CC-4000 high-voltage boost inverter

High-voltage boost inverter for driving ultra-high-speed turbo compressors in medium and heavy-duty fuel cell systems in mobile, stationary or marine applications. The integrated boost front-end ensures that the maximum inverter output voltage (800 V_{pk}) is available across the full the HV voltage range (250 to 920 V DC), enabling motor control at maximum speed even where the back EMF exceeds the input voltage. Additionally, the consistently high inverter output voltage results in a reduction of the phase current and the cable cross-section of the motor cables to just 6 mm^2 at 25 kW compressor power, simplifying integration on the system level.

- Designed for the Celeroton TurboCell air compressor CTE-4000 and optimized for fuel cell applications.
- Power electronics with maximum power density at highest inverter efficiency
- Operation of turbo compressor with maximum speed from wide HV voltage range (250 - 920 V DC)
- Continuous compressor power of > 25 kW available from HV voltage > 520 V DC without derating
- Sensorless PMSM speed control up to 140,000 rpm
- Protection class IP67 and IP6K9K

Main specifications	
Rated voltage	850 V
HV voltage range	520 – 850 V DC (full performance) 250 – 520 V DC (lower limited range) 850 – 920 V DC (upper limited range)
HV voltage trip level	< 250 V DC or > 920 V DC
Rated power at output	25 kW (continuous, cos(ϕ) ≥ 0.8, 520 V DC, 65°C coolant)
Efficiency	97.5%
Maximum HV input current	50 A DC
Maximum frequency/speed	2.3 kHz / 140,000 rpm
Maximum output voltage	800 V (peak value, phase-phase)
Maximum phase current	35 A rms
LV input voltage range	8 – 32 V DC
Coolant temperature (full perf.)	-40 °C – +65 °C
Coolant temperature (limited perf.)	+65 °C – 100 °C
Ambient temperature	-40 °C – +85 °C
Protection class	IP67 and IP6K9K
Communication interface	CAN 2.0 A/B (500 kbps) incl. daisy chaining CAN FD (option) Proprietary USB service interface
Dimensions (L x W x H)	308 mm x 258 mm x 78 mm
Weight	9.8 kg

High-voltage insulation	
Rated insulation voltage	920 V
Design altitude (for insulation coordination)	5000 m.a.s.l. for applications w/o mains connection 2000 m.a.s.l. for mains connected applications
Rated impulse voltage (BI)	4 kV
Insulation test voltage	2550 V DC
Insulation LV to HV	reinforced

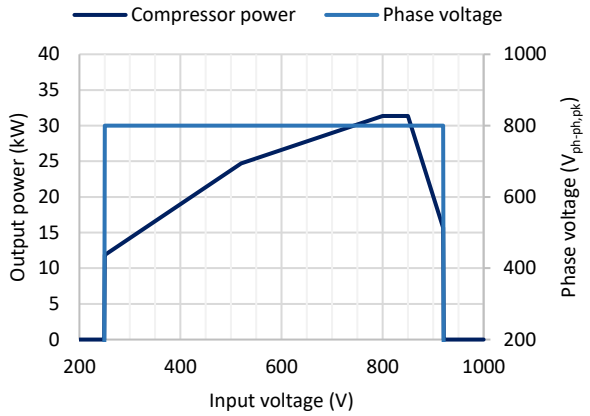
Electrical safety	
Passive discharge	< 60 V DC, 3 min
Active discharge (option)	< 60 V DC, 3 s

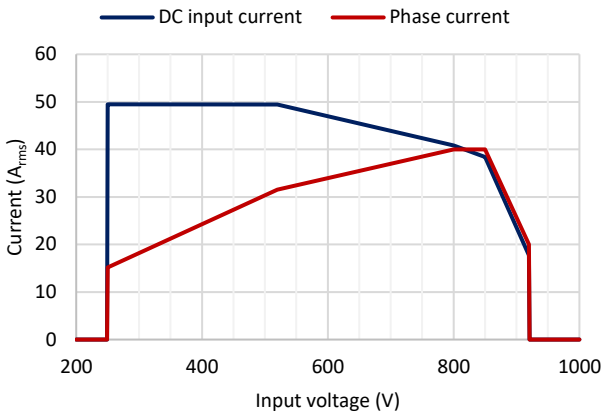
High-voltage interfaces	
Connector type (HV DC interface)	Jonhon EVH6, 2 pos. (cable side connector: EVH6-E2TK-A)
Cable type (HV DC interface)	2x 10 mm^2, individually shielded
Connector type (motor interface)	Jonhon EVH2, 4 pos. (cable-side connector: EVH2-N4TK-DA)
Cable type (motor interface)	3x 6 mm^2, individually shielded motor cables 1x 6 mm^2, optional PE connection
HVIL	passive loop of high-voltage connectors
Grounding	2x M6 cable lug

Low-voltage interfaces	
Connector type (LV interface)	Jonhon EVS5, 24 pos. (cable-side connector: EVS5-24BTK-01))
Connector type (sensor interface)	Amphenol eco|mate, 6 pos. (cable-side connector: RTS6BS10N6P03)
Available sensor inputs	2x PT1000 for compressor temperature 1x HVIL for motor connector of compressor

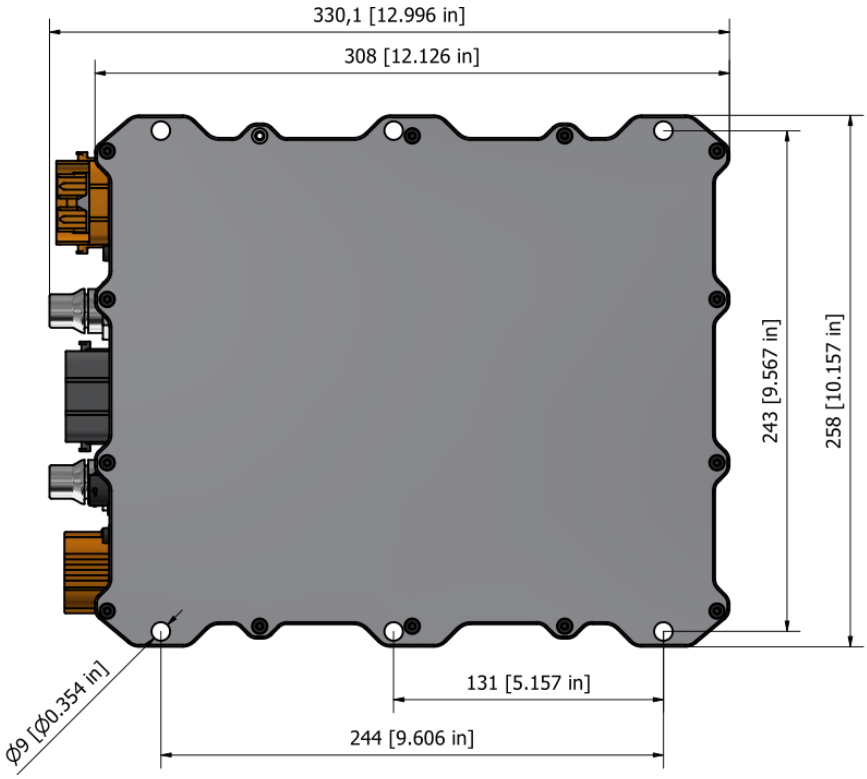
Cooling interfaces	
Liquid	Inhibited 50%/50% water glycol mixture
Coolant flow rate (nominal)	10 l/min
In-/outlet connector type	VDA NW 12
Tube ID (typical)	16 mm

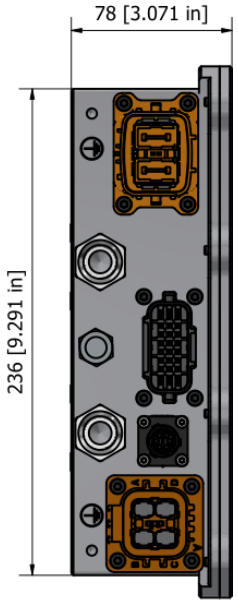
Boost inverter operating area





Drawing in mm [inch]





Ordering information	Article number
CC-4000	A4030100

Celeroton TurboCell AG | Industriestrasse 22 | 8604 Volketswil | Switzerland
T: +41 44 250 52 20 | info@celeroton-turbocell.com