

ENGINE

Engine Electrical System - Tightening Torques

IGNITION WIRES, SPARK

12 12 SPARK PLUGS

SPARK PLUGS-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
	1AZ Spark plugs to cylinder head	N54	M12x1.25	23 Nm
1AZ Spark plugs (ungreased)	All	M12x1.25		23 ± 3 Nm
	All	M14x1.25		30 ± 3 Nm

ELECTRONIC SWITCHING

12 14 ELECTRONIC SHIFT UNITS OR CONTROL UNITS

ELECTRONIC SHIFT UNITS OR CONTROL UNITS-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Knock sensor	N54	M8x30		21 Nm
2AZ Pulse generator for crankshaft	N54	M6x16		8 Nm
3AZ Pulse generator for inlet camshaft	N54	M6x16		8 Nm
4AZ Pulse generator for exhaust camshaft	N54	M6x16		8 Nm

ALTERNATOR WITH DRIVE

12 31 ALTERNATOR WITH DRIVE AND MOUNTING PARTS

ALTERNATOR WITH DRIVE AND MOUNTING PARTS-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Wires to alternator				
Terminal D+	M10/M20			5 Nm
	All/others	M6		7 Nm
Terminal B+	S38/B38			8 Nm
	All/others	M8		13 Nm
2AZ Pulley	All			45 Nm
	Alternator with cooling			

3AZ Pulley (ribbed drive belt)	jacket			80 Nm
	all others			70 Nm
	N42, N46 Valeo			75 Nm
	N42, N46 Bosch			65 Nm
4AZ Rear holder	All			3.5 Nm
5AZ Fillister head screw for wire holder	All			3.5 Nm
6AZ Alternator on bearing block	M40/M42/M43/M44			43 Nm
7AZ Alternator to crankcase	N42, N46, N62	M8		21 Nm
8AZ Belt pulley (ribbed V-belt) with freewheel (Ina) fitted to Bosch and Valeo alternators	N42, N43			80 Nm

ALTERNATOR WITH DRIVE AND MOUNTING PARTS-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Alternator to crankcase, top	N54	M8 x 85		19 Nm
1AZ Alternator to crankcase with A/C compressor carrier	N54	M8x105		19 Nm

REGULATOR

12 32 GOVERNOR

REGULATOR -TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Alternator to crankcase, top	N54	M8 x 85		19 Nm
1AZ Alternator to crankcase with A/C compressor carrier	N54	M8x105		19 Nm

STARTER WITH MOUNTING

12 41 STARTER MOTOR WITH MOUNTING

STARTER MOTOR WITH MOUNTING-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Starter to crankcase	N54	M10x30		38 Nm
2AZ Starter to transmission housing	N54	M10x85		38 Nm

STARTER LEAD

12 42 ALTERNATOR LEAD

ALTERNATOR LEAD-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Assembly: alternator lead to alternator	N54	M8		19 Nm
2AZ Alternator lead to starter	N54	M8		13 Nm
3AZ Alternator lead to battery positive terminal	N54	M8	Flange nut	15 Nm
	N54	M8 x 14	Hexagon screw 8.8 ZNS3	19 Nm
	N54	M8	Hexagon screw with internal Torx drive	13 Nm
	N54	M8	Hexagon screw with dog point	13 Nm
4AZ Ground cable to engine support arm/engine carrier	N54	M8		19 Nm
5AZ Ground cable to longitudinal member	N54	M8		19 Nm
6AZ Ground rail to longitudinal member	N54	M8		19 Nm
7AZ Bracket to crankcase	N54	M8 x 16		19 Nm
8AZ Ground cable to transmission stand	N54	M8 x 16		19 Nm
9AZ Ground cable to body	N54	M8		19 Nm
10AZ Ground pin, battery positive terminal	N54		Self-tapping pin	27 Nm

12 42 WIRES TO STARTER

WIRES TO STARTER-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Battery positive terminal in/on distribution box	E32/E34/E31/E36/E46/E87/E90/E85/E86/E81	M8		20 Nm
	E39/M57	M8		11 Nm
	E38/M67	M8		11 Nm
	E46/M47TU	M8		11 Nm
	E60/N62	M8		15 Nm
	E65/N62/N73	M8		15 Nm
2AZ Wiring harness on distributor	E36/M41	M8		10 Nm

ENGINE WIRING LOOM

12 52 PLUG CONNECTIONS, TERMINALS, LOOSE PARTS

PLUG CONNECTIONS, TERMINALS, LOOSE PARTS-TIGHTENING TORQUE SPECIFICATIONS

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	Type	Thread	Tightening specification	Measure
1AZ Holder, wiring harness, to cylinder head	N52, N54	M6x12		8 Nm
2AZ Cable duct to cylinder head cover	N52, N54, N53	M6	Replace screws	
			Jointing torque	3 Nm
			Torque angle	45 °
3AZ Ground cable to crankcase (electr. coolant pump)	N52, N54, N52K, N51, N53	M8	Replace screws	
			Jointing torque	8 Nm
			Torque angle	45 °
4AZ Assembly: holder, monitor sensors	N54	M6x12		8 Nm

CONNECTORS, PLUGS, LOOSE PARTS

12 52 PLUG CONNECTIONS, TERMINALS, LOOSE PARTS

PLUG CONNECTIONS, TERMINALS, LOOSE PARTS-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Holder, wiring harness, to cylinder head	N52, N54	M6x12		8 Nm
2AZ Cable duct to cylinder head cover	N52, N54, N53	M6	Replace screws	
			Jointing torque	3 Nm
			Torque angle	45 °
3AZ Ground cable to crankcase (electr. coolant pump)	N52, N54, N52K, N51, N53	M8	Replace screws	
			Jointing torque	8 Nm
			Torque angle	45 °
4AZ Assembly: holder, monitor sensors	N54	M6x12		8 Nm

OIL PRESSURE/OIL TEMPERATURE GAUGE

12 61 ENGINE OIL PRESSURE, ENGINE OIL TEMPERATURE, OIL CONDITION DISPLAY

ENGINE OIL PRESSURE, ENGINE OIL TEMPERATURE, OIL CONDITION DISPLAY-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Engine oil pressure switch/engine oil temperature sensor	N52, N52K, N51, N54, N53	M12x1.5		
			Jointing torque	20 Nm
			Torque angle	16 °

2AZ Oil condition sensor for engine oil	N52, N52K, N51, N54, N53	M6	Jointing torque 2 Nm	8.5 Nm
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ENGINE OIL PRESSURE, ENGINE OIL TEMPERATURE, OIL CONDITION DISPLAY-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Engine oil pressure switch	N54	M12x1.5	1. Tightening	20 Nm
			2. Further angle of rotation	16° ± 2°
2AZ Oil condition sensor	N54	M6		8 Nm

12 61 OIL PRESSURE, OIL TEMPERATURE, OIL LEVEL DISPLAY

OIL PRESSURE, OIL TEMPERATURE, OIL LEVEL DISPLAY-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Oil-pressure switch/oil-temperature switch	All	M12x1.5		27 Nm
2AZ Level switch for engine oil	N62/N73/M67TU		Jointing torque 2 Nm	8.5 Nm
3AZ Oil pressure switch	N46	M12 x 1.5		27 Nm
4AZ Level sensor to oil sump	N46	M6		9 Nm

COOLANT TEMPERATURE

12 62 COOLANT TEMPERATURE

COOLANT TEMPERATURE-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Temperature sensor to water flange (glow time/coolant temperature gauge)	M21			18 Nm
	M51			13 Nm
2AZ Temperature switch (5.5 °C/17 ° C) to fuel filter/cylinder head	M21			18 Nm
3AZ Coolant temperature sensor (2-pin plug-in connection)	S38/S50			13 Nm
	S85	M12 /1.52		13.5 Nm
	All/others			20 Nm
4AZ Remote thermometer sensor (2-pin plug-in connection)	All			20 Nm
Remote thermometer sensor (4-pin plug-in connection)	M62			16 Nm
	S62	M12 x 1.5		14 Nm

5AZ Remote thermometer sensor on coolant flange	S50			18 Nm
6AZ Temperature sensor - air	S38/S50			13 Nm
7AZ Temperature sensor - oil	S38/S50			13 Nm

SENSOR FOR CONTROL UNIT

12 72 SENSORS FOR CONTROL UNIT

SENDERS FOR CONTROL UNIT-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Lever to pedal value sender	E32/E34/E31/E36			9 Nm
2AZ Pedal value sender to pedal console	E32/E34/E31			5 Nm

CONTROL UNIT BOX

12 90 CONTROL UNIT HOUSING

CONTROL UNIT HOUSING-TIGHTENING TORQUE SPECIFICATIONS

	Type	Thread	Tightening specification	Measure
1AZ Assembly of upper and lower sections	E32/E34/E36			5 Nm
2AZ Center section to body	E32/E34			3 Nm
3AZ Control unit holder in E box	E36			5 Nm
4AZ Control unit box cover	E38/E39/E52			4 Nm
	E46			6 Nm
	E53/E36/7/E54			3 Nm
5AZ Electronics box to firewall	E65	Plastic screw		6 Nm