

# M286 SERIES

## 1.5 KW AC TO DC BASEPLATE COOLED POWER SUPPLY



The M286 is a series of mechanically robust, base plate cooled, high performance, 1.5kW AC to DC power supplies, designed for Navy shipboard applications. The M286 converts a 3-Phase 115/200VAC, 50/60Hz source or 3-Phase (3-lines), 115/200VAC, 400Hz Per MIL-STD-704F to a well regulated, filtered and protected DC Output.

## M286 Series– AC/DC Power Supply

### STANDARD CONFIGURATIONS

Part number	Input		Output	
	Voltage range	Frequency	Voltage	Current
M286-100	3-phase, 104 to 127 V <sub>AC</sub>	50/60Hz	12 V <sub>DC</sub>	54 A
M286-101	3-phase, 104 to 127 V <sub>AC</sub>	50/60Hz	15 V <sub>DC</sub>	54 A
M286-102	3-phase, 104 to 127 V <sub>AC</sub>	50/60Hz	24 V <sub>DC</sub>	54 A
M286-103	3-phase, 104 to 127 V <sub>AC</sub>	50/60Hz	28 V <sub>DC</sub>	54 A
M286-104	3-phase, 104 to 127 V <sub>AC</sub>	50/60Hz	36 V <sub>DC</sub>	41.6 A
M286-105	3-phase, 104 to 127 V <sub>AC</sub>	50/60Hz	48 V <sub>DC</sub>	31.25 A

\* Additional standard configurations available. **Contact factory for more details.**

\* All of our products can be configured to comply with **EU REACH** regulations. **Contact factory for more details.**

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### THE MAIN FEATURES OF THE M286 ARE:

- AC/DC Single output power supply up to 1.5kW
- High Density
- Input range: 104-127VAC | 50/60Hz 3-Phase
- Can parallel units for more power
- EMI filters included
- High efficiency
- Full galvanic isolation between Input, Chassis and Outputs.
- External Inhibit (On/Off)
- Indefinite short circuit protection with auto-recovery
- Over-voltage shutdown with recovery upon toggling the AC input or the INHIBIT Input.
- Over temperature shutdown with auto-recovery
- Remote sense compensation
- Conduction cooled via the baseplate
- J-STD-001B and IPC-610A Class-3 workmanship
- Conformal Coating per MIL-I-46058C and IPC-CC-830

## M286 Series– AC/DC Power Supply

### SPECIFICATIONS

<b>AC Input</b>	<b>Type</b>	3-Phase (3-lines), 115/200VAC, 400Hz Per MIL-STD-704F. Note: The M286 will operate and provide full performances when fed by a 270VDC source (per MIL-STD-704F) or by a 3-Phase 115/200VAC, 50/60Hz source (except that the input power factor will be lower).
	<b>Voltage Range</b>	Steady State: 104 to 127VAC (180 to 215Vac Line-to-Line) Transients: up to 180Vac/50mS (per Figures 3 and 4 of MIL-STD-704F). During voltage transient (per Figure 3 of MIL-STD-704E) the output voltage may deviate by -15% +5% from the regulation range, but will recover within 50mS. Will also accept a +270VDC input.
	<b>Frequency</b>	45 to 450Hz (will also operate from a 270VDC source).
	<b>Input Power Factor</b>	0.85 Minimum (at full load and 115VAC/400Hz input).
	<b>Missing Phase</b>	The M286 will not be damaged by a missing phase, but may shutdown. Automatic recovery within 1.5 Sec after input recovery.
<b>DC Output</b>	<b>Nominal Voltage</b>	28DC
	<b>Rated Current</b>	54Amp
	<b>Regulation</b> <i>(Using the Sense Lines)</i>	$\pm 1.5\text{Vdc}$ (worst case combination of steady state load, line and temp.) Note: In order to facilitate current sharing when several M286 are paralleled, the output voltage exhibits a controlled slop of 1.3Vdc from 0% to 100% load. ( $28.5\pm 0.4\text{Vdc}$ at No-load and $27.2\pm 0.4\text{Vdc}$ at 100% load, measured on the load near to the Remote Sense connection. <b>Can be set, upon request, to lower or higher voltage</b> ).
	<b>Remote Sense</b>	Capable of up to 3VDC line drop (round trip) compensation. When left open, the point of regulation shifts to the output connector.
	<b>Current Limit &amp; Overload Protection</b>	Output current internally limited to less than 125% of the full rated current. If an over-load pulls the output voltage below 14Vdc for more than 100mS, the output is disabled and will attempt to recover after 1 second. The recovery attempts (100mS On, 1 sec Off) will continue until the overload is removed.
	<b>Ripple and noise</b>	Less than 300mVpp (measured with BW of 20MHZ on any resistive load between 2 to 54Amp and any capacitance between 1 to 10,000 $\mu\text{F}$ . Below 2Amp the ripple may rise to 1.5 Vpp.
	<b>Overvoltage Protection</b>	In case of an internal failure that causes the output voltage to exceed $32.2\pm 0.5\text{V}$ , the output will shut down. (Externally imposed voltage will not trip the protection). Recovery upon toggling the AC input or the INHIBIT Input.
	<b>Over Temp. Protection</b>	Automatic shutdown when the Base Plate exceeds 90°C. Automatic recovery when the heatsink temperature drops below 80°C.

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<b>INHIBIT Input</b>	<i>Open-collector (or low-level switch)</i>	Low ( $V < 3.5V @ 6mA$ , relative to RTNVout) inhibits the Output. Open ( $I < 1mA @ 12V$ ) enables the Output.
<b>BIT Output</b>	<i>Opto-coupler (Open-collector)</i>	Low ( $V < 0.8 @ 1mA$ , relative to RTNBIT) means Normal Operation. Open ( $I < 0.1mA @ 15V$ ) means Failure to Operate.
<b>Isolation</b>	<i>Input to Chassis GND</i>	20M $\Omega$ (Min) at 500Vdc.
	<i>Input to Output and BIT</i>	20M $\Omega$ (Min) at 500Vdc.
	<i>Output to Chassis GND</i>	20M $\Omega$ (Min) at 200Vdc.
	<i>BIT to Output &amp; Chassis GND</i>	20M $\Omega$ (Min) at 200Vdc
<b>EMI</b>	<i>Designed to meet * MIL-STD-461E</i>	CE102, CS101, CS114, CS115, CS116, RE102 and RS103.
<b>Cooling</b>	<i>Base Plate</i>	User should maintain the M286's Base Plate below 85°C by thermally attaching it to a suitable coldplate (heatsink).
<b>Temperature &amp; Altitude</b>	<i>Operating</i>	-50°C to +70°C, 40,000 feet.
	<i>Non-operating</i>	-55°C to +80°C. Up to 40,000 feet.
<b>Vibration</b>	<i>Operating and Non-operating</i>	MIL-STD-810F , Method 514.5C, Figure 514-5C-17
<b>Mechanical Shock</b>	<i>Operating and Non-operating</i>	Sow-tooth, 40g peak, 11mS (3 shocks in each 6 orthogonal directions).
<b>Humidity</b>	<i>Operating and Non-operating</i>	Up to 100% RH (including condensation).
<b>Salt-fog</b>	<i>Operating and Non-operating</i>	MIL-STD-810F, Method 509-4.

## M286 Series– AC/DC Power Supply

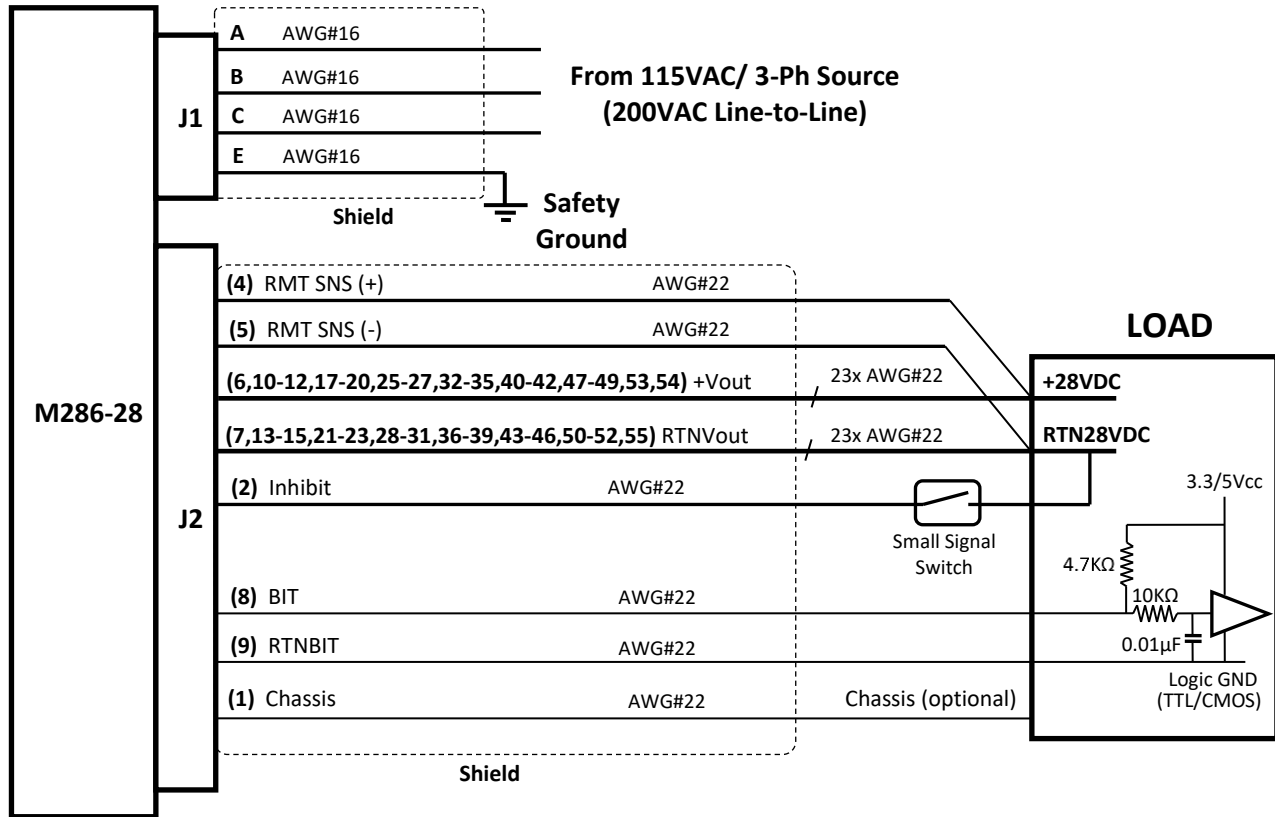
### PIN ASSIGNMENT

<b>J1 – AC Input</b>	
D38999/20WD5PN or Eq.	
<b>Pin</b>	<b>Fucntion</b>
A	115VAC Phase A (or +270VDC)
B	115VAC Phase B (or RTN270VDC)
C	115VAC Phase C (not used with DC Input)
D	NC
E	Chassis (Safety) GND

<b>J2 – DC Output</b>							
D38999/20WE35SN or Eq.							
<b>Pin</b>	<b>Fucntion</b>		<b>Pin</b>	<b>Fucntion</b>		<b>Pin</b>	<b>Fucntion</b>
1	Chassis GND		20	+Vout		39	RTN Vout
2	Inhibit		21	RTN Vout		40	+Vout
3	Reserved		22	RTN Vout		41	+Vout
4	Remote Sense (+)		23	RTN Vout		42	+Vout
5	Remote Sense (-)		24	NC		43	RTN Vout
6	+Vout		25	+Vout		44	RTN Vout
7	RTN Vout		26	+Vout		45	RTN Vout
8	BIT		27	+Vout		46	RTN Vout
9	RTN BIT		28	RTN Vout		47	+Vout
10	+Vout		29	RTN Vout		48	+Vout
11	+Vout		30	RTN Vout		49	+Vout
12	+Vout		31	RTN Vout		50	RTN Vout
13	RTN Vout		32	+Vout		51	RTN Vout
14	RTN Vout		33	+Vout		52	RTN Vout
15	RTN Vout		34	+Vout		53	+Vout
16	NC		35	+Vout		54	+Vout
17	+Vout		36	RTN Vout		55	RTN Vout
18	+Vout		37	RTN Vout			
19	+Vout		38	RTN Vout			

# M286 Series– AC/DC Power Supply

## TYPICAL CONNECTION DIAGRAM

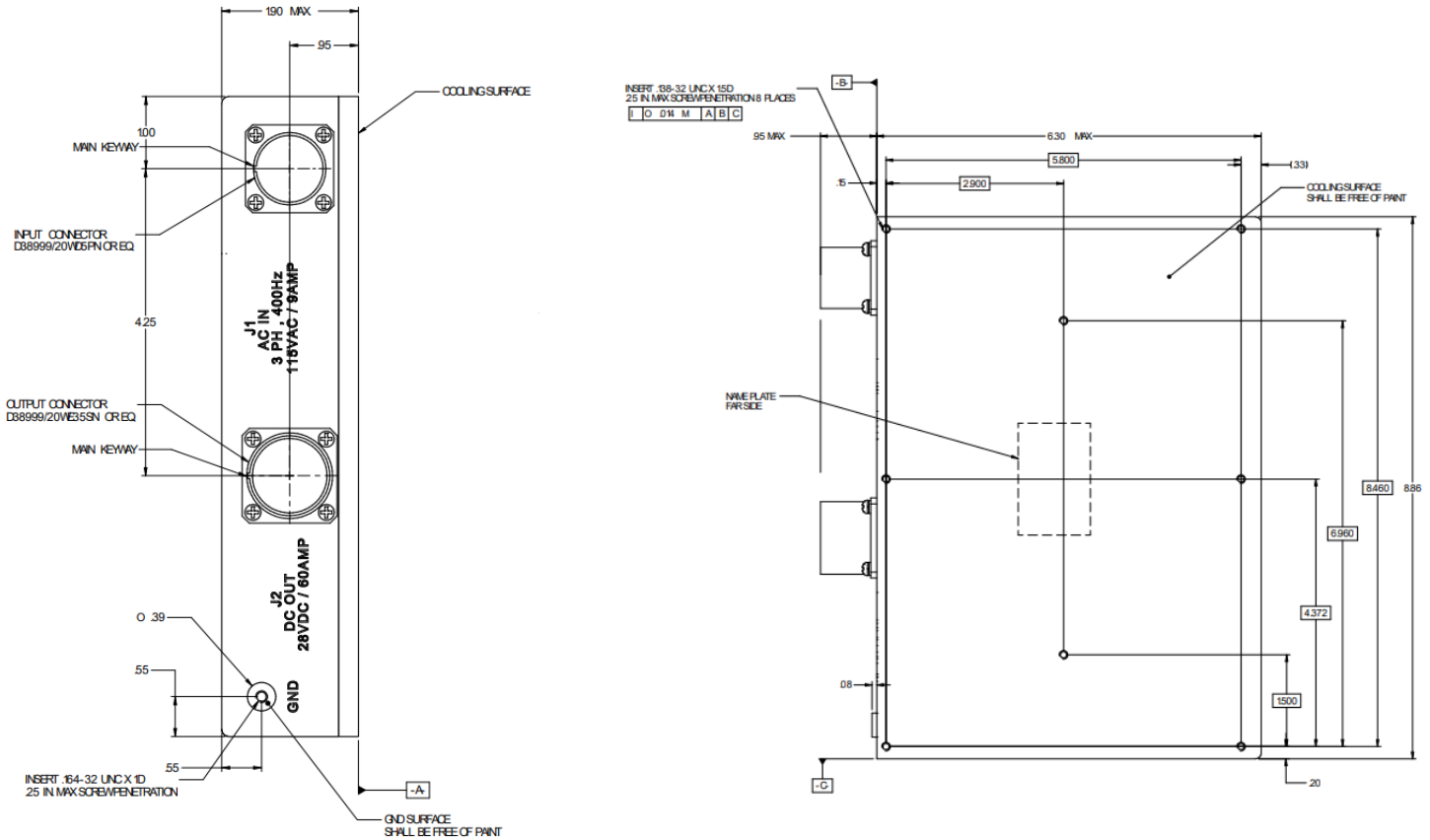


### Notes:

1. For effective remote sensing at full load (54Amp), the output cable length should not exceed 20 feet.
2. For best EMC performances use shielded cables.
3. The INHIBIT Switch can be a small-signal mechanical switch or an electronic switch (Small-signal Transistor).
4. To inhibit (disable) the 28VDC output, the low side of the switch (emitter for NPN, source for N-MOS) should be connected to the RTN28VDC.
5. RTNBIT may be connected to any Logic GND (not necessarily RTN28VDC).
6. **When paralleling several M286, for best performances:**  
 Connect all AC Inputs (J1) to the same AC Source.  
 Connect all +Vout and all RMT SNS (+) lines to the same point (+28VDC Point Of Regulation).  
 Connect all RTNVout and all RMT SNS(-) lines to the same point (RTN28VDC Point Of Regulation).  
 The Inhibit lines may be connected to a single or several switches.  
 Each BIT should have its own pull-up and gate interface.

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**OUTLINE DRAWING**



**NOTES:**

1. WORKMANSHIP SHALL BE IAW MIL-STD-454, REQ. 9
2. DRILL, TAP & COUNTERSINK PER MS 33537
3. MTL. AL 6061-T651 PER QQ-A-250/11
4. CONVERSION COATING PER MIL -C-5541 CL 1A
5. WEIGHT :6.5 LBS MAX
6. PAINT GRAY COLOR NO.26307 PER FED-STD-595

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