

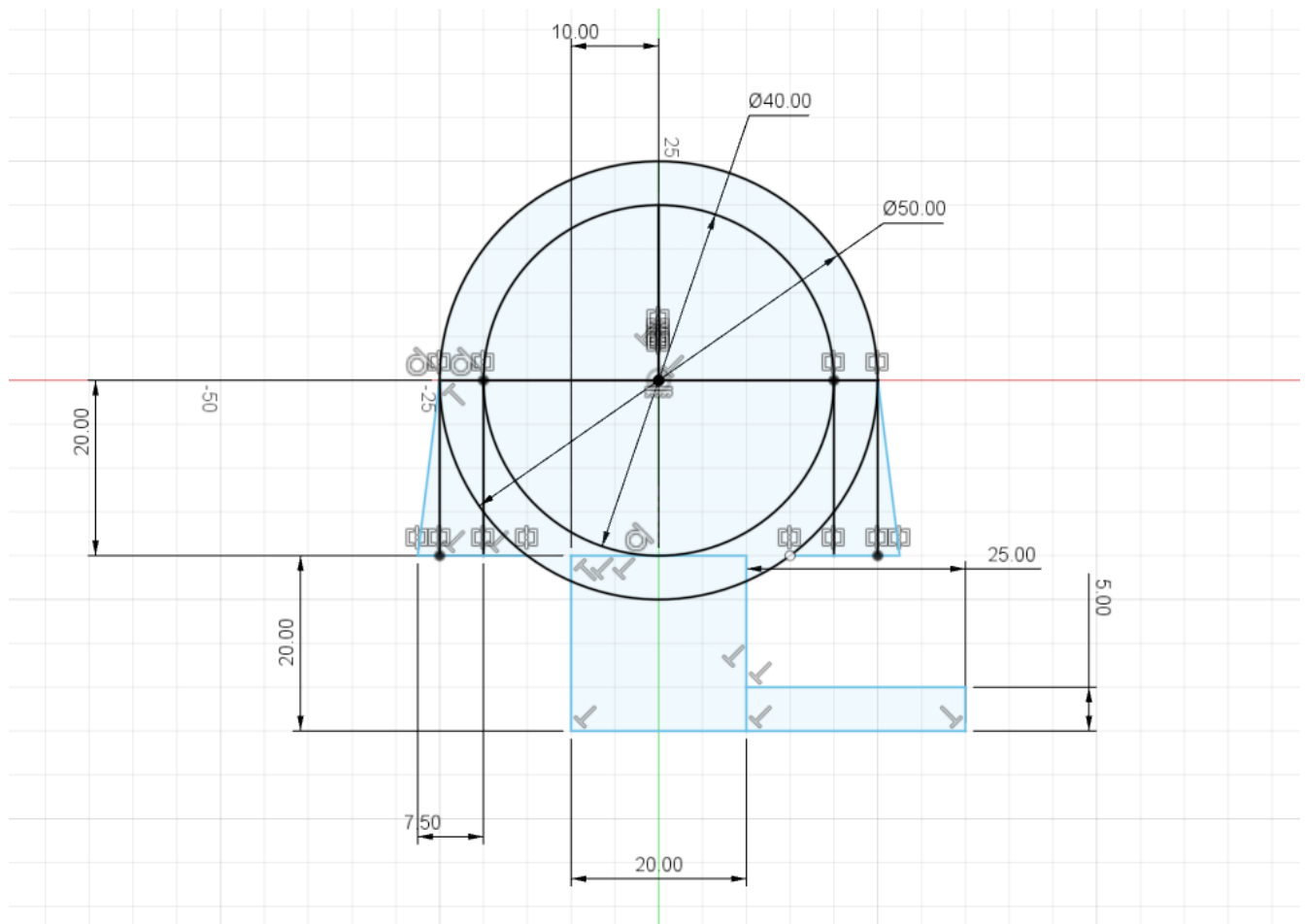
Pneumatic Air Reservoir Clamps

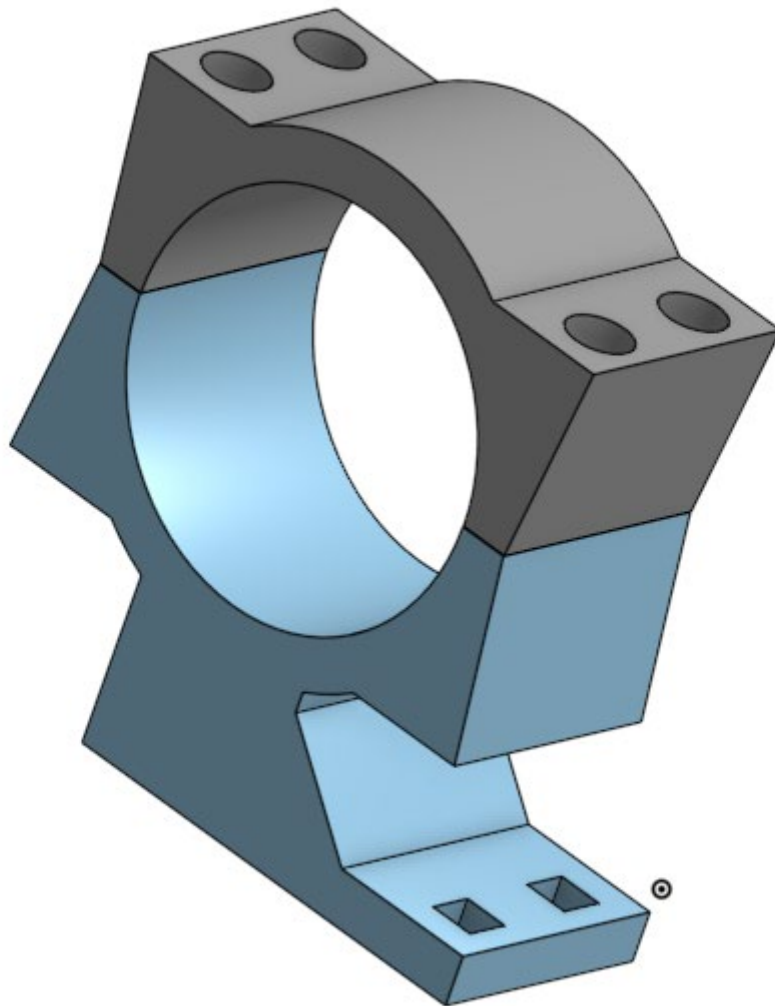
As a robotics member there are some things that Vex needs to make a little simpler. When I was installing the pneumatics system on our robot I noticed a few problems. Since the pneumatic kits are sourced from 3rd party sellers and sold on Vex's website, Vex didn't really take the time to consider how we are going to mount them to our robot. Now the cylinders are very self explanatory but the actuators and the air reservoir are the two main concerns. The only way that we have to mount these two items are just zip ties. That can be alright but when you want to mount them in specific places a zip tie sometimes doesn't work.

With this pneumatic air reservoir clamping system you can mount them anywhere you please. To mount them to the medal you use your standard Vex nylon nut and bolt. To clamp the two pieces together you will need four M3x20mm bolts and four M3 nuts to go with that. You might be asking why I chose to go with M3 instead of the Vex nuts and bolts. The answer is simple, Space. If I were to use the standard Vex nuts and bolts, this part would be way bulkier than it is right now.

This is a very durable part that I designed so that anyone can 3d print this without supports. Now I know you can't use this if it is 3d printed but I still wanted to leave that option open. I am hoping that not only Vex will make this an injection molded part that people can buy off of their website but that they also let people 3d print this part even if they have to buy the files to print it.

Now lets go through what it took to design this part. I used Fusion 360 to draw up this part. I took the OD of the air reservoir which turned out to be 40 mm for me. I drew a circle of 40 mm then another one of 50 mm to give me a 5mm wall. I wanted a 90 degree mounting point off of the bottom of this clamp so I drew a box coming off the bottom of the box then another one off of that box creating a 90 degree. Now that I had the basic shape down I needed a way of clamping the two parts down. I decided to use the 5mm walls to my advantage by making a hole through them to accommodate a M3 screw. For ease of use I made a hexagon pattern in the back so that the M3 nut would be seated in the part. Over all it was a very simple but practical design.





Designing this part I learned the different ways to trouble shoot problems that might occur. I also learned different measuring techniques that can help get a more accurate measure. Designing things on Fusion 360 will significantly help me in the future. How you might ask! Since technology has evolved engineering is based off of 3d cad software to help develop prototypes that can lead into consumer or industrial products. With that being said, Fusion 360 is what some of the real engineers use to create prototypes. Starting early on cad software will only help you when you get into college or

even get into a job that uses 3d cad software. Also, being able to design things will help you get a better understanding of the processes that it takes to make a final product. It helps you understand that not always the first design is the final design.

As I said earlier my goal to designing this part is to make it easier to mount the pneumatic air reservoir to our robot. Even though zip ties work, they don't work well enough for all of us. I see zip ties as a temporary solution to this problem and these air reservoir clamps as the next step to making a better mounting solution for the air reservoirs. They have been tested and used in practicing so I can say that they are up to the standards for Vex V5 competitions. Even if I don't win I hope that vex takes into consideration these clamps and makes some available for purchase on their website. Thank you for taking time to look over and read this paper!

Sincerely,

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