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## **6.0 L**

### **ENGINE SERVICE MANUAL**



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# Engine Mechanical - 6.0L

## Specifications

### Fastener Tightening Specifications

Application	Specification	
	Metric	English
Accelerator Control Cable Bracket Bolts	10 N•m	89 lb in
Camshaft Retainer Bolts	25 N•m	18 lb ft
Camshaft Sensor Bolt	25 N•m	18 lb ft
Camshaft Sprocket Bolts	35 N•m	26 lb ft
Connecting Rod Bolts-First Design (First Pass)	20 N•m	15 lb ft
Connecting Rod Bolts-First Design (Final Pass)	60 degrees	
Connecting Rod Bolts-Second Design (First Pass)	20 N•m	15 lb ft
Connecting Rod Bolts-Second Design (Final Pass)	75 degrees	
Coolant Temperature Gauge Sensor	20 N•m	15 lb ft
Crankshaft Balancer Bolt (Installation Pass-to Ensure the Balancer is Completely Installed)	330 N•m	240 lb ft
Crankshaft Balancer Bolt (First Pass-Install a NEW Bolt After the Installation Pass and Tighten as Described in the First and Final Passes)	50 N•m	37 lb ft
Crankshaft Balancer Bolt (Final Pass)	140 degrees	
Crankshaft Bearing Cap Bolts (Inner Bolts-First Pass in Sequence)	20 N•m	15 lb ft
Crankshaft Bearing Cap Bolts (Inner Bolts-Final Pass in Sequence)	80 degrees	
Crankshaft Bearing Cap Side Bolts	25 N•m	18 lb ft
Crankshaft Bearing Cap Bolts (Outer Studs-First Pass in Sequence)	20 N•m	15 lb ft
Crankshaft Bearing Cap Bolts (Outer Studs-Final Pass in Sequence)	51 degrees	
Crankshaft Oil Deflector Nuts	25 N•m	18 lb ft
Crankshaft Position Sensor Bolt	25 N•m	18 lb ft
Cylinder Head Bolts (First Pass-all M11 Bolts in Sequence)	30 N•m	
Cylinder Head Bolts (Second Pass-all M11 Bolts in Sequence)	90 degrees	
Cylinder Head Bolts (Final Pass-all M11 Bolts in Sequence-Excluding the Medium Length Bolts at the Front and Rear of Each Cylinder Head)	90 degrees	
Cylinder Head Bolts (Final Pass-all M11 Medium Length Bolts at the Front and Rear of Each Cylinder Head in Sequence)	50 degrees	
Cylinder Head Bolts (M8 Inner Bolts in Sequence)	30 N•m	22 lb ft
Cylinder Head Coolant Plug	20 N•m	15 lb ft
Engine Block Coolant Drain Plugs	60 N•m	44 lb ft
Engine Block Heater	40 N•m	30 lb ft
Engine Block Oil Gallery Plugs	60 N•m	44 lb ft
Engine Coolant Air Bleed Pipe Bolts	12 N•m	106 lb in
Engine Flywheel Bolts (First Pass)	20 N•m	15 lb ft
Engine Flywheel Bolts (Second Pass)	50 N•m	37 lb ft
Engine Flywheel Bolts (Final Pass)	100 N•m	74 lb ft

## Fastener Tightening Specifications (cont'd)

Application	Specification	
	Metric	English
Engine Service Lift Bracket M10 Bolts	50 N•m	37 lb ft
Engine Service Lift Bracket M8 Bolt	25 N•m	18 lb ft
Engine Sight Shield Bolts	10 N•m	89 lb in
Engine Sight Shield Bracket Bolts	5 N•m	45 lb in
Engine Valley Cover Bolts	25 N•m	18 lb ft
Exhaust Manifold Bolts (First Pass)	15 N•m	11 lb ft
Exhaust Manifold Bolts (Final Pass)	25 N•m	18 lb ft
Exhaust Manifold Heat Shield Bolts	9 N•m	80 lb in
Fuel Rail Bolts	10 N•m	89 lb in
Fuel Rail Crossover Tube Bolts	3.8 N•m	34 lb in
Fuel Rail Stop Bracket Bolt	50 N•m	37 lb ft
Ignition Coil-to-Bracket Bolts	8 N•m	71 lb in
Ignition Coil Bracket-to-Valve Rocker Arm Cover Studs	12 N•m	106 lb in
Intake Manifold Bolts (First Pass in Sequence)	5 N•m	44 lb in
Intake Manifold Bolts (Final Pass in Sequence)	10 N•m	89 lb in
Intake Manifold Wiring Harness Stud	10 N•m	89 lb in
Knock Sensors	20 N•m	15 lb ft
Oil Filter	30 N•m	22 lb ft
Oil Filter Fitting	55 N•m	40 lb ft
Oil Level Indicator Tube Bolt	25 N•m	18 lb ft
Oil Level Sensor	13 N•m	115 lb in
Oil Pan Baffle Bolts	12 N•m	106 lb in
Oil Pan Closeout Cover Bolt (Left Side)	9 N•m	80 lb in
Oil Pan Closeout Cover Bolt (Right Side)	9 N•m	80 lb in
Oil Pan Cover Bolts	12 N•m	106 lb in
Oil Pan Drain Plug	25 N•m	18 lb ft
Oil Pan M8 Bolts (Oil Pan-to-Engine Block and Oil Pan-to-Front Cover)		25 N•m 18 lb ft
Oil Pan M6 Bolts (Oil Pan-to-Rear Cover)	12 N•m	106 lb in
Oil Pressure Sensor	20 N•m	15 lb ft
Oil Pump-to-Engine Block Bolts	25 N•m	18 lb ft
Oil Pump Cover Bolts	12 N•m	106 lb in
Oil Pump Relief Valve Plug	12 N•m	106 lb in
Oil Pump Screen Nuts	25 N•m	18 lb ft
Oil Pump Screen-to-Oil Pump Bolt	12 N•m	106 lb in
Spark Plugs-New	20 N•m	15 lb ft
Spark Plugs-All Subsequent Installations	15 N•m	11 lb ft
Throttle Body Nuts	10 N•m	89 lb in
Throttle Body Studs	6 N•m	53 lb in
Valve Lifter Guide Bolts	12 N•m	106 lb in
Valve Rocker Arm Bolts	30 N•m	22 lb ft
Valve Rocker Arm Cover Bolts	12 N•m	106 lb in
Water Inlet Housing Bolts	15 N•m	11 lb ft



**Fastener Tightening Specifications (cont'd)**

<b>Application</b>	<b>Specification</b>	
	<b>Metric</b>	<b>English</b>
Water Pump Bolts (Final Pass)	30 N•m	22 lb ft
Water Pump Cover Bolts	15 N•m	11 lb ft

## Engine Mechanical Specifications

Application	Specification	
	Metric	English
<b>General Data</b>		
Engine Type	V8	
Displacement	6.0L	364 CID
Bore	101.618-101.636 mm	4.0007-4.0014 in
Stroke	92.0 mm	3.622 in
Compression Ratio - LQ4	9.40:1	
Compression Ratio - LQ9	10.0:1	
Firing Order	1-8-7-2-6-5-4-3	
Spark Plug Gap	1.524 mm	0.060 in
<b>Lubrication System</b>		
Oil Capacity (without Oil Filter Change)	4.73 Liters	5.0 Quarts
Oil Capacity (with Oil Filter Change)	5.68 Liters	6.0 Quarts
Oil Pressure (Minimum-Hot)	41 kPa at 1,000 engine rpm 124 kPa at 2,000 engine rpm 165 kPa at 4,000 engine rpm	6.0 psig at 1,000 engine rpm 18.0 psig at 2,000 engine rpm 24.0 psig at 4,000 engine rpm
Oil Type	5W-30	
<b>Camshaft</b>		
End Play	0.025-0.305 mm	0.001-0.012 in
Journal Diameter	54.99-55.04 mm	2.164-2.166 in
Journal Diameter Out-of-Round	0.025 mm	0.001 in
Lobe Lift (Exhaust)	7.13 mm	0.281 in
Lobe Lift (Intake)	6.96 mm	0.274 in
Runout (Measured at the Intermediate Journals)	0.05 mm	0.002 in
<b>Connecting Rod</b>		
Connecting Rod Bearing Bore Diameter	56.505-56.525 mm	2.224-2.225 in
Connecting Rod Bearing Bore Out-of-Round - LQ4	0.004-0.008 mm	0.00015-0.0003 in
Connecting Rod Bearing Bore Out-of-Round - LQ9	0.006 mm	0.00023 in
Connecting Rod Bearing Clearance (Production)	0.023-0.065 mm	0.0009-0.0025 in
Connecting Rod Bearing Clearance (Service Limit)	0.023-0.076 mm	0.0009-0.003 in
Connecting Rod Side Clearance	0.11-0.51 mm	0.00433-0.02 in
<b>Crankshaft</b>		
Crankshaft Bearing Clearance (Production)	0.020-0.052 mm	0.0008-0.0021 in
Crankshaft Bearing Clearance (Service Limit)	0.020-0.065 mm	0.0008-0.0025 in
Crankshaft Connecting Rod Journal Diameter (Production)	53.318-53.338 mm	2.0991-2.0999 in
Crankshaft Connecting Rod Journal Diameter (Service Limit)	53.308 mm (Minimum)	2.0987 in (Minimum)
Crankshaft Connecting Rod Journal Taper (Production)	0.005 mm (Maximum for 1/2 of the Journal Length)	0.0002 in (Maximum for 1/2 of the Journal Length)
Crankshaft Connecting Rod Journal Taper (Service Limit)	0.02 mm (Maximum)	0.00078 in (Maximum)
Crankshaft Connecting Rod Journal Out-of-Round (Production)	0.005 mm	0.0002 in
Crankshaft Connecting Rod Journal Out-of-Round (Service Limit)	0.01 mm	0.0004 in
Crankshaft End Play	0.04-0.2 mm	0.0015-0.0078 in
Crankshaft Main Journal Diameter (Production)	64.993-65.007 mm	2.558-2.559 in
Crankshaft Main Journal Diameter (Service Limit)	64.993 mm	2.558 in
Crankshaft Main Journal Out-of-Round (Production)	0.003 mm	0.0001 in
Crankshaft Main Journal Out-of-Round (Service Limit)	0.008 mm	0.0003 in
Crankshaft Main Journal Taper (Production)	0.01 mm	0.0004 in
Crankshaft Main Journal Taper (Service Limit)	0.02 mm	0.00078 in
Crankshaft Reluctor Ring Runout (Measured 1.0 mm (0.04 in) Below the Tooth Diameter)	0.7 mm (Maximum)	0.028 in (Maximum)
Crankshaft Runout (at Rear Flange)	0.05 mm (Maximum)	0.002 in (Maximum)

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