Fastener Specifications

Single Use Threaded Fastener/Component Tightening Specifications

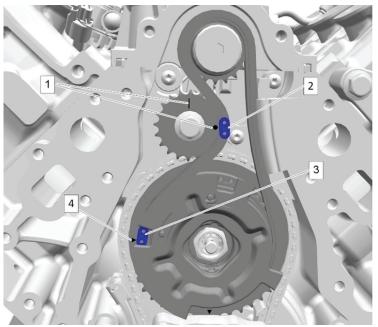
	Specification	
Application	Metric (English)	
Note: All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.		
Camshaft Position Actuator Magnet Bolt	10 N·m (89 lb in)	
Camshaft Position Actuator Solenoid Valve		
• First Pass:	65 N-m (48 lb ft)	
• Final Pass:	90 degrees	
Crankshaft Balancer Bolt - New Bolt with Flanged Head		
• First Pass:	150N+m (111lbft)	
Second Pass:	Loosen 360 degrees	
Third Pass:	80 N·m (59 lb ft)	
• Final Pass:	125 degrees	
Crankshaft Balancer Bolt – New Bolt with Retained Rotating Washer		
• First Pass:	150N+m (111 lb ft)	
Second Pass:	Loosen 360 degrees	
Third Pass:	80 N·m (59 lb ft)	
• Final Pass:	200 degrees	
Cylinder Head Bolt Refer to procedure for tightening sequence and torque values.	Refer to image for tightening sequence and torque values	
Exhaust Manifold Bolt	25 N·m (18 lb ft)	
Fuel Feed Intermediate Pipe Fitting	30 N+m (22 lb ft)	

Reusable Threaded Fastener Tightening Specifications

	Specification	
Application	Metric (English)	
Note: All fasteners listed in this table can be reused after removal.		
Accessory Drive Belt Idler Pulley Bolt	20 N·m (15 lb ft)	
Accessory Drive Belt Tensioner Bolt	58 N•m (43 lb ft)	
Balance Shaft Chain Guide Bolt	10 N•m (89 lb in)	
Balance Shaft Driven Sprocket Bolt	58 N•m (43 lb ft)	
Balance Shaft Idler Sprocket Bolt	58 N•m (43 lb ft)	
Balance Shaft Retainer Bolt	10 N•m (89 lb in)	
Camshaft Position Sensor Bolt	25 N•m (18 lb ft)	
Camshaft Position (CMP) Sensor Wire Harness Bolt	10 N-m (89 lb in)	
Camshaft Retainer Bolt – TORX Head Bolt Refer to procedure for tightening sequence and torque values.		
Connecting Rod Bolt		
• First Pass:	20 N⋅m (15 lb ft)	
• Final Pass:	85 degrees	
Coolant Temperature Sensor	20 N•m (15 lb ft)	
Crankshaft Balancer Bolt – Ensure the Balancer is Completely Installed	330 N⋅m (244 lb ft)	
Crankshaft Oil Deflector Bolt	10 N-m (89 lb in)	
Crankshaft Position Sensor Bolt	25 N•m (18 lb ft)	
Crankshaft Rear Oil Seal Housing Bolt	25 N·m (18 lb ft)	
Engine Block Coolant Drain Hole Plug	60 N•m (44 lb ft)	
Engine Block Coolant Heater	50 N•m (37 lb ft)	
Engine Block Oil Gallery Plug	30 N+m (22 lb ft)	

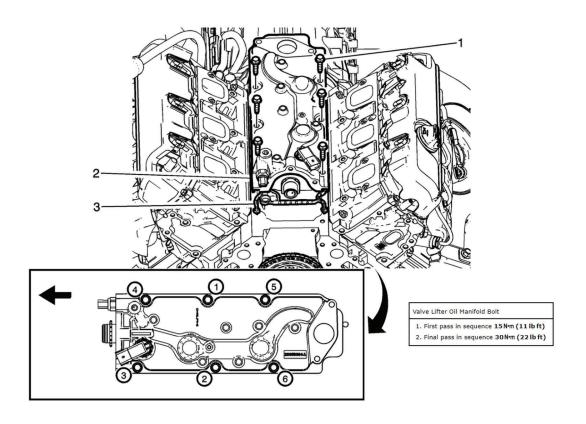
Reusable Threaded Fastener Tightening Specifications

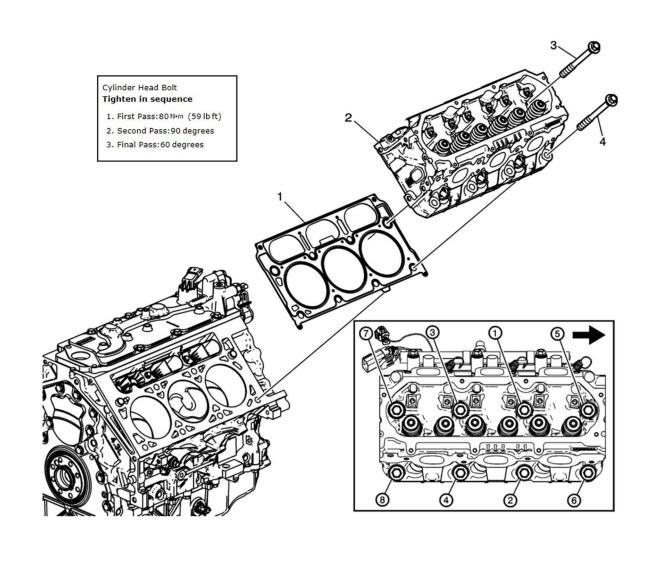
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	Oil Pan Bolt - Lower Oil Pan to Upper Oil Pan		
Oil Level Sensor Bolt 10 Nem (89 lb in) Oil Pressure Sensor 35 He (26 lb ft) Oil Pump Screen Bolt 10 Nem (89 lb in) Oil Pump Bolt 25 Nem (18 lb ft) PCV Valve 6 Nem (53 lb in) Spark Plug 20 Hem (15 lb ft) Starter Heat Shield Bolt - Side 10 Nem (89 lb in) Starter Heat Shield Bolt - Rear 25 Nem (18 lb ft) Throttle Body Bolt 10 Nem (89 lb in) Timing Chain Tensioner Bolt 25 Nem (18 lb ft) Valve Lifter Guide Bolt 12 Nem (91b ft) Valve Lifter Oil Manifold Bolt 1. First pass in sequence 15 Nm (11 lb ft) Valve Lifter Oil Manifold Filter Plug 30 Nem (22 lb ft) Valve Rocker Arm Bolt 30 Nem (22 lb ft) Valve Rocker Arm Cover Bolt 10 Nem (89 lb in)	Oil Pan Cover Bolt		
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SPINITED	Oil Pressure Sensor	35 N·m (26 lb ft)	
PCV Valve 6 Hem (53 lb in) Spark Plug 20 Nem (15 lb ft) Starter Heat Shield Bolt - Side 10 Nem (89 lb in) Starter Heat Shield Bolt - Rear 25 Nem (18 lb ft) Throttle Body Bolt 10 Nem (89 lb in) Timing Chain Tensioner Bolt 25 Nem (18 lb ft) Valve Lifter Guide Bolt 12 Nem (9 lb ft) Valve Lifter Oil Manifold Bolt 1. First pass in sequence 15 Nem (11 lb ft) Valve Lifter Oil Manifold Filter Plug 30 Nem (22 lb ft) Valve Rocker Arm Bolt 30 Nem (22 lb ft) Valve Rocker Arm Cover Bolt 10 Nem (89 lb in) Water Inlet Housing Bolt 10 Nem (89 lb in)	Oil Pump Screen Bolt	10 N·m (89 lb in)	
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Starter Heat Shield Bolt - Side Starter Heat Shield Bolt - Rear Starter Heat Shield Bolt - Side	PCV Valve	6 N-m (53 lb in)	
Starter Heat Shield Bolt - Rear Throttle Body Bolt Timing Chain Tensioner Bolt Valve Lifter Guide Bolt Valve Lifter Oil Manifold Bolt Valve Lifter Oil Manifold Filter Plug Valve Rocker Arm Bolt Valve Rocker Arm Cover Bolt Valve Rocker Arm Cover Bolt Water Inlet Housing Bolt 10 Nem (89 lb in) 25 Nem (18 lb ft) 12 Nem (9 lb ft) 30 Nem (22 lb ft) Valve Rocker Arm Cover Bolt Valve Rocker Arm Cover Bolt 10 Nem (89 lb in)	Spark Plug	20 N·m (15 lb ft)	
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2. Final pass in sequence 30N·m (22 lb ft) Valve Lifter Oil Manifold Filter Plug 30 N·m (22 lb ft) Valve Rocker Arm Bolt 30 N·m (22 lb ft) Valve Rocker Arm Cover Bolt 10 N·m (89 lb in) Water Inlet Housing Bolt 10 N·m (89 lb in)	Valve Lifter Guide Bolt	12 N·m (9 lb ft)	
Valve Rocker Arm Bolt 30 N·m (22 lb ft) Valve Rocker Arm Cover Bolt 10 N·m (89 lb in) Water Inlet Housing Bolt 10 N·m (89 lb in)	Valve Lifter Oil Manifold Bolt		
Valve Rocker Arm Cover Bolt 10 N-m (89 lb in) Water Inlet Housing Bolt 10 N-m (89 lb in)	Valve Lifter Oil Manifold Filter Plug	30 N+m (22 lb ft)	
Water Inlet Housing Bolt 10 N-m (89 lb in)	Valve Rocker Arm Bolt	30 N·m (22 lb ft)	
	Valve Rocker Arm Cover Bolt	10 N·m (89 lb in)	
Water Pump Impeller Bolt 10 Nem (89 lb in)	Water Inlet Housing Bolt	10 N+m (89 lb in)	
	Water Pump Impeller Bolt	10 Nrm (89 lb in)	

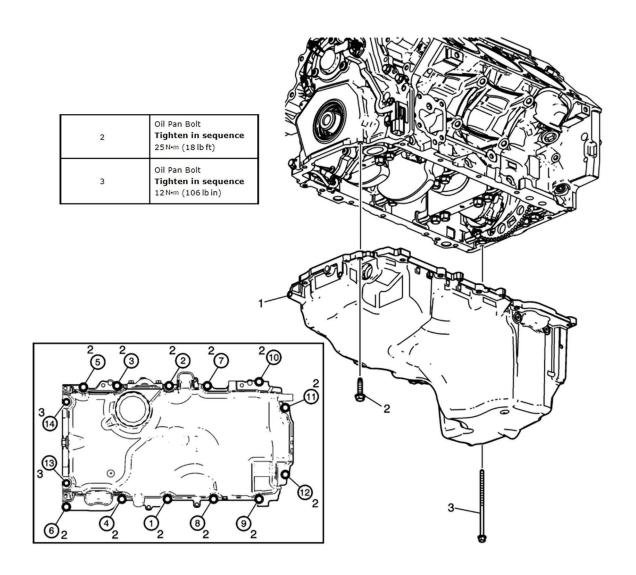


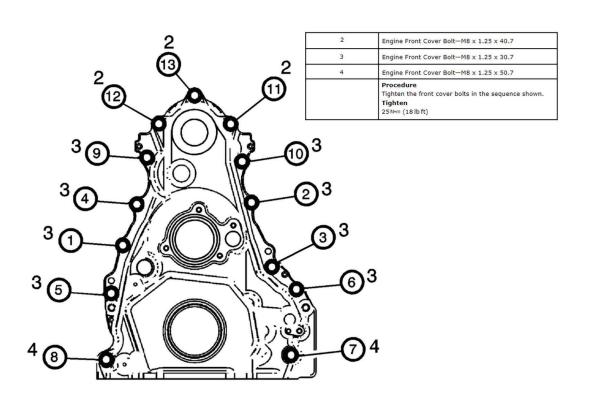
With the timing marks on the crank and cam aligned, the dark colored balance shaft chain link (3) will align with the other timing chark on the cam sprocket (4). Also, the other dark colored balance shaft chain link (2) will align with the dot on the balance shaft sprocket (1).

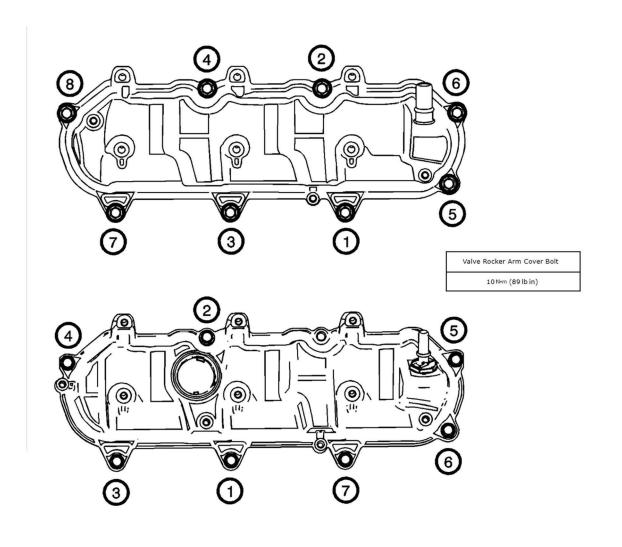
Balance Shaft Idler Sprocket Bolt	58 N·m (43 lb ft)	
Balance Shaft Driven Sprocket Bolt	58 N·m (43 lb ft)	
Camshaft Position Actuator Solenoid Valve		
First Pass:	65 N•m (48 lb ft)	
• Final Pass:	90 degrees	

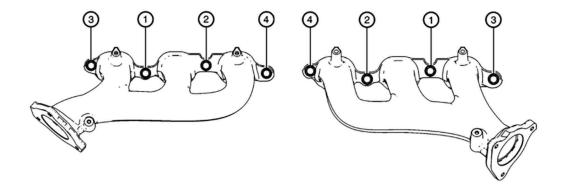












Exhaust Manifold Bolt

Procedure

Note: The cylinder head exhaust manifold bolt hole threads must be clean and free of debris or threadlocking material.

- 1. Install New Bolts
- 2. Tighten the exhaust manifold bolts in the sequence shown.

Tighten in sequence — New Cylinder Head

- 1. First Pass: 27 N·m (20 lb ft).
- 2. Second Pass: Loosen 180 degrees .
- 3. Final Pass: 23 N·m (17 lb ft)

Tighten in sequence — Existing Cylinder Head

23 N·m (17 lb ft)

