VERSION 1.0

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# R2-ATL MOTOR MOUNT KIT

## ASSEMBLY GUIDE

ASTROMECH DRIVE SYSTEM

# R2-ATL MOTOR MOUNT KIT

## PURPOSE

The R2-ATL motor mount is designed for use in Astromech's Droids up to 300 pounds. The motor mount utilizes commonly found motors used within scooters. Replacement motors for Razor e100/150 can be commonly found for an inexpensive price making this a good replacement for more expensive NPC motors. The design uses a variety of spacers which will allow the end user to use the motor mount system in all feet shells currently available.

## PARTS INCLUDED

| | What's in the Box |
|---|---|
| **1** | Waterjet cut Aluminum Plates (6 pieces) |
| **2** | Hardware Burrito (113 pieces) |
| **3** | Casters (4 pieces) |

## PARTS REQUIRED NOT INCLUDED

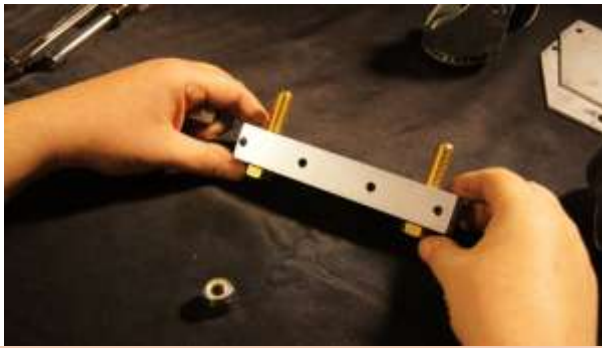
In order to keep the cost of the kit down, (double shipping basically) the standard kit package does not come with the following parts. These parts are commonly found should the current recommended suppliers below no longer carry them. The parts listed below have been extensively tested with this design. Both vendors have the same parts available. I've just identified the vendors that had them at the lowest cost. You may or may not find that using a single vendor will save you on the shipping costs. Please note: In the assembly instructions, we will be removing the shaft that comes with the wheel.

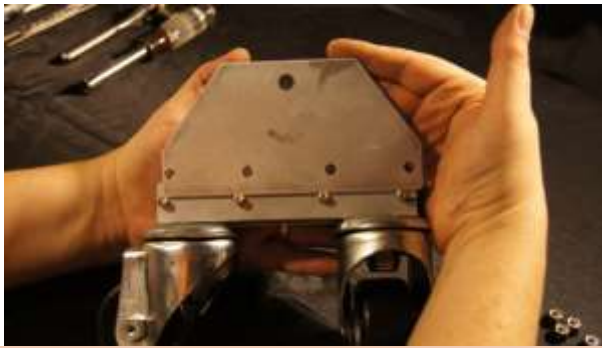
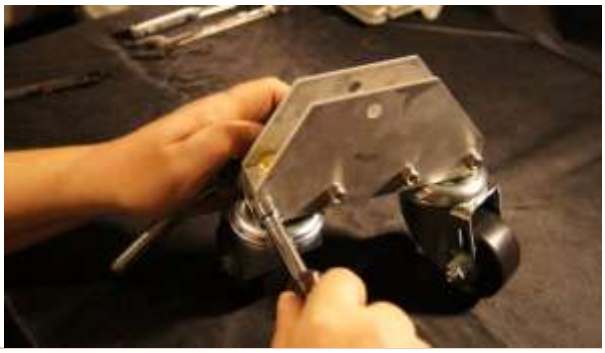
There is tensioner devices included with the wheels as ordered. If you want to skip ordering the ones listed below, then you will need to trim the length of the current ones.

**Parts required; Need to be ordered separately**

| # | Description | Part Number | Seller | Quantity | Cost | Extended |
|---|---|---|---|---|---|---|
| **1** | Razor e100 / e125 (V5-28), e150 (V6-14) & e175 (V18-25) Electric Scooter Rear Wheel (Chain Driven) | 13110040048 | razorama.com | 2 | $21.99 | $43.98 |
| **2** | Razor e100/e125 (V5+), Razor e150 (V1+) and eSpark Motor (Chain Driven) | W13111612030 | razorama.com | 2 | $25.99 | $51.98 |
| **3** | 66 Links Of Standard Duty #25 Chain With Master Link (CHN-2566) | CHN-2566 | electricscooterparts.com | 2 | $7.92 | $15.84 |
| **4** | Rear Axle Tension Adjuster (HDW-125) | HDW-125 | electricscooterparts.com | 4 | $2.95 | $11.80 |
| | | | | | **Subtotal:** | **$123.60** |

## ASSEMBLE THE CENTER FOOT

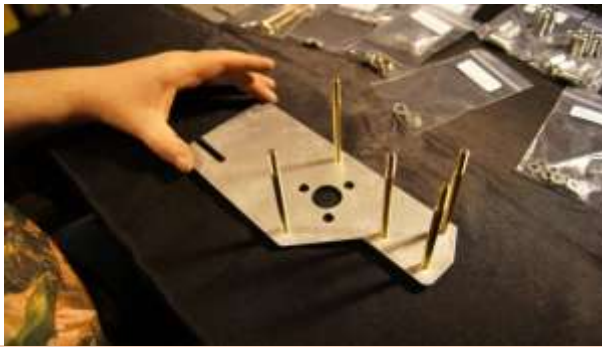
| | Instructions | Visual Aid |
|---|---|---|
| **1** | You will need the following parts:<br><br>A – 6.25 inch aluminum tube;<br>D – ½”-13 x 2- ¼” Hex Head Cap (2)<br>E – ½”-13 Nylon Insert Locknut (2)<br>M – ¼”-20 x 1-½” Hex Head Cap (4)<br>O – ¼”-20 Nylon Insert Locknut (4)<br>Center Foot Plates (2)<br>Caster (2) |  |
| **2** | Insert Part D through the appropriate holes on Part A – aluminum tube. |  |
| **3** | Place the caster on using Part D as the caster shaft. Attach **loosely** with Part E – nylon nut.<br><br>**Do not tighten at this time**.<br><br>Repeat for the other caster.<br><br>You still don’t want to tighten these until the end so just make sure that the nut is holding on to the bolt. |  |
| **4** | Look carefully at the currently assembled Part A – aluminum tube. One set of holes is closer to the end than the other. Do the same for the Center foot plates… See the pattern?<br><br>You will need to align the short ends together. It’s the same for both plates so whichever you start with is still correct.<br><br>Now align the holes. |  |

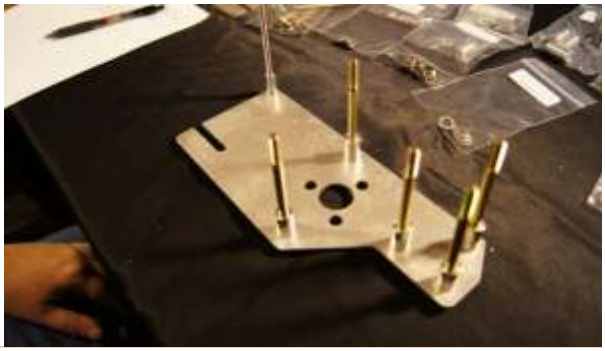
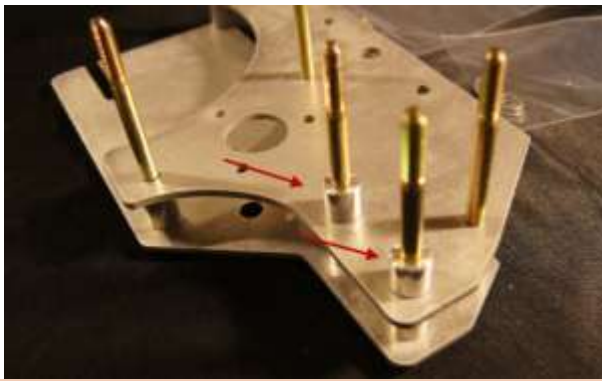
| | Instructions | Visual Aid |
|---|---|---|
| **5** | Insert Part M – ¼" Hex Head bolts through the holes. |  |
| **6** | Flip the assembly over and place the second Center Foot Plate over the bolts.<br>Once again you need to verify that you are placing the short sides in alignment. |  |
| **7** | Place Part O – ¼"-20 Nylon Insert Locknut on Part M and tighten. |  |
| **8** | Tighten the ¼" bolts and nuts completely. You don't have to go crazy cranking them down. Just get them nice and snug. The nylon insert does wonders for keeping these together. |  |

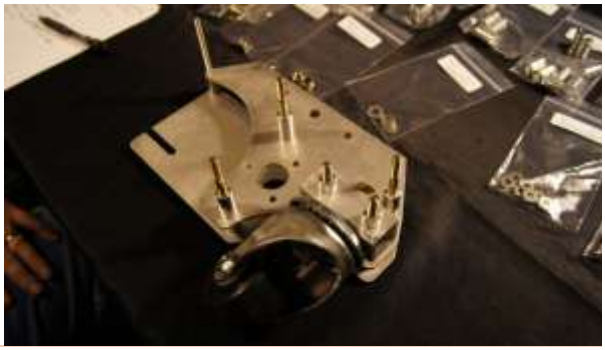
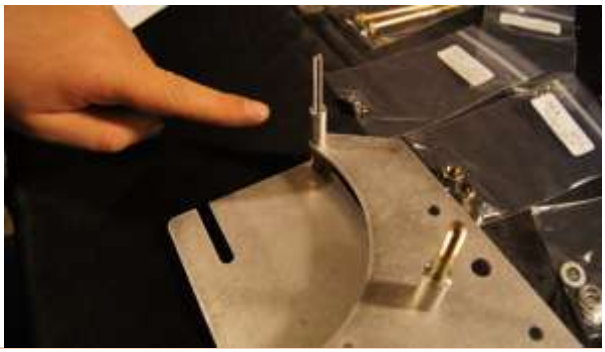
| | Instructions | Visual Aid |
|---|---|---|
| 9 | Now tighten up the caster bolts. You want it to fit snugly up against the side plates. |  |
| 10 | Congratulations!<br><br>You've finished up the center foot. |  |
| 11 | | |

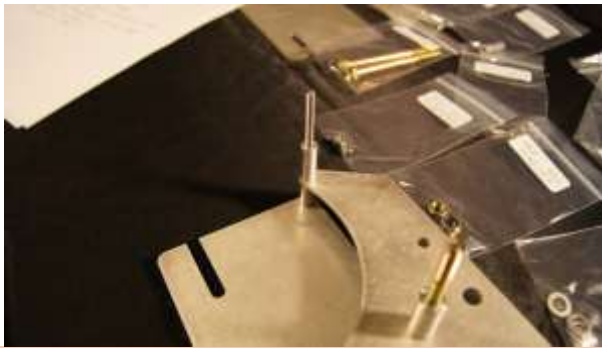
## ASSEMBLE THE OUTER FOOT

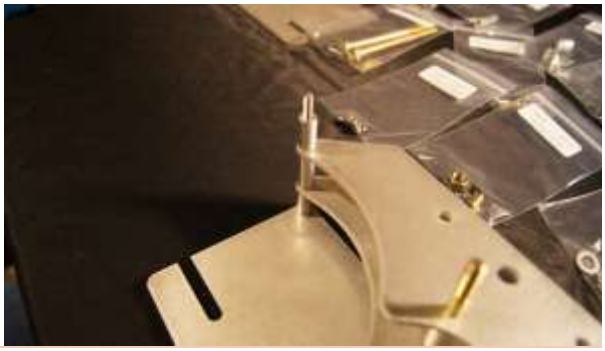
You can do this assembly for both feet at the same time if you like. The instructions and pictures only show one foot being assembled. Remember, if you choose to do so, you need to mirror the plates. If you don't you will end up with two left or right feet.

| | Instructions | Visual Aid |
|---|---|---|
| **1** | You will need the following parts:<br>One set of plates (4)<br>Caster (1)<br>Part B – 2.5" Aluminum tube<br>All the rest of the small bagged parts. |  |
| **2** | Start by taking one castor,<br>Part B – Aluminum Square tube 2.5"<br>Part D –½"-13 x 2-¼"Hex Bolt<br>Part E – ½" Nylon Insert Locknut<br>Insert the bolt through Part B – Aluminum tube and secure the caster to it. Tighten Part E to the bolt. Ensure that you have this connection tight; there should be no play on the caster base. |  |
| **3** | Find the plate and lay out as pictured.<br>Orientation is important during this build. There will be a section for the second foot, the instruction will remain exactly the same but the plates will be mirrored. |  |
| **4** | Grab 5 of Part N – ¼"-20 x 3-½" Hex Head Bolt and insert into the holes as shown. |  |

| | Instructions | Visual Aid |
|---|---|---|
| **5** | Now insert Part P – 10/24” screw and insert it into the upper left hole.<br><br>Take 5 of Part G – ¾” spacer and place onto part N.<br><br>Take 1 of Part L – ¾” spacer and place onto part P.<br><br>We are just adding a ¾” space between the two plates. All the bolts should have a spacer now. |  |
| **6** | Find the plate as pictured, and place it on the assembly. |  |
| **7** | With the plate installed, your assembly should look as it does to the right.<br><br>Note: This plate will align higher as it’s the start of the foot channel. |  |
| **8** | Place Part K on the pair of bolts N. This is on the lower right side of the assembly. |  |

| | Instructions | Visual Aid |
|---|---|---|
| 9 | Place the completed (and hopefully tightened) caster mount onto these two bolts.<br><br>Seriously, make sure the caster is tight at this point. It's significantly harder to tighten later. |  |
| 10 | Place Part J – 3/8" spacers on the bolts Part N which go through the caster mount. There are only two bolts.<br><br>Place Part F – 1" spacers on the bolts Part N that are on the rest of the plate. My fingers are pointing to them. There are only three. |  |
| 11 | You assembly should look like this now. All five of the Part N bolts should have a spacer on them and the caster should be installed with spacer both below and on top.<br><br>Everything looks good? |  |
| 12 | Now put Part I – 1" spacer on Screw P. |  |

| | Instructions | Visual Aid |
|---|---|---|
| 13 | Double and triple check your work…<br><br>Still good? |  |
| 14 | Find this plate.<br>Check the orientation.<br>Little tiny hole to the left… |  |
| 15 | Place the plate on the assembly as shown. It only fits on three bolts<br>This is the other side of the 1” channel for the feet shells. |  |
| 16 | The plate should sit as shown to the right. |  |

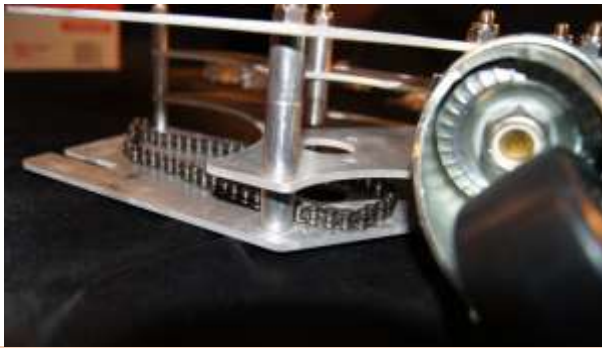
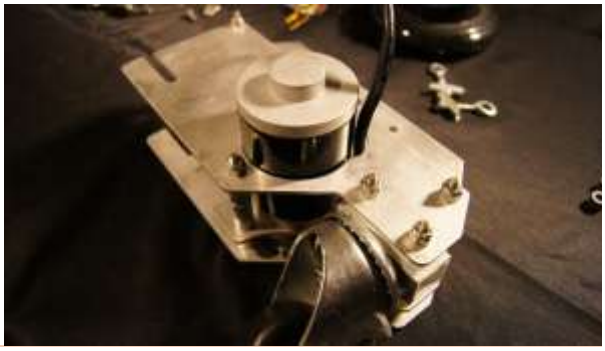
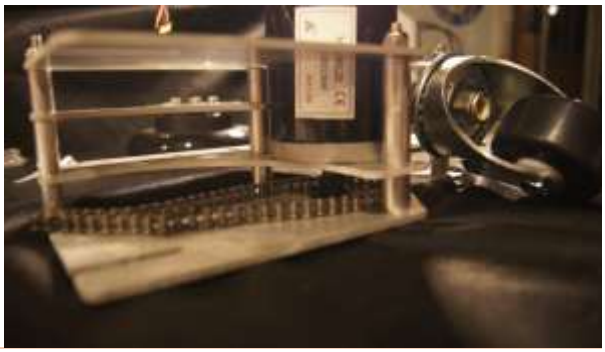
| | Instructions | Visual Aid |
|---|---|---|
| 17 | Place Part L – ¾” spacer on Screw P. |  |
| 18 | Sitting pretty..<br><br>Double check.. ------->  <br><br>Looking good so far… |  |
| 19 | Now Put Part G – ¾” spacer on the two top bolts that I am pointing at. |  |
| 20 | Your motor mount should look like this… |  |

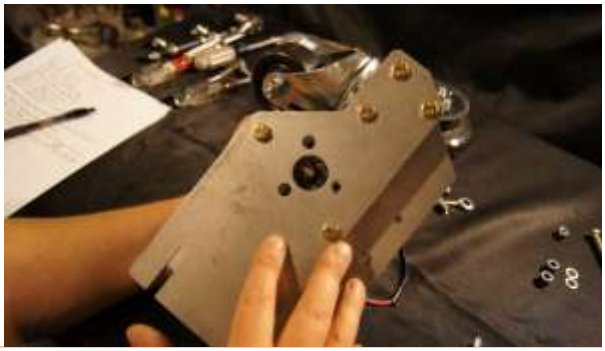
| | Instructions | Visual Aid |
|---|---|---|
| 2 | Now place Part H – 7/8” spacer on the bottom bolt. |  |
| 2 | Find this last plate… |  |
| 2 | And place it on top of the assembly. |  |
| 2 | Place five of Part O – ¼”-20 Hex Locknut on Bolts N.<br>Tighten slightly, leave some movement.<br>Place Part Q – 10/24 Hex Locknut on Screw P.<br>Tighten slightly, leave some movement. |  |

| | Instructions | Visual Aid |
|---|---|---|
| 25 | Congratulations! You've completed the basic assembly of the ATL foot drive system. You will need to do the exact same steps as above for your next one.<br><br>The only caveat is that you need to have the parts mirrored. So lay your first plate like this, and work from there. |  |
| 26 | Plate number two would be… |  |
| 27 | Plate number three… |  |
| 28 | And lastly plate number four.<br><br>I had considered torturing everyone and just copying the directions from above and just mirroring the pictures but I'm sure all of you can figure this out. |  |

## ADDING THE MOTOR AND WHEEL ASSEMBLY

| | Instructions | Visual Aid |
|---|---|---|
| **1** | You will need the following parts:<br><br>R – Pan Head 10-32 Screws;<br>S – 5/16”-18 Hex Locknut<br>T – 5/16”-18 Hex Head Bolts<br>U –5/16” Flat Washers<br>W –5/16” Bronze Bearings<br>HDW-125 Tensioner (User Supplied)<br>#25 Chain – 66 links (User Supplied)<br>E125 Rear Wheel Assembly (User Supplied) |  |
| 2 | Start by removing the existing axle assembly from the wheel. It’s too long for our purposes. |  |
| 3 | These are all the parts that we remove. I kept mine since I never know when I might need it. It’s your choice.<br><br>**IF** you decided to use the existing tensioners, keep them to the side. You will want to cut the length down as these seem to be almost ¼” inch longer than the ones I recommend. |  |
| 4 | Now take one of you completed foot assemblies. Remember, you shouldn’t have tightened it up completely, we will want a small amount of play for this installation.<br><br>**Note:** the motor hole is to the top. |  |

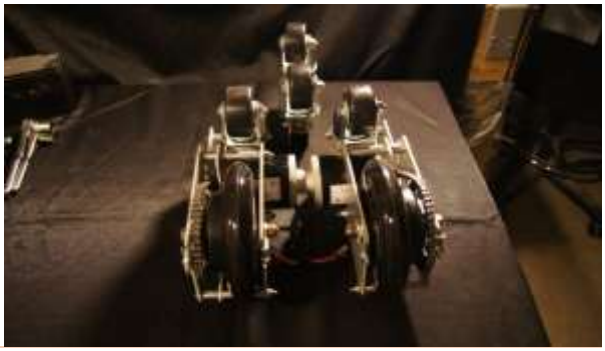
| | Instructions | Visual Aid |
|---|---|---|
| 5 | With the drive assembly flat on a surface. Carefully lay the chain down ensuring that it is going around the sprocket hole.<br><br>Once the motor is in place the chain won't get past the sprocket, and correspondingly you can't get the chain in place once the motor is in.<br><br>Just be sure to clear the sprocket hole… |  |
| 6 | Carefully insert the motor into the hole. There is a definite cutout that the wiring will fit through.<br><br>Don't jiggle the assembly too much and check the chain. |  |
| 7 | The motor should seat down nicely and the wire should have a small amount of play. |  |
| 8 | This is how the motor should look all seated down with the chain around the sprocket. |  |

| | Instructions | Visual Aid |
|---|---|---|
| 9 | Holding the entire assembly, turn it over and carefully move the motor until you line up the mounting holes. There are three. This step is a little awkward as your trying to not lose the chain nor mess up the motor. |  |
| 10 | If you have a magnetized Phillips head screwdriver now is the time to use it. If you're like me and you don't, then get the screws in through the hole and into the motor any way you can.<br>It's not really hard but can be aggravating if you've had too much coffee. Don't tighten the screws until you have all three in the motor. You will need to shift the motor a little to get them all in. |  |
| 11 | Sweet! You've conquered the motor, you're halfway there! |  |
| 12 | Here is the wheel, axle assembly and tensioners. |  |

| | Instructions | Visual Aid |
|---|---|---|
| 13 | The final axle assembly should look like this. So keep this picture in your mind as you continue.<br><br>Notice the HDW-125 tensioner has a small bend to it. Make sure the bend is going to the outside of the wheel on each side. |  |
| 14 | I like to keep all the bolts on one side of the assembly, unless you like to watch the world burn then I think you should too.<br><br>Take Part T – 5/16" bolt and put on Part U – Washer, then HDW-125 tensioner. (bend to the outside please), and then Part W – Sleeve bearing. This is one half the axle assembly. |  |
| 15 | Now put the bolt through the wheel. It gets tight here, but get the chain over the bolt. I laid it on the four screws around the shaft.<br><br>Also, there is a bearing on the inside of the wheel, sometimes it shifts when you pull the axle. You may need to fiddle with it to get the new axle in. |  |
| 16 | The order should be bolt, washer, tensioner, plate, bushing, wheel at this point. |  |

| | Instructions | Visual Aid |
|---|---|---|
| 17 | So if you're like me, you will spend five minutes trying to get the other busing in place with just your fingers. Don't… |  |
| 18 | Put the bushing on a screwdriver and slide it into place. Work much better and took about 2 seconds. |  |
| 19 | Now you can push the bolt completely through. |  |
| 20 | Add the second HDW-125 tensioner and washer to the assembly.<br>Place Part S – 5/16" nut on the axle.<br>Tighten slightly, but not too tight. Just get the lock nut to engage. This is important for proper operation and battery life. |  |

| | Instructions | Visual Aid |
|---|---|---|
| 21 | Once the axle is in place, go back and tighten up the rest of the motor mount.<br><br>Now tighten up the HDW-125 tensioners. You want to ensure the wheel is straight, the chain is straight and not loose. |  |
| 22 | Now before you tighten the axle, you should do a simple test. Try spinning the wheel with your hand. It should spin about one revolution before the motor slows it down.<br><br>Now, slowly tighten the axle, then check the spin. Once it doesn't do a full revolution, back up the tension a little bit. |  |
| 23 | Congratulation! You've completed the foot drive.<br><br>You're **AWESOME!** |  |
| 24 | Now go back and do the other one….<br><br>I'll wait a bit… |  |

| | Instructions | Visual Aid |
|---|---|---|
| 25 | SWEET! You've got yourself a completed drive system for your Astromech! |  |
| 26 | | |