

## **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**

## M4252 SERIES DC/AC INVERTER

### 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>

#### Output Voltage Regulation

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

#### 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

#### Output Waveform

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

#### Efficiency

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

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

#### 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>

#### EMC

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

#### Turn-On Transient

Soft Start – no voltage overshoot.

<sup>†</sup> Compliance achieved with 5μH LISN shielded harness and static resistive load.

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### 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  $+105 \pm 5^{\circ}C$ .  
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 – Storage/Air transport: up to 70,000 ft. (non-operational)

Procedure II – Operation/Air Carriage: up to 70,000 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  $+85^{\circ}C$  baseplate, Ground Fixed conditions.

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

## M4252 SERIES DC/AC INVERTER

### 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     | ~ |

## M4252 SERIES DC/AC INVERTER

### 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  $\pm$  10 kHz, with duty-cycle of 50%  $\pm$  10%.

When not connected, the power supply will synchronize to its internal clock, set at 250 kHz  $\pm$  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:

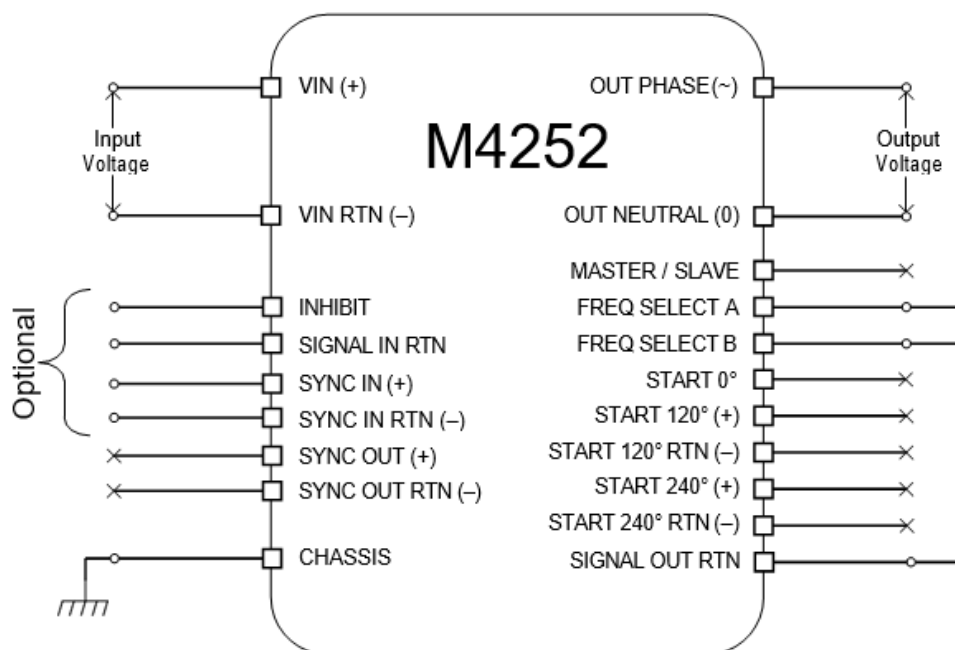
| Frequency | FREQ SELECT A<br>(Pin 6) | FREQ SELECT B<br>(Pin 18) |
|-----------|--------------------------|---------------------------|
| 400 Hz    | 0                        | 0                         |
| 60 Hz     | 1                        | 0                         |
| 50 Hz     | 0                        | 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).

## M4252 SERIES DC/AC INVERTER

### Single-Phase Typical Connection

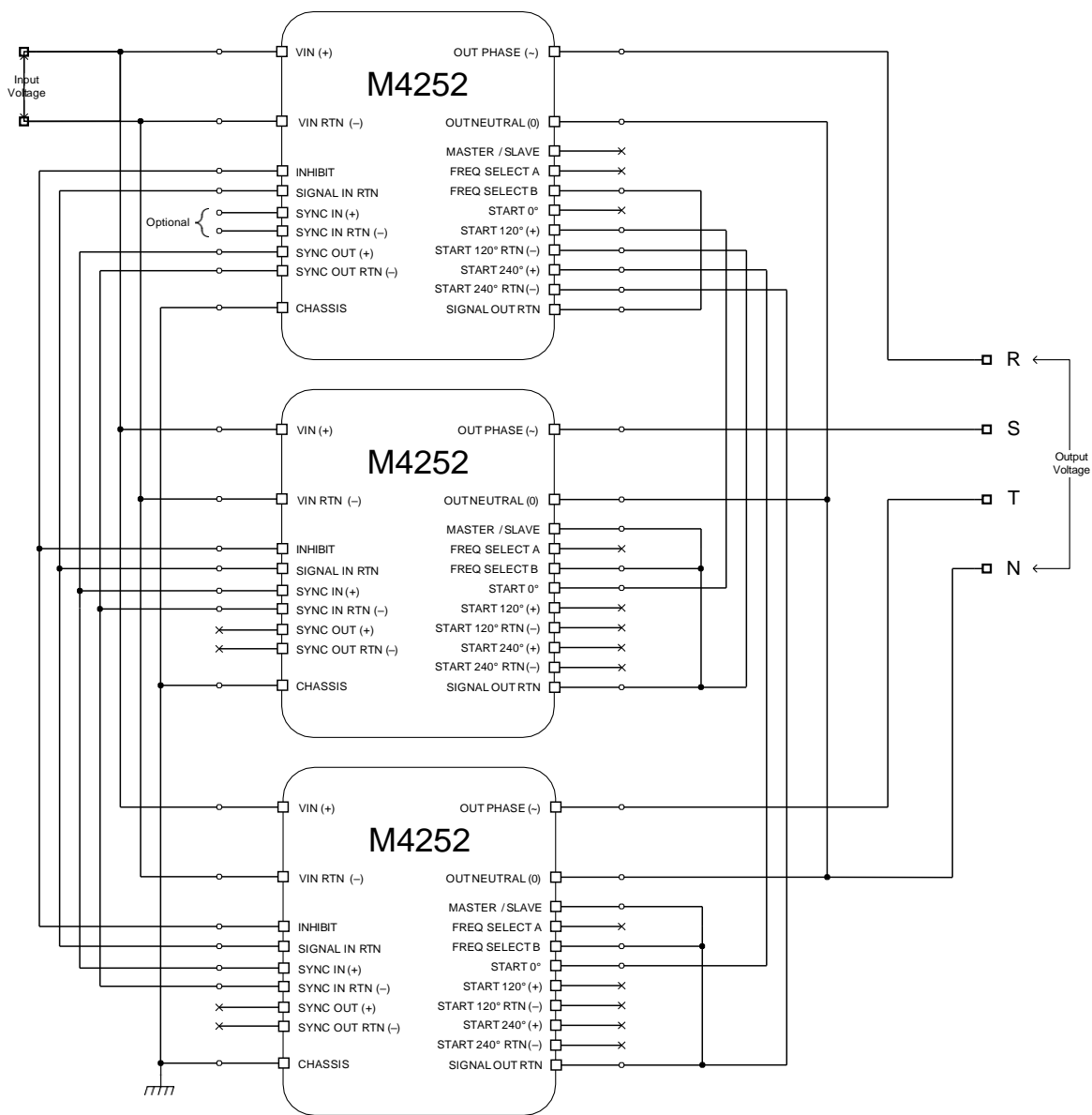
In this example, the unit is configured to 115 V<sub>AC</sub> / 400 Hz



## M4252 SERIES DC/AC INVERTER

### Three-Phase Wye Typical Connection

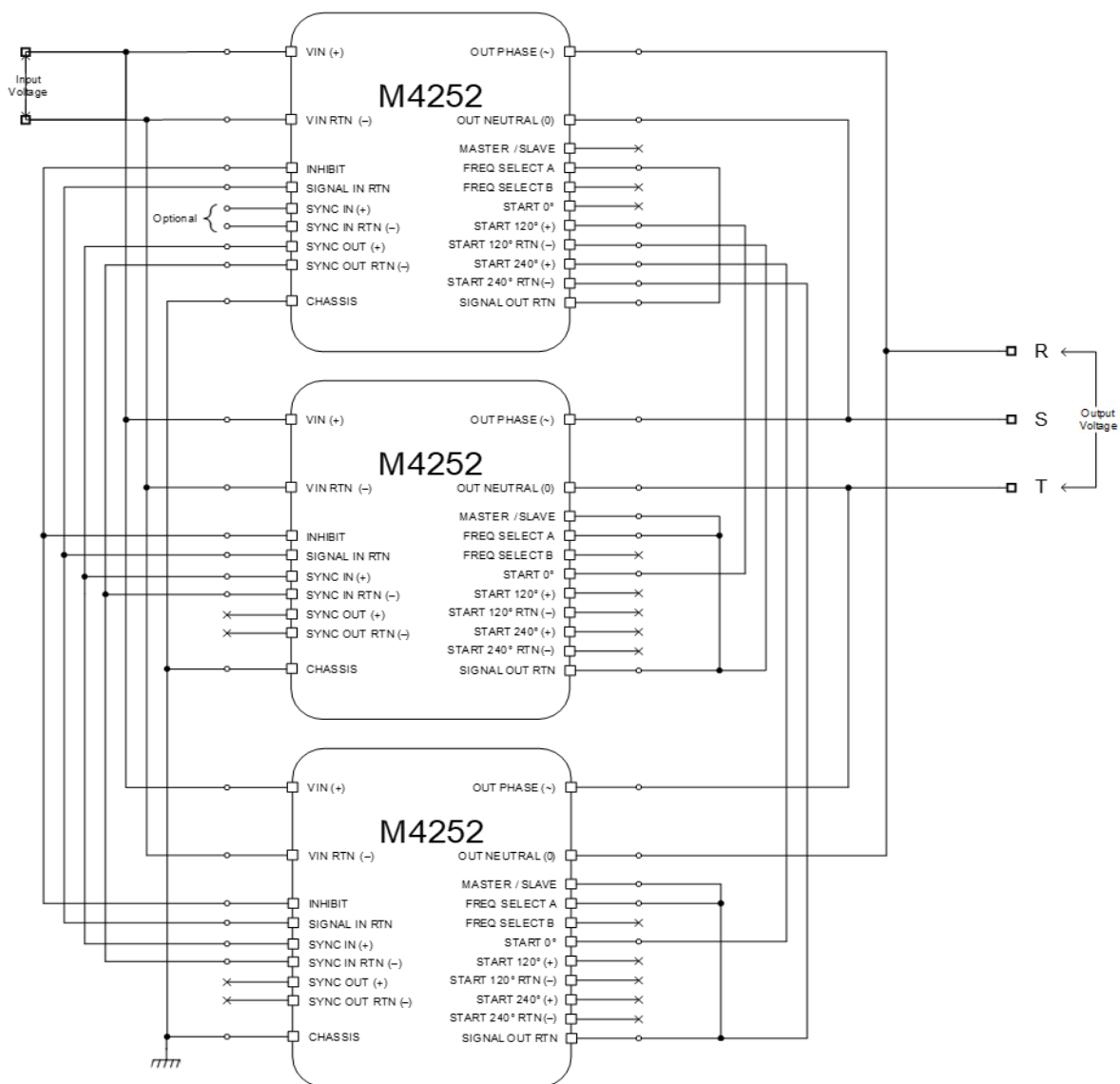
In this example, the units are configured to 115 V<sub>line-neutral</sub> / 200 V<sub>line-line</sub>, 60 Hz Wye connection



## M4252 SERIES DC/AC INVERTER

### Three-Phase Delta Typical Connection

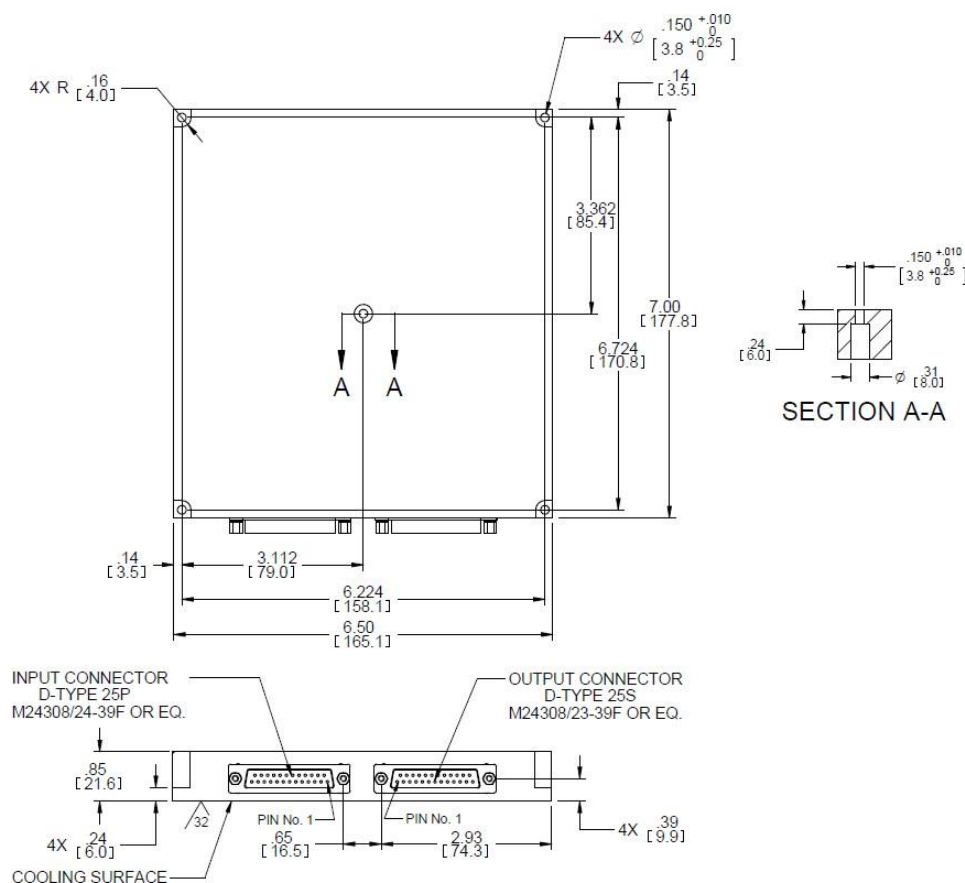
In this example, the units are configured to 115 V<sub>line-line</sub>, 50 Hz Delta connection



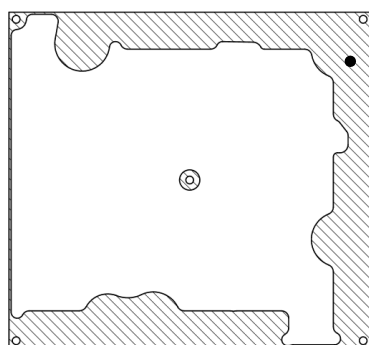


## M4252 SERIES DC/AC INVERTER

### Outline Drawing



### Heat Dissipation Surface



Dissipation Area  
13.78 in<sup>2</sup>  
[8890 mm<sup>2</sup>]

#### Notes

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

## M4252 SERIES DC/AC INVERTER

### 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*