Installing the Economy Digital Readout

Installing the economy digital readout requires the fabrication of several brackets. Making the brackets is straightforward, with tips given below.

Each scale is mounted on one end. The encoder is also mounted, providing a two-point mounting. The two-point mounting ensures that the slider does not bind when moving on the scale.

Parts Required

One 3-axis display unit

Two 12” scales

One 8” scale

½" x 1½" aluminum bar

0.060" thick aluminum sheet

5/8" square steel or aluminum bar

2½" x 5" steel sheet

Fabrication Tips

The encoder brackets are all made from thin metal (aluminum or steel). The thickness is not critical, but there are some considerations. If the encoder brackets are too thin, the screws that are supplied with the scales will go so far in that they will bear against the back of the scale and prevent the slider from moving. If you use thin material, you might need to use washers under the heads of the screws. If the brackets are too thick, you might need to counterbore for the heads of the screws so the screws will be long enough.

None of the encoder brackets fit flush with the surface on the mini mill that they mount to. Make spacers to fill the space between the bracket and the mini mill casting. The X-axis bracket might just need a washer or two. The others will need thicker spacers. Use 3/8” diameter rod with a 0.20 hole drilled axially through the center for the spacers. Cut and face to the required length.

Mounting the X-Axis Scale

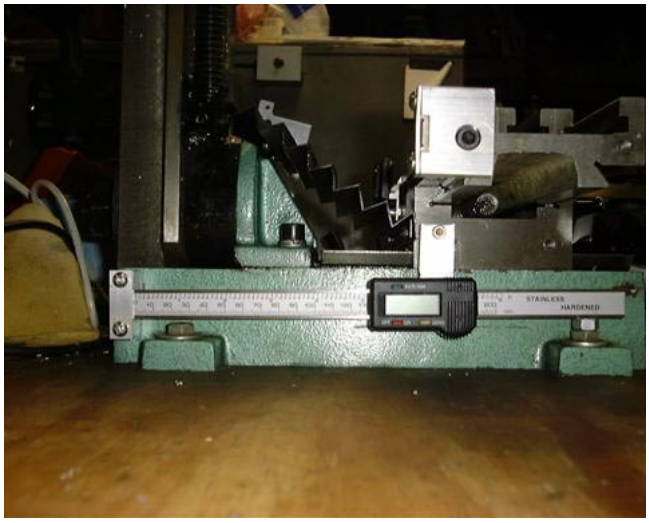
The X-axis scale bracket mounts on the left-rear corner of the mill table using the existing threaded hole. You can mount this bracket with or without the table end cap in place. You will need a different length socket head cap screw depending on whether the table end cap is used or not. The socket head cap screw is an M6 cap screw.

The X-axis encoder bracket mounts to the back of the saddle. Follow these steps to locate the mounting hole.

1. Mark a vertical line at the center of the back of the saddle.
2. Mount the X-axis encoder bracket on the slider.
3. Mount the scale in the X-axis scale bracket. The left end of the scale should be flush with the left side of the scale bracket.
4. Hold the scale horizontal so it is parallel with the top of the mill table.
5. Position the slider so the hole in the X-axis encoder bracket is centered on the vertical line.
6. Mark the center of the hole in the X-axis encoder bracket on the back of the saddle.
7. Remove the saddle from the mini mill
8. Drill and tap a #10-24 hole at the marked location.
9. Reassemble the mini mill.
10. Measure the space between the X-axis encoder bracket and the saddle.
11. Make a spacer to fill the space between the X-axis encoder bracket and the saddle. (A #10 washer or two might suffice.)
12. Assemble with an appropriate length #10-24 socket head cap screw.

Mounting the Y-Axis Scale

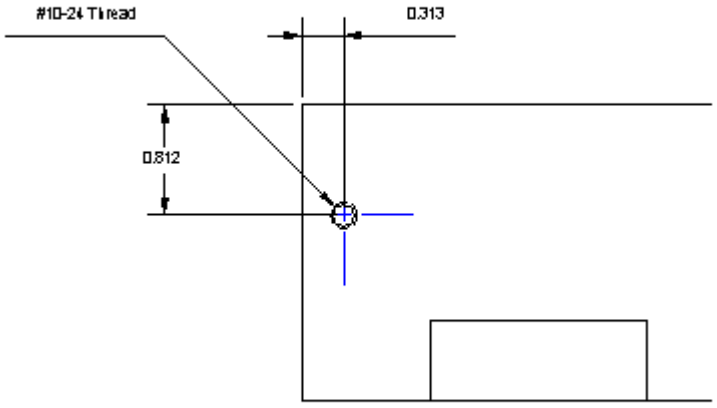
The Y-axis scale mounts along the left side of the base of the mini mill. The Encoder mounts to the saddle.



The Y-axis scale bracket must be cut at a 5° angle to match the draft angle of the cast base. There are several ways to cut this angle accurately enough for this application.

If you have a sine vise or other means of milling precise angles, then use it for this application.

Otherwise, you can use a bandsaw to cut the angle. Start with a piece of ½" x 1½" aluminum at least 2½" long. Create the bracket configuration on one end of the piece. Adjust the bandsaw to cut an accurate 5° angle (hint: don't count on the built-in scale; use a protractor to set the angle). Cut the bracket off the end of the bar.



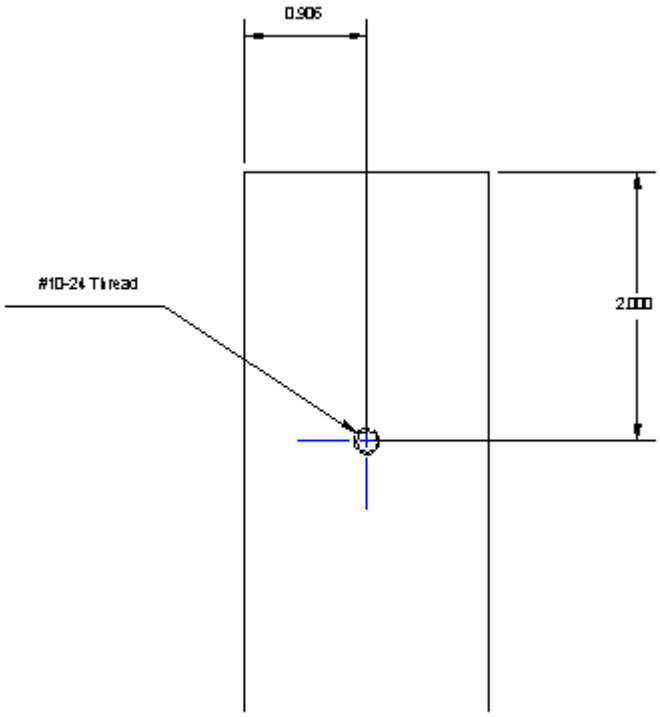
Drill and tap the mounting hole at the rear of the left side of the base casting as shown in the sketch above.

The Y-axis encoder bracket mounts to the back of the left side of the saddle. Follow these steps to locate the mounting hole.

1. Mount the Y-axis encoder bracket on the slider. The tab should stick up on the left side as you face the display on the slider.
2. Mount the scale in the Y-axis scale bracket. The back end of the scale should be flush with the back of the scale bracket.
3. Hold the scale horizontal so it is parallel with the surface the mini mill is mounted on.
4. Position the slider so the left edge of the Y-axis encoder bracket is flush with the back of the saddle.
5. Mark the center of the hole in the y-axis encoder bracket on the saddle.
6. Remove the saddle from the mini mill
7. Drill and tap a #10-24 hole at the marked location.
8. Reassemble the mini mill.
9. Measure the space between the y-axis encoder bracket and the saddle.
10. Make a spacer to fill the space between the y-axis encoder bracket and the saddle.
11. Assemble with an appropriate length #10-24 socket head cap screw.

Mounting the Z-Axis Scale

The Z-axis scale mounts on the right side of the column. The Z-axis encoder mounts to the side of the head assembly.



Drill and tap the mounting hole at the rear of the right side of the column as shown in the sketch above.

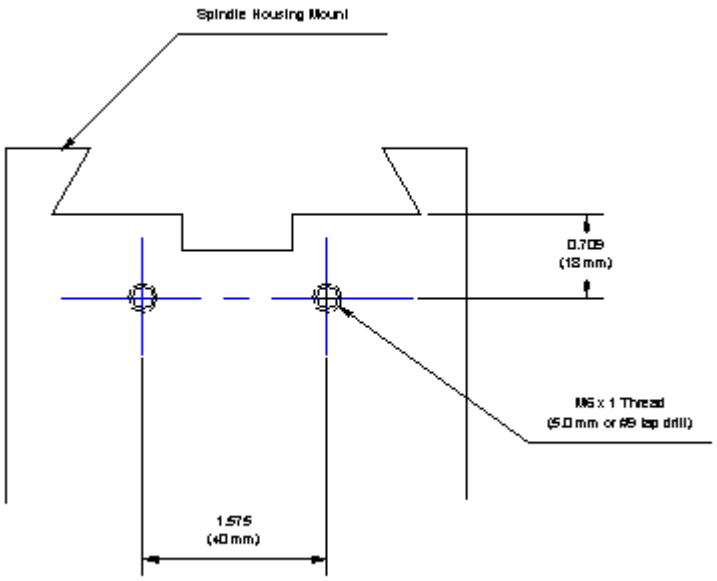
The Z-axis encoder bracket mounts to the right side of the spindle housing mount. Follow these steps to locate the mounting hole.

1. Mount the Z-axis scale bracket on the right side of the column.
2. Mount the Z-axis encoder bracket on the slider. The tab should stick up on the left side as you face the display on the slider.
3. Mount the scale in the Z-axis scale bracket. The top of the scale should be flush with the top of the scale bracket.
4. Hold the scale vertical so it is parallel with the column.

5. Position the slider so the tab is centered between the lower two gib-adjusting screws..
6. Mark the center of the hole in the Z-axis encoder bracket on the spindle housing mount.
7. Drill and tap a #10-24 hole at the marked location.
8. Measure the space between the Z-axis encoder bracket and the saddle.
9. Make a spacer to fill the space between the Z-axis encoder bracket and the saddle.
10. Assemble with an appropriate length #10-24 socket head cap screw.

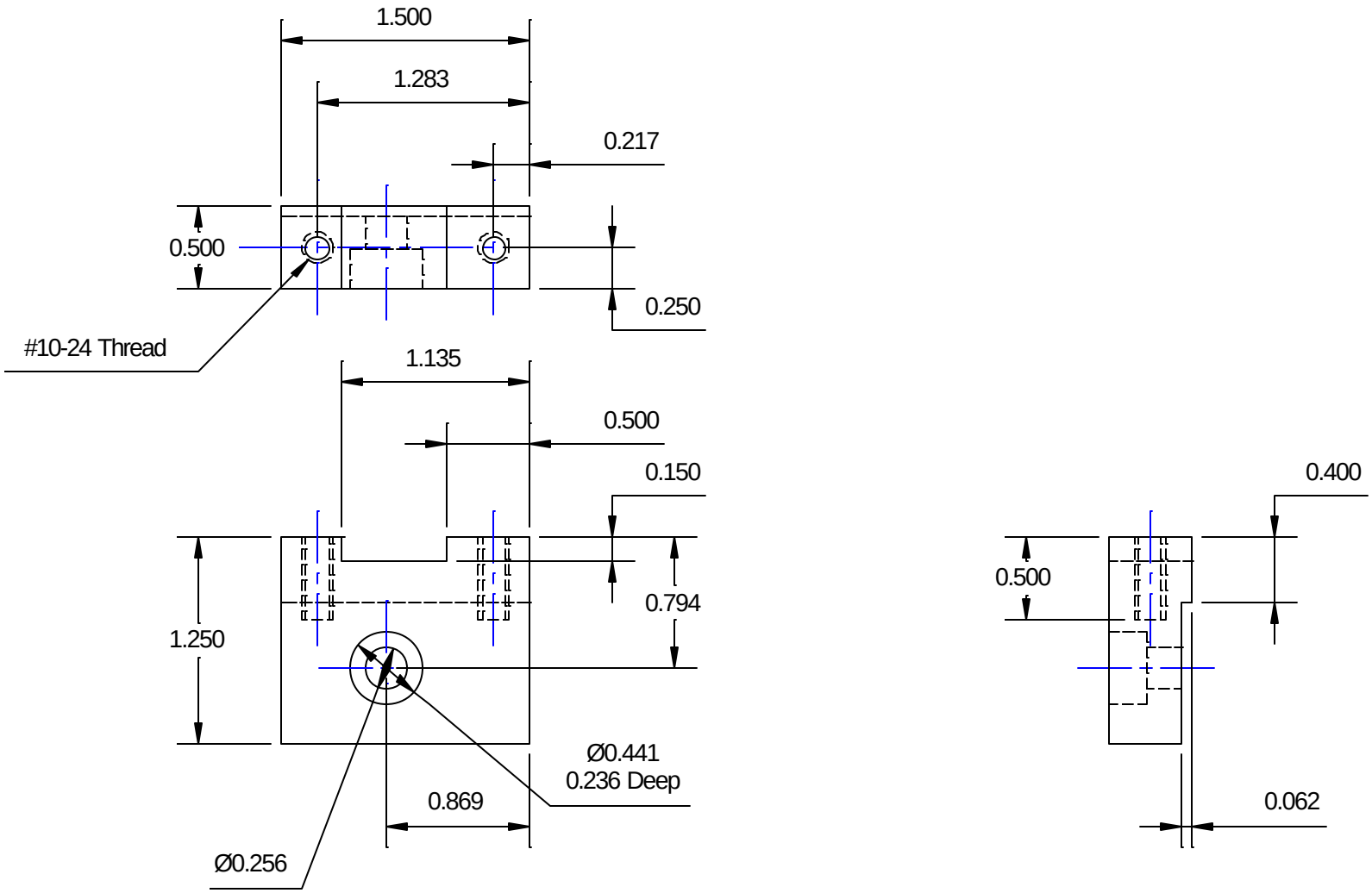
Mounting the Display Unit

The display unit bracket mounts on the top of the head assembly. If the mini mill is equipped with an air spring, the display unit bracket replaces the lower air spring mount.



If the mini mill does not have an air spring, drill two holes in the top of the spindle housing mount as shown in the sketch above. If you don't have an air spring, you also don't need the M10 tapped hole in the display unit bracket.

The thickness of the plate on the display unit bracket is not critical, but it must be made out of steel. The display unit mounts on the display unit bracket with magnets. Countersink the holes for the flat head cap screws through the plate and into the bar so that the assembly is flush.



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DRO Bracket X-Axis Scale

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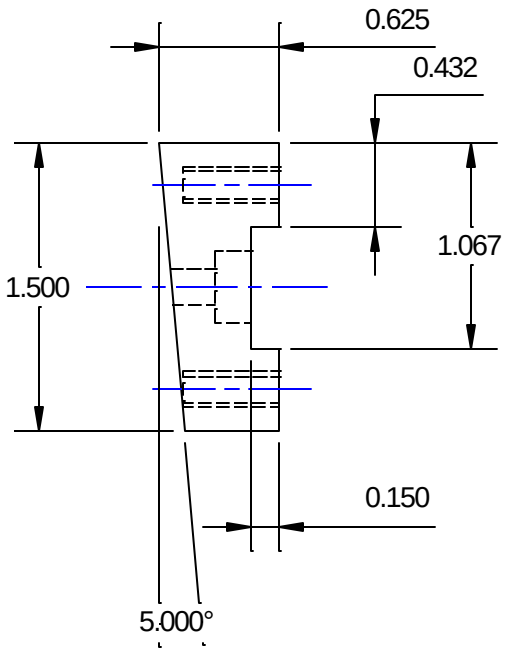

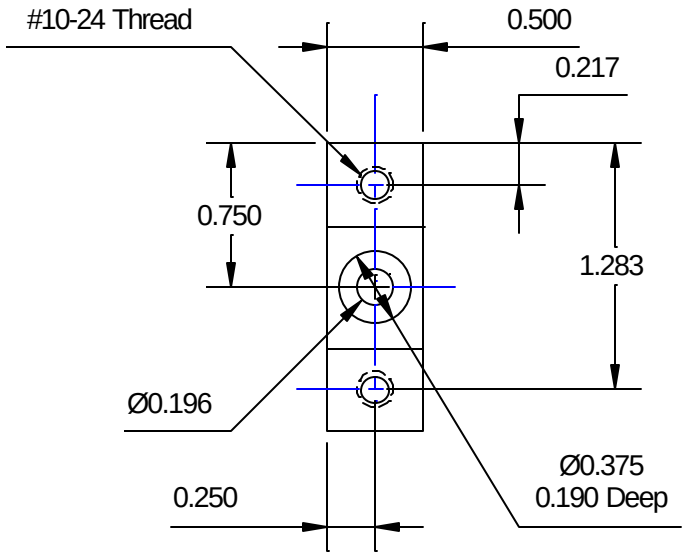

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DRO Bracket Y-Axis Scale

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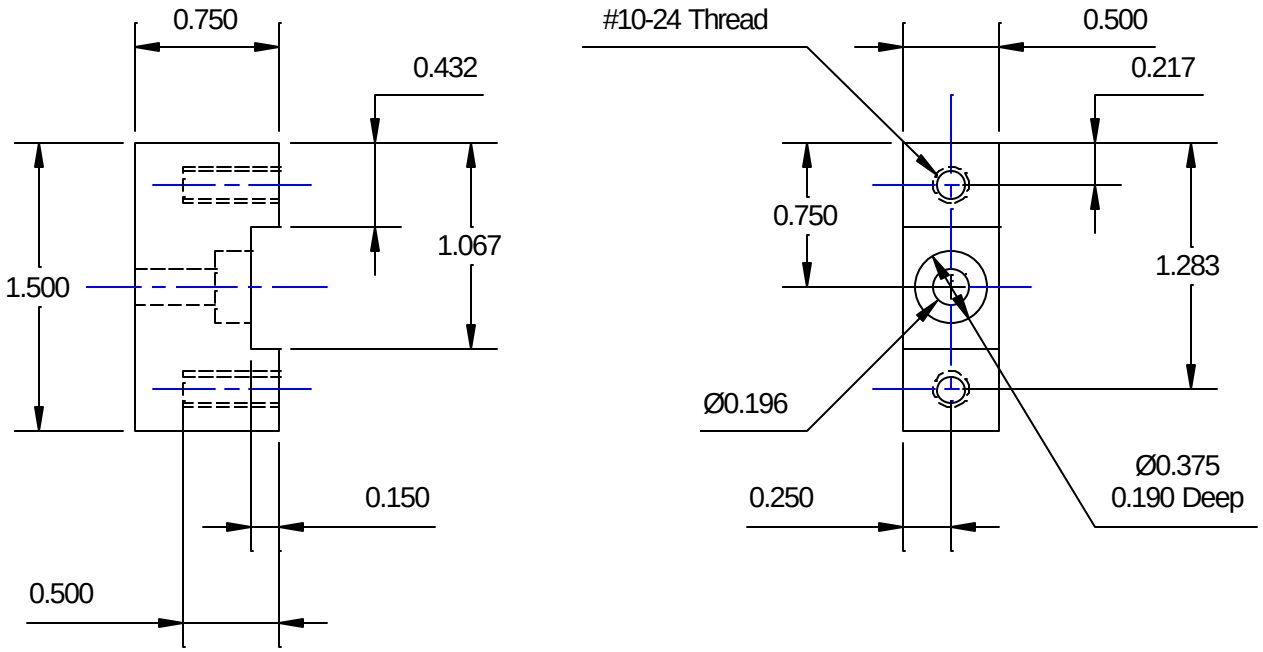

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DRO Bracket Z-Axis Scale

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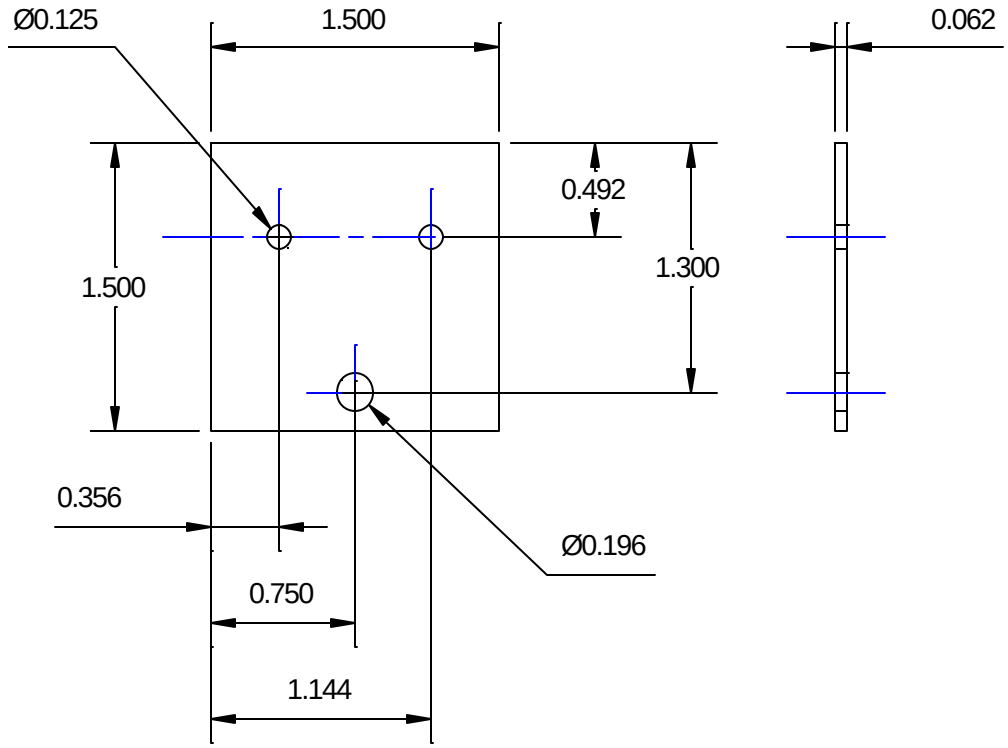

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DRO Bracket X-Axis Encoder

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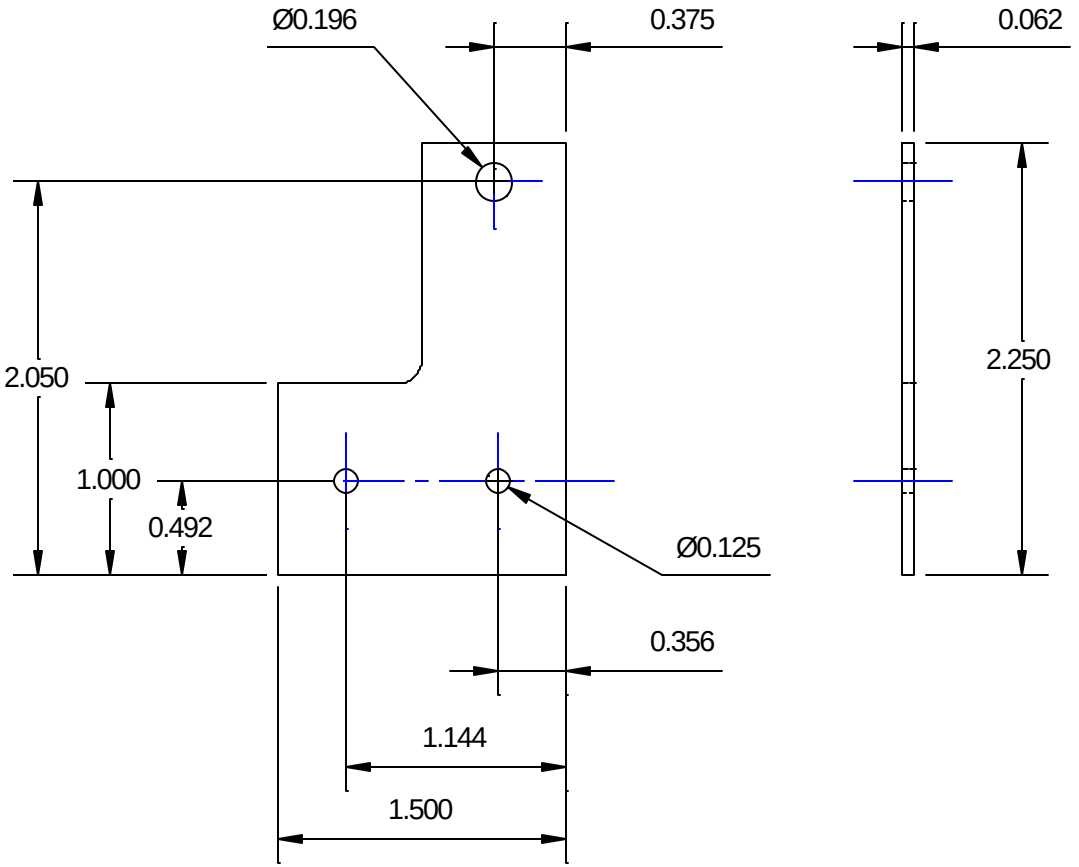

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DRO Bracket Y-Axis Encoder

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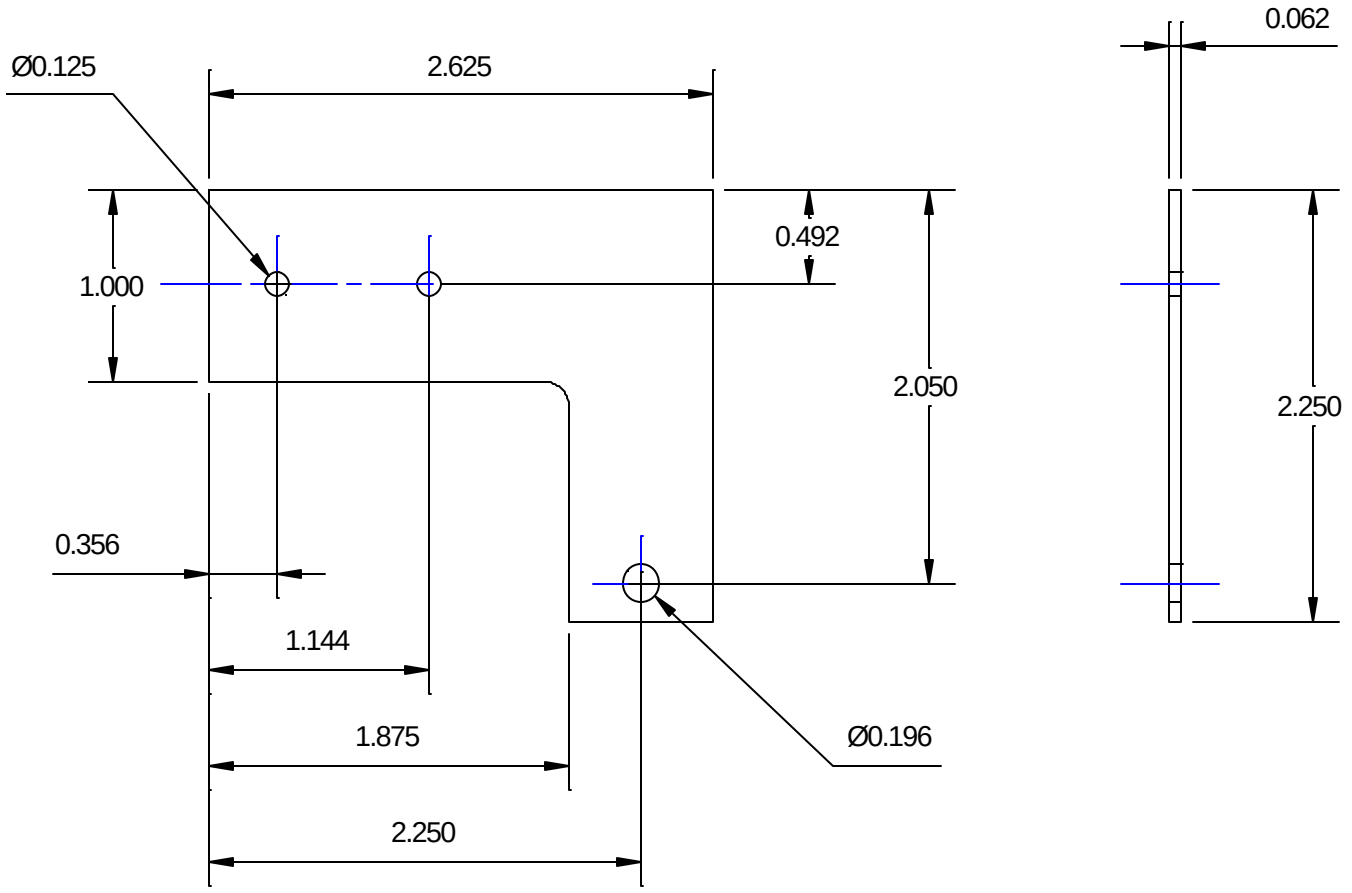

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DRO Bracket Z-Axis Encoder

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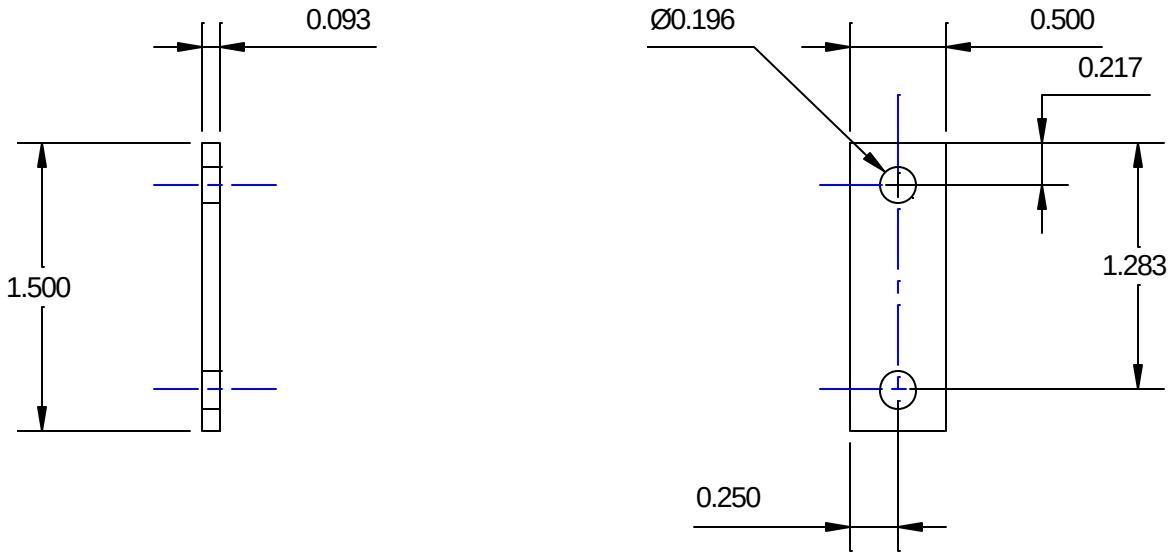

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DRO Retainer Scale

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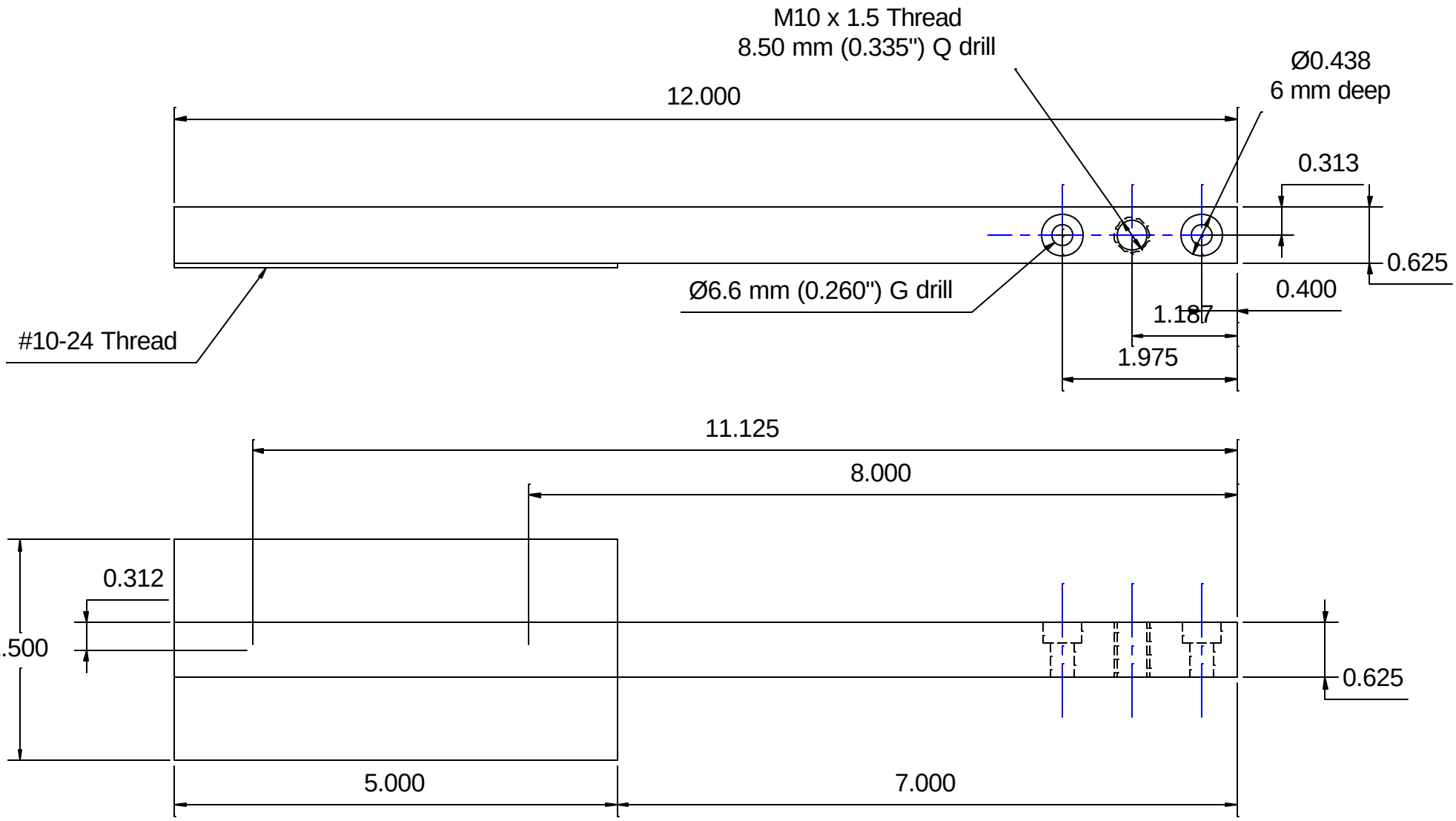

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DRO Mount Readout

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