SynQor

POWER CONVERTERS & SYSTEMS

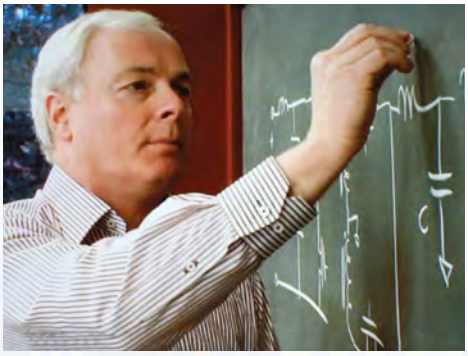
2015 Product Catalog

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, critical military and power generation systems.

The Military series of Uninterruptible Power Supply units (UPS), Hi-Rel and Mil-COTS DC-DC converters and EMI filters brings SynQor's field proven high-efficiency synchronous-rectifier technology to the Military/Aerospace industry.



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, and it also provides complete power systems.

SynQor's capabilities include both standard and custom solutions, and it delivers them 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®

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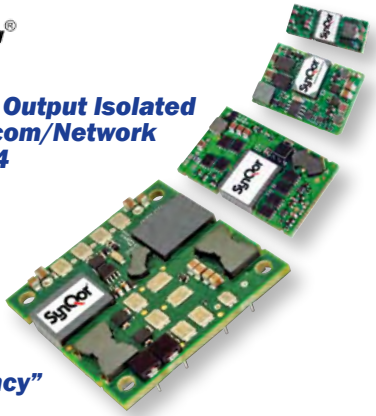

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UPS3000 2500W (3000VA) 2U High Rack-Mount Package >10 Minutes Battery Run Time, Only 65 lbs.

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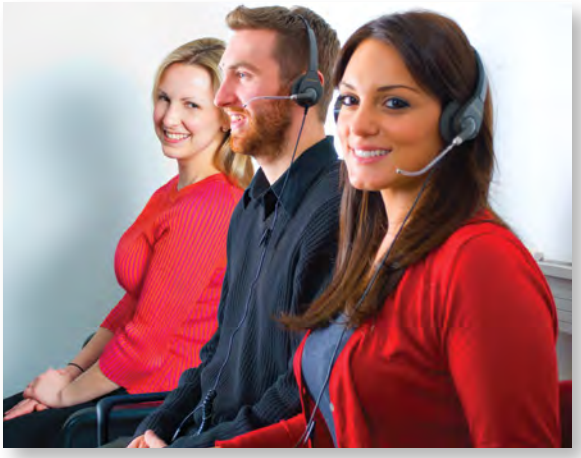
SynQor is a world-class supplier of DC-DC power converters,

CUSTOMER SERVICE



... the power behind communications

SynQor is committed to providing you the highest level of customer support. We support our products with direct sales, manufacturers 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 listed there 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 wining technology innovations stem from the design team's industry-leading knowledge in the power arena. SynQor's design engineers also have the expertise in many of the electrical, mechanical and environment specifications required for system level compliances.

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	

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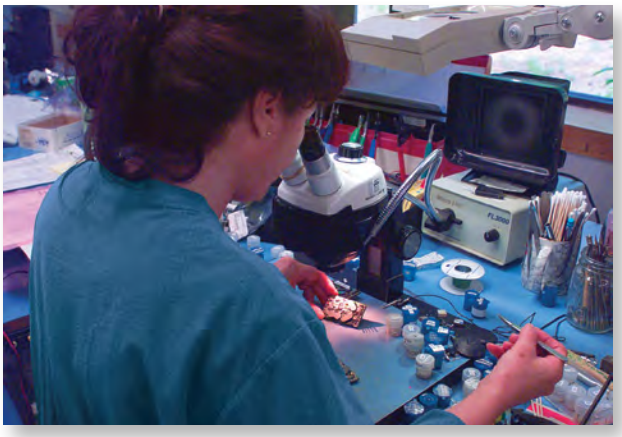
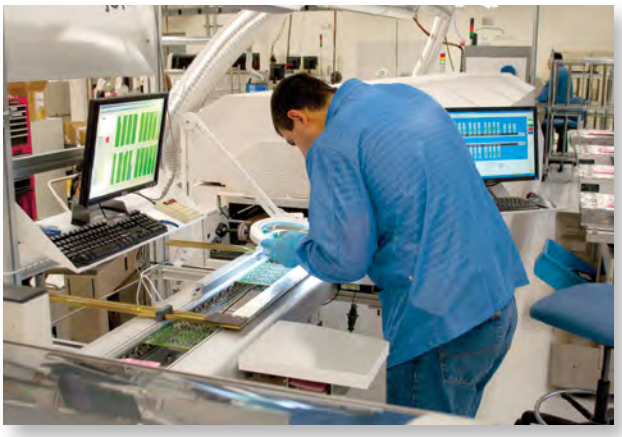
QUALITY & RELIABILITY



... the power behind industry

Since its founding, SynQor has fostered a culture of quality and continual 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 that are practiced on a daily basis. 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 a timely supply of highly reliable product at competitive prices to our customers. 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 configurations 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 approach 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 (PF>0.99)

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

Power Conditioners *page MPC-34*

- Ultra Low Weight
- Well Conditioned AC & DC output

Military Power Supply *page MPS-36*

- AC-DC units
- 3-Phase input
- Ultra Low Weight

VPX VITA 62 Compliant Power Supply *page VPX-38*

- Up to 1000W
- MIL-STD Compliant
- 3U and 6U Size Packages

MultiQor Plate *page MTQ-42*

- 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-48*

- Isolated DC-DC Converters

InQor Filters *page IQ-54*

- Filters

ACuQor *page AQ-55*

- AC-DC Power Supplies

NiQor High Voltage *page HVNQ-56*

- High Voltage Non-Isolated DC-DC Converters

PFCQor *page PFC-58*

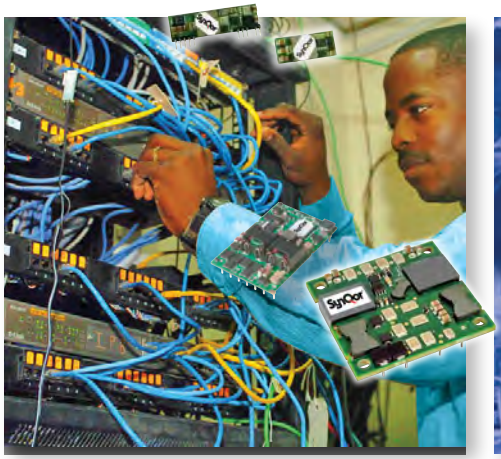
- Power Factor Correction Module

TRANSPORTATION

... 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, & 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 poses on power supplies, SynQor has designed the RailQor line for optimal performance in the most demanding applications.

TELECOM/DATACOM



... 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.

MEDICAL

... the power behind innovation

SynQor's Medical Product line offers the best-in-class solutions for AC-DC and DC-DC power supplies. They are designed to meet an extensive range of medical applications. The 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. These medical supplies offer the highest power density in the smallest packages sizes available in today's market.

MilCOTS™

Isolated 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.

MCOTS 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 optional on some models
- Flanged baseplate available
- Industry standard pin-out configurations and standard footprints.

Compliance Features

MilCOTS converters with MilCOTS filters are designed to meet:

- MIL-HDBK-704-8 (A through F)
- RTCA/DO-160 Section 16, 17, 18
- MIL-STD-1275 (B, D)
- MIL-STD-461 (C, D, E, F)
- DEF-STAN 61-5 (part 6)/(5, 6)

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)

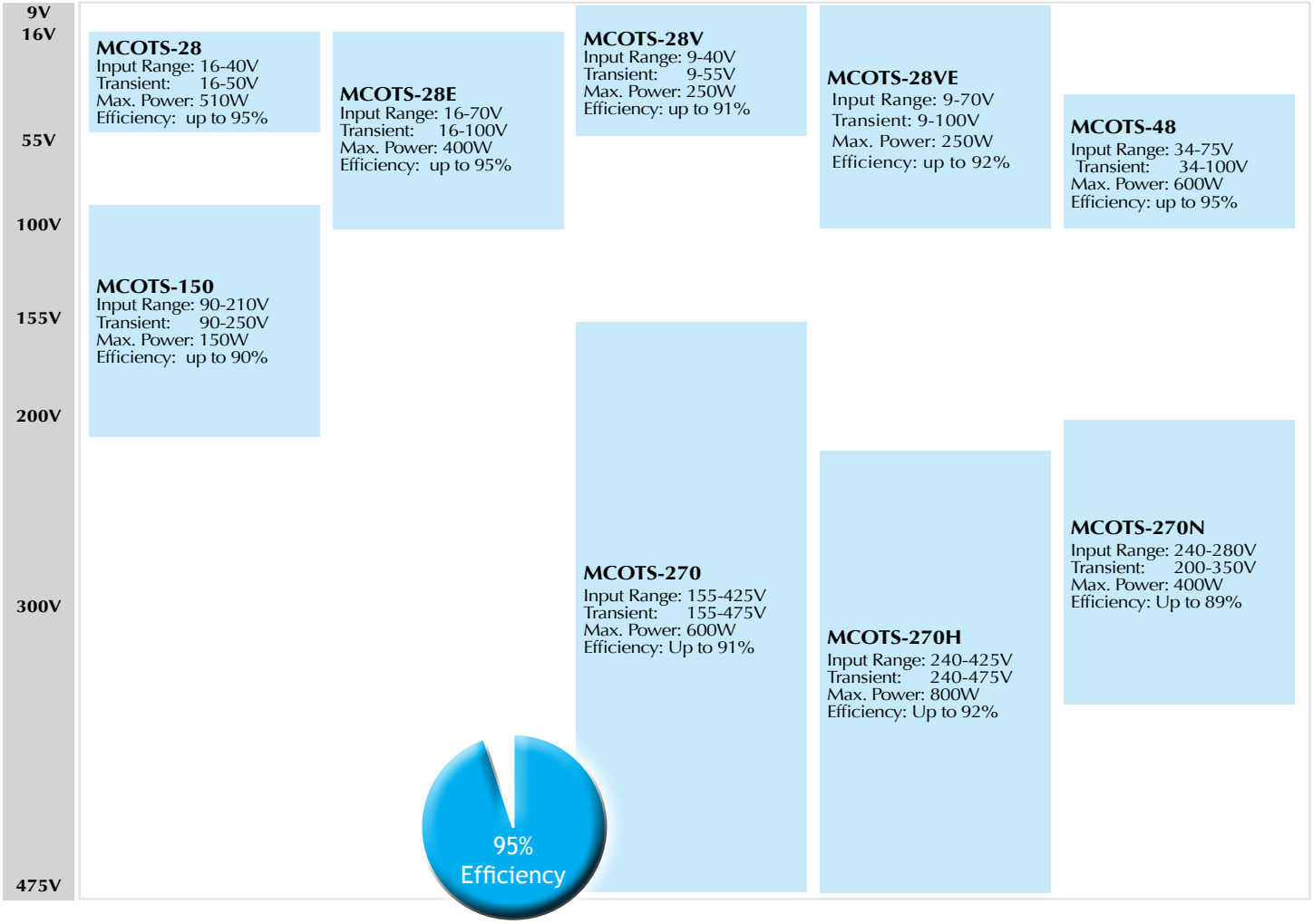
Control

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



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. Abs. 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 Packages" on page MECH-82 for package outlines.

Military Isolated DC-DC Converters

MCOTS-28E

16-70Vin Cont.
100Vin 1s Trans.
Absolute Max
Vin = 100V

Vout	1.5V	1.8V	2.5V	3.3V	5V	7.5V	9.6V	12V	15V	24V	28V	30V	40V	48V	50V
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

9-40Vin Cont.
55Vin 1s Trans.
Absolute Max
Vin = 60V

Vout	1.5V	1.8V	2.5V	3.3V	5V	7V	7.5V	12V	15V	24V	28V	30V	40V	48V	50V
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

9-70Vin Cont.
100Vin 1s Trans.
Absolute Max
Vin = 100V

Vout	1.5V	1.8V	2.5V	3.3V	5V	7V	7.5V	12V	15V	24V	28V	30V	40V	48V	50V
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

34-75Vin Cont.
100Vin 1s Trans.
Absolute Max
Vin = 100V

Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V	50V
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

90-210Vin Cont.
250Vin 1s Trans.
Absolute Max Vin = 250V

Vout	3.3V	5V	6V	12V	15V	24V	28V	48V
1/4 Brick Tera		30A 150W					5.35A 150W	3.1A 149W

MCOTS-270

155-425Vin Cont.
475Vin 1s Trans.
Absolute Max Vin = 600V

Vout	3.3V	5V	6V	12V	15V	24V	28V	48V
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

240-425Vin Cont.
475Vin 1s Trans.
Absolute Max Vin = 600V

Vout	5V	28V	36V
Full Brick Peta	100A 500W	28.6A 801W	22.2A 799W

MCOTS-270N

240-280Vin Cont.
200-350Vin 1s Trans.
Absolute Max Vin = 600V

Vout	8V	10V	28V
Half Brick Tera	50A 400W	40A 400W	14.5A 406W

MilCOTS™
DC Filters

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 chassis and input / output
- Wide temperature range operation
- Designed to meet MIL-STD-461

DC Filter Model Number	Input Voltage		Output Current	Isolation Voltage (to case)	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 or distributor.

MPFCQor™

Power Factor Correction

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 environments 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: 45 - 65Hz / 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
- Up to 3 modules 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
- Clock synchronization
- Output current monitor/current sharing
- 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:** 85-140V	**270:** 270Vdc **390:** 390Vdc	**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 or distributor.

MilCOTS™
AC Filters

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 industry EMI standards.

MCOTS AC Filter Features

- Universal Input voltage range
- 1kW@115V or 2kW@230V
- 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-060-230-HT	50/60 Hz	85-264 VRMS	9 ARMS	1kW/2kW	15.8 W	2250 VPK
MACF-400-230-HT	400 Hz	85-264 VRMS	9 ARMS	1kW/2kW	15.8 W	2250 VPK

MIL-COTS AC LINE FILTERS

Family	Input Frequency	Vin Range	Package Size	Thermal Design	Screening Level
MACF	**060:** 50/60 Hz **400:** 400 Hz	**230:** 85-264 Vrms	**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 or distributor.

MPFCQor™

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 a bulk stabilizing capacitors, SynQor's high efficiency MCOTS DC-DC converters and SynQor's MCOTS AC line filter, the 3-Phase MPFCQor will draw a nearly perfect sinusoidal current (PF>0.99) from each phase of a 3-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 environments 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 var. freq. systems
- Meets military standards for harmonic content
- Minimal Inrush current
- No external input or output capacitance needed
- (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

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 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 or distributor.

MilCOTS™

3-Phase AC Filters

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 industry EMI standards. These filters have high differential-mode attenuation and low series resistance

MCOTS AC Filter Features

- Universal Input voltage range
- 1kW@115V
- 6.3Arms
- 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	50/60 Hz	85-140 VRMS	6.3ARMS	1kW@115VRMS	165mΩ@100°C	>TBD dB @ 200kHz

MIL-COTS 3-PHASE AC LINE FILTER

Family	Vin Range (L-N)	Phase	Input Type	Package Size	Thermal Design	Screening Level
MACF	**115:** 85-140 Vrms	**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 or distributor.

MilCOTS™ 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 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. MCOTS-Bus converters are ideal for creating the mid-bus voltage required to drive point-of-load (non-isolated) converters in IBA.

Features

- High efficiency, up to 95% at full rated load current
- Delivers 32A full power with minimal derating - no heatsink required
- Operating input voltage range: 230-400 & 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	29.2Vout	32.5A	1000W	95%
MCOTS-B-600-31	**Half-Brick**	440-700Vin	400-750Vtrans	31.2Vout	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 or distributor.

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

MilCOTS™

High Voltage Non-Isolated

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

The high input voltage non-isolated 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 IBA, 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.

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

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 charge

MIL-COTS NON-ISOLATED DC-DC CONVERTERS

Model Number	Brick Size	Input Voltage	Output Voltage	Current Rating	Max Output Power	High Efficiency
MCOTS-N-28V-60	**Half-brick**	9-60Vin	0-60Vout	40A	2000W	96% Efficiency
MCOTS-N-28VE-90	**Half-brick**	9-90Vin	0-90Vout	26A	2000W	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	**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 or distributor.

QuadQor™

Non-isolated Converters

Military COTS Non-Isolated DC-DC Converters

The MCOTS-N 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-N 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 postitive output and 1A on the negative output
- Input Voltage Range: 6-15 Vdc
- 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 or distributor.

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

MilCOTS™

Product Screening & Qualification

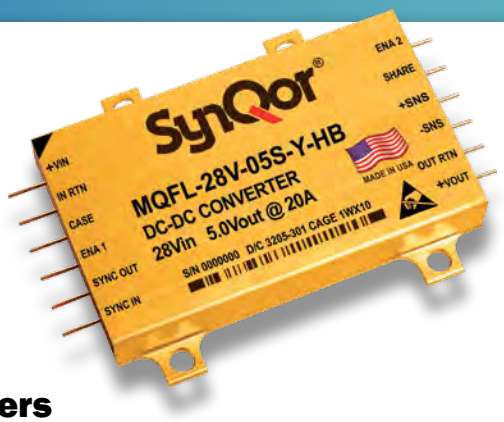
Product Screening

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)	—	—

Hi-Rel
Isolated Converters

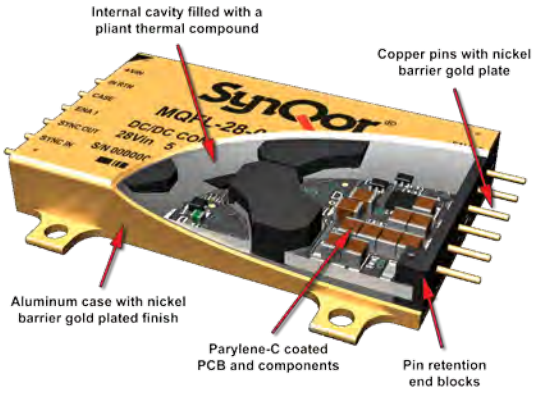


High-Reliability, Field Proven DC-DC Converters for Military/Avionics Applications

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%



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.

Design Process

***Hi*-Rel series converters are:**

- Designed for reliability per NAVSO-P3641-A guides
- Designed with components derated per:
  - MIL-HDBK-1547A
  - NAVSO P-3641A

Qualification Process

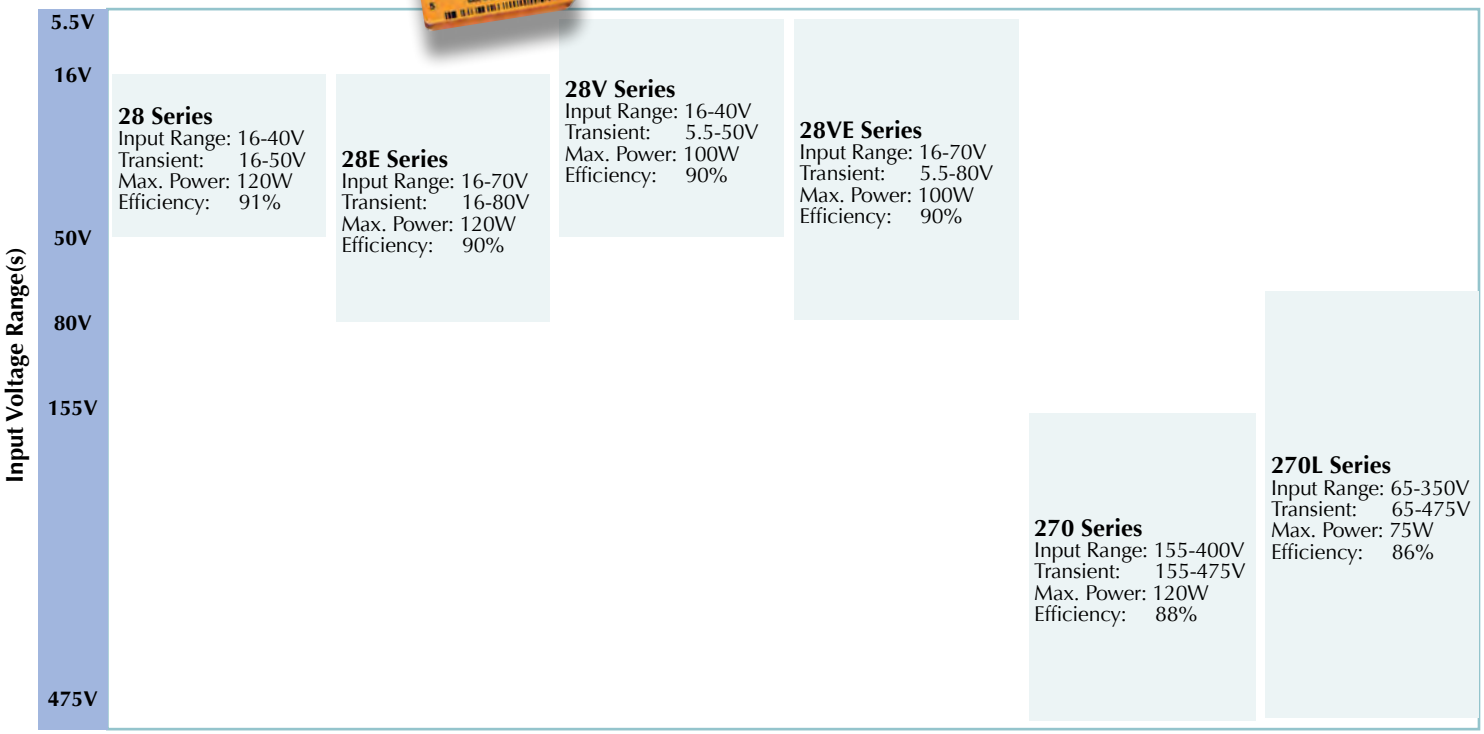
***Hi*-Rel series converters are qualified to:**

- 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

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 (B, D)
- DEF-STAN 61-5 (Part 6)/(5, 6)
- MIL-STD-461 (C, D, E, F)
- RTCA/DO-160 (E, F, G) Section 22



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** (BL)	**S** (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 or distributor.

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

	Single Output											Dual Output†		
Bottom Pin (MQBL)	**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

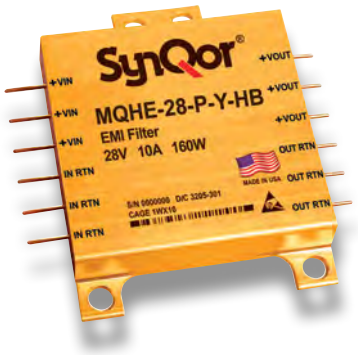
	Single Output				Dual Output†		
Bottom Pin (MQSA)	**5V 05S**	**12V 12S**	**15V 15S**	**28V 28S**	**±5V 05D**	**±12V 12D**	**±15V 15D**
MQSA-28 (5W) 16-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	1A 5W	0.42A 5W	0.33A 5W	0.18A 5W	1A 5W Total	0.42A 5W Total	0.33A 5W Total
MQSA-28E (5W) 16-70Vin 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.

Bus Converters (MQBQ)	Vout = ~Vin/1 28B
MQBQ-28 18-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	14A 400W

Bus Converters (MQBQ)	Vout = ~Vin/9 28B
MQBQ-270 230-400Vin Cont. 155-450Vin 1s Trans. Absolute Max Vin = 550V	14A 400W

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 Packages" 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
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 22.2″) 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-704F - Aircraft Electrical Power
- Mil-STD-1399-300B - Interface Shipboard
- MIL-STD-1275D - Vehicle Electrical Power
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-810G - 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 (up to 1250W) parallelable for higher power
- Total DC1 & DC2 output power = 1250W
- Shipboard version with floating neutral wire
- Rack mounting style

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 UNINTERRUPTIBLE 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**: 3.48"	**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 or distributor.
Part Numbering Example: UPS-1500-E-2U-L1G6D28-000, UPS-1500-S-1U-L2G5S00-000, UPS-1500-S-1U-L2G5S00-0CE

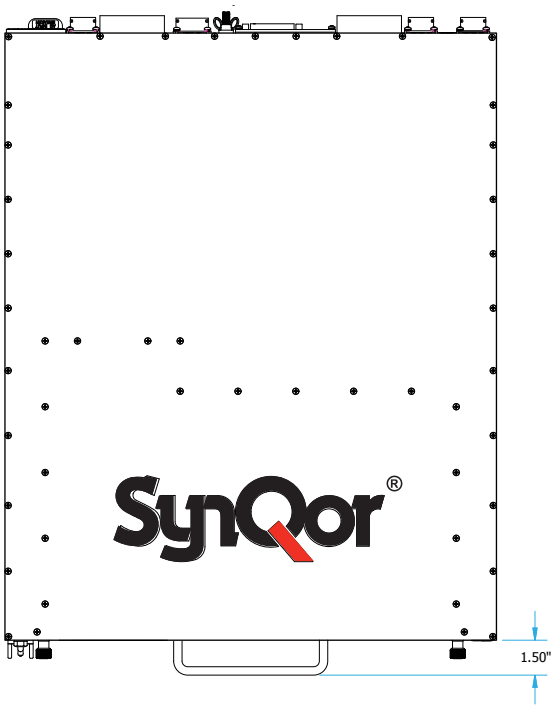
UPS-1500-1U UNIT

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

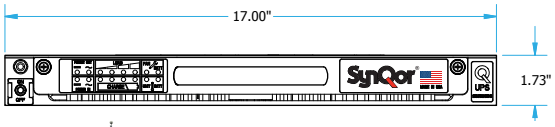
DC1 Output Option | **AC Output** | **Exhaust Fan** | ***Ethernet Port*** Option | **I/O Port** | **USER CONFIG Port** | **Ground Stud (1/4-20)** | ***DC Input*** Option | **Exhaust Fan** | **AC Input** | **AC Circuit Breaker**

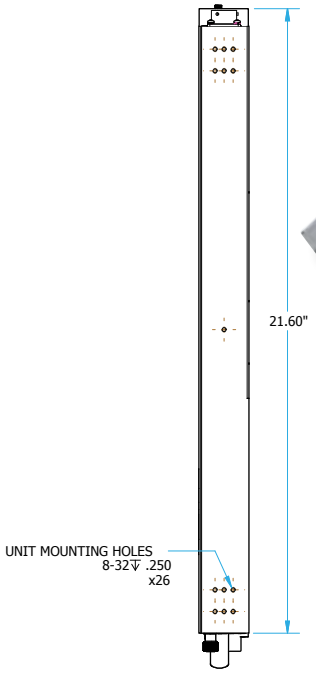
UPS-1500-1U UNIT with DC1 Output/DC2 Output Options

DC1 Output Option | **AC Output** | **Exhaust Fan** | ***Ethernet Port*** Option | **I/O Port** | **USER CONFIG Port** | **Ground Stud (1/4-20)** | ***DC2 Output*** Option | **Exhaust Fan** | **AC Input** | **AC Circuit Breaker**



Front View

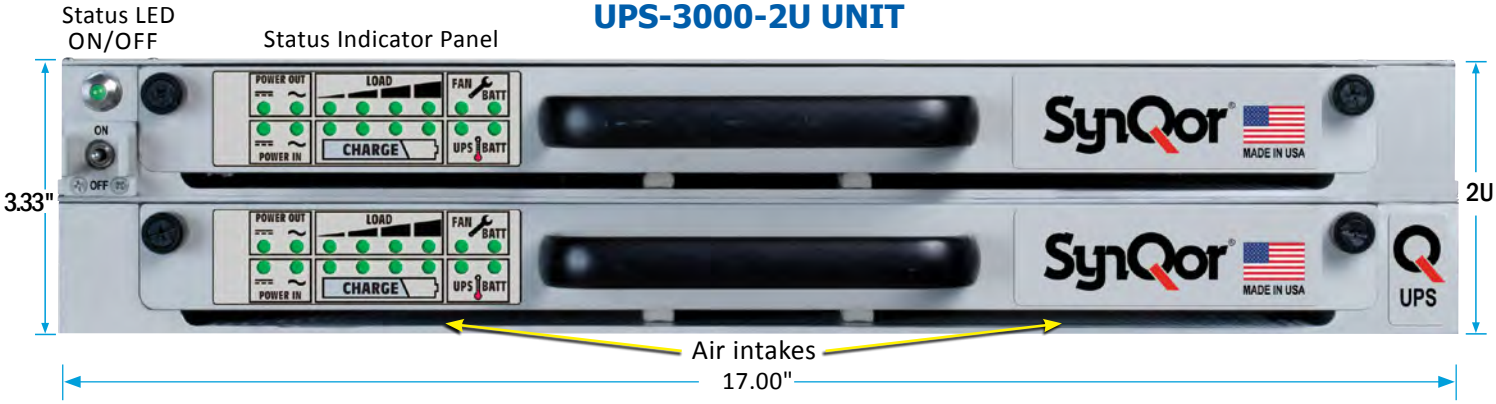




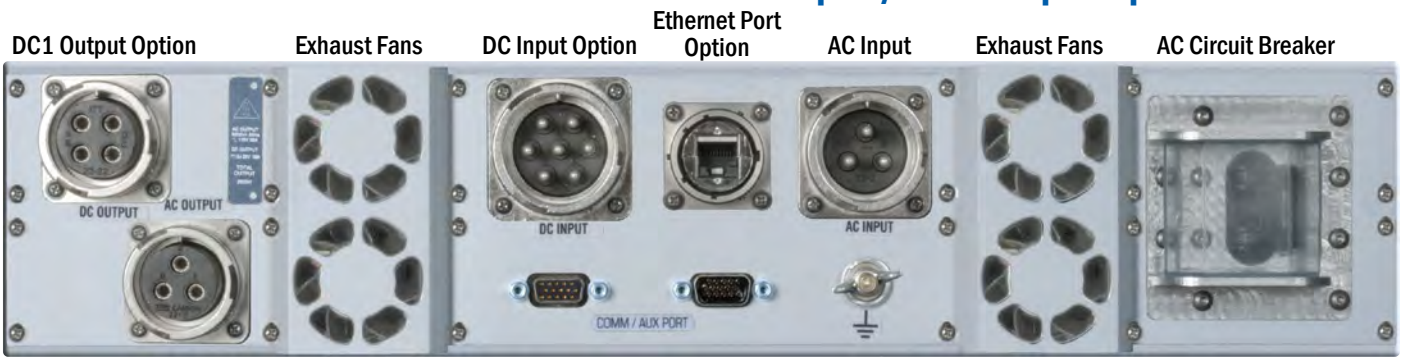
Hot swappable battery pack

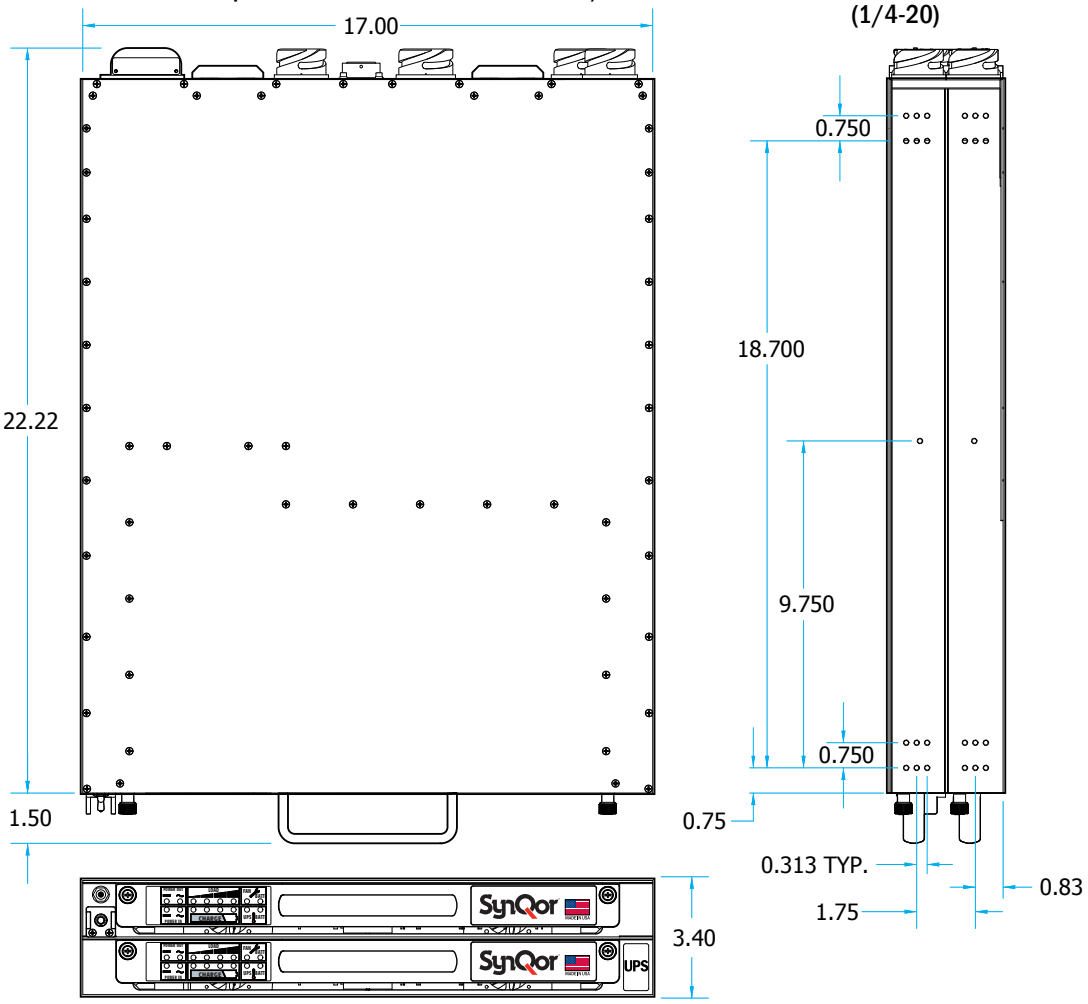
Visit our website for more information

UPS-3000-2U UNIT



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





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: 68 lbs.

Specification Compliance

EBM units are designed to meet: *(pending)*

- MIL-STD-704F - Aircraft Electrical Power
- Mil-STD-1399-300B - Interface Shipboard
- MIL-STD-1275D - Vehicle Electrical Power
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-810G - 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**	**68 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	**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 or distributor.

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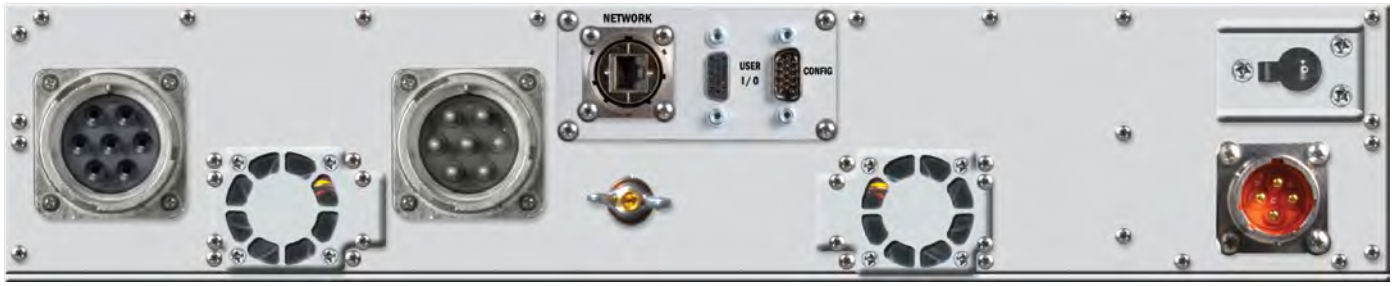
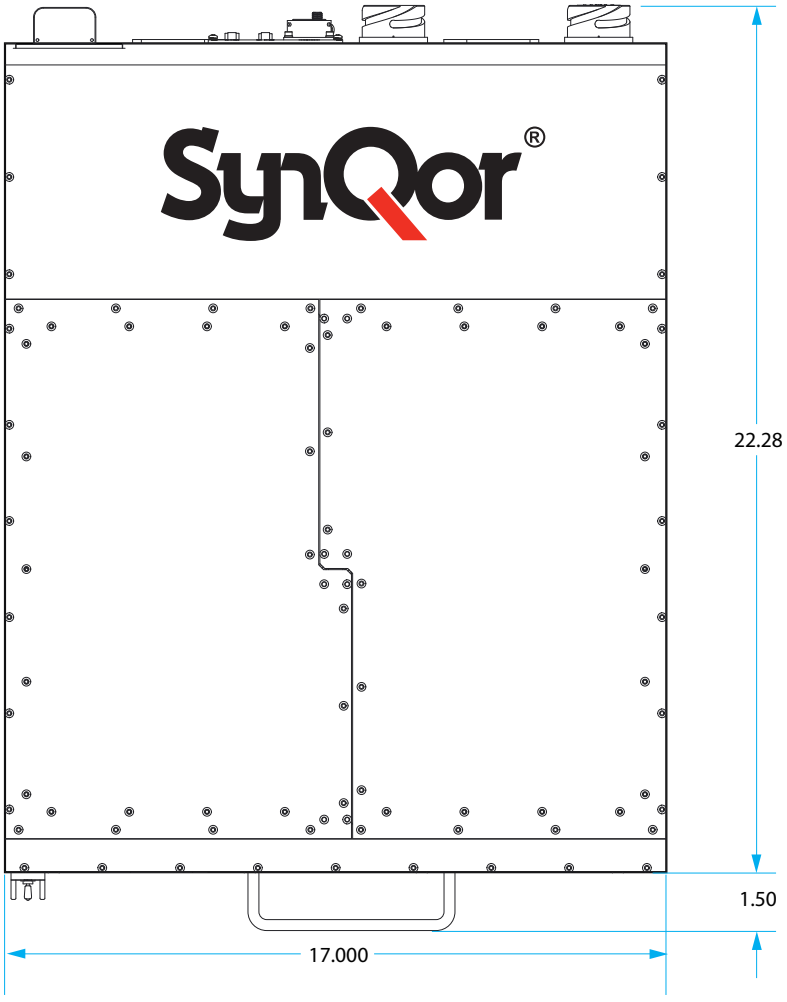
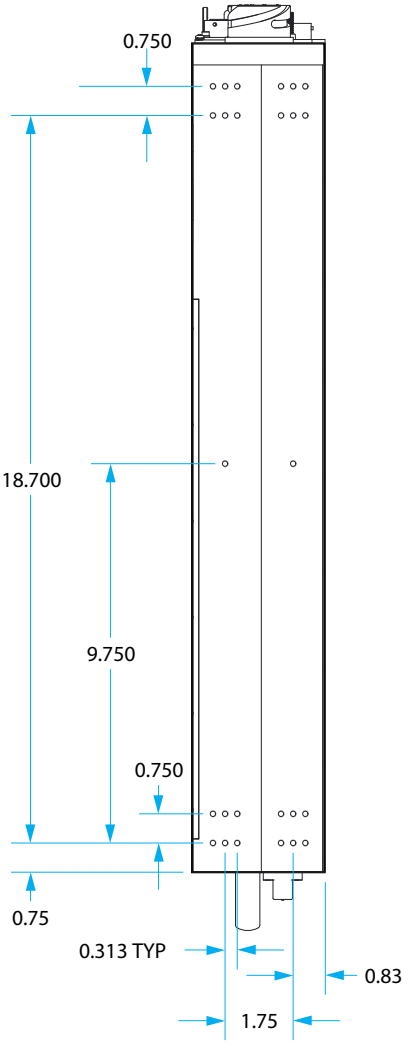
EBM-1000-2U UNIT







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-1399-300B - Interface Shipboard
- MIL-STD-810G - Environmental Engineering
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-704 (A-F) - Aircraft Electrical Power
- MIL-STD-1275 (B,D,E) - 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 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 or distributor.

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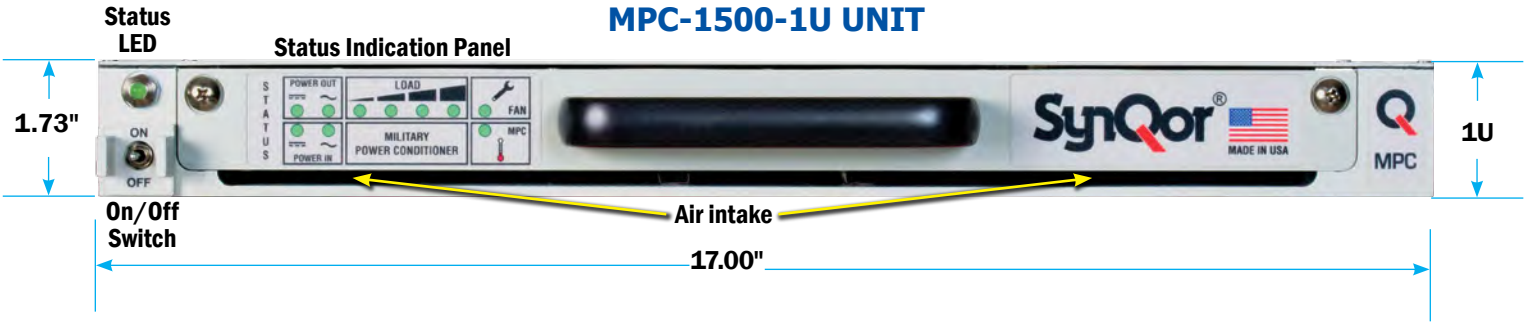
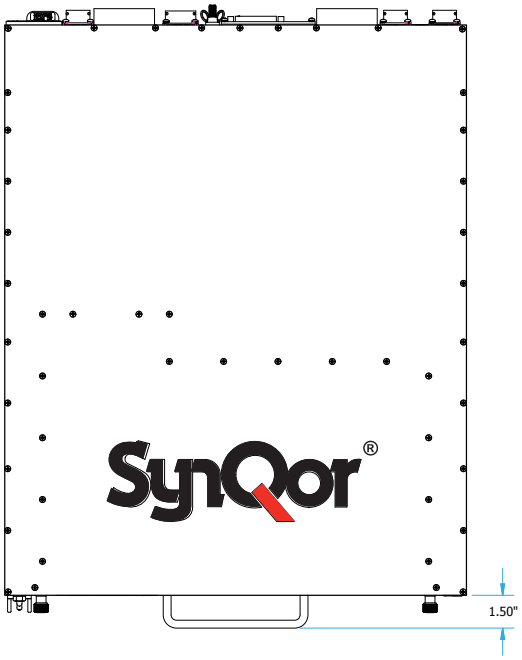
MPC-1500-1U UNIT



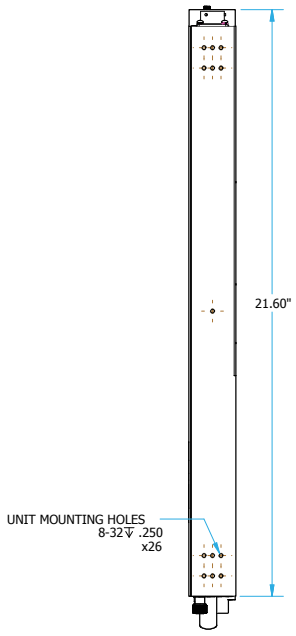
MPC-1500-1U UNIT with DC Input/DC1 Output Options

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

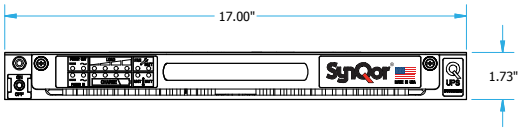
Top View



Side View



Front View



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 30VDC output to the load. It 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
- SNMP network port
- 1U high rack mount unit (17" x 20.4")
- Low weight: 25 lbs.

Specification Compliance

MPS units are designed to meet: *(pending)*

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

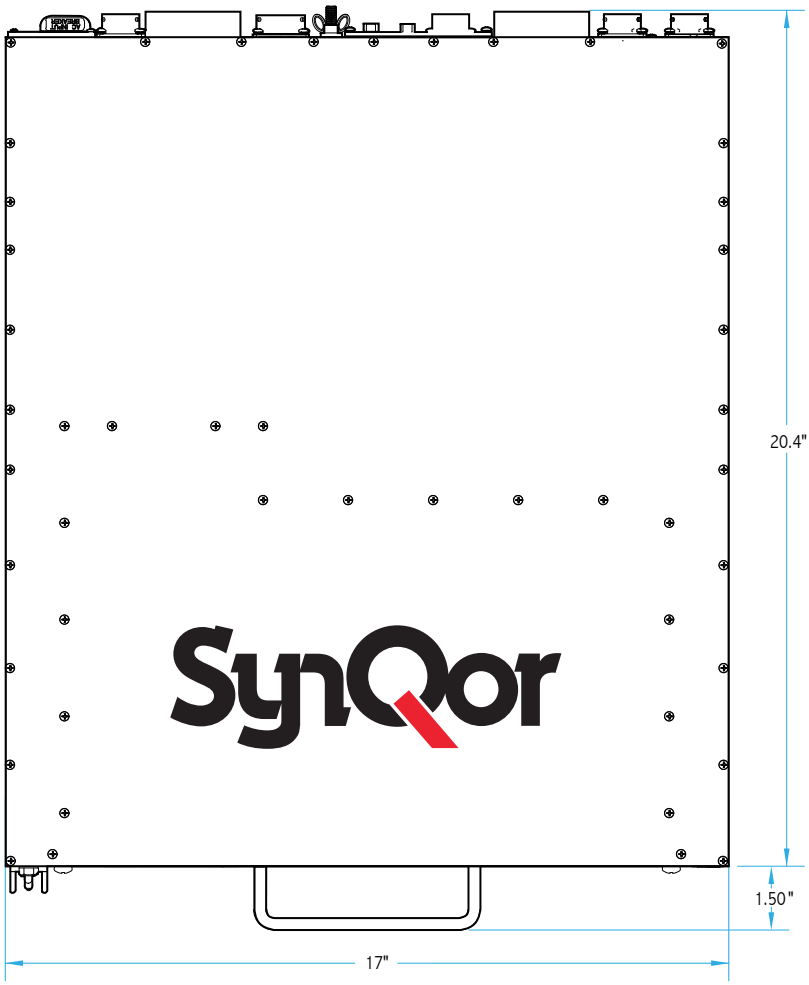
MILITARY GRADE POWER SUPPLY (MPS)

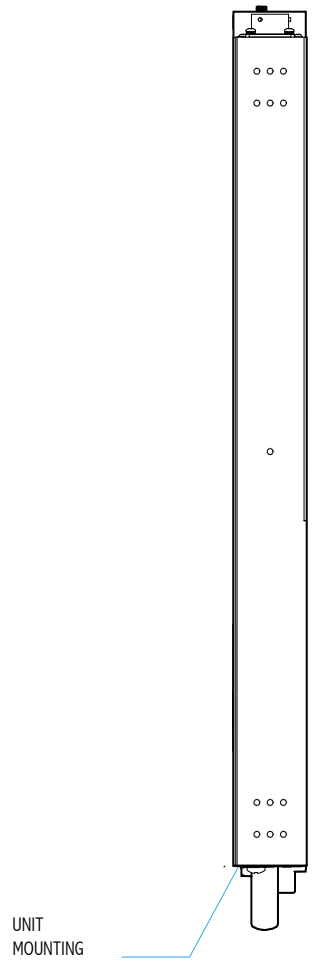
Family	Output Power	Height	AC Input Phase #	AC Input Frequency	DC Output Voltage @ Full Load*	Output Regulation	Network
MPS	**4000:** 4000W	**1U:** 1.73"	**3:** 3-Phase	**W:** 47-800Hz	**2B:** 24V **2D:** 28V **2E:** 30V **4B:** 48V	**S00:** Semi-regulated	**E00:** Ethernet/SNMP

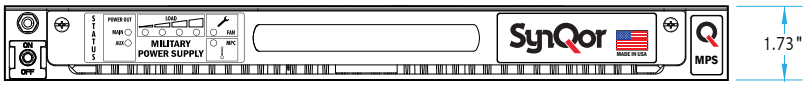
Part Numbering Example: MPS-4000-1U-3W2ES00-E00 For valid part numbers, refer to the website or contact your local sales representative or distributor.
*Approximate output voltage at full load, output voltage has Droop

MPS-4000-1U UNIT

MPS-4000-1U UNIT with AC Input







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-810G 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-810G - Environmental Engineering
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-704F - Aircraft Electrical Power
- MIL-STD-1275(B,D) - 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 (B-F) **T:** T -MIL-STD-704 A MIL-STD-1275 (B,D) 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 or distributor.

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 shutsdown & 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	+3.3 VAUX @ 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	+3.3 VAUX @ 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	+3.3 VAUX @ 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	+3.3 VAUX @ 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

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

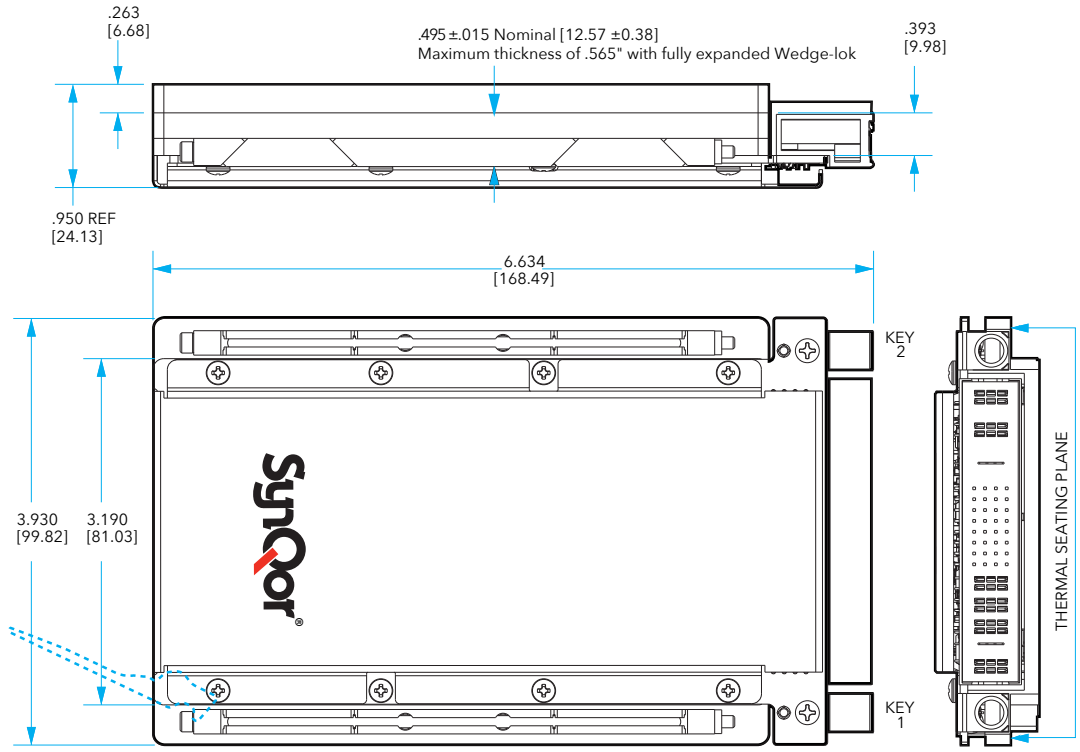
Screening	Process Description	S-Grade	M-Grade
Baseplate Operating Temperature		-55˚C to +100˚C	-55˚C to +100˚C
Storage Temperature		-65˚C to +135˚C	-65˚C to +135˚C
Pre-Cap Inspection	IPC-610, Class III	Yes	Yes
Temperature Cycling	Method 1010, Condition B, 10 Cycles		Yes
Burn-In	100˚C Baseplate	12 Hours	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


.263
[6.68]
.495 ±.015 Nominal [12.57 ±0.38]
Maximum thickness of .565" with fully expanded Wedge-lok
.393
[9.98]
.950 REF
[24.13]
6.634
[168.49]
KEY 2
KEY 1
3.930
[99.82]
3.190
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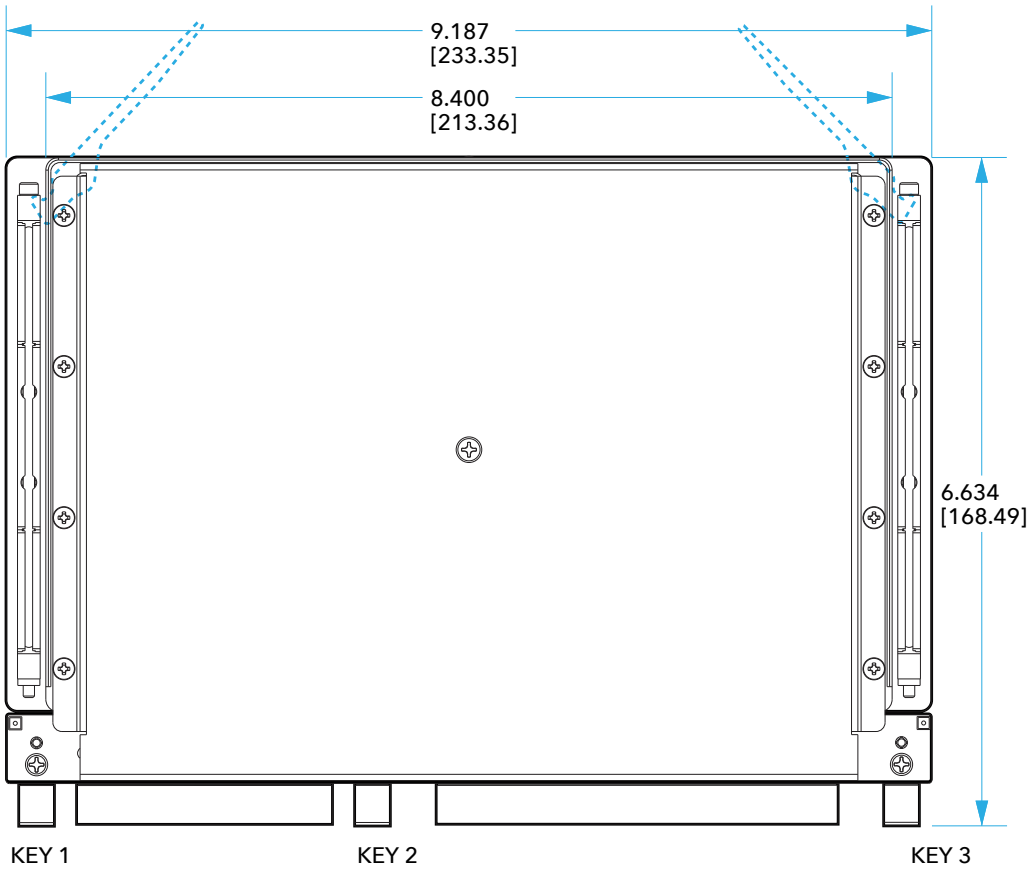
THERMAL SEATING PLANE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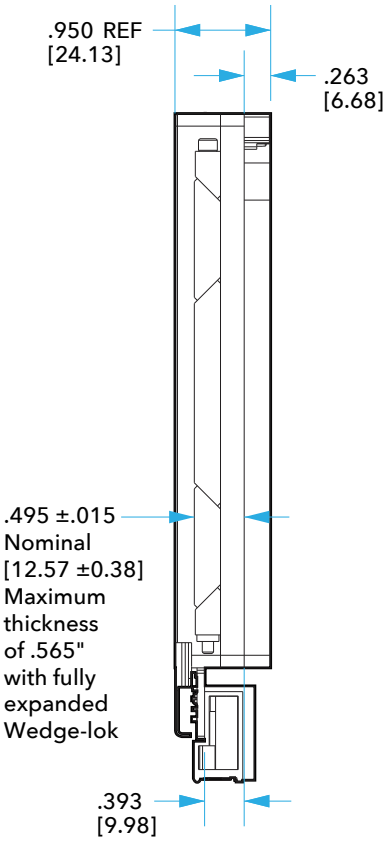
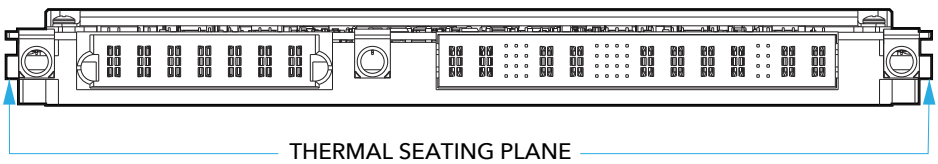
KEY 1
KEY 2
KEY 3


.950 REF
[24.13]
.263
[6.68]
.495 ±.015
Nominal
[12.57 ±0.38]
Maximum
thickness
of .565"
with fully
expanded
Wedge-lok
.393
[9.98]


THERMAL SEATING PLANE

MultiQor™

Configurable DC-DC Power Supplies

MultiQor Configurable Multi-Output Military DC-DC Power Supplies

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 environments of the Military and Aerospace industries and is compliant with MIL-STD-810G requirements.

Operational Features

- Internal EMI filter with ceramic stabilizing bulk cap
- Over-voltage Spike & Surge suppression circuitry to comply with: MIL-STD-704 (A - F)
  MIL-STD-1275 (B,D)
  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)

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

Optional Features

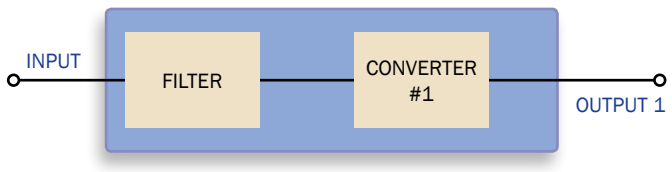
- Remote Sense Jumpers
- Internal input fuse
- Output current sharing
- Cover

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 (A-F) MIL-STD-1275(B,D) 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-XXXXXXXX-SV For valid part numbers, refer to the website or contact your local sales representative or distributor.

DC28T CONFIGURATIONS

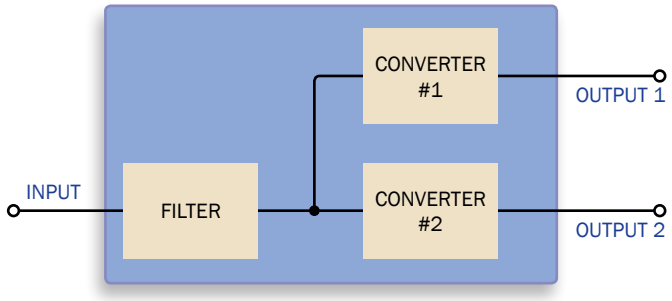
P1 SINGLE OUTPUT



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)

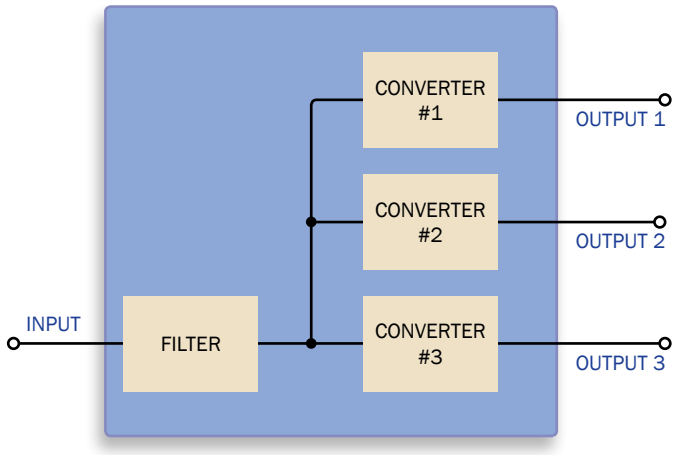
P2 DUAL OUTPUT



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)

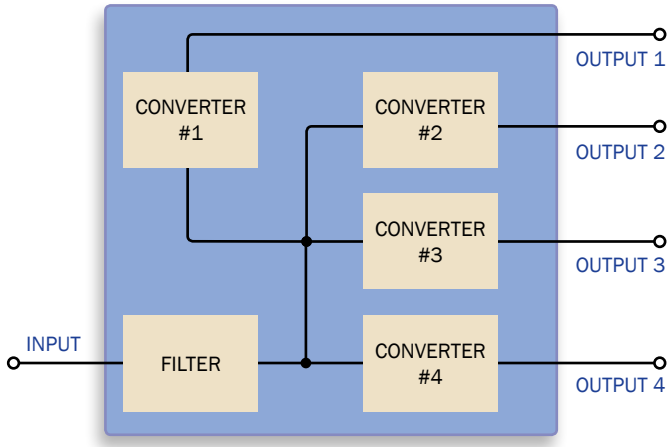
P3 TRIPLE OUTPUT



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)

MultiQor™

Configurable DC-DC Power Conversion

MultiQor Configurable Multi-Output 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-810G requirements.

Operational Features

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

Optional Features

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

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)

Protection Features

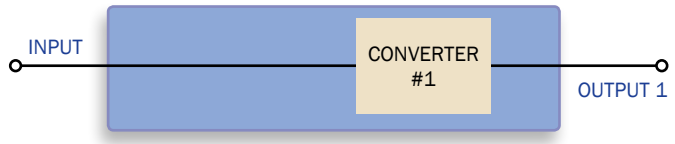
- Input under-voltage lockout
- Output current limit and short circuit protection
- Output over-voltage protection
- Thermal shutdown
- Automatic restart for all of the above
- Active back bias current limit

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	**DC28:** N/A	8 Digit Application Identification Number	**S:** S-Grade	**Blank:** Standard **V:** Cover

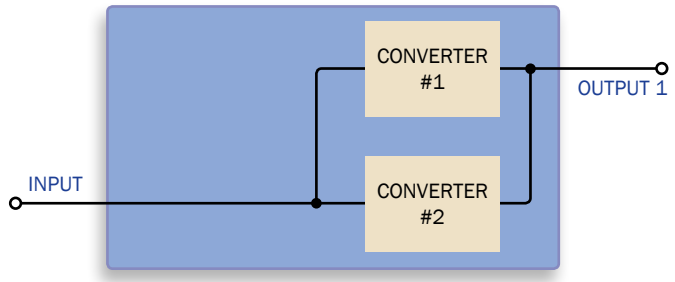
Part Numbering Example: MTQ-P3-DC28-XXXXXXXX-SV For valid part numbers, refer to the website or contact your local sales representative or distributor.

DC28 CONFIGURATIONS

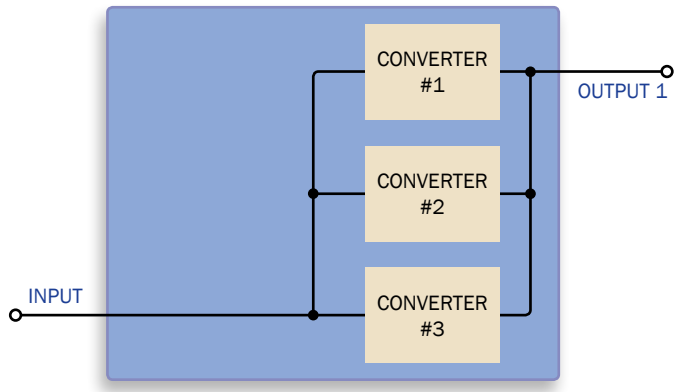
P1 **SINGLE**



P2 **DUAL**



P3 **TRIPLE**



P1 DC-DC CONVERTER OPTIONS:

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

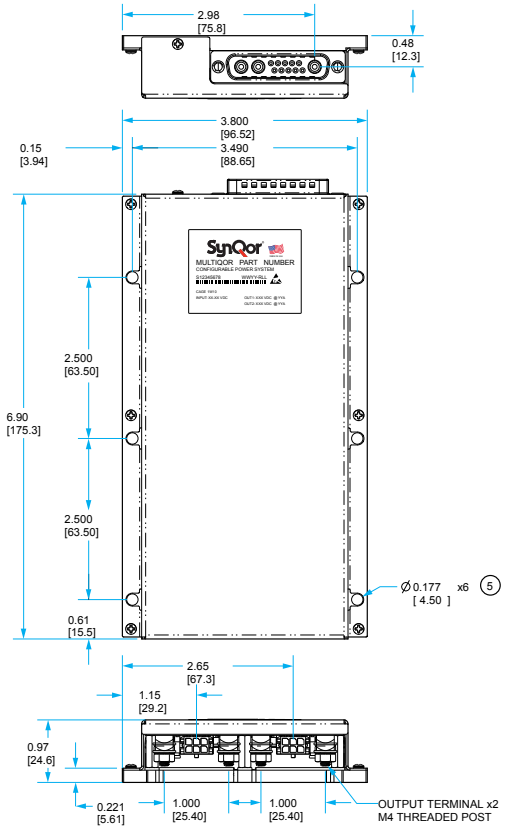
P2 DC-DC CONVERTER OPTIONS:

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

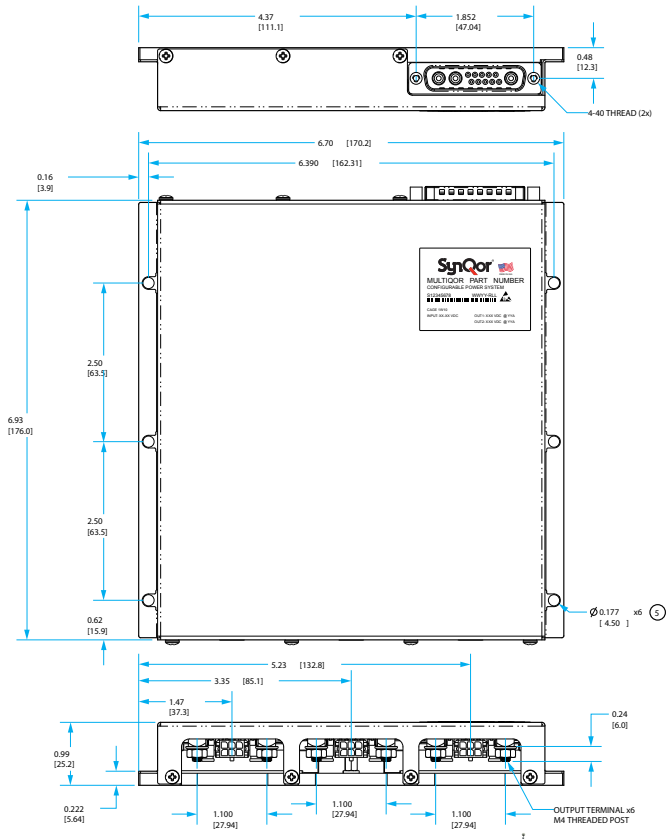
P3 DC-DC CONVERTER OPTIONS:

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

P1 & P2 HAVE SIMILAR COVERS



P3 & P4 HAVE SIMILAR COVERS



MultiQor™

Configurable AC-DC Power Supplies

MultiQor Configurable Multi-Output Military AC-DC Power Supplies

The MultiQor Plate format of input-filtered 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 converter and AC Line filters, this supply is designed to comply with MIL-STD-704, MIL-STD-1399 and MIL-STD-461 for EMC for an AC115Vin system. The complete assembly is designed to withstand the harsh environments of the Military and Aerospace industries and is compliant with MIL-STD-810G requirements.

Operational Features

- Internal EMI filter with ceramic stabilizing bulk cap
- High efficiency converters (90%-95%)
- Fixed frequency switching provides predictable EMI
- No minimum load requirement
- Soft start of all outputs

Control Features

- PFC enable (isolated)
- Individual output voltage Inhibit control (isolated)
- Remote Sense for each output voltage
- Output voltage trim for each output
- AC Power Good signal (isolated)

Compliance Features

MultiQor units are designed to meet *(pending)*:

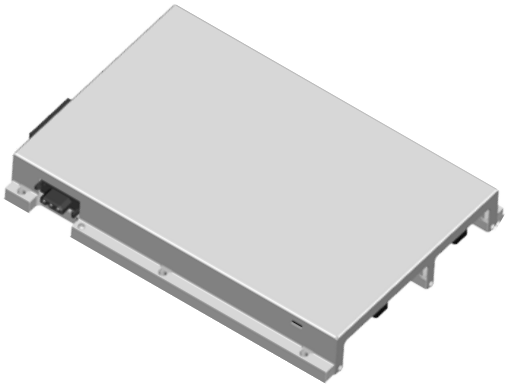
- MIL-STD-704 (A - F) - Aircraft Electrical Power
- Mil-STD-1399-300B - Interface Shipboard
- MIL-STD-461F - Electromagnetic Interference

Protection Features

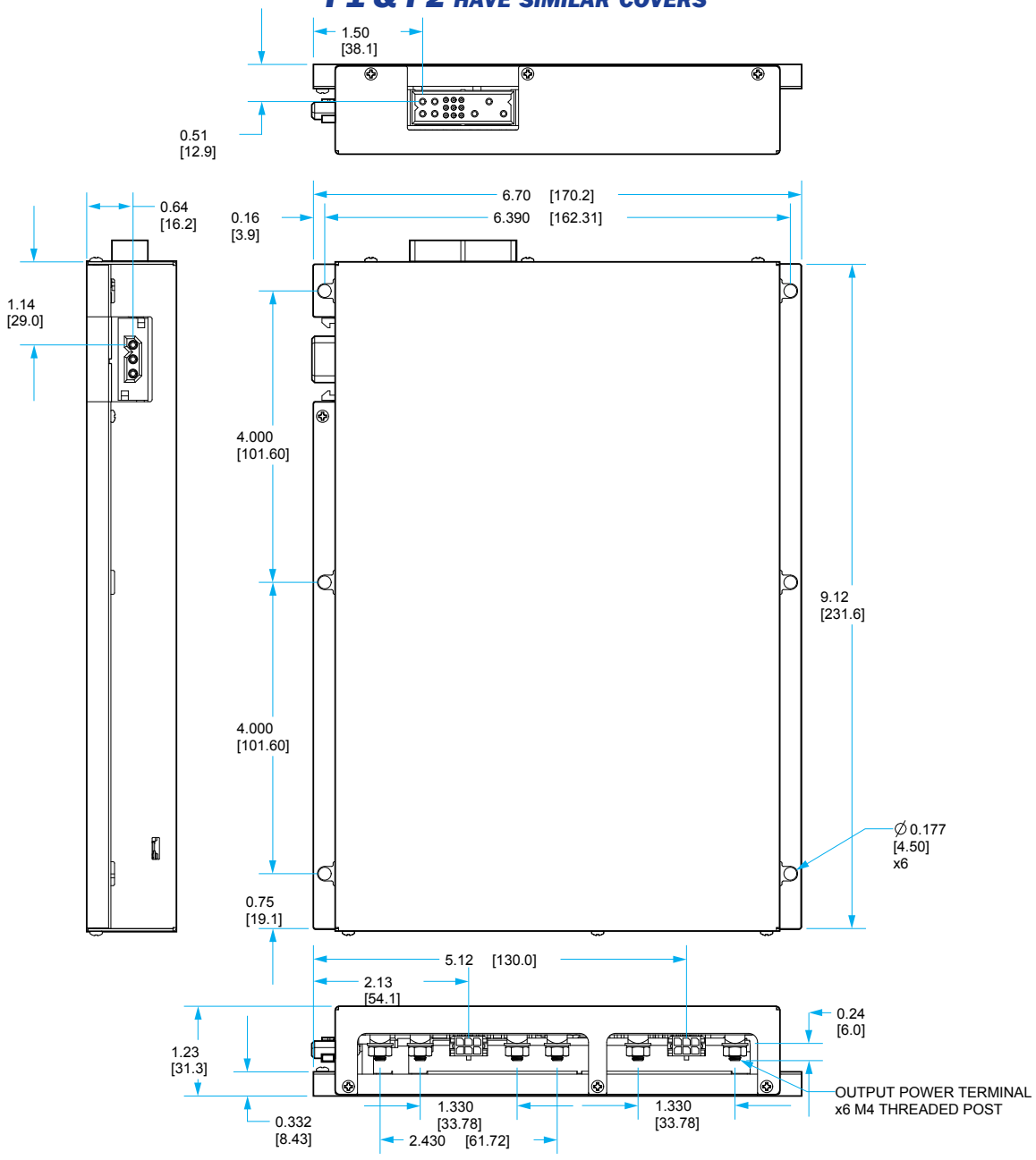
- Input under-voltage lockout
- Output current limit and short circuit protection
- Output over-voltage protection
- Thermal shutdown
- Automatic restart for all of the above
- Active back bias current limit

Family	Plate Format (# of Outputs)	MIL-STD Compliance	8 Digit Application Identification Number	Screening	Housing
MTQ	**P1:** 1 output **P2:** 2 outputs	**AC115:** MIL-STD-704 (A-F) MIL-STD-1399 MIL-STD-461	8 Digit Application Identification Number	**S:** S-Grade **M:** M-Grade	**V:** Cover

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



P1 & P2 HAVE SIMILAR COVERS



InQor® Isolated Converters

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

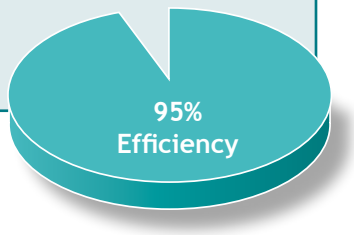
SynQor's ruggedized DC-DC converters and filters are designed for a wide range of industrial applications including those required to withstand harsh environments: railway and transportation systems, industrial motion control, information displays, factory automation and power generation systems. SynQor 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 optional on some models
- Industry standard pin-out configurations and standard footprints
- Operating Temperature -40ºC to +100ºC
- 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 **18:** 9-36V **24:** 18-36V **32:** 9-75V **36:** 18-75V **48:** 34-75V **64:** 18-135V **68:** 12-150V **70:** 34-135V **72:** 42-110V **90:** 34-160V **1B:** 66-160V **2H:** 90-210V **4H:** 180-425V	**012:** 1.2V **015:** 1.5V **018:** 1.8V **025:** 2.5V **033:** 3.3V **050:** 5V **070:** 7V **120:** 12V **150:** 15V **240:** 24V **280:** 28V **300:** 30V **400:** 40V **480:** 48V **500:** 50V	**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

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

SynQor Headquarters 155 Swanson Road, Boxborough, MA 01719-1316 USA | 1.888.567.9596 (USA only) | **www.synqor.com**

PRODUCT MATRIX — INPUT VOLTAGE RATIO

2:1 INPUT RATIO

8:1 INPUT RATIO

Input Voltage Range

9V
18V
25V
34V
75V
100V
170V
475V

IQ12
Input Range: 9-22V
Transient: 25V
Max Power: 182W
Eff: Up to 92%

IQ24
Input Range: 18-36V
Transient: 50V
Max Power: 510W
Eff: Up to 95%

IQ48
Input Range: 34-75V
Transient: 100V
Max Power: 602W
Eff: Up to 95%

IQ72
Input Range: 42-110V
Max Power: 255W
Eff: Up to 93%

IQ32
Input Range: 9-75V
Transient: 100V
Max Power: 255W
Eff: Up to 91%

IQ64
Input Range: 18-135V
Max Power: 200W
Eff: Up to 91%

IQ1B
Input Range: 66-160V
Transient: 170V
Max Power: 255W
Eff: Up to 93%

IQ2H
Input Range: 90-210V
Transient: 250V
Max Power: 150W
Eff: Up to 90%

IQ4H
Input Range: 180-425V
Transient: 475V
Max Power: 600W
Eff: Up to 90%

4:1 INPUT RATIO

12:1 INPUT RATIO

Input Voltage Range

9V
12V
18V
34V
75V
170V

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%

IQ70
Input Range: 34-135V
Max Power: 240W
Eff: Up to 93%

IQ90
Input Range: 34-160V
Max Power: 228W
Eff: Up to 94%

IQ68
Input Range: 12-150V
Transient: 170V
Max Power: 53W
Eff: Up to 90%

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
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 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						

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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

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

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 Packages" on page MECH-82 for package outlines.

InQor® 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 Packages" on page MECH-82 for package outlines.

ACuQor®

AC-DC Power Supplies

E-Series *G-Series*

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

The ACuQor product line offers the 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 3.5" x 5.25" x 1.63". The G-Series provides 1400W of useable power in a 4.756" x 7" 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

Protection/Control Features

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

ACuQor Isolated DC-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	**Industrial Grade** **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		
	G-Series *(Single Output)* (4.75″ x 7″ x 1.65″ 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″ x 5″ x 1.45″ Open Frame Package) 12V, 24V, 36V or 48V (includes 5V@50mA standby)	300W (400W Transient)	400W (500W Transient)	500W (700W Transient)
	E-Series *(Triple Output)* (3.59″ x 5.25″ x 1.65″ Encased Package) 12V, 24V, 36V or 48V (includes 5V@2A and 12V@4.2A)	300W (400W Transient)	400W (500W Transient)	500W (700W Transient)

NiQor®

High-Volatage 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 IBA, 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.

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

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

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

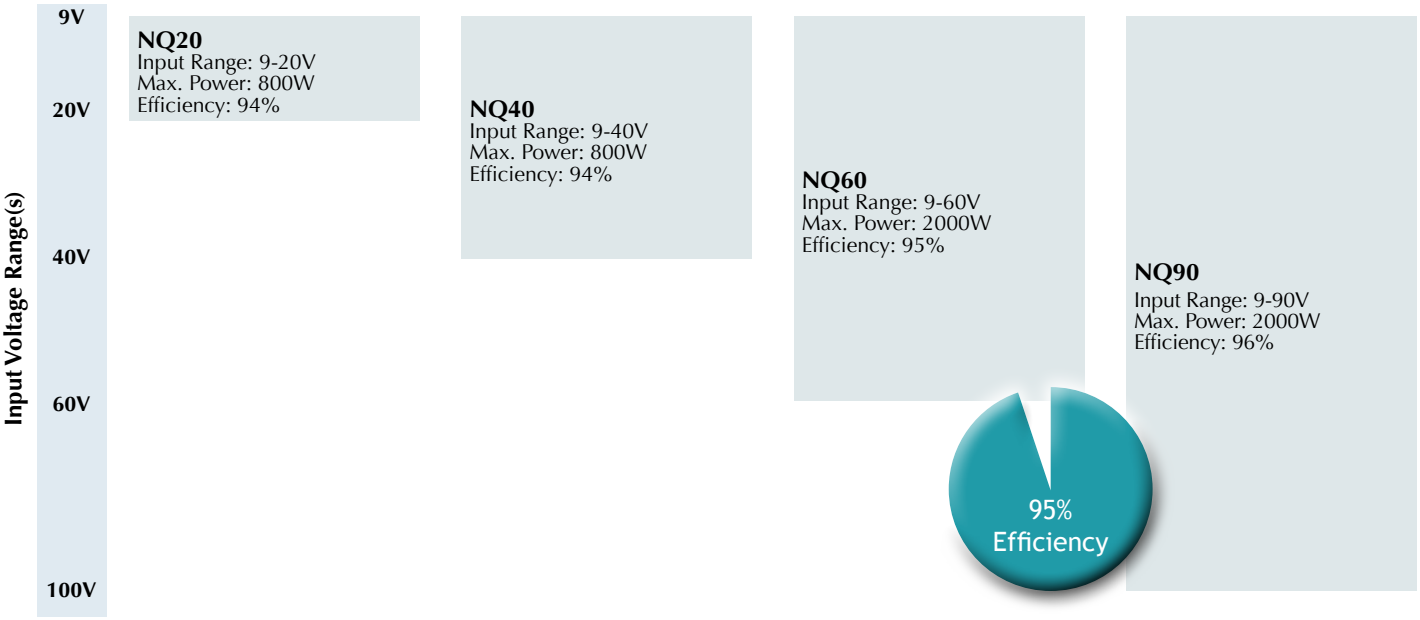
NiQor® HI-VOLTAGE LISTED BY PACKAGE & OUTPUT VOLTAGE

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
9-100Vdc 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.

PFCQor®

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 (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 environments seen in many industrial and transportation environments.

Operational Features

- Universal input voltage range: 85-264Vrms
- Universal input frequency range: 45 - 65Hz / 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

PFCQOR POWER FACTOR CORRECTION

Family	Vin Range	Vout	Package Size	Performance Level	Thermal Design	Output Power	Input Phases	Pin Style	Feature Set
PFC	**U**: 85-264 Vrms	**390**: 390V	**H**: Half-brick	**P**: Peta	**C**: Encased **D**: Encased, Non-threaded Baseplate **V**: Encased, Flanged Baseplate	**07:**700W	**S**: Single-Phase	**R**: 0.180"	**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 Packages" on page MECH-82 for package outlines.

InQor®
AC Filters

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.

RailQor® Isolated 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 -40ºC to +100ºC
- 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

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

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 fully cover 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)

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

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
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
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

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)

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

APPLICATIONS

VIDEO SURVEILLANCE SYSTEMS

CABIN ELECTRICAL EQUIPMENT

LED INFORMATION DISPLAYS

DOOR CONTROL

ENTERTAINMENT SYSTEMS

WIRELESS & RADIO COMMUNICATIONS

INTERNAL & EXTERNAL LIGHTING

ACCESS & TICKETING MACHINES

BRAKING CONTROL

MOTOR DRIVE CONTROLLERS

EMBEDDED COMPUTER SYSTEMS

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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

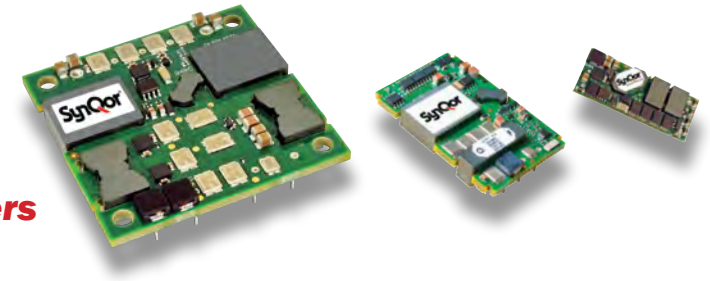
Testing Type	Units	Test Conditions
Vibration	5	EN 61373:1999 Category I, Class B, Body mounted
Life Test	30	95% rated Vin and load, units at derating point, 1000 hours
Cold	5	EN 60068-2-1:2007
Dry Heat	5	EN 60068-2-2:2007
Mechanical Shock	5	EN 61373:1999 Category I, Class B, Body mounted
Temperature 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			RailQor Capabilities		
Nominal	**Continuous Input**	**Transient Input**	**Family**	**Continuous Input**	**Transient Input**
24V	17V – 30V	14V – 34V	**RQ18**	9V – 36V	9V – 40V (100ms)
72V	50V – 90V	43V – 101V	**RQ72**	42V – 110V	42V – 110V
110V	77V – 137V	66V – 160V	**RQ1B**	66V – 160V	66V – 200V (100ms)
24V – 110V	17V – 137V	14V – 160V	**RQ68**	12V – 155V	12V – 170V (100ms)

PowerQor®
Isolated Converters



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

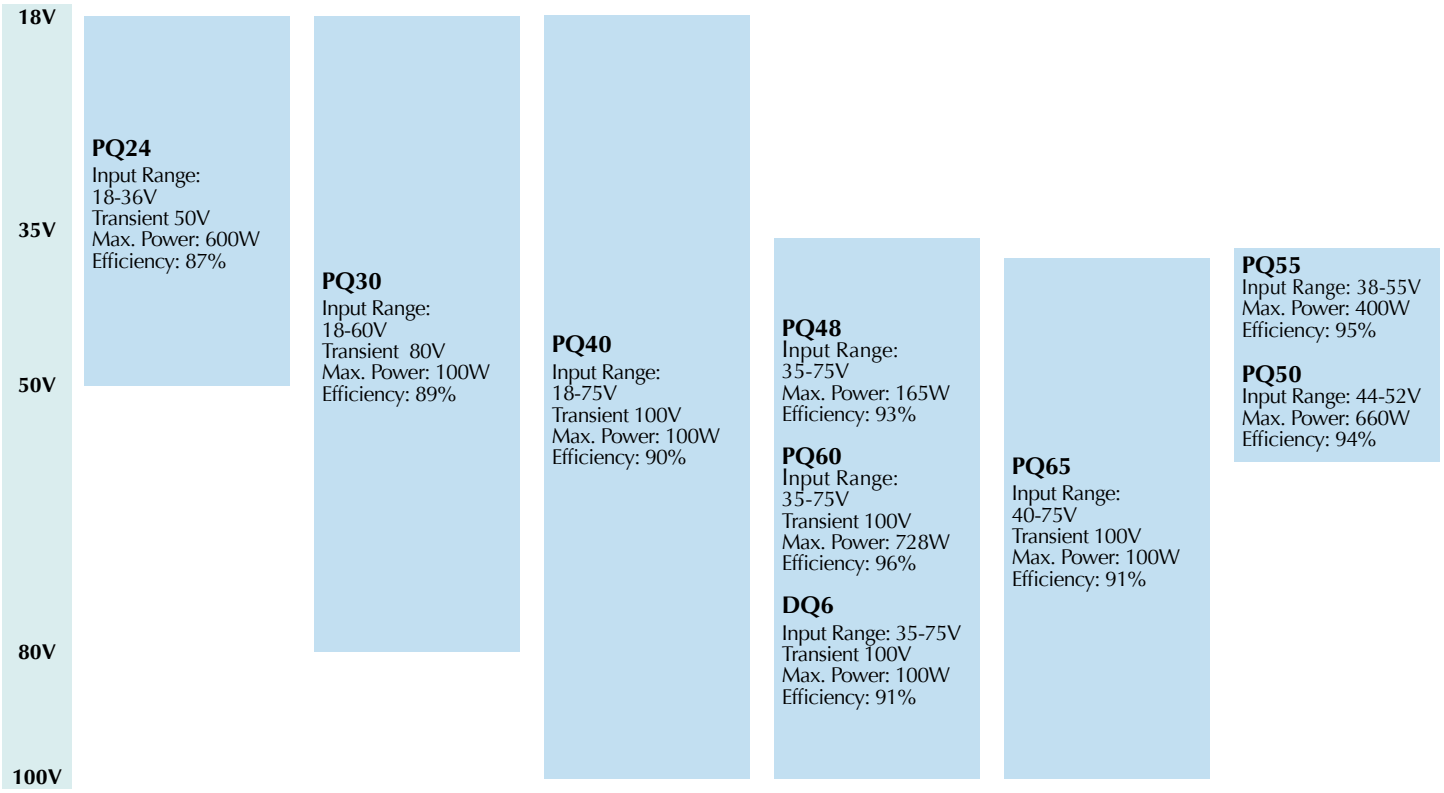
- Ultra-high efficiency up to 97%
- Wide input voltage ranges:
  - 18-36V (PQ24)
  - 18-60V (PQ30)
  - 18-75V (PQ40)
  - 35-75V (PQ48, PQ60, DQ6)
  - 44-52V (PQ50)
  - 38-55V (PQ55)
  - 40-75V (PQ65)
- Withstand up to 100V, 100ms input voltage transient (PQ60, PQ40 models only)
- Fixed frequency switching, 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 -40ºC to +100ºC
- 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 Iin (typ.) rms
- Switching Frequency 200 - 300kHz
- Isolation Voltage Up to 2250Vdc
- Industry standard pin-out configurations and standard footprints



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:** 48 V **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 **50:** 5.0V	**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 Packages" 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
Quarter Brick QGL		25A 83W					
Quarter Brick 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
	25A 83W
Eighth Brick EGA	20A 66W

PQ55

Vout	7V	53V	54V
48Vdc Input (38-55Vdc Input Range)			
Half Brick HZB	52A 364W		
Half Brick HEB		7.6A 400W	
Half Brick 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
Half Brick HGA	40A 60W	40A 72W	40A 80W	40A 100W	40A 132W	30A 150W			12A 144W	10A 150W
Half Brick HMA	30A 45W	30A 54W	30A 60W	30A 75W	30A 99W	25A 125W				
Half Brick 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	
Half Brick HPA	50A 250W				
Half Brick HTA					10A 180W
Quarter Brick QGB			11A 99W		

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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		

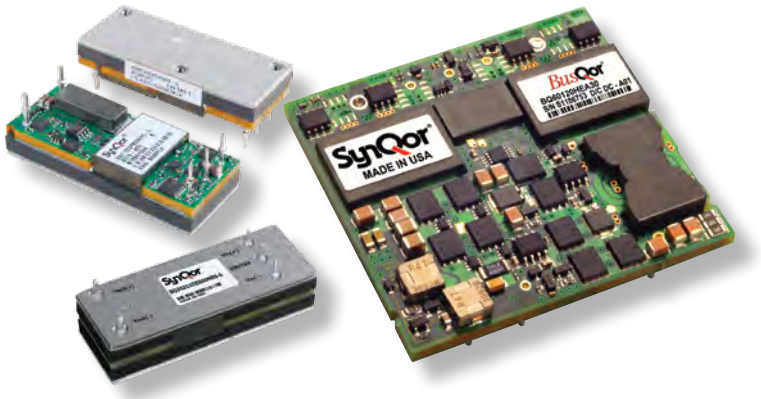
DualQor®

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	

BusQor®

Isolated BUS Converters



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

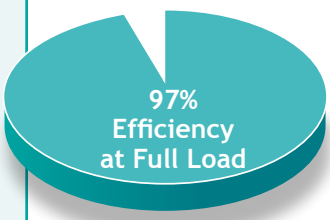
The BusQor bus converters are the next-generation, board-mountable, isolated, fixed switching frequency DC-DC converters that uses synchronous rectification to achieve extremely high conversion efficiency. The power dissipated by the converter is so low that a heatsink is not required, which saves cost, 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 IBA.

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 -40ºC to +100ºC
- Encased Operating Temp. -55ºC to +100ºC
- 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							Option Descriptions		
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.

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Input Voltage Range	UN-REGULATED		SEMI-REGULATED	FULLY-REGULATED
35V – 55V	**BQ50** Input Range: 42-53V Max. Power: 331W Efficiency: 96%	**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%
100V – 230					
230 – 400V	**BQ352** Input Range: 330-365V Transient: 450V Max. Power: 600W Efficiency: 95%	**BQ4H** Input Range: 230-400V Transient: 450V Max. Power: 3040W Efficiency: 97%			

BQ55

Vout	9.6V	12V
48Vdc Input (35-55Vdc Input Range)		
Quarter Brick – QZB	84A 537-873W	67A 552-885W
Quarter Brick – QEx	60A 390-624W	50A 412-662W
Quarter Brick – QPA	43A 280-451W	
Quarter Brick – QTA	240W** 22-36A	
Eighth Brick – EZB	48A 312-500W	38A 313-503W
Eighth Brick – EPA	35A 228-367W	
Eighth Brick – ETx	27A 189-297W	20A 175-275W
Eighth Brick – 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)		
Half Brick – HZx		50A 600W
Quarter Brick – QZB		40A 480W
Quarter Brick – QPB		33A 396W
Quarter Brick – QPx	55A 330W	28A 336W
Quarter Brick – QEx		25A 300W
Eighth Brick – EPB		25A 300W
Eighth Brick – ETA		20A 240W
Eighth Brick – ETA		17A 204W

BQ60/PQ60

Vout	12V
48Vdc Input (35-75Vdc Input Range, Transient 100Vdc)	
Half Brick – HZx	50A 600W
Half Brick – HEx	30A 360W
Quarter Brick – QZB	33A 400W
Quarter Brick – QEx	25A 300W
Quarter Brick – QEx	17A 204W

BQ50

Vout	12V
48Vdc Input (42-53Vdc Input Range)	
Quarter Brick – QTA	20A 210-265W
Quarter Brick – QTA	25A 263-331W

BQ57

Vout	9V	10.5V	12V
48Vdc Input (40-65Vdc Input Range)			
Quarter Brick – QZB	84A 621-1044W		67A 636-1050W
Quarter Brick – QEx		60A 450-750W	50A 475-787W
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	48V
385Vdc Input (230-400Vdc Input Range, Transient 155-450Vdc)		
Half Brick – HTC	80A 1048W	
Extended Eighth Brick – EEC	45A 589.5W	
Full Brick – FTC		64A 3040W

NiQor®

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 -40ºC to +105ºC
- 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

Protection/Control Features

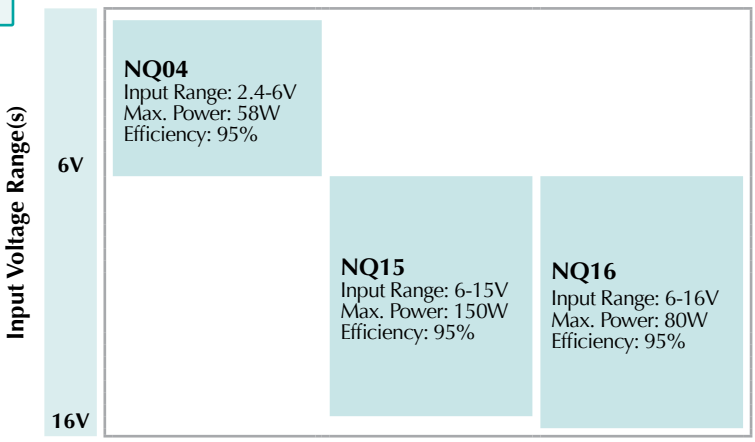
- Input under-voltage lockout (UVLO)
- Output current limit (OCP) and short circuit protection
- Output over-voltage protection (OVP)
- Thermal shutdown (OTP)
- On/Off control referenced to input side
- Output voltage trim (industry std. trim equations)

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



SynQor Headquarters 155 Swanson Road, Boxborough, MA 01719-1316 USA | 1.888.567.9596 (USA only) | **www.synqor.com**

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
6.0-16Vin	SIP	10A 50W	
		16A 80W	
	SMT	10A 50W	
		16A 80W	

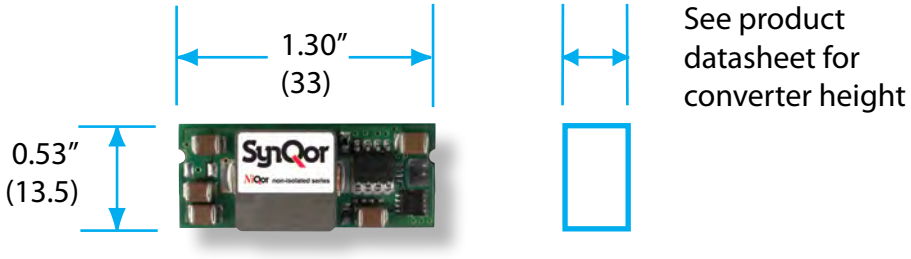
NIQOR NON-ISOLATED DC-DC CONVERTER

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″ SIP Std **V:** 0.160″ Rev. Vert. **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.

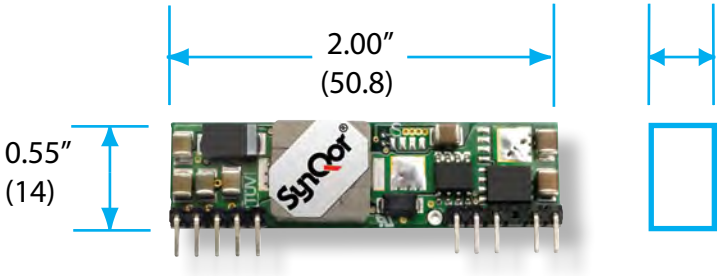
NiQor products are available in SIP and SMT packages. SIPS package options include vertical and horizontal mounting pins. See website for data sheets with more details.

NQ SURFACE MOUNT CONVERTER



See product datasheet for converter height

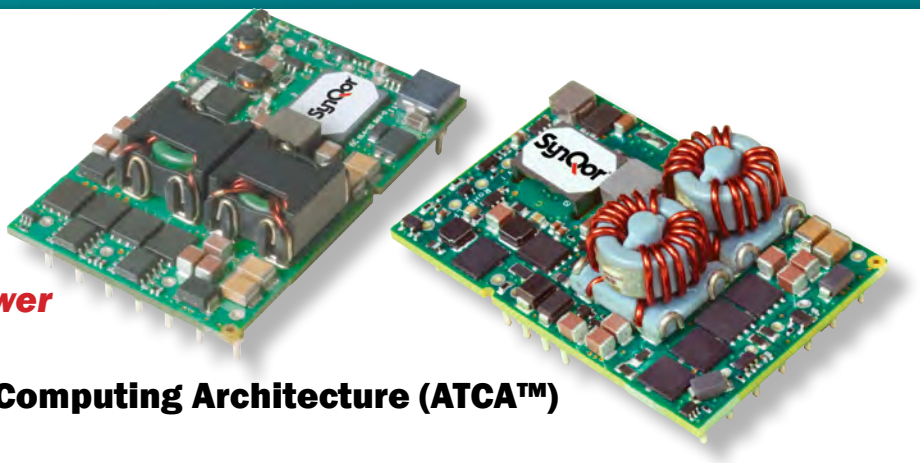
NQ SIPS CONVERTER



See product datasheet for converter width

iQor™

Advanced Telecom Power



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

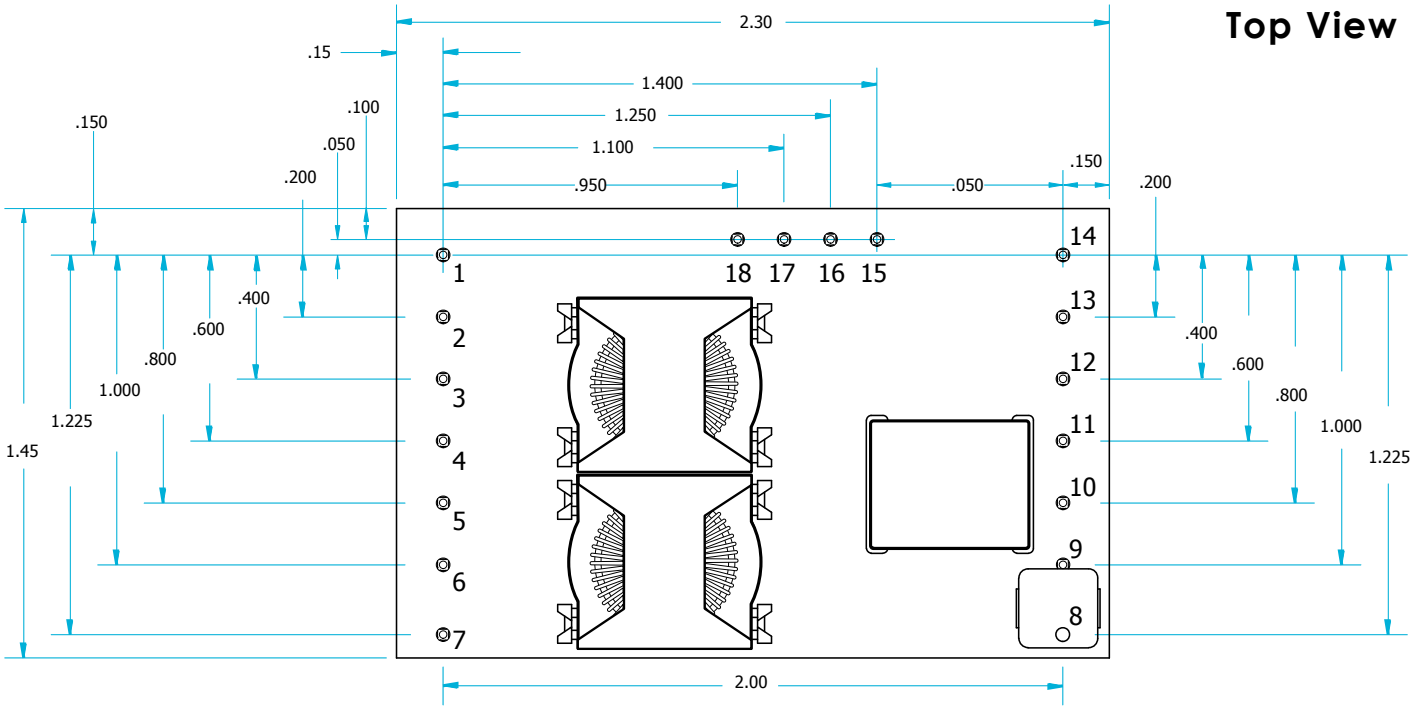
Threshold Protocols	Pin Length	Feature Set
S: Standard (ATCA) **N:** NEDS (Mega only) **E:** ETSI	**K:** 0.110″ **N:** 0.145″ **R:** 0.180″ **Y:** 0.250″	**S:** Standard Feature **F:** Full Feature

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**

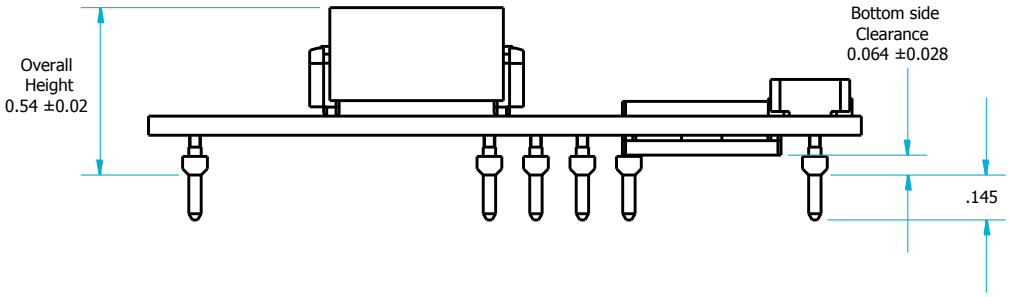
Part Numbering Example: IQ6503QMA10SNS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

Top View



Drawing is for the QM/QG Models only

Side View



Pin No.	Name	Function
1	-48V_A	Negative 48V A feed
2	-48V_B	Negative 48V B feed
3	VRTN_A	48V Return A feed
4	VRTN_B	48V Return B feed
5	ENABLE_A	Enable A feed
6	ENABLE_B	Enable B feed
7	SHELF_GND	Shelf ground
8	5.0V	+5.0V Management power
9	3.3V	+3.3V Management power
10	I2C_ADR	Address (Full feature version)
11	I2C_DAT	Data (Full feature version)
12	I2C_CLK	Clock (Full feature version)
13	LOGIC_GND	Logic ground
14	ALARM	Alarm
15	-48V_OUT	Negative 48V output
16	HU_TRIM	Hold-up voltage trim
17	VRTN_OUT	Positive 48V output
18	HU_CAP	Hold-up capacitor connect

CFQor™

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 that comply with IEC60601-1 for CF patient contact and 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.

ACuQor®

Medical Grade AC-DC Power Supplies

E-Series *G-Series*

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

The ACuQor product line offers the 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 3.5" 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 4.756" x 7" x 1.63" package. The medical grade version meets 60601-1 medical safety specs 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: 0ºC - 70ºC

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

ACUQOR ISOLATED DC-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	**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.

MEDICAL GRADE

Output Voltage	Power Rating		
G-Series *(Single Output)* (4.75″ x 7″ x 1.65″ 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″ x 5″ x 1.45″ Open Frame Package) 12V, 24V, 36V or 48V (includes 5V@50mA standby)	300W (400W Transient)	400W (500W Transient)	500W (700W Transient)
E-Series *(Triple Output)* (3.59″ x 5.25″ x 1.65″ 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 a higher power and multiple outputs.

Double/Triple Stacked

- Double Package: S, Thermal Design: C
  - — Small size: 3.5″ x 5.25″ x 3.25″
  - — 600W/800W @ 12V, 24V, 36V or 48V
- Triple Package: U, Thermal Design: C
  - — Small size: 3.5″ x 5.25″ x 4.875″
  - — 900W/1200W @ 12V, 24V, 36V or 48V

Double/Triple Flat

- Double Package: R, Thermal Design: C
  - — Small size: 6.75″ x 5.25″ x 1.625″
  - — 600W/800W/1000W @ 12V, 24V, 36V or 48V
- Triple Package: T, Thermal Design: C
  - — Small size: 10″ x 5.25″ x 1.625″
  - — 900W/1200W/1500W @ 12V, 24V, 36V or 48V

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)	

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		
$115V_{rms}$ (NEMA 5-20R Receptacle)	**SYN-9131**	**SYN-9135**
Hardwire	**SYN-9130**	
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**	

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 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**

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; 25 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

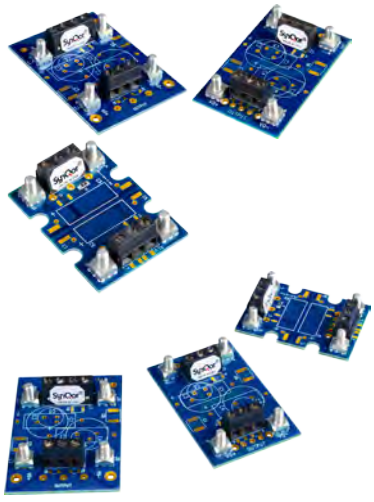
ACUQOR CABLES

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	

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.

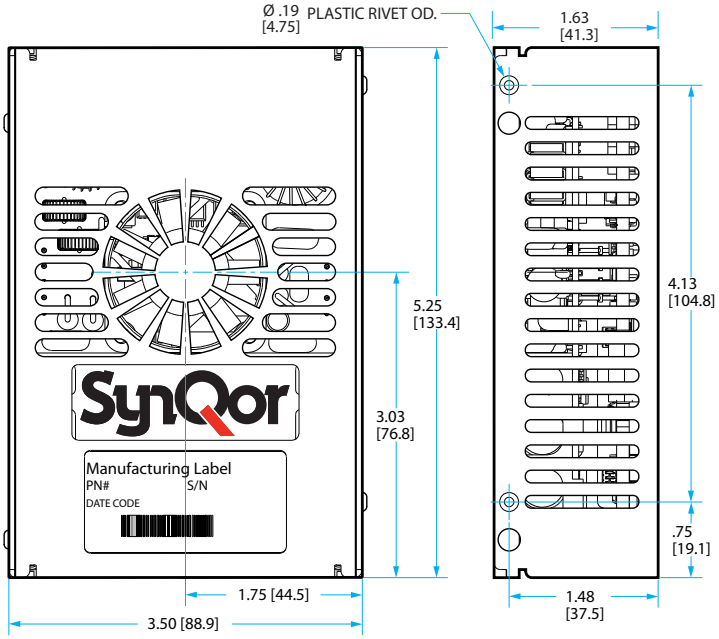


	Converters	Passive Filters	Transient Suppression Filters	AC Line Filters	Power Factor Correctors
Sixteenth Brick Adaptor	SBI-00				
Demi Brick Adaptor	DBI-00	DBI-02			
Quarter Brick Adaptor	QBI-00	QBI-02			
Half Brick Adaptor	HBI-00	HBI-02	HBI-03	HBI-04	HBI-05
Full Brick Adaptor	FBI-00				

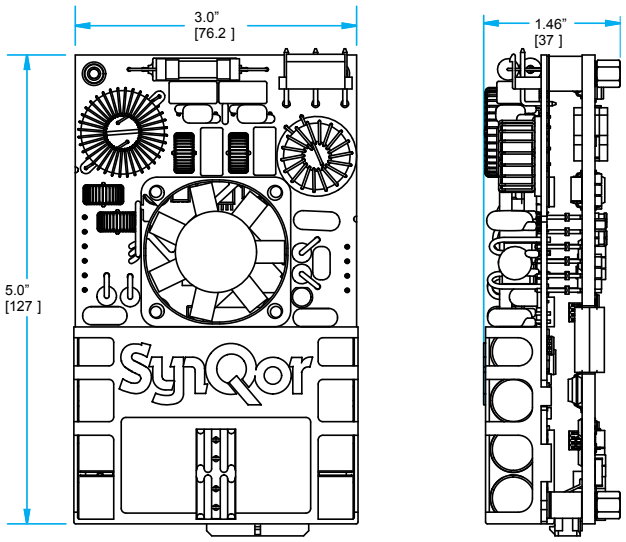
Notes:
1. Other Accessories are also available -- for further information contact Power@SynQor.com
2. Slide Rail Kit (SYN-9002) is not recommended for transit and ruggedized use.
3. Fixed Bracket Kit (SYN-9031) with Transit Case (SYN-9410 or SYN-9412) is required for transit and ruggedized use (qualified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

E-Series Packages

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



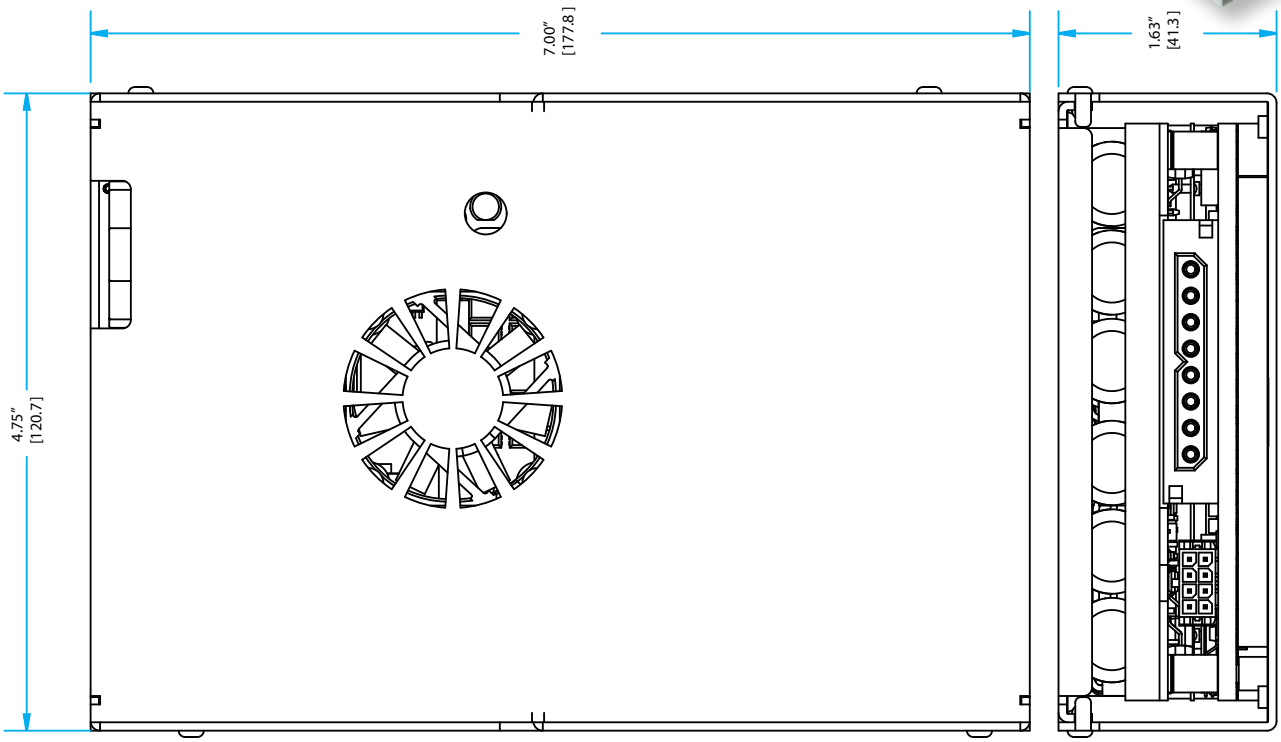
Encased Units



Open Frame Units

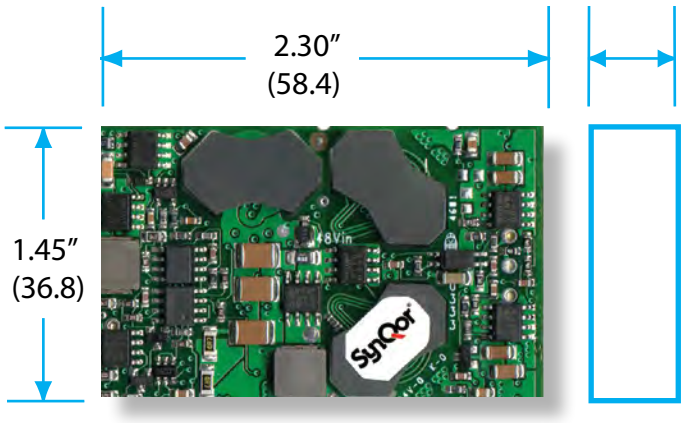
G-Series Packages

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

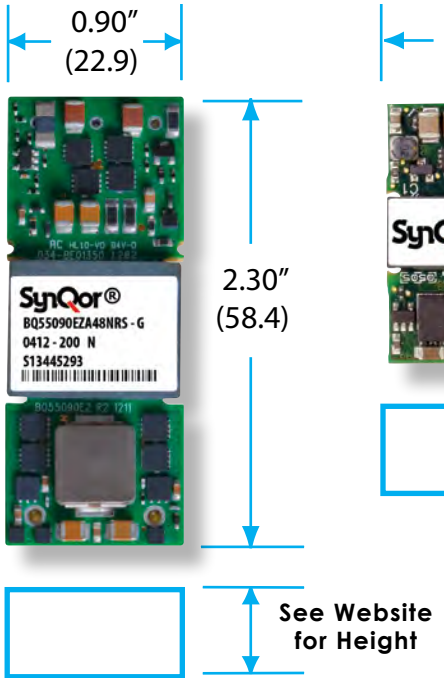


PowerQor, DualQor and **BusQor** products are available in a variety of industry standard sizes/pinouts depending on power level and features. All units are available in open frame configurations as shown below. Many units are also available with varying configurations of base plates and mounting features.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

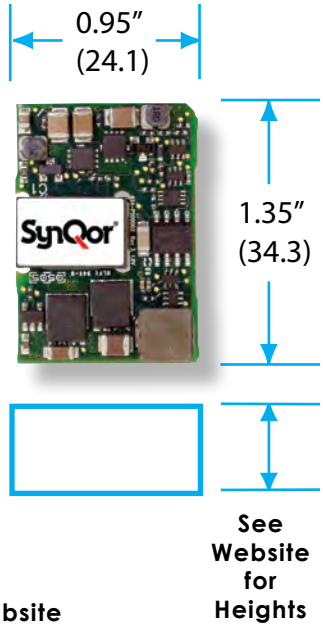
QUARTER BRICK

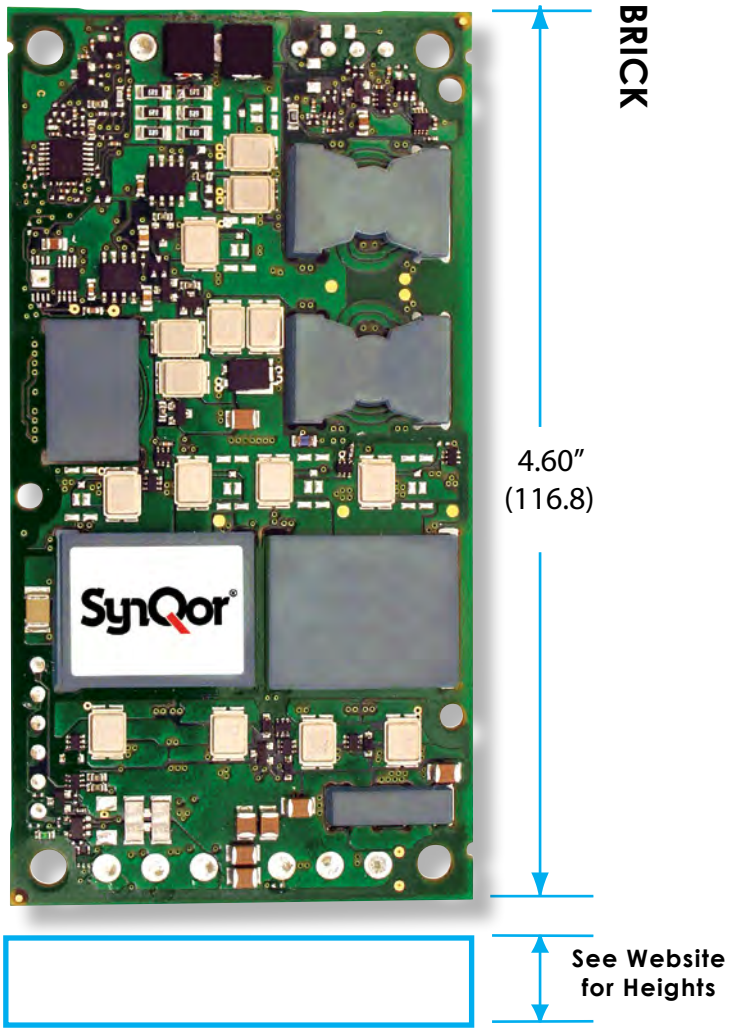


EIGHTH BRICK

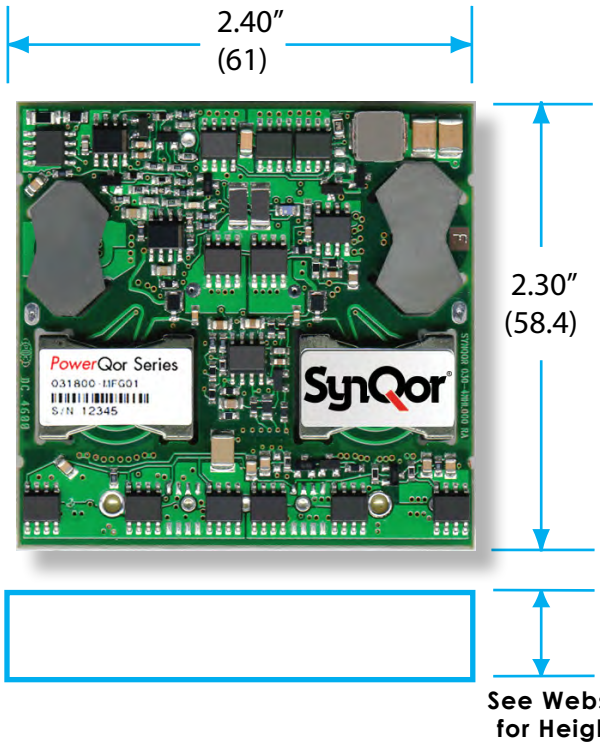


SIXTEENTH BRICK





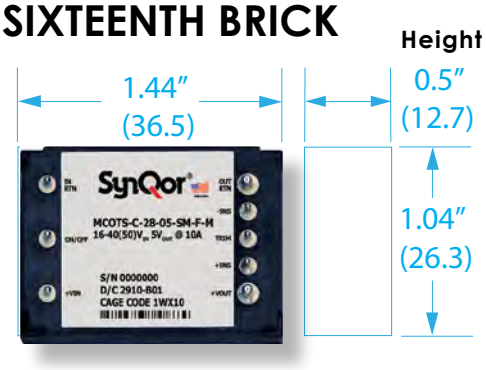
HALF BRICK



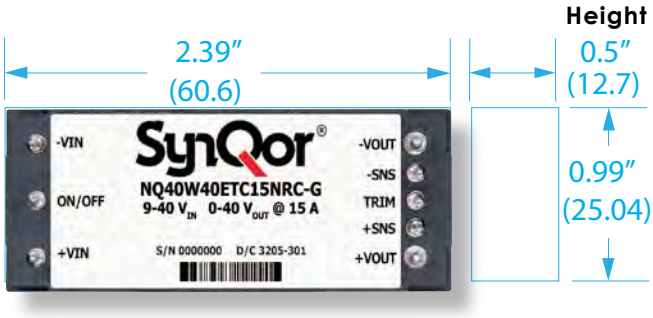
Encased Package Configurations

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.

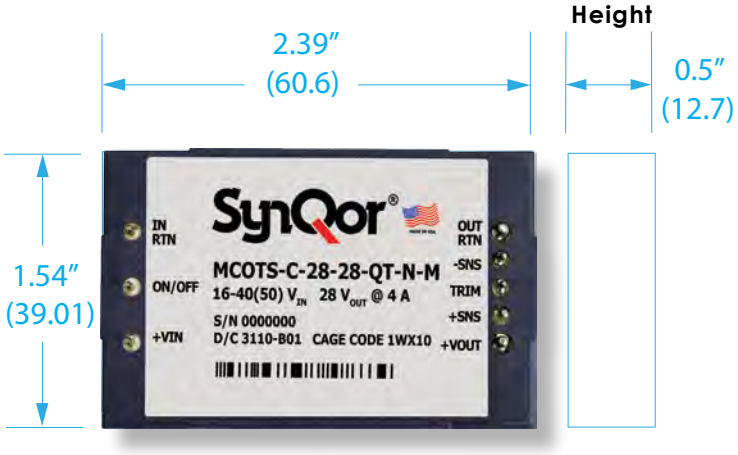
SIXTEENTH BRICK



EIGHTH BRICK

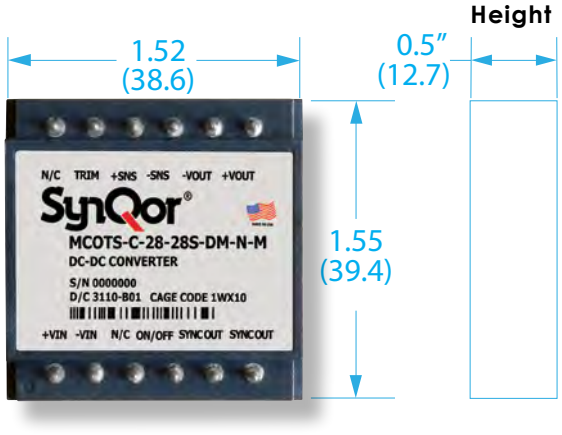


QUARTER BRICK

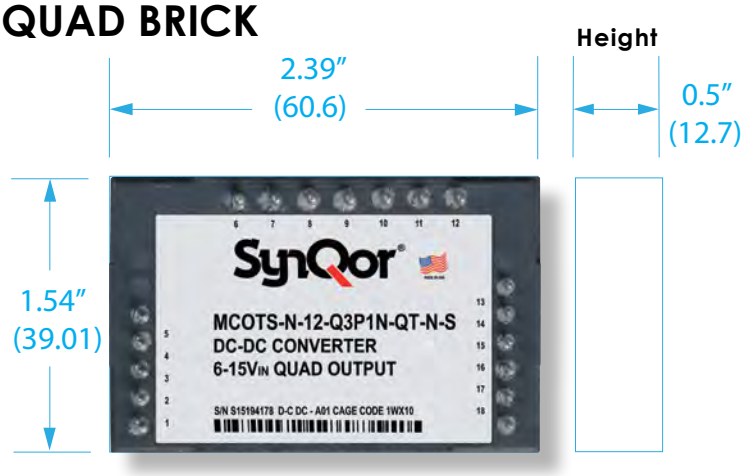


Flanged versions available. See the website for details

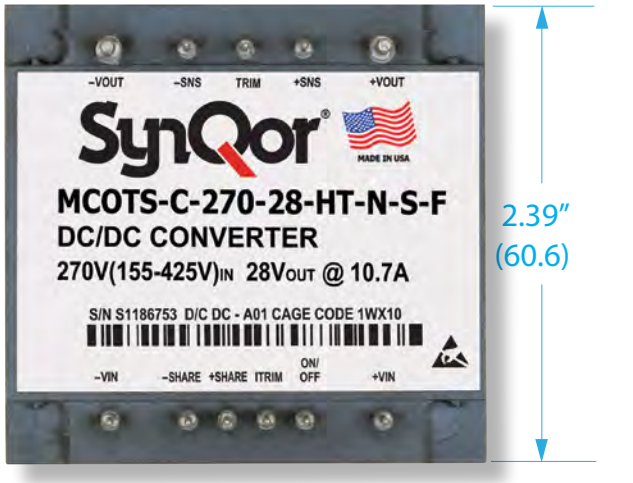
DEMI BRICK



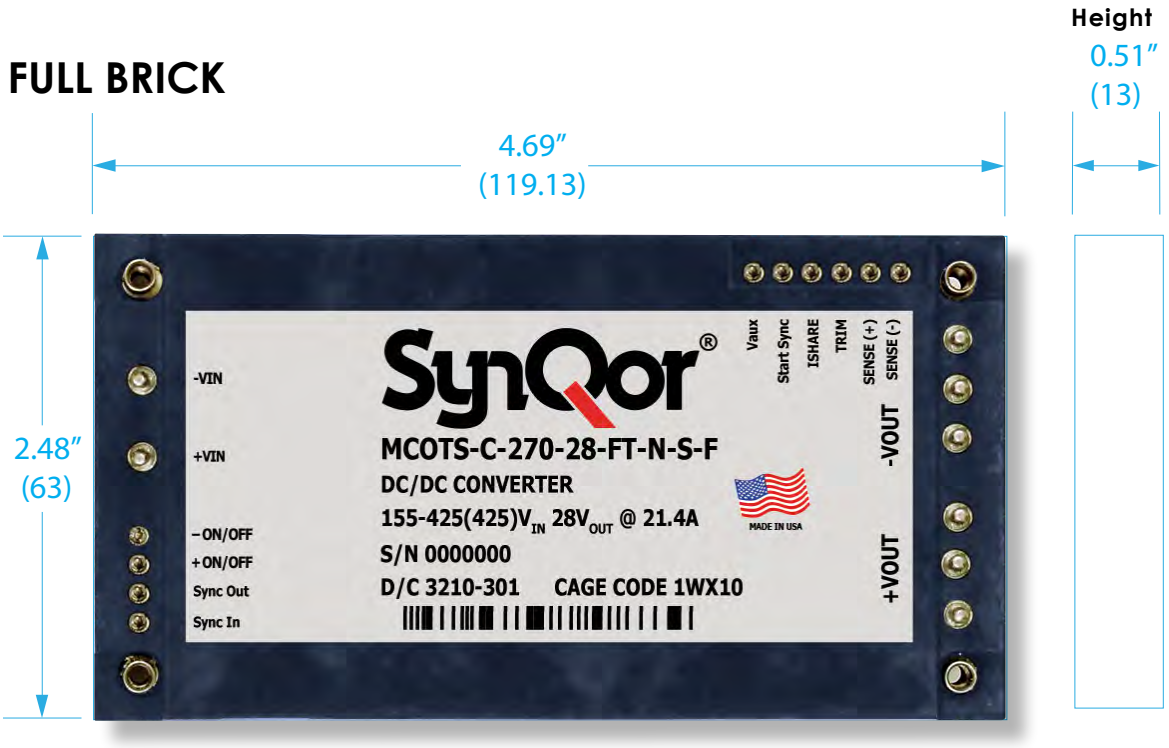
QUAD BRICK



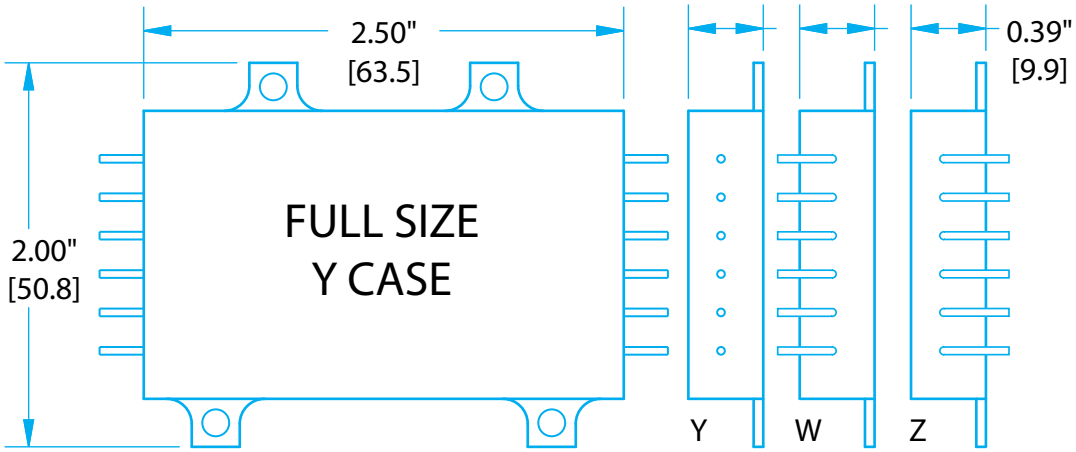
HALF BRICK



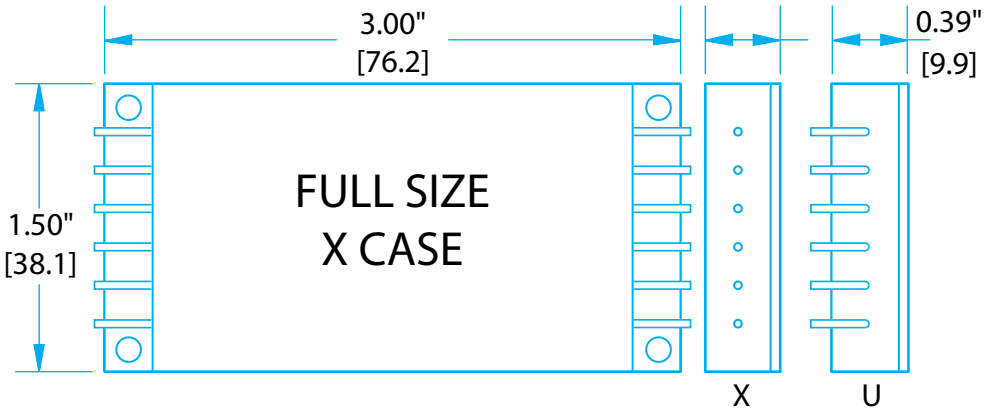
FULL BRICK



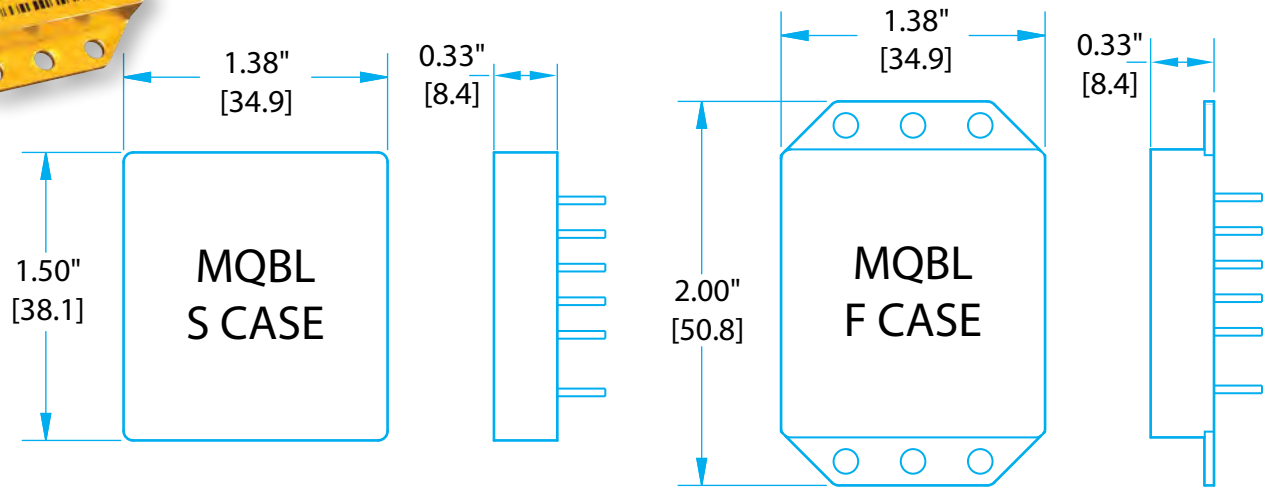
Hi-Rel products are available in a variety of package mounting and lead form configurations. See website for data sheets with more details.

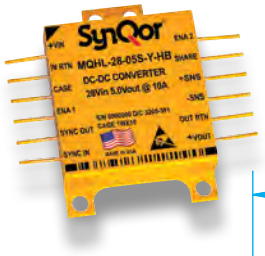


FL/ME PACKAGE

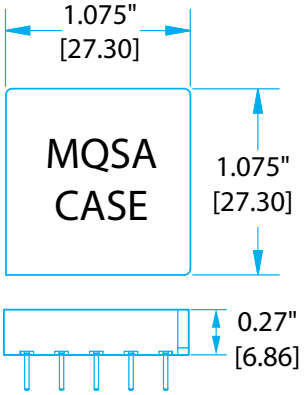


BL PACKAGE

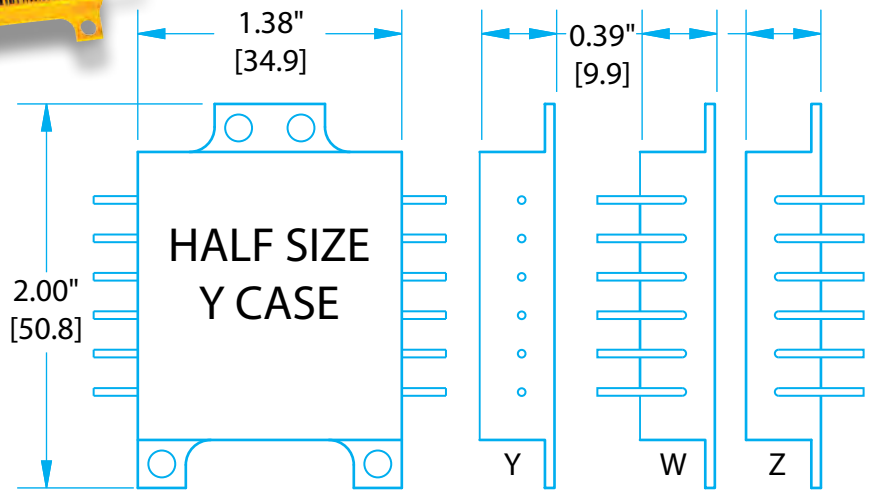


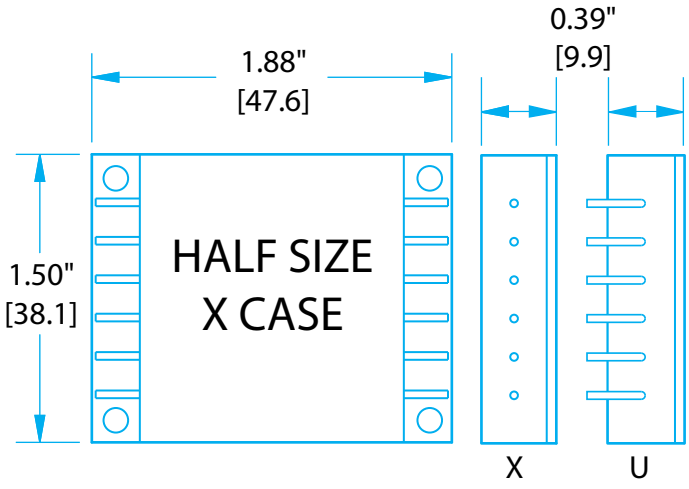


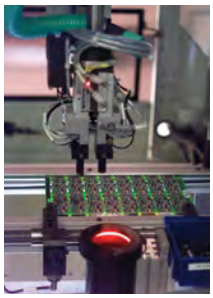
SA PACKAGE

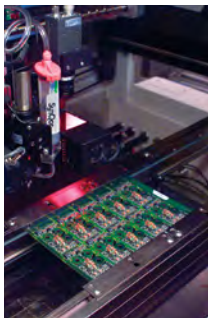


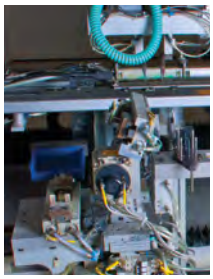
HL/HR/HE PACKAGE





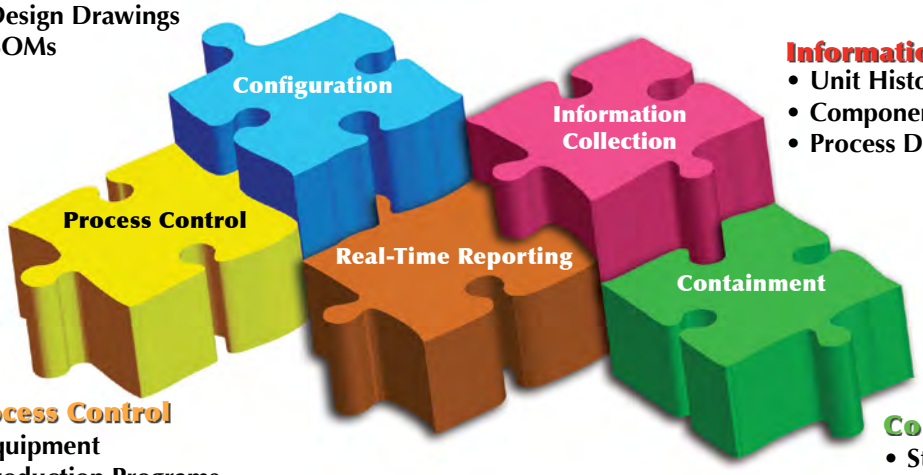






Integrates Business Processes & Enforces Process Adherence

Configuration Control
- Documentation Control
- Manufacturing Routings
- Design Drawings
- BOMs

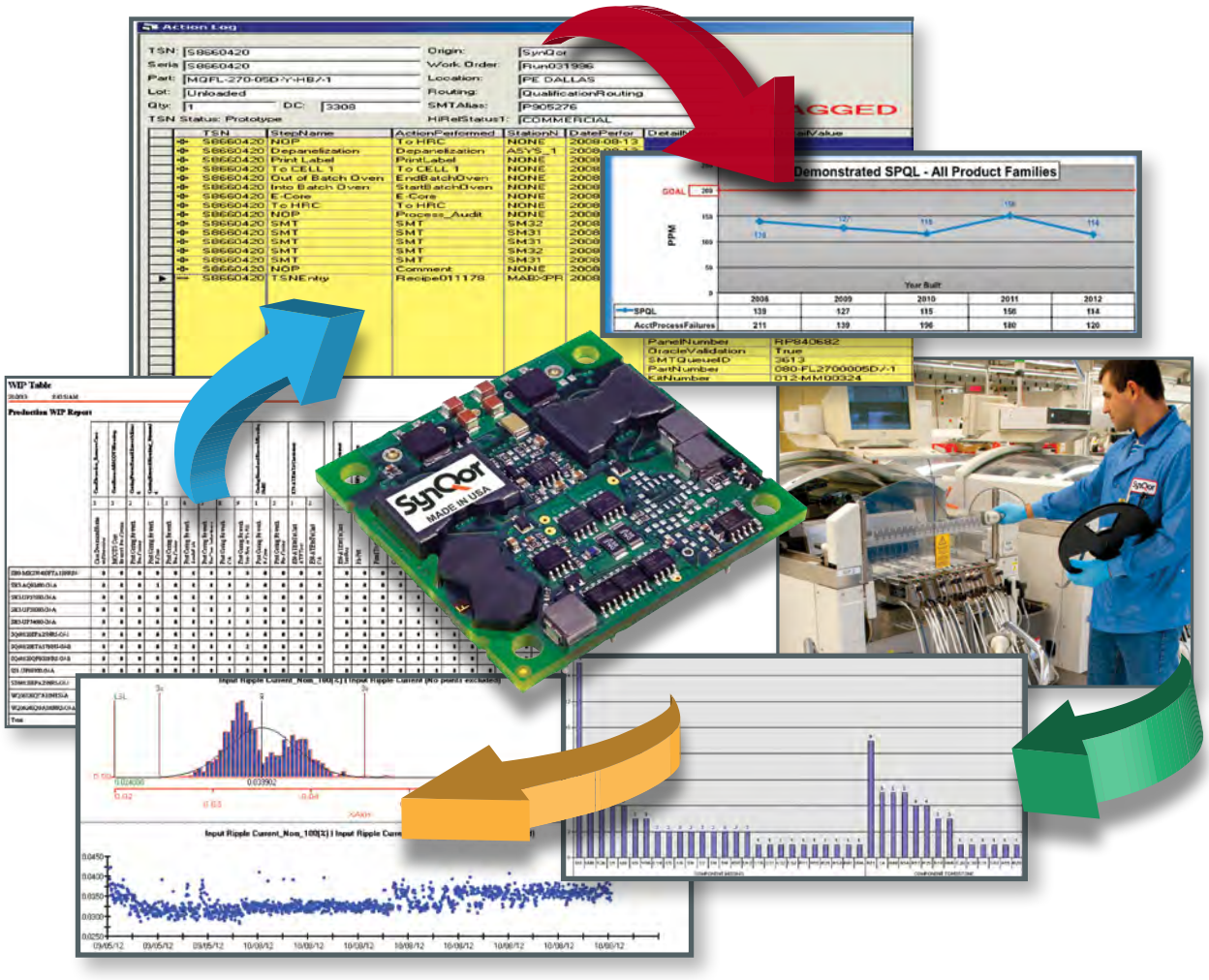


Information Collection
- Unit History
- Component History
- Process Data Capture

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

Real-Time Reporting
- WIP
- Cycle Times
- Yields
- Material Flow

Containment
- Stop Ship
- Process Diversions



SynQor Headquarters 155 Swanson Road, Boxborough, MA 01719-1316 USA | 1.888.567.9596 (USA only) | www.synqor.com

USA Manufacturing AS9100 and ISO 9001 Certified Facility

SynQor considers in-house manufacturing to be a core competency and strategic advantage. All SynQor products are manufactured in our manufacturing facility located 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, which provides 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
• Generate electrical specification • Review performance requirements • Design simulation • Schematic • Qualify new components • Breadboard • Prelim thermal analysis	• 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	• Build 50-100 units and electrically characterize • Verify electrical performance • Verify component stress analysis • Statistical variations • Thermal analysis and imaging • HALT testing • Complete datasheet	• 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)	• 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. 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

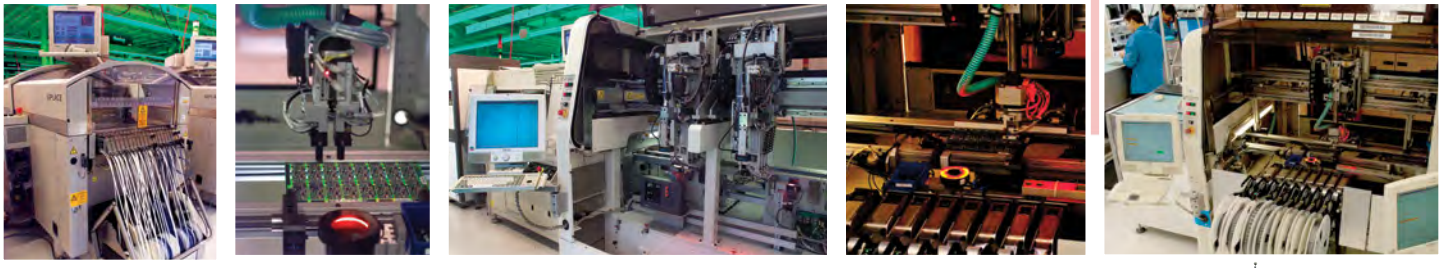
Parameter	# of Units	Test Conditions
Life Test	32	1000 hours, 95% rated V_{in} and load, units at derating point
Vibration	5	10 - 55Hz sweep, 0.060" total excursions, 1 minute/sweep, 120 sweeps for 3 axis
Mechanical Shock	5	100G minimum, 3 drops in x and y axis, 1 drop in z axis
Temperature Cycling	10	500 cycles, -40°C to 100°C, unit temperature ramp of 15°C/minute
Power/Thermal Cycling	5	100 cycles, $T_{operating}$ = min to max, V_{in} = min to max, full load
Design Marginality	5	T_{min} -10°C to T_{max} +10°C, 5°C steps, V_{in} = 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

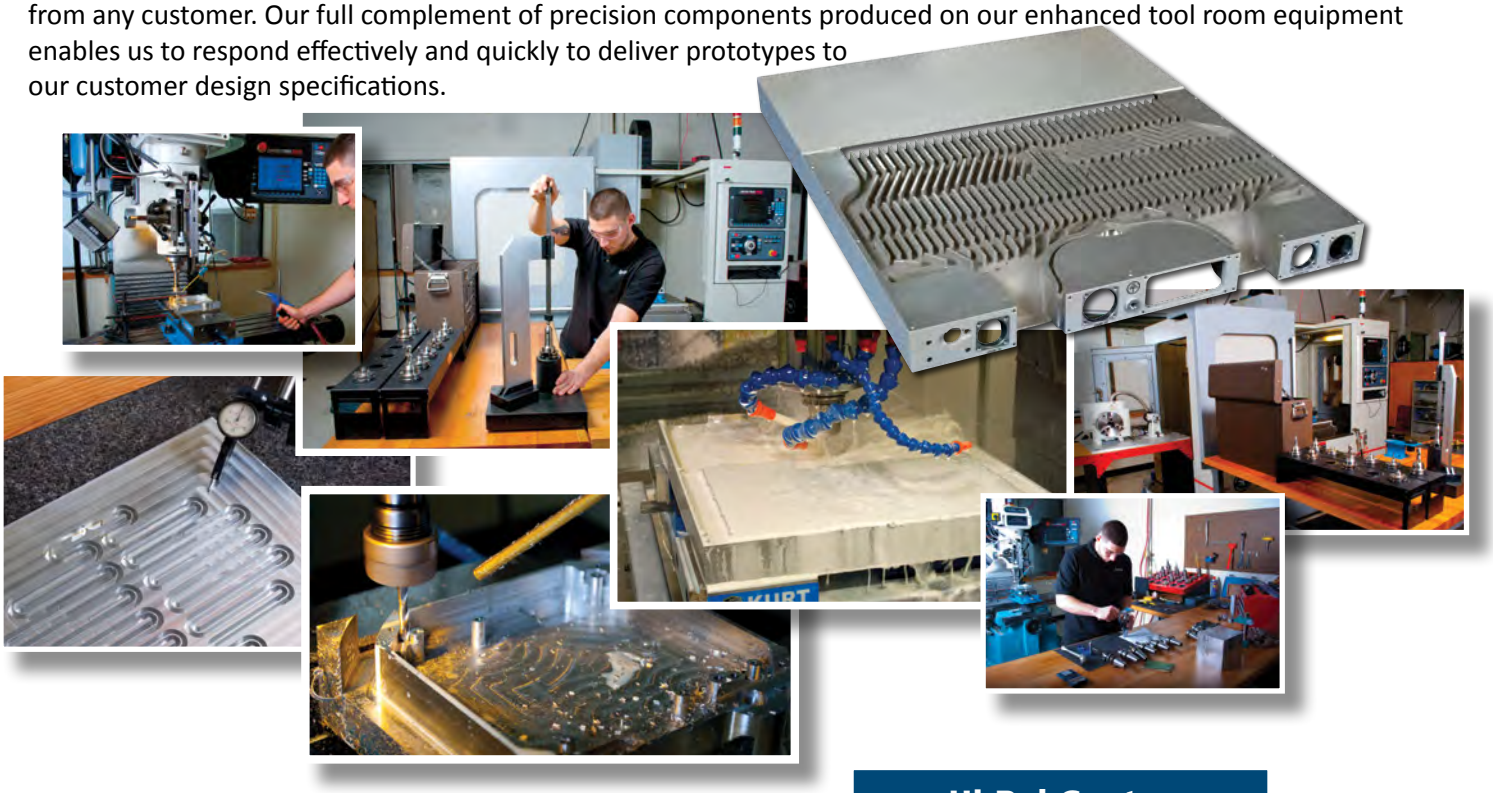
Our manufacturing facility has multiple production lines that are integrated into the plant resources. The engineering and design units are within seconds of the Manufacturing areas. Component supply, production, testing and shipping areas of the company are readily available to the design engineers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

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



Prototype Milling Machine Lab

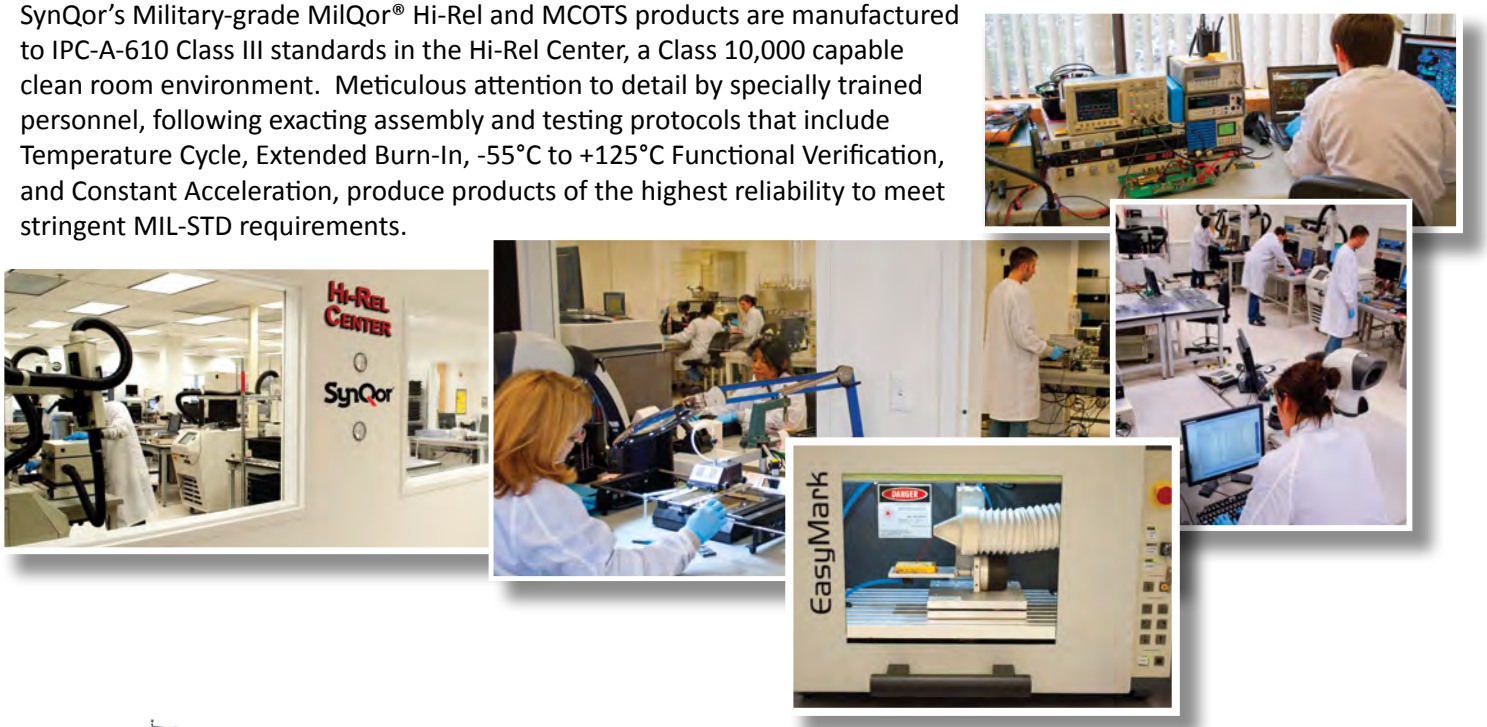
Our manufacturing facility has recently made significant investments into our precision milling technology equipment and with increased capabilities, we are ready to meet even the most stringent quality and delivery requirements from any customer. Our full complement of precision components produced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

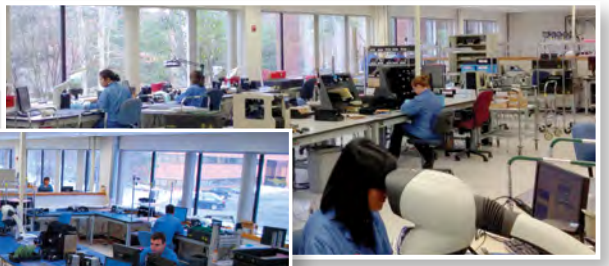


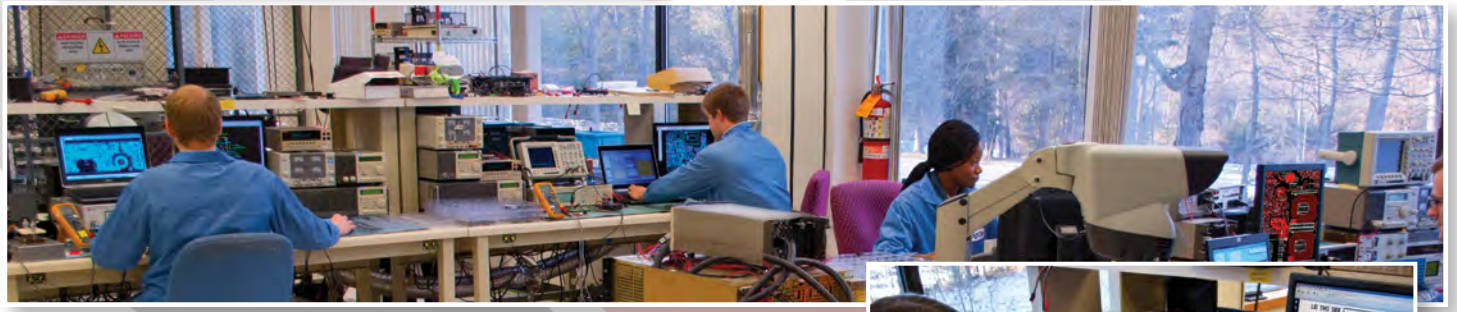
Integrated System Assembly

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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