

A-LINE-IT™

ALIGNING WOODWORKING MACHINES USING THE A-LINE-IT™ ALIGNMENT SYSTEM

Aligning machines can be very frustrating without the proper tools. You need a precision measuring device to make a precision adjustment. In all A-Line-It™ kits, we have provided the same dial indicator provided in our Deluxe kit. In the Wood Magazine (December 1995 Issue), they compared alignment systems, and said this indicator gave them the same readings as one they paid \$160 for. As some of you may have never used a dial indicator before, we will give you a few pointers about how to keep the indicator in top condition:

- **Keep the indicator clean** and in the protective foam box when not in use.

- **Make sure the locking knob is loose** before you rotate the dial to set a "zero point".

- **Check the 4 small screws on the indicator back** to make sure they are snug. (Rotating the dial without loosening the locking knob can cause the screws to loosen).

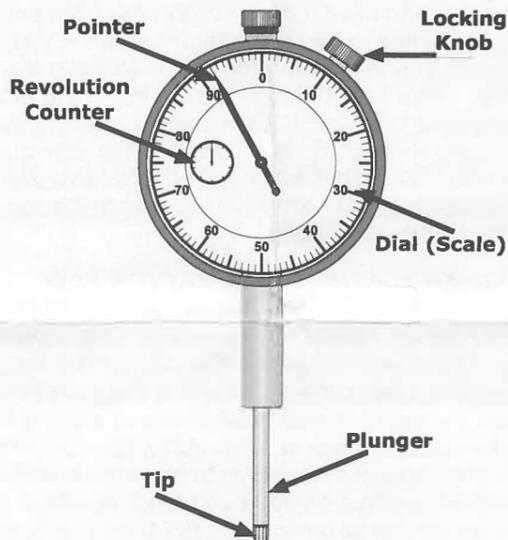
- **Don't abuse or misuse the indicator.** Treat it in the same way you would any precision tool.

Before starting to use the A-Line-It™, it may be helpful for us to describe the different parts of the indicator and their purpose:

DIAL (SCALE) At first glance, the dial of the indicator looks very much like the face of a clock. The graduations around the dial that resemble the minutes on the clock face are increments of one thousandth (.001) of an inch. (For reference, a human hair is about three thousandths (.003) of an inch). The numbers at 10 through 90 are ten thousandths (.010) increments, or one hundredth of an inch. One complete revolution on the dial is one hundred thousandths (.100) or one tenth of an inch. (See Illustration of Dial Indicator)

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REVOLUTION COUNTER On the face of the dial, at about the 9 o'clock position, you will notice a small secondary scale, which is the revolution counter. Every time the large dial pointer makes a full rotation (one hundred thousandths or one tenth of inch) around the dial, the pointer on the revolution counter moves one division. This sub-scale is very handy when you want to check total change when the measurement is over one tenth of an inch. (See Illustration of Dial Indicator)



LOCKING KNOB The locking knob is used to lock the dial in position when you are making a test and don't want the dial to rotate. When you establish an initial zero during a test, most times the pointer will not be at zero when you make contact between the indicator tip and the object you are measuring. By loosening the locking knob, you can rotate the dial to set the zero on the dial on the pointer. After you have aligned the zero on the dial with the pointer, I would recommend that you tighten the locking knob to insure the dial doesn't rotate out of position as you are making the desired test. **Be sure to loosen the locking knob when you rotate the dial.** Failure to do so can loosen the back screws or damage the dial indicator.

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PLUNGER & TIP The plunger (shaft) of the dial indicator is spring loaded in the extended position. The end of the plunger is threaded to accept varied styles of replaceable tips.

NOTE: We inspect every dial indicator that is sent out of our shop to insure that it operates properly. The most common way indicators get damaged is if they are dropped, and the plunger shaft is bent. If this happens, contact us at:

IN-LINE INDUSTRIES
661 South Main Street
Webster, MA 01570
Tel: (508) 949-2968

We also have a lot of in-depth articles on aligning various woodworking machines (table saw, planer, jointer, drill press, table mounted router, etc.) On our website at

www.in-lineindustries.com

INVENTORY PARTS

Before you start using the A-Line-It™, you should make sure that the kit is complete.

In the A-Line-It™ Basic you should find:

- 3/4" x 3/4" Indicator Mounting Bar with 5/8" screw.
- 3/8" x 3/4" Miter Groove Bar with leveling knobs, 3/4" screw, and set screws to adjust the width of the bar (self adjusting spring plungers in the Basic Upgrade).
- Dial Indicator
- 3/32" and 3/16" hex keys

In the A-Line-It™ Deluxe you should find:

- Extra length Indicator Mounting Bar
- Miter Groove Bar with Spring Plungers
- Dial Indicator
- Planer Bar
- Precision pin (for Drill Press & Router tests)
- Spring and Nut (to test blade and arbor run out)
- 3/16" hex key
- Instructional DVD
- Instruction Manual

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ALWAYS DISCONNECT POWER TO MACHINE BEFORE STARTING ALIGNMENT

TABLE SAW ALIGNMENT

ASSEMBLE THE A-LINE-IT™ by mounting the dial indicator on the mounting bar. The hole in the lug on the indicator back should be aligned (with the lug inset into the notch) with the hole in the notch on the mounting bar. Insert the 1/4"-20 x 5/8" socket head cap screw, and tighten with the 3/16" hex key provided with the kit. **Note:** I like to pivot the indicator downward toward the saw top. By doing this, it places the tip of the indicator at a wider point on the blade. This makes the reference length longer as we check the saw's alignment, which makes it easier to align the saw accurately. (The longer the reference, the more obvious the error will be.)

Place the miter groove bar (with the center notch up) into the groove of the table saw that you wish to use while aligning the saw. Check to insure the bar fits into the slot, and that there is no "side-play". **If using the Basic A-Line-IT™**, use the 3/32" hex key to adjust the set screws to obtain a proper fit. **If using the Basic kit with the spring plunger upgrade or the Deluxe kit**, use a small slotted screwdriver to get the spring plungers to hold the bar snugly in the miter groove. In all cases, the bar should be positioned so the bar is pushed toward the saw blade side of the miter groove.

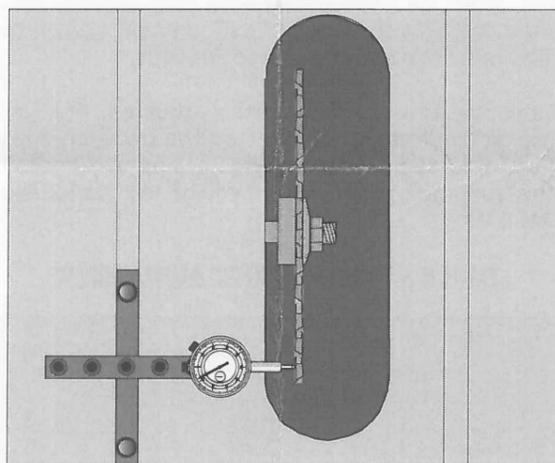
Place the mounting bar into the notch on the miter groove bar, with the tip of the indicator toward the saw blade. Push the mounting bar toward the saw blade until the tip of the indicator tip makes contact with the saw blade. Once the tip has made contact, push the mounting bar further to align the next recessed hole in the mounting bar with the threaded hole in the notch in the miter bar. Insert the 1/4"-20 x 3/4" socket head cap screw, and tighten with the 3/16" hex key.

With the bars assembled, push down on the bars and adjust the leveling knobs in the miter groove bar. The tips of the knob screws should make contact with the miter groove on the table saw.

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When properly adjusted, the knobs will prevent the bars from rocking in either direction as the saw is aligned. When properly configured the A-Line-It will be assembled as shown in the Illustration below.

Using a felt tip marker, place a mark on the plate of the blade near the outer edge. **Don't put the mark on a tooth.** Elevate the saw blade to its highest position, and then lower it about 1/4". We want to expose as much of the blade as possible, without having it "limit out". Rotate the blade so the mark is toward the operator side of the saw, near the saw top. Slide the A-Line-It toward that point, and adjust the blade rotation so the tip of the indicator is on the mark on the blade. The Illustration below shows an overhead view of this configuration.

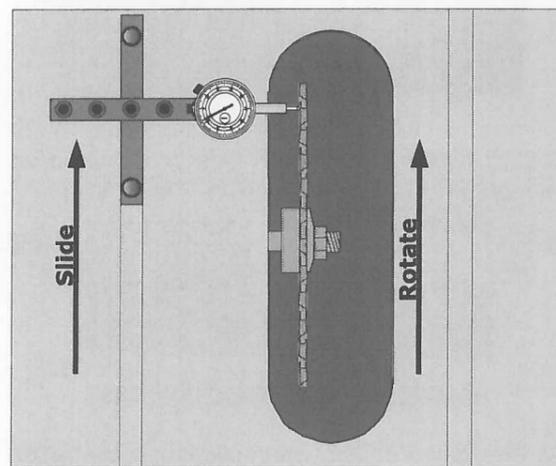


Loosen the locking knob, and rotate the dial so the scale zero is perfectly aligned with the pointer. If you wish, re-tighten the locking knob.

Slide the A-Line-It toward the rear of the saw. Rotate the saw blade (backwards) toward the rear of the saw. Adjust the A-Line-It position and blade rotation so the tip of the indicator is again on the mark on the saw blade. The Illustration in the next column shows an overhead view of this configuration.

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If the pointer is not perfectly aligned on zero, it is telling us two things; how much the saw is out of alignment, and in which direction the rear of the saw is out of alignment.



If the reading at the rear of the blade is on the "Plus Side" of zero, (the pointer went in a clockwise direction) the rear of the blade is closer to the miter groove in which the A-Line-It is positioned. In this case, the rear of the blade needs to be moved away from the miter groove.

If the reading at the rear of the blade is on the "Negative Side" of zero, (the pointer went in a counter-clockwise direction) the rear of the blade is further away from the miter groove in which the A-Line-It is positioned. In this case, the rear of the blade needs to be moved toward the miter groove.

Depending on the style of saw being aligned, the technique varies:

- On cabinet saws, such as the Delta Unisaw and the Powermatic 66, the top of the saw is moved to get proper alignment.

- On contractor style saws, where the motor will hang out of the rear of the saw, you will need to loosen the rear housing (trunnion) and move it in the proper direction.

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An Important Tip on Aligning Table Saws

When aligning a table saw, regardless of the type of saw you are working on, remember as you make an adjustment, the point at which the initial zero was set is also moving slightly. For this reason, you should re-check your zero point frequently to make sure you have not over-compensated on the alignment.

ALIGNING A CABINET SAW

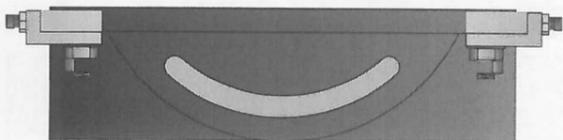
On cabinet saws, since the mechanics of the saw are built into the base of the machine, you must loosen the bolts that hold the saw top to the base and move the top to achieve proper alignment. As the tops on cabinet saws are very heavy, this is the most difficult style of saw to align.

Depending on the brand of saw, the top will be held on with either 3 or 4 bolts. One thing that I would recommend is that when you move the top, you should leave 1 bolt tight to serve as a pivot point as you make the adjustments of the top. An extra pair of hands can be very helpful when aligning a cabinet saw. You may also find it helpful to use a bar clamp with one end on the cabinet and the other end on the end of the saw top when making the necessary adjustments.

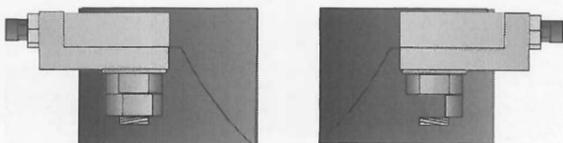
To help you understand how to align cabinet saws, I will give you a couple of examples. In both cases, you are viewing the saw from the front (operator side) of the saw. The A-Line-It is in the left miter slot on the saw, and the indicator was set at zero at the front rotation of the blade.

- In this example, when the A-Line-It was pushed toward the rear and the blade was rotated, the pointer on the indicator went negative.* This tells us that the miter groove is further from the blade at this point than it was at the front of the blade. This means that the rear of the saw top needs to be adjusted toward the right, reducing the distance between the miter groove and the blade. I would recommend that you leave the left-front bolt tight, and loosen the others. I would then adjust the rear of the saw top to the right.

The Illustration below should give you a good idea of how the PALS kit installs on the rear trunnion.



The Illustrations below will give you a close up view of the PALS kit on the ends of the trunnion.



ALIGNING A CONTRACTOR SAW

As mentioned earlier, when aligning a contractor saw (with the motor hanging out the rear of the saw), it is the rear trunnion that needs to be moved to make adjustments to the saw.

To help you understand how to align a contractor saw, I will give you a couple of examples. In both cases, you are viewing the saw from the front (operator side) of the saw. The A-Line-It is in the left miter slot on the saw, and the indicator was set at zero at the front rotation of the blade.

- In this example, when the A-Line-It was pushed toward the rear and the blade was rotated, the pointer on the indicator went negative.* This tells us that the miter groove is further from the blade at this point than it was at the front of the blade. This means that the rear trunnion needs to be adjusted to the left, reducing the distance between the miter groove and the blade. When you go to the rear of the saw to make the adjustment, the trunnion will need to be moved to your right. If you are using the "hammer" method, loosen the trunnion bolts and tap the trunnion to your right. If you have installed the PALS kit, loosen the nuts on the studs and micro-adjusting screws, and then rotate both micro-adjusting screws downward. This will move the trunnion to your right.

- In this example, when the A-Line-It was pushed toward the rear and the blade was rotated, the pointer on the indicator went positive.* This tells us that the miter groove is closer from the blade at this point than it was at the front of the blade. This means that the rear of the saw top needs to be adjusted toward the left, increasing the distance between the miter groove and the blade. I would recommend that you leave the right-front bolt tight, and loosen the others. I would then adjust the rear of the saw top to the left.

When you have checked (and double-checked) the alignment, and have the readings at the front and back within one to two thousandths (.001 - .002) of an inch of one another, the saw is well aligned. As you start to tighten the bolts, I would recommend that you tighten them gradually as you rotate through them to prevent the saw top from moving. **Remember to monitor the dial indicator to insure the saw top doesn't move as you tighten the bolts.**

SUPER TUNING A CONTRACTOR SAW

As mentioned earlier, on contractor style saws where the motor hangs out the rear of the saw, adjustments are made by loosening the bolts that secure the rear housing (trunnion) and shifting it side-to-side to adjust it. Normally, the owner's manual for type of saw tell you to make the needed adjustments with a hammer and block of wood. I can't remember how many times I tried to adjust my 1976 Sears using that technique, but I know it never worked as well as I hoped it would, and the saw never cut as well as I hoped it would, either. I don't want to make these Instructions a promotion for my solutions in solving my problems, but I do want to get the point across to you that if you take my advice, your contractor saw will run quieter, cut 25% better, have more power, and stay aligned a lot longer than it will if you don't take my advice.

Helpful Hints for Contractor Saw Owners

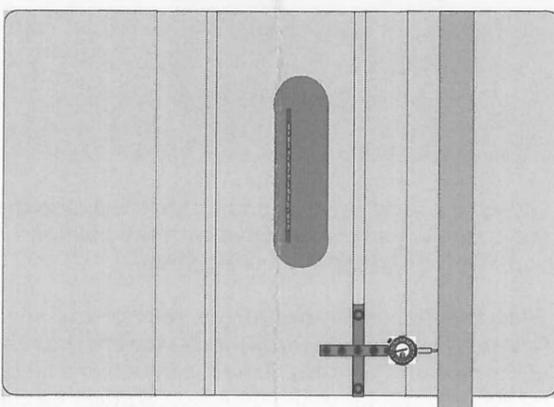
Vibration in a contractor saw not only causes saw marks and burns, loss of power, and a very noisy running saw, it also makes it hard to keep the saw properly aligned.

Once the trunnion is properly adjusted, monitor the dial indicator to make sure the trunnion does not come out of adjustment as you tighten the trunnion bolts (or nuts if you have installed the PALS kit)

- In this example, when the A-Line-It was pushed toward the rear and the blade was rotated, the pointer on the indicator went positive.* This tells us that the miter groove is closer to the blade at this point than it was at the front of the blade. This means that the rear trunnion needs to be adjusted to the right, increasing the distance between the miter groove and the blade. When you go to the rear of the saw to make the adjustment, the trunnion will need to be moved to your right. If you are using the "hammer" method, loosen the trunnion bolts and tap the trunnion to your right. If you have installed the PALS kit, loosen the nuts on the studs and the micro-adjusting screws, and then rotate both micro adjusting screws upward. This will move the trunnion to your left.

Once the trunnion is properly adjusted, monitor the dial indicator to make sure the trunnion does not come back out of adjustment as you tighten the trunnion bolts (or nuts if you have installed the PALS kit).

TABLE SAW RIP FENCE ALIGNMENT



In the Illustration above, the A-Line is in the right miter groove and zeroed, the rip fence is locked.

Our **Contractor Saw Performance Package** (machined steel pulleys and the Power-Twist™ belt) will remove 80% to 90% of the vibration in the typical contractor saw. Where many dealers carry the Power-Twist™ belt, most of them do not carry machined steel pulleys. Putting the belt on "stock" cast pulleys is like buying new tires for your car, and mounting them on bent rims.

We introduced this kit to the woodworking industry about 15 years ago, and in many cases, are the only source in the US where you can get machined steel pulleys for most of the imported saws with "non-standard" sized pulleys on the arbor shaft.

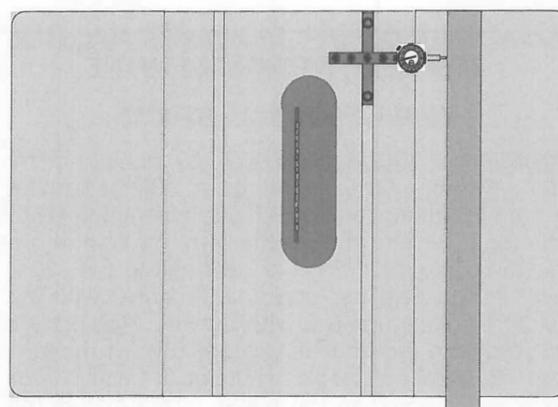
If you already have the Power-Twist™ belt on your saw, you can purchase machined steel pulleys separately from:

IN-LINE INDUSTRIES
661 South Main Street
Webster, MA 01570
Tel: (508) 949-2968

If you have an imported contractor saw, such as: Jet, Powermatic, Grizzly, Sunhill, General, Mao Shan, etc., you should remove the arbor pulley and measure the inside bore of the pulley with dial calipers to make sure you receive the right pulleys the first time we ship them to you. Some of the saws above have had as many as 3 different pulleys on their arbor shafts.

Our **Contractor Saw PALS** (Precision Alignment & Locking System) is designed for almost any saw where the motor hangs out the rear of the saw. PALS install in about 10 minutes, and from that point it should take you no more than 15 minutes to get your saw aligned properly. The PALS also keep the saw aligned, which is a nice bonus!

The PALS kit comes with everything you need to install it on the rear trunnion of the contractor saw. We provide you with studs to replace the trunnion bolts, washers, hex nuts and special locking nuts, a pair of brackets with micro-adjusting screws, and a hex key to make the needed adjustments. It is the easiest way possible to align a contractor saw, and has a 90 day money-back guarantee.



In the Illustration above, the A-Line-It has been pushed to the rear of the saw. The pointer on the dial indicator will have done one of three things:

- The pointer went positive.** If this is the case, you should adjust the fence immediately! This is an indication that the fence is closer to the saw blade at the rear than it was at the front. This will result in burns, and more importantly, kick back. This is the most dangerous situation when using the fence, and should be corrected immediately.

- The pointer stayed on zero.** This means the fence is parallel to the miter slot on the saw. Many wood workers align their fences this way, but if the saw is perfectly aligned, as boards are ripped they will be cut at the front of the blade, and rubbed at the rear of the blade, causing burn marks.

- The pointer went negative.** This is the way I like to have my fence aligned, but not to extremes. I like for the blade to cut with the front, and for the rip fence be "open" at the rear of the blade just enough for the teeth at the rear of the blade to just clear the board I am ripping. When the rip fence is perfectly set, it is almost impossible to see a gap between the teeth at the rear of the blade and the edge of the board, and any cutting noise will stop the instant that the board clears the teeth at the front of the saw blade.

For more information on alignment procedures, go to our website at www.in-lineindustries.com