LAMB TOOL WORKS

PRECISION LEVEL MODEL 1600

The Lamb Tool Works Precision Level has been designed to perform numerous tasks, which include helping to accurately and precisely set up European style sliding table saws, setting jointer tables, milling machines, lathes, and just about any other piece of equipment where flatness or level becomes important to the accuracy of the machine.

The LTW level can be used in two ways, one, as shipped it will be set to “level”, so anything can be checked to be level. But, most machines in woodworking aren’t level to begin with and don’t have feasible options of being set level. The LTW level is adjustable so that surfaces can be set coplanar to each other, regardless of whether the whole machine is “level to the world” or not. This is accomplished by having the vial attached firmly at one end, while the other side is adjustable and spring-loaded. This lets you set the vial level on a specific surface and then make any other surface coplanar within less than .001” per foot (the accuracy per division on the vial) by comparing readings from surface to surface.

The following pages detail some of the methods of use, and also, how to reset the LTW level to be “level” if you have used it in the comparison mode. These are just examples of some of the many uses the LTW level has. It would be impossible to detail all the uses of this versatile tool.

If you have any questions, feel free to contact us at Customer Service if we can be of any help. This document is also available at www.lambtoolworks.com for download.

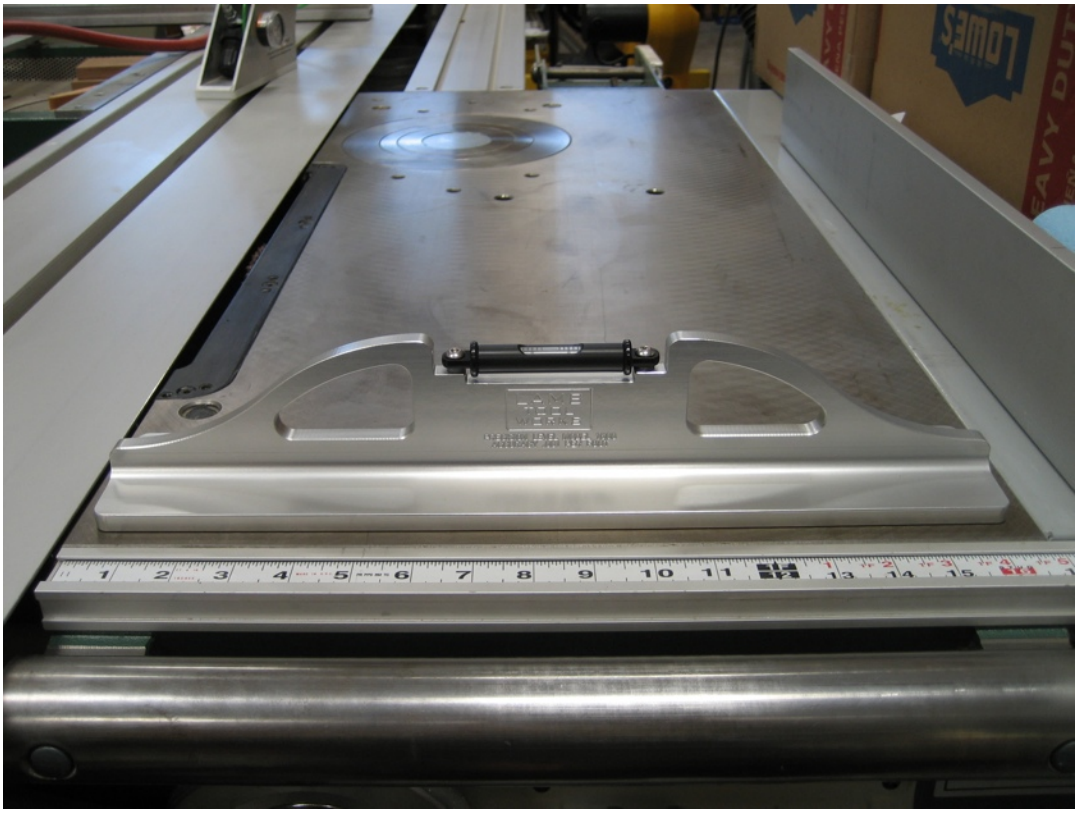
Please read all the directions before making adjustments to the Lamb Tool Works Precision Level.

Unboxing the Level

The LTW level comes shipped in the box shown to the right. It is double boxed in another, larger box to adequately protect it during shipment. The box flap is tight, it might be helpful to use a putty knife inserted to help open so as not to tear off the flap. You will notice the included hex key for adjusting the level.

Removing the top piece of foam shows the LTW level cradled in foam to protect it.

This is a close up of the vial, showing the ability to adjust it for level. One side is fixed permanently using the socket screw and a nylon washer under the vial with Loctite. **Do not adjust this side.** The right side is where adjustments for level are made, where there are a stack of spring washers between the vial and the level body. The adjusting screw is a fine pitch thread, so adjusting for level is relatively easy even though the vial is very accurate.

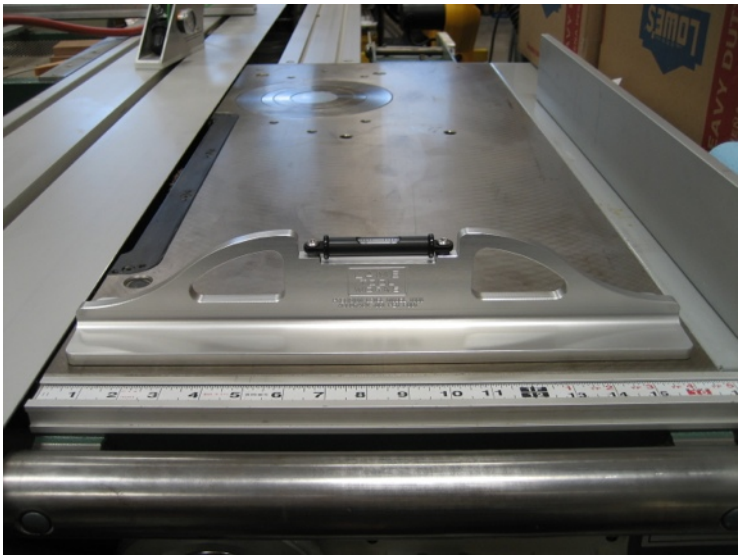


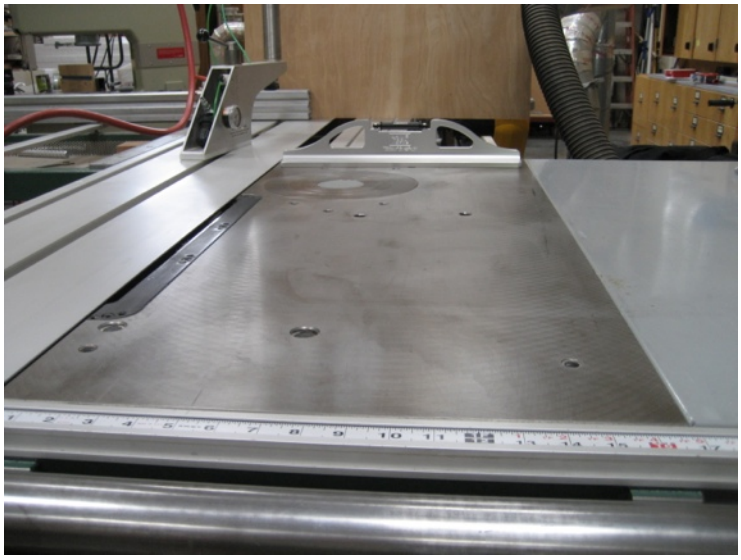
To level the cast iron top of a saw table, place the LTW level as shown to see if the machine is fairly close to level to begin with. If the bubble is to the left, then the left side of the machine is high; to the right, then the right side is high.

At this point you have two options: use feeler gages or adjust the vial. We cover how to do both in the following pages.

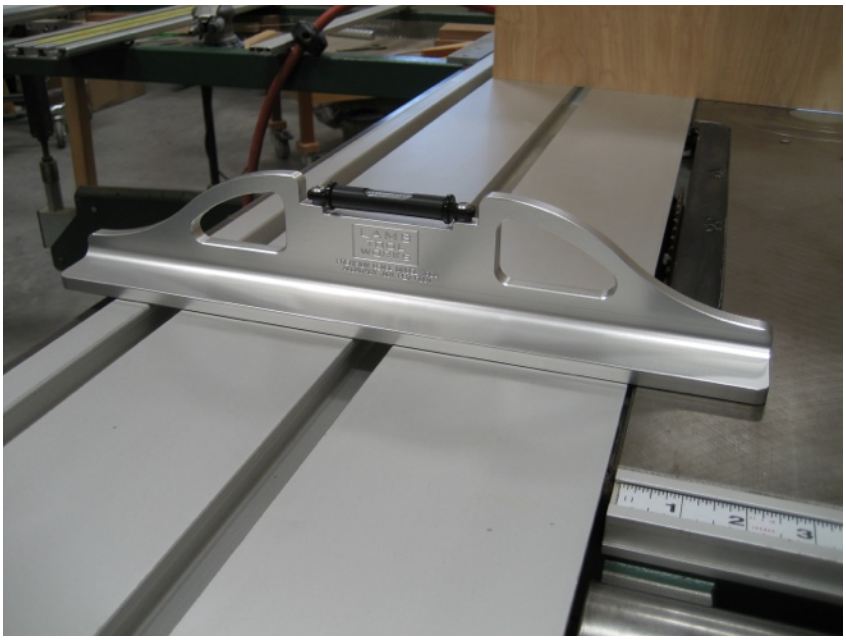
Comparative Method by Adjusting the Vial

Determine which side of the bubble is high and put the adjusting screw on the opposite side by spinning the level 180º if necessary. This is because the spring stack has limited travel going down, with a lot more adjustability going up. Insert the supplied 1/8” long arm hex wrench, slowly turning it counterclockwise until the vial reads level, or the edge of the bubble is on a specific line, whichever is easier for you to see. Now you can position the LTW level anywhere on the saw and verify coplanar to the position you calibrated to.

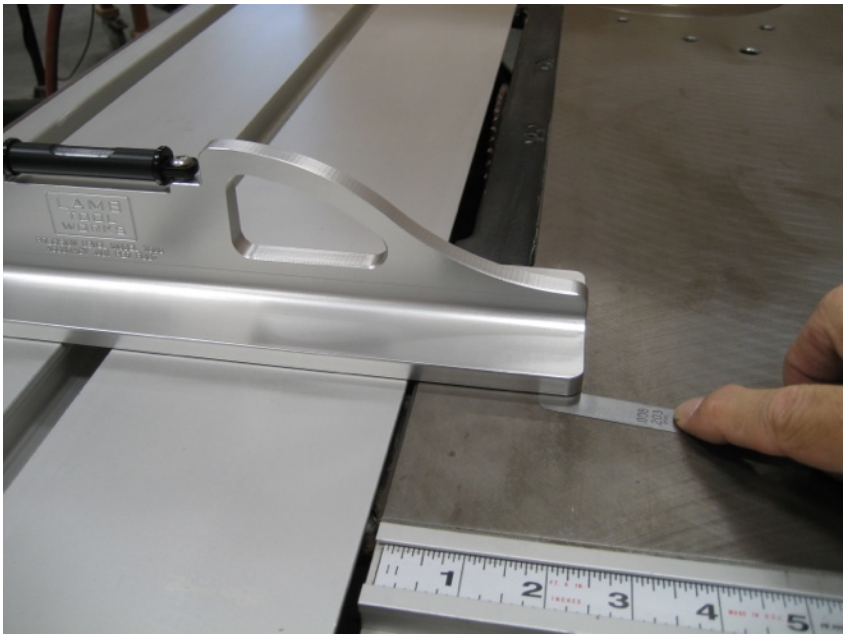




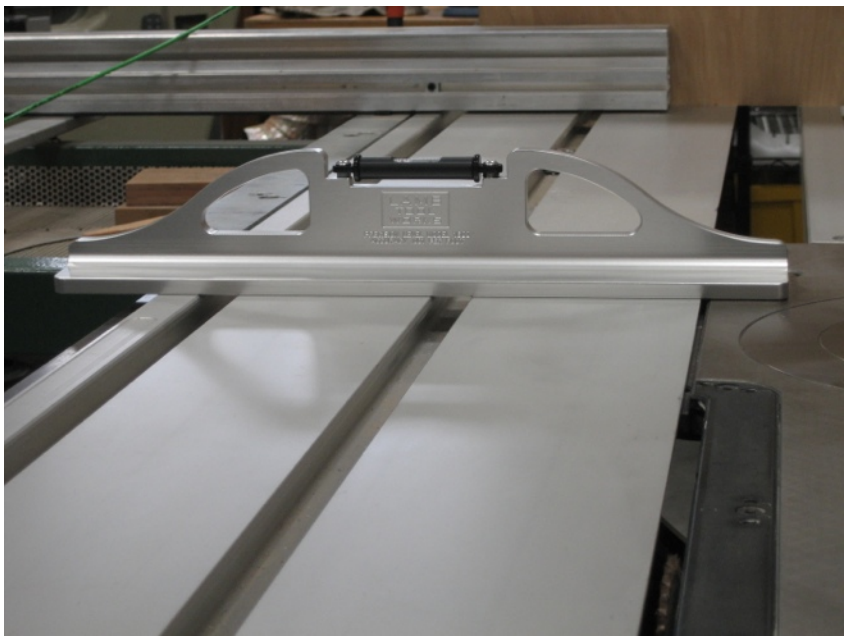
Once you have finished calibrating the LTW level, you can then slide it to the rear and see if it is still level. If you have the saw table flat, all future adjustments become a lot easier to accomplish. How adjustments to specific saws are accomplished will have to be determined by the user, as they all vary somewhat. When you have the front and rear edges in the same plane, a straight edge front to back is best to determine if there are dips or high spots in the length of the table.



When the saw table flatness is established, you can use the same settings on the LTW level to adjust the sliding table. It is best to have your slider's bearings directly between the position of the level and the support bolts on the lower slider carriage so things are solid and you get a consistent reading.

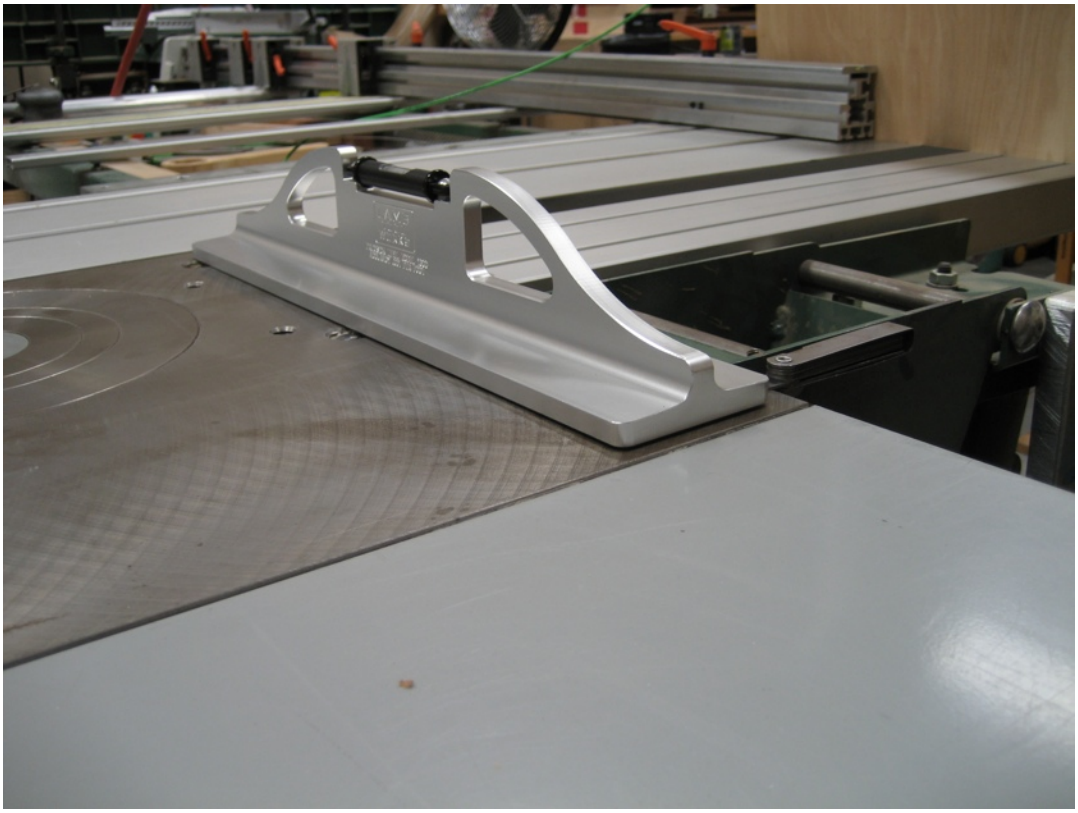


The height of the sliding table above the cast iron saw top is also easily checked by using feeler gages along the edges of the slider as shown. First in the front of the saw, then in the rear.

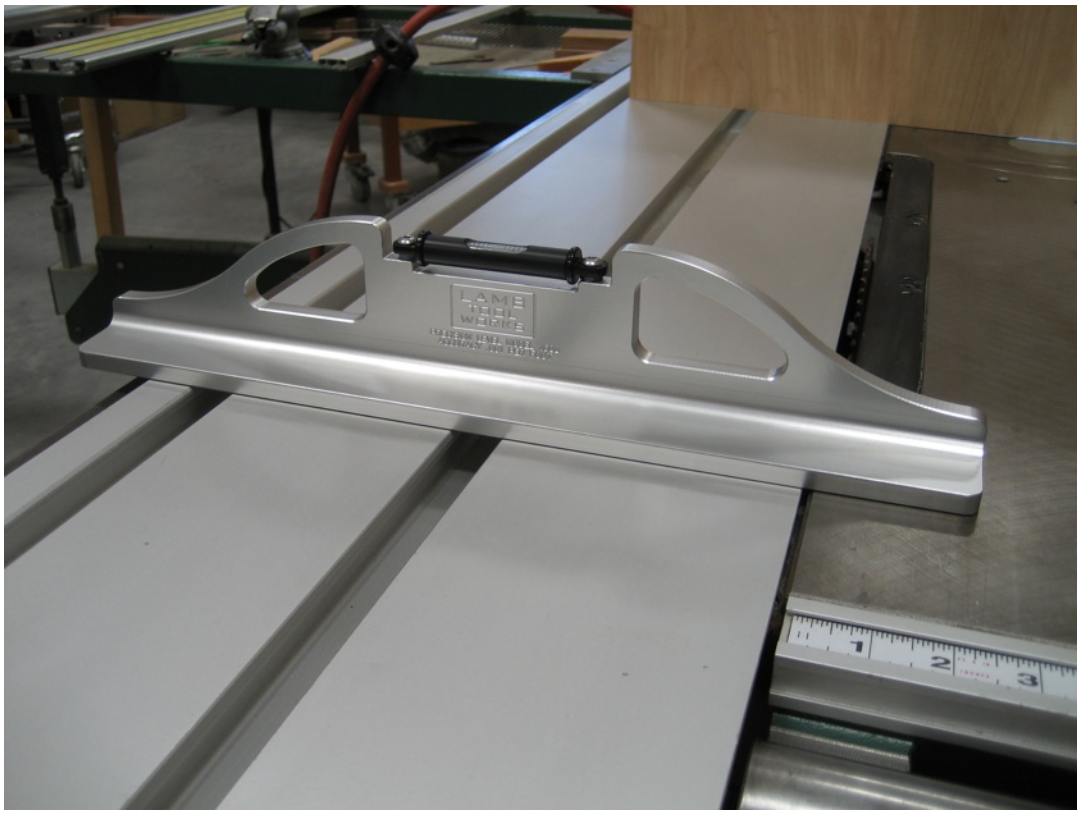


Leaving the Vial Level and Using Shims

If you would prefer to leave the LTW level as set from the factory at level, you can always use feeler gages to achieve level and then transfer the feeler gages to wherever you are getting comparison readings. In this example, .042” of feeler gages were required to get a level reading. To check the rear of the table, the LTW level and the feeler gages will have to be transferred and the same distance maintained between the feeler gages and the end that is resting on the table.



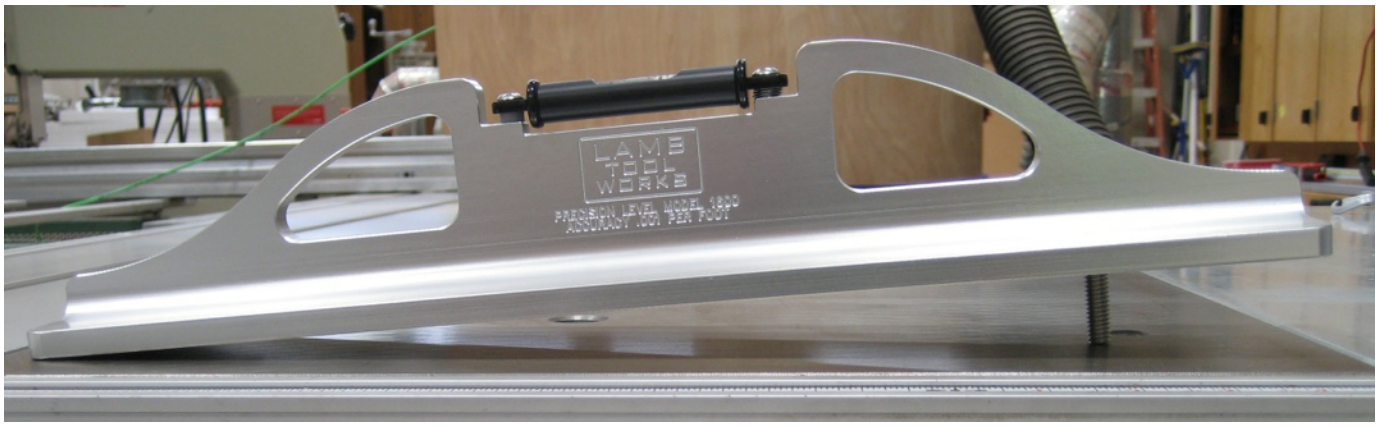
Here is the LTW level in the rear position, showing the feeler gages sticking out the back of the saw table. Care must be used to maintain the position of the shims so that you get consistent readings.



This method of using shims is probably not the best idea if you intend to use the LTW level to also adjust your slider. Because the position of the feeler gages needs to be consistent, on a narrower sliding table, the feeler gages would be off the table, or the opposite end of the level could be hanging off the table on the other side as shown in this picture. This would vary the contact points and throw off the readings of the LTW level.

The image below is somewhat tongue in cheek, but it shows another feature of the LTW Level. There are three 5/16-18 threaded holes on the bottom surface. They can be used to secure the LTW level to a longer beam, say a 6' level or maybe a jointed straight piece of wood. This allows you to have a precision level of any length.

Using a set screw as shown (of course a shorter one would be most common) you could accommodate an extremely out-of-level floor by resting on one edge of the level and using the set screw as a jack to hold the level up, similar in manner to our description of using shims above. Given that the distance from the hole to the edge is roughly 13.35" you could also use a little trigonometry and set specific angles. For example if you wanted 5°, your formula would be sin 5° x 13.35, so .0871" x 13.35" = 1.163" which is the distance the set screw would be out from the bottom of the level. This might come in handy if you wanted to tilt your drill press table to be perpendicular to an angled surface to drill a hole.



Reseting the Vial to Level

If you have used the adjusting screw to set the vial to a level reading on your machine and would like to reset the vial to be truly level again, this is the procedure to accomplish this.

1) It might be wise to find a reference surface to use for calibration, something static, that doesn't change. It could be the granite counter tops in the kitchen, a smooth desk top, or any of your stationary machines in the shop. Using the LTW level as shipped, find out what thickness of feeler gages makes it read level on top of this reference surface. Say we use the saw table as pictured in this document above, we found .042" was level. With the LTW level shimmed, you should be able to turn the level 180º and get the same reading either way, even if the bubble isn't perfectly centered when you have the level shimmed, as long as the reading is the same when flipped, the vial is level.

2) If you haven't found a reference surface and gotten a value, you can start from the beginning. In this example we are using the sliding table surface of the saw. We used a 4 foot carpenter's level and checked to see if the machine is level. If not, using feeler gages on one end of the level, calculate what it takes to be as level as you can detect. Remember a carpenter's level will not be anywhere near as accurate as the LTW Level, but it will get you close. If the level is 4 foot long, its spacing will be approximately 3 times the length of the LTW Level. So you will divide whatever shim stack you arrive at by 3 to use as at a starting point for the LTW level. Say we come up with .030", then we start with .010".

3) Place the LTW level in the same location on the slider, using the calculated stack of feeler gages if necessary. Adjust the vial to read level, remember, there is a limited amount of travel in the vial adjustment, so if the springs start to compress too much, spin the level and attempt to use the adjustment with it facing the opposite direction. Here we have adjusted the vial centered (camera angle makes it look slightly to the left).

4) Spin the level 180º and the bubble will be a specific amount off to one side. Raise or lower the vial accordingly to place the bubble half way between the two readings.

5) It was estimated to be four marks on the vial off-center. So you would adjust the screw to bring it back to two-off the original reading (again, camera angle makes it appear slightly to the left).

6) Now you can spin the LTW level and verify that the reading, whether it is exactly centered or not, is the same in either direction. You can now raise/lower the shim stack to establish a specific thickness to reset the level in the future. If you know it takes .012” on the right hand side, it makes it very easy to adjust the vial back to level at any given point in time, as long as your “reference” surface hasn’t changed.

We hope you enjoy your new Lamb Tool Works Precision Level and find it useful in many ways.

A few specifications for those that are interested:

Length:	16”
Width:	3”
Height:	3”
Vial Sensitivity:	.001” per foot
Flatness of bottom surface:	.0005-.001”
Threaded holes:	5/16”-18 Thread

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