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56RS1 AC/DC Power Supply

300-Watt Ruggedized Power Supply
Conduction-Cooled, Single Output

Proudly made in the USA

Description

NAI's 56RS1 is a 300-Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This COTS unit provides a single full-power output 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 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
- Standard output voltages: 12V, 24V, 28V
- Current Share option available only with output voltages of 24V and 28V
- Integrated EMI filtering per MIL-STD-461D
- Input transient protection per MIL-STD-704D
- 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	115/220 VAC (see Input Table, page 3, and Input Connections Table, page 4); 270 VDC: input range of 170 VDC to 355 VDC
Input Frequency Range	47 Hz to 440 Hz
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
Inrush Current	Limited to 15 times nominal input current
DC Output Characteristics	
Output Power	300 W (see Output Power and Power Ratings Tables, page 3)
Output Voltage	see Output Power Table, page 3
Efficiency	75% minimum
Output Voltage Tolerance	±1%
Line Regulation	Within 0.1% for low to high line changes at constant load
Load Regulation	0.1% for 0 to 100% of rated load at nominal input line
Power Rating	See Power Ratings Table, page 3
PARD (Noise and Ripple)	50 mV p-p typical; 10 mV p-p maximum for 5 V outputs (20 MHz bandwidth); 1% of the output voltage, with a maximum of 200 V 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 with auto recovery
Current Limiting	120% ±10% typical
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)
Current Share (Optional)	Allows for increased system wattage or redundancy by connecting 2 or more units (+28 VDC and +24 VDC outputs only)
Isolation Voltage	1000 VDC input to output and input to case; 200 VDC output to case (see Code Table, page 7)
Insulation Resistance	50 Mega Ohm at 50 VDC

All specifications are subject to change without notice.

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Physical/Environmental	
Temperature Range	Operating: -55°C to +85° (temperature measured at baseplate, conduction-cooled via baseplate only); Storage: -55°C to +100°C (see Power Ratings Table below)
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)	766,000 hours, ground benign, at 50°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 6
Salt & Fog	Per MIL-STD-810C, Method 509.1
Sand/Dust/Fungus	Per MIL-STD-810C
Enclosure	Aluminum housing to aluminum baseplate (see Mechanical Dimension Tables, page 6)
Finish	Cover: black anodized; Baseplate: chemfilm
Interface	Connections via a D-subminiature (S) connector (see Connector Specifications Table below and Pinout Designations Table, page 4)
Weight	38 ounces max

All specifications are subject to change without notice.

Output Power

Watts	Volts	Amps
300	12	25
300	24	12.5
300	28	10.7

Connector Specifications

DC Output Voltage	Unit Connector-Series	Mating Connector Series
12 V	DEMM9PL	DEMAM9S
24 V and 28 V	DCMME37PR	DCMM37S

Input

Input Power
100 – 126 VAC; 47 – 440 Hz; 1Ø
100 – 126 VAC; 47 – 440 Hz; 3Ø Δ
100 – 126 VAC; 47 – 440 Hz; 3Ø, 4 Y
200 – 252 VAC; 47 – 440 Hz; 1Ø
200 – 252 VAC; 47 – 440 Hz; 3Ø Δ
270 VDC

Power Ratings at 300 Watts

Input Power	@ 71ºC	@ 85ºC
115 VAC; 1Ø	100%	75% *(see Note)
115 VAC; 3Ø Δ	100%	100%
115 VAC; 3Ø, 4 Y	100%	100%
230 VAC; 1Ø	100%	100%
230 VAC; 3Ø Δ	100%	100%
270 VDC	100%	100%

**Note: Applies only to +12 VDC and +25 VDC outputs.*

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Pinout Designations

12 V OUTPUT POWER SUPPLIES					
9-PIN CONNECTOR (J1)		13-PIN CONNECTOR (J2)			
Pin No.	Function	Pin No.	Function	Pin No.	Function
1	INPUT A	A1	-OUTPUT	1	+SENSE
2	INPUT B	A2	-OUTPUT	2	+TTL (ON/OFF)
3	INPUT C	A3	-OUTPUT	3	N/C
4	INPUT N	A4	+OUTPUT	4	N/C
5	CHASSIS GROUND	A5	+OUTPUT	5	-SENSE
6	INPUT A	A6	+OUTPUT	6	-TTL (ON/OFF)
7	INPUT B			7	N/C
8	INPUT C				
9	INPUT N				

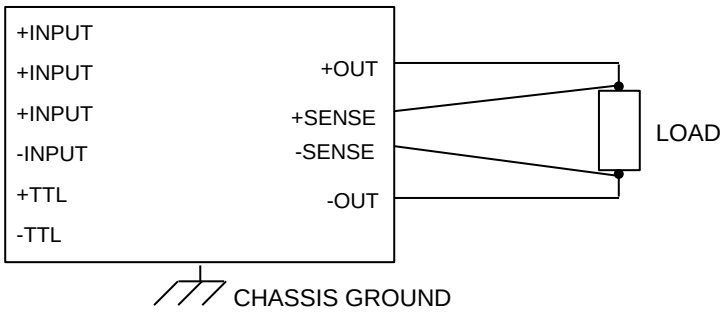
FOR 24 V AND 28 V OUTPUT POWER SUPPLIES – 37 PIN CONNECTOR (J1)					
Pin No.	Function	Pin No.	Function	Pin No.	Function
1	PHASE A	14	+OUTPUT	26	N/C
2	N/C	15	+OUTPUT	27	CHASSIS GND
3	PHASE B	16	+OUTPUT	28	N/C
4	PHASE C	17	-OUTPUT	29	-TTL (ON/OFF)
5	N/C	18	-OUTPUT	30	N/C
6	NEUTRAL	19	-OUTPUT	31	-SENSE
7	N/C	20	PHASE A	32	+OUTPUT
8	N/C	21	PHASE B	33	+OUTPUT
9	N/C	22	N/C	34	+OUTPUT
10	+TTL (ON/OFF)	23	PHASE C	35	-OUTPUT
11	N/C	24	NEUTRAL	36	-OUTPUT
12	CURRENT SHARE	25	N/C	37	-OUTPUT
13	+SENSE				

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Input Connections for J1 Connector (In Conjunction with Above Pinout Designations Table)

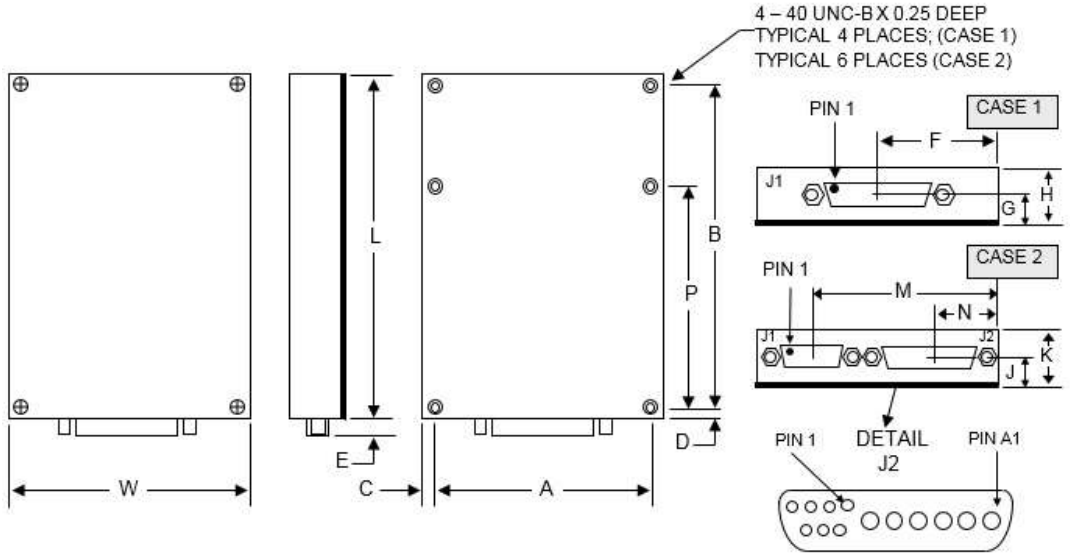
AC Input Type	12 V Output	24 V and 28 V Output
115 VAC, 1Ø	1 & 6, 4 & 9 (Neutral)	1 & 20, 6 & 24 (Neutral)
115 VAC, 3Ø Δ	1 & 6, 2 & 7, 3 & 8	1 & 20, 3 & 21, 4 & 23
115 VAC, 3Ø Y	1 & 6, 2 & 7, 3 & 8, 4 & 9 (Neutral)	1 & 20, 3 & 21, 4 & 23, 6 & 24 (Neutral)
230 VAC, 1Ø	1 & 6, 2 & 7	1 & 20, 3 & 21
230 VAC, 3Ø Δ	1 & 6, 2 & 7, 3 & 8	1 & 20, 3 & 21, 4 & 23
270 VDC	1 & 6 (Positive), 2 & 7 (Return)	1 & 20 (Positive), 3 & 21 (Return)

Output Wiring Diagram



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Mechanical Layout



See tables on page 6 for Mechanical Dimensions.

Mechanical Dimensions

CASE*	UNITS	W	L	A	B	F
1	Inches	5.50	6.90	5.10	6.50	2.75
1	mm	139.7	175.3	129.5	165.0	69.8
2	Inches	5	7.25	4.6	6.85	N/A
2	mm	127	184	117	174	N/A

**Use Case 1 for 24V and 28V; use Case 2 for 12V,*

Additional Dimensions

Dimension	Inches	Millimeters
C & D	0.2	5.1
E	0.23	5.84
G	0.455	11.56
H	0.85	21.6
J	0.536	13.61
K	0.85	21.6
M	3.94	100.1
N	1.82	46.2
P	4.92	124.9

Tolerance*	Inches	Millimeters
A	0.01	0.25
B	0.01	0.25

**Note: Tolerances are 0.03" (0.76mm) except as stated above.*

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Ordering Information

56 R S1 – 005 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: 000 = Special Voltage, see Code Table below.
012 = 12 V
024 = 24 V
028 = 28 V

Outputs: S1 = Single

Wattage: R = 300 W

Series: 56 = AC/DC

Example: 56RS1-028M0 = AC/DC; 300 Watt; Single Output; +28V; COTS-Mil-Type; Standard Testing

Code Table for Special Orders

Code	Description
01	Isolation Voltage, 1500 VDC for input to output & input to case; 200 VDC output to case
02	Current Share option installed - available only for units with +28 VDC and +24 VDC outputs
03	Model 56RS1-028XX-03: 15 A minimum current limit
04	Input 115 VAC, 3Ø Δ, 47 Hz to 440 Hz; Use Case 2 dimensions Single output of 12 VDC @ 25 A (see modifications for compliance with Input Voltage and Frequency Transients below: Input Voltage Transients: Maximum change relative to 115 V: +/-20% (138 V to 92 V) Time to reach maximum change: 0.001 - 0.03 seconds Maximum time to recover to within 5%: 2 seconds Input Frequency Transients: Maximum change relative to fundamental: +/-5.5% Time to reach maximum change: 0.1 - 1 second Maximum time to recover to within 5% of fundamental: 2 seconds
05	Model 56RS1-028M1-05 Isolation Voltage: increased to 1500 VDC for input to output and input to case Current Share option installed 15 A minimum current limit 100% vibration screening option

Consult Factory for Additional Options and/or Special Units

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