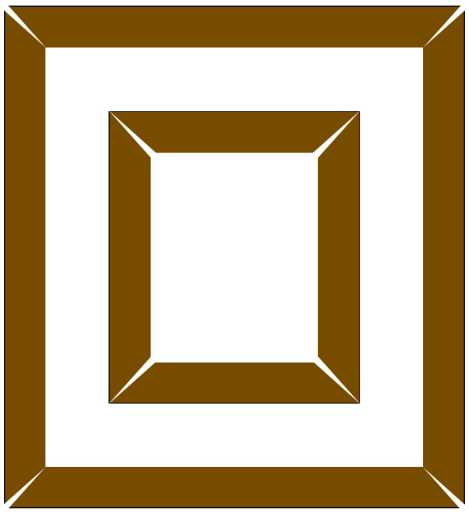
Another Method For Adjusting A Logan Precision Sander

We have a Logan Precision Sander Elite Model F200-2 disk sander for improving saw-cut miters for your picture frames to a "perfect 45°" after cutting the moulding to size on our miter saw. To maintain such perfection requires due diligence and occasional adjustment.

How Do You Know When It's Time To Adjust Your Sander?

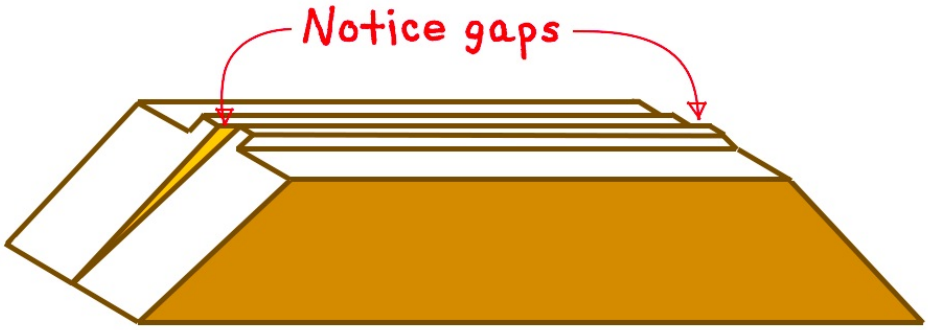
1. You may notice that when you put your frames together, there is a small gap between the pieces of moulding either on the inside of all four corners or the outside of all four corner. If some corners have gaps on the inside and some have a gap on the outside, you have other problems.



In the figures used in this article, the symptoms have been exaggerated for illustration purposes. If the condition of your sander gets this bad without you noticing, you may want to consider another profession or hobby.

2. When you are comparing the lengths of opposite pieces, and you have them side by side with the miters face up and their back sides touching, you may notice by running your finger over the miter that they are the same length on one end of the miter but not the other, or that one piece of moulding is higher at one end of the miter and the other piece is higher at the other end.

In either of these cases, it's time to adjust your sander.



But What About The Miter Saw?

It may be true that the miter saw also needs adjustment, but that would have minimal impact on your frames, because even if the angle of the cut was wrong, the sander should correct that problem. Of course it would take more sanding to correct, which beside taking more time and effort could, in the worst case, result in your frame being too small, so it should periodically be checked and corrected according to the manufacturer's instructions (I currently have no improvements or suggestions for that process). An indication that the miter saw needed adjustment would be if as you are sanding the miter, sawdust builds up on top of one side of the moulding faster than it accumulates on the other. If it takes too many revolutions of the sander to perfect the edge, that could also be a clue, or it could be time to change the sandpaper.

How To Adjust The Sander

On the last page of the 4-page manual are simple instructions for that adjustment that should work well if you are willing to remove the sandpaper. When I don't remove the sandpaper disk the technique doesn't work as well, so I've come up with an alternate set of instructions:

1. Put miter cuts on both ends of two long scrap pieces of your widest moulding.

2. When you sand a piece of moulding, each end will use a different side of the sander. Call one side of the sander "A" and the other "B". As you sand the two pieces of moulding, mark the back of each end of each piece with the side of the sander used (A or B).

3. Find a good right angle, either in a reliable carpenter's square or using other methods.

4. Flip one of the pieces of scrap moulding upside down so you can join Corner "A" on both pieces to make a 90° (right) angle. Flipping is very important (see sidebar below).

5. Put one piece of moulding along one edge of the reference angle (carpenter's square) and slide the reference toward the second moulding until it just touches at one end or the other (if it touches at both ends, you are finished with Side A - skip ahead to Step 8). Measure the error gap (I like millimeters only because they are so small) at the end of the moulding that's away from the reference line. Then measure the length of that piece of scrap moulding (using the same units of measurement).

6. Divide the error you measured in the last step by the length of the moulding that you measured and multiply by 25,000 [†]. Your result will be the number of degrees you need to turn the adjustment screw. If the error gap was at the corner, then the angle is too large and you have to turn the screw counterclockwise to back it out. Conversely, if the error gap was at the end of the moulding, then the angle is too small and you have to turn the adjustment screw clockwise to push it out more. After making the adjustment, you may want to retest by repeating the process by starting at Step 2 and resanding the same two corners just used. Before sanding, I recommend drawing a line all the way across the end of the moulding with a pen or marker and then sanding until the line completely

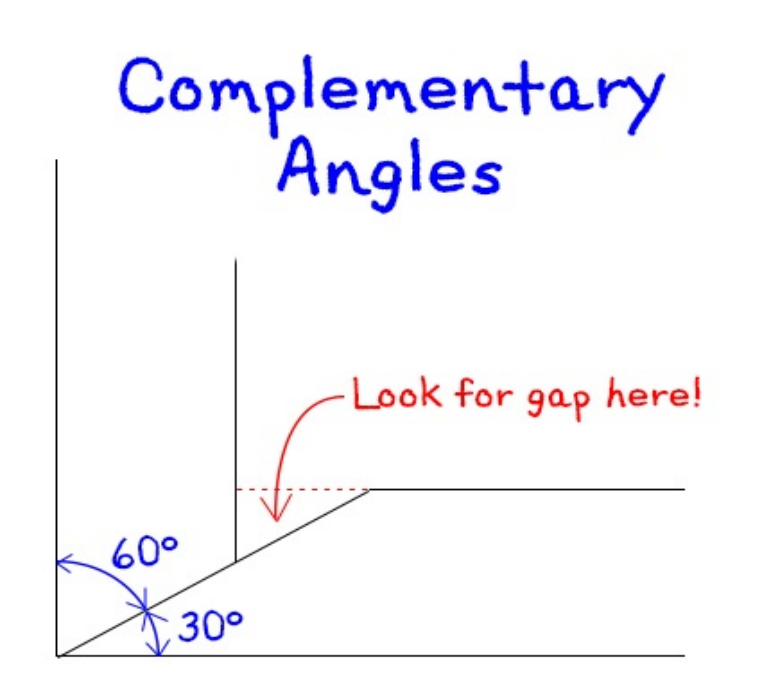
disappears.

[† Note: The adjustment screw on my sander had 32 threads per inch, and it was 109 millimeters from the pivot point. Based on that, your multiplier will be 25,000. (I'll do the math just in case your sander has different measurements so that you can substitute the real numbers in for mine at the proper places. One complete turn of the adjustment screw is 360° or $^{1}/_{32}$", and there are 25.4 millimeters per inch, so the constant multiplier would be 109 mm * 360° per turn of screw * 32 threads per inch ÷ 25.4 mm per inch ÷ 2 errors = 24,718.11. We'll say 25,000.)]

7. Repeat this whole process (starting at Step 4) for the other two miters, labeled "B".

That's all there is to it. Congratulations.

What Would Happen If You Didn't Flip One Piece Of Moulding?



The reason you flip one piece of moulding is so each corner adjustment is considered separately. When you flip, you are actually adding Corner A to Corner A, which means the measured error will twice as much as the actual error, making it easier to measure.

If you didn't flip one piece of moulding, when you put the two pieces together to get 90°, you would be adding one Corner A and one Corner B. If the result was a right angle, it wouldn't show that either of them was the desired 45°, it would only show that the two angles were complementary (meaning the two of them add up to 90°). If they weren't both 45°, then the inner edges would not line up and you should see a gap along the inner edge of the corner with the smaller angle.

Math Warning: a quick note about trigonometry (OPTIONAL)!

This process was concerned with angles, not distances, but since angles are harder to measure with any precision we had to convert. When you take the ratio of the two perpendicular sides (the sides that are 90° apart) of a right triangle containing the angle you are interested in, that's called the tangent of that angle, and you can have a good calculator app on your phone find it for you (for my Droid, I found RealCalc Plus by Quartic Software at the Play Store and was happy to pay $3.50. There are plenty of other options, though).

The error angle you measured (indirectly) was actually twice as large as the real error. One problem is that the tangent curve is not generally a straight line, which means that the tangent of twice some angle is not the same as twice the tangent of that angle. That's why the normal procedure would be to convert to angles, do the adding, subtracting, or multiplying, and then convert back to distances we can measure again. We were able to use the small angle exception, however. It turns out that for angles less than say 10°, the tangent curve IS pretty straight and the error introduced by taking our shortcut isn't worth worrying about. That's what we did with the error angle, and that's why the problem was so easy. That's your math lesson of the ~~day~~ ~~week~~ month. Let's get back to work.