

M9201-100

Shipboard, 48VDC/3.6KW Power Supply

(Other output voltages are available upon request)

The M9201-100 is a rugged, 48VDC/3.6KW, high performance AC to DC Power Supply, designed for below-deck Naval Shipboard and High-reliability industrial applications. It converts a three-phase 440VAC/60Hz (delta), shipboard power to a well-regulated filtered and protected 48VDC output optimized for large capacitance, high power pulsed-load applications. The M9201-100 is an air-cooled (internal fans), 19" Rackmount unit, 2U high and 17" deep.



Shown with standard front panel painting (Black). Other colors are available upon request.

M9201-100 AC/DC Power Supply

M9201-100 Main Features:

- Complies with MIL-STD-1399-300B and MIL-STD-461G.
- Clean sine-wave input current – less than 3% harmonic current.
- Withstands 2,500V / 50µs spikes per MIL-STD-1399-300B.
- Full-load Power-factor higher than 0.98.
- Exceptional step-load response.
- Stable operation when loaded by large capacitance loads
- Full galvanic isolation between Input, Chassis and Outputs.
- 10/100Mb Ethernet control and monitor.
- Over-load, Over-temperature, Over-voltage and Missing-phase protections.
- Designed to tolerate high-impact shocks and vibration.
- Cooled by four RPM controlled fans in a fault-redundant (N+1) high-reliability configuration.
- Up to five M9201-100 units can be paralleled (current share) and provide 18KW of regulated and protected power.
- Less than 1/5th of the Human Body Leakage limits of MIL-STD-1399-300B, allowing safe parallel connection of up to five M9201-100 units.
- J-STD-001B and IPC-610A Class-3 Workmanship.
- Conformal Coating per MIL-I-46058C and IPC-CC-830.

M9201-100 AC/DC Power Supply

Specification:

AC Input	Voltage and Frequency	Compatible with both MIL-STD-1399-300B, Type I, 3-phase, 440VAC/60Hz, ungrounded Delta, and industrial 3-phase, 480VAC/60Hz Delta. Steady-state: 404VAC to 519VAC, 60Hz \pm 10%. Transient: down to 352VAC for up 2 seconds, and up to 594VAC for up to 2 minutes. No damage for any voltage between 0 to the above limits.
	Power Factor	> 0.98 (Leading) at full load.
	Inrush Current	Internally limited, such that the peak RMS current is less than 5 times the nominal rated input current.
	Isolation	> 20 M Ω at 1,500VDC (AC input to DC output and chassis). Capacitance between AC input to chassis is less than 0.1 μ F per line.
	Current Waveform	Low-distortion sinusoidal, complies with the 3% Harmonic Current limits (and 6000/f limit between 2KHz to 20KHz) of MIL-STD-1399-300B.
	Leakage Current	Less than 20% of the max. leakage specified in Para. 5.2.4.1 of MIL-STD-1399-300B.
	Missing Phase	Protected from missing phase. Automatic recovery upon phase restoration.
DC Output	Nominal Ratings	48VDC/75Amp (Full load). Note 1
	Load Type	Optimized for high capacitance (up to 60mF) pulsed load
	Regulation	\pm 1% (worst case deviation for all operating and environmental conditions)
	Ripple	Less than 50mVpp. Measured on a resistive load of 2 to 75 Amp with load capacitance of 40mF \pm 50% using a BW of 20Mhz. Less than 0.48Vpp when loaded by less than 2Amp.
	Interrupts Ride-thru	When fully loaded (3.6KW) provides uninterruptible operation (ride-thru) for up to 4mS (10mS at 1.6KW).
	High Power Pulse Response	Recovers from a 500Amp/50 μ S pulse within 0.5mS (to within \pm 0.5% of its initial value). Measured with a capacitive load 45mF and a constant current consumption of 5Amp.
	Isolation	Output is galvanically isolated ("floating") from chassis (> 20 M Ω at 200VDC).
	Current Limit	The Output is current-limited (clamped) at 83 \pm 8 Amp. Note 2
	Overload Protection	A sustained overload condition that pulls the output voltage below 33 \pm 3VDC for more than 200mS will trip the Overload protection and disable the output for two (2) seconds. Automatic recovery upon overload removal. Inhibited in Battleshort mode. Note 2
	Efficiency	Higher than 91% at Full load.
	Turn On Time	Less than 3 seconds from the application of input power.
	Overvoltage Protection	Automatic shutdown (latched) in case of a fault that results in output voltage above 55 \pm 2Vdc. Reset by toggling the DC Output On/Off switch, or by Reset Command. Note 2
Over Temp. Protection	Automatic shutdown in case of an Over-temperature failure (inhibited in Battleshort mode). Automatic reset when temperature is back within normal range. Note 2	

Note 1: Other output voltages are available upon request.

Note 2: Protections' threshold can be adjusted (at the factory) to user specified values.

M9201-100 AC/DC Power Supply

Specification (Cont.):

Control & Monitor	Front Panel Switches	<p>On/Off Switch: When Off, unconditionally inhibits the 48VDC Output and resets all faults.</p> <p>Battleshort Switch: By-passes all inhibit commands (except for the On/Off Switch), the Over temperature and the Overload protections.</p>
	Front Panel LEDs	<p>AC PWR: A Green LED, indicates that AC input power is connected.</p> <p>DC OK: A Green LED, indicates that DC output is available and stable.</p> <p>FAIL: A Red LED, indicates a fault condition.</p> <p>BATTLSHORT: A White blinking LED, indicates an active Battleshort.</p> <p>LINK: A Green LED, indicates that Ethernet cable is connected.</p> <p>DATA: A Green (blinking) LED, indicates Ethernet activity.</p>
	Ethernet	100MbE interface allows the remote control and monitor of the unit. Allows remote Enable/Disable of the 48VDC output, faults reset and in response to query commands – provides operational status (faults report, output voltage and current, internal temperature) and logistic data (such as S/N and Versions). Supports UDP/IP multicast reports (transmitting) and unicast command protocol. Configurable Static IP Address, Destination IP Address, Port and Message ID. Software/Firmware upgrade via the Ethernet port.
Environment	Ambient Temperature	Non-operating: -40°C to +70°C Operating: -10°C to +40°C
	Humidity	MIL-STD-810G, Method 507.6 Procedure II (Aggravated).
	Ambient Pressure	Operating: 12.6 to 17.7 psi Non-operating: (Air transport) up to 15,000 feet.
	Mechanical Shock	MIL-STD-810G, Method 516.6 Procedure I, Figure 516.6-10, 25g/30mS Terminal Peak Sawtooth (all directions).
	Vibration	Per MIL-STD-167-1, Type I (Environmental) vibration. Random Vibration Per MIL-STD-810G, Method 514.6, Cat. 24, Fig 514.6E-1.
	Shipboard Motion	Up to ±45° with a period of 6 to 10 seconds, all axes.
	Airborne Noise	Does not exceed the octave band sound pressure limits specified in MIL-STD-1474E, Table E-I, Equipment Grade E. (Measured at 25°C ambient, in a Standard 19" Rack.)
EMI	MIL-STD-461G	CE101 (CE101-2 limit), CE102, CS101 (CS101-2 limit), CS114 (All Ships and Submarines limits), CS116, RE101 (RE101-2 limit), RE102 (RE102-1, Below deck and RE102-2 Internal to pressure hull limits), RS103 (2MHz to 18GHz, 50V/m). All tests are at full load and with shielded Output and Signal cables per the provisions of MIL-STD-461G.
	DC Magnetic Field	Per DOD-STD-1399-70-1 (Navy)
	Bonding	10mΩ max from any of the six external surfaces of the enclosure to the GND stud. 15mΩ max from any of the I/O connectors' shells to the enclosure.

M9201-100 AC/DC Power Supply

Specification (Cont.):

Safety Features	High Voltage	All exposed terminals are discharge to <30V within 2 Sec of AC Power Removal. Inaccessible terminals (internal to the enclosure) are discharge to <30V within 20 Sec
	High Temperature	The front panel temperature surfaces does not exceed 50°C (at 25°C ambient)
	Power Line Fusing	The 3 AC input lines are protected from non-recoverable (catastrophic) failure by internal fuses that are not accessible to the user. These fuses are a secondary over-load protection and will not trip under any operating conditions (including overload).
Form-factor	19" Rackmount, 2U high and 17" deep. All I/O connectors are on the front panel. Air inlet at the front, air outlet at the rear panel (see Page 7). For detailed dimensions and tolerances see Drawing: M9201100	
Weight	35 pounds.	
Cooling	Four RPM controlled DC fans (arranged in a fault redundant configuration). Front side inlet, rear side outlet. Cooling air is confined to a close-channel heatsink and is not allowed to flow directly over PWBs and/or Power devices.	
Electrical Interface	AC Input: D38999/20WD5PN or eq. DC Output: D38999/20WH21SN or eq. Ethernet: RJF21N (RJ45 Cat. 5e) or eq. GND: .250-28 UNF threaded hole. Supplied with a bolt, a flat washer and a spring washer	

M9201-100 AC/DC Power Supply

Pin Assignment:

The Part Numbers below are of the receptacles on the M9201-100 front panel.

J1 is mounted with the Major Key point upward.

J2 is mounted with the Major Key point downward.

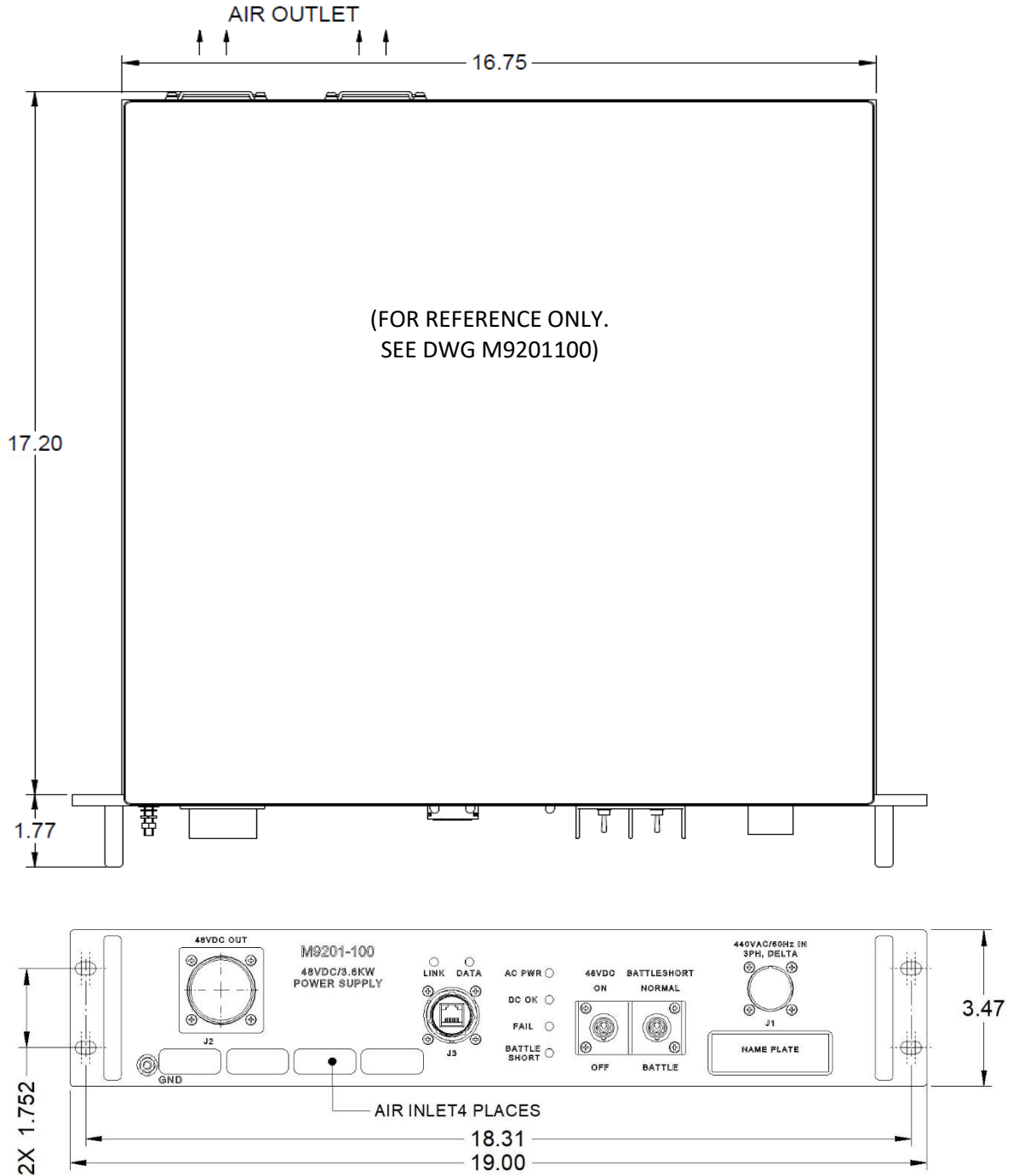
J1 – AC Input	
D388999/20WD5PN (or eq.)	
Pin	Function
A	PHASE A
B	PHASE B
C	PHASE C
D	N/C
E	CHASSIS GND

Phase order is not essential.

J2 – DC Output		
D38999/20WH21SN (or eq.)		
Pin	Function	I/O
A	48VDC_RTN	O
B	48VDC_RTN	O
C	48VDC_RTN	O
D	+48VDC	O
E	+48VDC	O
F	+48VDC	O
G	+48VDC	O
H	+48VDC	O
J	+48VDC	O
K	P_SENSE	I
L	N_SENSE	I
M	48VDC_RTN	O
N	48VDC_RTN	O
P	48VDC_RTN	O
R	48VDC_RTN	O
S	+48VDC	O
T	+48VDC	O
U	+48VDC	O
V	LOADSHARE	I/O
W	48VDC_RTN	O
X	48VDC_RTN	O

M9201-100 AC/DC Power Supply

Outline Dimensions



Note: Specifications are subject to change without prior notice by the manufacturer