

11 00 Standard screw connection

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Screws and nuts	B47O0	M5		5 Nm $\pm$ 0.5
2AZ Screws and nuts	B47O0	M6		8 Nm $\pm$ 1
3AZ Screws and nuts	B47O0	M7		13 Nm $\pm$ 2
4AZ Screws and nuts	B47O0	M8		19 Nm $\pm$ 3
5AZ Screws and nuts	B47O0	M10		38 Nm $\pm$ 5
6AZ Hose clamp, WAF 5	B47O0			1.0 to 1.5 Nm
7AZ Hose clamp, WAF 6	B47O0			2,5 up to 3,5 Nm

1100 Overview of Technical Data

Compression pressure setpoint value	
	min. 16 bar

Engine oilB47TÃœ1	
Capacity of engine oil	5,5 l

1100 Overview of tightening torques

Engine fixture to engine support arm		
Hexagon screws from special tool set	Tightening torque	105Nm
Engine support arm on the assembly stand		
M14 x 95	Tightening torque	130Nm
Holder to crankcase		
M10	Tightening torque	38Nm
Special tool 2 455 010 to crankcase		
M10x30	Tightening torque	38Nm
Special tool to cylinder head		
M8	Tightening torque	21,5Nm
Special tool to cylinder head		
M8	Tightening torque	21,5Nm
Standard screw connection 4 Nm		
Oval-head screw	Tightening torque	4Nm
Standard screw connection M10		
M10		38Nm
Standard screw connection M5		
M5		5Nm
Standard screw connection M6		
M6		8Nm
Standard screw connection M7		
M7		13Nm
Standard screw connection M8		
M8	Tightening torque	19Nm
Standard screw connection hose clamp 5		
Hose clamp L12 - L15	Tightening torque	1,25Nm

11 27 Dual-mass balance

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Gear to counterbalance shaft	B47O0	M10	1. Jointing torque	20 Nm
			2. Angle of rotation	180 °
2AZ Idler gear to crankcase	B47O0	M12	1. Jointing torque	10 Nm
			2. Angle of rotation	45 °

11 11 Engine block

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Bearing cap to crankcase (collar bolt)	B47O0	M10x1.5	Replace bolts, screw in hand-tight	
			1. Jointing torque	25 Nm
			2. Jointing torque	50 Nm
			3. Angle of rotation	60 °
			4. Angle of rotation	60 °
2AZ Oil spray nozzle in crankcase	B47O0	M6		10 Nm
3AZ Coolant screw plug	B47O0	M14x1,5	Replace sealing ring	30 Nm
4AZ Special tool/holder to crankcase	B47O0	M10x35		40 Nm
5AZ Special tool 11 8 930 to special tool 00 2 300	B47O0	M14x35		160 Nm
6AZ Bearing journal of tensioning and guide rail	B47O0	M8	Replace bolts	20 Nm
7AZ Solenoid valve to engine block	B47O0	M6		8 Nm
8AZ Spacing screw for acoustic cover on engine block (AF 17)	B47O0	M8x12		12 Nm
9AZ Guide tube for oil dipstick on engine block	B47O0	M8x16		19 Nm

11 00 Standard screw connection

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Screws and nuts	B47O0	M5		5 Nm $\pm$ 0.5
2AZ Screws and nuts	B47O0	M6		8 Nm $\pm$ 1
3AZ Screws and nuts	B47O0	M7		13 Nm $\pm$ 2
4AZ Screws and nuts	B47O0	M8		19 Nm $\pm$ 3
5AZ Screws and nuts	B47O0	M10		38 Nm $\pm$ 5
6AZ Hose clamp, WAF 5	B47O0			1.0 to 1.5 Nm
7AZ Hose clamp, WAF 6	B47O0			2,5 up to 3,5 Nm

1111 Overview of Technical Data

Cylinder bore	
	Diameter of cylinder bore
	84,00 mm ... 84,018 mm
	Permitted irregularity of the cylinder bore
	0,01 mm
	Permitted conicity of the cylinder bore
	0,01 mm

1111 Overview of tightening torques

Bearing journal of tensioning and guide rail			
M8	Replace bearing journal.	Tightening torque	20Nm
Main bearing cap to crankcase			
M10x85 Replace screws.		1. tightening torque	25Nm
		2. tightening torque	50Nm
		3. Angle of rotation	60째
		4. Angle of rotation	60째
Oil deflector to crankcase			
M8x14		Tightening torque	19Nm
Oil deflector to crankshaft bearing cap			
M8x14 Replace screws.		Tightening torque	35Nm
		Release	180째
		Tightening torque	15Nm
		Angle of rotation	45째
Special tool 11 8 930 to special tool 00 2 300			
M14x35			160Nm
Special tool 11 8 930 to special tool 00 2 320			
M14x35		Tightening torque	160Nm
Special tool/holder to crankcase			
M10x35			40Nm

11 12 Cylinder head with cylinder head cover

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Cylinder head bolt	B47O0	M12 x 1.5 x 200	Renew screws.	
			1. Jointing torque	50 Nm
			2. Angle of rotation	120 °
			3. Angle of rotation	120 °
2AZ Cylinder head bolt to gear case cover	B47O0	M8x40		22 Nm
3AZ Cylinder head cover to cylinder head.	B47O0	M6		10 Nm
4AZ Securing eye to cylinder head.	B47O0	M8		22 Nm
5AZ Chain tensioner to cylinder head	B47O0	M22 x 1.5		70 Nm
6AZ Bearing journal to cylinder head	B47O0	M16 x 1.5	Replace bearing journal	20 Nm

1112 Overview of Technical Data

Check for cylinder head watertightness	
	Temperature of the cylinder head
	60 Å°C

Check for cylinder head watertightness	
	Testing pressure
	max. 3,0 bar

Cleaning the intake ports	
	Operating pressure
	6 bar ... 8 bar

Cleaning the intake ports	
	Blast duration with walnut granules
	Approx. 20 s
	Blast duration with pure compressed air for the complete blowing out of walnut granules
	Approx. 10 s

Cross deviation from flatness	
	max. 0,05 mm

Cylinder head flatness	
	Maximum lengthwise deviation from flatness
	0,10 mm
	Maximum transverse deviation from flatness
	0,05 mm

Longitudinal deviation from flatness	
	max. 0,10 mm

Selecting the cylinder head gasket

A decision is made to determine which cylinder head gasket must be used based on the measuring result of the measurement of the piston protrusion.

Cylinder head gasket with number of holes 1

0 mm ... 0,92 mm

Cylinder head gasket with number of holes 2

0,93 mm ... 1,03 mm

Cylinder head gasket with number of holes 3

1,04 mm ... 1,18 mm

Valve underprotrusion

0,8 (0,7 - 0,9) mm

1112 Overview of tightening torques

Bearing journal to cylinder head			
M16x1.5 Replace bearing journal.		Tightening torque	20Nm
Cylinder head bolt to timing case cover			
M8x40		Tightening torque	19Nm
Cylinder head cover to cylinder head			
M6		Tightening torque.	8,5Nm
Cylinder head to crankcase			
M12x1.5 Renew screws.		1. Jointing torque	50Nm
		2. Angle of rotation	120°
		3. Angle of rotation	120°
Cylinder head to special tool			
Special tool		Tightening torque	25Nm
Flange to assembly stand			
M14X30		Tightening torque	135Nm
Ground to cylinder head			
M6		Tightening torque	8Nm
Special tool to cylinder head			
Special tool		Tightening torque	20Nm

11 13 Oil sump

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Oil drain plug	B47O0	M12 x 1.5	Renew the sealing ring.	25 Nm
2AZ Oil sump to crankcase	B47O0	M8x30 M8x110		24 Nm

1113 Overview of Technical Data

Height of the sealing bead	
	2,0 mm ... 2,5 mm

1113 Overview of tightening torques

Bracket to oil sump			
M12		Tightening torque	100Nm
Holder to front axle support			
M12		Tightening torque	100Nm
Oil drain plug			
M12x16 Replace sealing ring.		Tightening torque	25Nm
Oil drain plug on oil sump			
M12x1.5 Renew the sealing ring.		Tightening torque	25Nm
Oil sump to crankcase			
M8x30		Tightening torque	24Nm
M8x110		Tightening torque	24Nm

11 14 Case Covers

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Timing case cover to crankcase	B47O0	M6	Replace screws	
			Jointing torque Angle of rotation	8 Nm 90 Å°
2AZ Spacer screw to component carrier	B47O0	M6		6 Nm
		M8		12 Nm

1114 Overview of Technical Data

Processing time of liquid sealing compound	
	< 12 min

1114 Overview of tightening torques

Rear timing case cover to crankcase			
M6 Renew screws.	Jointing torque		8Nm
	Angle of rotation		90°
Screw on component carrier			
M8x12 Renew screw.	Tightening torque		12Nm

1115 Overview of Technical Data

Differential pressure between ambient pressure and engine internal pressure	
	Nominal value
	0 (-15 - +30) mbar

1116 Overview of tightening torques

Component carrier to crankcase			
M8x35		Tightening torque	19Nm

11 24 Connecting Rods and Bearings

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Connecting rod bolts	B47O0	M9x1.25	Release screws. Clean crack surfaces.	
			1. Jointing torque	5 Nm
			2. Jointing torque	20 Nm
			3. Angle of rotation	70 Å°

11 21 Crankshaft and Bearings

Tightening Torques

	Type	Thread	Tightening specification	Torque
1AZ Increment wheel on crankshaft	S54	M5 10.9	Replace screws	5.0 Nm 45 Å°
Increment wheel on crankshaft			Jointing torque Torque angle	
Increment wheel on crankshaft		M5 10.9	Replace screws	13 Nm
Increment wheel on crankshaft		M5 8.8	Replace screws	5.5 Nm

11 27 Dual-mass balance

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Gear to counterbalance shaft	B47O0	M10	1. Jointing torque	20 Nm
			2. Angle of rotation	180 °
2AZ Idler gear to crankcase	B47O0	M12	1. Jointing torque	10 Nm
			2. Angle of rotation	45 °

11 11 Engine block

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Bearing cap to crankcase (collar bolt)	B47O0	M10x1.5	Replace bolts, screw in hand-tight	
			1. Jointing torque	25 Nm
			2. Jointing torque	50 Nm
			3. Angle of rotation	60 °
			4. Angle of rotation	60 °
2AZ Oil spray nozzle in crankcase	B47O0	M6		10 Nm
3AZ Coolant screw plug	B47O0	M14x1,5	Replace sealing ring	30 Nm
4AZ Special tool/holder to crankcase	B47O0	M10x35		40 Nm
5AZ Special tool 11 8 930 to special tool 00 2 300	B47O0	M14x35		160 Nm
6AZ Bearing journal of tensioning and guide rail	B47O0	M8	Replace bolts	20 Nm
7AZ Solenoid valve to engine block	B47O0	M6		8 Nm
8AZ Spacing screw for acoustic cover on engine block (AF 17)	B47O0	M8x12		12 Nm
9AZ Guide tube for oil dipstick on engine block	B47O0	M8x16		19 Nm

11 00 Standard screw connection

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Screws and nuts	B47O0	M5		5 Nm $\pm$ 0.5
2AZ Screws and nuts	B47O0	M6		8 Nm $\pm$ 1
3AZ Screws and nuts	B47O0	M7		13 Nm $\pm$ 2
4AZ Screws and nuts	B47O0	M8		19 Nm $\pm$ 3
5AZ Screws and nuts	B47O0	M10		38 Nm $\pm$ 5
6AZ Hose clamp, WAF 5	B47O0			1.0 to 1.5 Nm
7AZ Hose clamp, WAF 6	B47O0			2,5 up to 3,5 Nm

1121 Overview of Technical Data

Axial play of crankshaft	
	Equipment installation status
	0,090 mm ... 0,273 mm
	Operating condition
	0,11 mm ... 0,314 mm

Maximum permitted torque of the crankshaft	
	max. 2 Nm

11 22 Flywheel

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Flywheel to crankshaft	B4700	M12x1.5	Replace screws.	120 Nm

1122 Overview of tightening torques

Flywheel to crankshaft			
M12x1.5 Renew screws.		Tightening torque	120Nm

11 23 Vibration damper

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Vibration damper with belt pulley to crankshaft	B47O0	M10x65	Replace screw. 1. Jointing torque 2. Angle of rotation	40 Nm 120 Å°

1123 Overview of tightening torques

Vibration damper with belt pulley to crankshaft		
M10x65 Renew screws. Tighten screws crosswise.	1. Jointing torque	40Nm
	2. Angle of rotation	60°
	3. Angle of rotation	60°
Vibration damper with belt pulley to crankshaft		
M10x65 Renew screws.	Jointing torque	40Nm
	Angle of rotation	120°

11 24 Connecting Rods and Bearings

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Connecting rod bolts	B47O0	M9x1.25	Release screws. Clean crack surfaces.	
			1. Jointing torque	5 Nm
			2. Jointing torque	20 Nm
			3. Angle of rotation	70 Å°

11 27 Dual-mass balance

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Gear to counterbalance shaft	B47O0	M10	1. Jointing torque	20 Nm
			2. Angle of rotation	180 °
2AZ Idler gear to crankcase	B47O0	M12	1. Jointing torque	10 Nm
			2. Angle of rotation	45 °

11 11 Engine block

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Bearing cap to crankcase (collar bolt)	B47O0	M10x1.5	Replace bolts, screw in hand-tight	
			1. Jointing torque	25 Nm
			2. Jointing torque	50 Nm
			3. Angle of rotation	60 °
			4. Angle of rotation	60 °
2AZ Oil spray nozzle in crankcase	B47O0	M6		10 Nm
3AZ Coolant screw plug	B47O0	M14x1,5	Replace sealing ring	30 Nm
4AZ Special tool/holder to crankcase	B47O0	M10x35		40 Nm
5AZ Special tool 11 8 930 to special tool 00 2 300	B47O0	M14x35		160 Nm
6AZ Bearing journal of tensioning and guide rail	B47O0	M8	Replace bolts	20 Nm
7AZ Solenoid valve to engine block	B47O0	M6		8 Nm
8AZ Spacing screw for acoustic cover on engine block (AF 17)	B47O0	M8x12		12 Nm
9AZ Guide tube for oil dipstick on engine block	B47O0	M8x16		19 Nm

11 00 Standard screw connection

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Screws and nuts	B47O0	M5		5 Nm $\pm$ 0.5
2AZ Screws and nuts	B47O0	M6		8 Nm $\pm$ 1
3AZ Screws and nuts	B47O0	M7		13 Nm $\pm$ 2
4AZ Screws and nuts	B47O0	M8		19 Nm $\pm$ 3
5AZ Screws and nuts	B47O0	M10		38 Nm $\pm$ 5
6AZ Hose clamp, WAF 5	B47O0			1.0 to 1.5 Nm
7AZ Hose clamp, WAF 6	B47O0			2,5 up to 3,5 Nm

1124 Overview of tightening torques

Connecting rod bearing cap to connecting rod		
M9x47	Tightening torque	20Nm
	Angle of rotation 1	70°
	Angle of rotation 2	70°

1125 Overview of Technical Data

End clearance of the piston rings	
Before measuring the end clearance, make sure the cylinder is within the permissible tolerance.	End clearance of the plain rectangular compression ring
	0,13 mm ... 0,17 mm
	End clearance of the taper faced piston ring
	0,0045 mm ... 0,12 mm
	End clearance of the oil scraper ring with spiral expander
	cannot be measured

Piston diameter	
Measure the piston diameter at distance (A) from the lower end of the piston skirt.	Distance (A) to the lower end of the piston skirt
	17 mm
	Nominal dimension of piston diameter
	83,936 mm ... 83,954 mm

Side clearance of piston rings

Clean all components before measuring the side clearance.

Side clearance of the plain rectangular compression ring

0,17 mm ... 0,27 mm

Side clearance of the taper faced piston ring

0,30 mm ... 0,50 mm

Side clearance of the oil scraper ring with spiral expander

0,2 mm ... 0,4 mm

11 27 Dual-mass balance

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Gear to counterbalance shaft	B47O0	M10	1. Jointing torque	20 Nm
			2. Angle of rotation	180 °
2AZ Idler gear to crankcase	B47O0	M12	1. Jointing torque	10 Nm
			2. Angle of rotation	45 °

1127 Overview of tightening torques

Gear to counterbalance shaft		
M10 Renew screws.	1. Jointing torque	20Nm
	2. Angle of rotation	180°
Idler gear to crankcase		
M12	Tightening torque	70Nm
Idler gear to crankcase		
M12x1.5	Tightening torque	10Nm
	Angle of rotation	45°
Special tool 2 288 054 to crankshaft		
M10	Tightening torque	20Nm
Special tool 2 288 054 to crankshaft		
	Tightening torque	20Nm

11 28 V-ribbed belt with Tension and Deflection Element

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Belt tensioner with deflection pulley to crankcase	B47O0	M10		45 Nm
2AZ Deflection pulley to alternator	B47O0	M8		22 Nm
3AZ Deflecting element to crankcase	B47O0	M10		45 Nm

1128 Overview of tightening torques

Belt tensioner for drive belt		
M8x30	Tightening torque	28Nm

1130 Overview of tightening torques

SWZ2249117		
Screw M6	Tightening torque	10Nm

11 31 Camshaft

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Sprocket wheel to fitted camshaft	B47O0	M7x17.		17 Nm
2AZ Inlet and exhaust camshafts in camshaft carrier	B47O0	M6x31		10 Nm
3AZ Camshaft carrier to cylinder head	B47O0	M7x35		15 Nm

1131 Overview of tightening torques

Camshaft carrier to cylinder head		
M7x35	Tightening torque	13Nm
Camshaft sprocket to camshaft		
M7x17.		17Nm
Chain tensioner piston to cylinder head		
NX7 25 mm Replace sealing ring, oil thread.	Jointing torque	12Nm
	Angle of rotation	90°
Coolant line to crankcase		
M6X16	Tightening torque	8Nm
Holder to crankcase		
M8X16	Tightening torque	19Nm
Hydraulic chain tensioner to crankcase		
M6x22	Tightening torque	9Nm
Intake and exhaust camshaft in camshaft support		
M6x31	Tightening torque	10Nm
Preload timing chain		
	Tightening torque	0,6Nm

11 27 Dual-mass balance

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Gear to counterbalance shaft	B47O0	M10	1. Jointing torque	20 Nm
			2. Angle of rotation	180 °
2AZ Idler gear to crankcase	B47O0	M12	1. Jointing torque	10 Nm
			2. Angle of rotation	45 °

11 41 Oil pump with strainer and motor

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Intake pipe to oil pump	B47O0	M6x25		8 Nm
2AZ Oil pump to crankcase	B47O0	M8x35		19 Nm
3AZ Oil deflector screw connection in the center	B47O0	M8x14	Renew screw	
			1. Jointing torque	35 Nm
			2. Loosen all screws	180 °
			3. Join	15 Nm
			4. Angle of rotation	45 °
4AZ Outer oil deflector screw connection	B47O0	M8x14		19 Nm
5AZ Sprocket to oil pump	B47O0	M8x35	Important - left-hand thread Renew screw	
			1. Jointing torque	5 Nm
			2. Angle of rotation	90 °

1141 Overview of tightening torques

Camshaft sprocket to oil vacuum pump		
M8x35 Left-hand thread	Renew screws.	
	Jointing torque	5Nm
	Angle of rotation	90°
Hydraulic valve to crankcase		
M6 x 18	Tightening torque	8Nm
Intake pipe to oil vacuum pump		
M6x25	Tightening torque	8Nm
Oil vacuum pump to crankcaseB47		
M8x35	Tightening torque	19Nm

11- 42 Oil filter with line

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Oil filter cover to oil filter module	B47O0	S88.5x3	O-ring lightly oiled	
			1. Initial tightening torque	25 Nm
			2. Loosen oil filter cover by 180°.	
			3. Final torque	25 Nm
2AZ Oil feed line to crankcase	B47O0	M6x12	Replace O-ring.	10 Nm
3AZ Oil return line to crankcase	B47O0	M6x16		10 Nm
4AZ Oil return line to turbocharger	B47O0	M6x16	Replace beaded metal gasket.	10 Nm
5AZ Oil feed line to exhaust manifold (with thermal protection)	B47O0	M6x12		10 Nm
6AZ Oil drain plug to oil filter cover	B47O0		Renew screw.	5 Nm
7AZ Oil-to-water heat exchanger to full-flow oil filter	B47O0			10 Nm
8AZ Oil feed line to exhaust turbocharger	B47O0	Hollow bolt	Renew sealing rings.	10 Nm
				45 °
	B47T0	Duplicate banjo bolt	Renew banjo bolt and sealing rings .	10 Nm
				70 °
9AZ Oil filter module to crankcase	B47O0	M6	Observe tightening sequence.	
			1. Jointing torque	8 Nm
			2. Tighten to	8 Nm.

1142 Overview of tightening torques

Central piston cooling valve to crankcase		
M6x16	Tightening torque	8Nm
Full-flow oil filter to crankcase		
Screw M6 Observe tightening sequence.	Jointing torque	8Nm
	Tighten down	8Nm
Oil drain plug to oil filter cover		
	Renew oil drain plug. Tightening torque	6Nm
Oil feed line for the exhaust turbocharger high-pressure stage		
Hollow bolt	Jointing torque	10Nm
	Angle of rotation	70°
Oil feed line on cylinder head		
M6x12	Tightening torque	8Nm
Oil feed line to bracket		
Torx screw M6x12	Tightening torque	8Nm
Oil filter cover to oil filter housing		
S88.5 x 3	New sealing ring, lightly oiled. Tightening torque	27Nm
Oil filter cover to oil filter module		
O-ring lightly oiled.	Initial tightening torque	25Nm
	Disassembly procedure	180°
	Tightening torque	25Nm
Oil return line to crankcase		
M6x12	Tightening torque	8Nm
Oil return line to turbocharger		
M6x12	Tightening torque	8Nm

Oil-to-water heat exchanger to full-flow oil filter

10Nm

Special tool to measure the pressure on the oil filter module

O-ring lightly oiled.

Tightening torque

25Nm

Special tool to oil filter cover

Special tool

Tightening torque

6Nm

1143 Overview of tightening torques

Guide tube for oil dipstick on engine		
M8x16	Tightening torque	19Nm

11 51 Coolant pump

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Coolant pump to component carrier	B47DO0	M6x30	For reuse of the coolant pump apply liquid seal 2.2.	8 Nm
2AZ Cooler feed flow socket to crankcase	B47DO0	M6x25		10 Nm
3AZ Coolant pump housing / component carrier to crankcase	B47O0	M8x35		19 Nm

11 71 Exhaust-gas recirculation

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ EGR pipe to exhaust manifold	B47O0	M8		32 Nm
2AZ EGR cooler on the cylinder head	B47O0	M8x20		19 Nm
3AZ Exhaust-gas recirculation valve to exhaust-gas recirculation cooler	B47O0	M6x16		10 Nm

11 71 Exhaust-gas recirculation

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ EGR pipe to exhaust manifold	B47T0	M8		35 Nm
2AZ EGR cooler on the cylinder head	B47T0	M8x20		19 Nm
3AZ Exhaust-gas recirculation valve to exhaust-gas recirculation cooler	B47T0	M6x16		10 Nm

1151 Overview of tightening torques

Coolant pump to component carrier		
M6x20	Tightening torque	8Nm
Coolant pump to crankcase		
M6 If reusing the coolant pump: Apply Loctite 5970 For additional information see: 11 00 ... Overview of consumables in EPC (Electronic Parts Catalogue) sealing compound 2.2	Tightening torque	8Nm

11 52 Fan

Tightening Torques

	Type	Thread	Tightening specification	Torque
1AZ Fan clutch on water pump Coupling nut (left-hand threads)	All			40 Nm
	M54			45 Nm
2AZ Fan to fan clutch	All			10 Nm

1153 Overview of tightening torques

Connecting branch on crankcase		
M6x25		10Nm
Connecting branch to component carrier		
M6x20	Tightening torque	8Nm
Connecting branch to engine block		
M6x25	Tightening torque	8Nm
SCR coolant lines to crankcase end cover		
Hexagon screw M6x16	Tightening torque	8Nm
Thermostat housing to component carrier		
M6	Tightening torque	8Nm

11 61 Intake manifold

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Intake manifold to cylinder head	alle	M8		22 Nm
	alle	M7		15 Nm
	alle	M6		10 Nm
2AZ Sound absorption cover to holder	M60/1 / M60/2 / M62	M6		8 Nm
3AZ Throttle valve to intake manifold	N73	M6x60/ M6x80		8 Nm

11 61 Intake plenum

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Suction module to cylinder head	B47O0	M6		10 Nm
2AZ Suction module to EGR	B47O0	M6		10 Nm
3AZ Charging pressure sensor in suction module	B47O0	M6x20		10 Nm
4AZ Preheat control unit to suction module	B47O0	PJ6 x20		7 Nm
5AZ Swirl-flap controller to suction module	B47O0		1. Abut screw head.	
			2. Final torque	4 Nm

11 65 Turbocharger and Control

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Exhaust manifold to turbocharger (D80 V-band clamp).	B47O0	M8	Replace V-band clamp.	13 Nm
2AZ Exhaust turbocharger support holder	B47O0	M8x16		22 Nm
3AZ Heat protection to cylinder head	B47O0	M8x16		10 Nm
4AZ Exhaust turbocharger to diesel particulate filter	B47O0	V-band clamp		15 Nm

11 65 Turbocharger and Control

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Exhaust turbocharger to exhaust turbocharger.	B47T0	M8	Coat screw threads thinly with high temperature paste 4.3	20 Nm
2AZ Exhaust turbocharger support holder	B47T0	M8x16		22 Nm
3AZ Heat shield to exhaust turbocharger	B47T0	M8x16		10 Nm
4AZ Exhaust turbocharger to diesel particulate filter	B47T0	V-band clamp	Replace V-band clamp	15 Nm
5AZ Exhaust turbocharger to exhaust manifold	B47T0	V-band clamp	Replace V-band clamp	15 Nm

1161 Overview of Technical Data

Clean the intake system	
	Soaking time of the cleaning agent
	1 h

Cleaning agent	
Universal cleaner must be diluted with water.	Washer fluid
	2 parts water, 1 part universal cleaner

Walnut granules	
	Quantity for each blasting process
	2 l

1161 Overview of tightening torques

Charge air duct to oil sump		
M6	Tightening torque	8Nm
Exhaust-gas recirculation cooler to intake plenum		
	Tightening torque	10Nm
Intake plenum to cylinder head		
M6	Tightening torque	11Nm
Intake plenum to exhaust-gas recirculation cooler		
M6	Tightening torque	11Nm
Swirl-flap controller to intake plenum		
M6 x 16 Tighten the bolts in alternating order until flush.		4Nm
Swirl-flap controller to intake plenum		
6x20 self-tapping	Tightening torque	6,5Nm

1162 Overview of tightening torques

Heat shield for exhaust turbocharger		
Torx screw BM 6x12	Tightening torque	10Nm

Heat shield for exhaust turbocharger		
Torx screw BM 6x12	Tightening torque	10Nm

11 71 Exhaust-gas recirculation

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ EGR pipe to exhaust manifold	B47O0	M8		32 Nm
2AZ EGR cooler on the cylinder head	B47O0	M8x20		19 Nm
3AZ Exhaust-gas recirculation valve to exhaust-gas recirculation cooler	B47O0	M6x16		10 Nm

11 71 Exhaust-gas recirculation

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ EGR pipe to exhaust manifold	B47T0	M8		35 Nm
2AZ EGR cooler on the cylinder head	B47T0	M8x20		19 Nm
3AZ Exhaust-gas recirculation valve to exhaust-gas recirculation cooler	B47T0	M6x16		10 Nm

11 65 Turbocharger and Control

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Exhaust manifold to turbocharger (D80 V-band clamp).	B47O0	M8	Replace V-band clamp.	13 Nm
2AZ Exhaust turbocharger support holder	B47O0	M8x16		22 Nm
3AZ Heat protection to cylinder head	B47O0	M8x16		10 Nm
4AZ Exhaust turbocharger to diesel particulate filter	B47O0	V-band clamp		15 Nm

11 65 Turbocharger and Control

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Exhaust turbocharger to exhaust turbocharger.	B47T0	M8	Coat screw threads thinly with high temperature paste 4.3	20 Nm
2AZ Exhaust turbocharger support holder	B47T0	M8x16		22 Nm
3AZ Heat shield to exhaust turbocharger	B47T0	M8x16		10 Nm
4AZ Exhaust turbocharger to diesel particulate filter	B47T0	V-band clamp	Replace V-band clamp	15 Nm
5AZ Exhaust turbocharger to exhaust manifold	B47T0	V-band clamp	Replace V-band clamp	15 Nm

1165 Overview of tightening torques

Electric changeover valve to intake plenum

TS6x20

Tightening torque

5Nm

Exhaust turbocharger to exhaust manifold

V-band clamp

Tightening torque

19Nm

Holder to exhaust turbocharger and crankcase

M8x16

Tightening torque

22Nm

Holder to exhaust turbocharger and crankcase

M8x16

Tightening torque

22Nm

11 66 Vacuum pump

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ End cover to vacuum pump	B47O0	M6x20		10 Nm

1166 Overview of tightening torques

Vacuum line for oil vacuum pump to crankcase		
M6x22	Tightening torque	8Nm

11 71 Exhaust-gas recirculation

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ EGR pipe to exhaust manifold	B47O0	M8		32 Nm
2AZ EGR cooler on the cylinder head	B47O0	M8x20		19 Nm
3AZ Exhaust-gas recirculation valve to exhaust-gas recirculation cooler	B47O0	M6x16		10 Nm

11 71 Exhaust-gas recirculation

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ EGR pipe to exhaust manifold	B47T0	M8		35 Nm
2AZ EGR cooler on the cylinder head	B47T0	M8x20		19 Nm
3AZ Exhaust-gas recirculation valve to exhaust-gas recirculation cooler	B47T0	M6x16		10 Nm

1171 Overview of tightening torques

Bracket to exhaust-gas recirculation valve		
M6	Tightening torque	12Nm
Exhaust gas recirculation module to exhaust manifold		
M8x28		32Nm
Exhaust-gas recirculation cooler to cylinder head		
M8x20	Tightening torque	19Nm
Exhaust-gas recirculation cooler to cylinder head		
M8x20	Tightening torque	5Nm
	Release angle	90°
Exhaust-gas recirculation cooler to exhaust manifold		
M8x28 Replace screws	Tightening torque	32Nm
Exhaust-gas recirculation valve to exhaust-gas recirculation cooler		
M6		10Nm

11 78 Emissions control, control sensor / monitoring sensor

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Control sensor LSUADV / monitoring sensor LSF 4.2	B47O0	M18 x 1.5		50 Nm
2AZ Bracket, oxygen sensor, to cylinder head cover	B47O0	M6		10 Nm
3AZ Support bridge to cylinder head cover	B47O0	M6		10 Nm

11 78 Emissions-control, Lambda oxygen sensor

Tightening Torques

	Type	Thread	Tightening specification	Torque
1AZ Oxygen control sensor; oxygen monitor sensor	All	M18 x 1.5		50 Nm

1179 Overview of tightening torques

Heat shield to cylinder head		
M8X16	Tightening torque	10Nm

11 14 Case Covers

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Timing case cover to crankcase	B47O0	M6	Replace screws	
			Jointing torque Angle of rotation	8 Nm 90 Å°
2AZ Spacer screw to component carrier	B47O0	M6		6 Nm
		M8		12 Nm

11 27 Dual-mass balance

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Gear to counterbalance shaft	B47O0	M10	1. Jointing torque	20 Nm
			2. Angle of rotation	180 °
2AZ Idler gear to crankcase	B47O0	M12	1. Jointing torque	10 Nm
			2. Angle of rotation	45 °

11 11 Engine block

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Bearing cap to crankcase (collar bolt)	B47O0	M10x1.5	Replace bolts, screw in hand-tight	
			1. Jointing torque	25 Nm
			2. Jointing torque	50 Nm
			3. Angle of rotation	60 °
			4. Angle of rotation	60 °
2AZ Oil spray nozzle in crankcase	B47O0	M6		10 Nm
3AZ Coolant screw plug	B47O0	M14x1,5	Replace sealing ring	30 Nm
4AZ Special tool/holder to crankcase	B47O0	M10x35		40 Nm
5AZ Special tool 11 8 930 to special tool 00 2 300	B47O0	M14x35		160 Nm
6AZ Bearing journal of tensioning and guide rail	B47O0	M8	Replace bolts	20 Nm
7AZ Solenoid valve to engine block	B47O0	M6		8 Nm
8AZ Spacing screw for acoustic cover on engine block (AF 17)	B47O0	M8x12		12 Nm
9AZ Guide tube for oil dipstick on engine block	B47O0	M8x16		19 Nm

11 00 Standard screw connection

Tightening Torques

	Type	Thread	Tightening specifications	Torque
1AZ Screws and nuts	B47O0	M5		5 Nm $\pm$ 0.5
2AZ Screws and nuts	B47O0	M6		8 Nm $\pm$ 1
3AZ Screws and nuts	B47O0	M7		13 Nm $\pm$ 2
4AZ Screws and nuts	B47O0	M8		19 Nm $\pm$ 3
5AZ Screws and nuts	B47O0	M10		38 Nm $\pm$ 5
6AZ Hose clamp, WAF 5	B47O0			1.0 to 1.5 Nm
7AZ Hose clamp, WAF 6	B47O0			2,5 up to 3,5 Nm

11 operating fluid overview

Testing equipment

Connecting hose Ä = 8 x 13 mm, length = 70 mm	
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Sealing compound

Loctite 5970 liquid sealing compound	50 ml, Cartridge	83190404517
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[Overview of consumables \(Electronic Parts Catalogue\)](#)

Expendable materials

Brake cleaner2.0	500 ml, Spray can	83192365214
	20 , Canister	83192365215

Expendable materials

lubricating grease Longtime PD -1	400 g, Cartridge	83192160340
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[Overview of consumables \(Electronic Parts Catalogue\)](#)

Expendable materials

Copper paste	100 g, Tube	81229400794
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[Overview of consumables \(Electronic Parts Catalogue\)](#)

Expendable materials

Lubricating grease SYNTHESO GLEP 1	100 g, Tube	83299407778
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[Overview of consumables \(Electronic Parts Catalogue\)](#)

Engine oil

Technically suitable engine oils for BMW Group engines	
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[3.0 Technically appropriate engine oils for BMW Group engines](#)

Engine oil

Technically suitable engine oils for BMW Group engines	
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[3.0 Specified engine oils for Toyota J29](#)

Sealing compound

Sealant Drei Bond 1209	30 ml, Tube	07 58 9 062 376
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