

GROUP 2

ENGINE

SECTIONS IN GROUP 2

Section	Subject	Page	Section	Subject	Page
2-A	Engine Specifications	2-1	2-E	Replacement of Crankshaft and Connecting Rod Bearings.	
2-B	Engine Description .	2-5		Pistons and Rings	2-36
2-C	Engine Tune - Care and Trouble Diagnosis	2-16	2-F	Cooling and Oiling Systems Service	2-39
2-D	Cylinder Head and Valve Mechanism Service	2-22	2-G	Engine Mounting Adjustment. Flywheel Replacement. Engine Balancing	2-44

SECTION 2-A

ENGINE SPECIFICATIONS

CONTENTS OF SECTION 2-A

Paragraph	Subject	Page	Paragraph	Subject	Page
2-1	Engine Tightening Specifications.	2-1	2-3	Engine Dimensions, Fits and Adjustments	2-2
2-2	Engine General Specifications . .	2-1			

2-1 ENGINE TIGHTENING SPECIFICATIONS

Use a reliable torque wrench to tighten the parts listed, to insure proper tightness without straining or distorting parts. These specifications are for clean and lightly lubricated threads only; dry or dirty threads produce increased friction which prevents accurate measurement of tightness.

Part	Location	Thread Size	Torque Ft. Lbs.
Plug	Spark	14 MM	25-35
Plug	Crankcase Drain	1/2"-20	30-35

Part	Location	Thread Size	Torque Ft. Lbs.
Bolt	Water Pump Cover	1/4-20	6-8
Bolt	Timing Chain Cover	5/16-18	20-25
Bolt	Lower Crankcase (Oil Pan)	5/16-18	6-15
Bolt	Valve Lifter Cover	5/16-18	3-5
Bolt	Valve Rocker Arm Cover .	5/16-18	3-5
Bolt	Intake Manifold	3/8-16	25-30
Bolt	Exhaust Manifold	3/8-16	10-15
Bolt	Rocker Arm Shaft Bracket.	3/8-16	30-35
Bolt	Water Manifold	3/8-16	25-30
Bolt	Generator Mounting Bracket	3/8-16	25-30
Nut	Connecting Rod Cap Bolt. .	3/8-24	40-45
Bolt	Flywheel to Crankshaft. . .	7/16-20	50-60
Bolt	Cylinder Head	7/16-14	65-75
Bolt	Crankshaft Bearing Cap . .	1/2-13	100-110
Bolt	Harmonic Balancer	3/4-16	200-220

2-2 ENGINE GENERAL SPECIFICATIONS

NOTE: See paragraph 2-3 for dimensions.

Items	Series 4400	Series 4600-4800
Type - No. of Cylinders	90 Deg. V-8	
Valve Arrangement	In Head	
Bore and Stroke	4.1875" X 3.640"	
Piston Displacement (cu. in.)	401	
Compression Ratio,		
Std.	10.25 to 1	10.25 to 1
Power Pack	10.25 to 1	No Power Pack
Regular Gas Option	9.0 to 1	No Reg. Gas Option
Export	8.75 to 1	8.75 to 1
Compression Pressure @ 160 RPM Cranking Speed -		
Std. (P.S.I.)	180	180
Power Pack (P.S.I.)	180	No Power Pack

2-2 ENGINE GENERAL SPECIFICATIONS (Cont'd)

Items	Series 4400	Series 4600-4800
Regular Gas Option (P.S.I.)	160	No Reg. Gas Option
Taxable Horsepower	56.11	
Max. Brake Horsepower, Bare Engine - @ RPM		
Std.	280 @ 4400	325 @ 4400
Power Pack	325 @ 4400	No Power Pack
Regular Gas Option	265 @ 4400	No Reg. Gas Option
Engine Torque (lbs.-ft. @ RPM)		
Std.	424 @ 2800	445 @ 2800
Power Pack	445 @ 2800	No Power Pack
Regular Gas Option	412 @ 2800	No Reg. Gas Option
Octane Requirements		
Std.	99 Research 88 Motor	
Power Pack	99 Research 88 Motor	No Power Pack
Regular Gas Option	93 Research 84 Motor	No Reg. Gas Option
Export	93 Research 84 Motor	
Manufacturing Code Number Preface (See Fig. 0-1)		
Std.	2I	4I
Power Pack	4I	No Power Pack
Regular Gas Option	L2I	No Reg. Gas Option
Export	L2I	L4I
Firing Order		1-2-7-8-4-5-6-3
Crankshaft Bearings No. and Type		5, Replaceable Liners
Material		Steel Backed Moraine 400
Bearing Which Takes End Thrust		No. 3
Connecting Rod Bearings, Type		Replaceable Liners
Material		Steel Backed Moraine 400
Piston Material & Surface Treatment		Aluminum Alloy - Tin Plated
Compression Rings - No./Piston, Material		2, Cast Iron
Oil Rings - No./Piston		One
Type		3-Piece/Expander
Location of all Piston Rings		Above Piston Pin
Camshaft, Type and Material		Cast Iron Alloy
Camshaft Drive		Chain
No. & Type of Camshaft Bearings		5, Steel Backed Babbitt
Valve Lifter Type and Material		Hydraulic, Alloy Iron
Valve Spring Type		Dual Helical
Oiling System Type		Forced Feed
Oil Supplied to Bearing Surfaces -		
Crankshaft, Camshaft, Con. Rods		Full Pressure
Pistons, Pins		Splash
Cylinder Walls		Splash & Nozzle
Valve Lifters, Rocker Arms, Valves		Low Pressure
Normal Oil Pressure		40 lbs. @ 1600 RPM
Oil Reservoir Capacity - Quarts		
Dry Engine		5 (6 with dry filter)
Refill		4 (5 with dry filter)
Oil Filter, Make and Type		AC, Type PF-7
Cooling System Type		Pressure (15 lb. Rad. Cap.)
Water Temperature Control		Thermostat & Fixed By-Pass
Thermostat Opens at - (deg. F)		167 to 172
Cooling System Capacity - Quarts		
Less Heater		17
With Heater		18.5
Fan Diameter, No. of Blades, Regular		18", 4
With Air Conditioning		20", 5
Fan Drive - Regular		Water Pump Shaft
With Air Conditioner		Torque and Temperature Sensitive Clutch

2-3 ENGINE DIMENSIONS, FITS AND ADJUSTMENTS

NOTE: These dimensions and limits for fit of parts apply to new parts only. "T" means tight. "L" means loose.

Items	Series 4400	Series 4600-4800
Crankshaft Journal Diameter	2.498 - 2.499	
Crankshaft Journal to Bearing Clearance . . . . .	.0005" - .0021"	
Crankshaft End Play at Thrust Bearing . . . . .	.004" - .008"	
Crankshaft Bearing Effective Length -		
No. 1, 2, 4 and 5 . . . . .	.804"	
No. 3 . . . . .	.861"	
Crankpin Journal Diameter	2.249" - 2.250"	
Crankpin Journal to Bearing Clearance . . . . .	.0002" - .0023"	
Connecting Rod End Play on Crankpin . . . . .	.005" - .012" Total, Both Rods	
Connecting Rod Bearing Length . . . . .	.781"	
Cylinder Bores, Standard Size	4.186" - 4.189"	
Piston Clearance in Bore . . . . .	.001" - .0016"	
Piston Pin Diameter . . . . .	.9994" - .9997"	
Piston Pin Length	3.520"	
Piston Pin Fit @ 70° F. (In Piston)	Finger Push (.0001")	
Piston Pin Fit (In Connecting Rod) . . . . .	.0007"T to .0015"T	
Piston Ring Side Clearance in Groove -		
Compression Ring . . . . .	.003" - .005"	
Oil Ring . . . . .	.0035" - .0095"	
Piston Ring Gap, Compression Ring in Bore . . . . .	.015" - .025"	
Oil Ring in Bore . . . . .	.015" - .035"	
Camshaft Bearing Journal Diam.		
No. 1	1.785" - 1.786"	
No. 2	1.755" - 1.756"	
No. 3	1.725" - 1.726"	
No. 4	1.695" - 1.696"	
No. 5	1.665" - 1.666"	
Camshaft Journal Clearance in Bearings . . . . .	.0005" - .0035"	
Valve Lifter Diameter . . . . .	.8425"	
Valve Lifter Clearance in Crankcase . . . . .	.0015" - .003"	
Valve Lifter Leakdown Rate, in Test Fixture	12 to 40 Sec.	
Rocker Arm Ratio	1.6 to 1	
Rocker Arm Clearance on Shaft . . . . .	.0027" - .0042"	
Valve Head Diameter - Inlet	1.875"	
Valve Head Diameter - Exhaust	1.500"	
Valve Seat Angle - Inlet & Exhaust	45 Degrees	
Valve Stem Diameter - Inlet . . . . .	.373" Top - .3715" Bottom	
Valve Stem Diameter - Exhaust . . . . .	.372" Top - .3705" Bottom	
Valve Stem Clearance in Guide - Inlet . . . . .	.001" - .003" Top - .002" - .004" Bottom	
- Exhaust . . . . .	.0015" - .0035" Top - .0025" - .0045" Bottom	
Valve Spring - Outer		
Valve Closed (lbs. @ length)	39.5 - 44.5 @ 1.60"	
Valve Open (lbs. @ length)	93 - 99 @ 1.16"	
Valve Spring - Inner		
Valve Closed (lbs. @ length)	23 - 28 @ 1.69"	
Valve Open (lbs. @ length)	73 - 79 @ 1.25"	
Oil Pump Shaft to Bearing Clearance . . . . .	.001" - .0025"	
Oil Pump Idler Gear Bearing Clearance . . . . .	.001" - .0025"	
Oil Pump Driving Gear Backlash . . . . .	.002" - .004"	
Oil Pump, Drive and Idler Gear Backlash . . . . .	.004" - .008"	
Oil Pump Gear End Clearance in Body . . . . .	.0005" - .005"	
Fan Belt Adjustment	See Fig. 2-39 and 2-40	

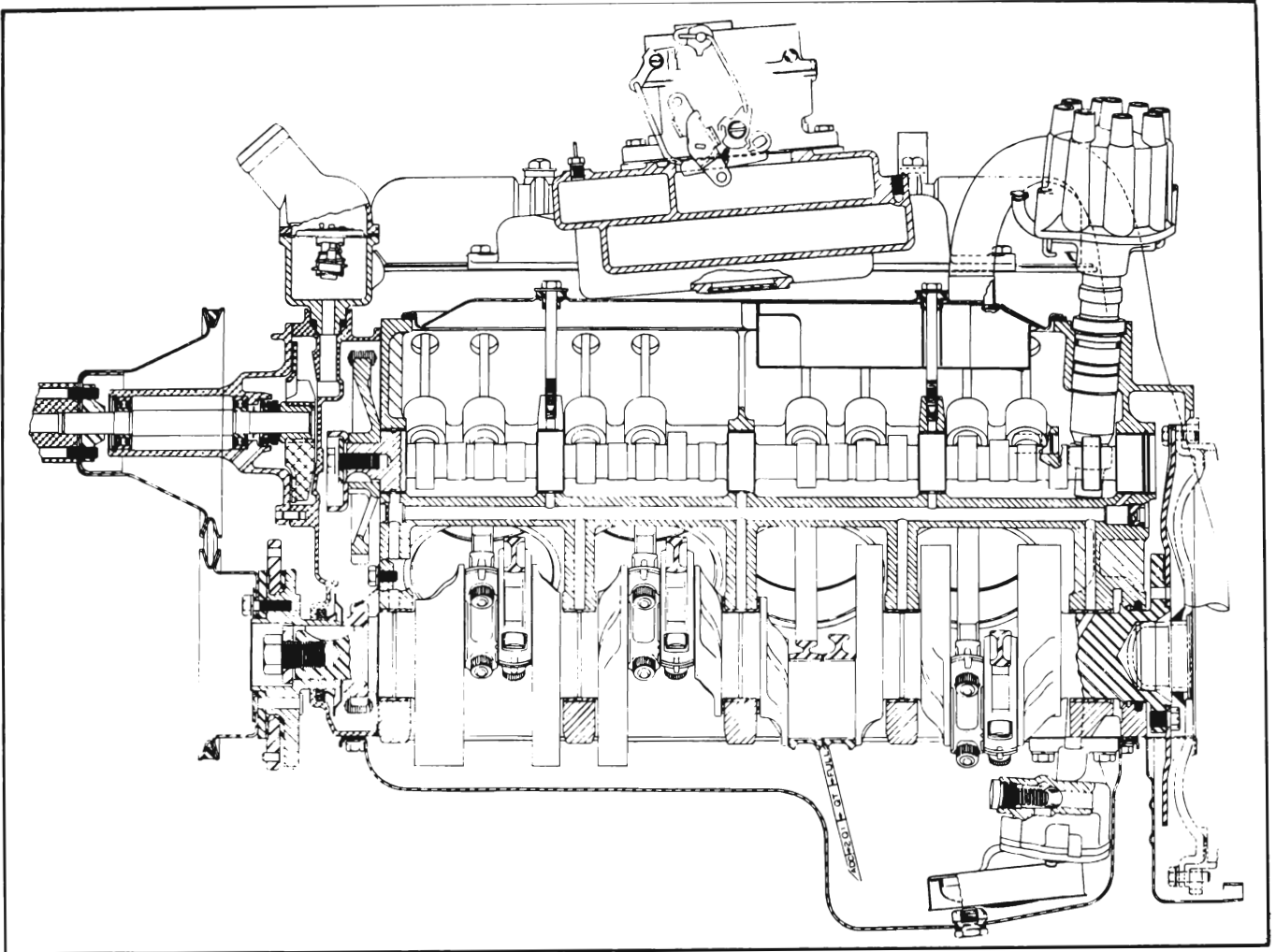


Figure 2-1—Engine Cross Sectional View