

ROCHESTER INSTITUTE OF TECHNOLOGY

P12401 WECEB Assembly Instructions

Senior Design

2/16/2012

This document contains the assembly instructions for Senior Design team P12401. The team is responsible for wind energy collection to battery bank (WECEB).

Turbine Stand Assembly

The turbine stand assembly instructions contain all the necessary tools, parts, and steps to completely assemble the turbine stand from the storage state to a fully functional state.

Tools Needed

1. 5/16" Allen wrench – Provided with the wind turbine

Personnel Needed

1. Two (2) people

Assembly Time

1. Less than 15 minutes

Parts and Assemblies Needed

1. One (1) Pre-assembled base, leg, lower mast, guy wire, and electrical cable assembly
2. One (1) Pre-assembled upper mast, guy wire flange, and turbine adapter assembly
3. One (1) Turbine and adapter assembly
4. One (1) Pre-Assembled turbine rotor hub and blades
5. One (1) Turbine rotor hub cover (not pictured)
6. One (1) Plastic electrical enclosure



Assembly Steps

1. Begin by unwrapping the guy wires and extra electrical cables from assembly 1.
2. Carefully lay the entire assembly 1 on its side.



3. Insert the end of the electrical cable with two connectors through the coupling end of the upper mast, assembly 2, and pull through
4. Thread the upper mast assembly into the top of the lower mast on assembly 1.
5. Lay the upper mast on top of the electrical enclosure, assembly 6, with 2-3 feet over hanging the enclosure as shown below.



6. Connect the two (2) turbine assembly electrical connectors (assembly 3) to the two (2) electrical connectors on the cable protruding from the top of the mast as shown. The connectors are male-female and female-male and will only connect one way. **DO NOT FORCE THE ELECTRICAL CONNECTORS TOGETHER.**
7. While one (1) person pulls the excess electrical cable through the mouse hole in the base, the second person feeds the excess turbine wiring into the mast.
8. Once all the slack is taken up, the turbine assembly can be threaded into the adapter fitting on the top of the upper mast assembly.



9. Now it's time to assemble the rotor hub and blade assembly 4 to the turbine assembly 3. Remove the large nut from the rotor shaft of the turbine; the nut has left-handed threads so you must rotate it clockwise to remove it. Insert the turbine shaft through the center bore of the rotor hub with the hex shaped pocket facing out. Set the nut into the hex shaped pocket, and insert the 5/16" Allen wrench through the hole as shown below. Turn the Allen wrench clockwise while holding the blades stationary to tighten the hub onto the shaft. Be careful not to cross-thread the nut.
10. Simply snap the turbine rotor cover over the rotor hub as shown below.
11. Carefully rotate the turbine around so that the blades are facing downward, paying close attention to the blade tips. **DO NOT ALLOW THE BLADES TO COME INTO CONTACT WITH ANY OTHER OBJECT.** Bending, cracking, and/or scratching of the blades can reduce the performance of the wind turbine.



12. Attach one of the guy wire hooks on one of the upper legs to the guy wire flange located half way up the mast.
13. Remove the unused outer leg pin from the corresponding leg channel on the base, and fold the corresponding leg up to draw tension into the guy wire then reinsert the outer leg pin to hold the leg in place.



14. Repeat steps 12 & 13 with the other leg that is located on top of the overturned base assembly. The stand should now look like the picture below and is ready to be up righted.
15. Remove the two unused outer leg pins from the lower leg channels. Carefully raise the turbine stand into the upright position by lifting on the mast starting at the turbine and walking your way down the pole. The second person should be making sure that there are no obstructions to the turbine or blades as it is raised, and that the electrical cable does not get caught under the stand.



16. While raising the stand, the lower two legs will fold out into place. Once the stand is fully erect, with one person holding the mast in place, the second person can attach the remaining two guy wire hooks to their respective holes in the guy wire flange, and reinstall the outer leg pins through the remaining two legs.



17. Congratulations! Your turbine stand is now fully assembled. See the electrical system assembly instructions next to finish your installation.



Turbine Electrical System Assembly

The turbine electrical system assembly instructions contain all the necessary tools, parts, and steps to completely assemble the turbine stand from the storage state to a fully functional state.

Tools Needed

1. None

Personnel Needed

1. One (1) person

Parts and Assemblies Needed

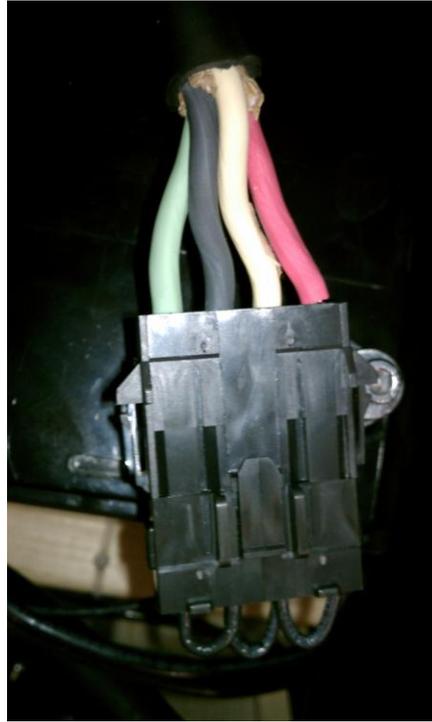
1. One (1) Pre-assembled electrical enclosure assembly
2. One (1) Fully assembled turbine stand (see turbine stand assembly instructions)

Approximate Assembly Time

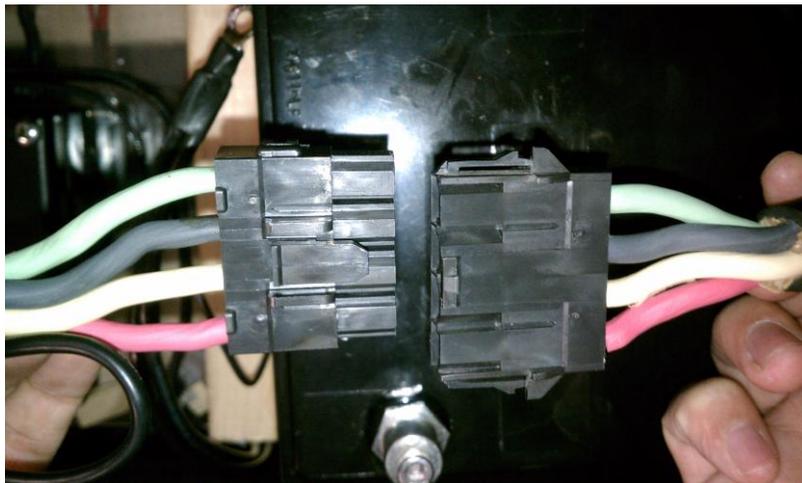
1. 1 minute

Assembly Steps

1. Feed the free end of the electrical cable from the assembled turbine stand through the hole located on the side of the plastic enclosure.
2. Remove the four-pin short.



3. Connect the turbine cable to its corresponding four pin electrical connector inside the enclosure.



4. The turbine is now ready to charge the battery.