

SPECIFICATIONS

GENERAL SPECIFICATIONS	
DISPLACEMENT	2.3L
NUMBER OF CYLINDERS	4
BORE AND STROKE	3.780 x 3.126
FIRING ORDER	1-3-4-2
OIL PRESSURE (HOT 2000 RPM)	40-60
CYLINDER HEAD AND VALVE TRAIN	
COMBUSTION CHAMBER VOLUME (cc)	57.35-60.35
VALVE GUIDE BORE DIAMETER	0.3433-0.3443
VALVE SEATS	
Width — Intake	0.060-0.080
Width — Exhaust	0.070-0.090
Angle	45°
Runout (T.I.R. MAX.)	0.0016
VALVE ARRANGEMENT (Front-to-Rear)	E-I-E-I-E-I-E-I
VALVE LASH ADJUSTER BORE DIAMETER	0.8449-0.9449
VALVE STEM TO GUIDE CLEARANCE	
Intake	0.0010-0.0027
Exhaust	0.0015-0.0032
Service Clearance	0.0055 Max.
VALVE HEAD DIAMETER	
Intake	1.730-1.747
Exhaust	1.49-1.51
VALVE FACE RUNOUT LIMIT	0.002 Max.
VALVE FACE ANGLE LIMIT	44°
VALVE STEM DIAMETER (STANDARD)	
Intake	0.3416-0.3423
Exhaust	0.3411-0.3418
(0.015 Oversize)	
Intake	0.3566-0.3573
Exhaust	0.3561-0.3568
(0.030 Oversize)	
Intake	0.3716-0.3723
Exhaust	0.3711-0.3718
VALVE SPRINGS	
Compression Pressure (Lb. @ Spec. Length)	
Intake Exhaust (Installed Load)	71-79 @ 1.52
Exhaust and Intake Valve	
67-74 @ 1.52	
128-142 @ 1.12	
Free Length (Approximate)	1.877
Assembled Height	1.49-1.55
Service Limit	5% Pressure Loss @ Specified Length
Out of Square Limit	5/64" (.078)
ROCKER ARM (Cam Follower)	
Ratio	1.64:1
VALVE TAPPET, LIFTER OR ADJUSTER	
Diameter (Standard)	0.8422-0.8427
Clearance to Bore	0.0007-0.0027
Service Limit	0.005 Max.
Hydraulic Leakdown Rate ①	2-8 Seconds
Collapsed Tappet Gap	
Allowable	0.035-0.055 @ Cam
Desired	0.040-0.050 @ Cam
CAMSHAFT	
LOBE LIFT	
Intake	0.2381
Exhaust	0.2381
Allowable Lobe Lift Loss	0.005 Max.
THEORETICAL VALVE LIFT @ ZERO LASH	
Intake390
Exhaust390
END PLAY	
Service Limit	0.001-0.007
	0.009
CAMSHAFT (Continued)	
JOURNAL-TO-BEARING CLEARANCE	
Service Limit	0.001-0.003
0.006	
JOURNAL DIAMETER	
#1	1.7713-1.7720
#2	1.7713-1.7720
#3	1.7713-1.7720
#4	1.7713-1.7720
Runout Limit	0.005 Max. T.I.R.
Out-of-Round Limit	0.0005 In. Max.
Front Bearing Location	② 0.000-0.010
CYLINDER BLOCK	
HEAD GASKET SURFACE FLATNESS 0.003 in any 6" -0.006 overall	
HEAD GASKET SURFACE FINISH (RMS)	
60-150	
MAIN BEARING BORE DIAMETER	
2.3971-3.979	
DISTRIBUTOR SHAFT BEARING BORE DIAMETER	
.5155-.5170	
CRANKSHAFT AND CONNECTING ROD	
MAIN BEARING JOURNAL DIAMETER	
2.2059-2.2051	
Out-of-Round Limit	0.0006 Max.
Taper Limit (Per Inch)	0.0006 Max.
Journal Runout Limit	0.002 Max.
Surface Finish (RMS) 12 Max.	
Runout Service Limit	0.005
THRUST BEARING JOURNAL	
Length	1.2010-1.1990
CONNECTING ROD JOURNAL	
Diameter	2.0462-2.0472
Out-of-Round Limit	0.0006 Max.
Taper Limit	0.0006 Per Inch Max.
Surface Finish (RMS)	12 Max.
MAIN BEARING THRUST FACE	
Surface Finish (RMS)	35 Front 25 Rear (Max.)
Runout Limit	0.001 Max.
FLYWHEEL CLUTCH FACE	
Runout Limit	0.005 max.
FLYWHEEL RING GEAR LATERAL RUNOUT (T.I.R.)	
Standard Transmission	0.025
Automatic Transmission	0.060
CRANKSHAFT FREE END PLAY	
0.003-0.008	
Service Limit	0.012
AUXILIARY SHAFT END PLAY	
0.001-0.007	
CONNECTING ROD BEARINGS	
Clearance to Crankshaft — Desired	0.008-0.0015
— Allowable	0.0008-0.0026
Bearing Wall Thickness (Std.) ③	0.0619-0.0624
MAIN BEARINGS	
Clearance to Crankshaft — Desired	0.0008-0.0015
— Allowable	0.0008-0.0026
Bearing Wall Thickness (Std.) ③	0.0956-0.0951
AUXILIARY SHAFT BEARINGS	
Clearance to Shaft	0.0006-0.0026
CONNECTING ROD	
Piston Pin Bore Diameter	23.104-23.145mm (0.9096-0.9012)
Crankshaft Bearing Bore Diameter	55.170-55.190mm
(2.1720-2.1726)	
Out-of-Round Limit	55-190mm (0.0004)
Taper Limit	0.0004
Length (Center to Center)	5.2031-5.2063
Alignment (Bore-to-Bore Max. Difference) ④	
Twist	0.024
Bend	0.012

CRANKSHAFT, FLYWHEEL AND CONNECTING ROD — Continued			
Side Clearance (Assembled to Crank)			
Standard	0.0035-0.0105		
Service Limit	0.014		
CYLINDER BORE AND PISTON			
CYLINDER BORE			
Diameter	3.7795-3.7825		
Surface Finish (CLA)	8-24		
Out-of-Round Limit	0.0015		
Out-of-Round Service Limit	0.005		
Taper Service Limit	0.010		
Piston-to-Bore Clearance (Select Fit)	0.048-0.074mm		
SERVICE PISTON SELECTION ⁽¹⁾			
Piston Bore Diameter	Code-Service Piston Required		
96.00-96.037mm (3.7795-3.7810 inch)	RED		
96.039-96.076mm (3.7810-3.7825 inch)	BLUE		
Pin Bore Diameter ⁽⁵⁾	23.1725-23.1800mm (0.9123-0.9126 inch)		
Ring Groove Width			
Compression (Top)	1.5545-1.5291mm (.061-.0601 inch)		
Compression (Bottom)	1.5545-1.5291mm (.061-.0601 inch)		
Oil	4.056-4.03mm (.1596-.1589 inch)		
PISTON PIN			
Length	76.5-77.2mm (3.010-3.040 inch)		
Diameter			
Standard	23.162-23.175mm (0.9118-0.9124 inch)		
0.001 Oversize	23.190-23.198mm (0.9130-0.9133 inch)		
0.002 Oversize	23.216-23.223mm (0.9140-0.9143 inch)		
Piston-to-Pin Clearance	.0003-.0005		
Pin-to-Rod Clearance	Interference Fit		
PISTON RINGS			
Ring Width			
Compression (Top)	1.46-1.49mm (0.058-0.059 inch)		
Compression (Bottom)	1.46-1.49mm (0.058-0.059 inch)		
Side Clearance			
Compression (Top)	.041-.084mm (.0016-.0033 inch)		
Compression (Bottom)	.041-.084mm (.0016-.0033 inch)		
Ring Gap			
Compression (Top)	0.25-0.50mm (0.010-0.020 inch)		
Compression (Bottom)	0.38-0.64mm (0.015-0.025 inch)		
Oil (Steel Rail)	0.25-1.02mm (0.010-0.040 inch)		
Oil Ring	Snug Fit		
Service Limit	0.006 Max.		
LUBRICATION SYSTEM			
OIL PUMP			
Relief Valve Spring Tension (Lbs. at Spec. Length)	12.6-14.5 @ 1.20"		
Driveshaft-to-Housing Bearing Clearance	0.0015-0.0030		
Relief Valve-to-Bore Clearance	0.0015-0.0030		
Rotor Assembly End Clearance (Assembled)	0.004 Max.		
Outer Race-to-Housing Clearance	0.001-0.013		
Oil Capacity (Quarts U.S.)	5.0		

TORQUE SPECIFICATIONS — SPECIAL APPLICATIONS

DESCRIPTION	Size	N·m	LB-FT
AUXILIARY SHAFT GEAR BOLT	M-10	40-55	30-41
AUXILIARY SHAFT THRUST PLATE BOLT	M-6	8-12	6-9
BELT TENSIONER (TIMING PIVOT BOLT)	M-10	40-55	30-41
BELT TENSIONER (TIMING ADJUSTING BOLT)	M-8	20-30	15-22
CAMSHAFT GEAR BOLT	M-12	70-95	52-70
CAMSHAFT THRUST PLATE BOLT	M-6	8-12	6-9
CONNECTING ROD NUT ⁽⁶⁾	M-9	⑥	⑥
CRANKSHAFT PULLEY HUB BOLT	M-14	155-205	114-151
CYLINDER HEAD BOLT ⁽⁷⁾	M-12	⑦	⑦
DISTRIBUTOR CLAMP BOLT	M-10	19-28	14-21
EXHAUST MANIFOLD TO CYLINDER HEAD BOLT, STUD OR NUT ⁽⁸⁾	M-10	⑧	⑧
FLYWHEEL TO CRANKSHAFT BOLT	M-10	73-87	56-64
INTAKE MANIFOLD TO CYLINDER HEAD BOLT NUT —	M-8	26-38	19-28
MAIN BEARING CAP — BOLT ⁽⁹⁾	M-12	⑨	⑨
OIL PRESSURE SENDING UNIT TO BLOCK		11-24	8-18
CRANKSHAFT PULLEY BOLT		20-30	15-22
LH AND RH ENGINE MOUNTS TO NO. 2 CROSSMEMBER		108-144	80-106

TORQUE SPECIFICATIONS — SPECIAL APPLICATIONS — Continued			
DESCRIPTION	SIZE	N·m	LB-FT
EXHAUST MANIFOLD BOLTS		27-45	20-33
EXHAUST PIPE TO MANIFOLD		36-46	25-34
SPRING BOLT		38-54	28-40
BELT TENSIONER BOLT		19-29	14-21
ENGINE SUPPORT, THROUGH BOLTS-CONVERTIBLE		45-61	33-45
NON CONVERTIBLE		88-119	65-85
OIL PUMP COVER SCREWS		10-15	90-130
PRESSURE PLATE TO FLYWHEEL		21-32	15-24
EXHAUST STUDS — OIL PUMP PICKUP			
TUBE TO PUMP	M-18	20-30	14-22
CAM BELT COVER	M-6	8-12	6-9
TORQUE CONVERTER TO FLYWHEEL	M-8	27-46	20-34
TIMING SENSOR BOLT	M-8	20-30	14-22
WATER PUMP PULLEY BOLT	M-8	20-30	14-22
BOLT — INTAKE MANIFOLD LOWER NUT — THROTTLE BODY TO UPPER INTAKE		19-28	14-20
OIL PUMP TO BLOCK	M-8	20-30	14-22
OIL PUMP TUBE NUT	M8	40-55	30-41
OIL PAN DRAIN PLUG TO PAN	M-14	21-38	15-25
OIL PAN TO BLOCK	M-6	10-13.5	7.5-10
OIL FILTER INSERT TO CYLINDER BLOCK		28-35	21-26
OIL FILTER TO ENGINE	⑩		
ROCKER ARM COVER TO CYLINDER HEAD	M-6	7-11	62-97 (Lb-In)
SPARK PLUG TO CYLINDER HEAD	M-14	7-14	5-10
TEMPERATURE SENDING UNIT TO BLOCK		11-24	8-18
WATER JACKET DRAIN PLUG TO BLOCK		32-37	23-28
WATER PUMP TO BLOCK BOLT	M-8	20-30	14-22
EGR VALVE TO SPACER BOLT	M-8	20-30	14-22
EGR TUBE TO EXHAUST MANIFOLD CONN.		25-35	18-28
EGR TUBE NUT		25-35	18-28
AUXILIARY SHAFT COVER BOLT	M-6	8-12	6-9
WATER OUTLET CONNECTION BOLT	M-8	20-30	14-22
CYLINDER FRONT COVER BOLT	M-6	8-12	6-9
INNER TIMING BELT COVER STUD	M-8	20-30	14-22
OUTER TIMING BELT COVER BOLT	M-6	8-12	6-9
PLUG		16-24	12-18
⁽¹⁾ Time required for plunger to lead down 1/8" of travel with 50 lb. load leakdown fluid in lash adjuster. ⁽²⁾ Distance in inches that front bearing is installed below front face of bearing tower. ⁽³⁾ 0.002 undersize = Add 0.001 to Standard Thickness. ⁽⁴⁾ Pin bore and crank bearing bore must be parallel and in the same vertical plane, within the specified total difference when measured at the ends of an 8" bar — 4" on each side of rod centerline. ⁽⁵⁾ Measured at the piston pin bore, centerline — 90° to the pin. ⁽⁶⁾ Torque in sequence in two steps: • Step 1 — 34-41 N·m (25-30 lb-ft) • Step 2 — 41-49 N·m (30-36 lb-ft) ⁽⁷⁾ Torque cylinder head bolts in sequence in two steps: • Step 1 — 68-81 N·m (51-59 lb-ft) • Step 2 — 108-122 N·m (80-90 lb-ft) ⁽⁸⁾ Torque in sequence in two steps: • Step 1 — 20-23 N·m (178-203 lb-in) • Step 2 — 27-41 N·m (20-30 lb-ft) ⁽⁹⁾ Torque in sequence in two steps: • Step 1 — 68-81 N·m (51-59 lb-ft) • Step 2 — 102-115 N·m (75-85 lb-ft) ⁽¹⁰⁾ 1/2 turn after gasket contacts surface — oil gasket. ⁽¹¹⁾ When replacing pistons, measure the cylinder bore as outlined in Section 03-00 and install the specified service piston as matched to the piston bore diameter above.			

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