

# Installing Pistons on, and Removing from, Connecting Rods

Types 220 and 220a

Operation No.
M 4i

## Special Tools:

Piston ring pliers,  
dia. 50–100 mm (1.97–3.94") 000 589 00 37

## Equipment:

Connecting rod checking and straightening tool

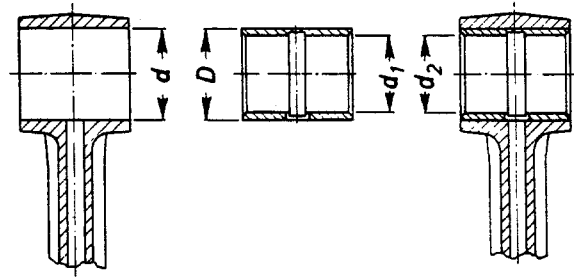


Fig. M 4i/4

## Procedure:

1. Remove wire snap rings from grooves of piston pin boss.
2. Heat piston on a hot plate to 40–60° C (105–140° F) and press out piston pin.
3. Take off piston rings with piston ring pliers 000 589 00 37. This is only necessary if the old pistons are to be reused.
4. Check connecting rod bushing. If the connecting rod is marked with black paint, the diameter is 22.007–22.010 mm (0.86642–0.86653"); and if the rod is marked white, the diameter is 22.010–22.013 mm (0.86653–0.86665"). If the bore is larger, remove the old bushing and press in a new one. After the new connecting rod bushing has been pressed in, anneal the connecting rod for half an hour at 160–180° C (320–355° F). Then finish the bore and chamfer on either end. When the basic bore in the connecting rod is worn out, recondition it to 25.500–25.521 mm (1.00393–1.00476") and install a bushing with an 0.5 mm (0.02") larger outer diameter (see Table 9). The minimum overlap of the connecting rod bushing in the bore is 0.035 mm (0.0014"). When pressing in the bushing, be sure that the oil hole coincides with the oil passage in the connecting rod.

Clean oil passage in connecting rod carefully after the bushing has been finished.

The dimensions will be seen from Fig. M 4i/4 and the pertaining Table 9.

Connecting Rod Bushing Dimensions  
in mm (in.)

Table 9

	Basic bore d	Outer dia. D	Rough-turned size d <sub>1</sub>	Finished size*
Standard size	25.000	25.048	21.600	22.007
	25.021	25.035	21.730	22.013
	(0.98425)	(0.98614)	(8.2913)	(8.6617)
	(0.98508)	(0.98563)	(8.2964)	(8.6619)
With larger outer dia.	25.500	25.548	21.600	22.007
	25.521	25.535	21.730	22.013
	(1.00393)	(1.00582)	(8.2913)	(8.6617)
	(1.00476)	(1.00531)	(8.2964)	(8.6619)

\* For tolerance subdivision see Table 8.

5. After the connecting rod bushing has been replaced, square the connecting rod.  
The permissible deviation of axis parallelism relative to a length of 100 mm (3.94") is 0.03 mm (0.0012"), and the permissible twist relative to a length of 100 mm (3.94") is 0.1 mm (0.004").
6. When installing the connecting rod into the piston, note the following:
  - a) Select the connecting rods for the engine so that the difference in their weight is not more than 5 g (0.18 oz.).  
The difference in the weight of the pistons in an engine must not exceed 4 g (0.14 oz.).
  - b) Watch out that connecting rod with bushing, piston and piston pin are marked with the same colour. This is to ensure that overlap and play are within the specified limits (see Table 8).

- c) Make sure that the numbers (1 to 6) etched into connecting rod and connecting rod cap are identical (Fig. M 4i/6c). If the piston is reused, the numbers on piston and connecting rod must also be identical.

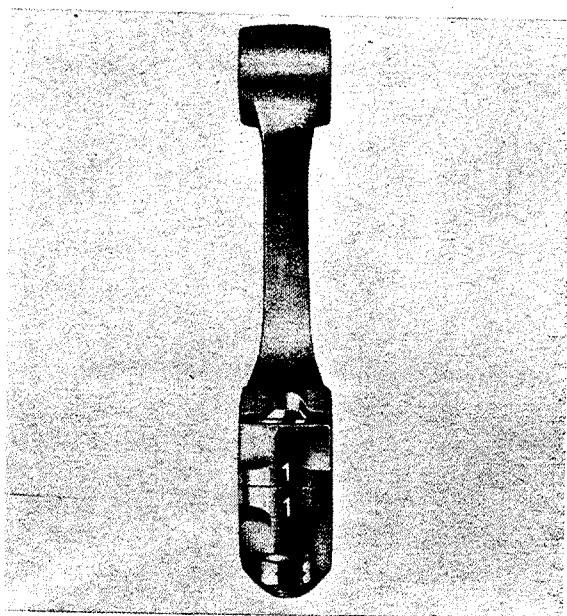


Fig. M 4i/6c

- d) Install piston so that arrow on piston crown points in direction of travel (Fig. M 4i/6d). The numbers 1 to 6 on connecting rods and caps are on the left side of the engine (as seen in direction of travel).
7. Heat piston on a hot plate to 40–60° C (105–140° F) and press in piston pin.
8. Insert wire snap rings into piston pin boss.

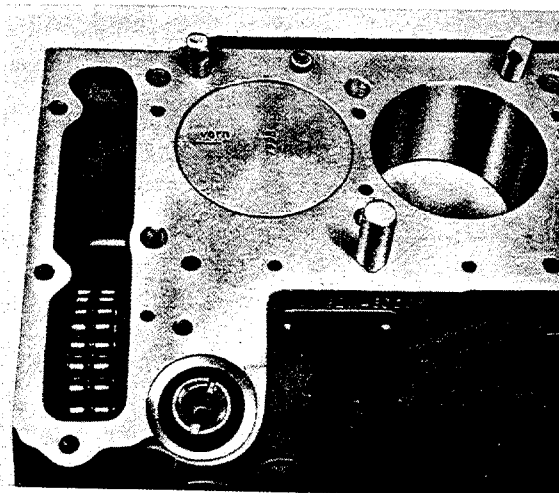


Fig. M 4i/6d

9. After piston has been installed on connecting rod, it is recommended to square piston and connecting rod together (Fig. M 4i/9).

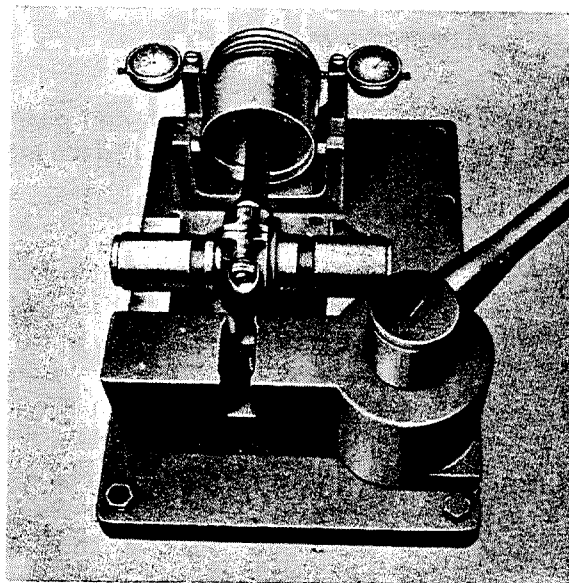


Fig. M 4i/9