2011 - 2012

Q5

Quick Reference Specification Book

Audi
Truth in Engineering

2011–2012 Audi Q5
Quick Reference Specification Book

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ENGINES

TRANSMISSIONS

CHASSIS

GENERAL INFORMATION

Decimal and Metric Equivalents

Distance/Length

To calculate: mm x 0.03937 = in.

mm	in.	mm	in.	mm	in.	mm	in.
0.002	0.00008	0.01	0.0004	0.1	0.004	1	0.04
0.004	0.00016	0.02	0.0008	0.2	0.008	2	0.08
0.006	0.00024	0.03	0.0012	0.3	0.012	3	0.12
0.008	0.00031	0.04	0.0016	0.4	0.016	4	0.16
0.010	0.00039	0.05	0.0020	0.5	0.020	5	0.20
0.020	0.00079	0.06	0.0024	0.6	0.024	6	0.24
0.030	0.00118	0.07	0.0028	0.7	0.028	7	0.28
0.040	0.00157	0.08	0.0031	0.8	0.031	8	0.31
0.050	0.00197	0.09	0.0035	0.9	0.035	9	0.35
0.060	0.00236	0.10	0.0039	1.0	0.039	10	0.39
0.070	0.00276	0.20	0.0079	2.0	0.079	20	0.79
0.080	0.00315	0.30	0.0118	3.0	0.118	30	1.18
0.090	0.00354	0.40	0.0157	4.0	0.157	40	1.57
0.100	0.00394	0.50	0.0197	5.0	0.197	50	1.97
0.200	0.00787	0.60	0.0236	6.0	0.236	60	2.36
0.300	0.01181	0.70	0.0276	7.0	0.276	70	2.76
0.400	0.01575	0.80	0.0315	8.0	0.315	80	3.15
0.500	0.01969	0.90	0.0354	9.0	0.354	90	3.54
0.600	0.02362	1.00	0.0394	10.0	0.394	100	3.94
0.700	0.02756	2.00	0.0787	20.0	0.787		
0.800	0.03150	3.00	0.1181	30.0	1.181		
0.900	0.03543	4.00	0.1575	40.0	1.575		
1.000	0.03937	5.00	0.1969	50.0	1.969		
2.000	0.07874	6.00	0.2362	60.0	2.362		
3.000	0.11811	7.00	0.2756	70.0	2.756		
4.000	0.15748	8.00	0.3150	80.0	3.150		
5.000	0.19685	9.00	0.3543	90.0	3.543		
6.000	0.23622	10.00	0.3937	100.0	3.937		
7.000	0.27559	20.00	0.7874				
8.000	0.31496	30.00	1.1811				
9.000	0.35433	40.00	1.5748				
10.000	0.39370	50.00	1.9685				
20.000	0.78740	60.00	2.3622				
30.000	1.18110	70.00	2.7559				
40.000	1.57480	80.00	3.1496				
50.000	1.96850	90.00	3.5433				
60.000	2.36220	100.00	3.9370				
70.000	2.75591						
80.000	3.14961						
90.000	3.54331						
100.000	3.93701						

Tightening Torque

Nm-to-lb·ft (ft·lb)

To calculate: Nm x 0.738 = lb·ft

Nm	lb·ft (ft·lb)	Nm	lb·ft (ft·lb)	Nm	lb·ft (ft·lb)
10	7	55	41	100	74
11	8	56	41	105	77
12	9	57	42	110	81
13	10	58	43	115	85
14	10	59	44	120	89
15	11	60	44	125	92
16	12	61	45	130	96
17	13	62	46	135	100
18	13	63	46	140	103
19	14	64	47	145	107
20	15	65	48	150	111
21	15	66	49	155	114
22	16	67	49	160	118
23	17	68	50	165	122
24	18	69	51	170	125
25	18	70	52	175	129
26	19	71	52	180	133
27	20	72	53	185	136
28	21	73	54	190	140
29	21	74	55	195	144
30	22	75	55	200	148
31	23	76	56	205	151
32	24	77	57	210	155
33	24	78	58	215	159
34	25	79	58	220	162
35	26	80	59	225	166
36	27	81	60	230	170
37	27	82	60	235	173
38	28	83	61	240	177
39	29	84	62	245	181
40	30	85	63	250	184
41	30	86	63	260	192
42	31	87	64	270	199
43	32	88	65	280	207
44	32	89	66	290	214
45	33	90	66	300	221
46	34	91	67	310	229
47	35	92	68	320	236
48	35	93	69	330	243
49	36	94	69	340	251
50	37	95	70	350	258
51	38	96	71	360	266
52	38	97	72	370	273
53	39	98	72	380	280
54	40	99	73	390	288
55	41	100	74	400	295

Nm-to-lb·in (in·lb), kg·cm

To calculate: Nm x 8·85 = lb·in • Nm x 10.20 = kg·cm

Nm	lb·in (in·lb)	kg·cm	Nm	lb·in (in·lb)	kg·cm
1	9	10	26	230	265
2	18	20	27	239	275
3	27	31	28	248	286
4	35	41	29	257	296
5	44	51	30	266	306
6	53	61	31	274	316
7	62	71	32	283	326
8	71	82	33	292	337
9	80	92	34	301	347
10	89	102	35	310	357
11	97	112	36	319	367
12	106	122	37	327	377
13	115	133	38	336	387
14	124	143	39	345	398
15	133	153	40	354	408
16	142	163	41	363	418
17	150	173	42	372	428
18	159	184	43	381	438
19	168	194	44	389	449
20	177	204	45	398	459
21	186	214	46	407	469
22	195	224	47	416	479
23	204	235	48	425	489
24	212	245	49	434	500
25	221	255	50	443	510

N·cm-to-lb·in (in·lb), kg·cm

To calculate: N·cm x 0.089 = lb·in • N·cm x 0.102 = kg·cm

N·cm	lb·in (in·lb)	kg·cm	N·cm	lb·in (in·lb)	kg·cm
50	4	5	250	22	25
60	5	6	300	27	31
70	6	7	350	31	36
80	7	8	400	35	41
90	8	9	450	40	46
100	9	10	500	44	51
110	10	11	550	49	56
120	11	12	600	53	61
130	12	13	650	58	66
140	12	14	700	62	71
150	13	15	750	66	76
160	14	16	800	71	82
170	15	17	850	75	87
180	16	18	900	80	92
190	17	19	950	84	97
200	18	20	1000	89	102

kg·cm-to-lb·in (in·lb), N·cm

To calculate: kg·cm x 0.868 = lb·in • kg·cm x 9.81 = N·cm

kg·cm	lb·in (in·lb)	N·cm		kg·cm	lb·in (in·lb)	N·cm
5	4	49		110	95	1079
6	5	59		120	104	1177
7	6	69		130	113	1275
8	7	78		140	122	1373
9	8	88		150	130	1471
10	9	98		160	139	1569
20	17	196		170	148	1667
30	26	294		180	156	1765
40	35	392		190	165	1863
50	43	490		200	174	1961
60	52	588		210	182	2059
70	61	686		220	191	2157
80	69	785		230	200	2256
90	78	883		240	208	2354
100	87	981		250	217	2452

Warnings and Cautions

WARNINGS

- Some repairs may be beyond your capability. If you lack the skills, tools and equipment, or a suitable workplace for any procedure described in this manual, we suggest you leave such repairs to an authorized dealer service department or other qualified shop.
- Do not reuse any fasteners that have become worn or deformed during normal use. Many fasteners are designed to be used only once and become unreliable and may fail when used a second time. This includes, but is not limited to, nuts, bolts, washers, self-locking nuts or bolts, circlips and cotter pins. Always replace these fasteners with new parts.
- Never work under a lifted car unless it is solidly supported on stands designed for the purpose. Do not support a car on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a car that is supported solely by a jack. Never work under the car while the engine is running.
- If you are going to work under a car on the ground, make sure the ground is level. Block the wheels to keep the car from rolling. Disconnect the battery negative (-) terminal (ground strap) to prevent others from starting the car while you are under it.

- Never run the engine unless the work area is well ventilated. Carbon monoxide kills.
- Remove rings, bracelets and other jewelry so they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Tie back long hair. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.
- Do not attempt to work on your car if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset, or have taken medication or any other substance that may keep you from being fully alert.
- Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the car. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel, vapors or oil.
- Use a suitable container to catch draining fuel, oil, or brake fluid. Do not use food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store oily rags which can ignite and burn spontaneously.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with battery acid. Wear gloves or other protective clothing whenever the job requires working with harmful substances.
- Greases, lubricants and other automotive chemicals contain toxic substances, many of which are absorbed directly through the skin. Read the manufacturer's instructions and warnings carefully. Use hand and eye protection. Avoid direct skin contact
- Disconnect the battery negative (-) terminal (ground strap) whenever you work on the fuel or electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.
- Friction materials (such as brake pads or shoes or clutch discs) contain asbestos fibers or other friction materials. Do not create dust by grinding, sanding, or cleaning with compressed air. Avoid breathing dust. Breathing any friction material dust can lead to serious diseases and may result in death.

(WARNINGS cont'd on next page)

WARNINGS *(cont'd)*

- Batteries give off explosive hydrogen gas during charging. Keep sparks, lighted matches and open flame away from the top of the battery. If hydrogen gas escaping from the cap vents is ignited, it ignites the gas trapped in the cells and causes the battery to explode.
- Connect and disconnect battery cables, jumper cables or a battery charger only with the ignition off. Do not disconnect the battery while the engine is running.
- Do not quick-charge the battery (for boost starting) for longer than one minute. Wait at least one minute before boosting the battery a second time.
- Do not allow battery charging voltage to exceed 16.5 volts. If the battery begins producing gas or boiling violently, reduce the charging rate. Boosting a sulfated battery at a high charging rate can cause an explosion.
- The A/C system is filled with chemical refrigerant, which is hazardous. The A/C system should be serviced only by trained technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat increases system pressure and may cause the system to burst.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.
- Some cars are equipped with a Supplemental Restraint System (SRS) that automatically deploys airbags and pyrotechnic seat belt tensioners in the event of a frontal or side impact. These are explosive devices. Handled improperly or without adequate safeguards, they can be accidentally activated and cause serious injury.
- The ignition system produces high voltages that can be fatal. Avoid contact with exposed terminals and use extreme care when working on a car with the engine running or the ignition on.

- Place jack stands only at locations specified by manufacturer. The vehicle lifting jack supplied with the vehicle is intended for tire changes only. Use a heavy duty floor jack to lift the vehicle before installing jack stands.
- Battery acid (electrolyte) can cause severe burns. Flush contact area with water, seek medical attention.
- Aerosol cleaners and solvents may contain hazardous or deadly vapors and are highly flammable. Use only in a well ventilated area. Do not use on hot surfaces (such as engines or brakes).
- Do not remove coolant reservoir or radiator cap with the engine hot. Burns and engine damage may occur.

CAUTIONS

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized dealer or other qualified shop.
- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly and do not attempt shortcuts. Use tools appropriate to the work and use only replacement parts meeting original specifications. Makeshift tools, parts and procedures will not make good repairs.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque specification listed.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond or lake. Dispose of in accordance with Federal, State and Local laws.
- The control module for the Anti-lock Brake System (ABS) cannot withstand temperatures from a paint-drying booth or a heat lamp in excess of 95°C (203°F) and should not be subjected to temperatures exceeding 85°C (185°F) for more than two hours.
- Before doing any electrical welding on cars equipped with ABS, disconnect the battery negative (-) terminal (ground strap) and the ABS control module connector.
- Always make sure the ignition is off before disconnecting battery.

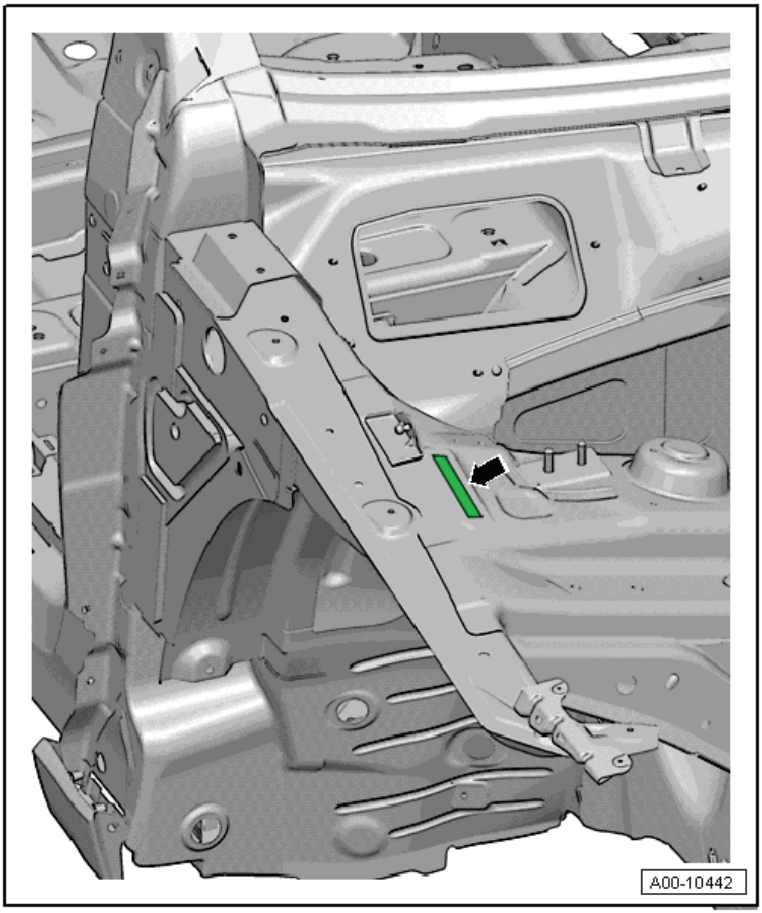
(CAUTIONS cont'd on next page)

CAUTIONS *(cont'd)*

- Label battery cables before disconnecting. On some models, battery cables are not color coded.
- Disconnecting the battery may erase fault code(s) stored in control module memory. Check for fault codes prior to disconnecting the battery cables.
- If a normal or rapid charger is used to charge the battery, disconnect the battery and remove it from the vehicle to avoid damaging paint and upholstery.
- Do not quick-charge the battery (for boost starting) for longer than one minute. Wait at least one minute before boosting the battery a second time.
- Connect and disconnect a battery charger only with the battery charger switched off.
- Sealed or "maintenance free" batteries should be slow-charged only, at an amperage rate that is approximately 10% of the battery's ampere-hour (Ah) rating.
- Do not allow battery charging voltage to exceed 16.5 volts. If the battery begins producing gas or boiling violently, reduce the charging rate. Boosting a sulfated battery at a high charging rate can cause an explosion.

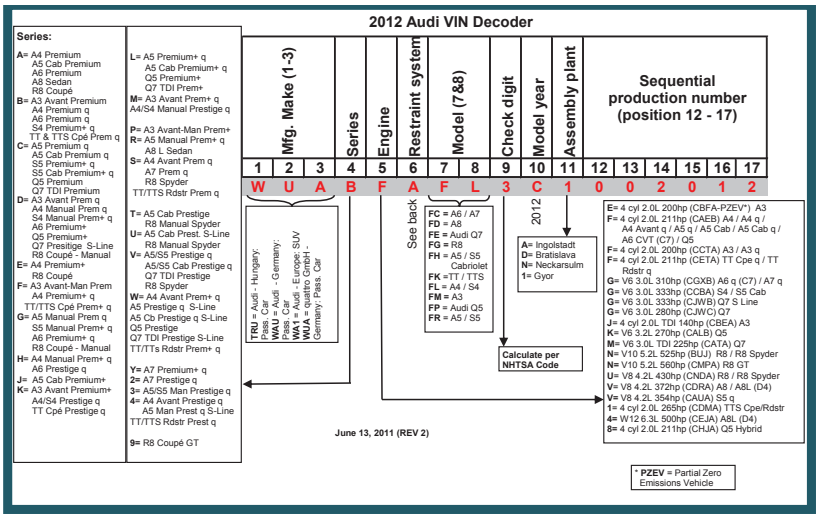
VEHICLE IDENTIFICATION

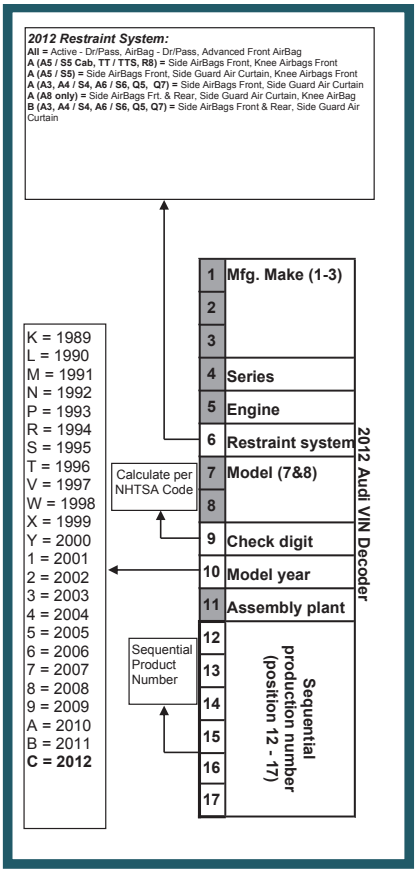
Vehicle Identification Number (VIN) Location

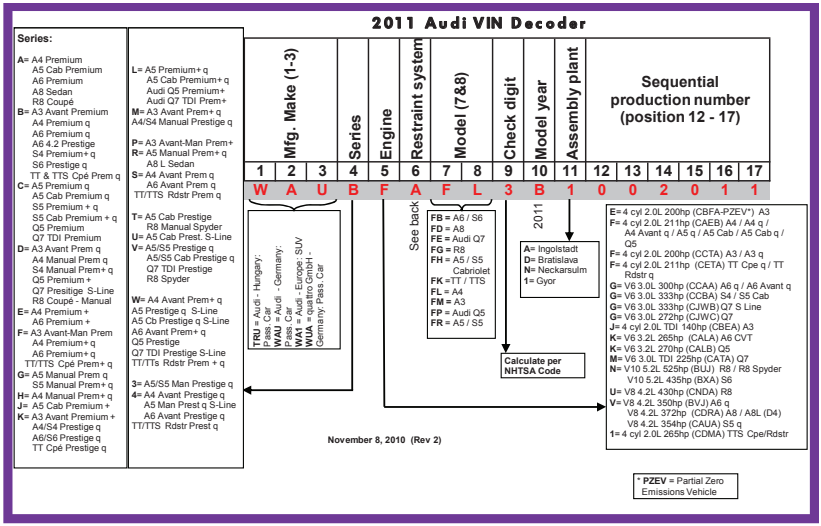


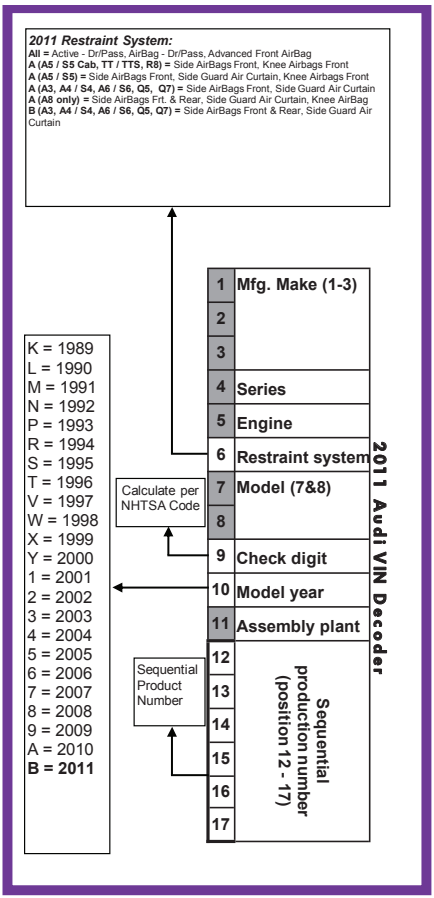
The Vehicle Identification Number (VIN) is located on the right suspension strut.

VIN Decoder

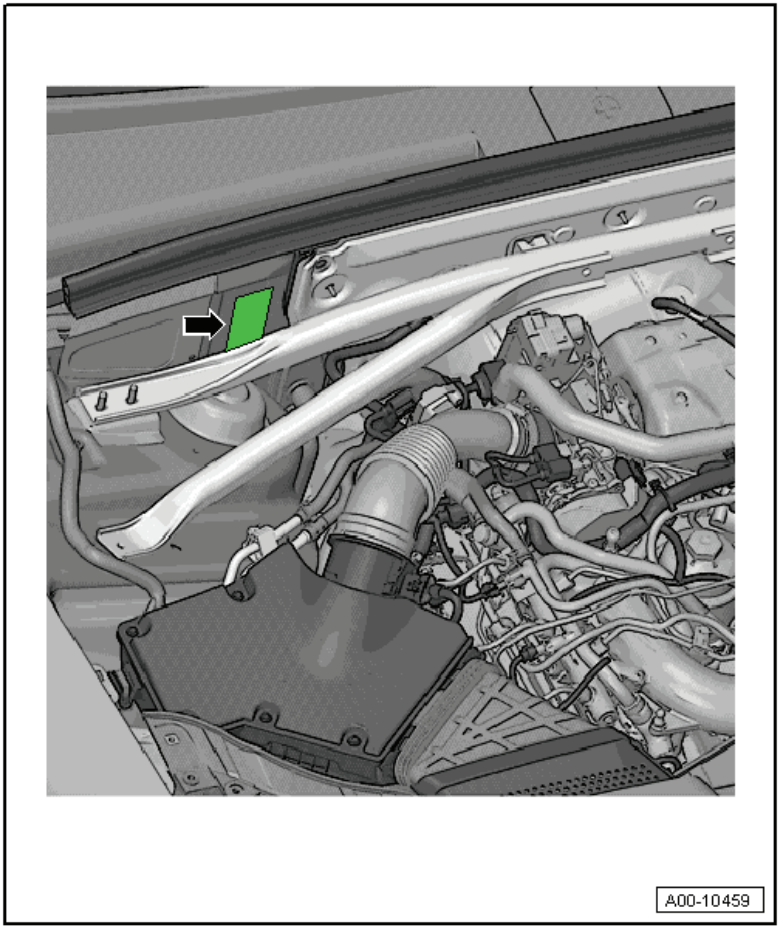

2012 Audi VIN Decoder
Series:
A= A4 Premium
A5 Cab Premium
A6 Premium
A8 Sedan
R8 Coupé
B= A3 Avant Premium
A4 Premium q
A6 Premium q
A4 Premium+ q
TT & TTS Cpé Prem q
C= A5 Premium q
A5 Cab Premium q
S5 Premium+ q
S5 Cab Premium+ q
Q5 Premium
Q7 TDI Premium
D= A3 Avant Prem q
A4 Manual Prem q
S4 Manual Prem+ q
A6 Premium+
Q5 Premium+
Q7 Prestige S-Line
R8 Coupé - Manual
E= A4 Premium+
R8 Coupé
F= A3 Avant-Man Prem
A4 Premium+ q
TT/TTS Cpé Prem+ q
G= A5 Manual Prem q
S5 Manual Prem+ q
A6 Premium+ q
R8 Coupé - Manual
H= A4 Manual Prem+ q
A6 Prestige q
J= A5 Cab Premium+
K= A3 Avant Premium+
A4/S4 Prestige q
TT Cpé Prestige q
L= A5 Premium+ q
A5 Cab Premium+ q
Q5 Premium+
Q7 TDI Prem+
M= A3 Avant Prem+ q
A4/S4 Manual Prestige q
P= A3 Avant-Man Prem+
R= A5 Manual Prem+ q
A8 L Sedan
S= A4 Avant Prem q
A7 Prem q
R8 Spyder
TT/TTS Rdstr Prem q
T= A5 Cab Prestige
R8 Manual Spyder
U= A5 Cab Prest. S-Line
R8 Manual Spyder
V= A5/S5 Prestige q
A5/S5 Cab Prestige q
Q7 TDI Prestige
R8 Spyder
W= A4 Avant Prem+ q
A5 Prestige q S-Line
A5 Cb Prestige q S-Line
Q5 Prestige
Q7 TDI Prestige S-Line
TT/TTs Rdstr Prem+ q
Y= A7 Premium+ q
2= A7 Prestige q
3= A5/S5 Man Prestige q
4= A4 Avant Prestige q
A5 Man Prest q S-Line
TT/TTS Rdstr Prest q
9= R8 Coupé GT
Mfg. Make (1-3)
Series
Engine
Restraint system
Model (7&8)
Check digit
Model year
Assembly plant
Sequential production number (position 12 - 17)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
W U A B F A F L 3 C 1 0 0 2 0 1 2
TRU = Audi - Hungary
WAU = Audi - Germany: Pass. Car
WA1 = Audi - Europe: SUV
WUA = Audi - Sonstige - Germany: Pass. Car
See back
FC = A6 / A7
FD = A8
FE = Audi Q7
FG = R8
FH = A5 / S5 Cabriolet
FK = TT / TTS
FL = A4 / S4
FM = A3
FP = Audi Q5
FR = A5 / S5
2012
A= Ingolstadt
D= Bratislava
N= Neckarsulm
1= Gyor
Calculate per NHTSA Code
E= 4 cyl 2.0L 200hp (CBFA-PZEV*) A3
F= 4 cyl 2.0L 211hp (CAEB) A4 / A4 q / A4 Avant q / A5 q / A5 Cab / A5 Cab q / A6 CVT (C7) / Q5
F= 4 cyl 2.0L 200hp (CCTA) A3 / A3 q
F= 4 cyl 2.0L 211hp (CETA) TT Cpe q / TT Rdstr q
G= V6 3.0L 310hp (CGXB) A6 q (C7) / A7 q
G= V6 3.0L 333hp (CCBA) S4 / S5 Cab
G= V6 3.0L 333hp (CJWB) Q7 S Line
G= V6 3.0L 280hp (CJWC) Q7
J= 4 cyl 2.0L TDI 140hp (CBEA) A3
K= V6 3.2L 270hp (CALB) Q5
M= V6 3.0L TDI 225hp (CATA) Q7
N= V10 5.2L 525hp (BUJ) R8 / R8 Spyder
N= V10 5.2L 560hp (CMPA) R8 GT
U= V8 4.2L 430hp (CNDA) R8 / R8 Spyder
V= V8 4.2L 372hp (CDRA) A8 / A8L (D4)
V= V8 4.2L 354hp (CAUA) S5 q
1= 4 cyl 2.0L 265hp (CDMA) TTS Cpe/Rdstr
4= W12 6.3L 500hp (CEJA) A8L (D4)
8= 4 cyl 2.0L 211hp (CHJA) Q5 Hybrid
* PZEV = Partial Zero Emissions Vehicle
June 13, 2011 (REV 2)


2012 Restraint System:
All = Active - Dr/Pass, AirBag - Dr/Pass, Advanced Front AirBag
A (A5 / S5 Cab, TT / TTS, R8) = Side AirBags Front, Knee Airbags Front
A (A5 / S5) = Side AirBags Front, Side Guard Air Curtain, Knee Airbags Front
A (A3, A4 / S4, A6 / S6, Q5, Q7) = Side AirBags Front, Side Guard Air Curtain
A (A8 only) = Side AirBags Frt. & Rear, Side Guard Air Curtain, Knee AirBag
B (A3, A4 / S4, A6 / S6, Q5, Q7) = Side AirBags Front & Rear, Side Guard Air Curtain
K = 1989
L = 1990
M = 1991
N = 1992
P = 1993
R = 1994
S = 1995
T = 1996
V = 1997
W = 1998
X = 1999
Y = 2000
1 = 2001
2 = 2002
3 = 2003
4 = 2004
5 = 2005
6 = 2006
7 = 2007
8 = 2008
9 = 2009
A = 2010
B = 2011
C = 2012
Calculate per NHTSA Code
Sequential Product Number
1 Mfg. Make (1-3)
2
3
4 Series
5 Engine
6 Restraint system
7 Model (7&8)
8
9 Check digit
10 Model year
11 Assembly plant
12
13
14
15
16
17
Sequential production number (position 12 - 17)
2012 Audi VIN Decoder


2011 Audi VIN Decoder
Series:
A= A4 Premium
A5 Cab Premium
A6 Premium
A8 Sedan
R8 Coupé
B= A3 Avant Premium
A4 Premium q
A6 Premium q
A6 4.2 Prestige
S4 Premium+ q
S6 Prestige q
TT & TTS Cpé Prem q
C= A5 Premium q
A5 Cab Premium q
S5 Premium + q
S5 Cab Premium + q
Q5 Premium
Q7 TDI Premium
D= A3 Avant Prem q
A4 Manual Prem q
S4 Manual Prem+ q
Q5 Premium +
Q7 Presitige S-Line
R8 Coupé - Manual
E= A4 Premium +
A6 Premium +
F= A3 Avant-Man Prem
A4 Premium+ q
A6 Premium+ q
TT/TTS Cpé Prem+ q
G= A5 Manual Prem q
S5 Manual Prem+ q
H= A4 Manual Prem+ q
J= A5 Cab Premium +
K= A3 Avant Premium +
A4/S4 Prestige q
A6/S6 Prestige q
TT Cpé Prestige q
L= A5 Premium+ q
A5 Cab Premium+ q
Audi Q5 Premium+
Audi Q7 TDI Prem+
M= A3 Avant Prem+ q
A4/S4 Manual Prestige q
P= A3 Avant-Man Prem+
R= A5 Manual Prem+ q
A8 L Sedan
S= A4 Avant Prem q
A6 Avant Prem q
TT/TTS Rdstr Prem q
T= A5 Cab Prestige
R8 Manual Spyder
U= A5 Cab Prest. S-Line
V= A5/S5 Prestige q
A5/S5 Cab Prestige q
Q7 TDI Prestige
R8 Spyder
W= A4 Avant Prem+ q
A5 Prestige q S-Line
A5 Cb Prestige q S-Line
A6 Avant Prem+ q
Q5 Prestige
Q7 TDI Prestige S-Line
TT/TTs Rdstr Prem + q
3= A5/S5 Man Prestige q
4= A4 Avant Prestige q
A5 Man Prest q S-Line
A6 Avant Prestige q
TT/TTS Rdstr Prest q
Mfg. Make (1-3)
Series
Engine
Restraint system
Model (7&8)
Check digit
Model year
Assembly plant
Sequential production number (position 12 - 17)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
W A U B F A F L 3 B 1 0 0 2 0 1 1
TRU = Audi - Hungary:
Pass Car
WAU = Audi - Germany:
Pass Car
WA1 = Audi - Europe: SUV
WUA = quattro GmbH -
Germany: Pass. Car
See back
FB = A6 / S6
FD = A8
FE = Audi Q7
FG = R8
FH = A5 / S5
Cabriolet
FK =TT / TTS
FL = A4
FM = A3
FP = Audi Q5
FR = A5 / S5
2011
A= Ingolstadt
D= Bratislava
N= Neckarsulm
1= Gyor
Calculate per NHTSA Code
E= 4 cyl 2.0L 200hp (CBFA-PZEV*) A3
F= 4 cyl 2.0L 211hp (CAEB) A4 / A4 q / A4 Avant q / A5 q / A5 Cab / A5 Cab q / Q5
F= 4 cyl 2.0L 200hp (CCTA) A3 / A3 q
F= 4 cyl 2.0L 211hp (CETA) TT Cpe q / TT Rdstr q
G= V6 3.0L 300hp (CCAA) A6 q / A6 Avant q
G= V6 3.0L 333hp (CCBA) S4 / S5 Cab
G= V6 3.0L 333hp (CJWB) Q7 S Line
G= V6 3.0L 272hp (CJWC) Q7
J= 4 cyl 2.0L TDI 140hp (CBEA) A3
K= V6 3.2L 265hp (CALA) A6 CVT
K= V6 3.2L 270hp (CALB) Q5
M= V6 3.0L TDI 225hp (CATA) Q7
N= V10 5.2L 525hp (BUJ) R8 / R8 Spyder V10 5.2L 435hp (BXA) S6
U= V8 4.2L 430hp (CNDA) R8
V= V8 4.2L 350hp (BVJ) A6 q
V8 4.2L 372hp (CDRA) A8 / A8L (D4)
V8 4.2L 354hp (CAUA) S5 q
1= 4 cyl 2.0L 265hp (CDMA) TTS Cpe/Rdstr
November 8, 2010 (Rev 2)
* PZEV = Partial Zero Emissions Vehicle

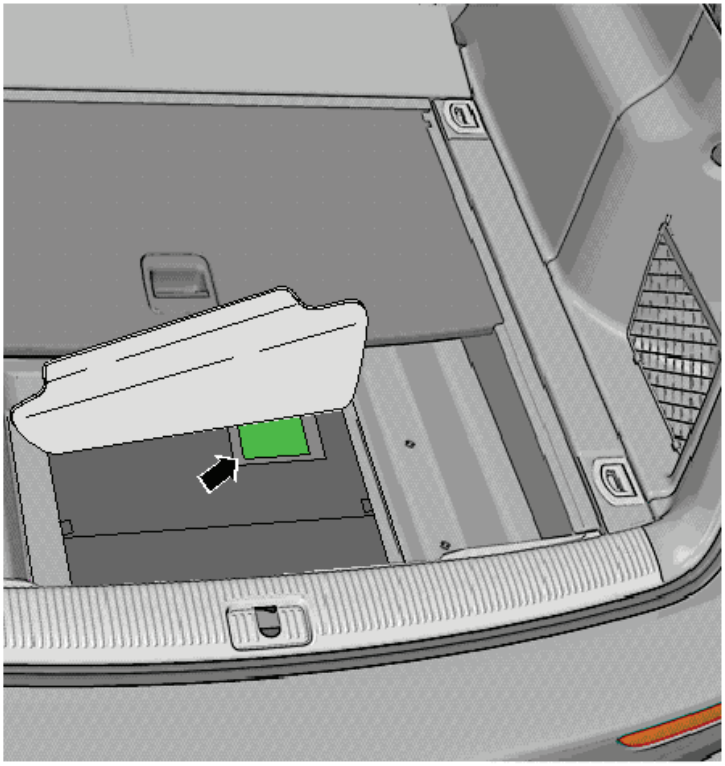

2011 Restraint System:
All = Active - Dr/Pass, AirBag - Dr/Pass, Advanced Front AirBag
A (A5 / S5 Cab, TT / TTS, R8) = Side AirBags Front, Knee Airbags Front
A (A5 / S5) = Side AirBags Front, Side Guard Air Curtain, Knee Airbags Front
A (A3, A4 / S4, A6 / S6, Q5, Q7) = Side AirBags Front, Side Guard Air Curtain
A (A8 only) = Side AirBags Frt. & Rear, Side Guard Air Curtain, Knee AirBag
B (A3, A4 / S4, A6 / S6, Q5, Q7) = Side AirBags Front & Rear, Side Guard Air Curtain
K = 1989
L = 1990
M = 1991
N = 1992
P = 1993
R = 1994
S = 1995
T = 1996
V = 1997
W = 1998
X = 1999
Y = 2000
1 = 2001
2 = 2002
3 = 2003
4 = 2004
5 = 2005
6 = 2006
7 = 2007
8 = 2008
9 = 2009
A = 2010
B = 2011
Calculate per NHTSA Code
Sequential Product Number
1 Mfg. Make (1-3)
2
3
4 Series
5 Engine
6 Restraint system
7 Model (7&8)
8
9 Check digit
10 Model year
11 Assembly plant
12
13
14
15
16
17
Sequential production number (position 12 - 17)
2011 Audi VIN Decoder

Vehicle Identification Number Decoder Type Plate Location



The type plate is located on the right side of the engine compartment near the suspension strut.

Vehicle Data Label Location



The vehicle data label is located inside the luggage compartment on the spare wheel well cover.

SALES CODES

Engine Codes

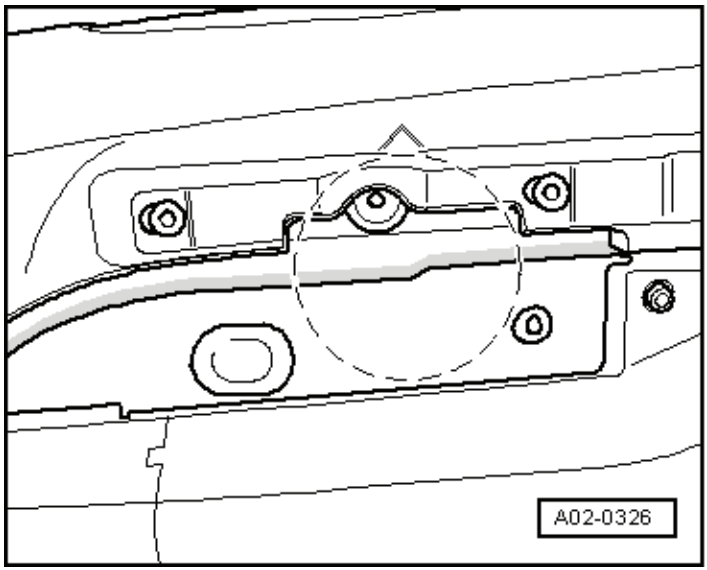
CAEB	2.0L 4-cylinder
CALB	3.2L 6-cylinder

Transmission Codes

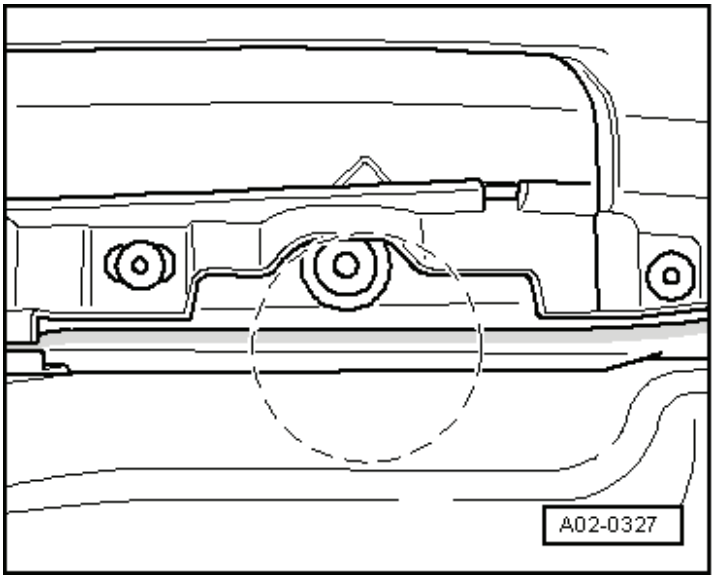
0B6	6-speed direct shift automatic/ 6-speed automatic
0BK	8-speed direct shift automatic/ 6-speed automatic

VEHICLE LIFTING

Lifting Points for Lifting Platform and Trolley Jack



Front: At the side member of the vertical reinforcement area.
The marking is for the onboard vehicle jack.

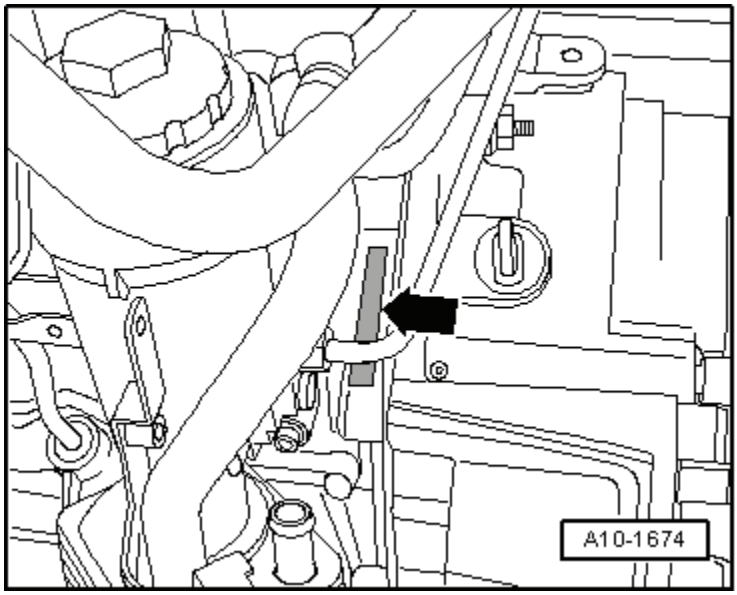


Rear: At the side member vertical reinforcement area.
The marking is for the onboard vehicle jack.

ENGINE MECHANICAL – 2.0L CAEB

General, Technical Data – 2.0L CAEB

Engine Number Location



The engine number (engine code and serial number) ➡ is located on the left side of the vehicle where the engine/transmission are joined.

Engine Data

Code Letters		CAEB
Displacement	liter	1.984
Output	kW at RPM	155/6000
Torque	Nm at RPM	350/1500
Bore	Diameter in mm	82.5
Stroke	mm	92.8
Compression ratio		9.6
RON		95 [1)]
Injection system/ignition system		FSI
Ignition sequence		1-3-4-2
Knock control		Yes
Turbocharger, Supercharger		Yes
Exhaust Gas Recirculation (EGR)		No
Variable intake manifold		No
Variable valve timing		Yes
Secondary Air Injection (AIR)		No

[1)] Unleaded RON 91 is also permitted but performance is reduced.

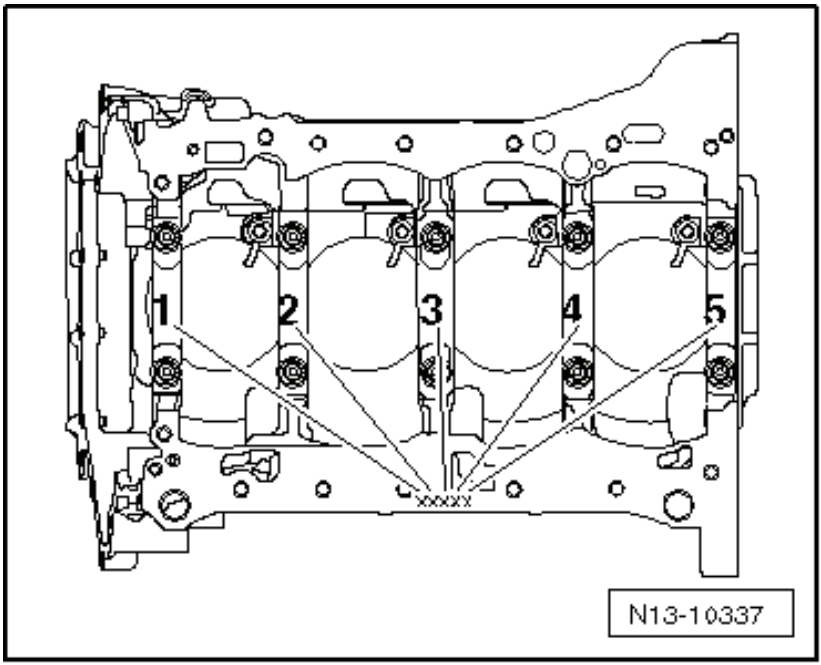
Engine Assembly – 2.0L CAEB

Fastener Tightening Specifications

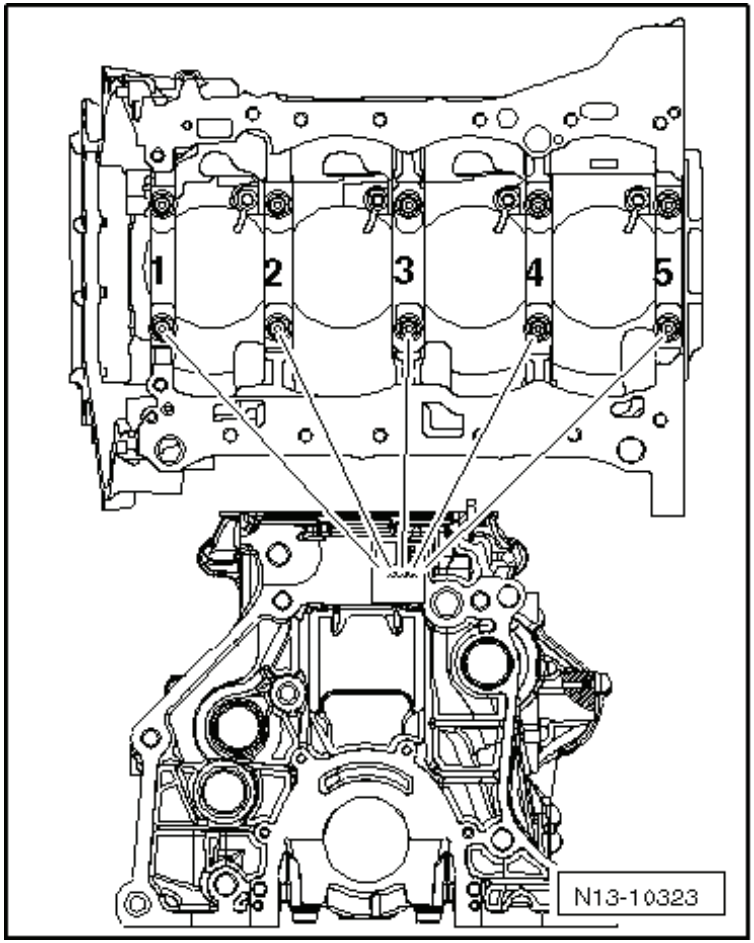
Component	Fastener size	Nm
Bolts and nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65
Exceptions:		
Ground (GND) cable nut		9
Hydraulic line bracket nut		9
Engine mount		90 plus an additional 90° (¼ turn)
Engine support		40
Heat shield		10
Retaining plate		20
Subframe		55

Crankshaft, Cylinder Block – 2.0L CAEB

Cylinder Block Bearing Shell Identification



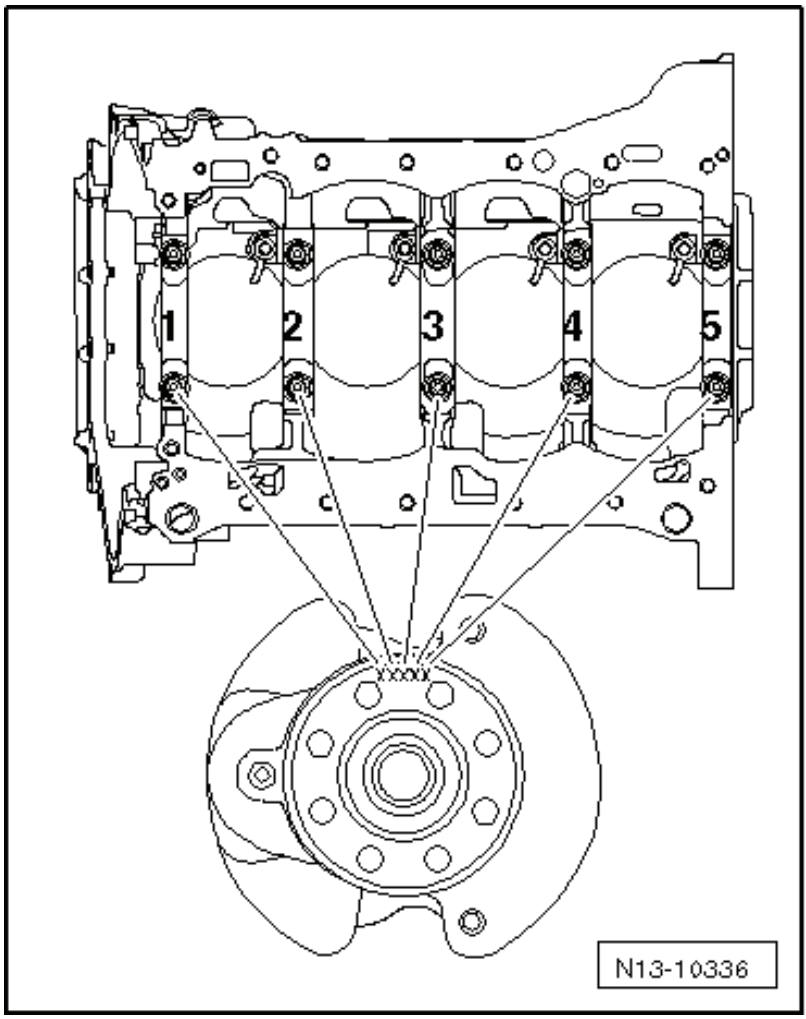
The cylinder block bearing shell identification is located either on the oil pan sealing surface or on the top (transmission side) of the cylinder block.



The identification on the cylinder block is for the upper bearing shell. Note the letter and match it to the color identification in the table.

Letter on cylinder block	Color of bearing
S	Black
R	Red
G	Yellow
B	Blue
W	White

Bearing Cap Bearing Shell Identification



The identification on the crankshaft is for the lower bearing shell. Note the letter and match it to the color identification in the table.

Letter on crankshaft	Color of bearing
S	Black
R	Red
G	Yellow
B	Blue
W	White

Fastener Tightening Specifications

Component	Nm
Connecting rod bearing cap (replace fasteners)	45 plus an additional 90° (¼ turn)
Drive plate (replace fasteners)	60 plus an additional 90° (¼ turn)
Idler roller	20
Pressure relief valve	27
Sensor wheel (replace fasteners)	10 plus an additional 90° (¼ turn)
Ribbed belt tensioning damper	40
Vibration damper (replace fasteners)	150 plus an additional 90° (¼ turn)
Pressure relief valve-to-oil spray jet	27

Crankshaft Dimensions

Reconditioning dimensions in mm [1)]	Crankshaft bearing pin diameter	Connecting rod bearing pin diameter
Basic dimension	58.00	47.80

[1)] The preparation of worn crankshafts is not provided.

Piston Ring End Gaps

Piston ring dimensions in mm	New	Wear limit
Compression ring	0.20 to 0.40	0.8
Oil scraping ring	0.25 to 0.50	0.8

Piston Ring Clearance

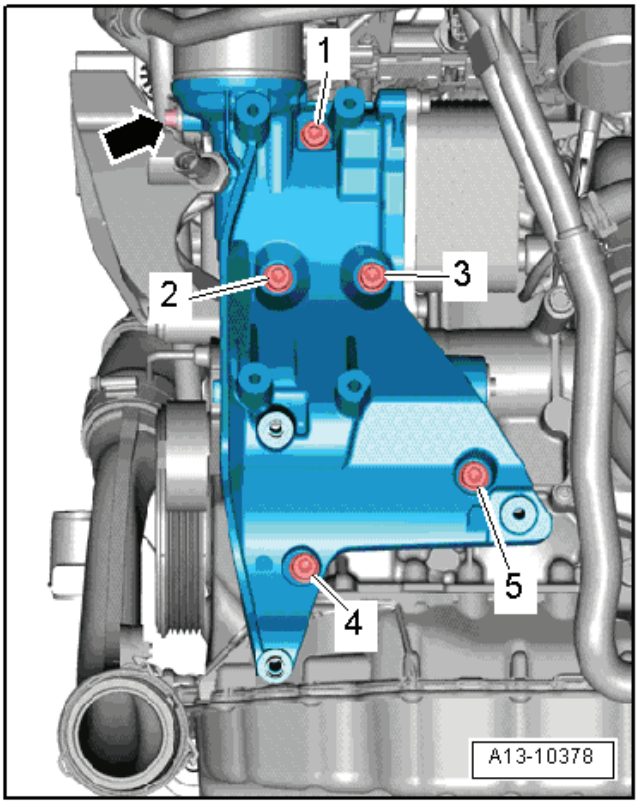
Piston ring dimensions in mm	New	Wear limit
1st compression ring	0.06 to 0.09	0.20
2nd compression ring	0.03 to 0.06	0.15
Oil scraping rings	Cannot be measured	

Piston and Cylinder Dimensions

Honing dimension in mm	Piston diameter	Cylinder bore diameter
Basic dimension	82.465 [1)]	82.51

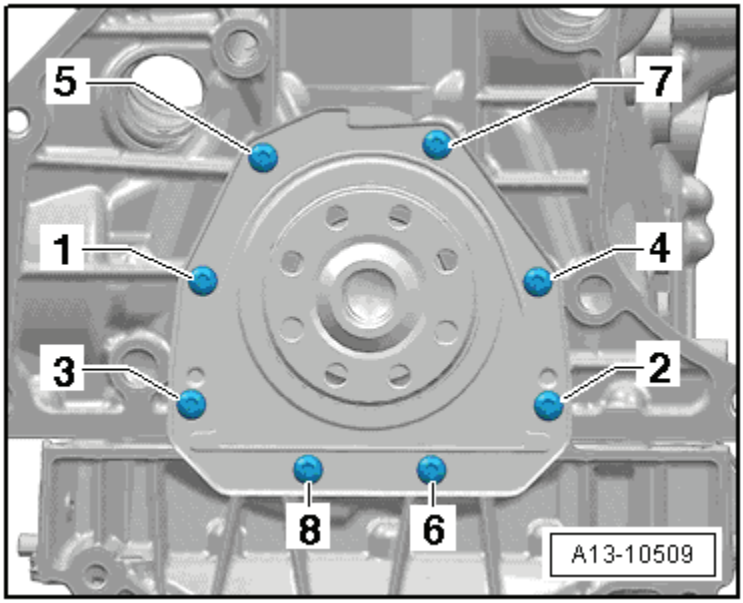
[1)] Measurements without graphite coating (thickness = 0.02 mm). The graphite coating wears off.

Accessory Assembly Bracket Tightening Specifications



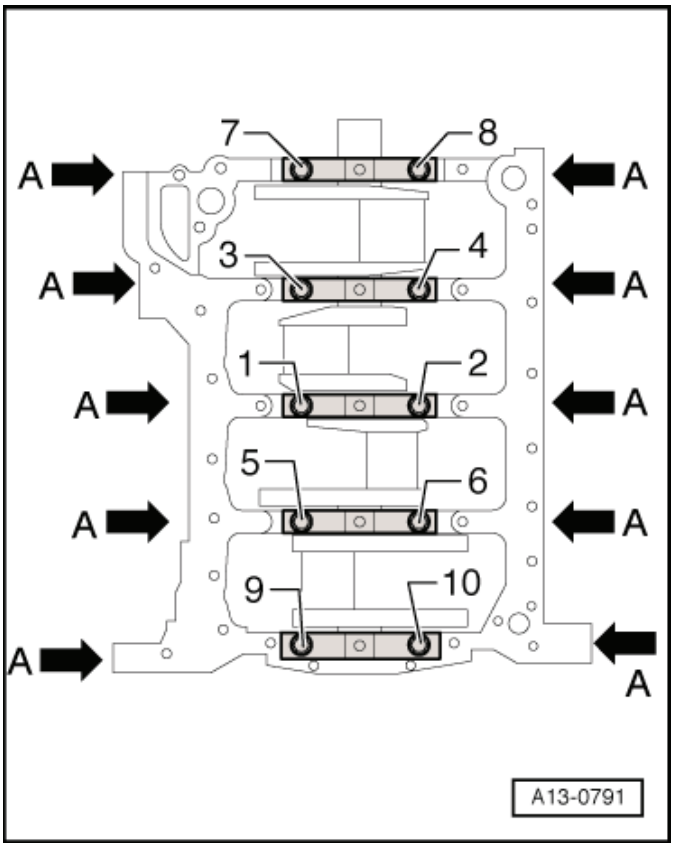
Step	Component	Nm
1	Tighten bolts 1 through 5 in sequence	Hand-tighten
2	Tighten bolts 1 through 5 in sequence	20
3	Tighten bolts 1 through 5 in sequence	an additional 90° (¼ turn)

Sealing Flange Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 9 in sequence	Hand-tighten
2	Tighten bolts 1 through 9 in sequence	9

Crankshaft Assembly Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 10 and A➡ in sequence	Hand-tighten
2	Tighten bolts 1 through 10 in sequence	65
3	Tighten bolts 1 through 10 in sequence	an additional 90° (¼ turn)
4	Tighten bolts A➡	20
5	Tighten bolts A➡	an additional 90° (¼ turn)

Cylinder Head, Valvetrain – 2.0L CAEB

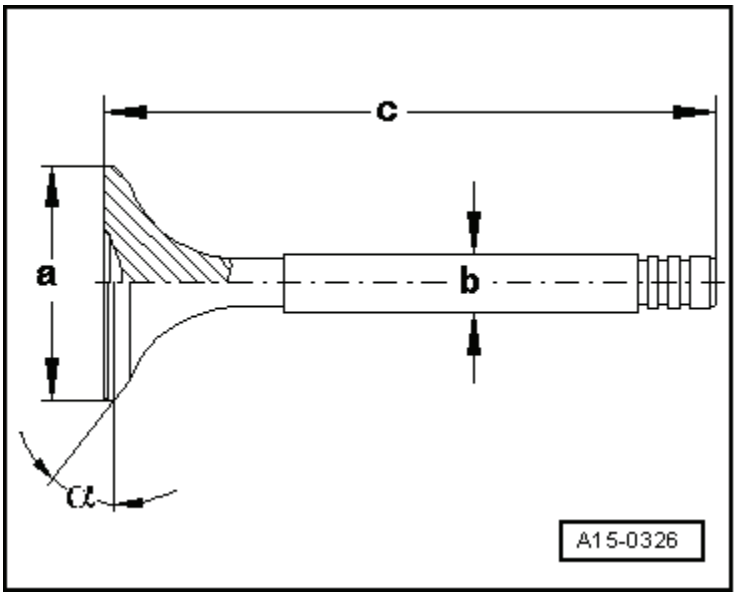
Fastener Tightening Specifications

Component	Nm
Balance shaft (replace fasteners)	9
Bearing bracket	9
	20 plus an additional 90° (¼ turn) (replace fasteners)
Camshaft adjuster actuator	5
Camshaft Position (CMP) sensor	9
Camshaft timing chain guide rail, guide pins	20
Chain tensioner [2)]	9
Chain tensioner [1)]	65
Control valve	35
Balance shaft timing chain guide rail, guide pins	20
Heat shield	20
Mounting plate	9
Oil dipstick guide tube	9
Sealing plugs	5
Timing chain tensioning rail, guide pins	20
Transport strap	25

1) For bolt tightening clarification, refer to ElsaWeb, Balance Shaft Timing Chain Overview, item 4.

2) For bolt tightening clarification, refer to ElsaWeb, Camshaft Timing Chain Overview, and item 3.

Valve Dimensions



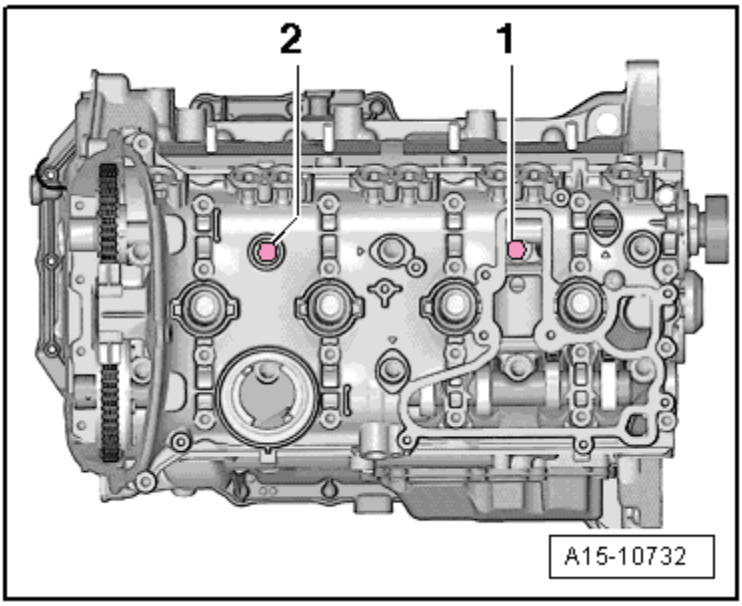
Dimension		Intake valve	Exhaust valve
Diameter a	mm	33.85 ± 0.10	28.0 ± 0.1
Diameter b	mm	5.98 ± 0.01	5.96 ± 0.01
c	mm	104.0 ± 0.2	101.9 ± 0.2
α	∠°	45	45

Note: Intake and exhaust valves must not be refaced by grinding. Only lapping is permitted.

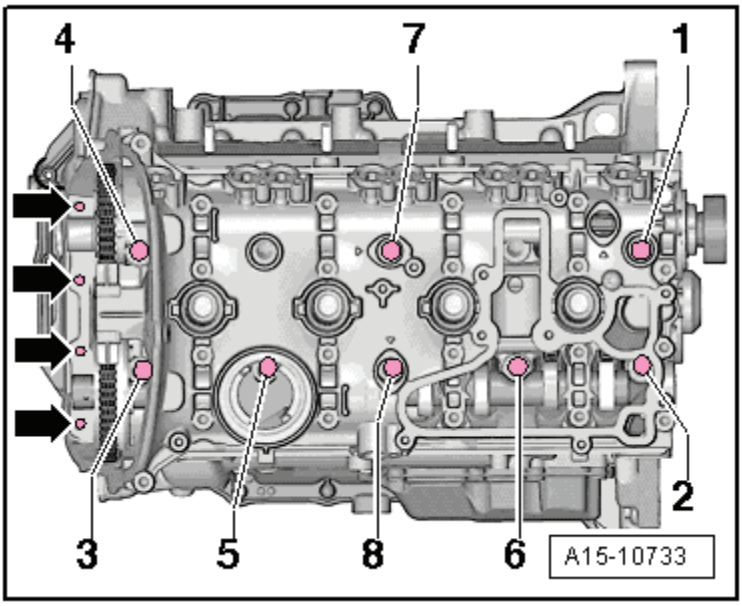
Compression Pressures

New bar positive pressure	Wear limit bar positive pressure	Difference between cylinders bar positive pressure
11.0 to 14.0	7.0	Max. 3.0

Cylinder Head Removal Specifications

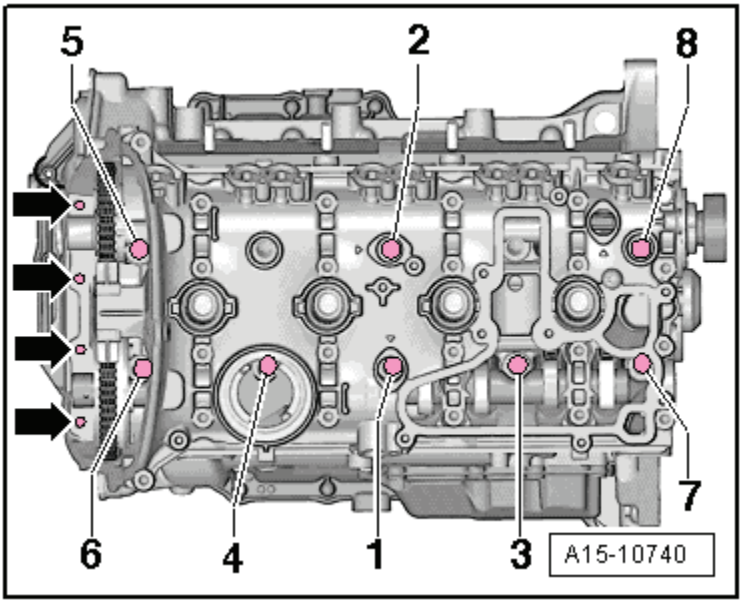


Remove cylinder head bolts 1 and 2 in sequence.

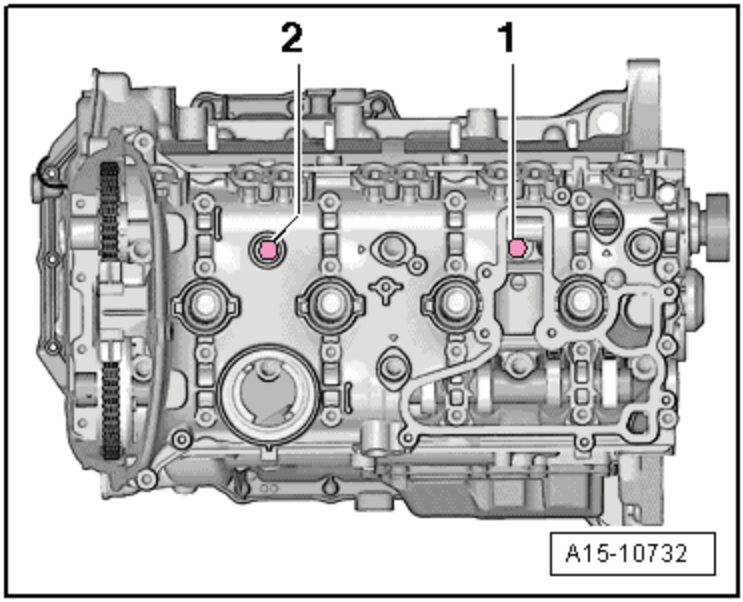


Remove cylinder head bolts 1 through 8 in sequence.

Cylinder Head Tightening Specifications

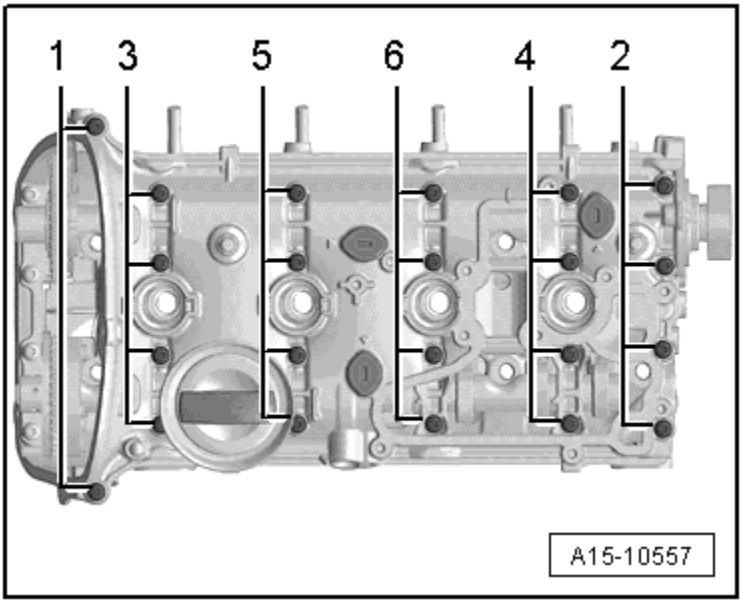


Step	Component	Nm
1	Tighten bolts 1 through 8 in sequence	40
2	Tighten bolts 1 through 8 in sequence	an additional 90° (¼ turn)
3	Tighten bolts 1 through 8 in sequence	an additional 90° (¼ turn)



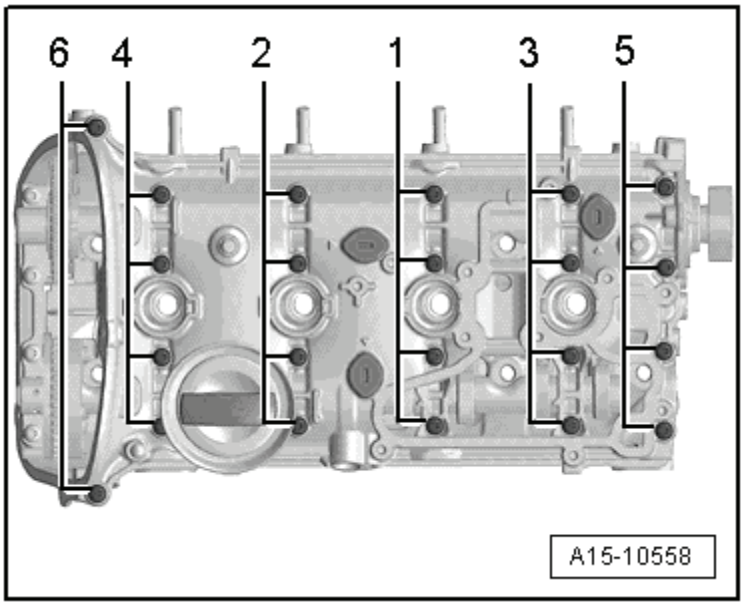
Step	Component	Nm
1	Tighten bolts 1 and 2 in sequence	40
2	Tighten bolts 1 and 2 in sequence	an additional 90° (¼ turn)
3	Tighten bolts 1 and 2 in sequence	an additional 90° (¼ turn)

Cylinder Head Cover with Integrated Camshaft Bearings Removal Specifications



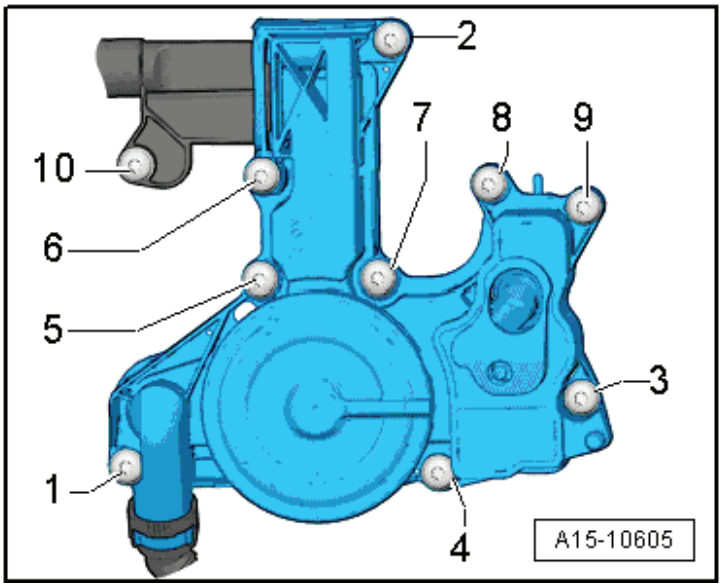
Loosen the cylinder head cover bolts 1 through 6 in sequence.

Cylinder Head Cover with Integrated Camshaft Bearings Tightening Specifications



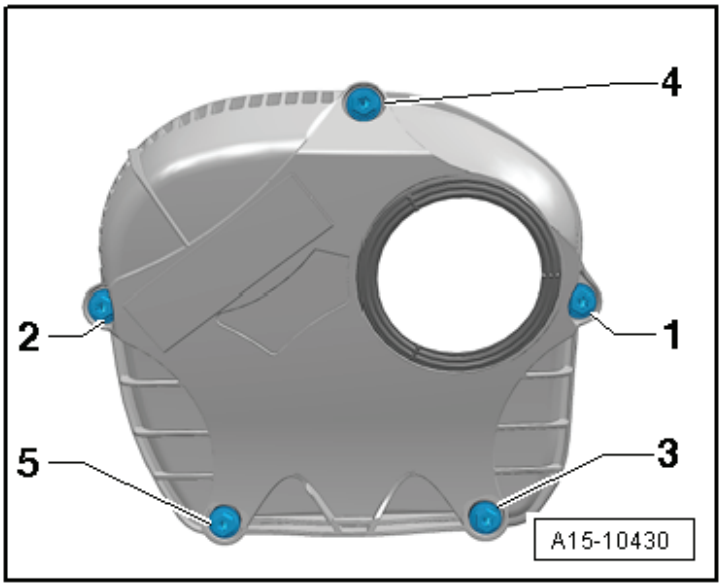
Step	Component	Nm
1	Tighten bolts 1 through 6 in sequence in several stages	Hand-tighten
2	Tighten bolts 1 through 6 in sequence	8
3	Tighten bolts 1 through 6 in sequence	an additional 90° (¼ turn)

Crankcase Ventilation Tightening Specifications



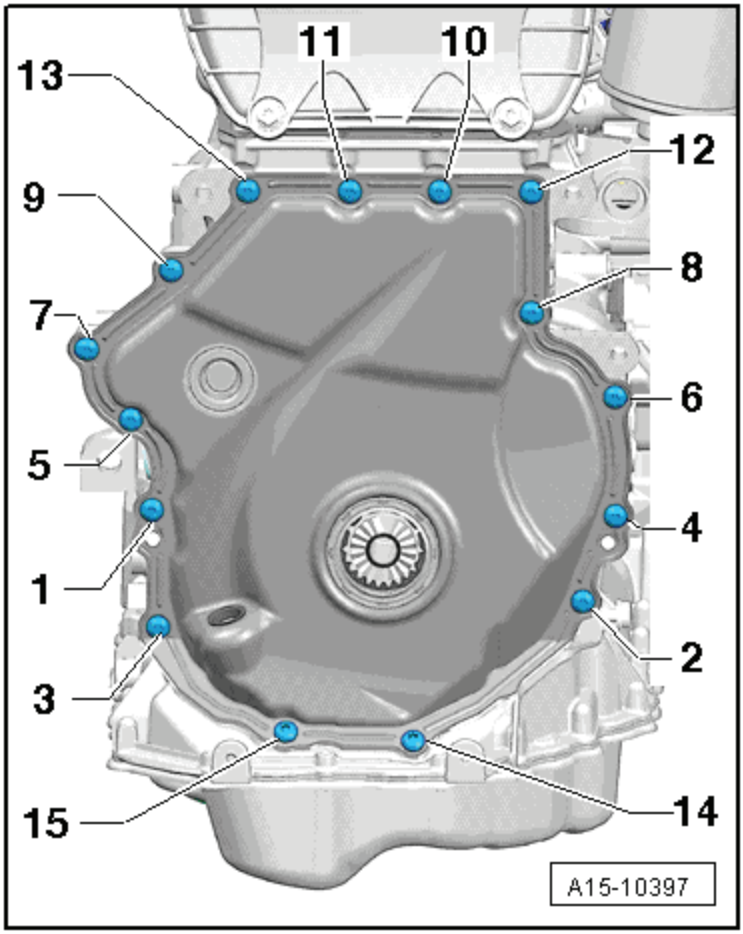
Step	Component	Nm
1	Tighten bolts 1 through 10 in sequence	11

Upper Timing Chain Cover Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 5 in sequence	9

Lower Timing Chain Cover Tightening Specifications



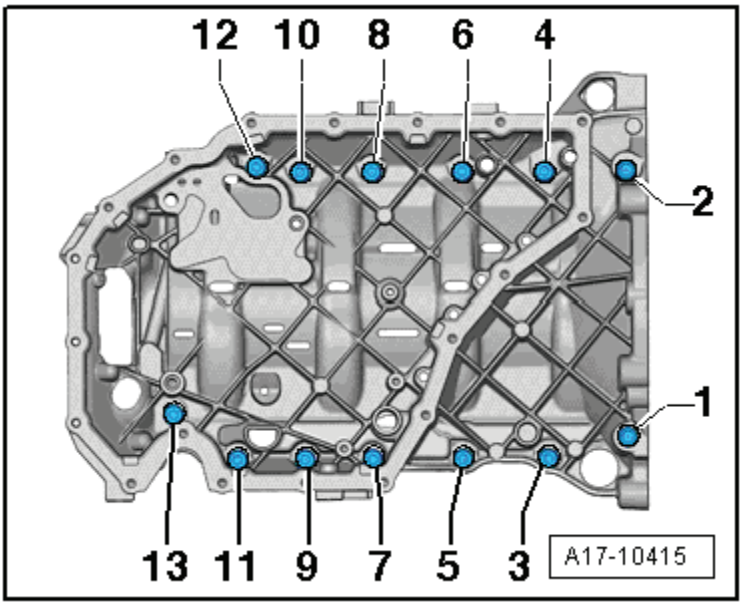
Step	Component	Nm
1	Tighten bolts 1 through 15 in sequence	8
2	Tighten bolts 1 through 15 in sequence	an additional 45° (⅛ turn)

Lubrication – 2.0L CAEB

Fastener Tightening Specifications

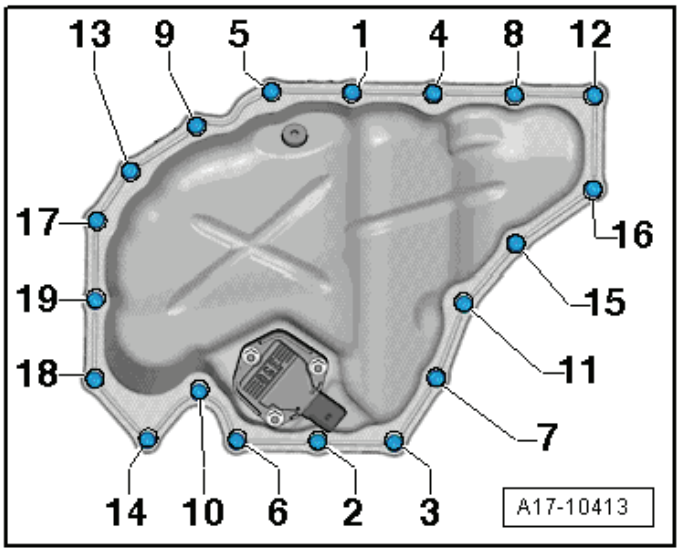
Component	Nm
Chain tensioner	9
Engine oil cooler	23
Oil baffle	9
Oil drain plug (replace)	30
Oil level thermal sensor nut	9
Oil pump	20
Oil pressure regulation valve	9
Oil pressure switch	20
Reduced oil pressure switch	20
Suction line	9
Oil cooler bolts	23

Upper Oil Pan Tightening Specifications



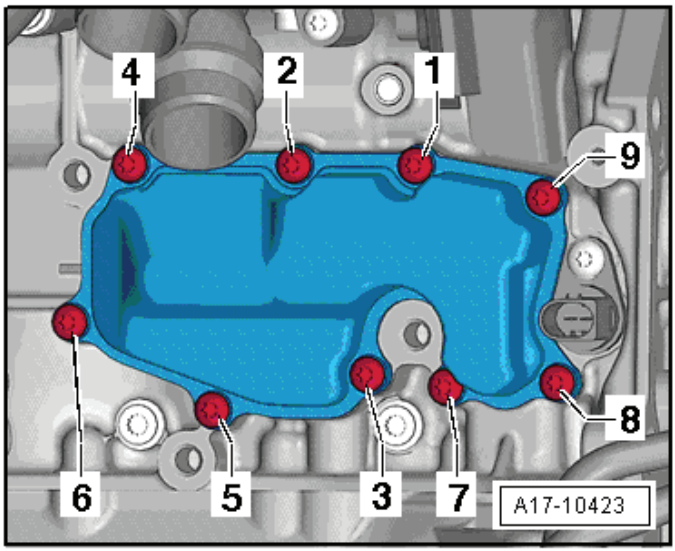
Step	Component	Nm
1	Tighten bolts 1 through 13 in sequence	15
2	Tighten bolts 1 through 13 in sequence	an additional 90° (¼ turn)

Oil Pan Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 19 in sequence	8
2	Tighten bolts 1 through 19 in sequence	an additional 45° (⅛ turn)

Oil Separator Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 9 in sequence	9

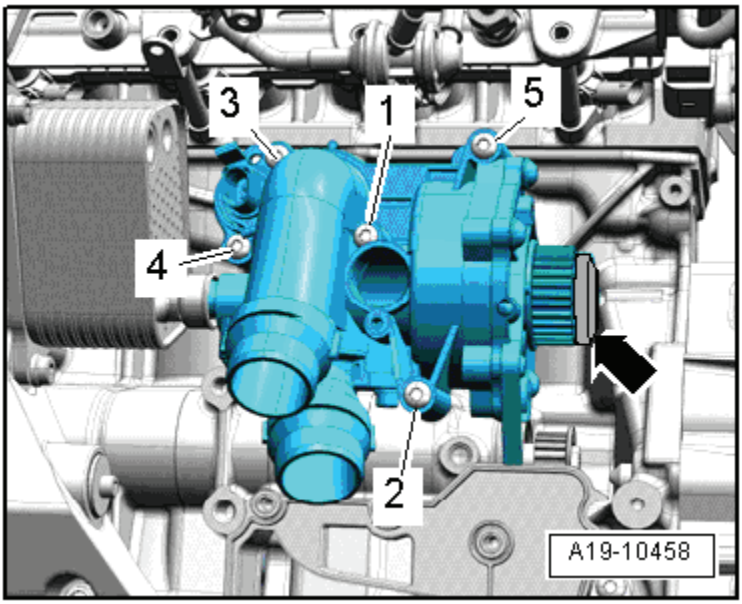
Engine Cooling – 2.0L CAEB

Fastener Tightening Specifications

Component	Nm
Connecting piece	9
Coolant connection	9
Coolant fan control module	2.5
Fan rib to coolant fan	5
Front coolant line	6
Radiator bracket [1)]	4.5
	5.5
Retaining plate	4
Small coolant pipe	9
Toothed belt drive gear (replace fastener)	10 plus an additional 90° (¼ turn)
Toothed belt guard	9

1) For bolt tightening clarification, refer to ElsaWeb, Radiator and Coolant Fan Overview, items 17 and 19.

Coolant Pump Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 5 in sequence	9

Fuel Supply – 2.0L CAEB

Fastener Tightening Specifications

Component	Nm
Accelerator pedal module	8
Fuel pump control module	2.5
Fuel tank nut/bolt	20
EVAP canister	16
Fuel tank heat shield	2
Leak Detection Pump (LDP)-to-EVAP canister	4
Locking ring	110
Securing strap	20

Turbocharger – 2.0L CAEB

Fastener Tightening Specifications

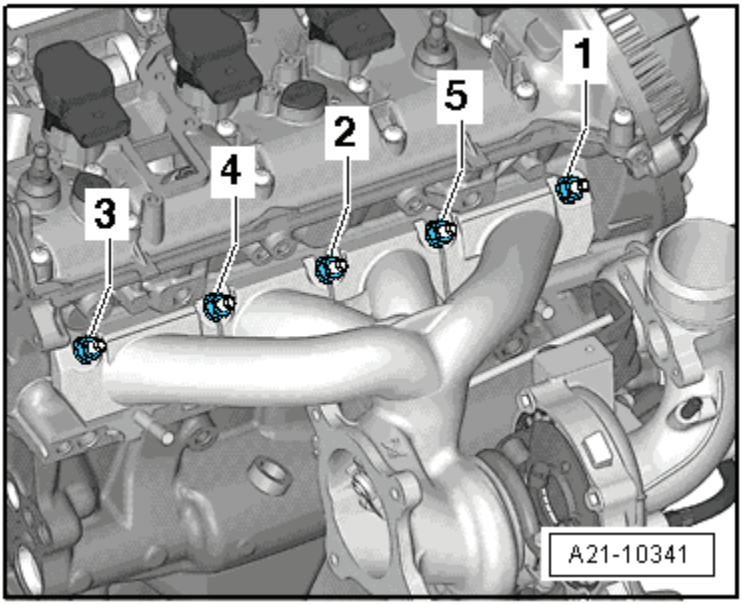
Component	Nm
Air guide pipe nut	9
Brace	30
Bracket	30
Charge Air Cooler (CAC)	7
Connection	9
Coolant return line [3]	9
	35
Coolant supply line [2]	9
	35
Crankcase ventilation pipe	9
Fastening strip nut (replace fastener)	30
Hose clamp	5.5
Oil return pipe	9
Oil supply line [1]	9
	30
Turbocharger recirculating valve	7
Charge air pressure sensor	5
Wastegate bypass regulator valve	3

[1] For bolt tightening clarification, refer to ElsaWeb, Turbocharger Overview Part II, items 6, 8 and 9.

[2] For bolt tightening clarification, refer to ElsaWeb, Turbocharger Overview Part II, items 12, 13 and 14.

[3] For bolt tightening clarification, refer to ElsaWeb, Turbocharger Overview Part III, items 3 and 6.

Turbocharger Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 5 in sequence	5
2	Tighten bolts 1 through 5 in sequence	12
3	Tighten bolts 1 through 5 in sequence	16
4	Tighten bolts 1 through 5 in sequence	25

Exhaust System – 2.0L CAEB

Fastener Tightening Specifications

Component	Nm
Bracket	23
Catalytic converter nuts [1] (replace fastener)	25
	40
Clamp	60
Clamping sleeve nut	25
Suspended mount	23

[1] For bolt tightening clarification, refer to ElsaWeb, Muffler Overview, items 10 and 12.

Fuel Injection and Ignition – 2.0L CAEB

Technical Data

Engine Data	2.0L Turbo FSI Engine
Idle speed Idle speed cannot be adjusted, it is regulated by idle stabilization	640 to 800 RPM
RPM limited by switching off fuel injectors and closing throttle valve	Approximately 6500 RPM
Ignition timing is regulated by Engine Control Module (ECM). It is not possible to adjust the ignition timing.	
Ignition/glow plug system	Single coil ignition system with 4 ignition coils (output stages integrated) connected directly to spark plugs via the ignition cables. The ignition coils can be pulled out of the cylinder head using ignition coil puller T40039.
Ignition sequence	1-3-4-2

Engine data		2.0L Turbo FSI engine
Idle speed Idle speed cannot be adjusted, it is regulated by idle stabilization		640 to 800 RPM
Engine speed limitation via fuel injector shut-off		6500 RPM
Fuel pressure	Fuel supply pressure up to high pressure pump (produced as needed by an electric fuel pump in the fuel tank).	3.0 to 10.5 bar pressure
	Fuel high pressure (produced by a mechanical single piston pump) at approximately 85 degree coolant temperature.	30 to 150 bar pressure

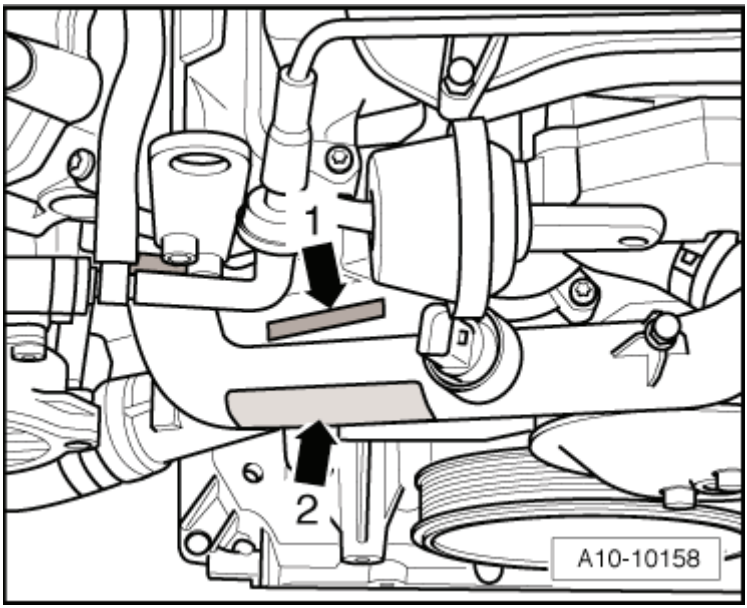
Fastener Tightening Specifications

Component	Nm
Air duct-to-lock carrier	2
E-Box cover	3.5
Engine speed sensor	4.5
Fuel pressure sensor	27
Fuel supply line connectors (replace fastener)	40
Fuel supply line union nut	27
High pressure fuel line	27
High pressure pump bolts	20
Intake Air Temperature (IAT) sensor	5
Intake manifold	9
Intake manifold support nut	10
Intake manifold support bolt	23
Knock Sensor (KS)	20
Oxygen Sensor (O2S)	55
Throttle valve control module	7
Camshaft Position (CMP) sensor	10
Spark plug	30

ENGINE MECHANICAL – 3.2L CALB

General, Technical Data – 3.2L CALB

Engine Number Location



The engine number (engine code and serial number) is located at the front of the cylinder block at the top (1➡).

Engine codes beginning with “C“ are four-digit.

The first 3 digits of the engine code are for displacement and mechanical structure of the engine and are stamped on the cylinder block. The fourth digit describes the engine output and torque.

Engine Data

Identification codes		CALB
Displacement	liter	3.197
Output	kW at RPM	199/5000
Torque	Nm at RPM	330/3000
Bore	diameter mm	85.5
Stroke	mm	92.8
Compression ratio		12.5
RON	at least	95 [1)]
Fuel injection and ignition system		Simos
Ignition sequence		1-4-3-6-2-5
Turbocharger		No
Knock control		2 sensors
Oxygen Sensor (O2S) regulation		4 heated oxygen sensors
Variable valve timing		Intake and exhaust
Variable intake manifold		Yes
Secondary Air Injection (AIR) system		Yes
Valve per cylinder		4

1) Unleaded RON 91 is permitted but performance is reduced.

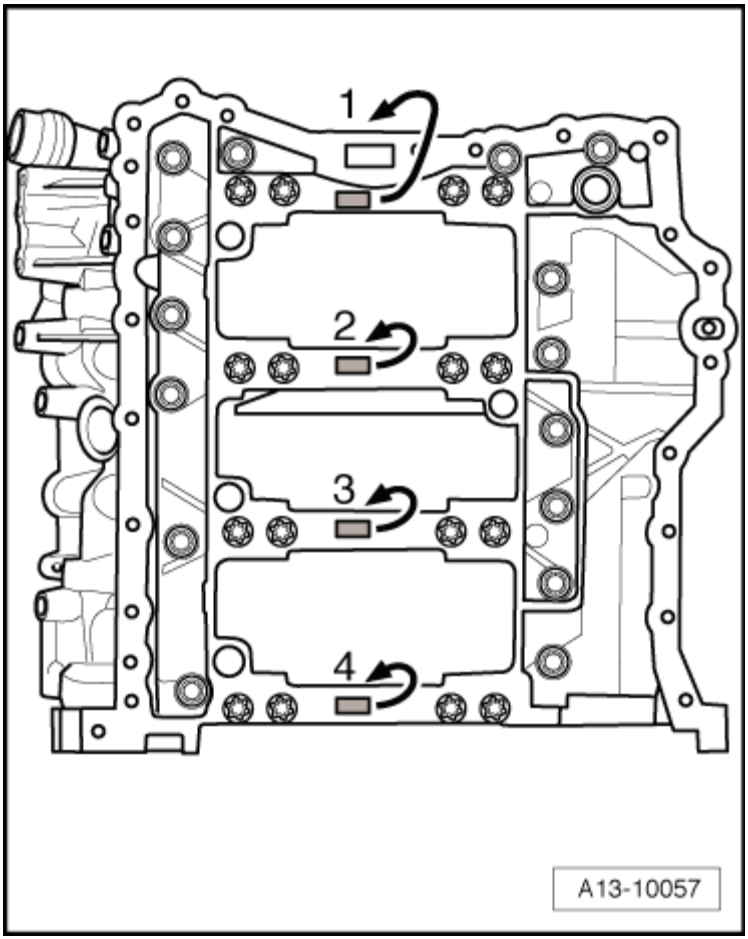
Engine Assembly – 3.2L CALB

Fastener Tightening Specifications

Component	Fastener size	Nm
Engine mount (replace fastener)	-	90 plus an additional 90° (¼ turn)
Engine support	-	40
Heat shield	-	10
Engine mount retaining plate	-	20
Subframe	-	55
Bolts and nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65

Crankshaft, Cylinder Block – 3.2L CALB

Allocation of Crankshaft Bearing Shells for Cylinder Block

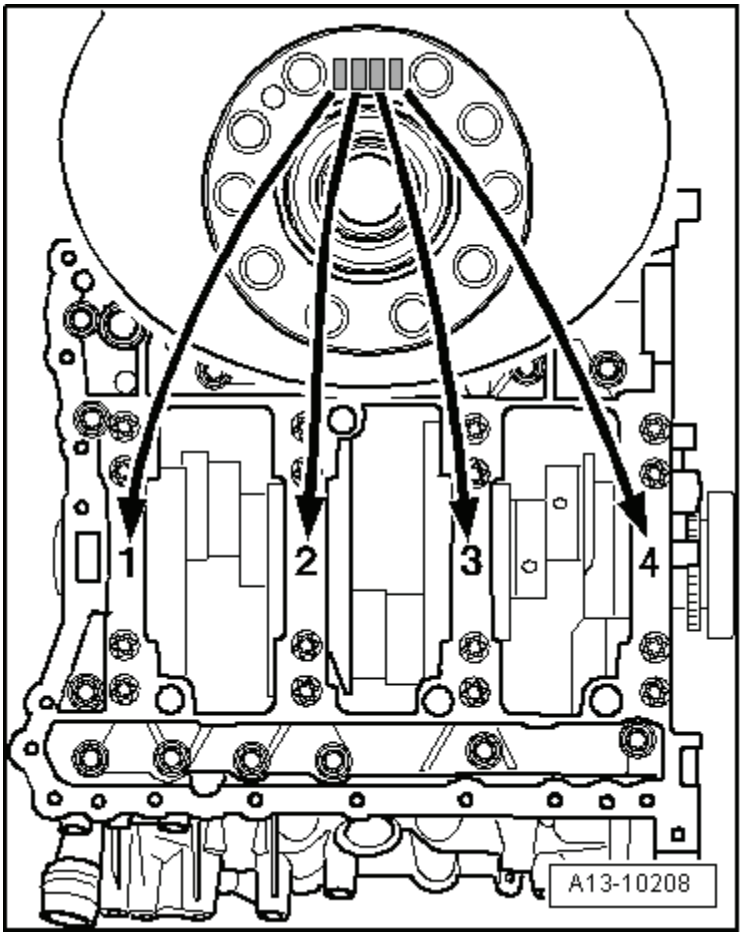


The bearing shells are allocated to the cylinder block with the correct thickness from the factory. Colored dots on the sides of the bearing shells identify the bearing shell thickness.

Allocation of the bearing shells to the cylinder block is marked by a letter on the respective bearing on the guide frame.

Letter on guide frame	Color of bearing
R	Red
G	Yellow
B	Blue
S	Black

Allocation of Crankshaft Bearing Shells for Guide Frame



The bearing shells are allocated to the guide frame with the correct thickness from the factory. Colored dots on the sides of the bearing shells identify the bearing shell thickness.

Allocation of the bearing shells to the guide frame is marked on the flywheel flange of the crankshaft by a row of letters. The first letter represents bearing 1, the second letter is for bearing 2, etc.

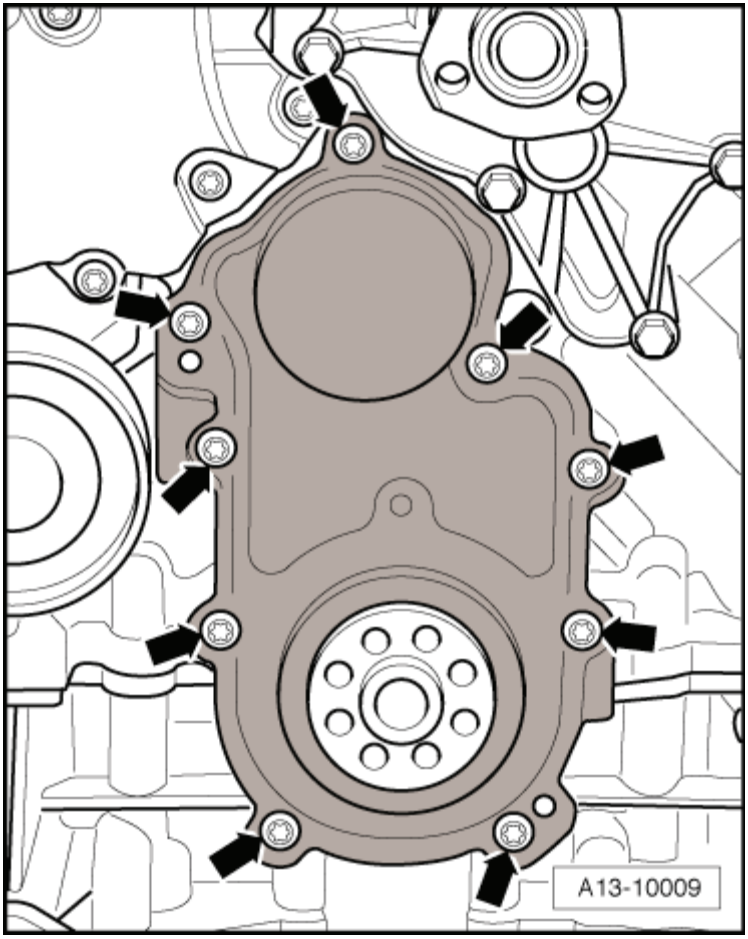
Letter on guide frame	Color of bearing
R	Red
G	Yellow
B	Blue
S	Black

Fastener Tightening Specifications

Component	Nm
Connecting rod bearing cap (replace fastener)	30 plus an additional 90° (¼ turn)
Drive plate (replace fastener)	60 plus an additional 90° (¼ turn)
Ribbed belt idler roller	40
Oil spray jet [1)]	9
Ribbed belt tensioning damper	20
Vibration damper with ribbed belt pulley (replace fastener)	20 plus an additional 90° (¼ turn)
“TDC“ marking locking bolt	14
Oil pressure regulation valve bolt	9

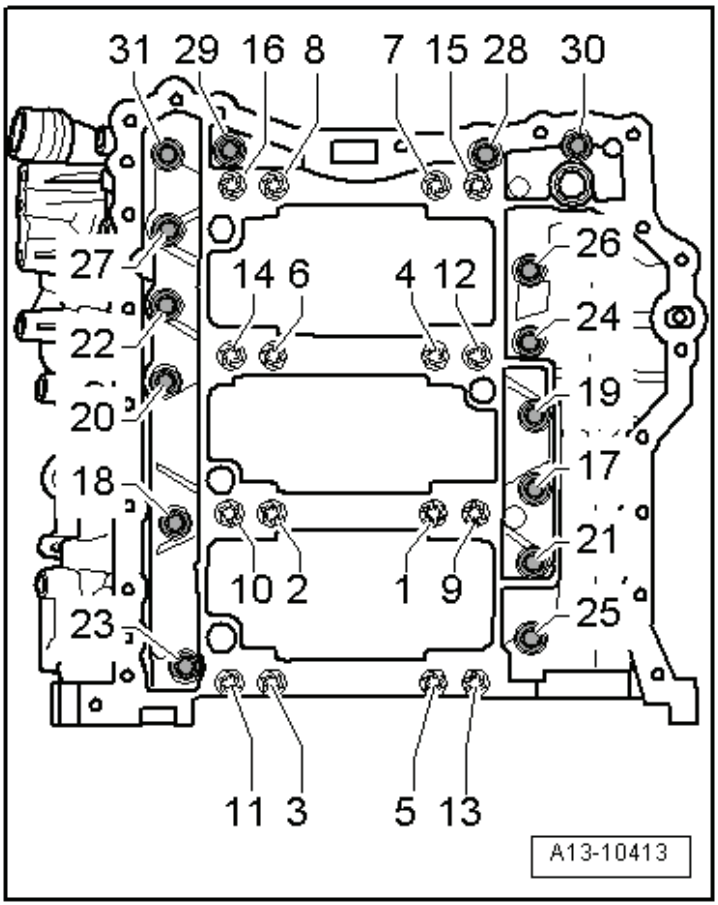
[1)] Insert the bolt with locking compound.

Ribbed Belt Sealing Flange Tightening Specification



Component	Nm
Tighten the bolts ➡ in a diagonal sequence	9

Guide Frame Tightening Specifications



Replace the guide frame bolts and insert the long bolts in the inner rows of the guide frame.

Step	Component	Nm
1	Tighten bolts 1 through 16 in sequence	50
2	Tighten bolts 1 through 16 in sequence	an additional 90° (¼ turn)
3	Tighten bolts 17 through 31 in sequence (for guide frame sealing surfaces on cylinder block)	23

Crankshaft Dimensions

Honing dimension in mm	Crankshaft bearing pin diameter		Crankshaft connecting rod journal diameter	
Basic dimension	65.000	-0.022 -0.042	56.000	-0.022 -0.042

Piston Ring End Gaps

Piston ring Dimensions in mm	New gap	Wear limit
1st compression ring	0.35 to 0.50	0.8
2nd compression rings	0.60 to 0.80	1.0
Oil scraping ring	0.25 to 0.50	0.8

Piston Ring Clearance

Piston ring Dimensions in mm	New	Wear limit
Compression rings	0.02 to 0.08	0.20
Oil scraping ring	0.02 to 0.08	0.15

Piston and Cylinder Dimensions

Honing dimension in mm	Piston diameter	Cylinder bore diameter
Basic dimension	84.49 [1)]	84.51

[1)] Dimension without graphite coating (thickness 0.02 mm). The graphite coating wears away.

Compression Checking Specifications

Compression pressure	Bar pressure
New	10.0 to 14.0
Wear limit	9.0
Maximum difference between cylinders	30

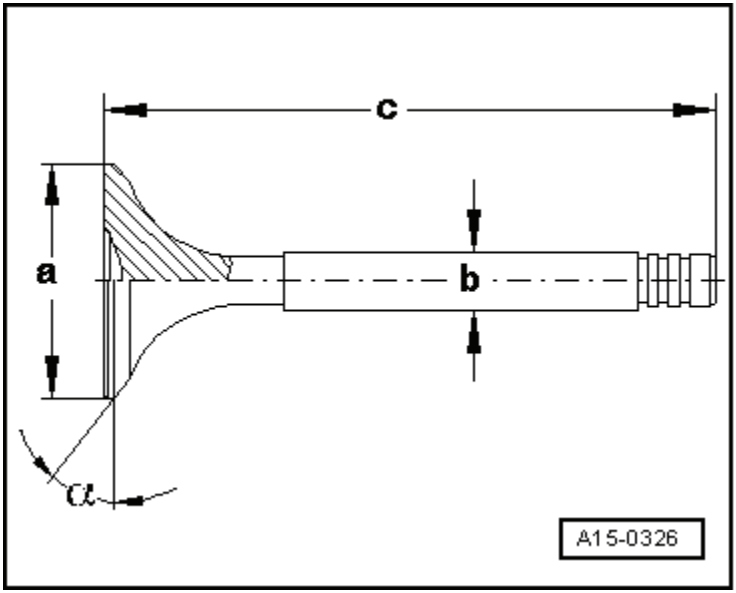
Cylinder Head, Valvetrain – 3.2L CALB

Fastener Tightening Specifications

Component	Nm
Balance shaft	60
Balance shaft chain sprocket	15 plus an additional 90° (¼ turn)
Bearing end bracket	13
Exhaust camshaft adjuster (replace fastener)	80 plus an additional 90° (¼ turn)
Camshaft adjuster actuator	5
Intake camshaft adjuster (replace fastener)	80 plus an additional 90° (¼ turn)
Camshaft Position (CMP) sensor, exhaust camshaft	9
Camshaft Position (CMP) sensor, intake camshaft	9
Chain tensioner	9
Chain tensioner with glide track (replace fastener)	10 plus an additional 45° (⅛ turn)
Drive sprocket mounting bracket (replace fastener)	8 plus an additional 45° (⅛ turn)
Oil pump drive sprocket (replace fastener)	30 plus an additional 90° (¼ turn)
Engine lifting eye	20
Guide rail [1] (replace fastener)	10 plus an additional 90° (¼ turn)
Left camshaft timing chain drive sprocket (replace fastener)	6 plus an additional 60° (⅙ turn)
Left camshaft timing chain tensioner	9
Drive sprocket pivot pin	30 plus an additional 90° (¼ turn)
Right camshaft timing chain tensioner	9
Solenoid valve for camshaft adjustment	2.5

[1] For bolt tightening clarification, refer to ElsaWeb, Timing Mechanism Drive Chain Overview, items 1 and 8.

Valve Dimensions

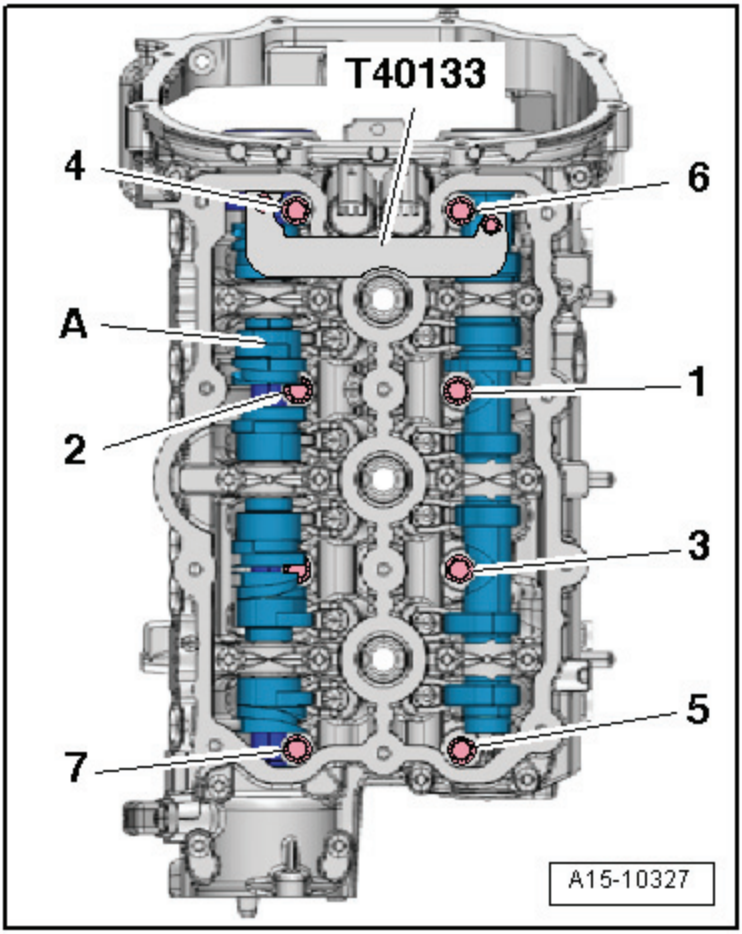


Dimension		Intake valve	Exhaust valve
Diameter a	mm	33.85 ± 0.10	28.0 ± 0.1
Diameter b	mm	5.98 ± 0.01	5.96 ± 0.01
c	mm	104.0 ± 0.2	101.9 ± 0.2
α	∠°	45	45

WARNING

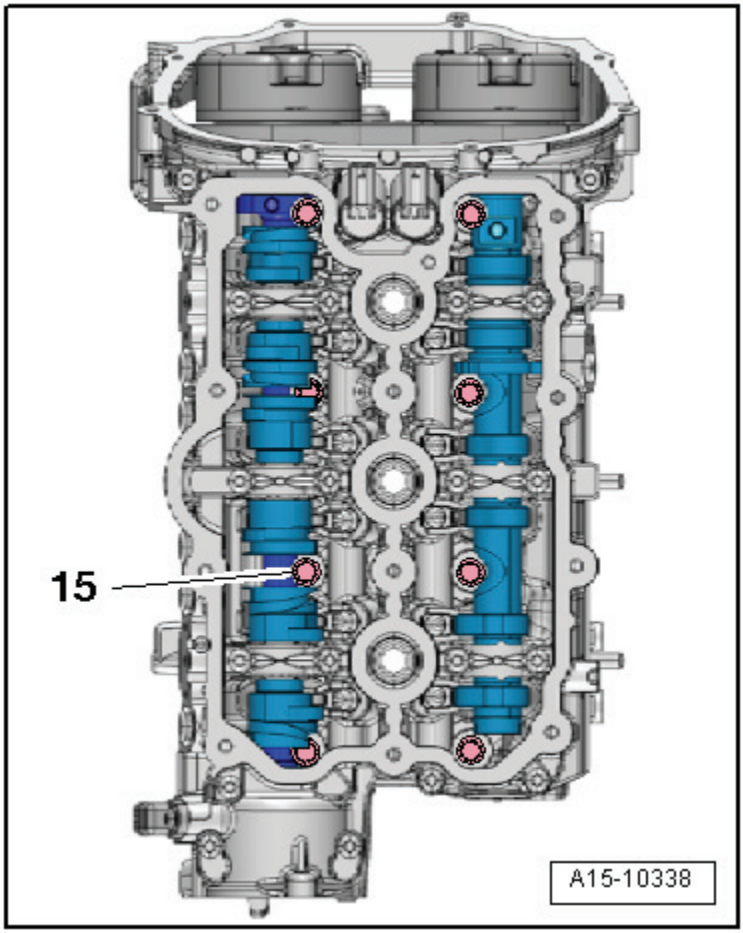
- Risk of injury if exhaust valves with sodium filling are disposed of improperly.
- Cut exhaust valve with sodium filling into 2 parts using a metal saw between the shaft center and valve plate. While doing this, do not come into contact with water.
- Throw, at the most, 10 such sawed exhaust valves in a bucket filled with water and step back immediately.
- When there is contact with water, a sudden chemical reaction occurs which burns the sodium filling.
- The treated parts may then be discarded through conventional disposal channels.

Left Cylinder Head Tightening Specifications



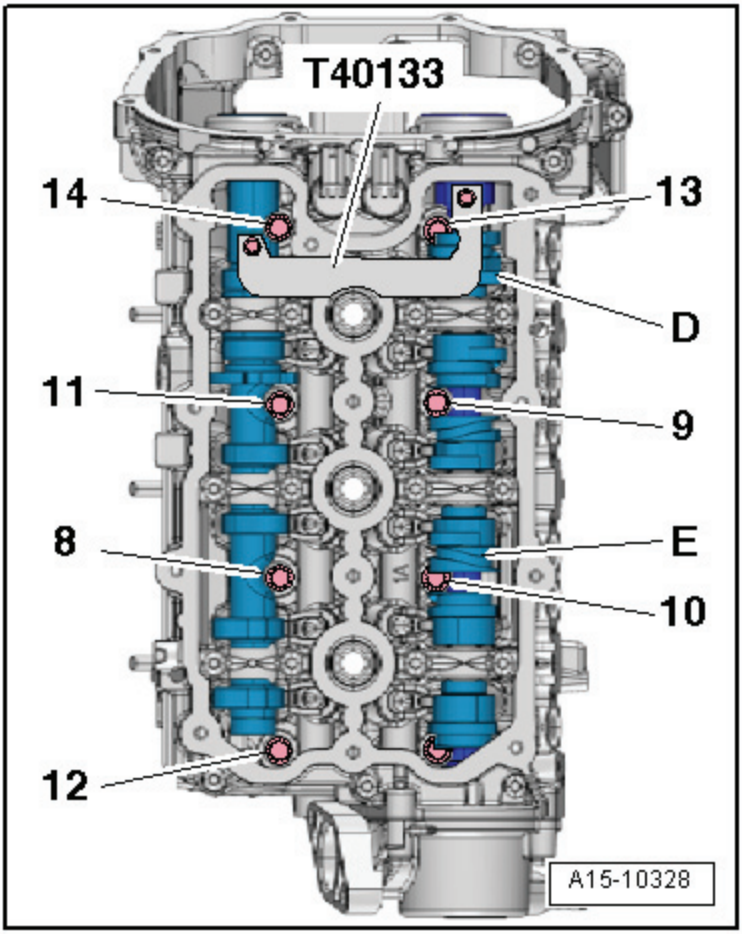
Insert bolts 1 through 7 while sliding the unloaded camshaft slider (A).

Step	Component	Nm
1	Insert and tighten bolts 1 through 7 in sequence	40
2	Tighten bolts 1 through 7 in sequence	an additional 90° (¼ turn)
3	Tighten bolts 1 through 7 in sequence	an additional 90° (¼ turn)



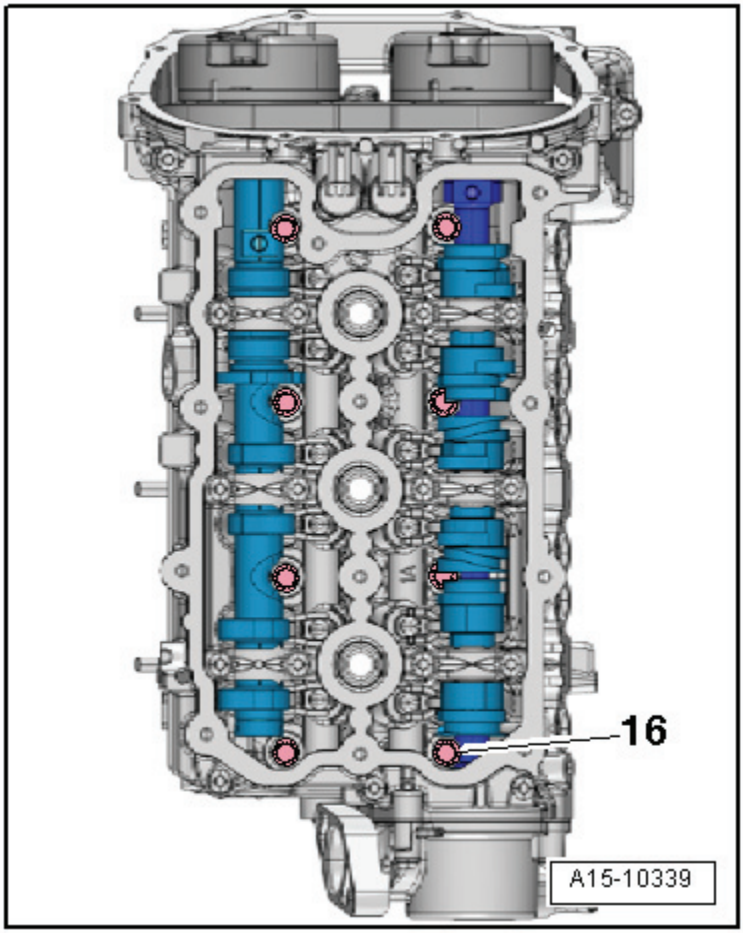
Step	Component	Nm
1	Insert and tighten bolt 15	40
2	Tighten bolt 15	an additional 90° (¼ turn)
3	Tighten bolt 15	an additional 90° (¼ turn)

Right Cylinder Head Tightening Specifications



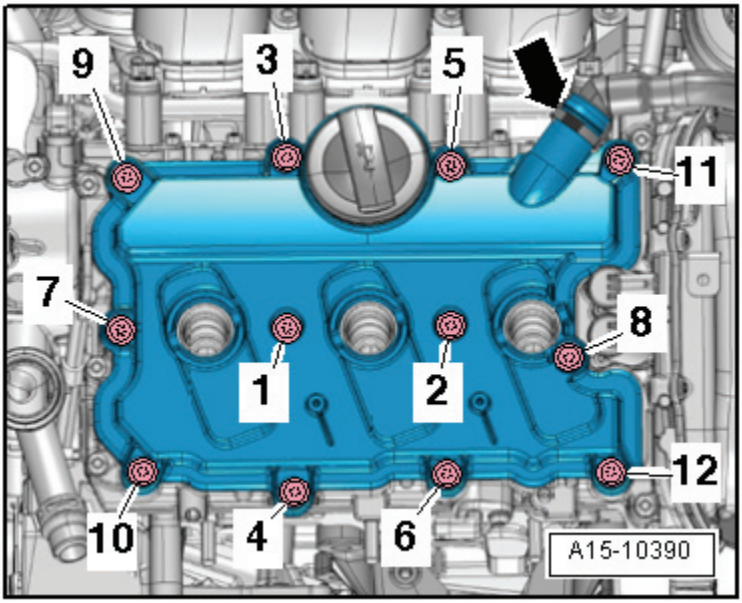
Insert bolts 8 through 14 while sliding the unloaded camshaft slider (D and E).

Step	Component	Nm
1	Tighten bolts 8 through 14 in sequence	40
2	Tighten bolts 8 through 14 in sequence	an additional 90° (¼ turn)
3	Tighten bolts 8 through 14 in sequence	an additional 90° (¼ turn)



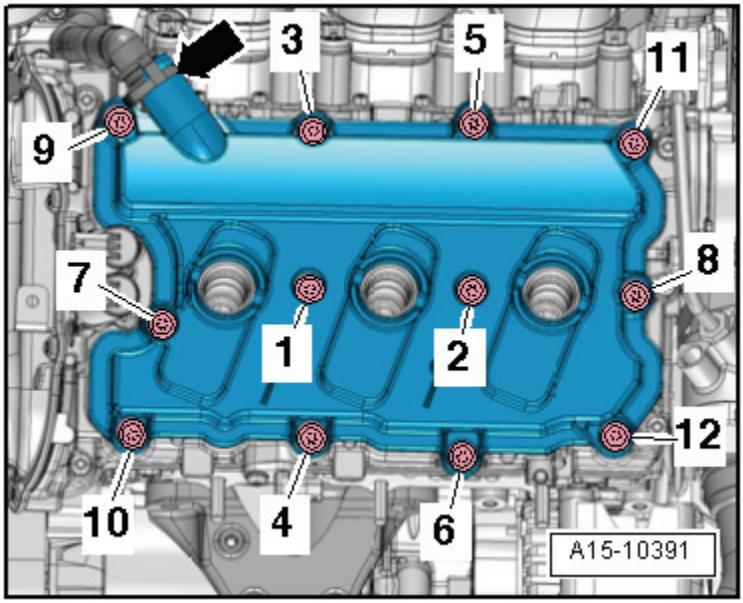
Step	Component	Nm
1	Insert and tighten bolt 16	40
2	Tighten bolt 16	an additional 90° (¼ turn)
3	Tighten bolt 16	an additional 90° (¼ turn)

Left Cylinder Head Cover Tightening Specification



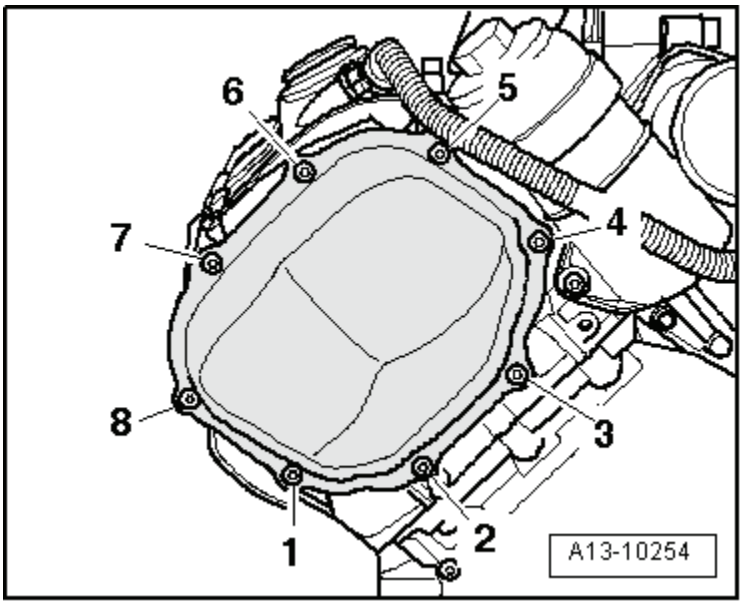
Step	Component	Nm
1	Tighten bolts 1 through 12 in sequence	9

Right Cylinder Head Cover Tightening Specification



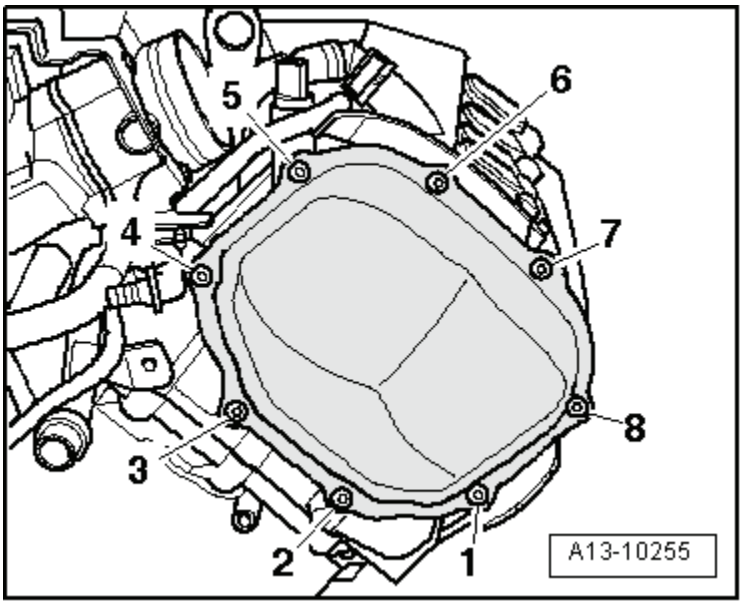
Step	Component	Nm
1	Tighten bolts 1 through 12 in sequence	9

Left Timing Chain Cover Tightening Specifications



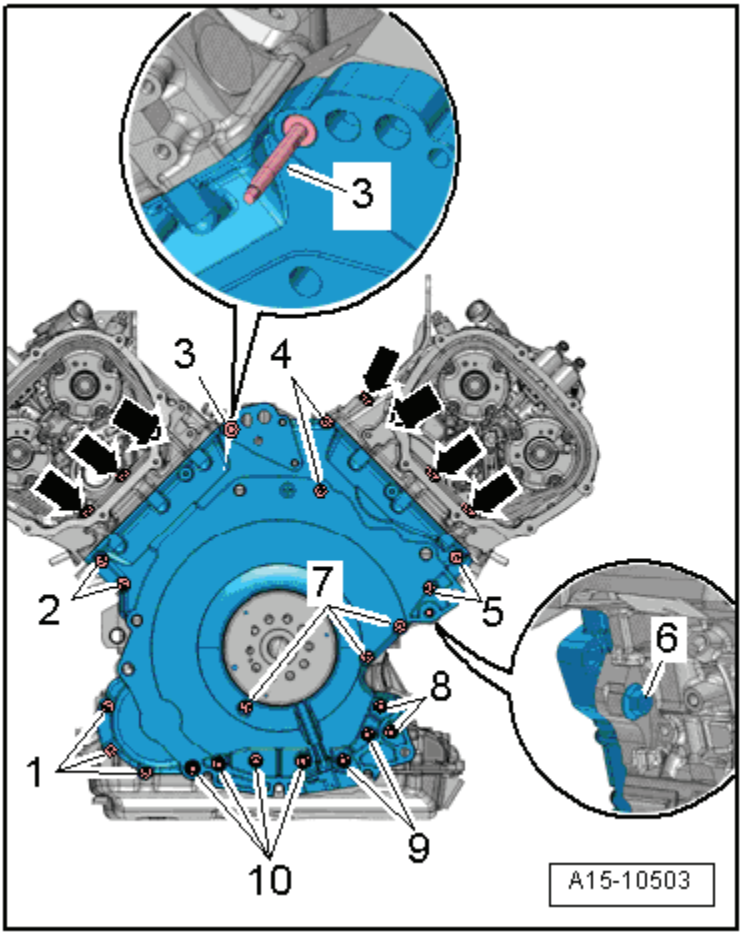
Step	Component	Nm
1	Tighten bolts 1 through 8 in sequence (replace bolts)	5
2	Tighten bolts 1 through 8 in sequence	an additional 90° (¼ turn)

Right Timing Chain Cover Tightening Specifications



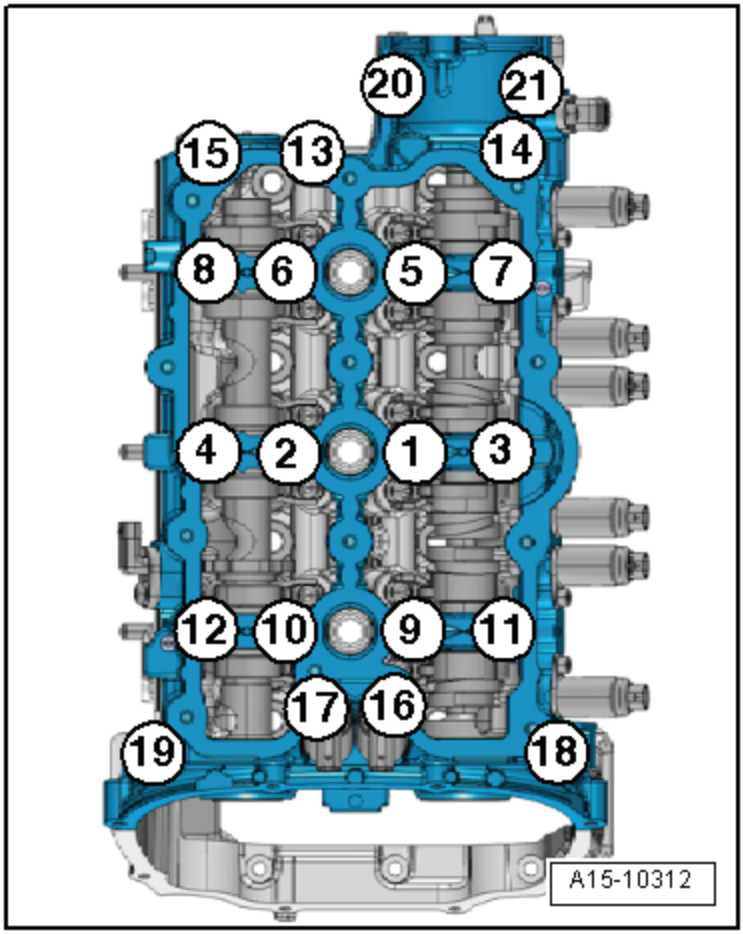
Step	Component	Nm
1	Tighten bolts 1 through 8 in sequence (replace bolts)	5
2	Tighten bolts 1 through 8 in sequence	an additional 90° (¼ turn)

Lower Timing Chain Cover Tightening Specifications



Step	Component	Nm
1	Insert the bolts (➡) and tighten	5
2	Tighten bolts 1 through 10 in sequence diagonally	9
3	Tighten bolts (➡)	9
4	Tighten bolts 8, 9 and 10	22
5	Tighten bolt 3	16
6	Tighten bolt 6	70

Camshaft Guide Frame Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 21 in sequence	Hand-tighten
2	Tighten bolts 1 through 21 in sequence	8
3	Tighten bolts 1 through 21 in sequence	an additional 90° (¼ turn)

Engine Lubrication – 3.2L CALB

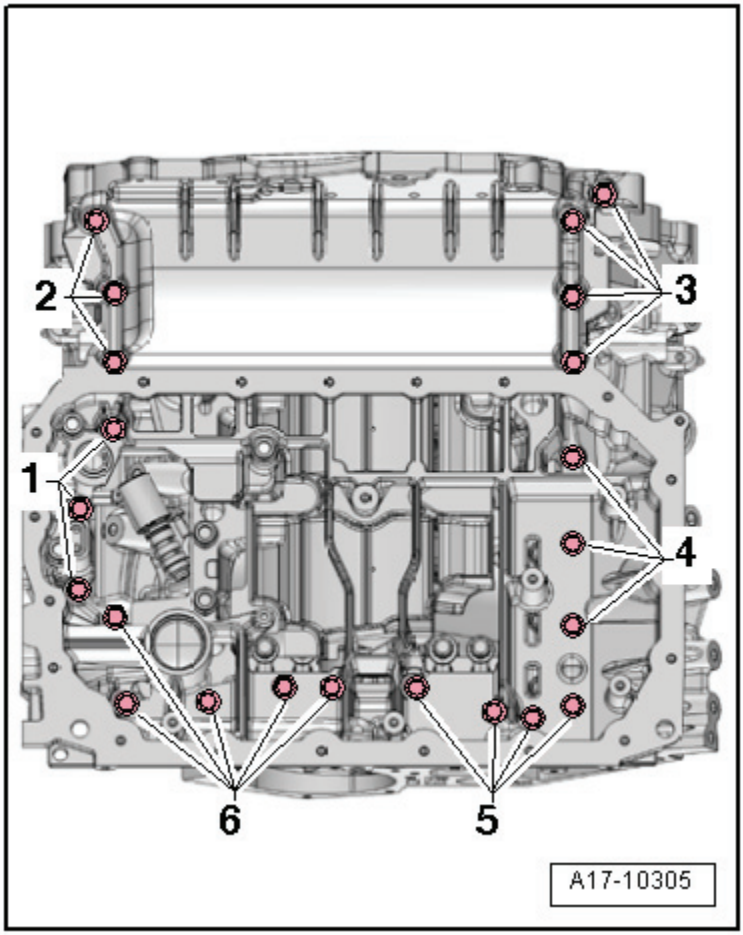
Fastener Tightening Specifications

Component	Nm
Cover for oil filter housing	25
Cover with oil separator	9
Crankcase ventilation hose	3
Engine oil cooler	9
Lower oil baffle	9
Oil check valve	20
Oil drain plug	30
Oil filter housing bolts [2]	9
	13
Oil filter housing stud bolt	16
Oil filter housing union nut	13
Oil level thermal sensor nut	9
Oil pressure switch	20
Oil pump	20
Oil pump chain sprocket (replace fastener)	30 plus an additional 90° (¼ turn)
Oil pump chain sprocket bracket	9
Reduced oil pressure switch	20
Upper oil baffle [1]	9

[1] Insert with locking compound.

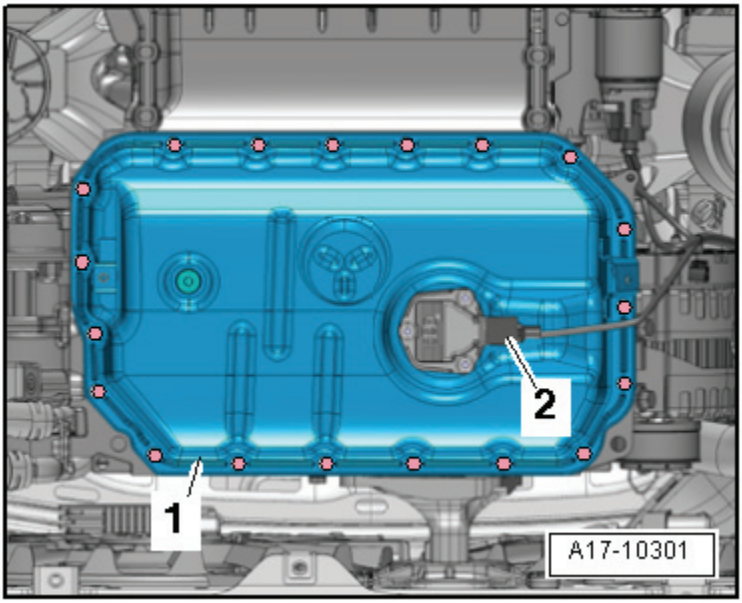
[2] For bolt tightening clarification, refer to ElsaWeb, Oil Filter Housing and Oil Pressure Switch Overview, items 1, 5 and 13.

Upper Oil Pan Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 6 in a diagonal sequence	5
2	Tighten bolts 1 through 6 in a diagonal sequence	16

Oil Pan Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 6 in a diagonal sequence	5
2	Tighten bolts 1 through 6 in a diagonal sequence	an additional 90° (¼ turn)

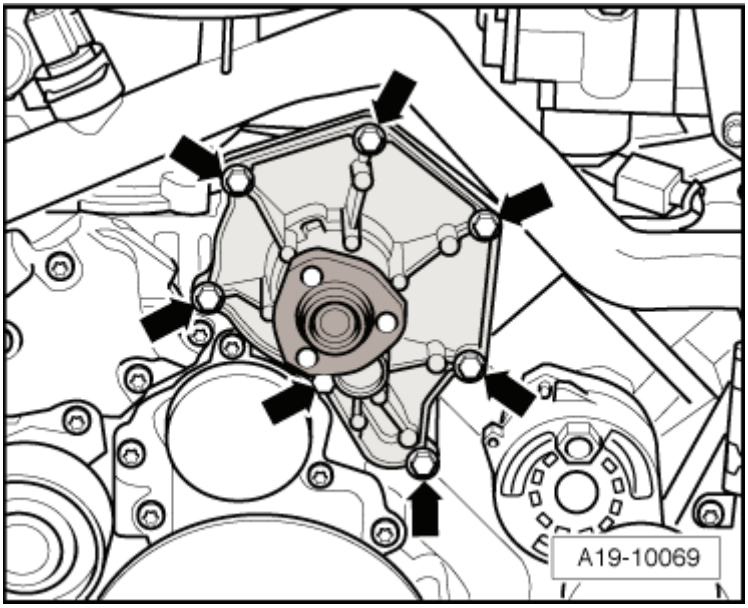
Cooling System – 3.2L CALB

Fastener Tightening Specifications

Component	Nm
After run coolant pump	4
Coolant fan control module	4.5
Coolant pump	9
Coolant pump ribbed belt pulley	20
Coolant thermostat	9
Fan rib	5
Front coolant pipe	9
Left coolant pipe	9
Radiator bracket [1)]	3.5
Upper coolant pipe	9

1) For bolt tightening clarification, refer to ElsaWeb, Radiator and Coolant Fan Overview, item 6.

Coolant Pump Tightening Specification



Step	Component	Nm
1	Tighten bolts (➡) in a diagonal sequence	9

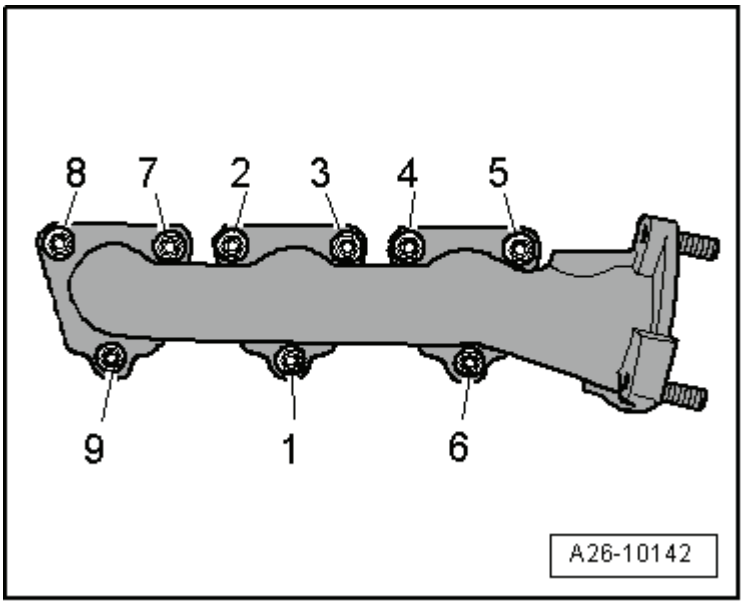
Exhaust System, Emission Controls – 3.2L CALB

Fastener Tightening Specifications

Component	Nm
Secondary Air Injection (AIR) pump motor bracket bolt/ nut	9
Catalytic converter nut [1] (replace fastener)	23
Center muffler nut (replace fastener)	23
Clamp	23
Front clamping sleeve nut	23
Heat shield	10
Rear clamping sleeve nut	23
Secondary Air Injection (AIR) combination valve	9
Secondary Air Injection (AIR) pipe	9
Suspended mount bolt	23
Suspended mount nut (replace fastener)	23

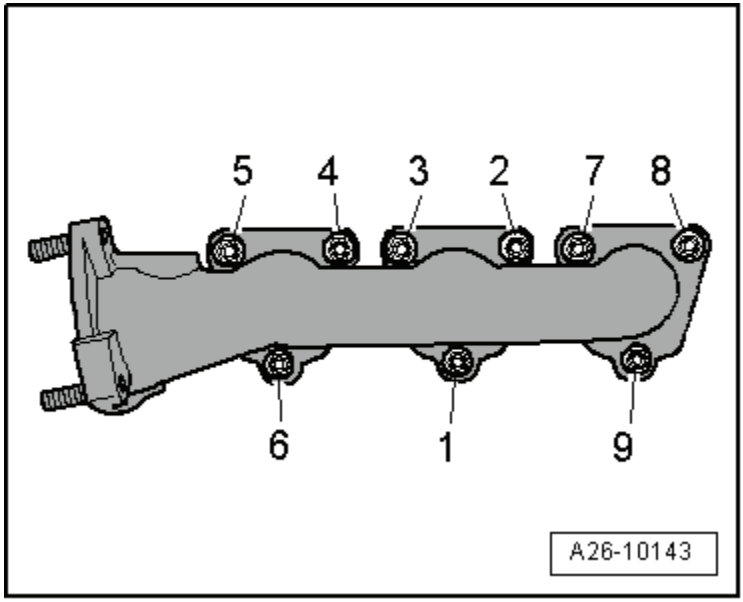
[1] Lubricate with hot bolt paste.

Left Exhaust Manifold Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 9 in sequence	Hand-tighten
2	Tighten bolts 1 through 9 in sequence	15
3	Tighten bolts 1 through 9 in sequence	25

Right Exhaust Manifold Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 9 in sequence	Hand-tighten
2	Tighten bolts 1 through 9 in sequence	15
3	Tighten bolts 1 through 9 in sequence	25

Fuel Supply – 3.2L CALB

Fastener Tightening Specifications

Component	Nm
Accelerator pedal module	8
Fuel pump control module	2.5
Fuel tank nut/bolt	20
EVAP canister	16
Fuel tank heat shield	2
Leak Detection Pump (LDP)-to-EVAP canister	4
Locking ring	110
Securing strap	20

Fuel Injection and Ignition – 3.2L CALB

Technical Data

Engine data	3.2L/4V FSI
Idle speed Cannot be adjusted, regulated by idle stabilization	650 to 750/min [1)]
Fuel pressure after high pressure pump	40 to 110 bar pressure
Fuel pressure before high pressure pump	3.0 to 5.7 bar pressure

1) Depending on Engine Control Module (ECM) requirements

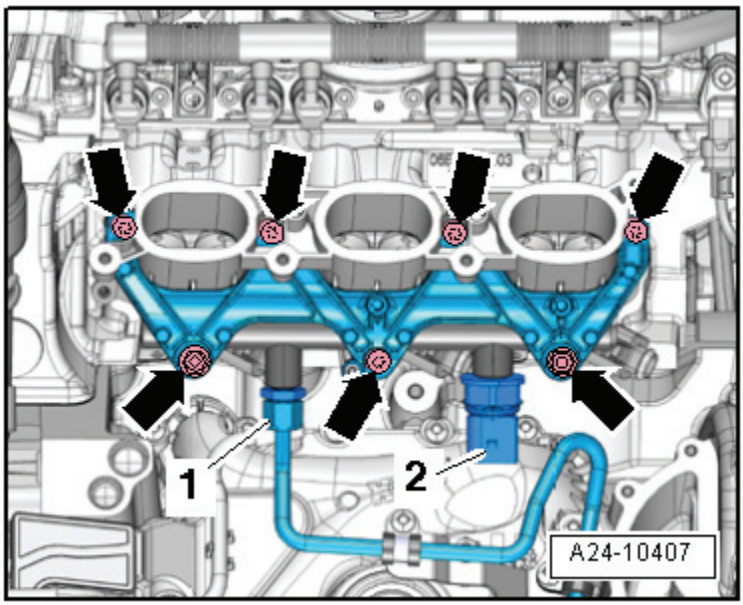
Ignition Technical Data

Engine data	3.2L/ 4V FSI
Idle speed	Not adjustable, regulated by Engine Control Module (ECM)
Ignition timing	
Ignition/glow plug system	Single coil ignition system with 8 ignition coils (output stages integrated) connected directly to the spark plugs via the ignition cables.
Ignition sequence	1-5-3-6-2-4

Fastener Tightening Specifications

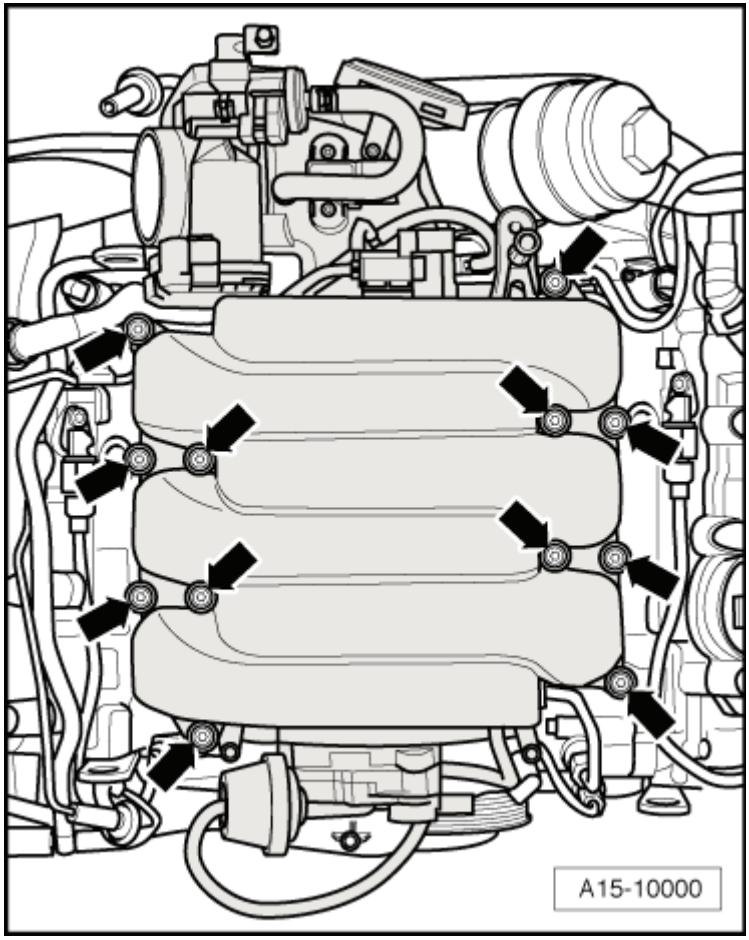
Component	Nm
Oxygen Sensors (O2S)	55
Camshaft adjustment valves	2.5
Intake Air Temperature (IAT) sensor/Manifold Absolute Pressure (MAP) sensor	3
Actuator for intake manifold changeover	2.5
Camshaft Position (CMP) sensor	10
Knock Sensors (KS)	20
Spark plugs	30

Lower Intake Manifold Tightening Specifications



Component	Nm
Intake manifold lower part-to-cylinder head (➡) (tighten diagonally)	9
High pressure line to fuel rail (1)	27

Upper Intake Manifold Tightening Specification

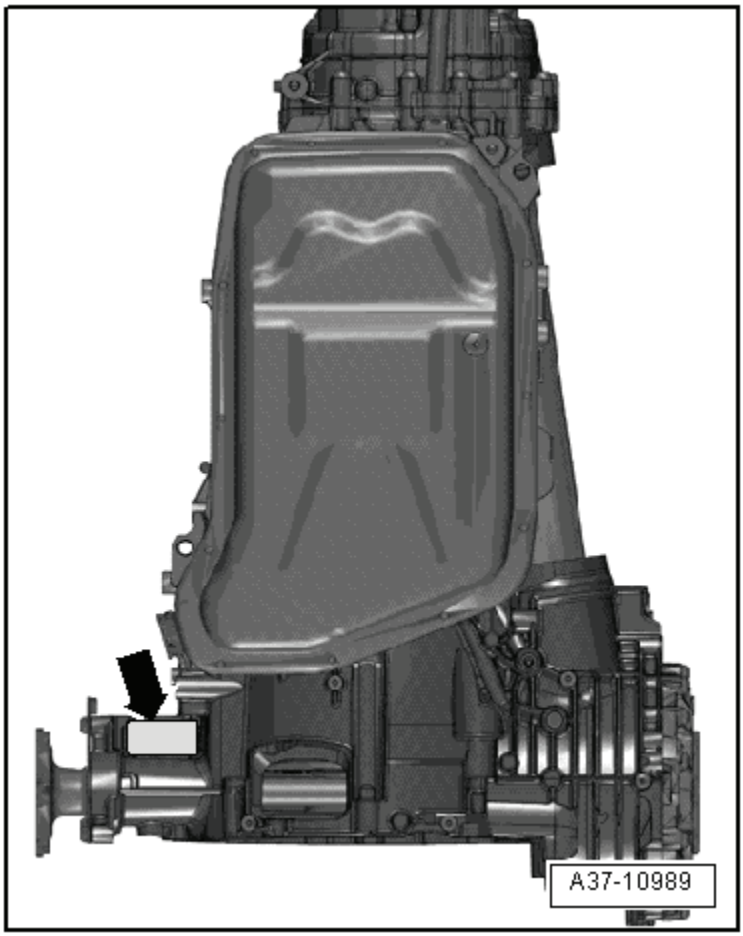


Component	Nm
Intake manifold upper part to lower part (➡) (tighten diagonally)	8

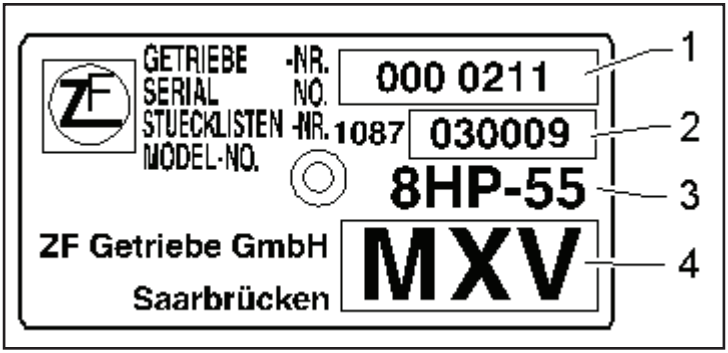
AUTOMATIC TRANSMISSION – 0BK

General, Technical Data – 0BK

Transmission Identification



Transmission code letters are located on the data plate under the transmission. Type plate installed location ➡.



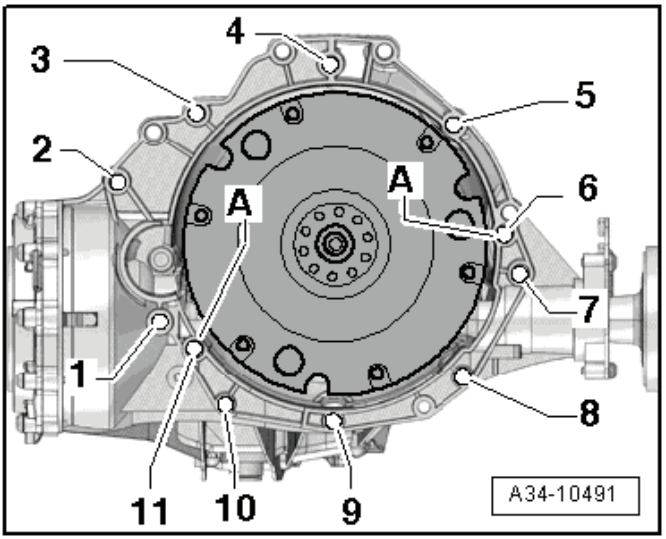
1 - Transmission serial number
2 - Parts list number
3 - Manufacturer transmission identification: 8HP-55
4 - Example of a transmission code: MXV

Note: The transmission code letters are also included on the vehicle data labels.

Code Letters, Transmission Allocations, Ratios and Equipment

Automatic Transmission			**0BK AWD**	
Trans-mission	Identification codes		MXV	NEV
	Month of manufacture	from	06.2010	07.2010
		through	07.2010	
Torque converter	Identification codes		NW235	NW235
Allocation	Type		Audi Q5 from MY 08	Audi Q5 from MY 08
	Engine		2.0L TFSI - 155 kW	2.0L TFSI - 155 kW
Primary drive			33:29 = 1.138	33:29 = 1.138
Gear wheel front axle			31:29 = 1.069	31:29 = 1.069
Front axle bevel gear			34:11 = 3.091	34:11 = 3.091
Complete front axle ratio = primary drive x drive wheel x bevel gear			3.760	3.760
Rear axle bevel gear			43:13 = 3.308	43:13 = 3.308
Complete rear axle ratio = rear axle bevel gear x primary drive			3.764	3.764
Oil system, front final drive/ transfer case			Separated	Separated

Securing Transmission to Engine



Item	Bolt	Nm
1 [1]	M10 x 50 [2]	65
2 [1], 7	M12 x 100 [3]	30 plus an additional 90° (¼ turn)
3 [4], 6	M12 x 75 [3]	30 plus an additional 90° (¼ turn)
4, 5 [4]	M12 x 120 [3]	15 plus an additional 90° (¼ turn)
8, 10	M10 x 75 [3]	15 plus an additional 90° (¼ turn)
9	M10 x 60 [3]	15 plus an additional 90° (¼ turn)
11 [5]	M12 x 50 [3]	30 plus an additional 90° (¼ turn)
A	Alignment sleeves for centering	

[1] Also secures the starter.
[2] Bolt strength rating 10.9, there is no limit to the number of times steel bolts can be used.
[3] The aluminum bolts can be used twice.
[4] With a bracket for the wires.
[5] Installed from the engine side.

Aluminum bolts 2 through 11 can only be used twice. After using the bolts once, use a chisel and mark the bolts with two notches (X). To prevent damaging the bolts when marking them, do not clamp them in a vise. Use a ½" drive 14 mm socket and extension clamped into a vice. Do not use bolts that have been marked with an X.

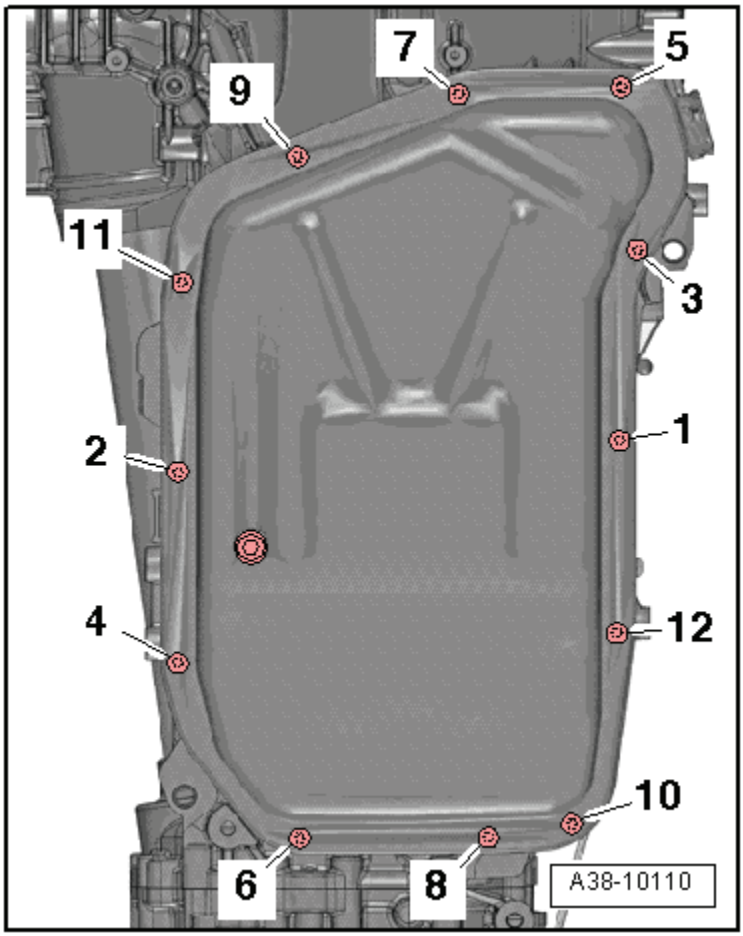
Fastener Tightening Specifications

Component	Fastener size	Nm
ATF drain plug (replace fastener)		12
ATF pipe nut		29
ATF plug for the hole for checking and filling (replace fastener)		30
Bolts and nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65
Drain plug for the hole for checking and filling the transmission fluid inside the transfer case		12
Drain plug for the hole for checking and filling the transmission fluid inside the front final drive		30
Drive axle heat shield		23
Oil drain plug for the transmission fluid inside the transfer case		30
Oil drain plug for the transmission fluid inside the front final drive		12
Selector mechanism function unit to the body nut		10

Fastener Tightening Specifications

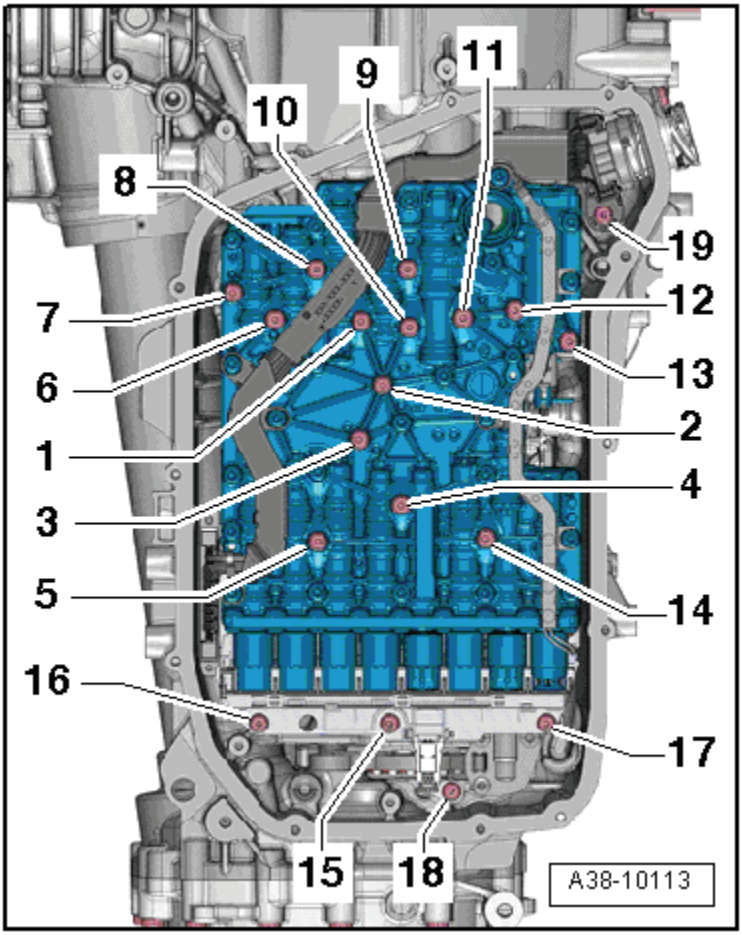
Component	Nm
Mechatronic connector-to-transmission housing	10
Transmission output speed sensor-to-transmission housing	10

ATF Oil Pan Tightening Specifications and Sequence



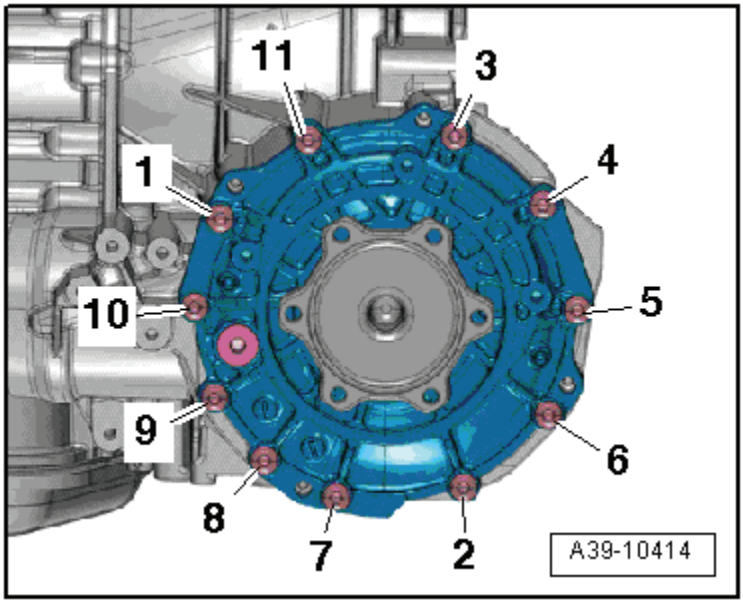
Step	Component	Nm
1	Replace and tighten bolts 1 through 12 in sequence	Hand-tighten
2	Tighten bolts 1 through 12 in sequence	4
3	Tighten bolts 1 through 12 in sequence	an additional 45° (⅛ turn)

Mechatronic Tightening Specification



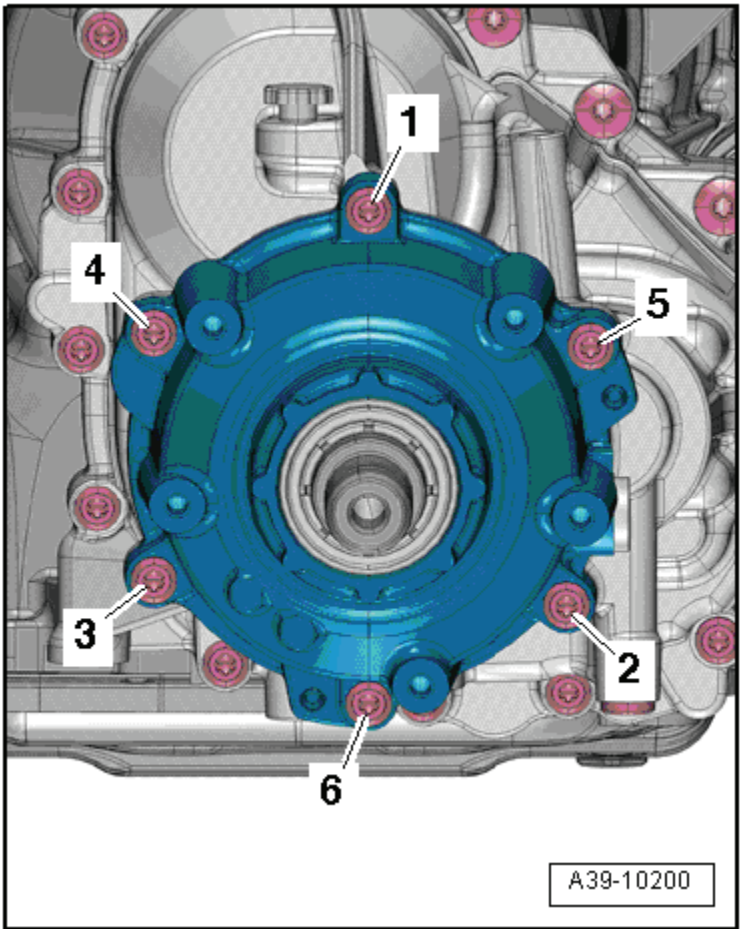
Component	Nm
Tighten bolts 1 through 19 in sequence	10

Front Final Drive Cover Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 and 6	3
2	Tighten bolts 1 through 11 in sequence	27

Center Differential Housing Tightening Specifications



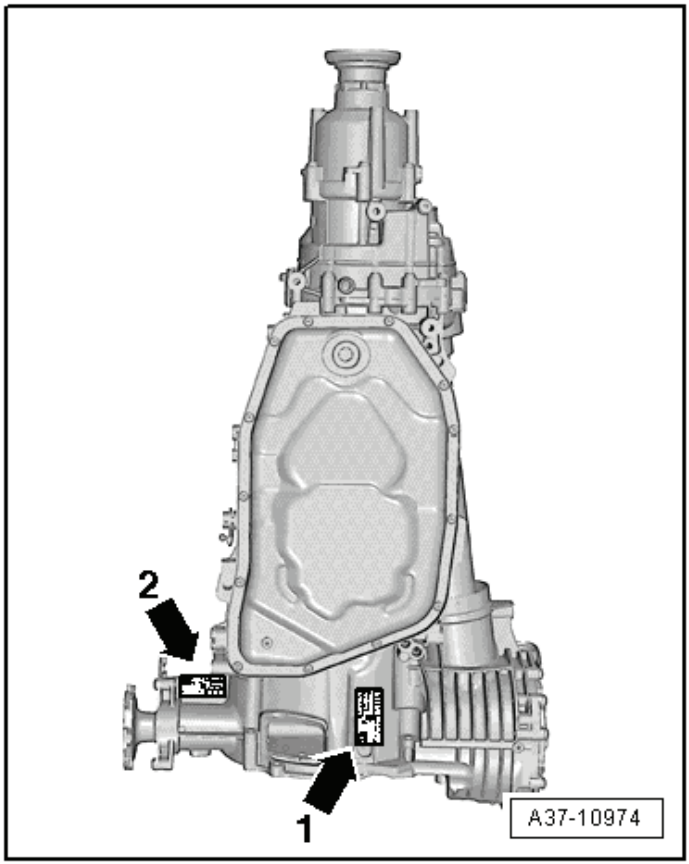
Replace the center differential housing bolts.

Step	Component	Nm
1	Tighten bolts 1 and 6	3
2	Tighten bolts 1 through 6 in sequence	10
3	Tighten bolts 1 through 6 in sequence	an additional 90° (¼ turn)

AUTOMATIC TRANSMISSION – 0B6

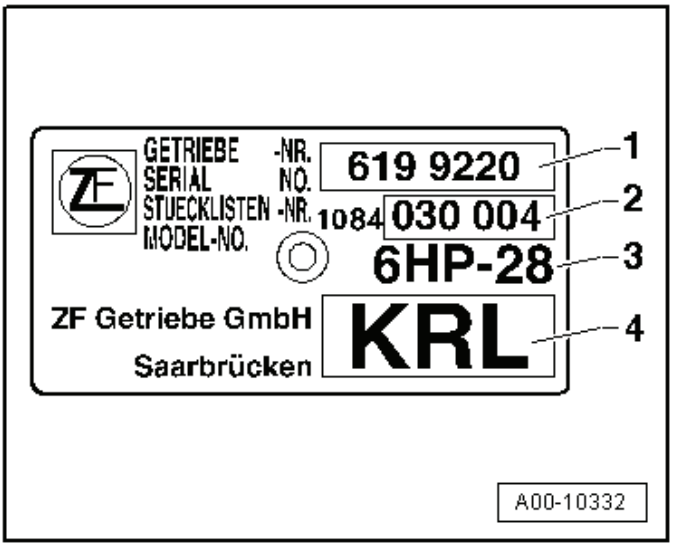
General, Technical Data – 0B6

Transmission Identification



Transmission code letters are located on the data plate under the transmission. The data plate is installed at either 1➡ or 2➡. An identical type plate is located on the left side of the transmission but is not accessible with the transmission installed.

Transmission Code Letters and Serial Numbers



Example:	
1	Transmission serial number
2	Parts list number
3	Manufacturer transmission identification: 6HP-28
4	Transmission code letters, for example: KRL

Note: The transmission code is also listed on the vehicle data plate.

Specifications – Engine Codes, Allocation, Ratios and Capacities

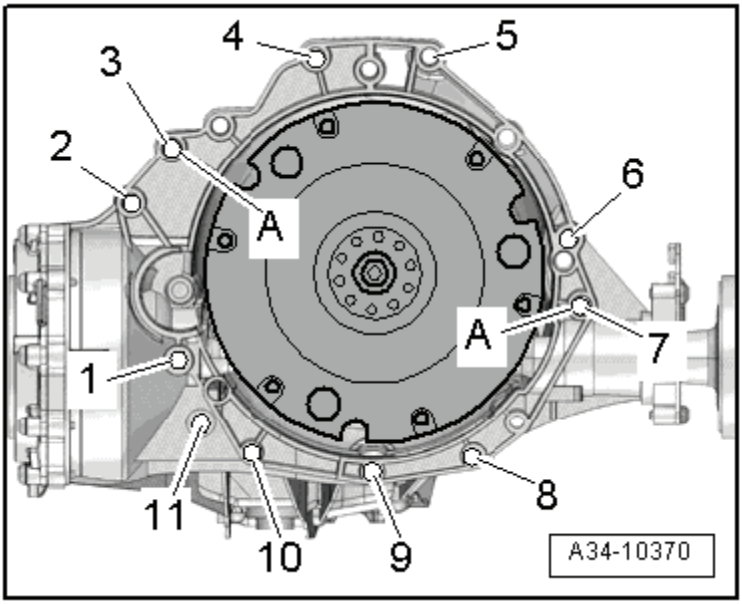
Automatic Transmission			0B6 All Wheel Drive
Transmission	Identification code		KGE
	Month of production	from	09.2008
		to	
Torque Converter	Identification code		K113
Allocation	Model		Audi Q5 from MY 2008 NAR
	Engine		3.2L FSI - 199 kW
Primary drive			37:29 = 1.276
Front axle helical gear			31:29 = 1.069
Front axle bevel gear			34:11 = 3.091
Complete front axle ratio = primary drive x helical gear drive x bevel gear drive			4.216
Rear axle bevel gear			43:13 = 3.308
Complete rear axle ratio = Rear axle bevel gear x primary drive			4.220

Controls, Housing – 0B6

Fastener Tightening Specifications

Component	Fastener size	Nm
Bolts and nuts	M6	9
	M7	15
	M8	20
	M10	40
	M12	65
Driveshaft heat shield bolt		23
Oil pan drain plug		12
Oil pan inspection lug		9
Torque converter-to-drive plate bolt		60

Transmission to Engine Tightening Specifications

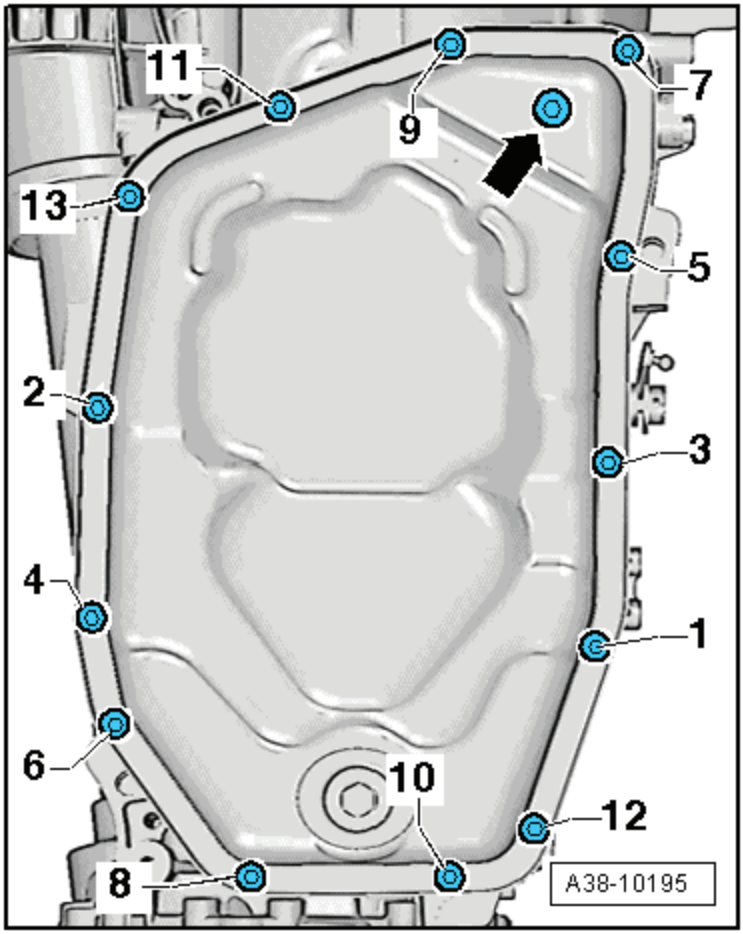


Item	Bolt	Nm
1	M10 x 50 [1)]	65
2 through 6	M12 x 100 [2)]	30 plus an additional 90° (¼ turn)
7	M12 x 125 [2)]	30 plus an additional 90° (¼ turn)
8 and 11	M10 x 60 [2)]	15 plus an additional 90° (¼ turn)
9	M10 x 75 [2)]	15 plus an additional 90° (¼ turn)
10	M10 x 95 [2)]	15 plus an additional 90° (¼ turn)
A	Alignment pins for centering	

[1)] Bolt strength rating 10.9. There is no limit to the number of times the steel bolt can be reused.

[2)] Aluminum bolts 2 through 11 can only be used twice. After using the bolts once, use a chisel and mark the bolts with two notches (X). To prevent damaging the bolts when marking them, do not clamp them in a vise. Use a ½" drive 14 mm socket clamped into a vice. Do not use bolts that have been marked with an X.

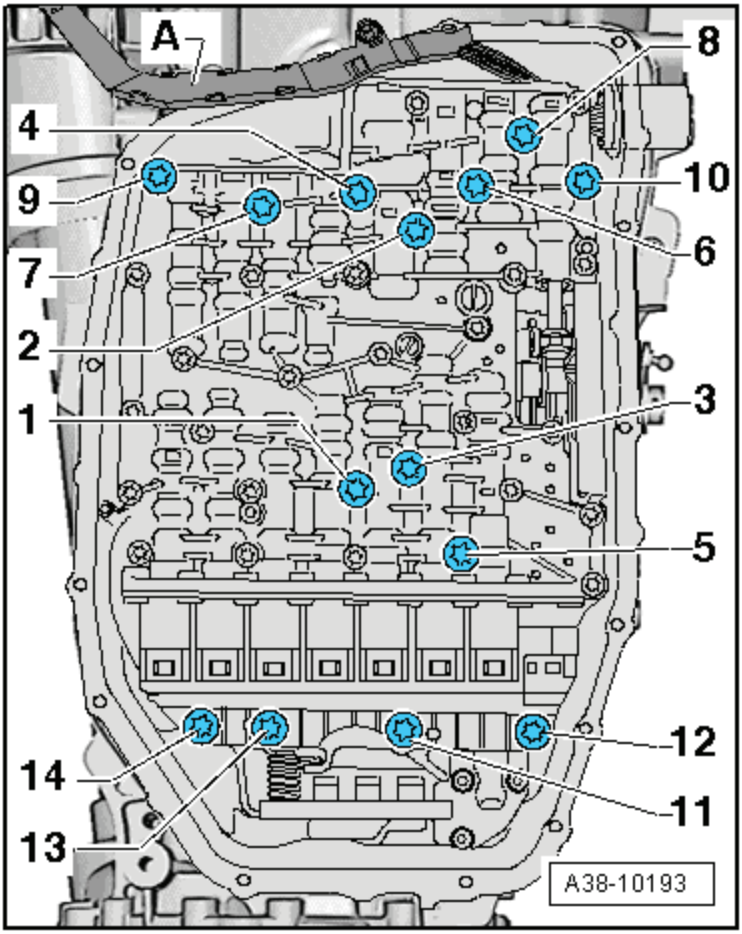
Oil Pan Tightening Specifications



Remove the oil pan bolts opposite of the tightening sequence (13 to 1).

Component	Nm
Install 4 guide pins using T40199 in locations 10, 11, 12, and 13	
Tighten bolts 1 through 9 in sequence (replace bolts)	2.5 plus an additional 90° (¼ turn)
Remove the 4 guide pins using T40199	
Install and tighten bolts 10, 11, 12, and 13 in sequence (replace bolts)	2.5 plus an additional 90° (¼ turn)

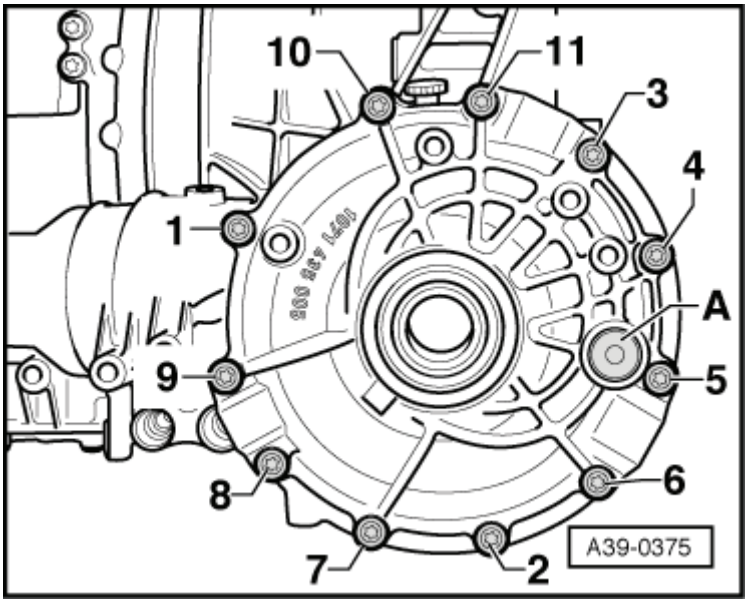
Mechatronic Tightening Specifications



Component	Nm
Tighten bolts 1 and 2	2
Tighten bolts 1 through 14 in sequence	8

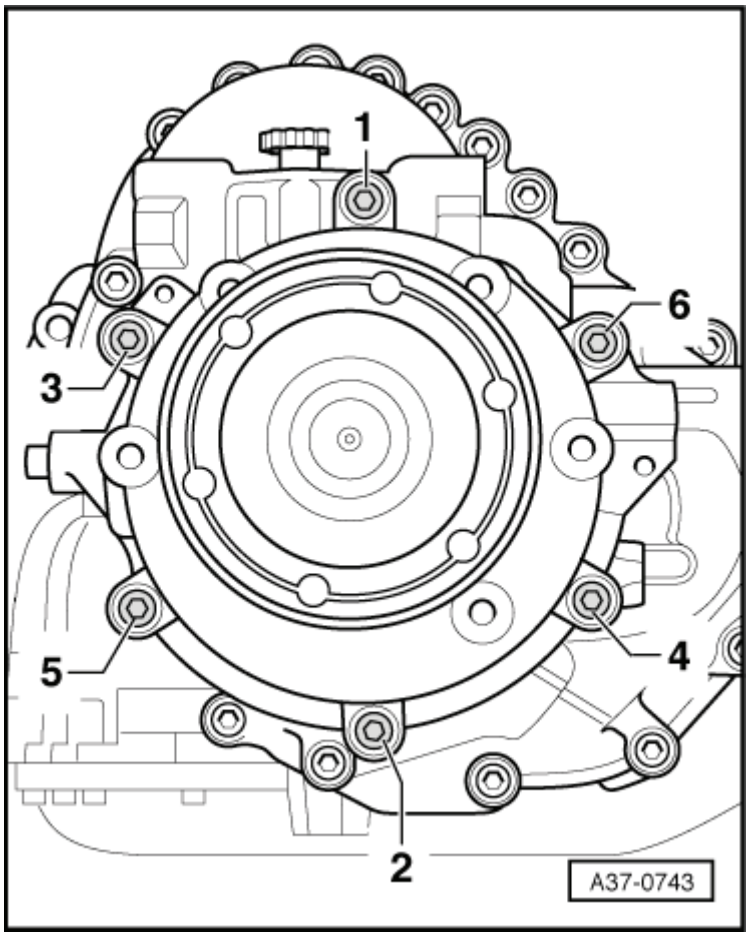
Final Drive, Differential – 0B6

Front Final Drive Cover Tightening Specifications



Component	Nm
Tighten bolts 1 and 2	3
Tighten bolts 1 to 11 in sequence	23

Center Differential Housing Tightening Specifications

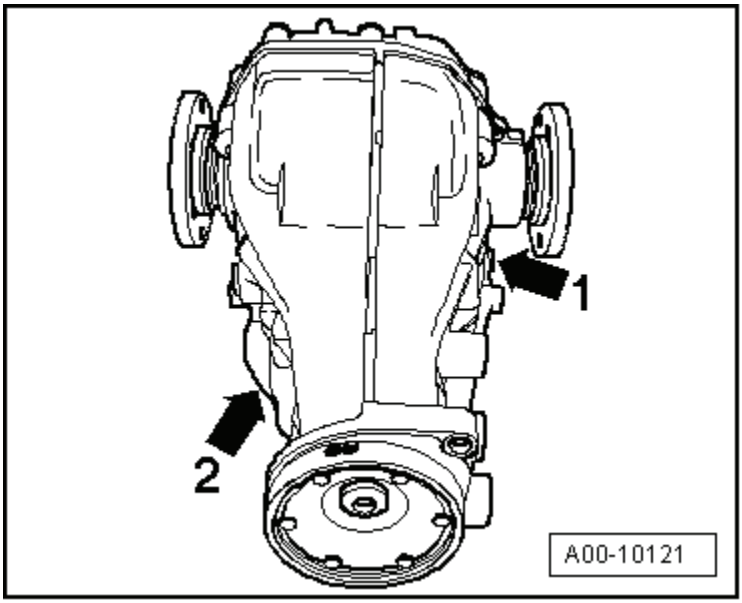


Component	Nm
Pre-tighten bolts 1 and 2	3
Tighten bolts 1 to 6 in sequence	8
Tighten bolts 1 to 6 in sequence	an additional 90° (¼ turn)

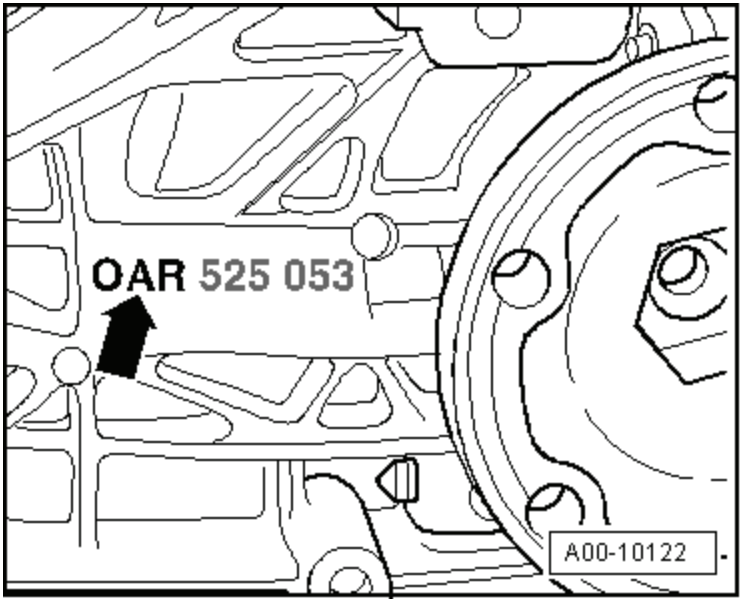
REAR FINAL DRIVE – 0BC

General, Technical Data – 0BC

Rear Final Drive Identification

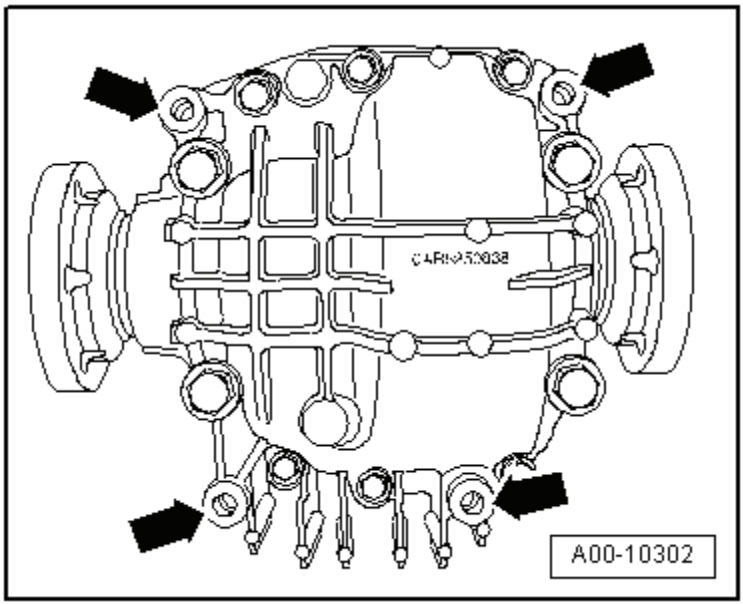


0BC final drive and 0AR (1➡). Code and build date (2➡).



Final Drive 0BC (➡) and 0AR

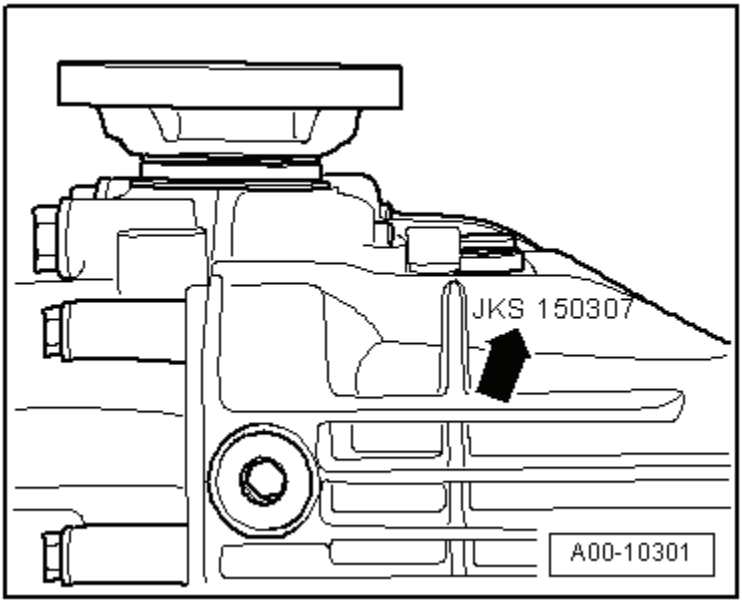
Note: 0AR is always on the rear final drive housing. The changes to the housing are what differentiate the 0BC final drive from the 0AR final drive.



The locations of the threaded holes (➡) for attaching the cross member to the rear final drive are also different.

The 0BC final drive has 4 threaded holes (➡) in its housing, used for attaching the cross member. In addition to this, there is an additional threaded hole under the flange/driveshaft used for attaching the final drive to the subframe.

Rear Final Drive Code and Date of Manufacture



Example:	JKS	15	03	07
	Code letters	Day	Month	Year of manufacture 2007

Rear Final Drive Transmission Allocations, Ratios, Capacities

Rear Final Drive		0BC			
Code letters		KCC	KLL	KLM	LAW
Ratio	Final drive Z_2:Z_1	43:13 = 3.308	35:8 = 4.375	35:8 = 4.375	42:9 = 4.666
Driveshaft flange diameter		75.5 mm	70.7 mm	75.5 mm	75.5 mm
Gear oil capacity		0.9 liters			0.9 liters

The following information can be found in the Electronic Parts Catalog (ETKA):

- Date of manufacture
- Gear oil specification
- Engine, manual transmission and automatic transmission allocation using code letters and PR numbers.

Fastener Tightening Specifications

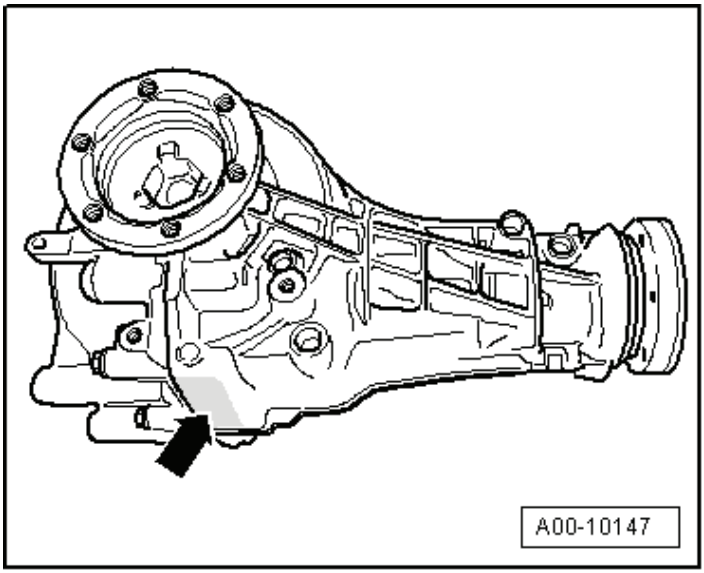
Component	Nm
Backing plate (replace fasteners)	30 plus an additional 90° (¼ turn)
Rear final drive check plug	30
Cross member	55
Heat shield	20
Intermediate bearing bracket	20
Subframe [1)]	55
	95

[1)] For bolt tightening clarification, refer to ElsaWeb, Rear Final Drive Overview, items 2 and 3.

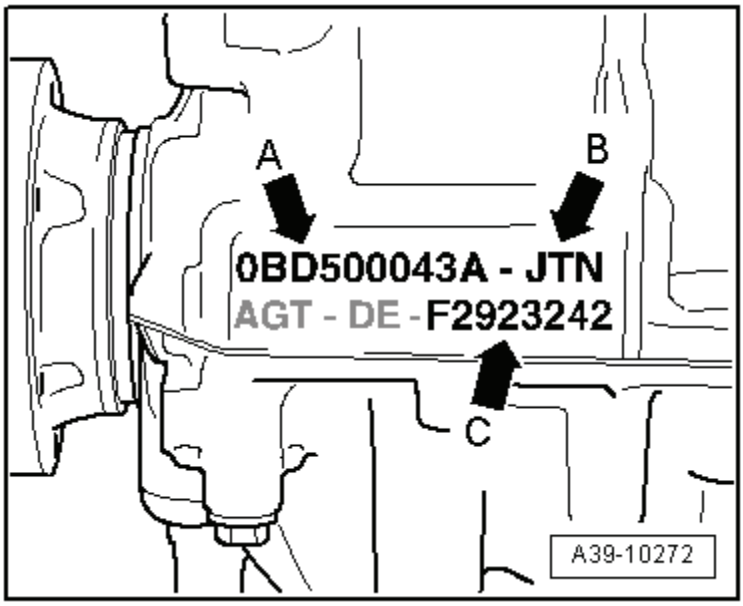
REAR FINAL DRIVE – 0BD

General, Technical Data – 0BD

Rear Final Drive Identification



Final drive 0BD, code letters and manufacture date (➡).



A➡ front final drive 0BD with replacement part number (example: 0BD 500 043A)

B➡ code letters JTN

C➡ Rear final drive manufacture date

Example:

F	292	3242
Production year 2006 F = 2006, G = 2007, H = 2008, etc.	Production date 292nd calendar day (always given in three-digit format)	Day of manufacture serial number

Rear Final Drive Allocations, Ratios, Capacities

Rear Final Drive		0BD		
Code letters		KBB	KHR	LLU
Ratio	Final drive $Z_2 : Z_1$	35:8 = 4.375	43:13 = 3.308	42:9 = 4.667
Driveshaft flange diameter		75.5 mm	75.5 mm	75.5 mm
Capacity		1.0 liters		

The following information can be found in the Electronic Parts Catalog (ETKA):
- Date of manufacture
- Gear oil specification
- Engine, manual transmission and automatic transmission allocation using code letters and PR numbers.

Fastener Tightening Specifications

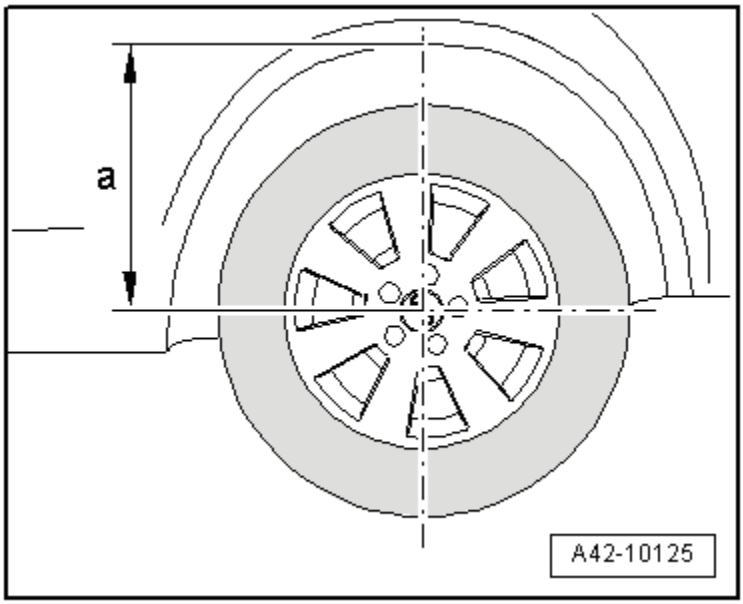
Component	Nm
Driveshaft backing plate (replace fasteners)	30 plus an additional 90° (¼ turn)
Crossmember	55
Heat shield	20
Intermediate bearing bracket	20
Screw plug	45
Subframe [1)]	55
	95

[1)] For bolt tightening clarification, refer to ElsaWeb, Rear Final Drive Assembly Overview, items 2 and 3.

SUSPENSION, WHEELS, STEERING

Front Suspension

Front Axle – Curb Weight Data



Before starting work, use a tape measure to measure dimension (a) from the wheel center to the lower edge of wheel housing. Take this measurement in the curb weight position (unloaded condition).

AWD				
		Standard Suspension (1BA)	**Sport Suspension (1BV)**	**Suspension with Electronic Damping (1BL)**
Wheelbase	mm	Approximately 2807	Approximately 2807	Approximately 2807
Front track; refer to Note	mm	Approximately 1617	Approximately 1617	Approximately 1617
Rear track; refer to Note	mm	Approximately 1613	Approximately 1613	Approximately 1613
Maximum steering angle at curved inner wheel	Degree	39° 54′	39° 54′	39° 54′

Note:
- The specified values apply to all engine versions.
- Tracks change with use of wheels with different offset.

Change in track width:
- ET 27 “+ 22 mm“
- ET 33 “+ 12 mm“
- ET 37 “+ 4 mm“

Front Suspension Tightening Specifications

Component	Nm
Ball joint-to-wheel bearing housing bolt (replace fastener)	40
Brake shield-to-wheel bearing housing bolt	10
Coupling rod-to-stabilizer bar bolt [1] (replace fastener)	40 plus an additional 90° (¼ turn)
Coupling rod-to-shock absorber fork bolt [1] [2]	40 plus an additional 90° (¼ turn)
Constant Velocity (CV) joint boot clamp	20
Drive axle-to-transmission bolt [1]	70
Drive axle-to-wheel hub bolt [1]	200 plus an additional 180° (½ turn)
Guide link-to-subframe nut [1] [2]	70 plus an additional 180° (½ turn)
Guide link-to-wheel bearing housing nut [1]	
- Hex collar nut M12 special wrench 21 mm	145
- Hex combination nut M12 special wrench 18 mm	110
- Hex combination nut M12 special wrench 21 mm	120
- Hex combination nut M12 special wrench 21 mm	140
Level control system sensor bolt	20
Level control system sensor nut	9
Shock absorber-to-shock absorber fork bolt [1]	40 plus an additional 180° (½ turn)
Shock absorber mounting bracket-to-body bolt [3] (replace fastener)	40 plus an additional 90° (¼ turn)
Stabilizer bar-to-subframe nut [1] (replace fastener)	25
Subframe-to-body bolt (replace fastener)	115 plus an additional 90° (¼ turn)
Subframe crossbrace-to-subframe bolt (replace fastener)	90 plus an additional 90° (¼ turn)
Subframe shield-to-subframe bolt	9
	20

Component	Nm
Tie rod end-to-wheel bearing housing nut	
- Hex collar nut	20 plus an additional 90° (¼ turn)
- 12-point combi-nut	100
- Hex combi-nut	110
Tower brace-to-body nut	2
	20
Tower brace reinforcement bolt	20
Track control arm-to-ball joint nut (replace fastener)	
- Hex collar nut M12 special wrench 21 mm	145
- Hex combination nut M12 special wrench 18 mm	110
- Hex combination nut M12 special wrench 21 mm	120
- Hex combination nut M12 special wrench 21 mm	140
Track control arm-to-shock absorber fork bolt [1] (replace fastener)	90 plus an additional 90° (¼ turn)
Track control arm-to-wheel bearing housing nut [1] (replace fastener)	70 plus an additional 180° (½ turn)
Upper control arm-to-mounting bracket nut [1] [2] (replace fastener)	50 plus an additional 90° (¼ turn)
Upper control arm-to-wheel bearing housing nut (replace fastener)	40
Wheel bearing-to-wheel bearing housing bolt (replace fastener)	80 plus an additional 90° (¼ turn)
Wheel speed sensor-to-wheel bearing housing bolt	9

[1] Must be tightened in the curb weight position. Refer to ElsaWeb, Wheel Bearing, Lifting to Curb Weight Position.

[2] Push toward the inside of the vehicle when tightening the control arm.

[3] Follow tightening sequence. Refer to ElsaWeb, Suspension Strut with Mounting Bracket.

Rear Suspension Tightening Specifications

Component	Fastener size	Nm
ABS wheel speed sensor-to-wheel bearing housing bolt	-	9
Brake disc-to-wheel hub bolt	-	5
Brake shield-to-wheel bearing housing bolt	-	10
Coupling rod-to-stabilizer bar bolt [1] (replace fastener)	-	40 plus an additional 90° (¼ turn)
Drive axle-to-rear final drive bolt (replace fastener)		
- with 89 mm diameter outer Constant Velocity (CV) joint and 100 mm diameter inner Constant Velocity (CV) joint	M8	20 plus an additional 90° (¼ turn)
- with 94 mm diameter outer Constant Velocity (CV) joint and 107 mm diameter inner Constant Velocity (CV) joint	M10	70
Drive axle-to-wheel hub bolt (replace fastener)	-	200 plus an additional 180° (½ turn)
Level control system sensor bolt	-	5
	-	9
Lower transverse link-to-subframe bolt [1] (replace fastener)	-	70 plus an additional 180° (½ turn)
Lower transverse link-to-wheel bearing housing bolt [1] (replace fastener)	-	120 plus an additional 360° (full turn)
Shock absorber-to-shock absorber mount nut (replace fastener)	-	35
Shock absorber-to-wheel bearing housing bolt 1) (replace fastener)	-	150 plus an additional 180° (½ turn)
Shock absorber mount-to-body bolt (replace fastener)	-	50 plus an additional 45° (⅛ turn)
Stabilizer bar-to-subframe bolt [2] (replace fastener)	-	25 plus an additional 90° (¼ turn)
Subframe-to-body bolt (replace fastener)	-	115 plus an additional 90° (¼ turn)
Tie rod-to-subframe nut [1] (replace fastener)	-	95
Tie rod-to-wheel bearing housing bolt [1] (replace fastener)	-	90 plus an additional 90° (¼ turn)

Component	Fastener size	Nm
Upper transverse link-to-subframe bolt [1] (replace fastener)	-	70 plus an additional 180° (½ turn)
Upper transverse link-to-wheel bearing housing nut [1] (replace fastener)	-	95
Wheel bearing-to-wheel bearing housing bolt	-	80 plus an additional 90° (¼ turn)

[1] Must be tightened in the curb weight position. Refer to ElsaWeb, Wheel Bearing, with Coil Spring, Lifting to Curb Weight Position.
[2] Tighten evenly.

Wheels, Tires

Fastener Tightening Specifications

Component	Nm
Adaptive cruise control sensor bracket bolt	8
Level control system control module bracket nut	6
Level control system control module to bracket bolt	8
Tire pressure monitoring control module nut	2
Tire pressure monitoring sensor to rim union nut	8
Wheel bolts (tighten the wheel bolts in a diagonal sequence to the following specified torque)	140

Wheel Alignment Data

Wheel Alignment Specified Values – AWD

Specifications valid for all engine versions

Front Suspension	Standard suspension (1BA)	Sport suspension (1BV)	Suspension with electronic damping (1BL)
Camber [1)]	- 25′ ± 23′	- 25′ ± 23′	- 25′ ± 23′
Maximum permissible difference between both sides	30′	30′	30′
Toe per wheel (adjustment value)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe per wheel (control value)	+ 10′ ± 7′	+ 10′ ± 7′	+ 10′ ± 7′
Toe-out angle at 20 degrees [2)]	1° 49′ ± 30′	1° 49′ ± 30′	1° 49′ ± 30′
Outer wheel steering angle at maximum steering angle	33° 30’ + 1° 30’- 2°	33° 30’ + 1° 30’- 2°	33° 30’ + 1° 30’- 2°
Inner wheel steering angle at maximum steering angle	39° 54’ + 1° 30’- 2°	39° 54’ + 1° 30’- 2°	39°54’ + 1°30′- 2°

1) A camber value of -20′ applies to the front axle for the Australian market.

2) Depending on the computer manufacturer, the toe-out angle difference can be indicated negatively in the alignment computer.

Rear Suspension	Standard suspension (1BA)	Sport suspension (1BV)	Suspension with electronic damping (1BL)
Camber	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′
Maximum permissible difference between both sides	30′	30′	30′
Toe per wheel (adjustment value)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe per wheel (control value)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Maximum permissible deviation in direction of travel relative to vehicle longitudinal axis	10′	10′	10′

Wheel Alignment Specified Values – FWD

Specifications valid for all engine versions

Front Suspension	Standard suspension (2MF)	Sport suspension (1BV)
Camber	- 49 ± 23′	- 49 ± 23′
Maximum permissible difference between both sides	30′	30′
Toe per wheel (adjustment value)	+ 10′ ± 5′	+ 10′ ± 5′
Toe per wheel (control value)	+ 10′ ± 7′	+ 10′ ± 7′
Toe-out angle at 20 degrees [1)]	1° 49′ ± 30′	1° 49′ ± 30′
Outer wheel steering angle at maximum steering angle	33° 30’ + 1° 30’- 2°	33° 30’ + 1° 30’- 2°
Inner wheel steering angle at maximum steering angle	39° 54’ + 1° 30’- 2°	39° 54’ + 1° 30’- 2°

1) Depending on the computer manufacturer, the toe-out angle difference can be indicated negatively in the alignment computer.

Rear Suspension	Standard suspension (2MF)	Sport suspension (1BV)	Standard suspension (1BA)
Camber	- 1°20′ ± 25′	- 1°20′ ± 25′	- 1°20′ ± 25′
Maximum permissible difference between both sides	30′	30′	30′
Toe per wheel (adjustment value)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Toe per wheel (control value)	+ 10′ ± 5′	+ 10′ ± 5′	+ 10′ ± 5′
Maximum permissible deviation in direction of travel relative to vehicle longitudinal axis	10′	10′	10′

Steering

Fastener Tightening Specifications

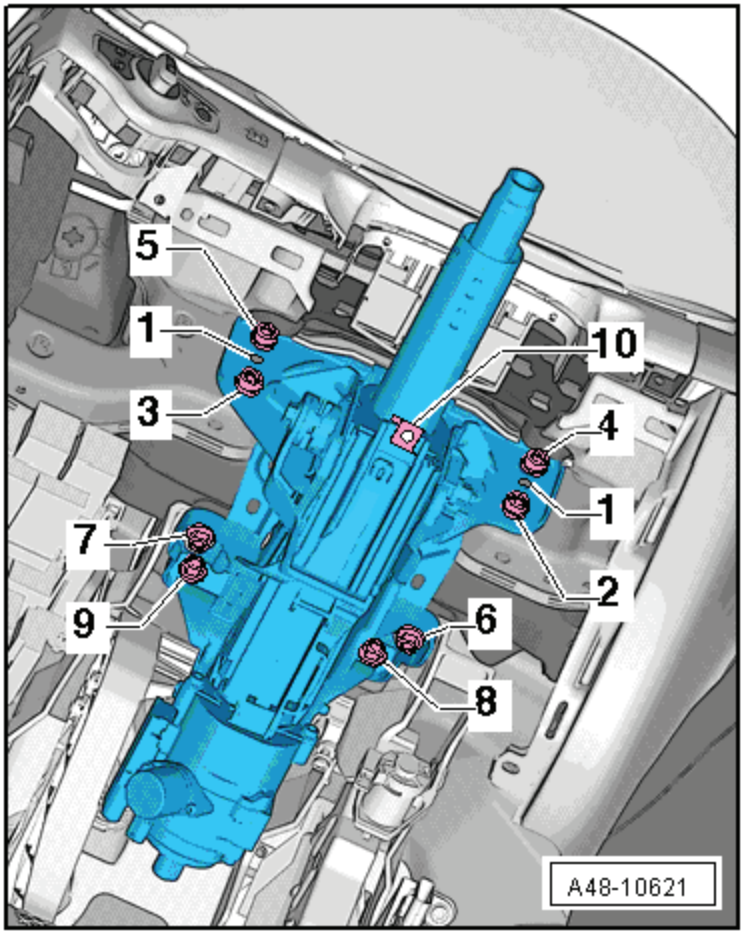
Component	Nm
Airbag-to-steering wheel bolt	7
Belt pulley-to-power steering pump bolt	
- 4-cylinder	20
- 6-cylinder	22
Electronic steering column lock control module-to-steering column bolt	5
Handle-to-steering column bolt	3
Power steering pump bolt	20
Pressure line-to-steering gear bolt	20
Pressure line rubber bushing-to-steering gear	6
Pressure line-to-rubber bushing nut	6
Pressure line union nut	40
Pressure line to power steering pump	
- Union nut, with dynamic steering	38
- Bolt, without dynamic steering	9
Reservoir-to-bracket bolt	9
Reservoir bracket-to-body bolt	9
Return line-to-body bolt	9
Servotronic solenoid valve-to-steering gear bolt [2]	3
Steering column-to mounting bracket and central tube bolt [1]	20
Steering gear-to-subframe bolt (replace fastener)	80 plus an additional 180° (½ turn)
Steering intermediate shaft-to-steering column bolt (replace fastener)	30 plus an additional 90° (¼ turn)
Steering intermediate shaft-to-steering gear bolt (replace fastener)	30 plus an additional 90° (¼ turn)
Steering wheel-to-steering column bolt (replace fastener)	30 plus an additional 90° (¼ turn)
Tie rod-to-steering gear	
- Electromechanical steering	100
- Hydraulic steering	90
Tie rod end-to-tie rod nut	
- Electromechanical steering	80
- Hydraulic steering	60

Component	Nm
Tie rod end-to-wheel bearing housing nut (electromechanical steering gear) (replace fastener)	100
Tie rod end-to-wheel bearing housing nut (hydraulic steering gear) (replace fastener)	
- Hex collar nut	20 plus an additional 90° (¼ turn)
- 12-point combi-nut	100
- Hex combi-nut	110

1) Always follow bolt tightening sequence. Refer to ElsaWeb, Steering Column Tightening Specifications.

2) Always follow bolt tightening sequence. Refer to ElsaWeb, Servotronic Solenoid Valve.

Steering Column Tightening Specifications

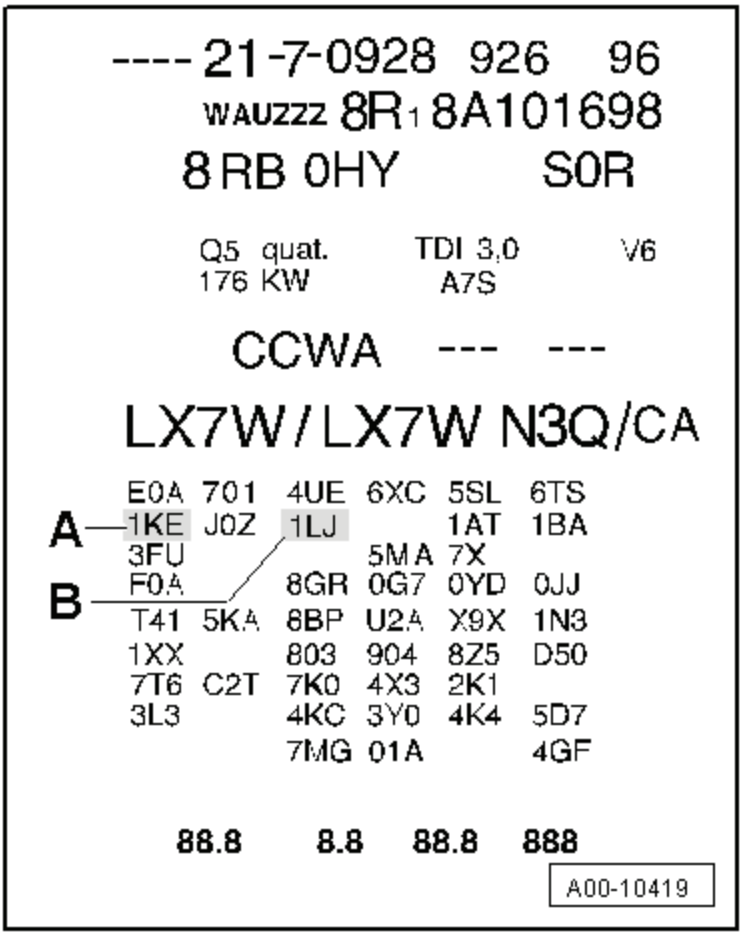


Step	Component	Nm
1	Position the steering column with the positioning pins (1) in the central tube positioning holes	
2	Loosely install all bolts	
3	Tighten bolts 2 through 5 in sequence	20
4	If equipped, install the right driver side knee bar	
5	Tighten bolts 6 through 9 in sequence	20
6	Replace the spring nut (10) if the steering column was replaced	

BRAKE SYSTEM

General Information

Brake System – Technical Data



The brake system installed in a vehicle is indicated on the vehicle data label by the Production Relevant No. (PR No.) (A and B).

Front Wheel Brakes – Technical Data

Front Brakes			
Production Relevant No. (PR. No.)		**1LA**	**1LJ**
Brake caliper		FBC- 60 - 16”	FBC- 60 - 17”
Brake disc ventilated	Diameter mm	320	345
Brake disc, thickness	mm	30	29.5
Brake disc, wear limit	mm	28	27.5
Brake caliper, piston	Diameter mm	60	60
Pad thickness with backing plate and dampening sheet	mm	19.2	19.2
Brake pad wear limit with backing plate and dampening sheet	mm	7	7

Rear Wheel Brakes – Technical Data

Rear Brakes			
Production Relevant No. (PR. No.)		**1KW**	**1KE**
Brake caliper		CII-43 EPB - 16”	CII-43 EPB - 17”
Brake disc	Diameter mm	300	330
Unvented brake disc thickness	mm	12	-
Internally vented brake disc thickness		-	22
Brake disc, wear limit	mm	10	20
Brake caliper, piston	Diameter mm	43	43
Pad thickness with backing plate and dampening sheet	mm	17.5	17.5
Brake pad wear limit with backing plate and dampening sheet	mm	7	7

Fastener Tightening Specifications

Component	Nm
Brake carrier-to-wheel bearing housing (always replace bolts)	196
Brake caliper-to-brake carrier bolts	30
Brake pad bolt	5
Rear electromechanical parking brake actuator self-locking bolt	12
Rear brake caliper housing self-locking bolt	35
Rear brake hose	12
Wheel bolts	140
Rear brake disc bolt	5
Rear brake shield bolts	10
Rear brake carrier bolts (replace fastener)	100 plus an additional 90° (¼ turn)
Speed sensor bolt	9
Parking brake lever hex nuts	25
Electromechanical parking brake control module	9
Vacuum pump Torx® bolts	9
Vacuum pump hose bolt	5

Brake Pedal Tightening Specifications

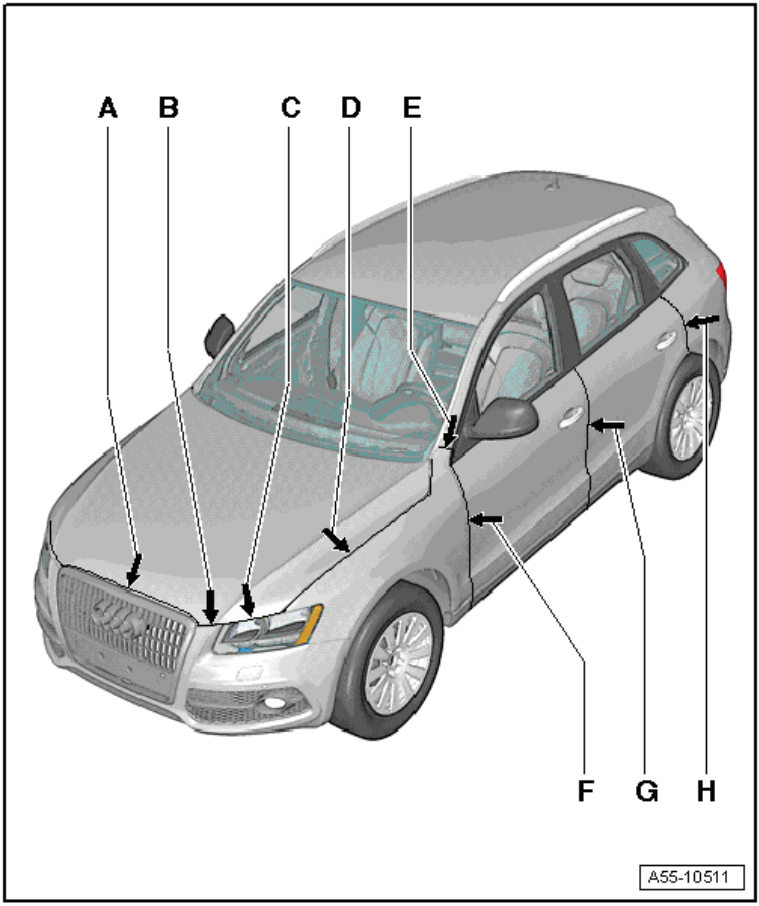
Component	Nm
Pedal support bolt	20
Mounting pin bolt	8
Mount nut	8

Hydraulic Tightening Specifications

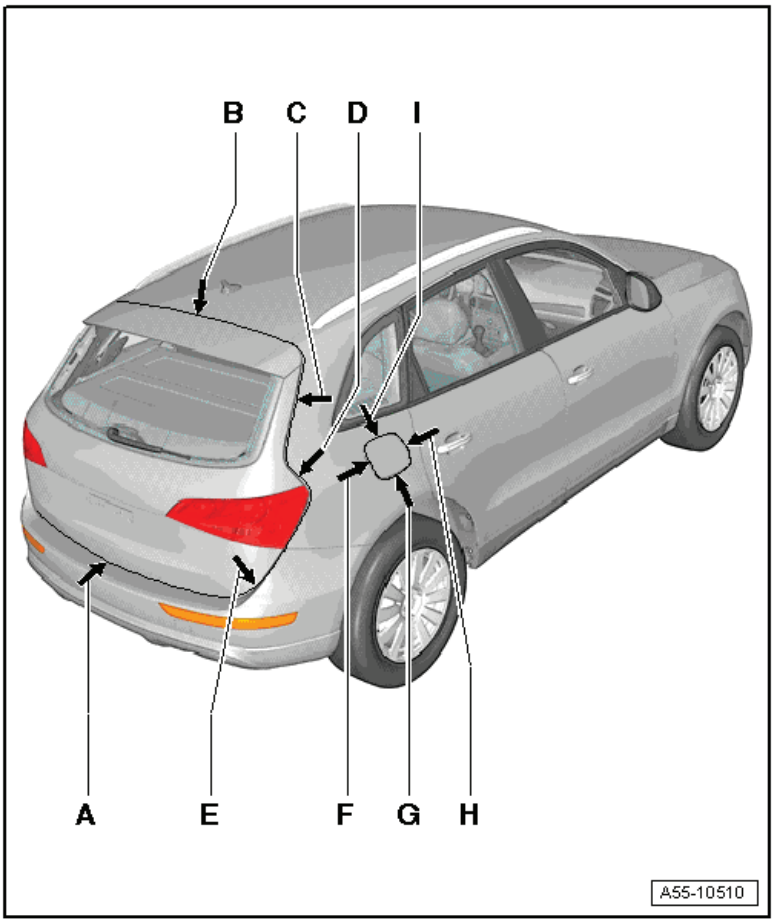
Component	Nm
Brake fluid reservoir bolt	5
Master brake cylinder at brake booster	25
Brake lines-to-main brake cylinder	16
Brake master cylinder hex nut	49
Bleeder valve	10
Brake lines-to-hydraulic unit M10 (dia. 5 mm brake lines)	12
Brake lines-to-hydraulic unit M12 (dia. 5 mm brake lines)	12
Brake lines-to-hydraulic unit M12 (dia. 8 mm brake lines)	16
Brake lines-to-brake hose	17

BODY

Air Gap Body Dimensions



Component	mm
A	4.5 ± 1.0
B	4.5 ± 1.0
C	4.5 ± 1.0
D	3.0 ± 0.5
E	2.0 ± 0.5
F	3.5 ± 0.5
G	4.5 ± 0.5
H	3.5 ± 0.5



Component	mm
A	5.0 ± 1.0
B	4.5 ± 0.5
C	4.5 ± 0.5
D	4.5 ± 0.5
E	4.5 ± 0.5
F	2.0 + 0.5
G	2.5 ± 0.5
H	2.0 + 0.5
I	2.0 + 0.5

Body Exterior

Lock Carrier, Plenum Chamber Tightening Specifications

Component	Nm
Lock carrier bolts, upper	5
Lock carrier bolts, lower	1.5
Side impact bar	55
Underbody cover hex nuts	2
Rear underbody bolts	2
Plenum chamber nut	4
Plenum chamber bolt	7
Rear lid bolts	21
Rear lid gas filled strut ball studs	21
Rear lid hinge hex head nut	21
Rear lid latch bracket bolts	21
Rear lid lock bolts	21

Front Fender Tightening Specifications

Component	Nm
Front fender bolts	8
Front fender mount nut	4
Front fender brace bolts	10
Front fender brace nuts	4
Front fender end plate screws	1.5

Front Hood Tightening Specifications

Component	Nm
Front hood hex nut	21
Front hood gas filled strut ball studs	21
Front hood hinge bolts	21
Front hood catch bolts	8

Rear Lid Tightening Specifications

Component	Nm
Rear lid bolts	21
Rear lid gas filled strut ball studs	21
Rear lid hinge hex head nut	21
Rear lid latch bracket bolts	21
Rear lid lock bolts	21

Front and Rear Door Tightening Specifications

Component	Nm
Door upper hinge stud bolt	30
Door upper hinge bolt	32
Door Lower hinge bolt	32
Door Lower hinge fitting bolt	45
Door lock to inner door part bolt	20
Side impact protection bolts	20
Side impact protection nuts	20
Door arrester bolts	8
Door striker pin bolts	25
Door lock bolts	19

Sunroof Tightening Specifications

Component	Nm
Sunroof motor bolts	1.5
Front and rear glass panel bolts	4.5
Sunshade motor bolts	1.5

Front Bumper Tightening Specifications

Component	Nm
Bumper cover bolts	2.5 - 4
Vent grille bolt	2.5
Noise insulation bolts	2.5
Cover mount nuts	4
Side impact member bar-to-bracket	55
Locating bolt	5

Rear Bumper Tightening Specifications

Component	Nm
Rear bumper cover bolts	1.5
Rear bumper guide piece	1.5
Side impact bar bolts	8
Side impact bar nuts	4
Left and right console impact member mount bolts	40
Cross member bolts	60
Trailer hitch bolts	20
Hand actuator bracket bolts	8

Front and Rear Door Window Tightening Specifications

Component	Nm
Window regulator bolts	6
Window regulator nuts	6
Speaker bolts	1.5

Front Wheel Housing Liner Tightening Specification

Component	Nm
Wheel housing liner bolts	2.5

Rear View Mirror Tightening Specifications

Component	Nm
Mirror adjusting unit mount	10
Mirror adjusting unit bolts	1.5

Strips and Trim Tightening Specifications

Component	Nm
Sill panel extension bolts	2
Retaining strip-to-sill panel bolts	2

Body Interior

Storage Compartment and Armrest Tightening Specifications

Component	Nm
Front center console bolts	2
Center console mounting bracket bolts	8
Storage compartment/ashtray unit bolts	3
Steering column trim bolts	1.5

Instrument Panel and Central Tube Tightening Specifications

Component	Nm
Instrument panel vent bolts	3
Top center defrost vent	1.5
Panel trim bolts	3
Speaker trim bolts	1.5
Central tube mounting bracket bolts	20
Driver's side trim bolts	3
Threaded pin	20
Instrument panel cover bracket bolt	9
Glove compartment bracket bolts	9
Glove compartment right retainer bolts	9
Glove compartment left retainer bolts	9
Left shock absorber bolts	9
Support base nuts	20
Support base bolts center armrest	1.4

Passenger Protection Tightening Specifications

Component	Nm
Belt latch to seat	34
Front seat belt to window anchor rail bolt	45
Belt guide ring bolt	45
Belt anchor bolt	45
Front seat belt B-pillar bolt	45
Front seat belt height adjuster bolt	23
Belt latch bolt	34
Automatic belt retractor bolt	45
Rear center 3-point seat belt latch hex nut	45
Rear center lap belt bolt	45
Rear double belt latch bolt	45
Airbag control module J234 nuts	7
Passenger side airbag unit bolts	9
Side airbag bolts	9
Side curtain airbag cap nuts	9
Front door crash sensor bolts	2.5
Rear wheel housing crash sensor bolts	9

Interior Trim Tightening Specifications

Component	Nm
Instrument panel bolts	3
Instrument panel above tunnel bolts	8
Instrument panel aligning bolts	2
Footwell trim bolts	2
Instrument panel below heating or A/C mechanism (2 bolts)	9
Instrument panel tunnel area bolts	20
Instrument panel tunnel area nuts	20
Fuse holder bolts	2
Fuse holder nuts	8
Door trim handle molding area bolts	2
Door trim handle molding area (4 surrounding bolts)	2
Door mirror triangle cover bolt	2
Upper A-pillar and B-pillar trim airbag emblem bolt	4
B-pillar trim bolts	4
C-pillar trim nut	2
Side trim bolts	2
Rear lid trim handle recess bolts	2
Luggage compartment cover side storage compartment bolts	2
Luggage compartment side trim bolts	8
Molded headliner bolts	2

Seat Frames Tightening Specifications

Component	Nm
Front seat frame bolts	50
Seat trim bolts	2
Seat drawer mount bolts	3.5
Seat bracket and operation lever bolts	3.5
Front seat backrest bolts	20
Rear seat center backrest bolt	16
Rear seat center bracket	16
Rear seat belt buckle-to-floor bolt	30
Rear seat side upholstery bolt	16
Rear seat side upholstery nut	55
Rear seat storage unit with center armrest bolts	9

HEATING AND AIR CONDITIONING

Refrigerant Oil Distribution

Component	Approximate % of total amount of oil in component
A/C compressor	50
Condenser	10
Suction hose	10
Evaporator	20
Fluid reservoir	10

Refrigerant R134a Vapor Pressure Table

Temperature in °C	Pressure in bar (positive pressure) of R134a
-45	-0.61
-40	-0.49
-35	-0.34
-30	-0.16
-25	0.06
-20	0.32
-15	0.63
-10	1.00
-5	1.43
0	1.92
5	2.49
10	3.13
15	3.90
20	4.70
25	5.63
30	6.70
35	7.83
40	9.10
45	10.54
50	12.11
55	13.83
60	15.72
65	17.79
70	20.05
75	22.52
80	25.21
85	28.14
90	31.34

Fastener Tightening Specifications

Component	Fastener size	Nm
Denso A/C compressor oil drain plug		30
Denso A/C compressor pressure relief valve		10
A/C compressor-to-engine bracket bolt		25
A/C pressure/temperature sensor-to-refrigerant line		5
Coolant pipe bracket-to-heat exchanger connector flange bolt		2.5
Dryer cartridge retaining screw (with filter)		2
Evaporator connector-to-evaporator bolt		5
Expansion valve-to-evaporator refrigerant line bolt		10
Fluid reservoir-to-condenser		10
Fresh air intake-to-plenum bolt		3
Refrigerant line-to-condenser bolt		9
Refrigerant line-to-compressor bolt	M6	9
Refrigerant line-to-compressor bolt	M8	25
Refrigerant line with inner heat exchanger-to-expansion valve bolt		10

ELECTRICAL EQUIPMENT

Communication Fastener Tightening Specifications

Component	Nm
Front information display control head screw	2
Radio screw	3
Roof antenna nut	6
Antenna systems	
Antenna amplifier (R24)/Antenna Amplifier 4 (R113) screw	6
Antenna amplifier 3 (R112) screw	2
Left antenna module (R108) screw	2
Roof antenna (R216) nut	6
Rearview camera system	
Rearview camera (R189) nut	6
Multifunction steering wheel	
Multifunction buttons screw	3
Sound system	
Center mid/high range loudspeaker (R158)	1
Digital sound system control module (J525) nut	3.5
Left front treble speaker (R20)/left front mid-range speaker (R103)/right front treble speaker (R22)/right front mid-range speaker (R104) screw	1
Left front treble speaker (R20)/right front treble speaker (R22) screw	2
Left front mid-bass speaker (R101)/right effects speaker (R21)/right front mid-bass speaker (R102)/right front bass speaker (R23) screw	3
Left rear mid-range speaker (R105)/right rear mid-range speaker (R106) nut	3
Left rear mid/low range loudspeaker (R159)/right rear mid/low range loudspeaker (R160) screw	3
Rear shelf subwoofer (R157) screw	2
Tv system	
Bracket with radio (R) nut	3
TV tuner (R78) nut	3

Battery, Starter, Generator, Cruise Control Tightening Specifications

Component	Nm
Nut for ground wire with battery monitoring control module	6
Fuse panel A nut	6
Terminal 30/B+-to-generator nut	16
Terminal 30/B+-to-starter nut	15
Battery retaining bracket screw	18
Generator screw	23

Instruments Tightening Specifications

Component	Nm
12V socket 3 right luggage compartment side trim nut	2
Low and high tone horn-to-impact member nuts	9
Data bus onboard diagnostic interface screw	3
Instrument cluster screw	2.5
Radio frequency controlled clock receiver screw	2.5

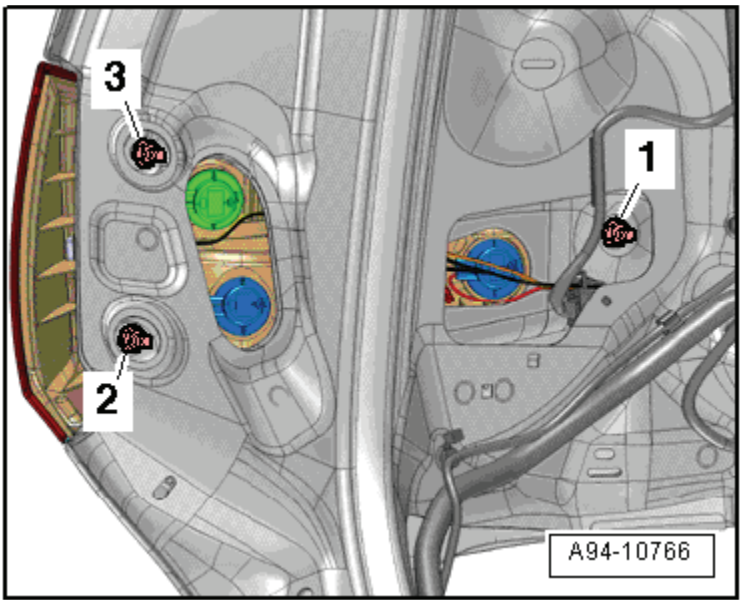
Windshield Wiper/Washer Tightening Specifications

Component	Nm
Fuel filler tube nut	7
Rear wiper arm-to-rear window wiper motor nut	12
Windshield wiper arm-to-windshield wiper motor nut	17
Fuel filler tube screw	7

Exterior Lights, Switches Tightening Specifications

Component	Nm
Parking aid control module nuts	3
Retaining strap on headlamp housing	6
Bi-Xenon headlamp retaining plate screw	1.4
Clamping ring-to-steering column screw	4
Daytime running lamp and parking lamp LED module screw	1.4
Exterior rearview mirror turn signal bulb screw	0.9
Fog lamps screw	4.5
Headlamp housing screws	4.5
Headlamp housing bracket screws	8
Headlamp housing bracket (Bi-Xenon headlamps) screws	4.5
Headlamp mount screws	4.5
Headlamp range control positioning motor housing cover screw	2
High mounted brake light screws	2.5
Steering column electronic systems control module screw	0.5

Taillamps Tightening Specification



Component	Nm
Tighten the rear light housing nuts 1 through 3 in sequence	3.5

Interior Lights, Switches Tightening Specifications

Component	Nm
Front interior lamps/reading lamps bolt	1.6
Interior access/start authorization antenna 1 mount bolt	2
Sunroof regulator bolt	1
Alarm horn bracket nuts	7
	8.5
Headlamp assistant screw	2.4
Lane change assistance control module screws	2.5
Lane change assistance control module 2 screws	2.5

Wiring Tightening Specifications

Component	Nm
4-pin relay/fuse panel electrical wire	9
Engine compartment E-Box cover bolt	3.5
Fuse panel A bolt	3.5
Electrical wire on back of fuse panel B	9
Fuse panel A electrical wire	7.5
Fuse panel A positive wire-to-engine	18
Engine compartment E-Box cover nut	9
Fuse panel A nut	9
Terminal 30 nut	7.5
Relay/fuse panel mount nut	3
Positive wire-to-fuse panel B	9
Engine compartment E-Box screws	4.5
Terminal 30 battery wire	18
Terminal 30 battery jump start terminal	20
Terminal 30 E-Box positive wire	7.5
Terminal 30 fan wire	7.5
Terminal 30 PTC line	7.5
Terminal 30 starter wire	18

DTC CHART

Fuel and Air Mixture, Additional Emission Regulations

DTC	Error Message	Malfunction Criteria and Threshold Value
P000A	Intake (A) Camshaft Position Slow Response Bank 1	Signal change < 1.9 - 4.2°CRK/s
P0010	Intake (A) Camshaft Position Actuator Circuit/Open (Bank 1)	Signal voltage > 4.4 - 5.6 V
P0011	Intake (A) Camshaft Position Timing - Over-Advanced (Bank 1)	Target error (stuck position) > 6.8 - 8°CRK
P0016	Crankshaft Position - Camshaft Position Correlation (Bank 1, Sensor A)	• Permissible deviation < 11° Rev or • Permissible deviation > 11° Rev
P025A	Fuel Pump Open Circuit	Signal voltage > 4.4 - 5.6 V
P025C	Fuel Pump Short to Ground	Signal voltage < 2.15 - 3.25 V
P025D	Fuel Pump Short to B+	Signal current > 1.1 A
P0030	HO2S Heater Control Circuit (Bank 1, Sensor 1) Open Circuit	Heater voltage 2.34 - 3.59 V
P0031	HO2S Heater Control Circuit Low (Bank 1, Sensor 1) Short to Ground	Heater voltage < 2.34 V
P0032	HO2S Heater Control Circuit High (Bank 1, Sensor 1) Short to B+	Heater voltage > 3.59 V
P0036	HO2S Heater Control Circuit (Bank 1, Sensor 2) Open Circuit	SULEV heater voltage 4.50 - 5.50 V
P0037	HO2S Heater Control Circuit Low (Bank 1, Sensor 2) Short to Ground	Heater voltage < 3.00 V
P0038	HO2S Heater Control Circuit High (Bank 1, Sensor 2) Short to B+	Heater current 2.70 - 5.50 A
P0043	HO2S Heater Control Circuit Low (Bank 1, Sensor 2) Short to Ground	• SULEV Heater voltage < 3 V • ULEV Heater voltage < 3 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P0044	HO2S Heater Control Circuit High (Bank 1, Sensor 2) Short to B+	Heater current > 2.70 - 5.50 A
P050A	Idle Air Control System RPM Lower or Higher Than Expected	Out of range - Low • Engine speed deviation < 80 RPM and • RPM controller torque value ≥ calculated max. value Out of range - High • Engine speed deviation > 80 RPM and • RPM controller torque value ≤ calculated min. value Plausibility check • Integrated deviation of engine speed low and integrated deviation of engine speed high > 2000 RPM
P0068	MAP/MAF – Throttle Position Correlation	• Plausibility with fuel system load calculation < -50% • Plausibility with fuel system load calculation > 50%
P0087	Fuel Rail/System Pressure - Too Low	• Pressure control activity > 5.00 mPa and • Fuel trim activity 0.90 - 120
P0088	Fuel Rail/System Pressure - Too High	Fuel rail pressure > 13.9 MPa
P0089	Fuel Pressure Regulator 1 Performance	Actual pressure deviation • < 100 kPa • > 100 kPa
P0100	Mass or Volume Air Flow A Circuit	MAF sensor signal 0 µs

DTC	Error Message	Malfunction Criteria and Threshold Value
P0101	Mass or Volume Air Flow A Circuit Range/Performance	• Mass air flow vs. lower threshold model < 0 - 396 kg/h • Mass air flow vs. upper threshold > 34 - 907 kg/h • Load calculation > 19% and • Fuel system (mult.) < -21% • Load calculation < -19% and • Fuel system (mult.) > 21 %
P0102	Mass or Volume Air Flow A Circuit Low Input	MAF sensor signal < 66 µs
P0103	Mass or Volume Air Flow A Circuit High Input	MAF sensor signal > 4500 µs
P0106	Manifold Absolute Pressure/ BARO Sensor Range/ Performance	Boost pressure signal • Altitude sensor < -210 hPa • Altitude sensor > 230 hPa
P0111	Intake Air Temperature Sensor 1 Rationality Check (ULEV)	• Difference in value between IAT and ECT at engine start (depending on engine off time) > 25 - 40 K and • Difference in value between IAT and AAT at engine start (depending on engine off time) > 25 - 40 K
P0112	Intake Air Temperature Sensor 1 Circuit Low Input	Intake air temperature > 141°C
P0113	Intake Air Temperature Sensor 1 Circuit High Input	Intake air temperature < 46°C
P0116	Engine Coolant Temperature Sensor 1 Circuit Range/ Performance	Stuck high •Difference in value between ECT and AAT at engine start (depending on engine off time) > 25 - 40°C and • Difference in value between IAT and AAT at engine start (depending on engine off time) < 25 - 40°C and • Difference in value between AAT and ECT at engine start (depending on engine off time) > 25 - 40°C

DTC	Error Message	Malfunction Criteria and Threshold Value
P0116	Engine Coolant Temperature Sensor 1 Circuit Range/ Performance (ULEV)	• Signal in range 109.6 - 140.3°C and no change on signal < 1.5 K • Signal in range 50.3 - 88.4°C and no change on signal < 1.5 K • Signal in range 88.5 - 109.5°C and no change on signal < 1.5 K
P0117	Engine Coolant Temperature Sensor 1 Circuit Low Input	Engine coolant temperature > 140°C
P0118	Engine Coolant Temperature Sensor 1 Circuit Open	Engine coolant temperature < -40°C
P0121	Throttle/Pedal Position Sensor A Circuit Range/Performance	• TPS 1 - TPS 2 > 6.30% and • Actual TPS 1 calculated value > actual TPS 2 calculated value or • TPS 1 calculated value > 9.00%
P0122	Throttle/Pedal Position Sensor A Circuit Low Input	Signal voltage < 0.20 V
P0123	Throttle/Pedal Position Sensor A Circuit High Input	Signal voltage > 4.81 V
P0130	O2 Sensor Circuit (Bank 1, Sensor 1)	O2S ceramic temperature < 640°C
P0131	O2 Sensor Circuit (Bank 1, Sensor 1) Low Voltage	Virtual mass < 2.0 V
		Nernst voltage < 1.50 V
		Adjustment voltage < 0.30 V
P0132	O2 Sensor Circuit (Bank 1, Sensor 1) High Voltage	Virtual mass > 3.25 V
		Nernst voltage > 4.40 V
		Adjustment voltage > 7 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P0133	O2 Circuit Slow Response (Bank 1, Sensor 1)	Symmetric fault: • Lower value of both area ratios R2L and L2R < 0.30 and • Difference of R2L area ratio vs. L2R area ratio -0.400 - 0.400 Asymmetric fault: • Lower value of both area ratios R2L and L2R < 0.30 and • Difference of R2L area ratio vs. L2R area ratio NOT (-0.400 - 0.400) General: • Lower value of both counters for area ratio R2L and L2R ≥ 5 times
P0135	O2 Heater Circuit (Bank 1, Sensor 1)	• O2S ceramic temperature < 715°C and • Heater duty cycle 100% • O2S ceramic temperature < 715°C and • Time after O2S heater on 40 Sec.
P0136	O2 Circuit (Bank 1, Sensor 2)	• Delta voltage one step at heater switching > 2.00 V and • Number of heater coupling ≥ 6 times
P0137	O2 Circuit Low Voltage (Bank 1, Sensor 2)	• Signal voltage < 0.06 V for time > 3 Sec. and • Difference of sensor voltage with load pulse and voltage without load pulse (mean value of 3 measurements) < 0.01 V
P0138	O2 Circuit High Voltage (Bank 1, Sensor 2)	Signal voltage > 1.26 V for > 5 Sec.

DTC	Error Message	Malfunction Criteria and Threshold Value
P0139	O2 Circuit Slow Response (Bank 1 Sensor 2)	• EWMA filtered transient time at fuel cut off > 0.7 Sec. • In voltage range 201 - 347.7 mV • Number of checks (initial phase) > 3 • Number of checks (step function) > 3
P0140	O2 Circuit No Activity Detected (Bank 1, Sensor 2)	• Signal voltage .40 - .60 mV for > 3 Sec or • Difference in sensor voltage with load pulse and voltage without load pulse (mean value of 3 measurements) ≥ 2.80 V
P0141	O2 Heater Circuit (Bank 1, Sensor 2) Out of Range	Heater resistance 810 - 4560 Ω
P0145	O2 Circuit Slow Response (Bank 1, Sensor 2)	• EWMA filtered transient time at fuel cut off > 0.4 Sec. • In voltage range 401.4 - 201.2 mV • Number of checks (initial phase) > 3 • Number of checks (step function) > 3
P0169	Incorrect Fuel Composition	Comparison with fuel quantity incorrect
P0171	System Too Lean (Bank 1)	At idle • Adaptive value > 21% At part-load • Adaptive value 26% (only B8 ULEVVII)
P0172	System Too Rich (Bank 1)	At idle • Adaptive value < 5.02% (< 6.0% only B8 ULEV) At part-load • Adaptive value < 21% (< -26% only B8 ULEVVII)
P0190	Fuel Rail Pressure Sensor A Circuit	Signal voltage > 4.8 V
P0191	Fuel Rail Control Valve, High Pressure Side	Actual pressure > 20.6 MPa

DTC	Error Message	Malfunction Criteria and Threshold Value
P0192	Fuel Rail Pressure Sensor A Circuit Low Input	Signal voltage < 0.2 V
P0201	Injector Circuit/Open - Cylinder 1	• Low side signal current < 2.1 A • Internal logic failure
P0202	Injector Circuit/Open - Cylinder 2	• Low side signal current < 2.1 A • Internal logic failure
P0203	Injector Circuit/Open - Cylinder 3	• Low side signal current < 2.1 A • Internal logic failure
P0204	Injector Circuit/Open - Cylinder 4	• Low side signal current < 2.1 A • Internal logic failure
P0221	Throttle/Pedal Position Sensor/Switch B Circuit Range/Performance	• TPS 1 - TPS 2 > 6.30% and • Actual TPS 2 calculated value > actual TPS 1 calculated value or • TPS 2 calculated value > 9.00%
P0222	Throttle/Pedal Position Sensor/Switch B Circuit Low Input	Signal voltage < 0.20 V
P0223	Throttle/Pedal Position Sensor/Switch B Circuit High Input	Signal voltage > 4.81 V
P0234	Turbocharger/Supercharger Overboost Condition Rationality Check	Difference of set value boost pressure vs. actual boost pressure value > 200 - 1280 hPa
P0236	Turbocharger Boost Sensor A Plausability Check	Difference in boost pressure signal vs. altitude sensor signal > 220 hPa or < 120 hPa
P0237	Turbocharger/Supercharger Boost Sensor A Circuit Low	Signal voltage < 0.2 V
P0238	Turbocharger/Supercharger Boost Sensor A Circuit High	Signal voltage > 4.88 V
P0243	Turbocharger/Supercharger Wastegate Solenoid A	Signal voltage > 4.4 - 5.6 V
P0245	Turbocharger/Supercharger Wastegate Solenoid A Low	Signal voltage < 2.15 - 3.25 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P0246	Turbocharger/Supercharger Wastegate Solenoid A High	Signal current > 2.2 A
P0261	Cylinder 1 Injector Circuit Low	Signal current < 2.1 A
P0262	Cylinder 1 Injector Circuit High	Signal current > 14.70 A
P0264	Cylinder 2 Injector Circuit Low	Signal current < 2.1 A
P0265	Cylinder 2 Injector Circuit High	Signal current > 14.70 A
P0267	Cylinder 3 Injector Circuit Low	Signal current < 2.1 A
P0268	Cylinder 3 Injector Circuit High	Signal current > 14.70 A
P0270	Cylinder 4 Injector Circuit Low	Low side signal current < 2.1 A
P0271	Cylinder 4 Injector Circuit High	Signal current > 14.70 A
P0299	Turbocharger/Supercharger Underboost Rationality Check Low	Difference of set boost pressure vs. actual boost pressure value > 150 hPa
P2004	Intake Manifold Runner Control Stuck Open Bank 1	• Normal closed position, unable to reach signal voltage < 2.62 or > 4.65 V or • Normal open position, unable to reach signal voltage < 0.35 or > 2.38 V
P2008	Intake Manifold Runner Control Circuit/Open (Bank 1)	Signal voltage 4.40 - 5.60 V
P2009	Intake Manifold Runner Control Circuit Shorted (Bank 1)	Signal voltage 2.15 - 3.25 V
P2010	Intake Manifold Runner Control Circuit Shorted to B+ (Bank 1)	Signal current > 2.20 A
P2014	Intake Manifold Runner Position Sensor/Switch Circuit (Bank 1)	Signal voltage > 4.75 V
P2015	Intake Manifold Runner Position Sensor/Switch Circuit Range/Performance (Bank 1)	Deviation runner flap position vs. actual position > 25%
P2016	Intake Manifold Runner Position Sensor/Switch Circuit Low (Bank 1)	Signal voltage < 0.25 V
P2088	Camshaft Position A Actuator Control Circuit Low (Bank 1) Short to Ground	Signal voltage < 2.15 - 3.25 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P2089	Camshaft Position A Actuator Control Circuit High (Bank 1) Short to B+	Signal current > 2.2 A
P2096	Post-Catalyst Fuel Trim System Too Lean (Bank 1)	I-portion of 2nd lambda control loop < 0.030
P2097	Post-Catalyst Fuel Trim System Too Rich (Bank 1)	I-portion of 2nd lambda control loop > 0.030
P3081	Engine Temperature Too Low	Difference between ECT and modeled ECT > 10° K

Ignition System

DTC	Error Message	Malfunction Criteria and Threshold Value
P0300	Crankshaft Speed Fluctuation (Single or Multiple)	• Emission threshold misfire rate (MR) > 1.7% • Catalyst damage misfire rate (MR) > 5.0 - 20.0%
P0301	Crankshaft Speed Fluctuation (Single or Multiple)	• Emission threshold misfire rate (MR) > 1.7% • Catalyst damage misfire rate (MR) > 5.0 - 20.0%
P0302	Crankshaft Speed Fluctuation (Single or Multiple)	• Emission threshold misfire rate (MR) > 1.7% • Catalyst damage misfire rate (MR) > 5.0 - 20.0%
P0303	Crankshaft Speed Fluctuation (Single or Multiple)	• Emission threshold misfire rate (MR) > 1.7% • Catalyst damage misfire rate (MR) > 5.0 - 20.0%
P0304	Crankshaft Speed Fluctuation (Single or Multiple)	• Emission threshold misfire rate (MR) > 1.7% • Catalyst damage misfire rate (MR) > 5.0 - 20.0%
P0321	Ignition/Distributor Engine Speed Input Circuit Range/ Performance	• Comparison of counted teeth vs. reference = incorrect • Monitoring reference gap failure
P0322	Ignition/Distributor Engine Speed Input Circuit No Signal	• Camshaft signal > 3 • Engine speed = no signal

DTC	Error Message	Malfunction Criteria and Threshold Value
P0324	Knock Control System Error	• Signal fault counter (combustion) > 24 or • Signal fault counter (measuring window) > 2.00
P0327	Knock Sensor 1 Circuit Low Input (Bank 1)	• Lower threshold < 70 V Value applies to Short to Ground, Port A and Port B as well as Signal Range Check
P0328	Knock Sensor 1 Circuit High Input (Bank 1)	• Upper threshold > 1.00 V (Short to B+, Port A and Port B) or • For signal range check > 18 - 150 V
P0340	Camshaft Position Sensor A Circuit (Bank 1 or Single Sensor)	Cam adaption values out of range • > 20° KW • < -20° KW • Difference of adapted and actual values > 9° KW
P0341	Camshaft Position Sensor A Circuit Range/Performance (Bank 1 or Single Sensor)	Signal pattern incorrect
P0342	Camshaft Position Sensor A Circuit Low Input (Bank 1 or Single Sensor)	• Signal voltage low • Crankshaft signals = 8
P0343	Camshaft Position Sensor A Circuit High Input (Bank 1 or Single Sensor)	• Signal voltage high • Crankshaft signals = 8
P0351	Ignition Coil A Primary/ Secondary Circuit	• Signal current < -0.25 to 2.0 mA • Internal check failed
P0352	Ignition Coil B Primary/ Secondary Circuit	• Signal current < -0.25 to 2.0 mA • Internal check failed
P0353	Ignition Coil C Primary/ Secondary Circuit	• Signal current < -0.25 to 2.0 mA • Internal check failed

DTC	Error Message	Malfunction Criteria and Threshold Value
P0354	Ignition Coil D Primary/ Secondary Circuit	• Signal current < -0.25 to 2.0 mA • Internal check failed

Additional Exhaust Regulation

DTC	Error Message	Malfunction Criteria and Threshold Value
P0410	System Check After SAI (PZEV)	Deviation SAI pressure > 20.0 hPa
P0413	Open Circuit (PZEV)	Signal voltage 9.25 - 11.25 V
P0414	Short to Ground (PZEV)	Signal voltage < 6.00 V
P0415	Short to B+ (PZEV)	Signal current 2.20 - 4.20 A
P0418	Air Pump Relay Open Circuit (PZEV)	Signal voltage 4.50 - 5.50 V
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	Front: • Oxygen Storage Capacity (OSC) vs. OSC of borderline catalyst < 0.40 or • Front catalyst < 1.30 and • Main catalyst < 1.20 Main: • Oxygen Storage Capacity (OSC) vs. OSC of borderline catalyst < 0.90 • While value for front catalyst < 2.00
P0420	Catalyst System (Only Bin 5, ULEV) Efficiency Below Threshold (Bank 1)	Measured OSC/OSC of borderline catalyst. EWMA filter value for catalyst < .20
P0441	Evaporative Emission System Incorrect Purge Flow	Deviation < 0.079% lambda controller and 35% idle controller
P0442	Evaporative Emission System Leak Detected (Small Leak)	Time for pressure drop < 1.55 - 1.75 Sec.
P0444	Evaporative Emission System Purge Control Valve Circuit Open	Signal voltage > 4.40 - 5.40 V
P0455	Evaporative Emission System Leak Detected (Gross Leak/ No Flow)	Time for pressure drop < 0.95 Sec.

DTC	Error Message	Malfunction Criteria and Threshold Value
P0456	Evaporative Emission System Leak Detected (Very Small Leak)	Time for pressure drop < 5 - 6.5 Sec.
P0458	Evaporative Emission System Purge Control Valve Circuit Low	Signal voltage < 2.15 - 3.25 V
P0459	Evaporative Emission System Purge Control Valve Circuit High	Signal current > 2.2 A
P0491	Secondary Air System Insufficient Flow. Flow Check During Catalyst Heating. (PZEV)	SAI pressure measured with SAI pressure sensor vs modeled < 0.6 (0.62) %

Speed and Idle Control

DTC	Error Message	Malfunction Criteria and Threshold Value
P0501	Vehicle Speed Sensor A Range/Performance	VSS signal < 4 km/h
P0503	Vehicle Speed Sensor A Out of Range/High	Vehicle speed > 200 km/h
P0506	Idle Air Control System - RPM Lower Than Expected	• Engine speed deviation < -80 RPM and • RPM controller torque value ≥ calculated max value • Integrated deviation of engine speed low and integrated deviation of engine speed high > 2000 RPM
P0507	Idle Air Control System - RPM Higher Than Expected	• Engine speed deviation > -80 RPM and • RPM controller torque value ≤ calculated min. value
P050B	Cold Start Idle Air Control System Performance	Difference between commanded spark timing vs. actual value > 0.25%
P052A	VVT Actuator Intake	Difference between target position and actual position > 12.0°CRK

DTC	Error Message	Malfunction Criteria and Threshold Value
P053F	Fuel Rail Control Valve High Pressure Side	

Control Module and Output Signals

DTC	Error Message	Malfunction Criteria and Threshold Value
P0601	Internal Control Module Memory Check Sum Error	Internal check sum, incorrect
P0604	Internal Control Module Random Access Memory (RAM) Error	Write ability check, failed
P0605	Internal Control Module Read Only Memory (ROM) Error	Checksum incorrect
P0606	CAN: Internal Fault	RAM error memory checksum error
P0606	ECM Processor	• Function monitoring: WDA general cause failure • Function monitoring: WDA internal check failure • Function monitoring: WDA overvoltage detection failure • EEPROM check failed • Internal hardware check (electrical adjustment communication, voltage supply) check
P0606	ECM: 5V Supply Voltage	Internal hardware check under-/over-voltage detection
P0606	ECM: A/D Converter	• Power-up calibration check failed • A/D-channel conversion check failed
P0606	ECM: A/D Converter 2	• Power-up calibration check failed • A/D-channel conversion check failed
P0627	Fuel Pump A Control Circuit/ Open	• Internal error fuel pump control unit • Feedback from fuel pump control unit pump blocked short circuit to battery +, ground or open circuit

DTC	Error Message	Malfunction Criteria and Threshold Value
P0638	Throttle Actuator Control Range/Performance (Bank 1)	Rationality check: • Time to close to reference point > 0.6 Sec. and • Reference point 2.88% Rationality check: • Time to open over reference point > 0.1 Sec or • Time to close below reference point > 0.6 Sec Signal range check at mechanical stop low • TPS 1 signal voltage ≠ 0.40 - 0.80 V or • TPS 2 signal voltage ≠ 4.20 - 4.60 V
P0641	Sensor Reference Voltage A Circuit/Open	Signal voltage deviation > ± 0.3 V
P0642	Sensor Reference Voltage A Circuit Low	Signal voltage < 4.6 - 5.0 V
P0643	Sensor Reference Voltage A Circuit High	5V supply voltage > 4.99 - 5.41 V
P0651	Sensor Reference Voltage B Circuit/Open	Signal voltage deviation > ± 0.3 V
P0652	Sensor Reference Voltage B Circuit Low	Signal voltage < 4.6 - 5.0 V
P0653	Sensor Reference Voltage B Circuit High	5V supply voltage > 4.99 - 5.41 V
P0657	Actuator Supply Voltage A Circuit/Open	Signal voltage > 4.4 - 5.6 V
P0658	Actuator Supply Voltage A Circuit Low	Signal voltage < 2.15 - 3.25 V
P0659	Actuator Supply Voltage A Circuit High	Signal current > 1.1 A
P0685	ECM/PCM Power Relay Control Circuit/Open	• Signal voltage 2.6 - 3.7 V • Sense circuit voltage > 6 V
P0686	ECM/PCM Power Relay Control Circuit Low	• Signal voltage 2.6 - 3.7 V • Sense circuit voltage > 6 V
P0687	ECM/PCM Power Relay Control Circuit High	• Signal current > 1.4 - 0.7 A • Sense circuit voltage < 6 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P0688	ECM/PCM Power Relay Sense Circuit	• Sense voltage < 3.0 V • Difference sense circuit voltage with camshaft actuator commanded off and on > 2.5 V • Battery voltage > 3 V
P0697	Sensor Reference Voltage C Circuit/Open	Signal voltage deviation > ± 0.3 V
P0698	Sensor Reference Voltage C Circuit Low	Signal voltage < 4.6 - 5.0 V
P0699	Sensor Reference Voltage C Circuit High	5V supply voltage > 4.99 - 5.41 V
P062B	Injection Valves Communication	Internal logic failure
U0001	High Speed CAN Communication Bus	CAN message, no feedback
U0002	High Speed CAN Communication Bus	Global time out
U0100	Lost Communication with ECM/PCM A	• Failure of all CAN engine messages, time out > 490 mSec. • Failure of all CAN engine messages, but not all CAN messages, time out > 1010 mSec.
U0101	Lost Communication with TCM	CAN communication with TCM, time out. No message received by ECM
U0121	CAN ABS Brake Unit	CAN communication with ABS, time out
U0140	CAN communication with Body Control Module	Received CAN message - no message
U0146	CAN Gateway A	CAN communication with gateway, time out
U0155	CAN Instrument Cluster	Received CAN message - no message
U0302	Software Incompatibility with Transmission Control Module	Manual transmission vehicle, TCM coded as automatic transmission vehicle
U0323	CAN: Instrument cluster Audi only	Ambient temperature value module not encoded for ambient temp sensor, 00h

DTC	Error Message	Malfunction Criteria and Threshold Value
U0402	CAN Communication with TCM	Data length code transmitted, incorrect
U0404	Invalid Data Received From Gear Shift Control Module	• If the value of message counter is permanent, constant, or change exceeds a threshold, increment an event counter • Maximum change of message counter > 5
U0415	CAN link to speed sensor	Vehicle speed > 325 km/h
U0415	CAN: Vehicle Speed Sensor	• Speed sensor signal: initialization error 655.34km/h • Speed sensor signal: low voltage error 655.33km/h • Speed sensor signal: sensor error 655.35 km/h • Vehicle speed >/= 325 km/h
U0422	CAN: Instrument cluster	Ambient temperature value initialization, Audi 01 h
U0423	CAN: Instrument cluster	Received CAN message, implausible message
U0447	CAN Gateway	CAN message incorrect

Fuel and Air Ratios Control Module

DTC	Error Message	Malfunction Criteria and Threshold Value
P1114	Internal Resistance Too Large (Bank 1, Sensor 2)	Heater resistance, (128-648)*(8-40)1.02-25.9 k Ω (dep. on mod. exhaust temp. and heater power)
P12A1	Fuel Rail Pressure Sensor Inappropriately Low	• Pressure control activity > 0.25 MPa and • Fuel trim activity < 0.85
P12A2	Fuel Rail Pressure Sensor Inappropriately High	• Pressure control activity > 0.25 MPa and • Fuel trim activity < 0.85
P12A4	Fuel Rail Pump Control Valve Stuck Closed	• Fuel trim activity 0.85 to 1.15 and • Pressure control activity < 6.0 mPa

DTC	Error Message	Malfunction Criteria and Threshold Value
P13EA	Ignition Timing Monitor	Difference between commanded spark timing and actual value > 0.60%
P150A	Engine Off Time Performance	Comparison of engine off time from instrument cluster control unit with engine after run time. • Difference between engine off time and ECM after run time < -12.0 Sec. Comparison of engine off time from instrument cluster control unit with engine after run time • Difference between engine off time and ECM after run time > 12.0 Sec.
P2101	Throttle Actuator A Control Motor Circuit Range/ Performance	• Duty cycle >80% and • ECM power stage, no failure • Deviation throttle valve angles vs. calculated value 4.0 - 50.0%
P2106	Throttle Actuator Control System	Internal check failed (Functioning Check, Current Monitoring) Internal check (Short to B+ or Ground, Open Circuit)
P2110	Throttle Actuator Control System - Forced Limited RPM	Engine load out of range
P2122	Throttle/Pedal Position Sensor/Switch D Circuit Low Input	Signal voltage < 0.646 V
P2123	Throttle/Pedal Position Sensor/Switch D Circuit High Input	Signal voltage > 4.794 V
P2127	Throttle/Pedal Position Sensor/Switch E Circuit Low Input	Signal voltage < 0.276 V
P2128	Throttle/Pedal Position Sensor/Switch E Circuit High Input	Signal voltage > 2.431 V
P2138	Throttle/Pedal Position Sensor/Switch D/E Voltage Correlation	Signal voltage: Difference between signal sensor 1 and 2 > 0.143 - 0.703 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P2146	Fuel Injector Group A Supply Voltage Circuit/Open	Short to ground (high side) • Signal current > 14.90 A Short to battery plus (high side) • Signal current < 2.60 A
P2149	Fuel Injector Group B Supply Voltage Circuit/Open	Short to ground (high side) • Signal current > 14.90 A Short to battery plus (high side) • Signal current < 2.60 A
P2177	Fuel System	• System too lean at part load • Adaptive value > 26%
P2178	Fuel System	• System too rich at part load • Adaptive value < 26%
P2181	Cooling System Performance	Cooling system temp too low after a sufficient air mass flow interval 55 - 80°C
P2187	Fuel System	• System too lean at idle • Adaptive value > 5.02%
P2188	Fuel System	• System too rich at idle • Adaptive value < 6.0%
P2195	O2 Sensor Signal Biased/ Stuck Lean (Bank 1, Sensor 1)	Delta lambda of 2nd lambda control loop > 0.07
P2196	O2 Sensor Signal Biased/ Stuck Rich (Bank 1, Sensor 1)	Delta lambda of 2nd lambda control loop < 0.07
P2231	O2 Sensor Signal Circuit Shorted to Heater Circuit	Delta O2S signal front > 190 uA
P2237	O2 Sensor Positive Current Control Circuit/Open (Bank 1, Sensor 1)	• Lambda set value < 0.97 or • O2S signal front 1.49 - 1.51 and lambda set value > 1.03 V • O2S signal front < 1.70 V and fuel cut off > 3.00 Sec. • O2S signal front 1.49 - 1.51 V and delta lambda controller > 0.10
P2243	O2 Sensor Reference Voltage Circuit/Open (Bank 1, Sensor 1)	• O2S signal front < 0.30 V and Internal resistance > 1000 Ohms • O2S signal front > 3.25 V and Internal resistance > 1000 Ohms
P2257	Air Pump Relay Short to Ground (PZEV)	Signal voltage < 3.00 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P2258	Air Pump Relay Short to B+ (PZEV)	Signal current 0.60 - 1.20 A
P2270	O2 Circuit Slow Response (Bank 1, Sensor 2)	O2S signal rear < 0.603 - 0.649 V
P2271	O2 Sensor Signal Stuck Rich (Bank 1, Sensor 2)	O2S signal rear > 0.603 - 0.649 V
P2279	Intake Air System Leak	• Threshold to detect a defective system > 1.45 and • Ratio of the tie system defective during the measurement window to the whole duration of the measurement window > 0.60
P2293	Fuel Pressure Regulator 2 Performance	• Difference between target pressure vs. actual pressure: > 1.50 mPa or • < -1.50 mPa
P2294	Fuel Pressure Regulator 2 Control Circuit	• Signal voltage 1.40 - 3.20 V (Open Circuit) • Signal pattern incorrect (Rationality Check)
P2295	Fuel Pressure Regulator 2 Control Circuit Low Short to Ground	Signal voltage < 1.40 - 3.20 V
P2296	Fuel Pressure Regulator 2 Control Circuit High	Signal voltage > 3.20 V

Ignition System

DTC	Error Message	Malfunction Criteria and Threshold Value
P2300	Ignition Coil A Primary Control Circuit Low	Signal current > 24.0 mA
P2301	Ignition Coil A Primary Control Circuit High	Signal current > 5.1 - 7.0 mA
P2303	Ignition Coil B Primary Control Circuit Low	Signal current > 24.0 mA
P2304	Ignition Coil B Primary Control Circuit High	Signal current > 5.1 - 7.0 mA

DTC	Error Message	Malfunction Criteria and Threshold Value
P2306	Ignition Coil C Primary Control Circuit Low	Signal current > 24.0 mA
P2307	Ignition Coil C Primary Control Circuit High	Signal voltage > 5.1 - 7.0 mA
P2309	Ignition Coil D Primary Control Circuit Low	Signal current > 24.0 mA
P2310	Ignition Coil D Primary Control Circuit High	Signal voltage > 5.1 - 7.0 mA

Additional Emissions Regulations

DTC	Error Message	Malfunction Criteria and Threshold Value
P2400	Evaporative Emission System Leak Detection Pump Control Circuit/Open	Signal voltage > 4.4 - 5.6 V
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	Signal voltage < 2.15 to 3.25 V
P2402	Evaporative Emission System Leak Detection Pump Control Circuit High	Signal current > 3.0 A
P2403	Evaporative Emission System Leak Detection Pump Sense Circuit/Open	Low signal voltage > 0.5 Sec.
P2404	Evaporative Emission System Leak Detection Pump Sense Circuit Range/Performance	• High signal voltage > 12 Sec. • Number of checks = 30 • Cumulative time of high signal voltage during pumping > 50 Sec.
P2414	O2 Sensor Exhaust Sample Error (Bank 1, Sensor 1)	• Threshold 1 - Signal voltage 3.1 - 4.81 V • Threshold 2 - Signal voltage 2.5 to 3.10 V
P2431	Rationality check	Difference between SAI pressure and ambient pressure ≠ -25.0 - 25.0 hPa
P2432	Signal Range Check	Signal voltage < 0.40 V
P2433	Signal Range Check	Signal voltage > 4.65 V

DTC	Error Message	Malfunction Criteria and Threshold Value
P2440	System Check After SAI (PZEV)	SAI pressure measured with SAI pressure sensor vs. modeled while SAI valve closed < 0.55%
P2539	Low Pressure Fuel System Sensor Circuit	Signal voltage > 4.9 V
P2540	Low Pressure Fuel System Sensor Circuit Range/ Performance	Actual pressure deviation < 800 kPa < 80 kPa
P2541	Low Pressure Fuel System Sensor Circuit Low	Signal voltage < 0.2 V
P2626	O2 Sensor Pumping Current Trim Circuit/Open (Bank 1 Sensor 1)	O2S signal front > 4.81 V

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