April 2020 Rev. A

KBI MKSM Marine KAPower Starting Module FAQs

1. Q: Do I need to retain some battery power?
   A: Yes, we can't eliminate all engine batteries. Some battery power must remain for the engine's electronics and other ancillary electrical loads. The KBI is there for the engine starting needs. One KBI starts all the engines but some battery power has to remain for the engine's ECMs, the boat's blowers, pumps, lighting, Etc.
2. Q: What does Power Density mean?
   A: There are basically two (2) ways to "rate" any energy storage device (battery or capacitor) capabilities. Those two ratings are Power Vs Energy.
   Think of runners, competitors running in a foot race.
   Power is what the sprinter has. He can bolt-out and get going fast, but only for a brief period of time. The marathon runner has energy, he may not be as fast as the sprinter, but he keeps going and going.
   Supercapacitors have great power density but rather poor energy density (as compared to a battery). But what makes a supercapacitor a supercapacitor is that its energy density is high, as compared to that of the traditional electrolytic type capacitors that are used in most applications. It would take a pallet-load or more of electrolytic type capacitors to give you the energy density of the KBI MKSM 6 pack of supercapacitors. The supercap is known to be an ideal energy storage device for "pulse-power" applications, like engine starting events. Engine starting events require a lot of power (amps / current) for a brief period of time, on a repetitive basis. It's like the supercapacitor was made for it. Batteries are better at providing energy, running the blowers, pumps, lights, etc.
3. Q: Can you relate the supercapacitors to the CCA, MCA, RC or AH of batteries for comparison?
   A: No, capacitor ratings and battery ratings are for the most part, not comparable. For a complete, technical response please reference:
   https://koldban.com/wp-content/uploads/2022/06/TR0007.pdf
4. Q: If the battery is parallel with the supercapacitor and the battery goes dead, how does the supercapacitor work?
   A: There is a contactor inside the MKSM box. The contactor terminals, circuit is normally open, there is no capacitor power at the MKSM terminals unless that contactor is closed. The contactor is only closed during engine starting events, when the driver engages the engines starter motor(s) or when the MKSM is being recharged. Otherwise the MKSM is isolated from the batteries, electrical system, while the engine is not running, waiting for the next engine starting event. Truly independent from or relying on the SOC of the batteries.

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5. Q: Why would I want a MKSM that isolates itself after the engine starts versus the MKSM that stays online while the engine is running?
   A: If there are considerable electrical loads to contend with while the engines are running it would be beneficial to keep the MKSM online. The supercapacitor has very low internal resistance so it will provide power to those electrical loads, on demand, helping reduce or buffer any brownouts the electrical system may suffer.
6. Q: What is the self-discharge rate? Meaning, how long will it retain enough energy to start engines assuming the battery chargers and batteries are completely off/dead?
   A: Fully isolated, enough energy is retained for over a year for an engine start - see *KBI KSM61200 self-discharge* chart. Also consider the lower ESR in the supercapacitor so it's effective for engine starting down to 10 volts or even less.
7. Q: What is ESR?
   A: Equivalent Series Resistance. Basically, the internal resistance, the ease or ability of the device to take on a charge or give up a charge. High resistance means it is difficult, low resistance means it is easier.
8. Q: What safety considerations when hooking it up – do you need to make initial connection through a resistor?
   A: The MKSM supercapacitor (KBI system) is supplied charged and retains a charge so initial connection is not an issue.
9. Q: Can I electrocute or shock myself?
   A: No, the KBI KAPower supercapacitor is not a high voltage device. It supplies the same amount of voltage that it was charged up to. A charged MKSM module should be treated as a fully charged battery.
10. Q: Is there a current limiting system for safety or is the full amperage from the capacitor allowed to flow instantaneously?
    A: OHM's law dictates how much current is supplied to the load. The load (cranking motor) has a known resistance which determines how much current the capacitor will deliver. It's actually more like having a fully charged battery always available.
11. Q: How many times could a single unit start all five Seven Marine 627 engines at once before it was dead, assuming no other charge/storage source was working?
    A: Using our 10 cell, 12 volt module, alone, all by itself, approximately 20 starts could be achieved on that engine (automotive 6.2 liter type engine) before a recharge would be required.

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