1971-73 FIAT 128 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
1971	68.1	1116	1-Bbl.	52@6000	54@3400	8.5	3.149	80	2.185	55.5
1972	68.1	1116	1-Bbl.	①	①	①	3.149	80	2.185	55.5
	78.7	1290	①	①	①	①	3.385	86	2.185	55.5
1973	68.1	1116	1-Bbl.	49@6400	50@3600	8.5	3.149	80	2.185	55.5
	78.7	1290	①	51@ ①	①	8.5	3.385	86	2.185	55.5

① — Information not available.

ENGINE IDENTIFICATION

Engine identification and serial numbers are stamped in crankcase on flywheel side of engine next to union for radiator hoses. Engine code is stamped above serial number.

Application	Engine Code
1116 cc Engine	128A.040
1290 cc Engine	128A1.040

ENGINE REMOVAL

NOTE — Engine and transmission are removed as one unit.

1) Raise vehicle and support with safety stands. Raise hood and disconnect stay rod. Remove spare tire from engine compartment. Remove lower protective guard. Disconnect both battery cables.

2) Drain complete cooling system. Lower heater lever inside vehicle. Remove radiator cap and supply tank cap. Open drain on bottom of radiator and on inner side of crankcase.

3) Disconnect wires from coil to distributor. Disconnect wires at generator, starter, oil pressure switch and water temperature sending unit. Remove air cleaner housing and cartridge.

4) Disconnect accelerator linkage and choke cable at carburetor. Disconnect fuel inlet line at fuel pump. Disconnect exhaust pipe at exhaust manifold.

5) Remove radiator hoses from union at left side of engine. Remove heater hoses from engine. Remove speedometer cable from transmission. Remove adjustable rod from clutch release lever by removing nut and lock-nut.

6) From underneath vehicle, remove stabilizer bar from body and lower suspension control arms. remove exhaust pipe support bracket from transmission. Disconnect rod from gearshift control lever.

7) Remove left wheel and tire. Remove left tie-rod nut and separate tie rod from steering arm using a suitable puller (A.47044). Disconnect shock absorber at lower mount. Remove outer axle nuts from both sides.

8) Remove strut connecting engine to body. Attach a suitable lifting fixture (A.60559) to engine. Connect lifting fixture to a hoist and raise engine slightly. Remove bolt from clamp securing engine to body. Remove engine support crossmember from right side of engine.

9) Pull shafts of axle joints from bearing housings. Secure axle shafts to differential with wire to prevent working loose from seats. Remove engine and transmission assembly from bottom of vehicle. Separate transmission and differential assembly from engine.

10) To install, reverse removal procedure. When installation is completed, fill radiator and expansion tank to 2.3-2.8" (60-70 mm) above "MIN" mark before starting engine.

INTAKE & EXHAUST MANIFOLD

1) Drain cooling system. Remove spare tire from engine compartment. Remove air cleaner and cartridge. Disconnect accelerator linkage and choke cable from carburetor. Remove carburetor pre-heating water hoses.

2) Remove carburetor with guard and gaskets. Remove shroud from intake and exhaust manifold. Remove intake and exhaust manifold from engine.

3) To install, use new gaskets and reverse removal procedure.

CYLINDER HEAD

NOTE — This procedure is with engine in vehicle.

1) Drain engine cooling system and remove spare tire from engine compartment. Remove air cleaner housing and cartridge. Disconnect spark plug wires at spark plugs.

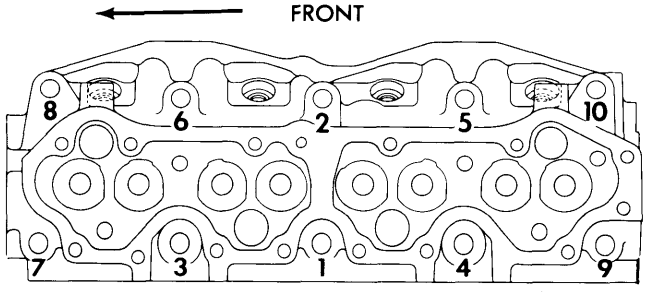
2) Disconnect accelerator linkage and choke cable at carburetor. Disconnect fuel line at carburetor. Disconnect wire from temperature sending unit.

3) Disconnect heater hose at cylinder head. Disconnect all water hoses at union on left side of engine. Disconnect exhaust pipe from exhaust manifold.

4) Remove fan belt guard cover. Release tensioner pulley retaining nut. Remove belt from camshaft sprocket. Remove lower screw from belt guard (1971-72). Remove shroud from intake and exhaust manifolds.

5) Remove engine-to-body strut. Remove cylinder head retaining nuts. Use a suitable wrench (A.50131/1/2) for removing nuts not accessible with a standard wrench. Remove cylinder head with camshaft and housing.

6) Thoroughly clean gasket surfaces on crankcase and cylinder head. Use new gasket and install with word "Alto" up. Reverse removal procedure to install remaining components. Cylinder head nuts are tightened in two steps: Using sequence shown in illustration, first tighten all nuts to 29 ft. lbs. (4 kgm), then tighten all nuts to final torque of 69 ft. lbs. (9.5 kgm). Make sure timing belt is installed correctly. See *Valve Timing*.



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CYLINDER HEAD TIGHTENING SEQUENCE

1971-73 FIAT 128 4 CYLINDER (Cont.)

VALVES

Engine & Valve	Head Diam.	Face Angle	Seat Angle	Seat Width	Stem Diameter	Stem Clearance	Valve Lift
1971-73							
Intake	1.417 (36.0)	45.5°	45°	.08 (2)	3.139-3.146 (7.974-7.992)	.0012-.0026 (.030-.066)	.358 (9.1)
Exhaust	1.201 ① (30.5)	45.5°	45°	.08 (2)	3.139-3.146 (7.974-7.992)	.0012-.0026 (.030-.066)	.358 (9.1)

① — In 1973, 1.221" (31.0 mm).

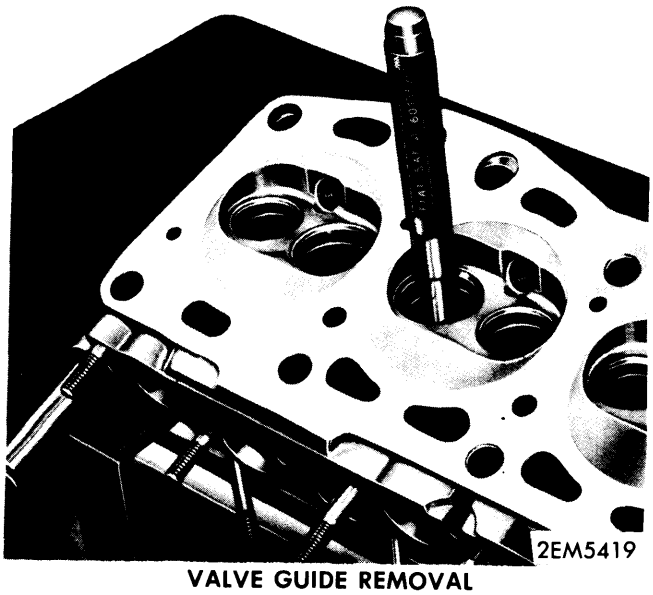
VALVE ARRANGEMENT

E-I-I-E-E-I-I-E

VALVE GUIDE SERVICING

1) With cylinder head removed and disassembled, check clearance between valve stem and valve guide. If clearance is more than .006" (.15 mm), and valve stem is not worn, valve guide must be replaced.

2) Drive guide from cylinder head using a suitable driver (A.60153). Use same driver to install guides with a suitable spacer installed (6A intake and 6S exhaust).



VALVE GUIDE REMOVAL

VALVE STEM OIL SEALS

Use new seals when assembling cylinder head. Use a suitable guide (A.60313) to install seals on valve guides.

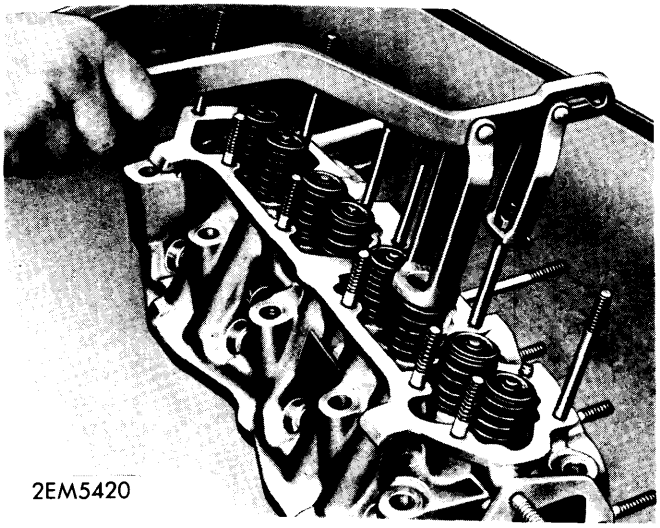
VALVE SPRINGS

Engine	Free Length In. (mm)	PRESSURE Lbs. @ In. (kg @ mm)	
		Valve Closed	Valve Open
All			
Inner	1.645 (41.78)	32@1.220 (14.5@30.99)	61@.866 (27.7@22.00)
Outer	2.122 (53.90)	86@1.417 (39.0@35.99)	131@1.043 (59.4@26.49)

VALVE SPRING REMOVAL

1) Remove cylinder head as previously outlined. Remove camshaft housing cover, carburetor, intake and exhaust manifolds. Remove camshaft housing with camshaft.

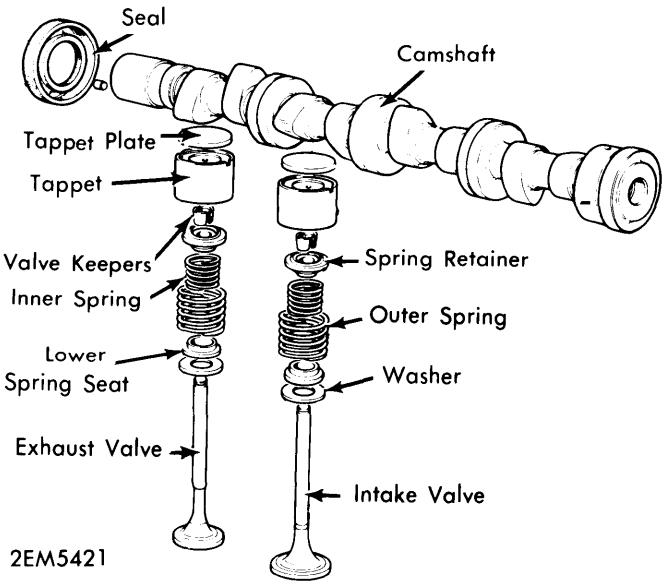
2) Using a suitable valve spring compressor (A.60311) compress valve spring. Remove valve keepers and release compressor. Remove spring retainer, inner spring, outer spring, lower spring seat and washer.



VALVE SPRING REMOVAL

3) Inspect valve springs for wear or cracking. Using a suitable spring tester (AP.5049), check inner and outer springs against specifications with specified load applied.

4) To install valve spring, reverse removal procedure. Install cylinder head as previously outlined.



VALVE TRAIN COMPONENTS

1971-73 FIAT 128 4 CYLINDER (Cont.)

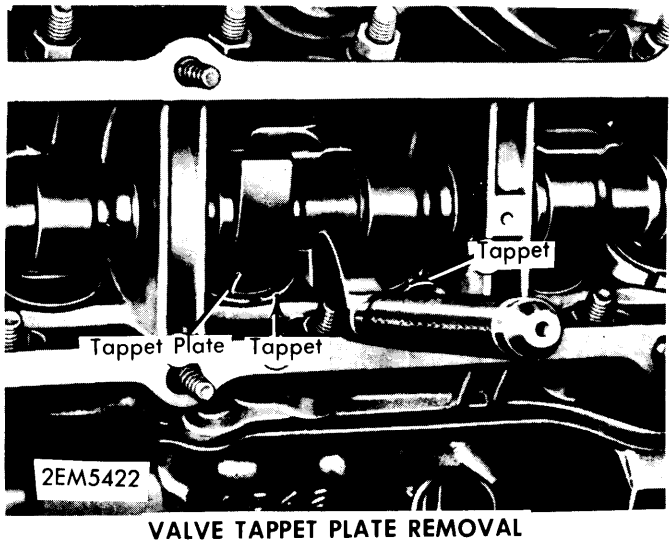
VALVE CLEARANCE ADJUSTMENT

NOTE – Valve clearance is checked and adjusted with engine cold.

Valve Clearance Adjustment

Valve	Intake In. (mm)	Exhaust In. (mm)
1116 cc Engine	.012 (.30)	.016 (.40)
1290 cc Engine	.016 (.40)	.018 (.45)

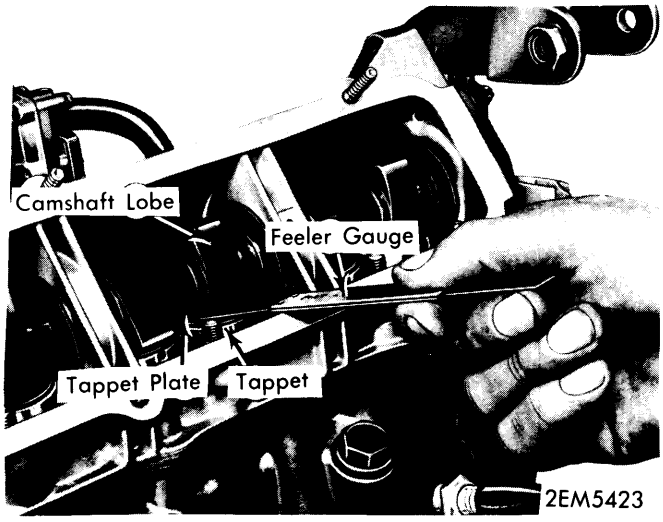
1) Remove camshaft cover. Rotate engine until lobe on camshaft of valve being checked is pointing straight up. Using a feeler gauge, check clearance between camshaft lobe and valve tappet plate.



VALVE TAPPET PLATE REMOVAL

2) If clearance is not as specified, insert a suitable spring compressor (A.60421) under camshaft to release spring tension against camshaft lobe. Remove tappet plate with a suitable removing tool (A.87001). With plate removed, measure thickness to determine size of plate to be installed.

3) Valve tappet plates are available in thicknesses ranging from .1475-.1850" (3.7-4.7 mm) in increments of .002" (.05 mm) for the 1116 cc engine, or from .1279-.1850" (3.25-4.7 mm) in increments of .002" (.05 mm) for the 1290 cc engine.



VALVE CLEARANCE CHECKING

PISTONS, PINS, RINGS

Engine	PISTONS ①Clearance In. (mm)	PINS Piston Fit In. (mm)	PINS Rod Fit In. (mm)	RINGS Rings	RINGS End Gap In. (mm)	RINGS Side Clearance In. (mm)
1116 cc	.0020-.0028 (.050-.070)	.0004-.0007 (.010-.018)	.0004-.0017① (.010-.042)	No.1	.0118-.0176 (.30-.45)	.0018-.0030 (.045-.077)
				No. 2	.0079-.0138 (.020-.035)	.0006-.0022 (.015-.055)
				No. 3	.0079-.0138 (.020-.035)	.0008-.0020 (.020-.052)
1290 cc	.0028-.0035 (.070-.090)	.0001-.0003 (.003-.008)	.0004-.0006②. (.010-.016)	No. 1	.0118-.0176 (.30-.45)	.0018-.0030 (.045-.077)
				No. 2	.0118-.0176 (.30-.45)	.0016-.0028 (.041-.071)
				No. 3	.0098-.0157 (.25-.30)	.0012-.0024 (.030-.061)

① – Interference fit.
② – Clearance fit.

OIL PAN REMOVAL

NOTE – This procedure is with engine in vehicle.

1) Attach a suitable engine support (A.70526) to top of engine. Remove protective shields and engine crossmember.

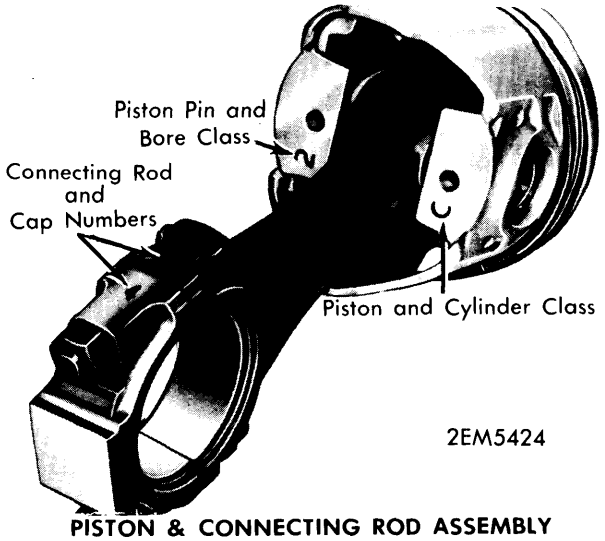
2) Drain oil and remove oil pan retaining screws and oil pan. To install, clean all gasket surfaces, use new gasket and reverse removal procedure.

PISTON & ROD ASSEMBLY

1) Remove oil pan and cylinder head as previously outlined. Remove oil pump. *See Oil Pump.* Remove nuts from connecting

1971-73 FIAT 128 4 CYLINDER (Cont.)

rods and remove rod caps. Push piston and rod assembly up and out through top.



PISTON & CONNECTING ROD ASSEMBLY

2) To install, compress piston rings with a suitable ring compressor (A.60270). Pistons must be installed with number stamped on big end of rod facing intake manifold side of engine. Connecting rod caps must be installed with number on cap corresponding with number on rod and on same side.

3) Tighten rod nuts to specifications. Install remaining components as previously outlined.

PISTON PIN REPLACEMENT

1116 cc Engine – 1) Remove piston and connecting rod assembly as previously outlined. Remove piston pin by pressing out using a suitable mandrel and driver (A.95614 and A.60379). Thoroughly clean and inspect piston and connecting rod.

2) Check fit of pin in piston. Pin should push fit through piston and should not fall through under its own weight. There are three classes of piston pin and piston pin bore sizes. If pin is replaced, one of the same class must be installed. Class of piston is stamped on bottom and class of pin is stamped on face of pin.

Piston Pin Class Specifications

Application	Piston Pin Dia.
Class 1	.8650-.8651" (21.970-21.974 mm)
Class 2	.8651-.8653" (21.974-21.978 mm)
Class 3	.8653-.8654" (21.978-21.982 mm)

Piston Pin Bore Class Specifications

Application	Piston Pin Bore Dia.
Class 1	.8655-.8657" (21.984-21.988)
Class 2	.8658-.865 (21.988-21.992 mm)

Class 1	.8655-.8657" (21.984-21.988 mm)
Class 2	.8657-.8658" (21.988-21.992 mm)
Class 3	.8658-.8660" (21.992-21.996 mm)

3) To assemble piston and connecting rod, heat rod to approximately 464°F (240°C). Piston pin bore in piston is offset .08" (2 mm). Rod must be installed with numbered side on same side as offset in piston.

4) With connecting rod heated to proper temperature, clamp big end in a vise. Place piston in proper position with connecting rod. Place piston pin on suitable driver (A.60325) and drive into piston and connecting rod until shoulder of driver contacts piston.

5) To check pin fit, install piston and rod assembly in a suitable tool (A.95614) and secure tool and assembly in a vise. Attach a torque wrench to rod nut on tool and apply 9.5 ft. lbs. (1.3 kgm). Pin fit is correct if dial indicator on tool returns to zero when pressure applied by torque wrench is released.

6) If dial indicator does not return to zero, pin fit in connecting rod is incorrect and rod must be replaced. Install piston and rod assembly as previously outlined.

1290 cc Engine – 1) Remove piston and rod assembly as previously outlined. Remove circlips and drive out piston pin using a suitable driver (A.60251).

2) Check fit of pin in piston. Pin should be push fit in piston and should not fall through under its own weight. There are two classes of piston pin and piston bore sizes. If piston pin is replaced it must be replaced with a pin of the same class. Class of piston is stamped on bottom and class of pin is stamped on face of pin.

Piston Pin Class Specifications

Application	Piston Pin Dia.
Class 1	.8658-.8659" (21.991-21.994 mm)
Class 2	.8659-.8660" (21.994-21.997 mm)

Piston Pin Bore Class Specifications

Application	Piston Pin Bore Dia.
Class 1	.8660-.8661" (21.996-21.999 mm)
Class 2	.8661-.8662" (21.999-22.002 mm)

3) Check piston pin clearance in connecting rod. If clearance is more than specified, drive bushing from connecting rod using a suitable driver (A.60054). Install a new bushing with same driver and ream to size with a new piston pin.

4) Piston pin bore in piston is offset .08" (2 mm). Install connecting rod with numbered side on same side as offset. Lubricate piston pin and secure connecting rod big end in a vise. Place piston in proper position with connecting rod and push in piston pin using a suitable driver (A.60251). Install circlips.

5) Install piston and connecting rod assembly as previously outlined.

FITTING PISTONS

1) With piston and rod assembly removed and disassembled as previously outlined, thoroughly clean piston. Check ring side clearance, side clearance should be no more than .006" (.15 mm). Check ring end gap in cylinders against specifications.

2) Check fit of piston in cylinders with rings removed. There should be no more than .006" (.15 mm) clearance. Pistons are available in .0079", .0157", and .0236" (.2 mm, .4 mm, and .6 mm) oversizes. There are three classes of standard size pistons.

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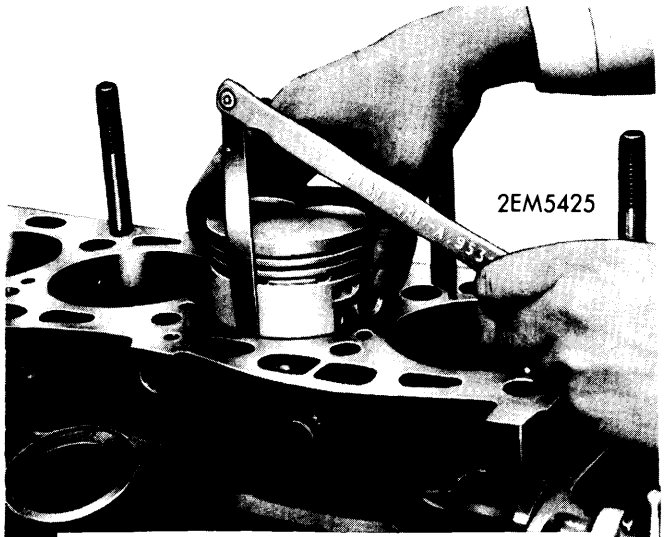
If piston is replaced with another of standard size, one of the same class must be installed. Class of piston is stamped on bottom of piston.

Piston Class Specification

Application	Piston Dia.
1116 cc Engine	
A	3.1472-3.1476" (79.940-79.950 mm)
C	3.1480-3.1484" (79.960-79.970 mm)
E	3.1488-3.1492" (79.980-79.990 mm)
1260 cc Engine	
A	3.4027-3.4031" (85.920-85.930 mm)
C	3.4035-3.4039" (85.940-85.950 mm)
E	3.4042-3.4046" (85.960-85.970 mm)

3) When installing rings, make sure gaps are spaced approximately 120° apart. Assemble piston and connecting rod and install in vehicle as previously outlined.



PISTON & CYLINDER CLEARANCE CHECKING

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)
All	1.9990-1.9998 (50.775-50.795)	.0020-.0037 (.050-.095)	No. 5 ①	.0021-.0104 (.055-.265)	1.7913-1.7920 (45.498-45.518)	.0014-.0034 (.036-.086)	②

① — Half-washers are installed on No. 5 main bearing cap.
② — Information not available.

MAIN & CONNECTING ROD BEARING SERVICE

1) Remove engine as previously outlined. Remove cylinder head, oil pan, clutch and flywheel as previously outlined. Remove oil pump. See *Oil Pump*. Remove all sprockets and timing belt. See *Timing Belt Replacement*.

2) Remove cover plates and seals from both ends of engine. Remove all piston and connecting rod assemblies. Remove main bearing caps with lower bearing halves.

3) Remove crankshaft and upper bearing halves. Remove thrust bearings from flywheel--end main bearing saddle. Thoroughly clean and inspect crankshaft and crankcase.

4) Check crankshaft journals for out-of-round, if more than .0002" (.005 mm), crankshaft must be ground to next undersize. Bearings for undersize crankshafts are available in .010" (.254 mm), .020" (.508 mm), .030" (.762 mm), and .040" (1.016 mm) undersizes.

5) Use the Plastigage method to check main bearing clearances. Install upper bearing halves in crankcase and install crankshaft. Place a piece of Plastigage on journal and install main bearing cap with bearing. Tighten bolts to specifications and then remove main bearing cap.

6) With cap removed, check flattened Plastigage against scale on back of package to determine if clearance is as specified. Check connecting rod bearing clearance using same procedure. If clearance is incorrect, crankshaft must be ground to next undersize and bearings of corresponding undersize installed.

7) With correct clearance obtained, install upper bearing halves in crankcase. Lubricate bearings and install crankshaft. Install main bearing caps with bearings and tighten bolts to specifications. Rotate crankshaft to check for freedom of movement.

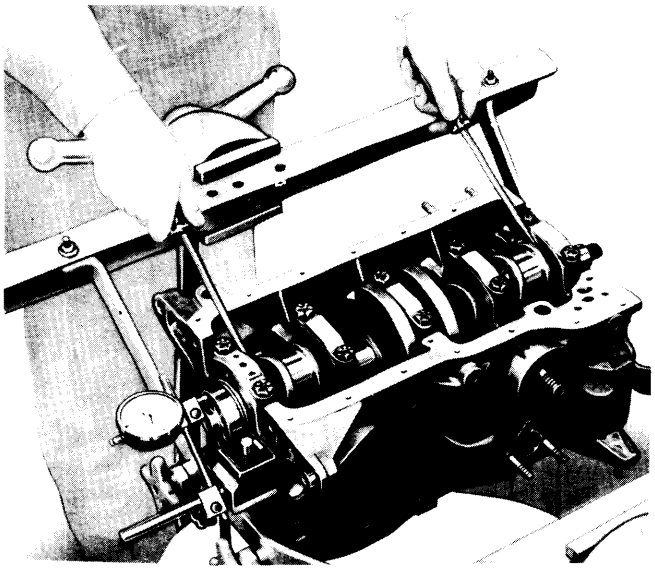
8) Check crankshaft endplay. See *Thrust Bearing Alignment*. Install remaining components in reverse of removal order or as previously outlined. Install engine as previously outlined.

THRUST BEARING ALIGNMENT

1) With crankshaft installed and main bearing caps tightened to specifications. Attach a dial indicator to crankcase with arm against flywheel end of crankshaft. Pry crankshaft back and forth to measure endplay.

2) If end play is more than .0137" (.35 mm), remove flywheel-end main bearing cap and install oversize thrust rings. Thrust rings are available in .005" (.127 mm) oversize. Install a suitable size thrust ring to obtain correct endplay.

1971-73 FIAT 128 4 CYLINDER (Cont.)



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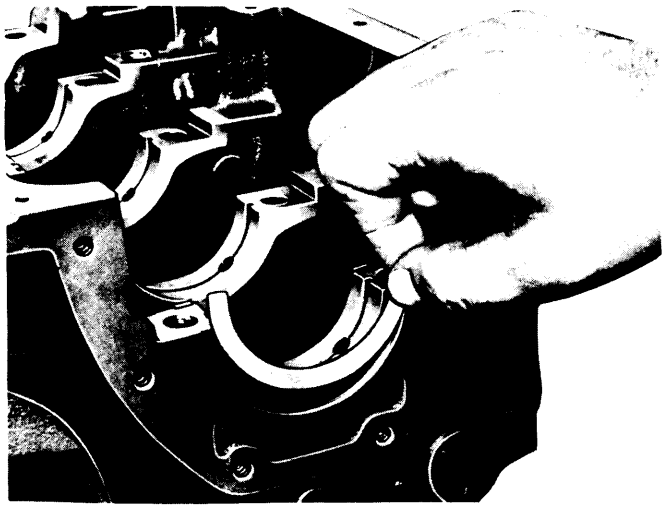
CRANKSHAFT ENDPLAY CHECKING



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THRUST WASHER INSTALLATION

FRONT & REAR MAIN BEARING OIL SEAL SERVICE

1) Front and rear main bearing oil seals are secured in end plates mounted to both ends of crankcase. Both seals should be replaced when crankshaft has been removed.

2) Drive seals from end plates and install new ones. Lubricate sealing lip of seal and use new gaskets when installing end plates.

CAMSHAFT			
Engine	Journal Diam. In. (mm)	Clearance In. (mm)	Lobe Lift In. (mm)
All			.3583 (9.101)
Journal			
No. 1	1.1789-1.1795 (29.944-29.960)	.001-.0027 (.029-.070)	
No. 2	1.8872-1.8878 (47.935-47.950)	.0012-.0027 (.030-.070)	
No. 3	1.8951-1.8957 (48.135-48.150)	.0012-.0027 (.030-.070)	
No. 4	1.9030-1.9035 (48.335-48.350)	.0012-.0027 (.030-.070)	
No. 5	1.9108-1.9114 (48.535-48.550)	.0012-.0027 (.030-.070)	

1) Remove timing belt protective cover and loosen belt tensioner. Remove timing belt from camshaft sprocket and remove sprocket from camshaft. Remove camshaft cover, camshaft and housing. Remove camshaft from housing and thoroughly clean and inspect both.

2) If camshaft housing camshaft bores show signs of wear or scoring and are out-of-round, replace housing. Check camshaft for signs of seizure or scoring. If scoring or seizure marks cannot be removed with a fine abrasive stone, replace camshaft.

3) Check camshaft for out-of-round conditions. Center camshaft journal should not vary more than .008" (.2 mm) out-of-round. Check lobe lift.

4) Install camshaft in housing using new drive end seal. Install sprocket and place housing and camshaft on cylinder head. Tighten nuts to specifications. Install timing belt correctly. See *Valve Timing*. Check valve clearance. See *Valve Clearance Adjustment*. Install camshaft cover.

VALVE TIMING①				
	INTAKE		EXHAUST	
Engine	Open (BTDC)	Close (ABDC)	Open (BBDC)	Close (ATDC)
All	10°	54°	54°	10°

① – With all tappet clearances set at .020" (.50 mm)

TIMING BELT REPLACEMENT

NOTE – This procedure is with engine in vehicle. Timing belt should be replaced approximately every 37,000 miles (60,000 km).

1) Remove timing belt protective cover. Align timing marks. See *Valve Timing*. Apply parking brake and place transmission in low gear to prevent crankshaft from turning.

2) Remove crankshaft and water pump drive belt. Loosen timing belt tensioner pulley and release spring action to remove timing belt.

3) Install timing belt making sure teeth are properly engaged in sprockets. Make sure sprockets and belt are still properly timed. See *Valve Timing*. Tighten belt tensioner pulley to

1971-73 FIAT 128 4 CYLINDER (Cont.)

specification. Install remaining components in reverse of removal order.

AUXILIARY SHAFT

1) Auxiliary shaft drives; distributor, oil pump and fuel pump. Shaft is driven by timing belt. Remove oil pump. *See Oil Pump Removal.* Remove fuel pump and distributor. Inspect drive gears of distributor and oil pump, if gears are chipped or worn, auxiliary shaft must be replaced.

2) Remove timing belt as previously outlined. With fuel pump, oil pump and distributor removed, remove auxiliary shaft sprocket. Remove lock plate and auxiliary shaft. Thoroughly clean and inspect shaft.

3) Check inner and outer journals of shaft. If journal size is less than specified, replace shaft. Check inside diameter of inner and outer bushings, if more than specified, replace bushings.

4) To replace bushings, drive out of crankcase using a suitable driver (A.60372/1/2 outer journal and A.660372/1 inner journal). Install new bushings using same drivers as used for removal. Make sure oil holes in bushings align with oil holes in crankcase. Ream bushings to specified clearance with shaft using a suitable reamer (A.90365).

5) Install auxiliary shaft and lock plate. Install sprocket and secure with lock plate and screw. Install remaining components as previously outlined or in reverse of removal order.

Auxiliary Shaft Specifications

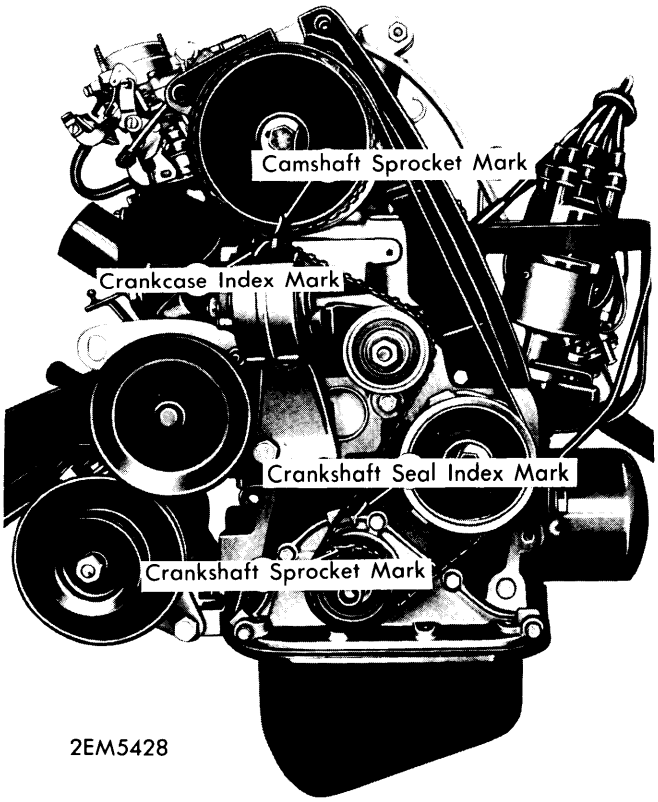
Application	Outer Bearing
Auxiliary Shaft	1.4013-1.4023" (35.593-35.618 mm)
Bushing (Reamed)	1.4041-1.4049" (35.664-35.684 mm)
Clearance	.0018-.0036" (.046-.091 mm)

Application	Inner Bearing
Auxiliary Shaft	1.2575-1.2583" (31.940-31.960 mm)
Bushing (Reamed)	1.2598-1.2606" (32.000-32.020 mm)
Clearance	.0016-.0031" (.040-.080 mm)

VALVE TIMING

1) With timing belt removed, rotate camshaft sprocket until mark on sprocket aligns with index mark on engine.

2) Rotate crankshaft sprocket until mark on sprocket aligns with index mark on end plate. Install timing belt as previously outlined, making sure camshaft and crankshaft are not rotated.



TIMING BELT INSTALLATION

ENGINE OILING

ENGINE OILING SYSTEM

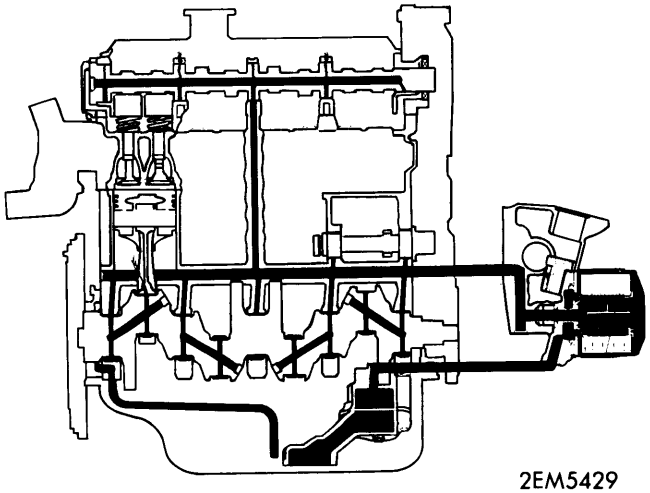
Oil is circulated through engine by pressure provided by a gear type oil pump. Pump is mounted on bottom of crankcase and driven by the auxiliary shaft. Oil is drawn from oil pan by oil pump and circulated through a full flow oil filter. Oil is then pumped into main oil gallery of crankcase where it is distributed to crankshaft and camshaft. Oil flows through crankshaft to lubricate main and connecting rod bearings. Cylinders, pistons and piston pins are lubricated by oil squirted from hole in connecting rod. Oil flows through camshaft to journals. Oil is squirted from number two and four journal to lubricate valve tappets and valves. Auxiliary shaft is lubricated by oil from main oil gallery. Excess oil flows back into oil pan.

Crankcase Capacity – 4.5 qts. (4.25 ltr).

Oil Filter – Full flow, mounted on front side of engine.

Normal Oil Pressure – 50-71 psi (3.5-5 kg/cm^2) @ 212°F (100°C).

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



ENGINE OILING SYSTEM

1971-73 FIAT 128 4 CYLINDER (Cont.)

ENGINE OILING (Cont.)

OIL PUMP

1) Remove oil pan as previously outlined. Remove retaining screws and slide out oil pump with suction tube.

2) Clamp pump housing in a vise and remove suction pipe with filter screen and relief valve. Remove pump cover and gears. Thoroughly clean all components.

3) Check both gears for excess wear and replace if necessary. Check clearance between gears; if more than .010"(.25 mm), replace both gears. Check gear-to-pump housing clearance; if more than .010" (.25 mm), replace gears or housing as necessary.

4) Check gear endplay by placing a straight edge on mating surface of pump and inserting a feeler gauge between straight edge and gears. If clearance is more than .006" (.15 mm), replace gears or housing as necessary. Check clearance between drive gear shaft and housing; if more than .004" (.10 mm), replace gear or housing as necessary.

5) Inspect pressure relief spring for cracking or wear. Inspect valve for wear or scoring. Check spring against specifications. Spring should not collapse below given length under given load. Replace spring if length is less than specified.

6) Assemble oil pump in reverse of disassembly order. To install, reverse removal procedure.

Oil Pump Specifications

Application	Inches (mm)
Gear-to-Gear Clearance	.006 (.15)
Gear-to-Housing Clearance	.004-.007 (.10-.18)
Gear Endplay	.0008-.0041 (.02-.10)
Gear Shaft-to-Pump Housing Clearance	.0006-.0023 (.015-.058)
Relief Valve Spring (Free Length)	1.583 (40.21)
Relief Valve Spring (10.26 lbs.-4.6 kg Load)	.89 (22.0)

ENGINE COOLING

Thermostat – Begins opening @ 176-183°F (80-84°C).

Cooling System Capacity – 7 qts. (6.5 ltr.)

WATER PUMP

1) Remove spare tire from engine compartment. Drain cooling system. Disconnect hot air hose and accelerator rod from shroud. Remove shroud.

2) Disconnect heater hoses. Remove water pump drive belt by loosening generator mount. Remove bolts securing water pump to crankcase and slide water pump off.

3) Clean gasket surfaces and use new gasket. To install reverse removal procedure.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Cylinder Head Bolts	69
Cylinder Head Nuts	69
Main Bearing Cap Bolts	58
Connecting Rod Cap Nuts	36
Intake and Exhaust Manifold Nuts	22
Camshaft Sprocket Bolt	61
Timing Belt Tensioner Pulley Nut	33
Crankshaft Pulley and Sprocket Nut	101
Flywheel-to-Crankshaft Bolts	61