Specifications

General

Displacement	182 cubic inches (2996cc)
Bore	3.359 inches (85mm)
Stroke	3.467 inches (88mm)
Direction of engine rotation	Clockwise (viewed from front of vehicle)
No 1 cylinder location	Timing chain end
Firing order	1-5-3-6-2-4

Camshafts

Endplay	0.0008 to 0.006 inch (0.020 to 0.162 mm)

Lubrication system

Minimum oil pressure at idle speed	21.7 psi (1.5 bar)
Regulated oil pressure	58.0 psi (4.0 bar)

Torque specifications

	Ft-lbs (unless otherwise indicated)	Nm

Note:
One foot-pound (ft-lb) of torque is equivalent to 12 inch-pounds (in-lbs) of torque. Torque values below approximately 15 foot-pounds are expressed in inch-pounds, because most foot-pound torque wrenches are not accurate at these smaller values.

Note:
There are a number of aluminum fasteners used to prevent electrolysis between the different types of metals used. Whenever they are removed, they must be replaced with new aluminum fasteners. They are easily identified, since a magnet will not stick to them is it would on steel fasteners. Additionally, most aluminum fasteners are identified with a blue paint marking.

Acoustic cover-to-valve cover*		
Step 1	36 in-lbs	4
Step 2	Tighten an additional 90-degrees	
Camshaft bearing cap bolts		
Step 1	72 in-lbs	8
Step 2	Tighten an additional 60-degrees	
Camshaft (intake) bearing cap	84 in-lbs	9
Chain drive module-to-cylinder head	72 in-lbs	8
Chain guide rail-to-cylinder block	15	20
Chain guide rail-to-cylinder head	10	14
Chain cover plugs	18	25
Chain tensioner-to-cylinder head	37	50
Crankshaft pulley hub bolt*		
Step 1	74	100
Step 2	Tighten an additional 360-degrees	
Crankshaft vibration damper bolts		
N52	18	25
N52K	26	35
Cylinder head bolts*		
M7 bolts (N52 engine)		
Step 1	60 in-lbs	7
Step 2	Tighten an additional 90-degrees	
M9 steel bolts		
Step 1	22	30
Step 2	Tighten an additional 90-degrees	
Step 3	Tighten an additional 90-degrees	
M9 aluminum bolts		
Step 1	84 in-lbs	10
Step 2	Tighten an additional 90-degrees	
M10 bolts		
Step 1	22	30
Step 2	Tighten an additional 90-degrees	
Step 3	Tighten an additional 90-degrees	

Step 4	Tighten an additional 45-degrees	
Valve cover bolts		
M6 bolts	84 in-lbs	10
M7 steel bolts	132 in-lbs	15
M7 aluminum bolts*		
N52 engine		
Step 1	60 in-lbs	7
Step 2	Tighten an additional 90-degrees	
N52K engine	84 in-lbs	9
Driveplate bolts*	96	130
Engine mounts		
Mount-to-subframe		
M8	21	28
M10	41	56
Mount-to-support arm	41	56
Support arm-to-engine*		
Step 1	18	25
Step 2	Tighten an additional 90-degrees	
Flywheel bolts*	89	120
Front subframe bolts*		
M10	35	47
M12	77	105
Oil condition/level sensor	84 in-lbs	9
Oil deflector-to-lower crankcase bolts*		
Step 1	36 in-lbs	4
Step 2	Tighten an additional 90-degrees	
Oil filter cap-to-housing	18	25
Oil filter housing and pipes on crankcase		
M8	16	22
M20	30	40

Torque specifications

	Ft-lbs (unless otherwise indicated)	Nm
Oil pressure switch/temperature sensor		
Step 1	15	20
Step 2	Tighten an additional 16-degrees	

Oil pump chain module*		
Step 1	36 in-lbs	4
Step 2	Tighten an additional 90-degrees	
Oil pump pick-up pipe*		
Step 1	36 in-lbs	4
Step 2	Tighten an additional 100-degrees	
Oil pump sprocket		
Step 1	15	20
Step 2	Tighten an additional 45-degrees	
Oil pump-to-lower crankcase (bedplate)		
M8 x 123 mm*		
Step 1	84 in-lbs	10
Step 2	Tighten an additional 180-degrees	
M8 x 31 and 37 mm*		
Step 1	84 in-lbs	10
Step 2	Tighten an additional 90-degrees	
Oil spray nozzles	84 in-lbs	10
Positioning motor-to-cylinder head bolts*		
Step 1	36 in-lbs	4
Step 2	Tighten an additional 90-degrees	
Oil pan oil drain plug	18	25
Oil pan		
M8 x 24 and 26 mm		
Step 1	72 in-lbs	8
Step 2	Tighten an additional 90-degrees	
M8 x 92 and 112 mm		
Step 1	72 in-lbs	8
Step 2	Tighten an additional 180-degrees	
Strut tower supports*		
M10		
Step 1	30	40
Step 2	Tighten an additional 90-degrees	
M12		
Step 1	74	100
Step 2	Tighten an additional 100-degrees	
Transmission cover plate-to-crankcase bolts*		
Step 1	36 in-lbs	4

Step 2	Tighten an additional 45-degrees	
Valvetronic settings		
Eccentric shaft bearing cap-to-cylinder head*	84 in-lbs	10
Eccentric shaft stop-screw-to-cylinder head	84 in-lbs	10
Electric servo drive-to-cylinder head	84 in-lbs	10
Electric servo drive-to-valve cover	84 in-lbs	10
Guide block-to-cylinder head	84 in-lbs	10
Oil spray nozzle-to-gate	84 in-lbs	10
Return spring-to-cylinder head	84 in-lbs	10
VANOS adjustment unit-to-camshafts*		
Step 1	15	20
Step 2	Tighten an additional 180-degrees	
VANOS non-return valve-to-cylinder head	120 in-lbs	13
VANOS solenoid valve	84 in-lbs	10