

# Blade Tracking and Adjustment for 4x6 Metal Cutting Bandsaws

By John Pitkin

## Disclaimer

If you read these instructions and attempt any of the procedures you do so at your own risk. You take responsibility for your own actions and will not whine, complain or sue anyone because you think someone is at fault besides yourself. If you get hurt, dismembered or shocked, it's because you failed to look out for yourself.

USE COMMON SENSE!

## Use a new blade

*The following procedures assume you are doing the alignment with a new blade. Worn, bent, kinked, or dull blades will tend to cut askew.*

*If your saw previously cut straight, and is now cutting crooked, change the blade before doing anything. If after changing the blade you still have problems, begin a complete alignment.*

*If your saw has never cut straight, you must start the alignment process with a new blade.*

## Preamble

This is the stuff they left out of the manuals. Using the owner's manual instructions will get you nowhere if the blade won't stay on for two seconds.

Example:

Step 1 in the Harbor Freight manual says, "Place the saw arm in the vertical position and open the wheel cover.

OK...fair enough.

Step two says, "Turn on the band saw. The blade is tracking properly when the back of the blade (B) (see figure 1) is just touching the edge of the wheel flange (C)."

The manual leaves out the part that should read, "Watch in disgust as the blade immediately jumps off the wheels making further steps impossible."

Before we begin, let's make one thing perfectly clear. This is a cheap saw. It does a great job for the home shop, but it's not a super-stiff industrial unit. IT BENDS and FLEXES!!! We're going to assume this little tool is going to flex when we tension the blade and we will compensate for that. We're also going to assume the saw is not

adjusted at the factory. It might run straight out of the box; but it's your job to fine tune the machine.

There are many variants of these saws so the exact screw, nut, plate or bolt that makes an adjustment may be slightly different on your saw. However, the technique and method of alignment is the same. If your saw is different from the one described here, simply modify what you need to get the job done.

The easiest way to start the adjustment and alignment is to begin with a setting that will ensure the blade doesn't jump off. THEN you can start fine tuning for proper tracking.

So, let's fix this saw!

1. Unplug the power cord.
2. Raise saw to the vertical position (We will refer to the wheels as upper and lower.)
3. Open the blade guard
4. Loosen blade tension knob enough to remove blade
5. Remove blade

## The Drive Shaft

The drive shaft rides in ball bearings. The shaft is held in the gear box by the lower drive wheel. The drive shaft must be held in place while the lower drive wheel is installed on the shaft. After the lower wheel is installed, the shaft must not be able to move in or out. Any axial movement will allow the blade to jump off the wheels. If the wheel does move in or out, you must remove the gearbox cover to hold the drive shaft firmly in place while the lower wheel is pushed onto the shaft as far as it will go. If you still have movement you will need to add shim washers or spacers. It doesn't matter if you shim the inside or the outside of the wheel as long as you remove any axial play. You will match the upper wheel in a subsequent step.

## Lower wheel

The lower wheel is the drive wheel. (Both Harbor Freight and Grizzly manuals call it the front wheel. Upper and lower makes more sense.) The lower wheel is held on the drive shaft with a set screw, or a snap ring. Ensure the set screw is tight in the drive shaft. If you have a snap ring make sure it is seated in the groove.

Grab the lower wheel and try to move it in and out on the shaft. Also, check the shaft is solid going into the gearbox. It should not wiggle or slide in and out. Next check the lower wheel runs true by taping a card or piece of wire to the frame so it is just touching the lower wheel outer edge. Plug in the power cord and turn the saw on. Watch the lower wheel for any wobbling. If the wheel wobbles, you have either a bent shaft or the lower wheel is miss-bored.

If the wheel is out of axis, replace it or you'll need to remove the lower wheel; over-bore the center hole to get it true, and bush it back to size. Then remount the wheel.

If the shaft is bent (you can check run-out with the wheel removed and a dial indicator) you can order a new shaft, or try straightening the shaft with a hydraulic press.

## Upper Wheel

The upper wheel is a non-drive idler wheel (HF and Grizzly call it the rear wheel) It is adjustable in tilt as well as up/down for tensioning the blade.

The upper wheel axle is attached to a sliding plate used to tension the blade. The sliding plate is held in the saw with guide rails. There are two or more bolts per guide rail.

The upper wheel tilts to adjust tracking. Tilt is accomplished by wedging the sliding plate with an adjusting screw or bolt. When the wheel is tilted the sliding plate tilts in the guide rails. Therefore: the rails are not snug when there is no blade installed. The tension of the blade takes up any lash in the sliding plate and the guide rails. Better saws have a hinge plate for the axle tilt and the guide rails are snug against the sliding plate.

To adjust tilt, loosen the center bolt on the sliding plate so it is loose but snug. (No slop) The lower screw (or bolt) on the sliding plate is for adjusting the wheel tilt. When adjustments are complete, tighten the center bolt on the sliding plate. Note: Some saws have three bolts for the tilt adjustment. Some saw require a hex wrench to adjust tilt

The upper wheel assembly rotates on ball bearings on most saws. Some have bushings.

There are two methods of mounting the upper wheel assembly.

1. The wheel assembly with bearings is pressed onto the shaft. There is no set screw or retaining clip. An interference fit holds the upper wheel bearings in place; or,
2. The wheel assembly is held with a shaft collar, a screw and washer in the end of the axle, or a snap ring.

We will discuss how to adjust both types in the offset section, below.

First, check the wheel rotates freely. Check the bearings or bushings are not loose on the shaft. Turn the wheel by hand and check for any unwanted wobble motion. If the upper wheel is out of axis (wobbles) you'll need to order a new wheel; or, re-bore the bearing recesses, insert sleeves to bring the recess back to size and reinstall the bearings.

## Zero Offset

Offset refers to both wheels being in the same plane.

Place a straight edge across the rims of the upper and lower wheels at the same time. The straight edge should be held close to the axles. Adjust the tilt of the upper wheel to be PARALLEL with the lower wheel. If any offset exists between upper and lower wheels, you will need to move the upper wheel on its shaft.

### **[Pressed on wheel adjustment]**

If the upper wheel is too far out, place a deep socket that just fits over the shaft and, using a hammer or mallet, drive the wheel assembly inward. If the upper wheel is too far inward, use a three jaw puller with a BEARING SEPARATOR to pull the wheel assembly outward. If you don't have a suitable puller, you can remove the wheel and sliding plate as a unit. Then support the inside bearing with bar stock while driving the shaft inward.

### **[Floating wheel adjustment]**

Remove the wheel retainer, snap ring or screw. Add or remove shims or spacers to put upper and lower wheels in the same plane.

## Zero Twist

Next check for twist between the wheels. Move the straight edge left and right of the axles. There should be zero offset on both sides. If one side is positive offset and the other side is negative, the axles are twisted in relation to each other. To remove twist, shim one side of the sliding plate and guide rails on the UPPER wheel then re-check the offset measurement.

## Initial Blade Installation

Unplug the power cord.

Remove the blade GUIDES from the saw. They will be re-installed in a later step. For now, it is easier if the blade guides are not interfering with the blade tracking.

Open the v-belt cover and remove the v-belt so the gear box may be rotated by hand.

To prevent the blade from popping off during the adjustment we will over-compensate by adjusting the upper wheel with a slight tilt. Tilt the upper part of the upper wheel a few degrees toward the saw body. It will be readjusted in later steps.

Install a new blade on the saw. Previously used blades will interfere with the alignment process. Make sure the blade is fully against the wheel flanges. Tighten the tension knob enough to take up all slack in the blade. The blade should make a musical like note when

plucked. If it just buzzes, you need more tension. Check the TEETH of the blade are not riding on the rim of either wheel. If the teeth are riding on the wheel, you may require a wider blade; or, relieve (chamfer) the edge of the wheel. If teeth ride on the wheel it will result in crooked cuts as the wheel will flatten the “set” of the teeth on one side.

With the v-belt removed, rotate the drive pulley by hand in the normal direction and observe the blade tracking. If the blade starts to move away from the wheel flanges, STOP and add more tilt to the upper wheel. Adding more tilt to the blade requires you to loosen the blade tension, adjust the tilt and re-tension the blade.

If the blade stays against the wheel flange for an entire revolution of the wheel, install the v-belt and close the BELT cover.

The BLADE cover must remain open to observe the tracking while making adjustments.

Make sure hands and fingers are clear. Plug the saw in and turn on the motor. If the blade jumps off the wheels; shut off the saw, add more upper wheel tilt and reinstall the blade.

If the blade remains on the saw, adjust the upper wheel tilt while the saw is running so the blade just touches the UPPER wheel flange. If the blade is hard against the upper wheel flange, back off the wheel tilt adjustment.

When the upper wheel tilt is correct, check the blade position on the LOWER wheel. The blade should just touch the lower wheel flange. If the blade is too far away from the LOWER flange or hard against the LOWER flange, repeat the offset adjustment by moving the upper wheel in or out on the shaft to correct the blade position, and start over.

## Installing and Adjusting the Blade Guide Bearings

Note: There are two types of 4X6 saws on the market. One version has blade guides adjustable for tilt. On the other version the blades guides are NOT (easily) adjustable for tilt.

Re-install the blade guides.

The blade guides have eccentric bolts on the outside bearing and back bearing. The inside bearing is not adjustable.

Adjust the blade guide SIDE BEARINGS with about 0.005 to 0.010” clearance. The manual states .001 clearance. That is much too tight. You do not want the rollers on the bearings compressing the blade. There needs to be enough clearance to allow sticky metal filings and chips to pass between the SIDE BEARINGS without jamming the blade and stopping the saw.

Insufficient blade to bearing clearance will lead to premature blade failure.

The manuals state .002 to .003" clearance for the BACKING BEARINGS. There is no reason to fiddle with these bearings trying to get them perfect. Simply adjust them so they barely touch the back of the blade. When lowering the saw onto a work piece the blade and the backing bearings carry the weight. The BACKINGS BEARINGS must have positive contact or the blade will pop off when it is pushed over the wheel flanges. More on blade guides follows.

## Final Tensioning

Tension the blade for normal cutting. When the tension is increased on this little saw the upper wheel has a tendency to tilt inward, so watch for a need to readjust the tilt. I find it best to tension the saw when it is running so I can watch the tracking as the tension increases.

NOTE: Any tilt adjustment may also require wheel offset adjustment!

After final tension is set, re-check the tracking on both upper and lower wheels. Be sure to compare offset of the wheels after tensioning.

## Subsequent Blade Changes

Once you have gone through this procedure, subsequent blade changes are pretty easy. All that is needed is to install a new blade is:

Reset the upper wheel tilt a little bit inward. (precautionary to prevent the new blade from jumping off.)

Tension the blade.

Turn the saw on and adjust the tilt so the blade just touches the wheel flange.

No further offset adjustment is necessary.

## Squaring the Cut

Lower the saw to the full down position.

Use a combination square or drafting triangle to set the non-movable fence at 90 degrees to the blade.

Next, prop the saw up so the blade is 2 to 3 inches above the cutting table. Use the triangle or square to check the tilt of the blade.

On saws with adjustable blade guides, adjust the tilt as necessary.

On saws without adjustable blade guides, place shims between the blade guide arms and the frame of the saw. A piece of duct tape will hold the shims in place so the guides can be moved in and out without losing the shims.

Using a WOOD 2X2 Make a test cut to check for blade drift. Wood will give you an accurate test and will cut down the time needed for the test cuts by a factor of about 50.

Cutting a wood 2X2 takes about five to ten seconds. Cutting a metal 2 inch bar takes about 5 minutes.

Using a square, check the cut and make adjustments for drift as needed.

Note: Do not change the blade guide side bearing clearance while making blade drift adjustments. Moving the blade guide bearings closer will cause the cut to go right. Increasing blade guide bearing clearance will cause the cut to drift left.

## Reinstalling used blades

On occasion, a blade will break or snap and the only replacement immediately available is a used blade. Sometimes a blade change may be necessary for cutting different material. Rarely will this cause a problem if the saw is properly aligned. Simply install the blade, tension, and check the tilt for tracking.

However, be aware that used blades sometimes wander or cut crooked. You may have to adjust the blade guides to obtain a straight cut. If you adjust the blade guides for a used blade... You must readjust the guides when installing a new blade.

## Finale

That's the procedure. Do it once. Your saw should be set for many years.

On the next two pages is a checklist to use for going through the above procedures.

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Revision 1 – 27Apr07 – *added notes on using new blade for alignment.*

# Bandsaw Tracking and Adjustment Checklist

## Lower wheel checks

- Unplug saw from electrical power
- Check Frame tilt shaft secure
- Raise saw to vertical position
- Open blade cover
- Release tension on blade
- Remove blade
- Check lower wheel secure. No axial movement (in and out)
- Check power switch in OFF position
- Plug in electrical power
- Turn saw on – check lower wheel runs true (no wobble)
- Turn saw off
- Unplug electrical power

## Upper wheel checks

- Check upper wheel secure on axle
- Check upper wheel has no axial (in out) movement on axle
- Check upper wheel runs true (no wobble)

## Zero offset

- Using a straight edge - Adjust upper wheel to parallel with lower wheel
- Adjust upper wheel to be in the same plane with lower wheel (Use shims, spacers or pullers and presses.)

## Initial blade install

- Remove blade guide assemblies (do not remove bearings from assemblies)
- Tilt upper wheel slightly inward (preload for blade tension)
- Install a new blade – do not use an old blade for initial alignment.
- Preliminary tension blade for a “musical” note
- Turn drive pulley by hand for preliminary tracking.
- Adjust tilt so blade stays on wheels when turning drive pulley by hand
- Check motor secure on frame

## V-belt

- Install v-belt
- Check belt tension and tension lock nut
- Install v-belt cover
- Check V-belt cover not touching pulleys or belt

## Initial Tracking with Power

Plug in electrical power

Turn on saw

If blade jumps off, turn off saw. Unplug electric. Go back to “Initial Blade Install”

If blade stays on, adjust tracking tilt so blade just touches the UPPER wheel inner flange

NOTE: Center bolt on sliding plate must be loosened to adjust tilt.

NOTE: Tension Knob must be loosened to adjust tilt.

## Offset follow-up

Check bottom wheel blade position. If blade position is not the same as the top wheel repeat “Zero Offset” adjustment.

## Blade guides

Turn saw off

Unplug saw

Install blade guide assemblies

Adjust blade guide side bearing clearance .005 to .010

Adjust blade guide backing bearings so they just touch the blade

Install blade guards over blade guides if removed

Close and secure blade cover.

Lower saw to down position

Check fixed fence at 90 degrees to blade

Raise saw 2 to 3 inches

Check blade vertical at 90 degrees to table

## Test cut

Check switch in off position

Plug in electrical power

Cut 2 x 2 block of wood.

Measure cut end for square.

Adjust blade guides to correct blade drift, if necessary.

## Final Tensioning

Pluck return side of blade. Tension blade so it will give a clear musical note. (no buzz)

NOTE: Any time you adjust tension, recheck the tracking.