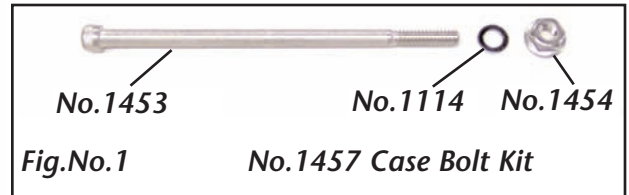




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INSTRUCTION SHEET FOR TWIN CAM BIG BORE KITS No's. 1501, 1501B, 1519, THRU 1528, & 1548, THRU 1551



Alpha Applications: 100" & 106" Big Bore kits are for use on Alpha 99-06 or Beta 00-06 Twin Cam Engines with H-D flywheels
110" & 117" Use on Alpha 07 - Pres. Twin Cam Engines with H-D Flywheels
120" Use with JIMS Alpha flywheels kits No. 1881, 1882 or Beta No. 1886
124" Use with JIMS Alpha flywheels kits No. 1883, 1884 or Beta No. 1888

ATTENTION!

Please read all instructions completely and thoroughly before performing any work. Prior to installation of this kit please read and follow the procedures and safety precautions to reduce the risk of personal injury. Read instructions completely so you understand before performing any steps. Always disconnect battery cables to prevent injury. Your work place should be clean and well lit, wear safety glasses and protective clothing when working around power tools and compressed air. Follow instructions in H-D® Service Manual for removal and disassembly of engine for your year and model. With engine removed from frame and bolted to one of JIMS engine stands, follow the disassembly instructions in the service manual to disassemble engine.

Clean all parts thoroughly including gasket surfaces, and inspect all parts for visible damage. Measure all parts for wear using the service wear limit section in the H-D® Service Manual. Check all threaded holes. JIMS® suggest using the latest cylinder studs from H-D® or Screamin' Eagle®. Replace any worn or damaged parts with JIMS® engine parts or equivalent.

The installation of all Big Bore Kits will require the cases to be bored to accept 4" or 4-1/8" bore cylinders (use JIMS® No.1408 Case Boring Fixture.) Follow the instruction sheet No.1177-IS before machining cases.

NOTE: IF YOU DO NOT KNOW WHAT YOU ARE DOING, DO NOT DO IT! ALWAYS WEAR SAFETY GLASSES OR OTHER FACE AND EYE PROTECTION SUCH AS FULL FACE SHIELD. JIMS® IS NOT RESPONSIBLE FOR DAMAGE, INJURY, OR YOUR WORK. JIMS® IS NOT RESPONSIBLE FOR THE QUALITY AND SAFETY OF YOUR WORK.

The following components are recommended by JIMS® for use with JIMS® Big Bore and stroker kits.

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INSTRUCTION SHEET FOR TWIN CAM BIG BORE KITS No's. 1501, 1501B, 1519, THRU 1528, & 1548, THRU 1551

Caution: All 100", 106" and 110" kits include pistons designed for Stock H-D 85cc heads. All 117", 120" and 124" kits include pistons designed for S/E 95cc heads. If the heads you will be using have different valve sizes or combustion chamber size, it will be your responsibility to check and confirm all piston to valve, valve to valve clearances, and the compression ratio.

NOTE: All stock 2003-Present Twin Cam engine cases must be built with JIMS 959, Twin Cam Timken Case Bearing Conversion Tool. You will also need a Twin Cam Service Manual (pre 2003) having information about setting up the left Timken bearing and torque specs for the motor sprocket nut. Due to the higher compression ratio created by the above Big Bore kits, your starter system efficiency may be reduced and may become prematurely damaged. JIMS® recommends installing high-output starter components: See JIMS website or catalog pages for our High Performance Super Flex heavy-gauge battery cable sets, JIMS® 1.8K High Torque Starters, JIMS® High Torque starter ring and pinion gear set, and JIMS® No. 727K Compression Release Valves. Also recommended is a High Output battery.

Another issue you may need to address is to install a No.721 JIMS manifold spacer kit depending on the manifold used on your application.

COMPRESSION RELEASE VALVES Manual (MCR)

Compression release valves are a must when building large displacement engines. These valves will manually vent cylinder compression to the atmosphere at startup.

Install JIMS® Compression Release Valves with JIMS® installation tool No.1169 for Twin Cam, or use JIMS® tapping tool No.1169-1 for all other engines.

No.727K - Use on all Big Twin, Sportster, and Buell.

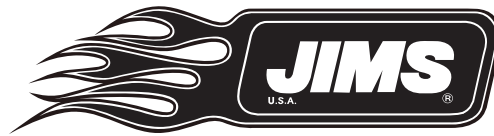
See JIMS Catalog and or www.jimsusa.com for further information, or call 805-482-6913.

Also available is the Screamin' Eagle Automatic Compression Release Tool (ACR) H-D No. 94648-08.

WARNING: "Beta" Engine kits must never be revved any higher than 6,200 RPM! Your Balanced flywheels ship with a pressed on balancer drive sprocket. This sprocket has been tested and proven to protect against potential damage caused by over-revving the engine past 6,200 RPM. THIS GEAR WILL MOVE DUE TO OVER-revving. Your flywheels will NOT be warranted against movement of this sprocket due to over revving. In addition to this, the pressed on sprocket is not available separately.

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Recommended Tools:

Part No.	Description
JIMS® No.2234	Primary drive locking tool (A must). Not for '06 Dyna and all '07 to present Big twin models. Use a primary locking bar
JIMS® No.1288	Crankshaft guide (A must)
JIMS® No.1283	Cam chain tensioner tool (A must for spring type tensioners)
JIMS® No.1285 or No.994	Cam/crank sprocket lock tool (A must)
JIMS® No.1276	Wristpin remover / installer (A must)
JIMS® No.1047TP or No.995	Crank assembly removing tool (A must)
JIMS® No.1048	Hard cap (A must)
JIMS® No.39361-69	Motor sprocket seal installation tool (A must)
JIMS® No.1022	Engine stand, see catalog for different engine applications (A must)
JIMS® No.97225-55	Sprocket shaft bearing installation tool (A must)
JIMS® No.1745	Timken bearing simulator (As needed)
JIMS® No.1169	Compression Release Drilling Tool
JIMS® No.1408	Case Boring Tool for all Twin Cam engines
JIMS® No.959	Timken Case Bearing Conversion Tool for all 2003 and up Twin Cam engines
JIMS® No.2246	Timken bearing race installer (A must)
JIMS® No.1458	Case Bolt Spot Facing Tool
JIMS® No.1235	Piston Ring Expander Tool
JIMS® No.1236	Piston Ring Compressor Set
JIMS® No.1255	Ring Gap Grinder Tool
JIMS® No.769	Piston Pin clip Installer / Remover

- Feeler gauge set, including .0015" through .040" blades
- 12 point 1/2" deep socket (3/8" drive)
- Non abrasive scouring pad & dish soap for cleaning cylinder bores.
- 3/8" drive torque wrench (0-25 ft/lbs)
- 13mm deep socket (3/8" drive)
- Clean pair of mechanics gloves

The following is a list of JIMS parts that may be needed to build a Big Bore Kit.

Part No.	Description
No. 1457	Big bore center case bolt kit, included in all 4-1/8" bore kits (optional for use on 4" Big bore kits). See Fig. 1
No. 1458	Case bolt spot facing tool (optional, must order separately) See Fig 2
No. 857	Set of 4.000 " bore, head and base gaskets (for 100", and 110" kits)
No. 873	Set of 4.125 " bore, head and base gaskets (for 106", 117", 120", and 124")

The following parts have been included in the kits listed below. Please make sure all parts have been included in the kit you have received:

Follow H-D® or Clymer Service Manual for installation of all parts that are not included in these Big Bore kits.

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The following instructions are to be followed for checking the running clearances in a mock up style for

No. 1501 100" Silver Kit

Part No.	Qty	Description
No. 1516-1	1	100" Front silver cylinder
No. 1516-2	1	100" Rear silver cylinder
No. 1603-1	1	100" Front piston w/pin
No. 1603-2	1	100" Rear piston w/pin
No. 1491	1	100" Two piston ring set
No. 1604	4	Wrist pin clip

No. 1501B 100" Black Kit

Part No.	Qty	Description
No. 1515-1	1	100" Front black cylinder
No. 1515-2	1	100" Rear black cylinder
No. 1603-1	1	100" Front piston w/pin
No. 1603-2	1	100" Rear piston w/pin
No. 1491	1	100" Two piston ring set
No. 1604	4	Wrist pin clip

No. 1522 110" Silver Kit

Part No.	Qty	Description
No. 1518-1	1	110" Front silver cylinder
No. 1518-2	1	110" Rear silver cylinder
No. 1615-1	1	110" Front piston w/pin
No. 1615-2	1	110" Rear piston w/pin
No. 1491	1	110" two piston ring set
No. 1604	4	Wrist pin clip
No. 1902	2	Piston oil jet assembly

No. 1521 110" Black Kit

Part No.	Qty	Description
No. 1517-1	1	110" Front black cylinder
No. 1517-2	1	110" Rear black cylinder
No. 1615-1	1	110" Front piston w/pin
No. 1615-2	1	110" Rear piston w/pin
No. 1491	1	110" two piston ring set
No. 1604	4	Wrist pin clip
No. 1902	2	Piston oil jet assembly

No. 1520 106" Silver Kit

Part No.	Qty	Description
No. 1504-1	1	106" Front silver cylinder
No. 1504-2	1	106" Rear silver cylinder
No. 1614-1	1	106" Front piston w/pin
No. 1614-2	1	106" Rear piston w/pin
No. 1286-1354	1	106" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit

No. 1519 106" Black Kit

Part No.	Qty	Description
No. 1503-1	1	106" Front black cylinder
No. 1503-2	1	106" Rear black cylinder
No. 1614-1	1	106" Front piston w/pin
No. 1614-2	1	106" Rear piston w/pin
No. 1286-1354	1	106" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.

No. 1524 117" Silver Kit

Part No.	Qty	Description
No. 1504-1	1	117" Front silver cylinder
No. 1504-2	1	117" Rear silver cylinder
No. 1616-1	1	117" Front piston w/pin
No. 1616-2	1	117" Rear piston w/pin
No. 1286-1354	1	117" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1523 117" Black Kit

Part No.	Qty	Description
No. 1503-1	1	117" Front black cylinder
No. 1503-2	1	117" Rear black cylinder
No. 1616-1	1	117" Front piston w/pin
No. 1616-2	1	117" Rear piston w/pin
No. 1286-1354	1	117" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1526 120" Alpha Silver Kit

Part No.	Qty	Description
No. 1506-1	1	120" Front silver cylinder
No. 1506-2	1	120" Rear silver cylinder
No. 1611-1	1	120" Front piston w/pin
No. 1611-2	1	120" Rear piston w/pin
No. 1286-1354	1	117" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1525 120" Alpha Black Kit

Part No.	Qty	Description
No. 1505-1	1	120" Front black cylinder
No. 1505-2	1	120" Rear black cylinder
No. 1611-1	1	120" Front piston w/pin
No. 1611-2	1	120" Rear piston w/pin
No. 1286-1354	1	117" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

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**INSTRUCTION SHEET FOR TWIN CAM BIG BORE KITS
No's. 1501, 1501B, 1519, THRU 1528, & 1548, THRU 1551**

No. 1549 120" Beta Silver Kit

Part No.	Qty	Description
No. 1506-1	1	120" Front silver cylinder
No. 1506-2	1	120" Rear silver cylinder
No. 1611-1	1	120" Front piston w/pin
No. 1611-2	1	120" Rear piston w/pin
No. 1286-1354	1	117" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1548 120" Beta Black Kit

Part No.	Qty	Description
No. 1505-1	1	120" Front black cylinder
No. 1505-2	1	120" Rear black cylinder
No. 1611-1	1	120" Front piston w/pin
No. 1611-2	1	120" Rear piston w/pin
No. 1286-1354	1	117" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1528 124" Alpha Silver Kit

Part No.	Qty	Description
No. 1506-1	1	124" Front silver cylinder
No. 1506-2	1	124" Rear silver cylinder
No. 1617-1	1	124" Front piston w/pin
No. 1617-2	1	124" Rear piston w/pin
No. 1286-1354	1	124" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1527 124" Alpha Black Kit

Part No.	Qty	Description
No. 1505-1	1	124" Front black cylinder
No. 1505-2	1	124" Rear black cylinder
No. 1617-1	1	124" Front piston w/pin
No. 1617-2	1	124" Rear piston w/pin
No. 1286-1354	1	124" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1551 124" Beta Silver Kit

Part No.	Qty	Description
No. 1506-1	1	124" Front silver cylinder
No. 1506-2	1	124" Rear silver cylinder
No. 1617-1	1	124" Front piston w/pin
No. 1617-2	1	124" Rear piston w/pin
No. 1286-1354	1	124" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

No. 1550 124" Beta Black Kit

Part No.	Qty	Description
No. 1505-1	1	124" Front black cylinder
No. 1505-2	1	124" Rear black cylinder
No. 1617-1	1	124" Front piston w/pin
No. 1617-2	1	124" Rear piston w/pin
No. 1286-1354	1	124" two piston ring set
No. 1604	4	Wrist pin clip
No. 880-1	2	Big bore tappet cover gasket
No. 1457	1	Big bore center case bolt, washer & nut kit.
No. 1902	2	Piston oil jet assembly

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the following engine components. All checking and removal of material will be performed on the left case first. After you are satisfied with all your clearance checks, any modifications made to the left case must be done on the right case.

The best way to indicate where to make modifications to right case, is with cases bolted together (held with two case bolts). Mark a line where material was removed from left case to right case. Remove the marked material from right case, to match the left case.

After you have bored the engine case for cylinders and before installing the Timken Case Bearing Conversion insert (on 2003 and up), clean cases of all machining material.

When checking for all running clearances, do not skip any of the following checks.

*Mask off all bearings and all oil holes. Optional top center case bolt is offered as stock replacement for the center case bolt (the one between both cylinders). This new bolt is 1/4" x 4- 3/4" long to clear both cylinder spigots. You will need to drill the right case to clear for this bolt. You will have to remove center case material that has been left over from case boring. Use JIMS Case Bolt Spot Facing tool No. **1458** shown on page one for this function. See tool's instruction sheet No **1458-IS** on www.jim-susa.com*

*See instruction sheet No. **1457-IS** that comes with the center Case Bolt kit. Also see instruction sheet No. **1177-IS** (See web site or call sales and request info) for more center case bolt information.*

*For all kits having a 4.125" bore, we include a Center Case Bolt kit No **1457** (shown above. Optional for 4.000" bore kit) When performing any case bolt hole modifications, always remove any case material that may fall or crack off during engine operation. **See Fig 3***

Keep all parts and tools clean. Keep bearings and oil passages masked off and/or covered at all times.

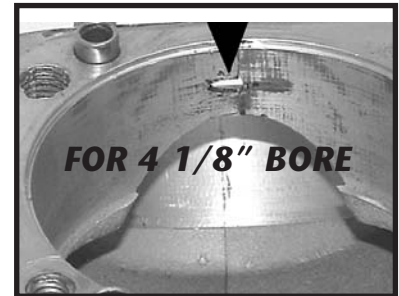


Fig.3

- 1.** Install a new Timken bearing H-D No. 9028 on the sprocket shaft. Use JIMS® No. **97225-55** Sprocket shaft bearing installation tool per instruction sheet with tool. Next install both Timken bearing races in case, with JIMS® No. **2246** Timken bearing race installer. Use per instruction sheet with tool. With flywheel assembly checked in left case by using JIMS® No. **1745** Timken Bearing Simulator. At this point you should have the center case bolt ready to be installed and center case material removed as needed. Install one bearing on flywheel sprocket shaft, with both Timken bearing races installed in a clean case. Next place flywheel in left case with No. **1745** Timken Bearing Simulator holding flywheel in position. You can hold this mocked up engine in one of JIMS engine stands. Install your new cylinder studs per the instruction sheet that comes with studs.



Fig.4

2. Cylinder Inspection and Preparation

- Inspection
- Inspect the fins and spigots of both cylinders for damage
- Closely inspect the cylinder bores.

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- There should be no scratches other than the normal hone cross hatch.
 - Cleaning
- Note:** *Be very careful when scrubbing the cylinders to avoid cutting your hands.*
- Soak a non-abrasive cleaning pad in dish soap and hot water.
 - Wearing your clean mechanics gloves thoroughly scrub the cylinder bores with the soapy pad and hot water. **See Fig. 4.**
- Rinse the bores with clean hot water until you can wipe the bore with a clean white cloth and show no signs of dirt.
- Dry with a low lint cloth or towel.
 - Immediately coat the cylinder bores with a light film of clean H-D 20W-50 oil to prevent rust.
 - Clean head & base gasket surfaces with a lint free cloth and denatured or Isopropyl alcohol. Make sure you clean all oil from the gasket surfaces.

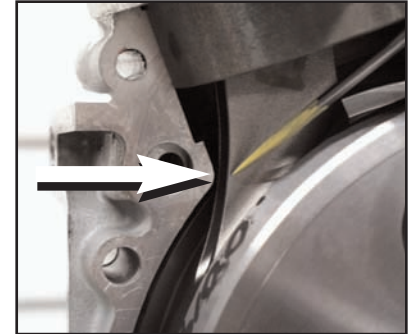


Fig.5

3. Place both pistons (without rings) on their appropriate rod. Notice laser markings on top of pistons for correct locations on rods. You may install one wrist pin lock ring to help hold wrist pin in place. (Left Side) Don't remove lock ring or reuse rings after they have been installed and removed.
4. Gently place the front and rear cylinder over studs and pistons. Slowly rotate flywheels so pistons are at T.D.C.. You can hold cylinders down by using two head bolts and two short pieces of 1/2" I.D. rubber hose, placed between bolts and cylinder.
5. Check Rod to case and cylinder spigot clearance, (both front and rear) by slowly turning flywheel counter clock-wise, stopping so rod has moved closer to the case and cylinder spigot. As you turn the flywheels back and forth, you will see the rod moving closer to case. Inspect, and if necessary, grind or file for a minimum clearance of .060 between the rod, case and cylinder spigot.

See Fig. 5

Warning: *Only remove material from the case and not the rods!*

6. Check to see if necessary to grind or file for a minimum clearance of .050 between cylinder spigots, and a minimum clearance of .060 between piston skirts. **See Fig 6.**



Fig.6

Note: *If it is necessary to remove material from piston skirt, do so only to the rear piston.*

Caution: *If you must remove material from the rear piston skirt, do so only with the smoothest finish possible. Only remove enough material to maintain the minimum clearance.*

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- 7.** If you are satisfied with all your clearance checks, now will be the time to check for tappet cover to cylinder clearance. Because of the larger 4-1/8" bore cylinders, they will use up some of the tappet cover sealing surfaces. We have provided special gaskets that will seal the modified tappet covers. These gaskets can also be used as a marking template. All 4.125" big bore kits will require some modification to the back side of both tappet covers. Some 4.000" big bore kits may need a small amount of modification made to tappet cover.

The best way to check for the amount (if any) of modification needed for 4.000" big bore kits is to install both cylinders (no need to install base gaskets) and hold in place with head bolts. Try to install both tappet covers (no gaskets) by loosely installing all screws. With the all screws threaded into the case 3 to 4 turns, you will have enough clearance for both covers if you can move (covers) in and out by the amount of screw clearance to covers. If you are unable to move the covers, then it will be necessary to remove tappet cover material from the side that is up against the cylinders. You can determine the amount of material to be removed by placing the supplied gaskets over the bottom side of cover and installing all 4 screws from the gasket side. Next with a marker, mark a line on the exposed tappet cover sealing surface not covered by the new gasket. You can sand up to this line, or only sand half the amount, and do a test fit until tappet covers fit without touching the cylinder. Do the same with all 4.125 bore cylinder kits, but sand up to your marked line, then do a test fit. **See Fig 7**

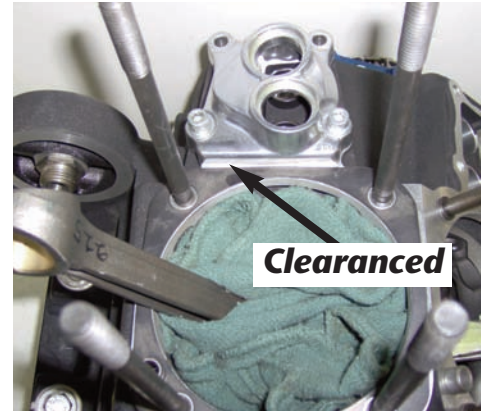


Fig.7

If you are unable to move the covers, then it will be necessary to remove tappet cover material from the side that is up against the cylinders. You can determine the amount of material to be removed by placing the supplied gaskets over the bottom side of cover and installing all 4 screws from the gasket side. Next with a marker, mark a line on the exposed tappet cover sealing surface not covered by the new gasket. You can sand up to this line, or only sand half the amount, and do a test fit until tappet covers fit without touching the cylinder. Do the same with all 4.125 bore cylinder kits, but sand up to your marked line, then do a test fit. **See Fig 7**

Caution: Do not sand with gaskets in place or you will damage the gaskets. You will be using these for final assembly. Do not let any sanding material get on your new gaskets. Wash tappet covers after you sand them and before final assembly.

- 8.** Cases must be cleaned of any foreign material before you begin reassembly of your engine. The assembly will be the same as any Twin Cam engine, except for the Timken bearing set up .

Note: Refer to a pre-2003 manual for information needed to set up the Timken bearing end play.

- 9.** Install two new or known to be good piston oiling jets into right case half. All 4.125" bore kits are provided with new piston oiling jets, No.1905. All 4.00" bore kits will use the original H-D® jets. Apply a very thin film of clean 20-50 engine oil to the new o-rings. Install the new o-rings in the groove on the piston oiling jets and apply a drop of Loctite 222 (purple) to the last few jet mounting screw threads. Torque to 20-30 (inch) lbs.

Caution: Keep all foreign material out of piston oiling jets.

- Use a Harley-Davidson Twin Cam service manual specific to your application for general assembly procedures.

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**INSTRUCTION SHEET FOR TWIN CAM BIG BORE KITS
No's. 1501, 1501B, 1519, THRU 1528, & 1548, THRU 1551**

10. Center Case Bolt Torque Settings

- The 1/4" or 5/16" center case bolt must be re-torqued prior to initial start-up, and again after the engine has cooled.
- All case bolts must be re-torqued once the engine has cooled after initial start up. Re-torquing must be continued after each heat cycle until the case bolts cannot be torqued any further than the torque specification.
- Refer to your Twin Cam "A" or "B" H-D Service Manual for the proper tightening sequence and torque specifications for all case bolts with the following exception:

Important: *The torque value for the center case bolt is 135-155 in/lbs.*

Center case bolt torque specification:

During each case bolt re-torquing sequence the H-D prescribed torque specification for the 1/4" center case bolt (#1 in the H-D Service manual diagram) should be amended to 135-155 in/lbs. See **Fig. 8** & **Fig. 9** for Alpha and Beta Engines.

11. Assemble per H-D® Service Manual.

NOTE: *When assembling case halves together, seal with High-Performance Sealant H-D No.99650-02 or equivalent.*

12. Tighten case bolts to factory Specs, except top center case bolt between cylinders. Install top center bolt last after you have cylinders and heads installed and torqued to H-D® specs.

NOTE: *When installing 4" bore cylinders on cases, they need to have the relief on bottom of skirt facing each other when installed as shown.*

See Fig. 10 & 11.

13. Apply High-Performance Sealant H-D No.99650-02 to shoulder of top center case bolt and torque to 50-

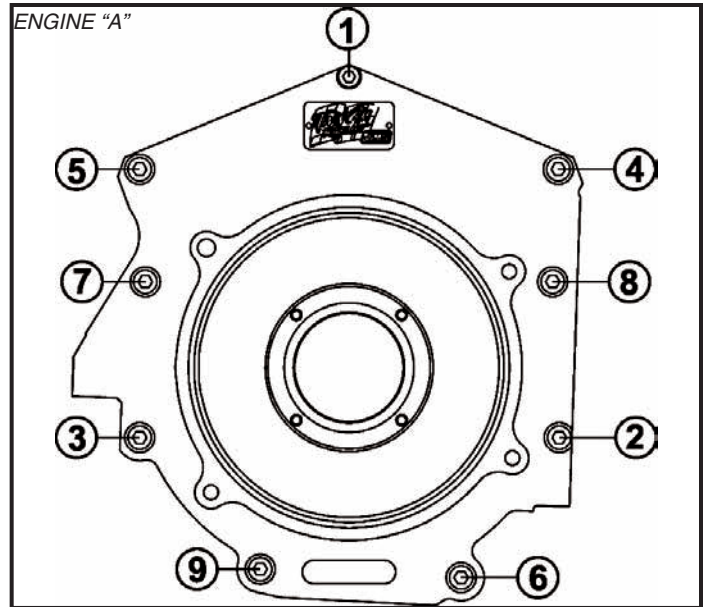


Fig.8 - Case torque sequence

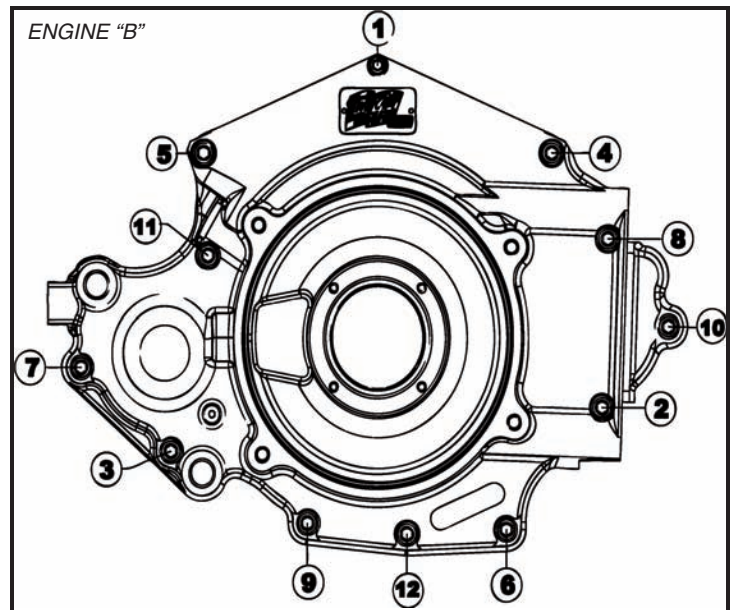


Fig.9 - Case torque sequence

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90-inch lbs maximum. Retorque after initial start up and check after a few heat cycles to 135-155 in/lbs.

14. Piston inspection

- Unwrap and work with the pistons over a padded surface, such as a half-dozen new, clean shop towels.
- Always handle pistons with great care. While they are capable of withstanding extreme acceleration loads, they can also be destroyed by a two-foot fall onto a hard surface.
- Piston ring end gaps must be checked and adjusted if required. Use a ring gap tool and do the work away from the engine. Piston ring particles are very hard and should not be allowed anywhere near the open engine. Make sure you wash your hands after adjusting ring gaps or doing any other grinding.
- Avoid the use of sandpaper. Keep all abrasives away from your work area and the internal components of your engine.
- Do not use pressurized air to clean anything. Its use virtually guarantees damaging particles will get into your new engine. If at all possible, use liquid cleaners, soft brushes and clean lint-free towels instead.
- Inspect the part numbers on the piston tops against the instruction sheet parts list for the kit you ordered to assure you have the correct piston set. There should be no dents, dings or gouges on any surface of the pistons. Pay particular attention to edges and corners, especially the corners formed by the wrist pin hole and the sides of the pistons. They should be smooth with no nicks or deformities. Inspect the piston ring grooves for any deformities. Clean the pistons and proceed to the next step.



Fig.10

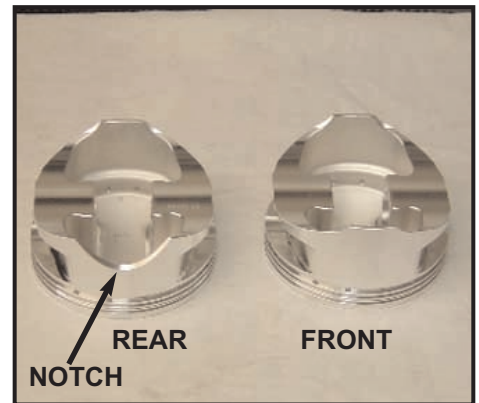


Fig.11

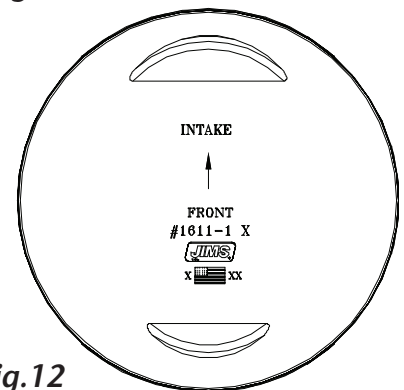


Fig.12

Piston and ring installation information:

Note: Piston orientation

Front and rear pistons are not the same in all kits and must be installed on the correct rod. All rear pistons have a skirt notch, some will come with a smaller notch than shown.

See Fig. 11

All pistons have laser markings on the top. Each piston

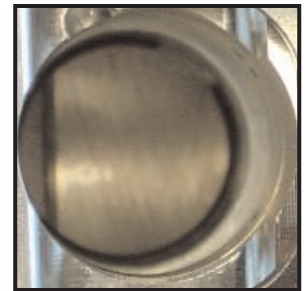
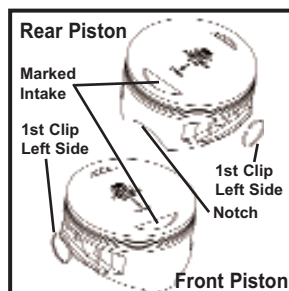


Fig.13 Front Intake Marked Fig.14 - Install left clip Fig.15 - Fully seat left clip

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will be marked **Front or Rear Intake with an arrow**. The arrow of each piston must point towards the intake valve. The front piston goes on the front rod with arrow pointing towards the rear of the engine or intake port.

The rear piston, with the skirt notch, goes on the rear rod with arrow pointing towards the front of the engine or intake port. **See Fig. 12.**

Note that all 124", 120", 117", and 106" piston sets come with larger intake reliefs than the exhaust reliefs. The 100" and 110" have the same size intake and exhaust reliefs.

15. Piston Pin Clip Insertion

IMPORTANT NOTE:

- Wrist pin clip insertion must be done carefully to avoid damaging the corners of the wrist pin hole.
- A crushed corner is a collection of cracks. At the high stress levels these pistons were designed to withstand, one or more of those cracks could grow and eventually result in piston failure and severe engine damage.
- Use JIMS tool No.769 wrist Pin lock ring Remover / Installer. This is an excellent tool and makes the task simple and safe for the pistons. This tool can only be used for left side of piston. Lock ring is to be installed on the left side at this time. **See Fig 13**
- It is very important you do not scratch or gouge the wrist pin bore.
- Place the piston on a clean pad. If using JIMS No.769, follow the directions in your H-D service manual to insert a wrist pin clip into the left side of each piston. **See Fig 14**
- Check to make sure the wrist pin clip is fully seated in its groove. **See Fig 15**

16. Piston Ring Inspection and Preparation

NOTE: Do this work away from the engine assembly.

Wipe excess oil from the piston rings. Run the rings through your fingers to feel for any burrs. If burrs are discovered, follow these instructions on deburring:

Remove any burrs with a fine jewelers file. Piston ring filings are often slightly magnetic and may be difficult to remove from the rings or steel tools, like the jewelers file you might use to adjust end gap. Piston ring end gap filing creates very sharp corners on the rings. These must be removed before inserting the rings into the cylinder bores. It is not necessary or desirable to bevel or break the corners of a modified piston ring. Wash rings after deburring.

- Lightly lubricate with clean H-D 20W-50 oil and slip one piston pin into a piston (either piston will do).
- Place a cylinder on the bench, top end up.
- The cylinder's bore should be clean to the touch and lightly oiled.

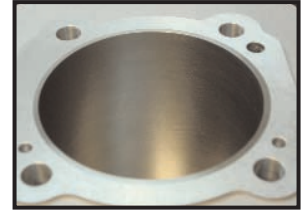


Fig.16 - Clean cylinder bore



Fig.17 - Feeler gauge gap

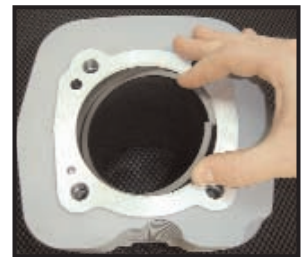


Fig.18 - Carefully twist in



Fig.19 - Press ring down

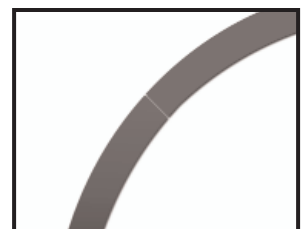


Fig.20 - Square ring ends

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See Fig. 16

17. End Gap Measurement for all kits. See Fig. 17

- Piston Ring end gap range:
- Top ring: .017" to .022"
- Second ring: .017" to .022"
- Oil control rails: .020" to .050"
- Tilt and start a piston ring into the bore. The most common and perhaps easiest way to do this is to first insert the side of the ring opposite the gap. Then, flex each ring end into the bore. Use your fingers to control twist as you insert the ring. **See Fig. 18**
- When the ring is in the bore, use the piston to push it down the bore until the piston pin is slightly below the top of the cylinder. **See Fig. 19**
- Remove the piston.
- The piston ring is now square with the bore and positioned for end gap inspection.
- Use a feeler gauge as pictured to measure the width of the gap. You may stack two blades if necessary. **See Fig. 17**
- Remove each ring by hooking it with a finger on the side opposite the gap and pulling smoothly and gently out of the cylinder bore.
- Start measuring with all piston rings to one side of the cylinder.
- After each ring is checked, place rings that passed the end gap test on the opposite side of the cylinder. Place each of those failing the end gap test on a piece of paper and write their measured end gap on the paper. When you have finished, separate and cover the piston rings not requiring additional fitting.

18. End Gap Adjustment:

- It is unlikely you will need to adjust the first and oil control ring end gaps. However it is likely you will have to adjust the second ring end gap. If you do, the amount will be very small. Take your time with this task and remove only a little material at a time.
- For the best result, use a piston ring gap tool to remove material from the ends of the rings. Do not work near the open engine.

19. Piston ring gap tool:

- Determine how much material must be removed from the ends of the ring. It will probably be only a few thousandths of an inch. For instance, if the 2nd compression ring's end gap was .013", then you would need to remove a total of .004" from the ends to meet the minimum gap standard of .017".
- Use a JIMS® No.1255 piston ring end gap tool to file both ends of the ring. Material removal can be very rapid. Fit the ring into the tool according to the tool's instructions. Gently rotate the cutter and remove a very small amount of ring material. **See Fig. 19A**
- Remove and clean the ring. Deburr if needed. Then, re-insert it into the bore. Square it using the piston as before and measure the end gap.
- Check the end gap often as you work, especially when you work with your first ring.

20. Flat Jewelers File:

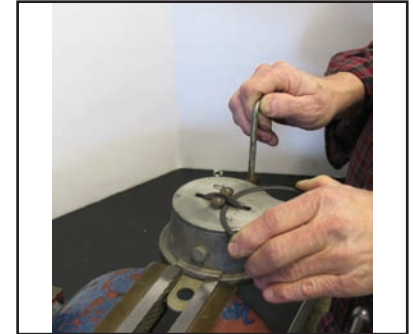


Fig.19A

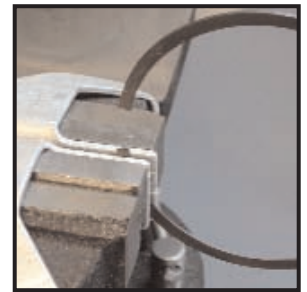


Fig.21 - Clamp securely



Fig.22 - Square ring end



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- It is not necessary to remove material from both ends.
- It is important to get the filed end square. When the two ends are brought together, they should be as nearly parallel as possible. **See Fig. 20**
- Devise a method to clamp or control the piston ring as you file it. You could use a clean smooth-jawed vise, with soft jaws or a machinists vise. **See Fig. 21**
- An alternate method might be to use a flat, hard, sharp cornered object like a thick glass plate or even a piece of hard wood. Place the ring end over the edge of this piece and hold it in place with the pressure of your hand as you gently remove a bit of material with the file. Do not be tempted to do the work in the air using your hand as the vise. As you start to file, be sure the file is at a right-angle to the end of the ring. Make the angle between file and ring square from both the top and side. **See Fig. 22**
- Use light pressure as you file, just enough to keep it cutting. Let the file do the work. Clean the ring and re-check the end gap often as you work, especially with your first ring. Piston ring ends you have modified must be de burred. A light back-stroke of the file across a burred corner should knock the burrs down. Do not be tempted to use abrasives. Your fine file is good enough.
- When you have finished all the rings, put the file away and thoroughly clean and lightly oil the piston rings. Be especially careful to remove any magnetic steel particles that may be clinging to the rings. A clean damp cloth works well. If you had to adjust the ring end gaps make sure to deburr the ring ends prior to installation. Cover cylinder and set aside as you proceed to the next step.

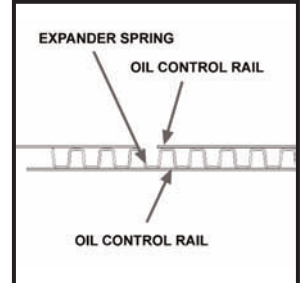


Fig.23 - Oil control rings

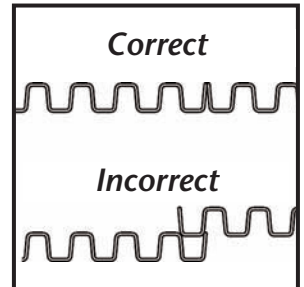


Fig.24 - Proper ring butt

21. Piston Ring Installations

- Wash all piston rings in warm water and dish soap prior to installation on the piston. Wear safety glasses while installing all piston rings. Install the rings from the top of the pistons. Take care not to scratch the piston as you install the rings. Place a piston top-end up, skirt-end down on your clean pad. Select one set of rings. (Set consists of two oil control rails, one expander spring, one second ring, and one top ring).

See Fig. 23

Installation: Oil Control Ring Sets

Note, that expander spring can be installed either way; there is no top or bottom. The oil control rails can be installed either way too. Install the oil ring expander spring. Make certain the ends of the expander spring butt against one another and do not overlap.

See Fig. 24

- Work one of the oil ring rails down over the piston with your fingers. It is okay to slightly twist the ring as you do this. Place the first rail on the lower side of the expander spring.

See Fig. 23

- Position its gap about 90-degrees from where the ends of the expander spring meet. Install the second rail with its gap roughly opposite the gap of the first rail. Make sure the expander spring ends butt and do not overlap. **See Fig. 24**



Fig.25

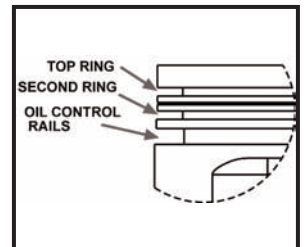


Fig.26 - Ring placement

Installation: Compression Rings

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Identification:

- The top two rings are different and each have an up side and a down side. They must be installed correctly. The first or top ring has a light colored, hard chrome plated sealing edge face. It has a very small dot on its top about 1/2" from one end. Also, one of its inside edges is beveled. Both the dot and the bevel go up, toward the top of the piston.

See Fig. 26 & 27**Installation: Second Ring**

- The second ring is very dark, almost black in color. It is marked with dot or "TOPC" about 1/2" from one end. This identifies the top side of the ring. Bevel goes down. Select a second ring. Remember, it is nearly black. Make sure the top of the ring is facing up. **See Fig. 28**
- Grasp the ring with your piston ring expander tool (JIMS No.1235). **See Fig. 29**
- With the piston supported on the clean pad, gently expand and guide the ring over the top of the piston and into its groove. Do not expand the ring any more than is needed to get it over the piston.

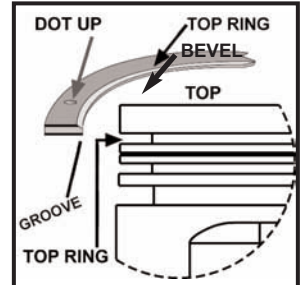
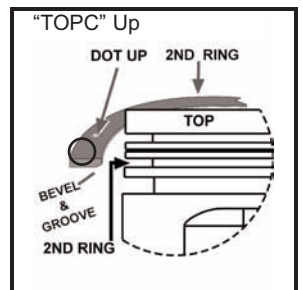
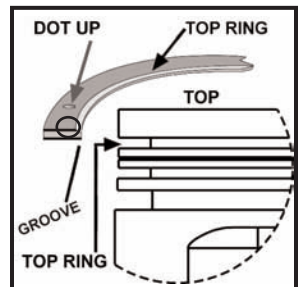
Top ring installation:

- Select a top compression ring. Remember, it has a light colored, hard chrome plated sealing edge face, a smaller dimple and a beveled inside edge. With the dimple and bevel up, grasp the ring with the piston ring expander tool. **See Fig. 30**
- Expand the ring just enough to clear the piston and guide the ring into its groove. **See Fig 29**
- Repeat the above procedure to install the remaining piston rings on the other piston. Check the fit between piston rings and piston ring grooves by sliding each ring around in its respective groove. There should be no tight spots. Clean pistons and proceed to the next step: **See Fig. 31**

22. Piston/Cylinder Assembly*Note: Please read the following notes carefully.***Piston Ring Orientation:**

IMPORTANT: All big bore cylinders have cutaways in their skirts. No piston ring end can be allowed to drop into either of these cutaways. If a piston ring end gets into one of the cutaways and the piston moves upward during installation, the end may catch and destroy the ring.

- If you follow our piston installation directions, the piston rings will be protected by keeping the ring gaps out of the cylinder spigot cutaways.

Cylinder differences and orientation:**Fig.27****Fig.28****Fig.29****Fig.30**

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The front and rear cylinders are different. Both cylinders have reduced fin width on their right sides to allow for the pushrod tubes. Both cylinders have notched skirts. The front cylinder's notch goes toward the rear of the engine. (Toward the center of the "V" formed by the cylinders) The rear cylinder's notch goes toward the front of the engine. (Again, toward the center of the "V" formed by the cylinders) When the front cylinder is correctly placed, its shortened fins will be on the right and the spigot notch will be toward the rear of the engine. When the rear cylinder is in place, its shortened fins will also be on the right but the spigot notch will be toward the front of the engine. Both cylinder notches go toward the center of the engine; they face each other. **See Fig. 32**

- Piston differences and orientation: The front and rear pistons are different. The rear piston has a notch at the bottom of its skirt. The rear piston's notch goes toward the front of the engine toward the center of the "V" formed by the cylinders. The front piston does not have a notched skirt. **See Fig. 33**
- The front piston's larger valve relief goes toward the rear of the engine, the intake side of the cylinder. **See Fig. 34**

23. Ring Orientation Installation Procedure:

- Piston installation procedure differs from that found in Harley-Davidson's Twin Cam shop manuals. Our alternate procedure is commonly used and preferred by many engine builders.
- Assembly: Rear Piston/Cylinder:
- Place the rear cylinder on your bench. Spigot or bottom up. **See Fig. 35**
- Place the rear piston assembly on your bench with top end up. Arrange the piston rings so that the end gaps do not line-up. **See Fig. 36** for proper front and rear piston ring placement around piston. This placement is very critical to piston installation, you must be certain you have duplicated ring position per the diagram or piston and ring damage can occur.

Note: If you find it useful, take a magic marker and duplicate the numbers from the diagram onto your piston. Be sure you have the rear cylinder with the rear piston.

- Fit the piston ring compressor, with a light film of clean H-D 20W-50 oil, over the piston just far enough to capture all the rings. **See Fig. 37**
- Align the ring compressor's handle with the smaller exhaust valve relief. Tighten the compressor. **See Fig. 38**
- Confirm all rings are compressed and lube skirt with the assembly lube. Slide the piston into the bore of the cylinder. **See Fig. 39**
- Place the ring compressor's handle opposite the larger cylinder spigot notch and be careful to avoid damaging the piston skirts.
- Carefully push the piston into the bore with the palm of your gloved hand. The ring compressor will release when the piston is completely in the bore. Turn each piston to the right and left approximately one (1) inch, this movement should be smooth. **See Fig. 40**



Fig.31

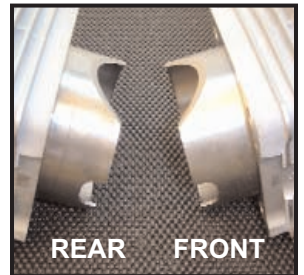


Fig.32



Fig.33 Note piston notch

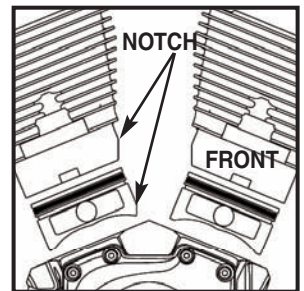


Fig.34 Rear piston notch



Fig.35 - Align correctly

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24. Assembly: Front Piston/Cylinder

- Use the same assembly technique as the above steps. Go back to LINE 22. and perform the same steps for other cylinder and piston.
- Be sure you have the Front piston with the Front cylinder.

25. Cylinder Installation

Note: This step is best done by two people.

- Work from the right side of the lower end One person should hold and position each piston/cylinder assembly. **See Fig. 41**
- The second can then align the connecting rod with the wrist pin and insert the pin into the rod. **See Fig. 42**
- Next make sure the cylinder base gaskets are properly positioned.

Note: Do not apply any sealant to gasket, check the oil return hole position in case, make sure it lines up with the base gasket, as pictured. **See Fig. 43**

- If you are using the recommended JIMS Engine Stand, or a similar stand, we recommend you bolt it down before proceeding. The engine is going to get taller and heavier and needs to be secured. Carefully shield the crankcase so foreign objects, like a dropped wrist pin clip, cannot fall into the engine. Materials such as clean lint free towels can also be used.

26. Installation: Rear Cylinder

- Lay the rear piston/cylinder assembly on its side. With the small spigot cutaway up. Rotate the piston so the wrist pin hole aligns with the cutaway.
- Gently push the piston down the bore until the pin hole is exposed enough to receive the pin.
- Pre-lubricate with a light film of clean H-D 20W-50 oil (or a good quality assembly lube) the piston's wrist pin hole by inserting a lubed wrist pin into the pin hole. Slide the wrist pin in until it bottoms out on the left side wrist pin clip, and then remove the wrist pin. **See Fig. 44.**
- Rotate the crankshaft until the rear connecting rod is at the top of its travel (TDC). Carefully position the cylinder over the rear studs so the short fins are on the right, toward you. The spigot bevel will be toward the front of the engine. **See Fig. 45.**

CAUTION:

Be careful not to scratch the base gasket sealing surface on the bottom with the cylinder studs during assembly. Be careful not to bend the cylinder studs during cylinder installation.

- Lower the cylinder assembly over the studs while guiding the rod into the piston. Align the wrist pin with the wrist pin bushing. Slide the lubed pin through the rod until it is stopped by the left wrist pin clip. **See Fig. 46**
- Install the remaining pin clip. Start one end of the clip into the wrist pin hole. Use a hard plastic rod, or wooden dowel to work the clip fully into its groove. **See Fig. 47**

Note: Be sure to wear your safety glasses when installing wrist pin clips.

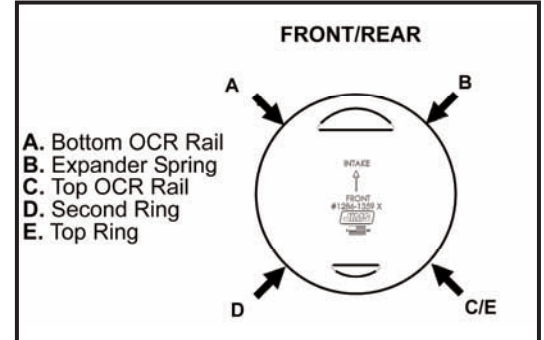


Fig.36 - Arrange ring gaps in this pattern



Fig.37



Fig.38



Fig.39



Fig.40

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- Verify the clip is fully seated in its groove.

Important: Be very careful not to gouge, nick, dent or otherwise deform the corners of the wrist pin hole. Remove the material protecting the case bore. Apply a thin film of assembly lube to the front and back of the piston skirt. Inspect the mating surfaces of the base gasket and cylinder to be sure they are clean. Gently slide the cylinder down until it seats on the base gasket. The base gasket normally has a little curl, so check that the gasket is located on the dowels as you lower the cylinder into position. **See Fig. 48**

- Clamp the cylinder down so it will not move as you rotate the crank shaft. **See Fig.49**

Note: Use a short, 1/2" I.D. oil, or gas hose. Thread the bolt onto one of the cylinder studs until the spacer is finger tight against the cylinder. **See Fig. 49**

27. Installation: Front Cylinder **See Fig. 50**

Note: Prior to front cylinder installation pour 1/3 of a quart of clean 20W-50 H-D oil over the crankpin area. **See Fig. 51**

- Rotate the crankshaft until the front connecting rod is at TDC. **See Fig. 52**
- Front cylinder installation is similar to the rear. There are a couple of differences in the parts. The notch on the front cylinder spigot goes toward the rear of the engine. The large valve relief, goes toward the rear of the engine and the front piston has no skirt notch. **See Fig. 34.**

28. Installation: Cylinder Dowel Pins

Note: Make sure the tappet block cover bores remain sealed so nothing can fall into them.

- Lightly lube the larger beveled side of the dowel pin with clean H-D 20W-50 oil. Install 2 dowel pins per cylinder into cylinder gasket surface area as shown **See Fig. 53**

29. Cylinder Head Inspection and Assembly

Caution: All 100", 106" and 110" kits include Pistons designed for Stock H-D 85cc heads. If the heads you will be using have any different Valve sizes or combustion chamber size. It will be your responsibility to check and confirm all piston to Valve, Valve to Valve clearances and compres-



Fig.41 - Assistant holds



Fig.42 - Insert wrist pin



Fig.43 - Oil hole aligned



Fig.44



Fig.45

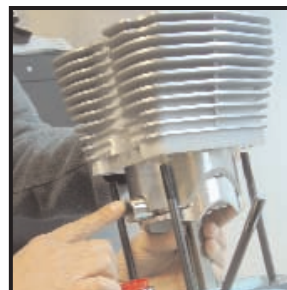


Fig.46



Fig.47

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sion ratio. The same applies to all 117", 120" and 124" kits. These kits have been designed for S/E 95cc heads. If the heads you will be using have any different Valve sizes or combustion chamber size, it will be your responsibility to check and confirm all piston to Valve, Valve to Valve clearances, and compression ratio.

30. Head Inspection

- All sealing surfaces must be free of dents, deep scratches or foreign material. Clean the cylinder gasket sealing surface with a lint-free cloth and denatured/ isopropyl alcohol and allow the surface to dry prior to installation.

Note: Before installing head gasket

- If you are using a 3 layer riveted "EST" style head gasket and you have aftermarket heads, you may find that you have interference with the rivet in the head gasket. If so, use a smooth jaw vice to reduce the thickness of the rivet before installation.

31. Inspect the head gaskets.

- They should be smooth and clean and a small amount of curl is okay. The surface coating should be intact. **See Fig. 54**

32. Head Gasket Installation

- The head gaskets can be installed either of two ways; only one is correct. Incorrect installation will close-off the oil drain hole from the head. Incorrect head gasket installation requires a partial engine tear-down to fix.

33. Head Gasket Orientation:

- The gaskets have a seventh hole about 3/8" in diameter, near one of the stud holes. Install each gasket so this hole is over the oil drain hole in its cylinder. **See Fig. 54**
- The front cylinder's drain hole is located at the left-front. **See Fig. 55**
- The rear cylinder's drain hole is located at the left-rear.

See Fig. 56

- Make sure each cylinder and gasket is clean, and free of oil. Place the gasket over the locating dowels (Dry).

Note: Do not apply sealant to gasket. These gaskets do not require any other sealant than what has already been applied at the factory.



Fig.48 - Verify gasket



Fig.49 - Clamp cylinder



Fig.50 - Repeat for front



Fig.51 - Pour 1/3 quart oil



Fig.52

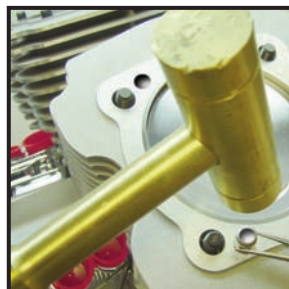


Fig.53



Fig.54

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- Double check to make sure the oil drain hole in the gasket aligns with the oil drain hole in the cylinder.

34. Cylinder Head Installation

- Clean the head gasket sealing surface with a lint free cloth and denatured/ isopropyl alcohol and allow the surface to dry prior to installation. Select a head and place it over the locating dowels and onto the cylinder. Be sure the head gasket is properly positioned.

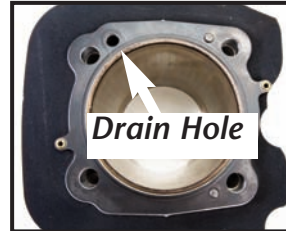


Fig.55

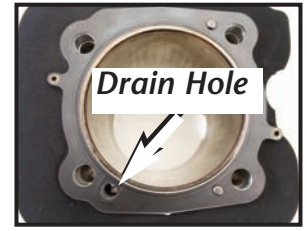
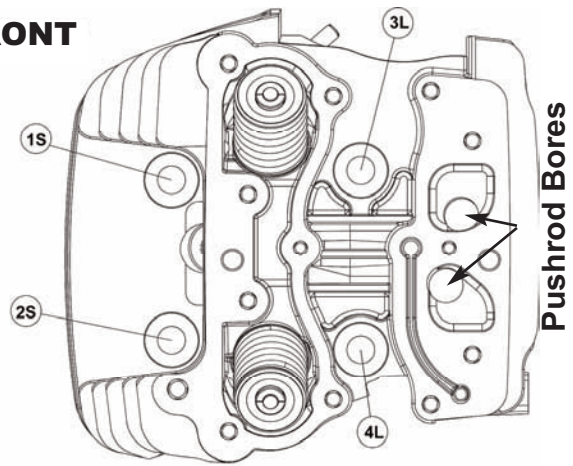


Fig.56

35. Head orientation

- The pushrod holes go to the right of the engine and make sure the head is fully seated on the cylinder. Lay out the head bolts within easy reach: two short and two long bolts are used for each head. Lightly lubricate, with moly lube the internal threads of each bolt. Also lightly lubricate, with moly lube, the underside of each head bolt flange. This is the flat area under the bolt head that contacts the cylinder head. Thread the two short bolts into the stud holes on the left (spark plug) side of the head. Thread the remaining longer bolts into the other two. Gently snug all four bolts (finger tight).
- Install the remaining head, remember to align the hole in the gasket with the cylinder's oil drain hole.

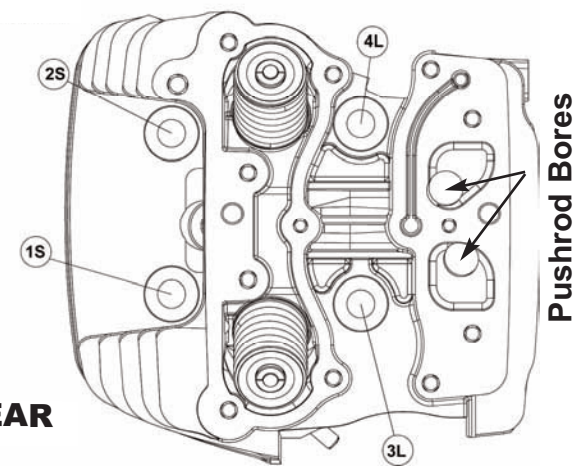
FRONT



LEFT SIDE

RIGHT SIDE

L = LONG BOLT
S = SHORT BOLT



REAR

Fig.57

36. Cylinder Head Torque

Note: Follow the tightening sequence exactly as it is described below. Deviation from the procedure can result in gasket failure or severe damage to the heads and cylinders.

- Torque each lubed head bolt to 8 ft/lbs, following the sequence and by using the figure.

See Fig. 57

- Continuing in the same sequence, torque each bolt to 18 ft - lbs. With a grease pencil or similar marker, mark a line on the smooth surface of all 8 head bolts, continuing this line down to the head casting surface, as pictured. **See Fig. 58**

- These marks will be used as a guide to tighten all head bolts an additional 1/4 of a turn (or 90 degrees). **See Fig. 59**

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Note: When torquing head bolts 90°, work them up in small increments following the torque sequence shown in **Fig 57**.

- After all 8 head bolts have been tightened an additional 1/4 turn (or 90 degrees), all 8 head bolts need to be loosened to allow seating-in of the gaskets. Loosen the head bolts using the same sequence described in 1/4 of a turn at a time until each is loose enough to turn with your fingers.

See Fig. 57

- After all 8 head bolts can be turned with your fingers start the torque sequence again. Torque each head bolt to 8 ft/lbs, following the sequence as shown. **See Fig. 57**
- Continuing in the same sequence, torque each bolt to 18 ft/lbs. Make a fresh mark on the head bolts as shown. **See Fig. 58**
- Tighten all 8 head bolts in sequence an additional 1/4 turn or 90 degrees as pictured in **See Fig. 59**

37. The installation of the remaining top end components should be followed per your service manual for the year and model engine you are building. Please follow the instruction sheets that have been provided with any other product you will be installing.

38. Oil Flow, Oil Pressure And Gasket Seating, All Engines:

Important Notes:

- Before you install your new JIMS Big Bore Kit in its chassis, thoroughly flush the motorcycle's complete oiling system.

Note: This includes removing the oil tank and washing it out. Be very careful that you do not tear small slivers of rubber off the edges of the oil lines as you fit them to the engine's oil fittings.

- Do not connect the oil return line from the engine to the oil tank. Fit a hose from the engine's oil return fitting and run the hose into a large catch-pan.

Note: Remove the spark plugs from the engine. Attach the plug wires to the spark plugs and lay them on the cylinder heads to prevent damage to the coils.

- Be sure the oil tank is properly filled with the correct oil. Use the electric starter to turn the engine over until the oil pressure light goes out or until the pressure gauge reads 10 -15 psi.
- Re-install the spark plugs, torque to 12 to 18 ft-lbs. Install plug wires. Depress both compression release



Fig.58 - Mark bolt and head



Fig.59 - 1/4 turn

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plungers if applicable.

- Start the engine using the normal procedure outlined in the owner's manual. Allow the return oil to run into the catch pan. Run engine between 1000 and 1500 rpm until the tops of the cylinders have reached 200 degrees (too hot to touch). This normally takes between one and two minutes.

Note: Do not allow the oil level in the tank to get too low while the engine is running. Stop the engine and let it cool to ambient temperature. Inspect the installation for any oil or gasoline leaks. Top off the oil tank. Repeat the warm-up and cooldown procedure three additional times.

Note: Watch and maintain the oil level in the tank. Reconnect the oil return line to the oil tank after at least two Quarts of oil have been pumped into the catch pan. Discard the oil in the pan as you would for any used oil.

BREAK IN PROCEDURE

After final assembly, the engine must be broken in. Over revving or lugging engine could cause damage to pistons and/or other engine components. On the initial start up, excessive heat build up can occur. Do not over heat by revving engine or running at a fast idle too long. To ensure proper head gasket seal upon first start up, idle engine 1000-1500 R.P.M. until cylinder head temperature reaches about 200 degrees. Shut engine off and let cool. This procedure is necessary to properly seal top end components.

CAUTION: *Improper initial engine start up may cause head gaskets to fail prematurely. Because most engine damage could occur during the first 50 miles, keep the heat down by not exceeding 2500 R.P.M., but do not lug engine. Continue to vary speed for the next 500 miles and do not exceed 3500 R.P.M. for the balance of the first 1000 miles. Avoid overheating engine. Do not lug engine or idle for long periods of time. No trailer towing, side cars, or racing, etc. Change oil and filter after the first 500 miles.*

WARNING! "Beta" Stroker kits must never be revved any higher than 6,200 RPM!

Caution: *If this kit is installed in a Softail or any model motorcycle that has its oil tank higher than the engine you will need to follow the instructions listed below. Install the recommended amount of oil and type per your owners manual.*

1. Following the previous start-up instructions. Ride the motorcycle until the engine is up to operating temperature.
2. Idle motorcycle on kickstand for 1-2 minutes. Turn the motorcycle off. With the motorcycle still on kickstand, remove and check oil level on the dipstick. Add oil if necessary until oil registers on the upper groove of dipstick (Full, Hot Line.)

Oil Cooler Recommendation: (ALL MODELS)

All big inch engines must be fitted with effective oil cooler. The Harley No.26155-11 is an example of such a cool-

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er.

Chassis Oiling System:

Make sure that the entire oiling system is clean. If you are fitting your new Big Bore kit into a chassis that has been used, be sure to completely clean the oil tank and all lines and fittings leading to and away from the engine. If the old engine has more than 20,000 miles of use, or, if it has suffered any unusual wear, dismantle the oil pan and hoses and thoroughly clean them.

Break In Procedure:

Note: Follow the engine break-in procedures outlined in the Harley-Davidson owner's manual per your application.

1. Allow the engine to warm-up before riding.
2. Do not use full throttle.
3. Do not idle the engine for more than two minutes. Note: Even less if the air temperature is above 80-degrees.
4. Do not overload the engine at low rpm.

Note: All engine loads must be moderate.

5. Vary the rpm frequently.

Note: Do not hold a steady speed.

6. First 50 miles: • Do not let the engine rpm exceed 2500. • Do not exceed 50mph.
7. Next 500 miles: • Do not let the engine rpm exceed 3000. • Do not exceed 55mph.

Oil Change Intervals:

Break in: • At 50 miles • 500 miles • 1000 miles

Normal Oil change intervals:

- 1500 to 2000 miles, depending upon usage.
- Change the oil filter every oil change.

Torque Checks:

- Re-check the torque of all accessible engine and chassis fasteners at all oil changes. (Do not re-torque the head bolts)

Detonation:

Detonation must be avoided. A detonation event is combustion before piston reaches top of stroke. Most of the time these explosions are so small that they do not immediately damage the engine, however if they are energetic or frequent enough, things break. A piston can be destroyed in a few engine revolutions from the effects of severe detonation.

Detonation can be brought on by a variety of conditions including; incorrect ignition timing, poor quality gasoline, overly lean air/fuel mixtures, too much cranking pressure for the particular combustion chamber, or engine overheating.

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If you choose to alter the cranking pressure, ignition timing, or air/fuel mixture of your new engine, please be aware that any of these alterations, improperly done, can result in engine damage. You should only consider such modifications if competition pressure demands them. And, make them only if you have the experience or expert assistance to deal with the possibility of detonation.

WARRANTY

All JIMS® parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of 6 (six) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at JIMS® option if the parts are returned to us by the purchaser within the 6 (six) month warranty period or within 10 (ten) days thereafter. In the event warranty service is required, the original purchaser must call or write JIMS® immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action. A part suspected of being defective must not be replaced by a Dealer without prior authorization from JIMS®. If it is deemed necessary for JIMS® to make an evaluation to determine whether the part is defective, it must be packaged properly to prevent further damage and be returned pre-paid to JIMS® with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used and the circumstances at the time of failure. If after an evaluation has been made by JIMS® and the part was found to be defective, repair, replacement, or credit will be granted.

ADDITIONAL WARRANTY PROVISIONS

1. JIMS® shall have no obligation in the event a JIMS® part is modified by any other person or organization.
2. JIMS® shall have no obligation if a JIMS® part becomes defective in whole or in part as a result of improper installation, improper maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the part.
3. JIMS® shall not be liable for any consequential or incidental damages resulting from the failure of a JIMS® part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in nonconforming condition, or for any other breach of contract or duty between JIMS® and a customer.
4. JIMS® parts are designed exclusively for use in Harley-Davidson® motorcycles. JIMS® shall have no warranty or liability obligation if a JIMS® part is used in any other application.
5. Any parts which have been replaced for any reason become the property of JIMS®, and will not be returned under any circumstances.

CAUTION: *Wear safety glasses. Excessive force may damage parts and tool.*

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