

# M4252 SERIES

## DC/AC INVERTER



### PRODUCT HIGHLIGHTS

- MINIATURE, HIGH DENSITY
- PURE SINE WAVE
- DC/AC INVERTER
- 18 to 70 VDC Input
- UP TO 350 VA CONT./500 VA PEAK

**Applications**

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

**Special Features**

- Miniature size
- High efficiency
- Wide input range
- Input / Output isolation
- Remote Inhibit (On/Off)
- Fixed switching freq. (250 kHz)
- External sync. capability
- EMI filters included
- Non-latching protection:
  - Short-circuit / Overload
  - Output over-voltage
  - Over temperature

**Electrical Specifications**

**DC Input**

Normal range: 18 to 70 V<sub>DC</sub>

**AC Output**

Voltage range: 75 to 115 V<sub>AC</sub>  
 Current range: 0 to 3.5 A  
 Power range: 0 to 350 VA  
 Optional Peak power: 500 VA for 45 sec **Please consult factory for details.**  
 Frequency: 50 / 60 / 400 Hz

**Isolation**

Input to Output: 200 V<sub>DC</sub>  
 Input to Case: 200 V<sub>DC</sub>  
 Output to Case: 500 V<sub>DC</sub>

**Output Voltage Regulation**

Less than ±3% (no load to full load, -40°C to +85°C).

**Output Waveform**

Sinusoidal with max 5% (for 50,60Hz) and 7% (for 400Hz) harmonic distortion into a resistive load.

**EMC**

Designed to meet<sup>†</sup> MIL-STD-461F: CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103

**Efficiency**

82 ± 1% - Typical (115 V<sub>AC</sub>/400 Hz output, full load, room temperature)

**Turn-On Transient**

Soft Start – no voltage overshoot.

79 ± 1% - Typical (115 V<sub>AC</sub> /50/60 Hz output, full load, room temperature)

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

### Protections \*

#### Input

- **Under Voltage Lock-Out**  
Unit shuts down when input voltage falls below  $17 V_{DC} \pm 1V$
- **Over Voltage Lock-Out**  
Unit shuts down when input voltage exceeds  $82 V_{DC} \pm 2V$

#### Output

- **Overvoltage Protection**  
Shuts down if output voltage exceeds  $110\% \pm 5\%$  of nominal voltage due to internal failure.
- **Current Limiting**  
Output hiccups as long as overload ( $120\% \pm 10\%$  of nominal) or short-circuit condition exists.

#### General

- **Over Temperature Protection**  
Shutdown if baseplate temperature exceeds  $+105 \pm 5 \text{ }^\circ\text{C}$ .  
Automatic recovery upon cooldown to below  $+95 \pm 5 \text{ }^\circ\text{C}$ .

### Environmental Conditions

Designed to meet MIL-STD-810F

#### Temperature

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

#### Altitude

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

#### Humidity

Method 507.4  
Up to 95% RH

#### Salt Fog

Method 509.4

#### Vibration

Method 514.5  
General minimum integrity exposure  
IAW Figure 514.5C-17 1 hour per axis.

#### Shock

Method 516.5  
20 g, 11 ms terminal peak saw-tooth  
**Optional: 40, 11ms saw-tooth. Please consult factory for details.**

### Reliability

150,000 hours, calculated IAW MIL-HDBK-217F Notice 2 at  $+85 \text{ }^\circ\text{C}$  baseplate, Ground Fixed conditions.

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

## Pin Assignment

### J1 - Input connector

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

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

Pin No.	Function	P
1	SYNC OUT RTN	-
2	SYNC IN	+
3	INHIBIT	+
4	VIN	+
5	VIN	+
6	VIN	+
7	VIN	+
8	VIN	+
9	VIN RTN	-
10	VIN RTN	-
11	VIN RTN	-
12	VIN RTN	-
13	VIN RTN	-

Pin No.	Function	P
14	SYNC OUT	+
15	SYNC IN RTN	-
16	SIGNAL IN RTN	-
17	VIN	+
18	VIN	+
19	VIN	+
20	VIN	+
21	VIN RTN	-
22	VIN RTN	-
23	VIN RTN	-
24	VIN RTN	-
25	CHASSIS	

### J2 - Output connector

**Connector type:** M24308/23-39F or eq.

**Mates with:** M24308/4-3F or eq.

Pin No.	Function	P
1	START 120	+
2		
3	START 240 RTN	-
4		
5	SIGNAL OUT RTN	-
6	FREQ SELECT A	+
7	MASTER / SLAVE	+
8		
9		
10	NEUTRAL OUT	0
11		
12		
13	PHASE OUT	~

Pin No.	Function	P
14	START 120 RTN	-
15		
16	START 240	+
17		
18	FREQ SELECT B	+
19	START 0	+
20		
21		
22	NEUTRAL OUT	0
23		
24		
25	PHASE OUT	~

## Functions and Signals

### **INHIBIT** (connector J1, pin 3)

The **INHIBIT** signal is used to turn the power supply ON or OFF. TTL "1" or OPEN – power supply turns ON (For always-on operation, leave this pin unconnected). TTL "0" or SHORT to **SIGNAL IN RTN** – power supply turns OFF. This signal is referenced to **SIGNAL IN RTN** pin (connector J1, pin 16).

### **SYNC IN** (connector J1, pin 2)

The **SYNC IN** signal is used to synchronize the power supply's switching frequency to an external clock. The external clock frequency is allowed to be 250 kHz ± 10 kHz, with duty-cycle of 50% ± 10%. When not connected, the power supply will synchronize to its internal clock, set at 250 kHz ± 10 kHz. This signal is referenced to **SYNC IN RTN** pin (connector J1, pin 15).

### **SYNC OUT** (connector J1, pin 14)

The **SYNC OUT** signal is a buffered clock signal that can be used to synchronize other power supplies to the power supply's switching frequency. This feature can be used in a master/slave setup – see typical 3-phase connection diagrams for more information. This signal is referenced to **SYNC OUT RTN** pin (connector J1, pin 1).

### **MASTER / SLAVE** (connector J2, pin 7)

This signal is used in a three-phase setup – see typical 3-phase connection diagrams for more information. This signal is referenced to **SIG OUT RTN** pin (connector J2, pin 5).

### **START 0, START 120, START 240** (connector J2, pins 19, 1 and 16 respectively)

These signals are used in a three-phase setup – see typical 3-phase connection diagrams for more information.

### **Chassis** (connector J1, pin 25)

This pin is connected to the converter's chassis.

### **FREQ SELECT A, FREQ SELECT B** (connector J2, pins 6 & 18, respectively)

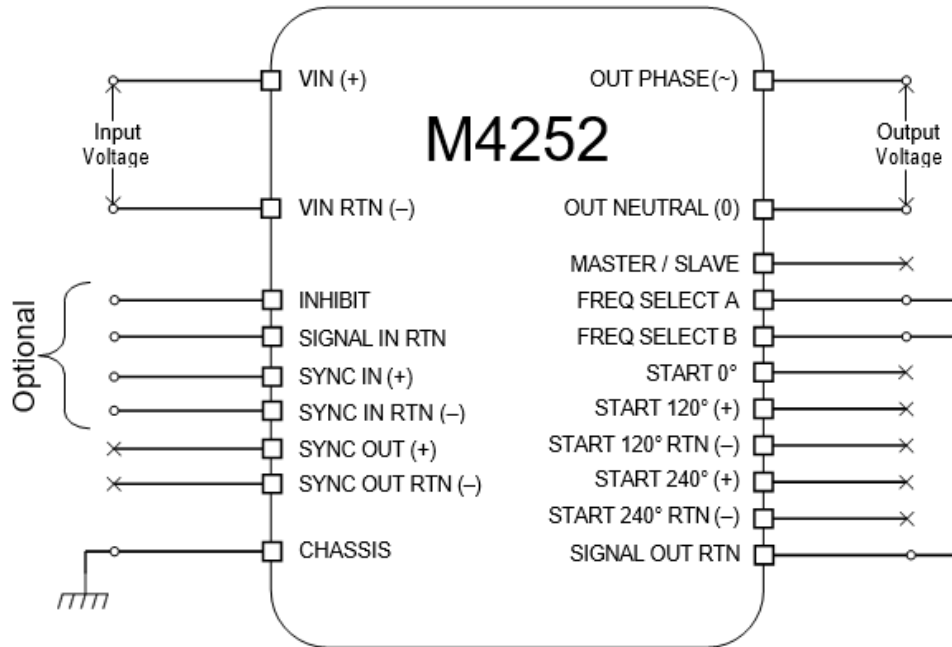
These pins are used to set the output frequency according to the following truth table:

Frequency	FREQ SELECT A (Pin 6)	FREQ SELECT B (Pin 18)
400 Hz	0	0
60 Hz	1	0
50 Hz	0	1
Off	1	1

"0" means the pin is shorted to its reference, "1" means pin is left open. These pins are referenced to **SIGNAL OUT RTN** pin (connector J2, pin 5).

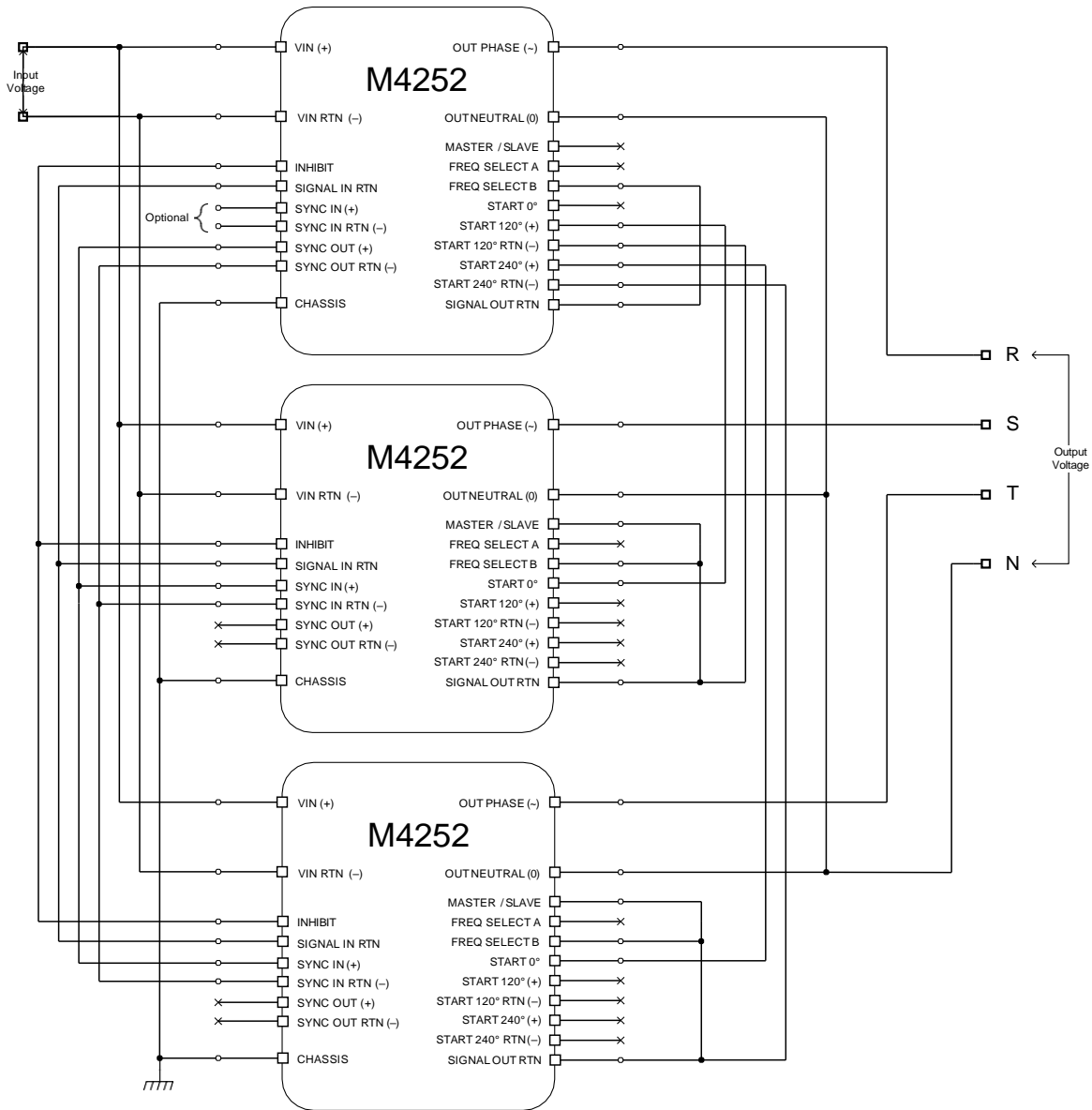
### Single-Phase Typical Connection

In this example, the unit is configured to 115 V<sub>AC</sub>/ 400 Hz



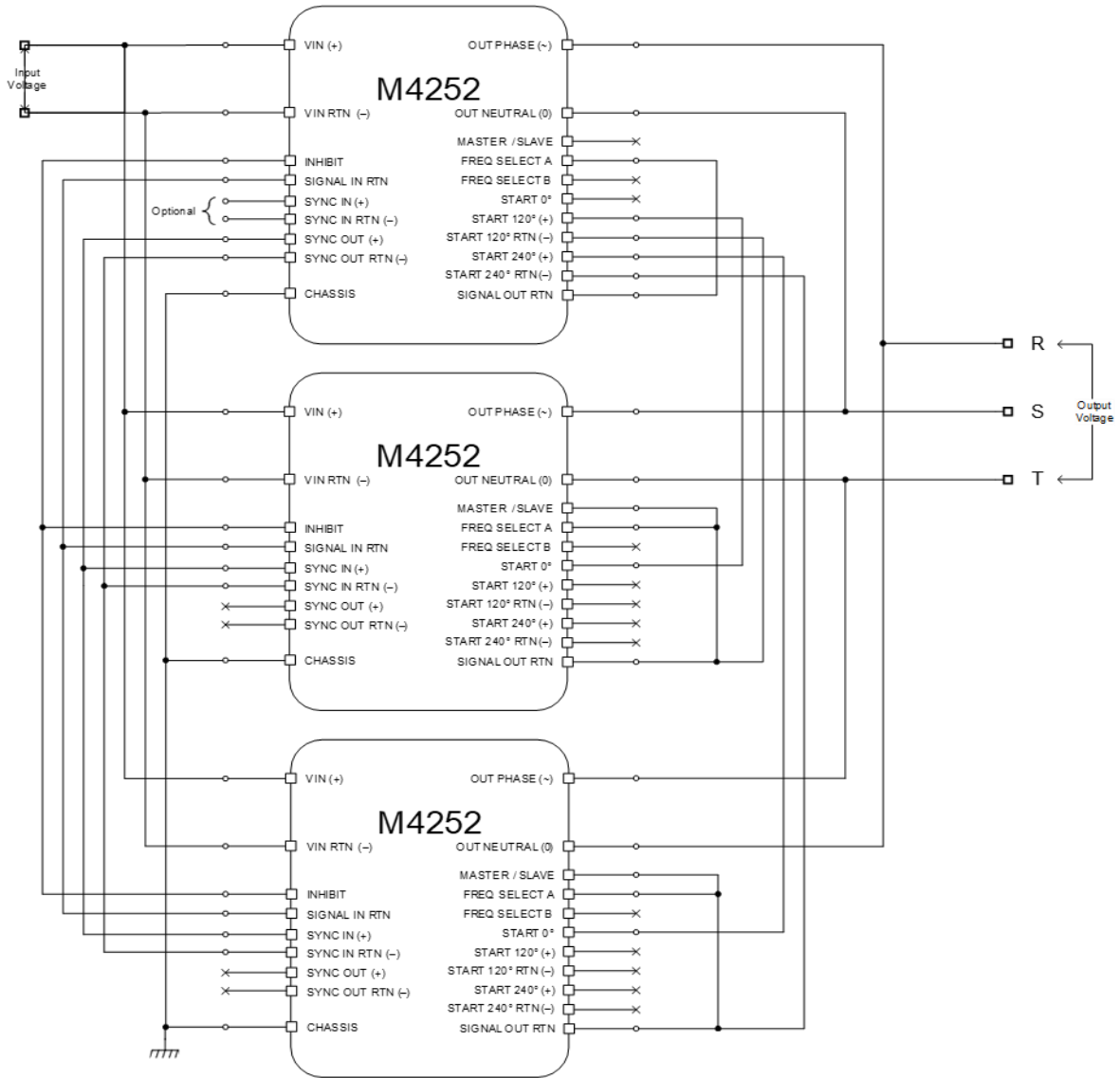
**Three-Phase Wye Typical Connection**

In this example, the units are configured to 115 V<sub>line-neutral</sub> / 200 V<sub>line-line</sub>, 60 Hz Wye connection



**Three-Phase Delta Typical Connection**

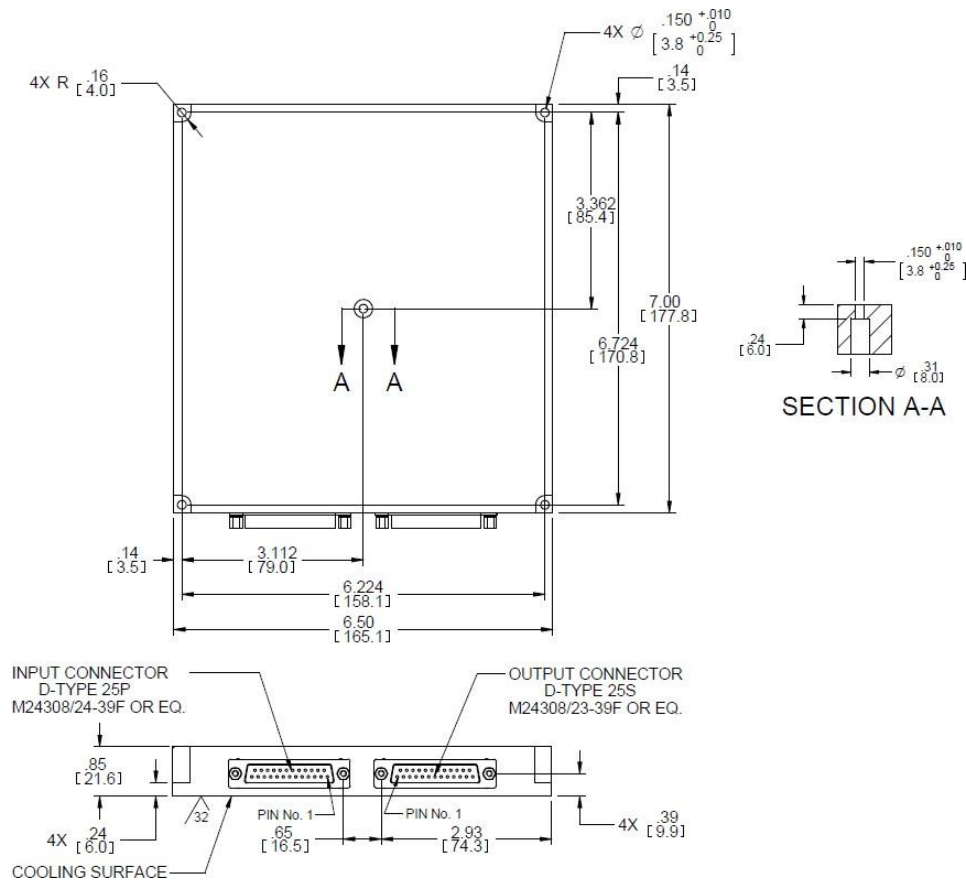
In this example, the units are configured to 115 V<sub>line-line</sub>, 50 Hz Delta connection



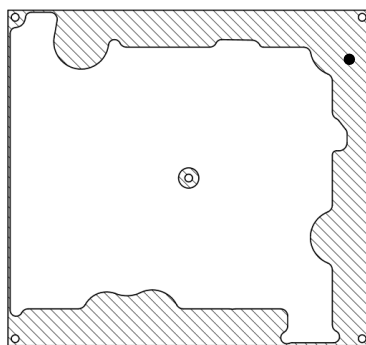


**M4252 SERIES DC/AC INVERTER**

**Outline Drawing**



**Heat Dissipation Surface**



Dissipation Area  
13.78 in<sup>2</sup>  
[8 890 mm<sup>2</sup>]

**Notes**

1. Dimensions are in inches [mm]
2. Tolerance is:  
.XX ± 0.01 in  
.XXX ± 0.005 in
3. Weight: Approx. 37 oz [1050 g]

## Standard Configurations

Part number	Input	Output		
	Voltage Input range	Voltage	Frequency	Current
M4252-100	18 to 70 V <sub>DC</sub>	115 V <sub>AC</sub>	50/60/400Hz	3 A
M4252-800	18 to 70 V <sub>DC</sub>	115 V <sub>AC</sub>	50/60/400Hz	3 A

## Special Features

- **M4252-800:** this variant is REACH Compliant
- **M4252-800:** The aluminum parts comprising this variant are chromate conversion coated per MIL-DTL-5541F, Type II CLASS 1A or eq.
- **M4252-800:** The shell of the connectors are Zinc:
  - **J1 - Input connector:** M24308/24-39Z
  - **J2 - Output connector:** M24308/23-39Z

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