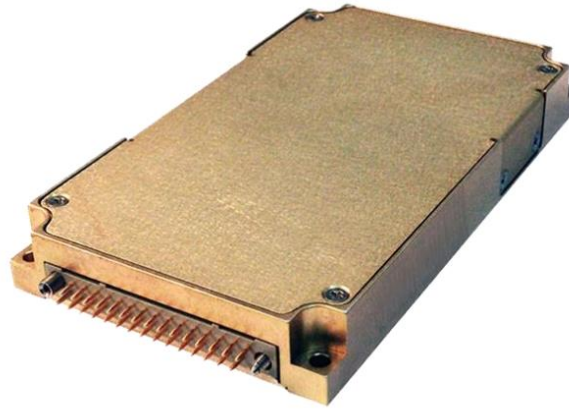


## M7028 SERIES

### DC/DC POWER SUPPLY



#### DESCRIPTION

The M7028 military power supply is a rugged DC to DC converter which accepts an 18 - 48VDC input voltage range and provides a single DC output from 3.3 to 50V at up to 200W. Custom outputs available upon request and the unit is Designed to meet military standards, MIL-STD-704, MIL-STD-1275, MIL-STD-810, MIL-STD-461.

#### FEATURES

- Miniature size
- High efficiency
- High Density – up to 32.4 W/in<sup>3</sup>
- Wide input range
- Input / Output isolation
- Remote sense compensation
- Remote Inhibit (On/Off)
- Parallel connection (Option)
- Output voltage calibration (Option)
- Current limit calibration (Option)
- Fixed switching freq (250 kHz)
- External sync capability
- EMI filters included
- Non-latching protections:
  - Overload
  - Short circuit
  - Output Over Voltage
  - Over Temperature

## HOW TO ORDER

Part Number	Input Voltage Range	Output Voltage	Output Configuration
CF-02EM7028-1	18-48VDC	5 VDC	20A
CF-02EM7028-2	18-48VDC	12VDC	16A
CF-02EM7028-3	18-48VDC	15VDC	13A
CF-02EM7028-4	18-48VDC	24VDC	8A
CF-02EM7028-5	18-48VDC	28VDC	7A
CF-02EM7028-6	18-48VDC	48VDC	4A

## ELECTRICAL SPECIFICATIONS

<p><b><u>DC Input</u></b></p> <p>Voltage range: 18 to 48 VDC, IAW MIL-STD-704F</p> <p>No damage due to overvoltage transients IAW:</p> <p>MIL-STD-1275A (100V for 50 ms) MIL-STD-704A (80V for 0.1 s)</p> <p><b><u>Line/Load regulation</u></b></p> <p>Better than <math>\pm 1\%</math> (no load to full load, <math>-55^{\circ}\text{C}</math> to <math>+85^{\circ}\text{C}</math> and over input voltage range).</p> <p><b><u>Ripple and Noise</u></b></p> <p>Less than 50 mVp-p, typical (max. 1%) without external capacitance. When connected to system capacitance ripple drops significantly.</p>	<p><b><u>DC Output</u></b></p> <p>Voltage range: 3.3 to 50 VDC Current range: 0 to 20 A Power range: 0 to 200 W</p> <p><b><u>Efficiency</u></b></p> <p>Typical 86-87% - (at 28V full load, room temperature)</p> <p><b><u>Transient Over-and-undershoot</u></b></p> <p>Output change at load transient of 30%-100% with Tr &amp; Tf of max <math>3\mu\text{s}</math> is 5% of output voltage. Output recover to steady stated within less 0.5 ms.</p>	<p><b><u>Isolation</u></b></p> <p>Input to Output: 200VDC Input to Case: 200VDC Output to Case: 100VDC</p> <p><b><u>EMC</u></b></p> <p>Designed to meet MIL-STD-461F* CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103</p> <p><b><u>Turn on Transient</u></b></p> <p>No output voltage overshoot during power on.</p>
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## PROTECTIONS

<u>Input</u>	<u>Output</u>	<u>General</u>
<p><b>Under-Voltage Lockout</b> Turn off below 15 VDC. Turn on above 16-18 VDC. UVLO hysteresis is approx. 2-3 V.</p> <p><b>Over-Voltage Lockout</b> Turn off above 52-55 VDC. Turn on below 48-51 VDC.</p>	<p><b>Over Voltage protection</b> Active protection: Unit shuts down if output voltage rises 10% ± 5% above nominal voltage. Passive protection: Transorb selected at approx. 20% above nominal voltage.</p> <p><b>Current Limiting</b> Continuous protection (10-30% above maximum current) for unlimited time (Hiccup).</p>	<p><b>Over Temperature Protection</b> Shutdown at base plate temperature of +105°C ± 5°C. Automatic recovery at base plate temperature lower than +95°C ± 5°C.</p>

## ENVIRONMENTAL CONDITIONS

Designed to meet MIL-STD-810F

<p><b><u>Temperature</u></b> Methods 501.4 &amp; 502.4 Operating: -55°C to +85°C (at baseplate) Storage: -55°C to +125°C (ambient)</p> <p><b><u>Altitude</u></b> Method 500.4 Procedures I – Storage/Air transport: up to 70 kft Procedure II – Operation/Air Carriage: up to 70 kft</p> <p><b><u>Humidity</u></b> Method 507.4 Up to 95% RH</p>	<p><b><u>Vibration</u></b> Method 514.5 Procedure I Category 24 - General minimum integrity exposure</p> <p><b><u>Shock</u></b> Method 516.5 30 g, 11 ms terminal peak saw-tooth</p> <p><b><u>Salt Fog</u></b> Method 509.4</p>
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## PIN ASSIGNMENT

Connector: WTB30PR7J –D23 or eq.

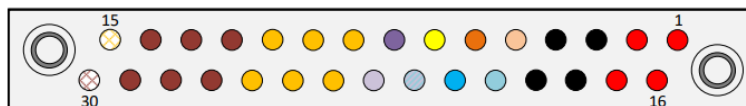
Mating connector options (Other options available - consult factory):

- Solder cup sockets: WTAX30SACJT# or eq.
- Removable crimp sockets: WTDXA30SJT# or eq.

Pin No.	Function	
1	INPUT	●
2	INPUT	●
3	INPUT RTN	●
4	INPUT RTN	●
5	PAR IN	○
6	PAR OUT	○
7	CRNT LMT CAL	○
8	SYNC OUT	○
9	OUTPUT	○
10	OUTPUT	○

Pin No.	Function	
11	OUTPUT	○
12	OUTPUT RTN	○
13	OUTPUT RTN	○
14	OUTPUT RTN	○
15	SENSE	○
16	INPUT	●
17	INPUT	●
18	INPUT RTN	●
19	INPUT RTN	●
20	INHIBIT	○

Pin No.	Function	
21	VLTG CAL	○
22	SIGNAL RTN	○
23	SYNC IN	○
24	OUTPUT	○
25	OUTPUT	○
26	OUTPUT	○
27	OUTPUT RTN	○
28	OUTPUT RTN	○
29	OUTPUT RTN	○
30	SENSE RTN	○



## FUNCTIONS AND SIGNALS

### INHIBIT signal

The INHIBIT signal is used to turn the power supply ON and OFF.

TTL “1” or OPEN – will turn on the power supply. (For normal operation leave the signal not connected.)

TTL “0” or short– will turn off the power supply.

### SYNC IN signal

The SYNC IN signal is used to allow the power supply frequency to sync with the system frequency.

The system frequency should be 250 kHz  $\pm$  10 kHz.

When not connected the power supply will work at 250 kHz  $\pm$  10 kHz.

### SYNC OUT signal

The SYNC OUT signal is a buffered clock used to synchronize other units to the switching frequency of this unit.

The signal amplitude is 12V. It is recommended to source and sink up to 1A on this pin.

### PAR IN signal

The PAR IN signal is used to connect the power supply in parallel to other power supplies and have them almost equally divide the power between one another. All the power supplies should connect PAR IN signals together except the master unit where the PAR OUT signal connects to all the PAR IN signals.

### PAR OUT signal

The PAR OUT signal is used to connect the power supply in parallel to other power supplies and have them almost equally divide the power between one another. The master unit connects the PAR OUT signals to all PAR IN pins of the slave units.

### VLTG CAL signal

The VLTG CAL signal is used to control and adjust the output voltage of the power supply by up to  $\pm$ 5%.

The calibration upwards is performed by connecting a resistor between this pin to SENSE pin.

The calibration downwards is performed by connecting a resistor between this pin to SENSE RTN pin.

Use a 1M $\Omega$  potentiometer set to full resistance and slowly decrease resistance until required output voltage reached.

## CRNT\_LMT\_CAL signal

The CRNT\_LMT\_CAL signal is used to adjust the output current limit of the power supply.

## SIGNAL\_RTN

The SIGNAL\_RTN is referred to the output.

This is used as grounding for all signals.

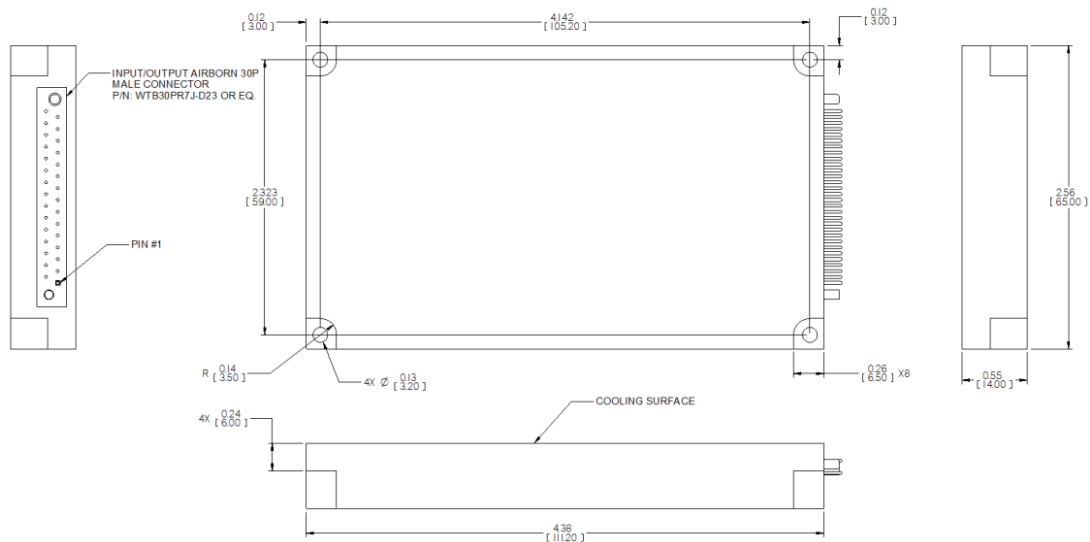
## SENSE

The SENSE is used to achieve accurate load regulations at load terminals (this is done by connecting the pins directly to the load's terminals).

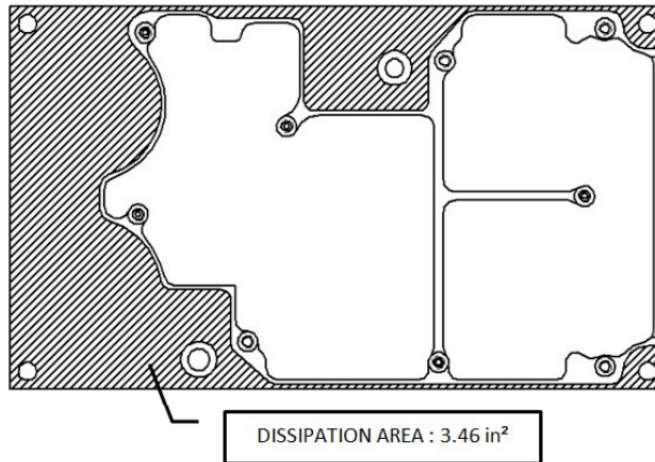
The use of remote sense has a limit of voltage dropout between converter's output and load terminals up to 0.5V.

When not used connect + SENSE to +VOUT and -SENSE to -VOUT

## OUTLINE DRAWING



## Heat Dissipation Surface



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# Amphenol

MILITARY HIGH SPEED

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