



EBM
Expansion Battery Module
EBM-1000-2U

Military Grade Uninterruptible Power Supply

3000 W EBM Output Power	85-264 Vrms 47-63 Hz / 360-800 Hz Charger Input	>45 Min. 1250 W >20 Min. 2500 W Battery Run Time	500 W Integral Charger	1000 W-hr Energy Storage	28 Vdc DC Input
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Sealed Construction, Ultra Low Weight, Compact Size



DESIGNED AND MANUFACTURED IN THE USA

SynQor's Military-Grade Expansion Battery (EBM) units are designed for the extreme environmental and demanding electrical conditions of Military Land, Shipboard, & Aerospace applications. SynQor's EBM incorporates field proven high efficiency designs and rugged packaging technologies. This EBM will accept a wide range of input voltage and frequency values for charging while delivering DC power to an UPS. The use of lithium polymer batteries permits the lowest profile and lowest weight solution in its power class. It is designed and manufactured in SynQor's USA facilities to comply with a wide range of military standards.

Combine Up to 3 units for Extended Battery Run Times

Features

- Sealed, weather-proof, shock-proof construction
- > 45 minute run-time with 1250 W UPS Load
- > 20 minute run-time with 2500 W UPS Load
- Integral 500 W battery charger
- Full power operation: -20 °C to +55 °C
- Universal AC input: 85-264 Vac; 47-63 Hz/ 360-800 Hz
- Power factor correction at AC input
- Dual input (AC and DC)
- Cold start with no AC or DC input connections
- Up to 3 units can be combined for extended run time
- User I/O, Ethernet and Configuration signal ports
- 2U high rack mount unit 3.40"H x 17.00"W x 22.28"D
- Low weight: 61 lbs.

In-Line Manufacturing Process

- AS9100 and ISO 9001 certified facility
- Full component traceability

Specification Compliance

- EBM units are designed to meet:
- MIL-STD-1399-300B - Interface Std for Shipboard Systems
 - MIL-STD-810G - Environmental Engineering Considerations
 - MIL-STD-461F - Electromagnetic Interference
 - MIL-STD-704F - Aircraft Electrical Power Characteristics
 - MIL-STD-1275D - Vehicle Electrical Power Characteristics

	Page No.
Technical Specifications	2
Block Diagram	4
Application with SynQor UPS-1500 and UPS-3000	5
Technical Images	6
Mechanical Diagrams	7
Accessory Options	8
Ordering Information	9

Technical Specifications

INPUT CHARACTERISTICS

AC Input - Charging

Voltage	85-264 Vrms
Frequency	47-63 Hz / 360-800 Hz
Input Power Factor	0.99 typical at 47-63 Hz
	0.97 typical at 400 Hz
Maximum Input Current	8 A Continuous
	20 Apk Inrush
	10 A Internal circuit breaker rating

DC Input - Charging and Pass Through

Voltage	22-33 V ¹
Maximum Input Current with UPS-1500	25 A Charging only ²
	67 A Pass through only, EBM fully charged
	91 A Pass through plus charging
Maximum Input Current with UPS-3000	25 A Charging only ²
	134 A Pass through only, EBM fully charged
	140 A Pass through plus charging

- 1) The minimum DC input voltage varies with load. See Applications Section.
- 2) The maximum input charging current may be reduced by user commands via EBM communication interfaces. DC output must be turned on for DC input charging.

OUTPUT CHARACTERISTICS

DC Input Pass Through

Maximum Output Power 3000 W continuous

Battery Discharge

UPS Output Power and Run Time	2500 W >20 min.
	1250 W >45 min.

LITHIUM-POLYMER BATTERY CHARACTERISTICS

Total Battery Energy Storage 1000 Whrs

Recharge Time 3 hrs From 0% to 90% charge

Temperature Range for Recharge: 0 °C to 45 °C

Internal heaters maintain battery temperature above 0°C when AC or DC input power is present. Battery charging only enabled below +45 °C.

ENVIRONMENTAL CHARACTERISTICS MIL-STD-810G

Temperature Methods 501.5, 502.5

Operating Temperature	-20 °C to +55 °C
Non-operating Temperature	-40 °C to +65 °C

Altitude Method 500.5

Operating	0 - 18,000 ft
Non-operating	0 - 40,000 ft

Environmental Tests

Shock/Drop	Method 516.6, Procedures 1,4,6
Temperature Shock	Method 503.5, Procedure 1
Vibration	Method 514.6, CAT 5, 7, 24
Fungus	Method 508.6
Salt Fog	Method 509.5
Sand and Dust	Method 510.5, Procedures 1,2
Rain	Method 506.5, Procedure 1
EMI	MIL-STD-461F
Humidity	Method 507.5, Procedure 2
Mechanical Vibrations of Shipboard Equipment	Method 528, Procedure 1

RELIABILITY CHARACTERISTICS MIL-HDBK-217F

MTBF	313 kHrs	MIL-217F Ground Benign, Ta=25 °C
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ELECTROMAGNETIC CAPABILITY MIL-STD-461F

CE101	30 Hz - 10 kHz
CE102	10 kHz - 10 MHz
CS101	30 Hz - 150 kHz
CS106	10 kHz - 40 GHz
CS114	10 kHz - 200 MHz
CS116	10 kHz - 100 MHz
RE101	30 Hz - 100 kHz
RE102	10 kHz - 18 GHz
RS101	30 Hz - 100 kHz
RS103	2 MHz - 40 GHz

MECHANICAL CHARACTERISTICS

Chassis

Chassis Size	3.40"(2U)H x 17.00"W x 22.28"D
Case Material	Aluminum
Total Weight	61 lbs.

Connectors

AC Input Connector	MS3470L14-4P
User I/O Ports	HD DB15 Female
Configuration I/O Port	HD DB15 Male
Ethernet Port	Amphenol RJF22N00, Code B
DC Input Connector	CA02COME24-10PB
DC Output Connector	CA02COME24-10SB

Cooling Exhaust Fans

Sound Pressure Level (SPL)	54 dB(A)
Air Flow	0.67(m ³ /min) 23.7 CFM

Two fans in system, above specs are for each fan separately.



Technical Specifications

High Density DB15 Female (15 Pin Connector)

Signal	PIN	Function
TX	2	RS232 DCE Device Transmit
RX	3	RS232 DCE Device Receive
GND	4, 5	Ground reference for all digital inputs and outputs
LOW_BATT	6	Open collector output where "low" indicates battery charge level <10%
ACIN_GOOD	7	Open collector output where "low" indicates AC Input voltage is within range
+5V	8	Vout with minimal current drive usable as a pull-up voltage for open collector output signals. Load must be < 35 mA
ON_BATT	9	Open collector output where "low" indicates that the EBM is running on battery power
REMOTE_START	12	Drive this line "high" with ≥ 5 mA to enable EBM outputs
SHUTDOWN	13	Drive this line "high" with ≥ 5 mA to disable EBM outputs
OUT_OK	14	Open collector output where "low" indicates DC Output voltage is within range
OVER_TEMP	15	Open collector output where "low" indicates that the EBM is at or above its maximum temperature

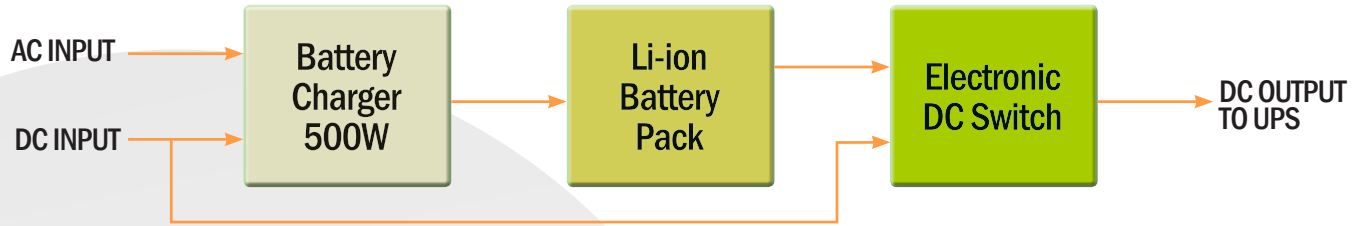
Safety & Qualifications

IEC 62133	Safety requirements for portable secondary sealed cells.
ST/SG/AC.10/11	UN Recommendations on the Transport of Dangerous Goods
UL 1642	Lithium Batteries
EN 62040-1	General and safety requirements for UPS (Does not apply to 400Hz operation)
EN 62040-2	UPS Electromagnetic compatibility (Category C4)



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SynQor Expansion Battery Module Block Diagram



Application with SynQor UPS-1500 and UPS-3000

A typical application for the EBM is shown below. The EBM uses the DC input feature of the UPS to deliver expanded battery capability. Therefore the UPS must be equipped with the DC power input option.

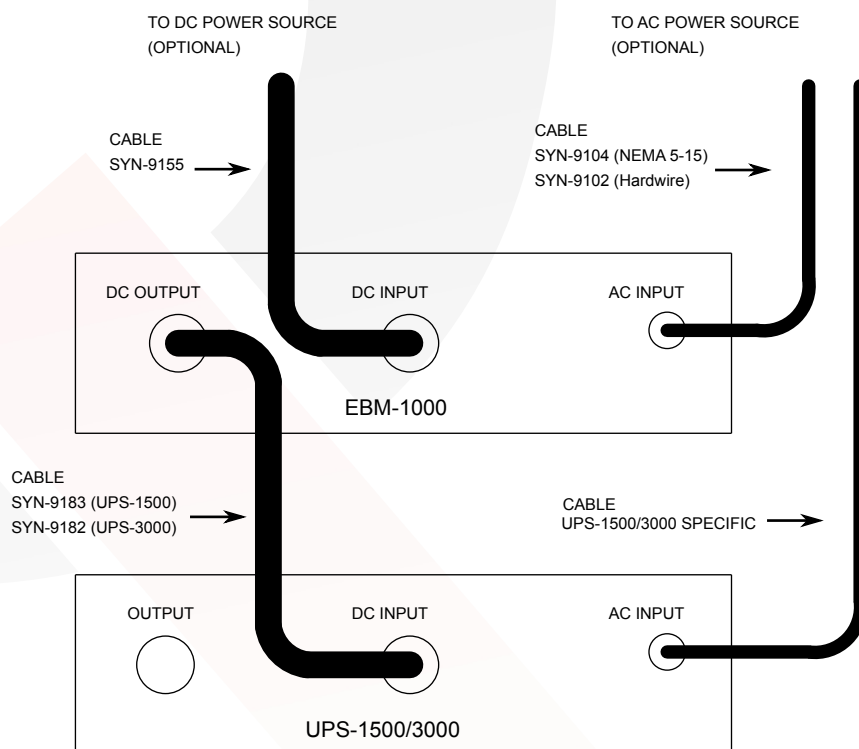
At least two power cables are required for the EBM. One cable is required to connect between the EBM and the UPS. A second cable is required to connect to a source of either AC or DC power. If AC power is used, then the AC power cable to the EBM only supplies battery charger power and another AC power cable is required for the UPS. If DC power used, then the EBM can both charge its battery from the DC power and pass-through the DC power to the UPS.

When DC power is used in the pass-through mode of operation, consideration must be given to the voltage drop introduced by the cables and the EBM. SynQor UPS-1500 and UPS-3000 models have a 22-33 V DC input voltage range for full power operation. The chart below shows the voltage range allowed at the EBM DC input connector or at the end of the DC input cable (DC Source) for full power operation, taking into account voltage drops.

More application information concerning power cables, connections, and multi-unit systems may be found in the EBM-1000 Operator's Guide.

UPS Type	UPS Load	EBM-UPS Power Cable	EBM DC Input Voltage	EBM-DC Source Power Cable	DC Source Voltage
UPS-1500	1250 W	SYN-9183	22.7 - 33.0 V	SYN-9155 (10')	23.0 - 33.0 V
UPS-3000	2500 W	SYN-9182	23.0 - 33.0 V	SYN-9155 (10')	23.7 - 33.0 V

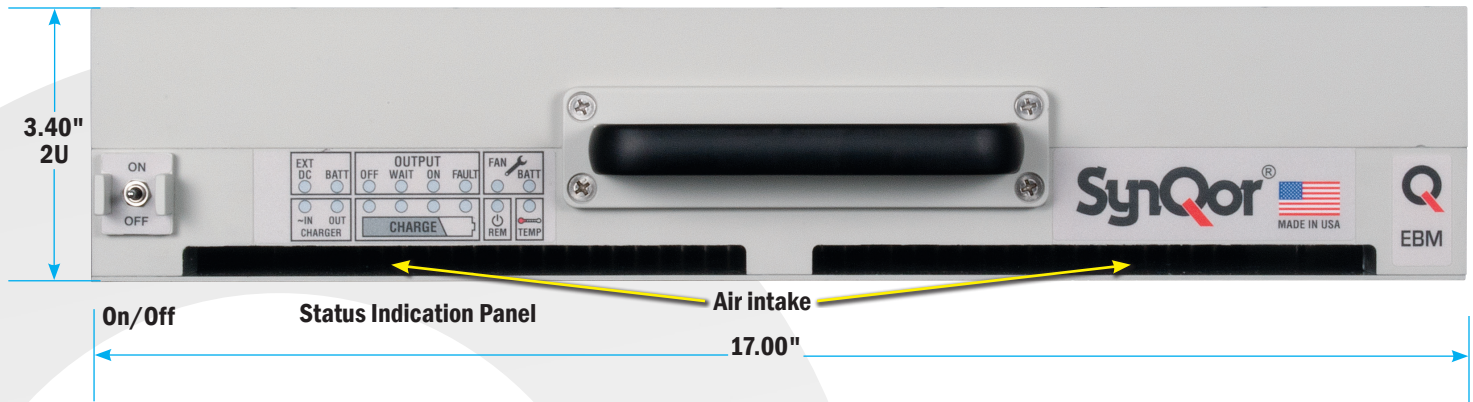
EBM POWER CONNECTIONS



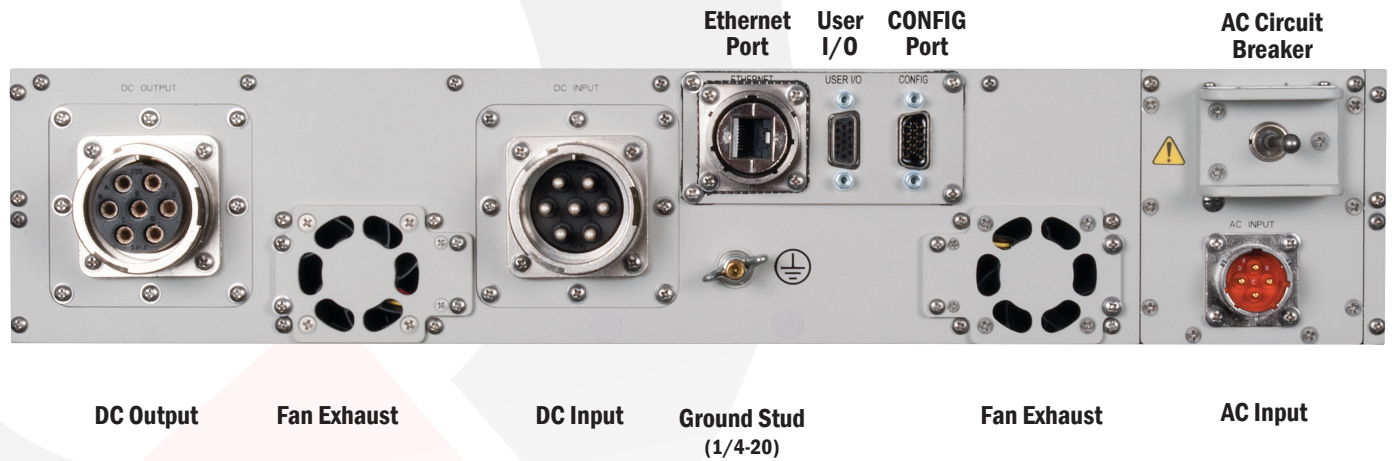


Technical Images

EBM-1000-2U



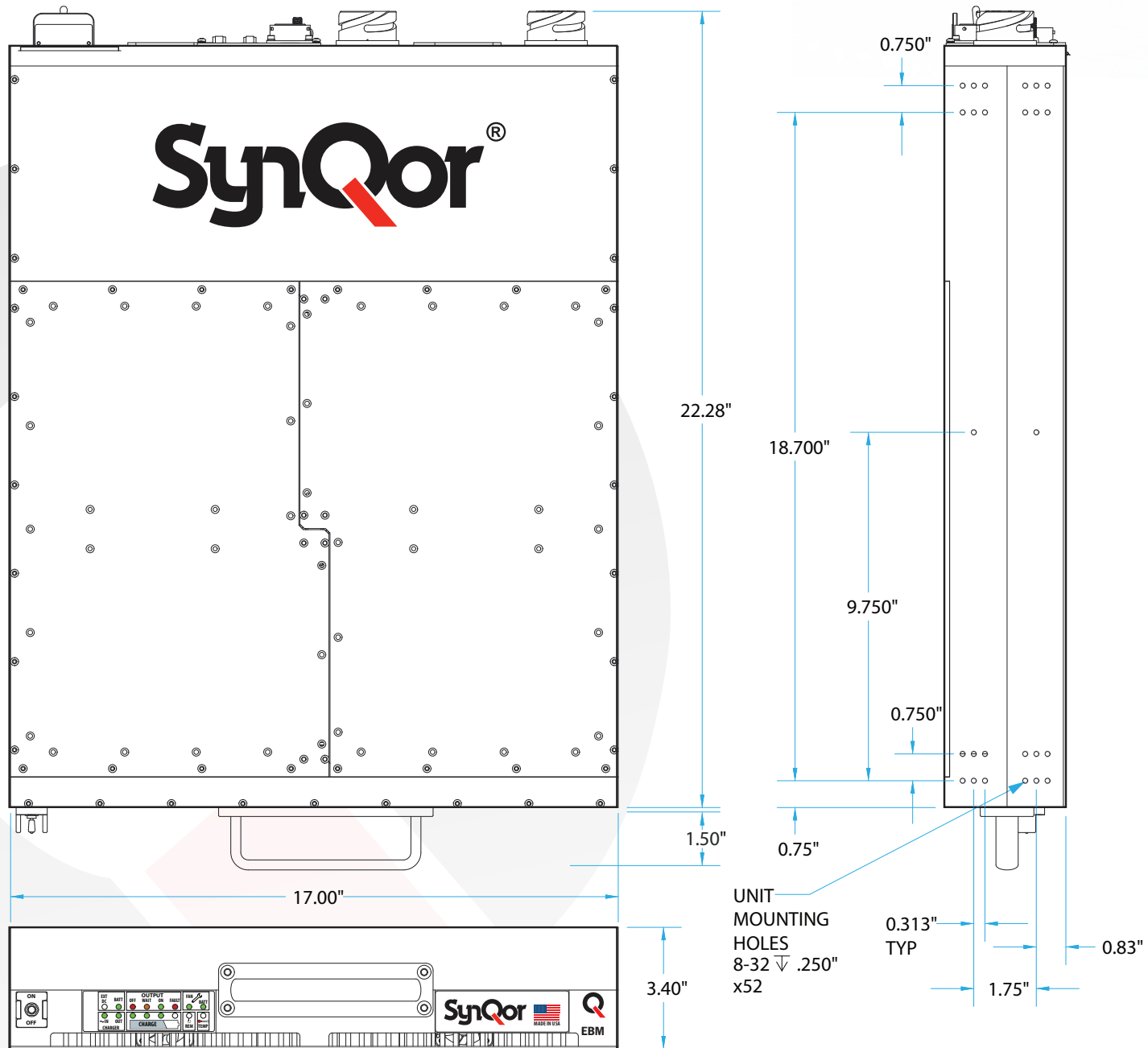
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Mechanical Diagrams



Accessory Options

Power Cable	
AC Input, NEMA 5-15 Plug, 10' length	SYN-9104
AC Input, Hardwire, 10' length	SYN-9102
DC Input, Hardwire, 10' length	SYN-9155
EBM DC Output to UPS-3000 DC Input, 2.5' length	SYN-9182
EBM DC Output to UPS-1500 DC Input, 2.5' length	SYN-9183
EBM DC Output, Hardwire, 4' length, for 1500 W load ¹	SYN-9185
EBM DC Output, Hardwire, 4' length, for 3000 W load ¹	SYN-9184
Rail Kits	
Slide Rail Kit ² - Two required per EBM	SYN-9002
Fixed Bracket Kit ³	SYN-9033
Rackmount Transit Cases	
Transit Case, 3U, Gray, with Casters ³	SYN-9410
Transit Case, 3U, Gray, No Casters ³	SYN-9412
Fan Replacement Kit	
Replaceable Fan Modules	SYN-9450

Notes:

- 1: These cables are for multi-unit application. Refer to the EBM Operator's Guide for wiring details.
- 2: Slide Rail Kit (SYN-9002) is not recommended for transit and ruggedized use.
- 3: Fixed Bracket Kit (SYN-9031) with Transit Case (SYN-9410 or SYN-9412) is required for transit and ruggedized use (qualified to pass MIL-STD-810G Loose Cargo and Transit Drop requirements).
- 4: Other Options also available, check the website or contact power@synqor.com for further information.

User Communications (I/O) Cables

HD DB15M to DB9F (RS232, 10')	SYN-9301
HD DB15M to DB15M (RS232 and Digital I/O, 10')	SYN-9305
Mil-Circular to RJ45 (Ethernet, 10')	SYN-9321
HD DB15F to HD DB15F (Synchronized Control of TWO Units, 3') ¹	SYN-9322
HD DB15F to HD DB15F to HD DB15F (Synchronized Control of THREE Units, 3') ¹	SYN-9323

Notes:

1. HD DB15F Cables (SYN-9322 or SYN-9323) not required for operation.



Optional Rackmount Transit Case



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Ordering Information

PART NUMBERING SYSTEM

Family	Watt Hours	Height	DC Output Voltage	Output Power	Charging Input	Additional Options
EBM	1000	2U	28	3000	W	ECE
EBM	1000: 1000 W Hr	2U: 3.40"	28: 28 Vdc	3000: 3000 W	W: 47-63 Hz / 360-800 Hz	E00: Ethernet / SNMP ECE: Ethernet / SNMP & CE Marking

Part Numbering Example: EBM-1000-2U-28-3000-W-E00

Not all combinations make valid part numbers, please contact SynQor for availability.

Contact SynQor for further information and to order:

Phone: 978-849-0600
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 USA

PATENTS

SynQor holds numerous U.S. patents, one or more of which apply to most of its power conversion products. Any that apply to the product(s) listed in this document are identified by markings on the product(s) or on internal components of the product(s) in accordance with U.S. patent laws. SynQor's patents include the following:

6,545,890 6,594,159 6,894,468 6,896,526 6,927,987 7,050,309
 7,085,146 7,119,524 7,765,687 7,787,261 8,149,597 8,644,027
 9,143,042

WARRANTY

SynQor offers a one (1) year limited warranty. Complete warranty information is listed on our website or is available upon request from SynQor.