

SagaCNC.us Vinyl Cutting Guide – Tips

There are several key captions that you should read through below. This is a technical guide with tips included for being successful with your new vinyl cutter.

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Vinyl Cutter Tracking Quality Parameters Effects and Causes

Tracking is the ability of a vinyl cutter to be able to return to the correct point after cutting out a loop. It is easy for a vinyl cutter to track over short distances and small loops of a few inches or so however, if your loops become substantially large such as 10' or so you may need to adjust some things so your loops close and your vinyl cutter maintains its tracking.

Here are some parameters you will need to adjust when your loops exceed 10 feet or so:

1) In general, servo cutters track slightly better than stepper cutters. This is due to both the higher resolution of the motor encoding for a servo motor as well as less vibration (smoother operation) being present in a servo system.

2) Dirt and dust that get deposited on both the rubber wheels on the top rollers and on the grit rollers on the bottom will reduce the friction between the wheels and the vinyl. The cutter depends on a high friction factor between the roller wheels and the vinyl to maintain a good track. Usually, what happens is that when a long cut is made, the vinyl hits the floor. When it hits the floor it picks up substantial debris (lint, dust, etc) due to static charge. This debris deposits itself on the rollers and makes them slippery. We recommend for long cutting that you get a basket to catch the vinyl so it doesn't hit the floor. In addition, prior to any long cutting, we recommend cleaning the top and bottom rollers. The top rollers can be cleaned with a cotton cloth with some ammonia based cleaner (such as glass cleaner). The bottom rollers can be cleaned with a dry tooth brush. Be careful not to deposit cloth fibers on the bottom roller.

3) In order to increase the friction force between the vinyl and the rollers we recommend increasing the force on the top rollers. This can be done with the adjustment nuts on the back of the rollers.

4) Another factor that decreases the tracking ability of a cutter is the speed which it is run at. When cutting at high speed, the rollers will impart more kinetic energy into the vinyl. When the cutter has to stop the vinyl from a high speed condition, some of that kinetic energy may result in slippage between the vinyl and the rollers. To reduce the vinyl inertia and reduce slippage between the roller wheels and the vinyl it is advisable

to reduce the cutting speed. In general, cutting at slower speed will result in better tracking.

5) Roll out your vinyl in advance and use a sharp blade. By doing this, you can reduce the force against the roller bar and thus reduce any slippage that would occur due to these forces. By rolling out your vinyl you will also insure that your vinyl is adequately lined up to the cutter over the distance you expect to be cutting.

6) The above recommendations will apply not only to Saga vinyl cutters but most vinyl cutters that don't employ a perforation tracking system. With perforated vinyl, the cutter does not depend on friction between the vinyl and the rollers for tracking but rather has the vinyl perforations and mechanical pins to mechanically restrict vinyl tracking to the rollers. Because of this, in general, perforated vinyl systems track better than roller friction based systems.

ARMS Vinyl Cutter By Saga Automatic Registration Mark Cutting With SignCut Pro

The process of ARMS cutting is simple however, there are some important points that you will need to be aware of.

1) The first step is to create your contour outline with registration marks. The registration marks used by the ARMS Vinyl Cutter system are simple "L" shaped lines in the four corners. It is helpful if you can make these corner registration marks thicker than a normal line. Perhaps 1 mm (.040") thick or so and they should be black or should be the color that maximizes the contrast relative to the color of the base media. These 8 lines in the corners should be 25 mm long which is .98425" (not one inch). The length of these lines is important. If they are too long they will not be recognized by SignCut as registration markers and if they are too short there won't be enough zone for automatically detecting them. 25 mm is just right. See picture below. In addition, the marks should be orthogonal with respect to each other and they should be directly in-line with one another and define the outer bounding box of the image. Make sure the registration mark lines are not offset with respect to one another.

2) SignCut will cut all the vector art in your image except for the 8 registration marker lines in the corners. Make sure your contour cut file contains only the 8 registration marks in the corners and the countour cut path. Non-vector art like JPEG artwork is OK as it will not be cut

by SignCut but make sure to remove any other vector art you do not want cut as part of the contour.

3) Make sure you are using the latest version of SignCut. You will need SignCut version 1.96 to support the ARMS system. This version can be obtained by going to SignCut here, not by checking for updates through the SignCut Help menu:

<http://www.signcutpro.com/download-signcut-productivity-pro/>

4) Next, open your contour cut path with the 4 L shaped corner registration markers in SignCut. The image will open and appear vertical in the SignCut window. Keep in mind that vertical orientation in the SignCut screen is left to right on your cutter. If you wish to place your artwork in front to back orientation as you look at your cutter, you will need to rotate your image 90° in SignCut so the orientations match. Matching the orientation between your artwork in SignCut and the artwork on the cutter is very important.

5) Place a small test piece of vinyl in your cutter that is similar to the material you will be contour cutting. Set your force and speed on the cutter and press the test button which will cause the cutter to cut a triangle / square test pattern. Verify that you can weed the square and that your blade doesn't penetrate the release liner.

6) Next, load your artwork into the vinyl cutter in the orientation you wish to cut at. Try to align your media with the cutter as best as possible. It may be useful to roll the media front to back a few times to check for rotational alignment. If the media is not well lined up with the cutter, lift the rollers, rotate your media slightly, lower the rollers and then roll the media front to back again to verify. Repeat as necessary.

7) Next, turn on the laser on the cutter and you will see the optic sensor laser on your image. Take the cutter offline and use the arrow keys to move the cutter head and the media so that the laser is in the center of the bottom right target. It should be in the center of the 25 x 25 mm square created by the lower right alignment mark line segments. It is important that you line up the laser with the center so that the automatic alignment algorithms find the first mark properly. SignCut expects this initial position so the first thing SignCut will do is look to the right and then look down to find these two first line segments. Place the laser where the X is marked in the image below. See picture.

8) In SignCut select the “Cutter” button at the top right corner, for your ARMS cutting system please select SAGA and the Cutter will be one of the following ARMS equipped cutters:

- 28” -> SAGA-720IP, SAGA-720-IIP
- 53” -> SAGA-1350IP, SAGA-1350IIP
- 68” -> SAGA-1750IP, SAGA-1750IIP

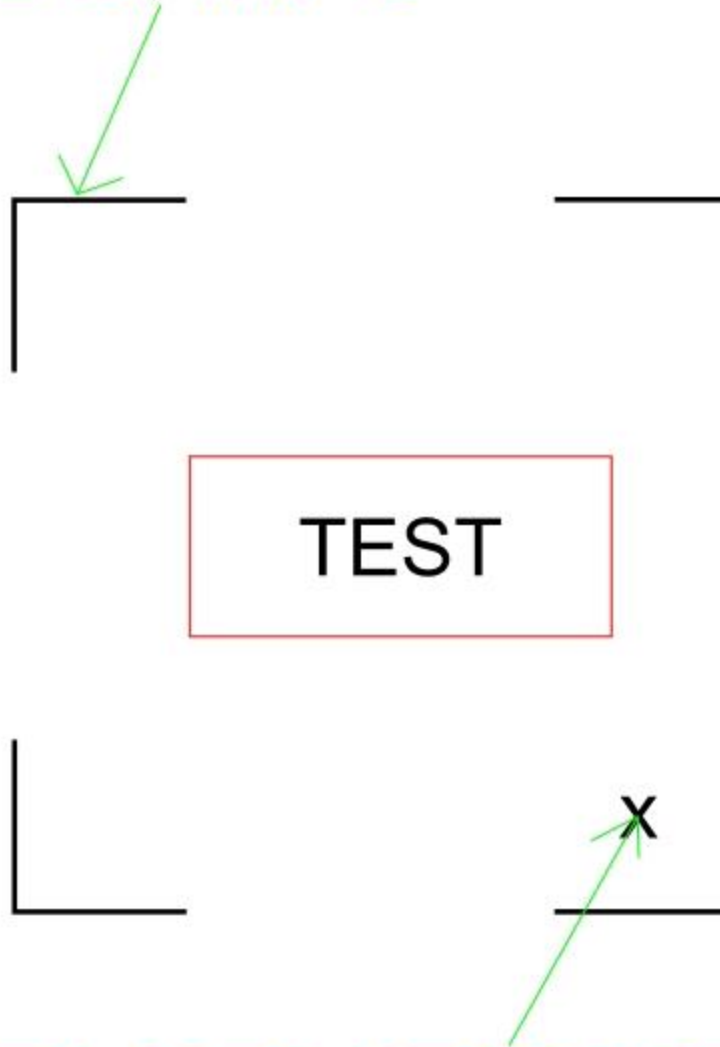
The output device / port will be a USB port such as USB001. If you have multiple USB ports listed, start with the highest port number and if a connection is not established then try another port. When one of the Saga ARMS systems is selected as the cutter the Saga ARMS cut will become available under “Special cutting”.

9A) With your image open in SignCut and orientated correctly with how you have placed your graphics in your cutter, you can initiate the contour cut. To initiate the ARMS Contour cut, select “Special cutting” from the top menu bar and select the “Saga ARMS Contour cut” option. A dialog box will open which states that you should align the center of the bottom right corner image marker (SignCut refers to the bottom right marker as the ‘first’ marker of the four). Since we have already done this in step 5 above we are ready. As soon as you press the OK button, SignCut will begin the contour cut.

9B) TIP: If your image contains contour lines, 8 registration mark lines and artwork vector art, you will need to select the registration mark lines and the contour lines to send to the cutter before selecting the “Saga ARMS Contour cut”. The easiest way to do this is to make sure your contour lines and registration lines are either on the same layer or are on 2 layers that you can select on the right side-bar menu. Select the two layers by holding down the control key and selecting the layer for the contour path and for the registration marks. Next, select “Saga ARMS Contour cut” and only the contour path and the registration marks will be sent to the cutter. The next method for selecting the contour path and registration marks is to use the SignCut selection tools to select only the contour path and the registration marks.

10) The test file you see below was created in InkScape by drawing straight lines in the shape of an L and then resizing each L to 25mm x 25mm. For this test, you can use a plotter pen. Print the test file on a piece of paper, run the ARMS contour cut and the pen will trace out the rectangle and the word TEST.

EACH OF THE 8 SEGMENTS SHOULD BE 25MM LONG AND TOUCH IN THE CORNER IN THE SHAPE OF AN "L"



PLACE LASER HERE INITIALLY
CENTERED BETWEEN
BOTH LINE SEGMENTS

Usage Of Fonts As Vinyl Cutter Ready Vector Art

Although you can use virtually any artwork to vectorize with InkScape and cut with your vinyl cutter, the extended characters of font sets are perhaps some of the most readily available sources of good quality Vinyl Cutter Ready Vector Art (VCRVA). It is also very inexpensive to purchase fonts. You can get thousands of fonts for around \$20.

Vinyl Cutter Ready Vector Art (VCRVA) is artwork that is made from closed loops and has weedable areas. If your artwork is not closed loop vector art then portions of it will not be able to be weeded. Font characters are looped vector art and are weedable.

Looking through the font list available in SignCut, Flexi and in InkScape you will see some of the characters available in the font set. Usually you will see A, B, C, D, etc. but you will not see the extended characters in the font set. A good way to see the extended characters in the font set is to use the Character Map tool in Windows.

Go to your Windows Start menu, Programs, Accessories (or Windows Accessories), System Tools and you will find the Character Map program. The program is charmap.exe so if you can't find it, search your hard drive for "charmap"

Running this program you will see the fonts listed in the top. Pull down the arrow to change the fonts. Below this is the complete character set. Scroll down with the scroll bar on the right to see all the characters in the font. You will mostly be interested in the True Type fonts which are fonts identified with the TT in front of them.

As you scroll through the font sets you will see a variety of pictures like houses, planes, telephones, etc. You will also see arrows which are very commonly used in signs.

To lift the character from the character map, double click the character and it will appear in the characters to copy list down at the bottom. (You can also press the select button). Then click the copy button next to the Characters to copy: box. The character will now be on your clip board. Next, go to SignCut, Flexi, InkScape or other program and open up a text window using the create text tool. Select Edit and Paste (alternatively you can press CNTL+V as the keyboard shortcut for paste). The character should now be in your artwork or cutting software as text.

Transfer Tape Selection For Vinyl Cutter Decals And Cut Vinyl Application

There are many types of transfer tape to choose from. When choosing transfer tape, keep in mind the following points:

1. Tact – Your transfer tape should have a tact that will easily remove the vinyl from the release liner and then easily remove away from the applied vinyl
2. Transparency – When you are applying your vinyl to your target surface it is highly advantageous to use a transfer tape that allows you to see through to your decal so you can see what you are doing.
3. Cost – Although transfer tape is very important for aiding in the proper application of your graphics to the target surface, the transfer tape itself will be discarded and in and of itself it is not the end product.
4. Ability to absorb release agents – Some transfer tape has the ability to absorb a release agent thereby having the ability to be removed with decals still wet. Other transfer tape that is hydrophobic will not allow release agents to penetrate to the adhesion layer and hence, will need to dry before it can be removed if the decal is applied wet.

Transfer Tape was chosen with a moderate tact and a paper backing so that it can be wet applied and can be removed with a release agent such as the ClearStar Splash fluid. These properties allow this transfer tape to be used with a wide variety of vinyls and allow it to be removed quickly during wet application by releasing the adhesive with the application fluid. Although it is not transparent, this transfer tape is semi-transparent / opaque which will allow you to partially see through during application. The transfer tape adhesion to the vinyl changes color somewhat when it is rolled with a squeegee which allows you to know if you have good adhesion to the tape and where you still need to apply pressure with your squeegee. The transfer tape is also inexpensive as it is a discardable consumable in the application process. During dry application, the transfer tape can be reused a few times. We use the vinyl release liner to store transfer tape for reuse.

If you are doing smaller, pre-cut decals where wet application will not be a consideration it may be better to choose a completely transparent application tape.

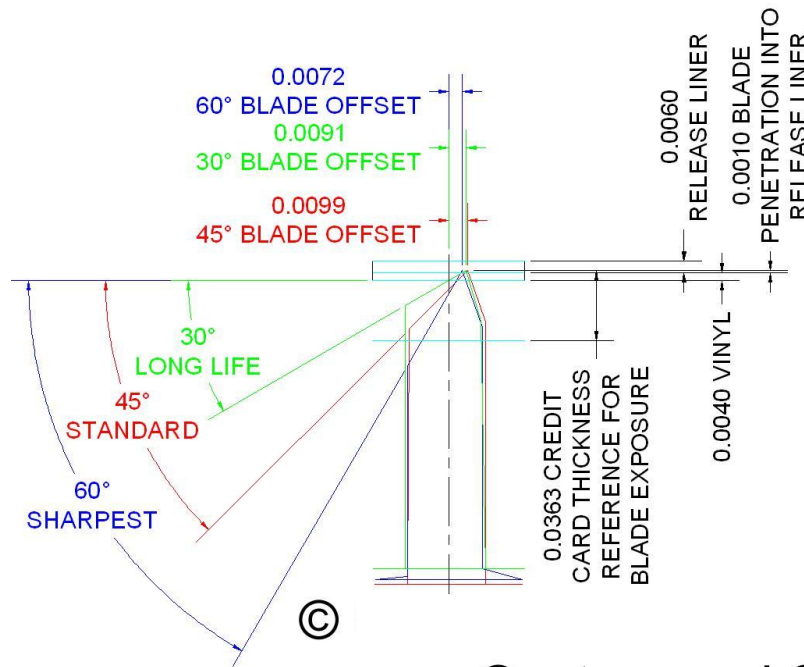
Vinyl Cutter Drag Knife Systems And Blade Offsets

Your vinyl cutter operates based on a drag knife system. This means that the actual cutting that your blade is doing happens behind the centerline of rotation of the blade shaft. Your blade holder restrains the blade with a magnet. As your vinyl cutter pulls the blade center along, the point of cut trails the center by a distance that is dependent on the blade angle but is approximately .008" (for a Contour or Servo cutter). This means that when the vinyl cutter tries to make a sharp corner, it will need to travel beyond the

end of the corner by the blade offset distance and then rotate down to the next vector to continue pulling the blade. Flexi and SignCut do this regularly as a function of the blade offset that you enter into these programs. If you have 0 in for the blade offset, the corners will be rounded. If your blade offset is too high then your corners will have a lip. Getting the blade offset correct for the blade you are using is essential for good quality corners.

Blade penetration into the vinyl is based on force, not on depth and not by the blade holder cover. If your blade holder cover is too close to the vinyl it will scratch up the surface. There should be approximately the width of a credit card from the tip of your blade to the beginning of the blade holder cover. (see pictures)

Below you will find blade offsets as measured for Contour-Servo series blades.



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Saga CNC 2013
 Contour and Servo Blade Angles
 (Based on actual blade measurements)
 Dimensions in inches

What You Need To Know – Important Points For A Contour Or Servo Vinyl Cutter

Following are some of the important points you should be aware of for your Saga Contour or Servo vinyl cutter system manufactured by Saga CNC.

1. Your vinyl cutter should be electrically connected to the stand. A green ground wire is included for this purpose. Make sure this wire is connected under the head of one of the stand fasteners. Connecting the stand to the cutter and then using conductive string on your vinyl is important for the dissipation of static charge, especially in dry environments less than 20% humidity.
2. Your blade should be placed in the blade holder to protrude from the blade holder shield no more than the width of a credit card. Only the blade portion of the blade needs to be exposed. Do not expose the blade shank unless you are cutting very thick materials.
3. The Teflon cutting strip is a white piece of Teflon running the length of your vinyl cutter under the tip of the blade. This strip must remain in good condition to allow for good cutting quality and even depth of cutting across the width of the vinyl cutter. If this strip gets damaged you can smooth it over with a spoon, tape over the top or flip it over and use the bottom side.
4. The roller bar under the pinch rollers is non-continuous. The pinch rollers should be lined up with the white pinch roller marks on the front of the cutter so they are directly over the rollers and not between the rollers. The rollers are knurled and have micro-spikes on them to insure good traction with the release liner.
5. The pinch rollers should be lowered onto the vinyl with the lever in the back right side of the cutter. Do not over-rotate the lever. Rotating the lever past the point of where the rollers lower onto the vinyl will cause the rollers to raise up again.
6. The pinch rollers are all individually force adjustable by rotating the adjustment nuts. Without vinyl in place and with the rollers lowered onto the grit rollers on the bottom, the rubber wheels on the roller should not spin. If a wheel spins when it is in the down position then adjust the roller to lower the wheel. Conversely, you will not want to overtighten the rollers as doing so can cause an impression of the knurled roller to come through to the vinyl surface. Enough pressure is needed to insure the micro-spikes engage and penetrate the release liner but not so much pressure that the knurl pattern impresses into the vinyl.

7. This vinyl cutter has optical limit switches on the left and right sides which will prevent you from cutting an image larger than the width of the machine. If your vinyl cutter tries to go beyond these optical limits then the carriage will be hard limited on either side and will nudge back into the cutting area. This will likely render your cut image non-usable so please be careful not to send images to your vinyl cutter that are larger than the cutting width.
8. The vinyl cutter has a test button. This test button will create a triangle inside a square which is about 1 inch by 1 inch. Always test your vinyl with the test button. Weed the square. If the square weeds easily then remove the triangle. There should be a slight impression in the release liner from the blade. The release liner should not be cut through. The objective is to completely cut through the vinyl layer while just penetrating the release liner but not cutting through the release liner. Adjust your force settings until you achieve this result. Since the blade offset cannot be adjusted on the cutter directly, depending on the blade you are using the corners may or may not be sharp.
9. If you experience a phenomena sometimes referred to as 'knife sticking' or 'bunching' this is due to too much force on your blade and perhaps too sharp of a blade angle. This is when your vinyl doesn't slide under the blade and 'bunches' between your blade and the rollers. This usually occurs with more rigid substrates such as the release liner for heat transfer material. If the force is too high or the blade too sharp the blade will stick into the release liner and will not slide properly. If this occurs, reduce your cutting force. Decreasing the blade angle to a smaller (duller) angle will help resolve this as well.
10. When the vinyl cutter displays Speed and Force settings in the LCD screen this indicates that the cutter is in online mode and ready to listen to your computer for commands. In online mode, you can change the force and speed using the speed and force buttons. By pressing the offline button, you can take the vinyl cutter offline. The speed and force buttons will now become the arrow keys which will manually move your carriage left and right and roll your vinyl front to back.
11. When you take the vinyl cutter offline and move the carriage and put the vinyl cutter back on line by pressing the online button the carriage will automatically move back to the original home position. If you want to reset the home position to the new carriage position that you have moved the cutter to, press the Enter button. This will put the vinyl cutter back online and re-zero the carriage position.

12. The Servo and Contour vinyl cutter systems have a laser alignment feature. This feature is semi-manual. Pressing the laser button will turn on and off the laser dot.
13. For a PC connection, simply plug the unit into a USB port. In Flexi Starter, use the USB_Printer_# (where # is the port number, usually the highest number if you just connected your cutter). In SignCut, connect to USB00# where # is the USB port number.
14. For alignment, it is important to roll out a substantial distance to make sure you are lined up within your margins over the length of the expected cut distance. If you expect to cut a 20 foot long image, roll out 20 feet of vinyl to make sure your vinyl will not move left to right more than about 1/4"-1/2". If it moves more than this, adjust the angle of the vinyl on the vinyl cutter slightly and roll out the vinyl again.

Why Choose A Servo Vinyl Cutter Over A Stepper Motor Vinyl Cutter

When it comes to choosing between a stepper motor vinyl cutter and a servo motor vinyl cutter there are several points of consideration. Before jumping into these points, it is important to have an understanding of the difference in construction between a servo motor system and a stepper motor system. In a nutshell, a servo motor is a regular motor with an encoder disk on the back of the shaft that may be read by an optic. The motor has a brake as well. The motor spins, reads its position on the encoder disk and then stops the shaft upon command. A stepper motor is driven by magnets that are cut up into sections. When the magnets are pulsed, they rotate one notch. A typical stepper motor may have 200 notches per revolution. For very good, detailed explanations of the differences between these motors, please see Wikipedia:

http://en.wikipedia.org/wiki/Servo_motor

http://en.wikipedia.org/wiki/Stepper_motor

The following points should be considered when deciding to pursue a Servo Motor Vinyl Cutter:

1. Servo Motor Vinyl Cutters are very quiet. When they run, you basically cannot hear the motors running. All you really hear is the solenoid actuating in the carriage and the vinyl running over the cutter. When I am on the phone with a client and performing test cuts I can never hear the vinyl cutter running in the background. Conversely, a stepper motor cutter is quite noisy. This noise comes from the way that the stepper motor actuates. The noise you hear is related to the pulse actuations of the magnets inside the motors. When I am on the phone with a client performing test cuts with a stepper motor cutter I always know when the cutter is running because I can always hear it in the background over the phone. Check back with this post later as we post recordings of the noise level between a Saga Servo Vinyl Cutter by Saga and a Saga Contour Vinyl Cutter by Saga (stepper motor driven). Because servo motors are so quiet, they are well suited to schools and office environments and for people that will do a lot of cutting.
2. Servo Motors are very powerful and maintain accuracy under heavy loading due to the closed loop feedback. Because servo motors are better under heavy load than their stepper motor counterparts and compensate for slippage, they can more reliably pull through thicker materials such as .030" thick magnetic material or Buttercut stencil material. If you are considering cutting through thicker materials then you will need a servo cutter.
3. Servo Motors are much more accurate than stepper motors. Because servo motors utilize a closed loop feedback system with sensing on the shaft position servo motors will always hit their intended stopping point. This is not true with a stepper motor. If the system told the stepper motor to move 90 pulses clock wise but because there was significant drag on the system the motor slipped a few pulses and ended at 88 then the system would stop at 88 pulses thinking that it went all the way to 90. In addition, servo motor encoder disks generally have finer graduation than the stepper motor magnet teeth. Because of this difference, servo motors can cut longer cuts and are more accurate when closing the loop on a longer cut and in retracing the same vectors when needed.
4. Servo Motors are faster. Although servo motors are faster, stepper motors can cut vinyl as fast as vinyl should be cut. Cutting speed in general is not really a point of differentiation between servo and stepper systems.
5. Servo Motor Vinyl Cutter parts are much more expensive. Because the repair parts (especially the motors and the motherboard) are more expensive you will want to figure this into your decision making process. Saga helps alleviate some concern with a 3 year warranty on servo systems however, someday you may need to replace a motherboard or a motor.

Sending Inkscape Files To Flexi To Cut Artwork On A Vinyl Cutter

Although Inkscape can produce many file types and Flexi can read in many file types, Flexi cannot read in Inkscape native files directly. Inkscape native files are SVG (Scalable Vector Graphic) files. The most consistently successful file type we have found and what we recommend you use is an EPS (Encapsulated Post Script) file.

In Inkscape you will always want to save your original artwork as an SVG file but when you are ready to send your file to Flexi, save as an EPS as follows:

In Inkscape, with your artwork open:

select – Save A Copy...

Under Save as type:

select – Encapsulated Post Script (*.eps)

Give your file a name and navigate to where you want the document saved

select – Save

The Encapsulated PostScript dialog box will open

Restrict to PS level – PostScript level 3

Convert texts to paths – check this box. This will convert your fonts to lines arcs and polylines or splines. This will make your artwork compatible with Flexi and will avoid font substitution issues and font incompatibilities.

EPS+LaTeX: Omit text in EPS, and create LaTeX file – DO NOT check this box. If you check this box your font text will not come over into Flexi successfully.

Rasterize filter effects – likely do not check this box. Define if you want to convert the marked objects into bitmap.

Resolution for rasterization (dpi) – 300 dpi is usually adequate

Export area is drawing – DO NOT check this box. This will clip your image if it is outside of the drawing area. In general you will want to export everything in the file.

Export area is page – DO NOT check this box. This will clip your image if it is outside of the page. In general you will want to export everything in the file.

Font Cleanup Before Sending Artwork To A Vinyl Cutter

Again referencing my sessions with Dan this weekend, when we made the numbers for his racecar we used a font that actually had some bumps in the sides of the letters. These indentations looked to us like they did not belong there. (The font was ReservoirGrunge by the way) We found this surprising as this was a commonly used font. We liked the way the font looked so we decided to fix the artwork. First we made the three offsets for the layered artwork. Next, we converted the font to strokes using the command, Path, Object To Path. There are many objects in Inkscape like rectangles, Stars, Text, etc. that are not editable until you convert them to paths. Once we converted the text to paths we are able to use the node edit tool on the characters. The node edit tool is the tool just below the arrow on the top left sidebar menu. Clicking this tool and then double clicking on the numbers (or other artwork) you will see the nodes appear. Zooming in to where the deformities are in the artwork you will see the nodes that are out of place. If you select the node it will change color to a dark blue. If you hit the Delete key the node will be deleted and the line or curve will flatten out. Nodes serve as an inflection point in the curve so when they are deleted, the curve flattens out to the two next adjacent nodes. Alternatively, you can click and drag the node until it is in the location you prefer. If you zoom back out, you will be able to see the impact of your edits.

TIP – Zooming in and out is best done in Inkscape by holding down the control key on your keyboard and rolling the mouse wheel. The zoom centers on where your mouse is pointed. To easily pan, zoom out, move your cursor to the place of interest and then zoom in.

Artwork Quality Hidden Objects And A Vinyl Cutter

I had the pleasure of assisting Dan today and yesterday as he was doing offsets in Inkscape to create vinyl overlaid numbers for his racecar. When we went to cut out the

numbers we ran into an issue with the cutter stopping in the middle of the numbers. As you read prior posts you may agree that my first suspect was a static discharge interference with his communication. Upon the second try however, we found that the cutter stopped again in the same place. If this issue was related to static dissipation then we would expect random problems and random places of where the vinyl cutter may stop. We found however, a consistent location of where the cutter stopped during cutting. Looking at his original artwork file we found some lines in the file that were not visible in Flexi. These lines were the same color as the background and were essentially invisible. After recreating the artwork in a new file we were able to cut the numbers as intended. The numbers were large, about 23" high. (Cutting large artwork with a stopping during cutting issue always makes me suspect static interference with the communication.)

If you suspect that you may have a graphics issue please try this:

1. Open your file in Inkscape.
2. Use CNTL+A to select all the graphics in the file. You can also go to Edit, Select All.
3. Next, go to Object, Fill and Stroke... which will bring up the fill and stroke editor.
4. On the first tab (Fill), click the X in the top left corner. This will turn off the fill of all the artwork so you can see your lines. You may notice a lot of your artwork has 'disappeared'. It has not disappeared. Simply, the fill has been turned off and the vector lines were clear or transparent which results in no visible objects.
5. On the second tab, (Stroke paint) select the solid color (the box just to the right of the X).
6. This will turn all your lines to a solid color.
7. Now take a look at your artwork. If a line appears where it isn't supposed to you may have a phantom line in your artwork that should likely be removed.

If your artwork was grouped, it may need to be ungrouped and exploded before you can do the above steps. To do this, select all, then go to Object, Ungroup. Then go to Path, Break Apart. Doing this will explode your graphics allowing you to get to the individual components.

Once you have done the above, it is likely that you will **not** want to save this file as we have just exploded everything. This method simply allows you to see everything in your

file so you know if you have phantom or hidden lines in your graphic that may not belong. Close the file without saving to reopen your original graphics.

Contour Cutting In Flexi Starter 10

Following are the steps for contour cutting graphics in Flexi Starter 10.

1. First, you must calibrate your cutter for the offsets that Flexi uses as the distance from your blade tip to the laser dot on the cutter carriage.
2. To do this, create a 3" x 3" square.
3. Create a contour profile (using Effects, Contour Cut...) around this 3" x 3" square and set the contour offset to 0 so that the contour and the square are the same 3" x 3" size. Press the green check mark when you are done.
4. Create the contour cut registration marks. (Effects, Contour Cut Mark...) Press the green check mark when you are done.
5. Cut the square first with a regular cut on some vinyl.
6. Cut the contour next (contour cut icon next to the regular cut icon, this icon only turns on when a contour path and registration marks exist in your file) with offsets of 0 for the X and 0 for the Y. There is no need to remove the vinyl from the cutter. (In the Cut Contour screen, select the second tab (options), select Edit, Select Cut Fast and check the Offset X and Offset Y and set them to 0 and 0, these are the calibration coefficients)
7. As accurately as possible, measure the distance between the two squares. A set of calipers works the best but a fine graduated ruler will work as well.
8. The distance in X and Y are the calibration offset coefficients to use in Flexi Starter. These coefficients will be approximately -26.1 mm for the X Offset and 19.26 mm for the Y Offset but will vary somewhat from cutter to cutter. Enter your measurements for these offsets. See slide 20 for additional details. The X Offset will always be a negative number and the Y Offset will always be a positive number.
9. To verify your numbers, recut the contour on the original square with your new calibration coefficients, your contour cut should be very close if not right on top of the original square.
10. VERY IMPORTANT – The Flexi contour cutting algorithms do not allow negative numbers. When you place your graphic vinyl into your cutter for contour cutting make sure that the origin is below and to the right of all registration marks. If a

registration mark is to the right of the origin you will not be able to align to it because it would cause Flexi to go to a negative number which it will not allow during this process.

11. VERY IMPORTANT – Using the mouse keys to click on the arrows on the screen during registration alignment is difficult and you need to have the mouse cursor well aligned to the black arrows. It is highly recommended that you use the keyboard arrow keys for registration alignment. If the cutter and the computer are far apart consider using a remote keyboard. The Contour and Servo cutters will start by moving very, very slowly (almost unnoticeable) but will increase in speed if you hold down the arrows for a few seconds. This makes it easier to do very small adjustments in position.
12. VERY IMPORTANT – Some customers using the Contour or Servo series connect to a USB port. This will sometimes allow the cutter to work normally for regular cutting jobs but this will not work for contour cutting and registration with Flexi. You must have your cutter connected properly through USB_Printer_# where the # is the port number of your cutter. If you have any question regarding the connection settings of the Contour or Servo system please contact Saga technical support.
13. Now, create or import your graphic file into Flexi Starter
14. If your artwork is in vector format, Flexi will give you an offset profile from your vector art. If your artwork is a JPEG or other bitmap file, you will get a rectangle or oval as your contour offset. If you need an offset profile then please vectorize your artwork with Inkscape first.
15. Create your contour profile offset.
16. Create your 4 registration marks. This option does not show up until after you have created your contour offset.
17. Print this on your vinyl printer either directly from Flexi Starter or export this to your printing software (RIP Software) and print it. Do not print the contour loop, just the artwork and your registration marks.
18. Place the printed vinyl into the cutter being mindful of point 10 above so that the origin is to the bottom right of all four registration marks.
19. Run the contour cut with the contour cut button (not the regular cut button). Flexi will only send the contour path to the cutter for the contour cut.
20. Register your vinyl to your cutter using the four registration marks.
21. Run the contour cut.

Static Dissipation In A Vinyl Cutter

Static dissipation in vinyl cutters is a very common and frustrating issue. Static dissipation causes a variety of issues including:

1. Stopping during cutting
2. Losing connection between the cutter and the computer
3. Cutting lines where there is no artwork
4. Missing cuts where there is artwork
5. Uncontrolled motor movement
6. Spilling vinyl onto the floor
7. Carriage moving to the outer limits of the cutter range when the artwork is within the range of the cutter

What happens is that vinyl holds significant static charge so coming off the roll, the vinyl is charged. In addition, the vinyl generates additional charge when it rubs against the center portion of the vinyl cutter. This center area is usually painted or coated so it is insulated and will not dissipate the charge. When the charge reaches a certain level, the charge will dissipate to ground. Usually, the path that the charge dissipates through is the USB port / cable. When this occurs, the flow of this charge will disrupt the communication between your computer and your cutter causing the above issues.

To mitigate these issues we highly recommend static grounding string. Static issues get worse as the humidity gets lower. Cutting above 25% humidity usually does not cause the issues above. Below this level we start to see the above issues. In Phoenix, AZ, where Saga is located we normally have days in the single digit humidity levels. We cannot reliably cut long length images in Phoenix without the use of the static grounding string. Similar low-humidity environments are created across the country in the winter when furnaces or wood burning stoves are running without a humidifier.

Always make sure your cutter does not bypass the ground prong of the three prong outlet. Grounding your cutter is extremely important to dissipate static charge. If you use the ground string and bypass the ground outlet the charge will have no place to go and will still cause the same issues. Make sure the outlet you are plugging into is correctly Earth grounded.

Although we have found that the ground string works the best, if the static grounding string is not used, there are other things you can do to mitigate this issue including the following:

1. Slow down your cutting speed
2. Use anti-static spray
3. Add humidity to the environment with a humidifier
4. Use an ionizer

Vinyl Cutter Cutting Quality

We have seen some instances of vinyl cutters cutting jagged edges on decals. The cutting quality of your vinyl cutter is controlled by the following:

- 1) Blade quality
- 2) Speed and force settings
- 3) Cutting mat quality
- 4) Carriage
- 5) Blade holder
- 6) Software settings

1) Your blade quality may be difficult to determine as the blade tips are very small. A household magnifying glass may be used to see the blade tip better. Blades in general can be used for a long time before they become too dull. If you are having poor cutting quality then start by trying an alternate blade. Blade tips will get dull over time however, they can also be damaged if the blade holder is dropped on the floor.

2) For general sign vinyl, speed should be set to mid-range. If you are cutting something with very intricate details such as minimum height text then set the speed to very slow. In general, sign vinyl should cut in the range of 80 to 110 for the force setting. Vinyl cutters cut by force, not by distance. Your blade tip should extend about the width of a credit card from the blade holder. This distance is not your cut depth but rather is the distance that the blade holder will protect your blade from cutting too deep in the event you run off of your vinyl or penetrate through it. More delicate materials such as window tint or heat transfer material should be cut at lower forces.

3) Your cutting mat is a white teflon strip that runs underneath your blade tip. (As a side note, if you have a CR series cutter and there are two holes in your blade clamp please make sure you are loading the blade holder in the back hole, not the front, so that the blade tip runs directly over the center of the cutting mat.) If your blade runs off of your

vinyl or through the vinyl then the cutting mat will protect your blade. However, if your cutting mat gets damaged you may need to repair it by rubbing out the grooves with a spoon or taping over the top of it. If it is damaged beyond repair then you may need to replace the mat. If you have a SA series cutter you can pull the mat off and flip it over and use the back side. If your cutting mat is damaged then the vinyl will not be supported properly directly underneath the tip of the blade. When this happens, you will get areas of deep cuts where the cutting mat is damaged and areas of normal cuts across the width of your vinyl.

4) Over time, the carriage solenoid can lose strength and become inconsistent in its actuation. In addition, a carriage can become loose and have too much play between the blade holder clamp and the guide rails (more common on CR series cutters). When this occurs you may need a new carriage. To determine if your carriage is loose, gently wiggle the blade holder clamp. If it wiggles too much then you may need to adjust the carriage or replace it.

5) Your blade holder is the tube that holds your blade. The SA series blade holders are magnetic with a quick release button at the top. The CR series blade holders restrain the blade with a shoulder and will need to have the black cap removed to replace the blade. Blade holders have roller bearings inside them to allow the blade to rotate and follow the cutting path. If your blade holder bearings get damaged then the blade will not freely rotate which will cause jagged cuts. If this happens, please replace your blade holder.

6) If you have Flexi Starter 10 and are experiencing jagged edges around your decals, then please reset Flexi Starter to the original settings. This is done with the Preference Manager. Go to your Windows Start button and look for the folder where Flexi is stored. It is likely called SAI Production Suite or Saga Flexi Starter. In this folder you will see the Preference Manager. Run the Preference Manager by clicking on it. There will be an available preference called 'Factory defaults' which will be highlighted. Click the Load button and then Exit. This will reset your Flexi. Keep in mind that you will need to restore any specific settings that you set previously.

One such setting is the overcut. The overcut is the distance that Flexi will travel beyond the end of a closed loop to fully cut out your decal. To change this value, go to Flexi and start the process of cutting a decal (you can type in an X to cut for now). When the cut/plot screen appears go to the fourth tab to the right which is the advanced settings.

From here you will see the Overcut box. This box should be checked by default and will have a default value in it. If the value is .12 then we recommend raising this to .15.