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Installation Instructions for 1936-'47 OHV BT and KN-Series Flathead Power™ Rocker Arms and Rocker Shafts

DISCLAIMER:

S&S parts are designed for high performance, closed course, racing applications and are intended for the very experienced rider only. The installation of S&S parts may void or adversely affect your factory warranty. In addition such installation and use may violate certain federal, state, and local laws, rules and ordinances as well as other laws when used on motor vehicles used on public highways, especially in states where pollution laws may apply. Always check federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when breathed. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgment when performing installation and operating motorcycle. Good judgment begins with a clear head. Don't let alcohol, drugs or fatigue impair your judgment. Start installation when you are fresh.
- Be sure all federal, state and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be breathed. Run motorcycle in a well ventilated area where fumes can dissipate.

IMPORTANT NOTICE:

Statements in this instruction sheet preceded by the following words are of special significance.



WARNING

Means there is the possibility of injury to yourself or others.



CAUTION

Means there is the possibility of damage to the part or motorcycle.

NOTE

Other information of particular importance has been placed in italic type.

S&S recommends you take special notice of these items.

WARRANTY:

All S&S parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of twelve (12) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&S's option if the parts are returned to us by the purchaser within the 12 month warranty period or within 10 days thereafter.

In the event warranty service is required, the original purchaser must call or write S&S immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action.

A part that is suspect of being defective must not be replaced by a Dealer without prior authorization from S&S. If it is deemed necessary for S&S to make an evaluation to determine whether the part was defective, a return authorization number must be obtained from S&S. The parts must be packaged properly so as to not cause further damage and be returned prepaid to S&S 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 S&S and the part was found to be defective, repair, replacement or refund will be granted.

ADDITIONAL WARRANTY PROVISIONS:

- (1) S&S shall have no obligation in the event an S&S part is modified by any other person or organization.
- (2) S&S shall have no obligation if an S&S 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 S&S part.
- (3) S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or for any other breach of contract or duty between S&S and a customer.
- (4) S&S parts are designed exclusively for use in Harley-Davidson® and other American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

ROCKER ARM REBUILD

S&S® uses specially machined and indexed rocker arm bushings, a rebuild may be more than an average shop or individual can handle, contact S&S Tech services for more information.

- 1- To check the wear limits use the chart below.
- 2- The function of the shaft to bushing tolerance is oil control to the top end, we do not recommend exceeding the wear limit, however, if you are not experiencing oil flooding to the top end, it is unlikely to need to replace the rocker arm bushings unless they are damaged or show unusual or uneven wear.

NEW KN ARM REAM		NEW KN SHAFT	
Top of Tolerance	0.55165	Top of Tolerance	0.5500
Bottom of Tolerance	0.55085	Bottom of Tolerance	0.5495
Total Tolerance	0.0008	Total Tolerance	0.0005
Nominal Diameter	0.55125	Nominal Diameter	0.54975
NOMINAL NEW	0.0015	Nominal Clearance	
	0.00075	Nominal Gap Around Shaft	
LOOSEST NEW	0.00215	Max Clearance	
	0.001075	Max Gap Around Shaft	
TIGHTEST NEW	0.00085	Min Clearance	
	0.000425	Min Gap Around Shaft	
LOOSEST AT WEAR LIMIT	0.00415	Max Clearance	
	0.002075	Max Gap Around Shaft	

ROCKER ARM AND HOUSING INSTALLATION - GENERAL

- 1- Determine your usage per figures 1, 2 or 3. Assemble rocker arms as shown for your application, note the oil hole end of the shaft must go in the rocker housing in order to properly oil the top end.
- 2- Follow installation Figure 1a.

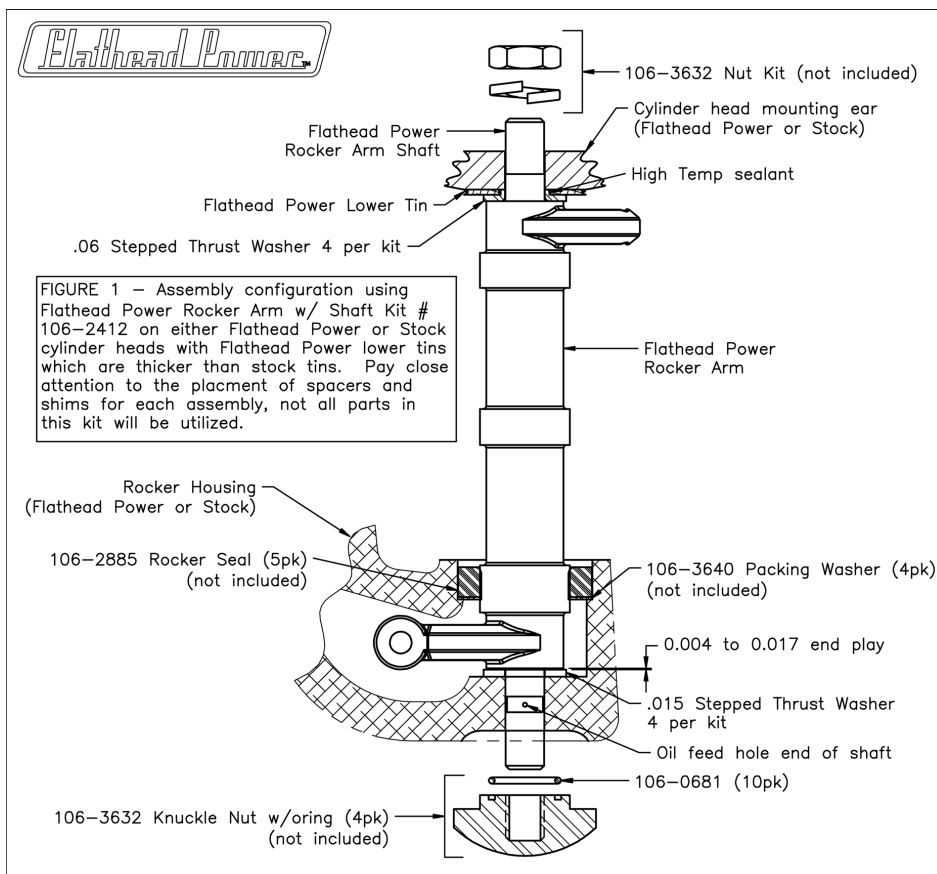
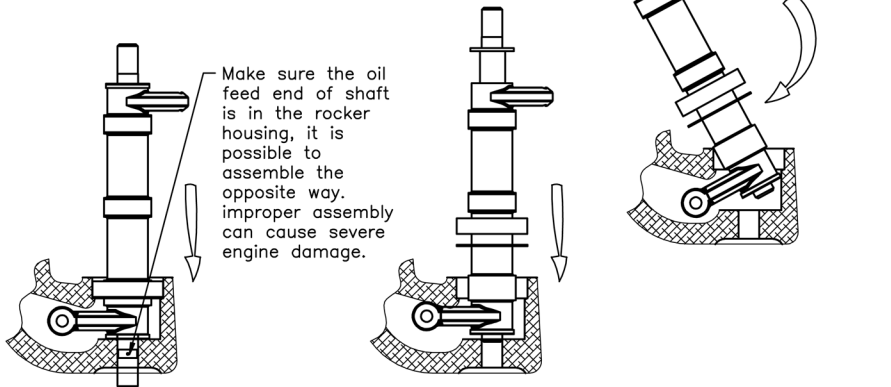


FIGURE 1a – Once proper assembly application has been determined from figures 1, 2 or 3, assemble and roll the rocker arm assembly into the rocker housing as shown. You may find it easier to drop the inner shim and thrust washer into the housing first and work the end of the rocker shaft into the shim and washer and into the housing. Once in place, the packing washer and packing seal can be worked into place.

NOTE: the rocker arm will have little or no play once the seal is in place and the tins are squeezed into place. Be sure to check your endplay without the seal installed to be sure your assembly has the proper end play.

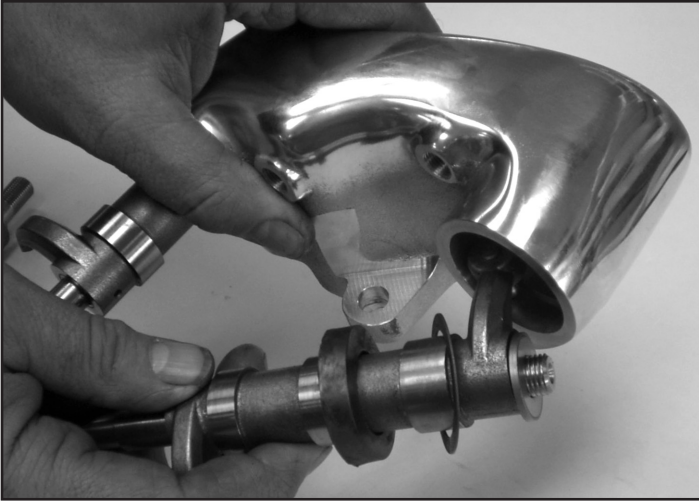


ROCKER ARM AND HOUSING INSTALLATION - PART 1 S&S® ARMS & TINS

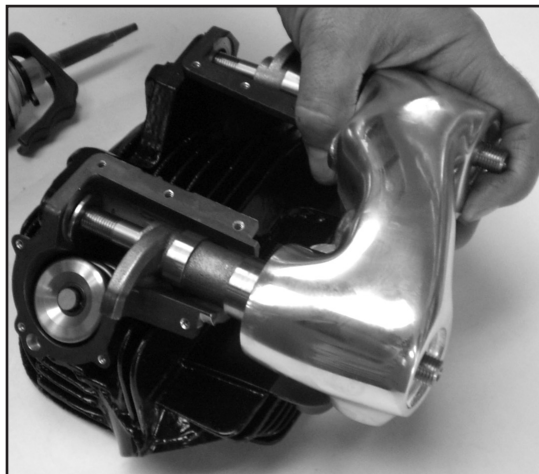
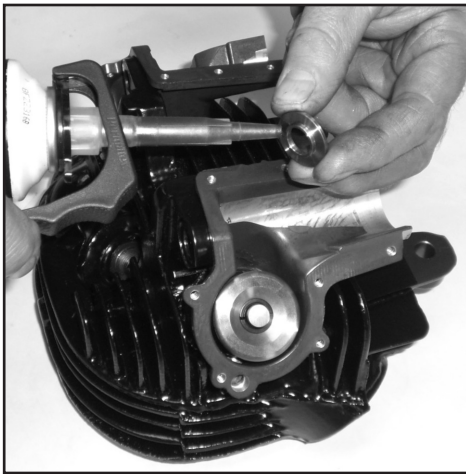
- 1- Clean all gasket surfaces to remove any previous gasket material or sealant. Be sure all passages are clear of machining, packing and other foreign materials.
- 2- Using a similar tool as shown or spacers and 1/16" nuts, assemble each rocker arm assembly as shown, tighten and check endplay. With S&S® tins end play should be .004 to .017. If rocker arm end play is less than .004, use a belt sander or flat file to remove material from the ends of the rocker arm clean parts thoroughly, reassemble and check end play.



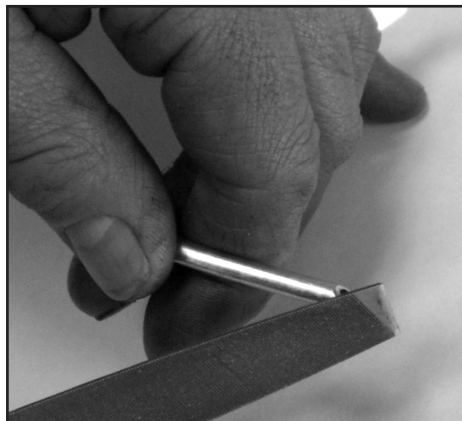
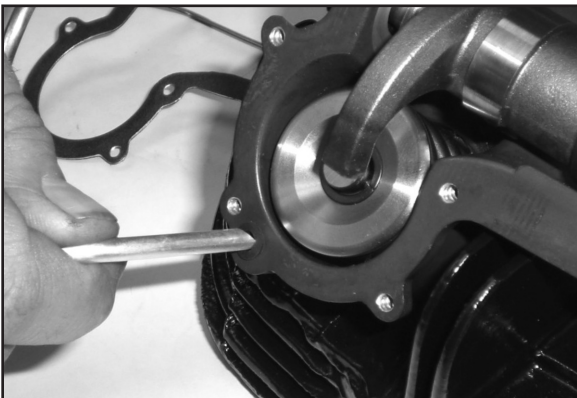
- 3- Since end play has been established, assemble the rocker arms into the housings as shown, as long as endplay is well established, you can install the rocker seals as well.



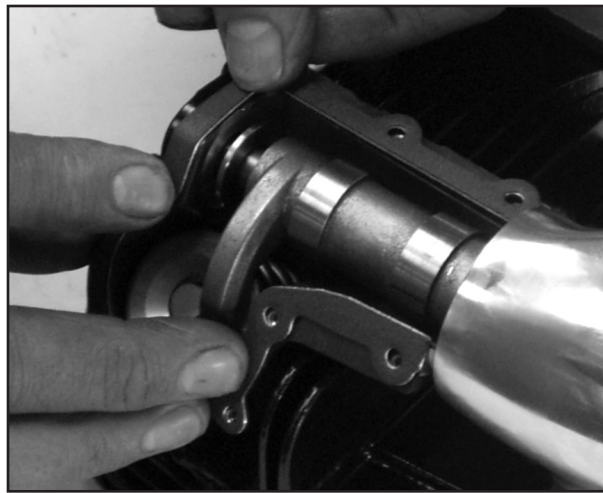
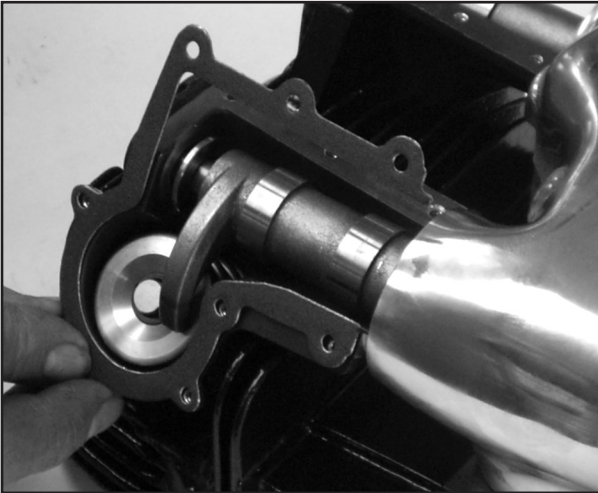
- 4- Using Permatex® Right Stuff® gasket maker apply to the stepped thrust washer as shown and install. Install the assembled rocker housings as shown but do not tighten the shaft nuts.



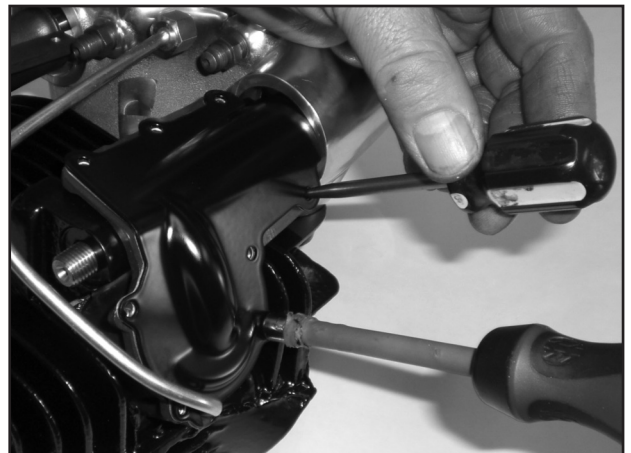
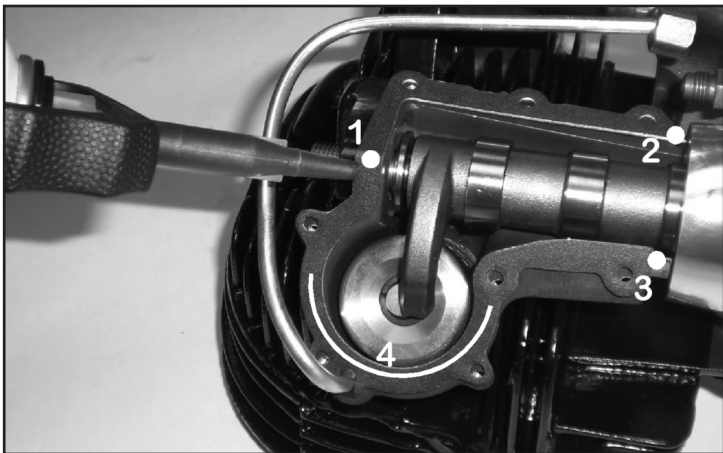
- 5- Install intake oil lines to the lower line assemblies, using file, remove any burrs from the end of the line so it can not hang up on the grommet as it is pushed into the housing.
- 6- Insert the rubber grommet into the return hole counter bore and press line into lower tin. Once in place, be sure grommet does not stick up past the top gasket surface. If needed, trim excess material to be flush or below the gasket surface. Follow the same procedure for the exhaust oil return lines.



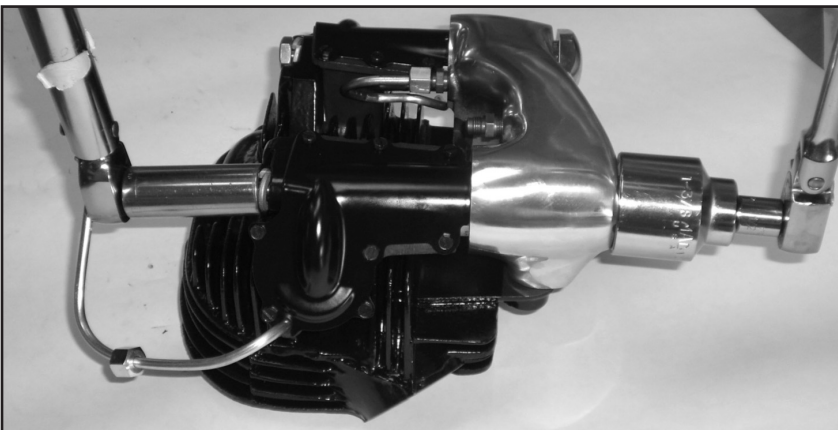
7- Hold the gasket in place as shown and bend to form over the lower tin gasket surface, repeat for the other three gaskets.



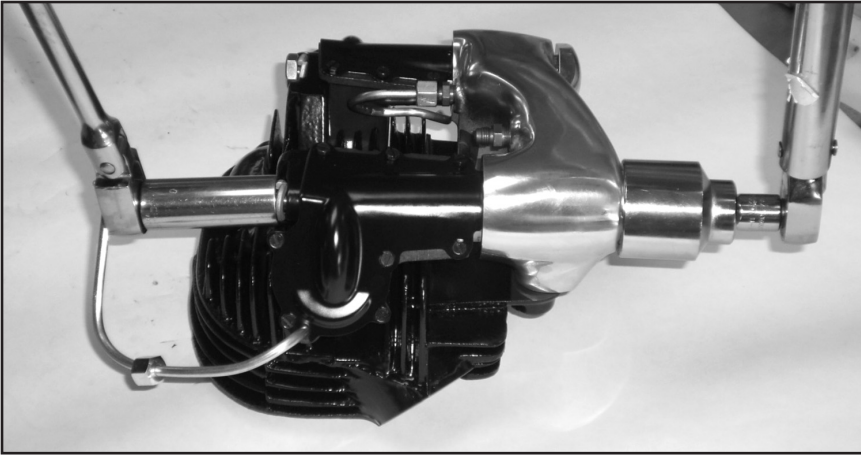
8- Using Permatex® Right Stuff® gasket maker apply to the four points as shown (both sides of the gasket) and install the gasket, install the cover and screws. Use an all to help align and hold the gasket and cover in place.



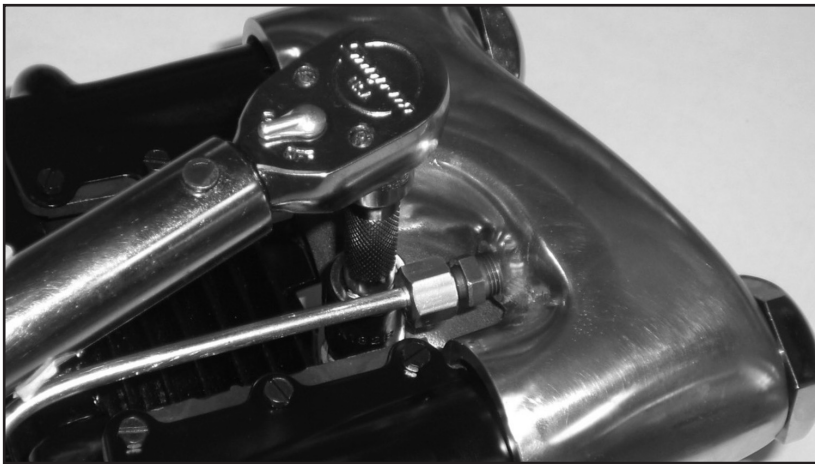
9- Tighten the rocker nuts enough to install but not tighten the 3/8" screws to hold the rocker housing in place.
10- Tighten rocker arm jam nuts to 27-30 ft-lb.



11- Tighten rocker arm knuckle nuts to 27-30 ft-lb.



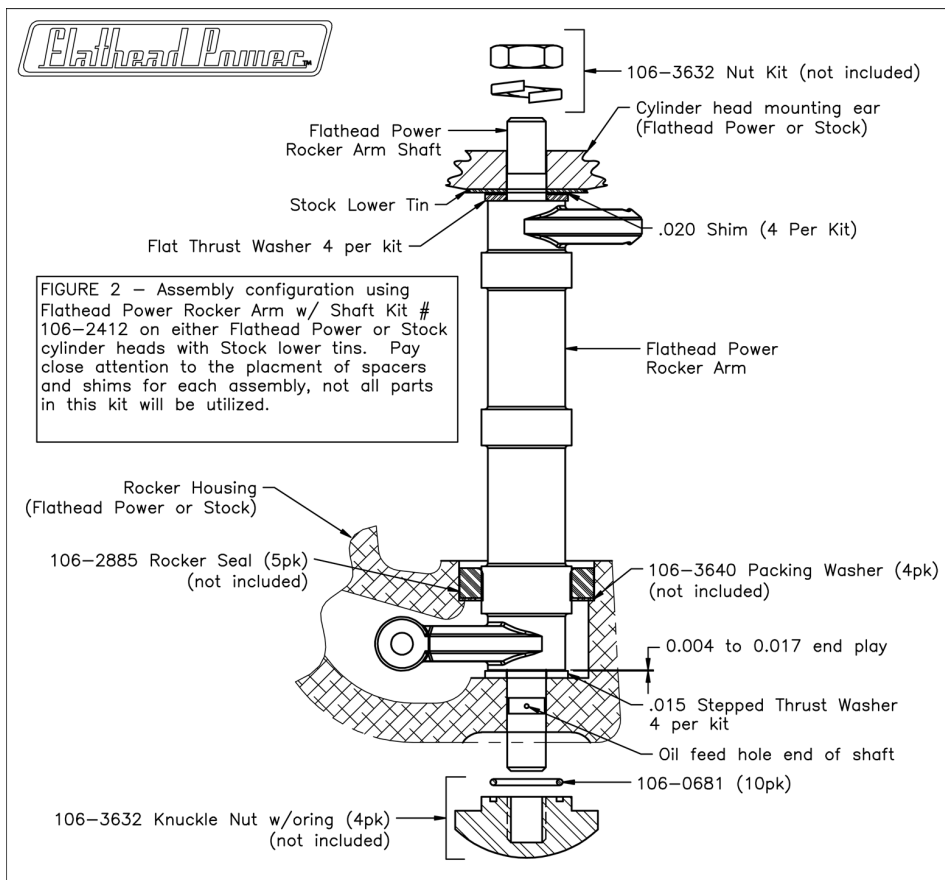
12- Tighten the 3/8" rocker housing bolts to 27-30 ft-lb.



ROCKER ARM AND HOUSING INSTALLATION - PART 2 S&S® ARMS & STOCK TINS

NOTE: S&S components are designed to work other S&S components or with stock components where specified. It is not recommended to mix and match non S&S components in the rocker arm assembly, the oiling system may be compromised and excessive damage or engine failure could result.

- 1- Clean all gasket surfaces to remove any previous gasket material or sealant. Be sure all passages are clear of machining, packing and other foreign materials.
- 2- Using a similar tool as shown or spacers and $\frac{7}{16}$ " nuts, assemble each rocker arm assembly as shown, tighten and check endplay. With stock tins, end play should be .007 to .017. If rocker arm end play is less than .007, use a belt sander or flat file to remove material from the ends of the rocker arm clean parts thoroughly, reassemble and check end play.
- 3- Since end play has been established, assemble the rocker arms into the housings as shown, as long as endplay is well established, you can install the rocker seals as well.
- 4- Install the assembled rocker housings as shown following the assembly instructions in your stock service manual.



ROCKER ARM AND HOUSING INSTALLATION - PART 3 STOCK ARMS & TINS

NOTE: S&S® components are designed to work other S&S components or with stock components where specified. It is not recommended to mix and match non S&S components in the rocker arm assembly, the oiling system may be compromised and excessive damage or engine failure could result.

- 1- Clean all gasket surfaces to remove any previous gasket material or sealant. Be sure all passages are clear of machining, packing and other foreign materials.
- 2- Assemble each rocker arm assembly as shown, assemble the rocker arms into the housings as shown, until endplay is well established, DO NOT install the rocker seals. Tighten rocker shaft nuts, install the 3/8" rocker housing bolts and check endplay. With stock tins, end play should be .007 to .017. If rocker arm end play is less than .007, use a belt sander or flat file to remove material from the ends of the rocker arm clean parts thoroughly, reassemble and check end play.
- 3- When end play has been established, disassemble rocker shafts from housings and re-assemble with the seals in place.
- 4- Install the assembled rocker housings as shown following the assembly instructions in your stock service manual.

