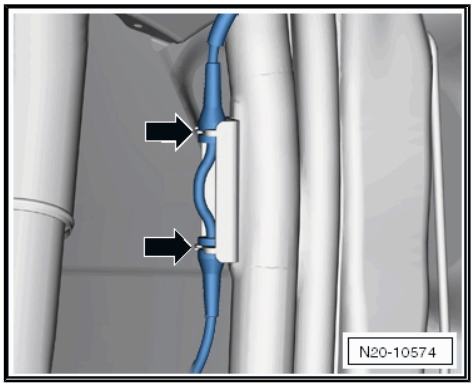


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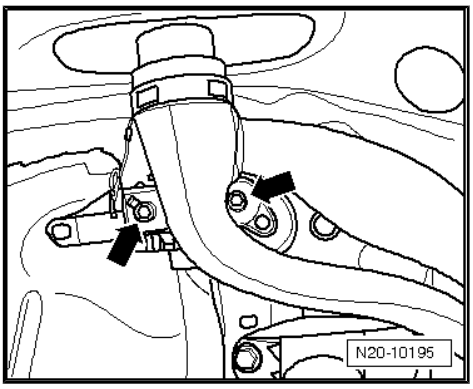
All:

– Unclip wire from filler neck -arrows-.

– Unscrew tank flap unit securing bolt and remove tank flap unit ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing tank flap unit .



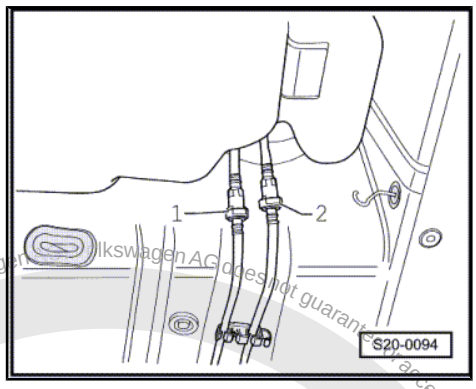
– Unbolt filler neck from body -arrows-.



WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

– Separate breather line (white) -1- and fuel line (black) -2- at connections.



Note

- *Press in securing ring to release fuel line.*
- *Vehicles with auxiliary heater, the fuel line of the metering pump - V54- must also be separated.*

– Lower rear axle ⇒ Running gear, axles, steering; Rep. gr. 42 ; Lowering rear axle .

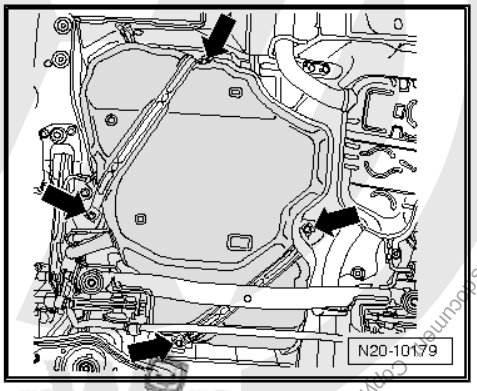
Note

- *When lowering, ensure sufficient clearance to brake lines and electrical wiring.*
- *Take the help of another mechanic while unbolting and lowering fuel tank.*

– Hold fuel tank and unscrew bolts securing the tensioning straps -arrows-.

– Remove tensioning straps.

– With the aid of a 2nd mechanic, lower the tank slowly and take it out through the space between rear axle and body.

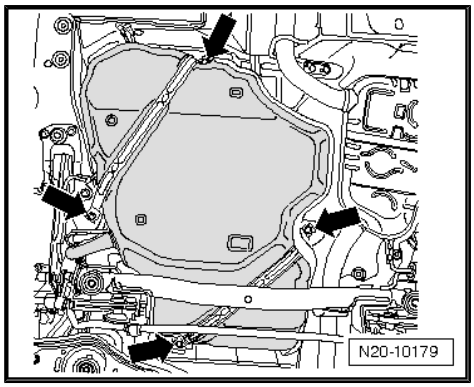


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3.4.2 Installing fuel tank

– With the aid of a second mechanic, guide the filler neck in between rear axle and body.

– Place fuel tank in mounting position and fit new securing bolts -arrows-.



Note

To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening. Bolts ⇒ ETKA (Electronic parts catalogue) .

– Secure rear axle to body again ⇒ Running gear, axles, steering; Rep. gr. 42 .

The remaining installation steps are carried out in the reverse order of removal. During this step, observe the following:

- Install breather lines and fuel lines free of kinks.
- Ensure that line connections are tight.
- Check fuel tank/body earth connection on filler neck.

– Fill fuel tank with at least 5 litres of fuel.

WARNING

Risk of explosion of fuel tank. If a new or completely empty fuel tank has been installed, it must be filled immediately with at least 5 litres of fuel. The fuel pump must not be allowed to run when the fuel tank is empty.

Specified torques:

Component	Torque setting
Tensioning straps to body ♦ Use new bolts! ♦ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. This will stop the securing straps from being twisted out of position when tightening the bolts.	25 Nm
Filler neck to body	8 Nm + 90°
Subframe/rear axle to body ♦ Use new bolts!	⇒ Running gear, axles, steering; Rep. gr. 42 ; Removing and installing rear axle .
Fitting wheels	⇒ Running gear; Rep. gr. 44 ; Specified torque for mounting wheels

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4 Fuel tank (Golf, Scirocco)

Safety precautions when working on fuel supply system ⇒ page 272 .

Comply with rules for cleanliness ⇒ page 274 .

Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA) ⇒ page 285 .

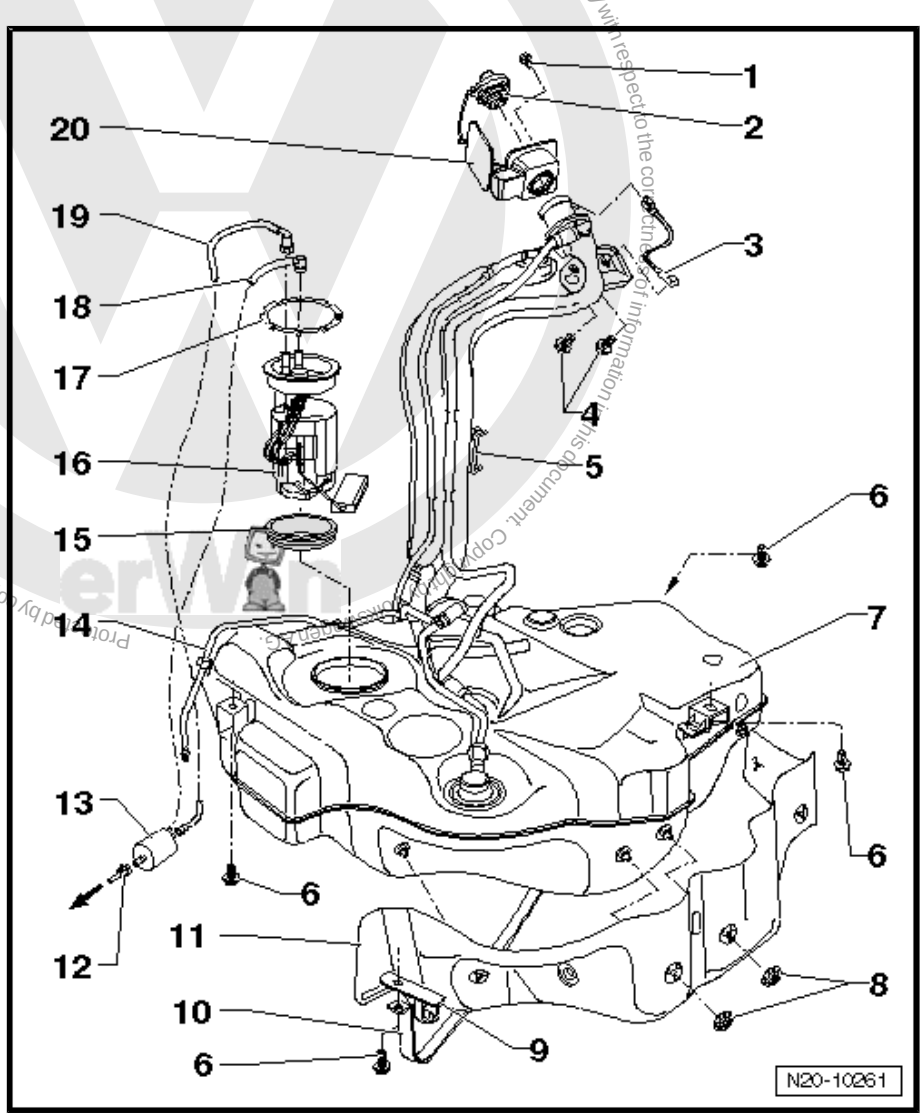
Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB) ⇒ page 287 .

Draining fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA) ⇒ page 289 .

Emptying fuel tank (engine codes CBFA, CCTA, CCTB) ⇒ page 293 .

Removing and installing fuel tank ⇒ page 295 .

4.1 Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA)



1 - Securing bolt

2 - Cap

- ❑ Renew if damaged

3 - Earth connection

- ❑ Ensure firm seating.

4 - 10 Nm

5 - Wiring guide

6 - 25 Nm

- ❑ Renew
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening. Bolts ⇒ ET-KA (Electronic parts catalogue) .

7 - Fuel tank

- ❑ When removing, support using engine and gearbox jack - V.A.G 1383 A- .
- ❑ Removing and installing ⇒ page 295

8 - Clamping washer

9 - Exhaust system retainer

10 - Tensioning strap

- ❑ Observe installation position

11 - Heat shield

12 - Supply pipe

- ❑ To fuel rail

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- ❑ Ensure firm seating.

13 - fuel filter.

- ❑ Fitting position ⇒ page 287
- ❑ Arrow points in direction of flow.

14 - Breather hose

- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

15 - Sealing ring

- ❑ Renew
- ❑ When installing, fit dry in fuel tank opening.
- ❑ Moisten with fuel only when installing flange.

16 - Fuel delivery unit

- ❑ Removing and installing ⇒ page 340
- ❑ Checking fuel pump ⇒ page 344 .
- ❑ Note installation position on fuel tank ⇒ page 286
- ❑ With fuel gauge sender - G-
- ❑ Removing and installing fuel gauge sender - G- ⇒ page 343

17 - Locking ring 110 Nm

- ❑ Ensure firm seating.
- ❑ Remove and install using wrench - T10202- .

18 - Supply pipe

- ❑ black
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

19 - Return line

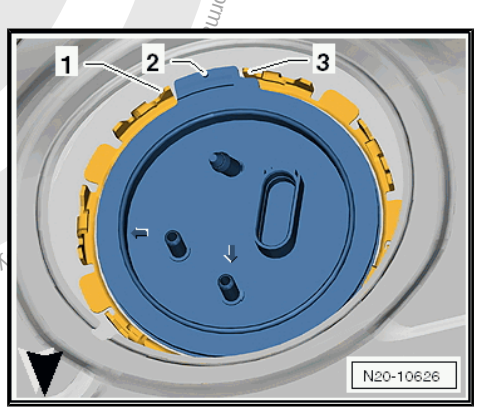
- ❑ blue
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

20 - Tank flap unit

- ❑ With rubber cup.
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

Installation position of fuel delivery unit

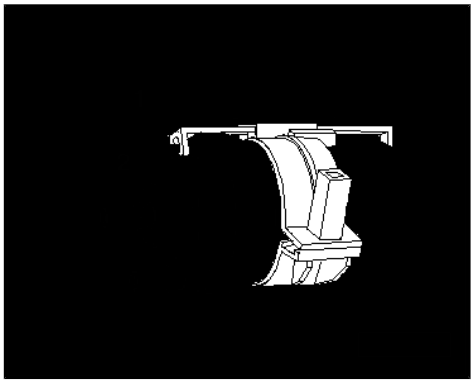
- Tab -2- on flange must be between lugs -1- and -3- on fuel tank.
- -Arrow- points in direction of travel.



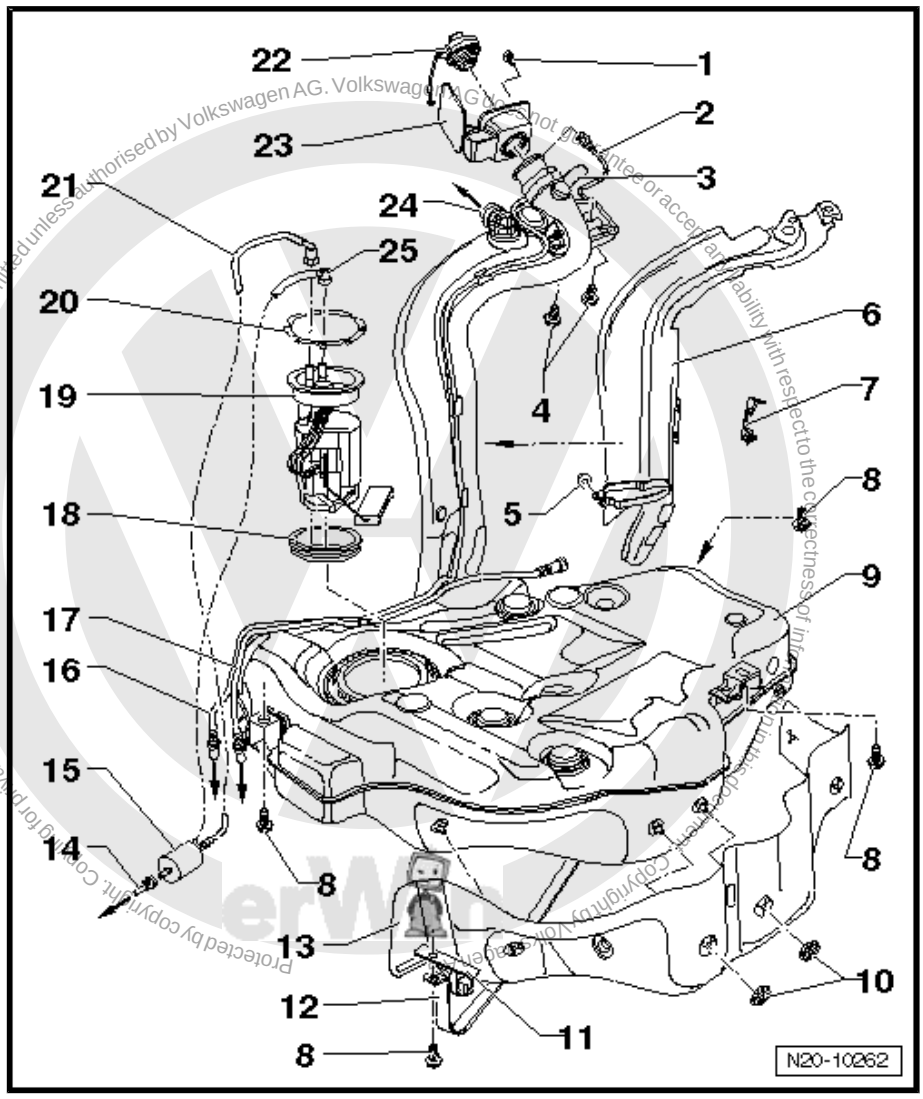
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Location of fuel filter

Pin -2- on filter housing must engage in notch of guide -1- on filter bracket.



4.2 Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB)



1 - Securing bolt

2 - Earth connection

- ❑ Ensure firm seating.

3 - Vacuum line

- ❑ To fuel system diagnostic pump - V144-

4 - 10 Nm

5 - Rivet

6 - Protective plate

- ❑ Riveted as standard to bottom clamp
- ❑ When replacing fuel tank, hold protective plate against filler pipe and rivet to clamp

7 - Cable bracket

- ❑ Clipped onto protective plate

8 - 25 Nm

- ❑ Renew
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening. Bolts ⇒ ETKA (Electronic parts catalogue) .

9 - Fuel tank

- ❑ When removing, support using engine and gearbox jack - V.A.G 1383 A- .
- ❑ Removing and installing ⇒ page 295

10 - Clamping washer

11 - Exhaust system retainer

12 - Tensioning strap

- ❑ Observe installation position

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13 - Heat shield

14 - Supply pipe

- ❑ To fuel rail
- ❑ Ensure firm seating.

15 - fuel filter.

- ❑ Fitting position ⇒ page 289
- ❑ Arrow points in direction of flow.

16 - Vacuum line

- ❑ From fuel system diagnostic pump - V144- to intake manifold.
- ❑ Clipped onto fuel tank.
- ❑ Ensure firm seating.

17 - Breather hose

- ❑ From activated charcoal filter to activated charcoal filter solenoid valve 1 - N80-
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

18 - Sealing ring

- ❑ Renew
- ❑ When installing, fit dry in fuel tank opening.
- ❑ Moisten with fuel only when installing flange.

19 - Fuel delivery unit

- ❑ Removing and installing ⇒ page 340
- ❑ If fuel delivery unit was renewed, adapt engine control unit to fuel pump ⇒ Vehicle diagnostic tester “Guided Functions”.
- ❑ Checking fuel pump ⇒ page 344 .
- ❑ Note installation position on fuel tank ⇒ page 289
- ❑ With fuel gauge sender - G-
- ❑ Removing and installing fuel gauge sender - G- ⇒ page 343
- ❑ Clean strainer if soiled

20 - Locking ring 110 Nm

- ❑ Ensure firm seating.
- ❑ Remove and install using wrench - T10202- .

21 - Return line

- ❑ blue
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

22 - Cap

- ❑ Renew if damaged

23 - Tank flap unit

- ❑ With rubber cup.
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

24 - To activated charcoal filter

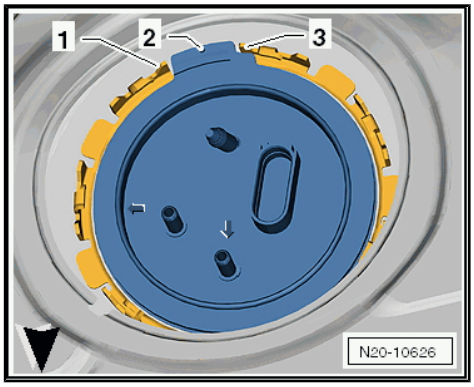
25 - Supply pipe

- ❑ black
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

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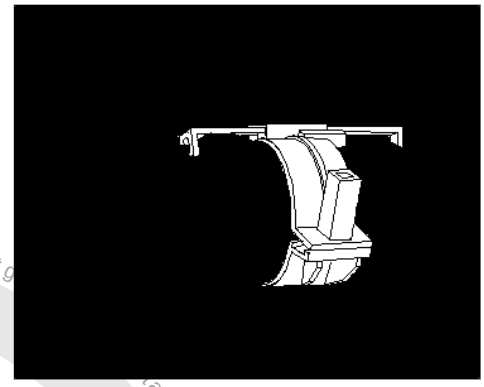
Installation position of fuel delivery unit

- Tab -2- on flange must be between lugs -1- and -3- on fuel tank.
- -Arrow- points in direction of travel.



Location of fuel filter

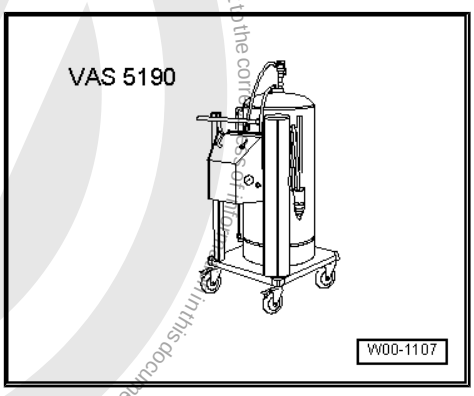
Pin -2- on filter housing must engage in notch of guide -1- on filter bracket.



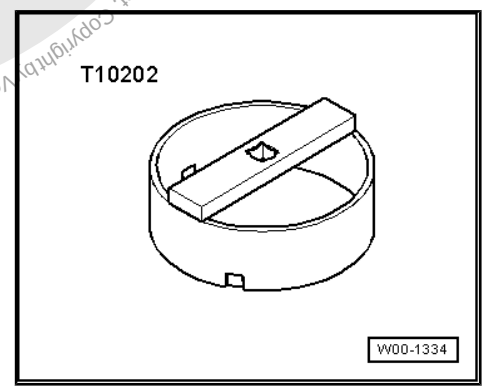
4.3 Draining fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA)

Special tools and workshop equipment required

- Fuel extraction unit - VAS 5190-



- Special wrench - T10202-



- Torque wrench (40 to 200 Nm) - V.A.G 1332-

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– Note safety precautions before beginning work ⇒ page 272 .

Emptying fuel tank with fuel pump intact ⇒ page 290 .

Emptying fuel tank if more than 3/4 full ⇒ page 291

Emptying fuel tank if less than 3/4 full ⇒ page 292

4.3.1 Emptying fuel tank when fuel pump is intact

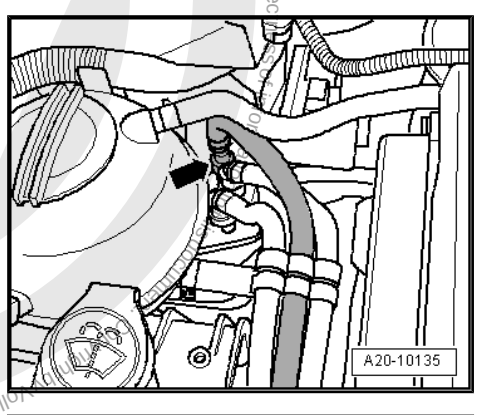
Special tools and workshop equipment required

- Adapter for fuel extraction - VAS 5190 /3-
- Test instrument adapter/DSO (5-pin) - VAS 5565-
- Remote control - V.A.G 1348/3A-

WARNING

- *Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.*
- *Connect fuel extractor - VAS 5190- earth wire to vehicle earth.*

– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.

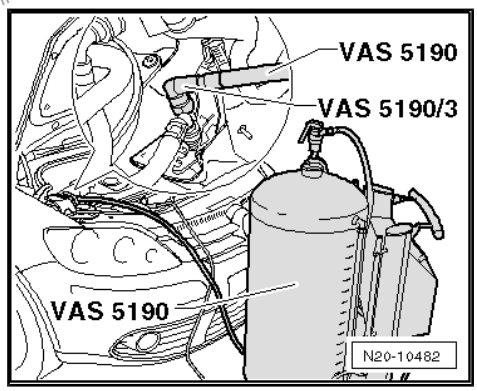


Note

Press in securing ring to release the fuel lines.

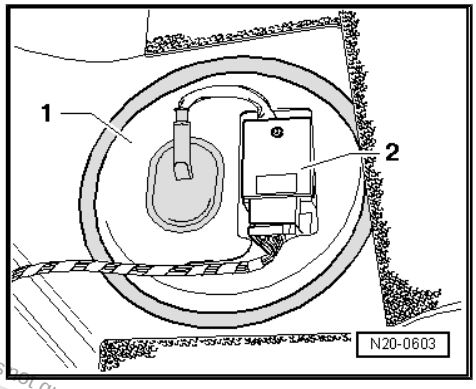
– Connect fuel extractor - VAS 5190- with adapter for fuel extractor - VAS 5190 /3- to fuel supply line.

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

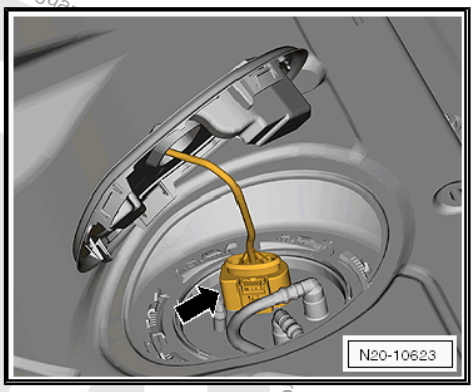


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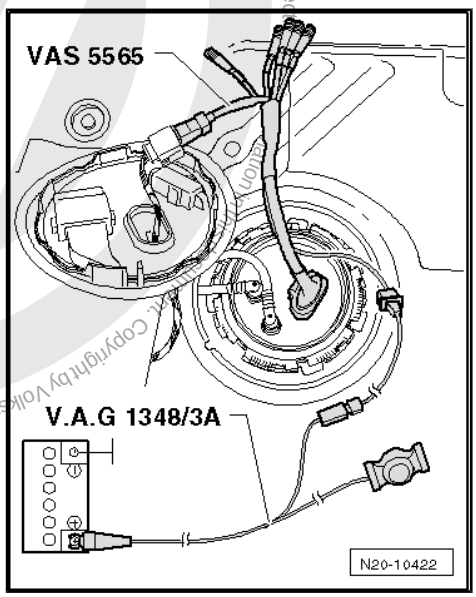
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– Unplug connector -arrow-.



– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect remote control - V.A.G 1348/3A- to test instrument adapter/DSO (5-pin) - VAS 5565- and to battery positive (+).



Note

This step serves only to have the fuel pump running when the engine is stopped.

– Remove filler cap from fuel tank filler neck.
– Operate remote control - V.A.G 1348/3A- and shut-off tap on fuel extractor - VAS 5190- until fuel tank is empty.

Caution

Fuel pump must not run »dry«.

4.3.2 Emptying fuel tank if it is more than 3/4 full

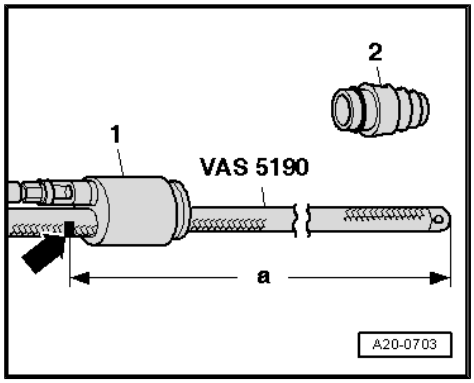
Caution

Secure earth wire of fuel extractor - VAS 5190- to a bare metal part of the body.

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– Remove cotter -2- from shaft -1- of fuel extractor - VAS 5190- .

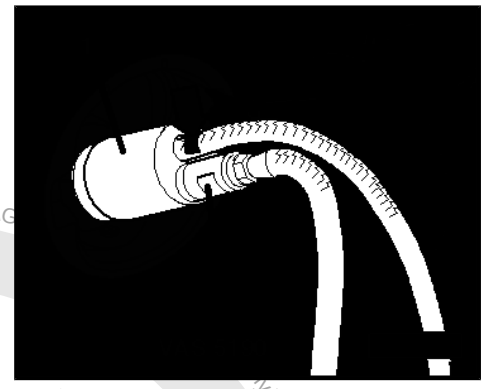
– At a distance of -a- = 1180 mm from the end of the hose, mark extraction hose with insulating tape -arrow-.



– Remove filler cap from fuel tank filler neck.

– Screw shaft end -1- of fuel extractor unit - VAS 5190- onto fuel filler neck.

– Push extraction hose into fuel tank until marking on hose -arrow- coincides with shaft end.

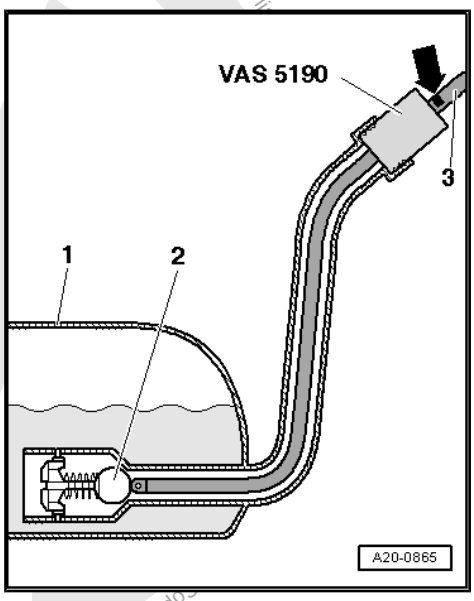


Note

A ball valve -2- is located at the bottom of the filler neck in the fuel tank -1-; it must not be damaged by the extraction hose -3-. Therefore push hose into filler neck only as far as marking -arrow-.

– Drain fuel tank as much as possible through fuel filler neck.

– Carefully pull out extraction hose.



Note

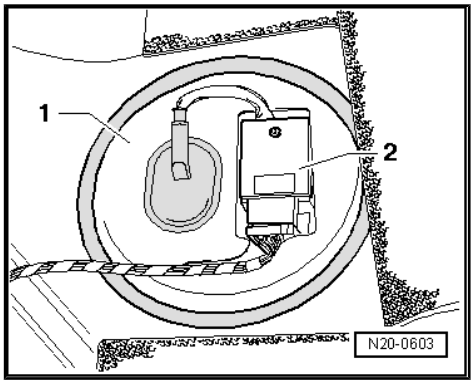
- *When no more fuel is extracted, the tank is emptied just enough for the sender flange to be opened without danger. The tank may be removed while containing remaining fuel.*
- *Emptying the fuel tank completely ⇒ page 292 .*

4.3.3 Emptying fuel tank if it is less than 3/4 full

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

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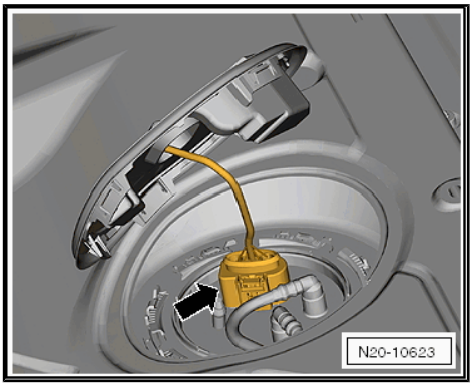
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



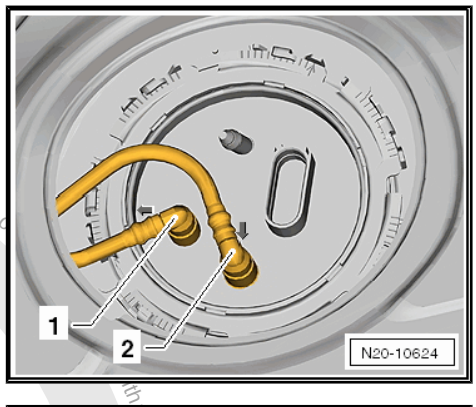
WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

– Unplug connector -arrow-.



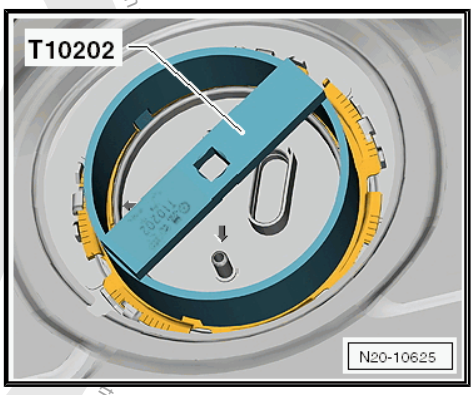
– Pull fuel lines -1- and -2- off the flange.



Note

- *Press in securing ring to release the fuel lines.*
- *On vehicles with auxiliary heater, the connector and the fuel line of the metering pump - V54- must also be disconnected.*

– Open locking ring using key - T10202- and raise flange slightly.



Caution

Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.

– Insert extraction hose of fuel extractor - VAS 5190- as deeply as possible into fuel tank and extract fuel.

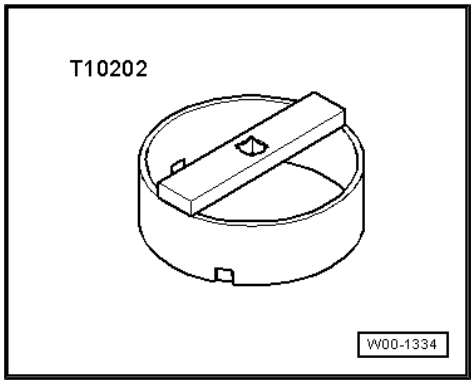
If fuel tank needed only to be emptied, reinstall sender flange ⇒ page 340.

4.4 Emptying fuel tank (engine codes CBFA, CCTA, CCTB)

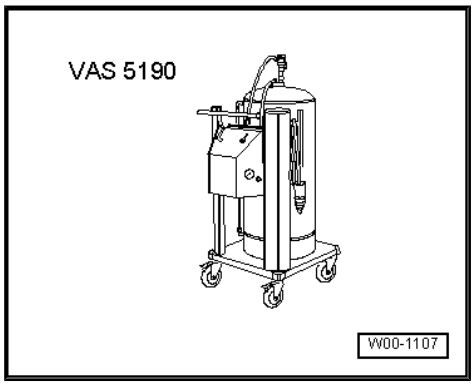
Special tools and workshop equipment required

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- Special wrench - T10202-



- Fuel extraction unit - VAS 5190-



- Torque wrench - V.A.G 1332-

– Note safety precautions before beginning work ⇒ page 272 .

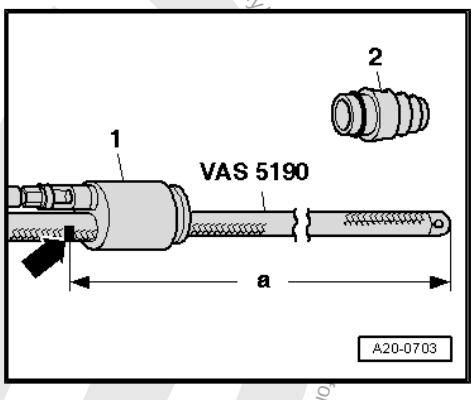
Caution

Secure earth wire of fuel extractor - VAS 5190- to a bare metal part of the body.

– Remove cotter -2- from shaft -1- of fuel extractor - VAS 5190- .

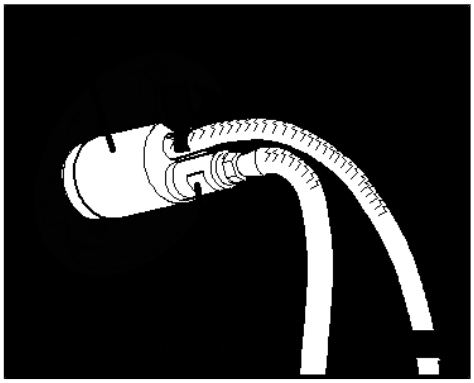
– At a distance of -a- = 1500 mm from the end of the hose, mark extraction hose with insulating tape -arrow-.

– Remove filler cap from fuel tank filler neck.



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– Screw shaft end -1- of fuel extractor unit - VAS 5190- onto fuel filler neck.



Note

On vehicles with plug-in connector, the shaft section of the fuel extractor must be held accordingly.

– Insert suction hose in fuel tank until marking -arrow- (previously made) is at the shaft section and extract fuel ⇒ Operating instructions for fuel extractor - VAS 5190- .

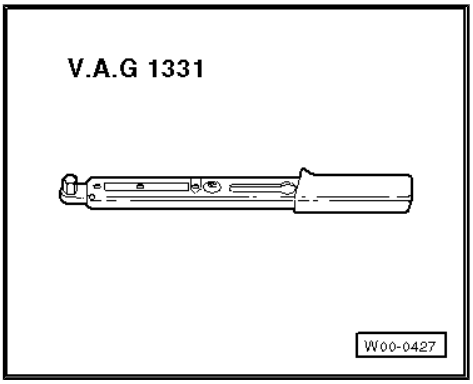
Note

- *After approx. 120 cm a pressure point is noticeable. The non-return flap in the fuel tank must be pushed open. Pull the hose out slightly and push it in with a slight jerk.*
- *The fuel tank is emptied almost completely in this way.*
- *Proceed in same manner when pulling hose out.*

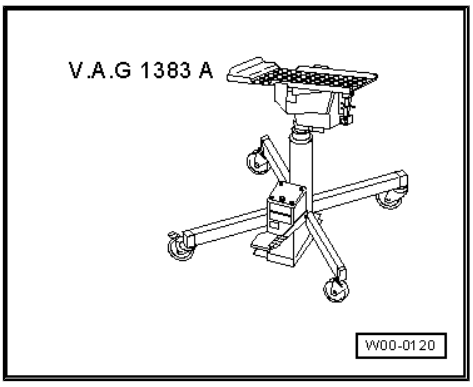
4.5 Removing and installing fuel tank

Special tools and workshop equipment required

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



- Engine and gearbox jack - V.A.G 1383 A-



Removing fuel tank

– Note safety precautions before beginning work ⇒ page 272 .

– Observe rules for cleanliness ⇒ page 274 .

– If necessary, empty fuel tank using fuel extractor - VAS 5190- :

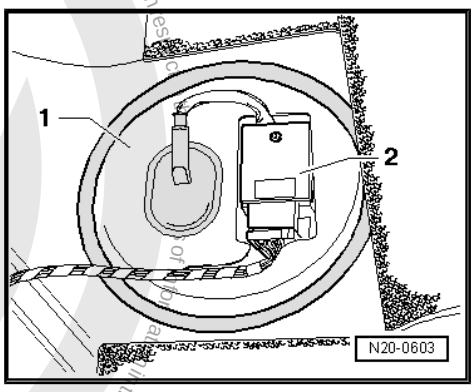
Engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA ⇒ page 289 .

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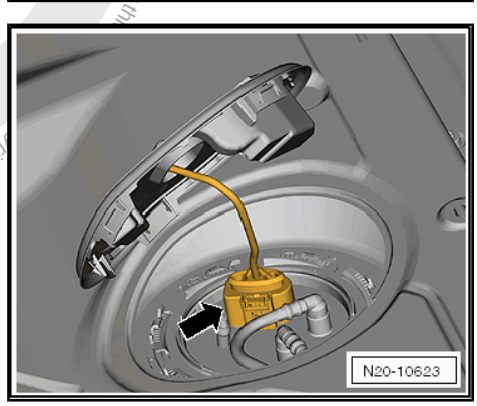
Engine codes CBFA, CCTA, CCTB ⇒ page 293 .

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– Unplug connector -arrow-.



Note

For vehicles with auxiliary heater the metering pump - V54- connector must be separated additionally.

– Remove rear right wheel.

– Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

– Unscrew tank flap unit securing bolt and remove tank flap unit ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit .

Engine codes CAWB, CCZA, CCZB, CDAA:

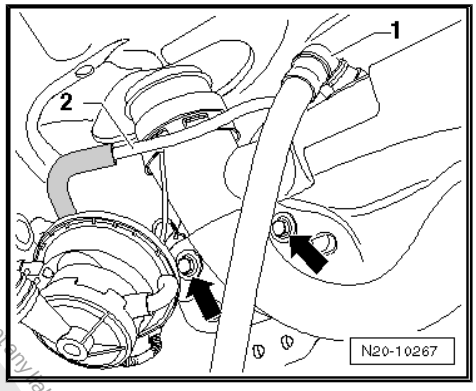


– Unbolt filler neck from body -1-.

– Unclip electrical wiring -2- from filler neck.

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Engine codes CBFA, CCTA:



– Disconnect hoses -1- and -2-.
– Unbolt filler neck from body -arrows-.
– Unclip electrical wiring from filler neck.

All:

– Remove centre and rear silencers.
– Remove heat shields from middle and rear silencers.

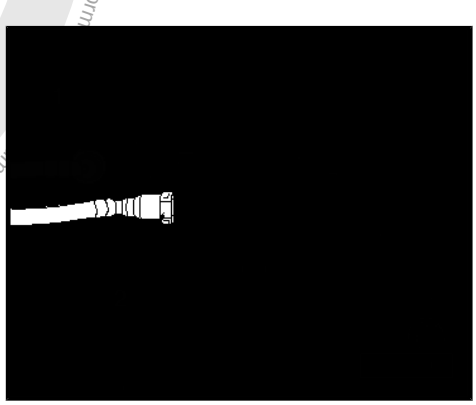
WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

Note

Press in securing ring to release the fuel lines.

– Disconnect breather line -1- (white) and fuel line -2- (black) at connecting point.



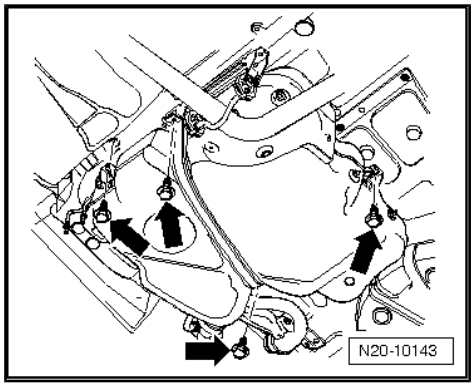
Note

- *On vehicles for USA/Canada, the vacuum line for the fuel system diagnostic pump - V144- must be separated in addition.*
- *Vehicles with auxiliary heater, the fuel line of the metering pump - V54- must also be separated.*

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– Unscrew securing strap and securing bolts. When doing this, support fuel tank with engine and gearbox jack - V.A.G 1383 A- .

– Lower fuel tank.



Installing fuel tank:

Install in reverse order of removal. During this step, observe the following:

Specified torques: Assembly overview - fuel tank.

Engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA ⇒ page 285 .

Engine codes CBFA, CCTA, CCTB ⇒ page 287 .

- To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening.
- Install breather lines and fuel lines free of kinks.
- Do not interchange supply line and return line (return line blue or with blue marking, supply line black).
- Ensure wiring/line connections are secured properly by pulling back.
- Check earth connection on fuel tank and body to filler neck.

– Fill fuel tank with at least 5 litres of fuel.

WARNING

Risk of explosion of fuel tank. If a new or completely empty fuel tank has been installed, it must be filled immediately with at least 5 litres of fuel. The fuel pump must not be allowed to run when the fuel tank is empty.

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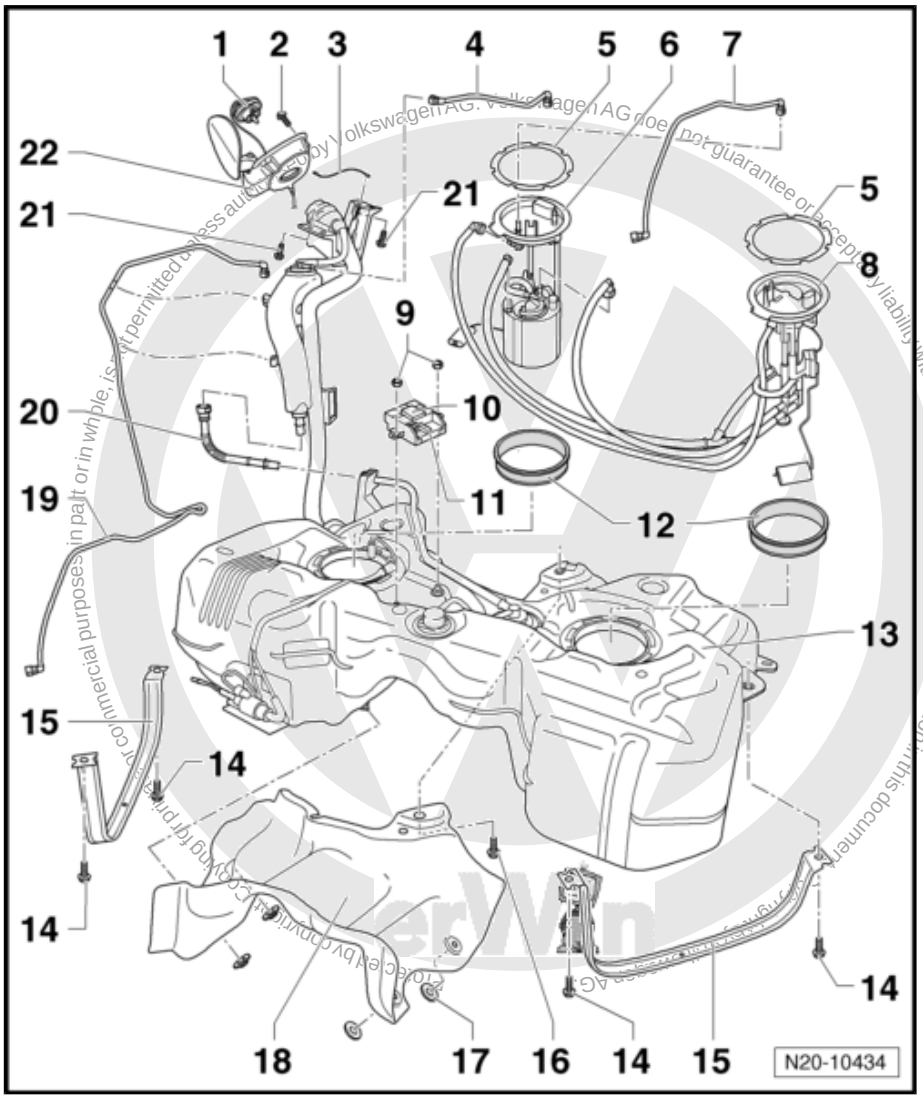
5 Fuel tank (Tiguan)

Assembly overview - fuel tank ⇒ page 299 .

Drain fuel tank ⇒ page 301 .

Removing and installing fuel tank ⇒ page 304 .

5.1 Assembly overview - fuel tank



1 - Cap

- ❑ Renew if damaged

2 - Securing bolt

3 - Earth connection

- ❑ Ensure firm seating.

4 - Breather hose

- ❑ To activated charcoal filter
- ❑ Ensure firm seating.

5 - Locking ring 110 Nm

- ❑ Ensure firm seating.
- ❑ Remove and install using fuel tank sender unit tool - 3087- .

6 - Fuel delivery unit

- ❑ Removing and installing ⇒ page 360
- ❑ Checking fuel pump ⇒ page 368 .
- ❑ Note installation position on fuel tank ⇒ page 300
- ❑ With fuel gauge sender - G-
- ❑ Removing and installing fuel gauge sender - G- ⇒ page 363
- ❑ Clean strainer if soiled

7 - Supply pipe

- ❑ black
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

8 - Flange on left side

- ❑ With fuel gauge sender 2 - G169- .
- ❑ With suction-jet pump
- ❑ With pressure limiting valve
- ❑ With fuel filter
- ❑ Removing and installing ⇒ page 366

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9 - 3.5 Nm

10 - Bracket for fuel pump control unit - J538-

11 - Fuel pump control unit - J538-

- ❑ Removing and installing ⇒ page 367

12 - Sealing ring

- ❑ Renew if damaged
- ❑ When installing, fit dry in fuel tank opening.
- ❑ Moisten with fuel only when installing flange.

13 - Fuel tank

- ❑ When removing, support using engine and gearbox jack - V.A.G 1383 A- .
- ❑ Removing and installing ⇒ page 304

14 - 25 Nm

- ❑ Renew
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening. Bolts ⇒ ETKA (Electronic parts catalogue) .

15 - Tensioning strap

- ❑ Observe installation position

16 - 25 Nm

- ❑ Renew

17 - Clamping washer

18 - Heat shield

19 - Breather hose

- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

20 - Breather hose

- ❑ Ensure firm seating.

21 - 8 Nm + 1/4 turn further (90°)

- ❑ Renew

22 - Tank flap unit

- ❑ With rubber cup.
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

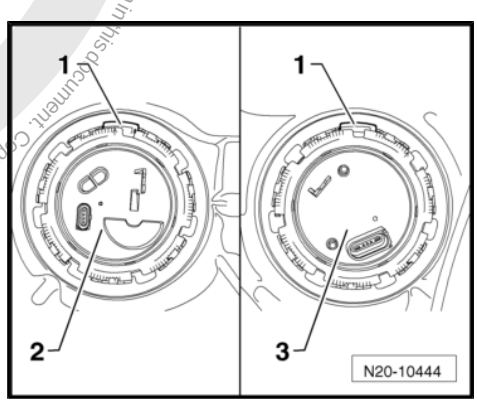
Installation position of flange for fuel delivery unit and fuel gauge sender 2 - G169-

Fuel delivery unit -3-:

The lug -1- points in direction of travel.

Fuel gauge sender 2 - G169- -2-:

The lug -1- points in direction of travel.



Note

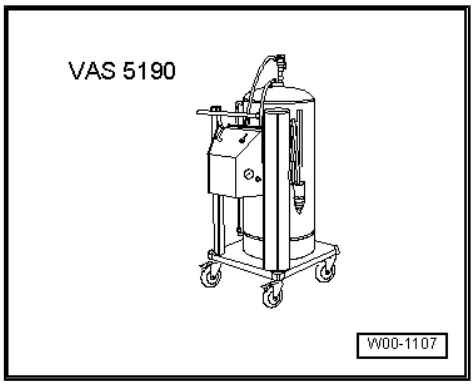
The arrows on the locking rings may be disregarded.

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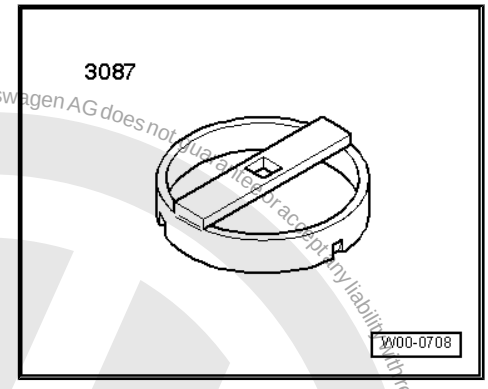
5.2 Emptying fuel tank

Special tools and workshop equipment required

- Fuel extraction unit - VAS 5190-



- Fuel tank sender unit tool - 3087-



- Torque wrench (40 to 200 Nm) - V.A.G 1332-

– Note safety precautions before beginning work ⇒ page 272 .

Emptying fuel tank with fuel pump intact ⇒ page 301 .

Emptying fuel tank if more than 3/4 full ⇒ page 303

Emptying fuel tank if less than 3/4 full ⇒ page 303

5.2.1 Emptying fuel tank when fuel pump is intact

Special tools and workshop equipment required

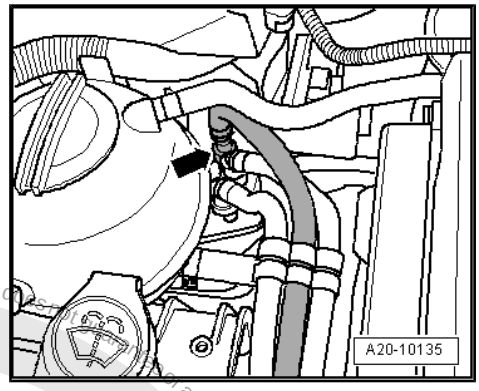
- Adapter for fuel extraction - VAS 5190 /3-
- Test instrument adapter/DSO (5-pin) -VAS 5565-
- Remote control - V.A.G 1348/3A-

WARNING

- *Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.*
- *Connect fuel extractor - VAS 5190- earth wire to vehicle earth.*

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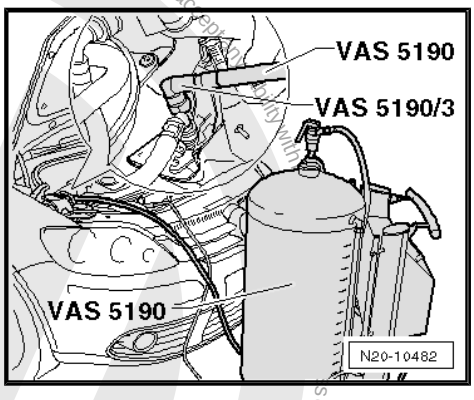
– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.



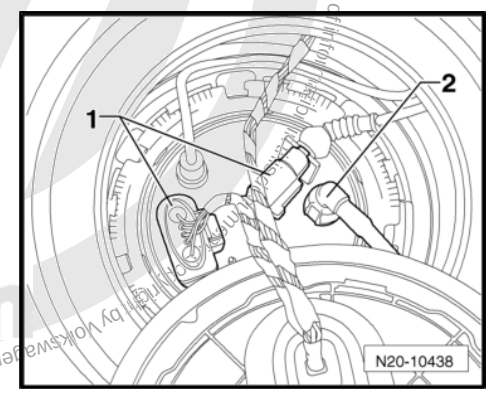
Note

Press in securing ring to release the fuel lines.

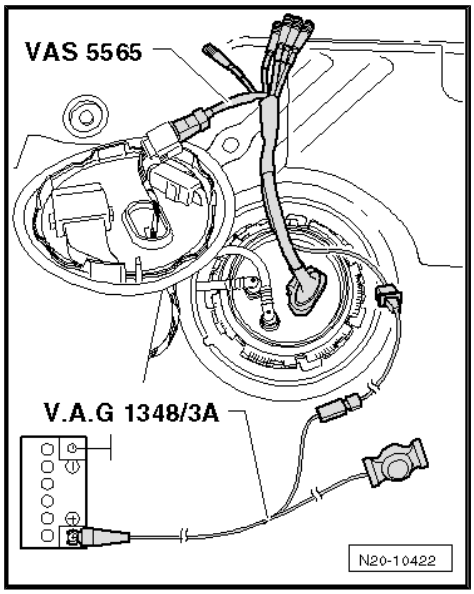
– Connect fuel extractor - VAS 5190- with adapter for fuel extractor - VAS 5190 /3- to fuel supply line.
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .
– Remove cover from fuel delivery unit.



– Pull 5-pin connector -1- off right flange (in direction of travel).



– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect remote control - V.A.G 1348/3A- to test instrument adapter/DSO (5-pin) - VAS 5565- and to battery positive (+).



Note

This step serves only to have the fuel pump running when the engine is stopped.

– Remove filler cap from fuel tank filler neck.
– Operate remote control - V.A.G 1348/3A- and shut-off tap on fuel extractor - VAS 5190- until fuel tank is empty.

Caution

Fuel pump must not run »dry«.

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5.2.2 Emptying fuel tank if it is more than 3/4 full

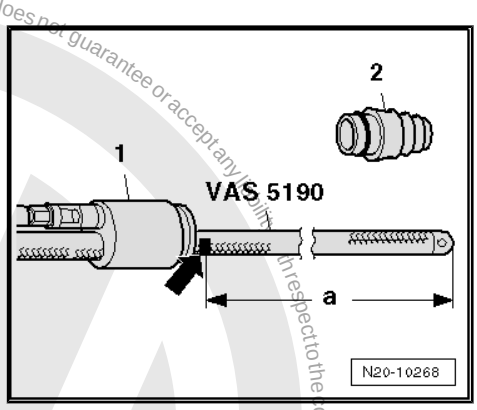
Caution

Secure earth wire of fuel extractor - VAS 5190- to a bare metal part of the body.

– Use insulating tape to mark the extraction hose -arrow- at a distance of -a- = 1200 mm from the end of the hose.

– Remove filler cap from fuel tank filler neck.

– Push extraction hose into fuel tank until marking on hose coincides with filler neck.



Note

- *The shaft piece -1- is not used.*
- *There is a flap on the lower end of the fuel filler neck in the fuel tank which must not be damaged by the extraction hose. Therefore, only push the hose in as far as the marking.*

– Drain fuel tank as much as possible through fuel filler neck.

– Carefully pull out extraction hose.

Note

- *When no more fuel is extracted, the tank is emptied just enough for the sender flange to be opened without danger. The tank may be removed while containing remaining fuel.*
- *Emptying the fuel tank completely ⇒ page 303 .*

5.2.3 Emptying fuel tank if it is less than 3/4 full

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove cover from fuel delivery unit.

WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

– Pull connector and fuel lines off flange.

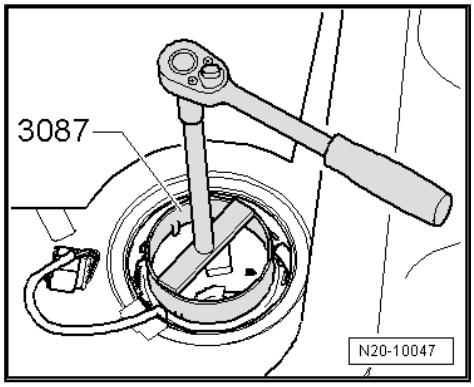
Note

Press buttons on hose couplings to do this.

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– Open locking ring using fuel tank sender wrench - 3087- .
– Raise fuel delivery unit.
– Insert extraction hose of fuel extractor - VAS 5190- as deeply as possible into fuel tank and extract fuel.

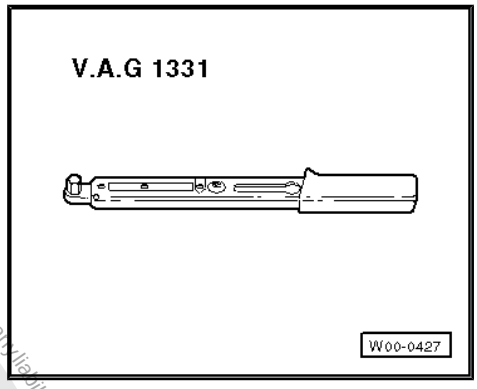
If fuel tank needed only to be emptied, install fuel delivery unit again ⇒ page 360 .



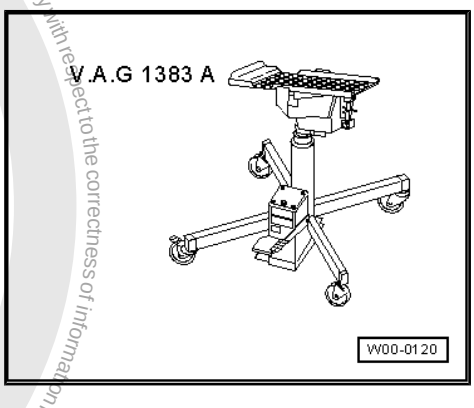
5.3 Removing and installing fuel tank

Special tools and workshop equipment required

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



♦ Engine and gearbox jack - V.A.G 1383 A-

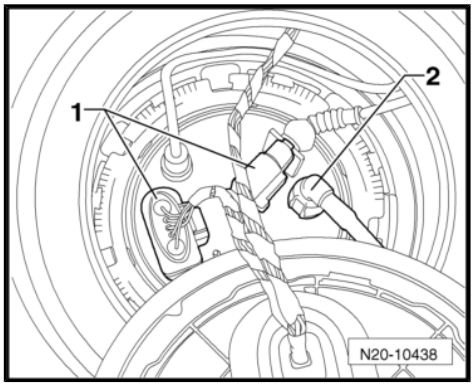


Removing

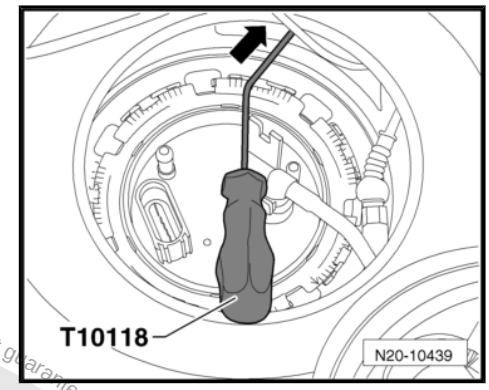
– Note safety precautions before beginning work ⇒ page 272 .
– First check whether a coded radio is fitted. If so, obtain anti-theft code.
– With the ignition switched off, disconnect battery earth strap.
– Unscrew securing bolts and remove tank flap unit.
– Drain fuel tank and clean fuel filler neck and surrounding area.
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .
– Remove cover from fuel delivery unit.

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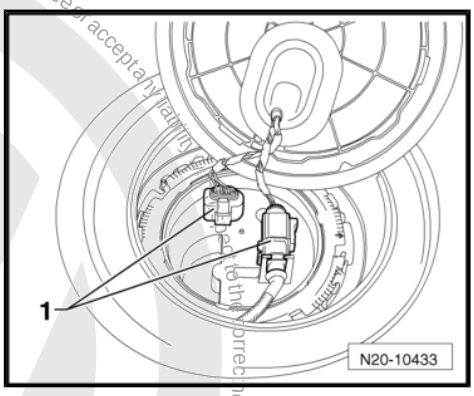
– Pull connector -1- and fuel line -2- off right flange (in direction of travel).



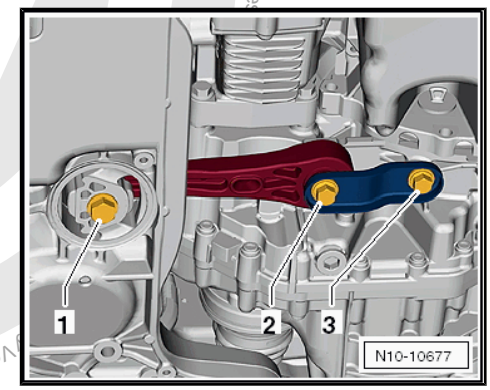
– Release connector -arrow- on fuel pump control unit - J538- using assembly tool - T10118- and pull it off.



– Pull connector -1- off left flange (in direction of travel).
– Remove rear exhaust system with centre and rear silencers.



– First, undo bolt -1- and then bolts -2…3- and remove pendulum support.
– Remove propshaft ⇒ Propshaft and rear final drive; Rep. gr. 39 ; Removing and installing propshaft .

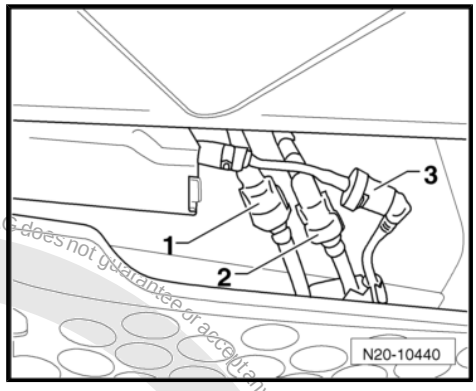


WARNING

Fuel supply lines are under pressure! Wear eye protection and gloves to avoid injuries and skin contact. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

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– Disconnect fuel line -1- (black) and breather line -2- (white) at connecting point.
– If an auxiliary heater is fitted, also separate fuel line -3-.



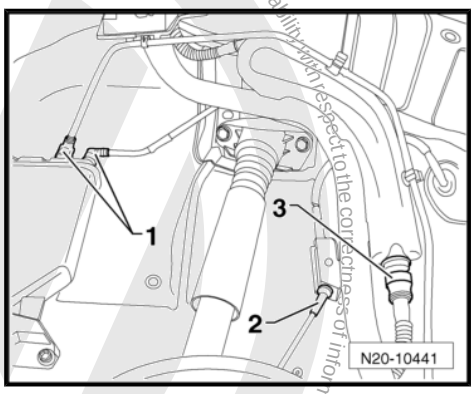
Note

Press in securing ring to release the fuel lines.

– Remove rear right wheel.
– Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

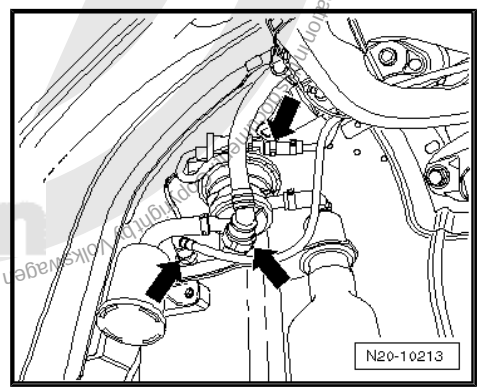
Engine codes BZB, CAWA, CAWB, CGYA:

– Disconnect breather lines -1- from activated charcoal filter and fuel filler neck -3-.
– Unclip wheel sensor wire -2- from retainer on filler neck.



Engine codes CBFA, CCTA, CCTB:

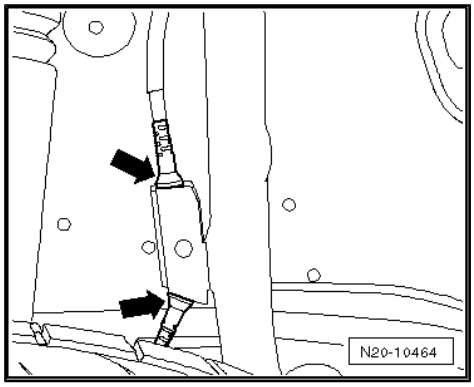
– Pull breather lines and vacuum line -arrows- off activated charcoal filter.



– Unclip wheel sensor wire -arrows- from retainer on filler neck.

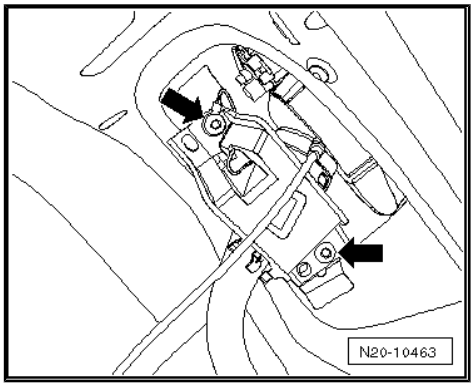
All:

– Remove tank flap and fuel tank filler neck cap.
– Disconnect earth cable at fuel filler neck.



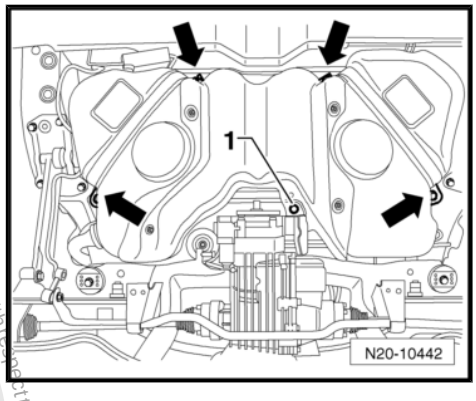
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– Unbolt filler neck from body -arrows-.



– Remove securing bolt -1-.

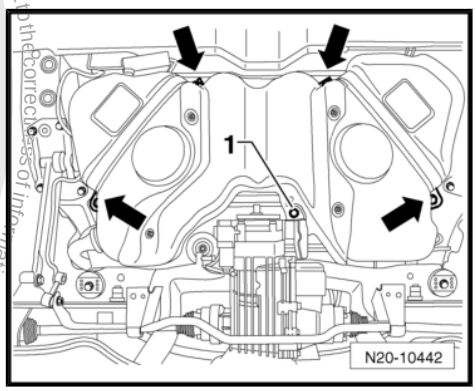
– Unscrew securing strap and securing bolts -arrows-. When doing this, support fuel tank with engine and gearbox jack - V.A.G 1383 A- .



Installing

– With the aid of a second mechanic, guide the filler neck in between rear axle and body. Then place fuel tank on engine and gearbox jack - V.A.G 1383 A- .

– Raise fuel tank slowly up to installation position and secure it in place.

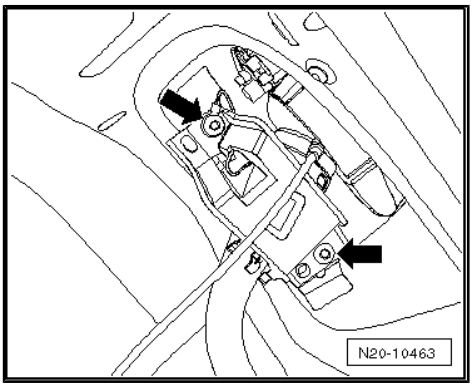


Note

To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening.

– Tighten the new bolts of the securing straps -arrows- and the new bolt -1- to 25 Nm.

– Tighten securing bolts -arrows- for fuel filler neck to 8 Nm + additional 1/4 (90°) turn.



Further installation is carried out in reverse order of removal. During this step, observe the following:

- Install breather lines and fuel lines free of kinks.
- Check earth connection on fuel tank and body to filler neck.
- Ensure that line connections are tight.
- After installing fuel tank, check that supply and breather lines are still clipped onto fuel tank.

– Fill fuel tank with at least 5 litres of fuel.

WARNING

Risk of explosion of fuel tank. If a new or completely empty fuel tank has been installed, it must be filled immediately with at least 5 litres of fuel. The fuel pump must not be allowed to run when the fuel tank is empty.

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6 Fuel tank (Eos)

Safety precautions when working on fuel supply system ⇒ page 272 .

Comply with rules for cleanliness ⇒ page 274 .

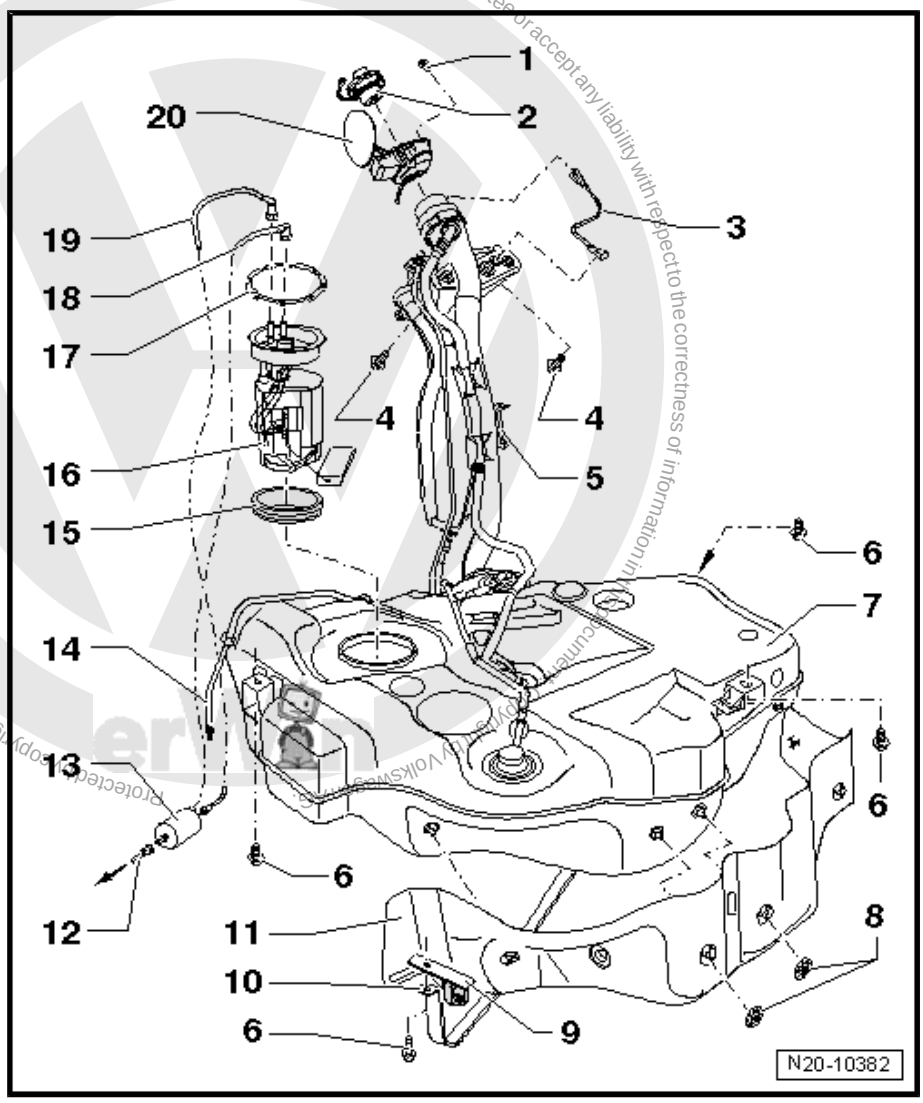
Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB) ⇒ page 310 .

Assembly overview - fuel tank (engine codes CAWA, CAWB, CCZA, CCZB) ⇒ page 308 .

Drain fuel tank ⇒ page 312 .

Removing and installing fuel tank ⇒ page 316 .

6.1 Assembly overview - fuel tank (engine codes CAWA, CAWB, CCZA, CCZB)



1 - Securing bolt

2 - Cap

- ❑ Renew if damaged

3 - Earth connection

- ❑ Ensure firm seating.

4 - 10 Nm

5 - Cable bracket

6 - 25 Nm

- ❑ Renew
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening.

7 - Fuel tank

- ❑ When removing, support using engine and gearbox jack - V.A.G 1383 A- .
- ❑ Removing and installing ⇒ page 316

8 - Clamping washer

9 - Exhaust system retainer

10 - Tensioning strap

- ❑ Observe installation position
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening.

11 - Heat shield

12 - Supply pipe

- ❑ To fuel rail
- ❑ Ensure firm seating.

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13 - fuel filter.

- ❑ Fitting position ⇒ page 310
- ❑ Arrow points in direction of flow.

14 - Breather hose

- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

15 - Sealing ring

- ❑ Renew
- ❑ When installing, fit dry in fuel tank opening.
- ❑ Moisten with fuel only when installing flange.

16 - Fuel delivery unit

- ❑ Removing and installing ⇒ page 340
- ❑ Checking fuel pump ⇒ page 344 .
- ❑ Note installation position on fuel tank ⇒ page 309
- ❑ With fuel gauge sender - G-
- ❑ Removing and installing fuel gauge sender - G- ⇒ page 348
- ❑ Clean strainer if soiled

17 - Locking ring 110 Nm

- ❑ Ensure firm seating.
- ❑ Remove and install using wrench - T10202- .

18 - Supply pipe

- ❑ black
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

19 - Return line

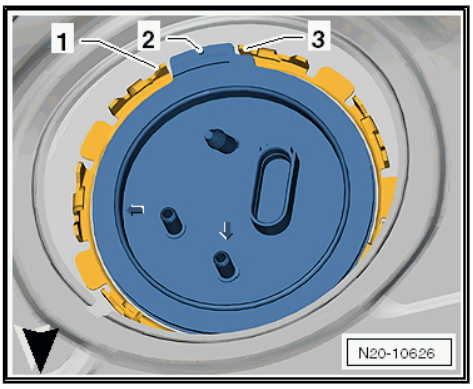
- ❑ blue
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

20 - Tank flap unit

- ❑ With rubber cup.
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

Installation position of fuel delivery unit

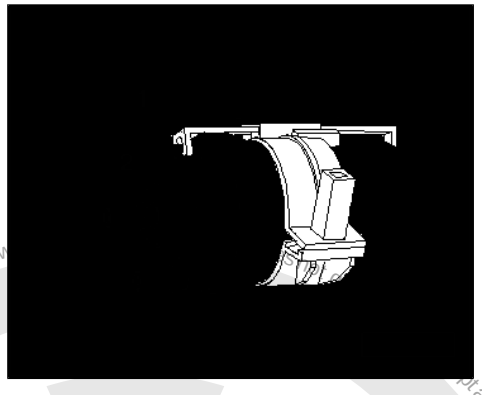
- Tab -2- on flange must be between lugs -1- and -3- on fuel tank.
- -Arrow- points in direction of travel.



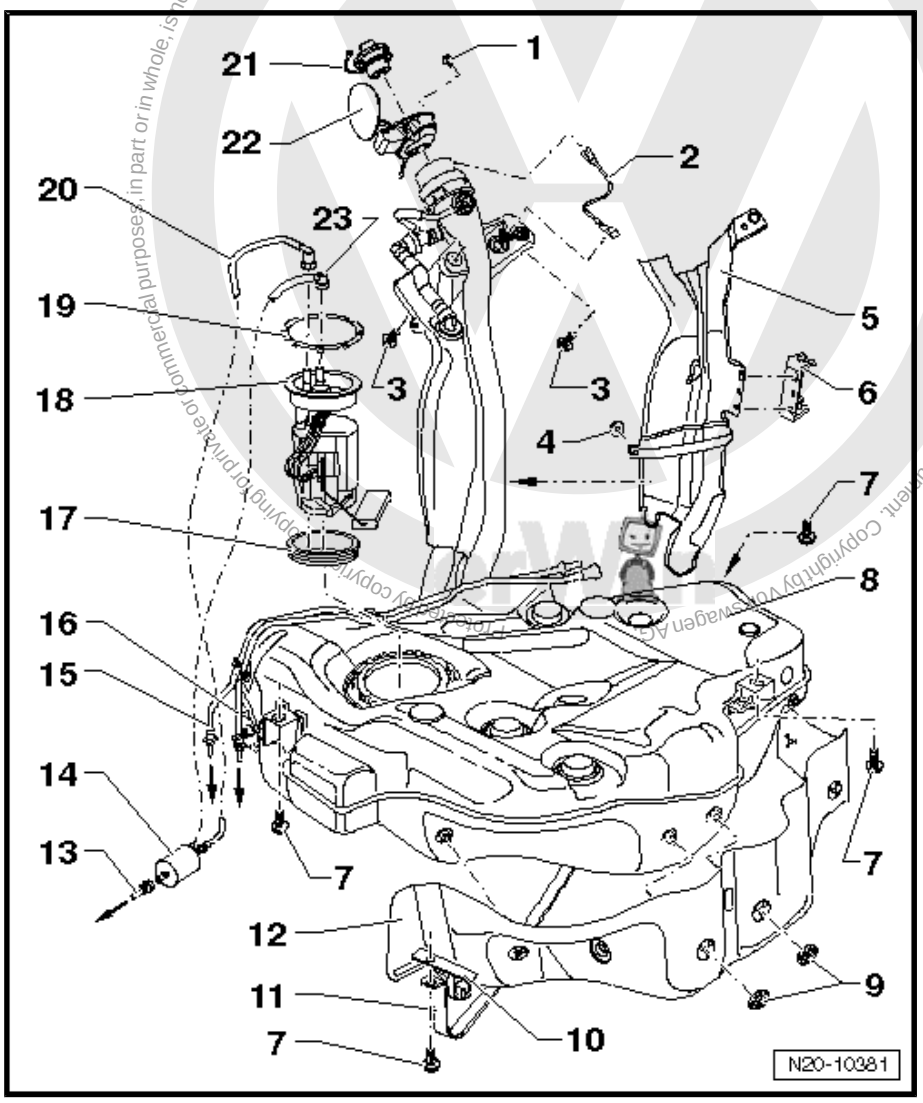
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Location of fuel filter

Pin -2- on filter housing must engage in notch of guide -1- on filter bracket.



6.2 Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB)



1 - Securing bolt

2 - Earth connection

- ❑ Ensure firm seating.

3 - 11 Nm

4 - Rivet

5 - Protective plate

- ❑ Riveted as standard to bottom clamp
- ❑ When replacing fuel tank, hold protective plate against filler pipe and rivet to clamp

6 - Cable bracket

- ❑ Clipped onto protective plate

7 - 25 Nm

- ❑ Renew
- ❑ To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening.

8 - Fuel tank

- ❑ When removing, support using engine and gearbox jack - V.A.G 1383 A- .
- ❑ Removing and installing ⇒ page 317

9 - Clamping washer

10 - Exhaust system retainer

11 - Tensioning strap

- ❑ Observe installation position

12 - Heat shield

13 - Supply pipe

- ❑ To fuel rail

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14 - fuel filter.

- ❑ Fitting position ⇒ page 312
- ❑ Arrow points in direction of flow.

15 - Vacuum line

- ❑ green
- ❑ From fuel system diagnostic pump - V144- to intake manifold.
- ❑ Clipped onto fuel tank.
- ❑ Ensure firm seating.

16 - Breather hose

- ❑ white
- ❑ From activated charcoal filter to activated charcoal filter solenoid valve 1 - N80-
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

17 - Sealing ring

- ❑ Renew
- ❑ When installing, fit dry in fuel tank opening.
- ❑ Only when installing, moisten inside of flange with fuel

18 - Fuel delivery unit

- ❑ Removing and installing ⇒ page 340
- ❑ Checking fuel pump ⇒ page 344 .
- ❑ Note installation position on fuel tank ⇒ page 312
- ❑ With fuel gauge sender - G-
- ❑ Removing and installing fuel gauge sender - G- ⇒ page 343
- ❑ Clean strainer if soiled

19 - Locking ring 110 Nm

- ❑ Ensure firm seating.
- ❑ Remove and install using wrench - T10202- .

20 - Return line

- ❑ blue
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

21 - Cap

- ❑ Renew if damaged

22 - Tank flap unit

- ❑ With rubber cup.
- ❑ Removing and installing ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit; Removing and installing fuel tank flap unit .

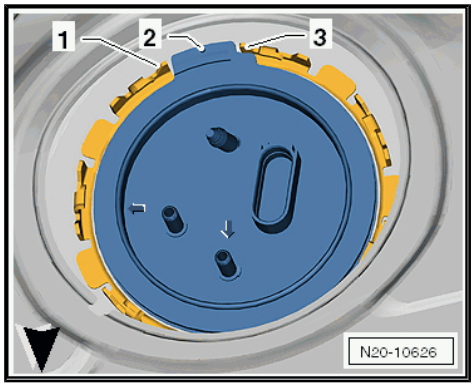
23 - Supply pipe

- ❑ black
- ❑ Clipped onto side of fuel tank.
- ❑ Ensure firm seating.

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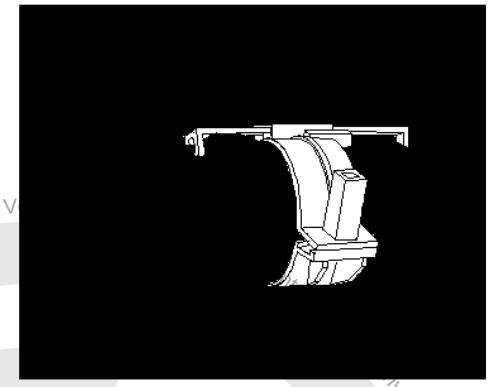
Installation position of fuel delivery unit

- Tab -2- on flange must be between lugs -1- and -3- on fuel tank.
- -Arrow- points in direction of travel.



Location of fuel filter

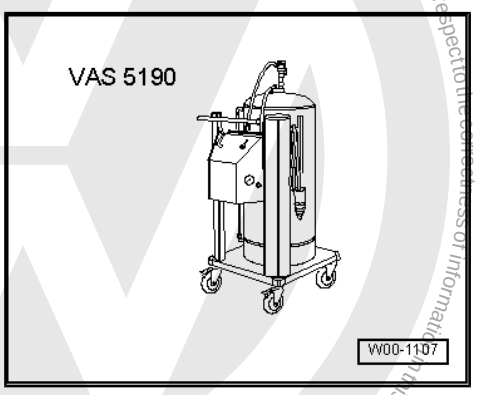
Pin -2- on filter housing must engage in notch of guide -1- on filter bracket.



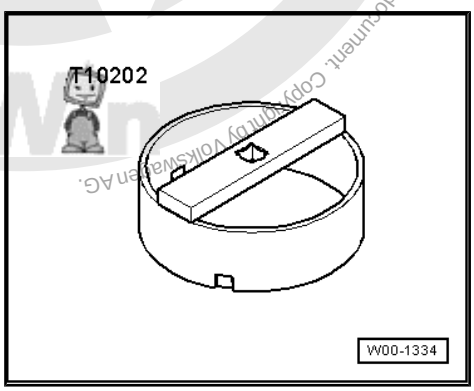
6.3 Emptying fuel tank

Special tools and workshop equipment required

♦ Fuel extraction unit - VAS 5190-



♦ Special wrench - T10202-



♦ Torque wrench (40 to 200 Nm) - V.A.G 1332-

– Note safety precautions before beginning work ⇒ page 272 .

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Emptying fuel tank with fuel pump intact ⇒ page 313 .

Emptying fuel tank if more than 3/4 full ⇒ page 314

Emptying fuel tank if less than 3/4 full ⇒ page 315

6.3.1 Emptying fuel tank when fuel pump is intact

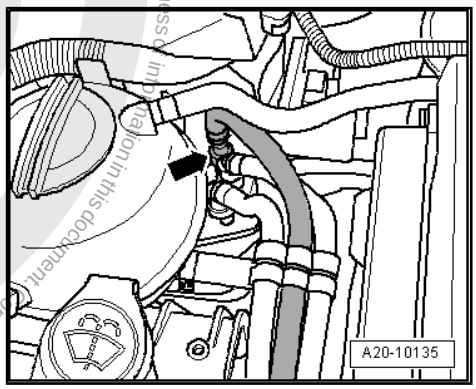
Special tools and workshop equipment required

- Adapter for fuel extraction - VAS 5190 /3-
- Test instrument adapter/DSO (5-pin) - VAS 5565-
- Remote control - V.A.G 1348/3A-

WARNING

- *Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.*
- *Connect fuel extractor - VAS 5190- earth wire to vehicle earth.*

– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.

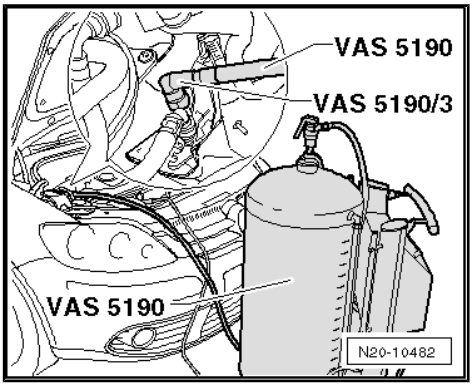


Note

Press in securing ring to release the fuel lines.

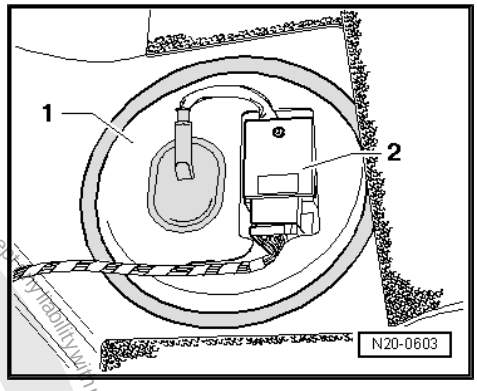
– Connect fuel extractor - VAS 5190- with adapter for fuel extractor - VAS 5190 /3- to fuel supply line.

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

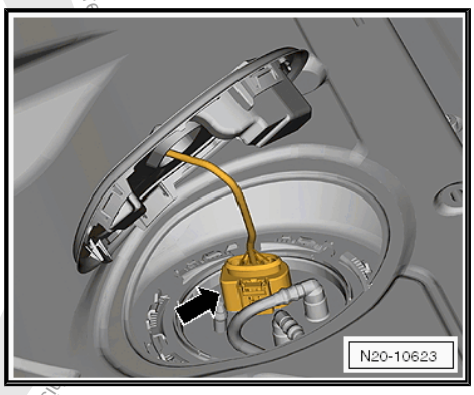


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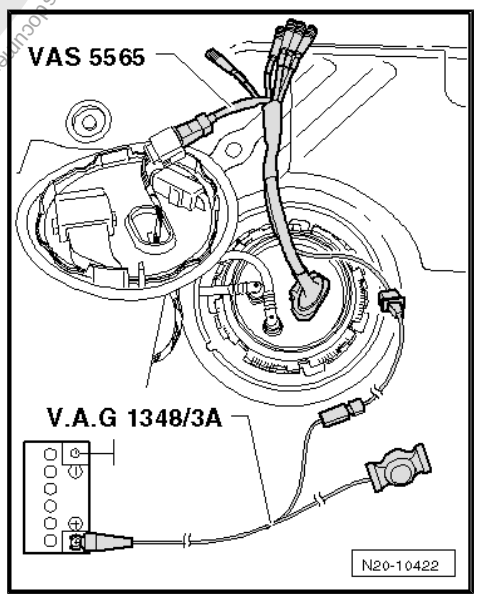
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– Unplug connector -arrow-.



– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect remote control - V.A.G 1348/3A- to test instrument adapter/DSO (5-pin) - VAS 5565- and to battery positive (+).



Note

This step serves only to have the fuel pump running when the engine is stopped.

– Remove filler cap from fuel tank filler neck.
– Operate remote control - V.A.G 1348/3A- and shut-off tap on fuel extractor - VAS 5190- until fuel tank is empty.

Caution

Fuel pump must not run »dry«.

6.3.2 Emptying fuel tank if it is more than ³/₄ full

Caution

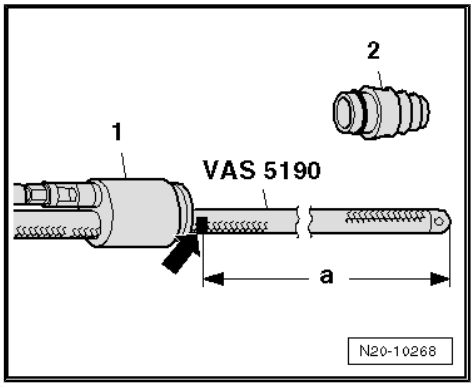
Secure earth wire of fuel extractor - VAS 5190- to a bare metal part of the body.

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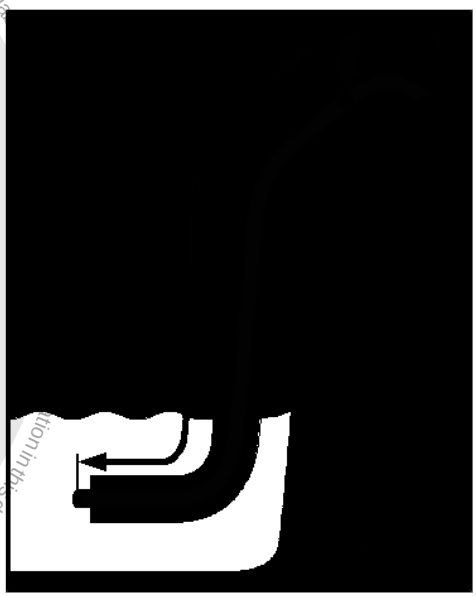
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– Remove cotter -2- from shaft -1- of fuel extractor - VAS 5190- .

– At a distance of -a- = 820mm from the end of the hose, mark extraction hose with insulating tape -arrow-.



– Push extraction hose into fuel tank until marking -arrow- on hose coincides with filler neck.



Note

A ball valve is located at the lower end of filler neck in fuel tank, which must not be damaged by the extraction hose -1-. Therefore push hose into filler neck only as far as marking -arrow-.

– Empty fuel tank as far as possible.

– Carefully pull out extraction hose.

Note

- *When no more fuel is extracted, the tank is emptied just enough for the sender flange to be opened without danger.*
- *If the fuel tank has to be drained fully, proceed as follows:* *⇒ page 315* .

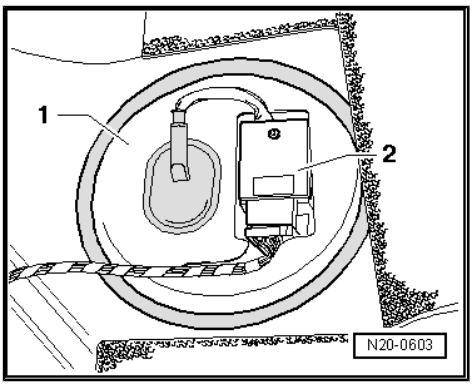
6.3.3 Emptying fuel tank if it is less than 3/4 full

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.

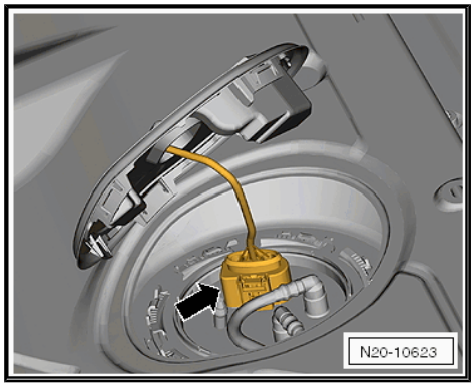
WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

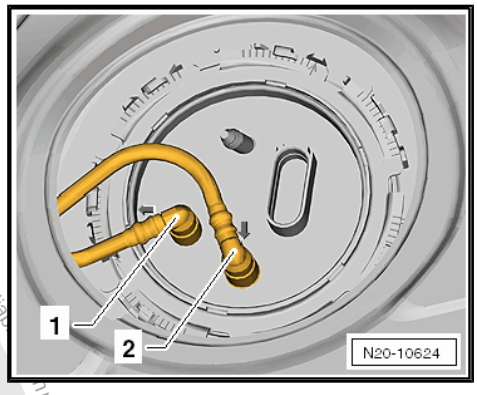


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– Unplug connector -arrow-.



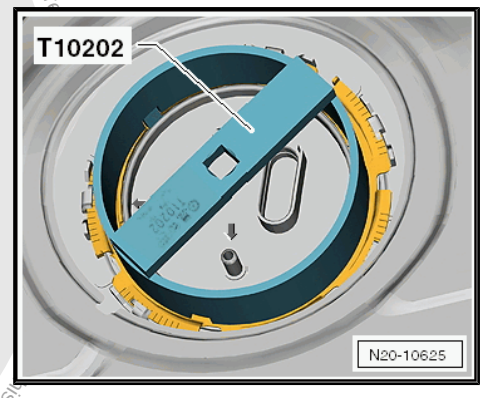
– Pull fuel lines -1- and -2- off the flange.



Note

- *Press in securing ring to release the fuel lines.*
- *On vehicles with auxiliary heater, the connector and the fuel line of the metering pump - V54- must also be disconnected.*

– Open locking ring using key - T10202- and raise flange slightly.



Caution

Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.

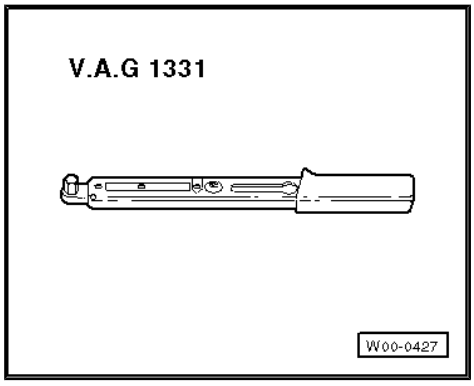
– Insert extraction hose of fuel extractor - VAS 5190- as deeply as possible into fuel tank and extract fuel.

If fuel tank needed only to be emptied, reinstall sender flange ⇒ page 340 .

6.4 Removing and installing fuel tank

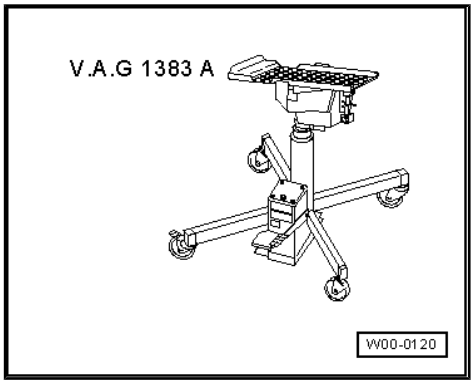
Special tools and workshop equipment required

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



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♦ Engine and gearbox jack - V.A.G 1383 A-



Remove fuel tank ⇒ page 317 .

Install fuel tank ⇒ page 319 .

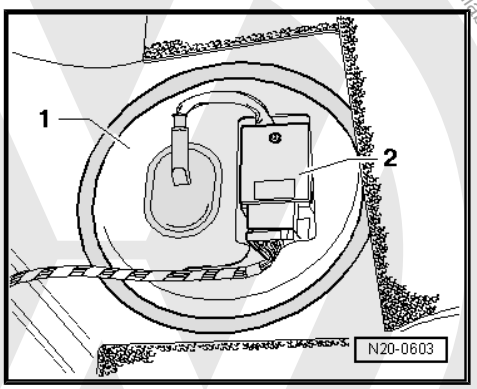
6.4.1 Removing

– Note safety precautions before beginning work ⇒ page 272 .

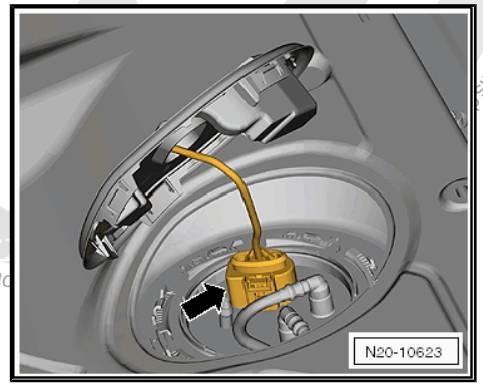
– If necessary, empty fuel tank using fuel extractor - VAS 5190- ⇒ page 312 .

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– Unplug connector -arrow-.



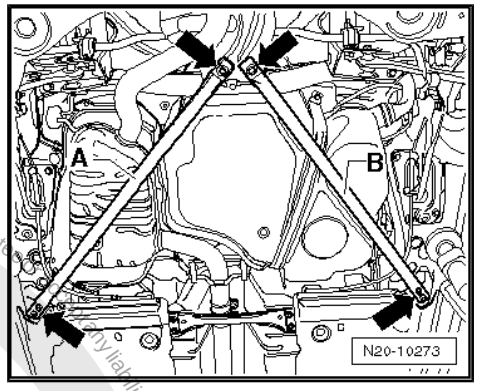
Note

For vehicles with auxiliary heater the metering pump - V54- connector must be separated additionally.

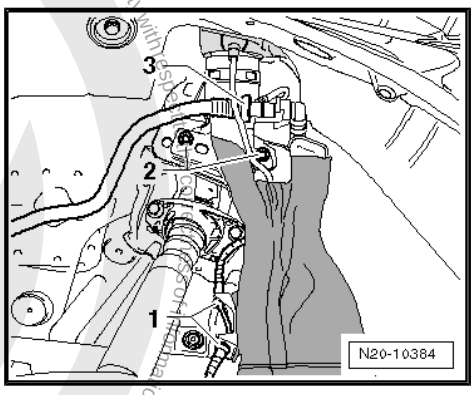
– Unscrew tank flap unit securing bolt and remove tank flap unit ⇒ General body repairs, exterior; Rep. gr. 55 ; Tank flap unit .

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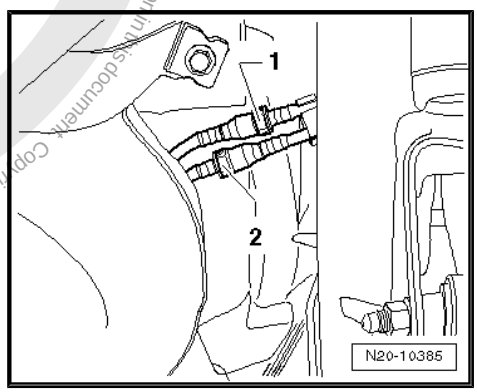
– Remove stiffener braces -A and B- ⇒ Running gear; Rep. gr. 42 ; Removing and installing stiffener braces .
– Remove centre and rear silencers.
– Remove heat shield for centre silencer.
– Remove rear right wheel.
– Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Removing and installing wheel housing liner; Rear wheel housing liner .



– Unclip wire from filler neck -1-.
– Separate breather line -3- (only engine code CBFA, CCTA, CCTB).
– Unbolt filler neck from body -2-.



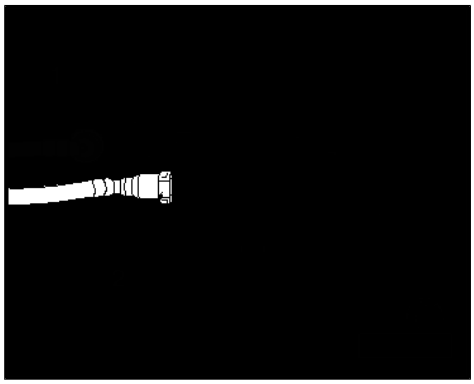
– Detach breather line -1- (white) behind fuel tank. Push in retaining ring to do this.
– Engine codes CBFA, CCTA, CCTB: Detach vacuum line -2- (green) for the fuel system diagnostic pump - V144- behind fuel tank. Push in retaining ring to do this.



WARNING

The fuel system is pressurised! Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

– Disconnect breather line -1- (white) and fuel line -2- (black) at connecting point.

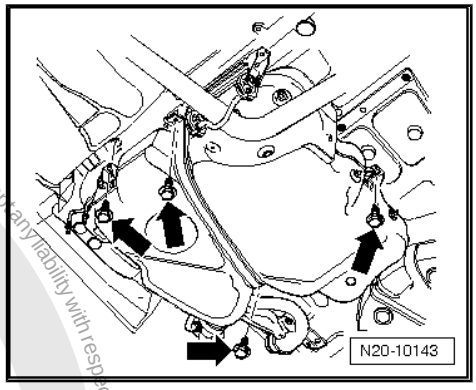


Note

- *Press in securing ring to release the fuel lines.*
- *Vehicles with auxiliary heater, the fuel line of the metering pump - V54- must also be separated.*
- *On vehicles with engine code CBFA, CCTA, CCTB, the vacuum line (green) of fuel system diagnostic pump - V144- must also be separated.*

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– Remove securing strap and securing bolts -arrows-. When doing this, support fuel tank with engine and gearbox jack - V.A.G 1383 A- .
– Carefully lower fuel tank.



6.4.2 Installing fuel tank

Install in reverse order of removal. During this step, observe the following:

- To secure the securing straps for the fuel tank, only bolts with loose washers must be used. If different bolts are used, the securing straps might twist during tightening.
- Install breather lines and fuel lines free of kinks.
- Do not interchange supply line and return line (return line blue, supply line black).
- Ensure that line connections are tight.
- Check earth connection on fuel tank and body to filler neck.

– Fill fuel tank with at least 5 litres of fuel.

WARNING

Risk of explosion of fuel tank. If a new or completely empty fuel tank has been installed, it must be filled immediately with at least 5 litres of fuel. The fuel pump must not be allowed to run when the fuel tank is empty.

– Install stiffener braces ⇒ Running gear; Rep. gr. 42 ; Removing and installing stiffener braces .

Specified torques:

Component	Nm
Fuel tank to body - M6 bolts	10
Fuel tank to body - M8 bolts	25[1)]

1) Renew

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7 Repairing fuel supply (Passat, CC)

Note

- *Fuel hoses on the engine must only be secured with spring-type clips which conform to the production standard.*
- *Spring-type clip pliers - VAS 6499- or space saving hose clip pliers - VAS 6362- are recommended for installation/removal of spring-type clips.*

Safety precautions when working on fuel supply system ⇒ page 272 .

Comply with rules for cleanliness ⇒ page 274

Removing and installing fuel delivery unit ⇒ page 320 .

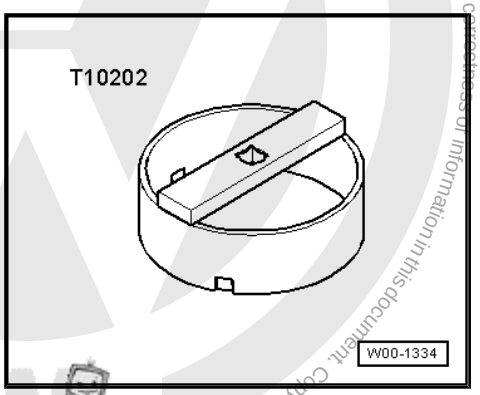
Removing and installing fuel gauge sender - G- ⇒ page 324 .

Check fuel pump ⇒ page 325 .

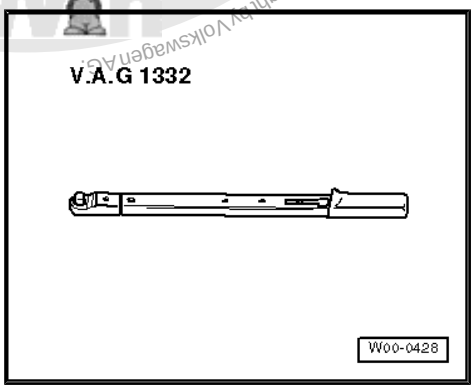
7.1 Removing and installing fuel delivery unit

Special tools and workshop equipment required

- Special wrench - T10202-



- Torque wrench (40 to 200 Nm) - V.A.G 1332-



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Remove fuel delivery unit:

Caution

Condition:

- *Fuel tank must not be more than 3/4 full. This ensures that the fill level is below the flange of the fuel delivery unit.*

Procedure:

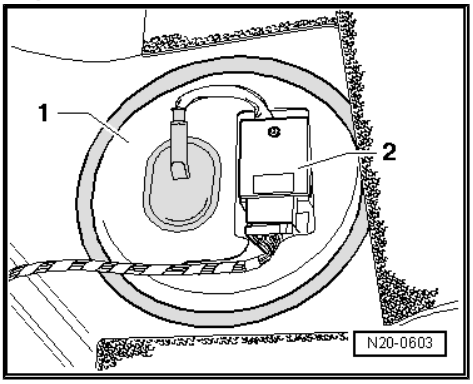
Note

- *When replacing fuel delivery unit, check fuel tank for heavy soiling and clean if necessary.*
- *Note safety precautions before beginning work ⇒ page 272 .*
- *Observe rules for cleanliness ⇒ page 274 .*
- *Assembly overview - fuel tank ⇒ page 275 .*

– If necessary, empty fuel tank using fuel extractor - VAS 5190- ⇒ page 277 .

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

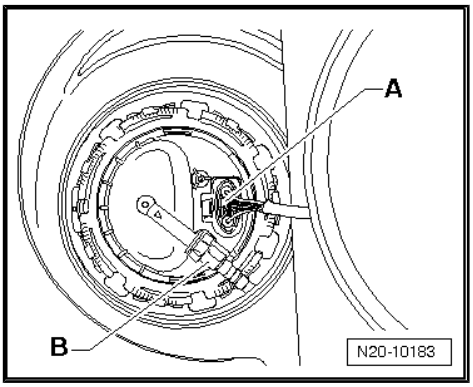
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that connector -A- is securely seated by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

– Now pull off connector.

– Check the contacts on the connector and on the fuel delivery unit for damage.

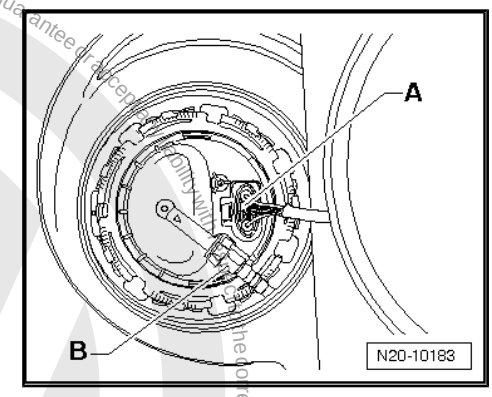


WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

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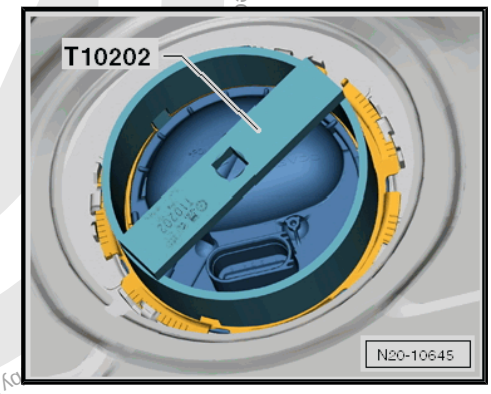
– Pull fuel line -B- off flange.



Note

- *Press in securing ring to release fuel line.*
- *On vehicles with auxiliary heater, the connector and the fuel line of the metering pump - V54- must also be disconnected.*

– Open locking ring using key - T10202- .

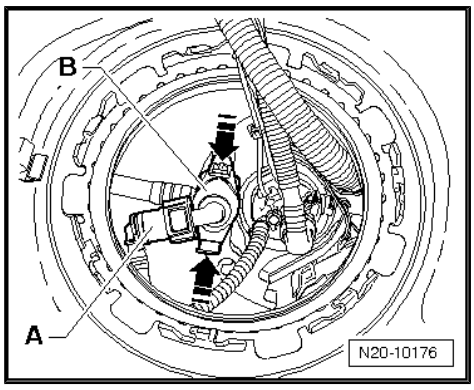


Caution

Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.

– Lift flange.

– Separate coupling -A- and remove suction-jet pump -B-. Do this by pressing lugs -arrows- together.



Note

Press in safety ring of coupling -A- to release fuel line.

– Pull seal and fuel delivery unit out of opening of fuel tank.

Note

- *If delivery unit is to be renewed, drain old delivery unit before disposal.*
- *Observe disposal regulations!*

Install fuel delivery unit:

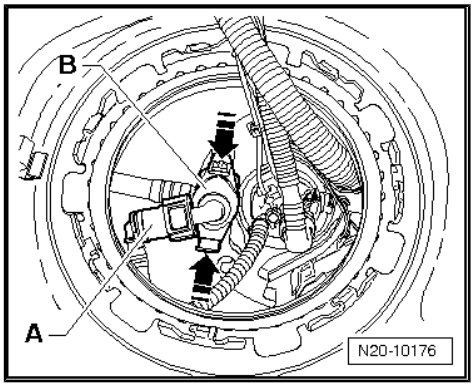
Caution

Do not bend float arm of fuel gauge sender - G- when installing.

– Insert fuel delivery unit (without suction-jet pump) into fuel tank.

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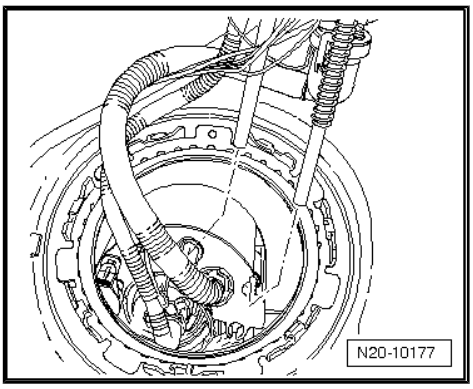
– Install suction-jet pump -B- and reconnect coupling -A-. Check coupling is secured properly by pulling.



– Push flange onto fuel delivery unit.

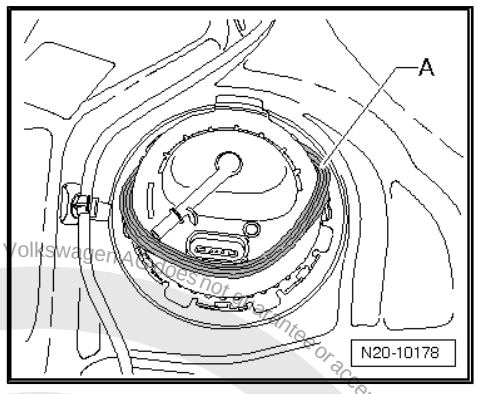
Note

Ensure hoses are secured correctly.



– Now pull seal -A- over the flange and seat it in the opening of the fuel tank.

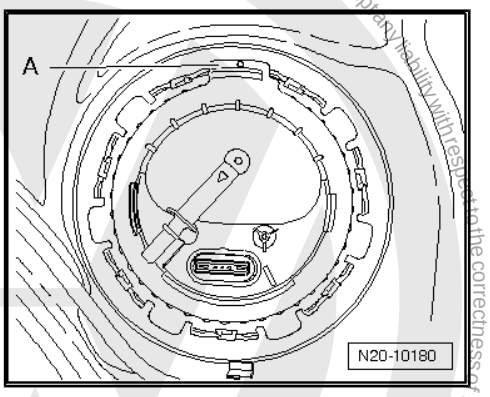
– Moisten seal lightly with fuel and push flange into fuel tank.



– Observe installation position: Marking -A- points towards rear of vehicle.

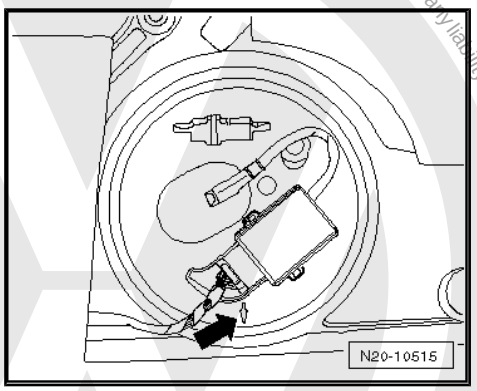
– Tighten locking ring using wrench -T10202- . Torque setting ⇒ Item 16 (page 276) .

The remaining installation steps are carried out in the reverse order of removal. During this step, observe the following:



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- The -arrow- on the cover points forwards.
- Fuel lines are to be installed free of kinks.
- Ensure wiring/line connections are secured properly by pulling back.



7.2 Removing and installing fuel gauge sender - G-

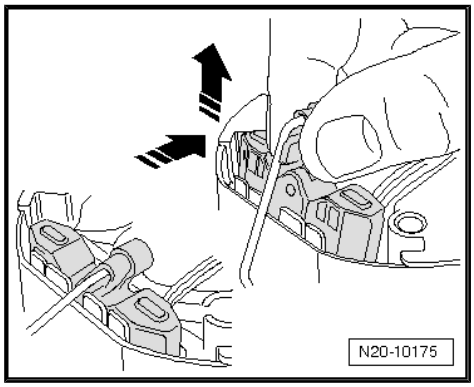
Note

- *Note safety precautions before beginning work* ⇒ page 272 .
- *Observe rules for cleanliness* ⇒ page 274 .
- *Assembly overview - fuel tank* ⇒ page 275 .

Removing fuel gauge sender

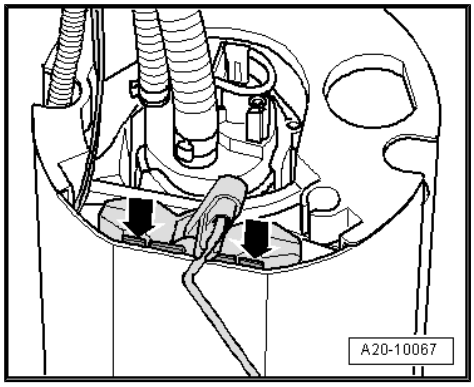
– Remove fuel delivery unit ⇒ page 320 .

– Pull fuel gauge sender - G- slightly to side and upwards at the same time.



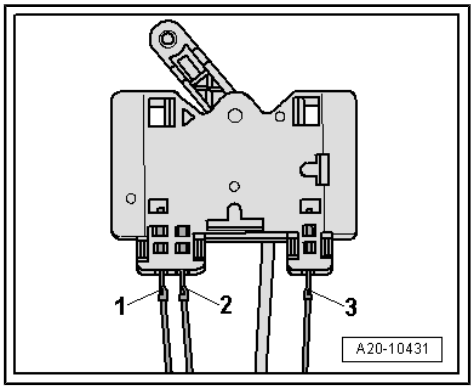
– If the sender cannot be released in this way, the retaining tabs -arrows- must also be pushed to the side slightly.

– Note colour co-ordination of cables for reinstallation.



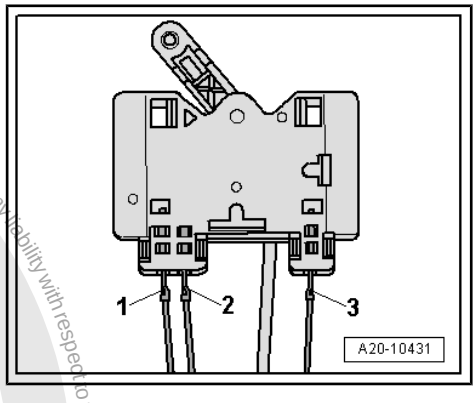
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– Release electrical connectors -1 to 3- and pull them off. Then bend back locking lugs of connectors.



Installing:

– Connect connectors -1…3-. Observe colour co-ordination.



– Check connectors are secured properly by pulling.
– Insert fuel gauge sender - G- into guide on fuel delivery unit and press down until it engages.
– Install fuel delivery unit ⇒ page 322 .

7.3 Checking fuel pump

Note

When replacing fuel delivery unit, check fuel tank for heavy soiling and clean if necessary.

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Special tools and workshop equipment required

- Pressure gauge - VAS 6550-
- Remote control - V.A.G 1348/3A-
- Test instrument adapter/ DSO (5-pin) - VAS 5565-
- Multimeter - V.A.G 1715-
- Special wrench - T10202-
- Measuring container, capacity at least 3 litres



7.3.1 Checking function and voltage supply

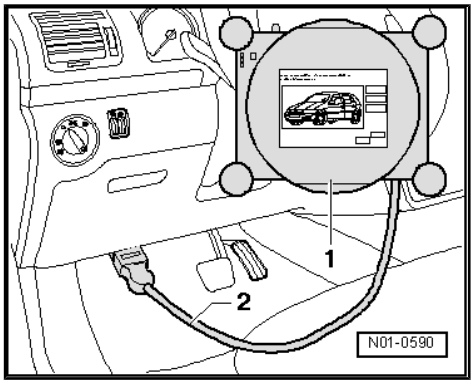
- Battery voltage at least 11.5 V.
- Fuse for fuel pump on fuse holder OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fuel pump control unit - J538- OK.

Note

- *Function of fuel pump is checked using final control diagnosis.*
- *If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.*

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– Connect vehicle diagnostic tester as follows:
– Push diagnosis cable connector onto diagnosis connection in driver footwell.
– Switch ignition on.
– Press buttons on display one after the other for `Vehicle self-diagnosis`, `Engine electronics` and `Final control diagnosis`.
– Press right arrow button ▶ on display up to final control diagnosis for fuel pump electronics.



The fuel pump must now run slowly up to maximum speed.

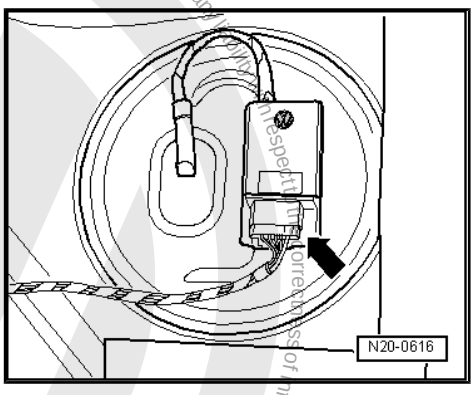
Note

The fuel pump runs very quietly.

– Switch off ignition.

If fuel pump does not run:

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .
– Pull connector off fuel pump control unit - J538- .



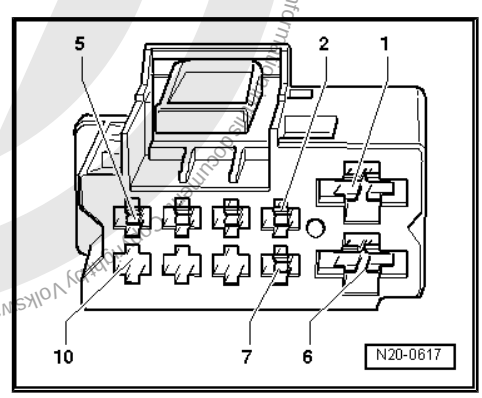
– Check voltage supply between contacts -1- and -6- using multimeter - V.A.G 1715- .

• Specification: approx. battery voltage

Voltage supply not OK:

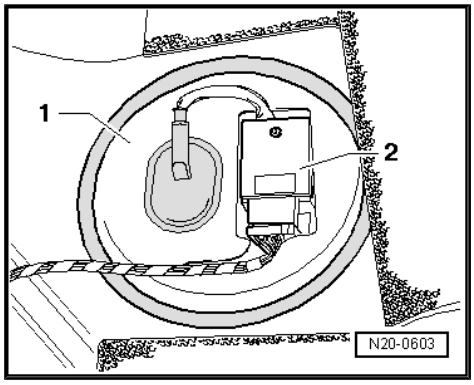
– Locate and eliminate open circuit referring to current flow diagram ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Voltage supply OK:

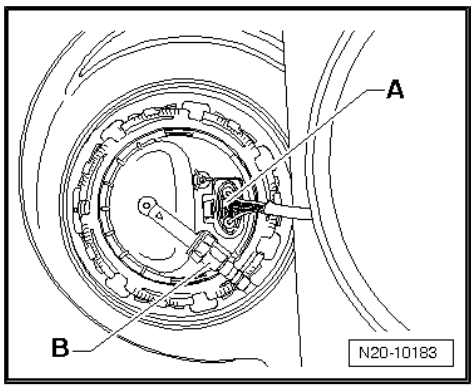


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– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



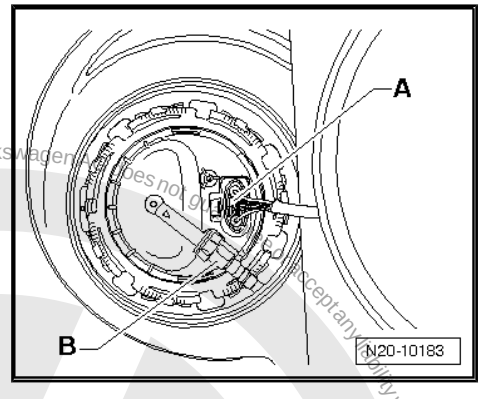
– First check that connector -A- is securely seated by pulling the connector without pressing the catch. If connector was not inserted correctly, repeat functional check of fuel pump.
– Now pull off connector.
– Check the contacts on the connector and on the fuel delivery unit for damage.



WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

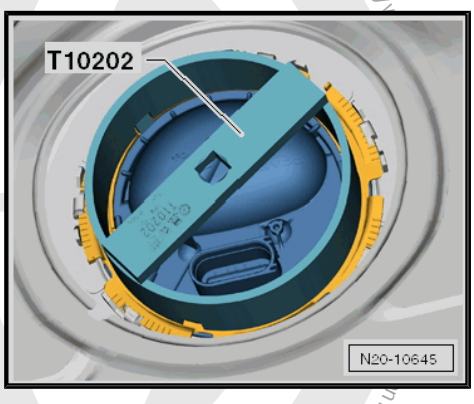
– Pull off fuel line -B- from the flange.



Note

- *Press in securing ring to release fuel line.*
- *On vehicles with auxiliary heater, the connector and the fuel line of the metering pump - V54- must also be disconnected.*

– Open locking ring using key - T10202- .



Caution

Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.

– Check that electrical wires between flange and fuel pump are connected.

If no open circuit can be found:

– Fuel pump defective, renew fuel delivery unit ⇒ page 320 .

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7.3.2 Checking fuel pressure

Test conditions:

- Function of fuel pump has been checked ⇒ page 326 .

Test sequence

Note

- *The fuel pressure must be checked by means of the final control diagnosis. If the fuel pressure is measured at idling speed, it may deviate from the specification.*
- *If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.*

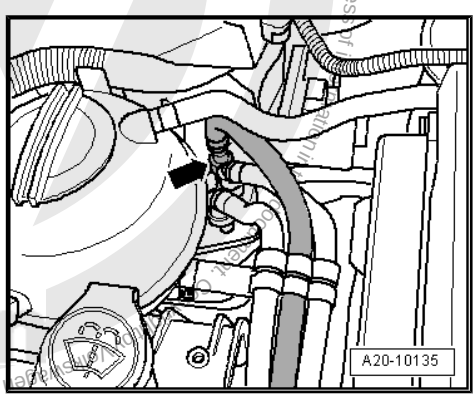
Note safety precautions before beginning work ⇒ page 272 .

– Observe rules for cleanliness ⇒ page 274 .

WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.

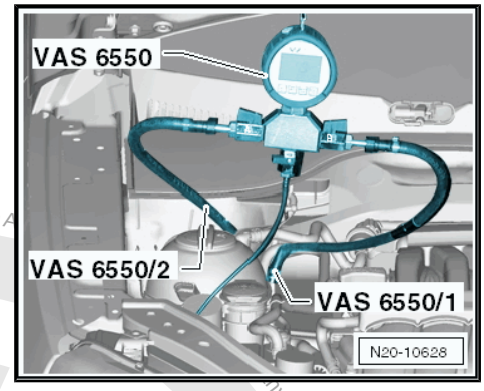


Note

Press in securing ring to release fuel line.

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– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/1- and -VAS 6550/2- .
– Make sure that drain tap is closed and cut-off taps are open.
– Actuate fuel pump with final control diagnosis to build up fuel pressure.
– Read fuel pressure on pressure gauge.
• Specification: 4.0 to 7.0 bar



If fuel pressure is OK, check holding pressure ⇒ page 332 .

If the specification is exceeded:

– Pressure limiting valve in flange defective, renew flange with fuel filter ⇒ Item 15 (page 276) .

If specification is not obtained

– Check fuel lines for possible restrictions (kinks) or blockages.

If no fault is found:

– Renew flange with fuel filter and pressure limiting valve ⇒ Item 15 (page 276) .
– Repeat check.

If reading again does not match specification:

– Fuel pump defective, renew fuel delivery unit ⇒ page 320 .

7.3.3 Checking fuel pressure when the engine is running (engine codes CCZA, CCZB, CDAA, CDAB)

Note

♦ *If a complaint is made about the vehicle's performance, the reason may be that the fuel pressure is too low. Faults in the high-pressure section may also be caused by inadequate fuel pressure in the low-pressure section. This check determines the fuel pressure in the high-pressure and low-pressure sections during a road test. Fuel pressure in the high-pressure section is read from the engine control unit. The lowest fuel pressure is measured by the pressure tester - VAS 6550- and reported to the vehicle diagnosis and service information system - VAS 5052 B- .*

♦ *This test can be part of "Guided Fault Finding" if an entry has been made in the event memory. However, it can also be started in the vehicle diagnosis and service information system - VAS 5052 B- by means of "Functions and component selection".*

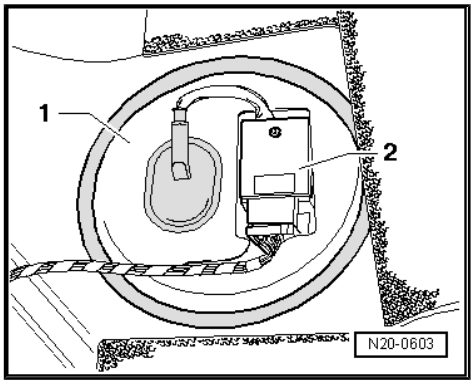
Special tools and workshop equipment required

♦ Pressure gauge - VAS 6550-
♦ Hose adapters - VAS 6550/1- and -VAS 6550/2-
♦ Vehicle diagnosis and service information system - VAS 5052 B-
♦ Connector cable - VAS 5051/66-

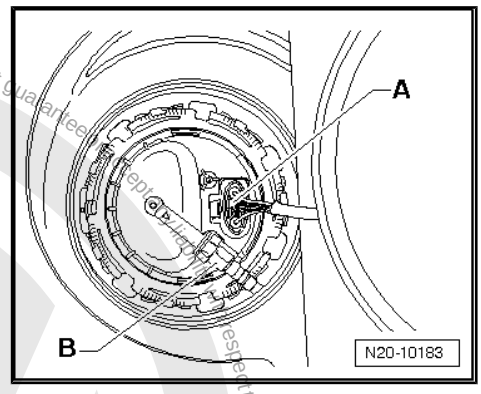
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

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– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that connector -A- is securely seated by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.



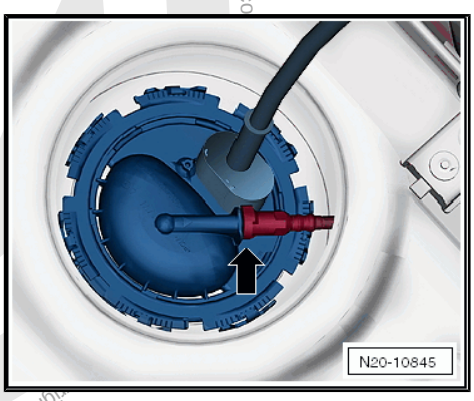
WARNING

The fuel line is under pressure.

Fuel poses danger of injury to eyes and skin.

Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.

– Pull off supply line -arrow- and catch escaping fuel with a cloth.

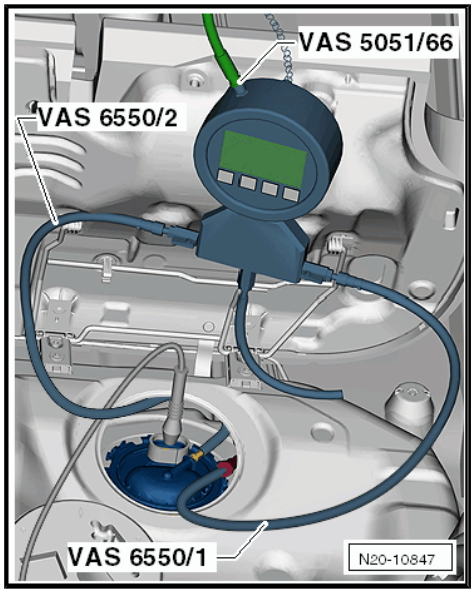


Note

Press in securing ring to release fuel line.

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– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- and -VAS 6550/1- .
– Fit connector cable - VAS 5051/66- to pressure tester - VAS 6550- and to vehicle diagnosis and service information system - VAS 5052 B- .
– Make sure that drain tap is closed and cut-off taps are open.
– Switch on pressure tester - VAS 6550- .



If the fuel pressure test is carried out within “Guided Fault Finding”, follow the instructions of the diagnostic tester.

If the fuel pressure test is carried out without “Guided Fault Finding”, proceed as follows:

– Connect vehicle diagnosis and service information system - VAS 5052 B- to vehicle.
– Select `Guided Fault Finding` in -VAS 5052 B- .
– Carry out identification of vehicle.
– Using the `GoTo` button, select the following menu options one after the other:

- `Function/component selection`
- `Drive`
- `Engine`
- `24 Mixture preparation/injection`
- `Mechanical components`
- `High-pressure pump`

– Follow instructions on vehicle diagnosis and service information system - VAS 5052 B- .

WARNING

Test instruments and measuring equipment must always be secured to the rear seat and operated by a second person from this location.

7.3.4 Checking holding pressure

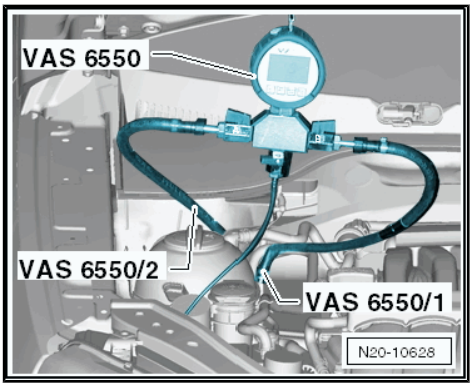
Note

If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.

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Prerequisites for check

- Fuel pressure OK and pressure tester - VAS 6550- connected. Check fuel pressure ⇒ page 329 .



Test sequence

– Actuate fuel pump with final control diagnosis to build up fuel pressure.

– Read fuel pressure on pressure gauge.

- Specification: 4.0 to 7.0 bar

– End self-diagnosis, and switch off ignition.

– Watch pressure drop on pressure gauge. Pressure must remain above 3.0 bar for 10 minutes.

If the pressure drops further:

– Actuate fuel pump with final control diagnosis to build up fuel pressure.



– After pressure has built up, close cut-off tap -B- of pressure tester immediately. Lever is then at right angle to direction of flow.

If the pressure drops again (leak on fuel tank side):

Leak must be sought on fuel tank side; proceed as follows:

– Check fuel line to flange ⇒ Item 15 (page 276) for leaks.

If no fault is found on the fuel line:

Pressure limiting valve in flange defective or pressure retention valve in fuel pump leaking.

– First replace flange with fuel filter ⇒ Item 15 (page 276) and repeat pressure retention check. If leak is still present, renew fuel delivery unit.

If the pressure does not drop now (leak on engine side):

Note

Search for leak on engine side. Repeat holding pressure test. This time, close shut-off tap -A- to check whether leak actually is on engine side.

– If there is a leak on the engine side, carry out external check of the fuel pipes and high-pressure pump for leaks.

If no fault can be determined, check the injectors for leaks:

– Remove spark plugs. Open shut-off valves -A- and -B-. Actuate fuel pump with final control diagnosis.

– Check through spark plug holes whether fuel has collected on the piston crown due to a leaking injector.

7.3.5 Checking fuel delivery rate (engine codes CAWA, CAWB, CBFA, CCTA, CCTB, CGYA, BZB)

Test conditions:

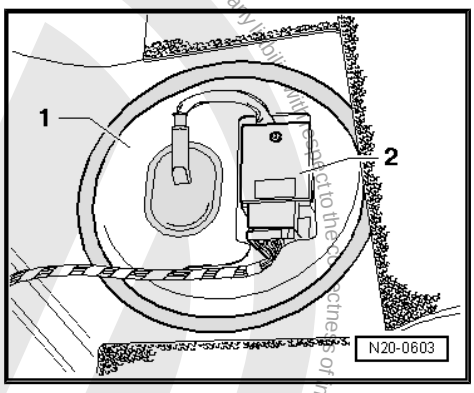
- Filling level in fuel tank above reserve

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Test sequence

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

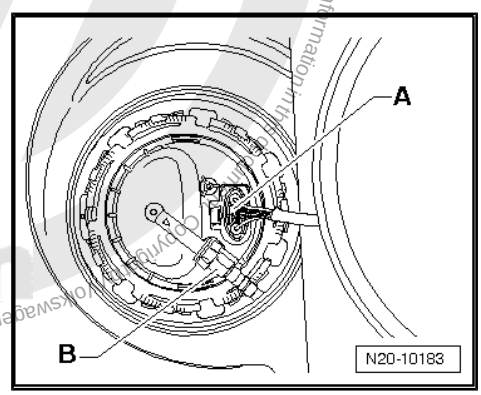
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that connector -A- is securely seated by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

– Now pull off connector.

– Check the contacts on the connector and on the fuel delivery unit for damage.



– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.

– Connect remote control - V.A.G 1348/3A- to test instrument adapter/DSO (5-pin) - VAS 5565- and to battery positive (+).



Note

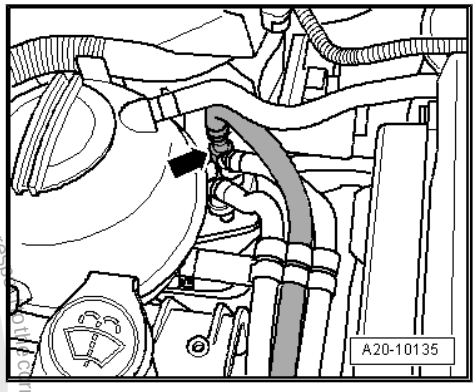
This step serves only to have the fuel pump running when the engine is stopped.

WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

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– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.

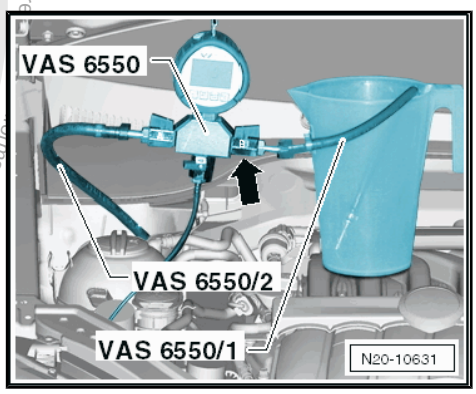


Note

Press in securing ring to release the fuel lines.

– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- . Hold adapter - VAS 6550/1- in a measuring container.

– Make sure that drain tap is closed and cut-off taps are open.



WARNING

Danger of spray when shut-off tap is opened. Wear eye protection and protective clothing to avoid injuries and skin contact. Hold container in front of open connection of pressure tester.

– Operate remote control - V.A.G 1348/3A- . Then slowly close shut-off tap -arrow- until a pressure of 4 bar is displayed on pressure gauge. From this point on do not move position of shut-off tap.

– Drain measuring container.

– The quantity delivered by the fuel pump depends on the battery voltage. Therefore, connect multimeter - V.A.G 1715- to wires -1- and -5- of adapter - VAS 5565- in addition.

– Operate remote control for 60 seconds while measuring voltage at fuel pump.

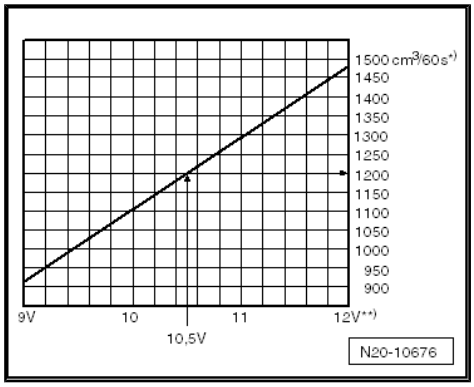


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– Compare quantity of fuel delivered with specification.

*) Minimum delivery rate cm³/60 s

**) Voltage at fuel pump with engine not running and pump running.



Reading example:

During the test a voltage of 10.5 volts is measured. This equates to a minimum delivery rate of approx. 1200 cm³/60 s

If specification is not obtained

– Check fuel line for possible restrictions (kinks) or blockages.

If no fault is found:

– Remove cap from fuel filler neck and repeat check. If fuel delivery rate is now reached, check fuel tank breather.

If reading again does not match specification:

– Remove fuel delivery unit and check filter strainer for soiling.

– If no fault is found here either, renew flange with fuel filter.

– Repeat check.

If reading again does not match specification:

– Fuel pump defective, renew fuel delivery unit ⇒ page 320 .

If the fuel delivery rate has been attained but a fault is still suspected in the fuel supply system (e.g. intermittent failure of fuel supply system):

– Measure current draw of fuel pump ⇒ page 338 .

7.3.6 Checking fuel delivery rate (engine codes CCZA, CCZB, CDAA, CDAB)

Note

The fuel delivery rate must first be checked in the engine compartment with the help of the function “Checking fuel delivery rate, quick test”. If the minimum delivery rate is not achieved, a 2nd measurement must be carried out at the flange of the fuel delivery unit.

Checking fuel delivery rate in engine compartment:

– Connect vehicle diagnosis and service information system - VAS 5052 B- to vehicle.

– Select `Guided Functions` in -VAS 5052 B- .

– Carry out identification of vehicle.

– Select `Engine`.

– Select `Checking fuel delivery rate, quick test`.

– Follow instructions on vehicle diagnosis and service information system - VAS 5052 B- .

Checking fuel delivery rate at flange:

Test conditions:

- The guided function “Checking fuel delivery rate, quick test” has been carried out ⇒ Vehicle diagnostic tester

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- The remote control - V.A.G 1348/3A- and test instrument adapter/DSO (5-pin) - VAS 5565- have been connected to the fuel delivery unit.
- Battery charger connected
- Filling level in fuel tank above reserve

Test sequence

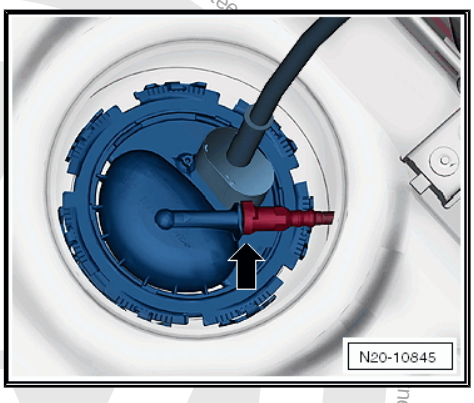
WARNING

The fuel line is under pressure.

Fuel poses danger of injury to eyes and skin.

Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.

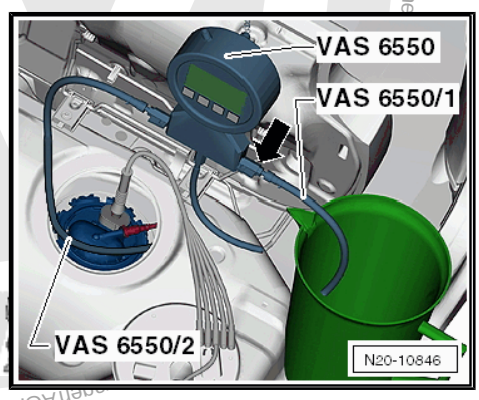
– Pull supply line -arrow- off at flange and catch escaping fuel with a cloth.



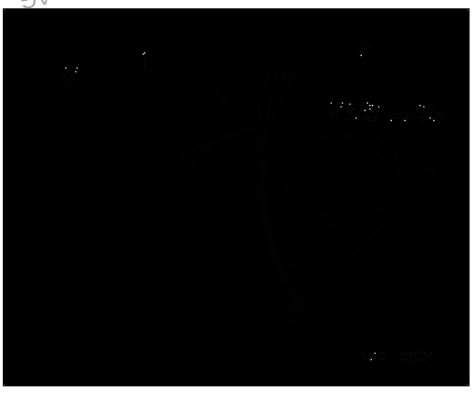
Note

Press in securing ring to release the fuel lines.

– Connect pressure tester - VAS 6550- to flange with adapter - VAS 6550/2- . Hold adapter - VAS 6550/1- in a measuring container.
– Make sure that drain tap is closed and cut-off taps are open.
– Press the remote control - V.A.G 1348/3A- and slowly close shut-off tap -arrow- until a pressure of 4 bar is displayed on pressure gauge. From this point on do not move position of shut-off tap.
– Drain measuring container.



– The quantity delivered by the fuel pump depends on the battery voltage. Therefore, connect multimeter - V.A.G 1715- to wires -1- and -5- of adapter - VAS 5565- in addition.
– Operate remote control for 60 seconds while measuring voltage at fuel pump.

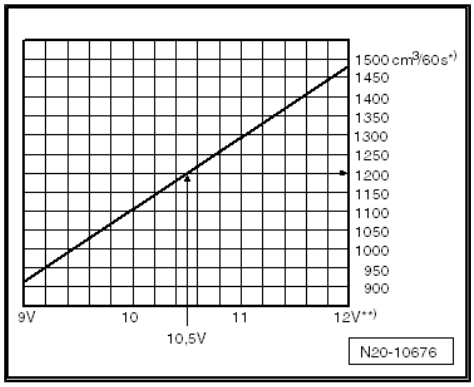


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– Compare quantity of fuel delivered with specification.

*) Minimum delivery rate cm³/60 s

**) Voltage at fuel pump with engine not running and pump running.



Reading example:

During the test a voltage of 10.5 volts is measured. This equates to a minimum delivery rate of approx. 1200 cm³/60 s

If specification is not obtained

– Remove cap from fuel filler neck and repeat check. If fuel delivery rate is now reached, check fuel tank breather.

If reading again does not match specification:

– Remove fuel delivery unit and check filter strainer for soiling.

– If no fault is found here either, renew flange with fuel filter.

– Repeat check.

If reading again does not match specification:

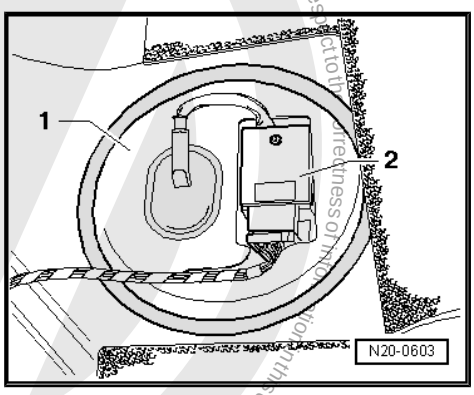
– Fuel pump defective, renew fuel delivery unit ⇒ page 320 .

If fuel delivery rate has been attained, but nevertheless you suspect a fuel supply system fault (e.g. intermittent failure of fuel supply system): Check fuel pressure with the engine running ⇒ page 330 .

7.3.7 Checking current consumption

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

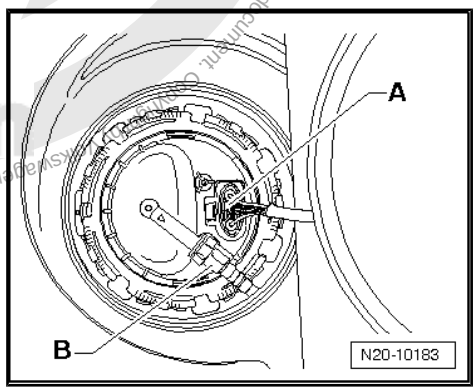
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that connector -A- is securely seated by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

– Now pull off connector.

– Check the contacts on the connector and on the fuel delivery unit for damage.



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– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect pick-up clamp -A- to red terminal with lettering “pick-up clamp” for test instrument adapter/DSO (5-pin) - VAS 5565- .
– Start engine and run at idling speed.
– Measure current draw of fuel pump.
• Specification: max. 10 amps

Note

♦ *The starting current for the fuel pump can be briefly above specifications when starting the engine.*

♦ *If the fault in the fuel system is not always evident, the check can also be carried out during a road test. A 2nd person is required to do this, however.*

If the current draw is exceeded:

– Fuel pump defective, renew fuel delivery unit ⇒ page 320 .

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8 Repairing fuel supply system (Golf, Eos, Scirocco)

Note

- *Fuel hoses on the engine must only be secured with spring-type clips which conform to the production standard.*
- *Spring-type clip pliers - VAS 6340- or space saving hose clip pliers - VAS 6362- are recommended for installing and removing spring-type clips.*

Safety precautions when working on fuel supply system ⇒ page 272 .

Comply with rules for cleanliness ⇒ page 274 .

Removing and installing fuel delivery unit ⇒ page 340 .

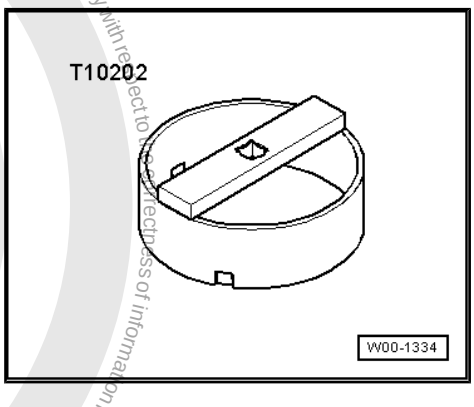
Removing and installing fuel gauge sender - G- ⇒ page 343 .

Checking fuel pump - G6- ⇒ page 344 .

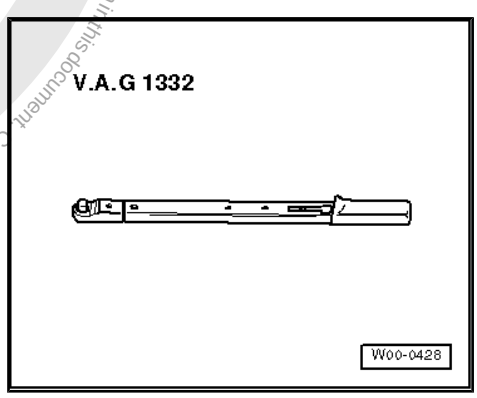
8.1 Removing and installing fuel delivery unit

Special tools and workshop equipment required

- Special wrench - T10202-



- Torque wrench (40 to 200 Nm) - V.A.G 1332-



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Removing:

Caution

Condition:

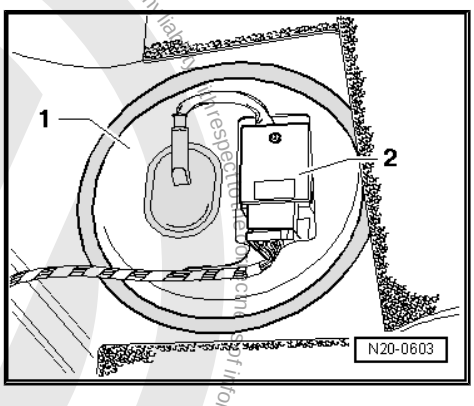
- *Fuel tank must not be more than 3/4 full. This ensures that the fill level is below the flange of the fuel delivery unit.*

Note

- *When replacing fuel delivery unit, check fuel tank for heavy soiling and clean if necessary.*
- *If necessary, drain fuel tank using fuel extractor - VAS 5190- .*
- *Note safety precautions before beginning work ⇒ page 272 .*
- *Observe rules for cleanliness ⇒ page 274 .*
- *Assembly overview - fuel tank ⇒ page 285 .*

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

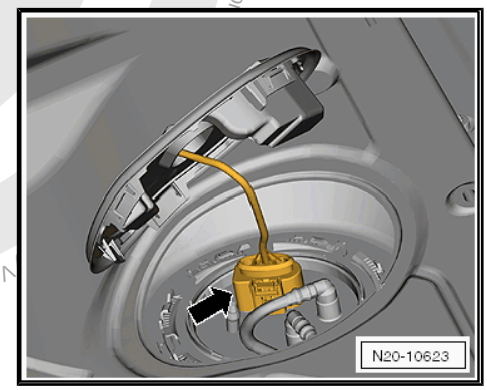
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that the connector -arrow- is fitted securely by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

– Now pull off connector.

– Check the contacts on the connector and on the fuel delivery unit for damage.

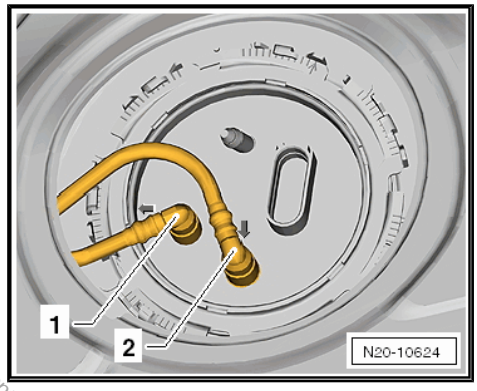


WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

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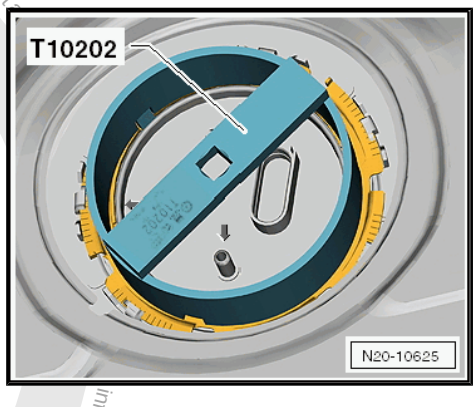
– Pull fuel lines -1- and -2- off the flange.



Note

- *Press in securing ring to release the fuel lines.*
- *On vehicles with auxiliary heater, the connector and the fuel line of the metering pump - V54- must also be disconnected.*

– Open locking ring using key - T10202- and raise flange slightly.



Caution

Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.

– Pull fuel delivery unit and seal out of the opening in fuel tank.

Note

- *If delivery unit is to be renewed, drain old delivery unit before disposal.*
- *Observe disposal regulations!*

Installing:

– Fit gasket.

– Insert seal for fuel delivery unit dry into opening of fuel tank.

– Coat inner side of seal with fuel.

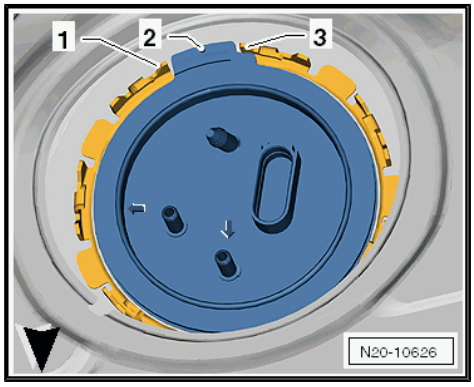
– When inserting fuel delivery unit, ensure that fuel gauge sender is not bent.

– Press sealing flange down against spring pressure, and move sealing flange to installation position.

- Tab -2- on flange must be between lugs -1- and -3- on fuel tank.
- -Arrow- points in direction of travel.

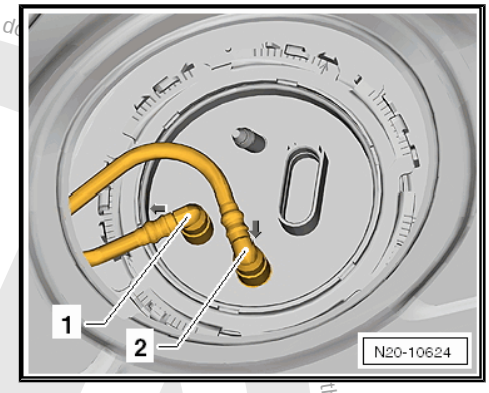
– Tighten sealing flange.

- Specified torque: 110 Nm



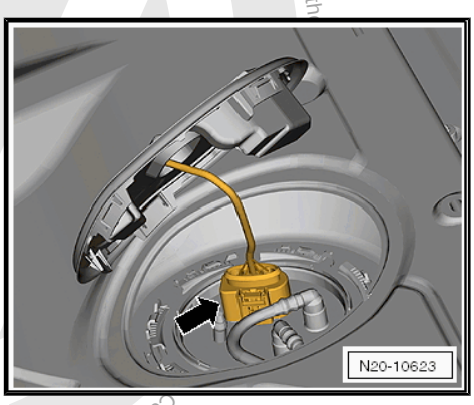
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– Reconnect supply line-1- (black).
– Reconnect fuel return line -2- (blue or blue marking).

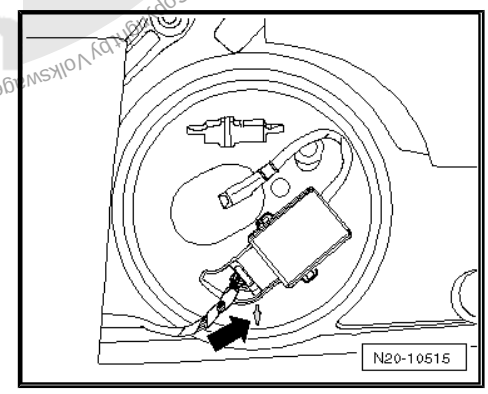


– Reconnect connector -arrow-.
– Ensure push-fit couplings and electrical connectors are secured properly by pulling.

Further assembly is performed in the reverse order of removal. During this step, observe the following:



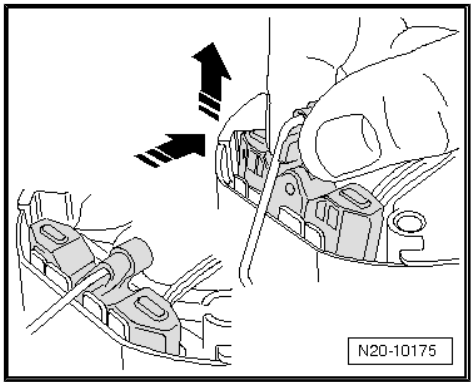
♦ Observe installation position of fuel feed line to auxiliary heater ⇒ Auxiliary heater; Rep. gr. 82 ; Fuel feed Thermo Top V
♦ The -arrow- on the cover points forwards.



8.2 Removing and installing fuel gauge sender - G-

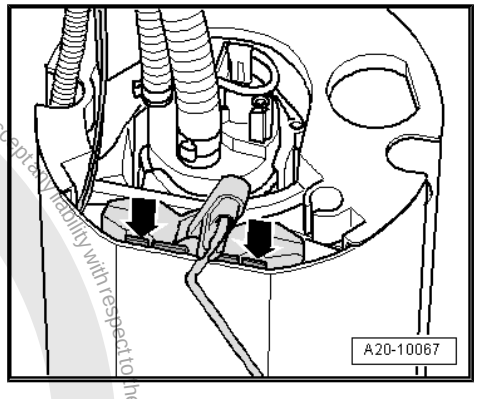
Removing:

– Remove fuel delivery unit ⇒ page 340 .
– Pull fuel gauge sender - G- slightly to side and upwards at the same time.

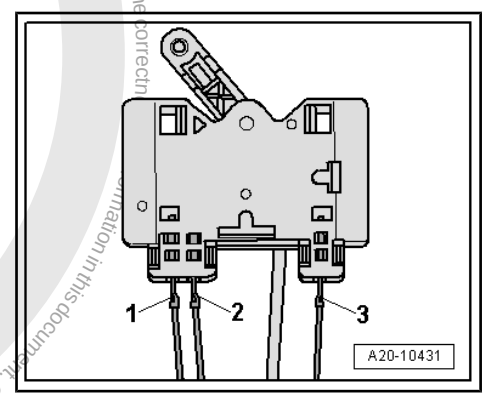


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– If the sender cannot be released in this way, the retaining tabs -arrows- must also be pushed to the side slightly.
– Note colour co-ordination of cables for reinstallation.

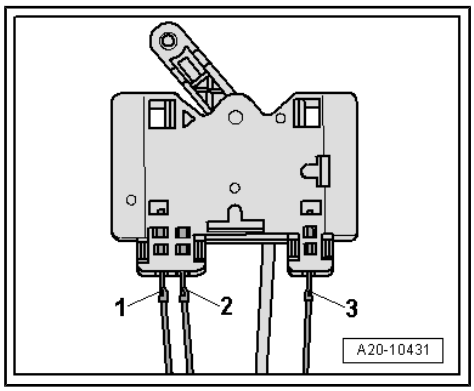


– Release electrical connectors -1 to 3- and pull them off. Then bend back locking lugs of connectors.



Installing:

– Connect connectors -1…3-. Observe colour co-ordination.
– Check connectors are secured properly by pulling.
– Insert fuel gauge sender - G- into guide on fuel delivery unit and press down until it engages.
– Install fuel delivery unit ⇒ page 340 .

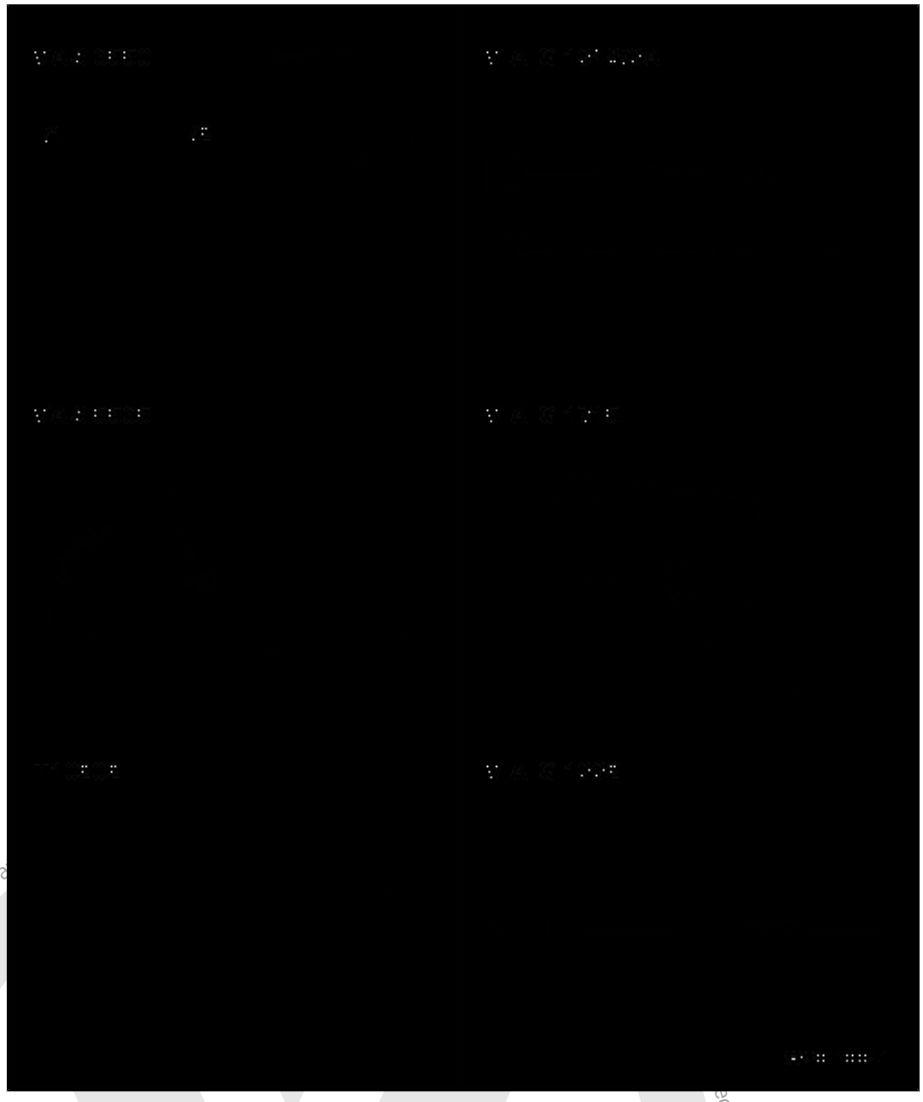


8.3 Checking fuel pump - G6-

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Special tools and workshop equipment required

- Pressure gauge - VAS 6550-
- Remote control - V.A.G 1348/3A-
- Test instrument adapter/ DSO (5-pin) - VAS 5565-
- Multimeter - V.A.G 1715-
- Special wrench - T10202-
- Torque wrench - V.A.G 1332-
- Measuring container, capacity: 3 litres



8.3.1 Checking function and voltage supply

Test conditions:

- Battery voltage at least 11.5 V.
- Fuse for Fuel pump control unit - J538- OK.
- Fuel pump control unit - J538- OK.

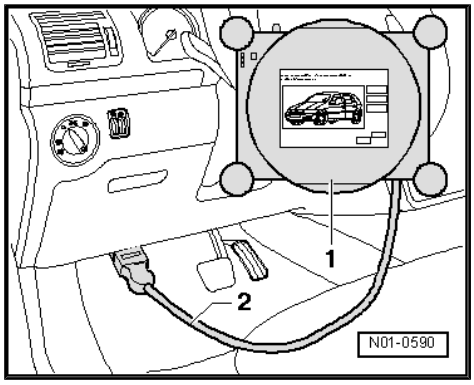
Test sequence

Note

- *Function of fuel pump is checked using final control diagnosis.*
- *If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.*

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– Connect vehicle diagnostic tester as follows:
– Push diagnosis cable connector onto diagnosis connection in driver footwell.
– Switch ignition on.
– Press buttons on display one after the other for `Vehicle self-diagnosis`, `Engine electronics` and `Final control diagnosis`.
– Press right arrow button ▶ on display up to final control diagnosis for fuel pump electronics.



The fuel pump must now run slowly up to maximum speed.

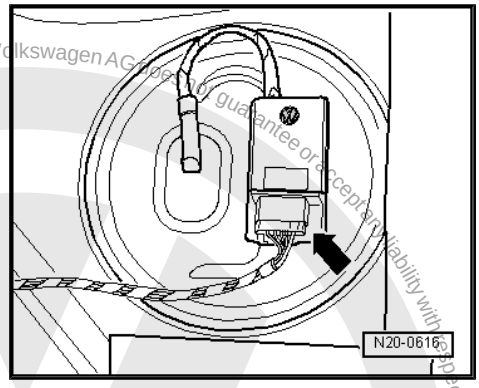
Note

The fuel pump runs very quietly.

– Switch off ignition.

If fuel pump does not run:

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .
– Pull connector off fuel pump control unit - J538- .



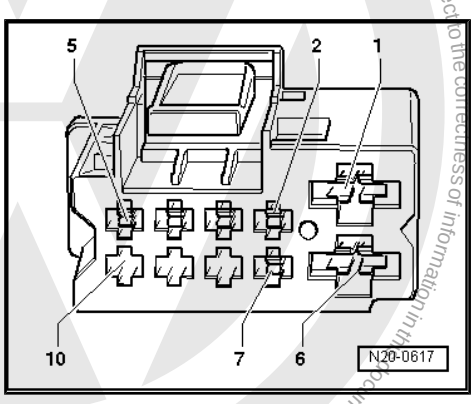
– Check voltage supply between contacts -1- and -6- using multimeter - V.A.G 1715- .

• Specification: approx. battery voltage

Voltage supply not OK:

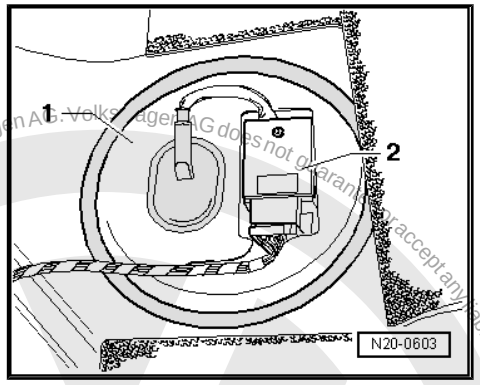
– Locate and eliminate open circuit referring to current flow diagram ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Voltage supply OK:



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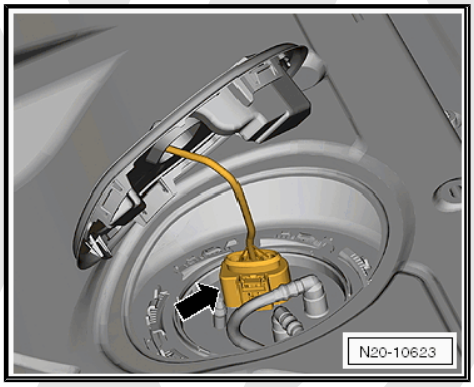
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that the connector -arrow- is fitted securely by pulling the connector without pressing the catch. If connector was not inserted correctly, repeat functional check of fuel pump.

– Now pull off connector.

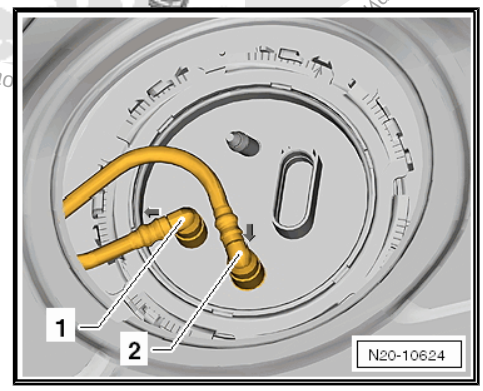
– Check the contacts on the connector and on the fuel delivery unit for damage.



WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

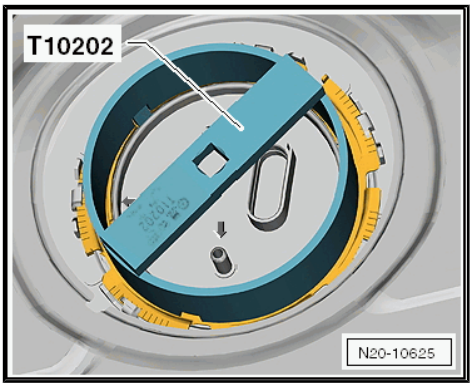
– Pull fuel lines -1- and -2- off the flange.



Note

- *Press in securing ring to release the fuel lines.*
- *On vehicles with auxiliary heater, the connector and the fuel line of the metering pump - V54- must also be disconnected.*

– Open locking ring using key - T10202- .



Caution

Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.

– Check that electrical wires between flange and fuel pump are connected.

If no open circuit can be found:

– Fuel pump defective, renew fuel delivery unit ⇒ page 340 .

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8.3.2 Checking fuel pressure

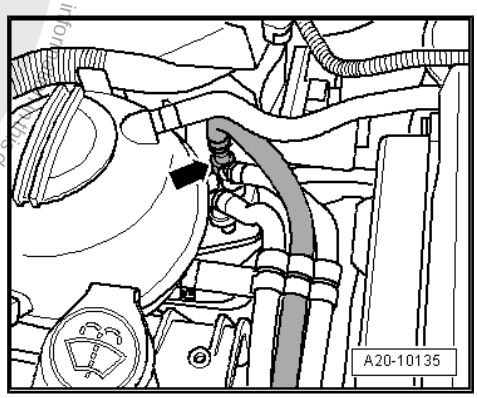
Note

- *The fuel pressure must be checked by means of the final control diagnosis. If the fuel pressure is measured at idling speed, it may deviate from the specification.*
- *If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.*

WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

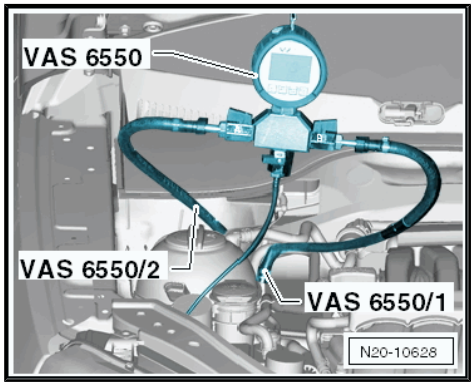
– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.



Note

Press in securing ring to release fuel line.

– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/1- and -VAS 6550/2- .



– Make sure that drain tap is closed and cut-off taps are open.
– Actuate fuel pump with final control diagnosis to build up fuel pressure.
– Read fuel pressure on pressure gauge.
• Specification: 4.0 to 7.0 bar

If fuel pressure is OK, check holding pressure ⇒ page 352 .

If the specification is exceeded:

– Check return line between fuel filter and fuel pump for kinks and blockages.

If no fault is found:

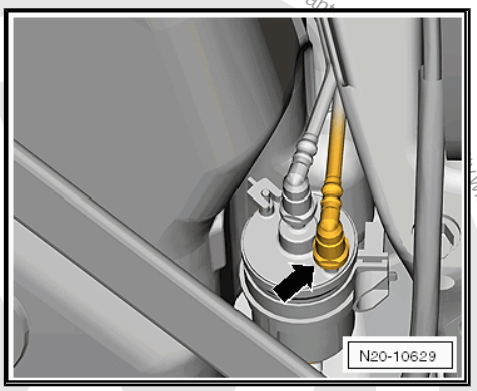
– Pressure limit valve in fuel filter is defective. Renew fuel filter.

If specification is not obtained

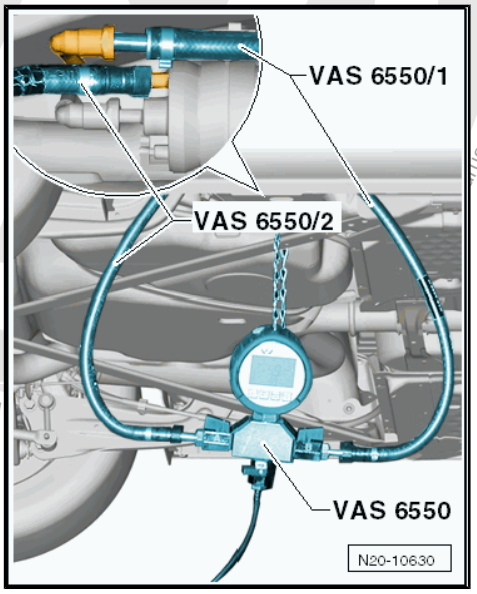
– Check fuel pressure upstream of fuel filter; proceed as follows:

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– Pull fuel supply line -arrow- off fuel filter.



– Connect pressure tester - VAS 6550- between fuel filter and fuel supply line with adapter - VAS 6550/1- and -VAS 6550/2- .



– Make sure that drain tap is closed and cut-off taps are open.
– Switch ignition on and activate the fuel pump with the final control diagnosis function.
– While the fuel pump is operating, close the shut-off tap -A-. Pressure must rise to at least 7.0 bar. When 7.0 bar is reached, open shut-off tap again immediately.



If pressure has risen:

– Fuel pump is OK. Pressure limiting valve in fuel filter is defective. Renew fuel filter.

If pressure does not rise:

– Fuel pump defective, renew fuel delivery unit ⇒ page 340 .

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8.3.3 Checking fuel pressure when the engine is running (engine codes CCZA, CCZB, CDAA, CDAB)

Note

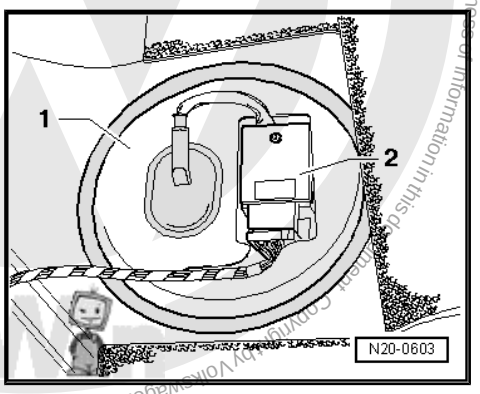
- *If a complaint is made about the vehicle's performance, the reason may be that the fuel pressure is too low. Faults in the high-pressure section may also be caused by inadequate fuel pressure in the low-pressure section. This check determines the fuel pressure in the high-pressure and low-pressure sections during a road test. Fuel pressure in the high-pressure section is read from the engine control unit. The lowest fuel pressure is measured by the pressure tester - VAS 6550- and reported to the vehicle diagnosis and service information system - VAS 5052 B- .*
- *This test can be part of "Guided Fault Finding" if an entry has been made in the event memory. However, it can also be started in the vehicle diagnosis and service information system - VAS 5052 B- by means of "Functions and component selection".*

Special tools and workshop equipment required

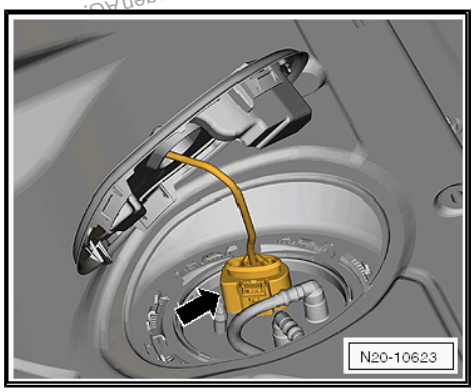
- Pressure gauge - VAS 6550-
- Hose adapters - VAS 6550/1- and -VAS 6550/2-
- Vehicle diagnosis and service information system - VAS 5052 B-
- Connector cable - VAS 5051/66-

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that the connector -arrow- is fitted securely by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.



WARNING

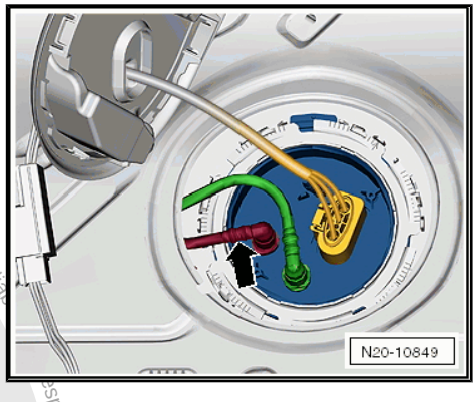
The fuel line is under pressure.

Fuel poses danger of injury to eyes and skin.

Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.

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– Pull off supply line -arrow- and catch escaping fuel with a cloth.



Note

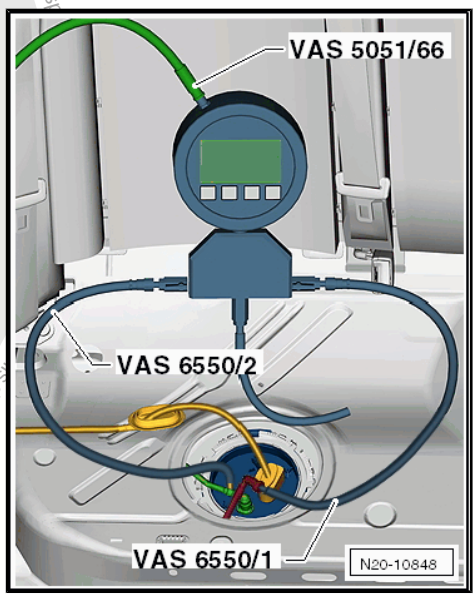
Press in securing ring to release fuel line.

– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- and -VAS 6550/1- .

– Fit connector cable - VAS 5051/66- to pressure tester - VAS 6550- and to vehicle diagnosis and service information system - VAS 5052 B- .

– Make sure that drain tap is closed and cut-off taps are open.

– Switch on pressure tester - VAS 6550- .



If the fuel pressure test is carried out within “Guided Fault Finding”, follow the instructions of the diagnostic tester.

If the fuel pressure test is carried out without “Guided Fault Finding”, proceed as follows:

– Connect vehicle diagnosis and service information system - VAS 5052 B- to vehicle.

– Select `Guided Fault Finding` in -VAS 5052 B- .

– Carry out identification of vehicle.

– Using the `GoTo` button, select the following menu options one after the other:

- `Function/component selection`
- `Drive`
- `Engine`
- `24 Mixture preparation/injection`
- `Mechanical components`
- `High-pressure pump`

– Follow instructions on vehicle diagnosis and service information system - VAS 5052 B- .

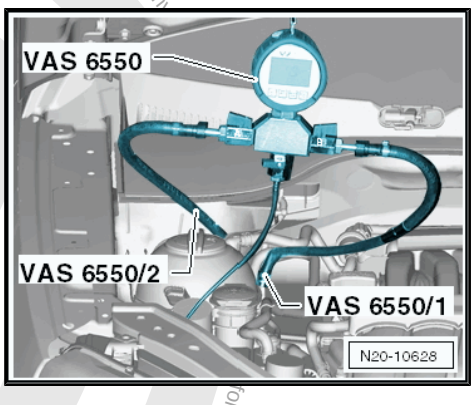
WARNING

Test instruments and measuring equipment must always be secured to the rear seat and operated by a second person from this location.

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8.3.4 Checking holding pressure

- Fuel pressure OK and pressure tester - VAS 6550- connected. Check fuel pressure ⇒ page 348 .



Test sequence

– Actuate fuel pump with final control diagnosis to build up fuel pressure.

– Read fuel pressure on pressure gauge.

- Specification: 4.0 to 7.0 bar

– End self-diagnosis, and switch off ignition.

– Watch pressure drop on pressure gauge. Pressure must remain above 3.0 bar for 10 minutes.

If the pressure drops further:

– Actuate fuel pump with final control diagnosis to build up fuel pressure.

– After pressure has built up, close cut-off tap -B- of pressure tester immediately. Lever is then at right angle to direction of flow.



If the pressure does not drop now (leak on engine side) ⇒ page 353 .

If the pressure drops again (leak on fuel tank side):

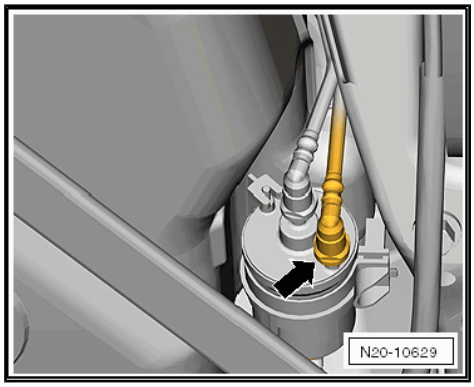
Leak must be sought on fuel tank side; proceed as follows:

– Check fuel supply line to fuel filter for leaks.

If no fault is found on the fuel line:

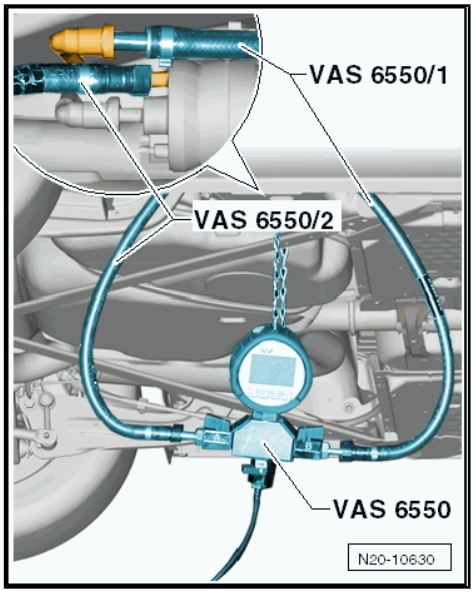
– Check pressure retention valve in fuel delivery unit. Proceed as follows:

– Pull fuel supply line -arrow- off fuel filter.



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– Connect pressure tester - VAS 6550- between fuel filter and fuel supply line with adapter - VAS 6550/1- and -VAS 6550/2- .
– Make sure that drain tap is closed and cut-off taps are open.
– Actuate fuel pump with final control diagnosis to build up fuel pressure.
– Read fuel pressure on pressure gauge.
• Specification: 4.0 to 7.0 bar



– After pressure has built up, close cut-off tap -A-.
– Watch pressure drop on pressure gauge. Pressure must remain above 3.0 bar for 10 minutes.



If the pressure drops:

– Pressure retention valve in fuel pump defective; renew fuel delivery unit ⇒ page 340 .

If the pressure does not drop:

– Pressure retention valve in fuel filter is OK, pressure limiting valve in fuel filter is defective. Renew fuel filter.

If the pressure does not drop now (leak on engine side):

Note

Search for leak on engine side. Repeat holding pressure test. This time, close shut-off tap -A- to check whether leak actually is on engine side.

– If there is a leak on the engine side, carry out external check of the fuel pipes and high-pressure pump for leaks.

If no fault can be determined, check the injectors for leaks:

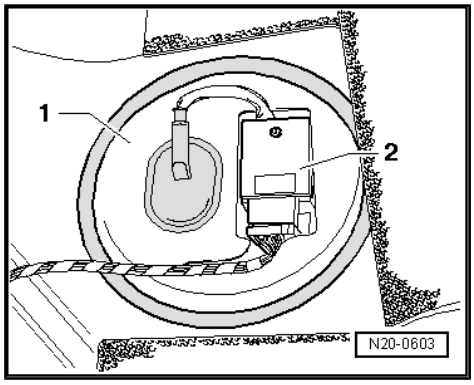
– Remove spark plugs. Open shut-off valves -A- and -B-. Actuate fuel pump with final control diagnosis.
– Check through spark plug holes whether fuel has collected on the piston crown due to a leaking injector.

8.3.5 Checking fuel delivery rate (engine codes CAWA, CAWB, CBFA, CCTA, CCTB, BZB, CGYA)

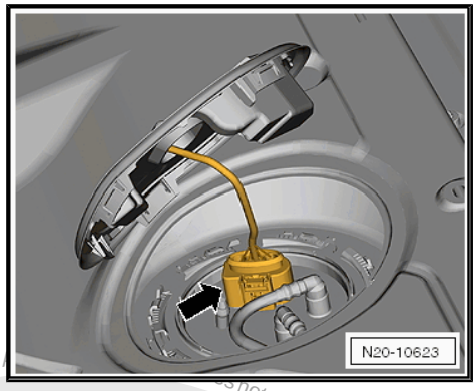
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

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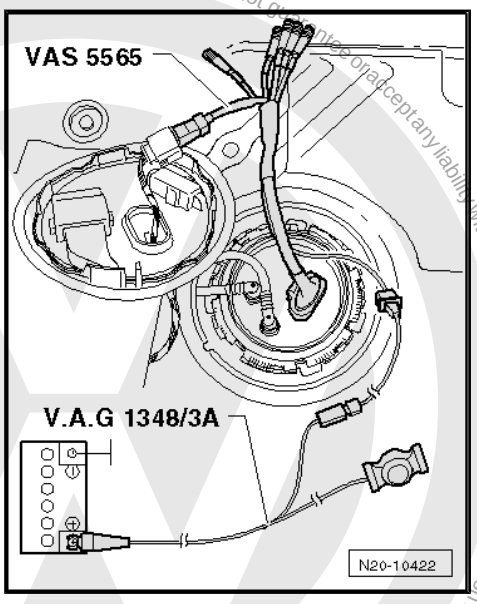
– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.



– First check that the connector -arrow- is fitted securely by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.
– Now pull off connector.
– Check the contacts on the connector and on the fuel delivery unit for damage.



– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect remote control - V.A.G 1348/3A- to adapter - VAS 5565- and to battery positive terminal clamp in the engine compartment.



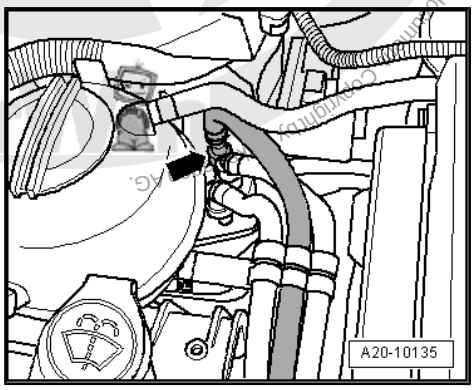
Note

This step serves only to have the fuel pump running when the engine is stopped.

WARNING

Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

– Pull off supply line (metal coupling) -arrow- and catch escaping fuel with a cloth.



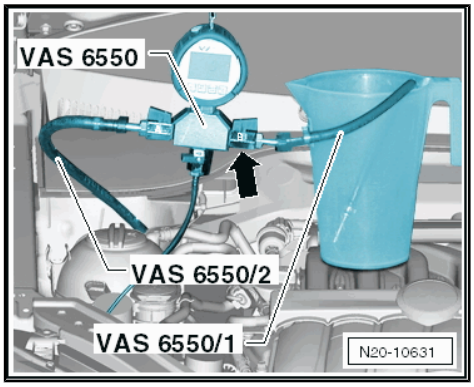
Note

Press in securing ring to release the fuel lines.

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– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- . Hold adapter - VAS 6550/1- in a measuring container.

– Make sure that drain tap is closed and cut-off taps are open.



WARNING

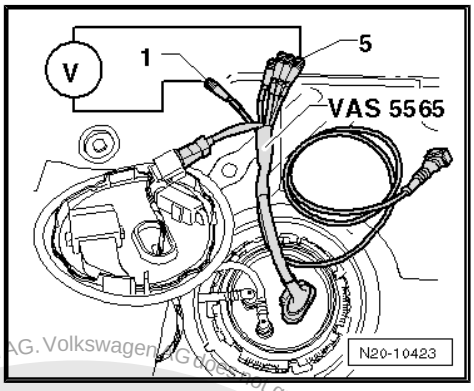
Danger of spraying! Wear protective goggles and protective clothing to avoid injury and contact with the skin. Hold container in front of open connection of pressure tester.

– Operate remote control - V.A.G 1348/3A- . Then slowly close shut-off tap -arrow- until a pressure of 4 bar is displayed on pressure gauge. From this point on do not move position of shut-off tap.

– Drain measuring container.

– The quantity delivered by the fuel pump depends on the battery voltage. Therefore, also connect multimeter - V.A.G 1715- to outputs -1 and 5- of test instrument/DSO adapter 5-pin - VAS 5565- .

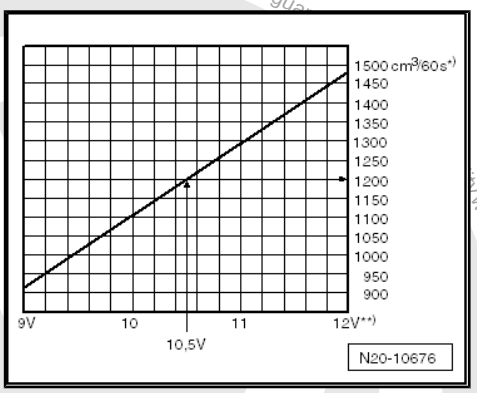
– Operate remote control for 60 seconds while measuring voltage at fuel pump.



– Compare quantity of fuel delivered with specification:

*) Minimum delivery rate cm³/60 s

**) Voltage at fuel pump with engine not running and pump running.



Reading example:

During the test a voltage of 10.5 volts is measured. This equates to a minimum delivery rate of approx. 1200 cm³/60 s

If specification is not obtained

– Check fuel lines for possible restrictions (kinks) or blockages.

If no fault is found:

– Remove cap from fuel filler neck and repeat check. If fuel delivery rate is now reached, check fuel tank breather.

If reading again does not match specification:

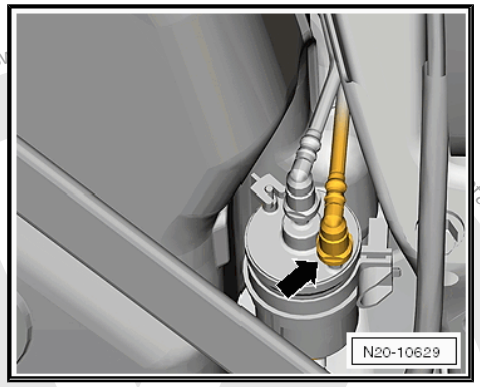
– Check fuel filter (proceed as follows):

WARNING

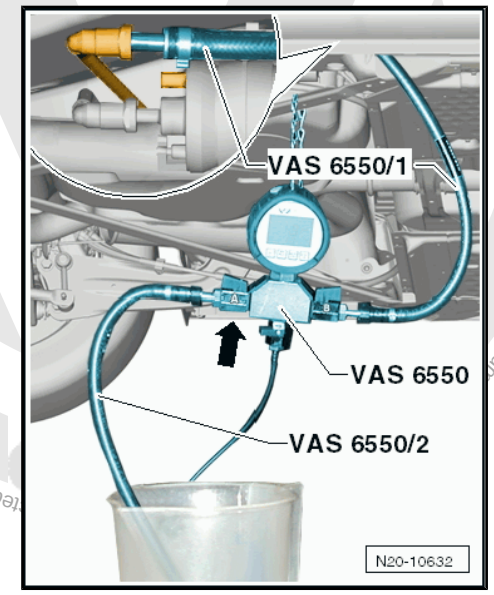
Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

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– Pull fuel supply line -arrow- off fuel filter.



– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/1- . Hold adapter - VAS 6550/2- in a measuring container.
– Make sure that drain tap is closed and cut-off taps are open.
– Operate remote control - V.A.G 1348/3A- . Then slowly close shut-off tap -arrow- until a pressure of 4 bar is displayed on pressure gauge. From this point on do not move position of shut-off tap.
– Drain measuring container.
– Repeat delivery rate check.



If the minimum delivery rate is now attained:

– Renew fuel filter.

If the minimum delivery rate is again not attained

– Remove fuel delivery unit and check filter strainer for soiling.

Only if still no fault has been detected:

– Renew fuel delivery unit.

If the fuel delivery rate has been attained but a fault is still suspected in the fuel supply system (e.g. intermittent failure of fuel supply system):

– Measure current draw of fuel pump ⇒ page 358 .

8.3.6 Checking fuel delivery rate (engine codes CCZA, CCZB, CDAA, CDAB)

Note

The fuel delivery rate must first be checked in the engine compartment with the help of the function "Checking fuel delivery rate, quick test". If the minimum delivery rate is not achieved, a 2nd measurement must be carried out at the flange of the fuel delivery unit.

Checking fuel delivery rate in engine compartment:

– Connect vehicle diagnosis and service information system - VAS 5052 B- to vehicle.
– Select `Guided Functions` in -VAS 5052 B- .
– Carry out identification of vehicle.
– Select `Engine`.
– Select `Checking fuel delivery rate, quick test`.

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– Follow instructions on vehicle diagnosis and service information system - VAS 5052 B- .

Checking fuel delivery rate at flange:

- The guided function “Checking fuel delivery rate, quick test” has been carried out ⇒ Vehicle diagnostic tester
- The remote control - V.A.G 1348/3A- and test instrument adapter/DSO (5-pin) - VAS 5565- have been connected to the fuel delivery unit.
- Battery charger connected
- Filling level in fuel tank above reserve

Test sequence

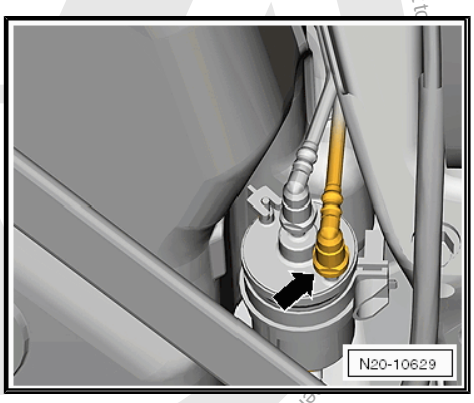
WARNING

The fuel line is under pressure.

Fuel poses danger of injury to eyes and skin.

Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.

– Pull fuel supply line -arrow- off fuel filter.

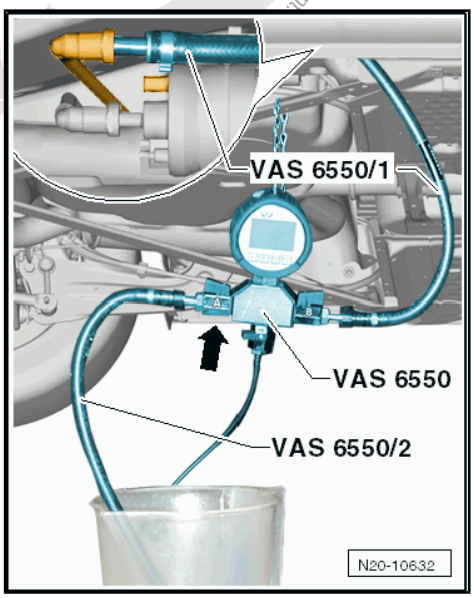


– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/1- . Hold adapter - VAS 6550/2- in a measuring container.

– Make sure that drain tap is closed and cut-off taps are open.

– Operate remote control - V.A.G 1348/3A- . Then slowly close shut-off tap -arrow- until a pressure of 4 bar is displayed on pressure gauge. From this point on do not move position of shut-off tap.

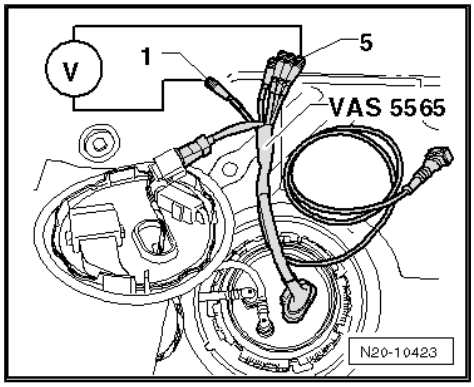
– Drain measuring container.



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– The quantity delivered by the fuel pump depends on the battery voltage. Therefore, connect multimeter - V.A.G 1715- to wires -1- and -5- of adapter - VAS 5565- in addition.

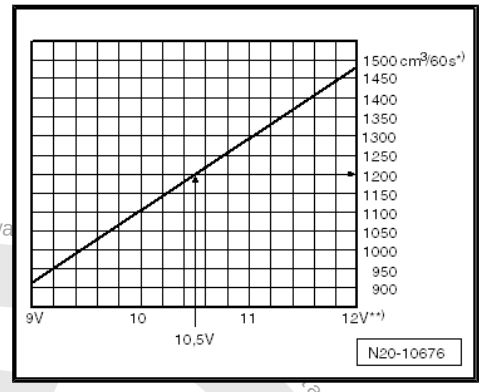
– Operate remote control for 60 seconds while measuring voltage at fuel pump.



– Compare quantity of fuel delivered with specification.

*) Minimum delivery rate cm³/60 s

**) Voltage at fuel pump with engine not running and pump running.



Reading example:

During the test a voltage of 10.5 volts is measured. This equates to a minimum delivery rate of approx. 1200 cm³/60 s

If specification is not obtained

– Remove cap from fuel filler neck and repeat check. If fuel delivery rate is now reached, check fuel tank breather.

If reading again does not match specification:

– Remove fuel delivery unit and check filter strainer for soiling.

– If no fault is found here either, renew flange with fuel filter.

– Repeat check.

If reading again does not match specification:

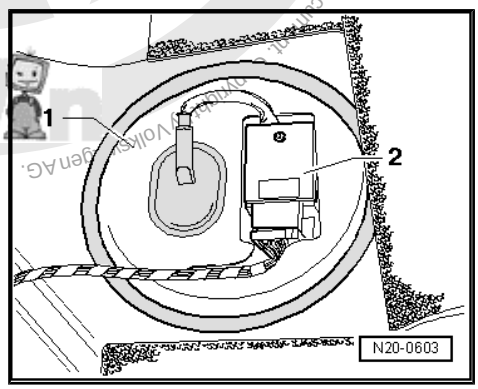
– Fuel pump defective, renew fuel delivery unit ⇒ page 320 .

If fuel delivery rate has been attained, but nevertheless you suspect a fuel supply system fault (e.g. intermittent failure of fuel supply system): Check fuel pressure with the engine running ⇒ page 330 .

8.3.7 Checking current consumption

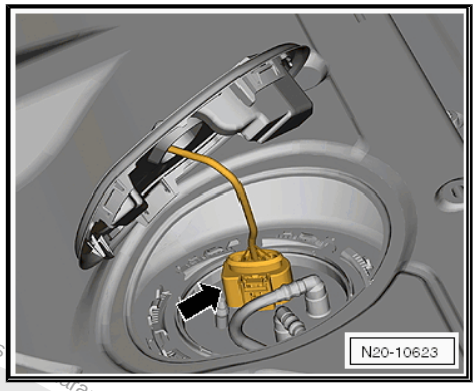
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove cover -1- with fuel pump control unit - J538- -2- from fuel delivery unit.

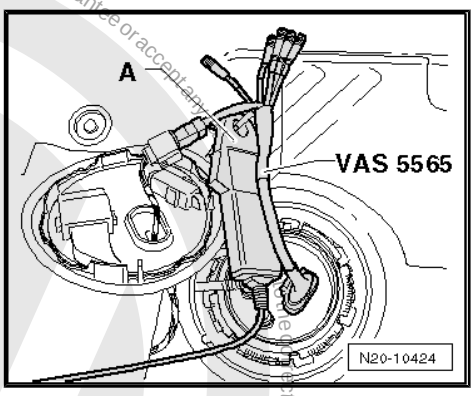


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– First check that the connector -arrow- is fitted securely by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.
– Now pull off connector.
– Check the contacts on the connector and on the fuel delivery unit for damage.



– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect pick-up clamp -A- to red terminal with lettering “pick-up clamp” for test instrument adapter/DSO (5-pin) - VAS 5565- .
– Start engine and run at idling speed.
– Measure current draw of fuel pump.
• Specification: max. 9 amps



Note

♦ *The starting current for the fuel pump can be briefly above specifications when starting the engine.*
♦ *If the fault in the fuel system is not always evident, the check can also be carried out during a road test. A 2nd person is required to do this, however.*

If the current draw is exceeded:

– Fuel pump defective, renew fuel delivery unit ⇒ page 340 .

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9 Repairing fuel supply (Tiguan)

Note

- *Fuel hoses on the engine must only be secured with spring-type clips which conform to the production standard.*
- *Hose clip pliers - VAS 6362- or hose clip pliers - V.A.G 1921- are recommended for installation of spring-type clips.*

Safety precautions when working on fuel supply system ⇒ page 272 .

Comply with rules for cleanliness ⇒ page 274 .

Removing and installing fuel delivery unit ⇒ page 360 .

Removing and installing fuel gauge sender - G- ⇒ page 363 .

Removing and installing suction jet pump ⇒ page 364 .

Removing and installing fuel gauge sender 2 - G169- ⇒ page 366 .

Removing and installing fuel pump control unit - J538- ⇒ page 367 .

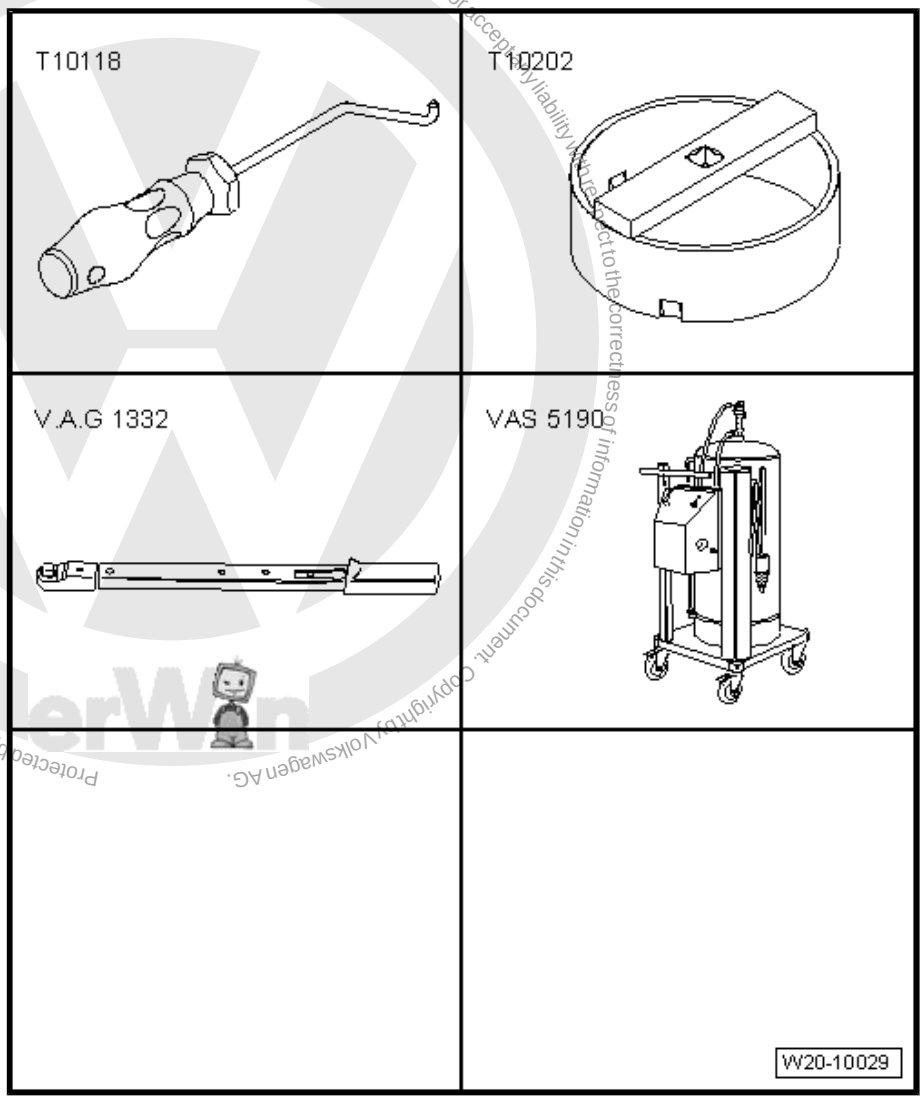
Check fuel pump ⇒ page 368 .

9.1 Removing and installing fuel delivery unit

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Special tools and workshop equipment required

- Assembly tool - T10118-
- Special wrench - T10202-
- Torque wrench - V.A.G 1332-
- Fuel extraction unit - VAS 5190-



Removing:

Caution

Condition:

- ***The fuel tank must be only 1/2 full or less. This ensures that the fill level is below the flange of the fuel delivery unit.***

Note

- *When replacing fuel delivery unit, check fuel tank for heavy soiling and clean if necessary.*
- *If necessary, drain fuel tank using fuel extractor - VAS 5190- .*
- *Note safety precautions before beginning work ⇒ page 272 .*
- *Observe rules for cleanliness ⇒ page 274 .*

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

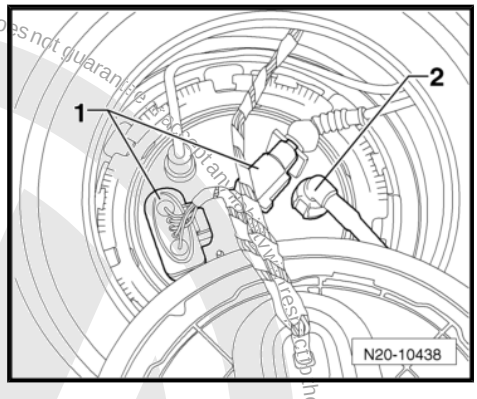
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– Remove cover from fuel delivery unit.

– First ensure that 5-pin wiring connection -1- is secure by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

– Now pull off connectors -1-.

– Check the contacts on the connector and on the fuel delivery unit for damage.



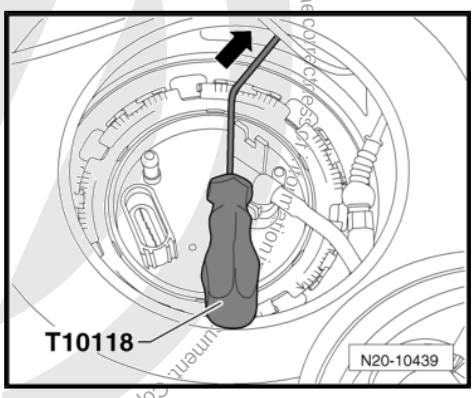
– Release connector -arrow- on fuel pump control unit - J538- using assembly tool - T10118- and pull it off.

WARNING

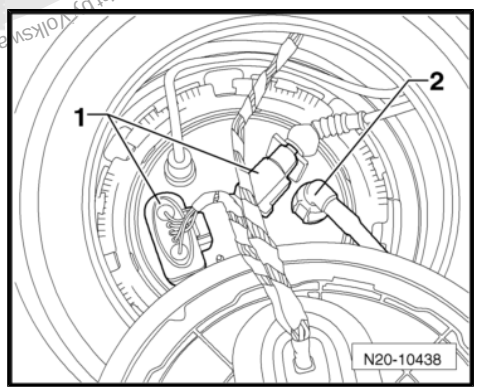
The fuel line is under pressure.

Fuel poses danger of injury to eyes and skin.

Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.



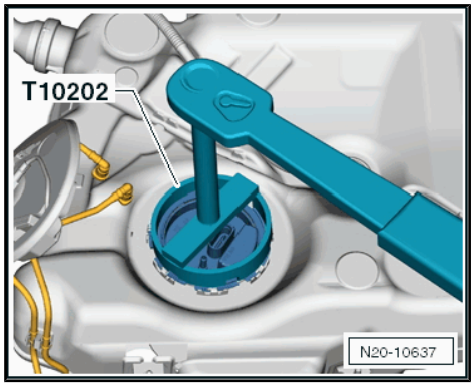
– Pull off supply line -2- and catch escaping fuel with a cloth.



– Open locking ring using key - T10202- .

Caution

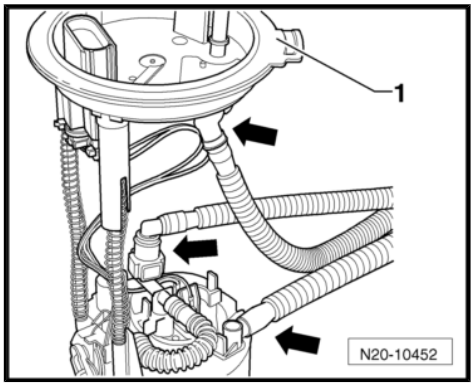
Do not cant key - T10202- and press against locking ring firmly. If the key slips off, the fuel delivery unit can be damaged.



– Slightly raise fuel delivery unit and remove seal out from aperture in fuel tank.

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– Release fuel hoses on delivery unit -arrows- and pull delivery unit out of fuel tank.



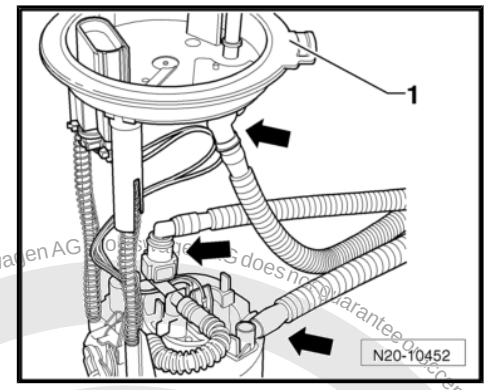
Note

If delivery unit is to be renewed, drain old delivery unit before disposal.

Installing

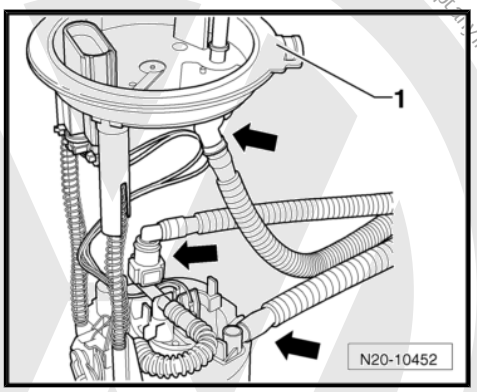
– Reconnect fuel hoses -arrows-. Ensure that fuel hoses engage audibly and check to ensure firm seating by pulling!

– Further installation of the fuel delivery unit is carried out in reverse order of removal.



Note

- *Fuel hoses are allocated to respective unions.*
- *Ensure plug-in connectors are secured properly by pulling.*
- *When inserting the fuel delivery unit, ensure that the fuel gauge sender - G- is not bent.*
- *Insert seal for fuel delivery unit dry into opening of fuel tank.*
- *Moisten seal with fuel only when installing fuel delivery unit.*
- *Note installation position of flange for fuel delivery unit: tab -1- must point in direction of travel. The fuel delivery unit flange can only be installed in this position.*



9.2 Removing and installing fuel gauge sender G

– Remove fuel delivery unit ⇒ page 360 .

Special tools and workshop equipment required

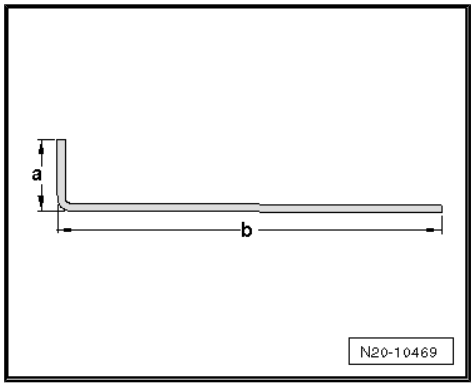
- Welding wire (2 mm thick)

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– Bend an 80 mm long welding wire as shown.

Dimension -a- = 10 mm

Dimension -b-: 70 mm

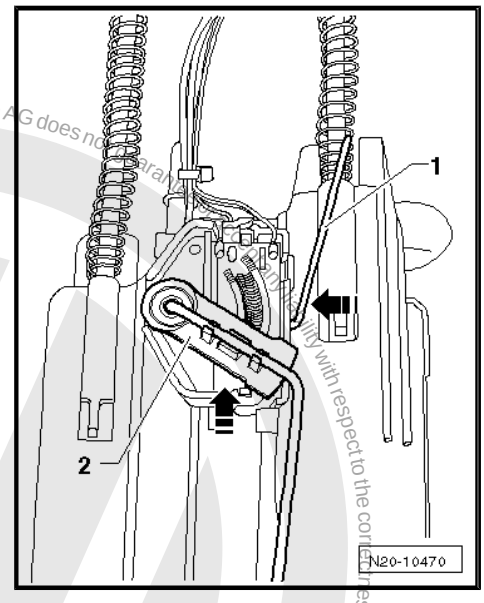


Removing

– Release connector of wiring for fuel gauge sender and disconnect it.

– Press welding wire -1- in direction of -arrow- into recess beneath sender.

– At the same time, push fuel gauge sender -2- from guides in direction of -arrow-.



Installing

– Insert fuel sender into guides on fuel delivery unit and press downwards until it engages.

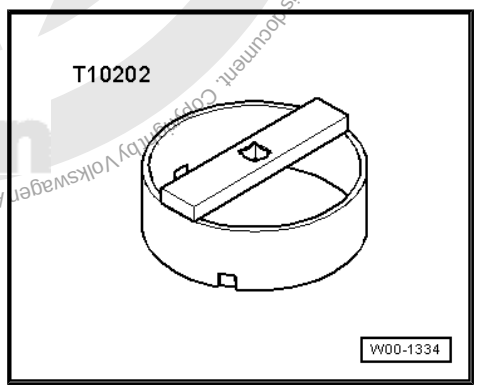
– Reconnect connector and check that it has engaged correctly.

– Install fuel delivery unit ⇒ page 360 .

9.3 Removing and installing suction-jet pump, fuel filter and pressure limitation valve

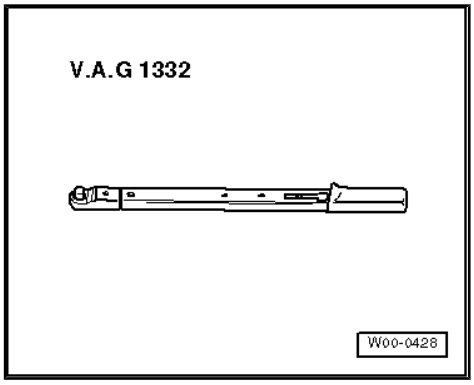
Special tools and workshop equipment required

♦ Special wrench - T10202-



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- Torque wrench (40 to 200 Nm) - V.A.G 1332-



Note

- *On vehicles with four-wheel drive, fuel must be pumped from the area of fuel gauge sender 2 - G169- to the fuel pump unit due to the shape of the fuel tank. To do so, a suction-jet pump pumps fuel from left chamber to right chamber of fuel tank.*
- *The fuel delivery unit must first be removed to remove the suction-jet pump.*
- *The left flange consists of suction-jet pump, fuel filter, pressure limitation valve and fuel gauge sender 2 - G169- Only fuel gauge sender 2 - G169- can be renewed separately.*
- *Checking fuel gauge sender 2 - G169- is only necessary when the engine stops due to lack of fuel, even though the fuel gauge shows that the tank is still 1/4 full.*

Removing:

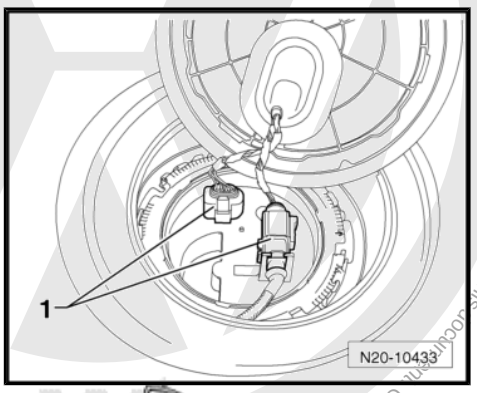
– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove fuel delivery unit ⇒ page 360 .

– Remove left cover (as seen facing direction of normal travel) from fuel gauge sender 2 - G169- .

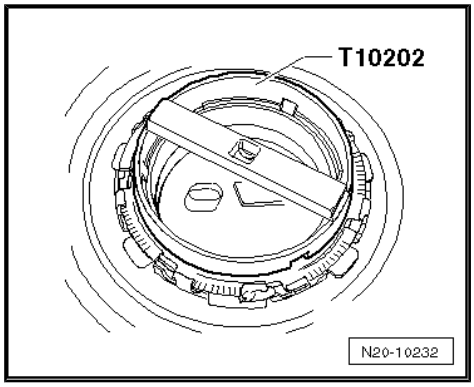
– First check that the connector is fitted securely by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

– Pull connector -1- off left flange.



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– Open locking ring using key - T10202- .
– Slightly raise flange and remove seal out from opening in fuel tank.
– Pull flange together with fuel gauge sender 2 - G169- out of fuel tank.
– Check fuel lines for kinks and damage.
– Additionally check suction-jet pump and fuel tank for possible soiling.

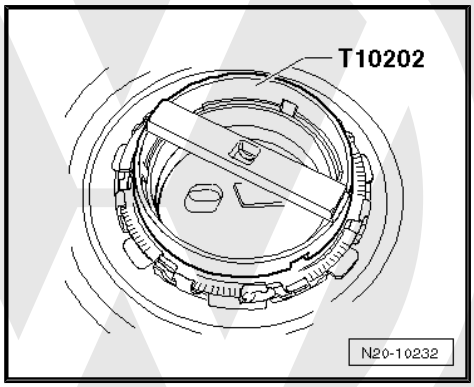


Installing

Caution

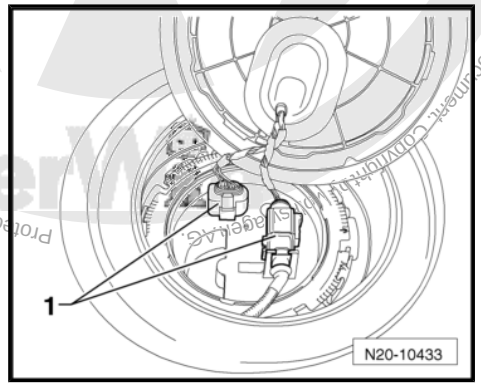
When installing do not bend fuel gauge sender 2 - G169- float arm.

– Install flange together with fuel gauge sender 2 - G169- in fuel tank. The lug on the flange points in direction of travel.
– Place fuel lines in right chamber of fuel tank ensuring they are not kinked.
– Fit new seal for flange in fuel tank opening (seal should be dry). Only moisten the inside (contact with flange) with fuel.
– Note installation position of fuel gauge sender 2 - G169- ⇒ page 300
– Check correct position of seal.
– Tighten locking ring using wrench - T10202- . Specified torque: 110 Nm.



– Reconnect connector -1- and check it is secured properly by pulling.
– Install fuel delivery unit ⇒ page 360 .

Further assembly is performed in the reverse order of removal.



9.4 Removing and installing fuel gauge sender 2 - G169-

– Removing and installing suction-jet pump (Tiguan) ⇒ page 364 .

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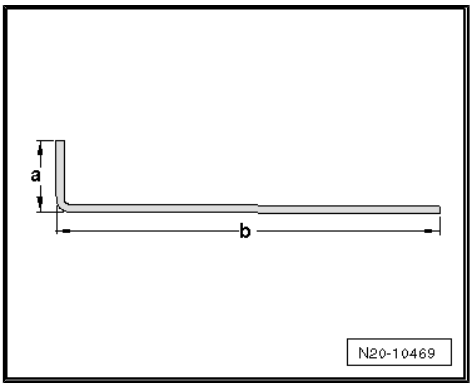
Special tools and workshop equipment required

- Welding wire (2 mm thick)

– Bend an 80 mm long welding wire as shown.

Dimension -a- = 10 mm

Dimension -b-: 70 mm

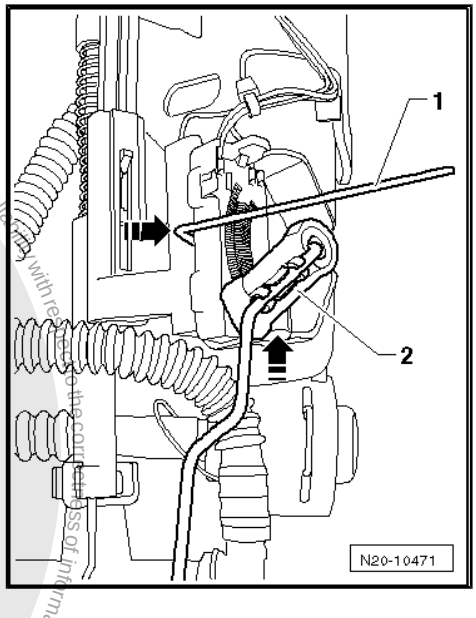


Removing

– Release connectors for lines for fuel gauge sender 2 - G169- -2- and pull off.

– Press welding wire -1- in direction of -arrow- into recess beneath sender.

– At the same time, push fuel gauge sender 2 - G169- -2- from guides in direction of -arrow-.



Installing

– Insert fuel gauge sender 2 - G169- into guides and press down until it engages.

– Reconnect connector and check that it has engaged correctly.

– Install suction-jet pump ⇒ page 364 .

9.5 Removing and installing fuel pump control unit - J538-

Note

The fuel pump control unit - J538- is installed on the fuel tank.

Special tools and workshop equipment required

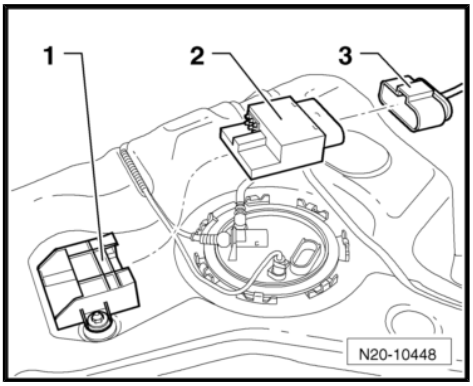
- Commercially available flat-bladed screwdriver (blade width 120 mm)

Fuel pump control unit - J538- fitting location

1 - Bracket for fuel pump control unit - J538-

2 - Fuel pump control unit - J538-

3 - Connector

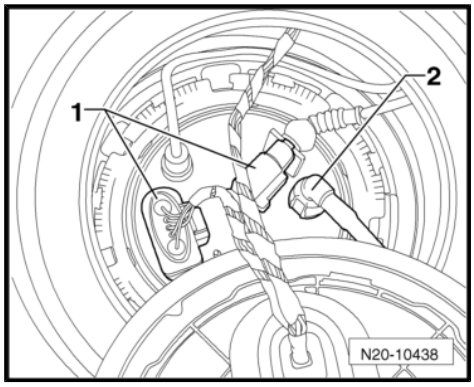


Removing

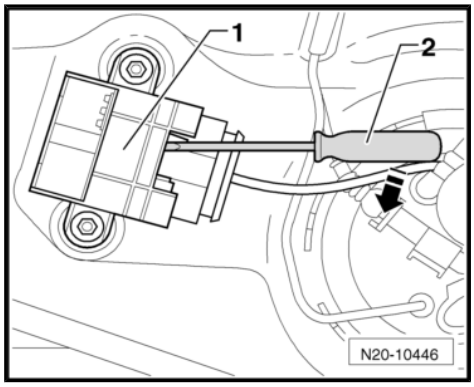
– Remove right (in direction of travel) cover from fuel delivery unit.

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– First ensure that 5-pin wiring connection -1- is secure by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.
– Now pull off connectors -1-.
– Check the contacts on the connector and on the fuel delivery unit for damage.

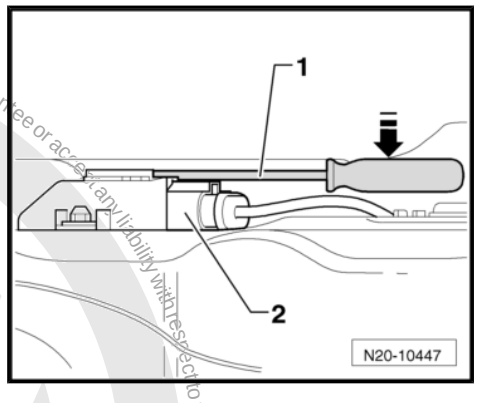


– Slide screwdriver -2- into bracket recess -1- directly above plug.
– Swivel screwdriver in direction of -arrow-.



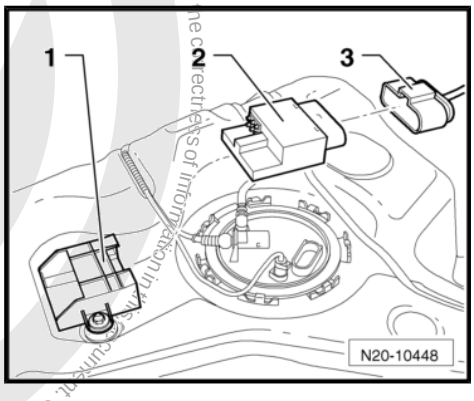
– Press screwdriver down in direction of -arrow- and pull control unit out of bracket at plug at same time.
– First check that the connector is fitted securely by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.
– Pull connector off control unit.

Installing



– Reconnect connector -3- to control unit -2- and check engagement (pull back).
– Slide control unit -2- into bracket -1- until it engages.

Further installation is carried out in the reverse sequence of removal.



9.6 Checking fuel pump

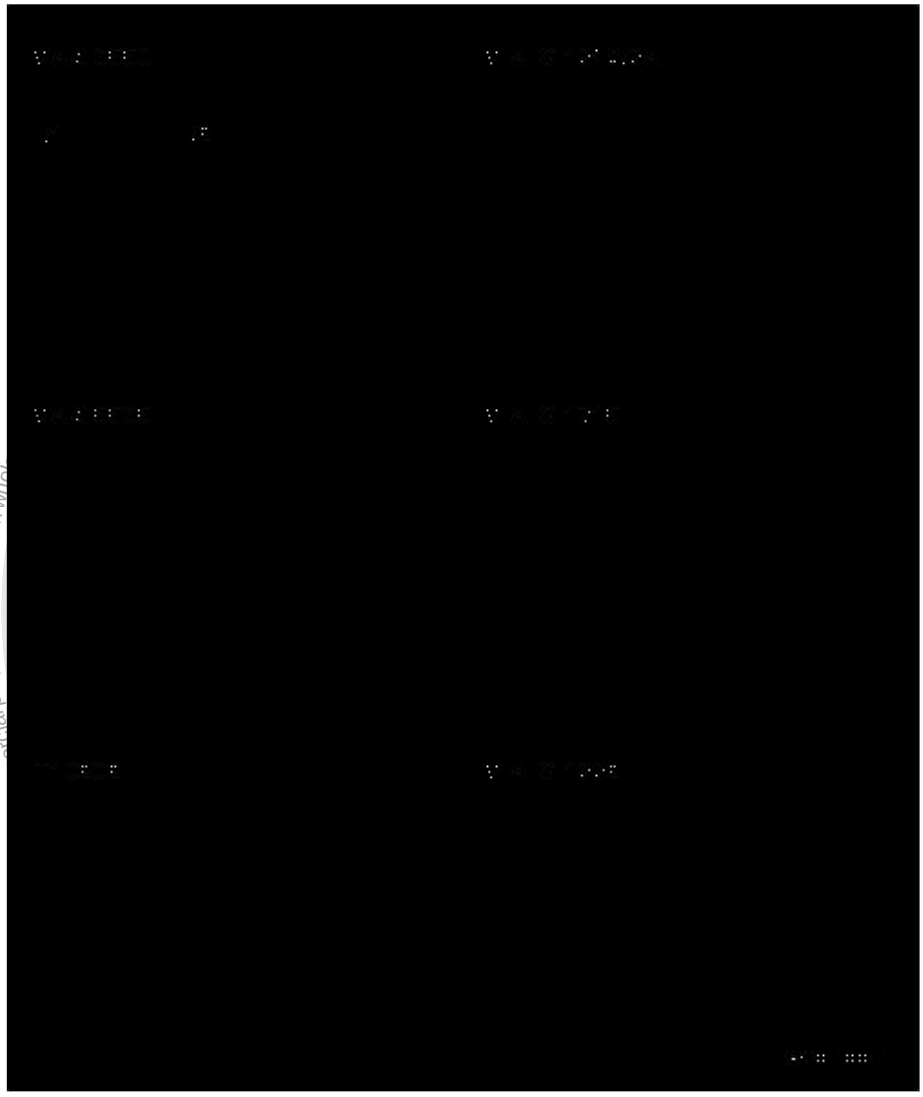
Note

When replacing fuel delivery unit, check fuel tank for heavy soiling and clean if necessary.

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Special tools and workshop equipment required

- Pressure gauge - VAS 6550-
- Remote control - V.A.G 1348/3A-
- Test instrument adapter/ DSO (5-pin) - VAS 5565-
- Multimeter - V.A.G 1715-
- Special wrench - T10202-
- Measuring container, capacity: 3 litres



⇒ “9.6.1 Checking function and voltage supply”, page 369

⇒ “9.6.2 Checking fuel pressure”, page 371

⇒ “9.6.3 Checking fuel pressure when the engine is running and vehicle is in gear (engine codes CCZA, CCZB, CCZC, CCZD)”, page 372

⇒ “9.6.4 Checking holding pressure”, page 375

⇒ “9.6.5 Checking fuel delivery rate (engine codes CAWA, CAWB, CCTA, CCTB)”, page 376

⇒ “9.6.6 Checking fuel delivery rate (engine codes CCZA, CCZB, CCZC, CCZD)”, page 378

⇒ “9.6.7 Checking current consumption”, page 380

9.6.1 Checking function and voltage supply

- Battery voltage at least 12 V
- Fuse for fuel pump on fuse holder OK ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Fuel pump control unit - J538- OK.

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Test sequence

Note

- *Function of fuel pump is checked using final control diagnosis.*
- *If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.*

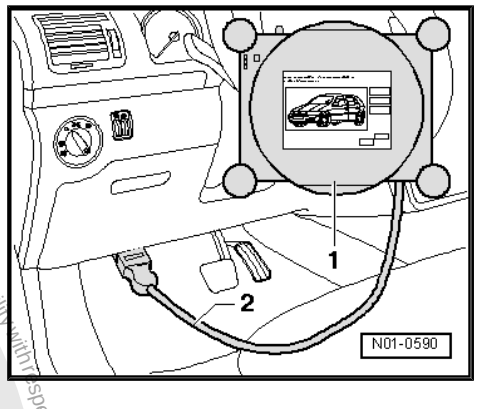
– Connect vehicle diagnostic tester as follows:

– Push diagnosis cable connector onto diagnosis connection in driver footwell.

– Switch ignition on.

– Press buttons on display one after the other for `Vehicle self-diagnosis`, `Engine electronics` and `Final control diagnosis`.

– Press right arrow button ▶ on display up to final control diagnosis for fuel pump electronics.



The fuel pump must now run slowly up to maximum speed.

Note

The fuel pump runs very quietly.

– Switch off ignition.

If fuel pump does not run:

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove right (in direction of travel) cover from fuel delivery unit.

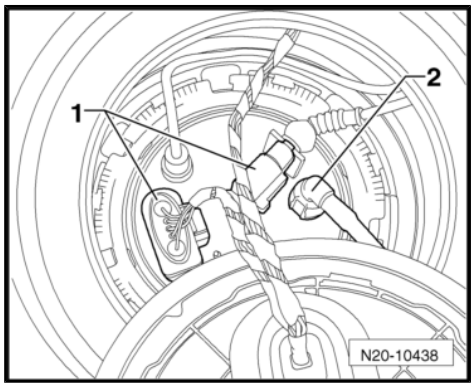
Note

For vehicles with auxiliary heater the metering pump - V54- connector must be separated additionally.

– First ensure that 5-pin wiring connection -1- is secure by pulling the connector without pressing the catch. If connector was not inserted correctly, repeat functional check of fuel pump.

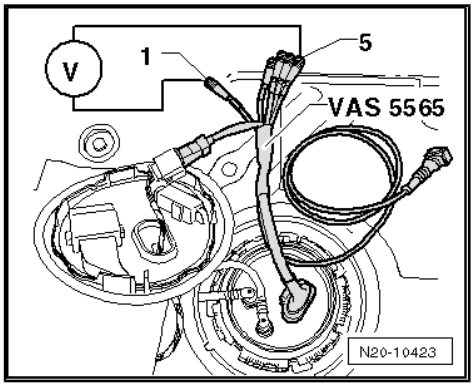
– Now pull off connectors -1-.

– Check the contacts on the connector and on the fuel delivery unit for damage.



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– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect multimeter - V.A.G 1715- to contacts -1- and -5- of adapters - VAS 5565- .
– Actuate fuel pump with final control diagnosis.
• The voltage must rise to about 9 V during the final control diagnosis.



Voltage supply not OK:

– Locate and eliminate open circuit referring to current flow diagram ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

Voltage supply OK:

– Remove fuel delivery unit ⇒ page 360 .
– Check that electrical wires between flange and fuel pump are connected.

If no open circuit can be found:

– Fuel pump defective, renew fuel delivery unit ⇒ page 360 .

9.6.2 Checking fuel pressure

Test conditions:

• Function of fuel pump has been checked ⇒ page 369 .

Test sequence

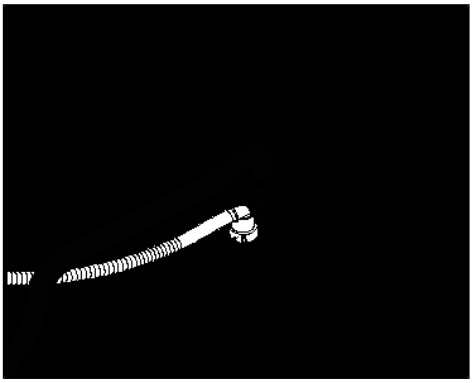
Note

◆ *The fuel pressure must be checked by means of the final control diagnosis. If the fuel pressure is measured at idling speed, it may deviate from the specification.*
◆ *If the final control diagnosis is to be carried out several times in succession, it may be necessary to start the engine briefly before repeating the final control diagnosis.*

WARNING

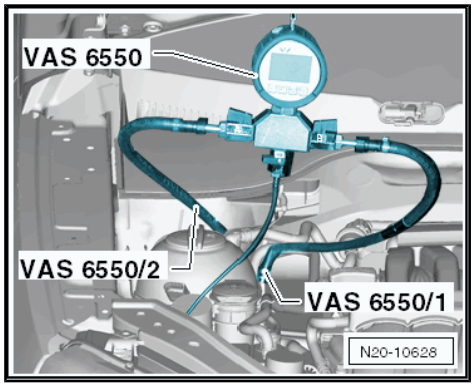
Fuel supply line is pressurised. Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then release pressure by carefully pulling hose off connection.

– Pull off supply line (metal coupling) -2- and catch escaping fuel with a cloth.



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– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/1- and -VAS 6550/2- .
– Make sure that drain tap is closed and cut-off taps are open.
– Actuate fuel pump with final control diagnosis to build up fuel pressure.
– Read fuel pressure on pressure gauge.
• Specification: 4.0 to 7.0 bar



If fuel pressure is OK, check holding pressure ⇒ page 375 .

If specification is not obtained

– Renew left flange with pressure limiting valve, suction jet pump and fuel filter.

Note

Pressure limiting valve and fuel filter are integrated into fuel gauge sender 2 - G169- with suction-jet pump and cannot be renewed individually.

– Repeat check.

If reading again does not match specification:

– Fuel pump defective, renew fuel delivery unit ⇒ page 360 .

9.6.3 Checking fuel pressure when the engine is running and vehicle is in gear (engine codes CCZA, CCZB, CCZC, CCZD)

Note

♦ *If a complaint is made about the vehicle's performance, the reason may be that the fuel pressure is too low. Faults in the high-pressure section may also be caused by inadequate fuel pressure in the low-pressure section. This check determines the fuel pressure in the high-pressure and low-pressure sections during a road test. Fuel pressure in the high-pressure section is read from the engine control unit. The lowest fuel pressure is measured by the pressure tester - VAS 6550- and reported to the vehicle diagnosis and service information system - VAS 5052 B- .*

♦ *This test can be part of "Guided Fault Finding" if an entry has been made in the event memory. However, it can also be started in the vehicle diagnosis and service information system - VAS 5052 B- by means of "Functions and component selection".*

Special tools and workshop equipment required

♦ Pressure gauge - VAS 6550-
♦ Hose adapters - VAS 6550/1- and -VAS 6550/2-
♦ Vehicle diagnosis and service information system - VAS 5052 B-
♦ Connector cable - VAS 5051/66-

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

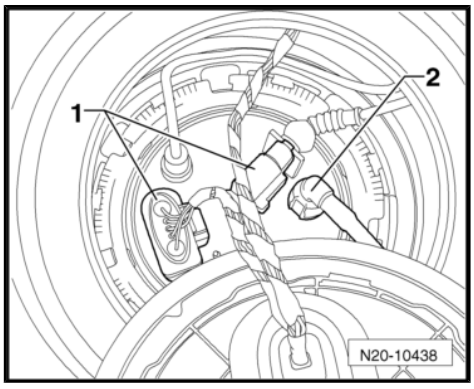
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– Remove right (in direction of travel) cover from fuel delivery unit.

Note

For vehicles with auxiliary heater the metering pump - V54- connector must be separated additionally.

– First ensure that 5-pin wiring connection -1- is secure by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.



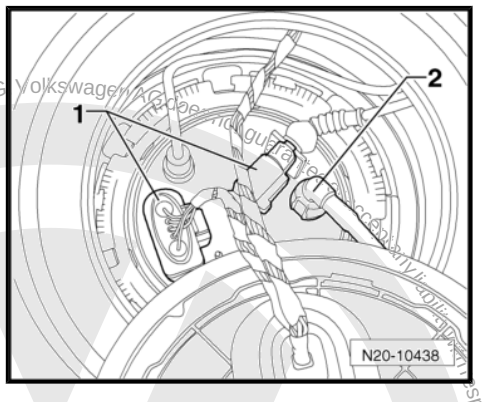
WARNING

The fuel line is under pressure.

Fuel poses danger of injury to eyes and skin.

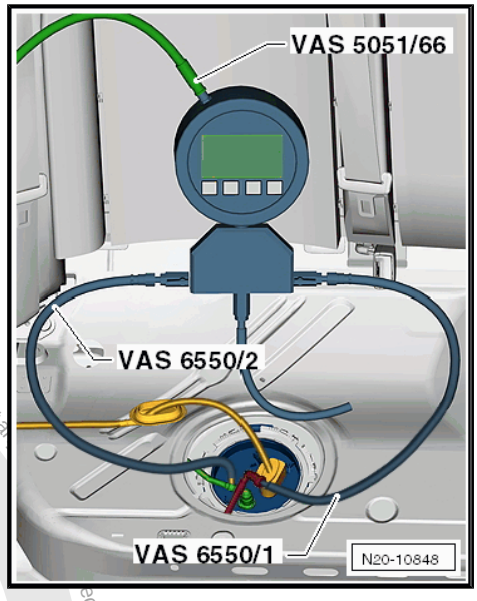
Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.

– Pull off supply line -2- and catch escaping fuel with a cloth.



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– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- and -VAS 6550/1- .
– Fit connector cable - VAS 5051/66- to pressure tester - VAS 6550- and to vehicle diagnosis and service information system - VAS 5052 B- .
– Make sure that drain tap is closed and cut-off taps are open.
– Switch on pressure tester - VAS 6550- .



If the fuel pressure test is carried out within “Guided Fault Finding”, follow the instructions of the diagnostic tester.

If the fuel pressure test is carried out without “Guided Fault Finding”, proceed as follows:

– Connect vehicle diagnosis and service information system - VAS 5052 B- to vehicle.
– Select `Guided Fault Finding` in -VAS 5052 B- .
– Carry out identification of vehicle.
– Using the `GoTo` button, select the following menu options one after the other:

♦ `Function/component selection`
♦ `Drive`
♦ `Engine`
♦ `24 Mixture preparation/injection`
♦ `Mechanical components`
♦ `High-pressure pump`

– Follow instructions on vehicle diagnosis and service information system - VAS 5052 B- .

WARNING

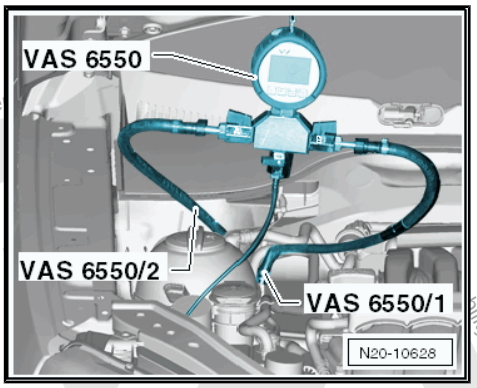
Test instruments and measuring equipment must always be secured to the rear seat and operated by a second person from this location.

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9.6.4 Checking holding pressure

Prerequisites for check

- Fuel pressure OK and pressure tester - VAS 6550- connected. Check fuel pressure ⇒ page 348 .



Test sequence

– Actuate fuel pump with final control diagnosis to build up fuel pressure.

– Read fuel pressure on pressure gauge.

- Specification: 4.0 to 7.0 bar

– End self-diagnosis, and switch off ignition.

– Watch pressure drop on pressure gauge. Pressure must remain above 3.0 bar for 10 minutes.

If the pressure drops further:

– Actuate fuel pump with final control diagnosis to build up fuel pressure.



– After pressure has built up, close cut-off tap -B- of pressure tester immediately. Lever is then at right angle to direction of flow.

If the pressure drops again (leak on fuel tank side):

Leak must be sought on fuel tank side; proceed as follows:

– Check fuel line to flange for leaks.

If no fault is detected on »external« fuel lines, search for leak in fuel tank. Proceed as follows:

– Open flanges on left and right. Ensure all hose connections are fitted correctly and do not leak.

If no fault is found:

– First renew left flange with pressure limiting valve and fuel filter. Repeat pressure retention test. If leak is still present, non-return valve in fuel pump leaks, renew fuel delivery unit.

If the pressure does not drop now (leak on engine side):

Note

Search for leak on engine side. Repeat holding pressure test. This time, close shut-off tap -A- to check whether leak actually is on engine side.

– If there is a leak on the engine side, carry out external check of the fuel pipes and high-pressure pump for leaks.

If no fault can be determined, check the injectors for leaks:

– Remove spark plugs. Open shut-off valves -A- and -B-. Actuate fuel pump with final control diagnosis.

– Check through spark plug holes whether fuel has collected on the piston crown due to a leaking injector.

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9.6.5 Checking fuel delivery rate (engine codes CAWA, CAWB, CCTA, CCTB)

Test conditions

- Voltage supply OK.
- When driving characteristic problems occur when the fuel tank is a approx. $^1/_4$ filled, then check fuel delivery rates with approx. $^1/_4$ filled tank or less.

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove right (in direction of travel) cover from fuel delivery unit.

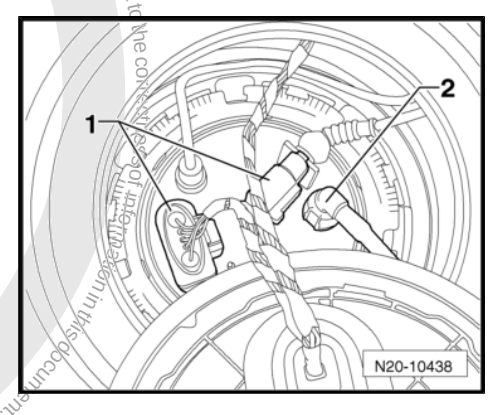
Note

For vehicles with auxiliary heater the metering pump - V54- connector must be separated additionally.

– First ensure that 5-pin wiring connection -1- is secure by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

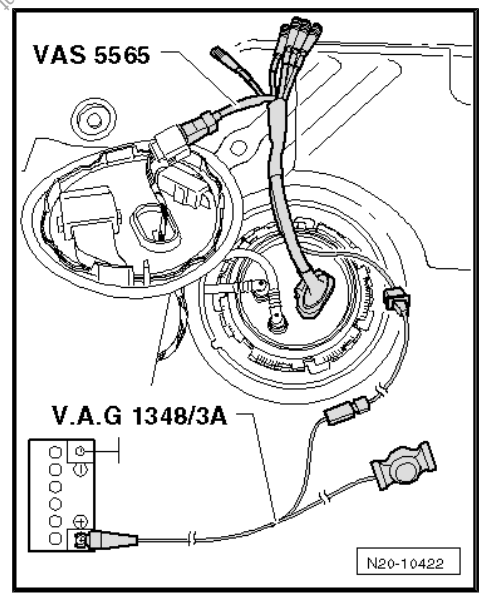
– Now pull off connectors -1-.

– Check the contacts on the connector and on the fuel delivery unit for damage.



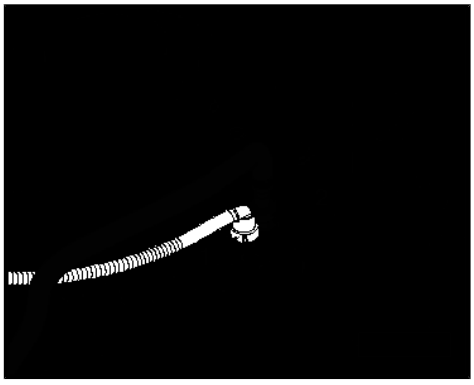
– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.

– Connect remote control - V.A.G 1348/3A- to test instrument adapter/DSO (5-pin) - VAS 5565- and to battery positive (+).



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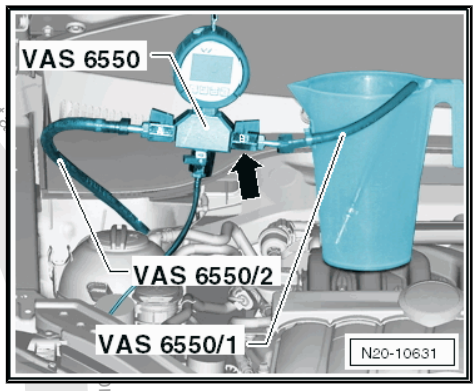
– Pull off supply line (metal coupling) -2- and catch escaping fuel with a cloth.



Note

Press in securing ring to release the fuel lines.

– Connect pressure tester - VAS 6550- to fuel supply line with adapter - VAS 6550/2- . Hold adapter - VAS 6550/1- in a measuring container.



– Make sure that drain tap is closed and cut-off taps are open.

WARNING

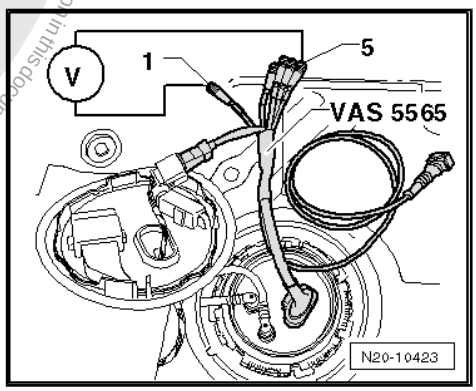
Danger of spray when shut-off tap is opened. Wear eye protection and protective clothing to avoid injuries and skin contact. Hold container in front of open connection of pressure tester.

– Operate remote control - V.A.G 1348/3A- . Then slowly close shut-off tap -arrow- until a pressure of 4 bar is displayed on pressure gauge. From this point on do not move position of shut-off tap.

– Drain measuring container.

– The quantity delivered by the fuel pump depends on the battery voltage. Therefore, connect multimeter - V.A.G 1715- to wires -1- and -5- of adapter - VAS 5565- in addition.

– Operate remote control for 60 seconds while measuring voltage at fuel pump.

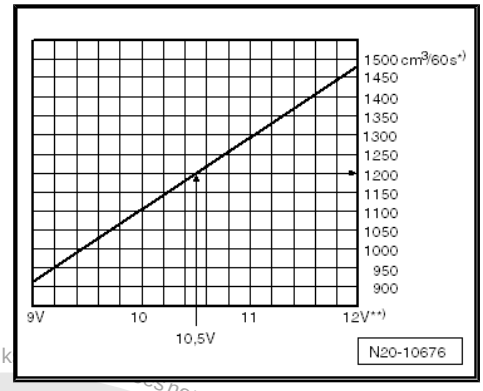


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– Compare quantity of fuel delivered with specification.

*) Minimum delivery rate cm³/60 s

**) Voltage at fuel pump with engine not running and pump running.



Reading example:

During the test a voltage of 10.5 volts is measured. This equates to a minimum delivery rate of approx. 1200 cm³/60 s

If specification is not obtained

– Check fuel lines for possible restrictions (kinks) or blockages.

If no fault is found:

– Remove cap from fuel filler neck and repeat check. If fuel delivery rate is now reached, check fuel tank breather.

If reading again does not match specification:

– Open flanges on left and right. Ensure all hose connections are fitted correctly and do not leak. Check sieve in fuel delivery unit and fuel tank for coarse soiling.

If no fault is found:

– First renew left flange with pressure limiting valve and fuel filter. Repeat delivery rate check. If fuel delivery is still insufficient, fuel pump defective, renew fuel delivery unit.

If the fuel delivery rate has been attained but a fault is still suspected in the fuel supply system (e.g. intermittent failure of fuel supply system):

– Measure current draw of fuel pump ⇒ page 380 .

9.6.6 Checking fuel delivery rate (engine codes CCZA, CCZB, CCZC, CCZD)

Note

The fuel delivery rate must first be checked in the engine compartment with the help of the function “Checking fuel delivery rate, quick test”. If the minimum delivery rate is not achieved, a 2nd measurement must be carried out at the flange of the fuel delivery unit.

Checking fuel delivery rate in engine compartment:

– Connect vehicle diagnosis and service information system - VAS 5052 B- to vehicle.

– Select `Guided Functions` in -VAS 5052 B- .

– Carry out identification of vehicle.

– Select `Engine`.

– Select `Checking fuel delivery rate, quick test`.

– Follow instructions on vehicle diagnosis and service information system - VAS 5052 B- .

Checking fuel delivery rate at flange:

- The guided function “Checking fuel delivery rate, quick test” has been carried out ⇒ Vehicle diagnostic tester

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- The remote control - V.A.G 1348/3A- and test instrument adapter/DSO (5-pin) - VAS 5565- have been connected to the fuel delivery unit.
- Battery charger connected
- Filling level in fuel tank above reserve

Test sequence

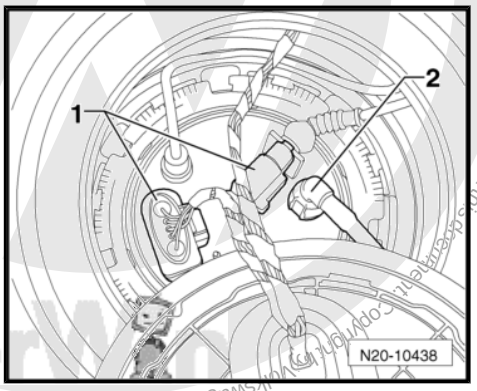
WARNING

The fuel line is under pressure.

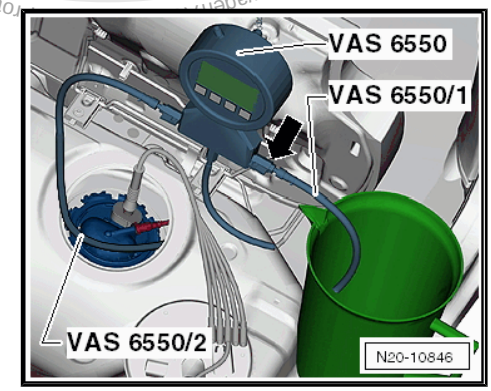
Fuel poses danger of injury to eyes and skin.

Wear protective goggles and protective clothing to avoid injury and contact with the skin. Wrap a cloth around the connection before loosening hose connections. Then reduce pressure by carefully opening the connection.

– Pull supply line -2- off right flange and catch escaping fuel with a cloth.



– Connect pressure tester - VAS 6550- to flange with adapter - VAS 6550/2- . Hold adapter - VAS 6550/1- in a measuring container.
– Make sure that drain tap is closed and cut-off taps are open.
– Press the remote control - V.A.G 1348/3A- and slowly close shut-off tap -arrow- until a pressure of 4 bar is displayed on pressure gauge. From this point on do not move position of shut-off tap.
– Drain measuring container.



– The quantity delivered by the fuel pump depends on the battery voltage. Therefore, connect multimeter - V.A.G 1715- to wires -1- and -5- of adapter - VAS 5565- in addition.
– Operate remote control for 60 seconds while measuring voltage at fuel pump.

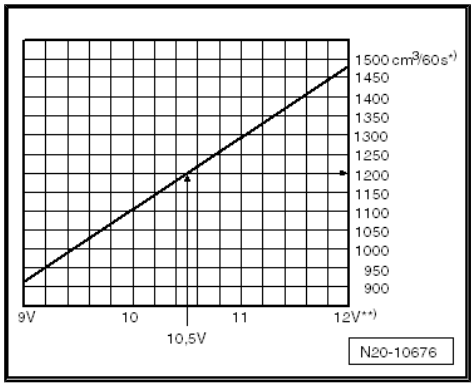


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– Compare quantity of fuel delivered with specification.

*) Minimum delivery rate cm³/60 s

**) Voltage at fuel pump with engine not running and pump running.



Reading example:

During the test a voltage of 10.5 volts is measured. This equates to a minimum delivery rate of approx. 1200 cm³/60 s

If specification is not obtained

– Check fuel lines for possible restrictions (kinks) or blockages.

If no fault is found:

– Remove cap from fuel filler neck and repeat check. If fuel delivery rate is now reached, check fuel tank breather.

If reading again does not match specification:

– Open flanges on left and right. Ensure all hose connections are fitted correctly and do not leak. Check sieve in fuel delivery unit and fuel tank for coarse soiling.

If no fault is found:

– First renew left flange with pressure limiting valve and fuel filter. Repeat delivery rate check. If fuel delivery is still insufficient, fuel pump defective, renew fuel delivery unit.

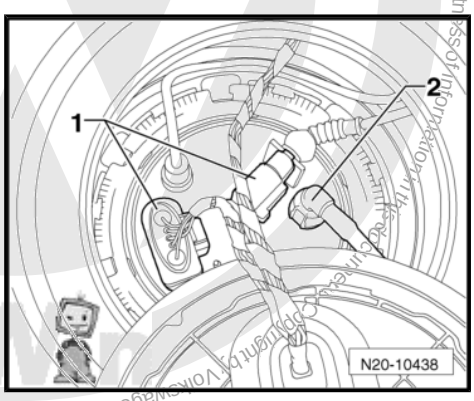
If fuel delivery rate has been attained, but nevertheless you suspect a fuel supply system fault (e.g. intermittent failure of fuel supply system): Check fuel pressure with the engine running ⇒ page 372 .

9.6.7 Checking current consumption

– Remove bench seat ⇒ General body repairs, interior; Rep. gr. 72 ; Removing and installing bench seat .

– Remove right (in direction of travel) cover from fuel delivery unit.

– First ensure that 5-pin wiring connection -1- is secure by pulling the connector without pressing the catch. The connector can cause a fault if it has not been fitted correctly.

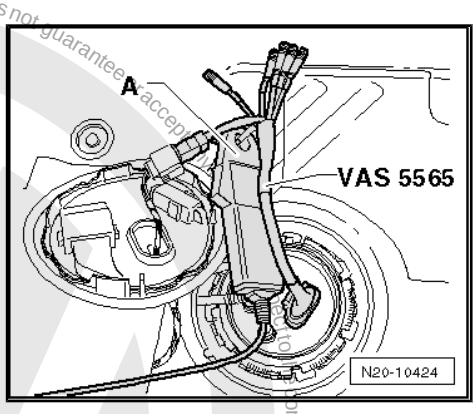


– Now pull off connectors -1-.

– Check the contacts on the connector and on the fuel delivery unit for damage.

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– Connect test instrument adapter/DSO (5-pin) - VAS 5565- to connector and fuel delivery unit.
– Connect pick-up clamp -A- to red terminal with lettering “pick-up clamp” for test instrument adapter/DSO (5-pin) - VAS 5565- .
– Start engine and run at idling speed.
– Measure current draw of fuel pump.
• Specification: max. 16 amps



Note

♦ *The starting current for the fuel pump can be briefly above specifications when starting the engine.*

♦ *If the fuel system malfunction is intermittent, you can perform the check during a road test, but a 2nd person is necessary.*

If the current draw is exceeded:

– Fuel pump defective, renew fuel delivery unit ⇒ page 360 .

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10 Electronic power control (EPC)

Assembly overview - accelerator module ⇒ page 382 .

Removing and installing accelerator module ⇒ page 382 .

10.1 Assembly overview - accelerator module

1 - Connector

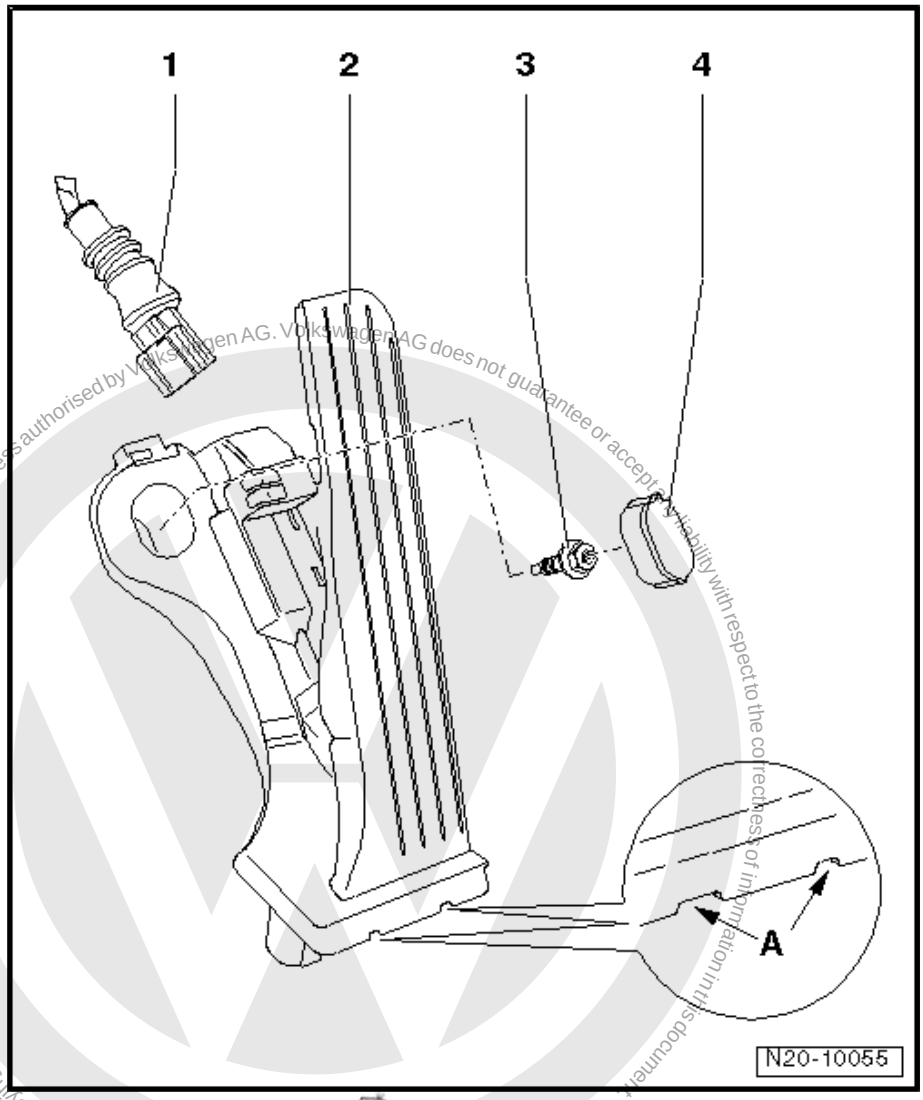
- ❑ Black, 6-pin.

2 - Accelerator position sender - G79- with accelerator position sender 2 - G185-

- ❑ Not adjustable.
- ❑ The accelerator position sender passes the position of the accelerator on to the engine control unit.
- ❑ -A- openings for release tool .
- ❑ Removing and installing ⇒ page 382

3 - 10 Nm

4 - Cap

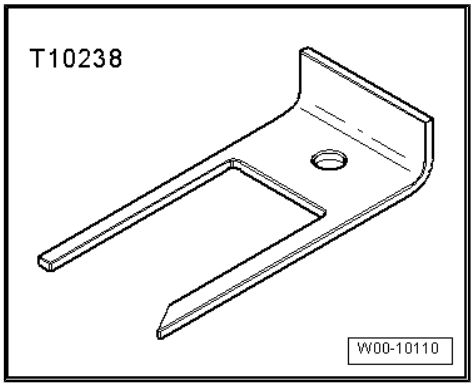


10.2 Removing and installing accelerator pedal module

Special tools and workshop equipment required

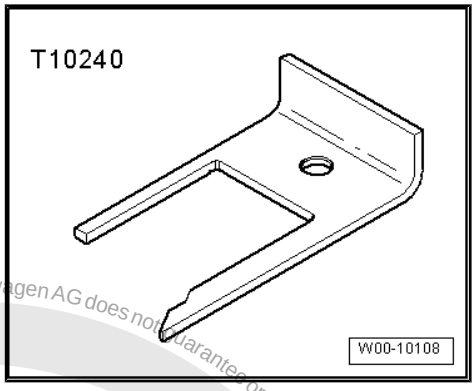
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♦ For left-hand drive vehicles: release tool - T10238-



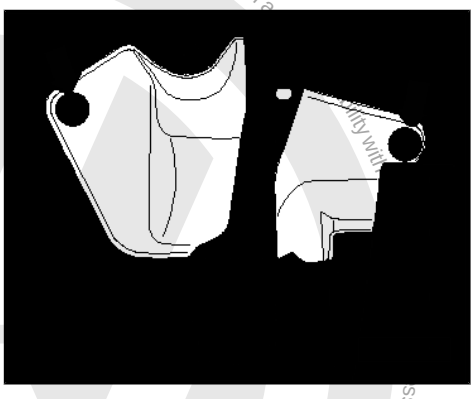
Or

♦ For right-hand drive vehicles: release tool - T10240-

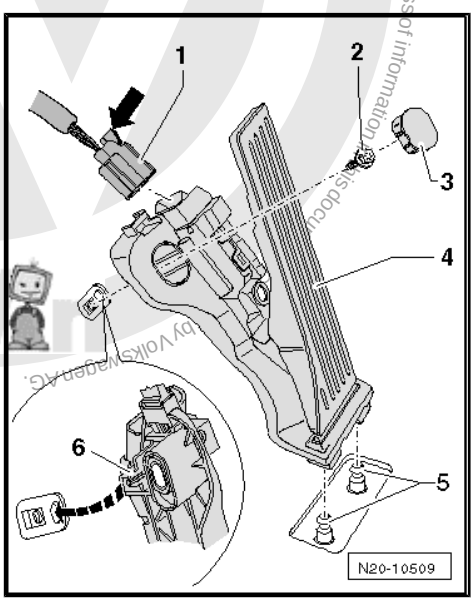


Removing

– Remove steering column cover -arrows-.

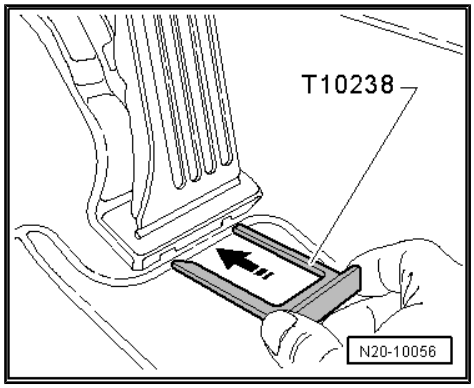


– Prise out cap -3- using a screwdriver.
– Remove bolts -2-.
– Release connector -1- -arrow- and pull off accelerator module.



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– Push release tool - T10238- (for right-hand drive vehicles release tool - T10240-) into intended holes as shown to stop and remove accelerator module.

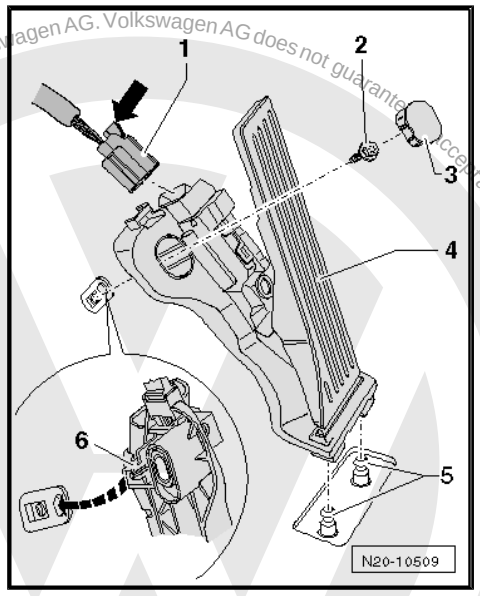


Note

In the Tiguan, raise the release tool slightly and then insert it at a slight angle.

Installing

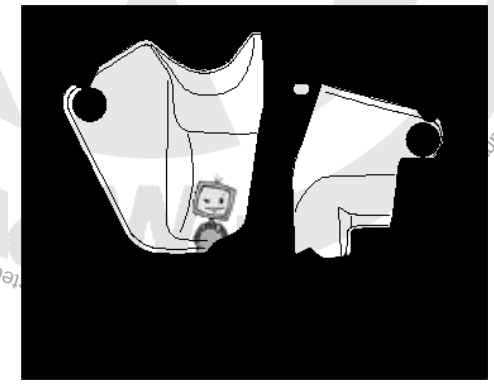
– Reconnect connector -1- to accelerator module -4-. Lock connector -arrow-.
– Press accelerator module onto securing pins -5-.
– Insert centring pin -6- into hole in underbody.
– Secure accelerator module with bolt -2- and install cap -3-.



– Install steering column trim.

Specified torque:

Component	Nm
Accelerator module to body	10



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11 Activated charcoal filter system (Passat, CC, Tiguan)

Assembly overview - activated charcoal filter system (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB) ⇒ page 385 .

Assembly overview - activated charcoal filter system (engine codes CBFA, CCTA, CCTB) ⇒ page 386 .

Checking fuel tank breather (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB) ⇒ page 388 .

Check fuel system for leaks CBFA, CCTA, CCTB ⇒ page 390 .

Note

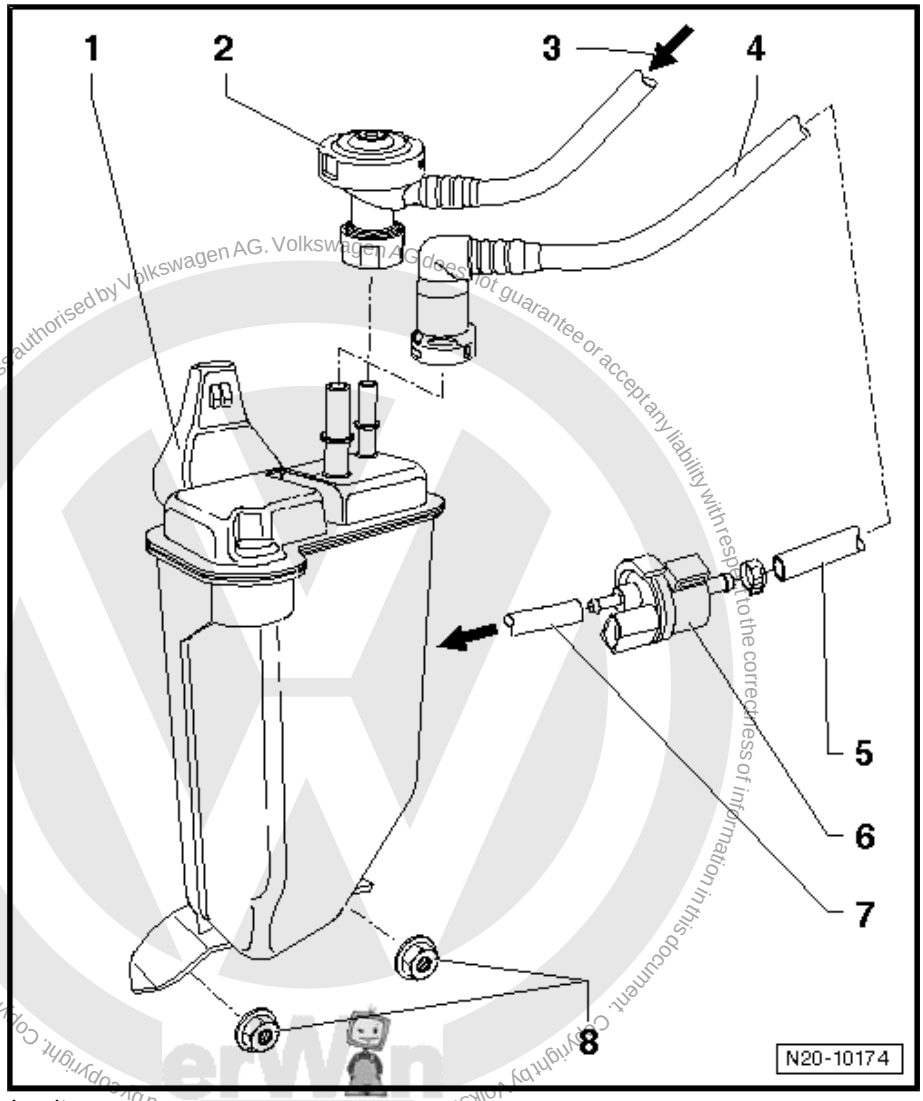
- *Hose connections are secured with either spring-type or clamp-type clips.*
- *Spring-type clip pliers - VAS 6340- or space saving hose clip pliers - VAS 6362- are recommended for installing and removing spring-type clips.*

The plug-in connectors for fuel, vacuum and breather lines are colour coded. There is either a coloured dot on the plug-in connector or the release button is coloured.

Plug-in connector	Colour code on plug-in connector
Fuel supply	black
Fuel return	blue
Breather	white, beige
Vacuum	green

11.1 Assembly overview - activated charcoal filter system (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)

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1 - Activated charcoal filter

- ❑ Location: in rear right wheel housing.
- ❑ To remove, unscrew securing bolts and pull activated charcoal filter downwards out of retainer.

2 - Pressure retention valve with connecting hose

- ❑ To remove, grasp securing ring (grey) and pull off upwards.
- ❑ Ensure firm seating.

3 - From fuel tank

4 - Breather hose

- ❑ To activated charcoal filter solenoid valve 1 - N80- ⇒ Item 6 (page 386)
- ❑ Clipped onto fuel tank.
- ❑ Ensure firm seating.

5 - Breather hose

- ❑ From activated charcoal filter ⇒ Item 1 (page 386)
- ❑ Ensure firm seating.

6 - Activated charcoal filter solenoid valve 1 - N80-

- ❑ Valve closed with ignition switched off
- ❑ When engine is warm, valve will be activated (pulsed) by engine control unit

7 - Connection hose

- ❑ To intake manifold
- ❑ Ensure firm seating.

8 - 10 Nm

11.2 Assembly overview - activated charcoal filter system (engine codes CBFA, CCTA, CCTB)

Note

On some vehicles an additional filter is installed on the activated charcoal filter system

Assembly overview - activated charcoal filter system ⇒ page 387

Assembly overview - activated charcoal filter system (vehicles with additional filter) ⇒ page 388 .

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11.2.1 Assembly overview - activated charcoal filter system

1 - Securing bolts

2 - Fuel system diagnostic pump - V144-

3 - Vacuum line

4 - Clamp

5 - Connection hose

- ❑ Activated charcoal filter / fuel system diagnostic pump - V144-

6 - Vacuum hose

7 - Connection hose

- ❑ Fuel system diagnostic pump - V144- / air filter.

8 - Air filter

9 - 10 Nm

10 - Activated charcoal filter

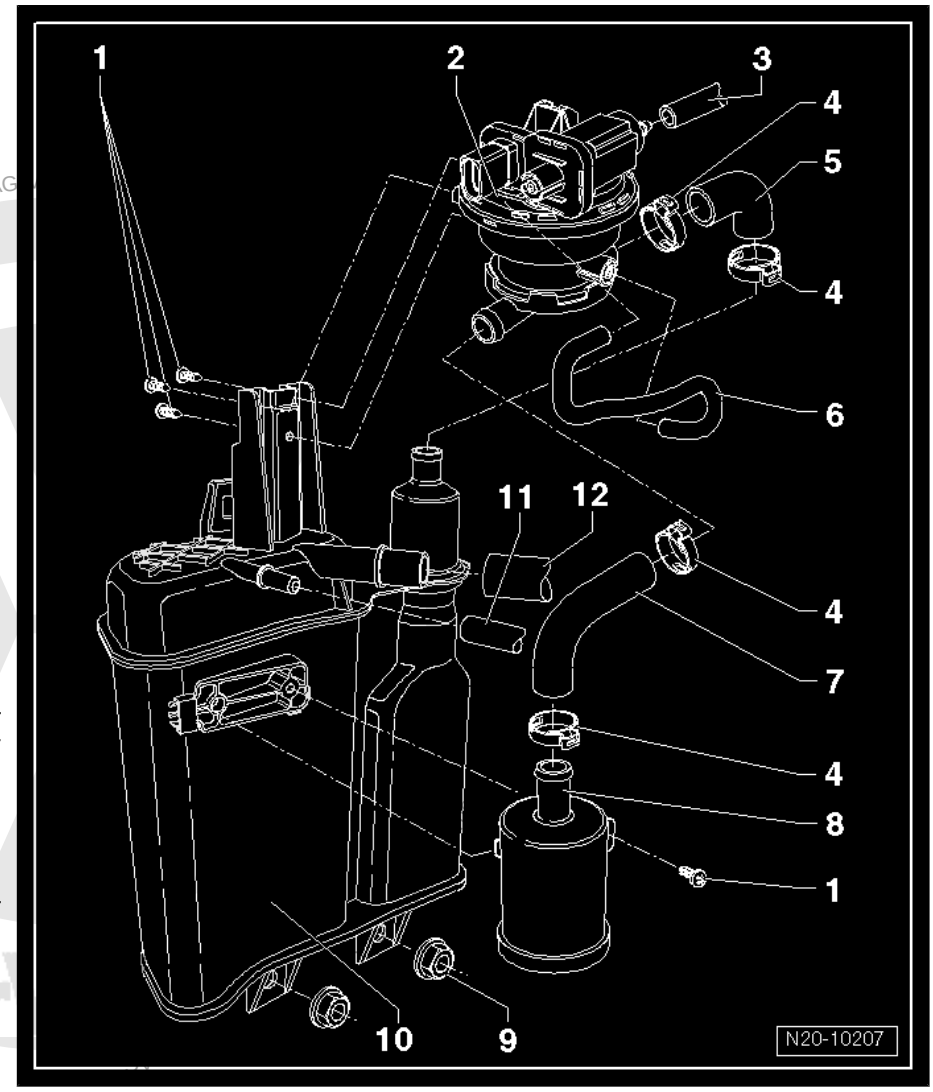
- ❑ Location: in rear right wheel housing.
- ❑ To remove, unscrew securing bolts and pull activated charcoal filter downwards out of retainer.

11 - Breather hose

- ❑ To activated charcoal filter solenoid valve 1 - N80-
- ❑ Clipped onto fuel tank.

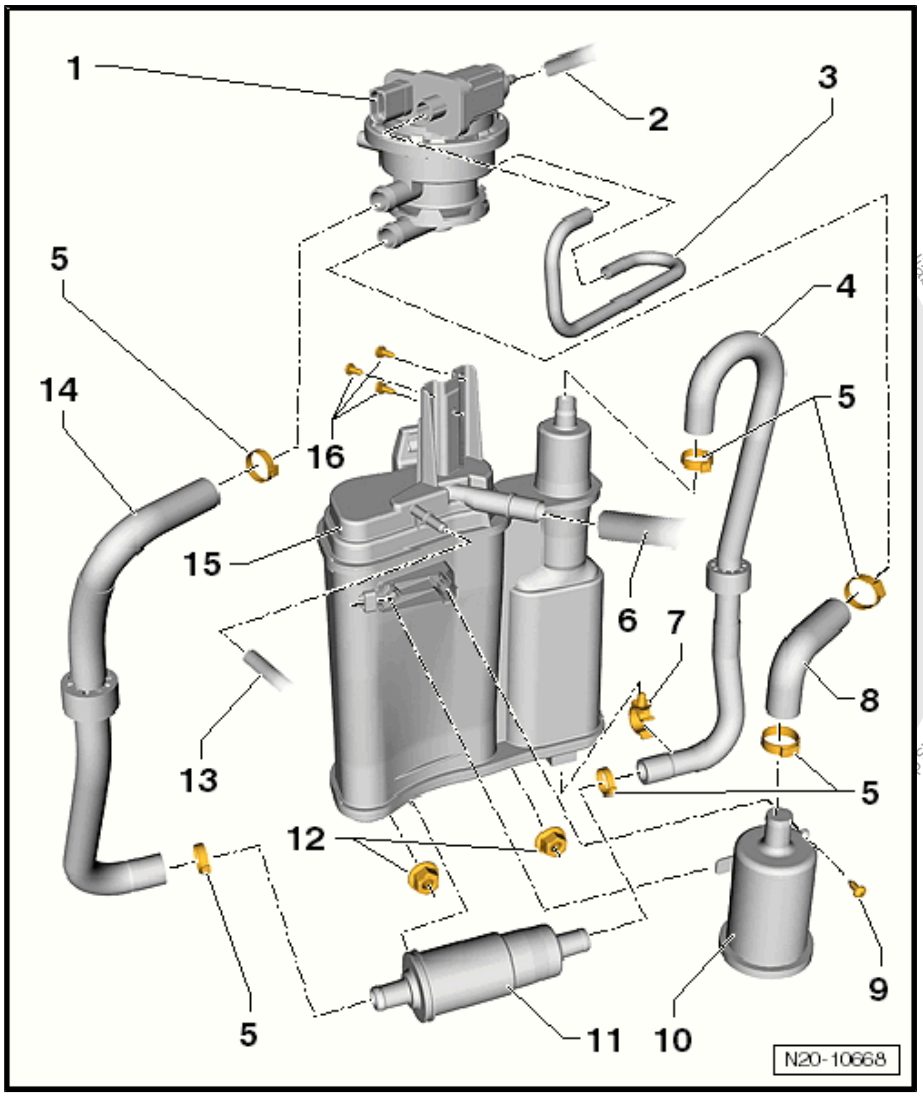
12 - Breather hose

- ❑ From fuel tank



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11.2.2 Assembly overview - activated charcoal filter system (vehicles with additional filter)



1 - Fuel system diagnostic pump - V144-

2 - Vacuum line

3 - Vacuum hose

4 - Connection hose

5 - Clamp

6 - Breather hose

- ❑ From fuel tank

7 - Clip

8 - Connection hose

- ❑ Fuel system diagnostic pump - V144- / air filter.

9 - Securing bolt

10 - Air filter

11 - Additional filter

12 - 10 Nm

13 - Breather hose

- ❑ To activated charcoal filter solenoid valve 1 - N80-
- ❑ Clipped onto fuel tank.

14 - Connection hose

15 - Activated charcoal filter

- ❑ Location: in rear right wheel housing.
- ❑ To remove, unscrew securing bolts and pull activated charcoal filter downwards out of retainer.

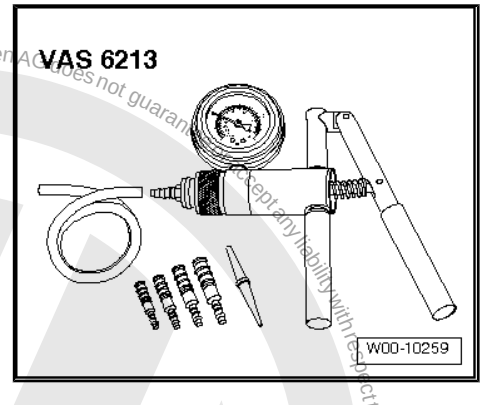
16 - Securing bolts

11.3 Checking fuel tank breather (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)

Special tools and workshop equipment required

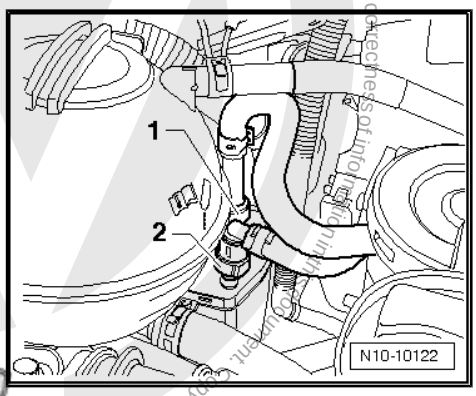
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♦ Hand operated vacuum pump - VAS 6213-

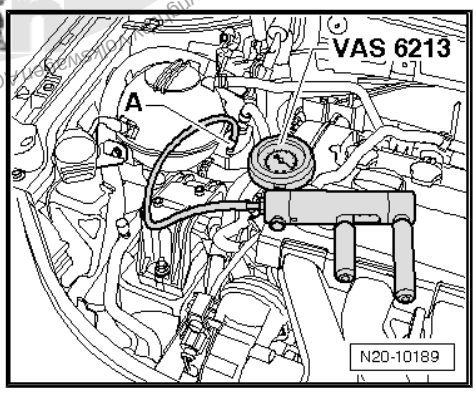


Test sequence

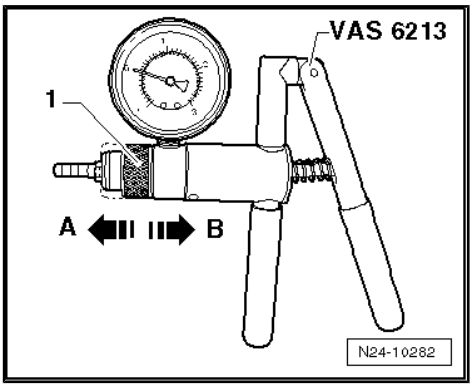
– Pull off breather line -2-. To do this, press release button. (colour marking: white)



– Then connect hand vacuum pump - VAS 6213- as shown to breather line.

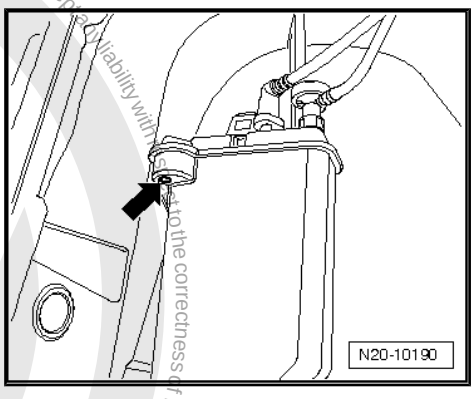


– Move slide ring -1- on hand vacuum pump - VAS 6213- to position -A- for “vacuum”.
– Operate hand vacuum pump - VAS 6213- several times. There must be no development of vacuum.



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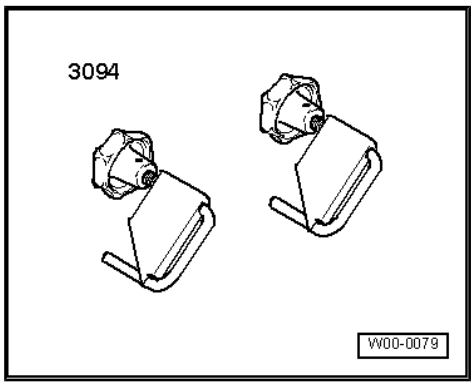
– Seal breather hole on activated charcoal filter -arrow- and operate vacuum pump several times again. Vacuum must build up.



11.4 Check fuel system for leaks (engine codes CBFA, CCTA, CCTB)

Special tools and workshop equipment required

- Fuel system tester (so-called smoke tester) - KLI 9210-
- Adapter hose - KLI 9210/55-1-
- Vehicle diagnostic tester
- Hose clamps to 25 mm - 3094-



The plug-in connectors for fuel, vacuum and breather lines are colour coded. There is either a coloured dot on the plug-in connector or the release button is coloured.

Plug-in connector	Colour code on plug-in connector
Fuel supply	black
Fuel return	blue
Breather	white, beige
Vacuum	green

Test specification:

- A leak has been detected by the fuel system diagnostic pump - V144- .
- Guided fault finding has been performed with the vehicle diagnostic tester .

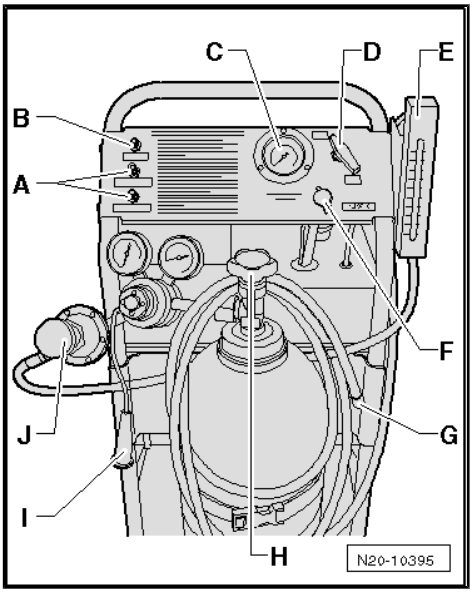
Preparation of fuel system tester - KLI 9210- :

Note

The fuel system tester - KLI 9210- may differ in appearance depending on the version.

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– Check on fuel system tester - KLI 9210- if there is enough fluid in smoke generator.
– Set valve -D- to “Hold”.
– Open nitrogen bottle -H-.
– Connect test hose -G- to self-test connection -B-.
– Set valve -D- to “Test”.
– Regulate pressure to 10 in. H2O (25 mbar) with pressure reducer -J-.
– Set valve -D- to “Hold”.
– Now pressure must be maintained for at least 2 minutes. Check tester if pressure is not maintained.

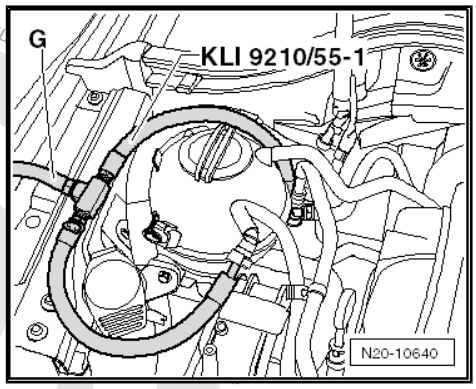


Checking fuel system for leaks:

– Connect adapter hose - KLI 9210/55-1- to breather line -A-. (colour marking: white)



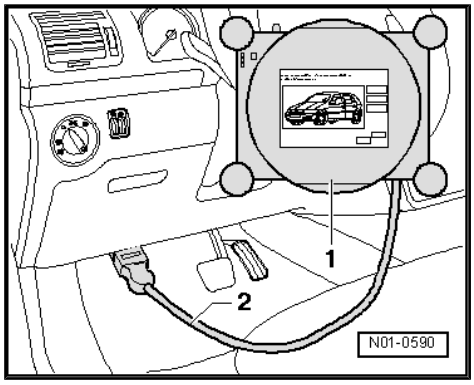
– Connect measuring hose -G- from fuel system tester - KLI 9210- to adapter hose - KLI 9210/55-1- .
– Set valve -D- to “Hold”.



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– Connect vehicle diagnostic tester to vehicle.
– Start engine and run at idling speed.
– On vehicle diagnostic tester , select operating mode `Guided Functions`.
– Select guided function “Checking tank ventilation system for leaks”.
– Initiate test.
– Observe pressure gauge - KLI 9210- while test is running.

• Fuel system diagnostic pump - V144- must pump up pressure in fuel system to at least 7 in. H2O (18 mbar).



The minimum pressure was not reached, but the available pressure does not drop.

– Switch off ignition and perform a pressure retention test ⇒ page 392 . If no pressure drop can be detected: Check vacuum supply of fuel system diagnostic pump - V144- ⇒ page 396 .

The minimum pressure was not reached and the available pressure drops immediately:

– Clamp off hose to activated charcoal filter solenoid valve 1 - N80- using a hose clip -arrow-.
– Repeat check. If the minimum pressure is reached now, renew activated charcoal filter solenoid valve 1 - N80- .



If the minimum pressure was again not reached and the available pressure drops immediately:

– Leak in fuel system: Perform “leak detection in fuel system” ⇒ page 394 .

Switch off ignition if the minimum pressure is reached.

The valve in the fuel system diagnostic pump - V144- closes and the pressure is retained.

– Observe pressure gauge:

If the pressure does not drop at first, perform a pressure retention test to localise any potential small leaks ⇒ page 392 .

If the pressure drops, clamp off hose to activated charcoal filter solenoid valve 1 - N80- using a hose clip -arrow-.



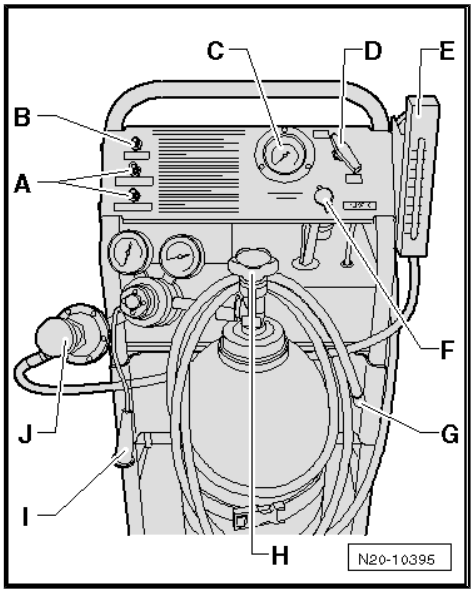
– If the pressure does not drop again, renew activated charcoal filter solenoid valve 1 - N80- .

If the pressure still drops, perform “leak detection in fuel system” ⇒ page 394 .

Pressure retention test

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– Set valve -D- to “Test”. Set the available pressure to 10 in. H2O (25 mbar).
– Observe pressure gauge -C- and flow meter -E-. When the throughput quantity decreases and the pressure increases to 10 in. H2O (25 mbar), the fuel system is filled.



Note

Depending on the filling level of the fuel tank, this process can take up to 3 minutes.

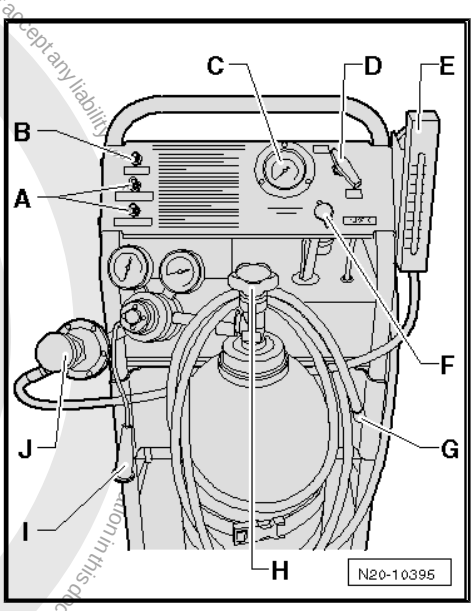
– Once pressure has stabilised, set valve -D- to “Hold”.
• After 5 minutes the pressure must not drop below 8 in. H2O (20 mbar).

If the pressure is not held for at least 5 minutes, localise leak as follows:

– First check activated charcoal filter solenoid valve 1 - N80- for leaks. To do this, clamp off hose to activated charcoal filter solenoid valve 1 - N80- using a hose clip -arrow-.



– Repeat pressure test by setting valve -D- again to “Test”.
– Observe pressure gauge and flow meter. When the throughput quantity decreases and the pressure increases to 10 in. H2O (25 mbar), the fuel system is filled.
– Once pressure has stabilised, set valve -D- to “Hold”.
– If the pressure does not drop again, renew activated charcoal filter solenoid valve 1 - N80- .



If the pressure still drops, perform “leak detection in fuel system” ⇒ page 394 .

After completing work, perform guided function “checking fuel tank ventilation system for leaks” using vehicle diagnostic tester .

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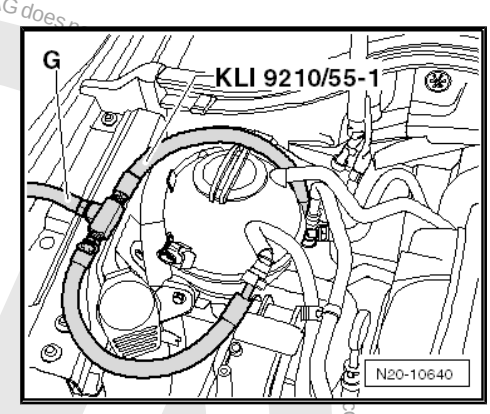
11.4.1 Leak detection in fuel system

Test specification:

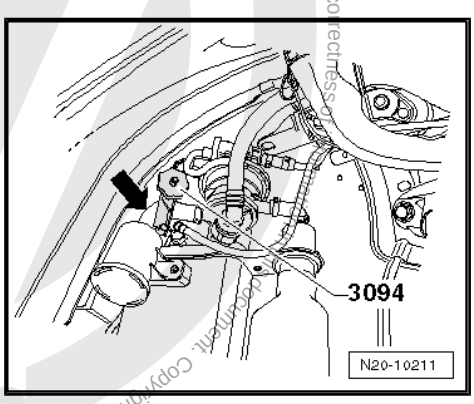
- Procedure for “checking fuel system for leaks” has been completed ⇒ page 390 .
- Fuel system tester - KLI 9210- is connected to vehicle via adapter hose - KLI 9210/55-1- .

– Connect fuel system tester - KLI 9210- to vehicle battery.

– Remove rear right wheel housing liner.



– Clamp off hose between fuel system diagnostic pump - V144- and air filter -arrow-.



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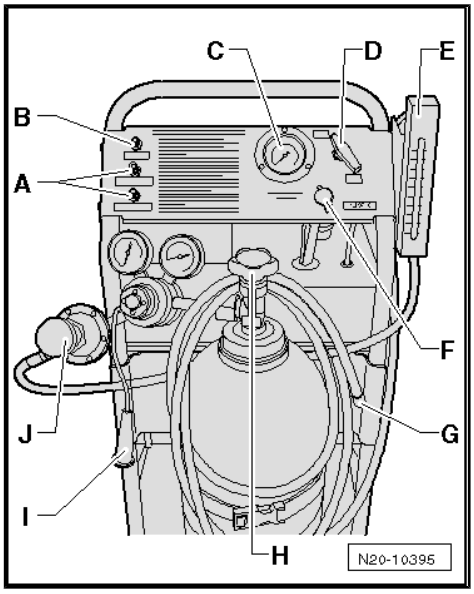
– Set valve -D- to “Test”.

– Observe pressure gauge -C- and flow meter -E-. When the throughput quantity decreases and the pressure increases to 10 in. H2O (25 mbar), the fuel system is filled.

– Once pressure has stabilised, set valve -D- to “Hold”.

• After 5 minutes the pressure must not drop below 8 in. H2O (20 mbar).

– If the pressure no longer drops, renew fuel system diagnostic pump - V144- .



If the pressure is not held for at least 5 minutes or does not build up, localise leak as follows:

– Fill fuel system with smoke, set valve -D- again to “Test” for this.

– While fuel system is being filled, press button -I- for smoke generator for approx. one minute.

The fuel system is now pressurised and filled with smoke.

– Check whether smoke escapes from any fuel system line or hose. Also check fuel tank cap.

Note

- *Light up the components and hoses with a strong floodlight. In the floodlight, smoke is more visible.*
- *For leak detection in accessible areas, also use ultrasonic meter or commercially available leak detector spray.*
- *Depending on how long the fault finding takes, it may be necessary to press the smoke generator button from time to time. This ensures that sufficient smoke is present in the fuel system.*
- *To inspect flanges for fuel pump and fuel filter, open assembly opening in vehicle interior.⇒ Vehicle diagnostic tester*

– Renew leaking hoses or components.

After completing work, perform guided function “checking fuel tank ventilation system for leaks” using vehicle diagnostic tester .

11.4.2 Schematic overview of activated charcoal filter system

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1 - Activated charcoal filter

2 - Location of adapter hose - KLI 9210/55-1-

- ❑ For leak detection in fuel system

3 - Activated charcoal filter solenoid valve 1 - N80-

4 - Breather hose

- ❑ Throttle valve module - J338-

5 - Solenoid valve

- ❑ For fuel system diagnosis pump - V144- .

6 - Vacuum line

- ❑ To intake manifold

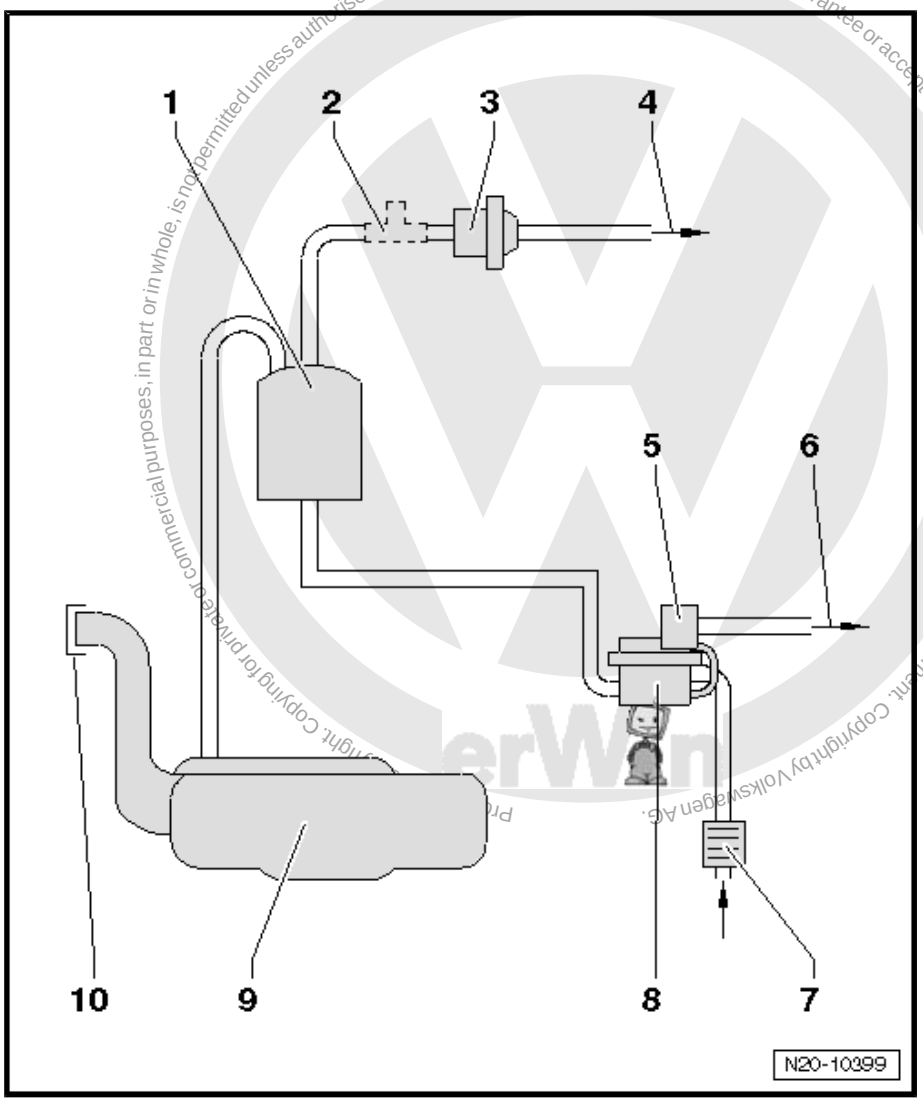
7 - Air filter

- ❑ For fuel system diagnosis pump - V144- .

8 - Fuel system diagnostic pump - V144-

9 - Fuel tank

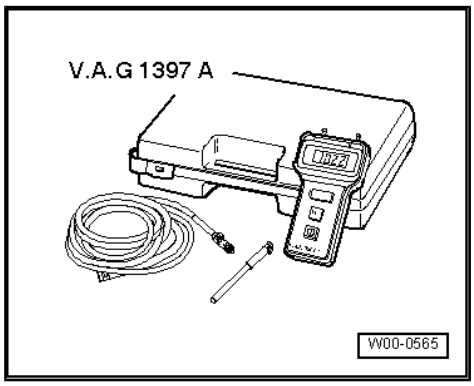
10 - Cap



11.4.3 Checking vacuum supply of fuel system diagnostic pump - V144-

Special tools and workshop equipment required

- ♦ Turbocharger tester - V.A.G 1397A-



- ♦ T-piece - 251 201 346-
- ♦ Hose ∅ 6mm

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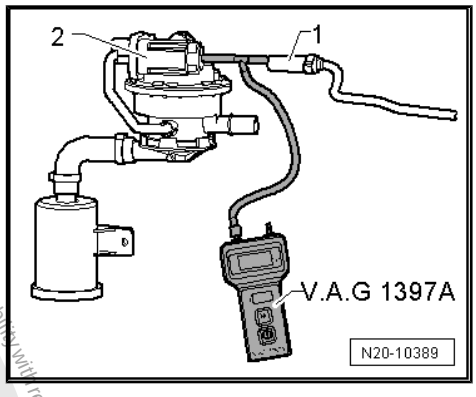
Note

The fuel system diagnostic pump - V144- is fitted in the rear right wheel housing behind the wheel housing liner.

– Remove rear right wheel and wheel housing liner.

– Pull off vacuum line -1- from fuel system diagnostic pump - V144- .

– Connect turbocharger tester - V.A.G 1397A- with T-piece and hose ∅ 6mm, between vacuum line -1- and fuel system diagnostic pump - V144- -2-.



– Switch on measuring range I (absolute pressure measurement).

– Connect vehicle diagnostic tester and start engine.

– On vehicle diagnostic tester , select operating mode Guided Functions.

– Select guided function “Checking tank ventilation system for leaks”.

– Initiate test.

– Observe display on turbocharger tester - V.A.G 1397A- while test is running.

• Pressure must pulsate and must not exceed 0.7 bar (absolute pressure) during test.

– If pressure exceeds 0.7 bar during test, vacuum supply is too low. Check vacuum line to intake manifold for possible kinks or blockages.

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12 Activated charcoal filter system (Golf, Eos, Scirocco with engine codes CA-WA, CAWB, BZB, CGYA, CCZA, CCZB, CDAA)

Assembly overview - activated charcoal filter system
⇒ page 398

Checking fuel tank breather ⇒ page 399 .

Note

- *Hose connections are secured with either spring-type or clamp-type clips.*
- *Spring-type clip pliers - VAS 6340- or space saving hose clip pliers - VAS 6362- are recommended for installing and removing spring-type clips.*

The plug-in connectors for fuel, vacuum and breather lines are colour coded. There is either a coloured dot on the plug-in connector or the release button is coloured.

Plug-in connector	Colour code on plug-in connector
Fuel supply	black
Fuel return	blue
Breather	white, beige
Vacuum	green

12.1 Assembly overview - activated charcoal filter system

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1 - Activated charcoal filter

- ❑ Location: on right in engine compartment.

2 - Pressure retention valve with connecting hose

3 - Connection hose

- ❑ Ensure firm seating.
- ❑ From fuel tank

4 - 10 Nm

5 - Activated charcoal filter solenoid valve 1 - N80-

- ❑ Valve closed with ignition switched off
- ❑ When engine is warm, valve will be activated (pulsed) by engine control unit

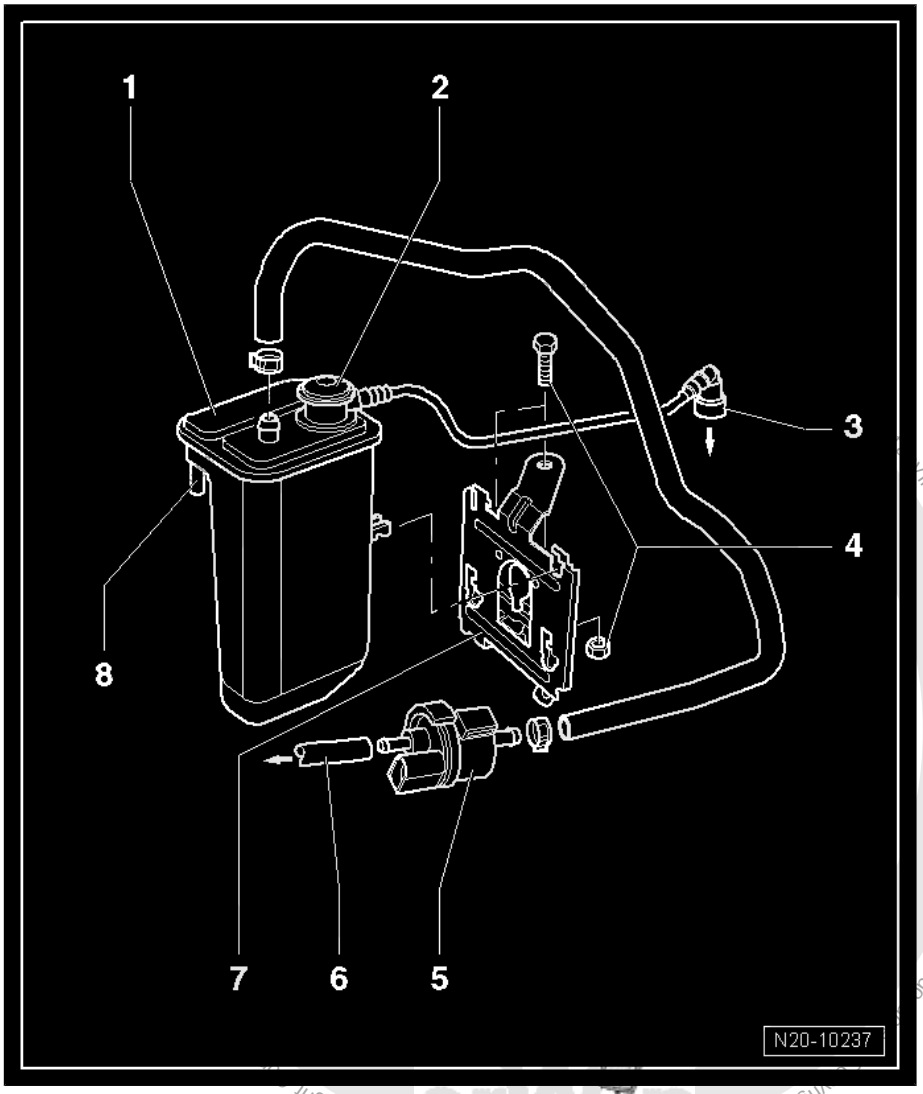
6 - Connection hose

- ❑ To intake manifold
- ❑ Ensure firm seating.

7 - Holder

- ❑ For activated charcoal filter.

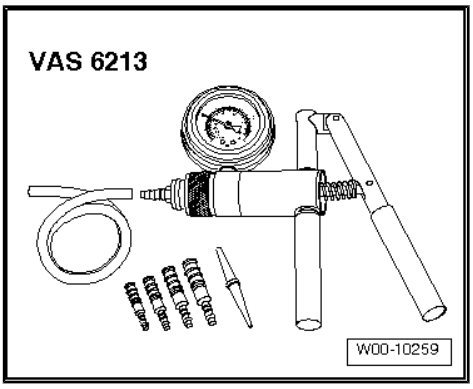
8 - Vent hole



12.2 Checking fuel tank breather

Special tools and workshop equipment required

- ♦ Hand operated vacuum pump - VAS 6213-



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♦ Pressure gauge - VAS 6550-



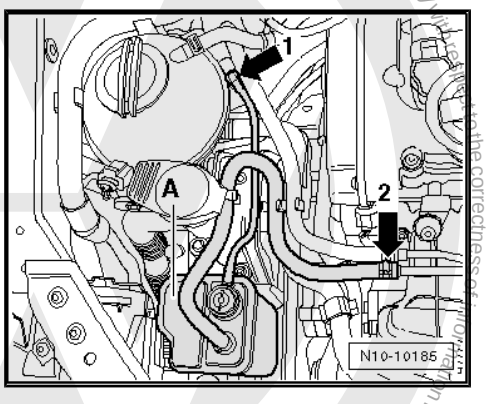
♦ Connecting nipple - VAS 6550/3-1-

Test specification:

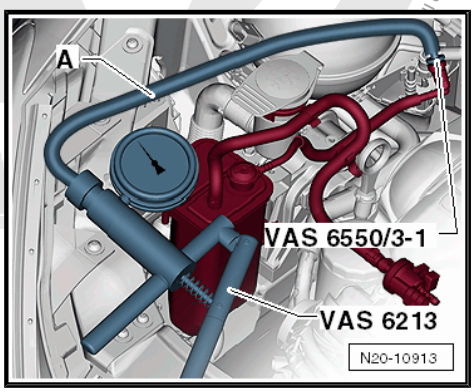
- Ignition must be switched off.

Test sequence

– Pull off bleeder line -1-.

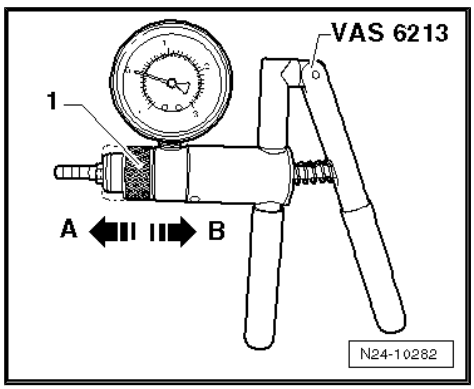


– Connect hand vacuum pump - VAS 6213- with connection nipple - VAS 6550/3-1- to breather line leading to activated charcoal filter.



– Set ring -1- of hand vacuum pump - VAS 6213- to position -A- for “vacuum”.

– Operate hand vacuum pump - VAS 6213- several times. There must be no development of vacuum.

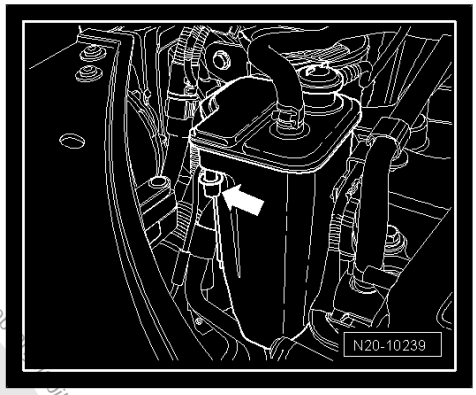


If vacuum builds up:

– Check breather hole on activated charcoal filter ⇒ Item 8 (page 399) for soiling and clean if necessary.

If vacuum does not build up:

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– Seal breather hole -arrow- and operate vacuum pump again several times. Vacuum must build up.

If vacuum does not build up:

– Also clamp off hose between activated charcoal filter and activated charcoal filter solenoid valve 1 - N80- ⇒ Item 5 (page 399) .

– Operate vacuum pump several times.

If vacuum builds up: Renew activated charcoal filter solenoid valve 1 - N80-.

If vacuum does not build up again, renew activated charcoal filter.

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13 Activated charcoal filter system (Golf, Eos with engine code CBFA, CCTA, CCTB)

Overview of activated charcoal filter system ⇒ page 402

Assembly overview - activated charcoal filter system (Golf) ⇒ page 404 .

Assembly overview - activated charcoal filter system (Eos) ⇒ page 405 .

Removing and installing activated charcoal filter ⇒ page 406

Removing and installing fuel system diagnostic pump - V144- (Golf) ⇒ page 407 .

Removing and installing fuel system diagnostic pump - V144- (Eos) ⇒ page 408 .

Checking fuel system for leaks ⇒ page 408

Note

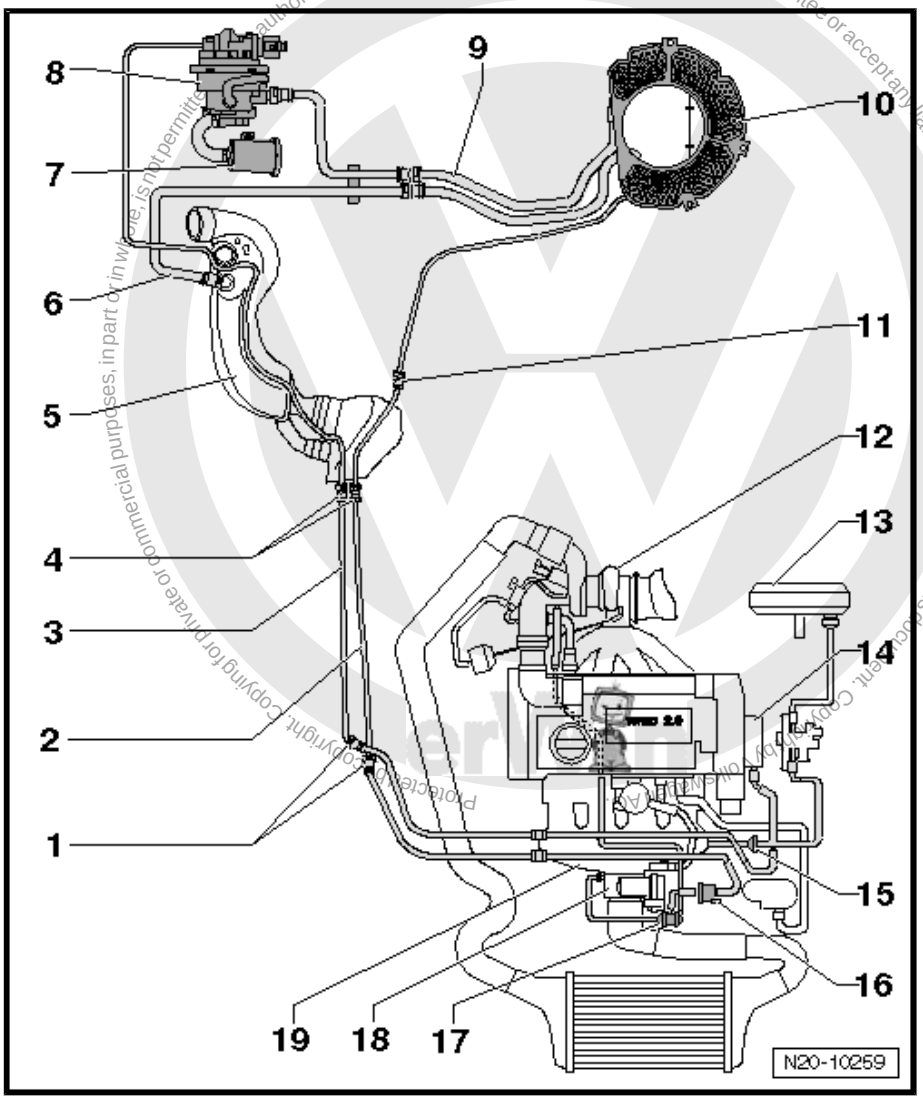
- *Hose connections are secured with either spring-type or clamp-type clips.*
- *Spring-type clip pliers - VAS 6340- or space saving hose clip pliers - VAS 6362- are recommended for installing and removing spring-type clips.*

The plug-in connectors for fuel, vacuum and breather lines are colour coded. There is either a coloured dot on the plug-in connector or the release button is coloured.

Plug-in connector	Colour code on plug-in connector
Fuel supply	black
Fuel return	blue
Breather	white, beige
Vacuum	green

13.1 Overview of activated charcoal filter system

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1 - Separation point

- ❑ Front right in engine compartment under coolant expansion tank

2 - Breather hose

- ❑ white
- ❑ From activated charcoal filter to activated charcoal filter solenoid valve 1 - N80-
- ❑ Installation position: On right under vehicle
- ❑ Secured to fuel tank.

3 - Breather hose

- ❑ green
- ❑ From engine to fuel system diagnostic pump - V144-
- ❑ Installation position: On right under vehicle
- ❑ Secured to fuel tank.

4 - Separation point

- ❑ Front right on fuel tank in vicinity of fuel filter

5 - Filler neck

6 - Breather hose

- ❑ From filler neck to activated charcoal filter

7 - Air filter

- ❑ For fuel system diagnosis pump - V144- .

8 - Fuel system diagnostic pump - V144-

- ❑ Fitting location: In rear right wheel housing beneath liner
- ❑ Removing and installing ⇒ page 407
- ❑ Checking fuel system for leaks ⇒ page 408

9 - Connecting cable

- ❑ From fuel system diagnostic pump - V144- to activated charcoal filter.
- ❑ Clip onto bracket

10 - Activated charcoal filter

- ❑ Location: down in spare wheel well
- ❑ Removing and installing ⇒ page 406

11 - Separation point

- ❑ Rear right on fuel tank

12 - Exhaust turbocharger

13 - Brake servo

14 - Vacuum pump

15 - Non-return valve

- ❑ Location: Arrow points in direction of flow

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16 - Activated charcoal filter solenoid valve 1 - N80-

- ❑ Checking ⇒ Vehicle diagnostic tester

17 - Non-return valve

- ❑ Different versions, allocation ⇒ ETKA (Electronic parts catalogue)

18 - Throttle valve module - J338-

- ❑ Removing and installing ⇒ page 479

19 - Intake manifold

13.2 Assembly overview - activated charcoal filter system (Golf)

1 - Fuel tank

2 - Breather hose

- ❑ Behind wheel housing liner

3 - Breather hose

- ❑ On underbody.

4 - Breather hose

- ❑ To activated charcoal filter solenoid valve 1 - N80-
- ❑ Press release button to pull off

5 - 8 Nm

6 - Activated charcoal filter

- ❑ Location: down in spare wheel well
- ❑ Removing and installing ⇒ page 406

7 - Connecting cable

- ❑ On underbody.

8 - Connecting cable

- ❑ Behind wheel housing liner

9 - 3 Nm

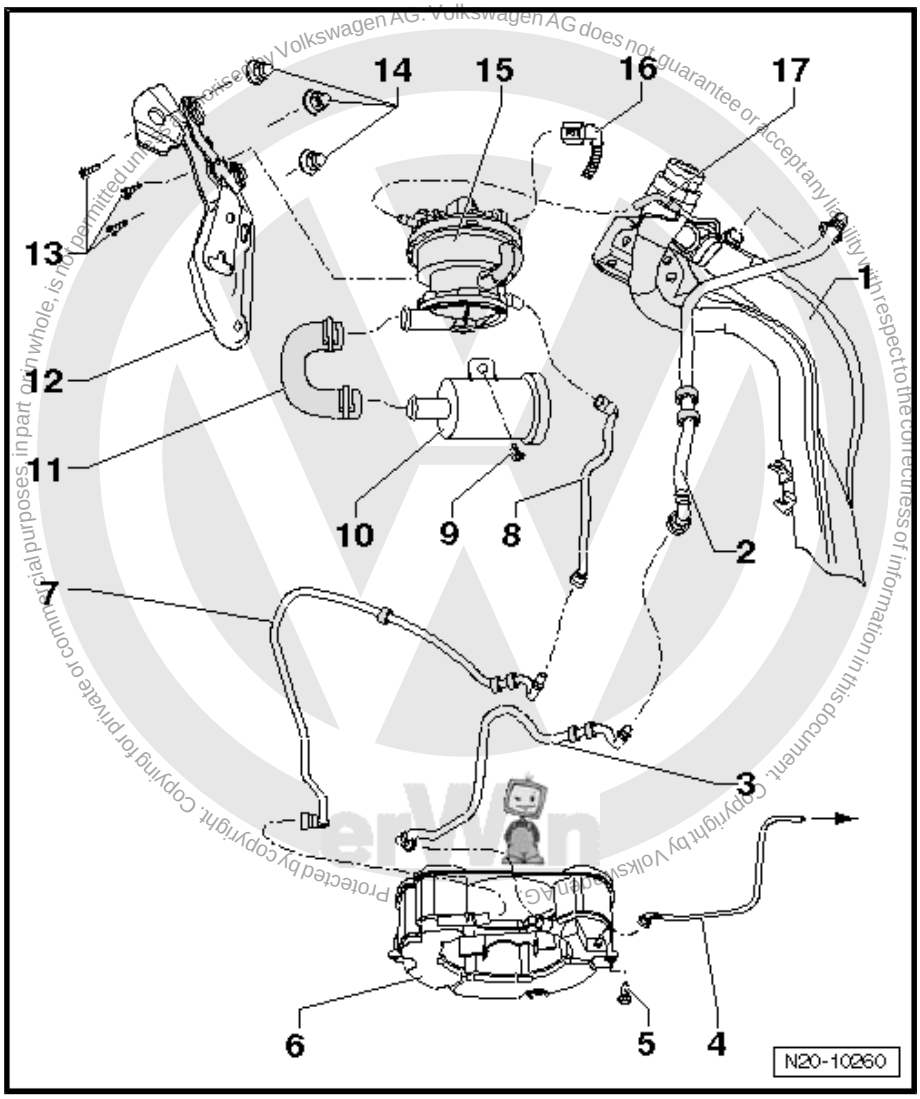
10 - Air filter

- ❑ For fuel system diagnosis pump - V144- .

11 - Connection hose

12 - Holder

- ❑ For fuel system diagnosis pump - V144- .



13 - 2 Nm

14 - 6 Nm

15 - Fuel system diagnostic pump - V144-

- ❑ Fitting location: In rear right wheel housing beneath liner
- ❑ Removing and installing ⇒ page 407
- ❑ Checking fuel system for leaks ⇒ page 408

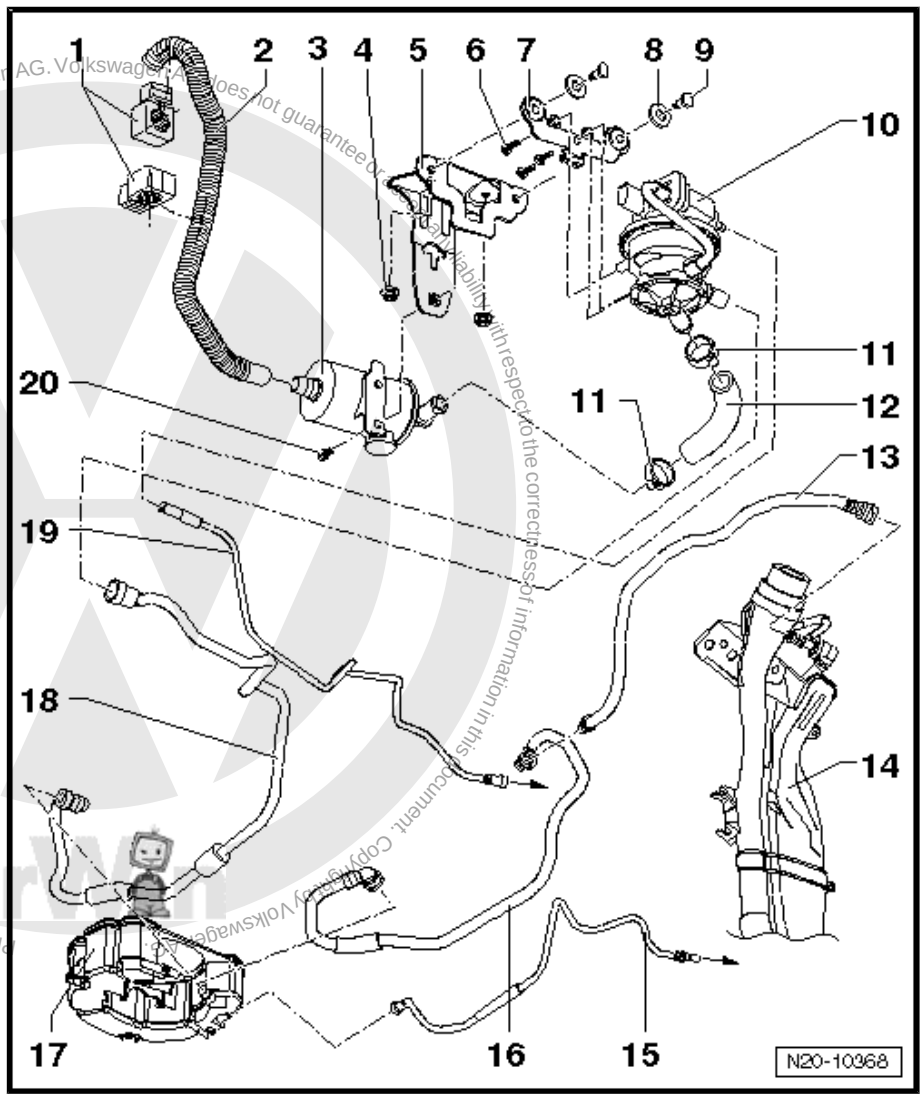
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16 - Connector

17 - Vacuum line

- ❑ From intake manifold

13.3 Assembly overview - activated charcoal filter system (Eos)



1 - Hose retainer

2 - Breather line

- ❑ To remove and install, remove bumper

3 - Air filter

- ❑ For fuel system diagnosis pump - V144- .

4 - 6 Nm

5 - Holder

- ❑ For fuel system diagnosis pump - V144- .

6 - 3 Nm

7 - Retaining plate

8 - Rubber mounting

9 - 8 Nm

10 - Fuel system diagnostic pump - V144-

- ❑ Location: Behind rear right wheel housing
- ❑ Removing and installing ⇒ page 407
- ❑ Checking fuel system for leaks ⇒ page 408

11 - Hose clamp

12 - Connection hose

13 - Breather hose

- ❑ Behind wheel housing liner

14 - Fuel tank

15 - Breather hose

- ❑ To activated charcoal filter solenoid valve 1 - N80-
- ❑ Press release button to pull off

16 - Breather hose

- ❑ On underbody.

17 - Activated charcoal filter

- ❑ Location: down in spare wheel well
- ❑ Removing and installing ⇒ page 406

18 - Connecting cable

- ❑ Activated charcoal filter / fuel system diagnostic pump - V144-

19 - Vacuum line

- ❑ To intake manifold

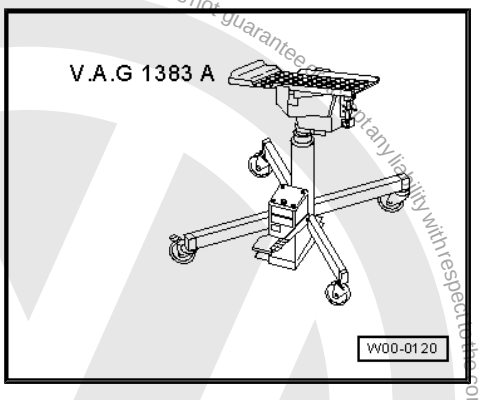
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20 - 2 Nm

13.4 Removing and installing activated charcoal filter

Special tools and workshop equipment required

- Engine and gearbox jack - V.A.G 1383 A-

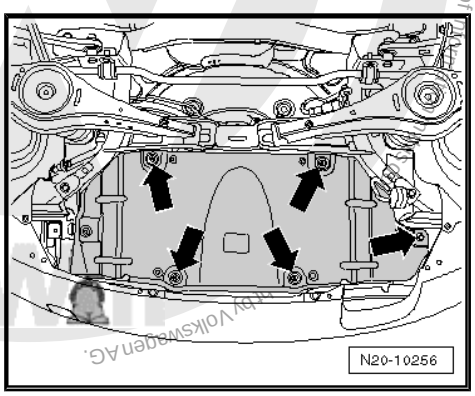


Removing:

– Remove centre and rear silencers.

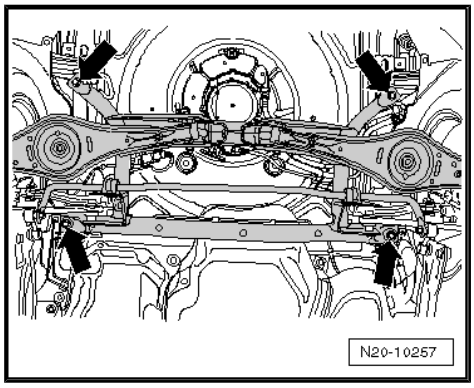
– Remove heat shield -arrows-.

– Position engine and gearbox jack - V.A.G 1383 A- below rear axle to support.



– Loosen securing bolts of rear axle -arrows- and unscrew them approx. 20mm.

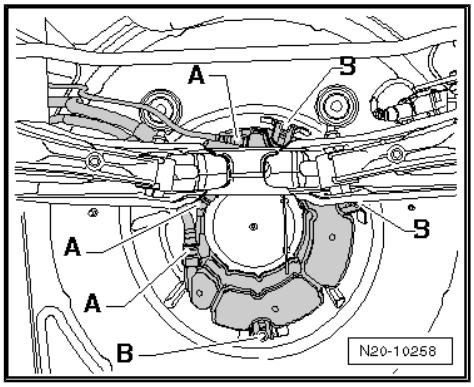
– Lower rear axle slowly using engine and gearbox jack - V.A.G 1383 A- .



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– Pull off breather lines -A- by pressing release tab.

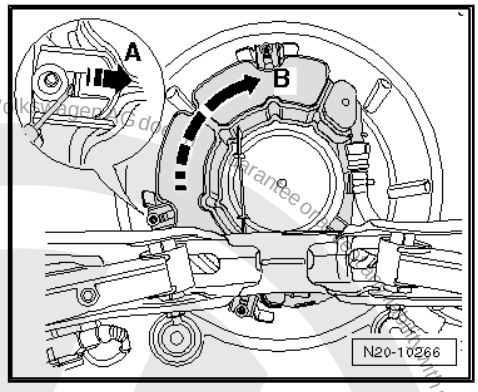
– Remove bolts -B-.



Note

A reinforcement plate is installed in the Eos. To loosen and tighten securing bolts -B-, use T-bar and socket 10 mm - 3185- .

– Release retaining tabs -A- using a screwdriver. Turn activated charcoal filter approx. 90° to right -B- and remove activated charcoal filter.



Installing:

Install in the reverse order of removal, observing the following:

– Fit breather lines so that they engage audibly.

– Install rear axle ⇒ Running gear; Rep. gr. 42 .

Torque setting

Component	Nm
Activated charcoal filter to body	8

13.5 Removing and installing fuel system diagnostic pump - V144- (Golf)

Removing:

– Remove rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 .

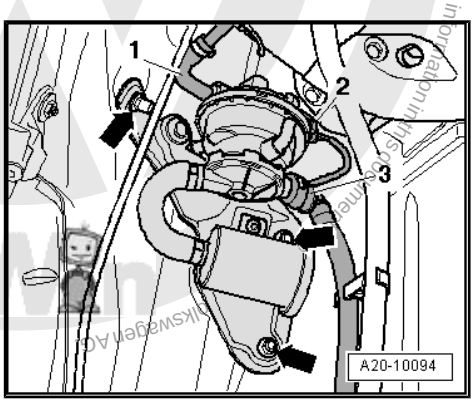
– Detach vacuum line -1-.

– Separate electrical connector -2-.

– Pull off breather line -3- by pressing release tab.

– Unscrew nuts -arrows-.

– Detach diagnostic pump with bracket.



Installing:

Install in the reverse order of removal, observing the following:

• The breather line -3- must engage audibly.

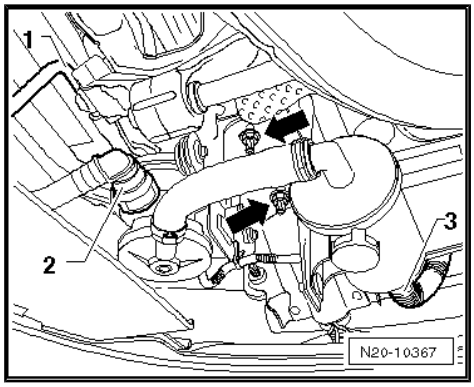
– Install rear right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 .

Specified torques: ⇒ page 404

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13.6 Removing and installing fuel system diagnostic pump - V144- (Eos)

Removing:



– Pull off vacuum line -1-, breather line (air outlet) -2- and breather line (air inlet) -3-.
– Unscrew nuts -arrows-.
– Remove diagnostic pump with bracket and disconnect electrical connector.

Installing:

Install in the reverse order of removal, observing the following:

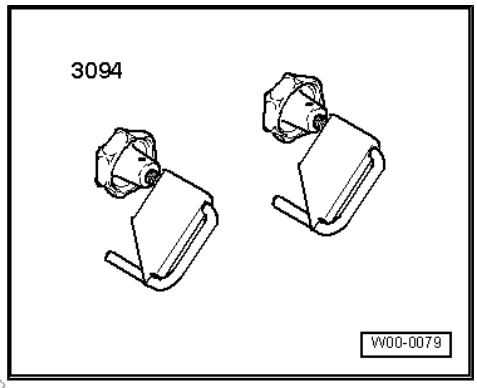
- Reconnect electrical connector before securing diagnostic pump with bracket.
- Breather line -2- must audibly engage.

Specified torques: ⇒ page 405

13.7 Checking fuel system for leaks

Special tools and workshop equipment required

- Fuel system tester (so-called smoke tester) - KLI 9210-
- Adapter hose - KLI 9210/55-1-
- Vehicle diagnostic tester
- Hose clamps to 25 mm - 3094-



The plug-in connectors for fuel, vacuum and breather lines are colour coded. There is either a coloured dot on the plug-in connector or the release button is coloured.

Plug-in connector	Colour code on plug-in connector
Fuel supply	black
Fuel return	blue
Breather	white, beige
Vacuum	green

Test specification:

- A leak has been detected by the fuel system diagnostic pump - V144- .
- Guided fault finding has been performed with the vehicle diagnostic tester .

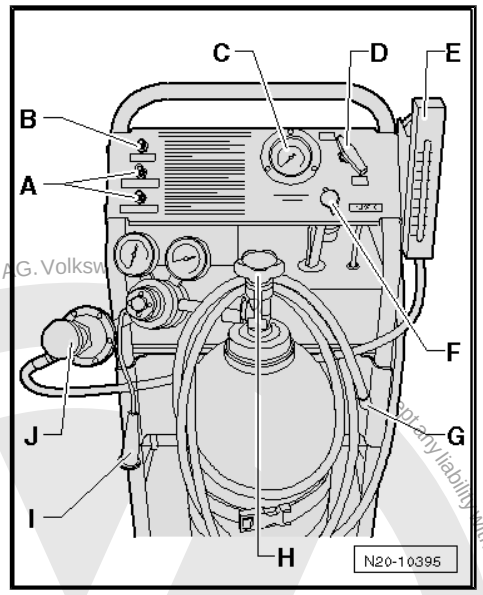
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Preparation of fuel system tester - KLI 9210- :

Note

The fuel system tester - KLI 9210- may differ in appearance depending on the version.

– Check on fuel system tester - KLI 9210- if there is enough fluid in smoke generator.
– Set valve -D- to “Hold”.
– Open nitrogen bottle -H-.
– Connect test hose -G- to self-test connection -B-.
– Set valve -D- to “Test”.
– Regulate pressure to 10 in. H2O (25 mbar) with pressure reducer -J-.
– Set valve -D- to “Hold”.
– Now pressure must be maintained for at least 2 minutes. Check tester if pressure is not maintained.

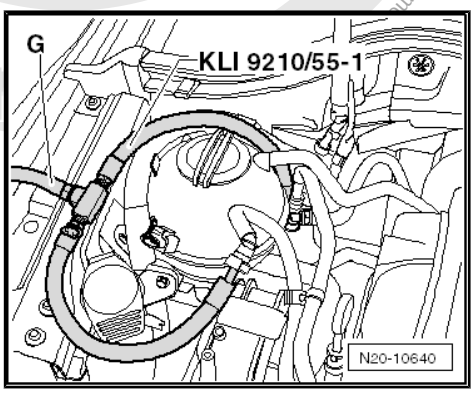


Checking fuel system for leaks:

– Connect adapter hose - KLI 9210/55-1- to breather line -A-. (colour marking: white)



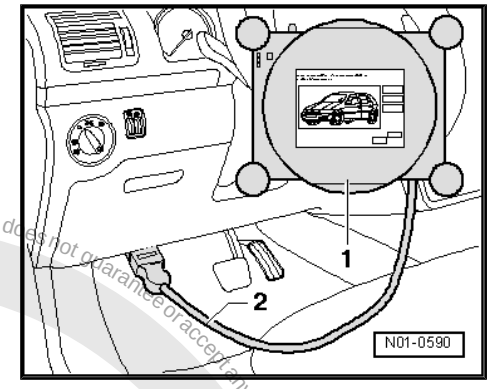
– Connect measuring hose -G- from fuel system tester - KLI 9210- to adapter hose - KLI 9210/55-1- .
– Set valve -D- to “Hold”.



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– Connect vehicle diagnostic tester to vehicle.
– Start engine and run at idling speed.
– On vehicle diagnostic tester , select operating mode `Guided Functions`.
– Select guided function “Checking tank ventilation system for leaks”.
– Initiate test.
– Observe pressure gauge - KLI 9210- while test is running.

• Fuel system diagnostic pump - V144- must pump up pressure in fuel system to at least 7 in. H2O (18 mbar).



The minimum pressure was not reached, but the available pressure does not drop.

– Switch off ignition and perform a pressure retention test ⇒ page 410 . If no pressure drop can be detected: Check vacuum supply of fuel system diagnostic pump - V144- ⇒ page 414 .

The minimum pressure was not reached and the available pressure drops immediately:

– Clamp off hose to activated charcoal filter solenoid valve 1 - N80- using a hose clip -arrow-.
– Repeat check. If the minimum pressure is reached now, renew activated charcoal filter solenoid valve 1 - N80- .



If the minimum pressure was again not reached and the available pressure drops immediately:

– Leak in fuel system: Perform “leak detection in fuel system” ⇒ page 412 .

Switch off ignition if the minimum pressure is reached.

The valve in the fuel system diagnostic pump - V144- closes and the pressure is retained.

– Observe pressure gauge:

If the pressure does not drop at first, perform a pressure retention test to localise any potential small leaks ⇒ page 410 .

If the pressure drops, clamp off hose to activated charcoal filter solenoid valve 1 - N80- using a hose clip -arrow-.



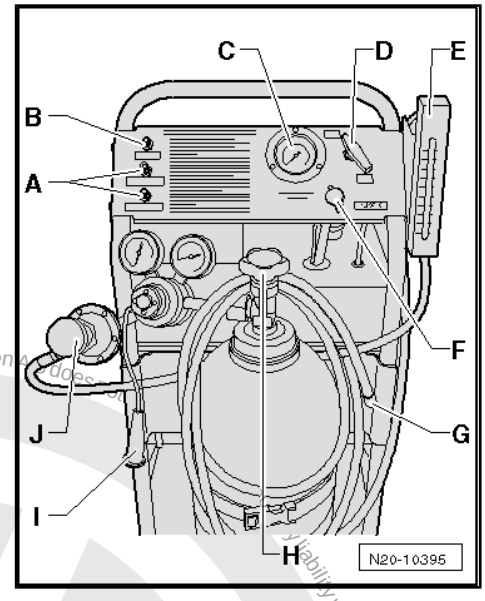
– If the pressure does not drop again, renew activated charcoal filter solenoid valve 1 - N80- .

If the pressure still drops, perform “leak detection in fuel system” ⇒ page 412 .

Pressure retention test

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– Set valve -D- to “Test”. Set the available pressure to 10 in. H2O (25 mbar).
– Observe pressure gauge -C- and flow meter -E-. When the throughput quantity decreases and the pressure increases to 10 in. H2O (25 mbar), the fuel system is filled.



Note

Depending on the filling level of the fuel tank, this process can take up to 3 minutes.

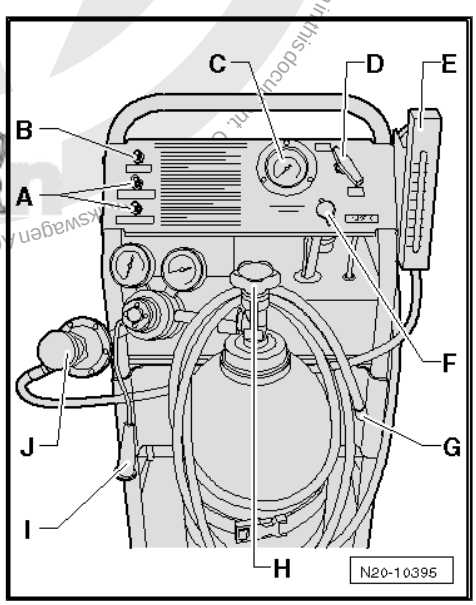
– Once pressure has stabilised, set valve -D- to “Hold”.
• After 5 minutes the pressure must not drop below 8 in. H2O (20 mbar).

If the pressure is not held for at least 5 minutes, localise leak as follows:

– First check activated charcoal filter solenoid valve 1 - N80- for leaks. To do this, clamp off hose to activated charcoal filter solenoid valve 1 - N80- using a hose clip -arrow-.



– Repeat pressure test by setting valve -D- again to “Test”.
– Observe pressure gauge and flow meter. When the throughput quantity decreases and the pressure increases to 10 in. H2O (25 mbar), the fuel system is filled.
– Once pressure has stabilised, set valve -D- to “Hold”.
– If the pressure does not drop again, renew activated charcoal filter solenoid valve 1 - N80- .



If the pressure still drops, perform “leak detection in fuel system” ⇒ page 412 .

After completing work, perform guided function “checking fuel tank ventilation system for leaks” using vehicle diagnostic tester .

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13.7.1 Leak detection in fuel system

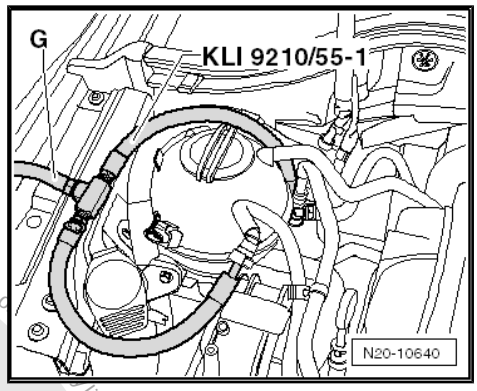
Test specification:

- Procedure for “checking fuel system for leaks” has been completed ⇒ page 408 .
- Fuel system tester - KLI 9210- is connected to vehicle via adapter hose - KLI 9210/55-1- .

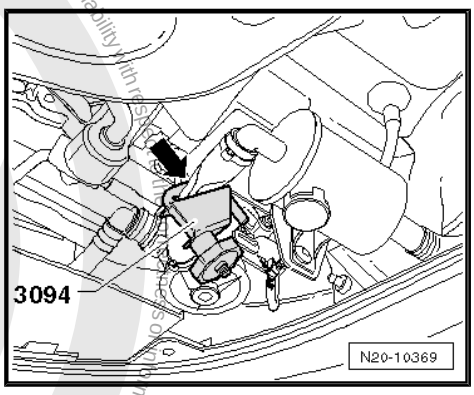
– Connect fuel system tester - KLI 9210- to vehicle battery.

– Remove rear right wheel housing liner.

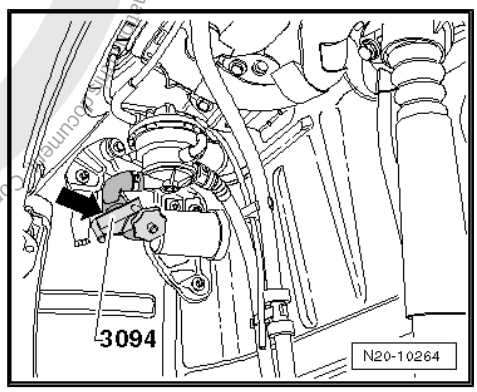
– Clamp off hose between fuel system diagnostic pump - V144- and air filter -arrow-.



Eos



Golf



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– Set valve -D- to “Test”.

– Observe pressure gauge -C- and flow meter -E-. When the throughput quantity decreases and the pressure increases to 10 in. H2O (25 mbar), the fuel system is filled.

– Once pressure has stabilised, set valve -D- to “Hold”.

• After 5 minutes the pressure must not drop below 8 in. H2O (20 mbar).

– If the pressure no longer drops, renew fuel system diagnostic pump - V144- .

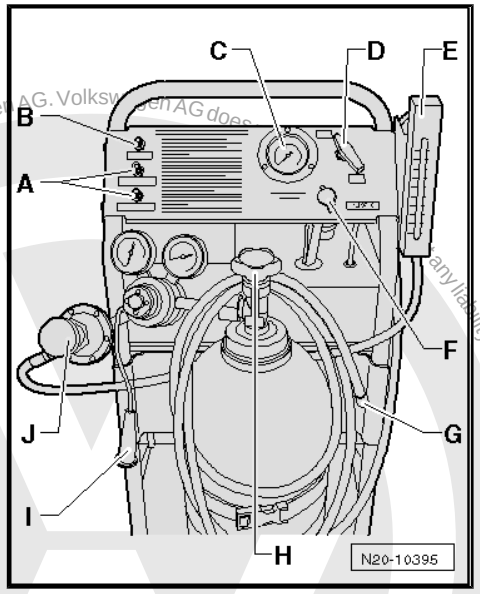
If the pressure is not held for at least 5 minutes or does not build up, localise leak as follows:

– Fill fuel system with smoke, set valve -D- again to “Test” for this.

– While fuel system is being filled, press button -I- for smoke generator for approx. one minute.

The fuel system is now pressurised and filled with smoke.

– Check whether smoke escapes from any fuel system line or hose. Also check fuel tank cap.



Note

- *Light up the components and hoses with a strong floodlight. In the floodlight, smoke is more visible.*
- *For leak detection in accessible areas, an ultrasonic detector or commercially available leak detecting spray may also be used.*
- *Depending on how long the fault finding takes, it may be necessary to press the smoke generator button from time to time. This ensures that sufficient smoke is present in the fuel system.*
- *To inspect flanges for fuel pump and fuel filter, open assembly opening in vehicle interior.*

– Renew leaking hoses or components.

After completing work, perform guided function “checking fuel tank ventilation system for leaks” using vehicle diagnostic tester .

13.7.2 Schematic overview of activated charcoal filter system

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1 - Activated charcoal filter

2 - Location of adapter hose - KLI 9210/55-1-

- ❑ For leak detection in fuel system

3 - Activated charcoal filter solenoid valve 1 - N80-

4 - Breather hose

- ❑ Throttle valve module - J338-

5 - Solenoid valve

- ❑ For fuel system diagnosis pump - V144- .

6 - Vacuum line

- ❑ To intake manifold

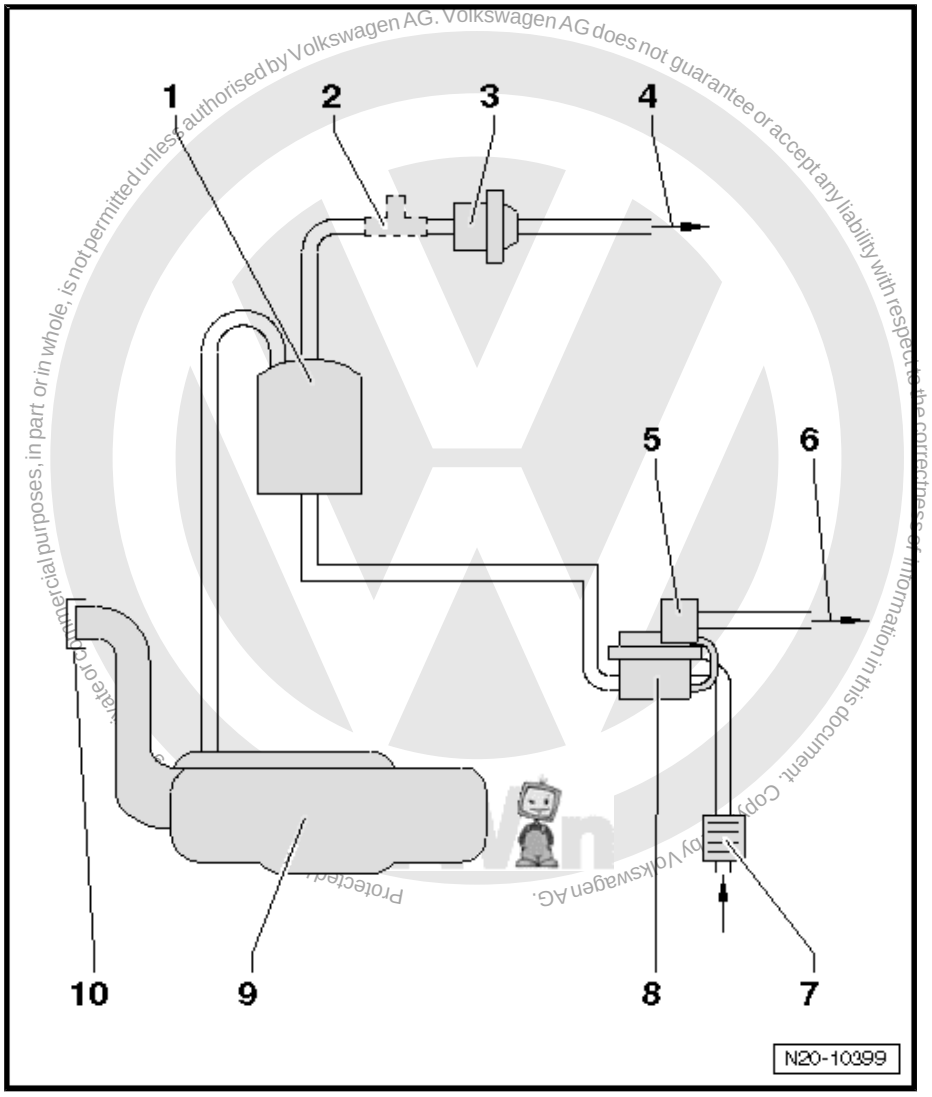
7 - Air filter

- ❑ For fuel system diagnosis pump - V144- .

8 - Fuel system diagnostic pump - V144-

9 - Fuel tank

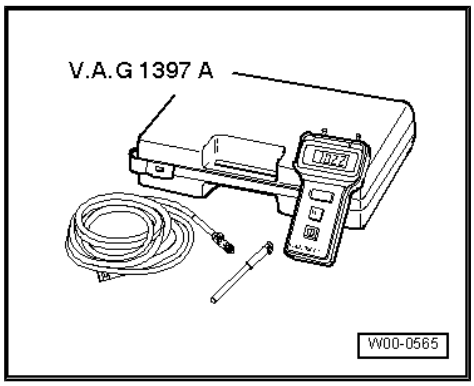
10 - Cap



13.7.3 Checking vacuum supply of fuel system diagnostic pump - V144-

Special tools and workshop equipment required

- ♦ Turbocharger tester - V.A.G 1397A-



- ♦ T-piece - 251 201 346-
- ♦ Hose ∅ 6mm

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Note

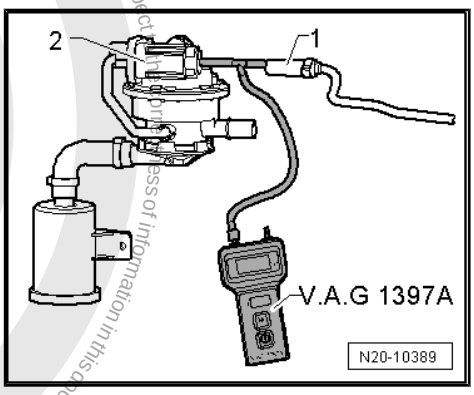
- *Fitting location of fuel system diagnostic pump - V144- .*
- *Golf: In rear right wheel housing below wheel housing liner.*
- *Eos: Behind rear right wheel.*

Golf:

– Remove rear right wheel and wheel housing liner.

– Pull off vacuum line -1- from fuel system diagnostic pump - V144- .

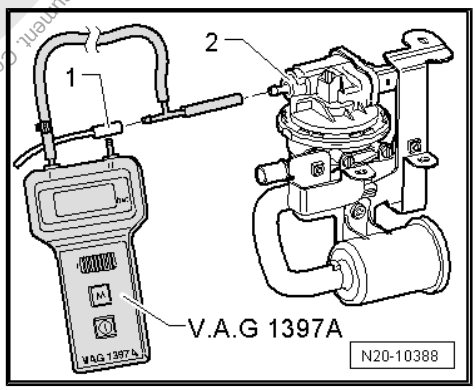
– Connect turbocharger tester - V.A.G 1397A- with T-piece and hose ∅ 6mm, between vacuum line -1- and fuel system diagnostic pump - V144- -2-.



Eos:

– Pull off vacuum line -1- from fuel system diagnostic pump - V144- .

– Connect turbocharger tester - V.A.G 1397A- with T-piece and hose ∅ 6mm, between vacuum line -1- and fuel system diagnostic pump - V144- -2-.



All vehicles:

– Switch on measuring range I (absolute pressure measurement).

– Connect vehicle diagnostic tester and start engine.

– On vehicle diagnostic tester , select operating mode Guided Functions.

– Select guided function “Checking tank ventilation system for leaks”.

– Initiate test.

– Observe display on turbocharger tester - V.A.G 1397A- while test is running.

• Pressure must pulsate and must not exceed 0.7 bar (absolute pressure) during test.

– If pressure exceeds 0.7 bar during test, vacuum supply is too low. Check vacuum line to intake manifold for possible kinks or blockages.

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21 – Turbocharging/supercharging

1 Exhaust turbocharger

Note

- *Secure all hose connections with hose clips which conform to production standard.*
- *Hose connections and hoses for charge air system must be free of oil and grease before assembly. The seal and sealing surface must be oiled lightly only for plug-in connectors* ⇒ page 423 .
- *Charge air system must be free of leaks.*
- *Renew self-locking nuts.*
- *Hose clip pliers - VAS 6362- or hose clip pliers - V.A.G 1921- are recommended for installation of spring-type clips.*
- *Fill turbocharger with engine oil at oil supply line connection.*
- *After installing turbocharger, run engine for about 1 minute at idling speed and do not rev up immediately. This ensures that the turbocharger is fully primed with oil.*
- *Observe rules for cleanliness* ⇒ page 274 .

Assembly overview - turbocharger ⇒ page 416 .

Installing hose connections with plug-in connectors ⇒ page 423 .

Removing and installing turbocharger ⇒ page 424 .

Checking turbocharger vacuum unit ⇒ page 431 .

Removing and installing vacuum unit for turbocharger ⇒ page 436 .

Adjusting turbocharger vacuum unit - (engine codes BZB, CGYA, CDAA) ⇒ page 432 .

1.1 Assembly overview - turbocharger

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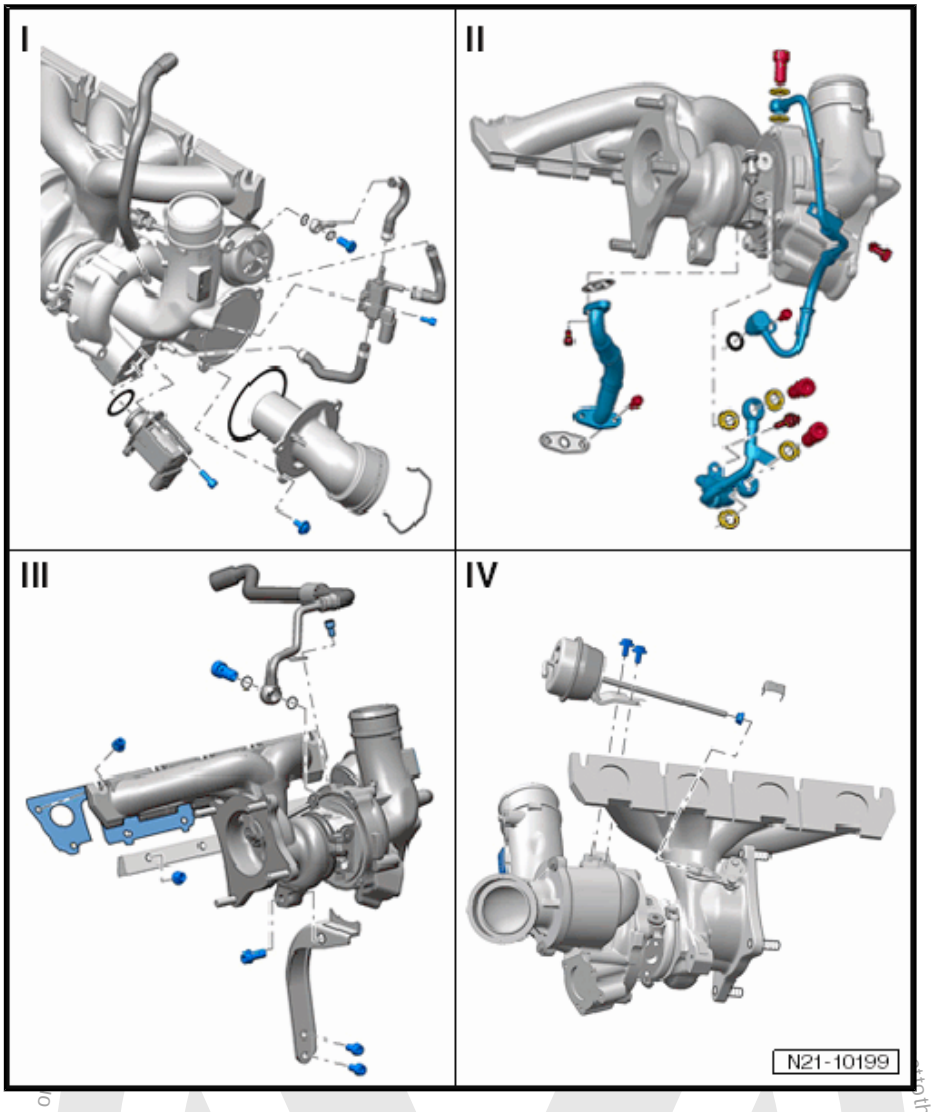
Teil I - Engine codes BZB, CGYA, CDAA, CDAB
⇒ page 418

Teil I - Engine codes CAWB, CBFA, CCTA, CCTB, CCZA, CCZB, CCZC, CCZD
⇒ page 419

Teil II - ⇒ page 420

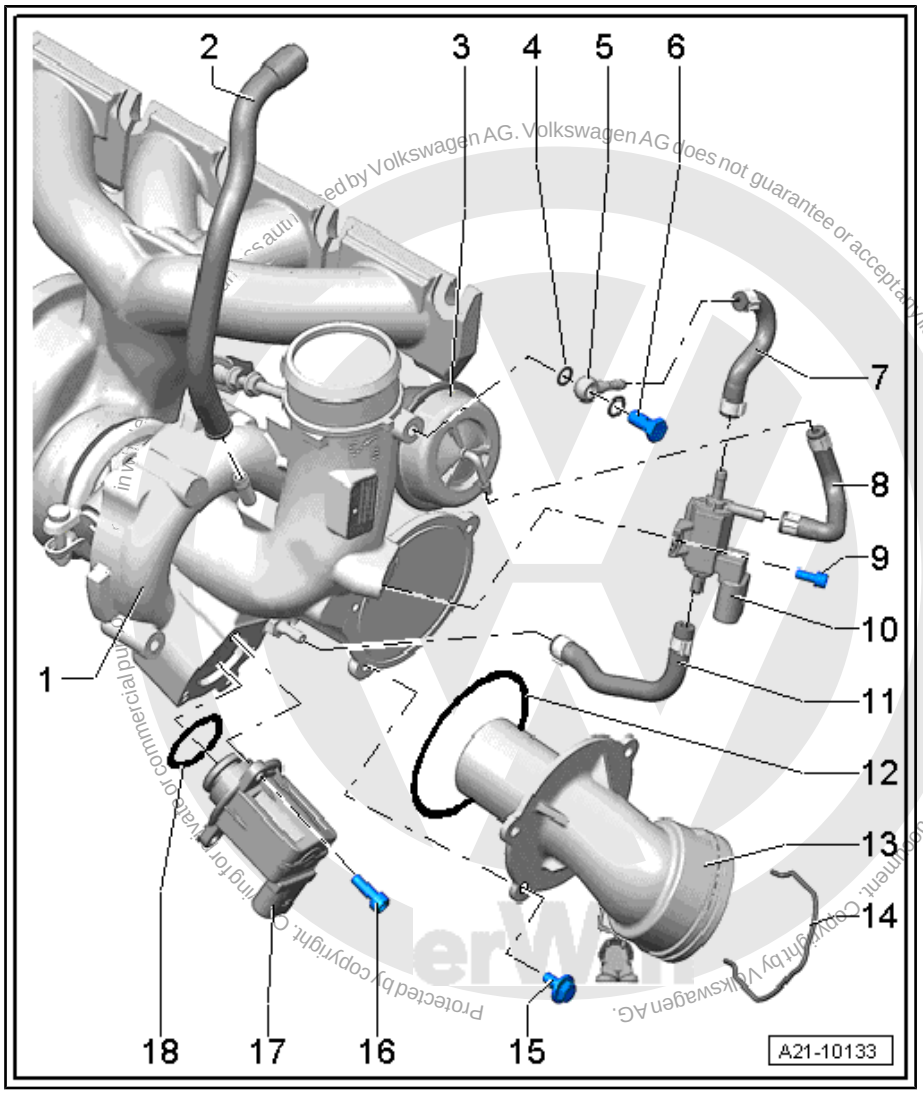
Teil III - ⇒ page 421

Teil IV - ⇒ page 422



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1.1.1 Part I (engine codes BZB, CGYA, CDAA, CDAB)



1 - Exhaust turbocharger
- ❑ Can only be renewed together with exhaust manifold and vacuum unit as one unit
- ❑ Removing and installing ⇒ page 424

2 - To activated charcoal filter

3 - Vacuum unit for turbocharger
- ❑ Checking ⇒ page 431
- ❑ Removing and installing ⇒ page 436
- ❑ Adjusting ⇒ page 432

4 - Sealing ring
- ❑ Renew

5 - Banjo union

6 - Banjo bolt
- ❑ 8 Nm

7 - Hose

8 - Hose

9 - Bolt
- ❑ 3 Nm

10 - Charge pressure control solenoid valve - N75-

11 - Hose

12 - Sealing ring

13 - Connection

14 - Retaining clip

15 - Bolt
- ❑ 9 Nm

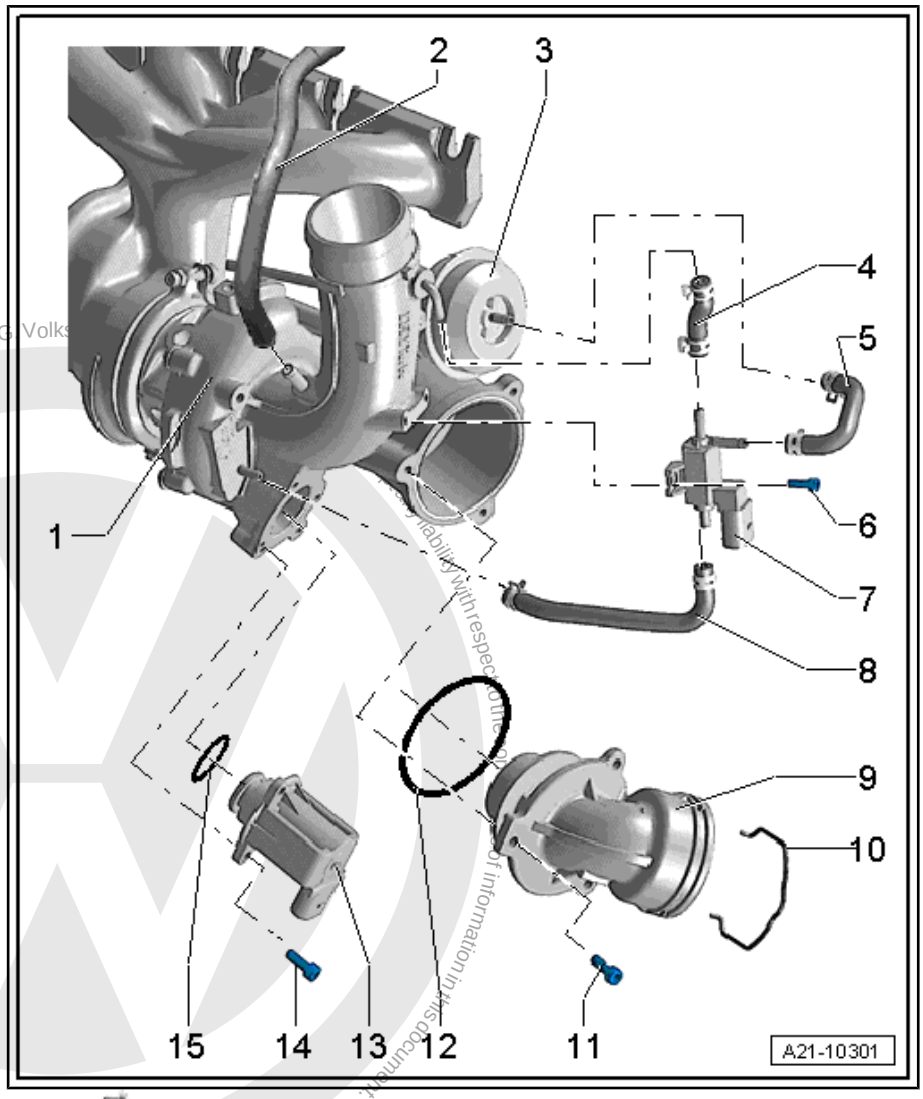
16 - Bolt
- ❑ 7 Nm

17 - Turbocharger air recirculation valve - N249-
- ❑ Note installation position ⇒ page 423

18 - Sealing ring

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1.1.2 Part I (engine codes CAWA, CAWB, CBFA, CCTA, CCTB, CCZA, CCZB, CCZC, CCZD)



1 - Exhaust turbocharger

- ❑ Can only be renewed together with exhaust manifold and vacuum unit as one unit
- ❑ Removing and installing ⇒ page 424

2 - To activated charcoal filter

3 - Vacuum unit for turbocharger

- ❑ Checking ⇒ page 431
- ❑ Removing and installing ⇒ page 436

4 - Hose

5 - Hose

6 - Bolt

- ❑ 3 Nm

7 - Charge pressure control solenoid valve - N75-

8 - Hose

9 - Connection

10 - Retaining clip

11 - Bolt

- ❑ 9 Nm

12 - Sealing ring

13 - Turbocharger air recirculation valve - N249-

- ❑ Note installation position ⇒ page 423

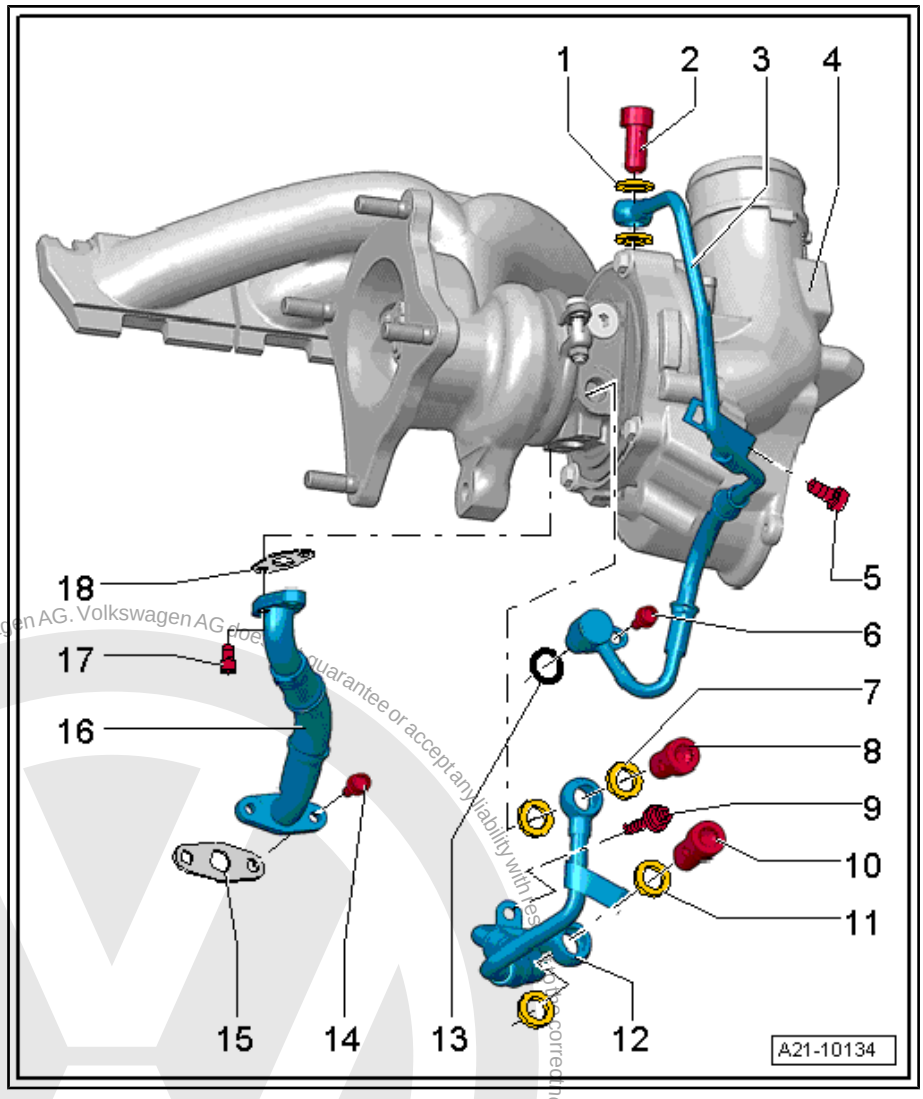
14 - Bolt

- ❑ 7 Nm

15 - Sealing ring

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1.1.3 Part II



1 - Sealing ring
- ❑ Renew

2 - Banjo bolt
- ❑ 33 Nm

3 - Oil supply line

4 - Exhaust turbocharger
- ❑ Can only be renewed together with exhaust manifold and vacuum unit as one unit
- ❑ Removing and installing ⇒ page 424

5 - Bolt
- ❑ 9 Nm

6 - Bolt
- ❑ 9 Nm

7 - Sealing ring
- ❑ Renew

8 - Banjo bolt
- ❑ 38 Nm

9 - Bolt
- ❑ 9 Nm

10 - Banjo bolt
- ❑ 38 Nm
- ❑ To remove and install, the turbocharger must be removed

11 - Sealing ring
- ❑ Renew

12 - Coolant supply line
- ❑ To remove and install, the turbocharger must be removed

13 - O-ring
- ❑ Renew

14 - Bolt
- ❑ 9 Nm

15 - Seal
- ❑ Renew

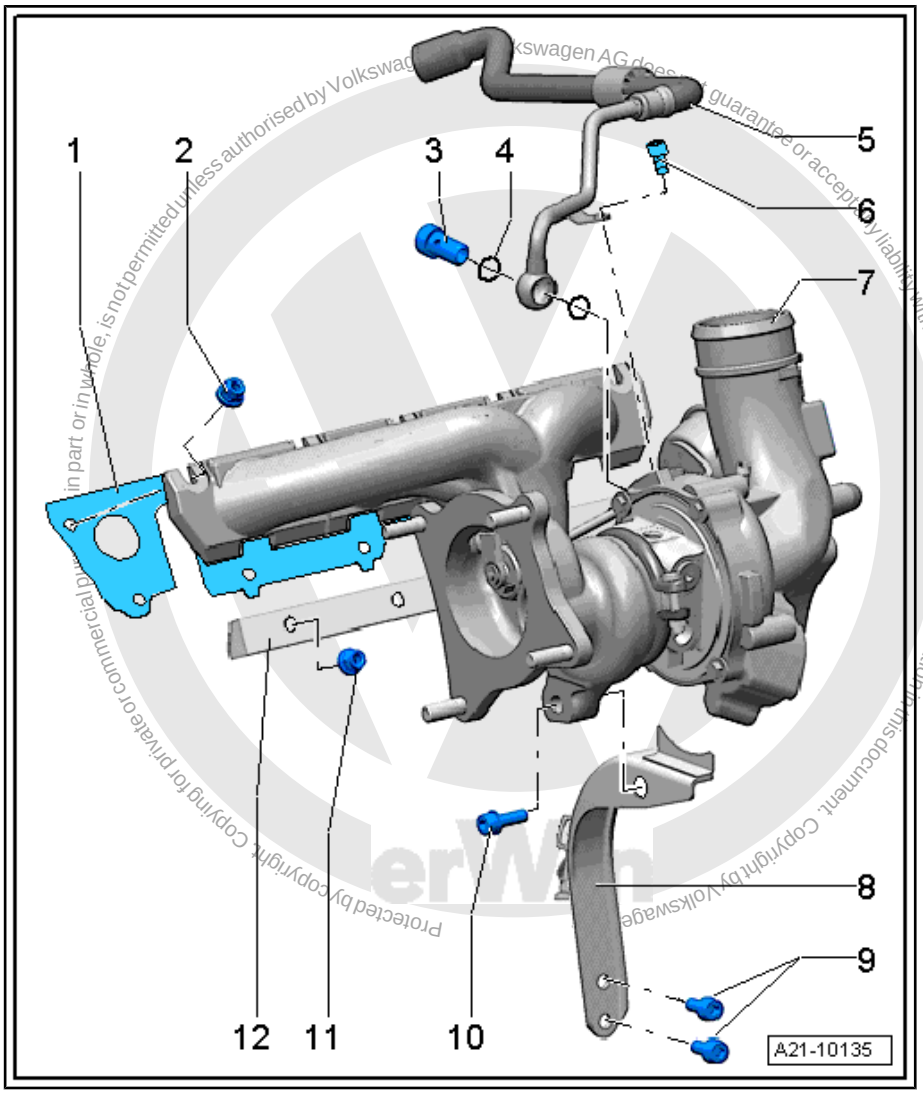
16 - Oil return line

17 - Bolt
- ❑ 9 Nm

18 - Seal
- ❑ Renew

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1.1.4 Part III



1 - Seal
- ❑ Renew

2 - Nut
- ❑ Tightening sequence ⇒ page 422
- ❑ Renew
- ❑ Coat exhaust manifold studs with high temperature paste; high temperature paste ⇒ ETKA (Electronic parts catalogue)

3 - Banjo bolt
- ❑ 38 Nm
- ❑ To remove and install, the turbocharger must be removed

4 - Sealing ring
- ❑ Renew

5 - Coolant return line
- ❑ To remove and install, the turbocharger must be removed

6 - Bolt
- ❑ 9 Nm

7 - Exhaust turbocharger
- ❑ Can only be renewed together with exhaust manifold and vacuum unit as one unit
- ❑ Removing and installing ⇒ page 424

8 - Holder

9 - Bolt
- ❑ 30 Nm
- ❑ Coat bolt with high temperature paste; high temperature paste ⇒ ETKA (Electronic parts catalogue)

10 - Bolt
- ❑ 30 Nm
- ❑ Coat bolt with high temperature paste; high temperature paste ⇒ ETKA (Electronic parts catalogue)

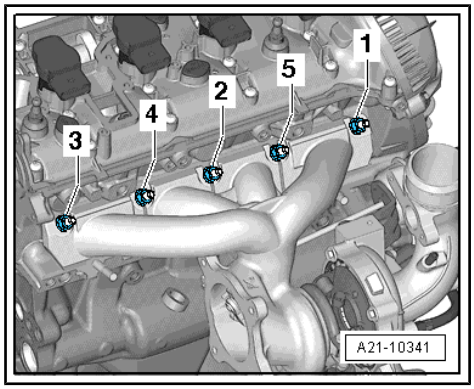
11 - Nut
- ❑ Do not loosen to remove turbocharger
- ❑ Renew
- ❑ 30 Nm
- ❑ Coat exhaust manifold studs with high temperature paste; high temperature paste ⇒ ETKA (Electronic parts catalogue)

12 - Windscreen surround

carDiagn.com

Tightening sequence - turbocharger

– Tighten bolts in sequence -1 to 5- in 4 stages as follows:
– 1. Tighten bolts to 5 Nm.
– 2. Tighten bolts to 12 Nm.
– 3. Tighten bolts to 16 Nm.
– 4. Tighten screws to 25 Nm.



1.1.5 Part IV

Note

Only engine codes BZB, CGYA, CDAA, CDAB have an adjustable vacuum unit.

1 - Exhaust turbocharger

- ❑ Can only be renewed together with exhaust manifold and vacuum unit as one unit
- ❑ Removing and installing ⇒ page 424

2 - Vacuum unit for turbocharger

- ❑ Checking ⇒ page 431
- ❑ Removing and installing ⇒ page 436
- ❑ Adjusting - only engine codes BZB, CGYA, CDAA, CDAB ⇒ page 432 .

3 - Bolt

- ❑ 10 Nm

4 - Nut

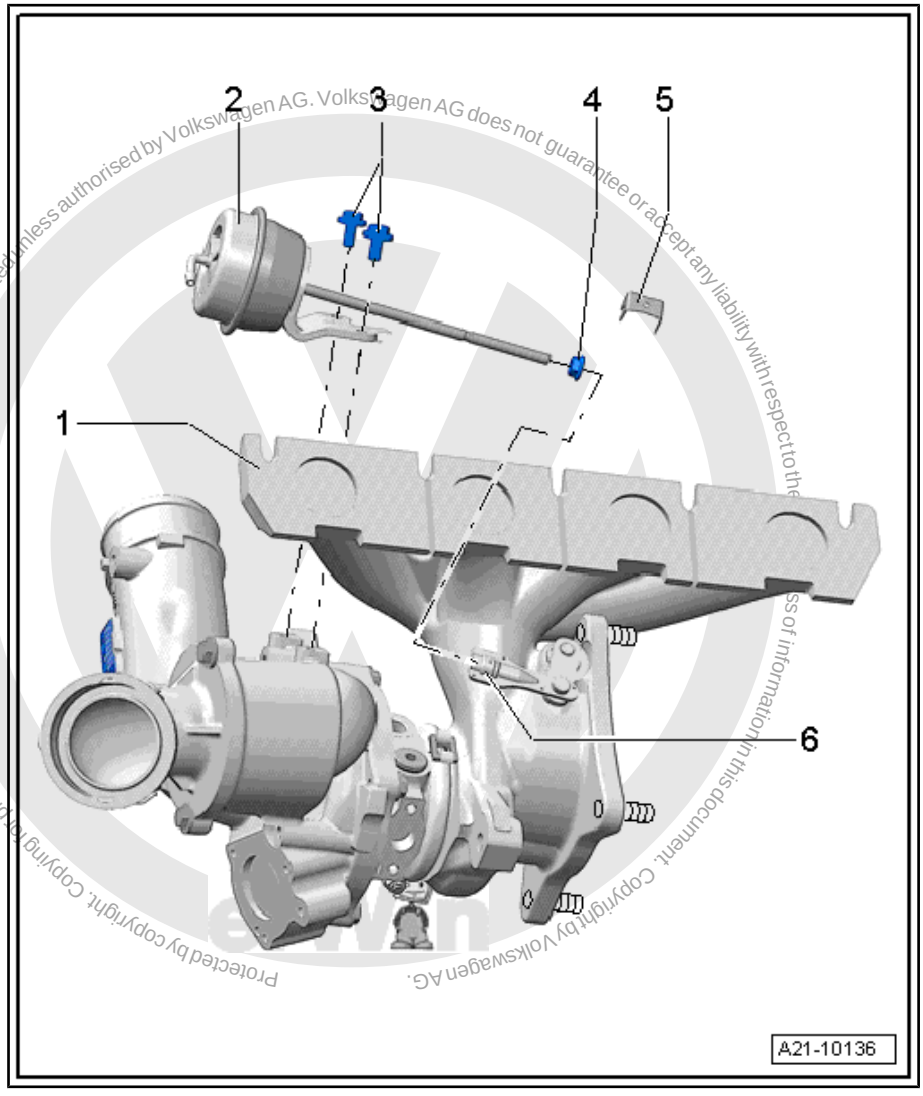
- ❑ Only engine codes BZB, CGYA, CDAA, CDAB.
- ❑ 9 Nm
- ❑ Secure with sealing paint

5 - Securing clip

- ❑ Only engine codes BZB, CGYA, CDAA, CDAB.

6 - Knurled nut

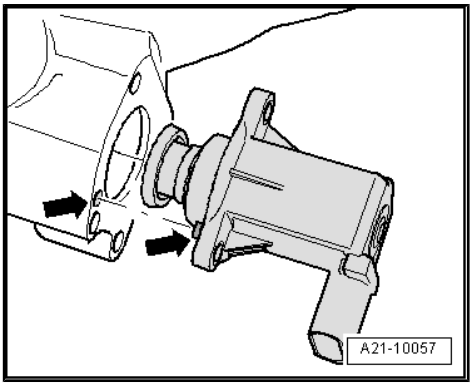
- ❑ Only engine codes BZB, CGYA, CDAA, CDAB.



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1.1.6 Installation location of turbocharger air recirculation valve - N249-

– Note installation position -arrows-.



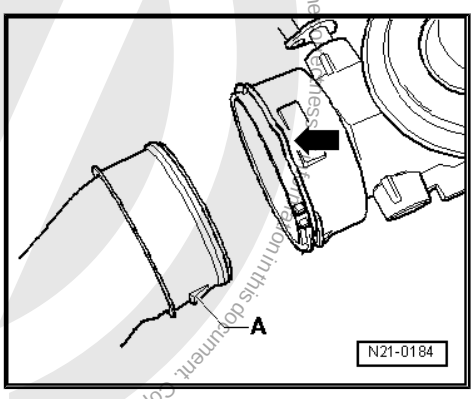
1.2 Fitting hose connections with plug-in connectors

Caution

The seal for the push-on coupling can be damaged if the retaining clip is in the locked position during installation. This would result in leaking. Observe installation instructions.

Removing:

– Release plug-in connector by pulling out retaining clip -arrow-. Separate hose/pipe without tools.



Installing

– If renewed, place seal in groove of charge air hose. Make sure that the seal is correctly seated in the groove all around the complete circumference and that it is not twisted.

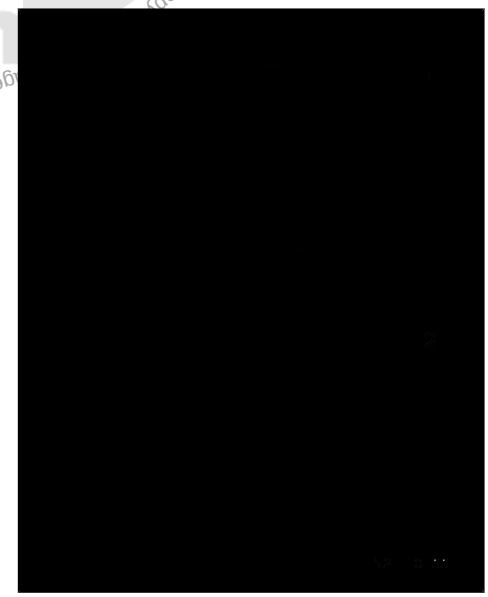
– Lubricate sealing surface and seal with oil.

– Bring retaining clip to release position -1-.

– Push charge air hose into coupling to stop.

– Bring securing clip to locking position -2- and then push charge air hose again.

– Check if plug-in connector seats correctly and is properly engaged by pulling hose.

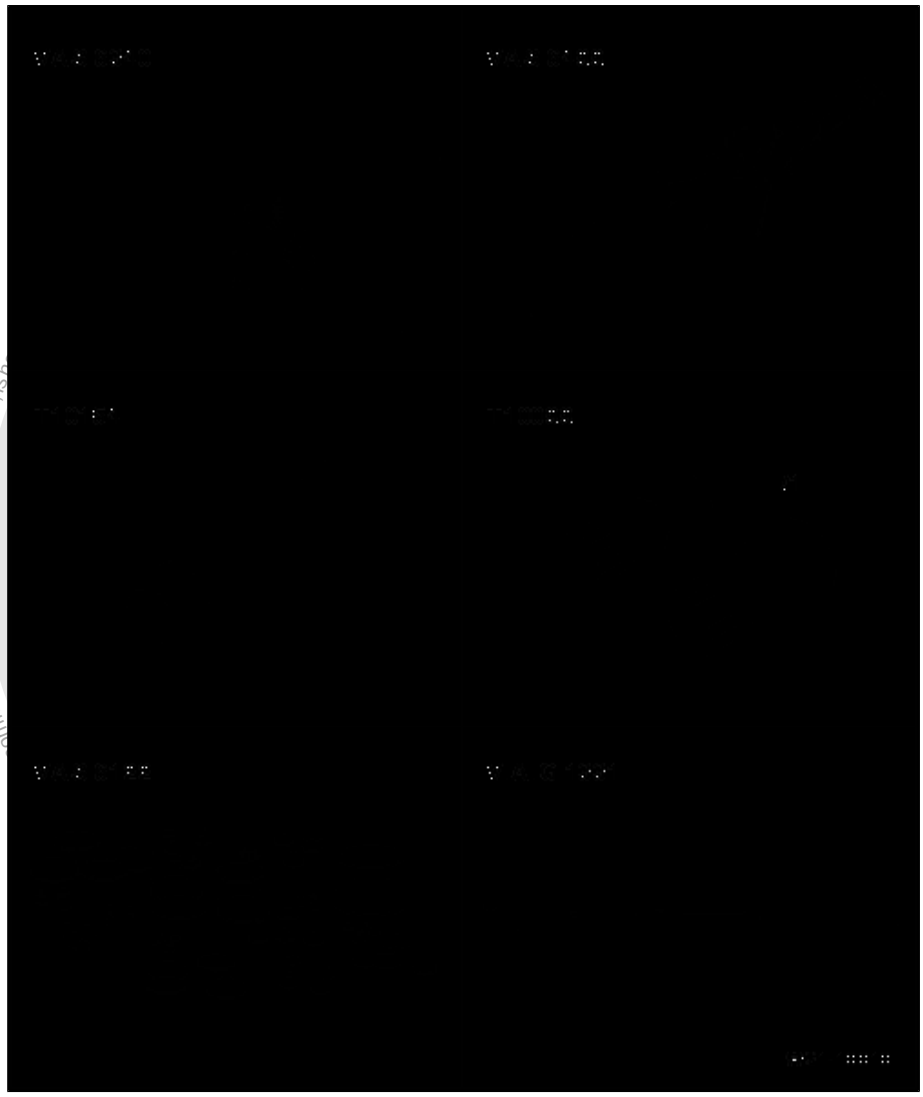


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1.3 Removing and installing turbocharger

Special tools and workshop equipment required

- Hose clamp pliers - VAS 6340-
- Spring-type clip pliers - VAS 6499-
- Bit XZN 10 - T10154-
- Bits - T10099-
- Engine plug set - VAS 6122-
- Torque wrench - V.A.G 1331-



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Caution

If a mechanical fault is found on the turbocharger, e.g. a destroyed compressor impeller, just renewing the turbocharger is not enough. To avoid subsequent damage, the following work must be carried out:

- *Check air filter housing, air filter element and intake hoses for dirt/soiling.*
- *Check the whole charge air path and charge air cooler for foreign objects.*

If foreign objects are found in the charge air system, the charged air routing must be cleaned and the charge air cooler must be renewed, if necessary.

Removing:

– Remove air filter housing ⇒ page 459 .

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Golf, Eos, Scirocco:

– Remove plenum chamber bulkhead ⇒ General body repairs, exterior; Rep. gr. 50 ; Plenum chamber bulkhead; Assembly overview - bulkhead .

All:

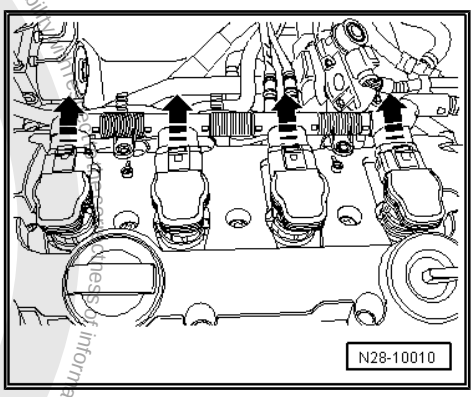
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

– Remove front part of right wheel housing liner or front right wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

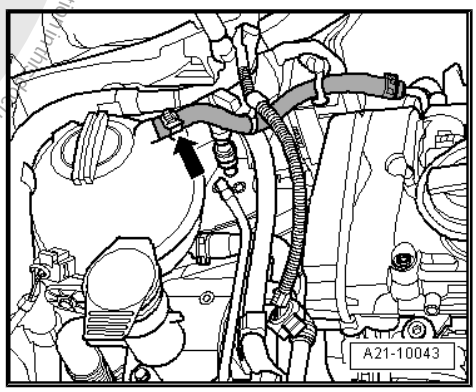
– Drain coolant ⇒ page 235 .

– Remove engine cover panel.

– Pull connectors from ignition coils and lay wiring harness to side.



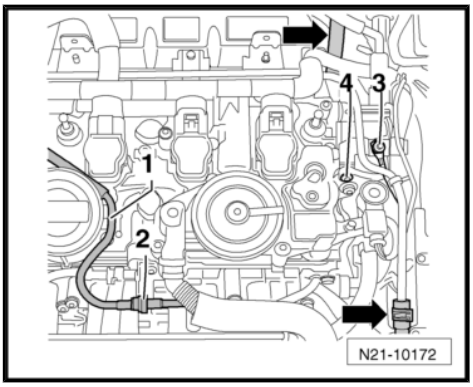
– Disconnect coolant line to coolant expansion tank -arrow-.



– Detach vacuum hose -1- at disconnection point -2-. and lay line to one side.

– Remove coolant hoses -arrows- from coolant pipe.

– Unbolt earth cable -3- (not engine codes CCZA, CCZB, CCZC, CCZD) and loosen bolt -4-.



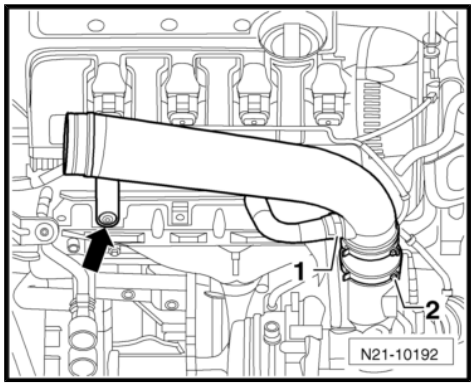
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Engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA:

– Press release buttons, pull off air hose -1- and swivel to side.

– Unscrew bolt -arrow- for air pipe.

– Undo hose clip -2- and remove air pipe.



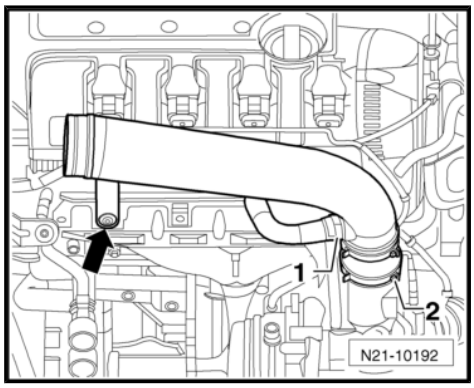
Engine codes CBFA, CCTA, CCTB:

– Unscrew bolt -arrow- for air pipe.

– Loosen hose clip -2- and lay air pipe on cylinder head.

All:

– Seal turbocharger openings with engine bung set - VAS 6122- .

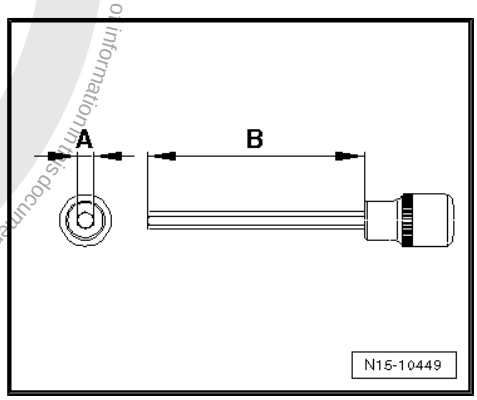


– Unscrew bolts -1…3- and remove heat shield together with coolant pipe.



Note

On 2.0 l engines, unscrew bolt -2- from heat shield using 6 mm -A- hexagon socket. The hexagon must be at least 5 cm -B- long. A socket which tapers to 6 mm at the tip is too thick.

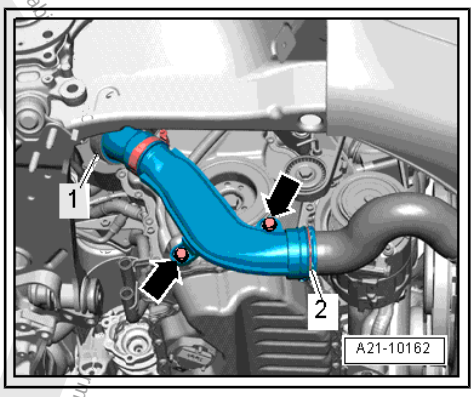


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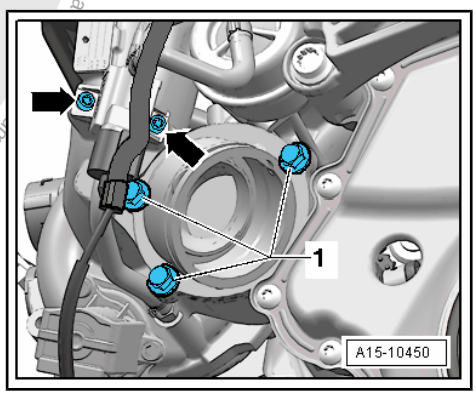
– Unscrew oil supply line -4- from turbocharger.



– Remove bolts -arrows-.
– Remove air pipe (lift clips -items 1 and 2-).



– Remove charge pressure solenoid valve - N75- from turbocharger -arrows-.
– Unscrew bolts -1-, and remove support for turbocharger.



Vehicles with front-wheel drive:

– Remove heat shield for drive shaft on right side -arrows-.

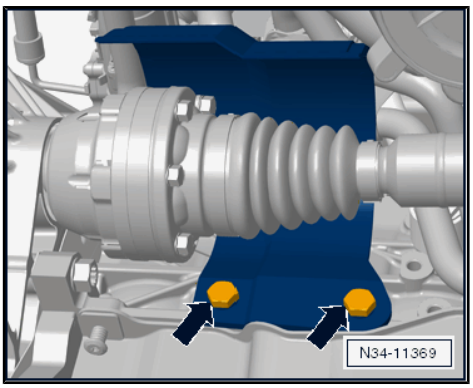
All:

– Remove front exhaust pipe with catalytic converter:

Passat, CC ⇒ page 517

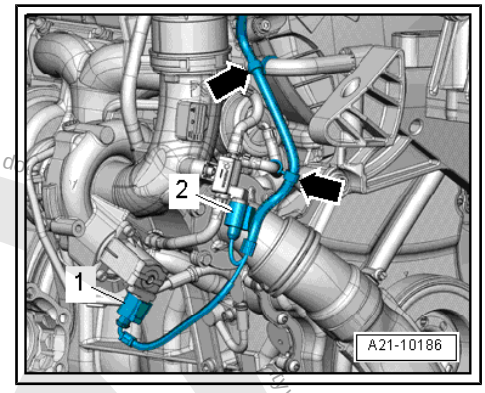
Golf, Eos, Scirocco ⇒ page 533

Tiguan ⇒ page 543



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– Separate electrical wiring connections -1 and 2- and place electrical wiring to one side -arrows-.



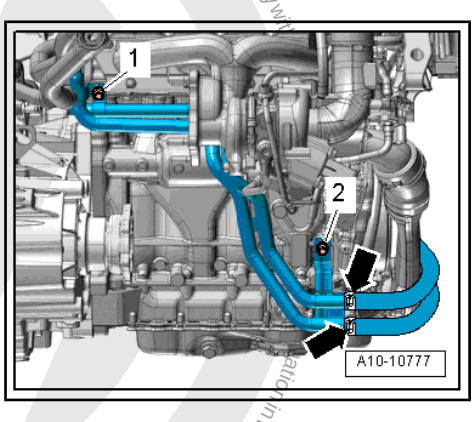
Vehicles with seat heating:

– Unscrew bolts -1 and 2- and move coolant pipes to the left.

Vehicles with all-wheel drive:

– Raise and tie propshaft to left in tunnel.

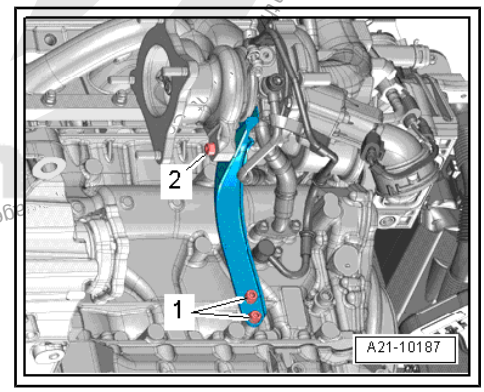
– Remove right drive shaft ⇒ Running gear, axles, steering; Rep. gr. 40 ; Removing and installing drive shafts .



All vehicles:

– Unscrew bolt -1- using bit XZN 10 - T10154- .

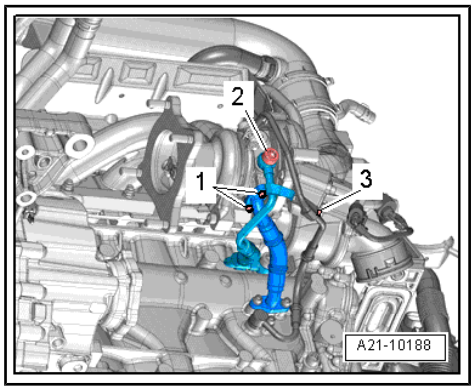
– Remove bolt -2-.



– Remove banjo bolt -2- using bits XZN 12 - T10099- and move coolant pipe to one side.

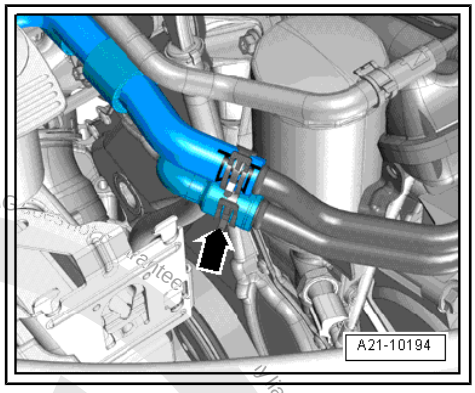
– Remove bolts -1- on oil return line.

– Remove bolt -3- on oil supply line.



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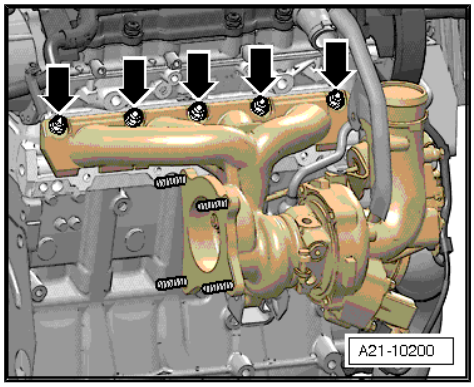
– Disconnect coolant hose -arrow- and move it clear.



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– Unscrew nuts -arrows-.

– Remove turbocharger and exhaust manifold upwards.



Installing:

Caution

If a mechanical fault is found on the turbocharger, e.g. a destroyed compressor impeller, just renewing the turbocharger is not enough. To prevent this from causing further damage, perform the following repairs:

- ***Check air filter housing, air filter element and intake hoses for soiling.***
- ***Check complete charged air routing and charge air cooler for foreign objects.***

If foreign objects are found in the charge air system, the charged air routing must be cleaned and the charge air cooler must be renewed, if necessary.

Install in the reverse order of removal, observing the following:

- Installing hose connections with plug-in connectors ⇒ page 423 .
- Renew seals, gaskets and self-locking nuts.
- Fill turbocharger with engine oil at oil supply line connection.
- After installing turbocharger, run engine for about 1 minute at idling speed to ensure that oil is supplied to turbocharger.
- The coolant return line ⇒ Item 5 (page 421) must be installed together with the turbocharger.
- Hose connections and hoses for charge air system must be free of oil and grease before assembly. The seal and sealing surface must be oiled lightly only for plug-in connectors ⇒ page 423 .
- Secure all hose connections with hose clips which conform to production standard.

Specified torques ⇒ page 416

Component	Nm
Exhaust manifold/turbocharger to cylinder head 1) 2)	Note tightening sequence ⇒ page 422
Oil supply line to turbocharger (M12 banjo bolt)	33
Oil return line to turbocharger	9
Coolant supply line to turbocharger (M14 banjo bolt, tighten using bits XZN 12 - T10099-)	38
Turbocharger bracket to cylinder block 2	30
Turbocharger bracket to turbocharger 2	30
Air intake pipe (right side) to sump	10
Heat shield to cylinder head M8 and M12	20

1) Renew nuts.

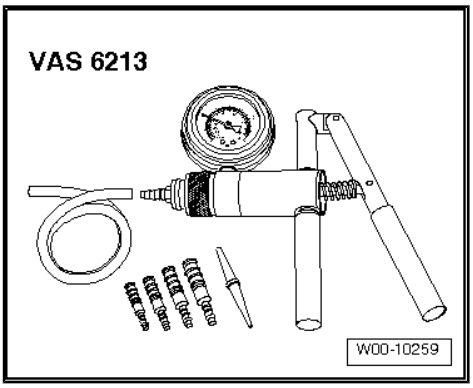
2) Use high-temperature paste ⇒ ETKA (Electronic parts catalogue) .

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1.4 Checking vacuum unit for turbocharger

Special tools and workshop equipment required

- Hand operated vacuum pump - VAS 6213-



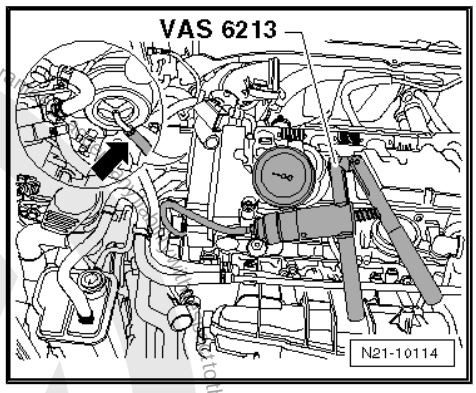
Test specification:

- Hose from turbocharger via charge pressure control solenoid valve - N75- to vacuum unit must have through-flow (not blocked).
- Charge pressure control solenoid valve - N75- OK.

Procedure:

– Remove engine cover panel ⇒ page 139 .

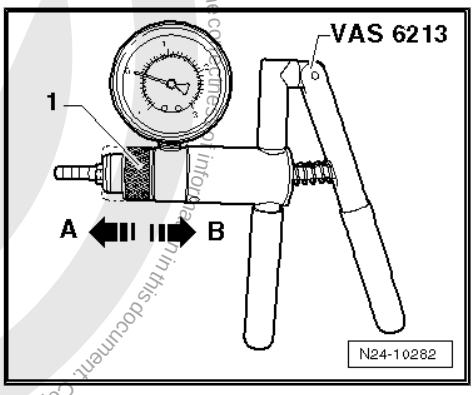
– Connect hand-operated vacuum pump - VAS 6213- to vacuum unit -arrow-.



– Move slide ring -1- on hand vacuum pump - VAS 6213- to position -B- for “pressure”.

Caution

The pressure must not exceed 750 mbar! If the pressure is exceeded, the vacuum unit can be damaged.

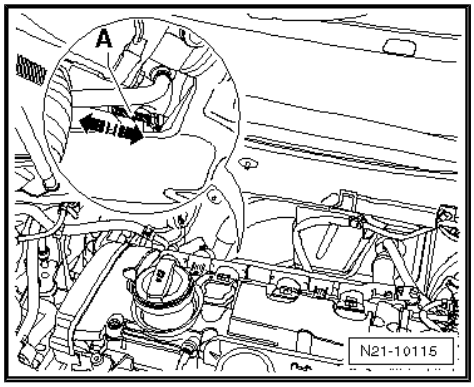


– Operate hand vacuum pump - VAS 6213- several times and observe the linkage.

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The linkage -A- should start to move at a pressure of approx. 300 mbar and be at its limit stop at a pressure of approx. 700 mbar.

The stroke of the rod is approx. 10 mm.



Note

If no pressure can be built up using hand vacuum pump - VAS 6213- , or if the pressure drops immediately again, check hand vacuum pump - VAS 6213- and connecting hoses for leaks. If no fault is found: renew vacuum unit *⇒ page 436* *.*

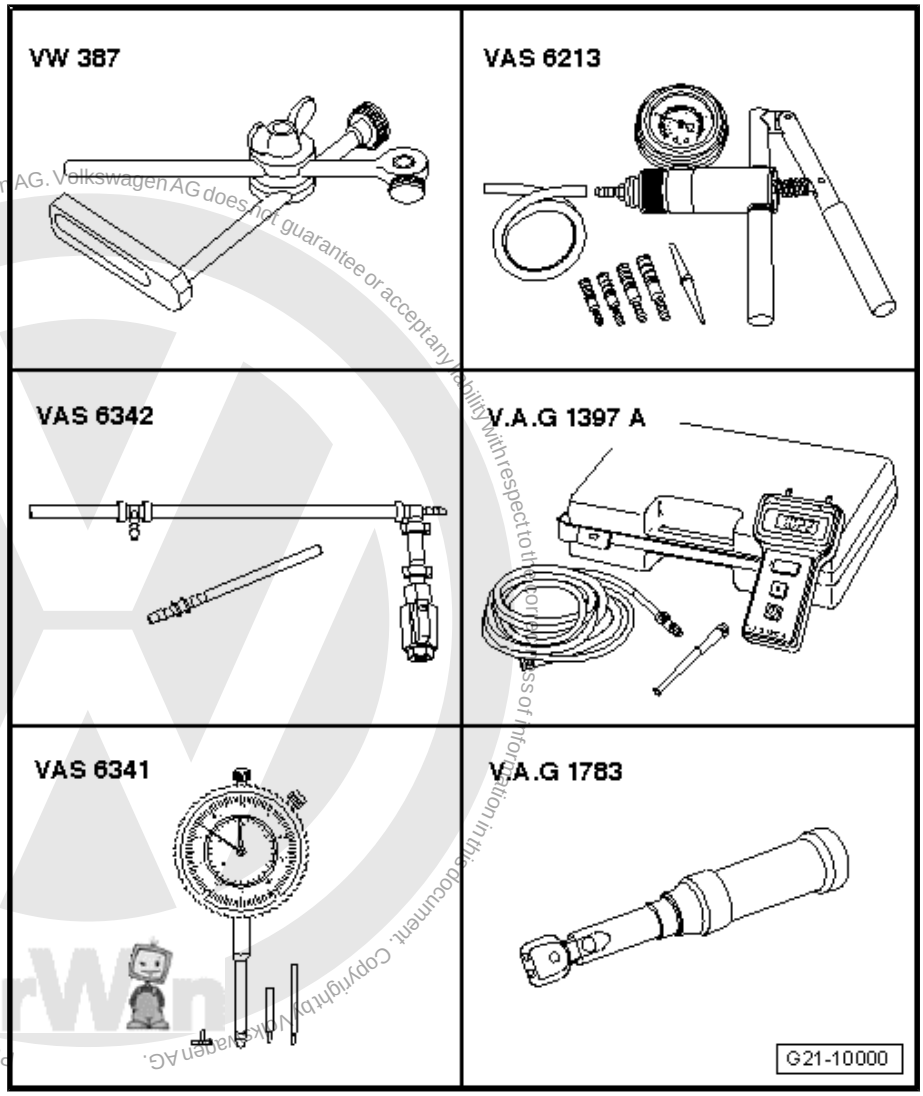
1.5 Adjusting turbocharger vacuum unit (engine codes BZB, CGYA, CDAA, CDAB)

Note

This procedure is used only to adjust the vacuum unit. When checking adjusted vacuum units the values may differ.

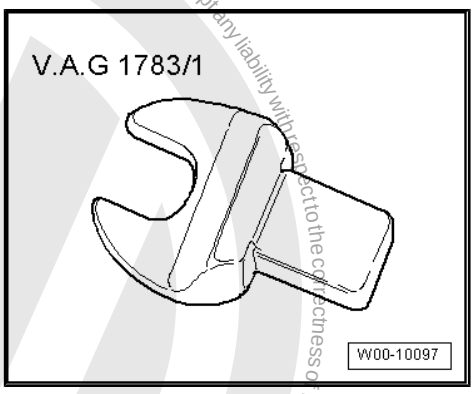
Special tools and workshop equipment required

- Universal dial gauge holder - VW 387-
- Hand operated vacuum pump - VAS 6213-
- Pressure regulating valve - VAS 6342-
- Turbocharger tester - V.A.G 1397A-
- Dial gauge set, 4-part - VAS 6341-
- Torque wrench - V.A.G 1783-



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- Open-end spanner insert (10 mm) - V.A.G 1783/1-

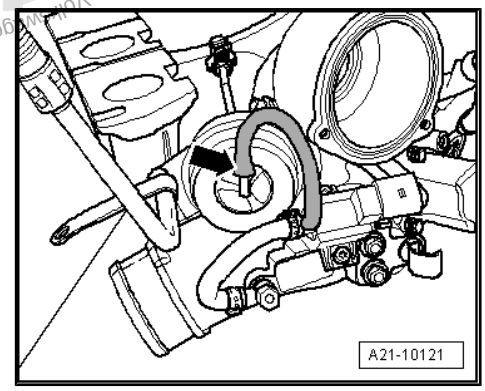


Note

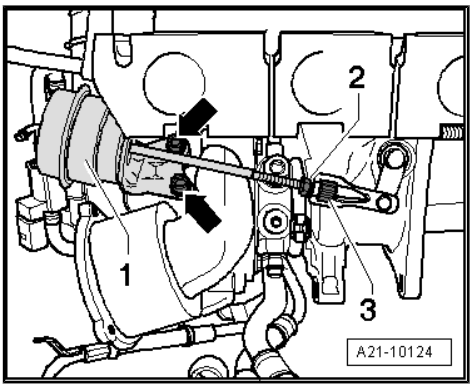
- *Non-adjustable vacuum units are fitted in some vehicles.*
- *The vacuum unit must be adjusted only if the linkage has been loosened.*
- *Adjustment is carried out when turbocharger is removed.*

– Pull hose -arrow- from vacuum unit on turbocharger.

– Detach locking plate above turbocharger linkage.

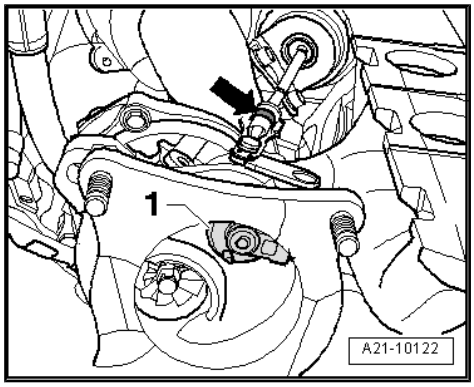


– Loosen lock nut -2-.

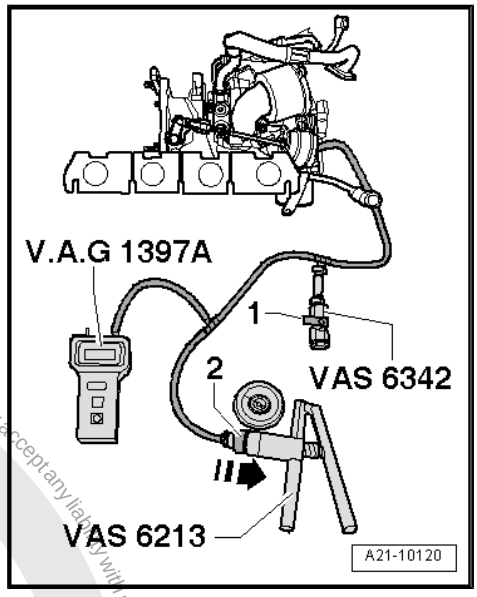


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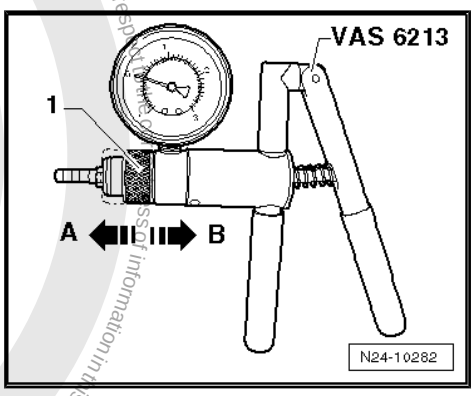
– Pre-adjust bypass flap -1- above rod of vacuum unit -arrow-, so that the bypass flap can just be turned by hand.
– Tighten lock nut hand-tight.



– Connect up hand-operated vacuum pump - VAS 6213- , turbocharger tester - V.A.G 1397A- (connection II) and pressure control valve - VAS 6342- as shown in illustration.
– Close pressure control valve - VAS 6342- at lever -1-.

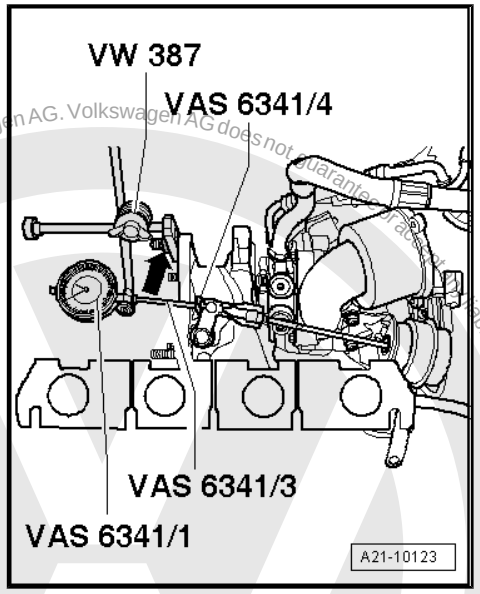


– Move slide ring -1- on hand vacuum pump - VAS 6213- to position -B- for “pressure”.
– Switch on turbocharger tester - V.A.G 1397A- and set sliding switch to position II.



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– Secure universal dial gauge bracket - VW 387- to turbocharger -arrows-.
– Secure dial gauge - VAS 6341/1- with dial gauge extension, 30 mm - VAS 6341/3- and flat pickup - VAS 6341/4- to universal dial gauge bracket - VW 387- .
– With pressure at 0 bar, set dial gauge - VAS 6341/1- to 1 mm preload.
– Turn dial of dial gauge - VAS 6341/1- to 0.
– Make sure that dial gauge can move freely.
– Operate hand vacuum pump - VAS 6213- until turbocharger tester - V.A.G 1397A- indicates 460 ± 5 mbar.
– The dial gauge must indicate between 4.1 mm and 4.3 mm; otherwise, turn rod of vacuum unit until the value is indicated.
– Tighten lock nut hand-tight.
– Repeat adjustment.



Note

The values in mm refer to the read value (includes 1 mm pretension).

– Vent system via pressure control valve - VAS 6342- so that pressure reading drops to 0 mbar.
– Set dial gauge - VAS 6341/1- to 0.

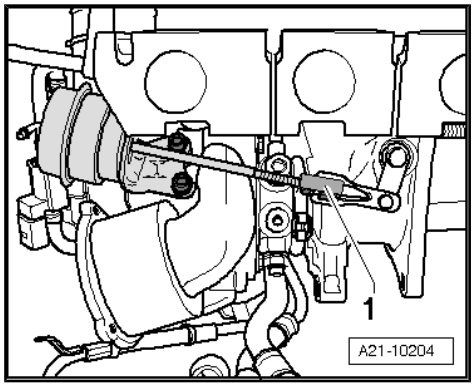
Note

The following measurements must be performed in continuous sequence. Do not allow the pressure to drop to 0 between measurements.

– Operate hand vacuum pump - VAS 6213- until turbocharger tester - V.A.G 1397A- indicates 460 ± 5 mbar.
– Read off and note value indicated on dial gauge - VAS 6341/1- .
– Actuate hand vacuum pump - VAS 6213- until turbocharger tester - V.A.G 1397A- indicates 650 mbar to 700 mbar.
– Vent system via pressure control valve - VAS 6342- so that pressure reading drops to 460 +/- 5 mbar.
– Read off and note value indicated on dial gauge - VAS 6341/1- .
– Add values 1 and 2 together and divide by 2.
– The result (mean value) should be 5 +/- 0.25 mm.
– Correct setting if the result (average) is not 5 +/- 0.25 mm, tighten lock nut hand-tight and repeat measurement.
– If the result (mean value) is 5 +/- -0.25 mm, tighten the lock nut to 9 Nm and secure with sealing paint.

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– Secure locking plate -1- above linkage on turbocharger.



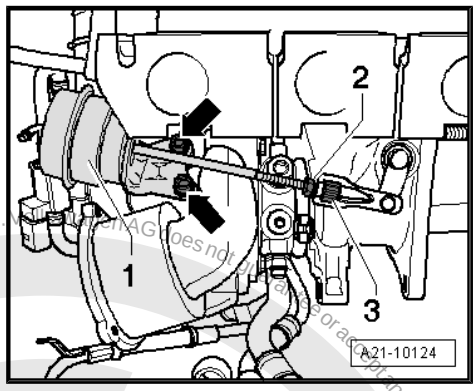
1.6 Removing and installing vacuum unit for turbocharger

Removing:

– Remove turbocharger ⇒ page 424 .

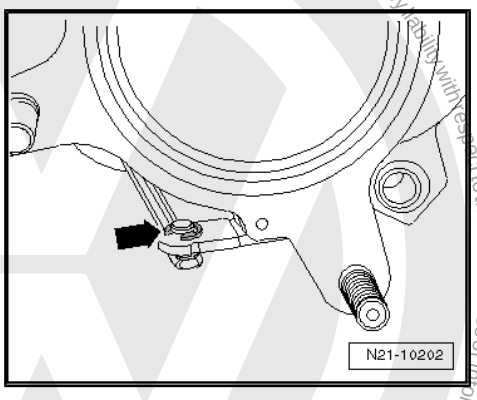
Engine code BZB, CGYA, CDAA, CDAB:

– Detach locking plate above turbocharger linkage.
– Loosen lock nut -2-.
– Separate rod from turbocharger -3-.
– Remove vacuum unit -1- from turbocharger -arrows-.

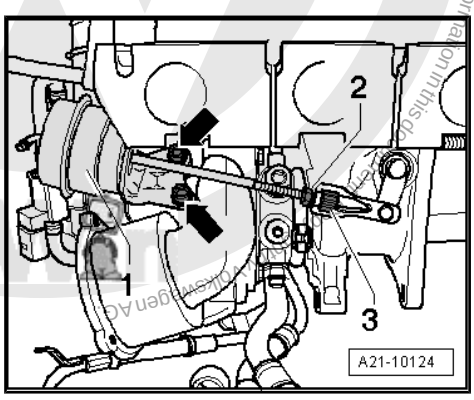


Engine codes CAWA, CAWB, CBFA, CCTA, CCTB, CCZA, CCZB, CCZC, CCZD:

– Pull securing clip off vacuum unit linkage.



– Remove vacuum unit -1- from turbocharger -arrows-.



Installing:

Install in the reverse order of removal, observing the following:

Engine code BZB, CGYA, CDAA, CDAB:

– Adjust vacuum unit ⇒ page 432 .

Torque settings

Component	Nm
Vacuum unit to turbocharger	10

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2 Charge air system

Caution

The screw-type clips on the charge air pipes must be tightened to 5.5 Nm. If the torque is too low or too high, the charge air hose may slip off the charge air pipe during vehicle operation.

Installing hose connections with plug-in connectors ⇒ page 423 .

Assembly overview - charge air cooling (Passat, CC, Tiguan, Eos) ⇒ page 437 .

Assembly overview - charge air cooler (Golf, Scirocco) ⇒ page 438 .

Assembly overview - sound generator (Golf, Scirocco) ⇒ page 440 .

Actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869- (Golf, Scirocco) ⇒ page 440 .

Turbocharging - overview ⇒ page 443 .

Removing and installing charge air cooler (Golf, Eos) ⇒ page 443 .

Removing and installing charge air cooler (Passat, CC, Scirocco) ⇒ page 445 .

Removing and installing charge air cooler (Tiguan) ⇒ page 446 .

Removing and installing charge air duct to sound generator (Golf, Scirocco) ⇒ page 447 .

Checking charge air system for leaks ⇒ page 448 .

2.1 Assembly overview - charge air cooling (Passat, CC, Tiguan, Eos)

Caution

The screw-type clips on the charge air pipes must be tightened to 5.5 Nm. If the torque is too low or too high, the charge air hose may slip off the charge air pipe during vehicle operation.

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1 - 5 Nm

2 - Bearing

- ❑ For charge air cooler.

3 - Intercooler

- ❑ Removing and installing (Passat, CC, Eos) ⇒ page 445 .
- ❑ Removing and installing (Tiguan) ⇒ page 446

4 - Charge air pipe

5 - 10 Nm

6 - From turbocharger

7 - Charge air hose

- ❑ Note installation instructions ⇒ page 423

8 - To throttle valve module - J338- .

9 - Charge air hose

10 - 10 Nm

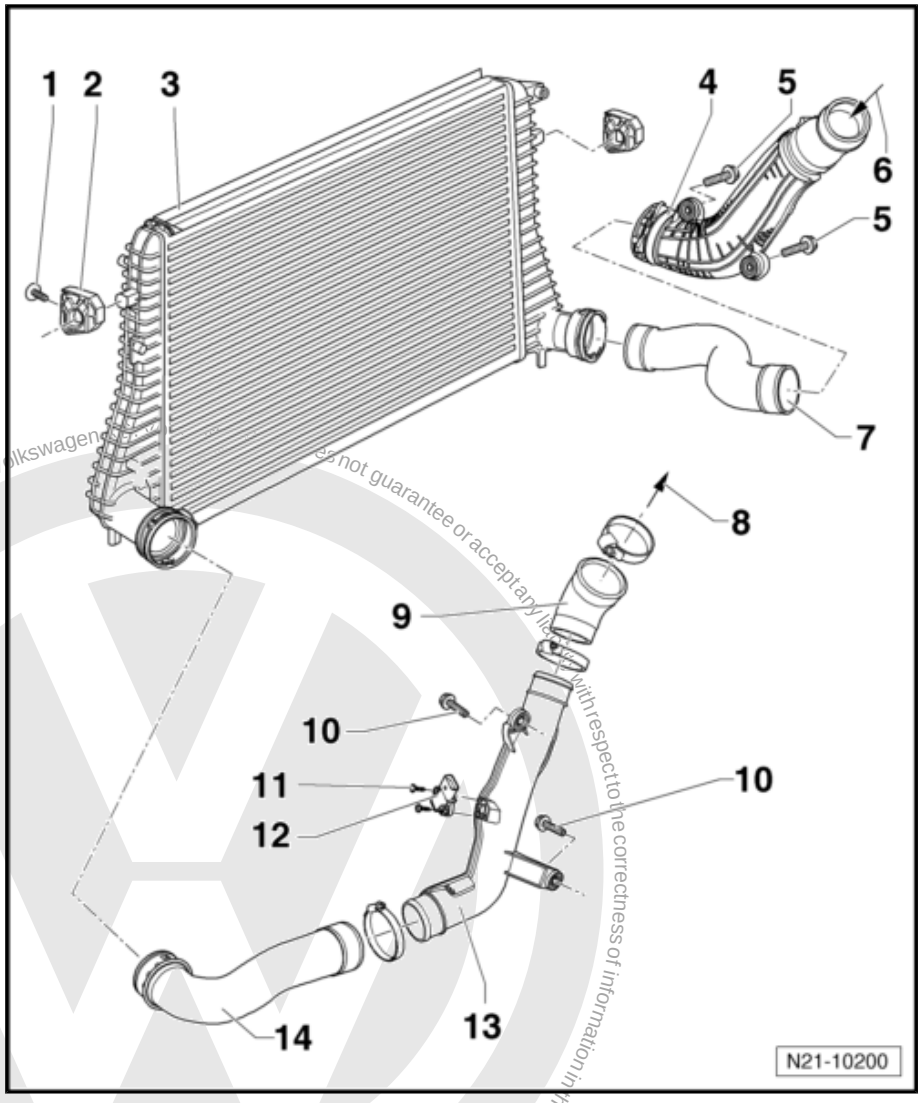
11 - 5 Nm

12 - Charge air pressure sender - G31-

13 - Charge air pipe

14 - Charge air hose

- ❑ Note installation instructions ⇒ page 423



2.2 Assembly overview - charge air cooler (Golf, Scirocco)

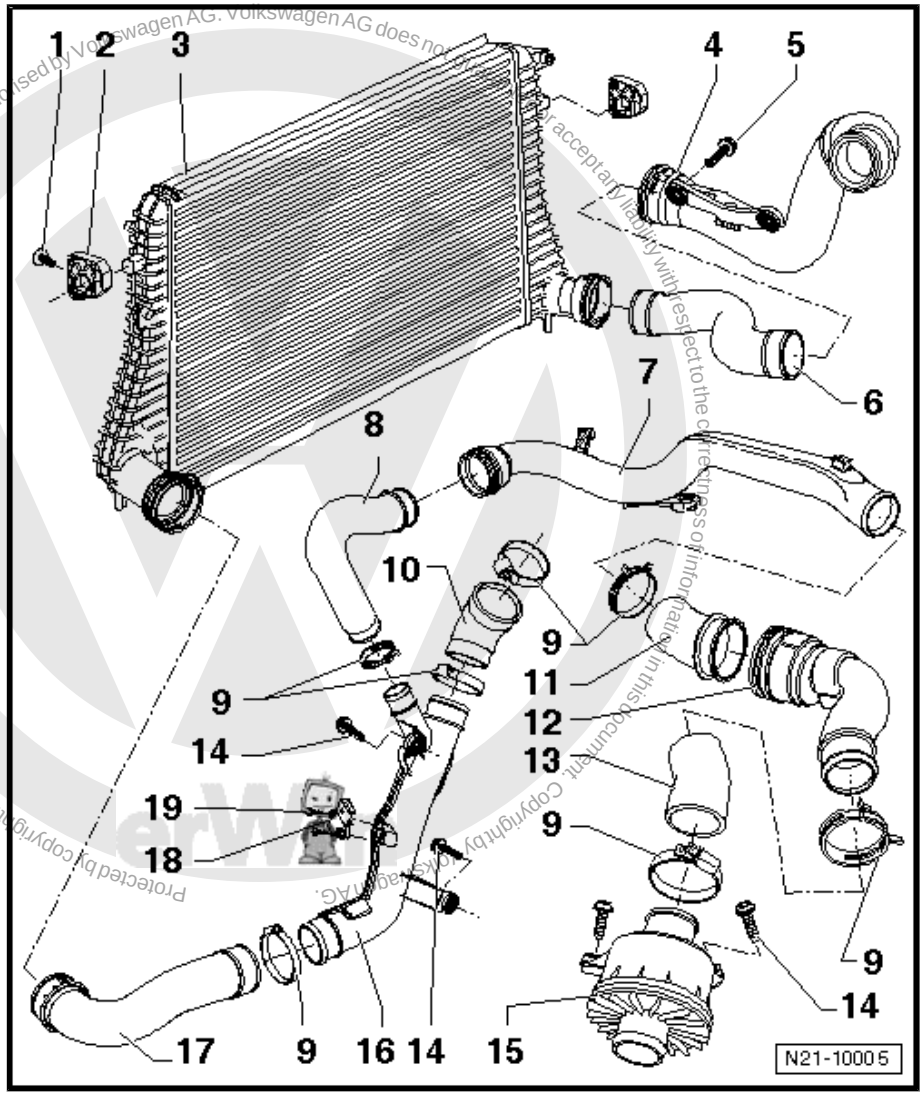
Caution

The screw-type clips on the charge air pipes must be tightened to 5.5 Nm. If the torque is too low or too high, the charge air hose may slip off the charge air pipe during vehicle operation.

Note

The sound generator is not fitted on all vehicles.

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1 - 5 Nm

2 - Bearing

- ❑ For charge air cooler.

3 - Intercooler

- ❑ Removing and installing ⇒ page 445

4 - Charge air pipe

5 - 10 Nm

6 - Charge air hose

- ❑ Fitting hose connections with plug-in connectors ⇒ page 423

7 - Charge air pipe

- ❑ To sound generator
- ❑ Removing and installing ⇒ page 447

8 - Charge air hose

- ❑ Removing and installing ⇒ page 447
- ❑ Fitting hose connections with plug-in connectors ⇒ page 423

9 - Hose clamp

10 - Charge air hose

- ❑ To throttle valve module - J338- .

11 - Charge air hose

12 - Charge air pipe

- ❑ Assembly overview ⇒ page 440 .

13 - Charge air hose

- ❑ Assembly overview ⇒ page 440 .

14 - 8 Nm

15 - Sound generator

- ❑ Assembly overview ⇒ page 440 .

16 - Charge air pipe

17 - Charge air hose

- ❑ Fitting hose connections with plug-in connectors ⇒ page 423

18 - Charge air pressure sender - G31-

19 - 5 Nm

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2.3 Assembly overview - sound generator (Golf, Scirocco)

Note

The sound generator is not fitted on all vehicles. As of 04/2009, the sound generator will be gradually replaced by the actuator for structure-borne sound - R214- .

1 - Cover

2 - 8 Nm

3 - Bulkhead of plenum chamber

4 - Trim
- ❑ For feed-through in plenum chamber bulkhead

5 - Charge air pipe

6 - Clamp

7 - Charge air hose

8 - 8 Nm

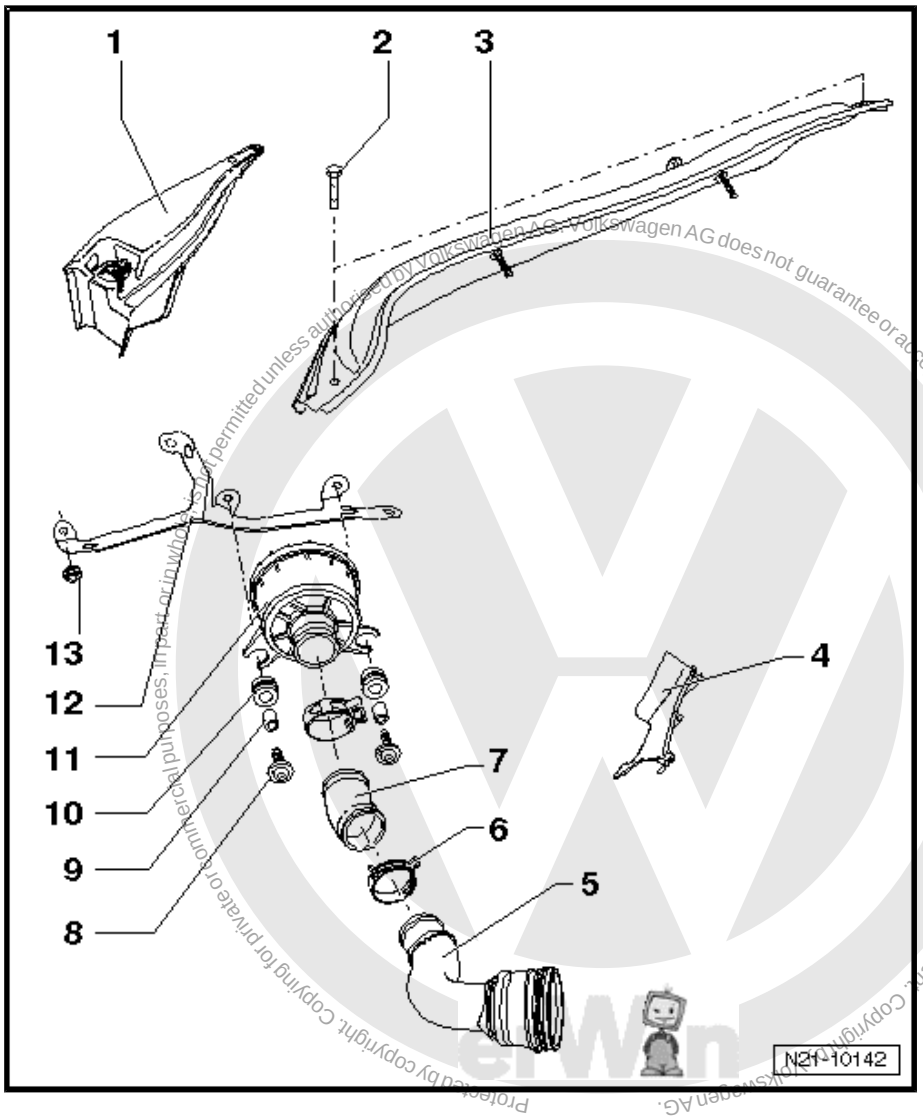
9 - Spacer sleeve

10 - Rubber mounting

11 - Sound generator
- ❑ Before removing, remove cover
⇒ Item 1 (page 440) .

12 - Holder
- ❑ For sound generator

13 - 8 Nm



2.4 Actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869-

Note

Actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869- are not fitted in all vehicles!

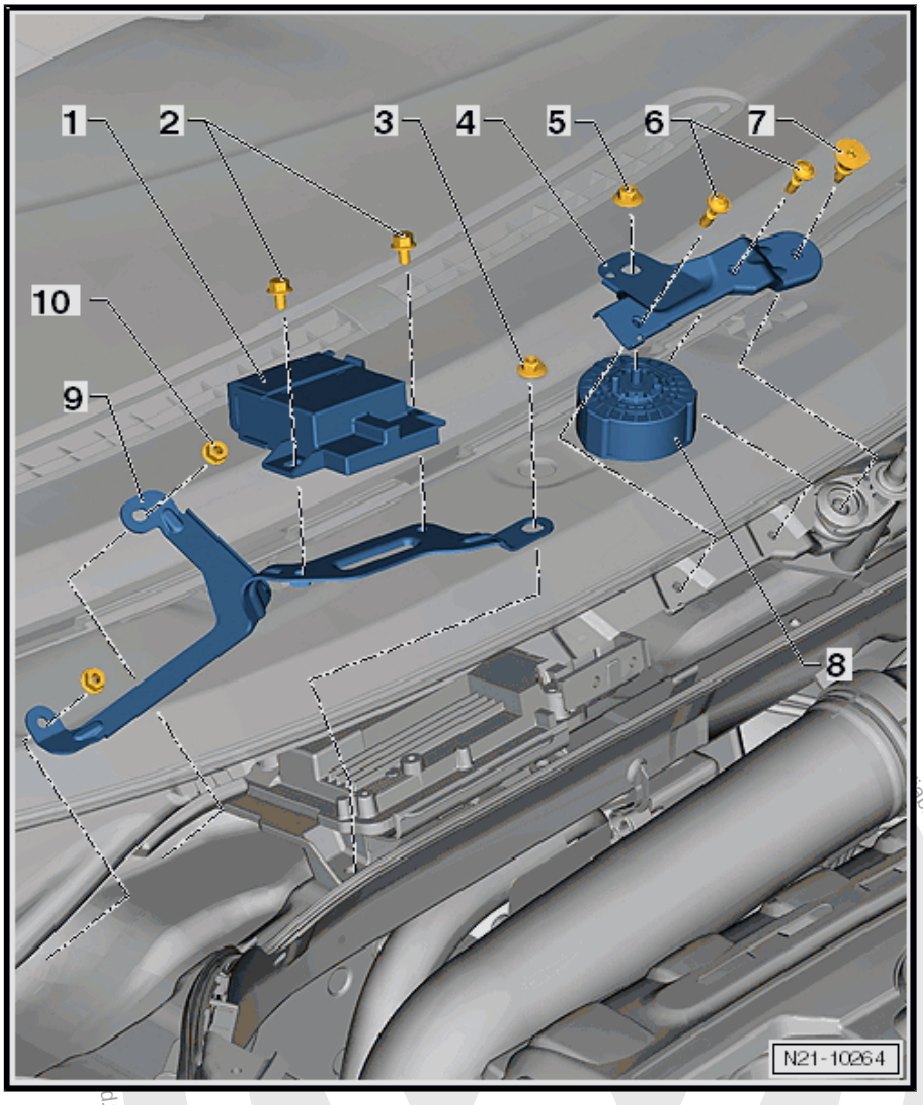
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To remove and install, plenum chamber cover and plenum chamber bulkhead must be removed ⇒ Body - front; Rep. gr. 50 .

Assembly overview - actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869- (left-hand drive vehicles) ⇒ page 441 .

Assembly overview - actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869- (right-hand drive vehicles) ⇒ page 442 .

2.4.1 Assembly overview - actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869- (left-hand drive vehicles)



1 - Control unit for structure-borne sound - J869-

- ❑ Fitting location: in plenum chamber
- ❑ To remove and install, plenum chamber cover and plenum chamber bulkhead must be removed.

2 - 8 Nm

3 - 8 Nm

4 - Bracket for actuator for structure-borne sound - R214-

- ❑ Not on Scirocco.

5 - 15 Nm

6 - 8 Nm

- ❑ Not on Scirocco.

7 - 8 Nm

8 - Actuator for structure-borne sound - R214-

- ❑ Fitting location: in plenum chamber
- ❑ To remove and install, plenum chamber cover and plenum chamber bulkhead must be removed.

9 - Bracket for control unit for structure-borne sound - J869-

10 - 8 Nm

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2.4.2 Assembly overview - actuator for structure-borne sound - R214- and control unit for structure-borne sound - J869- (right-hand drive vehicles)

1 - Bracket for control unit for structure-borne sound - J869-

2 - 8 Nm

3 - 8 Nm

4 - 15 Nm

5 - 8 Nm

- ❑ Not on Scirocco.

6 - Bracket for actuator for structure-borne sound - R214-

- ❑ Not on Scirocco.

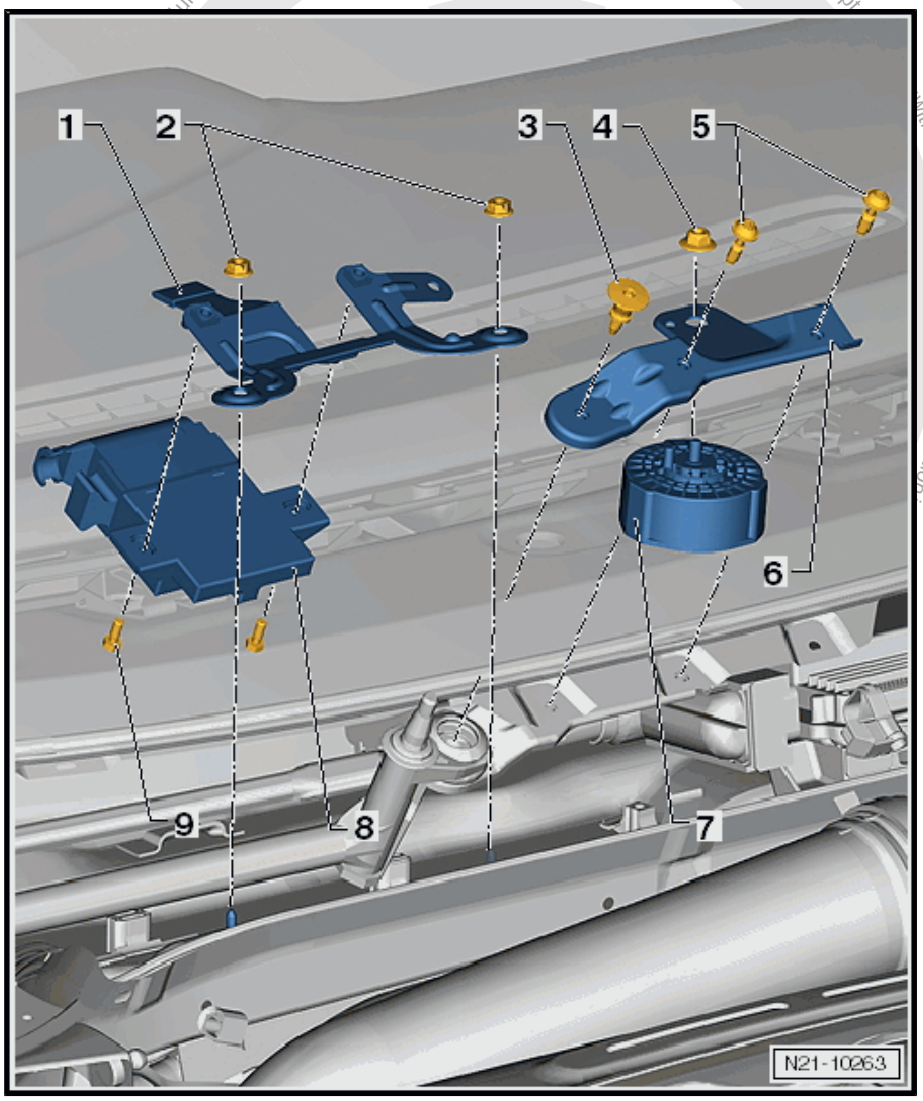
7 - Actuator for structure-borne sound - R214-

- ❑ Fitting location: in plenum chamber
- ❑ To remove and install, plenum chamber cover and plenum chamber bulkhead must be removed.

8 - Control unit for structure-borne sound - J869-

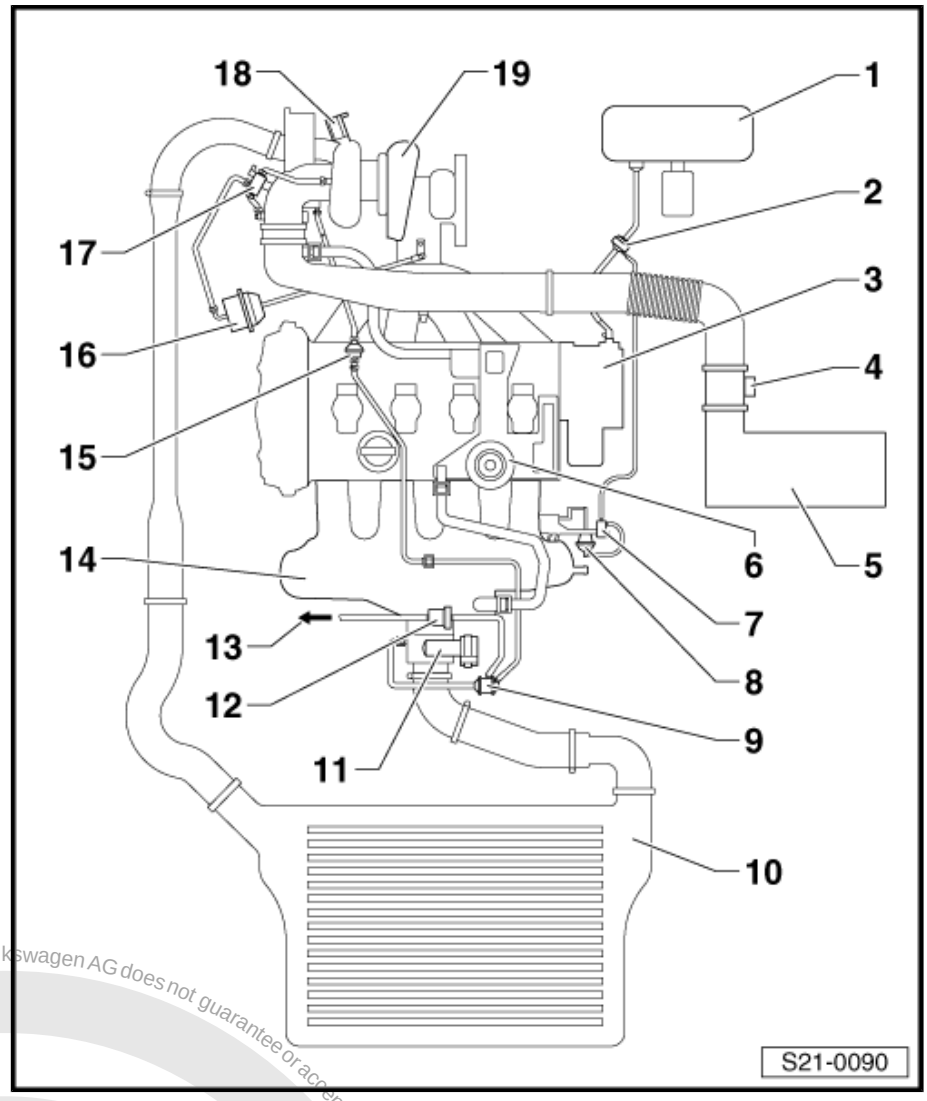
- ❑ Fitting location: in plenum chamber
- ❑ To remove and install, plenum chamber cover and plenum chamber bulkhead must be removed.

9 - 8 Nm



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2.5 Turbocharging - overview



1 - Brake servo

2 - Non-return valve

3 - Vacuum pump

4 - Air mass meter - G70-

5 - Air filter

6 - Pressure regulating valve

- ❑ For crankcase ventilation.

7 - Intake manifold flap air flow control valve - N316-

8 - Vacuum unit for intake manifold change-over

9 - Non-return valve

- ❑ Different versions, allocation ⇒ ETKA (Electronic parts catalogue)

10 - Intercooler

11 - Throttle valve module - J338-

12 - Activated charcoal filter solenoid valve 1 - N80-

13 - To activated charcoal filter

14 - Intake manifold

15 - Non-return valve

16 - Vacuum unit for charge pressure control

17 - Charge pressure control solenoid valve - N75-

18 - Turbocharger air recirculation valve - N249-

19 - Exhaust turbocharger

2.6 Removing and installing charge air cooler (Golf, Eos)

Removing:

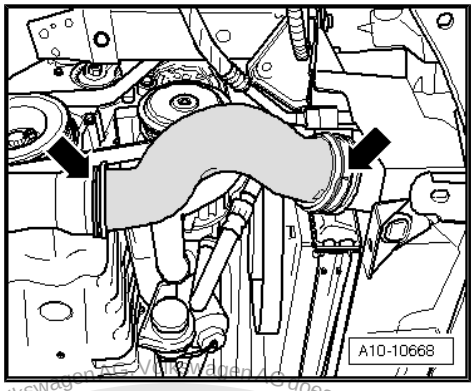
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

– Remove bumper cover ⇒ Bumpers; Rep. gr. 63 ; Removing and installing front bumper cover .

– Drain coolant ⇒ page 235 .

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– Remove right air hose -arrows-.

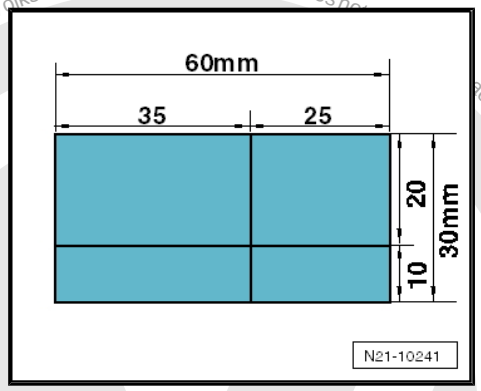


– Remove radiator cowl ⇒ page 267 .

– Removing radiator ⇒ page 269 .

Pipes of condenser are bolted to right-hand side of charge air cooler. To unscrew securing bolts, proceed as follows:

– Make a paper template with the specified dimensions.

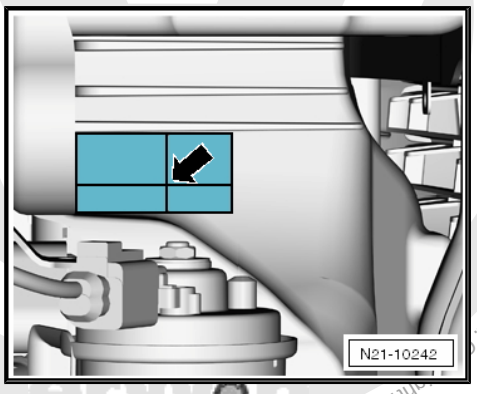


– Fit the template on the plastic bracket at the front right so that it rests against the edges at the top and left.

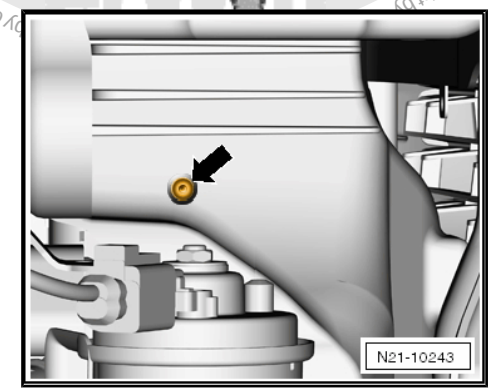
– Mark the intersection on the template -arrow- with a centre punch.

– Drill a hole into the plastic bracket with a 5-mm drill bit.

– Drill or cut the hole to 16 mm.

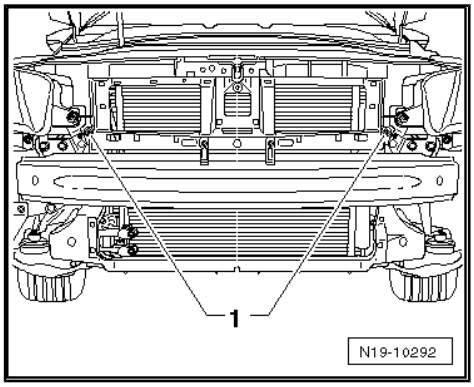


– Unscrew securing bolt -arrow- for condenser pipes.



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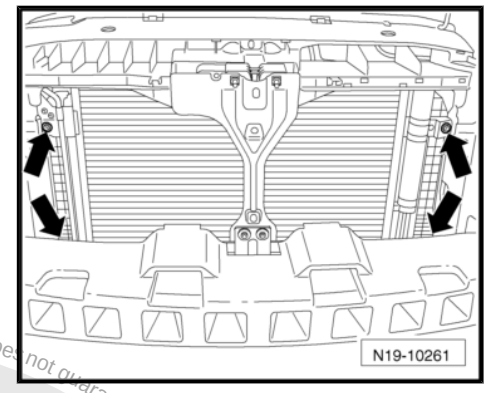
– Unscrew bolts -1- for charge air cooler mountings.



Note

The securing bolts of the condenser are difficult to access. With the aid of a second mechanic, lift the charge air cooler out of the radiator mountings. The charge air cooler can now be moved »back and forth« to allow access to the securing bolts.

– Unbolt condenser from charge air cooler -arrows-.
– Attach condenser to lock carrier using cable ties.
– Take out charge air cooler from underneath.



Installing:

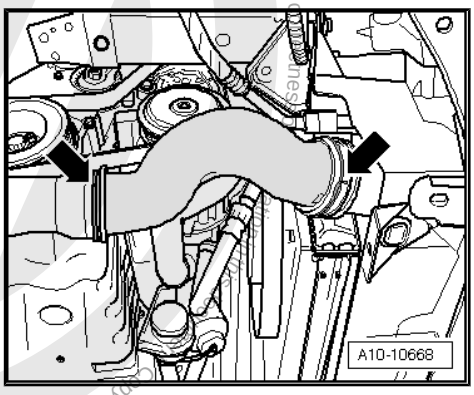
Install in the reverse order of removal, observing the following:

♦ Hose connections and hoses for charge air system must be free of oil and grease before assembly. The seal and sealing surface must be oiled lightly only for plug-in connectors ⇒ page 423 .

2.7 Removing and installing charge air cooler (Passat, CC, Scirocco)

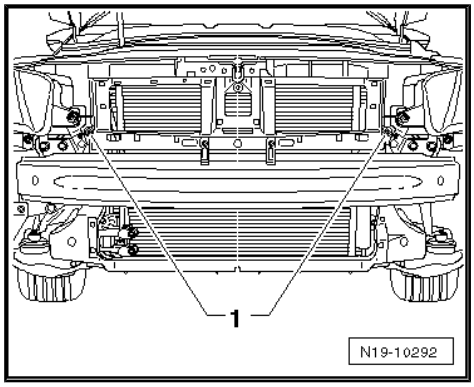
Removing:

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .
– Remove bumper cover ⇒ Bumpers; Rep. gr. 63 ; Removing and installing front bumper cover .
– Drain coolant ⇒ page 235 .
– Remove right air hose -arrows-.
– Remove radiator cowl ⇒ page 267 .
– Removing radiator ⇒ page 269 .
– Remove air deflector elements on lock carrier ⇒ Body - front; Rep. gr. 50 ; Assembly overview - air deflector elements on lock carrier .



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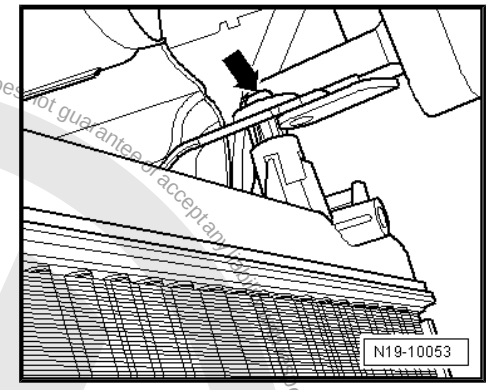
– Unscrew bolts -1- for charge air cooler mountings.



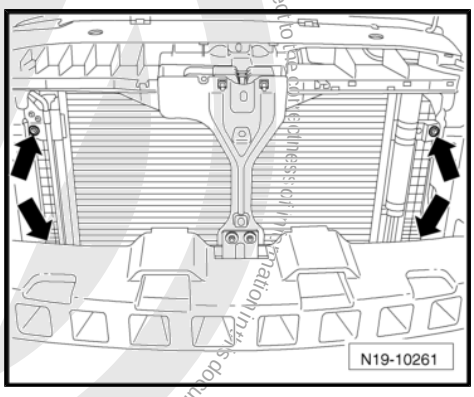
Note

The securing bolts of the condenser are difficult to access. With the aid of a second mechanic, lift the charge air cooler out of the radiator mountings. The charge air cooler can now be moved »back and forth« to allow access to the securing bolts.

– On the right-hand side of the charge air cooler unscrew pipes of condenser -arrow-.



– Unbolt condenser from charge air cooler -arrows-.
– Attach condenser to lock carrier using cable ties.
– Take out charge air cooler from underneath.



Installing:

Install in the reverse order of removal, observing the following:

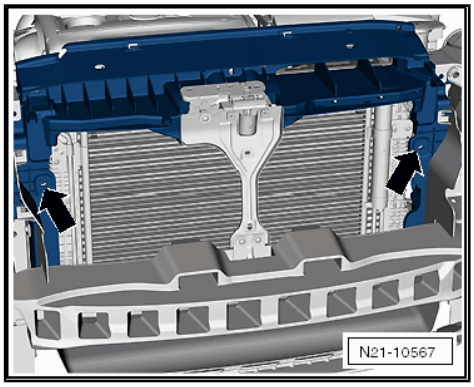
♦ Hose connections and hoses for charge air system must be free of oil and grease before assembly. The seal and sealing surface must be oiled lightly only for plug-in connectors ⇒ page 423 .

2.8 Removing and installing charge air cooler, Tiguan

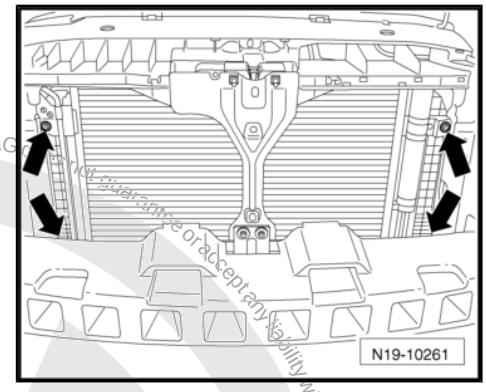
– Removing radiator ⇒ page 269 .
– Remove bumper cover ⇒ Bumpers; Rep. gr. 63 ; Removing and installing front bumper cover .
– Unclip air deflector parts on left and right of lock carrier ⇒ Body, front; Rep. gr. 50 ; Assembly overview - lock carrier .

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– Unscrew bolts -arrows- for charge air cooler mountings.



– Unbolt condenser from charge air cooler -arrows-.
– Secure condenser to lock carrier with cable ties.
– Remove charge air cooler downwards.



Installing:

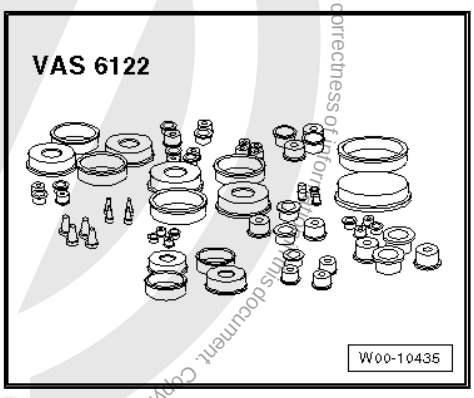
Install in the reverse order of removal, observing the following:

♦ Hose connections and hoses for charge air system must be free of oil and grease before assembly. The seal and sealing surface must be oiled lightly only for plug-in connectors ⇒ page 423 .

2.9 Removing and installing charge air duct to sound generator (Golf, Scirocco)

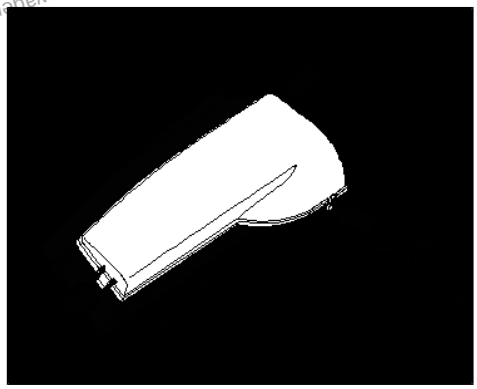
Special tools and workshop equipment required

♦ Set of plugs for engine - VAS 6122-



Removing:

– Pull cover off air duct (release clips on sides) -arrows-.

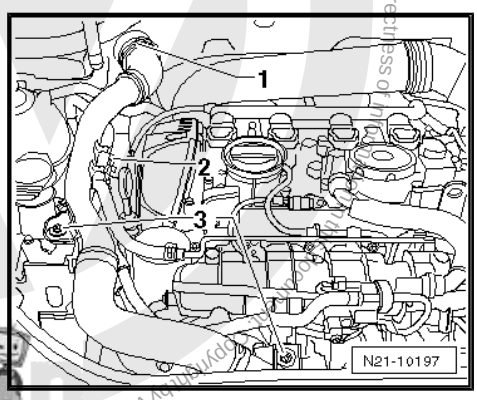


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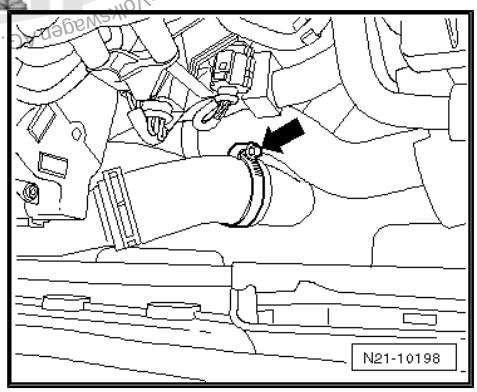
– Release clips -arrows- air duct at the bottom and remove duct.
– Detach air duct at bottom together with air hose.



– Open latch -1-, unclip fuel lines -2- and slacken bolts -3-.



– Loosen clip -arrow- and remove charge air duct.
– Seal connection for charge air duct with plug from engine bung set - VAS 6122- .



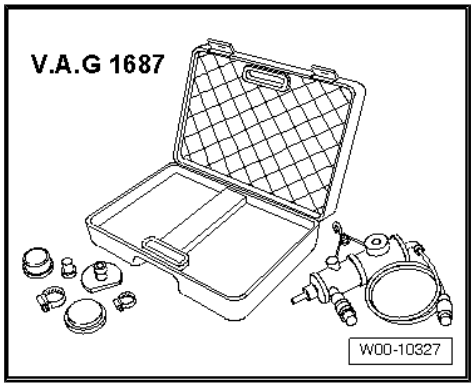
Installing:

Install in reverse order of removal.

2.10 Checking charge air system for leaks

Special tools and workshop equipment required

♦ Charge air system tester - V.A.G 1687-

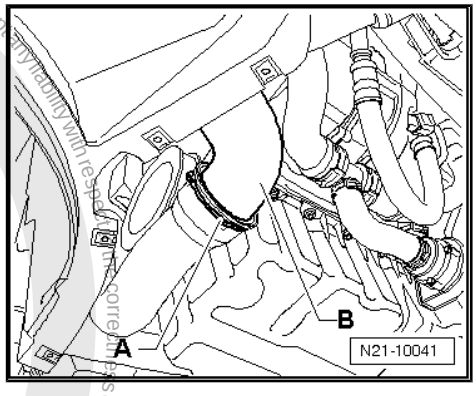


♦ Adapter - V.A.G 1687/5-

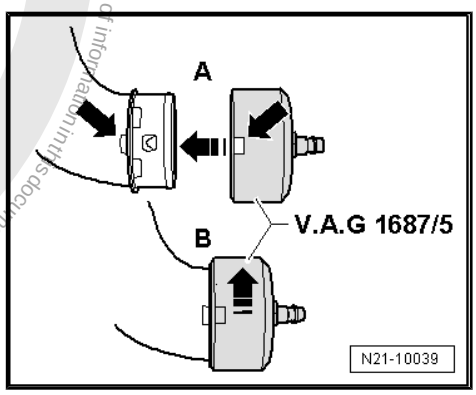
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

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– Release clip -A- and detach hose -B- from charge air pipe.



– Fit adapter - V.A.G 1687/5- onto charge air hose -A- and turn adapter through approx. 90° -B-.

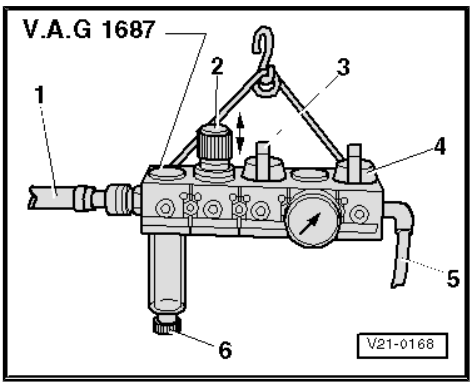


Prepare charge air system tester - V.A.G 1687- as follows:

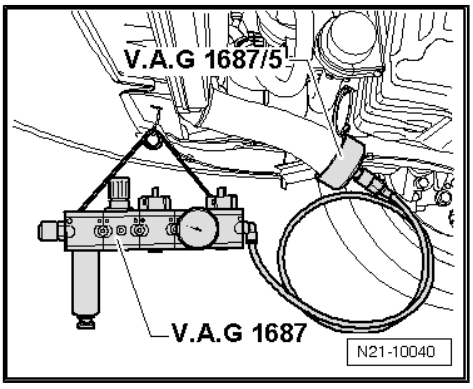
– Turn pressure control valve -2- anti-clockwise onto stop.
– Close valves -3- and -4-.

Note

To turn the pressure regulating valve -2- the knob must be pulled upwards.

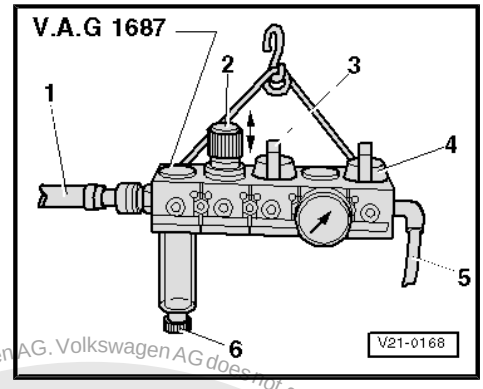


– Connect charge air system tester - V.A.G 1687- as shown.



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– Connect compressed air hose -1- (compressed air source) to charge air system tester - V.A.G 1687- .



Note

If there is water in the sight glass, drain at water drain screw -6-.

– Open valve -3-.

– Adjust pressure to 0.5 bar with pressure regulating valve -2-.

Caution

The pressure must not exceed 0.5 bar. If the pressure is too high this can cause damage to the engine.

– Open valve -4- and wait until the test circuit is filled. If necessary readjust pressure to 0.5 bar.

– Check the charge air system for leaks by hearing, touching, with commercially available leak detector spray or using ultrasonic tester - V.A.G 1842- .

Note

- *Fitting hose connections with plug-in connectors ⇒ page 423*
- *A small amount of air escapes through the valves and enters the engine. Therefore a holding pressure test is not possible.*
- *Ultrasonic tester - V.A.G 1842- ⇒ operating instructions*
- *Depressurise test circuit by detaching coupling from adapter - V.A.G 1687/5- before removing adapter.*
- *Hose connections and hoses for charge air system must be free of oil and grease before assembly.*

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24 – Mixture preparation - injection

1 Safety precautions and rules for cleanliness

General notes on self-diagnosis ⇒ page 451 .

Safety precautions ⇒ page 272 .

Comply with rules for cleanliness ⇒ page 274 .

1.1 General information on self-diagnosis

- The engine control unit has a self-diagnosis capability. Before carrying out repairs and for fault finding, first read event memory. Also the vacuum hoses and connections must be checked (unmetered air).
- 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.
- 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. It reduces the danger of a fire in a crash as the fuel pump is switched off via the fuel pump relay.
- 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 ⇒ page 272 .

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2 Injection system

Technical data ⇒ page 452 .

Fitting locations - overview ⇒ page 452 .

Assembly overview - air filter ⇒ page 458 .

Removing and installing air filter housing ⇒ page 459 .

Removing and installing air filter element ⇒ page 460 .

Removing and installing air mass meter - G70- ⇒ page 461 .

Assembly overview - intake manifold ⇒ page 461 .

Assembly overview - fuel rail ⇒ page 464 .

Removing and installing intake manifold with fuel rail ⇒ page 465 .

Removing and installing injectors ⇒ page 472 .

Renew Teflon seal on injector ⇒ page 475 .

Clean injectors ⇒ page 477 .

Removing and installing fuel pressure sender - G247- ⇒ page 478 .

Removing and installing throttle valve module - J338- ⇒ page 479 .

Cleaning throttle valve module - J338- ⇒ page 480 .

Assembly overview - high-pressure pump with fuel pressure regulating valve - N276- ⇒ page 481 .

Removing and installing high-pressure pump ⇒ page 483 .

2.1 Technical data

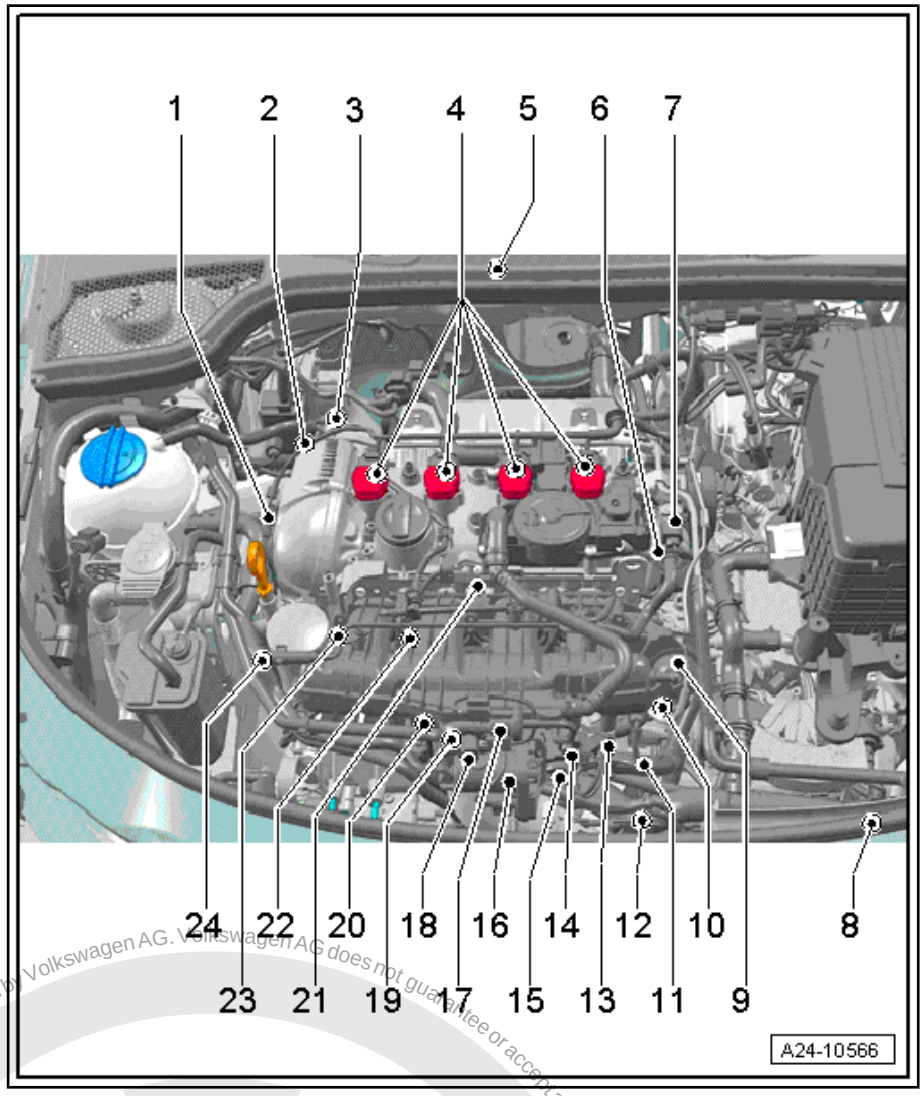
Engine code		BZB, CAWA, CAWB, CBFA, CCTA, CCTB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB
Idling check		
Idling speed [1]	rpm	640 to 800
Governed speed	rpm	approx. 6500

[1] If voltage supply to engine control unit drops below 12 volt, idling speed will be raised incrementally up to 990 rpm. The idling speed cannot be adjusted.

2.2 Overview of fitting locations

Components A to E are not shown in the exploded view.

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1 - Inlet camshaft control valve 1 - N205-

- ❑ Removing and installing ⇒ page 90

2 - Charge pressure control solenoid valve - N75-

- ❑ Installed directly on turbocharger ⇒ page 457

3 - Turbocharger air recirculation valve - N249-

- ❑ Installed directly on turbocharger ⇒ page 457

4 - Ignition coils with output stages

- ❑ Removing and installing ⇒ page 553
- ❑ Ignition coil 1 with output stage - N70-
- ❑ Ignition coil 2 with output stage - N127-
- ❑ Ignition coil 3 with output stage - N291-
- ❑ Ignition coil 4 with output stage - N292-
- ❑ Puller - T40039- is required for removing ignition coils from cylinder head.

5 - Engine (motor) control unit - J623-

- ❑ Removing and installing - Passat, CC ⇒ page 490 .
- ❑ Removing and installing - Golf, Eos ⇒ page 493
- ❑ Removing and installing - Tiguan ⇒ page 502
- ❑ Removing and installing - Scirocco ⇒ page 505

6 - High-pressure pump with fuel pressure regulating valve - N276-

- ❑ Fitting location:

  Engine codes BZB, CAWA, CAWB, CBFA, CCTA, CCTB, CGYA, CDAA, CDAB ⇒ page 455 .

  Engine codes CCZA, CCZB, CCZC, CCZD ⇒ page 455

- ❑ Removing and installing ⇒ page 483
- ❑ Assembly overview - high pressure pump ⇒ page 481 .

7 - Fuel pressure regulating valve - N276-

- ❑ Fitting location:

  Engine codes BZB, CAWA, CAWB, CBFA, CCTA, CCTB, CGYA, CDAA, CDAB ⇒ page 455 .

  Engine codes CCZA, CCZB, CCZC, CCZD ⇒ page 455

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8 - Radiator outlet coolant temperature sender - G83-

- ❑ Passat, CC, Golf, Eos, Scirocco: In lower union on radiator ⇒ page 264 .
- ❑ Tiguan: in coolant hose ⇒ page 266

9 - Vacuum unit for air flow control flaps

- ❑ Fitting location ⇒ page 456

10 - Intake manifold flap air flow control valve - N316-

- ❑ Fitting location ⇒ page 456

11 - Engine speed sender - G28-

- ❑ Location: Bottom left at front ⇒ page 456

12 - Charge air pressure sender - G31-

- ❑ Fitting location ⇒ page 457

13 - Electrical connector for knock sensor 1 - G61-

- ❑ Location: Below intake manifold ⇒ page 457
- ❑ Knock sensor 1 - G61- specified torque: 20 Nm

14 - Electrical connector for Hall sender - G40-

- ❑ Location: Below intake manifold ⇒ page 457

15 - 8-pin connector for injectors

- ❑ Location: Below intake manifold ⇒ page 457

16 - Throttle valve module - J338-

- ❑ Including throttle valve drive (electric throttle operation) - G186- , angle sender 1 for throttle valve drive (electric throttle operation) - G187- and angle sender 2 for throttle valve drive (electric throttle operation) - G188- .
- ❑ After renewing throttle valve module - J338- it must be reprogrammed to engine control unit - J623- ⇒ Vehicle diagnostic tester

17 - Activated charcoal filter solenoid valve 1 - N80-

- ❑ One unit with non-return valve/throttle
- ❑ To remove and install, remove intake manifold

18 - Intake air temperature sender - G42-

- ❑ Bolted to front intake manifold ⇒ page 461

19 - Knock sensor 1 - G61-

- ❑ Location: Below intake manifold
- ❑ Specified torque: 20 Nm

20 - Radiator outlet coolant - G62-

- ❑ In coolant pump housing ⇒ page 457

21 - Hall sender - G40-

- ❑ Bolted to front of cylinder head cover ⇒ page 456

22 - Fuel pressure sender - G247-

- ❑ On fuel rail ⇒ page 464

23 - Intake manifold flap potentiometer - G336-

- ❑ On intake manifold on right
- ❑ To remove and install, remove intake manifold ⇒ page 465 .

24 - Oil pressure switch - F1-

- ❑ In bracket for ancillary units

Engine codes CAWA, CAWB, CBFA, CCTA, CCTB, BZB, CGYA ⇒ page 219 .

Engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB ⇒ page 223

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A - Diagnosis connector

- ❑ In footwell on driver side

B - Air mass meter - G70- and intake air temperature sender 2 - G299-

- ❑ Fitting location ⇒ page 456
- ❑ Removing and installing ⇒ page 461

C - Accelerator position sender - G79- and accelerator position sender 2 - G185-

- ❑ On accelerator (both senders are accommodated in one housing)
- ❑ If accelerator module or engine control unit is renewed, kick-down function must be taught-in on vehicles with automatic gearbox.
- ❑ Removing and installing ⇒ page 382

D - Radiator fan control unit - J293-

- ❑ The radiator fan control unit - J293- is integrated into the radiator fan - V7- .

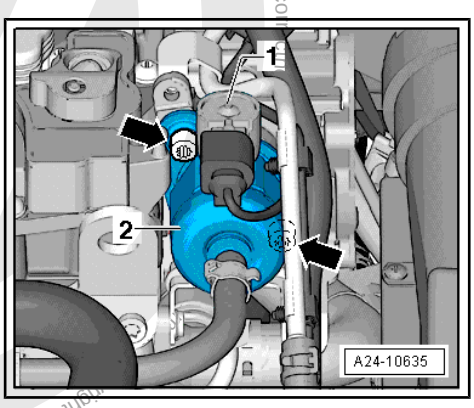
E - Injectors

- ❑ In fuel rail
- ❑ Removing and installing ⇒ page 472
- ❑ Injector, cylinder 1 - N30-
- ❑ Injector, cylinder 2 - N31-
- ❑ Injector, cylinder 3 - N32-
- ❑ Injector, cylinder 4 - N33-

High-pressure pump, engine codes BZB, CAWA, CAWB, CBFA, CCTA, CCTB, CGYA, CDAA, CDAB

1 - Fuel pressure regulating valve - N276-

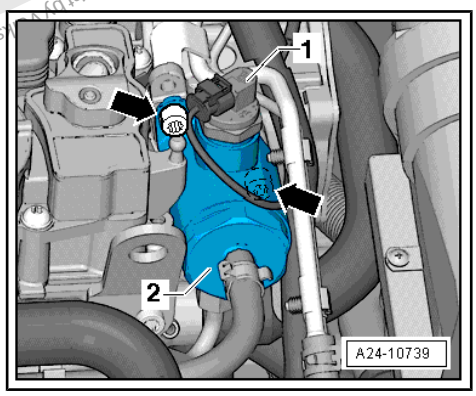
2 - High-pressure pump



High pressure pump engine codes CCZA, CCZB, CCZC, CCZD

1 - Fuel pressure regulating valve - N276-

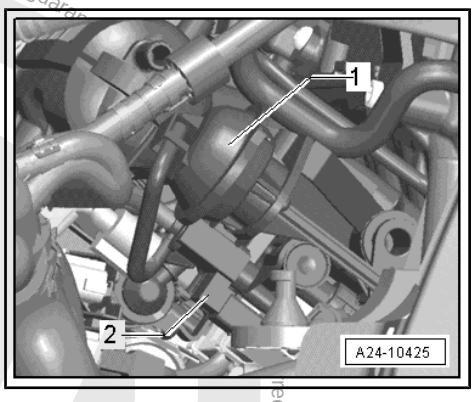
2 - High-pressure pump



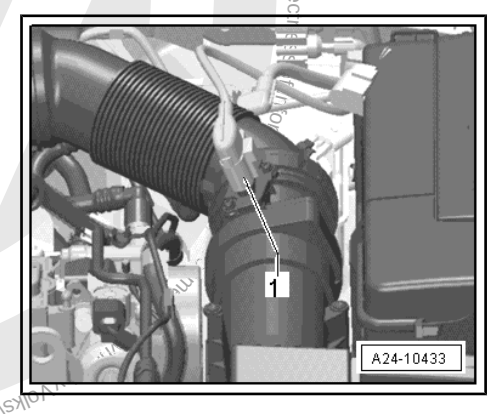
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Intake manifold flap valve - N316- -2-

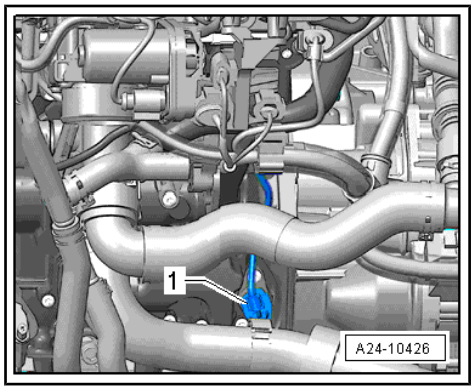
1 - Vacuum unit for air flow control flaps



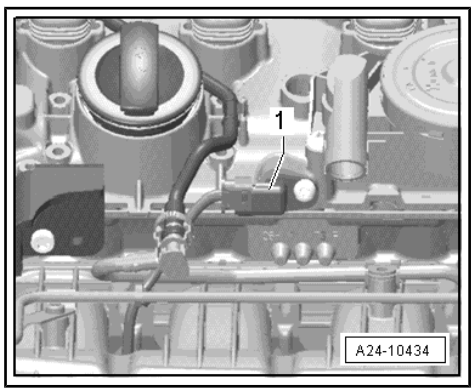
Air mass meter - G70- and intake air temperature sender 2 - G299- -1-



Engine speed sender - G28- -1-



Hall sender - G40- -1-



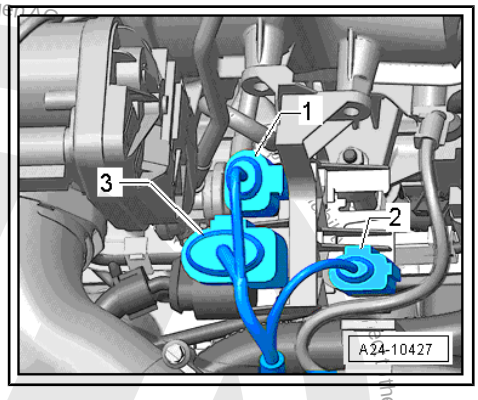
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Connectors

1 - From Hall sender - G40-

2 - From knock sensor 1 - G61-

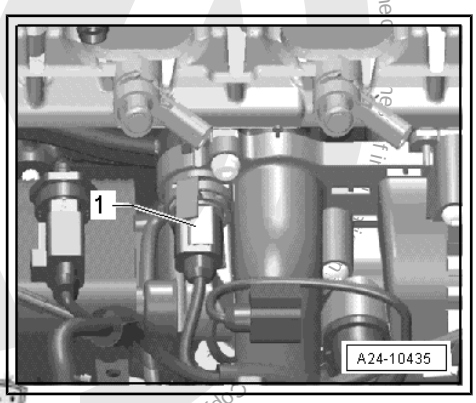
3 - 8-pin connector for injectors



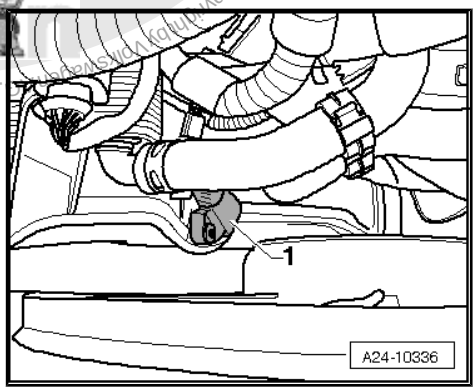
Coolant temperature sender - G62- -1-

Note

Below intake manifold (intake manifold is removed in illustration)



Charge air pressure sender - G31- -1-

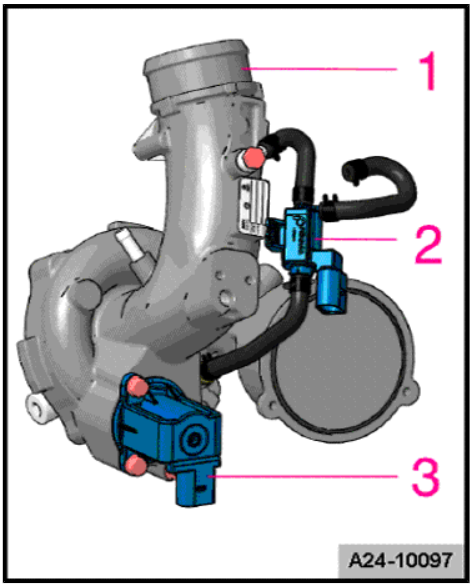


Components on turbocharger

1 - Removing and installing turbocharger ⇒ page 424

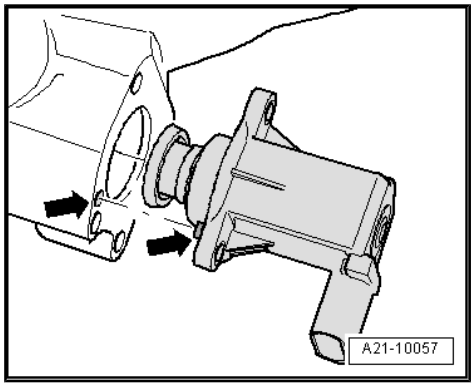
2 - Tighten charge pressure control solenoid valve - N75- to 3 Nm

3 - Tighten turbocharger air recirculation valve - N249- to 7 Nm (note installation position, refer to next illustration)

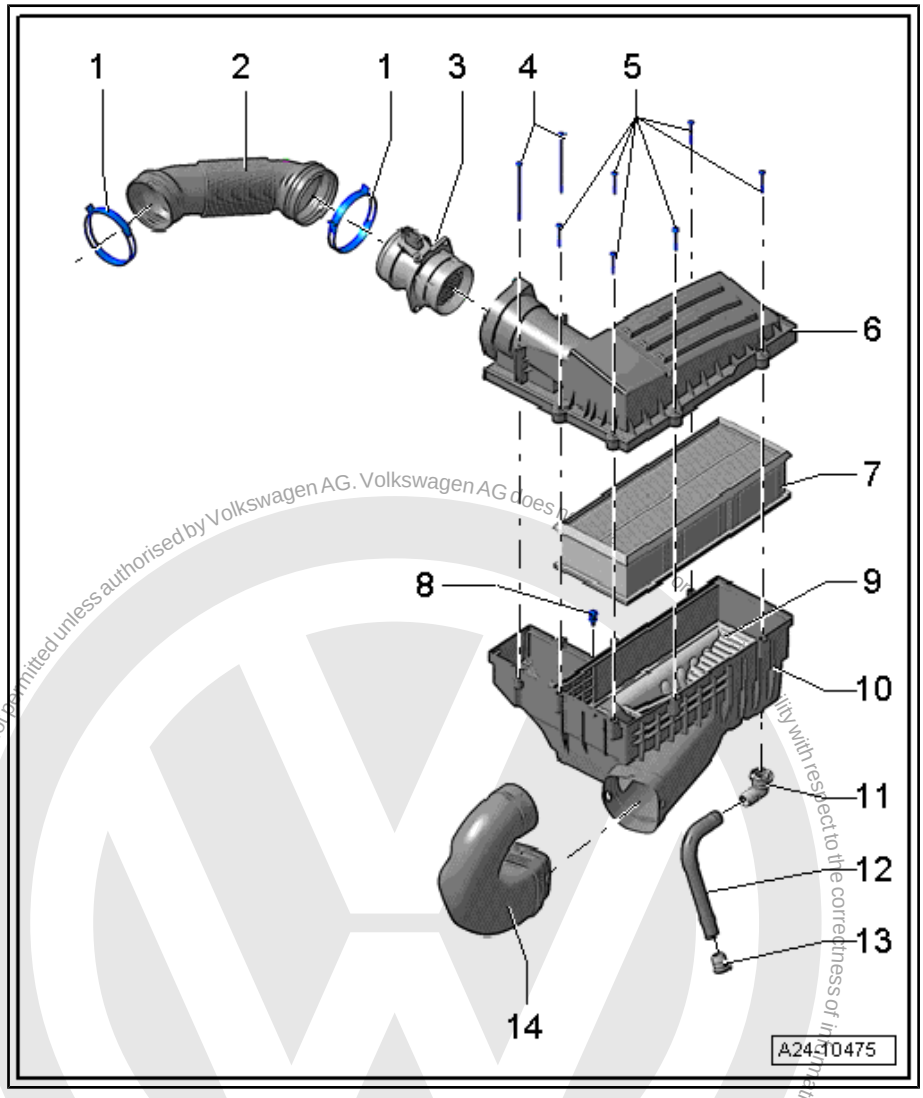


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Pay attention to installation position of turbocharger air recirculation valve - N249-



2.3 Assembly overview - air filter



1 - Spring-type clip

2 - Air intake hose

- ❑ To turbocharger
- ❑ Check air hose for contamination and leaves

3 - Air mass meter - G70-

- ❑ Removing and installing ⇒ page 461

4 - Bolts

- ❑ 1.5 Nm
- ❑ For upper part of air filter.

5 - Bolts

- ❑ 1.5 Nm
- ❑ For upper part of air filter.

6 - Air filter upper part

- ❑ Clean any salt residue, leaves and dirt from upper part of air filter

7 - Filter element

- ❑ Always use genuine part for air filter element
- ❑ Removing and installing ⇒ page 460
- ❑ Observe change intervals ⇒ Maintenance Booklet ; Service tables

8 - Bolt

- ❑ 8 Nm
- ❑ For air filter lower part

9 - Snow screen

- ❑ Not fitted in all vehicles.

10 - Air filter lower part

- ❑ Clean any salt residue, leaves and dirt from lower part of air filter.

11 - Connection for water drain hose

- ❑ Clean connection

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12 - Water drain hose

- ❑ Clean water drain hose

13 - Flutter valve

14 - Intake air guide

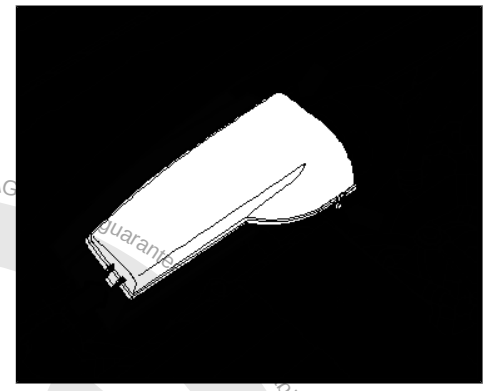
- ❑ To lock carrier.
- ❑ Clean any leaves and dirt out of intake air duct

2.4 Removing and installing air filter housing

Removing:

Proceed as follows:

– Pull cover off air duct (release clips on sides) -arrows-.



– Release clips -arrows- air duct at the bottom and remove duct.

– Detach air duct at bottom together with air hose.



Engine code CBFA:

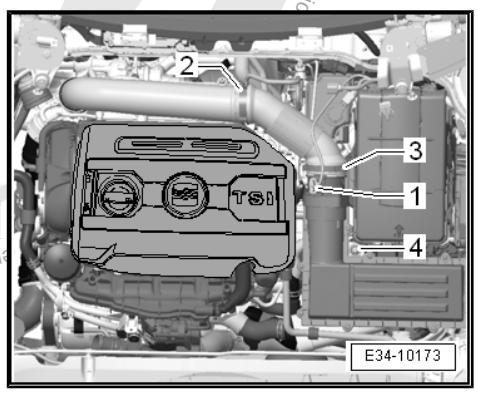
– Pull hose to secondary air pump motor - V101- from air filter housing.

All:

– Pull off connector -1- from air mass meter - G70- .

– Remove hose clips -2- and -3- and remove connecting pipe.

– Remove bolt -4- and pull air filter housing upwards out of mounting.



Installing:

Install in reverse order of removal.

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2.5 Removing and installing air filter element

Removing

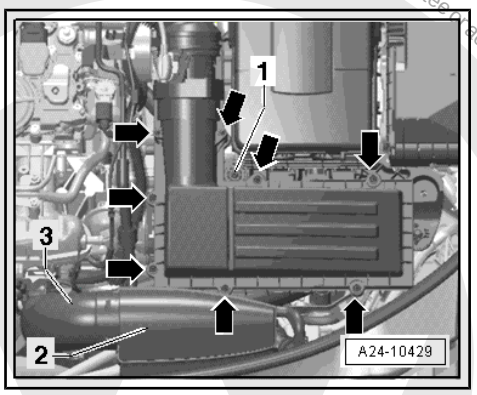
Engine code CBFA:

– Pull hose to secondary air pump motor - V101- from air filter housing.

All:

– Remove bolts -arrows- from upper part of air filter.

– Lift up upper part of air filter and remove air filter element.



Installing

Specified torques: ⇒ page 458

Note

- *Always use genuine part for air filter element.*
- *Hose connections and hoses for charge air system must be free of oil and grease before assembly. Do not use lubricants containing silicone.*
- *The air filter housing must be clean.*
- *Secure all hose connections with the correct type of hose clips (same as original equipment): ⇒ ETKA (Electronic parts catalogue)*
- *To prevent malfunctions, cover all critical engine air ducting components such as air mass meter, intake pipes, etc. with a clean cloth when blowing out the air filter housing with compressed air.*
- *Please observe disposal instructions!*

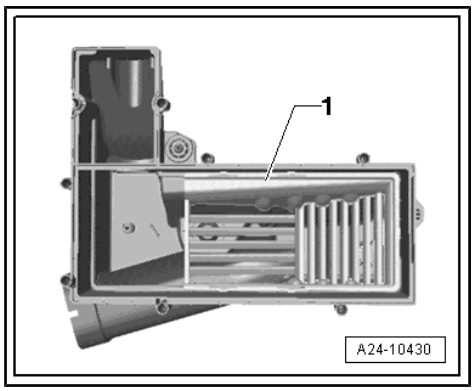
– Check air mass meter and intake hose for salt residue, dirt and leaves (engine intake side).

– Check for dirt in air intake hose from air duct.

– Remove snow screen -1- and clean it.

Note

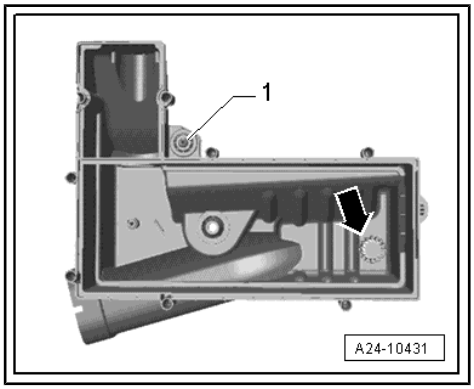
The snow screen is not installed in all vehicles.



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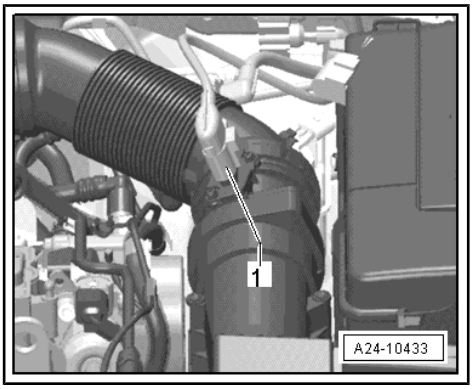
– Clean water drain -arrow- and lower part of air filter.
– When installing the air filter element, check that it is properly centred in the retainer in lower part of air filter.
– Place upper part of air filter carefully on lower part of air filter without exerting excessive force. Make sure the upper part of the air filter is fitted straight on the air filter element (note position of sealing lip on air filter element).

Continue installation in reverse order of removal.



2.6 Removing and installing air mass meter - G70-

– Separate electrical connector -1- on air mass meter - G70- .
– Unscrew both bolts from air mass meter - G70- and carefully pull air mass meter - G70- out of guide on air filter housing.



Installing

To ensure proper operation of the air mass meter - G70- it is important to observe the following instructions and comply with the procedures described.

Note

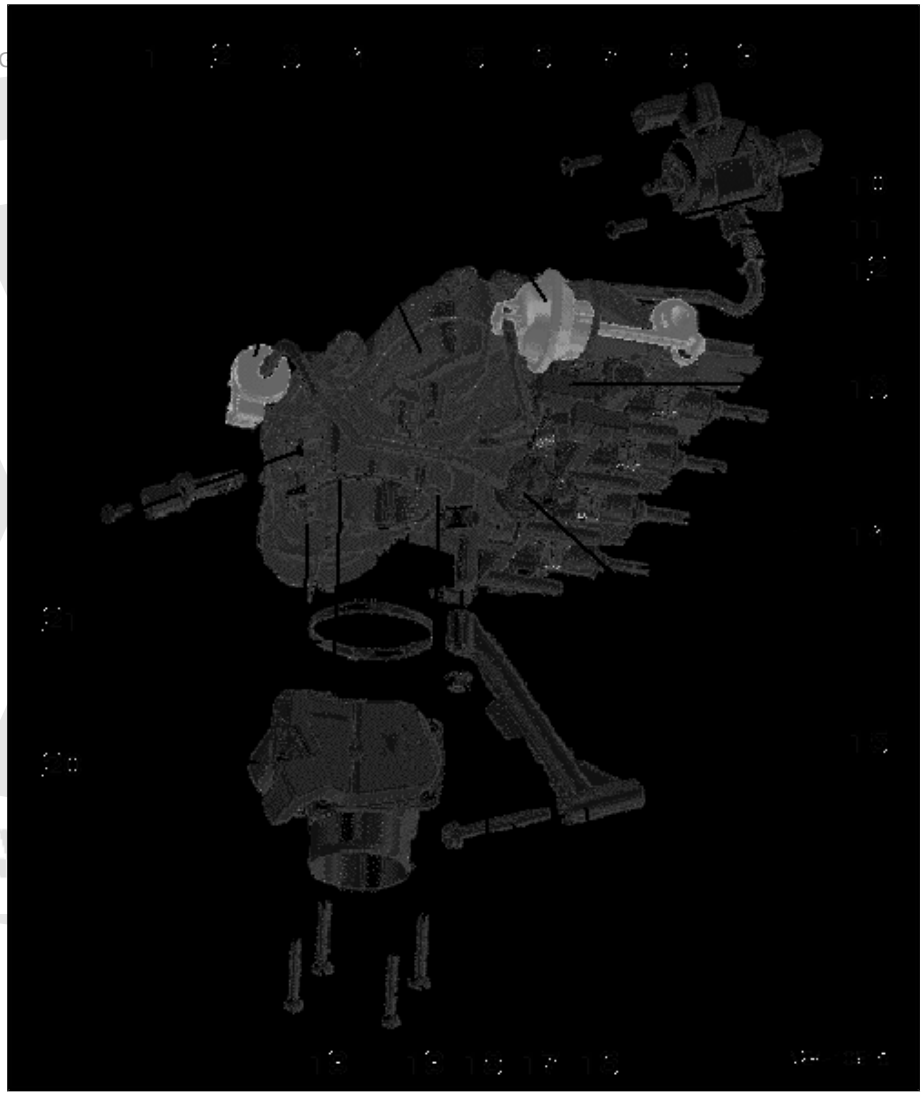
♦ *If the air filter element is very dirty or wet, dirt or water could reach the air mass meter - G70- and affect the air mass value. This would lead to loss of power, since a smaller injection quantity is calculated.*
♦ *Always use genuine part for air filter element.*
♦ *Use a silicone-free lubricant when installing the intake hose.*
♦ *Secure all hose connections with the correct type of hose clips (same as original equipment) ⇒ EKTA (Electronic parts catalogue) .*

– Check air mass meter and intake hose for salt residue, dirt and leaves (engine intake side).
– Check for contamination of intake duct as far as air filter element. If contamination is found, remove salt residues, dirt and leaves from top and bottom part of air filter housing by rinsing out or using a vacuum cleaner if necessary. Removing and installing air filter ⇒ page 460

Continue installation in reverse order of removal.

2.7 Assembly overview - intake manifold

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1 - Screw for intake air temperature sender - G42-

- ❑ 5 Nm

2 - Intake air temperature sender - G42-

3 - Activated charcoal filter solenoid valve 1 - N80-

- ❑ One unit with non-return valve/throttle
- ❑ To remove and install, remove intake manifold

4 - Intake manifold

- ❑ Removing and installing ⇒ page 465
- ❑ Specified torque of bolts ⇒ Item 15 (page 465)

5 - Vacuum unit for air flow control flaps

6 - Bolts for high-pressure pump

- ❑ Renew
- ❑ M6 thread = 8 Nm + 90°
- ❑ M8 thread = 20 Nm.

7 - Connecting piece for fuel supply line from fuel tank

8 - Fuel pressure regulating valve - N276-

9 - High-pressure pump

- ❑ With fuel pressure regulating valve - N276- .
- ❑ When installing the high-pressure pump, ensure that no dirt enters the fuel system
- ❑ The fuel system must not be under pressure when installing the high-pressure pump; procedure for reducing fuel pressure ⇒ page 272
- ❑ Install fuel line to fuel rail without tension
- ❑ Assembly overview - high pressure pump ⇒ page 481 .

10 - Roller tappet

- ❑ May remain inserted in vacuum pump after removal of high-pressure pump, removable

11 - Union for high-pressure fuel line

- ❑ Torque setting ⇒ page 481 .

12 - Fuel pipe to fuel rail

- ❑ Fuel line must be installed free of tension
- ❑ Torque setting ⇒ page 481 .

13 - Intake manifold flap air flow control valve - N316-

14 - Injectors

- ❑ Renew O-rings
- ❑ Ensure correct installation position
- ❑ Removing and installing ⇒ page 472

15 - Non-return valve/throttle

- ❑ Different versions, allocation ⇒ ETKA (Electronic parts catalogue)

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- ❑ One unit with activated charcoal filter system solenoid valve 1 - N80-

16 - Intake manifold support

17 - Bolt for intake manifold support

- ❑ 23 Nm

18 - Securing nut for intake manifold support

- ❑ 10 Nm

19 - Bolts for throttle valve module - J338-

- ❑ Qty. 4
- ❑ 5 Nm

20 - Throttle valve module - J338- , throttle valve drive for electric throttle operation - G186-

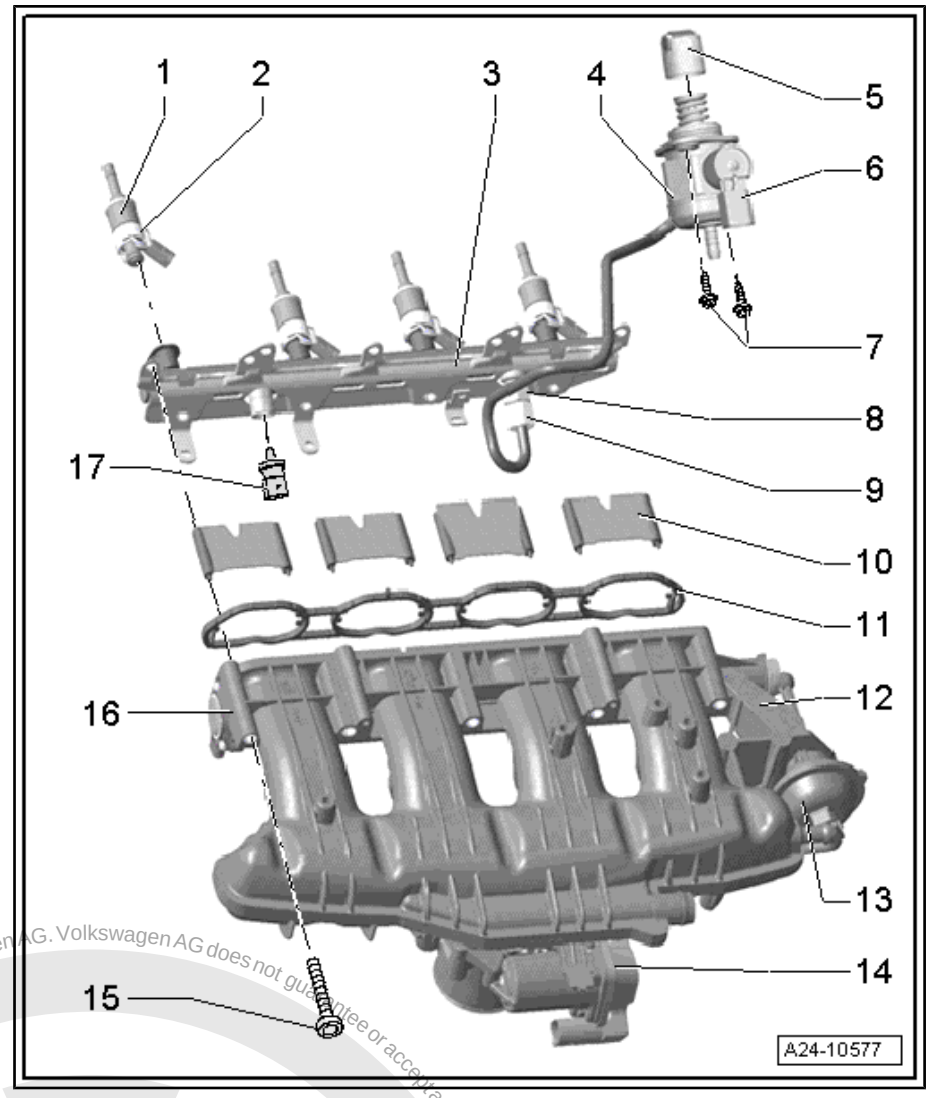
- ❑ Throttle valve drive angle sender 1 for electric throttle - G187- and throttle valve drive angle sender 2 for electric throttle - G188-
- ❑ After renewing throttle valve module - J338- it must be reprogrammed to engine control unit - J623- ⇒ Vehicle diagnostic tester via “Guided Functions”
- ❑ Removing and installing ⇒ page 479
- ❑ Cleaning ⇒ page 480

21 - Sealing ring

- ❑ Renew
- ❑ Lug of seal must lie in intended groove in intake manifold.

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2.8 Assembly overview - fuel rail



1 - Injection valve

- With combustion chamber ring seal (Teflon ring seal): always renew
- Renew O-rings
- Ensure correct installation position
- Removing and installing ⇒ page 472

2 - Support ring

3 - Fuel rail

- Removing and installing ⇒ page 472

4 - High-pressure pump

- With fuel pressure regulating valve - N276- .
- An electric fuel pump (fitted in fuel tank) supplies fuel to the mechanical high-pressure pump at a pressure of approx. 6 bar.
- When installing the high-pressure pump, ensure that no dirt enters the fuel system
- The fuel system must not be under pressure when installing the high-pressure pump; procedure for reducing fuel pressure ⇒ page 272
- Install fuel lines free of stress.
- Removing and installing ⇒ page 483
- Assembly overview - high pressure pump ⇒ page 481 .

5 - Roller tappet

6 - Fuel pressure regulating valve - N276-

7 - Bolts for high-pressure pump

- Renew
- M6 thread = 8 Nm + 90°
- M8 thread = 20 Nm.

8 - Connection for fuel supply line

- Counter-hold connection when loosening union nut.
- If the union nut or the connection is detached, the connection must be renewed.
- 40 Nm

9 - Union nut of fuel pressurisation line

- Counter-hold connection when loosening union nut.
- If the union nut or the connection is detached, the connection must be renewed.
- 27 Nm

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10 - Air flow control flaps

11 - Seal

- ❑ Renew

12 - Intake manifold

- ❑ Removing and installing ⇒ page 465

13 - Vacuum unit for air flow control flaps

- ❑ Checking ⇒ page 487

14 - Throttle valve module - J338- , throttle valve drive for electric throttle operation - G186-

- ❑ Throttle valve drive angle sender 1 for electric throttle - G187- and throttle valve drive angle sender 2 for electric throttle - G188-
- ❑ After renewing throttle valve module - J338- it must be reprogrammed to engine control unit - J623- ⇒ Vehicle diagnostic tester via “Guided Functions”

15 - Bolts for intake manifold

- ❑ Pre-tighten to 3 Nm and tighten to 9 Nm

16 - Intake manifold flap potentiometer - G336-

- ❑ To remove and install, remove intake manifold ⇒ page 465 .

17 - Fuel pressure sender - G247-

- ❑ 27 Nm
- ❑ Lubricate thread with clean engine oil
- ❑ Checking ⇒ page 485
- ❑ Removing and installing ⇒ page 478

Other specified torques

Further specified torques can be found at end of chapter entitled “Disconnecting fuel rail from intake manifold” ⇒ page 472 .

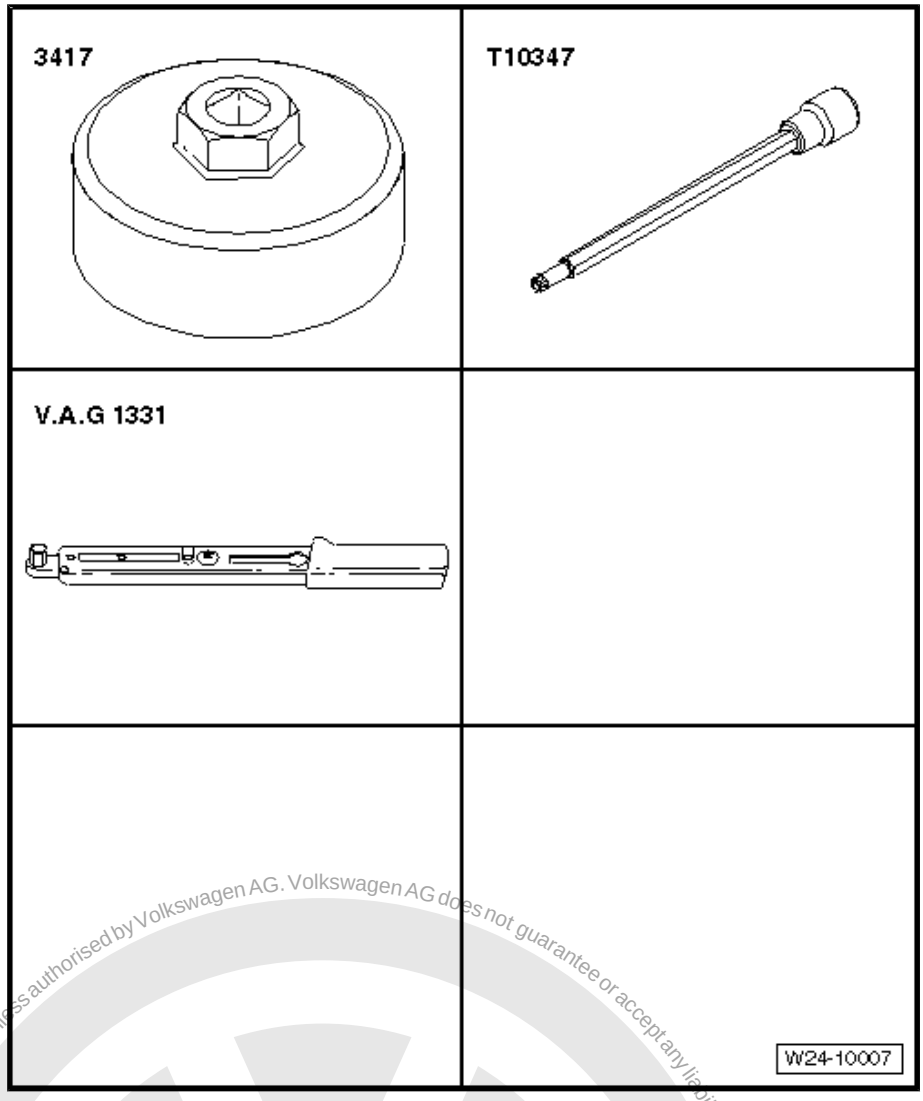
2.9 Removing and installing intake manifold with fuel rail

If intake manifold is renewed, intake manifold flap potentiometer - G336- must be adapted to engine control unit - J623- using a vehicle diagnostic tester .

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Special tools and workshop equipment required

- Hexagon bit, long reach - T10347-
- Oil filter tool - 3417-
- Torque wrench - V.A.G 1331-



Note

- *Observe all relevant safety precautions ⇒ page 272 .*
- *Observe rules for cleanliness ⇒ page 274 .*
- *The injectors can only be accessed after removal of the intake manifold and fuel rail with air flow control flap.*
- *Combustion chamber ring seal (Teflon) and O-ring must always be renewed.*
- *Assembly overview - intake manifold ⇒ page 461 .*
- *Assembly overview - fuel rail ⇒ page 464*

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Removing

– Only vehicles with sound generator: Remove charge air duct to sound generator ⇒ page 447 .

– Remove engine cover panel ⇒ page 139 .

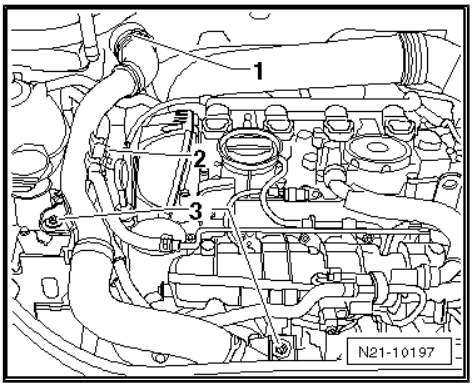
– Clean joint between intake manifold and cylinder head.

– Remove air filter housing ⇒ page 459 .

Golf, Eos, Scirocco:

– Remove radiator cowl ⇒ page 267 .

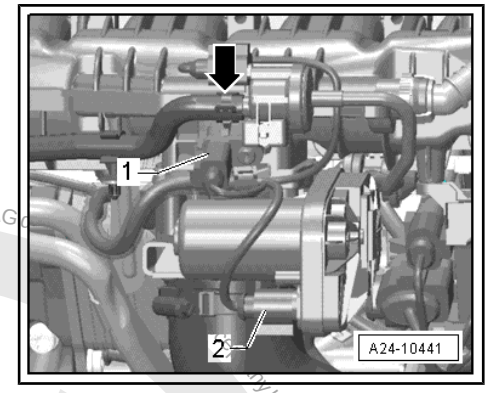
All:



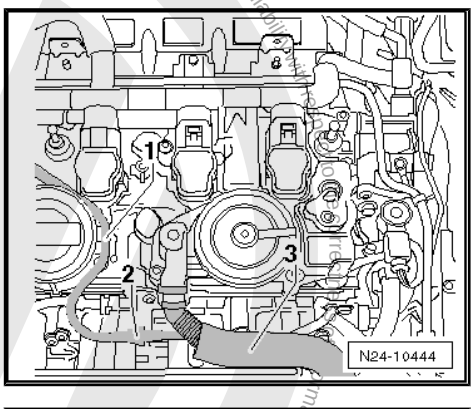
– Disconnect vacuum line -arrow- to activated charcoal filter.

– Disconnect the following electrical connectors:

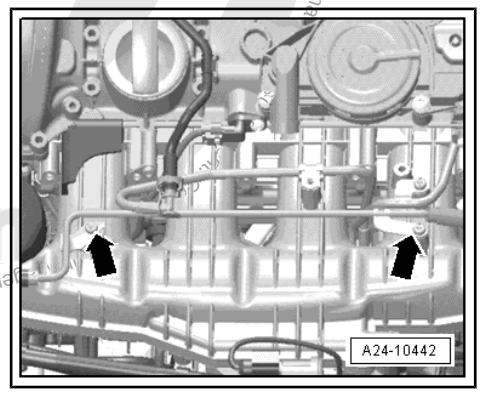
- ♦ Intake air temperature sender - G42- -1-
- ♦ Throttle valve module - J338- -2-
- ♦ Activated charcoal filter solenoid valve 1 - N80-
- ♦ Hall sender - G40-



– Disconnect vacuum line -1- at connecting point -2- and remove the crankcase breather hose -3-.



– Unscrew bolts -arrows- for fuel supply pipe and lay pipe to side.



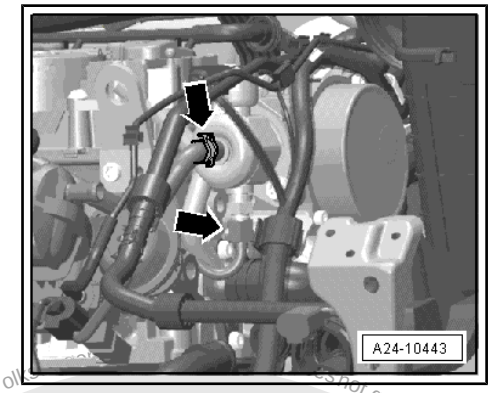
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WARNING

The fuel system is pressurised.

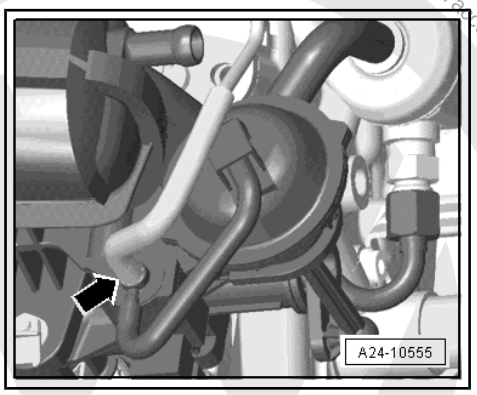
Danger of injury through fuel spray.

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

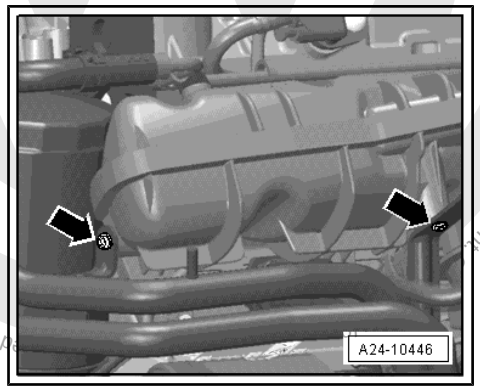


– Unscrew fuel pipe union nut -lower arrow-.

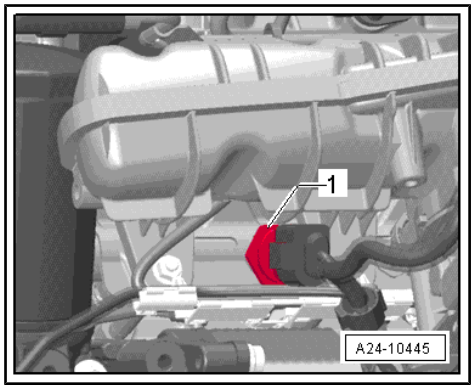
– Pull vacuum pipe -arrow- from intake manifold flap valve - N316- .



– Unscrew coolant line bolts -arrows- from intake manifold.

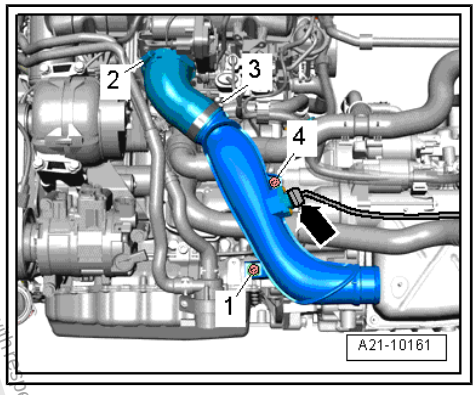


– Pull electrical connector -1- from fuel pressure sender - G247- .

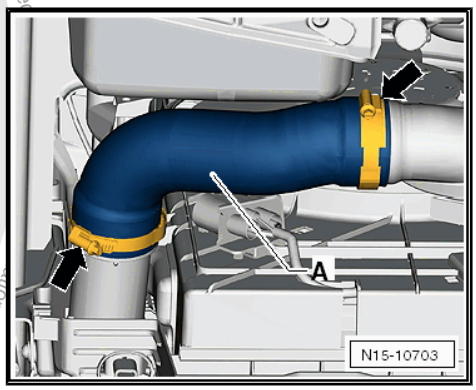


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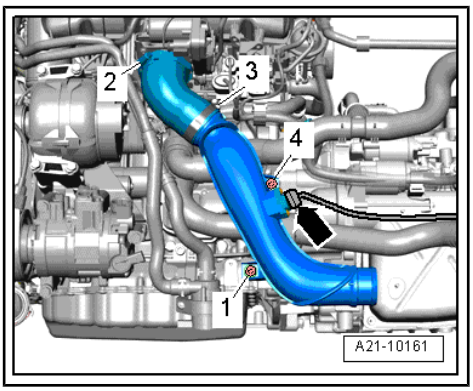
– Release hose clip -2-.
– Unscrew bolt -4-.
– Separate electrical connector -arrow-.
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .



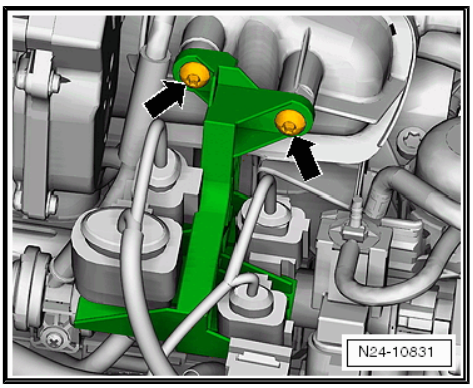
– Remove charge air hose -A- and seal charge air cooler with a clean cloth.



– Remove bolt -1- and take out air pipe downwards.

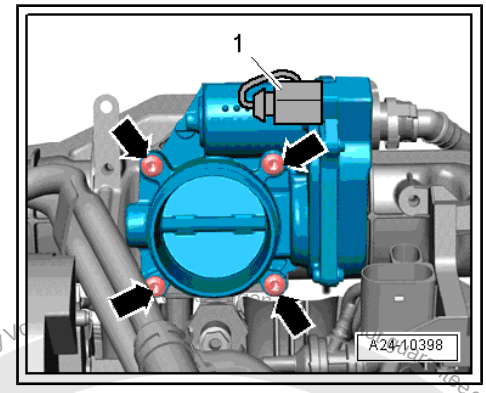


– Unbolt bracket from intake manifold -arrows-.

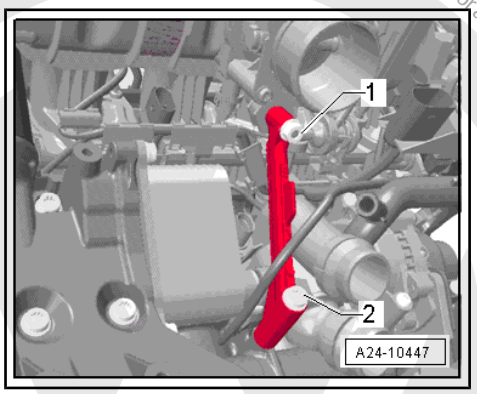


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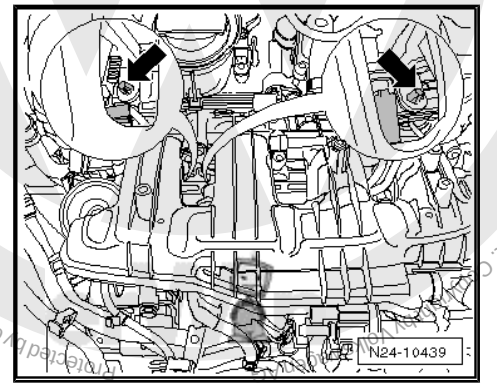
– Remove throttle valve module - J338- -arrows-.



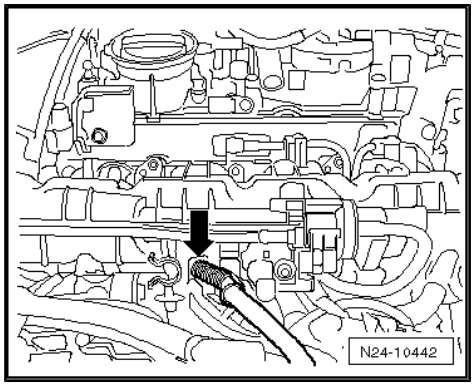
– Remove intake manifold support; to do this, unscrew securing nut -1- and unscrew bolt -2-.
– Remove oil filter ⇒ page 219 .



– Detach cable retainer -arrows-.



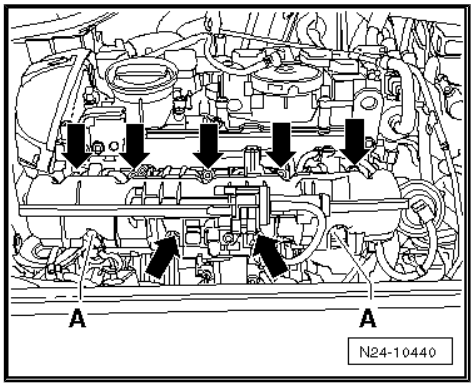
– Detach cables -arrows- from intake manifold.



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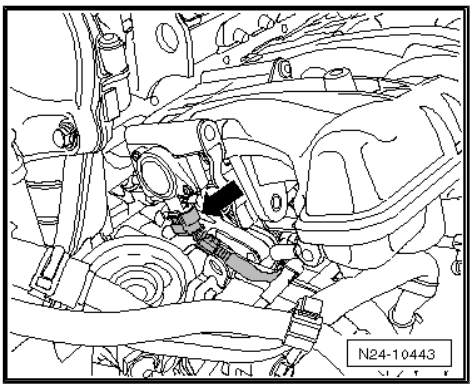
– Unscrew nuts -A- and remove bolts -arrows- for intake manifold using socket Torx T30 - T10347- .

– Carefully pull intake manifold with fuel rail slightly away from cylinder head.



– Disconnect electrical connector -arrow- from intake manifold flap potentiometer - G336- and remove intake manifold.

– Seal intake ports with a clean cloth.



Note

The injectors can remain in the fuel rail.

– Disconnect fuel rail from intake manifold ⇒ page 472 .

Installing:

- Injectors must be installed in cylinder head. Installing injectors ⇒ page 472

– Fit intake manifold onto studs (left and right) on cylinder head.

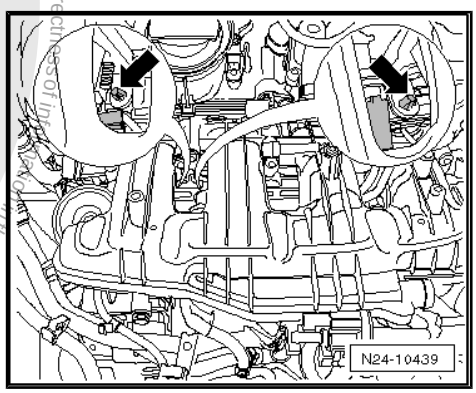
Note

Observe correct installation position of injectors and on cable retainer (below intake manifold) when positioning intake manifold.

- If, during intake manifold installation, the intake manifold has to be pulled out again slightly and the injectors remain in the fuel rail, Then pull the injectors out from the fuel rail again and again insert the injectors into the cylinder head.

Further assembly is performed in the reverse order of removal. During this step, observe the following:

– On engaging cable retainer onto intake manifold, also clip in the other two retainers.



Specified torques: refer to assembly overview of intake manifold ⇒ page 461 .

Specified torques: refer to assembly overview of fuel rail ⇒ page 464 .

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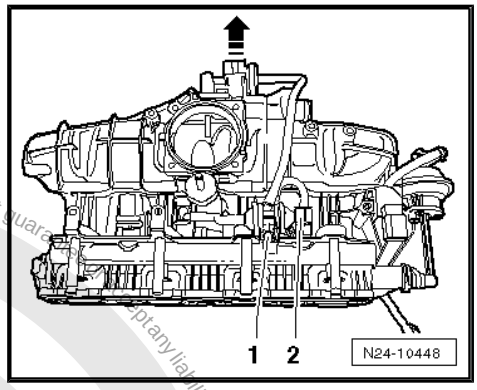
2.9.1 Disconnecting fuel rail from intake manifold

Note

Intake manifold must be removed; removing intake manifold ⇒ page 465 .

– Pull activated charcoal filter system solenoid valve 1 - N80- -arrow- from retainer.

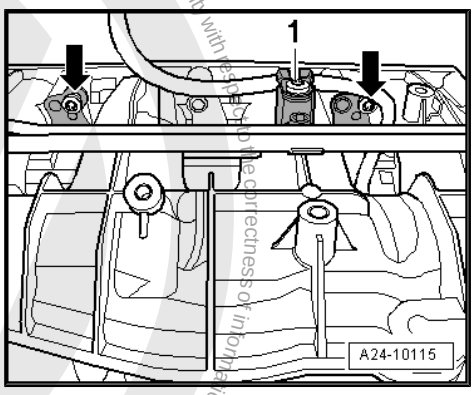
– Loosen non-return valve -1- and fuel line -2-.



– Open hose clip -1-.

– Remove both bolts -arrows- from fuel rail.

– Pull off fuel rail from intake manifold.



Installing

– Tighten fuel line.

– Continue installation in reverse order of removal.

– Re-connect electrical connectors.

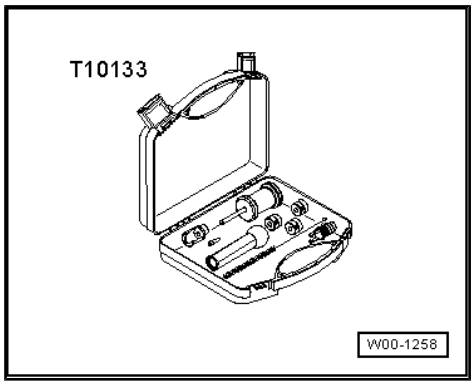
– Install intake manifold ⇒ page 465 .

Torque settings	
Adapter for fuel line to fuel rail (renew)	40 Nm
Fuel line (union nut) to adapter for fuel rail	27 Nm

2.10 Removing and installing injectors

Special tools and workshop equipment required

♦ Tool set - T10133-



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Note

Puller - T10133/2- has been modified and is now designated puller - T10133/2A- . If the new tool is not yet available in the workshop, perform the modification yourself.

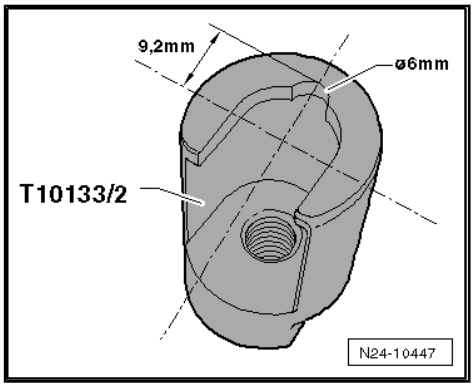
Convert puller - T10133/2- tool to puller - T10133/2A- tool.

Special tools and workshop equipment required

- ♦ Round file approx. 6 mm

– File out a semi-circular recess as shown in the illustration. The recess allows the tool to be pushed further onto the injector so the contact surface is increased.

– For identification purposes, mark the modified tool with the letter “A” after the tool number.



Injector (old version)

1 - Combustion chamber ring seal (Teflon ring seal), renew; when fitting, do not grease ring or use any other lubricant.

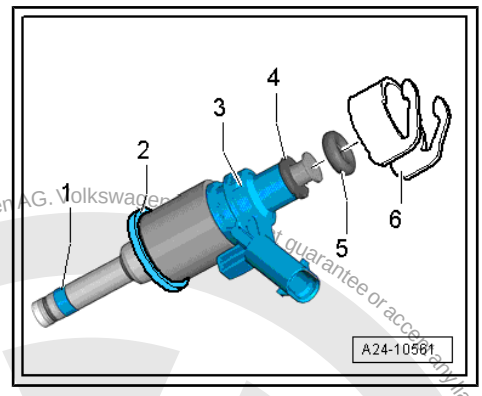
2 - The support ring must be replaced with an intermediate ring. See Injector (new version)

3 - Injection valve

4 - Spacer (renew if damaged)

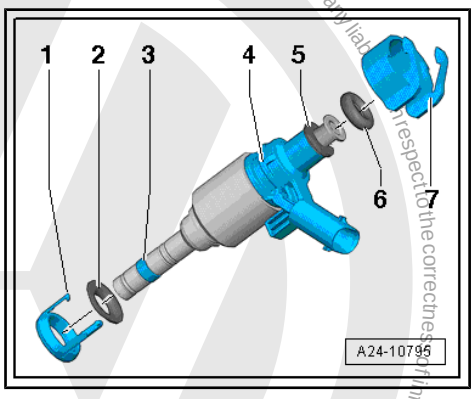
5 - O-ring (renew; to install, lightly lubricate with clean engine oil).

6 - Support ring (via this support ring, the fuel rail exerts force which secures injector in cylinder head)



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Injector (new version)



1 - Replace intermediate ring

2 - Support

3 - Combustion chamber ring seal (Teflon ring seal), renew; when fitting, do not grease ring or use any other lubricant.

4 - Injection valve

5 - Spacer (renew if damaged)

6 - O-ring (renew; to install, lightly lubricate with clean engine oil).

7 - Support ring (via this support ring, fuel rail exerts force which secures injector in cylinder head)

Removing:

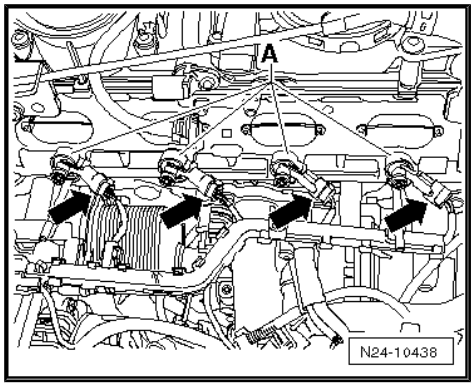
– Remove intake manifold with fuel rail ⇒ page 465 .

Note

If the injectors remain in the fuel rail, pull them out of the fuel rail.

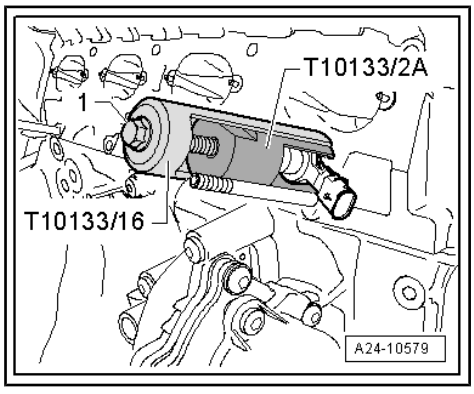
– Seal intake ports with a clean cloth.

– Remove supporting element -A- and pull off connectors -arrows- from injectors.



– Apply puller -T10133/2A- to groove on injector.

– Position removal tool -T10133/16- and pull injector out by turning bolt -1-.



Note

- *Note the intermediate rings.*
- *The Teflon seal must always be renewed prior to reinstallation of the injector ⇒ page 475 .*

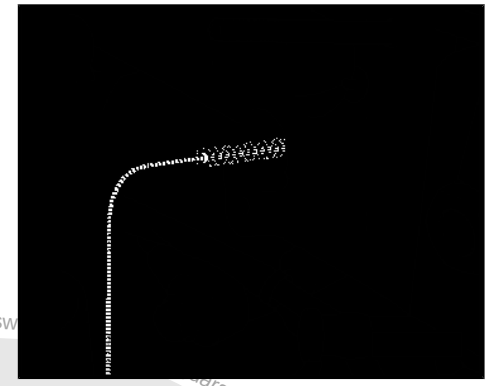
Installing:

Note

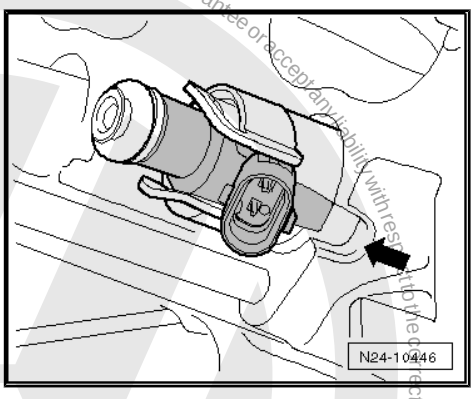
- *The Teflon seal on the injector must not be oiled or greased.*
- *It is possible that an open inlet valve hinders cleaning. In this case, turn engine by hand at crankshaft using a spanner.*

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– Thoroughly clean holes of high-pressure injectors in cylinder head using a nylon brush - T10133/4- .
– Renew Teflon seal of injector ⇒ page 475 .
– Complete injector with parts from the repair set.

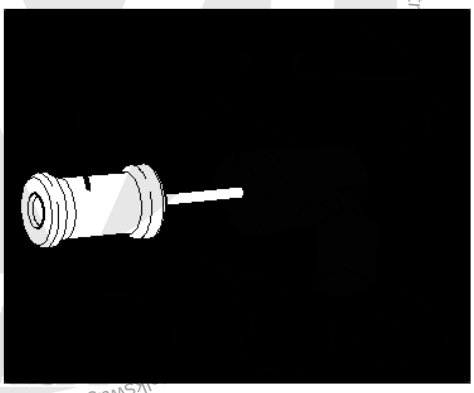


– Push injector by hand as far as it will go into the hole of the cylinder head (free of oil and grease). Ensure injectors are positioned correctly -arrow- in cylinder head.



Note

If it is not possible to insert the injector by hand, use the puller - T10133/2A- -2- with a hammer - T10133/3- to insert the injector.

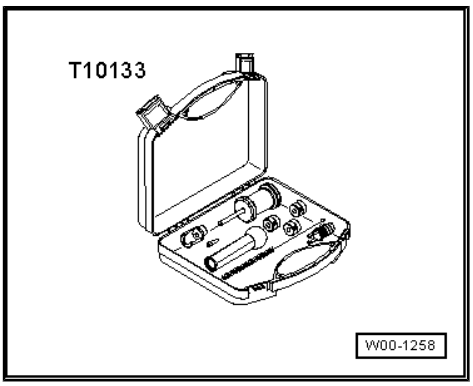


– Fit support ring onto injector.
– Lightly moisten O-rings of the high-pressure injector with clean engine oil.
– Install intake manifold with fuel rail ⇒ page 465 .

2.11 Renewing Teflon seal on injector

Special tools and workshop equipment required

♦ Tool set - T10133-



Note

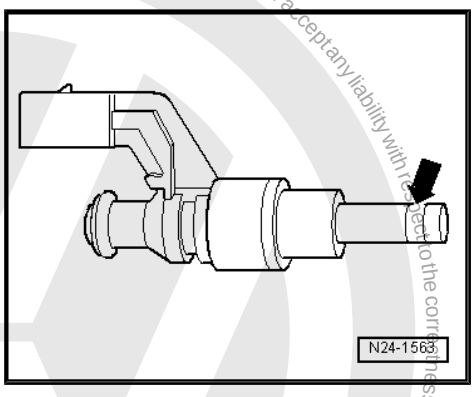
The Teflon ring must not be lubricated.

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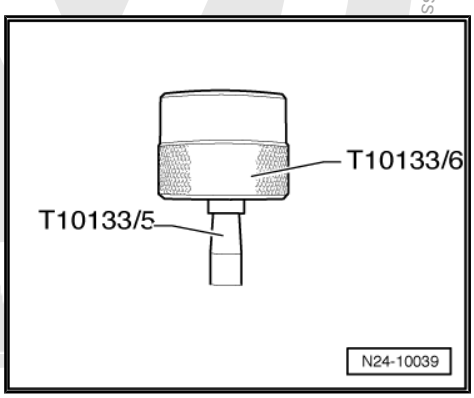
– Carefully remove old Teflon ring using suitable tools (e.g. cut open ring using razor blade, or prise open ring with small screwdriver and then pull off forwards). It is essential to ensure that the groove and continuous ridge in groove surface are not damaged.

– Carefully clean injector in area of seal -arrow-. Remove coking deposits using a brass wire brush.

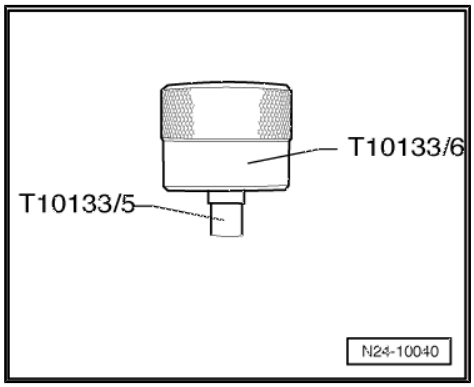
– Clean groove for seal.



– Fit new seal onto assembly cone - T10133/5- . Push seal as far as possible onto assembly cone - T10133/6- using assembly sleeve - T10133/5- .

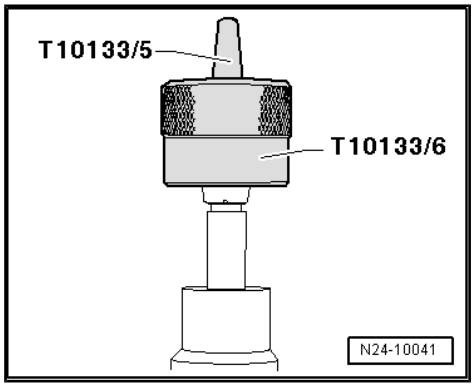


– Turn assembly sleeve - T10133/6- around and push seal to end of assembly cone - T10133/5- .



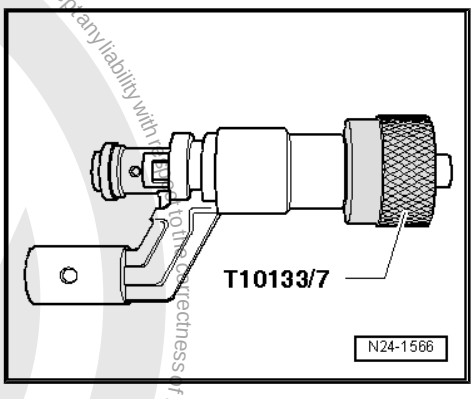
– Fit assembly cone - T10133/5- on injector and push seal onto injector using assembly sleeve - T10133/6- .

– Remove assembly cone - T10133/5- and push seal into groove using assembly sleeve - T10133/6- .

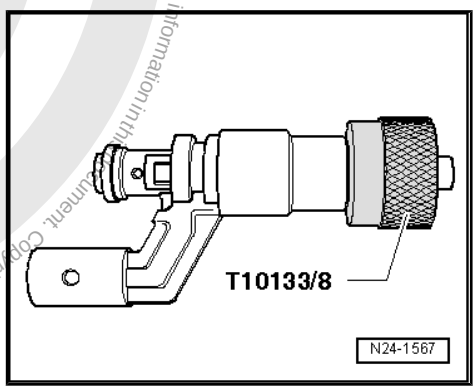


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– Push calibration sleeve - T10133/7- onto injector as far as it will go and simultaneously turn it slightly (approx. 180°).
– Pull calibration sleeve - T10133/7- off again by turning it in the opposite direction.



– Now press calibration sleeve - T10133/8- onto injector to stop by turning gently (approx. 180°).
– Pull calibration sleeve - T10133/8- off again by turning it in the opposite direction.
– Renew O-ring and support washer on injector.



2.12 Cleaning injectors

Special tools and workshop equipment required

- Ultrasonic cleaning device - VAS 6418-
- Mounting plate for injection modules - VAS 6418/1-
- Cleaning fluid - VAS 6418/2-

Cleaning

– Remove injectors ⇒ page 472 .

Note

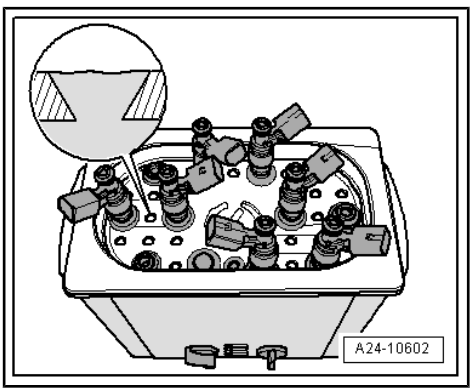
Comply with safety regulations and instructions for ultrasonic unit.

– The ultrasonic unit must be filled with cleaning fluid - VAS 6418/2- .

Note

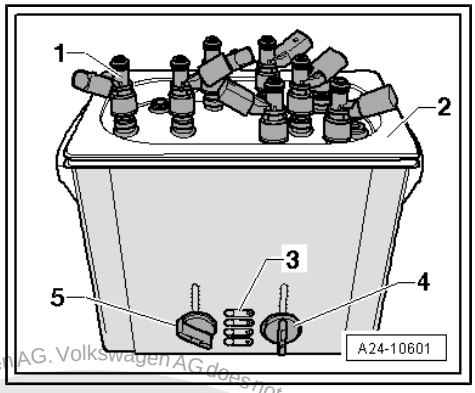
The ultrasonic unit must be filled with cleaning agent to upper edge of holes (see detail).

– Insert injectors -1- into mounting plate for injection modules - VAS 6418/1- as far as stop -2-.



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– Dip injectors together with mounting plate for injection modules - VAS 6418/1- into cleaning fluid.
– Set a temperature of 50 degrees with the rotary knob -4-.
– Set the rotary knob -5- to a cleaning time of 30 minutes.
– Switch the ultrasonic unit on with button -3-.



Note

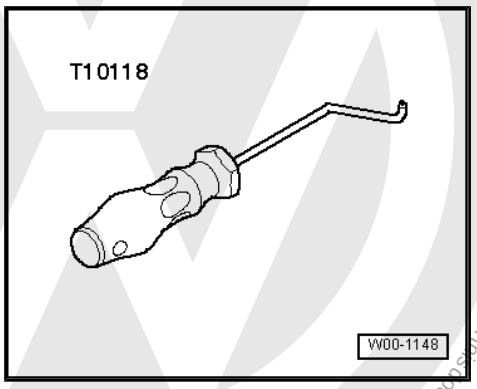
As soon as the cleaning temperature is 50 degrees, the set time will begin to elapse.

– After cleaning, always replace combustion chamber ring seal (Teflon seal) for each injector ⇒ page 475 .
– Then reinstall injectors ⇒ page 472 .

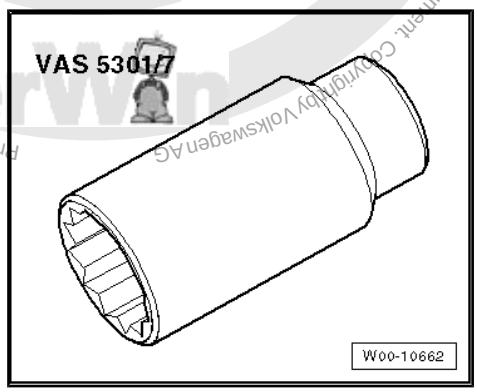
2.13 Removing and installing fuel pressure sender - G247-

Special tools and workshop equipment required

♦ Assembly tool - T10118-



♦ Double hexagon socket, 27mm - VAS 5301/7-



Removing:

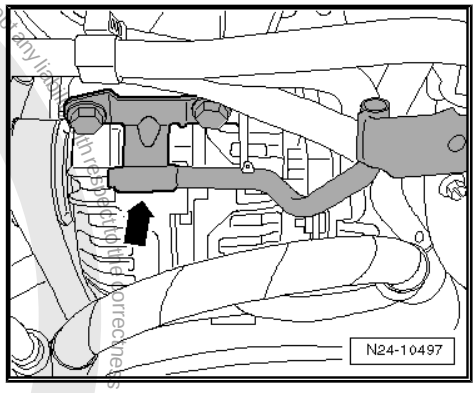
Vehicles with sound generator:

– Remove charge air duct to sound generator ⇒ page 447 .

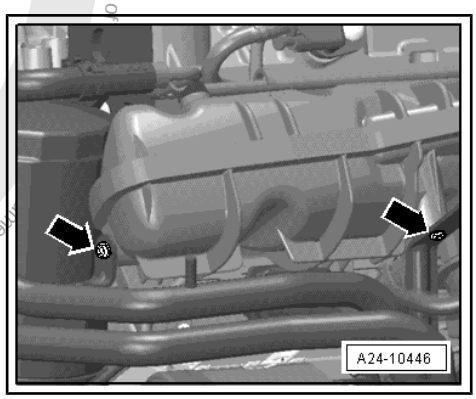
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All:

– Remove retainer from top of alternator - C- -arrow-.



– Detach coolant pipe from intake manifold -arrows-.



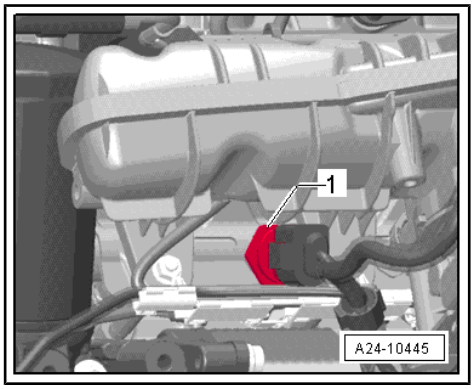
– Release connector from fuel pressure sender - G247- using assembly tool - T10118- .

WARNING

The fuel system is pressurised.

Danger of injury through fuel spray.

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



– Unscrew fuel pressure sender - G247- using deep hexagon socket, 27 mm - VAS 5301/7- .

– Collect escaping fuel with a cleaning cloth.

Installing:

Install in reverse order of removal, observing the following.

Lubricate sealing cone of fuel pressure sender - G247- with clean engine oil.

– Specified torques ⇒ page 464 .

2.14 Removing and installing throttle valve module - J338-

Removing:

Vehicles with sound generator:

– Remove charge air duct to sound generator ⇒ page 447 .

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Golf, Eos, Scirocco:

– Remove radiator cowl ⇒ page 267 .

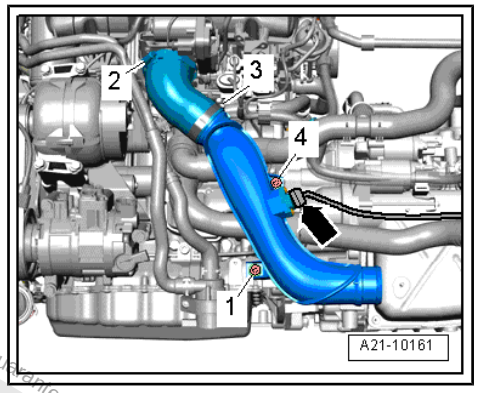
All:

– Release hose clip -2-.

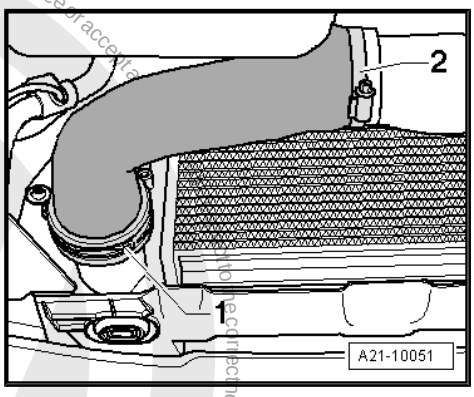
– Unscrew bolt -4-.

– Separate electrical connector -arrow-.

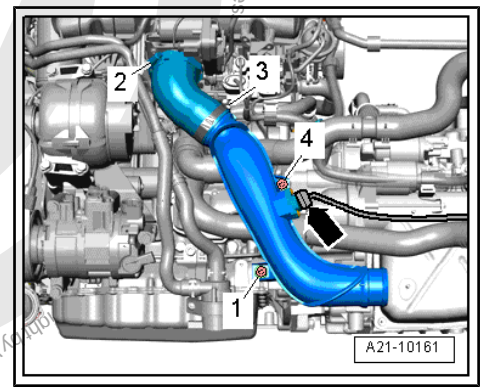
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .



– Remove air pipe -item 1 and 2-.

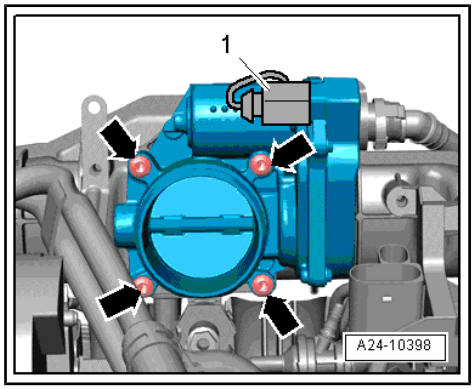


– Remove bolt -1- and take out air pipe downwards.



– Separate electrical connector -1- on throttle valve module - J338- .

– Remove bolts -arrows- and detach throttle valve module - J338- .



Installing:

Install in reverse order of removal, observing the following.

Specified torques ⇒ page 461 .

– Clean sealing surface for O-ring.

– Renew gasket, making sure that service lug is correctly positioned on oil seal.

– If a new throttle valve module - J338- was installed, adapt the engine control unit to throttle valve module - J338- ⇒ Vehicle diagnostic tester “Guided Functions”.

2.15 Cleaning throttle valve module - J338-

Special tools and workshop equipment required

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- Acetone

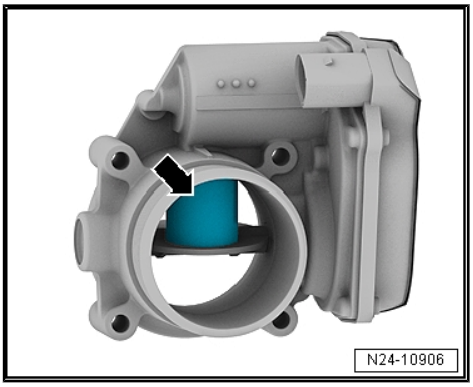
Note

- *Observe rules for cleanliness ⇒ page 274 .*
- *When cleaning the throttle valve housing it must not be scratched.*

Procedure:

– Remove throttle valve module ⇒ page 479 .

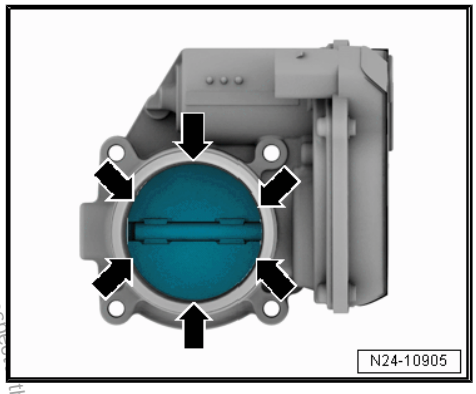
– Open throttle valve by hand and block throttle valve in open position with a suitable object -arrow-.



WARNING

Acetone is highly inflammable. Please comply with the accident prevention regulations and the safety instructions when handling highly inflammable fluids. Do not use compressed air when cleaning the throttle valve. Wear protective goggles and protective clothing to avoid injury and contact with the skin.

– Thoroughly clean throttle valve housing, especially around closed throttle valve, using commercially available acetone and a cleaning brush.



– Wipe off throttle valve housing using a lint-free cloth.

– Allow acetone to evaporate completely and re-install throttle valve module after cleaning.

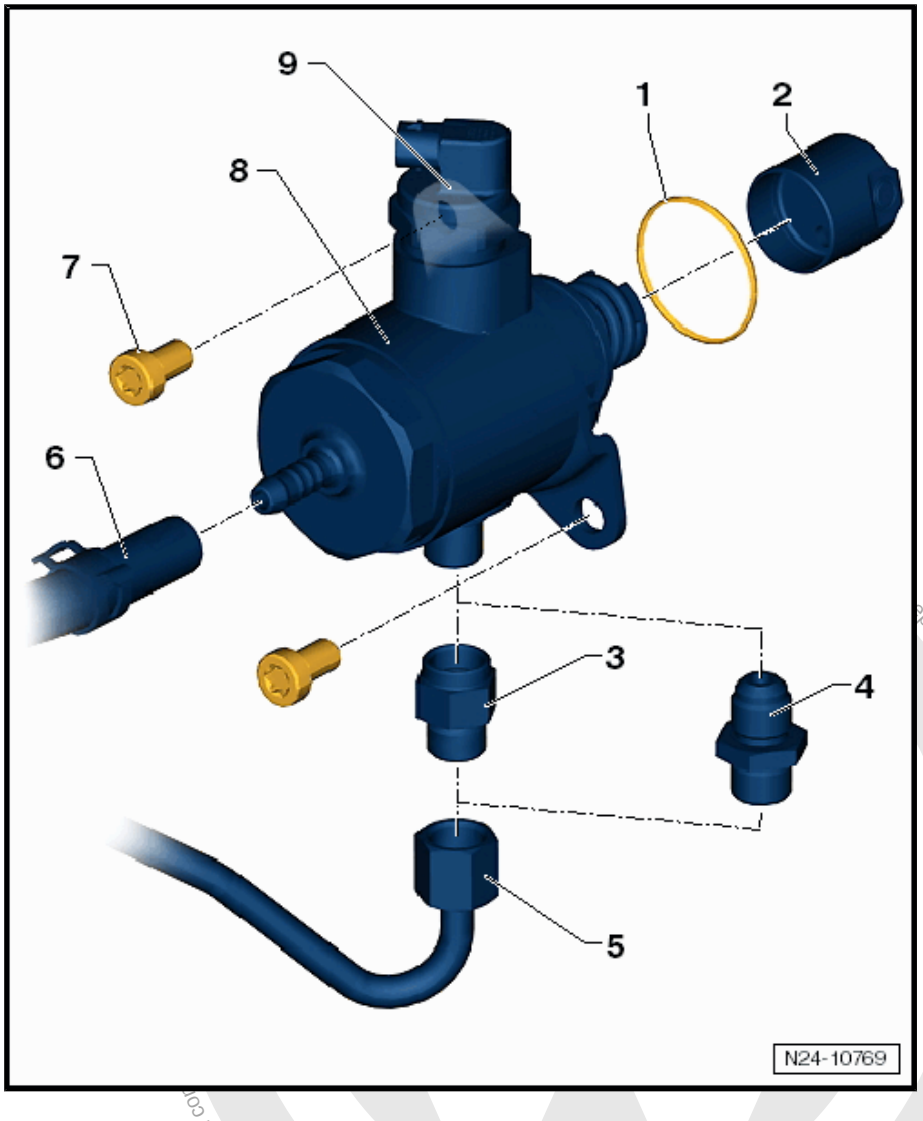
– Adapt the engine control unit to throttle valve module ⇒ Vehicle diagnostic tester “Guided Functions”.

2.16 Assembly overview - high-pressure pump with fuel pressure regulating valve - N276-

Note

Note that there are different versions of fuel high pressure pipe connecting pieces.

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1 - O-ring

- ❑ Renew

2 - Roller tappet

- ❑ May remain inserted in vacuum pump after removal of high-pressure pump, removable

3 - Fuel high pressure pipe connecting piece (with inner thread)

- ❑ 25 Nm
- ❑ Counter-hold connection when loosening union nut.
- ❑ If the union nut or the connection is detached, the connection must be renewed.

4 - Fuel high pressure pipe connecting piece (with outer thread)

- ❑ 40 Nm
- ❑ Counter-hold connection when loosening union nut.
- ❑ If the union nut or the connection is detached, the connection must be renewed.

5 - Union nut for fuel high pressure pipe

- ❑ Counter-hold connection when loosening union nut.
- ❑ If the union nut or the connection is detached, the connection must be renewed.
- ❑ Specified torques with installed connection at position 3: 18 Nm
- ❑ Specified torques with installed connection at position 4: 27 Nm

6 - Fuel pressurisation line from fuel tank

7 - Bolts for high-pressure pump

- ❑ Renew
- ❑ M6 thread = 8 Nm + 90°
- ❑ M8 thread = 20 Nm.

8 - High-pressure pump

- ❑ With fuel pressure regulating valve - N276- .
- ❑ When installing the high-pressure pump, ensure that no dirt enters the fuel system
- ❑ Install fuel line to fuel rail without tension

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2.17 Removing and installing high-pressure pump

Note

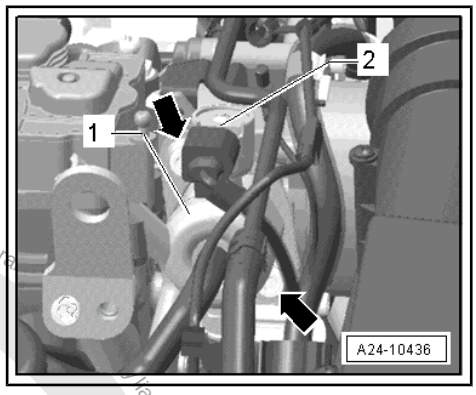
- *The high-pressure pump should be removed and installed only when the engine is cold.*
- *When installing the high-pressure pump, it is essential to ensure that no dirt enters the fuel system.*
- *Catch escaping fuel with a cleaning cloth.*
- *The O-ring and the union must always be renewed.*
- *Always ensure that high-pressure fuel lines are free of stress when installed.*

Removing

– Remove engine cover panel ⇒ page 139 .

– Remove air filter housing ⇒ page 459 .

– Pull off electrical connector -2- from fuel pressure regulating valve - N276- .

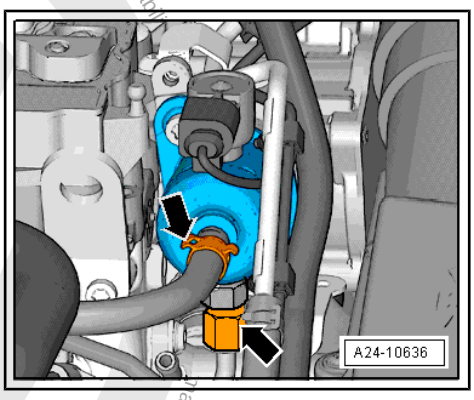


WARNING

The fuel system is pressurised.

Danger of injury through fuel spray.

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

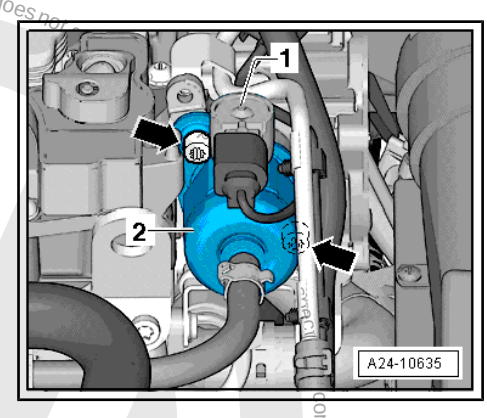


– Open both fuel pipes -arrows-.

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– Unscrew 2 bolts -arrows-.

– Carefully pull out fuel high-pressure pump. Under certain circumstances, the roller tappet may become stuck in the cylinder head.



Installing

Note

- *Roller tappet must be at bottom dead centre to enable high-pressure pump to be installed.*
- *The connection for fuel supply line (high-pressure side) must be renewed. See assembly overview for high pressure pump* ⇒ page 481 .
- Specified torques ⇒ page 481

– Renew O-ring for high-pressure pump.

– Insert roller tappet in vacuum pump (first check roller tappet for damage).

– Turn crankshaft until roller tappet is at bottom dead centre.

– Insert high pressure pump in vacuum pump.

– Tighten bolts hand-tight.

– Renew union on high-pressure pump.

– Now tighten bolts diagonally to required torque.

– Tighten union nut on fuel supply pipe hand-tight, »align stress-free« and then tighten.

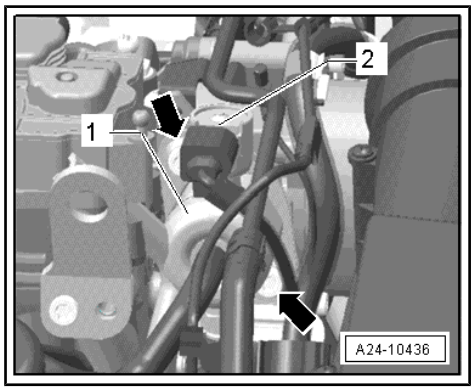
– Re-connect electrical connector -2- for fuel pressure regulating valve - N276- .

– Put back fuse if it has been removed.

– Install air filter housing ⇒ page 459 .

– Start engine and check fuel system for leaks.

– Fit engine cover panel ⇒ page 139 .



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3 Checking components

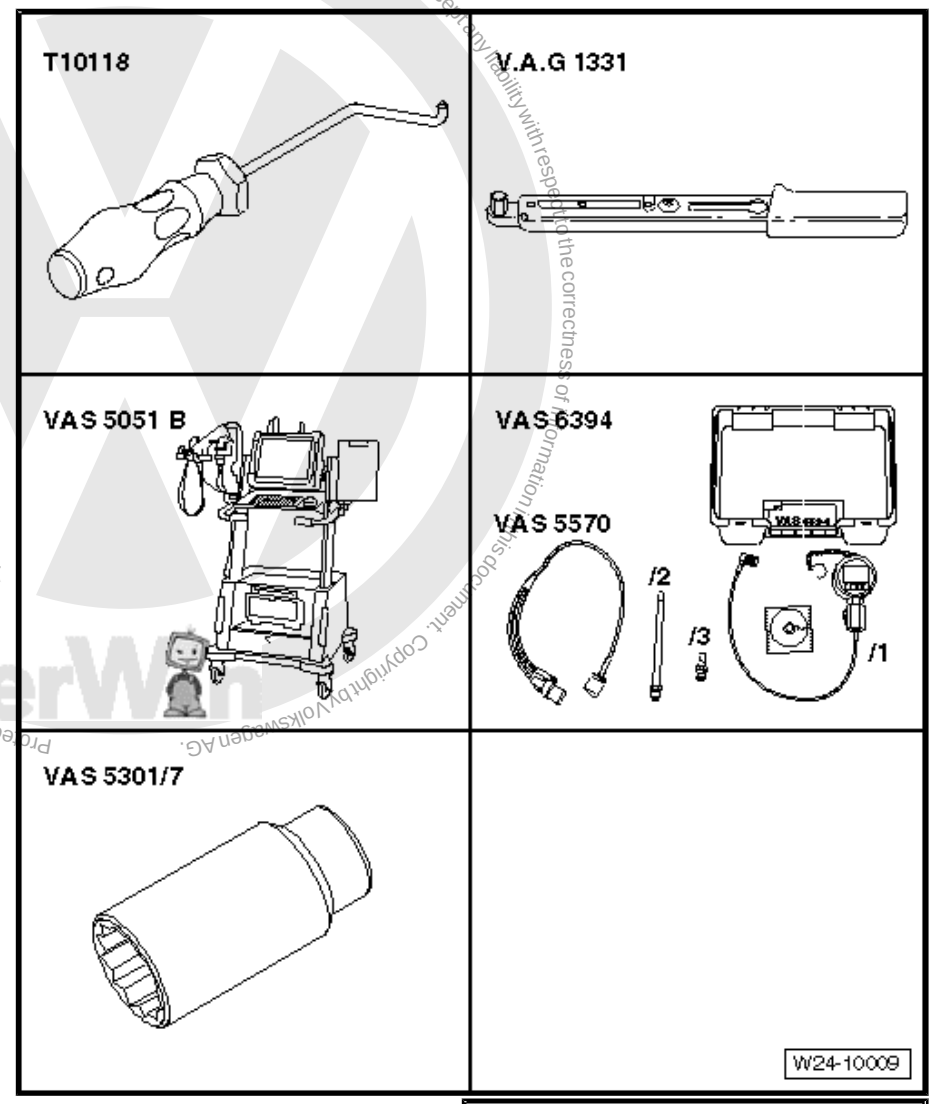
Checking fuel pressure sender - G247- ⇒ page 485 .

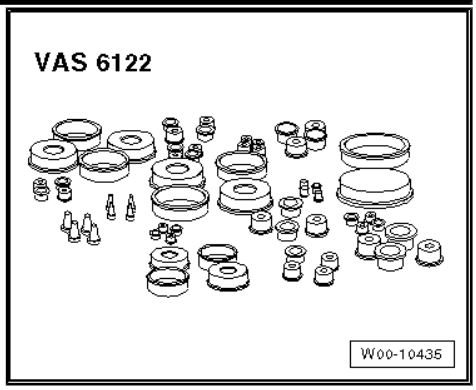
Checking intake manifold change-over ⇒ page 487 .

3.1 Checking fuel pressure sender - G247-

Special tools and workshop equipment required

- Assembly tool - T10118-
- Double hexagon socket, 27mm - VAS 5301/7-
- Pressure sensor tester - VAS 6394/1-
- Adapter - VAS 6394/2-
- Adapter - VAS 6394/4- (only Tiguan)
- Test adapter - VAS 5570-
- Torque wrench - V.A.G 1331-
- Vehicle diagnostic tester
- Vehicles with sound generator: Engine bung set - VAS 6122-





Procedure:

– Remove engine cover panel ⇒ page 139 .

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– Remove fuel pressure sender - G247- ⇒ page 478

Vehicles with sound generator:

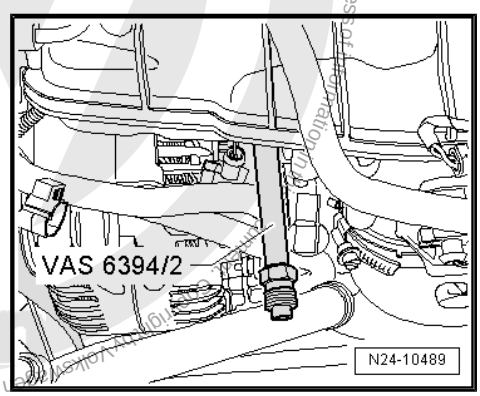
– Seal charge air duct connection to sound generator with plug from engine bung set - VAS 6122- and secure plug with a hose clip.

Continued for all vehicles:

Note

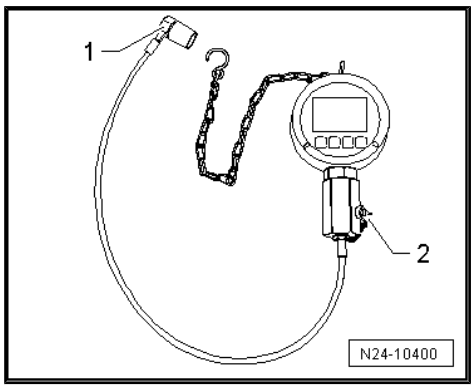
For the Tiguan, use adapter - VAS 6394/4- instead of adapter - VAS 6394/2- .

– Moisten tapered seat of adapter - VAS 6394/2- with clean engine oil and screw into fuel rail. Specified torque: 27 Nm.

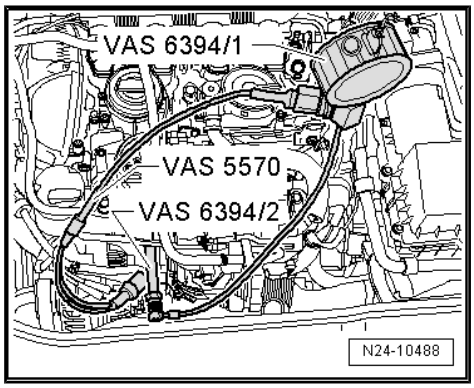


– Unscrew plug -2- and screw fuel pressure sender - G247- into tester - VAS 6394/1- . Specified torque: 27 Nm.

– Connect pressure line of tester - VAS 6394/1- to adapter - VAS 6394/2- .

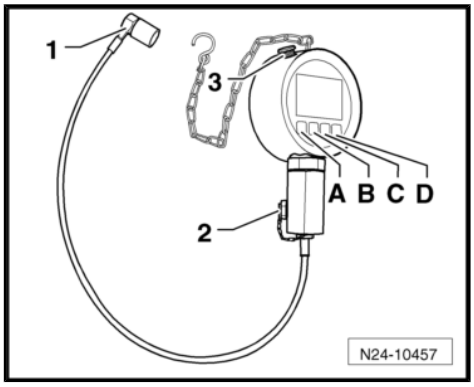


– Connect fuel pressure sender and electrical connector of fuel pressure sender with the aid of test adapter - VAS 5570- .



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– Switch on tester - VAS 6394/1- to do this, press button -A- once briefly.



Note

- *When button -A- is pressed for 2 seconds, the illumination will be switched on for 20 seconds.*
- *If the digital pressure gauge - VAS 6394/1- reading is not 0 bar, perform zero calibration procedure ⇒ operating instructions .*

– Connect vehicle diagnostic tester to diagnostic connection.

– Switch ignition on.

– Press following buttons on display of diagnostic tester one after the other:

`Vehicle self-diagnosis`

`Self-diagnosis` ▶

`01 - Engine electronics` ▶

`011 - Measured values` ▶

– Select measured value block `1` `4` `0` and confirm with `Q`.

The actual fuel pressure value is shown in display zone 3, measured by the fuel pressure sender - G247- .

– Start engine.

– Compare the displayed pressure of pressure tester - VAS 6394/1- with the displayed actual value on vehicle diagnostic tester .

• A maximum pressure deviation of 5 bar is permissible.

– If the deviation is greater than 5 bar, renew fuel pressure sender - G247- .

WARNING

The fuel system is pressurised.

Danger of injury through fuel spray.

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

– Repeat the test with the new fuel pressure sender - G247- and compare both measured values.

If measured values again fail to correspond:

– Check wiring ⇒ Vehicle diagnostic tester.

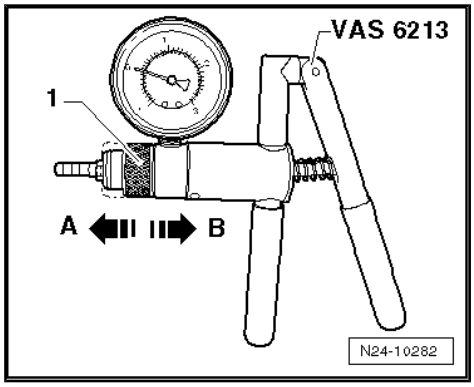
3.2 Checking intake manifold change-over

Perform check only if there is a loss of torque. This means when there is a lack of elasticity or a lack of pulling power.

Special tools and workshop equipment required

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- Hand operated vacuum pump - VAS 6213-



Prerequisites for check

- The variable intake manifold valve - N316- was checked with a vehicle diagnostic tester .

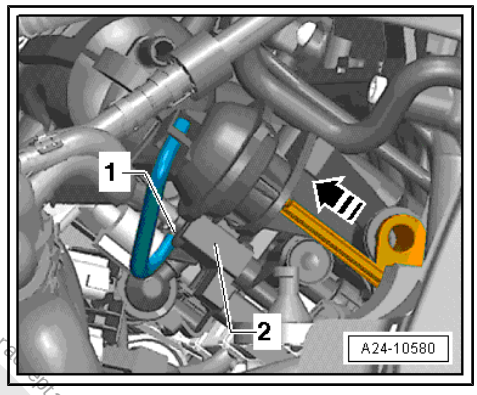
If the intake manifold flap valve - N316- is OK, perform the following tests:

– Pull engine cover panel off carefully.

– Start engine and run it at idling speed.

– Have second person abruptly increase engine speed (throttle burst). Observe vacuum unit for intake manifold change-over.

- The actuator must move -arrow-



If changeover does not operate as indicated:

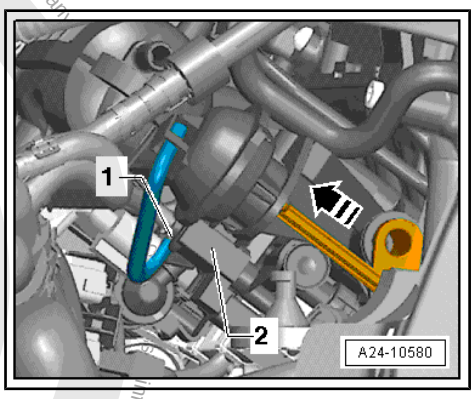
– Check vacuum system for leaks.

– Check mechanical change-over components for ease of movement. To do this, operate rods by hand.

– Check that vacuum lines are connected correctly.

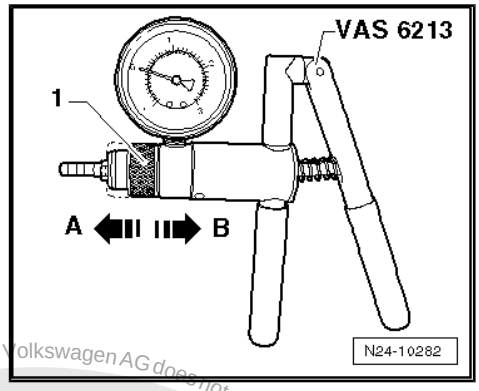
– Check vacuum hoses for porosity.

– Remove vacuum hose -1- leading to actuator for intake manifold flap valve - N316- from intake manifold flap valve - N316- -2-.



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– Move slide ring -1- on hand vacuum pump - VAS 6213- to position -A- for “vacuum”.

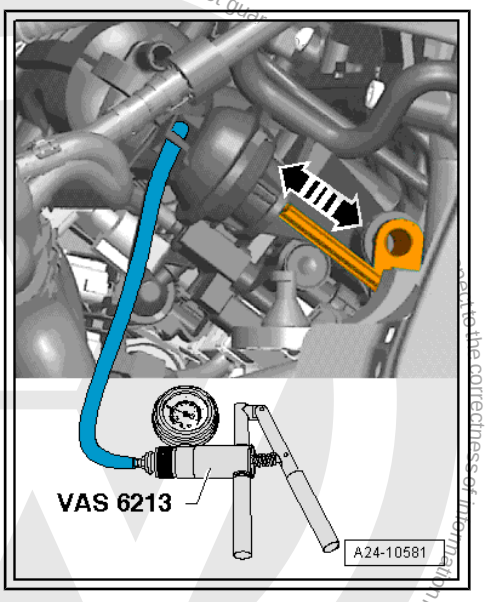


– Connect hand vacuum pump - VAS 6213- to actuator for intake manifold flap valve - N316- .

– Operate hand vacuum pump - VAS 6213- repeatedly.

The vacuum actuator must move -arrows-.

– If the vacuum actuator does not move, replace it.



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4 Engine control unit - J623- (Passat, CC up to 11/10)

Removing and installing engine control unit ⇒ page 490 .

Removing and installing engine control unit with protective housing ⇒ page 491 .

4.1 Removing and installing engine control unit

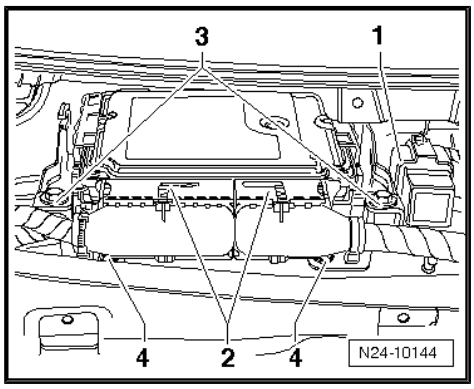
Note

Removing and installing engine control unit with protective housing ⇒ page 491 .

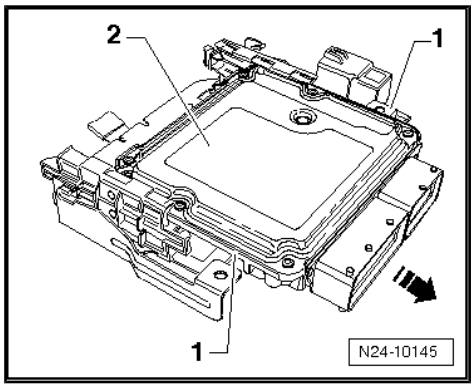
– If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function “Renewing engine control unit”.

Removing engine control unit

– Switch off ignition.
– Remove wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .
– Remove right plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 64 ; Flush-bonded windows; Assembly overview - plenum chamber cover .
– Pull connector -1- off heated windscreen control unit - J505- .
– Slide connector locking devices -2- on engine control unit outwards and pull off both connectors.
– Remove securing bolts -3-.
– Remove retainer frame with engine control unit from plenum chamber.



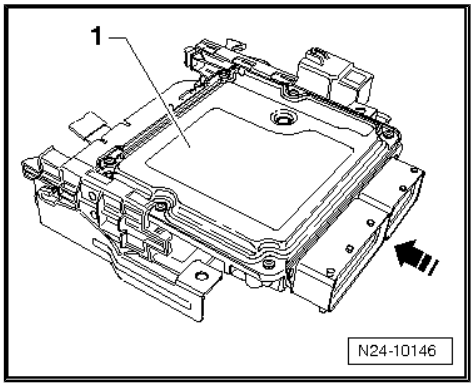
– Press locking device -1- outwards and slide engine control unit -2- out in -direction of arrow-.



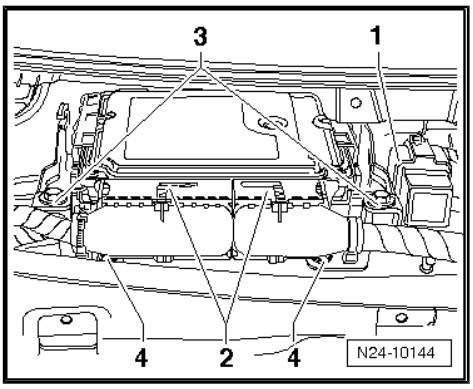
Installing engine control unit

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– Slide engine control unit -1- into retaining frame in -direction of arrow-.



– Fit retainer frame with engine control unit onto retainer -4-. Specified torque of securing nuts for retainer -4-: 6 Nm.



– Tighten securing bolts -3- to 7 Nm.
– Fit connectors to engine control unit and slide locking devices -2- inwards.
– Fit connector -1- to heated windscreen control unit - J505- .
– Install right plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 64 ; Flush-bonded windows; Assembly overview - plenum chamber cover .
– Install wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.

4.2 Removing and installing engine control unit with protective housing

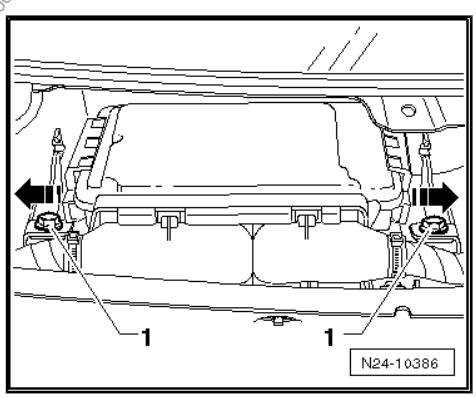
Special tools and workshop equipment required

♦ Grip pliers

– If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function “Renewing engine control unit”.

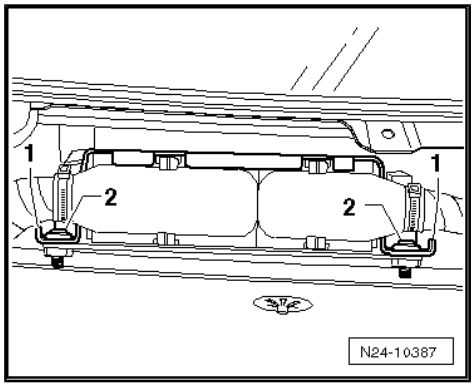
Removing:

– Switch off ignition.
– 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. 64 ; Flush-bonded windows; Assembly overview - plenum chamber cover .
– Unscrew bolts -1-.
– Remove engine control unit cover, if fitted.
– Cover the plenum chamber with a clean cloth so that it is not scratched.
– Raise engine control unit with retaining frame slightly.
– Release engine control unit -arrows- and pull out slightly.

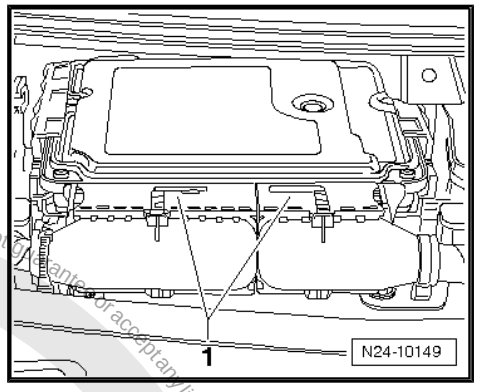


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– Bend the upper ends -1- of locking clip outwards.
– Remove shear-head bolts -2- using grip pliers and remove locking clip.



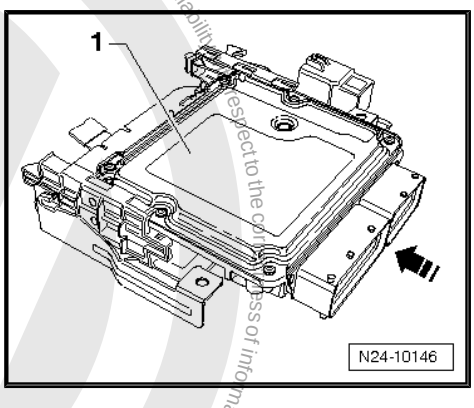
– Slide connector locking devices -1- on engine control unit outwards and pull off both connectors.
– Remove engine control unit.



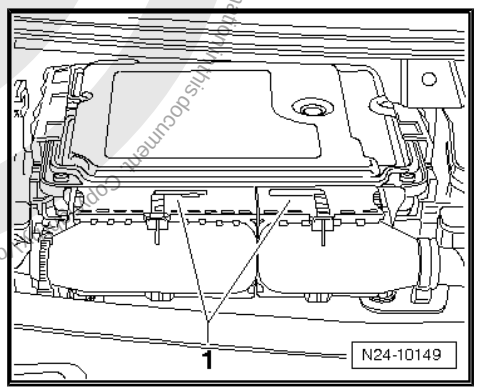
Installing:

– Slide engine control unit -1- in direction of -arrow- in retaining frame until it engages.
– Tighten the retaining frame.

  Specified torque: 6 Nm



– Fit connectors to engine control unit and slide locking devices -1- inwards.
– Take a new locking clip and tighten new shear-head bolts evenly until heads shear off.
– Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 64 ; Flush-bonded windows; Assembly overview - plenum chamber cover .
– Install wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.



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5 Engine control unit - J623- (Golf, Eos to 11/08)

Removing and installing engine control unit ⇒ page 493 .

Removing and installing engine control unit with protective housing ⇒ page 493 .

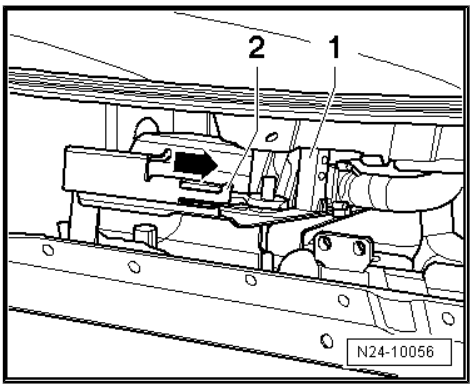
5.1 Removing and installing engine control unit

Note

If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function "Renewing engine control unit".

Removing

- Switch off ignition.
- Remove windscreen wiper arms, plenum chamber cover and plenum chamber bulkhead ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .
- Release front connector -1- from engine control unit and pull it off.
- Lever up catch -2- slightly.
- Then push engine control unit out of retainer -arrow-.
- Then release rear connector on engine control unit and pull it off.



Installing

- Fit rear connector to engine control unit and lock in position.
- Push engine control unit onto bracket.
- Fit front connector to engine control unit and lock it in position.
- Install plenum chamber bulkhead, plenum chamber cover and wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .

5.2 Removing and installing engine control unit with protective housing

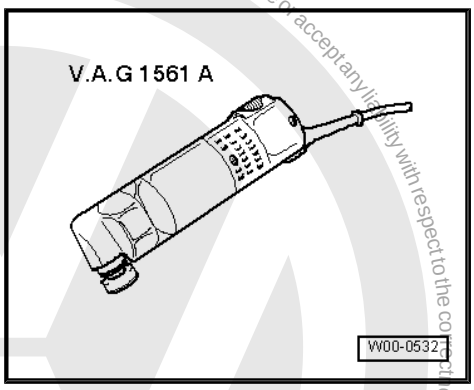
Special tools and workshop equipment required

- Electric cutter - V.A.G 1561 A-
- Saw set - V.A.G 1561/14-

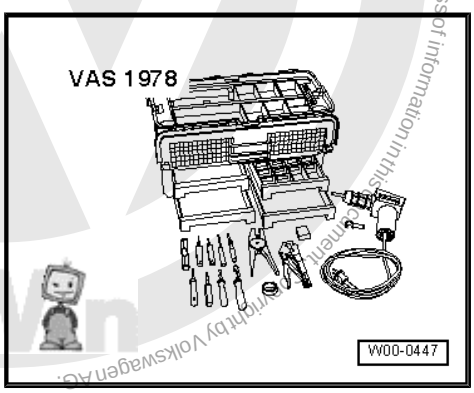
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- Grip pliers



- Hot air blower from wiring harness repair set - VAS 1978 B-



Note

If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function "Renewing engine control unit".

Removing:

– Switch off ignition.

– Remove windscreen wiper arms, plenum chamber cover and plenum chamber bulkhead ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .

Note

The shear-head bolt threads are coated with locking compound. Heating the shear-head bolt with a hot air blower releases the locking effect of the locking compound.

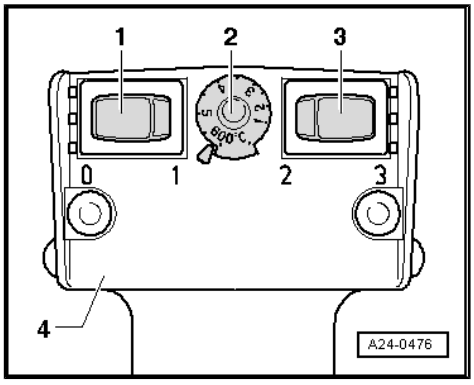
Caution

Cover lines, connections and control units in the vicinity of the engine control unit to prevent damage through heat.

Perform settings on hot air blower -4- as shown:

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– Turn temperature setting potentiometer -2- to maximum heat output (600°C).
– Set two-stage switch for volume of air -3- to position 3.



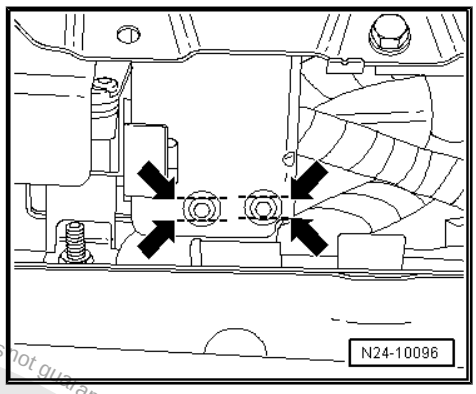
WARNING

When shear-head bolts are heated up, parts of the protective housing will be subjected to a large amount of heat. Wear protective gloves to avoid possible injury.

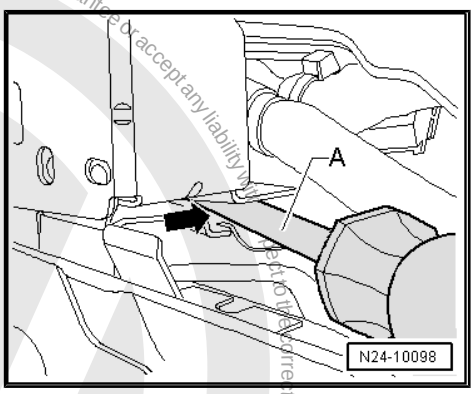
– Place nozzle of hot air blower close to shear-head bolt.
– Switch on hot air blower and heat the bolts.
– Remove bolts with grip pliers .

Note

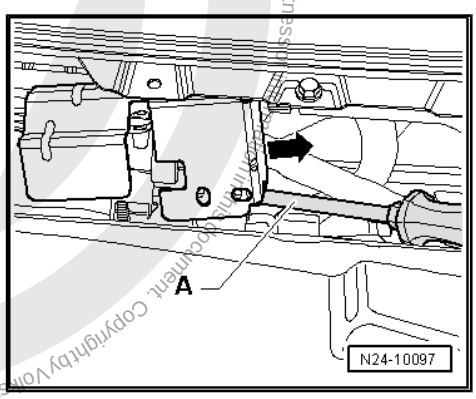
If the bolts will not move, saw into heads of shear-head bolts so that two parallel slots are created -arrows- and then remove the bolts.



– Insert a screwdriver between protective housing -A- and bracket -arrow-.

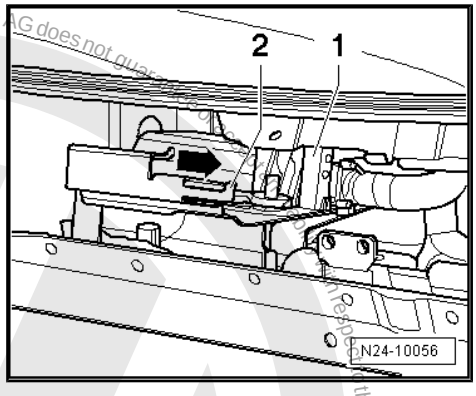


– Lever up protective housing using screwdriver -A- and pull to side off bracket -arrow-.



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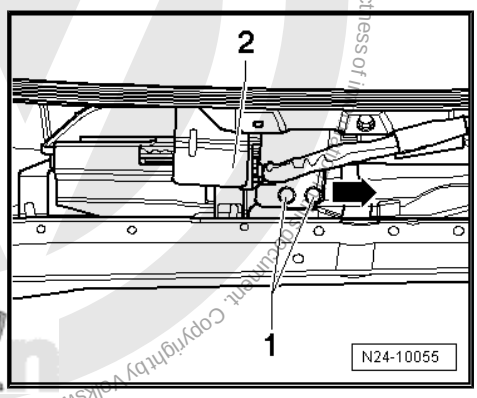
– Release front connector -1- from engine control unit and pull it off.
– Lever up catch -2- slightly.
– Then push engine control unit out of retainer -arrow-.
– Then release rear connector on engine control unit and pull it off.



Installing:

– Fit rear connector to engine control unit and lock in position.
– Push engine control unit onto bracket.
– Fit front connector to engine control unit and lock it in position.
– Push protective housing onto bracket.

– Tighten new shear-head bolts -1- evenly until heads shear off.
– Install plenum chamber bulkhead, plenum chamber cover and wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .



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6 Engine control unit - J623- (Golf, Eos, Scirocco from 11/08; CC from 11/10)

Removing and installing engine control unit ⇒ page 497 .

Removing and installing engine control unit with protective housing ⇒ page 498 .

6.1 Removing and installing engine control unit

Note

If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function "Renewing engine control unit".

Removing

– Switch off ignition.

Golf, Eos, Scirocco:

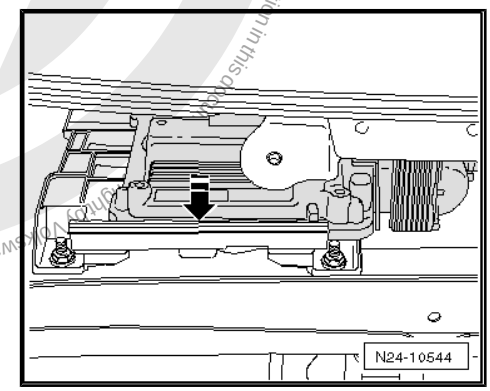
– Remove wiper arms, plenum chamber cover and plenum chamber bulkhead ⇒ Body; Rep. gr. 50 ; Plenum chamber bulkhead .

Passat, CC:

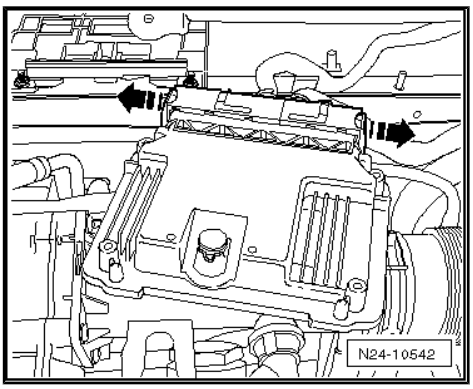
– Remove wiper arms and plenum chamber cover ⇒ Body; Rep. gr. 64 ; Assembly overview - plenum chamber cover .

All:

– Press retaining frame down in -direction of arrow- and remove engine control unit.



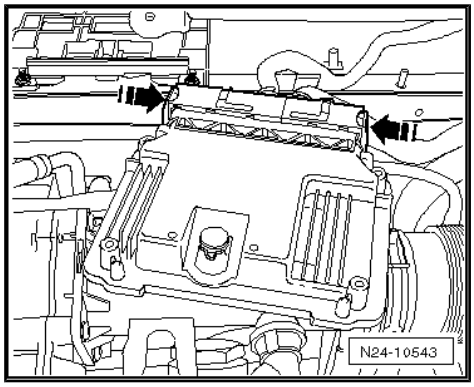
– Push connector locking devices in direction of -arrow-, and pull connectors off.



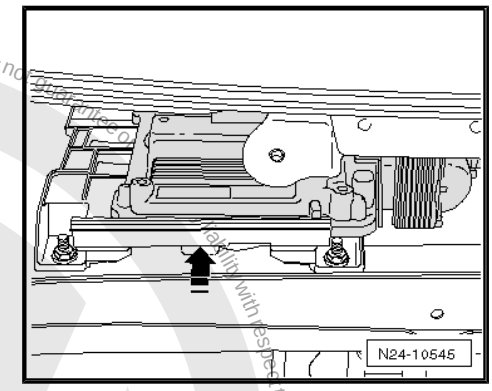
Installing

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– Fit connectors to engine control unit and slide locking devices onto stop in direction of -arrow-.



– Insert engine control unit into retaining frame and press retaining frame upwards in -direction of arrow-



Golf, Eos, Scirocco:

– Install wiper arms, plenum chamber cover and plenum chamber bulkhead ⇒ Body; Rep. gr. 50 ; Plenum chamber bulkhead .

Passat, CC:

– Install wiper arms and plenum chamber cover ⇒ Body; Rep. gr. 64 ; Assembly overview - plenum chamber cover .

6.2 Removing and installing engine control unit with protective housing

Note

- *If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function "Renewing engine control unit".*
- *The shear-head bolt threads may coated with locking compound. To simplify removal, the shear-head bolts can be heated using hot air blower - VAS 1978/14- . When doing this, ensure that no adjacent cables, connectors or components are damaged!*

Removing

– Switch off ignition.

Golf, Eos, Scirocco:

– Remove wiper arms, plenum chamber cover and plenum chamber bulkhead ⇒ Body; Rep. gr. 50 ; Plenum chamber bulkhead .

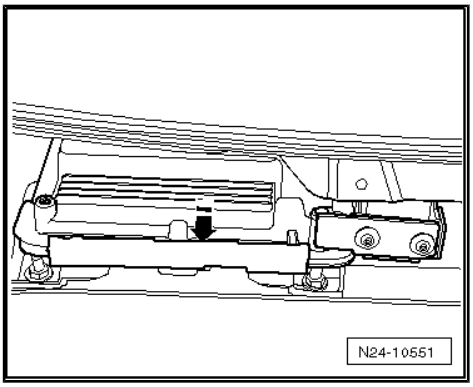
Passat, CC:

– Remove wiper arms and plenum chamber cover ⇒ Body; Rep. gr. 64 ; Assembly overview - plenum chamber cover .

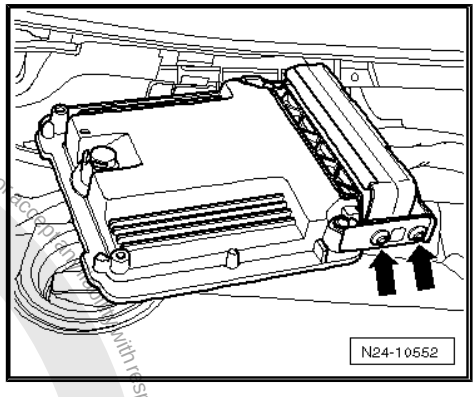
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All:

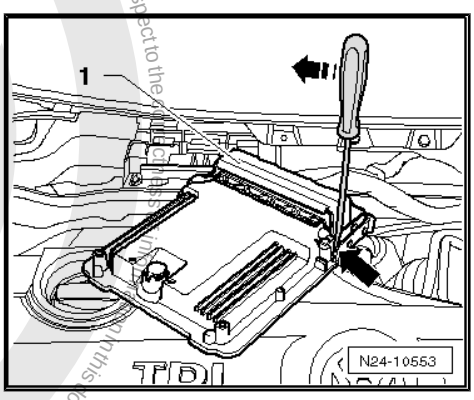
– Press retaining frame down in -direction of arrow- and remove engine control unit.



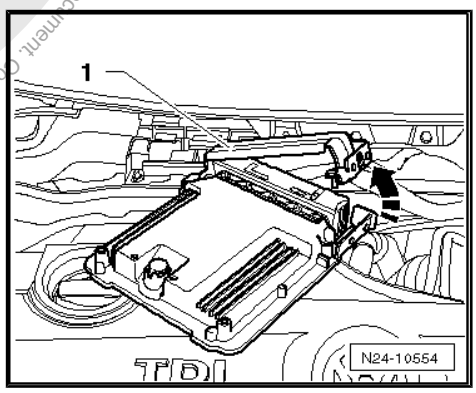
– Unscrew shear-head bolts -arrows- using pliers.



– Insert screwdriver between both locking plates -arrow-.
– Carefully press screwdriver in direction of -arrow- and bend locking bar -1- upwards at the same time.

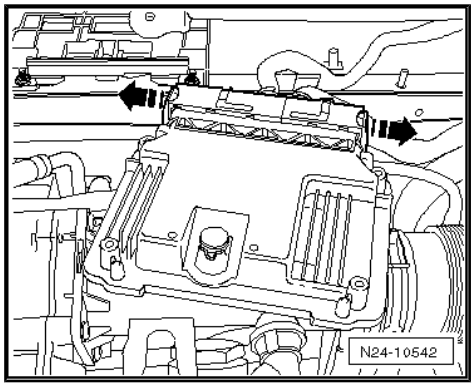


– Bend locking bar -1- in direction of -arrow- until it can be pulled off connector.



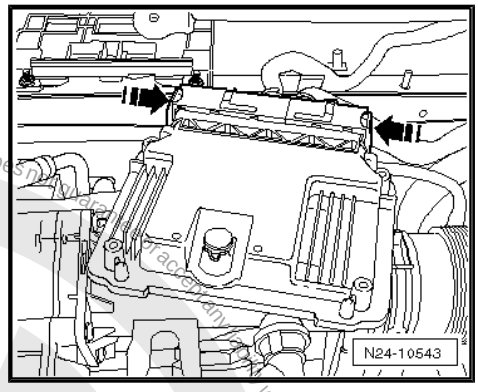
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– Push connector locking devices in direction of -arrow-, and pull connectors off.

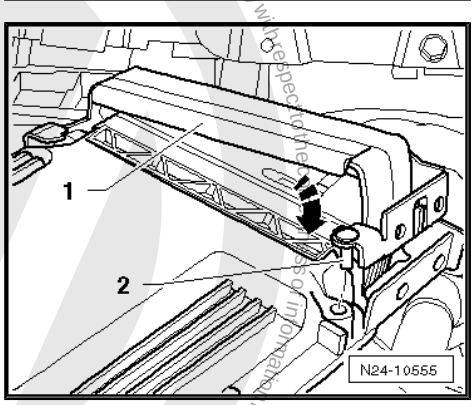


Installing

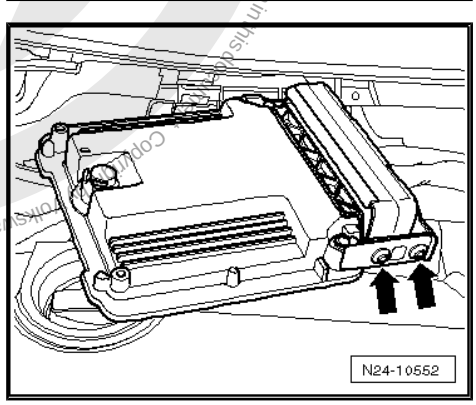
– Fit connectors to engine control unit and slide locking devices onto stop in direction of -arrow-.



– Fit locking bar -1- onto connectors and press it in direction of -arrow-.
– Guide pin -2- to stop into hole on engine control unit.

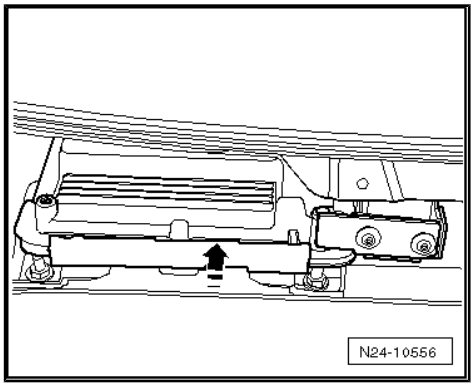


– Secure retaining bow with shear-head bolts to engine control unit -arrows-.
– Tighten shear-head bolts evenly until heads shear-head off -arrows-.



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– Insert engine control unit into retaining frame and press retaining frame upwards in -direction of arrow-



Golf, Eos, Scirocco:

– Install wiper arms, plenum chamber cover and plenum chamber bulkhead ⇒ Body; Rep. gr. 50 ; Plenum chamber bulkhead .

Passat, CC:

– Install wiper arms and plenum chamber cover ⇒ Body; Rep. gr. 64 ; Assembly overview - plenum chamber cover .

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7 Engine control unit - J623- (Tiguan)

Removing and installing engine control unit ⇒ page 502 .

Removing and installing engine control unit with protective housing ⇒ page 503 .

7.1 Removing and installing engine control unit

If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function “Renewing control unit”.

Removing

– Switch off ignition.

– Remove wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms .

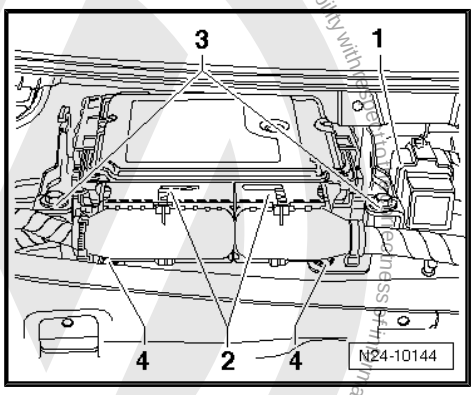
– Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 64 ; Removing and installing plenum chamber cover.

– Pull connector -1- off heated windscreen control unit - J505- .

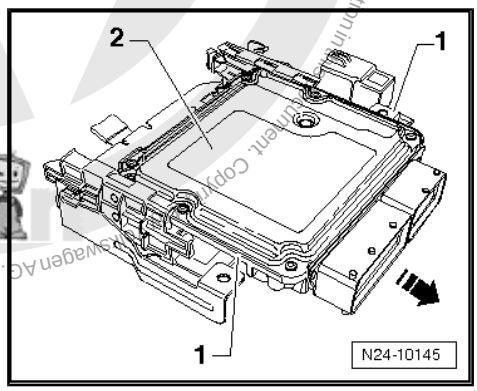
– Slide connector locking devices -2- on engine control unit outwards and pull off both connectors.

– Remove securing bolts -3-.

– Remove retainer frame with engine control unit from plenum chamber.



– Press locking device -1- outwards and slide engine control unit -2- in -direction of arrow-.



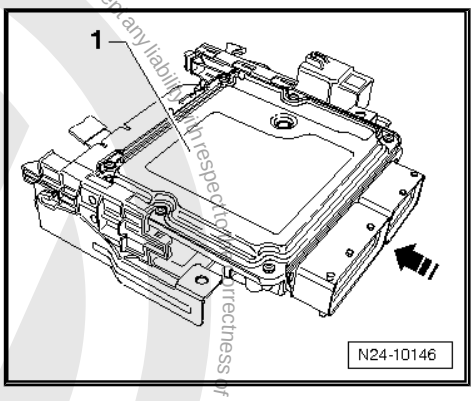
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Installing

– Slide engine control unit -1- into retaining frame in -direction of arrow-.

– Fit retainer frame with engine control unit onto retainer -4-.

Specified torque of securing nuts for retainer -4-: 6 Nm.



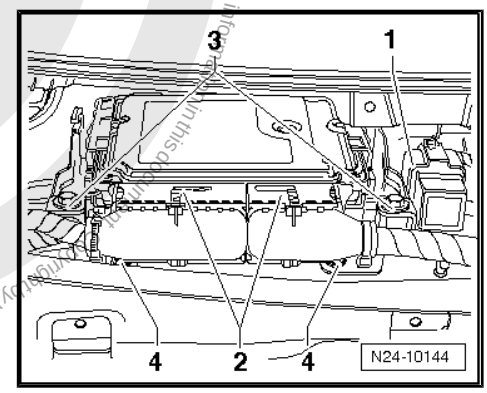
– Tighten securing bolts -3- to 7 Nm.

– Fit connectors to engine control unit and slide locking devices -2- inwards.

– Fit connector -1- to heated windscreen control unit - J505- .

– Install plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 64 ; Removing and installing plenum chamber cover.

– Install wiper arms ⇒ Electrical system; Rep. gr. 92; Windscreen wiper system; Removing and installing wiper arms.



7.2 Removing and installing engine control unit with protective housing

If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function “Renewing control unit”.

Special tools and workshop equipment required

♦ Grip pliers

Removing

– Switch off ignition.

– Remove wiper arms, ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.

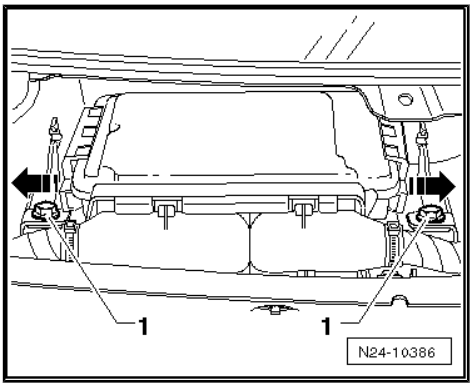
– Remove plenum chamber cover ⇒ General body repairs, exterior; Rep. gr. 64 ; Removing and installing plenum chamber cover.

– Unscrew bolts -1-.

– Cover the plenum chamber with a clean cloth so that it is not scratched.

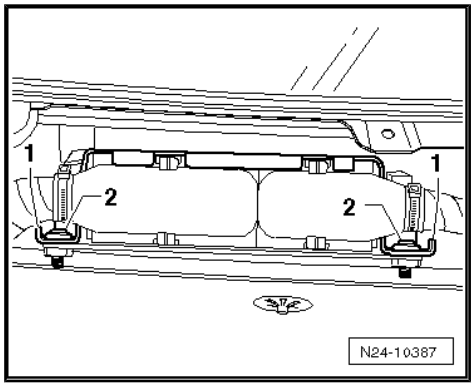
– Raise engine control unit with retaining frame slightly.

– Release engine control unit in direction of -arrow- and pull out slightly.

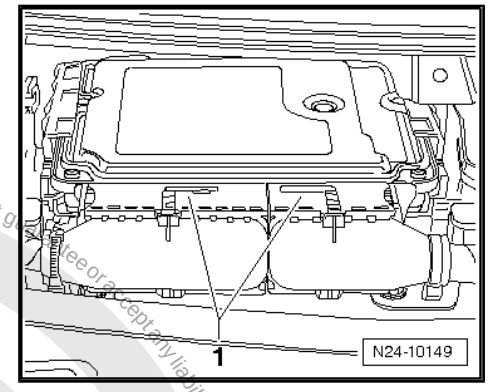


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– Bend the upper ends -1- of locking clip outwards.
– Remove shear-head bolts -2- using grip pliers and remove locking clip.



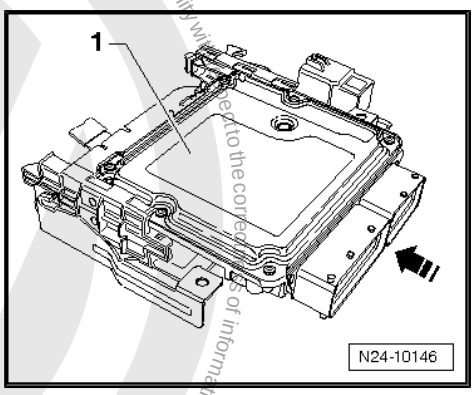
– Slide connector locking devices -1- on engine control unit outwards and pull off both connectors.
– Remove engine control unit.



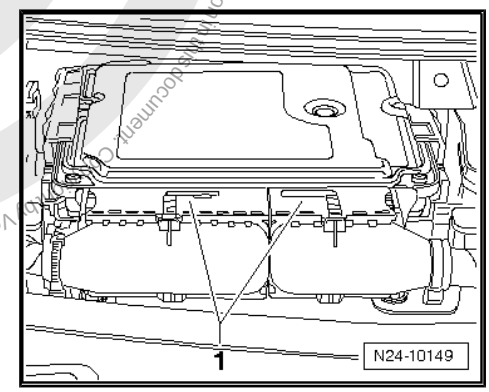
Installing:

– Slide engine control unit -1- in direction of -arrow- in retaining frame until it engages.
– Tighten the retaining frame.

  Specified torque: 6 Nm



– Fit connectors to engine control unit and slide locking devices -1- inwards.
– Take a new locking clip and tighten new shear-head bolts evenly until heads shear off.



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8 Engine control unit - J623- (Scirocco to 11/08)

Removing and installing engine control unit ⇒ page 505 .

Removing and installing engine control unit with protective housing ⇒ page 506 .

8.1 Removing and installing engine control unit

If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function “Renewing control unit”.

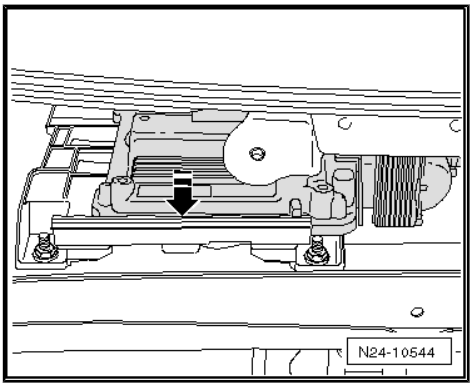
Removing

– Switch off ignition.

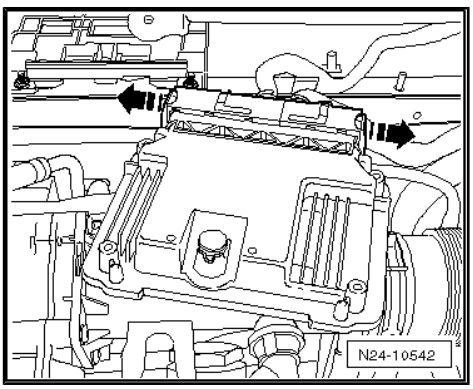
– Remove wiper arms, ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.

– Remove plenum chamber bulkhead ⇒ General body repairs; Rep. gr. 50 ; Body - front; Plenum chamber bulkhead .

– Press retaining frame down in -direction of arrow- and remove engine control unit.

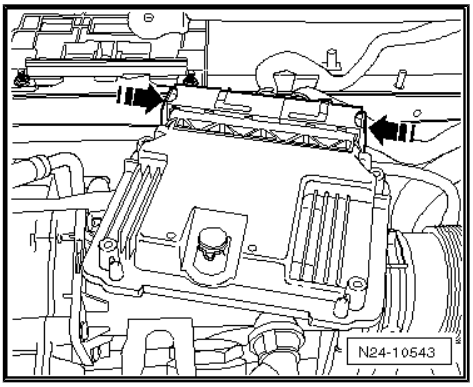


– Push connector locking devices in direction of -arrow-, and pull connectors off.



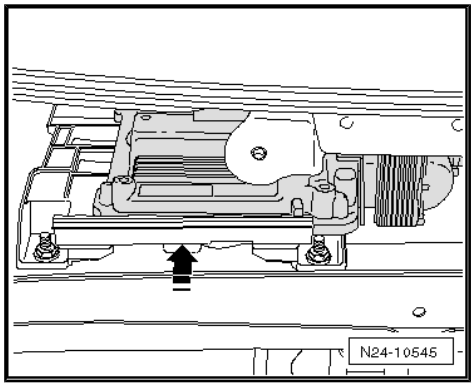
Installing

– Fit connectors to engine control unit and slide locking devices onto stop in direction of -arrow-.



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– Insert engine control unit into retaining frame and press retaining frame upwards in -direction of arrow-



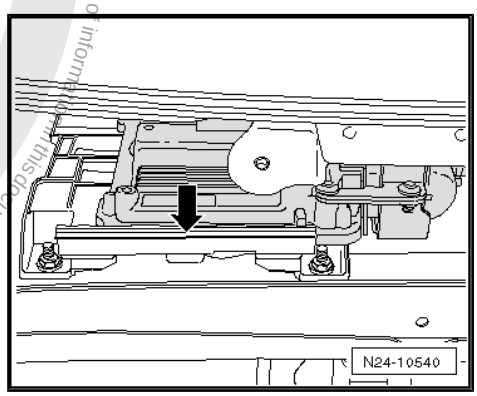
– Install plenum chamber bulkhead ⇒ General body repairs; Rep. gr. 50 ; Body - front; Plenum chamber bulkhead .
– Install wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.

8.2 Removing and installing engine control unit with protective housing

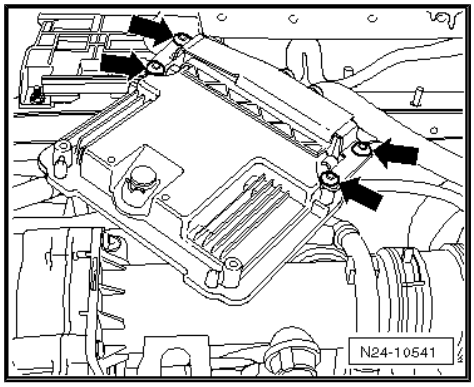
If you wish to renew the engine control unit, connect the vehicle diagnostic tester and perform the guided function “Renewing control unit”.

Removing

– Switch off ignition.
– Remove wiper arms, ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.
– Remove plenum chamber bulkhead ⇒ General body repairs; Rep. gr. 50 ; Body - front; Plenum chamber bulkhead .
– Press retaining frame down in -direction of arrow- and remove engine control unit.

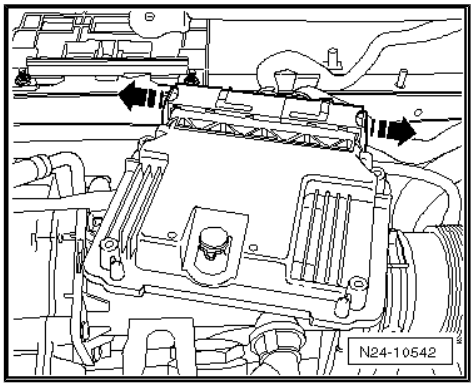


– Remove shear-head bolts -arrows- using pliers and remove locking clips.



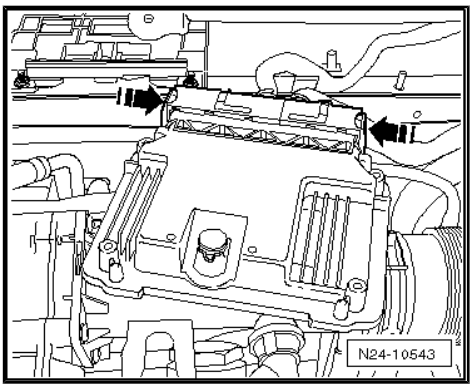
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– Push connector locking devices in direction of -arrow-, and pull connectors off.

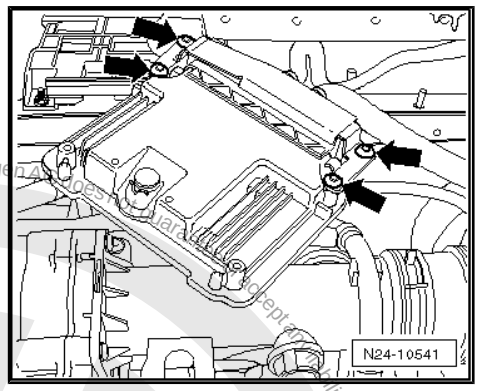


Installing

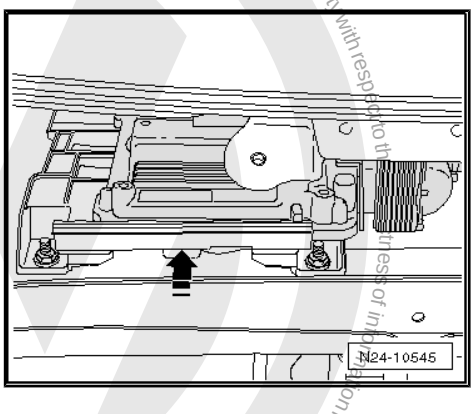
– Fit connectors to engine control unit and slide locking devices onto stop in direction of -arrow-.



– Fit the two locking clips over the connector and secure with new shear-head bolts -arrows-.
– Tighten shear-head bolts evenly until heads shear-head off -arrows-.



– Insert engine control unit into retaining frame and press retaining frame upwards in -direction of arrow-
– Install plenum chamber bulkhead ⇒ General body repairs; Rep. gr. 50 ; Body - front; Plenum chamber bulkhead .
– Install wiper arms ⇒ Electrical system; Rep. gr. 92 ; Windscreen wiper system; Removing and installing wiper arms.



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26 – Exhaust system

1 Exhaust system (Passat, CC)

Note

- *The flexible joint in the front exhaust pipe must not be bent more than 10° since otherwise it can be damaged.*
- *Renew seals, gaskets and self-locking nuts.*
- *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 clamp and align silencers and exhaust pipe so that sufficient clearance is maintained to the bodywork at all points and the mountings are evenly loaded.*
- *The exhaust manifold and the turbocharger are one component, removing and installing ⇒ page 424 .*

Assembly overview - exhaust system (engine codes BZB, CAWA, CAWB, CGYA) ⇒ page 508 .

Assembly overview - exhaust system (engine codes CCTA, CCTB, CCZA, CDAA, CDAB) ⇒ page 510 .

Assembly overview - exhaust system (engine code CBFA) ⇒ page 512 .

Separating centre and rear silencers ⇒ page 513 .

Align exhaust system free of stress ⇒ page 515 .

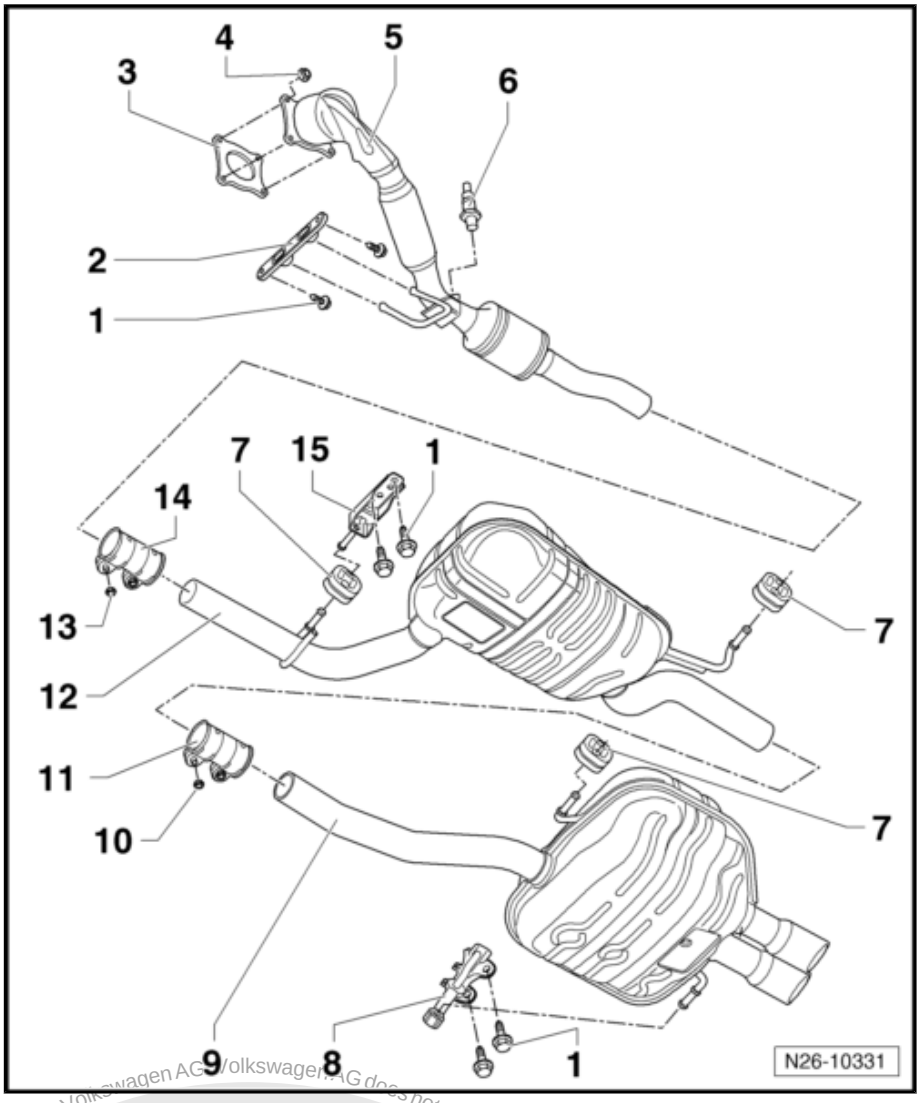
Mounting position and specified torque of the clamping sleeve ⇒ page 516

Removing and installing catalytic converters with front exhaust pipe ⇒ page 517 .

Checking exhaust system for leaks ⇒ page 519 .

1.1 Assembly overview - exhaust system (engine codes BZB, CAWA, CAWB, CGYA)

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1 - 25 Nm

2 - Mounting

- ❑ Renew if damaged

3 - Seal

- ❑ Renew

4 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

5 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.
Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 517
- ❑ Aligning exhaust system free of tension ⇒ page 515 .

6 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

7 - Retaining loop

- ❑ Renew if damaged

8 - Mounting

- ❑ Renew if damaged

9 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 513

10 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

11 - Rear clamp

- ❑ For separate replacement of centre and rear silencers

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- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

12 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 513

13 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

14 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

15 - Mounting

- ❑ For centre silencer

1.2 Assembly overview - exhaust system (engine codes CCTA, CCTB, CCZA, CDAA, CDAB)

1 - 25 Nm

2 - Mounting

- ❑ Renew if damaged

3 - Seal

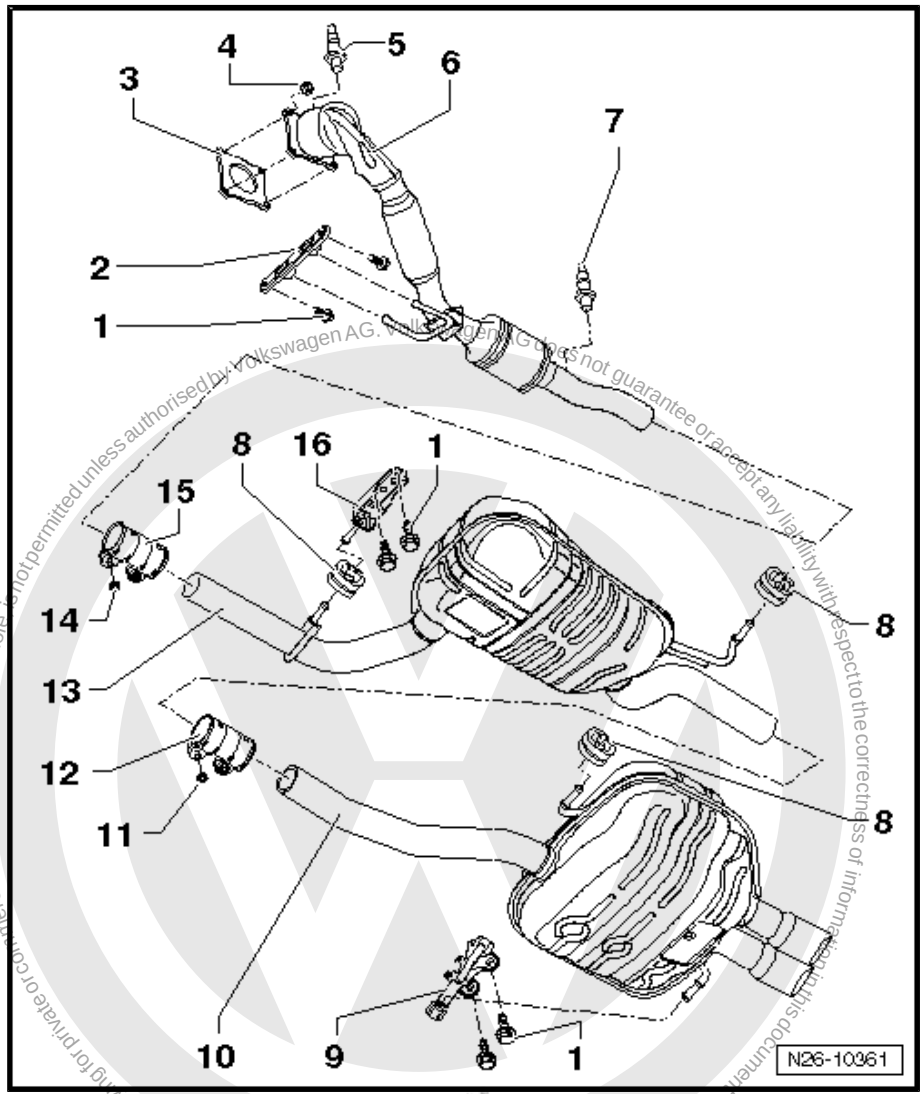
- ❑ Renew

4 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

5 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-



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6 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.
Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 517
- ❑ Aligning exhaust system free of tension ⇒ page 515 .

7 - Lambda probe after catalytic converter - G130-

- ❑ Bank 1, probe 2
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-



8 - Retaining loop

- ❑ Renew if damaged

9 - Mounting

- ❑ Renew if damaged

10 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 513

11 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

12 - Rear clamp

- ❑ For separate replacement of centre and rear silencers
- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

13 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 513

14 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

15 - Front clamp

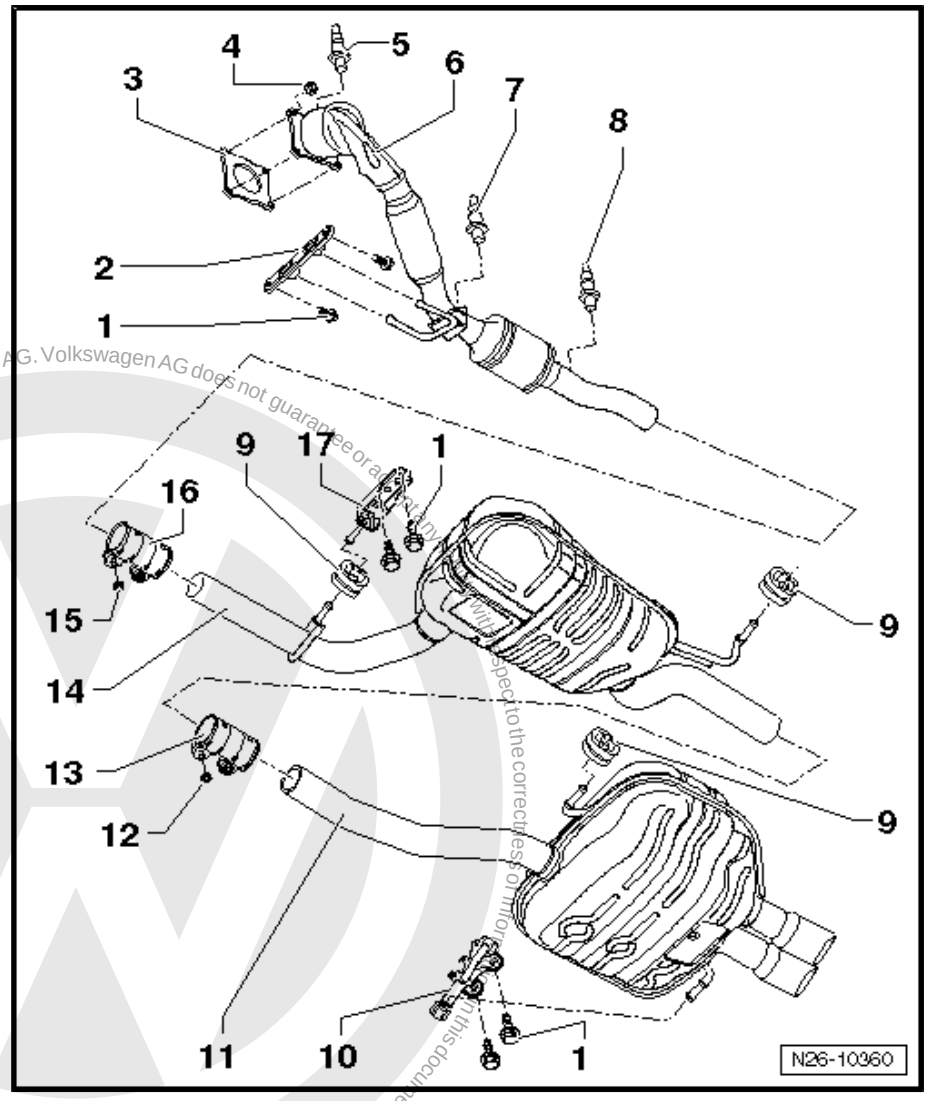
- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

16 - Mounting

- ❑ For centre silencer

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1.3 Assembly overview - exhaust system (engine code CBFA)



1 - 25 Nm

2 - Mounting

- ❑ Renew if damaged

3 - Seal

- ❑ Renew

4 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

5 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

6 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.

Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 517
- ❑ Aligning exhaust system free of tension ⇒ page 515 .

7 - Lambda probe 2 - G108-

- ❑ Bank 1, probe 2
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.

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- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

8 - Lambda probe after catalytic converter - G130-

- ❑ Bank 1, probe 3
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

9 - Retaining loop

- ❑ Renew if damaged

10 - Mounting

- ❑ Renew if damaged

11 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 513

12 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

13 - Rear clamp

- ❑ For separate replacement of centre and rear silencers
- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

14 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 513

15 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

16 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 516

17 - Mounting

- ❑ For centre silencer

1.4 Separating centre and rear silencers

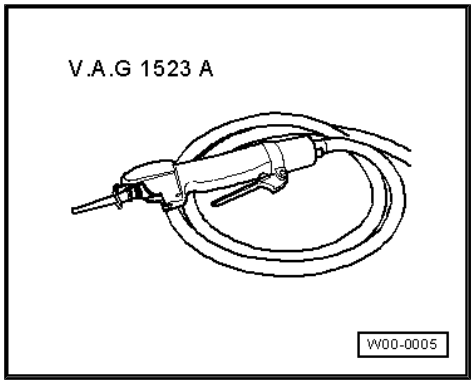
Note

- ♦ *The connecting pipe can be cut through at the cutting location in order to remove and install or renew the centre and rear silencers separately.*
- ♦ *Cutting location is marked by an indentation on the circumference of exhaust pipe.*

Special tools and workshop equipment required

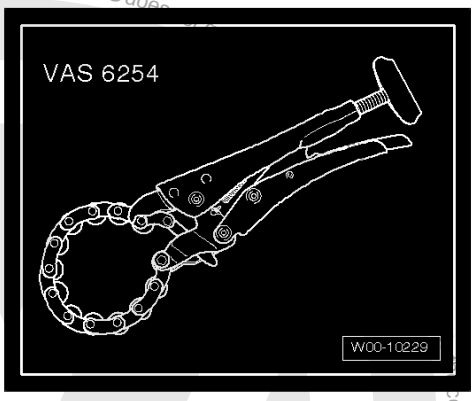
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- Pneumatic sabre saw - V.A.G 1523 A-



Or

- Chain-type pipe cutter - VAS 6254-

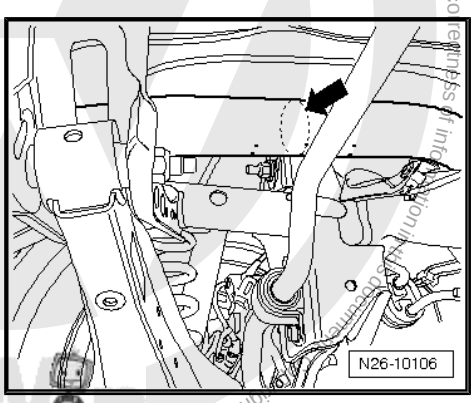


WARNING

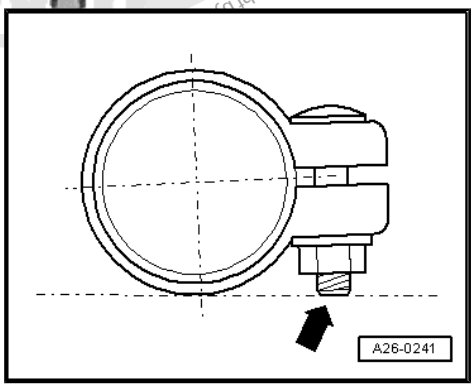
To avoid injury from metal shavings, wear eye protection and protective clothing.

– Cut through exhaust pipe at right angles using e.g. body saw - V.A.G 1523 A- at separating point -arrow-.

– Position clamping sleeve between side markings when installing.



– Install clamp so that ends of bolts do not protrude beyond bottom of clamp.



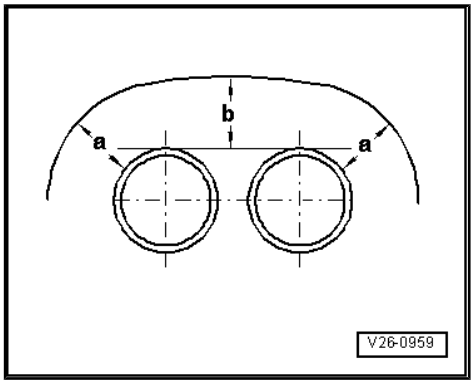
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– Align exhaust system so that the distance -a- on left and right is even.

Specified torque:

Clamp with 2 individual clips: 25 Nm

Clamp with continuous clip: 35 Nm



1.5 Aligning exhaust system free of stress

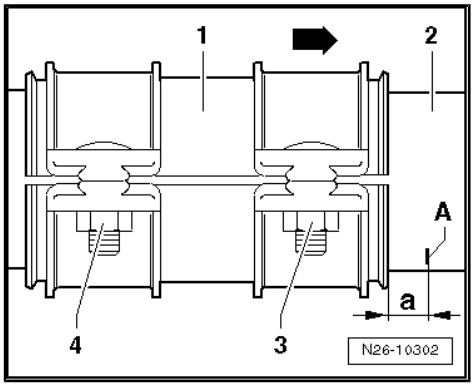
- The exhaust system must be aligned when cold.

– Loosen bolts -3 and 4- on front clamp -1-.

– Align front clamp -1- to marking -A- on front exhaust pipe -2- (-arrow- points forwards).

- Dimension -a- = ⇒ page 516
- The bolts must be on the right and the ends of the bolts must not protrude beyond the lower edge of the clamp.

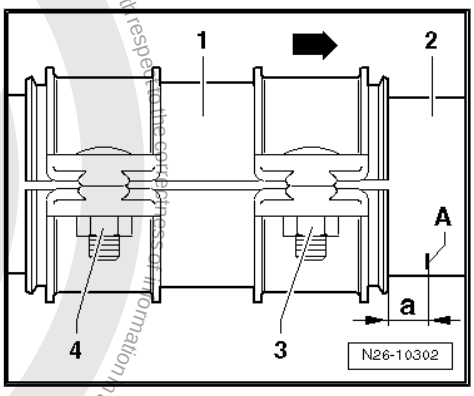
– Tighten front clamp bolts -3- hand-tight.



– Push exhaust system forward until preload on rubber mounting for rear silencer is dimension -a- 15…17 mm.



– In this position, tighten bolts -3 and 4- of front clamp evenly. Torque setting ⇒ page 516 .



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1.6 Installation position and specified torque of clamp

Note

Gradual introduction of clamp with continuous clip.

Specified torque and installation dimensions of clamp

Clamp -A- with 2 individual clips.

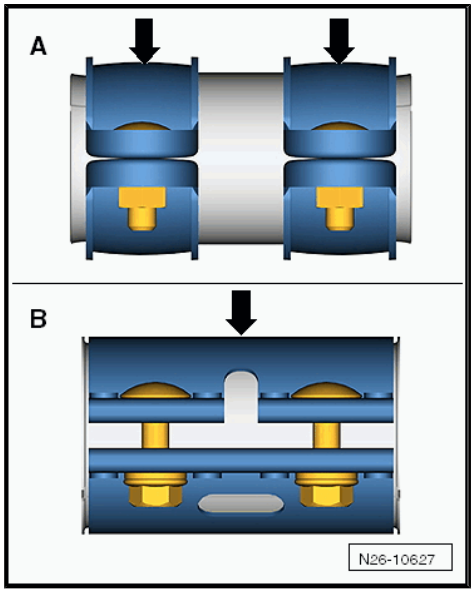
Specified torque: 25 Nm

Installation dimensions -a- 5 mm (only for front clamp)

Clamp -B- with continuous clip.

Specified torque: 35 Nm

Installation dimensions -a- 8.5 mm (only for front clamp)



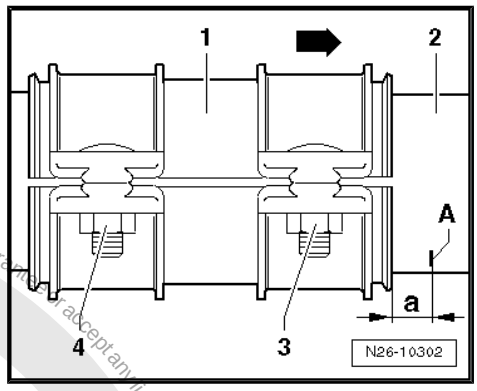
Installation dimension -a- for vehicles with marking on front exhaust pipe

1 - Clamping sleeve

2 - Front exhaust pipe

a - Installation dimension

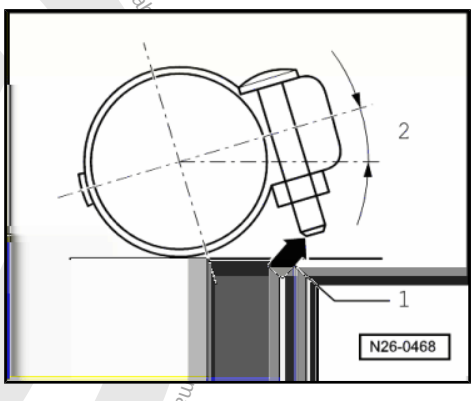
A - Marking



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

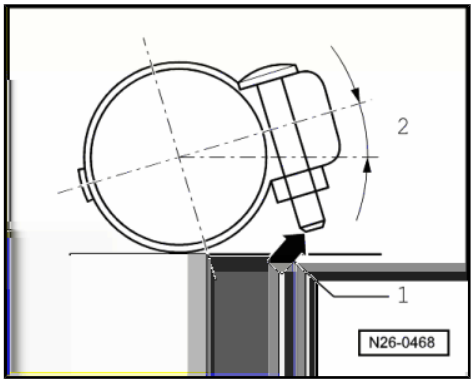


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Installation position of rear clamp

– Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.

• Threaded connection faces to rear.



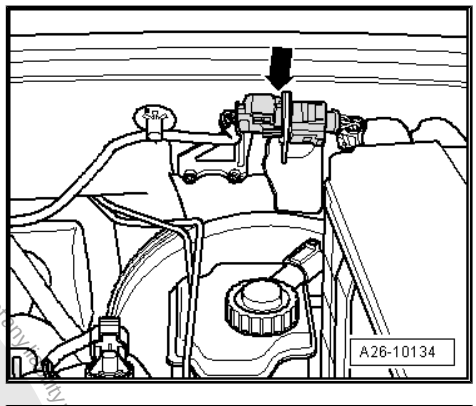
1.7 Removing and installing catalytic converters with front exhaust pipe

Removing:

– Remove air filter ⇒ page 459 .

Engine codes CBFA, CCTA, CCTB, CDAA, CDAB:

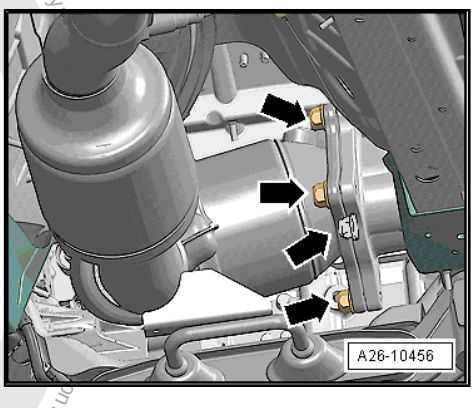
– Disconnect connector for Lambda probe - G39- -arrow- and lay cable to side.



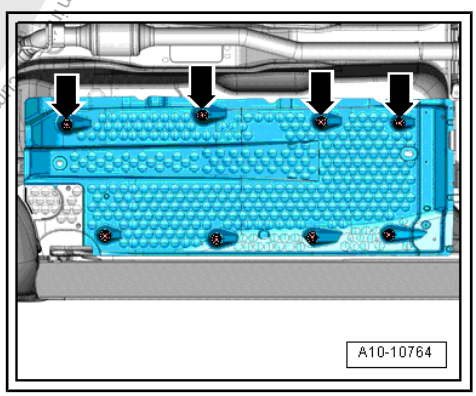
All:

– Remove nuts (accessible from above) -arrows- securing front exhaust pipe to turbocharger.

– Unscrew nuts (accessible from below) securing front exhaust pipe to turbocharger.



– Unscrew nuts -arrows- and pull underbody cover down slightly.

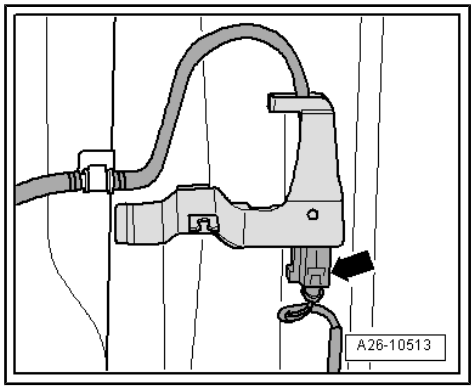


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Engine codes BZB, CAWA, CAWB, CCTA, CCTB, CGYA:

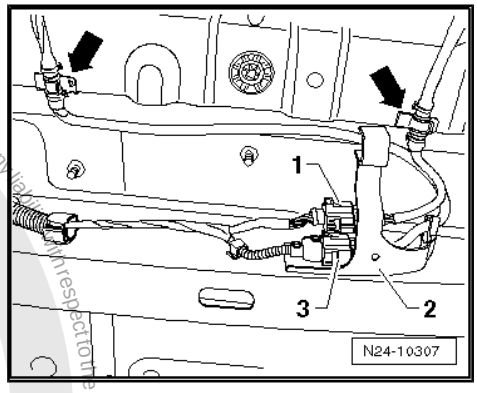
– Separate electrical connection -arrow- on right of underbody.

– Remove electrical connector from bracket and lay electrical line to Lambda probe to side.



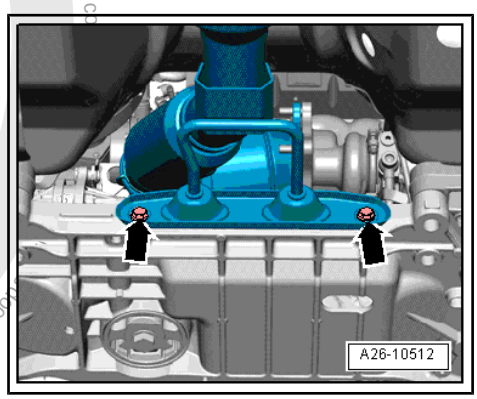
Engine code CBFA:

– Unclip lines -arrows-, pull off retainer -2- and separate connectors -1 and 3-.



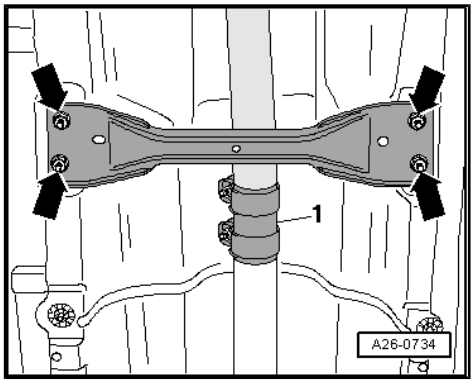
All:

– Unbolt bracket for exhaust system -arrows-.



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– Remove cross member for underbody -arrows-.



Caution

Danger of damage to the de-coupling elements.

- *Do not bend de-coupling elements in front exhaust pipe by more than 10°.*

– Loosen clamp -1- and push towards rear.

– Remove catalytic converters with front exhaust pipe.

Installing:

Install in the reverse order of removal, observing the following:

- Coat studs of turbocharger with high-temperature paste - G 052 112 A3- .
- Renew seals, gaskets and self-locking nuts.
- Align exhaust system free of stress ⇒ page 515 .

Torque settings

⇒ “1.1 Assembly overview - exhaust system (engine codes BZB, CAWA, CAWB, CGYA)”, page 508

⇒ “1.2 Assembly overview - exhaust system (engine codes CCTA, CCTB, CCZA, CDAA, CDAB)”, page 510

⇒ “1.3 Assembly overview - exhaust system (engine code CBFA)”, page 512

Component	Nm
Tunnel cross-piece to body	25

1.8 Check exhaust system for leaks

Proceed as follows:

– Start engine and allow to idle.

– Seal exhaust tailpipe briefly (e.g. hold cloth over end).

– Check for leaks and listen for noise at connecting points (cylinder head/exhaust manifold, exhaust manifold/front exhaust pipe, etc.) with the assistance of a 2nd mechanic.

– Repair any leaks found.

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2 Exhaust system (Golf, Eos, Scirocco)

Note

- *The flexible joint in the front exhaust pipe must not be bent more than 10° since otherwise it can be damaged.*
- *Renew seals, gaskets and self-locking nuts.*
- *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 clamp and align silencers and exhaust pipe so that sufficient clearance is maintained to the bodywork at all points and the mountings are evenly loaded.*
- *The exhaust manifold and the turbocharger are one component. Removing and installing ⇒ page 424 .*

Assembly overview - exhaust system (engine code CAWB) ⇒ page 520 .

Assembly overview - exhaust system (Golf 2004 ►, Eos, Scirocco, engine codes CCTA, CCZA, CCZB) ⇒ page 523

Assembly overview - exhaust system (engine code CBFA) ⇒ page 525 .

Assembly overview - exhaust system (Golf 2009►, engine codes CCZA, CCZB) ⇒ page 527

Assembly overview - exhaust system (Golf 2009 ►, engine codes CCTA, CDAA) ⇒ page 529

Separating centre and rear silencers ⇒ page 530 .

Align exhaust system free of stress ⇒ page 531 .

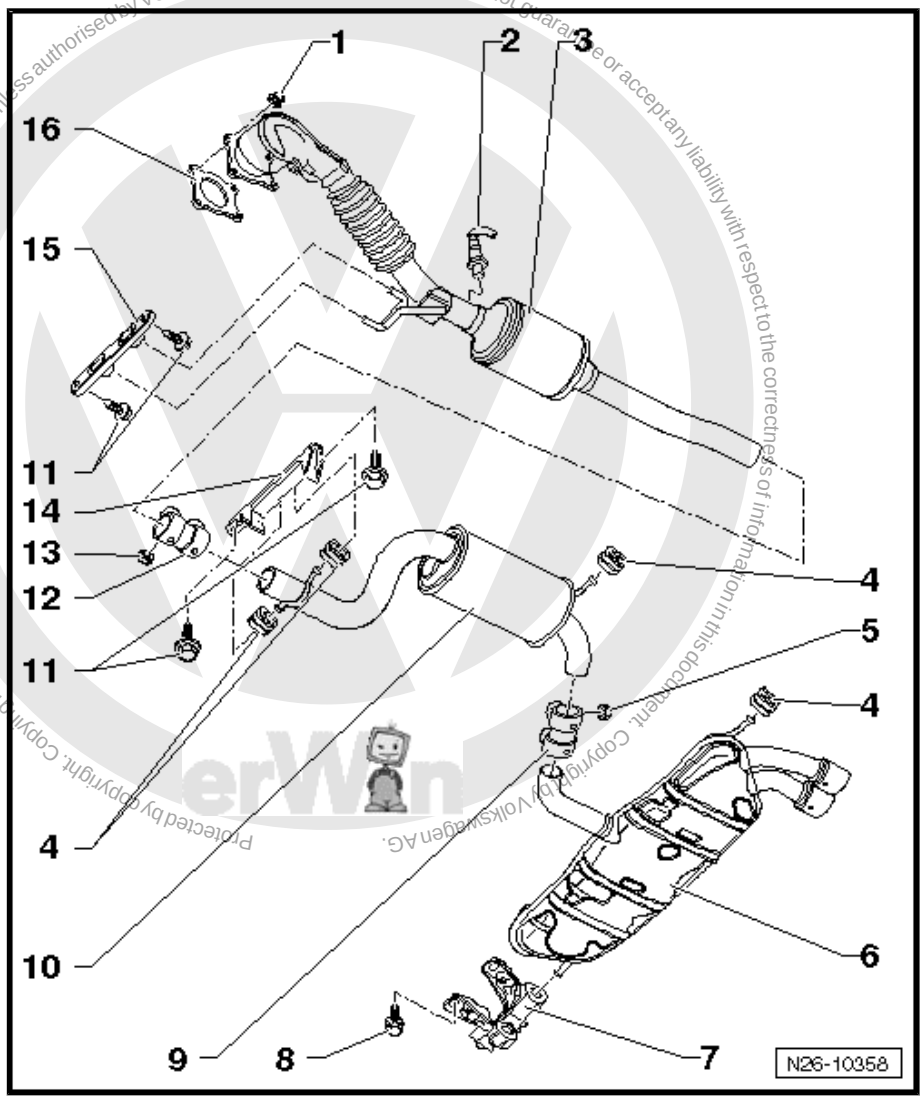
Installation position and specified torque of clamp ⇒ page 532 .

Removing and installing catalytic converters with front exhaust pipe ⇒ page 533 .

Checking exhaust system for leaks ⇒ page 535 .

2.1 Assembly overview - exhaust system (engine code CAWB)

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1 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

2 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

3 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.
Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 533
- ❑ Aligning exhaust system free of tension ⇒ page 531 .

4 - Retaining loop

- ❑ Renew if damaged

5 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

6 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

7 - Mounting

- ❑ Renew if damaged

8 - 25 Nm

9 - Rear clamp

- ❑ For separate replacement of centre and rear silencers

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- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

10 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

11 - 25 Nm

12 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532
- ❑ Tighten bolted connections evenly.

13 - Threaded union

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

14 - Mounting

- ❑ For centre silencer

15 - Mounting

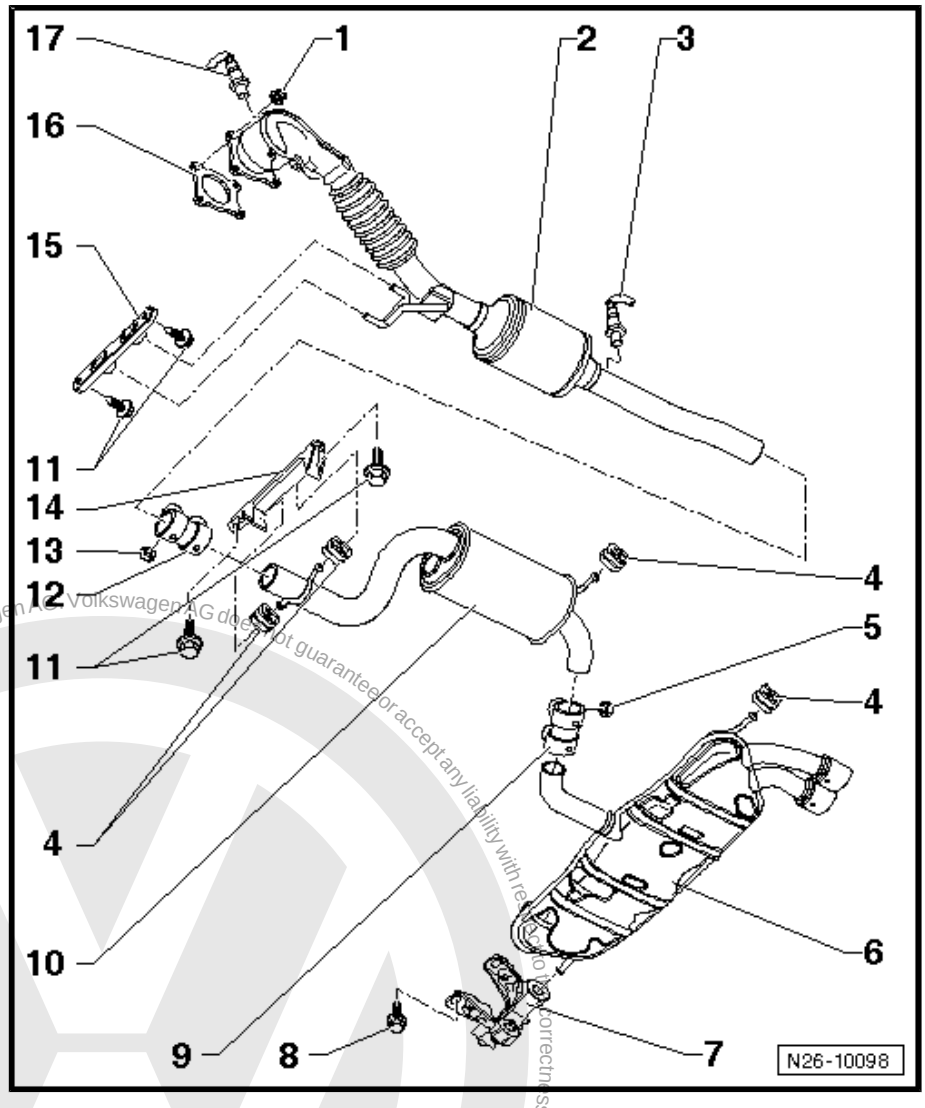
- ❑ Renew if damaged

16 - Seal

- ❑ Renew

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2.2 Assembly overview - exhaust system (Golf 2004 ►, Eos, Scirocco, engine codes CCTA, CCZA, CCZB)



1 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

2 - Front exhaust pipe with catalytic converters

> **Caution**
>
> *Risk of damage to decoupling element.*
> *Do not allow the decoupling element to kink by more than 10°.*
>
> *Install decoupling element so that it is not under tension.*
>
> *Do not damage wire mesh on decoupling element.*

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 533
- ❑ Aligning exhaust system free of tension ⇒ page 531 .

3 - Lambda probe after catalytic converter - G130-

- ❑ Bank 1, probe 2
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

4 - Retaining loop

- ❑ Renew if damaged

5 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

6 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

7 - Mounting

- ❑ Renew if damaged

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8 - 25 Nm

9 - Rear clamp

- ❑ For separate replacement of centre and rear silencers
- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

10 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

11 - 25 Nm

12 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

13 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

14 - Mounting

- ❑ For centre silencer

15 - Mounting

- ❑ Renew if damaged

16 - Seal

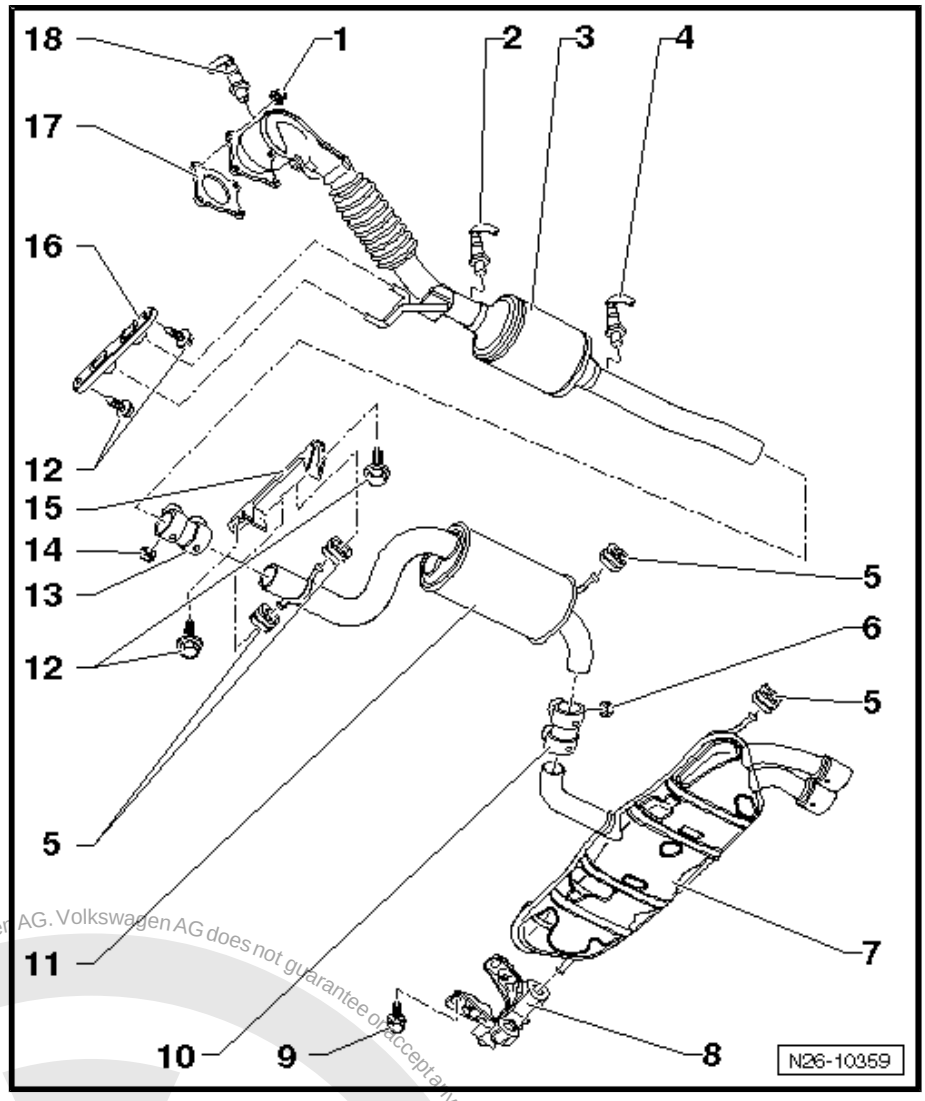
- ❑ Renew

17 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

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2.3 Assembly overview - exhaust system (engine code CBFA)



1 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

2 - Lambda probe 2 - G108-

- ❑ Bank 1, probe 2
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

3 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.
Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 533
- ❑ Aligning exhaust system free of tension ⇒ page 531 .

4 - Lambda probe after catalytic converter - G130-

- ❑ Bank 1, probe 3
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

5 - Retaining loop

- ❑ Renew if damaged

6 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

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7 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

8 - Mounting

- ❑ Renew if damaged

9 - 25 Nm

10 - Rear clamp

- ❑ For separate replacement of centre and rear silencers
- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

11 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

12 - 25 Nm

13 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

14 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

15 - Mounting

- ❑ For centre silencer

16 - Mounting

- ❑ Renew if damaged

17 - Seal

- ❑ Renew

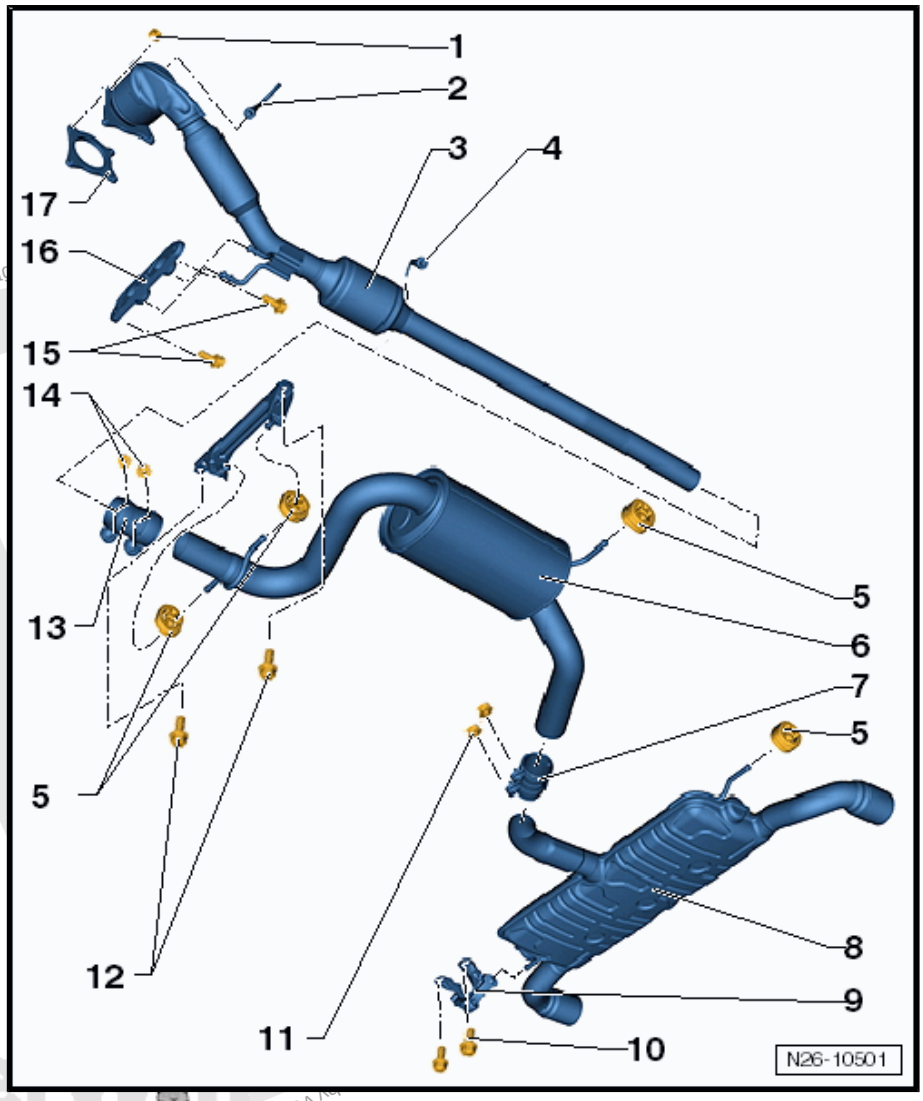
18 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

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2.4 Assembly overview - exhaust system (Golf 2009►, engine codes CCZA, CCZB)



1 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

2 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

3 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.
Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 533
- ❑ Aligning exhaust system free of tension ⇒ page 531 .

4 - Lambda probe after catalytic converter - G130-

- ❑ Bank 1, probe 2
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

5 - Retaining loop

- ❑ Renew if damaged

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6 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

7 - Rear clamp

- ❑ For separate replacement of centre and rear silencers
- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

8 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

9 - Mounting

- ❑ Renew if damaged

10 - Securing bolts

- ❑ 25 Nm

11 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

12 - 25 Nm

13 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

14 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

15 - Securing bolts

- ❑ 25 Nm

16 - Mounting

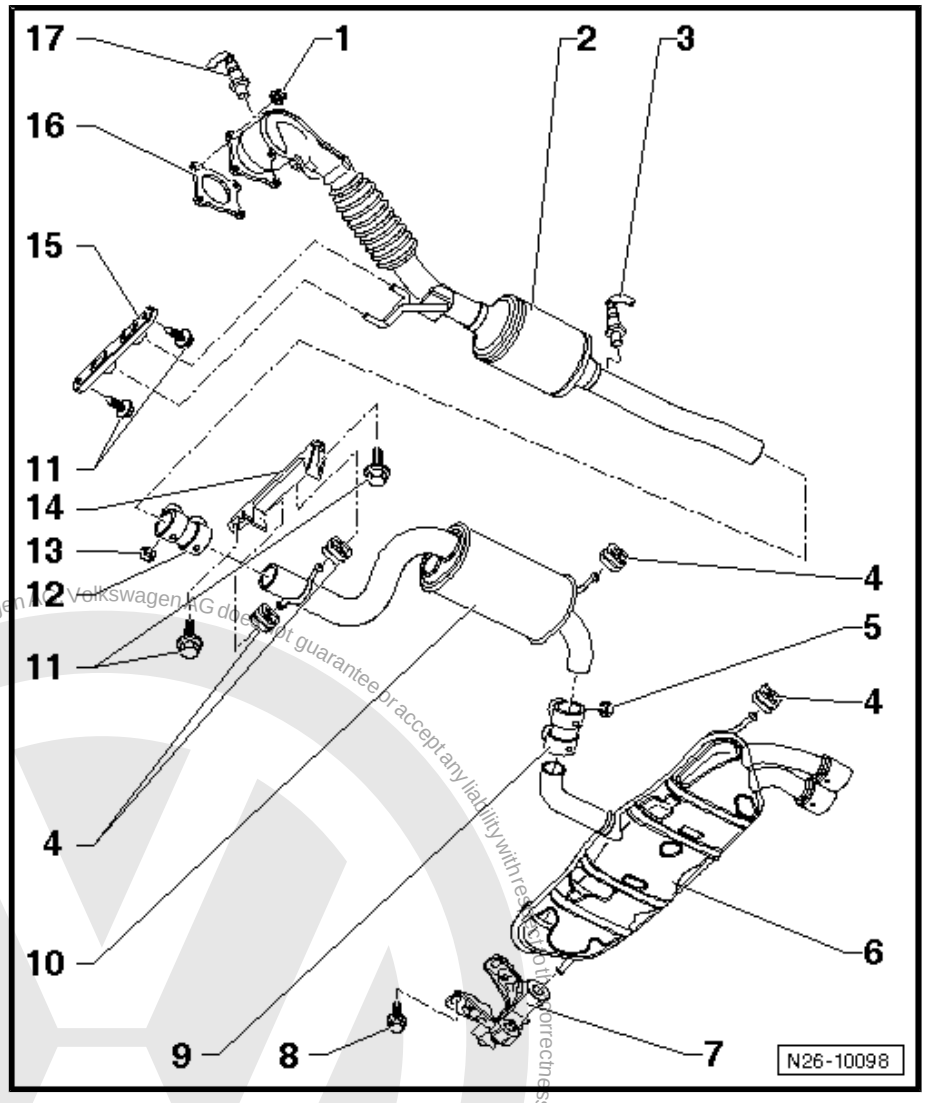
- ❑ Renew if damaged

17 - Seal

- ❑ Renew

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2.5 Assembly overview - exhaust system (Golf 2009 ►, engine codes CCTA, CDAA)



1 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

2 - Front exhaust pipe with catalytic converters

> **Caution**
>
> *Risk of damage to decoupling element.*
> *Do not allow the decoupling element to kink by more than 10°.*
>
> *Install decoupling element so that it is not under tension.*
>
> *Do not damage wire mesh on decoupling element.*

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 533
- ❑ Aligning exhaust system free of tension ⇒ page 531 .

3 - Lambda probe after catalytic converter - G130-

- ❑ Bank 1, probe 2
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

4 - Retaining loop

- ❑ Renew if damaged

5 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

6 - Rear silencer

- ❑ In initial equipment, component with centre silencer. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

7 - Mounting

- ❑ Renew if damaged

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8 - 25 Nm

9 - Rear clamp

- ❑ For separate replacement of centre and rear silencers
- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

10 - Centre silencer

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Separate exhaust system ⇒ page 530

11 - 25 Nm

12 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

13 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 532

14 - Mounting

- ❑ For centre silencer

15 - Mounting

- ❑ Renew if damaged

16 - Seal

- ❑ Renew

17 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

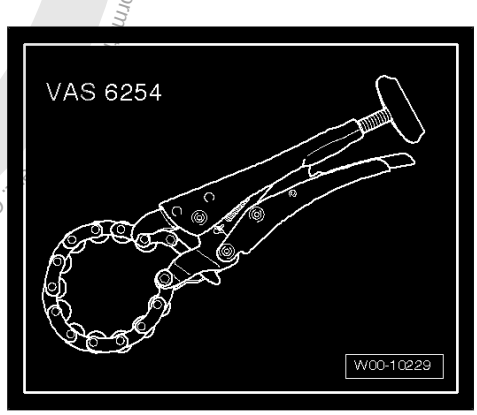
2.6 Separating centre and rear silencers

Note

- ♦ *The connecting pipe can be cut through at the cutting location in order to renew the centre and rear silencers separately.*
- ♦ *The separating point is marked with indentations on the outside of the exhaust pipe.*

Special tools and workshop equipment required

- ♦ Chain-type pipe cutter - VAS 6254-



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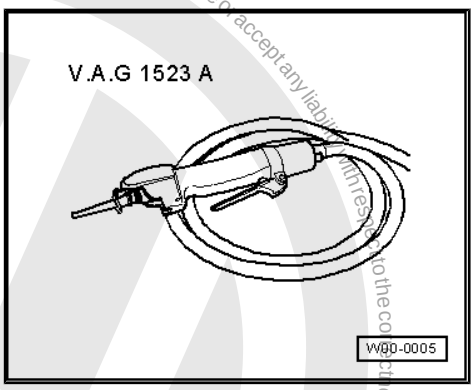
Or

- Pneumatic sabre saw - V.A.G 1523A-

Procedure:

WARNING

To avoid injury from metal shavings, wear eye protection and protective clothing.



– Cut through exhaust pipe at cutting point -arrow 2- using chain-type pipe cutter - VAS 6254- or pneumatic sabre saw - V.A.G 1523A- .

– Centre clamp -4- on side marks when installing, arrows -1- and -3-.



– Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.

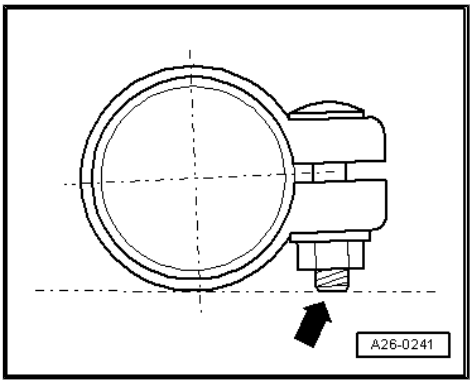
• Threaded connection faces to rear.

Specified torque:

Clamp with 2 individual clips: 25 Nm

Clamp with continuous clip: 35 Nm

– Align exhaust system free of stress ⇒ page 531 .



2.7 Aligning exhaust system free of stress

• The exhaust system must be aligned when cold.

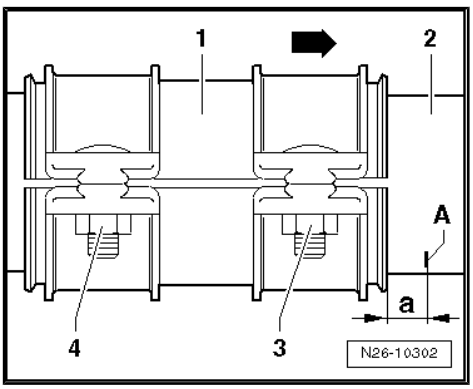
– Loosen bolts -3 and 4- on front clamp -1-.

– Align front clamp -1- to marking -A- on front exhaust pipe -2- (-arrow- points forwards).

• Dimension -a- = ⇒ page 532

• The bolts must be on the right and the ends of the bolts must not protrude beyond the lower edge of the clamp.

– Tighten front clamp bolts -3- hand-tight.

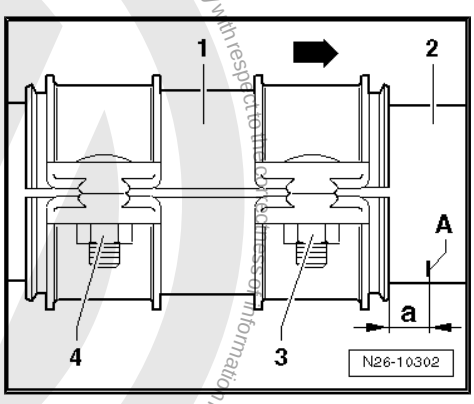


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– Push exhaust system forward until preload on rubber mounting for rear silencer is dimension -a- 15…17 mm.



– In this position, tighten bolts -3 and 4- of front clamp evenly. Torque setting ⇒ page 532 .



2.8 Installation position and specified torque of clamp

Note

Gradual introduction of clamp with continuous clip.

Specified torque and installation dimensions of clamp

Clamp -A- with 2 individual clips.

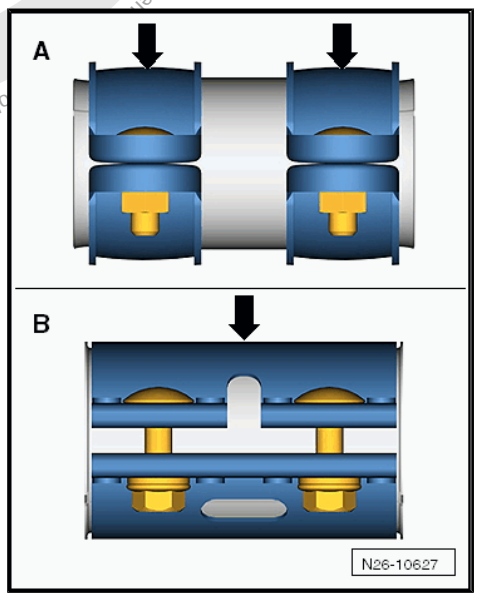
Specified torque: 25 Nm

Installation dimensions -a- 5 mm (only for front clamp)

Clamp -B- with continuous clip.

Specified torque: 35 Nm

Installation dimensions -a- 8.5 mm (only for front clamp)



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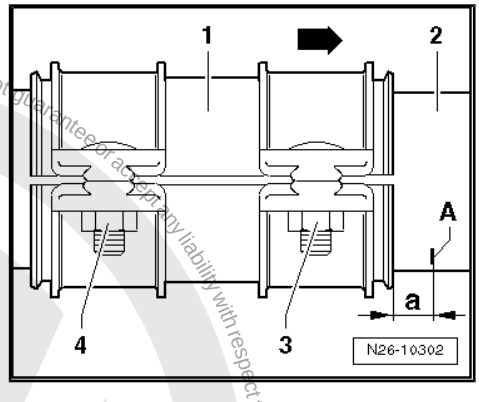
Installation dimension -a- for vehicles with marking on front exhaust pipe

1 - Clamping sleeve

2 - Front exhaust pipe

a - Installation dimension

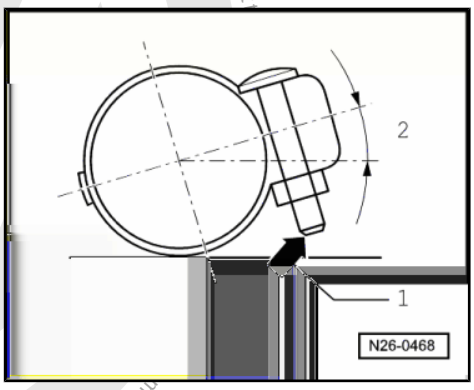
A - Marking



Installation position of front clamp

– Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.

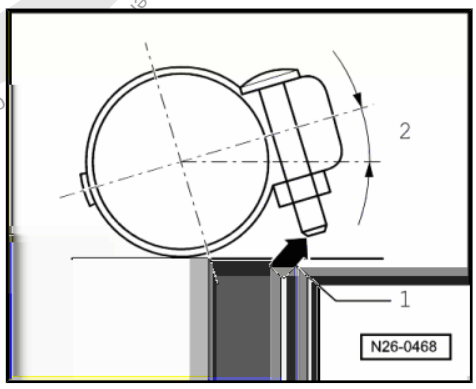
• Threaded connection faces right



Installation position of rear clamp

– Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.

• Threaded connection faces to rear.

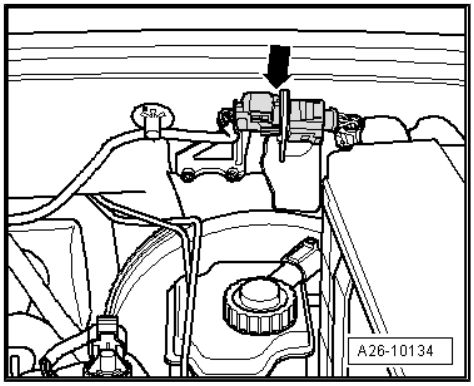


2.9 Removing and installing catalytic converters with front exhaust pipe

Removing:

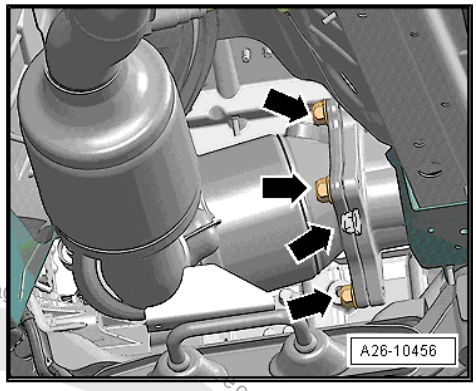
– Remove air filter ⇒ page 459 .

– Disconnect connector for Lambda probe - G39- -arrow- and lay cable to side.

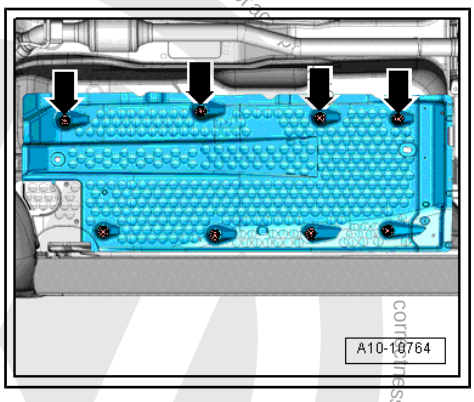


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– Remove nuts (accessible from above) -arrows- securing front exhaust pipe to turbocharger.
– Unscrew nuts (accessible from below) securing front exhaust pipe to turbocharger.

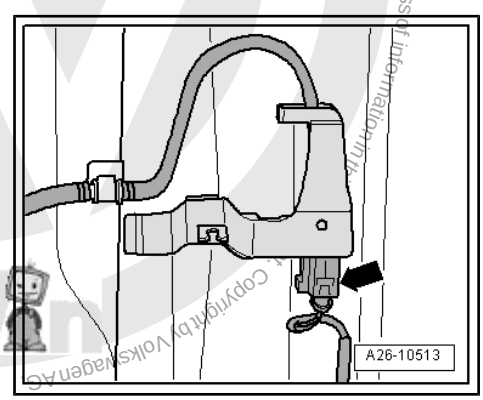


– Unscrew nuts -arrows- and pull underbody cover down slightly.



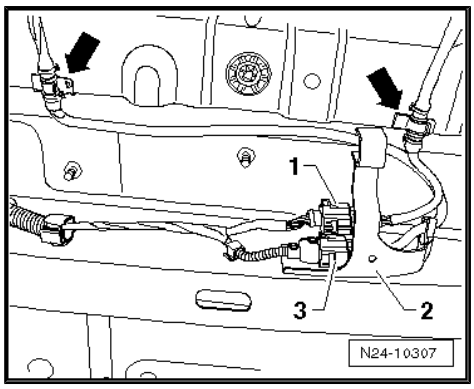
Engine codes BZB, CAWA, CAWB, CCTA, CCTB, CGYA, CCZA, CCZB, CDAA:

– Separate electrical connection -arrow- on right of underbody.
– Remove electrical connector from bracket and lay electrical line to Lambda probe to side.



Engine code CBFA:

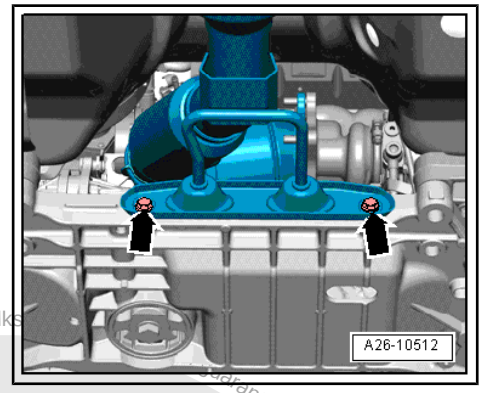
– Unclip lines -arrows-, pull off retainer -2- and separate connectors -1 and 3-.



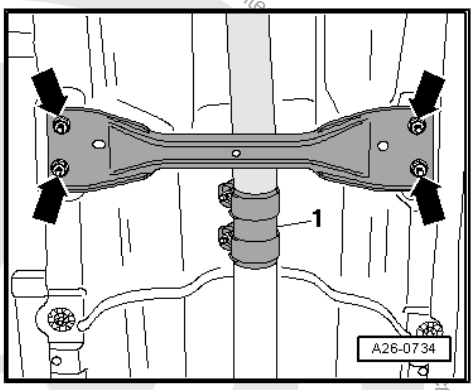
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All:

– Unbolt bracket for exhaust system -arrows-.



– Remove cross member for underbody -arrows-.



Caution

Danger of damage to the de-coupling elements.

- *Do not bend de-coupling elements in front exhaust pipe by more than 10°.*

– Loosen clamp -1- and push towards rear.

– Remove catalytic converters with front exhaust pipe.

Installing:

Install in the reverse order of removal, observing the following:

- Coat studs of turbocharger with high-temperature paste - G 052 112 A3- .
- Renew seals, gaskets and self-locking nuts.
- Align exhaust system free of stress ⇒ page 531 .

Torque settings

⇒ “2.1 Assembly overview - exhaust system (engine code CAWB)”, page 520

⇒ “2.2 Assembly overview - exhaust system (Golf 2004 ➤, Eos, Scirocco, engine codes CCTA, CCZA, CCZB)”, page 523

⇒ “2.3 Assembly overview - exhaust system (engine code CBFA)”, page 525

⇒ “2.4 Assembly overview - exhaust system (Golf 2009➤, engine codes CCZA, CCZB)”, page 527

⇒ “2.5 Assembly overview - exhaust system (Golf 2009 ➤, engine codes CCTA, CDAA)”, page 529

Component	Nm
Tunnel cross-piece to body	25

2.10 Check exhaust system for leaks

Proceed as follows:

– Start engine and allow to idle.

– Seal exhaust tailpipe briefly (e.g. hold cloth over end).

– Check for leaks and listen for noise at connecting points (cylinder head/exhaust manifold, exhaust manifold/front exhaust pipe, etc.) with the assistance of a 2nd mechanic.

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– Repair any leaks found.

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3 Exhaust system (Tiguan)

Note

- *The flexible joint in the front exhaust pipe must not be bent more than 10° since otherwise it can be damaged.*
- *Renew seals, gaskets and self-locking nuts.*
- *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 clamp and align silencers and exhaust pipe so that sufficient clearance is maintained to the bodywork at all points and the mountings are evenly loaded.*
- *The exhaust manifold and the turbocharger are one component, removing and installing ⇒ page 424 .*

Assembly overview – exhaust system (engine codes CCTA, CCTB, CCZA, CCZB, CCZC, CCZD) ⇒ page 537 .

Assembly overview - exhaust system (engine codes CAWB, CCZA) ⇒ page 540 .

Separating centre and rear silencers ⇒ page 541 .

Align exhaust system free of stress ⇒ page 542 .

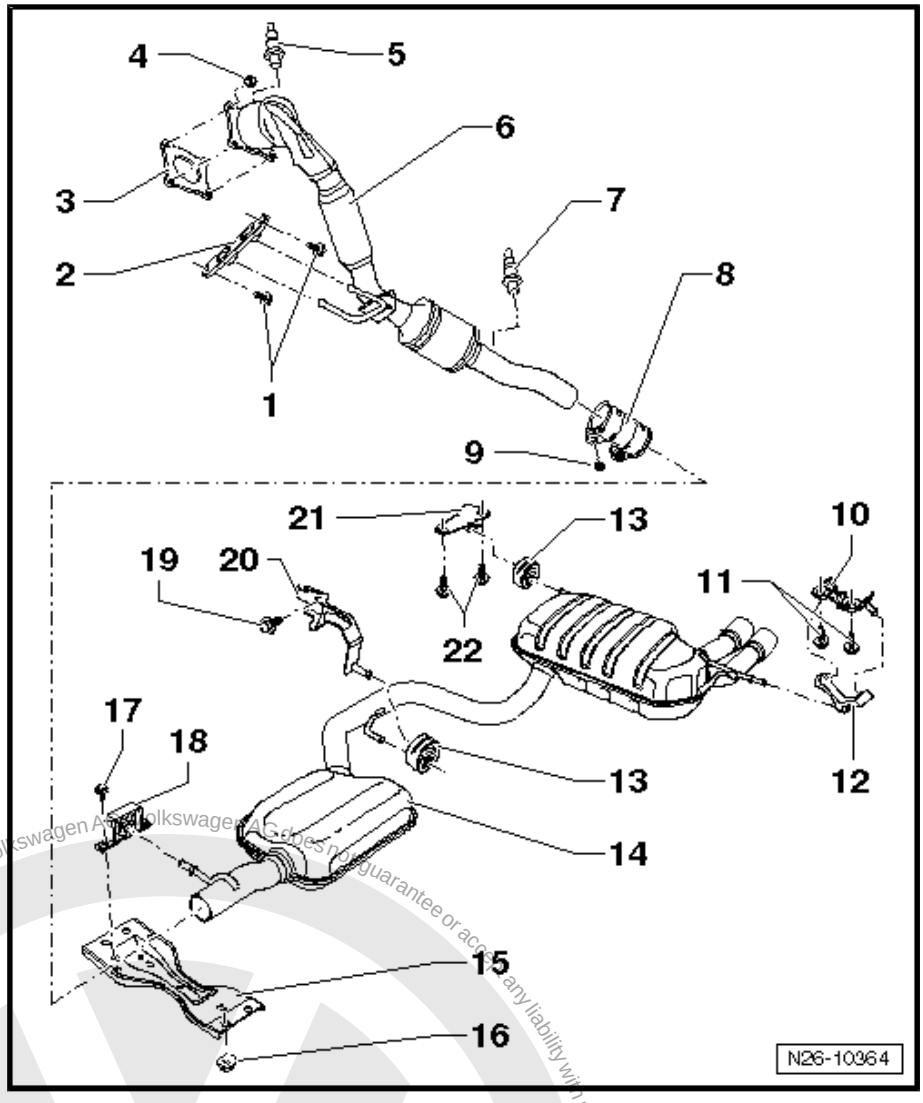
Removing and installing catalytic converters with front exhaust pipe ⇒ page 543 .

Installation position and specified torque of clamp ⇒ page 547 .

Checking exhaust system for leaks ⇒ page 548 .

3.1 Assembly overview – exhaust system (engine codes CCTA, CCTB, CCZA, CCZB, CCZC, CCZD)

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1 - 25 Nm

2 - Mounting

- ❑ Renew if damaged

3 - Seal

- ❑ Renew

4 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

5 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

6 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.

Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 543
- ❑ Aligning exhaust system free of tension ⇒ page 542 .

7 - Lambda probe after catalytic converter - G130-

- ❑ Bank 1, probe 2
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

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8 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 547

9 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 547

10 - Holder

11 - 25 Nm

12 - Mounting

13 - Mounting

14 - Exhaust pipe with centre and rear silencers

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Aligning exhaust system free of stress

15 - Tunnel cross-piece

16 - 25 Nm

17 - 25 Nm

18 - Mounting

19 - 20 Nm

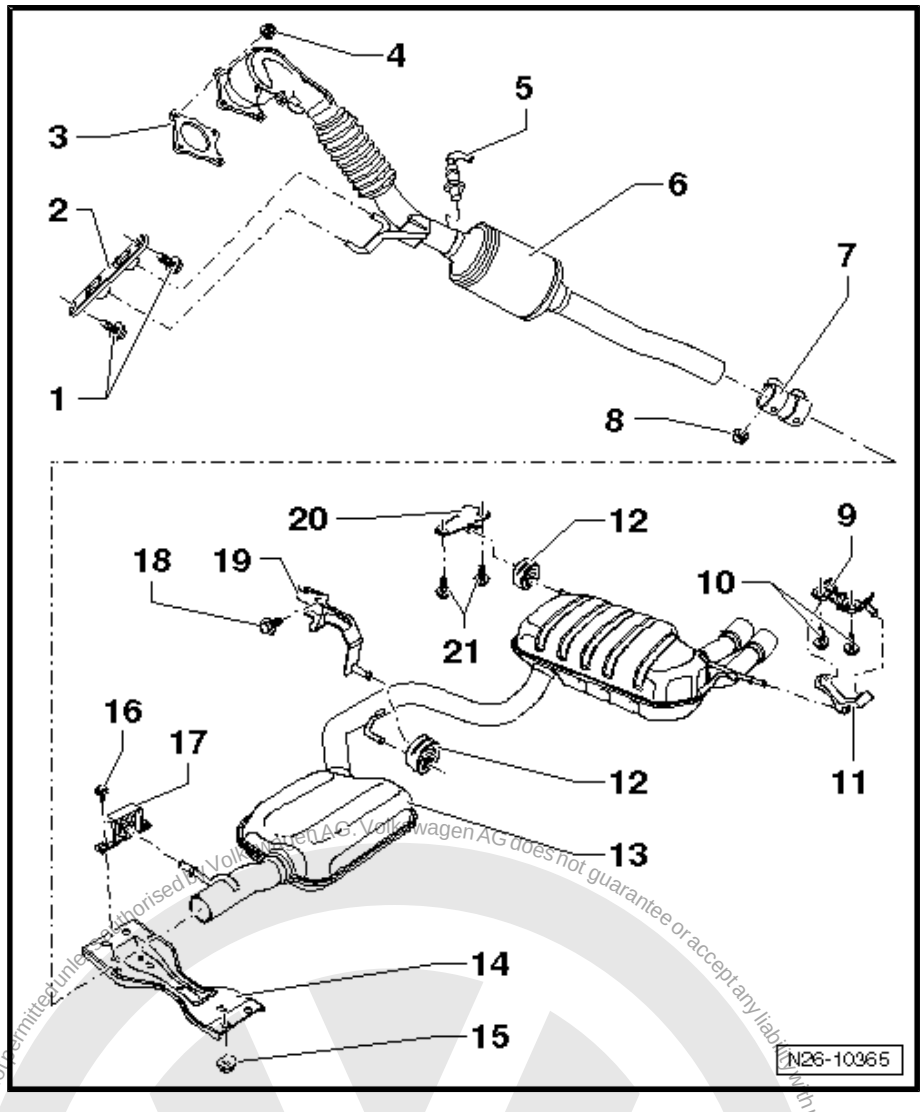
20 - Holder

21 - Holder

22 - 25 Nm

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3.2 Assembly overview - exhaust system (engine codes CAWB, CCZA)



1 - 25 Nm

2 - Mounting

- ❑ Renew if damaged

3 - Seal

- ❑ Renew

4 - 40 Nm

- ❑ Renew
- ❑ Coat studs of exhaust manifold with high-temperature paste.
- ❑ High-temperature paste - G 052 112 A3-

5 - Lambda probe - G39-

- ❑ Bank 1, probe 1
- ❑ 55 Nm
- ❑ The thread on new Lambda probes is coated with high-temperature paste.
- ❑ When re-using the old Lambda probe, coat only the thread with high-temperature paste; the paste must not get into the slots of the probe body.
- ❑ High-temperature paste - G 052 112 A3-

6 - Front exhaust pipe with catalytic converters

Caution

Risk of damage to decoupling element.
Do not allow the decoupling element to kink by more than 10°.

Install decoupling element so that it is not under tension.

Do not damage wire mesh on decoupling element.

- ❑ Protect catalytic converter from damage by knocks and impact
- ❑ Removing and installing ⇒ page 543
- ❑ Aligning exhaust system free of tension ⇒ page 542 .

7 - Front clamp

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 547

8 - Nut

- ❑ Tighten bolted connections evenly. Specified torque and installation position ⇒ page 547

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9 - Holder

10 - 25 Nm

11 - Mounting

12 - Mounting

13 - Exhaust pipe with centre and rear silencers

- ❑ Combined in one unit with rear silencer as original equipment. Can be renewed individually for repair purposes.
- ❑ Aligning exhaust system free of stress

14 - Tunnel cross-piece

15 - 25 Nm

16 - 25 Nm

17 - Mounting

18 - 20 Nm

19 - Holder

20 - Holder

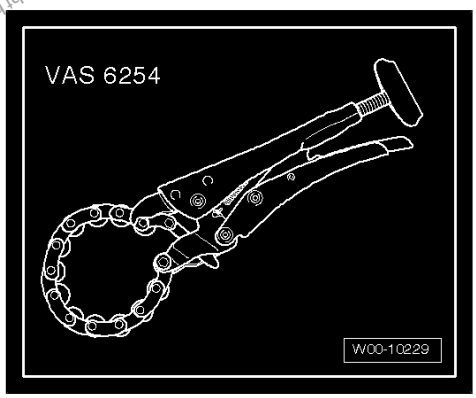
21 - 25 Nm

3.3 Separating centre and rear silencers

- The connecting pipe can be cut through at the cutting location in order to renew the centre and rear silencers separately.
- Cutting location is marked by an indentation on the circumference of exhaust pipe.

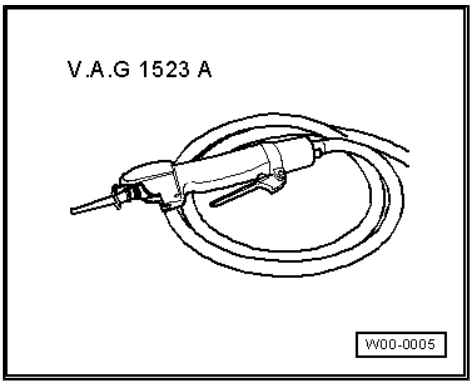
Special tools and workshop equipment required

- Chain-type pipe cutter - VAS 6254-



Or

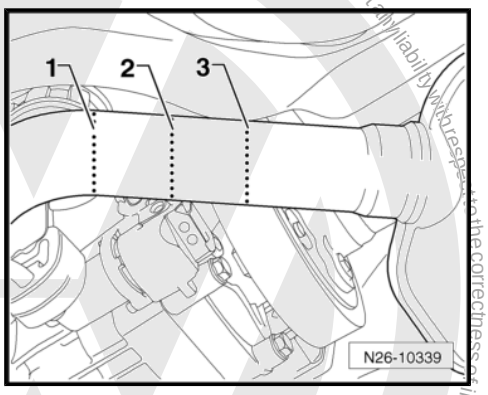
- Pneumatic sabre saw - V.A.G 1523A-



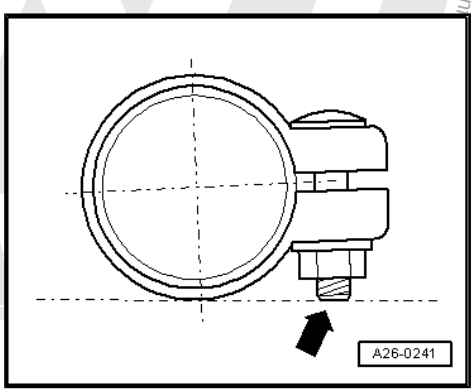
Sequence of operations

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– Cut through exhaust pipe at separating point -2- using chain-type pipe cutter - VAS 6254- or pneumatic sabre saw - V.A.G 1523A- .
– Position double clamp centrally at side marks -1- and -3- when installing.



– Install double clamp so that end of bolt -arrow- does not extend beyond lower edge of double clamp.
• Threaded connection faces to rear.



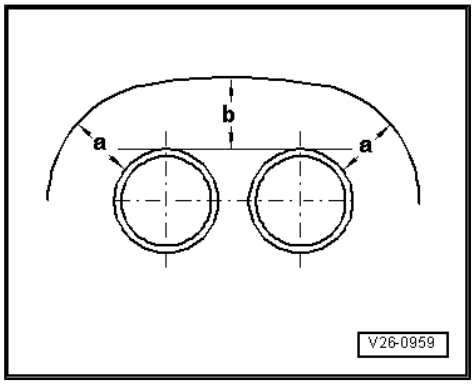
Align rear silencer.

– Align rear silencer so that dimensions -a- are identical.

Specified torque:

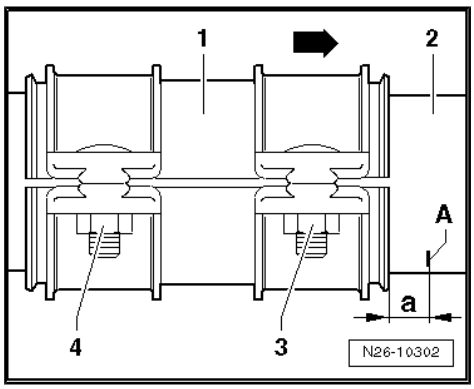
Clamp with 2 individual clips: 25 Nm

Clamp with continuous clip: 35 Nm



3.4 Aligning exhaust system free of stress

• The exhaust system must be aligned when cold.
– Loosen bolts -3 and 4- on front clamp -1-.
– Align front clamp -1- to marking -A- on front exhaust pipe -2- (-arrow- points forwards).
• Dimension -a- = ⇒ page 547
• The bolts must be on the right and the ends of the bolts must not protrude beyond the lower edge of the clamp.
– Tighten front clamp bolts -3- hand-tight.

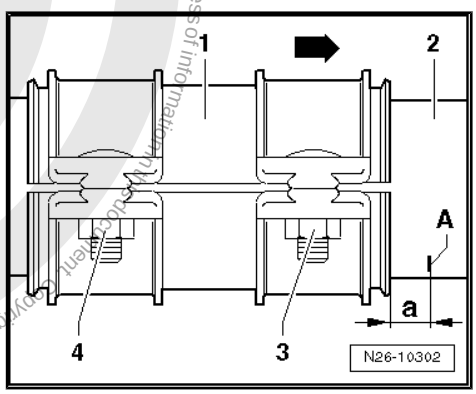


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– Push exhaust system forward until preload on rubber mounting for rear silencer is dimension -a- 15…17 mm.



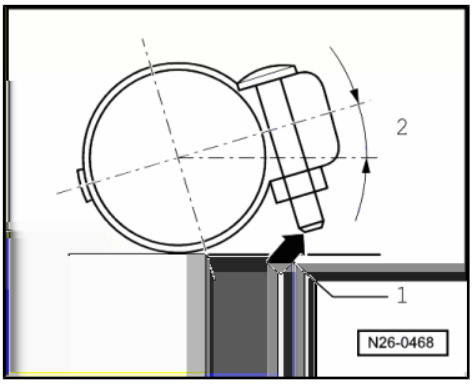
– In this position, tighten bolts -3 and 4- of front clamp evenly. Torque setting ⇒ page 547 .



Installation position of clamps

– Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.

• Threaded connection faces right



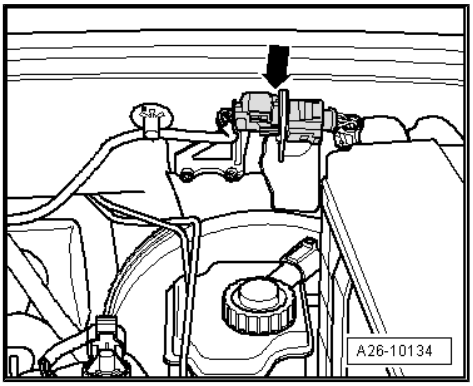
3.5 Removing and installing catalytic converters with front exhaust pipe

Removing:

– Remove air filter ⇒ page 459 .

Engine codes CCTA, CCTB, CCZA, CCZB, CCZC, CCZD:

– Disconnect connector for Lambda probe - G39- -arrow- and lay cable to side.

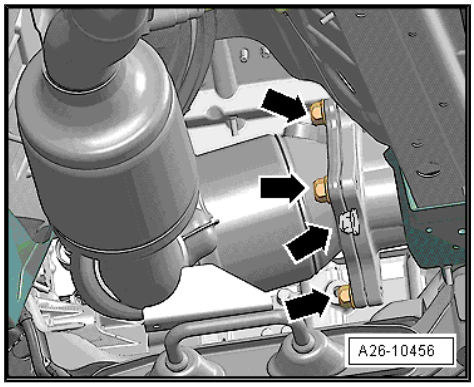


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All:

– Unscrew nuts (accessible from above) -arrows- securing front exhaust pipe to turbocharger.

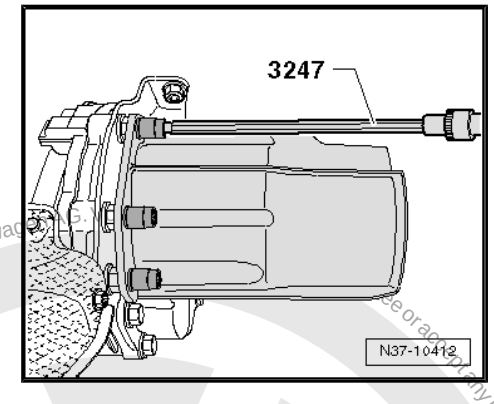
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .



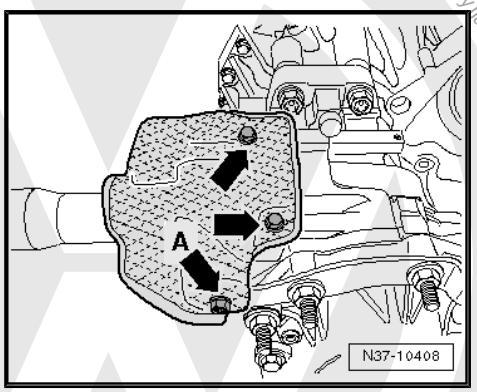
All-wheel drive:

– Move selector lever to »N« position so that the propshaft can be turned later to be loosened.

– If present, remove heat shield above right drive shaft.

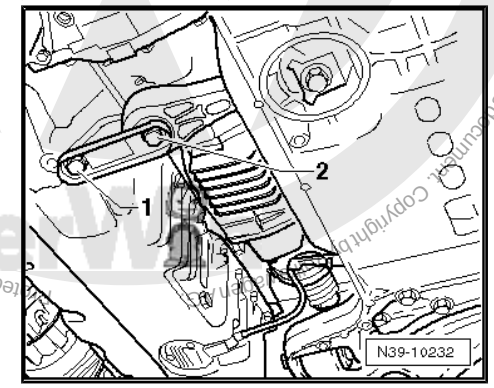


– Remove flexible coupling guard plate -arrows-.



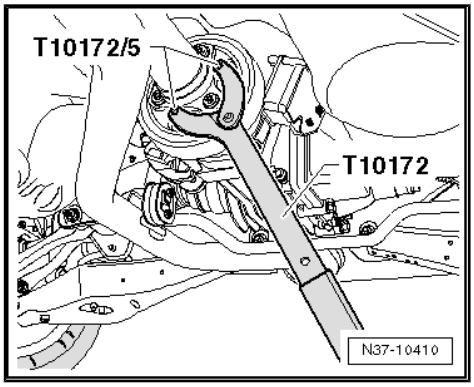
– Remove bolts -1- and -2- for pendulum support.

– Mark position of propshaft with flexible coupling relative to output shaft of bevel box.



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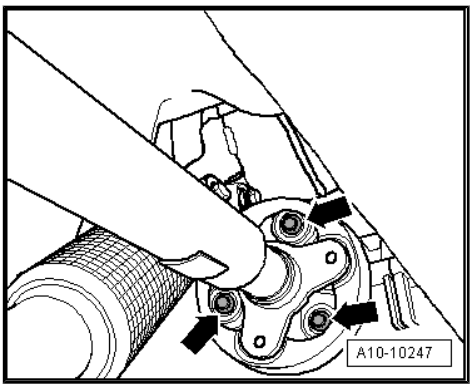
– Counterhold at rear final drive when loosening or tightening propshaft.



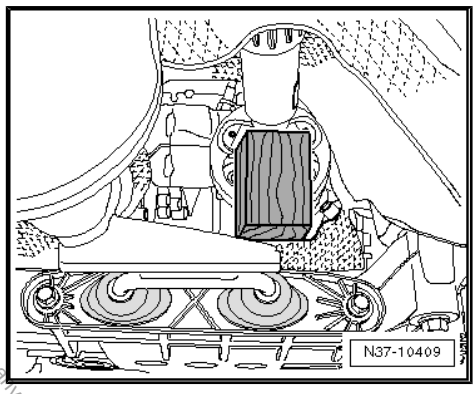
Note

To loosen »next« bolt, turn propshaft further by turning front wheels at same time.

– Unbolt propshaft -arrows- and pull off from bevel box.

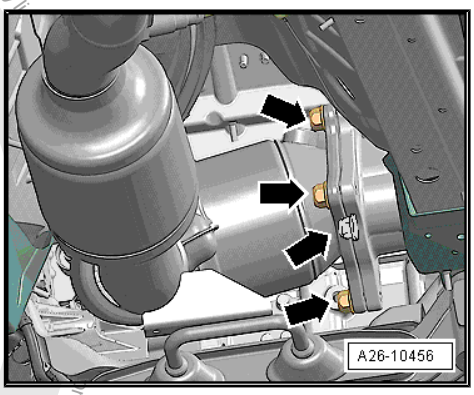


– Guide propshaft upwards into the tunnel and use a suitable piece of wood to support it on steering rack guard plate.



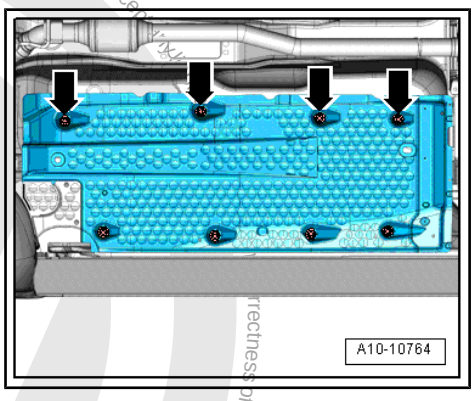
All:

– Unscrew nuts (accessible from below) securing front exhaust pipe to turbocharger.

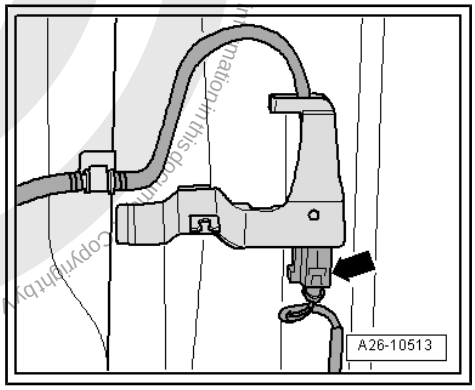


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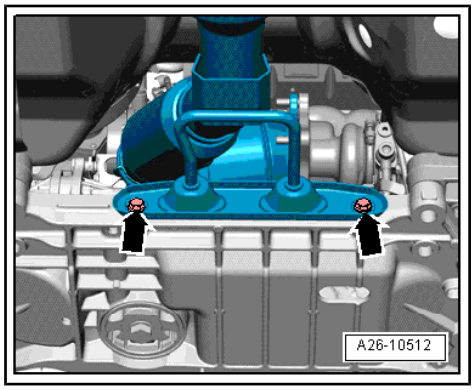
– Unscrew nuts -arrows- and pull underbody cover down slightly.



– Separate electrical connection -arrow- on right of underbody.
– Remove electrical connector from bracket and lay electrical line to Lambda probe to side.

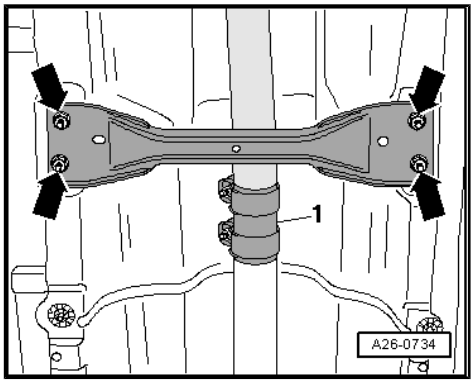


– Unbolt bracket for exhaust system -arrows-.



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– Remove cross member for underbody -arrows-.



Caution

Danger of damage to the de-coupling elements.

- *Do not bend de-coupling elements in front exhaust pipe by more than 10°.*

– Loosen clamp -1- and push towards rear.

– Remove catalytic converters with front exhaust pipe.

Installing:

Install in the reverse order of removal, observing the following:

- Coat studs of turbocharger with high-temperature paste - G 052 112 A3- .
- Renew seals, gaskets and self-locking nuts.
- Align exhaust system free of stress ⇒ page 542 .
- Install propshaft, Tiguan with all-wheel drive ⇒ Propshaft and rear final drive; Rep. gr. 39 ; Propshaft, Tiguan 2008 ► .

Torque settings

⇒ "3.1 Assembly overview – exhaust system (engine codes CCTA, CCTB, CCZA, CCZB, CCZC, CCZD)", page 537

⇒ "3.2 Assembly overview - exhaust system (engine codes CAWB, CCZA)", page 540

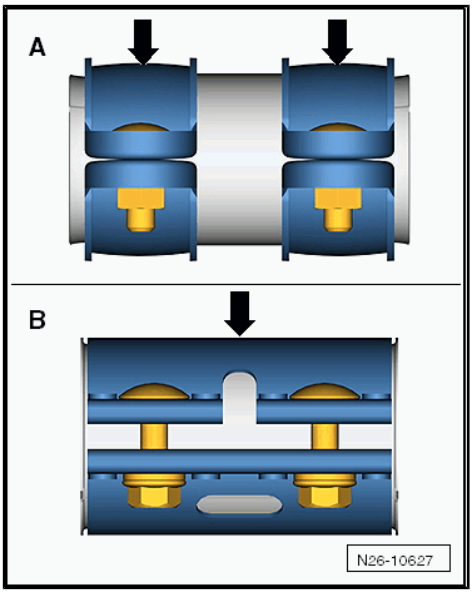
Tiguan with all-wheel drive ⇒ Propshaft and rear final drive; Rep. gr. 39 ; Propshaft, Tiguan 2008 ►

Component	Nm
Tunnel cross-piece to body	25

3.6 Installation position and specified torque of clamp

Note

Gradual introduction of clamp with continuous clip.



Specified torque and installation dimensions of clamp

Clamp -A- with 2 individual clips.

Specified torque: 25 Nm

Installation dimensions -a- 5 mm (only for front clamp)

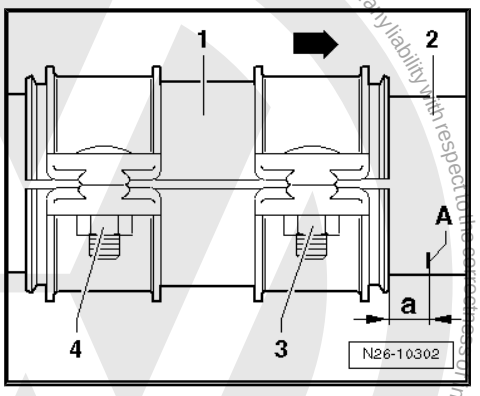
Clamp -B- with continuous clip.

Specified torque: 35 Nm

Installation dimensions -a- 8.5 mm (only for front clamp)

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Installation dimension -a- for vehicles with marking on front exhaust pipe



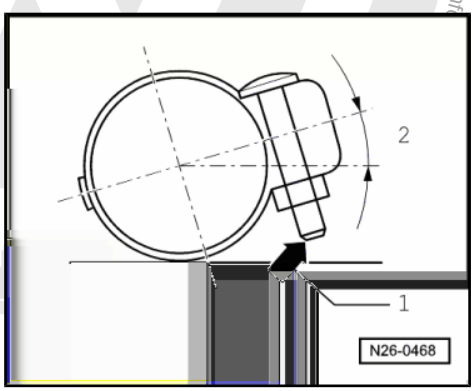
1 - Clamping sleeve

2 - Front exhaust pipe

a - Installation dimension

A - Marking

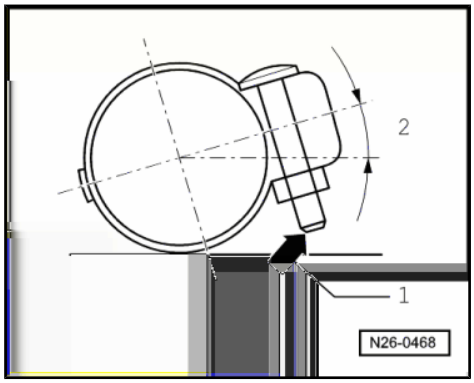
Installation position of front clamp



– Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.

• Threaded connection faces right

Installation position of rear clamp



– Install clamp so that end of bolt -arrow- does not extend beyond lower edge of clamp.

• Threaded connection faces to rear.

3.7 Check exhaust system for leaks

Proceed as follows:

– Start engine and allow to idle.

– Seal exhaust tailpipe briefly (e.g. hold cloth over end).

– Check for leaks and listen for noise at connecting points (cylinder head/exhaust manifold, exhaust manifold/front exhaust pipe, etc.) with the assistance of a 2nd mechanic.

– Repair any leaks found.

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4 Secondary air system - engine code CBFA

Assembly overview - secondary air system ⇒ page 549 .

Removing and installing secondary air pump motor - V101- ⇒ page 549 .

Removing and installing secondary air inlet valve - N112- ⇒ page 550 .

4.1 Assembly overview - secondary air system

1 - Seal

- ❑ Renew

2 - Secondary air inlet valve - N112-

- ❑ Removing and installing ⇒ page 550

3 - 9 Nm

4 - Sender 1 for secondary air pressure - G609-

5 - Sealing ring

- ❑ Renew

6 - To air filter

7 - Secondary air lines

8 - Routing aid for drainage line from air filter

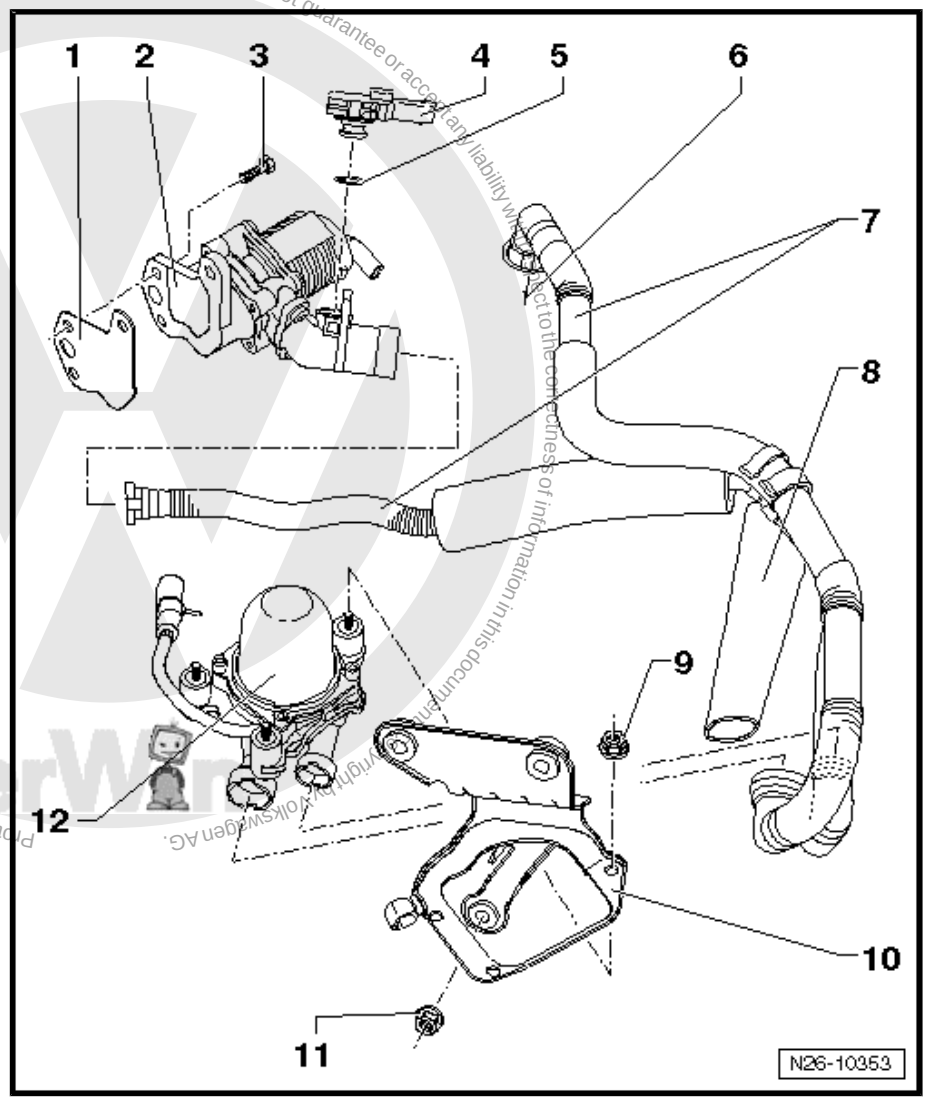
9 - 9 Nm

10 - Retainer for secondary air pump motor - V101-

11 - 25 Nm

12 - Secondary air pump motor - V101-

- ❑ Removing and installing ⇒ page 549



4.2 Removing and installing secondary air pump motor - V101-

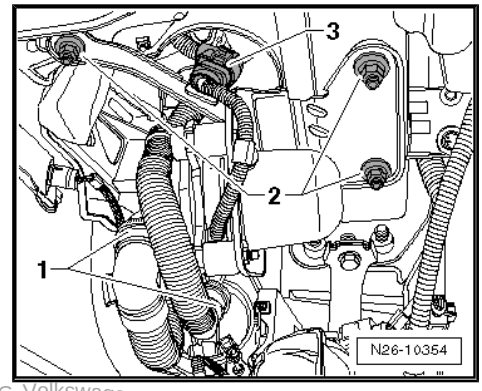
Removing:

– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .

– Remove front left wheel housing liner ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner .

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– Slacken lines -1-, slacken bolts -2-, separate connector -3- and remove secondary air pump motor - V101- .



Installing:

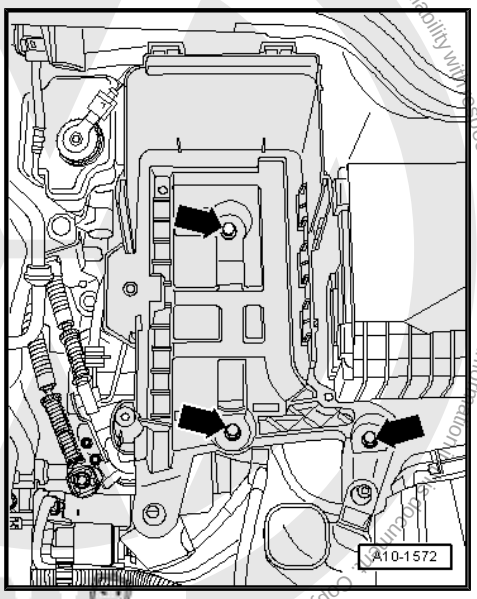
Install in reverse order of removal.

4.3 Removing and installing secondary air inlet valve - N112-

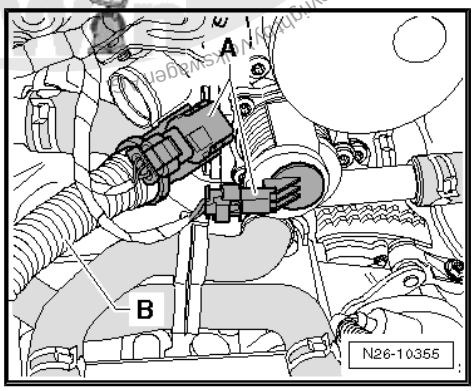
Removing:

– Remove air filter ⇒ page 459 .

– Remove battery and battery tray.

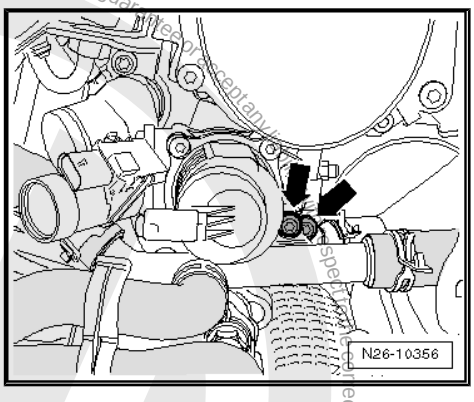


– Pull connector -A- and hose -B- from secondary air inlet valve - N112- .

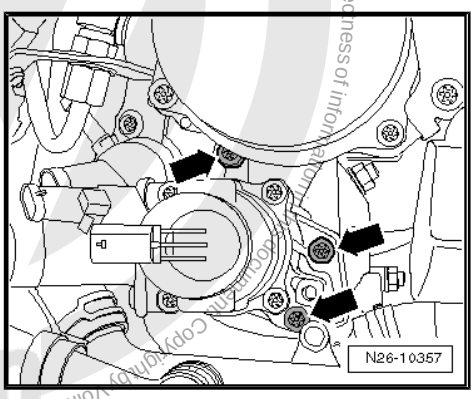


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– Loosen coolant pipe by unscrewing bolts -arrows-.



– Unscrew bolts -arrows- and remove secondary air inlet valve - N112- .



Installing:

Install in the reverse order of removal, observing the following:

– Renew seals.

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28 – Ignition system

1 Repairing ignition system

General notes on ignition system ⇒ page 552 .

Safety precautions ⇒ page 552 .

Assembly overview - ignition system ⇒ page 553 .

Removing and installing ignition coils with output stages ⇒ page 553 .

Spark plug test data ⇒ page 556 .

1.1 General notes on ignition system

- The battery must be disconnected only with ignition switched off. If a coded radio is installed, ascertain code before disconnecting battery.
- Observe required procedures after connecting battery ⇒ Electrical system; Rep. gr. 27 ; Disconnecting and reconnecting battery .
- For trouble-free operation of electrical components, a voltage of at least 11.5 V is necessary.
- After completing work, read event memory of engine control unit. Clear all events that may have been recorded while checks and repairs were carried out. If the event memory was cleared, the readiness code must be generated ⇒ Vehicle diagnostic tester “Guided Functions”.
- If, after fault finding, repairs or component tests, the engine starts, runs for a short period and then stops, then the fault may be that the immobilizer is blocking the engine control unit. In this case, the control unit must be adapted ⇒ Vehicle diagnostic tester “Guided Functions”.

1.2 Safety precautions

To prevent injuries to persons and/or damage to the injection and ignition system, the following must be observed:

- Do not touch or pull off ignition coils with output stage when engine is running or turning at starter speed.
- Switch off ignition before connecting or disconnecting injection and ignition system wiring as well as test instrument cables.
- If the engine has to be turned over at starting speed without it starting (e.g. compression test), first unplug the connectors from the ignition coils and the injectors. Read and delete event memory after completion of work.
- Always switch off ignition before cleaning engine.
- Disconnecting and connecting the battery must only be done with the ignition switched off, otherwise the engine control unit could be damaged.

Note the following if testers and measuring instruments have to be used during a road test:

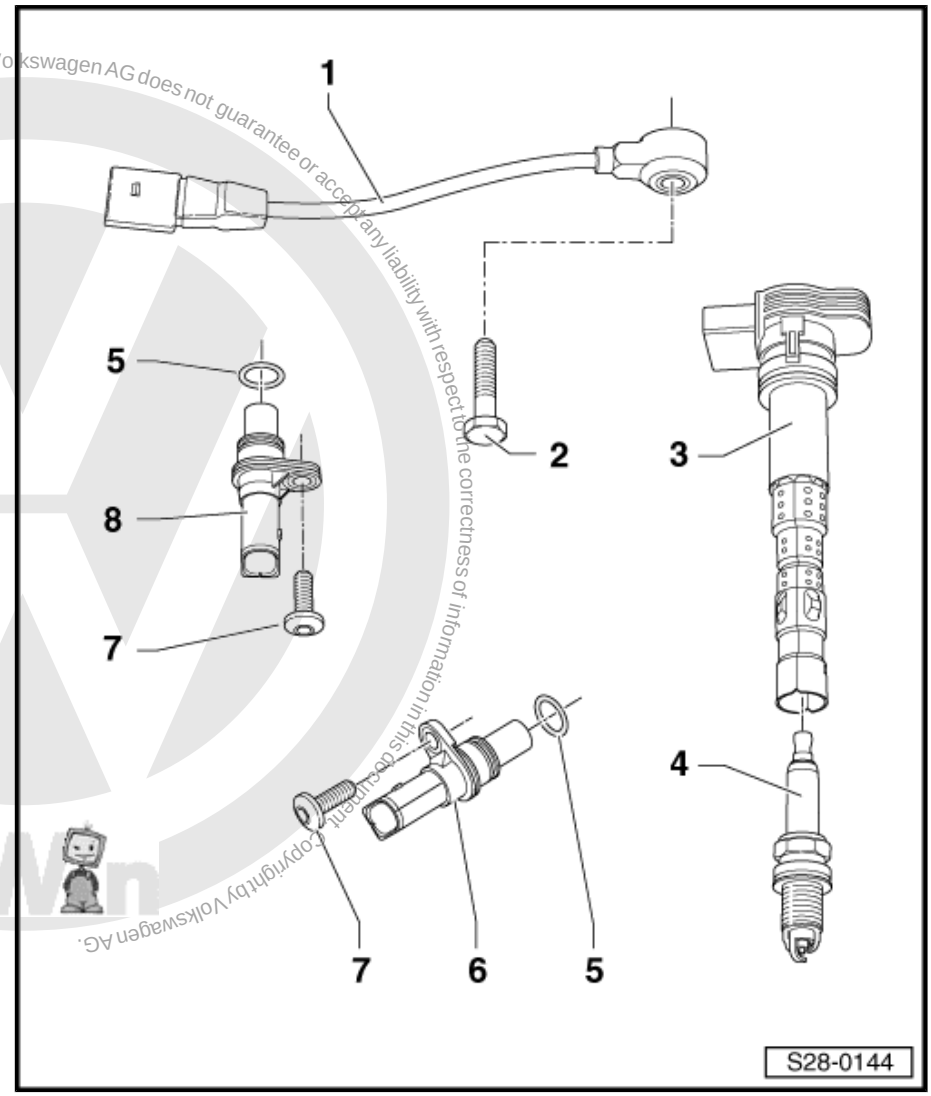
- Test instruments and measuring equipment must always be secured to the rear seat and operated by a second person from this location.

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

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

1.3 Assembly overview - ignition system



1 - Knock sensor 1 - G61-

- ❑ On front of cylinder head under intake manifold
- ❑ Removing and installing ⇒ page 555
- ❑ Gold-plated contacts

2 - 20 Nm

- ❑ The specified torque influences the function of the knock sensor.

3 - Ignition coil with output stage - (N70, N127, N291, N292)-

- ❑ Removing and installing ⇒ page 553

4 - Spark plug, 25 Nm

- ❑ Type and electrode gap ⇒ page 556 .
- ❑ Remove and install with spark plug socket and extension - 3122 B-

5 - O-ring

- ❑ Renew

6 - Engine speed sender - G28-

- ❑ At lower left of front cylinder block, next to coarse oil separator ⇒ page 456
- ❑ Removing and installing ⇒ page 555

7 - 10 Nm

8 - Hall sender - G40-

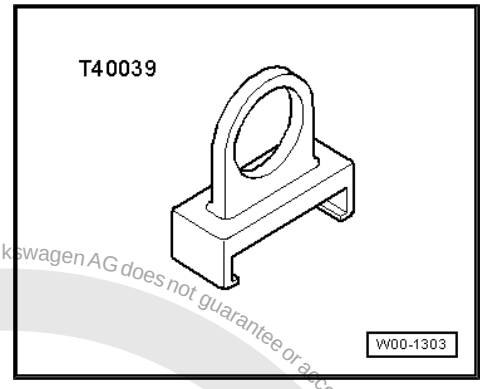
- ❑ In cylinder head cover at front.
- ❑ Gold-plated contacts

1.4 Removing and installing ignition coils with output stage

Special tools and workshop equipment required

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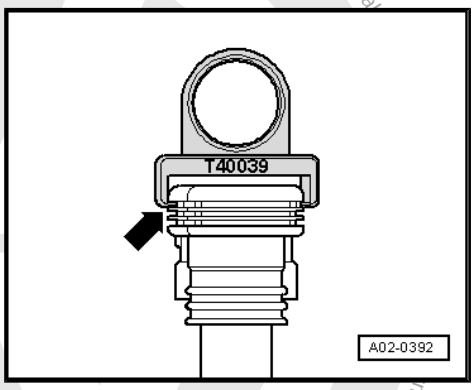
- Puller - T40039-



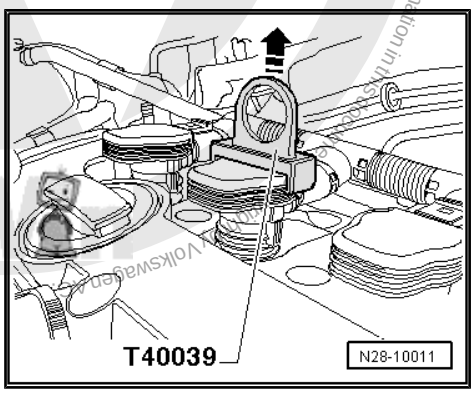
Removing ignition coils with output stages

Note

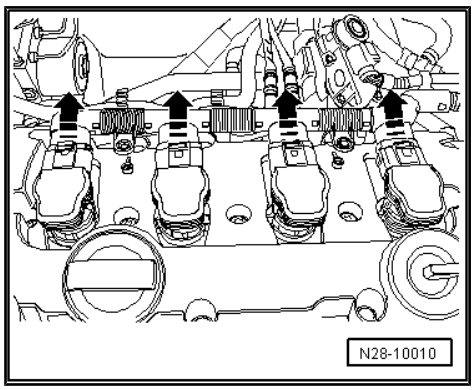
- *Observe all relevant safety precautions ⇒ page 552 .*
- *Assembly overview - ignition system ⇒ page 553 .*
- *To pull off spark plugs, fit puller - T40039- on top, thick rib -arrow- of ignition coils with final output stages.*
- *If the lower ribs are used, they could be damaged.*



– Pull all ignition coils about 30 mm out of spark plug recess using puller - T40039- .



– Release connectors and pull all connectors off ignition coils -arrows- at the same time.

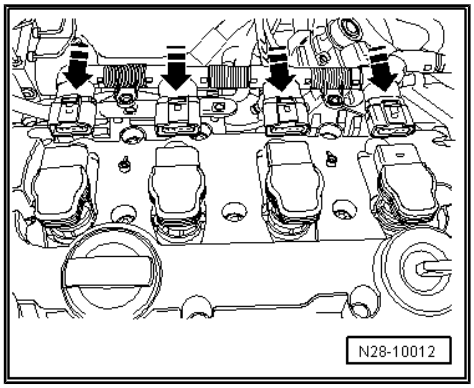


Installing ignition coils with output stages

– Fit all ignition coils loosely into spark plug holes.

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– Align the ignition coils with the connectors -arrows- and attach all connectors onto ignition coils simultaneously.
– Press ignition coils onto spark plugs by hand with uniform pressure.



1.5 Removing and installing knock sensor 1 - G61-

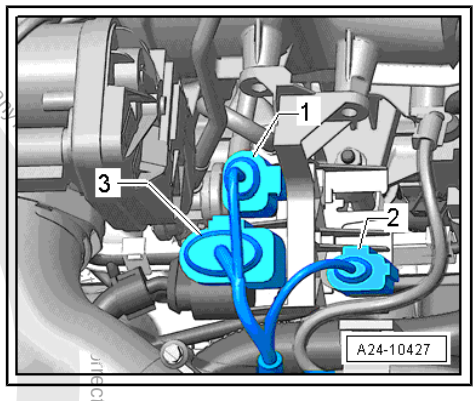
Removing

– Pull electrical connector -2- off knock sensor I - G61- .
– Remove coolant pump ⇒ page 245 .

Note

The knock sensor I - G61- is located under the intake manifold behind the coolant pump.

– Remove bolts of knock sensor I - G61- and remove it.



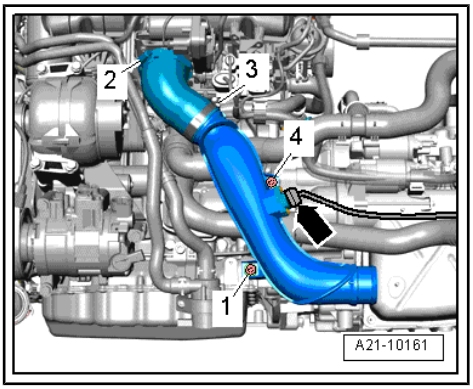
Installing

– Install in reverse order of removal.
• Torque setting ⇒ page 553 .

1.6 Removing and installing engine speed sender - G28-

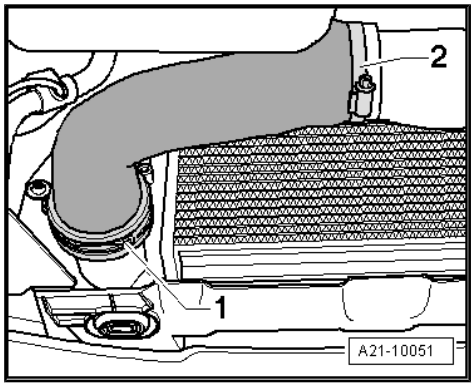
Removing

– Remove engine cover.
– Open hose clip -2- of air pipe.
– Disconnect electrical connector -arrow-.
– Remove noise insulation ⇒ General body repairs, exterior; Rep. gr. 50 ; Noise insulation .
– Undo and remove bolts -1 and 4- and pull air hose downwards off throttle valve module - J338- .

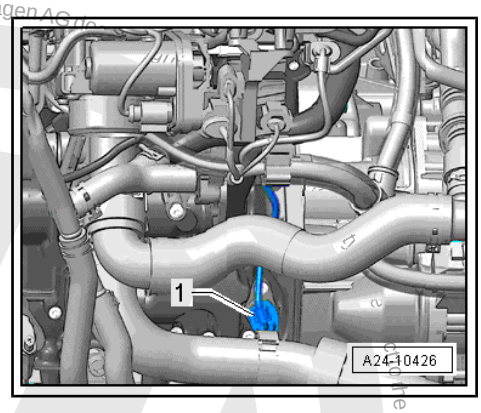


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– Pull air hose -1- off charge air cooler and take air pipe out downwards.



– Detach electrical connector -1- from engine speed sender - G28- .
– Undo and remove bolt securing engine speed sender - G28- .



Installing

Install in reverse order of removal, observing the following.

- Torque setting ⇒ Item 6 (page 553) .

1.7 Test data, spark plugs

Engine code	BZB, CAWA, CAWB, CBFA, CCTA, CCTB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB
Firing order	1-3-4-2
Spark plugs	
VW/Audi	For part numbers, see ⇒ Electronic parts catalogue (ETKA)
Electrode gap	0.8 mm
Torque setting	25 Nm
Change interval	⇒ Maintenance ; Booklet ; Service tables

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