GLOBAL UNINTERRUPTIBLE POWER SUPPLY (GUPS)

MODEL GUPS 1250A

OPERATION MANUAL

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ELGAR ONE-YEAR WARRANTY

Elgar Electronics Corporation (hereinafter referred to as Elgar) warrants its products to be free from defects in material and workmanship. This warranty is effective for one year from the date of shipment of the product to the original purchaser. Liability of Elgar under this warranty shall exist provided that:

- the Buyer exposes the product to normal use and service and provides normal maintenance on the product;
- Elgar is promptly notified of defects by the Buyer and that notification occurs within the warranty period;
- the Buyer receives a Return Material Authorization (RMA) number from Elgar's Repair Department prior to the return of the product to Elgar for repair, phone 800-73-ELGAR (800-733-5427), ext. 2295;
- the Buyer returns the defective product in the original, or equivalent, shipping container;
- if, upon examination of such product by Elgar it is disclosed that, in fact, a defect in materials and/or workmanship does exist, that the defect in the product was not caused by improper conditions, misuse, or negligence; and,
- that Elgar QA seal and nameplates have not been altered or removed and the equipment has not been repaired or modified by anyone other than Elgar authorized personnel.

This warranty is exclusive and in lieu of all other warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness of the product to a particular purpose. Elgar, its agents, or representatives shall in no circumstance be liable for any direct, indirect, special, penal, or consequential loss or damage of any nature resulting from the malfunction of the product. Remedies under this warranty are expressly limited to repair or replacement of the product.

CONDITIONS OF WARRANTY

- To return a defective product, contact an Elgar representative or the Elgar factory for an RMA number. Unauthorized returns will not be accepted and will be returned at the shipper's expense.
- For Elgar products found to be defective within thirty days of receipt by the original purchaser, Elgar will absorb all ground freight charges for the repair. Products found defective within the warranty period, but beyond the initial thirty-day period, should be returned prepaid to Elgar for repair. Elgar will repair the unit and return it by ground freight pre-paid.
- Normal warranty service is performed at Elgar during the weekday hours of 7:30 am to 4:30 pm Pacific time. Warranty repair work requested to be accomplished outside of normal working hours will be subject to Elgar non-warranty service rates.
- Warranty field service is available on an emergency basis. Travel expenses (travel time, per diem expense, and related air fare) are the responsibility of the Buyer. A Buyer purchase order is required by Elgar prior to scheduling.
- A returned product found, upon inspection by Elgar, to be in specification is subject to an inspection fee and applicable freight charges.
- Equipment purchased in the United States carries only a United States warranty for which repair must be accomplished at the Elgar factory.

ELGAR

Committed to Quality...Striving for Excellence

SAFETY NOTICE

BEFORE APPLYING POWER to the System, verify that the GUPS 1250A is properly configured for the user's particular application.

WARNING

HAZARDOUS VOLTAGES IN EXCESS OF 280 VRMS, 400V PEAK MAY BE PRESENT WHEN COVERS ARE REMOVED. QUALIFIED PERSONNEL MUST USE EXTREME CAUTION WHEN SERVICING THIS EQUIPMENT. CIRCUIT BOARDS, TEST POINTS AND OUTPUT VOLTAGES MAY ALSO BE FLOATING ABOVE (BELOW) CHASSIS GROUND.

Installation and servicing must be performed by QUALIFIED PERSONNEL who are aware of properly dealing with attendant hazards. This includes such simple tasks as fuse verification.

Ensure that the ac power line ground is properly connected to the GUPS 1250A input connector or chassis. Similarly, other power ground lines including those to application and maintenance equipment MUST be properly grounded for both personnel and equipment safety.

Always ensure that facility ac input and dc input power is de-energized prior to connecting or disconnecting the input/ output power cables or the RS-232 interconnecting cable between the GUPS unit and a computer or terminal. Similarly, the GUPS 1250A circuit breaker must be switched OFF prior to connecting or disconnecting input power.

In normal operation, the operator does not have access to hazardous voltages within the chassis. However, depending on the user's application configuration, **HIGH VOLTAGES HAZARDOUS TO HUMAN SAFETY** may be normally generated on the output terminals. The Customer/User must ensure that the output power lines are properly labeled as to the SAFETY hazards and any that inadvertent contact with hazardous voltages is eliminated.

Guard against risks of electrical shock during open cover checks by NOT TOUCHING any portion of the electrical circuits. Even when power is OFF, capacitors may retain an electrical charge. Use SAFETY GLASSES during open cover checks to avoid personal injury by any sudden component failure.

Always disconnect the internal battery and disconnect the ac and dc input power prior to performing any internal servicing.

Page

SECTION I – GENERAL DESCRIPTION

SECTION II – INSTALLATION

SECTION III – OPERATION

Page

SECTION IV – OPERATOR MAINTENANCE

Page

LIST OF FIGURES

LIST OF TABLES

SECTION I

GENERAL DESCRIPTION

1.1 INTRODUCTION

The Elgar Model GUPS 1250A is a 1250 VA Global Uninterruptible Power Supply (GUPS) that provides regulated 115 Vac, 60 Hz output power. The ac input can be either 115 Vac or 230 VAC at 50, 60, or 400 Hz frequency. In addition, an internal battery provides backup should the ac input not be available.

The instrument is an on–line UPS and, therefore, no interruptions occur in the output power when transitioning between the ac input and the battery. Regardless of which source supplies power, the output is galvanically isolated. Power factor correction is provided on the ac input to reduce power demand on the source and minimize the harmonic currents that are drawn from it.

1.2 GENERAL DESCRIPTION

The Elgar Model GUPS 1250A is contained in a 7" (178 mm) high by 19" (483 mm) wide by 21" (533 mm) deep rack–mount enclosure. All input and output power terminations, the RS–232 connector, and the operator controls are located on the rear panel. Operational and input/output power status is indicated on a front panel display. A master power switch and an alarm silence switch are also provided on the front panel of the GUPS.

An RS–232 data communications port is available for interface with a computer or terminal for monitoring the status of the GUPS. Alarm relay contacts are provided for remote indication of an ac input failure and impending shutdown of the inverter while running on battery. No operator adjustments are necessary.

1.3 SPECIFICATIONS

Ac Input Voltage: 80 Vac to 280 Vac.

Ac Input Frequency: 45 to 450 Hz.

Ac Input Power Factor: 0.95.

Ac Input Current: 13.5 Amps RMS, maximum, at 115 Vac input voltage while charging battery.

Output Voltage: 115 Vac ±2% over the full range of line/load regulation, stability and accuracy.

Output Frequency: 60 Hz ±0.1%.

Output Current: 10.9 Amps RMS.

Output Current Crest Factor: 3:1, maximum.

Output Distortion: Less than 2% maximum Total Harmonic Distortion (THD) with linear loads.

Output Power: 1250VA/1000W.

Internal Battery: 24 Vdc; sealed, maintenance–free lead–acid.

Battery Backup Time: 15 minutes with a 1250VA/1000W load, at 25°C (77°F).

Battery Recharge Time: 4 hours to 85% capacity.

Temperature: Operating: –20°C to 50°C (–4°F to 122°F); Non–Operating: –40°C to 65°C (–40°F to 149°F).

Humidity: 5% to 95%, non–condensing.

Altitude: Operating: 0 to 15,000 feet (0 to 4,572 meters); Non–Operating; 0 to 40,000 feet (0 to 12,192 meters).

Dimensions:

Height: 7" (178 mm)

Depth: 21" (533 mm)

Width: 19" (483 mm). Fits standard RETMA rack.

Weight: 93 lbs. (42 kg).

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

SECTION II

INSTALLATION

2.1 INTRODUCTION

The Elgar Model GUPS 1250A has been fully calibrated and tested prior to shipment. Therefore, the instrument is ready for immediate use upon receipt. The enclosure is designed to be installed in a standard 19" (483 mm) RETMA rack or a transit case; pem-nuts are provided for mounting optional slides.

The following checks should be made to ensure that the instrument was not damaged during shipment.

WARNING

The GUPS 1250A weighs 93 lbs. (42 kg)! A minimum two person lift is required for each unit!

WARNING

Hazardous voltages are present when operating this equipment. Read the "SAFETY" notices on page ii prior to performing installation, operation, or maintenance.

2.2 UNPACKING

Perform a visual inspection of the shipping container prior to accepting the package from the carrier. If extensive damage to the shipping container is evident, a description of the damage should be noted on the carrier's receipt and signed by the driver of the carrier agent.

If damage is not apparent until the instrument is unpacked, a claim for concealed damage should be placed with the carrier. In addition, the shipping container(s) and filler material should be saved for inspection. Forward a report of damage to the Elgar Repair Department. Elgar will provide instructions for repair or replacement of the instrument.

If the instrument needs to be returned to Elgar, suitable shipping containers and packing materials must be used. If proper packing material is not available, contact Elgar to provide containers and shipping instructions.

2.3 PRE-INSTALLATION INSPECTION

Perform a visual inspection of the instrument when it is removed from the shipping container. Check for shipping damage such as dents, scratches, distortion, and damaged connectors. If the instrument or container(s) show signs of rough handling, remove the covers from the instrument to ensure that the circuit boards are securely in place and that no loose or broken components are evident.

2.4 INSTALLATION

The Model GUPS 1250A is 7" (178 mm) high and is designed to be installed in a standard 19" (483 mm) wide cabinet enclosure or a transit case.

CAUTION

Avoid blocking the instrument air intakes or exhaust.

2.5 AIR INTAKE AND EXHAUST

The air intake is located on the front panel of the instrument and the exhaust is through the rear panel. Care must be taken not to block the air intake and exhaust. No special vertical separation is required when stacking instruments. However, a 1.75" (45 mm) vertical spacer above and below the instrument may improve cooling. The temperature of the intake air should not exceed 50°C.

2.6 INSTALLATION/DIMENSIONAL DRAWING

Refer to Figures 2–1 and 2–2 for information on outline and mounting dimensions of the GUPS unit.

2.7 INPUT/OUTPUT CONNECTORS

Table 2–1 provides a listing of the GUPS unit input and output connectors while Table 2–2 provides a listing of the connector pinouts.

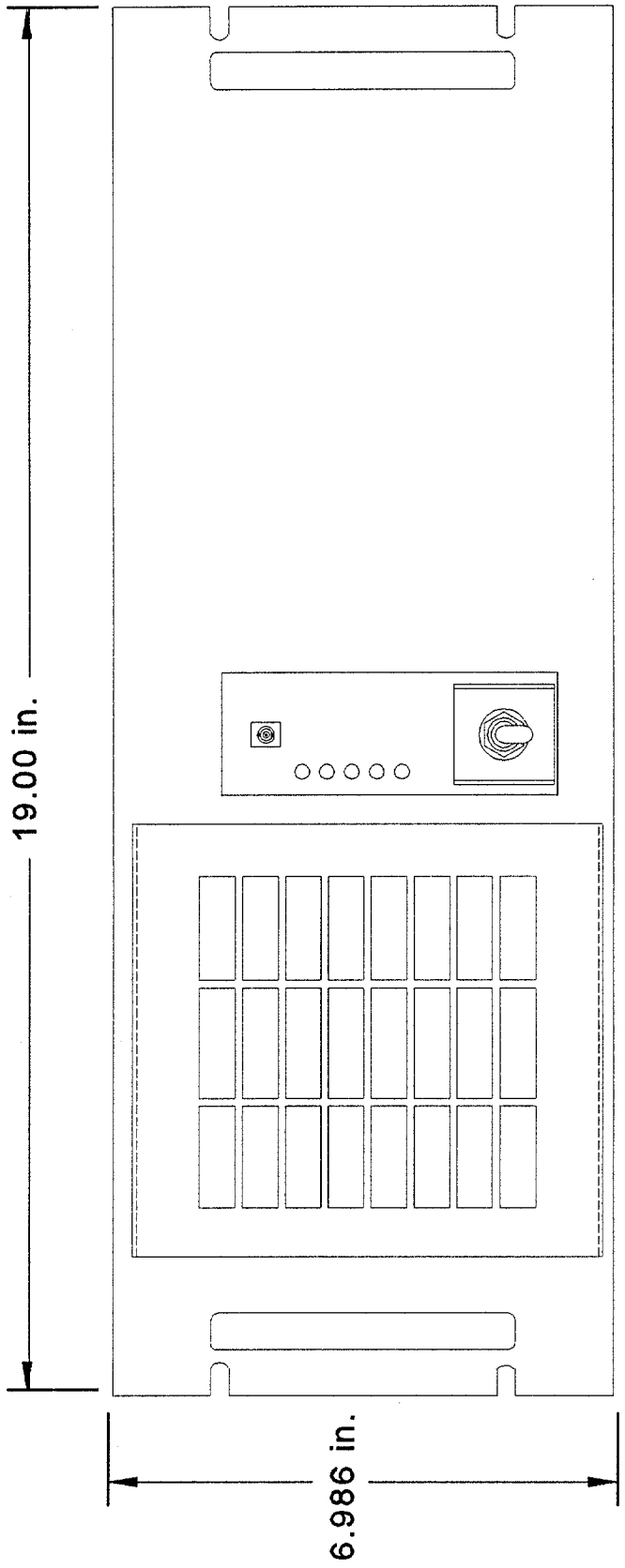

Figure 2-1. GUPS 1250A (Front View) Mounting Dimensions

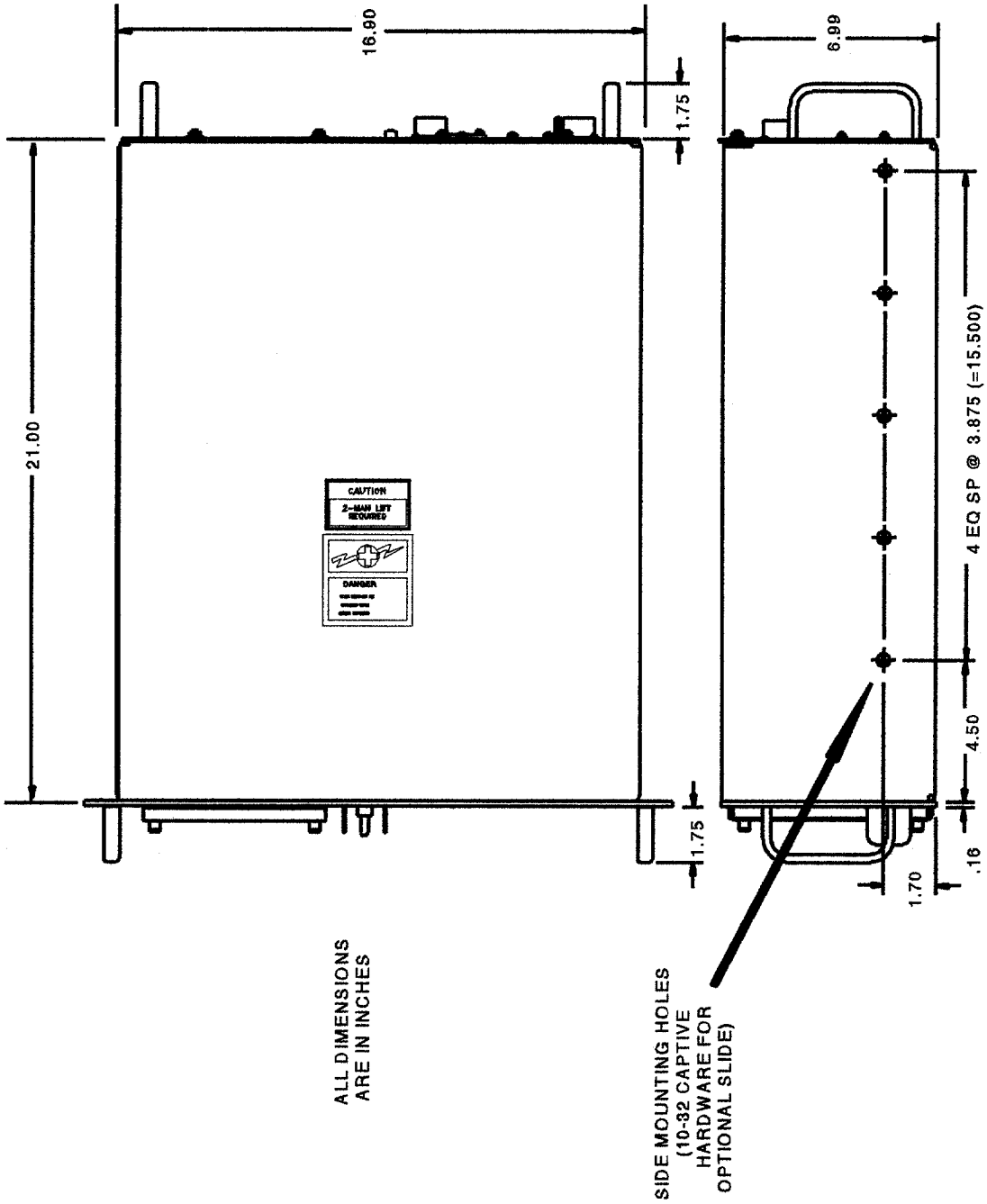

Figure 2-2. GUPS 1250A (Top and Side View) Mounting Dimensions

2.8 INPUT POWER REQUIREMENTS

Input power is connected to the GUPS via the rear panel connectors. The unit will operate across the full ac input range without requiring manual selection by the user.

The GUPS 1250A will operate from the ac input unless the voltage is outside the operating specification range. If the ac input voltage is insufficient, the unit will transition to the internal battery.

2.8.1 115 Vac Operation

A 20A service is required for 115 Vac operation (the input conductor should be AWG #14, or larger) if the input voltage may drop to 80 Vac. Refer to Section 2.11 for wire gauge selection criteria.

2.8.2 230 Vac Operation

A 10A service is required for 230 Vac operation (the input conductor should be AWG #16, or larger) if the input voltage may drop to 160 Vac. Refer to Section 2.11 for wire gauge selection criteria.

2.9 EXTERNAL SOURCE LINE IMPEDANCE

The GUPS 1250A is designed for proper operation with line impedances typically found in utility distribution systems or engine generators. However, if the unit is connected to a source that has high line impedance (such as an undersized isolation transformer, variac, or dc supply) or if the unit is located an extended distance from the power source (requiring long power cables), the regulation characteristics of the source could cause voltage fluctuations during load application that would be interpreted as line faults. Symptoms of excessive line impedance would be a repeated transitioning between sources when the input voltage is near a transition threshold.

2.10 POWER CONNECTION

WARNING

Hazardous voltages are present when operating this equipment. Read the "SAFETY" notices on page ii prior to performing installation, operation, or maintenance.

WARNING

To minimize shock hazard, the GUPS chassis must be connected to an electrical ground. The supply must be connected to the ac power source through a three-conductor cable, with the third wire connected to an electrical safety ground. A ground stud is located on the rear panel of the unit.

CAUTION

Before applying input power to the GUPS, check to ensure that the front panel switch labeled POWER ON is in the OFF (down) position.

2.11 WIRE GAUGE SELECTION

The following guidelines assist in determining the optimum cable specification for the user's power applications. The same engineering rules apply whether going into or out of an electrical device. Thus, this guide applies equally to the input cable and output cable for this ELGAR instrument and application loads.

Power cables must be able to safely carry maximum load current without overheating or causing insulation destruction. It is important to everyday performance to minimize IR (voltage drop) loss within the cable. These losses have a direct effect on the quality of power delivered to and from instruments and corresponding loads.

When specifying wire gauge, the operating temperature needs to be considered. Wire gauge current capability and insulation performance drops with the increased temperature developed within a cable bundle and with increased environmental temperature. Thus, short cables with generously derated gauge and insulation properties are recommended for power source applications.

Avoid using published commercial utility wiring codes. These codes are designed for the internal wiring of homes and buildings and accommodate the safety factors of wiring loss, heat, breakdown insulation, aging, etc. However, these codes consider that up to 5% voltage drop is acceptable.

Such a loss directly detracts from the quality performance specifications of this ELGAR instrument. Frequently, these codes do not consider bundles of wire within a cable arrangement.

In high performance applications, as in motor start-up and associated inrush/ transient currents, additional consideration is required. The cable wire gauge must consider peak voltages and currents which may be up to ten times the average values. An underrated wire gauge adds losses which alter the inrush characteristics of the application and thus the expected performance.

Table 2-3 identifies popular ratings for dc and ac power source cable wire gauges.

Table 2-3. Recommended Wire Gauge Selection Guide

Column 1	Column 2	Column 3	Column 4
Size (AWG)	Amperes (Maximum)	Ohms/100 Feet (One Way)	IR Drop/100 Feet (Col. 2 X Col. 3)
14	15	0.257	3.85
12	20	0.162	3.24
10	30	0.102	3.06
8	40	0.064	2.56
6	55	0.043	2.36
4	70	0.025	1.75
2	95	0.015	1.42
1/0	125	0.010	1.25
3/0	165	0.006	1.04

The following notes apply to Table 2–3 and to the power cable definition:

1. The above figures are based upon insulated copper conductors at 25°C (77°F), two current carrying conductors in the cable plus a safety (chassis) ground.

   Columns 3 and 4 refer to "one way" ohms and IR drop of current carrying conductors (e.g., a 50–foot cable contains 100 feet of current carrying conductor).

2. Determine which wire gauge for the application by knowing the expected peak load current (I_{peak}), the maximum tolerated voltage loss (V_{loss}) within the cable, and the one way cable length. The formula below determines which ohms/100 feet entry is required from Column 3. Read the corresponding wire gauge from Column 1.

   $$(\text{Column 3 value}) = V_{loss}/[I_{peak} \times 0.02 \times (\text{cable length})]$$

   Where:

   Column 3 value = Entry of the table above.

   Cable length = One way cable length in feet.

   V_{loss} = Maximum loss, in volts, permitted within cable.

   Special case: Should the V_{loss} requirement be very loose, I_{peak} may exceed the maximum amperes (Column 2). In this case, the correct wire gauge is selected directly from the first two columns of the table.

   Example:

   A 20 ampere (I_{peak}) circuit which may have a maximum 0.5 volt drop (V_{loss}) along its 15–foot cable (one way cable length) requires (by formula) a Column 3 resistance value of 0.083. This corresponds to wire gauge size 8 AWG.

   If the cable length was 10 feet, the Column 3 value would be 0.125 and the corresponding wire gauge would be 10 AWG.

3. Aluminum wire is not recommended due to soft metal migration at the terminals which may cause long term (on the order of years) poor connections and oxidation. If used, increase the wire gauge by two sizes (e.g., specify 10 gauge aluminum instead of 14 gauge aluminum).

4. Derate the above wire gauge (use a heavier gauge) for higher environmental temperatures since conductor resistance increases with temperature.

Temperature in Degrees		Current Capability
C	F	
40	104	80%

5. Derate the above wire gauge (use a heavier gauge) for an increased number of current carrying conductors. This offsets the thermal rise of bundled conductors.

Number of Conductors	Current Capability
3 to 6	80%
Above 6	70%

6. The preferred insulation material is application dependent. Elgar's recommendation is any flame retardant, heat resistant, moisture resistant thermoplastic insulation rated to a nominal 75°C (167°F). Voltage breakdown must exceed the combined effects of:

   - The rated output voltage;
   - Transient voltages induced onto the conductors from any source;
   - The differential voltage to other nearby conductors; and,
   - Safety margins to accommodate degradations due to age, mechanical abrasion and insulation migration caused by bending and temperature.

7. As frequency increases, the magnetic field of the current carrying conductors becomes more significant in terms of adverse coupling to adjacent electrical circuits. Use twisted pairs to help cancel these effects. Shielded twisted pairs are even better. Avoid close coupling with nearby cables by using separate cable runs for high power and low power cables.

8. The above general values and recommendations should be reviewed, modified and amended, as necessary, for each application. Cables should be marked with appropriate safety WARNING decals as hazardous voltages may be present.

SECTION III

OPERATION

3.1 INTRODUCTION

The controls and display for the Model GUPS 1250A are easily understood after a brief overview.

3.2 CONTROLS AND INDICATORS

The user controls consist of five indicators, one momentary pushbutton switch, and a power toggle switch. An audible alarm is present to warn of abnormal conditions. Refer to Figures 3-1 through 3-3 for the location of the various connectors, indicators and switches.

3.3 SWITCH AND DISPLAY PANEL

Refer to Figure 3-3 for the location of the indicators and controls listed below. All controls and indicators are located on the Display panel. There are no operator adjustments inside the unit.

3.3.1 Indicators

3.3.1.1 AC INPUT

This indicator shows the condition of the ac input (illuminated green when the ac input is within the normal line range, and illuminated red when the ac line is too low). When illuminated green, the GUPS will use the ac input as the source of power. Also, at high ac input voltages above 280 Vac, the indicator will illuminate red; however, the GUPS 1250A will continue to draw power from the ac input.

3.3.1.2 BATTERY

This three color indicator shows the condition of the internal battery. When illuminated green, the battery is in the normal range, amber when the battery voltage is low (while charging or discharging), and red when there is an impending shutdown of the battery because of low battery capacity (when the battery is the power source).

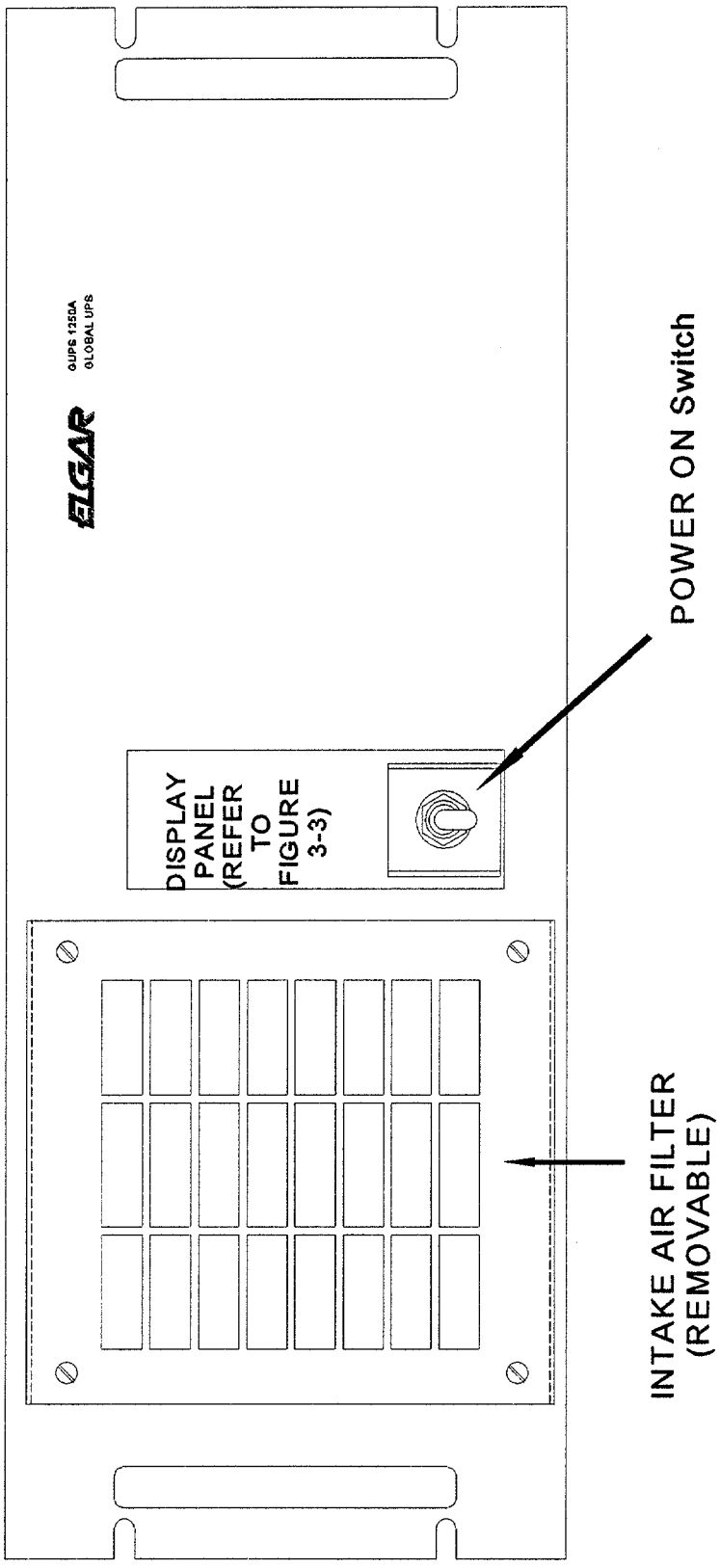

Figure 3-1. GUPS 1250A (Front View)

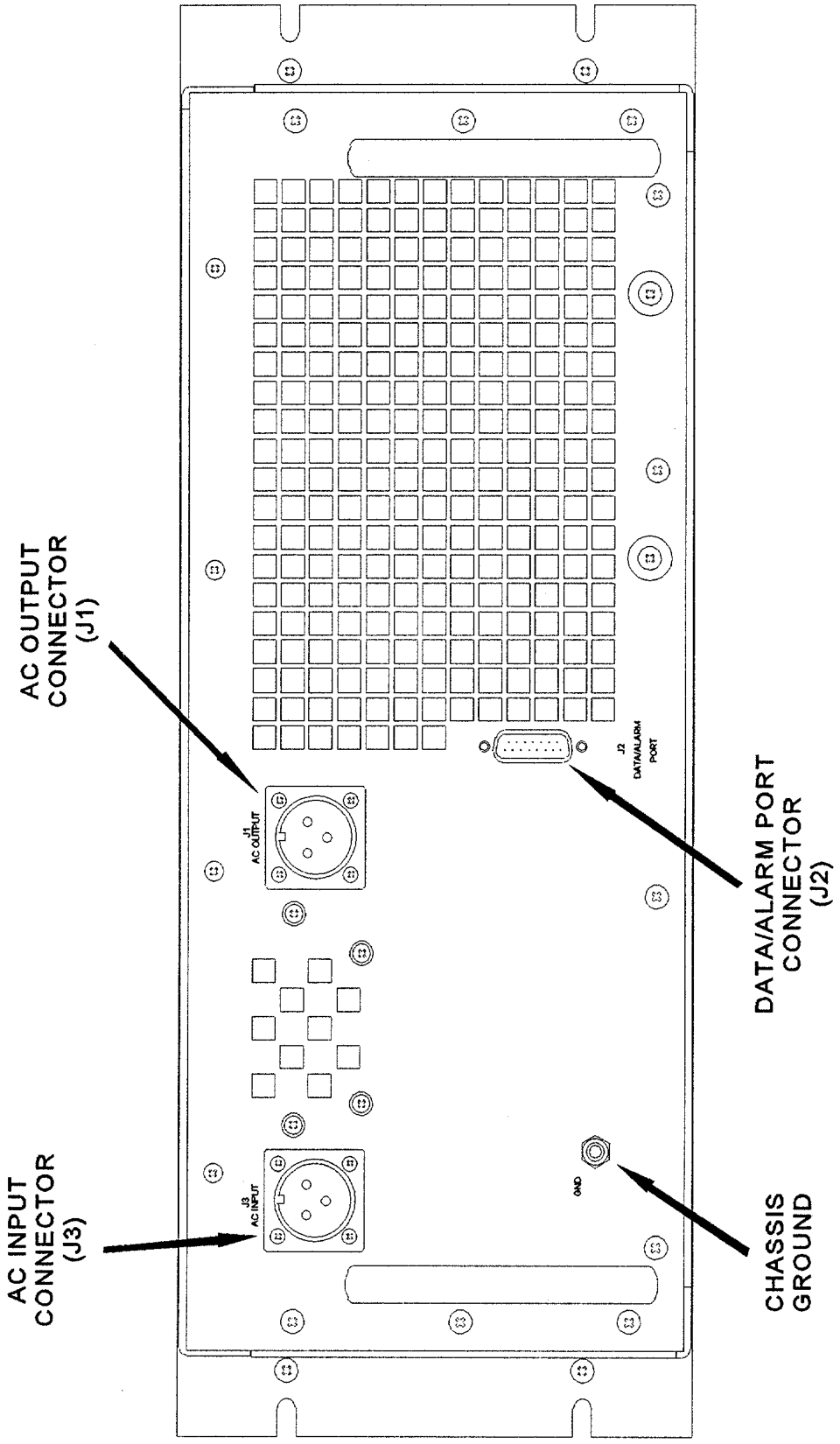

Figure 3-2. GUPS 1250A (Rear View)

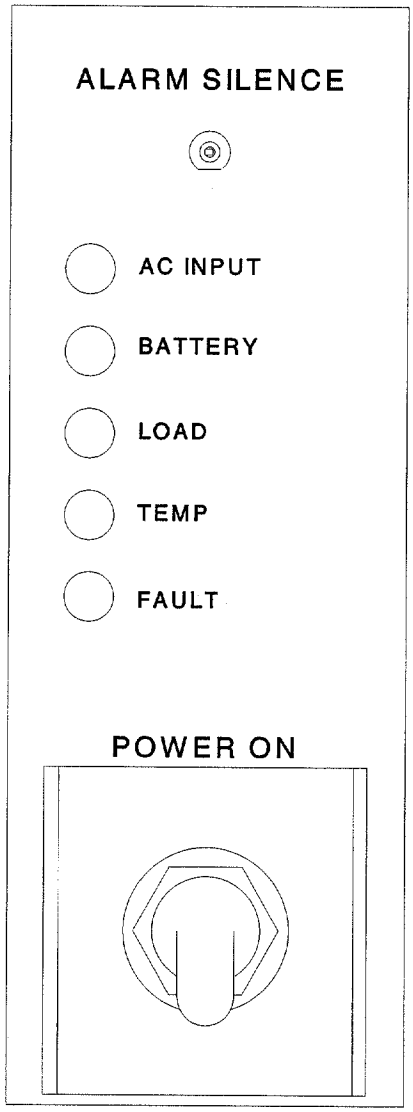

Figure 3-3. GUPS 1250A Switch and Display Panel

3.3.1.3 LOAD

This three color indicator shows the condition of the load. When illuminated green, the load is less than 95% of the rating, amber when the load is between 95% and 105% of rating, and red when an overload greater than 105% exists. A sustained overload between 105% and 150% will result in shutdown of the GUPS within 30 seconds; a sustained overload between 150% and 200% will result in shutdown within 3 seconds; and an overload above 200% will cause shutdown in 5 cycles of the output frequency.

3.3.1.4 TEMP

This indicator shows the presence of an over–temperature condition. If the unit internal temperature becomes high and nears the over–temperature shutdown threshold, the indicator illuminates amber. If the temperature reaches the shutdown threshold, the indicator illuminates red.

3.3.1.4 FAULT

This indicator shows the presence of abnormal operational conditions internal to the GUPS. It is normally illuminated green and turns red when one of the self–tests fails.

3.3.2 Switches

3.3.2.1 ALARM SILENCE

This momentary action switch silences the audible alarm when momentarily pressed.

3.3.2.2 POWER ON Switch

This switch (located on the Display Panel) controls the application of ac input power to the unit and the enabling of the internal power converters. This switch must be in the on (up) position for operation from either the ac input or battery. It is also used to reset the system following a shutdown (the switch should be turned off for **3 seconds** and then turned on again to initiate a reset).

3.4 AUDIBLE ALARM

The audible alarm gives notice of abnormal operating conditions. The alarm will sound for the following conditions:

- Running on internal battery;
- Output overload;
- Internal fault;
- Over-temperature; or
- Impending shutdown (low battery).

If the alarm is silenced for a particular condition, it will be re-enabled when a new alarm condition develops.

3.5 TURN ON SEQUENCE

To turn on the GUPS 1250A, perform the following:

1. Ensure that the POWER ON switch is in the off (down) position.
2. Connect the ac input power source.
3. Connect the output load.
4. Place the POWER ON switch in the on (up) position. The unit will perform an internal self test and indicator test (the front panel indicators will be illuminated in a green, amber, red, and off sequence). After the self test is completed, the front panel indicators will show the status of the various displayed parameters.

3.6 OPERATING MODES

In the normal mode of operation, the GUPS 1250A derives power from the ac input. The unit will remain in this mode as long as the input voltage remains above 80 Vac, regardless of the variations of voltage or frequency.

Upon loss of the ac input, the unit will transition to the internal battery. Loss of ac input is indicated by the ac input indicator illuminating red, a change of state of the AC INPUT FAIL relay, and through the RS-232 port.

The unit will continue to supply output power until either the battery discharges or the ac input returns. The battery backup time is dependent on the initial capacity of the battery and the output load; when the battery capacity is depleted, the unit will automatically shut down. Prior to shutdown an advance warning is provided called IMPENDING SHUTDOWN. This is indicated with the BATTERY indicator illuminated red, a change of state of the IMPENDING SHUTDOWN relay, and through the RS-232 port.

When the ac input power returns, the unit will transition back to it. The internal battery is then recharged and maintained in a float charge condition.

3.7 RS-232 DATA COMMUNICATIONS PORT

The RS-232 interface signals for communications to and from the GUPS 1250A are provided via a 15-pin subminiature-D hardware interface connector, designated as the DATA/ALARM PORT (J2), located on the rear of the unit. The connector pinout is provided in Table 3-1.

Table 3-1. GUPS 1250A RS-232 Connector Pinout

Pin	Signal
6	Transmit from the GUPS 1250A
7	Receive to the GUPS 1250A
8	Signal Ground

3.7.1 Interface Software

The RS-232 interface software which resides in the GUPS 1250A has the following communication features.

3.7.1.1 Remote Terminal Software Commands

The RS-232 interface software has two sets of remote terminal software commands:

- Text data request commands, which are applicable for dumb terminal display of the unit status. Text data request commands return both descriptive text and the data values requested.

- Fast "data only" data request commands, called the Elgar Terminal Interface (ETI), for use by a program running on a host computer. The ETI commands return only the data values that are requested.

3.7.1.2 Data Available Via The RS-232 Interface

The data available via the RS-232 interface includes:

- AC Line Fail signal;
- AC Input Voltage in floating point or hexadecimal;
- AC Input Frequency in floating point;
- AC Output Voltage in floating point or hexadecimal;
- AC Output Current in floating point or hexadecimal;
- Battery Voltage in floating point or hexadecimal
- Operation from the ac input, dc input or battery; and,
- Impending Shutdown status.

3.7.2 RS-232 Protocol

The RS-232 communications port protocol is as follows:

Baud Rate:	9600
Data Bits:	8
Start Bits:	1
Stop Bits:	1
Parity :	None

3.7.3 Text Data Request Commands

The RS-232 text data mode commands have been developed for a user interface utilizing a dumb terminal interface. The text data mode commands provide formatted responses which include text which provides both the name of the data parameters and the measured values. The following provides a description of each of the GUPS 1250A text data requests that are supported.

3.7.3.1 List Selection Menu

The GUPS will display the following menu in response to a "space" (0x20) character:

s = Status registers, A/D
v = Display version
m = ETI Hex
n = ETI Floating

3.7.3.2 Display Status Registers and A/D Values

The GUPS will display the two 16–bit status registers along with the A/D values of system parameters in response to a Command 's' (lowercase S) character. For example:

Status 1:	5540	// 16–bit status flags in hexadecimal
Status 2:	0283	
A/D Values:	//A/D values in floating point and hexadecimal	
Output Voltage:	115.0	2314
Output Current:	3.25	0028
Ac Input Voltage:	120.1	2357
Ac Input Frequency:	60.00	
Battery Voltage:	27.6	0081

The status word formats are explained in paragraph 3.7.5 below.

3.7.3.3 Display Firmware Version Number

The unit will display the version number of the firmware in response to a command 'v' (lowercase V) character. For example:

Firmware version number:
P/N 5152315–02 Rev A

3.7.4 Elgar Terminal Interface (ETI) Data Request Commands

The GUPS 1250A RS-232 text data mode commands have been developed for use by a program running on a host computer. The ETI mode data requests commands provide formatted responses which provide only the measured value data in a formatted form. The following provides a description of each of the GUPS 1250A ETI data requests that are supported.

3.7.4.1 Status Words and Hexadecimal A/D Values

The unit will provide the Status Words and Hexadecimal A/D readings for the A/D converter algorithm values in response to a Command 'm' (lowercase M) character. For example, this command will return the A/D values and the unit status in the following order:

Status word 1 // 16-bit flags in hexadecimal

Status word 2

Output Voltage // A/D values in hexadecimal

Output Current

AC Input Voltage

Battery Voltage

The status word formats are explained in paragraph 3.7.5.

3.7.4.2 Status Words and Floating Point A/D Values

The GUPS 1250A will provide the Status Words and A/D values in response to a Command 'n' (lowercase N) character.

This command will return the A/D values and the unit status as in the 'm' command (refer to paragraph 3.7.4.1 above), but the voltage and currents will be returned in IEEE floating point format.

3.7.5 Status Words

The status words may be used to examine the current state of the GUPS, but are not meant to be used in applications that are time critical such as "AC Line Loss." The "Line Loss" message sent from the GUPS (refer to paragraph 3.7.6) will have the quickest response.

3.7.5.1 Status Word 1 Format

Table 3–2 provides the bit position information and definition of the data in Status Word 1.

Table 3–2. Status Word 1

Bit	Name	Definition
0	Over Temperature	0 = Normal Operation 1 = Over Temperature This status bit indicates that the thermostat internal to the GUPS 1250A has exceeded its trip point. A binary value of 0 indicates normal operation, while a binary value of 1 indicates that the thermostat sensor has exceeded its trip point.
1	Alarm Sense	0 = Alarm Not Sensed 1 = Alarm Sensed This bit indicates that an alarm condition is currently being detected by the unit. A binary value of 0 indicates that no alarms are being sensed, while a binary value of 1 indicates that an alarm is being sensed.
2	Alarm Silence	0 = Alarm Silence Not Enabled 1 = Alarm Silence Enabled This bit reflects the setting of the front panel Alarm Silence switch of the GUPS 1250A. A binary value of 0 indicates that the Alarm Silence is Not Enabled (when an alarm condition is sensed, the audible alarm will enunciate it), while a binary 1 indicates that the Alarm Silence is Enabled (a subsequent change in the alarm condition will re-enable the alarm).
3	Charger Status	0 = Charger Not On 1 = Charger On This bit reflects the condition of the charger enable logic of the GUPS 1250A. A binary value of 0 indicates that the charger is not on, while a binary value of 1 indicates that the charger is on.

Bit	Name	Definition
4	Output Current Overload	0 = Normal Operation 1 = Current Overload This bit indicates that the unit has sensed a current overload of greater than 105% of the specified output current. A binary value of 0 indicates normal operation, while a binary value of 1 indicates that the output current is greater than 105% of the specified current output capability of the unit.
5, 6, 7	Reserved	N/A
8	On Battery	0 = Power Source Is Ac Input 1 = Power Source Is Internal Battery This status bit indicates that the GUPS 1250A is currently powered by the internal battery. A binary value of 0 indicates that the power source is the ac input, while a binary value of 1 indicates that the internal battery is the power source.
9	Impending Shutdown	0 = Greater than 10% of Backup Time 1 = Less than 10% of Backup Time This status bit indicates the status of the battery of the unit. A binary value of 0 indicates more than approximately 10% of backup time is available or that the battery voltage is greater than 22V, while a binary value of 1 indicates that less than approximately 10% of backup time is available or that the battery voltage is less than 22V.
10, 11, 12	Reserved	N/A
13	Ac Input Source	0 = Not Powered By Ac Input 1 = Powered By Ac Input This status bit indicates that the GUPS 1250A is currently powered by the ac input. A binary value of 0 indicates that the input is not powering the unit, while a binary value of 1 indicates that the unit is powered by the ac input.
14	Reserved	N/A
15	Self Test Passed	0 = Fault Condition 1 = OK This status bit indicates the outcome of the built-in self tests performed during start up and in normal operation of the GUPS 1250A. A binary value of 0 indicates test failure and a binary value of 1 indicates successful passing of the self tests.

3.7.5.2 Status Word 2 Format

Table 3–3 provides the bit position information and definition of the data in Status Word 2.

Table 3–3. Status Word 2

Bit	Name	Definition
0 to 9	Reserved	N/A
10	System Shutdown	0 = System Operational 1 = System is Shutting Down This status bit indicates that the system has been commanded to shut down, and a system shutdown is in effect. A binary value of 0 indicates the system is operating (normal operating mode), while a binary value of 1 indicates the unit is in system shutdown mode.
11	150% Output Overload Sense	0 = Normal Operation 1 = 150% Overload Detected This bit indicates that the unit has sensed a current overload of greater than 150% of the specified output current. A binary value of 0 indicates normal operation, while a binary value of 1 indicates the output current is greater than 150% of the specified current output capability of the unit.
12 to 15	Reserved	N/A

3.7.6 AC Line Fail Signal

When the ac input is lost, the GUPS will send the message "Line Loss Detected" out the RS–232 port. Applications may use this as a trigger to take action on a host computer.

3.8 BATTERY INFORMATION, CARE AND HANDLING

The battery used in the GUPS 1250A requires proper storage and recharging if it is to remain reliable.

During storage, the self-discharge of the battery results in a sulfate coating that builds up on the plates. This coating reduces the effective surface area of the plates, which reduces the backup time. Allowing the batteries to self-discharge for too long a period of time may result in problems with recharging or battery degradation.

Storing the battery at reduced temperatures reduces the level of chemical activity, thus sulphation takes longer to take place. Reasonable storage times can be found in Table 3-4 for several different temperatures.

The batteries should be recharged for 24 hours after coming out of storage. Prolonged storage may require a 72-hour recharge to recover full battery capacity.

CAUTION

Failure to recharge the batteries after the storage time may result in permanent battery degradation.

Table 3-4. Battery Storage Times

Storage Temperature	Storage Time
0°C (32°F)	20 Months
10°C (50°F)	10 Months
20°C (68°F)	5 Months
40°C (104°F)	1.5 Months

SECTION IV

OPERATOR MAINTENANCE

4.1 INTRODUCTION

This section contains information on maintaining the GUPS 1250A. There are no adjustments accessible to the user. This maintenance section will deal with mechanical or general operational details only.

WARNING

Hazardous voltages are present when operating this equipment. Read the "SAFETY" notices on page ii prior to performing installation, operation, or maintenance.

4.2 SERVICE INFORMATION

Questions concerning the operation, repair or service of this instrument should be directed to the Elgar Repair Department, Elgar 9250 Brown Deer Road, San Diego, CA 92121-2294. Include the model number and serial number in any correspondence concerning this instrument. DO NOT return the unit to the factory without prior authorization.

4.3 SPARE AND REPAIR PARTS

When ordering spare parts or repair parts, specify the part name, part number, component value and rating, and the Elgar part number, if available.

If complete assemblies are required, contact the Elgar Repair Department. Specify the assembly part number as marked on the assembly and the unit model number, GUPS 1250A, when ordering.

4.4 PERIODIC MAINTENANCE

The only periodic maintenance required for this instrument is to remove any dust and dirt accumulated during operation. The front panel fan filter should be removed and cleaned or replaced on a periodic basis.

The amount of time between cleaning is dependent on the environment in which the unit is used. Dirt accumulation in the air filter can cause restricted air flow and subsequent overheating or reduced life on the internal components and batteries.

4.5 TROUBLESHOOTING

In the event that problem arises during unit operation, the guidelines listed in Table 4–1 should be used to assist in determining the cause and to repair the unit as quickly as possible.

Table 4–1. GUPS 1250A Troubleshooting Guide

Symptom	Probable Cause	Suggested Solution
No indicators are illuminated.	The ac input and battery are not connected; the POWER ON switch is off (down).	Ensure that the external power sources and battery have adequate voltage; turn on the POWER ON switch.
The AC INPUT indicator is illuminated red.	Ac input voltage is below 95 Vac or approximately 275 VAC (outside the transfer threshold).	Ensure that the ac input voltage is within the required operating range.
The LOAD indicator is illuminated amber.	Output load is between 95% and 105%.	Ensure that additional load is not applied that would exceed 105%; otherwise, shutdown would occur!
The LOAD indicator is illuminated red.	An overload condition exists on the output.	Reduce the output load (a momentary red flash of the indicator during start up of a load is normal).
The unit shuts down when the POWER ON switch is turned on, the audible alarm is sounded or the LOAD indicator is illuminated red.	Severe overload or a short exists on the output.	Ensure that the load is functional; reduce the load.

Symptom	Probable Cause	Suggested Solution
Upon a loss of ac input, the unit transitions to battery and quickly shuts down.	The battery is discharged; the battery is sulfated; defective battery.	Allow for a 4-hour recharge; if sulfated, allow a 72-hour recharge; replace the battery if defective.
The TEMP indicator is illuminated red.	An over-temperature condition exists.	Ensure that the intake air temperature is less than 122°F (50°C). Check for dust/dirt accumulation within the unit. Allow the unit to cool before turning it back on. If the problem persists, contact the Elgar Service Department.
The TEMP indicator is illuminated amber.	The internal operating temperatures are high and are near the over-temperature shutdown threshold.	Check for dust/dirt accumulation within the unit; ensure that the intake air is less than 122°F (50°C).
The unit attempts to transfer to the ac input but quickly transfers back to the battery.	The impedance of the source is too high, causing its voltage to drop when the load is applied.	Ensure that the source voltage does not sag at the instant the load is transferred to it; increase the source voltage.
The FAULT indicator is illuminated red.	The unit has failed the internal self-test.	Contact the Elgar Service Department.

NOTES