## 1969-73 FIAT 124 SEDAN 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 |
| 1969-70 | 73.05 | 1197 | 1x2-Bbl. | 60@5600 | 64.4@3400 | 8.8-1 | 2.874 | 73 | 2.815 | 71.5 |
| 1970-72 Special | 87.74 | 1438 | 1x2-Bbl. | 70@5400 | 80.9@3300 | 9.0-1 | 3.150 | 80 | 2.815 | 71.5 |
| 1973 | 87.75 | 1438 | 1x2-Bbl. | 68@5400 | 81@3300 | 8.5-1 | 3.150 | 80 | 2.815 | 71.5 |

### ENGINE IDENTIFICATION

Engine identification number is stamped in pad on cylinder block on left side of engine above oil filter mount.

| Application | Engine Code |
|---|---|
| 1197 cc Engine | 124 A.000 |
| 1438 cc Engine | |
| 1970-72 | 124 B2.000 |
| 1973 | 124 B2.040 |

### 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 exhaust pipe and power brake unit vacuum line from manifold. From inside driver's compartment, press down on gear shift lever and pry out retaining ring with a screwdriver. Remove transmission cover.

4) 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. 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. Remove heat shield and 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

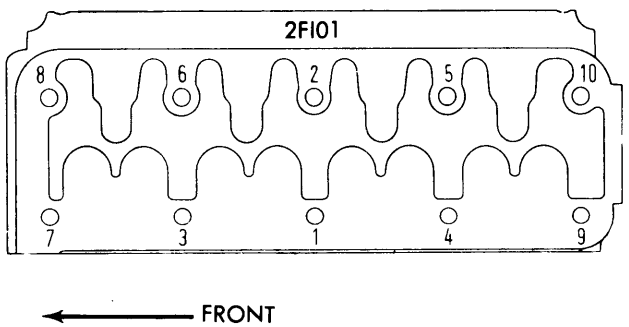
1) Disconnect battery, drain cooling system and remove air cleaner. Disconnect water temperature sending unit connection and spark plug wires.

2) Disconnect accelerator cable from lever on firewall and disconnect accelerator rod from lever on carburetor. Remove rocker cover.

3) Disconnect all water hoses from cylinder head. Disconnect fuel line and starter relay cable. Disconnect power brake vacuum line and fuel overflow from carburetor (if equipped).

4) Disconnect exhaust pipe from manifold and remove starter heat shield. Remove rocker arm assembly and push rods. Remove cylinder head retaining bolts and remove cylinder head.

5) To install cylinder head, reverse removal procedure. Tighten bolts to specifications in sequence shown in illustration.




CYLINDER HEAD TIGHTENING SEQUENCE

## 1969-73 FIAT 124 SEDAN 4 CYLINDER (Cont.)

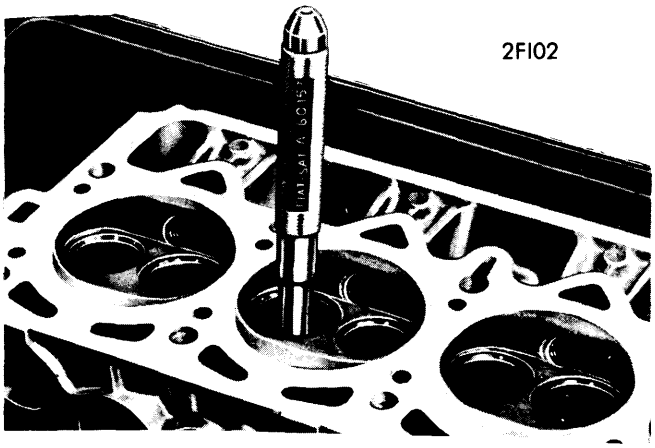
| VALVES | | | | | | | |
|---|---|---|---|---|---|---|---|
| Engine & Valve | Head Diam. In. (mm) | Face Angle | Seat Angle | Seat Width In. (mm) | Stem Diameter In. (mm) | Stem Clearance In. (mm) | Valve Lift In. (mm) |
| 1969-71 | | | | | | | |
| Intake | 1.358 (34.5) | 45½° | 45° | .063-.067 (1.6-1.7) | .3144-.3150 (7.985-8.000) | .0009-.0022 (.022-.055) | .340 (8.63) |
| Exhaust | 1.220 (31) | 45½° | 45° | .075-.079 (1.9-2.0) | .3144-.3150 (7.985-8.000) | .0011-.0024 (.029-.062) | .340 (8.63) |
| 1972-73 | | | | | | | |
| Intake | 1.358 (34.5) | 45½° | 45° | .063-.067 (1.6-1.7) | .3144-.3150 (7.985-8.000) | .0009-.0022 (.022-.055) | ..... |
| Exhaust | 1.220 (31) | 45½° | 45° | .075-.079 (1.9-2.0) | .3142-.3148 (7.980-7.995) | .0011-.0024 (.029-.062) | ..... |

### VALVE ARRANGEMENT

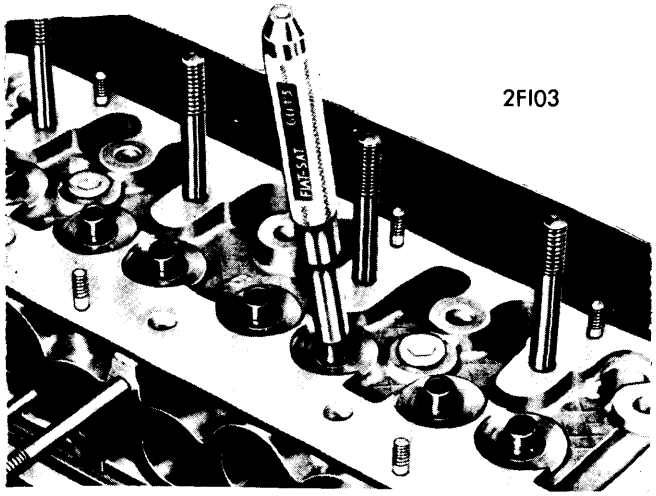
E-I-I-E-E-I-I-E (front to rear).

### VALVE GUIDE SERVICING

Check clearance between valve and guides, if clearance exceeds .006", drive guide out top of head through combustion chamber with a suitable driver (A. 60153). Drive new guide in from top of head until circlip is flush against head. If new guide is loose in head, guide bore in head must be reamed and an oversize guide installed. Guides are available in two oversize, .5606" and .5613".




REMOVING VALVE GUIDES




INSTALLING VALVE GUIDES

| VALVE SPRINGS | | | |
|---|---|---|---|
| Engine | Free Length In. (mm) | PRESSURE Lbs. @ In. (kg @ mm) | |
| | | Valve Closed | Valve Open |
| 1969-71 | | | |
| Inner | 1.54 (39.2) | 34@1.13 (15.4@28.7) | 63.7@.77 (28.9@19.5) |
| Outer | 1.97 (50) | 67.7@1.29 (30.7@32.7) | 104@.93 (47@23.5) |
| 1972-73 | | | |
| Inner | 1.54 (39.2) | 30.6@1.17 (13.9@29.7) | 60.4@.80 (27.4@20.4) |
| Outer | 1.97 (50) | 63.7@1.33 (28.9@33.7) | 100@.96 (45.4@24.4) |

### VALVE SPRING REMOVAL

1) With cylinder head removed as previously outlined, compress valve spring with a suitable valve spring compressor (A. 60311) and remove valve keepers. Release spring compressor and remove springs and retainer.

2) To assemble cylinder head, thoroughly lubricate valve stems and reverse disassembly procedure.

### ROCKER ARM ASSEMBLY

1) Remove valve cover and rocker arm assembly. Disassemble rocker assembly and thoroughly clean all components. Check clearance between rocker arm bores and shaft.

2) If clearance exceeds .0059", rocker arms, shaft or both must be replaced. Standard rocker arm to shaft clearance is .0016-.0034".

3) Check contact surfaces of rocker arms and push rod seat in rocker arms for wear or damage and replace as necessary.

## 1969-73 FIAT 124 SEDAN 4 CYLINDER (Cont.)

### VALVE TAPPET SERVICE

1) With tappets removed, thoroughly clean tappet bores in crankcase and tappets. Check clearance between tappets and crankcase bore.

2) If clearance exceeds .0031", tappet bores in crankcase must be reamed for oversize tappets. Tappets are available .0020" and .0039" oversize.

3) Using a suitable reamer (A. 90338), ream crankcase until specified clearance with oversize tappet is obtained. Correct tappet-to-bore clearance is .0003-.0016".

4) When installing tappets, thoroughly lubricate and make sure camshaft contact surface of used tappets is not worn or scored.

### VALVE CLEARANCE ADJUSTMENT

Valve clearance is adjusted with engine cold. Adjust both intake and exhaust valves to .008" (.20 mm).

**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) |
| 1969-70 1197 cc | .001-.002 (.03-.05) | .0003-.0006 (.008-.016) | ① .0004-.0017 (.010-.042) | No. 1<br>No. 2<br>No. 3 | .008-.014 (.20-.35)<br>.008-.014 (.20-.35)<br>.008-.016② (.20-.40) | .002-.003 (.05-.08)<br>.001-.002 (.03-.06)<br>.001-.002③ (.02-.05) |
| 1970-73 1438 cc | .002-.003 (.06-.08) | .0003-.0006 (.008-.016) | ① .0004-.0017 (.010-.042) | No. 1<br>No. 2<br>No. 3 | .012-.018 (.30-.45)<br>.008-.014 (.20-.35)<br>.008-.014 (.20-.35) | .002-.003 (.05-.08)<br>.001-.003 (.03-.07)<br>.001-.002 (.03-.06) |

① — Interference fit.
② — Oil rings with radial slots, ends butt together.
③ — Oil rings with radial slots, clearance is .0011-.0030" (.027-.077 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.

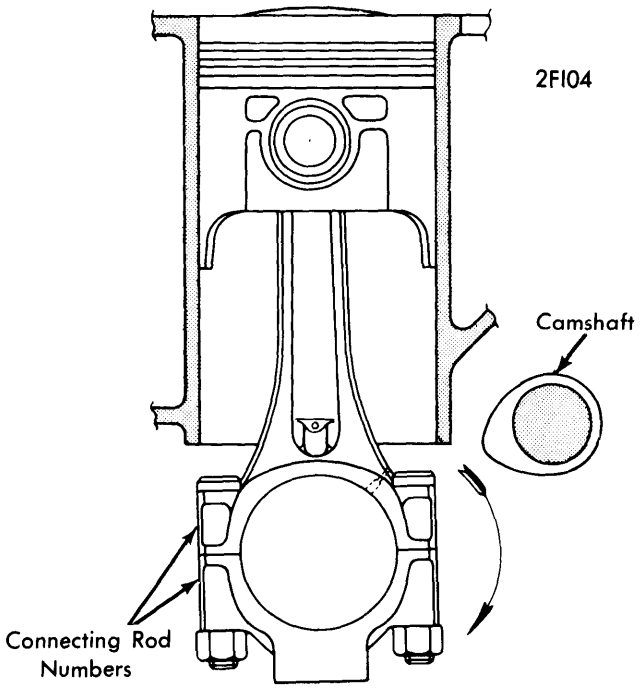
### PISTON & ROD ASSEMBLY

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

2) Lubricate rings and cylinder bore. Using a suitable ring compressor (A. 60270), compress rings and install assembly in cylinder block so that numbers on connecting rod and cap are matched and facing away from camshaft. Tighten connecting rod nuts to specification.

### PISTON PIN REPLACEMENT

1) Using a suitable mandrel (A. 95614) and driver (A. 60379), press piston pin from connecting rod. Mark piston and connecting rod to insure that same piston is installed on same rod.




**PISTON & ROD ASSEMBLY INSTALLATION**

## 1969-73 FIAT 124 SEDAN 4 CYLINDER (Cont.)

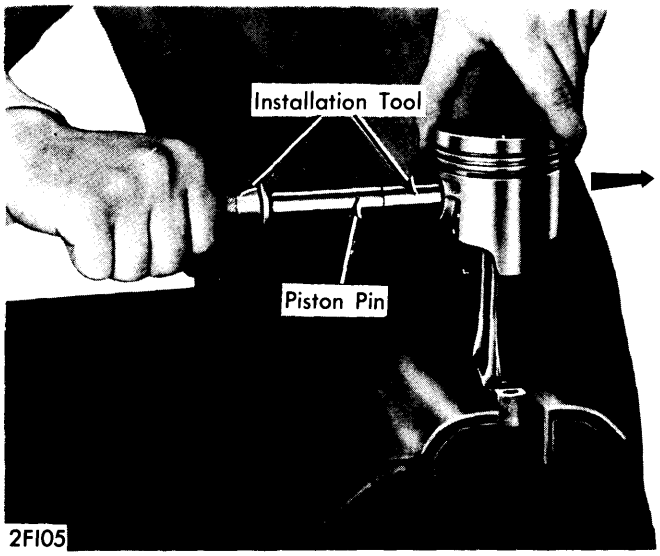
2) Check clearance between piston and pin by oiling pin and inserting in piston. If clearance is correct, pin should push fit through piston with slight thumb pressure.

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

4) Connecting rod must be heated to 465°F 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.

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.




**PISTON PIN INSTALLATION**

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. Fit is correct if after torque wrench is released, dial indicator returns to zero.

### 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.

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 motor.

**Piston Size Class Designation**

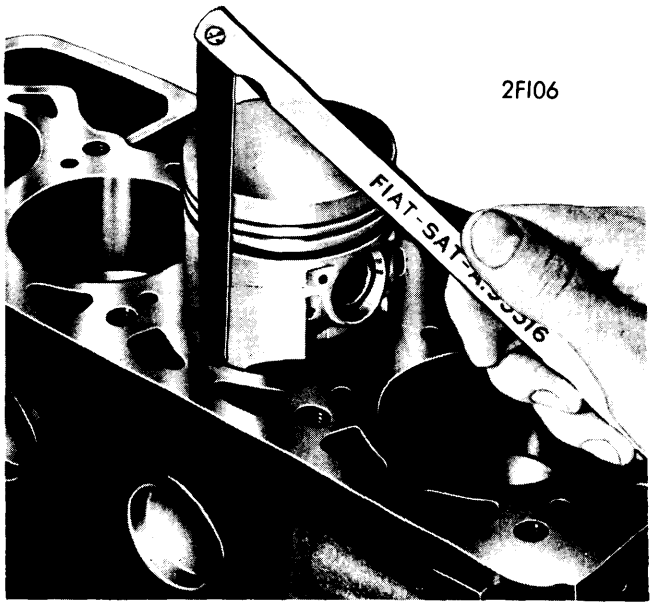
| Letter Code | In. (mm) |
|---|---|
| 1197 cc Engine | |
| Class "A" | 2.8724-2.8728 (72.960-72.970) |
| Class "C" | 2.8732-2.8736 (72.980-72.990) |
| Class "E" | 2.8740-2.8744 (73.000- 73.010) |
| 1438 cc Engine | |
| Class "A" | 3.1467-3.1471 (79.930-79.940) |
| Class "C" | 3.1475-3.1479 (79.950-79.960) |
| Class "E" | 3.1483-3.1487 (79.970-79.980) |

**Piston Bore Size Class Designation**

| Letter Code | In. (mm) |
|---|---|
| 1197 cc Engine | |
| Class "A" | 2.8740-2.8744 (73.000-73.010) |
| Class "C" | 2.8748-2.8752 (73.020-73.030) |
| Class "E" | 2.8756-2.8760 (73.040-73.050) |
| 1438 cc Engine | |
| Class "A" | 3.1500-3.1504 (80.000-80.010) |
| Class "C" | 3.1508-3.0512 (80.020-80.030) |
| Class "E" | 3.1516-3.1520 (80.040-80.050) |

3) Measure piston size at right angles to piston pin and 2.057" 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.




**CHECKING PISTON & CYLINDER CLEARANCE**

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.

## 1969-73 FIAT 124 SEDAN 4 CYLINDER (Cont.)

| CRANKSHAFT MAIN & CONNECTING ROD BEARINGS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | MAIN BEARINGS | | | | CONNECTING ROD BEARINGS | | |
| Engine | 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) |
| 1969-73 | 1.999-2.000 (50.78-50.80) | .002-.004 (.05-.10) | No. 5 | .002-.010 (.06-.26) | 1.792-1.793 (45.51-45.53) | .001-.003 (.03-.08) | ..... |

### MAIN & CONNECTING ROD BEARING SERVICE

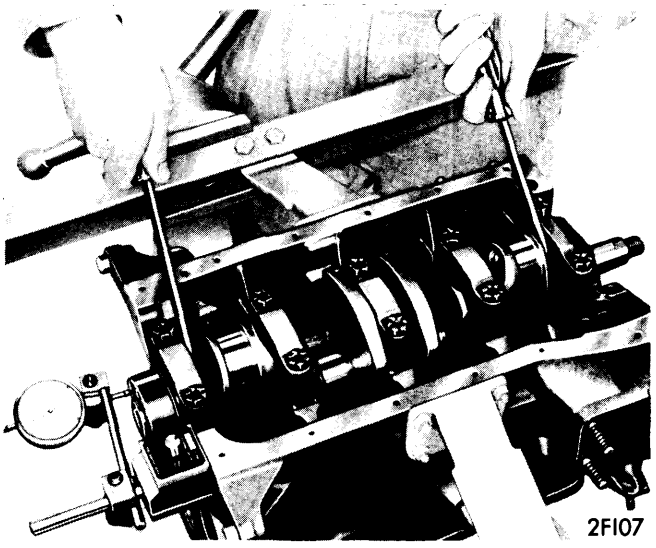
1) With crankshaft removed, thoroughly clean and inspect for cracks or scoring on bearing journals. Check all journals for out-of-round conditions with a micrometer. If journal is out-of-round or tapers more than .002", crankshaft must be reground for undersize bearings.

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 in .010", .020", .030" and .040" undersize.

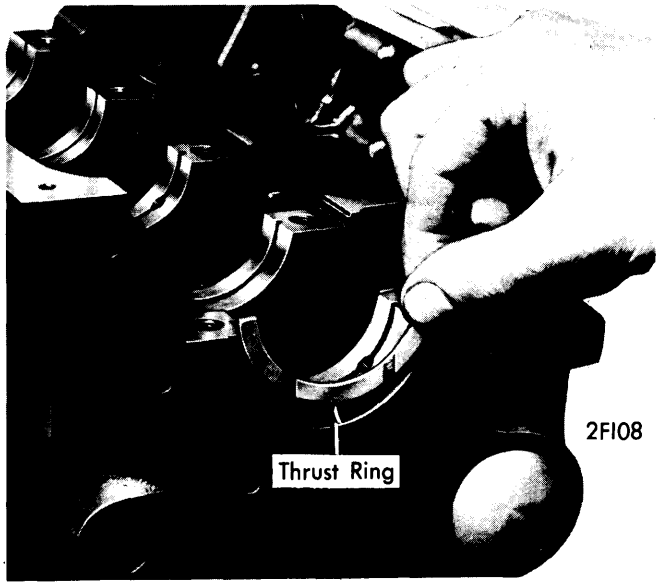
### CRANKSHAFT END PLAY

1) With crankshaft installed, mount a dial indicator and check back and forth movement of crankshaft by prying back and forth.




CHECKING CRANKSHAFT END PLAY

2) If end play exceeds .0137", oversize thrust rings must be installed at rear main bearing. Thrust rings are available .005" oversize from standard. Install a thrust ring of suitable thickness to obtain specified end play.




THRUST RING INSTALLATION

### REAR MAIN BEARING OIL SEAL SERVICE

Rear Main bearing oil seal is installed in a mount at rear of crankshaft. Seal should be replaced if crankshaft is removed. Make sure seal is seated squarely in mount when replaced. Lubricate seal contact surface before installing.

### ENGINE FRONT COVER & OIL SEAL

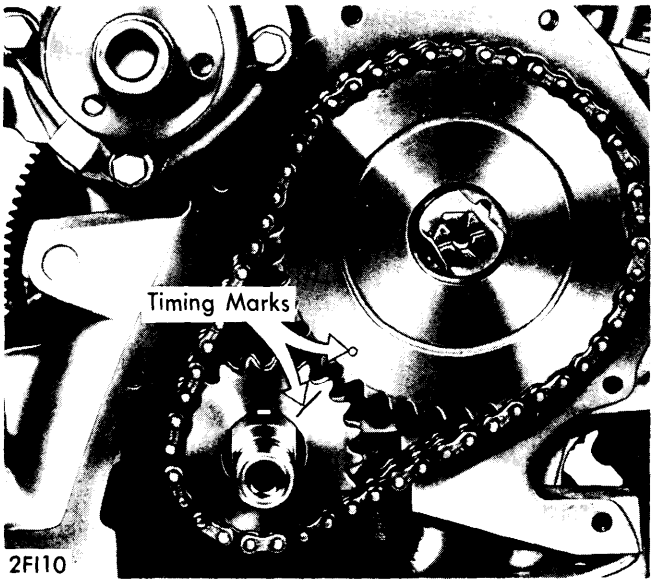
Engine front cover seal should be replaced whenever front cover is removed. Make sure new seal is squarely seated in cover. Lubricate seal contact surface before installing front cover.

| CAMSHAFT | | | |
|---|---|---|---|
| Engine | Journal Diam. In. (mm) | Clearance In. (mm) | Lobe Lift In. (mm) |
| 1969-73 | | | |
| No. 1 | 1.891-1.892 (48.03-48.06) | .001-.003 (.03-.07) | ..... |
| No. 2 | 1.726-1.727 (43.83-43.86) | .002-.004 (.05-.09) | ..... |
| No. 3 | 1.452-1.453 (36.88-36.90) | .001-.003 (.03-.07) | ..... |

## 1969-73 FIAT 124 SEDAN 4 CYLINDER (Cont.)

### TIMING CHAIN REPLACEMENT

Install camshaft and crankshaft sprockets with timing chain installed so that marks on sprockets align (see illustration).




TIMING MARKS POSITION

### CAMSHAFT REMOVAL

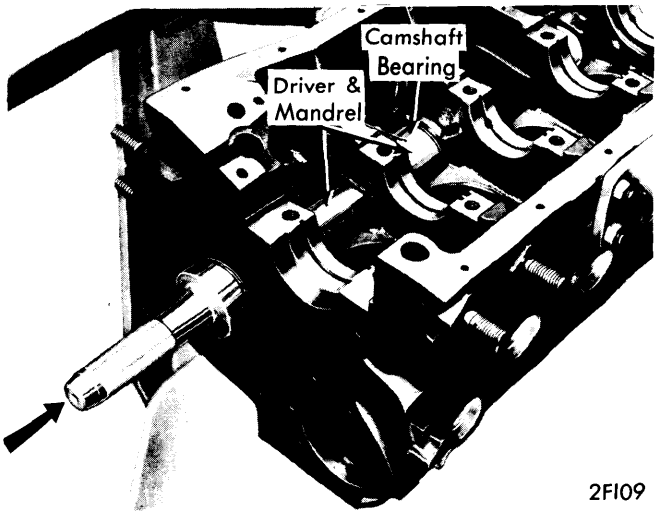
With engine front cover removed, remove bolt securing camshaft sprocket to camshaft and remove with timing chain. Remove two bolts securing camshaft lock plate to cylinder block and remove lock plate. Pull camshaft carefully out to avoid damaging bearings. To install camshaft, reverse removal procedure. Install sprockets and timing chain correctly. *See Timing Chain Replacement.*

### CAMSHAFT BEARING REPLACEMENT

1) With camshaft removed, measure all journal diameters and camshaft bearing inside diameters. If clearance exceeds specifications, bearings must be replaced.

2) Using a suitable driver and mandrels (A. 40025), drive camshaft bearing from cylinder block. Use same tool to install camshaft bearings, making sure oil holes in bearings align with oil holes in cylinder block.

3) With bearings installed, ream to appropriate clearance for camshaft journals with a suitable reamer (A. 90348).




CAMSHAFT BEARING INSTALLATION

| VALVE TIMING | | | | |
|---|---|---|---|---|
| | INTAKE | | EXHAUST | |
| Engine | Open (BTDC) | Close (ABDC) | Open (BBDC) | Close (ATDC) |
| 1969-71 | 25° | 59° | 65° | 19° |
| 1972-73 | 19° | 48° | 59° | 8° |

### VALVE TIMING

1) To insure that marks on timing chain sprockets are in correct position, valve timing must be checked. Install a suitable graduated sector (A. 96304) to crankcase.

2) Adjust valve clearance of both valves on number one cylinder to .015" (.37 mm) on 1969-71 models and .024" (.60 mm) on 1972-73 models. Turn flywheel until number one intake valve just starts to open. At this position, pointer on flywheel should read 25° BTDC for 1969-71 models and 19° BTDC for 1972-73 models.

3) Continue turning flywheel until mark on flywheel aligns with TDC on graduated scale. At this point, marks on sprockets should align.

## ENGINE OILING

**Crankcase Capacity** – 4 qts. (3.8 ltr). Add ½ qt. (.43 ltr) with oil filter.

**Oil Filter** – Full-flow, mounted on left side of engine.

**Normal Oil Pressure** – 64-85 psi (4.5-6 kg/cm²) with engine at 185°F.

**Oil Pressure Relief Valve** – Mounted in oil pump. *See Oil Pump.*

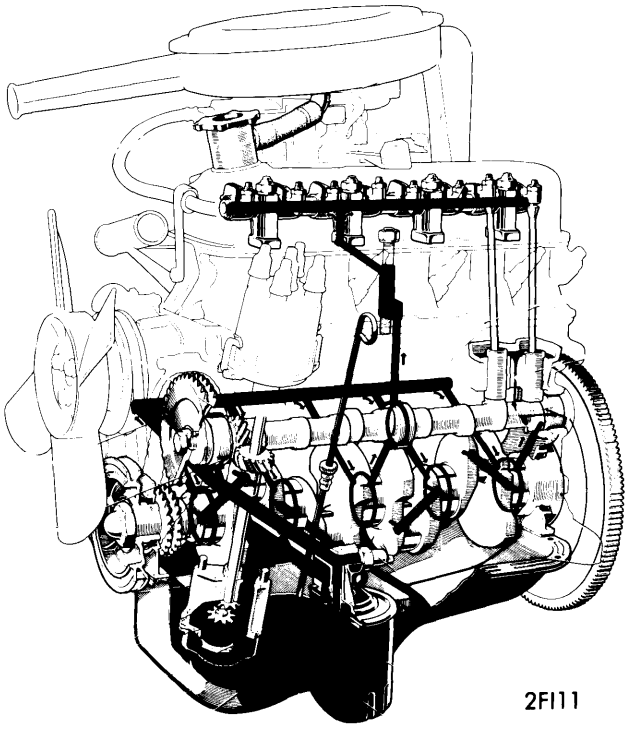
### ENGINE OILING SYSTEM

Engine oiling system is force-feed type utilizing a gear type oil pump driven by camshaft. A full-flow oil filter and an oil pressure relief valve is also employed. Oil is picked up at sump and pumped through oil filter to main bearings and front camshaft journal. Oil passes from main bearing through crankshaft to connecting rod bearings. Oil to center and rear camshaft journals is supplied through center and rear main bearing journals. Oil is pumped from center camshaft journal through oil passage in cylinder block to rocker arms where ex-

## 1969-73 FIAT 124 SEDAN 4 CYLINDER (Cont.)

### ENGINE OILING (Cont.)

cess oil lubricates valve stems and flows back to oil pan past push rods and tappets. A groove in front camshaft bearing lubricates timing chain.



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ENGINE OILING SYSTEM

#### OIL PUMP

1) Remove oil pan as previously outlined. Remove bolts securing oil pump to cylinder block and remove oil pump with pick-up. Clamp pump in a vise, taking care not to damage housing.

2) Remove oil pick-up from pump cover and extract pressure relief valve. Remove pump cover and withdraw both gears. Thoroughly clean and inspect all components.

3) Check clearance between gears installed in housing. If clearance exceeds .010", replace both gears. Check clearance between gears and housing. If clearance exceeds .010", replace gears or housing.

4) With gears installed in housing, place a straightedge across top of housing and measure gear end play. If end play exceeds .006", measure thickness of gears. If gears are 1.1794-1.1807", replace housing.

5) Check clearance of drive gear shaft in housing. If clearance exceeds .004", replace gear or housing. Check clearance between driven gear and shaft in housing. If clearance exceeds .004", replace gear or housing.

6) Thoroughly clean and inspect oil pressure relief valve components. Check spring against values given in Oil Pump Specification table.

7) To assemble and install oil pump, thoroughly oil all components and reverse procedures above.

**Oil Pump Specifications**

| Application | In. (mm) |
|---|---|
| Gear-to-Housing Cover Clearance | .001-.004 (.02-1.1) |
| Gear-to-Housing Clearance | .004-.007 (.11-.18) |
| Driven Gear-to-Shaft Clearance | .001-.002 (.02-.06) |
| Drive Gear Shaft-to-Housing Clearance | .001-.002 (.02-.06) |
| Oil Pressure Relief Valve Spring | |
| Free Length | 1.583 (40.2) |
| Length Installed | .886@10.16 lbs (22.5@4.61 kg) |
| Length Loaded | .827@11 lbs. (21@5 kg) |

## ENGINE COOLING

**Cooling System Capacity** – 2 gals.

**Thermostat** – Starts opening at 163-171°F (73-77°C).

#### WATER PUMP

Drain cooling system and remove drive belt from water pump pulley. Disconnect hoses at cylinder head and radiator. Remove water pump. To install water pump, use new gasket and reverse removal procedure.

**TIGHTENING SPECIFICATIONS**

| Application | Ft. Lbs. (mkg) |
|---|---|
| Cylinder Head Bolts | 58 (8.0) |
| Main Bearing Cap Bolts | 58 (8.0) |
| Connecting Rod Nuts | 36 (5.0) |
| Flywheel Bolts | 61 (8.5) |
| Rocker Arm Assembly-to-Head Nuts | 29 (4.0) |
| Camshaft Sprocket Bolt | 36 (5.0) |
| Fan & Water Pump Drive Pulley | 87 (12) |
| Manifold Nuts | 18 (2.5) |
| Oil Pan Screws | 7 (1.0) |