

SynQor

POWER CONVERTERS & SYSTEMS

2015 FALL PRODUCT CATALOG

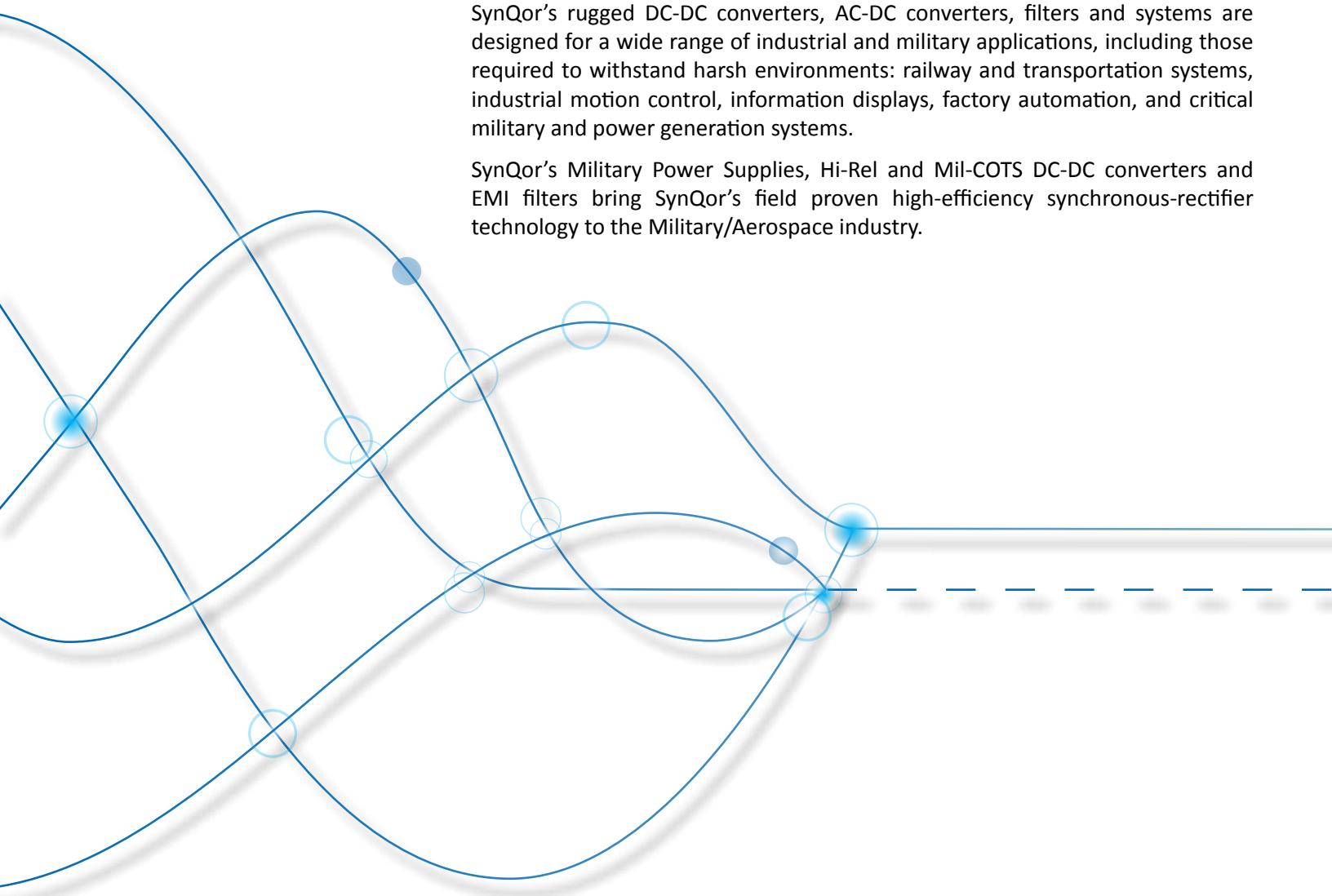


Advancing The Power Curve®

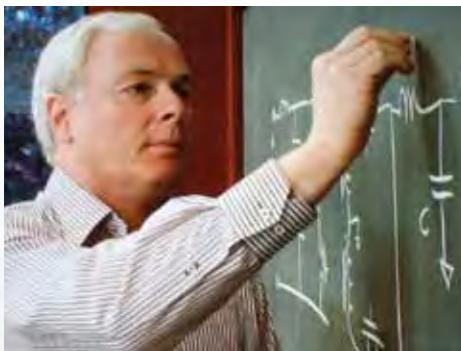
Headquartered in Boxborough, Massachusetts, at the location of its manufacturing operations, SynQor is a privately owned U.S. AS9100 and ISO9001 company. SynQor's converters feature a patented two-stage power topology that greatly improves efficiency and optimizes the power dissipated by the converter. With a design center in Dallas, Texas, and sales/marketing offices throughout the World, SynQor is the technology, quality and service leader for power conversion modules and systems.

SynQor's rugged DC-DC converters, AC-DC converters, filters and systems are designed for a wide range of industrial and military applications, including those required to withstand harsh environments: railway and transportation systems, industrial motion control, information displays, factory automation, and critical military and power generation systems.

SynQor's Military Power Supplies, Hi-Rel and Mil-COTS DC-DC converters and EMI filters bring SynQor's field proven high-efficiency synchronous-rectifier technology to the Military/Aerospace industry.



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SynQor is a leading supplier of power conversion solutions to the military, avionics, transportation, medical, industrial, telecommunications and computing markets.

SynQor's innovative products are designed to exceed the demanding performance, quality, and reliability requirements of today's power electronic engineers who develop leading-edge infrastructure hardware.

SynQor provides all the power conversion modules needed to build a power system, as well as complete power systems.

SynQor's core capabilities include both standard and custom solutions, delivered with industry leading service and support.

SynQor's total commitment to quality, customer satisfaction and continuous improvement drives our business processes.

Dr. Martin F. Schlecht
President, & CEO

SynQor®

Military / Avionic Products

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NiQor

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Design, Engineering & Manufacturing	MFG-87
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SynQor

POWER CONVERSION MODULES

MilCOTS™

Military "Off-the-shelf"
Isolated DC-DC Converters,
DC-DC & AC-DC Filters, Bus Converters,
Non-Isolated DC-DC Converters,
Quad Output Converters, and
Power Factor Correction Modules
designed for Cost Sensitive
Military/Avionics Applications
beginning on page MCOTS-10



InQor®

Next-Generation, Ruggedized
Isolated DC-DC Converters for
Industrial Applications
beginning on page IQ-50



NiQor®

High Voltage, Non-isolated
DC-DC Converters for
Industrial Applications
beginning on page HVNQ-58



PFCQor®

Power Factor Correction
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RailQor®

Isolated DC-DC Converters for
the Rail Transportation Industry
beginning on page RQ-62



CFQor®

Medical Grade DC-DC Converters
Rated for CF Patient Contact and
Defibrillation Proof
beginning on page CF-75



PowerQor®

48V Input, Single and Dual Output Isolated
DC-DC Converters for Telecom/Network
Applications beginning on page PQ-66

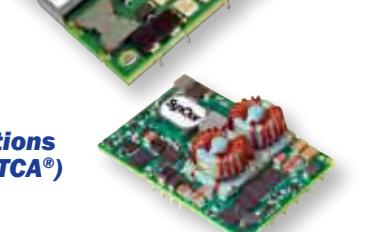
BusQor®

DC-DC Bus Converters
"Open-Frame,
High Efficiency"
beginning on page BQ-70



iQor™

Advanced Telecommunications
Computing Architecture (ATCA®)
Power Interface Modules
beginning on page iQ-74



Made in USA

*ATCA is a registered trademark of PICMG.

SynQor

POWER SYSTEMS SOLUTIONS

UPS

Military Tough – Sealed,

Weather-Proof,
Shock-Proof

Military Grade Uninterruptible Power Supply
UPS-1500 1U beginning on page UPS-28



UPS-3000
2500W (3000VA)
2U High Rack-Mount Package
>10 Minutes Battery Run Time, Only 65 lbs.



EBM

Military Tough – Sealed,

Weather-Proof,
Shock-Proof

Military Grade Expanded Battery Module
beginning on page EBM-32



MPC

Military Tough – Sealed,

Weather-Proof,
Shock-Proof

Military Power Conditioner beginning on page MPC-34



MPS

Military Tough – Sealed,

Weather-Proof,
Shock-Proof

Military Power Supply beginning on page MPS-36



MINV

Military Tough – Sealed,

Weather-Proof,
Shock-Proof

Military Grade Power Inverter beginning on page MINV-38



VPX

Military Power Supplies in 3U & 6U models are VITA62 compliant, MIL-STD-704, MIL-STD-461 and MIL-STD-810G for 28Vin and 270Vin systems beginning on page VPX-40



MultiQor

Configurable Multi-Output Military-Grade DC-DC Power Supplies & AC-DC Power Supplies beginning on page MTQ-44



ACuQor®

AC-DC Power Supplies for Industrial Applications beginning on page AQ-57 & Medical Applications beginning on page AQ-76



SynQor is a world-class supplier of DC-DC Power Systems and

CUSTOMER SERVICE



... the power behind communication

SynQor is committed to providing you the highest level of customer support. We support our products with direct sales, manufacturer's representatives and distribution partners.

If you have questions about customer support or ordering, you can visit our Sales Frequently Asked Questions (FAQ) website section. Our Technical Support Contacts are also listed on our website.



DESIGN ENGINEERING



... the power behind innovation

SynQor was founded by M.I.T. Professor Dr. Martin F. Schlecht. Dr. Schlecht believed that a technology known as "synchronous rectification" would revolutionize the decades-old industry of DC-DC power converters.

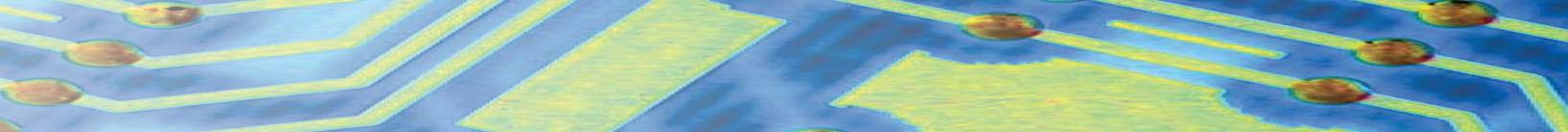
SynQor's award winning technology innovations stem from the design team's industry-leading knowledge in the power arena. SynQor's design engineers also have expertise in many of the electrical, mechanical and environment specifications required for system level compliance.

SynQor holds numerous U.S. patents, one or more of which apply to most of its power converter products. Any that apply to the product(s) listed in this document are identified by marking 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:

5,999,417	6,222,742	6,545,890	6,594,159
6,731,520	6,894,468	6,896,526	6,927,987
7,050,309	7,072,190	7,085,146	7,119,524
7,269,034	7,272,021	7,272,023	7,558,083
7,564,702	7,765,687	7,787,261	8,023,290
8,149,597	8,493,751	8,644,027	9,143,042





Converters, AC-DC power supplies and Filter solutions.

QUALITY & RELIABILITY



... the power behind industry

Since our founding, SynQor has fostered a culture of quality and continuous improvement across every facet of our business. Our customer focused, process-centered organizational structure, which is designed to deliver operational excellence throughout the company, incorporates continual improvement for all our business processes which we practice daily. SynQor continues to thrive by adhering to our founding tenets of providing world-class performance, quality, reliability, and service. By fostering innovation and adherence to executional focus, we continue to redefine industry expectations for quality and reliability performance, in order to support a lowest cost of ownership model.

U.S. MANUFACTURING



... the power behind strength

SynQor is committed to achieving the highest quality manufacturing processes while ensuring timely supply of our highly reliable product at competitive prices. To meet these objectives, SynQor designs and operates its own production lines, assuring minimized lead times, while retaining control over industry leading quality levels and 100% component level traceability. In our state-of-the art AS9100 and ISO9001 certified manufacturing facility located at our corporate headquarters in Boxborough, MA, USA, SynQor operates a multiple cell production flow, using the latest in automated surface-mount technology. The in-line, flow-manufacturing process allows for virtually hands-free assembly with minimal WIP, resulting in very high throughput and product mix that supports a flexible, flow production strategy.



MILITARY / AVIONICS



... the power behind strength

The MilQor® brick series of Hi-Rel & Mil-COTS DC-DC converters and EMI filters bring SynQor's field proven high-efficiency synchronous-rectifier technology to the Military/Avionics industry. Our innovative packaging ensures survivability in the most hostile environments. MilQor products are designed and manufactured to comply with military standards.

Mil-COTS [page MCOTS-10](#)

- Full Power @ -55 °C to +100 °C
- Isolated DC-DC Converters
- Non-Isolated DC-DC Converters
- Bus Converters
- EMI Filters
- Military PFC
- Extended Input voltage ranges available (28E, 28V, 28VE, 270H, 270N)

Hi-Rel [page HiRel-22](#)

- Full Power @ -55 °C to +125 °C
- 28V & 270V Single and Dual Output Isolated DC-DC Converters
- Extended Input Voltage Ranges Available (28E, 28V, 28VE, 270L)
- Bus Converters
- EMI Filters



... the power behind command

SynQor's Military Power Systems are designed and manufactured in our USA facilities to comply with a wide range of standards for the extreme environmental and demanding electrical conditions of Military applications. SynQor incorporates field proven high efficiency designs and rugged packaging technologies.

Uninterruptible Power Supply [page UPS-28](#)

- Dual Input (AC and DC)
- Hot Swappable Lithium Battery
- Well Conditioned AC & DC output
- Ultra Low Weight

EBM [page EBM-32](#)

- PFC at AC input
- Dual input (AC and DC)

Power Conditioners [page MPC-34](#)

- Ultra Low Weight
- Well Conditioned AC & DC output

Military Power Supply [page MPS-36](#)

- AC-DC Power Supplies
- 3-Phase input
- Ultra Low Weight

Military Grade Power Inverter [page MINV-38](#)

- DC-AC Power Supplies
- Multiple single-phase outputs and 3-Phase outputs

VPX VITA 62 Compliant Power Supply [page VPX-40](#)

- Up to 1000W
- 3U and 6U Size Packages

MultiQor Plate [page MTQ-44](#)

- AC-DC & DC-DC Power Supplies
- Multiple outputs

INDUSTRIAL



... the power behind industry

SynQor's ruggedized DC-DC power converters and filters are designed for a wide range of industrial applications including those required to withstand harsh environments: industrial motion control, information displays, factory automation and power generation systems. SynQor converters feature a two-stage power topology with synchronous-rectification that greatly improves efficiency and optimizes the power dissipated by the converter.

InQor [page IQ-50](#)

- Isolated DC-DC Converters

InQor Filters [page IQ-56](#)

- Filters

ACuQor [page AQ-57](#)

- AC-DC Power Supplies

NiQor High Voltage [page HVNQ-58](#)

- High Voltage Non-Isolated DC-DC Converters

PFCQor [page PFC-60](#)

- Power Factor Correction Module





... the power behind motion

SynQor's ruggedized isolated DC-DC converters are designed to be used in the transportation industry for such electronics as LED displays, audio amplifiers, safety monitors, lighting and communications systems under the European Standard EN 50155. These converters use SynQor's synchronous rectifier based technology to achieve extremely efficient industry leading performance. Due to the difficult environmental and zero airflow conditions the transportation market imposes on power supplies, SynQor has designed the RailQor line for optimal performance in the most demanding applications.

RailQor page RQ-62

- Rail Transportation specific Isolated DC-DC Converters

... the power behind communications

SynQor is the worldwide leader in technology, quality and service for high-efficiency DC-DC converters for the telecom / datacom marketplace. SynQor's isolated, high-efficiency, open-frame DC-DC converter product lines combine our unmatched lead-times, flexibility and design support that the worldwide telecom market requires.

PowerQor page PQ-66

- 48V Input, Single and Dual Output Isolated DC-DC Converters

BusQor page BQ-70

- Bus Converters

NiQor page NQ-72

- Non-Isolated DC-DC Converters

iQor page iQ-74

- ATCA Power Interface Module

... the power behind innovation

SynQor's Medical Product line offers best-in-class solutions for AC-DC and DC-DC power supplies, designed to meet an extensive range of medical applications our medical power supplies have been approved to the 3rd Edition, 60601-1 safeties for cardiac contact without requiring an external isolation transformer. They feature extremely low leakage and have BF, CF and CFD isolation ratings. SynQor's medical supplies offer the highest power density in the smallest package sizes available in today's market.

CFQor page CF-75

- CF Grade Isolated DC-DC Converters

ACuQor page AQ-76

- AC-DC Power Supplies



MILITARY ISOLATED DC-DC CONVERTERS



"Off-the-shelf" DC-DC Converters for Cost Sensitive Military/Avionics Applications

The MilQor® series of Mil-COTS Isolated DC-DC converters brings SynQor's field proven high-efficiency synchronous rectifier technology to the Military/Avionics industry. These "off-the-shelf" converters are compatible with the industry standard format, operate at a fixed frequency, and follow conservative component derating guidelines. MilQor products are designed and manufactured to comply with a wide range of military standards.

MilCOTS Product Features

- ♦ High efficiency, up to 95% at full rated load current
- ♦ Fixed frequency switching provides predictable EMI
- ♦ No minimum load requirement
- ♦ Rugged design for harsh environments
- ♦ Full Feature option on some models
- ♦ Flanged baseplate available
- ♦ Industry standard pin-out configurations and standard footprints.

Protection

- ♦ Input under-voltage lockout
- ♦ Output current limit and short circuit protection
- ♦ Active back bias limit
- ♦ Output over-voltage protection
- ♦ Thermal shutdown (not on DM Package Size)

Compliance Features

Mil-COTS converters with Mil-COTS filters are designed to meet:

- ♦ MIL-HDBK-704
- ♦ RTCA/DO-160 Section 16, 17, 18
- ♦ MIL-STD-1275
- ♦ MIL-STD-461
- ♦ DEF-STAN 61-5 (part 6)/(5, 6)

Control

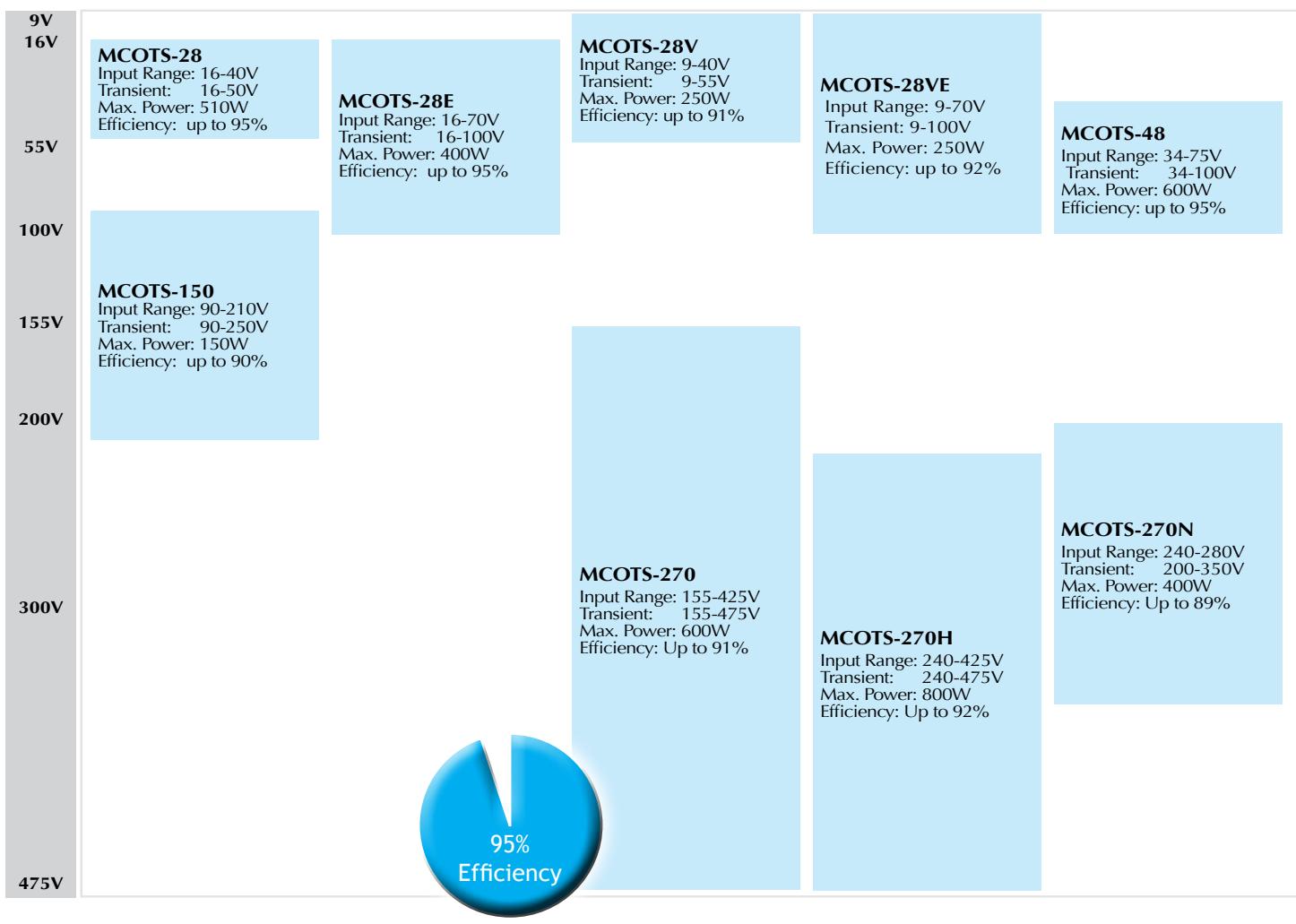
- ♦ On/Off control referenced to input side
(Fully isolated Full Bricks)
- ♦ Remote sense for the output voltage
- ♦ Digital Output Current Sharing (HZ only)
- ♦ Output voltage trim range of:
Half-Brick Zeta +10% to -20%
Quarter-Brick Exa +10% to -50%
Sixteenth Brick +10% to -50%
 +10% to -10%

MIL-COTS DC-DC CONVERTERS

Family	Product	Cont. Input Voltage	Output Voltage		Package Size/ (Performance Level)	Heatsink Option	Screening Level	Options
MCOTS	C: Converter	28: 16-40V 28E: 16-70V 28V: 9-40V 28VE: 9-70V 48: 34-75V 150: 90-210V 270: 155-425V 270H: 240-425V 270N: 240-280V	1R2: 1.2V 1R5: 1.5V 1R8: 1.8V 2R5: 2.5V 3R3: 3.3V 05: 5V 07: 7V 7R5: 7.5V 08: 8V 10: 10V	12: 12V 15: 15V 24: 24V 28: 28V 36: 36V 40: 40V 48: 48V 50: 50V 135: 135V 270: 270V	FZ: Full Brick (Zeta) FP: Full Brick (Peta) FT: Full Brick (Tera) HZ: Half Brick (Zeta) HP: Half Brick (Peta) HT: Half Brick (Tera) QE: Quarter Brick (Exa) QT: Quarter Brick (Tera) SM: Sixteenth Brick (Mega) DM: Demi Brick (Mega)	N: Encased, Baseplate D: Encased, Non-Threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade	[]: Standard F: Full Feature

Part Numbering Example: MCOTS-C-28-05-HP-N-M For valid part numbers, refer to the website or contact your local sales representative.

MILITARY ISOLATED DC-DC CONVERTERS



MCOTS-28 Demi	Single Output							Dual Output						
	Vout	3.3V	5.0V	12V	15V	28V	±5.0V	±12V	±15V					
16-40Vin Cont. 50Vin 1s Trans. Absolute Max Vin = 60V	Demi Brick	15A 50W	10A 50W	4.0A 48W	3.3A 50W	1.8A 50W	10A 50W Total	4A 48W Total	3.3A 50W Total					

MCOTS-28	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	7.5V	12V	15V	24V	28V	40V	48V	50V	135V	270V
16-40Vin Cont. 50Vin 1s Trans. Absolute Max Vin = 60V	Full Brick Zeta																	3.7A 999W
	1/2 Brick Zeta						60A 300W			42A 504W	34A 510W	21A 504W	18A 504W	12.5A 500W		10A 500W	3.7A 500W	
	1/2 Brick Peta				60A 108W	50A 165W	40A 200W		27A 202W	16A 192W	13A 195W	8.33A 192W	7A 196W	5A 200W	4A 192W			
	1/4 Brick Exa						40A 200W			25A 300W	20A 300W		10.7A 300W			6A 300W		
	1/4 Brick Tera	40A 48W	40A 60W	40A 72W	40A 100W	30A 99W	24A 120W	17A 119W		10A 120W	8A 120W	5A 120W	4A 112W	3A 120W	2.5A 120W			
	1/16 Brick Mega	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W		4A 48W								

See "Encased Package Configurations" on page MECH-82 for package outlines.

MILITARY ISOLATED DC-DC CONVERTERS

MCOTS-28E	Vout	1.5V	1.8V	2.5V	3.3V	5V	7.5V	9.6V	12V	15V	24V	28V	30V	40V	48V	50V
16-70Vin Cont. 100Vin 1s Trans. Absolute Max Vin = 100V	1/2 Brick Zeta					60A 300W		42A 403W	33A 396W	26A 390W	16A 384W	14A 392W		10A 400W		8A 400W
	1/2 Brick Peta		60A 108W		50A 165W	36A 180W	24A 180W		15A 180W	12A 180W	7.5A 180W	6.5A 182W		4.5A 180W	3.7A 178W	
	1/4 Brick Tera				30A 99W	24A 120W			10A 120W	8A 120W		4.3A 120W			2.5A 120W	

MCOTS-28V	Vout	1.5V	1.8V	2.5V	3.3V	5V	7V	7.5V	12V	15V	24V	28V	30V	40V	48V	50V
9-40Vin Cont. 55Vin 1s Trans. Absolute Max Vin = 60V	1/2 Brick Zeta					50A 250W			21A 252W	17A 255W	10A 240W	9A 252W		6A 240W		5A 250W
	1/2 Brick Peta		60A 108W		50A 165W	36A 180W		24A 180W	15A 180W	12A 180W	7.5A 180W	6.5A 182W		4.5A 180W	3.7A 178W	
	1/4 Brick Tera		35A 63W		25A 83W	17A 85W	12A 84W		7A 84W	5.5A 83W	3.5A 84W	2.8A 78W			1.8A 86W	

MCOTS-28VE	Vout	1.5V	1.8V	2.5V	3.3V	5V	7V	7.5V	12V	15V	24V	28V	30V	40V	48V	50V
9-70Vin Cont. 100Vin 1s Trans. Absolute Max Vin = 100V	1/2 Brick Zeta					50A 250W			21A 252W	17A 255W	10A 240W	9A 252W		6A 240W		5A 250W
	1/2 Brick Peta		55A 99W		45A 149W	32A 160W		22A 165W	13A 156W	11A 165W	6.7A 161W	5.8A 162W		4A 160W	3.4A 163W	
	1/4 Brick Tera		35A 63W		25A 83W	17A 85W	12A 84W		7A 84W	5.5A 83W	3.5A 84W	2.8A 78W			1.8A 86W	

MCOTS-48	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V	50V
34-75Vin Cont. 100Vin 1s Trans. Absolute Max Vin = 100V	1/2 Brick Zeta						60A 300W		50A 600W	40A 600W	25A 600W	21.5A 602W		15A 600W		12A 600W
	1/2 Brick Peta	60A 72W	60A 90W	60A 108W	60A 150W	60A 198W	46A 230W	35A 245W	21A 252W	17A 255W	10.5A 252W	9A 252W		6.3A 252W	5.2A 250W	
	1/4 Brick Tera	40A 48W	40A 60W	40A 72W	40A 100W	30A 99W	25A 125W	20A 140W	12A 144W	10A 150W	6A 144W	5A 140W	5A 150W	3A 120W	3A 144W	
	1/16 Brick Mega	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W	4A 48W	3A 45W						

MCOTS-150	Vout	3.3V	5V	6V	12V	15V	24V	28V	48V
90-210Vin Cont. 250Vin 1s Trans. Absolute Max Vin = 250V	1/4 Brick Tera		30A 150W						5.35A 150W 3.1A 149W

MCOTS-270	Vout	3.3V	5V	6V	12V	15V	24V	28V	48V
155-425Vin Cont. 475Vin 1s Trans. Absolute Max Vin = 600V	Full Brick Tera		80A 400W		50A 600W	40A 600W	25A 600W	21.4A 599W	12.5A 600W
	1/2 Brick Tera	60A 198W	50A 250W		25A 300W	20A 300W	12.5A 300W	10.7A 300W	6.3A 302W
	1/4 Brick Tera	30A 99W	30A 150W	25A 150W	13A 156W	10A 150W	6.25A 150W	5.35A 150W	3.1A 149W

MCOTS-270H	Vout	5V	28V	36V	MCOTS-270N	Vout	8V	10V	28V
240-425Vin Cont. 475Vin 1s Trans. Absolute Max Vin = 600V	Full Brick Peta	100A 500W	28.6A 800W	22.2A 800W	240-280Vin Cont. 200-350Vin 1s Trans. Absolute Max Vin = 600V	Half Brick Tera	50A 400W	40A 400W	14.5A 406W



DC Filter Modules

SynQor provides EMI filters for the MIL-COTS DC-DC converters. All EMI filters provide high levels of differential-mode and common-mode attenuation and include stabilizing bulk capacitors and damping resistors.

MCOTS DC Filter Features

- ◆ Low DC resistance
- ◆ Differential-mode attenuation
- ◆ Common-mode attenuation
- ◆ Bulk capacitance provides input system stabilization for downstream power converters
- ◆ No electrolytic capacitors (all ceramic design)
- ◆ High-voltage isolation between common-mode pins and input / output
- ◆ Wide temperature range operation
- ◆ Designed to meet MIL-STD-461

DC Filter Model Number	Input Voltage		Output Current	Isolation Voltage (to common-mode)	Maximum DC Resistance @ 100°C	Differential-Mode Attenuation	Common-Mode Attenuation
	Continuous	Surge (<100ms)					
HALF BRICK							
MCOTS-F-28-T-HT	±40V	+100V, -50V	30A	2250V	40mΩ	>80dB @ 250kHz	>36dB @ 250kHz
MCOTS-F-270-P-HT	±500V	±630V	9A	2500V	106mΩ	>70dB @ 250kHz	>50dB @ 250kHz
QUARTER BRICK							
MCOTS-F-28-P-QT	±40V	±50V	30A	2250V	20mΩ	>80dB @ 250kHz	>36dB @ 250kHz
MCOTS-F-48-P-QT	±80V	±100V	20A	2250V	32mΩ	>80dB @ 250kHz	>36dB @ 250kHz
MCOTS-F-270-P-QT	±500V	±630V	4.0A	2500V	180mΩ	>80dB @ 500kHz	>50dB @ 500kHz
DEMI BRICK							
MCOTS-F-28-P-DM	±40V	±50V	10A	1000V	60mΩ	>80dB @ 500kHz	>60dB @ 500kHz
MCOTS-F-28E-P-DM	±70V	±100V	10A	1000V	60mΩ	>80dB @ 500kHz	>60dB @ 500kHz

MIL-COTS DC FILTERS

Family	Product	Vin Range	Filter Type	Package Size	Thermal Design	Screening Level
MCOTS	F: Filter	28: -40V to +40V 28E: -70V to +70V 48: -80V to +80V 270: -500V to +500V	P: Passive T: Transient	DM: Demi-brick Mega QT: Quarter-brick Tera HT: Half-brick Tera	N: Encased, Threaded Baseplate D: Encased, Non-Threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MCOTS-F-28-T-HT-N-M For valid part numbers, refer to the website or contact your local sales representative.

MILITARY POWER FACTOR CORRECTION MODULE



Military Grade Power Factor Correction Module

The MPFCQor Power Factor Correction module is an essential building block of an AC-DC power supply. Used in conjunction with a hold-up capacitor, SynQor's high efficiency MCOTS DC-DC converters and SynQor's MCOTS AC line filter, the MPFCQor will draw a nearly perfect sinusoidal current (PF>0.99) from a single phase AC input. The MPFCQor module can be paralleled to achieve higher power. The module is supplied completely encased to provide protection from the harsh conditions seen in many military and extreme environments.

Operational Features

- ◆ Universal input voltage range: 85-264Vrms
- ◆ Narrow input voltage range: 85-140Vrms
- ◆ Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- ◆ Up to 700W output power
- ◆ ≥0.99 Power Factor
- ◆ High efficiency: Up to 95% (115Vrms)
- ◆ Internal inrush current limit
- ◆ Auxiliary 10V bias supply
- ◆ 100°C max baseplate temperature at full power
- ◆ Can be paralleled with current sharing
- ◆ Compatible with SynQor's MCOTS DC-DC Converters & SynQor's AC line filters

Protection/Control Features

- ◆ PFC Enable
- ◆ Load Enable (also: Power Out Good signal)
- ◆ AC Power Good Signal (Half-Brick Only)
- ◆ Clock synchronization (Half-Brick Only)
- ◆ Output current monitor/current sharing (Half-Brick Only)
- ◆ Input current limit and auto-recovery short circuit protection
- ◆ Auto-recovery input under/over-voltage protection
- ◆ Auto-recovery output over-voltage protection
- ◆ Auto-recovery thermal shutdown

MIL-COTS POWER FACTOR CORRECTION MODULE

Family	Vin Range	Output Voltage	Package Size	Thermal Design	Screening Level
MPFC	U: 85-264V 115: 85-180V	270: 270Vdc 390: 390Vdc	QP: Quarter-brick Peta HP: Half-brick Peta	N: Encased, Threaded Baseplate D: Encased, Non-threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MPFC-U-390-HP-N-M For valid part numbers, refer to the website or contact your local sales representative.



AC Line Filter Modules

SynQor provides AC Line filters for the Mil-COTS series of PFC modules and DC-DC converters. SynQor's high-performance filters are designed to comply with military EMI requirements.

MCOTS AC Filter Features

- ◆ Universal Input voltage range
- ◆ 500W@115Vrms or 1kW@230Vrms (Eighth-Brick)
- ◆ 1kW@115V or 2kW@230V (Half-Brick)
- ◆ All ceramic capacitor design
- ◆ High voltage isolation between baseplate and input/output
- ◆ Internally damped
- ◆ Wide temperature range operation
- ◆ Low power dissipation
- ◆ Complies with industry EMI standards when used with SynQor MPFC and DC-DC converter modules

Model Number	Input Frequency	Input Voltage	Output Current	Output Power	Power Dissipation @100°C Tcase	Isolation
MACF-U-230-ET	50/60Hz & 400Hz	85-264Vrms	4.5 ARMS	500W/1kW	4.5W	2250Vpk
MACF-060-230-HT	50/60Hz	85-264Vrms	9 ARMS	1kW/2kW	15.8W	2250Vpk
MACF-400-230-HT	400Hz	85-264Vrms	9 ARMS	1kW/2kW	15.8W	2250Vpk

MIL-COTS AC LINE FILTERS

Family	Input Frequency	Vin Range	Package Size	Thermal Design	Screening Level
MACF	U: 50/60Hz & 400Hz 060: 50/60Hz 400: 400Hz	230: 85-264Vrms	ET: Eighth-brick Tera HT: Half-brick Tera	N: Encased, Threaded Baseplate D: Encased, Non-Threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MACF-060-230-HT-N-M For valid part numbers, refer to the website or contact your local sales representative.

MILITARY 3-PHASE POWER FACTOR CORRECTION MODULE



3-Phase Power Factor Correction



Military Grade 3-Phase Power Factor Correction Module

The MPFCQor Power Factor Correction module is an essential building block of an AC-DC power supply. Used in conjunction with SynQor's MCOTS AC line filter and a limited amount of stabilizing capacitance, the 3-Phase MPFCQor will draw a nearly perfect sinusoidal current from each phase of a 3-Phase AC input. The module is supplied completely encased to provide protection from the harsh conditions seen in many military and extreme environments.

Operational Features

- ♦ Full-brick form factor industry standard
- ♦ 1.5kW continuous (2.0kW surge)
- ♦ Semi-regulated output: 270Vdc
- ♦ Compatible with Military Standard 60Hz, 400Hz and variable frequency systems
- ♦ Meets military standards for harmonic content
- ♦ Minimal Inrush current
- ♦ Compatible with large external hold-up capacitors
- ♦ Additional Half-brick input filter available to meet full EMI
- ♦ 100°C max baseplate temperature at full power
- ♦ Parallelable for higher power on a common input filter
- ♦ Compatible with SynQor MCOTS - 270 Converters
- ♦ Enables systems with repetitive load transients to pass MIL-STD-461 CE101 with superior load current rejection

Protection/Control Features

- ♦ PFC Enable and Battle Short inputs
- ♦ All control pins referenced to separate ground with functional isolation
- ♦ AC and DC Power Good outputs
- ♦ Clock synchronization output
- ♦ 3.3V standby power output
- ♦ Input current limit and auto-recovery short circuit protection
- ♦ Auto-recovery input under/over-voltage protection
- ♦ Auto-recovery output over-voltage protection
- ♦ Auto-recovery thermal shutdown

MIL-COTS 3-PHASE POWER FACTOR CORRECTION MODULE

Family	Vin Range	Input Phases	Vout	Package Size	Thermal Design	Screening Level
MPFC	115: 85-140V	3PH: Three-Phase	270: 270Vdc	FP: Full-brick Peta	N: Encased, Threaded Baseplate D: Encased, Non-Threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MPFC-115-3PH-270-FP-N-M For valid part numbers, refer to the website or contact your local sales representative.



3-Phase AC Line Filter Modules

SynQor provides AC Line filters for the MIL-COTS series of PFC modules and DC-DC converters. SynQor's high-performance filters are designed to comply with military EMI requirements. These filters have high differential-mode attenuation and low series resistance.

MilCOTS AC Filter Features

- ◆ >2kW@115V
- ◆ 8.0Arms
- ◆ Very low series resistance
- ◆ Internally damped
- ◆ High voltage isolation between baseplate and input/output
- ◆ -55°C to +100°C operation range
- ◆ Low power dissipation
- ◆ Complies with industry EMI standards when used with SynQor MPFC and DC-DC converter modules

Model Number	Input Frequency	Input Voltage (L-N)	Output Current	Output Power	Max Series Resistance	Differential & Common-mode Attenuation
MACF-115-3PH-UNV-HT	45-800Hz	85-140VRMS	8.0Arms	>2kW@115VRMS	165mΩ@100°C	>45dB @ 200kHz

MIL-COTS 3-PHASE AC LINE FILTER

Family	Vin Range (L-N)	Phase	Input Frequency	Package Size	Thermal Design	Screening Level
MACF	115: 85-140Vrms	3PH: 3-Phase	UNV: Universal	HT: Half-brick Tera	N: Encased, Threaded Baseplate D: Encased, Non-Threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MACF-115-3PH-UNV-HT-N-M For valid part numbers, refer to the website or contact your local sales representative.

MILITARY DC-DC BUS CONVERTERS



Rugged, High Efficiency

Next Generation DC-DC Bus Converters

These military-grade bus converters are the next-generation, board-mountable, isolated, fixed switching frequency DC-DC converters that use synchronous rectification to achieve extremely high conversion efficiency. MCOTS Bus converters are ideal for creating the mid-bus voltage required to drive point-of-load (non-isolated) converters in Intermediate Bus Architectures.

Features

- ♦ High efficiency, up to 95% at full rated load current
- ♦ Delivers 32A full power with minimal derating
- ♦ Operating input voltage range: 230-400V & 440-700V
- ♦ Fixed frequency switching provides predictable EMI
- ♦ No minimum load requirement
- ♦ Industry standard half-brick pin-out configuration

Protection

- ♦ Input under-voltage and over voltage lockout protects against abnormal input voltages
- ♦ Output current limit and short circuit protection (auto recovery)
- ♦ Thermal shutdown

Control

- ♦ On/Off control referenced to input side
- ♦ Inherent current share (by droop method) for high current and parallel applications
- ♦ Clock synchronization (primary reference)

MIL-COTS ISOLATED DC-DC BUS CONVERTERS

Model Number	Package Size	Input Voltage	Input Transient	Output Voltage	Output Current	Max Output Power	Efficiency
MCOTS-B-270-31	Half-Brick	230-400Vin	155-450Vtrans	29.7Vout	32.5A	1000W	95%
MCOTS-B-600-31	Half-Brick	440-700Vin	400-750Vtrans	30.3Vout	32.5A	1000W	95%

Family	Product	Vin Range	Vout	Package Size	Thermal Design	Screening Level
MCOTS	B: Bus Converter	270: 230-400V 600: 440-700V	31: 31V	HT: Half-brick Tera	N: Encased, Threaded Baseplate D: Encased, Non-Threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MCOTS-B-600-31-HT-N-M For valid part numbers, refer to the website or contact your local sales representative.



Military-Grade High Voltage, Non-Isolated DC-DC Converters

The high input voltage non-isolated DC-DC converters offer unique solutions for converting high-powered, variable voltages to a wide range of output voltages. The converter is a non-isolated buck-boost regulator, which employs synchronous rectification to achieve extremely high conversion efficiency. These products are suitable for use in Intermediate Bus Architectures, or to provide a regulated output voltage from a variable voltage source such as a battery. They can be configured to 'buck' the input voltage down or 'boost' the input voltage up with a single external setpoint resistor.

Features

- ◆ Ultra-high efficiency up to 97%
- ◆ Wide input voltage ranges: 9-60V (28V); 9-90V (28VE)
- ◆ Buck/Boost Mode available
- ◆ Maximum input/output currents up to 40A
- ◆ Suitable for use in Intermediate Bus Architectures
- ◆ On-board input and output filtering
- ◆ No minimum load requirement
- ◆ Remote sense and wide output voltage trim (Half-brick only)

Protection

- ◆ Input under-voltage lockout (UVLO)
- ◆ Output current limit (OCP) & short circuit protection
- ◆ Output over-voltage protection (OVP)
- ◆ Thermal shutdown (OTP)
- ◆ Output voltage trim

Battery Charging

Key feature of Trimmable Current Limit

- ◆ Provides the power conversion platform for battery charging
- ◆ Output current limit is externally controlled for constant-current charging
- ◆ Current can be set with an external resistor or an active circuit
- ◆ Current analog signal provided for instrumentation and control functions
- ◆ Ideal diode output stage with zero back-drive currents prevents discharge of battery when not charging
- ◆ Output voltage set-point is independently controlled through trim pin
- ◆ Unit will smoothly transition between current and voltage modes as charging cycle needs change

MIL-COTS NON-ISOLATED DC-DC CONVERTERS

Model Number	Brick Size	Input Voltage	Output Voltage	Current	Max Output Power	High Efficiency
MCOTS-N-28V-60-HG	Half-brick	9-60V	0-60V	40A	2000W	96% Efficiency
MCOTS-N-28V-60-QT	Quarter-brick	9-60V	0-60V	25A	1500W	96% Efficiency
MCOTS-N-28VE-90-HG	Half-brick	9-90V	0-90V	26A	2000W	96% Efficiency
MCOTS-N-28VE-90-QT	Quarter-brick	9-90V	0-90V	18A	1500W	97% Efficiency
Family	Product	Vin Range	Vout	Package Size	Thermal Design	Screening Level
MCOTS	N:Non-isolated Converter	28V: 9-60V 28VE: 9-90V	60: 0-60V 90: 0-90V	QT: Quarter-brick Tera HG: Half-brick Giga	N: Encased, Threaded Baseplate D: Encased, Non-threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MCOTS-N-28VE-90-HG-N-M For valid part numbers, refer to the website or contact your local sales representative.

MILITARY QUAD OUTPUT NON-ISOLATED DC-DC CONVERTERS



Military COTS Non-Isolated DC-DC Converters

The MCOTS QUAD Output non-isolated DC-DC converter employs synchronous rectification to achieve extremely high conversion efficiency in a quarter brick package. The module generates three positive output voltages, and one negative output voltage. The MCOTS QUAD Output Brick converter can be used in traditional DPA (distributed power architecture) systems that require a more rugged design. All four outputs have a wide output trim range, creating a high degree of flexibility for the user.

Operational Features

- ♦ High efficiency, up to 93% at full rated load current
- ♦ Delivers up to 30A on each positive output and 1A on the negative output
- ♦ Input Voltage Range: 6-15Vdc
- ♦ Output Voltage Range:
Positive Outputs: 0.8V to 5V
Negative Output: -3.0V to -13.5V

Protection/Control Features

- ♦ Over-current shutdown (all outputs)
- ♦ Thermal shutdown (all outputs)
- ♦ Over-voltage shutdown (positive outputs only)
- ♦ Input under-voltage lockout (positive outputs only)
- ♦ On/Off control for each output
- ♦ Output voltage trim for each output permits custom voltages
- ♦ Remote Sense (positive outputs only)

MIL-COTS QUAD OUTPUT NON-ISOLATED CONVERTER

Family	Product	Vin Range	Output Voltage	Package Size	Thermal Design	Screening Level
MCOTS	N:Non-isolated Converter	12: 6-15Vdc	Q3P1N: Quad Output 3 Positive, 1 Negative	QT: Quarter-brick Tera	N: Encased, Threaded Baseplate F: Encased, Flanged Baseplate	S: S-Grade M: M-Grade

Part Numbering Example: MCOTS-N-12-Q3P1N-QT-N-M. For valid part numbers, refer to the website or contact your local sales representative.

See "Encased Package Configurations" on page MECH-82 for package outlines.

MilCOTS™

Product Screening & Qualification

Product Screening

SCREENING	Process Description	S-Grade	M-Grade
Baseplate Operating Temperature		-55°C to +100°C	-55°C to +100°C
Storage Temperature		-65°C to +135°C	-65°C to +135°C
Pre-Cap Inspection	IPC-610 Class III	•	•
Temperature Cycling	Method 1010, Condition B, 10 Cycles		•
Burn-In	100°C Baseplate	12 hours	96 hours
Final Electrical Test	100%	25°C	-55°C, +25°C, +100°C
Final Visual Inspection	MIL-STD-2008	•	•

Product Qualification

QUALIFICATION Test Name	Details	# Tested (# Failed)	Consistent with MIL-STD-883F Method	Consistent with MIL-STD-883F Method 5005
Life Testing	Visual, mechanical and electrical test before, during and after 1000 hour burn-in @ full load	15 (0)	Method 1005.8	—
Shock-Vibration	Visual, mechanical and electrical test before, during and after shock and vibration tests	5 (0)	—	MIL-STD 202, Methods 201A and 213B
Humidity	+85°C, 95%RH, 1000 hours, 2 minutes on 6 hours off	8 (0)	Method 1004.7	—
Temperature Cycling	500 cycles of -55°C to +100°C (30 minute dwell at each temperature)	10 (0)	Method 1010.8	Condition A
Solderability	15 pins	15 (0)	Method 2003	—
DMT	-65°C to +110°C across full line, and load specifications in 5°C steps	7 (0)	—	—
Altitude	70,000 feet (21 km)	2 (0)	—	—

MILITARY HI-REL ISOLATED DC-DC CONVERTERS

Hi-Rel
Isolated Converters



High-Reliability, Field Proven DC-DC Converters for Military/Avionics Applications

The MilQor® series of high-reliability DC-DC converters brings SynQor's field proven high-efficiency synchronous rectifier technology to the Military/Avionics industry. SynQor's innovative QorSeal® packaging approach ensures survivability in the most hostile environments. Compatible with the industry standard format, these converters operate at a fixed frequency, have no opto-isolators, and follow conservative component derating guidelines.

Hi-Rel Product Features

- ◆ Fixed switching frequency
- ◆ No opto-isolators
- ◆ Parallel operation with current share on MQFL
- ◆ Remote sense
- ◆ Clock synchronization
- ◆ Primary referenced enable
- ◆ Secondary referenced enable on MQFL
- ◆ Continuous short circuit and overload protection with auto-restart feature
- ◆ Input under-voltage and over-voltage shutdown
- ◆ Output voltage trim range (MQHL, MQHR & MQBL) +10% to -10%

Design Process

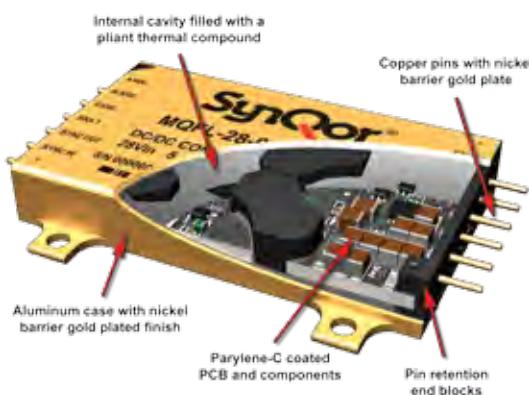
Hi-Rel series converters are:

- ◆ Designed for reliability per:
 - NAVSO P-3641A guidelines
- ◆ Designed with components derated per:
 - MIL-HDBK-1547A
 - NAVSO P-3641A

Qualification Process

Hi-Rel series converters are qualified to:

- ◆ MIL-STD-810
 - consistent with RTCA/DO-160
- ◆ SynQor's First Article Qualification
 - consistent with MIL-STD-883
- ◆ SynQor's Long-Term Storage Survivability Qual.
- ◆ SynQor's on-going life test
- ◆ SynQor's element evaluation for HB & ES Grade



Our unique QorSeal® packaging approach provides a conduction-cooled mechanical assembly around an SMT constructed power circuit that is low-profile, light-weight, and shielded. This process provides three levels of Tin Whisker mitigation.

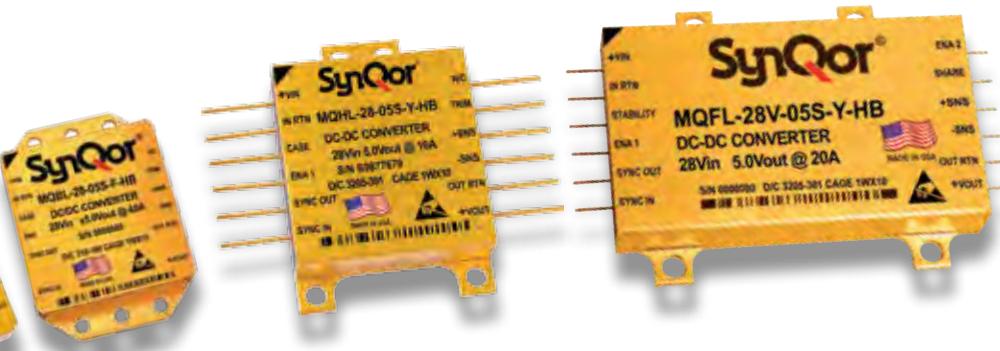
Specification Compliance

Hi-Rel series converters (with Hi-Rel filter) are designed to meet:

- ◆ MIL-HDBK-704
- ◆ RTCA/DO-160 Section 16, 17, 18
- ◆ MIL-STD-1275
- ◆ DEF-STAN 61-5 (Part 6)/(5, 6)
- ◆ MIL-STD-461
- ◆ RTCA/DO-160 Section 22



MILITARY HI-REL ISOLATED DC-DC CONVERTERS



Input Voltage Range(s)	5.5V	16V	28 Series Input Range: 16-40V Transient: 16-50V Max. Power: 120W Efficiency: 91%	28E Series Input Range: 16-70V Transient: 16-80V Max. Power: 120W Efficiency: 90%	28V Series Input Range: 16-40V Transient: 5.5-50V Max. Power: 100W Efficiency: 90%	28VE Series Input Range: 16-70V Transient: 5.5-80V Max. Power: 100W Efficiency: 90%	80V	155V	270L Series Input Range: 65-350V Transient: 65-475V Max. Power: 75W Efficiency: 86%	475V
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HI-REL DC-DC CONVERTERS

Family	System Input Voltage (with transients)	Output Voltage(s)		Package Size/ Pin Configuration	Screening Grade
		Single Output	Dual Output		
MQFL MQHL MQHR MQBL MQSA	28: 16-40V (16-50V) 28E: 16-70V (16-80V) 28V: 16-40V (5.5-50V) 28VE: 16-70V (5.5-80V) 270: 155-400V (155-475V) 270L: 65-350V (65-475V)	1R5S: 1.5V 1R8S: 1.8V 2R5S: 2.5V 3R3S: 3.3V 05S: 5.0V 06S: 6.0V 7R5S: 7.5V 09S: 9V 12S: 12V 15S: 15V 28S: 28V	05D: ±5.0V 12D: ±12V 15D: ±15V	U X Y W Z (FL, HL, HR)	C ES HB
S	F	S	(BL)	(SA)	

Family	System Input Voltage (with transients)	Nominal Output Voltage(s)	Package Size/ Pin Configuration	Screening Grade
MQBQ	28: 18-40V (16-50V) 270: 230-400V (155-450V)	28B: (1:1) 28B: (9:1)	U X Y W Z	C ES HB

Part Numbering Example: MQHL-28-05S-Y-HB For valid part numbers, refer to the website or contact your local sales representative.

MILITARY HI-REL ISOLATED DC-DC CONVERTERS

Full Size (MQFL)	Single Output											Dual Output [†]		
	1.5V 1R5S	1.8V 1R8S	2.5V 2R5S	3.3V 3R3S	5V 05S	6V 06S	7.5V 7R5S	9V 09S	12V 12S	15V 15S	28V 28S	±5V 05D	±12V 12D	±15V 15D
MQFL-28 (120W) 16-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	40A 60W	40A 72W	40A 100W	30A 99W	24A 120W	20A 120W	16A 120W	13A 117W	10A 120W	8A 120W	4A 112W	24A 120W Total	10A 120W Total	8A 120W Total
MQFL-28E (120W) 16-70Vin Cont. 16-80Vin 1s Trans. Absolute Max Vin = 100V	40A 60W	40A 72W	40A 100W	30A 99W	24A 120W	20A 120W	16A 120W	13A 117W	10A 120W	8A 120W	4A 112W	24A 120W Total	10A 120W Total	8A 120W Total
MQFL-28V (100W) 16-40Vin Cont. 5.5-50Vin 1s Trans. Absolute Max Vin = 60V	40A 60W	40A 72W	40A 100W	30A 99W	20A 100W	17A 102W	13A 98W	11A 99W	8A 96W	6.5A 98W	3.3A 92W			
MQFL-28VE (100W) 16-70Vin Cont. 5.5-80Vin 1s Trans. Absolute Max Vin = 100V	40A 60W	40A 72W	40A 100W	30A 99W	20A 100W	17A 102W	13A 98W	11A 99W	8A 96W	6.5A 98W	3.3A 92W			
MQFL-270 (120W) 155-400Vin Cont. 155-475Vin 1s Trans. Absolute Max Vin = 550V	40A 60W	40A 72W	40A 100W	30A 99W	24A 120W	20A 120W	16A 120W	13A 117W	10A 120W	8A 120W	4A 112W	24A 120W Total	10A 120W Total	8A 120W Total
MQFL-270L (75W) 65-350Vin Cont. 65-475Vin 1s Trans. Absolute Max Vin = 550V	40A 60W	40A 72W	30A 75W	22A 72.6W	15A 75W	12A 72W	10A 75W	8A 72W	6A 72W	5A 75W	2.7A 75W	15A 75W Total	6A 72W Total	5A 75W Total

Half Size (MQHL)	Single Output											Dual Output [†]		
	1.5V 1R5S	1.8V 1R8S	2.5V 2R5S	3.3V 3R3S	5V 05S	6V 06S	7.5V 7R5S	9V 09S	12V 12S	15V 15S	28V 28S	±5V 05D	±12V 12D	±15V 15D
MQHL-28 (50W) 16-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	20A 30W	20A 36W	20A 50W	15A 50W	10A 50W	8A 48W	6.6A 50W	5.5A 50W	4A 48W	3.3A 50W	1.8A 50W	10A 50W Total	4A 48W Total	3.3A 50W Total
MQHL-28E (50W) 16-70Vin Cont. 16-80Vin 1s Trans. Absolute Max Vin = 100V	20A 30W	20A 36W	20A 50W	15A 50W	10A 50W	8A 48W	6.6A 50W	5.5A 50W	4A 48W	3.3A 50W	1.8A 50W	10A 50W Total	4A 48W Total	3.3A 50W Total
Half Size (MQHR)	1.5V 1R5S	1.8V 1R8S	2.5V 2R5S	3.3V 3R3S	5V 05S	6V 06S	7.5V 7R5S	9V 09S	12V 12S	15V 15S	28V 28S	±5V 05D	±12V 12D	±15V 15D
MQHR-28 (25W) 16-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	10A 15W	10A 18W	10A 25W	7.5A 25W	5A 25W	4A 24W	3.3A 25W	2.75A 25W	2A 24W	1.65A 25W	0.9A 25W	5A 25W Total	2A 24W Total	1.65A 25W Total
MQHR-28E (25W) 16-70Vin Cont. 16-80Vin 1s Trans. Absolute Max Vin = 100V	10A 15W	10A 18W	10A 25W	7.5A 25W	5A 25W	4A 24W	3.3A 25W	2.75A 25W	2A 24W	1.65A 25W	0.9A 25W	5A 25W Total	2A 24W Total	1.65A 25W Total

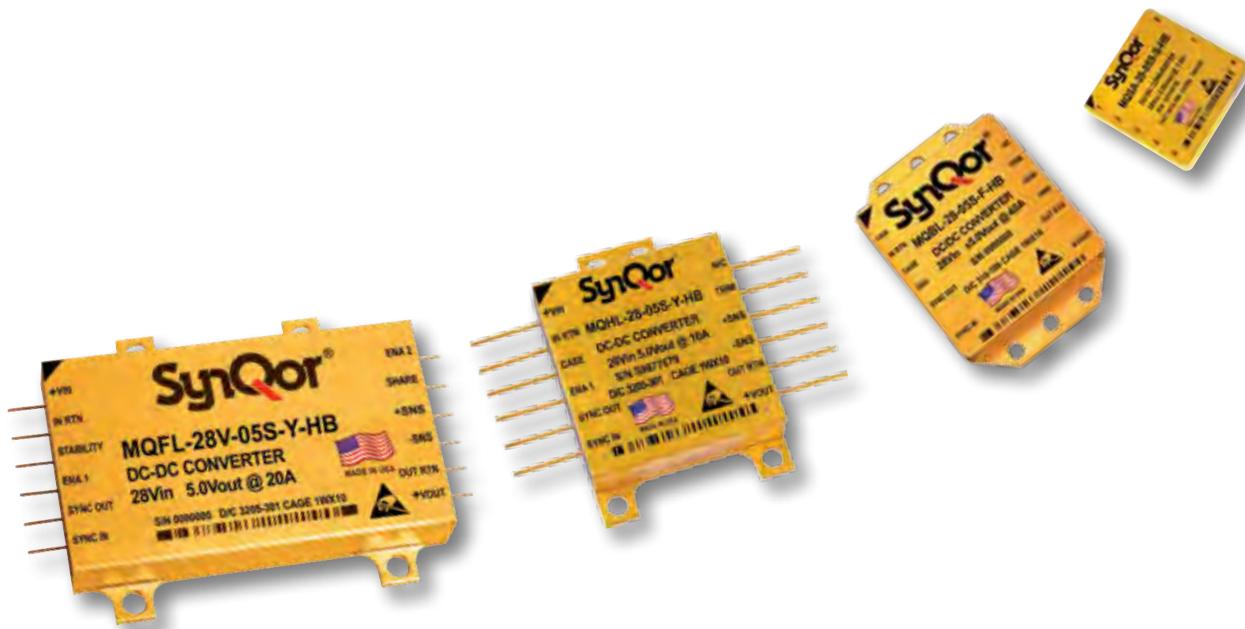


MILITARY HI-REL ISOLATED DC-DC CONVERTERS

Bottom Pin (MQBL)	Single Output											Dual Output†		
	1.5V 1R5S	1.8V 1R8S	2.5V 2R5S	3.3V 3R3S	5V 05S	6V 06S	7.5V 7R5S	9V 09S	12V 12S	15V 15S	28V 28S	±5V 05D	±12V 12D	±15V 15D
MQBL-28 (20W) 16-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	8A 12W	8A 14.4W	8A 20W	6A 19.8W	4A 20W	3.3A 19.8W	2.6A 19.5W	2.2A 19.8W	1.6A 19.2W	1.3A 19.5W	0.72A 20.2W	4A 20W Total	1.6A 19.2W Total	1.3A 19.5W Total
MQBL-28E (20W) 16-70Vin Cont. 16-80Vin 1s Trans. Absolute Max Vin = 100V	8A 12W	8A 14.4W	8A 20W	6A 19.8W	4A 20W	3.3A 19.8W	2.6A 19.5W	2.2A 19.8W	1.6A 19.2W	1.3A 19.5W	0.72A 20.2W	4A 20W Total	1.6A 19.2W Total	1.3A 19.5W Total

Bottom Pin (MQSA)	Single Output				Dual Output†			Bus Converters (MQBQ)		Vout = ~Vin/1 28B	
	5V 05S	12V 12S	15V 15S	28V 28S	±5V 05D	±12V 12D	±15V 15D	MQBQ-28	18-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	14A 400W	
MQSA-28 (5W) 16-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	1A 5W	0.42A 5W	0.33A 5W	0.18A 5W	1A 5W Total	0.42A 5W Total	0.33A 5W Total	MQBQ-270	230-400Vin Cont. 155-450Vin 1s Trans. Absolute Max Vin = 550V	14A 400W	
MQSA-28E (5W) 16-70Vin Cont. 16-80Vin 1s Trans. Absolute Max Vin = 100V	1A 5W	0.42A 5W	0.33A 5W	0.18A 5W	1A 5W Total	0.42A 5W Total	0.33A 5W Total				

† 80% of total output available on any one output.



MILITARY HI-REL DC-DC FILTERS

Hi-Rel
DC Filters



High-Reliability, Field Proven Filters for Military/Avionics Applications

The MilQor® series of high-reliability EMI Filters bring SynQor's field proven technology to the Military/Avionics industry. SynQor's innovative QorSeal® packaging approach ensures survivability in the most hostile environments. Compatible with the industry standard format, these filters follow conservative component tracking guidelines.

Model Number	Input Voltage		Output Current	Isolation Voltage (to case)	Maximum DC Resistance @ 125°C	Differential-Mode Attenuation (@ 500kHz)	Common-Mode Attenuation (@ 500kHz)
	Continuous	Surge ³ (≤100ms)					
Full Size							
MQME-28-P	± 40V	±100V	20A	500V	35mΩ	>80dB	>60dB
MQME-28-T ¹	±40V	+100, -50V	20A	500V	60mΩ	>80dB	>60dB
MQME-28E-P	±70V	±100V	20A	500V	35mΩ	>80dB	>60dB
MQME-28E-T ¹	+70, -40V	+100V, -50V	20A	500V	60mΩ	>80dB	>60dB
MQME-28E-T6 ¹	+70, -40V	+100V, -50V	20A	500V	60mΩ	>80dB	>60dB
MQME-270-P	±400V	±1000V	2.0A	500V	1.6Ω	>80dB	>60dB
MQME-270-R ²	±400V	±1000V	2.0A	500V	1.6Ω	>80dB	>60dB
MQME-270L-P ⁴	±400V	±500V	3.0A	500V	0.84Ω	>80dB	>60dB
MQME-270L-R ^{2,4}	±400V	±500V	3.0A	500V	0.84Ω	>80dB	>60dB
Half Size							
MQHE-28-P	±40V	±100V	10A	500V	60mΩ	>80dB	>60dB
MQHE-28E-P	±70V	±100V	10A	500V	60mΩ	>80dB	>60dB
MQHE-270-P	±400V	±500V	1.0A	500V	450mΩ	>50dB	>60dB

Note 1 - T and T6 filters feature enable pass-through, transient suppression, soft-start and reverse polarity protection circuitry in addition to passive filter components.

Note 2 - R filters feature reverse polarity protection circuitry in addition to passive filter components.

Note 3 - While the passive filters can withstand these long-duration surge voltages, the surge voltage will be passed to the filter's load. Care should therefore be taken to make sure that the load will also be able to withstand any applied surges. The transient suppression filters block surges of either polarity, as specified in their data sheets

Note 4 - Designed specifically to be matched with MQFL-270L DC-DC converters.

See "MilQor Hi-Rel Package Configurations" on page MECH-84 for package outlines.



Hi-Rel

SCREENING



SCREENING	Consistent with MIL-STD-883	C-Grade (0°C to +70°C)	ES-Grade (-45°C to +100°C)	HB-Grade (-55°C to +125°C)
Element Evaluation		No	Yes	Yes
Internal Visual	*	Yes	Yes	Yes
Temperature Cycle	Method 1010	No	Condition B (-55°C to +125°C)	Condition C (-65°C to +150°C)
Constant Acc.	Method 2001 (Y1 direction)	No	500g	Condition A (5000g)
Burn-In	Method 1015	24hrs @ +125°C	96hrs @ +125°C	160hrs @ +125°C
Final Electrical Test	Method 5005 (Group A)	+25°C	-45°C, +25°C, +100°C	-55°C, +25°C, +125°C
Packaging		QorSeal®	QorSeal®	QorSeal®
External Visual	2009	Yes	Yes	Yes
Construction		QorSeal®	QorSeal®	QorSeal®

* Per IPC-A-610 Class III



UPS

Uninterruptible Power Supply



Military-Grade Uninterruptible Power Supply (UPS)

SynQor's UPS is designed for the extreme environmental and demanding electrical conditions of Military/Avionics applications. SynQor's UPS incorporates field proven high efficiency designs and rugged packaging technologies. This UPS will accept a wide range of input voltage and frequency values while delivering a well-conditioned AC output to the load. Its use of lithium polymer batteries permits the lowest profile and lowest weight solution in its power class. It is designed and manufactured to comply with a wide range of military standards. Options include a DC output and the ability to also draw power from a military standard 28VDC input.

UPS Product Features

- ◆ Sealed, weather-proof, shock-proof construction
- ◆ Military Tough, Die-Cast Aluminum Chassis
- ◆ 1250W-1500VA; 2500W-3000VA output power
- ◆ >10 minute run-time at full power
- ◆ Full power operation -20°C to +55°C (Storage: -20°C to +65°C)
- ◆ True on-line double conversion
- ◆ Hot swappable internal battery pack (lithium polymer)
- ◆ Universal AC input: 80-265VAC; 47-65Hz
- ◆ Dual input: AC and optional DC
- ◆ Cold-start with no AC or DC input connections
- ◆ Power factor correction at AC input
- ◆ Pure sinusoidal AC output voltage (115VAC, 60Hz)
- ◆ Handles 0.0—1.0 power factor loads and non-linear loads
- ◆ User I/O and Configuration signal ports
- ◆ Up to 3 units can be combined for higher power, voltage or a 3-phase AC output
- ◆ 1U high rack mount unit (17" x 21.6") UPS-1500
- ◆ 2U high rack mount unit (17" x 21.6") UPS-1500
- ◆ 2U high rack mount unit (17" x 22.22") UPS-3000
- ◆ Low weight: 32 lbs. (UPS-1500 1U including battery)
- ◆ Low weight: 50 lbs. (UPS-1500 2U including battery)
- ◆ Low weight: 65 lbs. (UPS-3000 including batteries)

Specification Compliance

UPS units are designed to meet:

- ◆ MIL-STD-704 - Aircraft Electrical Power
- ◆ Mil-STD-1399-300 - Interface Shipboard
- ◆ MIL-STD-1275 - Vehicle Electrical Power
- ◆ MIL-STD-461 - Electromagnetic Interference
- ◆ MIL-STD-810 - Environmental Engineering

Option

- ◆ DC input (28Vnom) for dual source
- ◆ 2U Extended battery pack gives >24 minutes of run-time (UPS-1500)
- ◆ Wide-range AC input frequency: 47Hz to 800Hz
- ◆ 115Vrms or 230Vrms AC output
- ◆ 50Hz, 60Hz, or 400Hz output
- ◆ DC1: Auxiliary isolated DC output (up to 500W)
- ◆ DC2: High power DC output parallelable for higher power (UPS-1500 up to 1250W; UPS-3000 up to 2500W)
- ◆ Total AC & DC1 & DC2 output power UPS-1500 = 1250W
- ◆ Total AC & DC1 & DC2 output power UPS-3000 = 2500W
- ◆ Shipboard version with floating neutral wire
- ◆ Rack mounting style



MILITARY UPS UNINTERRUPTIBLE POWER SUPPLY

**Sealed
Shock-Proof
Weather-Proof
Rugged Construction**



1250W (1500VA)

1U High Rack-Mount Package

>10 Minutes Battery Run Time

Only 32 lbs.

Model Number	Power	Battery Run-Time @ Full Power (80% Power)	Height	Weight	Options					
					DC Input (28V nom)	DC Output	Floating Neutral AC Output	AC Input Frequency (47-65Hz or 47-800Hz)	AC Output Voltage (115Vrms or 230Vrms)	AC Output Frequency (50Hz, 60Hz or 400Hz))
UPS-1500-S-1U (1 Standard Battery)	1250W 1500VA	>10 min. (>13 min.)	1U	32 lbs.	•	500W DC1 1250W DC2	•	•	•	•
UPS-1500-E-2U (1 Extended Battery)	1250W 1500VA	>24 min. (>31 min.)	2U	50 lbs.	•	500W DC1 1250W DC2	•	•	•	•
UPS-3000-S-2U (2 Standard Batteries)	2500W 3000VA	>10 min. (>13 min.)	2U	65 lbs.	•	2 X 500W DC1 2250W DC2	•	•	•	•

UPS1500

1250W (1500VA)

*Expanded Internal Battery for
>24 Minutes of Run Time at Full Power
Only 50 lbs.*



UPS3000

2500W (3000VA)

*2U High Rack-Mount Package
>10 Minutes Battery Run Time
Only 65 lbs.*



MILITARY-GRADE UNITERRUPTIBLE POWER SUPPLY (UPS)

UPS	Output Power	Battery Pack Size	Height	AC Input Frequency	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Freq	DC Input	DC Output Voltage	Additional Options
UPS	1500: 1500VA 1250W 3000: 3000VA 2500W	S: Standard E: Extended N: No Battery	1U: 1.73" 2U: 3.40"	L: 47-65Hz W: 47-800Hz	1: 115Vrms 2: 230Vrms	G: Grounded F: Floating	5: 50Hz 6: 60Hz 4: 400Hz	S: Not Installed D: DC Input M: DC2 Out 24VDC w/Droop Share P: DC2 Out 24VDC no sharing R: DC2 Out 28VDC w/Droop Share V: DC2 Out 28VDC no sharing	00: None 12: 12V 15: 15V 24: 24V 28: 28V 40: 40V 50: 50V	000: Standard 0CE: CE Marking E00: Ethernet / SNMP ECE: Ethernet / SNMP & CE Marking

The DC Input is not available if a DC2 Option is selected. DC2 Options P & V are only available on the UPS-1500.

For valid part numbers, refer to the website or contact your local sales representative.

Part Numbering Example: UPS-1500-E-2U-L1G6D28-000, UPS-1500-S-1U-L2G5S00-000, UPS-1500-S-1U-L2G5S00-0CE



MILITARY UPS UNINTERRUPTIBLE POWER SUPPLY

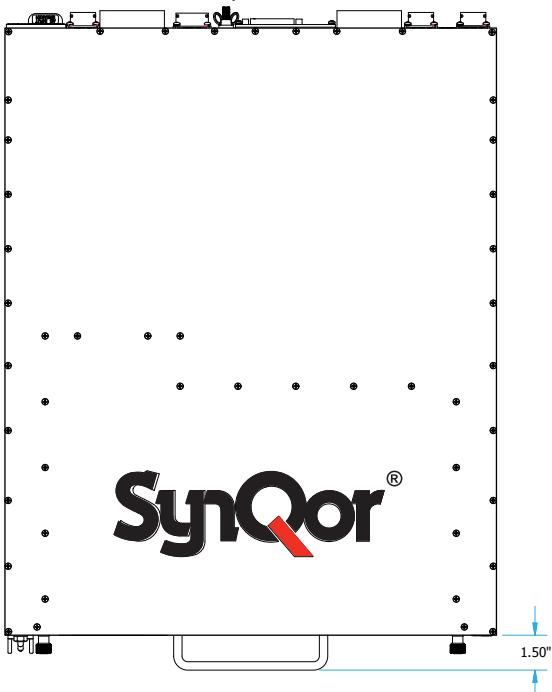
UPS-1500-1U UNIT



UPS-1500-1U UNIT with DC Input/DC1 Output Options



UPS-1500-1U UNIT with DC1 Output/DC2 Output Options

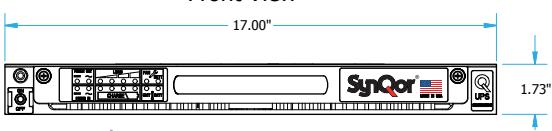


*Hot swappable
battery pack*

Visit our website for
more information



Front View



MILITARY UPS UNINTERRUPTIBLE POWER SUPPLY

Status LED
On/Off

Status Indicator Panel

UPS-3000-2U UNIT

3.40"
2U

Air intakes
17.00"

SynQor®
MADE IN USA

Q
UPS

UPS-3000-2U UNIT UPS Units with DC Input / DC1 Output Options

DC1 Output Option

Exhaust Fans

DC Input Option

Ethernet Port
Option

AC Input

Exhaust Fans

AC Circuit Breaker



AC Output

17.00

User I/O

Config
Port

Ground Stud
(1/4-20)

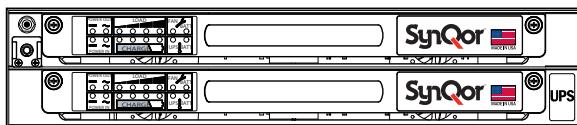
22.22

1.50

SynQor®

18.700
9.750
0.750

0.313 TYP.
1.75
0.83
3.40



MILITARY EXPANSION BATTERY MODULE

EBM

Expansion Battery Module



Military Grade Expansion Battery Module (EBM)

SynQor's Military-Grade UPS 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 while delivering a DC power source to the 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.

EBM Product Features

- ◆ Sealed, weather-proof, shock-proof construction
- ◆ > 45 minute run-time at full power 1250W UPS
- ◆ >20 minute run-time at full power 2500W UPS
- ◆ Integral 500W battery charger
- ◆ Full power operation: -20°C to +55°C
- ◆ Universal AC input: 80-265VAC; 47-65Hz
- ◆ Power factor correction at AC input
- ◆ Dual input (AC and DC)
- ◆ Cold start with no AC or DC input connections
- ◆ 3 units can be combined for extended run time
- ◆ User I/O, Ethernet and Configuration signal ports
- ◆ 2U high rack mount unit (17" x 22.28")
- ◆ Low weight: 61 lbs.

Specification Compliance

- EBM units are designed to meet:** (pending)
- ◆ MIL-STD-704 - Aircraft Electrical Power
 - ◆ Mil-STD-1399-300 - Interface Shipboard
 - ◆ MIL-STD-1275 - Vehicle Electrical Power
 - ◆ MIL-STD-461 - Electromagnetic Interference
 - ◆ MIL-STD-810 - Environmental Engineering

MILITARY GRADE EXPANSION BATTERY MODULE (EBM)

Model Number	UPS		Height	Weight	Options		
	Power	Battery Run-Time @ Full Power			DC Input (28V nom)	DC Output	AC Input Frequency (47-65Hz or 47-800Hz)
EBM-1000-2U (Expansion Battery Module)	1250W	>45 min.	2U	61 lbs.	•	28V	•
	2500W	>20 min.					

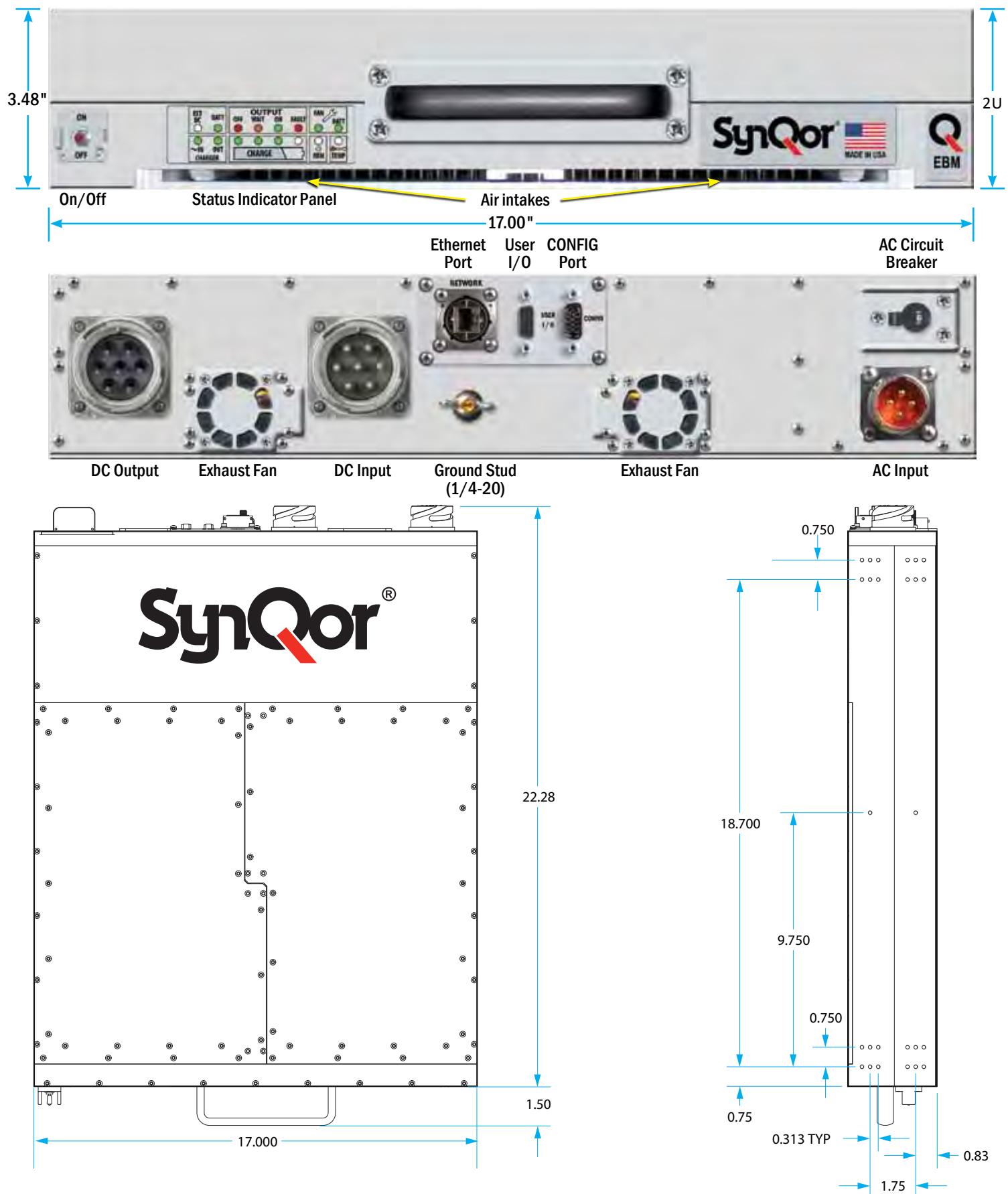
Family	Energy	Height	DC Output	Power	AC Input Freq.	Additional Options
EBM	1000: 1000 Watt Hours	2U: 3.48"	28: 28V DC	1500: 1500W 3000: 3000W	L: 47-65Hz Single Phase W: 47-800Hz Single Phase	000: Standard 0CE: CE Marking E00: Ethernet/SNMP ECE: Ethernet/SNMP & CE Marking

Part Numbering Example: EBM-1000-2U-28-3000-L-000 For valid part numbers, refer to the website or contact your local sales representative.



MILITARY EXPANSION BATTERY MODULE

EBM-1000-2U UNIT



MILITARY POWER CONDITIONER

MPC

Military Power Conditioner



Military Grade Power Conditioner (MPC)

SynQor's Military Power Conditioner units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace applications. SynQor's MPC incorporates field proven high efficiency designs and rugged packaging technologies. This MPC will accept a wide range of input voltage and frequency values while delivering a well-conditioned AC output to the load. It is designed and manufactured in SynQor's USA facilities to comply with a wide range of military standards. Options include two DC outputs and the ability to also draw power from a military standard 28VDC input.

MPC Product Features

- ♦ Sealed, weather-proof, shock-proof construction
- ♦ 1250W (1500VA) output power
- ♦ Full power operation: -40°C to +55°C
- ♦ Universal AC input: 80-265VAC; 47-65Hz (see options)
- ♦ Power factor correction at AC input
- ♦ Dual input (AC and optional DC)
- ♦ True on-line double conversion
- ♦ Pure sinusoidal AC output voltage (115VAC, 60Hz)
- ♦ Handles 0.0—1.0 power factor loads and non-linear loads
- ♦ Up to 3 units can be combined for higher power, voltage or a 3-phase AC output
- ♦ User I/O and Configuration signal ports
- ♦ 1U high rack mount unit (17" x 21.6")
- ♦ Low weight: 24 lbs.

Specification Compliance

MPC-1500 units are designed to meet:

- ♦ MIL-STD-1399-300 - Interface Shipboard
- ♦ MIL-STD-810 - Environmental Engineering
- ♦ MIL-STD-461 - Electromagnetic Interference
- ♦ MIL-STD-704 - Aircraft Electrical Power
- ♦ MIL-STD-1275 - Vehicle Electrical Power

Option

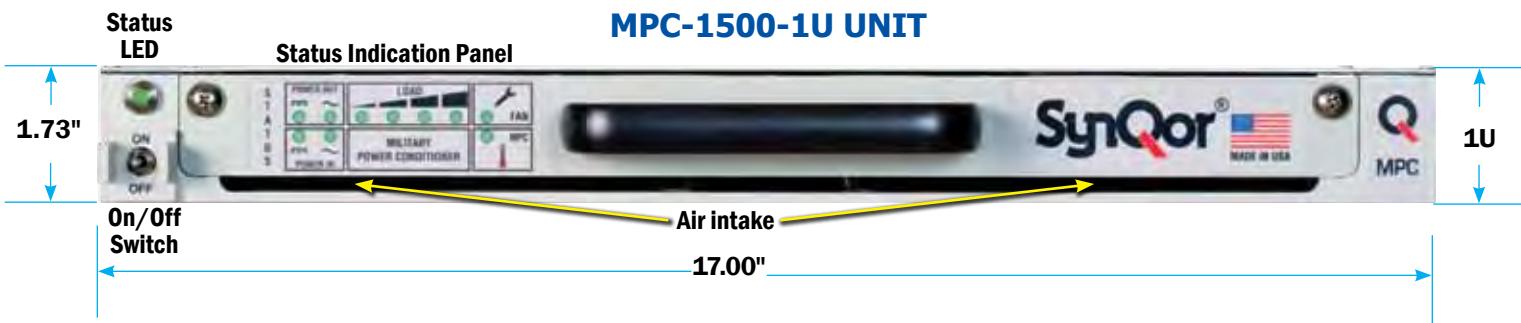
- ♦ DC input (28Vnom) for dual source
- ♦ Wide-range AC input frequency: 47Hz to 800Hz
- ♦ 115Vrms or 230Vrms AC output
- ♦ 50Hz, 60Hz, or 400Hz output
- ♦ DC1: Auxiliary isolated DC output (up to 500W)
- ♦ DC2: High power DC output (up to 1250W) parallelable for higher power
- ♦ Total AC & DC1 & DC2 output power = 1250W
- ♦ Shipboard version with floating neutral wire

MILITARY GRADE POWER CONDITIONER (MPC)

Family	Output Power	Height	AC Input Freq.	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Freq.	DC Input / DC2 Output	DC1 Output	Additional Options
MPC	1500	1U	L	1	G	6	D	28	E00
MPC	1500: 1250W 1500VA	1U: 1.73"	L: 47-65Hz W: 47-800Hz	1: 115Vrms 2: 230Vrms	G: Grounded F: Floating	5: 50Hz 6: 60Hz 4: 400Hz	S: Not Installed D: DC Input M: DC2 Out 24VDC, Droop Share P: DC2 Out 24VDC, No Sharing R: DC2 Out 28VDC, Droop Share V: DC2 Out 28VDC, No Sharing	00: None 12: 12V 15: 15V 24: 24V 28: 28V 40: 40V 50: 50V	000: None 0CE: CE Marking E00: Ethernet / SNMP ECE: Ethernet / SNMP & CE Marking

Part Numbering Example: MPC-1500-1U-L1G5M24-000 For valid part numbers, refer to the website or contact your local sales representative.

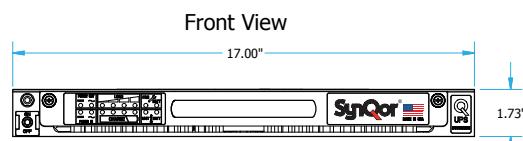
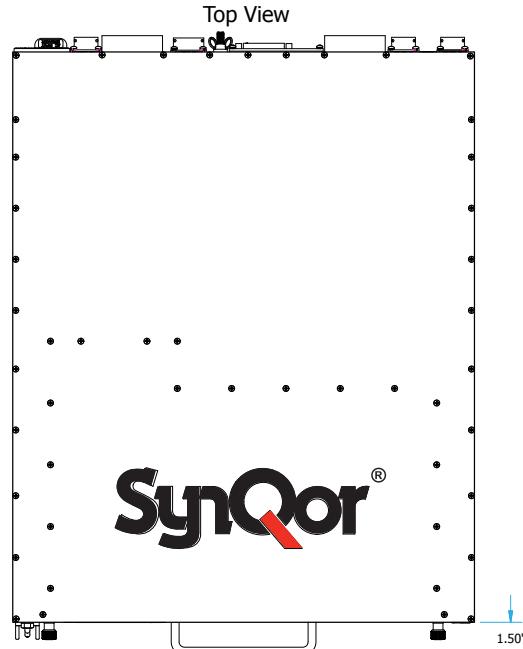




MPC-1500-1U UNIT with DC Input/DC1 Output Options



MPC-1500-1U UNIT with DC1 Output/DC2 Output Options



MPS

Military Power Supply



Military Grade Power Supply (MPS)

SynQor's Military AC-DC Power Supply units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace applications. SynQor's MPS incorporates field proven high efficiency designs and rugged packaging technologies. This MPS will accept a 3-Phase input with a wide range of input voltage and frequency values while delivering a well-conditioned continuous 4000W (5250W transient), DC semi-regulated output to the load. The output voltage droops for system stability and for load sharing when units are in parallel. The MPS-4000 Power Supply is designed and manufactured in SynQor's USA facilities to comply with a wide range of military standards

MPS Product Features

- ◆ Sealed, weather-proof, shock-proof construction
- ◆ 4000W output power
- ◆ Full power operation: -40°C to +55°C
- ◆ 3-Phase input: 80-265Vrms line-to-line; 47-800Hz
- ◆ Power factor correction at AC input
- ◆ Up to 8 units can be combined for higher power
- ◆ User I/O and Configuration signal port
- ◆ Synchronized start and stop of multiple units
- ◆ Battle Mode for over-temperature events
- ◆ 1U high rack mount unit (17" x 20.42")
- ◆ Low weight: 28 lbs.

Specification Compliance

MPS units are designed to meet:

- ◆ MIL-STD-1399-300 - Interface Shipboard
- ◆ MIL-STD-810 - Environmental Engineering
- ◆ MIL-STD-461 - Electromagnetic Interference
- ◆ MIL-STD-704 - Aircraft Electrical Power
- ◆ MIL-STD-1275 - Vehicle Electrical Power



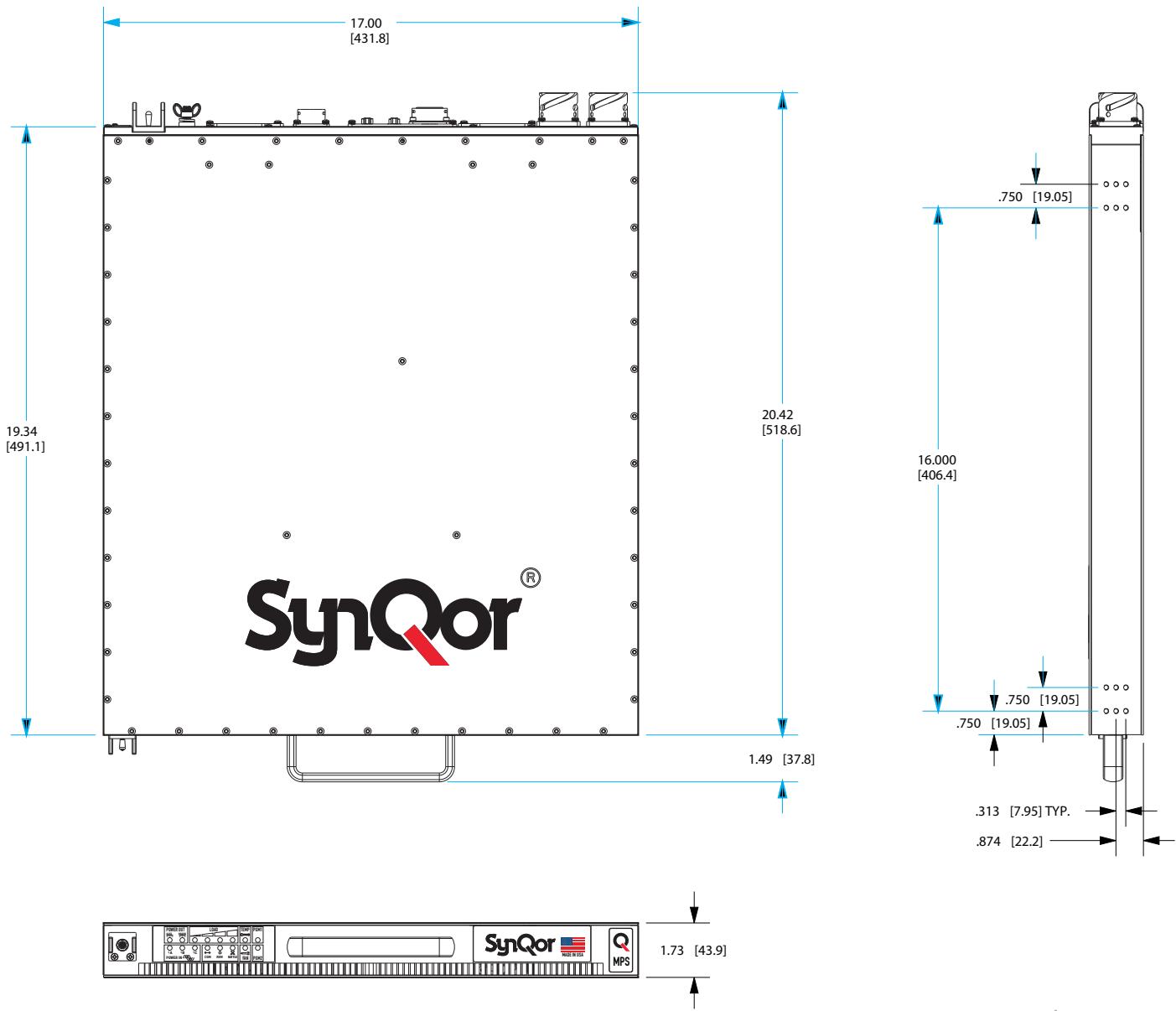
MILITARY GRADE POWER SUPPLY (MPS)

Family	Output Power	Height	AC Input Phase #	AC Input Frequency	DC Output Voltage @ Full Load*	Output Regulation	Network
MPS	4000: 4000W	1U: 1.73"	3: 3-Phase	W: 47-800Hz	2B: 24V 2D: 28V 2E: 30V 4B: 48V	500: Semi-regulated	E00: Ethernet/SNMP

Part Numbering Example: MPS-4000-1U-3W2ES00-E00 For valid part numbers, refer to the website or contact your local sales representative.

*Approximate output voltage at full load, output voltage has Droop



MPS-4000-1U UNIT**MPS-4000-1U UNIT with AC Input**

MILITARY GRADE POWER INVERTER

MINV

Military Power Inverter



Military Grade Power Inverter (MINV)

SynQor's Military Inverter units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace applications. SynQor's MINV incorporates field proven high efficiency designs and rugged packaging technologies. This MINV will accept a wide range of steady-state and transient DC input voltage values while delivering a well-conditioned AC output to the load. Options include a selection of output voltage amplitudes, frequencies, and configurations that provide a single output, two or three single phase outputs, or a 3 phase output.

MINV Product Features

- Sealed, weather-proof, shock-proof construction
- 4000W (5000VA) output power
- Full power operation: -40°C to +55°C
- DC Input
- Pure sinusoidal AC output voltage (115VAC, 60Hz)
- Handles 0.0—1.0 power factor loads and non-linear loads
- Up to 3 units can be combined for higher power, voltage or a 3-phase AC output
- Battle Mode for over-temperature events
- User I/O and Configuration signal ports
- 1U high rack mount unit (17" x 22.41")
- Low weight: 30 lbs.

Specification Compliance

MINV-4000 units are designed to meet (pending):

- MIL-STD-1399-300 - Interface Shipboard
- MIL-STD-810 - Environmental Engineering
- MIL-STD-461 - Electromagnetic Interference
- MIL-STD-704 - Aircraft Electrical Power
- MIL-STD-1275 - Vehicle Electrical Power

Options

- 28V or 180V DC input
- 115Vrms or 230Vrms AC output
- 50Hz, 60Hz, or 400Hz AC output
- Multiple single-phase outputs and 3-Phase output configurations available
- Shipboard version with floating neutral wire

MILITARY GRADE POWER INVERTER (MINV)

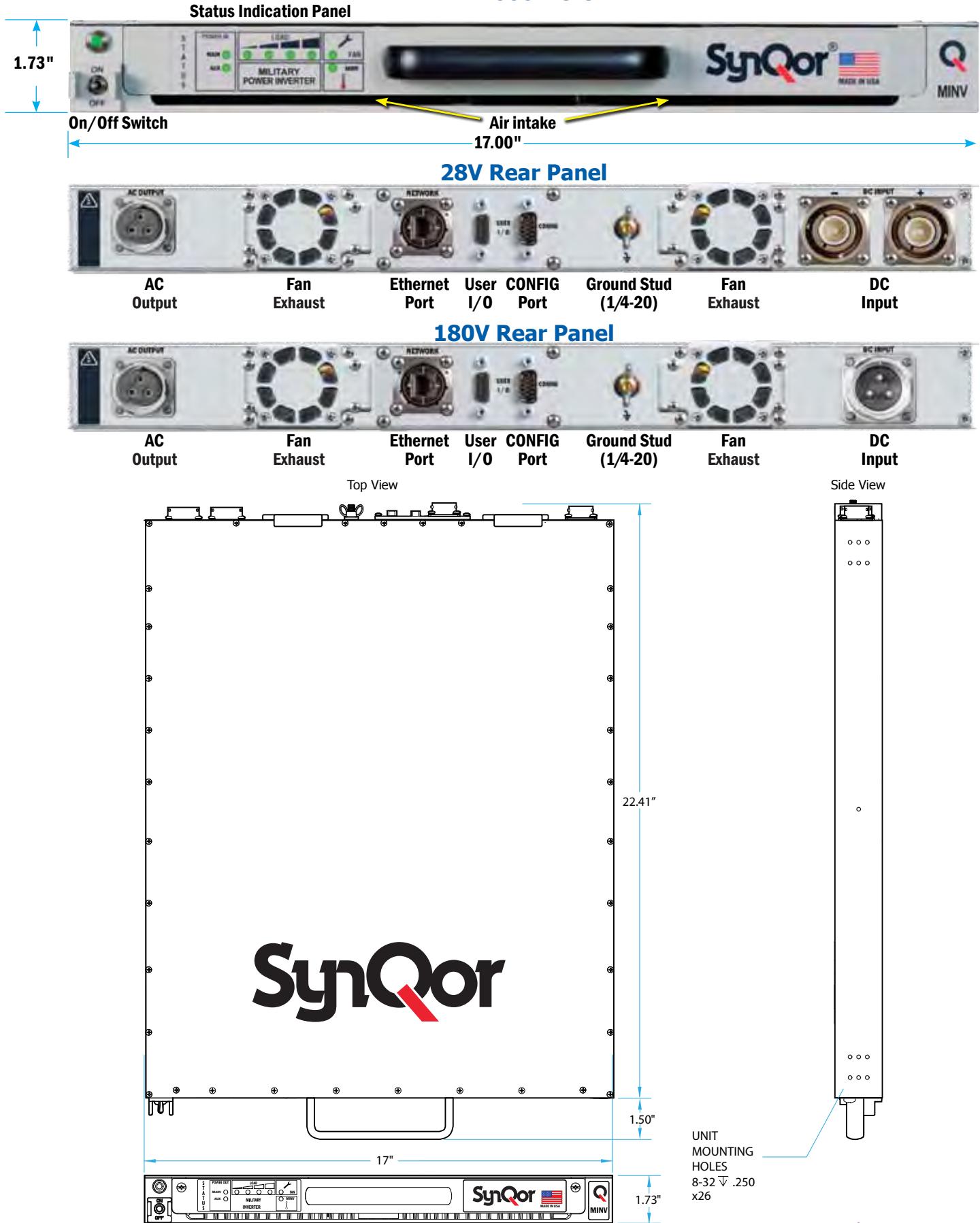
Family	Output Power	Height	DC Input Voltage	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Frequency	Output Configuration	Additional Options
MINV	4000: 5000VA	1U:1.73"	28V: 28VNOM 180:180VNOM	1: 115Vrms 2: 230Vrms 3: 240Vrms	G: Grounded F: Floating	5: 50Hz 6: 60Hz 4: 400Hz	S: One Single-Phase Output D: Two Single-Phase Output T: Three Single-Phase Output Y: One Three-Phase Output	000: None 0CE: CE Marking E00: Ethernet / SNMP ECE: Ethernet / SNMP & CE Marking

Part Numbering Example: MINV-4000-1U-28V-1G6S-E00 For valid part numbers, refer to the website or contact your local sales representative.



MILITARY GRADE POWER INVERTER

MINV-4000-1U UNIT



VPX Power Supplies



3U & 6U Military DC-DC Power Supplies

The VPX power supplies are compliant with VITA 62, MIL-STD-704, MIL-STD-461 and MIL-STD-810 for 28Vin and 270Vin systems. The VPX delivers up to 1000W and up to 6 outputs with a typical efficiency of 91%. Offered in VITA approved ruggedized 3U and 6U size packages with internal conduction cooling and high speed backplane connectors.

VPX Product Features

- ◆ VITA 62 & 47 Compliant
- ◆ Maximum Total Output Power: 1000W
- ◆ Input EMI Filtering
- ◆ -40°C to 85°C Operating Temperature (at card edge)
- ◆ Active current share through backplane
- ◆ Over-current, over-voltage, over-temperature protection and Remote Sense
- ◆ Standard VITA 62 Controls

Specification Compliance

VPX units are designed to meet:

- ◆ VITA 62
- ◆ VITA 47
- ◆ MIL-STD-810 - Environmental Engineering
- ◆ MIL-STD-461 - Electromagnetic Interference
- ◆ MIL-STD-704 - Aircraft Electrical Power
- ◆ MIL-STD-1275 - Vehicle Electrical Power – T version

MILITARY-GRADE VPX POWER SUPPLY

Series	Package Size (U)	Input Range	Mil Std Filtering	Output Voltage Combination Code	Packaging Options
VPX	3U 6U	DC28: 28V DC270: 270V	P: P -MIL-STD-704 T: T -MIL-STD-704 MIL-STD-1275 DEF-STAN 61-5 (P6)/6	001 002	Y1: Screening S: S-Grade (MCOTS) M: M-Grade (MCOTS) Y2: Conformal Coating N: No Conformal Coating C: Conformal Coating Y3: — TBD

Part Numbering Example: VPX-3U-DC28P-001-SN For valid part numbers, refer to the website or contact your local sales representative.



MILITARY VPX DC-DC POWER SUPPLIES

Model	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-6U-DC28T-001 (28Vin with Transient Suppression EMI input filtering)	800W	+12V @ 67A		+5.0V @ 30A	+3.3VAUX @ 15A +12 VAUX @ 1A -12 VAUX @ 1A	3.8 lb

INPUT VOLTAGE SPIKE SUPPRESSION		Method
Module Operates through these Spikes		
Input Voltage Spike (Centered on Vin)		
±250V, 100µs, Emax = 15mJ	MIL-STD-1275D	
±200V, 10µs, Rs ≤ 0.5Ω	MIL-STD-461C (CS06); DEF-STAN 61-5	
±400V, 5µs, Rs ≤ 0.5Ω	MIL-STD-461C (CS06)	
±600V, 10µs, Rs = 50Ω	RTCA/DO-160E	

INPUT VOLTAGE SURGE SUPPRESSION		Method
Module Operates through these Surges		
Input Surge Voltage and Duration		
60V, 550 ms, Rs = 0 Ω	MIL-HDBK-704A	
80V, 100 ms, Rs = 0 Ω	MIL-HDBK-704A; RTCA/DO-160E	
100V, 80 ms, Rs = 0 Ω	MIL-STD-1275D; DEF-STAN 61-5 (Part 6)/5	
110V, 5 ms, Rs = 0 Ω	DEF-STAN 61-5 (Part 6)/5	
Module shutdown & restarts for these Surges		
202V, 350 ms, Rs = 0 Ω	MIL-STD-1275D; DEF-STAN 61-5 (Part 6)/6	

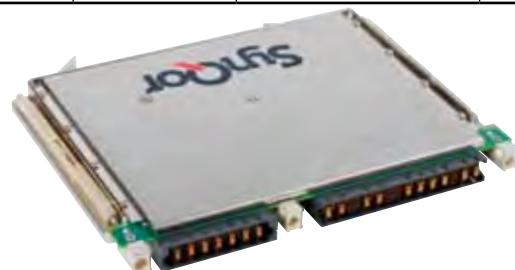
Model	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-6U-DC28P-001 (28Vin with Passive EMI input filtering)	1000W	+12V @ 80A		+5.0V @ 30A	+3.3VAUX @ 15A +12 VAUX @ 1A -12 VAUX @ 1A	3.6 lb
VPX-3U-DC28P-001 (28Vin with Passive EMI input filtering)	500W	+12V @ 40A	+3.3V @ 20A	+5.0V @ 30A	+3.3VAUX @ 6A +12 VAUX @ 1A -12 VAUX @ 1A	1.6 lb
VPX-3U-DC28P-002 (28Vin with Passive EMI input filtering)	500W	+12V @ 40A	+3.3V @ 25A	+5.0V @ 30A	+3.3VAUX @ 6A +12 VAUX @ 1A -12 VAUX @ 1A	1.6 lb

INPUT VOLTAGE SPIKE SUPPRESSION		METHOD
Module Operates through these Spikes		
Input Voltage Spike (Centered on Vin)		
±250V, 100µs, Emax = 15mJ	MIL-STD-1275D	
±200V, 10µs, Rs ≤ 0.5Ω	MIL-STD-461C (CS06); DEF-STAN 61-5	
±400V, 5µs, Rs ≤ 0.5Ω	MIL-STD-461C (CS06)	
±600V, 10µs, Rs = 50Ω	RTCA/DO-160E	



Model	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-6U-DC270P-001 (270Vin with Passive EMI input filtering)	730W	+12V @ 50A		+5.0V @ 30A	+3.3VAUX @ 40A +12 VAUX @ 1A -12 VAUX @ 1A	3.8 lb

INPUT VOLTAGE SPIKE SUPPRESSION		METHOD
Module Operates through these Spikes		
Input Voltage Spike (Centered on Vin)		
±200V, 10µs, Rs ≤ 0.5Ω	MIL-STD-461C (CS06); DEF-STAN 61-5	
±400V, 5µs, Rs ≤ 0.5Ω	MIL-STD-461C (CS06)	
±600V, 10µs, Rs = 50Ω	RTCA/DO-160E	



MILITARY VPX DC-DC POWER SUPPLIES

VPX 3U & 6U MILITARY DC-DC POWER SUPPLIES

CONTROL FEATURES

ENABLE*	Standard VITA 62 control signal, enables +3.3V_AUX.
INHIBIT*	Standard VITA 62 control signal, disables all outputs other than +3.3V_AUX.
FAIL*	FAIL* Output indicates if one of the outputs is outside the specified voltage range.
SYSRESET*	SYSRESET* Output indicates startup is completed and power outputs are ready.

PARALLEL OPERATION

+12V_MAIN, +3.3V_MAIN, +5V_MAIN	All main outputs include active sharing. On the 28V input VPX modules, sharing on the +12V_MAIN requires that VPX cards operate from the same input source and sharing does not provide glitch-free redundancy.
+3.3V_AUX	Active current sharing is implemented on the 270V input VPX module. On the 28V input modules, active sharing on +3.3V_AUX is not provided, but an OR'ing MOSFET is implemented and modules can be paralleled.
+12V_AUX, -12V_AUX	Active current sharing is not supported on these two auxiliary outputs. However, both outputs have OR'ing MOSFETs or OR'ing diodes implemented, so that they can be operated in parallel.

For more information see the datasheet on our website.

DC-DC CONVERTER AND FILTER SCREENING

Screening	Process Description	S-Grade	M-Grade
Baseplate Operating Temperature		-55°C to +100°C	-55°C to +100°C
Storage Temperature		-65°C to +135°C	-65°C to +135°C
Pre-Cap Inspection	IPC-610, Class III	Yes	Yes
Temperature Cycling	Method 1010, Condition B, 10 Cycles		Yes
Burn-In	100°C Baseplate	12 Hours	96 Hours
Final Electrical Test	100%	25°C	-55°C, +25°C, +100°C
Final Visual Inspection	MIL-STD-2008	Yes	Yes

VITA 62 CONTROL STATES

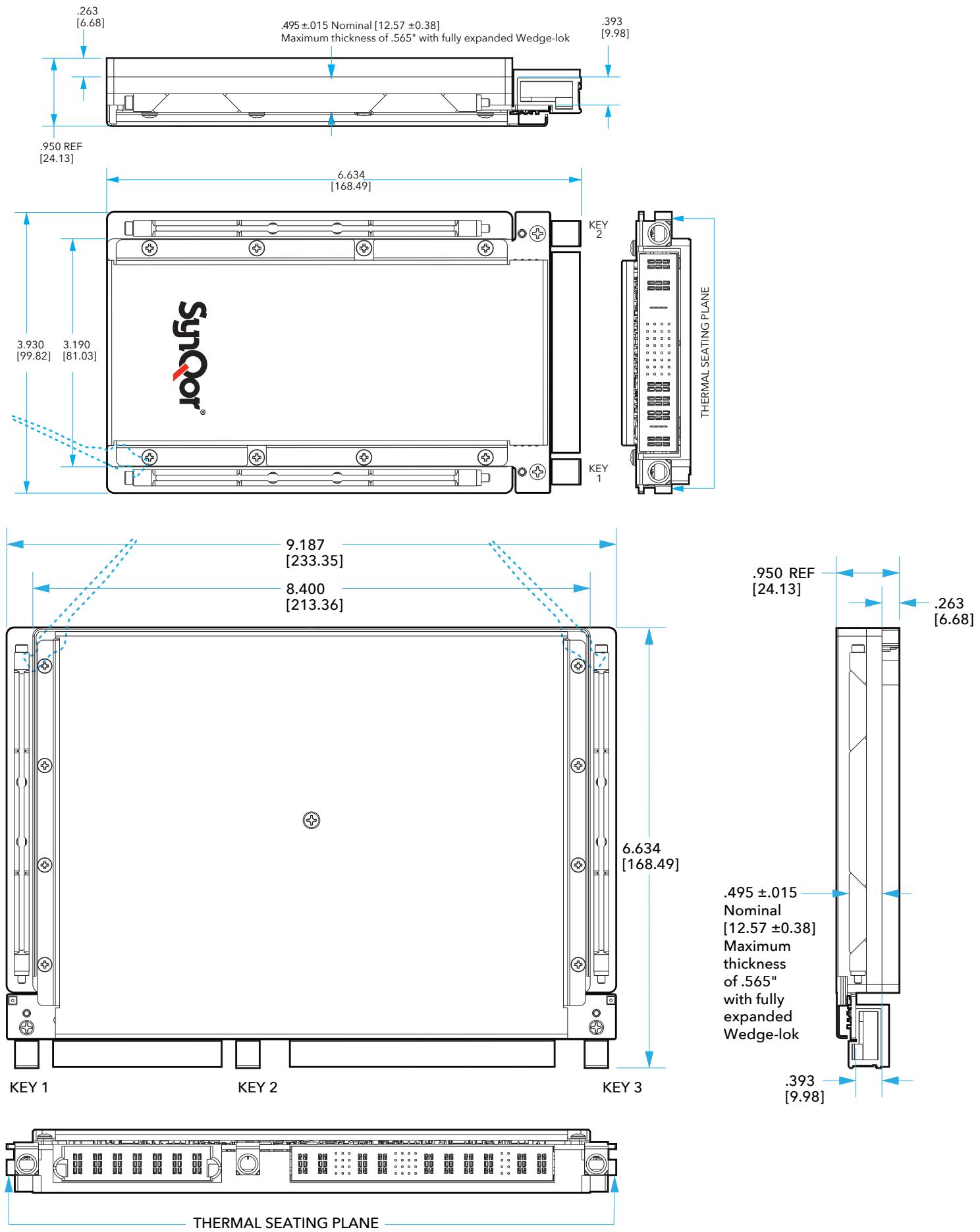
ENABLE*	INHIBIT*	+3.3V_AUX	VS1, VS2, VS3, +12V_AUX, -12V_AUX
HIGH	HIGH	OFF	OFF
LOW	HIGH	ON	ON
HIGH	LOW	OFF	OFF
LOW	LOW	ON	OFF

VPX MODULE QUALIFICATION (VITA 47 COMPLIANT)

Test Name	Method
Random Vibration	MIL-STD-810, 514.6 - Procedure I, Class V3
Shock	MIL-STD-810, 516.6 - Procedure I, VI, Class OS2
Altitude	MIL-STD-810, 500.5 - Procedure I, II, III
Fungus Resistance	MIL-STD-810, 508.6
Corrosion Resistance	ASTM G85, Annex A4
Humidity	MIL-STD-810, 507.5 - Procedure II
High Temperature	MIL-STD-810, 501.5 - Procedure I, II
Low Temperature	MIL-STD-810, 502.5 - Procedure I, II
Temperature Cycling	MIL-STD-202, 107 - Class C4
ESD	EN61000-4-2, Level 4; 15kV Air Discharge



MILITARY VPX DC-DC POWER SUPPLIES





MultiQor Configurable Multi-Output Military DC-DC Power Supplies with EMI filter

The MultiQor Plate format of input-filtered DC-DC power supplies provides up to FOUR customer defined output voltages that are isolated from the input, each other and the cold plate. Using SynQor's Mil-COTS line of high efficiency, high reliability, fixed switching frequency DC-DC converters and EMI filters, this supply is designed to comply with MIL-STD-704, MIL-STD-1275, DEF-STAN 61-5 and MIL-STD-461 for a 28Vin system when continuous full power operation is only needed down to 18Vin. The complete assembly is designed to withstand the harsh conditions of Military and Aerospace applications and is compliant with MIL-STD-810 requirements.

Operational Features

- ◆ Internal EMI filter with ceramic stabilizing bulk cap
- ◆ Over-voltage Spike & Surge suppression circuitry to comply with: MIL-STD-704
MIL-STD-1275
DEF-STAN 61-5 (Part 6)/(5 or 6)
- ◆ Reverse polarity protection
- ◆ High efficiency converters (90%-95%)
- ◆ Fixed frequency switching provides predictable EMI
- ◆ No minimum load requirement
- ◆ Soft start of all outputs

Control Features

- ◆ System Off control (isolated)
- ◆ Individual output voltage Inhibit control (isolated)
- ◆ Remote Sense for each output voltage
- ◆ Output voltage trim for each output
- ◆ Input Good signal (isolated)

Optional Features

- ◆ Remote Sense Jumpers
- ◆ Internal input fuse
- ◆ Output current sharing
- ◆ Cover

Protection Features

- ◆ Input under-voltage lockout
- ◆ Output current limit and short circuit protection
- ◆ Output over-voltage protection
- ◆ Thermal shutdown
- ◆ Automatic restart for all of the above
- ◆ Active back bias current limit

Family	Plate Format (# of Outputs)	MIL-STD Compliance	8 Digit Application Identification Number	Screening	Optional Character
MTQ	P1: 1 output P2: 2 outputs P3: 3 outputs P4: 4 outputs	DC28T: MIL-STD-704 MIL-STD-1275 DEF-STAN 61-5 (Part 6)/6 (converters shut off below 16Vin)	8 Digit Application Identification Number	S: S-Grade M: M-Grade	Blank: Standard V: Cover

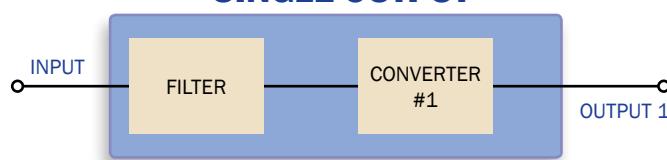
Part Numbering Example: MTQ-P3-DC28T-XXXXXXX-SV For valid part numbers, refer to the website or contact your local sales representative.



DC28T CONFIGURATIONS

P1

SINGLE OUTPUT

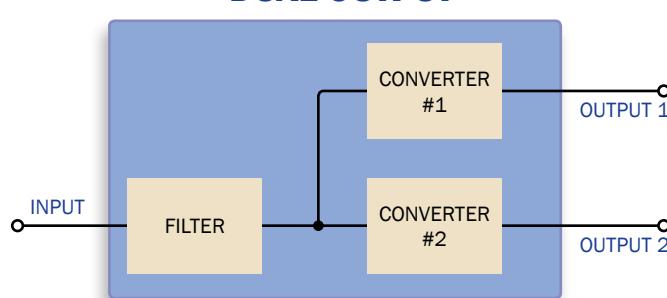


P1 DC-DC CONVERTER OPTIONS:

- ◆ Any Quarter-Brick or Half-Brick converter from the MCOTS-28 Family
- ◆ Size: 3.80" x 6.84" x 0.92"
- ◆ Typical Weight: 1.0 LB to 1.3 LBS (1QB or 1 HB)

P2

DUAL OUTPUT

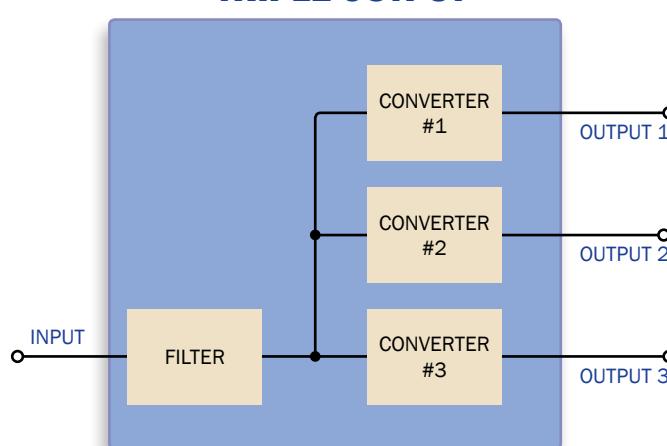


P2 DC-DC CONVERTER OPTIONS:

- ◆ Any Quarter-Brick converter from the MCOTS-28 Family
- ◆ Size: 3.80" x 6.84" x 0.92"
- ◆ Typical Weight: 1.4 LBS (2QB)

P3

TRIPLE OUTPUT

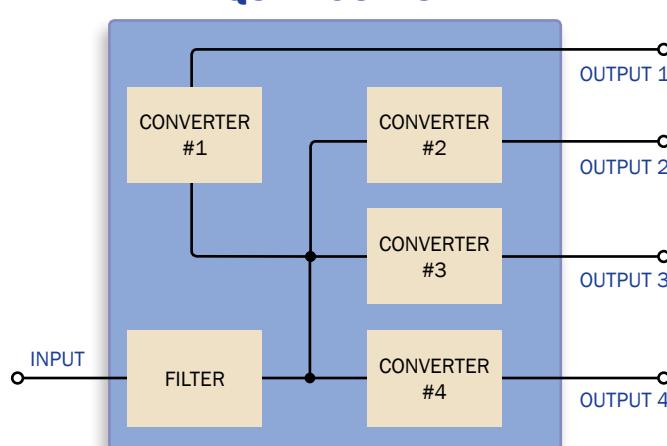


P3 DC-DC CONVERTER OPTIONS:

- ◆ Any Quarter-Brick or Half-Brick converter from the MCOTS-28 Family
- ◆ Size: 6.70" x 6.84" x 0.92"
- ◆ Typical Weight: 2.1 LBS to 2.5 LBS (3QB or 3 HB)

P4

QUAD OUTPUT



P4 DC-DC CONVERTER OPTIONS:

- ◆ Converter #1: Half-brick converter from the MCOTS-28 Family
- ◆ Converters #2, #3, #4: Any Quarter-Brick converter from the MCOTS-28 Family
- ◆ Size: 6.70" x 6.84" x 0.92"
- ◆ Typical Weight: 2.4 LBS (3QB and 1HB)





Configurable DC-DC Power Supplies



MultiQor Configurable Single-Output, Increased Power Military DC-DC Power Supplies

The MultiQor Plate format of military-grade DC-DC power supplies provides one customer defined output voltage that is isolated from the input and the cold plate. Using SynQor's Mil-COTS line of high efficiency, high reliability, fixed switching frequency DC-DC converters, this supply is designed to comply with MIL-STD-704 for a 28Vin system when continuous full power operation is only needed down to 16Vin. The complete assembly is designed to withstand the harsh environments of the Military and Aerospace industries and is compliant with MIL-STD-810 requirements.

Operational Features

- ◆ Designed to comply with MIL-STD-704 Steady State
- ◆ High efficiency converters (90%-95%)
- ◆ Fixed frequency switching provides predictable EMI
- ◆ No minimum load requirement
- ◆ Soft start of all outputs

Control Features

- ◆ System On/Off control (isolated)
- ◆ Output voltage Inhibit control (isolated)
- ◆ Remote Sense for the output voltage
- ◆ Output voltage trim (-20%, +10%) available
- ◆ Input Good signal (isolated)

Optional Features

- ◆ Remote Sense Jumpers
- ◆ Internal input fuse
- ◆ Output current sharing
- ◆ Cover

Protection Features

- ◆ Input under-voltage lockout
- ◆ Output current limit and short circuit protection
- ◆ Output over-voltage protection
- ◆ Thermal shutdown
- ◆ Automatic restart for all of the above
- ◆ Active back bias current limit

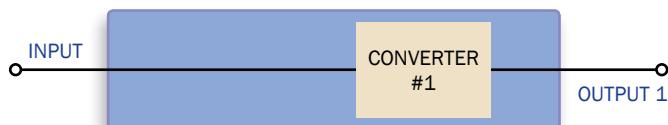
Family	Plate Format (# of Converters)	MIL-STD Compliance	8 Digit Application Identification Number	Screening	Optional Character
MTQ	P1: 1 converters P2: 2 converters P3: 3 converters	DC28: N/A	8 Digit Application Identification Number	S: S-Grade	Blank: Standard V: Cover

Part Numbering Example: MTQ-P3-DC28-XXXXXXX-SV For valid part numbers, refer to the website or contact your local sales representative.

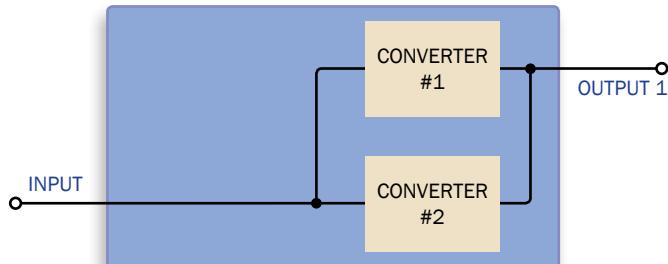


DC28 CONFIGURATIONS

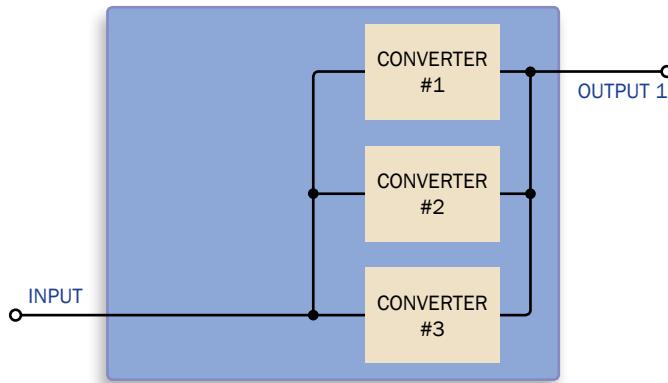
P1 SINGLE CONVERTER, SINGLE OUTPUT



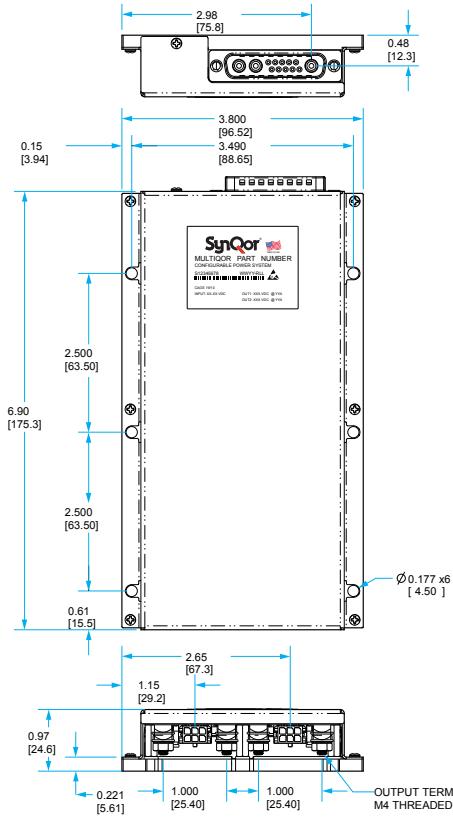
P2 DUAL CONVERTER, SINGLE OUTPUT



P3 TRIPLE CONVERTER, SINGLE OUTPUT



P1 & P2 HAVE SIMILAR COVERS



P1 DC-DC CONVERTER OPTIONS:

- Any Half-Brick Zeta converter from the MCOTS-28 Family
- Size: 3.80" x 6.84" x 0.92"
- Typical Weight: 1.3 LBS (1 HB)

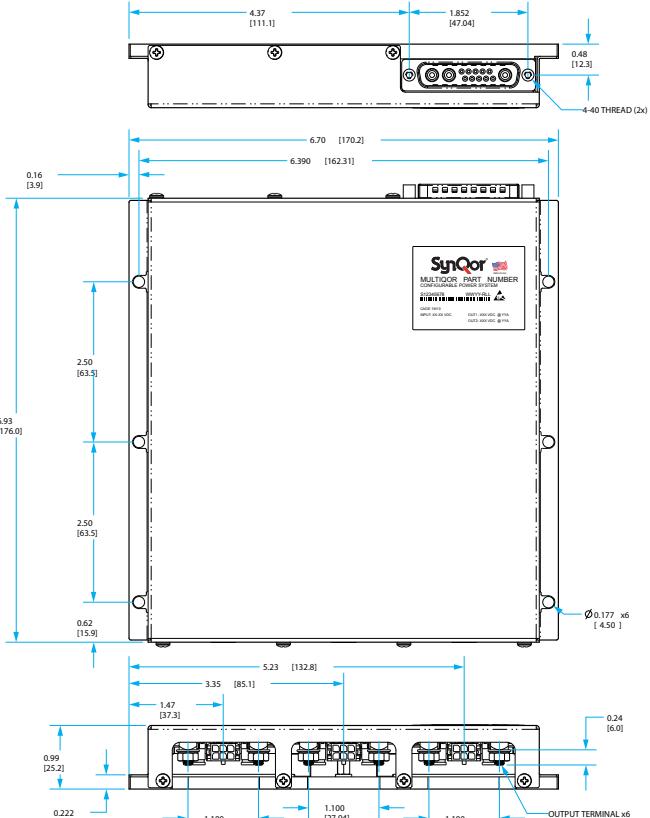
P2 DC-DC CONVERTER OPTIONS:

- Any Half-Brick Zeta converter from the MCOTS-28 Family
- Size: 3.80" x 6.84" x 0.92"
- Typical Weight: 1.6 LBS (2HB)

P3 DC-DC CONVERTER OPTIONS:

- Any Half-Brick Zeta converter from the MCOTS-28 Family
- Size: 6.70" x 6.84" x 0.92"
- Typical Weight: 2.5 LBS (3 HB)

P3 & P4 HAVE SIMILAR COVERS



MILITARY CONFIGURABLE MULTI-OUTPUT AC-DC POWER SUPPLY



MultiQor Configurable Multi-Output Military AC-DC Power Supplies

The MultiQor Plate format of input-filtered single phase AC-DC power supplies provides up to two customer defined output voltages that are isolated from the input, each other and the cold plate. Using SynQor's Mil-COTS line of high efficiency, high reliability, fixed switching frequency DC-DC converters, PFC and EMI filters, this supply is designed to comply with MILSTD-704, and MIL-STD-1399. The complete assembly is designed to withstand the harsh environments of the Military and Aerospace industries and is compliant with MIL-STD-810 requirements.

Operational Features

- ◆ Input voltage range: 85 - 180Vrms
- ◆ Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- ◆ Up to 650W output power
- ◆ ≥ 0.99 Power Factor (50/60Hz)
- ◆ Internal inrush current limit
- ◆ Hold-Up Capacitors (with available external connection)

Control Features

- ◆ PFC enable (isolated)
- ◆ Individual output voltage Inhibit control (isolated)
- ◆ AC Power Good signal (isolated)

Compliance Features

MultiQor units are designed to meet (pending):

- ◆ MIL-STD-704 - Aircraft Electrical Power
- ◆ Mil-STD-1399-300 - Interface Shipboard

Protection Features

- ◆ Input current limit and auto-recovery short circuit protection
- ◆ Auto-recovery input under/over-voltage protection
- ◆ Auto-recovery output over-voltage protection
- ◆ Auto-recovery thermal shutdown

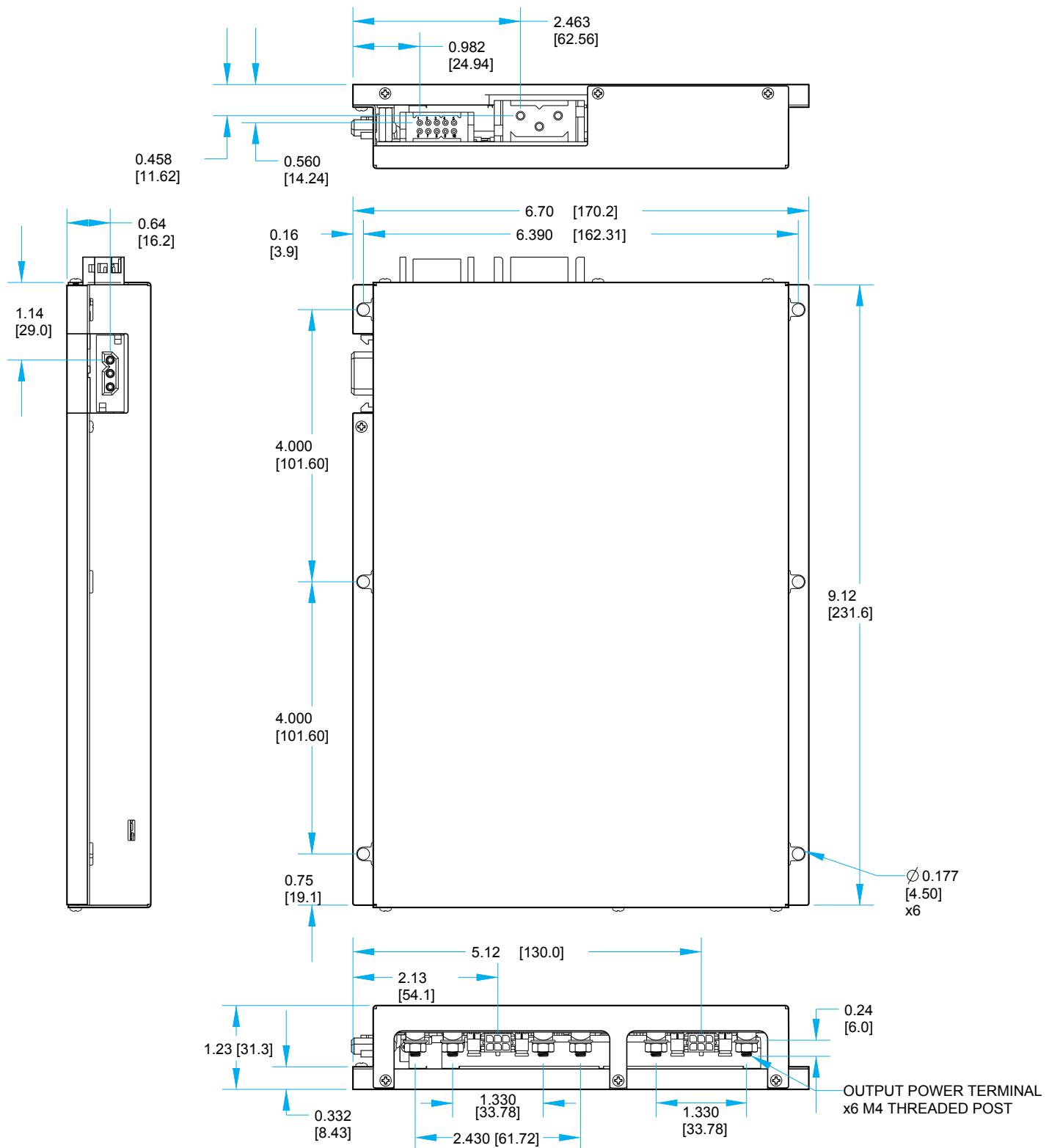
Family	Plate Format (# of Outputs)	MIL-STD Compliance	Phase	6 Digit Application Identification Number	Screening	Housing
MTQ	P1: 1 output P2: 2 outputs	AC115: MIL-STD-704 MIL-STD-1399	1: Single Phase	6 Digit Application Identification Number	S: S-Grade M: M-Grade	V: Cover

Part Numbering Example: MTQ-P1-AC115-1-XXXXXX-SV For valid part numbers, refer to the website or contact your local sales representative.



MILITARY CONFIGURABLE MULTI-OUTPUT AC-DC POWER SUPPLY

P1 & P2 HAVE SIMILAR COVERS



INDUSTRIAL ISOLATED DC-DC POWER CONVERTERS



Next-Generation, Ruggedized Isolated DC-DC Converters for Industrial Applications

SynQor's ruggedized InQor DC-DC converters and filters are designed for a wide range of industrial applications including those required to withstand harsh environments: railway and transportation systems, industrial motion control, information displays, factory automation and power generation systems. SynQor converters feature a two-stage power topology with synchronous-rectification that greatly improves efficiency and optimizes the power dissipated by the converter.

Operational Features

- ◆ High efficiency up to 95%
- ◆ Input voltage ranges from 9V to 425V
- ◆ Output power up to 600W
- ◆ Fixed frequency switching, low output noise
- ◆ No minimum load requirement
- ◆ Full Feature option on some models
- ◆ Industry standard pin-out configurations and standard footprints
- ◆ Operating Temperature -40°C to +100°C
- ◆ Output Voltage Set Point ±1.0%
- ◆ Output Voltage Ripple <1% of Vout (typ.) pk-pk
- ◆ Isolation Voltage Up to 4250Vdc

Protection/Control Features

- ◆ Input under-voltage lockout
- ◆ Output current limit and short circuit protection
- ◆ Active back bias limit prevents damage to converter from external load induced pre-bias
- ◆ Digital output current sharing (Half Brick Zeta only)
- ◆ Output over-voltage protection
- ◆ Thermal shutdown
- ◆ Trimmable output voltages



INQOR ISOLATED DC-DC CONVERTER

Family	Cont. Input Voltage	Output Voltage	Package Size	Performance Series	Thermal Design	Max. Iout	Options Description		
							Enable Logic	Pin Length	Features
IQ	12: 9-22V	012: 1.2V	S: Sixteenth Brick Q: Quarter Brick H: Half Brick F: Full Brick	K: Kilo M: Mega G: Giga T: Tera P: Peta E: Exa Z: Zeta	C: Encased D: Encased, Non-threaded Baseplate V: Encased, Flanged Baseplate	60: 60A 50: 50A 30: 30A 10: 10A 06: 6A 02: 2A (not all shown)	N: Negative	R: 0.180"	S: Standard F: Full Feature
	18: 9-36V	015: 1.5V							
	24: 18-36V	018: 1.8V							
	32: 9-75V	025: 2.5V							
	36: 18-75V	033: 3.3V							
	48: 34-75V	050: 5V							
	64: 18-135V	070: 7V							
	68: 12-150V	120: 12V							
	70: 34-135V	150: 15V							
	72: 42-110V	240: 24V							
	90: 34-160V	280: 28V							
	1B: 66-160V	300: 30V							
	2H: 90-210V	400: 40V							
	4H: 180-425V	480: 48V							
		500: 50V							

Part Numbering Example: IQ1B480QTC03NRS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.



INDUSTRIAL ISOLATED DC-DC POWER CONVERTERS

PRODUCT MATRIX		INPUT VOLTAGE RATIO	
		2:1 INPUT RATIO	8:1 INPUT RATIO
Input Voltage Range	9V	IQ12 Input Range: 9-22V Transient: 25V Max Power: 182W Eff: Up to 92%	
	18V		
	25V		
	34V	IQ48 Input Range: 34-75V Transient: 100V Max Power: 602W Eff: Up to 95%	IQ24 Input Range: 18-36V Transient: 50V Max Power: 510W Eff: Up to 95%
	75V		IQ72 Input Range: 42-110V Max Power: 255W Eff: Up to 93%
	100V	IQ1B Input Range: 66-160V Transient: 170V Max Power: 255W Eff: Up to 93%	IQ32 Input Range: 9-75V Transient: 100V Max Power: 255W Eff: Up to 91%
	170V	IQ2H Input Range: 90-210V Transient: 250V Max Power: 150W Eff: Up to 90%	
	475V		IQ4H Input Range: 180-425V Transient: 475V Max Power: 600W Eff: Up to 90%
		4:1 INPUT RATIO	
Input Voltage Range	9V	IQ18 Input Range: 9-36V Transient: 40V Max Power: 182W Eff: Up to 92%	IQ36 Input Range: 18-75V Max Power: 220W Eff: Up to 93%
	12V		
	18V		
	34V		IQ70 Input Range: 34-135V Max Power: 240W Eff: Up to 93%
	75V		IQ90 Input Range: 34-160V Max Power: 228W Eff: Up to 94%
	170V		IQ68 Input Range: 12-150V Transient: 170V Max Power: 53W Eff: Up to 90%
		12:1 INPUT RATIO	
			

INDUSTRIAL ISOLATED DC-DC POWER CONVERTERS

2:1 INPUT RATIO LISTED BY PACKAGE AND OUTPUT VOLTAGE

IQ12

	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
12Vdc Input (9-22Vdc Input Range, Transient 25V)															
Half Brick	HPC			60A 108W		50A 165W	36A 180W		15A 180W	12A 180W	7.5A 180W	6.5A 182W		4.5A 180W	3.7A 178W
	HTC			50A 90W		40A 132W	28A 140W		12A 144W	9.5A 143W	6A 144W	5A 140W		3.5A 140W	3A 144W
24Vdc Input (18-36Vdc Input Range, Transient 50V)															
Sixteenth Brick	SMC	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W	4A 48W	3A 45W					
	SKC	20A 24W	16A 24W	14A 25W	10A 25W	8A 26W	5A 25W	3.5A 25W	2A 24W	1.7A 26W					

IQ24

	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V	50V
24Vdc Input (18-36Vdc Input Range, Transient 50V)																
Half Brick	HZC					60A 300W		42A 504W	34A 510W	21A 504W	18A 504W		12.5A 500W		10A 500W	
	HEC										14A 392W				8A 400W	
	HPC			60A 108W		50A 165W	40A 200W		18A 216W	15A 225W	9A 216W	7.5A 210W		5.5A 220W	4.5A 216W	
	HTC			50A 90W		40A 132W	30A 150W		13A 156W	10A 150W	6.5A 156W	5.5A 154W		4A 160W	3.3A 158W	
Quarter Brick	QTC			40A 72W		30A 99W	24A 120W	17A 119W	10A 120W	8A 120W	5A 120W		4A 120W		2.5A 120W	
	QGC			32A 58W		25A 83W	18A 90W	13A 91W	7.5A 90W	6A 90W	3.7A 89W		3A 90W		1.8A 91W	
	QMC												2A 60W		1.2A 58W	
Sixteenth Brick	SMC	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W	4A 48W	3A 45W						
	SKC	20A 24W	16A 21W	14A 25W	10A 25W	8A 26W	5A 25W	3.5A 25W	2A 24W	1.7A 26W						

IQ48

	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V	50V
48Vdc Input (34-75Vdc Input Range, Transient 100V)																
Half Brick	HZC					60A 300W		50A 600W	40A 600W	25A 600W	21.5A 602W		15A 600W		12A 600W	
	HPC			60A 108W		60A 198W	46A 230W		21A 252W	17A 255W	10.5A 252W	9A 252W		6.3A 252W	5.2A 250W	
	HTC			50A 90W		45A 149W	34A 170W		16A 192W	13A 195W	8A 192W	7A 196W		5A 200W	4A 192W	
Quarter Brick	QTC			40A 72W		30A 99W	25A 125W	20A 140W	12A 144W	10A 150W	6A 144W		5A 150W		3A 144W	
	QGC			32A 58W		25A 83W	21A 105W	15A 105W	9A 108W	7A 105W	4.5A 108W		3.5A 105W		2.2A 106W	
Sixteenth Brick	SMC	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 48W	4A 48W	3A 45W						
	SKC	20A 24W	16A 21W	14A 25W	10A 25W	8A 26W	5A 25W	3.5A 25W	2A 24W	1.7A 26W						



INDUSTRIAL ISOLATED DC-DC POWER CONVERTERS

2:1 INPUT RATIO LISTED BY PACKAGE AND OUTPUT VOLTAGE

IQ72	Vout	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
72Vdc Input (42-110Vdc Input Range)												
Half Brick	HPC	60A 108W	60A 198W	46A 230W		21A 252W	17A 255W	10.4A 250W	9A 252W		6.3A 252W	5.2A 250W
	HTC	50A 90W	45A 149W	34A 170W		16A 192W	13A 195W	8A 192W	7A 196W		5A 200W	4A 192W
Quarter Brick	QTC	40A 72W	30A 99W	25A 125W	20A 140W	12A 144W	10A 150W	6A 144W		5A 150W		3A 144W
	QGC	32A 58W	25A 83W	20A 100W	15A 105W	9A 108W	7A 105W	4.5A 108W		3.5A 105W		2A 96W

IQ1B	Vout	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
110Vdc Input (66-160Vdc Input Range, Transient 170V)												
Half Brick	HPC	60A 108W	60A 198W	48A 240W		21A 252W	17A 255W	10A 240W	9A 252W		6.3A 252W	5.2A 250W
	HTC	50A 90W	45A 149W	34A 170W		16A 192W	13A 195W	8A 192W	7A 196W		5A 200W	4A 192W
Quarter Brick	QTC	40A 72W	30A 99W	25A 125W	20A 140W	12A 144W	10A 150W	6A 144W		5A 150W		3A 144W
	QGC	32A 58W	23A 76W	18A 90W	15A 105W	9A 108W	7A 105W	4.5A 108W		3.5A 105W		2A 96W

IQ2H	Vout	1.8V	2.5V	3.3V	5V	12V	15V	24V	28V	48V
150Vdc Input (90-210Vdc Input Range, Transient 250V)										
Quarter Brick	QTC				30A 150W				5.35A 150W	3.13A 150W

IQ4H	Vout	1.8V	2.5V	3.3V	5V	12V	15V	24V	28V	48V
385Vdc Input (180-425Vdc Input Range, Transient 475V)										
Full Brick	FTC				80A 400W	50A 600W	40A 600W	25A 600W	21.4A 600W	12.5A 600W
Half Brick	HTC	70A 126W	70A 175W	60A 198W	50A 250W	25A 300W	20A 300W	12.5A 300W	10.7A 300W	6.3A 300W
Quarter Brick	QTC	30A 54W	30A 75W	30A 99W	30A 150W	13A 156W	10A 150W	6.25A 150W	5.35A 150W	3.13A 150W



INDUSTRIAL ISOLATED DC-DC POWER CONVERTERS

4:1 INPUT RATIO LISTED BY PACKAGE AND OUTPUT VOLTAGE

IQ18

	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
18Vdc Input (9-36Vdc Input Range, Transient 40V)															
Half Brick	HPC			60A 108W		50A 165W	36A 180W		15A 180W	12A 180W	7.5A 180W	6.5A 182W		4.5A 180W	3.7A 178W
	HTC			50A 90W		40A 132W	28A 140W		12A 144W	9.5A 143W	6A 144W	5A 140W		3.5A 140W	3A 144W
Quarter Brick	QTC			40A 72W		30A 99W	20A 100W	14A 98W	8A 96W	7A 105W	4A 96W		3A 90W		2A 96W
	QGC			30A 54W		20A 66W	15A 75W	10A 70W	6A 72W	5A 75W	3A 72W		2.4A 72W		1.5A 72W
Sixteenth Brick	SMC	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W	4A 48W	3A 45W					
	SKC	20A 24W	16A 21W	14A 25W	10A 25W	8A 26W	5A 25W	3.5A 25W	2A 24W	1.7A 26W					

IQ36

	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
36Vdc Input (18-75Vdc Input Range)															
Half Brick	HPC			60A 108W		50A 165W	40A 200W	30A 210W	18A 216W	14A 210W	9A 216W	7.5A 210W		5.5A 220W	4.5A 216W
	HTC			50A 90W		40A 132W	30A 150W	22A 154W	13A 156W	10A 150W	6.5A 156W	5.5A 154W		4A 160W	3.2A 154W
Quarter Brick	QTC			40A 72W		30A 99W	24A 120W	17A 119W	10A 120W	8A 120W	5A 120W		4A 120W		2.5A 120W
	QGC			32A 58W		25A 83W	18A 90W	13A 91W	7.5A 90W	6A 90W	3.7A 89W		3A 90W		1.8A 86W
Sixteenth Brick	SMC	25A 30W	25A 38W	25A 45W	20A 50W	15A 50W	10A 50W	7A 49W	4A 48W	3A 45W					
	SKC	20A 24W	16A 24W	14A 25W	10A 25W	8A 26W	5A 25W	3.5A 25W	2A 24W	1.7A 26W					

IQ70

	Vout	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
70Vdc Input (34-135Vdc Input Range)												
Half Brick	HPC	60A 108W	57A 188W	44A 220W		20A 240W	16A 240W	10A 240W	8.5A 238W		6A 240W	5A 240W
	HTC	50A 90W	43A 142W	32A 160W		15A 180W	12A 180W	7.5A 180W	6.5A 182W		4.5A 180W	3.8A 182W
Quarter Brick	QTC	40A 72W	30A 99W	24A 120W	18A 126W	11A 132W	8.6A 129W	5.5A 132W		4.4A 132W		2.7A 130W
	QGC	32A 58W	23A 76W	17A 85W	12A 84W	7A 84W	5.5A 83W	3.5A 84W		2.8A 84W		1.8A 86W

IQ90

	Vout	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
90Vdc Input (34-160Vdc Input Range)												
Half Brick	HPC	60A 108W	53A 175W	40A 200W		19A 228W	15A 225W	9.5A 228W	8A 224W		5.7A 228W	4.6A 221W
	HTC	50A 90W	40A 132W	30A 150W		13A 156W	10A 150W	6.5A 156W	5.7A 160W		4A 160W	3.2A 154W
Quarter Brick	QTC	40A 72W	30A 99W	24A 120W	17A 119W	10A 120W	8A 120W	5A 120W		4A 120W		2.5A 120W
	QGC	32A 58W	23A 76W	17A 86W	12A 84W	7A 84W	5.5A 83W	3.5A 84W		2.8A 84W		1.8A 86W
	QMC	25A 45W	15A 50W	10A 49W	7A 49W	4A 48W	3.3A 50W	2A 48W		1.6A 48W		1A 48W



INDUSTRIAL ISOLATED DC-DC POWER CONVERTERS

8:1 INPUT RATIO LISTED BY PACKAGE AND OUTPUT VOLTAGE

IQ32	Vout	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V	50V
32Vdc Input (9-75Vdc Input Range, Transient 100V)													
Half Brick	HZC			50A 250W		21A 252W	17A 255W	10A 240W	9A 252W		6A 240W		5A 250W
	HPC	55A 99W	45A 149W	32A 160W		13A 156W	11A 165W	6.7A 161W	5.8A 162W		4A 160W	3.4A 163W	
	HTC	45A 81W	33A 109W	24A 120W		10A 120W	8A 120W	5A 120W	4.5A 126W		3A 120W	2.5A 120W	
Quarter Brick	QTC	35A 63W	25A 83W	17A 85W	12A 84W	7A 84W	5.5A 83W	3.5A 84W		2.8A 84W		1.8A 86W	
	QGC	25A 45W	15A 50W	10A 50W	7A 49W	4A 48W	3.3A 50W	2A 48W		1.6A 48W		1A 48W	

IQ64	Vout	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
64Vdc Input (18-135Vdc Input Range)												
Half Brick	HPC	60A 108W	50A 165W	36A 180W		16A 192W	13A 195W	8A 192W	7A 196W		5A 200W	4A 192W
	HTC	50A 90W	40A 132W	28A 140W		12A 144W	10A 150W	6A 144W	5.5A 154W		3.8A 152W	3A 144W
Quarter Brick	QTC	36A 65W	27A 89W	20A 100W	14A 98W	8A 96W	6.5A 98W	4A 98W		3.2A 96W		2A 96W
	QGC	25A 45W	15A 50W	10A 50W	7A 49W	4A 48W	3.3A 50W	2A 48W		1.6A 48W		1A 48W

12:1 INPUT RATIO LISTED BY PACKAGE AND OUTPUT VOLTAGE

IQ68	Vout	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
68Vdc Input (12-150Vdc Input Range, Transient 170V)												
Half Brick	HGC			10.6A 50W		4.4A 53W		2.2A 53W				1.1A 53W
Quarter Brick	QMC			5.3A 25W		2.2A 26W		1.1A 26W				0.55A 26W

InQor, High Voltage NiQor, RailQor and CFQor products are fully encased for additional environmental protection and available in a variety of industry standard sizes/pinouts. There are various mounting configurations consisting of threaded inserts, through-hole inserts and mounting flanges. See packaging page or website for data sheets with more details.



See "Encased Package Configurations" on page MECH-82 for package outlines.



INDUSTRIAL ISOLATED DC FILTERS



DC Filter Modules for DC-DC Converters

SynQor provides EMI filters for InQor® DC-DC converters. All EMI filters provide high levels of differential-mode and common-mode attenuation and include stabilizing bulk capacitors and damping resistors.

Operational Features

- ◆ Low DC resistance
- ◆ Differential-mode attenuation
- ◆ Common-mode attenuation
- ◆ Bulk capacitance provides input system stabilization for downstream power converters
- ◆ No electrolytic capacitors (all ceramic design)
- ◆ High-voltage isolation between chassis and input / output
- ◆ Wide temperature range operation

Model Number	Input Voltage		Output Current	Isolation Voltage (to common-mode / baseplate)	Maximum DC Resistance @ 100°C	Differential-Mode Attenuation	Common-Mode Attenuation
	Continuous	Surge (<100ms)					
QUARTER BRICK							
IQ040PFQTx30	±40V	±50V	30A	2250V	20mΩ	>80dB @ 250kHz	>36dB @ 250kHz
IQ080PFQTx20	±80V	±100V	20A	2250V	32mΩ	>80dB @ 250kHz	>36dB @ 250kHz
IQ200PFQTx10	±200V	±250V	10A	2250V	70mΩ	>80dB @ 500kHz	>50dB @ 500kHz
IQ500PFQTx04	±500V	±630V	4.0A	2500V	180mΩ	>80dB @ 500kHz	>50dB @ 500kHz

INQOR DC FILTER

Family	Cont. Input Voltage	Filter Type	Package Size	Performance Series	Thermal Design	Max. Iout	Options Description		
							Enable Logic	Pin Length	Features
IQ	040: ±40V 080: ±80V 200: ±200V 500: ±500V	PF: Passive Filter	Q: Quarter Brick	T: Tera	C: Encased V: Flanged Baseplate	30: 30A 20: 20A 10: 10A 04: 4A	S: Standard	R: 0.180"	S: Standard

Part Numbering Example: IQ080PFQTC20NRS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

See "Encased Package Configurations" on page MECH-82 for package outlines.





E-Series

G-Series

Industrial-Grade Highly Efficient AC-DC Power Supplies with PFC

The ACuQor® product line offers best-in-class solutions for AC-DC power supplies designed to meet an extensive range of applications. The E-Series packages 500W of useable power into just 3.50" x 5.25" x 1.63". The G-Series provides 1400W of useable power in a 4.75" x 7.00" x 1.63" package.

Product Features

- ♦ High efficiency up to 93% at full rated load current
- ♦ Delivers up to 1400W of output power (1800W transient)
- ♦ Semi-regulated output
- ♦ Operating ambient temperature: -40°C to +70°C

Protection/Control Features

- ♦ Over-current, over-voltage, and over-temp protection
- ♦ DC Power Good and AC Power Good signals
- ♦ Remote enable input

ACUQOR ISOLATED AC-DC CONVERTER

Family	Output Power	Grade	Range	Output Voltage	Package Size	Thermal Design	Options
AQ	0300: 300W 0400: 400W 0500: 500W 0600: 600W 0800: 800W 0900: 900W 1000: 1000W 1100: 1100W 1200: 1200W 1400: 1400W 1500: 1500W	I: Industrial	U: Universal (85-264VRMS)	12: 12V 1T: 12V/12V/5V 15: 15V 24: 24V 2T: 24V/12V/5V 28: 28V 36: 36V 3T: 36V/12V/5V 48: 48V 4T: 48V/12V/5V	E: 1 Unit 3" x 5" G: 1 Unit 4.75" x 7" Multiple E-Series Packages R: 2 Units (flat) S: 2 Units (stacked) T: 3 Units (flat) U: 3 Units (stacked)	A: Open-frame C: Encased	IND: Industrial

Part Numbering Example: AQ0400IU24ECIND For valid part numbers, refer to the website or contact your local sales representative or distributor.

INDUSTRIAL GRADE	Output Voltage	Power Rating		
		800W (1000W Transient)	1100W (1300W Transient)	1400W (1800W Transient)
G-Series (Single Output) (4.75" x 7.00" x 1.63" Encased Package) 12V, 15V, 24V, 28V, 48V (includes 5V@50mA standby)				
E-Series (Single Output) (3.00" x 5.00" x 1.45" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@50mA standby)		300W (400W Transient)	400W (500W Transient)	500W (700W Transient)
E-Series (Triple Output) (3.00" x 5.00" x 1.45" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@2A and 12V@4.2A)		300W (400W Transient)	400W (500W Transient)	500W (700W Transient)





High-Voltage Non-isolated Converters



High Voltage, Non-isolated DC-DC Converters for Industrial Applications

The high input voltage NiQor® family of DC-DC converters offers unique solutions for converting high-powered, variable voltages to a wide range of output voltages. The converter is a non-isolated buck-boost regulator, which employs synchronous rectification to achieve extremely high conversion efficiency. These products are suitable for use in Intermediate Bus Architecture, or to provide a regulated output voltage from a variable voltage source such as a battery. They can be configured to 'buck' the input voltage down or 'boost' the input voltage up using a single external resistor.

Operational Features

- ◆ Ultra-high efficiency up to 96%
- ◆ Wide input voltage ranges:
 - ◆ 9-20V (NQ20); 9-40V (NQ40); 9-60V (NQ60);
9-90V (NQ90)
 - ◆ Buck or Buck/Boost Mode available
 - ◆ Maximum input/output currents up to 40A
 - ◆ Suitable for use in
Intermediate Bus Architectures
 - ◆ On-board input and output filtering
 - ◆ No minimum load requirement
 - ◆ Remote sense and wide output voltage trim

BATTERY CHARGING

- ◆ Provides the power conversion platform for
battery charging
- ◆ Output current limit is externally controlled for
constant-current charging
- ◆ Current can be set with an external resistor or an
active circuit
- ◆ Current analog signal provided for instrumentation
and control functions
- ◆ Ideal diode output stage with zero back-drive
currents prevents discharge of battery when
not charging
- ◆ Output voltage set-point is independently
controlled through trim pin
- ◆ Unit will smoothly transition between current and
voltage modes as charging cycle needs charge

Protection/Control Features

- ◆ Input under-voltage lockout (UVLO)
- ◆ Output current limit (OCP) and short circuit
protection
- ◆ Output over-voltage protection (OVP)
- ◆ Thermal shutdown (OTP)
- ◆ Output voltage trim



INDUSTRIAL NON-ISOLATED HIGH VOLTAGE DC-DC CONVERTERS

NiQor® HIGH-VOLTAGE LISTED BY PACKAGE & OUTPUT VOLTAGE

NQ20	Series	0-20V
9-20Vdc Input Range		
Quarter Brick	QG	40A
Eighth Brick	ET	20A
	EG	10A

NQ40	Series	0-40V
9-40Vdc Input Range		
Quarter Brick	QT	35A
	QG	30A
Eighth Brick	ET	15A
	EG	8A

NQ60	Series	0-60V
9-60Vdc Input Range		
Half Brick	HG	40A
Quarter Brick	QT	25A
	QG	20A
Eighth Brick	EP	15A
	ET	10A
	EG	5A

NQ90	Series	0-90V
9-90Vdc Input Range		
Half Brick	HG	26A
Quarter Brick	QT	18A
Eighth Brick	EP	10A

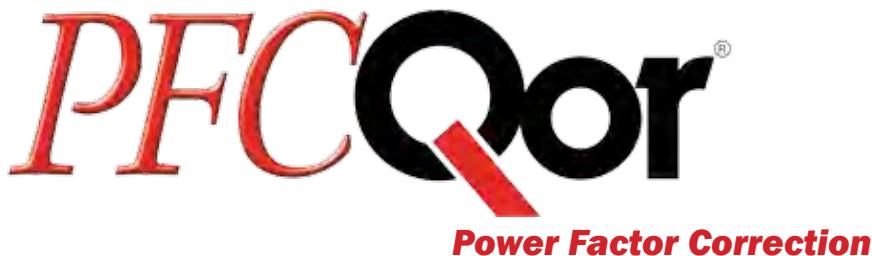


NIQOR HIGH-VOLTAGE NON-ISOLATED DC-DC CONVERTERS

Family	Input Voltage	Mode	Output Voltage	Package Size	Series	Thermal Design	Maximum Current	Options Description:		
								Enable Logic	Pin Length	Feature Set
NQ	20: 9-20V 40: 9-40V 60: 9-60V 90: 9-90V	T: Buck (1/8 & 1/4) W: Buck/Boost	20: 0-20V 40: 0-40V 60: 0-60V 90: 0-90V	E: Eighth Brick Q: Quarter Brick H: Half Brick	G: Giga T: Tera P: Peta	C: Encased D: Encased, Non-threaded Baseplate V: Encased, Flanged Baseplate	05: 5A 08: 8A 10: 10A 15: 15A 20: 20A 26: 26A 30: 30A 40: 40A	N: Neg.	K: 0.110" N: 0.145" R: 0.180" Y: 0.250"	S: Standard (1/8 & 1/4 only) C: Current monitor output/ trimmable current limit (1/8 & 1/4 only) F: Current share/ trimmable current limit (half brick only)

Part Numbering Example: NQ20W20ETC20NRS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

INDUSTRIAL POWER FACTOR CORRECTION



Power Factor Correction Modules

The PFCQor® Power Factor Correction module is an essential building block of an AC-DC power supply. Used in conjunction with a hold-up capacitor, SynQor's high efficiency DC-DC converters and SynQor's AC line filter, the PFCQor will draw a nearly perfect sinusoidal current ($\text{PF} > 0.99$) from a single phase AC input. Up to three PFCQor modules can be paralleled to achieve higher power. The module is supplied completely encased to provide protection from the harsh conditions seen in many industrial and transportation environments.

Operational Features

- ♦ Universal input voltage range: 85-264Vrms*
- ♦ Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- ♦ Up to 700W output power
- ♦ ≥ 0.99 Power Factor
- ♦ High efficiency: >96% (230Vrms), >94% (115Vrms)
- ♦ Internal inrush current limit
- ♦ Auxiliary 10V bias supply
- ♦ 100°C max baseplate temperature at full power
- ♦ Up to three modules can be paralleled with current sharing
- ♦ Compatible with SynQor IQ4H Converters and AC line filters

Protection/Control Features

- ♦ PFC Enable
- ♦ Load Enable (also: Power Out Good signal)
- ♦ AC Power Good Signal
- ♦ Clock synchronization
- ♦ Output current monitor / active current sharing
- ♦ Input current limit along with auto-recovery short circuit protection
- ♦ Auto-recovery input under / over-voltage protection
- ♦ Auto-recovery output over-voltage protection
- ♦ Auto-recovery thermal shutdown

Model Number	Input Voltage	Output Voltage	Max Output Power
PFCU390HPx07SRS	85-264Vrms	390Vdc	Up to 700W
PFCU390QPx04SRS	85-264Vrms	390Vdc	Up to 350W

PFCQOR POWER FACTOR CORRECTION

Family	Vin Range	Vout	Package Size	Perf. Level	Thermal Design	Output Power	Input Phases	Pin Style	Feature Set
PFC	U: 85-264Vrms	390: 390V	H: Half-brick Q: Quarter-brick	P: Peta	C: Encased D: Encased, Non-threaded Baseplate V: Encased, Flanged Baseplate	07:700W 04:350W	S: Single-Phase	R: 0.180"	S: Supports Parallel Capability (Half-brick only) S: Standard

Part Numbering Example: PFCU390HPC07SRS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

* The label shows a narrower input voltage range to be consistent with labeling requirements of IEC60950-1, Section 1.7

See "Encased Package Configurations" on page MECH-82 for package outlines.





AC Line Filter Modules

SynQor provides AC Line filters for the Industrial PFC modules and DC-DC converters. SynQor's high-performance filters are designed to comply with industry EMI standards.

Operational Features

- ◆ Universal Input voltage range
- ◆ 1kW@115V or 2kW@230V
- ◆ All ceramic capacitor design
- ◆ Internally damped
- ◆ Wide temperature range operation
- ◆ Low power dissipation
- ◆ Complies with industry EMI standards when used with SynQor PFC and DC-DC converter modules
- ◆ High voltage isolation between baseplate and input/output

Model Number	AC Line Frequency	AC Line Voltage	Output Current	P_{OUT}^{MAX} (115V / 230V)	Dissipation P_{OUT}^{MAX} (115V / 230V)	Isolation Voltage (to baseplate)
HALF BRICK						
ACLF060HTx230	50/60Hz	85-264VRMS	9ARMS	1kW/2kW	15.8W	2150Vpk

INQOR AC LINE FILTER

Family	Input Frequency	Package Size	Performance Level	Thermal Design	Input Voltage	Pin Style	Feature Set
ACLF	060: 50/60 Hz	H: Half-brick	T: Tera	C: Encased D: Encased, Non-threaded Baseplate V: Encased, Flanged Baseplate	230: 85-264 VRMS	R: 0.180"	S: Standard

Part Numbering Example: ACLF060HTC230RS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

RAIL TRANSPORTATION ISOLATED DC-DC CONVERTERS



Isolated DC-DC Converters for the Rail Transportation Industry

The RailQor® converter series is composed of next-generation, board-mountable, isolated, fixed switching frequency DC-DC converters that use synchronous rectification to achieve extremely high power conversion efficiency, even at low output power levels. The Quarter-brick 25W-50W Mega Series has power dissipation so low that no heatsink is necessary to operate at 85°C in an enclosed environment without airflow. Each module is supplied completely encased to provide protection from the harsh environments seen in many industrial and transportation applications.

General Specifications

- ♦ Operating Temperature -40°C to +100°C
- ♦ Output Voltage Set Point ±1.0%
- ♦ Output Voltage Ripple <1% of Vout (typ.) pk-pk
- ♦ Switching Frequency 240 - 350kHz
- ♦ Output Voltage Trim Range +10% to -20%
+10% to -50% (HZ only)
- ♦ Isolation Voltage Up to 3000Vdc
- ♦ EN50155 Compliance
- ♦ RIA 12 Compliance with external circuit
- ♦ Industry standard pin-out configurations and standard footprints

Operational Features

- ♦ High efficiency at full load up to 93%
- ♦ Quarter-brick 25-50W Mega Series has no derating in environments with zero airflow and ambient temperatures up to 85°C with no heatsink.
- ♦ Input voltage ranges: 9-36V, 18-45V, 42V-110V, 12-155V & 66V-160V
- ♦ Input voltage ranges meet the requirements of EN 50155
- ♦ Full power operation at baseplate temperature range from -40°C to 100°C.
- ♦ Output power up to 500W
- ♦ Fixed frequency switching, low output noise
- ♦ No minimum load requirement
- ♦ Encased module to provide protection from harsh environments and available with optional flanged style baseplate.
- ♦ Digital Output Current Sharing (HZ only)

Protection/Control Features

- ♦ Input under-voltage lockout
- ♦ Output current limit and short circuit protection
- ♦ Active back bias limit prevents damage to converter
- ♦ Output over-voltage protection
- ♦ Thermal shutdown



See "Encased Package Configurations" on page MECH-82 for package



RAIL TRANSPORTATION ISOLATED DC-DC CONVERTERS

RAILQOR INPUT/OUTPUT RATINGS

Family	Output Voltage	3.3V	5V	12V	15V	24V	48V	Package Size / Power Level
2:1 Input Ratio		110V (66V - 160V) Continuous Input Range, 200V Transient						
RQ1B	Max. Iout / Power Out	15A 50W	10A 50W	4.1A 50W	3.3A 50W	2A 48W		QUARTER-BRICK MEGA
			25A 125W	12A 144W	10A 150W	6A 144W	3A 150W	QUARTER-BRICK TERA
			48A 240W	21A 252W	17A 255W	10A 240W	5.3A 255W	HALF-BRICK PETA
2:1 Input Ratio		72V (42V - 110V) Continuous Input Range, (150V Transient, QT & HP only)						
RQ72	Max. Iout / Power Out		10A 50W	4.1A 50W	3.3A 50W	2A 48W		QUARTER-BRICK MEGA
			25A 125W	12A 144W	10A 150W	6A 144W	3A 150W	QUARTER-BRICK TERA
			46A 230W	21A 252W	17A 255W	10A 240W	5.3A 255W	HALF-BRICK PETA
4:1 Input Ratio		18V (9V - 36V) Continuous Input Range, 40V Transient						
RQ18	Max. Iout / Power Out		10A 50W	4.1A 50W	3.3A 50W	2A 48W		QUARTER-BRICK MEGA
			20A 100W	8.0A 96W	7.0A 100W	4A 98W	2A 100W	QUARTER-BRICK TERA
			36A 180W	15A 180W	12A 180W	7.5A 180W	3.7A 178W	HALF-BRICK PETA
12:1 Input Ratio		68V (12V - 155V) Continuous Input Range, 170V Transient						
RQ68	Max. Iout / Power Out		5.3A 26.5W	2.2A 27.6W	1.8A 27W	1.1A 26.4W		QUARTER-BRICK MEGA
			10.6A 53W	4.4A 53W	3.5A 52.5W	2.2A 53W		HALF-BRICK GIGA

Family	Output Voltage	40V	Package Size / Power Level	
2:1 Input Ratio		24V (18V - 45V) Continuous Input Range, 50V Transient		
RQ24	Max. Iout / Power Out	12.5A / 500W	HALF-BRICK ZETA	

RAILQOR PART NUMBERING GUIDE

Family	Cont. Vin	Output Voltage	Package Size	Series	Thermal Design	Max. Iout	Enable Logic	Pin Length	Features
RQ	18: 9 - 36V 24:18 - 45V 68:12 -155V 72:42 -110V 1B:66 -160V	033: 3.3V 050: 5V 120: 12V 150: 15V 240: 24V 480: 48V	Q:Quarter-brick H:Half-brick	G: Giga M: Mega P: Peta T: Tera Z: Zeta	C: Encased D: Encased, Non-threaded Baseplate V: Encased, Flanged Baseplate	48:48A 46:46A 36:36A 25:25A 21:21A 15:15A 12:12A 10:10A 08: 8A 07: 7A 06: 6A 05: 5A 04: 4A 02: 2A 01: 1A	N: Negative	R: 0.180"	S: Standard F: Full Feature (HZ only)

outlines. Part Numbering Example: RQ24400HZC13NRF-G For valid part numbers, refer to the website or contact your local sales representative or distributor.



RAIL TRANSPORTATION ISOLATED DC-DC CONVERTERS

APPLICATIONS



VIDEO SURVEILLANCE SYSTEMS



CABIN ELECTRICAL EQUIPMENT



DOOR CONTROL

ENTERTAINMENT SYSTEMS

LED INFORMATION DISPLAYS

WIRELESS & RADIO COMMUNICATIONS



INTERNAL & EXTERNAL LIGHTING

ACCESS & TICKETING MACHINES



BRAKING CONTROL



MOTOR DRIVE CONTROLLERS

EMBEDDED COMPUTER SYSTEMS

RAIL TRANSPORTATION ISOLATED DC-DC CONVERTERS

Technical Support

SynQor understands the need for rapid development of new projects in the transportation industry and provides excellent support for new designs incorporating the RailQor product lines. Concerns regarding EN 50155 compliance, transient and surge suppression to meet RIA 12, design for optimal thermal performance and other techniques are described in our RailQor datasheets and in technical papers available at www.synqor.com/support-technical-documents.html.

APPLICATION NOTES

- **"RailQor EN 50155 / RIA-12 Compliance & Evaluation Board Application Note"** – Addresses the input voltage requirements of the European Railway Standards EN50155 and RIA-12 and how to meet them using SynQor's RailQor DC-DC converters. The RailQor converters are designed to meet or exceed EN50155 input static and transient DC voltage requirements. Since some equipment is being designed to also comply with RIA-12 surges and transients, those requirements are discussed as well, along with the supplemental circuitry needed to meet those requirements.
- **"EMI Characteristics"**
 - On overview of EMI with suggestions for external filtering solutions and suggested layout and grounding practices.
- **"Input System Instability"**
 - Describes the phenomena of input instability in DC-DC converters and the preferred solution for correcting it.

DATASHEET APPLICATION INFORMATION

- How to lay out a board for optimal thermal performance with RailQor product
- Circuits for driving the enable pin
- How to trim the converter to compensate for resistive drops between supply and load

RAILQOR QUALIFICATION TESTING

Testing Type	Units	Test Conditions
Vibration	5	EN 61373:1999 Category I, Class B, Body mounted
Life Test	30	95% rated Vin and load, units at derating point, 1000 hours
Cold	5	EN 60068-2-1:2007
Dry Heat	5	EN 60068-2-2:2007
Mechanical Shock	5	EN 61373:1999 Category I, Class B, Body mounted
Temperature Cycling	5	-40°C to 100°C, unit temp. ramp 15°C/min., 500 cycles
Power/Thermal Cycling	5	Toperating = min to max, Vin = min to max, full load, 100 cycles
Design Marginality	5	Tmin-10°C to Tmax+10°C, 5°C steps, Vin = min to max, 0-105% load
Damp Heat, Cyclic	5	EN 60068-2-30:2005
Solderability	15	Pins MIL-STD-883, method 2003

Note: Governing Standard BS EN 50155:2007 Railway applications - Electronic equipment used on rolling stock

EN50155 REQUIREMENTS AND RAILQOR FEATURES

EN50155 Requirements		
Nominal	Continuous Input	Transient Input
24V	17V – 30V	14V – 34V
72V	50V – 90V	43V – 101V
110V	77V – 137V	66V – 160V
24V – 110V	17V – 137V	14V – 160V

RailQor Capabilities		
Family	Continuous Input	Transient Input
RQ18	9V – 36V	9V – 40V(100ms)
RQ72	42V – 110V	42V – 110V
RQ1B	66V – 160V	66V – 200V(100ms)
RQ68	12V – 155V	12V – 170V(100ms)





24V and 48V Input, Single and Dual Output Isolated DC-DC Converters for Telecom/Network Applications

Single and dual output converters are composed of next-generation, board-mountable, isolated, fixed switching frequency DC-DC converters that use synchronous rectification to achieve extremely high power conversion efficiency. The power dissipated by the converter is so low that a heatsink is not required, which saves cost, weight, height, and application effort. All of the power and control components are mounted to the multi-layer PCB substrate.

Operational Features

- ◆ Ultra-high efficiency up to 97%
- ◆ Wide input voltage ranges:
 - 18-36V (PQ24)
 - 18-60V (PQ30)
 - 18-75V (PQ40)
 - 35-75V (PQ48, PQ60, DQ6)
 - 44-52V (PQ50)
 - 38-55V (PQ55)
 - 40-75V (PQ65)
- ◆ Withstand up to 100V, 100ms input voltage transient (PQ60, PQ40 models only)
- ◆ Fixed frequency switching, low output noise
- ◆ No minimum load requirement (except PQ60525HTA04)
- ◆ Full Feature optional on some models

Protection/Control Features

- ◆ Input under-voltage lockout (UVLO)
- ◆ Output current limit (OCP) and short circuit protection
- ◆ Output over-voltage protection (OVP)
- ◆ Thermal shutdown (OTP)
- ◆ Back-drive protection (starts into pre-biased load)
- ◆ On/Off control referenced to input side (Fully isolated for Full Bricks)
- ◆ Remote sense
- ◆ Output voltage trim (industry std. trim equations)
- ◆ Digital Output Current Sharing (HZ only)

General Specifications

- ◆ Operating Temperature -40°C to +100°C
- ◆ Output Voltage Set Point ±1.0% to 1.5%
- ◆ Output Voltage Trim Range +10% to -20%
 - Sixteenth Brick +10% to -10%
 - Half Brick Zeta +10% to -50%
- ◆ Output Voltage Ripple <1% of Vout (typ.) pk-pk
- ◆ Input Ref. Ripple Current <1% of lin (typ.) rms
- ◆ Switching Frequency 200 - 300kHz
- ◆ Isolation Voltage Up to 2250Vdc
- ◆ Industry standard pin-out configurations and standard footprints



TELECOM / DATACOM ISOLATED DC-DC CONVERTERS

18V	PQ24 Input Range: 18-36V Transient 50V Max. Power: 600W Efficiency: 87%	PQ30 Input Range: 18-60V Transient 80V Max. Power: 100W Efficiency: 89%	PQ40 Input Range: 18-75V Transient 100V Max. Power: 100W Efficiency: 90%	PQ48 Input Range: 35-75V Max. Power: 165W Efficiency: 93%	PQ60 Input Range: 35-75V Transient 100V Max. Power: 728W Efficiency: 96%	PQ65 Input Range: 40-75V Transient 100V Max. Power: 100W Efficiency: 91%	PQ55 Input Range: 38-55V Max. Power: 400W Efficiency: 95%
35V							PQ50 Input Range: 44-52V Max. Power: 660W Efficiency: 94%
50V							
80V							
100V							

POWERQOR ISOLATED DC-DC CONVERTER

Base Part Number							Option Descriptions			
Family	Cont. Input Voltage	Output Voltage		Package Size	Performance Series	Thermal Design	Max. Output Current	Enable Logic	Pin Length	Feature Set
PQ	24: 18-36V 30: 18-60V 40: 18-75V 48: 35-75V 50: 44-52V 55: 38-55V 60: 35-75V 65: 40-75V	010: 1V 012: 1.2V 015: 1.5V 016: 1.65V 018: 1.8 V 020: 2V 025: 2.5V 033: 3.3V 050: 5V 053: 5.3V 060: 6V	080: 8V 090: 9V 120: 12V 150: 15V 180: 18V 240: 24V 260: 26V 280: 28V 480: 48V 500: 50V 525: 52.5V 530: 53V 540: 54V	S: Sixteenth Brick E: Eighth Brick Q: Quarter Brick H: Half Brick F: Full Brick	K: Kilo M: Mega G: Giga T: Tera P: Peta E: Exa Z: Zeta	A: Open frame B: Baseplate C: Encased D: Encased Non-threaded Baseplate L: Low profile M: Low Profile Baseplate	25: 25A 30: 30A 40: 40A 60: 60A 80: 80A A0: 100A (not all models are shown)	P: Pos. N: Neg.	K: 0.110" N: 0.145" R: 0.180" Y: 0.250"	S: Standard F: Full Feature

Part Numbering Example: PQ60120QZB33NNS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

DUALQOR ISOLATED DC-DC CONVERTER

Family	Input Voltage	1st Output Voltage	2nd Output Voltage	Package Size	Series	Thermal Design	Max Power Output	Enable Logic	Pin Length	Feature Set
DQ	6: 35-75V (100V Trans.)	33: 3.3V	25: 2.5V 33: 3.3V	Q: Quarter Brick	K: Kilo M: Mega G: Giga	A: Open frame B: Baseplate	04: 40W 06: 60W	P: Pos. N: Neg.	K: 0.110" N: 0.145" R: 0.180" Y: 0.250"	S: Standard

Part Numbering Example: DQ65033QMA06NNS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

See "Open Frame Package Configurations" on page MECH-81 for package outlines.



TELECOM / DATACOM ISOLATED DC-DC CONVERTERS

PQ24	Vout	1.8V	3.3V	5V	12V	15V	28V	50V
24Vdc Input (18-36Vdc Input Range, 50Vdc Transient on Full Brick)								
Full Brick	FTx						21.5A 600W	
Quarter Brick	QEx			40A 200W	25A 300W	20A 300W	10.7A 308W	6A 300W
	QGL		25A 83W					
	QGA	25A 45W	25A 83W	20A 100W	8.33A 100W	6.67A 100W		



PQ30	Vout	3.3V
24 and 48Vdc Input (18-60Vdc Input Range, 80Vdc Transient)		
Quarter Brick	QGA	30A 100W
Eighth Brick	QGA	25A 83W
	EGA	20A 66W

PQ55	Vout	7V	53V	54V
48Vdc Input (38-55Vdc Input Range)				
Half Brick	HZB	52A 364W		
	HEB		7.6A 400W	
	HTL			5.1A 275W

PQ40	Vout	3.3V	5V	8V	12V	15V
24 and 48Vdc Input (18-75Vdc Input Range, 100Vdc Transient)						
Quarter Brick	QGA	25A 83W	20A 100W	9A 72W	8.33A 100W	6.67A 100W

PQ65	Vout	18V
48Vdc Input (40-75Vdc Input Range, 100Vdc Transient)		
Quarter Brick	QGA	5.6A 100W

PQ48	Vout	1.5V	1.8V	2V	2.5V	3.3V	5V	5.3V	6V	12V	15V
48Vdc Input (35-75Vdc Input Range)											
Half Brick	HTA	60A 90W	60A 108W	60A 120W	60A 150W	38A 125W	33A 165W	30A 160W		13.8A 165.6W	11A 165W
	HGA	40A 60W	40A 72W	40A 80W	40A 100W	40A 132W	30A 150W			12A 144W	10A 150W
	HMA	30A 45W	30A 54W	30A 60W	30A 75W	30A 99W	25A 125W				
	HKA	20A 30W	20A 36W	20A 40W	20A 50W	20A 66W	20A 100W				
Quarter Brick	QGA	25A 37.5W	25A 45W	25A 50W	25A 62.5W	25A 82.5W	20A 100W		17A 102W	8.3A 99.6W	6.7A 100W



PQ50	Vout	5V	7.3V	9V	12V	18V
48Vdc Input (44-52Vdc Input Range)						
Half Brick	HZA		60A 438W		55A 660W	
	HPA	50A 250W				
	HTA				10A 180W	
Quarter Brick	QGB			11A 99W		

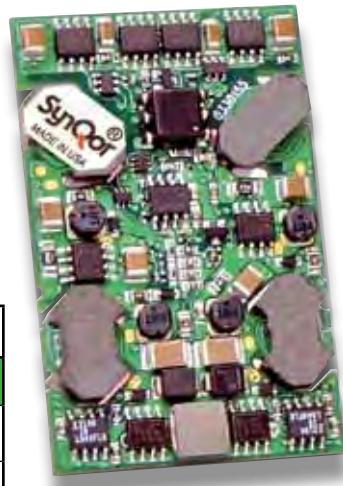


TELECOM / DATACOM ISOLATED DC-DC CONVERTERS

PQ60	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	12V	15V	18V	24V 26V	28V	40V	50V 52.5V
48Vdc Input (35-75Vdc Input Range, 100Vdc Transient)														
Full Brick	FTA												26A 728W	
Half Brick	HZA						60A 300W	50A 600W	40A 600W		25A 600W	21.5A 602W	15A 600W	12A 600W
	HEA											12.8A 360W		
	HPA	100A 120W	100A 150W	100A 180W	80A 200W	70A 230W	45A 225W	20A 240W						
	HTA	60A 72W	60A 90W			50A 165W	33A 165W	14A 168W		9.2A 166W	9.6A 250W			3.85A 200W
	HGA					40A 132W	30A 150W							
	HMA					30A 99W								
PQ60	Vout	1V	1.2V	1.5V	1.65V	1.8V	2.5V	3.3V	5V	6V	12V	15V	24V	48V
48Vdc Input (35-75Vdc Input Range, 100Vdc Transient)														
Quarter Brick	QZB										33A 400W			
	QEA										25A 300W			
	QEA										17A 204W			
	QPA	60A 60W	60A 72W	60A 90W		60A 108W	60A 150W	45A 150W						
	QTA	40A 40W	40A 48W	40A 60W	40A 66W	40A 72W	40A 100W	35A 115W	30A 150W		12A 144W			3.0A 144W
	QGA			25A 37.5W		25A 45W	25A 62.5W	25A 82.5W	20A 100W	17A 100W	8.3A 100W		5.0A 120W	
	QML			15A 22.5W		15A 27W	15A 37.5W	15A 50W	15A 75W					
Eighth Brick	ETx			45A 37.5W		45A 81W	35A 87.5W	30A 99W						
	EGx	25A 25W	25A 30W	25A 37.5W		25A 45W	25A 62.5W	20A 66W	15A 75W		7.0A 84W	5.0A 75W	3.0A 72W	
	EGx	20A 20W	20A 24W	20A 30W		20A 36W	20A 50W							
	EMx	15A 15W	15A 18W	15A 22.5W		15A 27W	15A 37.5W	15A 50W	10A 50W		4.0A 48W			
	EKx		30A 36W	25A 37.5W		25A 45W	20A 50W	15A 50W	10A 50W		4.0A 48W	3.3A 50W		
Sixteenth Brick	SMx		25A 30W	25A 37.5W		25A 45W	20A 50W	15A 50W	10A 50W		4.0A 48W	3.0A 45W		

DualQor®

Dual Output Isolated Converters



DQ6	Vout	2.4/1.2V	3.3/1.2V	3.3/1.5V	3.3/1.8V	3.3/2.5V	5.0/3.3V	+12/-12V
48Vdc Input (35-75Vdc Input Range, 100Vdc Transient)								
Quarter Brick	QGL		15/15A 68W	15/15A 72W	15/15A 77W	15/15A 87W	10/15A 100W	
	QMA				12/22A 44W	12/16A 40W	12/18A 60W	5/5A 60W
	QKA	8/16A 20W					8/12A 40W	





Open-Frame, High Efficiency Next Generation DC-DC Bus Converters

The BusQor® bus converters are the next-generation, board-mountable, isolated, fixed switching frequency DC-DC converters that uses synchronous rectification to achieve extremely high conversion efficiency. The power dissipated by the converter is so low that a heatsink is not required, which saves cost, weight, height, and application effort. BusQor converters are ideal for creating the mid-bus voltage required to drive point-of-load (non-isolated) converters in Intermediate Bus Architecture.

Operational Features

- ♦ Ultra-high efficiency up to 97%
- ♦ Wide input voltage ranges:
 - 42V - 53V (BQ50)
 - 35V - 55V (BQ55)
 - 40V - 65V (BQ57)
 - 35V - 75V (BQ60, PQ60)
 - 36V - 75V (SQ60)
 - 330V - 365V (BQ352)
 - 230V - 400V (BQ4H)
- ♦ Delivers 6.0V, 9.6V, 12V, 13.6V or 48V bus for Intermediate Bus Architectures (IBA)
- ♦ Operating Temperature -40°C to +100°C
- ♦ Enclosed Operating Temp. -55°C to +100°C
- ♦ Output Voltage Ripple <0.3% of Vout (typ.) pk-pk
- ♦ Input Ref. Ripple Current <5% of Iin (typ.) rms
- ♦ Current Share Accuracy ±10%
- ♦ Isolation Voltage Up to 4250Vdc
- ♦ Industry standard pin-out configurations and standard footprints

Protection/Control Features

- ♦ Input under-voltage lockout (UVLO)
- ♦ Output current limit (OCP) and short circuit protection
- ♦ Output over-voltage protection (OVP)
- ♦ Thermal shutdown (OTP)
- ♦ Back-drive protection (starts into pre-biased load)
- ♦ On/Off control referenced to input side
- ♦ Remote sense
- ♦ Output voltage trim on select models



Base Part Number

Family	Cont. Input Voltage	Output Voltage	Package Size	Performance Series	Thermal Design	Max. Output Current	Enable Logic	Pin Length	Feature Set
BQ SQ	50: 42-53V 55: 35-55V 57: 40-65V 60: 35-75V 352: 330-365V 4H: 230-400V	060: 6.0V 090: 9.6V 105: 10.5V 120: 12.0V 136: 13.6V 480: 48.0V 11: 11V	E: Eighth Brick Q: Quarter Brick H: Half Brick F: Full Brick	T: Tera P: Peta E: Exa Z: Zeta	A: Open frame B: Baseplate C: Encased D: Encased, Non-threaded Baseplate L: Low profile M: Low Profile, Baseplate V: Encased, Flanged Baseplate	17: 17A 20: 20A 25: 25A 30: 30A 40: 40A 60: 60A 84: 84A (not all models are shown)	P: Pos. N: Neg.	K: 0.110" N: 0.145" R: 0.180" Y: 0.250"	S: Standard

Part Numbering Example: BQ4H480FTC64NNS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.



TELECOM / DATACOM ISOLATED BUS CONVERTERS

Input Voltage Range

35V	
42V	BQ50 Input Range: 42-53V Max. Power: 331W Efficiency: 96%
55V	
100V	
230	
400V	BQ352 Input Range: 330-365V Transient: 450V Max. Power: 600W Efficiency: 95%

UN-REGULATED

SEMI-REGULATED

FULLY-REGULATED

BQ55
Input Range: 35-55V
Max. Power: 800W
Efficiency: 97%

BQ57
Input Range: 40-65V
Max. Power: 1050W
Efficiency: 97%

SQ60
Input Range: 36-75V
Transient: 100V
Max. Power: 600W
Efficiency: 95%

BQ60 & PQ60
Input Range: 35-75V
Transient: 100V
Max. Power: 600W
Efficiency: 95%



BQ55			
	Vout	9.6V	12V
48Vdc Input (35-55Vdc Input Range)			
Quarter Brick	QZB	84A 537-873W	67A 552-885W
	QEx	60A 390-624W	50A 412-662W
	QPA	43A 280-451W	
	QTA	240W** 22-36A	
Eighth Brick	EZB	48A 312-500W	38A 313-503W
	ETx	27A 189-297W	20A 175-275W
	ETL		16A 140-220W

** BQ55090QTA27 is power limited
@ 240W over Input Voltage Range 36-55Vdc

SQ60			
	Vout	6V	12V
48Vdc Input (36-75Vdc Input Range, Transient 100Vdc)			
Quarter Brick	Half Brick	Hx	50A 600W
	QZB		40A 480W
	QPB		33A 396W
	QPx	55A 330W	28A 336W
Eighth Brick	QEx		25A 300W
	EPB		25A 300W
	ETA		20A 240W
	ETA		17A 204W

BO60/ PQ60		
	Vout	12V
48Vdc Input (35-75Vdc Input Range, Transient 100Vdc)		
Quarter Brick	Half Brick	50A 600W
	HEx	30A 360W
	QZB	33A 400W
	QEx	25A 300W
Eighth Brick	QEx	17A 204W
	BO50	Vout 12V
		48Vdc Input (42-53Vdc Input Range)
Quarter Brick	QTA	20A 210-265W
	QTA	25A 263-331W

BQ57			
	Vout	9V	10.5V
48Vdc Input (40-65Vdc Input Range)			
Quarter Brick	QZB	84A 621-1044W	
	QEx		60A 450-750W
Eighth Brick	EZB	48A 360-600W	
			38A 361-598W

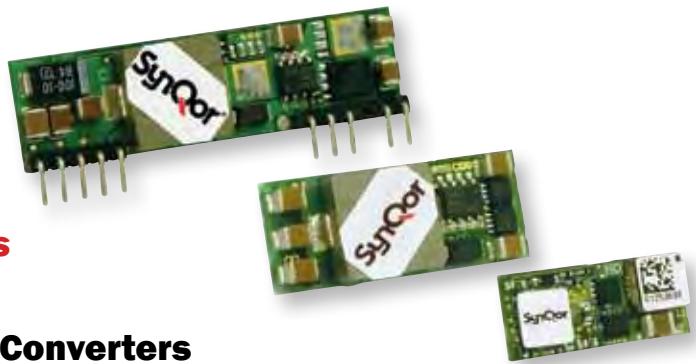
BQ352		
	Vout	11V
352Vdc Input (330-365Vdc Input Range, Transient 450Vdc)		
Extended Eighth Brick	EEC	60A 600W

BQ4H		
	Vout	13.6V
385Vdc Input (230-400Vdc Input Range, Transient 155-450Vdc)		
Half Brick	HTC	80A 1048W
	EEC	45A 589.5W
Full Brick	FTC	
		64A 3040W





Non-isolated Converters



Non-Isolated, Ultra-High Efficiency DC-DC Converters for Telecom, Industrial and Medical Applications

The NiQor® DC-DC converter is a non-isolated buck regulator, which employs synchronous rectification to achieve extremely high conversion efficiency. The NiQor family of converters are used predominately in DPA systems using a front end DC-DC high power brick (48Vin to low voltage bus). The non-isolated NiQor converters are then used at the point of load to create the low voltage outputs required by the design. The wide trim module can be programmed to a variety of output voltages through the use of a single external resistor.

General Specifications

- ◆ Operating Temperature -40°C to +105°C
- ◆ Output Voltage Set Point ±0.7 - 2.0%
- ◆ Output Voltage Ripple <1.5% of Vout (typ.) pk-pk
- ◆ Input Ref. Ripple Current <5% of Iin (typ.) rms
- ◆ Switching Frequency 300 - 390kHz
- ◆ Industry standard pin-out configurations and standard footprints

Operational Features

- ◆ Ultra-high efficiency up to 96%
- ◆ Wide input voltage ranges:
 - 2.4-6.0Vin (NQ04W33 SMT) 0.75-3.6Vout @10A/16A
 - 3.0-6.0Vin (NQ04W33 SIP) 0.75-3.6Vout @10A/16A
 - 3.0-5.5Vin (NQ04T33 SIP) 0.9-3.3Vout @10A/16A
 - 6.0-15Vin (NQ15W50 SMT) 0.8-5.0Vout @30A
 - 6.0-16Vin (NQ16W50 SIP) 0.75-5.0Vout @10A/16A
 - 6.0-16Vin (NQ16W50 SMT) 0.75-5.0Vout @10A/16A
- ◆ Wide Trimmable Output Voltage Ranges:
 - 0.75-5.0V (W50)
 - 0.75-3.6V (W33)
 - 0.9-3.3V (T33)
- ◆ Output Voltage Trim Range: 0.7 - 5.5V
- ◆ Suitable for use in Intermediate Bus Architectures
- ◆ On-board input and output filtering
- ◆ No minimum load requirement
- ◆ Optional features include remote sense, wide output voltage trim, and output current sharing
- ◆ Follows DOSA standard pinout and footprint

Protection/Control Features

- ◆ Input under-voltage lockout (UVLO)
- ◆ Output current limit (OCP) and short circuit protection
- ◆ Output over-voltage protection (OVP)
- ◆ Thermal shutdown (OTP)
- ◆ On/Off control referenced to input side
- ◆ Output voltage trim (industry std. trim equations)



Input Voltage Range(s)

NQ04
Input Range: 2.4-6V
Max. Power: 58W
Efficiency: 95%

6V

NQ15
Input Range: 6-15V
Max. Power: 150W
Efficiency: 95%

16V

NQ16
Input Range: 6-16V
Max. Power: 80W
Efficiency: 95%



NiQor® LISTED BY PACKAGE & OUTPUT VOLTAGE

NQ04	Package	0.75-3.6V	0.9-3.3V
3.3, 5.0Vdc Input			
2.4-6.0Vin	SMT	10A 36W	
		16A 58W	
3.0-5.5Vin	SIP		10A 36W
			16A 58W
3.0-6.0Vin	SIP	10A 36W	
		16A 58W	

NQ15, NQ16	Package	0.75-5.0V	0.8-5.0V
12Vdc Input			
6.0-15Vin	SMT		30A 150W
	SIP	10A 50W	
6.0-16Vin	SIP	16A 80W	
	SMT	10A 50W	
		16A 80W	

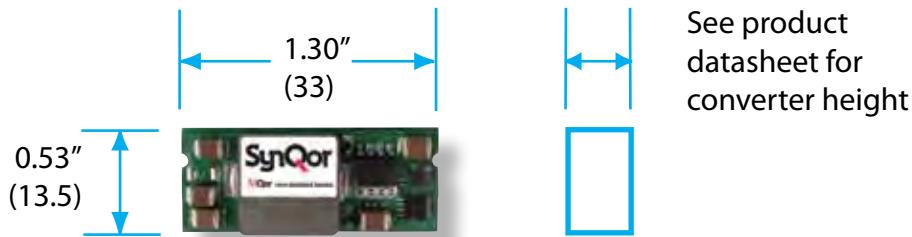
NIQOR NON-ISOLATED DC-DC CONVERTER

Family	Input Voltage	Output Voltage	Package Type	Series	Thermal Design	Maximum Current	Options Description		
							Enable Logic	Pin Style	Feature Set
NQ	04: 2.4-6V 15: 6-15V 16: 6-16V	W50: 0.75-5V W33: 0.75-3.6V T33: 0.9-3.3V	V: Vert. SIP H: Horiz. SIP S: Surface-Mount	K: Kilo M: Mega G: Giga	A: Open frame	07: 7A 10: 10A 15: 15A 16: 16A 30: 30A	P: Pos./Open O: Neg./Open N: Negative	R: 0.160" V: 0.160" S: SMT Std.	N: None S: Sense D: Sense & Share G: Sense, Share & Gnd Pins

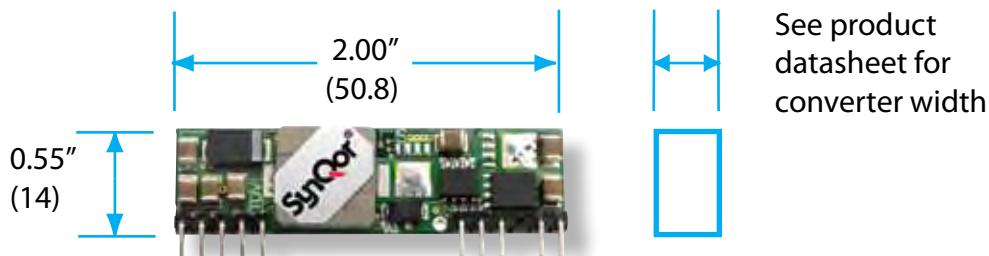
Part Numbering Example: NQ15W50SGA30NNS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

NiQor products are available in SIP and SMT packages. SIPS package options include vertical and horizontal mounting pins. See website for data sheets with more details.

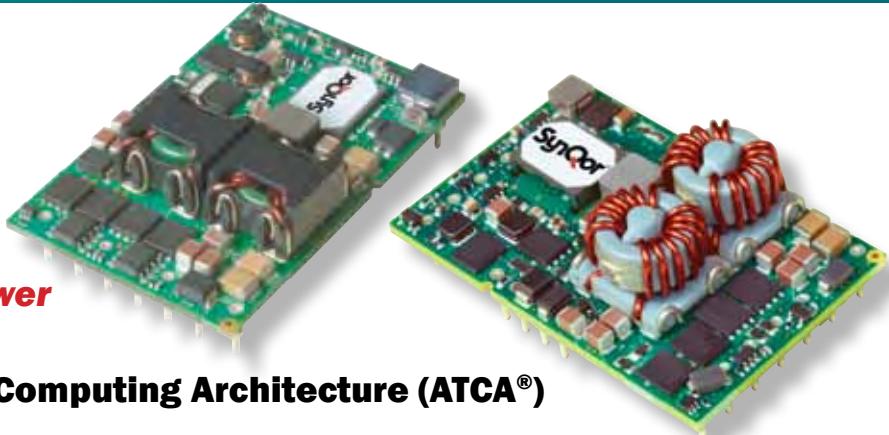
NQ SURFACE MOUNT CONVERTER



NQ SIPS CONVERTER



TELECOM / DATACOM ATCA POWER INTERFACE MODULES



Advanced Telecommunications Computing Architecture (ATCA®)

Power Interface Module

The iQor Power Interface Modules integrate all features required by the Advanced TCA Base Specification for a frame board power entry into a Quarter-Brick footprint. Minimal external components are required for all the key functions. The product family provides efficient utilization of hold-up capacitance. A full-feature module with I²C interface is also available.

Operational Features

- ◆ 100V/1ms transient protection
- ◆ Auxiliary supply voltages:
 - 3.3V, 3.6A
 - 5.0V, 150mA
- ◆ Standard Quarter Brick package size: 1.45" x 2.3"
- ◆ Trimmable 50-95V hold-up capacitance voltage
- ◆ Optional I²C interface for feedback on:
 - A & B Feed Voltage
 - Hold-up Voltage
 - 48Vout Voltage & Current
 - Temperature
 - Fuse and MOSFET failure
- ◆ Random start-up delay
- ◆ Industry standard pin-out configurations and standard footprints

Protection/Control Features

- ◆ Inrush current limiting
- ◆ EMI filtering
- ◆ Output current limit (OCP) and short circuit protection
- ◆ Output over-voltage protection (OVP)
- ◆ Thermal shutdown (OTP)
- ◆ Hold-up capacitor discharge control

Threshold Protocols	Pin Length	Feature Set
S: Standard (ATCA) N: NEDS (Mega only) E: ETSI	K: 0.110" N: 0.145" R: 0.180" Y: 0.250"	S: Standard Feature F: Full Feature

iQOR POWER INTERFACE MODULES

Family	Input Voltage	Auxiliary Output 1	Auxiliary Output 2	Package Size	Performance Series	Thermal Design	Output Current	Threshold Protocols	Pin Length	Feature Set
IQ	6	50	33	Q	T: Tera M: Mega G: Giga	A	10 12 14	S	N	S

Part Numbering Example: IQ6503QMA10SNS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.





Medical Grade DC-DC Converters



Medical Grade DC-DC Converters

Rated for CF Patient Contact and Defibrillation Proof

The CFQor series of Quarter-Brick DC-DC converters are high efficiency converters designed for those medical applications that require isolation and leakage current levels complying with IEC60601-1 for CF patient contact. They are also defibrillation proof.

Product Features	
♦ High Efficiency, up to 93% at full rated load current	
♦ Industry standard quarter-brick pin-out configuration	
♦ Reinforced Insulation	
♦ 4250V, 100MΩ input-to-output	
♦ CF Patient Contact	
♦ Defibrillation Proof	
♦ Industry standard pin-out configurations and standard footprints	

CFQor	Series	Output Voltage			
		5V	12V	15V	24V
12Vdc Nominal Input (9-22V Continuous Input Range; 9-25V transient)					
Quarter Brick	CF12	20A 100W	8A 96W	7A 105W	4A 96W
24Vdc Nominal Input (18-36V Continuous Input Range; 18-50V transient)					
Quarter Brick	CF24	24A 120W	10A 120W	8A 120W	5A 120W
48Vdc Nominal Input (34-75V Continuous Input Range; 34-100V transient)					
Quarter Brick	CF48	25A 125W	12A 144W	10A 150W	6A 144W

CFQOR MEDICAL GRADE ISOLATED DC-DC CONVERTER

Family	Cont. Input Voltage	Output Voltage	Package Size	Series	Thermal Design	Maximum Output Current		Options Description		
								Enable Logic	Pin Length	Features
CF	12: 9-22V 24: 18-36V 48: 34-75V	050: 5V 120: 12V 150: 15V 240: 24V	Q: Quarter Brick	T: Tera	C: Encased, Baseplate V: Encased, Flanged, Baseplate	25: 25A 24: 24A 20: 20A 12: 12A 10: 10A	08: 8A 07: 7A 06: 6A 05: 5A 04: 4A	N: Negative Logic	R: 0.180"	S: Standard

Part Numbering Example: CF24120QTC10NRS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.



MEDICAL GRADE AC-DC POWER SUPPLIES



Medical Grade AC-DC Power Supplies

E-Series



G-Series



Medical Grade Highly Efficient AC-DC Power Supplies with PFC

The ACuQor® product line offers best-in-class solutions for AC-DC power supplies designed to meet an extensive range of medical applications. Packing 500W of useable power into just 3.50" x 5.25" x 1.63", the E-Series is the world's smallest cardiac care, medical grade AC-DC converter for this power level. The G-Series provides 1400W of useable power in a 4.75" x 7.00" x 1.63" package. The medical grade version meets 60601-1 medical safety specifications for cardiac contact without requiring an external isolation transformer.

Product Features

- ♦ High efficiency up to 93% at full rated load current
- ♦ Delivers up to 1400W of output power (1800W transient)
- ♦ Semi-regulated output
- ♦ Universal 85-264V AC Input Voltage (47-63Hz)
- ♦ Single output voltages: 12V, 15V, 24V, 28V, 36V, 48V
- ♦ 5V "Always On" standby power output
- ♦ Active PFC; EN61000-3-2 compliant
- ♦ Low leakage; EN60601-1 compliant
- ♦ Low noise; EN55011 / EN55022 Class B compliant
- ♦ Operating ambient temperature: 0°C - 70°C

Protection/Control Features

- ♦ Over-current, over-voltage and over-temp protection
- ♦ DC Power Good and AC Power Good signals
- ♦ Remote enable input
- ♦ Type B, BF, CF & Defibrillator proof variants available

Family	Output Power	Grade	Range	Output Voltage	Package Size	Thermal Design	Options
AQ	0300: 300W 0400: 400W 0500: 500W 0600: 600W 0800: 800W 0900: 900W 1000: 1000W 1100: 1100W 1200: 1200W 1400: 1400W 1500: 1500W	M: Medical	U: Universal (85-264VRMS)	12: 12V 1T: 12V/12V/5V 15: 15V 24: 24V 2T: 24V/12V/5V 28: 28V 36: 36V 3T: 36V/12V/5V 48: 48V 4T: 48V/12V/5V	E: 1 Unit 3" x 5" G: 1 Unit 4.75" x 7" Multiple E-Series Packages R: 2 Units (flat) S: 2 Units (stacked) T: 3 Units (flat) U: 3 Units (stacked)	A: Open-frame C: Encased	Medical Grade B: B isolation rating BF: BF isolation rating CF: CF isolation rating CFD: CF isolation rating, defibrillator proof

Part Numbering Example: AQ0400MU24ECBF For valid part numbers, refer to the website or contact your local sales representative or distributor.

Output Voltage	Power Rating
G-Series (Single Output) (4.75" x 7.00" x 1.63" Encased Package) 12V, 15V, 24V, 28V, 48V (includes 5V@50mA standby)	800W (1000W Transient) 1100W (1300W Transient) 1400W (1800W Transient)
E-Series (Single Output) (3.00" x 5.00" x 1.45" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@50mA standby)	300W (400W Transient) 400W (500W Transient) 500W (700W Transient)
E-Series (Triple Output) (3.00" x 5.00" x 1.45" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@2A and 12V@4.2A)	300W (400W Transient) 400W (500W Transient) 500W (700W Transient)



E-SERIES PRODUCT FAMILY CONFIGURATIONS

Mix and match a combination of 2 or 3 of any of the E-Series (3" x 5") packages in either flat or stacked packages to achieve higher power and provide multiple outputs.

Double/Triple Stacked

- ◆ Double Package: S, Thermal Design: C
 - Small size: 3.50" x 5.25" x 3.25"
 - 600W/800W @ 12V, 24V, 36V or 48V
- ◆ Triple Package: U, Thermal Design: C
 - Small size: 3.50" x 5.25" x 4.88"
 - 900W/1200W @ 12V, 24V, 36V or 48V



Double/Triple Flat

- ◆ Double Package: R, Thermal Design: C
 - Small size: 6.75" x 5.25" x 1.63"
 - 600W/800W/1000W @ 12V, 24V, 36V or 48V
- ◆ Triple Package: T, Thermal Design: C
 - Small size: 10.00" x 5.25" x 1.63"
 - 900W/1200W/1500W @ 12V, 24V, 36V or 48V



ACCESSORIES

UPS BATTERY PACKS

	1500 S Series (1U)	1500 E Series (2U)	3000 S Series (2U)
Standard Battery Pack (10 lbs.)	BAT-0200-S-1U-000 (200 Watt Hours)	NA	BAT-0200-S-1U-000 Uses 2 (200W Hours Each)
Extended Battery Pack (21 lbs.)	NA	BAT-0500-E-2U-000 (500 Watt Hours)	NA

AC OUTPUT POWER STRIPS (CABLE HAS CIRCULAR CONNECTOR)

Connector	1500 Series	3000 Series
6 NEMA Receptacles (1U Rackmount with 3' Cable)	SYN-9231	
6 NEMA Receptacles with Breaker (1U Rackmount with 3' Cable)	SYN-9232	SYN-9236

UPS/MPC POWER CABLES (10')

AC Input Connector	1500 Series	3000 Series
NEMA 5-15P Plug	SYN-9104	
NEMA 5-20P Plug	SYN-9101	
Hardwire	SYN-9102	SYN-9105
Grounded Hardwire	SYN-9108	
SCHUKO 16A, 250V-3W Euro Plug	SYN-9112	
UK 13A 250V Plug	SYN-9111	
AC Output Connector		
115V _{ms} (NEMA 5-20R Receptacle)	SYN-9131	
Hardwire	SYN-9130	SYN-9135
Grounded Hardwire	SYN-9138	
UK 13A 250V Sockets	SYN-9137	
DC Input Connector		
Ring Connectors	SYN-9151	
Hardwire	SYN-9152	SYN-9155
NATO Connector	SYN-9154	
DC Output Connector		
Fork Connectors	SYN-9171	
Hardwire	SYN-9172	SYN-9173
DC2 Fork #10	SYN-9175	
DC2 Hardwire	SYN-9174	



MPS-4000 CABLES

AC Input Connector	MPS-4000
AC Input (NEMA L18-30P)	SYN-9114
AC Input (Hardwire)	SYN-9113
DC Output Connector	
DC Output Negative (Hardwire)	SYN-9176
DC Output Positive (Hardwire)	SYN-9177



UPS/MPC CONFIGURATION CABLES

HD DB15F to DB15F: Connector	All
2 Units in Parallel, 3'	SYN-9311
2 Units in Series, 3'	SYN-9313
3 Units in Parallel, 6'	SYN-9315
3 Units for 3 Phase, 6'	SYN-9317

MPS-4000 CONFIGURATION CABLE

HD DB15F to M12M: Connector	All
Synchronized Control of Parallel Units, 10'	SYN-9318

USER I/O CABLES

Connector	All
HD DB15 to DB9 (RS232)	SYN-9301
HD DB15 to DB15 (RS232 and Digital I/O)	SYN-9305
MI-Circular to RJ45M (Ethernet)	SYN-9321



RACKMOUNT KITS

	1500 S (1U; 32 lbs.)	1500 E (2U; 50 lbs.)	3000 S (2U; 65 lbs.)	MPS-4000 (1U; 28 lbs.)
Slide Rail Kit ²	SYN-9002	SYN-9002	SYN-9002	
Fixed Bracket ³	SYN-9031	SYN-9033	SYN-9033	SYN-9038

TRANSIT CASES

All Rack Mount Power Supplies	
Transit Case, 3U, Gray, with Casters ³	SYN-9410
Transit Case, 3U, Gray, No Casters ³	SYN-9412

MULTIQOR PLATE CABLES

These cables can be used with MultiQor Plates and Adaptor Boards with multiple output options to accommodate different levels of output current.

MultiQor Plate Cables

Input mating cable with pre-stripped wire ends (36")	MTQ-CBL-INPUT1C
Input mating cable with pre-stripped wire ends (36"), no filter	MTQ-CBL-INPUT2C
AC Input mating cable with pre-stripped wire ends (36")	MTQ-CBL-INPUTAC
Hold-up capacitor mating cable with pre-stripped wire ends (36")	MTQ-CBL-HOLDUPAC
Output signal mating cable with pre-stripped wire ends (36")	MTQ-CBL-OUT1CS
Output mating cable (20A) with pre-stripped wire ends (36")	MTQ-CBL-OUT1CP20
Output mating cable (40A) with pre-stripped wire ends (36")	MTQ-CBL-OUT1CP40
Output mating cable (60A) with pre-stripped wire ends (36")	MTQ-CBL-OUT1CP60



ACUQOR CABLES

The following documents are the mechanical drawings for a series of assemblies that SynQor offers for the customer's convenience.

ACuQor Cables	E-Series	G-Series
Input mating cable with pre-stripped wire ends (36")	AQ-CBL-INPUT1C	AQ-CBL-INPUT1CG
Output mating cable with pre-stripped wire ends (18")	AQ-CBL-OUT1C	AQ-CBL-OUT1CDG
Output mating cable with connectors on both ends (18")	AQ-CBL-OUT2C	
Output mating cable with connectors on both ends & additional 8 pin connector (18")	AQ-CBL-OUT2CD	



INTERFACE ADAPTORS

Our series of thru hole mounting adaptor boards allows for easy wiring to SynQor filters and DC-DC converters. For terminal and component assignments and additional information, please see our application note "Interface Adaptor Boards." The following documents contain mechanical information.

	Converters	Passive Filters	Transient Suppression Filters	AC Line Filters	Power Factor Correctors
Sixteenth Brick Adaptor	SBI-00				
Demi Brick Adaptor	DBI-00	DBI-02			
Quarter Brick Adaptor	QBI-00	QBI-02			
Half Brick Adaptor	HBI-00	HBI-02	HBI-03	HBI-04	HBI-05
Full Brick Adaptor	FBI-00				



Notes:

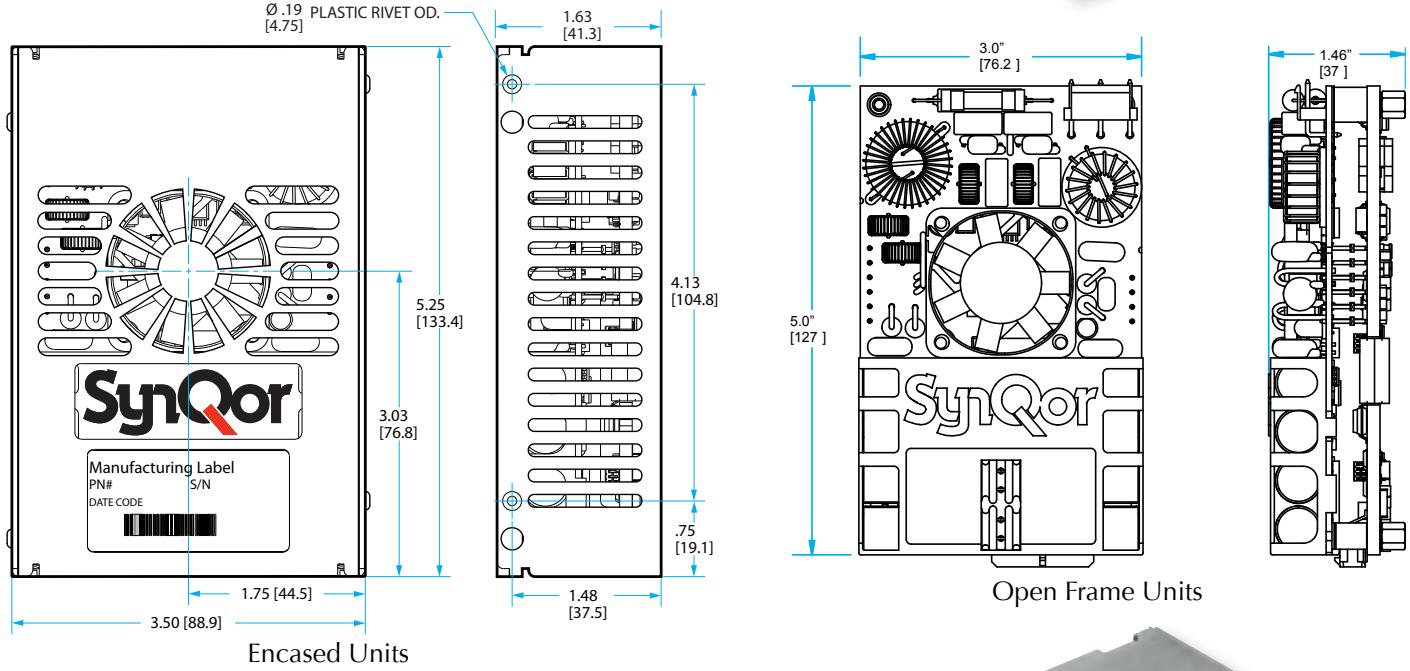
1. Other Accessories are also available -- for further information contact Power@SynQor.com
2. Slide Rail Kit (SYN-9002) is not recommended for transit and ruggedized use.
3. Fixed Bracket Kit (SYN-9031) with Transit Case (SYN-9410 or SYN-9412) is required for transit and ruggedized use (qualified to pass MIL-STD-810G Loose Cargo and Transit Drop requirements).



ACUQOR PACKAGE CONFIGURATIONS

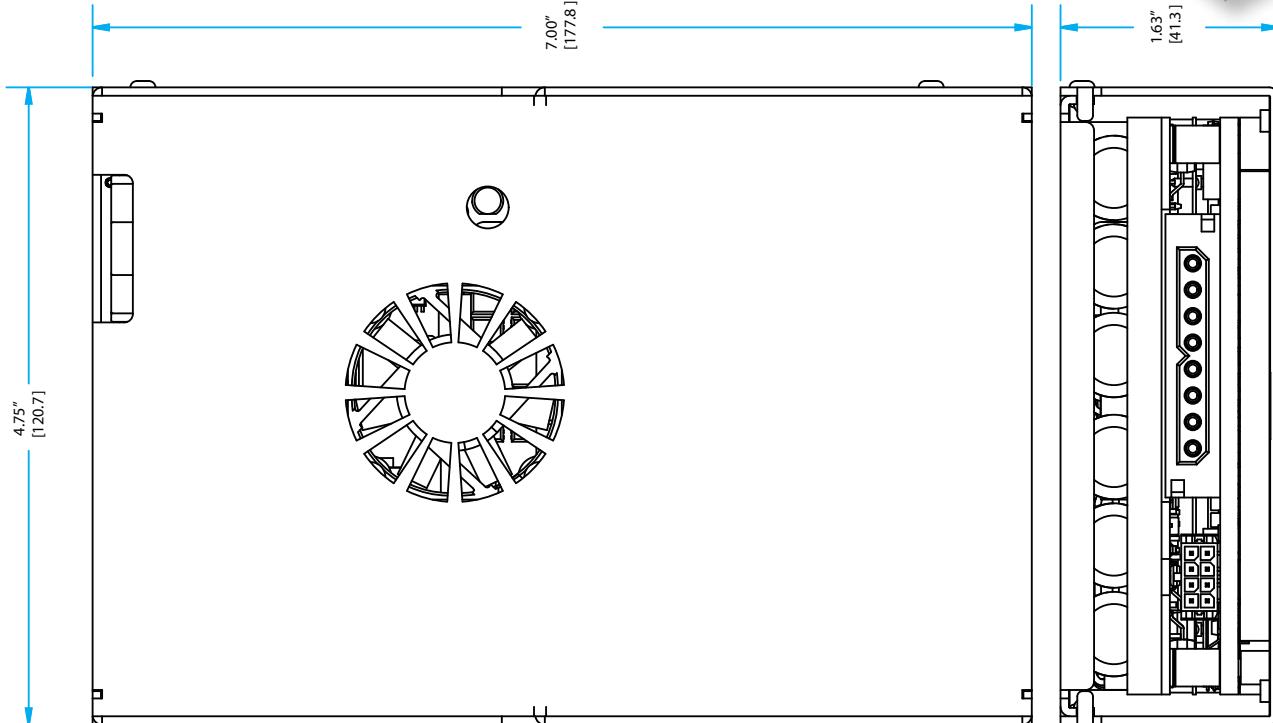
E-SERIES PACKAGES

E-Series ACuQor products are available as encased and open frame units. Accessories, including input and output cables, are also available. See website for data sheets with more details.



G-SERIES PACKAGES

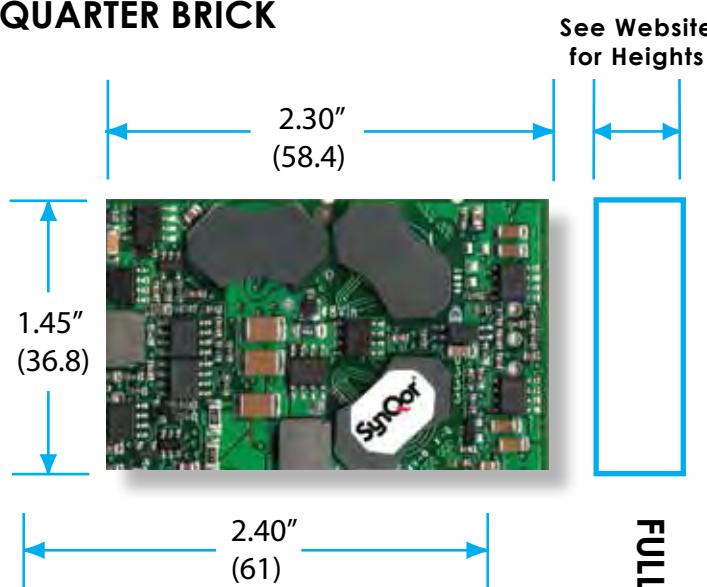
G-Series ACuQor products are only available encased. Accessories, including input and output cables, are also available. See website for data sheets with more details.



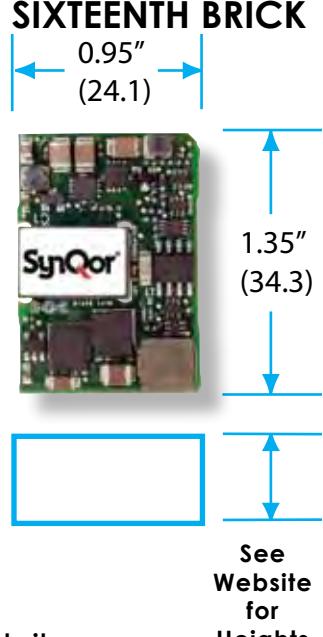
OPEN FRAME PACKAGE CONFIGURATIONS

PowerQor, DualQor and **BusQor** products are available in a variety of industry standard sizes/pinouts depending on power level and features. All units are available in open frame configurations as shown below. Many units are also available with varying configurations of base plates and mounting features. See website for data sheets with more details. All dimensions in inches (mm).

QUARTER BRICK



SIXTEENTH BRICK



See Website for Heights

EIGHTH BRICK



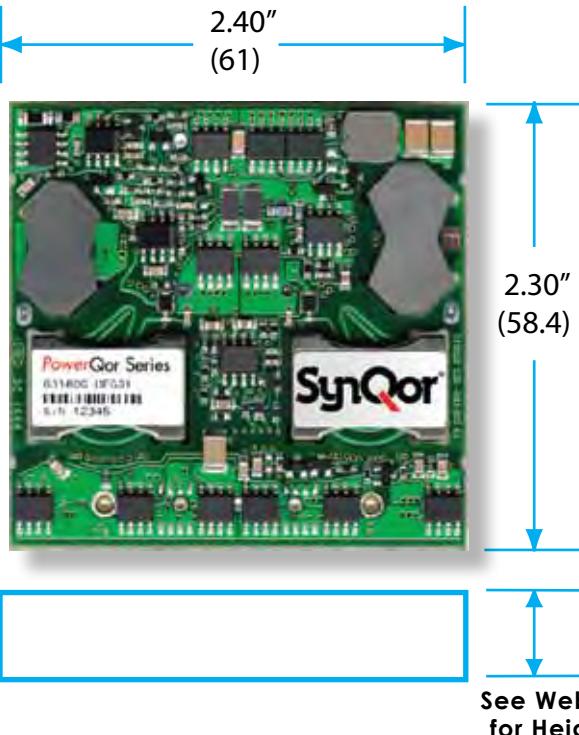
FULL BRICK

See Website for Height

FULL BRICK



HALF BRICK

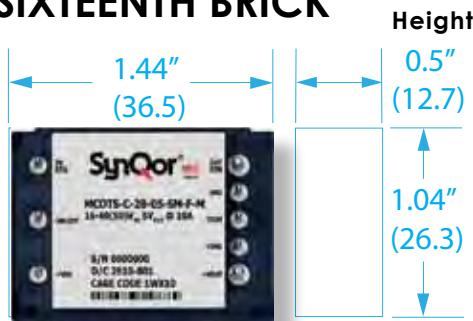


See Website for Heights

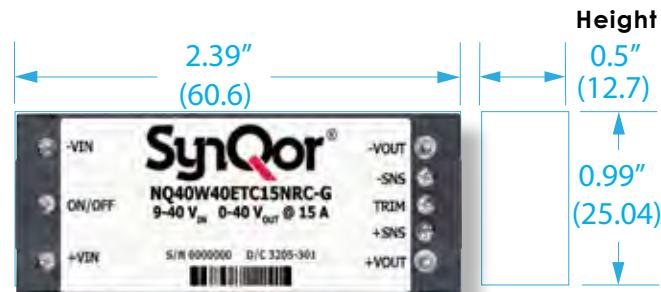
ENCASED PACKAGE CONFIGURATIONS

Mil-COTS, InQor, High Voltage NiQor, RailQor and CFQor products are fully encased for additional environmental protection and available in a variety of industry standard sizes/pinouts. There are various mounting configurations consisting of threaded inserts, through-hole inserts and mounting flanges. See website for data sheets with more details.

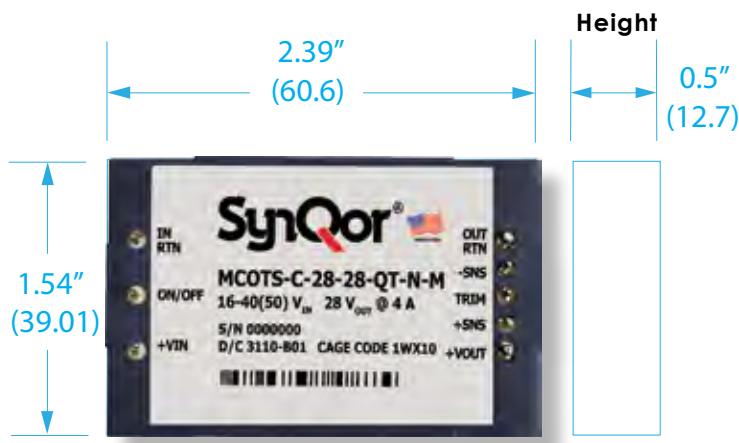
SIXTEENTH BRICK



EIGHTH BRICK



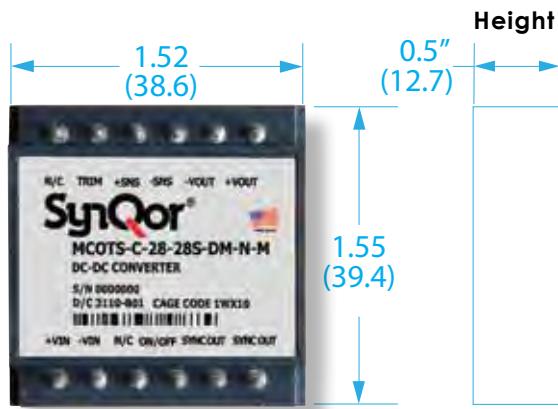
QUARTER BRICK



Flanged versions available.
See the website for details



DEMI BRICK

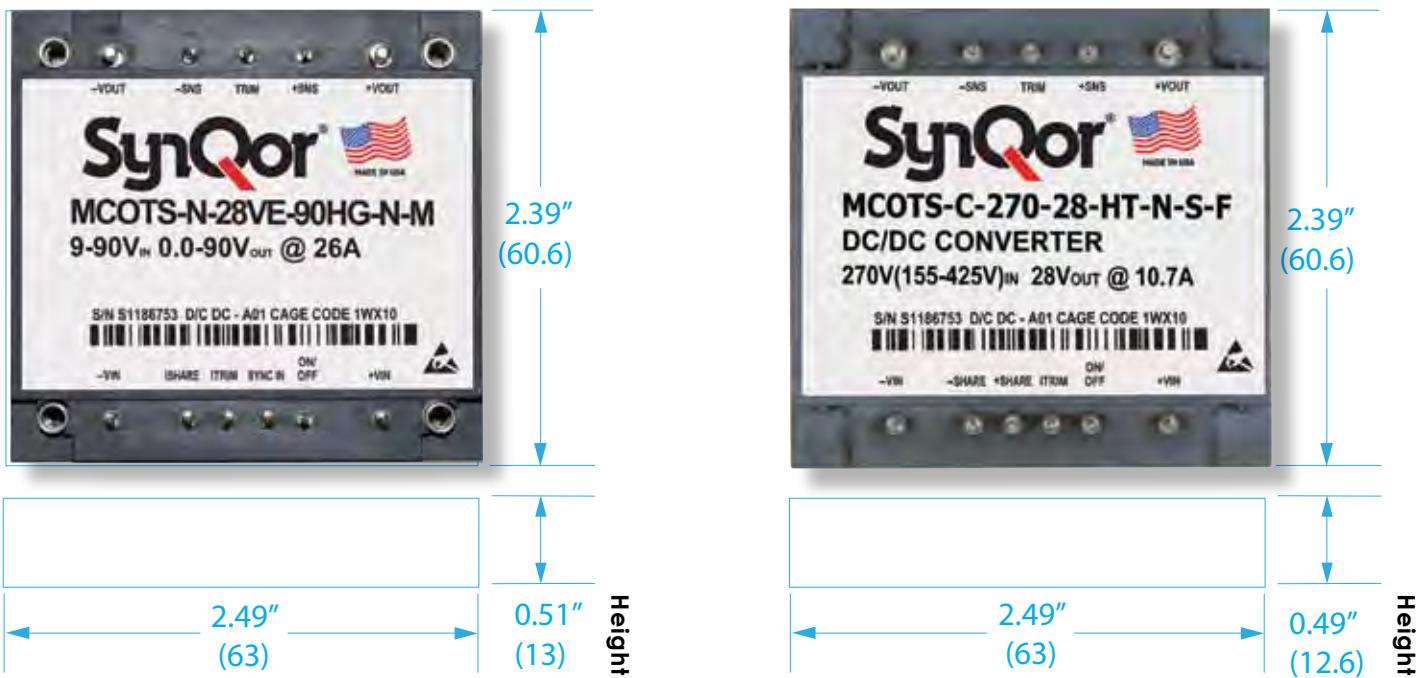


QUAD BRICK

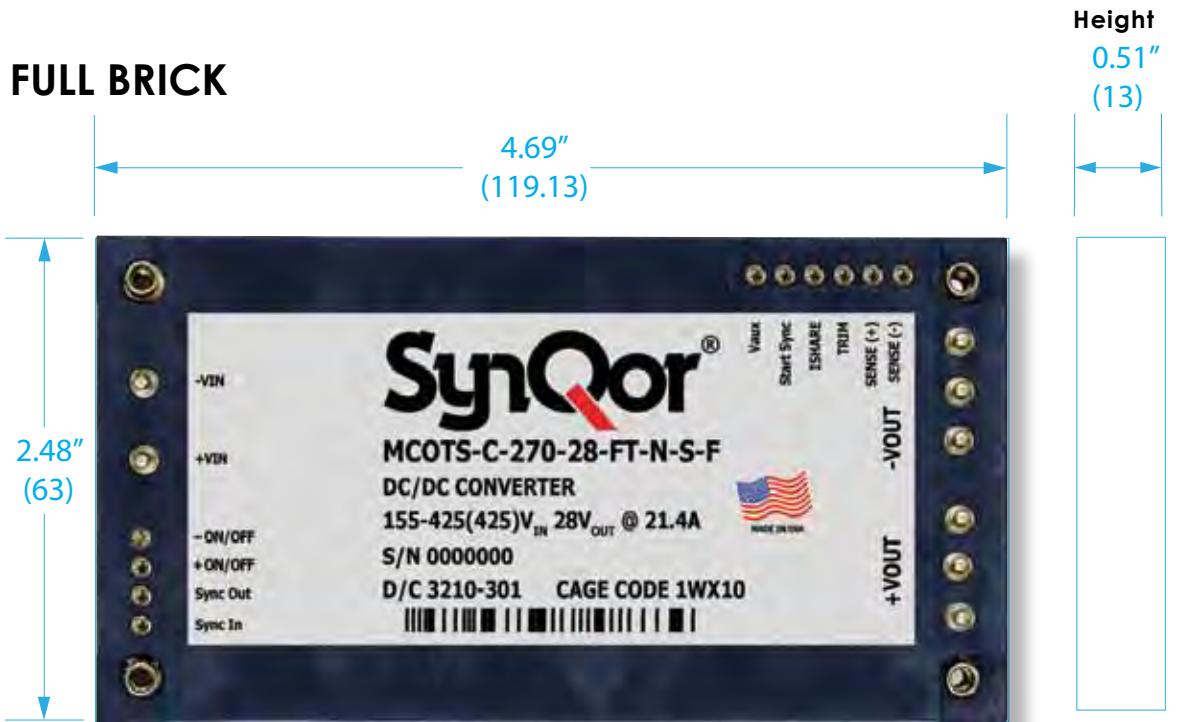


ENCASED PACKAGES CONFIGURATIONS

HALF BRICK

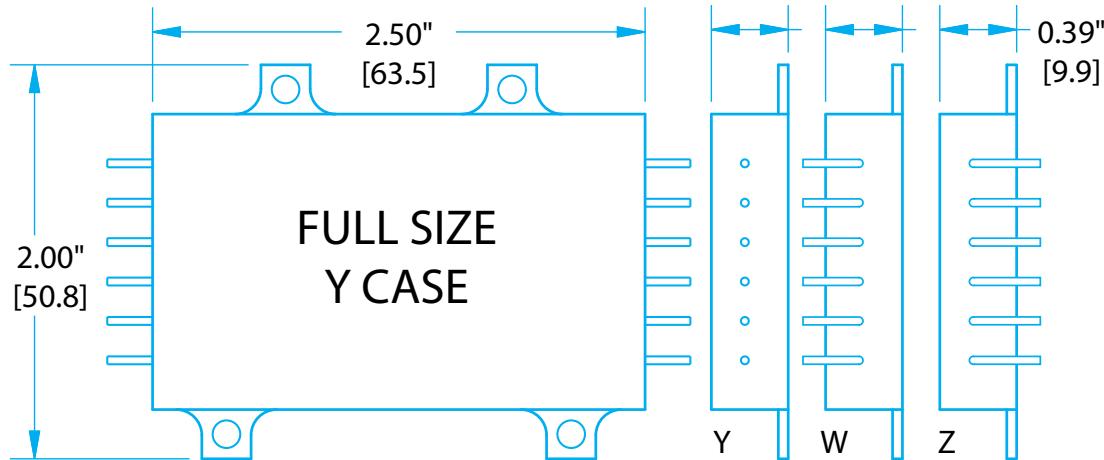


FULL BRICK

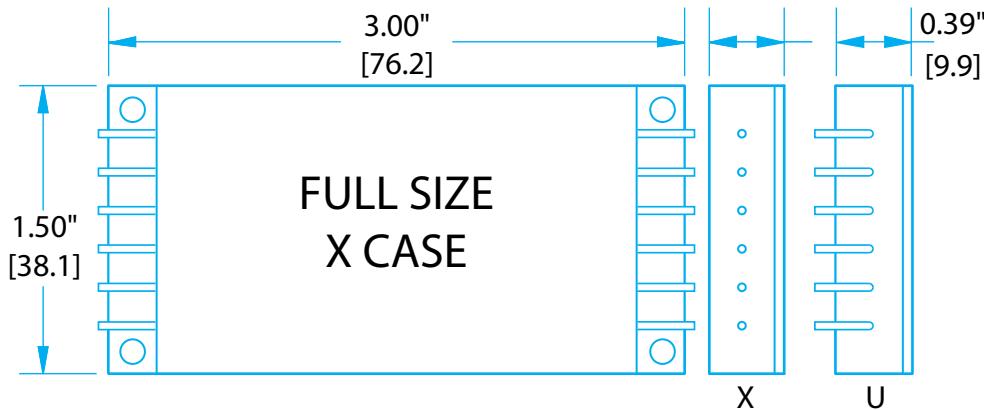


MILQOR HI-REL PACKAGE CONFIGURATIONS

Hi-Rel products are available in a variety of package mounting and lead form configurations. See website for data sheets with more details.



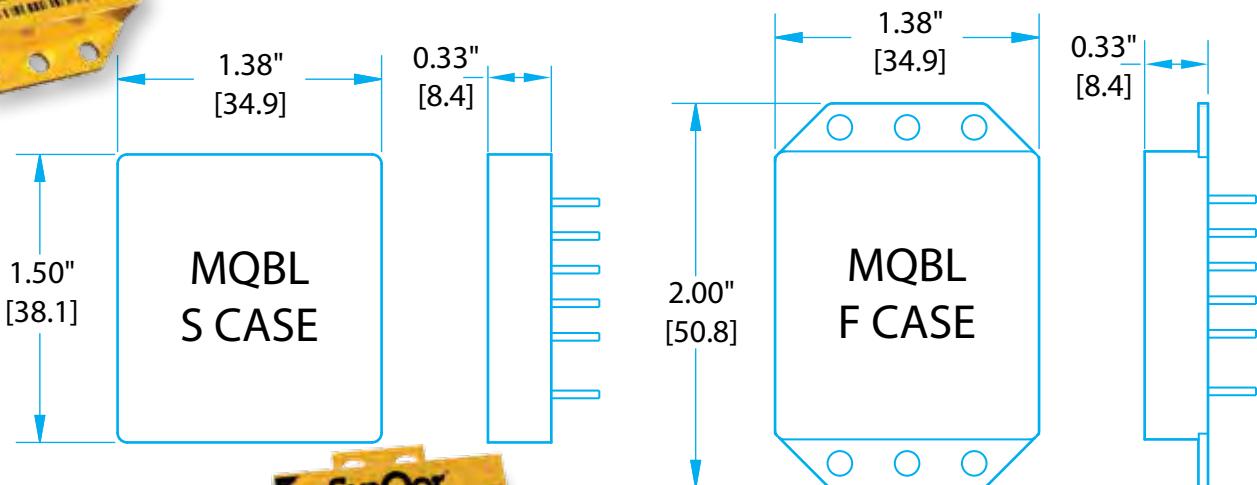
FL/ME PACKAGE



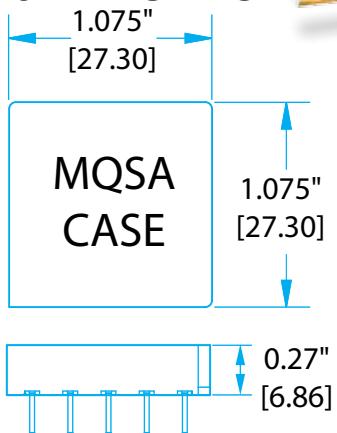
MILQOR HI-REL PACKAGE CONFIGURATIONS



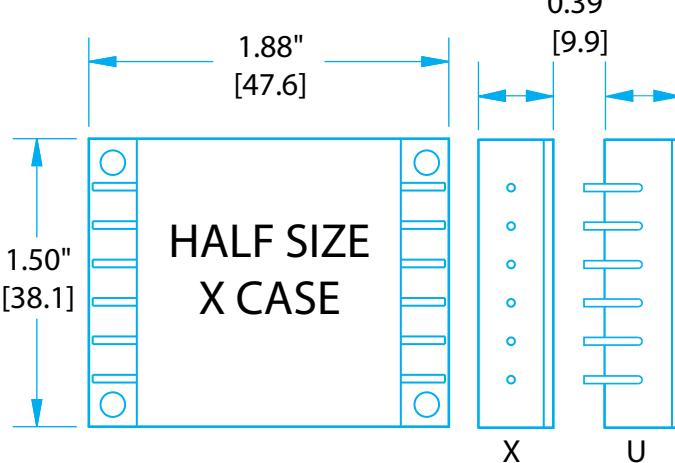
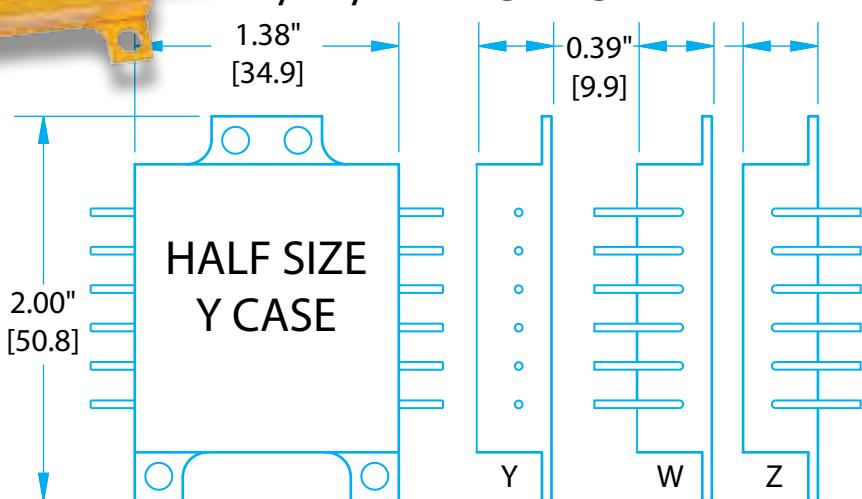
BL PACKAGE



SA PACKAGE



HL/HR/HE PACKAGE



SYNQOR'S TRACKING SYSTEM

INTEGRATES BUSINESS PROCESSES & ENFORCES PROCESS ADHERENCE



Configuration Control

- Documentation Control
- Manufacturing Routings
- Design Drawings
- BOMs

Information Collection

- Unit History
- Component History
- Process Data Capture

Containment

- Stop Ship
- Process Diversions

Configuration

Information
Collection

Containment

Process Control

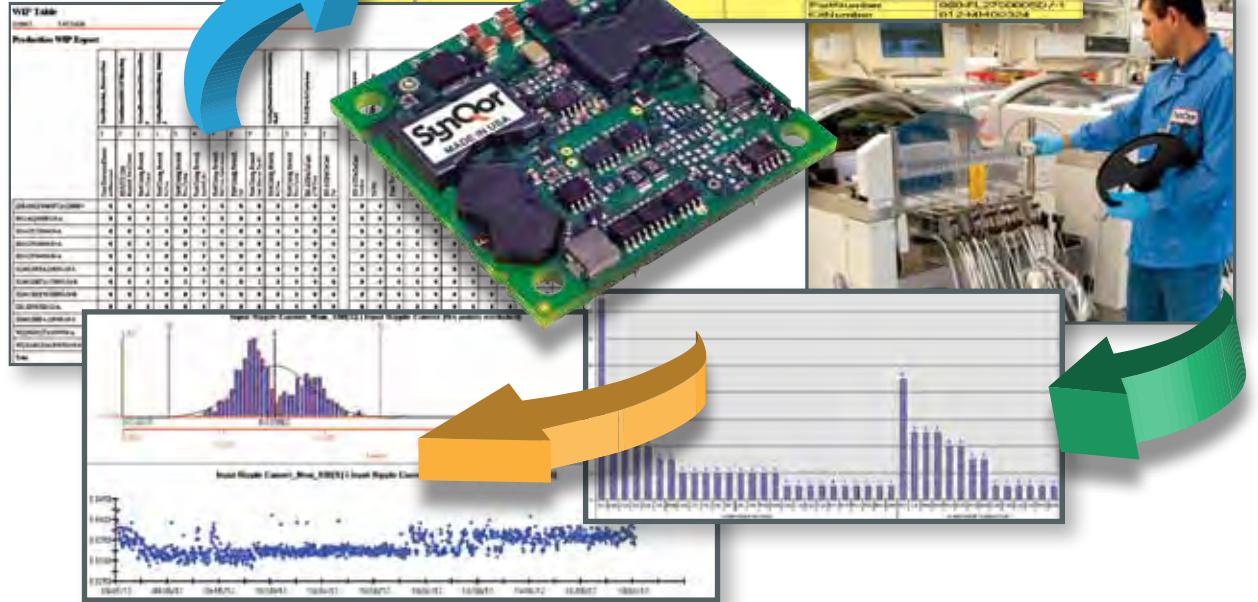
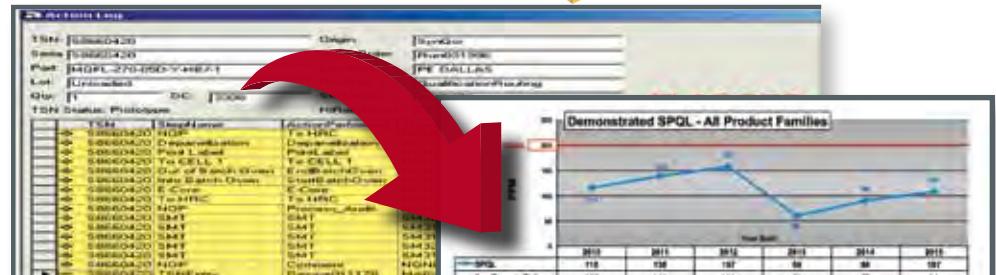
Real-Time Reporting

Real-Time Reporting

- WIP
- Cycle Times
- Yields
- Material Flow

Process Control

- Equipment
- Production Programs
- Temperature Profiles
- Process Times
- Test Parameters



USA Manufacturing Facility: AS9100 and ISO 9001 Certified

SynQor considers in-house manufacturing to be a core competency and strategic advantage. All SynQor products are manufactured in our manufacturing facility at our corporate headquarters in Boxborough, MA, USA, utilizing state-of-the-art equipment and proprietary assembly techniques. By maintaining both AS9100 and ISO9001 certifications, SynQor is able to provide the same level of attention to detail in our manufacturing processes as we do in our products. We utilize proprietary in-house developed manufacturing data and document control systems that allow us to operate in a paperless manufacturing environment, providing both maximized manufacturing efficiency and flexibility. Ultimately, our manufacturing expertise remains in-house, allowing us to maintain complete control over the quality and traceability of our product down to the component level to meet the most stringent customer and industry requirements.

USA Design, Engineering & Manufacturing



SynQor employs a stringent, ECO controlled, 5-stage product development process, starting

with product concept design and ending with manufacturing integration. We believe that a solid design and DFM review process leads to efficient manufacturing, higher performance, and enhanced reliability. By designing for reliability, SynQor greatly reduces the chance of field defects and increases product integrity.

Concept Design	Design & Verification	Proof of Design	Proof of Manufacturing	Manufacturing Integration
<ul style="list-style-type: none"> Generate electrical specification Review performance requirements Design simulation Schematic Qualify new components Breadboard Prelim thermal analysis 	<ul style="list-style-type: none"> Full layout DFM/DFT Review Build engineering prototypes Debug circuit Worst-case electrical testing Component stress analysis Stability analysis Abnormal electrical testing Specification review Preliminary datasheet 	<ul style="list-style-type: none"> Build 50-100 units and electrically characterize Verify electrical performance Verify component stress analysis Statistical variations Thermal analysis and imaging HALT testing Complete datasheet 	<ul style="list-style-type: none"> 300 units in mfg. run ATE testing Yield analysis Validate and finalize manufacturing processes and Tooling 1000 hour life test Qualification testing (humidity, vibration, DMT, PTC, thermal and mechanical shock, altitude and solderability) 	<ul style="list-style-type: none"> Processes transfer Full documentation release (SCD's, BOM, processes, procedures, etc.) Release qualification reports Release final datasheet Transfer units to finished goods

SynQor's use of a single PCB construction, planar magnetics and a baseplate-free design allows for simplified automated manufacturing and inspection techniques, resulting in higher first-pass product yields. Utilization of common design architecture across all of SynQor's product lines greatly reduces unique component content. This not only simplifies raw material sourcing, it also facilitates our use of internally developed machine set-up optimization software that allows us to plan for virtually zero down time between production runs. Consequently, SynQor can deliver most standard products in as little as four weeks.





Quality & Reliability

At SynQor, we view quality as a system, not a result. Achieving quality and high reliability requires a company-wide commitment to a closed loop process that incorporates continual improvement. At SynQor, all processes are built upon this framework and philosophy, which are detailed in our comprehensive QMS documentation. By defining the desired results and metrics for each process, a continual improvement system is created at every level that is consistent with SynQor's documented quality objectives. As described by our U.S Manufacturing model, our manufacturing expertise remains in house, which provides complete control of the quality and traceability of our products.



Product Qualification

SynQor's structured product qualification process tests all aspects of converter performance through Steady-State life testing, DMT (design marginality testing), PTC (power thermal cycling), thermal and mechanical shock/drop, EMI, fungus, vibration, humidity, altitude and solderability testing. Our extensive product characterization and qualification testing, coupled with our state-of-the-art flow manufacturing processes ensure our ability to deliver products at industry leading quality and reliability levels.

COMMERCIAL QUALIFICATION TESTING

Parameter	# of Units	Test Conditions
Life Test	32	1000 hours, 95% rated V_{in} and load, units at derating point
Vibration	5	10 - 55Hz sweep, 0.060" total excursions, 1 minute/sweep, 120 sweeps for 3 axis
Mechanical Shock	5	100G minimum, 3 drops in x and y axis, 1 drop in z axis
Temperature Cycling	10	500 cycles, -40°C to 100°C, unit temperature ramp of 15°C/minute
Power/Thermal Cycling	5	100 cycles, $T_{operating} = \text{min to max}$, $V_{in} = \text{min to max}$, full load
Design Marginality	5	$T_{min} -10^{\circ}\text{C}$ to $T_{max} +10^{\circ}\text{C}$, 5°C steps, $V_{in} = \text{min to max}$, $I_{out} = 0 - 105\%$ load
Humidity	5	1000 hours, +85°C, 95% Relative Humidity, 2 minutes on and 6 hours off
Solderability	15 pins	MIL-STD-883, method 2003 & JESD22-B102D Solderability Requirements (lead-free)





Baseplate & Encasement

Automated Manufacturing Center

Our manufacturing facility has multiple production lines that are integrated into the plant resources. The engineering and design units are within seconds of the manufacturing areas. Component supply, production, testing and shipping areas of the Company are readily available to the design engineers to check performance under specific conditions which will not show up in the normal design characterization.

Designers are able to achieve more energy efficient robust products with an integrated design and manufacturing workflow.





Prototype Milling Machine Lab

Our manufacturing facility has recently made significant investments into our precision milling technology equipment. With increased capabilities, we are ready to meet even the most stringent quality and delivery requirements from any customer. Our full complement of precision components produced on our enhanced tool room equipment enables us to respond effectively and quickly to deliver prototypes to our customer's design specifications.



High-Reliability Center

Hi-Rel Center

SynQor's Military-grade MilQor® Hi-Rel and MCOTS products are manufactured to IPC-A-610 Class III standards in the Hi-Rel Center, a Class 10,000 capable clean room environment. Meticulous attention to detail by specially trained personnel, following exacting assembly and testing protocols that include Temperature Cycle, Extended Burn-In, -55°C to +125°C Functional Verification, and Constant Acceleration, produce products of the highest reliability to meet stringent MIL-STD requirements.



Integrated System Assembly



System Integration

SynQor System-Level Products include ACuQor (medical), UPS (military/industrial), as well as Custom Hi-Rel Military products. SynQor manufactured sub-assemblies are delivered to dedicated production areas for system final assembly, integration, and test for SynQor's System-Level products. System assembly and test capabilities include:

- THT (through-hole-technology) assembly and soldering to IPC-A-610 class II and class III standards.
- Mechanical sub-assembly integration and hardware installation.
- Wire harness installation and sub-assembly staking and potting.
- Sub-assembly Hi-Pot and Electrical Functional Test.
- System-level Leakage, Burn-In, and Electrical Functional Test.
- Final QA and Packaging.



Custom Design Products

SynQor is eager to develop partnerships with customers requiring modified standard or custom power supply designs. Our in-house power design engineers have the expertise to deliver quick and reliable solutions for your most demanding power conversion specifications. Our integrated design and manufacturing facility expedites fast and easy development of modified standards, including diverse output voltages, reduced current limits and special testing requirements. Please contact your local SynQor sales representative for additional information.



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