



# BOX 3 ASSEMBLY INSTRUCTIONS

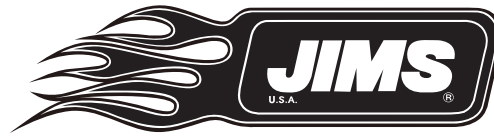
1208-1353

These instructions are for all models  
of 120" or 131" Alpha, Beta Engines  
(Including Kits)



**Includes  
User Info.**

**ROCKER KIT, BREATHER KIT, IGNITION, & PUSHRODS**



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## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

### Box Three Installation Instructions

#### **Introduction to Box 3:**

Congratulations! You have almost finished assembly of your JIMS 120 or 131 Race Kit engine. You'll soon be ready for chassis installation, break-in and a trip to the track.

As we explained back in Box One, there is nothing particularly difficult about assembly of the JIMS 120 or 131. That remains true in Box 3. All of the parts and assemblies are either stock or Screamin' Eagle items. Only the rocker covers have been modified to clear the roller rocker arms and special valve springs. If you are familiar with normal TWIN CAM top-end assembly procedures, then you already know how to finish your JIMS 120 or 131 Race Kit engine.

Use these instructions for general assembly procedures and torque specifications. Follow the instructions packaged with the enclosed Screamin' Eagle kits to install those parts. These kits include the pushrods.

Notes and reminders:

Cleanliness:

- Remember to maintain your work area's cleanliness.
- Inspect all parts for burrs and machining chips before beginning assembly.
- Pay particular attention to the threaded holes in the lower rocker covers where they have been modified to clear the valve springs.
- Be sure that all threaded holes are clear and clean.

#### **Lock patches:**

- Bolts used to assemble the lower rocker cover, rocker support plates and the breather assemblies have "lock patches" on their threads. Blue LOCTITE #243 will be needed for the regular cover screws.
- These patches release a thread-locking compound when they are installed.
- No additional locking compound is needed and none should be used.
- Do not lubricate the bolts before installation.

#### **STEP 1: Lower Rocker Housings - Installation**

**Note: Ensure that all mating surfaces are clean, flat and smooth. Be sure the threaded holes are clear of chips or other debris.**

**Important:** The rocker housing gaskets must be installed correctly.

- While they fit either of two ways, only one is right.
- Incorrect installation results in a major oil leak.
- Obtain:
  - A modified lower rocker housing 1208-1319.
  - A rocker-housing gasket 16719-99.
  - Six rocker housing bolts. (Two of the bolts are longer than the other four)

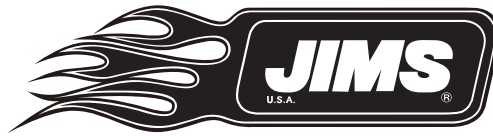


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**Note:** Each bolt has a lock patch on its threads and additional Loctite is not required.

- Place the lower rocker-housing gasket onto the cylinder head (clean & burr-free).
- Make sure you install the gasket so it covers the breather channel.
- If the channel not covered, turn the gasket over.
- Place the rocker housing on the gasket (clean & burr-free).
- Thread the two longer bolts H.D. 3693A through the left side of the lower rocker housing, nearest the valve springs, and into the head. (See Fig. 1, bolts 2 & 3).
- Thread the remaining bolts H.D. 3736A through the lower rocker housing and into the head.
- Torque the bolts to 10 - 14 ft-lbs (120 - 168 in-lbs, 13.6 - 19.0 Nm) See Fig. 1
- Follow the pattern shown in Fig. 1.
- Torque in two stages using about half the final torque the first time.
- Repeat these steps for the second lower rocker housing.



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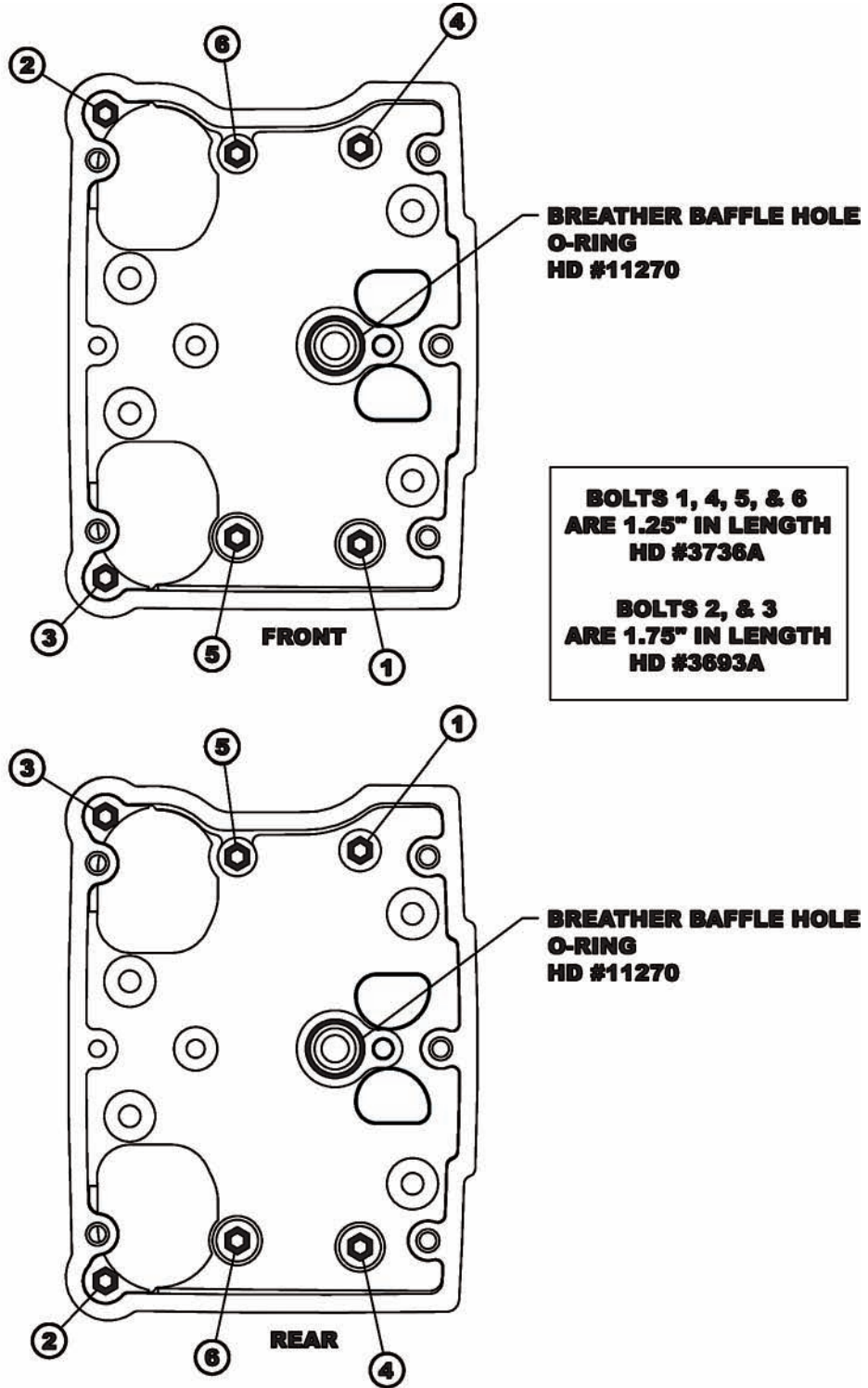
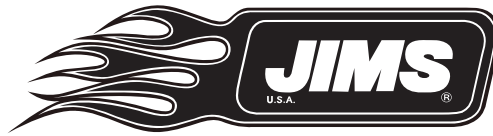


Figure 1

**ALTERNATELY TORQUE (TIGHTEN) ALL 12 ROCKER HOUSING BOLTS IN THE SEQUENCE SHOWN**



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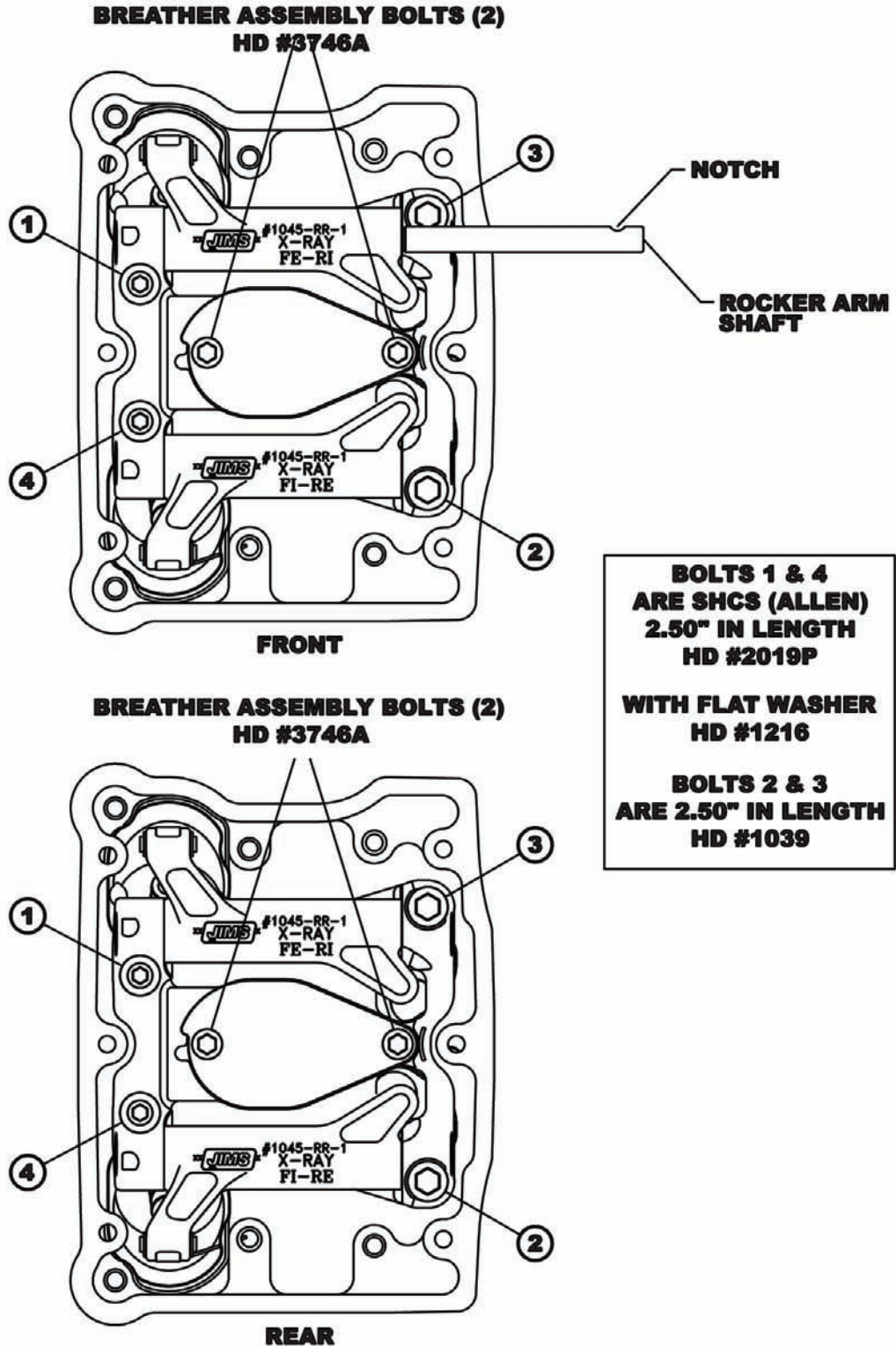


Figure 2

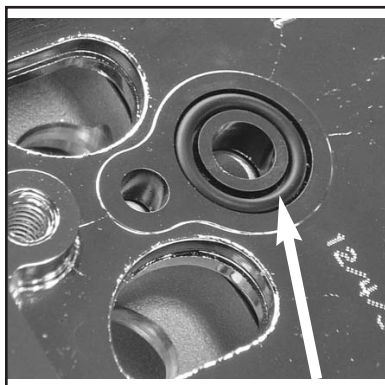


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## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

### STEP 2: Rocker Arms - Installation

- Obtain:
- The O-ring for the breather baffle hole in the lower rocker housing No.11270.
- A rocker arm support plate No.1208-1303.
- One intake and one exhaust rocker arm. They are different from one another. Their part numbers are laser-marked on each rocker arm for easy identification. **See Fig. 2.**
- Two rocker arm shafts No.17611-83.
- Two (Allen head) and two (flanged hex head) rocker arm support plate bolts.
- Lubricate the rocker arm bushing with the supplied assembly lube.
- Lubricate the rocker shafts with the supplied assembly lube.
- Lubricate the O-ring with a thin film of clean Harley-Davidson 20W-50 engine oil and install it into its groove in the lower rocker housing. **See Fig. 1 & 3**
- Lay the rocker arm support plate in position on the head.
- Position the exhaust and intake rocker arms. **See Fig. 2**
- Slide the rocker shafts into the rocker arm support plate, capturing the rockers. **See Fig. 2.**
- Be sure that the notched-end of each shaft is toward the right side of the engine. **See Fig. 2.**
- Thread the two Allen head bolts (2019P with washer 1216) through the left hand side of the support plate and into the head. (screws and washers supplied with rocker support) **See Fig. 2.**
- Thread the two remaining hex head bolts No.1286-1310 through the right side mounting holes of the plate and into the head.



**Fig.3** *Install O-ring*



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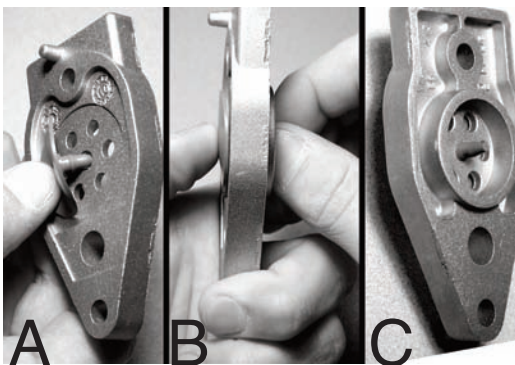
- You may need to move the rocker shafts slightly to allow passage of the bolts through the notch in the shaft.
- Torque the bolts to 18-22 ft-lbs (20.3 - 24.4 Nm).
- Follow the pattern shown in Fig. 2.
- Torque in 1/4-turn stages using about half the final torque the first time.

**Note:** To avoid contact between the pushrods and the upper pushrod covers, you may need to shift the rocker supports toward the engine cam side. To check the clearance between the pushrods and covers, rotate the engine until both valves are closed in the cylinder you are checking.

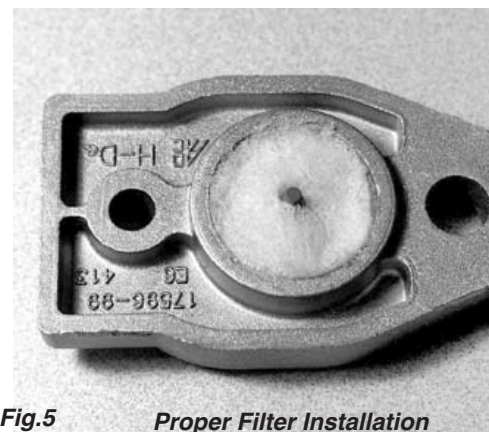
- Repeat these steps to install the second rocker arm support.

### STEP 3: Breather - Pre-Assembly

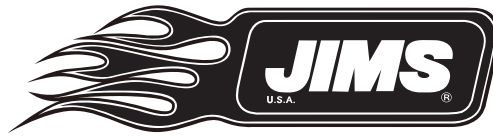
- Obtain the bags containing breather parts No.17650-02.
- Install the Umbrella Valves:
  - Locate the side of the breather baffle plate with the cast-in alignment pin.
  - Lube the stem of an umbrella valve with denatured alcohol or glass cleaner.
  - Insert the valve stem into the breather baffle plate, from the alignment pin side. **See Fig. 4A**
  - Gently pull the stem from the other side of the plate. **See Fig 4B.**
  - Verify that the lock nub on stem is completely through the hole in the plate. **See Fig. 4C**
- Repeat this procedure for the remaining umbrella valve and breather baffle plate.
- Install the filter elements into the plates.
- Press the filters into the plates until they are flush with the bottoms of the plates. **See Fig. 5.**



**Fig.4** Umbrella Valve Installation



**Fig.5** Proper Filter Installation



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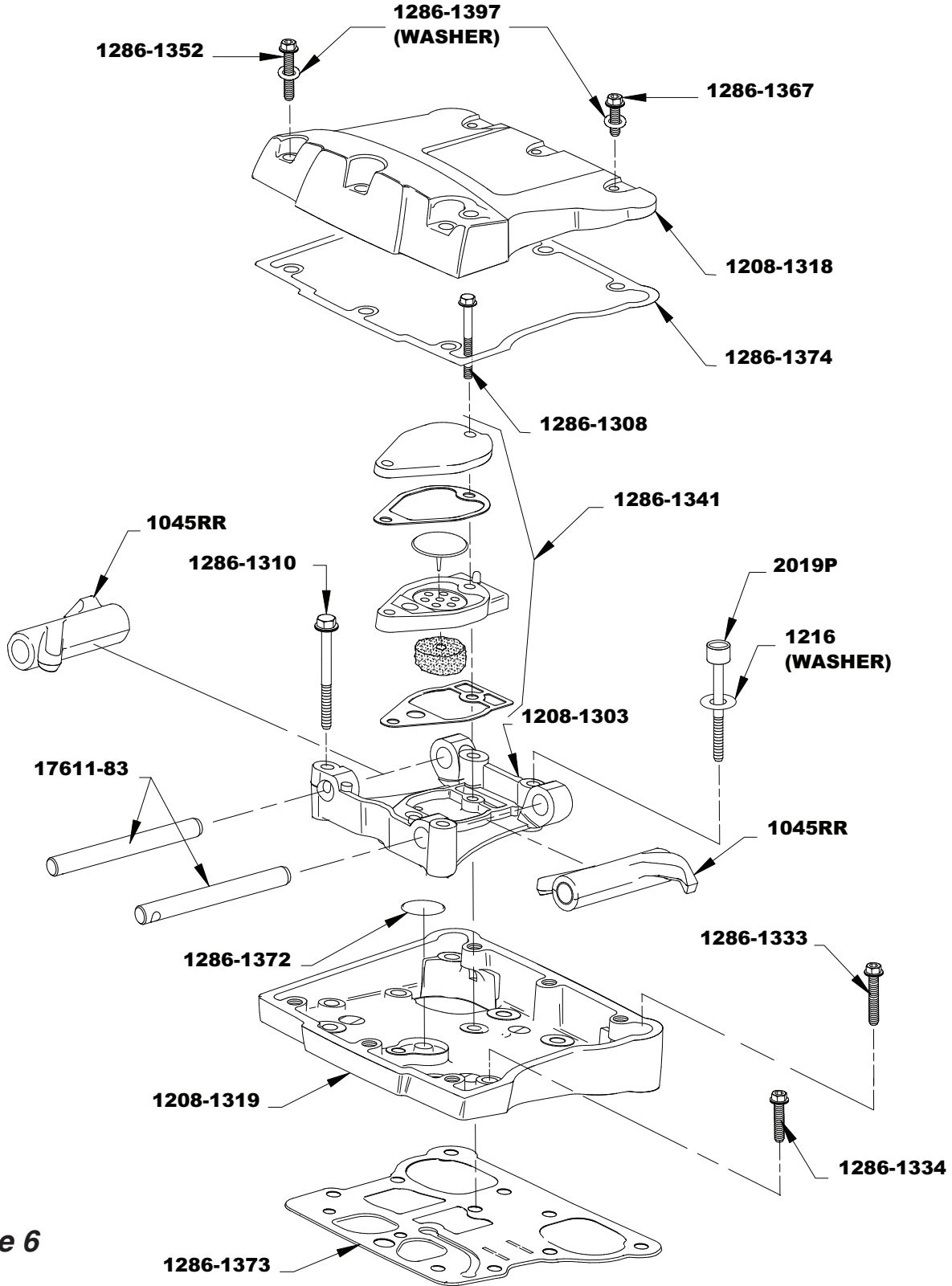


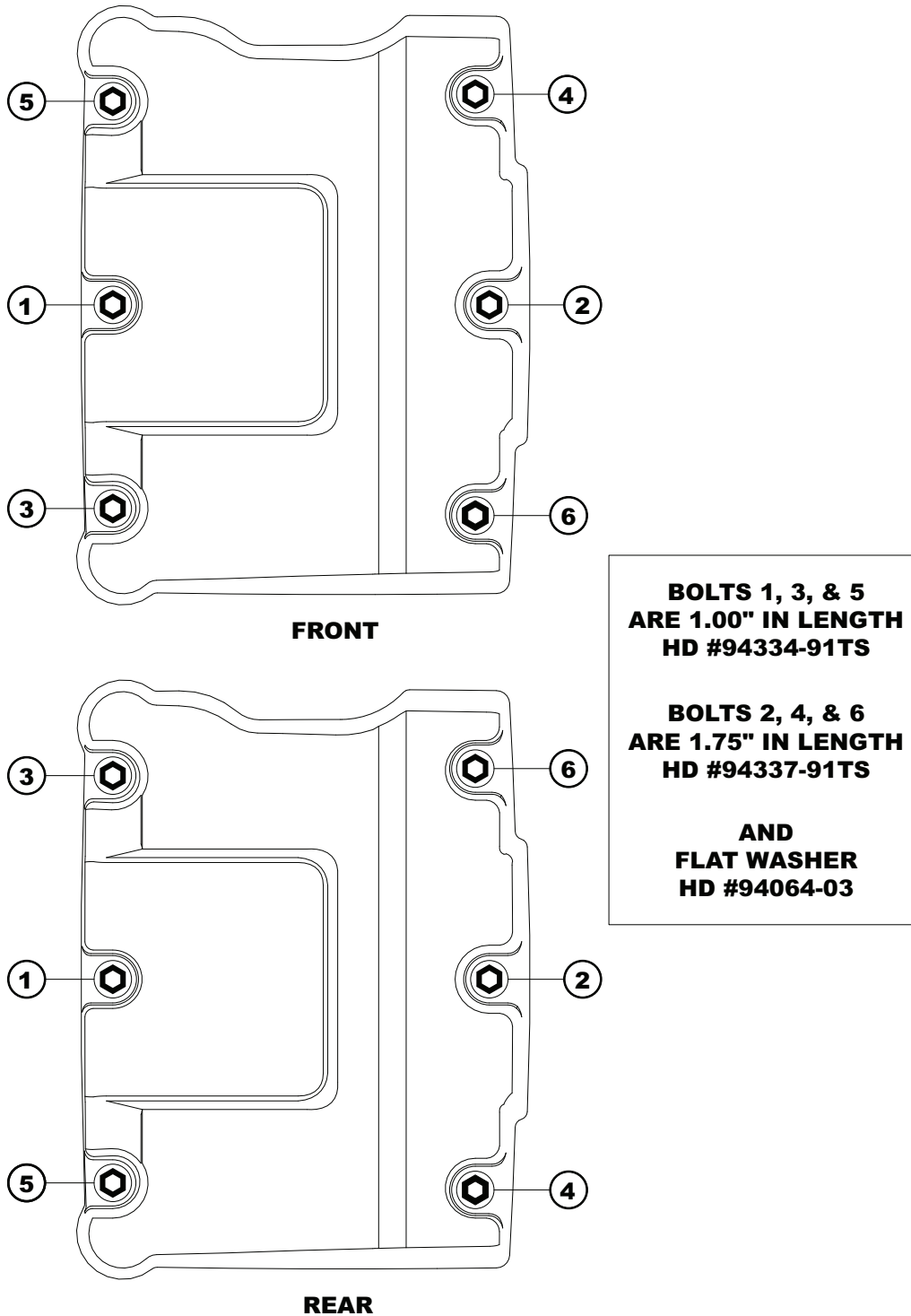
Figure 6



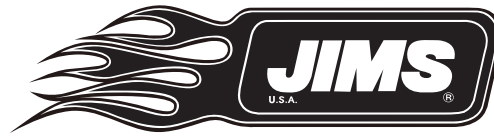


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# INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS



**Figure 7** ALTERNATELY TORQUE (TIGHTEN) ALL 12 ROCKER COVER BOLTS IN THE SEQUENCE SHOWN



## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

### **STEP 4: Breather - Main Assembly**

- Assemble: See Fig. 6
- Baffle base gaskets.
- Breather baffle plate assemblies (with umbrella valves & filter elements).
- Cover gaskets.
- Breather covers.

### **STEP 5: Breather - Installation**

- Obtain:
  - The breather baffle assembly.
  - Baffle cover.
  - Two bolts No.3746A. (all have lock patches)
- Install the breather baffle assembly into the support plate. See Fig. 6, page 7
- Fit the breather cover with the two bolts.
- Torque the bolts, in two stages, to 90 - 120 in-lbs (7.5 - 10 ft-lbs, 10.2 - 13.6 Nm).
- Repeat this procedure for the second cylinder.
- Pour approximately one ounce of clean 20W50 H-D engine oil over the roller-end of each rocker arm.

**Note:** *Be careful to keep the oil off the gasket surface.*

### **STEP 6: Top Cover - Installation See Fig. 6 & 7**

- Obtain:
  - A top rocker cover No.1208-1318.
  - A top rocker cover gasket No.17386-99.
  - Six chrome rocker cover bolts (three short three long) and six chrome washers.
- Make sure the gasket sealing surfaces are clean, smooth and dry.
- Place the gasket in position on the lower rocker cover.
- Place the top rocker cover in position over the gasket.
- Apply a drop of blue LOCTITE #243 to the first few threads of the 3 long bolts (1286-1367) and 3 short bolts (1286-1352).
- Thread three short bolts with one flat washer (1286-1397) through the left side of the top cover and into the lower cover.
- Thread the remaining three longer bolts, including the washers, into the right side of the top cover and into the lower cover.
- Snug the two short bolts while holding the top rocker cover in alignment with the lower rocker cover.
- Torque the bolts to 9 -12 ft-lbs (108 - 144 in-lbs, 12.2 - 16.3 Nm) See Fig. 7
- Torque in two stages, the first being about half the final torque.
- Follow the torque sequence shown in the illustration.
- Repeat these steps to install the second rocker cover.



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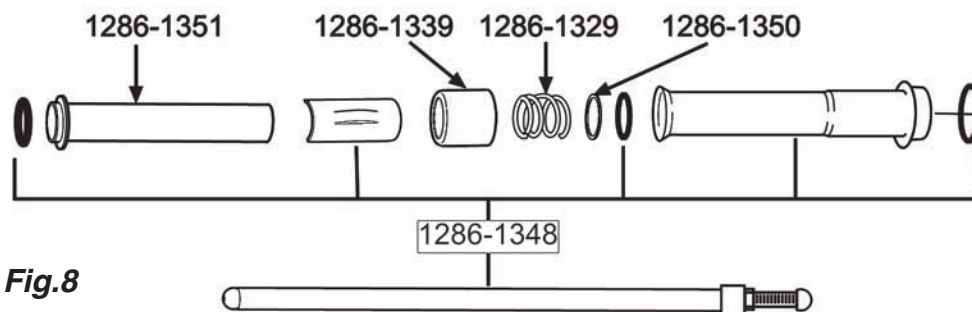
### STEP 7: Pushrods - Installation

Use the instructions in the supplied Screamin' Eagle pushrod and pushrod cover kit (H-D No.17997-99A).

**Note:** Pour approximately two ounces of clean 20W50 H-D engine oil into each tappet bore cover to ensure initial lubrication of the tappets.

### STEP 8: Pushrod Covers - Final Assembly

- Make sure that the top and bottom O-rings are fully seated.
- Slide the top & bottom pushrod covers apart.
- Gently push the bottom cover into its O-ring.
- Hold the bottom cover in place while you push the top cover into its O-ring.
- Make sure the spring cap is down against the spring.
- Install the lock clips – **See Fig. 8**
- Tilt and fit a lock clip up against the lip at the top of a pushrod cover.
- Use a round-shank standard screw driver as a lever to depress the spring cap as you slide the clip along the screw driver shank and into position.
- Wiggle the clip to make sure it is fully seated.



**Fig.8**

### STEP 9: Touch-up Paint Procedure

**Note:** Only apply touch-up paint when the parts to be painted and the room temperature are between 75 and 90 degrees Fahrenheit.

- Black wrinkle paint is sensitive to the temperature at which it is applied.
- If it is too cold when applied, the "wrinkles" may be too fine and not match the factory finish.
- Shake the bottle vigorously for a full two to three minutes to completely mix the paint.
- Apply paint only to bare metal surfaces as necessary to blend with the undamaged paint.
- Heat freshly painted area to between 100 and 130 degrees to obtain the correct wrinkle effect.
- 100 degrees feels warm
- 130 is too hot to touch for more than a few seconds.
- Hot tap water typically does not exceed 120 degrees.
- Let paint then set for one hour or until dry to a light touch.
- The paint will be dry enough to sand in 24 to 48 hours if needed.



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## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

### STEP 10: Carburetor & Manifold - Installation

Follow the manufactures instructions from your choice of fuel system you have chosen. See JIMS Sales Dept. for either carburetor, or fuel injection, recommended for your engine.

**Note:** Center the intake manifold in-between the two intake flange mounts during installation. See Fig. 9

### STEP 11: Installing Primaries, and Clutch

Follow installation instructions for inner and outer primary, clutch assembly, sprockets, primary chain, adjustment and alignment, per Harley-Davidson's service manual for the year and model you will be working with.

Clutch Recommendation:

The high torque output of the JIMS 120 or 131 Race Kit engine requires increased clutch torque capacity. The Screamin' Eagle® No.37969-03 clutch is one example.

Pre-Start Settings, Procedures and Recommendations:

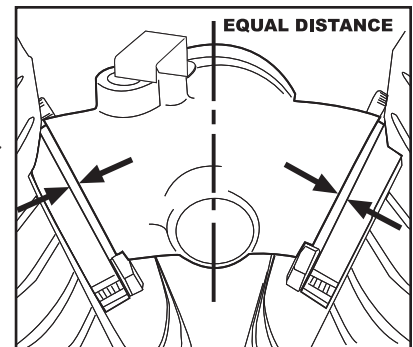


Fig. 9 - Proper manifold alignment

**Note: If installing JIMS 120" or 131" in a 2008 FL or later read the following:**

Harley-Davidson® made changes on the 2008 to H-D® motor mount using a new number 16321-08, installed on the front head.

JIMS 120" and 131" Twin Cam® Engines being installed in a 2008 FL have been designed with a new machined pad on the front head.

Each engine requires two spacers and each one of the spacers needs to be installed on the inside of the head mount between the front motor mount and head.

In other words the spacers will be sandwiched between the front and the chrome motor mount.

One spacer will be needed for the pushrod side of the head mount; it will be the thicker of the two at .300" thickness, JIMS part number 1708-1550.

The other spacer is .250" thick, JIMS part number 1708-1551 and will need to be installed on the primary side of the head mount.

After installing both spacers between head and motor mount, and after bolts are torqued to 10 ft-lb, check for rocker box to motor mount clearance, which needs to be at least 1/16".

Use stock bolt H-D number 4721 with stock washer H-D number 6127.

Follow the H-D Service Manual for installation and torquing information.



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## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

### STEP 12: Ignition - Installation all Engines

Follow the ignition manufactures instruction when installing per application.

Jims offers two carbureted only Screamin Eagle Select ignition systems that can be order sepeately.

Jims No.1286-1379, H-D 32704-01 Use on 1999 - 2003 Alpha carbureted only models:

Use on 2000 - 2003 Beta carbureted only models

Jims No.1286-1376, H-D 32124-04 Use on 2004 - 2006 Alpha or Beta carbureted only models.

If you are using one of these follow the instructions supplied by Harley-Davidson with the supplied Screamin' Eagle ignition system for your model year motorcycle.

Screamin Eagle Ignition Settings: (SETTINGS ARE NOT FOR E.F.I .SYSTEMS)

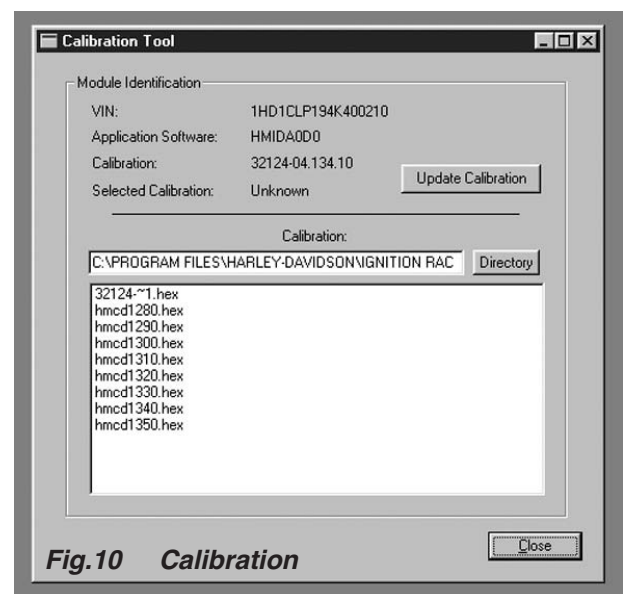
#### 1999 - 2003 carbureted only models:

- Set the "CS" Curve Selection Mode at "3"
- Set the "SA" Spark Advance to "+2"
- Set the "ES" Engine Speed to 6000 rpm Max.

#### 2004 and 2006 carbureted only models:

- Set calibration to: HMCD1340, HEX (32124-04.134) hmed 1340. **See Fig. 10**
- Select all and +2 across the board on both spark table maps.
- Rev limiter at 6000 rpm Max.

**Note:** The following carb settings in Step 13, only apply to the Screamin' Eagle "Super Bore 51mm CV Carburator Kit Jims No. 1286-1378, H-D No. 27926-02. You will also need to order 2-JIMS No 1286-1400, H-D No. 26993-06 in take mounting flanges. These items must be ordered separately.



**Fig.10 Calibration**



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### STEP 13: Carburetor Settings:

1. The standard (furnished) settings are normally correct when used with 2-into-1 exhaust systems.

**Note:** Alternate exhaust systems may require different settings.

2. If carburetor tuning is required, use the Screamin' Eagle "Super Bore 51mm CV Tuner's Kit" H-D No.27432-02. Order separately from a H-D dealer.

3. The standard (furnished) settings are normally correct for a "standard day" such as is common near sea level in the summer.

- 70 degrees Fahrenheit.
- 29.9 Hg pressure
- 50% humidity

4. The Screamin' Eagle 51mm carburetor's standard settings are:

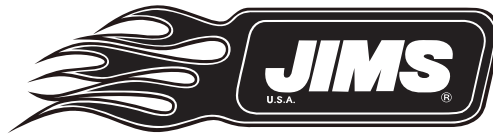
- Main Jet: 230
- Slow Jet: 48
- Jet Needle: NDKS (JET settings may need to be changed for peak H.P.)

### STEP 14: Oil Flow, Oil Pressure And Gasket Seating, All Engines:

#### Important Notes:

- Before you install your new JIMS 120 Race Kit engine in its chassis, thoroughly flush the motorcycle's complete oiling system.
- 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 until the oil pressure light goes out or until the pressure gage reads 10 -15 psi.
- Re-install the spark plugs, torque to 12 to 18 ft lbs., and plug wires. Depress both compression release plungers.
- Start the engine using the normal procedure outlined in the owner's manual. Allow the return oil to run into the catch pan.
- Run the JIMS 120 or 131 between 900 and 1500 rpm until the tops of the cylinders have reached 200 degrees Fahrenheit (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 room temperature. Inspect the installation for any oil or gasoline leaks. Top – off the oil tank. Repeat the warm-up and cool-down procedure three additional times.

**Note:** Watch and maintain the oil level in the tank. You may 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.



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### Oil Cooler Recommendation:

The JIMS 120 or 131 should be fitted with an effective oil cooler. The Harley No.62895-03B is an example of such a cooler.

### Chassis Oiling System:

Make sure that the entire oiling system is clean. If you are fitting your new JIMS 120 or 131 Race Kit engine into a chassis that has been used, be sure to completely clean the oil tank together with 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 Fahrenheit.
4. Do not load 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 55 mph.

### 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)



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### Tuning Factors:

#### The Air:

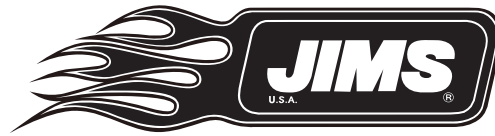
As with any other normally aspirated engine, the JIMS 120 or 131 Race Kit engine is affected by atmospheric conditions. Changes in air pressure, temperature and humidity all have their effects on air/fuel mixtures, power output, engine temperature and rideability. At a constant altitude, most such changes are small, not very important in day-to-day operation and can generally be ignored. Altitude changes have a more dramatic effect. As a rule-of-thumb, you can expect a pressure loss of three percent for each 1,000 feet of altitude gain. This means that at 10,000 feet an engine is going to lose almost 30-percent of its power, at best. The loss is normally even greater because air/fuel mixtures also richen. Carburetor settings can become too rich for either smooth operation or maximum power production. If you are going to operate your JIMS 120 or 131 above about 3,000 feet, you may find it necessary to alter the jetting. In Denver, at one mile above sea level, you may need to install the next leaner needle, next leaner slow jet and go a couple of sizes down on the main jet. A highly experienced engine tuner should make such changes. Atmospheric conditions are much more important when racing where small differences can determine whether you go on to the next round or go onto the trailer. Races are often won or lost on a tuner's ability to get the jetting (among other things) "right" as the atmospheric conditions change during the day. If you do not understand jetting, if you cannot 'read' the air, you are in for some hard lessons at the track. Ask questions. The great majority of race tuners are more than willing to share much of what they know. Do not expect to get all the details - it is racing after all. But expect to get more information than you can probably use right away. Drag racers are a congenial group and they want you to be there, racing with them, and enjoying it.

#### More Power Air Flow Volume:

Ultimately, the amount of power your JIMS 120 or 131 Race Kit can produce is going to be determined by two factors: How much air it can process in a given time, and, how efficiently it uses that air to supply useful power to its crankshaft. The JIMS 120 Race Kit delivers about 121 and the 131 at about 130 horsepower. It is very possible to increase that output by 20% or more. It is also possible to reduce it by a similar percentage. It is much easier to lose power than to gain it. Each and every part of this engine and its accessories are in balance. Each has been designed and developed or selected to work together for maximum airflow, power output and drivability. If, for instance, you fit a larger air cleaner or carburetor that flows more air, the result may not match your expectations. A bigger carburetor does little to improve power if the total airflow is limited in some other part of the engine system. Substantial power gains require substantial modifications.

Increased airflow through the cylinder heads of your JIMS 120 or 131 Race Kit engine requires that the manifold and both intake and exhaust ports be carefully and skillfully modified. Cylinder head porting continues to be an art form and should not be attempted without guidance from a practiced porting expert. Better yet, contract such an expert to do the work for you.





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While the Screamin' Eagle air cleaner element is one of the highest flowing units commonly available, air cleaner flow can be increased. Several larger filters may flow more air volume than the supplied filter. However, they are also likely to interfere with riding comfort.

### Combustion Chamber Pressure:

Power output and combustion chamber pressure are directly related. The higher the pressure, the more efficient and more powerful the engine becomes, within limits. That is, until the onset of detonation. A racing engine, one that is carefully and constantly looked after by an expert, can run with very high compression pressures. In the case of the Twin Cam chamber design, these pressures can exceed 210 psi.

An engine that operates under a variety of conditions must have its compression pressure compromised so that it is not damaged under the worst of those conditions. For this reason, your JIMS 120 or 131 Race Kit engine does not develop the very highest possible compression pressure.

Compression pressure is found by performing a common compression test as outlined in Harley's shop manuals. In this test, the mechanic removes both spark plugs and fits a compression tester to one of the plug holes. He then opens the throttle fully, lifts the CV slide, and turns the engine through five to seven compression cycles or until the pressure reading on the tester stops rising. The measured pressure is the compression pressure for that cylinder.

The common method used to raise compression pressure is to remove material from the heads on a milling machine. This decreases combustion chamber volume, raises the compression ratio and, in turn, raises the cranking pressure.

### Detonation:

Detonation must be avoided. A detonation event is literally an explosion. 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, and too much cranking pressure for the particular combustion chamber or engine overheating.

If you choose to alter the cranking pressure, ignition timing or carburetor settings of your JIMS 120 or 131 Race Kit 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.

### Performance Tuning:

As you can see, performance tuning is complex. One change often creates the need for other compensating or complimentary alterations. If raising the compression pressure makes the chamber more turbulent, a likely thing, it may be necessary to back-off ignition timing to compensate for the increased flame-front speed across the chamber. If moist air rolls across the track late in the afternoon, a leaner main jet may be needed to compensate for the reduced oxygen in the more moist air. If that air is also cooler and more dense, no change may be needed at all.



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## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

The possibilities are almost endless. However, exploring those possibilities can be great fun. If drag racing and performance tuning in general were "Cut-And-Dried", they would be boring. The stands would not fill and pits would be empty. There would be no friendly arguments about 'which cam' or 'what exhaust' works best.

Drag racing is one of the most popular participating motor sports in America. The fans are often racers themselves, have been racers, want to be racers or know a lot about the nuts and bolts of drag racing.

We at JIMS have spent years developing the JIMS 120 and 131 Race Kit engine for drag racers and those who want to become drag racers. The 120 or 131 engine is a strong, ground pounding and reliable base for your exploration into the complex and fascinating sport of drag racing. We hope you enjoy your new 120, or 131, as much we are pleased to bring it to you.

### Inspection and Service Wear information for Valve Train Components used in Performance Twin Cam Engines.

Valve Train Components should be inspected each 5000 miles of service. More often if an engine is used under severe riding condition, i.e. full throttle race operation, in city, dusty, low octane usage, trailer and two up riding. As with all high performance engines, components are under or subject to more stress in one-way or another, many times more than a stock engine. The following engine components will need to be inspected and or replaced each 5000 miles or more often as needed.

1. Rocker arm / Rocker arm Shaft Replace if more than  
 Shaft fit in bushing .0035  
 End play, side clearance .025  
 Shaft fit in support plate .003
2. Cam support plate Replace if more than  
 Cam chain tensioner shoe wear .090 or 1/2 thickness of shoe  
 Crankcase bushing press fit  
 in cam support plate .0008  
 Crankshaft bushing maximum I.D. .8545
3. Hydraulic Lifter Replace if more than  
 Fit in crankcase .003  
 Roller fit on axel .0015 or any rough area or tight spot  
 Roller end clearance .015
4. Cylinder Head Replace if more than  
 Valve guide, press fit in head .002  
 Valve seat, press fit in head .002  
 Head warpage .006
5. Cylinder, Replace if more than  
 Taper .002  
 Out of round .002  
 Warpage at gasket surfaces .006



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## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

6. Piston Replace if more than  
Fit in cylinder .006  
Piston pin fit (wrist pin) .0012  
Compression rings .030  
Oil control rings .070  
Ring side clearance compression rings .004  
Ring side clearance oil control rings .008
  
7. Connecting rod Replace if more than  
Piston pin fit (wrist pin) .0012  
Side play between flywheels  
(female rod end play) .024  
Fit on crank pin (up and down play) .002
  
8. Flywheel assembly Replace if more than  
End play ( F/W in left bearing) .006  
Inspect shaft bearing journals for scoring,  
galling or wear, not to exceed .0005
  
9. Balancer components Replace if more than  
Balance chain guides (front & rear) .060 to .070  
Balance chain guides (lower) .060 to .070  
Inspect other balancer components using H/D services  
manual)



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## INSTRUCTION SHEET FOR BOX 3 120" OR 131" ENGINE ASSEMBLIES OR ENGINE RACE KITS

### BOX 3 Materials Check-Off Sheet

<input checked="" type="checkbox"/> Part No.	H-D® No.	Description	Qty.
<input type="checkbox"/> 1286-1380	11289A	O-ring, Crank Position Sensor	1
<input type="checkbox"/> 1286-1373	16719-99	Gasket, Rocker Housing	2
<input type="checkbox"/> 1286-1374	17386-99	Gasket, Rocker Cover	2
<input type="checkbox"/> 1286-1372	11270	O-ring, Breather Assy	2
<input type="checkbox"/> 1208-1318		Rocker Cover, Modified	2
<input type="checkbox"/> 1208-1319		Rocker Housing, Modified	2
<input type="checkbox"/> 1045RR	1045RR	Roller Rockers, T/C, 1.625 ratio	1 set
<input type="checkbox"/> 17611-83	17611-83	Rocker Arm Shaft, T/C	4
<input type="checkbox"/> 1208-1303		Rocker Support Kit	1 set
<input type="checkbox"/> 1286-1310	1039	Screw, Rocker Support	4
<input type="checkbox"/> 1286-1308	3746 A	Screw, Breather	4
<input type="checkbox"/> 1286-1333	3693A	Screw, Rocker Housing, Long	4
<input type="checkbox"/> 1286-1334	3736A	Screw, Rocker Housing, Short	8
<input type="checkbox"/> 1286-1367		Screw, Rocker Cover, Chrome 1.750	6
<input type="checkbox"/> 1286-1352		Screw, Rocker Cover, Chrome 1.00	6
<input type="checkbox"/> 1286-1397		Washer, Flat, Chrome	12
<input type="checkbox"/> 1286-1341	17650-02	Breather Assy W/Gaskets	2
<input type="checkbox"/> 1286-1348	17997-99A	Pushrod set	1 set
<input type="checkbox"/> 1286-1350	6762B	Washer, Push Rod Tube Cover	4
<input type="checkbox"/> 1286-1351	17948-99	Cover, Upper Pushrod Tube	4
<input type="checkbox"/> 1286-1339	17945-36B	Cap, Cover Spring	4
<input type="checkbox"/> 1286-1329	17947-36	Spring, Push Rod Tube	4
<input type="checkbox"/> 1286-1367		Screw, Valve Cover, Chrome	6
<input type="checkbox"/> 1286-1397		Washer, Valve Cover, Chrome	6
<input type="checkbox"/> 1286-1399		Thread Locker, #243, .0502 Loctitie	6
<input type="checkbox"/> 1286-1327	63798-99	Oil Filter, Chrome	1
<input type="checkbox"/> 1708-1550		Spacer, 08' FL, Head Motor Mount (.300")	1
<input type="checkbox"/> 1708-1551		Spacer, 08' FL, Head Motor Mount (.250")	1
<input type="checkbox"/> 1206-1353		IS, Instruction Sheet Box 3	1