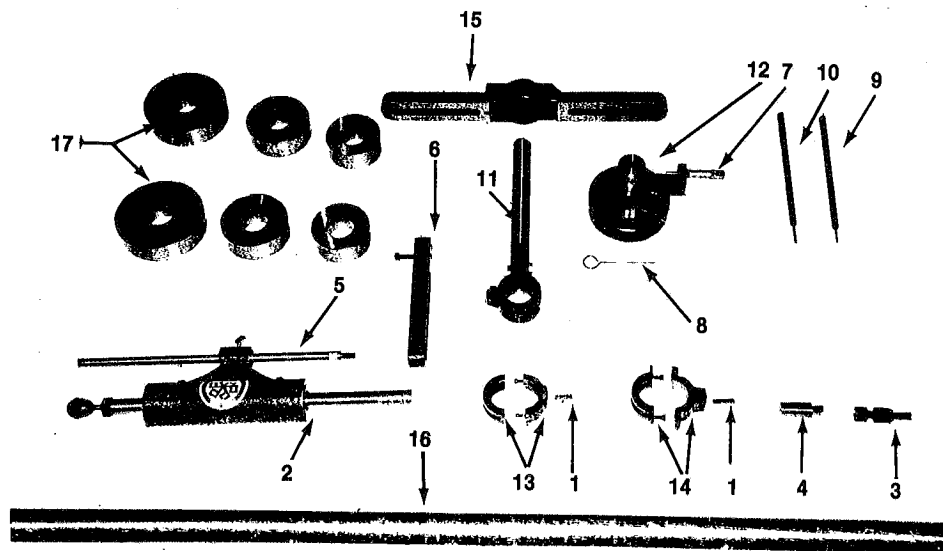


Instructions for use of PT-1000, PT-1050

LINE BORING TOOL FOR USE ON CUMMINS ENGINES

READ CAREFULLY BEFORE USING

The Line Boring Tool is a combination main bearing bore alignment checking bar and boring tool designed for use in repair of engine cylinder blocks. It is applicable to all current engine models except the L, LR, K12, K16, J and C. Accessories for working on the J and C engines are available, but not included with this tool.



DET #	PART #	PART DESCRIPTION	DET #	PART #	PART DESCRIPTION
1	PT-1000-001	Cutter (5/8")	17	PT-1000-060	Ring Group (4.7500)
1	PT-1000-002	Cutter (7/8")			(5 1/8 NH, 5 1/2 NH)
1	PT-1000-003	Cutter (1 1/4")	17	PT-1000-063	Ring Group (3.7530)
1	PT-1000-004	Cutter (1 1/2")			(V504/V555 Vim-Vine)
1	PT-1000-005	Cutter (2")	17	PT-1000-064	Ring Group (4.0620)
*	PT-1000-014	Steel Box			(V8-903)
2	PT-1000-016	Feed Unit	17	PT-1000-065	Ring Group (5.8460)
3	PT-1000-020	Universal Drive			(K series 6 cylinder)
4	PT-1000-023	Drive Adapter	17	PT-1000-087	Ring Group (5.3450)
5	PT-1000-024	Torsion Bar			(V12 Phase II)
6	PT-1000-025	Torsion Bar Bracket	17	PT-1000-088	Ring Group (6.0960)
7	PT-1000-032	Micrometer			(V12 Phase III)
8	PT-1000-036	Cutter Key	*	PT-1500-002	Setting Standard
9	PT-1000-037	Knurl Handle Wrench (5/32")	*	PT-16006	Hex Key (3/8")
10	PT-1000-038	Knurl Handle Wrench (3/16")	*	PT-16007	Hex Key (5/16")
11	PT-1000-048	Upright Bearing Assy	*	PT-16008	Hex Key (1/8")
12	PT-1000-050	Micrometer Base Assy			
13	PT-1000-054	Small Cutter Holder			
14	PT-1000-055	Large Cutter Holder			
15	PT-1000-056	Line Bore Bridge			
16	PT-1000-057	Line Bore Bar			

AVAILABLE ACCESSORIES:

PT-1000-058	Upright Bearing Stop
PT-1000-066	Ring Group (3.5020) (4 5/8 V6/8 Val-Vale)
PT-1000-089	Ring Group (4.1250) (C & J-eng)

*NOT SHOWN



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PORTA-TOOL
PRODUCTS

PREPARATION OF ENGINE BLOCK

1. The engine block should be cleaned, and the block and the "PT-1000" Line Boring Tool allowed to stabilize to room temperature.
2. Remove all burrs and irregularities from the engine oil pan ledge and each side of the main bearing bores.
3. Install main bearing capscrews and torque to required factory specs; Refer to engine shop manuals.
4. Check each bore diameter with a dial bore gauge. A damaged cap can be replaced with a semi-finished cap; see engine shop manuals.
5. Plug all oil passages with thick grease to prevent metal shavings from entering oil passages.

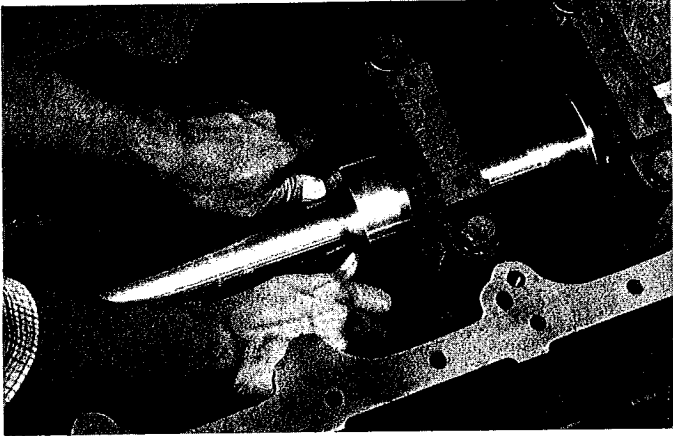


Fig. 2 Main bearing bore alignment

CHECKING THE ALIGNMENT OF THE MAIN BEARING BORES

1. The cylinder block should be cleaned and the block and necessary checking parts allowed to stabilize to room temperature.
2. Install appropriate centering rings in each end saddle of the block. You may have to tap on the centering ring with a plastic hammer to seat it. Reinstall the main bearing caps, and torque to required specifications. (See Engine Shop Manuals).
3. Apply a coat of oil in the centering ring bores, on both diameters of the test ring, and on the entire length of the boring bar.
4. Slide the boring bar through one of the centering rings and slip on the test ring, rotating the bar slowly as you slide, and pass through the entire block and the other centering ring.
5. Now rotating the bar, use light finger pressure against the test ring on both sides of the bar and push the test ring through each bore.
6. If the test ring will not pass through a bore, check for burrs. But if the test ring will not pass through a majority of the bores, move the centering rings to adjacent saddles and repeat procedure.
7. If the test ring still refuses to go through the saddle or an audible "click" is heard as the ring exits the bore, then that saddle is out of alignment. Be sure to mark the bores to be salvaged.

CHECKING THE MICROMETER SETTING

1. The Micrometer Assembly is preset at the factory, but should be checked before setting the cutter.
2. To check the micrometer reading install the setting standard between the Micrometer Shaft and the Micrometer. The Micrometer reading should be 3.000 inches. Take three readings from different places on the Micrometer Shaft and compare readings.
3. If adjustment is necessary, loosen the socket head cap screw and move the micrometer until the 3.000 reading is lined up, tighten socket head cap screw.
4. Recheck by backing off on the micrometer and again turning it against the setting standard in three different places on the Micrometer Shaft.

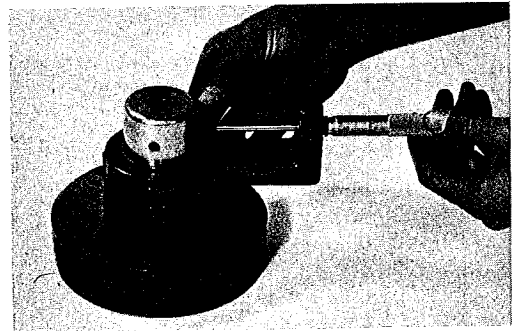


Fig. 3 Micrometer



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SETTING CUTTER TO REQUIRED BORE SIZE

1. Install the appropriate cutter holder over the micrometer shaft and align the cutter hole in the cutter holder with the hole through the micrometer shaft and tighten on the micrometer shaft. The scribed lines on the Micrometer Shaft and the Cutter Holder will easily identify the positions of the holes. Keep even gaps between the two halves of the cutter holder when tightening on the Micrometer Shaft.
2. Insert the appropriate cutter in the cutter holder. Be sure the cutter is short enough so it does not extend into the bore of the cutter holder.
3. Adjust the micrometer to specifications, see Engine Shop Manual. Using the cutter key push the cutter against the micrometer spindle and tighten set screws to lock cutter in position. (Note: When adjusting cutter, be careful to just touch the Micrometer Spindle or the Carbide Tip may be damaged).
4. Back-off micrometer and recheck the cutter setting. Do not tighten or sweep the micrometer spindle against the cutter point or the carbide may be chipped.

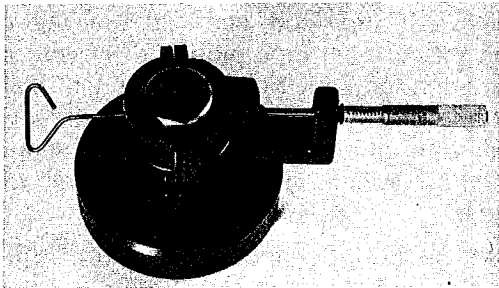


Figure 4 Cutter Holder

MOUNTING FEED UNIT TO THE ENGINE BLOCK

1. After following procedures for "Preparation for the Engine Block" remove two undamaged main bearing caps, preferably one from each end of the block (i.e. #1 and #7 on NH) or as far apart as possible.
2. Insert the proper centering rings in the two bearing journals and tap the top of each centering ring with a plastic hammer to seat in the journal. Reinstall the main bearing caps on the two respective bearing journals and torque to the required specifications. (See Engine Shop Manuals) CAUTION: If the centering rings must be installed in journals which have had the caps replaced by semi-finished caps, limit torque to 10 ft. lbs.
3. Oil the centering ring bores and entire length of the boring bar.
4. Slowly rotating the bar, slide the boring bar through the centering rings and the saddle bores of the block if more support is required, the upright bearing bar assemblies should now be installed on the boring bar.

5. To use the upright bearing assemblies, oil the bores of the bearing and while slowly rotating the boring bar, guide the upright bearing assembly to the desired position. Be sure to allow room for the cutter holder, if next to a journal being cut. Adjust the socket head cap screw on the upright bearing to where the boring bar just turns freely. Now slide a line bore bridge over the upright bearing bar and bolt loosely to the oil pan rail. Install the other upright bearing assembly if needed.
6. Making sure that the upright bar is perpendicular to the bridge, tighten the bridge to the oil pan rails and tighten the socket head cap screw, locking the upright assembly with the bridge. Tighten socket head cap screw locking bearing in position with the upright bar. Check the boring bar to see that it rotates freely. If adjustment is necessary because of a frozen boring bar, loosen cap screws on the oil pan rails to make adjustments. Oil upright bearing assemblies.
7. At this time, if the centerline of the crankshaft is to be raised, insert feeler stock under upright bearing stop (optional accessory) and lock in this position on the upright bearing bar. Bolt torsion bracket loosely to the cylinder block opposite the end from which the boring bar will be driven. Install the feed unit onto the boring bar and lock into position. Slide the feed unit onto the torsion bar and tighten bolt holding torsion bracket hand tight. The boring bar must slide in and out easily after these tightening operations.

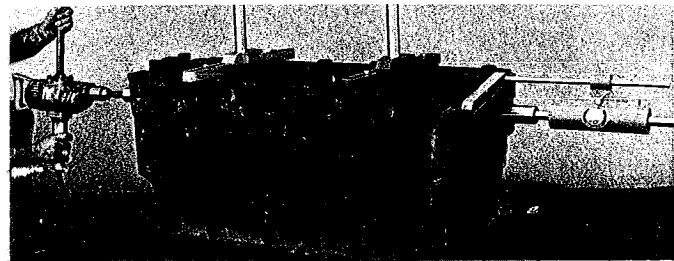
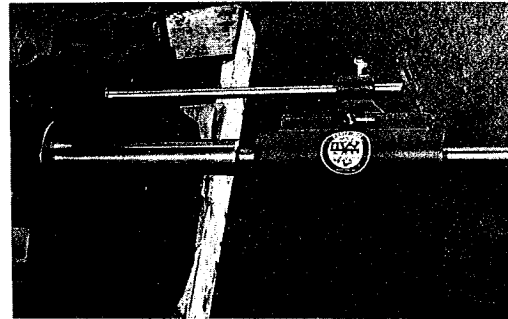


Fig. 5 & 6 Feed Unit mounted to Engine Block



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CUTTING THE MAIN BEARING JOURNALS

1. Turn the valve on the feed unit to the "OPEN" position and pull the complete feed unit away from the block. Tighten the thumb screw in the feed unit to secure it on the torsion bar. Install the square head set bolt in the second threaded hole of the torsion bar bracket and tighten snugly against the cylinder block to stabilize the torsion bar assembly. Turn the valve on the feed unit to the "CLOSED" position.

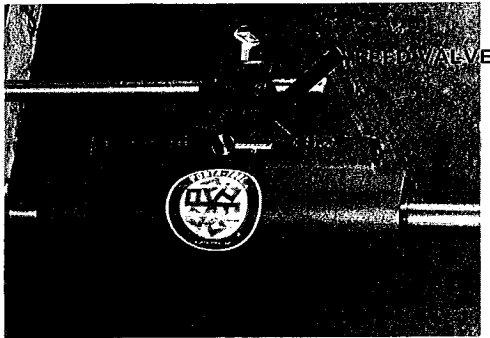


Figure 7

2. Install the drive adapter in the other end of the boring bar with the 1/2 inch end out and lock in position with the socket set screw. Lock the universal drive in with a 1/2 inch heavy duty right-hand rotation hand drill chuck. (450-500 rpm)

3. Wipe the boring bar and the cutter holder clean, and place the cutter holder on the boring bar next to the journal to be cut. (Note the direction of feed travel). To assemble the small cutter holder, place the lower half of the cutter holder over the socket head cap screw then slide sideways into the slot and tighten socket head cap screws. To assemble the large cutter holder, slip the halves together and tighten socket head cap screws. Compare the cutter tip with the bore while turning the boring bar by hand to insure the cutter setting is correct. (CAUTION: Always double check cutter specifications before boring.)

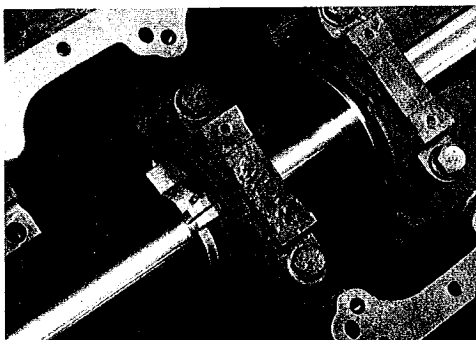


Figure 8

4. Oil the upright bearing assemblies and make sure that the boring bar is well lubricated during all boring operations. Do not use lubricant on the cutter.

5. If you are using the upright bearing stops on the upright bearing bars, remove the feeler gauge and lower all upright bearing assemblies.

6. Attach drill and universal drive on the drive adapter and bore the bearing journal, again making sure that all parts are well lubricated. **DO NOT PUSH ON THE DRILL!** Allow the feed unit to regulate the amount of cut.

7. Check the size of the bore with a dial gauge.

8. To cut the next journal, remove the cutter holder from the boring bar. Turn the feed valve to the "OPEN" position and push in on the feed shaft until it stops. Turn the feed valve to the "CLOSED" position and repeat steps #3, 4, 5, 6 and 7.

9. After the boring operation is complete, clean the engine block thoroughly.

CARE AND MAINTENANCE OF YOUR NEW TOOL

1. The line bore feed unit must always be completely filled with oil to prevent chatter or erratic feed. To fill reservoir, place feed unit in a level position and pull the feed shaft all-the-way back. Remove the furthest pipe plug and fill with clean 30W Non-detergent oil, replace pipe plug. Push the feed shaft all-the-way in and remove nearest pipe plug, fill with oil and replace pipe plug. Continue repeating procedure until all air bubbles in the oil disappear.

2. Keep the cutters honed to keep the tool from chattering. To help keep the cutter in excellent condition use our "PT-7180" PORTA-BIT SHARPENER. Designed especially to hone the cutters back to their original angles.

3. The "PT-1000" Line Boring Tool requires cleaning and lubrication to obtain precision performance. Wipe all parts clean after use and coat with a thin layer of lightweight oil to prevent rust or corrosion during storage. Do not drop or damage any part of the tool as this may cause difficulty in obtaining true finish bores.

4. Remove snap ring and bracket from the Micrometer Base Assembly. Clean preservative from all parts and oil lightly with clean oil. Install bracket and snap ring. Adjust socket head cap screw until the bracket becomes tight on the micrometer shaft, then loosen the screw until the bracket moves with a slight drag.

NOTE: For warranty or repairs, send to:
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