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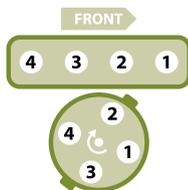
2.5L (150) / 4.0L (242) Engines

2.5L (150 cu) In-line 4-cylinder

Engine Type	In-line 4-cylinder
Bore and Stroke	98.4 x 81.0 mm (3.88 x 3.19 in.)
Displacement	2.5L (150 c.i.)
Compression Ratio	9.1:1
Firing Order	1-3-4-2
Lubrication	Pressure Feed - Full Flow Filtration
Cooling System	Liquid Cooled - Forced Circulation
Cylinder Block	Cast Iron
Crankshaft	Cast Nodular Iron
Cylinder Head	Cast Iron
Camshaft	Cast Iron
Pistons	Aluminum Alloy
Combustion Chamber	Dual-Quench
Connecting rods	Cast Malleable Iron

The 2.5 liter (150 CID) four-cylinder engine is an in-line engine. This engine is designed for unleaded fuel. The engine cylinder head has dual quench-type combustion chambers that create turbulence and fast burning of the air/fuel mixture. This results in good fuel economy. The cylinders are numbered 1 through 4 from front to rear. The firing order is 1-3-4-2.

The crankshaft rotation is clockwise, when viewed from the front of the engine. The crankshaft rotates within five main bearings and the camshaft rotates within four bearings.

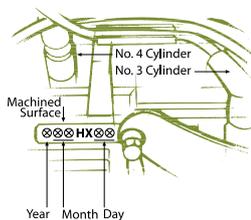


BUILD DATE CODE

The engine Build Date Code is located on a machined surface on the right side of the cylinder block between the No.3 and No.4 cylinders.

The digits of the code identify:

- (1) 1st Digit - The year (8 = 1998).
- (2) 2nd & 3rd Digits - The month (01 - 12).
- (3) 4th & 5th Digits - The engine type/fuel system/ compression ratio (HX = A 2.5 liter (150 CID) 9.1:1 compression ratio engine with a multi-point fuel injection system).
- (4) 6th & 7th Digits - The day of engine build (01 - 31).



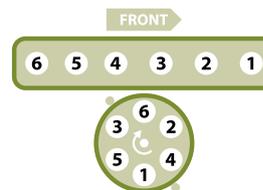
FOR EXAMPLE:
Code * 801HX23 * identifies a 2.5 liter (150 CID) engine with a multi-point fuel injection system, 9.1:1 compression ratio and built on January 23, 1998.

4.0L (242 cu) In-line 6-cylinder

Engine Type	In-line 6-Cylinder
Bore and Stroke	98.4 x 86.69 mm (3.88 x 3.413 in.)
Displacement	4.0L (242 cu. in.)
Compression Ratio	8.8:1
Firing Order	1-5-3-6-2-4
Lubrication	Pressure Feed - Full Flow Filtration
Cooling System	Liquid Cooled - Forced Circulation
Cylinder Block	Cast Iron
Crankshaft	Cast Nodular Iron
Cylinder Head	Cast Iron
Camshaft	Cast Iron
Pistons	Aluminum Alloy
Combustion Chamber	Dual-Quench
Connecting Rods	Cast Malleable Iron

The 4.0 Liter (242 CID) six cylinder engine is an in-line engine. This engine is designed for unleaded fuel. The engine cylinder head has dual quench-type combustion chambers that create turbulence and fast burning of the air/fuel mixture. This results in good fuel economy. The cylinders are numbered 1 through 6 from front to rear. The firing order is 1-5-3-6-2-4.

The crankshaft rotation is clockwise, when viewed from the front of the engine. The crankshaft rotates within seven main bearings. The camshaft rotates within four bearings.

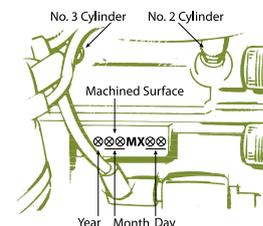


BUILD DATE CODE

The engine Build Date Code is located on a machined surface on the right side of the cylinder block between the No.2 and No.3 cylinders.

The digits of the code identify:

- (1) 1st Digit - The year (8 = 1998).
- (2) 2nd & 3rd Digits - The month (01 - 12).
- (3) 4th & 5th Digits - The engine type/fuel system/compression ratio (MX = A 4.0 Liter (242 CID) 8.8:1 compression ratio engine with a multi-point fuel injection system).
- (4) 6th & 7th Digits - The day of engine build (01 - 31).



FOR EXAMPLE:
Code * 801MX12 * identifies a 4.0 Liter (242 CID) engine with a multi-point fuel injection system, 8.8:1 compression ratio and built on January 12, 1998.



2.5L / 4.0L Engine Specifications

Camshaft

Hydraulic Tappet Clearance	Zero Lash
Bearing Clearance	0.025 to 0.076 mm (0.001 to 0.003 in.)
Bearing Journal Diameter	
No. 1	51.54 to 51.56 mm (2.029 to 2.030 in.)
No. 2	51.28 to 51.31 mm (2.019 to 2.020 in.)
No. 3	51.03 to 51.05 mm (2.009 to 2.010 in.)
No. 4	50.78 to 50.80 mm (1.999 to 2.000 in.)
Base Circle Runout	0.03 mm - max. (0.001 in. - max.)

Camshaft Lobe Lift

Exhaust	6.579 mm (0.259 in.)
Intake	6.477 mm (0.255 in.)

Valve Lift

(2.5L) Exhaust	10.528 mm (0.4145 in.)
(2.5L) Intake	10.350 mm (0.4075 in.)
(4.0L) Valve Lift	10.29 mm (0.405 in.)

Intake Valve Timing

(2.5L) Opens	15.4° BTDC
(2.5L) Closes	58° ABDC
(4.0L) Opens	12.4° BTDC
(4.0L) Closes	60.9° ABDC

Exhaust Valve Timing

(2.5L) Opens	52.8 BBDC
(2.5L) Closes	26.2° ATDC
(4.0L) Opens	49.8 BBDC
(4.0L) Closes	29.2° ATDC

Valve Overlap 41.6°

Intake Duration 253.3°

Exhaust Duration 259.°

Crankshaft

End Play	0.038 to 0.165 mm (0.0015 to 0.0065 in.)
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Main Bearing Journal

(2.5L) Diameter	63.489 to 63.502 mm (2.4996 to 2.5001 in.)
(2.5L) Width No. 1	27.58 to 27.89 mm (1.086 to 1.098 in.)
(2.5L) Width No. 2	32.28 to 32.33 mm (1.271 to 1.273 in.)
(2.5L) Width No. 3-4-5	30.02 to 30.18 mm (1.182 to 1.188 in.)
(4.0L) Diameter No. 1-6	63.489 to 63.502 mm (2.4996 to 2.5001 in.)
(4.0L) Diameter No. 7	63.449 to 63.487 mm (2.4980 to 2.4995 in.)
(4.0L) Width No. 1	27.58 to 27.89 mm (1.086 to 1.098 in.)
(4.0L) Width No. 3	32.28 to 32.33 mm (1.271 to 1.273 in.)
(4.0L) Width No. 2-4-5-6-7	30.02 to 30.18 mm (1.182 to 1.188 in.)

2.5L / 4.0L Engine Specifications

Main Bearing Clearance	0.03 to 0.06 mm (0.001 to 0.0025 in.)
(Preferred)	0.051 mm (0.002 in.)

Connecting Rod Journal

Diameter	53.17 to 53.23 mm (2.0934 to 2.0955 in.)
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Connecting Rod Journal

Width	27.18 to 27.33 mm (1.070 to 1.076 in.)
Out-of-Round (Max. All Journals)	0.013 mm (0.0005 in.)
Taper (Max. - All Journals)	0.013 mm (0.0005 in.)

Cylinder Block

(2.5L) Deck Height	236.73 mm (9.320 in.)
(2.5L) Deck Clearance	0.000 mm (0.000 in.)
(4.0L) Deck Height	240.03 to 240.18 mm (9.450 to 9.456 in.)
(4.0L) Deck Clearance (Below Block)	0.546 mm (0.0215 in.)
Cylinder Bore Diameter - Standard	98.45 to 98.48 mm (3.8759 to 3.8775 in.)
Cylinder Bore Diameter - Taper (Max.)	0.025 mm (0.001 in.)
Cylinder Bore Diameter - Out-of-Round (Max.)	0.025 mm (0.001 in.)
Tappet Bore Diameter	23.000 to 23.025 mm (0.9055 to 0.9065 in.)
Flatness	0.03 mm per 25 mm (0.001 in. per 1 in.)
Flatness	0.05 mm per 152 mm (0.002 in. per 6 in.)
Flatness Max.	0.20 mm for total length (0.008 in. for total length)
Main Bearing Bore Diameter	68.3514 to 68.3768 mm (2.691 to 2.692 in.)

Connecting Rods

Total Weight (Less Bearing)	657 to 665 grams (23.17 to 23.45 oz.)
Length (Center-to-Center)	155.52 to 155.62 mm (6.123 to 6.127 in.)
Piston Pin Bore Diameter	23.59 to 23.62 mm (0.9288 to 0.9298 in.)
Bore (Less Bearings)	56.08 to 56.09 mm (2.2080 to 2.2085 in.)
Bearing Clearance	0.025 to 0.076 mm (0.001 to 0.003 in.)
(Preferred)	0.044 to 0.050 mm (0.0015 to 0.0020 in.)
Side Clearance	0.25 to 0.48 mm (0.010 to 0.019 in.)
Twist (Max.)	0.001 mm per mm (0.001 in. per inch)
Bend (Max.)	0.001 mm per mm (0.001 in. per inch)

2.5L (150) / 4.0L (242) Engines

2.5L / 4.0L Engine Specifications

Cylinder Compression Pressure

(2.5L) Ratio	9.1:1
(4.0L) Ratio	8.8:1
Pressure Range	827 to 1,034 kPa (120 to 150 psi)
Max. Variation Between Cylinders	206 kPa (30 psi)

Cylinder Head

(2.5L) Combustion Chamber	49.9 to 52.9 cc (3.04 to 3.23 cu. in.)
(4.0L) Combustion Chamber	52.22 to 58.22 cc (3.37 to 3.55 cu. in.)
Valve Guide I.D. (Integral)	7.95 to 7.97 mm (0.313 to 0.314 in.)
Valve Stem-to-Guide Clearance	0.025 to 0.076 mm (0.001 to 0.003 in.)
Intake Valve Seat Angle	44.5°
Exhaust Valve Seat Angle	44.5°
Valve Seat Width	1.01 to 1.52 mm (0.040 to 0.060 in.)
Valve Seat Runout	0.064 mm (0.0025 in.)
Flatness	0.03 mm per 25 mm (0.001 in. per 1 in.)
Flatness	0.05 mm per 152 mm (0.002 in. per 6 in.)
(2.5L) Flatness Max.	0.15 mm for total length (0.006 in. for total length)
(4.0L) Flatness Max.	0.20 mm - max. for total length (0.008 in. - max. for total length)

Rocker Arms, Push Rods & Tappets

Rocker Arm Ratio	1.6:1
(2.5L) Push Rod Length	241.300 to 241.808 mm (9.500 to 9.520 in.)
(4.0L) Push Rod Length	244.856 to 245.364 mm (9.640 to 9.660 in.)
Push Rod Diameter	7.92 to 8.00 mm (0.312 to 0.315 in.)
Hydraulic Tappet Diameter	22.962 to 22.974 mm (0.904 to 0.9045 in.)
Tappet-to-Bore Clearance	0.025 to 0.063 mm (0.001 to 0.0025 in.)

Valves

Length (Tip-to-Gauge Dimension Line)

(2.5L) Intake	124.435 to 125.070 mm (4.899 to 4.924 in.)
(2.5L) Exhaust	125.120 to 125.755 mm (4.927 to 4.952 in.)
(4.0L) Intake	122.479 to 122.860 mm (4.822 to 4.837 in.)
(4.0L) Exhaust	122.860 to 123.241 mm (4.837 to 4.852 in.)
Valve Stem Diameter	7.899 to 7.925 mm (0.311 to 0.312 in.)
Stem-to-Guide Clearance	0.025 to 0.076 mm (0.001 to 0.003 in.)
Valve Head Diameter	
Intake	48.387 to 48.641 mm (1.905 to 1.915 in.)
Exhaust	37.973 to 38.227 mm (1.495 to 1.505 in.)

2.5L / 4.0L Engine Specifications

Valve Face Angle

Intake	45°
Exhaust	45°
Tip Refinishing (Max. Allowable)	0.25 mm (0.010 in.)

Valve Springs

Free Length (Approx.)	47.65 mm (1.876 in.)
Spring Tension	
Valve Closed	316 to 351 N @ 41.656 mm (71 to 79 lbf. @ 1.64 in.)
Valve Open	898.6 to 969.7 N @ 30.89 mm (202 to 218 lbf. @ 1.216 in.)
Inside Diameter	21.0 mm to 21.51 mm (0.827 to 0.847 in.)

Pistons

Weight (Less Pin)	417 to 429 grams (14.7 to 15.1 oz.)
Piston Pin Bore (Centerline to Piston Top)	40.61 to 40.72 mm (1.599 to 1.603 in.)
Piston-to-Bore Clearance	0.018 to 0.038 mm (0.0008 to 0.0015 in.)
Ring Gap Clearance	
Top Compression Ring	0.229 to 0.610 mm (0.0090 to 0.0240 in.)
2nd Compression Ring	0.483 to 0.965 mm (0.0190 to 0.0380 in.)
Oil Control Steel Rails	0.254 to 1.500 mm (0.010 to 0.060 in.)

Ring Side Clearance

Compression Rings	0.042 to 0.084 mm (0.0017 to 0.0033 in.)
Oil Control Ring	0.06 to 0.21 mm (0.0024 to 0.0083 in.)

Piston Ring Groove Height

Compression Rings	1.530 to 1.555 mm (0.0602 to 0.0612 in.)
Oil Control Ring	4.035 to 4.060 mm (0.1589 to 0.1598 in.)

Piston Ring Groove Diameter

No.1 Compression Ring	88.39 to 88.65 mm (3.48 to 3.49 in.)
No.2 Compression Ring	87.63 to 87.88 mm (3.45 to 3.46 in.)
Oil Control Ring	89.66 to 89.92 mm (3.53 to 3.54 in.)

Piston Pin Bore Diameter	23.650 to 23.658 mm (0.9312 to 0.9315 in.)
Piston Pin Diameter	23.637 to 23.640 mm (0.9306 to 0.9307 in.)
Piston-to-Pin Clearance	0.0102 to 0.0208 mm (0.0005 to 0.0009 in.)
Piston-to-Pin Connecting Rod (Press Fit)	8.9 kN (2000 lbf.)

Oil Pump

Gear-to-Body Clearance (Radial)	0.051 to 0.102 mm (0.002 to 0.004 in.)
(Preferred)	0.051 mm (0.002 in.)

2.5L / 4.0L Engine Specifications

Gear End Clearance - Plastigage	0.051 to 0.152 mm (0.002 to 0.006 in.)
(Preferred)	0.051 mm (0.002 in.)
Gear End Clearance - Feeler Gauge	0.1016 to 0.2032 mm (0.004 to 0.008 in.)
(Preferred)	0.1778 mm (0.007 in.)

Oil Pressure

(2.5L) Min. Pressure (600 rpm)	89.6 kPa (13 psi)
(2.5L) At Idle Speed (800 rpm)	172 to 241 kPa (25 to 35 psi)
(4.0L) At Idle Speed (600 rpm)	89.6 kPa (13 psi)
At 1600 rpm & Higher	255 to 517 kPa (37 to 75 psi)
Oil Pressure Relief	517 kPa (75 psi)

2.5L Torque Chart

Description	Torque
A/C Compressor Bracket-to-Engine Bolts	34 N-m (25 ft. lbs.)
A/C Compressor Mounting Bolts	27 N-m (20 ft. lbs.)
Block Heater Nut	1.8 N-m (16 in. lbs.)
Camshaft Sprocket Bolt	108 N-m (80 ft. lbs.)
Clutch Cover to Flywheel Bolts	31 N-m (23 ft. lbs.)
Connecting Rod Cap Nuts	45 N-m (33 ft. lbs.)
Cylinder Block Drain Plugs	41 N-m (30 ft. lbs.)
Cylinder Head	
Bolts #1-10 & #12-14	149 N-m (110 ft. lbs.)
Bolt #11	135 N-m (100 ft. lbs.)
Cylinder Head Cover Bolts	13 N-m (115 in. lbs.)
Dipstick Tube Bracket to Cylinder Block Bolt	19 N-m (168 in. lbs.)
Distributor Hold-Down Clamp Bolt	23 N-m (204 in. lbs.)
Engine Mounts - Front	
Insulator Bracket Bolts	81 N-m (60 ft. lbs.)
Insulator Bracket Nuts	47 N-m (35 ft. lbs.)
Insulator Thru-Bolt	81 N-m (60 ft. lbs.)
Engine Mounts - Rear	
Support Cushion/Crossmember Nuts	22 N-m (192 in. lbs.)
Support Cushion/Bracket Nuts	46 N-m (34 ft. lbs.)
Transmission Support Bracket Bolts	43 N-m (32 ft. lbs.)
Transmission Support Bracket/Cushion Bolt	75 N-m (55 ft. lbs.)
Transmission Support Adaptor Bracket Bolts	75 N-m (55 ft. lbs.)
Exhaust Manifold/Pipe Nuts	27 N-m (20 ft. lbs.)

2.5L Torque Chart

Description	Torque
Flywheel/Converter Housing Bolts	38 N-m (28 ft. lbs.)
Flywheel to Crankshaft Bolts	143 N-m (105 ft. lbs.)
Front Cover to Block	
Bolts 1/4-20	7 N-m (60 in. lbs.)
Bolts 5/16-18	22 N-m (192 in. lbs.)
Generator	
Adjusting Bolt	24 N-m (18 ft. lbs.)
Pivot Bolt/Nut	38 N-m (28 ft. lbs.)
Mounting Bracket-to-Engine Bolts	38 N-m (28 ft. lbs.)
Mounting/Head Bolts	45 N-m (33 ft. lbs.)
Main Bearing Cap Bolts	108 N-m (80 ft. lbs.)
Oil Filter	
Adaptor Bolt	102 N-m (75 ft. lbs.)
Connector	68 N-m (50 ft. lbs.)
Filter	18 N-m (13 ft. lbs.)
Oil Galley Plug	41 N-m (30 ft. lbs.)
Oil Pan	
1/4-20 Bolts	9.5 N-m (84 in. lbs.)
5/16-18 Bolts	15 N-m (132 in. lbs.)
Drain Plug	34 N-m (25 ft. lbs.)
Oil Pressure Sending Unit	15 N-m (130 in. lbs.)
Oil Pump	
Short Attaching Bolts	23 N-m (204 in. lbs.)
Long Attaching Bolts	23 N-m (204 in. lbs.)
Cover Bolts	8 N-m (70 in. lbs.)
Power Steering Pump Pressure Hose Nut	52 N-m (38 ft. lbs.)
Rocker Arm Assembly to Cylinder Head Capscrews	28 N-m (21 ft. lbs.)
Spark Plugs	37 N-m (27 ft. lbs.)
Starter Motor Mounting Bolts	45 N-m (33 ft. lbs.)
Tensioner Bracket of Cylinder Block Bolts	19 N-m (168 in. lbs.)
Thermostat Housing Bolts	18 N-m (156 in. lbs.)
Throttle Body Bolts	10 N-m (90 in. lbs.)
Vibration Damper Bolt	108 N-m (80 ft. lbs.)
Water Pump to Block Bolts	31 N-m (23 ft. lbs.)

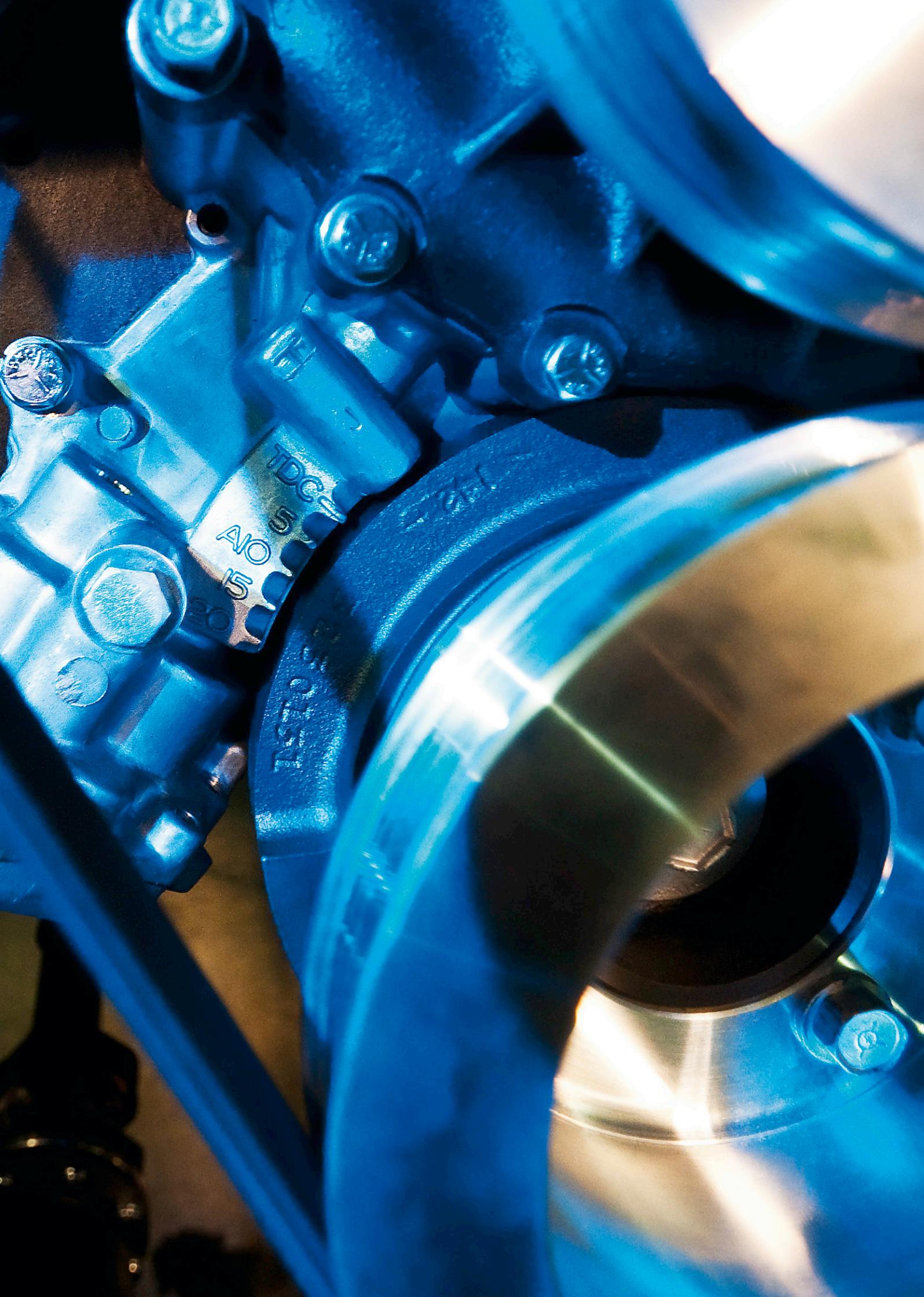
2.5L (150) / 4.0L (242) Engines

4.0L Torque Chart

Description	Torque
A/C Compressor Bracket-to-Engine Bolts	34 N-m (25 ft. lbs.)
A/C Compressor Mounting Bolts	27 N-m (20 ft. lbs.)
A/C Low Pressure Service Valve Nut	38 N-m (28 ft. lbs.)
Block Heater Nut	2 N-m (16 in. lbs.)
Camshaft Sprocket Bolt	68 N-m (50 ft. lbs.)
Camshaft Thrust Plate to Cylinder Block Screws	24 N-m (18 ft. lbs.)
Clutch Cover to Flywheel Bolts	54 N-m (40 ft. lbs.)
Coil Bracket to Block Bolts	22 N-m (192 in. lbs.)
Connecting Rod Nuts	45 N-m (33 ft. lbs.)
Cylinder Block Drain Plugs	34 N-m (25 ft. lbs.)
Cylinder Head Bolts	135 N-m (100 ft. lbs.)
Cylinder Head Cover Bolts	10 N-m (85 in. lbs.)
Distributor Clamp Bolt	23 N-m (204 in. lbs.)
Engine Mounts - Front	
Support Bracket Bolts	61 N-m (45 ft. lbs.)
Support Cushion Bolts/Nuts	41 N-m (30 ft. lbs.)
Support Cushion Bracket Bolts	54 N-m (40 ft. lbs.)
Support Cushion Bracket Stud Nuts	41 N-m (30 ft. lbs.)
Support Cushion Thru-Bolt	65 N-m (48 ft. lbs.)
Engine Mounts - Rear	
Crossmember-to-Sill Bolts (Automatic)	41 N-m (30 ft. lbs.)
Insulator Stud Assembly Nut	41 N-m (30 ft. lbs.)
Support Cushion/Crossmember Nuts	22 N-m (192 in. lbs.)
Support Cushion/Bracket Nuts (Manual)	75 N-m (55 ft. lbs.)
Transmission Support Bracket Bolt (Manual)	46 N-m (34 ft. lbs.)
Transmission Support Bracket/Cushion Bolt (4WD Auto)	75 N-m (55 ft. lbs.)
Transmission Support Adaptor Bracket Bolts (2WD Auto)	75 N-m (55 ft. lbs.)
Exhaust Manifold/Pipe Nuts	27 N-m (20 ft. lbs.)
Flywheel to Converter Housing Bolts	38 N-m (28 ft. lbs.)
Flywheel to Crankshaft Bolts	143 N-m (105 ft. lbs.)
Front Cover-to-Block	
Bolts 1/4-20	7 N-m (60 in. lbs.)
Bolts 5/16-18	22 N-m (192 in. lbs.)
Fuel Rail Bolts/Stud	12 N-m (108 in. lbs.)

4.0L Torque Chart

Description	Torque
Generator	
Fixed Bolt	24 N-m (18 ft. lbs.)
Thru Bolt/Nut	38 N-m (28 ft. lbs.)
Main Bearing Cap Bolts	108 N-m (80 ft. lbs.)
Main Bearing Brace Nuts	47 N-m (35 ft. lbs.)
Oil Filter	
Filter	18 N-m (156 in. lbs.)
Connector (to adaptor)	47 N-m (35 ft. lbs.)
Connector (to block)	68 N-m (50 ft. lbs.)
Adaptor Bolts	102 N-m (50 ft. lbs.)
Oil Galley Plug	41 N-m (30 ft. lbs.)
Oil Pan	
1/4-20 Bolts	9.5 N-m (84 in. lbs.)
5/16-18 Bolts	15 N-m (132 in. lbs.)
Drain Plug	34 N-m (25 ft. lbs.)
Oil Pump	
Short Attaching Bolts	23 N-m (204 in. lbs.)
Long Attaching Bolts	23 N-m (204 in. lbs.)
Cover Bolts	8 N-m (70 in. lbs.)
Power Steering Pump Pressure Hose Nut	52 N-m (38 ft. lbs.)
Rocker Arm Assembly-to-Cylinder Head Capscrews	30 N-m (21ft. lbs.)
Spark Plugs	37 N-m (27 ft. lbs.)
Starter Motor Mounting Bolts	45 N-m (33 ft. lbs.)
Thermostat Housing Bolts	18 N-m (156 in. lbs.)
Throttle Body Bolts	10 N-m (90 in. lbs.)
Vibration Damper Bolts	108 N-m (80 ft. lbs.)
Water Pump/Block Bolts	23 N-m (17 ft. lbs.)



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152103

3.8L (232) / 4.2L (258) Engines AMC (1971-1990)

232/258 cui Engines Specifications

The 232 and 258 CID are six-cylinder, in-line, overhead valve engines. Both engines operate only on unleaded fuel when installed in CJ Models. All Cherokee and Truck Models equipped with six-cylinder engines may use leaded or unleaded fuel. Cylinders are numbered from front to rear. Firing order is 1-5-3-6-2-4. Crankshaft rotation is counterclockwise, viewed from the rear. The crankshaft is supported by seven (two-piece) bearings. The camshaft is supported by four one-piece (line bored) bearings.

Identification:

Build Date Code

The engine Build Date Code is located on a machined surface on the right side of the block between the No.2 and No.3 cylinders. The numbers of the code identify the year, month, and day that the engine was built. The code letter identifies the cubic inch displacement, carburetor type and compression ratio. The letters are decoded as follows:

Example: **9 03 A 18**

The example code identifies a 258 CID with 1V carburetor and 8.00:1 compression ratio built on March 18, 1976.

Engine Build Date Code

Letter Code	CID	Carburetor	Compression Ratio
A	258	1V	8.0:1
E	232	1V	8.0:1

1st Character (Year)	2nd and 3rd Characters (Month)	4th Character (Engine Type)	5th and 6th Characters (Day)
8 - 1975 9 - 1976	01 - 12	A or E	01 - 31

Oversize or Undersize Components

Some engines may be built with oversize or undersize components such as oversize cylinder bores, undersize crankshaft main bearing journals, undersize connecting rod journals, or oversize camshaft bearing bores (inside diameter of camshaft bearing is always standard). These engines are identified by a letter code stamped on a boss on the cylinder block between the ignition coil and distributor. The letters are decoded as follows:

Code Letter B inch oversize	All cylinder bores	0.010-
Code Letter M	All crankshaft main bearing journals	0.010-inch undersize
Code Letter P	All connecting rod bearing journals	0.010-inch undersize
Code Letter C inch oversize	All camshaft bearing bores	0.010-

Example: The code letters **PM** mean that the crankshaft main bearing journals and connecting rod journals are 0.010-inch undersize.

232/258 cui Engines Specifications

Type	In Line, OHV, Six-cylinder
Bore	3.75 inches
Stroke	
232	3.50 inches
258	3.895 inches
Displacement	
232	232 cubic inches
258	258 cubic inches
Compression Ratio	8.0:1
Compression Pressure	
232	140 psi
258	150 psi
Maximum Variation Between Cyl.	20 psi
Firing Order	1-5-3-6-2-4
Taxable Horsepower	33.75
Fuel	Regular, Low Lead or No Lead
Camshaft	
Fuel Pump Eccentric Diameter	1.615 to 1.625 inches
Tappet Clearance	Zero Lash (Hydraulic tappets)
End Play	Zero (engine operating)
Bearing Clearance	0.001 to 0.003 inch
Bearing Journal Diameter	
No.1	2.029 to 2.030 inches
No.2	2.019 to 2.020 inches
No.3	2.009 to 2.010 inches
No.4	1.999 to 2.000 inches
Base Circle Runout	0.001 inch (max)
Cam Lobe Lift	0.232 inch
Intake Valve Timing	
Opens	12.12° BTDC
Closes	64.80° ABDC
Exhaust Valve Timing	
Opens	53.12° BBDC
Closes	23.80° ATDC
Valve Overlap	35.92°
Intake Duration	256.92°
Exhaust Duration	256.992°
Connecting Rods	
Total Weight (Less Bearings)	
232	557 to 665 grams
258	695 to 703 grams

232/258 cji Engines Specifications

Total Length (Center-to-Center)	
232	6.123 to 6.127 inches
258	5.873 to 5.877 inches
Piston Pin Bore Diameter	0.9288 to 0.9298 inches
Bearing Clearance	0.001 to 0.0025 inch (0.0015-0.002 inch preferred)
Side Clearance	0.005 to 0.014 inch
Maximum Twist	0.001 per inch
Maximum Bend	0.0005 per inch
Crankshaft	
End Play	0.0015 to 0.0065 inch
Main Bearing Journal Diameter	2.4986 to 2.5001 inches
Main Bearing Journal Width	
No.1	1.086 to 1.098 inches
No.3	1.271 to 1.273 inches
No.2-4-5-6-7	1.182 to 1.188 inches
Main Bearing Clearance	0.001 to 0.003 inch (0.0025 inch preferred)
Connecting Rod Journal Diameter	2.0934 to 2.0955 inches
Connecting Rod Journal Width	1.070 to 1.076 inches
Connecting Rod Bearing Clearance	0.001 to 0.0025 inch (0.0015-0.002 inch preferred)
Maximum Out-of-Round (All Journals)	0.0005 inch
Maximum Taper (All Journals)	0.0005 inch
Cylinder Block	
Deck Height	9.528 to 9.534 inch
Deck Clearance	
232	0.0575 inch (below block)
258	0.110 inch (below block)
Cylinder Bore (standard)	3.7501 to 3.7533 inches
Maximum Cylinder Taper	0.005 inch
Maximum Cylinder Out-of-Round	0.003 inch
Tappet Bore Diameter	0.905 to 0.906 inch
Cylinder Block Flatness	0.001/1 inch, 0.002/6 inch; 0.008 inch (max)
Cylinder Head	
Combustion Chamber Volume	62.5 to 65.5 cc
Valve Arrangement	EI-IE-IE-EI-EI-IE
Valve Guide ID (Integral)	0.3735 to 0.3745 inch
Valve Stem-to-Guide Clearance	0.001 to 0.003 inch
Intake Valve Seat Angle	30°
Exhaust Valve Seat Angle	44.5°
Valve Seat Width	0.040 to 0.060 inch
Valve Seat Runout	0.0025 inch

232/258 cji Engines Specifications

Cylinder Head Flatness	0.001/1 inch; 0.002/6 inch; 0.008 inch (max)
Lubrication System	
Engine Oil Capacity	5 quarts (Add 1 quart with filter change)
Normal Operating Pressure	13 psi at 600 rpm; 37 to 75 psi (max) at 1600 rpm+
Oil Pressure Relief	75 psi (max)
Gear-to-Body Clearance	0.0025 to 0.0005 inch (0.0005 inch preferred)
Gear End Clearance	0.002 to 0.006 inch (0.006 inch preferred)
Pistons	
Weight (less pin)	481 to 485 grams
Piston Pin Bore Centerline-to-Piston Top	1.599 to 1.603 inches
Piston-to-Bore Clearance	0.0009 to 0.0017 inch (0.0012 to 0.0013 inch preferred)
Piston Ring Gap Clearance - Compression (Both)	0.010 to 0.020 inch
Piston Ring Gap Clearance - Oil Control Steel Rails	0.010 to 0.025 inch
Piston Ring Side Clearance	
No.1 Compression	0.0015 to 0.003 inch (0.0015 preferred)
No.2 Compression	0.0015 to 0.003 inch (0.0015 preferred)
Oil Control	0.001 to 0.008 inch (0.003 preferred)
Piston Ring Groove Height	
Compression (both)	0.0795 to 0.0805 inch
Oil Control	0.188 to 0.189 inch
Piston Ring Groove Diameter	
No.1 and No.2	3.328 to 3.333 inches
Oil Control	3.329 to 3.339 inches
Piston Pin Bore Diameter	0.9308 to 0.9313 inch
Piston Pin Diameter	0.9304 to 0.9309 inch
Piston-to-Pin Clearance	0.0003 to 0.0005 inch loose (0.0005 inch preferred)
Piston Pin-to-Connecting Rod	2000 lb. press-fit
Rocker Arms, Push Rods and Tappets	
Rocker Arm Ratio	1.6:1
Push Rod Length	9.615 to 9.595 inches
Push Rod Diameter	313 to 312 inch
Hydraulic Tappet Diameter	0.904 to 0.9045 inch
Tappet-to-Bore Clearance	0.001 to 0.002 inch

3.8L (232) / 4.2L (258) Engines AMC (1971-1990)

232/258 cji Engines Specifications

Valves

Valve Length	
(Tip-to-Gauge Dim. Line)	4.7895 to 4.8045 inches
With Rotator	4.8095 to 4.8245 inches
Valve Stem Diameter	
	0.3715 to 0.3725 inch
Stem-to-Guide Clearance	
	0.001 to 0.003 inch
Intake Valve Head Diameter	
	1.782 to 1.792 inches
Intake Valve Face Angle	
	29°
Exhaust Valve Head Diameter	
	1.401 to 1.411 inches
Exhaust Valve Face Angle	
	44°
Maximum Allowable Removed for Tip Refinishing	
	0.010 inch

Valve Springs

Free Length	
	2.234 inches approx.
With Rotators	2.00 inches approx.
Spring Tension	
Valve Closed	
	95 to 105 lbs at 1-13/16 inches
With Rotators	80-88 lbs at 1-5/8 inches
Valve Open	
	188 to 202 lbs at 1-7/16 inches
With Rotators	210 to 226 lbs at 1-3/16 inches
Inside Diameter	
	0.948 to 0.968 inch
With Rotators	1.000 to 1.020 inches

232/258 cji Torque Chart

Torque Specifications	Service Set-To Torque	Service In-Use Recheck Torque
Accessory Drive Pulley Screws	18	12 to 25
Air Injection Tube-to-Manifold	20	15 to 20
Air Pump-to-Bracket	20	15 to 22
Air Pump Brackets-to-Engine		
(A. Compressor or Pedestals)	25	18 to 28
Air Pump Adjusting Snap-to-Pump	20	15 to 22
Alternator Pivot Bolt or Nut	28	20 to 35
Alternator Adjusting Bolt	18	15 to 20
Alternator Mounting		
Bracket-to-Engine	28	23 to 30
Alternator Pivot Mounting		
Bolt to Head	33	30 to 35
Block Heater Nut	20 in-lb	17 to 25 in-lb
Camshaft Sprocket Screw	50	45 to 55
Carburetor Hold-Down Nuts	14	12 to 15
Coil Bracket-to-Cylinder Head	14	10 to 18
Connecting Rod Bolt Nuts	28	26 to 30
Cylinder Head Capscrews	105	95 to 115
Cylinder Head Cover Screws	50 in-lb	42 to 58 in-lb
Crankshaft Pulley-to-Damper	23	18 to 28
Clutch Housing Spacer to Block Screws	12	9 to 15
Clutch Housing-to-Block Screws (top)	27	22 to 30
Clutch Housing-to-Block Screws (bottom)	43	37 to 47
Distributor Clamp Bracket Screw	13	10 to 18
EGR Valve	13	9 to 18
Exhaust Manifold Bolts	23	18 to 28
Exhaust Pipe-to-Manifold	23	18 to 28
Fan and Hub Assembly Bolts	18	12 to 25
Drive Plate-to-Converter Screw	22	20 to 25
Flywheel or Drive Plate-to-Crankshaft	105	95 to 120
Front Crossmember-to-Sill	65	55 min.
Front Support Bracket-to-Block	28	22 to 38
Front Support Cushion-to-Bracket	33	27 to 38
Front Support Cushion-to-Crossmember	37	30 to 45
Fuel Pump Screws	16	13 to 19
Idler Arm Bracket-to-Sill	50	35 to 60
Idler Pulley Bracket to Front Cover Nut	7	4 to 9

Engine Specifications

232/258 cuj Torque Chart

Torque Specifications	Service Set-To Torque	Service In-Use Recheck Torque
Idler Pulley Bearing Shaft-to-Bracket Nut	33	28 to 38
Intake Manifold Screws	23	18 to 28
Main Bearing Capscrews	80	75 to 85
Oil Filter Adapter	48	42 to 55
Oil Pump Cover Screws	70 in-lb	60 to 80 in-lb
Oil Pump Attaching Screws (Short)	10	8 to 13
Oil Pump Attaching Screws (Long)	17	12 to 20
Oil Pan Screws-1/4 inch - 20	7	5 to 9
Oil Pan Screws-5/16-inch - 18	11	9 to 13
Power Steering Pump Adapter Screw	23	18 to 28
Power Steering Pump Bracket Screw	43	37 to 47
Power Steering Pump Mounting Screw	28	25 to 35
Power Steering Pump Pressure Line Nut	38	30 to 45
Power Steering Pump Pulley Nut	58	40 to 65
Rear Crossmember-to-Side Sill Nut	30	20 to 35
Rear Support Cushion-to-Bracket	48	40 to 55
Rear Support Bracket-to-Transmission	33	27 to 38
Rear Support Cushion-to-Crossmember	18	12 to 25
Rocker Arm Assembly-to-Cylinder Head	21	18 to 26
Spark Plugs	28	22 to 33
Timing Case Cover-to-Block Screws	5	4 to 8
Timing Case Cover-to-Block Studs	16	13 to 19
Thermostat Housing Screw	13	10 to 18
Vibration Damper Screw	55	48 to 64
Water Pump Screws	13	9 to 18

All torque values given in foot-pounds with dry fits unless otherwise specified.

Service Set-To Torques should be used when assembling components.
Service In-Use Recheck Torques should be used for checking a pretorqued item.

5.2L (318) Engine ZJ/ZG (1993-1998)

5.2L (318 cu) V-Type 8-cylinder

Engine Type	90° V-8 OHV
Bore and Stroke	99.3 x 84.0 mm (3.91 x 3.31 in.)
Displacement	5.2L (318 cu. in.)
Compression Ratio	9.1:1
Torque	386 N-m (285 ft. lbs.) @ 3,600 rpm
Firing Order	1-8-4-3-6-5-7-2
Lubrication	Pressure Feed - Full Flow Filtration
Engine Oil Capacity	4.7L (5.0 qts) w/filter
Cooling System	Liquid Cooled - Forced Circulation
Cooling Capacity	15.6L (16.5 qts)
Cylinder Block	Cast Iron
Crankshaft	Nodular Iron
Cylinder Head	Cast Iron
Combustion Chambers	Wedge-High Swirl Valve Shrouding
Camshaft	Nodular Cast Iron
Pistons	Aluminum Alloy w/Strut
Connecting Rods	Forged Steel

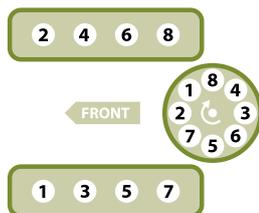
The 5.2 Liter (318 CID) eight-cylinder engine is a V-Type, single cam engine with hydraulic roller tappets.

This engine is designed for unleaded fuel. Engine lubrication system consists of a rotor type oil pump and a full flow oil filter.

The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank.

The firing order is 1-8-4-3-6-5-7-2

The crankshaft rotation is clockwise, when viewed from the front of the engine. The crankshaft rotates within five main bearings and the camshaft rotates within four bearings.



Engine Identification Number

The engine serial number is stamped into a machined pad located on the left, front corner of the cylinder block. When component part replacement is necessary, use the engine type and serial number for reference.

X Last Digit of Model Year
M Plant -
M Mound Road - S

X M 5.2L T XXXX XXXXXXXX

Saltillo

- T Trenton
- K Toluca

5.2L Engine Displacement

T Usage - T Truck

XXXX Month/Day

XXXXXXXX Serial Code - Last 8 Digits of VIN No.

5.2L Engine Specifications

Camshaft

Bearing Diameter	
No. 1	50.800 - 50.825 mm (2.000 - 2.001 in)
No. 2	50.394 - 50.419 mm (1.984 - 1.985 in)
No. 3	50.013 - 50.038 mm (1.969 - 1.970 in)
No. 4	49.606 - 49.632 mm (1.953 - 1.954 in)
No. 5	39.688 - 39.713 mm (1.5625 - 1.5635 in)
Diametrical Clearance	
Max. Allowable	0.127 mm (0.005 in)
End Play	
	0.051 - 0.254 mm (0.002 - 0.010 in)

Bearing Journal Diameter

No. 1	50.749 - 50.775 mm (1.998 - 1.999 in)
No. 2	50.343 - 50.368 mm (1.982 - 1.983 in)
No. 3	49.962 - 49.987 mm (1.967 - 1.968 in)
No. 4	49.555 - 49.581 mm (1.951 - 1.952 in)
No. 5	39.637 - 39.662 mm (1.5605 - 1.5615 in)

Connecting Rods

Bearing Clearance	0.0127 - 0.0559 mm (0.0005-0.0022 in)
Piston Pin Bore Diameter	24.966 - 24.978 mm (0.9829 - 0.9834 in)
Side Clearance (Two Rods)	0.152 - 0.356 mm (0.006 - 0.014 in)
Total Weight (Less Bearing)	726 grams (25.61 oz)

Crankshaft

Connect Rod Journal

Diameter	53.950 - 53.975 mm (2.124 - 2.125 in)
Out-of-Round (Max.)	0.0254 mm (0.001 in)
Taper (Max.)	0.0254 mm (0.001 in)

Diametrical Clearance

No. 1	0.0127 - 0.0381 mm (0.0005 - 0.0015 in)
Nos. 2, 3, 4 and 5	0.0127 - 0.0508 mm (0.0005 - 0.0020 in)
Max. Allowable (Nos. 2, 3, 4 & 5)	0.0635 mm (0.0025 in)
End Play	
	0.051 - 0.178 mm (0.002 - 0.007 in)
Max. Allowable	0.254 mm (0.010 in)

Main Bearing Journals

Diameter	63.487 - 63.513 mm (2.4995 - 2.5005 in)
Out-of-Round (Max.)	0.0254 mm (0.001 in)
Taper (Max.)	0.0254 mm (0.001 in)



5.2L Engine Specifications

Cylinder Block

Cylinder Bore

Diameter	99.314 - 99.365 mm (3.910 - 3.912 in)
Out-of-Round (Max.)	0.127 mm (0.005 in)
Taper (Max.)	0.254 mm (0.010 in)
Oversize (Max.)	1.016 mm (0.040 in)

Distributor Lower Drive Shaft

Bushing (Press Fit in Block)	0.0127 - 0.3556 mm (0.0005 - 0.0140 in)
Shaft-to-Bushing Clearance	0.0178 - 0.0686 mm (0.0007 - 0.0027 in)
Tappet Bore Diameter	22.99 - 23.01 mm (0.9051 - 0.9059 in)

Cylinder Head

Compression Pressure	689 kPa (100 psi)
Gasket Thickness (Compressed)	1.2065 mm (0.0475 in)
Valve Seat	
Angle	44.25° - 44.75°
Runout (Max.)	0.0762 mm (0.003 in)
Width (Finish) - Intake	1.016 - 1.524 mm (0.040 - 0.060 in)
Width (Finish) - Exhaust	1.524 - 2.032 mm (0.060 - 0.080 in)

Hydraulic Tappets

Body Diameter	22.949 - 22.962 mm (0.9035 - 0.9040 in)
Clearance in Block	0.0279 - 0.0610 mm (0.0011 - 0.0024 in)
Dry Lash	1.524 - 5.334 mm (0.060 - 0.210 in)
Push Rod length	175.64 - 176.15 mm (6.915 - 6.935 in)

Oil Pump

Clearance Over Rotors (Max.)	0.1016 mm (0.004 in)
Cover Out-of-Fiat (Max.)	0.0381 mm (0.0015 in)
Inner Rotor Thickness (Min.)	20.955 mm (0.825 in)
Outer Rotor	
Clearance (Max.)	0.3556 mm (0.014 in)
Diameter (Min.)	62.7126 mm (2.469 in)
Thickness (Min.)	20.955 mm (0.825 in)
Tip Clearance Between Rotors (Max)	0.2032 mm (0.008 in)

5.2L Engine Specifications

Oil Pressure

At Curb Idle Speed*	41.4 kPa (6 psi)
At 3000 rpm	207 - 552 kPa (30 - 80 psi)
Oil Pressure Switch Actuating Pressure (Min.)	34.5 - 48.3 kPa (5 - 7 psi)

***CAUTION:**
If pressure is ZERO at curb idle, DO NOT run engine at 3,000 rpm.

Oil Filter

Bypass Valve Setting	62 - 103 kPa (9 - 15 psi)
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Pistons

Clearance at Top of Skirt	0.0127 - 0.0381 mm (0.0005 - 0.0015 in)
Land Clearance (Diametrical)	0.635 - 1.016 mm (0.025 - 0.040 in)
Piston length	86.360 mm (3.40 in)
Piston Ring Groove Depth	
Nos. 1 and 2	4.572 - 4.826 mm (0.180 - 0.190 in)
No. 3	3.810 - 4.064 mm (0.150 - 0.160 in)
Weight	592.6 - 596.6 grams (20.90 - 21.04 oz)

Piston Pins

Clearance	
In Piston	0.00635 - 0.01905 mm (0.00025 - 0.00075 in)
In Rod (Interference)	0.0178 - 0.0356 mm (0.0007 - 0.0014 in)
Diameter	24.996 - 25.001 mm (0.9841 - 0.9843 in)
End Play	NONE
Length	75.946 - 76.454 mm (2.990 - 3.010 in)

Piston Rings

Ring Gap	
Compression Rings	0.254 - 0.508 mm (0.010 - 0.020 in)
Oil Control (Steel Rails)	0.254 - 1.270 mm (0.010 - 0.050 in)
Ring Side Clearance	
Compression Rings	0.038 - 0.076 mm (0.0015 - 0.0030 in)
Oil Ring (Steel Rails)	0.06 - 0.21 mm (0.002 - 0.008 in)
Ring Width	
Compression Rings	1.971 - 1.989 mm (0.0776 - 0.0783 in)
Oil Ring (Steel Rails)	3.848 - 3.975 mm (0.1515 - 0.1565 in)

5.2L (318) Engine ZJ/ZG (1993-1998)

5.2L Engine Specifications

Valves

Face Angle	43.25° - 43.75°
Head Diameter	
Intake	48.666 mm (1.916 in)
Exhaust	41.250 mm (1.624 in)
Length (Overall)	
Intake	124.28 - 125.92 mm (4.893 - 4.918 in)
Exhaust	124.64 - 125.27 mm (4.907 - 4.932 in)
Lift (Zero lash)	10.973 mm (0.432 in)
Stern Diameter	7.899 - 7.925 mm (0.311 - 0.312 in)
Stem-to-Guide Clearance	0.0254 - 0.0762 mm (0.001 - 0.003 in)
Max. Allowable (Rocking Method)	0.4318 mm (0.017 in)
Guide Bore Diameter (Std)	7.950 - 7.976 mm (0.313 - 0.314 in)

Valve Springs

Free Length (Approx.)	49.962 mm (1.967 in)
Spring Tension (Valve Closed)	@ 41.66 mm = 378 N (@ 1.64 in = 85 lbs)
Spring Tension (Valve Open)	@ 30.89 mm = 890 N (@ 1.212 in = 200 lbs)
Number of Coils	6.8
Installed Height (Spring Seat to Retainer)	41.66 mm (1.64 in)
Wire Diameter	4.50 mm (0.177 in)

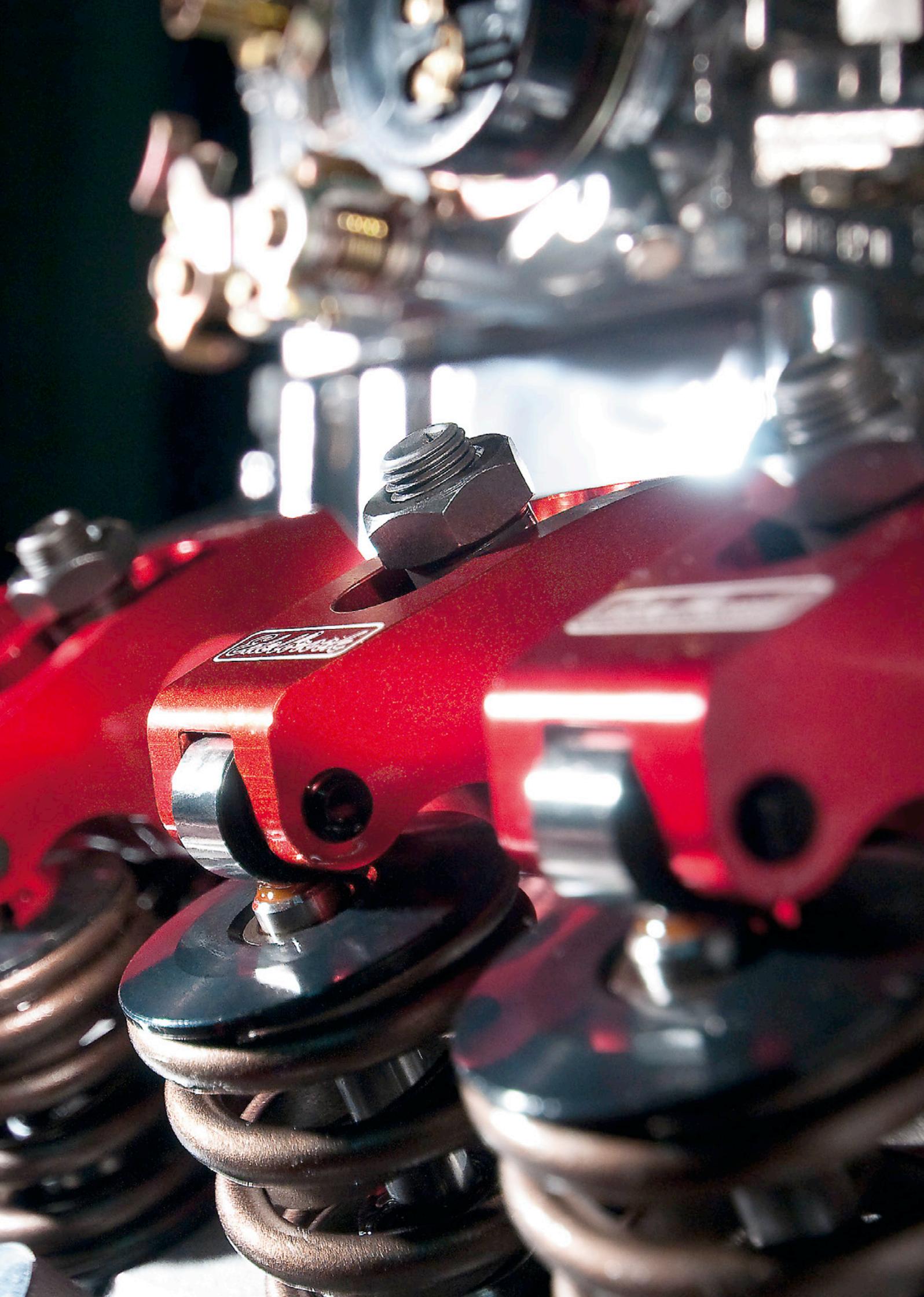
Valve Timing

Exhaust Valve	
Closes (ATC)	16°
Opens (BBC)	52°
Duration	248°
Intake Valve	
Closes (ABC)	50°
Opens (BTC)	10°
Duration	240°
Valve Overlap	26°

5.2L Torque Chart

Description	Torque
Adjusting Strap Bolt	23 N-m (200 in. lbs.)
Bell Housing Bolts	41 N-m (30 ft. lbs.)
Camshaft Bolt	68 N-m (50 ft. lbs.)
Camshaft Thrust Plate Bolts	24 N-m (210 in. lbs.)
Chain Case Cover Bolts	41 N-m (30 ft. lbs.)
Conning Rod Cap Bolts	61 N-m (45 ft. lbs.)
Crankshaft Main Bearing Cap Bolts	115 N-m (85 ft. lbs.)
Cylinder Head Bolts	
1st Step	68 N-m (50 ft. lbs.)
2nd Step	143 N-m (105 ft. lbs.)
Cylinder Head Collar Studs	13 N-m (115 in. lbs.)
Cylinder Head Cover Bolts	11 N-m (95 in. lbs.)
Exhaust Manifold Bolts	27 N-m (20 ft. lbs.)
Exhaust Manifold Nuts	20 N-m (15 ft. lbs.)
Front Left Sill Bracket	
Top Bolts	54 N-m (40 ft. lbs.)
Side Nuts	95 N-m (70 ft. lbs.)
Side and Bottom Bolts	121 N-m (89 ft. lbs.)
Front Right Inner Sill Bracket Stud-Nut	65 N-m (48 ft. lbs.)
Front Right Sill Bracket Bolts	54 N-m (40 ft. lbs.)
Front Support Bracket Through-Bolt Nuts	68 N-m (50 ft. lbs.)
Front Support Bracket-to-Engine Block Bolts	88 N-m (65 ft. lbs.)
Generator Mounting Bolt	41 N-m (30 ft. lbs.)
Oil Pan Bolts	24 N-m (215 in. lbs.)
Oil Pan Drain Plug	27 N-m (20 ft. lbs.)
Oil Pump Attaching Bolts	41 N-m (30 ft. lbs.)
Oil Pump Cover Bolts	11 N-m (95 in. lbs.)
Rear Mount Bracket Through-Bolt Nut	65 N-m (48 ft. lbs.)
Rear Mount Bracket Assembly Bolts	75 N-m (55 ft. lbs.)
Rear Mount Clevis Bracket-to-Crossmember Stud-Nuts	41 N-m (30 ft. lbs.)
Rocker Arm Bolts	28 N-m (21 ft. lbs.)
Spark Plugs	41 N-m (30 ft. lbs.)
Starter Mounting Bolts	68 N-m (50 ft. lbs.)
Throttle Body Bolts (MPI)	23 N-m (200 in. lbs.)
Torque Converter Drive Plate Bolts	31 N-m (270 in. lbs.)
Transmission Support Bracket Adaptor Bolts	95 N-m (70 ft. lbs.)
Transmission-to-Clutch Bolts	68 N-m (50 ft. lbs.)
Vibration Damper Retainer Bolt	183 N-m (135 ft. lbs.)
Water Pump-to-Chain Case Cover Bolt	41 N-m (30 ft. lbs.)

Source: 1993 Jeep® ZJ Service Manual



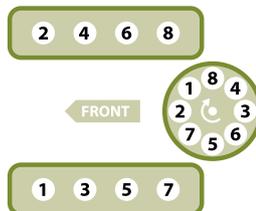
5.9L (360) Engine ZJ/ZG (1998)

5.9L (360 cu) V-Type 8-cylinder

Engine Type	90° V-8 OHV
Bore and Stroke	101.6 x 90.9 mm (4.00 x 3.58 in.)
Displacement	5.9L (360 c.i.)
Compression Ratio	9.1:1
Firing Order	1-8-4-3- 6-5- 7- 2
Lubrication	Pressure Feed - Full Flow Filtration
Cooling System	Liquid Cooled - Forced Circulation
Cylinder Block	Cast Iron
Cylinder Head	Cast Iron
Crankshaft	Nodular Iron
Camshaft	Nodular Cast Iron
Combustion Chambers	Wedge-High Swirl Valve Shrouding
Pistons	Aluminum Alloy w/strut
Connecting Rods	Forged Steel
Compression Pressure	689.5 kPa (100 psi) (Min.)

The 5.9 Liter (360 CID) eight-cylinder engine is a V-Type, single cam engine with hydraulic roller tappets. This engine is designed for unleaded fuel. Engine lubrication system consists of a rotor type oil pump and a full flow oil filter. The cylinders are numbered from front to rear; 1, 3, 5, 7 on the left bank and 2, 4, 6, 8 on the right bank. The firing order is 1-8-4-3-6-5-7-2

The crankshaft rotation is clockwise, when viewed from the front of the engine. The crankshaft rotates within five main bearings and the camshaft rotates within four bearings.



Engine Identification Number

The engine serial number is stamped into a machined pad located on the left, front corner of the cylinder block. When component part replacement is necessary, use the engine type and serial number for reference.

X	Last Digit of Model Year	
M	Plant	-
M	Mound Road	- S
	Saltillo	- T Trenton - K Toluca
5.9L	Engine Displacement	
T	Usage	- T Truck
XXXX	Month/Day	
XXXXXXXX	Serial Code - Last 8 Digits of VIN No.	

X M 5.9L T XXXX XXXXXXXX

5.9L Engine Specifications

Camshaft

Bearing Diameter	
No. 1	50.800 - 50.825 mm (2.000 - 2.001 in.)
No. 2	50.394 - 50.419 mm (1.984 - 1.985 in.)
No. 3	50.013 - 50.038 mm (1.969 - 1.970 in.)
No. 4	49.606 - 49.632 mm (1.953 - 1.954 in.)
No. 5	39.688 - 39.713 mm (1.5625 - 1.5635 in.)

Bearing Journal Diameter

No. 1	50.749 - 50.775 mm (1.998 - 1.999 in.)
No. 2	50.343 - 50.368 mm (1.982 - 1.983 in.)
No. 3	49.962 - 49.987 mm (1.967 - 1.968 in.)
No. 4	49.555 - 49.581 mm (1.951 - 1.952 in.)
No. 5	39.637 - 39.662 mm (1.5605 - 1.5615 in.)

Bearing to Journal Clearance

Standard	0.0254 - 0.0762 mm (0.001 - 0.003 in.)
Service Limit	0.127 mm (0.005 in.)

Camshaft End Play

End Play	0.051 - 0.254 mm (0.002 - 0.010 in.)
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CONNECTING RODS

Piston Pin bore Diameter	24.966 - 24.978 mm (0.9829 - 0.9834 in.)
Side Clearance	0.152 - 0.356 mm (0.006 - 0.014 in.)

CRANKSHAFT

Rod Journal	
Diameter	53.950 - 53.975 mm (2.124 - 2.125 in.)
Out of Round (Max.)	0.0254 mm (0.001 in.)
Taper (Max.)	0.0254 mm (0.001 in.)
Bearing Clearance	0.013-0.056 mm (0.0005 - 0.0022 in.)
Service Limit	0.0762 mm (0.003 in.)

Main Bearing Journal

Diameter	71.361 - 71.387 mm (2.8095 - 2.8105 in.)
Out of Round (Max.)	0.127 mm (0.001 in.)
Taper (Max.)	0.0254 mm (0.001 in.)
Bearing Clearance (#1 Journal)	0.013- 0.038 mm (0.0005 - 0.0015 in.)
Service Limit (#1 Journal)	0.0381 mm (0.0015 in.)
Bearing Clearance (#2-5 Journals)	0.013- 0.051 mm (0.0005 - 0.002 in.)
Service Limit (#2-5 Journals)	0.064 mm (0.0025 in.)

Crankshaft End Play

End Play	0.051 - 0.178 mm (0.002 - 0.007 in.)
Service Limit	0.254 mm (0.010 in.)

5.9L Engine Specifications

CYLINDER BLOCK

Cylinder Bore	
Diameter	101.60 - 101.65 mm (4.000 - 4.002 in.)
Out of Round (Max.)	0.127 mm (0.005 in.)
Taper (Max.)	0.254 mm (0.010 in.)
Lifter Bore	
Diameter	22.99 - 23.01 mm (0.9051 - 0.9059 in.)
Distributor Drive Bushing (Press Fit)	
Bushing to Bore Interference	0.0127-0.3556 mm (0.0005 - 0.0140 in.)
Shaft to Bushing Clearance	0.0178 - 0.0686 mm (0.0007 - 0.0027 in.)

CYLINDER HEAD AND VALVES

Valve Seat	
Angle	44.25° - 44.75°
Runout (Max.)	0.0762 mm (0.003 in.)
Width (Finish) - Intake	1.016- 1.524 mm (0.040 - 0.060 in.)
Width (Finish) - Exhaust	1.524 - 2.032 mm (0.060 - 0.080 in.)
Valves	
Face Angle	43.25° - 43.75°
Head Diameter - Intake	47.752 mm (1.88 in.)
Head Diameter - Exhaust	41.072 (1.617 in.)
Length (Overall) - Intake	126.21- 126.85 mm (4.969 - 4.994 in.)
Length (Overall) - Exhaust	126.44 - 127.30 mm (4.978- 5.012 in.)
Lift(@ zero Jash) - Intake	10.414 mm (0.410 in.)
Lift(@ zero Jash) - Exhaust	10.592 mm (0.417 in.)
Stern Diameter - Intake	9.449 - 9.474 mm (0.372 - 0.373 in.)
Stern Diameter - Exhaust	9.423 - 9.449 mm (0.371 - 0.372 in.)
Guide Bore	9.500 - 9.525 mm (0.374 - 0.375 in.)
Stern to Guide Clearance	
Intake	0.0254 - 0.0762 mm (0.001 - 0.003 in.)
Exhaust	0.0508 - 0.1016 mm (0.002 - 0.004 in.)
Service Limit	0.4318 (0.017 in.)
Valve Springs	
Free Length	49.962 mm (1.967 in.)
Spring Tension - (valve closed)	378 N @ 41.66 mm (85 lbs. @ 1.64 in.)
Spring Tension - (valve open)	890 N @ 30.89 mm (200 lbs. @ 1.212 in.)
Number of Coils	6.8
Installed Height	41.66 mm (1.64 in.)
Wire Diameter	4.50 mm (0.177 in.)

5.9L Engine Specifications

HYDRAULIC TAPPETS

Body Diameter	22.949 - 22.962 mm (0.9035 - 0.9040 in.)
Clearance (to bore)	0.0279 - 0.0610 mm (0.0011 - 0.0024 in.)
Dry Lash	1.524 - 5.334 mm (0.060 - 0.210 in.)
Push Rod Length	175.64 - 176.15 mm (6.915 - 6.935 in.)

OIL PRESSURE

Curb Idle (Min.*)	41.4 kPa (6 psi)
3000 rpm	207 - 552 kPa (30 - 80 psi)
Oil Pressure Bypass Valve Setting	62 - 103 kPa (9 - 15 psi)
Switch Actuating Pressure	34.5 - 48.3 kPa (5 - 7 psi)

CAUTION:

If oil pressure is zero at curb idle, DO NOT RUN ENGINE.

OIL PUMP

Clearance over Rotors (Max.)	0.1016 mm (0.004 in.)
Cover Out of Flat (Max.)	0.0381 mm (0.0015 in.)
Inner Rotor Thickness (Min.)	20.955 mm (0.825 in.)
Outer Rotor Clearance (Max.)	0.3556 mm (0.014 in.)
Outer Rotor Diameter (Min.)	62.7126 mm (2.469 in.)
Outer Rotor Thickness (Min.)	20.955 mm (0.825 in.)
Tip Clearance between Rotors (Max.)	0.2032 mm (0.008 in.)

PISTONS

Clearance at Top of Skirt	0.013 - 0.038 mm (0.0005 - 0.0015 in.)
Land Clearance (Diam.)	0.508 - 0.660 mm (0.020 - 0.026 in.)
Piston Length	81.03 mm (3.19 in.)
Piston Ring Groove Depth - #1&2	4.761 - 4.912 mm (0.187 - 0.193 in.)
Piston Ring Groove Depth - #3	3.996 - 4.177 mm (0.157 - 0.164 in.)
Weight	582 - 586 grams (20.53 - 20.67 oz.)

PISTON PINS

Clearance in Piston	0.006 - 0.019 mm (0.00023 - 0.00074 in.)
Diameter	25.007 - 25.015 mm (0.9845 - 0.9848 in.)
End Play	NONE
Length	67.8 - 68.3 mm (2.67 - 2.69 in.)

5.9L (360) Engine ZJ/ZG (1998)

5.9L Engine Specifications

PISTON RINGS

Ring Gap

Compression Ring (Top)	0.30 - 0.55 mm (0.012 - 0.022 in.)
Compression Ring (2nd)	0.55 - 0.80 mm (0.022 - 0.031 in.)
Oil Control (Steel Rails)	0.381 - 1.397 mm (0.015 - 0.055 in.)

Ring Side Clearance

Compression Rings	0.040 - 0.085 mm (0.0016 - 0.0033 in.)
Oil Ring (Steel Rails)	0.05 - 0.21 mm (0.002 - 0.008 in.)

Ring Width

Compression rings	1.530 - 1.555 mm (0.060 - 0.061 in.)
Oil Ring (Steel Rails) - Max	0.447 - 0.473 mm (0.018 - 0.019 in.)

VALVE TIMING

Exhaust Valve

Closes (ATDC)	33°
Opens (BBDC)	56°
Duration	269°

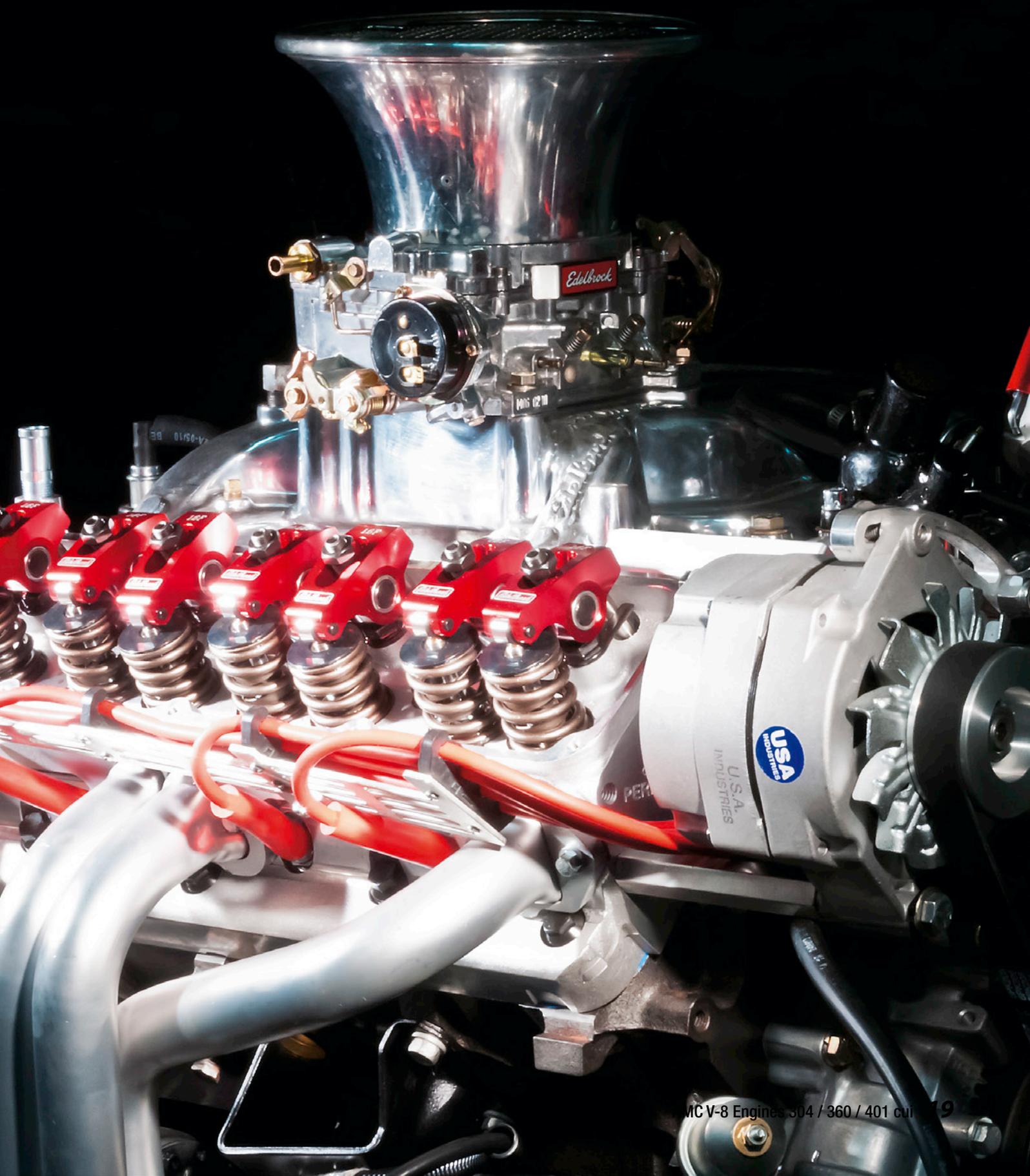
Intake Valve

Closes (ATDC)	62°
Opens (BBDC)	7°
Duration	249°
Valve Overlap	41°

5.9L Torque Chart

Description	Torque
Camshaft Sprocket Bolt	68 N-m (50 ft. lbs.)
Camshaft Thrust Plate Bolts	24 N-m (18 ft. lbs.)
Chain Case Cover Bolts	41 N-m (30 ft. lbs.)
Connecting Rod Cap Bolts	61 N-m (45 ft. lbs.)
Crankshaft Main Bearing Cap Bolts	115 N-m (85 ft. lbs.)
Crankshaft Pulley Bolts	24 N-m (210 in. lbs.)
Cylinder Head Bolts	
Step 1 - Initial	68 N-m (50 ft. lbs.)
Step 2 - Final	143 N-m (105 ft. lbs.)
Cylinder Head Cover Bolts	11 N-m (95 in. lbs.)
Exhaust Manifold to Cylinder Head Bolts/Nuts	34 N-m (25 ft. lbs.)
Flywheel Bolts	75 N-m (55 ft. lbs.)
Front Engine Mount Bracket to Block Bolts	81 N-m (60 ft. lbs.)
Front Engine Mount Through Bolt/Nut	68 N-m (50 ft. lbs.)
Generator Mounting Bolts	41 N-m (30 ft. lbs.)
Oil Pan Bolts	24 N-m (215 in. lbs.)
Oil Pan Drain Plug	34 N-m (25 ft. lbs.)
Oil Pump Bolts	41 N-m (30 ft. lbs.)
Oil Pump Cover Bolts	11 N-m (95 in. lbs.)
Rear Mount Insulator to Support Bracket Nuts	47 N-m (35 ft. lbs.)
Rear Mount Insulator to Crossmember Nut	47 N-m (35 ft. lbs.)
Rear Support Bracket to Transmission Bolts	102 N-m (75 ft. lbs.)
Rocker Arm Bolts	28 N-m (21 ft. lbs.)
Spark Plugs	41 N-m (30 ft. lbs.)
Starter Mounting Bolts	68 N-m (50 ft. lbs.)
Thermostat Housing Bolts	25 N-m (225 in. lbs.)
Throttle Body Bolts	23 N-m (200 in. lbs.)
Torque Converter Drive Plate Bolts	31 N-m (270 in. lbs.)
Transmission Support Bracket Bolts	102 N-m (75 ft. lbs.)
Transmission Support Spacer to Insulator Mounting Plate - (4wd) Nuts	204 N-m (150 ft. lbs.)
Vibration Damper Bolt	183 N-m (135ft. lbs.)
Water Pump to Chain Case Cover Bolt	41 N-m (30 ft. lbs.)

AMC V-8 Engines 304 / 360 / 401 cui



4.9L (304) / 5.9L (360) / 6.6L (401) Engines

304/360/401 cu Engine Specifications

The 304, 360, and 401 CID engines are 90-degree V-8 designs incorporating overhead valves.

The 304 CID engines (CJ Model only) operate ONLY on unleaded gasoline.

The cylinders are numbered from front to rear: 1-3-5-7 on the left bank and 2-4-6-8 on the right bank with cylinder firing order 1-8-4-3-6-5-7-2.

The crankshaft, supported by five two-piece main bearings, rotates in a counterclockwise direction as viewed from the rear.

The camshaft is supported by five one-piece, line-bored bearings.

Bridged pivot assemblies control movement of intake and exhaust rocker arms that are paired by cylinders.

Service procedures for all V-8 engines are essentially the same.

Identification

The cubic-inch displacement of all V-8 engines is cast into each side of the cylinder block. These numbers are located between the engine mounting bracket bosses.

Build Date Code

The engine Build Date Code is located on a tag attached to the right bank cylinder head cover.

The code numbers identify the year, month, and day that the engine was built.

The code letter identifies the cubic inch displacement, carburetor type, and compression ratio.

Example: **9 05 H 14**

The example code identifies a 304 CID with 2V carburetor and 8.4:1 compression ratio built on May 14, 1976.

Engine Build Data Code Explanation

Letter Code	CID	Carburetor	Compression Ratio
H	304	2V	8.4:1
N	360	2V	8.25:1
p	360	4V	8.25:1
z	401	4V	8.25:1

1st Character (Year)	2nd and 3rd Characters (Month)	4th Character (Engine Type)	5th and 6th Characters (Day)
8 - 1975 9 - 1976	01 - 12	H, N, P or Z	01 - 31

Upsize or Undersize Components

On vehicles with odd-sized engines, it is sometimes necessary to machine all cylinder bores to 0.010-inch oversize, all crankshaft main bearing journals, all connecting rod journals to 0.010-inch undersize, or all camshaft bearing bores 0.010-inch oversize. These engines have a single or double letter code stamped adjacent to the Build Date Code on the tag attached to the right bank cylinder head cover. The letters are coded as follows:

Single letter B	cylinder bore	0.010-
inch oversize		
Single letter M	main bearings	0.010-
inch oversize		
Single letter P	connecting rod bearings	0.010-inch undersize
Double letters PM	main and connecting rod bearings	0.010-inch undersize
Single letter C	camshaft bearing bores	0.010-inch oversize

304/360/401 cu Engine Specifications

Bore

304	3.75 inches
360	4.08 inches
401	4.165 inches

Stroke

304	3.44 inches
360	3.44 inches
401	3.68 inches

Displacement

304	304 cu. inches
360	360 cu. inches
401	401 cu. inches

Compression Ratio

304	8.40:1
360 (2V or 4V)	8.25:1
401	8.25:1

Compression Pressure

304	140 psi (min)
360 (2V or 4V)	140 psi (min)
401	140 psi (min)

Maximum Variation Between Cylinders

	20 psi (min)
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Taxable Horsepower

304	45.00
360	53.27
401	55.51

Camshaft

Fuel Pump Eccentric Diameter	2.182 inch to 2.192 inch
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Tappet Clearance	Zero lash (hydraulic tappets)
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End Play	Zero (engine operating)
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Bearing Clearance	0.001 inch to 0.003 inch (0.0017 - 0.0020 inch preferred)
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Bearing Journal Diameter

No. 1	2.1195 inch to 2.1205 inch
No. 2	2.0895 inch to 2.0905 inch
No. 3	2.0595 inch to 2.0605 inch
No. 4	2.0295 inch to 2.0305 inch
No. 5	1.9995 inch to 2.0005 inch

Base Circle Runout	0.001 maximum
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Cam Lobe Lift

304/360	0.266 inch
401	0.286 inch



304/360/401 cji Engine Specifications

Intake Valve Timing

Opens	304/360	14.75° BTDC
	401	25.57° BTDC
Closes	304/360	68.75° BTDC
	401	90.75° BTDC

Exhaust Valve Timing

Opens	304/360	56.75° BBDC
	401	80.80° BBDC
Closes	304/360	26.75° ATDC
	401	42.75° ATDC

Valve Overlap

304/360	41.50°
401	68.32°

Intake Duration

304/360	263.50°
401	296.32°

Exhaust Duration

304/360	263.50°
401	303.55°

Connecting Rods

Total Weight (Less Bearings)

304/360	681 to 689 grams
401	794 to 802 grams

Total Length (Center-to-Center)

304/360	5.873 inch to 5.877 inch
401	5.856 inch to 5.860 inch

Bearing Clearance

0.001 inch to 0.003 inch
(0.0020-0.0025 inch preferred)

Side Clearance

0.006 inch to 0.018 inch

Maximum Twist

0.0005 inch per inch

Maximum Bend

0.001 inch per inch

Crankshaft

End Play

0.003 inch to 0.008 inch

Main Bearing Journal Diameter

No. 1, 2, 3, 4	2.7474 inch to 2.7489 inch
Rear Main	2.7464 inch to 2.7479 inch

Main Bearing Journal Width

304/360

No. 1	1.2635 inch to 1.2695 inch
No. 2	1.246 inch to 1.248 inch
No. 3	1.273 inch to 1.275 inch
No. 4	1.246 inch to 1.248 inch
No.5	1.215 inch to 1.217 inch

304/360/401 cji Engine Specifications

401

No. 1	1.244 inch to 1.269 inch
No.2	1.222 inch to 1.232 inch
No. 3	1.273 inch to 1.275 inch
No. 4	1.222 inch to 1.232 inch
No.5	1.202 inch to 1.217 inch

Main Bearing Clearance

No. 1, 2, 3, 4	0.001 inch to 0.003 inch (0.0017-0.0020 inch preferred)
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Rear Main

No.5	0.002 inch to 0.004 inch (0.0025-0.003 inch preferred)
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Connecting Rod Journal Diameter

304/360	2.0934 inch to 2.0955 inch
401	2.2464 inch to 2.2485 inch

Connecting Rod Journal Width

304/360	1.998 inch to 2.004 inch
401	1.846 inch to 1.852 inch

Connecting Rod Bearing

Clearance	0.001 inch to 0.003 inch (0.0020-0.0025 inch preferred)
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Maximum Taper (All Journals)

0.0005 inch

Maximum Out-of-Round (All Journals)

0.0005 inch

Cylinder Block

Deck Height

9.205 inch to 9.211 inch

Deck Clearance

304/360	0.0145 inch (below block)
401	0.0045 inch (below block)

Maximum Cylinder Taper

0.051 inch

Maximum Cylinder Out-of-Round

0.031 inch

Tappet Bore Diameter

0.9055 inch to 0.9065 inch

Cylinder Block Flatness

0.001/1 inch; 0.002/6 inch;
0.008 inch maximum

Cylinder Head

Combustion Chamber Volume

304	57.42 to 60.42 cc
360/401	58.62 to 61.62 cc

Valve Arrangement

EI-IE-EI-IE

Valve Guide ID (Integral)

0.3735 inch to 0.3745 inch

Valve Stem-to-Guide Clearance

0.001 inch to 0.003 inch

Intake Valve Seat Angle

300

Exhaust Valve Seat Angle

44.50

Valve Seat Width

0.040 inch to 0.060 inch

4.9L (304) / 5.9L (360) / 6.6L (401) Engines

304/360/401 cwi Engine Specifications

Valve Seat Runout	0.0025 inch maximum
Cylinder Head Flatness	0.001/1 inch; 0.002/6 inch; 0.008 inch maximum
Lubrication System	
Engine Oil Capacity	4 quarts (add 1 quart with filter change)
Normal Operating Pressure	13 psi at 600 rpm; 37 to 75 psi at 1600 rpm+
Oil Pressure Relief	75 psi maximum
Gear-to-Body Clearance	0.0005 inch to 0.0025 inch (0.0005 inch preferred)
Gear End Clearance	0.002 inch to 0.006 inch (0.006 inch preferred)
Gear Diameter	1.526 inch to 1.578 inch
Gear Length	1.485 inch to 1.484 inch
Pistons	
Weight (Less Pin)	
304	506 to 510 grams
360	601 to 605 grams
401	590 to 594 grams
Piston Pin Bore CL - to Piston Top	
304/360	1.599 inch to 1.603 inch
401	1.506 inch to 1.510 inch
Piston-to-Bore Clearance	
304/401	0.0010 inch to 0.001 8 inch (0.0014 inch preferred)
360	0.0012 inch to 0.0020 inch (0.0016 inch preferred)
Piston Ring Gap Clearance	
No. 1 and No. 2	0.010 inch to 0.020 inch (0.010-0.0012 inch preferred)
Oil Control Steel Rail	
304	0.010 inch to 0.025 inch
360	0.015 inch to 0.045 inch
401	0.015 inch to 0.055 inch (0.010-0.020 inch preferred)
Piston Ring Side Clearance	
304	
No. 1	0.0015 inch to 0.0035 inch (0.0015 inch preferred)
No. 2	0.0015 inch to 0.003 inch (0.0015 inch preferred)
Oil Control	0.0011 inch to 0.008 inch
360/401	
No. 1	0.0015 inch to 0.003 inch (0.0015 inch preferred)
No. 2	0.0015 inch to 0.0035 inch (0.0015 inch preferred)

304/360/401 cwi Engine Specifications

Oil Control	0.000 inch to 0.007 inch
Piston Ring Groove Height	
No. 1 and No. 2	0.0795 inch to 0.0805 inch
Oil Control	0.1880 inch to 0.1895 inch
Piston Ring Groove Diameter	
304	
No. 1 and No. 2	3.328 inch to 3.333 inch
Oil Control	3.329 inch to 3.339 inch
360	
No. 1 and No. 2	3.624 inch to 3.629 inch
Oil Control	3.624 inch to 3.635 inch
401	
No. 1	3.749 inch to 3.759 inch
No. 2	3.715 inch to 3.725 inch
Oil Control	3.710 inch to 3.720 inch
Piston Pin Diameter	
304/360	0.9308 inch to 0.9313 inch
401	1.0009 inch to 1.0012 inch
Piston Pin Bore Diameter	
304/360	0.9288 inch to 0.9298 inch
401	0.9988 inch to 0.9998 inch
Piston-to-Pin Clearance	0.0003 inch to 0.0005 inch (0.0005 inch preferred) loose
Rocker Arms, Push Rods and Tappets	
Rocker Arm Ratio	1.6:1
Push Rod Length	7.790 inch to 7.810 inch
Push Rod Diameter	0.312 inch to 0.315 inch
Hydraulic Tappet Diameter	0.9040 inch to 0.9045 inch
Tappet-to-Bore Clearance	0.001 inch to 0.0025 inch
Valves	
Valve Length	
(Tip-to-Gauge Dim. Line)	4.7895 inch to 4.8045 inch
Valve Stem Diameter	0.3715 inch to 0.3725 inch
Stem-to-Guide Clearance	0.001 inch to 0.003 inch
Intake Valve Head Diameter	
304	1.782 inch to 1.792 inch
360/401	2.020 inch to 2.030 inch
Intake Valve Face Angle	29°
Exhaust Valve Head Diameter	
304	1.401 inch to 1.411 inch
360/401	1.675 inch to 1.685 inch
Exhaust Valve Face Angle	44°



304/360/401 cji Engine Specifications

Valve Springs

Free Length	2.200 inch
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Spring Tension

Valve Closed	80 to 88 pounds at 1-13/16 inch
Valve Open	210 to 216 pounds at 1-23/64 inch
Inside Diameter (All)	1.000 inch to 1.020 inch

304/360/401 cji Torque Chart

Torque Specifications	Service Set-To Torque	Service In-Use Recheck Torque
Air Injection Tube-to-Manifold	38	30 to 45
Air Pump-to-Bracket	20	15 to 22
Air Pump Brackets-to-Engine-AC		
Compressor or Pedestals	25	18 to 28
Air Pump Adjusting Strap-to-Pump	20	15 to 22
Alternator Pivot Bolt or Nut	28	20 to 35
Alternator Adjusting Bolt	18	15 to 20
Alternator Mounting Bracket		
Bolt-to-Engine	28	23 to 30
Alternator Pivot Mounting		
Bolt-to-Head	33	30 to 35
Automatic Transmission-to-Block	28	22 to 38
Camshaft Gear Retainer Screw	30	25 to 35
Carburetor Adapter-to-Manifold		
Screws-2V	14	12 to 15
Carburetor Holddown Nuts	14	12 to 15
Clutch Housing Spacer-to-Block		
Screws	12	9 to 15
Clutch Housing-to-Block Screws	27	22 to 30
Connecting Rod Bolts Nuts	33 (304 & 360) 39 (401)	30 to 35 (304 & 360) 35 to 40 (401)
Crankshaft Pulley-to-Damper	23	18 to 28
Cylinder Head Capscrews	110	100 to 120
Cylinder Head Cover Screws	50 in-lb	42 to 58 in-lb
Distributor Bracket Screw	13	10 to 18
Drive Plate-to-Converter Screw	22	20 to 25
EGR Valve-to-Manifold	13	9 to 18
Exhaust Manifold Bolts	25	20 to 30
Exhaust Pipe-to-Manifold Nuts	20	15 to 25
Fan and Hub Assembly Bolts	18	12 to 25

304/360/401 cji Torque Chart

Torque Specifications	Service Set-To Torque	Service In-Use Recheck Torque
Flywheel or Drive Plate-to-Crankshaft	105	95 to 120
Front Support Cushion		
Bracket-to-Block	28	22 to 38
Front Support Cushion-to-Bracket	33	27 to 38
Front Support		
Cushion-to-Frame	33	27 to 37
Fuel Pump Screws	16	13 to 19
Idler Pulley Bearing		
Shaft-to-Bracket Nut	33	28 to 38
Idler Pulley Bracket-to-Front		
Cover Nut	7	4 to 9
Intake Manifold Screws.	43	37 to 47
Main Bearing Capscrews	100	90 to 105
Oil Pump Cover Screws	55 in-lb	45 to 65 in-lb
Oil Pan Screws		
1/4 Inch - 20	7	5 to 9
5/16 Inch - 18	11	9 to 13
Oil Relief Valve Cap	28	22 to 35
Power Steering Pump Adapter Screw	23	18 to 28
Power Steering Pump Bracket Screw	43	37 to 47
Power Steering Pump Mounting Screw	28	25 to 35
Rear Insulator Bracket-to-Trans.		
Stud Nut	33	27 to 38
Rear Support Insulator-to-Bracket Nut	48	40 to 55
Rear Support Cushion-to-Crossmember		
Screw Nut	18	12 to 25
Rocker Arm Capscrew	19	16 to 26
Spark Plugs	28	22 to 33
Thermostat Housing Screw	13	10 to 18
Timing Case Cover-to-Block	25	18 to 33
Vibration Damper Screw	55	48 to 64
Water Pump Screws	48 in-lb	40 to 55 in-lb

All torque values given in foot-pounds with dry fits unless otherwise specified.

Service Set-To Torques should be used when assembling components.
Service In-Use Recheck Torques should be used for checking a pretorqued item.