

ETC 1000 MK5 POWER ELECTRONICS TECHNICAL DATASHEET

Overview	
Converter type	Diode rectifier for 6-phase generator, DC boost converter and a 3-phase grid-connect inverter
Electrical power	110 kW
Cooling	Liquid cooled converter heatsink with ventilated cabinet
Control principle	Voltage oriented control (VOC)

Electrical data - auxiliary power supply	
Input voltage	3 ph + earth, 400 VAC to 480 VAC, $\pm 10\%$
Power consumption	< 150 W
Hold-on time	30s w / int'l 24 VDC sealed rechargeable lead-acid battery
Black-start support input	24 VDC, $\pm 10\%$, 10 A max fuse protected

Electrical data - input (AC)	
Generator frequency (max)	2500 Hz
Input current, per phase (max)	116 A
Generator voltage phase to phase w / crest factor 1.25 (max)	634 VAC
Generator voltage for rated power operation (min)	398 VAC
Generator voltage for 60 kW power operation (min)	214 VAC
Generator-side converter common mode dv / dt	< 2 kV/ μ s

Electrical data - output (AC)	
Rated grid voltage	400 VAC, 3 ph, $\pm 10\%$
Rated power (@ 230 V, 50 Hz, $\cos \varphi = 0.8$)	110 kW
AC apparent power (max)	137 kVA
AC grid frequency range	50 or 60 Hz nominal (-6 to +5 Hz)
Output current at 360 VAC (max)	221 A
Uninterrupted short-circuit current (Ik)	221 A
Power factor, adjustable	0.8 overexcited to 0.8 underexcited
Efficiency at nominal maximum power condition	$\geq 95\%$
Grid harmonics	Max 5% (total harmonic current distortion at rated current)

Protective devices	
Grid connection	Output circuit breaker external to cabinet
AC surge arrester (as per IEC 61643-11)	Type II
Protection class (as per IEC 62109-1) / overvoltage category (as per IEC 62109-1)	I / III

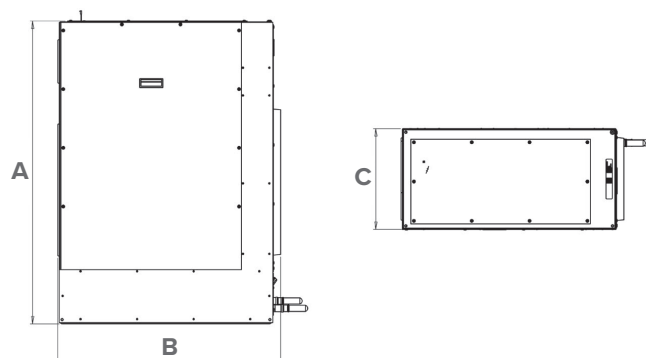
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General data	
Dimensions (W / H / D) (not inc'l external brake)	405 x 1200 x 850 mm
Weight (not inc'l external brake or coolant)	255kg
Ambient operating temperature range	0 to +55°C (-15°C on request)
Storage / transport temperature range	-25 to +60°C
Noise emission, full current	<95 dBA
Degree of protection (according to IEC 60529)	IP23
Climatic category (as per IEC 60721-3-3)	3K3
Permissible value for relative humidity (max)	85% (non-condensing)
Altitude	Up to 2000 m (without derating)
Coolant inlet temperature typical / transient limits	+5 to +65°C / -15 to +70°C
Coolant type	50:50 ethylene glycol (with corrosion and algae inhibitors)
Coolant flow rate (min / max)	12 / 18 litres / minute
Coolant pressure (max)	600 kPa gauge
Display	Optional LCD alphanumeric 20 characters x 4 lines
Field bus interface	SAE J1939 CAN bus and modbus (RS485 / RS232)
Ethernet interface	Modbus over TCP / IP

Product compliance	
Grid code compliance certificates and permits *	VDE-AR-N-4110, ENA EREC G99, ISO8528 class G2 volt / freq transients. Others on request
Product markings	CE (EMC & LVD)
EMC emissions	EN 61000-6-4 industrial generic emissions together with CIS- PR. 11 class A group 1 equipment > 75kVA
EMC immunity	EN 61000-4-4 immunity to fast transients (± 2 kV power lines, ± 1 kV signal lines). EN 61000-5-4 immunity to surges (± 2 kV power lines). EN 61000-4-2 ESD immunity limits (8kV contact)
Vibration	Transport simulation random vibration IEC 60068-2-64 test fh
Shock	IEC 60068-2-27 test ea half sine, 150 m/s ² 11ms, 30 bumps. Performed in each of 3 axes
Management systems	QMS (ISO 9001), EMS (ISO 14001)

* Planned for 2019

Dimensions (mm)	
A	1203
B	886
C	400



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or visit bowmanpower.com