MPS
MPS-4000-1U

3-Phase Military AC-DC Power Supply

3-Phase, 80-265 $Vrms_{L-L}$	47-800 Hz	Semi-Regulated 28 V-48 V	4000 W Continuous 5250 W Transient
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 MPS incorporates field proven high efficiency designs and rugged packaging technologies. This MPS will accept a 3-Phase input with a wide range of input voltage and frequency values while delivering a well-conditioned continuous 4000 W (5250 W transient), DC semi-regulated output to the load. The output voltage droops for system stability and for load sharing when units are in parallel. The MPS-4000 Power Supply is designed and manufactured in SynQor's USA facilities to comply with a wide range of military standards.

Combine Up to Eight Units for Higher Power

MPS Product Features

- Sealed, weather-proof, shock-proof construction
- 4000 W output power
- Full power operation: -40 °C to +55 °C
- 3-Phase AC Input: 80-265 Vrms L-L; 47-800 Hz
- 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
- SNMP Network Port
- 1U high rack mount unit (1.73"H x 17.00"W x 20.42"D)
- Low weight: 28 lbs.

In-Line Manufacturing Process

- AS9100 and ISO 9001 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



SynQor®

Technical Specification

MPS
MPS-4000-1U

INPUT CHARACTERISTICS

Operating AC Input	
Voltage	3-Phase, 80-265 $Vrms_{L-L}$*
Frequency	47-800 Hz
Input Power Factor	>0.98 at 47-65 Hz
	>0.97 at 400 Hz
	>0.92 at 800 Hz
Maximum Input Current	27 Arms
	May be programmed to less
	via communications port
AC Input Circuit Breaker Rating	30 Arms

*Power Derating vs. $Vrms_{L-L}$ (see Figure 2)

OUTPUT CHARACTERISTICS

Total Output Power	
Continuous	4000 W
15 s Transient	5250 W
Nominal DC Output Voltage at No Load	
28 Vout	29.7 V
30 Vout	32.2 V
48 Vout	51.5 V
DC Output Voltage over Line, Load & Temperature	
(Semi-regulated, see Figures 3-5)	
28 Vout	30.3-27.6 V
30 Vout	32.8-29.9 V
48 Vout	52.5-47.9 V
Maximum Output Capacitance	
28 Vout	255 mF
30 Vout	222 mF
48 Vout	86.8 mF
Output Ripple Voltage (20MHz BW)	
All Output Voltages	0.5% peak-to-peak of rated Vout
Hold-up Time	
To -20% rated Vout, 4000 W	10 ms
Turn-on Delay	
All Output Voltages	2 s max.
Output Voltage Response to Load Transient	
Iout steps from 50-75%	3% typ. / 6% max. deviation
at 0.2 A/µs	100 ms recovery
Over-voltage Protection	
Cyclic Restart	110-120% rated Vout
Short Circuit Protection	
Cyclic Operation	115% rated Iout

ENVIRONMENTAL CHARACTERISTICS MIL-STD-810G

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 - 18,000 ft
Non-operating	0 - 40,000 ft
Environmental Tests	
Shock/Drop	Method 516.6, Procedures 1,4,6
Temperature Shock	Method 503.5, Procedure 1
Vibration	Method 514.6, CAT 5, 7, 8, 9, 24
Fungus	Method 508.6
Salt Fog	Method 509.5
Sand and Dust	Method 510.5, Procedures 1,2
Rain	Method 506.5 Procedure 1
Humidity	Method 507.5 Procedure 2
Mechanical Vibrations of Shipboard Equipment	Method 528 Procedure 1

RELIABILITY CHARACTERISTICS MIL-HDBK-217F

MTBF	240 kHrs	MIL-217F Ground Benign, Ta=25 °C

ELECTROMAGNETIC CAPABILITY MIL-STD-461F

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

MECHANICAL CHARACTERISTICS

1U Standard Battery Pack Chassis	
Chassis Size	1.73"(1U)H x 17.00"W x 20.42"D
Case Material	Aluminum
Total Weight	28 lbs
Connectors	
AC Input Connector	MS3470L18-8PW
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.

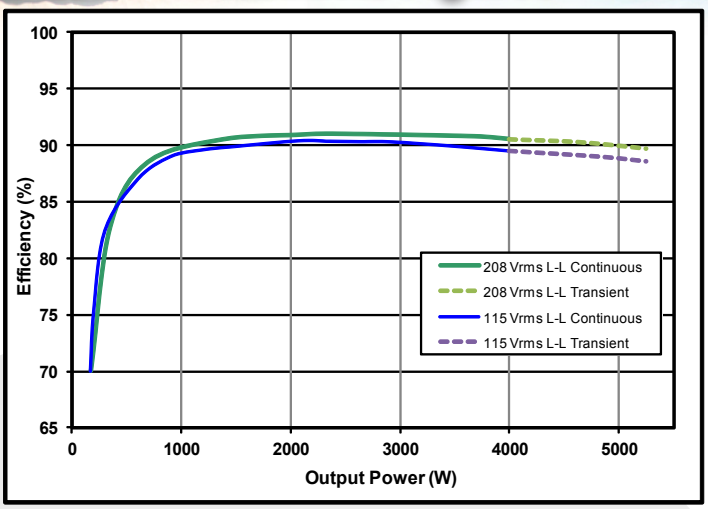


Figure 1: *Efficiency Curves for All Output Voltages*

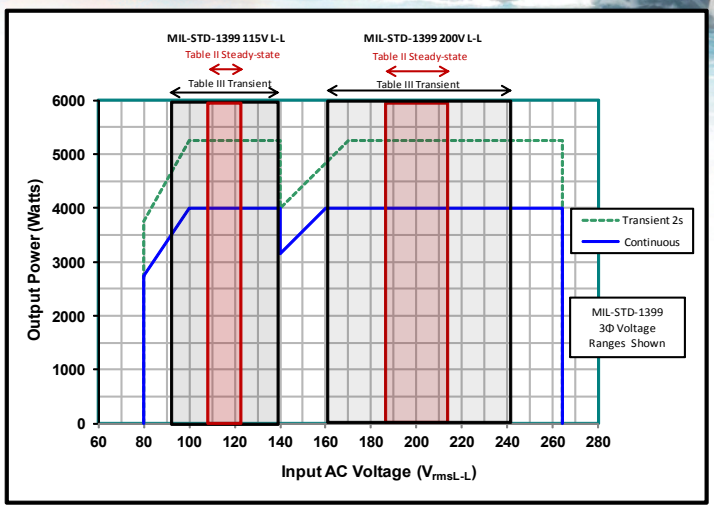


Figure 2: *Rated Output Power vs Input AC Voltage*

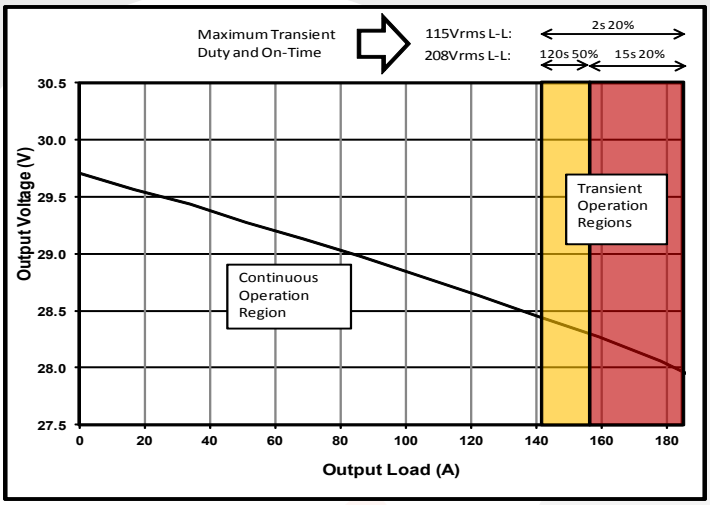


Figure 3: *28 Vout Droop Characteristics*

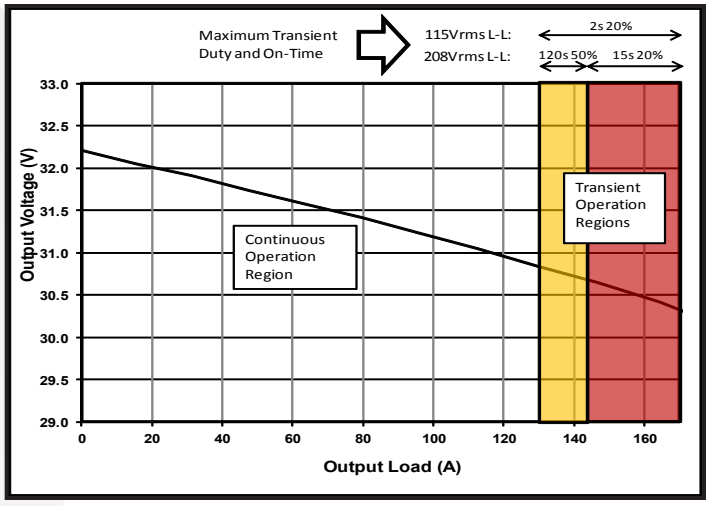


Figure 4: *30 Vout Droop Characteristics*

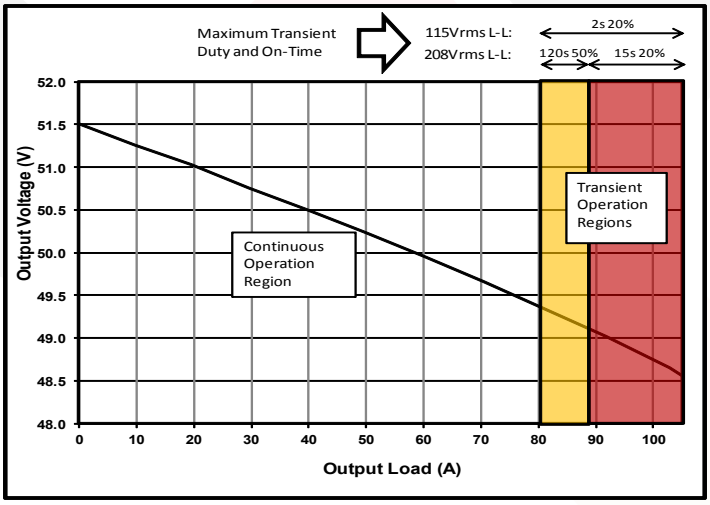


Figure 5: *48 Vout Droop Characteristics*

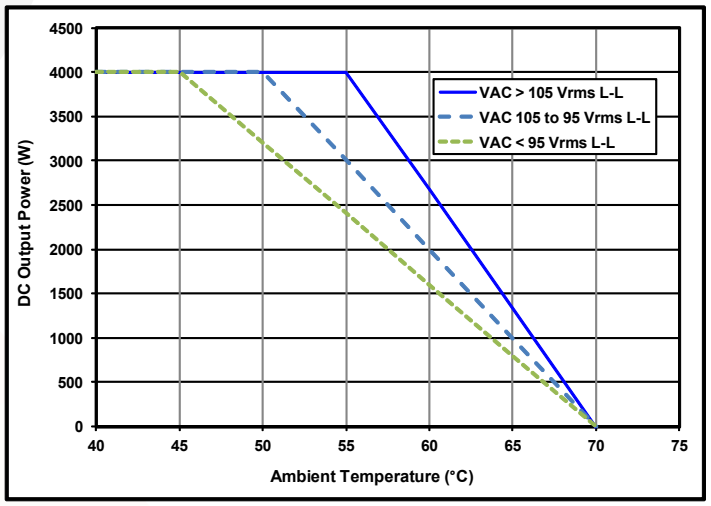


Figure 6: *Thermal Derating Curve (output power vs. ambient temperature)*



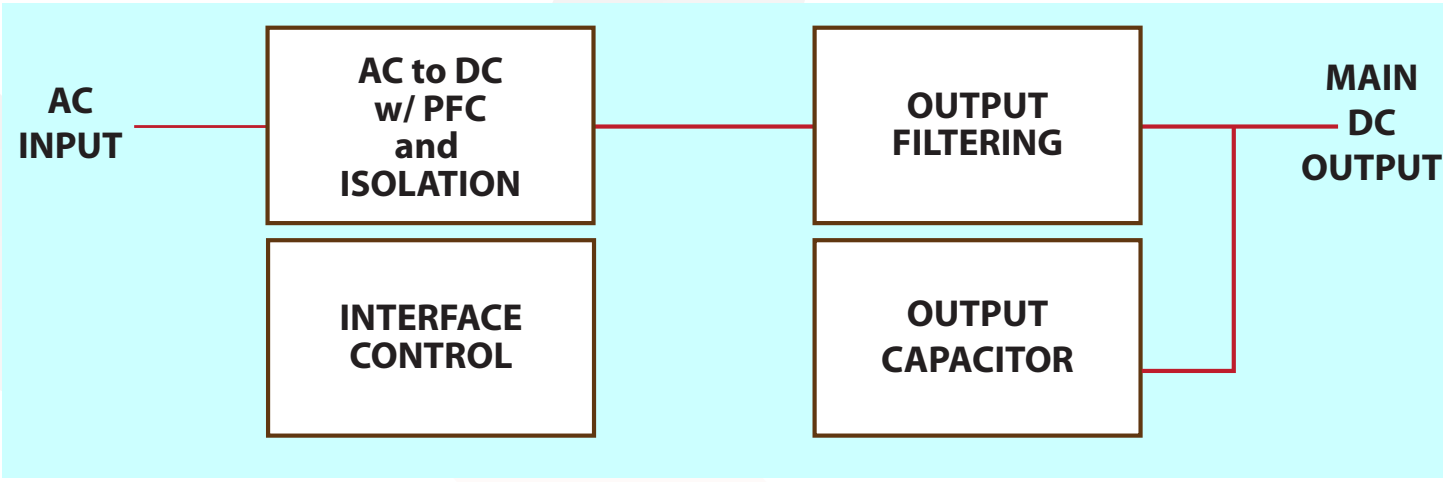
High Density DB15 Female (15 Pin Connector)

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
BATTLE_MODE	6	TTL-Input*, pull "low" to engage Battle Mode (disable internal over-temperature protection), has internal pull-up to +5 V.
ACIN_GOOD	7	Open collector* output where "low" indicates AC Input voltage is within range
+5 V	8	Vout with minimal current drive usable as a pull-up voltage for open collector output signals. Load must be <35 mA
REMOTE_START	12	Drive this line "high" with ≥5 mA to enable MPS outputs
SHUTDOWN	13	Drive this line "high" with ≥5 mA to disable MPS outputs
OUT_OK	14	Open collector* output where "low" indicates Main DC Output voltage is within range
OVER_TEMP	15	Open collector* output where "low" indicates that the MPS is at or above its maximum temperature

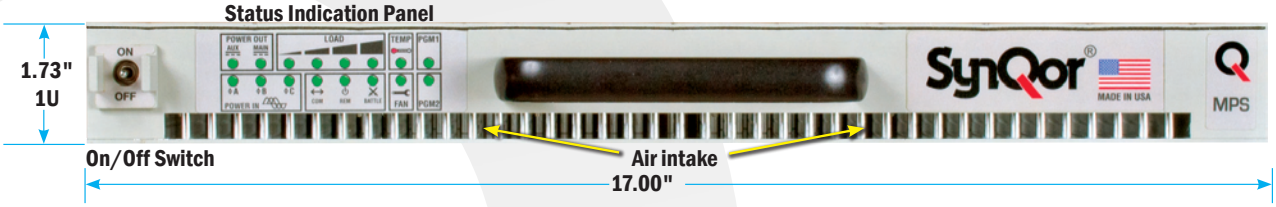
*With an internal 50 k Pull-up Resistor to 5 V and ESD Protection Diodes.

Safety & Qualifications - PENDING
UL 60950-1
CAN/CSA C22.2 No.60950-1
EN 60950-1

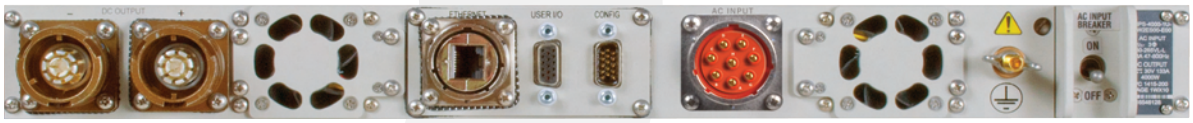
Block Diagram

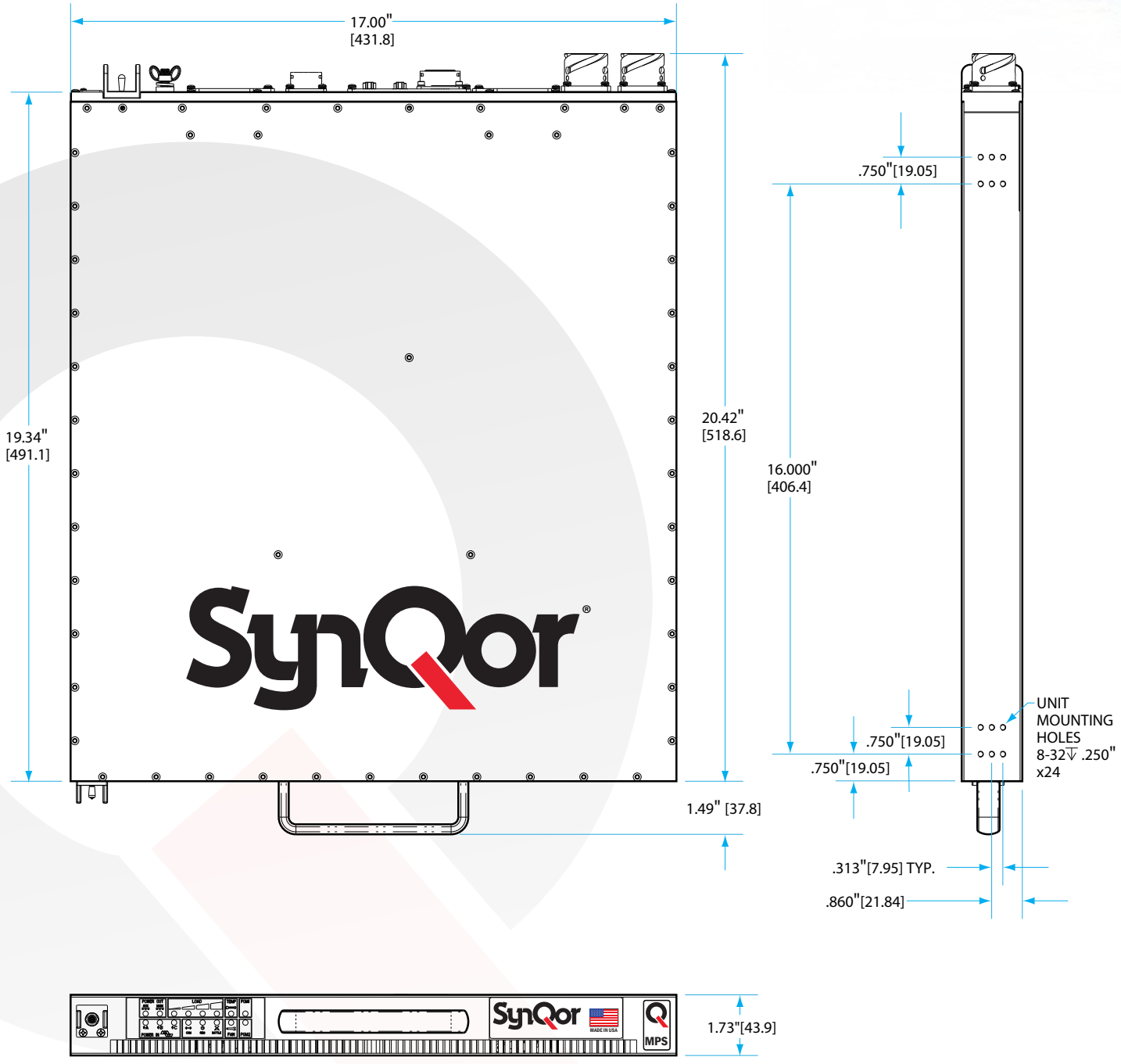


MPS-4000-1U



MPS-4000-1U with AC Input




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]
SynQor
MPS
1.73"[43.9]

Accessory Options

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')[1]	SYN-9322
HD DB15F to HD DB15F to HD DB15F (Synchronized Control of THREE Parallel Units, 3')[1]	SYN-9323

Notes:

1: HD DB15F cables (SYN-9322 or SYN-9323) not required for parallel operation.



Rail Kits	
Slide Rail Kit	SYN-9002
Fixed Bracket Kit[2]	SYN-9038
Power Cables (10' long)	
AC Input 30 A (18-8 MIL to NEMA L15-30P)	SYN-9115
AC Input 30 A (18-8 MIL Hardwire)	SYN-9116
DC Output Negative (Hardwire)	SYN-9176
DC Output Positive (Hardwire)	SYN-9177
Power Cables (3' long)	
DC Output (MPS), DC Input (MINV), 3', Negative	SYN-9180
DC Output (MPS), DC Input (MINV), 3', Positive	SYN-9181
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 Regulation	Network
MPS	**4000:** 4000 W	**1U:** 1.73"	**3:** 3 Phase	**W**: 47-800 Hz	**2D:** 28 V **2E**: 30 V **4B**: 48 V	**S00:** Semi-regulated	**E00:** Ethernet/SNMP

*Approximate output voltage at full load, output voltage has droop.
For valid part numbers, refer to the website or contact your local sales representative.

Part Numbering Example: MPS-4000-1U-3W2ES00-E00

Contact SynQor for further information and to order:

Phone: 978-849-0600
Toll Free: 888-567-9596
Fax: 978-849-0602
E-mail: power@synqor.com
Web: www.synqor.com
Address: 155 Swanson Road
Boxborough, MA 01719
USA

PATENTS

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

5,999,417 6,222,742 6,545,890 6,594,159 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.