1. **The turbine spins extremely quickly and noisily but doesn't deliver any electrical current to the batteries.**

   Potential Causes:

   The turbine may be running in an off-load state meaning that the circuit from the turbine to the batteries is not complete. In this situation, the turbine is free spinning and the turbine may be generating higher voltages than anticipated from the turbine output cables. Check that all of the connections from the turbine, through the run / stop switch to the batteries are correct. If a fuse or circuit breaker has been fitted to the turbine, ensure that this is correctly closing the circuit. Never leave the turbine running in an off-load state as it may cause damage to the turbine during high winds.

   The turbine may have developed an internal wiring fault which has resulted in a broken circuit. In this situation, the turbine is free spinning but no voltage will be measurable at the turbine output cables. If an internal fault is present, please contact your dealer or Leading Edge Turbines for further advice.

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2. **The LE-300 rotor hub plate fixings do not correctly grip the rotor hub plate which means that the rotor hub plate can rattle slightly.**

   Potential Causes:

   The rotor hub fixings have been positioned incorrectly in the drive bearing hub. Remove the fixings and replace them in the next hole over. This should allow the fixings to be completely tightened meaning that the rotor hub plate will be correctly installed.

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3. **A slight oscillation can be observed in the turbine tail fin whilst the turbine is rotating at certain speeds.**

   Potential Causes:

   Due to the nature of small wind turbines, a small level of oscillation is acceptable as the turbine passes through certain speeds. This oscillation movement can be minimised by ensuring that the distance between each tip is within tolerance (consult the Installation Manual). Also ensure that the assembled rotor is correctly and concentrically fitted to the drive bearing housing.

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4. **The turbine comes frequently comes to rest in the same horizontal position, regardless of which direction the wind is coming from.**

   Potential Causes:

   Turbines require that their towers are vertical. Although the LE-300 and LE-450 turbines are fitted with counterweights to compensate for the pitching and rolling of a yacht it is still recommended in all applications that the turbine tower is set to be perfectly vertical. The LE-300/LE-450 is designed to be slightly tail heavy so that when it is fitted to a yacht that is healing in the wind, the turbine will favour the windward side.

   As the LE-600 is a ‘downwind’ design, it requires the tower to be vertical in order to track the wind correctly without undesirable effects.

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5. **The turbine never seems to reach its operating speed and does not give any or very little power output.**

Potential Causes:

You may have installed a 24V turbine on a 12V battery system. This means that the turbine will reach its cut-in RPM prematurely and this in turn will stall the blades. Ensure that you have the correct voltage turbine for your application.

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6. **When fitted to a yacht, vibration is transmitted through to the hull of the vessel.**

   Potential Causes:

   Small wind turbines are an electro-mechanical device and as a result a small amount of ‘hum’ can be present during the operation of the LE-300/LE-450. Depending on the type and method of mounting to a yacht, some of the natural hum of the turbine alternator can be transmitted to the hull of the vessel. In order to limit or avoid this vibration transmission, it is recommended that appropriate anti-vibration mountings and bushes are used upon the structure used to support the turbine.

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7. **The turbine seems to be operating correctly, but the electrical output appears to be low.**

   Potential Causes:

   There are many reasons why the turbine may be demonstrating outputs that are lower than anticipated. These reasons can stem from turbulence, erroneous measurements through to battery type and condition.

   Turbulence is the most common reason why turbines do not perform to their specification. Turbines require clean un-turbulent laminar air flows in order to operate at their peak performances. This means that turbines need to be carefully sited in order to avoid areas of turbulence – Unfortunately this is not always possible and compromises need to be made. Please see our knowledge base for information about siting your turbine for best performance. Turbulence created by trees, structures and general topography will all create eddy currents in the wind which will severely reduce the turbines efficiency. Generally, the turbine should be positioned on a tower as high as possible above any local features of the topography.

Ensure that the correct minimum and maximum cable sizes have been installed (as per the user manual). Using a cable that is too small may lead to volt-drop losses, especially on a 12V system. Alternatively, using a cable that is larger than the recommended size may lead to the turbine becoming stalled or semi-stalled which will impair performance.

During operation the turbine alternator will become warm and even hot, especially during high wind events. When this happens, the resistance in the alternator coils dramatically increases which causes the alternator efficiency to drop drastically. This effects the overall output of the turbine. Performance will drop after the turbine has heated up due to prolonged high end running.

Different battery technologies have different rates at which they can absorb power from a wind turbine. The batteries will draw all of the power possible from a wind turbine until they reach their absorption limit. Generally, more battery capacity can be added to increase the rate at which they can absorb power. Battery age and condition will also affect the rate at which the batteries can absorb power – Older batteries or those in a poor condition will not draw the same power levels from the turbine as newer batteries in good condition.

Nominal battery voltages will vary widely. For example, a 12V battery system will operate between 11.5 – 15.0 volts. When the turbine is operating at 100 watts, this will equate to 8.7 amps whilst the batteries are at 11.5 volts, but the same 100 watts only equates to 6.66 watts when the batteries are at 15 volts. When using a current measuring device such as an ammeter, the current reading must be qualified against the voltage reading in order to calculate an accurate power output.

Measurement errors can easily occur whilst measuring both the wind and power output of the turbine. For example, in marine applications the wind speed measurement is often made at the top of the mast which will be approximately 10m + above the height of the wind turbine. The measured wind speeds at this height will be much higher than the wind speeds that the turbine experiences. This may lead to the assumption that the turbine is under performing in any given wind speed. Furthermore, current shunts are often used in low voltage DC systems due to the amount of currents flowing. Ensure that high quality shunts are employed for accurate current readings.