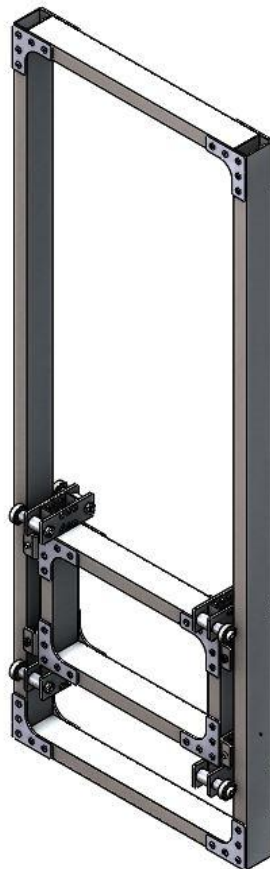




User Guide

2x1 Single Stage HD Elevator Bearing and Structure Kit

(am-3844a)



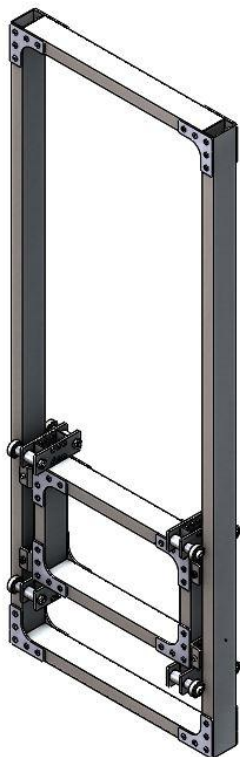
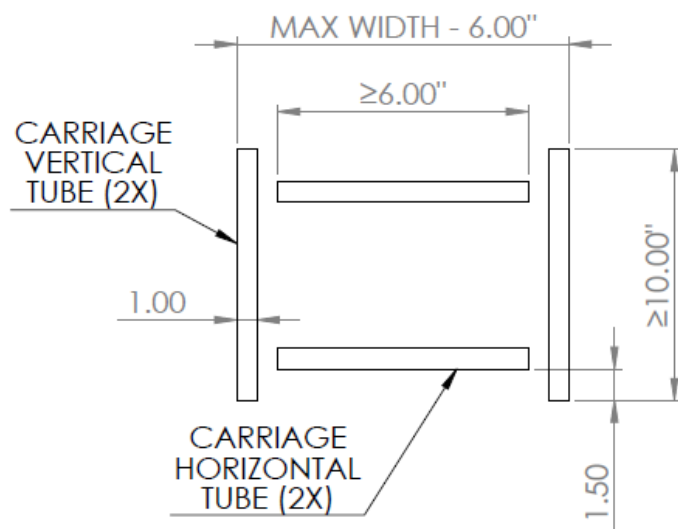
BOM & Tools

| Part Number | Description | Quantity |
|-------------|---|----------|
| am-0209 | 1614Z Bearing | 8 |
| am-0602 | Axle Tube, RD Brass, .192 x .250 x 2.14 | 4 |
| am-1027 | 1/4" Washer | 8 |
| am-1042 | 10-32 Nylock Nut | 4 |
| am-1226 | 3/16 Steel Rivet, 1/8-1/4 Grip | 128 |
| am-1394 | 3/8-16 Nylock Jam Nut | 8 |
| am-1397 | 10-32 x 2750 SHCS | 4 |
| am-1449 | 13RS075051 Spacer | 8 |
| am-1450 | Spacer, 3/4 OD x .382 ID x 1", Aluminum | 8 |
| am-1507 | Spacer, 5/8 OD x .382 ID x 11/16, Aluminum | 8 |
| am-1508 | 3/8-16 x 2.75" Button Head Cap Screw | 8 |
| am-3214-6 | Rectangular Tubing, 6ft, 2" x 1" with 0.062" wall | 4 |
| am-3793a | Small Bearing Block Plate HD | 4 |
| am-3794a | Large Bearing Block Plate HD | 4 |
| am-3860 | 90 Degree Gusset | 16 |

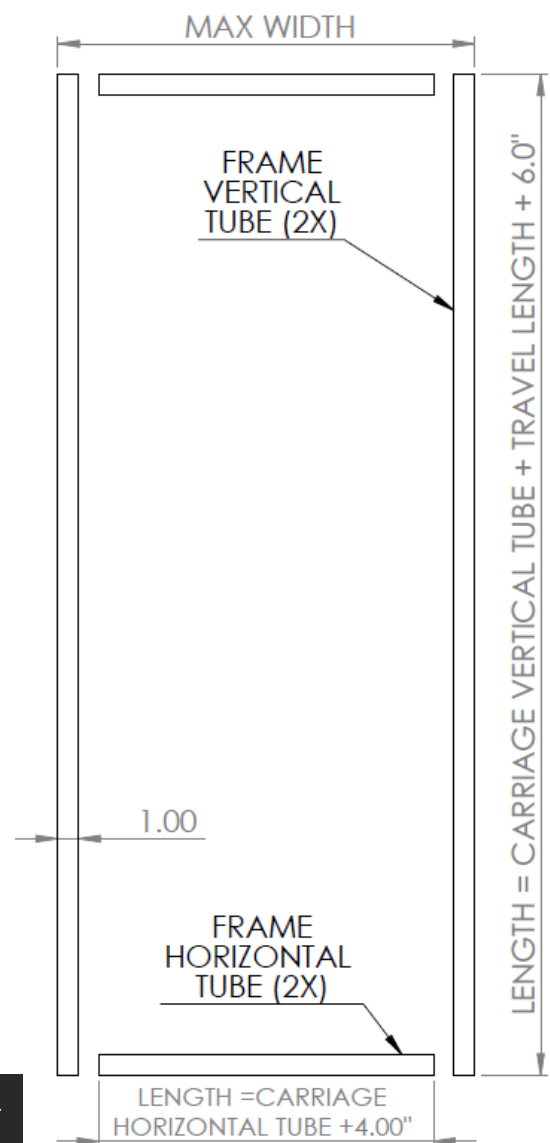
| Tools Needed | Part Number |
|---------------------------------------|-------------|
| Cold Saw (preferred) or Band/Hack Saw | |
| 12ft or longer Tape Measure | |
| Bench Vise | |
| 3" C-Clamps, Multiple | |
| Cordless Drill | |
| #9 Drill Bit | |
| Rivet Gun | |
| 36" Bar Clamps, Multiple | |
| Try Square | |
| 5/32" Allen Wrench | am-2751 |
| 3/8" Wrench | am-2745 |
| 9/16" Wrench | am-2746 |
| 7/32" Allen Wrench | |

Tube Cutting Guide

Note: The following cutting diagrams are for a single stage elevator system. This guide is written with minimum required dimensions, as this elevator bearing system was designed to adapt to many different size needs and constraints of *FIRST* Robotics Competition teams. **Before cutting tubes, you must determine your desired length of travel and desired MAX width of your elevator.** The dimensions below are the minimum required lengths for each tube, and also notes the important relationship between the length of the Carriage Horizontal Tubes and the length of the Frame Horizontal Tubes.

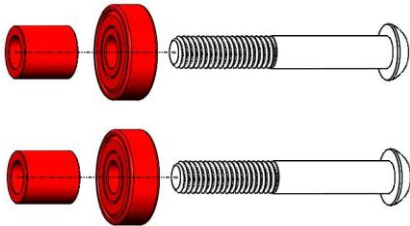


NOTE: The ends of each HORIZONTAL tube MUST be cut square.

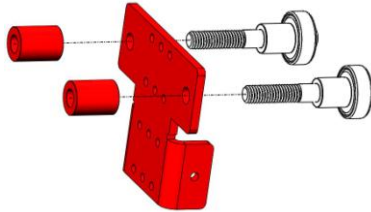


Corner Bearing Assembly

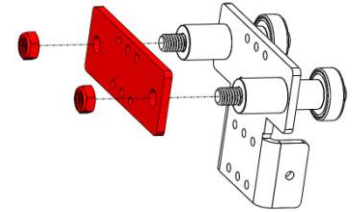
Step 1: Slide one 1614ZZ Bearing (am-0209) and one 11/16" long Aluminum Spacer (am-1507) onto two 3/8"x 2.75" BHCS (am-1508).



Step 2: Slide one Large Bearing Plate (am-3794a) and two 1" Long Aluminum Spacers (am-1450) onto the two 3/8" x 2.75" BHCS.



Step 3: Slide one Small Bearing Plate (am-3793a) onto the 3/8" screws, and secure with 3/8-16 Nylock Jam Nuts (am-1394)

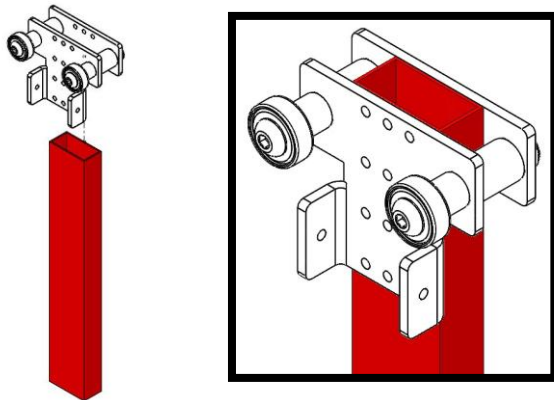


NOTE: Only tighten the bolts until they are snug. Do not over-tighten.

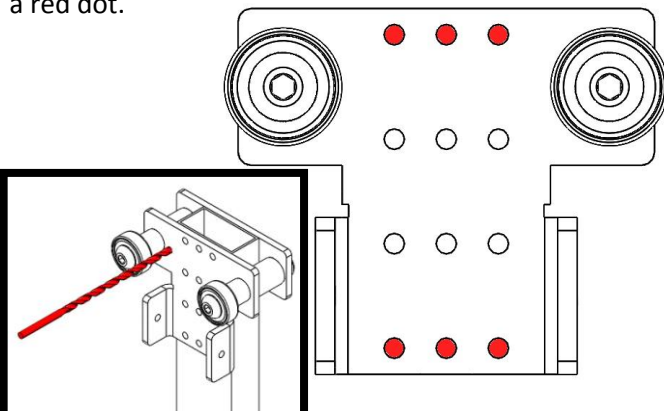
4X

Carriage Assembly

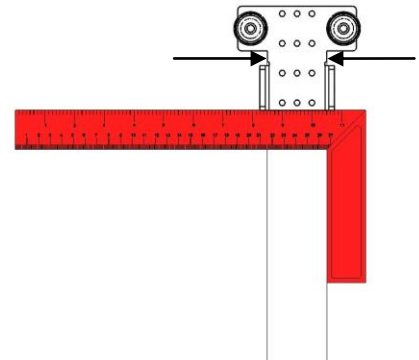
Step 1: Slide one Corner Bearing Assembly onto one Carriage Vertical Tube, and line up the top of the assembly with the end of the tube. This should be a somewhat snug fit.



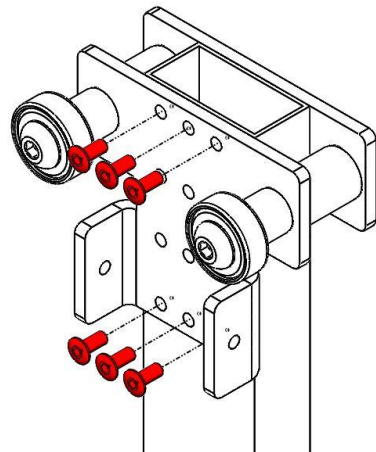
Step 3: Match drill the rivet holes with a #9 (0.196") drill bit through the Large Bearing Plate into the nearest side of the Tube in the locations shown with a red dot.



Step 2: Use a Try Square to ensure the bottom of the Corner Bearing Assembly is perpendicular with the 1" wide faces of the Carriage Vertical Tube. Align the inside surface of the notch (as shown with arrows,) with the outside surfaces of the Tube.

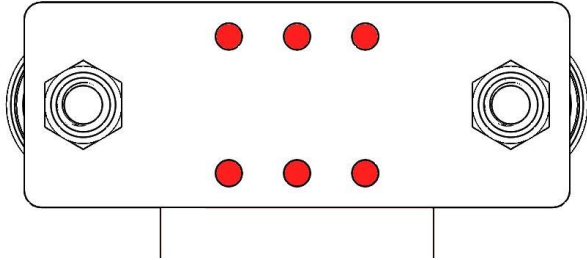


Step 4: Rivet the Large Bearing Plate in place with six 3/16" x 1/4" Steel Rivets (am-1226)

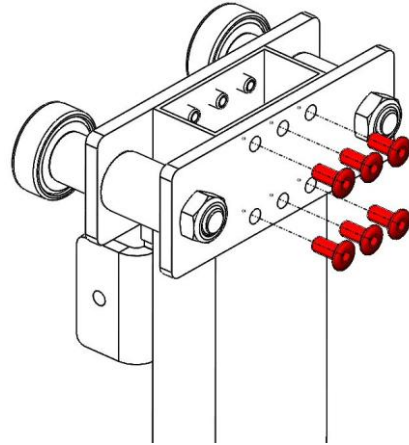


Carriage Assembly Continued

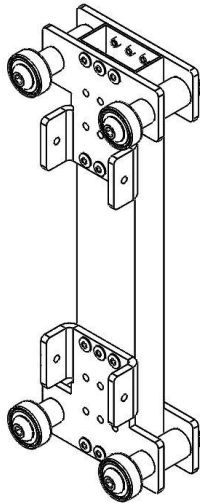
Step 5: Flip the assembly over, and match drill the rivet holes through the Small Bearing Plate to the nearest side of the tube in the locations shown with a red dot.



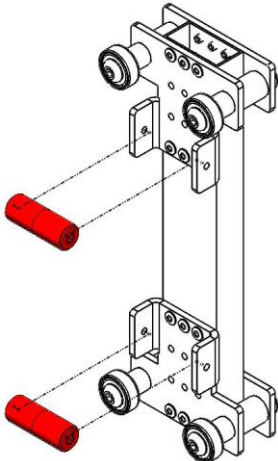
Step 6: Rivet the Small Bearing Plate in place with six 3/16" x 1/4" Steel Rivets.



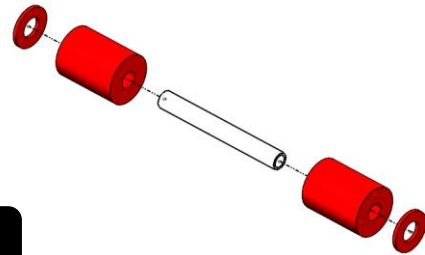
Step 7: Repeat Steps 1-6 to attach a second Corner Bearing Assembly to the other end of the tube.



Step 9: Slide each roller assembly between the tabs on the Large Bearing Plate.



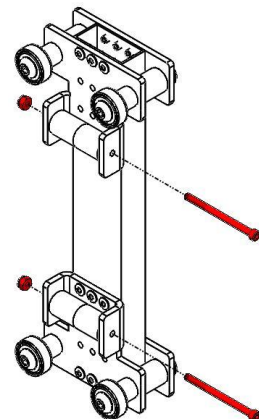
Step 8: Slide two Nylon Spacers (am-1449) and two 1/4" Washers (am-1027) over a 2.14" Brass Tube (am-0602) as shown to create a roller assembly. The spacers should be against each other, with the washers at the ends of the assembly. Repeat to create a second spacer assembly.



2X

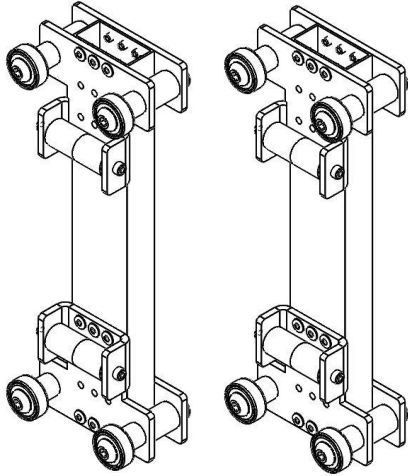
Step 10: Secure each roller assembly with a #10-32x2.75" SHCS (am-1397) and a #10-32 Nylock nut. (am-1042) **Do not over-tighten the screws.**

NOTE: Ensure the Nylon Rollers spin free. If they bind, loosen the screws.

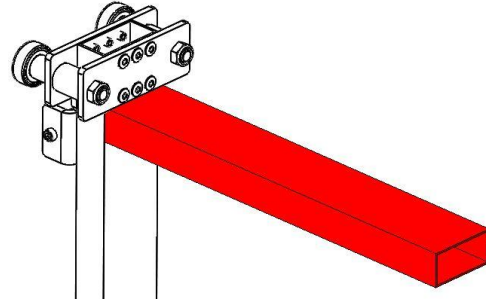


Carriage Assembly Continued

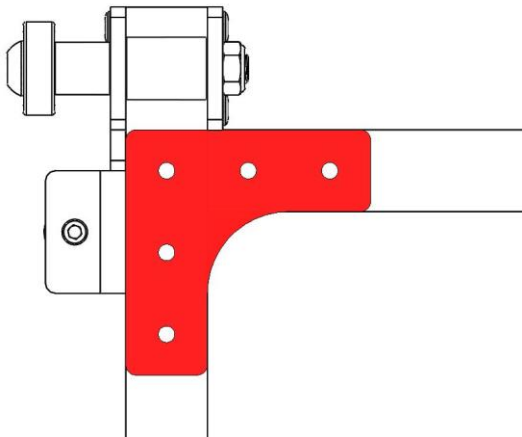
Step 11: Repeat Steps 1-10 to create a second Corner Bearing and Carriage Vertical Tube assembly.



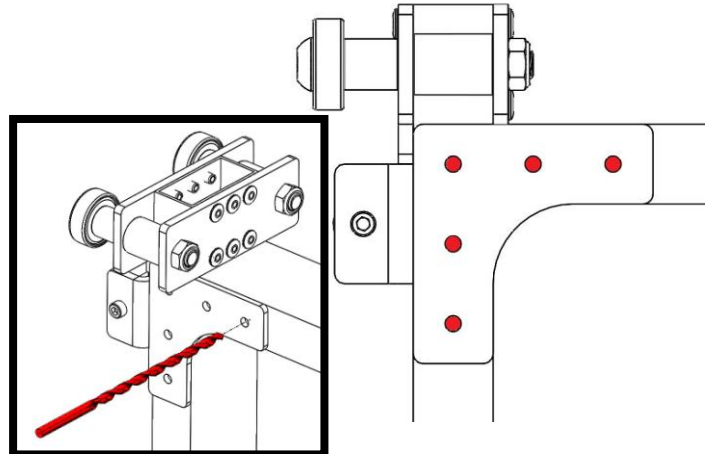
Step 12: Place a Carriage Horizontal Tube against the 2" face of the Carriage Vertical tube, and the bottom of Small Bearing Plate. Line up the 1" wide face of the Carriage Vertical Tube to the 1" wide face of the Carriage Vertical Tube.



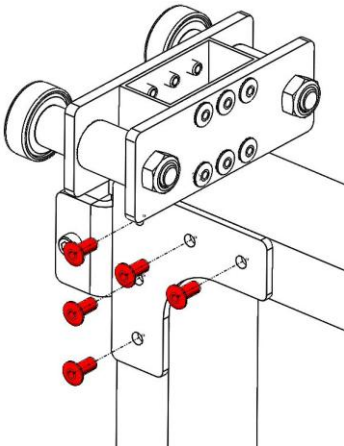
Step 13: Align a 90 degree gusset (am-3860) with both tubes as shown.



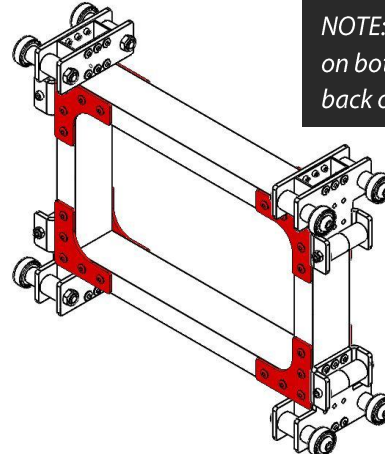
Step 14: Match drill the rivet holes through the gusset to the nearest side of each tube in the locations shown with a red dot.



Step 15: Rivet the gusset in place with five 3/16" x 1/4" Steel Rivets.



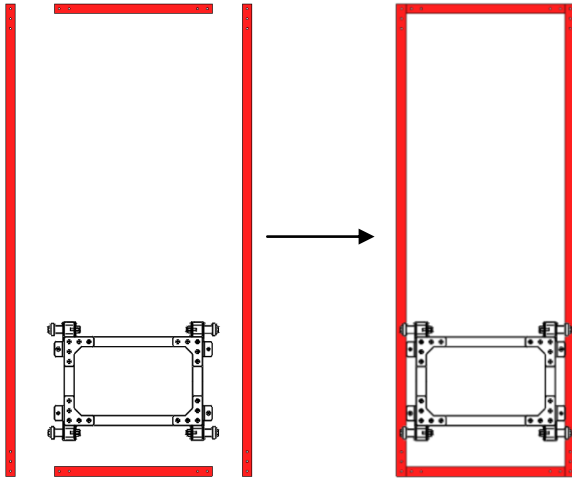
Step 16: Repeat Steps 13-15 for the remaining seven gussets to finish assembling the Carriage as shown.



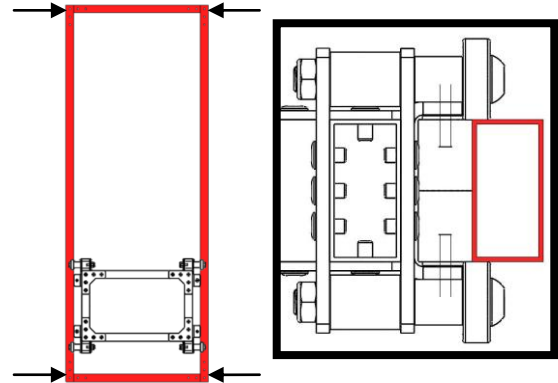
NOTE: Install gussets on both the front and back of the Carriage.

Frame Assembly

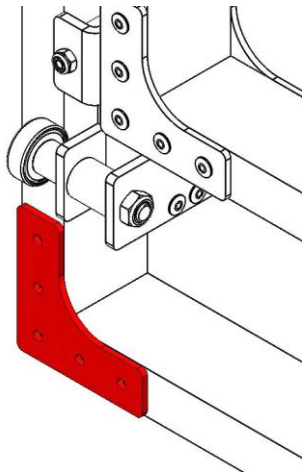
Step 1: Lay out the Frame Vertical Tubes and Frame Horizontal Tubes around the Carriage as shown.



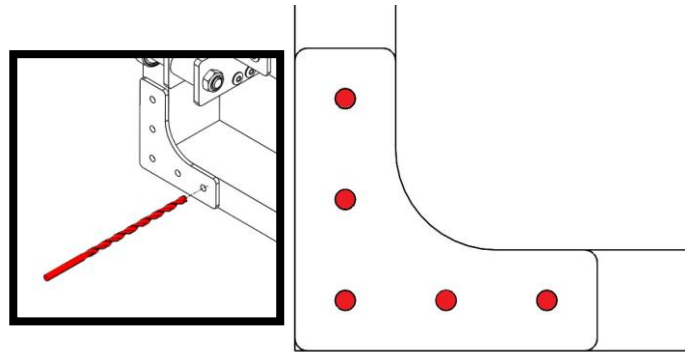
Step 2: Carefully clamp the Frame together between the arrows, and ensure it slides freely. Check the left/right movement of the carriage. If it exceeds $1/32"$, the Frame Horizontal Tubes should be trimmed to avoid potential binding.



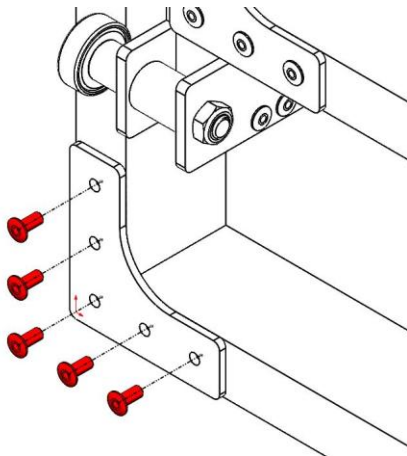
Step 3: Align a 90 degree gusset to the outer edges of one corner of the Frame as shown.



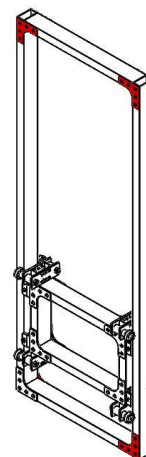
Step 4: Match drill the rivet holes through the gusset to the nearest side of each tube in the locations shown with a red dot.



Step 5: Rivet the gusset in place with five $3/16"$ x $1/4"$ Steel Rivets.



Step 6: Repeat Steps 3-5 for the remaining seven gussets to complete the Frame as shown.



NOTE: Install gussets on both the front and back of the Frame.