



ESM Module

Water cooled

- Innovative in energy storage & Power Electronics
- Custom-made solutions
- Complete solution: storage & Power Electronics
- Design and system integration

Features

- Designed specifically for energy regeneration and power boost
- Voltage control of each cell
- Active balancing by moving energy from one cell to another
- Improved thermal management
- Liquid cooling
- Improved protection of the cells and the environment by IP65
- Control via CAN or binary signals

Applications

- (Heavy) Transportation
 - Fast energy storage hybrid driveline
 - Combination diesel-electric, fuel cell & batteries
 - Utility vehicles, trains, trams, buses, forklifts, trucks, etc.
- Maritime & Offshore
 - Dynamic energy storage vessels
 - Heavy lifting, cranes, etc.

Mechanical Data

Length x Width x Height
698 x 425 x 205 mm
Approx. 67 kg

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Electrical Specifications

Symbol	Parameter	Description	Value	Unit
Capacitance				
C_s	Rated capacitance		62,5	F
	Tolerance capacity		-0/+20	%
Voltage				
U_{NOM}	Nominal voltage		120	VDC
U_{MAX}	Max. operation voltage		129,6	VDC
	Surge voltage		136,8	VDC
U_{ISO}	Isolation voltage	Test voltage 4000V	1	kVDC
Resistance				
ESR_{DC}	Internal resistance	Min – max	9 – 23	m Ω
ESR_{AC}	Internal resistance	@25°C and 1 kHz	14	m Ω
Environment				
T_A	Ambient temperature during operation		-20 to +40	°C
	Less than 15 minutes per 100 days a year		-25 to +50	°C
$T_{STORAGE}$	Storage temperature range		-40 to +65	°C
	Protection class		IP65	
Power (module)				
P_d	Rated power density	@ V_r and $ESR_{DC,max}$	2,0	kW/kg
P_{max}		@ V_{max} and ESR_{AC}	10,7	kW/kg
Energy (module)				
E_{max}	Energy density	@ V_{max}	4,1	kW/kg
E_{ava}	Available energy	Between V_{max} and $\frac{1}{2} V_{max}$	109	Wh
Current				
I_{AVG}	Rated continuous current		150	A
I_{PEAK}	Maximum peak current	< 5 seconds	750	A
I_{LEAK}	Leakage current	After 72 hours at 25°C	5,2	mA



Additional data

Symbol	Parameter	Description	Value	Unit
	Mechanical data			
	Weight		Ca. 67	Kg
	Length		698	mm
	Width		425	mm
	Height		205	mm
	Cooling			
	Recommended cooling	Water cooling		
	Certified tests			
	Mechanical shock and vibration	IEC 61 737		
	Electromagnetic compatibility	DIN EN 50 121-3-2:2006		
	Additional data			
	Cycles	Between V_{nom} and $\frac{1}{2} V_{nom}@25^{\circ}C$	>1.000.000	cycles
	Lifetime	@ V_{nom} and $25^{\circ}C$	10	years
		@ V_{nom} and $65^{\circ}C$	1500	hours
	Communication	CAN-Bus	HAN 8D-F	

Mechanical Dimensions

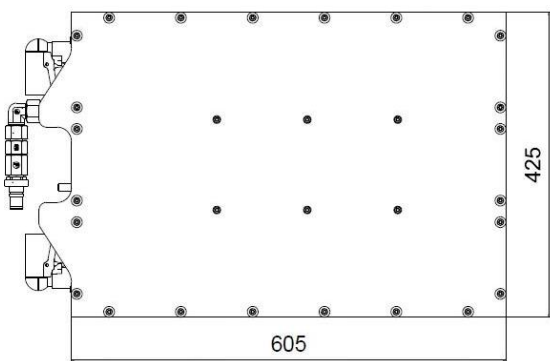


Figure 1: Top view

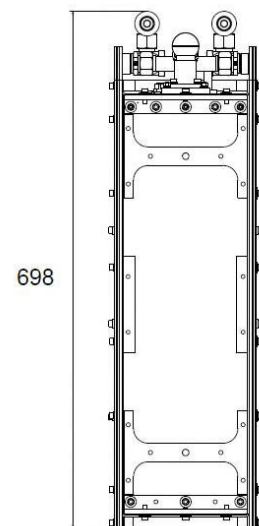


Figure 2: Side view

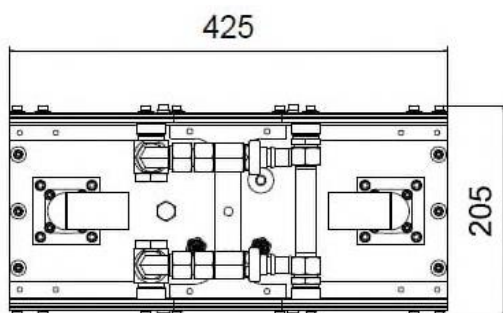


Figure 3: Front view

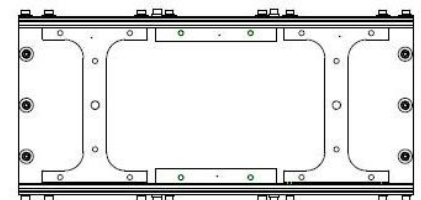


Figure 4: Back view