56M1 AC/DC Power Supply

150-Watt Ruggedized Power Supply
Conduction-Cooled, Single and Dual Outputs

Proudly made in the USA

Description

NAI's 56M1 is a 150-Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This COTS unit provides full-power output, either single or dual, at a baseplate temperature of +85°C.

Standard features include remote error sensing; remote digital (TTL) turn on/off; and protection against transients, over voltage, over-current, and short-circuits. Options such as dual output, ESS vibration testing, and choice of output voltages are available, and additional options and special units can be ordered.

This conduction-cooled power supply is specifically designed with NAVMAT component derating for rugged defense and industrial applications. It is also designed to meet the many harsh environmental requirements of military applications.

Features

- Ideal for rugged, conduction-cooled, military applications
- Ordering information for single and dual outputs:
  - 56MS1 - single output
  - 56MD1 - dual output
- Standard output voltages: 12V, 15V, 24V, 28V
- Integrated EMI filtering per MIL-STD-461
- Input transient protection per MIL-STD-704
- High power density
- Low profile packaging
- Low noise
- Operates at full load through the entire -55°C to +85°C temperature range
- Contact factory for additional options and special units

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Electrical Specifications

AC Input Characteristics	
Input	115/230 VAC (±10%); 270 VDC: input range of 170 VDC to 355 VDC; (see tables of Pinout Designations and Input Connections for the J1 Connector, page 4)
EMI/RFI	Designed to meet the requirements of MIL-STD-461D; CE102
Input Transient Protection	Per MIL-STD-704D; For nominal 115 VAC input: 180 VAC for 0.1 second For nominal 230 VAC input: 292 VAC for 0.1 second
Input Frequency	47 Hz to 440 Hz
DC Output Characteristics	
Output Power	See Output Power Table below
Output Voltage	See Output Power Table below
Efficiency	75% typical for single output units; 70% for dual output units
Output Voltage Tolerance	±1%
Line Regulation	Within 0.1% or 10 mV (whichever is greater) for low to high line changes at constant load
Load Regulation	0.1% or 10 mV (whichever is greater) for 0 to 100% of rated load at nominal input line
PARD (Noise and Ripple)	50 mV p-p typical; 100 mV p-p maximum for 5 V outputs (20 MHz bandwidth); 1% of the output voltage, with a maximum of 200 mV p-p, for all other outputs (20 MHz bandwidth)
Load Transient Recovery	Output voltage returns to regulation limits within 0.5 msec (typical), half to full load
Load Transient Under/Overshoot	0.35 V maximum from nominal output voltage set point for 5 V outputs; all other outputs are 5%
Short Circuit Protection	Under any short circuit condition, continuous short circuit protection with auto recovery
Current Limiting	Limited to 130% of rated current
Over Voltage Protection	Automatic electronic shutdown if voltage exceeds 125% ±10%
Remote Error Sensing	Compensates for up to 0.5 V drop on output leads
Remote Turn On/Off	TTL logic 1 inhibits (turns off) the output; a floating input acts as a logic 0 (output on)
Isolation Voltage	1000 VDC input to output and input to case; 200 VDC output to case
Insulation Resistance	50 Mega Ohm at 50 VDC

All specifications are subject to change without notice.

Output Power

Single Output		Dual Output	
Volts	Amps	Volts	Amps
12.0	12.5	±12.0	6.25
15.0	10.0	±15.0	5.0
24.0	6.3		
28.0	5.4		

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Additional Specifications

Physical/Environmental	
Temperature Range	Operating: -55°C to +85°C at 100% load, derate linearity to 67% load at 100°C; Storage: -55°C to +125°C; (temperature measured at baseplate, conduction via baseplate only)
Temperature Coefficient	0.01% per °C
Shock	30 G's each axis per MIL-STD-810C, Method 516.2, Procedure 1; Hammer shock per MIL-S-901C
Acceleration	6 G's per MIL-STD-810C, Method 513.2, Procedure 11; 14 G's per Procedure 1
Vibration	Per MIL-STD-810C, Method 514.2, Procedure 1A
Reliability (MTBF)	200,000 hours, ground benign, at 40°C baseplate
Humidity	95% at 71°C per MIL-STD-810C, Method 507.1 (non-condensing)
Altitude	40,000 feet per MIL-STD-810C, Method 504.1, Category 6 Equipment
Dimensions	See Mechanical Dimension Tables, page 5
Salt & Fog	Per MIL-STD-810C, Method 509.1
Sand/Dust/Fungus	Per MIL-STD-810C
Enclosure	Aluminum housing to aluminum baseplate
Finish	Cover: black anodized; Baseplate: chemfilm
Interface	Connections via a D-subminiature connector (see Connector Specifications Table, page 4)
Weight	Single output = 19 ounces max; Dual output = 20 ounces max

All specifications are subject to change without notice.

Pinout Designations (J1)

Pin No.	Single Output	Dual Output	Pin No.	Single Output	Dual Output
1	INPUT	INPUT	14	INPUT	INPUT
2	INPUT	INPUT	15	INPUT	INPUT
3	-TTL (ON/OFF)	NC	16	CHASSIS GND	NC
4	+TTL (ON/OFF)	NC	17	-OUTPUT	CHASSIS GND
5	NC	NC	18	-OUTPUT	NC
6	NC	+TTL (ON/OFF)	19	-OUTPUT	+OUTPUT 2
7	NC	-TTL (ON/OFF)	20	-OUTPUT	+OUTPUT 2
8	NC	+OUTPUT 1	21	-OUTPUT	+SENSE 2
9	+OUTPUT	+OUTPUT 1	22	-OUTPUT	-SENSE 2
10	+OUTPUT	+SENSE 1	23	-SENSE	- OUTPUT 2
11	+OUTPUT	-SENSE 1	24	+OUTPUT	- OUTPUT 2
12	+OUTPUT	-OUTPUT 1	25	+OUTPUT	NC
13	+SENSE	-OUTPUT 1			

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Input Connections (J1)

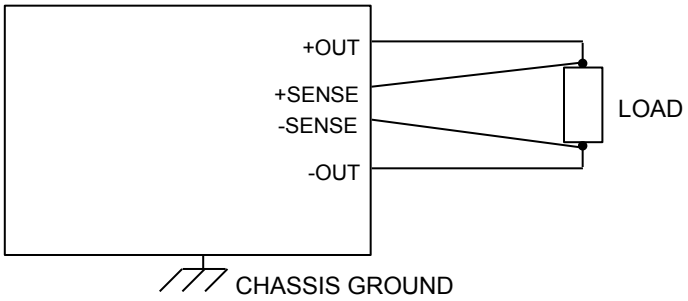
AC Type	Connection
115 VAC, 1∅	1 & 2 (Neutral)
115 VAC, 3∅ Δ	1, 14, & 15
115 VAC, 3∅ Y	1, 14, 15, 2 (Neutral)
230 VAC, 1∅	1, 14
230 VAC, 3∅ Δ	1, 14, 15
270 VDC	1 (Positive), 14 (Return)

Connector Specifications

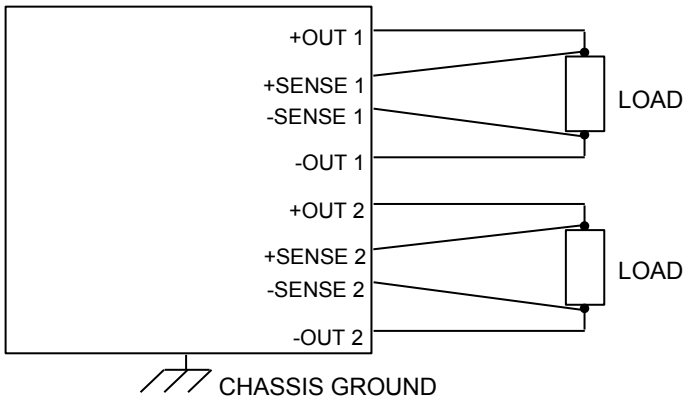
Connector	Part # - Series
Unit	DBMME25PR
Mating	DBMM25S

Output Wiring Diagrams

Single Output



Dual Output



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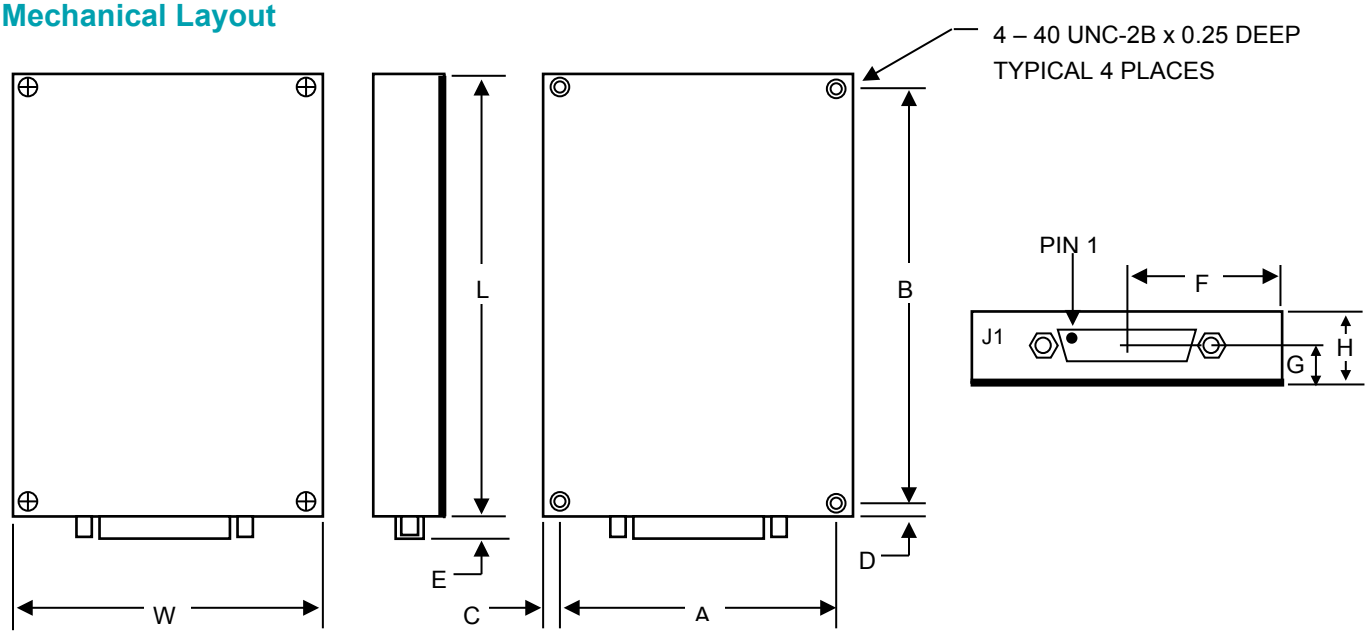
Mechanical Layout



TOP **BOTTOM**

See tables below for Mechanical Dimensions.

Mechanical Dimensions

Case*	Units	W	L	A	B	F
1	inches	4.5	5.75	4.10	5.35	2.25
1	mm	114.3	146.05	104.14	135.89	57.15
2	inches	4.75	6.00	4.35	5.60	2.38
2	mm	120.65	152.4	110.49	142.24	60.45

** Use Case 1 for Single Output Power Supply; Case 2 for Dual Output Power Supply.*

Additional Dimensions

Dimension	Inches	Millimeters
C & D	0.2	5.1
E	0.23	5.84
G	0.455	11.56
H	0.8	20.3

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Ordering Information

56 M S1 – 012 M 0 – XX

Code: Used only for Special Orders (see Code Table below).

Options: 0 = Standard Testing (Includes ESS Temperature Cycling per NAVMAT).
1 = Standard Testing plus ESS Vibration Testing (per NAVMAT).

Reliability: M = COTS-Mil-Type: -55°C to +85°C; Mil-Type Components.
Designed to meet the requirements of MIL-STD-461C and MIL-STD-810C.
Designed per NAVMAT Guidelines.

Output Voltages:

Single Output	Dual Output
000 Special Voltage*	000 Special Voltage*
012 – 12 V	012 = ±12 V
015 = 15 V	015 = ±15 V
024 = 24 V	
028 = 28 V	*See Code Table below

Outputs: S1 = Single
D1 = Dual

Wattage: M = 150 W

Series: 56 = AC/DC

Example: 56MD1-012M1 = AC/DC; 150 Watt; Dual Output; ±12 V; COTS-Mil-Type; ESS Vibration Testing

Code Table for Special Orders

Model Number	Description
56MS1-028M0-01	7.5 A peak current limit
56MS1-028M0-02	Standard unit encapsulated with potting; adds approx. 3 ounces to weight
56MS1-028M0-03	Standard 56MS1-028M0 modified as follows: 7.5 A peak current limit Encapsulated with potting; adds approx. 3 ounces to weight Bonding surface on the baseplate protected with a Class 3 coating, IAW MIL-C-5541E
56MS1-000M0-04	Single output of +15.6 VDC @ 9.62 A
56MS1-000M1-05	Standard 56MS1-028M1 modified as follows: Bonding surface on the baseplate protected with a Class 3 coating, IAW MIL-C-5541E
56MS1-000M1-06	Standard 56MS1-028M1 modified as follows: Bonding surface on the baseplate protected with a Class 3 coating, IAW MIL-C-5541E EMI Single phase CE102 performance optimized for 10 KHz to 10 MHz

Consult Factory for Additional Options and/or Special Units

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