



## **INSTALLATION & OPERATING MANUAL**

### **SCIMITAR SERIES 1RU RACK-MOUNT INVERTERS**

**[WWW.UNIPOWERCO.COM](http://WWW.UNIPOWERCO.COM)**



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## 1. Features

- R load Pure sine wave output (THD <3%)
- By-pass function (when external AC source connected)
- Programmable output frequency, 50/60Hz (front panel DIP switch)
- RS232 Serial interface provides unit status
- Thermostatically controlled cooling fans
- Advanced microprocessor design
- Protection: Input Low Voltage, Input Overvoltage, Overload, Output Short Circuit, Over Temperature

### 1.1 Applications

Office equipment – computers, printers, monitors, facsimile machines, scanner.

Applications should be limited only to ITE and office equipment.

1.2 SPECIFICATIONS FOR 1KVA MODELS

| MODEL NUMBER            | INV1210R-N   | INV2410R-N | INV4810R-N | INV1210RH-E                                   | INV2410RH-E | INV4810RH-E |
|-------------------------|--|------------|------------|---|-------------|-------------|
| <b>Inverter Section</b> | <b>100-120VAC Models</b>   |            |            | <b>200-240VAC Models</b>                      |             |             |
| Input Voltage           | 10-16VDC   | 20-32VDC   | 42-62VDC   | 10-16VDC                                      | 20-32VDC    | 42-62VDC    |
| Input Voltage Range     | 10-16VDC   | 20-32VDC   | 42-62VDC   | 10-16VDC                                      | 20-32VDC    | 42-62VDC    |
| Input Current (Max.)    | 98.8A  | 48.5A      | 22.8A      | 97.7A   | 47.3A       | 22.0A       |
| Input Current (NL)      | 0.75A  | 0.4A       | 0.3A       | 0.7A  | 0.35A       | 0.25A       |
| Output Power            | 1000VA @ ±0.85 power Factor<br>850W @ Unity Power Factor   |            |            |   |             |             |
| Surge Rating            | 900W for 1 minute, 950W for 3 second, 1000W for 1 second   |            |            |   |             |             |
| Efficiency @ FL         | 86%  | 88%        | 89%        | 87%   | 90%         | 92%         |
| Output Voltage          | 100/110/115/120VAC ±3%<br>(switch selectable)  |            |            | 200/220/230/240VAC ±3%<br>(switch selectable) |             |             |
| Output Frequency        | 50Hz or 60Hz ±0.05%<br>(switch selectable)   |            |            |   |             |             |
| Peak Output Current     | 15A  |            |            | 9A  |             |             |
| Output Waveform         | Pure Sine Wave <3% THD (R Load)  |            |            |   |             |             |
| Protection              | Output Overload - Output Short Circuit<br>Input Reverse Polarity (fuse) - Input Undervoltage - Input Overvoltage<br>Over Temperature |            |            |   |             |             |
| Digital Display         | OVP - UVP - OTP - OLP - VAC<br>AMP - WATT - VDC - TEMP - Hz  |            |            |   |             |             |
| Control Port            | RS232C<br>Baud Rates - 2400, 4800, 9600, 19200 (switch selectable)   |            |            |   |             |             |

**STS Section (By-Pass)**

|                |   |                             |
|----------------|---|-----------------------------|
| AC Input Range | 90 - 130VAC (110VAC nominal)  | 180-260VAC (230VAC nominal) |
| Frequency      | 47 - 63Hz   |                             |
| Transfer Time  | 4 - 6ms   |                             |
| Alarm Relay    | Form-C dry contacts, indicates presence of AC Utility supply<br>(NOTE: Not suitable for direct connection to SELV circuits) |                             |

**THE STS BY-PASS SECTION IS ONLY ACTIVE WHEN A UTILITY OR OTHER AC SOURCE IS CONNECTED. NORMAL OPERATION , WITH OR WITHOUT A UTILITY OR OTHER AC SOURCE IS 'ON-LINE' , WITH THE INVERTER DELIVERING REGULATED AC TO THE OUTLETS.**

**General**

|                   |   |  |
|-------------------|---|--|
| Temperature Range | -20°C to +60°C Operating<br>-30°C to +70°C Storage                  |  |
| Safety            | UL60950-1 (Listed - E130645)  | EN60950-1  |
| EMC               | FCC Class B   | EN 55022:1998/ A1:2000/A2:2003(Class B)<br>EN 55024: 1998/ A1:2001/A2:2003<br>EN 61000-3-2:2000/A2: 2005<br>EN 61000-3-3:1995/A1: 2001<br>IEC 61000-4-2:1995/ A1:1998/A2:2000<br>IEC 61000-4-3:2002/A1:2002<br>IEC 61000-4-4:2004<br>IEC 61000-4-5:1995/A1:2000<br>IEC 61000-4-6:1996/A1:2001<br>IEC 61000-4-8:1993/A1:2000<br>IEC 61000-4-11:2004 |
| Dimensions        | 16.1"(d) x 19"(w) x 1.73"(h)<br>408.7mm(d) x 484.0mm(w) x 44.0mm(h) |  |
| Mounting          | 19" rack-mount, 1RU high  |  |
| Weight            | 16.5lbs / 7.5Kg   |  |

**1.3 SPECIFICATIONS FOR 2KVA MODELS**

| MODEL NUMBER            | INV1220R-N   | INV2420R-N                     | INV4820R-N               | INV1220RH-E                                   | INV2420RH-E                    | INV4820RH-E              |  |  |
|-------------------------|--|--------------------------------|--------------------------|---|--------------------------------|--------------------------|--|--|
| <b>Inverter Section</b> |  |                                | <b>100-120VAC Models</b> |   |                                | <b>200-240VAC Models</b> |  |  |
| Input Voltage Range     | 10-16VDC   | 20-32VDC                       | 42-62VDC                 | 10-16VDC                                      | 20-32VDC                       | 42-62VDC                 |  |  |
| Input Current (Max.)    | 186.1A   | 95.6A                          | 45.0A                    | 184.0A  | 94.5A                          | 44.0A                    |  |  |
| Input Current (NL)      | 1.45A  | 0.7A                           | 0.45A                    | 1.47A   | 0.8A                           | 0.47A                    |  |  |
| Output Power            | 2kVA @ 0.80 PF<br>1600W @ 1 PF   | 2kVA @ 0.85 PF<br>1700W @ 1 PF |                          | 2kVA @ 0.80 PF<br>1600W @ 1 PF                | 2kVA @ 0.85 PF<br>1700W @ 1 PF |                          |  |  |
| Surge Rating            | 1870W for 1 minute, 2040W for 20 seconds   |                                |                          |   |                                |                          |  |  |
| Efficiency @ FL         | 86%  | 88%                            | 90%                      | 87%   | 90%                            | 92%                      |  |  |
| Efficiency @ FL         | 86%  | 88%                            | 90%                      | 87%   | 90%                            | 92%                      |  |  |
| Output Voltage          | 100/110/115/120VAC ±3%<br>(switch selectable)  |                                |                          | 200/220/230/240VAC ±3%<br>(switch selectable) |                                |                          |  |  |
| Output Frequency        | 50Hz or 60Hz ±0.05%<br>(switch selectable)   |                                |                          |   |                                |                          |  |  |
| Peak Output Current     | 25A  |                                |                          | 11A   |                                |                          |  |  |
| Output Waveform         | Pure Sine Wave <3% THD (R Load)  |                                |                          |   |                                |                          |  |  |
| Protection              | Output Overload - Output Short Circuit<br>Input Reverse Polarity (fuse) - Input Undervoltage - Input Overvoltage<br>Over Temperature |                                |                          |   |                                |                          |  |  |
| Digital Display         | OVP - UVP - OTP - OLP - VAC<br>AMP - WATT - VDC - TEMP - Hz  |                                |                          |   |                                |                          |  |  |
| Control Port            | RS232C<br>Baud Rates - 2400, 4800, 9600, 19200 (switch selectable)   |                                |                          |   |                                |                          |  |  |

**STS Section (By-Pass)**

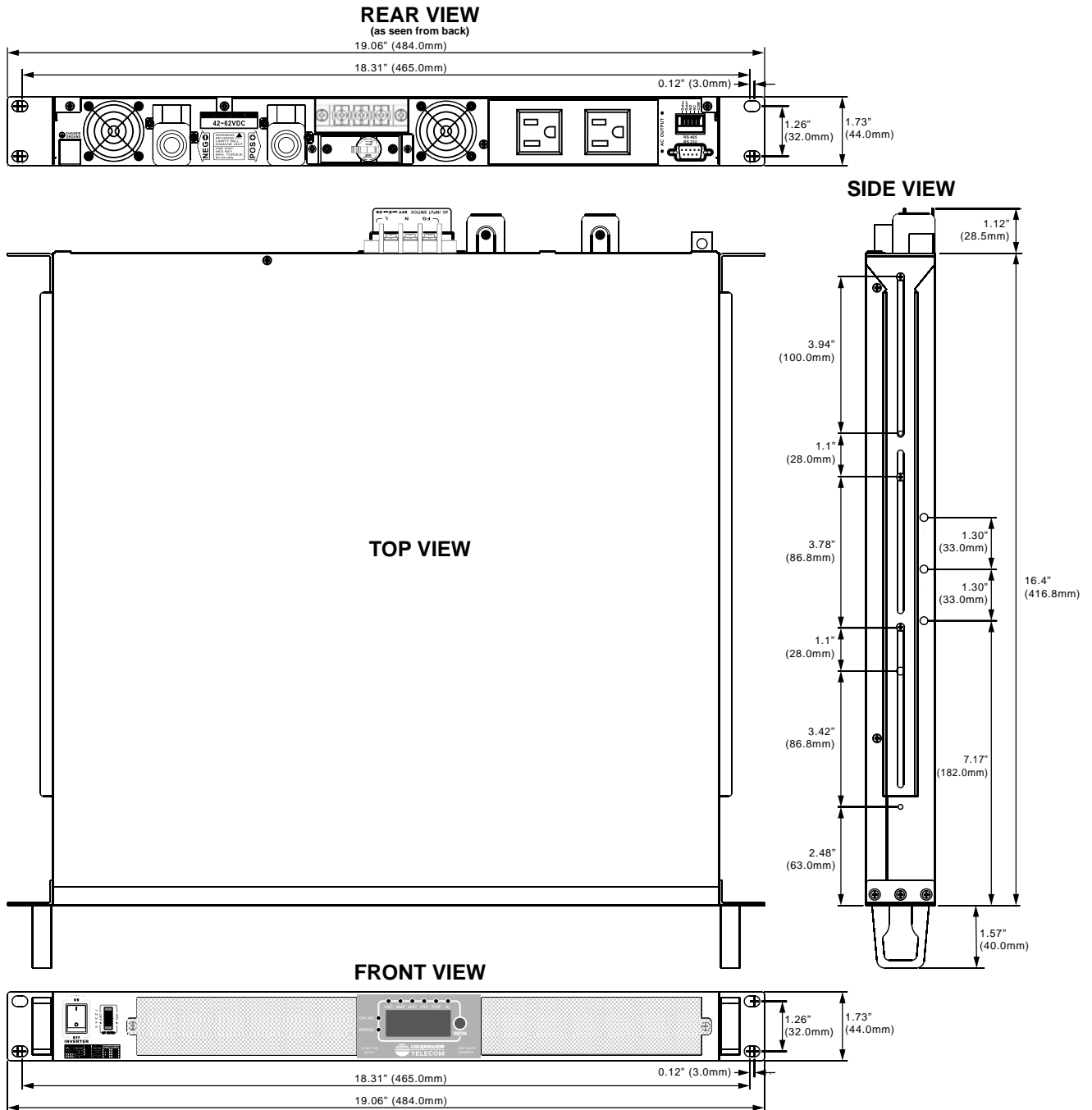
|                |   |                             |
|----------------|---|-----------------------------|
| AC Input Range | 90 - 130VAC (110VAC nominal)  | 180-260VAC (230VAC nominal) |
| Frequency      | 47 - 63Hz   |                             |
| Transfer Time  | 4 - 6ms   |                             |
| Alarm Relay    | Form-C dry contacts, indicates presence of AC Utility supply<br>(NOTE: Not suitable for direct connection to SELV circuits) |                             |

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**General**

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|-------------------|---|--|
| Temperature Range | -20°C to +60°C Operating<br>-30°C to +70°C Storage                  |  |
| Safety            | UL60950-1 (Listed - E130645)  | EN60950-1  |
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| Dimensions        | 16.1"(d) x 19"(w) x 1.73"(h)<br>408.7mm(d) x 484.0mm(w) x 44.0mm(h) |  |
| Mounting          | 19" rack-mount, 1RU high  |  |
| Weight            | 19.8lbs / 9Kg   |  |

1.4 MECHANICAL DRAWING



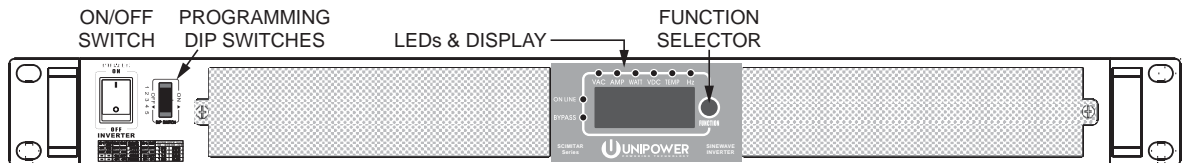
## 2. INTRODUCTION

Scimitar Series is an advanced range of pure sine wave output power inverters employing microprocessor technology.

For optimum performance and life expectancy they must be installed and used properly.

Please read the instructions in this manual BEFORE installing the unit and switching it on.

### 2.1 Front Panel Description



#### 2.1.1 ON/OFF Switch

Switches the inverter electronics ON and OFF. Should be in the OFF position during installation.

#### 2.1.2 Function Selector, LEDs & Display

When the function selector is sequentially pushed the display shows the reading associated with the actual parameter indicated by the top row of LEDs in the sequence:

**VAC - AMP - WATT - VDC - TEMP - Hz**

In the event of a fault condition this will be indicated on the display. See section 2.8.

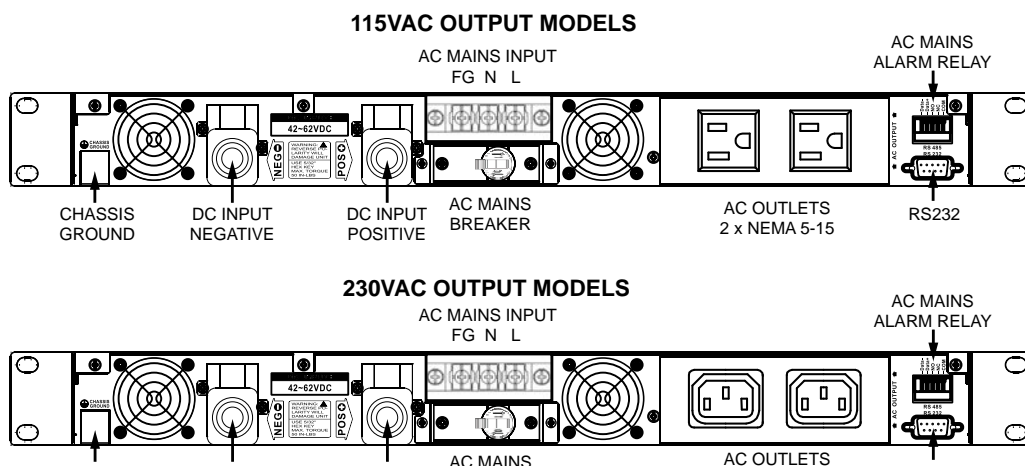
The **ONLINE** LED indicates that a Utility or other external AC source is connected to the unit. The **BYPASS** LED indicates that the unit is shutdown and the Utility or other AC source has been switched to the outlet sockets.

**IMPORTANT NOTE: In the event of a DC supply failure or if the ON/OFF switch is set to the OFF position all LEDs and the display will be switched off. If a Utility or other AC source is connected to the unit this will automatically be fed to the outlet sockets, unless the AC Mains Breaker mounted on the rear panel is switched off.**

#### 2.1.3 DIP Switches

The DIP switches are used to set output frequency, RS232 baud rate and output voltage setting. See sections 7.1 and 7.2 for full details.

### 2.2 Rear Panel Description

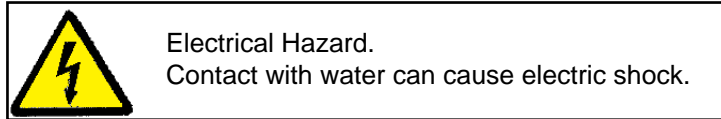




2.2.1 AC Outlets

120VAC output models (-N suffix) are fitted as standard with 2 x NEMA 5-15 outlet sockets, rated at 12A maximum each.

230VAC output models (-E suffix) are fitted as standard with 2 x IEC60320-C13 outlet sockets rated at 10A maximum each.



2.2.2 Ventilation openings.

Do not obstruct. Allow at least 3" (~75mm) for clear airflow.

2.2.3 AC mains breaker. This breaker must be operated by qualified personnel only. It must be switched on to allow the utility AC to be fed to the outlet sockets when the unit is on bypass.

2.2.4 Alarm connector: This connector MUST NOT be connected to SELV circuits.

NO means: Normally Open

NC means: Normally Close

COM means: Common.

The alarm indicates that an external AC source is available for by-pass purposes.

When the inverter is switched on and an AC supply is available to the by-pass circuit, NC and COM are shorted.

When the inverter is switched on and there is no AC supply available to the by-pass circuit, NO and COM are shorted.

When the inverter is switched off, NC and COM are shorted.

See section 2.7 for details about using this function.

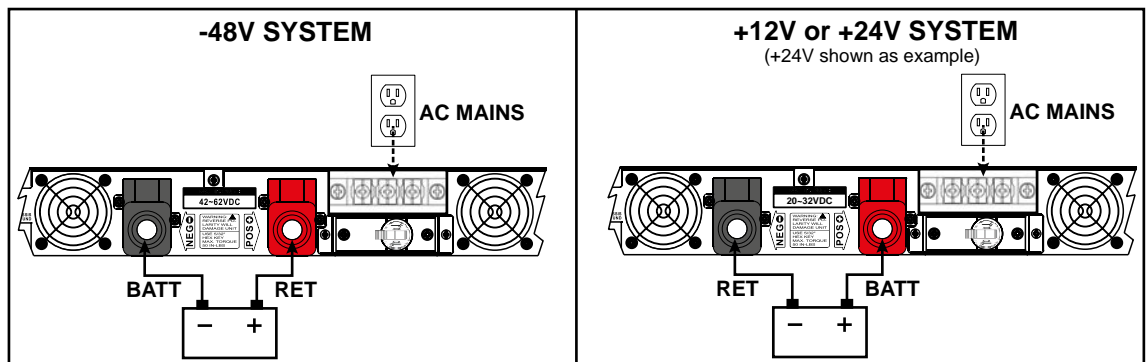
2.2.5 DC Input Terminals.

Used to connect to a 12V, 24V or 48V battery or other suitable DC source.

[+] must be connected to the positive terminal of the battery or DC source.

[-] must be connected to the negative terminal of the battery or DC source.

**WARNING: Reverse polarity connection will blow an internal fuse and may also damage the unit beyond repair. Pay particular attention when connecting to a -48V battery system. In such event the unit will have to be returned to UNIPOWER for repair if possible and any remaining warranty will be void.**



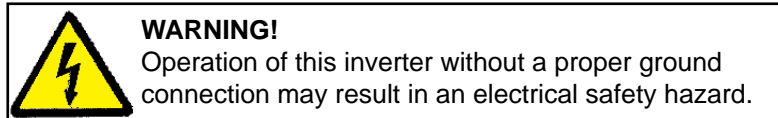
### 2.2.6 RS232 connector, 9-way D-type.

This connector allows for connection to a PC serial port and various status information obtained.

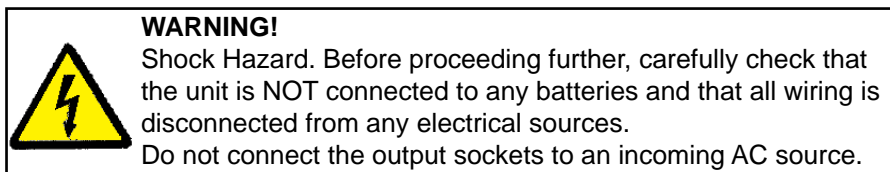
See section 8 for more details.

### 2.2.7 Frame Ground.

Connect to the frame ground of the cabinet or rack in which the unit is installed using 8AWG wire.



## 2.3 Installation




This power inverter should be installed in a restricted access location such as a Telecommunications room or IT room, where access is limited to service and other qualified personnel and which can only be entered by use of a tool lock or key which is controlled by the authority that is responsible for the location. Bare parts of any terminals that present a hazardous energy level shall be located or guarded so that unintentional bridging by conductive materials that might be present is unlikely. A readily accessible disconnect device shall be incorporated in the building installation wiring prior to connection to the inverter. These locations should additionally meet the following requirements:


- 2.3.1 Dry - Do not allow water to drip or splash on the inverter.
- 2.3.2 Elevated Operating Ambient - if the inverter is installed in a closed or multi-unit rack assembly the operating ambient temperature of the rack environment may be greater than the room ambient. consideration should be given to installing the inverter in an environment compatible with the maximum ambient temperature of 60°C.
- 2.3.3 Safe - Do not install the inverter in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.
- 2.3.4 Reduced Airflow - Installation of the inverter in a rack should be such that the amount of airflow required for safe operation is not compromised.
- 2.3.5 Dust Free - Do not install the inverter in a dusty environment as dust and other particles such as wood shavings, filings can be pulled into the unit when the cooling fans are operating.
- 2.3.6 Close to Batteries - Avoid excessive cable lengths but do not install the inverter in the same compartment as the batteries. Use the recommended wire lengths and sizes (see section 2.6). Also, do not mount the inverter where it will be exposed to gasses produced by the battery as these gasses are highly corrosive and prolonged exposure will damage the inverter.
- 2.3.7 Mechanical Loading - Mounting of inverter in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

- 2.3.8 Circuit Overload - Consideration should be given to the connection of the inverter to the supply circuit and the effect that overloading of these circuits might have on over current protection devices and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- 2.3.9 Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
- 2.3.10 The unit shall be connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.
- 2.3.11 The unit shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.
- 2.3.12 The DC supply source must be located within the same premises as the unit.
- 2.3.13 Switching or disconnecting devices shall not be in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.
- 2.3.14 This unit is intended for connection to a branch circuit with maximum 20A fuse protection.
- 2.3.15 Please confirm that the AC input breaker is set to the OFF position before connecting/disconnecting the AC power. Do not touch the AC INPUT terminals other than with properly insulated tools so as to avoid electric shock. Ensure that the protective cover has been correctly fitted after installation or when any maintenance has taken place.
- 2.3.16 Protection in PRIMARY CIRCUITS against over currents, short circuits and earth faults shall be provided, either as an integral part of the unit or as part of the building installation.
- 2.3.17 Aluminium conductors must not be used for protective earthing connections.
- 2.3.18 For supply connections, use wires suitable for at least 105°C since, from test results, cable temperatures may exceed 90°C.

## 2.4 Quick Hook-up and Testing

- 2.4.1 Unpack and inspect the power inverter. If any damage is visible do not proceed any further. Contact UNIPOWER Customer Service immediately  
  
Ensure that the power switch and the AC input breaker are in the OFF position.
- 2.4.2 Connect the cables to the power input terminals on the rear panel of the power inverter. The red terminal is positive [+] and black terminal is negative [-].  
Insert the cables into the terminals and tighten the Allen nut to clamp the wires securely.

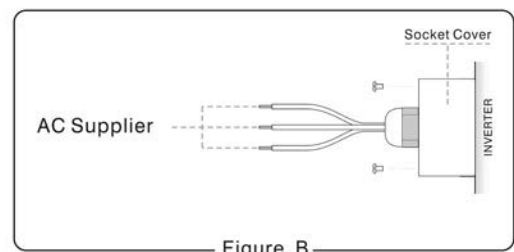
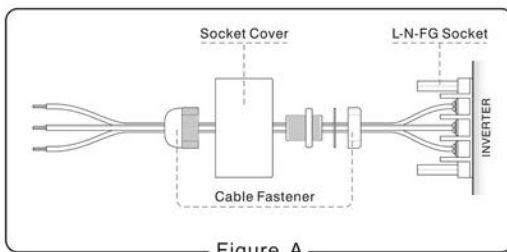
**WARNING!**  You may observe a spark when you make this connection since current may flow to charge capacitors in the power inverter. Do not make this connection in the presence of flammable fumes. Explosion or fire may result.


**WARNING!**  Make sure all the DC connections are tight (torque to 9-10 ft-lbs, 11.7-13Nm). Loose connections will overheat and could result in a potential hazard.

AC Supply


2.4.3 If connecting to a utility or other AC supply make the L, N and FG connections after placing the supplied safety cover over the AC supply cable. See figure A below.

Note that it will be necessary to remove the two screws fixing the AC input connector in place and replace them with the two hex nut pillars supplied with the safety cover before it can be fitted. See figure B below.



**WARNING!**  Connect to the utility supply only after the safety cover has been installed.

2.4.4 Before proceeding further, carefully check that the cables you have just connected to the negative terminal of inverter are connected to the negative DC power source.

**CAUTION!**  Reverse polarity connection will blow a fuse in inverter and may permanently damage the inverter. Damage caused by reversing polarity connection is not covered by our warranty.

2.4.5 Set the power switch to the ON position. After a moment you will hear three beeps. At the same time, the display scrolls the word “UNIPOWER” twice. After that, you will hear a continuous sound from internal alarm. When the AC output voltage shows on the display the unit will have completed the start-up sequence.

2.4.6 Set the power switch to the OFF position. The unit should shut down completely.

- 2.4.7 To accurately measure the true output R.M.S. voltage of inverter connect to one of the outlet sockets and then set the power switch to ON. Voltage will appear at the output sockets after the start-up sequence is completed.

## 2.5 Safety Grounding

During the AC wiring installation, AC input and output ground wires are connected to the inverter. The AC input ground wire must be connected to the incoming ground from your AC utility source.

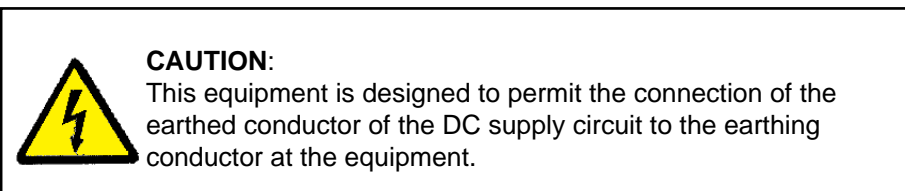
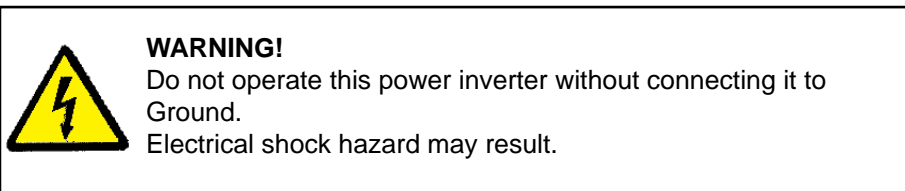
The AC output ground wire should go to the grounding point for your loads (for example, a distribution panel of bus chassis).

### 2.5.1 Neutral Grounding - 120V models only.

The neutral conductor of the AC output circuit of the Inverter is connected to the safety ground during inverter operation. This conforms to national electrical code requirements that separately derived AC sources (such as inverters and generators) which have their neutral conductors tied to ground in the same way that the neutral conductor from the utility is tied to ground at the GFCI breaker panel. When AC utility power is connected and the inverter is in bypass mode, this connection (neutral of the Inverter's AC output to input safety ground) is not present so that the utility neutral is only connected to ground at your breaker panel, as required.

### 2.5.2 230V models only.

The neutral conductor of the AC output of the Inverter is connected to the safety ground during inverter operation.



If this connection is made, all of the following conditions must be met:

This equipment shall be connected to directly to the D.C. supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode conductor is connected.

This equipment shall be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same D.C. supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.

The DC supply source is to be located within the same premises as the equipment.

Switching or disconnecting devices shall not be in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

### 2.6 Making DC Connections


Follow this procedure to connect the battery cables or those from another DC source to the DC input terminals on the Inverter. Your cables should be as short as possible (ideally, less than 10 feet / 3 meters) and large enough to handle the required Current in accordance with the electrical codes or regulations applicable to your installation.

Cables that are not an adequate gauge (too narrow) or are too long will cause decreased inverter performance such as poor surge capability and frequent low input voltage warnings and shutdowns.

These low input voltage warnings are due to DC voltage drop across the cables from the inverter to the batteries / other DC source.

The longer and narrower these cables, the greater the voltage drop.

**WARNING!**



The installation of a fuse must be on the positive cable. Failure to place a fuse on [+] cables running between the inverter and battery or other DC source may cause damage to the inverter and will void the warranty.

**Connections must not be made when the DC source is live.**

Increasing your DC cable size will help to improve the situation.

UNIPOWER recommends the following cables for optimum inverter performance.

| Model NUMBER<br>1kVA models | Wire Size <sup>1</sup> | In-line Fuse | Model NUMBER<br>2kVA models | Wire Size <sup>1</sup> | In-line Fuse |
|-----------------------------|------------------------|--------------|-----------------------------|------------------------|--------------|
| INV1210R-N                  | #2AWG                  | 150A         | INV1220R-N <sup>2</sup>     | #2/0AWG                | 250A         |
| INV1210RH-E                 |                        |              | INV1220RH-E <sup>2</sup>    |                        |              |
| INV2410R-N                  | #4AWG                  | 80A          | INV2420R-N <sup>2</sup>     | #1/0AWG                | 70A          |
| INV2410RH-E                 |                        |              | INV2420RH-E <sup>2</sup>    |                        |              |
| INV4810R-N                  | #6AWG                  | 40A          | INV4820R-N                  | #2AWG                  | 70A          |
| INV4810RH-E                 |                        |              | INV4820RH-E                 |                        |              |

Notes:

1. Use only high quality copper wiring and keep cable length from 3-6 feet (~1-2m).
2. The maximum wire size that the black and red input connectors can accept directly is #2AWG. These models are supplied with two types of adaptor for use in different applications. One type MUST be fitted into the connectors to allow for the greater wire size required.

A suitable breaker, at the DC source, for isolation and overload protection is recommend.

### 2.7 Alarm Connection



It is important to note that the electronic circuits associated with this function are directly connected within the AC output circuits of the inverter and that for this reason the relay contact connections that are provided on the rear panel mounted wire clamp connector MUST be considered to be at a non-SELV potential and all necessary precautions to protect the operator from electric shock hazard must be taken.

These relay contacts must not be connected directly to any SELV or other safety connected circuit and any cables or wiring used for such connections must be double insulated.

## 2.8 Inverter Operation

To operate the power inverter, turn it on using the ON/OFF switch on the front panel. The power inverter is now ready to deliver AC power to your loads.

If you are operating several loads from the power inverter, turn them on separately after the inverter has been turned on. This will ensure that the power inverter does not have to deliver the starting currents for all the loads at once.

|   |  |
|---|--|
|  | <p><b>CAUTION!</b><br/>EXTERNAL SURFACES GET HOT.<br/>During the period of the unit running, the case may become very warm. Please do not touch the side marked. “” directly.</p> |
|---|--|

### 2.8.1 Controls and indicators:

The ON/OFF switch turns the control circuit in the power inverter on and off.

### 2.8.2 Output Voltage Indication

When the VDC LED is lit the display shows the Output Voltage

When the unit is first switched on the VAC LED is lit and the Output Voltage is displayed as described above.

Selection of the following parameters is achieved by pressing the Function Selector button to the right of the display sequentially.

### 2.8.3 Output Current Indicator

When the AMP LED is lit the display shows the Output Current

### 2.8.4 Output Watts Indicator

When the WATTS LED is lit the display shows the Output Power in Watts

### 2.8.5 Input DC Voltage Indicator

When the VDC LED is lit the display shows the DC Input Voltage

### 2.8.6 Temperature Indicator

When the TEMP LED is lit the display shows the internal Operating Temperature

### 2.8.7 Output Frequency AC Indicator

When the Hz LED is lit the display shows the Output Frequency

The following table details the accuracy of measurement of the above mentioned display reading.

| Function | VAC                        | AMP                  | WATT                 | VDC                        | TEMP    | Hz                 |
|----------|----------------------------|----------------------|----------------------|----------------------------|---------|--------------------|
| Range    | 100-120V<br>or<br>200-240V | 0-10A<br>or<br>0-20A | 0-1KW<br>or<br>0-2kW | 10-16V<br>20-32V<br>42-62V | 0-120°C | 50Hz<br>or<br>60Hz |
| Accuracy | ± 1%                       | 1% ± 0.5A            | ± 3%                 | ± 2%                       | ± 1%    | ± 0.5%             |

These inverters are designed to operate from the following input voltage ranges:

- 12V Models - 10.0 to 16.0VDC
- 24V Models - 20.0 to 32.0VDC
- 48V Models - 42.0 to 62.0VDC

High and low DC input voltage conditions are handled per the following table and described in more detail below:

| <b>Model Type</b> | <b>DC input OVP shut-down</b> | <b>DC input OVP alarm</b> | <b>DC input UVP shut-down</b> | <b>DC input UVP alarm</b> |
|-------------------|-------------------------------|---------------------------|-------------------------------|---------------------------|
| 12VDC             | 16.0VDC                       | 15.5VDC                   | 10.5VDC                       | 10.0VDC                   |
| 24VDC             | 32.0VDC                       | 31.0VDC                   | 21.0VDC                       | 20.0VDC                   |
| 48VDC             | 62.0VDC                       | 61.0VDC                   | 43.0VDC                       | 42.0VDC                   |

2.8.8 Over voltage protection indicator: (OVP)  
 When **OVP** is indicated on the display the unit has shut itself down due to the input voltage exceeding the limits shown above.

2.8.9 Under voltage protection indicator: (UVP)  
 When **UVP** is indicated on the display the unit has shut itself down due to the input voltage falling below the limits shown above.

2.8.10 Over temp protection indicator: (OTP)  
 When **OTP** is indicated on the display the unit has shut itself down because it has become overheated.

The unit may overheat because it has been operated at power levels above its rating, or because it has been installed in a location which does not allow it to dissipate heat properly. The unit will automatically restart once it has cooled off.

2.8.11 Overload protection indicator: (OLP)  
 When **OLP** is indicated on the display one of two conditions has occurred as follows:  
 a) For an overload condition approximately 110-120% of the WATTS rating of the unit and lasting up to around 1 minute, an audible alarm will sound and the unit will continue to deliver power directly to the load. If the overload condition continues the unit shuts itself down.  
 b) For a larger overload condition the unit shuts itself down immediately.  
 In both cases it is necessary to restart the unit once the overload has been removed.

In all of the above cases, if an AC utility supply is connected and the AC input breaker switched ON the load will be automatically be transferred to the utility supply.

## 2.9 Cooling Fan Operation

The cooling fan management system monitors both the output power and internal temperature of the unit. The fans will not normally run if the output power is less than 300W, unless the internal temperature exceeds recommended norms.

In the event that the ventilation openings are obstructed the unit will enter over temperature protection mode (OTP) and the cooling fan will continue to operate in order to reduce the internal temperature to a safe operating level. Once this has been achieved the unit will turn on automatically.




### 3. Maintenance

Scimitar Series inverters require only minimal maintenance for reliable operation.

The exterior of the unit should be cleaned down periodically with a dry cloth to prevent accumulation of dust and dirt, paying particular attention to the ventilation openings.

Also, the DC input terminal connections should be checked to ensure that they are sufficiently tight.

### 4. Troubleshooting Guide

|   |  |
|---|--|
|  | <p><b>WARNING!</b><br/>Do not open or disassemble the inverter. Attempting to service the unit yourself may result in a risk of electrical shock or fire. Also, the warranty will be void in the event that any seals have been broken or tampered with.</p> |
|---|--|

Scimitar Series inverters are designed to comply with all relevant EMI Regulations so long as they have been correctly installed. If incorrectly installed interference with other electronic equipment in close proximity may occur.

- Make sure that the chassis ground lug at the rear of the unit is solidly connected to the ground system of the rack or cabinet in which it is installed.
- Keep the cables between the battery or other DC source and the unit as short as possible and twist them together about 2 to 3 twists per foot. This will minimise radiated interference from the cables.

| Problem and Symptoms  | Possible Cause                                      | Solution   |
|---|---|--|
| Low output voltage<br>(120V : 95-105VAC)<br>(230V : 190-210VAC)                                 | Incorrect type of voltmeter                         | Use true RMS meter (See section 2.4.7)   |
| Display indicates OLP   | Overload condition                                  | Reduce load  |
| No output voltage<br>Input voltage fault  | Low / High input voltage                            | Recharge battery, check connections.   |
| No output voltage<br>Display indicates OTP<br>Load <500W (1kVA unit)<br>Load <1000W (2kVA unit) | Thermal shutdown                                    | Ensure ventilation openings are clean and not obstructed.<br>Improve ventilation.<br>Reduce ambient temperature. |
| No output voltage<br>Display indicates OLP  | Short circuit or wiring error<br><br>Excessive load | Check AC wiring for short circuit or improper polarity (L and N reversed)<br>Remove load                         |

### 5. Warranty (summary)

Scimitar series inverters are warranted for two (2) years from date of shipment against defects in material and workmanship. This warranty does not extend to products which have been opened, altered or repaired by persons other than persons authorized by UNIPOWER or to products which become defective due to acts of God, negligence or the failure of customer to fully follow instructions with respect to installation, application or maintenance.

For a complete text of UNIPOWER's warranty conditions please request a copy from your local Sales Office.

## 6. Important Safety Instructions



### **WARNING!**

Before installing and using this inverter, be sure to read these safety instructions.  
Keep them in a safe place for future reference.

### 6.1 General Safety Precautions

- 6.1.1 Do not expose the Inverter to rain, snow, spray or dust. To reduce risk of hazard, do not cover or obstruct the ventilation openings. Do not install the Inverter in a zero-clearance compartment as overheating may result.
- 6.1.2 To avoid a risk of fire and electronic shock. Make sure that existing wiring is in good electrical condition; and that wire size is not undersized. Do not operate the Inverter with damaged or substandard wiring.
- 6.1.3 This equipment contains components which can produce arcs or sparks. To prevent fire or explosion do not install in compartments containing batteries or flammable materials or in locations where require ignition protected equipment.  
This includes any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.

### 6.2 Precautions When Working with Batteries

- 6.2.1 Ensure the installer is familiar with the material safety data sheet from the manufacturer of the batteries concerning safe use and medical treatment.
- 6.2.2 NEVER smoke or allow a spark or flame in the vicinity of batteries.
- 6.2.3 Do not drop a metal tool on the battery. The resulting sparks or short-circuit on the battery or other electrical part may cause an explosion.
- 6.2.4 Remove personal metal items such as rings, bracelets, necklaces, and watches when working with batteries. Lead-acid batteries produces a short-circuit current high enough to weld a ring or the like to metal, causing severe burn.

## 7. DIP switch settings

The follow tables define the various settings of the DIP switches mounted at the left side of the front panel of the Inverter.

**Note that when changes are made to these settings it is necessary to recycle the power to the Inverter to allow the internal microprocessor to read the new settings.**

### 7.1 110V units

| S1   | FREQ. (Hz) | S2  | S3  | BAUD RATE | S4  | S5  | VOLTAGE OUTPUT |
|------|------------|-----|-----|-----------|-----|-----|----------------|
| ON   | 60 *       | OFF | OFF | 2400      | OFF | OFF | 100VAC         |
| OFF  | 50         | OFF | ON  | 4800 *    | OFF | ON  | 110VAC         |
| ---- | ----       | ON  | OFF | 9600      | ON  | OFF | 115VAC *       |
| ---- | ----       | ON  | ON  | 19200     | ON  | ON  | 120VAC         |

\* default setting as shipped.

### 7.2 230V units

| S1   | FREQ. (Hz) | S2  | S3  | BAUD RATE | S4  | S5  | VOLTAGE OUTPUT |
|------|------------|-----|-----|-----------|-----|-----|----------------|
| ON   | 60         | OFF | OFF | 2400      | OFF | OFF | 200VAC         |
| OFF  | 50 *       | OFF | ON  | 4800 *    | OFF | ON  | 220VAC         |
| ---- | ----       | ON  | OFF | 9600      | ON  | OFF | 230VAC *       |
| ---- | ----       | ON  | ON  | 19200     | ON  | ON  | 240VAC         |

\* default setting as shipped.

## 8. Communications Protocol & Remote ON/OFF Function

Scimitar series inverters can communicate their status to a computer via an RS232 connection by sending a single 'Status Inquiry' Telnet command from the computer as follows.

Using a Terminal programme such as Hyperterminal create a profile with the following parameters:

Baud rate: to match setting on unit (default 2400)  
 Data bits: 8  
 Parity: none  
 Stop bits: 1  
 Flow control: none

From the properties tab (in Hyperterminal) settings and then ASCII and make sure that all boxes are checked with the exception of 'Force incoming data to 7-bit ASCII.

Make sure the profile is saved for future use.

At the computer type: Q1<cr>

The inverter will respond as follows:

INV INV data stream, (MMM.M NNN.N PPP.P QQQ RR.R S.SS TT.T b7b6b5b4b3b2b1b0<cr>

INVERTER data stream :

There should be a space character between every field is list as followed:

- a. Start byte : (
- b. I/P voltage : MMM.M------(SPEC)  
M is an integer number ranging from 0 to 9.  
The unit is Volts.
- c. I/P fault voltage : NNN.N------(SPEC)  
N is an integer number ranging from 0 to 9.  
The unit is Volts.
- d. O/P voltage : PPP.P  
P is an integer number ranging form 0 to 9.  
The unit is Volts.
- e. O/P current : QQQ  
QQQ is a percent of maximum current, not an absolute value.
- f. I/P frequency : RR.R  
R is an integer number ranging from 0 to 9.  
The unit is Hz.
- g. DC voltage : SS.S or S.SS  
S is an integer number ranging from 0 to 9.  
The unit is Volts.
- h. Temperature : TT.T  
T is an integer number ranging form 0 to 9.  
The unit is degrees centigrade.
- i. INVERTER Status : <U>------(SPEC)  
<U> is one byte of binary information such as <b7b6b5b4b3b2b1b0>.  
Where bn is an ASCII character '0' or '1'.

INVERTER status:

| Bit | Description                  |
|-----|------------------------------|
| 7   | 1 : Utility Fail (Immediate) |
| 6   | 1 : Battery Low              |
| 5   | SPEC                         |
| 4   | SPEC                         |
| 3   | SPEC                         |
| 2   | SPEC                         |
| 1   | SPEC                         |
| 0   | SPEC                         |

- j. Stop Byte : <cr>

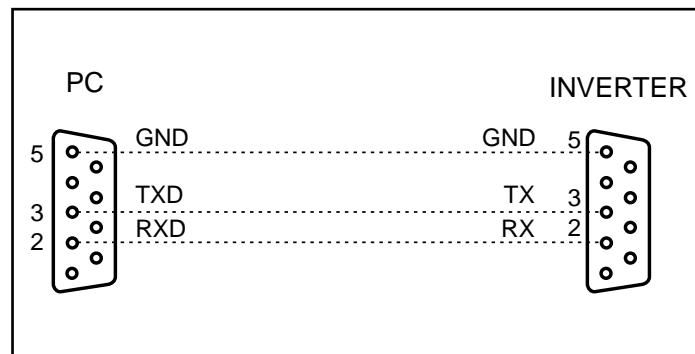
Example : Computer : Q1<cr>

INVERTER Response : (208.4 140.0 208.4 034 59.9 54.2 35.0 00110000<cr>

Means : AC I/P voltage is 208.4V.------(SPEC)  
 AC I/P fault voltage is 140.0V.------(SPEC)  
 AC O/P voltage is 208.4V.  
 AC O/P current is 34%.  
 AC O/P frequency is 59.9 HZ.  
 DC I/P voltage is 54.2V.  
 Temperature is 35.0 degrees centigrade.

**RS232 Hardware connection.**

**Note that only a 3 wire RS232 cable may be used otherwise damage may occur to the Inverter and/or the PC.**



Please note that there are no user serviceable parts inside and that opening either will void the warranty.

If you are still unable to resolve any problems after consulting section 4 of this manual please call your nearest UNIPOWER sales office for support:

US +1 954 346 2442  
 UK +44 (0)1903 768200

*This document is believed to be correct at time of publication and UNIPOWER LLC accepts no responsibility for consequences from printing errors or inaccuracies. Specifications are subject to change without notice.*