



3-Phase Military AC-DC Power Supply

| | | | |
|---|--|---|--|
| 3-Phase, 80-265 Vrms_{L-L} Input Power | 47-800 Hz Input Frequency | Semi-Regulated 28 V-48 V Output Voltages | 4000 W Continuous 5250 W Transient 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.

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

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In-Line Manufacturing Process

- AS9100 and ISO 9001 certified facility
- Full component traceability

INPUT CHARACTERISTICS

Operating AC Input

| | |
|---------------------------------|---|
| Voltage | 3-Phase, 80-265 Vrms _{UL} * |
| 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_{UL} (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% at 0.2 A/μs | 3% typ. / 6% max. deviation 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 (At 50/60Hz)

| | |
|-------|------------------|
| 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 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.

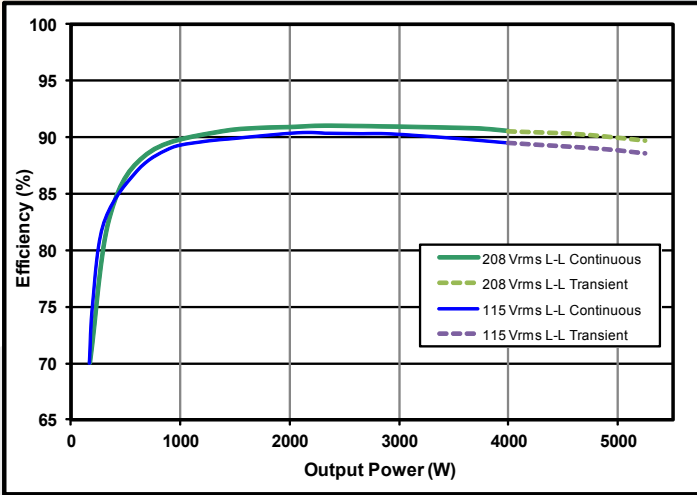


Figure 1: Efficiency Curves for All Output Voltages

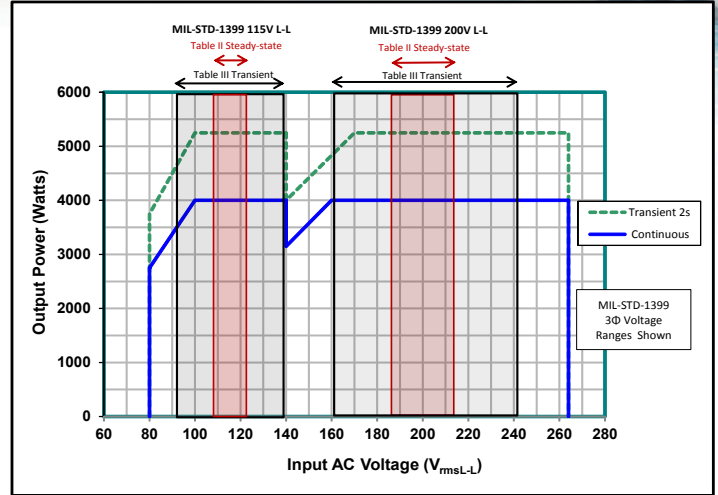


Figure 2: Rated Output Power vs Input AC Voltage

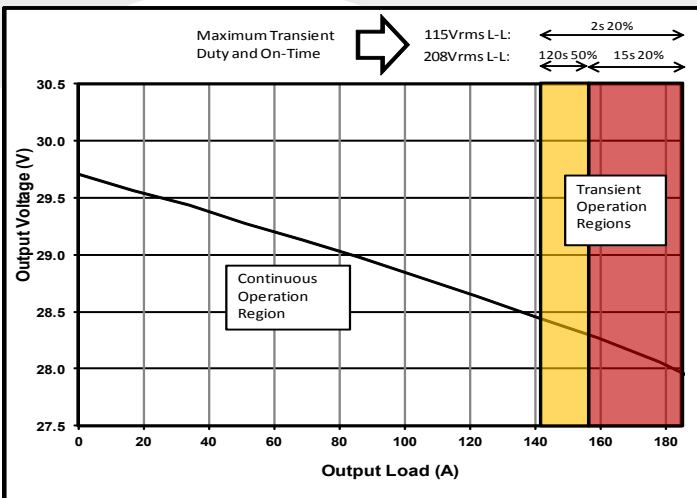


Figure 3: 28 Vout Droop Characteristics

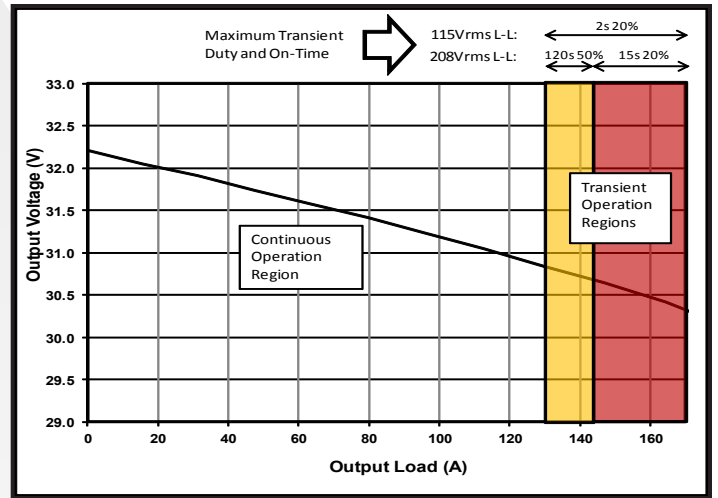


Figure 4: 30 Vout Droop Characteristics

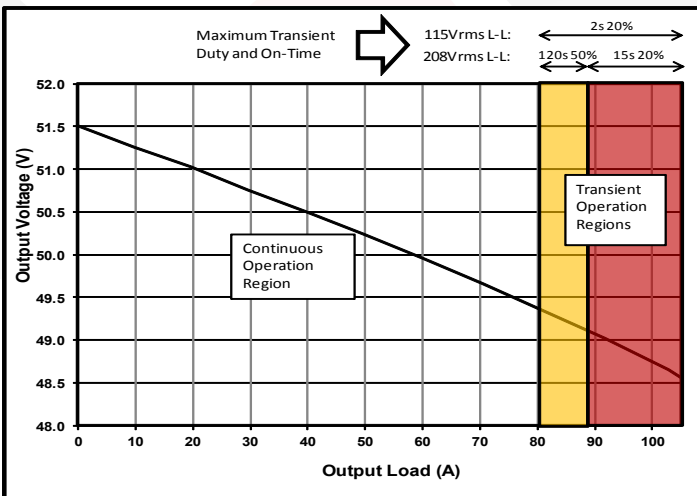


Figure 5: 48 Vout Droop Characteristics

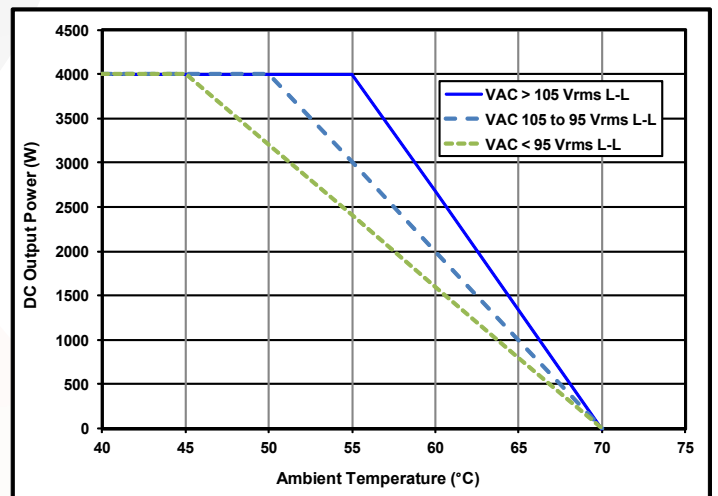


Figure 6: Thermal Derating Curve (output power vs. ambient temperature)

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.



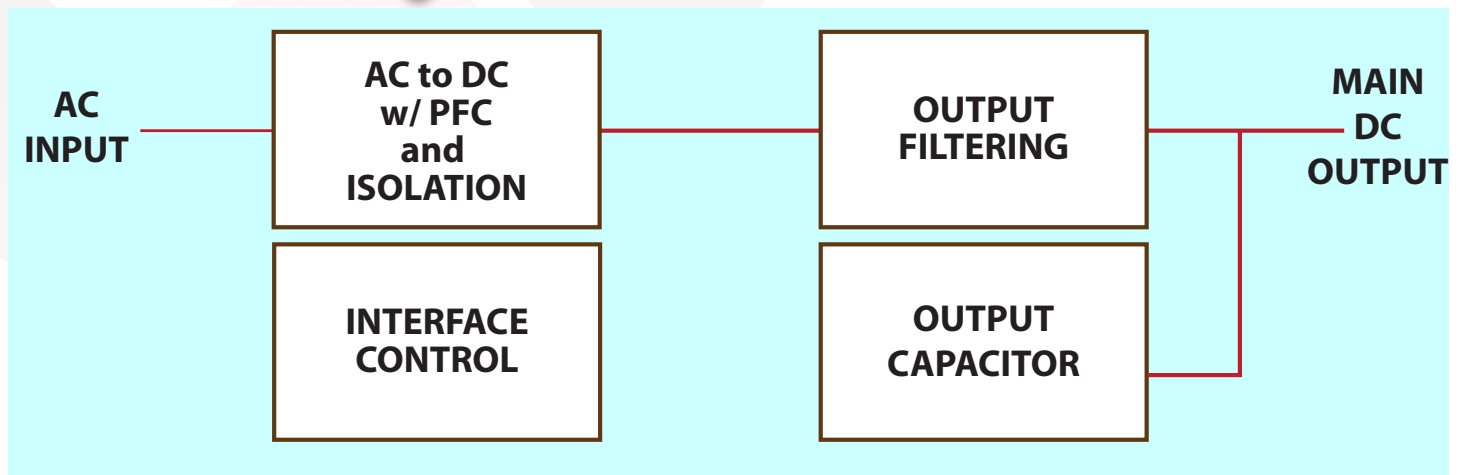
Safety & Qualifications - PENDING

UL 62368-1

CAN/CSA C22.2 No.62368-1

EN 62368-1

Block Diagram



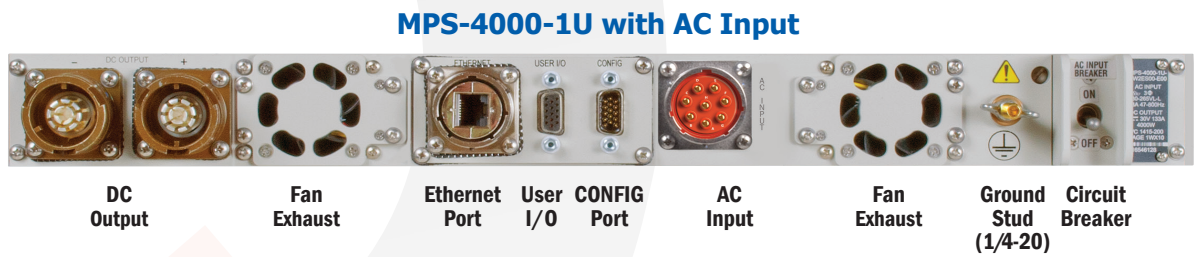


SynQor®

Mechanical Features

MPS MILITARY FIELD-GRADE

MPS-4000-1U



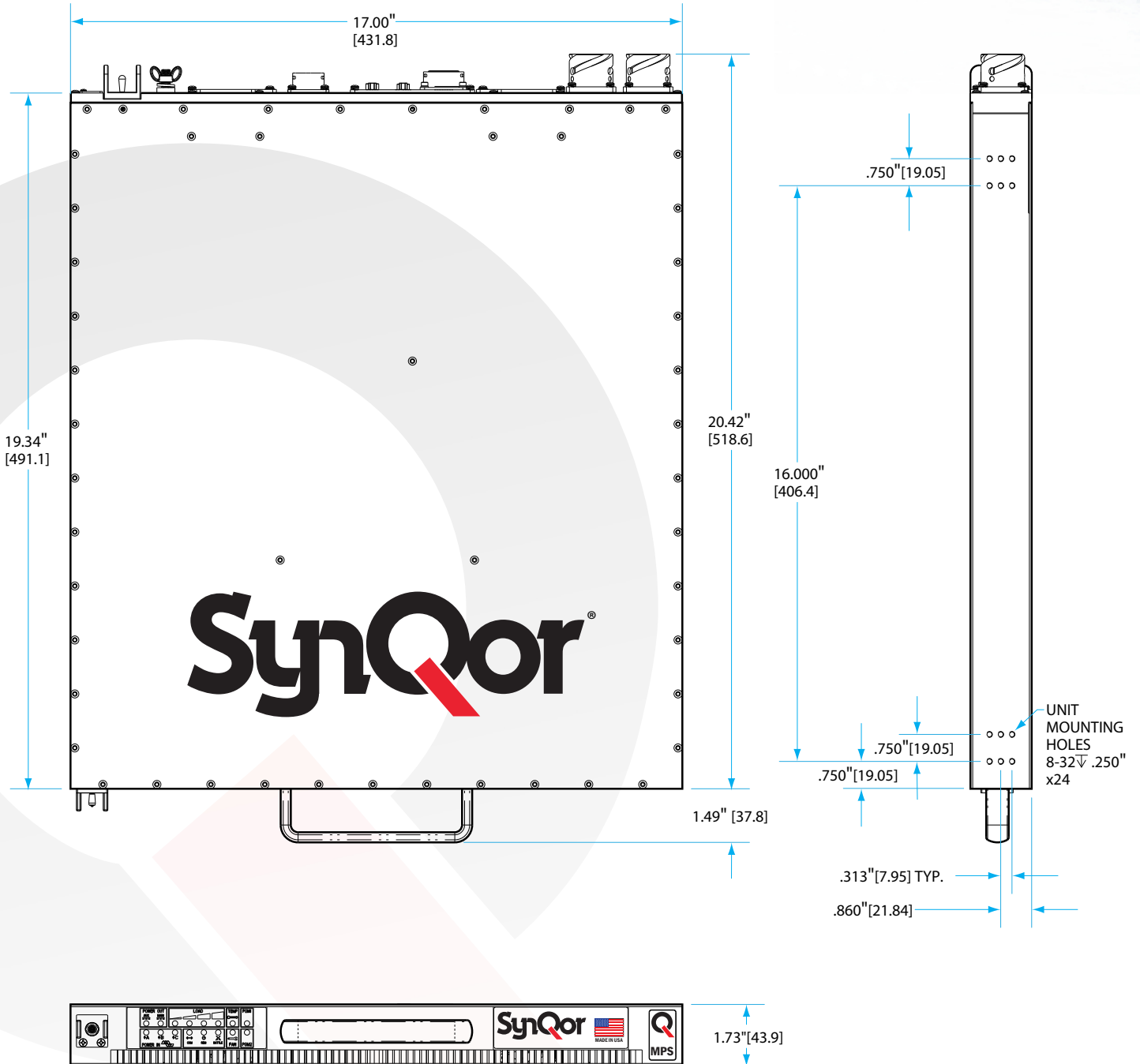


SynQor®

Mechanical Diagrams

MPS MILITARY FIELD-GRADE

MPS-4000-1U



Note:

- 1) ALL DIMENSIONS IN INCHES [mm]
- TOLERANCES: X.XXIN +/- 0.02 [0.5]
- X.XXXIN +/- 0.010 [0.25]



Accessory Options

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 |

Power Cables (2' long)

| | |
|--|------------|
| DC Output (MPS), DC Input (MINV), 2', Negative | SYN-9180-2 |
| DC Output (MPS), DC Input (MINV), 2', Positive | SYN-9181-2 |

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.



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 |

Configuration Cables

| | |
|--|----------|
| HD DB15F to HD DB15F (Synchronized Control of TWO Parallel Units, 3') ¹ | SYN-9341 |
| HD DB15F to HD DB15F to HD DB15F (Synchronized Control of THREE Parallel) | SYN-9343 |

Notes:

- 1: HD DB15F cables (SYN-9341 or SYN-9343) not required for parallel operation.



Optional
Rackmount Transit Case





| Base Model | | | |
|--------------------|---------------|--|----------------|
| Model Number | Power | Height | Weight |
| MPS-4000-1U | 4000 W | 1U (1.73"H x 17.00"W x 20.42"D) | 28 lbs. |

| Base Model | Options | | | | |
|---------------------|----------------|--------------------|-------------------------------------|-------------------|----------------------------------|
| | AC Input Phase | AC Input Frequency | DC Output Voltage Range | Output Regulation | Additional Options |
| MPS-4000-1U- | 3 | W | 2D 2E 4B | S00 | -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:

MPS-4000-1U-3W2DS00-E00, MPS-4000-1U-3W2ES00-E00

| Options | |
|--------------------------------|---------------------------|
| AC Input Phase | 3 3-Phase |
| AC Input Freq | W 47 - 800 Hz |
| DC Output Voltage Range | 2D 28 V Output |
| | 2E 30 V Output |
| | 4B 48 V Output |
| Output Regulation | S00 Semi-regulated |
| Additional Options | -E Ethernet/SNMP |
| | 00 No CE Marking |
| | CE CE Marking |

Contact SynQor for further information and to order:

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WARRANTY

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

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:

7,765,687 7,787,261
 8,149,597 8,644,027