

SynQor[®]



Sealed Weather-Proof Construction

MAC
Military AC Changer



MINV
Military Power Inverter



MPS
Military Power Supply



*Smaller
Lighter
More Powerful*



Military Power Systems

MAC

Military AC Changer



MILITARY GRADE AC CHANGER (MAC)

SynQor's Military 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
- ◆ Full power operation: -40 °C to +55 °C
- ◆ 3-Phase 400-480 Vrms L-L 3-wire input
- ◆ 47-65 Hz input 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 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
- ◆ Battle Mode for over-temperature events
- ◆ 1U high rack mount unit (17.00"W x 22.42"D x 1.73"H)
- ◆ Low weight: 33 lbs.

SPECIFICATION COMPLIANCE

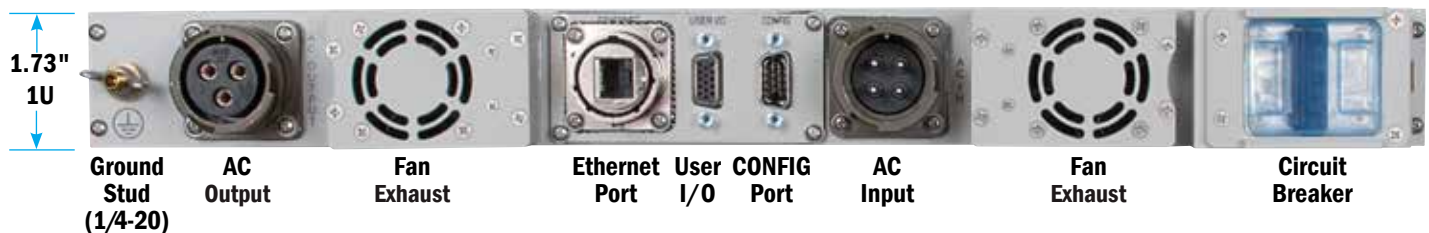
MAC-4000 units are designed to meet MIL-STD:

- ◆ MIL-STD-1399-300B - Interface Shipboard
- ◆ MIL-STD-810G - Environmental Engineering
- ◆ MIL-STD-461F - Electromagnetic Interference

OPTIONS

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

MAC-4000-1U



MILITARY GRADE AC CHANGER (MAC)

Family	Output Power	Height	Line to Line Input Voltage	Number of Input Phases	Input Frequency Range	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Frequency	Output Configuration	Additional Options
MAC	4000: 4000 W 5000 VA	1U: 1.73"	4: 400-480 V	T: 3-Phase	L: 47-65 Hz	1: 115 V 2: 230 V	G: Grounded F: Floating* R: AC Output Electronic Breaker*	5: 50 Hz 6: 60 Hz 4: 400 Hz	S: One Single-Phase Output	E00: Ethernet / SNMP ECE: Ethernet / SNMP & CE Marking

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

*Note: 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.

Part Numbering Example: MAC-4000-1U-4TL2G6S-E00 For valid part numbers, refer to the website or contact your local sales representative.



MILITARY 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. This 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 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”W x 20.42”D x 1.73”H)
- ◆ Low weight: 28 lbs.

SPECIFICATION COMPLIANCE

MPS & MPPS 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

MPS-4000-1U



3-PHASE MILITARY 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

Part Numbering 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 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: 0-55A 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.

MINV

Military Power Inverter



MILITARY 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 "Field-Rugged" family of rack-mount products incorporates field proven high efficiency designs and rugged packaging technologies. This MINV will accept a DC input voltage 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 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
- ◆ 4000 W (5000 VA) output power
- ◆ Full power operation: -40 °C to +55 °C
- ◆ 28 V nominal DC input
- ◆ 20 V - 33 V input range, 18 V - 40 V transient input range
- ◆ Pure sinusoidal AC output voltage (115 Vrms, 60 Hz)
- ◆ Handles 0.0—1.0 power factor loads and non-linear loads
- ◆ Low-power sleep state draws < 500 uA from source
- ◆ 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
- ◆ User I/O and Configuration signal ports
- ◆ Battle Mode for over-temperature events
- ◆ 1U high rack mount unit (17.00"W x 22.43"D x 1.73"H)
- ◆ Low weight: 32 lbs.

SPECIFICATION COMPLIANCE

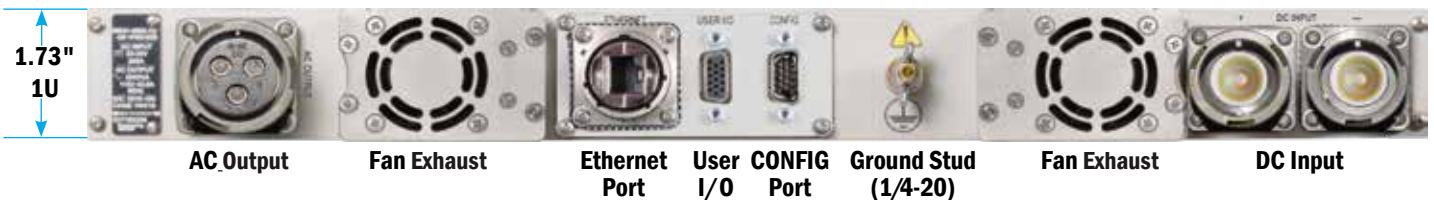
MINV-4000 units are designed to meet:

- ◆ 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

OPTIONS

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

28V REAR PANEL



MILITARY GRADE POWER INVERTER (MINV)

Family	Output Power	Height	DC Input Voltage	AC Output Voltage	AC Output Neutral Wire	AC Output Set Point Frequency	Output Configuration	Additional Options
MINV	4000: 4000W 5000VA	1U:1.73"	28: 28V _{NOM}	1: 115Vrms 2: 230Vrms	G: Grounded F: Floating* R: AC Output Electronic Breaker*	5: 50Hz 6: 60Hz 4: 400Hz	S: Single-Phase Output	E00: Ethernet / SNMP ECE: Ethernet / SNMP & CE Marking

*Note: Order "F: Floating" option when configuring the AC output for multi-unit combinations.
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 be connected to the chassis for either the F option or R option.

Part Numbering Example: MINV-4000-1U-28-1G6S-E00 For valid part numbers, refer to the website or contact your local sales representative.

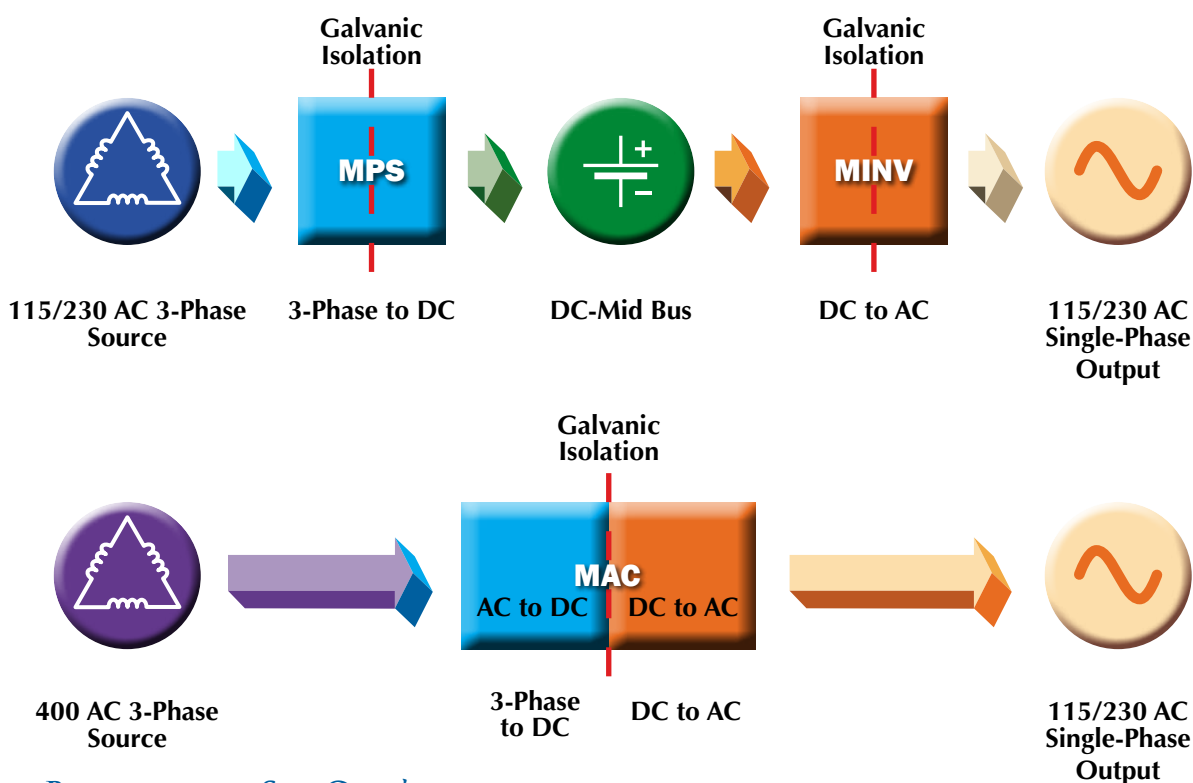
MIL-STD-1399-300B 3-PHASE POWER BALANCERS

POWER BALANCING PROBLEM

Shipboard and MIL-STD-1399-300B compliant applications require that loads draw balanced 3-phase power (5% for shipboard and 3% for submarine applications). Satisfying this requirement is extremely difficult since most devices were not designed for balanced 3 phase input power. Devices used in many seafaring applications have a single-phase input and highly variable load profiles which are detrimental to most 3-phase balancing schemes. The shipping and military industries have used UPS, electronic voltage regulators, variable shunt reactors and sophisticated transformer arrangements to try to balance 3-phase loads. These solutions are heavy, bulky and sometimes do not solve the load power unbalanced problem.

SYNQOR'S 3-PHASE LOAD BALANCING SOLUTION

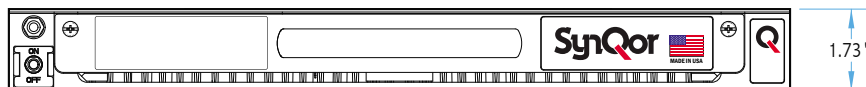
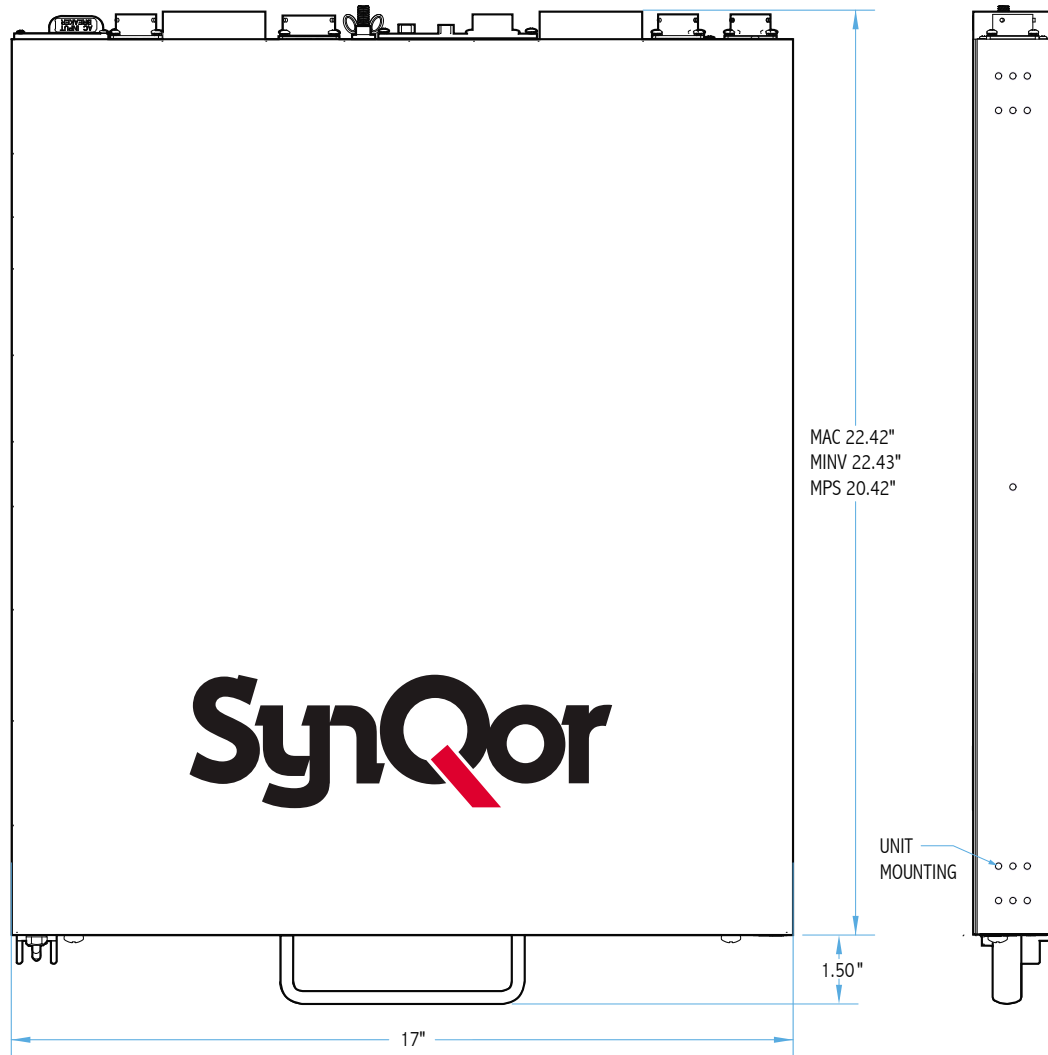
SynQor is able to provide a solution to the 3-phase load unbalance problem in a compact, ultra-low weight, efficient and military rugged package. For 115 and 230 input voltages, the SynQor solution uses its field proven 115 or 230 volt universal frequency input Military Power Supply (MPS) and its 115 or 230 volt Military Inverter (MINV). For the 400 voltage input solution, SynQor has developed a product know as Military AC 3-Phase Changer "MAC". SynQor's conceptual approach is to isolate the input power source from the output unbalanced loads through a DC mid-bus. With this approach, the military grade MPS and MAC units appear to the input power source as, clean, pure-sinusoidal, well behaved, nearly zero reactance, balanced, MIL-STD-1399-300B compliant loads. The output is created with inverters connected to the DC mid-bus. In the case of the 115 or 230 volt input solution, the MINV creates the single-phase output. In the case of the 400 volt input solution, the MAC is equipped with its own internal inverter.



BENEFITS OF SYNQOR'S APPROACH:

- ◆ Shipboard and MIL-STD-1399-300B compliant balanced loads.
- ◆ Components are compact, ultra-low weight, efficient and rugged to military standards.
- ◆ High noise and transient isolation between the input source and the output load.
- ◆ Floating or non-floating ground outputs options: 115 or 230 volts at 50, 60 or 400 Hz.
- ◆ Parallel/redundant configurations of up to 32 systems than can condition loads of up to 110 kW.
- ◆ Complex 3-Phase and Split-Phase parallel or redundant output configurations.
- ◆ All devices can be remotely monitored via SNMP.

MILITARY GRADE POWER SYSTEMS 1U MECHANICALS



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