Chapter 5

Setting parameters for text

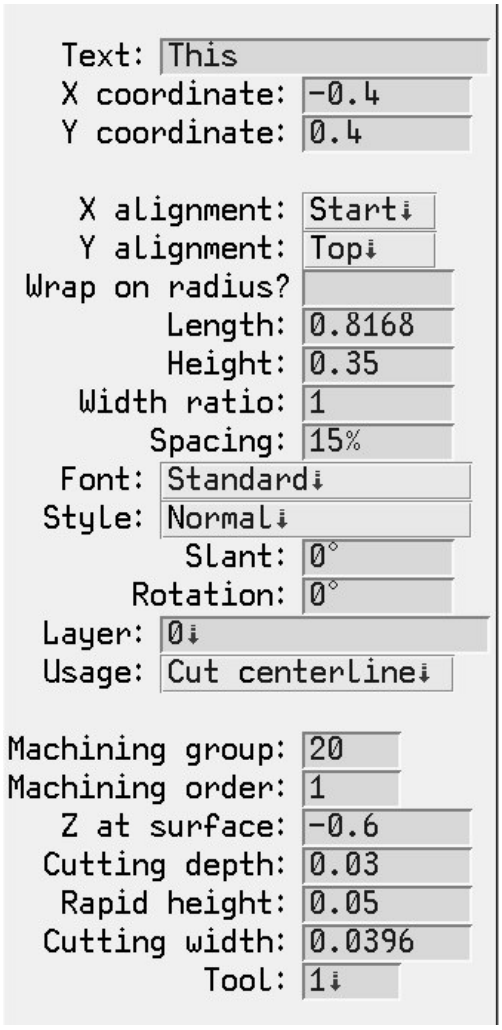


Figure 5-1

The parameters for text.

When you move the mouse over text in your drawing the parameters for the text appear on the right side of the computer screen, as seen in Figure 5-1. Actually, the parameters you find on your screen will sometimes differ slightly from those in the figure because the parameters change depending on whether the text is wrapped around an arc, or set to be an island or pocketed.

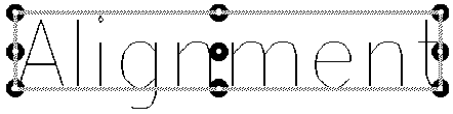
At the top of the list of parameters are the X and Y *coordinates* and X and Y *alignments*. These four parameters specify an ***alignment point*** for the text that MillWrite uses to locate the text in the drawing.

Each line of text needs an alignment point. The alignment point specifies one of nine possible locations on the text, as seen by the nine dots in Figure 5-2. These nine possible locations could have been referred to ***location #1***, ***location #2***, etc, or they could have been referred to as ***upper left corner***, ***lower left corner***, etc. But if the text is rotated, wrapped on an arc, mirrored, or set to be vertical, those locations become confusing no matter which words are used. MillWrite refers to the upper left corner as having an X alignment of ***Start*** and a Y alignment of ***Top*** because that location is where the text starts in the X dimension and it is the top of the text in the Y dimension.

MillWrite refers to the three possible X alignment locations as the ***start*** of the text, the ***center*** of the text, and the ***end*** of the text. And the three possible Y coordinates are the ***top***, the ***middle***, and the ***bottom*** of the text. This gives a total of nine locations on the text. So you specify how the text is to be aligned, and you specify the X and Y coordinates of the alignment point. Some examples are shown on the next page.

Figure 5-2

There are nine points for text to be aligned on.



X coordinate

If you had to engrave "Patent Pending" in such a manner that it was centered on the point X2.3, Y-4.5, as shown in Figure 5-3, you would enter 2.3 as the ***X coordinate***. If you had to engrave the text as shown in Figure 5-4, you would enter .77 for the ***X coordinate***.

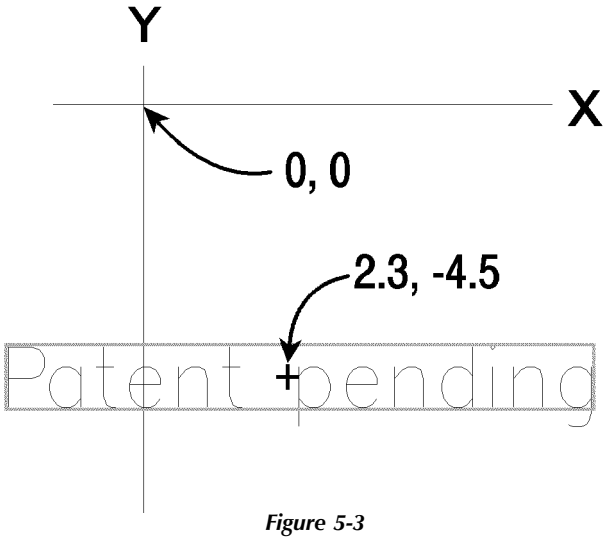


Figure 5-3

The alignment point for the text in this figure is X2.3, Y-4.5. This alignment point is at the center of the text in both X and Y, so you would set its X alignment to ***Center****, and its Y alignment to* ***Middle***

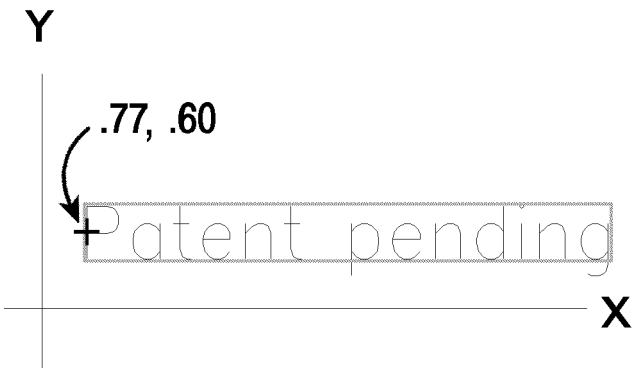


Figure 5-4

The alignment point for the text in this figure is X.77, Y.6. This point is the START of the text in the X dimension, and the MIDDLE of the text in the Y

X Alignment

This data field is where you tell MillWrite what the X coordinate refers to. As mentioned on the previous page, there are three possible locations that the X coordinate can refer to: the ***start***, the ***center***, and the ***end***.

For example, in Figure 5-3, the ***X coordinate*** of 2.3 is at the ***center*** of the text, so you would choose ***Center*** as the ***X alignment*** and 2.3 for the X coordinate. In Figure 5-4 the X coordinate of 0.77 is at the ***start*** of the text, so in this case you would choose ***Start*** as the ***X alignment*** and 0.77 for the X coordinate.

It makes no difference if the text is rotated. In Figure 5-5, for example, the text is engraved at an angle, and in this example the end of the text is at X.20, Y1.30. Therefore, you would enter an X coordinate of .20, and then set the X alignment to be ***End***.

Y Coordinate

For the text in Figure 5-3, the Y coordinate would be -4.5, and for Figure 5-4 it would be .60. In Figure 5-5 the Y coordinate is 1.3.

Y Alignment

This field is where you tell MillWrite what the ***Y coordinate*** refers to. Text can be aligned in the Y dimension in one of three ways: the ***top*** of the text, the ***middle*** of the text, and the ***bottom*** of the text. The Y alignment for text in Figures 5-3 and 5-4 is the ***middle*** of the text, while the Y alignment for text in Figure 5-5 is the ***bottom*** of the text.

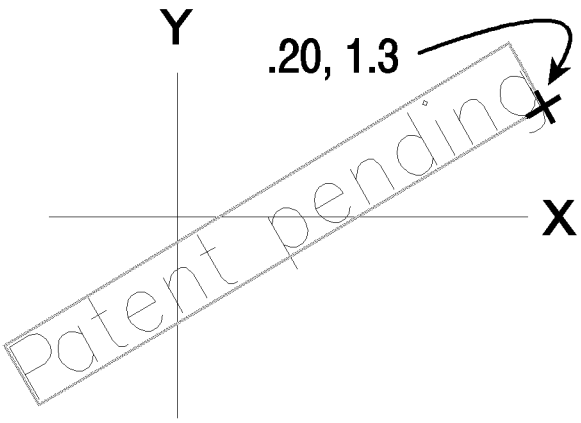


Figure 5-5

When setting the alignment point for rotated text, pretend the text is horizontal. The alignment point for the text in this figure is aligned at its END in the X dimension, and at its BOTTOM in the Y dimension, regardless of how it is rotated. The alignment point is X.2, Y1.3

A font has a proportion, or width ratio

Each font is designed with a certain proportion to its height and width. MillWrite refers to the natural proportion of a font as a width ratio of ***1.0***. If you want to maintain that "natural" proportion, you cannot specify ***both*** a height and a length for the text. Rather, you specify ***only*** the height or ***only*** the length, and you must leave the width ratio as 1.0. If you specify both a height and length, you will almost always specify dimensions that stretch or compress the text or symbol.

If you specify **only** a height and if you leave the width ratio at 1, MillWrite will calculate the length according to the font's natural proportion. The result will be displayed in the **Length** field. If instead you specify a length for the text, MillWrite will calculate the character height.

Length of the text

This field specifies the overall length of the text. In Figure 5-6 the text is 1.2 inches in length. If you want to force the text to be exactly 2 inches long, enter 2 in this field. MillWrite will then adjust the height of the letters to make the line 2 inches long.

Figure 5-6
The length takes into account the width of the tool.

Figure 5-7
The height refers to the height of the capital letters.

Note: whenever you pick a tool, the length of the text will change. For example, assume you pick a 1/16th diameter end mill as the tool to use, and you specify the line length to be 2.123 inches. If you then pick a 1/32 end mill, MillWrite will automatically move the letters closer together to compensate for the smaller tool. This will reduce the overall length of the text by a small amount. You must then enter 2.123 into the line length field again to get the length back to its original value. This means that you should pick your tool **before** you enter values in this field. Also, you should pick a font before specifying the length you want for the text because different fonts have different widths.

The reason that the **length** changes whenever you pick a tool or a font is that MillWrite gives character **height** first priority. Whenever you alter something about the text, MillWrite maintains the same height for the text by allowing the length to vary. Therefore, the height of the characters will remain the same while you pick fonts or tools.

Character Height

The character height is the height of the capital letters, as seen in Figure 5-7. Since lowercase letters, punctuation, and symbols are of various sizes, it makes no sense to specify character sizes any other way.

MillWrite puts a dashed box around the text to help you align it with other text, but this box will appear incorrect with most lowercase letters and punctuation. Just keep in mind that the dashed boxes show the outline of the text for the capital letters. Letters such as ***g*** will hang below the box and/or not reach the top of the box.

Width ratio

The width ratio determines if the font is compressed or expanded. If you specify a width ratio of 0.75, that means the character will be 3/4 as wide as normal. This compresses the text. If you specify a width ratio that is larger than 1.0, the text will be expanded. A width ratio of 2.0 will double the width. Figure 5-8 shows examples.

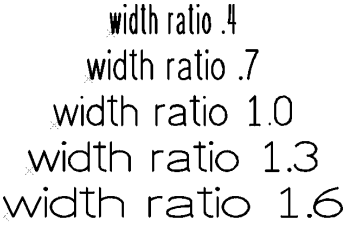
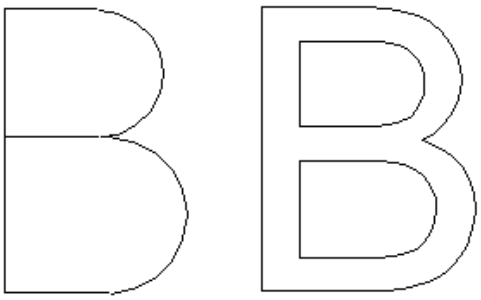


Figure 5-8
Examples of compressed and expanded text. A width ratio of 1.0 creates text with its "natural" proportions.

Fonts; True Type or MillWrite?

Most of the MillWrite fonts are ***single stroke*** fonts, whereas all True Type fonts are ***outline*** fonts. The two letter B's in the image show a MillWrite single-stoke font on the left next to a True Type font on the right.



The single-stoke MillWrite fonts engrave significantly faster than outlines fonts simply because the tool has about one half the distance to travel to cut the letters. Another advantage of the MillWrite fonts is that most of the letters have arcs rather than splines, so they produce smaller NC programs.

Usually you have to **pocket** the interior of a true type font, or you draw some shape around it and cut everything except the letters to make the letters raised above the background. As you can imagine, this requires a lot more machining time compared to engraving a MillWrite font. Also, the tools have to be smaller, which means they break more easily.

The point of this is that if you are only marking parts with serial numbers or identification numbers, you will save yourself time and money to use the MillWrite fonts. The True Type fonts are normally used only for decorative engraving, or for making raised letters (ie, for cutting the material around the letter to make the letters raised above the surface).

Text Styles

There are four styles for text: normal, vertical, mirrored, and both vertical and mirrored. You pick the style by moving the cursor to the **Style** field and pressing the Spacebar, Enter↵, or the left mouse button, or one of the hi-lited letters listed on the bottom of the screen; ie, N V M or B.

Normal Text

The letters in each word in this Users' Manual are placed side by side and they read from left to right. MillWrite refers to this as "Normal" text. You can rotate the text or wrap it around an arc, and it will still be "normal". Figure 5-9 shows five lines of normal text. Some of those lines have been rotated and wrapped on arcs, but they are all in the "normal" text style.

Vertical Text

Vertical text is when the letters are stacked on top of one another rather than side by side, as seen in Figure 5-10. You should note that vertical text will not look good with lowercase letters. The reason is that lowercase letters are different sizes, and certain lowercase letters, such as the g, p, and q, have "descenders" that our eye expects to be "below the line". When lowercase letters are stacked on top of each other the visual effect is not very appealing.

Mirrored Text

When you pick the mirrored style, MillWrite makes a mirrored image of the text. This is the style you use when making molds.

Figure 5-11 shows what happens if you take the five lines of text seen in Figure 5-9 and set each to a style of mirrored. Note that MillWrite mirrored the text in Y dimensions, so if you want the text mirrored in the X dimension instead, you have to also specify a rotational angle of 180°.

Figure 5-12 shows a line of text that was mirrored and placed under a line that was not mirrored.

Note that when you need to engrave text in a mirrored form, it is easier to set the job up with the text in a normal form and then use the mirror function that is available from the menu at the Drawing page to mirror all the lines of text at once. That way you can read the text as you set it up.

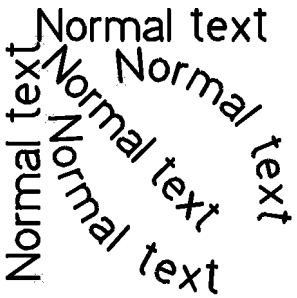


Figure 5-9

Each of these text items have the NORMAL style.

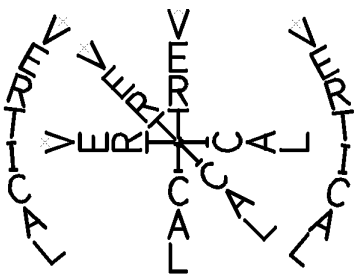


Figure 5-10

Each of these text items have the VERTICAL style.

Both Vertical and Mirrored

Use this style when you want the text to be both vertical and mirrored. Figure 5-13 shows the same five lines of text seen in Figure 5-10, but this time each was mirrored. As you can see by comparing the figures, the text has been mirrored in the X dimension. If you want to mirror the text in the Y dimension, specify a rotational angle of 180°.

Slant

You can slant text forward or backwards, up to 70°. Figure 5-14 shows both positive and negative slants.

If you are using a MillWrite font, the only disadvantage with the slant feature is that it requires all arcs to be broken up into line segments because it warps the arcs. This makes for larger NC programs.

True type fonts don't have arcs, so you can slant them without it affecting the size of the NC program. True Type fonts produce large NC programs regardless of their slant or width ratio.

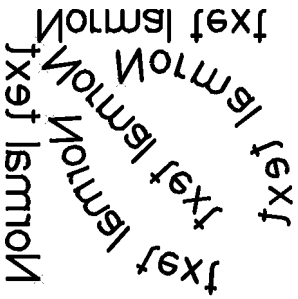


Figure 5-11

The same text as in Figure 5-9, but in a mirrored form.

Figure 5-12

The top line is NORMAL text, and the bottom line is MIRRORED text.

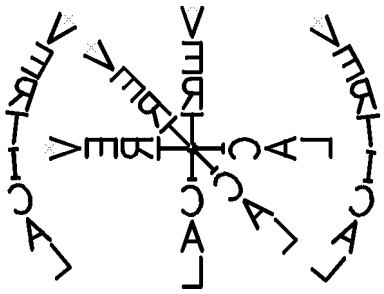


Figure 5-13

The same text as in Figure 5-10, but in a mirrored form.

Spacing

This is where you specify the distance between one letter and the next within a line of text, as seen in Figure 5-15. This is ***not*** the spacing between lines of text. MillWrite does not have a specific field for spacing between lines.

Each letter needs to be separated from the others to prevent them from touching (except when using script fonts, which are supposed to touch). The spacing between letters is expressed as a percentage of the character height. For example, a spacing of 12% means to separate all letters by 12% of their height. If the letters are 1 inch tall, the letters will be separated by 0.12 inches. If the spacing is 0%, MillWrite will not add any space between the letters.

There is no formula to determine what value the spacing should be. You simply have to view the text at the **Drawing** page, and if the letters seem too close together, increase the spacing.

Note that when you pick a script font you will usually want to set the spacing to 0% in order to make the letters touch each other. A script font loses its visual effect if there is a gap between the letters.

MillWrite compensates for the tool's cutting width when calculating spacing. A spacing of 0% means to make the letters touch each other, regardless of whether you engrave with a .25 diameter end mill or a .01 diameter tool. Don't worry about tool diameter compensation; MillWrite will take care of it for you.

True type fonts don't need spacing

True type fonts have spacing built into them, so normally you set the spacing for these fonts to 0%.

Figure 5-14

Examples of slanted text.

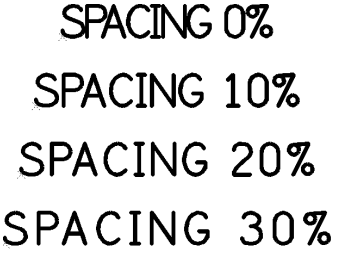


Figure 5-15

The Spacing value refers to the spacing between letters, not the spacing between different lines of text.

Angle of rotation

This field allows you to specify an angle for rotating the text. Angles for "normal text" are 0° at the 3 o'clock position; 90° at the 12 o'clock position, etc. Angles are counterclockwise if positive. You can enter negative angles if you want; they will be considered to be clockwise, and MillWrite will adjust them to be positive by adding 360°. For example, -45° would be replaced with 315°.

Figure 5-16 shows three lines of text in the "normal" style. The center of rotation is the ***alignment point*** of the text.

Vertical text can also be rotated, as seen in Figure 5-17. However, 0° is measured at the 6 o'clock position for vertical text.

You can also rotate text that is wrapped on arcs. Figures 5-18 and 5-19 shows examples. The center of rotation is the center of the arc the text wraps around.

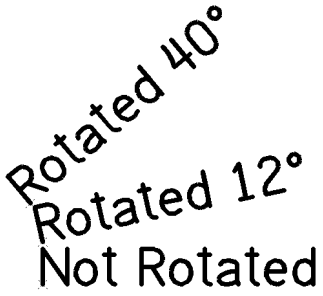


Figure 5-16

Angles of rotation for "normal" text are measured counterclockwise from the 3 o'clock position.

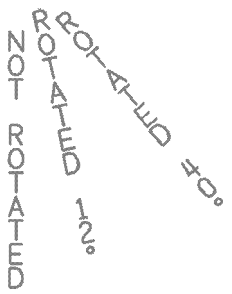


Figure 5-17

Angles of rotation for "vertical" text are measured counterclockwise, but 0° is at the 6 o'clock position.

Wrap radius

If you want to wrap text on an arc, the Wrap Radius field is where you specify the radius for the arc. The X and Y coordinates you entered at the top of the screen for the alignment point will become the center point of the arc. The text will be centered around whatever angle you specify in the **Angle** field.

When wrapping ***normal*** text, the radius that text is wrapped around is measured to the ***bottom*** of the letters, as seen by the arrow in Figure 5-20. However, if you specify that the text is to be ***vertical***, the radius is measured to the ***center*** of the letters, as seen in Figure 5-21.

As an example of how this affects you, assume you have to engrave text around a hole that has a one inch radius. If the text is normal or mirrored, you could safely specify a one inch radius to wrap the text. The text would just barely skim the hole. Of course, all lowercase letters and punctuation that hang below the character box would be "engraved" in the hole, which would not look nice. This means that when wrapping text on arcs, remember that lowercase letters and some other symbols hang below the wrapping radius.

By comparison, if you wrap vertical text around a 1 inch hole, only half of each letter will be seen; the other half will be in the hole. This means that when trying to wrap vertical text around holes, you might have to draw a circle the size of the hole and then visually alter the radius of the text until all the letters are away from the hole.

If, after you set the text to wrap around an arc, if you want to cancel the request for wrapped text, simply enter a 0 in this field.

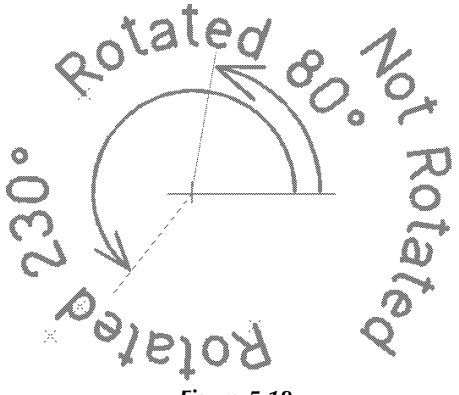


Figure 5-18

Three lines of "normal" text that have been wrapped on arcs. Two of the lines have been rotated. The rotation angle is the angle the text is centered on, with 0° being at the 3 o'clock position.

Arc direction

Here is where you specify which direction to wrap the text. Figure 5-22 shows some examples of text wrapped clockwise and counterclockwise. The inner two lines of text are normal text, while the outer two lines are vertical text.

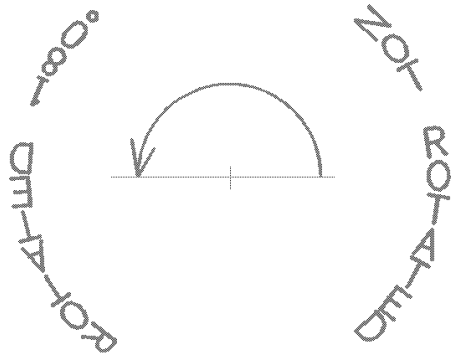


Figure 5-19

Two lines of "vertical" text that have been wrapped on arcs. One line has been rotated 180°

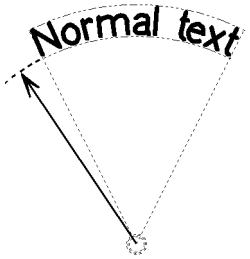


Figure 5-20
The wrapping radius for "normal" text is to the bottom of the capital letters, as shown by the arrow.

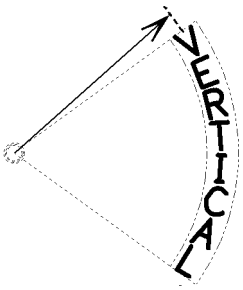


Figure 5-21
The wrapping radius for "vertical" text is to the center of the letters, as shown by the arrow.

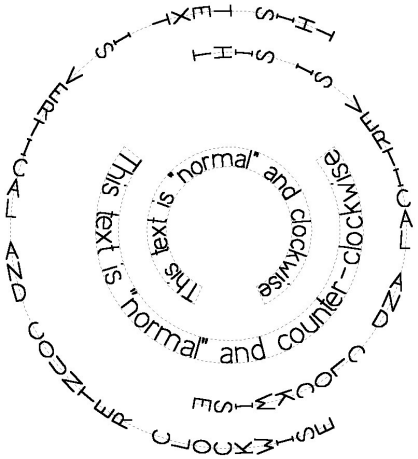


Figure 5-22
The two inner rings are "normal" text.

The two outer rings are "vertical" text.

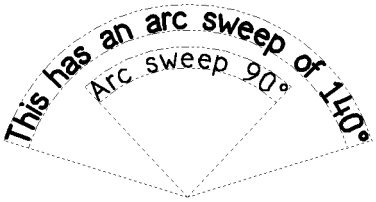


Figure 5-23
The arc sweep tells you how far around the circle the text will wrap.

Arc Sweep

This is another field that becomes visible only if you entered a value in the **Wrap radius** field; ie, only if the text is to be wrapped on an arc. This is a field that MillWrite generates only for your information; ie, you cannot enter a value in this field. Figure 5-23 shows two examples of what arc sweeps are.

Z at Surface

This is where you specify the Z value at the surface of the part; ie, the Z value the machine would display if you touch the tool to the part. Most people set the surface of the part to be at Z0.

The value in the **Cutting depth** field is the depth below whatever value you enter in this field. The value in the **Rapid height** field is the height above the value in this field. For example, if you set the Z at surface value to 0, and if you set the cutting depth to a value of .14, then MillWrite will send the tool down to Z-0.14

Rapid Height

Before making a rapid move, MillWrite will raise the tool above the surface to the value you specify here. Make sure the value in this field will allow the tool to clear obstacles.

When you engrave text, the rapid height is normally low so that the machine doesn't waste time moving the tool up and down.

When you are making (or engraving) a part that has different Z levels, MillWrite will rapid from one to the other with whichever Z level is the highest.

For example, assume you have a part to engrave in two different locations, and each of these locations is at a different X-Y plane, as seen in the top and side view of Figure 5-24. MillWrite allows you to set different rapid heights for the two different areas of the plate, as seen in Figure 5-25.

When MillWrite is finished with one line of text and must move to another line, it checks to see which line has the higher surface level and rapid height value, and it will use the higher Z value to avoid driving the tool into the part. This is true regardless of whether you are engraving or cutting pockets.

However, MillWrite will not know if you have clamps between one line of text and the other, nor will MillWrite know if the part has levels at still higher Z values. If the part has a high spot in it, as shown in Figure 5-26, you could specify a second rapid plane at the Job Setup page. The second rapid plane will cause MillWrite to lift the tool to that second and higher level when it must move to the next item.

Cutting Width

If you pick a conventional end mill as your tool, MillWrite will enter its diameter in this cutting width field and you cannot alter it.

However, if you pick a ball or a tapered tool, you can specify the cutting width you want and MillWrite will set the depth. For example, if you pick a ⅛th inch ball end mill, and if

you specify the cutting width to be .02", MillWrite will calculate the Z value that will cause a ⅛th inch ball end mill to cut a .02" wide path.

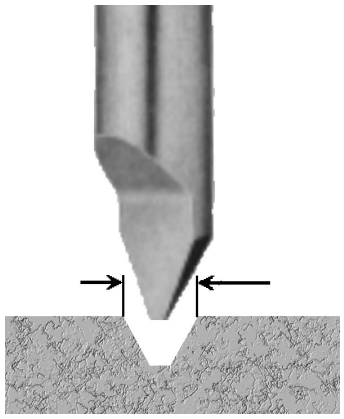


Figure 5-27

If you enter the cutting width you want a tapered or ball end tool to have, MillWrite will calculate the depth to send the tool to give you that cutting width

Cutting Depth value

The cutting depth is the depth you want the tool to penetrate the surface. For example, if you set the Z at Surface value to Z0.0, and if you set the cutting depth field to .05, MillWrite will send the tool to Z-0.05

If you pick a tapered or a ball tool, you can specify the cutting depth you want the tool to have, and MillWrite will calculate the cutting width.

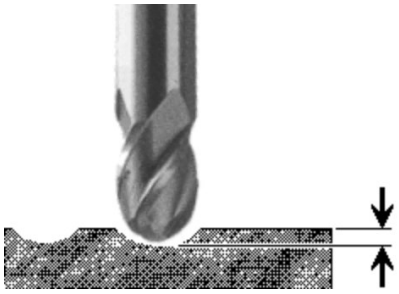
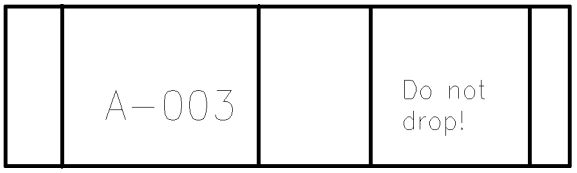


Figure 5-28

If you specify the cutting depth for a ball or tapered tool, MillWrite will calculate the cutting width



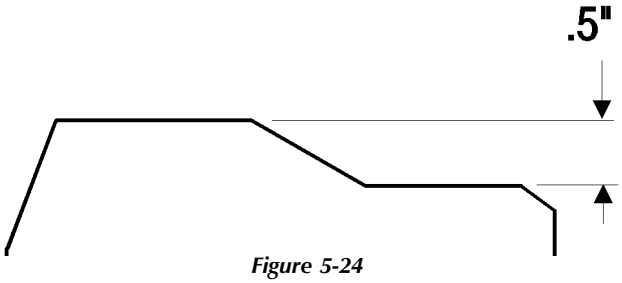


Figure 5-24

An example of engraving a part in which the engraving is at different X-Y planes.

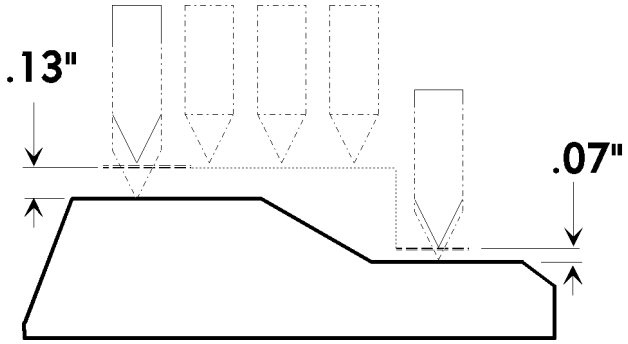


Figure 5-25

Each line of text can have different values for the rapid height. When moving from one area to the other, the tool will be raised to whichever Z value is the highest.

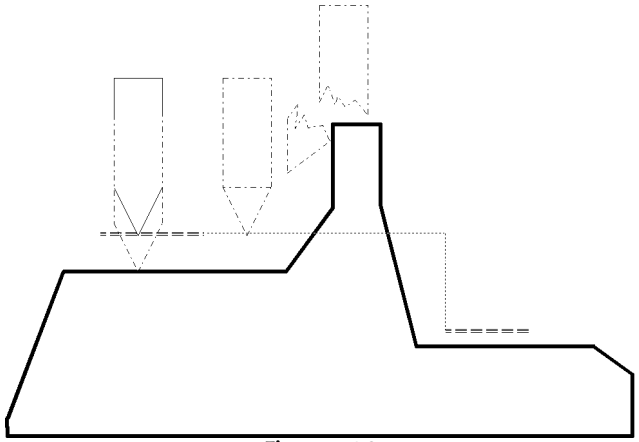


Figure 5-26

When there are obstacles between one line of text and the other, you can specify a second rapid plane to lift the tool to clear the obstacles.