



*Don't rely on lead-acid batteries to start your engines.*

**KSM™**  
**KAPower Starting Module**  
Eliminate No-Starts from "Dead" Batteries  
When you install KSM™ in your boat



**MKSM612-- Performance Data**

**KBI** KOLD-BAN INTERNATIONAL We Are The Expert Leader In Engine Starting Solutions  
[www.koldban.com](http://www.koldban.com)

January 2020  
Rev. A

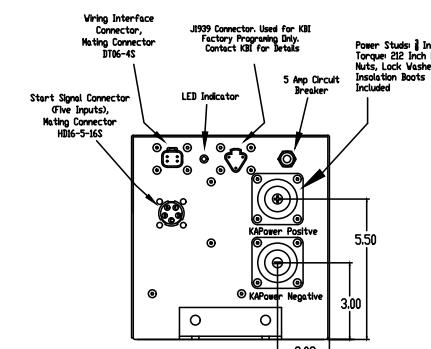
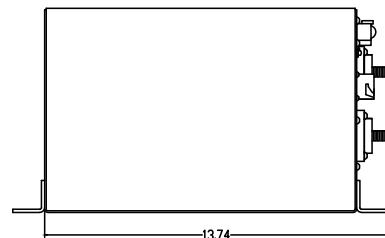
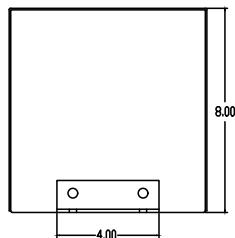
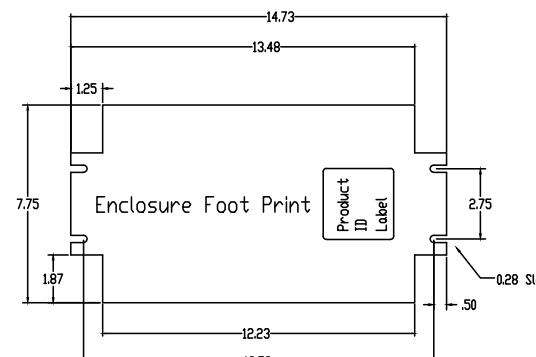
CAPACITOR ELECTRICAL PROPERTIES (@ 77°F / 25°C)			
OPERATING VOLTAGE WINDOW	7-145 VOLTS	INTERNAL RESISTANCE	0.0011 OHMS
ULTIMATE MAXIMUM VOLTAGE	18 VOLTS	CAPACITANCE	525 F
ULTIMATE MINIMUM VOLTAGE	0 VOLTS	MAXIMUM POWER	47 kW
CURRENT LEAKAGE @ 18V	4.5mA	CYCLE LIFE	2,000,000 CYCLES
ENERGY STORED WITHIN OPERATING VOLTAGE WINDOW	42.3 KILOJOULES	ENERGY STORED AT MAXIMUM VOLTAGE	85.1 KILOJOULES

Weight:  
Approx 21.5lb

Material:  
Shell: 16ga SS 304 2B  
Cover: 18ga SS 304 2B  
All Fasteners SS

PART NAME: KAPOWER SYSTEM, KSM,			
6 CELL, MARINE, Multiple Engine			
PART NUMBER:	MKSM61201		
CUSTOMER NUMBER:			
SIZE DRAWN BY:	<i>J. G. Banks</i>		
APPROVED BY:	<i>J. R. Scherry</i>		
D	DATE: 12/31/19		
SCALE: None	UNLESS OTHERWISE SPECIFIED DIMENSION TOLERANCES ARE: X .0015, XX .0010, XXX .0005. ANGLES ±0°. FINISH PER MIL. STD-19. DO NOT SCALE DRAWING.		
REV. I	DESCRIPTION	DATE	BY APPRV'D

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*So what does this mean to the boat or the boat builder?*

**When you install KSM™ in your boat**

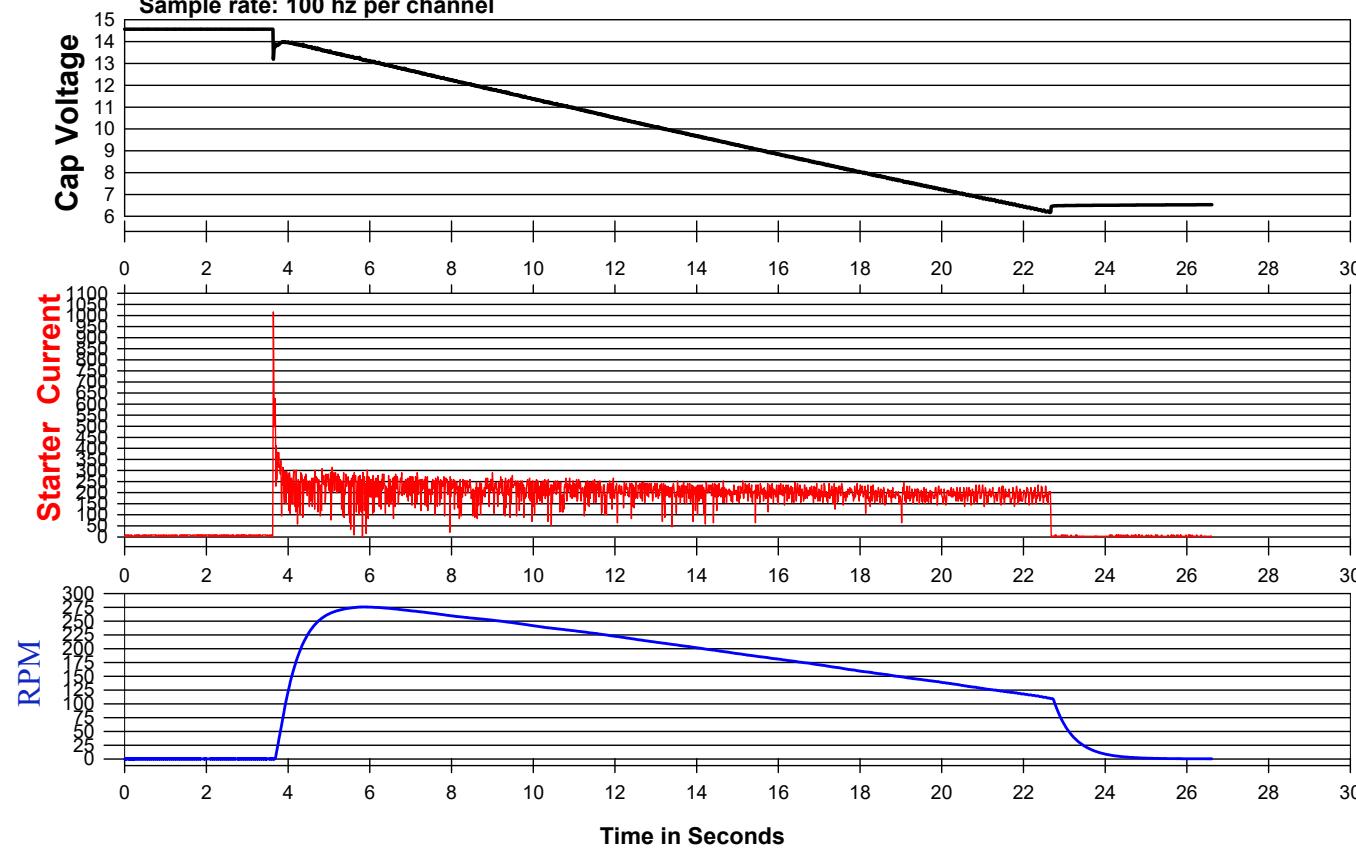


- ◆ The KSM Supercapacitor module is powerful enough to supply cranking power without the use of lead-acid batteries.
- ◆ Available as a 12 or 24-volt module, one module can provide 24 volts - no need to series modules (batteries).
- ◆ One module is all that's need to start several engines - eliminate multiple battery banks.
- ◆ The KSM can be left "on-line" while the vessel is in operation, buffering electrical brownouts.
- ◆ It is truly maintenance free and will last the life of the vessel.
- ◆ No gassing, no ventilation required. Can be installed in virtually any orientation.
- ◆ It can be installed in remote locations, not needing access for change-out like the batteries do.
- ◆ It will provide weight savings and space savings.
- ◆ When isolated it will retain sufficient charge for engine cranking for extended periods of time.
- ◆ It can be recharged almost instantaneously (within seconds) if need be off the house batteries or any other DC power source.

## 2 Stroke, 200HP, V6, 200 CID (3.3 L) engine Crank Test Data

Test Date 8/23/18

Sample rate: 100 hz per channel

Modules Tested:  
6 Cell 42.3 kJ

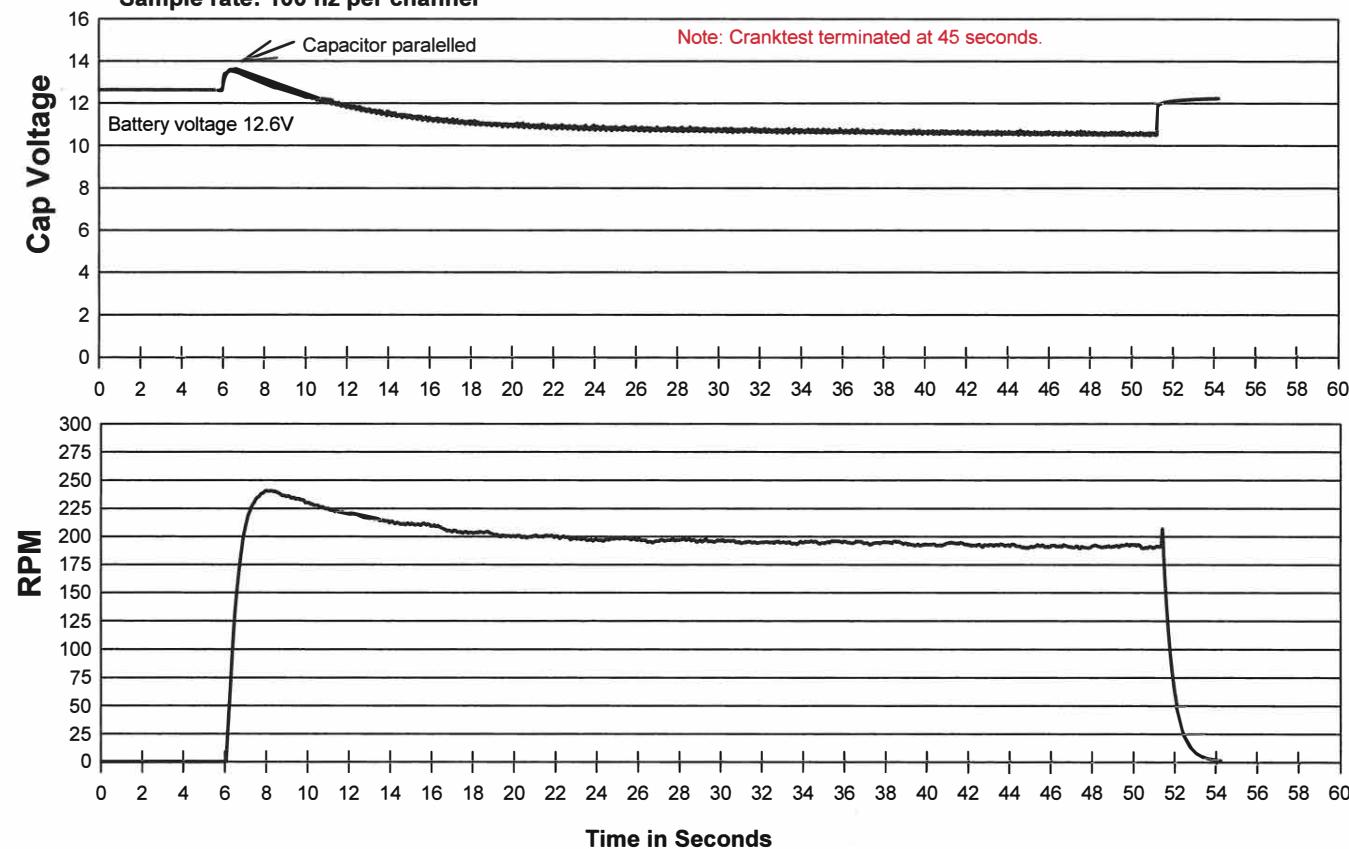
Test Performed by: KOLD BAN INTERNATIONAL 8390 PINGREE RD. LAKE IN THE HILLS, ILLINOIS 60156 (847)658-8561

## 2 Stroke, 200HP, V6, 200CID(3.3L) engine 6 Cell Capacitor / Fully Charged Battery Crank Test

Test Date: 4/10/19

Sample rate: 100 hz per channel

Modules Tested:  
6 Cell 43.3 kJ  
Battery used:  
Duracell 24MS  
650 MCA



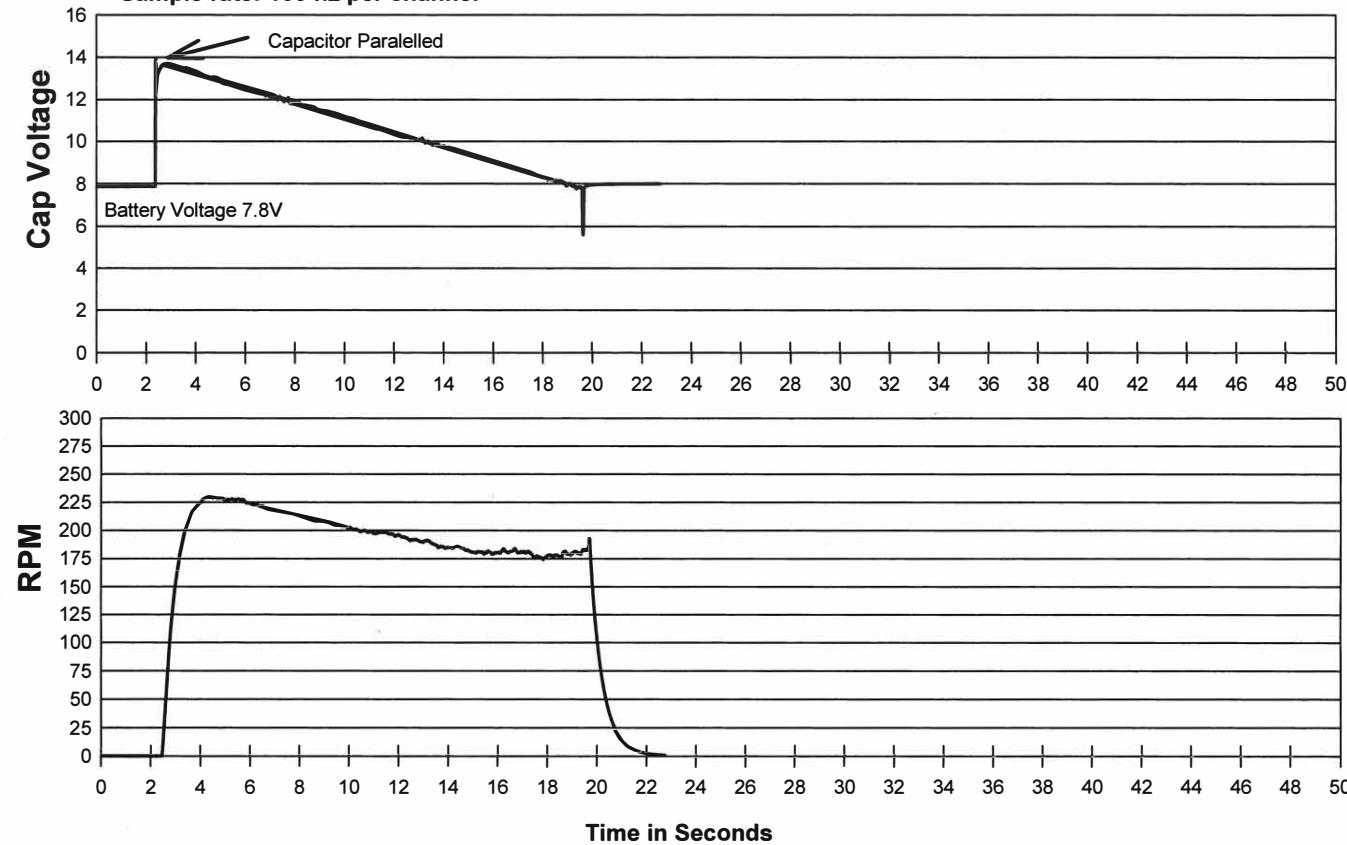
Test Performed by: KOLD BAN INTERNATIONAL 8390 PINGREE RD. LAKE IN THE HILLS, ILLINOIS 60156 (847)658-8561

## 2 Stroke, 200HP, V6, 200CID(3.3L) engine 6 Cell Capacitor / Discharged Battery Crank Test

Modules Tested:  
6 Cell 43.3 kJ  
Battery used:  
Duracell 24MS  
650 MCA

Test Date: 4/11/19

Sample rate: 100 hz per channel



Test Performed by: KOLD BAN INTERNATIONAL 8390 PINGREE RD. LAKE IN THE HILLS, ILLINOIS 60156 (847)658-8561

## 2 Stroke, 200HP,V6,200CID(3.3L) Engine Capacitor Module Crank Test

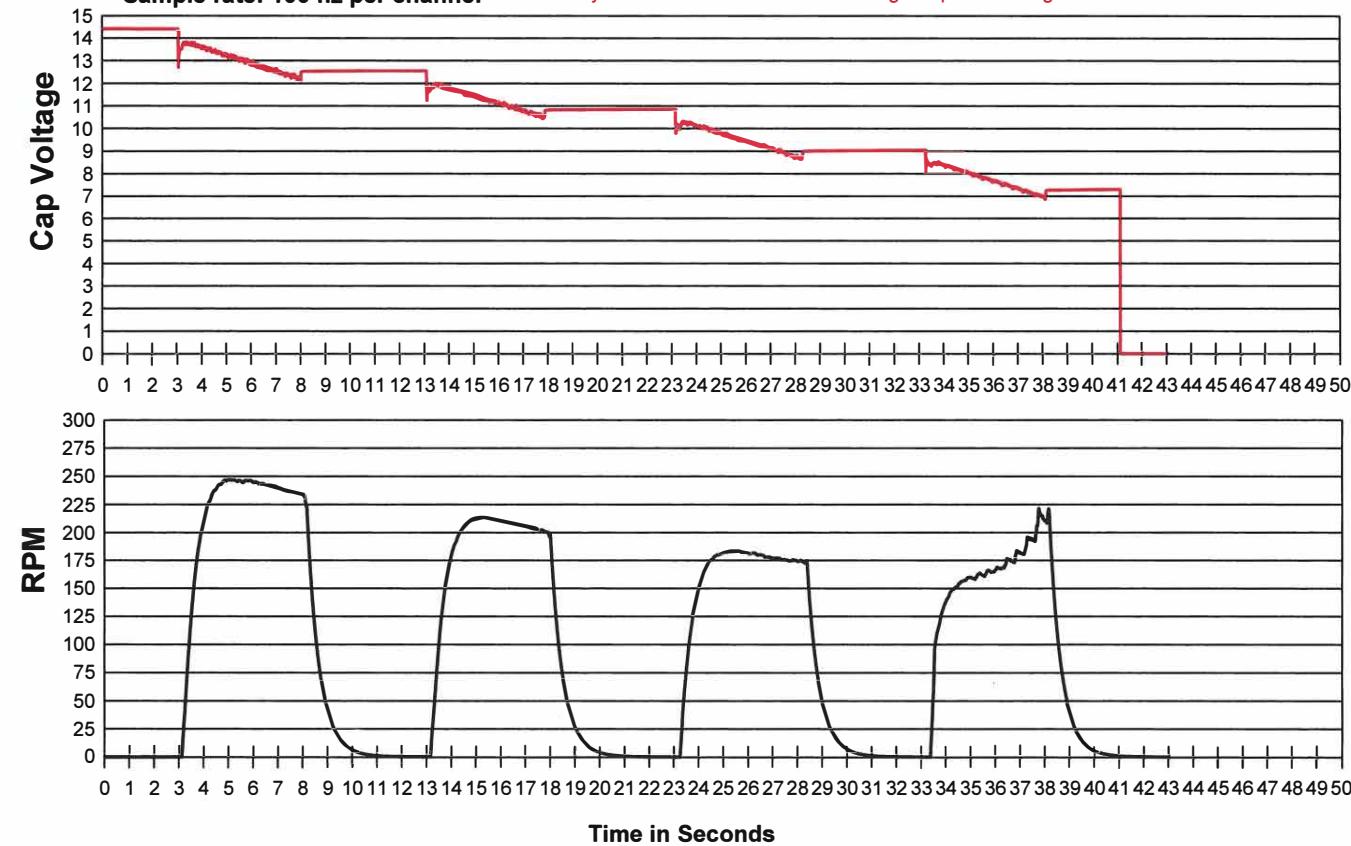
Test Date: 5/30/19

Sample rate: 100 hz per channel

Note: Purpose of this test was to determine how many 5 second crank cycles could be achieved from a single capacitor charge.

Module Tested:  
6 Cell 42.3 kJ

RPM Data aquired using  
a Mag pickup on the flywheel.



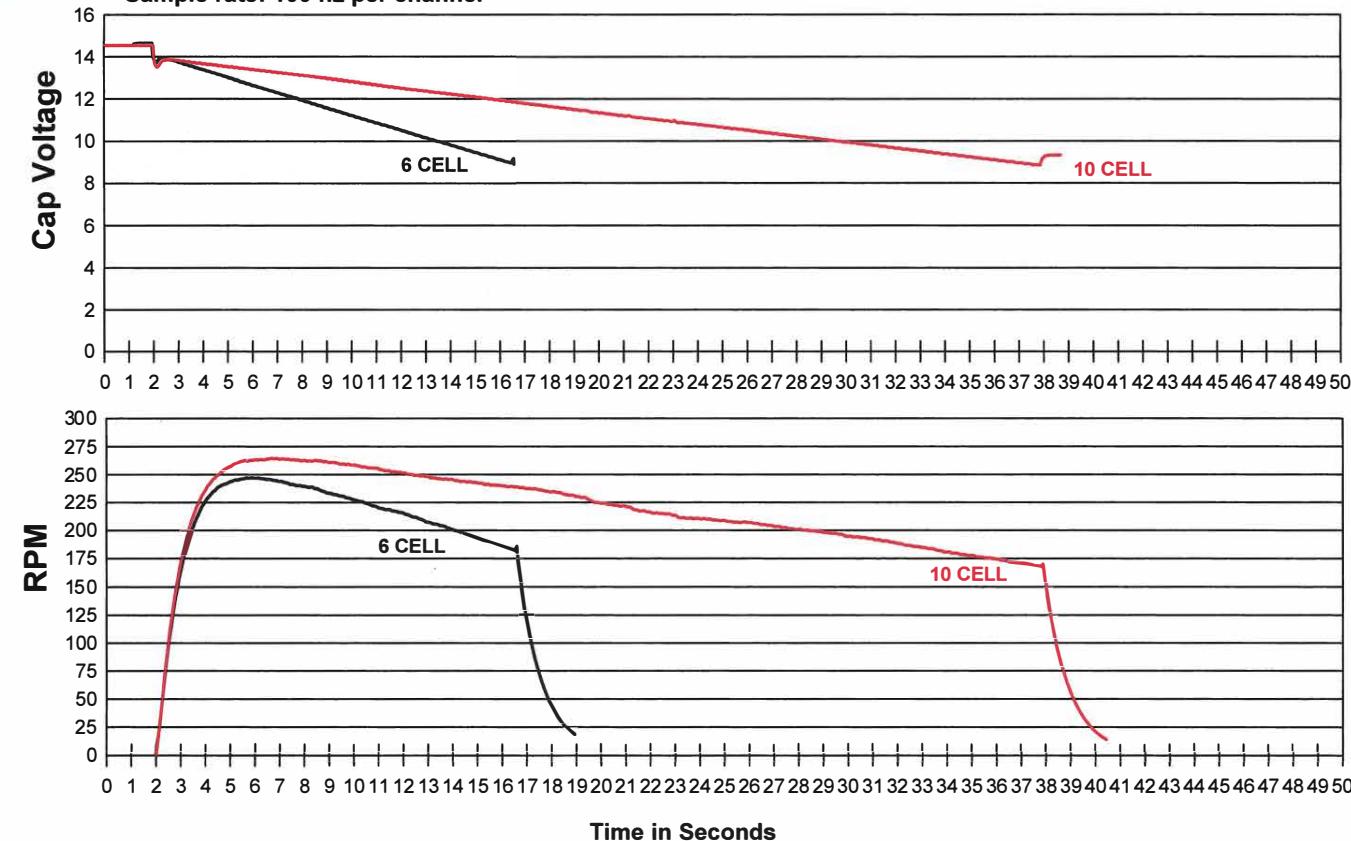
Test Performed by: KOLD BAN INTERNATIONAL 8390 PINGREE RD. LAKE IN THE HILLS, ILLINOIS 60156 (847)658-8561

## 2-Stroke,200HP,V6,200CID,(3.3L) engine Capacitor Module Crank Comparison Tests

Modules Tested:  
6 Cell 42.3 kJ  
10 Cell 122.4 kJ

Test Date: 3/6/19

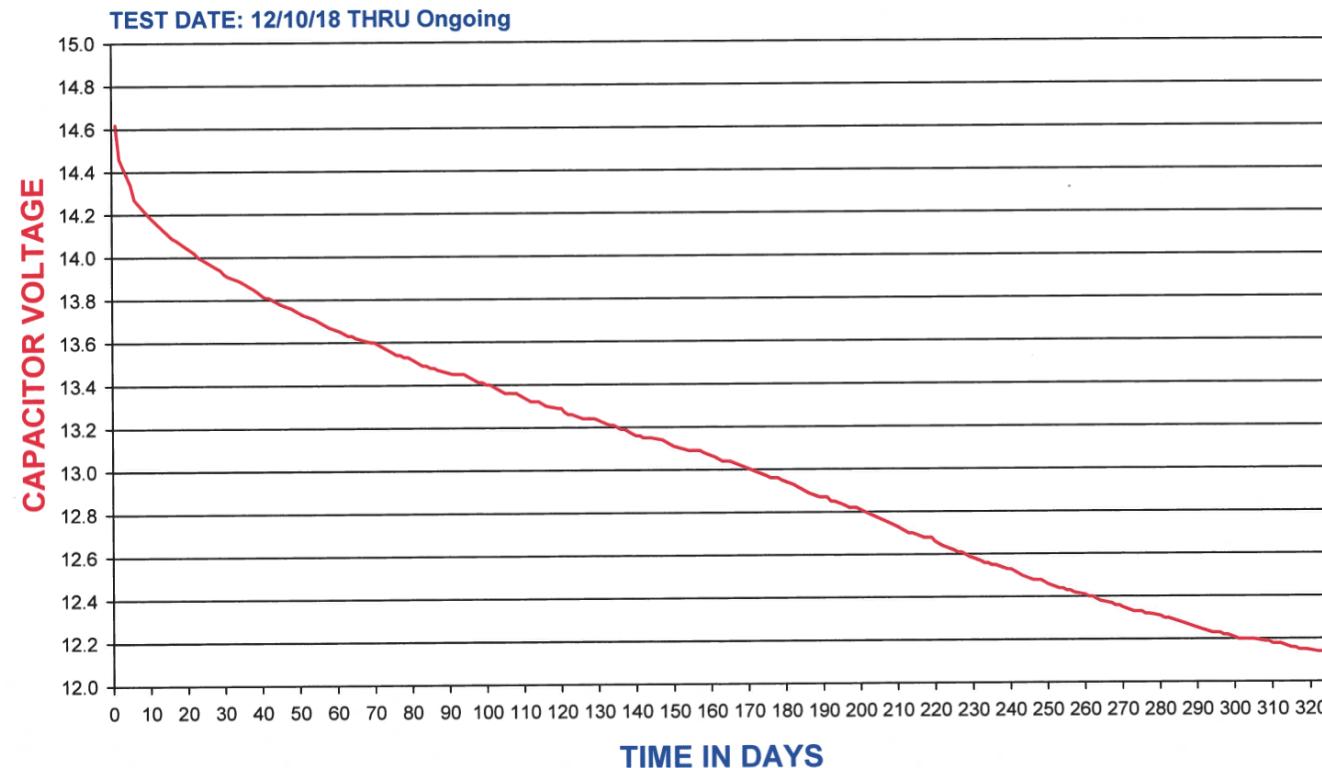
Sample rate: 100 hz per channel



Test Performed by: KOLD BAN INTERNATIONAL 8390 PINGREE RD. LAKE IN THE HILLS, ILLINOIS 60156 (847)658-8561

# CAPACITOR SELF DISCHARGE TEST

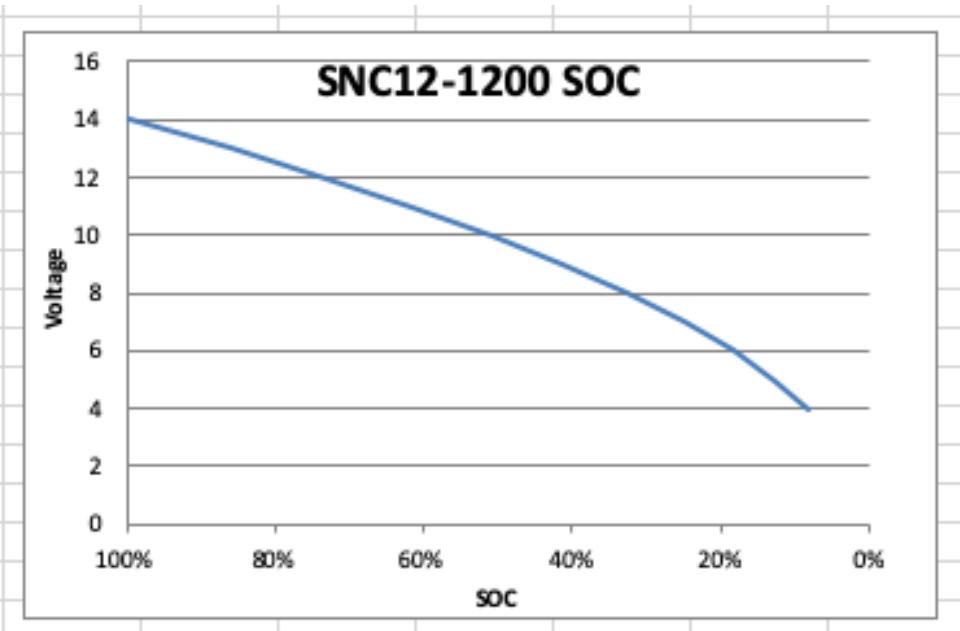
MODULE TESTED: 6S / 12 VOLT 42.3KJ



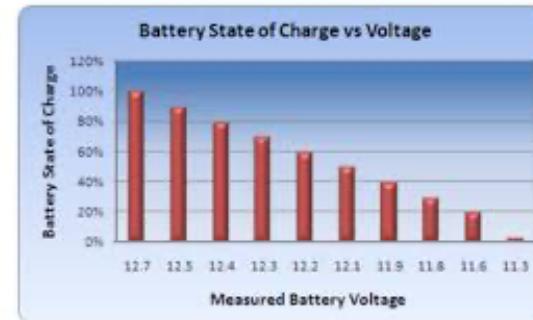
TEST PERFORMED BY : KOLDBAN INTERNATIONAL LAKE IN THE HILLS ILLINOIS

## Typical EDLC Voltage Vs. SOC

Volts	1200	SOC
14	117.6	100%
13	101.4	86%
12	86.4	73%
11	72.6	62%
10	60	51%
9	48.6	41%
8	38.4	33%
7	29.4	25%
6	21.6	18%
5	15	13%
4	9.6	8%



Vs. Pb SLA battery



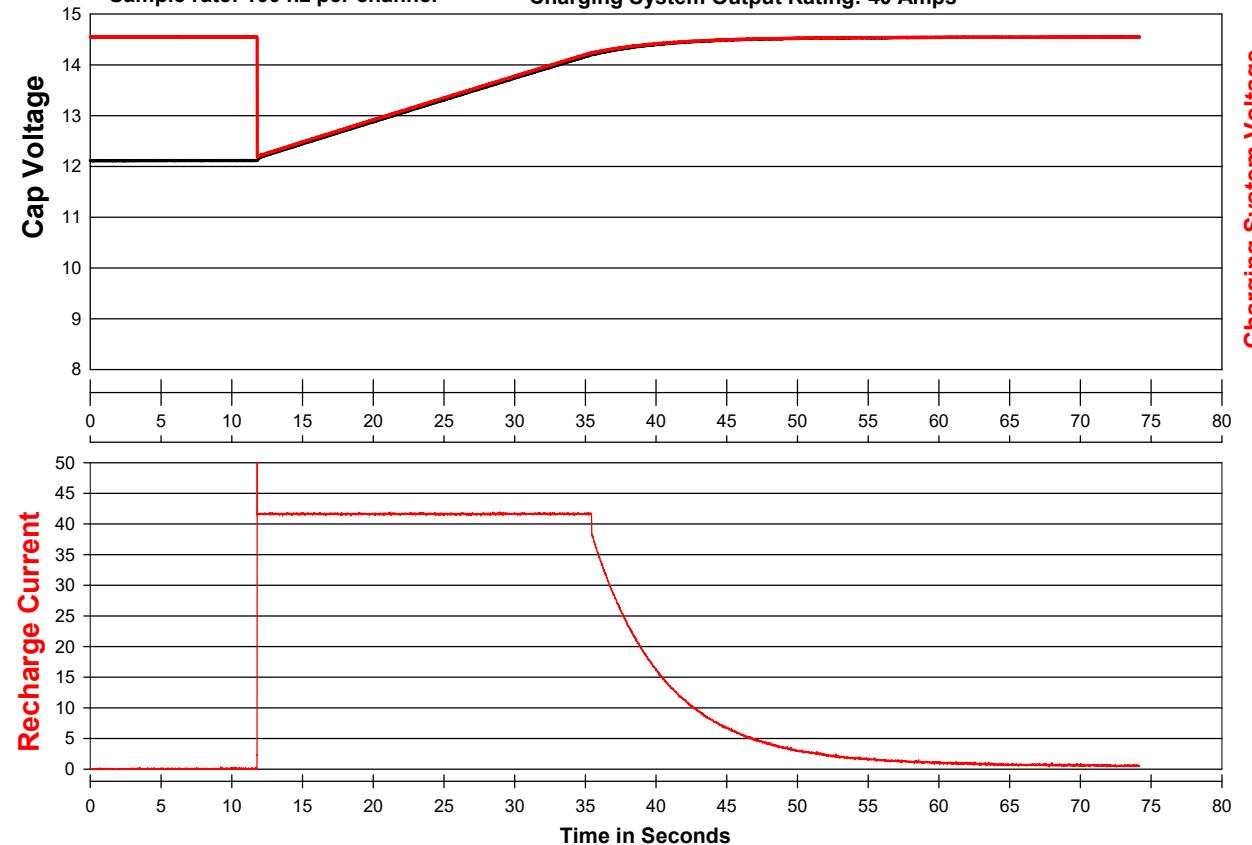
## MKSM61200 Recharge Test

Typical Engine Start

Test Date 8/20/18

Sample rate: 100 hz per channel

Charging System Output Rating: 40 Amps



Test Performed by: KOLD BAN INTERNATIONAL 8390 PINGREE RD. LAKE IN THE HILLS, ILLINOIS 60156 (847)658-8561