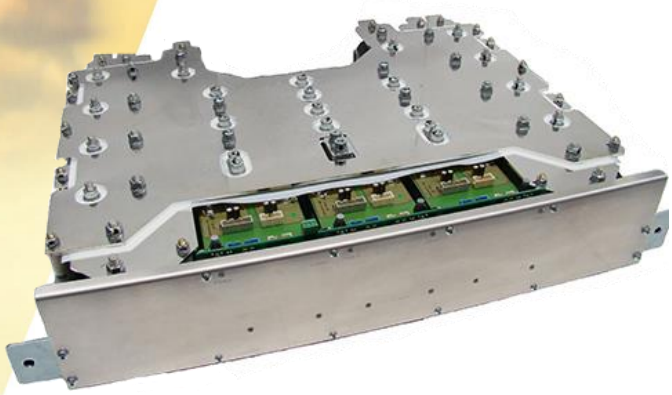
Hybrid Power

AEP 2000

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



Features

- Three level NPC technology with reduced losses and improved EMI characteristics
- Integrated DC voltage, AC current and IGBT temperature sensors
- Modular design
- Water cooling
- Optical control interface with $\Delta\sum$ measurement interface

Applications

- 3-phase 690 V AC/DC converters
- Active filters
- Frequency converter in motor control applications

Mechanical Data

Depth x Width x Height
486 x 660 x 135 mm
Approx. 35 kg

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Technical Characteristics

Symbol	Parameter	Description	Value	Unit
	General			
V_{DC}	DC-Link voltage	absolute maximum[1]	2200	V
V_{AC}	AC line voltage	absolute maximum	1400	V
f_{sw}	Switching frequency		≤8	kHz
I_{AC}	AC current	power terminal limited	1000	A_{rms}
$I_{N, IGBT}$	IGBT nominal current		1400	A
	Environmental conditions			
T_a	Ambient temperature		0 till +40	°C
	Storage temperature		-20 till +60	°C
	Installation height		2000	m
	Protection degree		IP00	
	Mechanical data			
	Weight		35	kg
	Width		660	mm
	Height	without coolant hose	135	mm
	Depth		486	mm
	Cooling			
	Coolant		60% water / 40% glycol	
	Maximum inlet temperature		60	°C
	Water flow		10 – 30	l/min
	Pressure drop		≤0.5	bar
	Power dissipation		≤6000	W

1 Insulation coordination in accordance with DIN EN 50178 VDE 0160:1998-04, overvoltage category III, contamination class 2, basic insulation.

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Interface Specifications

Symbol	Parameter	Description	Value	Unit
	Current transducer			
I_P	Measurement range		1000	Arms
	Accuracy	T_a = 25 °C	±0.4	%
	Frequency Bandwidth	-1 dB	DC … 150	kHz
U_{DC}	**DC-link voltage measurement**			
	Measurement range		0 till 1200	V
	Technology	Optical interface with Δ∑ bitstream		
	Accuracy	T_a = 0 till 40 °C (calibrated[2])	±0.4	%
	Resolution	@ 16 bit, 8 bit decimation	30	mV
	Bandwidth	@ 16 bit, 8 bit decimation	12	kHz
T_{IGBT}	**IGBT temperature measurement**			
	Measurement range		-30 till +120	°C
	Technology	Optical interface with Δ∑ bitstream		
	Accuracy	T_a = 0 till 40 °C (calibrated[2])	±0.4	%
	Resolution	@ 16 bit, 8 bit decimation	4.0E-3	°C

Pinout of the control interface (figure 1 … 3)

Pin Number	Pin Name	Plug property	Description / Conditions	Value	Unit
X1	**Power supply**				
X1.1	+24V / 1.5A	electrical	Positive pin power supply	24	V
X1.2	+24V / 1.5A	electrical	Positive pin power supply	24	V
X1.3	GND	electrical	Negative pin power supply	GND	
X1.4	GND	electrical	Negative pin power supply	GND	
X2	**Measurement / Error**				
X2.1	CLK	optical	Clock signal Δ∑-modulator	6	MHz
X2.2	UL	optical	DC link voltage lower half-bridge		
X2.3	UH	optical	DC link voltage upper half-bridge		
X2.4	TMAX	optical	Temperature of the hotspot IGBT-module (max. value of the three IGBT-modules)		
X2.5	ERR	optical	Error signal Low / light off: error High / light on: ok Duration of low state[3]	 520	 us

Pin Number	Pin Name	Plug property	Description / Conditions	Value	Unit
X3	PWM input				
X3,1	PWM 1	optical	Control signal of IGBT T1		
X3.2	PWM 2	optical	Control signal of IGBT T2		
X3.3	PWM 3	optical	Control signal of IGBT T3		
X3.4	PWM 4	optical	Control signal of IGBT T4		
X4	Current transducer				
X4.1	+15 V / +200 mA	electric	Positive power supply	+15	V
X4.2	I SENSE	electric	Current sensor signal	200	mArms
X4.3	-15 V / - 200 mA	electric	Negative power supply	-15	V

2 Software calibration required for offset and gain

3 Driver does not provide a self-blocking capability of the IGBTs in case of failure. Customer has to ensure a safe switch-off sequence of PWM1 … 4 during emergency turn-off.

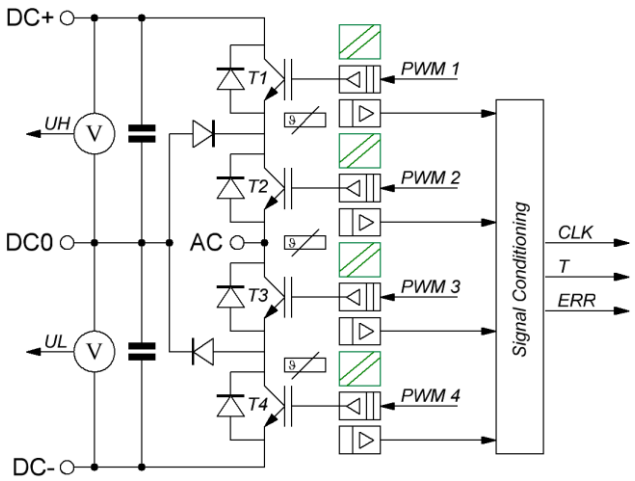

Figure 1: Schematic drawing

Figure 2: Control interfaces, bottom side

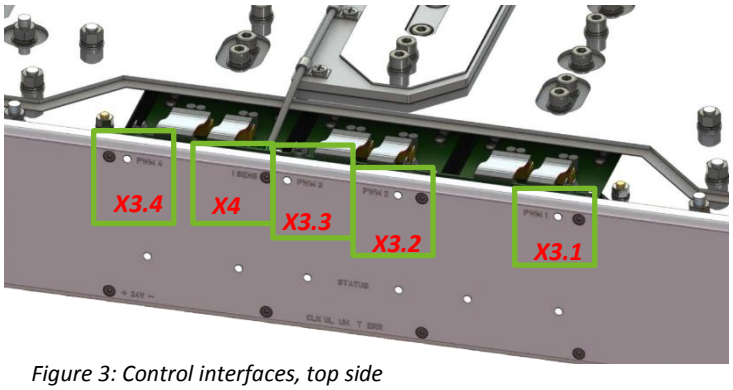

Figure 3: Control interfaces, top side

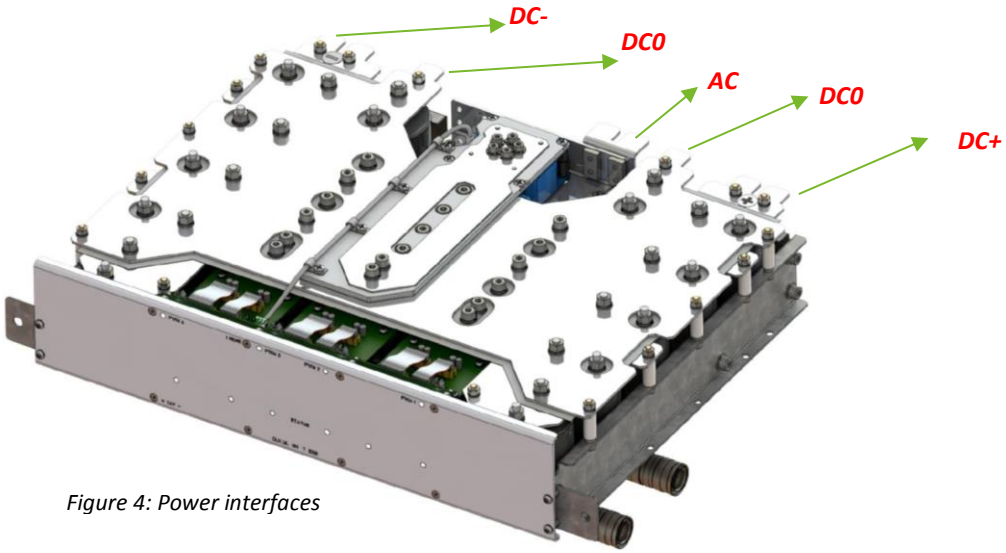

Figure 4: Power interfaces

Dimensions