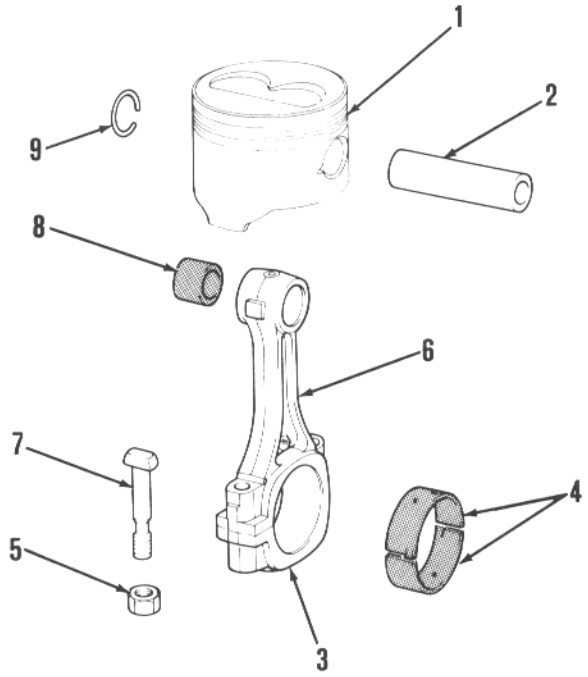
1. Piston
2. Pin
3. Big-end cap
4. Bearings
5. Cap nut
6. Connecting rod shank
7. Cap bolt
8. Small-end bushing
9. Circlip



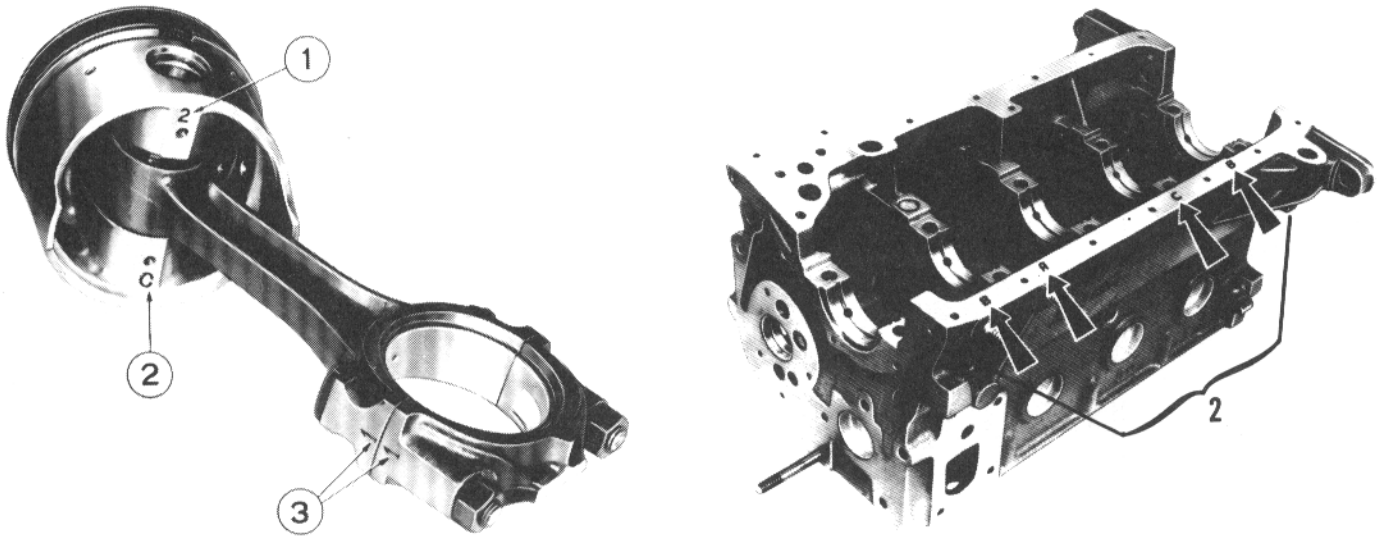
ROD-PIN-PISTON ASSEMBLY

PISTON

CHECKING PISTON CLEARANCE IN CYLINDER BORE AND PIN CLEARANCE IN PISTON

Checking piston clearance in cylinder bore should allow for class selection. Namely, only pistons and bores belonging to same class should be matched.

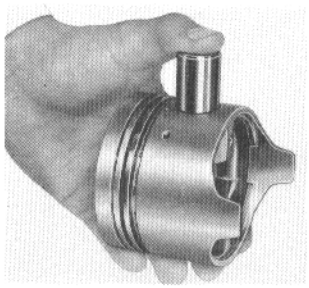
Standard pistons are selected in three classes, according to piston bore diameter. The same selection applies to piston pins, which must be fitted to pistons belonging to same class. The letter and number showing piston class (2) and piston pin bore class (1) are stamped on underside of piston bosses. Piston pin class is also stamped on pin surface.



1. Piston pin bore class 2. Piston class 3. Matching number of connecting rods to cylinder

Piston pin clearance in boss bore is .0004 to .0007 in. (0.010 to 0.018 mm).

To check pin fit, lubricate pin with light engine oil and insert it into piston bore. If fit is correct, pin should slide in by thumb pressure and when holding piston with pin in vertical position, pin should not fall from piston under its own weight.

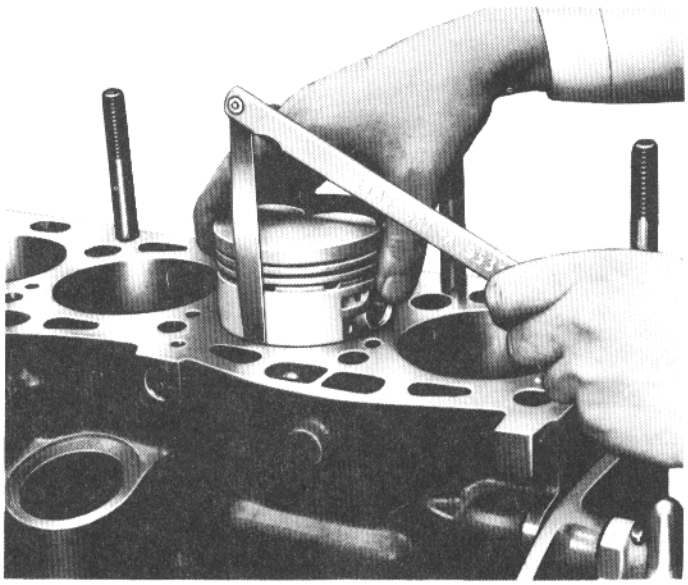


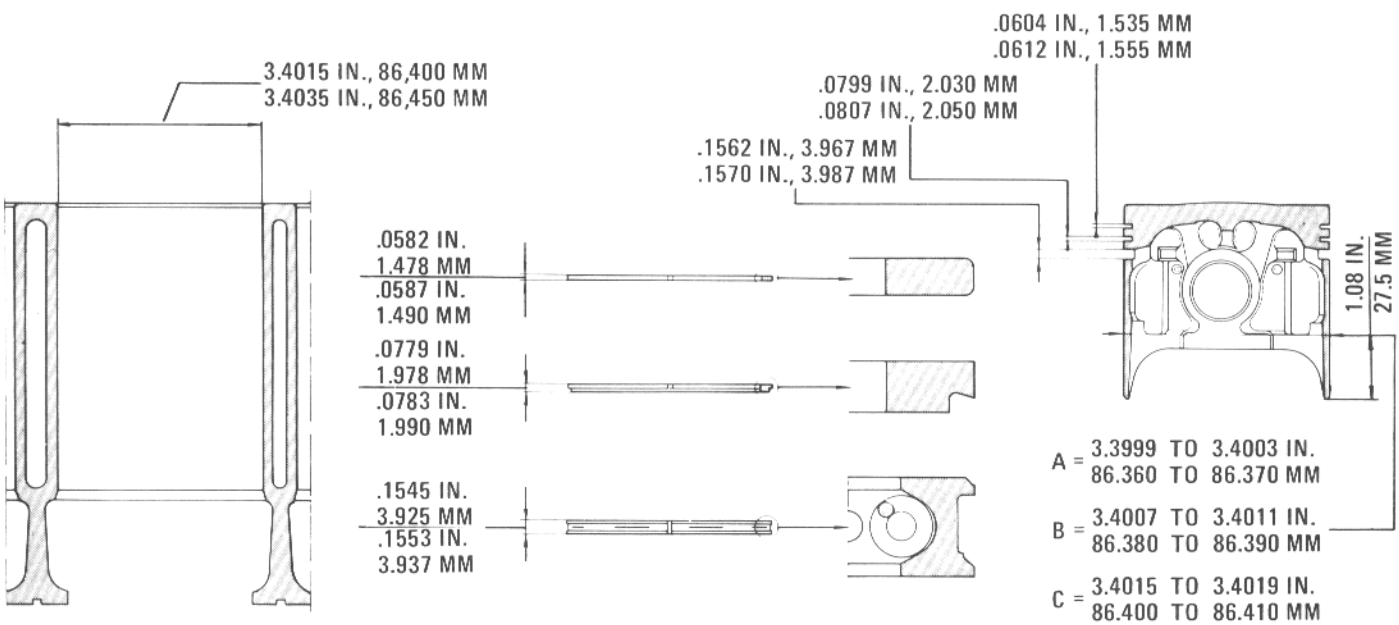
Clearance of pistons in cylinder bores, measured at right angles to the piston pin and 1.08 in. (27.5 mm) from piston skirt edge, is .0011 to .0019 in. (0.030 to 0.050 mm).

Be sure to always add piston skirt wear to cylinder wall wear to determine actual clearance between parts.

Piston clearance in bore must not exceed .006 in. (0.15 mm).

Oversize pistons are available in three oversizes of .0078 – .0157 – .0236 in. (0.2 – 0.4 – 0.6 mm). Oversize pins are only available in .0078 in. (0.2 mm) oversize.





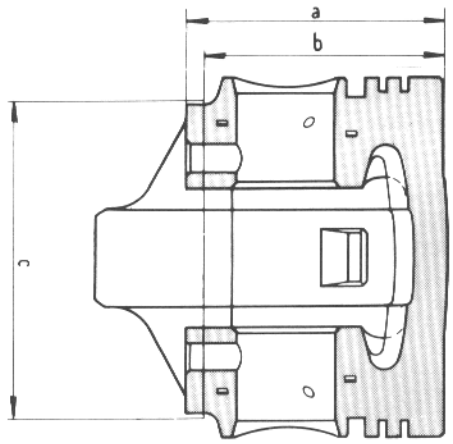
SPECIFICATIONS OF CYLINDER BORE, PISTON AND RINGS

Checking Piston Weight

Before assembly, check that the four pistons have the same weight; maximum permissible tolerance is ± .088 oz. (± 2.5 g).

If four pistons are not available whose weight comes within this tolerance, remove metal from base of piston bosses by milling.

Milling should not be done beyond a depth of .177 in. (4.5 mm) compared to nominal piston height of 2.232 in. (56.70 mm) and milling diameter should be limited to 2.775 in. (70.5 mm).



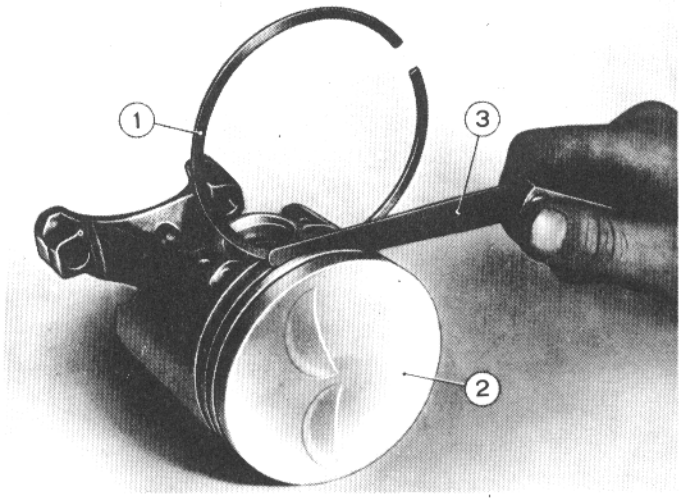
Milling diagram for balancing piston weights.

a = 2.232 in (56.70 mm) nominal piston height.
b = 2.055 in (52.20 mm) minimum height after milling.
c = 2.775 in (70.50 mm) maximum milling diameter.

Piston Ring Side Clearance

Side clearance of piston rings in grooves is checked by installing ring (1) and using feeler gage to measure clearance. Maximum wear limit is .006 in. (0.15 mm).

1. Ring 2. Piston 3. Feeler gage

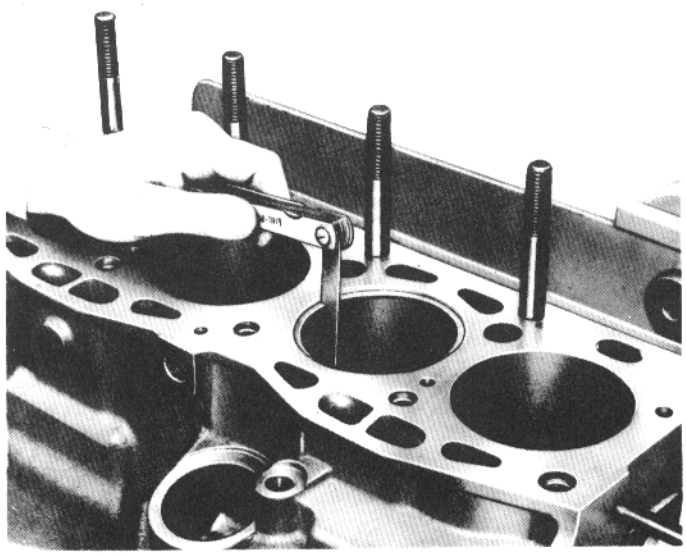


Piston ring fit (side clearance for new parts).

—first: compression ring	0.0018 to 0.0030 in 0.045 to 0.077 mm
—second: oil ring	0.0016 to 0.0028 in 0.040 to 0.072 mm
—third: scraper ring	0.0011 to 0.0024 in 0.030 to 0.062 mm

Ring End Gap

Prior to installing rings on pistons, push them down squarely into bores and check ring end gap, which should correspond to values shown. If gap is less than specified, grind ring ends as required. When installing rings on pistons, stagger end gaps 120° apart.



Ring end gap in bore.

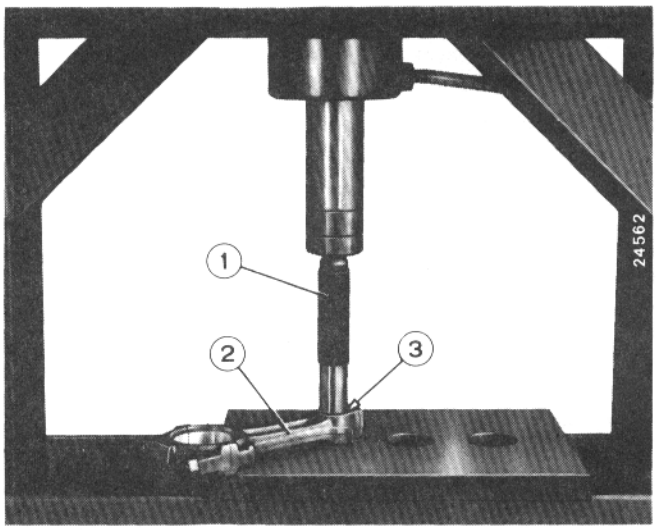
—first: compression ring	0.0118 to 0.0177 in 0.30 to 0.45 mm
—second: oil ring	0.0118 to 0.0177 in 0.30 to 0.45 mm
—third: scraper ring	0.0098 to 0.0157 in 0.25 to 0.40 mm

CONNECTING RODS

REMOVAL AND INSTALLATION OF SMALL-END BUSHING

Bushing is removed and installed on a suitable press with tool A.60054, as shown.

1. Drift A.60054 2. Connecting rod 3. Small-end bushing

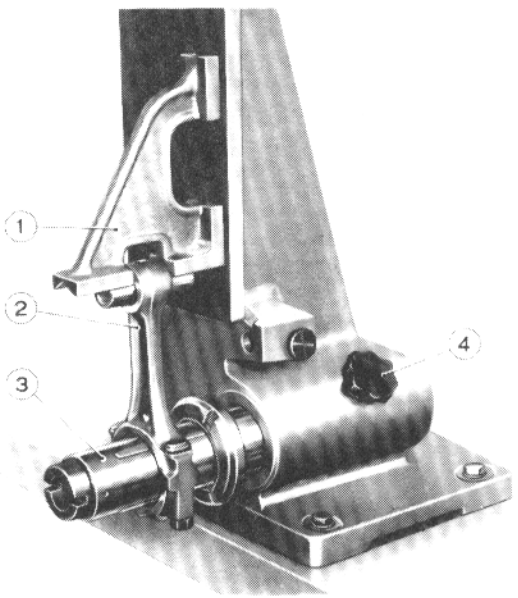


CONNECTING ROD-PIN-PISTON ASSEMBLY

ASSEMBLY

Check alignment of big-end and small-end axis measured at 4.92 in. (125 mm) from shank. Maximum allowable misalignment is ± .004 in. (± 0.10 mm).

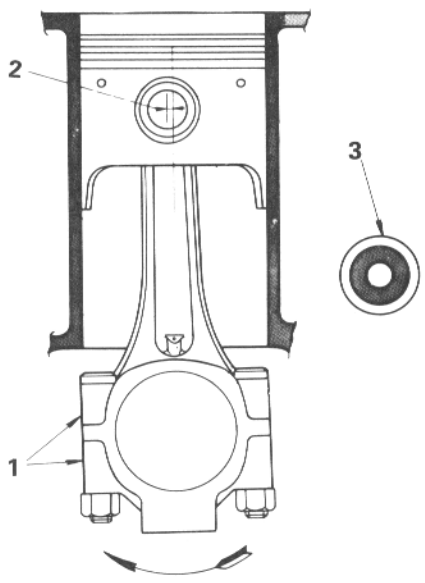
1. Square 2. Connecting rod and pin 3. Expandable blade arbor
4. Arbor lock



Piston bore is .08 in. (2 mm) offset (2).

Position rod to piston so that number stamped on rod (1) faces towards side of piston bore offset and away from auxiliary shaft (3).

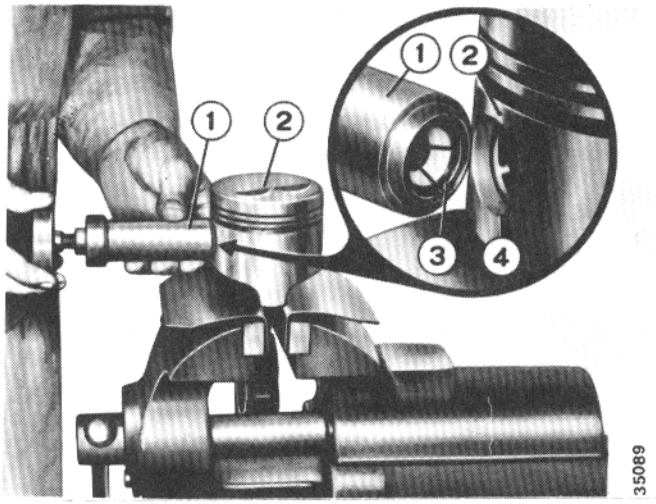
1. Connecting rod to cylinder matching number 2. Piston pin offset
3. Auxiliary shaft



To fit piston pin circlips (3), use tool A.60303 (1) as shown.

After installation, ensure that circlip end gap is not in line with slot provided in piston, to make removal of circlip easier.

1. Tool A.60303 2. Piston 3. Circlip 4. Circlip groove in piston



Connecting Rod Bearings

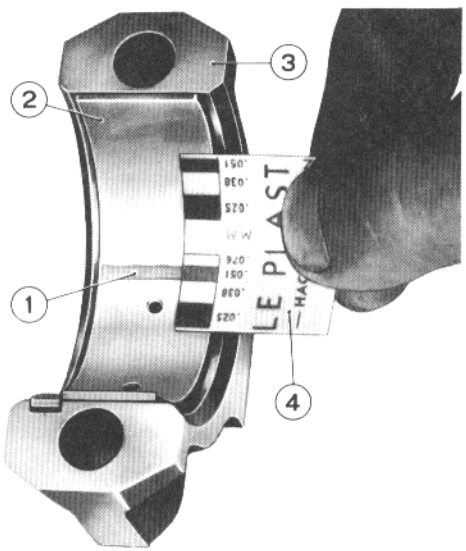
If there is evidence of deep scoring or excessive wear, replace bearing inserts (2).

Check for correct clearance between inserts and crankpins with "Plastigage" method.

Clean parts thoroughly and connect rods to relative crankpins. Place length of plastigage wire (1) along crankpin. Install caps (3) and tighten nuts to 38 ft. lbs. (5.2 kgm) torque.

Remove caps and using scale on envelope (4), measure width of compressed wire. If clearance is between .0014 to .0034 in. (0.036 to 0.086 mm), bearings are fit for service.

1. Plastigage wire 2. Bearing insert 3. Big-end cap 4. Measuring envelope



If clearance is in excess of limits, bearings should be replaced with undersize bearings.

Crankpins must be reground to an undersize such as to restore clearance of .0014 to .0034 in. (0.036 to 0.086 mm).

CRANKPIN DIAMETERS

Standard	Undersizes			
	.01 in (0.254 mm)	.02 in (0.508 mm)	.03 in (0.762 mm)	.04 in (1.016 mm)
1.7913 in (45.498 mm)	1.7813 in (45.244 mm)	1.7713 in (44.990 mm)	1.7613 in (44.736 mm)	1.7513 in (44.482 mm)
1.7920 in (45.518 mm)	1.7820 in (45.264 mm)	1.7720 in (45.010 mm)	1.7620 in (44.756 mm)	1.7520 in (44.502 mm)

CONNECTING ROD BEARING THICKNESSES

Standard	Undersizes			
	.01 in (0.254 mm)	.02 in (0.508 mm)	.03 in (0.762 mm)	.04 in (1.016 mm)
.0603 in (1.531 mm)	.0653 in (1.658 mm)	.0703 in (1.785 mm)	.0753 in (1.912 mm)	.0803 in (2.039 mm)
.0606 in (1.538 mm)	.0656 in (1.665 mm)	.0706 in (1.792 mm)	.0756 in (1.919 mm)	.0806 in (2.046 mm)