FEATURES

- » *Rated voltage of 64V and capacitance of 125F*
- » *High power module with ultra-low ESR*
- » *Long lifetimes with up to 1 million duty cycles*
- » *Integrated UMU (Ultracapacitor Management Unit) for effective cell balancing and monitoring*
- » *Typical applications:*
  - *Wind turbine pitch control system*
  - *Industrial UPS and DVR*

*

** Image is not to scale*

SPECIFICATIONS

ELECTRICAL		EMHSR-0125C0-064R0S
Rated Voltage, V_R		**64 V_{DC}**
Surge Voltage[1]		68 V_{DC}
Rated Capacitance[2]		**125 F**
Capacitance Tolerance	Maximum	0% / +20%
	Average[4]	+3% / +8%
DC-ESR (Equivalent Series Resistance)[3]	Maximum	7.5 mΩ
	Average[4]	4.3 mΩ
Typical Leakage Current[5]	Under 48V	5.2 mA
	Over 48V	45 ~ 59 mA
Maximum Peak Current, Non-repetitive[6]		1,800 A
Maximum Stored Energy, E_{max}[7]		71.1 Wh
Gravimetric Specific Energy[7]		3.3 Wh/kg
Usable Specific Power[7]		3.1 kW/kg
Impedance Match Specific Power[7]		6.5 kW/kg

TEMPERATURE	
Operating Temperature Range	-40 ~ 65°C (ΔCAP<5% and ΔESR<100% of initial value measured at 25°C)
Storage Temperature Range	-40 ~ 70°C (storage without charge)

LIFE	
Endurance (at V_R and 65°C)[8]	1,500 hours
Room Temperature (at V_R and 25°C)[8]	10 years
Cycle Life (at 25°C)[9]	1,000,000 cycles
Shelf Life	2 years (stored without charge at under 70°C and 40% RH)

PHYSICAL	
Output Terminals	M8 screw holes (positive) / M10 screw holes (negative)
Insulation Coordination	IEC 61287-1 (Category: OV II) Rated insulation voltage: 1kV DC or 2.8kV AC (at 50Hz, 10 sec) Rated impulse withstand voltage: 6kV DC
Protection Degree	IEC 60529 IP 65 (Dust-tight and protected against water jets)
Vibration Specification	SAE J2380
Shock Specification	SAE J2464

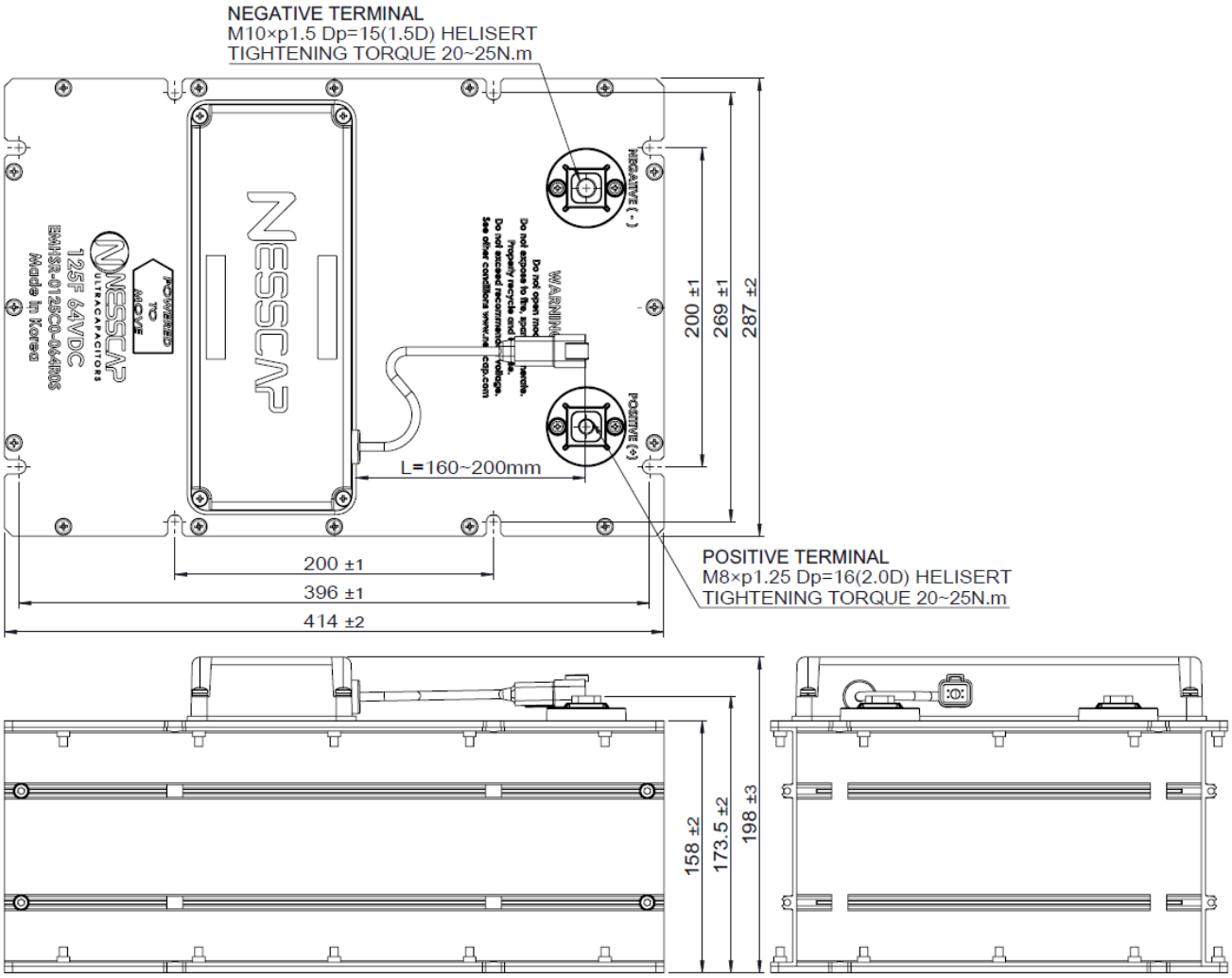
Copyright © 2014 Nesscap Co., Ltd. All Rights Reserved

SPECIFICATIONS (Cont'd)

UMU / MONITORING	
Cell Balancing	Active single cell balancing
Voltage Monitoring	High and low over-voltage logic signal using 5V supply
Temperature Monitoring	Resistance via NTC thermistor (10kΩ at 25℃)
Communication	CAN 2.0A (Optional)
Signal Output	Deutsch 4-pin water-roof connector

SAFETY	
RoHS	Compliant
REACH	Cell-level compliant

DRAWING



DIMENSION & WEIGHT					
Length (±2.0)	Width (±2.0)	H1 (±2.0)	H2 (±2.0)	H3 (±3.0)	Nominal Weight
414.0 mm	287.0 mm	158.0 mm	173.5 mm	198.0 mm	21 kg

Copyright © 2014 Nesscap Co., Ltd. All Rights Reserved

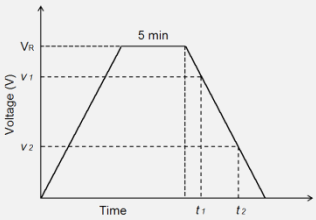
NOTE

1. **Surge Voltage**

> Absolute maximum voltage, non-repetitive. The duration must not exceed 1 second.

2. **Rated Capacitance (Measurement Method)**

> Constant current charge with 4CV [mA] to V_R.
e.g. In case of 64V-125F module, 4 x 125 x 64 = 32,000mA = 32A
> Constant voltage charge at V_R for 5min.
> Constant current discharge with 4CV [mA] to 12V.

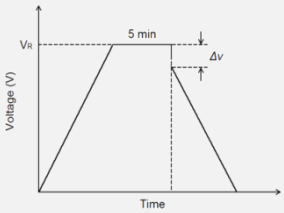


$$C = \frac{I \times (t_2 - t_1)}{v_1 - v_2}$$

where C is the capacitance (F);
I is the absolute value of the discharge current (A);
v_1 is the measurement starting voltage, 0.8 x V_R (V);
v_2 is the measurement end voltage, 0.4 x V_R (V);
t_1 is the time from discharge start to reach v_1 (s);
t_2 is the time from discharge start to reach v_2 (s);

3. **DC-ESR (Measurement Method)**

> Constant current charge with 4CV [mA] to to V_R.
> Constant voltage charge at V_R for 5min.
> Constant current discharge with 100A to 60V.



$$ESR_{DC} = \frac{\Delta v}{I}$$

where ESR_{DC} is the DC-ESR (Ω);
Δv is the voltage drop during first 10ms of discharge (V);
I is the absolute value of the discharge current (A)

4. **Average**

> Typical value or percentage spread that may be present in one Shipment

5. **Typical Leakage Current (LC)**

> LC under 48V (2V per cell) is equal to the LC of the cell measured at the cell's rated voltage and at room temperature after 72 hours.
> LC over 48V (2V per cell) is the sum of the LC of the cell and the bypass current created by the active balancing circuit.

6. **Maximum Peak Current**

> Current for 1-second discharging from the rated voltage to the half rated voltage under the constant current discharging mode

$$I = \frac{\frac{1}{2}V_R}{\Delta t / C + ESR_{DC}}$$

where I is the maximum peak current (A);
V_R is the rated voltage (V);
Δt is the discharge time (sec); Δt = 1 sec in this case;
C is the rated capacitance (F);
ESR_{DC} is the maximum DC-ESR (Ω);

> The stated maximum peak current should **not** be used in normal operation and is only provided as a reference value.

7. **Energy & Power**

> Maximum Stored Energy, E_{max} (Wh) = $\frac{\frac{1}{2}CV_R^2}{3600}$

> Gravimetric Specific Energy (Wh/kg) = $\frac{E_{Max}}{Weight}$

> Usable Specific Power (W/kg) = $\frac{0.12V_R^2}{ESR_{DC} \times Weight}$

> Impedance Match Specific Power (W/kg) = $\frac{0.25V_R^2}{ESR_{DC} \times Weight}$

8. **Endurance and Room Temperature DC Life**

> Test Conditions:
- Temperature: 65 ± 2°C, 25 ± 2°C
- Applied Voltage: V_R ± 0.02V

> End-of-Life Conditions:
- Capacitance: -20% from the rated minimum value
- DC-ESR: +100% from the rated maximum value

> Capacitance and ESR measurements are taken at 25°C

9. **Cycle Life**

> Test Conditions (1-minute cycle at room temperature):
- Constant current charge from 1/2V_R to V_R.
- Constant current discharge from V_R to 1/2V_R.
- Repeat the cycle for the desired number of times.

The contents of this document are subject to change without notice. The values presented are thought to be accurate at the time of writing. Nesscap does not guarantee that the values are always error-free, nor does Nesscap make any other representation or warranty regarding the accuracy or credibility of the information contained in this document. For more information, please reach us at one of following contacts.

Nesscap Energy Inc.	Nesscap Energy Inc.	Nesscap Co., Ltd.	Nesscap China	Nesscap Energy GmbH
Suite 3800, Royal Bank Plaza, South Tower, 200 Bay Street, P.O. Box 84, Toronto, Ontario, M5J 2Z4	S24040 Camino Del Avion #A118, Monarch Beach, California, 92629	17, Dongtangiheung-ro 681beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do	Room 1608, Block N, Cangson Building, Chegonmiao, Futian District, Shenzhen City, P.R.C	Beerengarten 4 D-86938 Schondorf
CANADA	USA	REPUBLIC OF KOREA	CHINA	GERMANY
marketing@nesscap.com				info@nesscap-energy.de

Copyright © 2014 Nesscap Co., Ltd. All Rights Reserved