

## 56K1 AC/DC Power Supply

### 75-Watt Ruggedized Power Supply Conduction-Cooled, Single and Triple Outputs



Proudly  
made

#### Description

NAI's 56K1 is a 75-Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This COTS unit provides full-power single, or triple 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
- Ordering information for single and triple outputs:
  - 56KS1 - single output
  - 56KT1 – triple output
- Standard output voltages: 5V, 12V, 15V, 24V, 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

## Electrical Specifications

AC Input Characteristics	
Input	115/230 VAC, 270 VDC; (see tables of Pinout Designations and Input Connections for the J1 Connector, page 4); 270 VDC: input range of 170 VDC to 355 VDC
EMI/RFI	Designed to meet the requirements of MIL-STD-461D; CE 102
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
Inrush Current	Limited to 500% of nominal input current
DC Output Characteristics	
Output Power	See Output Power Deratings Table, page 3
Output Voltage	5 VDC to 28 VDC (see Output Power Deratings Table, page 3)
Efficiency (See Note Below*)	75% typical; 70%, for triple output units; 70% for 5Vdc units
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
Minimum Load Requirements	For single output units: no minimum load; for triple output units: 20% minimum on main load, 150 mV for auxiliary outputs
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 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 output at 85°C
Over Voltage Protection	Automatic electronic shutdown if voltage exceeds 125% $\pm$ 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.

\*Note: Model 56KT1-000M0-02 efficiency is 55% minimum (57% typical).

## Additional Specifications

Physical/Environmental	
Temperature Range	Operating: -55°C to +85°C at 100% load, 400 Hz input (temperature measured at baseplate, conduction via baseplate only); Storage: -55°C to +125°C (see Output Power Deratings 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)	200,000 hours, ground benign, at 50°C baseplate per MIL-HDBK-217F
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; 0° to 71°C at baseplate
Dimensions	See Mechanical Dimensions Table, page 6
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 = 11 ounces; Triple output = 13 ounces

All specifications are subject to change without notice.

## Output Power Deratings

Volts	Current @ 400 Hz & 85°C	Current @ 400 Hz & 100°C	Current @ 60 Hz & 71°C	Current @ 60 Hz & 100°C
5.0	15.0	10.0	12.0	7.5
12.0	6.3	4.0	5.0	3.1
15.0	5.0	3.3	4.0	2.5
24.0	3.1	2.0	2.5	1.6
28.0	2.7	1.7	2.1	1.3
5/±12	10.0 / ±1.0	6.7 / ±0.7	8.0 / ±0.8	5.0 / ±0.5

### Pinout Designations (J1)

Pin No.	Single Output			Pin No.	Triple Output
1	INPUT			1	INPUT
2	INPUT (Neutral)			2	INPUT (Neutral)
3	-TTL (Return)			3	NC
4	+TTL			4	-TTL (Return)
5	+SENSE			5	+TTL
6	OUTPUT			6	OUTPUT 2
7	OUTPUT			7	OUTPUT RETURN 2
8	OUTPUT			8	OUTPUT RETURN 3
9	INPUT (3Ø & 230 V)			9	OUTPUT 3
10	INPUT (3Ø )			10	+SENSE
11	GROUND			11	OUTPUT 1
12	-SENSE (Return)			12	OUTPUT 1
13	OUTPUT RETURN			13	OUTPUT 1
14	OUTPUT RETURN			14	INPUT (3Ø & 230 V)
15	OUTPUT RETURN			15	INPUT (3Ø & 230 V)
				16	NC
				17	GROUND
				18	NC
				19	NC
				20	NC
				21	NC
				22	-SENSE (Return)
				23	OUTPUT RETURN 1
				24	OUTPUT RETURN 1
				25	OUTPUT RETURN 1

**Notes:**

- Use all pins which have been allotted for the main output and return lines.
- TTL logic 1 inhibits (turns off) the output; a floating input acts as a logic 0 (output on); (Remote Turn On/Off feature).
- Remote sense feature (SENSE) is available on 1<sup>st</sup> output of the single and triple output versions; on output version it is available on both outputs (see Output Wiring Diagrams, page 6).

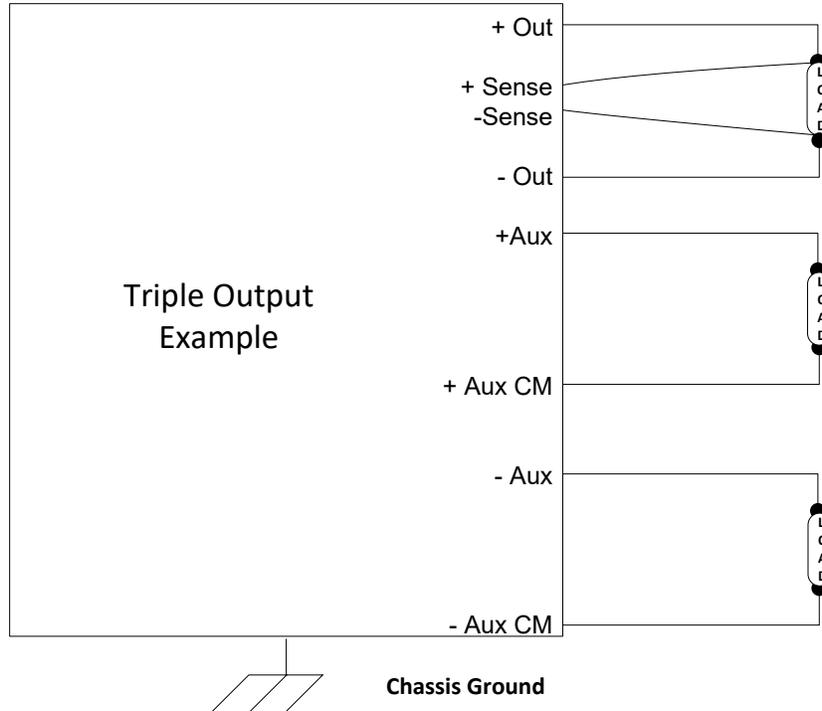
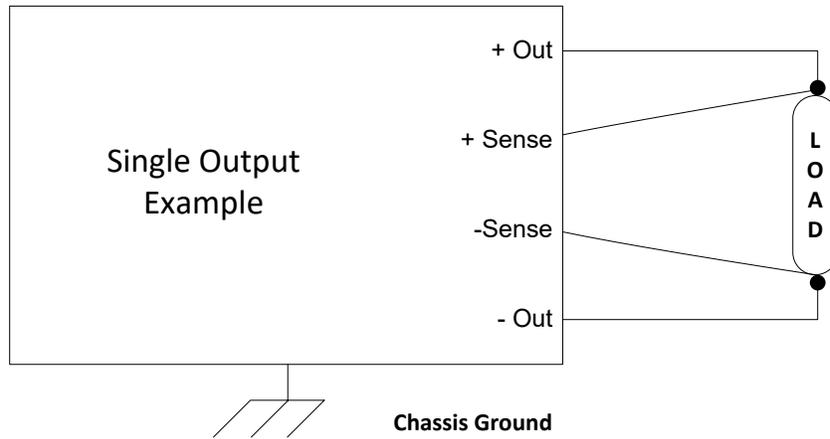
### Input Connections (J1)

AC Type	Connection for Single Output	Connection for Triple Outputs
115 VAC, 1Ø	1, 2 (Neutral)	1, 2 (Neutral)
115 VAC, 3Ø Δ	1, 9,10	1, 14, 15
115 VAC, 3Ø, Y	1, 9, 10, 2 (Neutral)	1, 14, 15, 2 (Neutral)
230 VAC, 1Ø	1, 9	14, 15
230 VAC, 3Ø Δ	1, 9, 10	1, 14, 15
270 VDC	1 (Positive), 9 (Return)	1 (Positive), 14 (Return)

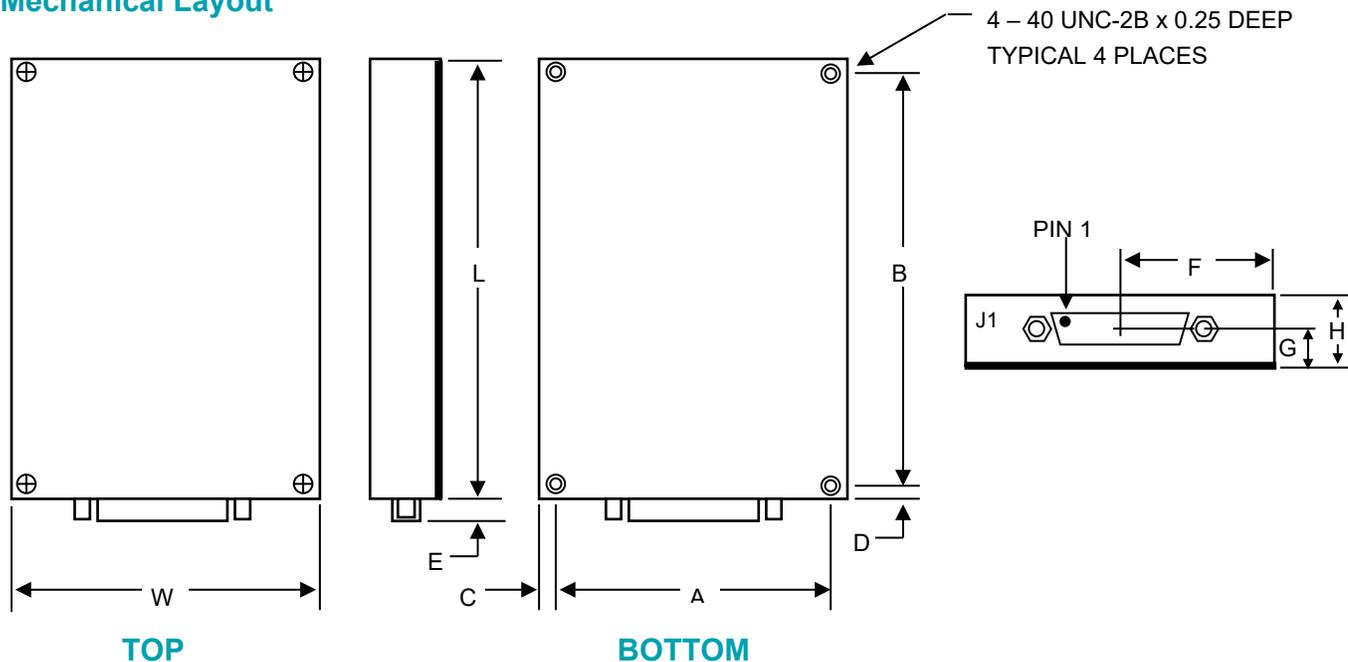
### Connector Specifications

Connector	Part # - Series
Unit – Single	DAMME15PR
Mating – Single	DAMM15S
Unit - Triple	DBMME25PR
Mating - Triple	DBMM25S

### Output Wiring Diagrams



### Mechanical Layout



See tables below for Mechanical Dimensions.

### Mechanical Dimensions

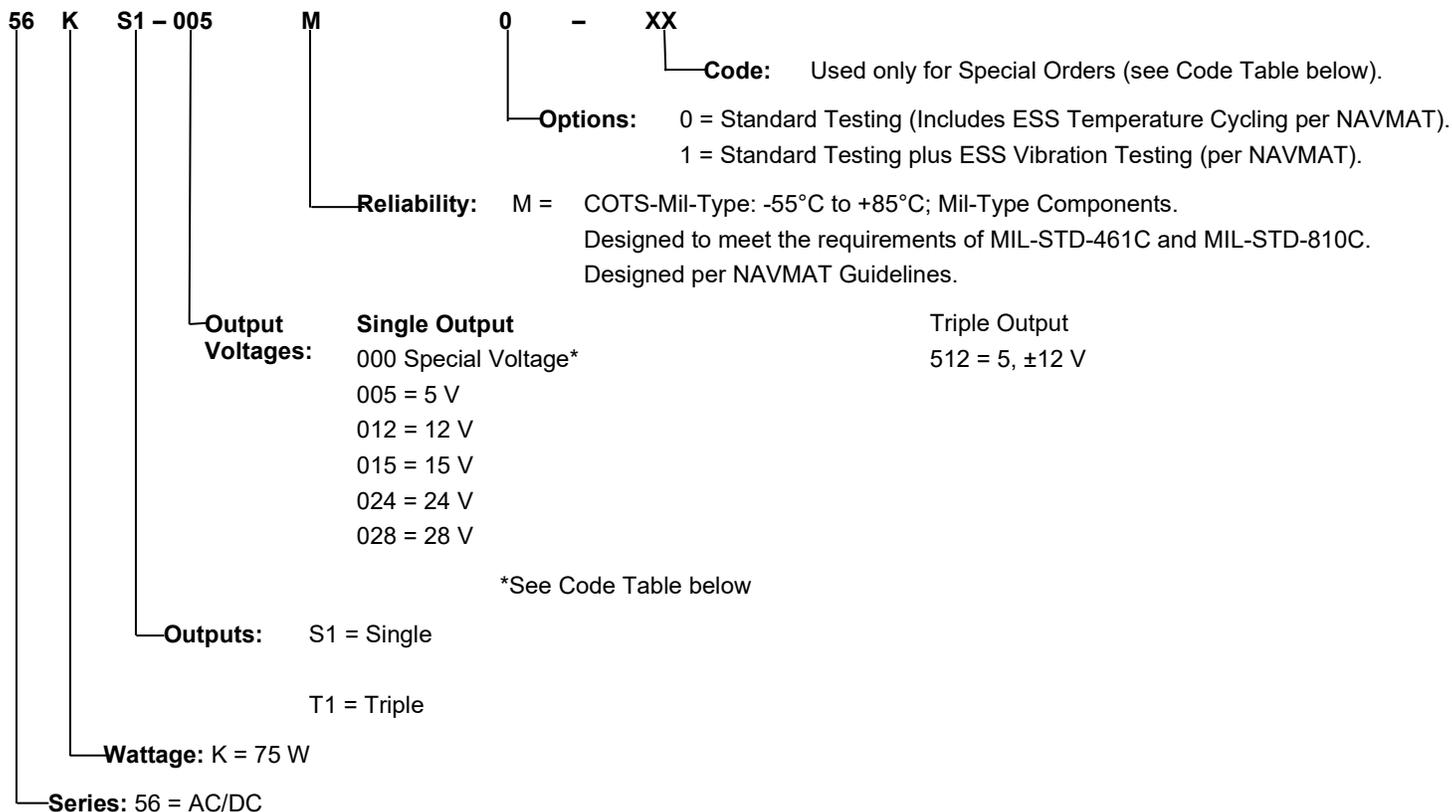
Case*	Units	W	L	H	A	B	F
1	inches	3.25	4.5	0.80	2.85	4.10	1.63
1	mm	82.6	114.3	20.3	72.39	104.14	41.3
2	inches	4.5	5.0	0.80	4.10	4.6	2.25
2	mm	114.3	127	20.3	104.14	116.84	57.5

\* Use Case 1 for Single Power Supply; Case 2 for Triple 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

### Ordering Information



**Examples:** 56KS1-012M1 = AC/DC; 75 Watt; Single Output; +12 V; COTS-Mil-Type; ESS Vibration Testing  
 56KT1-512M1 = AC/DC; 75 Watt; Triple Output; 5 V, ±12 V; COTS-Mil-Type; ESS Vibration Testing

### Code Table for Special Orders

Code	Model Number	Description
02	56KT1-000M0-02	56KT1 Modified for +5 VDC @ 1.0 A, +12 VDC @ 700 mA, and +24 VDC @ 800 mA
03	Add code 03 to end of desired p/n	Encapsulated with potting Adds 0.9 lbs of weight to unit.

**Consult Factory for Additional Options and/or Special Units**