

Spider Hill's Animated Ground Breaker AGB-1

Included in the Basic Kit:

- (1) Assembled aluminum base with 12 volt wiper motor installed
 - (1) Assembled set of motor drive arms with hardware
 - (4) SJ-1 Spider Joints with fender washers installed
 - (1) 1 inch PVC cross fitting with 1" to 1/2" reducer installed
 - (2) 1 inch PVC T fittings with 1" to 1/2" reducers installed
 - (26) Self drilling screws
 - (9) Wood screws
 - (2) 2" x 2" steel "L" brackets
 - (4) 10/24 nylon insert hex nuts
 - (2) 10/24 x 2" truss head machine screws
 - (1) Tube silicone grease
 - (1) 12 volt 5 amp power supply
 - (1) PWM electronic motor speed controller
 - (1) 1/2" x 4" PVC neck pipe (A)
 - (1) 1" x 4" PVC spine with bronze bushings installed (B)

The Complete Kit also includes:

- (4) Shoulders inner/outer "C", (2) Upper Arms "D", (2) Forearms "E",
Upper Slides "F", Lower Guides "G"

What you need to build as shown:

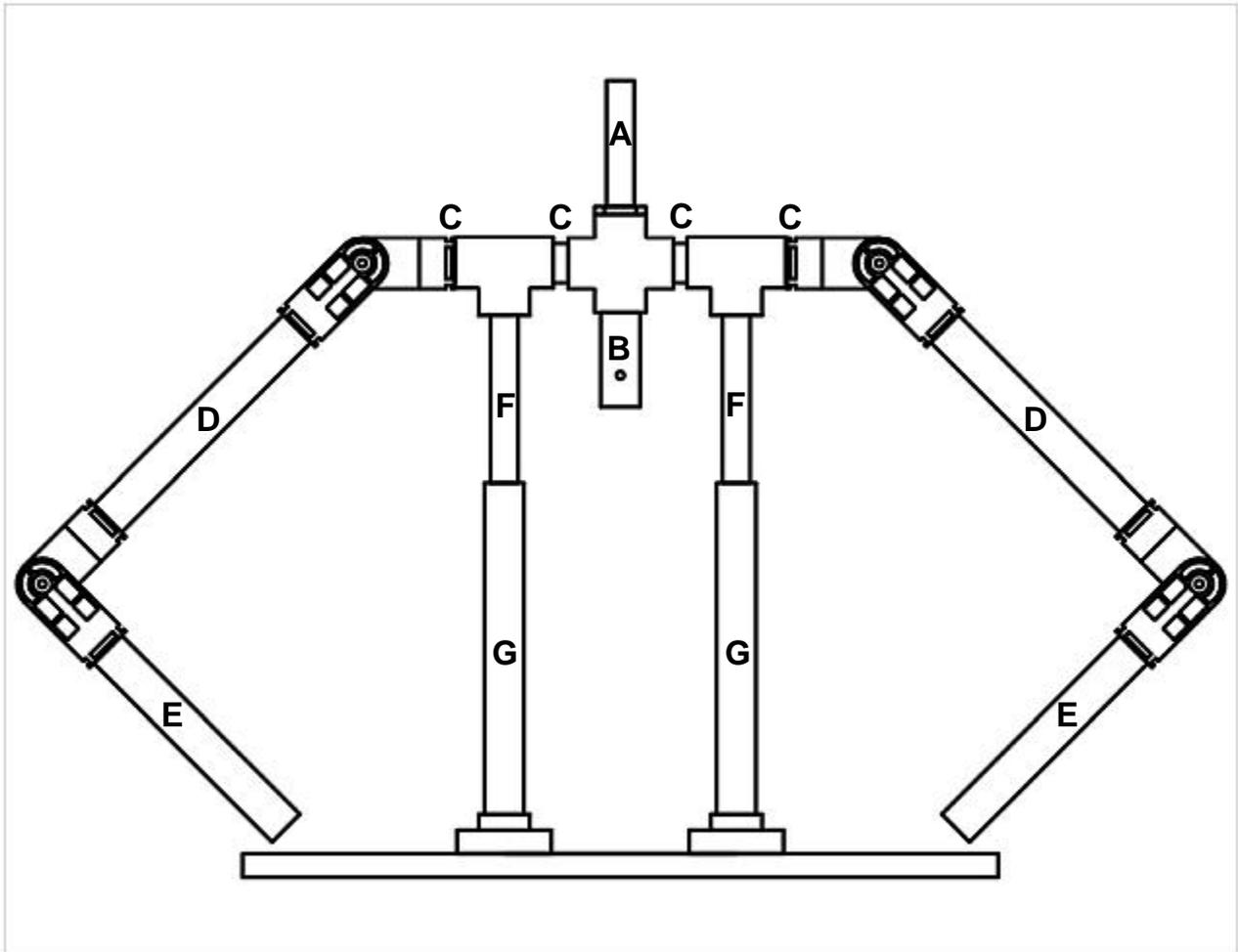
- (1) 1" x 6" x 24" wood base (needed for both kits)
- (6) Feet of 1 inch Schedule 40 PVC pipe (Basic Kit only)
- (2) Feet of 1/2 inch Schedule 40 PVC pipe (Basic Kit only)

PVC Pipe Cut List for Basic Kit (All Pipe is Schedule 40 PVC)

- A) Neck – (1) 4 inch piece of 1/2 inch PVC (included in both kits)
- B) Spine – (1) 4 inch piece of 1 inch PVC (included in both kits)
- C) Shoulders (inner/outer) – (4) 2 inch pieces of 1 inch PVC
 - D) Upper Arms – (2) 8 inch pieces of 1 inch PVC
 - E) Forearms – (2) 8 inch pieces of 1 inch PVC
- F) Upper Slides – (2) 11 inch pieces of 1/2 inch PVC
- G) Lower Guides – (2) 10 1/2 inch pieces of 1 inch PVC

READ THROUGH THESE PLANS BEFORE GETTING STARTED!

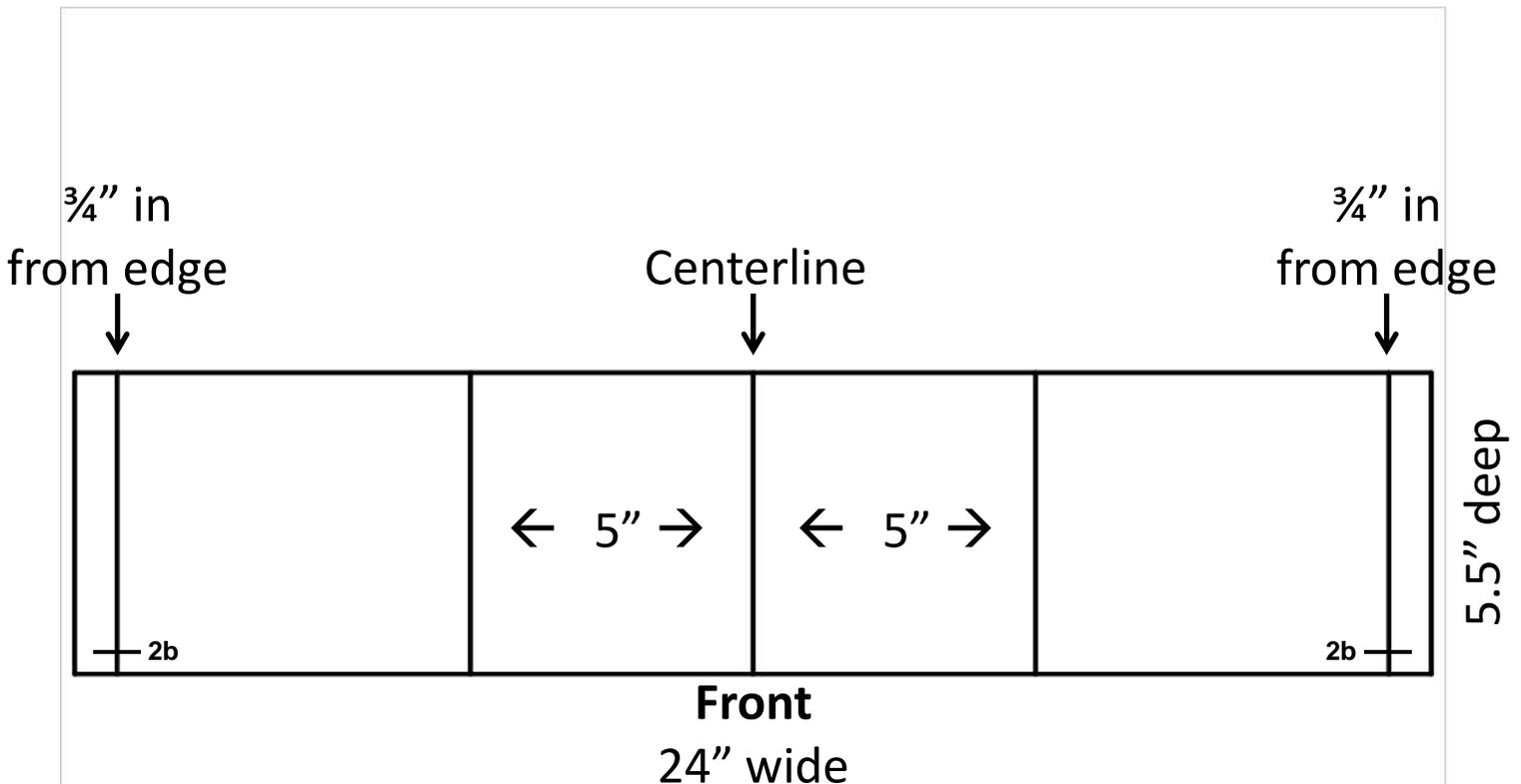
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Wood Base

(See Page 4 before completing these steps!)

- 1) Mark the center of your platform. Measure 5 inches from both the left and right of the center and draw 2 lines on the platform running from front to back.
- 2a) Measure in $\frac{3}{4}$ " from each outside edge and draw 2 lines on the platform running from front to back. 2b) Measure $\frac{3}{8}$ " back from the front of the base and make a mark on each one of these lines.
- 3) Center the "L" brackets on the lines drawn in step 2a. The horizontal portion of the brackets should be facing forward. Line the front of the bracket up with the marks you made in step 2b.
- 3) Mark the mounting holes on the base with an awl or sharp object. Pre-drill the holes with a $\frac{1}{16}$ " bit to prevent cracking the base and install the brackets using the supplied wood screws. Install the 2 supplied $\frac{10}{24}$ x 2" bolts from the rear of the brackets, in the top holes, facing forward. Install a $\frac{10}{24}$ nut on each bolt and tighten them all the way down.
- 4) Remove the Drill Template on the last page of these instructions. Cut out the template with a pair of scissors. Center the template on the wood base between the 2 lines drawn in step 1. Make sure the front edge of the template is flush with the front edge of the base. Tape the template to the base. Use an awl or other sharp object to make marks in the base at each location marked with an X.
- 5) Remove the template. Use a $\frac{1}{16}$ " bit to drill pilot holes in the 4 outer corner marks and the one in the center.
- 6) See Page 4 before Drilling! The remaining 8 holes need to be drilled with a $\frac{1}{2}$ " paddle bit going approximately $\frac{1}{4}$ " deep to make a recess for the bolt heads on the bottom of the motor mount.

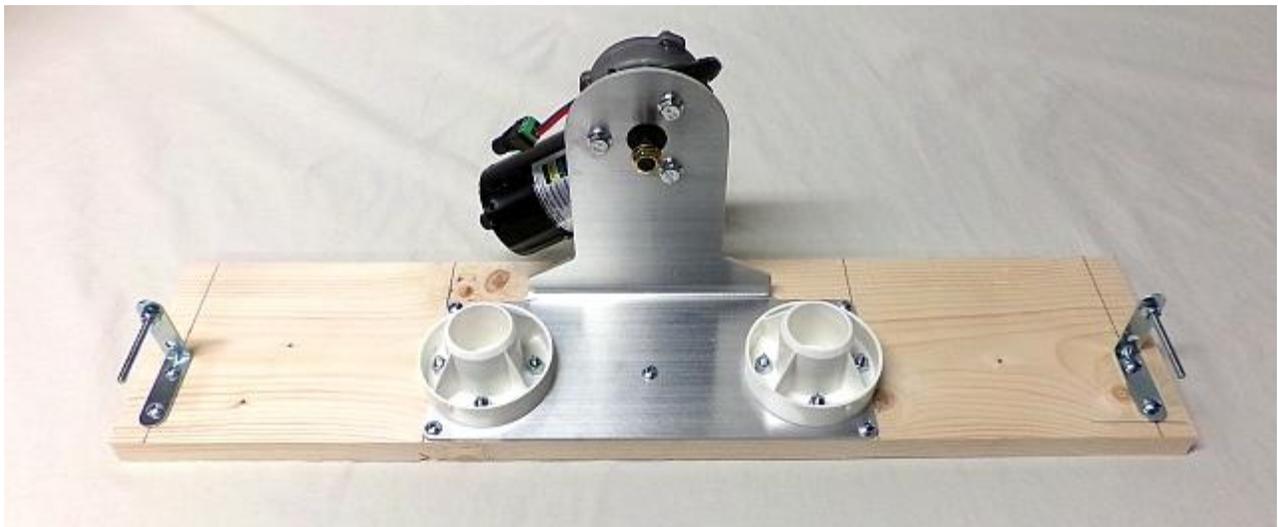


Base Continued

Your base should now look like this.



7) Attach the motor assembly to the base using the supplied wood screws.



8) Insert the 2 Lower Guides (G) into the 2 PVC mounting bases. Do not attach them with screws! Simply pressing them in works fine. If for some reason you need to attach them permanently, use PVC cement.

Torso

- 1) Install 1 shoulder pipe (C) into both sides of the 2 PVC T fittings. Make sure they are all the way in.
- 2) Attach a T fitting (reducers facing down) to either side of the PVC Cross fitting (spine facing down). Make sure all 3 fittings are aligned properly before tapping the pipes into place. Laying the assembly on a flat surface is the easiest way. Tap the fittings together until they are touching.
- 3) Insert self tapping screws at all of the pipe joints as shown below except the ones at the bottom of the T fittings. Install screws in the same locations on both the front and back side of the torso.
- 4) Insert the Upper Slides (F) into the reducers on the T fittings. Tap them all the way in. Insert self tapping screws on both the front and back of the reducers. We recommend these holes be pre-drilled with a 1/16" bit. Also, make sure the screw is going through the T Fitting, reducer, and inner pipe to keep everything in place.
- 5) Insert the Neck pipe (A) if needed.

Your Torso should now look like this.



Drive Assembly

- 1) Place the Torso onto the base by inserting the Upper Slides (F) into the Lower Guides (G).
- 2) Use the supplied lube and apply a small amount to the inside of each bushing in the spine.
- 3) Remove the nut, 1 metal washer, and 1 nylon washer from the tap bolt on the long drive arm. Insert the bolt from the rear of the spine so the threads are facing forward and the drive arm is behind the spine. There should be a nylon washer against the rear of the pipe. Install a nylon washer over the bolt so it is touching the front of the pipe. Install the metal washer against the nylon washer. Install the nut. Run the nut down until the washers do not wobble, but are still able to spin freely. This is very important!
- 4) Attach the shorter Drive Arm to the wiper motor using the supplied nut. Make sure the teeth on the arm are facing the wiper motor. Tighten the nut securely. We suggest using a light thread locking liquid on this nut.

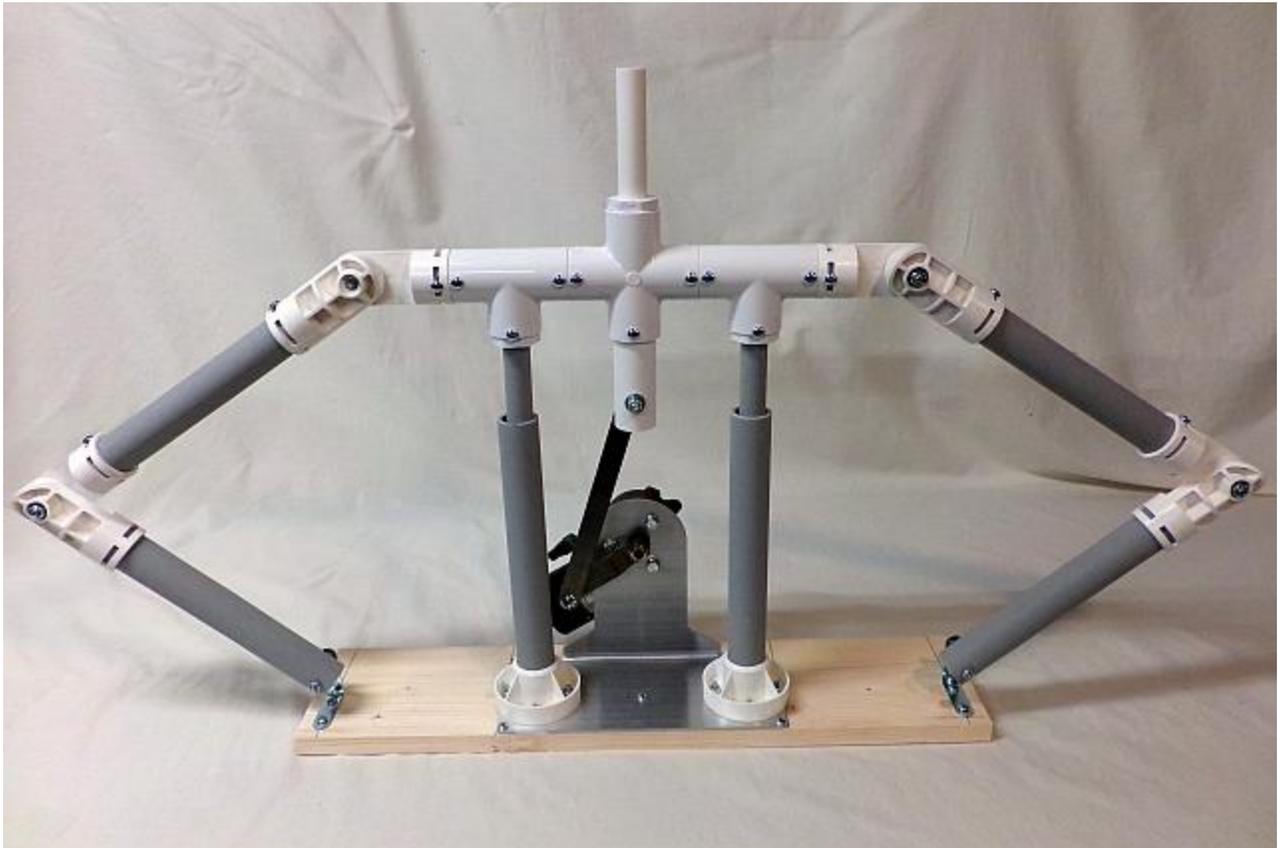
The prop should now look something like this.



Arms

- 1) Measure $\frac{1}{2}$ inch in from one end of each Forearm (E) and make a mark. Drill a $\frac{3}{16}$ inch hole at that mark in the center of the pipe going completely through the pipe.
- 2) Slide a Forearm (E) over each of the bolts on the L brackets on the base. Fasten the Forearms to the bracket using the supplied 10/24 nuts. Do not tighten them all the way down! Pipes Must be able to rotate freely.
- 3) Loosen the nuts on the (4) included Spider Joints enough that they move freely. Assemble the rest of the arms using a Spider Joint at the elbows connected to the Upper Arms (D) with another joint at each shoulder.
- 4) Make sure all the joints are all inline so the arms will move smoothly up and down without twisting or binding. Make sure the pipes are inserted completely into the Spider Joints. Fasten the arms together by installing a single self drilling screw at all connection points on both arms.

Your Prop should now look like this



Testing

- 1) Attach the power supply. Run the prop very slowly to make sure nothing is binding and that there is clearance between all moving parts.
- 2) Stop the prop at the highest point of its stroke. Apply a light coat of lube to the Upper Slides (F).
- 3) Enjoy your Prop!

Tips:

Wrapping the electrical connectors with some electrical tape will keep them from coming loose during prop operation.

Slow and steady wins the race. Running the prop at high speeds can cause premature wear to moving parts.

Pool noodles, bubble wrap, or foam can be used to bulk up arms.

The torso can be shaped from foam or metal hardware cloth (with ¼" squares).

If you are going to leave this prop out in the weather make sure you take steps to protect the motor and power supply from moisture.

Squeaks or groans can typically be silenced by using some silicone grease or spray. We do not recommend using petroleum based lubricants on PVC. A little seasonal maintenance will help your prop last a long time.

PPK-1 Wiring Instructions



Caution: 110 volts AC can cause serious injury or death!



Please use proper safety precautions. This kit is not weatherproof.

You must provide protection from the elements if used outdoors.

These components must be kept dry!

- 1) Locate the positive + wire and the Negative — wire on your wiper motor.
- 2) Strip away 3/16" of the insulation from each wire.
- 3) Using your fingers, twist each exposed wire end (keeping them separated)
- 4) Insert the bare wire ends into the included adapter plug (observing polarity on the plug)
- 5) Tighten the screws to secure the wiring to the adapter.
- 6) Attach the long cable from the PWM to the wiper motor.
- 7) Attach the short cable from the PWM to the power supply.
- 8) Plug the power supply into an outlet.

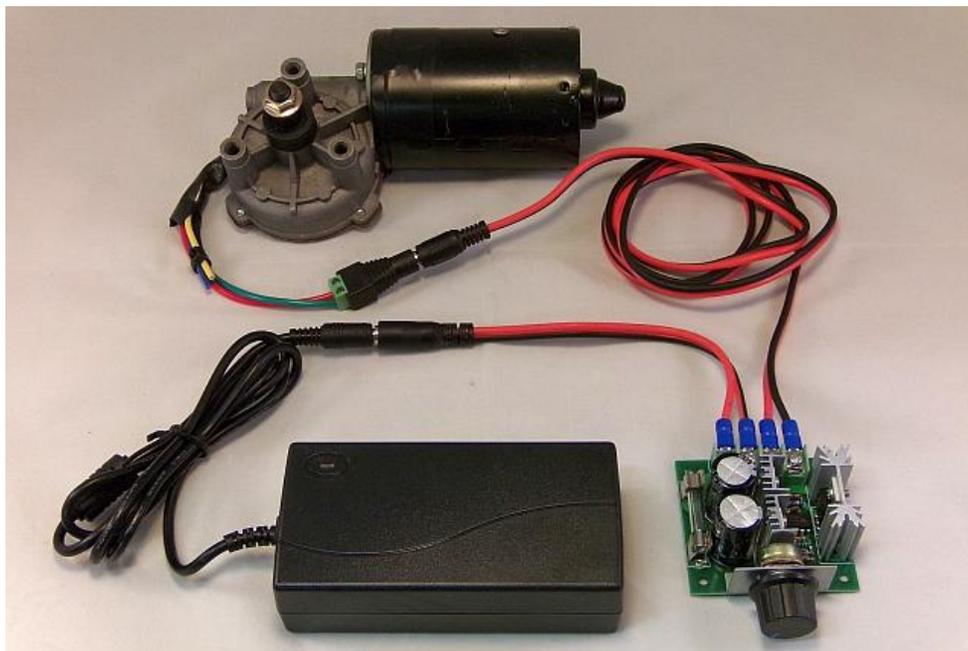
Don't:

Don't get the power supply or PWM wet! We suggest installing them into a small Rubbermaid style container or at the very least bagging them up.

Don't let any conductive material touch the exposed circuit board. It is safe to use double sided tape to attach the PWM directly to the power supply.

Note:

As the load on the motor increases, it will require adjusting the PWM to provide more power to the motor. If the motor operation become jerky or stalls, turn the PWM up until it is moving properly again. Stalling can damage the motor and or power supply.



If you need assistance, please contact us at info@spiderhillpropworks.com