Instructions for use of

UPB-300 PORTA BORE

READ CAREFULLY BEFORE USING THIS MACHINE

The "UPB-300" Universal Porta-Bore is a simplified tool for boring the Lower Packing Ring Bores in the cylinder block, preparatory to installing prefinished repair bushings. The Porta-Bore is used to bore all current Cummins engines, except the older V8-350 and VT-430, to bore the "K-Engine" an adapter plate is available. The "UPB-300" features tapered alignment rings to positively locate the tool in the counterbore, a special depth setting unit to preset the boring depth, and a micrometer setting block to preset the cutter.

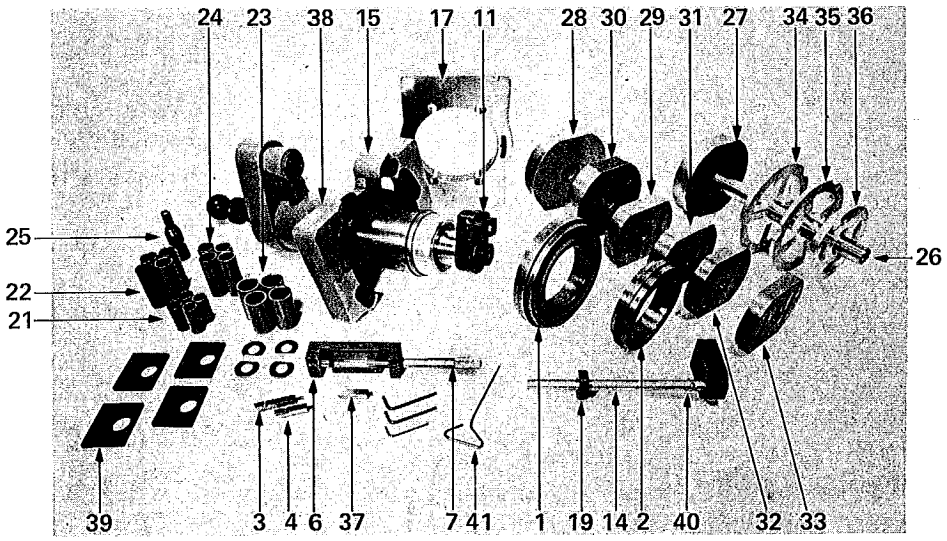

Fig. 1 "UPB-300" Porta-Bore (NS) Denotes Part Not Shown

DET. #	PART #	DESCRIPTION	AMT.	DET. #	PART #	DESCRIPTION	AMT.
1	PB-039	Alignment Ring (220, 250, 903, & Vim-Vine)	1	30	PB-030	Bushing Driver Vim-Vine	1
				31	PB-031	Bushing Driver Val-Vale	1
2	PB-040	Alignment Ring (C, J, & Val-Vale)	1	32	PB-032	Bushing Driver "C"	1
3	PB-006	Cutter (2-1/16)	1	33	PB-033	Bushing Driver "J"	1
4	PB-009	Cutter (1-5/8)	1	34	PB-034	Guide Plate 220 & 250	1
NS	PB-047	O-Ring	1	35	PB-035	Guide Plate 903, Vale-Vale & Vim-Vine	1
6	PB-053	Micrometer Block Assembly	1				
7	PB-004	Micrometer	1	36	PB-036	Guide Plate C & J	1
NS	PM-023	Socket Set Screw	2	37	PB-005	Setting Standard	1
NS	PM-021	Adj. Pin	2	38	PB-001	Main Housing	1
NS	PM-013	Soc. Head Cap Screw	2	39	PB-014	7/8 Offset Washer	4
11	PB-077	Cutter Holder	1	40	PB-019	Depth Setting Unit	1
NS	PM-020	Swivel Pad Set Screw	2	41	PM-051	Cutter Key	1
NS	PB-022	Collar	1	NS	PB-015	5/8 Cut-Off Washer	4
14	PB-021	Depth Setting Shaft	1	NS	PM-013	Jam Nut	1
15	PM-028	Base Plate	1	NS	PM-010	Spline Sprocket	1
NS	PB-024	Hex Head Bolt	1	NS	PM-011	Spline Washer	1
17	PB-082	Val-Vale Adapter Drive	1	NS	PM-031	Soc. Hd. Cap Screw	2
NS	PM-014	Needle Valve Knob	1	NS	PM-032	Nylon Lock Nut	2
19	PB-080	Depth Set Collar	1	NS	PM-034	7/8 Cut Off Washer	1
NS	PB-003	Soc. Set Screw	2	NS	PM-035	Soc. Hd. Cap Screw	4
21	PB-017	½"Stud Adapter	4	NS	PM-053	3/8 Special Washer	4
22	PB-018	¾" Stud Adapter	4	NS	PM-054	Chain Guard	1
23	PM-029	1" Stud Adapter	4	NS	PM-055	Button Hd. Set Screw	3
24	PM-040	¾" Stud Adapter	4	NS	PM-057	3/32 Hex Key	1
25	PM-048	Universal Drive	1	NS	PM-058	1/8 Hex Key	1
26	PB-026	Bushing Driver Shaft	1	NS	PM-059	5/32 Hex Key	1
27	PB-027	Bushing Driver 250	1	NS	PM-075	Drive Bracket	1
28	PB-028	Bushing Driver 903	1	NS	PM-107	Drive Chain	1
29	PB-029	Bushing Driver 220	1	NS	PB-051	Steel Box	1

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ATTENTION: To become familiar with the operation of the tool, it is suggested you secure a scrap block to practice on.

OPERATING INSTRUCTIONS:

1. Select proper alignment ring (1 or 2), see Fig. 1. Remove "O"-ring (5) and install alignment ring into main shaft with taper towards cutter holder. Install O-ring to keep alignment ring from sliding off the main housing, see Fig. 2.

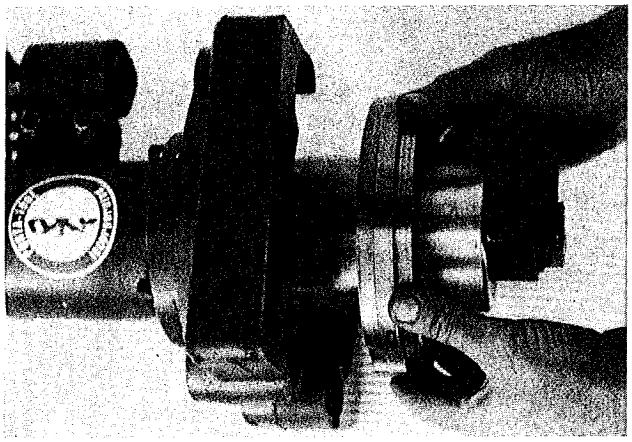
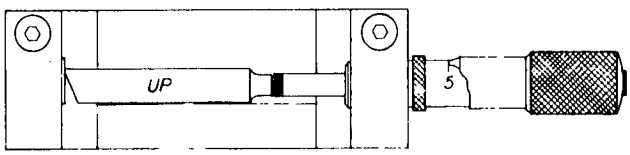


Fig. 2 Alignment Ring Installed

2. Check micrometer calibration with special setting standard (37), see Drawing 1. Micrometer (7) should read five inches when measuring "standard" (37). If correction is necessary, loosen socket head cap screw (10) and move micrometer in or out as required.



Dwg. 1 Adjusting the Micrometer

3. Place the carbide cutter (3 or 4) in the micrometer setting block, as indicated in Fig. 3. Making sure that the socket set screw (8) is facing up as shown. Now loosen the socket set screw (8) on the side of the cutter and set your micrometer to the size you want your bore to be (this is a direct reading "mike" so what you put on it is the size you will bore). After you have set the micrometer to your desired hole size tighten the socket set screw. Now back off your micrometer and recheck your reading; adjust as required.

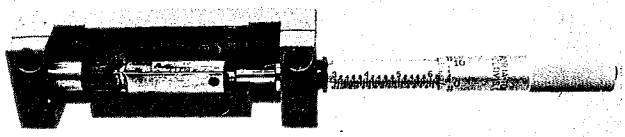
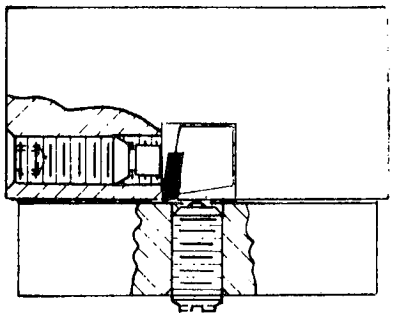


Fig. 3 Setting the Cutter

Place cutter in cutter holder (11) until it bottoms against the main shaft. Press in on the cutter and tighten swivel pad set screw (12), securing cutter. See Drawing #2.



Dwg. 2 Installing the Cutter

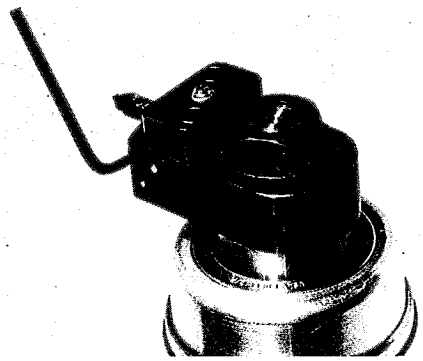


Fig. 4 Cutter Installed

4. Adjust collar (13) on special depth setting shaft (14) to the engine model to be bored.

5. Attach depth setting shaft (14) on bottom side of base plate (15) with socket head cap screw provided. See Figure 5.

NOTE: – Use 1 inch (25.4 mm) adapter plate (17) under base plate (15) on V6-140, and V8-185, and V-504 engines.

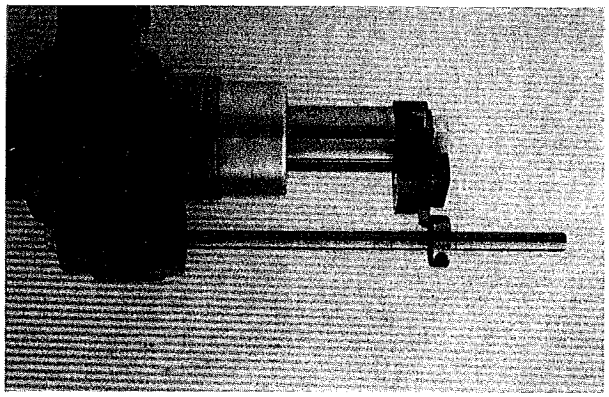


Fig. 5 Adjusting Depth of Cut

6. Loosen needle valve knob (18) and push main shaft down until cutter barely contacts preset collar (13) on the depth setting shaft (14). Adjust depth set collar (19) on the spline shaft to "bottom-out" on top of boring machine. Tighten socket set screw on depth set collar.

7. Remove depth setting shaft (14).

8. Pull upward on needle valve knob (18) to raise the main shaft all-the-way up and turn knob to right all the way to close the needle valve.

9. Remove all nicks and burrs from the counter-bore area in the block. Clean thoroughly. Deck must be flat and free from rough areas that would cause machine misalignment with the lower bore.

10. Lower unit into counterbore with tapered alignment ring (1 or 2) engaging counterbore. Fig. 6.

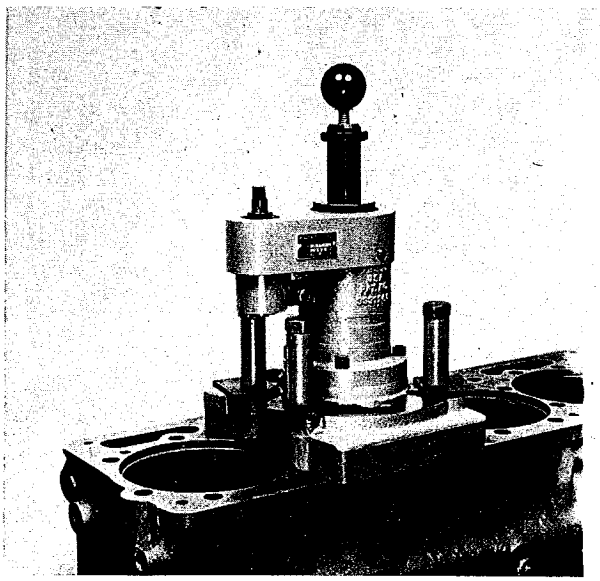


Fig. 6 Porta-Bore on Block

11. Secure base plate (15) to block using cylinder head cap screws and stud adapters (21, 22, 23 or 24). Tighten securely to approximately 50 ft. lbs.

12. Loosen needle valve knob (18) and push downward on knob slowly until cutter touches the lower bore area. Raise up main shaft approximately 1/2 inch.

13. Tighten needle valve knob (18), this engages the automatic feed mechanism. Rotate shaft by hand to be sure it rotates freely.

14. Install universal drive (25) in a heavy duty drill. Recommended drill size is 1/2 to 3/4 inch, 10 amperes or more, 450 rpm.

15. Place drill and universal drive on the drive shaft. Bore until depth set collar (19) "bottoms out". A noticeable change in drill speed will be observed.

16. Loosen needle valve knob (18), pull main shaft all the way up. Tighten knob (18).

17. Remove boring machine; care should be taken when removing tool so that you do not damage cutter.

18. Inspect and measure bore, clean thoroughly and remove rough edges with emery cloth.

INSTALLING REPAIR BUSHING INTO CYLINDER BLOCK

1. Clean outside diameter of the bushing with PT-025 Loctite Primer-T. Apply a narrow band of PT-024 Loctite Compound completely around the bushing's outside diameter.

2. Push bushing through upper bore Fig. 7. Place bushing on top of bore you have just made with I.D. chamfer in bushing facing up.

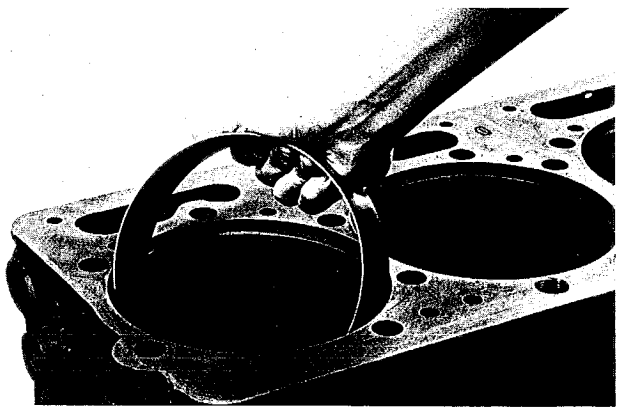


Fig. 7 Pushing bushing into bore

3. Select the proper bushing driver and insert through counter bore. Tilt driver so that the flat surfaces will allow the driver to go through the counterbore and into the bushing.

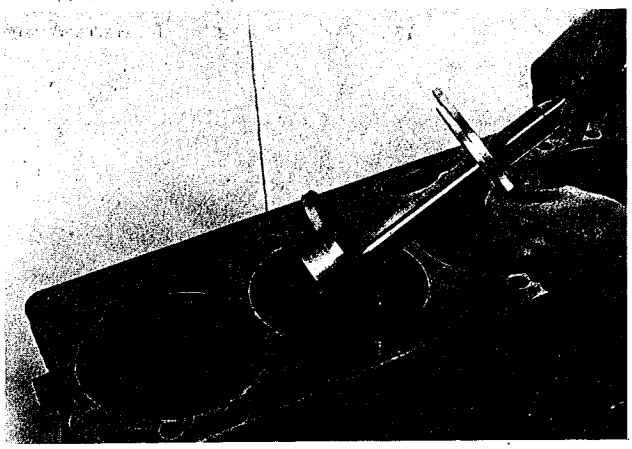


Fig. 8 Inserting Bushing Driver

4. Select proper guide plate and slide over driver shaft and into counterbore. See Fig. 8.

5. Tap gently on driver handle to position bushing in bore. See Fig. 9.

6. With suitable hammer (preferably a rawhide mallet) drive bushing into place. When bushing is positioned, bushing driver should rotate freely, remove tool.

7. Wipe clean excess Loctite Compound from around bushing entrance.

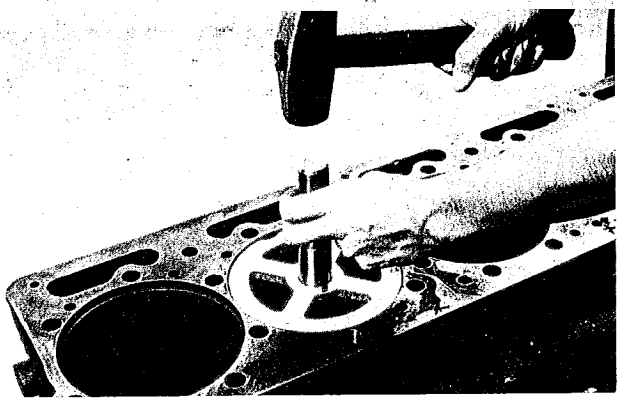


Fig. 9 Driving Bushing into Place

When operating machine and tool chatters check:
(1) Sharpness of the cutter
(2) Loose chain
(3) Low on oil

To sharpen cutters correctly you should use the "Porta-Bit Sharpener" tool #PBS-203. All Porta-Tool carbide cutters can be correctly sharpened using it: PB cutter, CB cutter, LB cutter, and PM cutter.

Or send cutters into the Porta-Tool Factory for sharpening.

To adjust the chain tension, remove chain guard and adjust tension bolt.

To check the oil in the machine — place machine on a bench with the oil plugs up. Tilt machine so that the oil plug is at the highest position. Loosen the needle valve knob and push the shaft in and out 2 or 3 times to work the air up to the oil plug area. Pull shaft all the way out and remove oil plug and fill with 20 W detergent oil.

TABLE I. LOWER BORE BUSHINGS & BORING SPECIFICATIONS

ENGINE MODEL NO.	BUSHING PART NO.	± .0005 Bore Size	± .001 Depth
NH, V12 5-1/8 INCH BORE	220-S	5.8700	1.750
	220-OS	5.9200	1.750
NH, V12 5-1/2 INCH BORE	250-S	6.2500	1.750
	250-OS	6.3000	1.750
V6-200, V8-265	VIM-VINE-L	6.2500	1.062
V6-140, V8-185, V-504 & V-555	VV-L	5.2500	.874
V-903	903-L	6.2500	1.163
J	J-ENG-L	4.7500	1.189
C	C-ENG-L	5.0000	1.050