

Pascall

thinking inside the box

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A subsidiary of EMRISE Electronics

DC/DC CONVERTER VM-10641



- Input Voltage 18 – 35V DC
- 17.8mm (0.7") profile, ¾ & 1 ATR box compatible.
- VME compatible AC FAIL* and SYSRESET* lines
- 250W, 5V/30A, 3.3V/10A, 12V/2.5A, 5V STANDBY/0.1A
- 4ms hold-up capability
- EMI to MIL-STD-461D
- -55 C to +85 C operation

The VM-10641 forms part of a family of rugged, high reliability and compact switch mode power supplies which have been designed to support electrically demanding and environmentally hostile applications.

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DC/DC CONVERTER VM - 10641

Input Voltage

18V to 35V DC.

Input Power Characteristics

MIL-STD-704E, all transient conditions excluding under voltage surge of Figure 11.

BS2G100 and BS3G100 excluding limits 2 & 4 *

RTCA DO-160D excluding line dropouts >4ms *

* Additional external hold-up will be required.

Inrush Current Limit

3 x steady state input current at full load and minimum input voltage.

Output Voltages:

Output Voltage Setting

Output	MIN	TYP	MAX
+5	4.95V	5.05V	5.15V
±12	11.87V	12.12V	12.36V
+3.3	3.26V	3.34V	3.42V
5V standby	4.95V	5.05V	5.15V

Output Current

Output	MIN	MAX
+5	0A	30A
±12	0A	2.5A
+3.3	0A	10.0A
5V standby	0A	0.1A

Output Ripple

<50mV peak to peak (10MHz bandwidth)

Line Regulation 18V to 35V, 50% load

Output	TYP	MAX
+5	0.01%	0.1%
±12	0.01%	0.2%
+3.3	0.01%	0.1%
5V standby	0.01%	0.2%

Load Regulation 28Vin, 0% to 100% Load

Output	TYP	MAX
+5	0.05%	0.2%
±12	0.05%	0.4%
+3.3	0.05%	0.2%
5V standby	0.05%	0.4%

Load Transient 50% to 100% load, 1A/us

Output	Transient	Recovery
+5	5% of Vout	1ms
±12	5% of Vout	1ms
+3.3	5% of Vout	1ms
5V standby	2% of Vout	1ms

Temperature Regulation -55°C to +85°C base plate temperature

Output	TYP	MAX
+5	±0.05%	±1%
±12	±0.05%	±1%
+3.3	±0.05%	±1%
5V standby	±0.05%	±1%

EMI:

The units meet the following requirements of MIL-STD-461D CE101 (Figure CE101-4), CE102, CS101, CS114 (Curve #3), CS115, CS116 (Air Force).

Isolation:

Input to Output	50MΩ @ 500V DC
Input to Chassis	50MΩ @ 500V DC
Outputs to Chassis	10MΩ @ 100V DC

All outputs have separate power returns to prevent ground loops. However there is no electrical isolation between outputs and it is intended that power returns are linked at the load.

Grounding:

The maximum dc resistance from the chassis to the connector earth terminal is 20 milliohms.

Efficiency:

Not less than 75% at full load, 28V input voltage and at 25°C baseplate temperature.

Output Protection:

All outputs are protected against indefinite overload and short circuit. The outputs have cycle by cycle current limit operating at 110-130% of full rated current. Recovery is automatic.

Output Overvoltage Protection:

The output voltages shall not exceed the values shown below under any circumstances. If the voltages reach these levels the unit shall trip and latch off. An emergency operation override is available.

Output	Maximum voltage
+5	+6.0V
+12	+14.5V
-12	-14.5V
+3.3	+3.9V

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Remote Sense:

Fitted on the 5V and 3.3V outputs only and capable of a maximum voltage offset of 100mV. If this feature is not used then the 5V and 3.3V output will be regulated at the output connector. Protection is provided in the event of misconnection of the sense lines.

Power Up:

From the application of input power all outputs shall be within specification limits in less than 500ms. All outputs rise monotonically and are sequenced. The nominal power up order is 5V standby, +5V, +3V3 then $\pm 12V$. This sequence may be modified on request.

Input Under Voltage Operation:

The PSU will not be damaged at inputs below 16V DC.

Operating Temperature:

Full specified performance with the card edge temperature maintained within the range $-55^{\circ}C$ to $+85^{\circ}C$.

Cooling:

Conduction cooled through the coldwall surface, see mechanical outline.

Hold Up:

4ms minimum at full load and any input voltage within specified ranges. After 4ms (may be longer dependant on the load) all outputs apart from the 5V standby will shut down. 5V standby continues to provide power for a minimum of 300ms.

Over-temperature Shutdown

If the internal temperature exceeds $100^{\circ}C$, the PSU will shut down and remain off until the internal temperature drops below $85^{\circ}C$ and the input power is recycled.

Override:

If this input is pulled logic low, the over-voltage and overtemperature fault protection functions will be disabled.

Note: In the event of a hard fault, activation of this function may result in permanent damage to the unit.

SIGNALS

PSUGOOD:

This open collector output in the OFF state indicates that all output voltages are within normal regulation limits. Maximum sink current is 48mA with $V_{out} < 0.6V$. Recommended pull up to +5V via a 5Kohm resistance.

TEMP WARNING:

This signal provides an over-temperature warning at $92^{\circ}C$. This is an open collector style signal which is LOW when the temperature exceeds $92^{\circ}C$. Maximum sink current is 48mA with $V_{out} < 0.6V$. Recommended pull up to +5V via a 5Kohm resistance.

TEMP Signal:

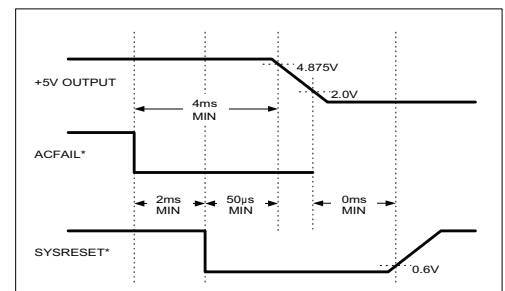
This provides an output voltage proportional to the ambient internal temperature. The signal has been scaled to $28.57mV / ^{\circ}C$, $-55^{\circ}C = 0V$, $+120^{\circ}C = 5V$, and is capable of driving into a 5Kohm resistive load.

ACFAIL* & SYSRESET* Signals:

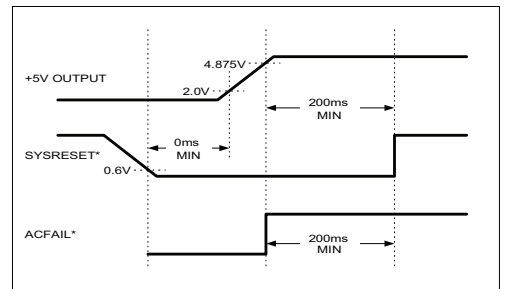
ACFAIL*, SYSRESET* as per ANSI /VITA 1-1994.

Recommended pull up to +5V via a 5Kohm resistance.

Power Monitor Failure Timing



Power Monitor System Restart Timing



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ENVIRONMENTAL

Humidity:

MIL-STD-810F, Method 507.4.

Shock:

MIL-STD-810F, Method 516.5 Procedure I.

Amplitude 20g / 15ms

Vibration:

The unit will perform to specification during and after the vibration profile detailed in MIL-STD-810F, Method 514.5 for Propeller aircraft, Jet aircraft and Ship board environments.

Acceleration:

MIL-STD-810F, Method 513.5, Procedure I & II Aircraft.

Salt Fog:

MIL-STD-810F, Method 509.4.

Explosion Atmosphere:

MIL-STD-810E, method 511.4.

Storage Temperature:

-55°C to +105°C.

Altitude:

The PSU is capable of operation from -17,500 to +55,000 feet.

Construction:

Chassis is of non hermetic construction utilising Aluminium alloy with Chromate conversion coating. Printed Circuit assemblies are conformal coated with Humiseal 1B31 coating or equivalent. Input and output connections DIN 41612 type M Class 1. See connector pin out.

Component Selection:

All components are selected for use over the specified operating and storage temperatures. Components are selected from well known high quality manufacturers. Component de-rating is in general accordance with NAVMAT P4855-1A.

Mass:

Less than 1.2 kilograms.

Maintainability:

No routine servicing or adjustment required. The units are repairable down to component level.

Shelf Life:

The shelf life of the units is a minimum of 10 years at a maximum temperature of +40°C.

ESS:

Each unit is subjected to 10 minutes of random vibration, perpendicular to the plane of the PCB, followed by 48 hours of temperature cycling between -55°C and +85°C with the outputs fully loaded.

Reliability [Calculated Using MIL- HDBK-217F]

Environment	Temperature	MTBF
AUF	85°C	7,000 hrs
ARW	55°C	10,900 hrs
NS	40°C	56,000 hrs
GM	25°C	47,000 hrs

Warranty:

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

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CONNECTORS

Input:- PL1

Power supply is fitted with a DIN 41612 type M/2 5 way plug shell, fitted with high current pins.

PIN	FUNCTION
1b	Hold-up +ve (optional)
2b	Hold-up -ve (optional)
3b	28V Return
4b	28V
5b	Chassis

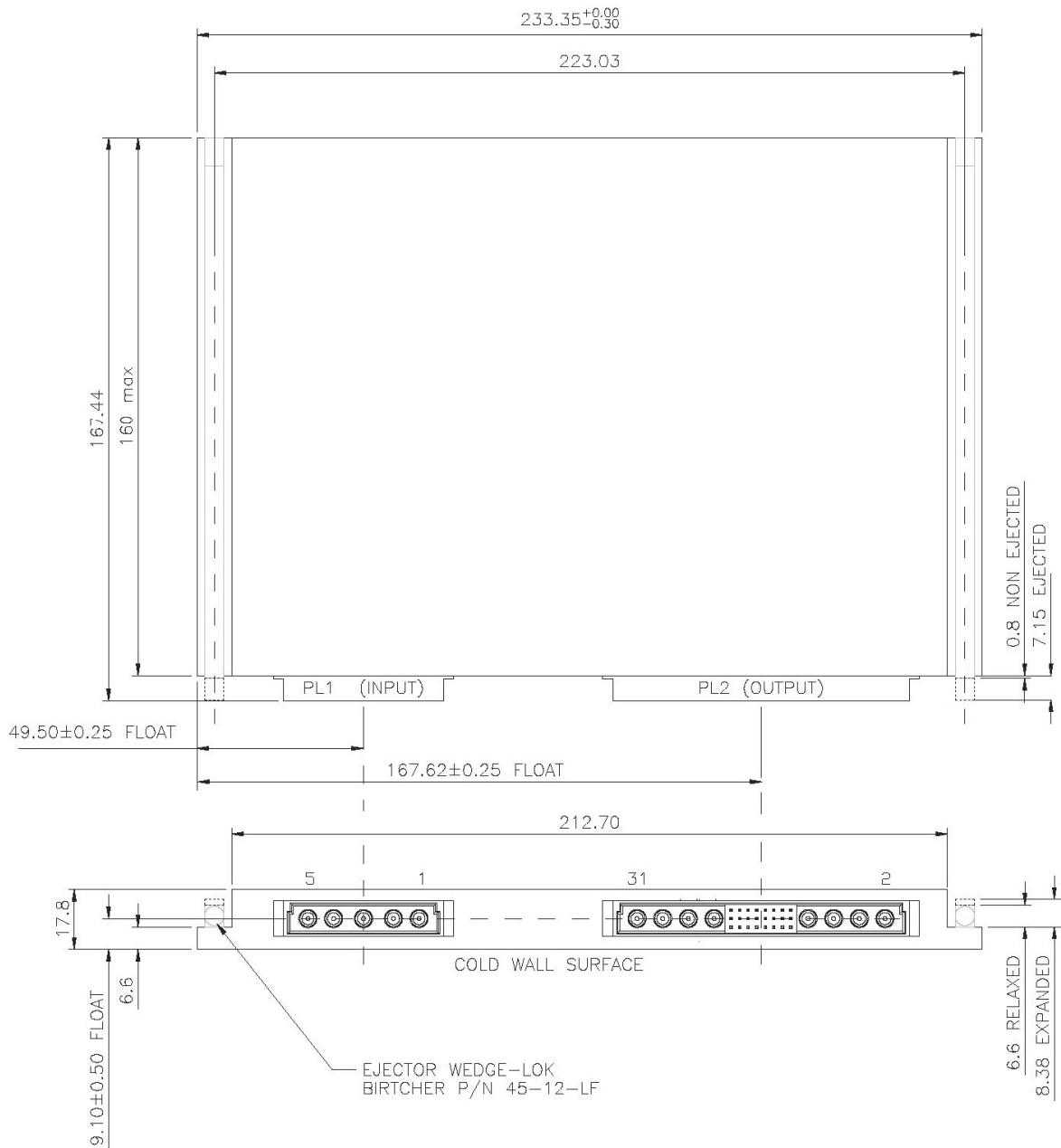
Output:- PL2

Power supply is fitted with DIN 41612 typeM, plug, 24 signal + 8 way power with high current pins marked *

PIN	FUNCTION
2b*	+5V
5b*	+5V RETURN
8b*	-12V
11b*	+12V
13a	Reserved for test purposes, connection to this terminal is prohibited
13c	ACFAIL
14a	SYSRESET
14c	Reserved for test purposes, connection to this terminal is prohibited
15a	+5V SENSE
15c	PSU GOOD
16a	TEMP OUT
16c	+5V SENSE RETURN
17a	CONTROL RETURN
17c	INHIBIT
18a	+5V STANDBY
18c	+5V STANDBY RETURN
19a	TEMP WARNING
19c	OVERRIDE
20a	3V3 SENSE RETURN
20c	3V3 SENSE
22b*	n/c
25b*	12V RETURN
28b*	+3V3
31b*	+3V3 RETURN

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Mechanical Configuration



ALL DIMENSIONS IN MILLIMETRES
TOLERANCES (UNLESS SHOWN OTHERWISE)
DIMENSIONS TO 1 DEC. PLACE ± 0.15
DIMENSIONS TO 2 DEC. PLACE ± 0.07
OTHER DIMENSIONS ± 0.5