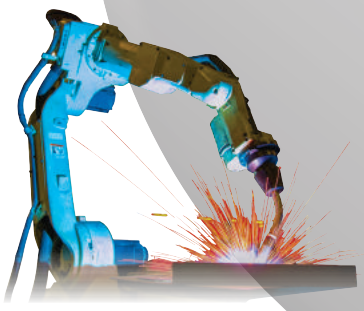
SynQor®



2019 Product Catalog

Power Converters & Systems

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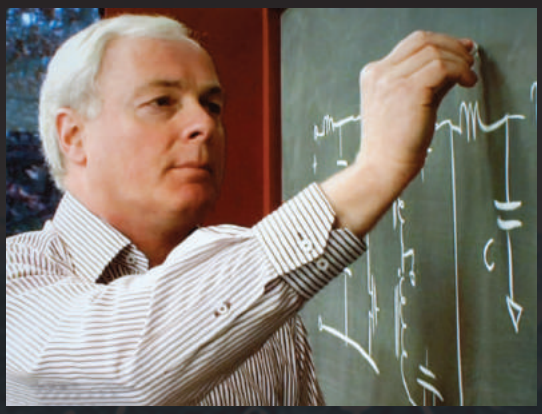


SynQor is a leading supplier of power conversion solutions to the military, avionics, transportation, medical, industrial, telecommunications and computing markets.

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

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

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

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

Dr. Martin F. Schlecht,
Chairman / CEO

SynQor®

Power Converters & Systems

Broad and Scalable Product Line

Hi-Rel Products

High-Reliability, Field Proven DC-DC Converters for Military applications

- -55°C to +125°C full power operational temperature
- Input voltage ranges from 5.5V to 475V
- No opto-isolators
- Non-hybrid, SMT construction
- Conduction cooled QorSeal® packaging

Military Power Systems

- Designed for the extreme environmental and demanding electrical conditions of military applications
- Product line includes EBM Expansion Battery Module, MPC Military Power Conditioners, MPS Military Power Supplies, MINV Military Power Inverter, MAC Military AC Changers, VPX Military Field-Grade DC-DC, & AC-DC Power Supplies , Configurable Multi-Output DC-DC & AC-DC Power Supplies & Uninterruptible Power Supplies

Mil-COTS Products

Mil-COTS Converters for Military applications

- -55°C to +100°C full power operational temperature
- DC input voltage ranges from 9.0V to 700V
- AC-DC Power Factor Correction Modules
- Conduction cooled, ruggedized package

Transportation Products

- Railway Transportation DC-DC Converters
- High efficiency in zero airflow

Industrial Products

- Power Converters designed to be used in a wide range of industrial applications including those required to withstand harsh environments
- Product line includes: Isolated DC-DC Power Converters, DC Filters, AC-DC Power Supplies, Non-Isolated DC-DC Converters, Power Factor Correction Modules, and AC Line Filters

Medical Power Supplies

- Designed to meet an extensive range of Medical applications
- Medical-Grade DC-DC Converters
- Medical-Grade AC-DC Supplies with PFC

Avionics Products

- Avionics Isolated Power Factor Correction Modules & Filters
- Designed to be used as a COTS Component in airborne applications

Telecom / Datacom Converters

- Single and Dual Output, Isolated Converters
- Single Output, Isolated Bus Converters
- Single Output, Non-Isolated Converters
- ATCA® Interface Modules

Advancing The Power Curve®

SynQor®

MilCOTS™
Isolated Converters

Mil-COTS DC-DC Converters for Military/Aerospace Applications

The MilQor® series of Mil-COTS Isolated DC-DC converters brings SynQor's field proven high-efficiency synchronous rectifier technology to the Military/Aerospace 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 option on some models
- Flanged baseplate available
- Industry standard pin-out configurations and standard footprints.
- Available: High-capacitance option for very large output capacitance and extreme transient applications
- -55°C to +100°C Operating Temperature

Compliance Features

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

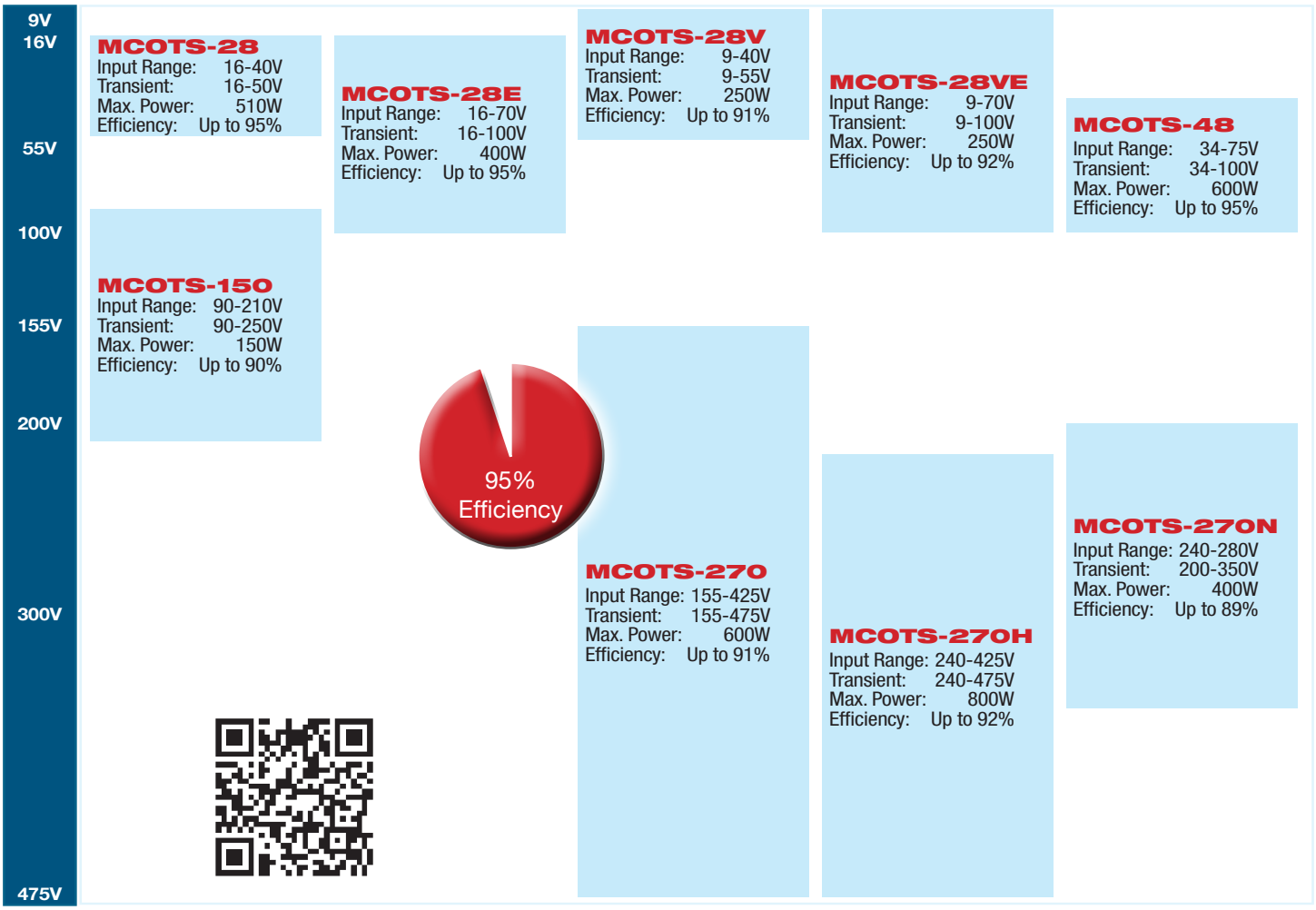
- MIL-HDBK-704
- RTCA/DO-160 Section 16, 17, 18
- MIL-STD-1275
- MIL-STD-461
- DEF-STAN 61-5 (part 6)/(5, 6)

Protection

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

Control

- On/Off control referenced to input side (Fully isolated Full Bricks)
- Remote sense for the output voltage
- Digital Output Current Sharing (HZ only)
- Output voltage trim range of: +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:** 5.0V **07:** 7.0V **7R5:** 7.5V **08:** 8.0V **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) **FE:** Full Brick (Exa) **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 **C:** High-Capacitance **FC:** High-Capacitance & Full Feature

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

See "Encased Package Configurations" on page 93 for package outlines.

MCOTS-28 Demi

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

MCOTS-28

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

MCOTS-28E

	Vout	5V	9.6V	12V	15V	24V	28V	40V	50V
16-70Vin Cont. 100Vin 1s Trans. Absolute Max Vin = 100V	**1/2 Brick Zeta**	60A 300W	42A 403W	33A 396W	26A 390W	16A 384W	14A 392W	10A 400W	8A 400W

MCOTS-28E Demi

	Vout	5V
16-70Vin Cont. 100Vin 1s Trans. Absolute Max Vin = 100V	**Demi Brick**	10A 50W

MCOTS-28V

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

MCOTS-28VE

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

MCOTS-48

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

MCOTS-150

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

MCOTS-270	Vout	3.3V	5V	6V	12V	15V	24V	28V	48V
155-425Vin Cont. 475Vin 1s Trans. Absolute Max Vin = 600V	**Full Brick Tera**		80A 400W		50A 600W	40A 600W	25A 600W	21.4A 599W	12.5A 600W
	1/2 Brick Tera	60A 198W	50A 250W	33A 198W	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-270	Vout	40V (10-40V)	60V (25-60V)
155-425Vin Cont. 475Vin 1s Trans. Absolute Max Vin = 600V	**Full Brick Exa**	60A 1000W	40A 1000W
	1/2 Brick Exa	35A 600W	25A 600W

MCOTS-270H	Vout	5V	6V	7V	12V	28V	36V
240-425Vin Cont. 475Vin 1s Trans. Absolute Max Vin = 600V	**Full Brick Peta**	100A 500W	110A 660W	90A 630W	66.7A 800W	28.6A 800W	22.2A 800W

MCOTS-270N	Vout	8V	10V	12V	28V
240-280Vin Cont. 200-350Vin 100ms Trans. Absolute Max Vin = 600V	**1/2 Brick Tera**	50A 400W	40A 400W	33A 396W	14.5A 406W

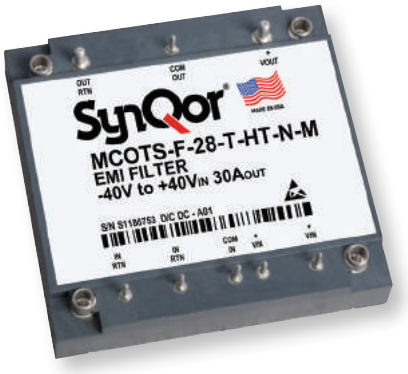
Product Screening

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-A-610 Class III	•	•
Temperature Cycling	MIL-STD-883F, 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-883, Method 2009	•	•

Product Qualification

QUALIFICATION Test Name	Details	# Tested (# Failed)	Consistent with MIL-STD-883F Method
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)	—

MilCOTS™
DC Filters



Mil-COTS 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.

Filter Features

- Low DC resistance
- Differential-mode attenuation
- Common-mode attenuation
- Bulk capacitance provides input system stabilization for downstream power converters
- -55°C to +100°C Operating Temperature
- No electrolytic capacitors (all ceramic design)
- High-voltage isolation between common-mode pins and input / output
- Wide temperature range operation
- Designed to meet MIL-STD-461

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

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

DC Filter Model Number	Input Voltage		Output Current	Isolation Voltage (to common-mode)	Maximum DC Resistance @ 100°C	Differential-Mode Attenuation	Common-Mode Attenuation
	Continuous	Surge (<100ms)					
HALF BRICK							
MCOTS-F-28-T-HP	±40V	+100V, -50V	40A	2250V	40mΩ	>80dB @ 250kHz	>36dB @ 250kHz
MCOTS-F-28-T-HT	±40V	+100V, -50V	30A	2250V	40mΩ	>80dB @ 250kHz	>36dB @ 250kHz
MCOTS-F-270-P-HT	±500V	±630V	9.0A	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

MilCOTS™
AC Filters

Mil-COTS AC Line Filter Modules

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

Filter Features

- Universal Input voltage range
- 500W@115Vrms or 1kW@230Vrms (Eighth-Brick)
- 1kW@115V or 2kW@230V (Half-Brick)
- All ceramic capacitor design
- High voltage isolation between baseplate and input/output
- Internally damped
- -55°C to +100°C Operating Temperature
- Low power dissipation
- Complies with industry EMI standards when used with SynQor MPFC and DC-DC converter modules

Mil-COTS AC Line Filters

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

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

Model Number	Input Phase	Input Frequency	Input Voltage	Output Current	Output Power
MACF-U-230-ET	Single Phase	50/60Hz & 400Hz	85-264VRMS	4.5ARMS	500W@115VRMS/1kW@230VRMS
MACF-060-230-HT	Single Phase	50/60Hz	85-264VRMS	9ARMS	1kW@115VRMS/2kW@230VRMS
MACF-400-230-HT	Single Phase	400Hz	85-264VRMS	9ARMS	1kW@115VRMS/2kW@230VRMS

MPFCQor™

Power Factor Correction

Mil-COTS Power Factor Correction Module

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

Operational Features

- Universal input voltage range: 85-264Vrms
- Narrow input voltage range: 85-180Vrms
- Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- Up to 700W output power
- ≥0.99 Power Factor
- High efficiency: Up to 95% (115Vrms)
- Internal inrush current limit
- Auxiliary 10V bias supply
- 100°C max baseplate temperature at full power
- -55°C to +100°C Operating Temperature
- Can be paralleled with current sharing
- Compatible with SynQor's MCOTS DC-DC Converters and SynQor's MCOTS AC line filters

Protection/Control Features

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

Mil-COTS Power Factor Correction Module

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

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

Model Number	Input Voltage	Output Voltage	Output Power
MPFC-U-390-HP	85-264 Vrms	390 Vdc	700 W
MPFC-115-270-HP	85-180 Vrms	270 Vdc	700 W
MPFC-U-390-QP	85-264 Vrms	390 Vdc	350 W
MPFC-115-270-QP	85-180 Vrms	270 Vdc	350 W

MPFICQor™

Isolated Power Factor Correction

Mil-COTS Isolated Power Factor Correction Module

The MPFICQor Power Factor Correction module is a high power, high efficiency AC-DC converter. It operates from a universal AC input and generates an isolated output. Both regulated and semi-regulated (droop version) modules are available. Used in conjunction with a hold-up capacitor, and SynQor's MCOTS AC line filter, the MPFICQor will draw a nearly perfect sinusoidal current (PF>0.99) from a single phase AC input. The module is supplied completely encased to provide protection from the harsh environments seen in many military and aerospace environments.

Operational Features

- Isolated output, 325W & 800W output power
- Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- Input voltage range: 85-264Vrms
- ≥0.99 Power Factor
- High efficiency: 92% (230Vrms)
- -55°C to +100°C Operating Temperature
- Internal inrush current limit
- Auxiliary 10V bias supply, primary-side referenced
- Can be paralleled (droop version only)
- Compatible with SynQor's MCOTS AC line filters

Protection/Control Features

- PFC Enable
- AC and DC Power Good outputs
- 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 Isolated Power Factor Correction Module

Family	Input Voltage	Output Voltage	Package Size	Thermal Design	Screening Level	Option
MPFIC	**U:** 85-264V	**12:** 12V **24:** 24V **28:** 28V **48:** 48V	**HT:** Half-brick Tera **FT:** Full-brick Tera	**N:** Encased **D:** Encased with Non-threaded Baseplate **F:** Encased with Flanged Baseplate	**S:** S-Grade **M:** M-Grade	**[ ]:** Standard **D:** Droop

Example: MPFIC-U-12-HT-N-M

MPFCQor™

3-Phase Power Factor Correction

Mil-COTS 3-Phase Power Factor Correction Module

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

Operational Features

- Full-brick form factor industry standard
- 1.5kW continuous (2.0kW surge)
- Semi-regulated output: 270Vdc
- Compatible with Military Standard 60Hz, 400Hz and variable frequency systems
- Meets military standards for harmonic content
- Minimal Inrush current
- Compatible with large external hold-up capacitors
- Additional Half-brick input filter available to meet full EMI
- 100°C max baseplate temperature at full power
- -55°C to +100°C Operating Temperature
- Parallelable for higher power on a common input filter
- Compatible with SynQor's MCOTS Converters
- Enables systems with repetitive load transients to pass MIL-STD-461 CE101 with superior load current rejection

Protection/Control Features

- PFC Enable
- AC and DC Power Good outputs
- Clock synchronization 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
- Parallel Option Available

Mil-COTS 3-Phase Power Factor Correction Module

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

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

Model Number	Input Voltage	Output Voltage	Output Power
MPFC-115-3PH-270-FP	3-Phase 85-140 Vrms L-N	270Vdc	1500W
MPFC-115-3PH-270P-FP	3-Phase 85-140 Vrms L-N	270Vdc	N*1500W

MPFICQor™

3-Phase Isolated Power Factor Correction

Mil-COTS 3-Phase Isolated Power Factor Correction Module

The MPFICQor Military Isolated PFC Module is a high power, high efficiency AC-DC converter. It operates from a 115 Vrms AC input and generates an isolated DC output. Both regulated output and droop output modules are available. Used in conjunction with a holdup capacitor, and SynQor's MCOTS AC line filter, the MPFICQor will draw a nearly perfect sinusoidal current (PF>0.99) from a 3-Phase AC input. The module is supplied completely encased to provide protection from the harsh environments seen in many military and aerospace environments.

Operational Features

- Compatible with Military Standard 60 Hz, 400 Hz and variable frequency systems
- Harmonic content meets military standards
- Superior load current rejection, enabling systems with repetitive load CE101 requirement by offering superior load current rejection
- Minimal inrush current
- Balanced phase currents
- High power factor (0.99 at 400 Hz / 750 W)
- Minimal external output capacitance requirement
- Full load current during startup
- Ability to meet full EMI with available additional EMI filters
- N * 750 W power levels when paralleled

Protection/Control Features

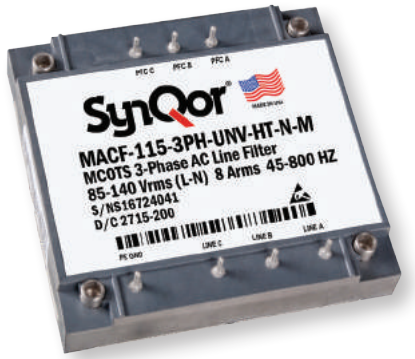
- All control pins referenced to separate floating return
- Asynchronous serial data interface
- AC and DC Power Good outputs
- PFC Enable and Battle Short inputs
- 3.3 V always-on standby power output
- Clock synchronization output

Mil-COTS Isolated Power Factor Correction Module

Family	Input Voltage	Output Voltage	Regulation	Package Size	Thermal Design	Screening Level
MPFIC	**115-3PH:** 3-Phase 115 Vrms L-N	**12:** 12V **24:** 24V **28:** 28V **48:** 48V **54:** 54V	**R:** Regulated output **D:** Droop Sharing	**FT:** Full-brick Tera	**N:** Encased **D:** Encased with Non-threaded Baseplate **F:** Encased with Flanged Baseplate	**S:** S-Grade **M:** M-Grade

Example: MPFIC-115-3PH-12R-FT-N-S

MilCOTS™
3-Phase AC Filters



Mil-COTS 3-Phase AC Line Filter Modules

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

Filter Features

- >2kW@115V
- 6.0-8.0Arms
- Very low series resistance
- Internally damped
- High voltage isolation between baseplate and input/output
- -55°C to +100°C Operating Temperature
- Low power dissipation
- Complies with industry EMI standards when used with SynQor MPFC and MCOTS DC-DC converter modules
- Quarter-brick filter with Differential-Mode filtering only for use with Parallelable 3-Phase PFC model

Mil-COTS 3-Phase AC Line Filter

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

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

Model Number	Input Frequency	Input Voltage (L-N)	Output Current	Output Power (L-N)	Max Series Resistance	Differential-mode Common-mode Attenuation
MACF-115-3PH-UNV-HT	45-800Hz	85-140Vrms	8.0Arms	>2kW@115Vrms	200mΩ@100°C	>45dB @ 200kHz >55dB @ 200kHz
MACF-115-3PH-UNVD-QT	45-800Hz	85-140Vrms	6.0Arms	>2kW@115Vrms	145mΩ@100°C	>55dB @ 200kHz (Differential-Mode only)
MACF-115-3PH-UNV-QG	45-800Hz	85-140Vrms	3.0Arms	1kW@115Vrms	655mΩ@100°C	>55dB @ 200kHz >40dB @ 200kHz

MilCOTS™
Bus Converters

Mil-COTS Rugged, High Efficiency Next Generation DC-DC Bus Converters

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

Operational Features

- High efficiency, up to 95% at full rated load current
- Delivers up to 65A @ full power with minimal derating
- Operating input voltage range: 230-400V and 440-700V
- Fixed frequency switching provides predictable EMI
- No minimum load requirement
- Industry standard half-brick pin-out configuration
- -55°C to +100°C Operating Temperature

Protection/Control Features

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

Family	Product	Vin Range	Vout	Package Size	Thermal Design	Screening Level
MCOTS	**B:** Bus Converter	**270:** 230-400V **385:** 230-400V **600:** 440-700V	**31:** 31V **270:** 270V	**HT:** Half-brick Tera **FT:** Full-brick Tera	**N:** Encased, Threaded Baseplate **D:** Encased, Non-Threaded Baseplate **F:** Encased, Flanged Baseplate	**S:** S-Grade **M:** M-Grade

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

Model Number	Package Size	Input Voltage	Input Transient	Output Voltage	Output Current	Max Output Power	Efficiency
MCOTS-B-270-31-HT	**Half-Brick**	230-400V	155-450V	29.7V	32.5A	1000W	95%
MCOTS-B-385-270-HT	**Half-Brick**	230-400V	155-450V	270V	3.7A	999W	95%
MCOTS-B-600-31-HT	**Half-Brick**	440-700V	400-750V	30.3V	32.5A	1000W	95%
MCOTS-B-270-31-FT	**Full-Brick**	230-400V	230-450V	31V	65A	2015W	97%

MilCOTS™
High Voltage Non-Isolated

Mil-COTS High Voltage, Non-Isolated DC-DC Converters

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

Operational 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
- -55°C to +100°C Operating Temperature
- Remote sense and wide output voltage trim (Half-brick only)

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

Battery Charging

Key feature of Trimmable Current Limit

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

Mil-COTS Non-Isolated DC-DC Converters

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	**EP:** Eighth-brick Peta **QT:** Quarter-brick Tera **HG:** Half-brick Giga	**N:** Encased, Threaded Baseplate **D:** Encased, Non-threaded Baseplate **F:** Encased, Flanged Baseplate	**S:** S-Grade **M:** M-Grade

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

Model Number	Brick Size	Input Voltage	Output Voltage	Current	Max Output Power	High Efficiency
MCOTS-N-28V-60-HG	**Half-brick**	9-60V	0-60V	40A	2000W	96% Efficiency
MCOTS-N-28V-60-QT	**Quarter-brick**	9-60V	0-60V	25A	1500W	96% Efficiency
MCOTS-N-28V-60-EP	**Eighth-brick**	9-60V	0-60V	15A	900W	95% Efficiency
MCOTS-N-28VE-90-HG	**Half-brick**	9-90V	0-90V	26A	2000W	96% Efficiency
MCOTS-N-28VE-90-QT	**Quarter-brick**	9-90V	0-90V	18A	1500W	97% Efficiency
MCOTS-N-28VE-90-EP	**Eighth-brick**	9-90V	0-90V	10A	900W	96% Efficiency

QuadQor™
Non-Isolated Converters

Mil-COTS Non-Isolated DC-DC Converters

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

Operational Features

- High efficiency, up to 93% at full rated load current
- Delivers up to 30A on each postitive output and 1A on the negative output
- Input Voltage Range: 6-15V
- Output Voltage Range:
  Positive Outputs: 0.8V to 5V
  Negative Output: -3.0V to -13.5V
- -55°C to +100°C Operating Temperature

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

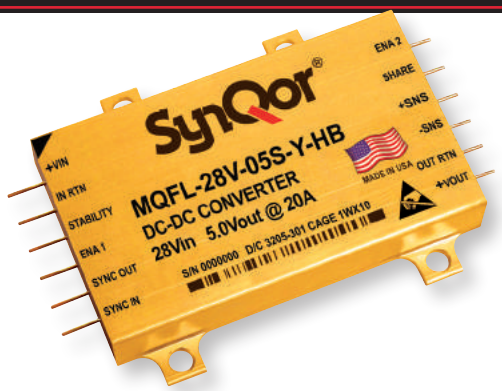
Family	Product	Vin Range	Output Voltage	Package Size	Thermal Design	Screening Level
MCOTS	**N:** Non-isolated Converter	**12:** 6-15V	**Q3P1N:** Quad Output 3 Positive, 1 Negative	**QT:** Quarter-brick Tera	**N:** Encased, Threaded Baseplate **F:** Encased, Flanged Baseplate	**S:** S-Grade **M:** M-Grade

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

Model Number	Package Size	Input Voltage	Output Voltage
MCOTS-N-12-Q3P1N-QT	**Quarter-brick**	6-15V	30A Positive Outputs, 1A Negative Output

See "Encased Package Configurations" on page 93 for package outlines.

Hi-Rel™
Isolated Converters

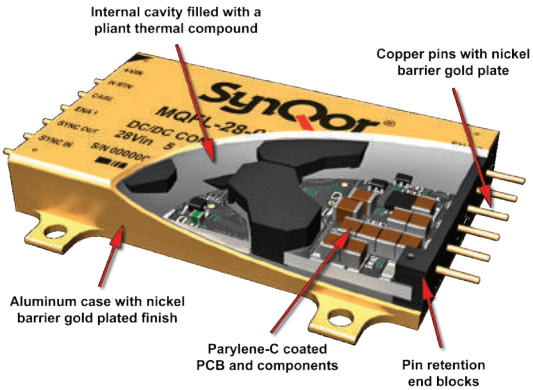


High-Reliability, Field Proven DC-DC Converters for Military/Aerospace Applications

The MilQor® series of high-reliability DC-DC converters brings SynQor's field proven high-efficiency synchronous rectifier technology to the Military/Aerospace 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 and MQBL) +10% to -10%
- -55°C to +125°C Operating Temperature



*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 P-3641A guidelines
- Designed with components derated per:
  - MIL-HDBK-1547A
  - NAVSO P-3641A

Qualification Process

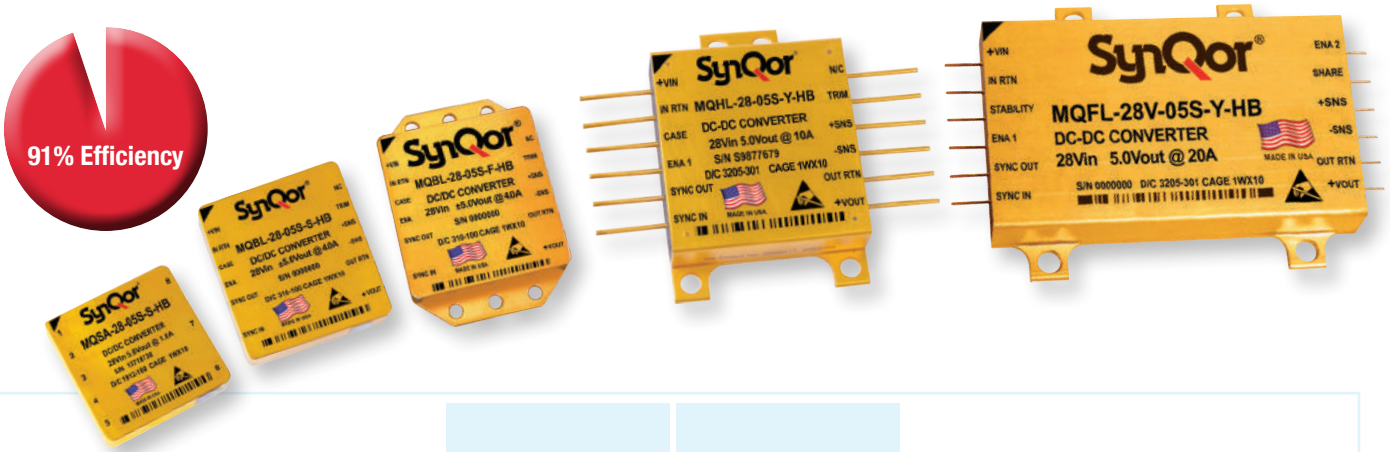
Hi-Rel series converters are qualified to:

- MIL-STD-810
  – consistent with RTCA/DO-160
- SynQor's First Article Qualification
  – consistent with MIL-STD-883
- SynQor's Long-Term Storage Survivability Qual.
- SynQor's on-going life test
- SynQor's element evaluation for HB and 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
- DEF-STAN 61-5 (Part 6)/(5, 6)
- MIL-STD-461
- RTCA/DO-160 Section 22



Input Voltage Range(s)

5.5V
16V
50V
80V
155V
475V

28 Series
Input Range: 16-40V
Transient: 16-50V
Max. Power: 120W
Efficiency: 91%

28E Series
Input Range: 16-70V
Transient: 16-80V
Max. Power: 120W
Efficiency: 90%

28V Series
Input Range: 16-40V
Transient: 5.5-50V
Max. Power: 100W
Efficiency: 90%

28VE Series
Input Range: 16-70V
Transient: 5.5-80V
Max. Power: 100W
Efficiency: 90%

270 Series
Input Range: 155-400V
Transient: 155-475V
Max. Power: 120W
Efficiency: 88%

270L Series
Input Range: 65-350V
Transient: 65-475V
Max. Power: 75W
Efficiency: 86%

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 **6R5S:** 6.5V **7R5S:** 7.5V **08S:** 8.0V **09S:** 9.0V **12S:** 12V **15S:** 15V **28S:** 28V	**05D:** ±5.0V **6R5D:** ±6.5V **12D:** ±12V **15D:** ±15V	**U** **X** **Y** **W** **Z** (FL, HL, HR) **S** **F** (BL)	**S** (SA)	**C** **ES** **HB**

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**

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

	Single Output												Dual Output†			
Full Size (MQFL)	**1.5V 1R5S**	**1.8V 1R8S**	**2.5V 2R5S**	**3.3V 3R3S**	**5V 05S**	**6V 06S**	**6.5V 6R5S**	**7.5V 7R5S**	**8V 08S**	**9V 09S**	**12V 12S**	**15V 15S**	**28V 28S**	**±5V 05D**	**±6.5V 6R5D**	**±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	18A 117W	16A 120W	15A 120W	13A 117W	10A 120W	8A 120W	4A 112W	24A 120W Total	18A 117W Total	10A 120W Total	8A 120W Total

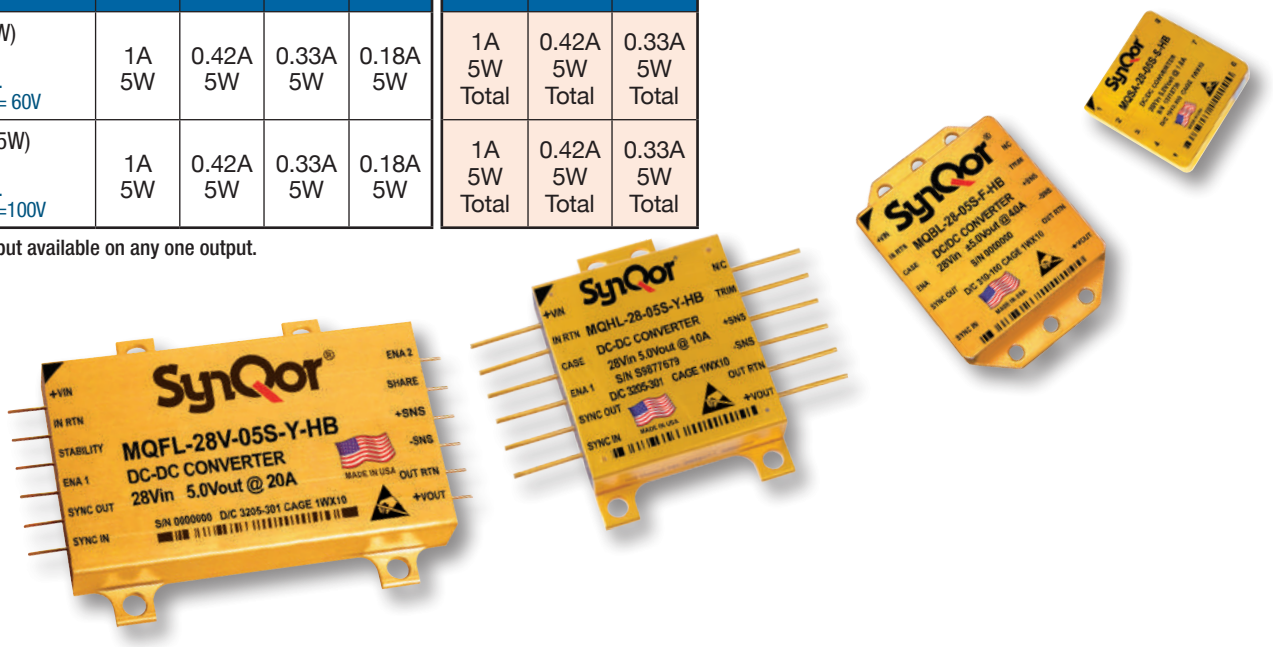
	Single Output											Dual Output†		
Full Size (MQFL)	**1.5V 1R5S**	**1.8V 1R8S**	**2.5V 2R5S**	**3.3V 3R3S**	**5V 05S**	**6V 06S**	**7.5V 7R5S**	**9V 09S**	**12V 12S**	**15V 15S**	**28V 28S**	**±5V 05D**	**±12V 12D**	**±15V 15D**
MQFL-28E (120W) 16-70Vin Cont. 16-80Vin 1s Trans. Absolute Max Vin =100V	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

	Single Output											Dual Output†		
Half Size (MQHL)	**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

Bottom Pin (MQBL)	Single 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	Dual Output† ±5V 05D	±12V 12D	±15V 15D
MQBL-28 (20W) 16-40Vin Cont. 16-50Vin 1s Trans. Absolute Max Vin = 60V	8A 12W	8A 14.4W	8A 20W	6A 19.8W	4A 20W	3.3A 19.8W	2.6A 19.5W	2.2A 19.8W	1.6A 19.2W	1.3A 19.5W	0.72A 20.2W	4A 20W Total	1.6A 19.2W Total	1.3A 19.5W Total
MQBL-28E (20W) 16-70Vin Cont. 16-80Vin 1s Trans. Absolute Max Vin =100V	8A 12W	8A 14.4W	8A 20W	6A 19.8W	4A 20W	3.3A 19.8W	2.6A 19.5W	2.2A 19.8W	1.6A 19.2W	1.3A 19.5W	0.72A 20.2W	4A 20W Total	1.6A 19.2W Total	1.3A 19.5W Total

Bottom Pin (MQSA)	Single Output 5V 05S	12V 12S	15V 15S	28V 28S	Dual Output† ±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

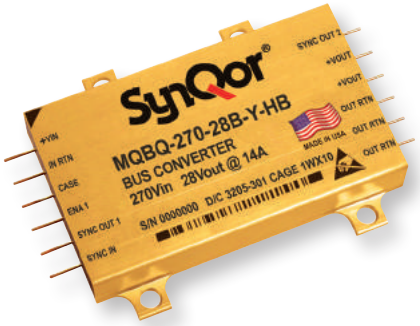
† 80% of total output available on any one output.



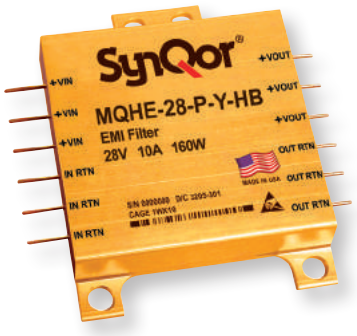
Hi-Rel™
Bus Converters

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/Aerospace Applications

The MilQor® series of high-reliability EMI Filters bring SynQor's field proven technology to the Military/Aerospace 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	0.86Ω	>80dB	>60dB
MQME-270L-R[2,4]	±400V	±500V	3.0A	500V	0.86Ω	>80dB	>60dB
Half Size							
MQHE-28-P	±40V	±100V	10A	500V	60mΩ	>80dB	>60dB
MQHE-28E-P	±70V	±100V	10A	500V	60mΩ	>80dB	>60dB
MQHE-270-P	±400V	±500V	1.0A	500V	450mΩ	>50dB	>60dB

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

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

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

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

See "MilQor Hi-Rel Package Configurations" on page 95 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	Per IPC-A-610 Class III	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
External Visual	Method 2009	Yes	Yes	Yes
Construction			QorSeal®	QorSeal®

UPS MILITARY FIELD-GRADE
Uninterruptible Power Supply

Sealed
Shock-Proof
Weather-Proof
Rugged Construction

Military Field-Grade Uninterruptible Power Supply (UPS)

SynQor's Military Field-Grade Uninterruptible Power Supply units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace 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. The use of lithium polymer batteries permits the lowest profile and lowest weight solution in its power class. It is designed to comply with a wide range of military standards. Options include two DC outputs, a DC input rated for military 28 VDC sources, and an electronic breaker on the AC output to permit fault-tolerant parallel operation for higher power and/or N+M redundant systems.

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
- Shallow Rack full power operation -20°C to +50°C
- Storage temperature: -40°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
- 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
- Up to 32 units can be combined to form a higher power fault-tolerant, glitch-free system, perhaps with N+M redundancy, by ordering with the "AC Output Electronic Breaker" option and the appropriate configuration cable

Specification Compliance

UPS units are designed to meet:

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

Options

- DC input (28Vnom) for dual source
- 2U Extended battery pack gives >24 minutes of run-time (UPS-1500)
- Wide-range AC input frequency: 47Hz to 800Hz
- 115Vrms or 230Vrms AC output
- 50Hz, 60Hz, or 400Hz output
- DC1: Auxiliary isolated DC output (up to 500W)
- DC2: High power DC output parallelable for higher power (UPS-1500 up to 1250W; UPS-3000 up to 2500W)
- Shipboard version with floating neutral wire
- N+1 Redundancy

Military Field-Grade Uniterruptible Power Supply (UPS)

Base Models				
Model Number	**Power**	**Battery Run-Time @Full Power** *(80% Power)*	**Height** *(W x D x H)*	**Weight**
UPS-1500-S-1U *(1 Standard Battery Pack)*	**1250 W/1500 VA**	**>10 min.** *(>13 min.)*	**1U** *(17.00" x 21.60" x 1.73")*	**32 lbs.**
UPS-1500-S-2S *(1 Standard Battery Pack)*	**1250 W/1500 VA**	**>10 min.** *(>13 min.)*	**2S** *(17.00" x 13.60" x 3.40")*	**33 lbs.**
UPS-1500-E-2U *(1 Extended Battery Pack)*	**1250 W/1500 VA**	**>24 min.** *(>31 min.)*	**2U** *(17.00" x 21.60" x 3.33")*	**50 lbs.**
UPS-3000-S-2U *(2 Standard Battery Packs)*	**2500 W/3000 VA**	**>10 min.** *(>13 min.)*	**2U** *(17.00" x 22.22" x 3.40")*	**65 lbs.**

Base Models	Options						
	AC Input Freq	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Freq	DC Input / DC2 Output	DC1 Output	Additional Options
UPS-1500-S-1U- UPS-1500-S-2S- UPS-1500-E-2U- UPS-3000-S-2U-	L W T	1 2	G F R	5 6 4	S D M P R V W	00 12 15 24 28 40 50	-E 00 CE

Not all combinations make valid part numbers, please contact SynQor for availability.
See the Product Summary web page for more options.

***Notes:**

Order "**F:** Floating" option when configuring the AC output for multi-unit combinations of up to 3 units.

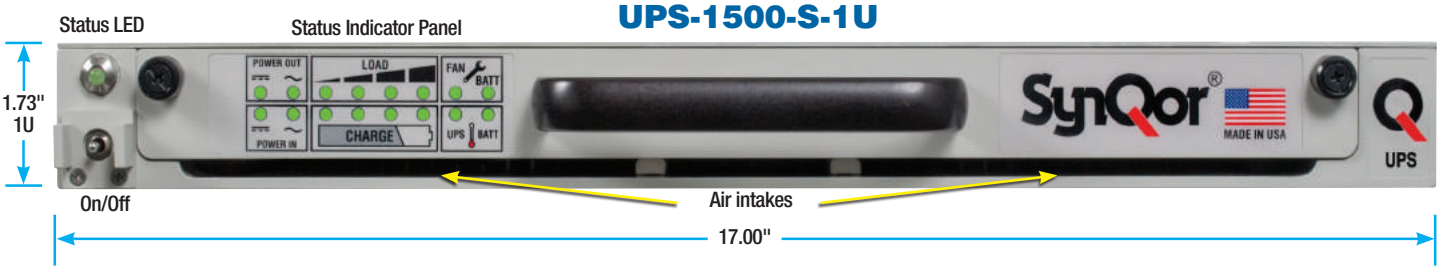
Order "**R**: AC Output Electronic Breaker" option for fault-tolerant, glitch-free parallel systems of up to 32 units with N+M redundancy. The AC output neutral wire will not be connected to the chassis.

Examples:
UPS-1500-E-2U-L1G6D28-E00, UPS-1500-S-1U-L2G5S00-E00
UPS-1500-S-1U-L2G5S00-ECE *(230 V output with CE marking)*

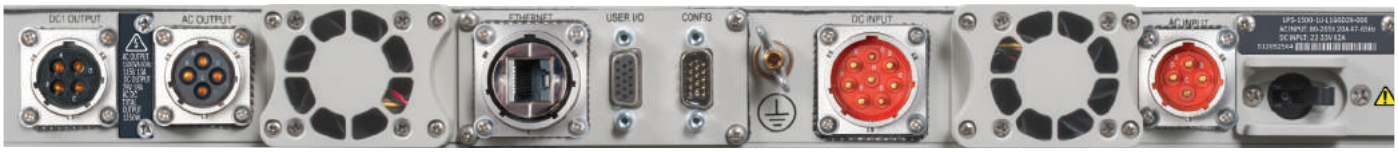
Options	
AC Input Frequency	**L** 47-65 Hz **W** 47-800 Hz **T** 3-Phase 45-800 Hz
AC Output Voltage	**1** 115 Vrms **2** 230 Vrms
AC Output Neutral Wire	**G** Grounded **F** Floating* **R** AC Output Electronic Breaker*
AC Output Set Point Frequency	**5** 50 Hz **6** 60 Hz **4** 400 Hz
DC Input / DC2 Output	**S** Not Installed **D** DC Input **M** DC2 Out 24 VDC with Droop Share **P** DC2 Out 24 VDC No Share **R** DC2 Out 28 VDC with Droop Share **V** DC2 Out 28 VDC No Share **W** DC2 Out 50 VDC No Share
DC1 Output	**00** None **12** 12 V **15** 15 V **24** 24 V **28** 28 V **40** 40 V **50** 50 V
Additional Options	**-E** Ethernet/SNMP with Configuration Loading
	00 No CE Marking **CE** CE Marking

UPS-1500-S-1U
(17.00" x 21.60" x 1.73")

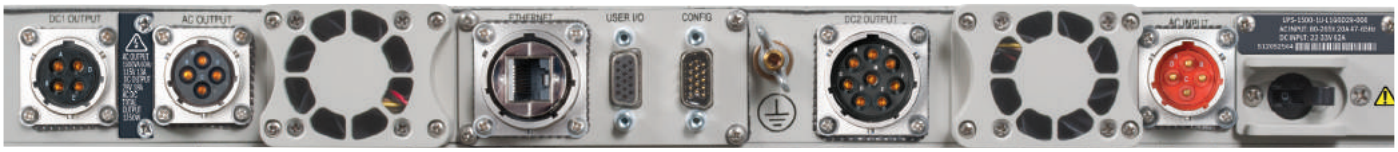
UPS-1500-S-1U

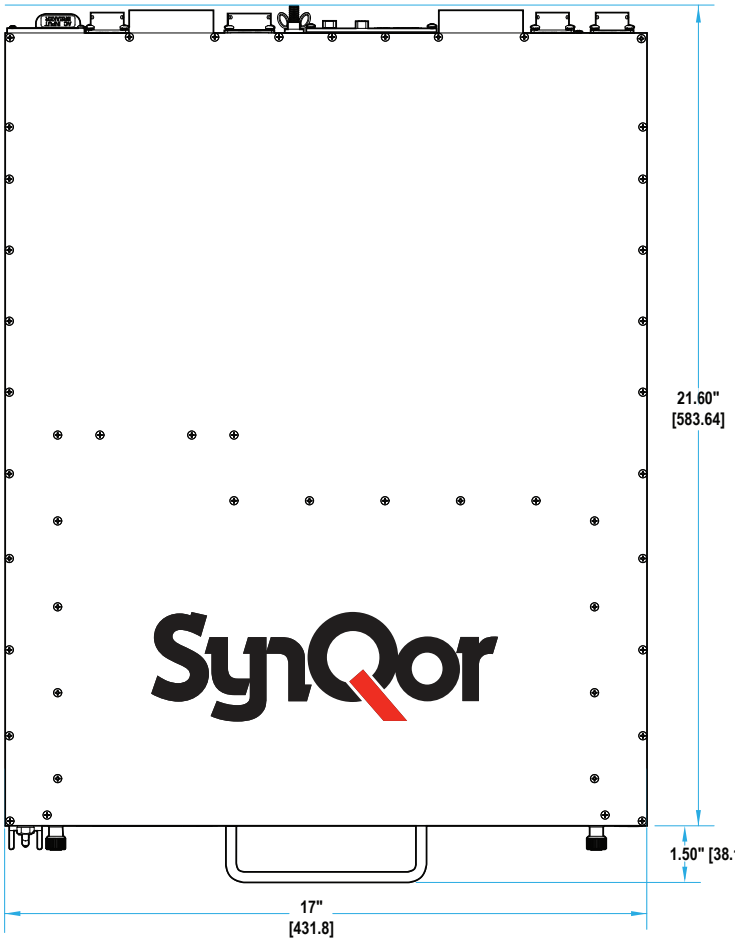


UPS-1500-S-1U with DC Input/DC1 Output Option



UPS-1500-S-1U with DC1 Output/DC2 Output Option



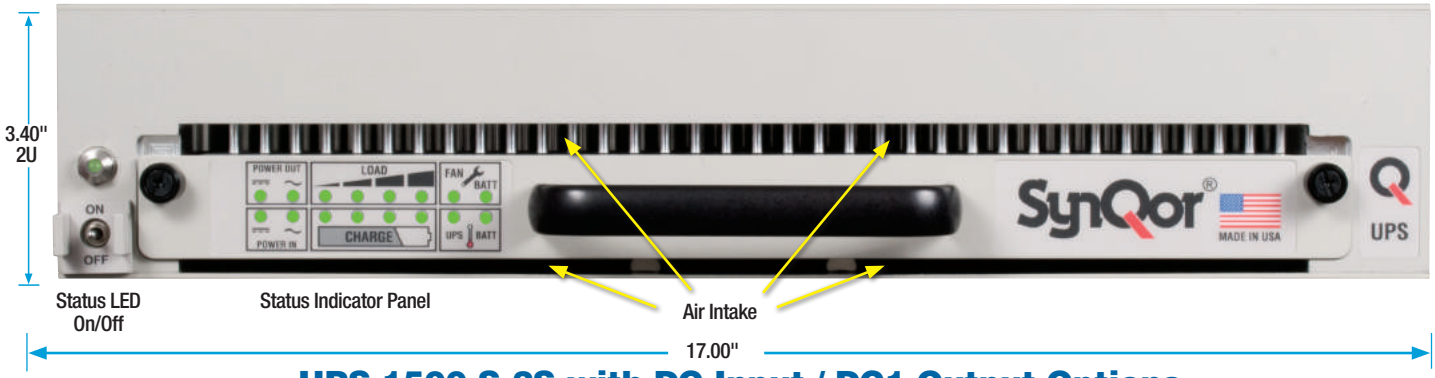


1.25kW 1U Model

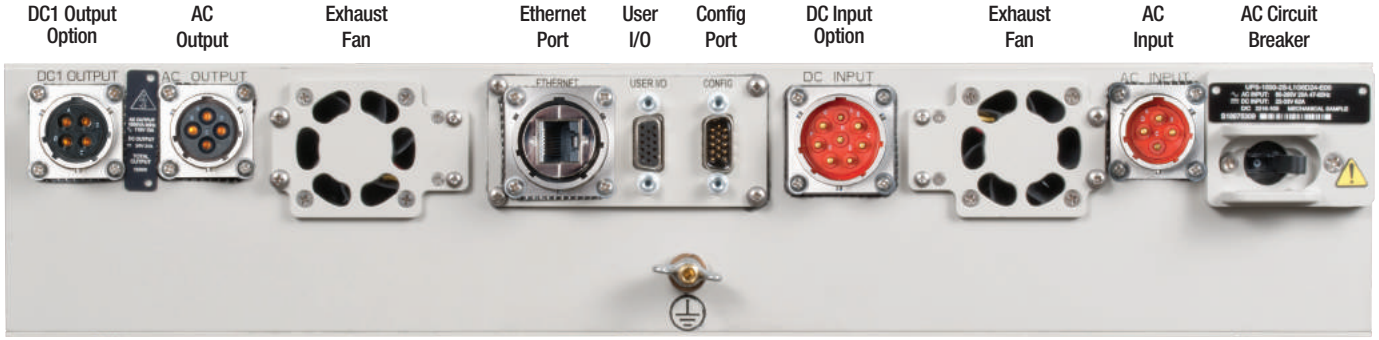
Hot swappable battery pack

Visit our website for more information

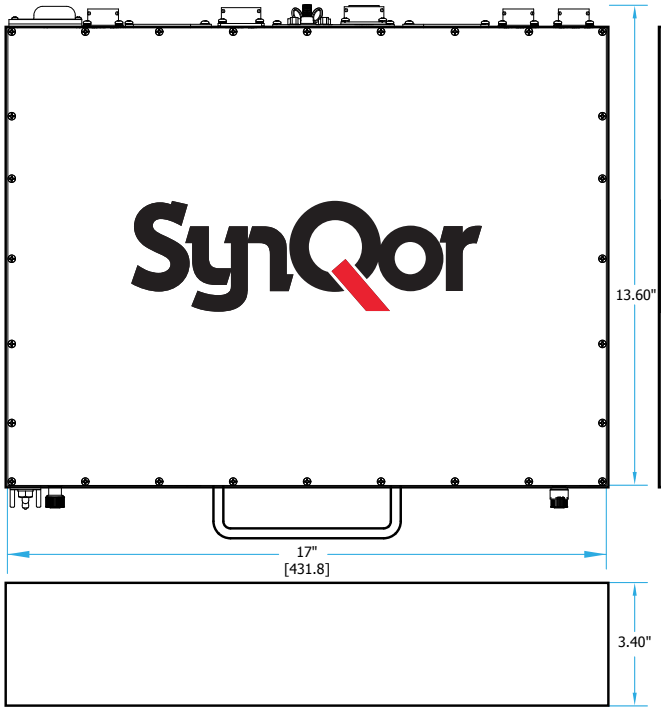
UPS-1500-S-2S



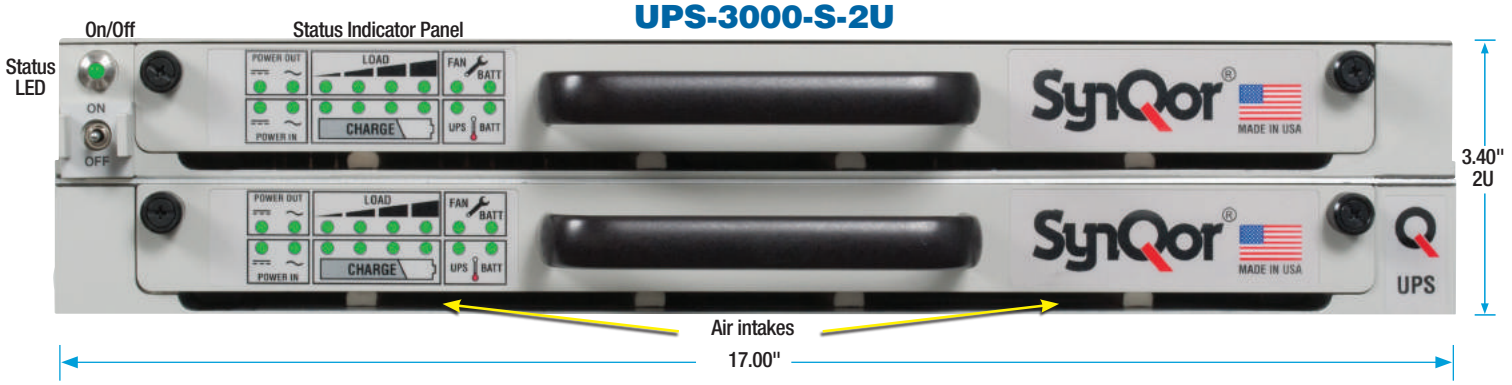
UPS-1500-S-2S with DC Input / DC1 Output Options



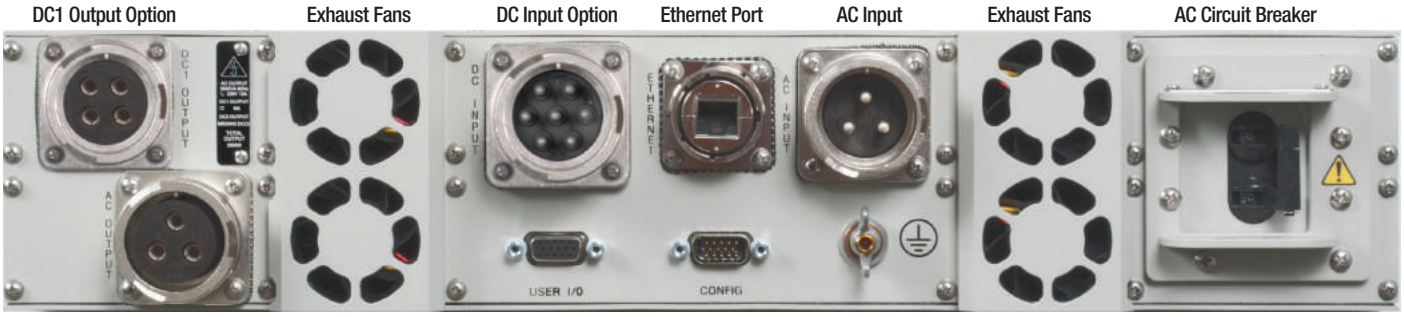
UPS-1500-S-2S with DC1 Output / DC2 Output Option



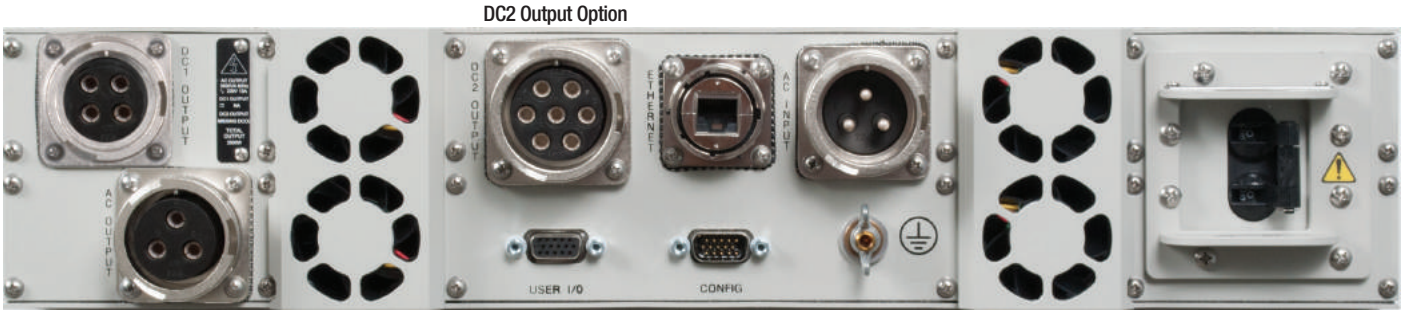
UPS-3000-S-2U

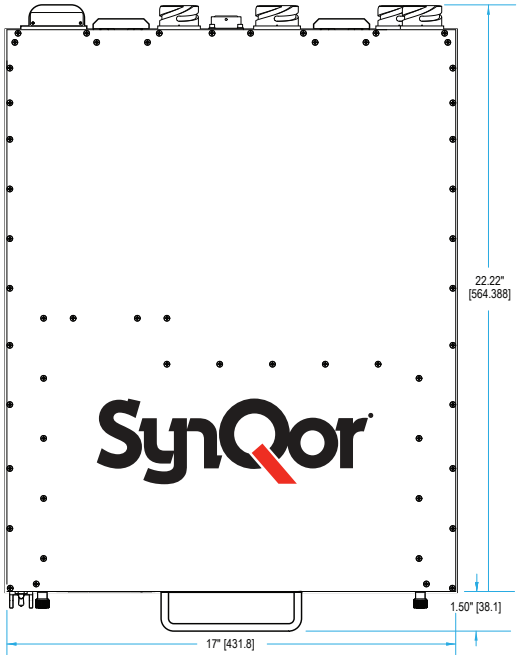


UPS-3000-S-2U with DC Input / DC1 Output Options



UPS-3000-S-2U with DC1 Output / DC2 Output Options





UPS-1500-S-2S
1250W (1500VA)
Shallow Rack-Mount Package
>10 Minutes of Run Time at Full Power
Only 33 lbs.

UPS-1500-S-1U
1250W (1500VA)
1U High Rack-Mount Package
>10 Minutes Battery Run Time
Only 32 lbs.

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

UPS-1500-E-2U
1250W (1500VA)
Expanded Internal Battery for
>24 Minutes of Run Time at Full Power
Only 50 lbs.

UPS MILITARY FIELD-GRADE Uninterruptible Power Supply

Sealed

Shock-Proof

Weather-Proof

Rugged Construction

DC Output Only Military Field-Grade Uninterruptible Power Supply (UPS-1250)

SynQor's Military Field-Grade Uninterruptible Power Supply units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace 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 DC output to the load. The use of lithium polymer batteries permits the lowest profile and lowest weight solution in its power class. It is designed to comply with a wide range of military standards.

UPS Product Features

- Sealed, weather-proof, shock-proof construction
- Military Tough, Die-Cast Aluminum Chassis
- 1250W DC output power
- >10 minute run-time at full power
- Full power operation -20°C to +55°C
- Shallow Rack full power operation -20°C to +50°C
- Storage temperature: -40°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 DC
- Cold-start with no AC or DC input connections
- Power factor correction at AC input
- User I/O and Configuration signal ports

Specification Compliance

UPS units are designed to meet:

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

Options

- 2U Extended battery pack gives >24 minutes of run-time
- 2U Shallow rack mount (17.00" x 13.80" x 3.40")
- Wide-range AC input frequency: 47Hz to 800Hz

DC Output Only Military Field-Grade Uniterruptible Power Supply (UPS)

Base Models				
Model Number	**Power**	**Battery Run-Time @Full Power (80% Power)**	**Height (W x D x H)**	**Weight**
UPS-1250-S-1U *(1 Standard Battery Pack)*	**1250 W**	**>10 min.** *(>13 min.)*	**1U** *(17.00" x 22.25" x 1.73")*	**33 lbs.**
UPS-1250-S-2S *(1 Standard Battery Pack)*	**1250 W**	**>10 min.** *(>13 min.)*	**2S** *(17.00" x 13.80" x 3.40")*	**33 lbs.**
UPS-1250-E-2U *(1 Extended Battery Pack)*	**1250 W**	**>24 min.** *(>31 min.)*	**2U** *(17.00" x 22.25" x 3.33")*	**52 lbs.**

Base Models	Options				
	AC Input Frequency	**DC Output Type**	**DC Output Voltage**	**DC Input**	**Additional Options**
UPS-1250-S-1U- **UPS-1250-S-2S-** **UPS-1250-E-2U-**	**L** **W**	**R** **P**	**24** **28**	**D00**	**-E** **00** **CE**

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

See the Product Summary web page for more options.

***Notes:** Order "**P:** Parallel" option to place multiple UPS units in parallel

Examples: UPS-1250-S-1U-LR28D00-E00, UPS-1250-E-2U-WP28D00-E00

Options		
AC Input Frequency	**L**	47-65 Hz
	W	47-800 Hz
DC Output Type	**R**	Regulated Output
	P	Parallelable Regulated Output
DC Output Voltage	**24**	24 V Output
	28	28 V Output
DC Input	**D00**	DC Input
Additional Options	**-E**	Ethernet/SNMP with Configuration Loading
	00	No CE Marking
	CE	CE Marking

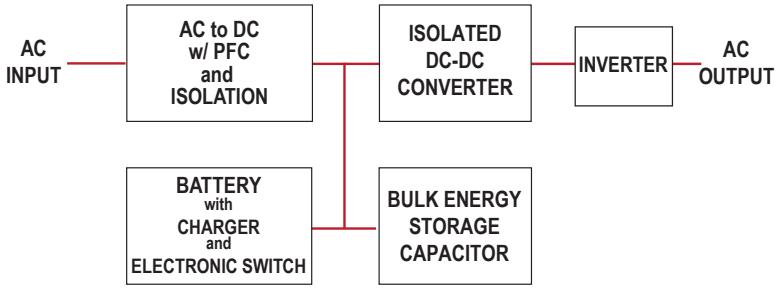
UPS MILITARY SHELTER-GRADE Uninterruptible Power Supply

Military Shelter-Grade Uninterruptible Power Supply (UPS-MS)

SynQor's family of rack-mounted Military Shelter-Grade Uninterruptible Power Supply units are designed for the environmental and electrical conditions of Military applications. SynQor's UPS incorporates proven high efficiency designs and 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. The use of lithium polymer batteries permits the lowest profile and lowest weight solution in its power class. It is designed to comply with a wide range of military standards.

UPS Product Features

- Hot swappable internal battery pack (lithium polymer)
- >10 minute run-time at full power
- 1250W-1500VA output power
- Full power operation -10°C to +50°C
- Storage temperature: -10°C to +65°C
- True on-line double conversion
- Universal AC input: 80-265VAC; 47-65Hz
- Cold-start with no AC input connections
- Power factor correction at AC input
- Pure sinusoidal AC output voltage
- Handles 0.0 - 1.0 power factor loads and non-linear loads
- User I/O and Configuration signal ports
- Low weight: 42 lbs. (including chasis & batteries)



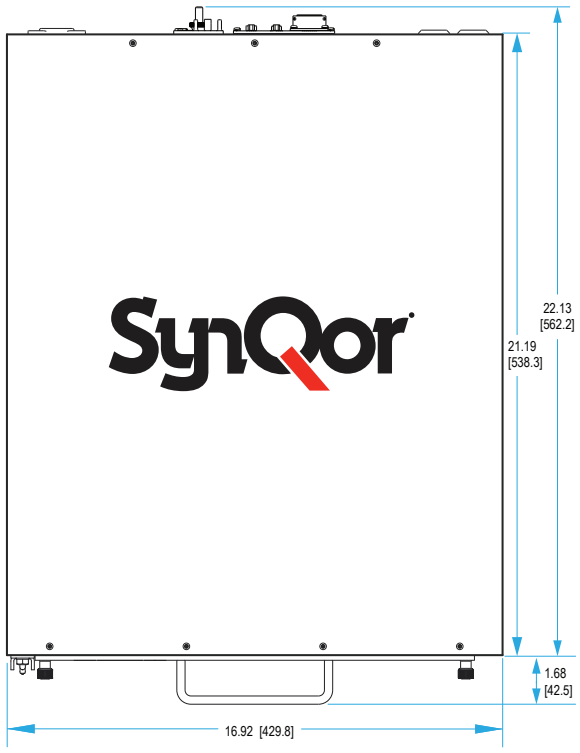
Specification Compliance

UPS units are designed to meet:

- MIL-STD-1399-300B - Interface Std for Shipboard Systems
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-810G - Environmental Engineering Considerations

Options

- 115 Vrms or 230 Vrms AC output
- 50 Hz or 60 Hz



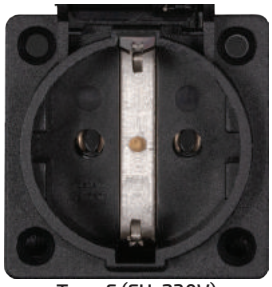
UPS-MS-1500

16.92"

Circuit Breaker

Output Connector Options

NEMA 5-15R (US -115V)



Type F (EU-230V)

Type G (UK-230V)

Type I (ANZ-230V)

Military Shelter-Grade Uninterruptible Power Supply (UPS-MS)

AC Base Models			
Model Number	**Power**	**Battery Run-Time @Full Power** *(80% Power)*	**Height** *(W x D x H)*	**Weight**
UPS-MS-1500-S-2U *(1 Standard Battery Pack)*	**1250 W 1500 VA**	**>10 min.** *(>13 min.)*	**2U** *(16.92" x 22.13" x 3.40")*	**42 lbs.**

AC Base Models	Options				
	AC Input Frequency	**AC Output Voltage**	**AC Output Neutral Wire**	**AC Output Set Point Frequency**	**Additional Options**
UPS-MS-1500-S-2U-	**L**	**1** **2** **3** **4**	**G**	**5** **6**	**-E** **00** **CE**

Not all combinations make valid part numbers, please contact SynQor for availability. See the Product Summary web page for more options.

Examples:

UPS-MS-1500-S-2U-L1G6-E00, UPS-MS-1500-S-2U-L2G5-E00

UPS-MS-1500-S-2U-L2G5-ECE (230 V output with CE marking)

Options	
AC Input Frequency	**L** 47-65 Hz
AC Output Voltage	**1** 115 Vrms **2** 230 Vrms - EU **3** 230 Vrms - UK **4** 230 Vrms - ANZ
AC Output Neutral Wire	**G** Grounded
AC Output Set Point Frequency	**5** 50 Hz **6** 60 Hz
Additional Options	**-E** Ethernet/SNMP with Configuration Loading
	00 No CE Marking **CE** CE Marking (230 V only)

EBM MILITARY FIELD-GRADE

Expansion Battery Module

Military Field-Grade Expansion Battery Module (EBM)

SynQor's Military Field-Grade UPS Expansion Battery (EBM) units are designed for the extreme environmental and demanding electrical conditions of Military Land, Shipboard, and 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 1250W UPS power
- > 20 minute run-time 2500W UPS power
- Integral 500W battery charger
- Full power operation: -20°C to +55°C
- Storage temperature: -40°C to +65°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
- Low weight: 61 lbs.

Specification Compliance

EBM units are designed to meet:

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

Military Field-Grade Expansion Battery Module (EBM)

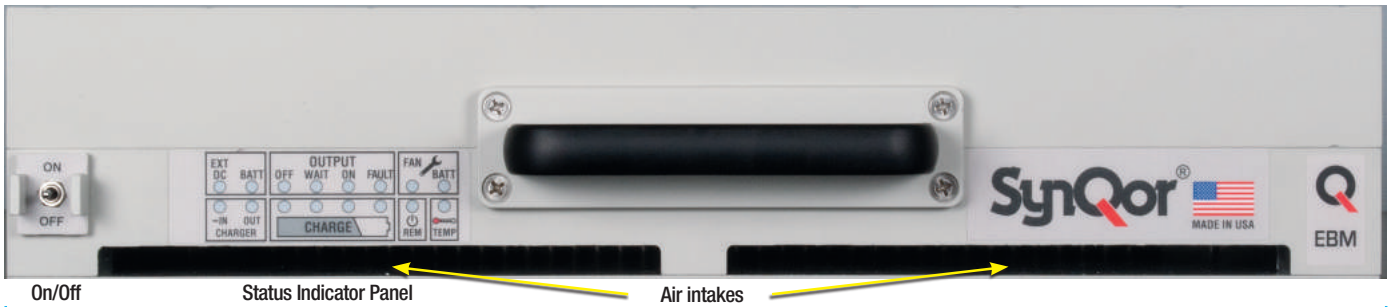
Model Specifications							
Model Number	**Power**	**Battery Run-Time**	**Height** *(W x D x H)*	**Weight**	**DC Input**	**DC Output**	**AC Input Frequency**
EBM-1000-2U	**1250 W**	**>45 min.**	**2U** *(17.00" x 22.28" x 3.40")*	**61 lbs.**	**28Vnom**	**28V**	**47-63 Hz or 360-800 Hz**
	2500 W	**>20 min.**					

PART NUMBERING SYSTEM

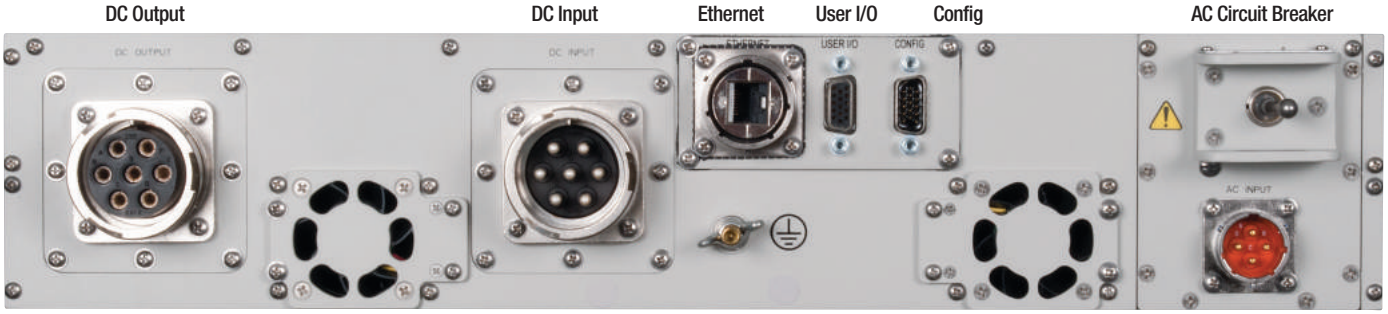
Family	Watt Hours	Height	DC Output Voltage	Output Power	Charging Input	Additional Options
EBM	**1000:** 1000 W Hr	**2U:** 3.40"	**28:** 28 Vdc	**3000:** 3000 W	**W:** 47-63 Hz / 360-800 Hz	**E00:** Ethernet / SNMP **ECE:** Ethernet / SNMP & CE Marking

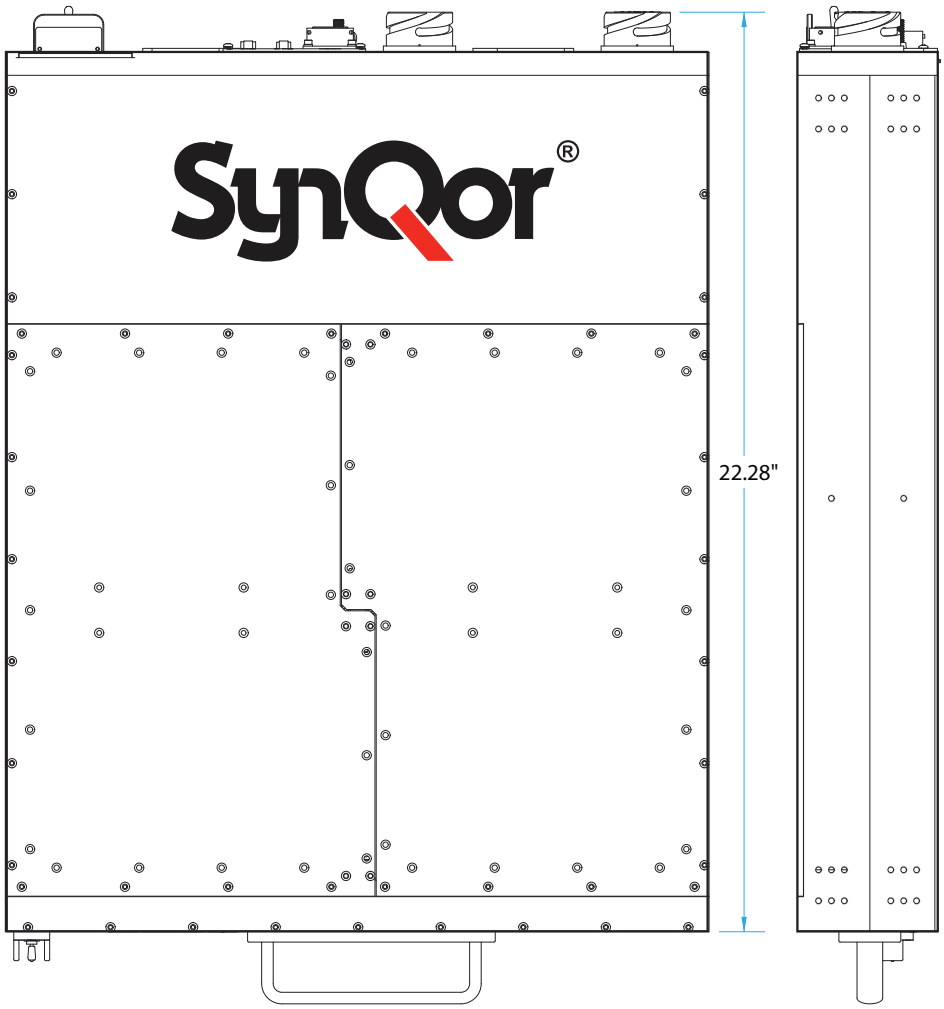
Part Numbering Example: EBM-1000-2U-28-3000-W-E00

EBM-1000-2U



EBM-1000-2U-28-3000 Back Panel





MPC MILITARY FIELD-GRADE

Military Power Conditioner

Military Field-Grade Power Conditioner (MPC)

SynQor's Military Field-Grade 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, a DC input rated for military 28 VDC sources, and an electronic breaker on the AC output to permit fault-tolerant parallel operation for higher power and/or N+M redundant systems.

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
- 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
- Up to 32 units can be combined to form a higher power fault-tolerant, glitch-free system, perhaps with N+M redundancy, by ordering with the "AC Output Electronic Breaker" option and the appropriate configuration cable
- User I/O and Configuration signal ports

Specification Compliance

MPC units are designed to meet:

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

Options

- 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
- Shipboard version with floating neutral wire
- N+1 Redundancy

Military Field-Grade Power Conditioner (MPC)

Base Models			
Model Number	**Power**	**Height** *(W x D x H)*	**Weight**
MPC-1500-1U	**1250 W/1500 VA**	**1U** *(17.00" x 21.60" x 1.73")*	**24 lbs.**
MPC-3000-2U	**2500 W/3000 VA**	**2U** *(17.00" x 22.22" x 3.40")*	**49 lbs.**

Base Models	Options						
	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- MPC-3000-2U-	L W T	1 2	G F R	5 6 4	S D M P R V W	00 12 15 24 28 40 50	-E 00 CE

Options	
AC Input Frequency	**L** 47- 65 Hz **W** 47-800 Hz **T** 3-Phase 47-800 Hz
AC Output Voltage	**1** 115 Vrms **2** 230 Vrms
AC Output Neutral Wire	**G** Grounded **F** Floating* **R** AC Output Electronic Breaker*
AC Output Set Point Frequency	**5** 50 Hz **6** 60 Hz **4** 400 Hz
DC Input / DC2 Output	**S** Not Installed **D** DC Input **M** DC2 Out 24 VDC with Droop Share **P** DC2 Out 24 VDC No Share (MPC-1500) **R** DC2 Out 28 VDC with Droop Share **V** DC2 Out 28 VDC No Share (MPC-1500) **W** DC2 Out 50 VDC No Share (MPC-1500)
DC1 Output	**00** None **12** 12 V **15** 15 V **24** 24 V **28** 28 V **40** 40 V **50** 50 V
Additional Options	**-E** Ethernet/SNMP with Configuration Loading **00** No CE Marking **CE** CE Marking

Not all combinations make valid part numbers, please contact SynQor for availability. See the Product Summary web page for more options.

***Notes:**

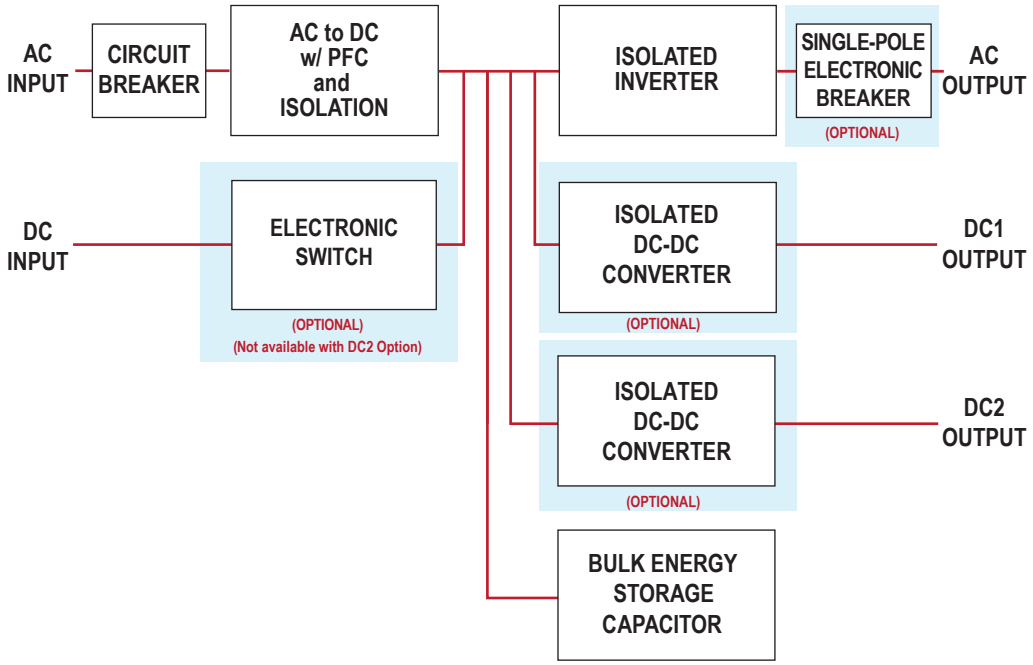
Order "**F:** Floating" option when configuring the AC output for multi-unit combinations of up to 3 units.

Order "**R**: AC Output Electronic Breaker" option for fault-tolerant, glitch-free parallel systems of up to 32 units with N+M redundancy. The AC output neutral wire will not be connected to the chassis.

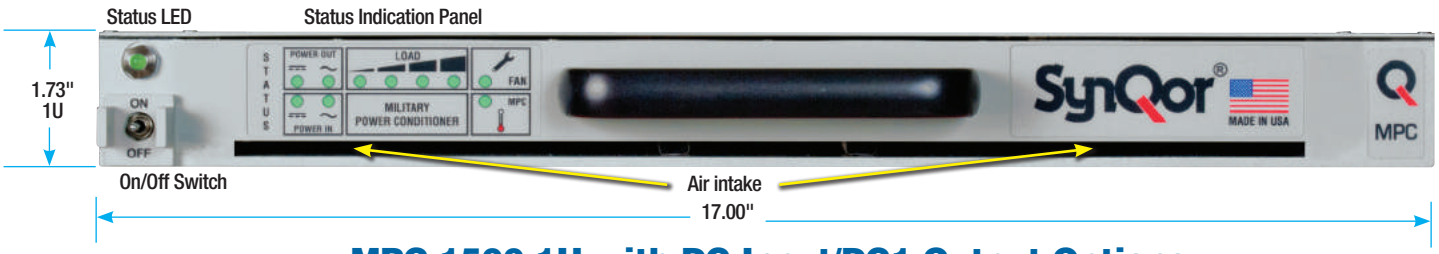
Examples:

MPC-1500-1U-L1G6D28-E00, MPC-1500-1U-L2G5S00-E00

MPC-3000-2U-L2G5S00-ECE *(230 V output with CE marking)*

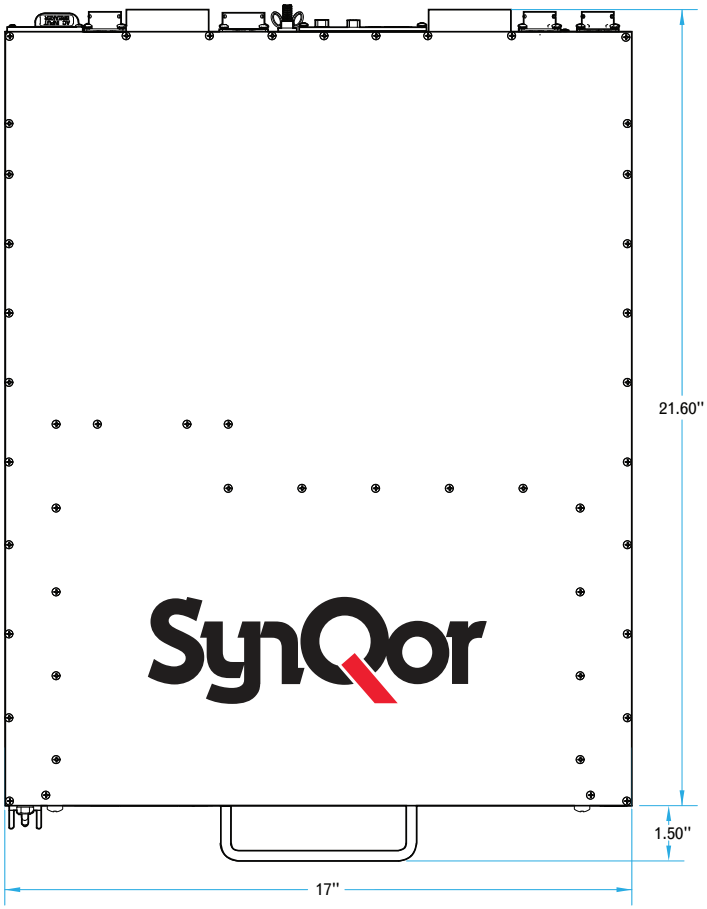


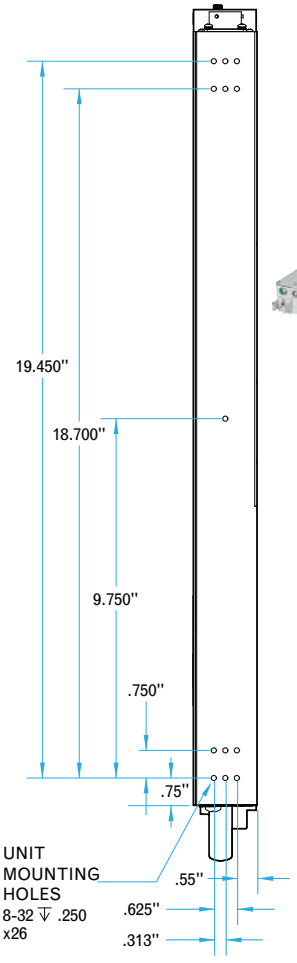
MPC-1500-1U

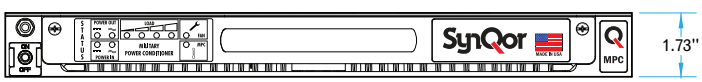


MPC-1500-1U with DC Input/DC1 Output Options

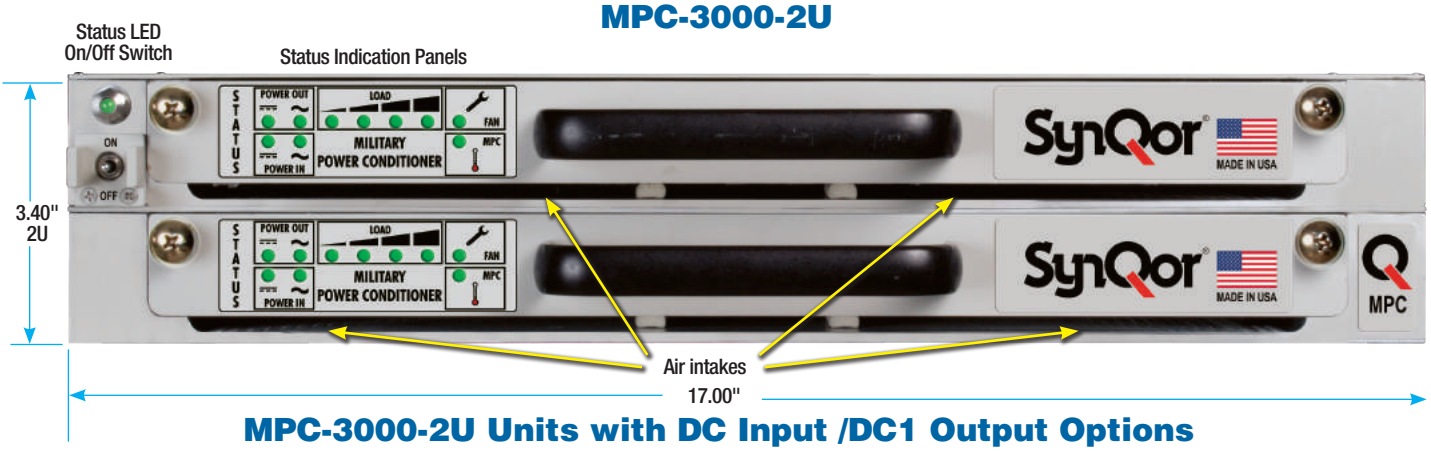
MPC-1500-1U with DC1 Output/DC2 Output Options



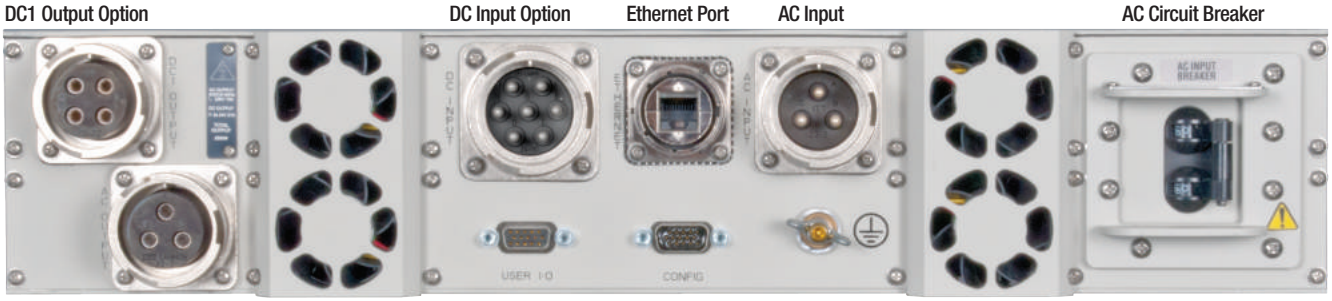




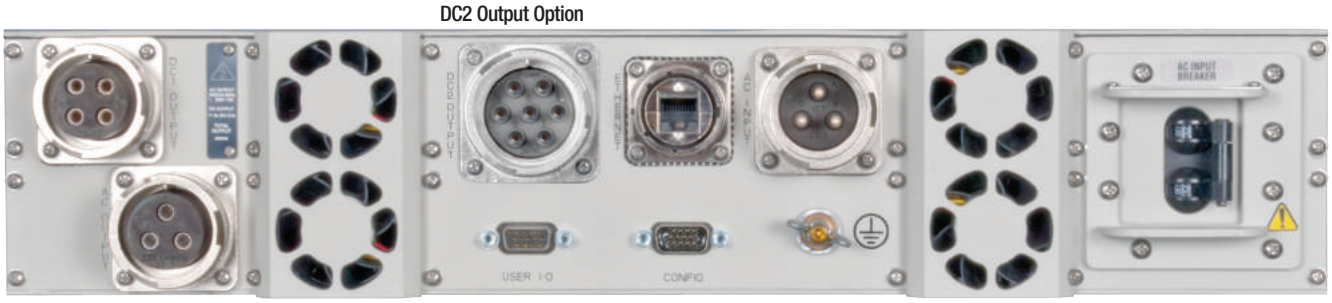
MPC-3000-2U

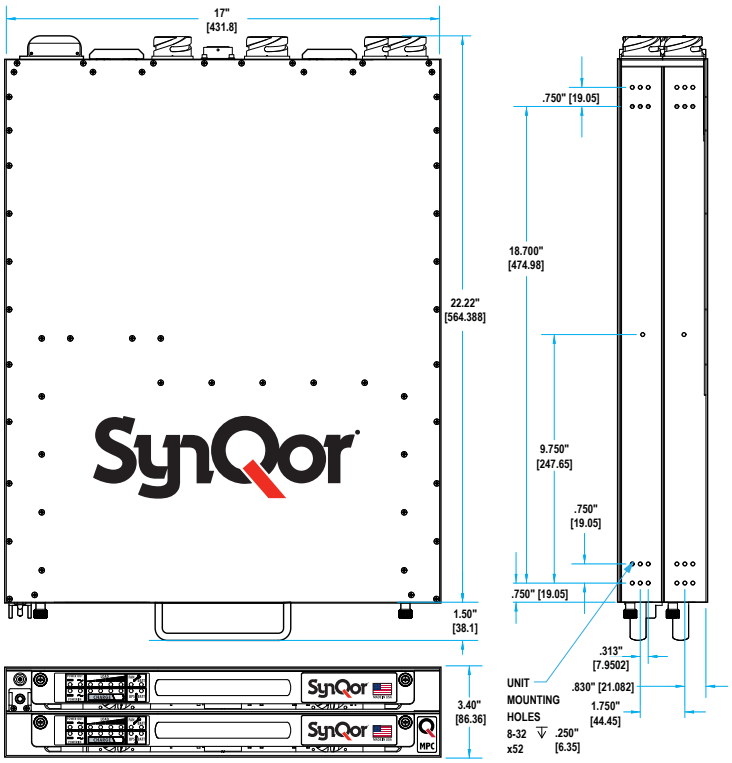


MPC-3000-2U Units with DC Input /DC1 Output Options



MPC-3000-2U Units with DC1 Output /DC2 Output Options





MPC MILITARY FIELD-GRADE

Military Power Conditioner

DC Output Only Military Field-Grade Power Conditioner (MPC-1250)

SynQor's Military Field-Grade 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 DC output to the load. It is designed to comply with a wide range of military standards.

MPC Product Features

- Sealed, weather-proof, shock-proof construction
- 1250W DC 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 DC)
- True on-line double conversion
- User I/O and Configuration signal ports
- Low weight: 22 lbs.

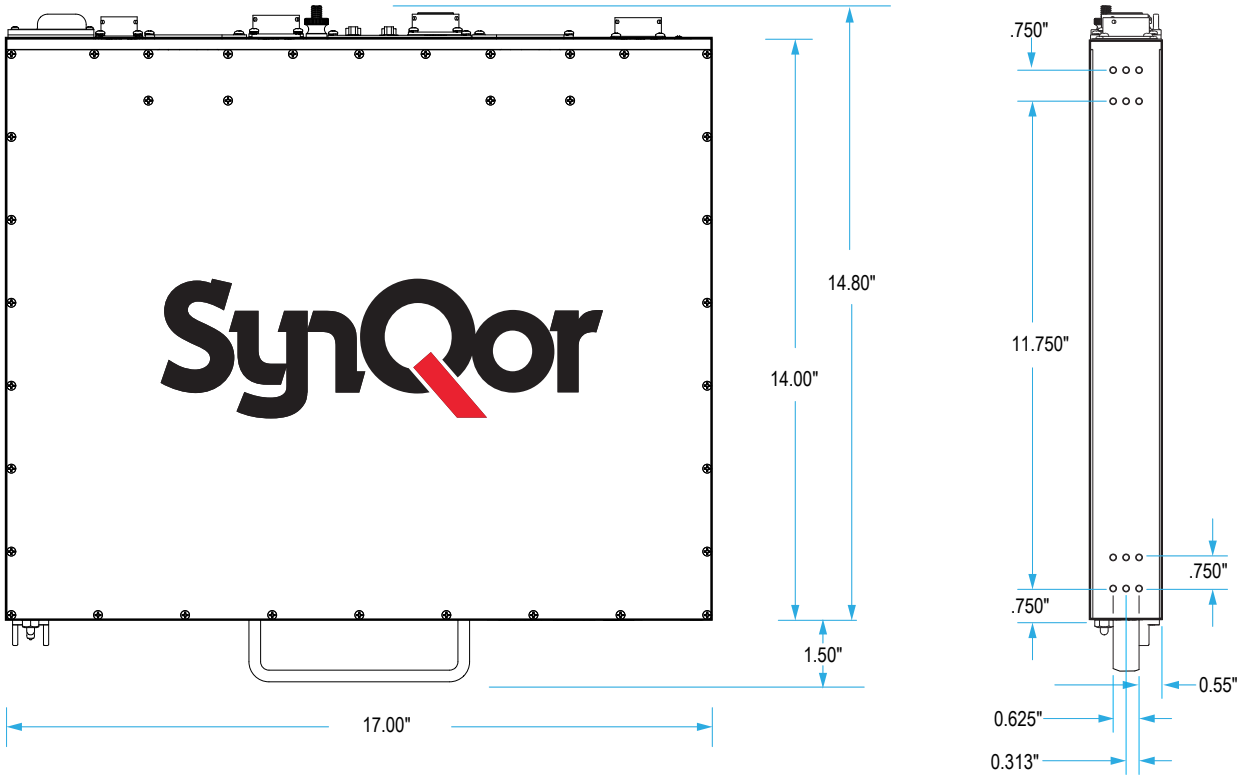
Specification Compliance

MPC units are designed to meet:

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

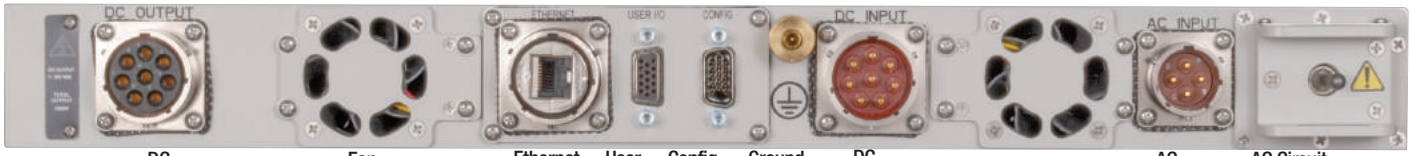
Options

- Fully Regulated or Parallelable DC Output
- Wide-range AC input frequency: 47 Hz to 800 Hz



MPC-1250-1S

MPC-1250-1S with AC & DC Input / DC Output



DC Output Only Military Field-Grade Power Conditioner (MPC)

Base Model			
Model Number	**Power**	**Height** *(W x D x H)*	**Weight**
MPC-1250-1S	**1250 W**	**1U** *(17.00" x 14.80" x 1.73")*	**22 lbs.**

Base Models	Options					
	AC Input Frequency	DC Output Type	DC Output Voltage	DC Input	Additional Options	
MPC-1250-1S-	L W	R P	28 24	D00	-E	00 CE

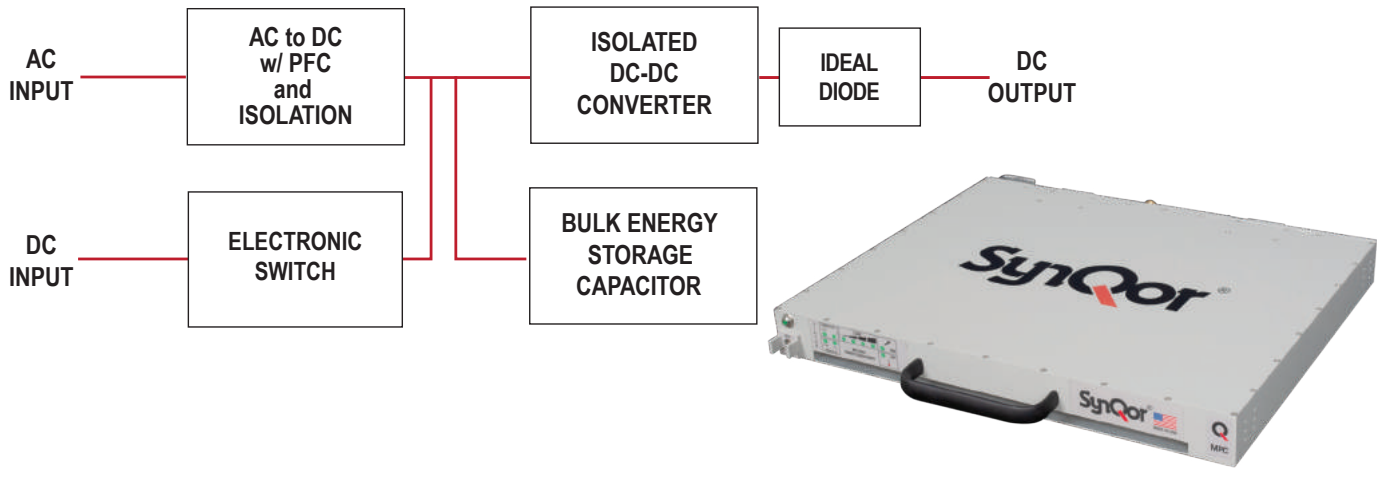
Not all combinations make valid part numbers, please contact SynQor for availability.

See the Product Summary web page for more options.

***Notes:** Order "**P:** Parallelable" option to place multiple MPC units in parallel

Examples: MPC-1250-1S-LR28D00-E00
MPC-1250-1S-LP28D00-ECE *(Parallelable with CE marking)*

Options		
AC Input Frequency	L W	47-65 Hz 47-800 Hz
DC Output Type	R P	Fully Regulated Output Parallelable Regulated Output
DC Output Voltage	28 24	28 V Output 24 V Output
DC Input	D00	DC Input
Additional Options	-E	Ethernet/SNMP with Configuration Loading
	00 CE	No CE Marking CE Marking



MPS MILITARY FIELD-GRADE

Military Power Supply

Military Field-Grade Power Supply (MPS) & Programmable Power Supply (MPPS)

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 & MPPS incorporate field proven high efficiency designs and rugged packaging technologies. The MPS & MPPS will accept a 3-Phase input with a wide range of input voltage and frequency values. The MPS delivers a well-conditioned continuous 4000W (5250W transient), DC semi-regulated output. The output voltage droops for system stability and for load sharing when units are in parallel. The MPPS delivers a well-conditioned output to the load. The output voltage and output current limit can be adjusted on the fly via RS-232 or web interface. Current sharing allows multiple units to be used in parallel. The MPS & MPPS are designed to comply with a wide range of military standards in SynQor's USA headquarters and manufacturing facilities.

MPS/MPPS Product Features

- Sealed, weather-proof, shock-proof construction
- 4000W output power
- Adjustable output voltage and output current limit (MPPS)
- Semi-Regulated 28V-48V output voltages (MPS)
- Full power operation: -40°C to +55°C
- 3-Phase input: 80-265Vrms line-to-line; 47-800Hz
- Power factor correction at AC input
- Up to 8 units can be combined for higher power
- User I/O and Configuration signal port
- Synchronized start and stop of multiple units
- Battle Mode for over-temperature events
- 1U high rack–mount unit (17.00" x 20.42")
- Low weight: 28 lbs.

Specification Compliance

MPS & MPPS units are designed to meet:

- MIL-STD-704F - Aircraft Electrical Power Characteristics
- MIL-STD-1399-300B - Interface Std for Shipboard Systems
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-810G - Environmental Engineering Considerations

3-Phase Military Field-Grade AC-DC 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	**2D:** 28V **2E:** 30V **4B:** 48V	**S00:** Semi-regulated	**E00:** Ethernet/SNMP

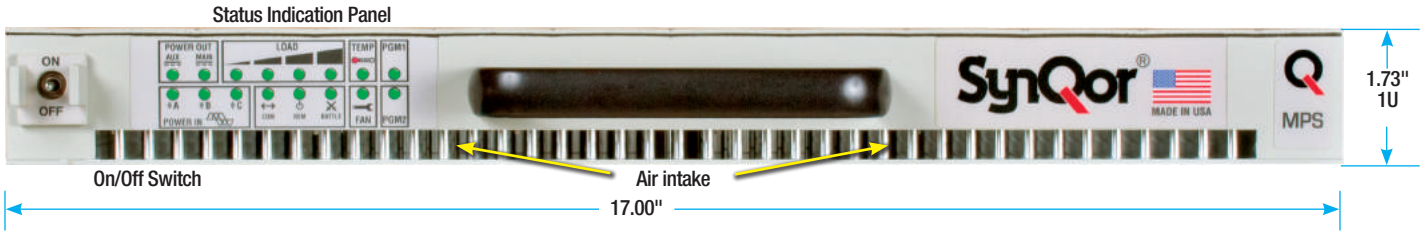
Example: MPS-4000-1U-3W2ES00-E00 For valid part numbers, refer to the website or contact your local sales representative.
*Approximate output voltage at full load, output voltage has Droop

3-Phase Military Field-Grade AC-DC Programmable Power Supply (MPPS)

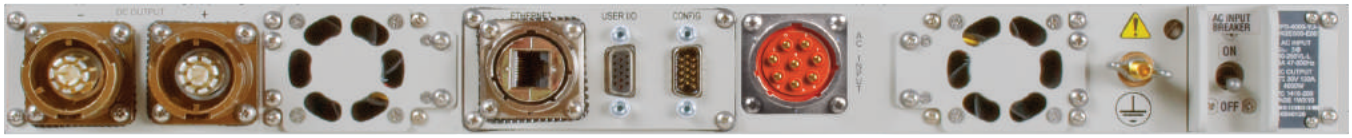
Family	Output Power	Height	AC Input Phase #	AC Input Frequency	DC Output Voltage @ Full Load	Output Current Range	Network
MPPS	**4000:** 4000W	**1U:** 1.73"	**3:** 3-Phase	**W:** 47-800Hz	**28:** 0-35V **48:** 0-55V **72:** 0-80V	**150:** 0-150A **120:** 0-120A **078:** 0-78A	**E00:** Ethernet/SNMP

Example: MPPS-4000-1U-3W28-150-E00 For valid part numbers, refer to the website or contact your local sales representative.

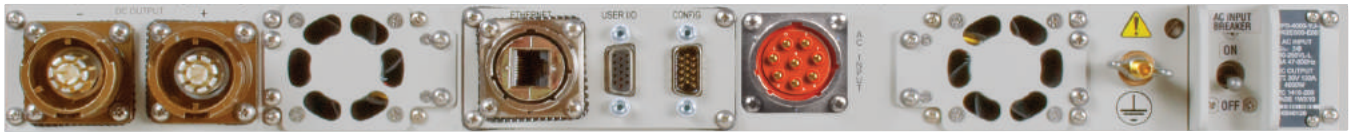
MPS-4000-1U and MPPS-4000-1U

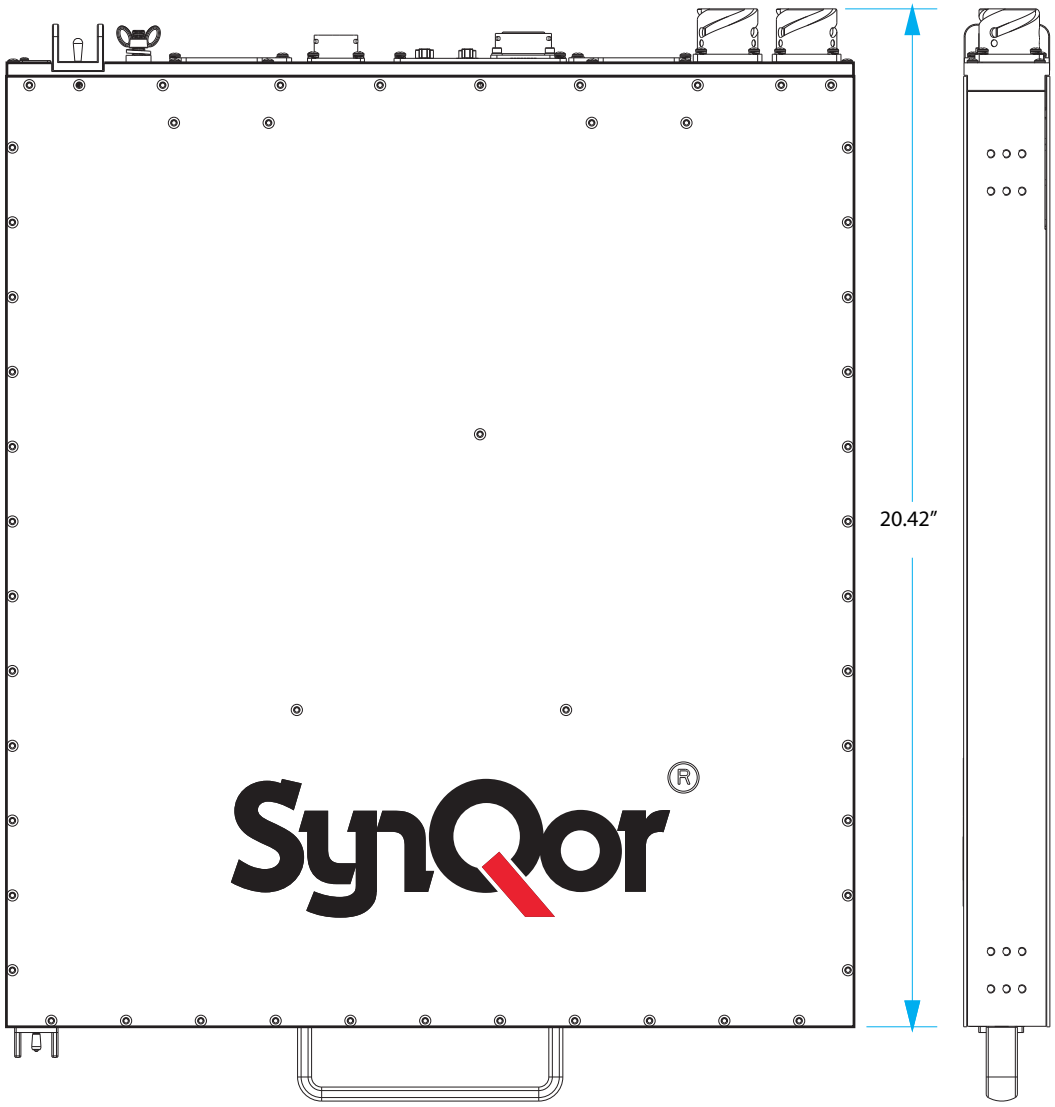


MPS-4000-1U with AC Input



MPPS-4000-1U with AC Input





MINV MILITARY FIELD-GRADE

Military Power Inverter

Military Field-Grade Power Inverter (MINV)

SynQor's Military Inverter units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace applications. SynQor's MINV incorporates field proven high efficiency designs and rugged packaging technologies. This MINV will accept a wide range of steady-state and transient DC input voltage values while delivering a well-conditioned AC output to the load. Options include a selection of output voltage amplitudes, frequencies, and an electronic breaker on the AC output to permit fault-tolerant parallel operation for higher power and/or N+M redundant systems.

MINV Product Features

- Sealed, weather-proof, shock-proof construction
- 4000W (5000VA) output power
- Full power operation: -40°C to +55°C
- 28V DC Input
- Pure sinusoidal AC output voltage
- Handles 0.0 - 1.0 power factor loads and non-linear loads
- Up to 32 units can be combined for higher power, voltage or a 3-Phase AC output
- Up to 32 units can be combined to form a higher power fault-tolerant, glitch-free system, perhaps with N+M redundancy, by ordering with the "AC Output Electronic Breaker" option and the appropriate configuration cable
- Battle Mode for over-temperature events
- User I/O and Configuration signal ports

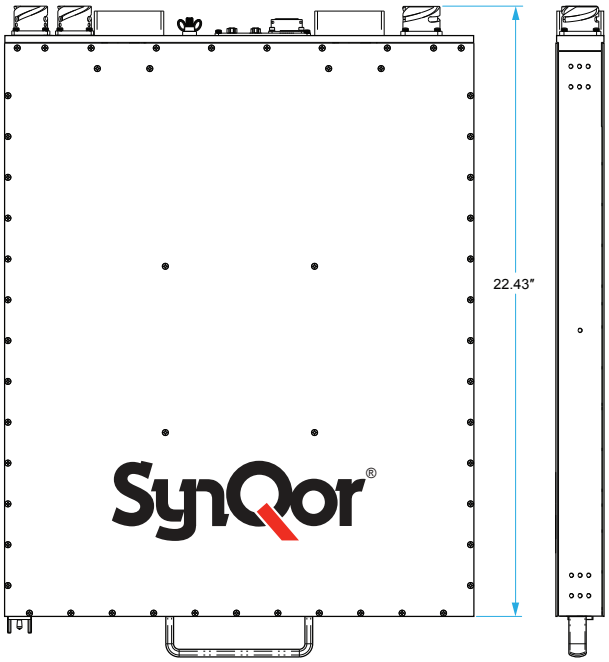
Specification Compliance

MINV-4000 units are designed to meet:

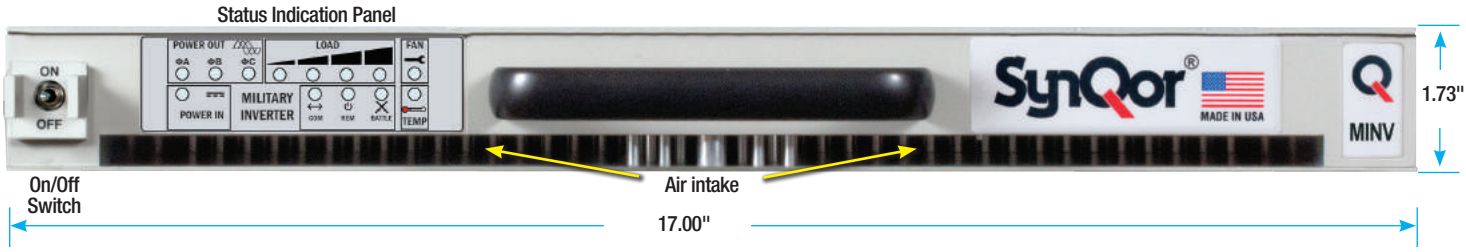
- MIL-STD-1399-300B - Interface Std for Shipboard Systems
- MIL-STD-810G - Environmental Engineering Considerations
- MIL-STD-461F - Electromagnetic Interference
- MIL-STD-704F - Aircraft Electrical Power Characteristics
- MIL-STD-1275D - Vehicle Electrical Power Characteristics

Options

- 115Vrms or 230Vrms AC output
- 50Hz, 60Hz, or 400Hz AC output
- Shipboard version with floating neutral wire
- N+1 Redundancy



MINV-4000-1U



28V Rear Panel

Military Field-Grade Power Inverter (MINV)

Base Model				
Model Number	**Power**	**Nominal DC Input Voltage**	**Height** *(W x D x H)*	**Weight**
MINV-4000-1U	**4000 W 5000 VA**	**28 V**	**1U** *(17.00" x 22.43" x 1.73")*	**32 lbs.**

Base Model	Options					
	DC Input Voltage	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Freq	Output Config	Additional Options
MINV-4000-1U-	28	1 2	G F R	5 6 4	S	-E 00 CE

Options	
DC Input Voltage	**28** 20 - 33 V
AC Output Voltage	**1** 115 Vrms **2** 230 Vrms
AC Output Neutral Wire	**G** Grounded **F** Floating* **R** AC Output Electronic Breaker*
AC Output Set Point Freq	**5** 50 Hz **6** 60 Hz **4** 400 Hz
Output Config	**S** Single-Phase Output
Additional Options	**-E** Ethernet/SNMP with Configuration Loading
	00 No CE Marking **CE** CE Marking

Not all combinations make valid part numbers, please contact SynQor for availability. See the Product Summary web page for more options.

***Notes:**

Order "**F**: Floating" option when configuring the AC output for multi-unit combinations of up to 3 units.

Order "**R**: AC Output Electronic Breaker" option for fault-tolerant, glitch-free parallel systems of up to 32 units with N+M redundancy.

The AC output neutral wire will not be connected to the chassis.

Examples:

MINV-4000-1U-28-1G6S-E00

MINV-4000-1U-28-2G5S-ECE (230 V output with CE marking)

MAC MILITARY FIELD-GRADE

Military AC Phase/Frequency Changer

Military Field-Grade AC Phase/Frequency Changer (MAC)

SynQor's Military Field-Grade AC Phase/Frequency Changer units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace applications. SynQor's MAC incorporates field proven high efficiency designs and rugged packaging technologies. This MAC will accept a 3-Phase AC input and change it to a well-conditioned Single-Phase AC output using a two-stage DC link isolated topology. It is designed and manufactured in SynQor's USA facilities to comply with a wide range of military standards. Options include a selection of output voltage amplitudes, frequencies and an electronic breaker on the AC output to permit fault-tolerant parallel operation for higher power and/or N+M redundant systems.

MAC Product Features

- Sealed, weather-proof, shock-proof construction
- Two-stage, DC link isolated topology
- 4000 W (5000 VA) output power;
  15 s transient to 5250 W (6500 VA)
- Full power operation: -40 °C to +55 °C
- 3-Phase 360-528 Vrms L-L △ input
  (draws balanced currents)
- 47-65 Hz input frequency range
- Pure sinusoidal AC output voltage
- Handles 0.0—1.0 power factor loads and non-linear loads
- Up to 32 units can be combined for higher power, voltage, a 3-Phase AC output, or a higher power fault-tolerant, glitch-free system, perhaps with N+M redundancy, by ordering with the "AC Output Electronic Breaker" option and the appropriate configuration cable
- User I/O and Configuration signal ports
- Battle Mode for over-temperature events

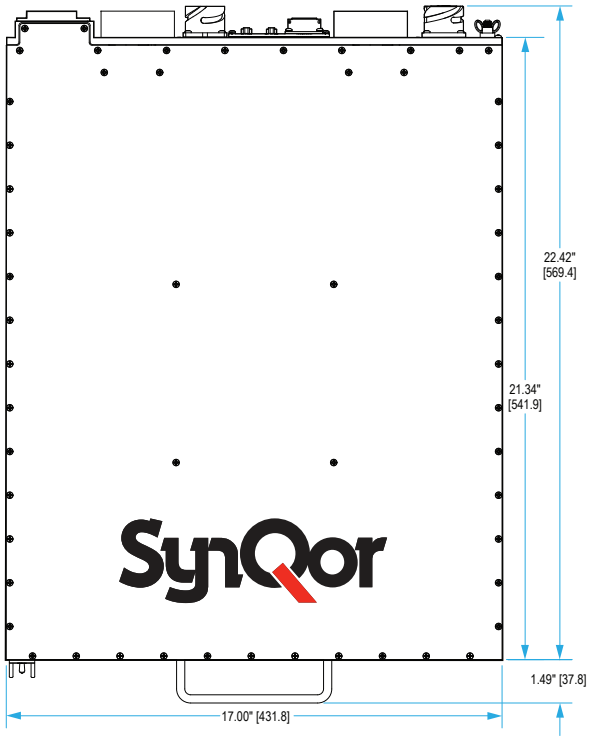
Specification Compliance

MAC-4000 units are designed to meet:

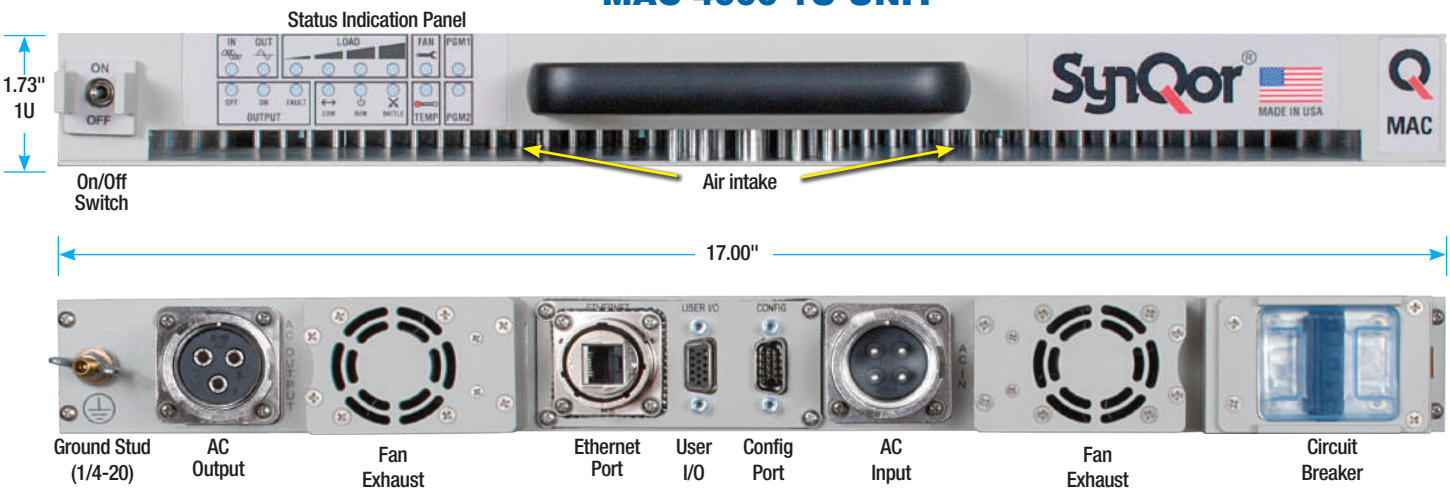
- MIL-STD-1399-300B - Interface Std for Shipboard Systems
- MIL-STD-810G - Environmental Engineering Considerations
- MIL-STD-461F - Electromagnetic Interface

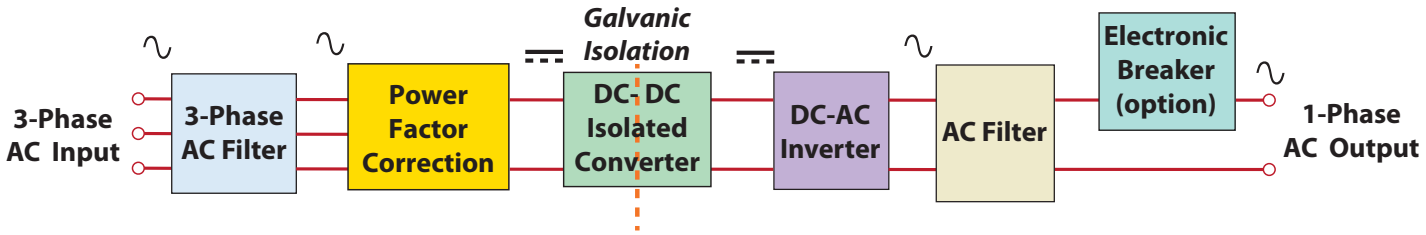
Options

- 115 Vrms or 230 Vrms AC output
- 50 Hz, 60 Hz, or 400 Hz AC output (software selectable)
- Shipboard version with floating output neutral wire
- N+1 Redundancy



MAC-4000-1U UNIT





Military Field-Grade Phase/Frequency Changer (MAC)

Base Model			
Model Number	**Power**	**Height** *(W x D x H)*	**Weight**
MAC-4000-1U- *(1 Standard Battery Pack)*	**4000 W 5000 VA**	**1U** *(17.00" x 22.42" x 1.73")*	**33 lbs.**

Base Models	Options							
	Line to Line Input Voltage	Number of Input Phases	Input Freq Range	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Freq	Output Config	Additional Options
MAC-4000-1U-	4	T	L	1 2	G F R	5 6 4	S	-E 00 CE

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

See the Product Summary web page for more options.

***Notes:**

Order "**F**: Floating" option when configuring the AC output for multi-unit combinations of up to 32 units.

Order "**R**: AC Output Electronic Breaker" option for fault-tolerant, glitch-free parallel systems of up to 32 units with N+M redundancy.

The AC output neutral wire will not be connected to the chassis for either the F option or R option.

Example: MAC-4000-1U-4TL2G6S-E00

Options		
Line to Line Input Voltage	**4**	360-528 V
Number of Input Phases	**T**	3-Phase
Input Freq Range	**L**	47-65 Hz
AC Output Voltage	**1** **2**	115 V 230 V
AC Output Neutral Wire	**G** **F** **R**	Grounded Floating* AC Output Electronic Breaker*
AC Output Set Point Freq	**5** **6** **4**	50 Hz 60 Hz 400 Hz
Output Config	**S**	One Single-Phase Output
Additional Options	**-E**	Ethernet/SNMP with Config Loading
	00	No CE Marking
	CE	CE Marking

VPX
Power Supplies

3U and 6U Military Power Supplies

The VPX power supplies are compliant with VITA 62, MIL-STD-704, MIL-STD-461 and MIL-STD-810 for 28Vin DC, 270Vin DC & Universal AC 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 and 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
- Conformal Coating Option available
- Optional I²C Function
  – Supports IPMI/PMBus/VITA 46.11
  – Input Reverse Polarity Protection

Specification Compliance

VPX units are designed to meet:

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

Military VPX DC Power Supply

Series	Package Size (U)	Input Range	Mil Std Filtering	Output Voltage Combination Code	Packaging Options
VPX	**3U** **6U**	**DC28:** 28V **DC48:** 48V **DC270:** 270V	**P:** P - MIL-STD-704 **T:** T - MIL-STD-704 MIL-STD-1275 DEF-STAN 61-5 (P6)/6	**001** **002** **003**	Y1: Screening **S:** S-Grade (MCOTS) **M:** M-Grade (MCOTS) Y2: Conformal Coating **N:** No Conformal Coating **C:** Conformal Coating Y3: I²C Function **[ ]:** No I²C **2:** I²C

Example: VPX-3U-DC28P-001-MC2 For valid part numbers, refer to the website or contact your local sales representative.

Military VPX AC Power Supply

Series	Package Size (U)	Input Range	Number of Phases	Mil Std Filtering	Output Voltage Combination Code	Packaging Options
VPX	**3U** **6U**	**ACUNV:** AC Universal Input	**1:** Single Phase	**C:** Clamped Passive Filter **CH:** Clamped Passive Filter with Hold-up	**001** **N01**	Y1: Screening **S:** S-Grade (MCOTS) **M:** M-Grade (MCOTS) Y2: Conformal Coating **N:** No Conformal Coating **C:** Conformal Coating Y3: I²C Function **[ ]:** No I²C **2:** I²C

Example: VPX-3U-ACUNV-1-C-001-SN For valid part numbers, refer to the website or contact your local sales representative.

Model 28Vin Transient Suppression EMI filtering	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-6U-DC28T-001	800W	+12V @ 67A		+5.0V @ 30A	+3.3 VAUX @ 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 SPIKE 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 shuts down and restarts for these Surges	
202V, 350 ms, Rs = 0 Ω	MIL-STD-1275D; DEF-STAN 61-5 (Part 6)/6

Model 28Vin Passive EMI filtering	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-6U-DC28P-001	1000W	+12V @ 80A		+5.0V @ 30A	+3.3 VAUX @ 15A, +12 VAUX @ 1A, -12 VAUX @ 1A	3.6 lb
VPX-3U-DC28P-001	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	500W	+12V @ 40A	+3.3V @ 25A	+5.0V @ 30A	+3.3 VAUX @ 6A, +12 VAUX @ 1A, -12 VAUX @ 1A	1.6 lb
VPX-3U-DC28P-003	500W	+12V @ 40A	+3.45V @ 20A	+5.2V @ 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 34-75 Vin Passive EMI filtering	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-3U-DC48P-001	600W	+12V @ 50A	+3.3V @ 20A	+5.0V @ 30A	+3.3 VAUX @ 6A, +12 VAUX @ 1A, -12 VAUX @ 1A	1.6 lb

Model 270Vin Passive EMI filtering	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-6U-DC270P-001	730W	+12V @ 50A		+5.0V @ 30A	+3.3 VAUX @ 40A, +12 VAUX @ 1A, -12 VAUX @ 1A	3.8 lb
VPX-3U-DC270P-001	400W	+12V @ 33A	+3.3V @ 20A	+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)	
±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 85-264 Vrms Passive EMI filtering	Total Output Power	Typical Outputs				Weight
		VS1	VS2	VS3	AUX	
VPX-6U-ACUNV-1-C-001	630W	+12V @ 52.5A		+5.0V @ 40A	+3.3 VAUX @ 20A, +12 VAUX @ 1A, -12 VAUX @ 1A	3.6 lb
VPX-3U-ACUNV-1-C-N01	300W	+12V @ 25A	+3.3V @ 20A	+5.0V @ 30A	+3.3 VAUX @ 6A, +12 VAUX @ 1A, -12 VAUX @ 1A	1.7 lb
VPX-3U-ACUNV-1-C-001	300W	+12V @ 25A	+3.3V @ 20A	+5.0V @ 30A	+3.3 VAUX @ 6A, +12 VAUX @ 1A, -12 VAUX @ 1A	1.7 lb
VPX-3U-ACUNV-1-CH-001	300W	+12V @ 25A	+3.3V @ 20A	+5.0V @ 30A	+3.3 VAUX @ 6A, +12 VAUX @ 1A, -12 VAUX @ 1A	2.0 lb

VPX 3U and 6U Military 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 6U 270V and AC input VPX modules. On the 3U/6U 28V input, 3U AC input & 3U 270V 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 datasheets on our website.

VPX-3U-ACUNV-1-N01 module does not support parallel operation.

Mil-COTS 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-A-610, Class III	Yes	Yes
Temperature Cycling	MIL-STD-883F, 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-883F, Method 2009	Yes	Yes

VITA 62 Control States

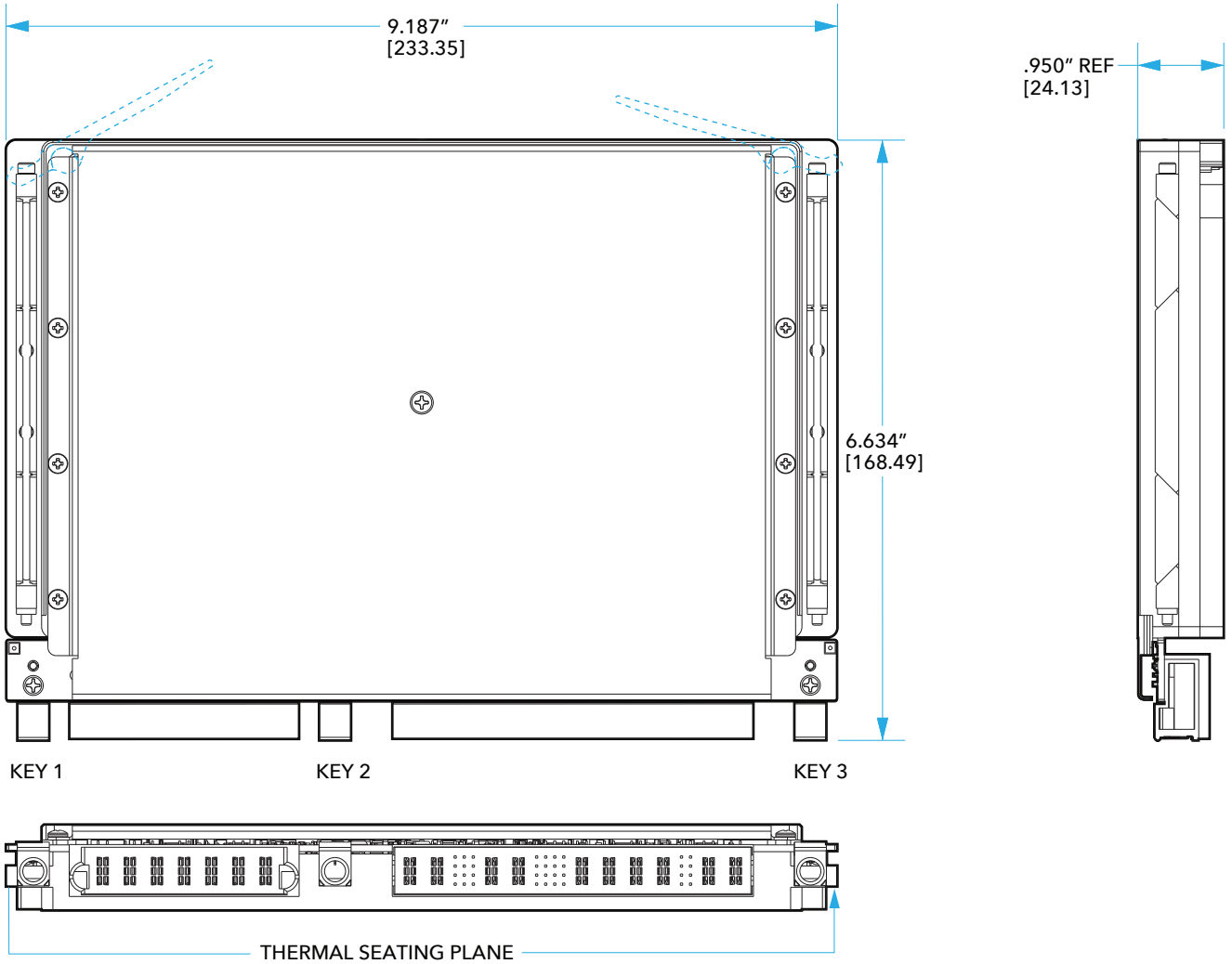
ENABLE*	INHIBIT*	+3.3V_AUX	VS1, VS2, VS3, +12V_AUX, -12V_AUX
HIGH	HIGH	OFF	OFF
LOW	HIGH	ON	ON
HIGH	LOW	OFF	OFF
LOW	LOW	ON	OFF

VPX Module Qualification (VITA 47 Compliant)

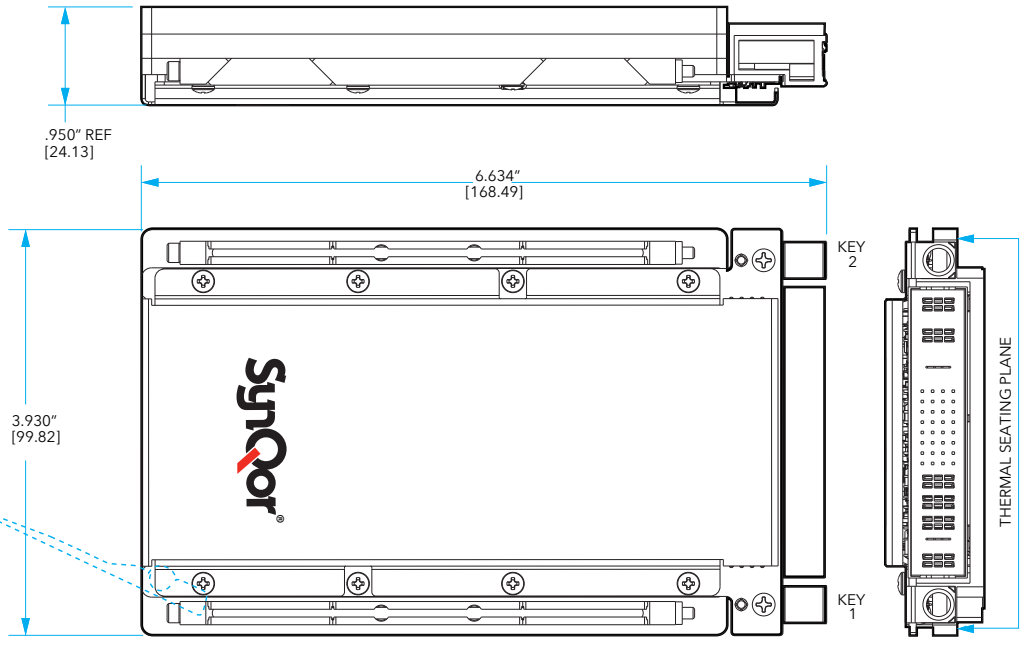
Test Name	Method
Random Vibration	MIL-STD-810, 514.6 - Procedure I, Class V3
Shock	MIL-STD-810, 516.6 - Procedure I, VI, Class OS2
Altitude	MIL-STD-810, 500.5 - Procedure I, II, III
Fungus Resistance	MIL-STD-810, 508.6
Corrosion Resistance	ASTM G85, Annex A4
Humidity	MIL-STD-810, 507.5 - Procedure II
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

3U & 6U VPX AC-DC & DC-DC Power Supply Mechanicals

VPX 6U Mechanical

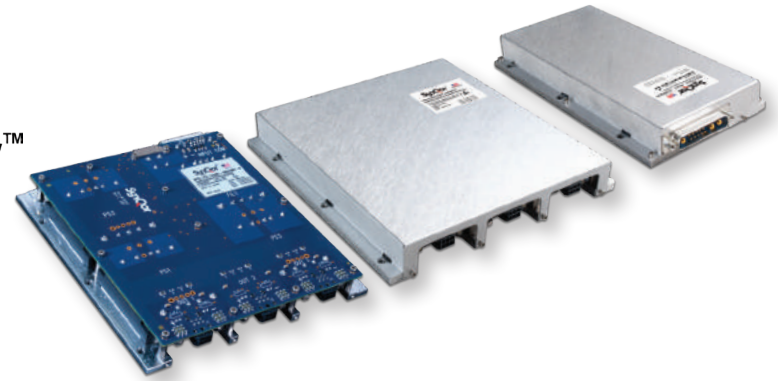


VPX 3U Mechanical



MultiQor™

Configurable DC-DC Power Supplies



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

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

Operational Features

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

Optional Features

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

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

MultiQor Configurable DC-DC Power Supplies

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

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

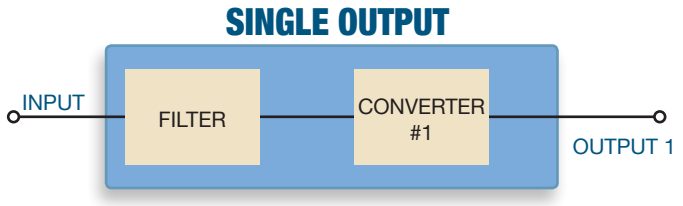
Model Number	Total Output Power	Configuration	Package Size	Weight
MTQ-Px-DC28T *(18V-40Vin with Transient Supression EMI input filter)*	450W	Up to 4 customer defined outputs	**P1/P2:** 3.80" x 6.84" x 0.92"	1.0 lb - 1.4 lb*
			P3/P4: 6.70" x 6.84" x 0.92"	2.1 lb - 2.5 lb*

* Weights vary depending on converters

DC28T Configurations

P1

SINGLE OUTPUT

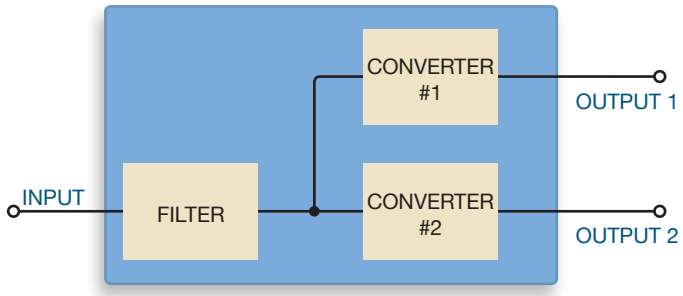


P1 DC-DC CONVERTER OPTIONS:

- 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

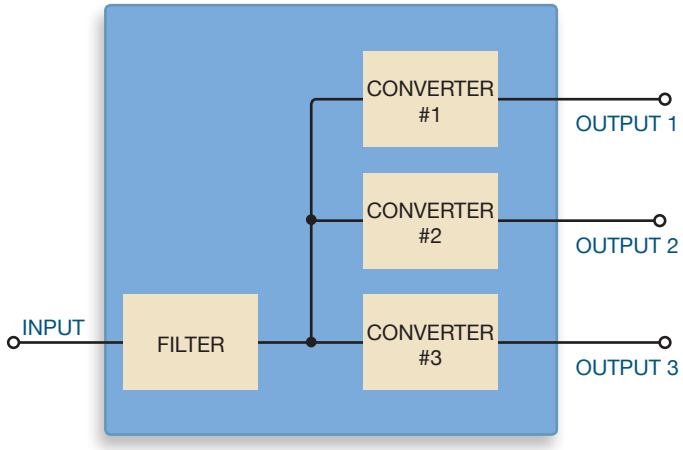


P2 DC-DC CONVERTER OPTIONS:

- 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

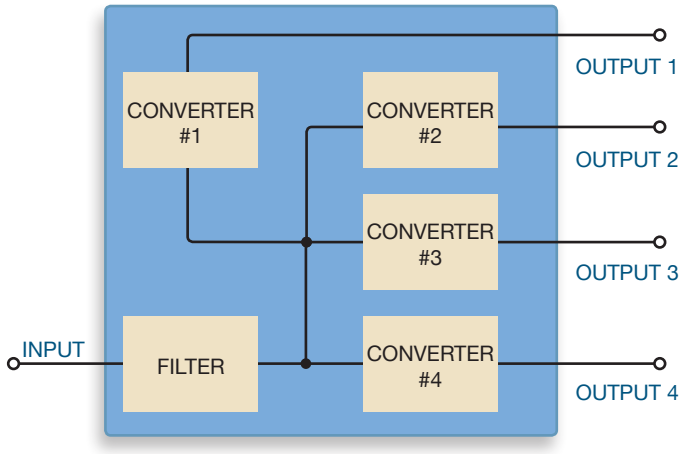


P3 DC-DC CONVERTER OPTIONS:

- 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 Supplies

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

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

Operational Features

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

Control Features

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

Optional Features

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

Protection Features

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

MultiQor Configurable DC-DC Power Supplies

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

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

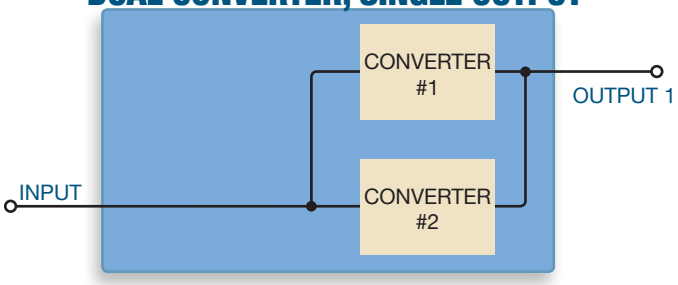
Model Number	Total Output Power	Configuration	Package Size	Weight
MTQ-Px-DC28 *(16V-40Vin with no input filter)*	**1500W**	One customer defined output *(with up to 3 converters in parallel)*	**P1/P2:** 3.80"x6.84"x0.92"	1.3 lb - 1.6 lb*
			P3: 6.70"x6.84"x0.92"	2.5 lb

* Weights vary depending on converters

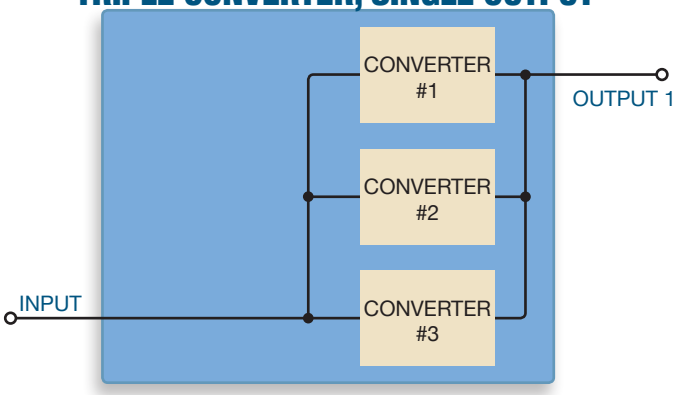
DC28 Configurations

P1 **SINGLE CONVERTER, SINGLE OUTPUT**

P2 **DUAL CONVERTER, SINGLE OUTPUT**



P3 **TRIPLE CONVERTER, SINGLE OUTPUT**



P1 DC-DC CONVERTER OPTIONS:

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

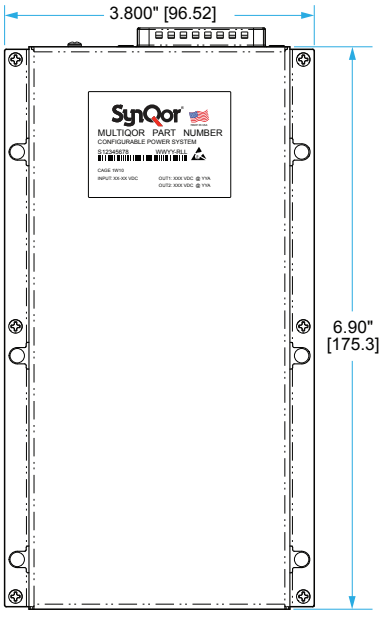
P2 DC-DC CONVERTER OPTIONS:

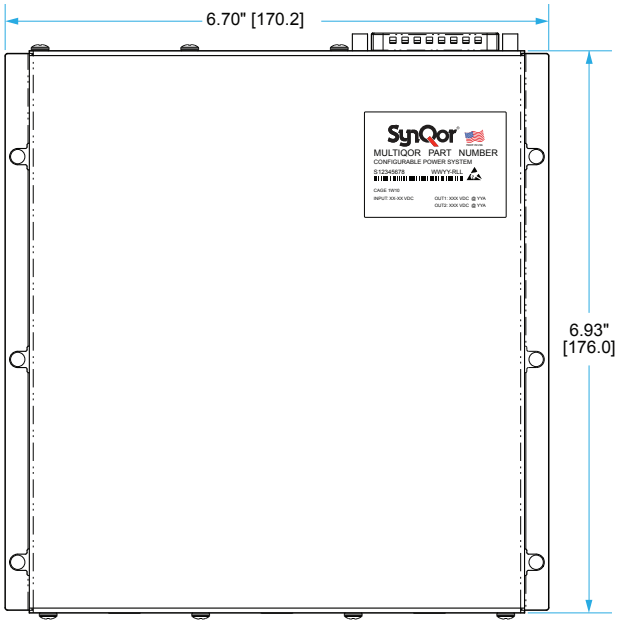
- Any Half-Brick Zeta converter from the MCOTS-28 Family
- Size: 3.80" x 6.84" x 0.92"
- Typical Weight: 1.6 LBS (2HB)

P3 DC-DC CONVERTER OPTIONS:

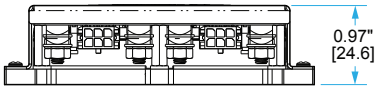
- Any Half-Brick Zeta converter from the MCOTS-28 Family
- Size: 6.70" x 6.84" x 0.92"
- Typical Weight: 2.5 LBS (3 HB)

DC28 & DC28T

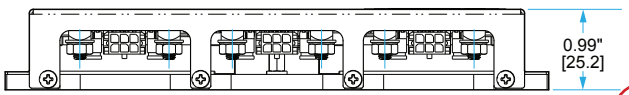




P1 AND P2 HAVE SIMILAR COVERS



P3 AND 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 single phase AC-DC power supplies provides up to two customer defined output voltages that are isolated from the input, each other and the cold plate. Using SynQor's Mil-COTS line of high efficiency, high reliability, fixed switching frequency DC-DC converters, PFC and EMI filters, this supply is designed to comply with MILSTD-704, and MIL-STD-1399. The complete assembly is designed to withstand the harsh environments of the Military and Aerospace industries and is compliant with MIL-STD-810 requirements.

Operational Features

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

Compliance Features

MultiQor units are designed to meet:

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

Control Features

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

Protection Features

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

MultiQor Configurable AC-DC Power Supplies

Family	Plate Format (# of Outputs)	Input Voltage Range	Phase	6 Digit Application Identification Number	Screening	Housing
MTQ	**P1:** 1 output **P2:** 2 outputs	**AC115:** 85-180 Vrms	**1:** Single Phase	6 Digit Application Identification Number	**S:** S-Grade **M:** M-Grade	**V:** Cover

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

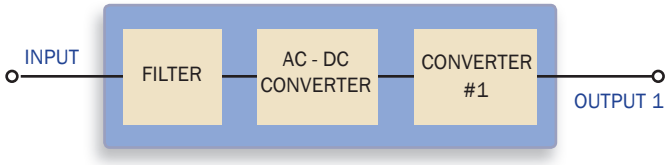
Model Number	Total Output Power	Configuration	Package Size	Weight
MTQ-Px-AC115 *(85-180Vrms with input filter)*	**650W**	Up to 2 customer defined outputs	**P1/P2:** 6.70" x 9.12" x 1.23"	3.4 to 3.7 lbs*

* Weights vary depending on converters

AC115 Configurations

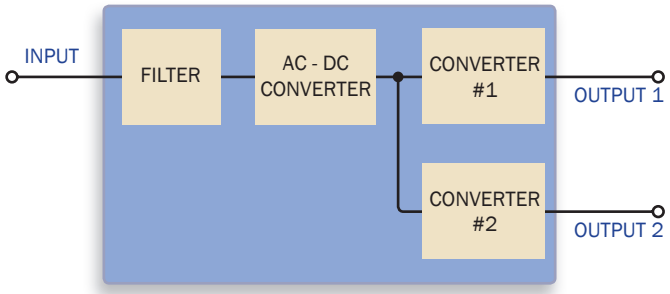
P1

SINGLE OUTPUT



P2

DUAL OUTPUT



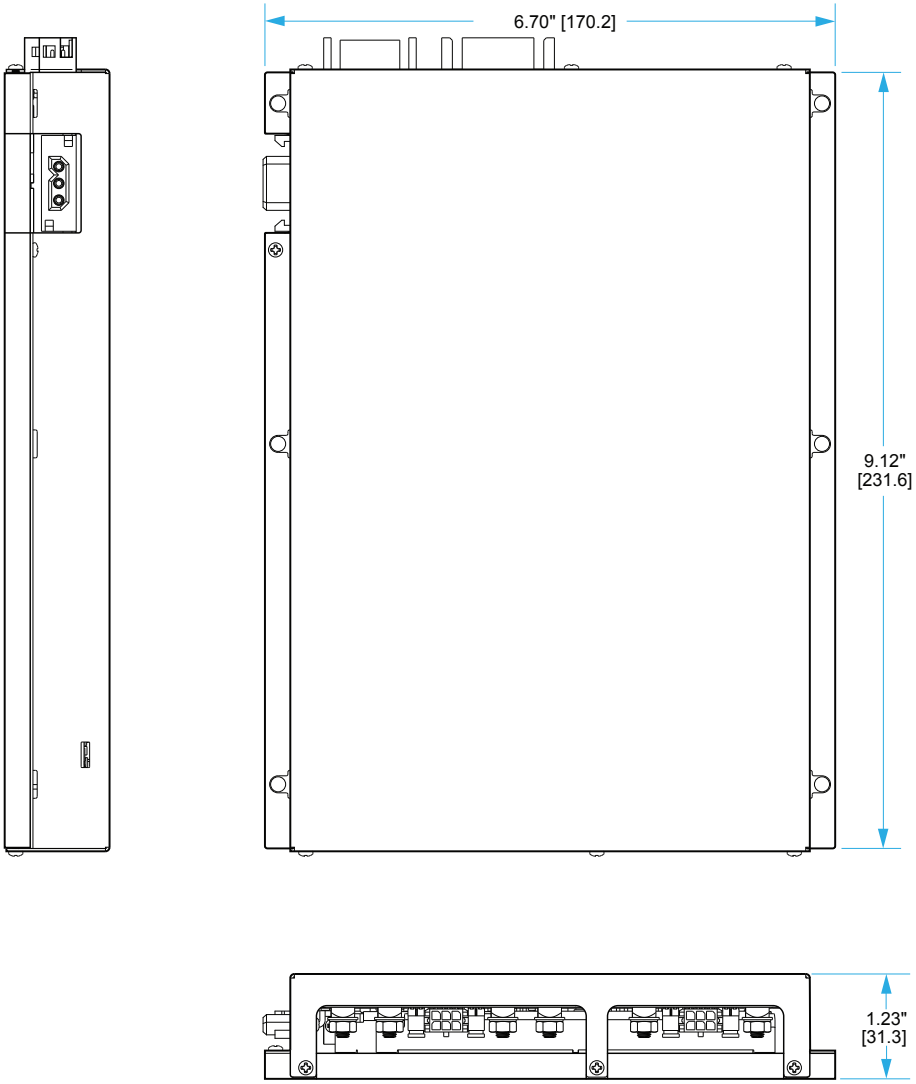
P1 CONVERTER OPTIONS:

- Any Full-Brick or Half-Brick converters from the MCOTS-270 Family
- Size: 6.70" x 9.12" x 1.23"
- Typical Weight: 3.4 LB to 3.7 LBS (1HB or 1 FB)

P2 CONVERTER OPTIONS:

- Any two Half-Brick converters from the MCOTS-270 Family
- Size: 6.70" x 9.12" x 1.23"
- Typical Weight: 3.7 LBS (2 HB)

Multi-Output AC115 — P1 and P2 have similar covers



AeroQor®

Isolated Power Factor Correction

Isolated Power Factor Correction Module for the Avionics Industry

The AeroQor® Isolated PFC Module is a high efficiency, active PFC, AC-DC converter designed to be used as a COTS Component in airborne applications. It operates from a universal AC input and generates an isolated DC output. Regulated output and droop output modules are available. Used in conjunction with a hold-up capacitor, and SynQor's AC line filter, the AeroQor module will draw a nearly perfect sinusoidal current (PF>0.99) from a single phase AC input. The module is designed with a high level of documentation and traceability.

Operational Features

- Isolated output, 100W & 325W output power
- Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- Input voltage range: 85-264Vrms
- ≥0.99 Power Factor
- High efficiency: 92% (230Vrms)
- -40°C to +100°C Operating Temperature
- Internal inrush current limit
- Auxiliary 10V bias supply, primary-side referenced
- Can be paralleled (droop version only)
- Compatible with SynQor's AeroQor AC line filters

Protection/Control Features

- PFC Enable
- AC and DC Power Good outputs
- 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

Specification Compliance

- RTCA/DO-160
- Airbus ADB0100.1.8
- Boeing 787B3-0147
- Boeing D6-36440
- Boeing D6-44588
- CE marked

AeroQor Isolated Power Factor Correction Module

Family	Input Voltage	Output Voltage	Regulation	Package Size	Thermal Design	RoHS
APFIC	**U:** 85-264V	**12:** 12V **24:** 24V **28:** 28V **48:** 48V **55:** 55V	**R:** Regulated Output **D:** Droop Sharing	**HM:** Half-brick Mega **HT:** Half-brick Tera	**C:** Encased **D:** Encased with Non-threaded Baseplate **V:** Encased with Flanged Baseplate	**G:** RoHS

Example: APFIC-U-24D-HT-C-G

AeroQor®

Avionics AC Filters

AC Line Filter Modules for the Avionics Industry

The AeroQor® EMI AC Line Filters brings SynQor's field proven technology and manufacturing expertise to the Avionics COTS Component marketplace. SynQor's innovative packaging approach ensures survivability in the most hostile environments. Compatible with the industry standard format, these filters have high differential-mode and common-mode attenuation and low series resistance. They follow conservative component derating guidelines and they are designed and manufactured to the highest standards.

Filter Features

- 85 to 264 Vrms
- Very low series resistance
- High Differential & Common-mode Attenuation
- All capacitors are safety-rated X7R multi-layer ceramic
- Meets common EMC standards in properly designed system with SynQor APFIC modules.
- -40°C to +100°C Operating Temperature
- Low power dissipation

Specification Compliance

- RTCA/DO-160
- Airbus ADB0100.1.8
- Boeing 787B3-0147
- Boeing D6-36440
- Boeing D6-44588
- CE marked

AeroQor AC Line Filter

Family	Input Frequency	Input Voltage	Package Size	Thermal Design	RoHS
ACF	**U:** 45 - 800 Hz	**230:** 85 to 264Vrms	**QT:** Quarter-brick Tera **QM:** Quarter-brick Mega	**C:** Encased **V:** Encased with Flanged Baseplate	**G:** RoHS

Example: ACF-U-230-ET-C-G For valid part numbers, refer to the website or contact your local sales representative.

Model Number	Input Frequency	Input Voltage (L-N)	Output Current	Output Power	Max Series Resistance	Differential & Common-mode Attenuation
ACF-U-230-QT	45-800Hz	85-264Vrms	5Arms	575W@115Vrms 1.5kW@230Vrms	330mΩ@100°C	>40dB @ 250kHz
ACF-U-230-QM	45-800Hz	85-264Vrms	2Arms	230W@115Vrms 460W@230Vrms	900mΩ@100°C	>45dB @ 250kHz

AeroQor®

3-Phase Power Factor Correction

3-Phase Isolated Power Factor Correction Module for the Avionics Industry

The AeroQor® Isolated PFC Module is a high efficiency, active PFC, AC-DC converter designed to be used as a COTS Component in airborne applications. It operates from a 115 Vrms AC input and generates an isolated DC output. Regulated output and droop output modules are available. Used in conjunction with a holdup capacitor, and SynQor's AC line filter, the AeroQor module will draw a nearly perfect sinusoidal current (PF>0.99) from a 3-Phase AC input. The module is supplied completely encased to provide protection from the harsh environments seen in many industrial areas.

Operational Features

- Compatible with commercial aircraft 60 Hz, 400 Hz and variable frequency systems
- Harmonic content meets commercial aircraft standards
- Minimal inrush current
- Balanced phase currents
- High power factor (0.99 at 400 Hz / 750 W)
- Minimal external output capacitance requirement
- Full load current during startup
- Ability to meet full EMI with available additional EMI filters
- N * 750 W power levels when paralleled
- 100°C max baseplate temperature at full power
- -40°C to +100°C Operating Temperature

Protection/Control Features

- All control pins referenced to separate floating return
- Asynchronous serial data interface
- AC and DC Power Good outputs
- PFC Enable input
- 3.3 V always-on standby power output
- Clock synchronization output
- Output 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

Specification Compliance

- RTCA/DO-160
- Airbus ADB0100.1.8
- Boeing 787B3-0147
- Boeing D6-36440
- Boeing D6-44588
- CE marked

AeroQor 3-Phase Isolated Power Factor Correction Module

Family	Vin Range	Input Phases	Vout	Regulation	Package Size	Thermal Design	RoHS
APFIC	**115:** 115Vrms	**3PH:** 3-Phase	**12:** 12V **24:** 24V **28:** 28V **48:** 48V **54:** 54V	**R:** Regulated Output **D:** Droop Sharing	**FT:** Full-brick Tera	**C:** Encased **D:** Encased with Non-threaded Baseplate **V:** Encased with Flanged Baseplate	**G:** RoHS

Example: APFIC-115-3PH-28R-FT-C-G For valid part numbers, refer to the website or contact your local sales representative.

AeroQor®

3-Phase AC Filters

3-Phase AC Line Filter Modules for the Avionics Industry

The AeroQor® EMI AC Line Filters brings SynQor's field proven technology and manufacturing expertise to the Avionics COTS Component marketplace. SynQor's innovative packaging approach ensures survivability in the most hostile environments. Compatible with the industry standard format, these filters have high differential-mode and common-mode attenuation and low series resistance. They follow conservative component derating guidelines and they are designed and manufactured to the highest standards.

Filter Features

- 85 to 264 Vrms
- Very low series resistance
- High Differential & Common-mode Attenuation
- All capacitors are safety-rated X7R multi-layer ceramic
- Meets common EMC standards in properly designed system with SynQor APFIC modules.
- -40°C to +100°C Operating Temperature
- Low power dissipation

Specification Compliance

- RTCA/DO-160
- Airbus ADB0100.1.8
- Boeing 787B3-0147
- Boeing D6-36440
- Boeing D6-44588
- CE marked

AeroQor 3-Phase AC Line Filter

Family	Input Frequency	Input Voltage	Phase	Package Size	Thermal Design	RoHS
ACF	**U:** 45 - 800 Hz	**115:** 85 to 264Vrms	**3PH:** 3-Phase	**QG:** Quarter-brick Giga	**C:** Encased **V:** Encased with Flanged Baseplate	**G:** RoHS

Example: ACF-U-115-3PH-QG-C-G For valid part numbers, refer to the website or contact your local sales representative.

Model Number	Input Frequency	Input Voltage (L-N)	Output Current	Output Power	Max Series Resistance	Differential-mode & Common-mode Attenuation
ACF-U-115-3PH-QG-x-G	45-800Hz	85-140Vrms	3Arms	1kW@115Vrms	700mΩ@100°C	>55db @ 200kHz >40dB @ 200kHz

InQor®
Isolated Converters

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

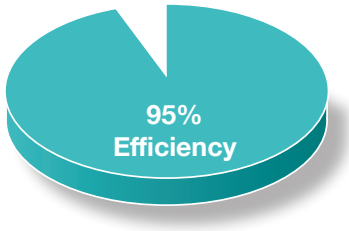
SynQor's ruggedized InQor DC-DC converters and filters are designed for a wide range of industrial applications including those required to withstand harsh environments: railway and transportation systems, industrial motion control, information displays, factory automation and power generation systems.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

Operational Features

- High efficiency up to 95%
- Input voltage ranges from 9V to 425V
- Output power up to 600W
- Fixed frequency switching, low output noise
- No minimum load requirement
- Full Feature options available 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. Output Current	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

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

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%

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%

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

IQ4H
Input Range: 180-425V
Transient: 475V
Max Power: 600W
Eff: Up to 92%

IQ32
Input Range: 9-75V
Transient: 100V
Max Power: 255W
Eff: Up to 92%

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

4:1 INPUT RATIO

12:1 INPUT

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

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
Half Brick 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
Quarter Brick 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					
Sixteenth Brick 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
Half Brick HEC											14A 392W				8A 400W
Half Brick HPC			60A 108W		50A 165W	40A 200W		18A 216W	15A 225W	9A 216W	7.5A 210W		5.5A 220W	4.5A 216W	
Half Brick 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	
Quarter Brick QGC			32A 58W		25A 83W	18A 90W	13A 91W	7.5A 90W	6A 90W	3.7A 89W		3A 90W		1.8A 91W	
Quarter Brick 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						
Sixteenth Brick SKC	20A 24W	16A 24W	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
Half Brick HPC			60A 108W		60A 198W	46A 230W		21A 252W	17A 255W	10.5A 252W	9A 252W		6.3A 252W	5.2A 250W	
Half Brick 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	
Quarter Brick 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 49W	4A 48W	3A 45W						
Sixteenth Brick SKC	20A 24W	16A 24W	14A 25W	10A 25W	8A 26W	5A 25W	3.5A 25W	2A 24W	1.7A 26W						

2:1 Input Ratio

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
Half Brick HTC	50A 90W	45A 149W	34A 170W		16A 192W	13A 195W	8A 192W	7A 196W		5A 200W	4A 192W
Quarter Brick QTC		30A 99W	25A 125W	20A 140W	12A 144W	10A 150W	6A 144W		5A 150W		3A 144W
Quarter Brick QGC		25A 83W	20A 100W	15A 105W	9A 108W	7A 105W	4.5A 108W		3.5A 105W		2A 96W

IQ1B

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

IQ2H

Vout	5V	28V	48V
150Vdc Input (90-210Vdc Input Range, Transient 250V)			
Quarter Brick QTC	30A 150W	5.35A 150W	3.13A 150W

IQ4H

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

4:1 Input Ratio

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		16A 24W	14A 25W		8A 26W	5A 25W	3.5A 25W	2A 24W						

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
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

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
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 50W	7A 49W	4A 48W	3.3A 50W	2A 48W		1.6A 48W		1A 48W

8:1 Input Ratio

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
Quarter Brick	QTC	36A 65W	27A 89W	20A 100W	14A 98W	8A 96W	6.5A 98W	4A 98W		3.2A 96W		2A 96W
	QGC			10A 50W		4A 48W	3.3A 50W	2A 48W				1A 48W

12:1 Input Ratio

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

See "Encased Package Configurations" on page 93 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
- -40°C to +100°C Operating Temperature

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 @ 250kHz	>50dB @ 250kHz
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

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

See "Encased Package Configurations" on page 93 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
- -40°C to +100°C Operating Temperature
- 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

InQor AC Line Filter

Family	Input Frequency	Package Size	Performance Level	Thermal Design	Input Voltage	Pin Style	Feature Set
ACLF	**060:** 50/60 Hz **UNV:** 50/60 Hz & 400Hz	**E:** Eighth Brick **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

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

Model Number	AC Line Frequency	AC Line Voltage	Output Current	P_{OUT}^{MAX} (115V / 230V)	Dissipation P_{OUT}^{MAX}	Isolation Voltage (to baseplate)
ACLFUNVETx230	50/60Hz & 400Hz	85-264Vrms	5Arms	500W/1kW	4.5W	2150V_{PK}
ACLF060HTx230	50/60Hz	85-264Vrms	9Arms	1kW/2kW	15.8W	2150V_{PK}

NiQor®

High-Voltage Non-Isolated Converters

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

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

Operational Features

- Ultra-high efficiency up to 96%
- Wide input voltage ranges:
- 9-20V (NQ20); 9-40V (NQ40); 9-60V (NQ60); 9-90V (NQ90)
- Buck or Buck/Boost Mode available
- Maximum input/output currents up to 55A
- Suitable for use in Intermediate Bus Architectures
- On-board input and output filtering
- No minimum load requirement
- -40°C to +100°C Operating Temperature
- Remote sense and wide output voltage trim

BATTERY CHARGING

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

Protection/Control Features

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

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		
Half Brick	HG	55A
Quarter Brick	QT	35A
	QG	30A
Eighth Brick	EP	20A
	ET	15A
	EG	8A

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

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

NiQor High-Voltage Non-Isolated DC-DC Converters

Family	Input Voltage	Mode	Output Voltage	Package Size	Series	Thermal Design	Maximum Current	Options Description:		
								Enable Logic	Pin Length	Feature Set
NQ	**20:** 9-20V **40:** 9-40V **60:** 9-60V **90:** 9-90V	**T:** Buck (1/8 & 1/4) **W:** Buck/ Boost	**20:** 0-20V **40:** 0-40V **60:** 0-60V **90:** 0-90V	**E:** Eighth Brick **Q:** Quarter Brick **H:** Half Brick	**G:** Giga **T:** Tera **P:** Peta	**C:** Encased **D:** Encased, Non-threaded Baseplate **V:** Encased, Flanged Baseplate	**05:** 5A **08:** 8A **10:** 10A **15:** 15A **20:** 20A **26:** 26A **30:** 30A **40:** 40A **55:** 55A	**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)

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 conditions seen in many industrial and transportation environments.

Operational Features

- Universal input voltage range: 85-264Vrms*
- Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- Up to 700W output power
- ≥0.99 Power Factor
- High efficiency: >96% (230Vrms), >94% (115Vrms)
- Internal inrush current limit
- Auxiliary 10V bias supply
- 100°C max baseplate temperature at full power
- -40°C to +100°C Operating Temperature
- 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 (HB only)
- Clock synchronization (HB only)
- Output current monitor / active current sharing (HB only)
- 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

See "Encased Package Configurations" on page 93 for package outlines.

PFCQor Power Factor Correction

Family	Vin Range	Vout	Package Size	Perf. Level	Thermal Design	Output Power	Input Phases	Pin Style	Feature Set
PFC	**U:** 85-264Vrms	**390:** 390V	**H:** Half-brick **Q:** Quarter-brick	**P:** Peta	**C:** Encased **D:** Encased, Non-threaded Baseplate **V:** Encased, Flanged Baseplate	**07:** 700W **04:** 350W	**S:** Single-Phase	**R:** 0.180"	**S:** Supports Parallel Capability (Half-brick only) **S:** Standard Not Parallel Capability (Quarter-brick only)

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

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

PFICQor™

Isolated Power Factor Correction

Isolated Power Factor Correction Modules

The PFICQor Isolated Power Factor Correction module is a high power, high efficiency AC-DC converter. It operates from a universal AC input and generates an isolated output. Both regulated and semi-regulated (droop version) modules are available. Used in conjunction with a hold-up capacitor, and SynQor's AC line filter, the PFICQor will draw a nearly perfect sinusoidal current (PF>0.99) from a single phase AC input. The module is supplied completely encased to provide protection from the harsh environments seen in many industrial and transportation environments.

Operational Features

- Isolated output, 325W output power
- Universal input frequency range: 47 - 63Hz / 360 - 800Hz
- Input voltage range: 85-264Vrms
- ≥0.99 Power Factor
- High efficiency: >92% (230Vrms),
- Internal inrush current limit
- Auxiliary 10V bias supply, primary-side referenced
- Can be paralleled (droop version only)
- -40°C to +100°C Operating Temperature
- Compatible with SynQor AC line filters

Protection/Control Features

- PFC Enable
- AC Power Good Signal
- DC Power Good Signal
- Input current limit and auto-recovery short circuit protection
- Auto-recovery input under/over-voltage protection
- Auto-recovery over-voltage protection
- Auto-recovery thermal shutdown

See "Encased Package Configurations" on page 93 for package outlines.

PFICQor Isolated Power Factor Correction

Family	Vin Range	Vout	Package Size	Perf. Level	Thermal Design	Output Power	Output Current	Pin Style	Feature Set
PFIC	**U:** 85-264Vrms	**12:** 12V **24:** 24V **28:** 28V **48:** 48V	**H:** Half-brick	**T:** Tera	**C:** Encased **D:** Encased, Non-threaded Baseplate **V:** Encased, Flanged Baseplate	**07:** 7A **12:** 12A **14:** 14A **27:** 27A	**N:** Negative	**R:** 0.180"	**S:** Standard **D:** Droop

Example: PFICU12HTC27NRS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

ACuQor®

AC-DC Power Supplies

E-Series G-Series

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

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

Product Features

- High efficiency up to 93% at full rated load current
- Delivers up to 1400W of output power (1800W transient)
- Semi-regulated output
- -Universal input voltage range (85-264Vrms)
- Operating ambient temperature: -40°C to +70°C
- 5V (500mW) standby output

Protection/Control Features

- Over-current, over-voltage, and over-temp protection
- DC Power Good and AC Power Good signals
- Remote enable input
- Parallel operation available, up to 3 units to be connected
- Parallel option units may still be used as stand-alone

ACuQor AC-DC Converter

Family	Output Power	Grade	Range	Output Voltage	Package Size	Thermal Design	Options
AQ	**0300:** 300W **0400:** 400W **0500:** 500W **0800:** 800W **1100:** 1100W **1400:** 1400W	**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" (Open Frame) **G:** 1 Unit 4.75" x 7"	**A:** Open-frame **C:** Encased	**IND:** Industria Grade **INP**: Parallel

* Parallel output capable with up to 3 units. 12V and 15V outputs excluded.

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

Output Voltage	Power Rating		
G-Series *(Single Output)* (4.75" x 7.00" x 1.63" Encased Package) 12V, 15V, 24V, 28V, 48V (includes 5V@100mA standby)	**800W** (1000W Transient)	**1100W** (1300W Transient)	**1400W** (1800W Transient)
E-Series *(Single Output)* (3.00" x 5.00" x 1.46" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@50mA standby)	**300W** (400W Transient)	**400W** (500W Transient)	**500W** (700W Transient)
E-Series *(Triple Output)* (3.00" x 5.00" x 1.46" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@2A and 12V@4.2A)	**300W** (400W Transient)	**400W** (500W Transient)	**500W** (700W Transient)

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%
- Input-to-Output Isolation Up to 2000Vrms
- 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, 18-75V, 42V-110V, 12-155V, 34V-160V and 66V-160V
- Input voltage ranges meet the requirements of EN 50155
- Full power operation at baseplate temperature range from -40°C to 100°C.
- Output power up to 500W
- Fixed frequency switching, low output noise
- No minimum load requirement
- Encased module to provide protection from harsh environments and available with optional flanged style baseplate.
- Output Current Sharing (HE/HZ only)

See "Encased Package Configurations" on page 93 for package outlines.

RailQor Input/Output Ratings

Family	VOUT	3.3V	5V	12V	15V	24V	48V	56V	Package Size / Power Level
2:1 Input Ratio		72V (42V - 110V) Continuous Input Range, (150V Transient, QT and HP only)							
RQ72	Max. Iout / Power Out		10A / 50W	4.1A / 49W	3.3A / 50W	2A / 48W			Quarter-brick / Mega
			25A / 125W	12A / 144W	10A / 150W	6A / 144W	3A / 144W		Quarter-brick / Tera
			46A / 230W	21A / 252W	17A / 255W	10.4A / 250W	5.2A / 250W		Half-brick / Peta
2:1 Input Ratio		110V (66V - 160V) Continuous Input Range, 200V Transient							
RQ1B	Max. Iout / Power Out	15A / 50W	10A / 50W	4.1A / 49W	3.3A / 50W	2A / 48W	1A / 48W		Quarter-brick / Mega
			20A / 100W	8.4A / 101W		4.2A / 101W	2.1A / 101W		Quarter-brick / Giga
		30A/99W	25A / 125W	12A / 144W	10A / 150W	6A / 144W	3A / 144W	3A / 168	Quarter-brick / Tera
			48A / 240W	21A / 252W	17A / 255W	10A / 240W	5.2A / 250W		Half-brick / Peta
			60A / 300W	27A / 324W	27A / 326W	13.6A / 326W	6.8A / 326W		Half-brick / Exa
			60A / 300W	42A / 504W	33A / 495W	21A / 504W	10A / 480W		Half-brick / Zeta
4:1 Input Ratio		18V (9V - 36V) Continuous Input Range, 40V Transient							
RQ18	Max. Iout / Power Out		10A / 50W	4.1A / 49W	3.3A / 50W	2A / 48W			Quarter-brick / Mega
			20A / 100W	8.0A / 96W	7.0A / 105W	4A / 96W	2A / 96W		Quarter-brick / Tera
			36A / 180W	15A / 180W	12A / 180W	7.5A / 180W	3.7A / 178W		Half-Brick / Peta
4:1 Input Ratio		36V (18V - 80V) Continuous Input Range							
RQ36	Max.		10A / 50W	4.1A / 49W	3.3A / 50W	2A / 48W	1A / 48W		Quarter-brick / Mega
4:1 Input Ratio		90V (34V - 160V) Continuous Input Range, 200V Transient							
RQ90	Max. Iout / Power Out		10A / 50W	4.2A / 50W	3.3A / 50W	2.1A / 50W	1A / 48W		Quarter-brick / Mega
			24A / 120W	10A / 120W	8A / 120W	5A / 120W	2.5A / 120W		Quarter-brick / Tera
			40A / 200W	19A / 228W	15A / 225W	9.5A / 228W	4.6A / 221W		Half-brick / Peta
		13.8Vout – 21.7A / 300W (40V - 160V Continuous, 200V Transient)							Half-brick / Exa
12:1 Input Ratio		68V (12V - 155V) Continuous Input Range, 170V Transient							
RQ68	Max. Iout / Power Out		5.3A / 26W	2.2A / 27W	1.8A / 27W	1.1A / 26W			Quarter-brick / Mega
			10.6A / 53W	4.4A / 53W	3.5A / 53W	2.2A / 53W			Half-brick / Giga
			20A / 100W	8.4A / 101W	6.7A / 101W	4.2A / 101W	2.1A / 101W		Half-brick / Exa
			30A / 150W	12.5A / 150W	10A / 150W	6A / 144W	3A / 144W		Half-Brick / Zeta

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. Output Current	Enable Logic	Pin Length	Features
RQ	**18:** 9 - 36V **24:** 18 - 45V **36:** 18 - 75V **68:** 12 - 155V **72:** 42 - 110V **90:*** 34 - 160V **1B:** 66 - 160V	**033:** 3.3V **050:** 5V **120:** 12V **138:** 13.8V **150:** 15V **240:** 24V **480:** 48V	**Q:** Quarter-brick **H:** Half-brick	**G:** Giga **M:** Mega **P:** Peta **T:** Tera **E:** Exa **Z:** Zeta	**C:** Encased **D:** Encased, Non-threaded Baseplate **V:** Encased, Flanged Baseplate	**60:** 60A **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 (HE/HZ only)

Example: RQ90050QMC10NRF-G For valid part numbers, refer to the website or contact your local sales representative or distributor. *RQ90138HEx22 Only Vin Range 40 - 160V.

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 and 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

RailQor Capabilities			
Input Ratio	Family	Continuous Input	Transient Input
2:1	**RQ72**	42V – 110V	42V – 110V
2:1	**RQ1B**	66V – 160V	66V – 200V (100ms)
4:1	**RQ18**	9V – 36V	9V – 40V (100ms)
4:1	**RQ36**	18V – 75V	18V – 80V
4:1	**RQ90**	34V – 160V	34V – 200V (100ms)
12:1	**RQ68**	12V – 155V	12V – 170V (100ms)

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

RailQor® DC Filters

DC Filter Modules for the Rail Transportation Industry

RailQor series of EMI filters brings SynQor's field proven technology and manufacturing expertise to the industrial power applications marketplace. SynQor's innovative packaging approach ensures survivability in the most hostile environments. Compatible with the industry standard format, these filters have high differential-mode and common-mode attenuation, low DC resistance, and a stabilizing bulk capacitor resistor. They follow conservative component derating guidelines and they are designed and manufactured to the highest standards.

Operational Features

- Very Low DC resistance
- Differential-mode attenuation >80dB @ 250kHz
- Common-mode attenuation >50dB @ 250kHz
- All capacitors are X7R multi-layer ceramic
- No electrolytic capacitors (all ceramic design)
- High-voltage isolation between chassis and input / output
- Wide temperature range operation
- -40°C to +100°C Operating Temperature
- Meets requirements of standard EN 50155

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							
RQ200PFQTx10	±200V	±250V	10A	3000V	70mΩ	>80dB @ 250kHz	>50dB @ 250kHz

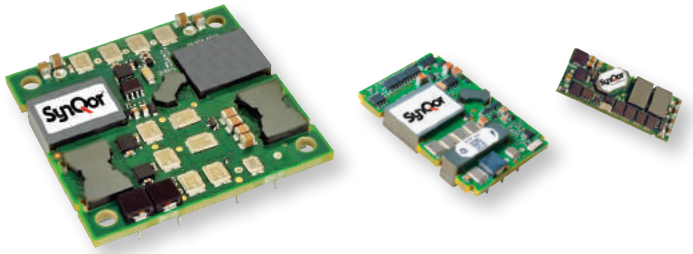
RailQor DC Filter

Family	Cont. Input Voltage	Filter Type	Package Size	Performance Series	Thermal Design	Max. Iout	Options Description		
							Enable Logic	Pin Length	Features
RQ	**200:** ±200V	**PF:** Passive Filter	**Q:** Quarter Brick	**T:** Tera	**C:** Encased **V:** Flanged Baseplate	**10:** 10A	**S:** Standard	**R:** 0.180"	**S:** Standard

Example: RQ200PFQTC10NRS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

PowerQor®

Isolated Converters



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

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

Operational Features

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

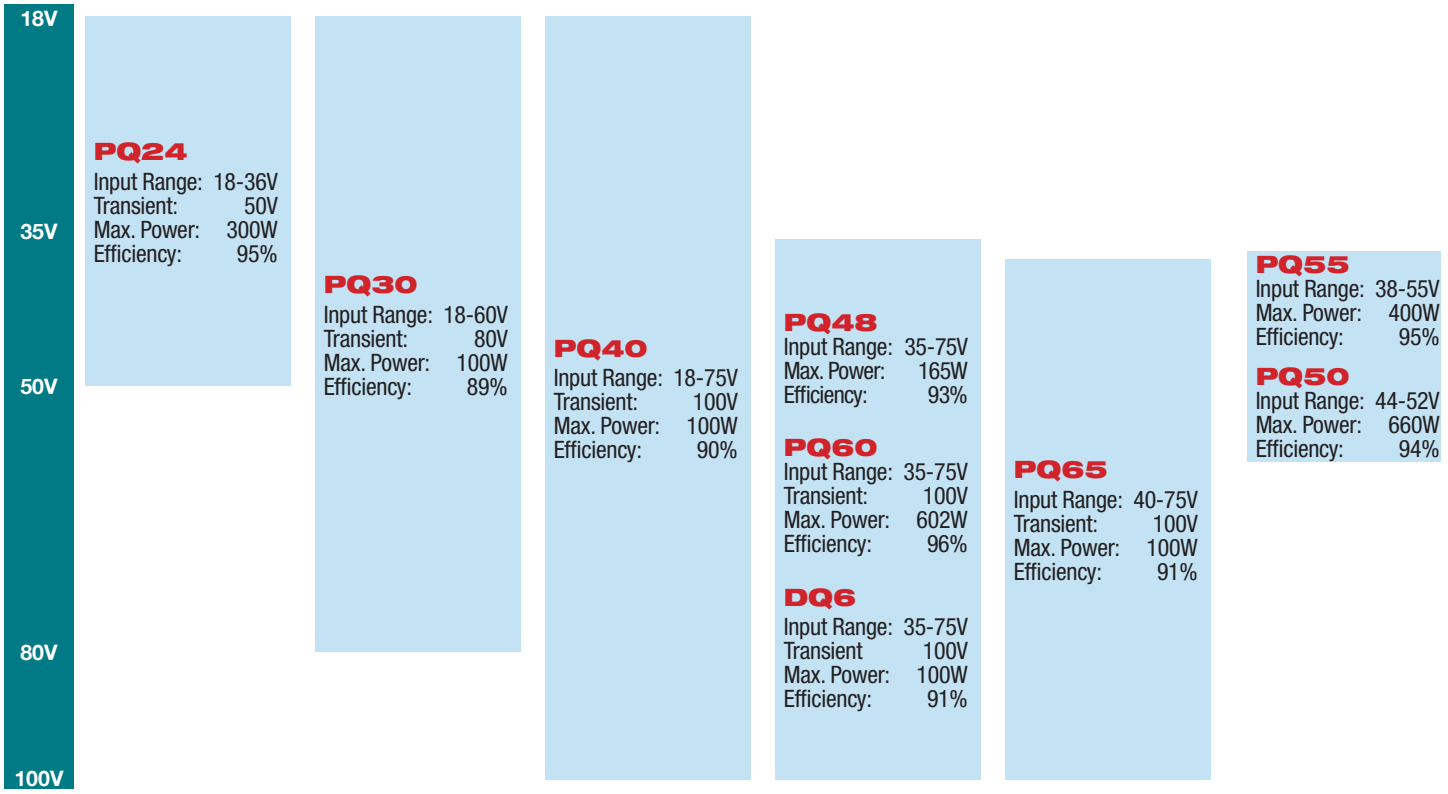
Protection/Control Features

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

See "Open Frame Package Configurations" on page 92 for package outlines.

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

Family	Cont. Input Voltage	Output Voltage		Package Size	Performance Series	Thermal Design	Max. Output Current	Option Descriptions		
								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	**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

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

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

PQ24

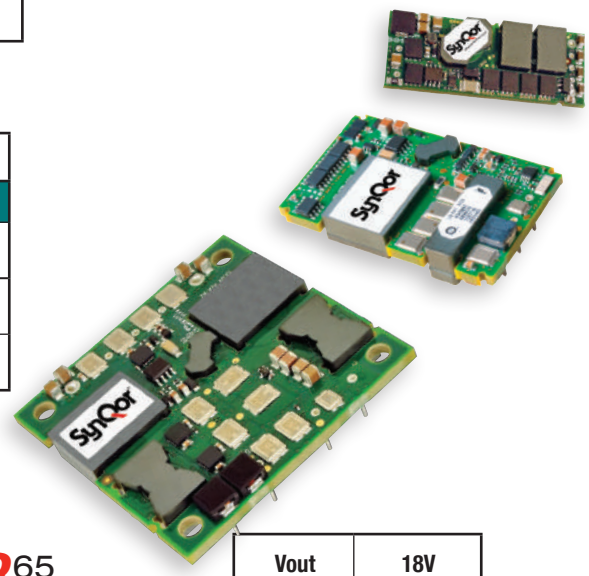
Vout	1.8V	3.3V	5V	12V	15V	28V	50V
24Vdc Input (18-36Vdc Input Range, 50Vdc Transient on Full Brick)							
Quarter Brick QEx			40A 200W	25A 300W	20A 300W	10.7A 300W	6A 300W
Quarter Brick QGL		25A 83W					
Quarter Brick QGA	25A 45W	25A 83W	20A 100W	8.33A 100W	6.67A 100W		

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	7.3V	53V	54V
48Vdc Input (38-55Vdc Input Range)			
Half Brick HZB	52A 380W		
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			12.5A 150W	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		

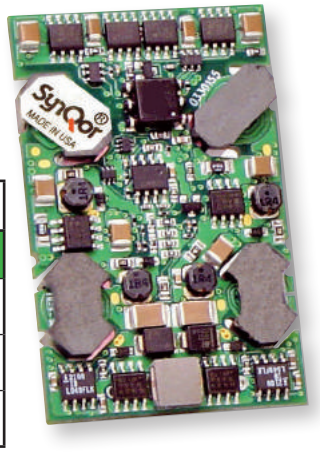
PQ60	Vout	1.2V	1.5V	1.8V	2.5V	3.3V	5V	12V	15V	18V	24V 26V	28V	40V	50V 52.5V
48Vdc Input (35-75Vdc Input Range, 100Vdc Transient)														
Half Brick	HZA						60A 300W	50A 600W	40A 600W		25A 600W	21.5A 602W	15A 600W	12A 600W
	HEA											12.8A 360W		
	HPA	100A 120W	100A 150W	100A 180W	80A 200W	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 67.5W		45A 81W	35A 87.5W	30A 99W						
	EGx	25A 25W	25A 30W	25A 37.5W		25A 45W	25A 62.5W	20A 66W	15A 75W		6.25A 75W	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®

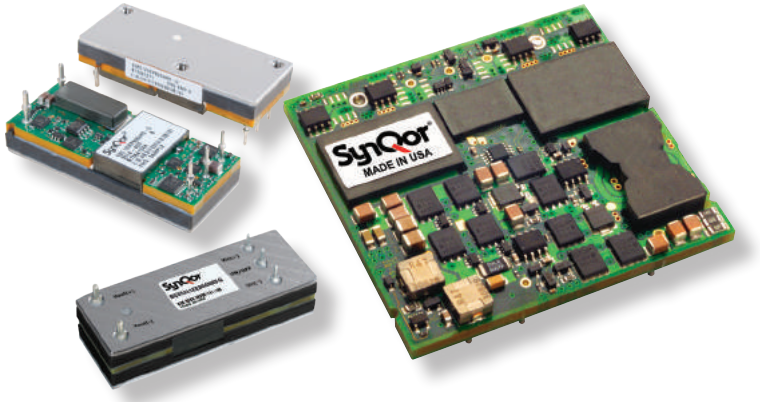
Dual Output Isolated Converters

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 40W	12/16A 40W	12/18A 60W	5/5A 60W
	QKA	8/16A 20W					8/12A 40W	



BusQor®

Isolated Bus Converters



High Efficiency Next Generation DC-DC Bus Converters

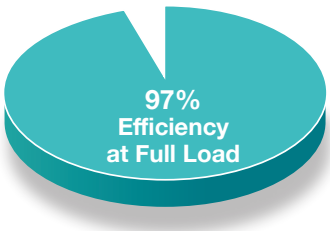
The BusQor® bus converters are the next-generation, board-mountable, isolated, fixed switching frequency DC-DC converters that uses synchronous rectification to achieve extremely high conversion efficiency. The power dissipated by the converter is so low that a heatsink is not required, which saves cost,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

Operational Features

- Ultra-high efficiency up to 97%
- Wide input voltage ranges:
  - 42V - 53V (BQ50)
  - 35V - 55V (BQ55)
  - 40V - 65V (BQ57)
  - 35V - 75V (BQ60, PQ60)
  - 36V - 75V (SQ60)
  - 330V - 365V (BQ352)
  - 230V - 400V (BQ4H)
- Delivers 6.0V, 9.6V, 12V, 13.6V or 48V bus for Intermediate Bus Architectures (IBA)
- Operating Temperature -40ºC 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

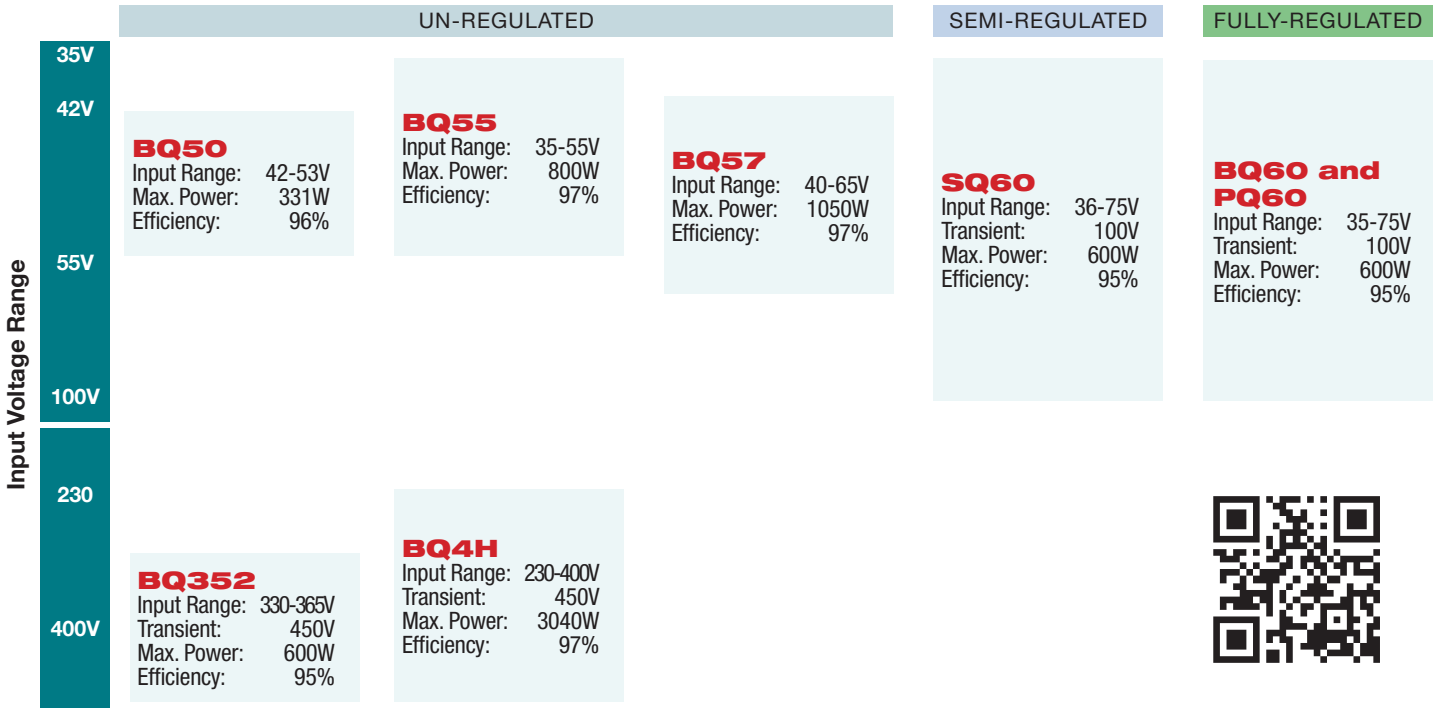
- Input under-voltage lockout (UVLO)
- Output current limit (OCP) and short circuit protection
- Output over-voltage protection (OVP)
- Thermal shutdown (OTP)
- Back-drive protection (starts into pre-biased load)
- On/Off control referenced to input side
- Remote sense
- Output voltage trim on select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



BusQor Isolated DC-DC Bus Converters

Family	Cont. Input Voltage	Output Voltage	Package Size	Performance Series	Thermal Design	Max. Output Current	Option Descriptions		
							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 **Y:** Yotta	**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 **87:** 87A (not all models are shown)	**P:** Pos. **N:** Neg.	**K:** 0.110" **N:** 0.145" **R:** 0.180" **Y:** 0.250"	**S:** Standard

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



BQ55

Vout	9.6V	12V
48Vdc Input (35-55Vdc Input Range)		
Quarter Brick QZB	84A	67A
QEx	60A	50A
QPA	43A	
QTA	240W**	
Eighth Brick EZB	48A	38A
ETx	27A	20A
ETL		16A

** 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
QPB		33A 396W
QPx	55A 330W	28A 336W
QEx		25A 300W
Eighth Brick EPB		25A 300W
ETA		20A 240W
ETA		17A 204W

BQ60/PQ60

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

BQ50

Vout	12V
48Vdc Input (42-53Vdc Input Range)	
Quarter Brick QTA	20A
QTA	25A

BQ57

Vout	9V	10.5V	12V
48Vdc Input (40-65Vdc Input Range)			
Quarter Brick QYB			84A
QZB	84A		67A
QEx		60A	50A
Eighth Brick EZB	48A		38A

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

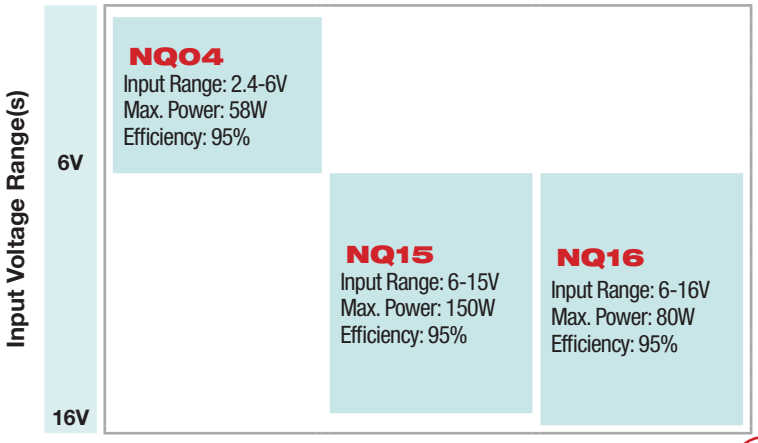
- Operating Temperature -40ºC to +100ºC
- Output Voltage Set Point ±0.7 - 2.0%
- Output Voltage Ripple <1.5% of Vout (typ.) pk-pk
- Input Ref. Ripple Current <5% of Iin (typ.) rms
- Switching Frequency 300 - 390kHz
- Industry standard pin-out configurations and standard footprints

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



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	

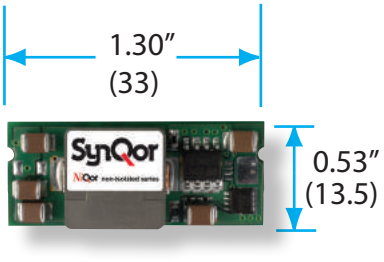
NiQor Non-isolated DC-DC Converter

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 and Gnd Pins

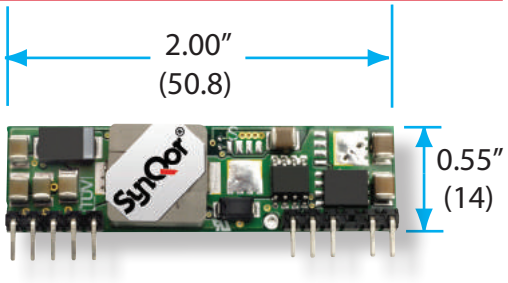
Example: NQ15W50SGA30NNS-G For valid part numbers, refer to the website or contact your local sales representative or distributor.

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

Surface mount converter

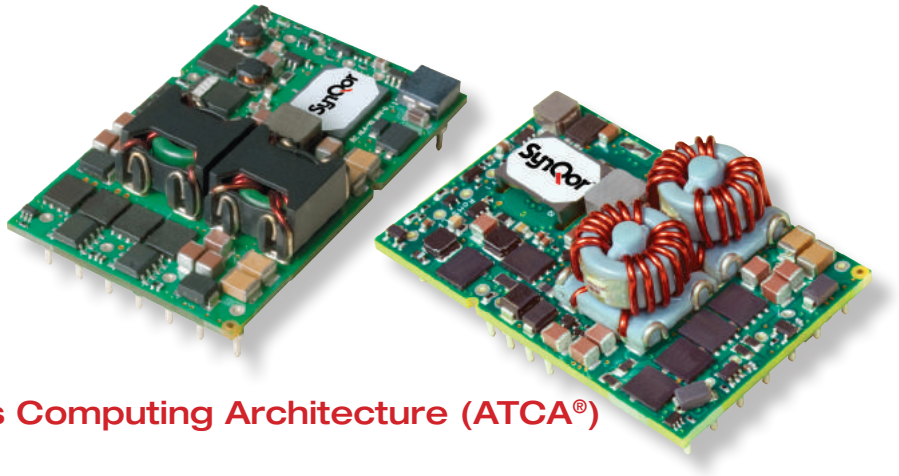


SIP converter



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 and B Feed Voltage
  - Hold-up Voltage
  - 48Vout Voltage and Current
  - Temperature
  - Fuse and MOSFET failure
- Random start-up delay
- -40°C to +100°C Operating Temperature
- 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

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

iQor		
IQ65033QTA14	Power Interface Module	500W ATCA Power Interface Module
IQ65033QGA12	Power Interface Module	350W ATCA Power Interface Module
IQ65033QMA10	Power Interface Module	300W ATCA Power Interface Module

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 complying with IEC60601-1 for CF patient contact. They are also defibrillation proof.

Product Features

- High Efficiency, up to 93% at full rated load current
- Industry standard quarter-brick pin-out configuration
- Reinforced Insulation
- 4250V, 100MΩ input-to-output
- CF Patient Contact
- Defibrillation Proof
- -40°C to +100°C Operating Temperature
- 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, Base-plate **V:** Encased, Flanged, Base-plate	**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

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 Grade Highly Efficient AC-DC Power Supplies with PFC

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

Product Features

- High efficiency up to 93% at full rated load current
- Delivers up to 1400W of output power (1800W transient)
- Semi-regulated output
- Universal 85-264V AC Input Voltage (47-63Hz)
- Single output voltages: 12V, 15V, 24V, 28V, 36V, 48V
- 5V "Always On" standby power output
- 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
- Medical EMI Compatibility: IEC 60601-1-2 ed 4.0 compliant
- Active PFC; EN61000-3-2 compliant
- Low leakage; EN60601-1 compliant
- Low noise; EN55011 / EN55022 Class B compliant
- Operating ambient temperature: 0ºC - 70ºC

ACuQor Medical Grade AC-DC Power Supplies

Family	Output Power	Grade	Range	Output Voltage	Package Size	Thermal Design	Options
AQ	**0300:** 300W **0400:** 400W **0500:** 500W **0800:** 800W **1100:** 1100W **1400:** 1400W	**M:** Medical	**4:** 4th Generation EMC 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"	**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

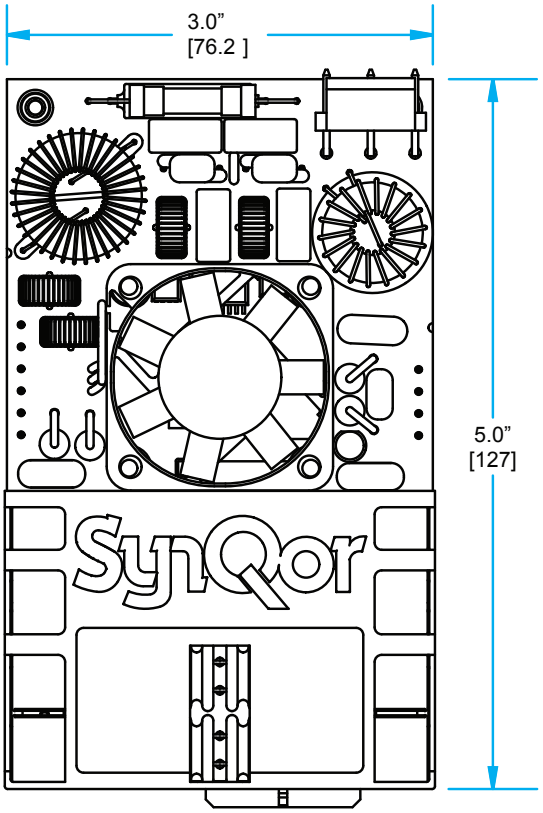
Example: AQ0400MU24ECBF For valid part numbers, refer to the website or contact your local sales representative or distributor.

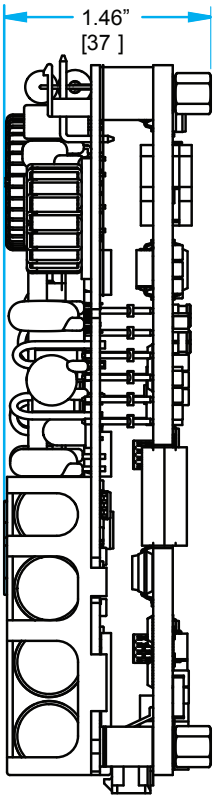
Output Voltage	Power Rating		
G-Series *(Single Output)* (4.75" x 7.00" x 1.63" Encased Package) 12V, 15V, 24V, 28V, 48V (includes 5V@100mA standby)	800W (1000W Transient)	1100W (1300W Transient)	1400W (1800W Transient)
E-Series *(Single Output)* (3.00" x 5.00" x 1.46" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@50mA standby)	300W (400W Transient)	400W (500W Transient)	500W (700W Transient)
E-Series *(Triple Output)* (3.00" x 5.00" x 1.46" Open Frame Package) (3.50" x 5.25" x 1.63" Encased Package) 12V, 24V, 36V or 48V (includes 5V@2A and 12V@4.2A)	300W (400W Transient)	400W (500W Transient)	500W (700W Transient)

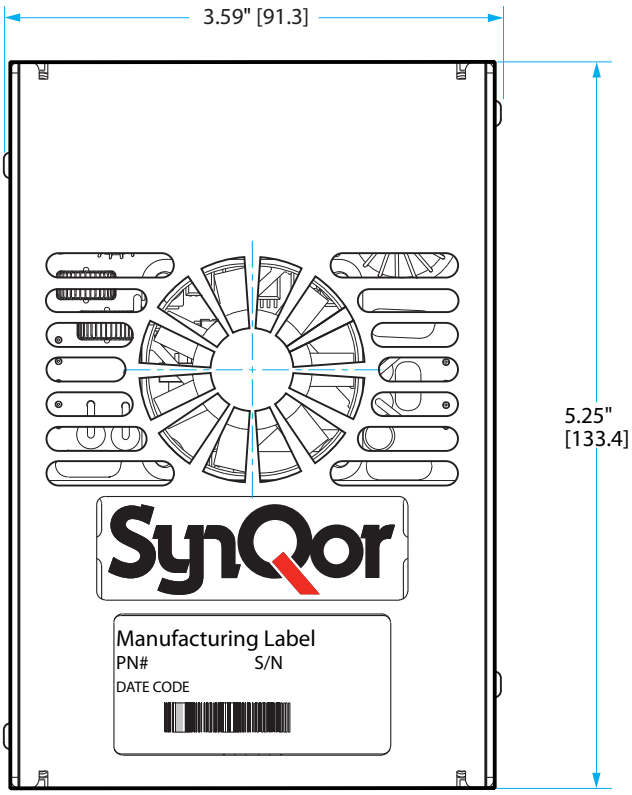
E-Series

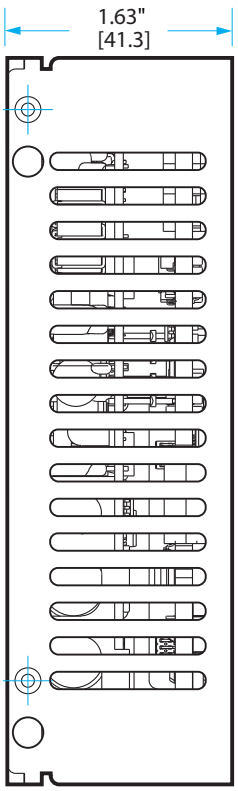
The E-Series Products are available as encased and open frame units. Accessories, including input and output cables, are also available. See website for data sheets with more details.

Open Frame Units





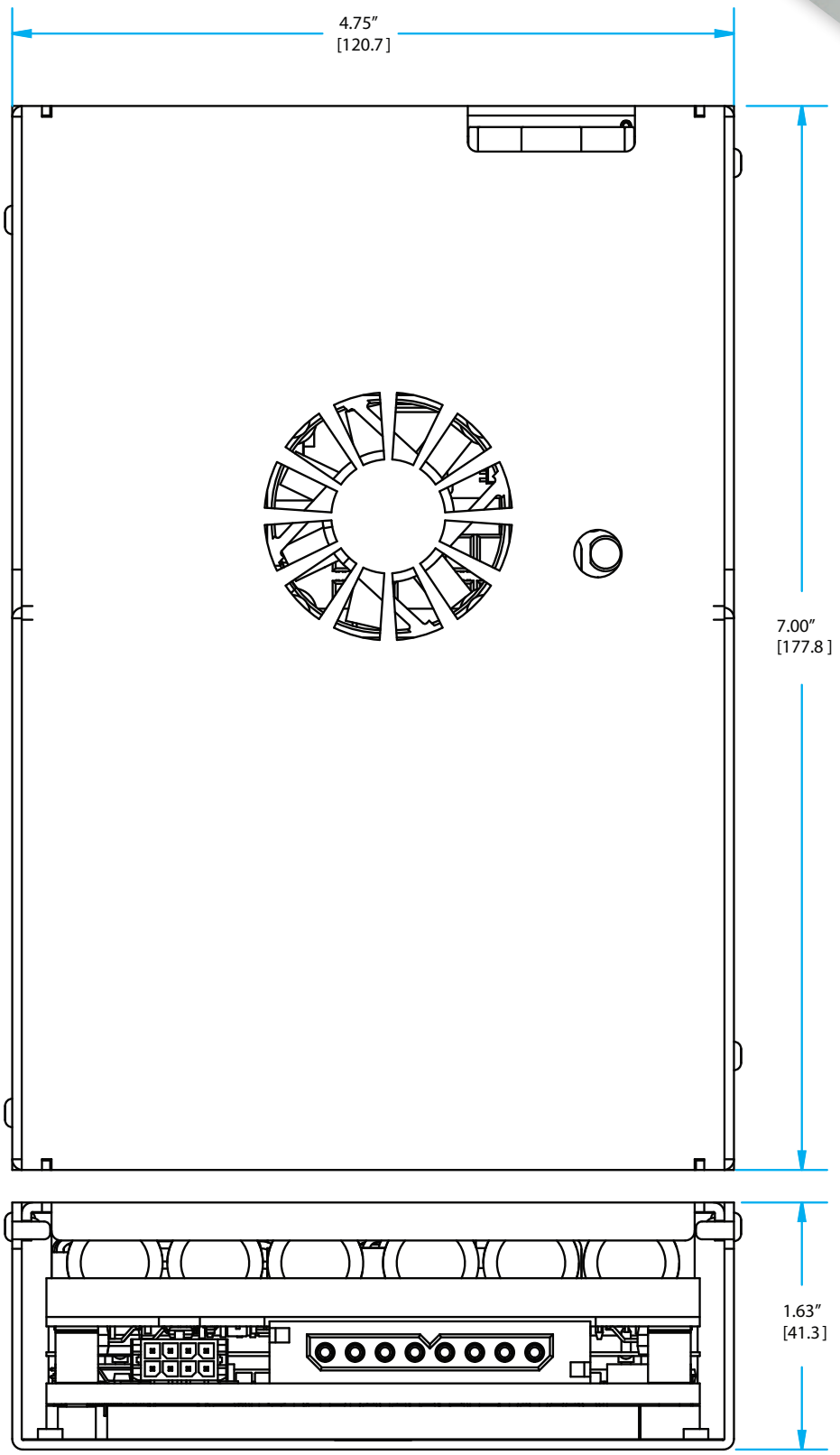




Encased Units

G-Series

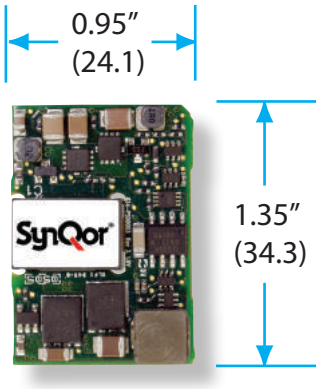
The G-Series products are only available encased. Accessories, including input and output cables, are also available. See website for data sheets with more details.



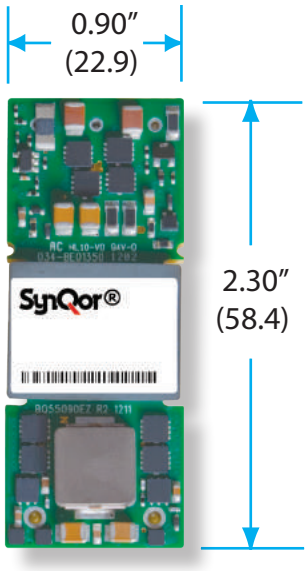
PowerQor, DualQor and BusQor

The open frame 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). See data sheets for heights.

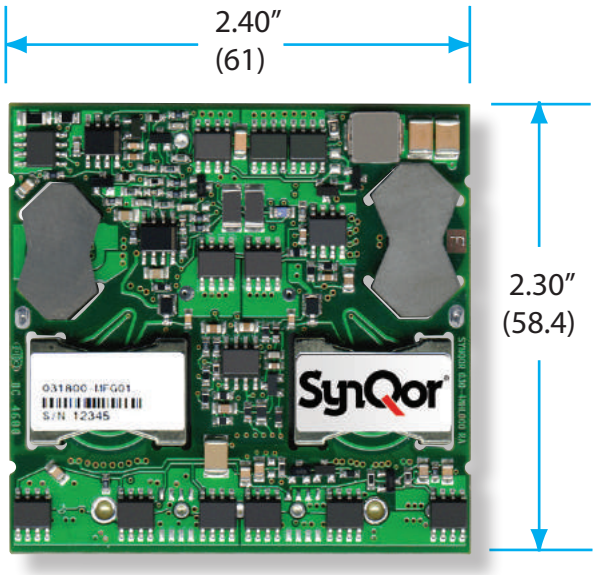
Sixteenth Brick



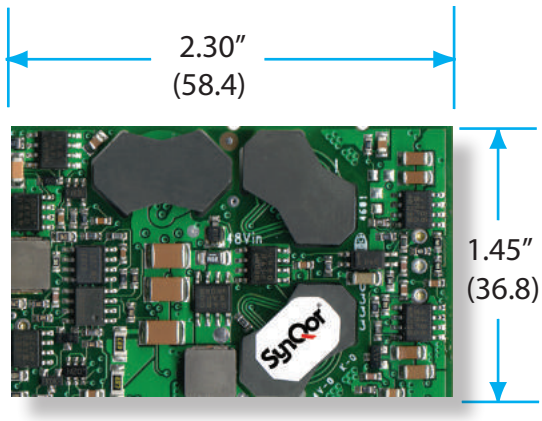
Eighth Brick



Half Brick



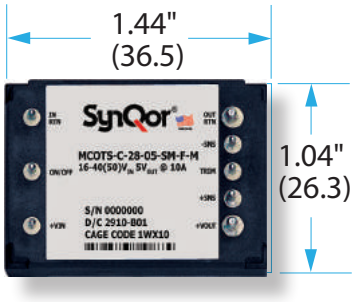
Quarter Brick



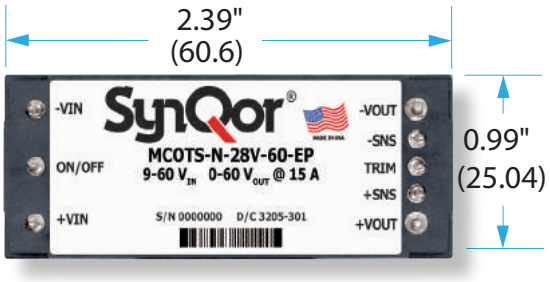
Mil-COTS, InQor, High Voltage NiQor, RailQor, AeroQor and CFQor

The fully encased products have additional environmental protection and are 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. All dimensions in inches (mm). See data sheets for heights.

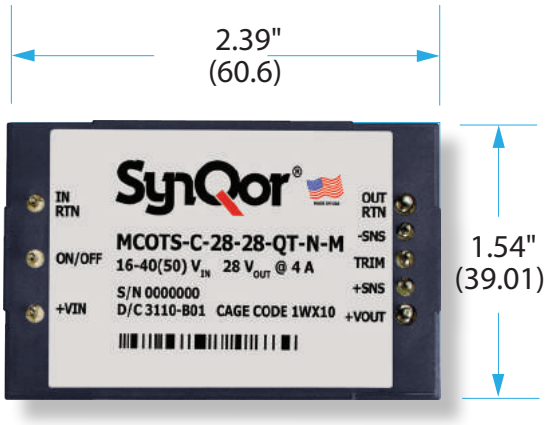
Sixteenth Brick



Eighth Brick

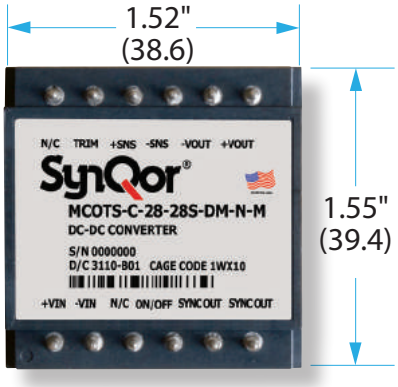


Quarter Brick

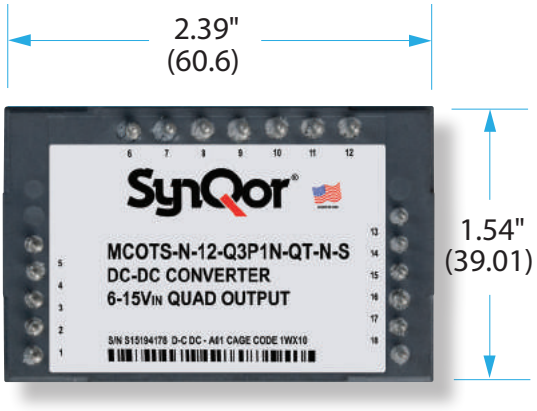


Flanged versions available.
See the website for details

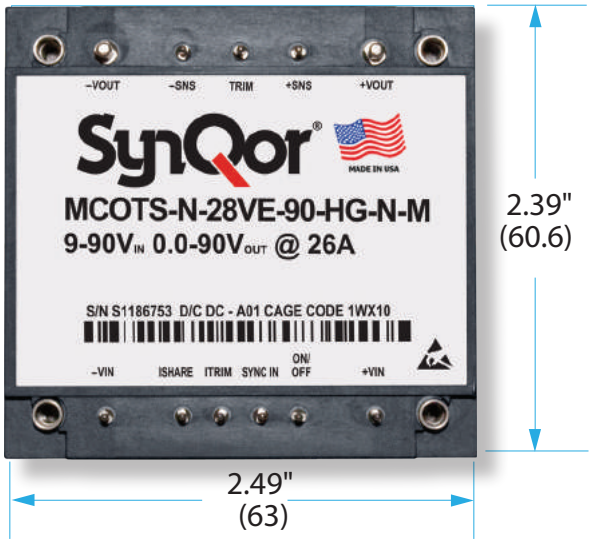
Demi Brick

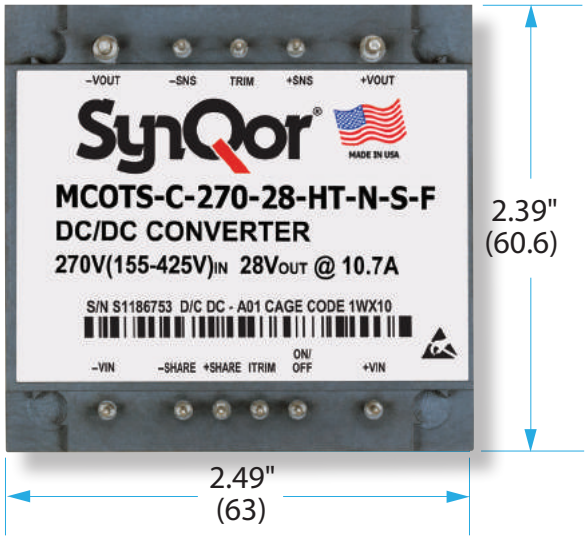


Quad Brick

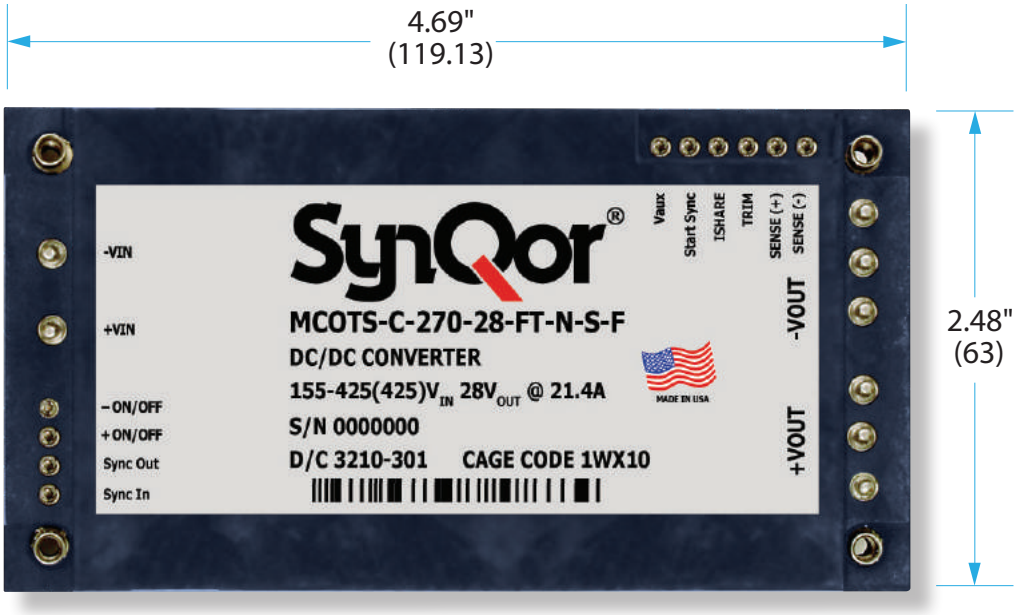


Half Brick





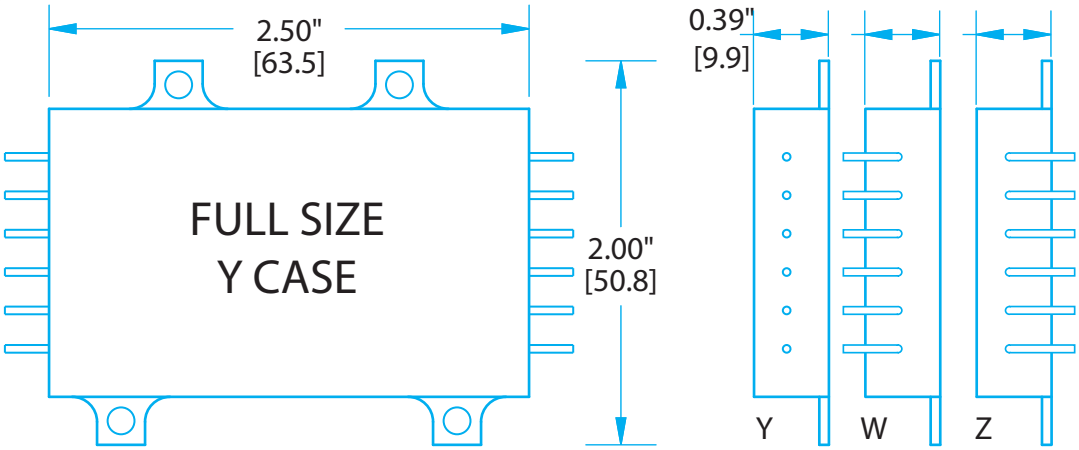
Full Brick

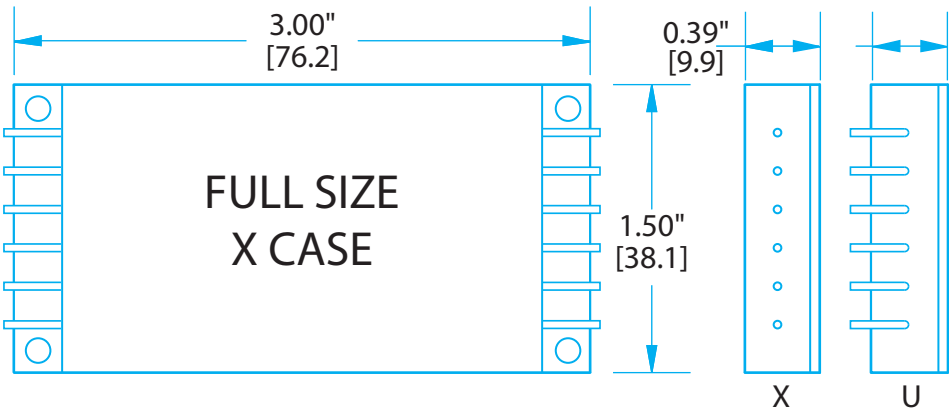


Hi-Rel

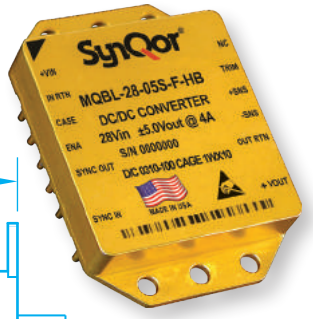
The High Reliability products are available in a variety of package mounting and lead form configurations. See website for data sheets with more details. All dimensions in inches [mm]. See data sheets for heights.

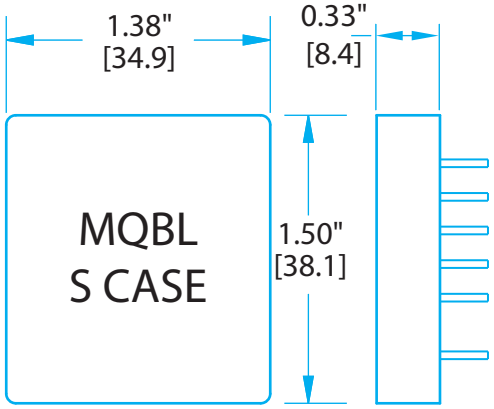
FL/ME Package

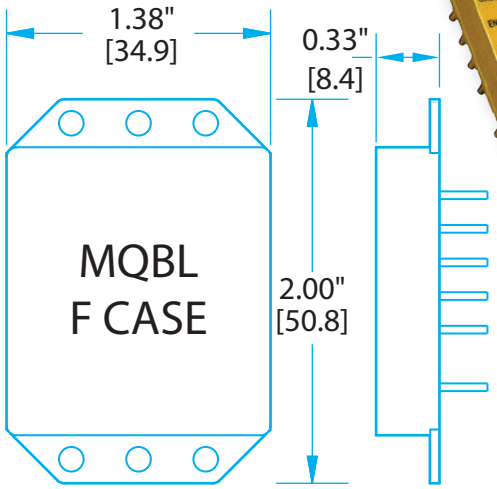


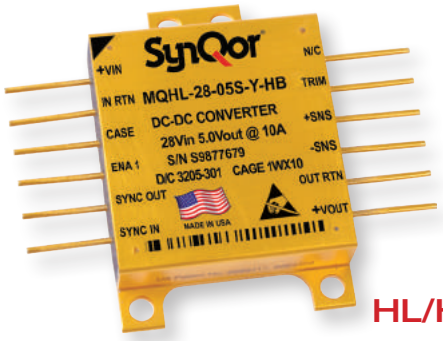


BL Package

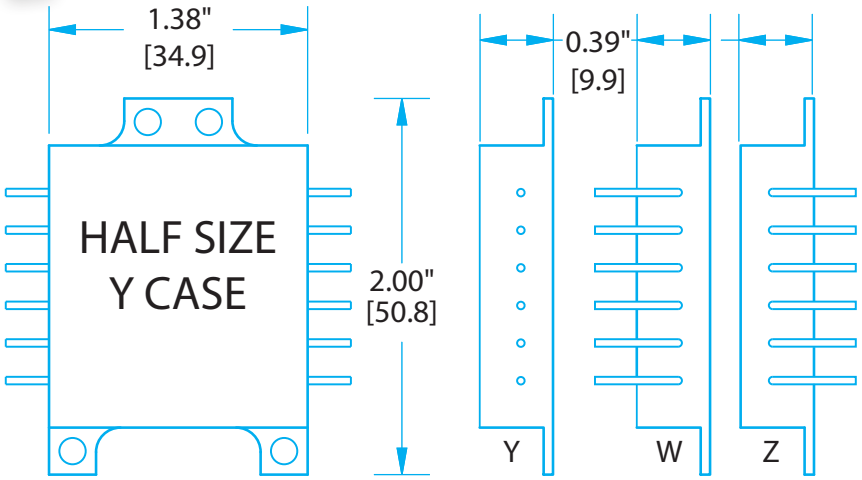


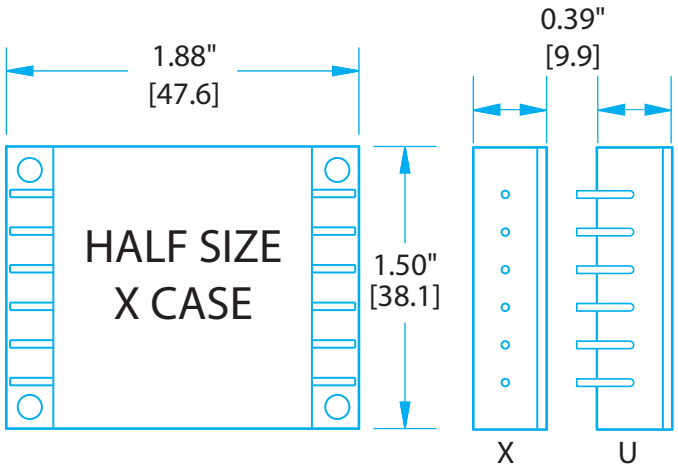




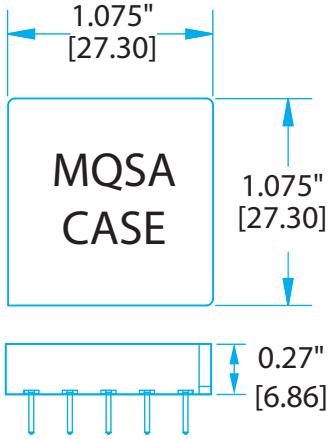


HL/HR/HE Package





SA Package



UPS/MPC Power Cables (10')

AC Input Connector	1250/1500 Series	3000 Series
NEMA 5-15P Plug	SYN-9104	
NEMA 5-20P Plug	SYN-9101	
Hardwire (2 AC lines + GND)	SYN-9102	SYN-9105
Hardwire (2 AC lines+GND+Connector Shell GND)	SYN-9108	
SCHUKO 16A, 250V-3W Euro Plug	SYN-9112	
UK 13A 250V Plug	SYN-9111	
MIL-C-26482 (Hardwire) 3-Phase UPS Only	SYN-9113	
AC Output Connector		
115Vrms (NEMA 5-20R Receptacle)	SYN-9131	
Hardwire (2 AC lines + GND)	SYN-9130	SYN-9135
Hardwire (2 AC lines+GND+Connector Shell GND)	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/DC Output Only Fork #10	SYN-9175	
DC2/DC Output Only Hardwire	SYN-9174	SYN-9178

EBM Power Cables

AC Input	EBM
AC Input, NEMA 5-15 Plug, 10'	SYN-9104
AC Input, Hardwire, 10'	SYN-9102
DC Input	
DC Input, Hardwire, 10'	SYN-9155
DC Output	
DC Output (EBM), DC Input (UPS-3000), 2.5'	SYN-9182
DC Output (EBM), DC Input (UPS-1500), 2.5'	SYN-9183
DC Output (EBM), DC Input (UPS-3000), Hardwire, 4'	SYN-9184
DC Output (EBM), DC Input (UPS-1500), Hardwire, 4'	SYN-9185

AC Output Power Strips

6 NEMA Receptacle Strip	1500 Series	3000 Series
1U Rackmount with 3' Cable	SYN-9231	
1U Rackmount with 3' Cable, with Breaker	SYN-9232	SYN-9236[4]

*Cable has Circular Connector

UPS Battery Packs

Model	BAT-0200-S-1U-000	BAT-0500-E-2U-000
Battery Pack	Standard	Extended
Watt Hours	200	500
Weight	10 lbs.	21 lbs.
1250/1500 S Series (1U)	1	NA
1250/1500 S Series (2S)	1	NA
1250/1500 E Series (2U)	NA	1
3000 S Series (2U)	Uses 2	NA

MPS/MPPS-4000 Power Cables

AC Input Connector	MPS/MPPS
AC Input 30A, 10' (NEMA L18-30P)	SYN-9115
AC Input 30A, 10' (Hardwire)	SYN-9116
DC Output Connector	
DC Output, 10', Negative (Hardwire)	SYN-9176
DC Output, 10', Positive (Hardwire)	SYN-9177
DC Output (MPS), DC Input (MINV, 28V), 3', Negative	SYN-9180
DC Output (MPS), DC Input (MINV, 28V), 3', Positive	SYN-9181

MINV Power Cables

AC Output	MINV
AC Output Single Phase, 10', (Hardwire)	SYN-9630
DC Input	
DC Input (MINV, 28V) 10', Positive, (Hardwire)	SYN-9651
DC Input (MINV, 28V) 10', Negative, (Hardwire)	SYN-9652
DC Input (MINV, 180V) 10', Hardwire	SYN-9655
DC Output	
DC Output (MPS), DC Input (MINV, 28V), 3', Negative	SYN-9180
DC Output (MPS), DC Input (MINV, 28V), 3', Positive	SYN-9181

MAC Power Cables

AC Output	MINV
AC Output 10', (Hardwire)	SYN-9630
AC Input	
AC Input 10', (Hardwire)	SYN-9118

Multi-Unit Configuration Cables

Description	UPS	MPC	MPS	MPPS	MAC	MINV	EBM	CABLE
2 Units Parallel - 3'	●	●						SYN-9311
3 Units Parallel - 6'	●	●						SYN-9315
2 Units Series - 3'	●	●						SYN-9313
3 Units 3-Phase - 6'	●	●						SYN-9317
2 Units Series - 3'					●	●		SYN-9613
3 Units 3-Phase - 6'					●	●		SYN-9617
2 Units Parallel - 3'	●	●	●	●	●	●	●	SYN-9341
3 Units Parallel - 6'	●	●	●	●	●	●	●	SYN-9343
4 Units Parallel - 9'	●	●	●	●	●	●		SYN-9344
5 Units Parallel - 15'	●	●	●	●	●	●		SYN-9345

User I/O Cables

Description	UPS	MPC	MPS	MPPS	MAC	MINV	EBM	CABLE
HD DB15M to DB9F (RS232) - 10'	●	●	●	●	●	●	●	SYN-9301
HD DB15M to DB15M (RS232 and Digital I/O) - 10'	●	●	●	●	●	●	●	SYN-9305
MI-Circular to Sealed RJ45 (Ethernet) Network SNMP - 10'	●	●	●	●	●	●	●	SYN-9321

Rackmount Kits

KIT	1250/1500 S	1250/1500 E	1250/1500 2S	3000 S	EBM-1000	MPC-1250 1S	MPPS/MPS	MINV-4000	MAC-4000
Slide Rail Kit [2]	**SYN-9002**	**SYN-9002**	**SYN-9043**	**SYN-9002**	**SYN-9002**	**SYN-9057**	**SYN-9002**	**SYN-9002**	**SYN-9002**
Fixed Bracket [3]	**SYN-9031**	**SYN-9033**	**SYN-9041**	**SYN-9033**	**SYN-9033**	**SYN-9055**	**SYN-9038**	**SYN-9031**	**SYN-9031**

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**

Fan Replacement Kits

1500 2S	EBM	MPS/MPPS	MINV	MAC
SYN-9450	**SYN-9450**	**SYN-9450**	**SYN-9452**	**SYN-9452**

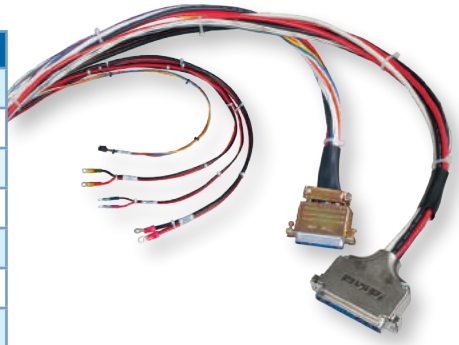
Notes:

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).
4. For UPS use with grounded output option only.
5. Not required for parallel operation.

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**
Input mating cable with pre-stripped wire ends (36”), 10 AWG	**MTQ-CBL-INPUT3C**
Input mating cable with pre-stripped wire ends (36”), AC Holdup	**MTQ-CBL-ACCAP1**
Input mating cable with pre-stripped wire ends (36”), AC Signal	**MTQ-CBL-ACINPUTS1**
Input mating cable with pre-stripped wire ends (36”), AC Power	**MTQ-CBL-ACINPUTP1**
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

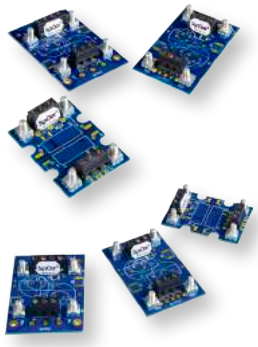
The following documents are the mechanical drawings for a series of assemblies that SynQor offers for the customer’s convenience.

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**
Same as AQ-CBL-OUT1C with additional 8 pin connector (18”)	**AQ-CBL-OUT2C**	
Output mating cable with connectors on both ends & additional 8 pin connector (18”)	**AQ-CBL-OUT2CD**	
Single module bottom-side Mylar insulator for open frame mounting	**AQ-INSUL1M**	
Evaluation board for up to three paralleled modules	**AQ-EVAL-PRL3**	

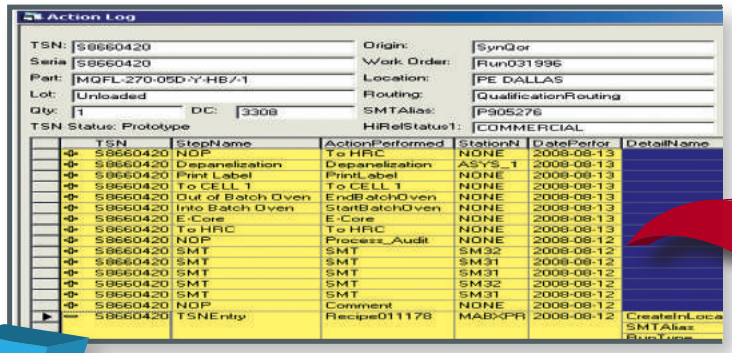
Interface Adaptors

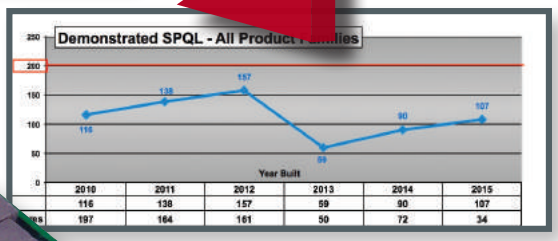
Our series of thru hole mounting adaptor boards allows for easy wiring to SynQor filters and DC-DC converters. For terminal and component assignments and additional information, please see our application note “Interface Adaptor Boards.” The following documents contain mechanical information.

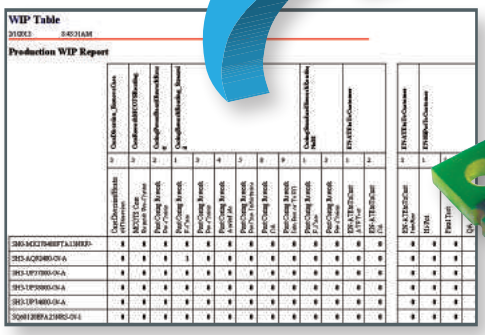
Adaptor Size	Single Output DC-DC Converters	DC-DC Converters Operating with SynQor Transient Filter	Dual Output DC-DC Converters	Passive Filters	Transient Suppression Filters	AC Line Filters	Power Factor Correctors	Isolated Power Factor Correctors
Sixteenth Brick	**SBI-00**	**SBI-04**						
Demi Brick	**DBI-00**		**DBI-03**	**DBI-02**				
Quarter Brick	**QBI-00**	**QBI-04**		**QBI-02**			**QBI-03**	
Half Brick	**HBI-00**	**HBI-06**		**HBI-02**	**HBI-03**	**HBI-04**	**HBI-05**	**HBI-08**
Full Brick	**FBI-00**							

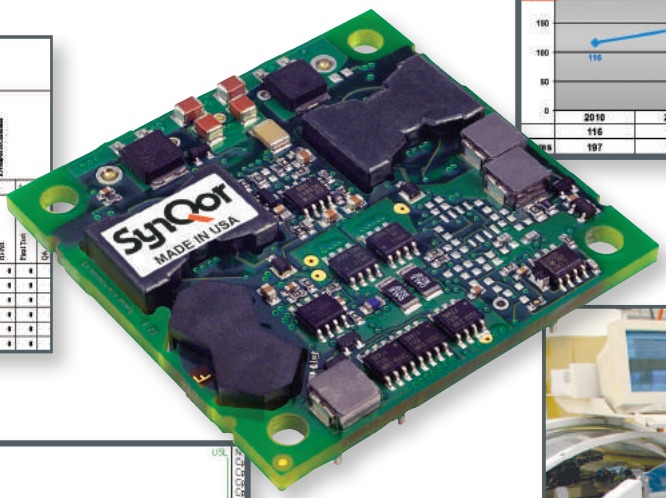


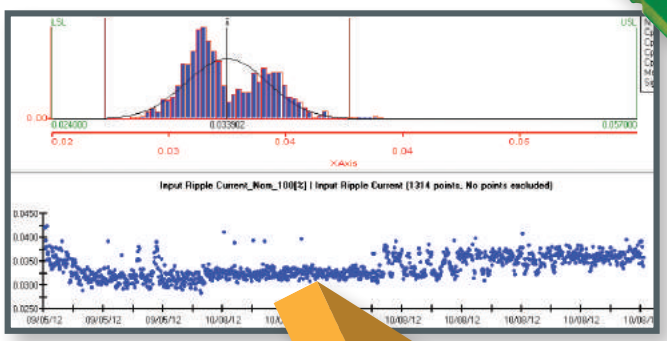
Integrates Business Processes & Enforces Process Adherence

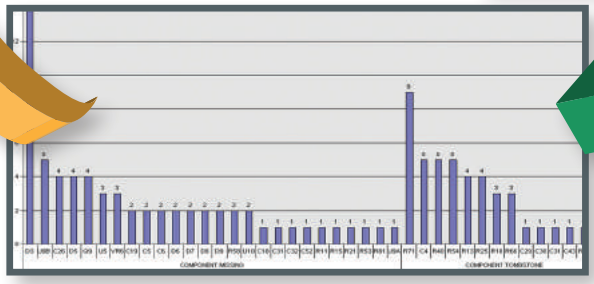










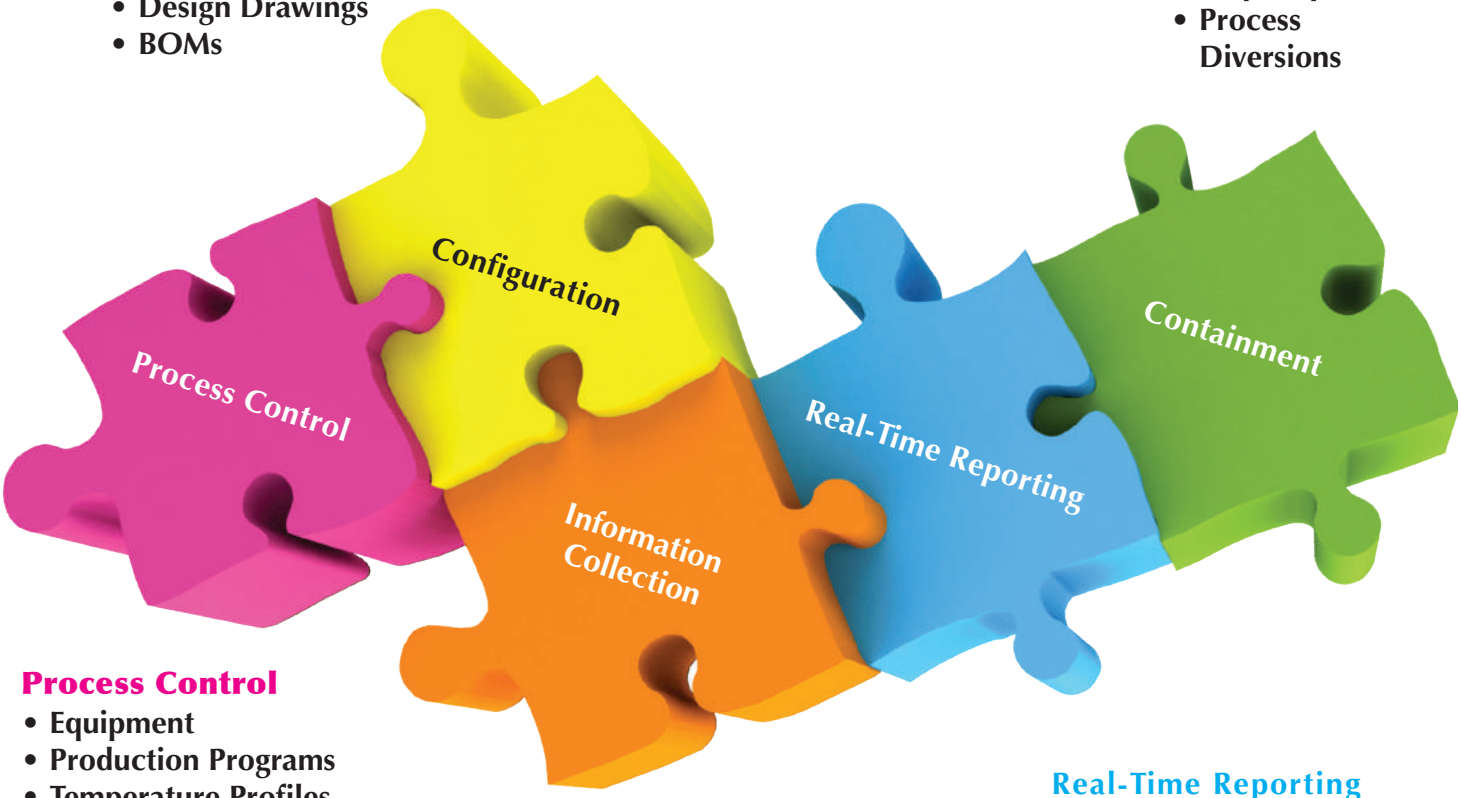


USA Manufacturing Facility: AS9100 & ISO-9001 Certified

SynQor considers in-house manufacturing to be a core competency and strategic advantage. All SynQor products are manufactured in our production facility at our corporate headquarters in Boxborough, MA, USA, utilizing state-of–the-art equipment and proprietary assembly techniques. By maintaining both AS9100 and ISO-9001 certifications, SynQor is able to provide the same level of attention to detail in our manufacturing processes as we do in our products. We utilize proprietary in-house developed manufacturing data and document control systems that allow us to operate in a paperless manufacturing environment, providing both maximized manufacturing efficiency and flexibility. Ultimately, our manufacturing expertise remains in-house, allowing us to maintain complete control over the quality and traceability of our product down to the component level to meet the most stringent customer and industry requirements.

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

Containment
- Stop Ship
- Process Diversions



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

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

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

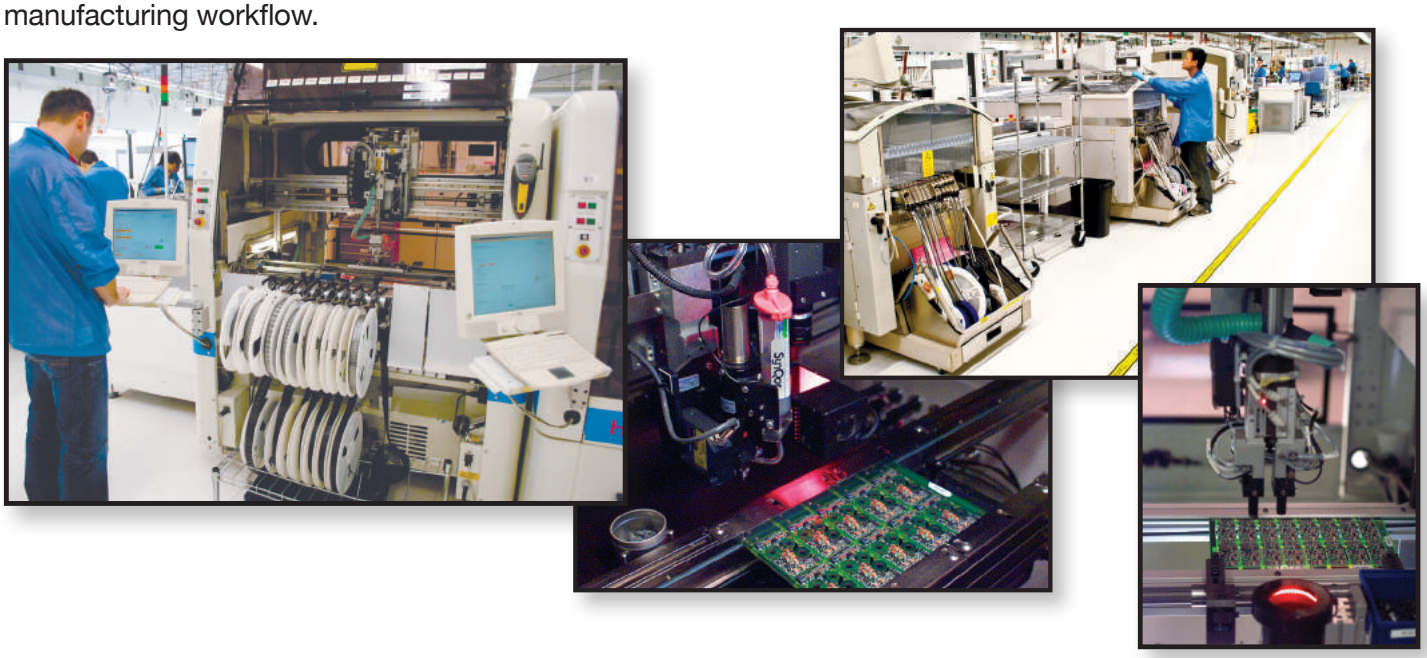
SynQor employs a stringent, ECO controlled, 5-stage product development process, starting with product concept design and ending with manufacturing integration. We believe that a solid design and DFM review process leads to efficient manufacturing, higher performance, and enhanced reliability. By designing for reliability, SynQor greatly reduces the chance of field defects and increases manufacture 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 units and electrically characterize • Verify electrical performance • Verify component stress analysis • Statistical variations • Thermal analysis and imaging • HALT testing • Complete datasheet	• Controlled Production Build • 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

Automated Manufacturing Center

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

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



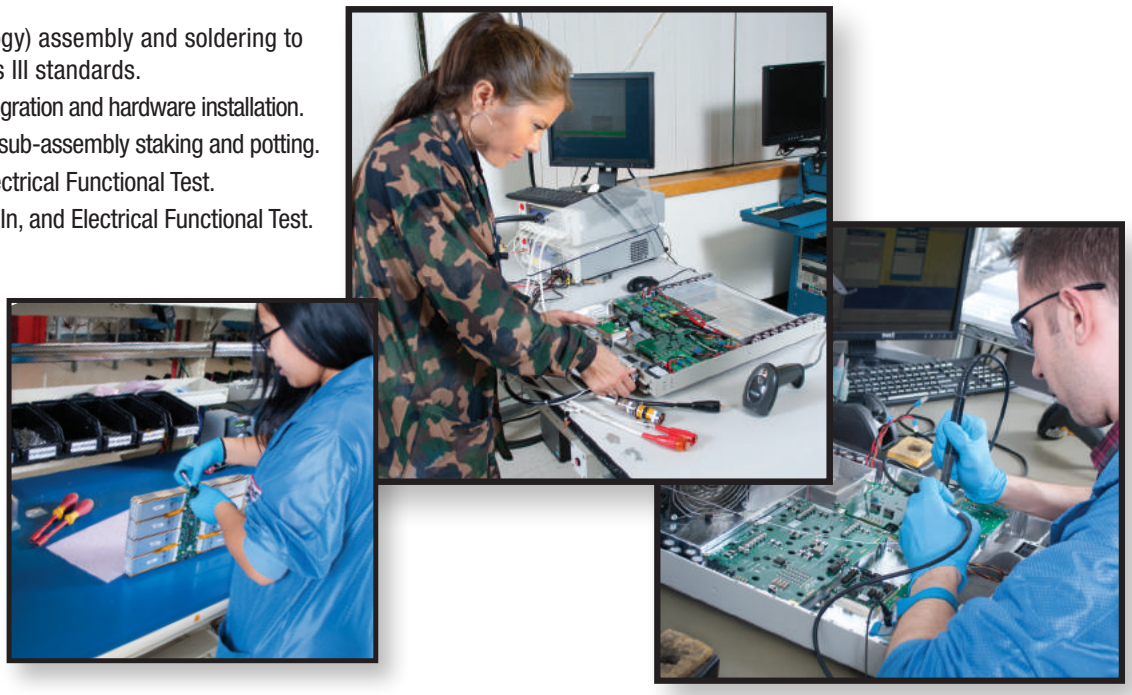
High-Reliability Center

SynQor's Military 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, manufacture products of the highest reliability to meet stringent MIL-STD requirements.

System Solutions

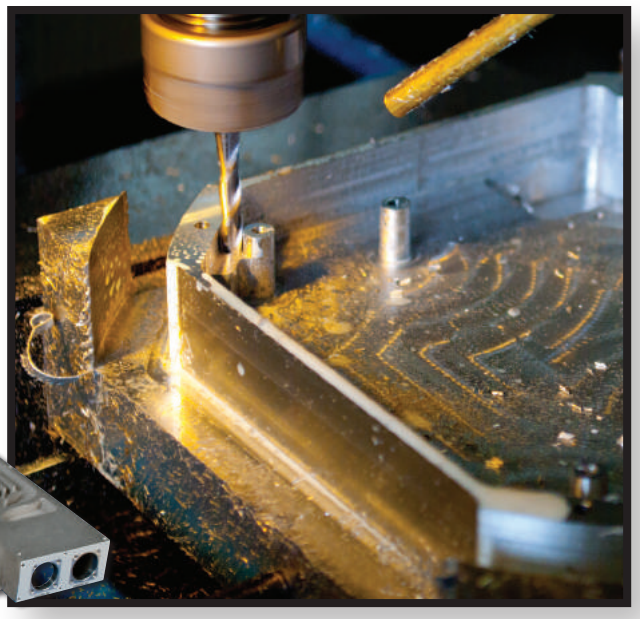
SynQor System-Level Products include ACuQor (medical), UPS (military/industrial), as well as Custom Hi-Rel Military products. SynQor manufactured sub-assemblies are delivered to dedicated production areas for system final assembly, integration, and test for SynQor's System-Level products. System assembly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

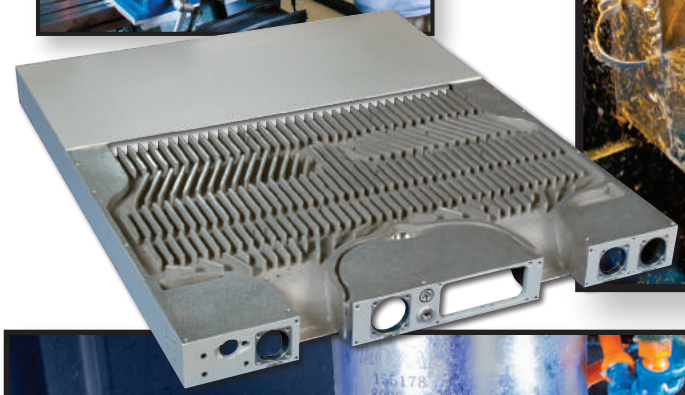
- THT (through-hole-technology) assembly and soldering to IPC-A-610 class II and class III standards.
- Mechanical sub-assembly integration and hardware installation.
- Wire harness installation and sub-assembly staking and potting.
- Sub-assembly Hi-Pot and Electrical Functional Test.
- System-level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

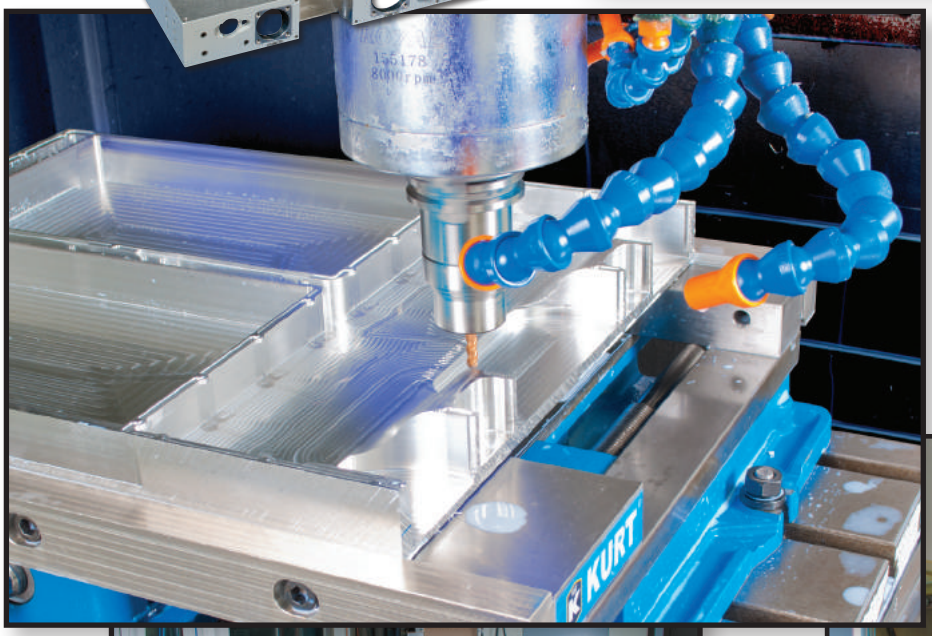


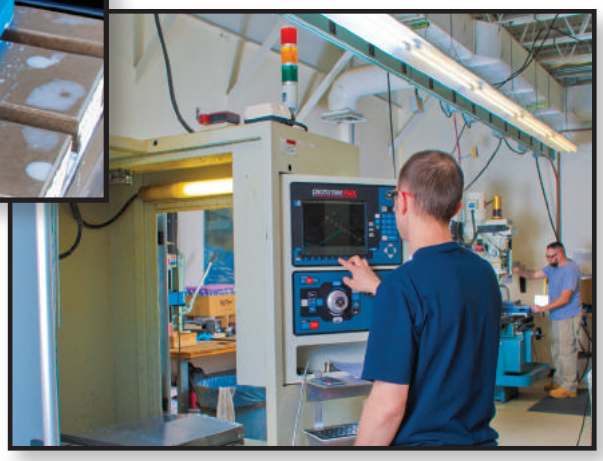
Prototype Milling Machine Lab

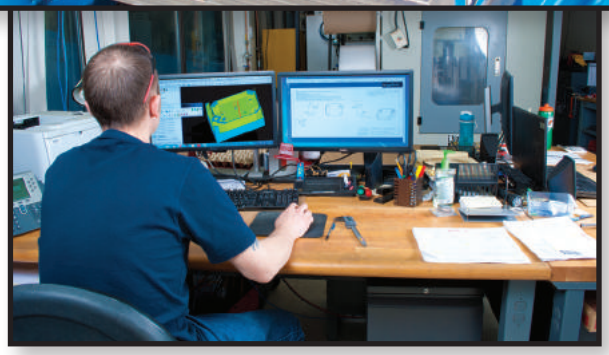
Our manufacturing facility has made significant investments into our precision milling technology equipment. With increased capabilities, we are ready to meet even the most stringent quality and delivery requirements from any customer. Our full complement of precision components produced on our enhanced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











SynQor®

Power Converters & Systems

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