

Micrometer Powder Bar Kit™

For the Dillon Auto Powder Measure *

Thank you for buying the UniqueTek Micrometer Powder Bar Kit™ for your Dillon Precision Auto Powder Measure. This kit includes everything you need to convert your Powder Bar to a Micrometer Powder Bar. This conversion kit is compatible with all Dillon Powder Bars (Extra Small, Small, Large, Magnum, Belted Magnum* plus the SL 900 Shot Bar*).

* The Belted Magnum powder bar and SL900 Shot Bar require minor modification. See Note in Step 4 of instructions.

Before beginning installation, it is recommended that you read these instructions completely at least twice. It is also recommended that you review the factory instructions and exploded parts diagram for your Dillon Precision Auto Powder Measure. If you do not have the instruction manual for your press, manuals are available for download at the Dillon Precision web site. (www.dillonprecision.com)

* Dillon Precision does not authorize the Micrometer Powder Bar Kit™ for use on any of its reloading presses and its use may void manufacturer or dealer warranties.

If you have any questions about installation, operation or experience any problem with your micrometer, please call me first. I can often resolve the problem over the phone (480-216-2041 cell). – Lee

Step 1: Place an Index Mark on Powder Bar

The Auto Powder Measure is oriented differently on each Dillon press. Before removing the powder bar, decide from which side you will want to view the micrometer when adjusting the powder charge. As you are facing the press, you will typically adjust the micrometer from the side shown below.

- Square Deal B – Left Side
- XL 650 – Left Side
- Super 1050 – Left Side
- RL 550B – Right Side
- SL 900 – Right Side
- AT 500 – Right Side

Mark a line on that side of the powder bar, near the adjustment screw, with a pencil, white crayon or other marker that is easily visible but removable. This line will be used later to orient the micrometer index mark for easy reading. On the XL 650 and Square Deal B you will notice that the micrometer numbers will be upside-down. But this orientation will be much easier to see during adjustment than if it was oriented on the opposite side of the powder bar as with the other presses.



Applying index mark (XL-650 shown)

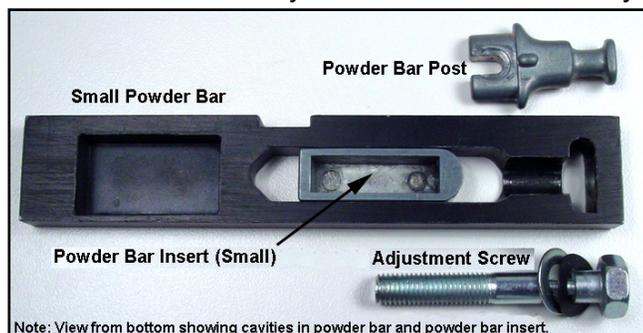
Step 2: Remove Powder Bar

Remove the Powder Bar from the Powder Measure. (Refer to Auto Powder Measure instruction manual for details.)

Step 3: Disassemble the Powder Bar

NOTE: Before disassembly, look closely at the Powder Bar and note that Powder Bar Inserts (Ex-Small, Small and Large) and some Powder Bars (Small and Large) have a flat side and a side with a cavity. The cavities must always be on the bottom side of the Powder Bar.

- a. Remove the Powder Bar Post. Press the bolt head against a hard surface to compress the spring washer while pulling out the Powder Bar Post. The Belted Magnum powder bar and SL900 Shot Bar have a 3/8" set screw instead of a powder bar post. Remove the set screw using a 3/16" hex key.
- b. Remove the Powder Bar Adjustment Screw.
- c. Set aside the Powder Bar Adjustment Screw, spring washer and flat washer. They will no longer be used.



Step 4: Prepare the Powder Bar for Installation **

The Teflon coating must be completely removed from the hole in the end of the powder bar where the adjustment screw was removed. Use a round file or rolled up sandpaper to scrape away the Teflon coating, leaving a fresh bare metal surface for the Loctite to achieve a good bond. Clean the hole with rubbing alcohol to remove any residue.

Note: If you happen to have a 7mm thread tap, it does a quick job of cutting through the Teflon coating and exposing clean bare metal for the Loctite to achieve a solid bond. Only a 7mm tap is the correct size. Do not substitute any other size metric or SAE tap.

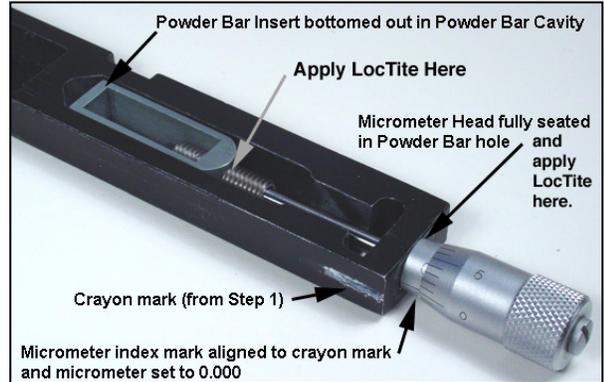
** The **Belted Magnum powder bar** and **SL900 Shot Bar** adjustment screw hole is smaller than on the other powder bars and must be enlarged using a 17/64" drill bit before installing the micrometer. Some older Small and Large powder bars may also require enlarging.

Step 5: Install Micrometer Assembly

NOTE: Do not remove the plastic strip(s) jammed between the micrometer shaft and the threaded bushing. They are there to provide friction to keep the micrometer setting from drifting during use.

- a. Set the micrometer to a reading of 0.000.
- b. Place the Powder Bar Insert in the Powder Bar. Make sure to orient the flat sides of the powder bar and powder bar insert so they are both on the top side of the Powder Bar (photo below shows the bottom side).
- c. Hold the Powder Bar vertically with the Powder Bar Insert at the bottom (minimum powder setting) and insert the micrometer assembly down through the hole in the Powder Bar where the Powder Bar Adjustment Screw was removed. Screw the ¼-28 adapter bushing into the Powder Bar Insert until the micrometer head is seated against the end of the Powder Bar.
- d. Check that the micrometer is still set to 0.000 and then position it so the index mark is aligned with the pencil mark you made on the Powder Bar during Step 1. (DO NOT FORCE)
- e. If the Powder Bar Insert does not touch the end of the Powder Bar cavity or if the micrometer head is not fully seated in the hole, pull it out slightly and screw the ¼-28 adapter bushing a little more or less into the Powder Bar Insert. Repeat until the micrometer reads as close as possible to 0.000 when the Powder Bar Insert just bottoms out against the end of the Powder Bar cavity.

NOTE: Do not worry if the micrometer does not read *exactly* 0.000. The micrometer is only for indexing purposes, so zero is an arbitrary number. However, it is better if it reads slightly greater than 0.000 rather than below 0.000 when the Powder Bar Insert bottoms out, so the micrometer setting will always be a positive number. This way you will never accidentally confuse -0.010 with +0.010. The Micrometer has been designed with more range than is needed so you will still be able to use the full range of powder bar adjustment.



Step 6: Loctite® Micrometer Assembly Into Place

The micrometer head must be held in place using the Loctite supplied in the kit. Before applying the Loctite, make absolutely certain that the powder bar is correctly assembled, the micrometer zero is adjusted and the micrometer head index mark is aligned with the mark you applied to the Powder Bar in Step 1.

Note: Photo in Step 5 also indicates locations for Loctite application.

- a. Twist off the top of the Loctite container and attach the application needle.
- b. Apply 2 drops of Loctite to the ¼-28 bushing screw threads at the point where they engage the Powder Bar Insert.
Caution: Do not get Loctite on the small #2 screw at the very tip of the micrometer shaft!
- c. Lift the micrometer head up 1/8th-inch and apply Loctite directly to the black base where it inserts into the Powder Bar hole. Apply only enough Loctite to wet the micrometer base all the way around.
DO NOT APPLY TOO MUCH LOCTITE! Excess Loctite can drip down onto the micrometer shaft and seize the micrometer. Use a cotton swab to remove any excess Loctite then apply a drop of oil to the micrometer shaft to prevent any remaining Loctite residue from bonding.
- d. Set the powder bar where it will be undisturbed while the Loctite cures. Clamp it vertically in a vice, prop it vertically between heavy books or lay on a flat surface (with the micrometer head hanging off the edge) so that the Loctite cures with the powder bar insert aligned with the powder bar. You may wish to add weight to hold it tightly while the Loctite cures. It is important that the powder bar insert is held aligned with the powder bar while the Loctite cures. **Allow 24 hours for the Loctite to fully cure.**

Step 7: Reinstall Powder Bar Post

The Powder Bar Post must be filed before installation to eliminate any contact with the micrometer shaft. Use a small file, emery board or rolled up sand paper to file the inside surfaces of the Powder Bar Post where it touches the micrometer shaft. This is very soft metal so only a few strokes should be required. There must be absolutely no contact between the powder bar post and the micrometer shaft.

Note: The new style Dillon Auto Powder Measure (without return springs) does not need a Powder Bar Post after the micrometer is installed. The setscrew used on the Belted Magnum and SL900 Shot Bar bar is also not needed.

Step 8: Install Micrometer Powder Bar in your Powder Measure.

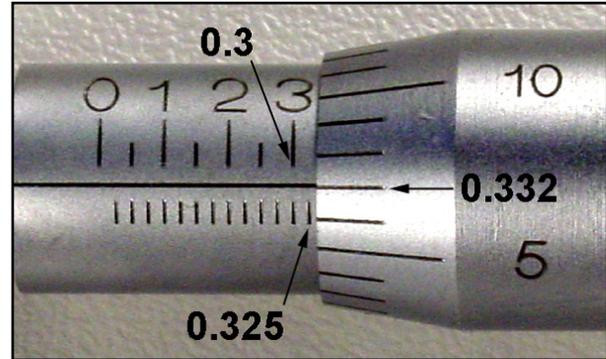
Install the Micrometer Powder Bar in the Powder Measure by following in reverse the procedures used to disassemble in Step 2. That is it!

How to Read Micrometer Powder Bar Setting

A micrometer or dial caliper should be on every reloading bench. But some times I get a little rusty if I don't use my micrometer frequently. So I've included these instructions just as a refresher. The photo below shows the Micrometer Powder Bar set to a random setting of 0.332.

To read that setting;

1. First, find the largest whole number on the linear scale. In this case it is 3.
Setting is > 0.3
2. Next, read the subdivisions on the linear scale. Each sub-division is 0.025. In this case, one sub-division is visible so add 0.025 to 0.3.
Setting is > 0.325
3. Now read the dial. Each division on the dial is 0.001.
The dial reads 7, so add 0.007 to 0.325.
Final setting = 0.332



That said, you might find it easier to read the settings as if each whole number on the linear scale is 1.0 instead of 0.1. Reading the micrometer this way, the final setting shown above is 3.32 instead of 0.332. I personally find it easier to read micrometer powder bar settings if I do it this way. The "calibration curves" shown on the next page were created reading the micrometer settings this way. Either way will yield the same results.

It is recommended that adjustments be made to the nearest 0.001 increment and not use settings between the lines on the dial. This will have no significant impact on powder weight accuracy as the micrometer has much finer screw threads (40 threads per inch) than the original powder bar adjustment screw (28 threads per inch).

The instructions for the Dillon Auto Powder Measure recommend turning the powder bar adjustment screw in 1/4-turn increments when adjusting the powder charge. The micrometer has finer screw threads so the equivalent adjustment is more than 1/4 turn. The equivalent on the micrometer is 0.009 increments on the dial. To keep it simple, we recommend using 0.010 increments for initial powder charge adjustments and then using smaller increments as you get close to your desired final powder weight. Also, the micrometer works in reverse compared to the original, powder bar adjustment screw ... turning the micrometer counterclockwise increases the powder charge.

Record the powder weight you obtain at each micrometer setting as you work toward your desired charge weight. This data can be charted to give you a calibration curve (see page 4) for that particular powder. Using the calibration curve, you can easily predict the micrometer setting that will yield a particular charge weight. Just dial the micrometer to that setting **and confirm the charge weight by weighing.**

CAUTION: You must always confirm the charge weight with a powder scale, even when setting the Micrometer Powder Bar based on data from your own calibration curve.

NOTE: As when making any powder bar adjustment, throw several "dummy" charges before measuring any. This will allow the powder to "settle in" to the new powder bar adjustment and give an accurate reading.

NOTE: When changing from a very large to a very small setting, you will compress powder in the powder bar and potentially overstress the micrometer threads. Cycle the press to drop powder, then make the adjustment while the press handle is still in the down position. All powder weight changes should be made with the press handle in the down position so that the powder bar is empty of powder.

Calibration Curves

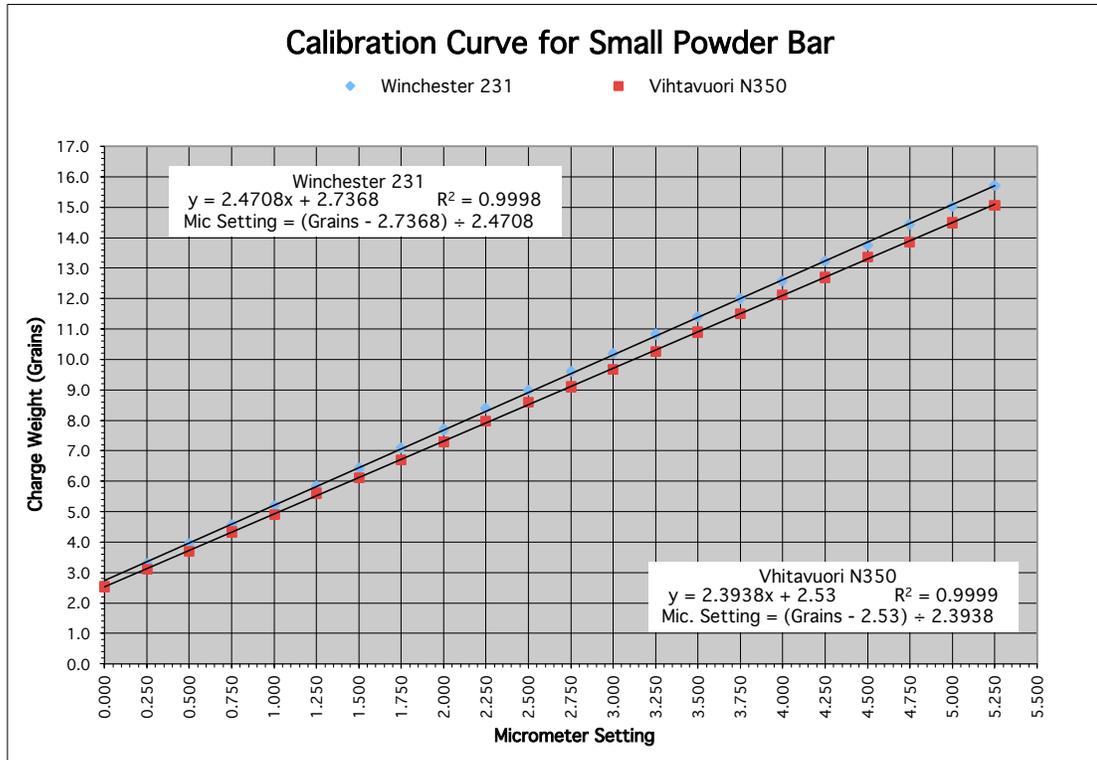
If you reload a very wide range of charge weights with a particular powder, you can make a calibration curve for that powder. Once completed, you can dial the micrometer to any charge weight you want by looking up the micrometer setting from the curve. This will get you very close to the desired charge weight on the first attempt, greatly minimizing the time needed to "dial in" the exact charge weight.

You can download a copy of the Calibration Curve Spreadsheet from the Micrometer Powder Bar Kit™ page on our web site at <http://www.uniquetek.com/site/696296/product/T1231>.

CAUTION: You must always confirm the charge weight with a powder scale, even when setting the Micrometer Powder Bar based on data from your own calibration curve.

Below is an example “Calibration Curve” for two of my favorite gunpowders. Due to the different physical characteristics of various powders, you must make a calibration curve for *each* powder you use. You must also make separate calibration curves for each powder bar size you use (Ex-Small, Small, Large and Magnum). As described previously, I find it much easier to read the micrometer as if each major increment were 1.00 instead of 0.100. This technique, although technically incorrect, makes reading the powder settings more intuitive.

You can look up the micrometer setting for any charge weight directly from your chart. But, if you have a computer and Microsoft Excel, you can fit a linear curve to the data and get the equation for the curve. From that equation, you will be able to quickly calculate the micrometer setting of any charge weight you desire!



For example, if I want 6.7 grains of Winchester 231, the equation (from the example calibration curve above) is:
 Micrometer Setting = $(6.7 - 2.7368) \div 2.4708 = 1.60$

So you don't need a computer at your reloading bench. Once you have the equation, a hand calculator will do.

CAUTION: You must always confirm the charge weight with a powder scale, even when setting the Micrometer Powder Bar based on data from your own calibration curve.

Since all calibration curves must be linear, curves can be generated with far fewer measurements (e.g. 0.00, 1.00, 2.00, 3.00, 4.00, 5.00) and still get a reasonably accurate curve with a lot less work. For maximum accuracy over a short range of powder weights, you can make calibration curves that cover just the range of powder weights you typically load, and measure at closer spaced micrometer settings. Always include one data point above and below the maximum and minimum powder weights you will actually use.

CAUTION: The above calibration curves are supplied only as examples. Do not attempt to use them with your own micrometer powder bar. Due to the slight differences in the zero setting from one Micrometer Powder Bar installation to another, calibration curves for one Micrometer Powder Bar will yield slightly larger or smaller powder charges compared to another Micrometer Powder Bar. Thus, if you have more than one Micrometer Powder Bar of the same size, you must generate separate calibration curves for each one. You may wish to write a number on the side of each Micrometer Powder Bar so that you can keep track of which set of calibration curves goes with each Micrometer Powder Bar.

Disclaimer: UniqueTek, Inc. is not liable for damages or personal injury that may be incurred as a result of using this product in an improper way or in a reloading press that has been improperly maintained or operated. It is your responsibility to ensure that your reloading equipment is properly assembled, is maintained in proper working condition, and is used according to the manufacturer's instructions and safe reloading practices.

* Dillon Precision does not authorize the Micrometer Powder Bar Kit™ for use on any of its reloading presses and its use may void manufacturer or dealer warranties.