

FEATURES

- ✓ High power performance with low heat generation and safe operation
- ✓ Voltage balancing system
- ✓ Temperature control

APPLICATIONS

- ✓ Energy harvesting and supply, recovery systems for heavy duty and industrial applications (electric buses, trains, cranes, alternative energy)



SPECIFICATIONS

ELECTRICAL PARAMETERS		
Rated Voltage, V_r		48 V
Maximum Voltage ¹		52 V
Rated Capacitance ²		165 F
Capacitance Tolerance		-0% +20%
Maximum ESR DC	Maxwell Technologies Test Procedure ³	6.2 mOhm
	Nesscap Co. Test Procedure ⁴	5.5 mOhm
Typical ESR DC	Maxwell Technologies Test Procedure ³	4.8 mOhm
	Nesscap Co. Test Procedure ⁴	3.1 mOhm
Test Current for Capacitance and ESR_{DC}		100 A
Maximum Peak Current, 1 second (non repetitive) ⁵		1950 A
Leakage Current, maximum ⁶ (passive voltage balancing system)		6 mA

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POWER AND ENERGY

Specific Energy, E_{\max}^7		3.9 Wh/kg
Stored Energy ⁸		53 Wh
Usable Specific Power, P_d^9	Maxwell Technologies Test Procedure ³	3.3 kW/kg
	Nesscap Co. Test Procedure ⁴	3.7 kW/kg
Maximum Specific Power (matched impedance), P_{\max}^{10}	Maxwell Technologies Test Procedure ³	6.9 kW/kg
	Nesscap Co. Test Procedure ⁴	7.8 kW/kg

TEMPERATURE

Operating Temperature (ambient temperature)		
Maximum		+65 °C
Minimum		-40 °C
Storage Temperature (stored discharged)		
Maximum		+70 °C
Minimum		-40 °C

LIFE TEST

Capacitance Change (% decrease from minimum initial value)	20%
ESR Change (% increase from maximum initial value)	100%

LIFE

High Temperature (at Rated Voltage and Maximum Operating Temperature)	1500 hours
Room Temperature (projected life at Rated Voltage and 25°C)	10 years
Cycle Life (Rated Voltage – Half Voltage, Test Current – 100A, at 25°C)	1 000 000 cycles
Shelf Life (stored discharged up to a Maximum Storage Temperature)	4 years

SAFETY

Short Circuit Current, typical (maximum current if shorted at Rated Voltage. Do not use as an operating current)	7 750 A
Highpot Test	2500 V DC

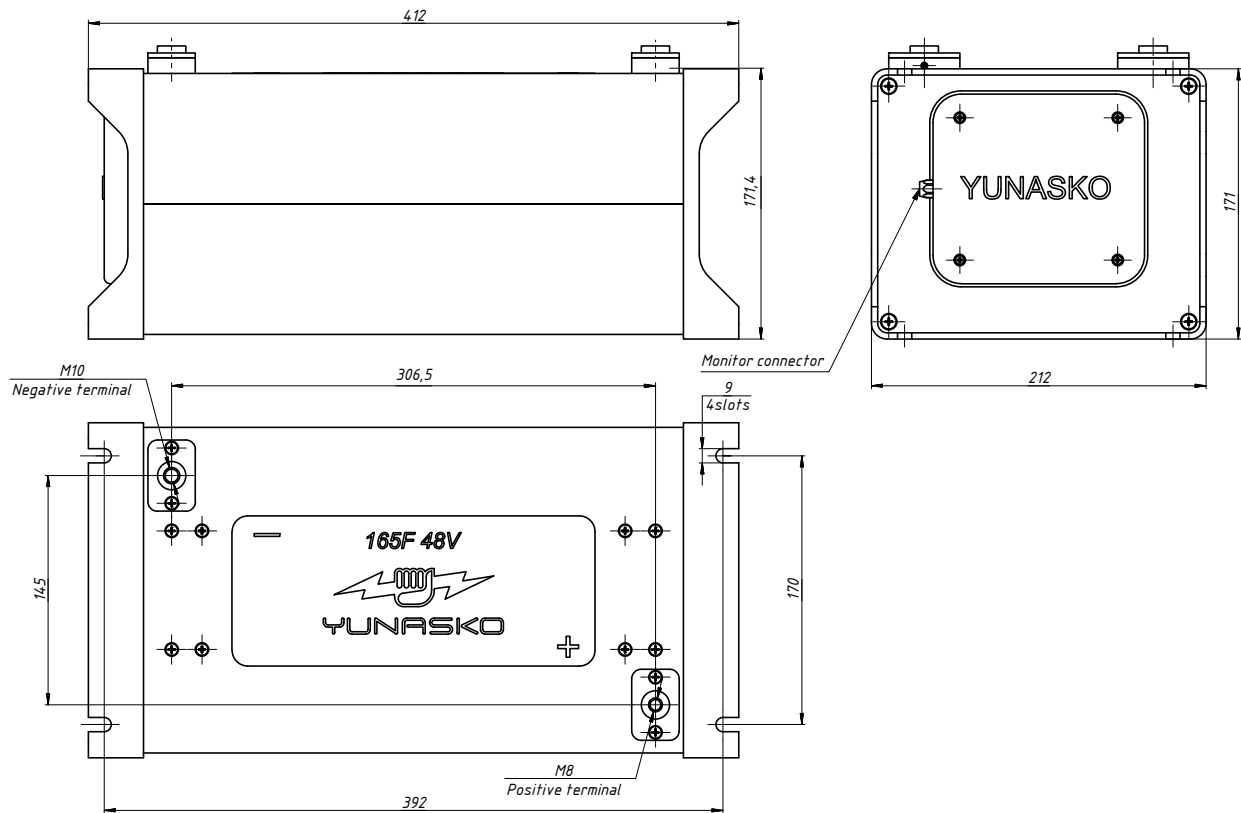
BALANCING SYSTEM / TEMPERATURE CONTROL

Internal Temperature Sensor	NTC Thermistor
Temperature Interface	Analog
Cell Voltage Monitoring	Overvoltage Alarm
Connector	Deutsch DTM
Cell Voltage Management	Passive Voltage Balancing System

PHYSICAL PARAMETERS

Power Terminals	M8/M10
Recommended Torque – Terminals	20/30 Nm
Cooling	Natural Air Convection
Mass	13.5 kg

MODULE DIMENSIONS



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NOTES:

The technology is protected by a number of patents and patent applications.

Module dimensions are for reference only and can be changed to meet the customer requirements.

1. Maximum voltage non-repeated, not to exceed 5 seconds.
2. Capacitance measured at 25 °C as per IEC 62391-1.
3. ESR_{DC} measured at 25 °C as per Maxwell Technologies test procedure specified in the 48V 165F module (BMOD0165 P048) datasheet, document # 1009365.13. Document available at www.maxwell.com.
4. ESR_{DC} measured at 25 °C as per Nesscap Co. test procedure specified in the 48V 166F module (EMHSR-0166C0-048R0S) datasheet, document # 20151105 Rev.1. Document available at www.nesscap.com.
5. Maximum peak current (discharge from V_r to $V_r/2$ per 1 second):

$$I_{\max} = \frac{CV_r}{2(C \times ESR_{DC} + 1)}$$

6. After 72 hours at 20 °C and rated voltage as per IEC 62391-1. Initial leakage current can be higher.

$$7. E_{\max} = \frac{CV^2}{2 \times 3600 \times mass}$$

$$8. E_{\text{stored}} = \frac{CV^2}{2 \times 3600}$$

$$9. \text{As per IEC 62391-2: } P_d = \frac{0.12V^2}{ESR_{DC} \times mass}$$

$$10. P_{\max} = \frac{0.25V^2}{ESR_{DC} \times mass}$$

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