

Fastener Specifications

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Single Use Non-Threaded Fasteners/Components

Application
Note: All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.
Camshaft Actuator Magnet Gasket
Camshaft Position Actuator Solenoid Valve
Camshaft Position Sensor Seal
Clutch Pilot Bearing
Charge Air Cooler Cover Gasket
Crankshaft Front Oil Seal
Crankshaft Rear Oil Seal
Crankshaft Rear Oil Seal Housing Gasket
Cylinder Head Gasket
Engine Oil Cooler Core Seal
Engine Oil Cooler Gasket
Engine Coolant Manifold Gasket
Exhaust Manifold Gasket
Fuel Injector Dust Seal
Fuel Injector O-ring
Fuel Injector Plastic Spacer
Fuel Injector Retaining Clip
Fuel Injector Seal

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Application
Fuel Pump Gasket
Intake Manifold Gasket
Oil Pan Front Seal
Oil Level Indicator Switch Seal
Oil Pan High Pressure Port Seal
Oil Pump Screen Seal
Lower Oil Pan
Positive Crankcase Ventilation Oil Separator Drain Tube O-ring
Positive Crankcase Ventilation Tube Seal
Supercharger Assembly Gasket
Supercharger Water Manifold Gasket
Throttle Body Gasket
Turbocharger Coolant Feed and Return Pipe Gasket
Valve Lifter Oil Manifold Gasket
Valve Rocker Arm Cover Gasket
Water Pump Assembly Gasket
Water Pump Outlet Gasket

Single Use Threaded Fastener/Component Tightening Specifications

Application	Specification
	Metric (English)
Note: All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.	
Automatic Transmission Flex Plate Bolt	
<ul style="list-style-type: none"> • First Pass: 	15 Y (133 lb in)
	30 Y (22 lb ft)

Application	Specification
	Metric (English)
• Second Pass:	
• Final Pass:	45 degrees
Camshaft Position Actuator Solenoid Valve	
• First Pass:	65 Y (48 lb ft)
• Final Pass:	90 degrees
Connecting Rod Bolt	
• First Pass:	20 Y (15 lb ft)
• Final Pass:	85 degrees
Crankshaft Balancer Bolt – New Bolt with Flanged Head	
• First Pass:	120 Y (89 lb ft)
• Second Pass:	Loosen 360 degrees
• Third Pass:	80 Y (59 lb ft)
• Final Pass:	125 degrees
Crankshaft Balancer Bolt – New Bolt with Retained Rotating Washer	
• First Pass:	120 Y (89 lb ft)
• Second Pass:	Loosen 360 degrees
• Third Pass:	80 Y (59 lb ft)

Application	Specification
	Metric (English)
<ul style="list-style-type: none"> Final Pass: 	200 degrees
Crankshaft Bearing Cap Bolt	
<ul style="list-style-type: none"> Inner Bearing Cap Bolt - First Pass in Sequence 	20 Y (15 lb ft)
<ul style="list-style-type: none"> Inner Bearing Cap Bolt - Final Pass in Sequence 	110 degrees
<ul style="list-style-type: none"> Outer Bearing Cap Bolt - First Pass in Sequence 	20 Y (15 lb ft)
<ul style="list-style-type: none"> Outer Bearing Cap Bolt - Final Pass in Sequence 	80 degrees
<ul style="list-style-type: none"> Bearing Cap Side Bolts – First Pass in Sequence 	25 Y (18 lb ft)
<ul style="list-style-type: none"> Bearing Cap Side Bolts – Final Pass in Sequence 	60 degrees
Cylinder Head Bolt	
<ul style="list-style-type: none"> Cylinder Head Bolts - Internal Hex – LH Cylinder Head forwardmost fastener - First Pass in Sequence 	80 Y (59 lb ft)
<ul style="list-style-type: none"> Cylinder Head Bolts – Internal Hex – LH Cylinder Head forwardmost fastener - Second Pass in Sequence 	90 degrees
<ul style="list-style-type: none"> Cylinder Head Bolts - Internal Hex – LH Cylinder Head forwardmost fastener - Final Pass in Sequence 	40 degrees
	80 Y (59 lb ft)

Application	Specification
	Metric (English)
<ul style="list-style-type: none"> Cylinder Head Bolts – Standard Hex - First Pass in Sequence 	
<ul style="list-style-type: none"> Cylinder Head Bolts – Standard Hex - Second Pass in Sequence 	90 degrees
<ul style="list-style-type: none"> Cylinder Head Bolts – Standard Hex - Final Pass in Sequence 	60 degrees
Engine Mount Fastener	58 Y (43 lb ft)
Engine Oil Cooler Hose Connector	35 Y (26 lb ft)
High Pressure Fuel Feed Pipe Fitting	28 Y (21 lb ft)
Flywheel Bolts	
<ul style="list-style-type: none"> First Pass 	15 Y (11 lb ft)
<ul style="list-style-type: none"> Second Pass 	30 Y (22 lb ft)
<ul style="list-style-type: none"> Final Pass 	45 degrees
Oil Filter	3/4 to 1 full turn after gasket makes contact with the sealing surface on the filter mounting flange
Supercharger to Block Bolts	
<ul style="list-style-type: none"> First Pass in Sequence 	10 Y (89 lb in)
<ul style="list-style-type: none"> Final Pass in Sequence 	10 Y (89 lb in)

Reusable Threaded Fastener Tightening Specifications

Application	Specification
	Metric (English)

Application	Specification
	Metric (English)
Note: All fasteners listed in this table can be reused after removal.	
Drive Belt Tensioner Bolt	58 Y (43 lb ft)
Accessory Drive Belt Tensioner Bolt - Lower	22 Y (16 lb ft)
Camshaft Position (CMP) Actuator Magnet Bolt	10 Y (7 lb ft)
Camshaft Position (CMP) Sensor Bolt	25 Y (18 lb ft)
Camshaft Position (CMP) Sensor Wire Harness Bolt	10 Y (7 lb ft)
Camshaft Retainer Bolt – TORX Head Bolt	15 Y (11 lb ft)
Charge Air Cooler Cover Ball Stud	10 Y (89 lb in)
Charge Air Cooler Cover Bolts	10 Y (89 lb in)
Charge Air Cooler Cover Double Ended Stud	10 Y (89 lb in)
Charge Air Regulator Solenoid Valve Bolt	10 Y (89 lb in)
Cooler Line Bracket Bolt	10 Y (89 lb in)
Crankshaft Balancer Bolt – Installation Pass with Used Bolt – to Ensure the Balancer is Completely Installed	330 Y (244 lb ft)
Crankshaft Oil Deflector Bolt	10 Y (89 lb in)
Crankshaft Position Sensor Bolt	25 Y (18 lb ft)
Crankshaft Rear Oil Seal Housing Bolt	25 Y (18 lb ft)
Engine Block Coolant Drain Hole Plug	60 Y (44 lb ft)
Engine Block Coolant Heater	50 Y (37 lb ft)
Engine Block Oil Gallery Plug – Front	25 Y (18 lb ft)
Engine Block Oil Gallery Plug – Rear	30 Y (22 lb ft)
Engine Coolant Temperature Sensor@Engine Coolant Manifold	20 Y (15 lb ft)

Application	Specification
	Metric (English)
Engine Coolant Temperature Sensor@Oil Filter Adapter	22 Y (16 lb ft)
Engine Coolant Manifold Bolt	25 Y (18 lb ft)
Engine Front Cover Bolt	25 Y (18 lb ft)
Engine Harness Fastener	10 Y (89 lb in)
Exhaust Manifold Bolt	
<ul style="list-style-type: none"> Exhaust Manifold Bolt – If installing on existing cylinder head 	23 Y (17 lb ft)
<ul style="list-style-type: none"> Exhaust Manifold Bolt – If installing on NEW cylinder head 	27 Y (20 lb ft)
Exhaust Manifold Heat Shield Bolt	10 Y (89 lb in)
Engine Oil Cooler Adapter to Oil Pan Bolt (M6)	10 Y (89 lb in)
Engine Oil Cooler Adapter to Oil Pan Bolt (M8)	25 Y (18 lb ft)
Engine Oil Cooler Coolant Fitting	35 Y (26 lb ft)
Engine Oil Cooler Core Bolt	25 Y (18 lb ft)
Engine Oil Pressure Sensor	35 Y (26 lb ft)
Engine Wiring Harness Bolt (Rear Engine Channel)	10 Y (89 lb in)
Engine Wiring Harness Jumper Bracket Bolt	25 Y (18 lb ft)
Evaporative Emission Canister Purge Solenoid Valve Bolt	10 Y (89 lb in)
Flywheel Inspection Cover Bolt	10 Y (89 lb in)
Flex Plate to Torque Converter Fastener	60 Y (44 lb ft)
Fuel Feed Pipe Fitting	28 Y (21 lb ft)
Fuel Injection Fuel Rail Fuel Pressure Sensor	33 Y (24 lb ft)

Application	Specification
	Metric (English)
Fuel Injection Fuel Rail Bolt	25 Y (18 lb ft)
Fuel Injection Fuel Rail Crossover Pipe Bolt	10 Y (89 lb in)
Fuel Injection Fuel Rail Crossover Pipe Fitting	28 Y (21 lb ft)
Fuel Pump Bolt	25 Y (18 lb ft)
Fuel Pump Lifter Follower Guide Bolt	25 Y (18 lb ft)
Generator Bracket Bolt	50 Y (37 lb ft)
Ignition Coil Bracket-to-Valve Rocker Arm Cover Bolt	10 Y (89 lb in)
Inlet Air Pressure and Temperature Sensor Bolt	10 Y (89 lb in)
Intake Manifold Bolt	
<ul style="list-style-type: none"> • First Pass in Sequence 	5 Y (44 lb in)
<ul style="list-style-type: none"> • Final Pass in Sequence 	10 Y (89 lb in)
Intake Manifold Cover Bolt	4.5 Y (40 lb in)
Intake Manifold Cover Stud	4.5 Y (40 lb in)
Jumper Harness Bolt	25 Y (18 lb ft)
Knock Sensor Bolt	25 Y (18 lb ft)
Knock Sensor Heat Shield Bolt	25 Y (18 lb ft)
Low Pressure Fuel Feed Pipe to Rocker Arm Cover Bolt	10 Y (89 lb in)
Manifold Absolute Pressure Sensor Bolt – Intake Manifold	4.5 Y (40 lb in)
Manifold Absolute Pressure Sensor Bolt – Supercharger	10 Y (89 lb in)
Oil Filter Fitting	55 Y (41 lb ft)

Application	Specification
	Metric (English)
Oil Level Indicator Tube Bolt	10 Y (89 lb in)
Oil Pan Cover Bolt	10 Y (89 lb in)
Oil Pan Drain Plug	25 Y (18 lb ft)
Oil Pan Bolt – Oil Pan-to-Rear Housing	12 Y (106 lb in)
Oil Pan Bolt – Oil Pan-to-Engine Block and Oil Pan-to-Front Cover	25 Y (18 lb ft)
Oil Pan Bolt - Lower Oil Pan to Upper Oil Pan	10 Y (89 lb in)
Engine Oil Level and Temperature Sensor Bolt	10 Y (89 lb in)
Oil Pump Screen Bolt	10 Y (89 lb in)
Oil Pump-to-Engine Block Bolt	25 Y (18 lb ft)
Positive Crankcase Ventilation Valve LT1	6 Y (53 lb in)
Positive Crankcase Ventilation Valve LT4	10 Y (89 lb in)
Positive Crankcase Ventilation Oil Separator Bolt	10 Y (89 lb in)
Spark Plug	20 Y (15 lb ft)
Starter Heat Shield Bolt - Side	10 Y (89 lb in)
Starter Heat Shield Bolt - Rear	25 Y (18 lb ft)
Supercharger Belt Idler Pulley Bolts – All	58 Y (43 lb ft)
Supercharger Belt Idler Pulley Bracket Bolts	25 Y (18 lb ft)
Supercharger Water Manifold Bolts	10 Y (89 lb in)
Supercharger Bypass Valve Actuator Bolt	27 Y (20 lb ft)
Supercharger Inlet Air Pressure and Temperature Sensor Bolt	10 Y (89 lb in)
Throttle Body Bolt	10 Y (89 lb in)
Transmission to Engine Fastener	50 Y (37 lb ft)

Application	Specification
	Metric (English)
Transmission to Oil Pan Bolt	50 Y (37 lb ft)
Timing Chain Tensioner Bolt	25 Y (18 lb ft)
Valve Lifter Follower Guide Bolt	12 Y (106 lb in)
Valve Lifter Oil Manifold Bolt	
• First Pass in Sequence	15 Y (11 lb ft)
• Final Pass in Sequence	30 Y (22 lb ft)
Valve Lifter Oil Manifold Filter Plug	30 Y (22 lb ft)
Valve Rocker Arm Bolt	30 Y (22 lb ft)
Valve Rocker Arm Cover Bolts - In Sequence	10 Y (89 lb in)
Water Pump Assembly Bolt	10 Y (89 lb in)
Water Pump Outlet Bolt	10 Y (89 lb in)