MPPS
MPPS-4000

3-Phase Military AC-DC Programmable Power Supply

3-Phase, 80-265Vrms$_{L-L}$	47-800Hz	0-80V Regulated Programmable	4000W Continuous
Input Power	**Input Frequency**	**Output Voltages**	**Output Power**

Sealed Construction, Ultra low Weight, Compact Size



DESIGNED & MANUFACTURED IN USA

SynQor's Military AC-DC Power Supply units are designed for the extreme environmental and demanding electrical conditions of Military/Aerospace applications. SynQor's MPPS incorporates field proven high efficiency designs and rugged packaging technologies. This MPPS will accept a 3-Phase input with a wide range of input voltage and frequency values while delivering a well-conditioned continuous 4000W, DC regulated 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 MPPS-4000 Power Supply is designed and manufactured in SynQor's USA headquarters and manufacturing facilities to comply with a wide range of military standards.

Combine Up to Eight Units for Higher Power

MPS Product Features

- Sealed, weather-proof, shock-proof construction
- 4000W output power
- Full power operation: -40°C to +55°C
- 3-Phase AC Input: 80-265Vrms L-L; 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
- Current sharing for paralleled units
- Battle Mode for over-temperature events
- SNMP Network Port
- 1U high rack mount unit (17.00" x 20.42")
- Low weight: 28 lbs.

In-Line Manufacturing Process

- AS9100 and ISO 9001:2008 certified facility
- Full component traceability

Specification Compliance

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

Contents

Technical Specification. 2
Technical Figures 3
Block Diagram. 4
Technical Characteristics 4
Technical Specification. 5
Mechanical Diagrams. 7
Accessory Options. 8
Ordering Information 9

PROGRAMMABLE FEATURES				
Model Part Number	Programmable Voltage Range	Programmable Current Range	Voltage Set Point Accuracy	Maximum Output Current (Short Circuit)
28V Default (MPPS-4000-3W28)	0 - 35V	0 - 150A	±5mV typical ±25mV max.	180A
48V Default (MPPS-4000-3W48)	0 - 55V	0 - 120A	±8mV typical ±38mV max.	145A
72V Default (MPPS-4000-3W72)	0 - 80V	0 - 78A	±10mV typical ±50mV max.	95A

INPUT CHARACTERISTICS	
Operating AC Input	
Voltage	3-Phase, 80-265Vrms$_{L-L}$*
Frequency	47-800Hz
Input Power Factor	>0.98 at 47-65Hz >0.97 at 400Hz >0.92 at 800Hz
Maximum Input Current	23A
AC Input Circuit Breaker Rating (Continuous full load, 110Vrms$_{L-L}$)	25A

*Power Derating below 110Vrms$_{L-L}$ (see Figure 2)

OUTPUT CHARACTERISTICS	
Total Output Power	
Continuous	4000W
Output Ripple Voltage (20MHz BW)	
28V Default (MPPS-4000-3W28)	25mV max.
48V Default (MPPS-4000-3W48)	38mV max.
72V Default (MPPS-4000-3W72)	50mV max.
Current Limit Inception	
All Models	110%-120% Current Set
Hold-up Time	
To -20% rated Vout, 4000W	10ms
Turn-on Delay	
All Output Voltages	2s max.
Output Voltage Response to Load Transient	
Iout steps from 50-75%	
28V Default (MPPS-4000-3W28)	1V max
48V Default (MPPS-4000-3W48)	1.5V max
72V Default (MPPS-4000-3W72)	2V max.
Short Circuit Protection	
Constant current source	110-120% Current Set See Figure 4

ADVANCE PUBLICATION

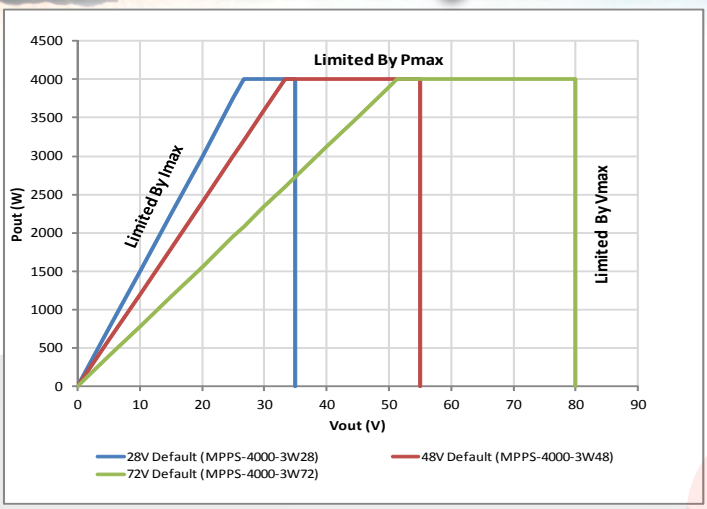


Figure 1: *Available Output Power vs Output Voltage*

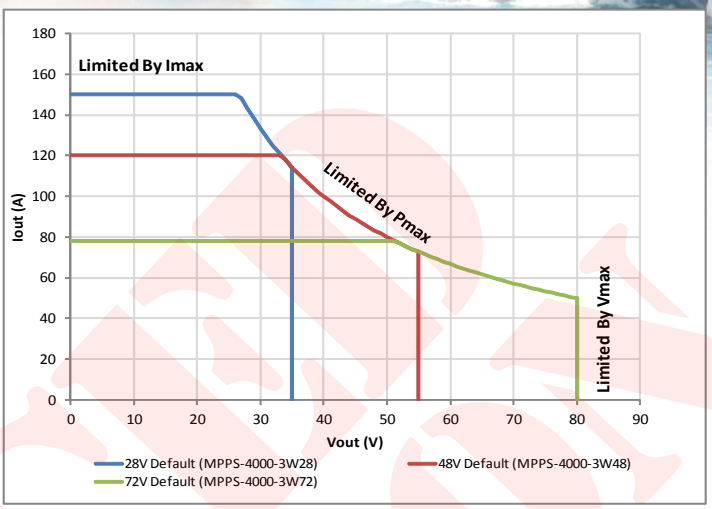


Figure 2: *Available Output Current vs Output Voltage*

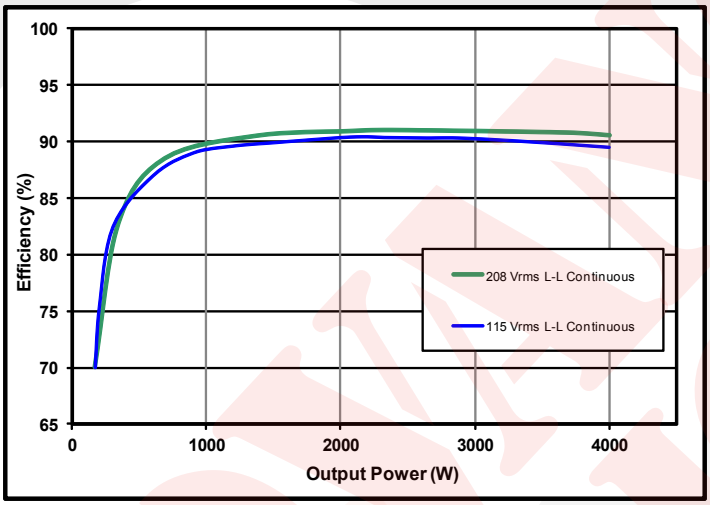


Figure 3: *Efficiency vs Output Power*

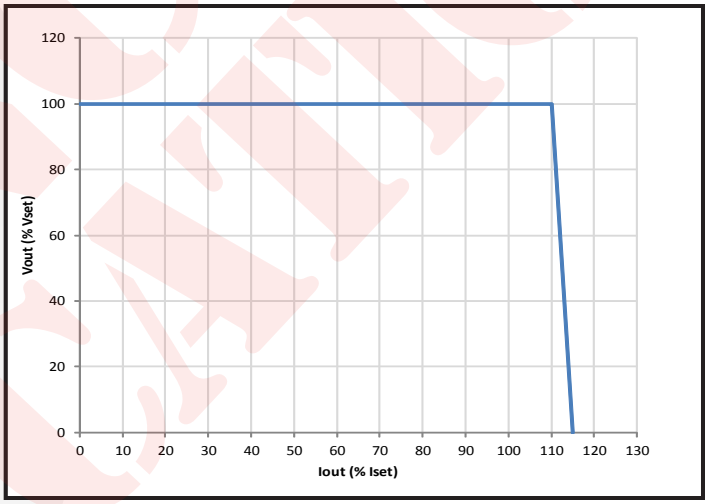


Figure 4: *Voltage Fold back During Current Limit, Short Circuit*

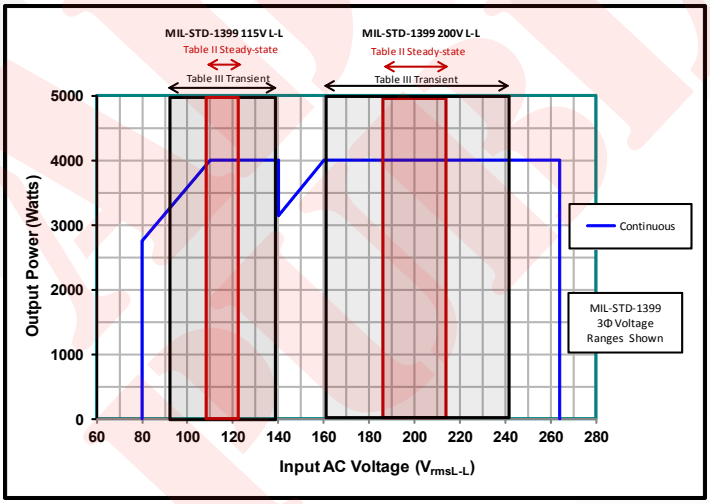


Figure 5: *Rated Output Power vs Input AC Voltage*

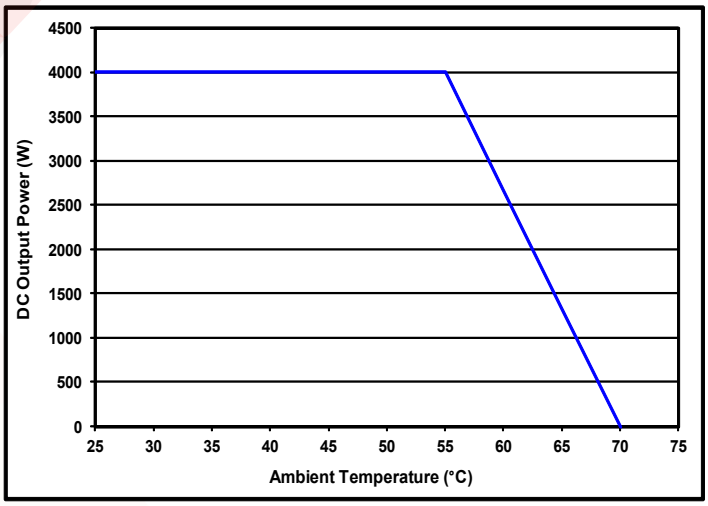


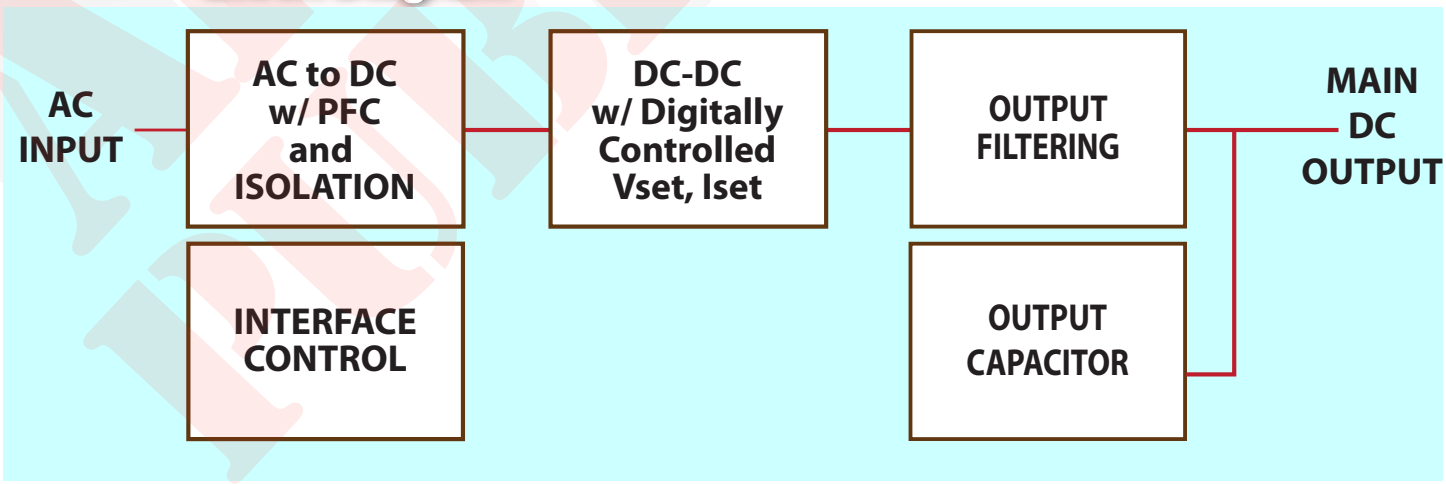
Figure 6: *Thermal Derating Curve (output power vs. ambient temperature) at 115VL-L*

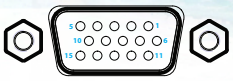
ENVIRONMENTAL	MIL-STD-810G
MTBF 100kHrs	MIL-217F Ground Benign,
Temperature Methods 501.5, 502.5	
Operating Temperature	
Full Rated Power	-40°C — +55°C
Reduced Power per Figure 6	-40°C — +70°C
Storage Temperature	-40°C — +70°C
Altitude Method 500.5	
Operating	0 - 15,000 ft
Non-operating	0 - 40,000 ft
Electromagnetic Capability	MIL-STD-461F
CE101	30 Hz - 10 kHz
CE102	10 kHz - 10 MHz
CS101	30 Hz - 150 kHz
CS106	10 kHz - 40 GHz
CS114	10 kHz - 200 MHz
CS116	10 kHz - 100 MHz
RE101	30 Hz - 100 kHz
RE102	10 kHz - 18 GHz
RS101	30 Hz - 100 kHz
RS103	2 MHz - 40 GHz
Environmental Tests	
Shock/Drop	Method 516.6, Procedures
Vibration	Method 514.6, CAT 5, 7, 8, 9,
Fungus	Method 508.6
Salt Fog	Method 509.5
Sand and Dust	Method 510.5, Procedures 1,2
Rain	Method 506.5
EMI	MIL-STD-461F
Humidity	Method 507.5
Mechanical Vibrations of Shipboard Equipment	Method 528

MECHANICAL CHARACTERISTICS	
Standard 1U Chassis	
Chassis Size (H x W x D)	1.73"(1U) x 17.00" x 20.42"
Case Material	Aluminum
Total Weight	28 lbs
Connectors	
AC Input Connector	MS3470L14-4PW
DC Output Connector (+)	CGE2E18H5FB-16
DC Output Connector (-)	CGE2E18H5FWB-16
User I/O Ports	HD DB15 Female
Configuration I/O Port	HD DB15 Male
Ethernet Port	Amphenol RJF22N00, Code B
Cooling Exhaust Fans	
Sound Pressure Level (SPL)	54 dB(A)
Air Flow	0.67(m3/min) 23.7 CFM

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

Block Diagram





High Density DB15 Female (15 Pin Connector)

Signal	PIN	Function
TX	**2**	RS232 DCE Device Transmit
RX	**3**	RS232 DCE Device Receive
GND	**4, 5**	Ground reference for all digital inputs and outputs
$\overline{\text{BATTLE_MODE}}$	**6**	TTL-Input*, pull "low" to engage Battle Mode (disable internal over-temperature protection), has internal pull-up to +5V.
$\overline{\text{ACIN_GOOD}}$	**7**	Open collector* output where "low" indicates AC Input voltage is within range
+5V	**8**	Vout with minimal current drive usable as a pull-up voltage for open collector output signals. Load must be <35mA
REMOTE_START	**12**	Drive this line "high" with ≥5mA to enable MPPS outputs
SHUTDOWN	**13**	Drive this line "high" with ≥5mA to disable MPPS outputs
$\overline{\text{OUT_OK}}$	**14**	Open collector* output where "low" indicates Main DC Output voltage is within range
$\overline{\text{OVER_TEMP}}$	**15**	Open collector* output where "low" indicates that the MPPS is at or above its maximum temperature

*With an internal 50k Pull-up Resistor to 5V and ESD Protection Diodes.

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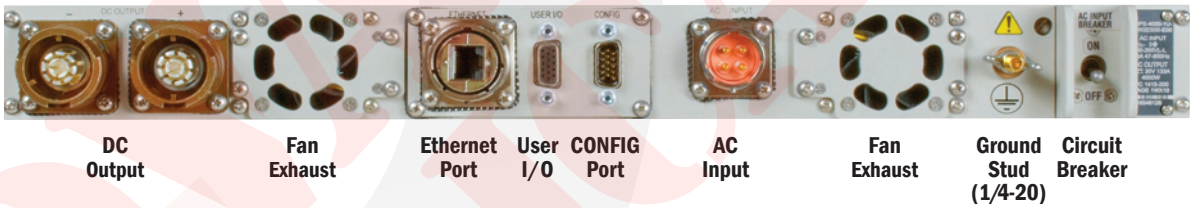
MPPS-4000-1U UNIT



MPPS-4000-1U UNIT with AC Input



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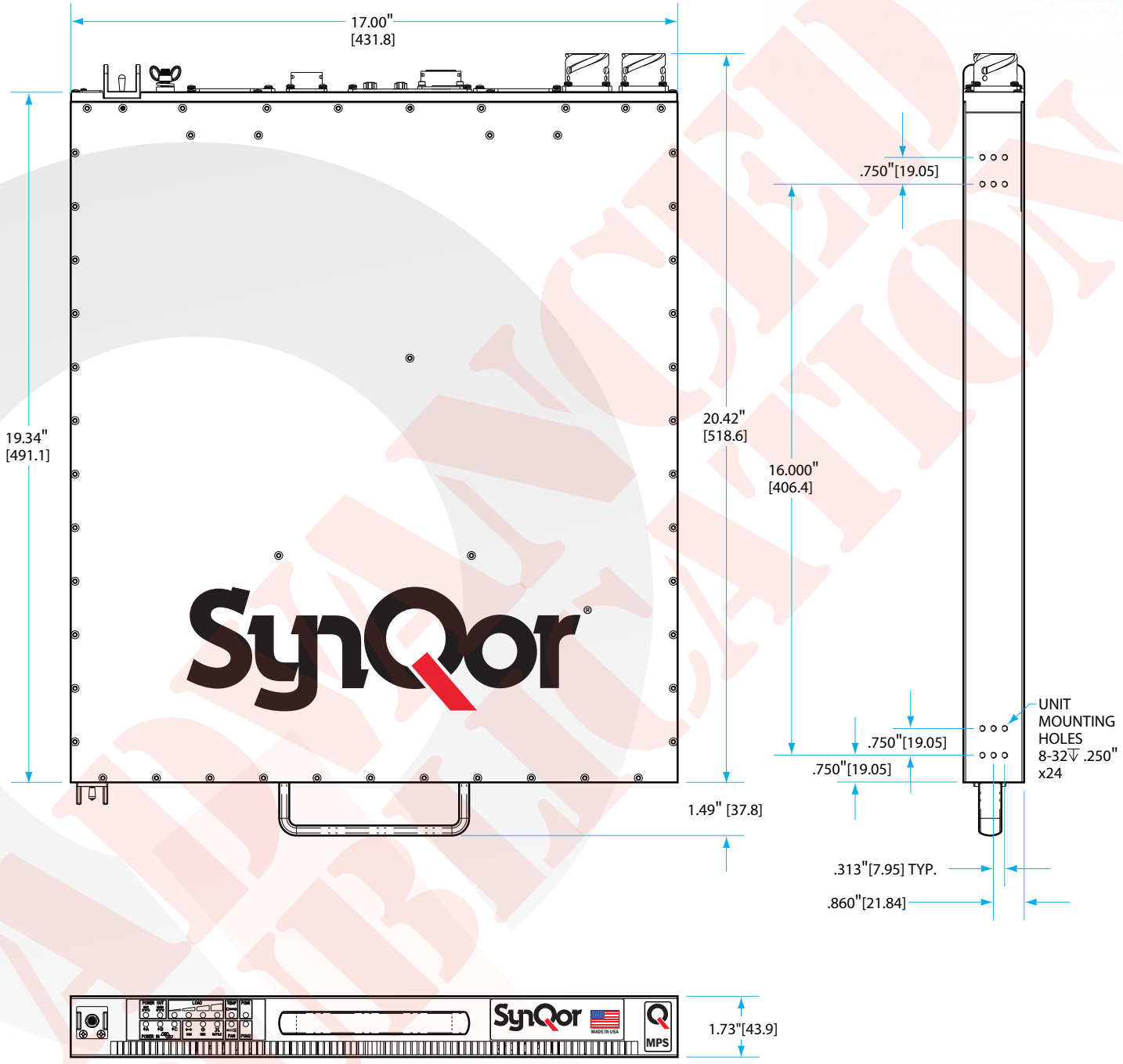
17.00"
[431.8]
19.34"
[491.1]
20.42"
[518.6]
1.49" [37.8]
.750"[19.05]
16.000"
[406.4]
.750"[19.05]
.750"[19.05]
UNIT
MOUNTING
HOLES
8-32↧.250"
x24
.313"[7.95] TYP.
.860"[21.84]
1.73"[43.9]
SynQor
MPS

User Communications (I/O) Cables	
HD DB15M to DB9F (RS232, 10')	SYN-9301
HD DB15M to DB15M (RS232 and Digital I/O, 10')	SYN-9305
Network SNMP (Sealed RJ45, 10')	SYN-9321
HD DB15F to HD DB15F (Synchronized Control of TWO Parallel Units, 3')	SYN-9322
HD DB15F to HD DB15F to HD DB15F (Synchronized Control of THREE Parallel Units, 3')	SYN-9323



Rail Kits	
Slide Rail Kit	SYN-9002
Fixed Bracket Kit[2]	SYN-9038
Power Cables (10' long)	
AC Input (NEMA L15-30P)	SYN-9114
AC Input (Hardwire)	SYN-9113
DC Output Negative (Hardwire)	SYN-9176
DC Output Positive (Hardwire)	SYN-9177
Rackmount Transit Cases	
Transit Case, 3U, Gray, with Casters[2]	SYN-9410
Transit Case, 3U, Gray, No Casters[2]	SYN-9412

Notes:
1: Other Options also available, check the website or contact power@synqor.com for further information.
2: Fixed Bracket Kit (SYN-9038) with Transit Case (SYN-9410 or SYN-9412) is required for transit and ruggedized use.





Optional
Rackmount Transit Case



Ordering Information

Family	Output Power	Height	AC Input Phase #	AC Input Frequency	DC Output Voltage Range	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

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

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Contact SynQor for further information and to order:

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Boxborough, MA 01719
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PATENTS

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

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

WARRANTY

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