

M7029 SERIES

DC/DC POWER SUPPLY



PRODUCT HIGHLIGHTS

- MINIATURE
- HIGH DENSITY
- SINGLE OUTPUT
- DC/DC POWER SUPPLY
- UP TO 300 W

M7029 Series– C/DC Power Supply

<p>Applications Military (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial</p>																				
<p>Special Features</p> <ul style="list-style-type: none"> • Miniature size • High efficiency • Wide input range • Remote sense • Remote inhibit • Input / Output isolation • High Density – up to 36 W/in³ • <u>Fixed</u> switching freq. (250 kHz) • External sync. capability • <u>EMI</u> filters included • Indefinite short circuit and current limit protection with auto-recovery • Over-voltage shutdown with auto-recovery • Over temperature shutdown with auto-recovery 																				
<p>Electrical Specifications*</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%; vertical-align: top;"> <p><u>DC Input</u> Input range†: 18 to 48 V_{DC} No damage for: 100 V for 50 ms (IAW MIL-STD-1275A) 80 V for 0.1 s (IAW MIL-STD-704A)</p> </td> <td style="width: 33%; vertical-align: top;"> <p><u>DC Output</u> Voltage range: 3.3 V_{DC} to 50 V_{DC} Current range: 0 to 20 A Power range: 0 to 300 W</p> </td> <td style="width: 33%; vertical-align: top;"> <p><u>Isolation</u> Input to Output: 200 V_{DC} Input to Case: 200 V_{DC} Output to Case: 100 V_{DC}</p> </td> </tr> <tr> <td style="vertical-align: top;"> <p><u>Line/Load/Temp regulation</u> Up to ±1% (no load to full load, –55 °C to +85 °C and over input voltage range).</p> </td> <td style="vertical-align: top;"> <p><u>Efficiency</u> 88% - 90% typical (full load, room temperature) 83% - 86% for extended input range</p> </td> <td style="vertical-align: top;"> <p><u>EMC</u> Designed to meet MIL-STD-461F‡ CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103</p> </td> </tr> <tr> <td style="vertical-align: top;"> <p><u>Ripple and Noise</u> Less than 50 mV_{p-p}, typical (max. 100 mV) without external capacitance. When connected to system capacitance ripple drops significantly.</p> </td> <td style="vertical-align: top;"> <p><u>Transient</u> <u>Over-and-undershoot</u> <u>Turn on Transient</u></p> <p>Load transient at a rate of up to 0.5 A/μs</p> <p>Output ramps up without overshooting during power on.</p> <table border="0" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Range</th> <th style="text-align: left;">Excursio n</th> <th style="text-align: left;">Settling time</th> </tr> </thead> <tbody> <tr> <td>50-100%</td> <td>~ 1%</td> <td>< 20 μs</td> </tr> <tr> <td>10-100%</td> <td>< 2.5%</td> <td>< 100 μs</td> </tr> </tbody> </table> </td> <td></td> </tr> </table>			<p><u>DC Input</u> Input range†: 18 to 48 V_{DC} No damage for: 100 V for 50 ms (IAW MIL-STD-1275A) 80 V for 0.1 s (IAW MIL-STD-704A)</p>	<p><u>DC Output</u> Voltage range: 3.3 V_{DC} to 50 V_{DC} Current range: 0 to 20 A Power range: 0 to 300 W</p>	<p><u>Isolation</u> Input to Output: 200 V_{DC} Input to Case: 200 V_{DC} Output to Case: 100 V_{DC}</p>	<p><u>Line/Load/Temp regulation</u> Up to ±1% (no load to full load, –55 °C to +85 °C and over input voltage range).</p>	<p><u>Efficiency</u> 88% - 90% typical (full load, room temperature) 83% - 86% for extended input range</p>	<p><u>EMC</u> Designed to meet MIL-STD-461F‡ CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103</p>	<p><u>Ripple and Noise</u> Less than 50 mV_{p-p}, typical (max. 100 mV) without external capacitance. When connected to system capacitance ripple drops significantly.</p>	<p><u>Transient</u> <u>Over-and-undershoot</u> <u>Turn on Transient</u></p> <p>Load transient at a rate of up to 0.5 A/μs</p> <p>Output ramps up without overshooting during power on.</p> <table border="0" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Range</th> <th style="text-align: left;">Excursio n</th> <th style="text-align: left;">Settling time</th> </tr> </thead> <tbody> <tr> <td>50-100%</td> <td>~ 1%</td> <td>< 20 μs</td> </tr> <tr> <td>10-100%</td> <td>< 2.5%</td> <td>< 100 μs</td> </tr> </tbody> </table>	Range	Excursio n	Settling time	50-100%	~ 1%	< 20 μs	10-100%	< 2.5%	< 100 μs	
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* Unless stated otherwise, all measurements specified here were taken from a 28V/10.7A output variant, at nominal line voltage and room ambient temperature.

† Standard version complies with various standards: MIL-STD-704B-F, MIL-STD-1275A-D, RTCA/DO-160G Section 16.0 Category A and more.

Extended range version (12 to 100V_{DC} operation) available for compliance with even more standards:

MIL-STD-704A (exc. 8V sag), MIL-STD-1275E, RTCA/DO-160G Section 16.0, Categories B & Z, DEF STAN 61-5 Part 6 Issue 5, BS EN2282.

‡ Compliance achieved with 5μH LISN, shielded harness and static resistive load.

M7029 Series– C/DC Power Supply

*Protections**

Input

- **Input Reverse Polarity**
Protection for unlimited time, up to -48 V_{DC}.
- **Under-Voltage Lock-Out**
Unit shuts down if input voltage falls below 14 V ± 1 V, and turns back on at 16 V ± 1 V.
- **Over-Voltage Lock-Out**
Unit shuts down if input voltage rises above 54 V ± 2 V, and turns back on at 50 V ± 2 V. Extended versions available for compliance with various standards.

Output

- **Active Overvoltage Protection** Secondary independent control, fed directly from the output, is set to override the primary control in case of control loss, and keeps output voltage at 110% ± 5% of nominal.
- **Passive Overvoltage Protection** Transorb placed across the output, selected at 120% ± 10% of nominal voltage.
- **Current limiting**
Continuous protection (10-30% above maximum current) for unlimited time (Hiccup).

General

- **Over Temperature Protection:** Unit shuts down if baseplate temperature rises above +105 °C ± 5 °C. Unit recovers automatically when baseplate temperature falls below +95 °C ± 5 °C.

Environmental Conditions

Designed to meet MIL-STD-810G

Temperature

Method 501.5 Procedures I & II
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Operating: -55 °C to +85 °C (baseplate)
Storage: -55 °C to +125 °C (ambient)

Altitude

Method 500.5
Procedures I & II
Up to 70000 ft. Operational

Salt Fog:

Method 509.5

Humidity

Method 507.5
Up to 95% RH.

Vibration (Random)

Method 514.6
Random Vibration, Category 24,
Fig 514.6E-1.

Shock

Method 516.6
30 g, 11 ms terminal peak saw-tooth (all directions)

Reliability

150,000 hours, calculated per MIL-STD-217F Notice 2 at +85 °C base plate, Ground fixed.

Environmental Stress Screening (ESS)

Including random vibration and thermal cycles is also available. **Please consult factory for details.**

* Thresholds and protections can be modified / removed – please consult factory

M7029 Series– C/DC Power Supply

Pin Assignment

Connector type: M24308/24-39F or eq.

Mates with: M24308/2-3F or eq.

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	VIN (+)	10	VOUT RTN (-)	19	SYNC
2	VIN (+)	11	VOUT RTN (-)	20	VOUT (+)
3	VIN (+)	12	VOUT RTN (-)	21	VOUT (+)
4	VIN RTN (-)	13	SENSE (+)	22	VOUT (+)
5	VIN RTN (-)	14	VIN (+)	23	VOUT RTN (-)
6	SIGNAL RTN	15	VIN (+)	24	VOUT RTN (-)
7	INHIBIT	16	VIN RTN (-)	25	SENSE RTN (-)
8	VOUT (+)	17	VIN RTN (-)		
9	VOUT (+)	18	VIN RTN (-)		

Note: All pins with identical function/designation should be connected together for optimal performance.

M7029 Series– C/DC Power Supply

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.
 (Optional to change the logic of this signal. Please consult with factory.)

SYNC signal

The **SYNC** 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.

SIGNAL RTN

The **SIGNAL RTN** is used as a return path for **SYNC** and **INHIBIT** signals. This pin is referenced to **VIN RTN**.

SENSE

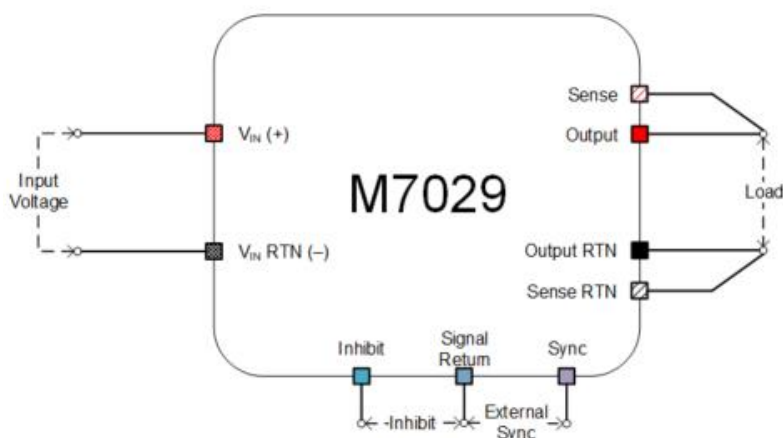
The **SENSE** is used to achieve accurate load regulation at load terminals. This is done by connecting the pins directly to the load terminals.

The remote sense correction function is limited to voltage drop between converter’s output and load terminals of 2% to 5%, or up to 0.5V, the least of the two.

When not used, connect **SENSE** to **VOUT** and **SENSE RTN** to **VOUT RTN**.

Do not leave **SENSE** and **SENSE RTN** pins unconnected. These pins can be tied internally to avoid external connection, if function is not required – *consult factory*.

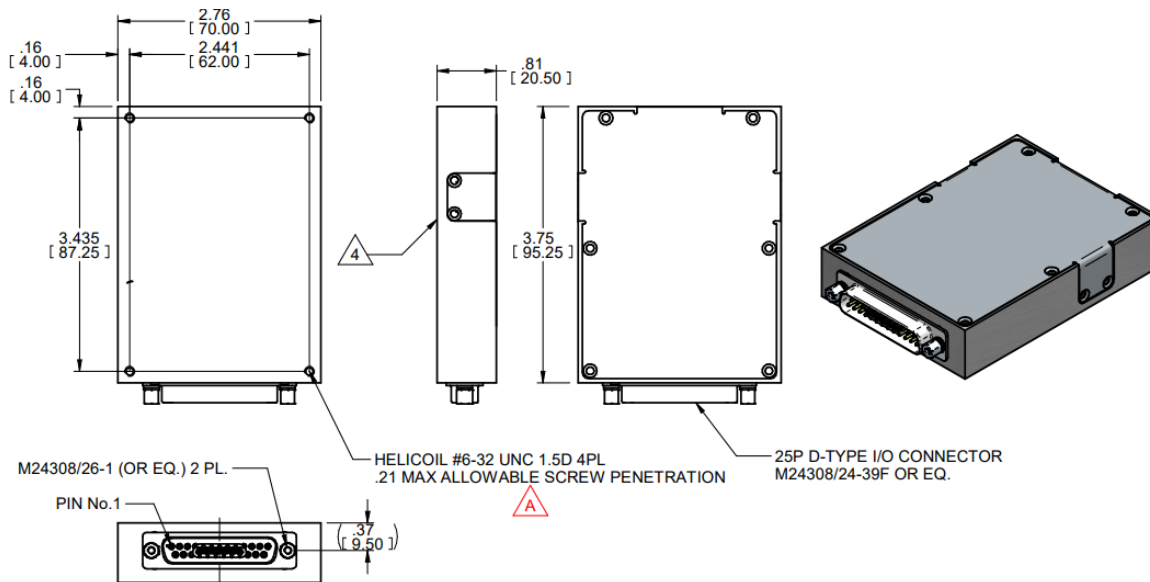
Typical Connection Diagram



M7029 Series– C/DC Power Supply

Outline Drawing

For detailed dimensions and tolerances see Drawing: M7029001



NOTES :

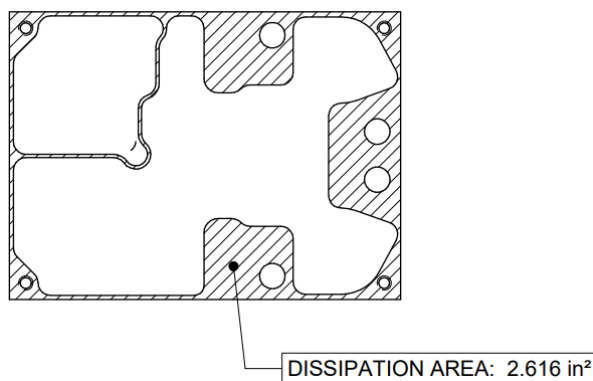
1. WORKMANSHIP SHALL BE MIL-STD-454, REQ. 9
2. DRILL TAP & COUNTERSINK PER MS 33537
3. CONVERSION COATING PER MIL -C-5541 CL IA
4. DISSIPATION AREA: 2.616 in² [1690 mm²]
5. MTL: AL 6061 T651 / AL 5052 H32

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCH [MM]
TOLERANCES ARE:

DECIMALS	ANGLES
.XX ± .01	± 1
.XXX ± .005	

DO NOT SCALE DRAWING

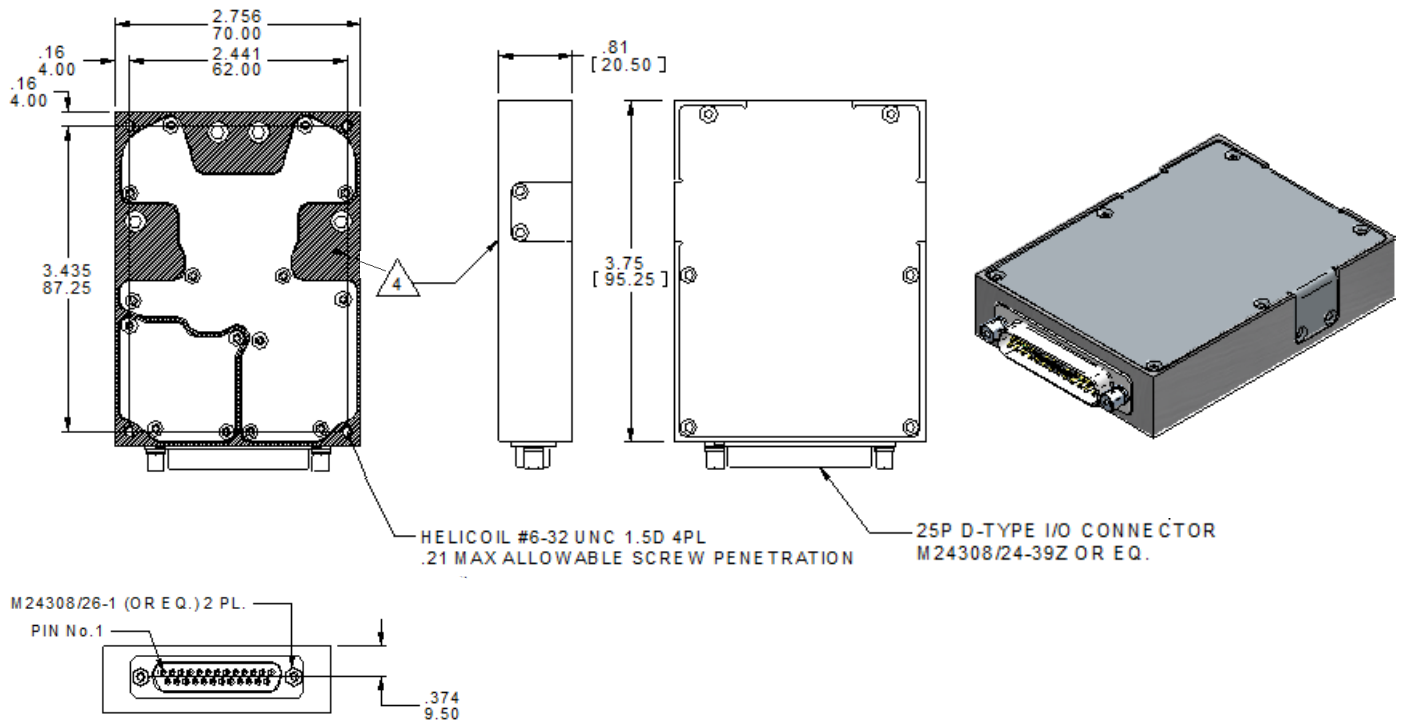
Heat Dissipation Surface



M7029 Series– C/DC Power Supply

Outline Drawing for REACH complaint units

For detailed dimensions and tolerances see Drawing: M7029801



NOTES:

1. WORKMANSHIP SHALL BE ML-STD-454, REQT. 9
2. DRILL, TAP & COUNTERSINK PER MS 33 537
3. CONVERSION COATING PER ML-DTL-554 I LAST REV., TYPE II, CLASS IA, CLEAR
4. DISSIPATION AREA: 2.616 in² [1690 mm²]
5. MTL: AL 6061 T651 / AL 5052 H32

M7029 Series– C/DC Power Supply

Standard Configurations

Part Number	Input	Output		Special features
	Voltage range	Voltage	Current	
M7029-100	18 to 48 V _{DC}	5 V _{DC}	20 A	
M7029-101	18 to 48 V _{DC}	12 V _{DC}	20 A	
M7029-102	18 to 48 V _{DC}	15 V _{DC}	20 A	
M7029-103	18 to 48 V _{DC}	24 V _{DC}	12.5 A	
M7029-104	18 to 48 V _{DC}	28 V _{DC}	10.7 A	
M7029-105	18 to 48 V _{DC}	48 V _{DC}	6.2 A	
M7029-800	18 to 48 V _{DC}	5 V _{DC}	20 A	*This Product is REACH Compliant
M7029-801	18 to 48 V _{DC}	12 V _{DC}	20 A	*The aluminum parts comprising this converter are chromate conversion coated per MIL-DTL-5541F, Type II CLASS 1A or eq.
M7029-802	18 to 48 V _{DC}	15 V _{DC}	20 A	
M7029-803	18 to 48 V _{DC}	24 V _{DC}	12.5 A	
M7029-804	18 to 48 V _{DC}	28 V _{DC}	10.7 A	
M7029-805	18 to 48 V _{DC}	48 V _{DC}	6.2 A	*Connector type: M24308/24-39Z or eq

Note: Specifications are subject to change without prior notice by the manufacturer.