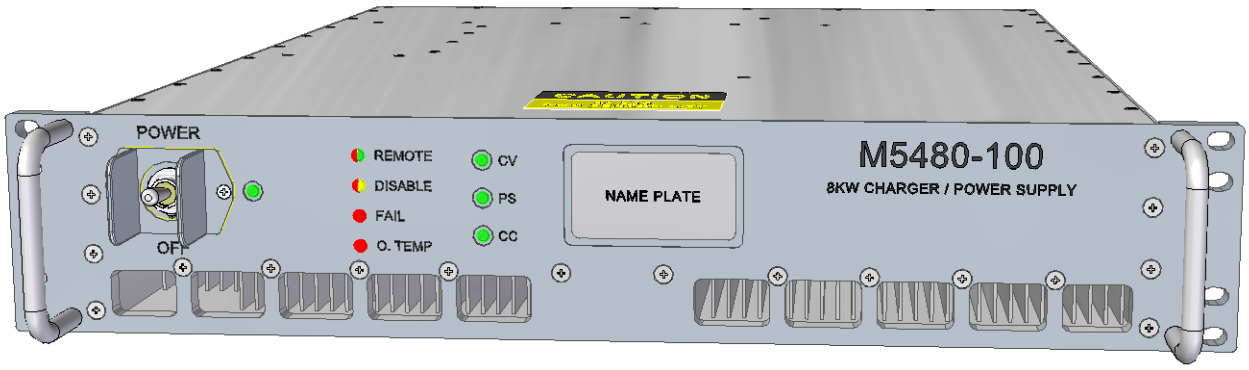
M5480-100 (Preliminary)

8.75 kW AC to DC Programable 350VDC/25Amp Power Supply/Charger

The M5480-100 is a mechanically robust, self-cooled (internal fan) high performance, AC to DC converter designed for Navy shipboard applications. The M5480-100 converts MIL-STD-1399-300B 3-Phase 440VAC (Delta) 60Hz shipboard power to a well-regulated, filtered and protected DC Output. When used as a DC Power Supply, the output voltage can be set to any voltage between 150 to 350 VDC, and the current limit to any level between 5 to 25 Amp. When used as a programable Battery Charger, the user can set the C.V. and C.C. to any level within the above range.



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The main features of the M5480-100 are:

- Can be supplied as a fixed voltage DC Power Supply or a Programable Battery Charger
- Complies with the User Interface Requirements of MIL-STD-1399-300B.
- Self-cooled unit - cooling air is confined to a close-channel heatsink
- TCP/IP and RS-232 Control and Monitor.
- Hard-wire safety interlock/EPO pins on the DC Output connector.
- Clean sine-wave input current – less than 3% harmonic current.
- Full-load Power Factor (PF) of 0.99.
- Inrush current limiting.
- Overload, Overtemperature, Overvoltage and Missing-phase protections.
- Full galvanic isolation between Input, Chassis and Outputs.
- Supports parallel connection for higher power.
- Withstands MIL-STD-1399-300B 2,500 V spikes.
- Design to meet MIL-STD-461F for shipboard application.
- Complies with MIL-STD-167-1 (Type I) shipboard vibration.
- Robust mechanical design, intended for systems that should withstand MIL-DTL-901E high impact shocks.
- J-STD-001B and IPC-610A Class-3 workmanship.
- Conformal Coating per MIL-I-46058C and IPC-CC-830.

Specifications:

AC Input	***Voltage and Frequency***	MIL-STD-1399-300B, Type I, 440Vac/60Hz, 3-Phase Ungrounded Delta. Steady state: 377VAC to 486VAC, 44Hz to 67Hz. Transient: down to 329VAC for up 3 seconds, and up to 594VAC for up to 2 minutes. No damage for any voltage between 0 to the above limits.
	Power Factor	>0.99 at full load and 50/60Hz.
	Spikes	Withstand 2,500 V spikes IAW MIL-STD-1399-300B.
	Inrush Current	Internally limited such that the peak RMS current is less than 50Arms and recovers to below 15Arms within 50mS.
	Isolation	Input is galvanically isolated from output and chassis (> 20 MΩ at 1,500 Vdc). Capacitance between AC input to chassis is less than 0.1µF per line (MIL-STD-1399-300B compliant).
	Current Waveform	Low-distortion Sinusoidal, complies with the Harmonic Current limits of MIL-STD-1399-300B.
	Missing Phase Protection	Protected from missing phase. Output gracefully shuts down upon missing phase detection.
DC Output	***Power Rating***	8.75KW
	Setting Range	150 to 350Vdc, 5 to 25Amp
	Voltage Regulation	Worst case deviation from the Voltage set-point is less than ±1% or ±1Vdc (the higher) for all operating and environmental conditions
	Current Regulation	Typical deviation from the Current set-point is less than ±5% or ±1.0Amp (the higher) for all operating and environmental conditions.
	Step Load Response	When operating in Voltage Regulation mode, the over/under shoot for a step load between 10Amp to 20Amp with a rise/fall time of 50µS or longer, is less than ±10V and recovers within 5mS.
	Ripple Voltage	Less than 0.25% for all operating and environmental conditions (resistive load with 1uF or higher).
	Isolation	Output is galvanically isolated ("floating") from chassis (> 20 MΩ at 1,500 V_{DC}).
	Overload Protection	A sustained overload that pulls the output voltage below a user programmable O.L. Tripping Threshold (typically set 50% of the regulated voltage setting) for more than a user programable O.L. Tripping Delay (typically 50mS) will trip the Overload protection and disable the output. Output recovers upon receiving a Fault Reset command, or when AC Power is re-cycled.
	Efficiency	92% minimum (93% typical) at full load.
	Overvoltage Protection	Automatic shutdown in case of a fault that causes the output voltage to exceed 115±5% of the Set voltage. Output recovers upon receiving a Fault Reset command, or when AC Power is re-cycled.
	Over Temp. Protection	In case of an Overtemperature, the output will shut down and could be turned back On when the temperature will drop to within normal range.

Specifications (Cont.):

Control & Indication	***On/Off Switch***	Disconnects the 3-Ph AC power from the AC to DC converter.
	TCP/IP Control & Monitor	Allows the user to set the unit to Charger/Power-supply modes, to Enable/Disable the DC Output, to set the CC and CV levels, and resets faults. Provides Configuration data, set levels, operational status, actual voltage and current levels, and internal hot-spot temperature. See document M5480_EID.
	Interlock/EPO	When Open, disables the DC Output.
	Front Panel LEDs	**PWR ON** Green LED **Disabled** Yellow LED **CC Mode** Green LED **Over-temp.** Red LED **CV Mode** Green LED **Fail** Red LED **PS Mode** Green LED **Remote** Green/Red LED
Environment	***Ambient Temperature***	Non-operating : -18°C to +70°C Operating: -10 to + 50°C.
	Humidity	Up to 95% RH, Per MIL-STD-810F, Method 507.4
	Salt-fog	Per MIL-STD-810F, Method 509.4
	Altitude	Non-operating: (Air transport) up to 40,000 feet.
	Mechanical Shock	40g/11ms and 25g/30mS (Terminal Peak Sawtooth, all directions). Designed for systems that need to comply with MIL-DTL-901E
	Vibration	Type I vibration IAW MIL-STD-167-1. Random Vibration Per MIL-STD-810G, Cat. 24, Fig 514.6E-1.
	Inclination	Capable of operation in any orientation and inclination.
	Fungus	Does not support fungus growth, in accordance with the guidelines of MIL-STD-454, Requirement 4.
EMI	***MIL-STD-461F***	Design to meet CE101, CE102, CS101, CS114 (10 kHz to 400 MHz, Curve #5), CS115, CS116, RE102, RS101 and RS103 (2 MHz to 18 GHz 50 V/m). Surface-ship and Internal-submarine limits. Al tests are at full load and in accordance with the provisions of MIL-STD-461F – with shielded Output and Signals cables.
Reliability	MTBF>125,000 hours, Excluding FAN, for a typical Naval (NS) environment.	
Weight	39 Pounds.	
Connectors	See below	

Pin Assignment:

J1 - Input		
D38999/20WE6PN (or eq.)		
Pin	**Fucntion**	**AWG#**
A	N/C	12
B	PHASE A	12
C	CHASSIS	12
D	PHASE C	12
E	N/C	12
F	PHASE B	12

J4 – Ethernet
RJFTV2SA5GF459 (or eq.)
Standard Ethernet RJ45

J2 – DC Output		
TVP00RW17-20S (or eq.)		
Pin	**Fucntion**	**AWG#**
A	+VDC	12
B	+VDC	12
C	VDC_RTN	12
D	VDC_RTN	12
1	N/C	22
2	N/C	22
3	N/C	22
4	N/C	22
5	N/C	22
6	N/C	22
7	N/C	22
8	N/C	22
9	N/C	22
10	N/C	22
11	N/C	22
12	INTERLOCK_IN	22
13	INTERLOCK_OUT	22
14	N/C	22
15	N_SENSE	22
16	P_SENSE	22

J3 - Signals		
D38999/20WB35SN (or eq.)		
Pin	**Fucntion**	**AWG#**
1	LOAD_SHARE	22
2	LOAD_SHARE_RTN	22
3	N/C	22
4	COM_TX	22
5	COM_RX	22
6	ID_1	22
7	ID_2	22
8	ID_3	22
9	N/C	22
10	N/C	22
11	N/C	22
12	COM_RTN	22
13	ID_4	22