1968-73 FIAT 124 SPORTS DOHC 4 CYLINDER

GENERAL SPECIFICATIONS										
Year	Displ.		Carburetor	HP at RPM	Torque (Ft. Lbs. at RPM)	Compr. Ratio	Bore		Stroke	
	cu. ins.	cc					in.	mm	in.	mm
124 AC.040										
1968-70	87.74	1438	1x2-Bbl.	96@6500	82@4000	8.9-1	3.150	80.0	2.815	71.5
125 BC.040										
1971-72	98.13	1608	1x2-Bbl.	94@6600	94@4000	8.5-1	3.150	80.0	3.150	80.0
1973	98.13	1608	1x2-Bbl.	90@6600	88@3600	8.5-1	3.150	80.0	3.150	80.0
132 AC.040.3										
1973	97.17	1592	1x2-Bbl.	87@6200	85@4200	8.0-1	3.150	80.0	3.120	79.2

ENGINE IDENTIFICATION

Engine code number is stamped on pad above oil filter mount on left side of engine.

Engine Identification

Application	Code Number
1438 cc	124 AC.040
1592 cc	132 AC.040.3
1608 cc	125 BC.040

ENGINE REMOVAL

1) Disconnect battery and all electrical connections to engine. Drain cooling system, remove shroud, all hoses and radiator. Remove air cleaner.

2) Disconnect accelerator cable at lever on dash and starting device cable at lever on carburetor. Disconnect fuel inlet line to fuel pump and fuel overflow line from carburetor to tank.

3) Disconnect power brake unit vacuum line from manifold (if equipped). From inside driver's compartment, press down on gear shift lever and pry out retaining ring with a screwdriver.

4) Remove transmission cover. From under vehicle, disconnect drive shaft from transmission and remove drive shaft safety cross strap. Remove drive shaft center pillow block.

5) Disconnect speedometer drive from transmission. Disconnect back-up light switch cables at transmission (if equipped). Disconnect clutch fork return spring and remove adjusting rod.

6) Remove inspection cover from bottom of clutch housing. Disconnect exhaust pipe support bracket from rear of transmission and remove starter from clutch housing.

7) Position a suitable transmission holding fixture (A. 70509) to a floor jack and position under transmission. Remove bolts securing transmission to engine and remove rear crossmember.

8) With transmission supported by jack, pull to rear until input shaft clears release bearing. Lower jack when transmission is clear and remove from under vehicle.

9) Remove clutch assembly from flywheel. Attach a suitable lifting fixture to engine, raise slightly and remove nuts securing engine to front motor mounts. Lift engine up and remove.

10) To install engine and transmission, reverse removal procedure. Make sure engine and transmission connect properly.

CYLINDER HEAD

Removal – 1) Disconnect battery, drain cooling system and remove air cleaner. Disconnect water temperature sending unit connection and spark plug wires. Disconnect water hoses.

2) Disconnect accelerator cable from lever on firewall and disconnect accelerator rod from lever on carburetor. Disconnect fuel line and fuel overflow from carburetor. Disconnect power brake vacuum line and starter relay cable.

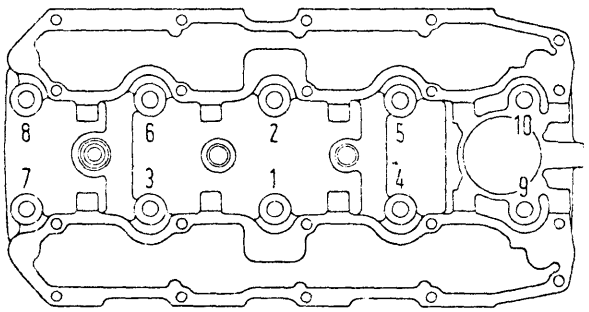
3) Disconnect exhaust pipe from manifold and remove starter heat shield. Remove timing belt. *See Timing Belt Replacement.* Remove cylinder head retaining bolts and remove cylinder head.

Installation – 1) Before installation of cylinder head, position camshafts so that reference marks on sprockets are aligned with fixed pointers on front of cylinder head.

2) When installing cylinder head, camshafts must not be moved in either direction. Rotate crankshaft and bring pistons number 1 and 4 to TDC.

3) Install two dummy studs in one cylinder head bolt hole at front and rear of engine. Install new cylinder head gasket on block and carefully install cylinder head, making sure any valves in open position do not contact block.

4) Install a few head bolts and tighten manually and remove dummy studs. Install remaining head bolts and tighten to specification in sequence shown in illustration.



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CYLINDER HEAD TIGHTENING SEQUENCE

1968-73 FIAT 124 SPORTS DOHC 4 CYLINDER (Cont.)

VALVES							
Engine & Valve	Head Diam. In. (mm)	Face Angle	Seat Angle	Seat Width In. (mm)	Stem Diameter In. (mm)	Stem Clearance In. (mm)	Valve Lift In. (mm)
1438 cc							
Intake	1.630 (41.4)	45.5°	45°	.079 (2)	.3140-.3146 (7.98-7.99)	.0013-.0026 (.032-.065)	.376 (9.564)
Exhaust	1.417 (36)	45.5°	45°	.079 (2)	.3137-.3143 (7.97-7.98)	.0015-.0028 (.039-.072)	.376 (9.564)
1592 cc							
Intake	1.622-1.638 (41.20-41.60)	45.5°	45°	.079 (2)	.3139-.3146 (7.97-7.99)	.0012-.0026 (.030-.065)	.376 (9.564)
Exhaust	1.412-1.435 (35.85-36.45)	45.5°	45°	.079 (2)	.3139-.3146 (7.97-7.99)	.0012-.0026 (.030-.065)	.376 (9.564)
1608 cc							
Intake	1.630 (41.40)	45.5°	45°	.079 (2)	.3139-.3146 (7.97-7.99)	.0012-.0026 (.030-.065)	.376 (9.564)
Exhaust	1.417 (36)	45.5°	45°	.079 (2)	.3139-.3146 (7.97-7.99)	.0012-.0026 (.030-.065)	.376 (9.564)

VALVE ARRANGEMENT

All intake valves are on left side of engine and all exhaust valves are on right side of engine.

VALVE GUIDE SERVICING

1) Measure clearance of valve stem in guide with a dial indicator. If clearance exceeds specifications, valve guide must be replaced.

2) Drive guide out of head from combustion chamber side through top of head. Drive new guide in from top of head. Install new guide with snap ring flush against head.

VALVE SPRINGS			
Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
All			
Inner	1.645 (41.25)	32@1.220 (14.5@30.99)	61@.866 (27.7@22.99)
Outer	2.122 (53.90)	86@1.417 (39.01@35.99)	131@1.043 (59.42@26.49)

VALVE SPRING REMOVAL

1) With cylinder head removed, remove camshaft carriers with camshafts. Compress valve spring with a spring compressor and remove both valve keepers.

2) Release spring compressor, remove upper spring retainer, inner and outer springs and lower spring retainer. To assemble cylinder head, reverse disassembly procedure.

VALVE CLEARANCE ADJUSTMENT

1) Valve clearance is checked or adjusted with engine cold. Intake valves are adjusted to .018" (.45 mm) and exhaust valves are adjusted to .020" (.50 mm).

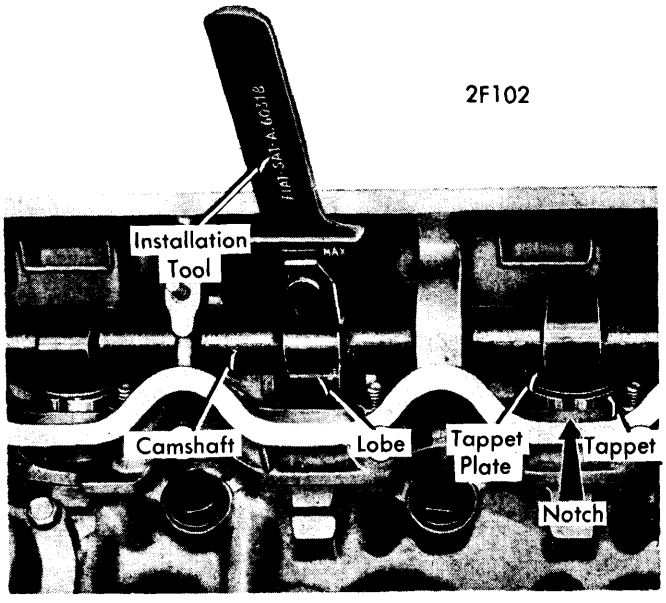
2) To adjust valves, remove camshaft covers from cylinder head. Rotate crankshaft until camshaft lobe of valve being adjusted is pointing away from valve (valve will be closed).

3) Using a feeler gauge, measure valve clearance. If clearance is not as specified, a thicker or thinner tappet plate must be installed to obtain specified clearance.

4) Tappet plates are available in different thickness ranging from .128" to .185" (3.25-4.70 mm) in .0019" (.05 mm) increments.

5) To install predetermined tappet plate, rotate camshaft until valve is fully open. Insert a suitable tappet plate removal tool (A.60318) over lobe of valve being adjusted. Rotate camshaft and remove tappet plate by means of a jet of air through notch in tappet (see illustration).

6) Insert correct thickness tappet plate, rotate camshaft until lobe is resting on tappet plate, and remove tool. Use this same procedure for adjusting both intake and exhaust valve clearances.



INSTALLING TAPPET PLATES

1968-73 FIAT 124 SPORTS DOHC 4 CYLINDER (Cont.)

PISTONS, PINS, RINGS

Engine	PISTONS	PINS		RINGS		
	Clearance In. (mm)	Piston Fit In. (mm)	Rod Fit In. (mm)	Rings	End Gap In. (mm)	Side Clearance In. (mm)
1438 cc	.0031-.0039 (.079-.099)	.0003-.0006 (.008-.015)	.0004-.0017① (.010-.043)	No. 1	.0118-.0177 (.300-.450)	.0018-.0030 (.046-.076)
				No. 2	.0079-.0138 (.200-.351)	.0010-.0022 (.025-.056)
				No. 3	.0079-.0138 (.200-.351)	.0008-.0020 (.020-.050)
1592 cc & 1608 cc	.0025-.0033② (.064-.084)	.0001-.0003 (.003-.008)	.0004-.0006 (.010-.015)	No. 1	.0118-.0177 (.300-.450)	.0018-.0030 (.046-.076)
				No. 2	.0079-.0138 (.200-.351)	.0010-.0027 (.028-.069)
				No. 3	.0079-.0138 (.200-.351)	.0011-.0024 (.028-.061)

① – Interference fit.
② – Piston clearance for 1592 cc, .0016-.0024" (.041-.061 mm).

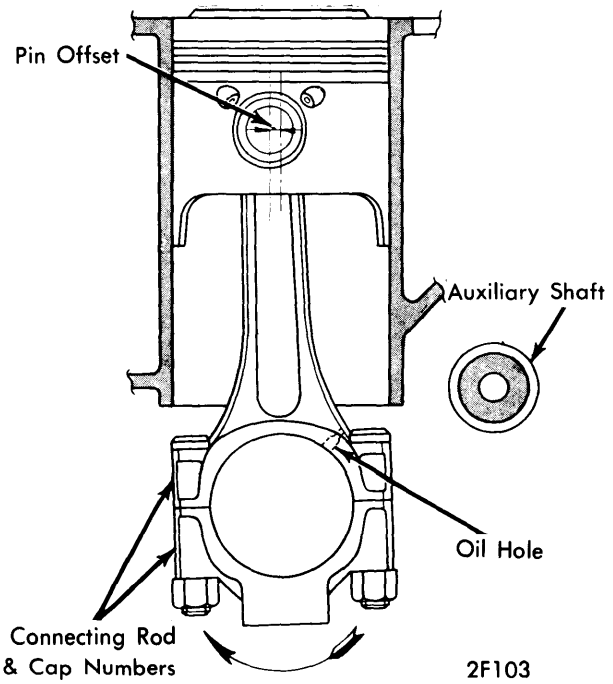
OIL PAN REMOVAL

1) Raise vehicle and drain oil pan. Disconnect front motor mounts and raise engine sufficiently to remove oil pan.

2) To install oil pan, clean oil pump and crankcase mating surfaces, install new gasket with sealer and reverse removal procedure.

PISTON & ROD ASSEMBLY

1) When installing piston and rod assembly, thoroughly oil piston pin in piston boss. Make sure ring gaps are spaced approximately 120° apart.



PISTON & ROD ASSEMBLY INSTALLATION

2) Lubricate rings and cylinder bore. Compress rings with a ring compressor and install assembly in cylinder block so that numbers on connecting rod and cap are facing away from auxiliary shaft. Tighten connecting rod nuts to specification.

PISTON PIN REPLACEMENT

1438 cc Engine – 1) Using a suitable mandrel and driver press piston pin from connecting rod. Mark piston and connecting rod to insure that same piston is installed on same rod.

2) Check clearance between piston and pin by oiling pin and inserting in piston. If clearance is correct, pin should push fit through piston with slight thumb pressure.

3) If fit is too loose, piston must be reamed for correct clearance for an oversize piston pin. Connecting rod must be reamed for correct interferance fit for an oversize pin. Piston pin is available in .0079" (2 mm) oversize.

4) Connecting rod must be heated to 465°F (240°C) to install piston pin. Position heated rod in a vise and position piston on rod so that side of piston with piston pin bore offset is toward numbers on connecting rod (see illustration).

5) Using a suitable driver (A. 60325) with pin installed, push pin in piston and insert until shoulder of tool bottoms against piston.

6) To check for correct piston pin fit, install piston and rod assembly in a suitable testing tool (A. 95614) and attach a torque wrench to correct portion of tool.

7) Position dial indicator stem of tool against piston pin. Turn screw attached to torque wrench until it contacts opposite end of pin. Adjust dial indicator to zero.

8) Using torque wrench, apply 11 ft. lbs. (1.5 mkg). Fit is correct if after torque wrench is released, dial indicator returns to zero.

1592 cc & 1608 cc Engines – 1) Remove circlips from piston and push piston pin out of piston and connecting rod. Separate piston from connecting rod.

2) Check clearance of piston pin in piston and connecting rod. If clearance is excessive, piston and connecting rod must be resized for a .0079" (2 mm) oversize piston pin.

1968-73 FIAT 124 SPORTS DOHC 4 CYLINDER (Cont.)

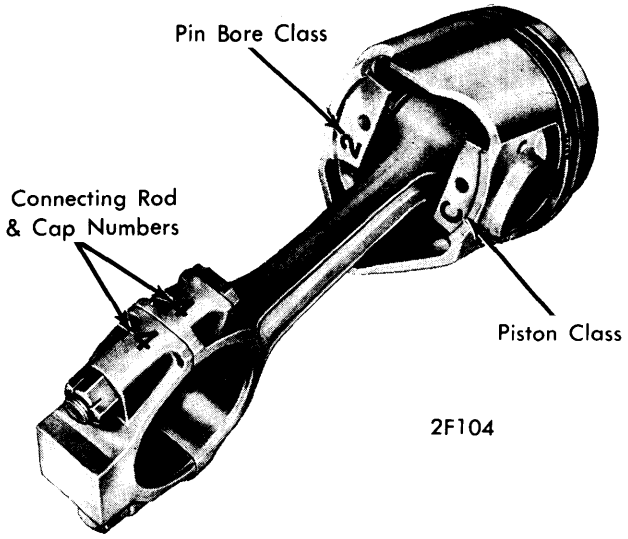
3) Bushing in small end of connecting rod is replaceable and requires a .0017-.0040" interference fit in connecting rod.

4) To assemble piston and rod assembly, position piston on connecting rod with side of piston having offset portion of piston pin bore on same side as connecting rod numbers.

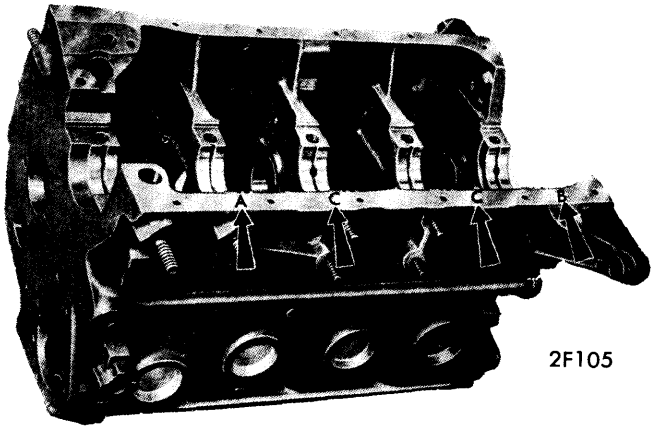
5) Oil piston pin and insert in piston and connecting rod. Install circlips and check piston for freedom of movement on pin. Check alignment.

FITTING PISTONS

1) Standard pistons are manufactured in three size classes and cylinder bores are machined according to piston class. Class of piston and bore is designated by a letter code.



PISTON & ROD ASSEMBLY MARKINGS



PISTON BORE CLASS DESIGNATION MARKS

2) Class code of piston is stamped on bottom of piston pin boss. Class of cylinder bore is stamped next to appropriate cylinder on oil pan flange on bottom of cylinder block.

3) Measure piston size at right angles to piston pin and 2.057" (52.25 mm) below piston crown. If piston is replaced for any reason, one of same class must be installed.

4) With piston size determined, measure cylinder bore. If clearance exceeds specification, cylinders must be rebored and oversize pistons installed.

5) Pistons are available .0079" (0.2 mm), .0157" (0.4 mm) and .0236" (0.6 mm) oversize. If piston or pistons are replaced, weight of pistons must not vary more than .09 oz. (2.5 g).

CRANKSHAFT MAIN & CONNECTING ROD BEARINGS

Engine	MAIN BEARINGS				CONNECTING ROD BEARINGS		
	Journal Diam. In. (mm)	Clearance In. (mm)	Thrust Bearing	Crankshaft End Play In. (mm)	Journal Diam. In. (mm)	Clearance In. (mm)	Side Play In. (mm)
1438 cc	1.9990-1.9998 (50.775-50.795)	.0020-.0037 (.050-.095)	No. 5	.002-.010 (.06-.26)	1.7916-1.7924 (45.508-45.528)	.0010-.0030 (.026-.076)	①
1592 cc	2.0860-2.0868 (52.985-53.005)	.0020-.0037 (.050-.095)	No. 5	.002-.010 (.06-.26)	1.9997-2.0001② (50.792-50.802)	.0018-.0032 (.046-.080)	①
1608 cc	1.9990-1.9998 (50.775-50.795)	.0020-.0037 (.050-.095)	No. 5	.002-.010③ (.06-.26)	1.8990-1.8994④ (48.234-48.244)	.0018-.0032 (.046-.080)	①

① — Information not available.
② — Journal diameter is machined in two sizes designated by class codes; specification given is class A, class B is 1.9993-1.9997" (50.782-50.792 mm).
③ — End play in 1973 is .002-.012" (.06-.31 mm).
④ — Class A is given, class B is 1.8985-1.8990" (48.224-48.234 mm). See ②.

MAIN & CONNECTING ROD BEARING SERVICE

1) With crankshaft removed, thoroughly clean and inspect for cracks or scoring on bearing journals. Check all journals for out-of-round conditions with a micrometer. If journal is out-of-round or tapers more than .002" (.05 mm), crankshaft must be reground for undersize bearings.

2) Bearing-to-journal clearance is checked by the Plastigage method. If clearance exceeds specifications, crankshaft must be ground for undersize bearings.

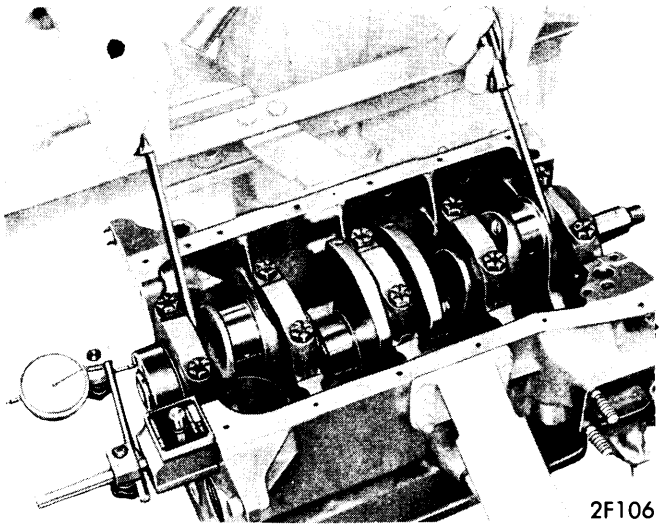
3) Main and connecting rod bearings are available .010", .020", 030", and .040" (.25 mm, .51 mm, .76 mm, and 1.02 mm) undersize.

1968-73 FIAT 124 SPORTS DOHC 4 CYLINDER (Cont.)

CRANKSHAFT END PLAY

1) Mount a dial indicator on front of engine and pry crankshaft back and forth to measure crankshaft end play.

2) If end play exceeds .014" (.35 mm), install enough additional .005" (.13 mm) thrust washers to obtain correct end play.



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CHECKING CRANKSHAFT END PLAY

REAR MAIN BEARING OIL SEAL SERVICE

Rear main bearing oil seal is installed in a housing bolted to rear of cylinder block. Seal should be replaced whenever housing is removed. When installing new seal in housing make sure it is squarely seated in housing. Lubricate contact lip of seal before installing housing.

ENGINE FRONT COVER & OIL SEAL

Engine front cover oil seal should be replaced whenever front cover is removed. Make sure new seal is squarely seated in cover. Lubricate seal contact lip before installing cover.

CAMSHAFT

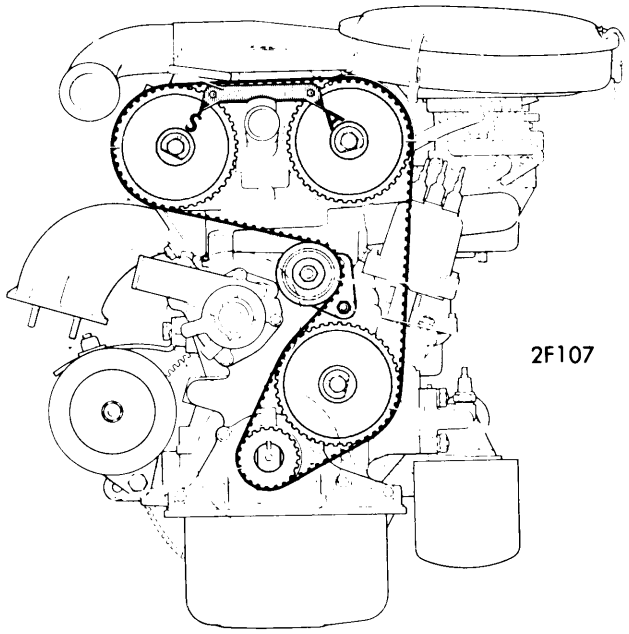
Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
All			①
No. 1	1.1789-1.1795 (29.944-29.959)	.0019-.0035 (.048-.089)	
No. 2	1.8014-1.8020 (45.756-45.771)	.0011-.0027 (.028-.069)	
No. 3	1.8171-1.8177 (46.154-46.160)	.0011-.0027 (.028-.069)	

① — Information not available.

VALVE TIMING ①

Engine	INTAKE Open (BTDC)	INTAKE Close (ABDC)	EXHAUST Open (BBDC)	EXHAUST Close (ATDC)
All				
1968-70	26°	66°	66°	26°
1971-73	22°	70°	70°	22°

① — With valve clearance set at .020".



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CAMSHAFT SPROCKET TIMING MARKS

TIMING BELT REPLACEMENT

1) Drain cooling system and remove upper radiator hose. Remove upper section of air duct. Rotate crankshaft until marks on both camshaft sprockets are aligned with fixed pointer on front of engine (see illustration).

2) Secure camshaft and auxiliary drive shaft in a stationary position by installing a suitable holding tool (A. 60319). Place transmission in a low gear and apply parking brake to prevent crankshaft from turning. Number one piston should be at TDC.

3) Remove lower engine protection plate. Remove generator drive belt. Loosen belt idler pulley nut and mounting bracket bolt, release tension on belt, tighten pulley nut and bracket bolt, and remove belt. Install belt making sure not to move sprockets.

4) To adjust timing belt tension loosen belt idler pulley nut and bracket mounting bolt. Spring will adjust tension. Tighten idler pulley nut and bracket bolt. Check belt tension two or three times, rotating crankshaft ½ to ¾ turns between checks.

1968-73 FIAT 124 SPORTS DOHC 4 CYLINDER (Cont.)

ENGINE OILING

ENGINE OILING SYSTEM

Engine oiling system is full pressure lubrication utilizing a gear type oil pump driven by auxiliary shaft. A full-flow oil filter and a pressure regulator valve is also employed.

Crankcase Capacity – 4 quarts (3.75 ltr.) including filter.

Oil Filter – Full-flow, cartridge type filter.

Normal Oil Pressure – In 1968-72, pressure is 50-71 psi (3.5-5 kg/cm²). In 1973, pressure is 64-85 psi (4.5-6 kg/cm²).

Pressure Regulator Valve – Installed in oil pump cover.

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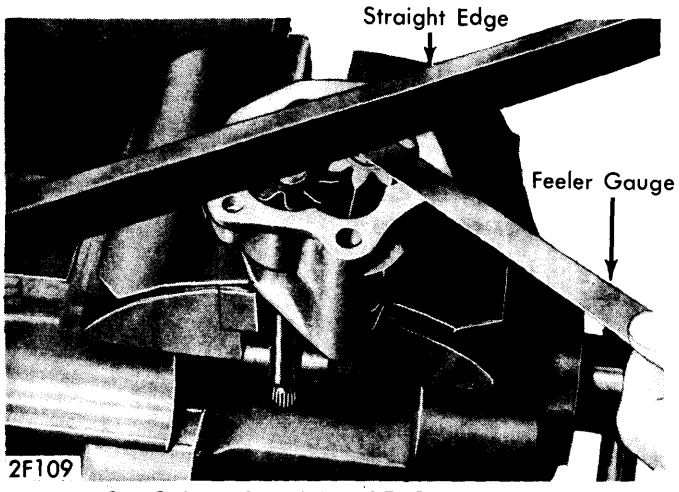
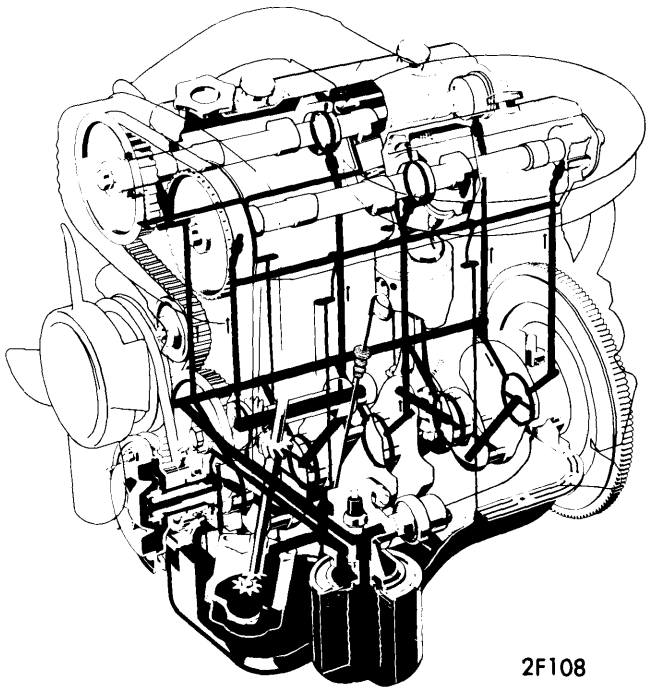


CHECKING OIL PUMP GEAR END PLAY

OIL PUMP

With pump disassembled, check clearance of cover to gears. Insert gears in housing and place a straight edge across pump to cover mating surface. Measure clearance between gears and housing. If clearance exceeds .0059" (.15 mm), replace gears, housing or cover.



ENGINE OILING SYSTEM

ENGINE COOLING

Thermostat – Starts opening at 189°F (87°C).

Cooling System Capacity – 8 quarts (7.5 ltr).

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Cylinder Head Bolts	
1438 cc	57 (7.9)
1592 cc	54 (7.5)
1608 cc	62 (8.6)
Connecting Rod Cap Nuts	
1438 cc & 1608 cc	40 (5.5)
1592	47 (6.5)
Main Bearing Cap Bolt	
All (Exc. 1592 cc)	58 (8.0)
1592 cc	
Front Cap Bolts	58 (8.0)
Self-Locking Bolts	83 (11.5)
Intake & Exhaust Manifold Nuts	18 (2.5)
Flywheel-to-Crankshaft Bolts	62 (8.6)
Camshaft Sprocket Bolts	
1438 cc	35 (4.8)
1592 cc & 1608 cc	87 (12.0)
Timing Belt Idler Nut	33 (4.6)
Spark Plugs	29 (4.0)