

M169 SERIES

AC/DC POWER SUPPLY



PRODUCT HIGHLIGHTS

- 1-PHASE AC-DC POWER SUPPLY
- 85-265 VAC
- 50-400Hz
- HIGH POWER FACTOR
- HIGH DENSITY
- SINGLE DC OUTPUT
- Up to 1,000W



Applications

Military (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial Power Supply

Special Features

- High efficiency
- Wide input range
- High power factor
- Input / Output isolation
- Remote sense compensation
- Remote Inhibit (On/Off)
- Fixed switching freq. (250 kHz)
- External sync. capability
- EMI filters included
- Inrush current limiter
- Non-latching protections:
 - Overload / short-circuit
 - Input under-voltage lockout
 - Output over-voltage
 - Over temperature

Electrical Specifications

AC Input

single-phase
85 to 265 V_{AC}
50 to 400 Hz

Optional: Input 115 V_{AC} / 60Hz IAW
MIL-STD-1399, section 300B, type I
Please consult factory for details.

Output Voltage Regulation

Up to ±1%
(no load to full load, -40 °C to +85 °C
and over normal input voltage range).

Ripple and Noise

100 to 150 mV_{p-p}, typical (max. 1%)
without external capacitance.
When connected to external
capacitance ripple drops significantly.

DC Output

Voltage range: 3.3 to 300 V_{DC}
Power range: 1 000 W
Current range: 0 to 80 A.

Efficiency

Up to 85-87% - typical
(nominal input voltage, full load, room
temperature)

Isolation

1 000 V_{DC} Input to Output
1 000 V_{DC} Input and Case
200 V_{DC} Output and Case

EMC

Designed to meet MIL-STD-461F*:
CE101, CE102, CS101, CS114, CS115,
CS116, RE101, RE102, RS101, RS103

Turn-On Transient

No voltage overshoot during power-on.

* Compliance achieved with shielded harness and static resistive load.

Protections **

Input

- **Inrush Current Limiter**

- **Under-Voltage Lock-Out**
 Output shuts down when input voltage falls below $75 \pm 5 V_{AC}$.
 Output turns on when input voltage rises above $85 \pm 5 V_{AC}$.

Output

- **Active Over-Voltage Protection**
 Internal control shuts output down if voltage exceeds $110\% \pm 5\%$ of nominal.
- **Passive Over-Voltage Protection**
 A transorb, rated to $120\% \pm 10\%$ of nominal voltage, is placed across the output.
- **Current Limiting**
 Output turns off and on periodically (hiccup) until fault is condition removed. Protection threshold set at $120\% \pm 10\%$ of maximum current.

General

- **Over Temperature Protection**
 Unit shuts down if baseplate temperature exceeds $105 \pm 5 ^\circ C$.
 Automatic recovery upon cooldown to below $95 \pm 5 ^\circ C$.

Environmental Conditions

Designed to Meet MIL-STD-810F

Temperature

Methods 501.4 & 502.4
 Operating: $-40 ^\circ C$ to $+85 ^\circ C$ (at baseplate)
 Storage: $-55 ^\circ C$ to $+125 ^\circ C$ (ambient)

Altitude

Method 500.4
 Procedures I – up to 70,000 ft. (non-operational)
 Procedure II – up to 40,000 ft. (operational)

Humidity

Method 507.4
 Procedure I
 Up to 95% RH

Vibration

Method 514.5
 Procedure I
 Category 24 - General minimum integrity exposure

Shock

Method 516.5
 Procedure I
 30 g, 11 ms terminal peak saw-tooth

Salt Fog

Method 509.4

Reliability

150,000 hours, calculated per MIL-STD-217F Notice 2 at $+85 ^\circ C$ baseplate, Ground Fixed environment.

Environmental Stress Screening (ESS)

100% of delivered power supplies are tested at low ambient temperature, high baseplate temperature and at standard room temperature.

Additional tests, such as random vibration and thermal cycling can be added. **Consult factory for details.**

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

Pin Assignment

Input Connector (J1):

Connector type: M24308/24-38F or eq.

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

Pin #	Function	P
1	PHASE	~
2	PHASE	~
3	PHASE	~
4	N.C.	
5	NEUTRAL	0

Pin #	Function	P
6	NEUTRAL	0
7	N.C.	
8	CHASSIS	
9	PHASE	~
10	PHASE	~

Pin #	Function	P
11	N.C.	
12	NEUTRAL	0
13	NEUTRAL	0
14	NEUTRAL	0
15	N.C.	

Output Connector (J2):

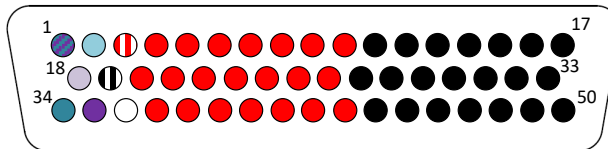
Connector type: M24308/23-41F or eq.

Mates with: M24308/4-5F or eq.

Pin #	Function	P
1	SIGNAL RTN	-
2	SYNC OUT	+
3	SENSE	+
4	OUT	+
5	OUT	+
6	OUT	+
7	OUT	+
8	OUT	+
9	OUT	+
10	OUT	+
11	OUT RTN	-
12	OUT RTN	-
13	OUT RTN	-
14	OUT RTN	-
15	OUT RTN	-
16	OUT RTN	-
17	OUT RTN	-

Pin #	Function	P
18	INHIBIT OUT	+
19	SENSE RTN	-
20	OUT	+
21	OUT	+
22	OUT	+
23	OUT	+
24	OUT	+
25	OUT	+
26	OUT	+
27	OUT RTN	-
28	OUT RTN	-
29	OUT RTN	-
30	OUT RTN	-
31	OUT RTN	-
32	OUT RTN	-
33	OUT RTN	-
34	SYNC IN	+

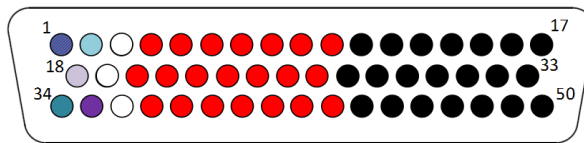
Pin #	Function	P
35	INHIBIT IN	+
36	N.C.	
37	OUT	+
38	OUT	+
39	OUT	+
40	OUT	+
41	OUT	+
42	OUT	+
43	OUT	+
44	OUT RTN	-
45	OUT RTN	-
46	OUT RTN	-
47	OUT RTN	-
48	OUT RTN	-
49	OUT RTN	-
50	OUT RTN	-



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

HV option: High voltage version (100 to 300 VDC)

Pin #	Function	P	Pin #	Function	P	Pin #	Function	P
1	SIGNAL RTN	-	18	INHIBIT OUT	+	35	INHIBIT IN	+
2	SYNC OUT	+	19	N.C.	-	36	N.C.	
3	N.C.	+	20	OUT	+	37	OUT	+
4	OUT	+	21	OUT	+	38	OUT	+
5	OUT	+	22	OUT	+	39	OUT	+
6	OUT	+	23	OUT	+	40	OUT	+
7	OUT	+	24	OUT	+	41	OUT	+
8	OUT	+	25	OUT	+	42	OUT	+
9	OUT	+	26	OUT	+	43	OUT	+
10	OUT	+	27	OUT RTN	-	44	OUT RTN	-
11	OUT RTN	-	28	OUT RTN	-	45	OUT RTN	-
12	OUT RTN	-	29	OUT RTN	-	46	OUT RTN	-
13	OUT RTN	-	30	OUT RTN	-	47	OUT RTN	-
14	OUT RTN	-	31	OUT RTN	-	48	OUT RTN	-
15	OUT RTN	-	32	OUT RTN	-	49	OUT RTN	-
16	OUT RTN	-	33	OUT RTN	-	50	OUT RTN	-
17	OUT RTN	-	34	SYNC IN	+			



Functions and Signals

INHIBIT IN

The INHIBIT IN 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" – will turn off the power supply.

Ground reference for the INHIBIT IN signal is SIGNAL RTN (pin #1).

INHIBIT OUT

Used when connecting two units or more in parallel.

Connect this signal to the INHIBIT IN pin of the slave unit (see diagram below). This signal synchronizes the shutdown and startup of the units.

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).

For output voltage above 8V, the use of remote sense has a max limit of 0.25V voltage dropout between converter's output and load terminals.

For output voltage below 8V, the use of remote sense has a max limit of 0.5V voltage dropout between converter's output and load terminals.

When not used connect SENSE to OUT and SENSE RTN to OUT RTN.

SYNC IN

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

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

SIGNAL RTN

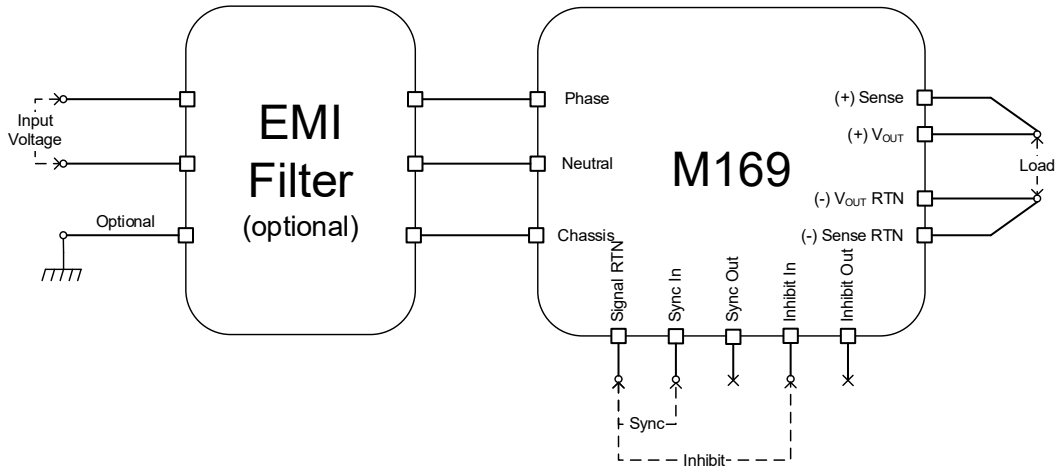
The SIGNAL RTN is a floated ground.

This pin is used as ground return for SYNC IN, SYNC OUT, INHIBIT IN and INHIBIT OUT signals.

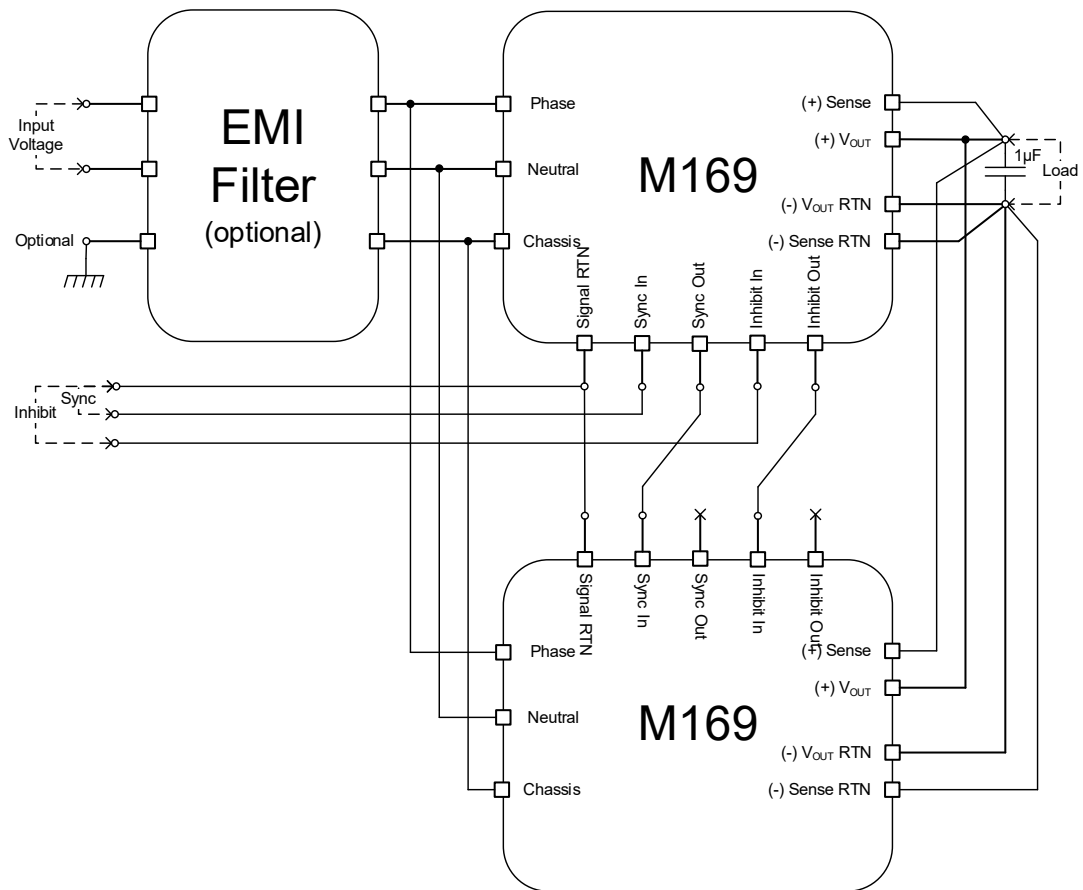
CHASSIS

This pin is connected to the converter's chassis.

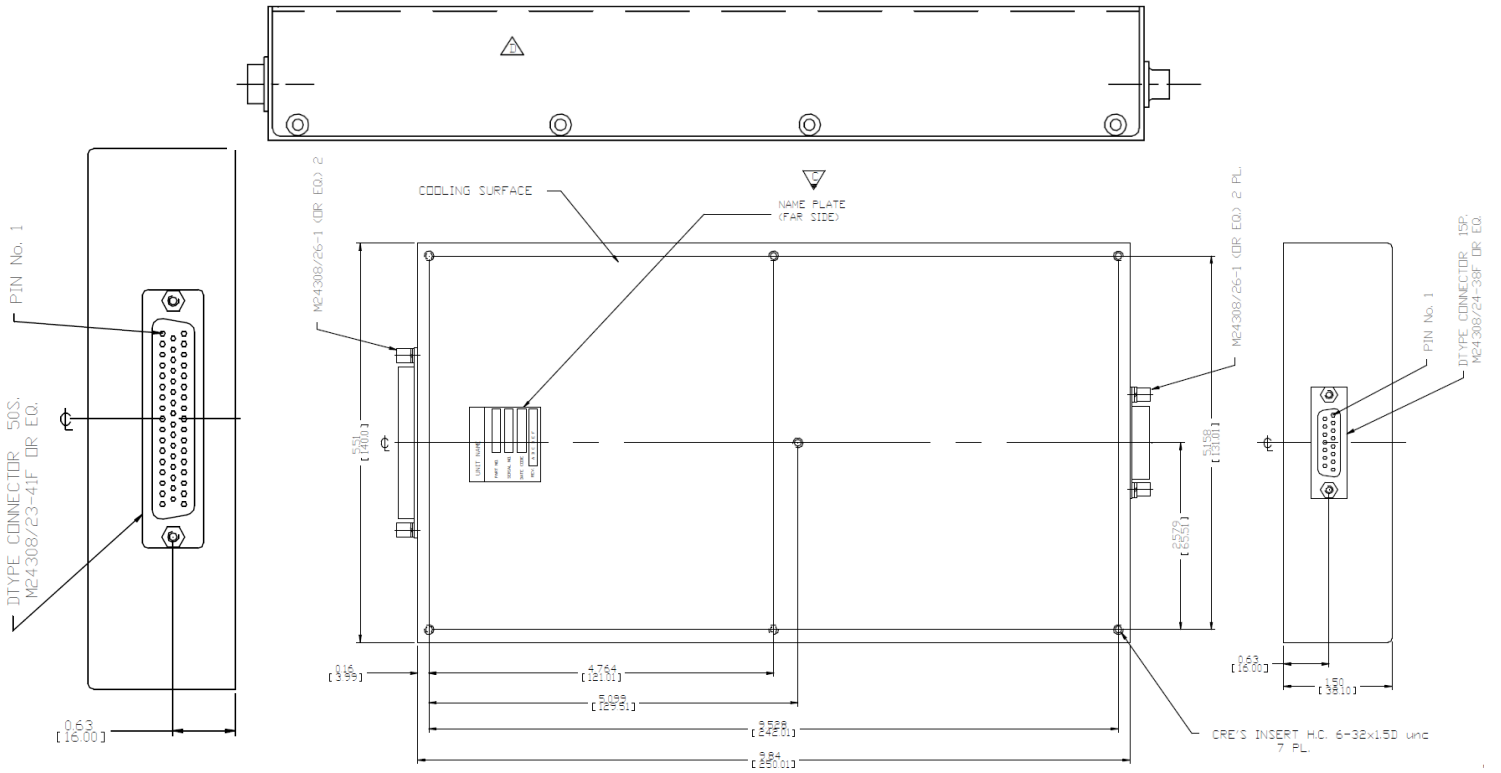
Typical Connection



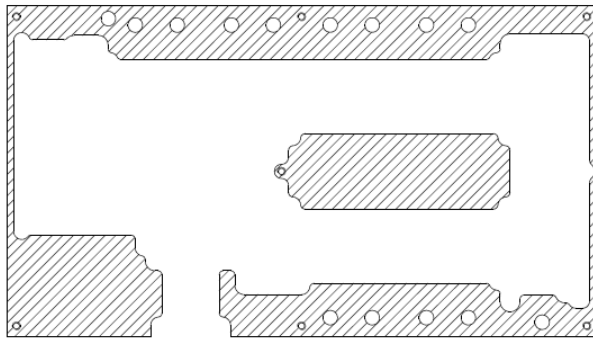
Parallel Connection



Outline Drawing



Heat Dissipation Surface



Dissipation Area
21.08 in²
(13,600 mm²)

Notes

1. Dimensions are in inches [mm]
2. Tolerance is:
.XX ± .02 in
.XXX ± .01 in
3. Weight: 4.25 lbs [1922 g]

Standard Configurations

Part number	Input		Output		Special features
	Voltage range	Frequency	Voltage	Current	
M169-100	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	5 V _{DC}	70 A	
M169-101	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	12 V _{DC}	70 A	
M169-102	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	24 V _{DC}	42 A	
M169-103	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	28 V _{DC}	36 A	
M169-104	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	48 V _{DC}	21 A	
M169-105	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	270 V _{DC}	4 A	
M169-106	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	28 V _{DC}	36 A	Parallel operation via output voltage droop. Voltage regulation is ±2%..
M169-107	1-phase, 85 to 265 V _{AC}	50 to 400 Hz	48 V _{DC}	21 A	Parallel operation via output voltage droop. Voltage regulation is ±2%..

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