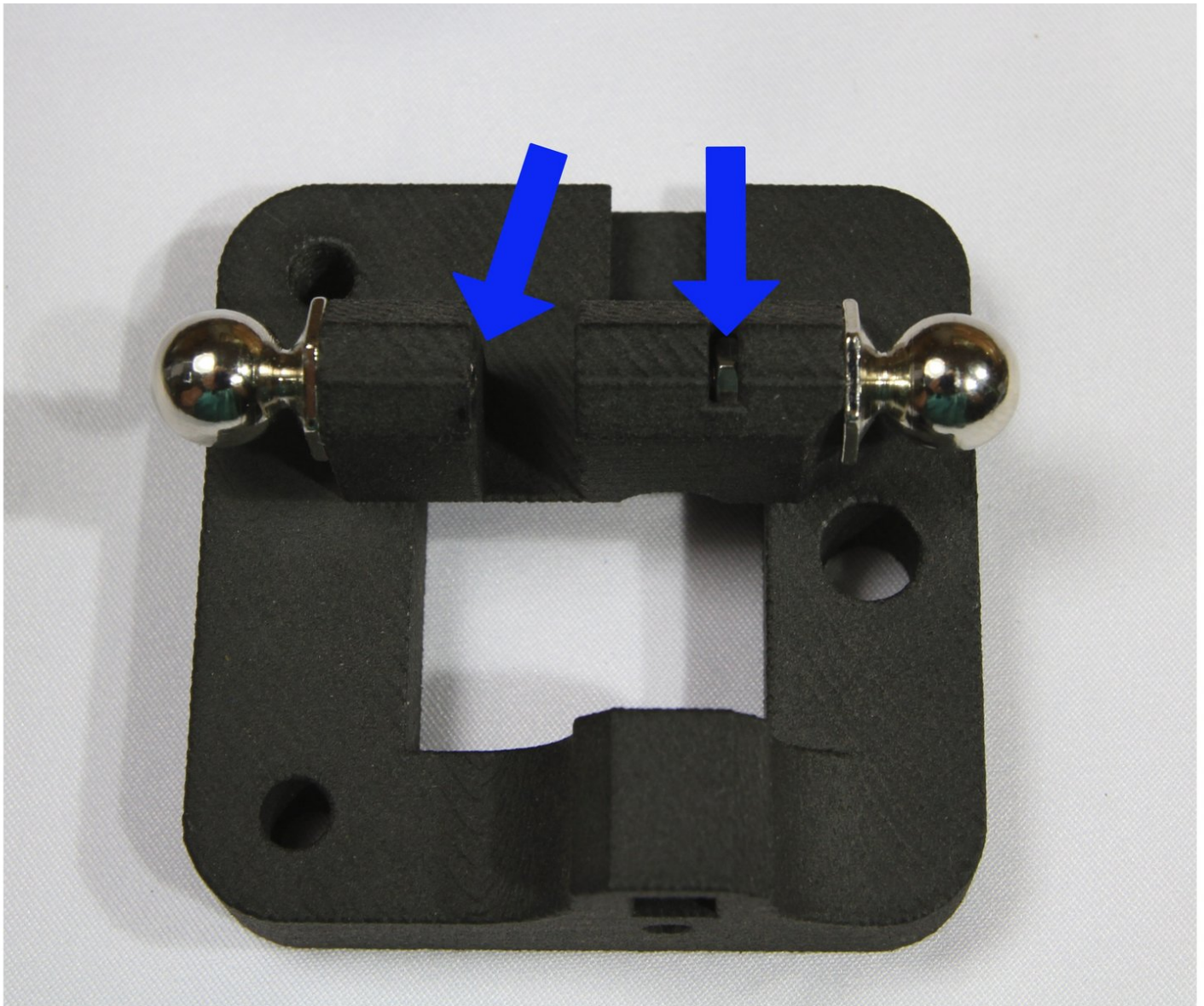


UltiBots

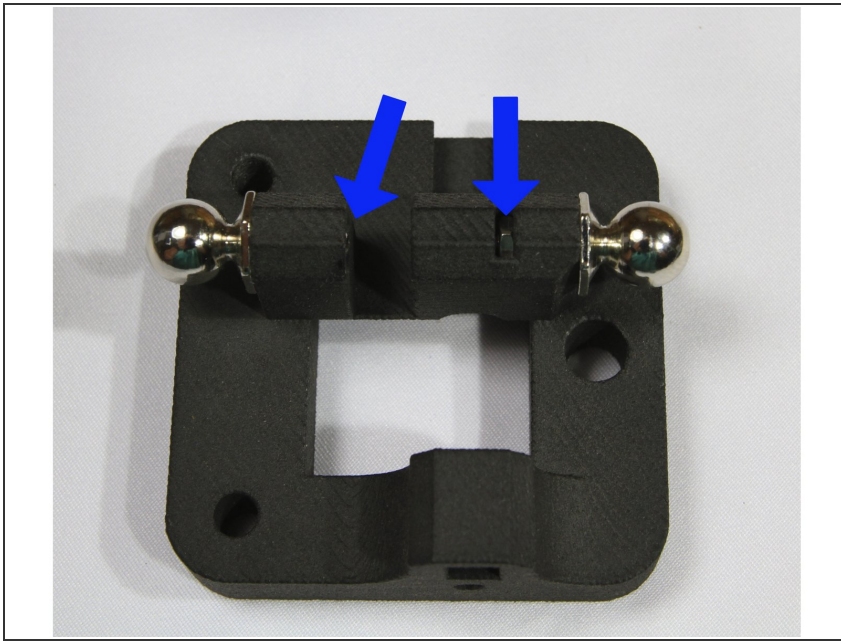
DRAFT... D300VS-PLUS Ball Cup Adjustable Carriage Assembly

Assembly guide for the precision ball cup carriages included with the D300VS+ printer.

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Step 1 — Ball Stud Assembly



- Install two *ball studs* using two *M3 Jam Nuts* in each of the three *carriages* as shown.

Step 2 — Build the Wheels



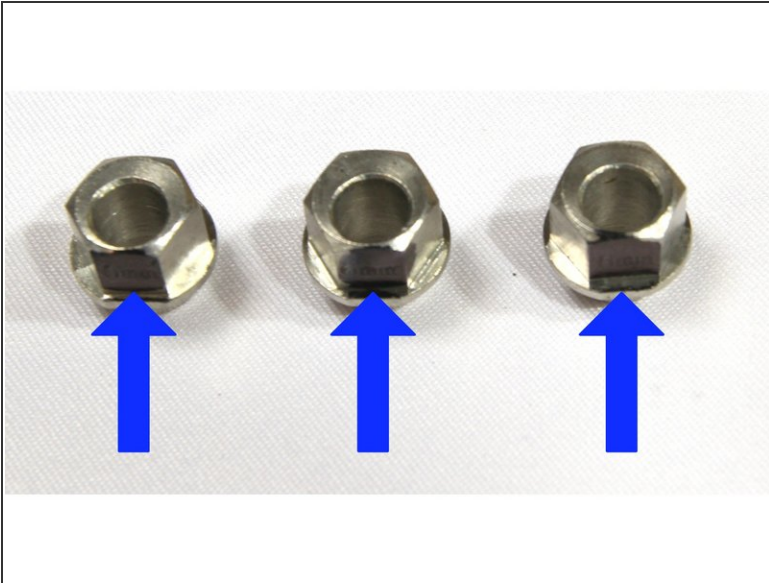
 Repeat these steps to build all 9 wheels.

- Locate the individual bagged parts for the wheels. Each contains 1 wheel, 2 bearings, 2 washers, and 1 lock nut.
- On a flat surface, press one of the bearings into the face of the wheel until it is flush. (photo 1)
- Turn over the wheel. Drop a washer into the center of the wheel aligned with the center hole. (photo 2)
- Press the second bearing into the face of the wheel until it is flush. (photo 3)
- Set aside the completed wheel and lock nut for later steps. The second washer is not used.

 **Be sure to place a washer between the two bearings.**

 The washer may fall out of alignment with the center hole. This is expected.

Step 3 — Eccentrics and Axles



- Locate the three eccentric spacers. Mark the surface closest to the offset hole with a black marker as shown in the first photo. It may also already have text on it.
- Press one of the eccentric spacers into the back side of the carriage in the side with the single hole. The black marked surface should face out as shown in the photo.
- Insert three M5x35mm axels into each *carriage* as shown in the second photo.
- Add one short *3mm spacer* on the *axle* with the *eccentric spacer*. Refer to the second photo.
- Add one long *9 mm spacer* to each of the other two *axles*.
- Repeat installing the *eccentrics*, *axles* and *spacers* on the other two *carriages*.

Step 4 — Installing the Wheels



- Add three wheels and lock nuts from step 2.
- ⓘ If the washer between the bearings moves off center and you can't get the axle through, just use a pen tip or small screwdriver to push it back in place.
- Tighten the nut with an 8mm wrench and 3mm Allen wrench.
- ⓘ Make sure the wheel can spin without being loose or so tight that the bearings feel like they are grinding.
- ☑ Confirm the black mark on the offset spacer is correctly positioned after you tighten the lock nut.
- Repeat for the other 2 carriages.

Step 5 — Installing the Belt Tensioner



- Insert an *M3 nut* in the three *belt tensioners* as shown in the first photo.
 - ❗ The nut should be oriented away from the top of the *carriage*. The first photo shows the correct orientation.
- Slide the *tensioner* into the dovetail slot at the top of the *carriage*.
- Insert an *M3x20 SHCS* into the hole between the *ball studs*. Use an Allen wrench to start the screw into the captive nut in the *tensioner*. Only thread on one or two turns.
- Complete assembly of all three *carriages* as shown in the third photo.