SKELETON TECHNOLOGIES

DATA SHEET

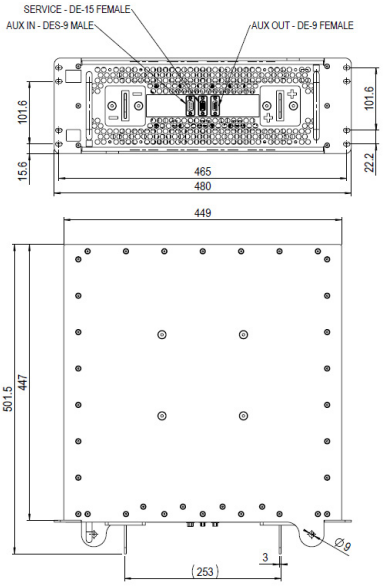
SkelMod 102V 88F

+ 102V DC nominal voltage
+ Ultra-low ESR
+ Long lifetime - 1 million duty cycles
+ Integrated Ultracapacitor Management System for effective cell balancing
+ CAN bus communication
+ 19 inch rack system compatible

CE

SMA102V88FAF TECHNICAL SPECIFICATIONS	UNIT	VALUE
Electrical		
Nominal voltage	V	102
Absolute maximum voltage	V	108
Minimum monitoring voltage	V	18
Rated capacitance, initial	F	88
DC 10ms ESR (~ AC 100Hz), rated	mΩ	6.2
DC 1s ESR (AC 0.1 Hz), rated	mΩ	7.6
Maximum series voltage	VDC	1260*
Maximum peak current (for 1 s duration)[1]	A	2689
Short circuit current	kA	16.5
Maximum stored energy	Wh	127.1
Cells in total	pcs	36
Cell type		SCA3200
Life*		
Life at 102 V and maximum operating temperature		1500 h
Shelf life @ RT, uncharged		10 years
Projected cycle life @ RT between 102 V and 56 V		1 000 000 cycles
Capacitance decrease 20% from rated value; resistance increase 100% from rated value		
Temperature		
Operating temperature range		-40 °C to +65 °C*
Ultracapacitor management system		
Nominal auxiliary supply voltage		24 V
Auxiliary supply voltage range		16-33 V
Auxiliary supply current		max. 0.02 A
Cell balancing method		Controlled resistive balancing
Temperature monitor		6 NTC sensors
Voltage monitor		Individual Cell
Communication interface		CAN bus 2.0B
Connectors		
Power connector		Ø 13.5 mm Trough hole
Signal connectors		D-sub DE-9 Male
		D-sub DE-9 Female
Connector location		Front

SMA102V88FAF TECHNICAL SPECIFICATIONS	UNIT	VALUE
Standards		
International protection marking (for enclosure)	IEC 60529, IP 20	
Isolation protection	EN 60664-1, OV2	
EMC immunity	IEC EN 61000-6-2	
EMC emissions	IEC EN 61000-6-3	
Energy		
Energy[2]	Wh	127.1
Specific energy[3]	Wh/kg	4.4
Energy density[4]	Wh/L	4.3
Nominal Power (calculated from DC 10ms ESR, for comparison)		
Power (matched impedance)[5]	kW	419.5
Practical specific power (matched impedance)[6]	kW/kg	14.6
Practical power density (matched impedance)[7]	kW/L	14.2
Practical Power (calculated from DC 1s ESR, for engineering)		
Power (matched impedance)[5]	kW	342.2
Practical specific power (matched impedance)[6]	kW/kg	11.9
Practical power density (matched impedance)[7]	kW/L	11.6
Thermal parameters**		
Thermal resistance given at ΔT 30 °C (R_{th})	°C/W	0.086
Thermal capacitance (C_{th})	kJ/°C	26.5
Maximum continuous current (ΔT 15 °C)	A	163
Maximum continuous current (ΔT 30 °C)	A	235
Maximum continuous current (ΔT 40 °C)	A	270
Physical parameters		
Typical mass	kg	28.8
Typical volume	L	29.6
Depth max	mm	502
Width max	mm	480
Height	mm	155



*For maximum series voltage IE32 (EN 60721-3-3) requirements must be followed. For lower temperature contact Skeleton Technologies

**Thermal parameters given for cooling airflow rate of 60CFM

[1] Maximum peak current(1s)= $\frac{C \times 1/2 \times V}{C \times ESR + 1\,s}$ [2] $E_{stored} = \frac{1/2 \times C \times V^2}{3600}$ [3] $E_{specific} = \frac{E_{stored}}{mass}$

[4] $E_{density} = \frac{E_{stored}}{volume}$ [5] $P_{max} = \frac{V^2}{4 \times ESR}$ [6] $P_{specific} = \frac{P_{max}}{mass}$ [7] $P_{density} = \frac{P_{max}}{volume}$ [8] $R_{th} = \frac{\Delta T}{DC\ 1s\ ESR \times I^2}$

Standard markings	Notes
+ Name of Manufacturer, Part number, Serial number, Rated voltage + Rated capacitance, Negative and positive terminals, Warning marking + Total energy in watt-hours	+ All information provided on this data sheet and all subsequent ultracapacitors sales and testing are subject to Standard Terms of Service (ToS) available on www.skeletontech.com, document *General Terms of Sale for Skeleton Technologies OÜ* + For ultracapacitors, the power values are often calculated using nominal resistance values (DC 10 ms ESR). For engineering purposes, practical values based on total resistance (DC 1s ESR) are preferred. + Mounting Recommendation: Please refer to the user manual for installation recommendations.

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