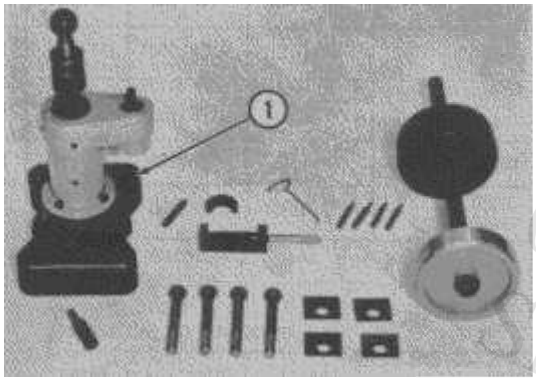
Using 5P4175 Boring Tool Group And 5P1618 Tool Arrangement{0672, 1200} (SMHS8839)

SMCS - 0672, 1200

All Caterpiller Engines With Cylinder Liners



The 5P1618 Tool Arrangement or the 5P4175 Boring Tool Group (1), with the necessary tools given in the tool application chart on page 2, are used to cut away material from the cylinder liner counterbore, or the top face of the cylinder liner counterbore, or the top face of the cylinder block on engines that use a spacer plate, and install a new insert in the machined counterbore. The 5P1618 Tool Arrangement has all the tools needed for 6.25" (158.7) bore engines. Additional tools, that can be used with the 5P1618 Tool Arrangement, are available for other engines; see the tool chart on page 2. After installation of the inserts, use the 8S3140 Counterboring Tool Group to cut away material from the insert to get the correct liner projection (height).

Tool Application Chart

CYLINDER BLOCKS THAT DO NOT HAVE A SPACER PLATE
BLOCS-CYLINDRES SANS PLAQUE DE TÊTE
MOTORBLÖCKE OHNE ZWISCHENPLATTE
BLOQUES DE MOTOR QUE NO TIENEN PLANCHA ESPACIADORA

Engine / Moteur / Motor / Motor	Liner Seat Insert / Bague rapportée / Einsatz / Inserto de asiento para camisa	Installer Assembly / Outil de montage / Einbausatz / Conjunto de montador	Holder Group / Porte-lame / Haltegruppe / Portaútil	Cutter Assembly / Lame / Schneidsatz / Útil	Cutter Setting Gauge / Calibre de réglage de lame / Schneideinstell-Messer / Calibrador de útil	Depth Master Gauge / Calibre de profondeur / Tiefenmesser / Calibrador maestro de profundidad	Mounting Bolts / Vis de fixation / Halteschrauben / Pernos de montaje
D353, D379 D398, D399	5P936	*5P1655	*5P1632	*5P1619	*5P1644	*5P1646	*1D4614
D339, D342 D364, D375 D386, D397	5P1625	5P1654	5P1633	*5P1619	5P1643	5P1647	*1D4614 9S1354
5.4" 90° V8	5P937	5P1653	5P1634	5P1658	5P1642	*5P1646	*1D4614
D343 1693	5P1624	5P1653	5P1634	5P1658	5P1641	*5P1646	*1D4614
D337	5P1623	5P1652	5P1636	5P1658	5P1640	5P1647	1A5405 2H6488
D330C, D333C 1673C	5P1622	5P1651	5P1637	5P1659	5P2409	5P1648	1A5405
D315, D318	5P1620	5P1650	5P1635	5P1659	5P1639	5P1649	1A5405
D330, D333 1670, 1673	5P1621	5P1650	5P1638	5P1659	5P2409	5P1648	8S4740

CYLINDER BLOCKS THAT HAVE A SPACER PLATE
BLOCS-CYLINDRES AVEC PLAQUE DE TÊTE
MOTORBLÖCKE MIT ZWISCHENPLATTE
BLOQUES DE MOTOR QUE TIENEN PLANCHA ESPACIADORA

D334, 1674+	5P4174	5P1651+++	5P1637	5P1659	5P2409	5P4176	1D4588
D343, 1693, ++ D346, D348, D349	5P4173	5P1653+++	5P1634	5P1658	5P1641	5P4176	1D4614*
3406	5P4173	5P1653+++ 5P4177 5P4178	5P1634	5P1658	5P1641	5P4176	7B5163

*PART OF 5P1618 TOOL ARRANGEMENT. THE INSERTS AND OTHER TOOLS MUST BE ORDERED SEPARATELY.
+EXCEPT 556200 CYLINDER BLOCK
++EXCEPT 559500 CYLINDER BLOCK
+++EARLY INSTALLER ASSEMBLIES MUST BE REWORKED (MACHINED). SEE MACHINED DIMENSIONS FOR EARLIER INSTALLER ASSEMBLIES.

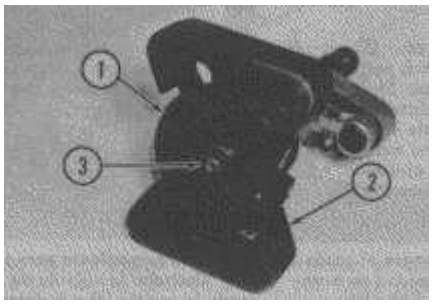
*FAIT PARTIE DE L'OUTILLAGE 5P1618. LES BAGUES RAPPORTÉES ET LES AUTRES OUTILS DOIVENT ÊTRE COMMANDÉS SÉPARÉMENT.
+SAUF BLOC-CYLINDRES 556200
++SAUF BLOC-CYLINDRES 559500
+++LES OUTILS DE MONTAGE DOIVENT ÊTRE RECTIFIÉS. VOIR COTES DE RECTIFIAGE DES OUTILS DE MONTAGE.

*TEIL DES WERKZEUGSATZES 5P1618. EINSÄTZE UND SONSTIGE WERKZEUGE MÜSSEN GETRENNT BESTELLT WERDEN.
+AUSSER MOTORBLOCK 556200.
++AUSSER MOTORBLOCK 559500.
+++FRÜHERE EINBAUSÄTZE MÜSSEN NACHGESCHLIFFEN WERDEN. SIEHE NACHSCHLEIFMASSE FÜR FRÜHERE EINBAUSÄTZE.

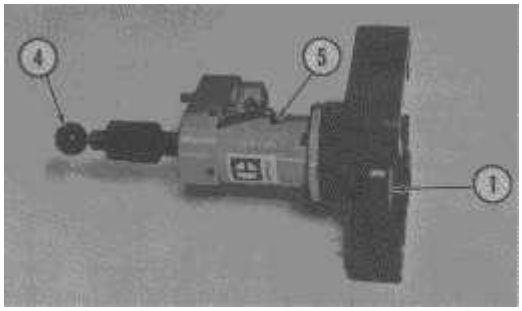
*PARTE DEL CONJUNTO DE HERRAMIENTAS 5P1618. LOS INSERTOS Y OTRAS HERRAMIENTAS DEBEN PEDIRSE POR SEPARADO.
+EXCEPTO BLOQUE DE MOTOR 556200
++EXCEPTO BLOQUE DE MOTOR 559500
+++LOS CONJUNTOS DE MONTADOR ANTIGUOS DEBEN MAQUINARSE. VER DIMENSIONES PARA EL MAQUINADO DE CONJUNTOS DE MONTADOR ANTIGUOS.

NOTE: Always remove the spacer plate from the cylinder block, on those engines that have a spacer plate, before doing the counterboring procedure.

1. Use a file to remove any rough places from the top surface of the cylinder block. Clean the top of the cylinder block to make it free from all foreign material. Also make sure the cylinder liner pilot bore is clean and free from all foreign material. This is necessary because the boring tool uses this area for alignment.

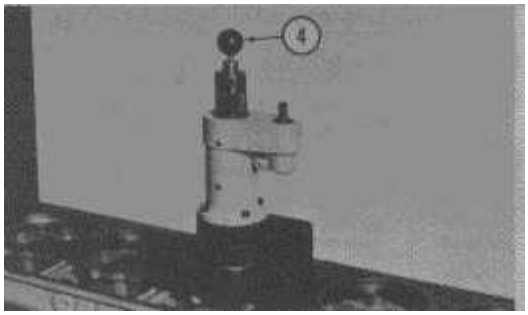


2. Assemble tool holder (1) onto boring tool (2). Make sure the tool holder slot is down and both the pilot on the boring tool and the pilot on the tool holder are clean. Install the washer and nut. Tighten nut (3) to 50 ± 5 lb. ft. (6.9± 0.7) torque.

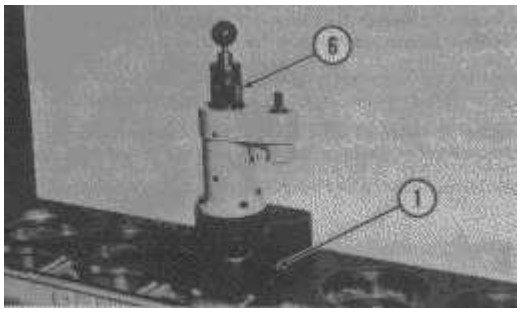


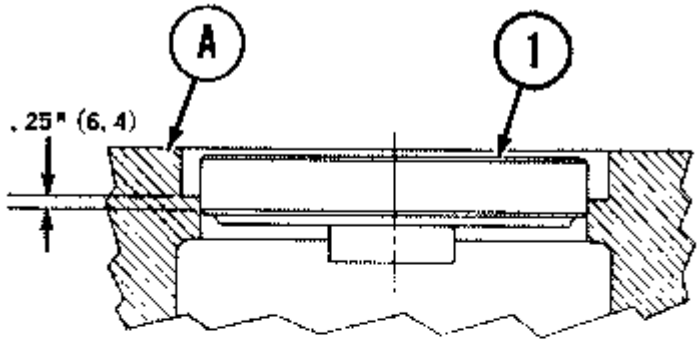
3. With the boring tool in the horizontal position, remove plug (5) and check the oil level in the hydraulic feed unit. Fill the unit with SAE10W, 20W, or 30W oil. Install plug (5). Loosen knob (4) to release the feed control valve and move tool holder (1) in and out several times. Remove plug (5) and again check the oil level. Fill with oil if necessary and install plug (5). Tighten knob (4).

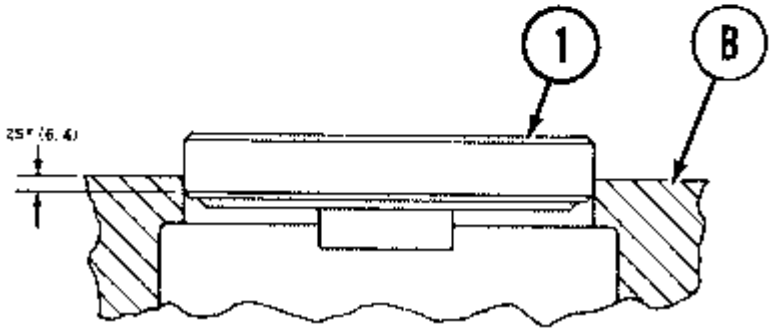
NOTE: If the oil level is low, the tool may not cut smoothly.



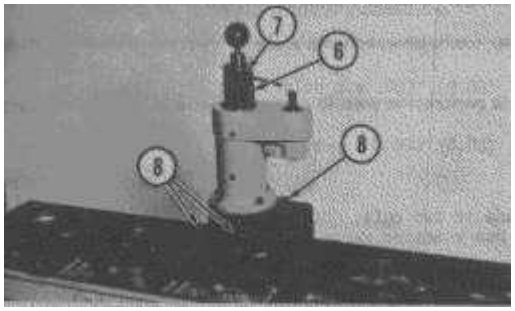
4. Install the boring tool on the cylinder block. Release the feed control valve by turning knob (4) counterclockwise; the tool holder will then move down into the cylinder liner pilot bore.





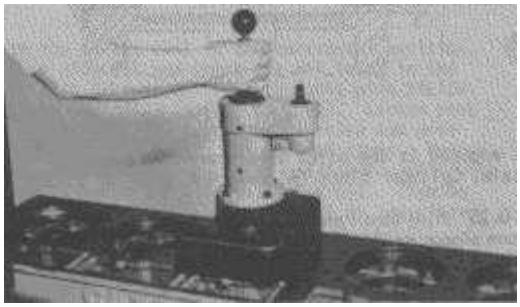


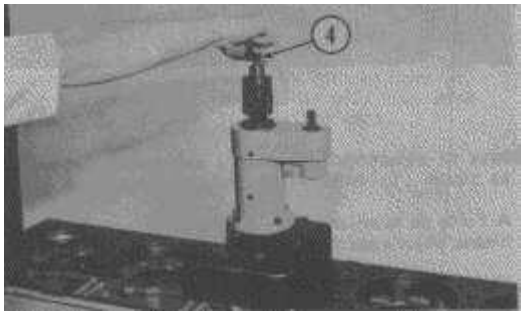
5. Make an adjustment to nut (6) until tool holder (1) is engaged in the pilot bore approximately .25" (6.4) as shown. Cylinder block (A) does not use a spacer plate; Cylinder block (B) does use a spacer plate.



6. Tighten screw (7), to hold nut (6) in place. Install a minimum of three bolts (8) and washers. Tighten bolts (8) just enough to hold the boring tool in place, yet loose enough to let the boring tool be moved if necessary. While turning the tool holder manually with nut (6), tighten bolts (8) to 50 ± 5 lb. ft. (6.9 ± 0.7) torque. The tool holder should turn freely after bolts (8) are tightened.

NOTE: To make the effect of gravity less when installing the boring tool on vee engine cylinder blocks (because the cylinder block faces are at an angle), push up on the boring tool as bolts (8) are tightened.





7. Manually pull the tool holder up out of the cylinder liner bore. Close the feed control valve by turning knob (4) clockwise.

The counterbore should be made in two cuts. Use the micrometer and the chart on page 7, when making the setting for the rough cut. Use a master gauge when making the tool setting for the finish cut.

NOTE: If tool chatter (rapid vibration of the tool) is felt during the cutting operations, check the following items:

1. The level of the hydraulic oil; see step 3 on page 4.

2. The drive chain; if it is loose, remove the chain guard and tighten the drive chain.

3. The cutting tool; if it is not sharp, see page 18.

4. The tool holder retaining nut; if it is loose, see step 2 on page 3.

● Cylinder Block Counterbore Dimensions

Cotes du chambrage

Maße der Gegenbohrung im Motorblock

Dimensiones para el rebaje en el bloque del motor

● Engine / Moteur / Motor / Motor	○ ● Cylinder Blocks That Do Not Use a Spacer Plate ○ Bloc-cylindres sans plaque de tête ○ Motorblöcke ohne Zwischenplatte ○ Bloques de motor sin plancha espaciadora		
●	Rough Ø ± .005" (0.13) Ø dégrossissage ± 0.005" (0,13) Grobdurchmesser ± 0,005" (0,13) Diámetro de corte de desbaste ± 0,005" (0,13)	Finish Ø ± .003" (0.08) Ø finition ± 0.003" (0,08) Feindurchmesser ± 0,003" (0,08) Diámetro acabado ± 0,003" (0,08)	Depth + .004" (0.10) - .002" (0.05) profondeur + 0.004" (0,10) - 0.002" (0,05) Tiefe + 0,004" (0,10) - 0,002" (0,05) Profundidad + 0,004" (0,10) - 0,002" (0,05)
D353,D379,D398,D399	7.535" (191.39)	7.800" (198.12)	.753" (19.13)
D339,D342 D364,D375,D386,D397	7.015" (178.18)	7.250" (184.15)	.690" (17.53)
5.4" 90° V8	6.525" (165.74)	6.785" (172.34)	.753" (19.13)
1693, D343	6.525" (165.74)	6.665" (169.29)	.753" (19.13)
D337	6.276" (159.41)	6.410" (162.81)	.690" (17.53)
D330C,D333C,1673C 3304,3306	5.660" (143.76)	5.800" (147.32)	.653" (16.59)
D375, D318	5.640" (143.26)	5.853" (148.67)	.528" (13.41)
D330,D333,1670,1673	5.516" (140.11)	5.800" (147.32)	.653" (16.59)

Cylinder Block Counterbore Dimensions Cotes du chambrage	Maße der Gegenbohrung im Motorblock Dimensiones para el rebaje en el bloque del motor		
Engine Moteur Motor Motor	c Cylinder Blocks That Use A Spacer Plate c Blocs-cylindres avec plaque de tête c Motor blöcke mit Zwischenplatte c Bloques de motor que tienen plancha espaciadora		
	Rough Ø ± .005" (0.13) Ø dégrossissage ± 0.005" (0,13) Grobdurchmesser ± 0,005" (0,13) Diámetro de corte de desbaste ± 0,005" (0,13)	Finish Ø ± .003" (0.08) Ø finition ± 0.003" (0,08) Feindurchmesser ± 0,003" (0,08) Diámetro acabado ± 0,003" (0,08)	Depth + .004" (0.10) - .002" (0.05) profondeur + 0.004" (0,10) - 0.002" (0,05) Tiefe + 0,004" (0,10) - 0,002" (0,15) Profundidad + 0, 004" (0,10) - 0, 002" (0,05)
D334, 1674+	5.660" (143.8)	5.800" (147.3)	.200" (5.1)
D334, 1693, D346 D348, D349 ++	6.525" (165.7)	6.665" (169.3)	.200" (5.1)
3406	6.525" (165.7)	6.665" (169.3)	.200" (5.1)

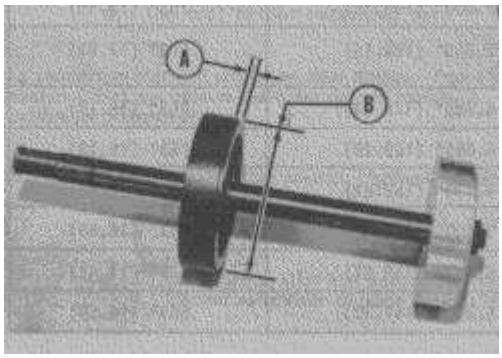
+Except 5S6200 Cylinder Block
++Except 5S9500 Cylinder Block

c +Außer Motorblock 5S6200
++Außer Motorblock 5S9500

+Sauf bloc-cylindres 5S6200
++Sauf bloc-cylindres 5S9500

c +Excepto Bloque de motor 5S6200
++Excepto Bloque de motor 5S9500

Machined Dimensions For Earlier 5P1651 And 5P1653 Installer Assemblies

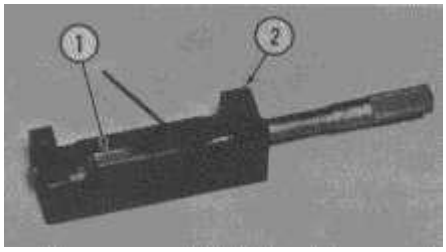


INSTALLER ASSEMBLY OUTIL DE MONTAGE EINBAU-SATZ CONJUNTO DE MONTA-DOR	DIMENSION (A) COTE (A) MASS (A) DIMENSION A	DIMENSION (B) COTE (B) MASS (B) DIMENSION B
5P1651	.180" (4.57)	+.000 +0.00 5.453-.005 (138.5-0.13)
5P1653	.180" (4.57)	+.000 +0.00 6.246-.005 (158.7-0.13)

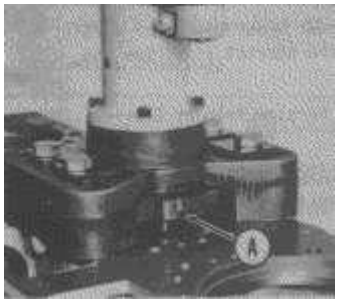
If the 5P1651 or 5P1653 Installer Assemblies are used for installing cylinder liner seats for 4.75" (120.7) or 5.4" (137.2) bore engines, the installers must be machined to the correct size. see the illustration and chart (bottom of page 8) for the dimensions needed.

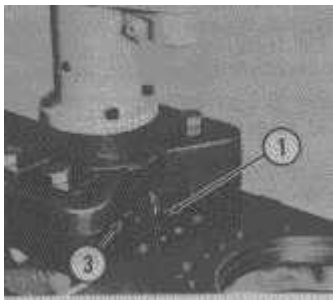
NOTE: The installer assemblies can also be sent to Porta Tool Inc., 812 Barstow Avenue, Clovis, California 93612, to be machined to the correct size.

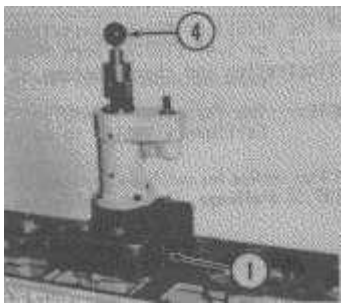
Making the Rough Cut



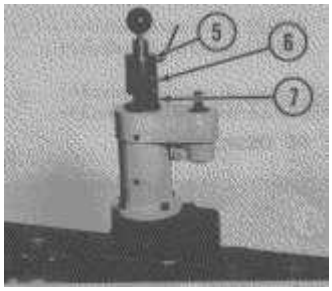
1. Put cutter (1 into micrometer fixture (2). Make an adjustment to cutter (1) to the dimension shown in the chart on page 7 or page 8. Example: for the D398 Engine the micrometer should read 7.535Ø (Ø191.38).







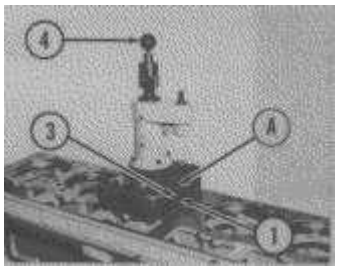
2. Clean tool holder slot (A) before installing the cutting tool. Install cutter (1) into slot (A). Pull cutter (1) out approximately .12" (3.2) over the to face of the cylinder block, while the setting for the depth of cut is made. Tighten screw (3). Carefully loosen knob (4) to lower the boring bar until cutter (1) is against the top face of the cylinder block.

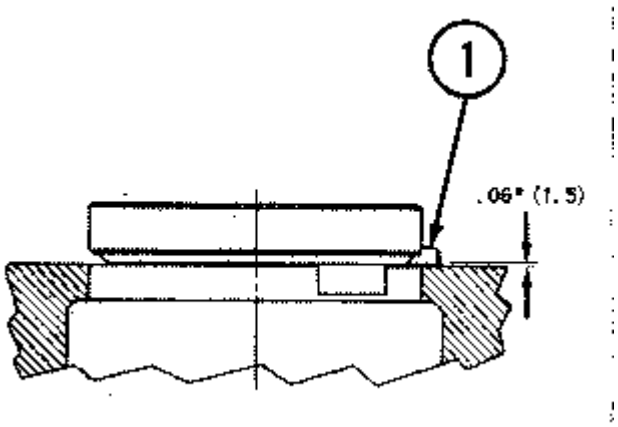


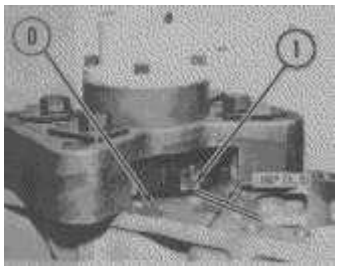
3. Loosen screw (5) until adjusting nut (6) is free. Install depth gauge (7) and make an adjustment to nut (6) until it is against gauge (7). Tighten screw (5), to hold nut (6) in place.

NOTICE

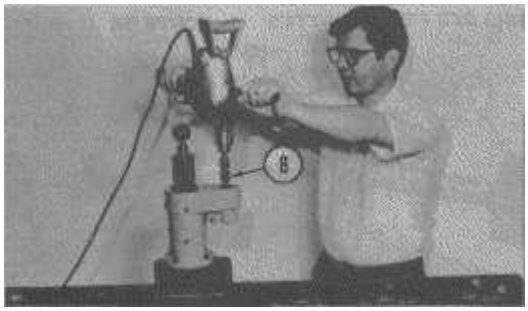
To prevent damage to the cutting tool, never hit the cutter or let it fall. Never turn the cutter backwards while it is in contact with the cylinder block.



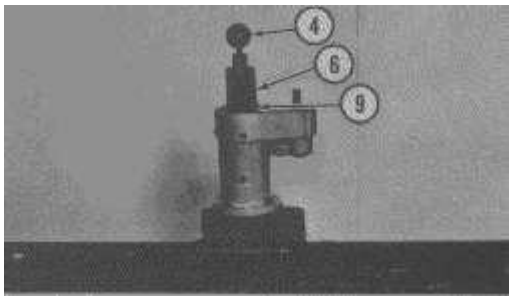




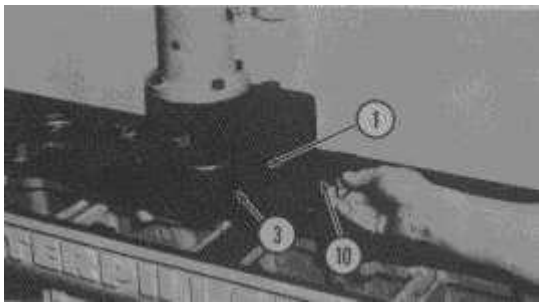
4. Turn knob (4) counterclockwise and lift the cutter so it is above the top face (D) of the cylinder block. Turn knob (4) clockwise to hold the toolholder in position. Loosen screw (3) and push the cutter tool into tool holder slot (A) as far as it will go, then tighten screw (#). Loosen knob (4) and lower cutter (1) until it is .06" (1.5) above the top face of the cylinder block. Tighten knob (4).



5. Use a heavy duty industrial drill and adapter (8)to operate the boring tool. Remove the depth gauge and start the rough cut.

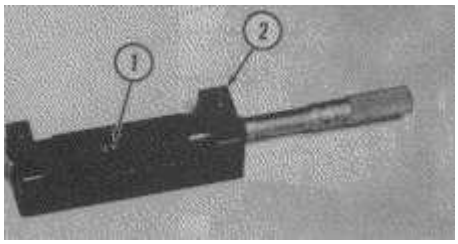


6. Stop the cutter rotation immediately when adusting nut (6) is against positive stop (9). Loosen knob. (4).

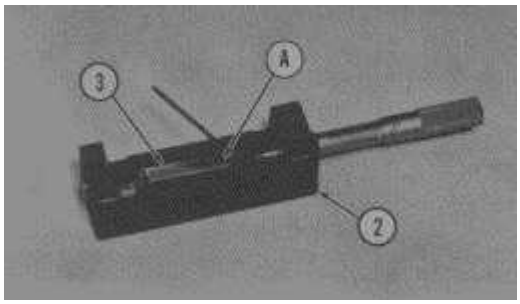


7. Lift the cutter out of the cylinder block and tighten knob (4) again. Loosen screw (3) and remove cutter (1) with 5P1656 Hook (10).

Making The Finish Cut



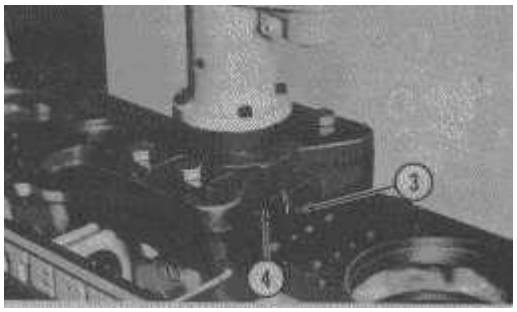
1. Put master gauge (1) into micrometer fixture (2); make sure the side having the mark, UP, is on top. Make an adjustment to micrometer (2) until the micrometer stem is against the master gauge. The micrometer should then read the same as the dimension given on the side of master gauge (1).

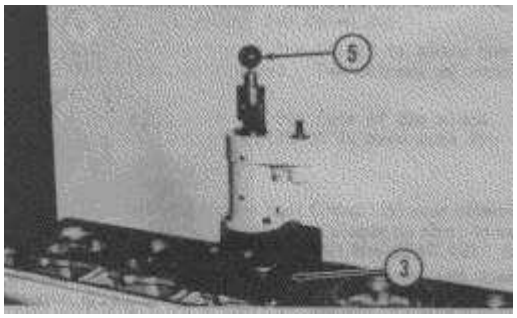


2. Remove the master gauge and put cutter (3) into micrometer fixture (2). Make an adjustment to cutter (3) until it is the exact same size as the master gauge.

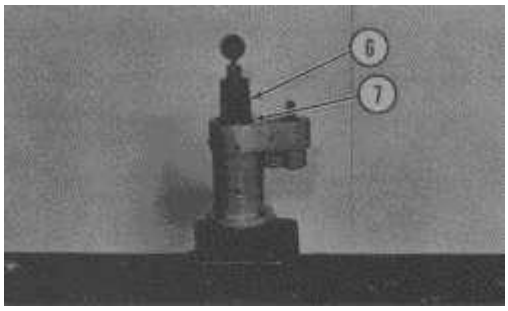
NOTICE

Be careful not to loosen screw (A) too fast, because the adjustment of cutter (3) has a spring load behind it and damage may be caused to the cutting edge.

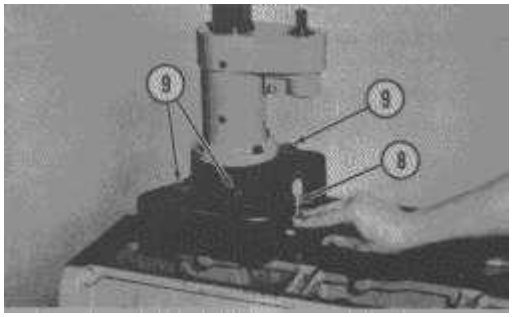




3. Clean the tool holder slot carefully before installing the cutting tool. Install cutter (3) into the slot, and push the tool back into the slot as far as it will go. Tighten screw (4). Lower cutter (3) until it is .06" (1.5) above the top face of the cylinder block. Close the feed control valve by turning knob (5). Start the finish cut.

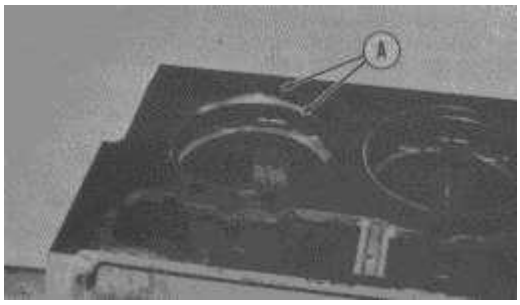


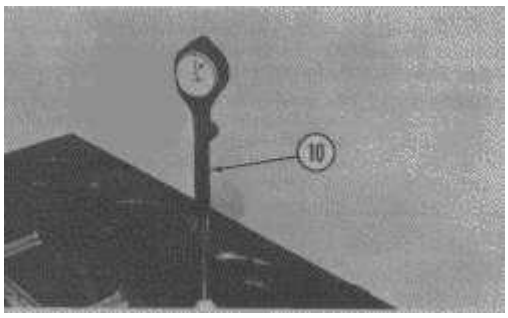
4. Make the complete finish cut without stopping. Stop the cutter rotation immediately when adjusting nut (6) is against positive stop (7).



5. Check the bottom of the counterbore to see if it is smooth. It may be necessary to turn the boring bar very slowly for several revolutions to get a smooth finish on the bottom of the counterbore.

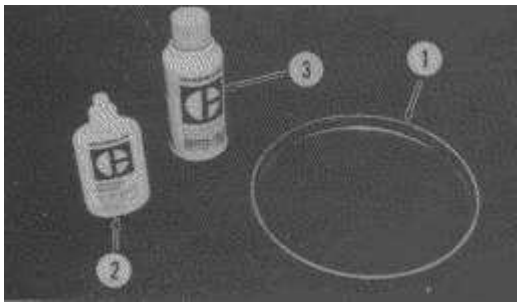
NOTE: The depth of the counterbore can be checked with depth micrometer (8). The chart on page 7 or 8 gives the correct dimension. Remove bolts (9) and lift the tool group from the cylinder block.

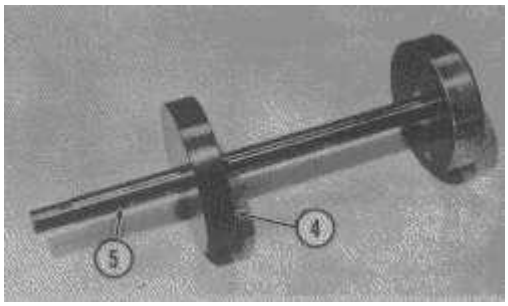




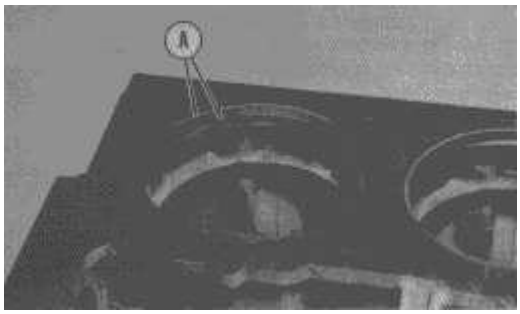
6. Use emery cloth to remove sharp edges (A) from the counterbore. The inside diameter of the counterbore can be checked with 1P3537 Dial Bore Gauging Group (10) and again see the chart on page 7 or 8 for the correct dimension.

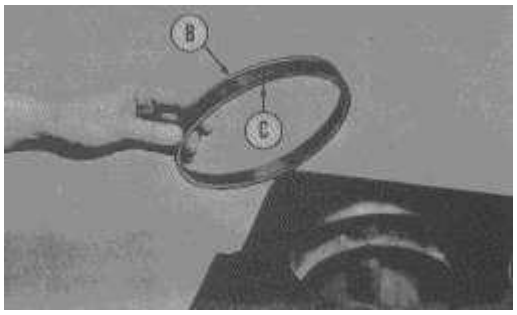
Installing Counterbore Inserts





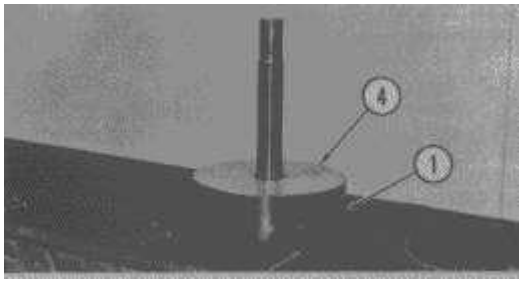
1. Tools needed when installing insert (1) are 9S3265 Retaining Compound (2), 8M8060 Quick Cure Primer (3), installer assembly (4) and 5P1657 Top Shaft (5).

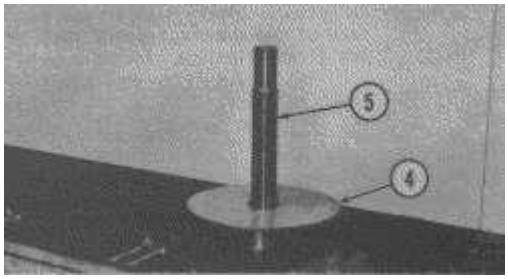




2. Carefully clean the counterbore area of all chips and foreign material. Put some 8M8060 Quick Cure Primer all over the counterbore area. Put a thin ring of the 9S3265 Retaining Compound around diameters (A) of the counterbore area.

NOTE: If any cracks can be seen, put a thin ring of 9S3265 Retaining Compound along the complete length of the crack. Put 8M8060 Quick Cure Primer on the insert. Put a thin ring of 9S3265 Retaining Compound around diameter (B) and lower face (C) of the insert.





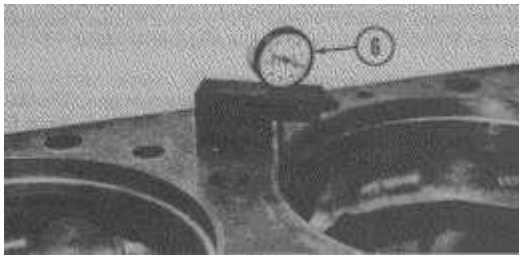
3. Install insert (1) and installer assembly (4) into the cylinder block. Hit shaft (5) with enough force to put the insert into place.

NOTE: Use a hammer with a minimum size of six pounds.

NOTICE

Make sure the insert is against the bottom of the counterbore. If the insert is not against the bottom, the liner projection will not be correct when the cylinder head is installed.

NOTE: When installing an insert in a 4.75" (120.7) or 5.4" (137.2) bore engine that uses a spacer plate, the earlier 5P1651 or 5P1653 Installer Assemblies must be machined before they can be used to install an insert. See MACHINED DIMENSIONS FOR EARLIER 5P1652 AND 5P1653 INSTALLER ASSEMBLIES.



4. Use a 1P5510 Liner Projection Tool Group (6) to check the assembled height of the insert. See Special Instruction GMG00623. On counterbored cylinder blocks, the indicator should read zero to -.007" (-0.18). On spacer plate cylinder blocks, the indicator should read +.001" to +.008" (+0.03 - +0.20).

NOTICE

On cylinder blocks that do not have a spacer plate, if the top of the insert is above the top face of the cylinder block, that part of the insert must be removed. Two methods of removal are given below:

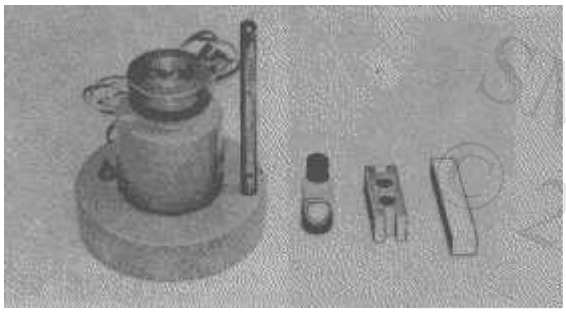
1. Use a file, carefully, to make the insert even with the top face of the block.

2. Install the boring tool again to cut away the insert until it is even with the top face of the block.

---

5. Use the 8S3140 Cylinder Block Counterboring Tool Group to cut the cylinder liner counterbore to the correct depth or to machine the cylinder liner seat for engines that have a spacer plate; see the Special Instruction Form FM055228-02.

Cutters that are not sharp can be sent to: Porta-Tool, Inc., P.O. Box 307, Clovis, California 93612, to be resharpened (made sharp again).



A Cutter Sharpener Model No. PBS-203, shown above, is available from Porta-Tool, Inc.

PIP-10179815
2024/02/23
05:25:11-06:00
SMHS88390001