INSTRUCTIONS

EVOLUTION™ HYDRAULIC ROLLER LIFTERS
Part #s 85001-16, 85601-16, 85301-16, 85401-16, 89591-16, 89571-16, 89201-16, 89211-16, 89311-16, 89341-16, 85701-16, 85531-16

Patent No 11,136,907

Thank you for choosing COMP Cams® products; we are proud to be your manufacturer of choice. Please read this instruction sheet carefully before beginning installation and also take a moment to review the included limited warranty information. Contact us toll free at 1.800.999.0853 or at www.compcams.com under Tech Support with any questions.

The following instructions cover the correct procedures for installing COMP Cams® Evolution™ Hydraulic Roller Lifters. Before beginning installation, be sure the engine's oil system is clean and free of sludge or other contaminants such as silicon fragments. Sludge or contaminants in the oil system can cause premature failure of the new hydraulic lifters.

PRE-INSTALLATION

1. Check the part number on the box to ensure that the lifters match the intended application.

Make	Description	Diameter	Seat Height	Part #
OE-STYLE NO LINKBAR HYDRAULIC ROLLER LIFTERS				
Dodge	GEN III HEMI 5.7L, 6.1L, 6.2L, 6.4L	.842”	3.150"	**85601-16**
Chevrolet & GM LS/LT	Small-block 305 and 350, use in blocks originally equipped w/hydraulic roller cam (1987-present, including GEN II, III, IV, and V small blocks)	.842”	2.660"	**85001-16**
RETRO-FIT LINKBAR HYDRAULIC ROLLER LIFTERS				
Chevrolet	Small-block 265-400, retro-fit roller lifter for early-model blocks originally equipped w/flat tappet cam, tall body fits both standard block and tall lifter bore aftermarket blocks	.842”	2.475"	**85301-16**
	Big-block 396-454, retro-fit roller lifter for early-model blocks originally equipped w/flat tappet cam, tall body fits both standard blocks and tall lifter bore aftermarket blocks	.842"	2.475"	**85401-16**
	Big-block 348, 409, retro-fit roller lifter for early-model blocks originally equipped w/flat tappet cam, tall body fits both standard blocks and tall lifter bore aftermarket blocks	.842"	2.475"	**89591-16**
GM LS/LT	LS/LT series captured linkbar retro-fit roller lifter for '97-up, fits factory, LSX, and Warhawk blocks	.842"	2.660"	**89571-16**
Chrysler	Small-block 273-360, retro-fit roller lifter for early-model blocks originally equipped w/flat tappet cam	.904”	2.300"	**89201-16**
	Big-block 383-440, retro-fit roller lifter for early-model blocks originally equipped w/flat tappet cam	.904"	2.300"	**89211-16**
Ford	Small-block 289-302-351W, retro-fit roller lifter for early-model block originally equipped w/flat tappet cam	.875"	2.600"	**89311-16**
	Big-block and FE 390-428, 429, 460, retro-fit roller lifter for early-model blocks originally equipped w/flat tappet cam	.875"	2.600"	**89341-16**
Oldsmobile & Pontiac	Oldsmobile and Pontiac, retro-fit roller lifter for blocks originally equipped w/flat tappet cam (will not clear stock intake on small-block Oldsmobile or Edelbrock #3711 intake)	.842”	2.475"	**85701-16**
Holden	Holden V8 1969-1999 253-308-350, retro-fit roller	.842”	2.630”	**85331-16**

2. **Lifter cleaning**: Remove the new COMP Cams® Evolution™ Hydraulic Roller Lifters from the packaging. The lifters need to be cleaned with mineral spirits or parts washing solvent first to remove any debris from shipping or handling. Also check to ensure that the wheel rolls smoothly.

NOTE: Rollers may feel as though the wheels drag more than expected due to the grease packing for assembly and break-in. This is normal. WARNING: The wheel needle bearings are pre-greased with special OE grease. While cleaning, be careful to **NOT** blow out this grease for this is very vital to initial break-in. Also do **NOT** clean with aerosol cleaners! And do **NOT** allow the wheel to be spun by compressed air.

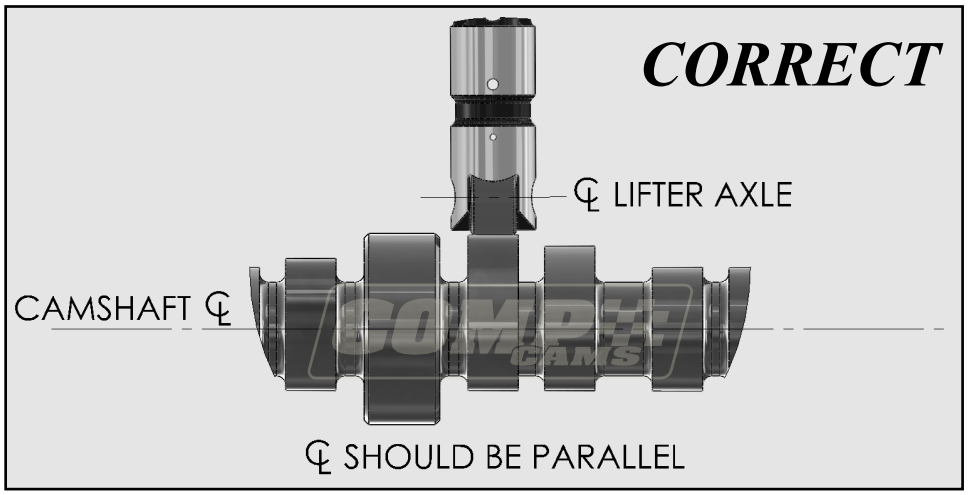
NOTE: Rollers may feel as though the wheels drag more than expected due to the grease packing for assembly and break-in. This is normal.

3. Next, soak the lifters with COMP Cams® Break-In Oil (Part #1590) or equivalent for at least two hours. Doing so ensures the lifters are adequately lubricated on their outer surfaces prior to installation.

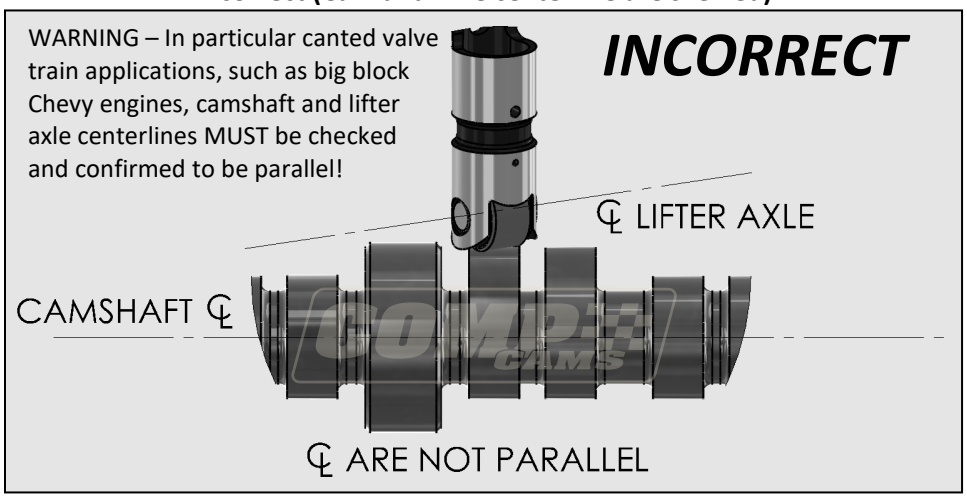
INSTALLATION

4. **Setup:** With the cam installed, place the prepped lifters into the lifter bores. If using hydraulic rollers with a link bar, pay close attention to which direction the link bar faces. The link bars on retro-fit lifters should face the valley of the block (**except for 89201-16, in which link bars must face the cylinder side of the block instead of the valley**). If the link bar has an arrow on it, make sure the arrow is pointing upward (↑). If the engine block was originally equipped with hydraulic rollers, make sure the lifter roller wheel is positioned to roll along the camshaft lobe. Failure to do so will result in camshaft damage and improper oiling.

Correct (Cam and Axle Centerline are parallel)

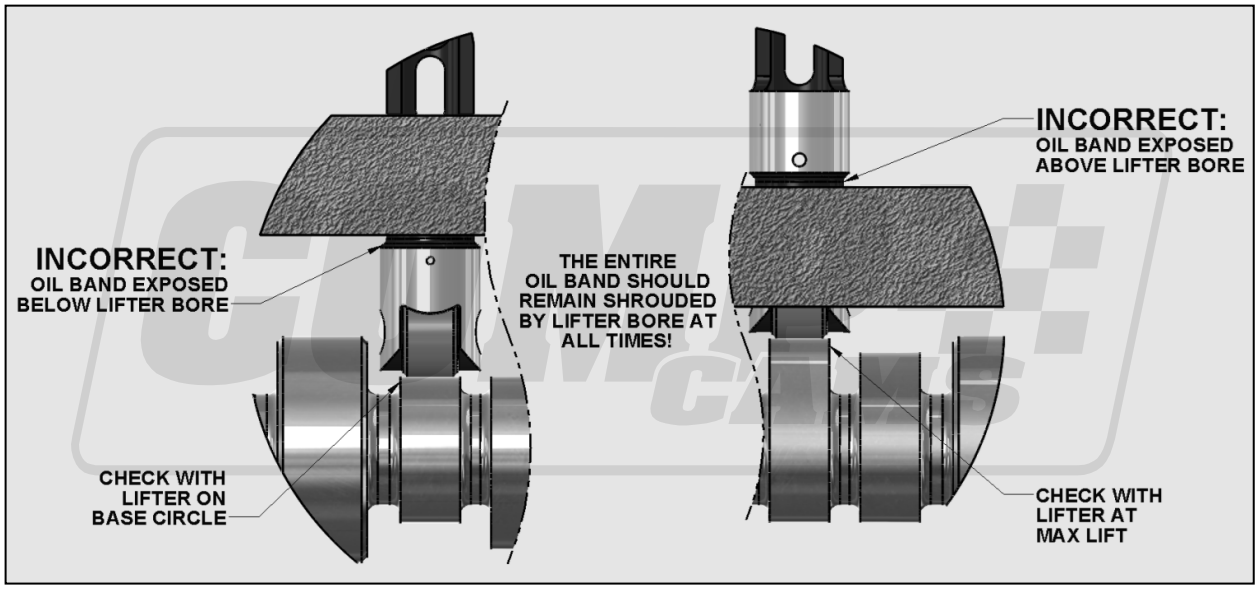


Incorrect (Cam and Axle centerline are skewed)



Verify that the oil band on the side of the lifter does not extend out of the top or bottom of the lifter bore as seen below, first at max lift and then again on the base circle. Oil band should be at least 0.050" below the top of the bore.

(Oil band incorrectly sitting above and below the lifter bore)



When installing the lifters, make sure they fit well. Any excess clearance or tight lifters can cause damage to the camshaft, leading to engine failure. Verification of lifter to lifter bore clearance is recommended. **Note: Contact your engine builder or block manufacturer for your specific clearance specifications.**

5. **Pushrod and rocker arms:** Clean all pushrods thoroughly because most engines oil through the center. If the original pushrods are being used, be especially sure they come clean inside and out. Apply a small amount of COMP Cams® Engine Assembly Lube (Part #102) or an equivalent lube on each end of the pushrods and install them into the engine. Clean all rocker arms thoroughly. If the original rocker arms are being used, examine each one for excessive wear, and replace any that are questionable. Apply a small amount of lube on all contact areas of the rocker arm. With a clean rag or towel, wipe the tips of the valves clean and apply lube to the areas that will make contact with the rocker arms. Also be sure to check the valve stem tips for excessive wear. Next, install the rocker arms. Make sure the pushrod is in the lifter and the rocker arm seat when making valve adjustments.

6. **Adjusting pre-load:** COMP Cams® Evolution™ Hydraulic Roller Lifters can be used with adjustable and non-adjustable valve train designs. However, each type of valve train has its own set of procedures for setting pre-load. This section is divided into two parts: Section I describes adjusting pre-load with an adjustable valve train, while Section II explains adjusting the valves using a non-adjustable valve train.

   The Evolution™ Hydraulic Roller Lifters have nominally .125” of internal travel within the hydraulic cartridge. For most engines with adjustable rockers, ¾ turn (7/16-20 studs) to 1 turn (3/8-24 studs) of the adjusting nut past zero lash is an adequate place to set lifter preload. However, please follow the instructions following in Section I for the most accurate method to set lifter preload.

   a. **Section I. Setting pre-load with ADJUSTABLE ROCKER ARMS**
   Turn the engine in the normal direction of rotation. Start with cylinder number (1) one. When the exhaust valve begins to open, adjust the intake valve to the correct pre-load. To reach zero,

take the pushrod between your fingertips and move it up and down while tightening the rocker arm. Once the pushrod has no more vertical slack, zero pre-load has been achieved. Make sure the pushrod is in the lifter and the rocker arm seat when making valve adjustments. As stated before, the **recommended** setting is ¾ to 1 turn of the wrench on the rocker arm adjusting nut past zero. Depending upon the rocker ratio and threads of the stud, this should get close to the middle of the travel range of the hydraulic cartridge. Now move on to the exhaust valve on the same cylinder. Begin by rotating the engine over again until the intake valve reaches maximum lift and is almost all the way back down. Then set the exhaust valve using the same method as the intake (3/4 to 1 turn of the wrench past zero). Continue adjusting the valves on each cylinder in this manner until all the valves are adjusted.

b. **Section II. Setting pre-load with NON-ADJUSTABLE ROCKER ARMS**
A different procedure and measurement is required to set hydraulic lifter pre-load on engines with non-adjustable rocker arms. First, install the pushrods and torque all the rocker arm bolts down in the proper sequence and to the correct torque specification. Rotate the engine by hand in the normal direction of engine rotation until both the exhaust and intake valves have opened and closed completely. Allow a couple of minutes for the lifters to bleed down.

Using the valve cover gasket surface on the head as a reference point, place a mark on the pushrod. The smaller, more defined the mark, the more accurate the measurement. Be sure the reference point chosen for the first mark is easily accessible and easy to duplicate. The pushrod will be marked twice. It must be measured from the same reference point and angle for the measurement to be accurate.
Loosen the rocker or rocker shaft bolts. Leave the rockers on the head so they will support the pushrods. Be sure the pushrods are standing free in the lifters and do not have any pre-load. Using the same reference point, place a second mark on the pushrod. Make sure the angle and reference point are the same as the first mark.

There are now two marks on the pushrod: one with the assembly bolted into place as the engine will run, and one with the lifter unloaded. The distance between these two points will represent the amount of lifter pre-load. If the pre-load is not within .020" to .070," adjustment is necessary. The simplest way to accomplish this is by using different length pushrods. When measuring to find the correct length needed, be sure to include the pre-load that the lifter requires (.020" to .080"). If the engine uses pedestal-mount rockers, shims can be placed under the pedestal to reduce the pre-load. The stands on shaft-mounted rockers can also be shimmed in this manner. Longer pushrods will be needed in the case of insufficient pre-load.

In most cases, only one intake and one exhaust pushrod will need to be checked. If the valve stem heights are not equal, then pre-load will have to be checked on each valve. If custom-length pushrods are needed, call CAM HELP® at 1-800-999-0853. COMP Cams® offers a variety of pushrods in most lengths.

7. **Engine Start-up:** After the lifters are installed, it is **NOT** recommended that the engine sit for a long period of time prior to initial startup, in order to help prevent the breakdown of the oil film. If this is a new engine build or your engine has not recently been run, be sure to prime the oil system before initial start-up. This will ensure the new lifters do not run dry while the oil pump is building pressure. During this time the lifters are cycling oil and filling their reservoirs, no damage will occur to the lifters or engine during this time if the RPM is kept below 3500 and the engine is not operated under full load. **Important:**

please monitor oil pressure as it should rise into the operating range within the first few seconds of start-up; otherwise, the engine should be stopped and the oiling problem investigated.

CARTRIDGE REMOVAL AND REPLACEMENT

COMP Cams® Evolution™ Hydraulic Roller Lifters are designed with a revolutionary replaceable cartridge that contains the hydraulic elements of the lifter.

1. Removal of the cartridge is as simple as using a pair of snap ring pliers to remove the C-clip that captures the hydraulic cartridge in the lifter body.
2. Turning the lifter upside down should allow the cartridge to drop out of the lifter. If the lifter is still in the engine, or the oil film tension is keeping the cartridge in the lifter body, simply use a magnet to pull the cartridge from the body.
3. Ensure there is no debris in the bore of the lifter body before installing a cartridge.
4. Drop a cartridge back into the lifter body. Ensure the pushrod interface (cupped side) is oriented towards the top of the lifter body.
5. Replace the C-clip to capture the cartridge within the body. Ensure it is fully seated in the snap ring groove at the top of the lifter body.

Description	Part #
Set, Replacement Evolution Cartridge	85000-16
Single, Replacement Evolution Cartridge	85000-1
Set, Replacement Retaining Rings	85000C-16

Limited Warranty

Competition Cams, Inc. warrants that all of its products are free from defects in material and workmanship, and against excessive wear for a period of (1) one year from the date of purchase. This **limited warranty** shall cover the original purchaser.

Competition Cams, Inc.'s obligation under this warranty is limited to the repair or replacement of its product. To make a warranty claim, the part must be returned within (1) one year of purchase to the address listed below, freight prepaid. Items covered under warranty will be returned to you freight collect.

It is the responsibility of the installer to ensure that all of the components are correct before installation. We assume no liability for any errors made in tolerances, component selection, or installation.

There is absolutely no warranty on the following:

A) Any parts used in racing applications;

B) Any product that has been physically altered, improperly installed or maintained;

C) Any product used in improper applications, abused, or not used in conjunction with the proper parts.

There are no implied warranties of merchantability or fitness for a particular purpose. There are no warranties, which extend beyond the description of the face hereof. Competition Cams, Inc. will not be responsible for incidental and consequential damages, property damage or personal injury damages to the extent permitted by law. Where required by law, implied warranties or merchantability and fitness are limited for a term of (1) one year from the date of original purchase.

This warranty gives you specific legal rights and you may also have other legal rights, which vary from state to state.