

BHJ Products, Inc.

Parts List & Instructions

Product Name: **Lifter-Tru Kit for Chevrolet Big Block V8**
BHJ Part#: **LTK-CHB**

Page 1 of 5

Kit Contents:

2x End Plates	1x Positioning Ring *
1x Front Angle Bracket	2x Threaded Adjustment Sleeves
4x Angle Adapter Blocks * (2 Intake, 2 Exhaust)	2x 1/4-20 x 2.5" Hex Head Bolts & Washers
1x Cam Tunnel Mandrel *	1x 3/8 x 2" OD Clamp Washer
1x Upper Guide Plate *	8x 3/8-16 x 1" Allen Head Bolts
1x Piloted Cutter (Customer Specified Diameter)	4x 3/8-16 x 1.75" Allen Head Bolts *

Items with * included in Lifter-Tru Step-Up Kit.

Description

BHJ's Lifter-Tru Kit blueprinting fixture allows machinists to re-machine the lifter bores and correct their position in an engine block front-to-rear and up-and-down, as well as to restore the correct lifter bore angle as referenced from the cam-crank centerline. In addition, blocks without finished lifter bosses may also be machined with new lifter bores, with the addition of optional cutters in the process.

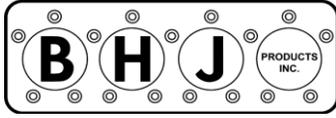
***NOTE: Since most shops utilize a Bridgeport or similar style vertical milling machine, bear in mind that it will be necessary to install a column riser under the head of the machine to achieve a minimum of 20-1/2" of "Z" axis height to accommodate this fixture.**

Instructions

Block Preparation

Align bore the mains prior to using the Lifter-Tru if it is your intention to do so. The ultimate end result will be achieved if the camshaft-bearing bores are align-bored. This should be done by zeroing-in on the rear bearing. The location of this rear bearing is critical, since it establishes the distributor gear mesh. The objective is to bore the cam tunnel parallel to the mains. Install the front and rear cam bearings into the cylinder block. If the block uses oversize, or roller cam bearings, it will be necessary to install optional Cam Tunnel Mandrel Adapter Sleeves in the front and rear bearing bores, which must be purchased separately.

***NOTE: All timing cover and bellhousing dowels must be removed from engine block before installation into the Lifter-Tru fixture.**



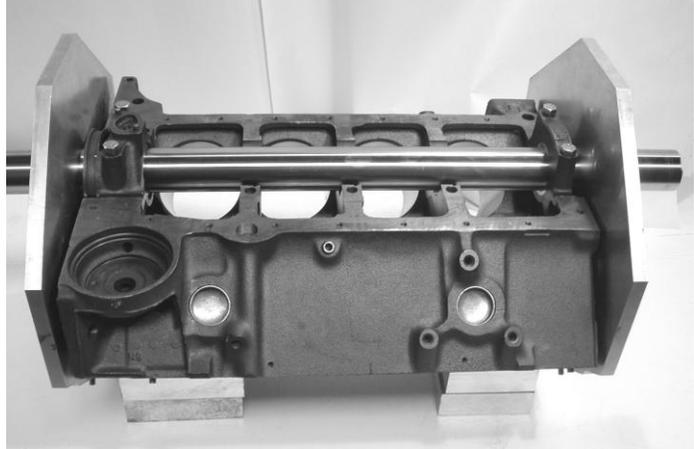
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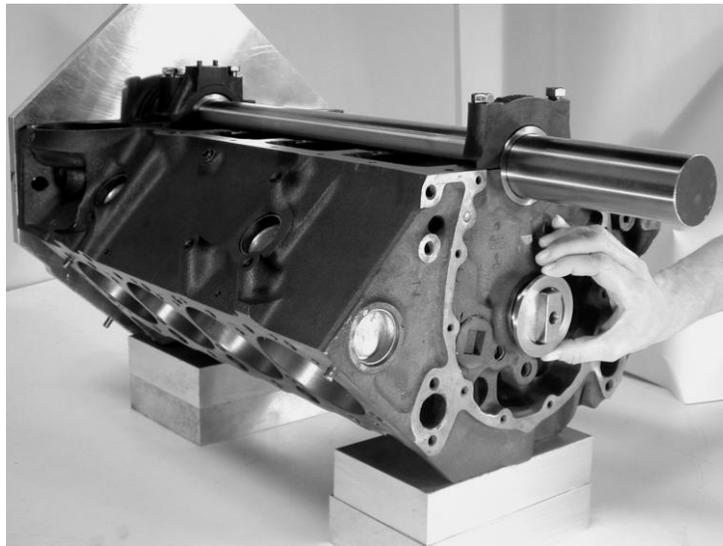
Page 2 of 5

1. Set the cylinder block on a bench, upside down, with a pair of wooden blocks underneath the intake valley rails to elevate it as shown in photo to right.

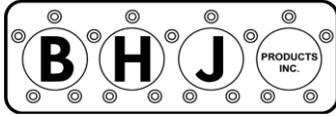
Install the 2-Inch Precision Support Bar and Main-bearing Bore Adapter Rings in the main bearing bore of the block with the Rings registering in the #1 and #5 bearing bores. Attach and torque the #1 and #5 main bearing caps to spec.



2. Slide the Cam Tunnel Mandrel into the block with the "F" end toward the front of the block. The #1 and #5 cam bearings should be installed in the block to properly center the Mandrel. The Mandrel's drill bushings should be in line with and directly below the lifter bores and the end of the Mandrel should protrude slightly from the front of the block. Install the Positioning Ring over the Cam Tunnel Mandrel and slide it back until it contacts the cam thrust surface, as seen in photo below.



3. Gently slide the front and rear Fixture Plates onto the 2-inch Main-bearing Bar. The fixture plate with the tapped holes installs at the front of the block, with the engraved side facing out. The rear plate mounts with the "R" facing out. Slide the Angle Bracket onto the front end of the 2" Bar. Align and install three 3/8"-16 X 1" Allen Bolts. Tighten the three bolts that clamp the bracket to the 2" bar, then install and tighten the



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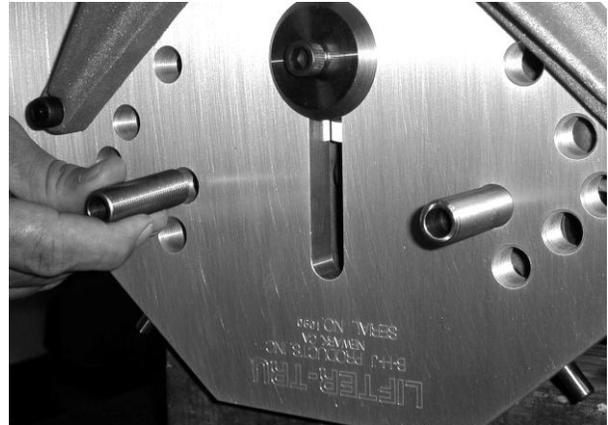
Product Name: **Lifter-Tru Kit for Chevrolet Big Block V8**
BHJ Part#: **LTK-CHB**

Page 3 of 5

three bolts that fasten it to the end plate. (Once installed the first time, the Angle Bracket may remain permanently bolted to the Front Plate for future use.)

4. Slide the front Fixture Plate backward until it contacts the installed Positioning Ring.

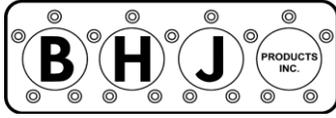
5. Install 3/8-16 x 1" Allen Bolt with 3/8 x 2" washer through the Front Plate, into the Cam Tunnel Mandrel and tighten. Then install the threaded Adjustment Sleeves into the two holes in the Front Plate which line up with the timing cover bolt-holes and lightly screw them in until they touch the front of the block, as seen in photo to right. Install the 1/4-20 Locking Bolts through each Adjustment Sleeve and tighten, thus securing the Front Plate to the engine block.



6. Turn the assembly over so that it rests on the bottom edges of the End Plates with the doweled edges facing upward. Install one pair Angle Adapter Blocks (intake "CHB-INT" or exhaust "CHB-EXH") on the dowels located on the top edges of the End Plates with the side marked "OUT" facing outward. Fasten using the four 3/8-16 x 1.75" Allen Bolts. Install the Upper Guide Plate on the dowels located on the top edges of the Angle Adapter Blocks. Fasten using the four 3/8-16 x 1" Allen Bolts. Slight forward or backward repositioning of the rear End Plate may be necessary so the Upper Guide Plate will install completely onto the alignment dowels.

7. At this point, if you intend to finish the lifter bores to .875", it is wise to insert the .875" Cutter, or optional Alignment Pilot into each lifter bore, to be sure that all 16 bores will clean-up. It has been found that while one bank of lifters may be correctly positioned, the other may be sufficiently far out of position to the front or rear that they will not clean-up. If this is the case there are three alternatives; 1.) Give the block away. 2.) Enlarge the bores to 1" and sleeve them. 3.) Remove the Positioning Ring and reposition the threaded Adjustment Sleeves until both banks will clean up. (Though this third compromise may assure all 16 bores will clean-up, the bores will not be aligned to the blueprint-correct location.)

8. Place the complete assembly onto the milling machine table. Tilt the head back 4° to line up with the Exhaust lifter bores and forward 2-1/4° to line up with the Intake lifter bores. Liberally grease the bushings in the Upper Guide Plate. Insert the Piloted Cutter down through the Upper Guide Plate into the lifter bore. Be sure the pilot on the nose of the Piloted Cutter engages the drill bushing in the Cam Tunnel Mandrel prior to starting the cut. Position the assembly so that the spindle can be brought down over the cutter shank and tighten the 3/4" collet. Experience indicates that it is not necessary to clamp the assembly to the mill table, however it is recommended that an



BHJ Products, Inc.

Parts List & Instructions

Product Name: **Lifter-Tru Kit for Chevrolet Big Block V8**
BHJ Part#: **LTK-CHB**

Page 4 of 5

anti-rotation stop be inserted in a table slot. Turn on power to the machine and machine lifter bores following the speed and feed instructions shown in section 9 below.

9. Cutters supplied with the Lifter-Tru are first quality, high speed steel tools. The following information is supplied by the manufacturers for optimum tool life and surface finish:

Speed: 40–60 RPM

Power Feed: .006–.012" Per Revolution

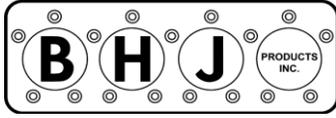
Coolant: Flood or High Pressure Mist with soluble oil. The coolant is of the utmost importance. By either flooding the cutter or using a high pressure mist, not only is the cutter kept cool but more importantly, the chips are constantly flushed away preventing scoring of the finish. Experience shows that either type of cutter supplied gives a mirror finish when used according to the above recommendations.

NOTE: BHJ Lifter-Tru Piloted Cutters are available in two pilot lengths, "Standard" Pilot and "Long" Pilot.

Standard Pilot-length cutters incorporate a 2.0625" length pilot and will accommodate OEM-configuration lifter boss heights in the majority of blocks.

In cases where a block has a taller lifter boss, as is the case with many aftermarket blocks, GM LS-Series blocks and others, it is necessary to begin cutting the lifter bore using an equivalent-size Long Pilot Cutter. The pilot length of Long Pilot Cutters is 2.250". In some cases, it is necessary to begin cutting the lifter boss using a Long Pilot Cutter and finish the cut with a Standard Pilot Cutter, as the longer pilot may bottom-out in the cam tunnel of the block before completing the cut.

10. If this kit comes as a "Step-Up" it may be necessary for you to drill and tap adjustment sleeve holes in your front end plate. A sketch giving the positions for these holes may be attached in this case.



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BHJ Part#: **LTK-CHB**

Page 5 of 5

The following accessories are available to complement your Lifter-Tru:

Alignment Pilot

Insert this pilot in place of the cutter to determine if the lifter bore is out of position. Also used to determine if a .843" hole will clean-up at .875", as well as if a .875" hole will clean-up at .906".

Angle Adapter Feet

Mimic the angle of the intake and exhaust Angle Adapter Blocks, which will align the Cutter at 90 degrees to the table surface, thus eliminating the need to tilt the mill head.

Bushing Installation Drivers

Simplifies Bushing installation.

1.062" Cutter and Top Guide Plate

Allows installation of 1.062" OD Lifter Bushings.

Cam Tunnel Mandrel Adapter Sleeves

Allows use of Cam Tunnel Mandrel in blocks with oversized cam bearings, including roller-bearings.

Oil Galley Drill

3/8" or 7/16" diameter, 18" long drill for ease in re-drilling oil holes in blocks.

Lifter Bore Hone

Rigid type hone for final sizing of lifter bores. Accommodates bore sizes from .843 through .937. Larger size adapters available separately.

Dial Bore Gauge

Dial Bore Gauge for .750-1.500" I.D. measurements to accurately check lifter bore dimensions.

Call BHJ at (510) 797-7680 or email at sales@bhjinc.com with any questions regarding additional Lifter-Tru options.