Das Auto.

2014

Beetle/Beetle Convertible

Quick Reference Specification Book

2014 Volkswagen Beetle/Beetle Convertible Quick Reference Specification Book

TABLE OF CONTENTS

ENGINES

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.

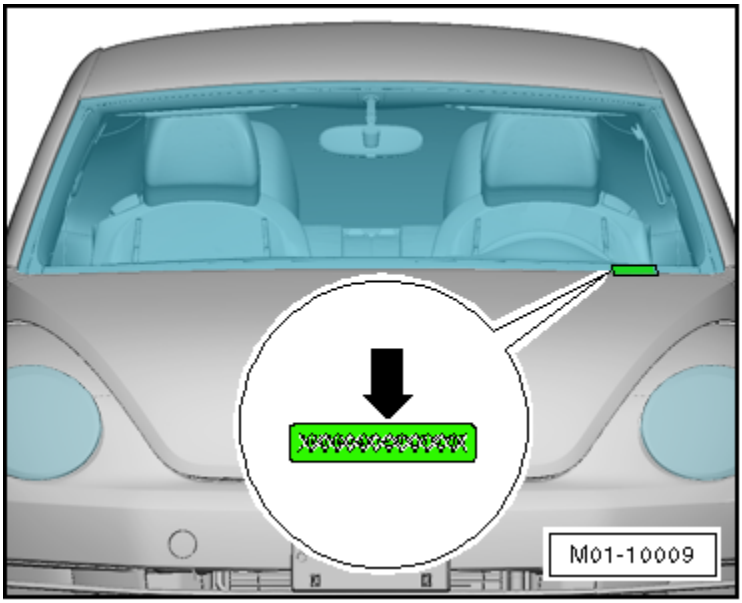
(CAUTIONS cont'd on next page)

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.

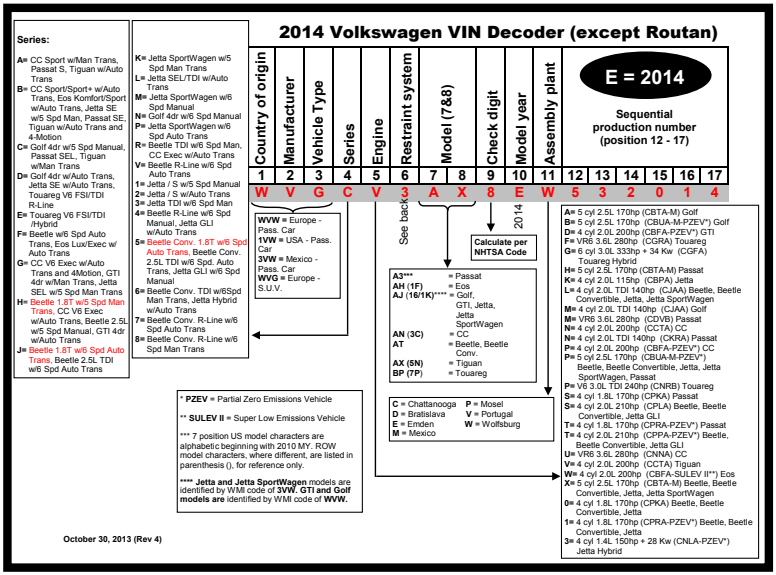
VEHICLE IDENTIFICATION

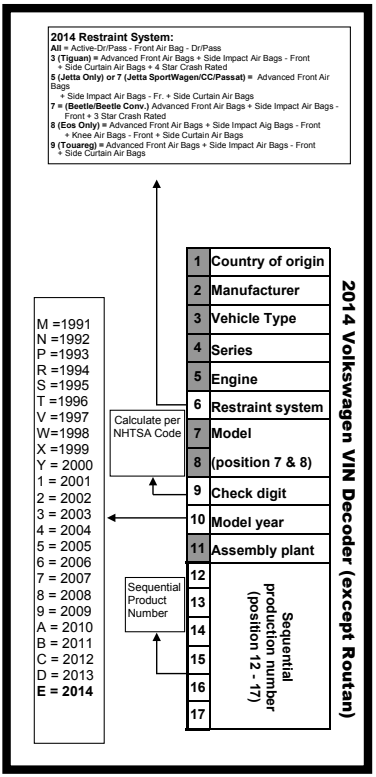
Vehicle Identification Number (VIN) Location



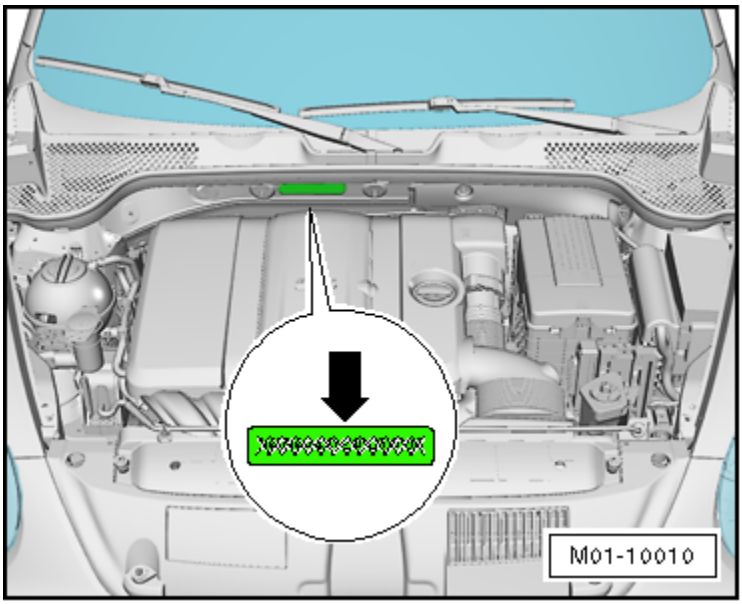
The VIN (➡) is on the left side of the vehicle in the area of the windshield wiper mount. It is visible from the outside.

VIN Decoder


2014 Volkswagen VIN Decoder (except Routan)
Series:
A= CC Sport w/Man Trans, Passat S, Tiguan w/Auto Trans
B= CC Sport/Sport+ w/Auto Trans, Eos Komfort/Sport w/Auto Trans, Jetta SE w/5 Spd Man, Passat SE, Tiguan w/Auto Trans and 4-Motion
C= Golf 4dr w/5 Spd Manual, Passat SEL, Tiguan w/Man Trans
D= Golf 4dr w/Auto Trans, Jetta SE w/Auto Trans, Touareg V6 FSI/TDI R-Line
E= Touareg V6 FSI/TDI Hybrid
F= Beetle w/6 Spd Auto Trans, Eos Lux/Exec w/ Auto Trans
G= CC V6 Exec w/Auto Trans and 4Motion, GTI 4dr w/Man Trans, Jetta SEL w/5 Spd Man Trans
H= Beetle 1.8T w/5 Spd Man Trans, CC V6 Exec w/Auto Trans, Beetle 2.5L w/5 Spd Manual, GTI 4dr w/Auto Trans
J= Beetle 1.8T w/6 Spd Auto Trans, Beetle 2.5L TDI w/6 Spd Auto Trans
K= Jetta SportWagen w/5 Spd Man Trans
L= Jetta SEL/TDI w/Auto Trans
M= Jetta SportWagen w/6 Spd Manual
N= Golf 4dr w/6 Spd Manual
P= Jetta SportWagen w/6 Spd Auto Trans
R= Beetle TDI w/6 Spd Man, CC Exec w/Auto Trans
V= Beetle R-Line w/6 Spd Auto Trans
1= Jetta / S w/5 Spd Manual
2= Jetta / S w/Auto Trans
3= Jetta TDI w/6 Spd Man
4= Beetle R-Line w/6 Spd Manual, Jetta GLI w/Auto Trans
5= Beetle Conv. 1.8T w/6 Spd Auto Trans, Beetle Conv. 2.5L TDI w/6 Spd. Auto Trans, Jetta GLI w/6 Spd Manual
6= Beetle Conv. TDI w/6Spd Man Trans, Jetta Hybrid w/Auto Trans
7= Beetle Conv. R-Line w/6 Spd Auto Trans
8= Beetle Conv. R-Line w/6 Spd Man Trans
Country of origin
Manufacturer
Vehicle Type
Series
Engine
Restraint system
Model (7&8)
Check digit
Model year
Assembly plant
E = 2014
Sequential production number (position 12 - 17)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
W V G C V 3 A X 8 E W 5 3 2 0 1 4
See back
2014
WVW = Europe - Pass. Car
1VW = USA - Pass. Car
3VW = Mexico - Pass. Car
WVG = Europe - S.U.V.
Calculate per NHTSA Code
A3*** = Passat
AH (1F) = Eos
AJ (16/1K)**** = Golf, GTI, Jetta, Jetta SportWagen
AN (3C) = CC
AT = Beetle, Beetle Conv.
AX (5N) = Tiguan
BP (7P) = Touareg
C = Chattanooga
D = Bratislava
E = Emden
M = Mexico
P = Mosel
V = Portugal
W = Wolfsburg
A= 5 cyl 2.5L 170hp (CBTA-M) Golf
B= 5 cyl 2.5L 170hp (CBUA-M-PZEV*) Golf
D= 4 cyl 2.0L 200hp (CBFA-PZEV*) GTI
F= VR6 3.6L 280hp (CGRA) Touareg
G= 6 cyl 3.0L 333hp + 34 Kw (CGFA) Touareg Hybrid
H= 5 cyl 2.5L 170hp (CBTA-M) Passat
K= 4 cyl 2.0L 115hp (CBPA) Jetta
L= 4 cyl 2.0L TDI 140hp (CJAA) Beetle, Beetle Convertible, Jetta, Jetta SportWagen
M= 4 cyl 2.0L TDI 140hp (CJAA) Golf
M= VR6 3.6L 280hp (CDVB) Passat
N= 4 cyl 2.0L 200hp (CCTA) CC
N= 4 cyl 2.0L TDI 140hp (CKRA) Passat
P= 4 cyl 2.0L 200hp (CBFA-PZEV*) CC
P= 5 cyl 2.5L 170hp (CBUA-M-PZEV*) Beetle, Beetle Convertible, Jetta, Jetta SportWagen, Passat
P= V6 3.0L TDI 240hp (CNRB) Touareg
S= 4 cyl 1.8L 170hp (CPKA) Passat
S= 4 cyl 2.0L 210hp (CPLA) Beetle, Beetle Convertible, Jetta GLI
T= 4 cyl 1.8L 170hp (CPRA-PZEV*) Passat
T= 4 cyl 2.0L 210hp (CPPA-PZEV*) Beetle, Beetle Convertible, Jetta GLI
U= VR6 3.6L 280hp (CNNA) CC
V= 4 cyl 2.0L 200hp (CCTA) Tiguan
W= 4 cyl 2.0L 200hp (CBFA-SULEV II**) Eos
X= 5 cyl 2.5L 170hp (CBTA-M) Beetle, Beetle Convertible, Jetta, Jetta SportWagen
0= 4 cyl 1.8L 170hp (CPKA) Beetle, Beetle Convertible, Jetta
1= 4 cyl 1.8L 170hp (CPRA-PZEV*) Beetle, Beetle Convertible, Jetta
3= 4 cyl 1.4L 150hp + 28 Kw (CNLA-PZEV*) Jetta Hybrid
* PZEV = Partial Zero Emissions Vehicle
** SULEV II = Super Low Emissions Vehicle
*** 7 position US model characters are alphabetic beginning with 2010 MY. ROW model characters, where different, are listed in parenthesis (), for reference only.
**** Jetta and Jetta SportWagen models are identified by WMI code of 3VW. GTI and Golf models are identified by WMI code of WVW.
October 30, 2013 (Rev 4)

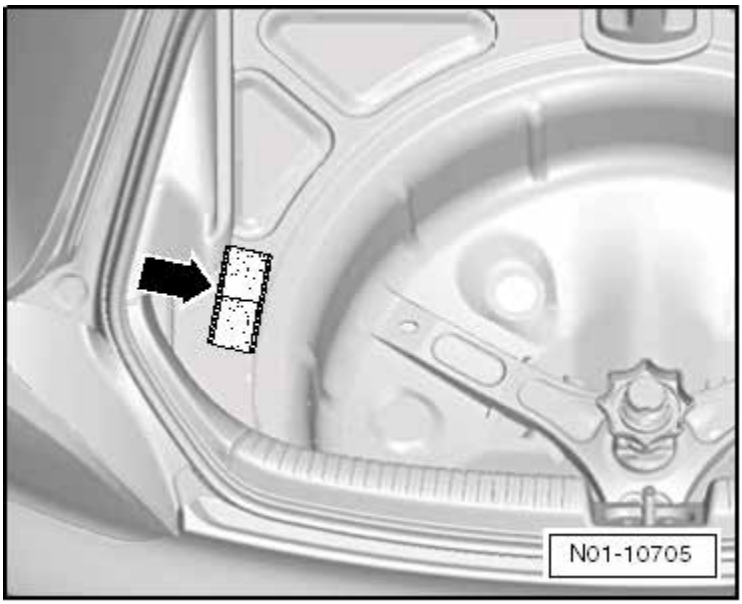

2014 Restraint System:
All = Active-Dr/Pass - Front Air Bag - Dr/Pass
3 (Tiguan) = Advanced Front Air Bags + Side Impact Air Bags - Front + Side Curtain Air Bags + 4 Star Crash Rated
5 (Jetta Only) or 7 (Jetta SportWagen/CC/Passat) = Advanced Front Air Bags + Side Impact Air Bags - Fr. + Side Curtain Air Bags
7 = (Beetle/Beetle Conv.) Advanced Front Air Bags + Side Impact Air Bags - Front + 3 Star Crash Rated
8 (Eos Only) = Advanced Front Air Bags + Side Impact Aig Bags - Front + Knee Air Bags - Front + Side Curtain Air Bags
9 (Touareg) = Advanced Front Air Bags + Side Impact Air Bags - Front + Side Curtain Air Bags
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
D = 2013
E = 2014
Calculate per NHTSA Code
Sequential Product Number
1 Country of origin
2 Manufacturer
3 Vehicle Type
4 Series
5 Engine
6 Restraint system
7 Model
8 (position 7 & 8)
9 Check digit
10 Model year
11 Assembly plant
12 13 14 15 16 17 Sequential production number (position 12 - 17)
2014 Volkswagen VIN Decoder (except Routan)

VIN Inside Engine Compartment



The VIN is located in the center of the bulkhead under the plenum chamber, behind the noise insulation (➡).

Vehicle Data Label



The vehicle data label (➡) is located in the spare wheel well on the left side. The vehicle data label is also in the customer's maintenance booklet.

SALES CODES

Engine Codes

CBFA/CCTA	2.0L TFSI 4-cylinder 4V
CBTA/CBUA	2.5L 5-cylinder 4V
CJAA	2.0L TDI 4-cylinder 4V

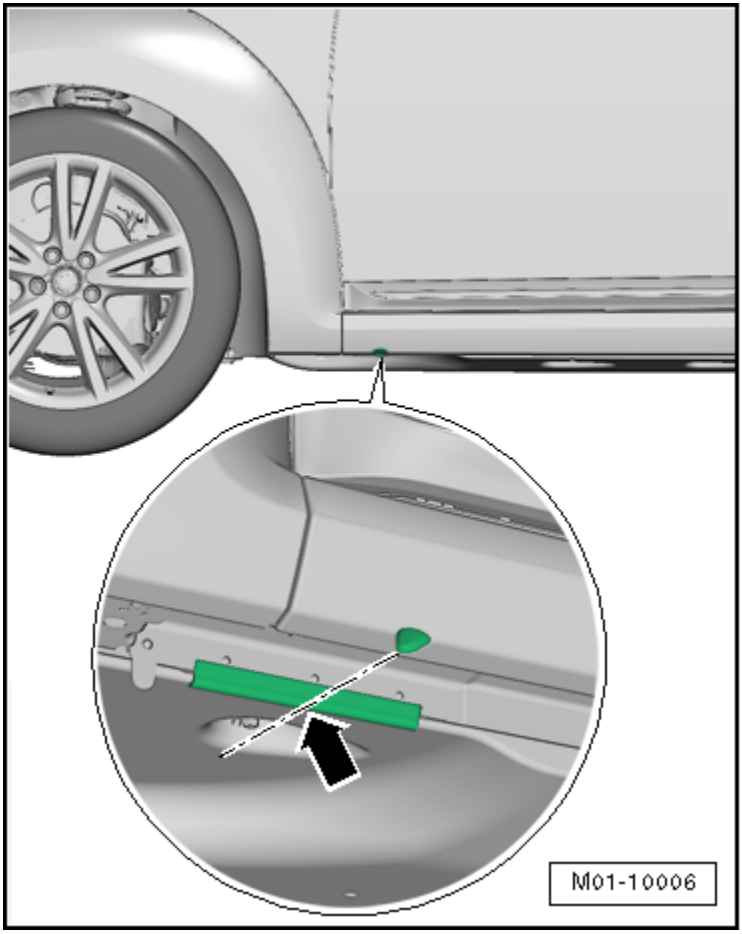
Transmission Codes

0A4	5-speed manual
02Q	6-speed manual
02E	6-speed Direct Shift Gearbox (DSG)
09G	6-speed automatic

VEHICLE LIFTING

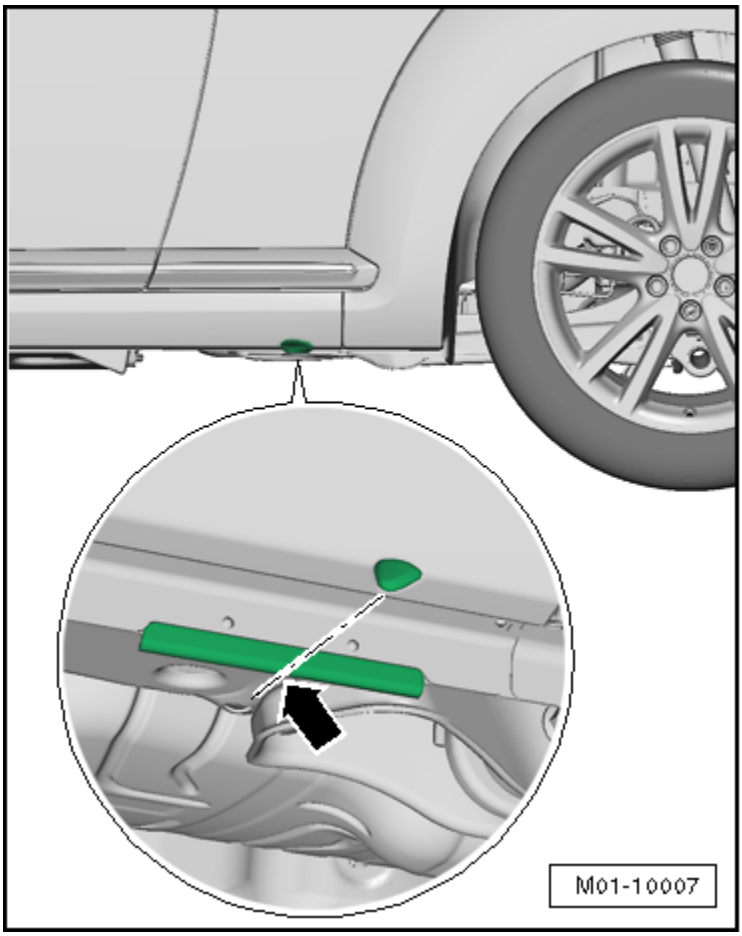
Hoist and Jack Mounting Points

Front



Position the support plate in the side member vertical reinforcement area (➡).

Rear

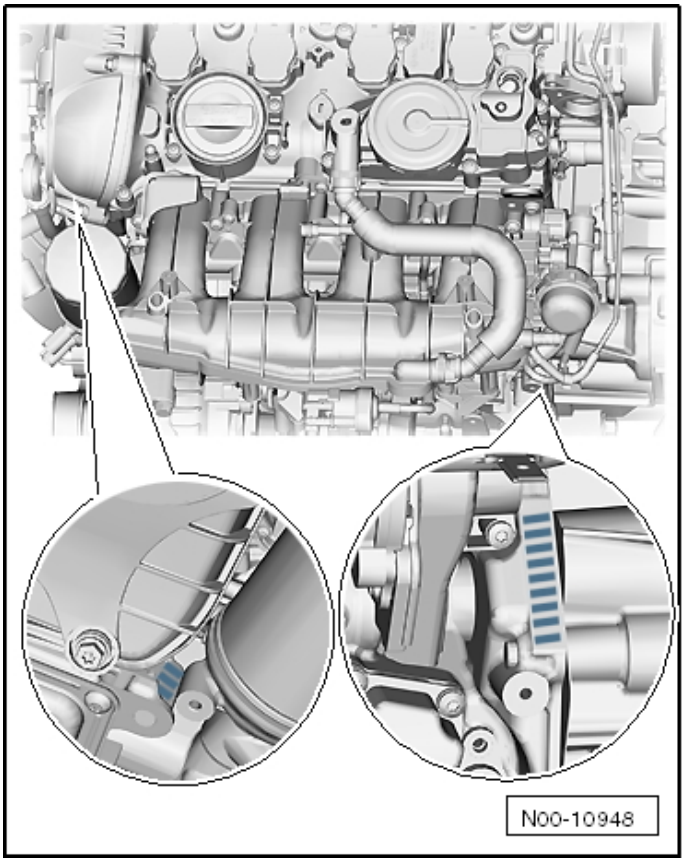


Position the support plate in the side member vertical reinforcement area (➡).

ENGINE MECHANICAL – 2.0L CPLA, CPPA

General, Technical Data

Engine Number Location



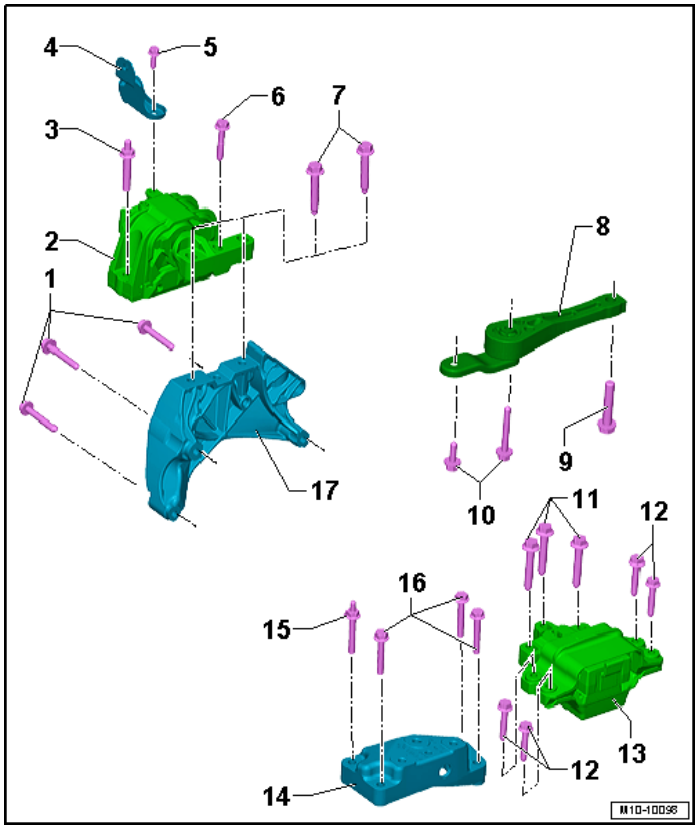
The engine number (engine code and serial number) are located at the engine/transmission joint. The engine code is also printed on the cylinder block behind the oil filter.

Engine Data

Engine code		CPLA	CPPA
Manufactured		from 02/2013	from 02/2013
Emissions values	Standard	Tier 2 BR	SULEV
Displacement	Liter	2.0	2.0
Output	kW at RPM	155 @ 5300 to 6200	155 @ 5300 to 6200
Torque	Nm at RPM	280 @1700 to 5200	280 @1700 to 5200
Bore	diameter mm	82.5	82.5
Stroke	mm	92.8	92.8
Compression ratio		9.6:1	9.6:1
Research Octane Number (RON)		minimum 95	minimum 95
Fuel injection and ignition system		TFSI	TFSI
Ignition sequence		1-3-4-2	1-3-4-2
Turbocharger,		Turbocharger	Turbocharger
Variable valve timing		Yes (Intake)	Yes (Intake)
Secondary Air Injection (AIR) system		No	Yes
Valves per cylinder		4	4
Oil pressure control		Yes	Yes

Engine Assembly – 2.0L CPLA, CPPA

Assembly Mounts Overview



1 - Bolt
- ☐ Engine support to engine
- ☐ Tightening specification, see below Engine Support - Tightening Specification and Sequence
- ☐ Replace after removing

2 - Engine Mount

3 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Engine mount to body
- ☐ Replace after removing

4 - Bracket

5 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Engine mount to body
- ☐ Replace after removing

6 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Engine mount to body
- ☐ Replace after removing

7 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Engine mount to engine support
- ☐ Replace after removing

8 - Pendulum Support
- ☐ First install pendulum support to the transmission and then to the subframe

9 - Bolt
- ☐ Pendulum supports to subframe
- ☐ Replace after removing
- ☐ Tightening specification, see Installing Pendulum Support below

10 - Bolt
- ☐ Pendulum supports to transmission
- ☐ Replace after removing
- ☐ Tightening specification, see Installing Pendulum Support below

11 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Transmission mount to transmission support
- ☐ Replace after removing

12 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Transmission mount to body
- ☐ Replace after removing

13 - Transmission Mount
- ☐ The illustration shows the DSG transmission version

14 - Gearbox Support

15 - Bolt
- ☐ Double bolt
- ☐ Transmission support to transmission

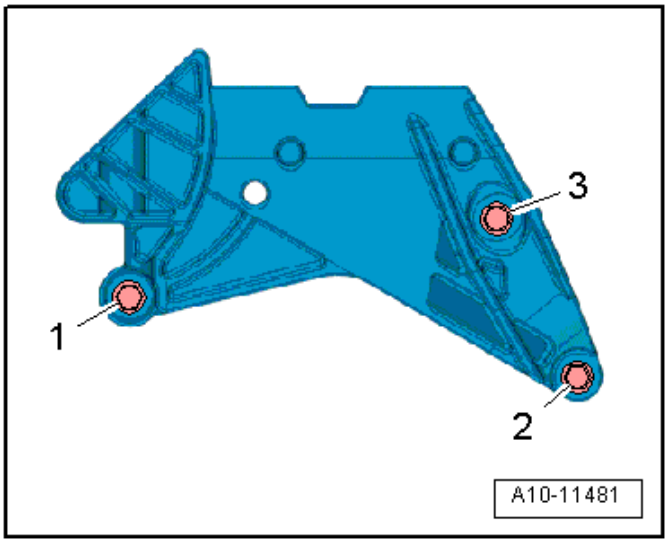
16 - Bolt
- ☐ Transmission support to transmission

17 - Engine Support

Fastener Specification

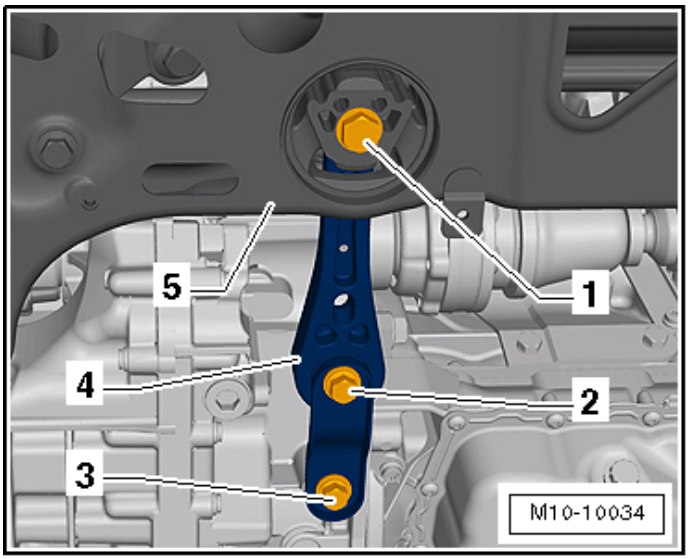
Component	Fastener size	Nm
Bolts and nuts	M6	9
	M7	15
	M8	23
	M10	40
	M12	60

Engine Support - Tightening Specification and Sequence



Stage	Fastener size	Nm
1	-1- through -3-	7
2	-1- through -3-	40
3	-1- through -3-	Tighten 90° additional turn

Installing Pendulum Support

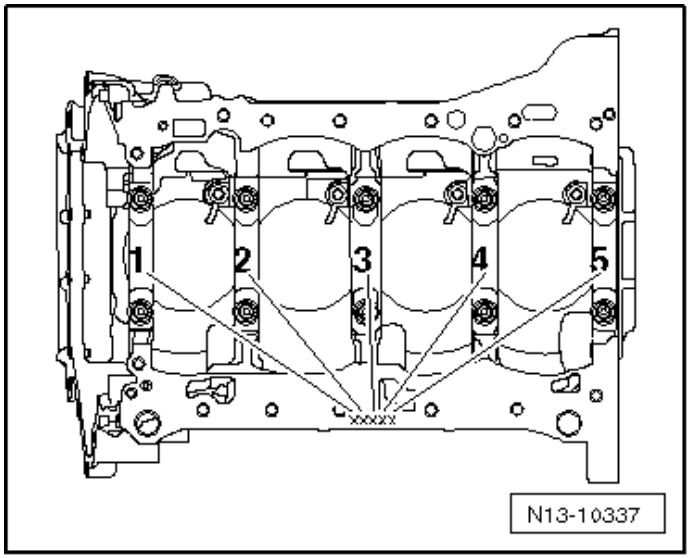


First install pendulum support -4- to the transmission and then to the subframe. Tighten the bolts in steps in the sequence shown:

Stage	Fastener size	Nm
1	-2- and -3-	50
2	-1-	100
3	-1- through -3-	Tighten 90° additional turn

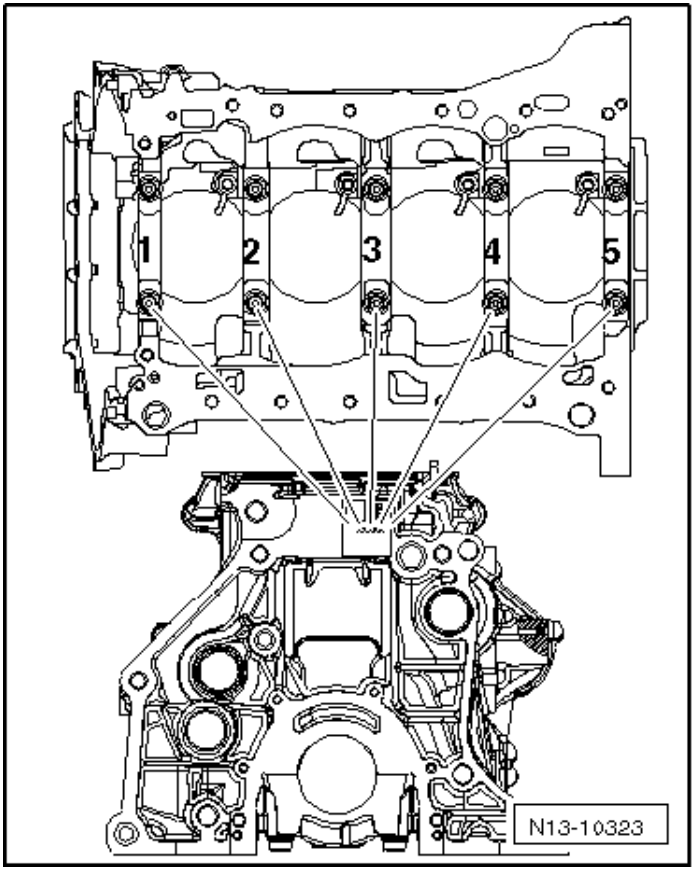
Crankshaft, Cylinder Block – 2.0L CPLA,CPPA

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.

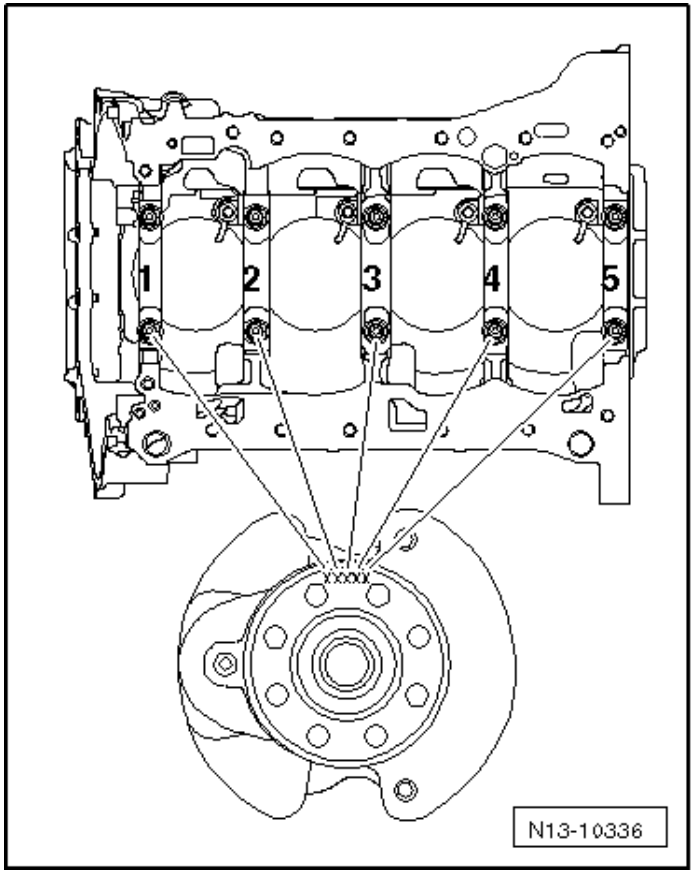
Cylinder Block Bearing Shell Identification *(cont'd)*



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

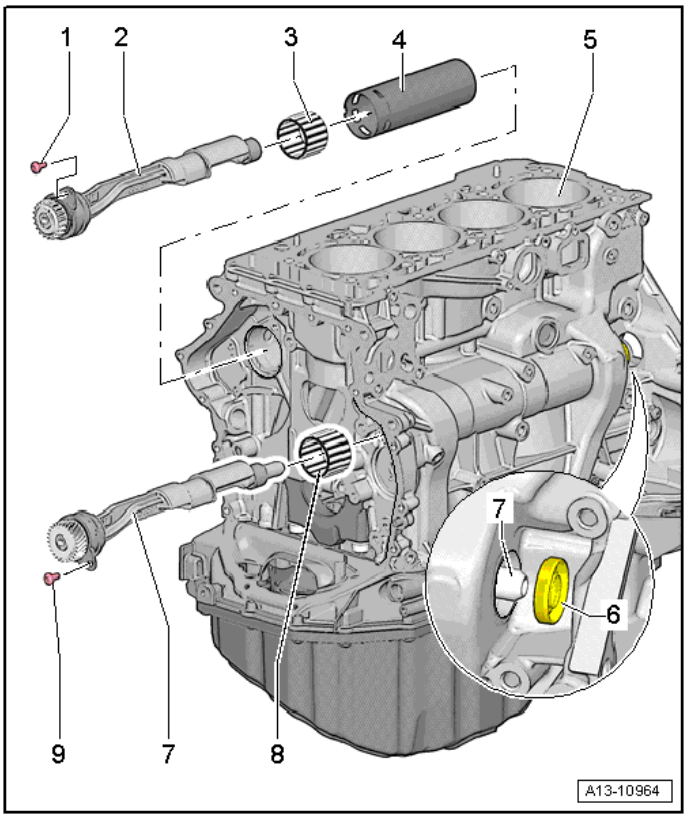


The identification on the crankshaft is for the lower bearing shell. Note the letter and match it to the color identification in the table.

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

Crankshaft, Cylinder Block – 2.0L CPLA,CPPA

Balance Shaft Overview



1 - Bolt
- ☐ 40Nm + 45° turn
- ☐ Replace after removing

2 - Balance Shaft
- ☐ Exhaust side
- ☐ Must be replaced after removing
- ☐ Lubricate the bearing with engine oil

3 - Needle Bearing Rim
- ☐ No replacement part, part of the balance shaft delivery package

4 - Pipe for Balance Shaft

5 - Cylinder Block

6 - Balance Shaft Seal Intake Side

7 - Balance Shaft
- ☐ Intake side
- ☐ Engine mount to engine support
- ☐ Replace after removing

Balance Shaft Overview *(cont'd)*

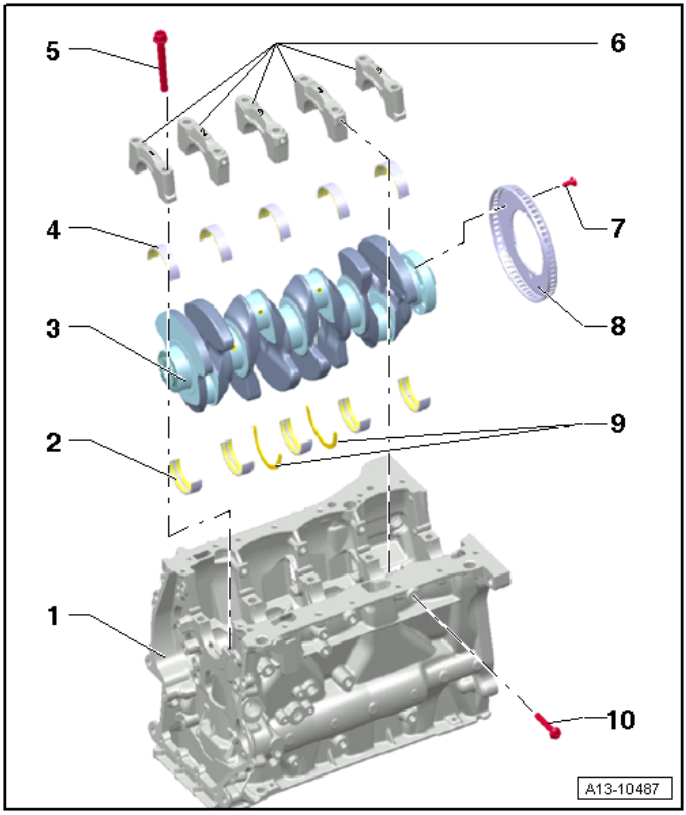
8 - Needle Bearing Rim

- ☐ No replacement part, part of the balance shaft delivery package

9 - Bolt

- ☐ 4 Nm + 45° turn
- ☐ Replace after removing

Crankshaft Overview



1 - Cylinder Block

2 - Engine Mount

- ☐ With lubricating groove
- ☐ Lubricate
- ☐ Do not interchange used bearing shells (mark)

3 - Crankshaft

4 - Bearing Shell for Bearing Cap

5 - Bolt
- ☐ Replace after removing
- ☐ Tightening sequence, see Crankshaft, Tightening Sequence below
- ☐ Replace after removing

6 - Bearing Cap
- ☐ Bearing cap 1: belt pulley side
- ☐ Retaining tabs of bearing shells and cylinder block/bearing caps must lie above one another

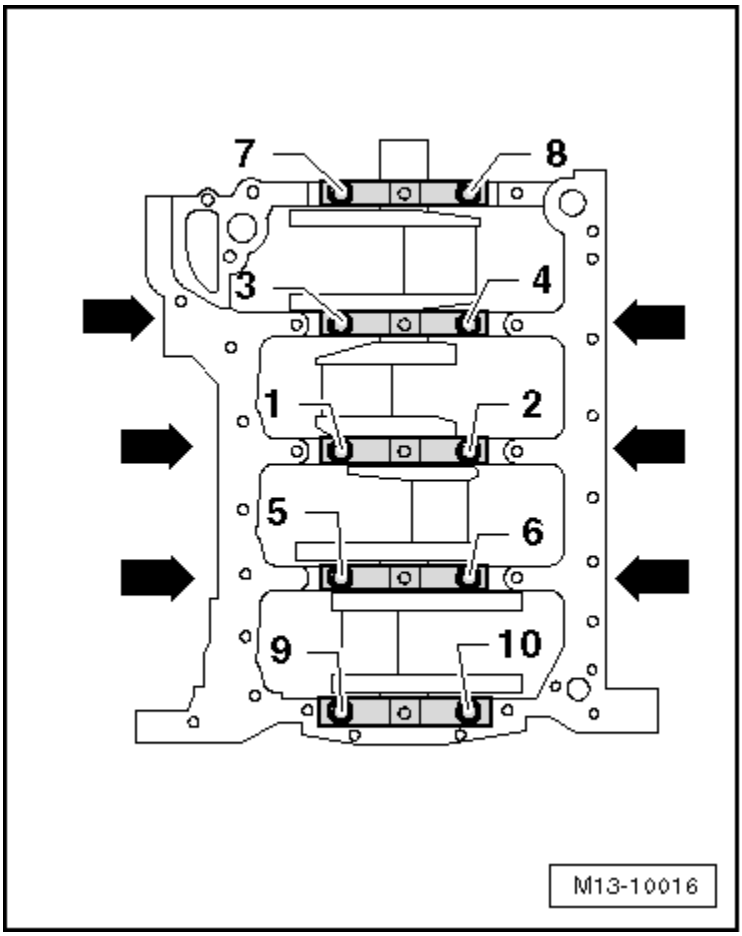
7 - Bolt
- ☐ 10 Nm + 90° turn
- ☐ Replace sensor wheel every time bolts are loosened.
- ☐ Replace after removing

8 - Pendulum Support
- ☐ Sensor Wheel
- ☐ Only possible to install in one position - Bores are offset\
- ☐ Replace sensor wheel every time bolts are loosened

9 - Thrust Washers
- ☐ For bearing 3
- ☐ Lubricate

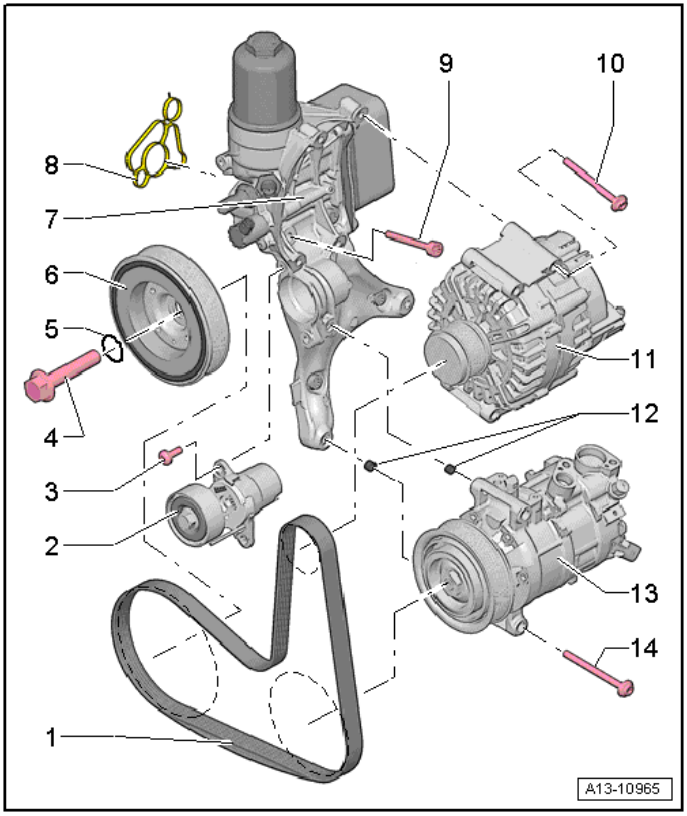
10 - Bolt
- ☐ Replace after removing
- ☐ Tightening specification, see Crankshaft, Tightening Sequence below

Crankshaft Bearing Cap Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 10 and ➡ 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 ➡	20
5	Tighten bolts ➡	an additional 90° (¼ turn)

Cylinder Block Overview, Belt Pulley Side



1 - Ribbed Belt
- ☐ Before removing, mark direction of rotation using chalk or felt-tip marker. Reversing the running direction on a used belt can destroy it

2 - Ribbed Belt Tensioning Damper

3 - Bolt
- ☐ 8 Nm + 45° turn
- ☐ Lubricate O-ring
- ☐ Replace after removing

4 - Bracket

5 - O-ring
- ☐ Not a replacement part; supplied with the bolt

6 - Vibration Damper

7 - Auxiliary Components Bracket

8 - Seal
- ☐ Replace after removing

9 - Bolt
- ☐ Tightening specification, see Accessory Assembly Bracket - Tightening Specifications and Tightening Sequence below

Cylinder Block Overview, Belt Pulley Side *(cont'd)*

10 - Bolt
- ☐ Refer to Eletrical Euipment

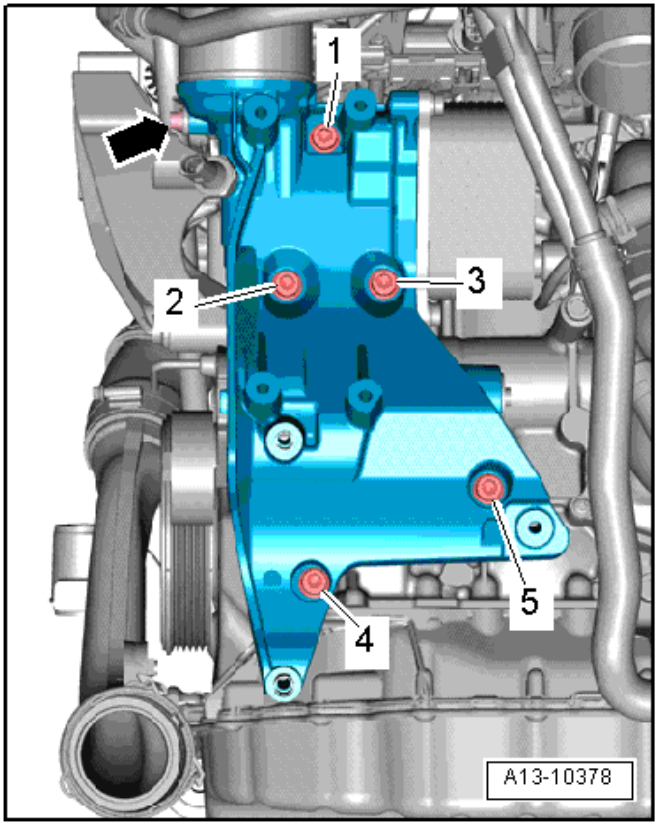
11 - Generator

12 - Alignment Sleeves
- ☐ For air conditioning compressor

13 - Air Conditioning (A/C) Compressor

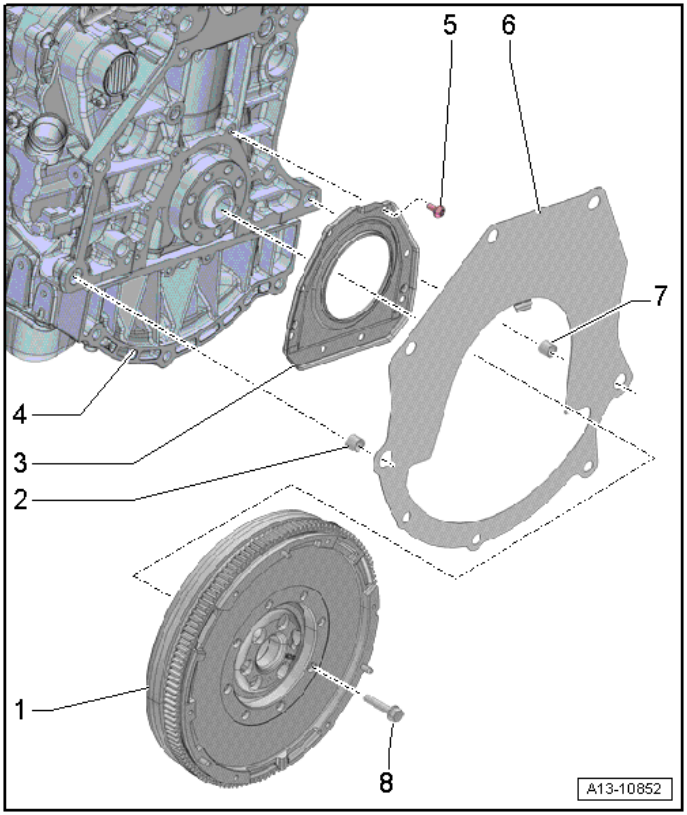
14 - Bolt
- ☐ Refer to Heating and Air Conditioning

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)

Cylinder Block Overview, Transmission Side



1 - Flywheel Engine support to engine
- ☐ Tightening specification, see Engine Support - Tightening Specification and Sequence below
- ☐ Replace after removing

2 - Alignment Sleeve

3 - Sealing Flange, Transmission Side
- ☐ Always replace as a complete unit.

4 - Cylinder Block

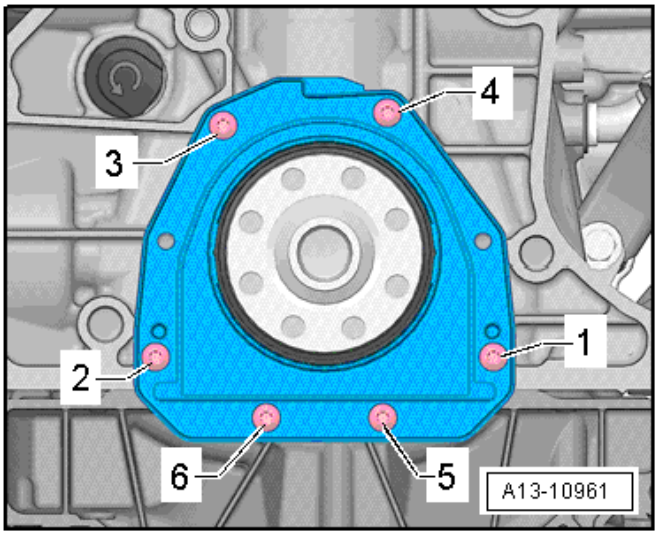
5 - Bolt
- ☐ Tightening specification, Tightening specification, see Ribbed Belt Transmission Side Sealing Flange - Tightening Specifications and Sequence below

6 - Intermediate Plate
- ☐ Illustration does not correspond to version in vehicle

7 - Alignment Sleeve

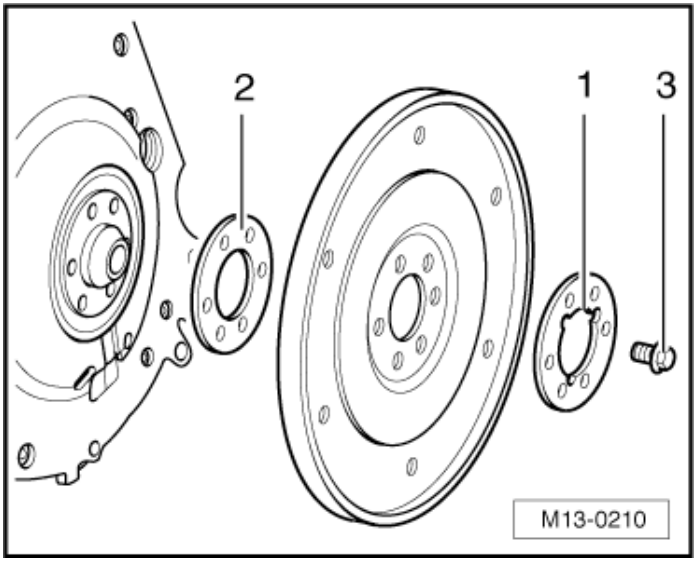
8 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ For the dual-mass flywheel
- ☐ Replace after removing

Ribbed Belt Transmission Side Sealing Flange - Tightening Specifications and Sequence



Stage	Component	Nm
1	Tighten bolts 1 through 6 in sequence	Hand-tighten
2	Tighten bolts 1 through 6 in sequence	9

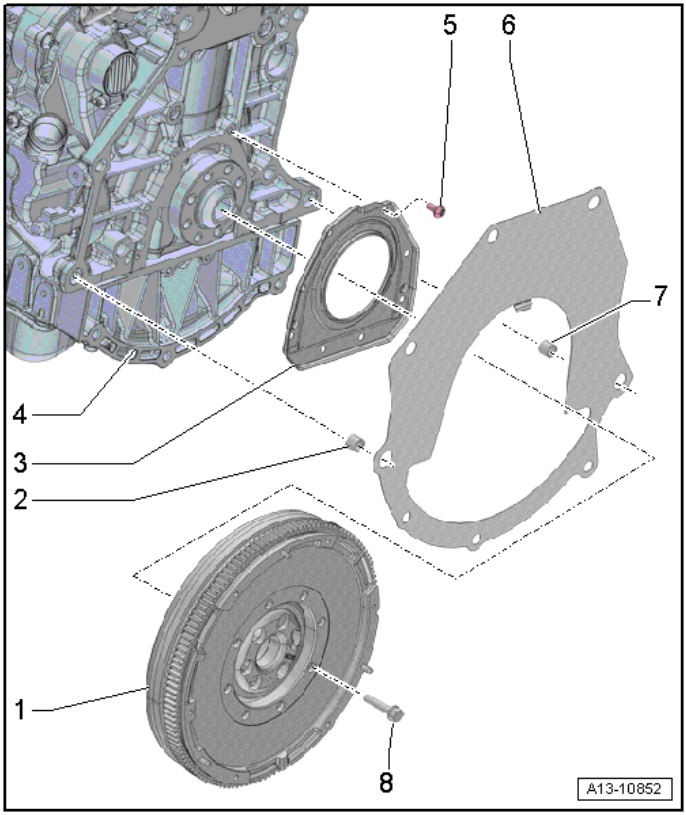
Drive Plate Overview



1 - Washer with Recessest
2 - Shim
3 - Bolts

- ☐ Nm + 90° turn (additional turning can occur in several stages).
- ☐ Replace after removing
- ☐ Install the drive plate only using the washer with openings -1- without a shim -2-

Pistons and Connecting Rods Overview



1 - Connecting Rod Bolts
- ☐ 45 Nm + 90° turn
- ☐ Replace after removing
- ☐ Lubricate the thread and contact surface

2 - Connecting Rod Bearing Cap

3 - Bearing Shells
- ☐ Do not interchange used bearing shells (mark)
- ☐ Lubricate before installing

4 - Relief Valve
- ☐ 27 Nm

5 - Oil Spray Jet

6 - Locking Ring
- ☐ Replace after removing

7 - Piston Pin
- ☐ Lubricate before installing

8 - Piston
- ☐ Mark installed position and cylinder allocation.
- ☐ Arrow on piston face points toward belt pulley side.

9 - Compression Rings

10 - Oil Scraping Ring
11 - Connecting Rod

- ☐ Always replace as a set.

Crankshaft Dimensions

Reconditioning dimension 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	0.80
Oil scraping ring	0.25 to 0.50	0.80

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	

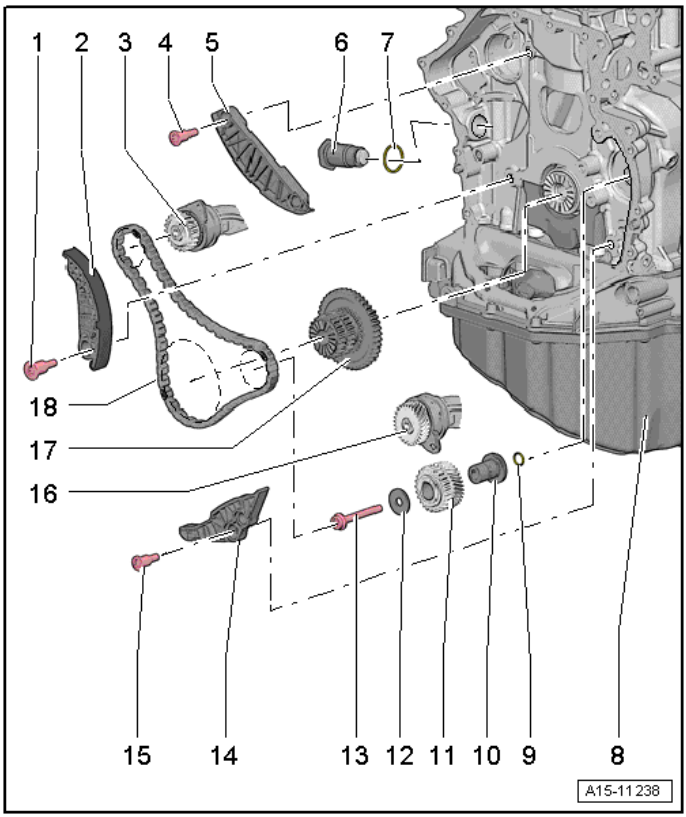
Piston and Cylinder Dimensions

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

1) Measurement does not include the graphite coating (thickness = 0.02 mm). The graphite coating wears away.

Cylinder Head, Valvetrain – 2.0L CPLA, CPPA

Balance Shaft Drive Chain Overview



1 - Guide Pins
- ☐ 20 Nm

2 - Tensioning Rail
- ☐ For the timing chain

3 - Balance Shaft
- ☐ Must be replaced after removing
- ☐ Lubricate the bearing with engine oil

4 - Guide Pins
- ☐ 20 Nm

5 - Guide Rail
- ☐ For timing chain

6 - Chain Tensioner
- ☐ 85 Nm
- ☐ Mount with locking compound, refer to the Parts Catalog.

7 - Seal

8 - Cylinder Block

9 - O-ring
- ☐ Lubricate with engine oil

10 - Mounting Pin

- ☐ Lubricate with engine oil

11 - Intermediate Sprocket

- ☐ The intermediate sprocket must be replaced if the bolt -13- is loosened.

12 - Washer

13 - Bolt

- ☐ The intermediate sprocket -11- → Item must be replaced if the bolt is loosened.
- ☐ Replace after removing
- ☐ Tightening sequence, see Intermediate Sprocket Tightening Sequence below

14 - Guide Rail

- ☐ For the balance shaft timing chain

15 - Guide Pins

- ☐ 20 Nm

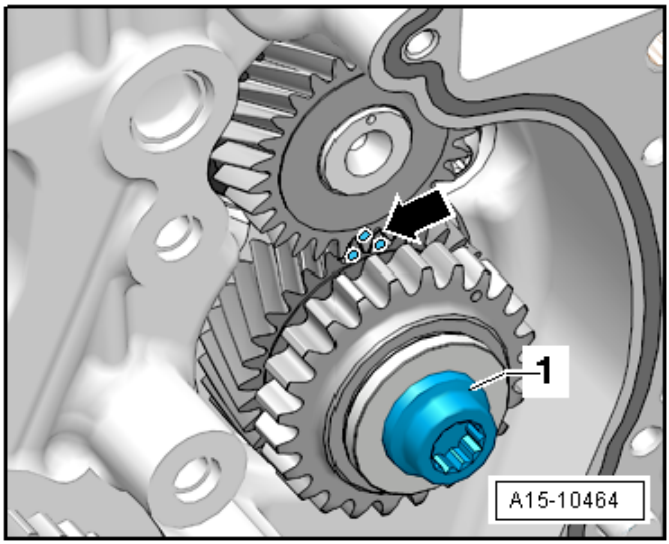
16 - Balance Shaft

- ☐ Intake side
- ☐ Must be replaced after removing
- ☐ Lubricate the bearing with engine oil

17 - Three Stage Chain Sprocket

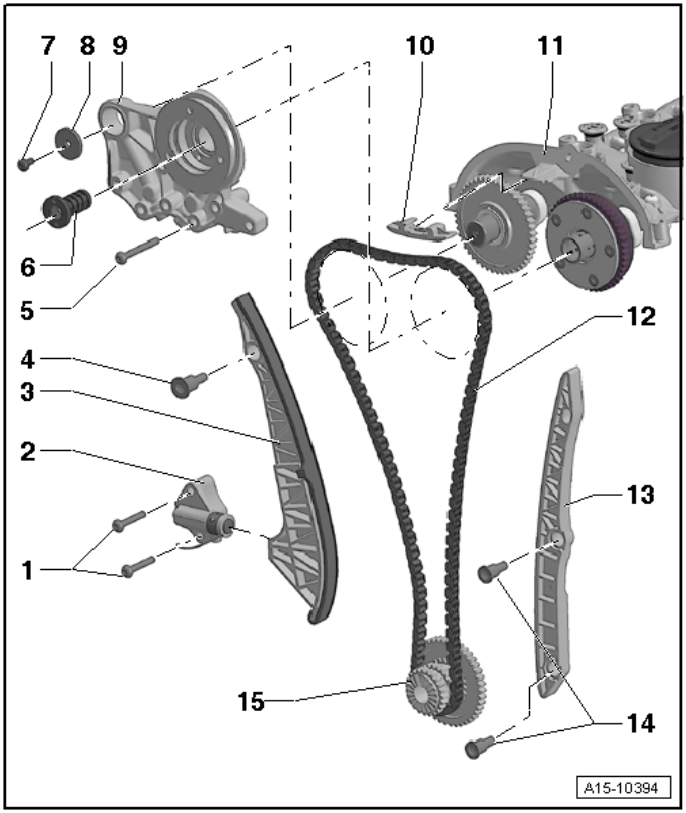
18 - Balance Shaft Drive Chain

Intermediate Sprocket Tightening Sequence



Stage	Component	Nm
1	Tighten bolts 1 through 5 in sequence	10
2	Tighten bolts 1 through 5 in sequence	The intermediate sprocket must not have any play. Loosen and tighten it again if necessary.
3	Tighten bolts 1 through 5 in sequence	25
4	Tighten bolts ➡	Tighten 90° further using a rigid wrench.

Camshaft Timing Chain Overview



1 - Ribbed Belt
- ☐ 4 Nm + 90° turn
- ☐ Replace after removing

2 - Chain Tensioner

3 - Timing Chain Tensioning Rail

4 - Guide Pins
- ☐ 20 Nm

5 - Bolt
- ☐ 4 Nm + 180° turn
- ☐ Replace after removing

6 - Regulator Valve
- ☐ 35 Nm
- ☐ Left thread

7 - Bolt
- ☐ M6 bolt: 8 Nm + 90° turn
- ☐ M8 bolt: 20 Nm + 90° turn
- ☐ Replace after removing

8 - Washer

9 - Bearing Bracket

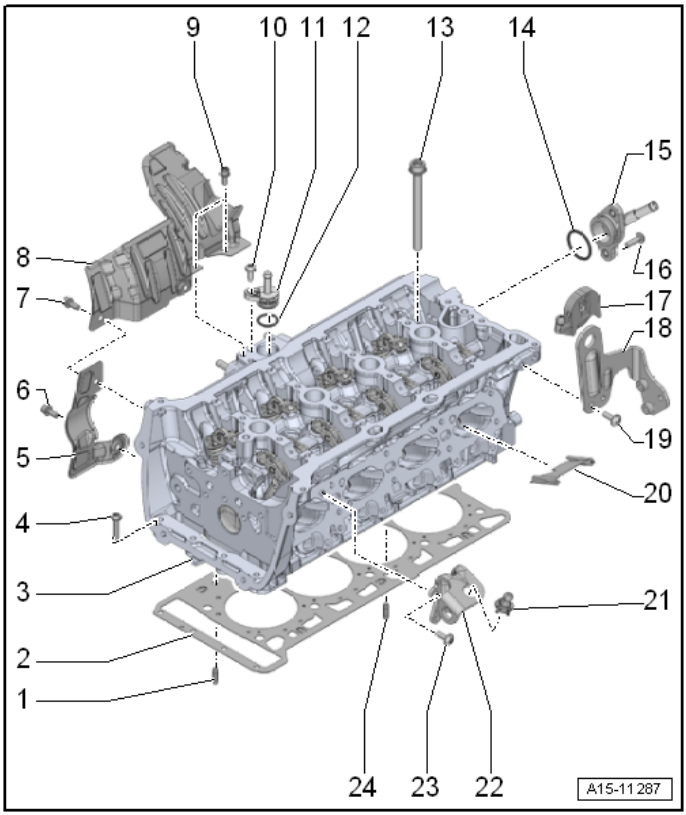
Camshaft Timing Chain Overview *(cont'd)*

10 - Camshaft Timing Chain Guide Rail
11 - Camshaft Housing
12 - Camshaft Timing Chain
- ☐ Before removing, mark the direction of rotation with paint

13 - Camshaft Timing Chain Guide Rail
14 - Guide Pins
- ☐ 20 Nm

15 - Three Stage Chain Sprocket
- ☐ Crankshaft

Cylinder Head Overview



1 - Alignment Pin
2 - Cylinder Head Gasket
- ☐ Replace after removing
- ☐ Installed position: the part number faces the cylinder head

3 - Cylinder Head
4 - Bolt
- ☐ Replace after removing

- ☐ Follow the procedure when loosening, see Loosening Cylinder Head below
- ☐ Follow the procedure when tightening, see Cylinder Head Tightening Sequence below

5 - Heat Shield
- ☐ Not a replacement part; supplied with the bolt

6 - Bolt
- ☐ 9 Nm

7 - Bolt
- ☐ 9 Nm

8 - Heat Shield

9 - Bolt
- ☐ 9 Nm

10 - Bolt
- ☐ 9 Nm

11 - Connecting Piece
- ☐ For coolant hose

12 - O-ring
- ☐ Replace after removing
- ☐ Coat with coolant

13 - Cylinder Head Bolt
- ☐ Replace after removing
- ☐ Follow the procedure when loosening, see Loosening Cylinder Head below
- ☐ Follow the procedure when tightening, see Cylinder Head Tightening Sequence below

14 - O-ring
- ☐ Replace after removing
- ☐ Coat with coolant

15 - Connecting Piece
- ☐ For coolant hose

16 - Bolt
- ☐ 9 Nm

17 - Mount
- ☐ For engine cover

18 - Engine Lifting Eye

19 - Bolt
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing

20 - Partition Plate

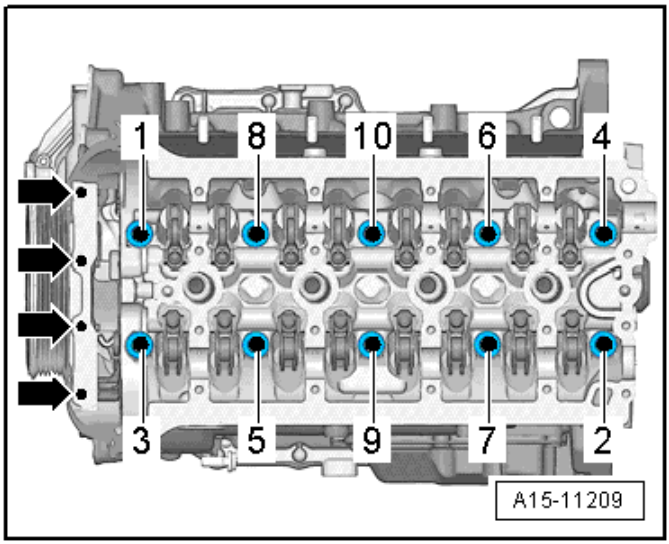
21 - Ball Pin
- ☐ For engine cover

22 - Engine Lifting Eye
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing

23 - Bolt
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing

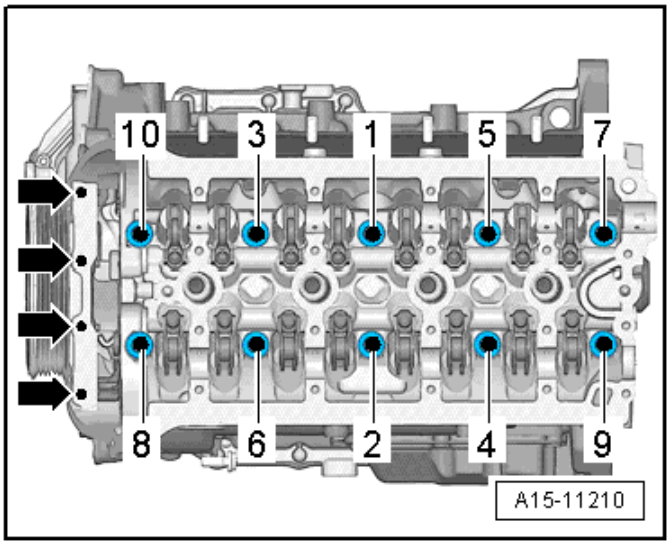
24 - Alignment Pin

Loosening Cylinder Head



Remove the bolts -arrows-. Loosen the cylinder head bolts in order from -1- to -10-.

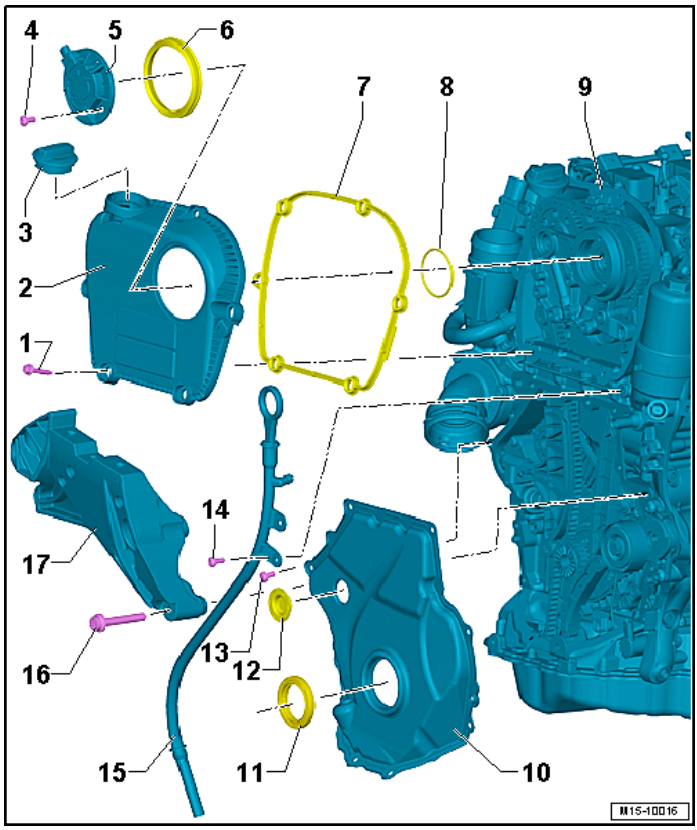
Cylinder Head Tightening Sequence



Tighten the cylinder head bolts in sequence -1- to -10- and -arrows-.

Stage	Bolts	Tightening Specification/Additional Turn
1	-1- through -10-	40 Nm
2	-1- through -10-	Tighten 90° further using a rigid wrench.
3	-1- through -10-	Tighten 90° further using a rigid wrench.
4	Bolts ➡	Tighten to 4 Nm
5	Bolts ➡	Turn another 90° using a rigid wrench.

Timing Chain Cover Overview



1 - Bolt
- ☐ Tightening sequence, see Upper Timing Chain Cover - Tightening Sequence below

2 - Upper Timing Chain Cover

3 - Cover

4 - Bolt
- ☐ 4 Nm + 45° turn
- ☐ Replace after removing

5 - Camshaft Adjustment Valve 1 -N205-

6 - Seal
- ☐ Replace after removing

7 - Seal
- ☐ Replace if damaged

8 - O-ring
- ☐ Replace after removing
- ☐ Coat with oil before installing

9 - Engine

10 - Lower Timing Chain Cover

- ☐ With seal
- ☐ Dependent on the sealing compound sealant, bends the cover when removing. For this reason the cover must always be replaced after removing.

11 - Shaft Seal

- ☐ For vibration damper

12 - Plug

- ☐ Replace after removing

13 - Bolt

- ☐ Replace after removing
- ☐ Tightening sequence eight bolts, see Lower Timing Chain Cover Tightening Sequence below
- ☐ Tightening sequence 15 bolts, see Lower Timing Chain Cover - Tightening Sequence for 15 Bolts below

14 - Bolt

- ☐ 9 Nm

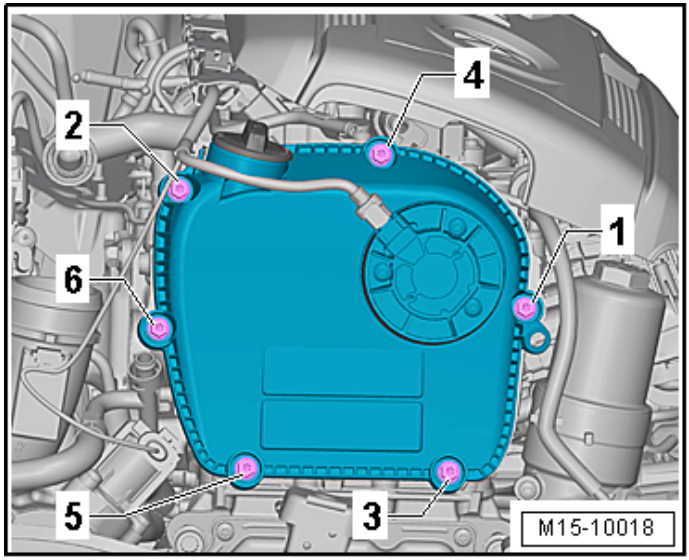
15 - Oil Dipstick Tube

16 - Bolt

- ☐ Engine support to engine

17 - Engine Support

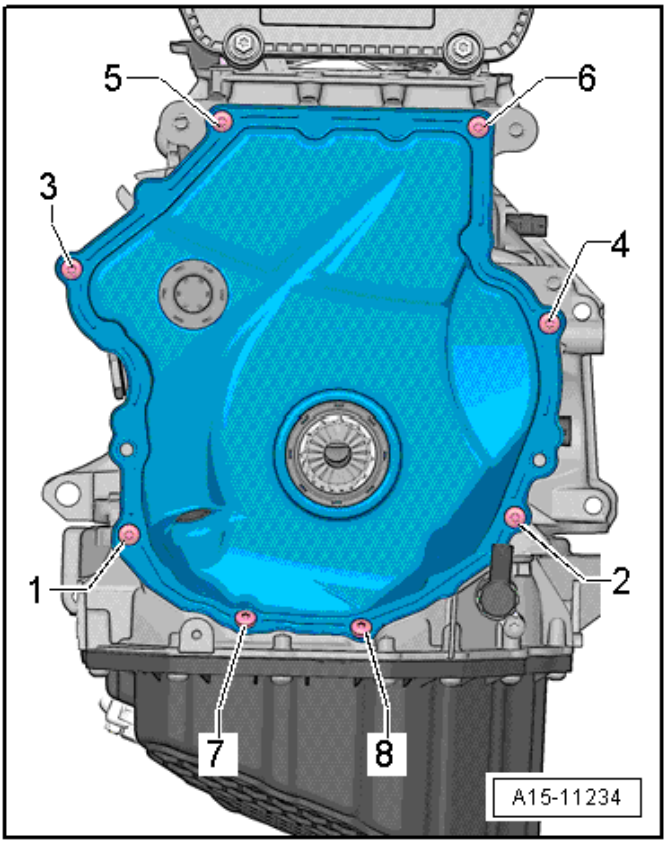
Upper Timing Chain Cover - Tightening Sequence



Tighten the bolts -1- through -6- in the sequence shown:

Stage	Bolts	Tightening Specification/Additional Turn
1	-1- through -6-	Install by hand all the way
2	-1- through -6-	Tighten to 9 Nm

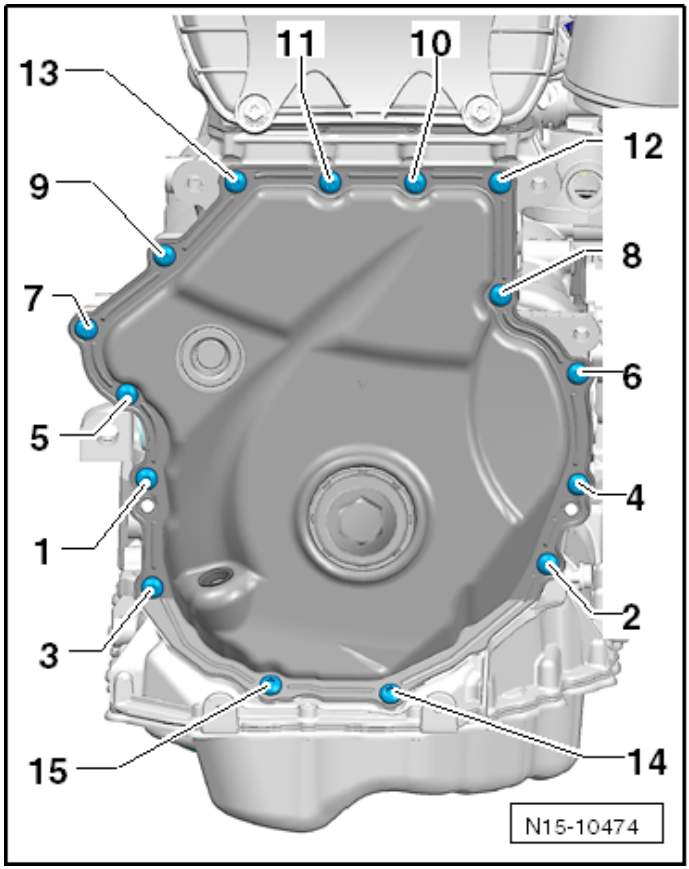
Lower Timing Chain Cover Tightening Sequence for 8 Bolts



Tighten the bolts -1- through -8- in two stages in the sequence shown:

Stage	Bolts	Tightening Specification/Additional Turn
1	-1- through -8-	Tighten to 4 Nm
2	-1- through -8-	Tighten 45° additional turn

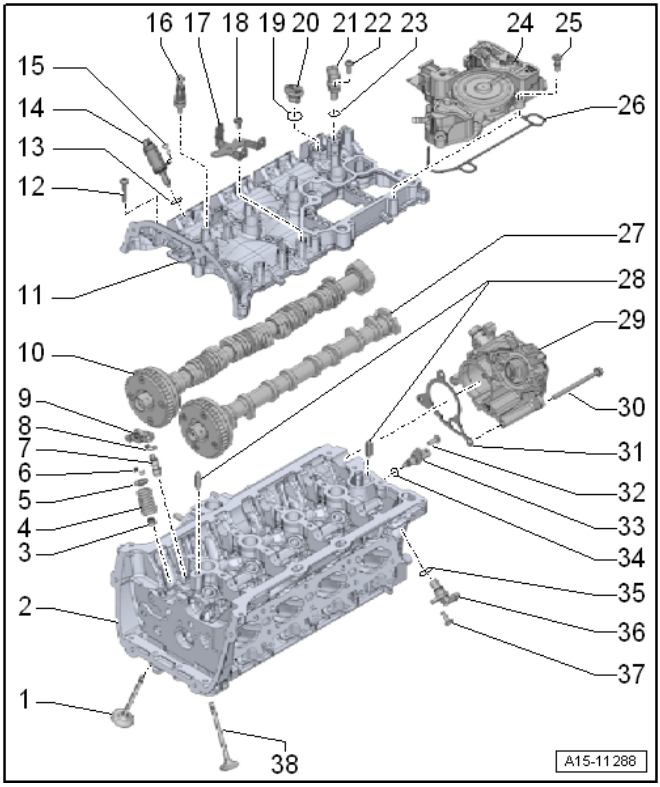
Lower Timing Chain Cover Tightening Sequence for 15 Bolts



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

Stage	Bolts	Tightening Specification/Additional Turn
1	-1- through -15-	Tighten to 8 Nm
2	-1- through -15-	Tighten 45° additional turn

Valvetrain Overview



1 - Intake Valve
- ☐ Do not rework, only lapping is permitted

2 - Cylinder Head

3 - Valve Stem Seal

4 - Valve Spring

5 - Valve Spring Retainer

6 - Valve Retainers

7 - Hydraulic Adjusting Element
- ☐ Lubricate contact surface

8 - Clip
- ☐ For hydraulic adjuster

9 - Roller Rocker Lever
- ☐ Mark the installed position for installation later
- ☐ Lubricate the running surfaces before installing

10 - Exhaust Camshaft

11 - Cylinder Head Cover

12 - Bolt
- ☐ Loosening, see Loosening Cylinder Head Cover below
- ☐ Tightening specification and sequence, see Cylinder Head Cover, Tightening Specifications and Sequence below

Valvetrain Overview *(cont'd)*

13 - O-ring
- ☐ Not installed

14 - Cam Adjustment Actuator
- ☐ Not installed

15 - Bolt
- ☐ Not installed

16 - Ball Pin
- ☐ 9 Nm
- ☐ For engine cover

17 - Bracket
- ☐ For EVAP Canister Purge Regulator Valve 1 -N80-

18 - Bolt
- ☐ 9 Nm

19 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

20 - Plug

21 - Camshaft Position Sensor 3 -G300-
- ☐ Not installed

22 - Bolt
- ☐ Not installed

23 - O-ring
- ☐ Not installed

24 - Oil Separator

25 - Bolt
- ☐ Tightening specification and sequence, see Oil Separator - Tightening Sequence below

26 - Seal
- ☐ Replace after removing

27 - Intake Camshaft

28 - Alignment Pins

29 - Vacuum Pump

30 - Bolt
- ☐ Refer to Chapter Brakes

31 - Seal
- ☐ Replace if damaged

32 - Bolt
- ☐ 4 Nm + 45° turn
- ☐ Replace after removing

33 - Engine Coolant Temperature Sensor -G62-

34 - O-ring
- ☐ Replace
- ☐ Coat with coolant

35 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

36 - Camshaft Position Sensor -G40-

- ☐ For air conditioning compressor

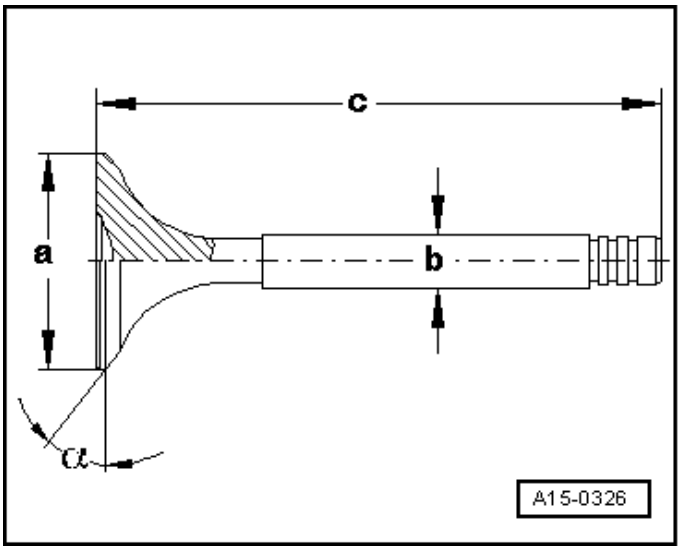
37 - Bolt

- ☐ Refer to Chapter Ignition/Glow Plug System

38 - Exhaust Valve

- ☐ Do not rework, only lapping is permitted

Valve Dimensions



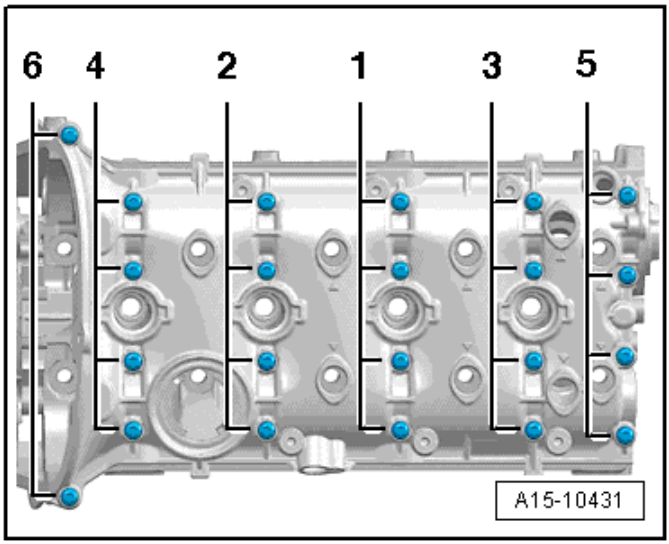
Dimension		Intake valve	Exhaust valve
Diameter a	mm	33.85 ± 0.10	28.0 ± 0.1
Diameter b	mm	5.98 ± 0.01	5.96 ± 0.01
c	mm	104.0 ± 0.02	101.9 ± 0.02
α	∠°	45	45

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

Compression Pressures

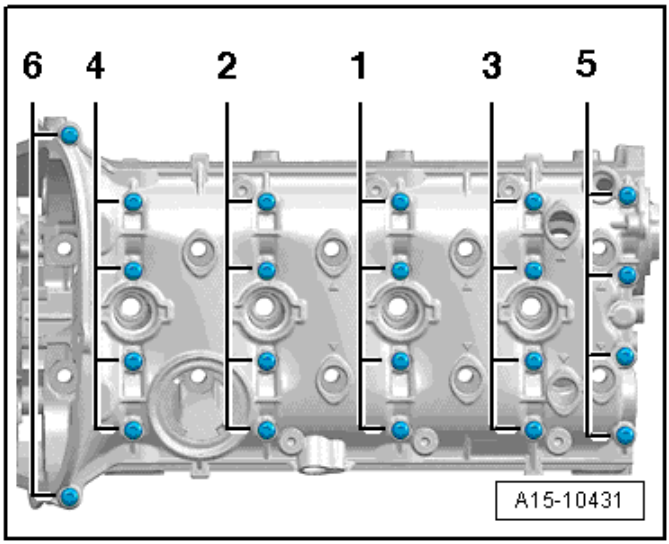
New Bar positive pressure	Wear limit Bar positive pressure	Difference between cylinders Bar positive pressure
11.0 to 14.0	7.0	Maximum 3.0

Loosening Cylinder Head Cover



Loosen the cylinder head cover in the following sequence: -1- to -6-.

Cylinder Head Cover Tightening Specifications

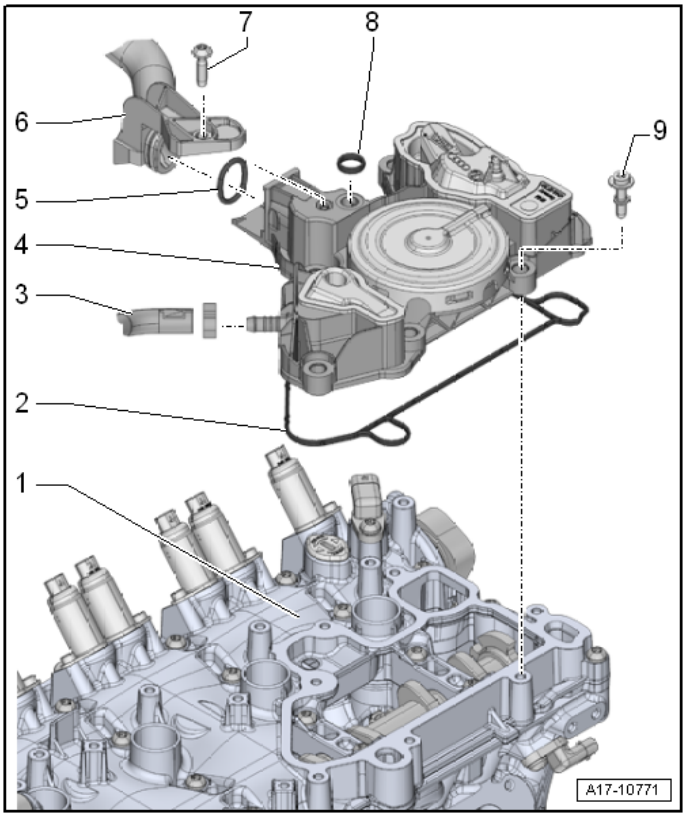


Replace the bolts.

Stage	Bolts	Tightening Specification/Additional Turn
1	-1- through -6-	Install hand-tight in several stages
2	-1- through -6-	Tighten with torque wrench to 8 Nm
3	-1- through -6-	Tighten 90° further using a rigid wrench.

Lubrication – 2.0L CPLA, CPPA

Crankcase Ventilation Overview



1 - Cylinder Head Cover

2 - Seal

- ☐ Replace after removing

3 - Hose

- ☐ To the EVAP Canister Purge Regulator Valve 1 -N80-

4 - Oil Separator

5 - Seal

- ☐ Replace after removing

6 - Hose

- ☐ For the crankcase ventilation
- ☐ To turbocharger

7 - Bolt

- ☐ 4 Nm
- ☐ Self-tapping
- ☐ Position the bolt by hand and tighten it until it finds the old threads. Then tighten the bolt to the specification.

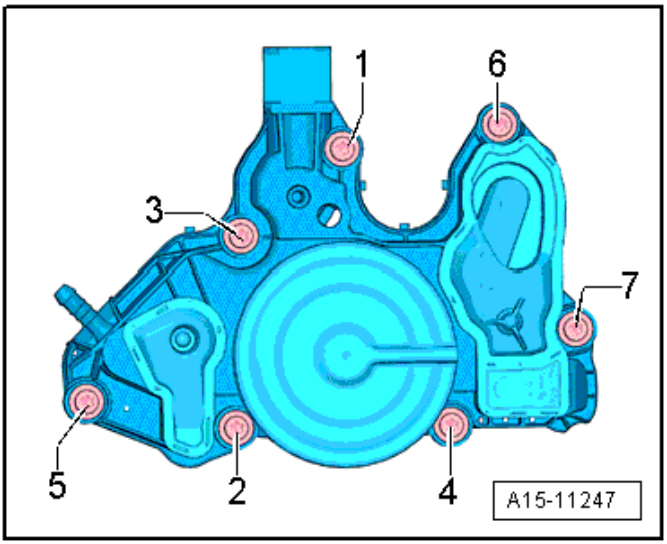
8 - Seal

- ☐ Replace after removing

9 - Bolt

- ☐ Self-tapping
- ☐ Position the bolt by hand and tighten it until it finds the old threads. Then tighten the bolt to the specification.
- ☐ Tightening specification and sequence, see Oil Separator - Tightening Sequence below

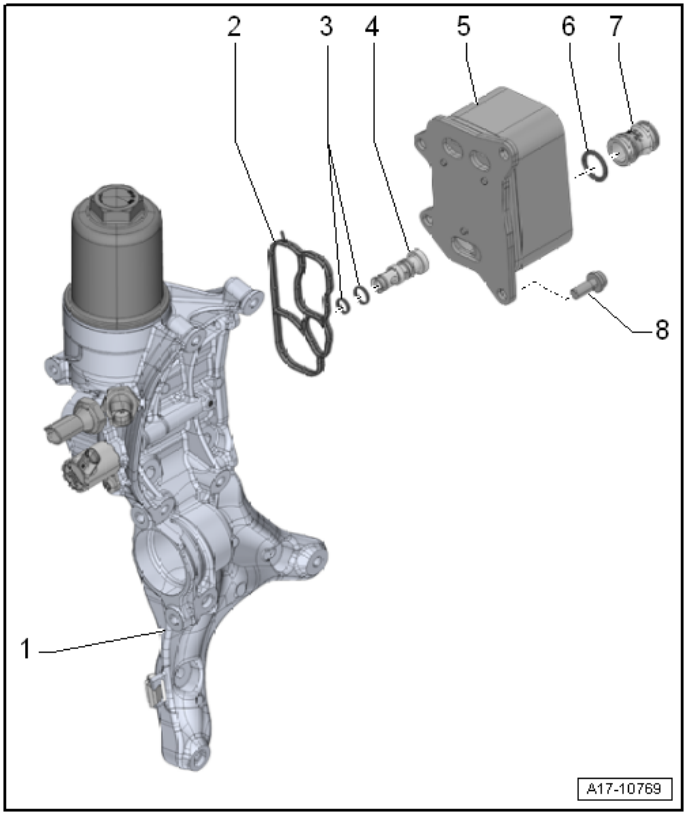
Oil Separator Tightening Specification



Tighten bolts in sequence

Bolts	Tightening Sequence and Torque Specification
-1- through -7-	Tighten to 9 Nm.

Engine Oil Cooler Overview



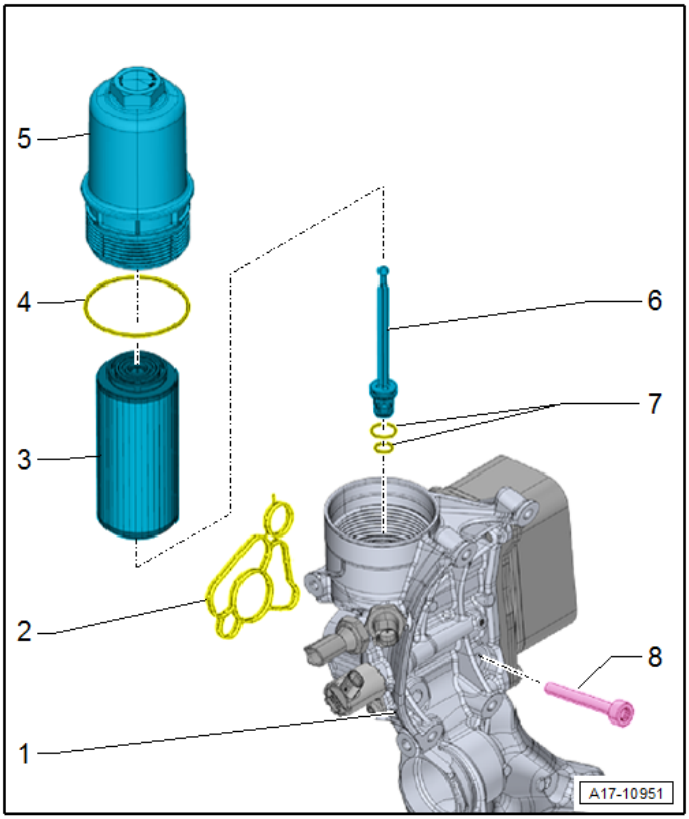
1 - Auxiliary Components Bracket
2 - Seal
- ☐ Replace after removing

3 - O-rings
- ☐ Replace after removing
- ☐ Coat with engine oil

4 - Mechanical Switch Valve
5 - Engine Oil Cooler
6 - Seal
- ☐ Replace after removing
- ☐ Coat with engine oil

7 - Connection
8 - Bolt
- ☐ 8 Nm + 45° turn
- ☐ Replace after removing

Oil Filter Overview



1 - Auxiliary Components Bracket

2 - Seal

- ☐ Replace after removing

3 - Oil Filter

4 - O-ring

- ☐ Replace after removing
- ☐ Coat with engine oil

5 - Filter Housing

- ☐ 25 Nm

6 - Oil Drain Supports

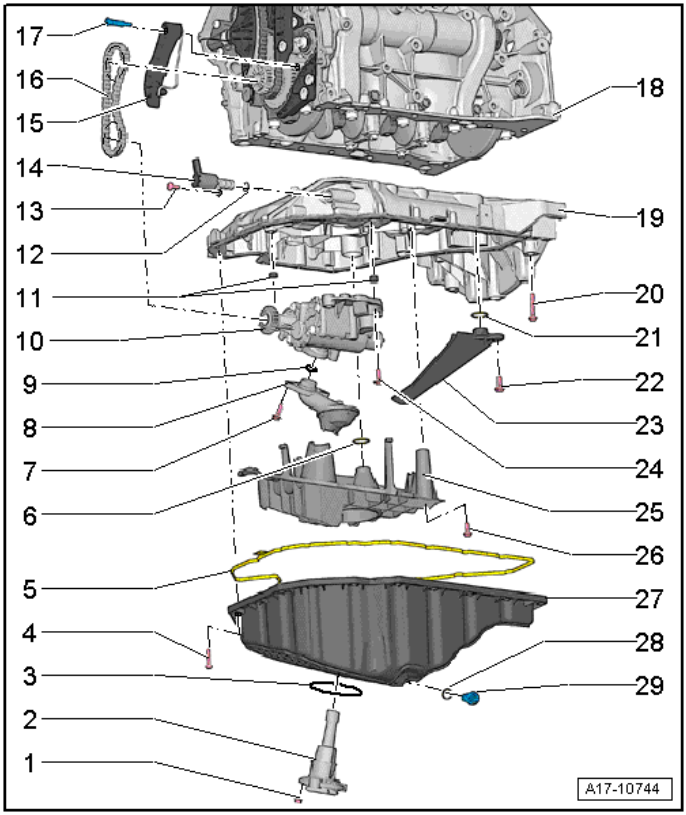
7 - O-rings

- ☐ Replace if damaged

8 - Bolt

- ☐ Tightening specification and sequence see Accessory Assembly Bracket - Tightening Specifications and Tightening Sequence in Cylinder Block Overview, Belt Pulley Side

Oil Pan/Oil Pump Overview



1 - Nut
- ☐ 9 Nm

2 - Oil Level Thermal Sensor -G266-

3 - Seal
- ☐ Replace after removing

4 - Bolt
- ☐ Replace after removing
- ☐ Tightening sequence, see Oil Pan Lower Section - Tightening Sequence below

5 - Seal
- ☐ For oil pan lower sections only

6 - O-ring
- ☐ Coat with engine oil
- ☐ Replace after removing

7 - Bolt
- ☐ 4 Nm + 45° turn
- ☐ Replace after removing

8 - Intake Line
- ☐ Replace after removing
- ☐ Coat with oil before installing

9 - O-ring
- ☐ Coat with engine oil
- ☐ Replace after removing

10 - Oil Pump

11 - Centering Sleeve

12 - O-ring
- ☐ Coat with engine oil
- ☐ Replace after removing

13 - Bolt
- ☐ Tightening specification see item 1 in Oil Pressure Switch/Oil Pressure Regulator Valve Overview

14 - Oil Pressure Regulation Valve -N428-

15 - Chain Tensioner

16 - Oil pump drive chain

17 - Bolt
- ☐ 9 Nm

18 - Cylinder Block

19 - Oil Pan Upper Section

20 - Bolt
- ☐ Replace after removing
- ☐ Tightening sequence, see Oil Pan Upper Section - Tightening Sequence below

21 - O-ring
- ☐ Coat with engine oil
- ☐ Replace after removing

22 - Bolt
- ☐ 4 Nm + 45° turn
- ☐ Replace after removing

23 - Oil Return Pipe

24 - Bolt
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing

25 - Oil Baffle
- ☐ Replace after removing

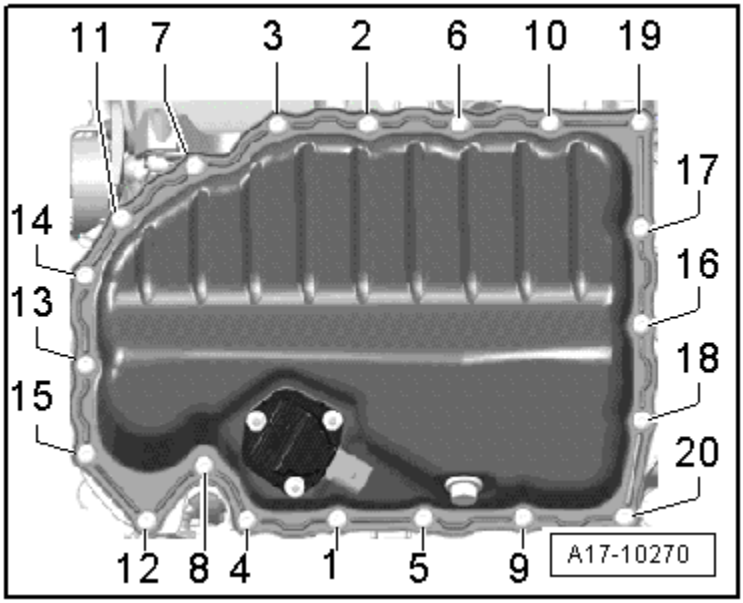
26 - Bolt
- ☐ 4 Nm + 45° turn
- ☐ Replace after removing

27 - Oil Pan Lower Section
- ☐ There are different versions. Refer to the Parts Catalog.

28 - Seal
- ☐ Replace after removing
- ☐ Coat the O-ring with engine oil

29 - Oil Drain Plug
- ☐ Oil Drain Plug 30 Nm

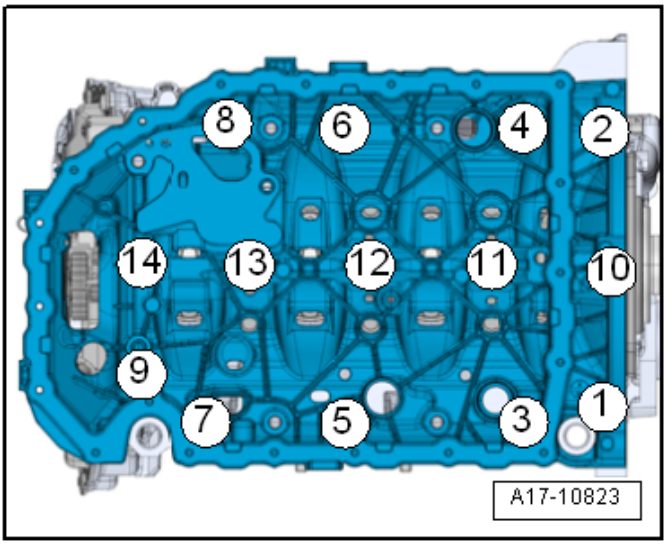
Oil Pan Tightening Specifications



Replace the bolts were tightened with an additional turn. Tighten the bolts -1- through -20- in two stages in the sequence shown:

Stage	Component
1. Bolts -1- through -20-	Tighten to 8 Nm
2. Bolts -1- through -20-	Tighten 45° additional turn

Oil Pan Upper Section - Tightening Sequence

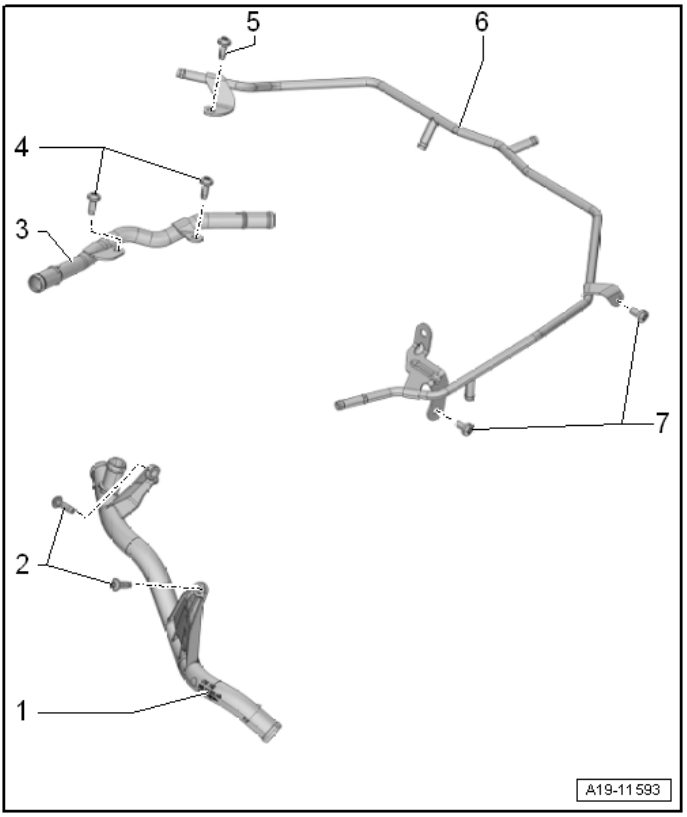


Replace the bolts were tightened with an additional turn. Tighten the bolts -1- through -14- in the sequence shown:

Stage	Tightening Sequence and Torque Specification
1. Bolts -1- through -14-	Tighten to 8 Nm
2. Bolts -1- and -2-	Tighten 180° additional turn
3. Bolts -3- through -9-	Tighten 45° additional turn
4. Bolt -10-	Tighten 180° additional turn
5. Bolts -11- through -14-	Tighten 90° additional turn

Cooling System – 2.0L CPLA, CPPA

Coolant Pipes Overview



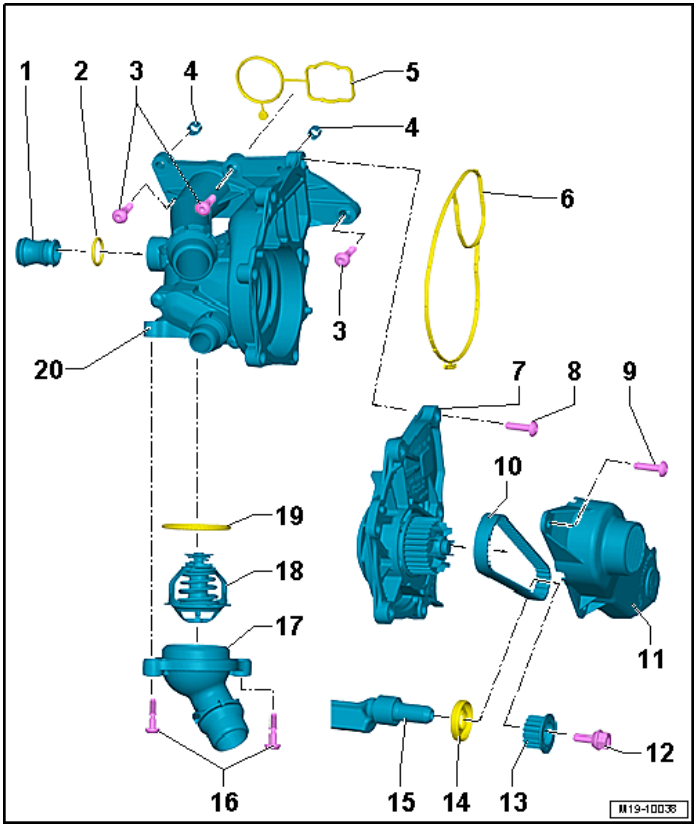
1 - Front Coolant Pipe
2 - Bolts
- ☐ 6 Nm

3 - Upper Coolant Pipe
4 - Bolt
- ☐ 9 Nm

5 - Bolt
- ☐ 9 Nm

6 - Coolant Line
7 - Bolts
- ☐ 9 Nm

Coolant Pump/Thermostat Overview



1 - Connection

2 - O-ring

- ☐ Replace after removing
- ☐ Coat with coolant

3 - Bolt

- ☐ Tightening specification and sequence, see Thermostat - Tightening Specification and Tightening Sequence below

4 - Centering Pin

5 - Seal

- ☐ Replace after removing

6 - Seal

- ☐ Replace after removing

7 - Coolant Pump

8 - Bolt

- ☐ Tightening sequence, see Coolant Pump - Tightening Specification and Sequence below

9 - Bolt

- ☐ 9 Nm

Coolant Pump/Thermostat Overview *(cont'd)*

10 - Toothed Belt
- ☐ For coolant pump

11 - Toothed Belt Cover

12 - Bolt
- ☐ 10 Nm + 90° turn
- ☐ Left thread
- ☐ Replace after removing

13 - Drive Gear for Toothed Belt

14 - Balance Shaft Seal Intake Side

15 - Balance Shaft

16 - Bolt
- ☐ 9 Nm

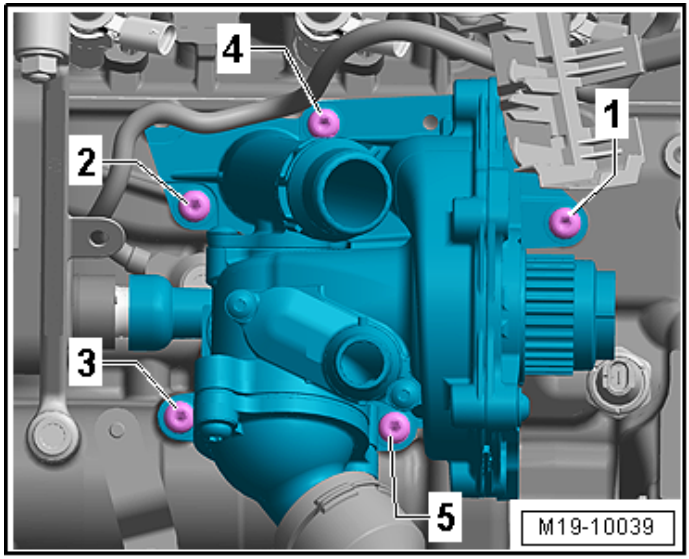
17 - Connecting Piece

18 - Thermostat

19 - O-ring
- ☐ Replace after removing

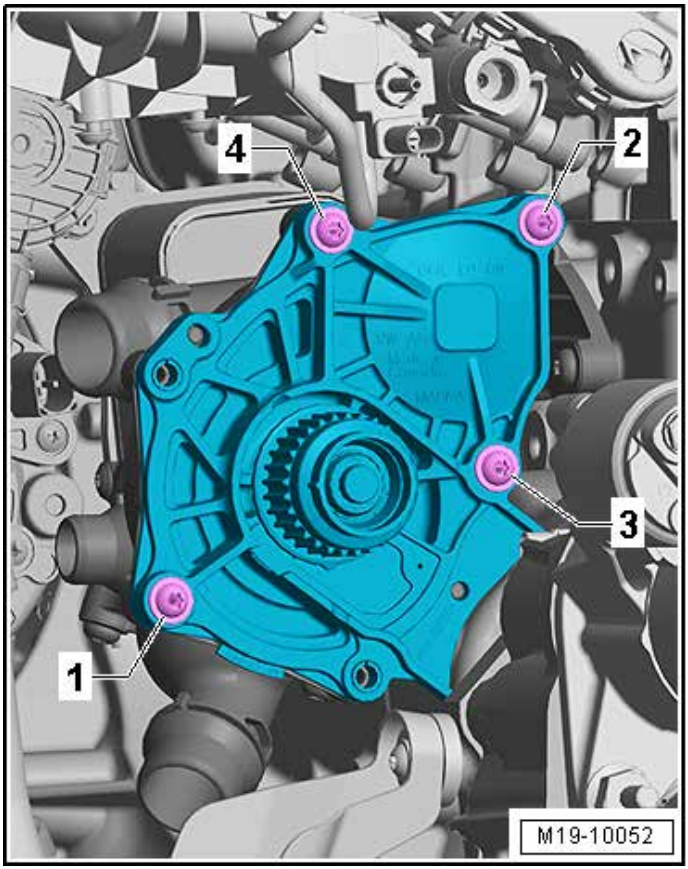
20 - Coolant Thermostat

Thermostat - Tightening Specification and Tightening Sequence



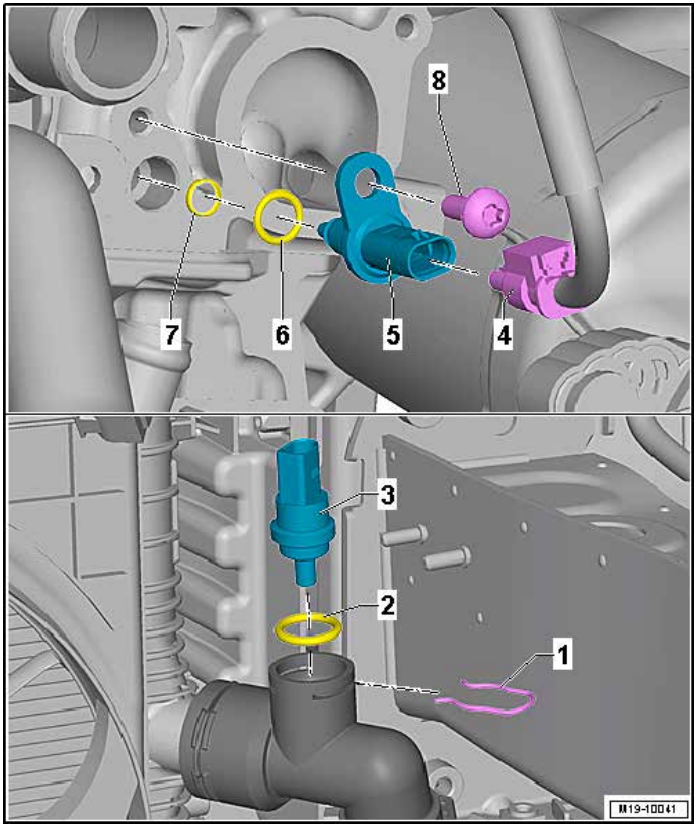
Tightening Sequence	Tightening Specification
Sequence -1- through -5-	Tighten to 9 Nm

Coolant Pump - Tightening Specification and Sequence



Tightening Sequence	Tightening Specification
Sequence -1- through -4-	Tighten to 9 Nm

Coolant Temperature Sensor Overview



1 - Clamp

2 - O-ring

- ☐ Replace after removing

3 - Engine Coolant Temperature Sensor on Radiator Outlet -G83-

4 - Connector

- ☐ To Engine Coolant Temperature Sensor -G62-

5 - Engine Coolant Temperature Sensor -G62-

6 - O-ring

- ☐ Replace after removing
- ☐ Coat with coolant

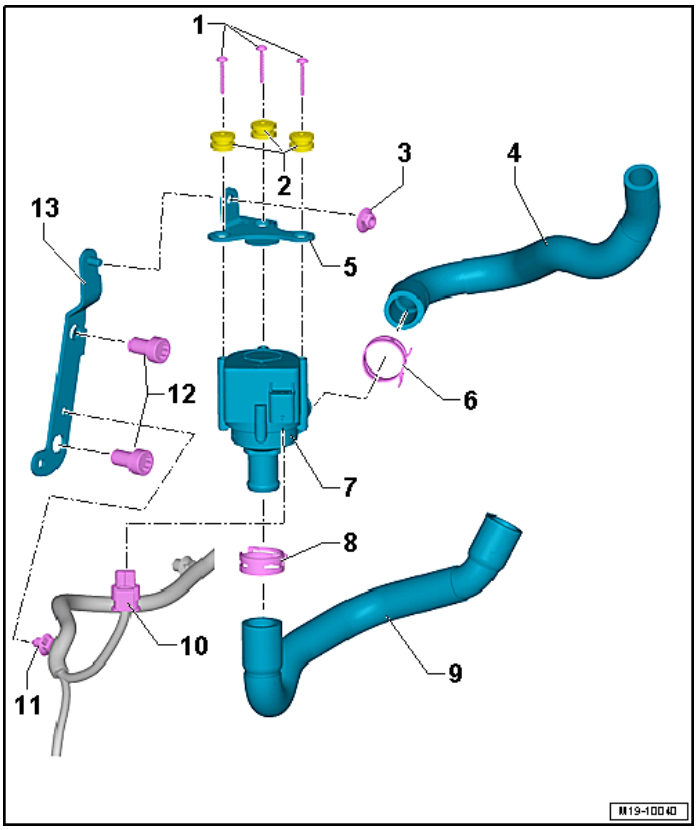
7 - O-ring

- ☐ Replace if damaged
- ☐ Coat with coolant

8 - Bolt

- ☐ 4 Nm + 45° turn
- ☐ Replace after removing

Electric Coolant Pump Overview



1 - Bolt
- ☐ 5 Nm

2 - Plastic Sockets

3 - Nut
- ☐ 9 Nm

4 - Coolant Hose

5 - Bracket

6 - Spring Clamp

7 - After-Run Coolant Pump -V51-
- ☐ With bracket

8 - Spring Clamp

9 - Coolant Hose

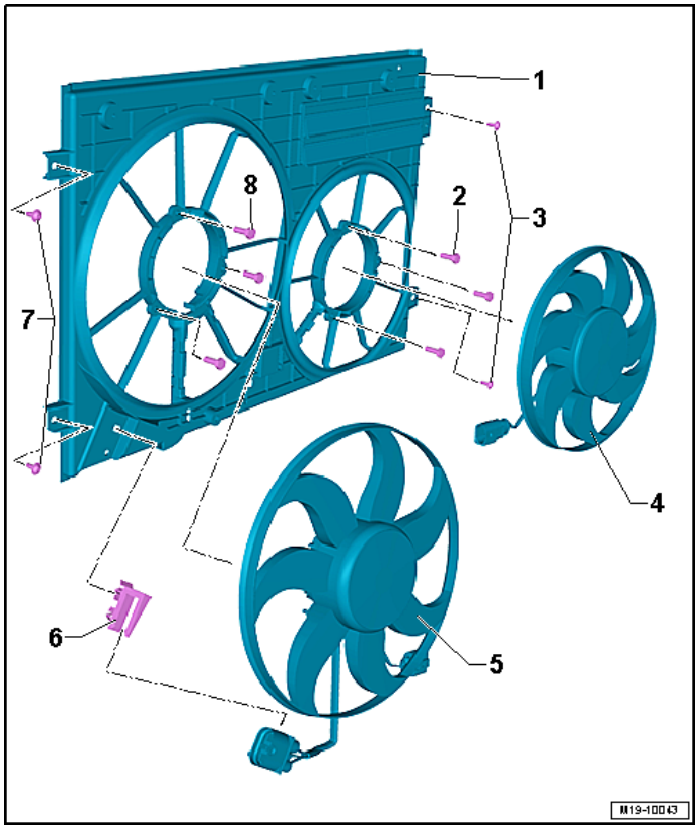
10 - Connector

11 - Clip

12 - Bolt
- ☐ 20 Nm

13 - Bracket
- ☐ Needs to be removed in order to remove the engine
- ☐ The lower attachment point is mount for the engine bracket

Fan Shroud and Radiator Fan Overview

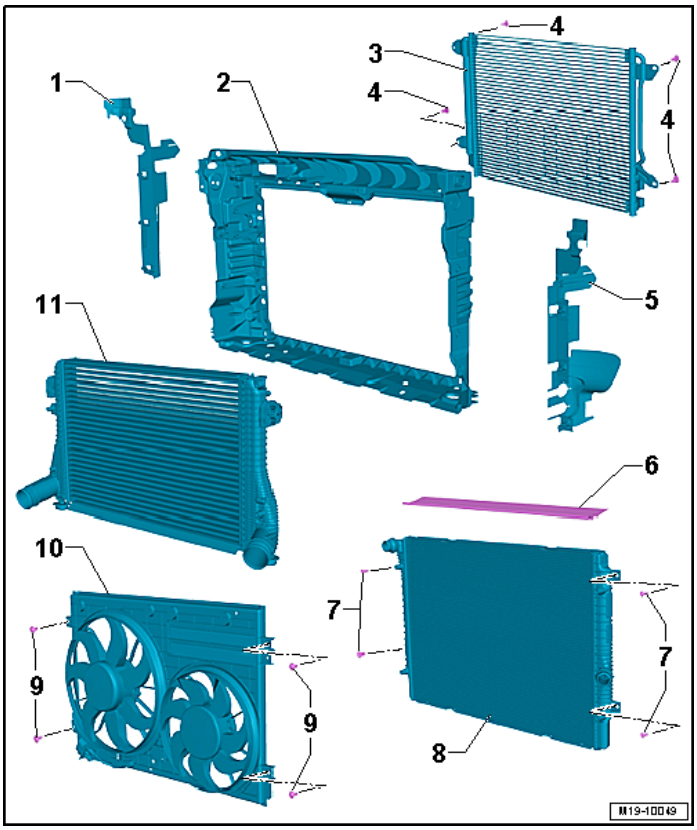


1 - Fan Shroud
2 - Bolt
- ☐ 5 Nm
- ☐ Fan shroud to radiator

3 - Bolt
- ☐ Fan shroud to radiator
- ☐ Tightening specification, see Radiator/Coolant Fan Overview

4 - Coolant Fan 2 -V177-
5 - Coolant Fan -V7-
6 - Bracket
7 - Bolt
- ☐ Fan shroud to radiator
- ☐ Tightening specification, see Radiator/Coolant Fan Overview

Radiator/Coolant Fan Overview



1 - Side Air Guide
- ☐ Left

2 - Lock Carrier

3 - Condenser

4 - Bolst
- ☐ 9 Nm

5 - Side Air Guide
- ☐ Right

6 - Seal
- ☐ Replace after removing

7 - Bolts
- ☐ 8 Nm

8 - Radiator
- ☐ Change the coolant after replacing

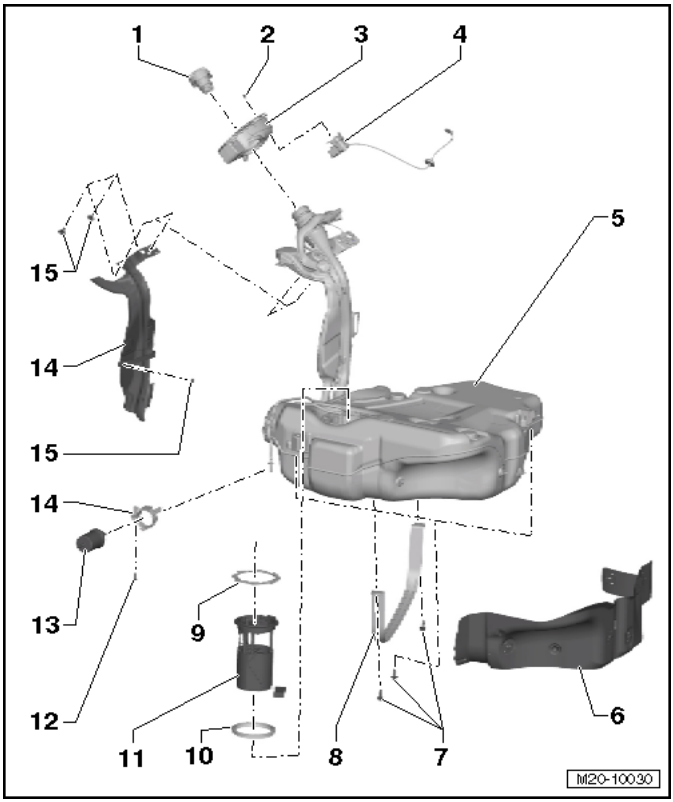
9 - Bolts
- ☐ 8 Nm

10 - Fan Shroud

11 - Charge Air Cooler

Fuel Supply – 2.0L CPLA, CPPA

Fuel Tank Assembly Overview



1 - Cover
- ☐ Replace the seal if damaged.

2 - Bolt

3 - Fuel Filler Door Unit

4 - Fuel Flap Lock

5 - Fuel Tank

6 - Heat Shield

7 - Bolts
- ☐ 25 Nm
- ☐ Fuel tank mounting

8 - Mounting Strap

9 - Locking Ring
- ☐ 110 Nm

10 - Seal
- ☐ Install the dry seal into the opening in the fuel tank
- ☐ Coat the inside of seal with fuel before installing the fuel delivery unit.
- ☐ Replace after removing

11 - Fuel Delivery Unit
- ☐ With seal
- ☐ Dependent o

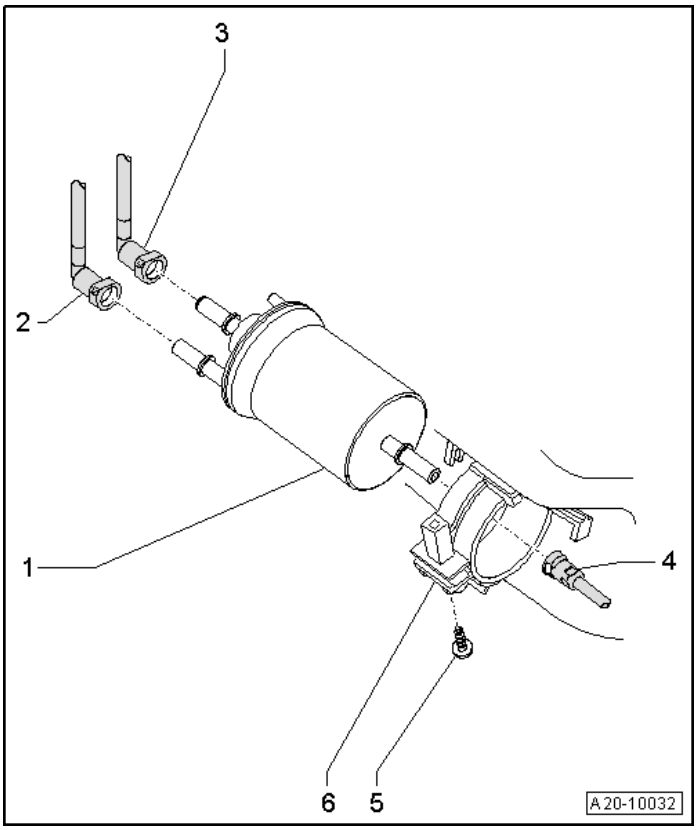
12 - Fuel Filter Bracket

13 - Fuel Filter

14 - Cover Plate with Mount and Rivets

15 - Bolts
- ☐ 11 Nm
- ☐ Filler tube to body

Fuel Filter Assembly Overview



1 - Fuel Filter
- ☐ Direction of flow is marked with arrows

2 - Fuel Supply Line
- ☐ Black
- ☐ To disconnect, press release button on connection piece

3 - Fuel Return Line
- ☐ Blue
- ☐ To disconnect, press release button on connection piece

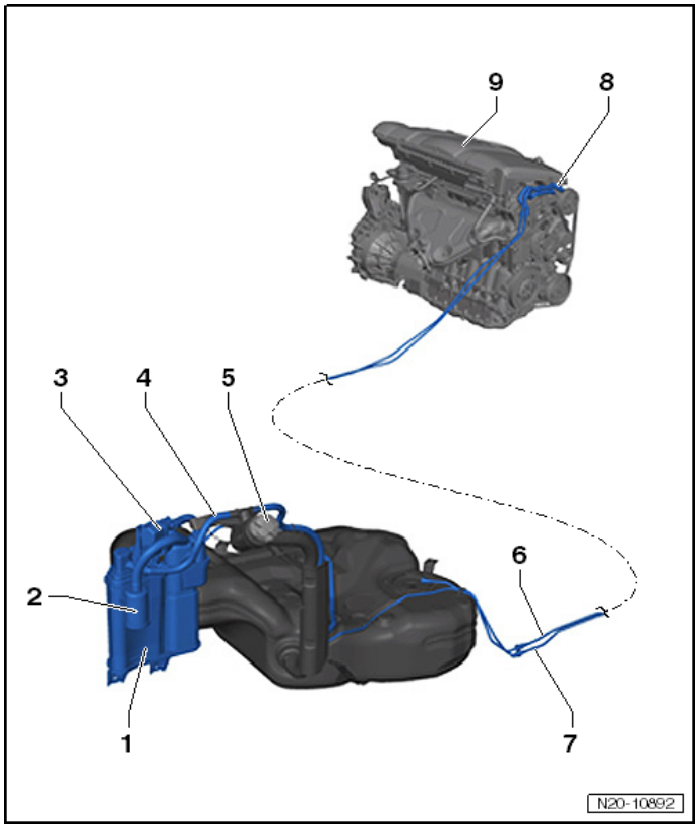
Fuel Filter Assembly Overview *(cont'd)*

4 - Fuel Supply Line
- ☐ Black
- ☐ To disconnect, press release button on connection piece

5 - Bolts
- ☐ 3 Nm
- ☐ Fuel tank mounting

6 - Bracket
- ☐ For fuel filter

EVAP Canister System Connection Plan, EVAP Canister in Right Rear Wheel Housing



1 - EVAP Canister

2 - Air Filter

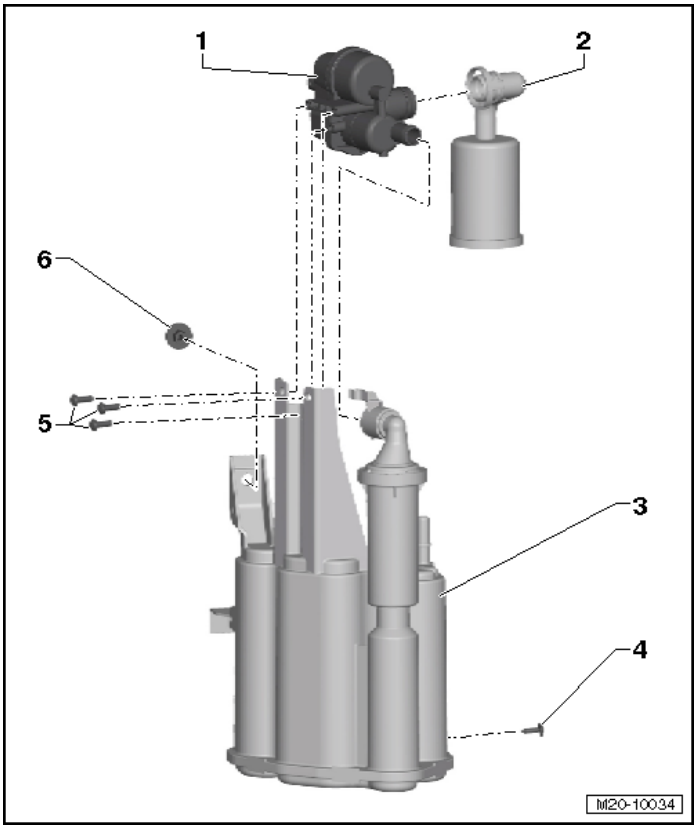
3 - Leak Detection Pump -V144-
- ☐ Vehicles with engine codes (CBTA, CBUA, CCTA, CBFA, CCZA)

4 - Vent Line
- ☐ From the filler tube to the EVAP canister

5 - Filler Tube
6 - Fuel Supply Line
7 - Vent Line
- ☐ White

8 - EVAP Canister Purge Regulator Valve 1 -N80-
9 - Throttle Valve Control Module -J338-

EVAP Canister System Assembly Overview, EVAP Canister in Right Rear Wheel Housing

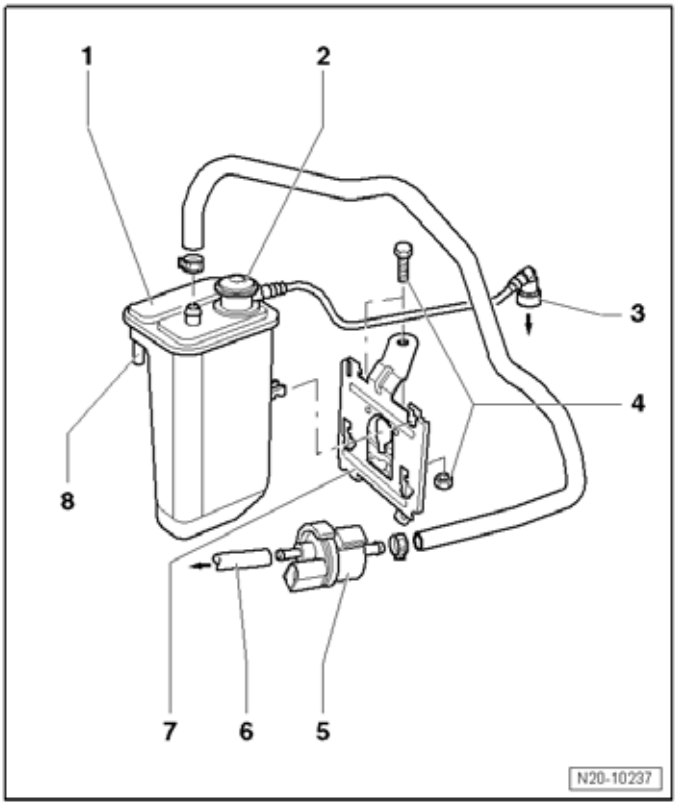


1 - Leak Detection Pump -V144-
- ☐ Replace the seal if damaged.

2 - Air Filter
3 - EVAP Canister
4 - Bolt
5 - Bolts
- ☐ 1.8 Nm
- ☐ Diagnostic pump to EVAP canister

6 - Nut
- ☐ 8 Nm

EVAP Canister System Assembly Overview, EVAP Canister in Engine Compartment



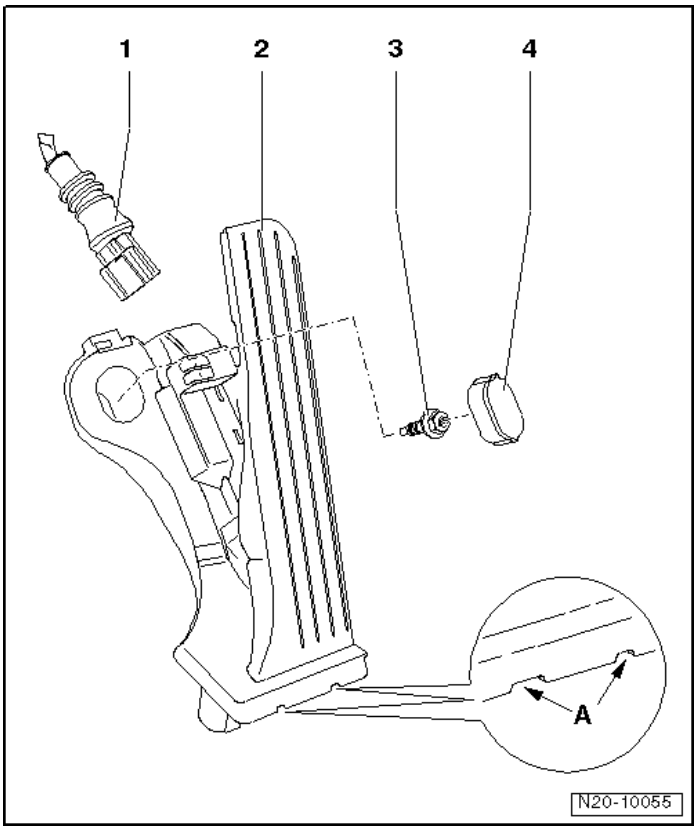
1 - EVAP Canister
2 - Pressure Retaining Valve with Connecting Hose
3 - Connecting Hose
4 - Nuts and Bolts
- ☐ 10 Nm

5 - EVAP Canister Purge Regulator Valve 1 -N80-
- ☐ 1.8 Nm
- ☐ Diagnostic pump to EVAP canister

6 - Connecting Hose
- ☐ To intake manifold

7 - Bracket
- ☐ For EVAP canister

Accelerator Pedal Mechanism Assembly Overview



1 - Connector

- ☐ Black 6-pin

2 - Accelerator Pedal Position Sensor -G79- with Accelerator Pedal Position Sensor 2 -G185-

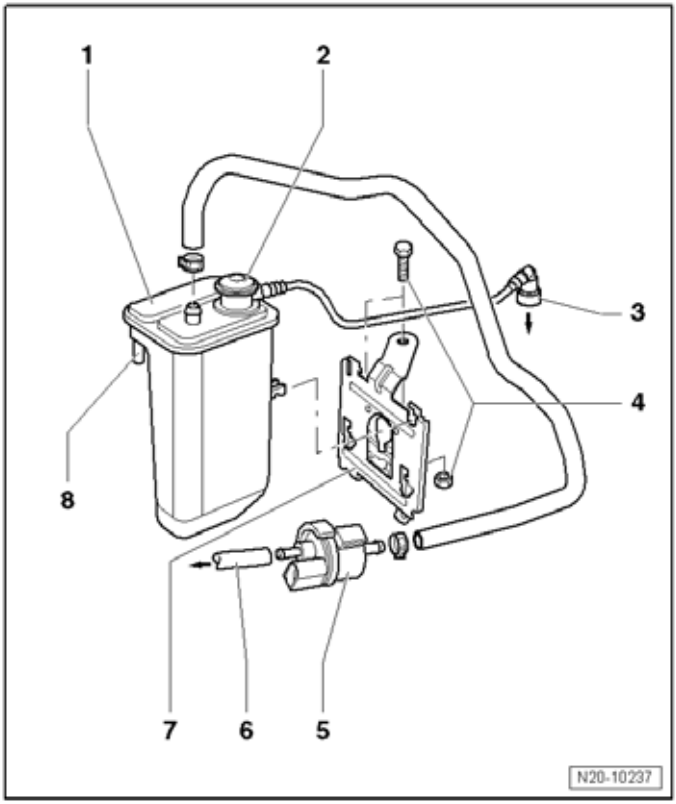
3 - Bolt

- ☐ 10 Nm

4 - Cap

Turbocharger, G-Charger – 2.0L CPLA, CPPA

Charge Air System Overview



1 - Air Guide Hose
2 - Rubber Bushing
- ☐ Left
- ☐ For charge air cooler

3 - Bolt
- ☐ 8 Nm

4 - Charge Air Cooler
5 - Rubber Bushing
- ☐ Right
- ☐ For charge air cooler

6 - Bolt
- ☐ 8 Nm

7 - Rubber Bushing
- ☐ Right
- ☐ For lower charge air cooler in body

8 - Rubber Bushing
- ☐ Left
- ☐ For lower charge air cooler in body

9 - Gasket
- ☐ Replace if damaged

10 - Bolt
- ☐ 7 Nm

11 - Air Guide Hose

12 - Spring Clip

13 - Bolt
- ☐ 7 Nm

14 - Air Guide Pipe

15 - Bolt
- ☐ 7 Nm

16 - Air Guide Pipe

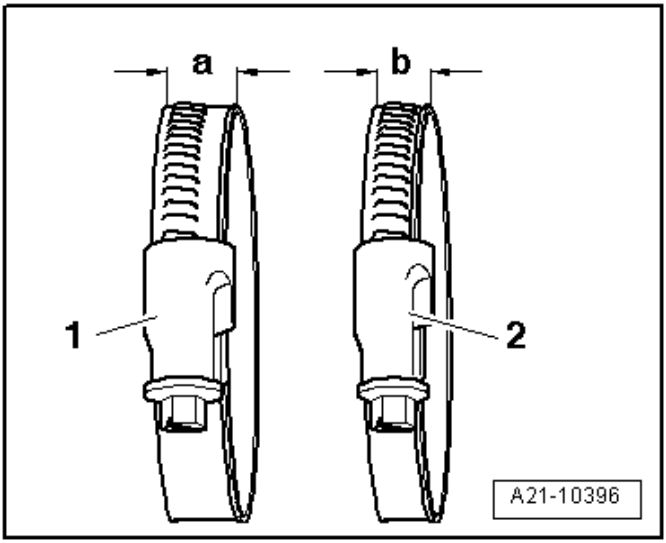
17 - Bolt
- ☐ 7 Nm

18 - O-ring
- ☐ Replace after removing

19 - Charge Air Pressure Sensor -G31-

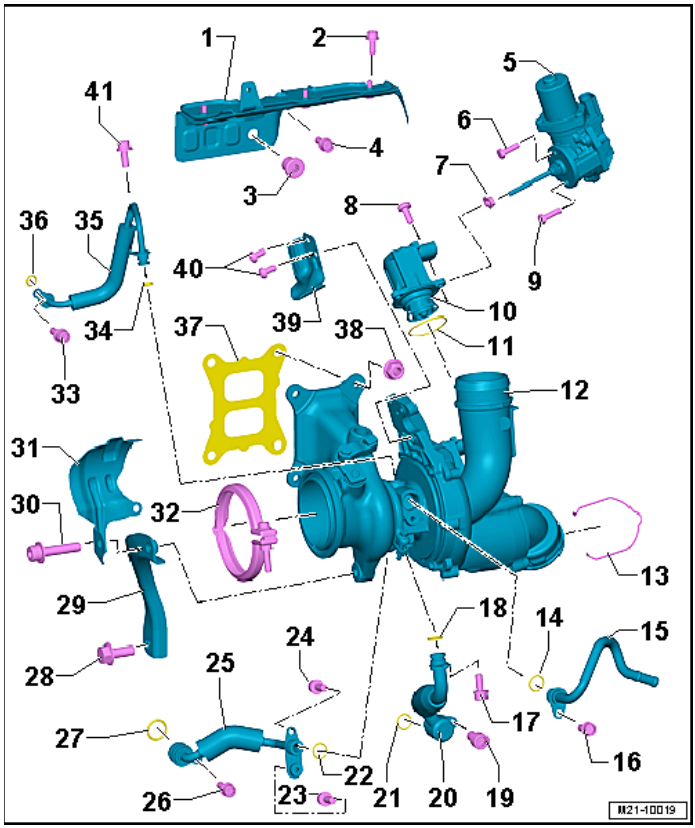
20 - Air Guide Hose

Air Guides with Screw-Type Clamps, Installing



Hose Clamp	Width	Tightening Specification
1	-a- = 13 mm wide	5.5 Nm
2	-b- = 9 mm wide	3 Nm

Turbocharger and Cooper Charge Pressure Actuator -V465- Overview



1 - Heat Shield

2 - Bolt

- ☐ 9 Nm

3 - Bolt

- ☐ 20 Nm

4 - Bolt

- ☐ 9 Nm

5 - Charge Pressure Actuator -V465-

6 - Bolt

- ☐ Do not remove the Charge Pressure Actuator -V465-.
- ☐ Replace turbocharger after loosening bolt.

7 - Nut

- ☐ 7 Nm

8 - Bolt

- ☐ 7 Nm

9 - Bolt

- ☐ Do not remove the Charge Pressure Actuator -V465-.
- ☐ Replace turbocharger after loosening bolt.

10 - Turbocharger Recirculation Valve -N249-
11 - O-ring
- ☐ Replace after removing

12 - Turbocharger
13 - Spring Clip
14 - O-ring
- ☐ Replace after removing
- ☐ Coat with coolant

15 - Coolant Supply Line
16 - Bolt
- ☐ 9 Nm

17 - Bolt
- ☐ 9 Nm

18 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

19 - Bolt
- ☐ 25 Nm

20 - Oil Return Pipe
21 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

22 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

23 - Bolt
- ☐ 9 Nm

24 - Bolt
- ☐ 9 Nm

25 - Coolant Supply Line
26 - Bolt
- ☐ 9 Nm

27 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

28 - Bolt
- ☐ 30 Nm

29 - Support Brace
30 - Bolt
- ☐ 30 Nm
- ☐ Lubricate the thread with hot bolt paste before loosening and installing. Refer to the Parts Catalog.

31 - Heat Shield
32 - V-Clamp
- ☐ 15 Nm
- ☐ Replace after removing

33 - Bolt
- ☐ 9 Nm

Turbocharger and Cooper Charge Pressure Actuator -V465- Overview *(cont'd)*

34 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

35 - Oil Supply Line

36 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

37 - Seal
- ☐ Replace after removing

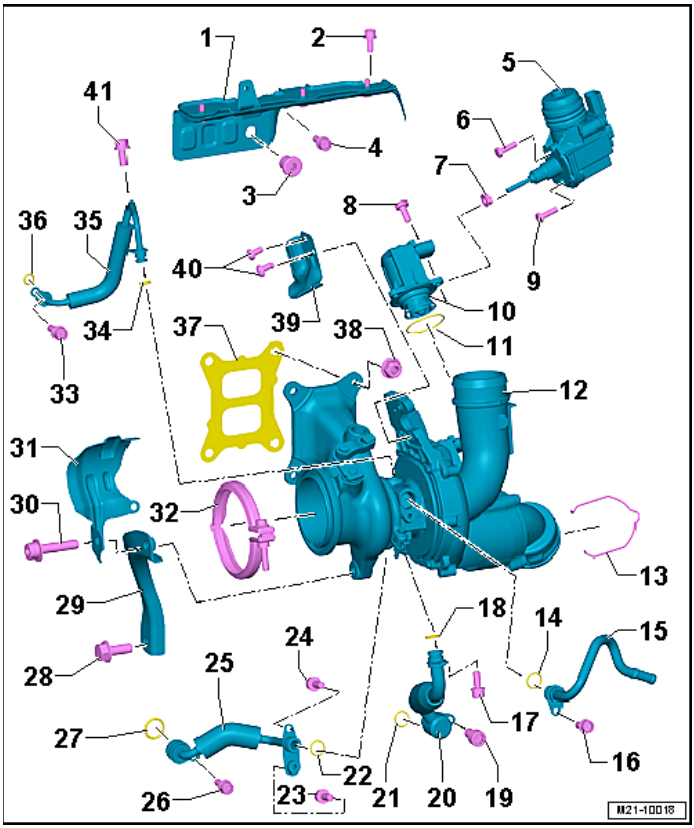
38 - Nut
- ☐ 25 Nm
- ☐ Replace after removing

39 - Heat Shield

40 - Bolt
- ☐ 4.5 Nm

41 - Bolt
- ☐ 9 Nm

Turbocharger and Mahle Charge Pressure Actuator -V465- Overview



1 - Heat Shield

2 - Bolt

- ☐ 9 Nm

3 - Bolt

- ☐ 20 Nm

4 - Bolt

- ☐ 9 Nm

5 - Charge Pressure Actuator -V465-

6 - Bolt

- ☐ Do not remove the Charge Pressure Actuator -V465-.
- ☐ Replace turbocharger after loosening bolt.

7 - Nut

- ☐ 7 Nm

8 - Bolt

- ☐ 7 Nm

9 - Bolt

- ☐ Do not remove the Charge Pressure Actuator -V465-.
- ☐ Replace turbocharger after loosening bolt.

10 - Turbocharger Recirculation Valve -N249-
11 - O-ring
- ☐ Replace after removing

12 - Turbocharger
13 - Spring Clip
14 - O-ring
- ☐ Replace after removing
- ☐ Coat with coolant

15 - Coolant Supply Line
16 - Bolt
- ☐ 9 Nm

17 - Bolt
- ☐ 9 Nm

18 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

19 - Bolt
- ☐ 25 Nm

20 - Oil Return Pipe
21 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

22 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

23 - Bolt
- ☐ 9 Nm

24 - Bolt
- ☐ 9 Nm

25 - Coolant Supply Line
26 - Bolt
- ☐ 9 Nm

27 - O-ring
- ☐ Replace after removing
- ☐ Coat with engine oil

28 - Bolt
- ☐ 30 Nm

29 - Support Brace
30 - Bolt
- ☐ 30 Nm
- ☐ Lubricate the thread with hot bolt paste before loosening and installing. Refer to the Parts Catalog.

31 - Heat Shield
32 - V-Clamp
- ☐ 15 Nm
- ☐ Replace after removing

33 - Bolt
- ☐ 9 Nm

Turbocharger and Mahle Charge Pressure Actuator -V465- Overview *(cont'd)*

34 - O-ring

- ☐ Replace after removing
- ☐ Coat with engine oil

35 - Oil Supply Line

36 - O-ring

- ☐ Replace after removing
- ☐ Coat with engine oil

37 - Seal

- ☐ Replace after removing

38 - Nut

- ☐ 25 Nm
- ☐ Replace after removing

39 - Heat Shield

40 - Bolt

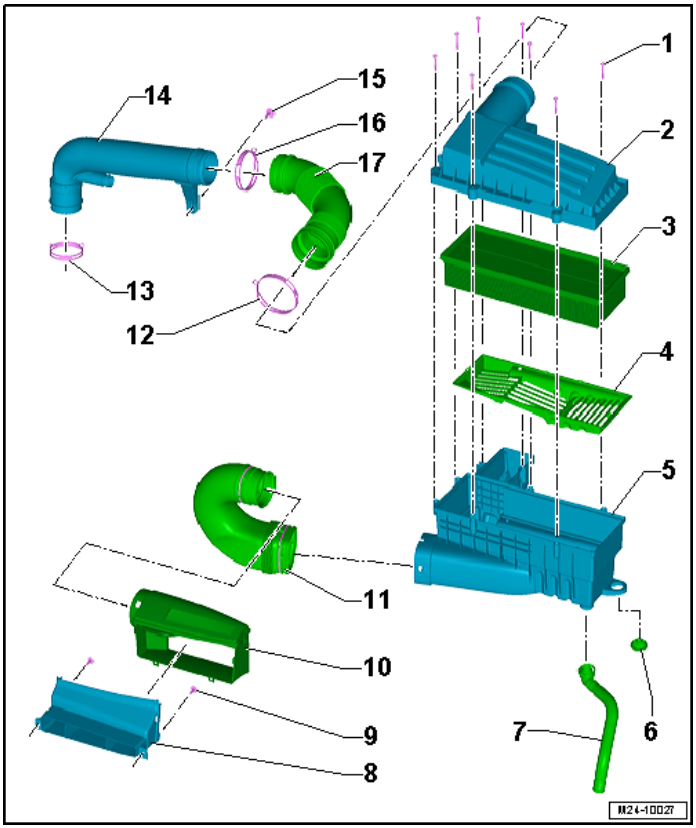
- ☐ 4.5 Nm

41 - Bolt

- ☐ 9 Nm

Multiport Fuel Injection – 2.0L CPLA, CPPA

Air Filter Housing Overview



1 - Bolt
- ☐ 1.5 Nm
- ☐ For upper air filter housing

2 - Upper Air Filter Housing

3 - Filter

4 - Snow Screen
- ☐ Not installed on all vehicles

5 - Lower Air Filter Housing
- ☐ Bolt 8 Nm

6 - Rubber Buffer

7 - Water Drain Hose

8 - Air Guide
- ☐ Bolted to the lock carrier

9 - Bolts
- ☐ 3 Nm

10 - Intake Air Guide
- ☐ From the air guide on lock carrier

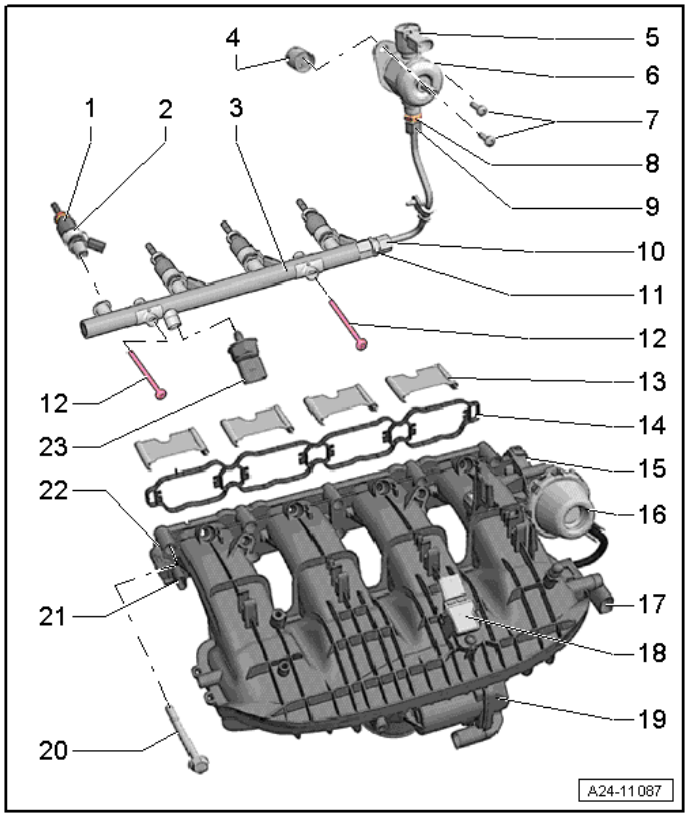
Air Filter Housing Overview *(cont'd)*

11 - Intake Air Guide
12 - Spring Clamp
13 - Spring Clamp
14 - Connecting Pipe
- ☐ From air filter housing to the turbocharger

15 - Bolt
- ☐ 5 Nm
- ☐ Connecting tube to heat shield

16 - Spring Clamp
17 - Air Guide Hose
- ☐ To turbocharger

Fuel Rail with Fuel Injectors Overview



1 - Fuel Injector
- ☐ With combustion chamber seal (Teflon seal), always replace
- ☐ Replace O-rings

2 - Support Ring
- ☐ Replace after removing

3 - Fuel Rail for Fuel Injector
- ☐ 9 Nm

4 - Roller Tappet
5 - Fuel Pressure Regulator Valve -N276-
6 - High Pressure Pump
- ☐ Do not remove the Charge Pressure Actuator -V465-.
- ☐ Replace turbocharger after loosening bolt.

7 - High Pressure Pump Bolts
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing

8 - Fuel Supply Line Connection on High Pressure Pump
- ☐ 40 Nm
- ☐ Replace after removing

9 - Fuel Supply Line Union Nut
- ☐ 27 Nm

10 - Fuel Supply Line Union Nut
- ☐ 27 Nm

11 - Connections for Fuel Supply Line on Fuel Rail
- ☐ 40 Nm
- ☐ Replace after removing

12 - Bolts
- ☐ 9 Nm

13 - Channel Separating Plate
14 - Seal
- ☐ Check and replace if damaged

15 - Charge-Motion Valve Adjuster (intake manifold flap)
16 - Channel Separating Plate Vacuum Diaphragm (intake manifold flaps)
17 - Intake Manifold Runner Control Valve -N316-
18 - Intake Air Temperature Sensor -G42- with Manifold Absolute Pressure Sensor -G71-
- ☐ 5 Nm

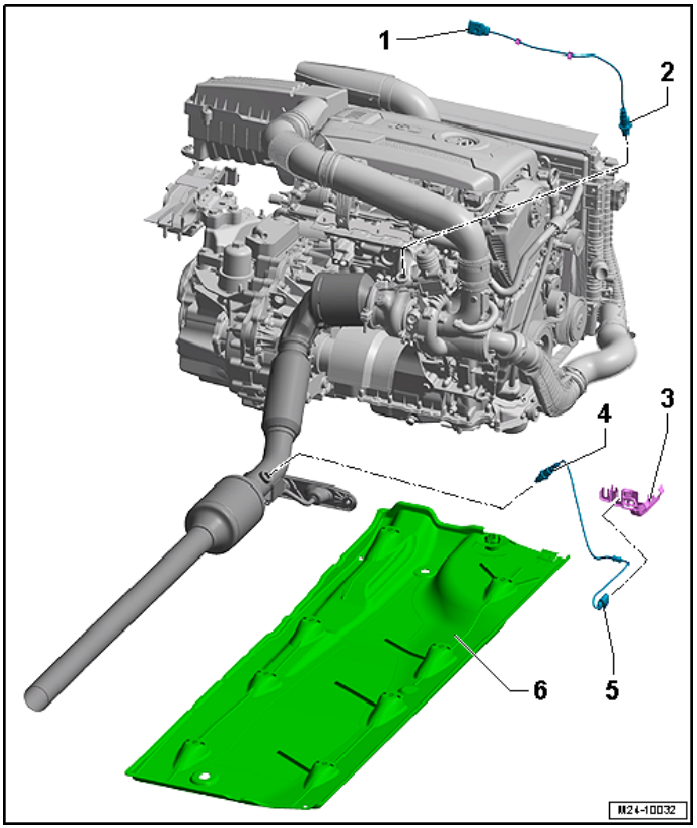
19 - Throttle Valve Control Module -J338-, EPC Throttle Drive -G186-
- ☐ 7 Nm
- ☐ Each time the Throttle Valve Control Module -J338- is removed and installed or replaced, it must be adapted to the Engine Control Module -J623-. See “Guided Functions”; to do this, use Vehicle Diagnostic Tester

20 - Intake Manifold Bolt
- ☐ 9 Nm

21 - Intake Manifold Runner Position Sensor -G336-
- ☐ The Intake Manifold Runner Position Sensor -G336- needs to be adapted to the Engine Control Module -J623- each time it is removed and installed or replaced; see “Guided Functions”. To do this, use Vehicle Diagnostic Tester.

22 - Intake Manifold
23 - Bolt
- ☐ 27 Nm
- ☐ Coat the sealing point and thread with clean engine oil.

Heated Oxygen Sensor and Two Heated Oxygen Sensors Overview



1 - Connector
- ☐ For the Oxygen Sensor Heater -G39- with Oxygen Sensor Heater -Z19-

2 - Oxygen Sensor -G39- with Oxygen Sensor Heater -Z19-
- ☐ 55 Nm

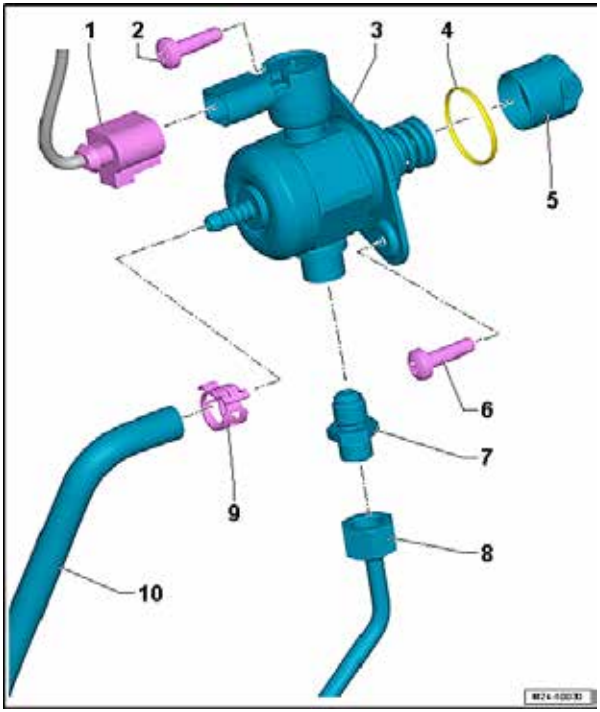
3 - Bracket

4 - Oxygen Sensor after Three Way Catalytic Converter -G130- with Heater for Oxygen Sensor 1 after Catalytic Converter -Z29-

5 - Connector
- ☐ For Oxygen Sensor after Three Way Catalytic Converter -G130- with Heater for Oxygen Sensor 1 after Catalytic Converter -Z29-

6 - Underbody Trim
- ☐ Right

High Pressure Pump Overview



1 - Connector
- ☐ For Fuel Pressure Regulator Valve -N276-

2 - High Pressure Pump Bolt
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing
- ☐ Tighten by hand

3 - High Pressure Pump

4 - O-ring
- ☐ Replace if damaged

5 - Roller Tappet

6 - High Pressure Pump Bolt
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing
- ☐ Tighten by hand

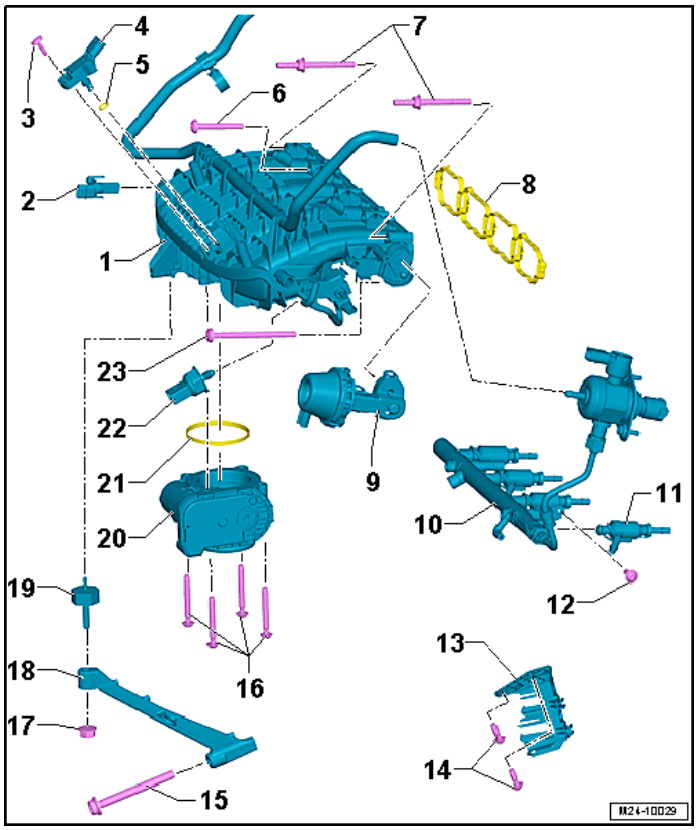
7 - Fuel Supply Line Connection
- ☐ 30 Nm
- ☐ Replace after removing

8 - Fuel Supply Line
- ☐ 27 Nm
- ☐ Lubricate the fuel supply line ball with engine oil

9 - Spring Clamp
- ☐ Replace if damaged

10 - Fuel Supply Line

Intake Manifold Overview



1 - Intake Manifold

2 - Intake Manifold Runner Position Sensor -G336-

- ☐ The Intake Manifold Runner Position Sensor -G336- needs to be adapted to the Engine Control Module -J623-. See “Guided Functions”; to do this, use Vehicle Diagnostic Tester.

3 - Bolt

- ☐ 5 Nm

4 - Intake Air Temperature Sensor -G42- with Manifold Absolute Pressure Sensor -G71-

- ☐ 5 Nm

5 - O-ring

- ☐ Replace after removing

6 - Intake Manifold Bolt

- ☐ 9 Nm

7 - Outer Intake Manifold Threaded Pin

- ☐ 9 Nm

8 - Seal

- ☐ Check and replace if damaged

9 - Channel Separating Plate Vacuum Diaphragm (intake manifold flaps)

10 - Fuel Injector Fuel Rail

11 - Fuel Injectors

- ☐ Replace the O-ring and Teflon® ring

12 - Bolt

- ☐ 9 Nm
- ☐ High pressure line to intake manifold

13 - Bracket

14 - Bolt

- ☐ 5 Nm

15 - Bolt

- ☐ 20 Nm
- ☐ For the intake manifold bracket

16 - Bolts for Throttle Valve Control Module -J338-

- ☐ 7 Nm

17 - Intake Manifold Support Nut

- ☐ 10 Nm

18 - Intake Manifold Support

19 - Rubber Bushing

- ☐ 5 Nm

20 - Throttle Valve Control Module -J338-, EPC Throttle Drive -G186-

- ☐ It is necessary to adapt the Throttle Valve Control Module -J338- to the Engine Control Module -J623- whenever it is removed and installed or replaced. See “Guided Functions”; to do this, use Vehicle Diagnostic Tester

21 - Seal

- ☐ Replace after removing

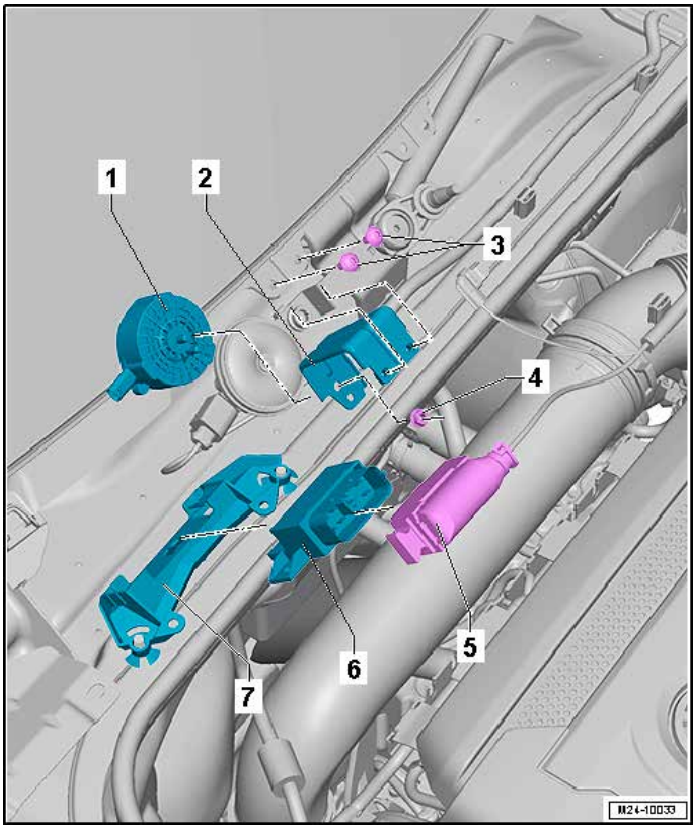
22 - Fuel Pressure Sensor -G247-

- ☐ 27 Nm
- ☐ Coat the sealing point and thread with clean engine oil.

23 - Bolts

- ☐ 9 Nm
- ☐ Fuel rail to cylinder head

Structure Borne Sound Actuator and Control Module Overview



1 - Structure-Borne Sound Actuator -R214-
2 - Bracket
- ☐ For Structure-Borne Sound Actuator -R214-

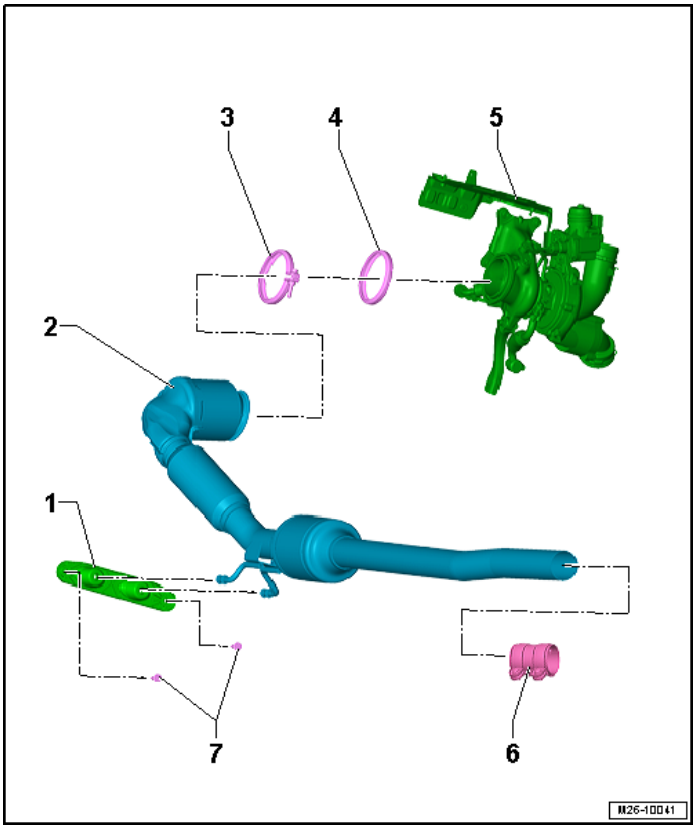
3 - Bolt
- ☐ 8 Nm

4 - Nut
- ☐ 15 Nm

5 - Connector
6 - Structure Borne Sound Control Module -J869-
7 - Bracket
- ☐ For Structure Borne Sound Control Module -J869-

Exhaust System – 2.0L CPLA, CPPA

Emissions Control Overview



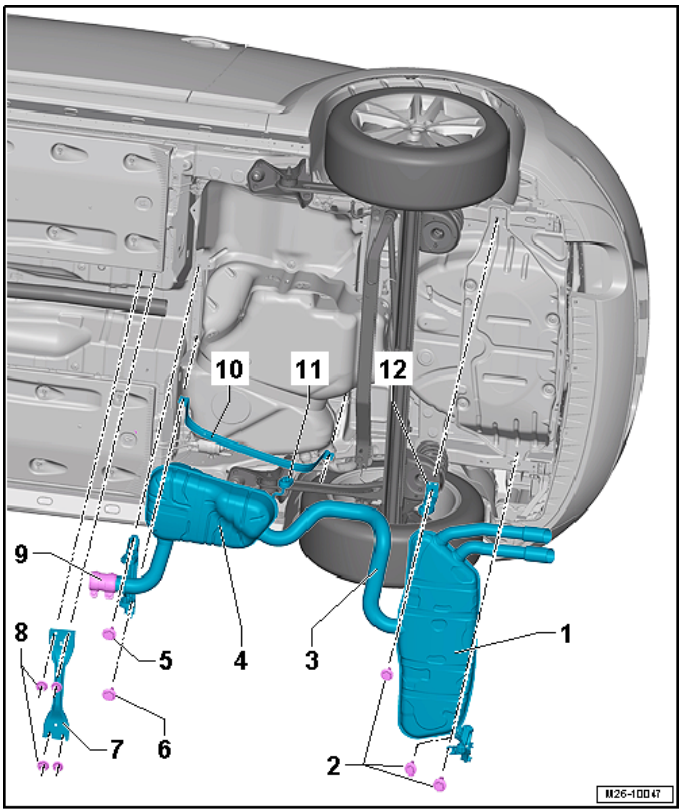
1 - Bracket
2 - Catalytic Converter
- ☐ With front exhaust pipe

3 - V-Clamp
- ☐ Replace after removing

4 - Seal
- ☐ Replace after removing

5 - Turbocharger
6 - Front Clamping Sleeve
7 - Bolt
- ☐ 23 Nm

Muffler Overview, Twist Beam Suspension



1 - Rear Muffler
2 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

3 - Separating Point
4 - Center Muffler
5 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

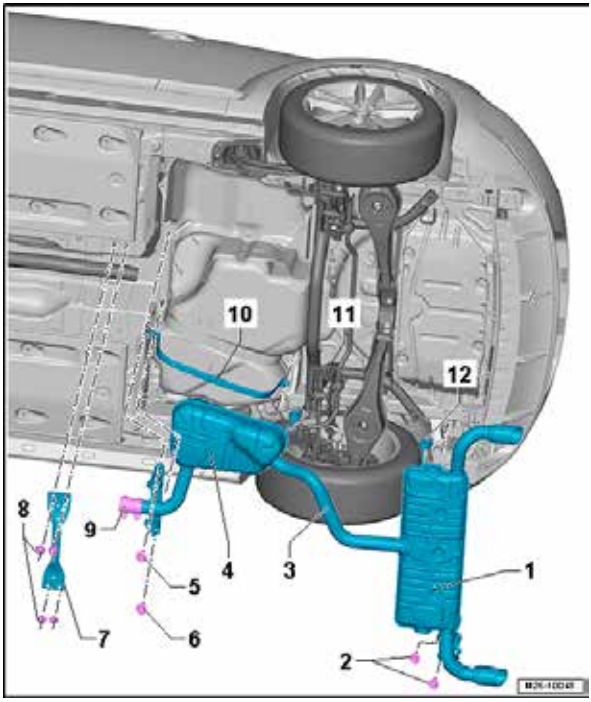
6 - Bolt
- ☐ 25 Nm

7 - Rear Tunnel Bridge
8 - Nuts
- ☐ Refer to Repair Group 66 Exterior Equipment

9 - Clamping Sleeve
10 - Mounting Strap
11 - Bracket
- ☐ Replace if damaged

12 - Bracket
- ☐ Replace if damaged

Muffler Overview, Multi-Link Suspension, Sedan



1 - Rear Muffler
2 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

3 - Separating Point
4 - Center Muffler
5 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

6 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

7 - Rear Tunnel Bridge
- ☐ 23 Nm

8 - Rear Tunnel Bridge
- ☐ 23 Nm

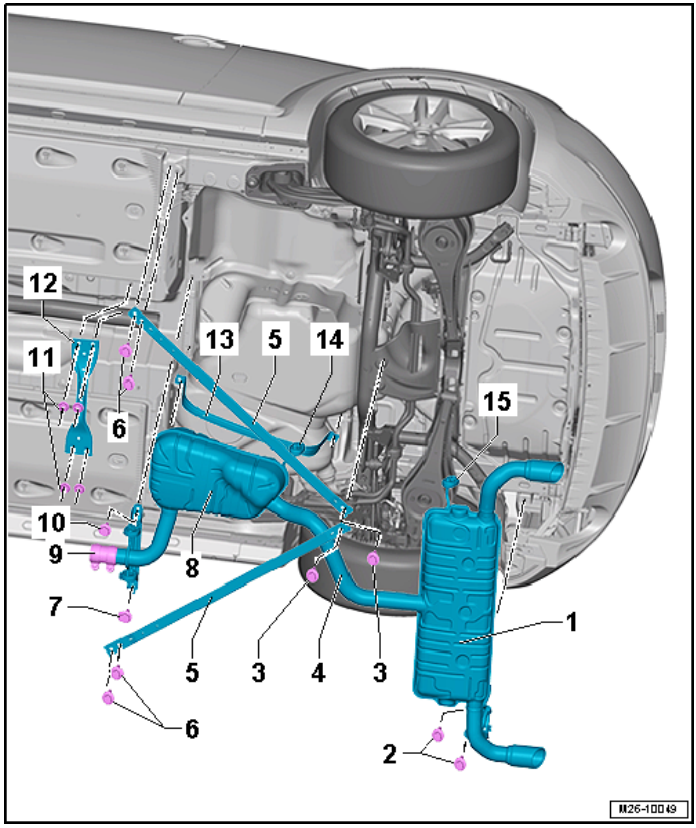
9 - Rear Tunnel Bridge
- ☐ 23 Nm

10 - Rear Tunnel Bridge
- ☐ 23 Nm

11 - Bracket
- ☐ Replace if damaged

12 - Bracket
- ☐ Replace if damaged

Muffler Overview, Multi-Link Suspension, Cabriolet



1 - Rear Muffler
2 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

3 - Bolts
- ☐ Refer to Suspension, Wheels and Steering, Rear Suspension

4 - Tension Struts
5 - Turbocharger
6 - Bolts
- ☐ Refer to Suspension, Wheels and Steering, Rear Suspension

7 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

8 - Center Muffler
9 - Clamping Sleeve
10 - Bolt
- ☐ 25 Nm
- ☐ Replace after removing

11 - Nuts

- ☐ Refer to Body Exterior, Exterior Equipment

12 - Rear Tunnel Bridge

13 - Mounting Strap

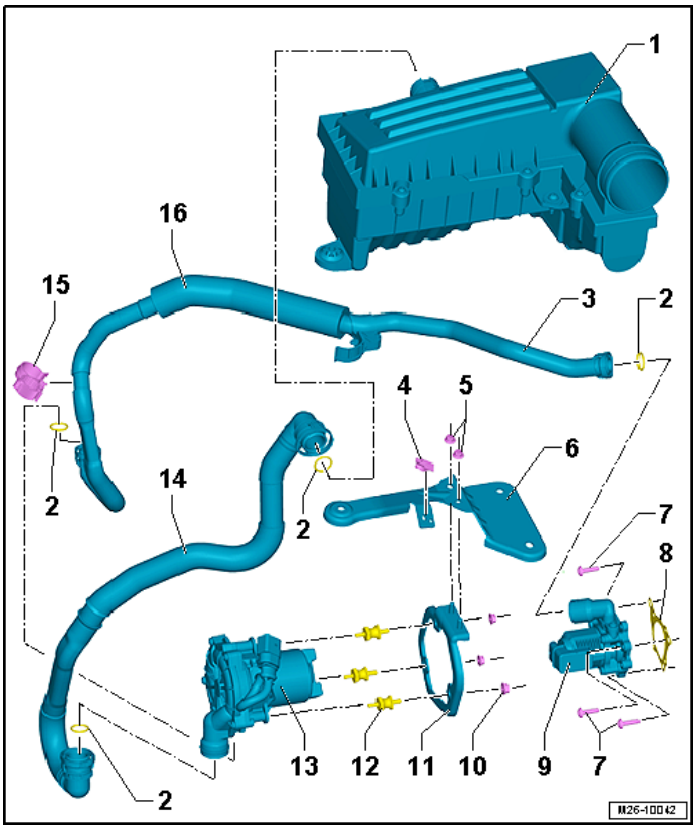
14 - Bracket

- ☐ Replace if damaged

15 - Bracket

- ☐ Replace if damaged

Secondary Air Injection System Overview



Vehicles with Engine Code CPPA Only

1 - Air Filter Housing

2 - O-ring

- ☐ Replace after removing
- ☐ Coat with engine oil

3 - Connecting Line

4 - Bracket

5 - Nut

- ☐ 8 Nm

6 - Bracket

Secondary Air Injection System Overview *(cont'd)*

7 - Bolt
- ☐ 9 Nm

8 - Seal
- ☐ Replace after removing secondary air injection valve

9 - AIR Solenoid Valve
10 - Nut
- ☐ 8 Nm

11 - Bracket
12 - Rubber Bushing
13 - AIR Pump Motor
14 - Connecting Line
15 - Bracket
16 - Protection

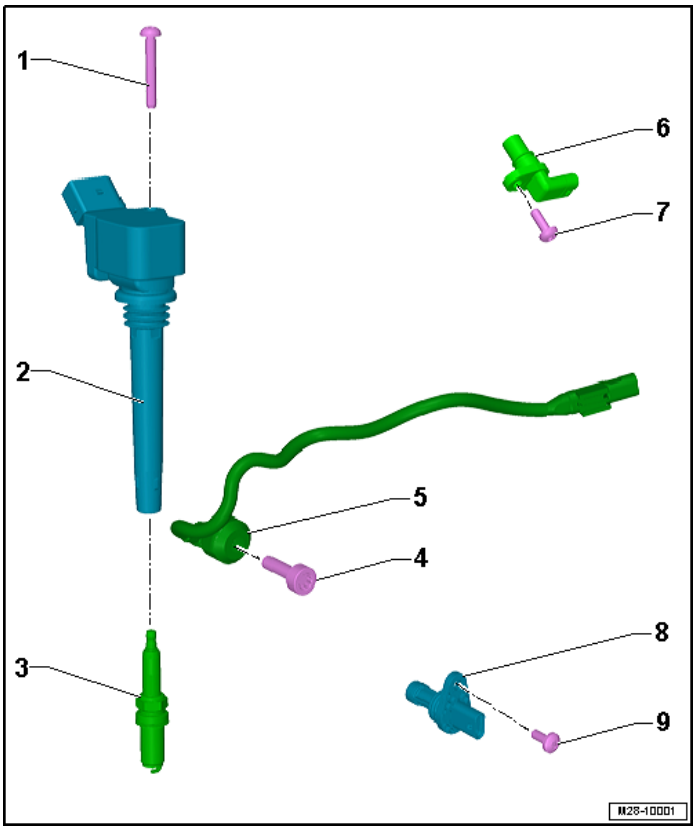
Ignition – 2.0L CPLA, CPPA

Technical Data

Engine codes	**CPLA and CPPA**	
Ignition sequence	1-3-4-2	
Spark plugs[1)]		
VW	06K 905 601 B	06K 905 611 C
Electrode gap	0.7 to 0.8 mm	0.7 to 0.8 mm
Tightening specifications	30 Nm	30 Nm
Change intervals	Refer to Maintenance Intervals Rep. Gr. 03	

1) For current spark plugs, refer to the Parts Catalog.

Ignition System Overview



1 - Bolt
- ☐ 10 Nm

2 - Ignition Coil with Power Output Stage
- ☐ Replace after removing
- ☐ Coat with engine oil

3 - Spark Plug

4 - Bolt
- ☐ 20 Nm
- ☐ Replace after removing

5 - Knock Sensor 1 -G61-

6 - Camshaft Position Sensor -G40-
- ☐ Replace O-ring

7 - Bolt
- ☐ 9 Nm

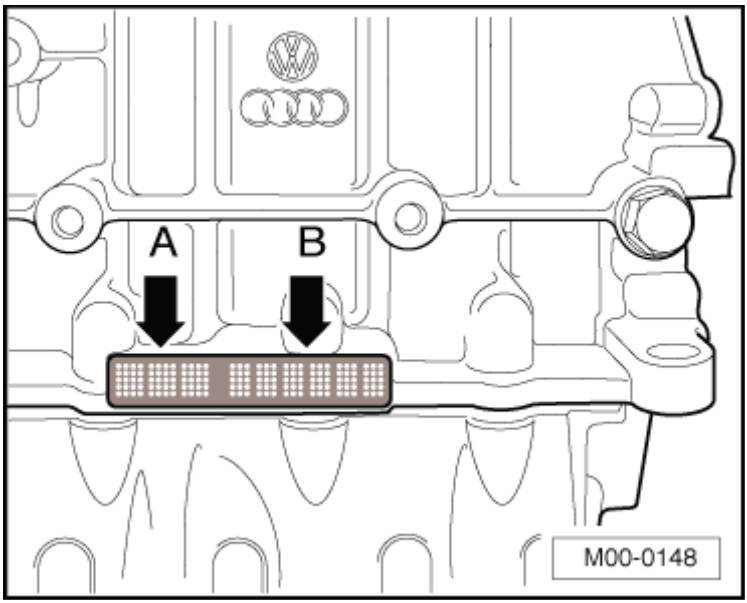
8 - Engine Speed Sensor -G28-

9 - Bolt
- ☐ 10 Nm

ENGINE MECHANICAL – 2.5L CBTA, CBUA

General, Technical Data

Engine Number



The engine code (A) and engine number (B) (serial number) are located on the rear side of the engine, above the cylinder block/upper oil pan partition.

Engine Data

Engine codes		CBTA	CBUA
Manufactured		from 07.2007	from 07.2007
Emission values in accordance with		TIER 2/BIN5 (US coalition)	SULEV [1]
Displacement	cm^3	2480	2480
Output	kW at RPM	125 @ 5700	125 @ 5700
Torque	Nm at RPM	240 @ 4250	240 @ 4250
Engine idle speed [3]	RPM	680	680
Engine speed (RPM) limitation	RPM	approximately 6300	approximately 6300
Bore	diameter mm	82.5	82.5
Stroke	mm	92.8	92.8
Compression ratio		9.5	9.5
Valves per cylinder		4	4
Research Octane Number (RON)	minimum	95 unleaded [2]	95 unleaded [2]
Fuel injection, ignition		Motronic ME 17.5	Motronic ME 17.5
Knock control		2 sensors	2 sensors
Variable valve timing		Yes	Yes
Variable intake manifold		No	No
Oxygen Sensor (O2S) regulation		2 sensors	3 sensors
Catalytic converter		Yes	Yes
Exhaust Gas Recirculation (EGR)		No	No
Turbocharger, Supercharger		No	No
Secondary Air Injection (AIR) System		No	Yes

[1] SULEV - Super Ultra Low Emission Vehicles.

[2] Unleaded RON 91 is permitted but performance is reduced.

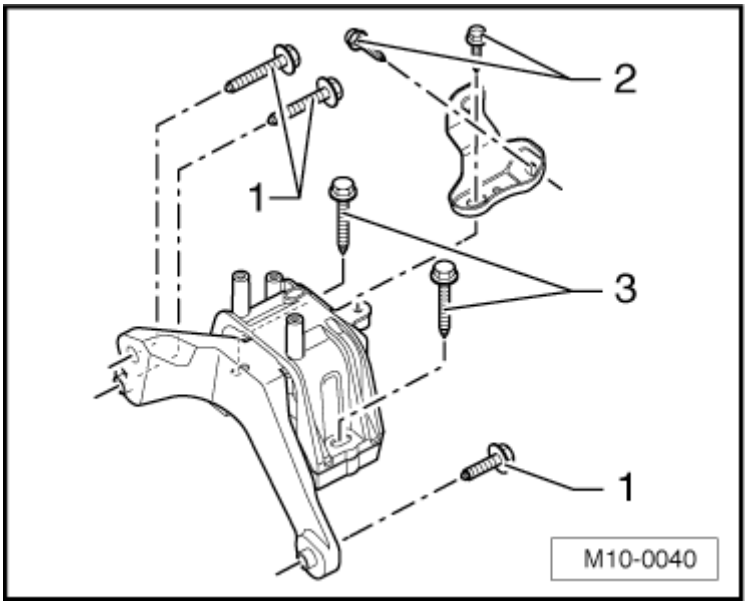
[3] If the voltage supply of the Engine Control Module (ECM) drops below 12 volts, the idle speed is raised in stages up to 780 RPM. The idle speed is not adjustable.

Engine Assembly – 2.5L CBTA, CBUA

Fastener Tightening Specifications

Component	Fastener size	Nm
Bolts and nuts	M6	10
	M7	15
	M8	25
	M10	40
	M12	60

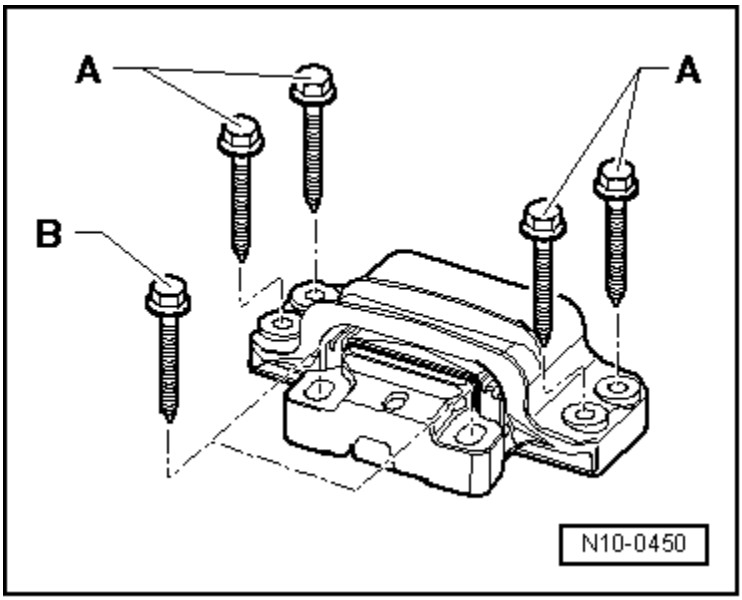
Engine Mount Tightening Specifications



Component	Nm
Bolts 1	40 plus an additional 90° (¼ turn) [1]
Bolts 2	20 plus an additional 90° (¼ turn) [1]
Bolts 3	60 plus an additional 90° (¼ turn) [1]

[1] Replace fastener(s).

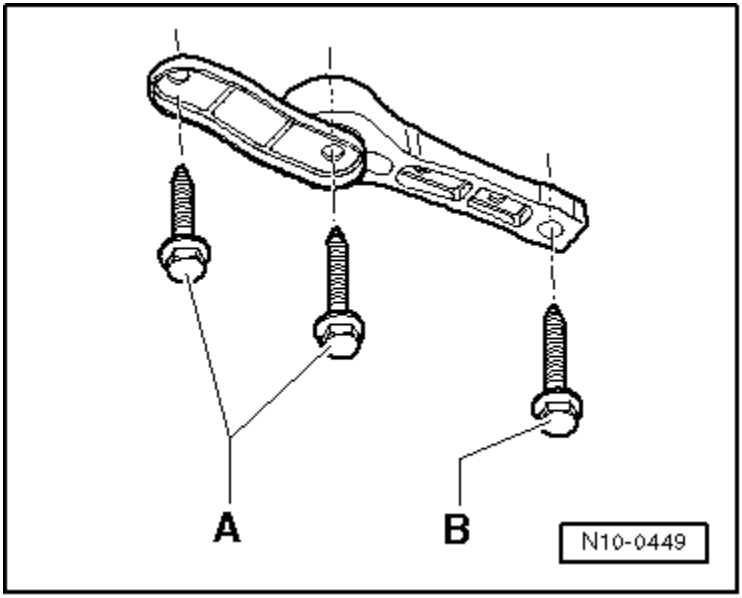
Transmission Mount Tightening Specifications



Component	Nm
Bolts A [1]	40 plus an additional 90° (¼ turn)
Bolt B [1]	60 plus an additional 90° (¼ turn)

[1] Replace fastener(s).

Pendulum Support Tightening Specifications



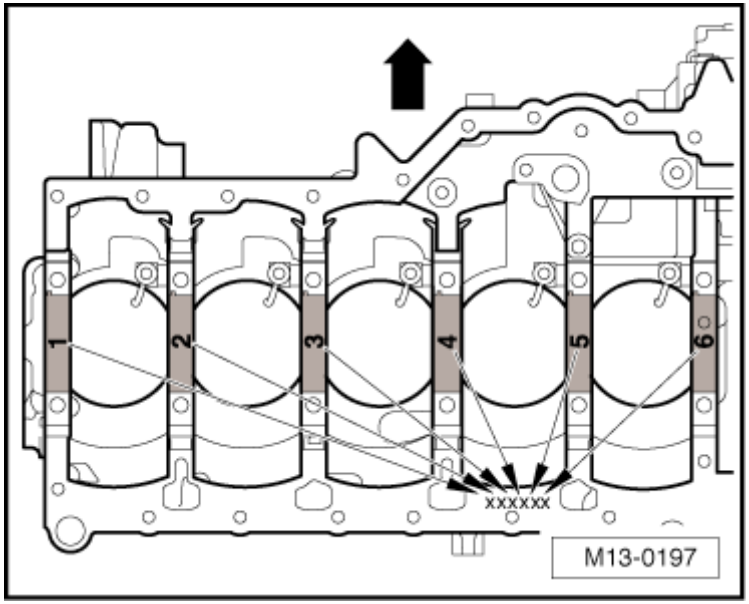
Secure the pendulum support to the transmission first and then to the subframe. To remove, first remove bolt B, then bolts A.

Component	Fastener size	Nm
Bolt A [1)]	10.9	50 plus an additional 90° (¼ turn)
Bolt B [1)]	-	100 plus an additional 90° (¼ turn)

[1)] Replace fastener(s).

Crankshaft, Cylinder Block – 2.5L CBTA, CBUA

Main Bearing Shell Allocation Crankshaft/Upper Bearing Shell Marks

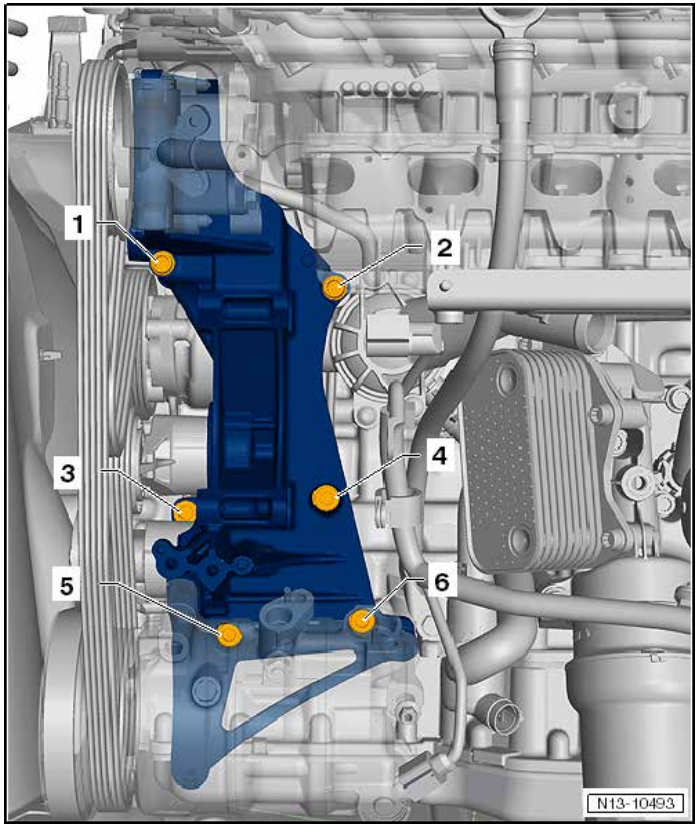


The upper bearing shells are allocated to the cylinder block with the correct thickness from the factory. Colored dots identify the bearing thicknesses. The letters marked on the lower sealing surface of the cylinder block identify which bearing thickness must be installed in which location.

Letter on cylinder block	Color of bearing
G	Yellow
B	Blue
W	White

NOTE:
- The ➡ points in the direction of travel.
- If the colored dots can no longer be seen, use the bearing shell with a blue dot.
- The lower crankshaft bearing shells are always shipped as a replacement part with the yellow colored dot.

Auxiliary Components Bracket



1 - Bolt
- ☐ 25 Nm
- ☐ M8 x 110

2 - Bolt
- ☐ 25 Nm
- ☐ M8 x 60

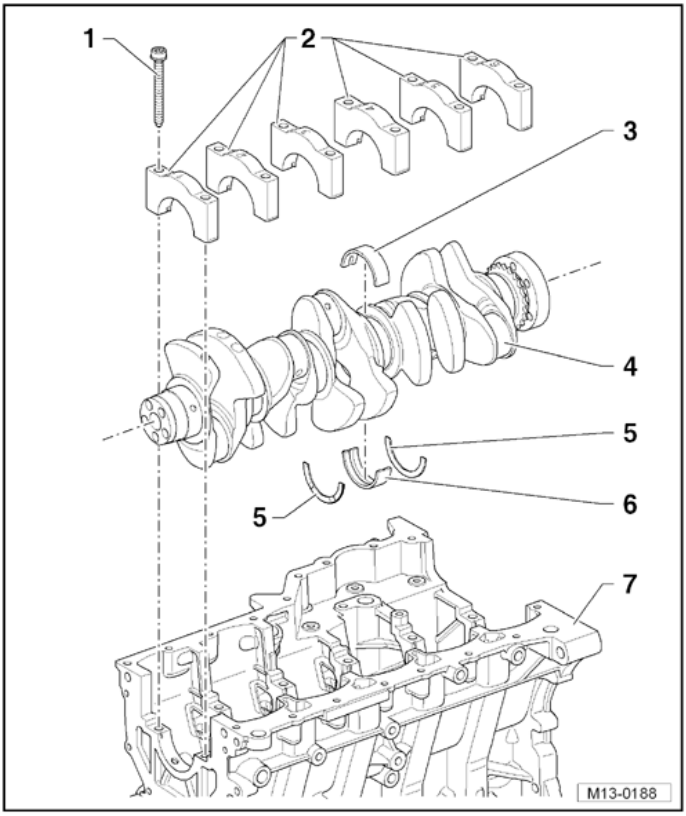
3 - Bolt
- ☐ 25 Nm
- ☐ M8 x 30

4 - Bolt
- ☐ 25 Nm
- ☐ M8 x 30

5 - Bolt
- ☐ 25 Nm
- ☐ M8 x 130

6 - Bolt
- ☐ 25 Nm
- ☐ M8 x 30

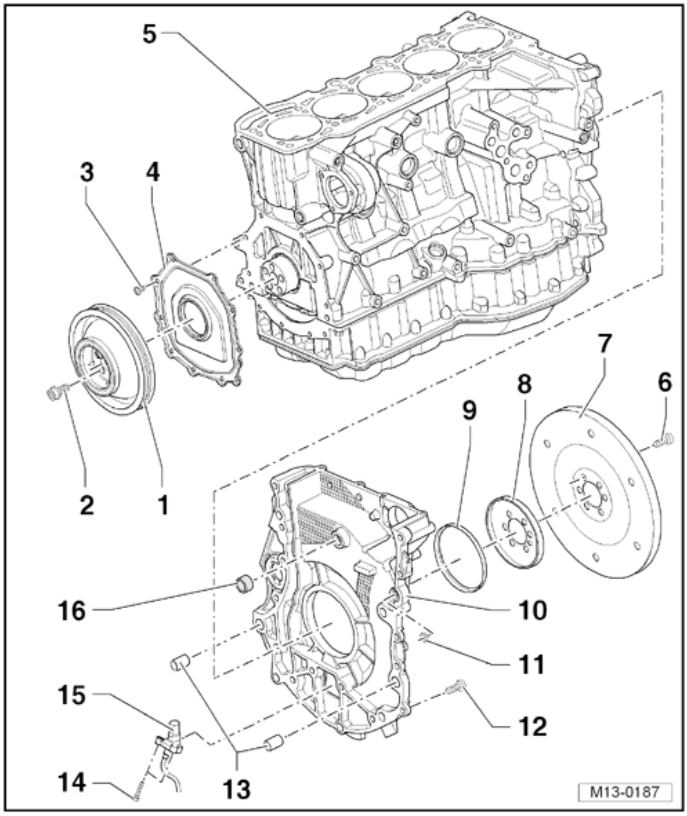
Crankshaft Assembly Overview



1 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

2 - Bearing Cap
3 - Bearing Shell for Bearing Cap
4 - Crankshaft
5 - Thrust Washers
6 - Bearing Shell for Cylinder Block
7 - Cylinder Block

Cylinder Block Overview, Transmission Side



1 - Belt Pulley/Vibration Damper
- ☐ There are different versions

2 - Bolt
- ☐ 50 Nm + 90° turn
- ☐ Replace after removing

3 - Bolt
- ☐ 10 Nm

4 - Sealing Flange on Belt Pulley Side

5 - Cylinder Block

6 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

7 - Drive Plate/Flywheel

8 - Sensor Wheel

9 - Seal on Transmission Side

10 - Control Housing Cover

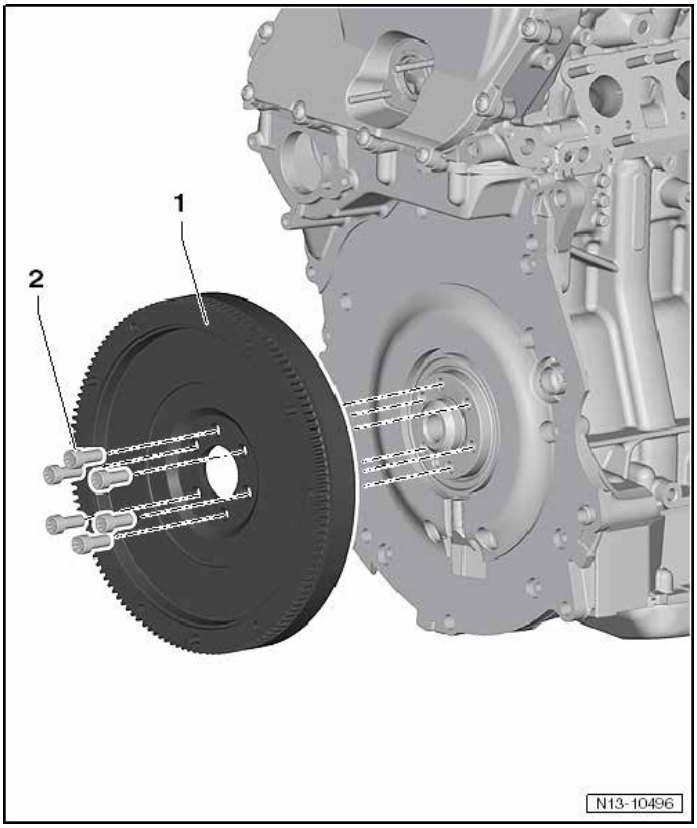
11 - O-ring

12 - Bolt
- ☐ 25 Nm

13 - Alignment Sleeves
14 - Bolt
- ☐ 5 Nm

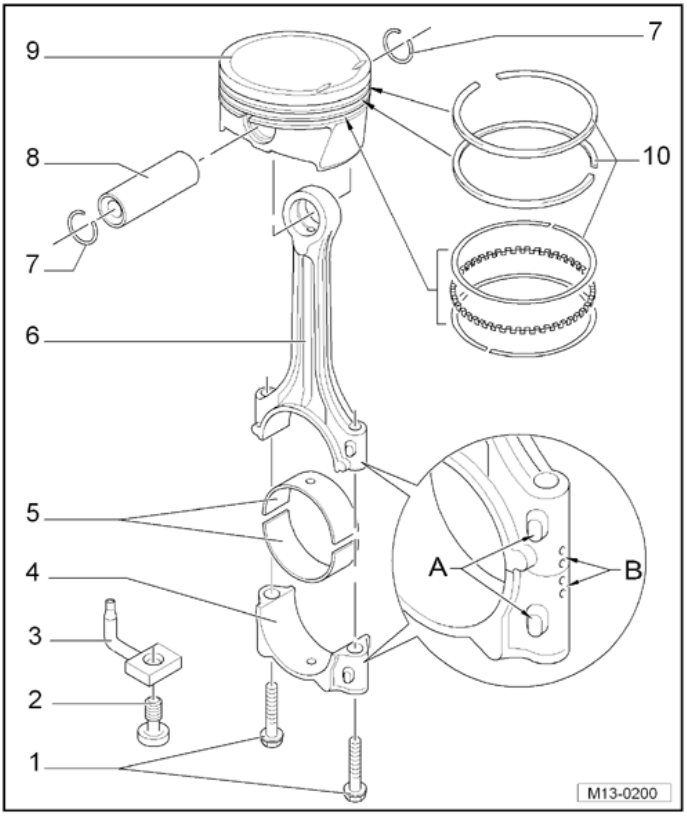
15 - Engine Speed Sensor -G28-
16 - Seal

Flywheel Overview



1 - Flywheel
2 - Balance Shaft
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

Pistons and Connecting Rods Overview

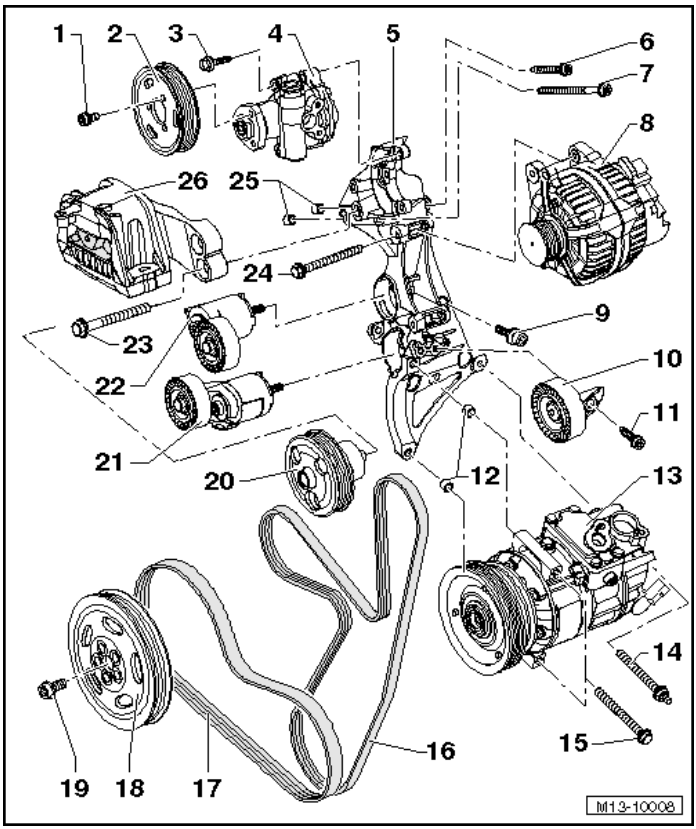


1 - Bolt
- ☐ 30 Nm + 90° turn
- ☐ Replace after removing
- ☐ Lubricate threads and contact surface

2 - Relief Valve
- ☐ 27 Nm

3 - Oil Spray Jet
4 - Connecting Rod Cover
5 - Bearing Shell
6 - Connecting Rod
7 - Locking Ring
8 - Piston Pin
9 - Pison
10 - Piston Rings

Ribbed Belt Drive Overview



1 - Bolt
- ☐ 23 Nm

2 - Belt Pulley

3 - Bolt
- ☐ 23 Nm

4 - Power Steering Pump

5 - Auxiliary Components Bracket

6 - Bolt
- ☐ 25 Nm

7 - Bolt
- ☐ 25 Nm

8 - Generator

9 - Bolt
- ☐ 25 Nm

10 - Bracket with Lower Relay Pulley

11 - Bolt
- ☐ 25 Nm

12 - Bushing

13 - A/C Compressor

Ribbed Belt Drive Overview *(cont'd)*

14 - Double Bolt
- ☐ 25 Nm

15 - Bolt
- ☐ 25 Nm

16 - Ribbed Belt for Generator, Vane Pump and Coolant Pump

17 - A/C Compressor Ribbed Belt

18 - Belt Pulley/Vibration Damper

19 - Bolt
- ☐ 50 Nm + 90° turn
- ☐ Use strength category 10.9 only

20 - Coolant Pump

21 - Tensioning Element for A/C Compressor Ribbed Belt
- ☐ 35 Nm

22 - Tensioning Element for Ribbed Belt for Generator, Vane Pump and Coolant Pump
- ☐ 35 Nm

23 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

24 - Bolt
- ☐ 25 Nm

25 - Bushing

26 - Engine Mount

Fastener Tightening Specifications

Component	Nm
Accessory bracket-to-cylinder block bolt	25
Air conditioning compressor-to-accessory bracket bolt/ stud bolt	25
Air conditioning compressor ribbed belt tensioner-to-accessory bracket bolt	35
Drive plate/flywheel-to-crankshaft bolt 1. Replace bolts 2. Tighten bolts 3 Tighten bolts	 30 60 + 90°
Sealing flange to cylinder block	10
Sealing plug to cylinder block at rear	30
Tensioning element to auxiliary component bracket	35

Crankshaft Dimensions

Honing dimensions in mm	Crankshaft bearing pin diameter		Connecting rod bearing pin diameter	
Basic dimension	58.00	-0.022	47.80	-0.022
		-0.042		-0.042
1st oversize	57.75	-0.022	47.55	-0.022
		-0.042		-0.042
2nd oversize	57.50	-0.022	47.30	-0.022
		-0.042		-0.042
Stage III	57.25	-0.022	47.05	-0.022
		-0.042		-0.042

Piston and Cylinder Dimensions

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

[1)] Measurement does not include the graphite coating (thickness = 0.02 mm). The graphite coating wears away.

Piston Ring Gap

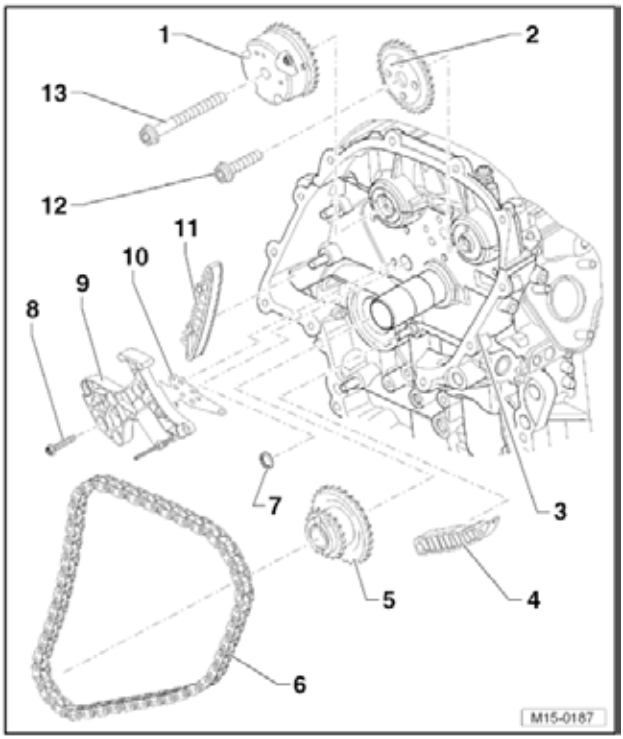
Piston ring dimensions in mm	Gap	
	New	Wear limit
Compression rings	0.20 to 0.40	0.8
Oil scraping ring	0.25 to 0.50	0.8

Piston Ring Groove Clearance

Piston ring dimensions in mm	Ring to groove clearance	
	New	Wear limit
Compression rings	0.06 to 0.09	0.20
Oil scraping ring	0.03 to 0.06	0.15

Cylinder Head, Valvetrain – 2.5L CBTA, CBUA

Camshaft Timing Chain Overview



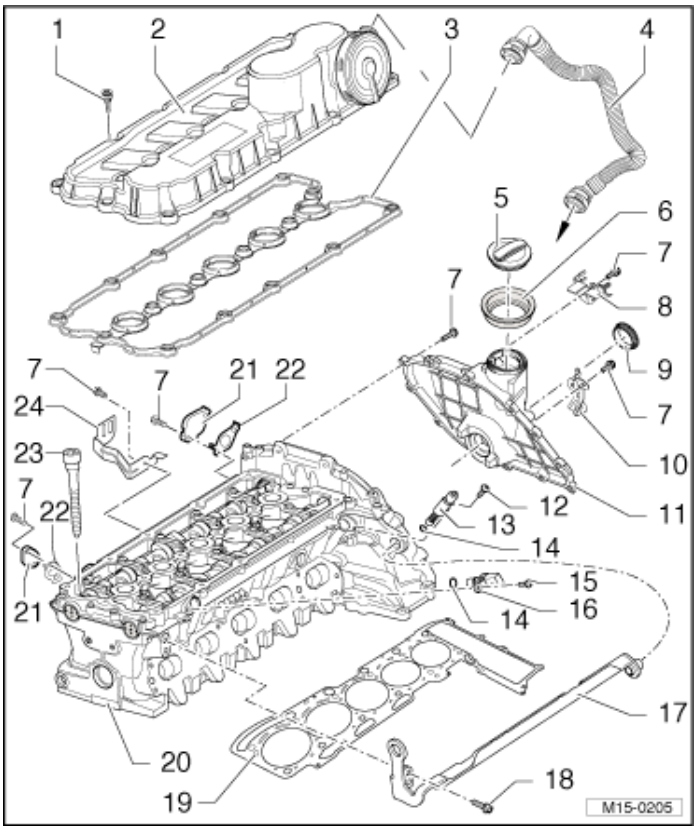
1 - Camshaft Adjuster for Intake Camshaft
2 - Chain Sprocket for Exhaust Camshaft
3 - Cylinder Head
4 - Tensioning Rail
5 - Double Chain Sprocket (drive wheel)
6 - Timing Chain
7 - Strainer
- ☐ Replace after removing

8 - Bolt
- ☐ 10 Nm

9 - Chain Tensioner
10 - Seal
11 - Guide Rail
12 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

13 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

Cylinder Head Overview



1 - Bolt
- ☐ 10 Nm

2 - Cylinder Head Cover
3 - Cylinder Head Cover Gasket
4 - Bleeder Hose for Crankcase Ventilation
5 - Oil Filler Cap
6 - Seal
7 - Bolt
- ☐ 10 Nm

8 - Cable Bracket
9 - Seal
- ☐ Replace if damaged

10 - Cable Bracket
11 - Timing Chain Cover
12 - Bolt
- ☐ 2 Nm

13 - Camshaft Adjustment Valve 1 -N205-
14 - O-ring

Cylinder Head Overview *(cont'd)*

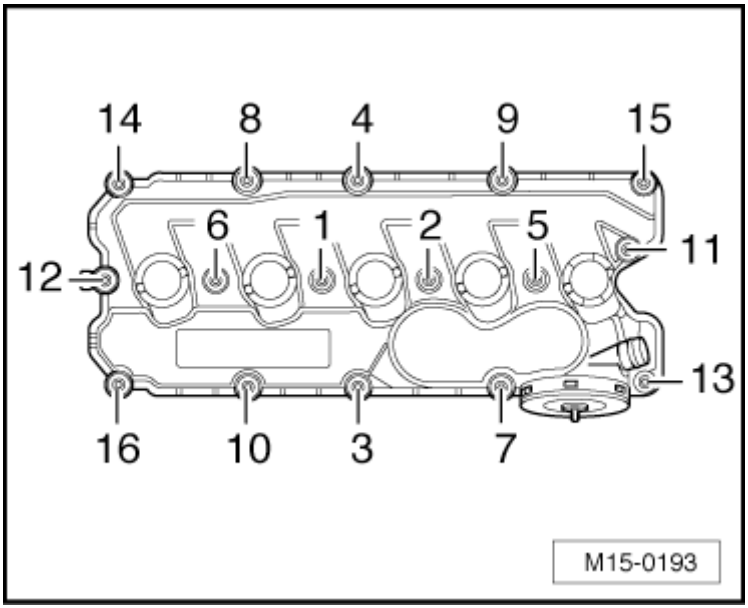
15 - Bolt
- ☐ 10 Nm

16 - Camshaft Position Sensor -G40-
17 - Transport Strap
18 - Bolt
- ☐ 25 Nm

19 - Cylinder Head Gasket
20 - Cylinder Head
21 - Cover
22 - Seal
23 - Bolt
- ☐ 40 Nm + 180° turn
- ☐ Replace after removing

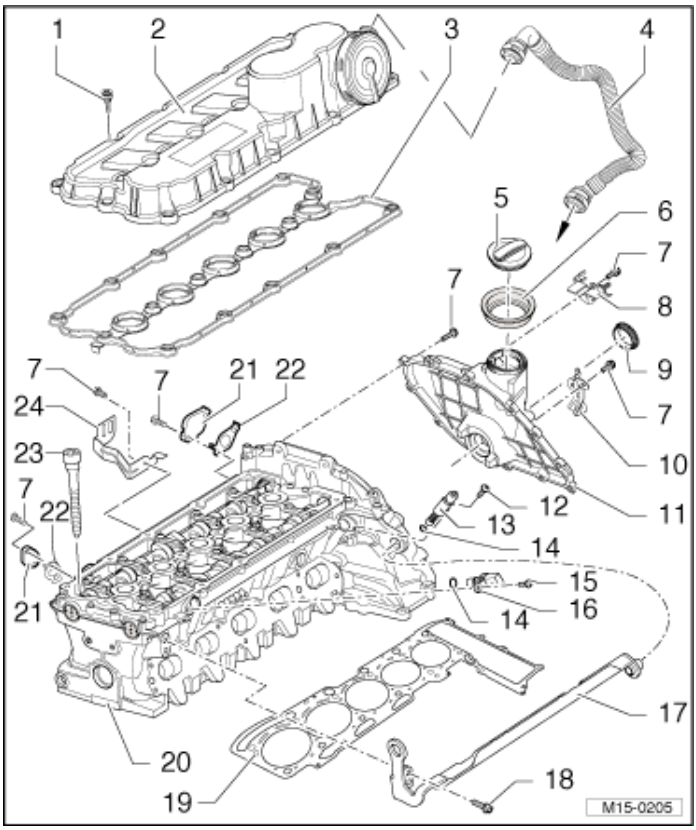
24 - Cable Bracket

Cylinder Head Cover Tightening Specification



Step	Component	Nm
1	Tighten bolts 1 through 16 in sequence	10

Cylinder Cover Overview



1 - Bolt
- ☐ 10 Nm

2 - Cylinder Head Cover
3 - Cylinder Head Cover Gasket
4 - Bleeder Hose for Crankcase Ventilation
5 - Oil Filler Cap
6 - Seal
7 - Bolt
- ☐ 10 Nm

8 - Cable Bracket
9 - Seal
- ☐ Replace if damaged

10 - Cable Bracket
11 - Timing Chain Cover
12 - Bolt
- ☐ 2 Nm

13 - Camshaft Adjustment Valve 1 -N205-
14 - O-ring

Cylinder Cover Overview

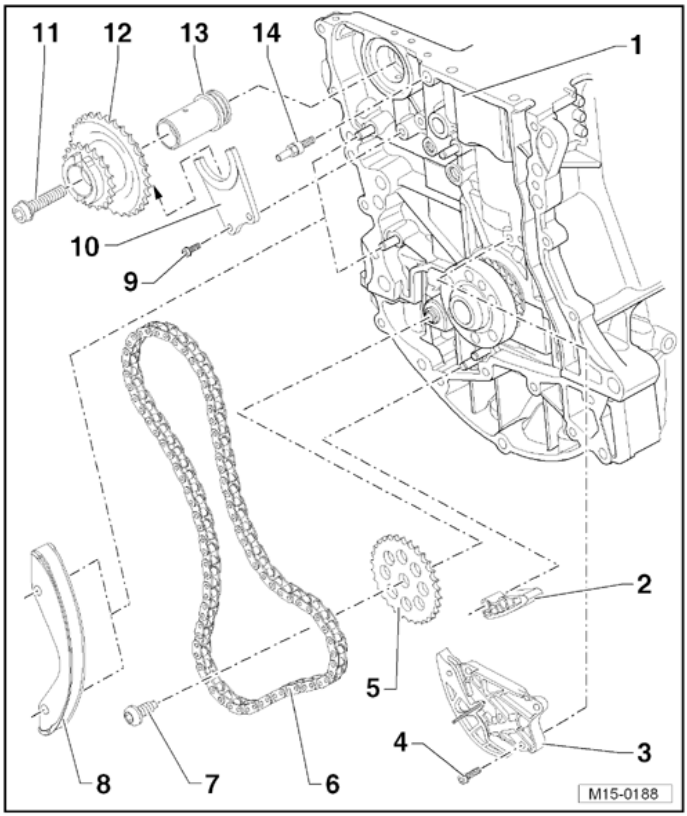
15 - Bolt
- ☐ 10 Nm

16 - Camshaft Position Sensor -G40-
17 - Transport Strap
18 - Bolt
- ☐ 25 Nm

19 - Cylinder Head Gasket
20 - Cylinder Head
21 - Cover
22 - Seal
23 - Bolt
- ☐ 40 Nm + 180° turn
- ☐ Replace after removing

24 - Cable Bracket

Timing Mechanism Drive Chain Overview



1 - Cylinder Block
2 - Guide Rail
3 - Chain Tensioner

4 - Bolt
- ☐ 10 Nm

5 - Chain Sprocket of Oil Pump

6 - Power Take-Off Drive Chain

7 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

8 - Guide Rail

9 - Bolt
- ☐ 10 Nm

10 - Axial Bearing Disc

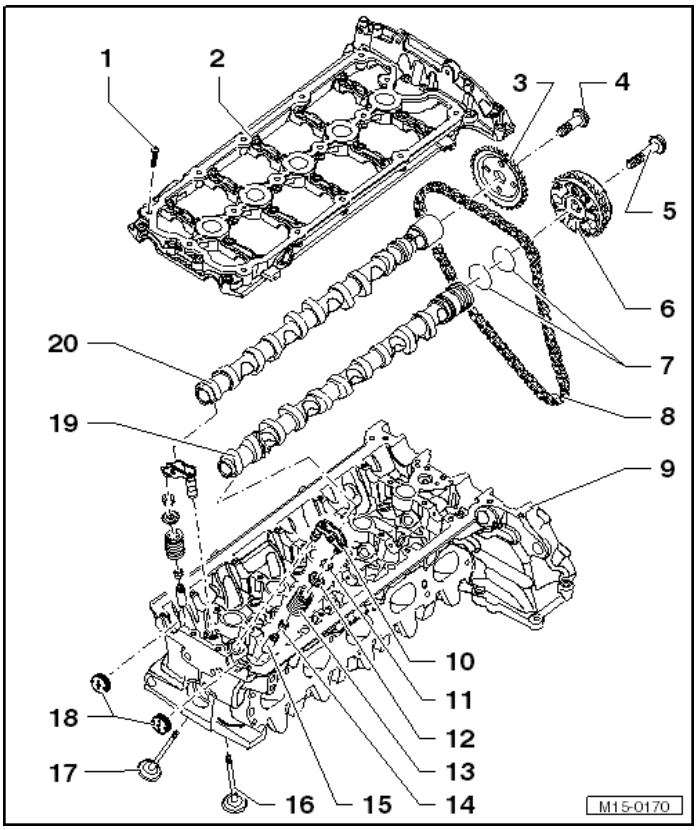
11 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

12 - Double Chain Sprocket (drive wheel)

13 - Journal for Double Chain Sprocket (drive wheel)

14 - Tensioning Rail Pins
- ☐ 40 Nm

Valvetrain Overview



1 - Bolt
- ☐ 8 Nm + 90° turn
- ☐ Replace after removing

2 - Guide Frame
3 - Chain Sprocket
4 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

5 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

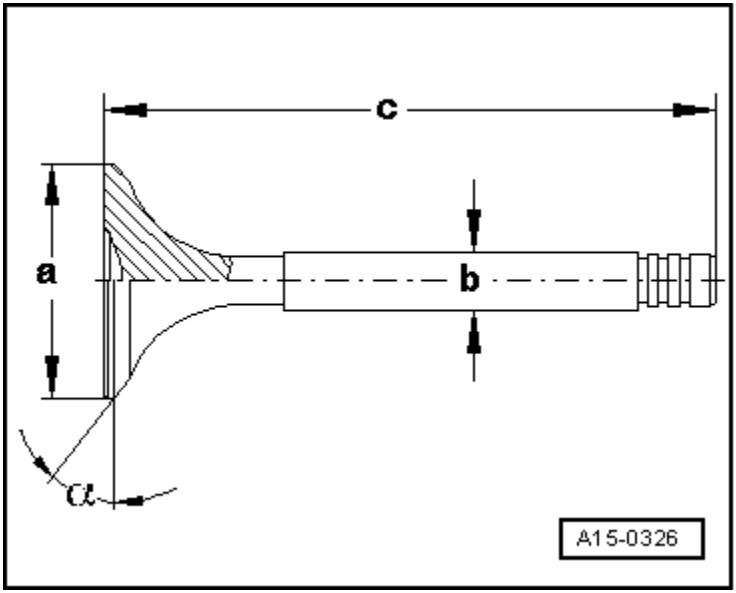
6 - Camshaft Adjuster
7 - Seals
8 - Timing Chain
9 - Cylinder Head
10 - Hydraulic Valve Play Balancing Element
11 - Valve Retainers
12 - Upper Valve Spring Retainer
13 - Valve Spring

14 - Valve Stem Seal
15 - Valve Guide
16 - Intake Valve
17 - Exhaust Valve
18 - Plug
19 - Intake Camshaft
20 - Exhaust Camshaft

Fastener Tightening Specifications

Component	Nm
Camshaft clamp (T40070)-to-camshaft bolt	20
Chain compartment cover-to-cylinder head bolt	10
Connecting pipe for the secondary air to the cylinder head.	10
Coolant pipe-to-bracket bolt	10
Cylinder block mount bolt	10
Cylinder block plug	30
Secondary Air Injection (AIR) connecting pipe-to-cylinder head bolt	10
Timing chain tensioner-to-cylinder block bolt	10
Timing chain tensioner-to-cylinder head bolt	10
Transport strap-to-cylinder block bolt	25
Vacuum pump-to-control housing cover bolt	10
Wire bracket-to-chain compartment cover bolt	10

Valve Dimensions

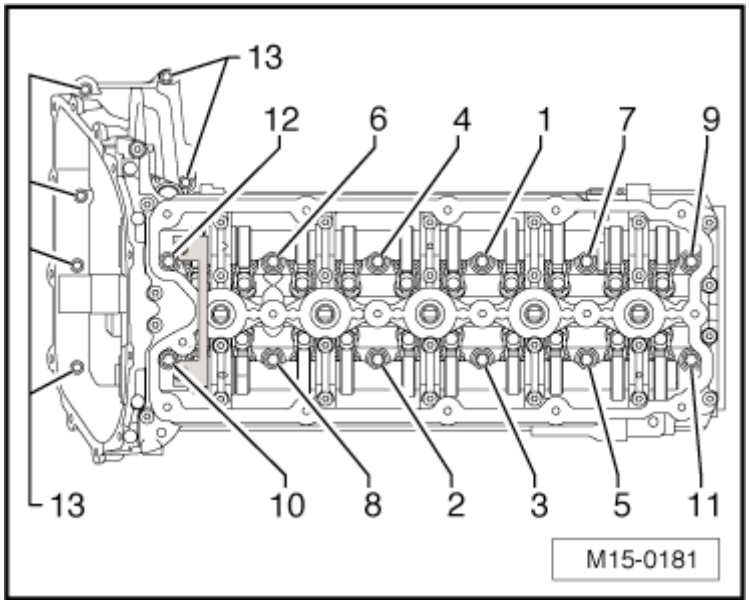


Dimension		Intake valve	Exhaust valve
Diameter a	mm	26.80 to 27.00	29.80 to 30.00
Diameter b	mm	5.95 to 5.97	5.94 to 5.95
c	mm	104.84 to105.34	103.64 to 104.14
α	∠°	45	45

Compression Pressures

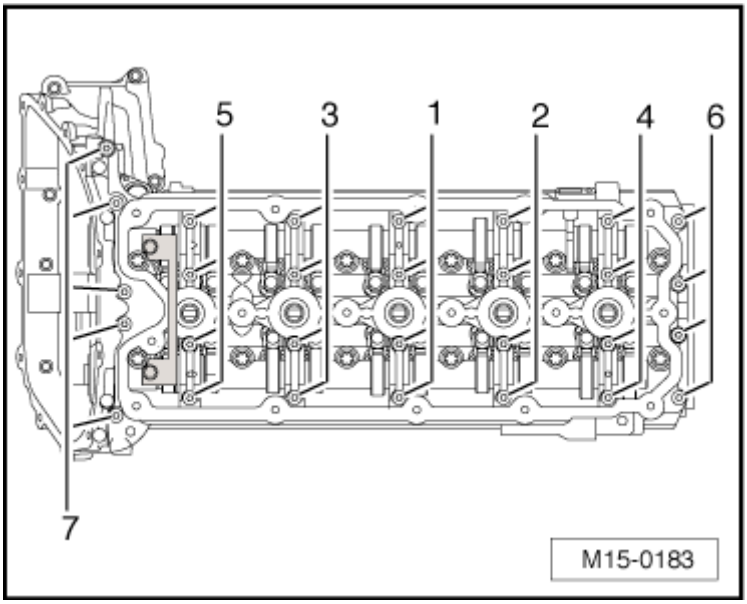
New Bar positive pressure	Wear limit Bar positive pressure	Difference between cylinders Bar positive pressure
9.0 to 13.0	8.0	Maximum 3.0

Cylinder Head Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 12 in sequence	40
2	Tighten bolts 1 through 12 in sequence	an additional 90° (¼ turn)
3	Tighten bolts 1 through 12 in sequence	an additional 90° (¼ turn)
4	Tighten bolts 13	10

Guide Frame Tightening Specifications

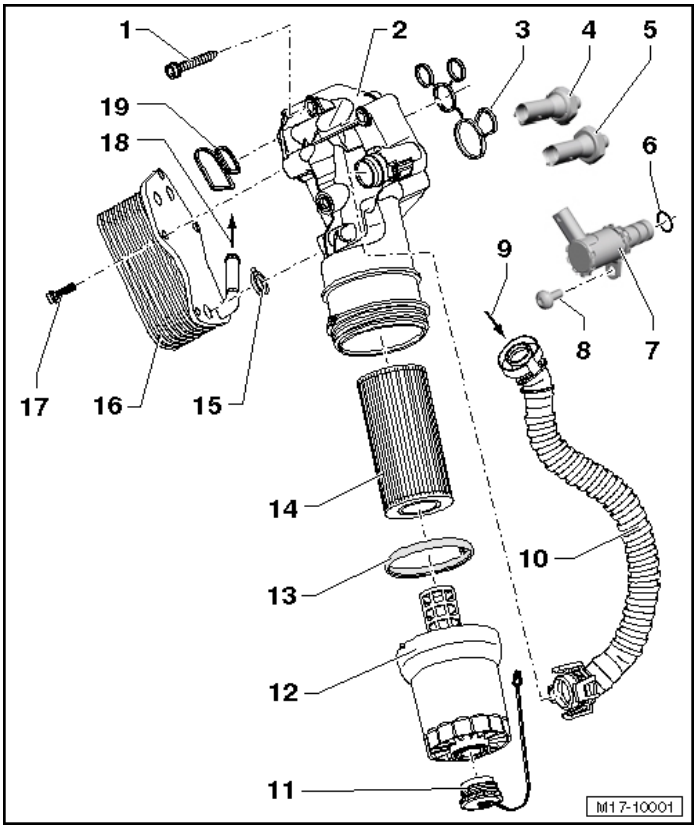


Step	Component	Nm
1	Tighten bolts 1 through 8 in sequence [1)]	8
2	Tighten bolts 1 through 8 in sequence	an additional 90° (¼ turn)

[1)] Replace fastener(s).

Lubrication – 2.5L CBTA, CBUA

Oil Filter Housing/Oil Pressure Switch Overview



1 - Bolt
- ☐ 25 Nm

2 - Oil Filter Bracket
3 - Seal
4 - Reduced Oil Pressure Switch -F378-
- ☐ 20 Nm

5 - Oil Pressure Switch -F1-
- ☐ 20 Nm

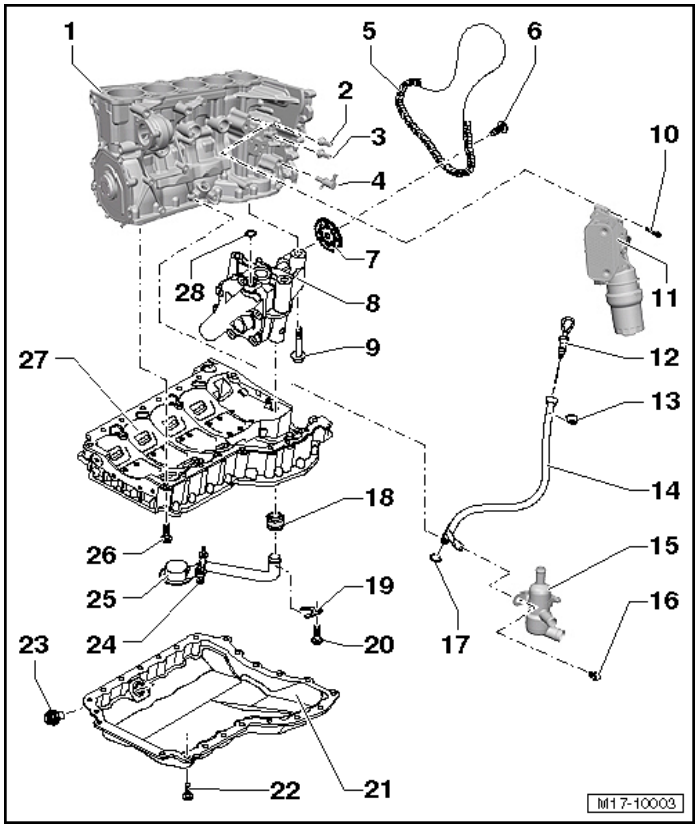
6 - O-ring
7 - Oil Pressure Regulation Valve -N428-
8 - Bolt
- ☐ 9 Nm

9 - From Intake Hose
10 - Vent Hose
11 - Dust Cap
12 - Oil Filter Housing
- ☐ 25 Nm

Oil Filter Housing/Oil Pressure Switch Overview *(cont'd)*

13 - Seal
14 - Oil Filter
15 - Seal
16 - Oil Cooler
17 - Bolt
☐ 25 Nm
18 - To Thermostat Housing
19 - Seal

Oil Pan/Oil Pump Overview



1 - Cylinder Block
2 - Reduced Oil Pressure Switch -F378-
3 - Oil Pressure Switch -F1-
4 - Oil Pressure Regulation Valve -N428-
5 - Power Take-Off Drive Chain

6 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

7 - Chain Sprocket for Oil Pump
8 - Oil Pump
9 - Bolt
- ☐ 25 Nm

10 - Bolt
- ☐ 25 Nm

11 - Oil Filter Bracket with Attachments
12 - Oil Dipstick
13 - Retaining Ring
14 - Guide Tube
15 - Preheater
16 - Bolt
- ☐ 25 Nm

17 - O-ring
- ☐ Replace after removing

18 - Seal
- ☐ Replace after removing

19 - Bracket
20 - Bolt
- ☐ 10 Nm

21 - Oil Pan Lower Section
22 - Bolt
- ☐ 10 Nm

23 - Oil Drain Plug
- ☐ 30 Nm
- ☐ Replace after removing

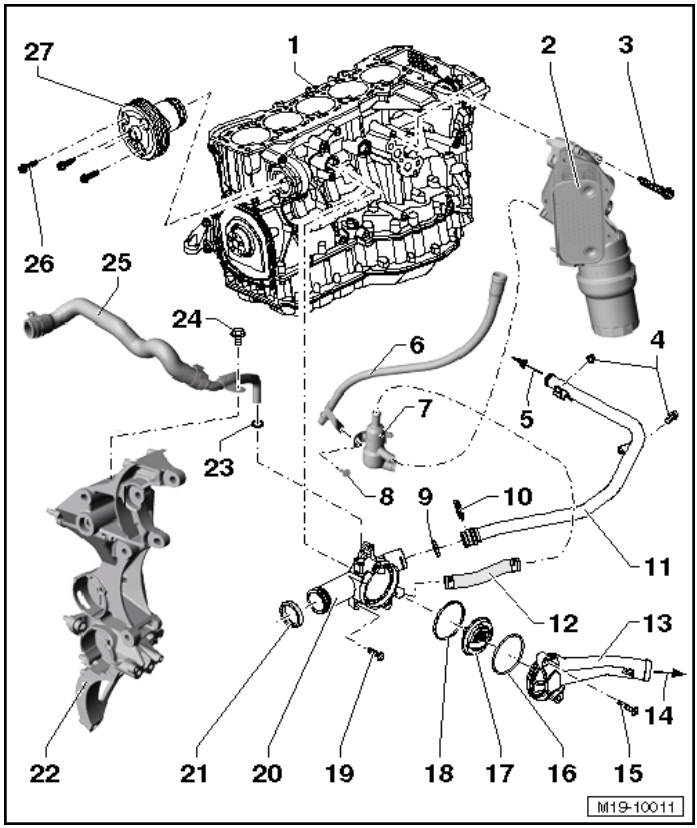
24 - Decoupling Element
- ☐ Bolt 10 Nm

25 - Oil Intake Pipe
26 - Bolt
- ☐ 25 Nm

27 - Oil Pan Upper Section
28 - O-ring
- ☐ Replace after removing

Cooling System – 2.5L CBTA, CBUA

Coolant Pump/Thermostat Overview
Part 1 Belt Pulley Side



1 - Cylinder Block
2 - Engine Oil Cooler
3 - Bolt
☐ 25 Nm
4 - Bolt
☐ 10 Nm
5 - To Heater Core of Heater, Bottom
6 - Guide Tube
7 - Preheater
8 - Bolt
☐ 25 Nm
9 - O-ring
10 - Clamp
11 - Front Coolant Pipe
12 - Connecting Hose
13 - Connecting Piece

14 - To Lower Radiator
15 - Bolt
- ☐ 5 Nm

16 - O-ring
17 - Coolant Thermostat
18 - Seal
19 - Bolt
- ☐ 25 Nm

20 - Coolant Thermostat Housing
21 - Seal
- ☐ Replace after removing

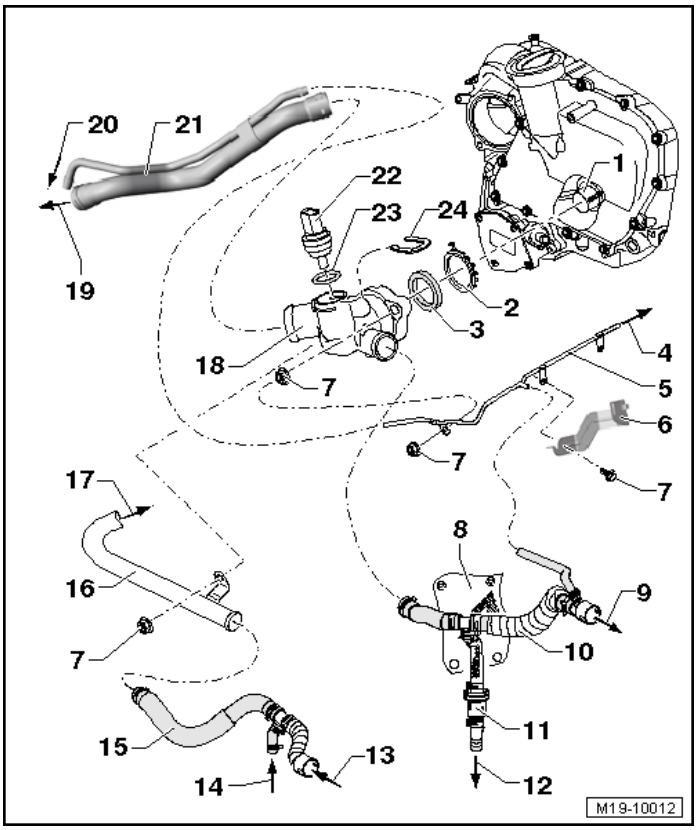
22 - Auxiliary Components Bracket
23 - O-ring
- ☐ Replace after removing

24 - Bolt
- ☐ 9 Nm

25 - Coolant Hose
26 - Bolt
- ☐ 10 Nm

27 - Coolant Pump

Part 2 Transmission Side

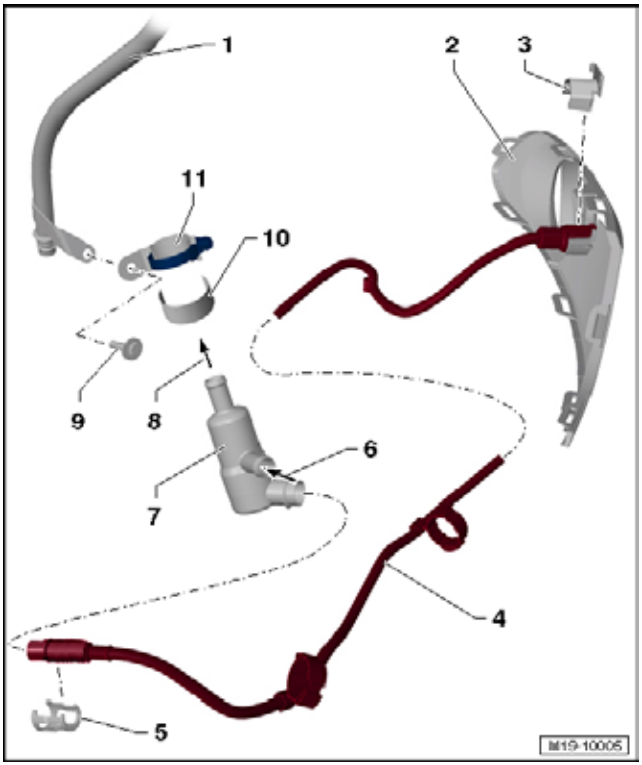


1 - Coolant Connection
2 - Locking Ring
3 - Seal
4 - To Expansion Tank, Top
5 - Rear Coolant Pipe
6 - Bracket
7 - Nut
☐ 10 Nm
8 - Heat Shield
9 - To Heater Core, Top
10 - Supply Hose
11 - Bypass Thermostat
12 - To Transmission Fluid Cooler
13 - From Heater Core, Bottom
14 - From Transmission Oil Cooler
15 - Return Hose
16 - Coolant Pipe
17 - To Coolant Regulator Housing
18 - Coolant Distribution Housing

19 - To the Top of the Radiator
20 - To the Top of the Radiator
21 - Supply Hose
22 - Engine Coolant Temperature Sensor -G62-
23 - O-ring
☐ Replace after removing
24 - Clamp

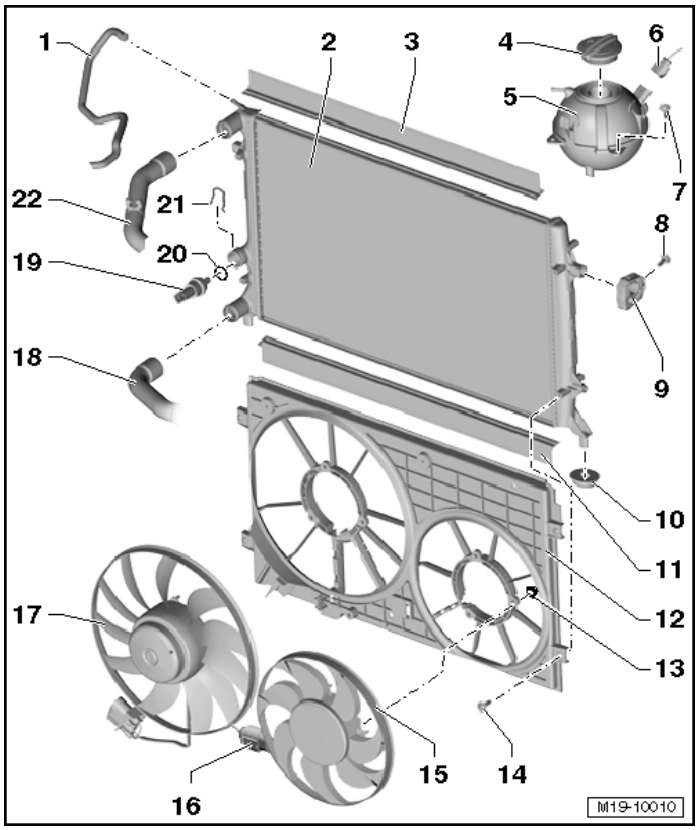
Engine Pre-Warmer Overview

Not all vehicles have a pre-heater.



1 - Guide Tube
2 - Left Cover
3 - Bracket
4 - Connecting Cable
5 - Retainer
6 - From the Oil Cooler
7 - Preheater
8 - To coolant regulator housing
9 - Bolt
☐ 25 Nm
10 - Adhesive Foil
11 - Bracket with Screw-Type Clamp
☐ Tighten the screw-type clamp to 3 Nm.

Radiator/Coolant Fan Overview



1 - Coolant Hose
2 - Radiator
3 - Upper Seal
4 - Cover
5 - Reservoir
6 - Connector
7 - Bolt
- ☐ 2 Nm

8 - Bolt
- ☐ 5 Nm

9 - Bearings
10 - Base Plate
11 - Lower Seal
12 - Air Shroud
13 - Nut
- ☐ 5 Nm

14 - Bolt
- ☐ 5 Nm

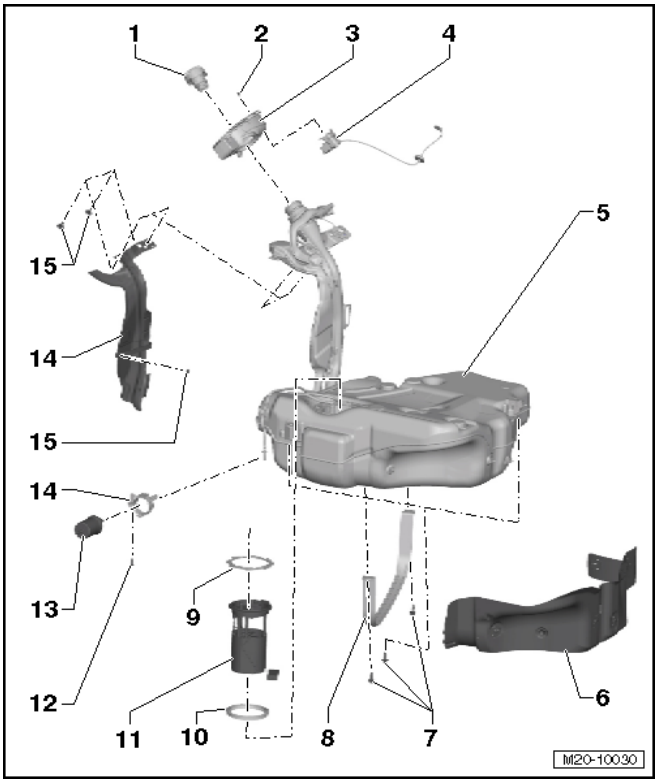
15 - Coolant Fan 2 -V177-
16 - Connector
17 - Coolant Fan -V7-
18 - Lower Coolant Hose
19 - Engine Coolant Temperature Sensor on Radiator Outlet -G83-
20 - O-ring
21 - Clamp
22 - Upper Coolant Hose

Fastener Tightening Specifications

Component	Nm
Condenser to radiator	5
Coolant fan to intake air elbow	5

Fuel Supply – 2.5L CBTA, CBUA

Fuel Tank Assembly Overview



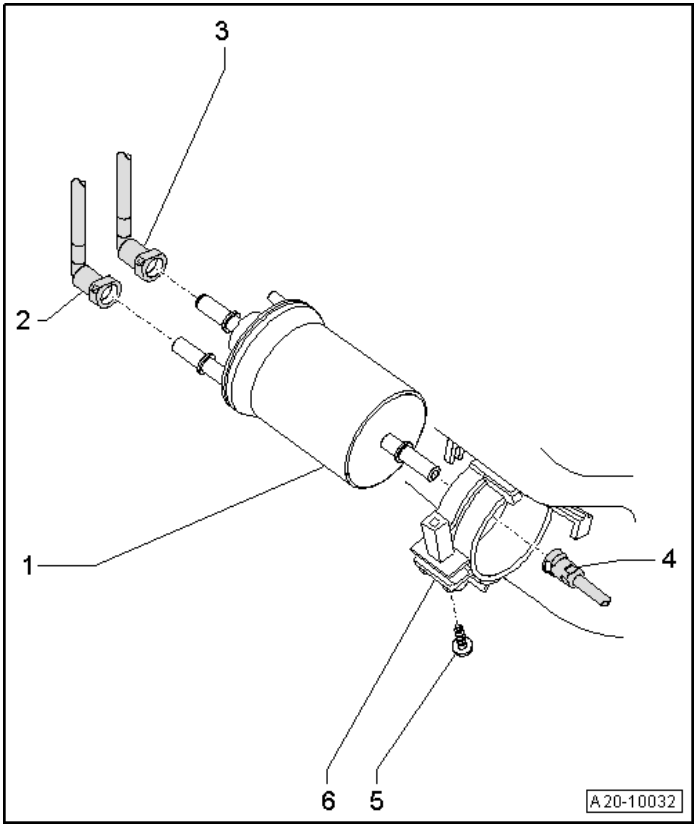
1 - Cover
2 - Bolt
- ☐ Tigthening specification, refer to Body Exterior

3 - Fuel Filler Door Unit
4 - Fuel Flap Lock
5 - Fuel Tank
6 - Heat Shield
7 - Bolt
- ☐ 25 Nm

8 - Mounting Strap
9 - Locking Ring
- ☐ 110 Nm

10 - Seal
11 - Fuel Delivery Unit
12 - Fuel Filter Bracket
13 - Fuel Filter
14 - Cover Plate with Mount and Rivets
15 - Bolt
- ☐ 25 Nm

Fuel Filter Assembly Overview



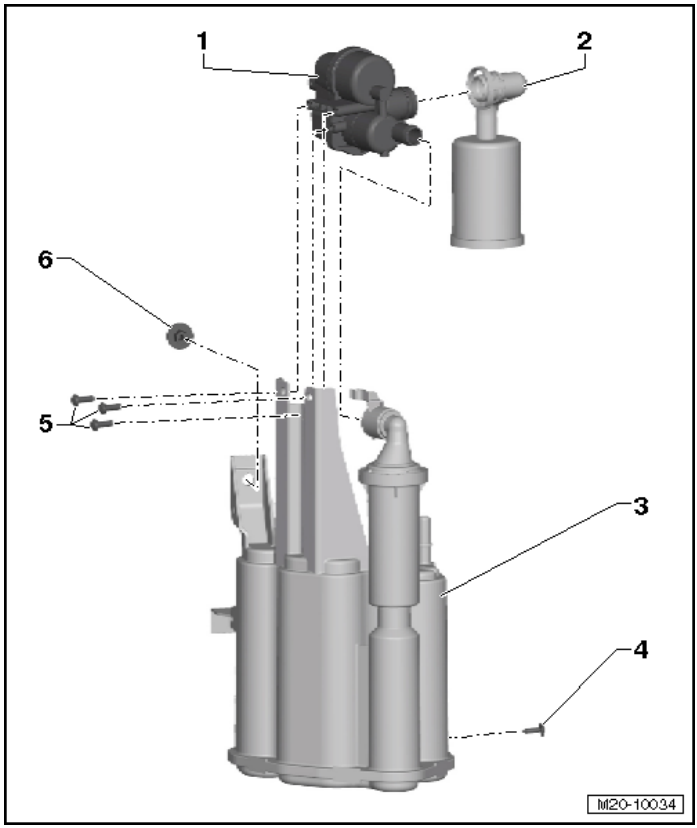
1 - Fuel Filter
2 - Fuel Supply Line
- ☐ From the fuel tank

3 - Fuel Return Line
4 - Fuel Supply Line
- ☐ To fuel rail

5 - Bolt
- ☐ 3 Nm

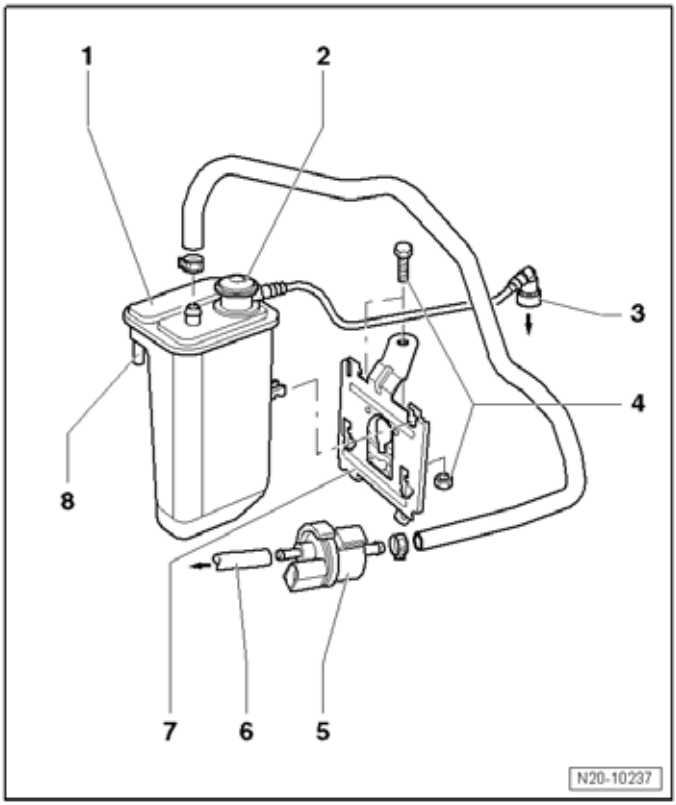
6 - Bracket

EVAP Canister System Assembly Overview, EVAP Canister in Right Rear Wheel Housing



1 - EVAP Canister System Assembly Overview, EVAP Canister in Right Rear Wheel Housing
2 - Air Filter
3 - EVAP Canister
4 - Bolt
☐ 1.8 Nm
5 - Bolt
☐ 1.8 Nm
6 - Nut
☐ 8 Nm

EVAP Canister System Assembly Overview, EVAP Canister in Engine Compartment



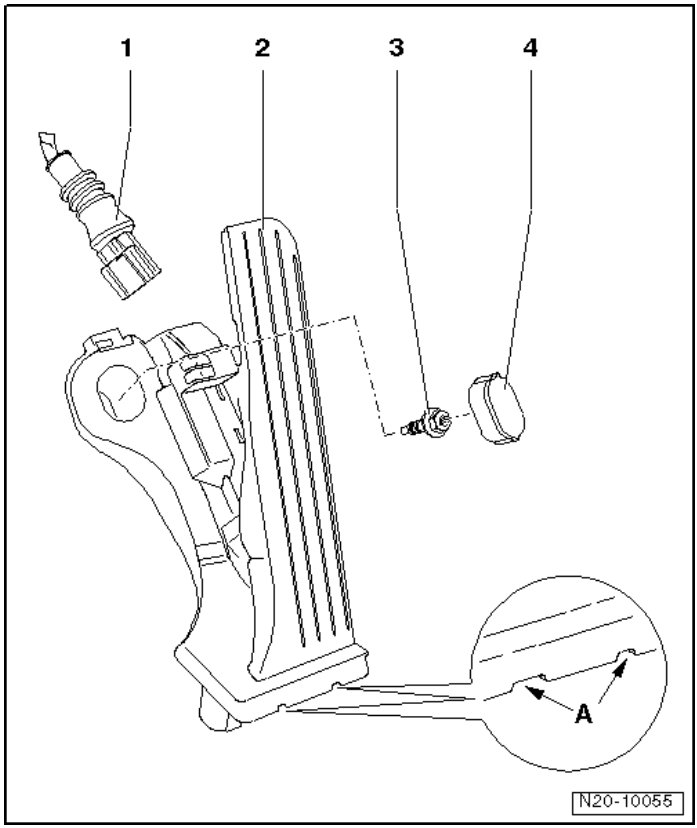
1 - EVAP Canister
2 - Pressure Retaining Valve with Connecting Hose
3 - Connecting Hose
4 - Nuts and Bolt
- ☐ 10 Nm

5 - EVAP Canister Purge Regulator Valve 1 -N80-
6 - Connecting Hose
- ☐ To the intake manifold

7 - Bracket
- ☐ 2 Nm

8 - Vent Hole

EVAP Canister System Assembly Overview, Accelerator Pedal Mechanism Assembly Overview



1 - Connector

2 - Accelerator Pedal Position Sensor -G79- with Accelerator Pedal Position Sensor 2 -G185-

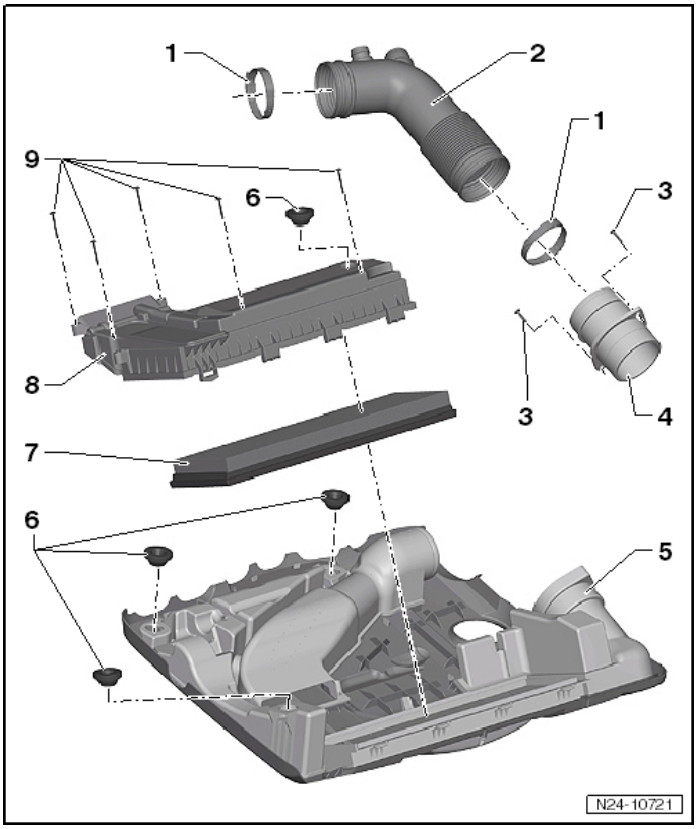
3 - Bolt

☐ 10 Nm

4 - Cap

Multiport Fuel Injection – 2.5L CBTA, CBUA

Air Filter Housing Overview

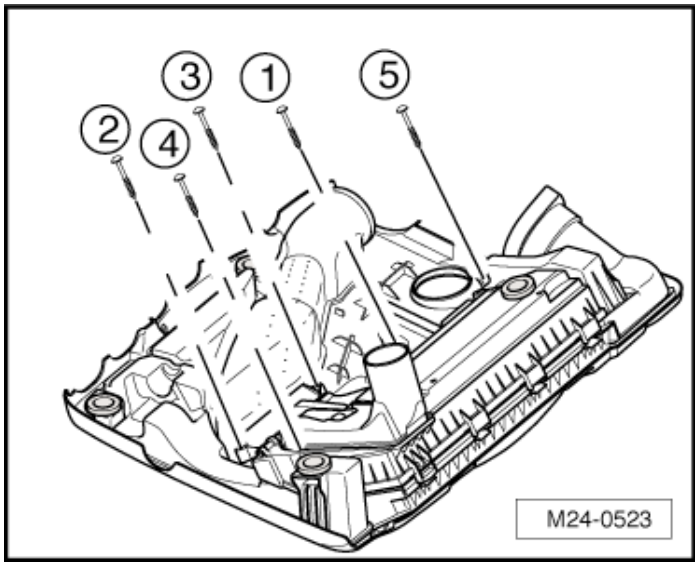


1 - Spring Clamp
2 - Intake Hose
3 - Bolt
- ☐ 3 Nm

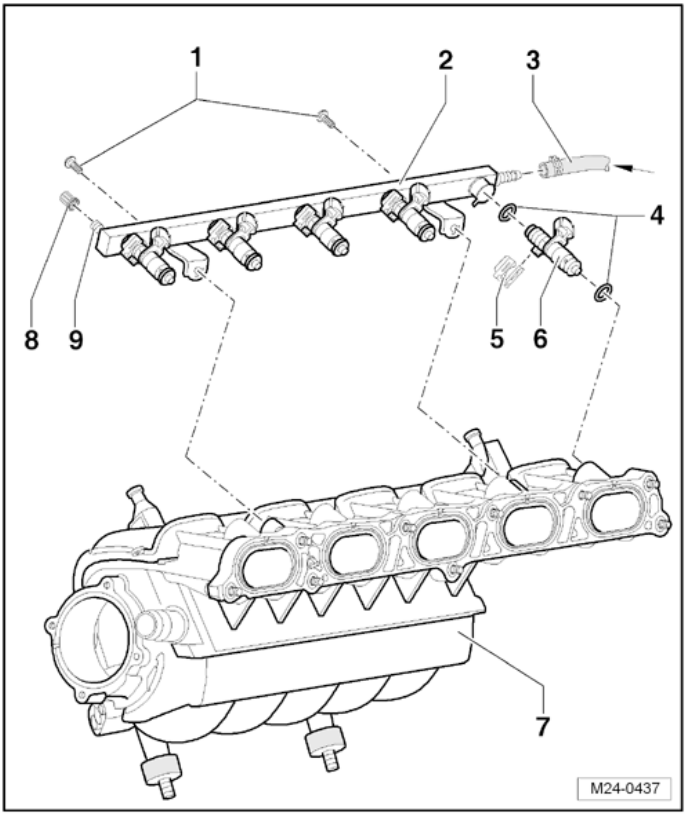
4 - Connecting Piece
5 - Upper Air Filter Housing
6 - Rubber Bushing
7 - Filter
8 - Lower Air Filter Housing
9 - Bolt
- ☐ 2 Nm
- ☐ See sequence below

Lower Air Filter Section Tightening Sequence

Tighten the bolts in the following sequence: -1 to 5-.



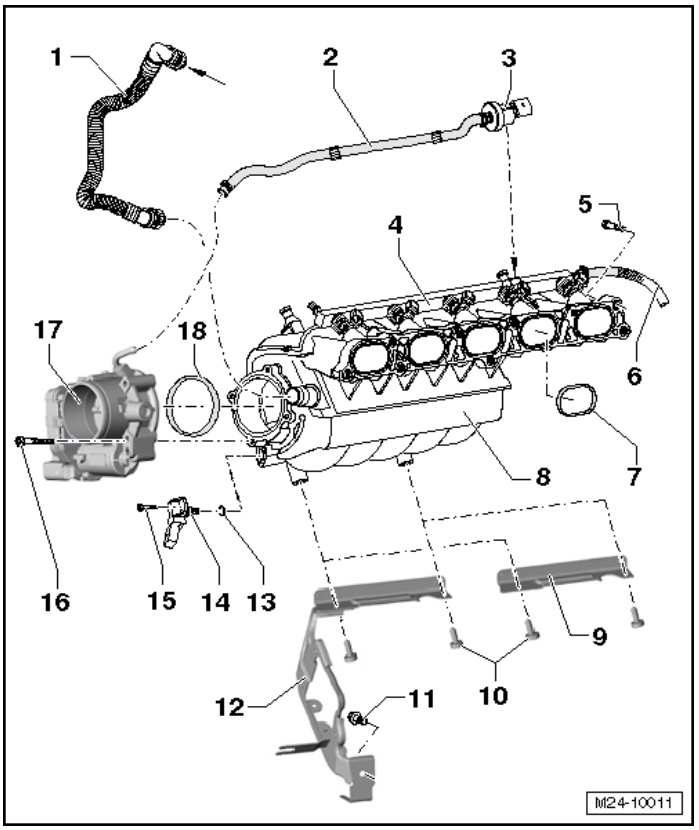
Fuel Rail with Fuel Injectors Overview



1 - Bolt
- ☐ 3.5 Nm

2 - Fuel Rail
3 - Fuel Supply Line
4 - O-ring
5 - Clamp
6 - Fuel Injector -N30, N31, N32, N33, N83-
7 - Intake Manifold
8 - Cap
9 - Breather Valve

Intake Manifold Overview



1 - Bleeder Hose for Crankcase Ventilation
2 - Ventilation Hose
3 - EVAP Canister Purge Regulator Valve 1 -N80-
4 - Fuel Rail
5 - Bolt
- ☐ 9 Nm

6 - Fuel Supply Line
7 - Seal
- ☐ Replace after removing

8 - Intake Manifold
9 - Bracket
10 - Bolt
- ☐ 16 Nm

11 - Bolt
- ☐ 25 Nm

12 - Bracket
13 - O-ring
14 - Manifold Absolute Pressure Sensor -G71- with Intake Air Temperature Sensor -G42-

15 - Bolt

- ☐ 3.5 Nm

16 - Bolt

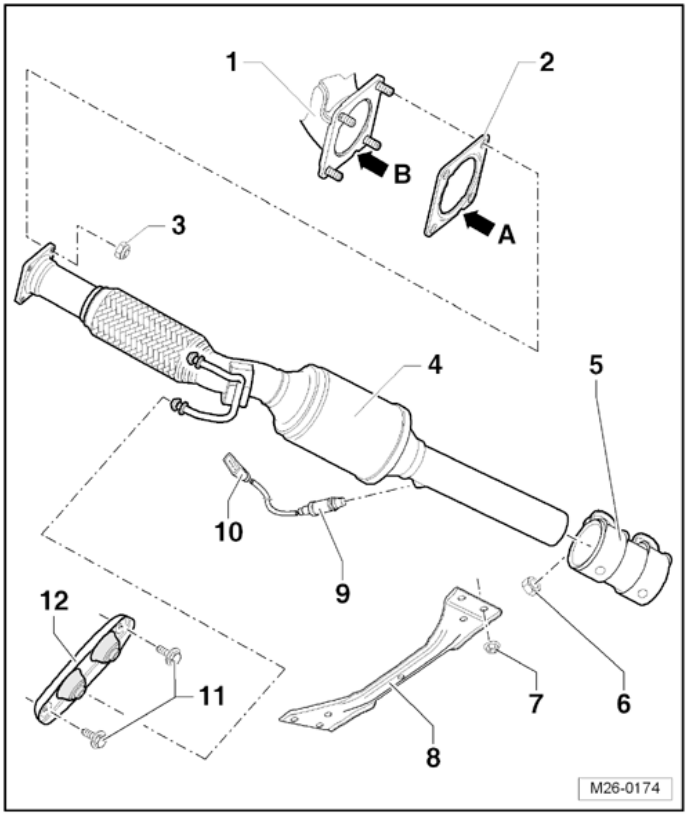
- ☐ 6.5 Nm

17 - Throttle Valve Control Module -J338-

18 - Seal

Exhaust System, Emission Controls – 2.5L CBTA, CBUA

Exhaust Cleaning System Overview, CBTA



1 - Exhaust Manifold
- ☐ Coat stud bolts with Hot Bolt Paste -G 052 118 A3-.

2 - Seal
- ☐ Replace after removing

3 - Nut
- ☐ 23 Nm
- ☐ Replace after removing

4 - Front Exhaust Pipe

5 - Clamp

6 - Fuel Supply Line

7 - Nut
- ☐ 23 Nm

8 - Nut
- ☐ 20 Nm

9 - Oxygen Sensor after Three Way Catalytic Converter -G130-

- ☐ 55 Nm
- ☐ Coat the threads on the new heated oxygen sensors with assembly paste.

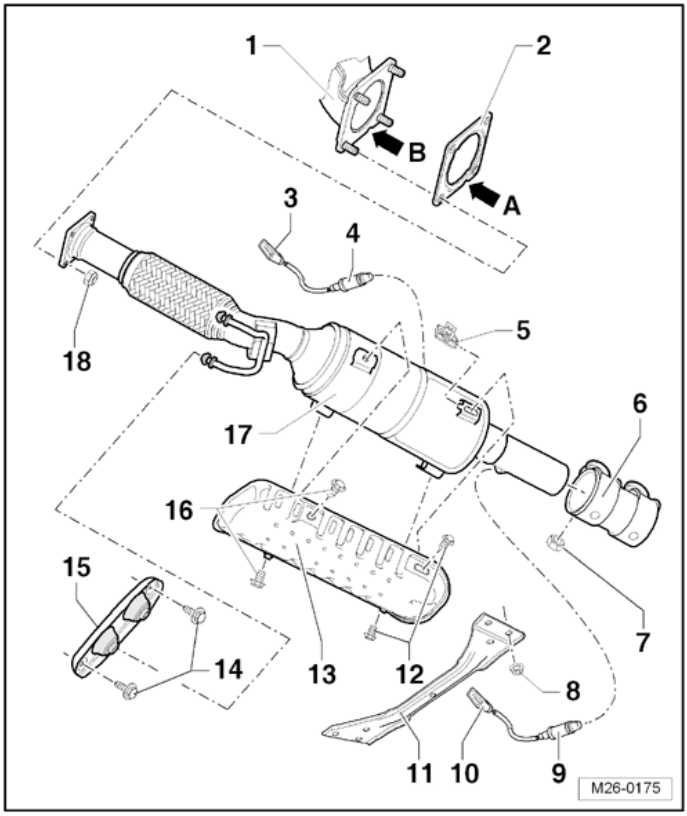
10 - Connector

11 - Bolt

- ☐ 23 Nm

12 - Suspended Mount

Exhaust Cleaning System Overview, CBUA



1 - Exhaust Manifold
- ☐ Coat stud bolts with Hot Bolt Paste -G 052 118 A3-.

2 - Seal
- ☐ Replace after removing

3 - Nut
- ☐ 23 Nm
- ☐ Replace after removing

4 - Oxygen Sensor in Bank 1 Center Three Way Catalytic Converter -G465-
- ☐ 55 Nm

5 - Spring Nut

6 - Clamp

7 - Nut
- ☐ 23 Nm

8 - Nut
- ☐ 20 Nm

9 - Oxygen Sensor after Three Way Catalytic Converter -G130-
- ☐ 55 Nm
- ☐ Coat the threads on the new heated oxygen sensors with assembly paste.

10 - Connector

11 - Front Tunnel Bridge

12 - Bolt
- ☐ 5 Nm

13 - Heat Shield

14 - Bolt
- ☐ 23 Nm

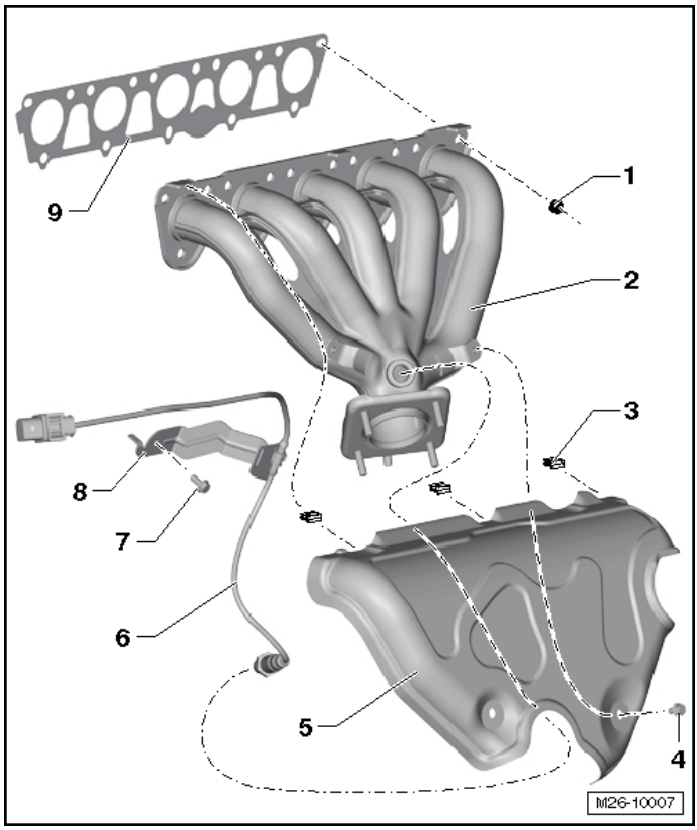
15 - Suspended Mount

16 - Bolt
- ☐ 10 Nm

17 - Front Exhaust Pipe

18 - Nut
- ☐ 23 Nm
- ☐ Replace after removing

Exhaust Manifold Overview



1 - Bolt
- ☐ 23 Nm
- ☐ Replace after removing

2 - Exhaust Manifold
- ☐ Coat stud bolts on cylinder head with Hot Bolt Paste -G 052 118 A3-.

3 - Clamp

4 - Bolt
- ☐ 10 Nm

5 - Heat Shield

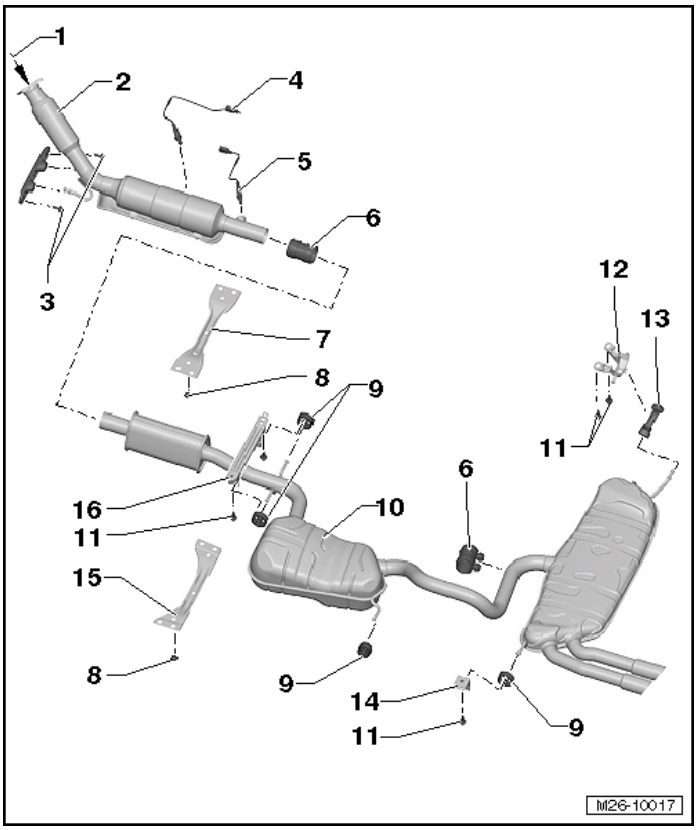
6 - Heated Oxygen Sensor -G39-
- ☐ 55 Nm
- ☐ Coat the threads on the new heated oxygen sensors with assembly paste.

7 - Bolt
- ☐ 10 Nm

8 - Bracket

9 - Seal
- ☐ Replace after removing

Muffler Overview



1 - From Exhaust Manifold
2 - Front Exhaust Pipe
3 - Bolt
- ☐ 23 Nm

4 - Oxygen Sensor in Bank 1 Center Three Way Catalytic Converter -G465-
- ☐ 55 Nm
- ☐ Coat the threads on the new heated oxygen sensors with assembly paste.

5 - Oxygen Sensor after Three Way Catalytic Converter -G130-
- ☐ 55 Nm
- ☐ Coat the threads on the new heated oxygen sensors with assembly paste.

6 - Repair - Clamping Sleeve
7 - Front Tunnel Bridge
8 - Nut
- ☐ 20 Nm

9 - Suspended Mount
10 - Center Muffler

Muffler Overview *(cont'd)*

11 - Bolt
- ☐ 23 Nm

12 - Suspended Mount

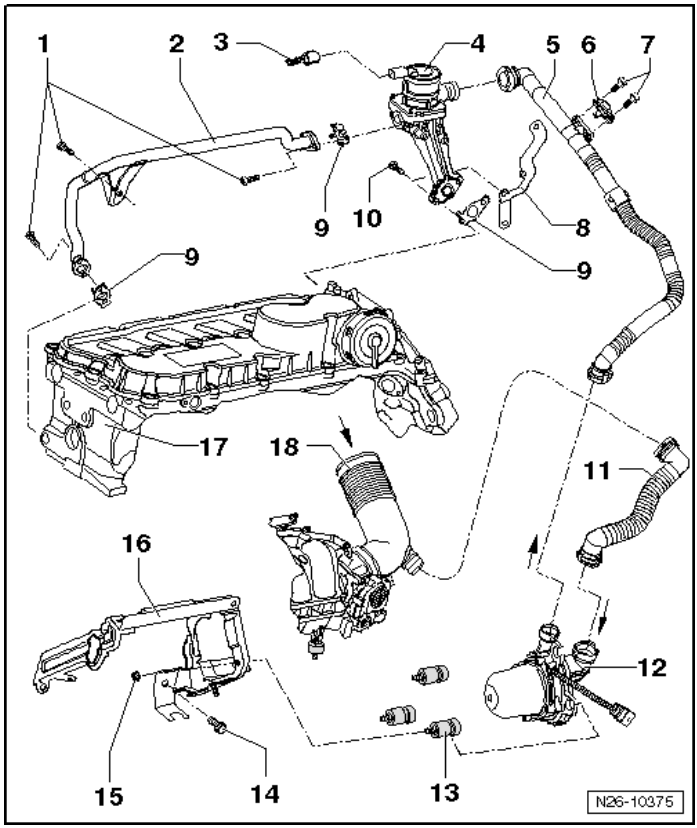
13 - Rear Muffler

14 - Left Suspended Mount for Rear Muffler

15 - Rear Tunnel Bridge

16 - Tunnel Exit Suspended Mount
- ☐ 23 Nm

Secondary Air Injection System Overview



1 - Bolt
- ☐ 10 Nm

2 - Connecting Pipe
- ☐ Follow the tightening sequence, see below
- ☐ Only with engine code CBUA

3 - Connector

4 - Secondary Air Injection Solenoid Valve -N112-

5 - Pressure Pipe

6 - Secondary Air Injection Sensor 1 -G609-
7 - Bolt
- ☐ 2 Nm

8 - Bracket
9 - Seal
10 - Bolt
- ☐ 10 Nm

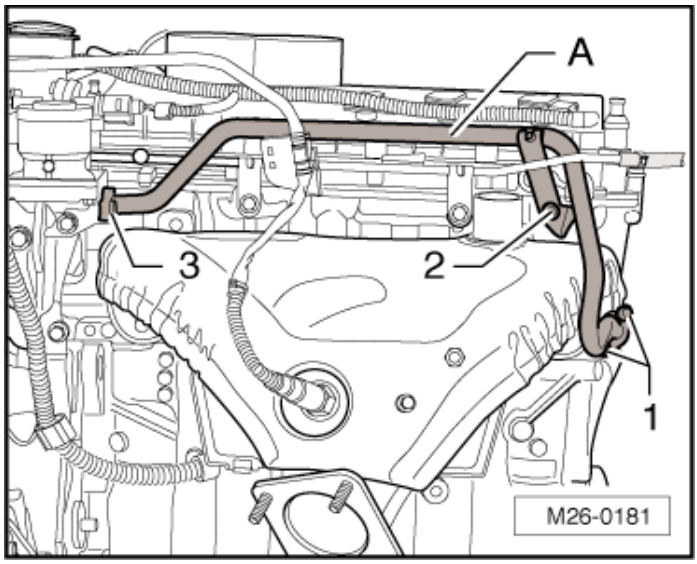
11 - Intake Manifold
12 - Secondary Air Injection Pump Motor -V101-
13 - Rubber Bushing
14 - Bolt
- ☐ 25 Nm

15 - Nut
- ☐ 10 Nm

16 - Intake Manifold Support
- ☐ Engine code CBUA, mount for the Secondary Air Injection Pump Motor -V101-
- ☐ Not equipped for engine code CBTA without secondary air injection system

17 - Cylinder Head
18 - Intake Hose

Connecting Pipe - Tightening Sequence



Replace all connecting pipe seals -A-

Step	Component	Nm
1	Tighten bolts 1 through 3 in sequence	Hand-tighten
2	Tighten bolts 1 through 3 in sequence	10

Fastener Tightening Specifications

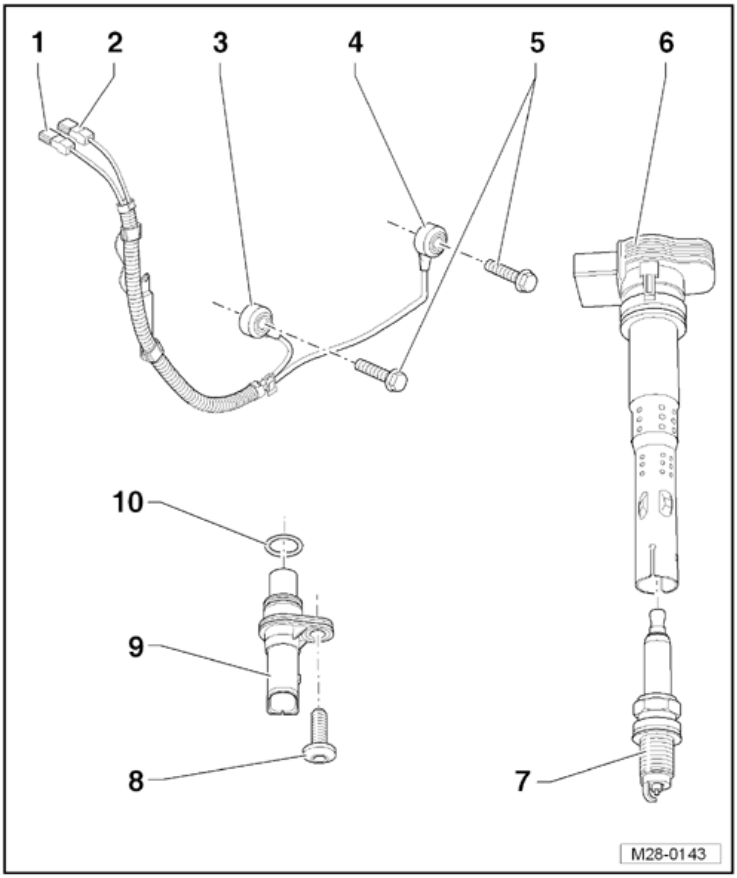
Component	Nm
Clamp	25
Mount to subframe	25
Secondary Air Injection (AIR) Pump Motor -V101- to intake manifold support	10

Ignition/Glow Plug System – 2.5L CBTA, CBUA

Technical Data

Engine codes	CBTA and CBUA
Ignition sequence	1-2-4-5-3
Spark plugs	Refer to the Parts Catalog
Electrode gap	1.0 to 1.1 mm
Tightening specification	25 Nm
Change intervals	Refer to Maintenance Intervals Rep. Gr. 03

Lower Air Filter Housing Tightening Sequence

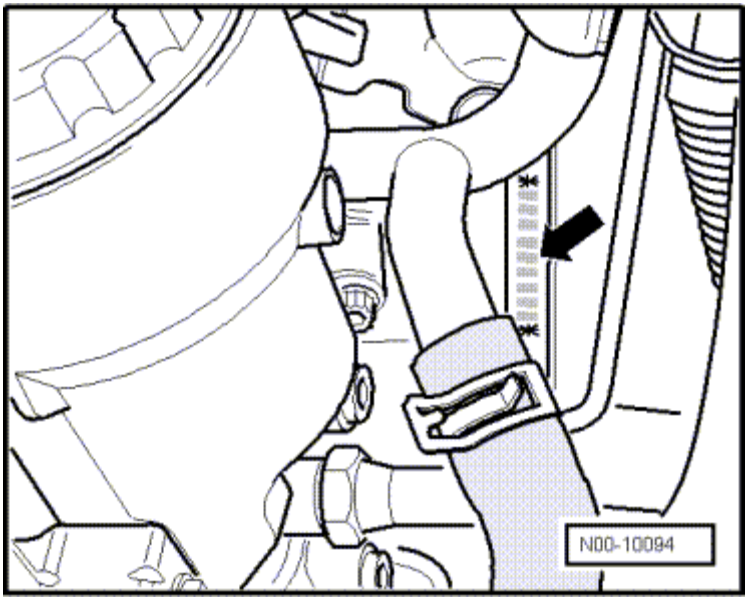


1 - Harness Connector for Knock Sensor (KS) 2 -G66-
2 - Harness Connector for Knock Sensor (KS) 1 -G61-
3 - Knock Sensor 2 -G66-
4 - Knock Sensor 1 -G61-
5 - Bolt
☐ 20 Nm
6 - Ignition Coil with Power Output Stage -N70, N127, N291, N292, N323-
7 - Spark Plug
☐ 25 Nm
8 - Bolt
☐ 10 Nm
9 - Camshaft Position Sensor -G40-
10 - O-ring
☐ No replacement par

ENGINE MECHANICAL – 2.0L CJAA (TDI)

General, Technical Data

Engine Number Location



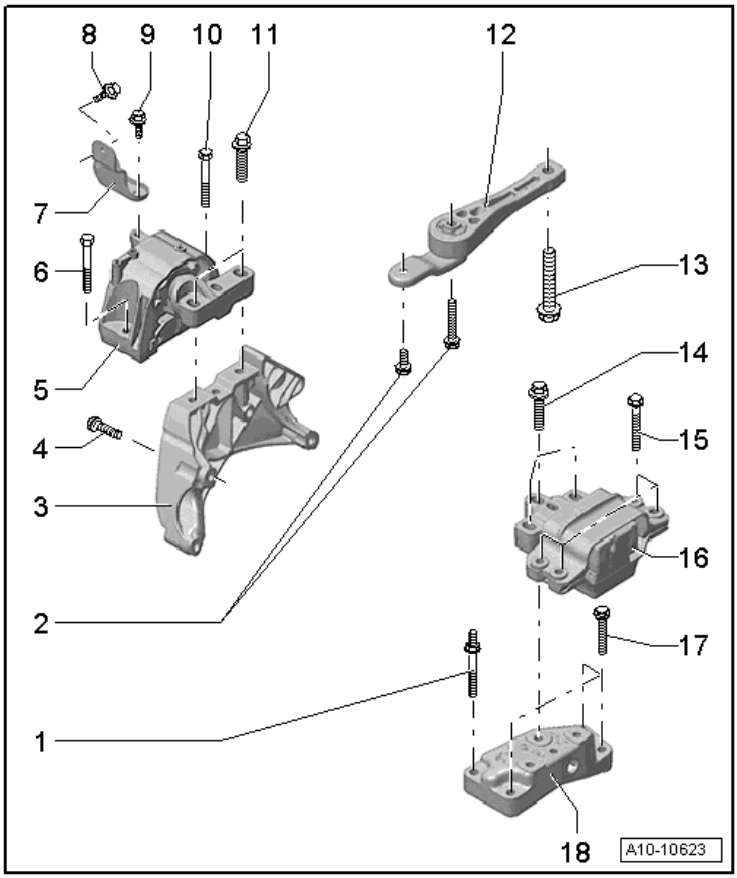
The engine number (engine code and serial number) (arrow) is located at the front of the engine/transmission joint. There is also a label on the toothed belt guard that shows the engine code and serial number. Engine codes beginning with C are four digits. The first 3 digits of the engine code indicate the displacement and the mechanical structure of the engine. They are stamped in the cylinder block, including the serial number. The fourth digit describes the engine output and torque.

Engine Data

Identification code		**CJAA**
Emission values in accordance with		ULEV2 Standard
Displacement	liter	2.0
Output	kW at RPM	103 @ 4000
Torque	Nm at RPM	320 @ 1750 to 2500
Bore	diameter mm	81.0
Stroke	mm	95.5
Valves per cylinder		4
Compression ratio		16.5
Fuel		Diesel
Ignition sequence		1-3-4-2
Balance shaft module		Yes
Catalytic converter		Yes
Exhaust Gas Recirculation (EGR)		Yes
Turbocharger, Supercharger		Yes
Charge Air Cooler (CAC)		Yes
Particulate filter		Yes

Engine Assembly – 2.0L CJAA (TDI)

Assembly Mounts Overview



1 - Bolt
- ☐ Tightening specification, refer to Transmission Repair Manual

2 - Bolt
- ☐ 50 Nm + 90° turn
- ☐ Replace after removing

3 - Engine Support

4 - Bolt
- ☐ 40 Nm + 180° turn
- ☐ Replace after removing

5 - Engine Mount

6 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

7 - Bracket

8 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

9 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

10 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

11 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

12 - Pendulum Support

13 - Bolt
- ☐ 100 Nm + 90° turn
- ☐ Replace after removing

14 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

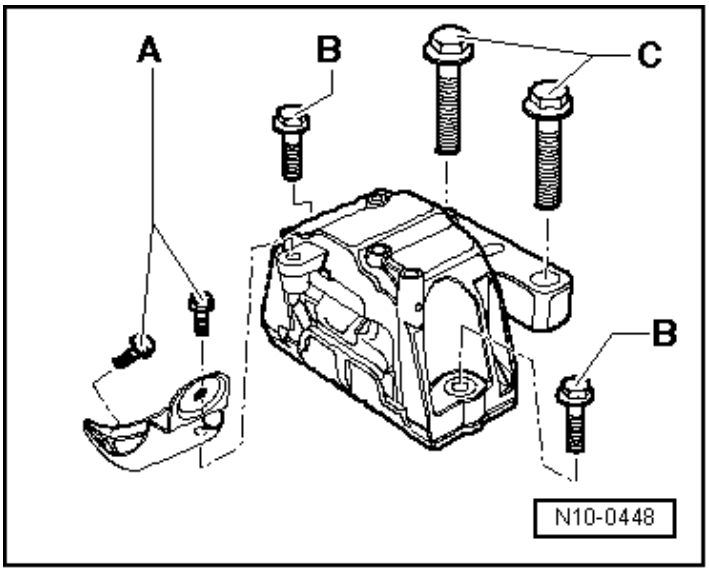
15 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

16 - Transmission Mount
- ☐ The illustration shows the DSG transmission version

17 - Bolt
- ☐ Tightening specification, refer to Transmission Repair Manual

18 - Gearbox Support

Engine Mount



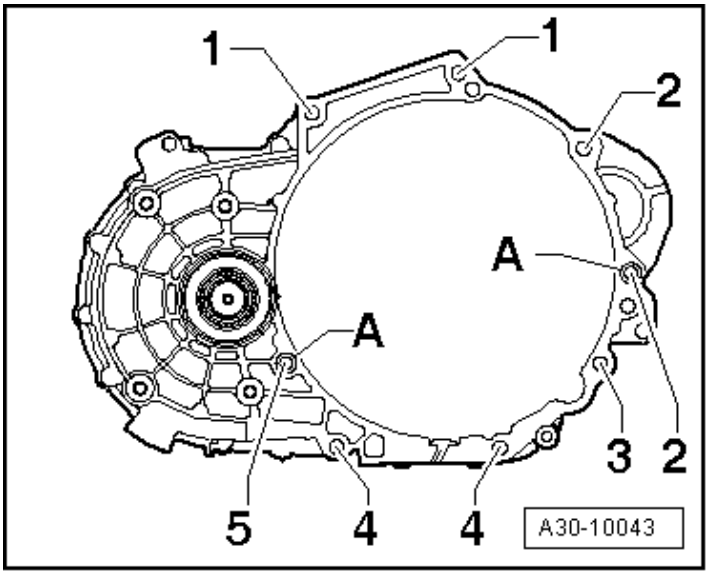
Stage	Tightening Specifications and Sequence
1	40 Nm + 90° (1/4 turn) additional turn, replace the bolts
2	20 Nm + 90° (1/4 turn) additional turn, replace the bolts
3	60 Nm + 90° (1/4 turn) additional turn, replace the bolts

Fastener Tightening Specifications

Component	Fastener size	Nm
Bolts and nuts	M6	10
	M7	15
	M8	25
	M10	40
	M12 [1]	65

[1] Tightening specification for a M12 collar bolt is 75 Nm.

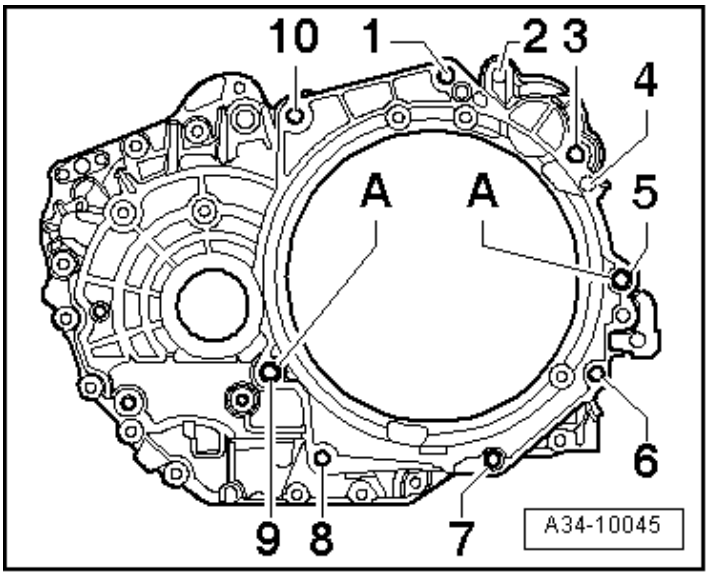
Secure Manual Transmission to Engine



Item	Bolt	Nm
1 [1]	M12x55	80
2 [1]	M12x165	80
3	M10x105	40
4	M10x50	40
5 [2]	M12x65	80
A	Alignment sleeves for centering	

[1] It with threaded pin M8.
[2] Install in transmission from engine side.

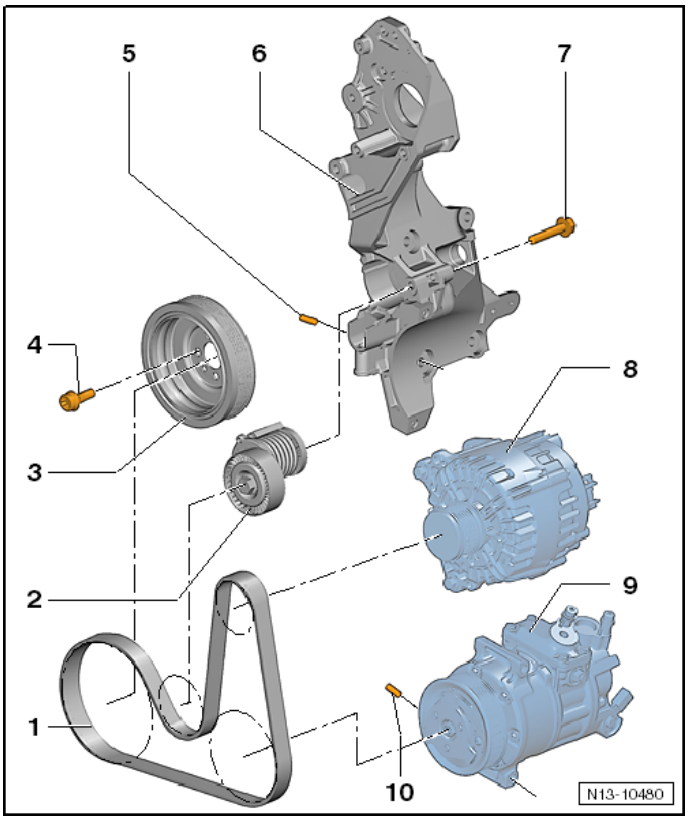
Secure DSG Transmission to Engine



Item	Bolt	Nm
1, 3, 10	M12x55	80
5	M12x65	80
6, 7, 8	M10x150	40
9	M102x70	80
2, 4	Start, refer to Electrical Equipment	
A	Alignment sleeves for centering	

Crankshaft, Cylinder Block – 2.0L CJAA (TDI)

Ribbed Belt Drive with Tensioner and A/C Compressor Overview

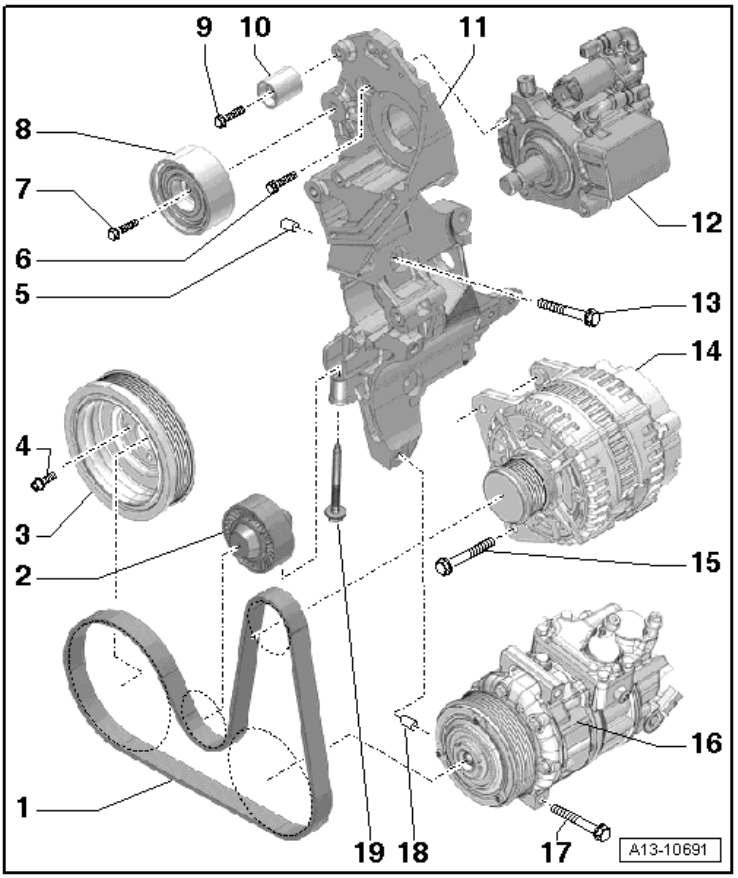


1 - Ribbed Belt
2 - Ribbed Belt Tensioning Damper
3 - Pulley/Vibration Damper
4 - Bolt
- ☐ 10 Nm + 90° turn
- ☐ Replace after removing

5 - Alignment Sleeves
6 - Bracket
7 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

8 - Generator
9 - A/C Compressor
10 - Alignment Sleeves

Ribbed Belt Drive with Tensioning Roller and A/C Compressor Overview



1 - Ribbed Belt
2 - Ribbed Belt Tensioning Roller
3 - Vibration Dampert
4 - Bolt
- ☐ 10 Nm + 90° turn
- ☐ Replace after removing

5 - Alignment Sleeve
6 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

7 - Bolt
- ☐ 50 Nm + 90° turn
- ☐ Replace after removing

8 - Idler Roller

9 - Bolt

- ☐ 15 Nm

10 - Idler Rollerg

11 - Auxiliary Components Bracket

12 - High Pressure Pump

13 - Bolt

- ☐ Tightening specification and sequence, see below

14 - Generator

15 - Bolt

- ☐ 20 Nm

16 - A/C Compressor

17 - Bolt

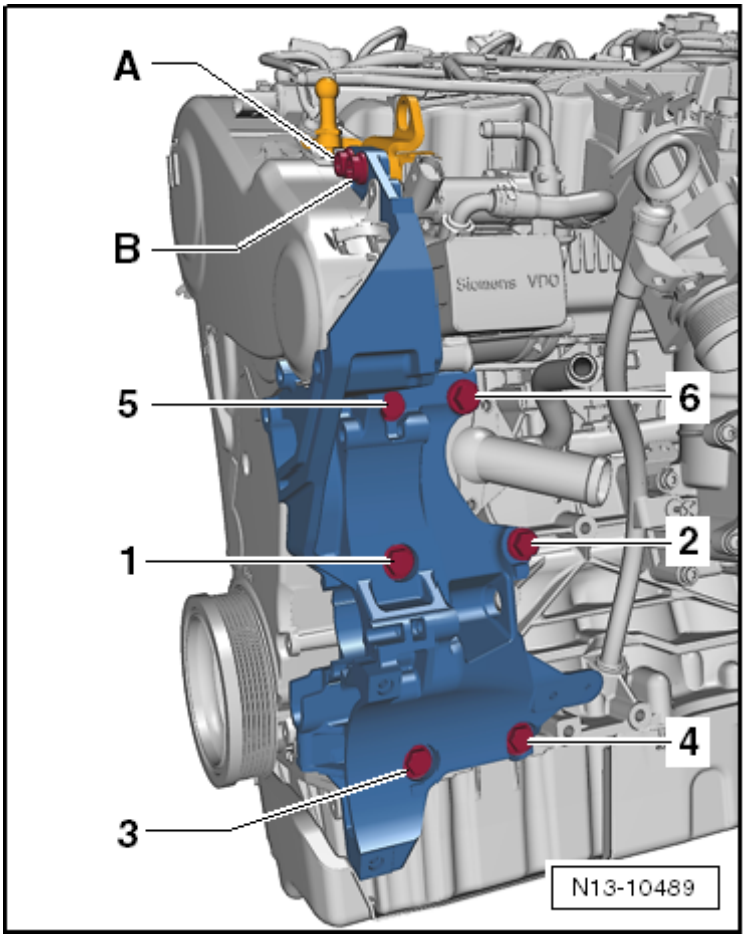
- ☐ 45 Nm

18 - Alignment Sleeve

19 - Bolt

- ☐ 40 Nm + 90° turn
- ☐ Tightening specification and sequence, see below

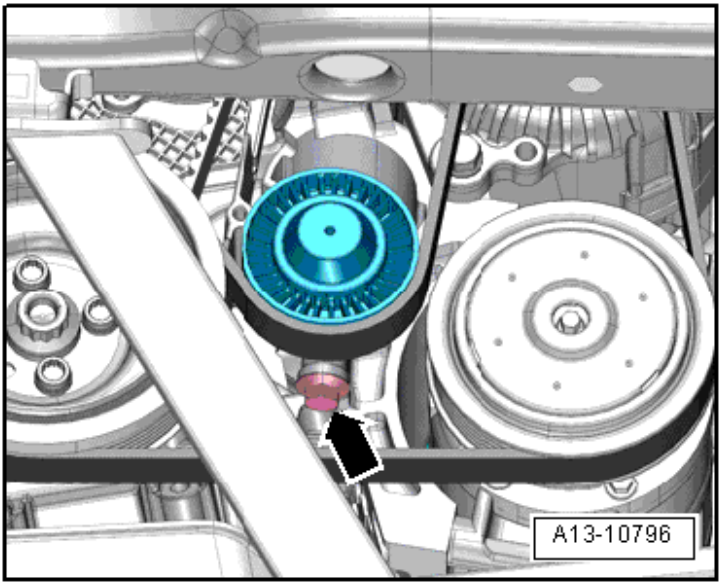
Accessory Assembly Bracket - Tightening Specifications and Tightening Sequence



Tighten the auxiliary component bracket bolts in 2 steps in the following sequence: -1 through 6-:

Item	Bolt	Nm
1 and 2	M10 x 52	
5 and 6	M10 x 60	
3 and 4	M10 x 30	
Stage		
1	1 through 6	Install the bolts all the way in by hand.
2	1 through 6	40
3	3 and 4	Tighten 45° additional turn
4	1, 2, 5 and 6	Tighten 90° additional turn.

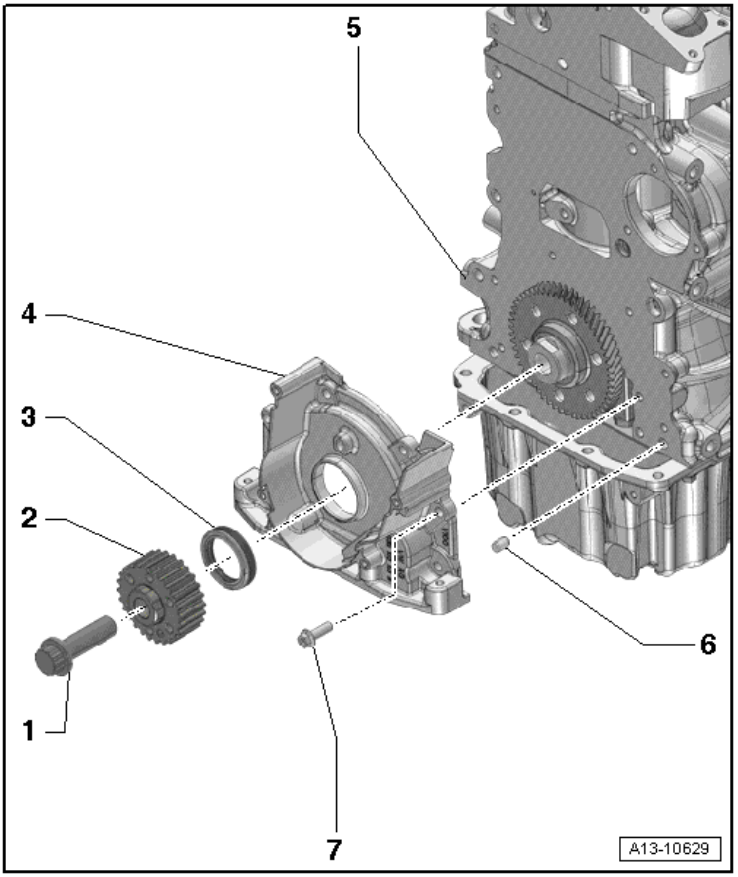
Ribbed Belt Tensioning Roller - Tightening Specification and Sequence



Tighten the bolt in five steps:

Stage	Bolt	Nm
1	-arrow-	Install the bolts all the way in by hand.
2	-arrow-	Turn until the tensioning roller bolt is all the way in.
3	-arrow-	Loosen 90°
4	-arrow-	30 Nm
5	-arrow-	Tighten 90° additional turn

Sealing Flange - Belt Pulley Side Overview



1 - Bolt
- ☐ 120 Nm + 90° turn
- ☐ Replace after removing

2 - Crankshafts - Toothed Belt Gear

3 - Seal
- ☐ Do not lubricate or grease the sealing lip on the seal

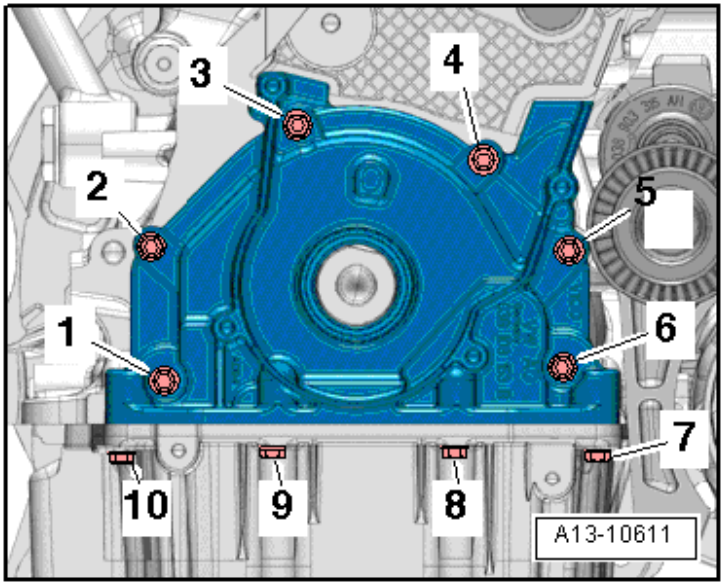
4 - Sealing Flange

5 - Cylinder Block

6 - Alignment Pin

7 - Bolt
- ☐ Tightening specification and sequence, see below

Ribbed Belt Pulley Side Sealing Flange - Tightening Specifications and Sequence

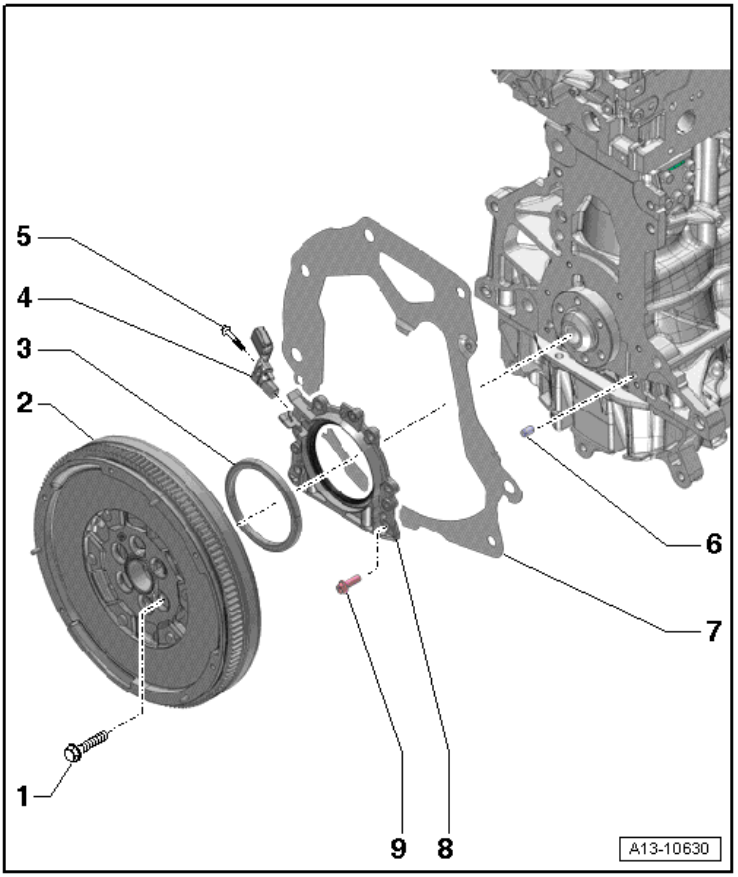


Tighten the bolts in three steps and in the sequence shown:

Stage	Bolt	Nm
1	-1 to 10-	Install the bolts all the way in by hand
2	-1 to 6-	Diagonally in steps at least to 15 Nm
3	-7 to 10-	15 Nm

Cylinder Block Overview, Transmission Side

Dual mass flywheel and sealing flange.

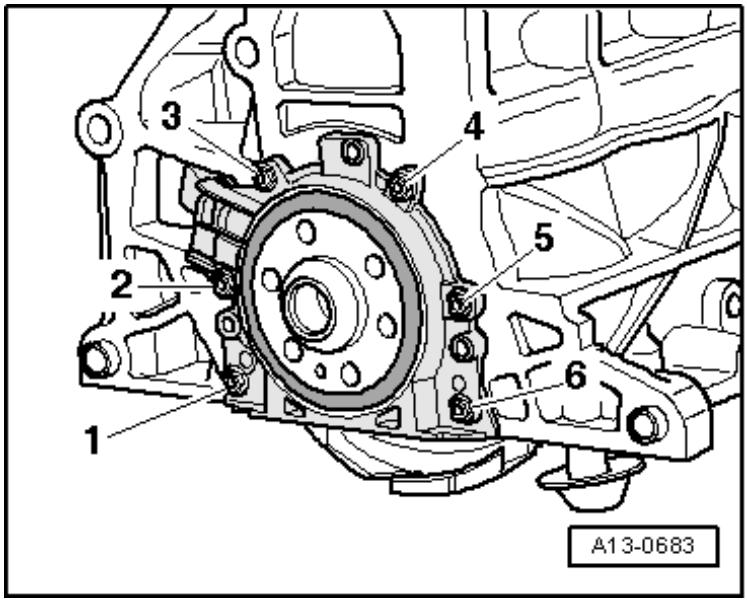


1 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

2 - Dual Mass Flywheel
3 - Sensor Wheel
4 - Engine Speed Sensor -G28-
5 - Bolt
- ☐ 5 Nm

6 - Alignment Pin
7 - Intermediate Plate
8 - Flywheel Side Sealing Flange
9 - Bolt
- ☐ Tightening specification and sequence, see below.

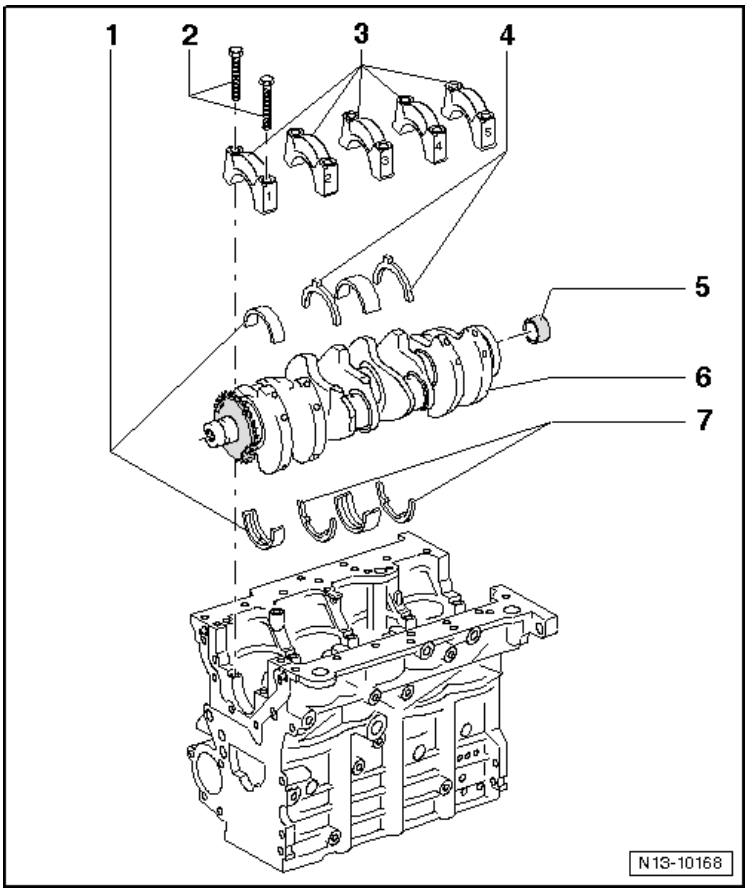
Flywheel Side Sealing Flange - Tightening Specifications and Sequence



Tighten the bolts in two steps in the sequence shown.

Stage	Bolt	Nm
1	-1 through 6-	Install the bolts all the way in by hand
2	-1 through 6-	Diagonally in steps at least to 15 Nm

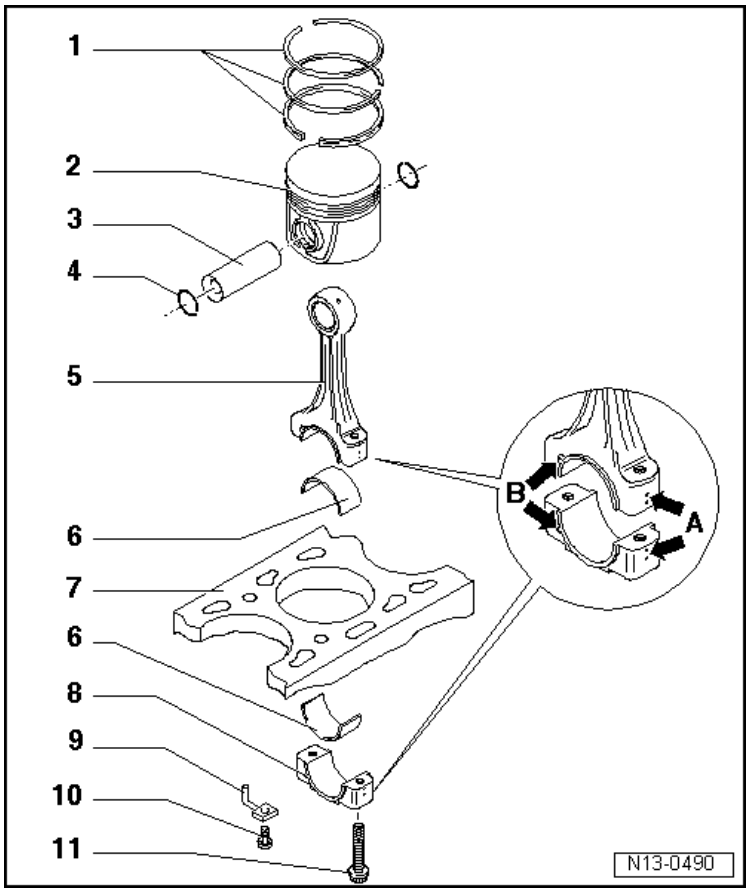
Crankshaft Overview



1 - Bearing Shell
2 - Bolt
- ☐ 65 Nm + 90° turn
- ☐ Replace after removing

3 - Bearing Cap
4 - Thrust Washer
5 - Needle Bearing
6 - Crankshaft
7 - Thrust Washer

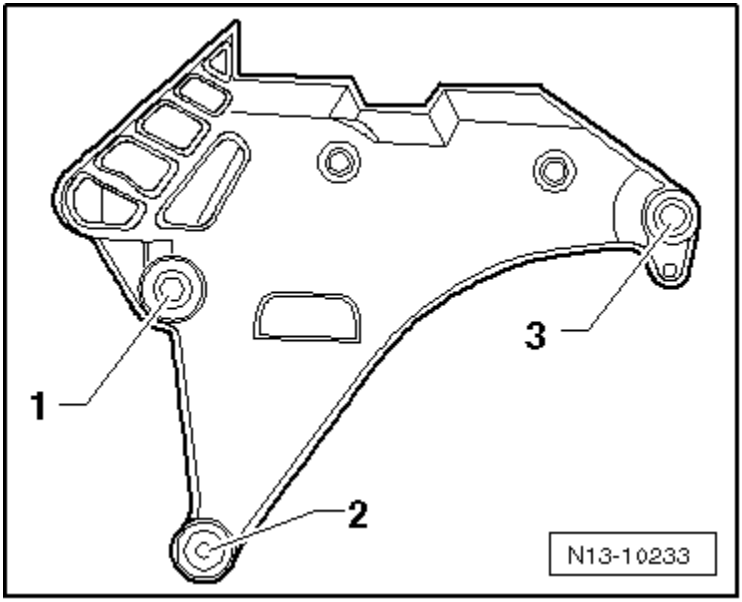
Pistons and Connecting Rods Overview



1 - Piston Rings
2 - Piston
3 - Piston Pin
4 - Locking Ring
5 - Connecting Rod
6 - Bearing Shell
7 - Cylinder Block
8 - Connecting Rod Bearing Cap
9 - Oil Spray Jet
10 - Bolt
- ☐ 25 Nm
- ☐ Install without sealant

11 - Connecting Rod Bolt
- ☐ 30 Nm + 90° turn
- ☐ Replace after removing
- ☐ Lubricate the thread and contact surface.

Engine Mount Bracket Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 3 in sequence [1]	7
2	Tighten bolts 1 through 3 in sequence	40
3	Tighten bolts 1 through 3 in sequence	an additional 180° (½ turn)

[1] Replace fastener(s).

Sealing Flange (Transmission Side) Bolt Crankshaft Dimensions

Honing dimension in mm	Crankshaft bearing pin diameter		Connecting rod bearing pin diameter	
Basic dimension	54.000	-0.022	50.900	-0.022
		-0.042		-0.042

Piston and Cylinder Dimensions

Honing dimension in mm	Piston diameter [1]	Cylinder bore diameter
Basic dimension	80.96	81.01

[1] Measurement with coating (thickness = 0.02 mm). The coating wears off.

Piston Ring End Gaps

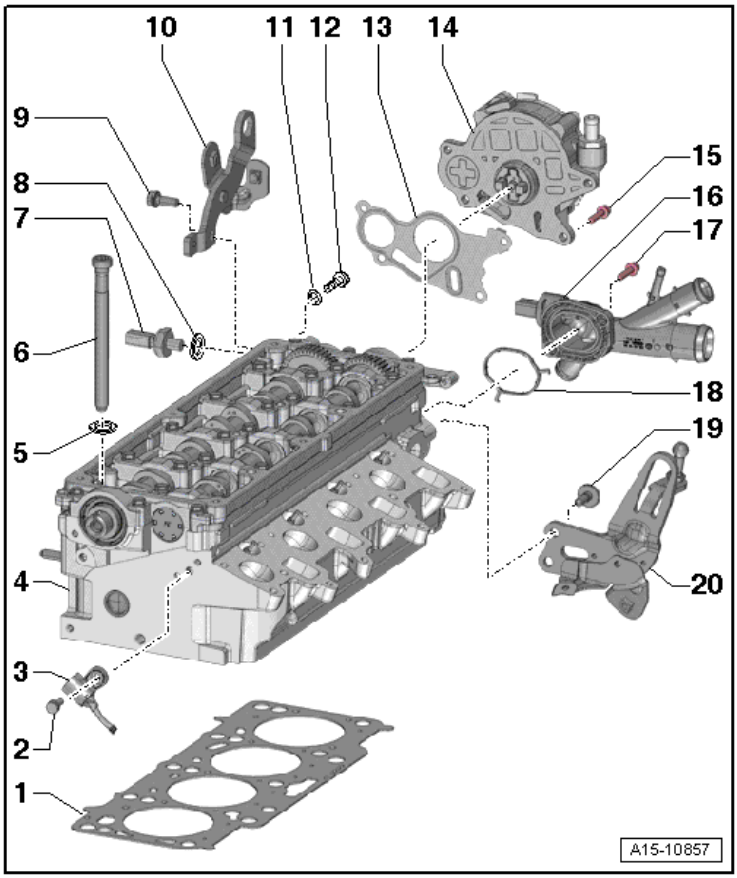
Piston ring gap dimensions in mm	New	Wear limit
1st compression ring	0.20 to 0.40	1.0
2nd compression ring	0.20 to 0.40	1.0
Oil scraping ring	0.25 to 0.50	1.0

Piston Ring Clearance

Piston ring to groove clearance dimensions in mm	New	Wear limit
1st compression ring	0.06 to 0.09	0.25
2nd compression ring	0.05 to 0.08	0.25
Oil scraping ring	0.03 to 0.06	0.15

Cylinder Head, Valvetrain – 2.0L CJAA (TDI)

Cylinder Head Overview



1 - Piston Rings
2 - Bolt
- ☐ 10 Nm

3 - Camshaft Position Sensor -G40-
4 - Cylinder Head
5 - Washer
6 - Cylinder Head Bolt
- ☐ Replace

7 - Oil Pressure Switch -F1-
- ☐ 20 Nm

8 - Seal
- ☐ Replace

9 - Bolt
- ☐ 20Nm

10 - Engine Lifting Eye
11 - Seal
- ☐ Replace

12 - Bolt
- ☐ 20 Nm

13 - Seal
- ☐ Replace

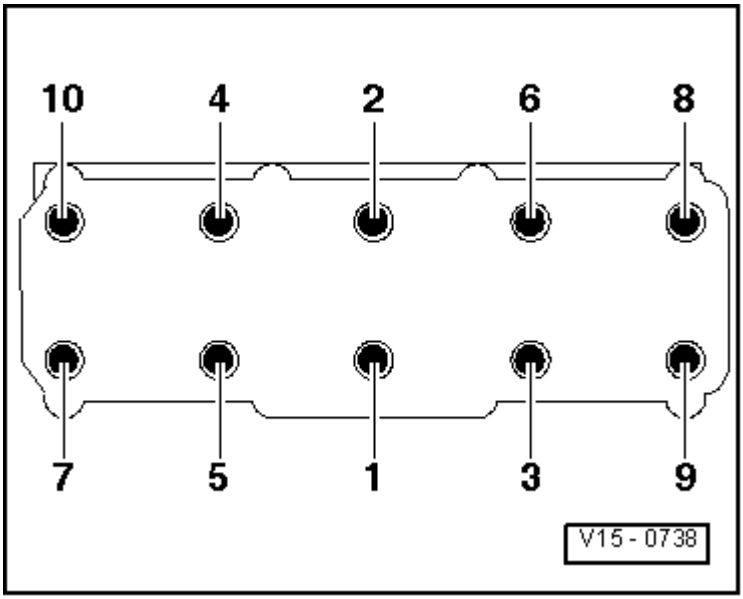
14 - Vacuum Pump
15 - Bolt
- ☐ 10 Nm

16 - Connecting Piece
17 - Bolt
- ☐ 9 Nm

18 - Connecting Piece
19 - Bolt
- ☐ 20 Nm

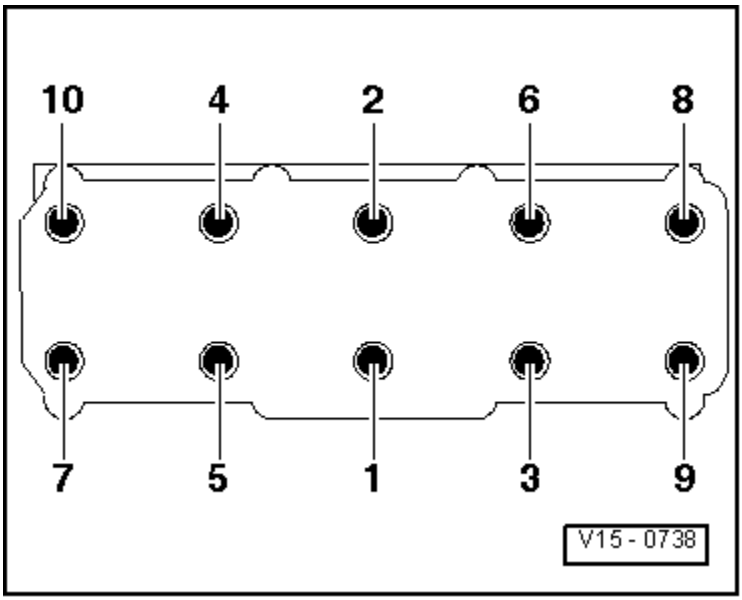
20 - Engine Lifting Eye

Cylinder Head Loosening Specifications



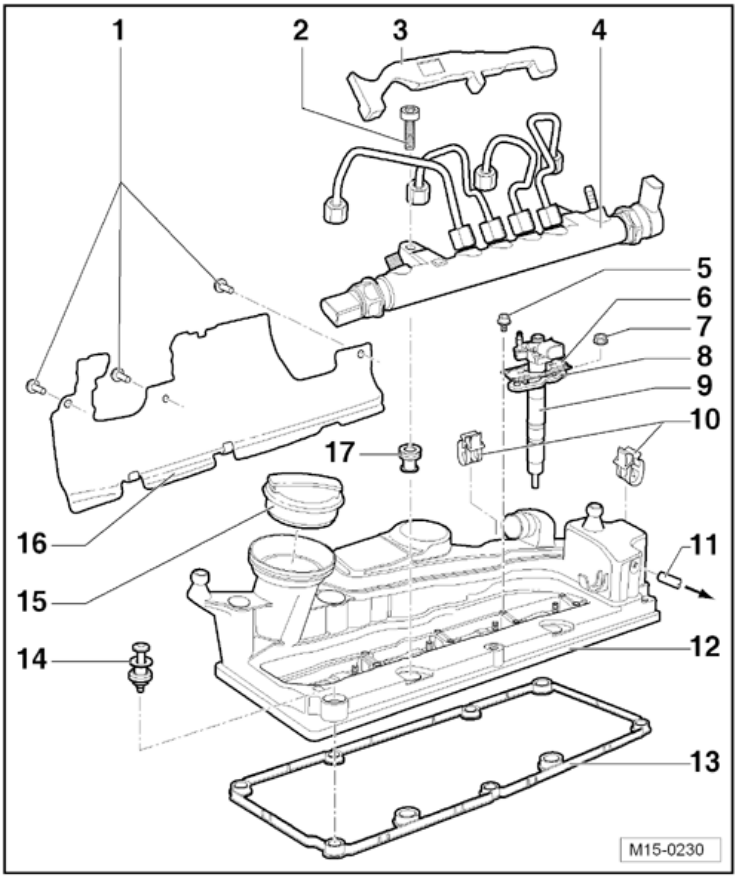
Loosen bolts 1 through 10 in sequence.

Cylinder Head Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 10 in sequence	30
2	Tighten bolts 1 through 10 in sequence	50
3	Tighten bolts 1 through 10 in sequence	an additional 90° (¼ turn)
4	Tighten bolts 1 through 10 in sequence	an additional 90° (¼ turn)

Cylinder Head Cover Overview



1 - Bolt
- ☐ 5 Nm

2 - Bolt
- ☐ 22 Nm

3 - Protective Strip

4 - Rail Element (High Pressure Reservoir)

5 - Bolt
- ☐ 5 Nm

6 - Injection Unit Cover

7 - Bolt
- ☐ 10 Nm

8 - Tension Clamp
- ☐ Replace

9 - Fuel Injector (Injector)

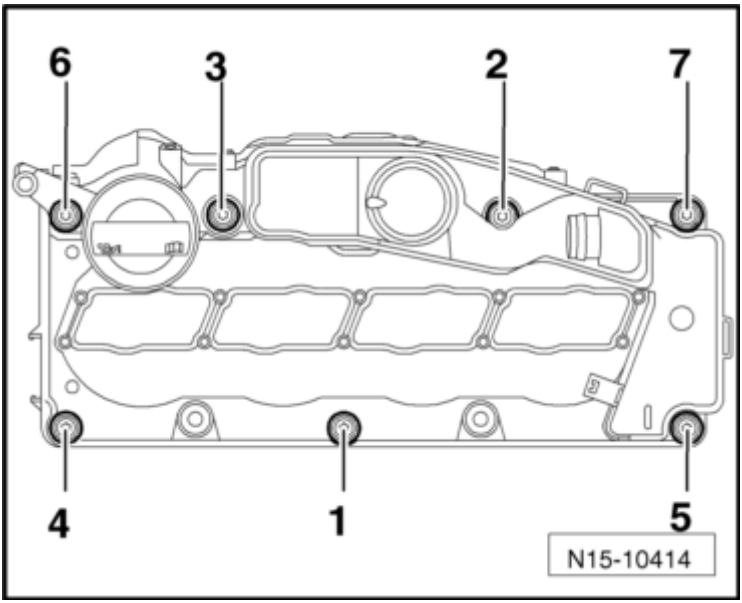
10 - Bracket

11 - Vacuum Hose

12 - Cylinder Head Cover
13 - Seal
14 - Bolt
- ☐ Tightening specification and sequence, see below.

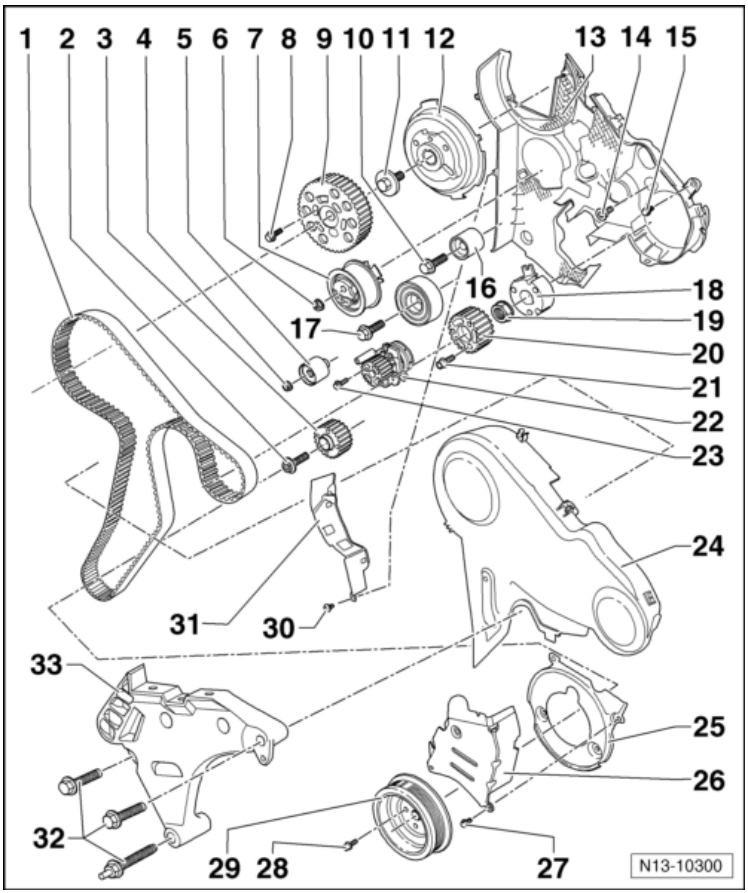
15 - Cover
16 - Heat Shield
17 - Bushing

Cylinder Head Cover Tightening Specification



Step	Component	Nm
1	Tighten bolts 1 through 7 in sequence	9

Toothed Belt Overview



1 - Toothed Belt
2 - Bolt
- ☐ 120 Nm + 90° turn
- ☐ Replace after removing

3 - Crankshafts - Toothed Belt Gear
4 - Bolt
- ☐ 20 Nm

5 - Idler Roller
6 - Bolt
- ☐ 20 Nm + 45° turn

7 - Tensioning Roller
8 - Bolt
- ☐ 20 Nm + 45° turn

9 - Camshaft Sprocket
10 - Bolt
- ☐ 20 Nm

11 - Bolt
- ☐ 100 Nm

12 - Hub

13 - Rear Toothed Belt Cover

14 - Bolt
- ☐ 20 Nm

15 - Bolt
- ☐ 10 Nm
- ☐ Replace after removing

16 - Idler Roller

17 - Bolt
- ☐ 50 Nm + 90° turn
- ☐ Replace after removing

18 - Hub

19 - Bolt
- ☐ 95 Nm

20 - Toothed Belt Gear for the High Pressure Pump

21 - Bolt
- ☐ 20 Nm

22 - Coolant Pump

23 - Bolt
- ☐ 15 Nm

24 - Toothed Belt Cover Upper Section

25 - Toothed Belt Cover Lower Section

26 - Toothed Belt Cover Center Section

27 - Bolt
- ☐ 10 Nm
- ☐ Replace after removing

28 - Bolt
- ☐ 10 Nm + 90° turn
- ☐ Replace after removing

29 - Belt Pulley/Vibration Damper

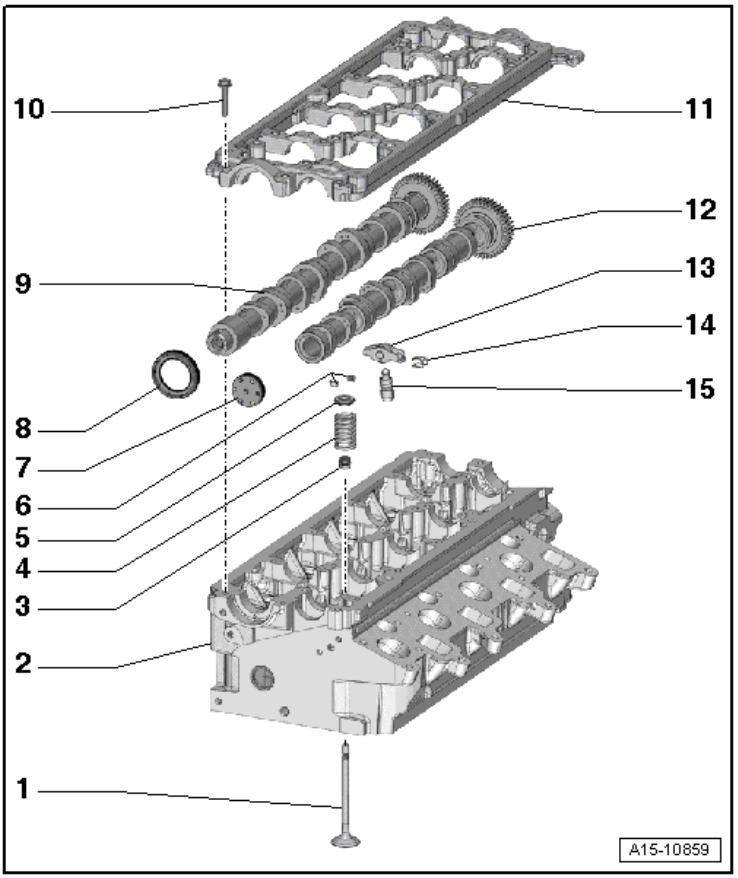
30 - Bolt
- ☐ 5 Nm

31 - Shield

32 - Bolt
- ☐ 40 Nm + 180° turn
- ☐ Replace after removing

33 - Engine/Transmission Support

Valvetrain Overview

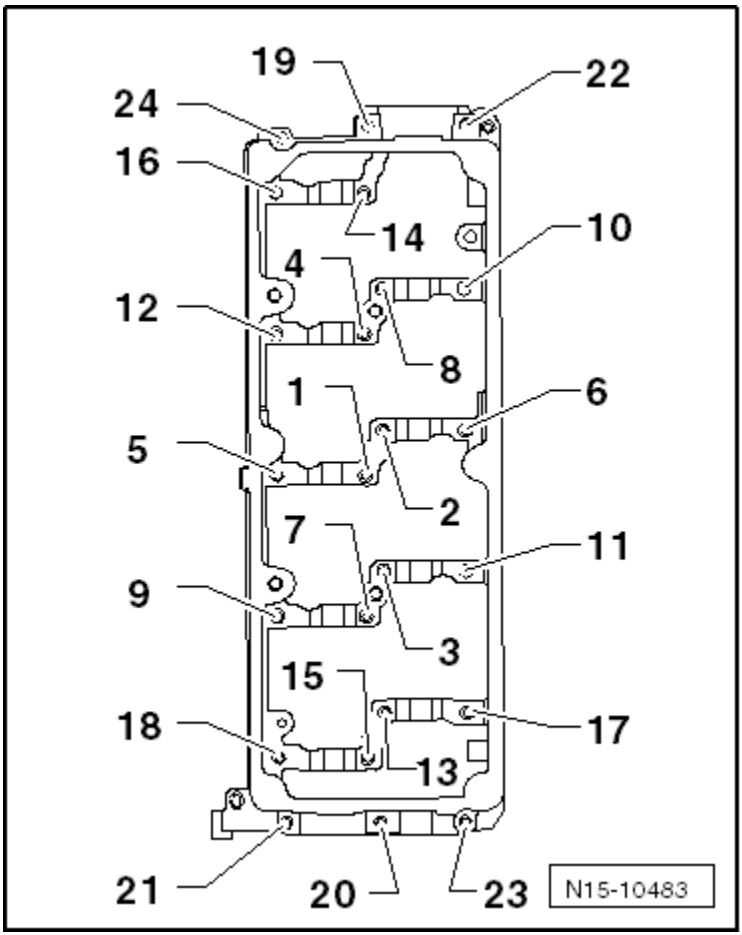


1 - Valve
2 - Cylinder Head
3 - ve Stem Seal
4 - Valve Spring
5 - Valve Spring Retainer
6 - Valve Retainers
7 - Cover
- ☐ Replace

8 - Shaft Seal
9 - Exhaust Camshaft
10 - Bolt
- ☐ Tightening specification and sequence, see below.

11 - Guide Frame
12 - Intake Camshaft
13 - Roller Rocker Lever
14 - Clip
15 - Hydraulic Adjusting Element

Bearing Frame Tightening Specifications



Step	Component	Nm
1	Tighten bolts and nuts 1 through 24 in sequence [1]	Hand-tighten
2	Tighten bolts and nuts 1 through 24 in sequence	10

[1] The guide frame must be in contact with the entire contact surface of the cylinder head.

Fastener Tightening Specifications

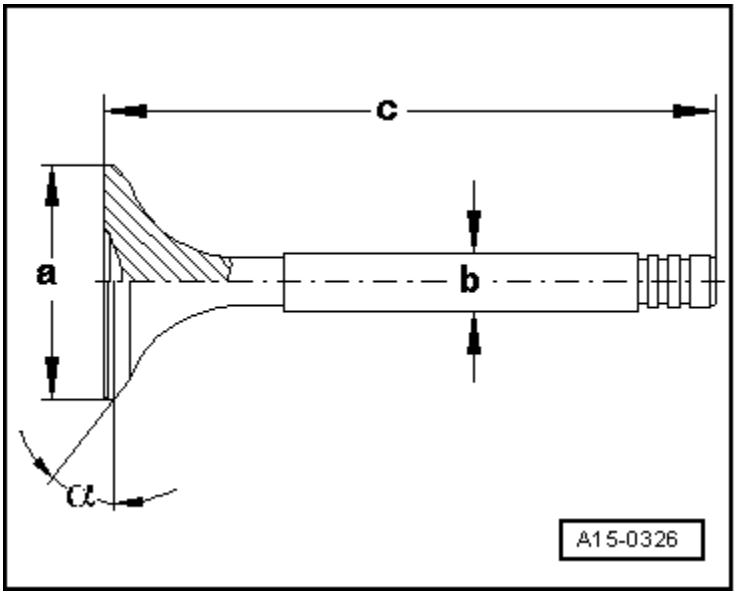
Component	Nm
High pressure line clamp screw	8
Tensioning bracket-to-cylinder head cover/cylinder head bolt [1]	8 plus an additional 180° (½ turn)
Toothed belt idler roller-to-cylinder block nut	20

Fastener Tightening Specifications *(cont'd)*

Component	Nm
Vacuum pump-to-cylinder head bolt	10
Vibration damper-to-crankshaft bolt [1]	10 plus an additional 90° (¼ turn)

[1] Replace fastener(s).

Valve Dimensions



Dimension		Intake valve	Exhaust valve
Diameter a	mm	28.10	26.00
Diameter b	mm	5.975	5.965
c	mm	99.30	99.10
α	∠°	45	45

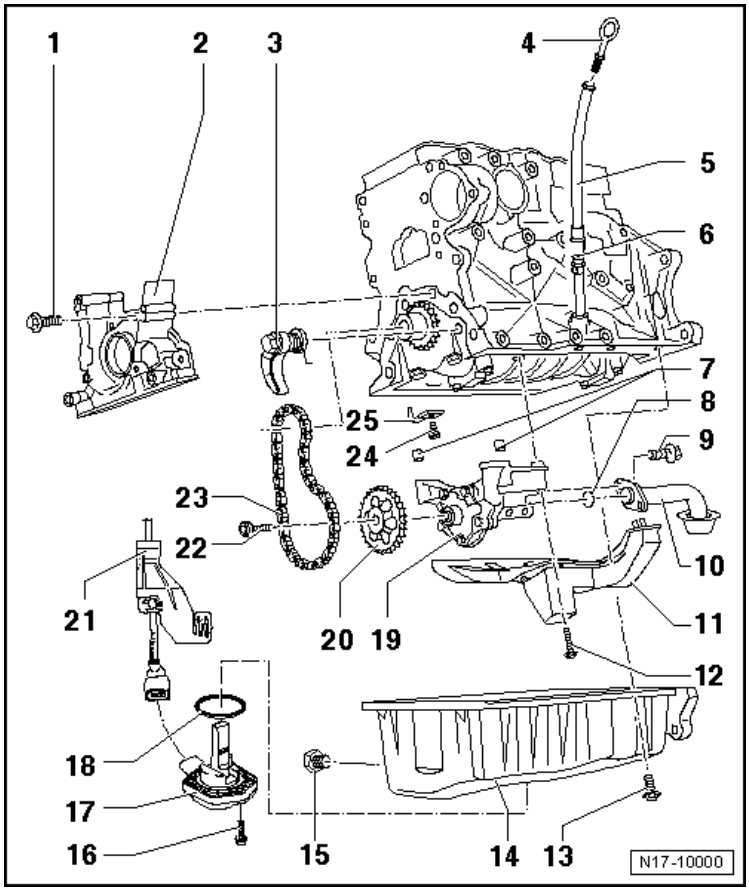
NOTE: Intake and exhaust valves must not be refaced by grinding. Only lapping is permitted.

Compression Pressures

New Bar positive pressure	Wear limit Bar positive pressure	Difference between cylinders Bar positive pressure
25.0 to 31.0	19.0	Maximum 5.0

Lubrication – 2.0L CJAA (TDI)

Oil Pan/Oil Pump Overview



1 - Bolt
- ☐ 15 Nm

2 - Sealing Flange

3 - Chain Tensioner with Tensioning Rail
- ☐ 15 Nm

4 - Oil Dipstick

5 - Funnel

6 - Guide Tube

7 - Alignment Sleeves

8 - O-ring

9 - Bolt
- ☐ 15 Nm

10 - Intake Line

11 - Splash Wall

Oil Pan/Oil Pump Overview *(cont'd)*

12 - Bolt
- ☐ 15 Nm

13 - Bolt
- ☐ 15 Nm

14 - Oil Pan

15 - Oil Drain Plug
- ☐ 30 Nm
- ☐ Replace after removing

16 - Bolt
- ☐ 10 Nm

17 - Oil Level Thermal Sensor -G266-

18 - Seal

19 - Oil Pump

20 - Chain Sprocket for Oil Pump

21 - Bracket

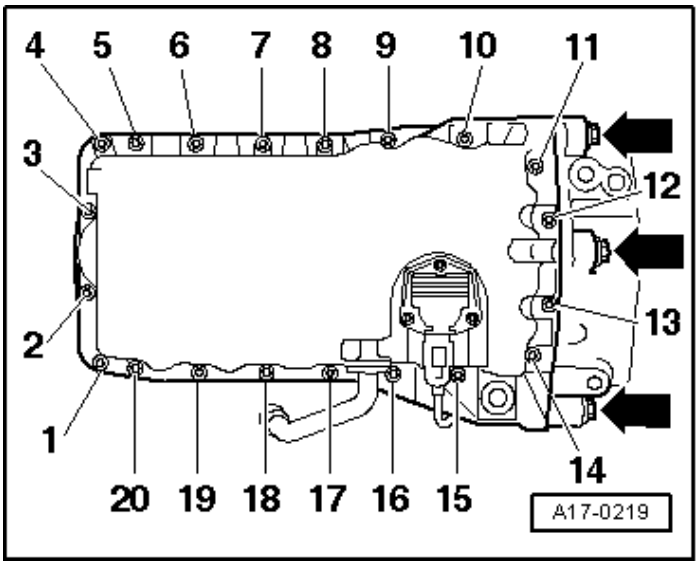
22 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

23 - Chain

24 - Bolt
- ☐ 25 Nm
- ☐ Install without sealant

25 - Oil Spray Jet Bolt
- ☐ 27 Nm

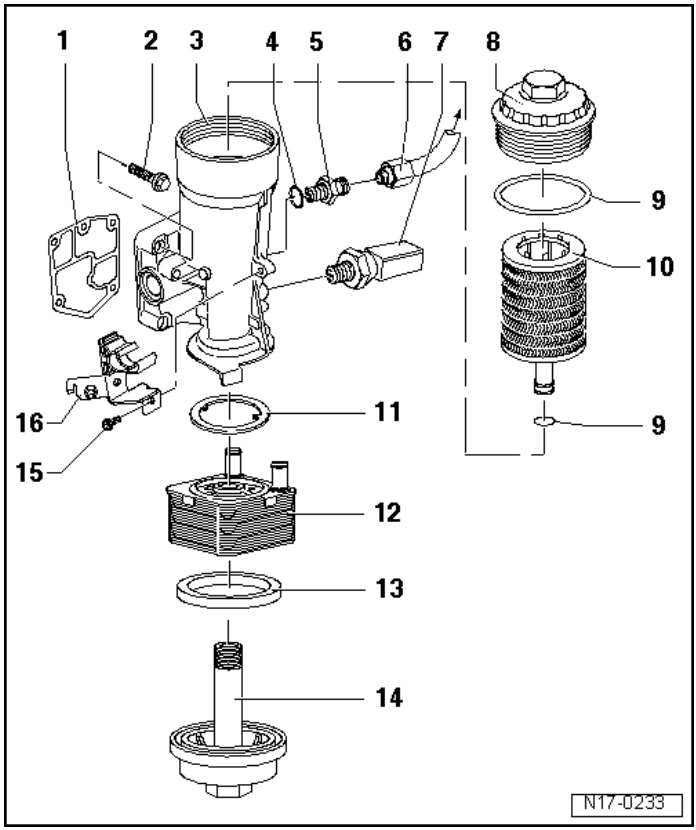
Oil Pan Bolt Tightening Sequence and Specification



Note: Replace the oil pan bolts. Tighten the bolt in 3 steps:

Step	Bolts	Nm
1	-1 through 20-	Tighten to 5 Nm, in a diagonal sequence
2	-Arrows-	Tighten to 40 Nm
3	-1 through 20-	Tighten to 15 Nm, diagonally and in steps

Oil Filter Housing/Oil Pressure Switch Overview



1 - Seal
- ☐ Replace after removing

2 - Bolt
- ☐ 15 Nm + 90° turn
- ☐ Replace after removing

3 - Oil Filter Housing
- ☐ Tightening specification and sequence, see below.

4 - Seal
- ☐ Replace after removing

5 - Connecting Piece
- ☐ 30 Nm

6 - Oil Supply Line
- ☐ 22 Nm

7 - Oil Pressure Switch -F1-
- ☐ 22 Nm

8 - Cover
- ☐ 25 Nm

9 - O-ring

10 - Oil Filter

11 - Seal

- ☐ Replace after removing

12 - Engine Oil Cooler

13 - Seal

- ☐ Replace after removing

14 - Sealing Plug

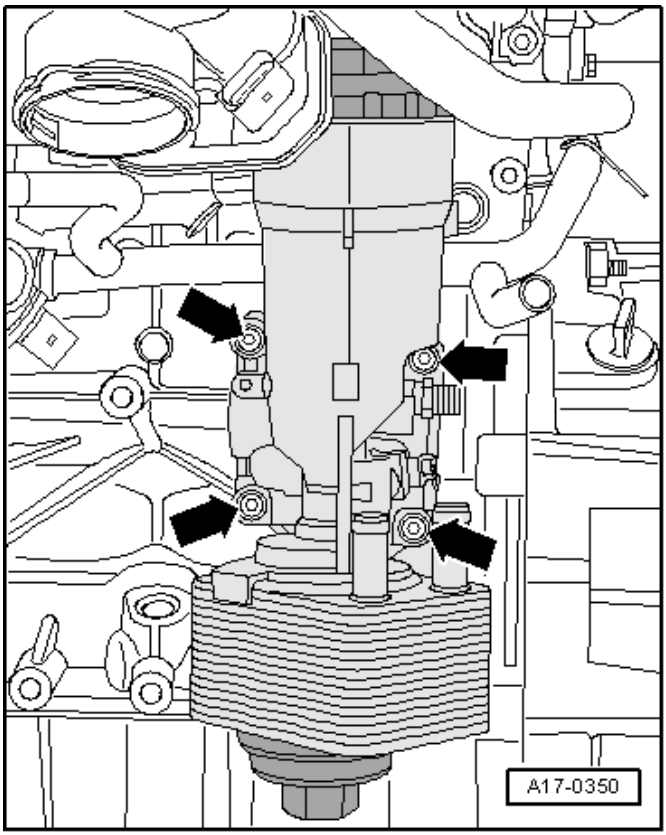
- ☐ 25 Nm

15 - Bolt

- ☐ 10 Nm

16 - Bracket

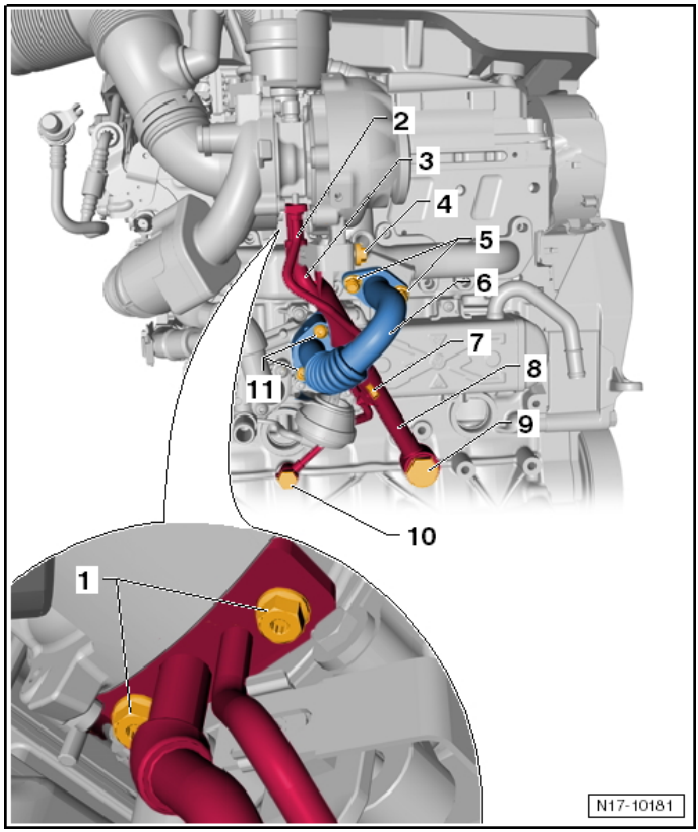
Oil Filter Housing Tightening Sequence and Tightening Specifications



Tighten the bolt in two steps:

Step	Bolts	Tightening specification/rotation angle
1	-Arrows-	In a diagonal sequence, to 14 Nm
2	-Arrows-	In a diagonal sequence, turn an additional 90°

Oil Circuit Overview



1 - Bolt
- ☐ 20 Nm

2 - Oil Supply Line

3 - Oil Return Line

4 - Bolt
- ☐ 25 Nm

5 - Bolt
- ☐ 20 Nm
- ☐ Replace

6 - Connecting Pipe to EGR Cooler

7 - Bolt
- ☐ 10 Nm

8 - Support

9 - Banjo Bolt
- ☐ 60 Nm
- ☐ Replace
- ☐ Replace Seals

10 - Banjo Bolt

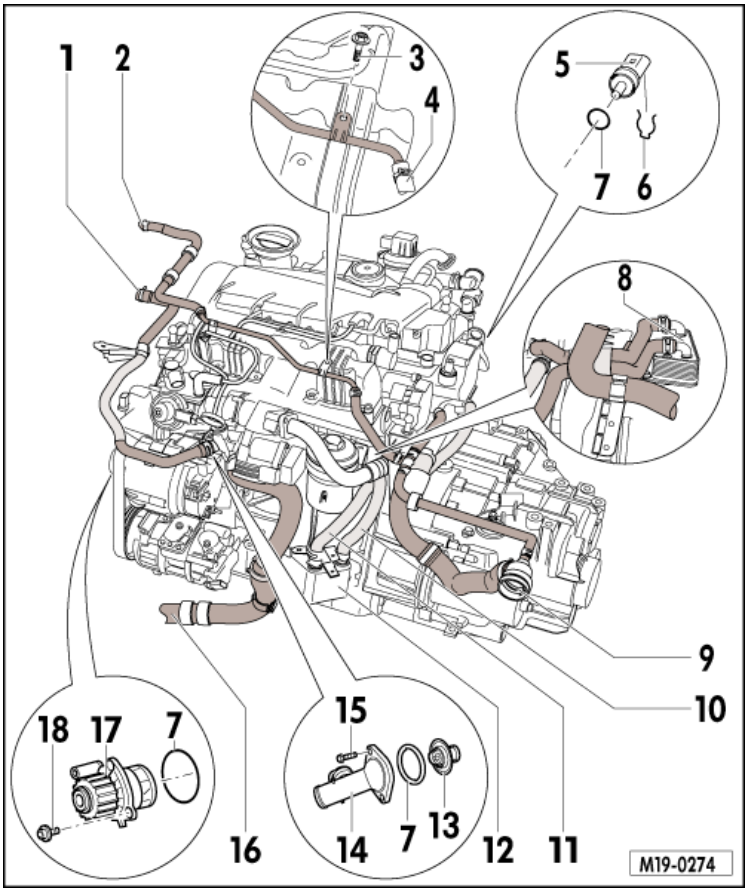
- ☐ 30 Nm
- ☐ Replace
- ☐ Replace Seals

11 - Bolt

- ☐ 10 Nm

Cooling System – 2.0L CJAA (TDI)

Coolant System Component Location, Front, without Engine Pre-Warmer



1 - Lower Coolant Reservoir Hose
2 - Upper Coolant Reservoir Hose
3 - Bolt
- ☐ 10 Nm

4 - Ventilation Pipe
5 - Engine Coolant Temperature Sensor -G62-
6 - Clamp
7 - O-ring
8 - Transmission Fluid Cooler
- ☐ On vehicles without a transmission fluid cooler

9 - To Upper Radiator

10 - Engine Oil Cooler Coolant Supply Hose

- ☐ On vehicles without a transmission fluid cooler
- ☐ **Transmission oil cooler coolant return line**
- ☐ On vehicles with a transmission oil cooler

11 - Engine Oil Cooler Coolant Return Hose

12 - Engine Oil Cooler

13 - Thermostat/4/2-Way Valve with Thermostat

14 - Connecting Piece

15 - Bolt

- ☐ 15 Nm

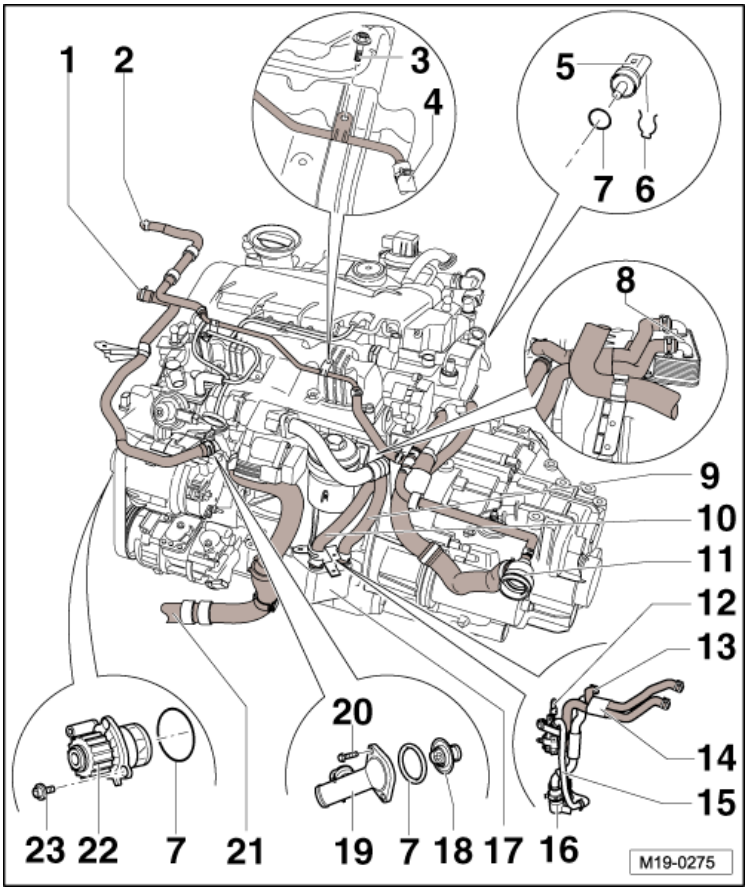
16 - Hose to the Lower Radiator

17 - Coolant Pump

18 - Bolt

- ☐ 40 Nm

Coolant System Component Location, Front, with Engine Pre-Warmer



1 - Lower Coolant Reservoir Hose
2 - Upper Coolant Reservoir Hose
3 - Bolt
- ☐ 10 Nm

4 - Ventilation Pipe
5 - Engine Coolant Temperature Sensor -G62-
6 - Clamp
7 - O-ring
- ☐ Replace after removing

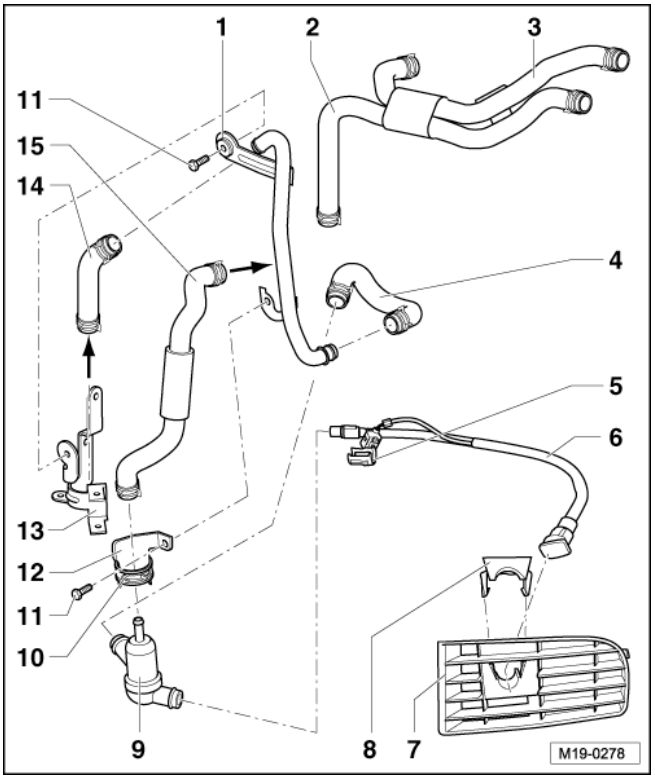
8 - Transmission Fluid Cooler
- ☐ Only on vehicles with the dual clutch transmission

9 - Engine Oil Cooler Coolant Supply Hose
- ☐ On vehicles without a transmission fluid cooler
- ☐ **Transmission oil cooler coolant return line**
- ☐ On vehicles with a transmission oil cooler

10 - Engine Oil Cooler Coolant Return Hose
11 - To the Upper Radiator
12 - Bracket for Wiring Harness and Coolant Pipe
13 - Coolant Hose
14 - Coolant Hoses
15 - Coolant Pipe
16 - Engine Preheater
17 - Engine Oil Cooler
18 - Coolant Thermostat
19 - Connecting Piece
20 - Bolt
- ☐ 15 Nm

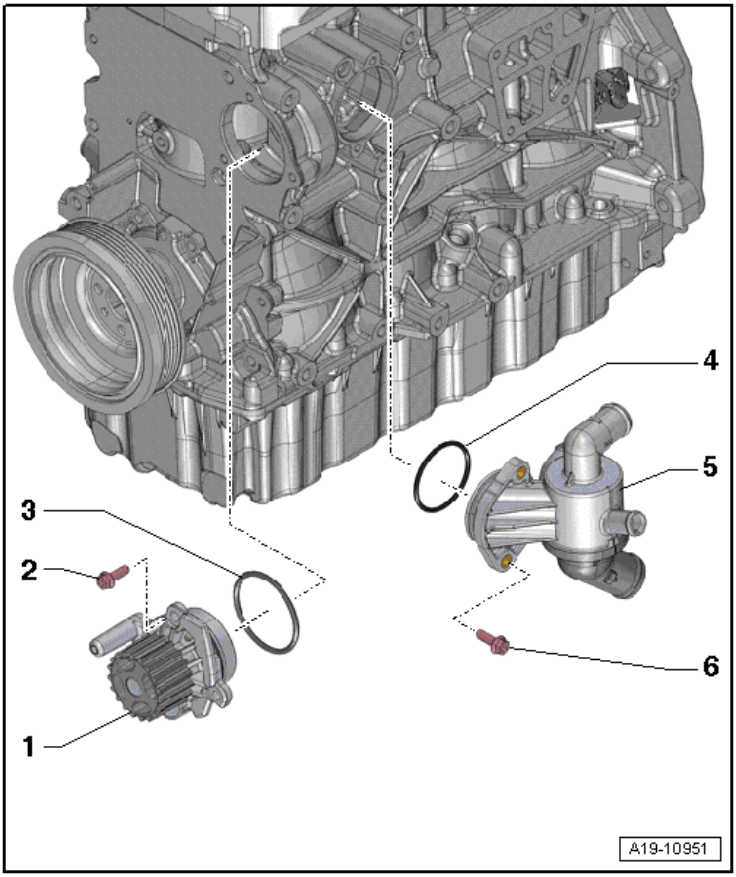
21 - Hose to the Lower Radiator
22 - Coolant Pump
23 - Bolt
- ☐ 40 Nm

Engine Pre-Warmer Overview



1 - Engine Preheater for Coolant Pipe
2 - Coolant Hose from the Cylinder Block Connection to the Transmission Oil Cooler
3 - Coolant Hose from the Transmission Oil Cooler to the Engine Oil Cooler
4 - Coolant Hose from the Engine Preheater Coolant Pipe to the Engine Pre-Warmer
5 - Retainer
6 - External Power Supply Connecting Wire
7 - Left Vent Grille
8 - Bracket
9 - Engine Preheater
10 - Engine Preheater Clamp
11 - Bolt
☐ 10 Nm
12 - Line Preheater Bracket
13 - Bracket for Wiring Harness and Coolant Pipe
11 - Coolant Hose from the Engine Oil Cooler to the Engine Preheater Coolant Pipe
15 - Coolant Hose from the Engine Preheater to the Coolant Hose on the Cylinder Block

Coolant Pump/Thermostat Overview



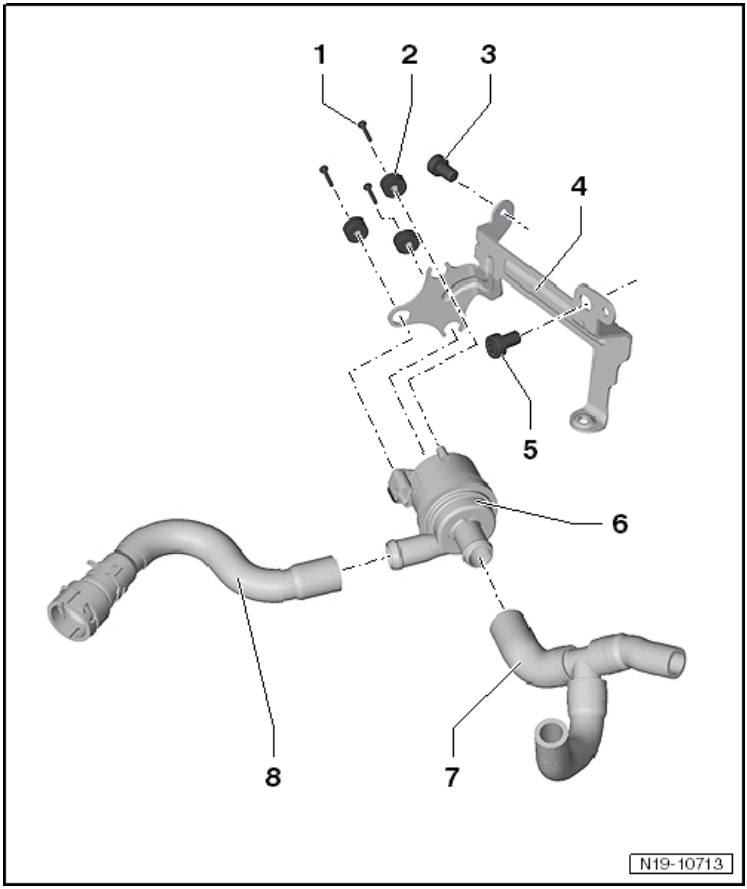
1 - Coolant Pump
2 - Bolt
- ☐ 15 Nm

3 - O-ring
- ☐ Replace

4 - O-ring
- ☐ Replace

5 - 4/2-Way Valve with Thermostat
6 - Bolt
- ☐ 15 Nm

Engine Coolant Circulation Pump 2 -V178- Overview



1 - Bolt
- ☐ 1.5 Nm

2 - Rubber Grommet with Sleeve

3 - Bolt
- ☐ 8 Nm
- ☐ M6 x 12

4 - Bracket

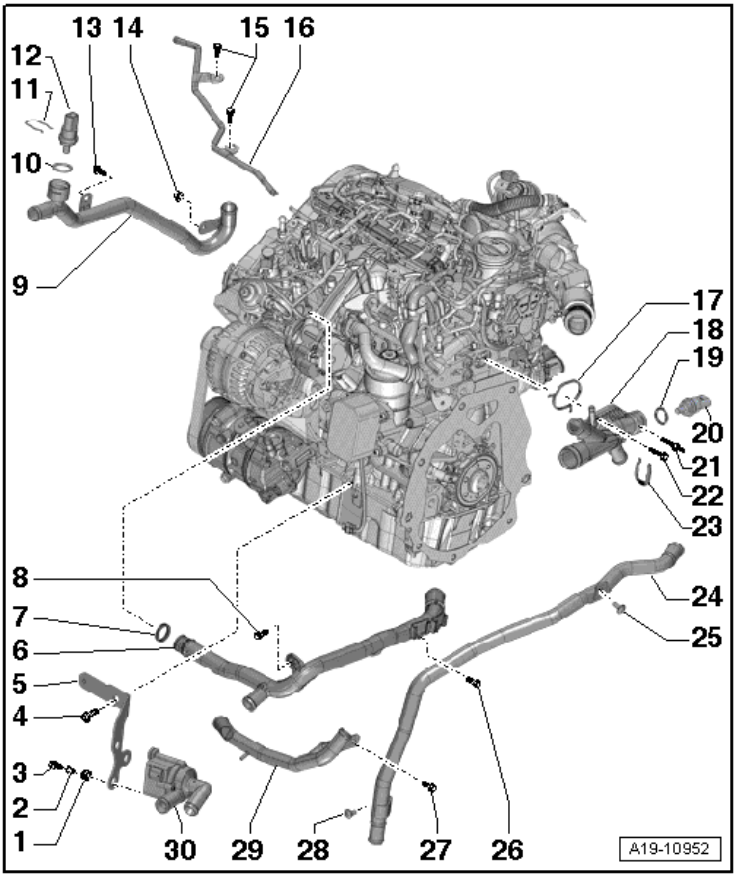
5 - Bolt
- ☐ 40 Nm

6 - Engine Coolant Circulation Pump 2 -V178-

7 - Coolant Hose

8 - Coolant Hose

Coolant Pipes Overview



1 - Grommet
2 - Sleeve
3 - Bolt
- ☐ 2.7 Nm

4 - Bolt
- ☐ 40 Nm

5 - Bracket
6 - Front Coolant Pipe
7 - O-ring
- ☐ Replace

8 - Bolt
- ☐ 8 Nm

9 - Right Coolant Pipe
10 - O-ring
- ☐ Replace

11 - Clamp
12 - Engine Coolant Temperature Sensor on Radiator Outlet -G83-

Coolant Pipes Overview *(cont'd)*

13 - Bolt
- ☐ 9 Nm

14 - Bolt
- ☐ 9Nm

15 - Bolt
- ☐ 9 Nm

16 - Coolant Line

17 - Seal
- ☐ Replace

18 - Connecting Piece

19 - O-ring
- ☐ Replace

20 - Engine Coolant Temperature Sensor -G62-

21 - Double Bolt
- ☐ 9 Nm

22 - Bolt
- ☐ 9 Nm

23 - Clamp

24 - Left Coolant Pipe

25 - Bolt
- ☐ 9 Nm

26 - Bolt
- ☐ 9 Nm

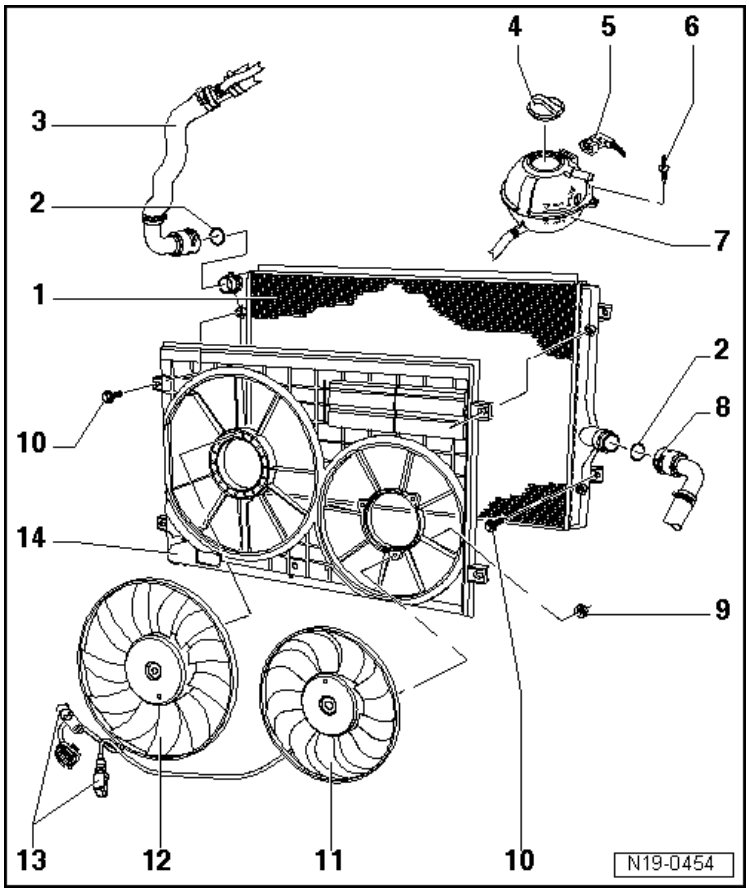
27 - Bolt
- ☐ 9 Nm

28 - Bolt
- ☐ 13 Nm

29 - Front Upper Coolant Pipe

30 - Engine Coolant Circulation Pump 2 -V178-

Radiator/Coolant Fan Overview



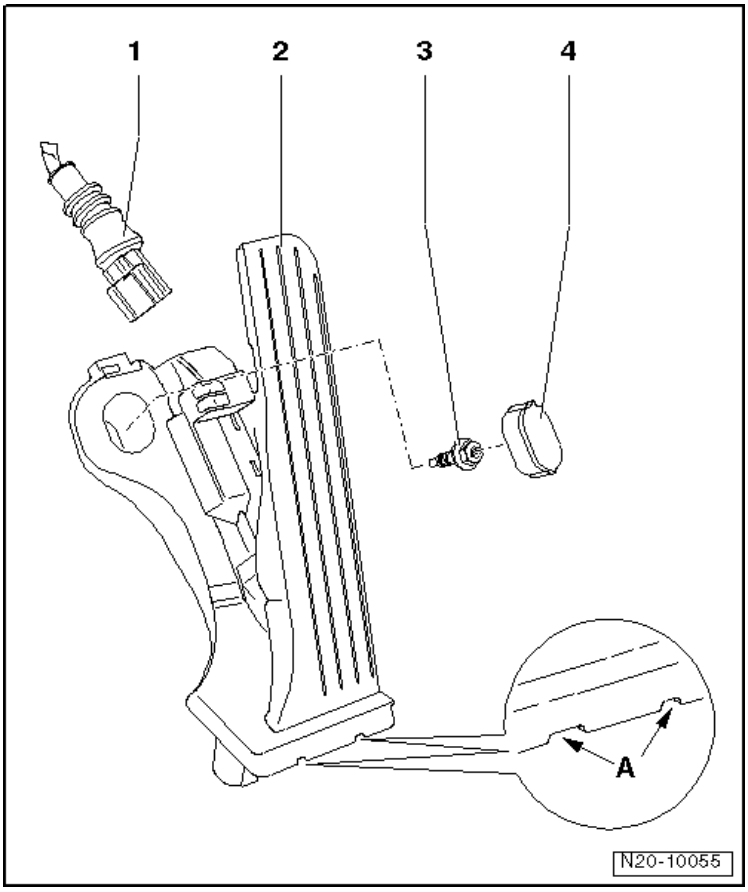
1 - Radiator
2 - O-ring
3 - Upper Coolant Hose
4 - Cover
5 - Connector
6 - Connecting Pipe to EGR Cooler
7 - Coolant Reservoir
8 - Lower Coolant Hose
9 - Bolt
- ☐ 5 Nm

10 - Bolt
- ☐ 5 Nm

11 - Coolant Fan 2 -V177-
12 - Coolant Fan -V7-
13 - Connector
14 - Fan Shroud

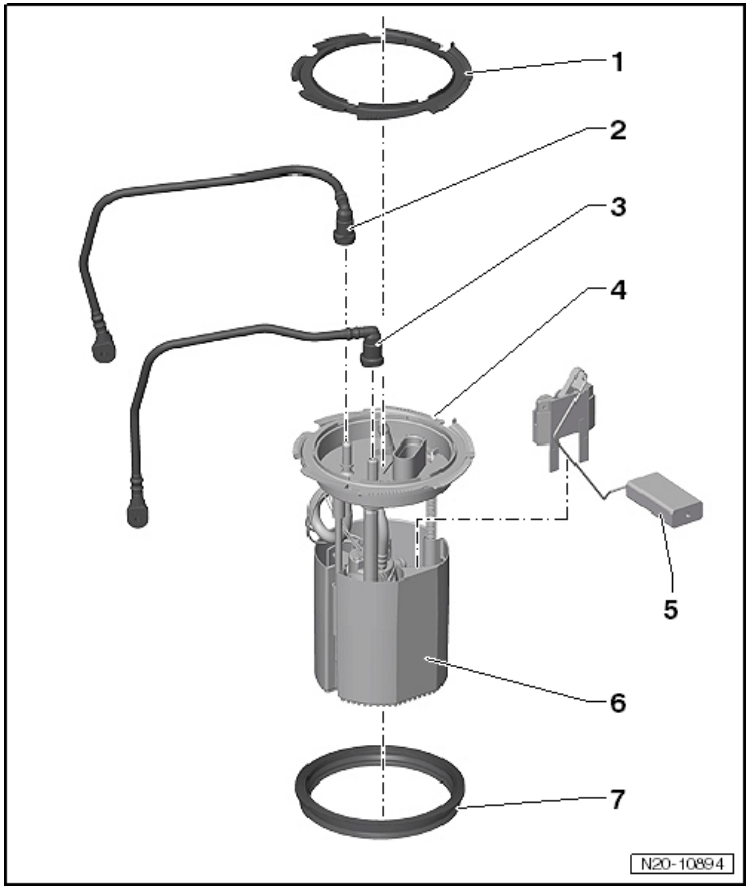
Fuel Supply – 2.0L CJAA (TDI)

Accelerator Pedal Mechanism Overview



1 - Connector
2 - Accelerator Pedal Module
3 - Bolt
☐ 10
4 - Cap

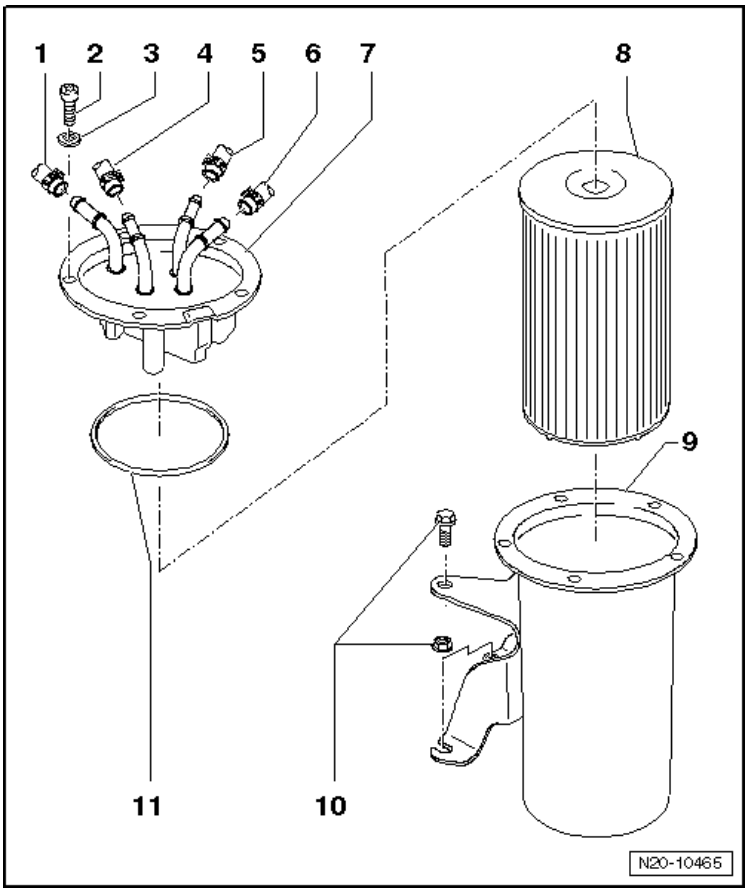
Radiator/Coolant Fan Overview



1 - Locking Ring
- ☐ 110 Nm

2 - Supply Line
3 - Return Line
4 - Flange
5 - Fuel Level Sensor -G-
6 - Fuel Delivery Unit
7 - Seal
- ☐ Replace

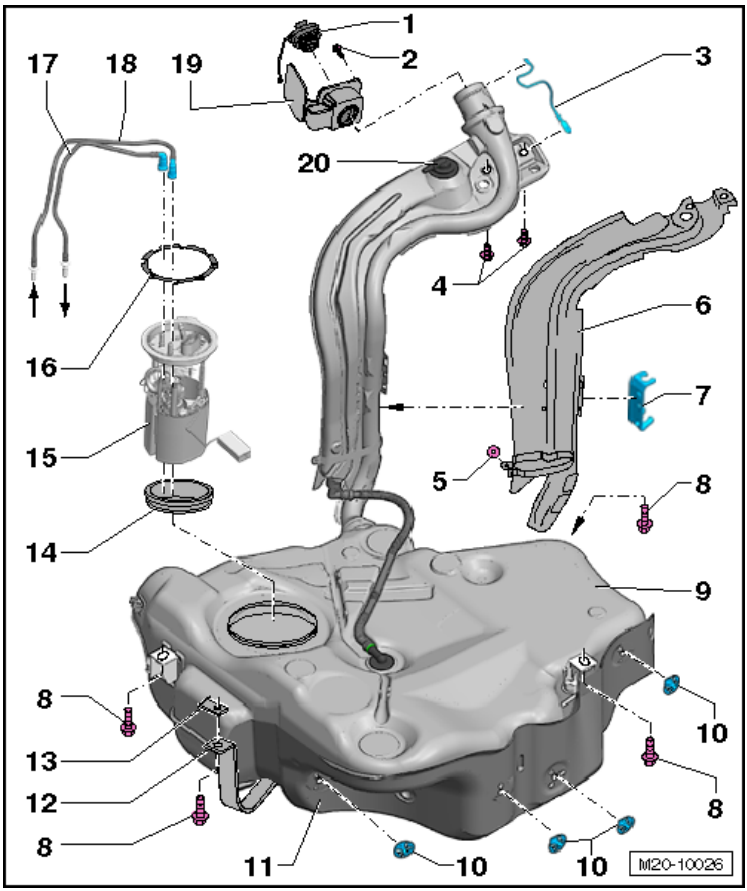
Fuel Filter Overview



1 - Fuel Line
2 - Bolt
- ☐ 5 Nm

3 - Washer
4 - Fuel Line
5 - Fuel Line
6 - Fuel Line
7 - Fuel Filter Upper Section
8 - Replacement Filter
9 - Fuel Filter Lower Part
10 - Bolt
- ☐ 10 Nm
- ☐ **11 - Seal**

Fuel Tank Overview



1 - Cap
2 - Bolt
- ☐ 1.5 Nm

3 - Ground Connection
4 - Bolt
- ☐ 10 Nm

5 - Rivet
6 - Protective Plate
7 - Wiring Router
8 - Bolt
- ☐ M6 8 Nm + 90° turn
- ☐ M8 20 Nm + 90° turn
- ☐ Replace after removing

9 - Fuel Tank
10 - Lock Washer
11 - Heat Shield
12 - Mounting Strap

13 - Suspended Mount
14 - Seal
15 - Fuel Delivery Unit
16 - Locking Ring
- ☐ 110 Nm

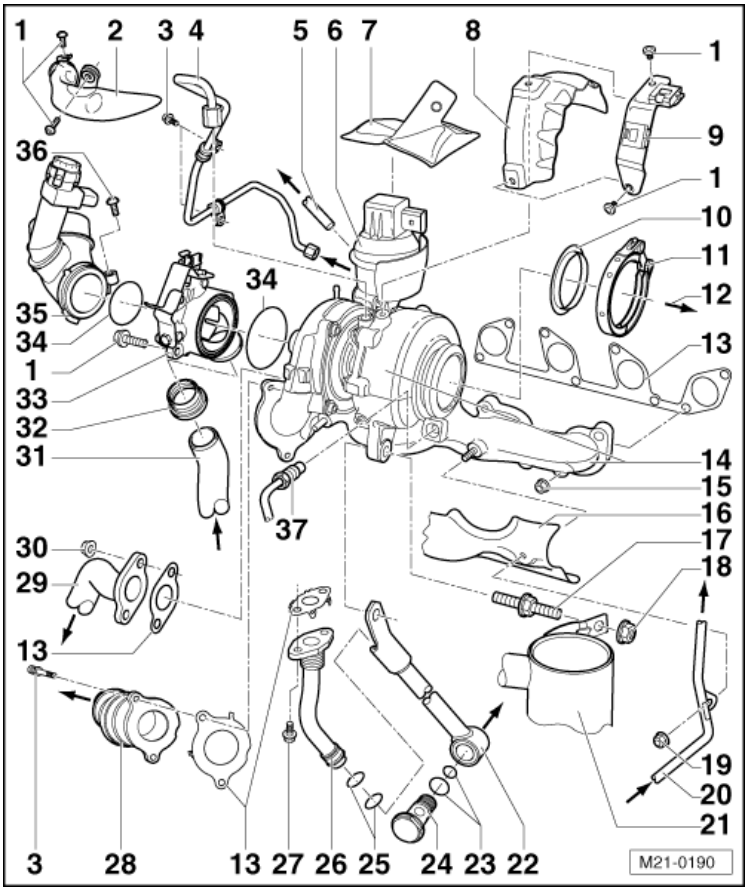
17 - Fuel Supply Line
18 - Fuel Return Line
19 - Fuel Filler Door Unit
20 - Ventilation

Fastener Tightening Specifications

Component	-	Nm
Auxiliary fuel pump	-	20
Differential pressure sensor	-	8

Turbocharger – 2.0L CJAA (TDI)

Turbocharger Overview



1 - Bolt
- ☐ 8 Nm

2 - Warm Air Collector Plate

3 - Bolt
- ☐ 10 Nm

4 - Oil Supply Line
- ☐ 22 Nm

5 - Vacuum Hose

6 - Vacuum Diaphragm

7 - Heat Shield

8 - Heat Shield

9 - Bracket

10 - Seal

11 - Securing Clamp
- ☐ 7 Nm

12 - To Particulate Filter
13 - Seal
14 - Turbocharger
15 - Nut
- ☐ 23 Nm
- ☐ Replace after removing
- ☐ Coat stud bolts on exhaust manifold with Hot Bolt Paste -G 052 112 A3-.

16 - Heat Shield
17 - Hex Stud
- ☐ 20 Nm

18 - Nut
- ☐ 23 Nm

19 - Nut
- ☐ 23 Nm

20 - Control Wire
- ☐ 23

21 - Filter
22 - Support
23 - Seal
- ☐ Replace

24 - Banjo Bolt
- ☐ 60 Nm
- ☐ Replace after removing

25 - O-ring
- ☐ Replace

26 - Oil Return Pipe
27 - Bolt
- ☐ 1.5

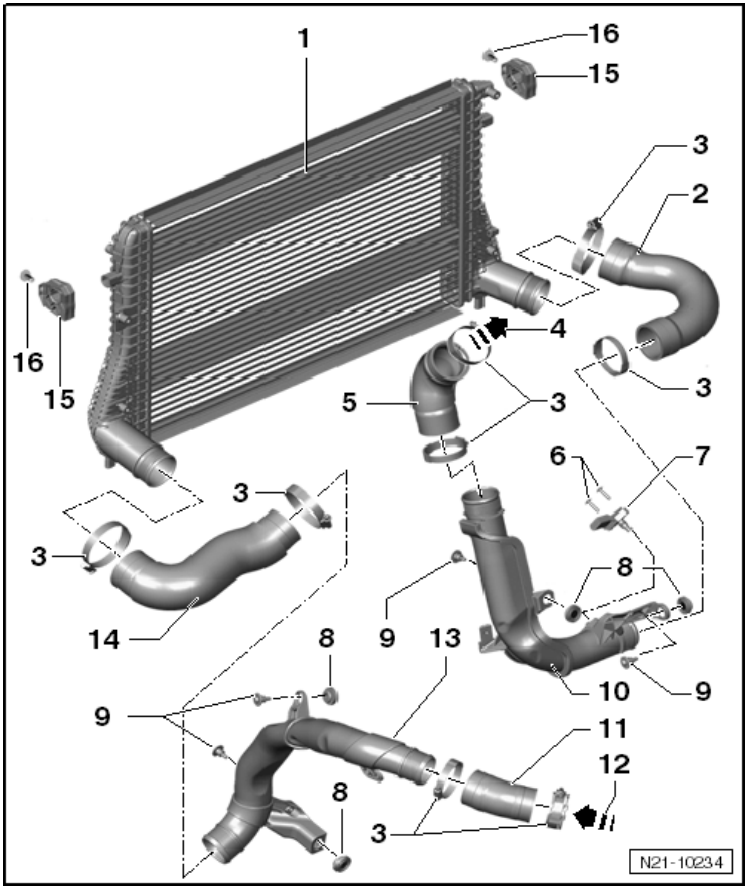
28 - Pulsation Damper
29 - Connecting Pipe
30 - Nut
- ☐ 20 Nm
- ☐ Coat stud bolts on exhaust manifold with Hot Bolt Paste -G 052 112 A3-.

31 - Connecting Pipe
32 - Seal
33 - Connecting Piece
34 - O-ring
- ☐ Replace

35 - Intake Scoop
36 - Bolt
- ☐ 8 Nm

37 - Exhaust Gas Temperature Sensor 1 -G235-
- ☐ 45 Nm

Charge Air System Overview



1 - Charge Air Cooler
2 - Connecting Hose
3 - Screw-Type Clamp
☐ 8 Nm
4 - To Throttle Valve Control Module -J338-
5 - Connecting Hose
6 - Bolt
☐ 5 Nm
7 - Charge Air Pressure Sensor -G31- with Intake Air Temperature (IAT) Sensor -G42-
8 - Rubber Grommet
9 - Bolt
☐ 10 Nm
10 - Charge Air Pipe
11 - Connecting Hose
12 - From Turbocharger
13 - Charge Air Pipe

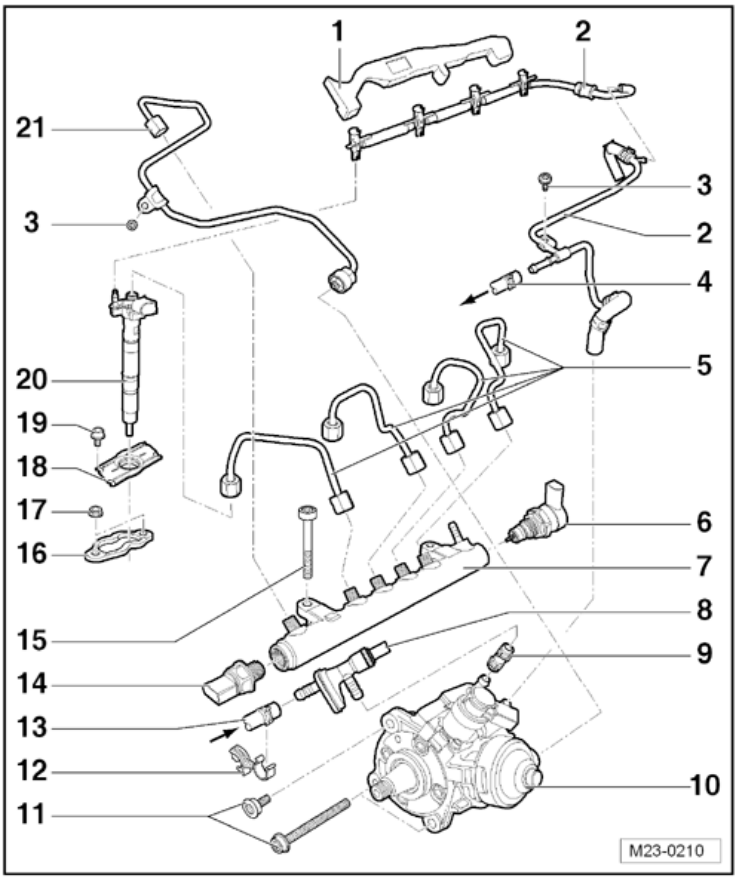
14 - Connecting Hose
15 - Bearings
16 - Bolt
- ☐ 10 Nm

Fastener Tightening Specifications

Component	Nm
Air intake elbow to cooler	5
Charge air cooler to lock carrier	7
Condenser to charge air cooler	5
Radiator to charge air cooler	5

Diesel Fuel Injection – 2.0L CJAA (TDI)

Fuel Injectors Overview



1 - Protective Strip
2 - Fuel Return Lines
3 - Bolt
- ☐ 8 Nm

4 - Fuel Return Line
5 - High-Pressure Lines
6 - Fuel Pressure Regulator Valve -N276-
7 - Rail Element (High Pressure Reservoir)
8 - Fuel Temperature Sensor -G81-
9 - Fuel Supply Line
10 - Fuel High Pressure Pump
11 - Bolt
- ☐ Tightening specifications, refer to High Pressure Pump

12 - Bracket
13 - Fuel Supply Line

14 - Fuel Pressure Sensor -G247-

- ☐ 22 Nm

15 - Bolt'

- ☐ 100 Nm

16 - Tension Clamp

- ☐ Replace after removing

17 - Nut

- ☐ 10 Nm

18 - Injection Unit Cover

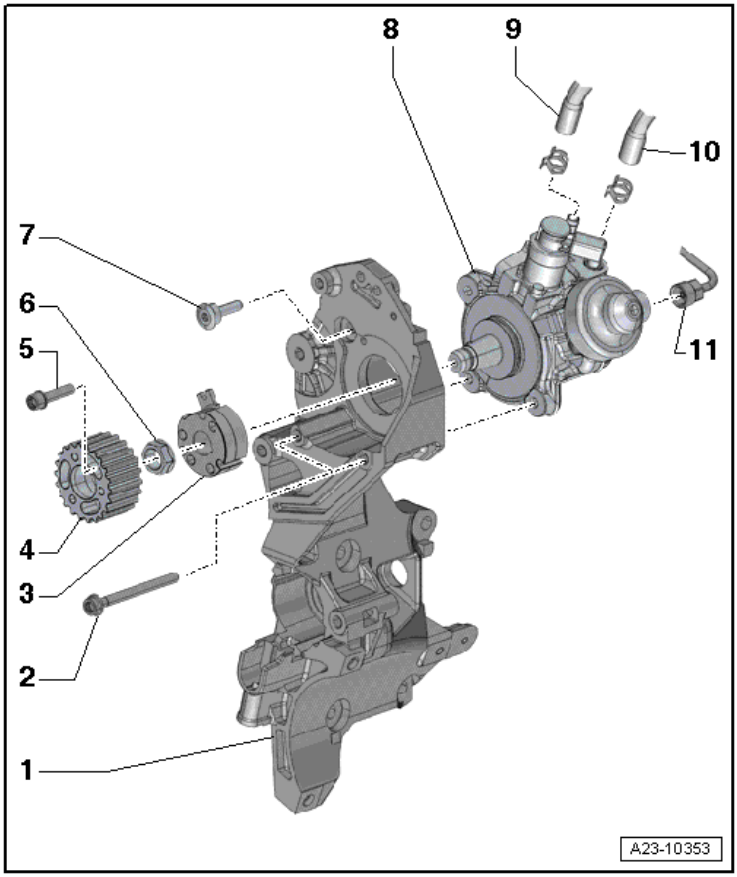
19 - Bolt

- ☐ 5 Nm

21 - Bolt

- ☐ 28 Nm

High Pressure Pump Overview



1 - Auxiliary Components Bracket
2 - Bolt
- ☐ 20 Nm + 180° turn

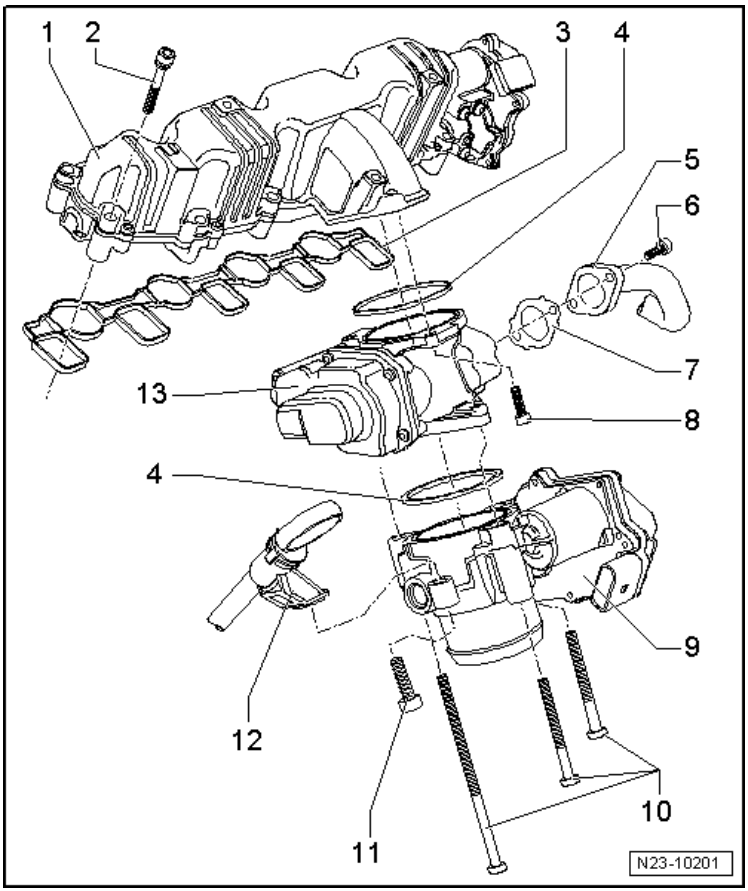
3 - Hub
4 - Toothed Belt Gear for the High Pressure Pump
5 - Bolt
- ☐ 20 Nm
- ☐ Replace after removing

6 - Nut
- ☐ 95 Nm

7 - Bolt
- ☐ 20 Nm + 45° turn
- ☐ Replace after removing

8 - High Pressure Pump
9 - Fuel Supply Hose
10 - Fuel Return Hose
11 - High-Pressure Lines

Charge Air System Overview



1 - Intake Manifold

2 - Bolt

- ☐ 8 Nm

3 - Seal

- ☐ Replace after removing

4 - Seal

- ☐ Replace after removing

5 - Connecting Pipe

- ☐ Connecting Pipe

6 - Bolt

- ☐ 20 Nm

7 - Seal

- ☐ Replace after removing

8 - Bolt

- ☐ 8 Nm

9 - Throttle Valve Control Module -J338-

10 - Bolt

- ☐ 8 Nm

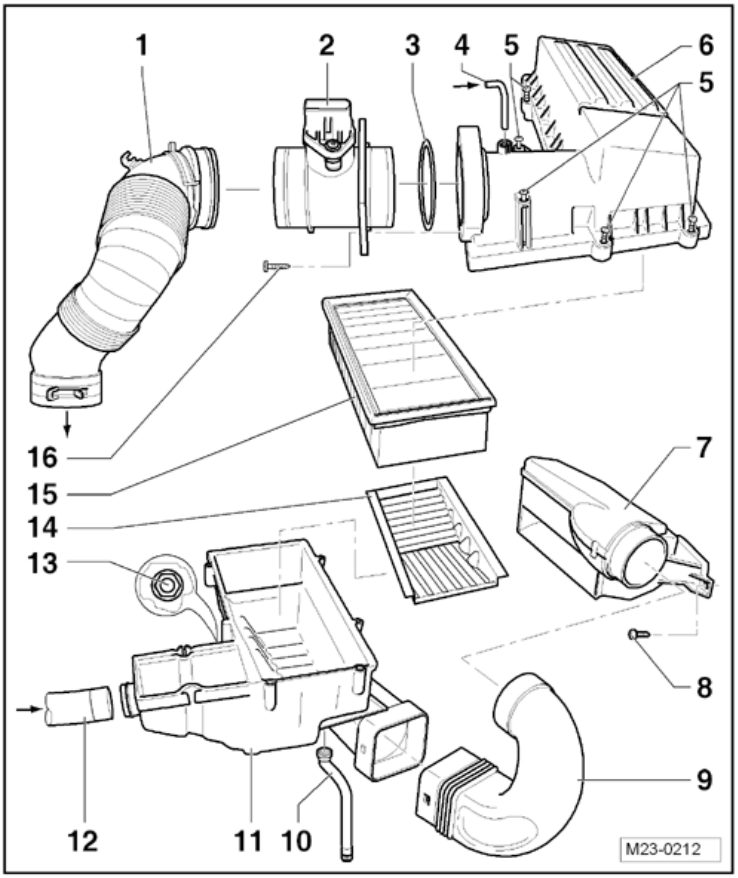
11 - Bolt

- ☐ 8 Nm

12 - Oil Dipstick

13 - EGR Vacuum Regulator Solenoid Valve -N18-

Air Filter Overview



1 - Intake Hose
2 - Mass Airflow Sensor -G70-
3 - O-ring
4 - Vacuum Hose
5 - Bolt
- ☐ 5 Nm

6 - Air Filter Housing Upper Section
7 - Intake Air Guide
8 - Bolt
- ☐ 2 Nm

9 - Air Guide Hose
10 - Water Drain Hose
11 - Air Filter Housing Lower Section
12 - Connecting Hose
13 - Bolt
- ☐ 8 Nm
- ☐ Permanent bolt

14 - Snow Screen
15 - Filter
16 - Bolt
- ☐ 3.5 Nm

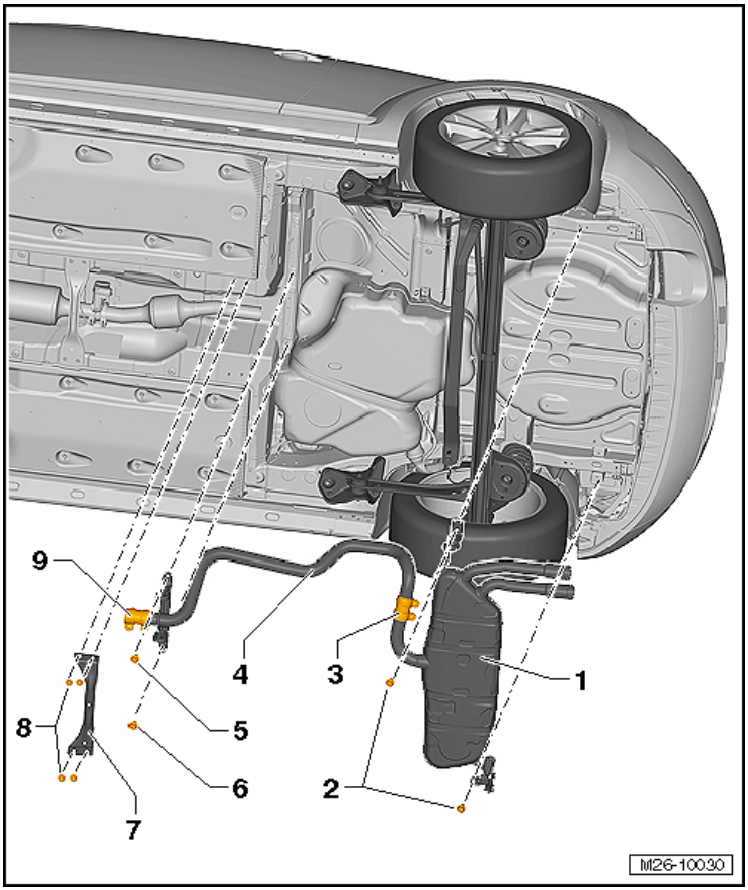
Fastener Tightening Specifications

Component	Nm
Bracket to auxiliary fuel pump	8
Differential pressure sensor	4
Fuel rail to cylinder head cover bolt	22
Fuel pressure regulator valve	80
High pressure fuel pump to cylinder block bolt	20
Oil dipstick	10
Oxygen sensor [1)]	50
Throttle valve control module to intake manifold	10

[1)] Only grease the threads with Hot Bolt Paste -G 052 112 A3-. Do not allow the Hot Bolt Paste -G 052 112 A3- to enter the slits on the sensor bod

Exhaust System, Emission Controls – 2.0L CJAA (TDI)

Muffler Overview, Sedan



1 - Rear Muffler
2 - Bolts
- ☐ 25 Nm

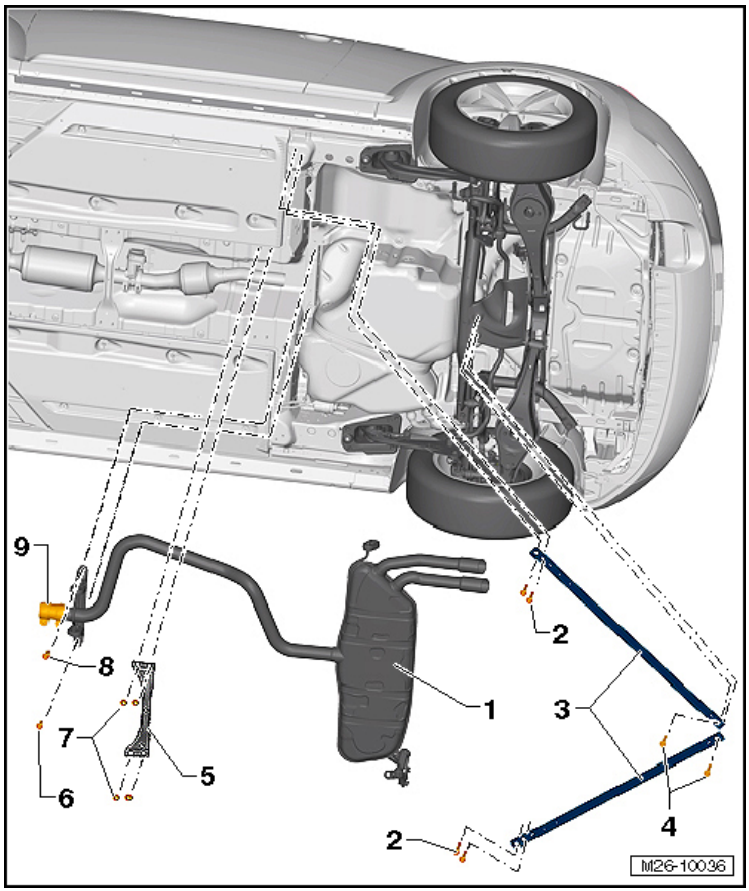
3 - Clamping Sleeve
4 - Connecting Pipe
5 - Bolt
- ☐ 25 Nm

6 - Bolts
- ☐ 25 Nm

7 - Tunnel Bridge
8 - Nuts
- ☐ For specification, refer to Body Exterior

9 - Clamping Sleeve

Muffler Overview, Convertible



1 - Rear Muffler
2 - Bolts
- ☐ For specifications, refer to Suspension, Wheels and Steering

3 - Crossbrace
- ☐ For specifications, refer to Suspension, Wheels and Steering

4 - Vacuum Hose
5 - Tunnel Bridge
- ☐ For specifications, refer to Body Exterior

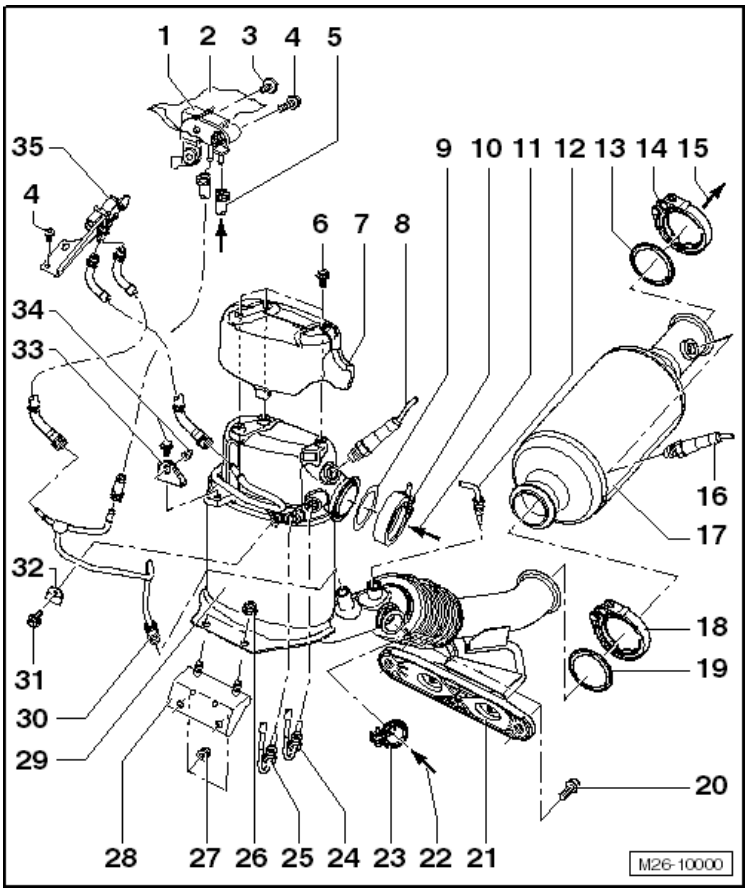
6 - Bolt
- ☐ 25 Nm

7 - Nuts
- ☐ For specifications, refer to Body Exterior

8 - Bolt
- ☐ 25 Nm

9 - Clamping Sleeve
- ☐ 25 Nm

Particulate Filter Overview



1 - Exhaust Pressure Sensor 1 -G450-
2 - Heat Shield
3 - Bolt
- ☐ 8 Nm

4 - Bolt
- ☐ 4 Nm

5 - Control Wire
6 - Nut
- ☐ 10 Nm

7 - Shield
8 - Heated Oxygen Sensor -G39-
- ☐ 52 Nm
- ☐ Lubricate the thread with hot bolt paste -G 052 112 A3- only, do not let the hot bolt paste -G 052 112 A3- get into the slots on the oxygen sensor body

9 - Seal
- ☐ Replace

10 - Securing Clamp
- ☐ 7 Nm
- ☐ Replace

11 - From the Turbocharger

12 - Exhaust Gas Temperature Sensor 4 -G648-
- ☐ 45 Nm
- ☐ Coat only the thread with Hot Bolt Paste -G 052 112 A3-

13 - Seal
- ☐ Replace

14 - Securing Clamp
- ☐ Replace

15 - To the Exhaust Flap Control Module -J883-

16 - Oxygen Sensor after Three Way Catalytic Converter -G130-
- ☐ 52
- ☐ Lubricate the thread with hot bolt paste -G 052 112 A3- only, do not let the hot bolt paste -G 052 112 A3- get into the slots on the oxygen sensor body

17 - NOx Reduction Catalytic Converter

18 - Securing Clamp
- ☐ Replace

19 - Seal
- ☐ Replace

20 - Bolt
- ☐ 25 Nm

21 - Suspended Mount

22 - From the Exhaust Gas Recirculation Filter

23 - Securing Clamp
- ☐ 3.5 Nm
- ☐ Replace

24 - Exhaust Gas Temperature Sensor 2 -G448-
- ☐ 45 Nm

25 - Exhaust Gas Temperature Sensor 3 -G495-
- ☐ 45 Nm

26 - Nut
- ☐ 23 Nm

27 - Nut
- ☐ 23 Nm

28 - Bracket

29 - Particulate Filter

30 - Control Wire
- ☐ 45 Nm

31 - Bolt
- ☐ 9 Nm

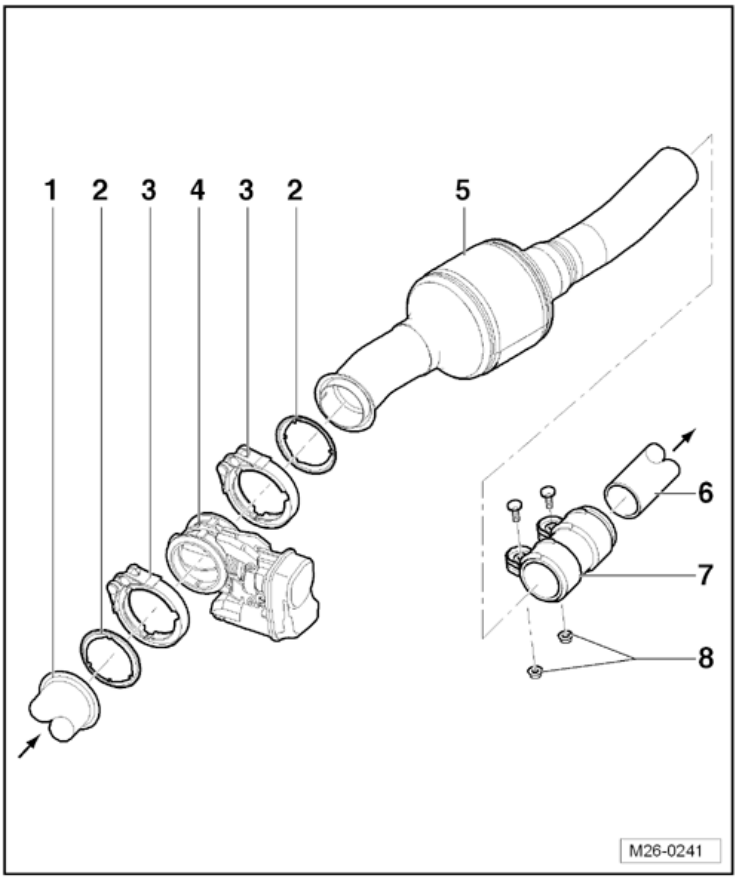
32 - Bracket

33 - Bracket

34 - Nut
- ☐ 23 Nm

35 - Differential Pressure Sensor -G505-

Exhaust Door Control Unit -J883- with Reduction Catalytic Converter Overview

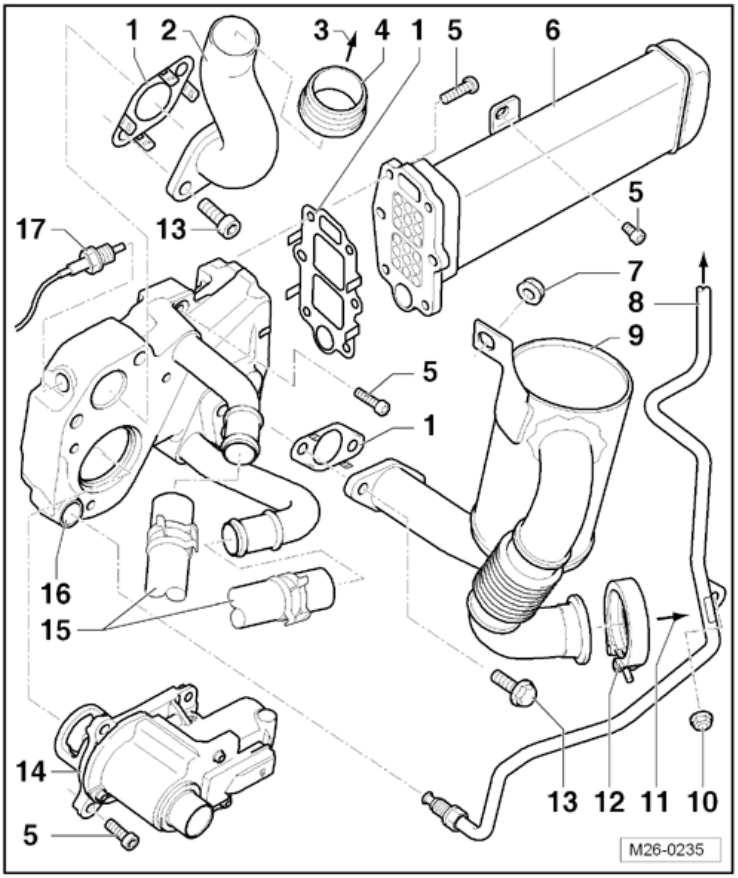


1 - From the Reduction Catalytic Converter
2 - Seal
- ☐ Replace

3 - Securing Clamp
- ☐ 7 Nm
- ☐ Replace

4 - Exhaust Door Control Unit -J883-
5 - Reduction Catalytic Converter
6 - Front Muffler
7 - Clamping Sleeve
8 - Nut
- ☐ 23 Nm

Exhaust Gas Recirculation Overview



1 - Seal
- ☐ Replace

2 - Connecting Pipe

3 - To Connection on the Turbocharger

4 - Seal

5 - Bolt
- ☐ 8 Nm

6 - Air Filter Housing Upper Section

7 - Nut
- ☐ 23 Nm

8 - Control Wire
- ☐ 23 Nm

9 - Filter

10 - Nut
- ☐ 23 Nm

11 - To Particulate Filter

12 - Securing Clamp

- ☐ 3.5 Nm
- ☐ Replace after removing

13 - Bolt

- ☐ 23 Nm

14 - Valve 2 for EGR -N213-

15 - Coolant Hose

16 - EGR Temperature Sensor -G98-

- ☐ 20 Nm
- ☐ Follow tightening specification

Ignition/Glow Plug System – 2.0L CJAA (TDI)

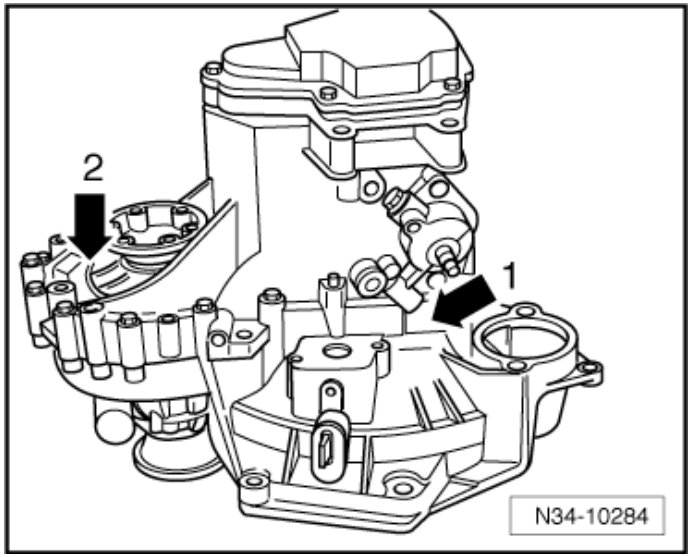
Fastener Tightening Specifications

Component	Nm
Fuel Line Clamp Bolts	8
Glow plugs	12

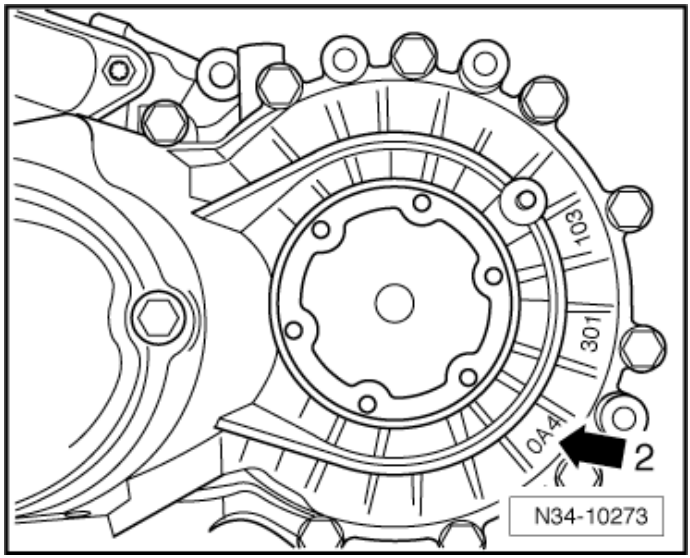
MANUAL TRANSMISSION – 0A4

General, Technical Data

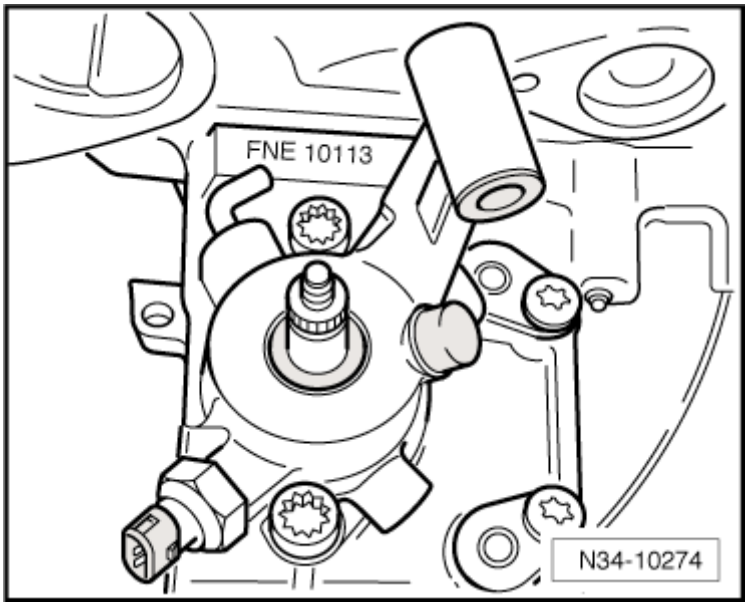
Transmission Identification



Code letters and build date (1) manual transmission 0A4 (2).



Manual transmission 0A4 (2).



Transmission code letters and build date.

Example:

FNE	10	11	3
Identification code	Day	Month	Year (2003) of manufacture

NOTE: The transmission code letters are also included on the vehicle data label.

Codes Letters, Transmission Allocation and Capacities

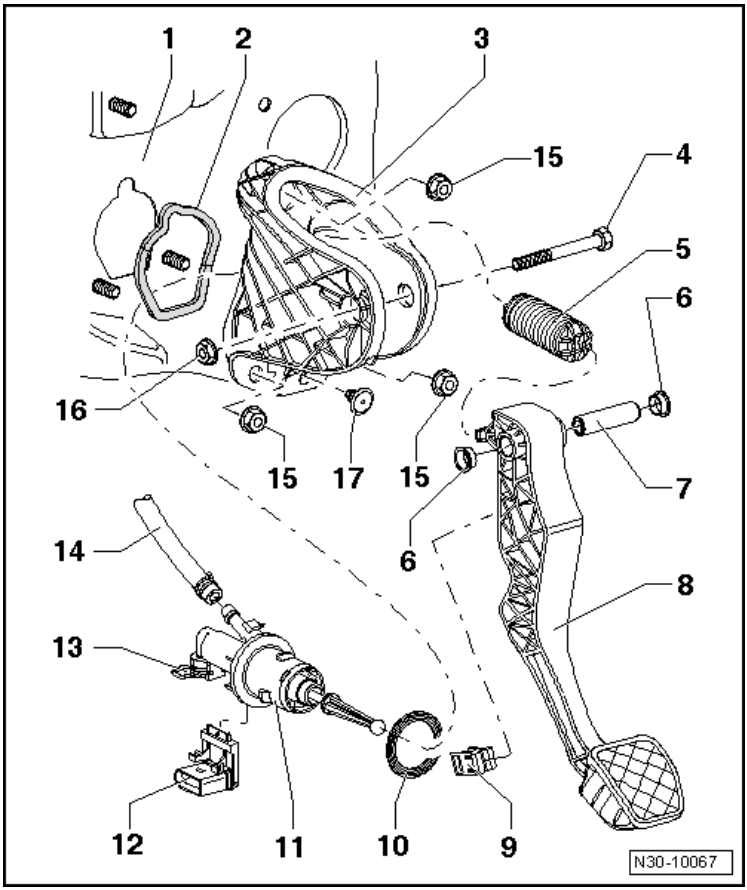
Manual transmission		**5 Speed Manual Transmission 0A4**
Identification codes		LPU
Manufactured	from	05.2011
	through	
Allocation	Type	Beetle from MY 2012
	Engine	2.5L - 125 kW
Manual transmission capacity (transmission completely disassembled)		Refer to Fluid Capacity Tables Rep. Gr. 03
Manual transmission capacity (transmission partly disassembled), refer to Elsaweb, Transmission Fluid, Checking and Filling		

Refer to the Electronic Parts Catalog (ETKA) for the following information:

- Individual gear ratios
- Final drive ratio
- Transmission fluid specifications
- Flange shaft allocation
- Clutch disc and pressure plate allocation

Manual Trans. – 0A4

Clutch Pedal Overview



1 - Bulkhead
2 - Gasket
- ☐ Always replace after removing the mounting bracket.

3 - Mounting Bracket
4 - Bolt
5 - Over-Center Spring
6 - Bushing
7 - Pin
8 - Clutch Pedal
9 - Mount
10 - Gasket
- ☐ Replace after removing

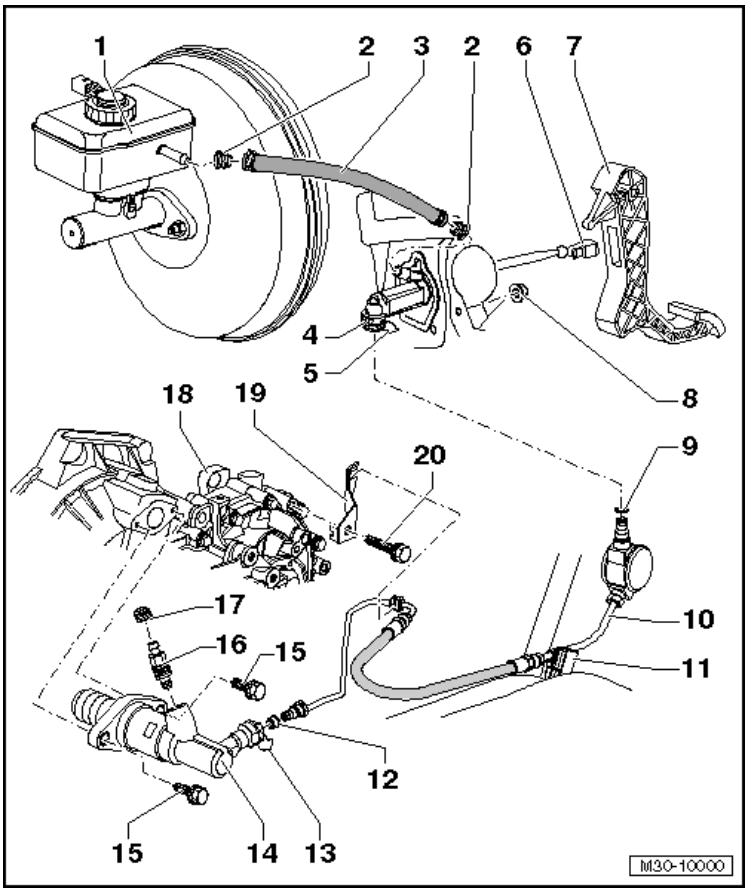
11 - Clutch Master Cylinder
12 - Clutch Position Sensor -G476-

13 - Clip
14 - Supply Hose
15 - Nut
- ☐ 25 Nm
- ☐ Replace after removing

16 - Nut
- ☐ 25 Nm
- ☐ Replace after removing

17 - Stop Bumper

Clutch Hydraulics Overview



1 - Brake Fluid Reservoir
2 - Seal
3 - Supply Hose
4 - Clutch Master Cylinder
5 - Clip
6 - Mount
7 - Clutch Pedal
8 - Nut
- ☐ Replace after removing

9 - Seal or O-Ring
10 - Hose/Line Assembly
11 - Bracket
12 - Seal or O-Ring
13 - Clip
14 - Clutch Slave Cylinder

15 - Bolt

- ☐ Tightening specifications, refer to Clutch Release Mechanism Overview

16 - Bleed Valve

- ☐ 4.5 Nm

17 - Dust Cap

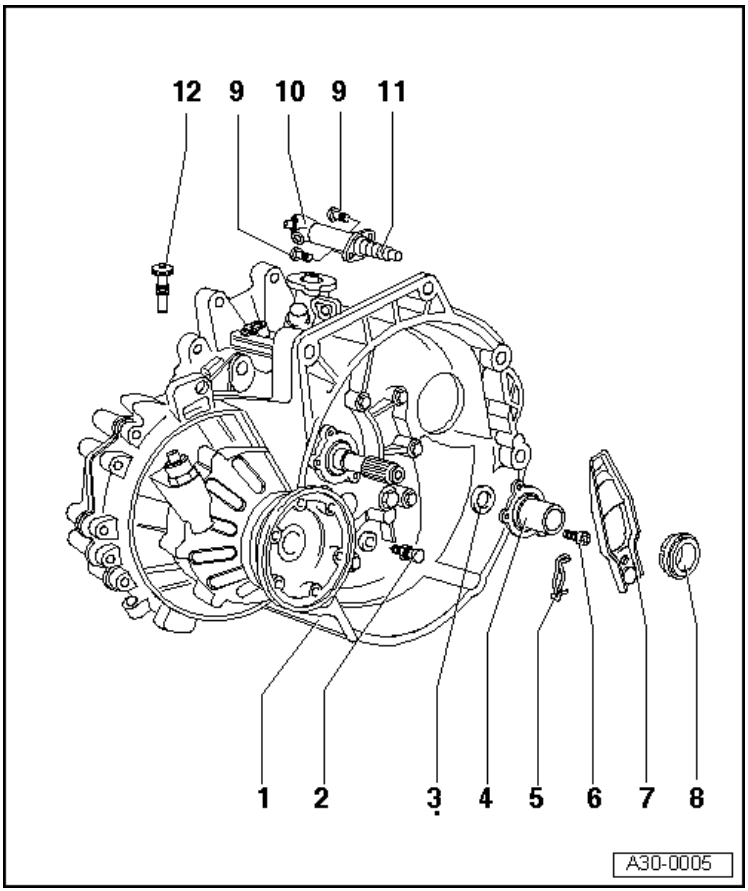
18 - Transmission

19 - Bracket

20 - Bolt

- ☐ 20 Nm

Clutch Release Mechanism Overview



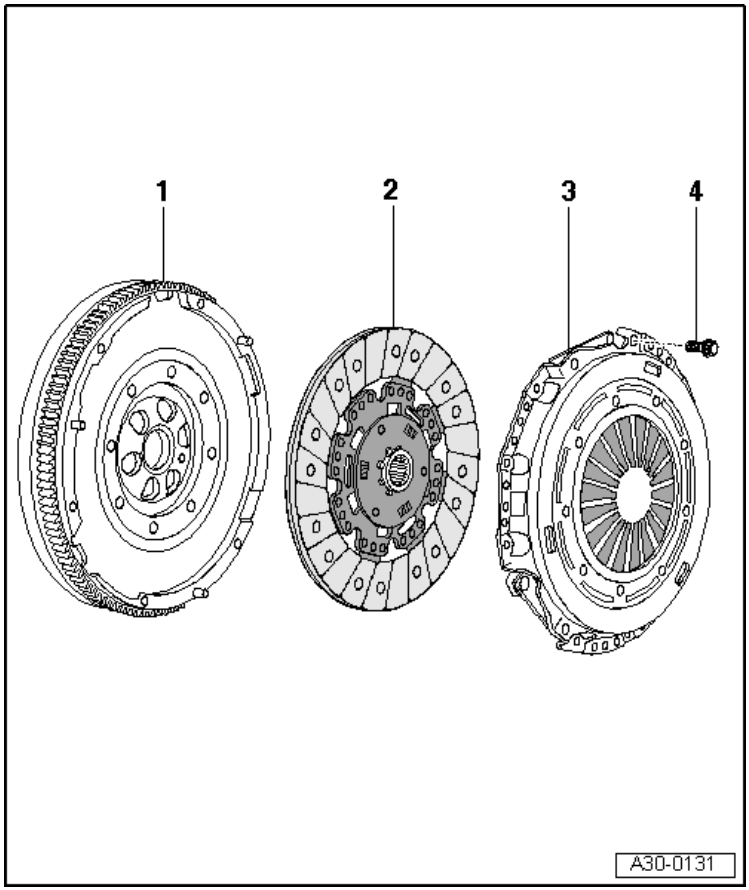
1 - Transmission
2 - Stud Bolt
- ☐ 8 Nm

3 - Input Shaft Seal
4 - Guide Sleeve
5 - Spring
6 - Bolt
- ☐ 20 Nm

7 - Clutch Release Lever
8 - Release Bearing
9 - Bolt
- ☐ 20 Nm

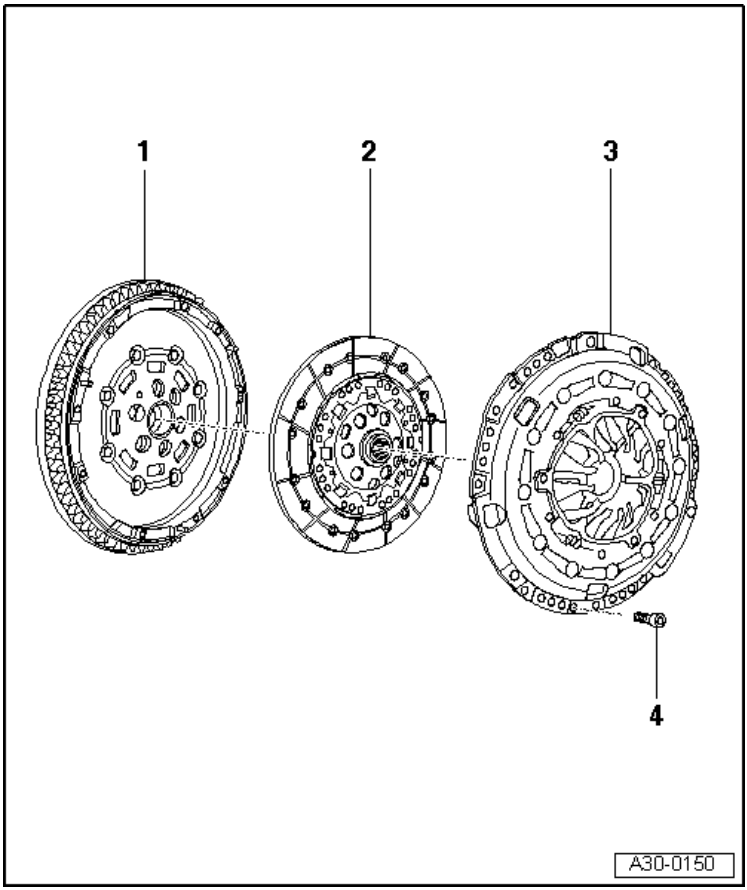
10 - Clutch Slave Cylinder
11 - Plunger
12 - Bolt

Clutch Overview, with Dual Mass Flywheel, Manufactured by Sachs



1 - Dual Mass Flywheel
2 - Clutch Disc
3 - Pressure Plate
4 - Bolt
- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm
- ☐ Loosen and tighten in small steps and in a diagonal sequence.

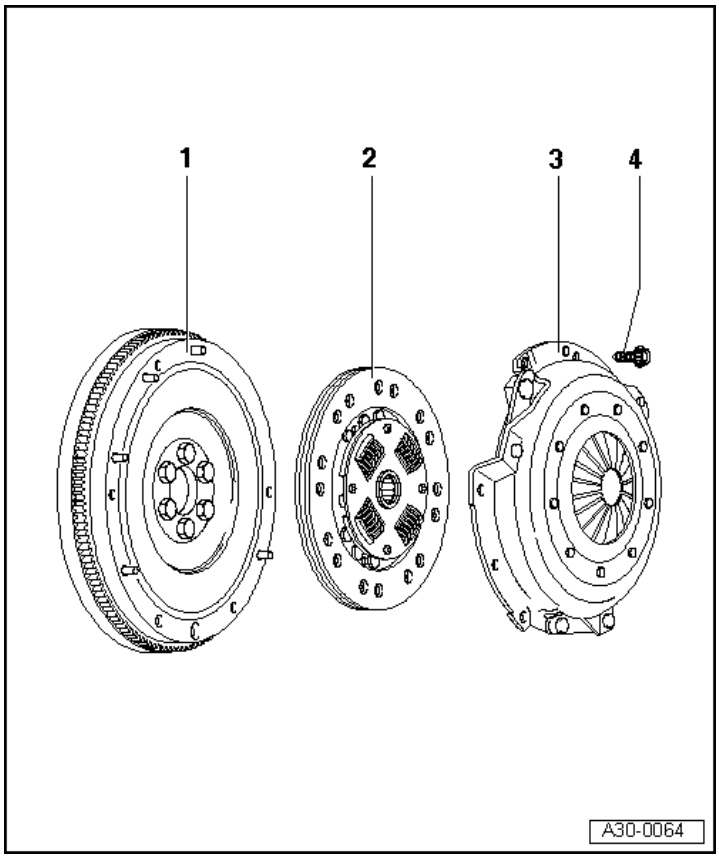
Clutch Overview, with Dual Mass Flywheel, Manufactured by LuK



1 - Dual Mass Flywheel
2 - Clutch Disc
3 - SAC Pressure Plate
4 - Bolt

- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm
- ☐ Loosen and tighten in small steps and in a diagonal sequence.

Clutch Overview, with Single Flywheel



1 - Flywheel
2 - Clutch Plate
3 - Pressure Plate
4 - Bolt

- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm
- ☐ Loosen and tighten in small steps and in a diagonal sequence.

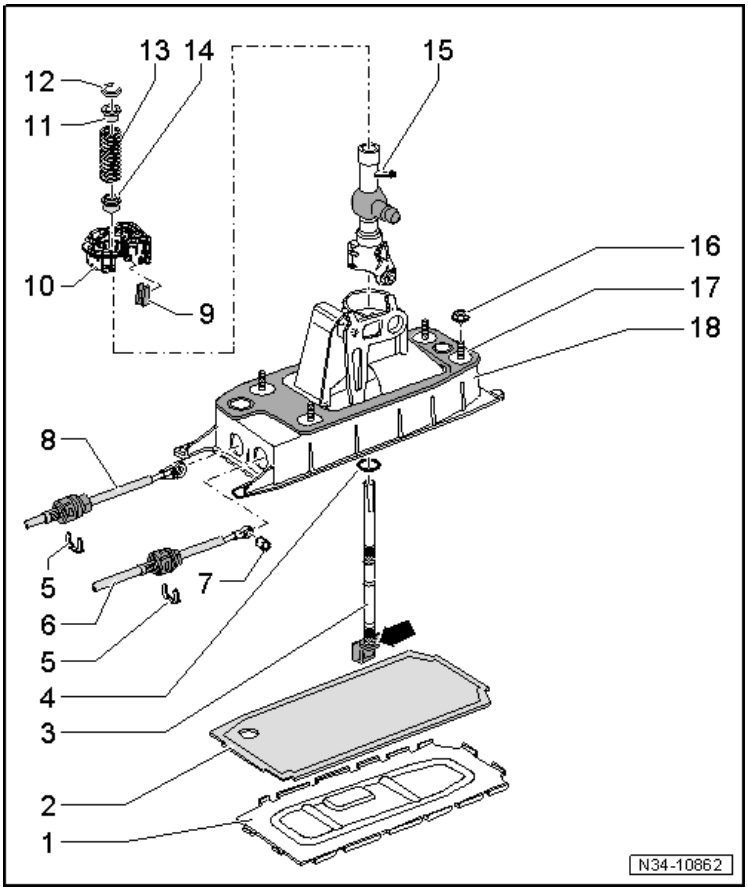
Fastener Tightening Specifications

Component	Fastener size	Nm
Impact bolster support-to-steering column bracket bolt [1]	-	20
Transmission support-to-transmission bracket/transmission bolt [1]	-	20 plus an additional 90° (¼ turn)

[1] Replace fastener(s).

Controls, Housing – 0A4

Shift Lever and Housing Overview



1 - Base Plate
- ☐ Replace after removing

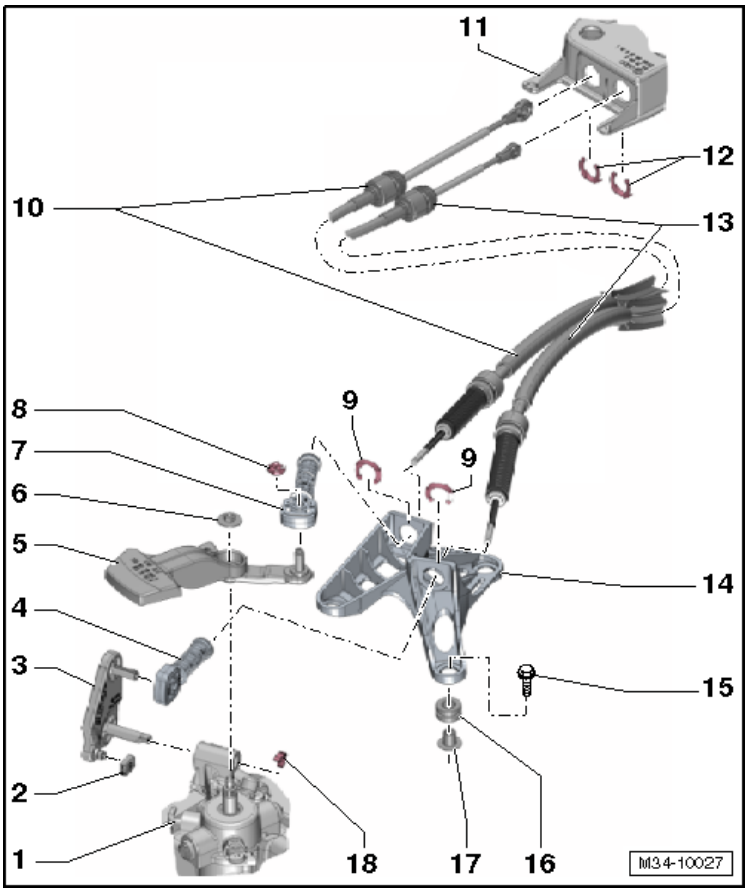
2 - Gasket
- ☐ Always replace

3 - Shift Lever
4 - Washer
5 - Lock Washer
6 - Selector Cable
7 - Bushing
8 - Shift Cable
9 - Sound Insulation
10 - Bearing shell
11 - Bushing
12 - Lock Washer
13 - Pressure Spring

14 - Bushing
15 - Shift Lever Guide
16 - Nut
- ☐ M6 - 8 Nm
- ☐ M8 - 25 Nm

17 - Gasket
18 - Shift Housing

Shift Cable and Selector Cable Overview



1 - Gear Shift Shaft with Shift Cover
2 - Sliding Shoe
3 - Relay Lever
4 - Cable Retainer
5 - Transmission Shift Lever
6 - Nut
- ☐ 23 Nm

7 - Cable Retainer
8 - Circlip
- ☐ Replace after removing

9 - Circlip
- ☐ Replace after removing

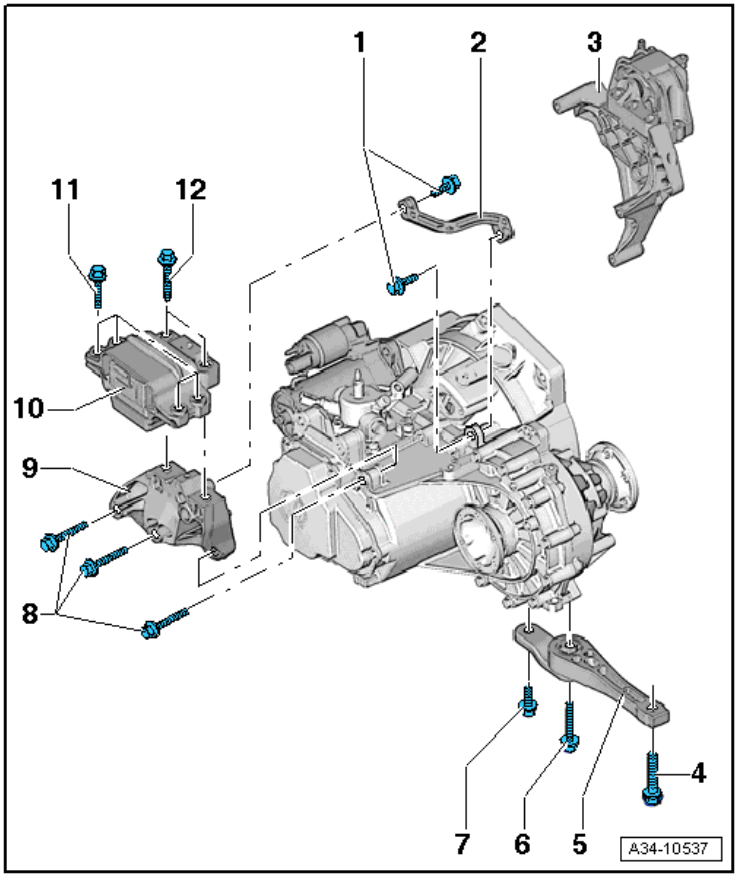
10 - Selector Cable
11 - Shift Housing
12 - Circlip
- ☐ Replace after removing

13 - Shift Cable

14 - Cable Bracket
15 - Bolt
- ☐ 20 Nm

16 - Grommet
17 - Spacer
18 - Clip

Engine and Transmission Mount Overview



1 - Bolt
- ☐ 20 Nm + 90° turn.
- ☐ Replace after removing

2 - Transmission Support

3 - Engine Mount with Engine Mount Bracket
- ☐ Refer to Engine Assembly

4 - Bolt
- ☐ Tightening specifications, refer to Suspension, Wheels, Steering

5 - Pendulum Support
- ☐ Tightening specifications, refer to Suspension, Wheels, Steering

6 - Bolt
- ☐ Tightening specifications, refer to Suspension, Wheels, Steering

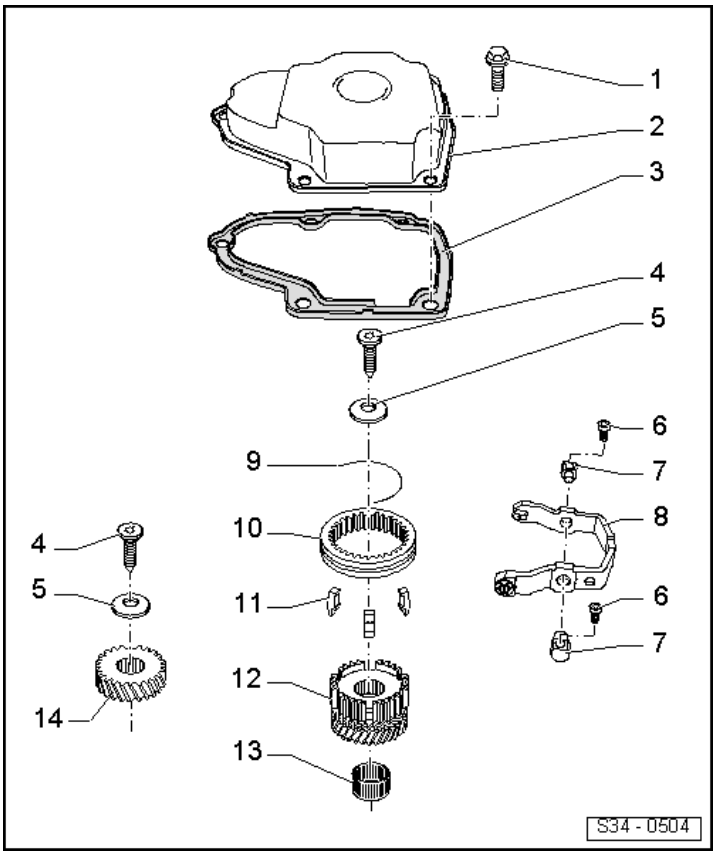
7 - Bolt
- ☐ Tightening specifications, refer to Suspension, Wheels, Steering

8 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

9 - Transmission Mount Bracket
10 - Transmission Mount
11 - Bolt
- ☐ Refer to Engine Assembly

12 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

Transmission Housing Cover and 5th Gear Overview



1 - Bolt
- ☐ 18 Nm

2 - Transmission Housing Cover

3 - Gasket

4 - Bolt
- ☐ 80 Nm + 90° turn
- ☐ Replace after removing

5 - Concave Washer

6 - Bolt
- ☐ 25 Nm

7 - Selector Fork Base

8 - 5th Gear Selector Fork

9 - Spring

10 - 5th Gear Locking Collar

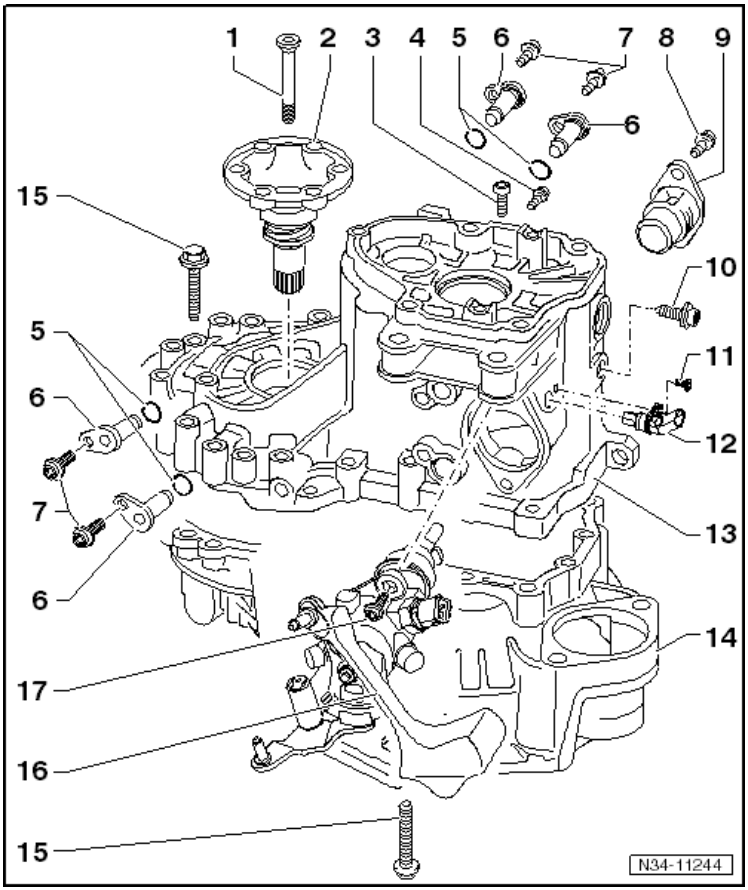
11 - Locking Pieces

12 - Synchronizer Hub with Gear and 5th Gear Synchronizer Ring

13 - Needle Bearing

14 - 5th Gear

Transmission Housing and Shift Mechanism Overview



1 - Countersunk Bolt
2 - Flange Shaft with Pressure Spring
3 - Inner TORX® Bolt
- ☐ 25 Nm
- ☐ Replace after removing

4 - Inner TORX® Bolt
- ☐ 30 Nm
- ☐ Replace after removing

5 - O-Ring
6 - Support Pin
7 - Bolt
- ☐ 25 Nm

8 - Bolt
- ☐ 25 Nm

9 - Seal or O-Ring

10 - Socket Head Bolt

- ☐ 25 Nm
- ☐ Replace after removing

11 - Bolt

- ☐ 6 Nm
- ☐ Not available in the USA/Canadian markets.

12 - Transmission Neutral Position Sensor -G701-

- ☐ Not available in the USA/Canadian markets.

13 - Transmission Housing

14 - Clutch Housing

15 - Bolt

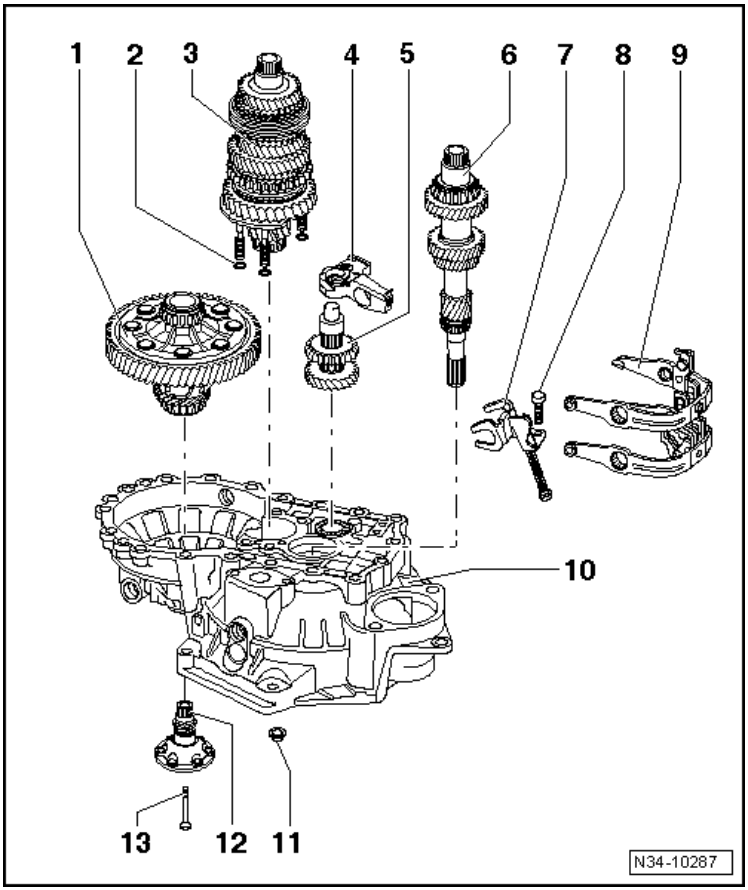
- ☐ 25 Nm + 90° turn
- ☐ Replace after removing

16 - Gear Shift Shaft with Gear Shift Cover

17 - Bolt

- ☐ 25 Nm

Input Shaft, Output Shaft, Differential and Selector Forks Overview

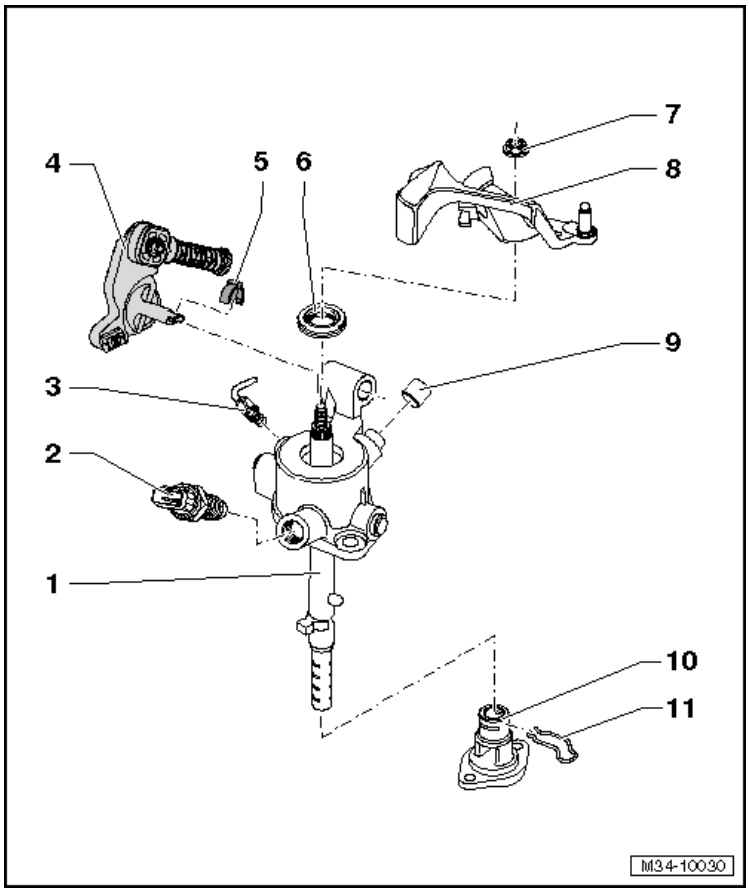


1 - Differential
2 - Seal
3 - Output Shaft
4 - Reverse Gear Shaft Support
5 - Reverse Shaft
6 - Input Shaft
7 - Reverse Gear Selector Fork
8 - Inner TORX® Bolt
- ☐ 25 Nm

9 - Selector Fork with Rail
10 - Clutch Housing
11 - Nut
- ☐ 25 Nm + 90° turn

12 - Flange Shaft with Pressure Spring
13 - Conical Bolt
- ☐ Tightening specifications, refer to Differential Overview

Shift Unit Assembly Overview

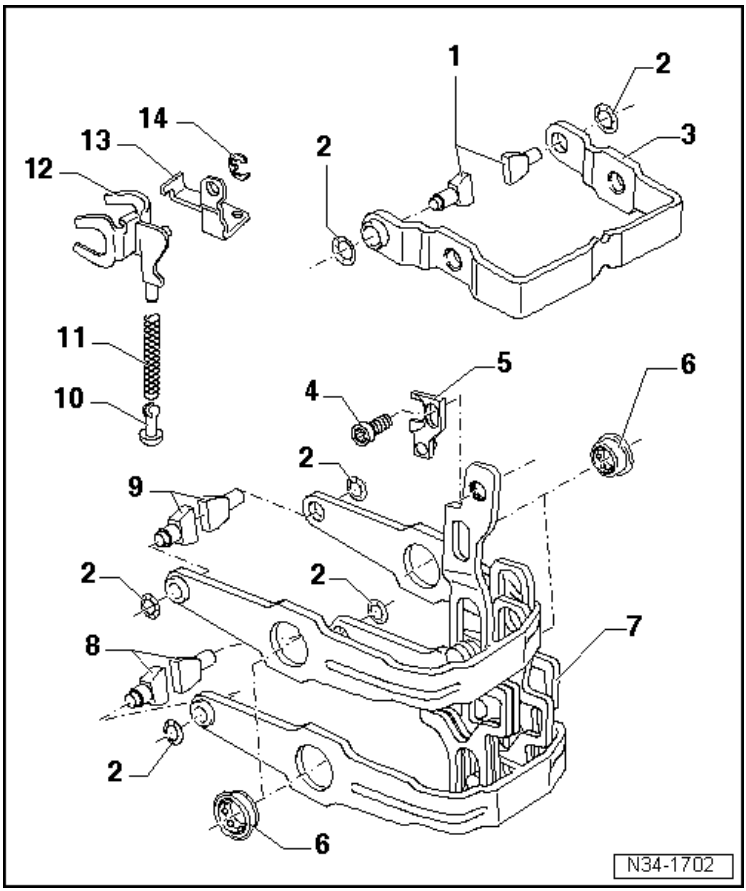


1 - Shift Unit
2 - Backup Lamp Switch -F4-
- ☐ 20 Nm

3 - Locking Pin
4 - Relay Lever
5 - Clip
6 - Seal
7 - Nut
- ☐ Tightening specification, refer to Shift Cable and Selector Cable Overview
- ☐ Replace after removing

8 - Transmission Shift Lever
9 - Cap
10 - Sealing Cap
11 - Spring

Selector Forks Overview



1 - 5th Gear Shift Segment
2 - Lock Washer
- ☐ Replace after removing

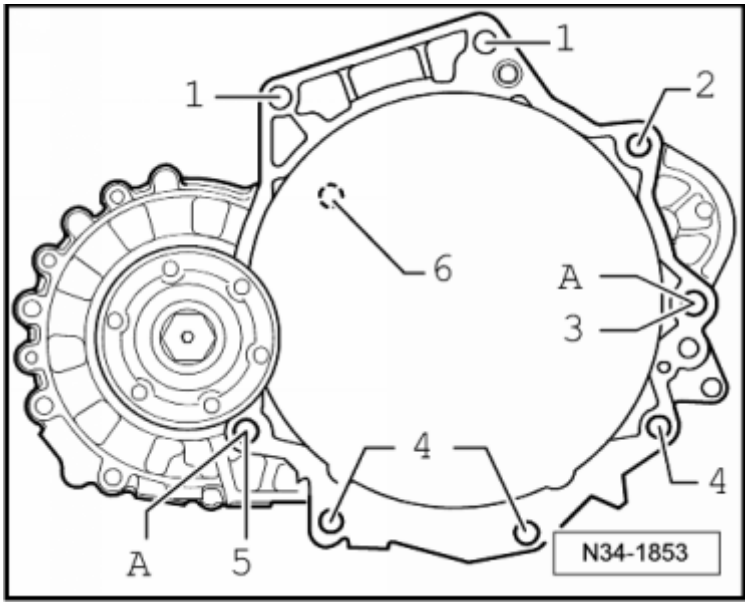
3 - 5th Gear Selector Fork
4 - Bolt
- ☐ 25 Nm

5 - 5th Gear Shift Jaw
6 - Angular Contact Ball Bearing
7 - Selector Fork with Rail
8 - 1st/2nd Gear Shift Segment
9 - 3rd/4th Gear Shift Segment
10 - Glide
11 - Spring
12 - Reverse Gear Selector Fork
13 - Support for the Reverse Gear Selector Fork
14 - Locking Ring
- ☐ Overview

Fastener Tightening Specifications

Component	Nm
Mount for lower starter plug wires	23

Transmission to Engine Tightening Specifications



Gas Engine

Item	Fastener	Qty.	Nm
1	M12 x 65	2	80
2	M12 x 170 Also starter to transmission	1	80
3	M12 x 170 Also starter to transmission	1	80
4	M10 x 65	3	40
5	M12 x 95	1	80
6	M6 x 8 Small flywheel cover plate	1	10
A	Alignment bushings for centering	-	-

Component	Nm
Lower starter plug wires mount	23

Gears, Shafts – 0A4

Component	Nm
Output Shaft Bearing Support to Clutch Housing Nut 1	25 plus an additional 90° (¼ turn)

1) Replace fastener(s).

Determining Shim Thickness

Example:

Bearing clearance measured value	Adjustment shim thickness according to the table
1.21 mm	1.175 mm

Adjustment Shim Table

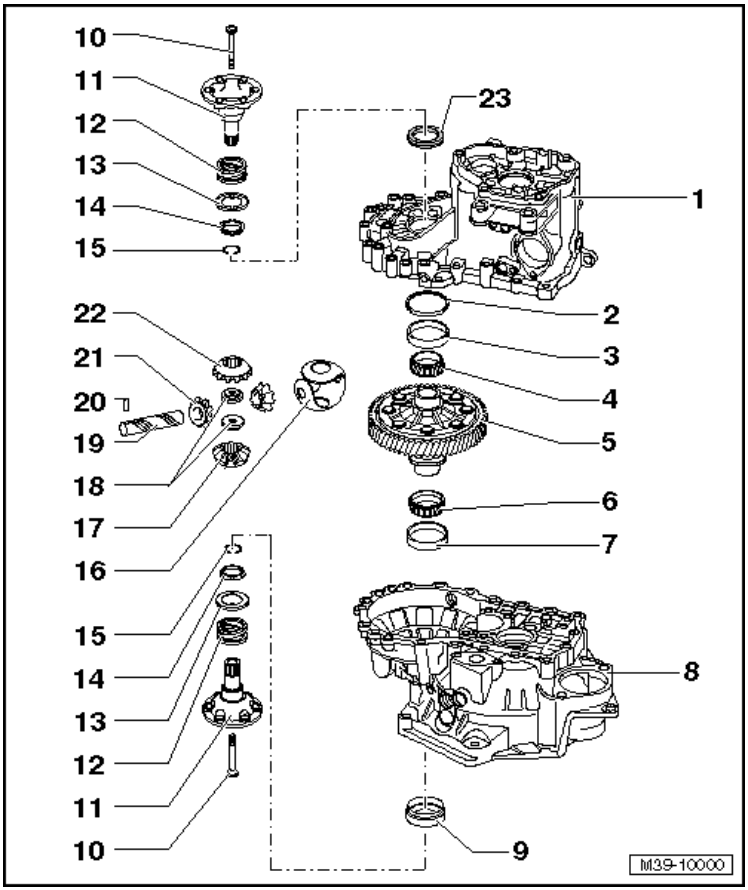
Bearing play Adjusting shim Measured value (mm)	Adjustment shim thickness (mm)
0.671 to 0.699 0.700 to 0.724 0.725 to 0.749	0.650 0.675 0.700
0.750 to 0.774 0.775 to 0.799 0.800 to 0.824	0.725 0.750 0.775
0.825 to 0.849 0.850 to 0.874 0.875 to 0.899	0.800 0.825 0.850
0.825 to 0.849 0.850 to 0.874 0.875 to 0.899	0.875 0.900 0.925
0.900 to 0.924 0.925 to 0.949 0.950 to 0.974	0.950 0.975 1.000
0.975 to 0.999 1.000 to 1.024 1.025 to 1.049	1.025 1.050 1.075
1.050 to 1.074 1.075 to 1.099 1.100 to 1.124	1.100 1.125 1.150
1.125 to 1.149 1.150 to 1.174 1.175 to 1.199	1.150 1.200 1.250
1.200 to 1.224 1.225 to 1.249 1.250 to 1.274	1.175 1.200 1.225
1.275 to 1.229 1.300 to 1.324 1.325 to 1.349	1.250 1.275 1.300

Bearing play Adjusting shim Measured value (mm)	Adjustment shim thickness (mm)
1.350 to 1.374	1.325
1.375 to 1.399	1.350
1.400 to 1.424	1.375
1.425 to 1.449	1.400
1.450 to 1.474	1.425
1.475 to 1.499	1.450
1.500 to 1.524	1.475
1.525 to 1.549	1.500
1.550 to 1.574	1.525
1.575 to 1.599	1.550
1.600 to 1.624	1.575
1.625 to 1.649	1.600
1.650 to 1.674	1.625
1.675 to 1.699	1.650
1.700 to 1.724	1.675

NOTE: Refer to the Electronic Parts Catalog (ETKA) for the correct shims.

Rear Final Drive, Differential – 0A4

Differential Overview



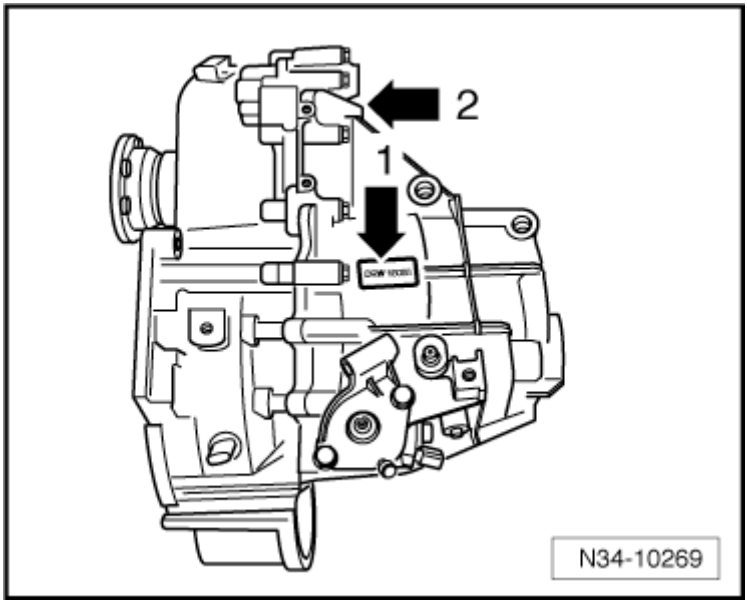
1 - Transmission Housing
2 - Adjusting Shim
3 - Outer Race/Tapered Roller Bearing
4 - Bearing Inner Race/Tapered Roller Bearing
5 - Differential Housing
6 - Bearing Inner Race/Tapered Roller Bearing
7 - Outer Race/Tapered Roller Bearing
8 - Clutch Housing
9 - Seal
10 - Conical Bolt
☐ 25 Nm
11 - Flange Shaft
12 - Flange Shaft Pressure Spring
13 - Thrust Washer
14 - Tapered Ring

15 - Lock Ring
16 - Thrust Washer Union
17 - Large Differential Bevel Gear
18 - Threaded Piece
19 - Differential Taper Axle
20 - Adapter Sleeve
21 - Small Differential bevel Gear
22 - Large Differential Bevel Gear
23 - Seal

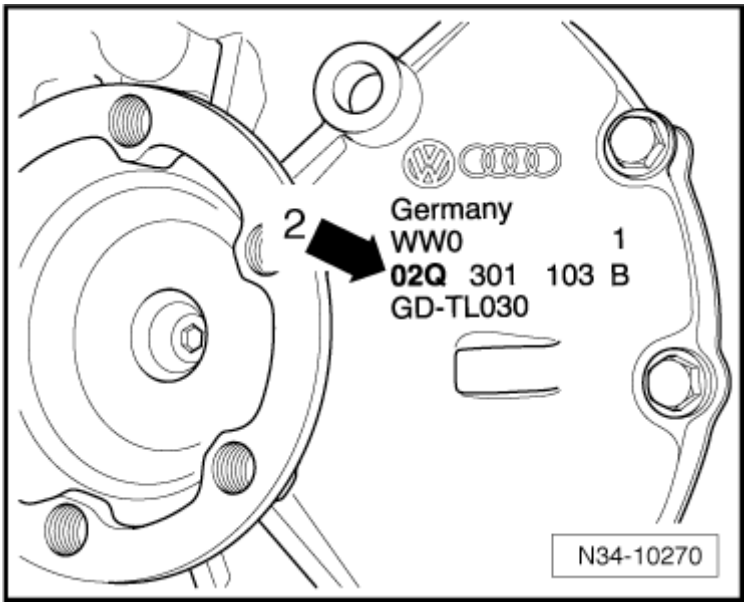
MANUAL TRANSMISSION – 02Q

General, Technical Data

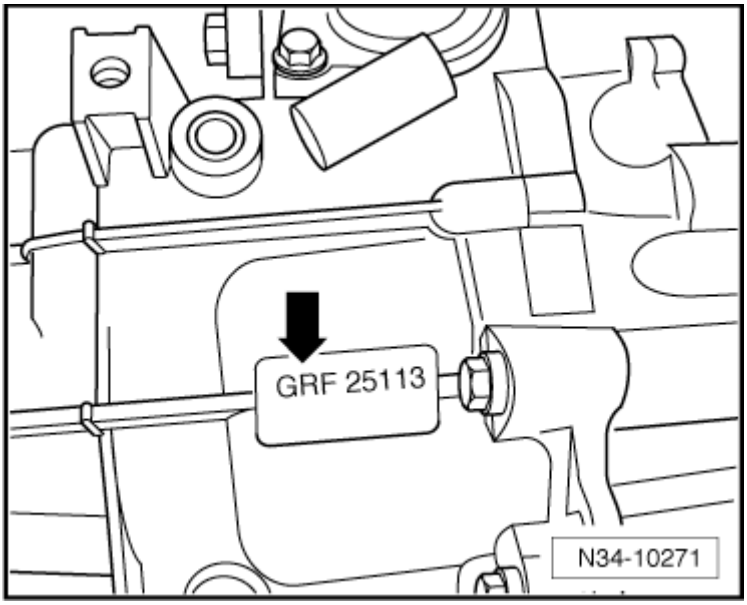
Transmission Identification



Code letters and build date (1) for the manual transmission 02Q (2).



Manual transmission 02Q (2).



Transmission code letters and build date (➡).

Example:

GRF	25	11	3
Identification codes	Day	Month	Year (2003) of manufacture

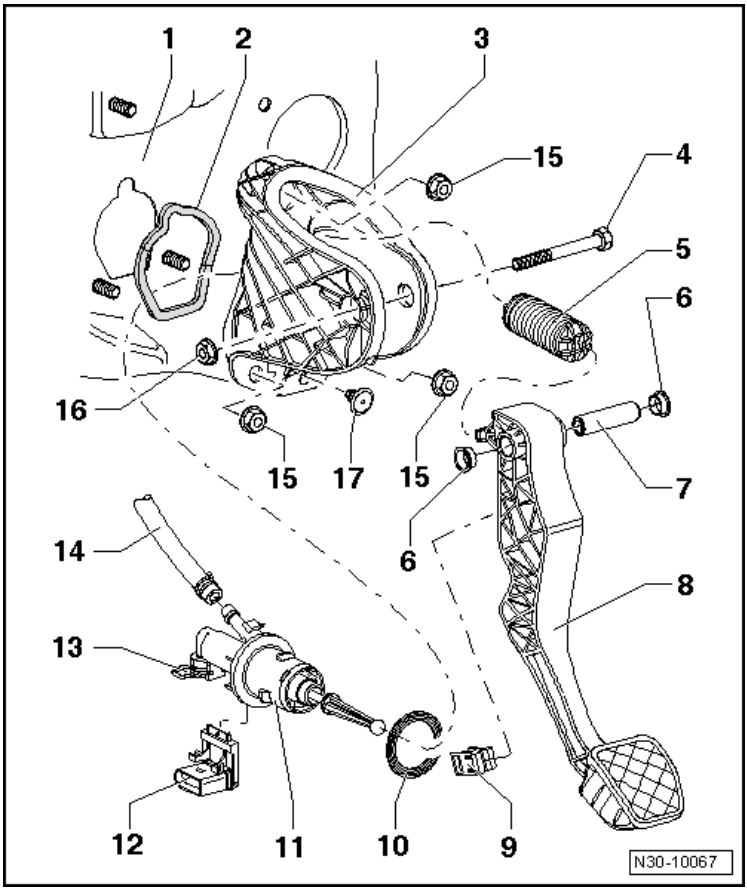
Codes Letters, Transmission Allocation and Capacities

Manual transmission		**6 Speed 02Q**		
Identification codes		KZS	MWS	NGB
Manufactured	from	05.2011	05.1201	05.2011
	through			
Allocation	Type	Beetle from MY 2012	Beetle from MY 2012	Beetle from MY 2012
	Engine	2.0L - 147 kW	2.0L - 147 kW	2.0L - 103 kW TDI CR
Capacity		Refer to Fluid Capacity Tables Rep. Gr. 03		

Refer to the Electronic Parts Catalog (ETKA) for the following information:

- Individual gear ratios
- Final drive ratio
- Flange shaft allocation
- Clutch allocation

Clutch Pedal Overview



1 - Bulkhead
2 - Gasket
- ☐ Always replace after removing the mounting bracket.

3 - Mounting Bracket
4 - Bolt
5 - Over-Center Spring
6 - Bushing
7 - Pin
8 - Clutch Pedal
9 - Mount
10 - Gasket
- ☐ Replace after removing

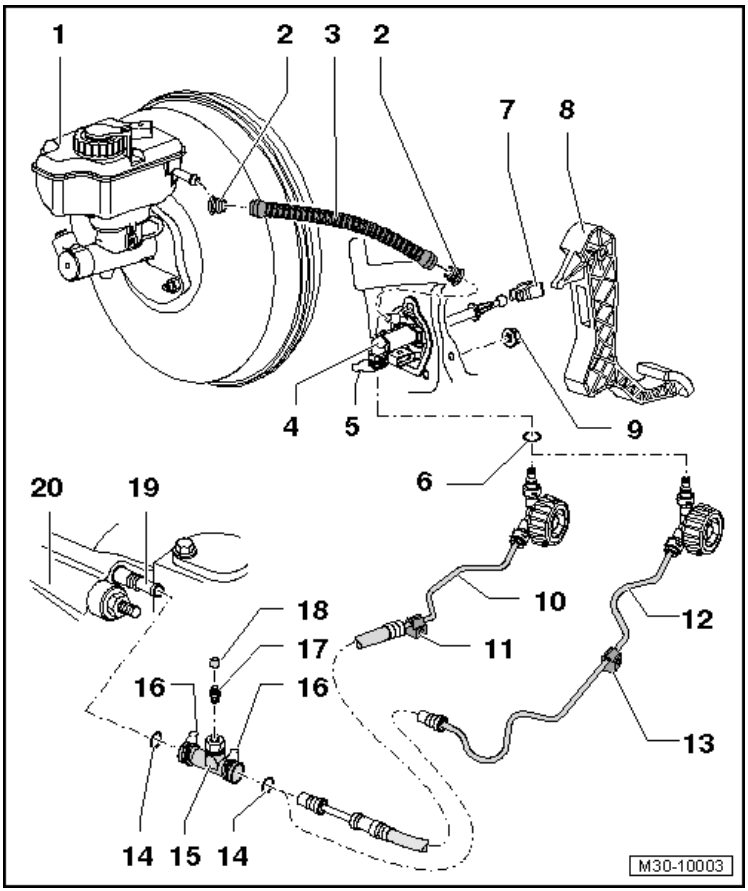
11 - Clutch Master Cylinder
12 - Clutch Position Sensor -G476-
13 - Clip

14 - Supply Hose
15 - Nut
- ☐ 25 Nm
- ☐ Replace after removing

16 - Nut
- ☐ 25 Nm
- ☐ Replace after removing

17 - Stop Bumper

Hydraulic System Overview

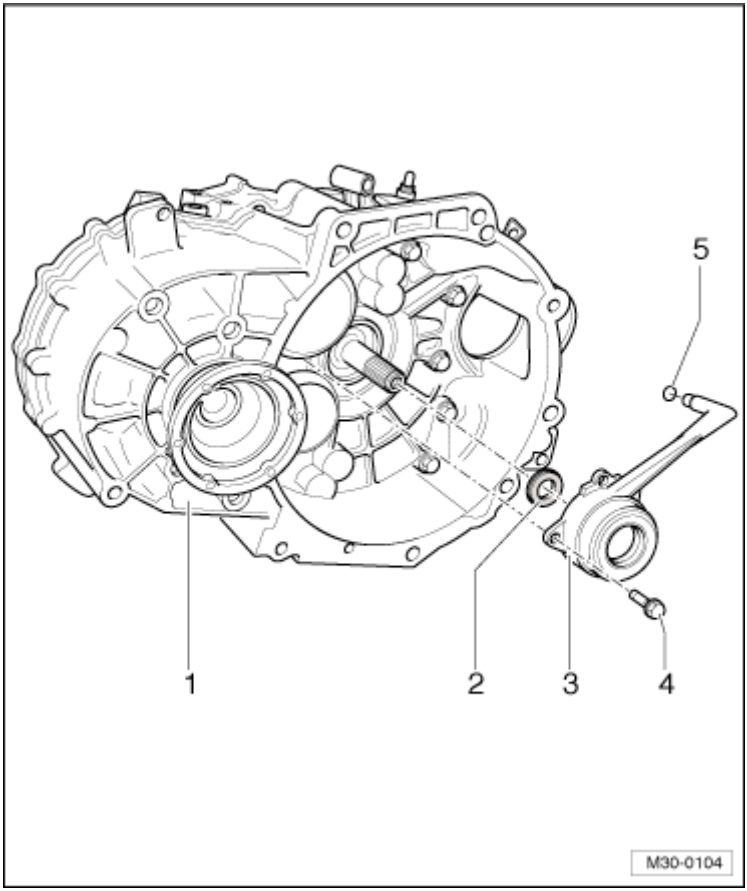


1 - Brake Fluid Reservoir
2 - Gasket
3 - Supply Hose
4 - Clutch Master Cylinder
5 - Clip
6 - Seal/O-Ring
7 - Mounting
8 - Clutch Pedal
9 - Nut
☐ Replace after removing
10 - Hose/Line Assembly
11 - Bracket
12 - Line
13 - Bracket
14 - Seal or O-ring
15 - Bleeder Assembly

16 - Clip
17 - Bleed Valve
- ☐ 4.5 Nm

18 - Dust Cap
19 - Clutch Slave Cylinder
20 - Transmission

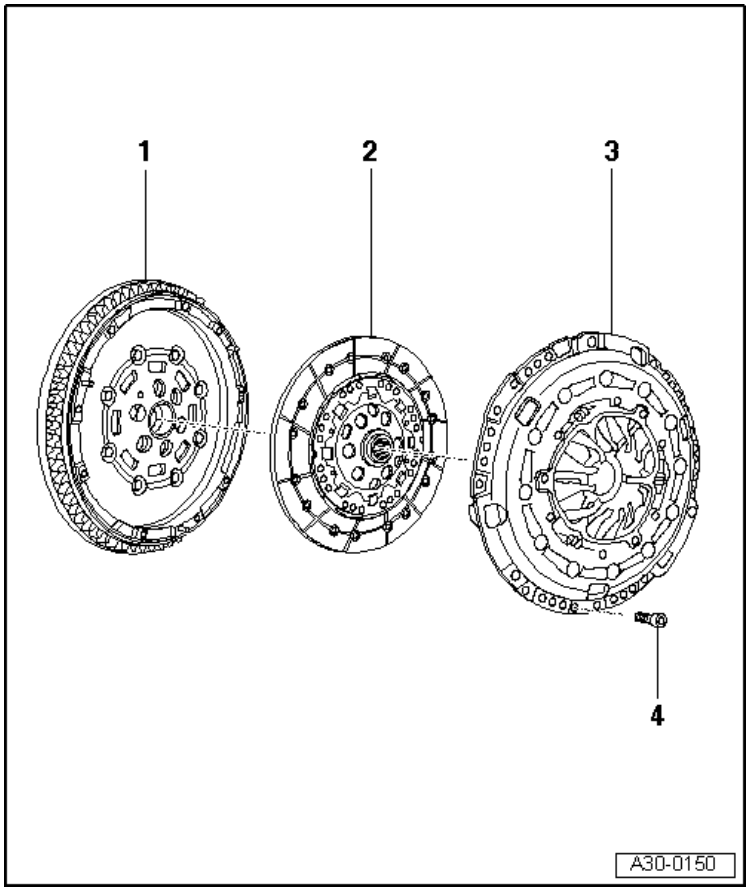
Differential Overview



1 - Transmission
2 - Input Shaft Seal
3 - Clutch Slave Cylinder with Release Bearing
4 - Bolt
- ☐ 12 Nm for clutch slave cylinder with a metal cylinder housing (without locking fluid).
- ☐ 15 Nm for clutch slave cylinder with a plastic cylinder housing (with locking fluid).
- ☐ Replace after removing

5 - O-Ring

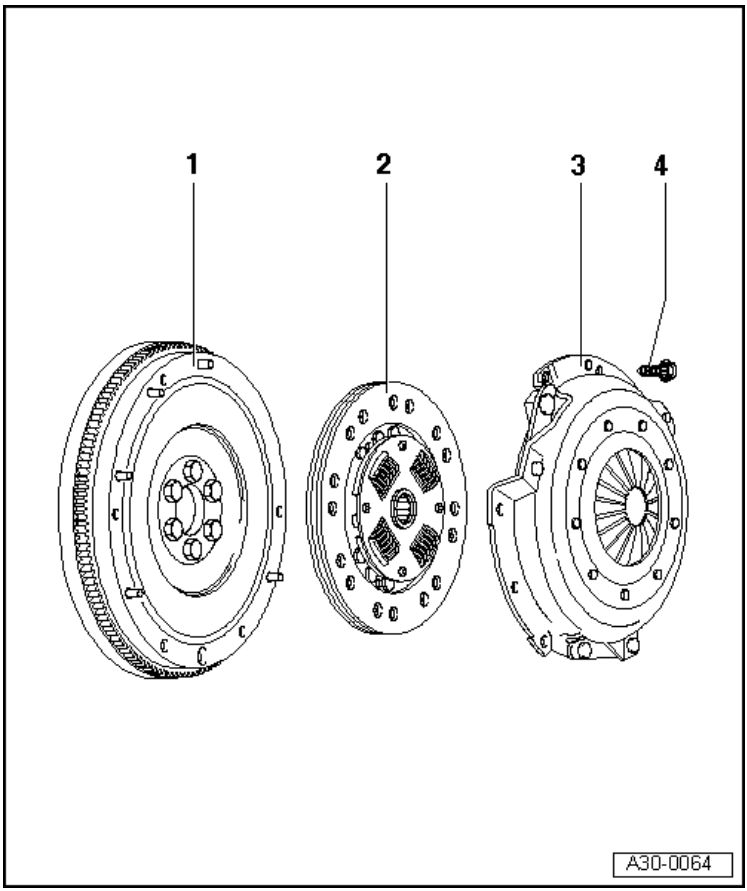
Clutch Overview, with Dual Mass Flywheel, Manufactured by LuK



1 - Dual Mass Flywheel
2 - Clutch Disc
3 - SAC Pressure Plate
4 - Bolt

- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm
- ☐ Loosen and tighten in small steps and in a diagonal sequence.

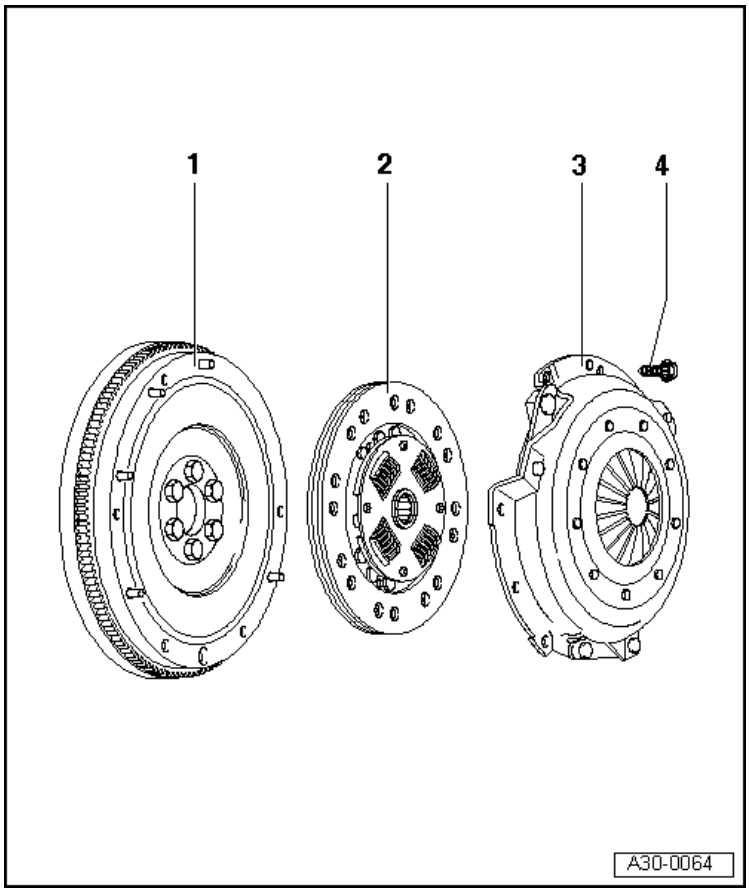
Clutch Overview, with Single Flywheel



1 - Flywheel
2 - Clutch Plate
3 - Pressure Plate
4 - Bolt

- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm
- ☐ Loosen and tighten in small steps and in a diagonal sequence.

Clutch Overview, with Single Flywheel



1 - Single Flywheel
2 - Clutch Plate
3 - Pressure Plate
4 - Bolt

- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm
- ☐ Loosen and tighten in small steps and in a diagonal sequence.

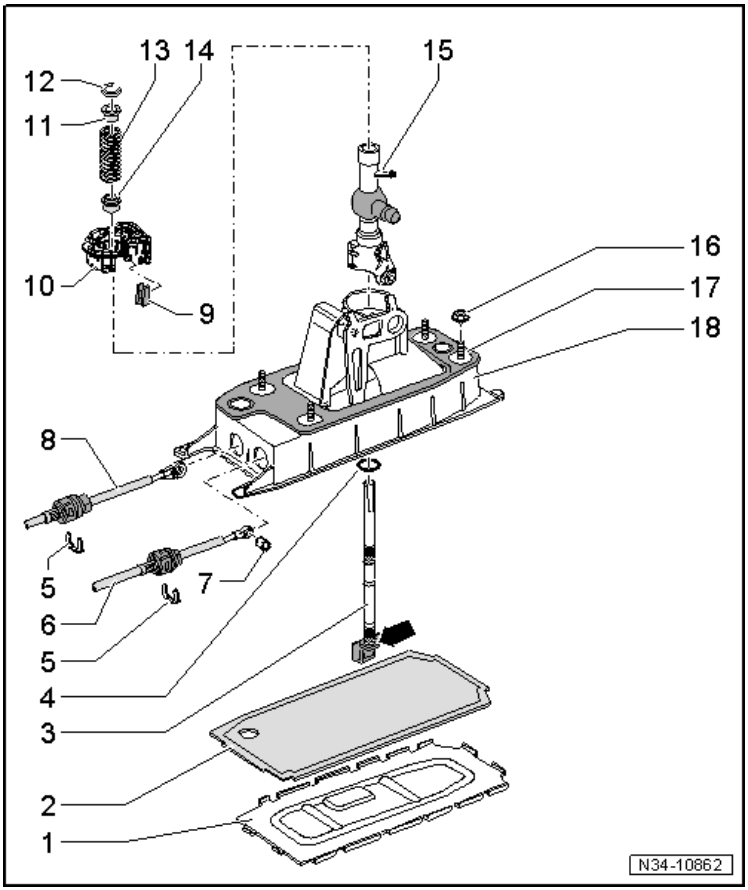
Fastener Tightening Specifications

Component	Fastener size	Nm
Impact bolster support-to-steering column bracket bolt [1)]	-	20
Mounting bracket-to-bulkhead nut [1)]	-	25

[1)] Replace fastener(s).

Controls, Housing – 02Q

Shift Lever and Housing Overview



1 - Base Plate
- ☐ Replace after removing

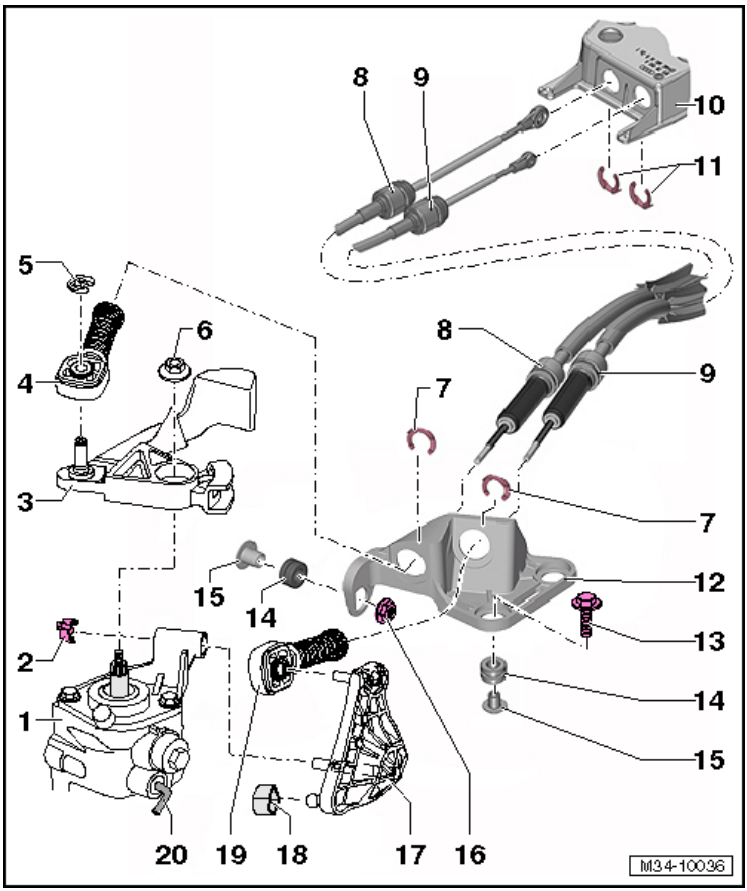
2 - Gasket
- ☐ Replace after removing

3 - Shift Lever
4 - Washer
5 - Lock Washer
6 - Selector Cable
7 - Bushing
8 - Shift Cable
9 - Insulation
10 - Bearing Shell
11 - Bushing
12 - Lock Washer
13 - Pressure Spring

14 - Bushing
15 - Shift Lever Guide
16 - Nut
- ☐ M6 - 8 Nm
- ☐ M8 - 25 Nm

17 - Gasket
18 - Shift Housing

Shift and Selector Cables Overview



1 - Selector Shaft with Selector Cover
2 - Clip
3 - Transmission Shift Lever
4 - Cable Retainer
5 - Lock Washer
6 - Nut
- ☐ 23 Nm
- ☐ Replace after removing

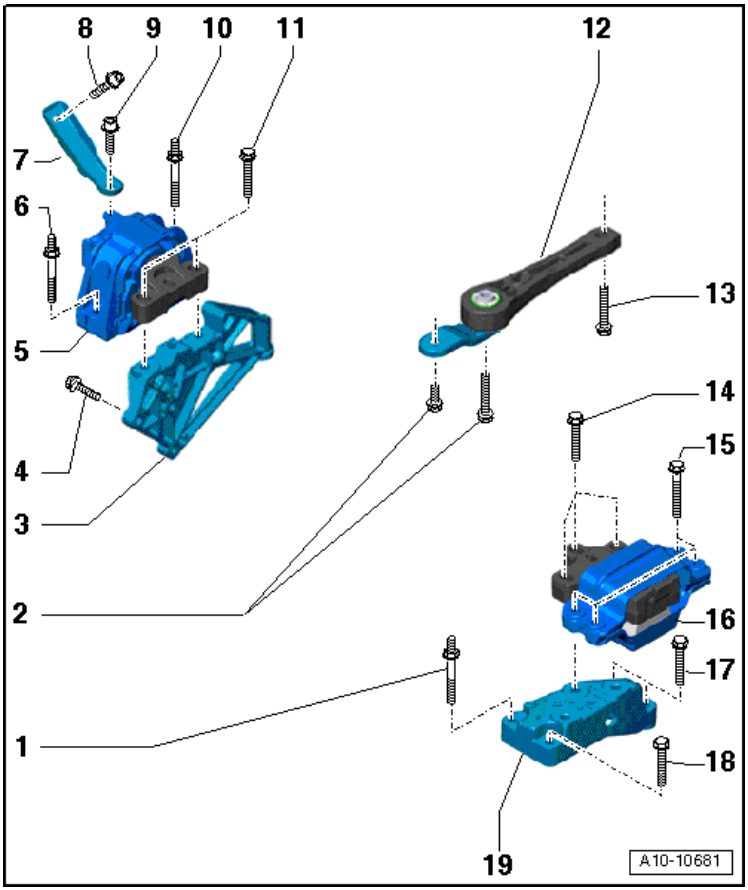
7 - Lock Washer
8 - Shift Cable
9 - Selector Cable
10 - Shift Housing
11 - Lock Washers
- ☐ Replace after removing

12 - Cable Bracket
13 - Bolt
- ☐ 20 Nm

14 - Grommet
15 - Spacer
16 - Nut
- ☐ 20 Nm

17 - Relay Lever
18 - Sliding Shoe
19 - Cable Retainer
20 - Locking Pin

Engine and Transmission Mounts and Brackets Overview



1 - Bolt
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

2 - Bolts
- ☐ Tightening sequence and specification, refer to Suspension, Wheels, Steering

3 - Engine Mount Bracket

4 - Bolt
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Ignition
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

5 - Engine Mount

6 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Ignition
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

7 - Support

8 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Ignition
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

9 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Ignition
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

10 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Ignition
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

11 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Ignition
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

12 - Pendulum Support

13 - Bolt

- ☐ Tightening sequence and specification, refer to Suspension, Wheels, Steering

14 - Bolt

- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

15 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Ignition
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

16 - Transmission Mount

17 - Bolt

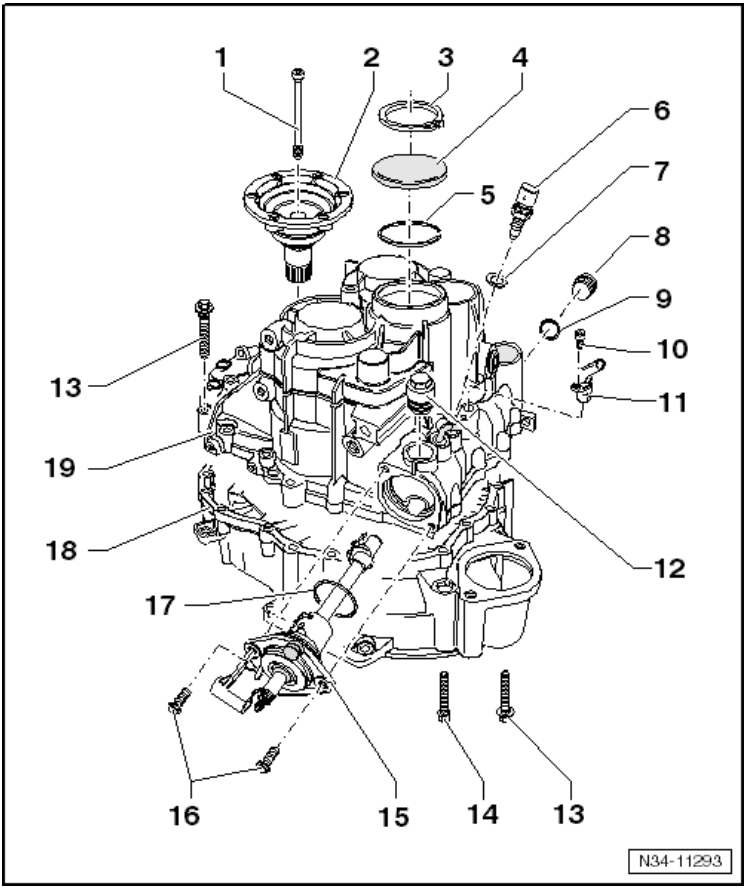
- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

18 - Bolt

- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

19 - Transmission Mount Bracket

Transmission Housing and Shift Unit Overview



1 - Countersunk Bolt
- ☐ 33 Nm

2 - Flange Shaft with Pressure Spring
3 - Circlip
4 - Sealing Cap
5 - Locking Ring
6 - Back-up Lamp Switch -F4-
- ☐ 20 Nm

7 - Seal
8 - Fluid Drain Plug
9 - Seal
- ☐ Always replace

10 - Bolt
- ☐ 6 Nm

11 - Transmission Neutral Position Sensor -G701-g
12 - Locking Bolt
- ☐ 45 Nm

13 - Bolt
- ☐ 20 Nm

14 - Bolt
- ☐ 15 Nm + 180° turn
- ☐ Replace after removing

15 - Gear Shift Unit

16 - Bolt
- ☐ 20 Nm
- ☐ Replace after removing

17 - O-ring

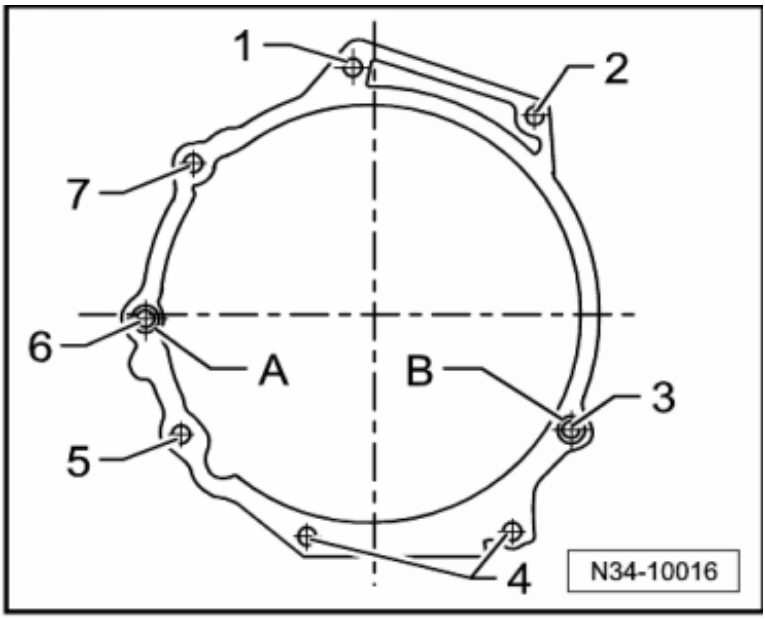
18 - Clutch Housing

19 - Transmission Housing

Fastener Tightening Specifications

Component	Fastener size	Nm
Mount for lower starter plug wires	-	23

Transmission to Engine Tightening Specifications

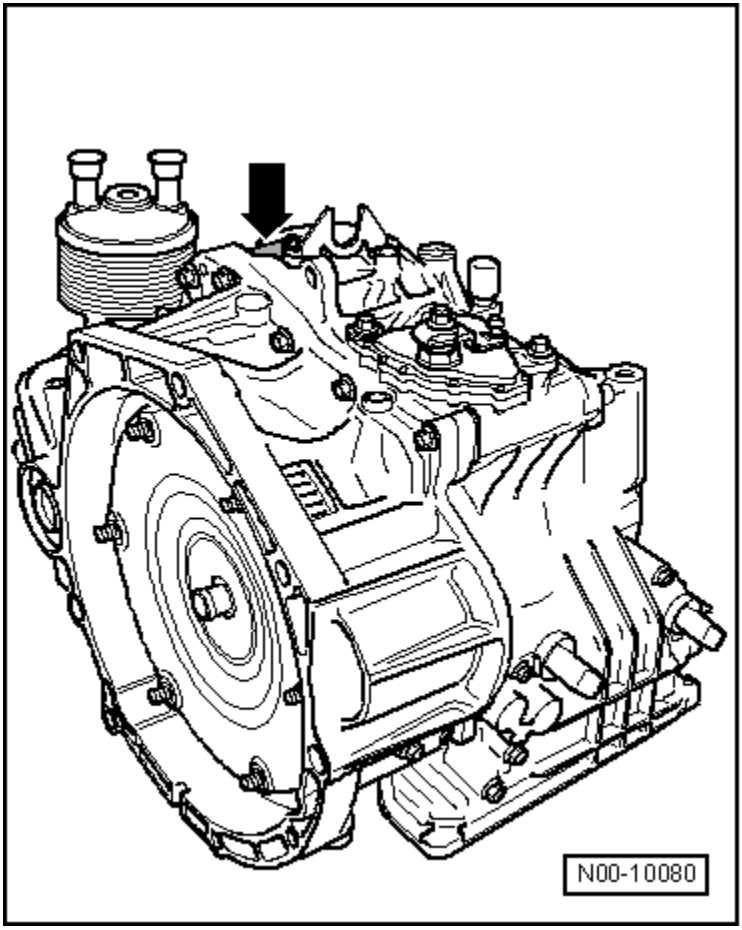


Item	Fastener	Qty.	Nm
1	M12 x 55 With a short M8 threaded pin or M12 x 50 Without threaded pin	1	80
2	M12 x 55 With a long M8 threaded pin	1	80
3	M12 x 70 or M12 x 65	1	80
4	M10 x 50	2	40
5	M10 x 105	1	40
6	M12 x 165 With a short M8 threaded pin Also starter to transmission	1	80
7	M12 x 165 With a short M8 threaded pin Also starter to transmission	1	80
-	M6 x 8 Small flywheel cover plate (not present on all engines)	1	10
A and B	Centering alignment sleeves		

AUTOMATIC TRANSMISSION – 09G

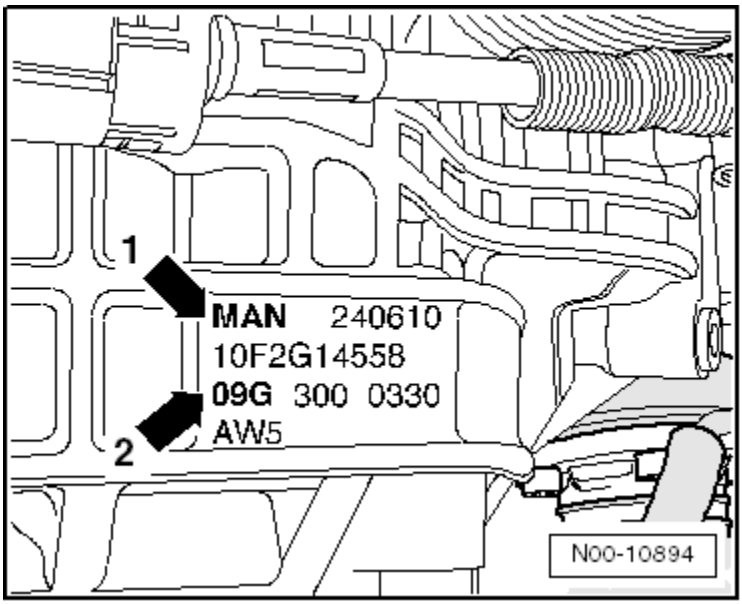
General, Technical Data

Transmission Identification



Code letters (➡).

Transmission Identification *(cont'd)*



Code letter (1) indicates 6-speed automatic transmission 09G (2).

Example:

MAN	24	06	10
Identification codes	Day	Month	Production year (2010)

The transmission code letters are also included on the vehicle data label.

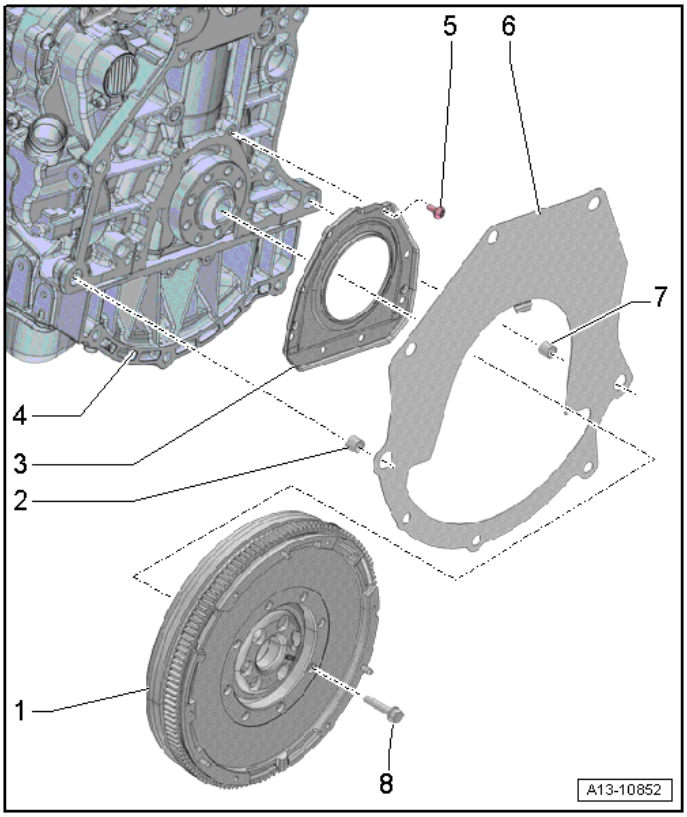
Code Letters, Assembly Allocation and Ratios

If original replacement parts are needed for a repair, always pay attention to the transmission codes.

6 Speed Automatic Transmission 09G	
Identification codes	MAN
Engine	2.5L -125 kW

Controls, Housing – 09G

ATF Circuit Overview

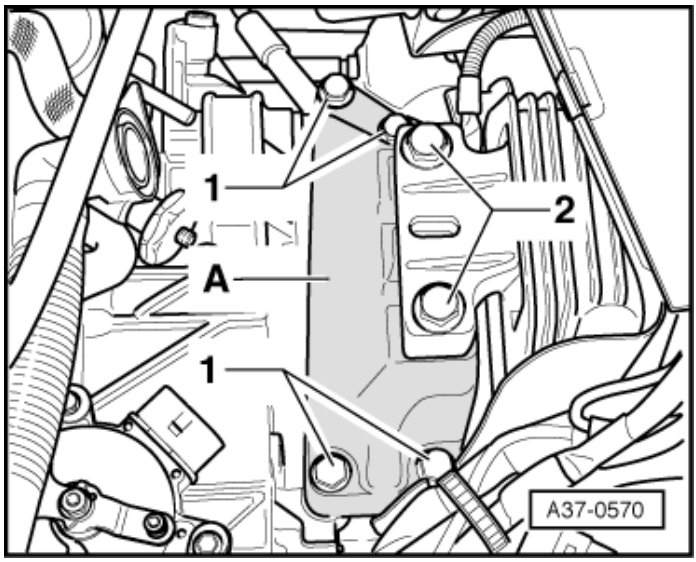


1 - Transmission Housing
2 - O-ring
- ☐ Replace after removing

3 - ATF Cooler
4 - O-ring
- ☐ Replace after removing

5 - Washer
6 - Plate Spring
7 -Bolt
- ☐ 36 Nm

Assembly Mounts Assembly Overview

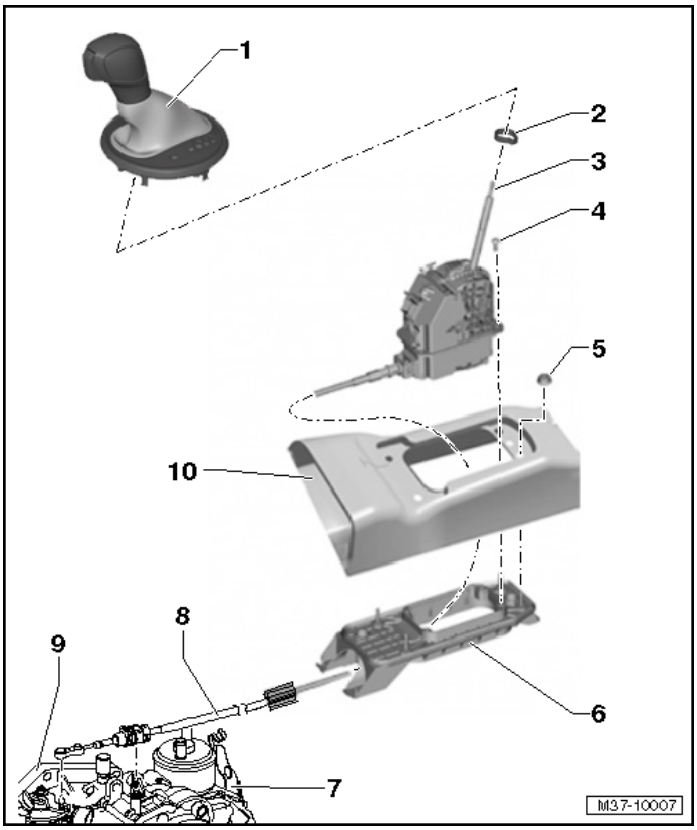


Left Assembly Mounts

Transmission bracket -A- on the transmission and transmission mount.

- ☐ 1 - = 40 Nm + an additional 90° (1/4) turn, when replacing bolts.
- ☐ 2 - = 60 Nm + an additional 90° (1/4) turn, when replacing bolts.

Selector Mechanism Overview



1 - Selector Lever Handle
- ☐ Tightening specification, see Engine Support - Tightening Specification and Sequence below
- ☐ Replace after removing

2 - Clamp
- ☐ Replace after removing

3 - Selector Mechanism with Selector Lever Cable
- ☐ Always replace as a complete unit.

4 - Bolt
- ☐ 8 Nm

5 - Nut with Collar
- ☐ 8 Nm

6 - Selector Housing

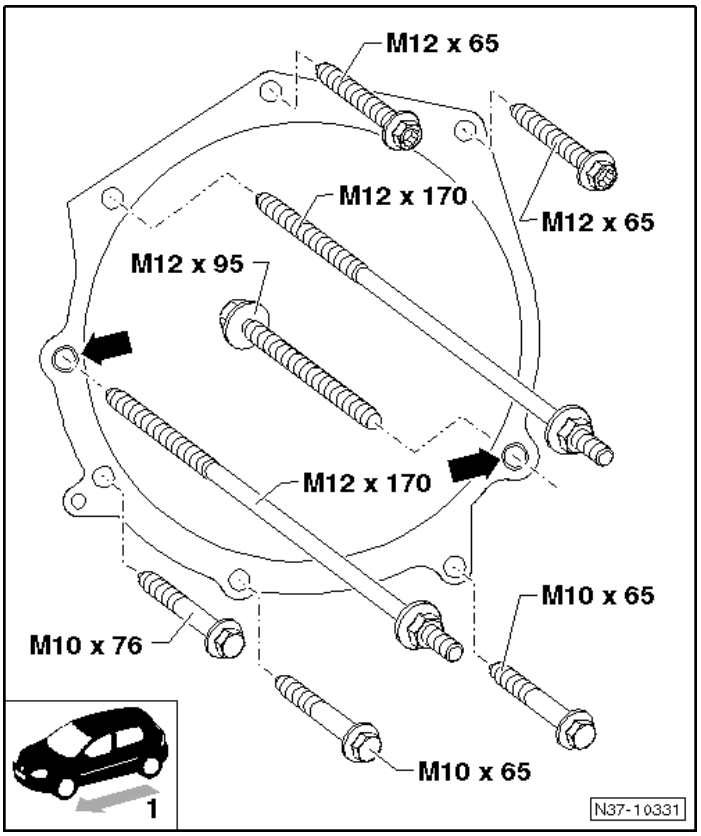
7 - Bracket

8 - Selector Lever Cable

9 - Transmission

10 - Tunnel/Body

Transmission to Engine Tightening Specifications



1 - Driving Direction

- Drive Plate to Torque Converter

- ☐ 60 Nm

- Bolt - M12

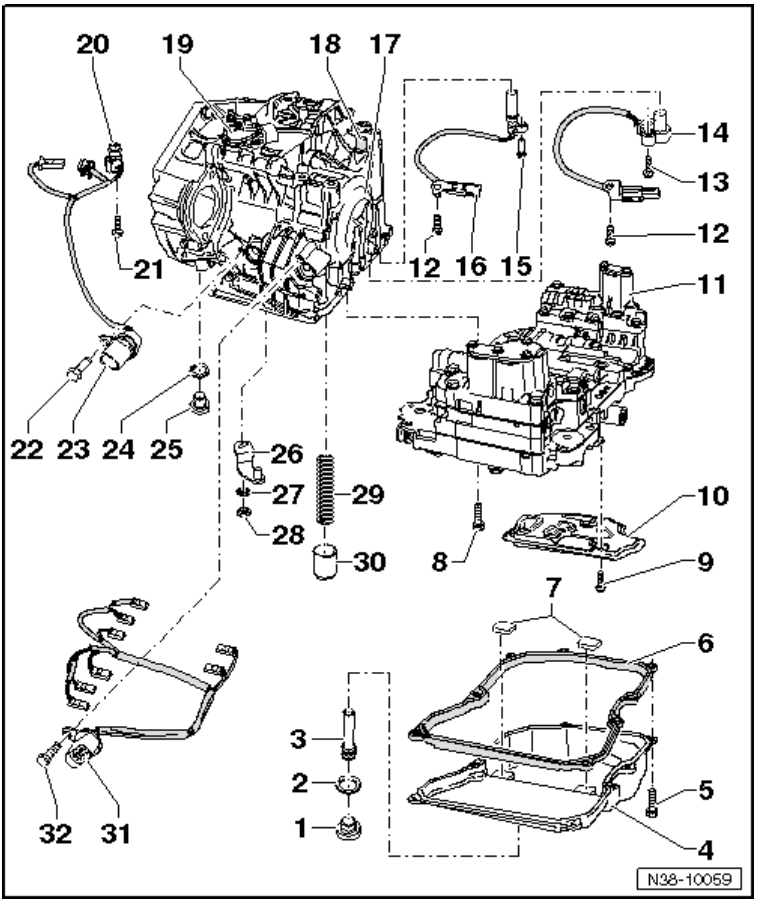
- ☐ 80 Nm
- ☐ 65 Nm, if using the insert tool 18 mm -T10179-

- Bolt - M10

- ☐ 40 Nm
- ☐ Bolts are located in lower flange

- Transmission fluid cooler nuts 8 Nm

Valve Body Overview



1 - ATF Check Plug
- ☐ 27 Nm

2 - Seal
- ☐ Replace after removing

3 - Overflow Pipe
- ☐ 2 Nm

4 - Oil Pan

5 - Bolt
- ☐ 7 Nm
- ☐ Tighten the ATF pan bolts diagonally and in several steps.

6 - Gasket

7 - Magnet

8 - Bolt
- ☐ 8 Nm + an additional 90° (1/4 turn)
- ☐ Replace after removing
- ☐ Attaching valve body to transmission

9 - Bolt
- ☐ 11 Nm
- ☐ Attaching te ATF strainer to valve body

10 - Oil Screen
11 - Valve Body
12 - Bolt
- ☐ 6 Nm

13 - Bolt
- ☐ Always replace as a complete unit.

14 - Transmission Input Speed Sensor -G182-
15 - Bolt
- ☐ 7 Nm

16 - Transmission Output Speed Sensor -G195-
17 - Transmission Housing
18 - Bleed Cap
19 - Multifunction Transmission Range Switch -F125-
20 - Transmission Fluid Temperature Sensor -G93-
21 - Selector Mechanism with Selector Lever Cable
- ☐ 6 Nm

22 - Bolt
- ☐ 6 Nm

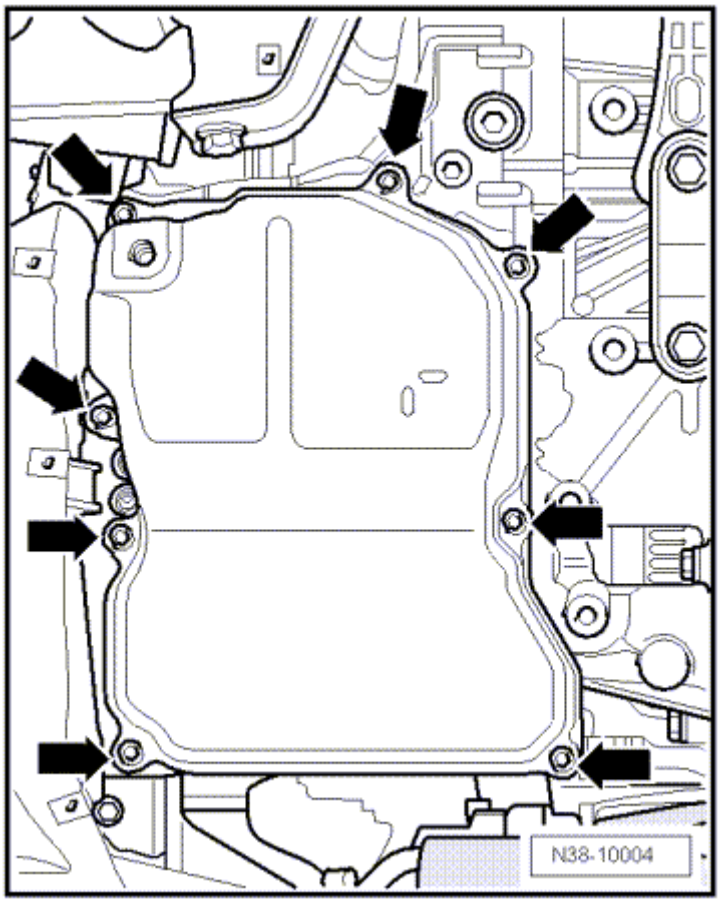
23 - Seal
- ☐ If present, replace after removing

24 - Selector Housing
25 - ATF Drain Plug
- ☐ 40 Nm
- ☐ Not installed on all transmissions

26 - Lever
27 - Washer
28 - Nut
- ☐ 10 Nm

29 - Spring
30 - Damper Piston
31 - Solenoid Valve Wiring Harness
32 - Bolt
- ☐ 6 Nm

Transmission Fluid Pan Tightening Specification

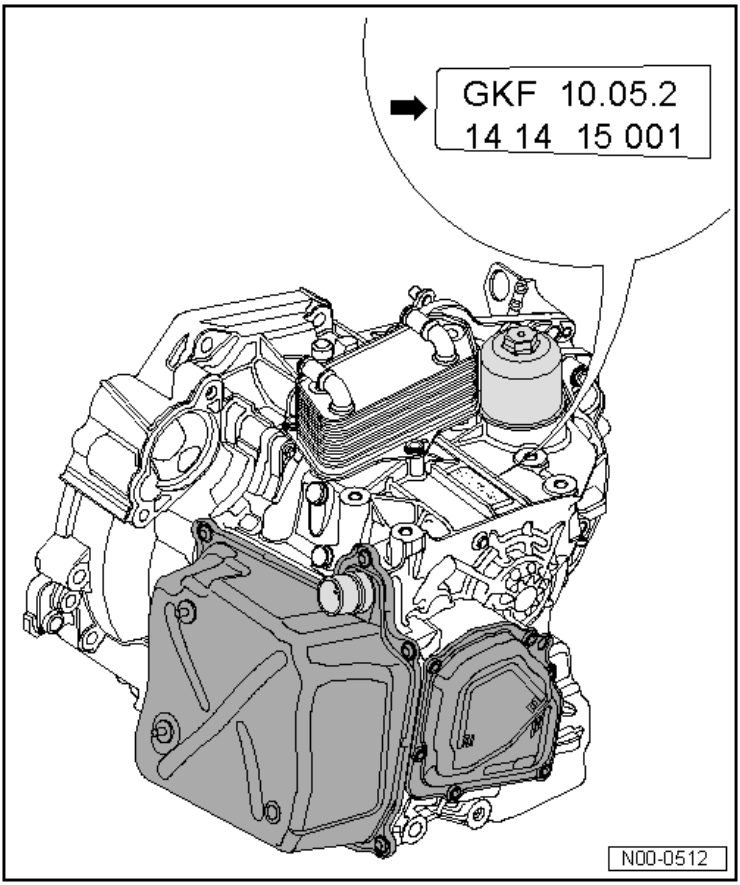


Component	Nm
Tighten the transmission fluid pan bolts (➡) diagonally in several steps	7

DIRECT SHIFT GEARBOX (DSG) TRANSMISSION – 02E

General, Technical Data

Transmission Identification

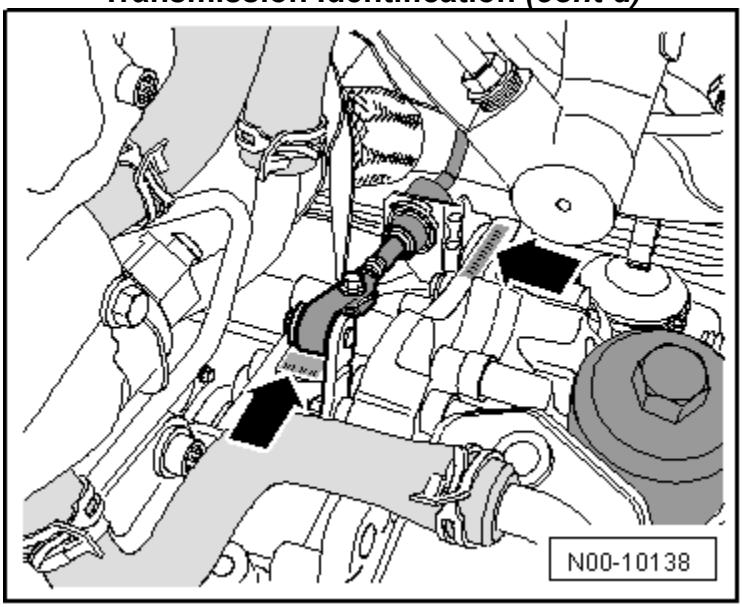


Example: arrow

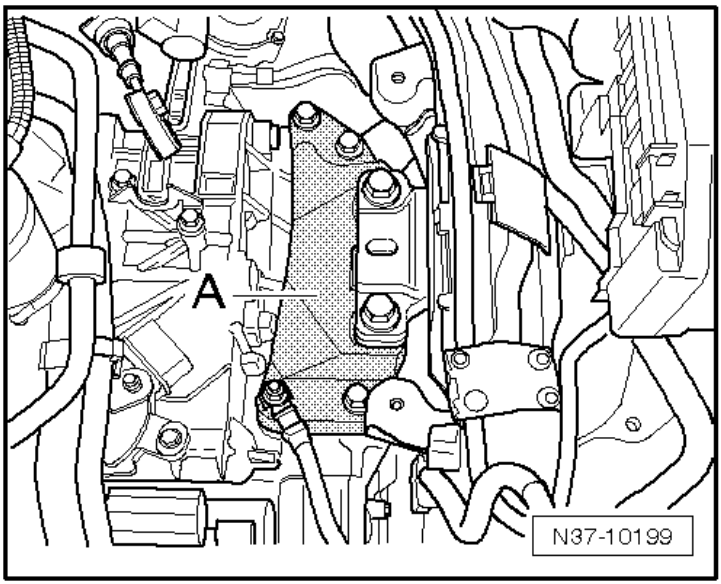
GKF	10	05	10
Identification code	Day	Month	Production year (2010)

14 - Plant code 14 15 - Time 001 - serial number

Transmission Identification *(cont'd)*



The transmission code letters can be found on the transmission near the selector lever cable (➡) or under the transmission mount bracket.



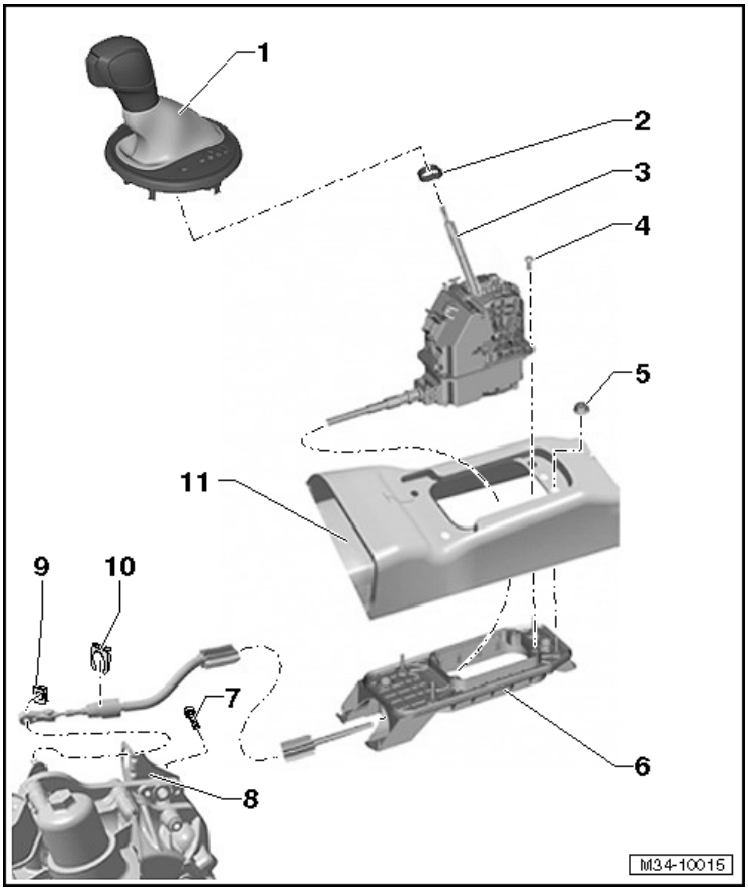
To read the transmission code letters under the transmission mount bracket, support the engine and transmission and remove the transmission mount bracket (A). Refer to ElsaWeb for the transmission mount bracket removal procedure.

Transmission Allocation Codes

Direct Shift Gearbox (DSG) 02E		
Transmission identification codes	MSX, MSY and NJM	MFL, MSV and NJK
Engine	2.0L - 147 kW TFSI	2.0L - 103 kW TDI CR

Controls, Housing (DSG) – 02E

Selector Mechanism Assembly Overview



1 - Selector Lever Handle
2 - Clamp
- ☐ Replace after removing

3 - Selector Mechanism with Selector Lever Cable
4 - Bolt
- ☐ 8 Nm

5 - Nut with Collar
- ☐ 8 Nm

6 - Selector Housing
7 - Lock Washer
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

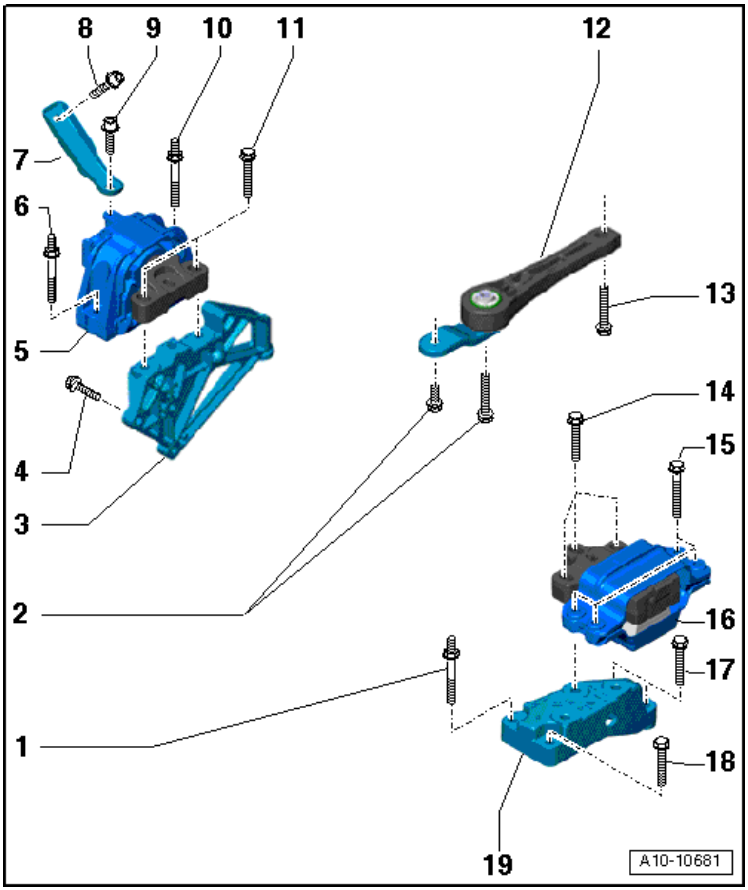
8 - Cable Mounting Bracket
9 - Lock Washer
- ☐ Replace after removing

10 - Lock Washer

- ☐ Replace after removing

11 - Tunnel/Body

Engine and Transmission Mounts and Brackets Overview



1 - Bolt
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

2 - Bolts
- ☐ Tightening sequence and specification, refer to Suspension, Wheels, Steering

3 - Engine Support

4 - Bolt
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

5 - Engine Mount

6 - Bolt
- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

7 - Connecting Bar

8 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

9 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

10 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

11 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

12 - Pendulum Support

13 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

14 - Bolt

- ☐ 60 Nm + 90° turn
- ☐ Replace after removing

15 - Bolt

- ☐ Tightening sequence and specification, refer to Engine Mechanical, Fuel Injection and Glow Plug

16 - Transmission Mount

17 - Bolt

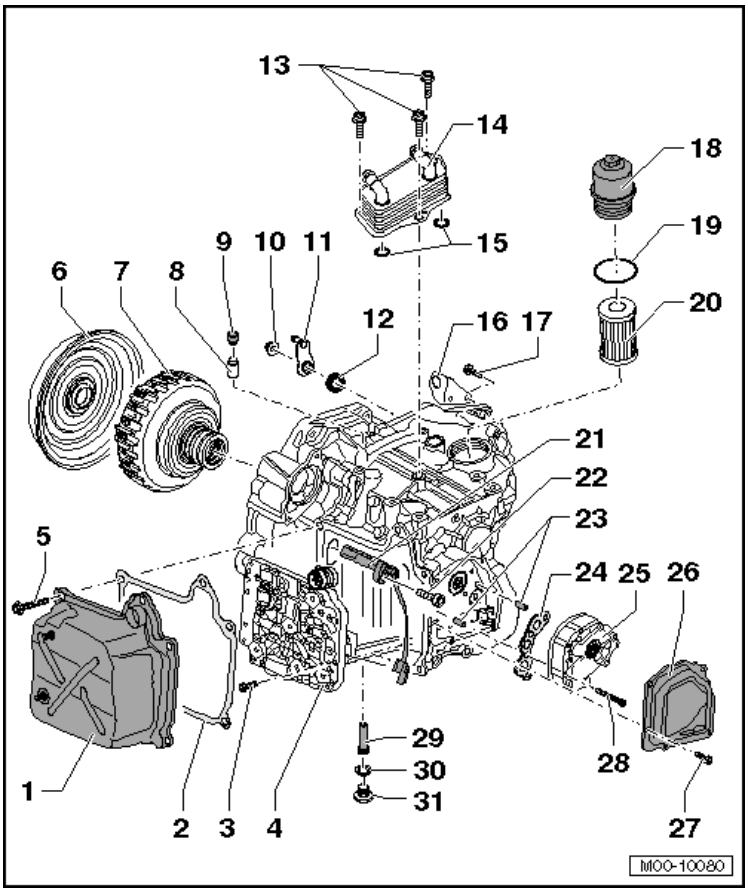
- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

18 - Bolt

- ☐ 40 Nm + 90° turn
- ☐ Replace after removing

19 - Transmission Mount Bracket

Transmission Assembly Overview



1 - Transmission Cover
2 - Seal
- ☐ Replace after removing

3 - Bolt
- ☐ Tightening specification and sequence, see below

4 - DSG Transmission Mechatronic -J743-
5 - Bolt
- ☐ Tightening specification and sequence, see below

6 - Clutch End Cover
7 - Dual Clutch
8 - Bleed Pipe
- ☐ Replace after removing

9 - Bleed Cap
10 - Nut
- ☐ 20 Nm
- ☐ Replace after removing

11 - Selector Lever

12 - Seal
13 - Bolt
- ☐ 20 Nm + 90° turn
- ☐ Replace after removing

14 - Transmission Oil Cooler
15 - O-rings
16 - Cable Mounting Bracket
17 - Bolt
- ☐ Replace after removing
- ☐ Tightening specification, refer to Selector Mechanism Assembly Overview

18 - Filter Housing
- ☐ 20 Nm

19 - O-Ring
- ☐ Replace after removing

20 - Transmission Fluid Filter
21 - Transmission Input Speed Sensor -G182- and Clutch Oil Temperature Sensor -G509-
22 - Bolt
- ☐ 10 Nm

23 - Alignment Pin
24 - Gasket
- ☐ Replace after removing

25 - Transmission Oil Pump
26 - Transmission Oil Pump Cover
27 - Bolt
- ☐ Replace after removing
- ☐ Tightening specification and sequence see below

28 - Bolt
- ☐ Replace after removing
- ☐ Tightening specification and sequence see below

29 - Overflow Pipe
- ☐ 3 Nm

30 - Seal
- ☐ Replace after removing

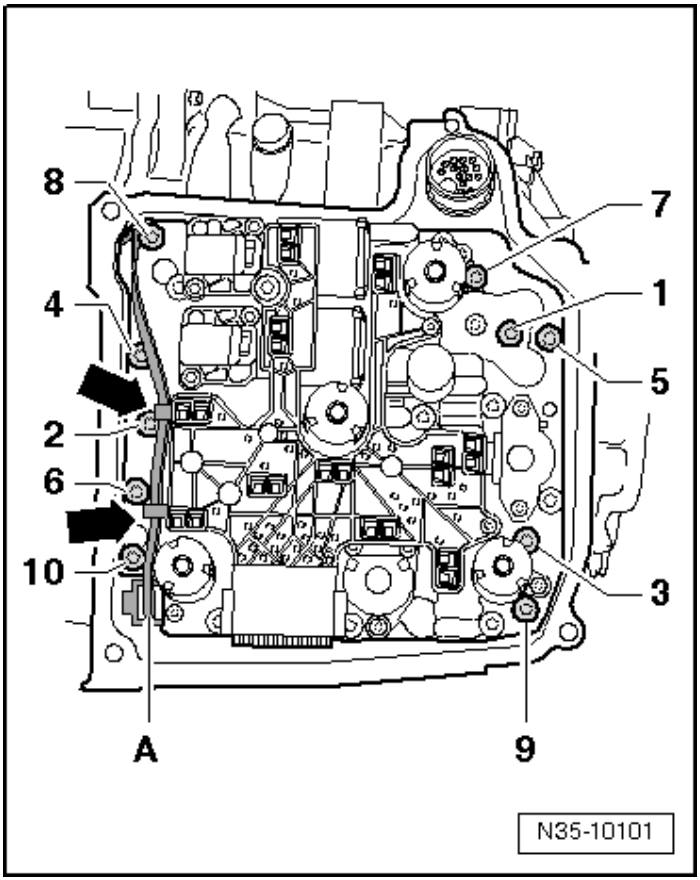
31 - Drain and Check Plug
- ☐ 45 Nm

Fastener Tightening Specifications

Component	Fastener size	Nm
Component Tightening Specification Cable bracket on the transmission cover	-	10
Transmission cover bolt [1)]	-	16
Transmission fluid pump cover	-	8
Transmission Input Speed Sensor/Clutch Oil Temperature Sensor/	-	10

[1)] Tighten bolts diagonally in steps

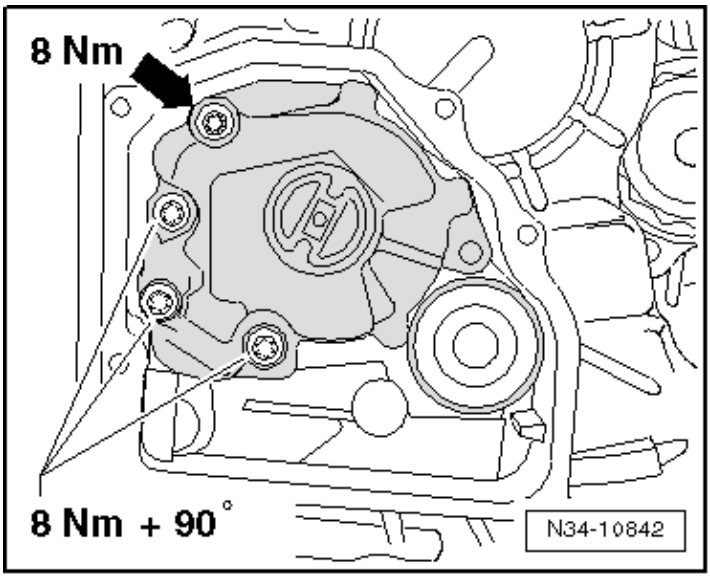
DSG Transmission Mechatronic -J743- Tightening Specifications



Step	Component	Nm
1	Tighten bolts 1 through 10 in sequence [1)]	Hand-tighten
2	Tighten bolts 1 through 10 in sequence	5
3	Tighten bolts 1 through 10 in sequence	an additional 90° (¼ turn)

[1)] Replace fastener(s).

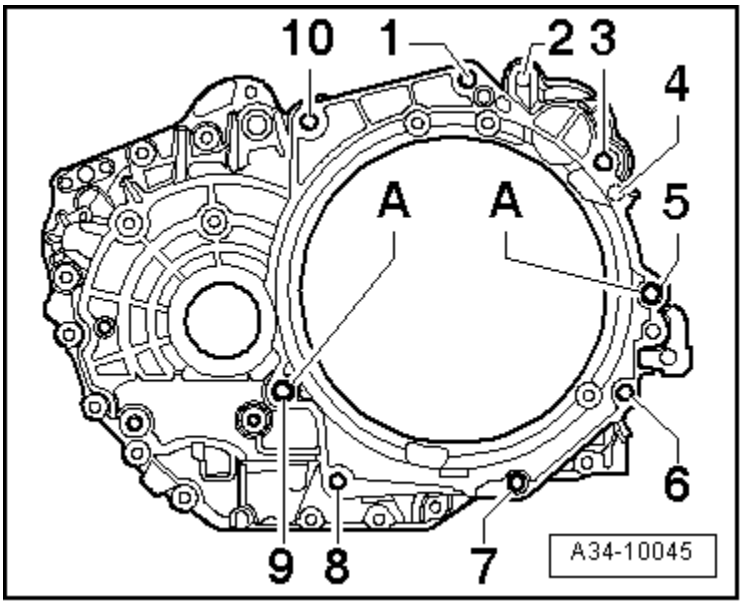
Oil Pump Tightening Specifications



Step	Component	Nm
1	Upper countersink bolt	8 with Wrench - Pump/Injector Long Reach -T10054-
2	Flat head bolts	8
3	Flat head bolts	an additional 90° (¼ turn)

1) Replace fastener(s).

Transmission to Engine Tightening Specifications



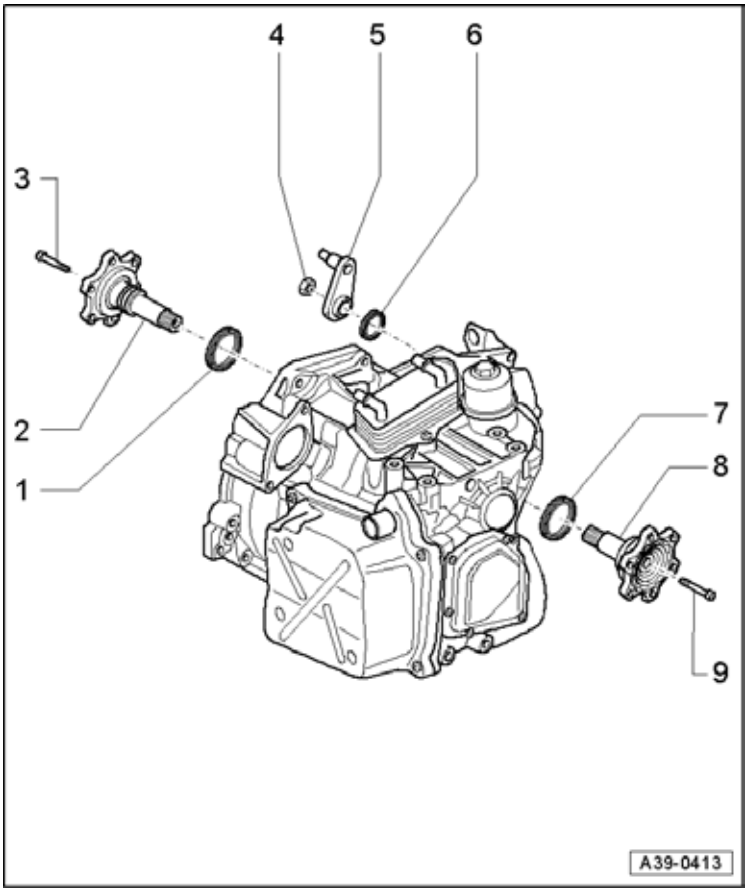
Item	Bolt	Nm
1	M12 x 55	80
2	M10 x 45 [1)]	40
3	M12 x 55 [2)]	80
4	M10 x 45 or M10 x 40 [1)]	40
5	M12 x 65 or M12 x 70	80
6	M10 x 50	40
7	M10 x 50	40
8	M10 x 50	40
9	M12 x 65 or M12 x 70	80
10	M12 x 55	80
A	Alignment sleeves for centering	

[1)] Starter to transmission.

[2)] Accessible only through the opening in the removed starter.

Rear Final Drive, Differential (DSG) – 02E

Seals Component Location Overview



1 - Right Seal
2 - Right Flange Shaft
3 - Bolt
- ☐ 30 Nm
- ☐ Replace after removing

4 - Nut
- ☐ Tightening specification, refer to Transmission Assembly Overview

5 - Selector Lever
6 - Gearshift Shaft Seal
7 - Left Seal
8 - Left Flange Shaft
9 - Bolt
- ☐ 30 Nm
- ☐ Replace after removing