

## SPECIFICATIONS

GENERAL SPECIFICATIONS	CYLINDER BLOCK
DISPLACEMENT .....1597cc (97.4 cu. inch)	HEIGHT .....206.5mm (8.130 inch)
NUMBER OF CYLINDERS .....4	Cylinder Head Flatness Maximum Limit .....0.15mm (0.006 inch)
BORE AND STROKE	Maximum Resurface Grinding .....0.20mm (0.008 inch)
Bore .....78mm (3.07 inch)	CYLINDER BORE DIAMETER ..78.000-78.019mm (3.0709-3.0717 inch)
Stroke .....83.6mm (3.29 inch)	SERVICE LIMIT
FIRING ORDER .....1-3-4-2	Standard Size .....78.000-78.019 (3.0709-3.0717)
	0.25 (0.010) Oversize .....78.250-78.269 (3.0807-3.0815)
	0.50 (0.020) Oversize .....78.500-78.519 (3.0905-3.0913)
	Taper .....0.019mm (0.0007 inch)
	Out-of-Round .....0.019mm (0.009 inch)
CYLINDER HEAD AND VALVE TRAIN	CRANKSHAFT
COMBUSTION CHAMBER DESIGN .....PENT-ROOF	MAIN BEARING JOURNAL DIAMETER .....49.938-49.956mm
VALVE GUIDE HEIGHT .....16.8-17.4mm (0.661-0.685 inch)	(1.9661-1.9668)
VALVE GUIDE BORE DIAMETER	0.25 (0.010) Standard .....49.688-49.706 (1.9562-1.9569)
Intake and Exhaust .....6.01-6.03mm (0.2366-0.2374 inch)	Undersize Minimum .....49.64 (1.954)
VALVE SEATS	0.50 (0.020) Standard .....49.438-49.456 (1.9464-1.9471)
Width	Undersize Minimum .....49.39 (1.944)
Intake .....0.8-1.4mm (0.0315-0.0551 inch)	Maximum Out-of-Round .....0.05mm (0.0019 inch)
Exhaust .....0.8-1.4mm (0.0315-0.0551 inch)	Maximum Taper .....0.05mm (0.0019 inch)
Angle .....45°	CONNECTING ROD JOURNAL DIAMETER .....44.940-44.956mm
VALVE STEM TO GUIDE CLEARANCE	(1.7693-1.7699 inch)
Intake .....0.025-0.060mm (0.0010-0.0024 inch)	CRANKPIN DIAMETER
Exhaust .....0.30-0.65mm (0.0012-0.0026 inch)	Standard Size
VALVE HEAD DIAMETER	Standard .....44.940-44.956 (1.7693-1.7699)
Intake .....30.9-31.1mm (1.2171-1.224 inch)	Minimum .....44.89 (1.767)
Exhaust .....26.1-26.3mm (1.0281-1.035 inch)	0.25 (0.010) Undersize
VALVE FACE ANGLE .....45°	Standard .....44.690-44.706 (1.7594-1.7601)
VALVE MARGIN	Minimum .....44.64 (1.757)
Thickness-Minimum	0.50 (0.020) Undersize
Intake .....0.5mm (0.020 inch)	Standard .....44.440-44.456 (1.7496-1.7502)
Exhaust .....0.5mm (0.020 inch)	Minimum .....44.39 (1.748)
VALVE LENGTH	Maximum Out-of-Round .....0.05mm (0.0020 inch)
Intake .....105.29mm (4.1452 inch)	Maximum Taper .....0.05mm (0.0020 inch)
Minimum .....104.8mm (4.126 inch)	CRANKSHAFT RUNOUT-MAXIMUM .....0.04mm (0.0016 inch)
Exhaust .....105.39mm (4.1492 inch)	MAIN BEARINGS
Minimum .....104.9mm (4.130 inch)	Oil Clearance .....0.024-0.042mm (0.0010-0.0017 inch)
VALVE STEM DIAMETER	Maximum .....0.08mm (0.0031 inch)
Intake .....5.970-5.985mm (0.2350-0.2356 inch)	Undersize .....0.25mm (0.010 inch) 0.50mm (0.020 inch)
Exhaust .....5.965-5.980mm (0.2348-0.2354 inch)	CONNECTING ROD BEARINGS
VALVE SPRINGS	Oil Clearance .....0.028-0.068mm (0.0011-0.0027 inch)
Free Length .....47.2mm (1.858 inch)	Maximum .....0.10mm (0.0039 inch)
Minimum .....45.8mm (1.803 inch)	THRUST BEARING
Out of Square-Maximum .....1.6mm (0.063 inch)	Width
Setting Load/Height .....196 N/40mm (44 lb/1.54 inch)	Standard .....2.500-2.550mm (0.984-0.1004 inch)
VALVE HLA BORE CLEARANCE	End Play .....0.080-0.282mm (0.0031-0.011 inch)
Intake .....0.025-0.066mm (0.0010-0.0026 inch)	Maximum .....0.30mm (0.0118 inch)
Exhaust .....0.025-0.066mm (0.0010-0.0026 inch)	
CAMSHAFT	CONNECTING ROD
Journal Diameter .....25.940-25.965mm (1.0213-1.0222 inch)	CONNECTING ROD
Out-of-Round Maximum .....0.05mm (0.002 inch)	Piston Pin Bore Diameter .....20.003-20.014mm
LOBE LIFT	(0.7875-0.7880 inch)
Intake .....40.888mm (1.6098 inch)	Crankshaft Bearing Bore Diameter .....48.000-48.016mm
Minimum .....40.688mm (1.6019 inch)	(1.8898-1.8904 inch)
Exhaust .....40.888mm (1.6098 inch)	Length (Center-to-Center) .....132.85-132.95mm
Minimum .....40.688mm (1.6019 inch)	(5.230-5.234 inch)
Wear Limit .....40.489mm (1.5940 inch)	ALIGNMENT (BORE-TO-BORE MAX. DIFF)
RUNOUT .....0.03mm (0.0012 inch)	Bending .....0.198mm (0.0078 inch)
ENDPLAY .....0.07-0.19mm (0.0028-0.0075 inch)	SIDE CLEARANCE (ASSEMBLED TO CRANK)
Maximum .....0.2mm (0.008 inch)	Standard .....0.110-0.262mm (0.0043-0.0103 inch)
Bearing Oil Clearance .....0.035-0.081mm (0.0014-0.0032 inch)	Maximum .....0.30mm (0.012 inch)
Maximum .....0.15mm (0.0059 inch)	

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## SPECIFICATIONS (Continued)

PISTONS	
DIAMETER	.77.954-77.974mm (3.0690-3.0698 inch)
0.25 (0.010) Oversize	.78.204-78.224 (3.0789-3.0797)
0.50 (0.020) Oversize	.78.454-78.474 (3.0887-3.0895)
PISTON-TO-BORE CLEARANCE	.0.026-0.065mm (.0010-.0026 inch)
Maximum	.0.15mm (.0059 inch)
PISTON RING GROOVE WIDTH	
Thickness	
Top	1.520-1.535mm (.0598-.0604 inch)
Second	1.520-1.535mm (.0598-.0604 inch)
Oil	4.120-4.040mm (.1583-.1591 inch)
PISTON RINGS	
Thickness	
Top	1.47-1.49mm (.0579-.0587 inch)
Second	1.47-1.49mm (.0579-.0587 inch)
Oil	4.015-4.035mm (.1580-.1588 inch)
Ring Gap	
Top	.0.20-0.40mm (.008-.0157 inch)
Second	.0.15-0.30mm (.0059-.0118 inch)
Oil	.0.20-0.70mm (.008-.028 inch)
Side Clearance Limit	
Top	.0.030-0.065mm (.0012-.0026 inch)
Second	.0.030-0.065mm (.0012-.0026 inch)

PISTONS — (Continued)	
Oil	.0.030-0.065mm (.0012-.0026 inch)
Maximum	.0.15mm (.0059 inch)
PISTON PIN	
Diameter	19.987-19.993mm (.7869-.7871 inch)
Interference Fit	.0.010-0.027mm (.0004-.0012 inch)
LUBRICATION SYSTEM	
OIL PUMP TYPE	Trochoid Gear
Regulating Pressure at 1,000 RPM	177-216 kPa (25-31 psi)
Regulating Pressure at 3,000 RPM	294-333 kPa (43-48 psi)
ROTOR CLEARANCE	
Inner Rotor Tooth Tip to Outer Rotor	.0.02-0.16mm (.0008-.0063 inch)
Maximum	.0.2mm (.0078 inch)
Outer Rotor to Body	.0.09-0.18mm (.0035-.0071 inch)
Maximum	.0.22mm (.0087 inch)
Side Clearance	.0.03-0.11mm (.0012-.0043 inch)
OIL CAPACITY	
Total (Dry Engine)	3.6L (3.8 U.S. Quart)
Oil Pan	3.2L (3.4 U.S. Quart)
Oil Filter (Regular Size)	0.3L (.32 U.S. Quart)

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Description	N-m	Lb-Ft	Description	N-m	Lb-Ft
Shift Linkage Rod—Nut	16-22	12-16	RH Engine Mount Body Bracket—Bolt (1)	67-91	50-67
Shifter Stabilizer—Nut	31-46	23-34	RH Engine Mount Through Bolt	45-65	34-47
Engine End Plate—Screw	8-11	7 1-97 (Lb-In)	Front Engine Mount to Transmission—Bolt	37-52	28-38
Flywheel—Bolt	96-103	7 1-76	Front Engine Mount—Nut	64-89	48-65
Clutch Pressure Plate—Bolt	18-26	14-19	Rear Engine Mount—Bolt	37-52	28-38
Torque Converter—Bolt	34-49	25-36	Rear Engine Mount—Nut	32-47	24-34
Intermediate Axle Shaft Bearing Support—Bolt	37-52	28-38	Exhaust Manifold—Nut	39-57	29-42
Manual Transaxle to Engine—Bolt (Upper)	89-117	66-86	Intake Manifold—Nut	19-25	14-18
Manual Transaxle Engine—Bolt (Lower)	37-52	28-38	Intake Manifold—Bolt	19-25	14-18
Automatic Transaxle to Engine—Bolt (Upper)	55-80	41-59	Cylinder Head—Bolt <sup>1</sup>	76-81	56-59
Torque Converter Cover Plate—Bolt	7-10	62-88 (Lb-In)	Cylinder Head Cover—Bolt	8-11	7 1-97 (Lb-In)
Gusset Plate—Bolt	37-52	28-38	Timing Belt Tension Pulley—Bolt	37-52	28-38
Starter—Bolt	31-46	23-34	Timing Belt Idler Pulley—Bolt	37-52	28-38
Support Bracket, Intake Manifold—Bolt	31-46	23-34	Timing Belt Covers—Bolt	8-11	7 1-97 (Lb-In)
Starter Bracket to Support Bracket—Bolt	19-25	14-18	Seal Plate—Bolt	8-11	7 1-97 (Lb-In)
Shift Cable Pivot (Automatic)—Nut	44-64	33-47	Camshaft Pulley	49-61	37-45
Shift Cable Retaining Bolt (Automatic)	8-11	7 1-97 (Lb-In)	Crankshaft Main Bearing—Bolt	54-59	40-43

(Continued)

<sup>1</sup> Tighten first to 20-34 N-m (15-25 lb-ft), in sequence, then 76-81 N-m (56-59 lb-ft).

## SPECIFICATIONS (Continued)

Description	N-m	Lb-Ft	Description	N-m	Lb-Ft
Front Exhaust Pipe to Support Bracket—Bolt	43-61	32-45	Connecting Rod Bearing—Nut	47-52	35-38
Exhaust Pipe to Manifold—Nut (Naturally Aspirated)	31-46	23-33	Crankshaft Timing Pulley—Bolt	108-118	80-87
Exhaust Pipe to Manifold (Turbocharged)	24-32	18-23	Crankshaft Rear Seal Flange—Bolt	8-11	71-97 (Lb-In)
Chassis Cross Brace—Bolt	35-50	26-36	Crankshaft Pulley—Bolt	12-17	10-12
A-Arm Front Bolt	97-117	72-86	Oil Pan—Bolt	8-11	71-97 (Lb-In)
Wheel Lug Nuts	90-120	67-88	Oil Pump Assembly—Bolt	19-25	14-18
Ball Joint—Bolt	43-54	32-40	Oil Pump Pick-Up—Bolt	8-11	71-97 (Lb-In)
A / C Compressor—Bolt	39-54	29-40	Oil Pump Cover	19-25	14-18
Power Steering Pump Bracket—Nut	47-66	35-48	Camshaft Bearing—Bolt	11-14	9-10
Power Steering Pump Bracket—Bolt	47-66	35-48	Oil Spray Nozzle—Bolt	12-18	10-13
Power Steering—Adjusting Nut	37-52	28-38	Oil Pressure Sensor	12-18	10-13
Power Steering—Pivot Bolt	31-46	23-24	Knock Sensor	20-34	15-25
Radiator Bracket—Bolt	8-11	71-97 (Lb-In)	Oil Cooler—Nut	29-39	22-28
RH Engine Mount Body Bracket—Bolt (3)	20-28	15-20	Water Pump, Outlet Bolt	19-25	14-18
Hood Hinge Bolt	20-28	15-20	Water Pump Pulley Bolt	8-11	71-97 (Lb-In)

## SPECIAL SERVICE TOOLS

Tool Number	Description
T78P-3504-N	Locknut Pin Remover
T90P-6256-AH	Cam Seal Protector
T90P-6256-BH	Cam Seal Replacer
T89P-6565-A1	Valve Spring Compressor
T87C-6565-A	Valve Spring Compressor Pivot Bar
T89P-6565-A2	Valve Spring Compressor Brackets
T90P-6565-AH	Valve Spring Compressor Screw Set
T89P-6510-D	Valve Stem Seal Remover
T89P-6510-AH	Valve Stem Seal Replacer
D81L-6002-C	Piston Ring Compressor
T64L-6011-EA	Cylinder Ridge Reamer
T87C-6019-A	Front Seal Installer
T87C-6701-A	Seal Replacer

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Tool Number	Description
T59L-1001-B	Impact Slide Hammer
D90P-6135-A	Piston Pin Remover and Replacer
T89P-6510-A	Valve Guide Remover / Replacer
D83L-4201-A	Straight Edge
T73L-6011-A	Cylinder Hone Set
TOOL-4201-C	Dial Indicator With Bracketry
D81L-6002-D	Piston Ring Groove Cleaner
T50T-100-A	Impact Slide Hammer

**ROTUNDA EQUIPMENT**

Model	Description
077-00043	Portable Crane
014-00705	Engine Cylinder Air Pressurization Kit