

## Windspire FAQs

### Issue and prioritized order of checks for each issue

Note: For warranty procedures, please send the serial number of the inverter, a clear photo of the part or issue in question along with a brief description to [service@mariahpower.com](mailto:service@mariahpower.com)

#### Contents:

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1. The Windspire appears to wobble
  - Check foundation nuts, verify not over tightened.
    - Normal tightness is when in calm wind conditions, snug plus 1/8 turn.
  - Check washer stackup, make sure correct.
    - See photo (photo of washer stackup)
  - Check hinge bolt alignment between plates.
    - Ensure that the bolt is centered on the hinge tab holes (photo)
  - Check top shaft clamp tightness,.
    - Torque to 15 ft lb when horizontal, then 35 ft-lb when vertical.
  - Check total indicator runout at top end of top shaft.
    - Measure the overall amplitude of runout at the top end of the top shaft, using a fixed measuring point, rotating the top shaft, and measuring the difference in highest and lowest point. Normal tolerance is 0.060" diameter, or about 1/16".
    - Spec is .120" maximum total indicator runout
  - Check runout on bottom shaft.
    - Remove the top shaft and measure the amplitude of runout on the bottom shaft top sleeve, using a dial indicator with 0.001" resolution. The maximum allowable runout is 0.002" overall, on each turned surface.
    - Maximum is .004" total indicator runout from surface to surface.
2. There is a noise in the Windspire
  - Diagnosis:
  - Listen to the noise, does it originate from metal on metal, plastic on metal? What conditions create the noise? High wind, low wind, any wind?
  - Resolution:

- Check vertical gap between generator housing and inverter base plate, and verify there is no binding. Check horizontal clearance between generator housing and inverter base plate, and verify there is no binding. Check top of generator, ensure the generator clamp did not slip downward (highly unlikely if properly torqued)
  - If both gaps are properly set, remove inverter insert plate, check for wires contacting generator housing or bottom back iron
  - Check that there is tension in the wire inside the base pole by pulling on the wire upward above wire tube
  - Check generator gap in the generator with plastic strips, ensure proper gapping. Please review your owner's manual in setting the generator gap.
  - Check underneath the unit at the magnetic bearing location. Try to put your hand onto the mag bearing dust cover through the access opposite the hinge, and spin the rotor to see if there is vibration onto the dust cover.
3. There is a broken part on the Windspire
- Shut off unit to temporary stall the rotor, and then prevent it from spinning completely using rope or strapping. Lower the Windspire if required. Inspect failed part, inspect related parts to it for damage. All damaged parts must be replaced.
4. The brake engages on the Windspire
- Use WindSync monitoring software to capture a datalog of the unit to find out what conditions are causing the brake to engage.
  - Contact technical support at (775) 857-4888.
  - WindSync software is located at: <http://www.mariahpower.com/windsync.aspx>
5. The Windspire has low power production
- Verify there are few or no obstructions on or around the unit.
  - Verify the wind resource near the Windspire with an anemometer.
  - Verify there is no noise from the unit, or mechanical drag (See other sections on rotational symptoms)
6. The Windspire spins freely, but only slowly
- This symptom would occur if the electronic brake is engaging, once rpm reaches about 40-60 rpm.
  - Verify that the unit is turned on at the breaker panel.
  - Verify that the unit is connected at the manual disconnect switch (most utilities require a manual disconnect switch nearby the turbine)
  - Verify that the unit is seeing 120 V at the inverter itself, using a voltage meter.
  - Shut off the unit, wait 20 seconds, and turn it back on. After 5 minutes, check to see if the brake is still on.
7. The Windspire spins, but only in moderate to high wind
- This symptom would suggest that there is higher than normal mechanical drag on the unit.
    - Check the drag on the rotor in calm wind conditions. If a string or tape is placed around the top shaft diameter, which is 3.5", the normal pulling force on the tape or

string required to just get the rotor to spin is about 6 ounces, or approximately 10 inch-ounces of torque on the rotor.

- The unit has a slight amount of vertical play in the bottom bearing (.01"). The magnetic bearing balances the spinning mass of the rotor, generator, and shafts within about 20-40 lb.
    - With the unit vertical, push up and down on the generator housing to try to feel this vertical play. If there is no vertical play, either there is an issue with fitments of the bottom shaft, the generator gap is set incorrectly, or the bottom bearing or magnetic bearing is improperly installed.
    - If there is no vertical play on the unit, spin the rotor and check for noise.(See section on noise)
    - If no noise, lower the unit, remove the mag bearing, and check it for a loose aluminum push plate. If loose, remove it and inspect. If the mag bearing is damaged, the damaged parts need to be replaced.
  - The unit will exhibit excessive drag, if the bottom bearing and/or bearing cap is not fully seated due to dirt, , or if the mag bearing is not fully secured against the bottom bearing cap..
  - The bearing fits are designed to be clearance fits. If the bottom shaft was initially difficult to slide into place and required force to install, there may be compression between the two bearings, and a source for drag.
  - If there is noise on the unit, coupled with higher drag, check the generator housing clearance to the inverter base plate. Check the generator gap to ensure it is properly set.
  - The bearing grease is designed to operate at temperatures between -100 F to +275 F. If you have very cold temperatures, the grease will naturally have higher viscosity and present larger bearing drag on the unit. This is normal.
8. There is very large drag
- Check the vertical balancing on the unit by pushing up and down on the generator housing.
    - If there is no vertical play, there is a source of drag on the bottom shaft or generator.
    - If there is no vertical play, and no noise on the unit when it spins, the magnetic bearing is likely damaged and/or not tightened down correctly.
    - If there is no vertical play, and noise is found in the generator, check the generator gap for proper gapping, and reset the gap as appropriate if not correct.
    - If the bottom shaft was forced into place, the bearings could have thrust forces on them due to compression in tight fits, which can cause drag.
    - Check for noisy bearings, to determine if they are seizing up.
9. The Windspire does not spin in any wind
- Check the vertical balancing on the unit by pushing up and down on the generator housing. There will likely be no movement
    - Check for a source of noise on the unit, when forced to spin.
    - Check the inverter base plate to generator housing gap and then the generator gap.
    - Lower the unit, remove the magnetic bearing, and inspect it. If damaged, it will need replacement.
    - Try to rotate the unit. If it rotates freely, the issue was likely the magnetic bearing.

- Check the bearings, to ensure they are not seized. This is a highly unlikely occurrence.

#### 10. The Windspire overspeeds

- This is very dangerous and should never be intentionally allowed to freely rotate. The unit is designed to extract power from the wind, not to freely spin.
  - Remove the inverter insert plate and ensure the generator plug is connected to the inverter.
  - Ensure the opposite ends of wires from the generator are connected together, with a blue wire nut or a crimp with shrink tubing around it.
  - Ensure that the male pins in the inverter socket on the inverter are in the correct position on the socket.
  - Ensure that the wires into the socket on the generator plug are in the correct position in the plug.
  - If all above checks are good, the inverter may need replacement. This is a highly unlikely occurrence.

#### 11. The Windspire overalls

- Symptoms of overalls are that the unit begins extracting power and slows the rotor down to a shutoff threshold point, and repeats this cycle. This symptom will be normal in nominal, light, or low, variable winds.