MK4+ Wind Generator FAQ – Frequently Asked Questions:

Q: I have several solar panels on my boat, which use their own charge controller. Is there any problem using my existing controller, and will it interfere with your controller?

A: No, there is no conflict, as both controllers work autonomously to charge the battery. Both will contribute to charging if there is both sun and wind. If there is sun, but no wind (or visa-versa), the individual charging source will supply charging current to your battery on its own. Each will adjust their profile, or discontinue charging when they reach their respective set-point voltages. Just as there is no conflict between your solar charger and your engine alternator, there is no conflict between the solar charger controller and the MK4+ controller.

Q: I have AGM batteries. Your controller does not seem to have an AGM float setting for AGMs, so I think your set-point voltage of 14.4V is too high. Will I be okay?

A: Yes. Our controller is made to work perfectly with all lead-acid based batteries (Gel, Flooded, VRLA, and especially AGM's). The vast majority of our customers are cruising sailors using AGM batteries due to their long-life, and their ability to accept charge more quickly. AGMs are great for cruising, and are a great match with our wind generator.

The confusion regarding set-point voltages seems to stem from the general misunderstanding of the float stage of charging. Quite simply, float is a maintenance or storage charge profile which comes into play only when storing your batteries while charging. It is strictly a lower- voltage charge which is just enough of a trickle-charge to prevent the battery from naturally losing its charge over time when the battery is stored for a prolonged period. Float voltage can only come into play if the batteries have no loads whatsoever, and they are being stored for an extended time while connected to a charging source. The moment a battery has a load placed upon it, it is no longer in float. The best example of a situation where float comes into play is the case where a golf-cart roams around the golf-course, and then comes back to the clubhouse and is then connected to a charger for a long recharge. Once it is recharged, it may sit there for days at a time attached to the charging source. Because there are no external loads on the batteries during this time, to prevent damage to the batteries the charger must either shut off, or go into float. If the charger could shut itself off, this would be great, except that if the battery remained stored for a long period it would begin to lose its charge. The solution in this case is a float charge, where the charger simply lowers the voltage to a maintenance voltage, which is just enough to keep the battery from discharging naturally.

The important point is that the moment that there is a load, the battery cannot be in float, and the fact of the matter is that cruising boats are never in a float situation. Even in the situation where the boat is connected to shore power with a float type charger, with absolutely no on-board loads, and the batteries are fully charged, there is no conflict. The moment the wind generator sees a full battery it will stop charging. It will stay in this mode indefinitely until the battery reaches about 13.5 VDC. This of course won't happen when because the float mode on the boat's battery charger is maintaining the battery at its float voltage.

Q: I want to use lithium batteries (LiFePO4). Is your wind generator compatible?

A: Yes, providing you are using "drop-in" type batteries with an integrated BMS. If you are purchasing quality-brand commercial marine lithium batteries, then they will have a BMS built-in, and there are no charging issues using the MK4+ controller. The same voltage setpoints are used for lead-acid chemistries and LiFePO4. The confusion about compatibility has to do with multi-stage shore-power chargers and smaller "dumb" alternators. Shore-power chargers typically have float and equalization profiles, which are not healthy for lithium batteries. Lithium batteries do not suffer from sulfation, so they don't need float or equalization. The MK4+ charge controller in an IU (2 stage) charger, and does not have these charging modes. Because of the low internal resistance of lithium batteries, charging with "dumb" alternators (without smart regulation), can force the alternator into running at 100% duty-cycle at very high currents, which can (and eventually will) kill the alternator. The wind generator is not powered by an engine, and has a built-in microprocessor-regulated charge controller, so it already has the smarts it needs to prevent damage from excessive current, over-temperature, etc.

An interesting fact is that load-wise, a lithium bank "looks bigger" to a charging source than a similar sized lead-acid bank (in Amp-Hours). This is because lithium batteries have a lower internal resistance than lead-acids, and therefore have more load. When resistance goes down, the load (and torque) goes up. This is why an alternator belt and regulator upgrade are usually suggested when migrating to lithium. Another fact is that transfer of energy from a source to a load is more efficient if the source and load are matched impedance-wise. What that tells us is to be careful when selecting the size of the battery bank that you will couple to your existing charging sources. We think that many cruisers over-size their bank when moving to lithium, thinking that bigger is better. Oversizing a bank has diminishing returns, and can require upgrading alternators, solar panels, shore-power chargers, belts, pulleys, wiring, fuses, etc. While it gives you more time between charging, the charging is longer and requires bigger (or more) charging devices. We recommend that you first decide how many days you can "survive" on the hook without any wind or sun before you must run your engine or genset. Let's say you think 3-days is acceptable. Then do an energy audit and calculate the size of the bank you need. If you use 100Ah each 24-hour day, you will need 300Ah of useable capacity to get 3-days of autonomy, or about total 425 Ah of total bank using lithium (at 70% discharge).

Q: How high should I mount the wind generator?

A: The higher the better, because the wind speed increases the higher up you go, and there are fewer obstructions on-board that can leave a wind-shadow. Most Marine wind generators are mounted 8' to 12' above the deck. The wind generator should certainly be mounted higher than the tallest crew member can reach, and it should be clear of any stays, booms, lines, etc. We recommend that you have at least 8" of clearance from any object. The spinning blades can cause serious injury, so plan your mounting location carefully. Tie a light lanyard to the tail that terminates in a large loose loop around the pole. This lanyard can be used to safely turn the wind generator away from the wind for manual furling.

You should also mount the pole and its attachments such that the pole can be pivoted down for access to the wind generator when needed. The pole should be structurally sound to accommodate the weight and aerodynamic forces in a seaway, and include at least 2 solid triangulated stays for support. Please note that wind generators on very long poles can be more subject to harmonic vibration.

Q: Where is the best place to mount the charge controller?

A: Generally the charge controller should be mounted as close to the wind generator as practical, and in general proximity to the batteries. You should mount it where routing the cables is easy. This normally means mounting it on a bulkhead or in a locker in the cabin below where the pole is mounted. Leave several inches of room around the controller for air movement and cooling. Avoid excessively hot or damp environments. While it is a hands-off controller, you should mount the controller where it can be accessed easily when you wish to see the display or activate the braking function.

Q: Do I need a stop switch?

A: No. The MK4+ controller has an integrated manual stop switch, and it also has an automatic braking function, so a separate auxiliary stop switch is not necessary for most applications. If access to controller is difficult, or you wish to locate a remote switch in another location, it is possible to add an auxiliary remote stop switch. Contact tech support for details and pricing.

Q: We are expecting a hurricane in our area. What steps should I take to secure the wind generator?

A: While the MK4+ can easily accommodate winds greater than 70 knots, we recommend that you remove all sources of windage on your boat, including the wind generator and pole, when anticipating storm-force wind conditions. Remove the wind generator, then hub and blades, and store securely down below.

Q: I plan to leave the boat for a few months. What should I do with the wind generator?

A: Like most rotating equipment left alone in the tropical marine environment, wind generators like to keep moving. Outside of hurricane season, it is fine to leave the wind generator unattended for weeks or months, assuming it maintains its connection to the controller and batteries. Never disconnect a rotating wind generator from the batteries or controller, and never remove the blades and hub, leaving the wind generator exposed on the pole. It is preferred to remove the wind generator from the pole, lightly grease the bearing face and rotor shaft, and store it below.

Q: The 10AWG wiring that you recommend between the wind generator and the controller seems very heavy. Can I reduce the wire size?

A: The 10AWG wiring size is calculated to minimize the voltage drop at the maximum output (400W), over a 30 foot cable run. However, out there in the real world, the chances of the wiring ever seeing a maximum load at the maximum distance is very slim. This is because as the wind builds in velocity, it does so over time, and during that time the battery is building up its charge. As the battery charges, its acceptance rate diminishes, meaning it can accept fewer and fewer Amps. So it is very difficult to have a low battery in a high wind, because as the wind was building in speed, the battery was charging, and its acceptance rate was falling. If the controller is located within 30 feet of the controller, there is no problem going down to a size 12AWG. If your run exceeds 30 feet or if you have devices on-board that regularly draw more than 15 or 20A of load, then you should stay with the 10AWG wire size or bigger. As a general rule, the bigger the wire, the better the performance.

Q: What kind of maintenance should I perform on the wind generator?

A: While the wind generator arguably operates in the planet's worst conditions, it should provide years of maintenance free service. The bearings, slip rings, and finish are designed to last; however, there are some helpful tips from protecting your investment:

- Regularly inspect your wind generator, especially after a passage.
- Inspect the blades for salt build-up, UV damage, nicks, etc.
- Remove the nose cone, and check the tightness of the blades, especially in the first few weeks of service.
- Apply waterproof grease to the area where the shaft and bearing intersect.
- Rotate the blades and yaw pivot by hand to feel for any bearing wear, corrosion or rough spots.
- While the wind generator is made of aluminum and magnesium, and the finish is truly the best marine grade finish available, the marine environment can (and will) take its toll if the finish is not well maintained. In addition to regular fresh water cleaning and waxing, any chips, cracks, or noticeable corrosion should immediately be addressed to prevent further corrosion. Any chips or bubbles should be sanded or wire-brushed and top coated with appliance enamel paint. You should expect fading, chipping, and some corrosion over time, but it will not affect the wind generator performance.
- When leaving the boat for extended periods, leave the wind generator unfurled, or store it down below. The wind generator and the bearings prefer to be turning.

Q: I just installed the wind generator and it does not start-up until we get about 7 knots of wind. I thought it would start turning at about 5 knots.

A: It will, but there is a short break-in period for the grease in the bearings to distribute, and for the bearings to free up for optimum low speed performance. Wait for a couple of big wind days to turn the blades at high RPM. After a few big-wind days, you will notice the generator starting up with less and less wind, and much earlier than others. You may also find that there can be up to a 20% difference in the wind at the masthead, compared to wind on the deck. This is particularly true at the dock, or near trees or buildings. Wind shadows can persist up to 300M at ground level.

Q: We have very light winds, and the wind generator is turning slowly, but it is not charging the batteries.

A: The cut-in speed --the point where there is enough RPM, and therefore voltage-- to charge the batteries is managed by the controller, and is affected by the loads which are currently being imposed upon it, and the wind's ability to overcome the torque required to turn the rotor at a high enough RPM . Depending on the state-of-charge of the battery, and current loads, the wind generator will normally begin charging at 6 or 7 knots, but may begin turning somewhat earlier.

Q: I am not getting the amperage from your wind generator that you show in your chart. Why not?

A: The maximum power (or current) shown in performance charts are produced to an industry standard, and show the maximum output possible given a specific laminar wind flow, and most importantly a matched load.

All generators, no matter the type or manufacturer, produce their maximum power at the ½ no-load speed. This can be more easily understood if you first consider a wind generator at its maximum load. Imagine your wind generator hooked up to 100 batteries. The load would be so great that the normally spinning wind generator would stall. This is because the load would be greater than the torque the wind could provide. A stalled wind generator has a high load, but zero Volts, so is making zero power in Watts. Now imagine the same wind generator in the same wind conditions, but now disconnected from the batteries entirely. In this scenario the wind generator would be would have no load whatsoever, and would be freewheeling. It would be spinning ridiculously fast in this no load condition, and would be making very high voltage, but again zero Watts. So at a specific wind speed we can now imagine a plot or curve of power (in Watts) vs RPM according to the load. The curve would be a parabola, and show zero Watts at no load speed, and zero Watts when stalled. It would also show maximum Watts half way between these two points at ½ no-load speed.

So what does this tell us? It tells us that in order to get maximum power, we need a matched load, which doesn't necessary happen day-to-day, because the loads, and the state of charge of the batteries are always varying on a cruising boat. So, if you plotted the power output and wind speed on-board your boat, you would quickly find that the wind gen would make the power you expect at certain times, but not at other times. You would also find that the battery's state-of-charge is a critical factor, but why?

All wind generators, and in fact all DC charging sources, no matter what their size or capacity, can produce only the amount of current (Amps) that your battery or ongoing loads can accept. As a battery reaches a fuller and fuller state of charge, its acceptance rate (the amount of charging amps that it can accept) falls logarithmically. In fact, the definition of a fully charged battery is one that cannot accept anymore Amps.

Most folks are familiar with automotive type battery chargers that plug into the wall, and usually have a small analog Ammeter on the face. When attached to a depleted battery, the meter jumps to maximum Amps, but then continues to fall to zero Amps over the course of a 12-hour charging cycle. Using the meter, we will know the battery is full when it can accept no more Amps. So, let us say that this automotive charger is a 10A charger. If you tested the output of the charger when you first connected to the battery you would be quite happy to confirm that it is indeed a 10 Amp charger. However, if you tested it the next day, you would find that its output is zero! But you bought and paid for a 10A charger! This is the nature of batteries and their chemistry.

You might see by now that wind generator works the same way as the battery charger described above. Let's use the example of two-day period where the wind is blowing a very steady 15 knots. You decide to test the wind generator's output against the manufacturer's curve during these 2-days. The first day, the battery bank on-board is quite depleted, and it is therefore capable of accepting large amounts of current (Amps). You measure and compared the power results to the wind generator manufacturer's maximum output curve, and you are ecstatic. The following day, however, you run the identical test, at the same wind speed, and are disappointed. The results fall well below the manufacturer's curve. This is because the battery has been charging all night long, and is now at a high state-of-charge, and therefore its acceptance rate is diminished.

Matching the manufacturer's curve day-to-day is made even more difficult by the fact that we cruisers try to avoid depleting the batteries by more than 50%, so we tend to live on the high side of the battery state-of-charge curve where the acceptance rate is quite low.

When we at MarineKinetix characterize the wind generator's output for our curves, we use an industry testing standard where we use a variable load, so we are always providing a matched load to the wind generator. This allows us to measure the actual power that the wind generator makes at all speeds. This is very difficult to simulate on-board because of the battery's acceptance rate limitation. The truest test of the MK4+ is to go cruising, and continue to use your loads as you normally would. You will find that when you have wind, you have plenty of power, and you will arrive with fully charged batteries.

Q: I expected this wind generator to be very quiet, but I am getting a noise and a vibration when the wind comes up. Is this normal?

A: No, it is not normal. If you are getting any noticeable abnormal blade noise or vibration, other than the typical harmonics, then there is something wrong. If your pole and wind generator are mounted securely, then this is most likely just a disconnected or shorted wire from the wind generator to the controller. Check to be sure all wires are connected, tight, and not chafed through at both the mounting collar and the controller. Also check to be sure that the wires are not chafed at any point where the turn a corner within the pole or arch tubing. A loose or shorted wire will cause the load on the 3-phase rotor to be out of balance

If you are experiencing vibration or noise in a new installation, it could also be a blade which is not seated correctly on the hub. This can occur when the fastening instructions in the set-up manual are not followed, and the blade does not seat properly. Just loosen the blades, and follow the tightening sequence in the manual. This will solve it.

Q: I hear wind generator noise when the wind suddenly changes directions, or when the brake is applied. Is this normal?

A: Yes. When the wind generator is turning it is very quiet, but when it suddenly encounters air from a different direction, or if the relative speed between the wind and the blades differs significantly, a wind shearing noise can be heard. It is similar to sailing. When the wind is flowing correctly over properly set sails they are very quiet, but if the wind suddenly shifts, the sails become quite noisy momentarily until the sails, or the boat, are adjusted to the new wind angle.

Q: The wind is blowing quite hard, and the wind generator was turning earlier, but now our wind generator is stopped (or turning slowly). Every other wind generator in the anchorage is turning. Is there something wrong?

A: No! If the wind generator is stopped, or turning very slowly it means your batteries are fully charged, and your beer is cold. The MK4+ has a smart controller that uses automatic Hysteresis Braking to actively stop the wind generator if the batteries are charged. Many other wind generators (KISS, Superwind, etc.) just divert the extra power to a bank of resistive heating elements, which may not stop their generators, even when the batteries are fully charged (or when the wind is at 50 knots!). Wind generators with these crude resistive diversion loads will reach tremendous speeds, and make a tremendous racket, all night long, even when the batteries are full.

Q: Everyone claims they have the best wind generator. How do I really know which one is the best?

A: Good question. Do your homework and learn all that you can.

First, engage the company that is selling the wind generator. Do they offer just a short cut-sheet type brochure, or does their website have page after page of detailed information? Do they explain what went into their design, and why it is better, or do then just make claims? Do they help you learn, or leave you with more questions than answers? Are they attempting to mimic a big-box type retailer by offering a dozen different brands, or are they focused on a specific type of marine wind generator that they know inside and out, and use on their own cruising boats?

To fully understand what you are buying, let's first review some basic wind-power physics. To make usable power, one obviously needs wind. It should also be clear that the wind's power is proportionate to the cube of the wind velocity. What this means is that there is 27 times more energy in a 15 knot wind than there is in a 5 knot wind. Wow! So, the basic rule of thumb here is that you need good wind, regardless of the wind generator's claims. If you don't regularly have good wind (say 15 knots), then you will be disappointed with wind power.

Physics also dictates that for with any given wind speed the power produced from the wind generator is a function of the swept area of the blades. In other words, the bigger the swept area, the more power can be extracted from the wind. It makes sense that if you can intercept more of the available windstream with the blades, then you can capture more of the available energy. What is amazing is that every inch of blade diameter counts, because swept area is also an exponential function (Π R^2). While hard to believe, if we compare the MK4+ with its 1.33 meter blade diameter to a standard wind generator with a 1.1 meter blade diameter, the MK4+ has 46% more swept area! This means that the blades can also intercept and extract power from 46% more wind.

So, how does that help you? Well, you now know that more wind is better, and that the bigger the blade diameter the better. So, start with wind that has power, and capture that wind with a big swept area. A big swept area also allows a big generator head with more power.

A big generator normally means heavier blades and a heavier housing, right? Not in our case. Because we use rare earth magnets with high-energy-density, a magnalium case, and carbon fiber composite blades, our wind generator weighs less than half of our main 400W competitors. This means very low rotational inertia, low polar moment, and very low yaw error. Best of all it means a low start up speed, which is lower than our competitors.

Q: What is "wild AC", and why do most wind generators make AC, which then needs to be converted to DC?

A: Our MK4+ wind generator produces wild 3-phase AC. Wild AC just means that the AC's frequency and voltage vary with the speed of the wind turbine. AC in homes, and from gensets, comes from generators where the speed is regulated to a specific RPM, and therefore so are the frequency and voltage. Our wind generator's frequency and voltage are based on its RPM. Voltage is proportional to RPM, and with 12 magnetic poles, the frequency calculates to 10Hz for every 100 RPM.

It is good to know that while there are indeed generators that are referred to as "DC Generators", all generators, motors, and transformers in fact only operate via AC. Faraday's Law of Inductance insists upon that. Said another way, all DC generators are actually AC generators which are mechanically *commutated* to produce DC. DC generators convert their AC wave-form into DC by using a commutator, which is a segmented copper wheel which has carbon brushes riding upon it. The brushes are connected to the output with opposite polarity, so the polarity is switched each time a brush contacts the next commutator segment. Due to the rotary switching, and the brush-to-commutator friction, the brushes wear down, create dust, and cause RF interference.

Due to the absence of brushes, and the fact that they have fewer parts, AC generators tend to be less expensive, and are maintenance free. Our permanent magnet synchronous AC generators are also typically deemed to be more efficient, although electrical engineers seem to fall into two distinct camps regarding this topic. The downside with AC wind generators is that they require 3 wires between the wind generator and the controller, and the AC must be converted to DC electronically. This is done using modern solid-state rectifier electronics, which are inside the controller.

Q: Why only 3 blades? Why not 2, or 5 or 6 like some wind generators?

A: Another deep topic, with many answers. With modern wind generators, and with modern computer-aided blade design, 3-bladed turbines are considered to be best for high-performance in moderate winds. Look at all the large format wind turbines around the globe, and you will see that 3-bladed turbines are the standard. 3-bladed turbines are the best compromise for power, tip speed ratio, mechanical balance, and gyroscopic balance.

While 1 blade would technically be the most efficient aerodynamically, there are obvious balance problems with that configuration. Two blades are well balanced from a mass perspective, but not so well balanced gyroscopically. We all know that a figure skater speeds her rotation by tucking her arms in, and likewise slows herself down by extending her arms. She slows because the mass of her arms extended away from her spinning axis increases her moment of inertia, and she speeds up because her tucked-in arms reduce her moment of inertia. Now imagine a 2-bladed wind generator on a pole. As the blades rotate around, there is a single point in time where the blades are both vertical and therefore are both as close as they can possibly be to the axis of rotation (yaw or pole axis). This is analogous to the figure-skater with her arms tucked in. When the blades are both vertical like this it should be easy, from a gyroscopic perspective, for the wind generator to turn on its yaw axis (the mounting pole axis). However, as the wind generator blades continue to rotate, there is also a moment in time where the blades are now horizontal, with the mass of both blades as far as it can possibly be from the axis of rotation. So, you can see that when the wind generator blades are spinning, they are alternating between two distinct and opposite states, one which encourage yaw (blades in the vertical position), and one which resist yaw (blades in the horizontal position). For each revolution of the blades it switches states four times. While at first glance we would think 2-blades would be perfectly balanced, when we add a yaw axis to the mix this creates a gyroscopic imbalance which contributes to structural stress, noise, and vibration.

In the case of a 3-bladed wind generator, there is never a moment in time where the blades are positioned such that more than one blade is as far from the axis of rotation as it can possibly be. At the point when one blade is at its maximum distance away from the axis (it is horizontal), then there are also two blades that are very close to that axis. This effectively balances out the moment of inertia, providing a more constant resistance to yaw, and a better gyroscopic balance.

While there is a technical case that can be made for 4, 5 or 6 bladed wind generators, the physics gets more complex, and there are diminishing returns. There is clearly more mass, more drag, more cost, and a potential speed issue. A perfect wind generator would have perfect rotary speed such that the blades moved fast enough so that they could intercept most of the wind passing through their arc. This would enable the blades to capture, or transfer, the power from most of the wind which is passing through the area swept by the blades. On the other hand, if the blades moved too slowly, much of the wind might pass through the gaps between the moving blades without ever contacting a blade. This would mean the blades lost their opportunity to capture the power from the wind.

So faster is better, right? Nope --not quite. If the blades move too fast, or if there are too many blades, then the blades begin to look like a solid disc to the wind, and the wind begins to pile-up in front of the blades, which restricts the flow of air through the area swept by the blades, especially as the wind speed increases. This also loses power. Additionally, the fast-moving blades leave a wake of disturbed air behind, which doesn't have time to dissipate before the next blade arrives in the same location. This too reduces energy capture. So, you can see that too many blades, or blades rotating too fast, are also detrimental to energy capture.

The key to multiple blade systems which have more than 3 blades is that they need to operate at lower rotational speeds (have a lower tip-speed ratio). This means that they have to have much more expensive generators with more magnetic energy and more wire to make the same voltage at a slower generator speed. More blades have more surface area, and typically will start quicker than 2 or 3 bladed designs, but as the wind builds so do the problems related to the physics above.

Q: I am docked at a marina, and we have gusty winds. Sometimes when the wind suddenly stops, the wind generator spins around. What is happening?

A: It must first be noted that we have found that the winds in a marina are very fickle, and are influenced by all the hardware (other boats, rigging, masts, pilings, etc.) upstream and downstream of the wind generator. Wind generators love laminar flow, which is pretty much non-existent in a marina environment. If you want to gauge the performance or normal operation of the wind generator, then get out on the open water. Marinas are a horrible place for wind generators.

There are many aerodynamic and seemingly magic gyroscopic forces operating on a wind generator. Normally the tail balances out these forces and keeps the wind generator stable and pointed into the apparent wind. When the wind suddenly stops, or changes directions, the forces which were maintaining the tail balance are also suddenly stopped, however the blades' inertia allows them to continue to spin, creating gyroscopic precession forces, which can magically turn the generator at the yaw axis. Additionally, when the wind drops suddenly, a pole that is not 100% plumb (the boat is heeled) will also allow the wind generator to seemingly rotate by itself. This is because it was the wind that was actually keeping the wind generator straight to begin with.

Q: What typically goes wrong with your wind generator? Do I need extra blades?

A: More than 90% of calls and emails we get are related to disconnected, loose, or chafed wiring, which is easily solved. Normally this is caused by the weight of the wires running down the pole pulling the connections apart, or by the wiring scraping and chafing against something sharp inside the pole or arch. It is very clear that the time spent during the installation on preventive measures will save the installer time and energy later.

We also occasionally get calls that the wind generator is turning slowly or making noise due to a bad bearing. In every instance the bearing issue is caused by the wind generator being tied-up, or the brake deployed, for long periods of time (weeks or months). If leaving the boat for extended periods it is best to leave the wind generator working, or removed and stored below. Follow the instructions in the manual if leaving the boat for an extended time.

We can ship blades anywhere in the world cheaply, but we doubt you'll need any spares.

My flag halyard got caught on the nose cone and when I tugged on it, the nose cone was flung it into the sea, and sunk before I could retrieve it. What can I do to make it float? The nosecone is actually fastened very securely onto the hub, and if properly installed will not fall off on its own. If it does get knocked off by another object, it will usually be cracked or broken, and will need to be replaced. But, you can easily make it float by gluing a solid 2" Styrofoam ball (available at crafts stores) into the inside center of the nosecone. Any good waterproof glue should work if it is compatible with polystyrene.

Thanks for your feedback and pictures of your installations.

In the 11 years since the first MK450 was produced (which is still operational, with original blades, on a full-time cruising boat), we have made dozens of upgrades and improvements. While wind generators are pretty basic devices, the excellent feedback from bluewater cruisers have allowed continuous improvement, which has made the MarineKinetix a very robust device, and we still proudly stand behind each and every one.

KEEP YOUR QUESTIONS COMING