

COLD PLATE TECHNOLOGY



HPDC1700 Series

High Power DC-DC Military & Rugged Aerospace Application Power Supply

Features

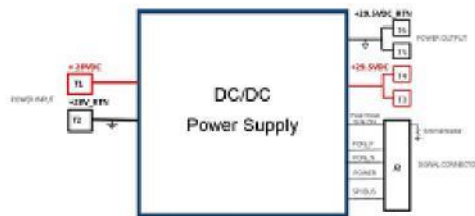
- DC input voltage range: 23~36V
- DC output: 29.5V/57.5A
- Size: 9.98" x 5.98" x 1.25
- Operating case Temp. Range : -
40°C~+100°C
- Fully protected (OTP, OCP, OVP,
UVLO, reverse polarity) with
automatic recovery
- System monitor function via SPI
interface
- High Reliability
- Designed to meet MIL-STD 1275B,
CE101 and CE102 of MIL-STD 461
and MIL-STD-810F

- Meets functional isolation 250VDC
- Stable operation with input cables up to 30 ft long

Product Description:

Autec's 1700W converter is a dc-dc single output, isolated power supply specially designed for military applications. The Power Supply Unit (PSU) converts MIL-STD-1275 compliant 28VDC power to the 29.5VDC internal bus voltage used by the system. It integrates a high efficiency dc/dc converter, EMI filter and transient & reverse polarity protection circuit and system monitor function, thus providing a complete solution in one package. The power supply is designed to operate over a wide temperature range and to comply with MIL-STD-810F and MIL-STD-461E.

The dc-dc converter's high performance is accomplished through the use of high-efficiency synchronous rectification technology, advanced electronic circuits (without the use of opto-couplers), packaging and thermal design resulting in the high reliability demanded by Military/Aerospace industry. The converter operates at a fixed switching frequency and follows conservative component derating guidelines.



Block Diagram of the 1700W Power Supply

EMI Filter Specification

EMI filter has high differential-mode and common-mode attenuation, low DC resistance and a stabilizing bulk capacitor resistor. It is designed using only X7R multilayer ceramic capacitors. Designed to meet the requirements of MIL-STD-461F, CE101 and CE102. Power supply is not required to meet MIL-STD-461F during initial power-up.

Reverse Polarity Protection

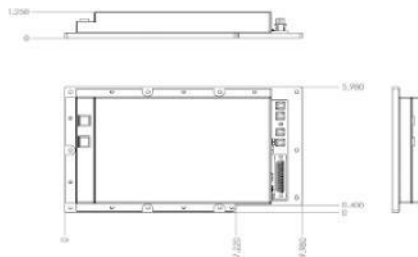
Input of the power supply is protected from reverse polarity with electronic switch. In case of reverse polarity on the input terminals, DC/DC converter will not be damaged and will be disabled.

Input Short Circuit Protection

Power supply has implemented input short circuit protection by means of electronic switch. Input current is sensed and in case of short across input, electronic switch is turned-off thus disconnecting power supply from the input bus. Fast acting fuse is also recommended.

Mechanical Outline (Preliminary)

*Mechanical dimension (LxWxH): 11.56x7.50x3.0 inch / 293.6x190.5x76.2 mm





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Specification:

Conditions: Ta = 25°C, Vin = 28 Vdc, unless otherwise noted; full temperature range is – 40°C to +100°C baseplate temperature.

Parameter	Notes	Min	Typ	Max	Units
Absolute Maximum Ratings					
Input Voltage					V
Non-Operating	Protected from reverse polarity on the input terminals	-32		55	V
Operating		23		36	V
Operating Surge Protection	100ms transient for normal operating mode per MIL-STD-1275D Section 5.1.3.3			40	V
Operating Transient Protection	Per MIL-STD-1275D				
Operating Temperature	Baseplate temperature	-20		100	°C
Storage Temperature		-55		105	°C
Isolation Voltage					
Input to Output	Functional	250			V
Input to Case	Functional	250			V
Output to Case	Functional	150			V
Isolation Capacitance			560		nF
Isolation Resistance		10			MΩ
Voltage at ON/OFF input pin	PON P connected to input +28VDC via 5K resistor	0		55	V
Input Characteristics					
Operating Input Voltage Range	Measured across the input terminals T1 and T2	23	28	35	V
Input Under Voltage Lockout					
Turn-in Threshold		14.5	15.3	16	V
Turn-off Threshold		13.4	14.1	14.8	V
Lockout Hysteresis Voltage			0.8		V
Recommended External Input Capacitance	Typical ESR 0.1Ω - 0.2Ω		1000		μF
Maximum Input Current	Po = 1700W @ 23VDC in			82	A
Input Stand-by Current	Vin = 28V, converter disabled			10	mA
Input No Load Current	Vin = 28V, converter enabled,		680	860	mA
Output Characteristics					
Output Voltage Set Point	Vin = 28V, Io = 29A (50% load)	29.00	29.5	30.00	V
Output Regulation					
Over Line			± 70		mV
Over Load			± 300		mV
Total Output Voltage Range	Over sample, line, load, temperature & life	28.60		30.40	V
Output Voltage Ripple and Noise	20 MHz Bandwidth, 10 μF tantalum + 1 μF ceramic				
Peak-to-Peak	Full Load (resistive)		250	400	mV _{pp}
RMS	Full Load (resistive)		80	160	mV _{RMS}

Parameter	Notes	Min	Typ	Max	Units
External Load Capacitance	Full Load (resistive) C_{EXT}			1000	μ F
	ESR	5			m Ω
Operating Output Current Range		0		57.6	A
Output DC Current Limit Inception	Non-Latching	60	65	70	A
Output DC Current Limit Shutdown Voltage			25		V
Peak Short-Circuit Current	Non-Latching, Short = 10 m Ω		TBD		A
RMS Short-Circuit Current	Non-Latching, Short = 10 m Ω		15		A _{RMS}
Dynamic Response					
Load Change 50%-75%-50% I _{oMAX}	di/dt = 0 1A/ μ s, Co = 10uF tant + 1uF ceramic		1.5		V
Settling time	To within 1% V _{out} nom		500		μ s
Load Change 50%-75%-50% I _{oMAX}	di/dt = 1A/ μ s, Co = 470uF		1.5		mV
Settling time to 1% of V _{out}	To within 1% V _{out} nom		500		μ s
Output Over-Voltage Protection	Non Latching	33.0	34.8	36.6	V
Efficiency					
100% Load	V _{in} = 28VDC, Airflow 300 LFM (1.5 m/s)		92		%
50% Load	V _{in} = 28VDC, Airflow 300 LFM (1.5 m/s)		94		%
Feature Characteristics					
Switching Frequency	Output voltage ripple		200		KHz
	Input voltage ripple		400		KHz
ON/OFF Control					
Converter On (logic low)	Positive. Shorting pin PON_P and PON_N enables power supply				
Pull-Up Voltage	Internal to power supply			40	V
Pull-up Resistance	Internal to power supply		5		k Ω
Turn-On time from V _{in}	Time from UVLO to V _o =90%V _{OUT} (NOM), Resistive Load, Converter enabled		90		ms
Turn-On time from ON/OFF Control	Time from ON to V _o =90%V _{OUT} (NOM), Full Load		90		ms
Output Voltage Rise Time	Time from 10% to 90% V _{OUT} (NOM)		12		ms
Over Temperature Shutdown - OTP					
Average PCB Temperature			120		C
Base Plate Temperature			105		C
Over-Temperature Shutdown Restart Hysteresis			10		C
Auto-Restart period			500		ms
Component Temperature					
Semiconductor Junction Temperature - T _j	For derating			125	C
PCB Temperature - T _{pcb}	UL rated max operating temp 130 °C			125	C
Base Plate Temperature - T _{tp}				105	C
Transformer Temperature - T _t				125	C
Reliability Characteristics					
Calculated MTBF per MIL-HDBK-217F			TBD		10 ⁶ hrs
Mechanical Characteristics					
Weight			1450		g
Dimensions	See mechanical drawing				

Note 1: Input voltage is measured at output terminals of the converter.

Note 2: Output Voltage is measured at output terminals of the converter.

Note 3: All protections are non-latching. tripped, converter enters into auto-restart mode with 500ms off time.

Note 4: Maximum Po=1200W is only during initial power up. Typical Po=600W continuous.

Note 5: Factory to provide setup for measuring V_{out} at pins of output connector J2.

Note 6: Remote ON/OFF provided by toggle switch.