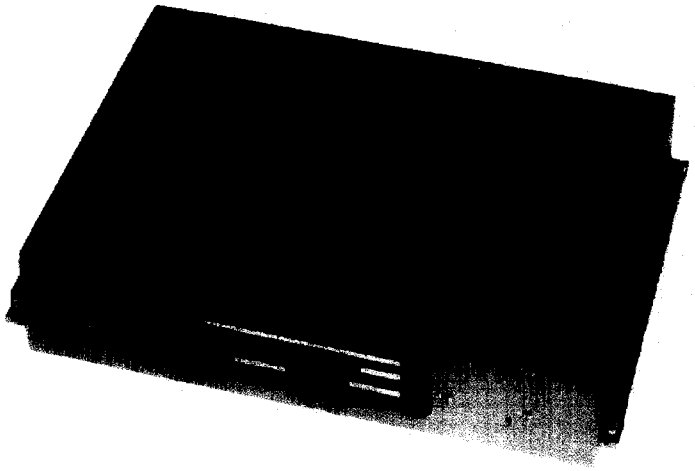
Pascall
POWER PRODUCTS

VM SERIES
DC/DC AND AC/DC CONVERTERS

INPUT
18-32 VDC
100-400 VDC
90-270 VAC



- **ATR box compatible (except VM-08223)**
- **Variety of input and output options available**
- **VME compatible Power FAIL* and SYSRESET* lines**
- **6U compatible**
- **Space, missile and military avionics applications**

The VM range is a family of high reliability compact switch mode power supplies which have been designed to meet demanding hostile environments both mechanically and electrically.

The VM range is suitable for applications such as shipboard, ground mobile and airborne and is available in two specification levels, mil temp and full mil spec, depending on the operating conditions.

Output Configuration

Model	Environment Class	Input	V out (Volts)	I out (Amps)	Cooling Method
VM-05336	FULL MIL	DC	+5, ±12	40, ±2	CONDUCTION
VM-07370	FULL MIL	AC	+5, ±12, +3.3	35, ±2, 5	CONDUCTION
VM-07970	MIL TEMP	DC	+5, ±12, +3.3	35, ±2, 5	CONDUCTION
VM-08008	MIL TEMP	AC	+5, ±12, +3.3	35, ±2, 5	CONDUCTION
VM-08223	MIL TEMP	AC	+5, ±12	35, ±2, 5	FORCED AIR
VM-07850	FULL MIL	AC	+5, ±12, -5.2	40, ±2, 2	CONDUCTION
VM-07400	FULL MIL	DC	+5, ±12, +3.3	35, ±2, 5	CONDUCTION
VM-04330	FULL MIL	AC	+5, ±12, -5.2	40, ±2, 2	CONDUCTION
VM-04179	MIL TEMP	AC	+5, ±12	25, ±2	FORCED AIR
VM-04178	MIL TEMP	AC	+5, ±15	25, ±2	FORCED AIR

VM SERIES

Input Voltage:

DC Input Models is:
18V to 32V

AC Input Models is:
90V to 270V, Single or three phase (line to line)
45Hz to 440Hz and 100V to 400V DC

Input Power Characteristics:

DC Input: MIL-STD-704D, Transients as per figure 10, including voltage spikes specified in MIL-E 6051. DEF STAN 61-5 Part 6 (A1, A2, B1, B2). MIL-STD-1275A, excluding the single fault condition, RTCA/DO-160C (all categories).

AC Input: MIL-STD-704E, BS3G100 (except limit 1 of figure 6, 3 phase only and limit 2 of figure 4), DEF-STAN 61-5 (Part 4) 115V supplies, RTCA/DO-160C (all categories) AND 270V DC supplies to MIL-STD-704E and DEF-STAN 61-5 (Part 4)

Inrush Current Limit:

3 x I at full load.

Power Factor (AC Models)

Typically 0.95 or higher: single phase.
Please contact sales for details of 3 phase.

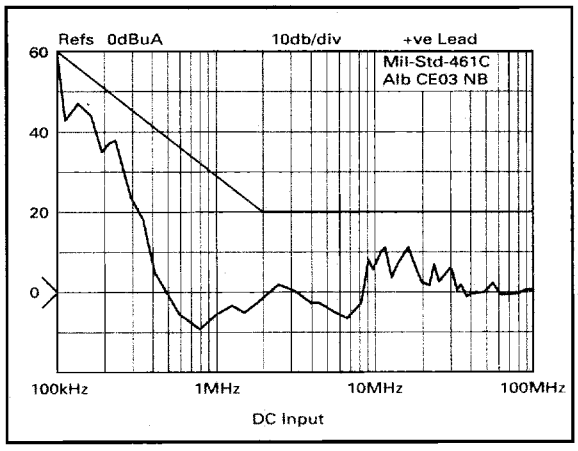
Output Voltages:

See Output Rating Table for details.

Load, Line and Temperature Regulation (CEB):

All Outputs	±2% of output voltage.

Typical EMI



EMI:

The units are designed to meet the following requirements of MIL-STD-461C, Part 2, category A1b

CE01	CE03	CE07
CS01	CS02	CS06
RE02	RS02	RS03 (20V/m)

Isolation:

DC Models:

Input to Output	>10MΩ @ 500V DC
Input to Chassis	>10MΩ @ 500V DC
Outputs to Chassis	>10MΩ @ 500V DC

AC Models:

Input to Output	>10MΩ @ 1KV DC
Input to Chassis	>10MΩ @ 1KV DC
Outputs to Chassis	>10MΩ @ 500V DC

Efficiency:

Not less than 70% at full load, nominal input voltage and at 25°C baseplate temperature.

Noise and Ripple (PARD):

Measured over bandwidth DC-20MHz

All Outputs	±2% of output voltage.

Total Effect Band (TEB):

Total combination of CEB + PARD + drift and warm-up.

All Outputs	±5% of output voltage.

Cross Regulation:

All Outputs	±2% of output voltage.

Dynamic Load Regulation:

Maximum transient over or undershoot of 5% of nominal output voltage for a 50%, or 10A maximum step load change in 20µs. Recovery within 1 ms.

Dynamic Line Regulation:

Maximum transient over or undershoot of 5% of nominal output voltage with recovery within 1ms for all line transients and surges defined in Input Power Characteristics above.

Specification

Minimum Load Conditions:

For all specified performance.
All outputs 10% of maximum current.

Output Protection:

Individual outputs are protected against indefinite overload and short circuit. Current limiting circuitry operates at 110-130% of full rated current. Output voltages recover automatically following removal of overload.

Output Overvoltage Protection:

All outputs are protected by means of zener diode clamps. These limit the output voltage to 120%, typically, of the nominal value.

Remote Sense:

5V output only.

Soft Start:

Under all conditions the converters start up in an orderly fashion. Rise time of supplies is less than 20ms dc or 100ms AC.

Undervoltage Lockout:

To protect internal circuits against low input voltages, the converters will not operate below the following voltages: DC input 13V DC
AC input 75V AC, 70V DC

Remote Shutdown:

Connecting the shutdown terminal to a voltage of 0V (±0.4V) with respect to the output return terminal, will cause the unit to shutdown. Leaving the terminal open circuit or connecting it to a logic high signal (3V to 5.5V) will allow the unit to operate.

Overtemperature Shutdown:

The unit will shutdown if the internal temperature exceeds safe limits of +100°C internally (+88°C case temperature). Outputs will recover automatically.

Operating Temperature:

Full specified performance with the case temperature maintained within the range -55°C to +85°C for cold wall mounting or with an air flow of 16 cuft/min (VM-08223 only).

Cooling:

ATR box conduction cooling via card guides and wedgelocks. Eurorack via forced air and fins.

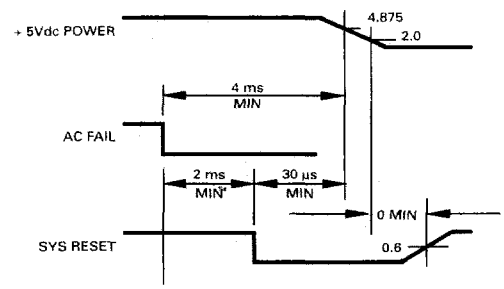
Hold Up:

4ms minimum at full load and any input within specified ranges.

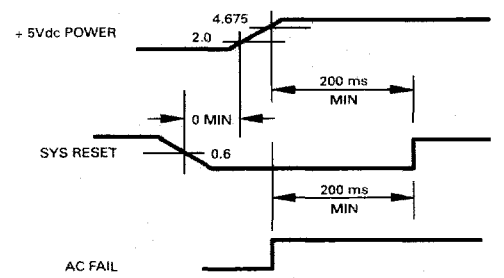
Signals:

AC Fail System Reset DC
as per ANSI/IEEE std 1014-1987.

Power Monitor Failure Timing



Power Monitor System Restart Timing



Environmental

Humidity:
MIL-STD-810C, Method 507.3, 95% at 25°C.
BS3G100, Part 2, Section 3, Sub-section 3.2, Para 6.2.

Shock:
MIL-STD-810E, Method 516.4 Procedure I and V.
DEF-STAN-07-55 Part 2, Section 1.1 Test A3 1/2 sign wave (100g, 6ms, 3 shocks per axis).

Vibration:
MIL-STD-810E, Method 514.4, Category 5.
BS3G100, Part 2, Section 3, Sub-Section 3.1, tests 4.3, 4.4.2 and 4.4.4, category 3.

Acceleration:
MIL-STD-810E, Method 513.4, Procedure II (aircraft).
BS3G100, Part 2, Section 3, Sub-Section 3.6.

Salt Mist:
BS3G100, Part 2, Section 3, Sub-Section 3.8, level 2.

Explosion Atmosphere:
BS3G100, Part 2, Section 3, Sub-Section 3.5
MIL-STD-810E, method 511.3, procedure I.

Storage Temperature:

-55°C to +125°C.

Construction:

Input and output via separate D-type connectors (other option available, consult sales team).

Component Selection:

To meet the reliability and environmental specifications, also see environmental class.

Maintainability:

Units are constructed in a non-hermetically sealed two part housing. Internal circuitry is protected by means of conformal coating.

All VM series units are repairable.

Shelf Life:

The shelf life of the units is ten years, they may be left in deep store, without the need for intermittent powering-up or any form of servicing for the period of the shelf life.

Burn In:

Standard burn in is 48 hours at full load and 85°C case temperature.

Warranty:

All products carry a 12 month warranty from date of delivery.

Environmental Class:

a. Full Mil:

Component selection - JANTX and MIL-STD 883C/DESC semi-conductors. Failure rate R (minimum) passive components. MIL-P-SS110 printed circuit boards. Mil-Spec connectors.

E.S.S. - 10 minutes random vibration followed by 48 hours temperature and power cycling in accordance with NAVMAT P4855-1A

b. Mil temp:

Component selection - Some semi-conductors are plastic

E.S.S. - 10 minutes random vibration followed by 48 hours temperature and power cycling in accordance with NAVMAT P4855-1A

Reliability (Calculated Using MIL-HDBK-217F)

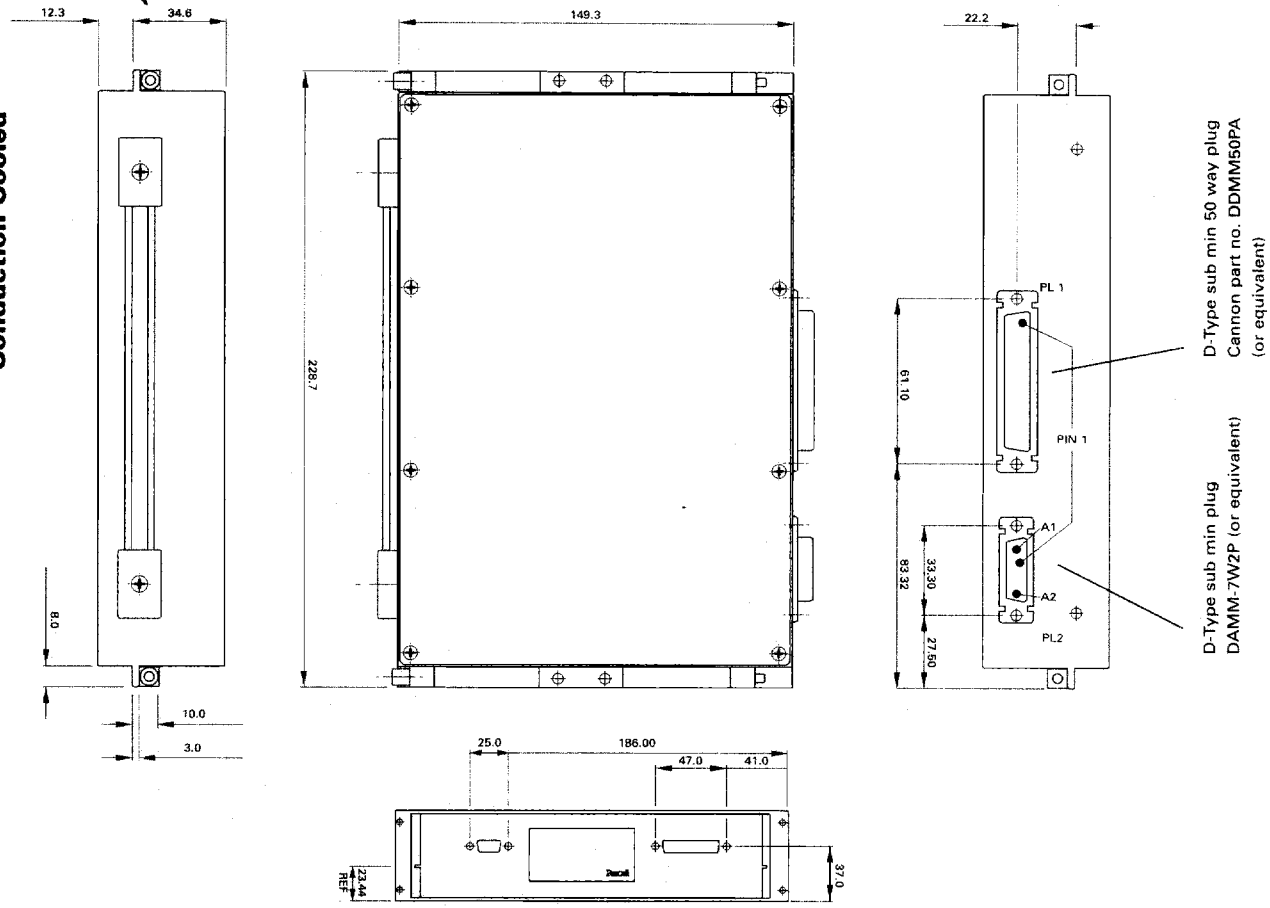
Environment	MIL Environment	Typical MTBF
AUF	Temp 70°C	5,000
GM	Temp 50°C	20,000
GB	Temp 25°C	350,000
ARW	Temp 70°C	7,500
NS	Temp 50°C	40,000

The above figures are achieved using full mil components

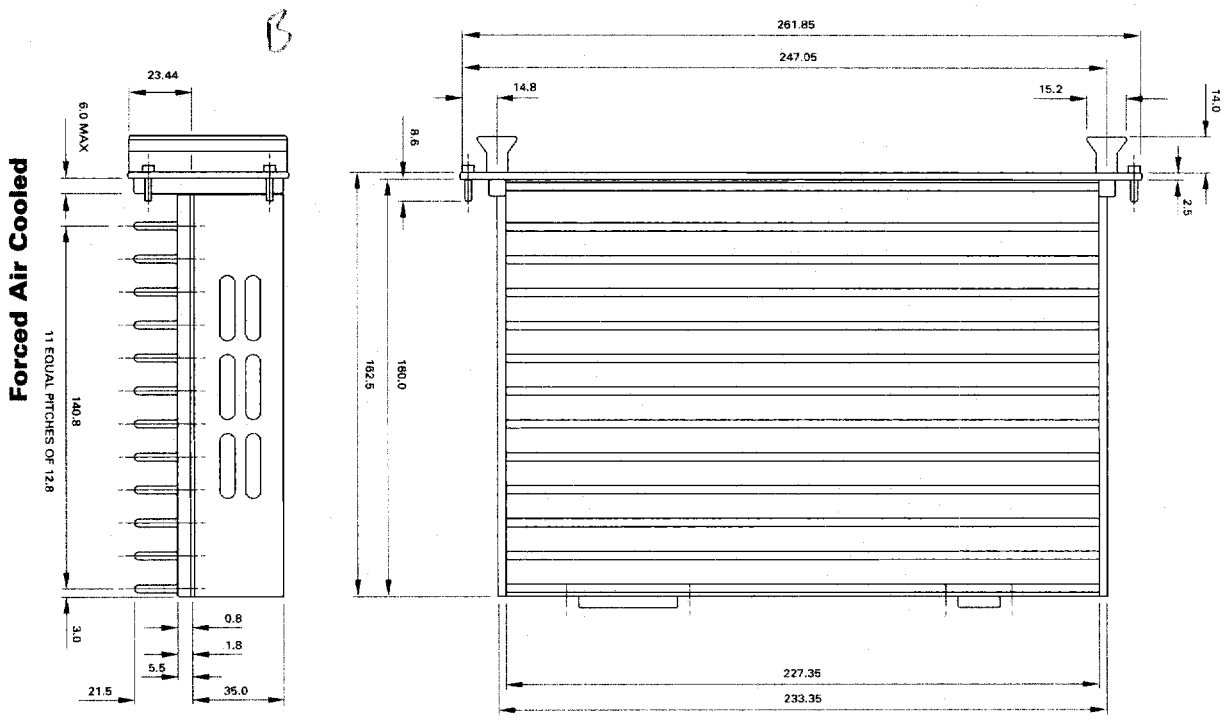
Outline Dimensions

Dimensions in mm tolerances
±0.3mm unless otherwise stated.

Conduction Cooled



Forced Air Cooled



Pin Details

Function	Pin	Function	Pin	Function	Pin
+5V	2,3,4,18,22,34-39	Power Fail	14	Phase A	PL1/17 (Single Connector version)
+5V Return	6,7,8,23-26, 40-45	Chassis Gnd	15	Phase B	PL1/33 (Single Connector version)
+5V Sense (+)	5	±12V/-5V Remote	16	Phase C	PL1/50 (Single Connector)
+5V Sense (-)	9	Remote S/down	31	28V	PL2/A2 (Dual Connector)
-5V (+3.3V)	10,27	Sys Reset	48	28V Return	PL2/A1 (Dual Connector)
-12V	11,28	Thermostat	1,34	Phase A	PL2/3 (Dual Connector)
+12V	13,30	No Connections	32,49	Phase B	PL2/4 (Dual Connector)
+12V, -5V Return	12,29,46,47			Phase C	PL2/5 (Dual Connector)

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