X2 / Do-It-Yourself Universal Tachometer Kit

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Unmachined and NOT SOLDERED Kit

This is yours to build.

Build it to the instructions for the X2, Harbor Freight, Grizzly mini mill.

This kit can be used to create a spindle tach for virtually any machine if you so choose and plan it out.

You will need...

A Milling Machine
A Lathe is nice but not needed.

The following drills
15/32 inch
7/32 inch
3/8 inch
#36
#27

End Mills
10mm
1/4 inch

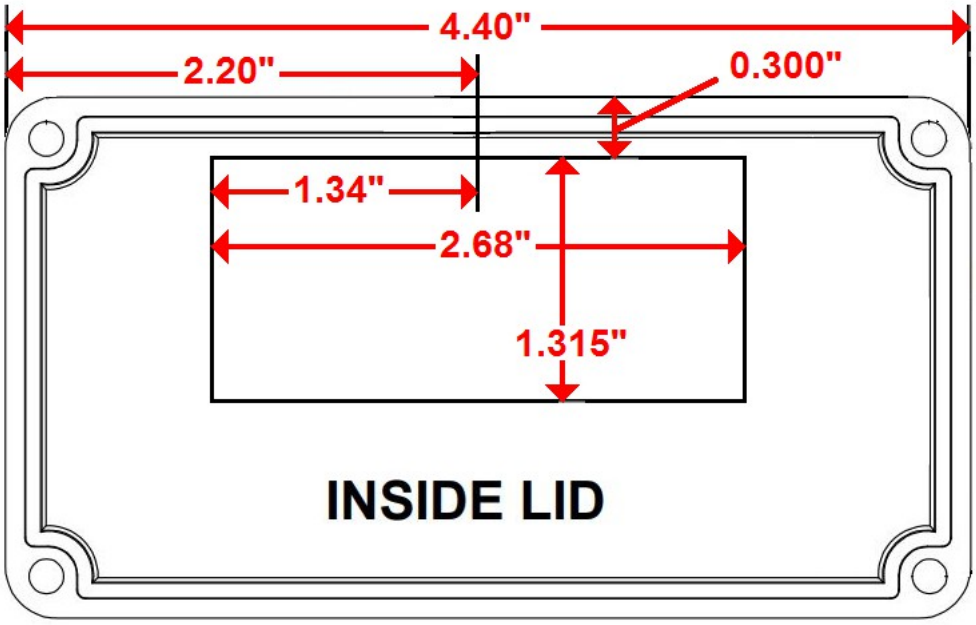
Tap
#6x32

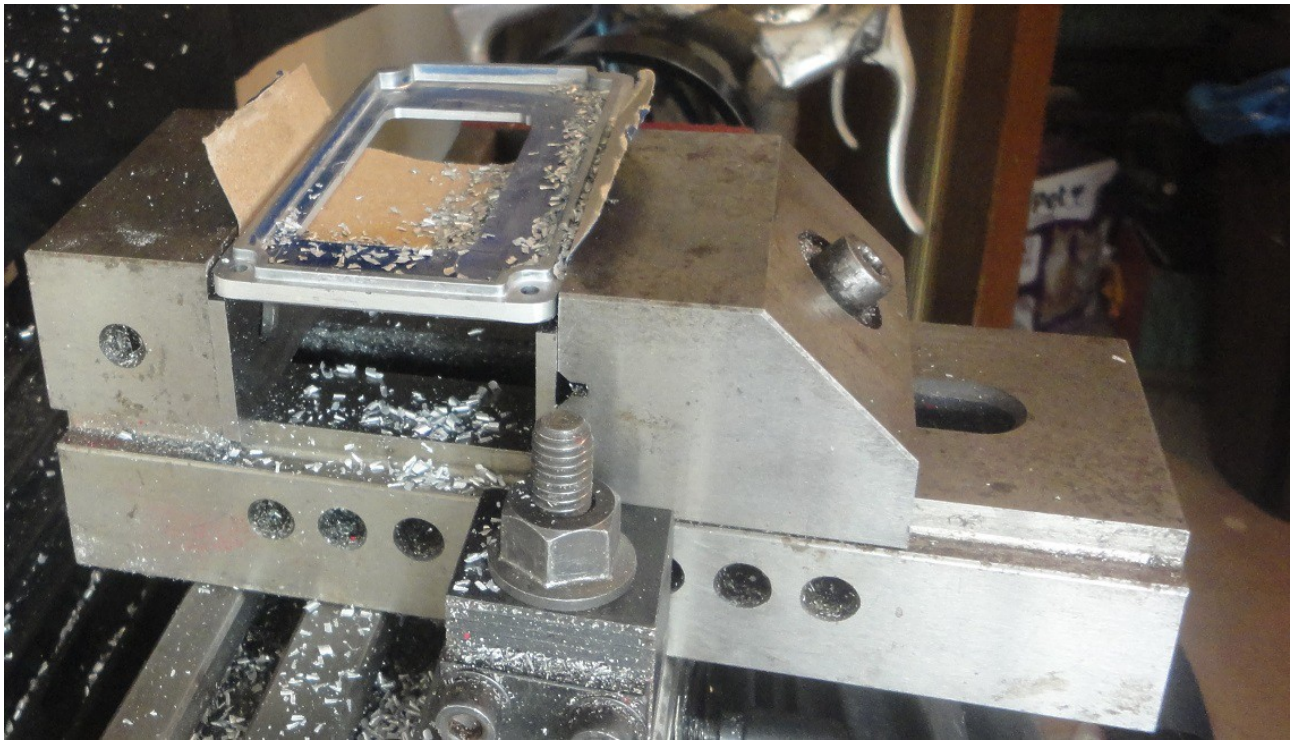
A good single cut flat file
A good single cut round file

Soldering Iron
Solder
Heat Shrink kit (Harbor Freight #67524)

Start

Do the layout on the inside of the top of the box.

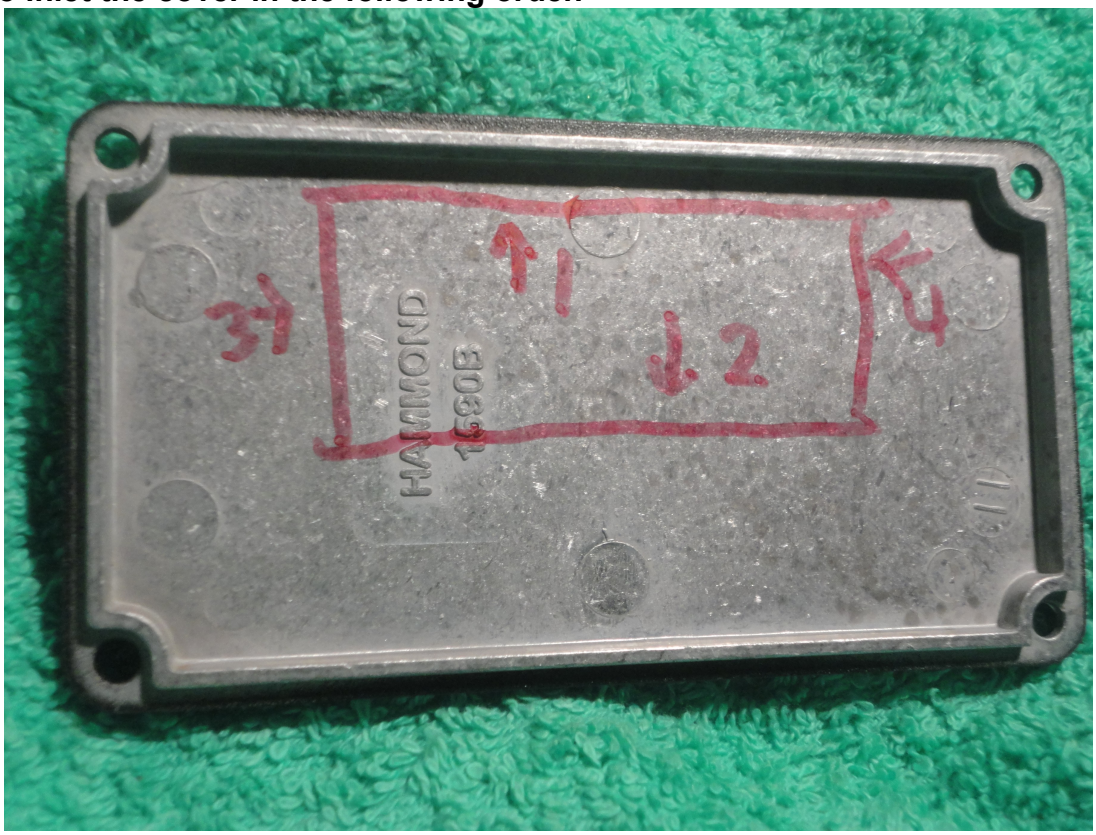




Now place the lid in your vise on a set of parallels with a piece of cardboard wrapped around it as shown to prevent damage and cut out the rectangle a bit undersize and sneak up on the finished size. This way you will get a nice fit.

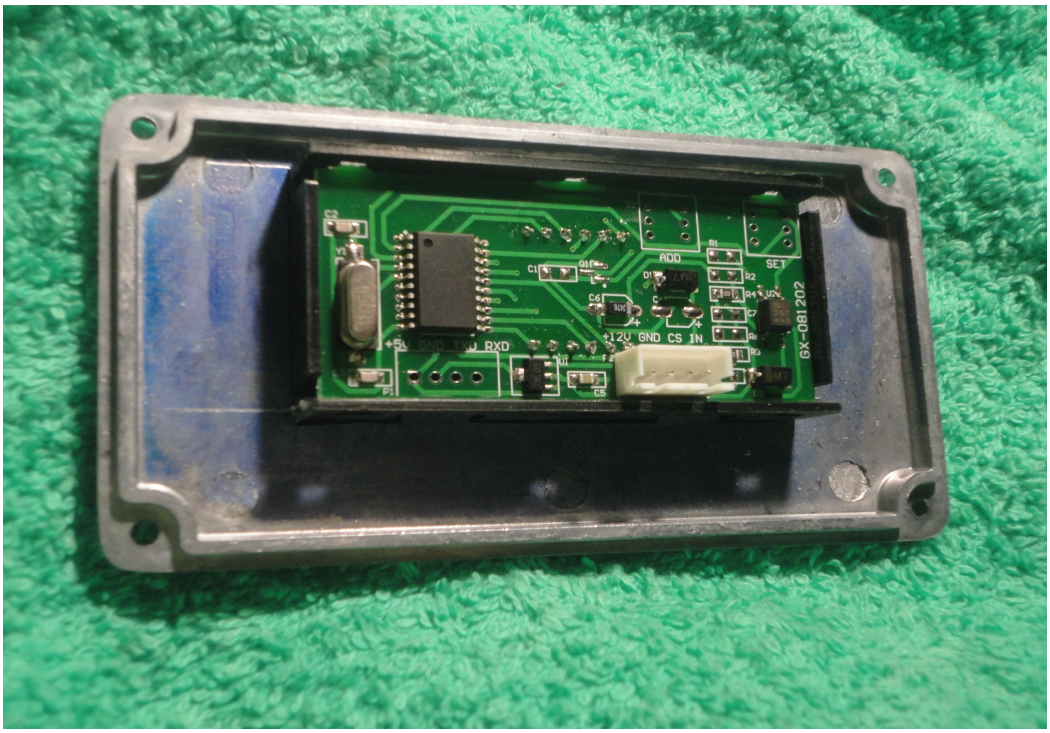
I like to use a 1/4 inch endmill to cut out the rectangle.

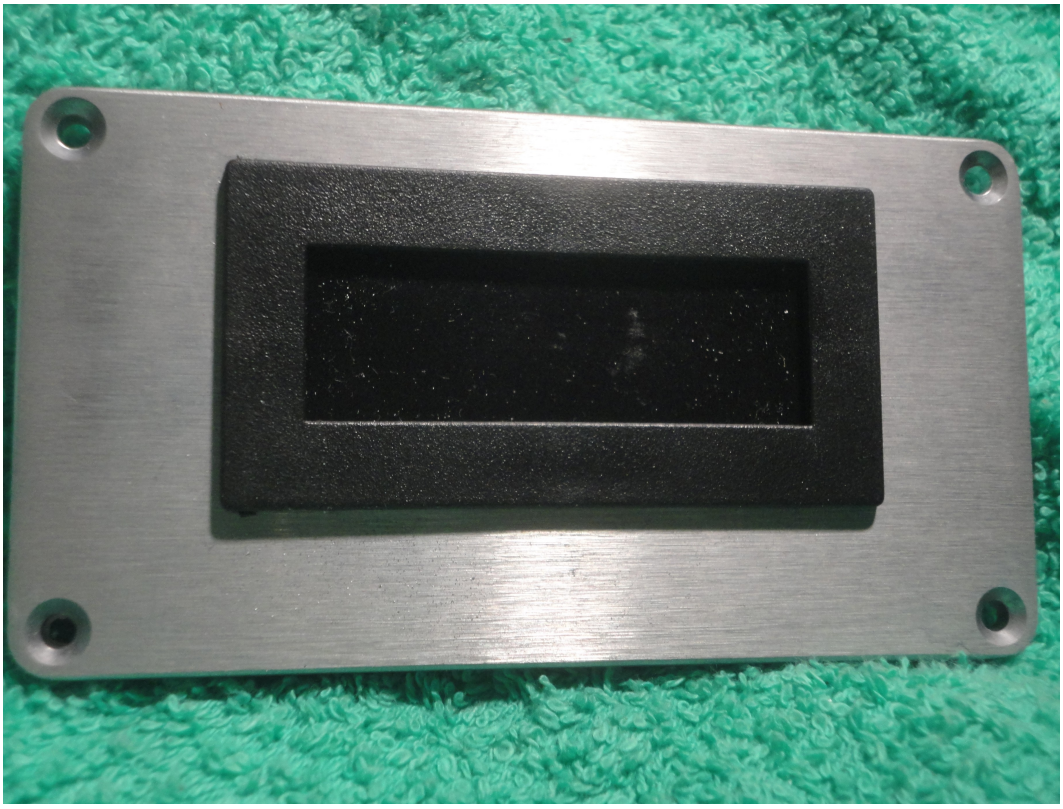
I like to inlet the cover in the following order.



Layout lines..

When you have the hole cut square up the corners with a file and insert the face into position.





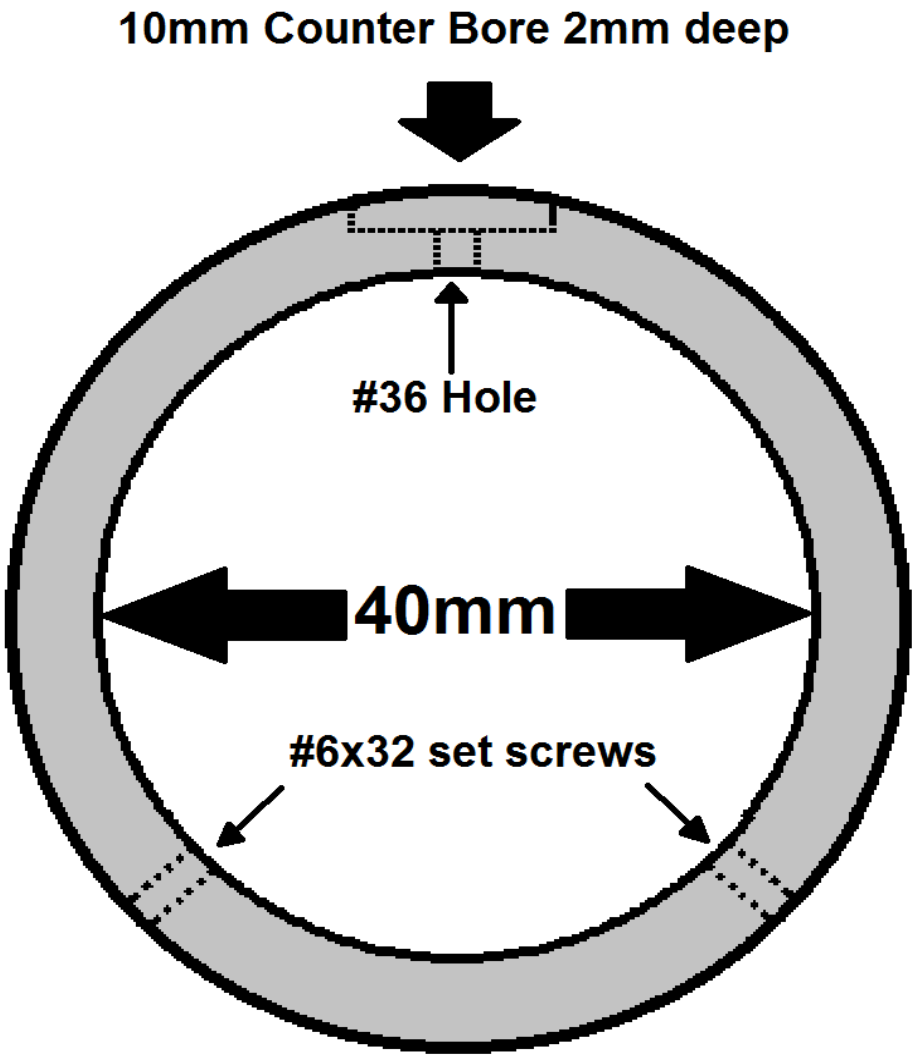
This part is now complete

The Sensor Ring

Take the section of aluminum tube, square it in the chuck and face the end.

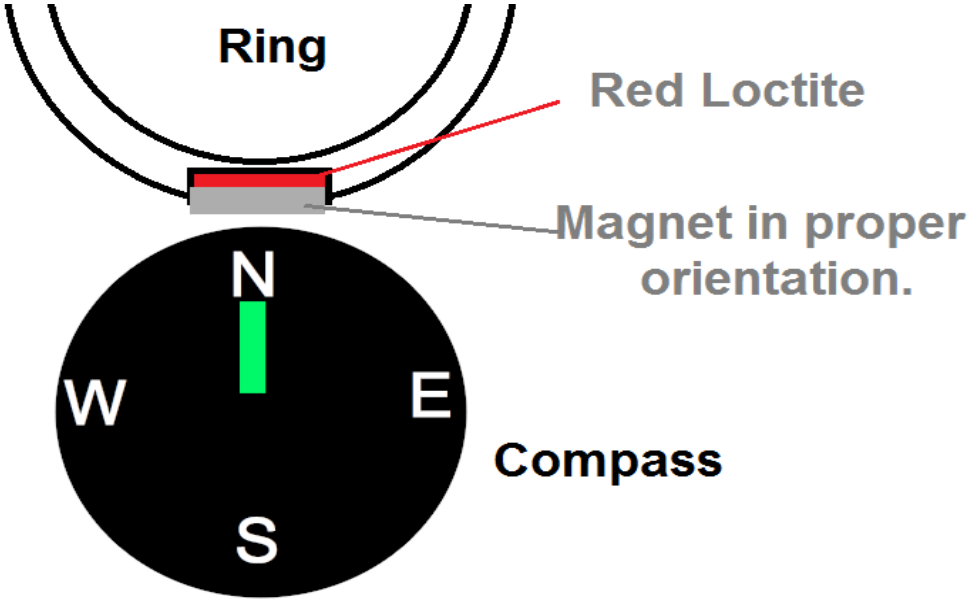
Turn it around and face the other end for a length of 20mm.

Bore the hole to 40mm. If you want you have the skill you may leave an extra 5 tenth on it for a snug fit. If you are "Joe Cool" with a lathe you can make it an interference fit and omit the set screws. (The mark of a pro!) Don't go too tight, one day you might be putting new bearings in that mill head.



Drill 3 holes with your #36 drill at 120 degree intervals, on the last hole do the 10mm couterbore 2mm deep. Note: You want that #36 hole behind that magnet should you put it in North side out. The proximity switch that reads the magnet only sees South Poles.

I include a compass in the kit so you can tell that you have the south pole out when you get ready to use RED loctite and permanently install the magnet. The compass should have the north pointing to the side of the magnet that trips the proxinity switch.



A picture of a finished ring.

I use a Scotchbrite pad for the satin finish.

This part is complete

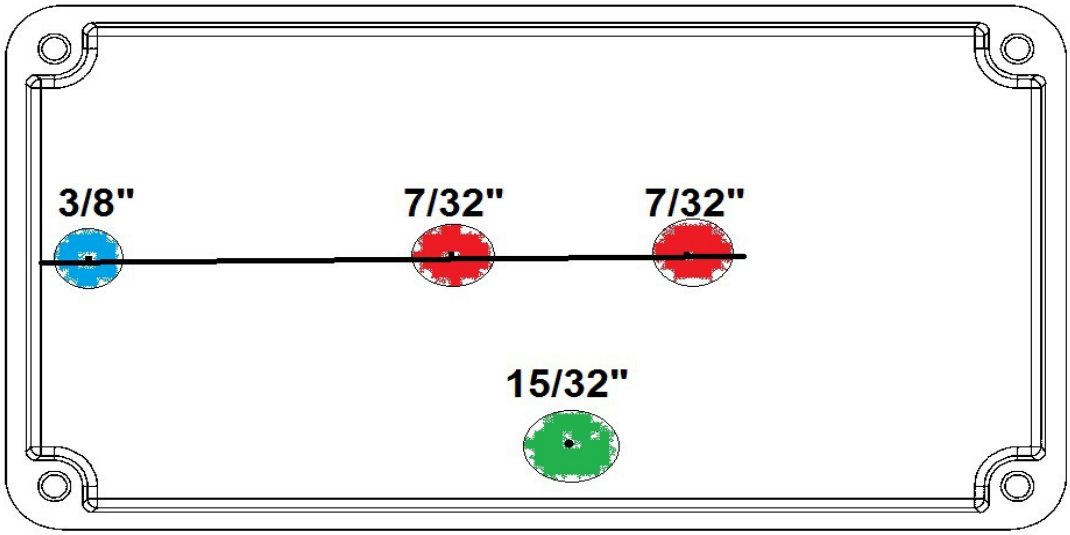
The Back Case

This is a cakewalk. No measuring. I centerpunched for all 4 holes for you to make it easy.

3 of the holes are on the same line on the X axis, once the Y axis is set lock it and drill all 3 holes on the same line for best results.

You can use a coaxial indicator or a center finder to set up to drill the holes.

Not all holes are the same size.



Link to Drilling video https://youtu.be/6rOkBdtbZ0A

Don't forget to put a piece of cardboard under your work piece to protect the paint.

Lining up a hole with a center fnder.

Hole locations are pre centerpunched with a jig.

Holes drilled

Disregard the large wiring hole on the left, we changed gromets, the new hole is smaller.

This part is complete.

Wiring the unit

Watch the video, a few times if need be and section by section during the build.

Wiring Video Link... https://youtu.be/zSHh4XRDRX4

Please refer to Tach Head Wiring video for proper assembly.

This is a map of the actual connections, it will look different in reality

Examine the wire colors and thier sources carefully.

Take the prroximity and cut the wire 7 inches from the switch.

Cut 1¼ inches of the outer insulation from the proximity switch wiring.

Strip all 6 the wires of both the proximity switch and Tach face plug back 3/9 of an inch. Do not shorten the wires of the tach plug. (One day you may need them.)

I will give you the wiring diagram and a link to a video that shows this part being assempled.

If you go by the colors and trace the wires you can't screw up.

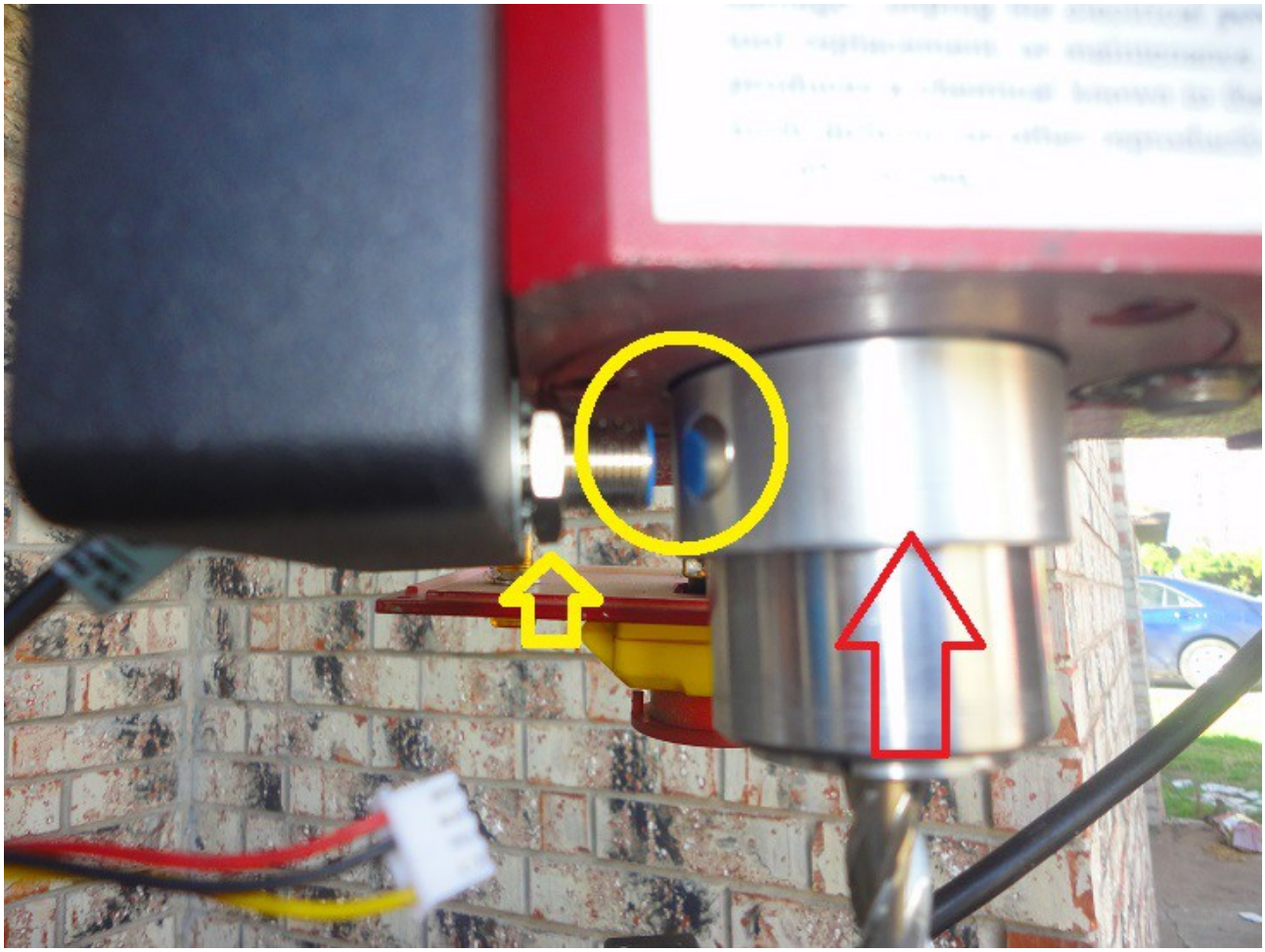
Watch the video, a few times if need be and section by section during the build.

This part is complete.

Assembling the Parts Prior to installing.

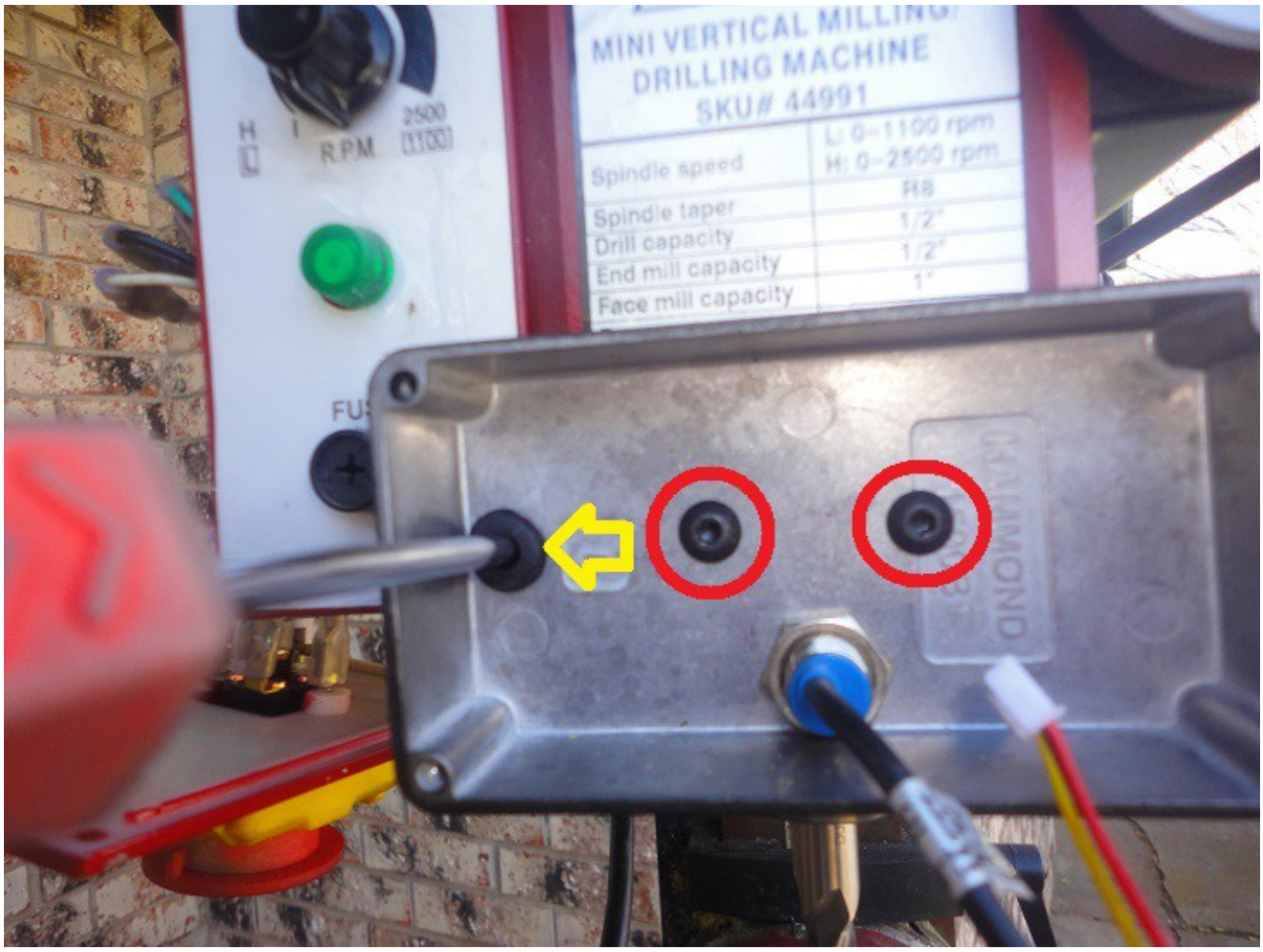
With the 2 cap screws mount the case back to the front of the mill head using the 2 threaded bolt holes that once held the plastic shield. (Yeah that thing you threw away during the first hour of runnug the mill. That is why I included screws and not a pair of washers.)

Take the proximity switch and remove 1 nut an 2 wahers. Adjust the remaining nut so you get about 1mm clearence between the switch and the ring. 2Mm is the limit on clearence. Install one waher on the outside of the case with a nut. If you drilled the case right a washer will not fit inside, the nut should have the bottom side captured against the case side. Do not over tighten the nut.



There is one hole left that you drilled in to the case that is not yet used, the rubber gromet goes in that hole for the wirs to pass through. Yoy will need to drill a coresponding hole in the switch box centered on that hole.

I use a philips screwdiver to mark the hole. When drilling the hole in the switch box make sure you don't drill in to ant wires.



At this point you have the tach parts pretty much as we ship them for installation on the machine.

I hope you like the clean and simple ellegance of this unit. I worked hard to produce a unit that installed fairly easy and made the best use of the fewest parts.

My father was an electronics engineer on the Apollo project and taught me "KISS" meaning Keep It Simple Stupid to remind me that others may have to look at it one day. I hope I have kept to that line of thinking with this unit. Believe me I could have taken this to wonderous new levels of complexity. I will reserve that for the power drawbar.

Installation Instructions

They are online in HTML format (webpage).

http://www.oncnc.com/tachinst/