# Cordex HP LPS04

## Installation & Operation Manual

Part # 0120037-J0
*Effective:* ***07/2020***


*Your Power Solutions Partner*

# Cordex HP LPS04
# -48Vdc to +/-190Vdc Quad Line Power Up Converter Unit

**NOTE:**

**Photographs contained in this manual are for illustrative purposes only. These photographs may not match your installation.**

**NOTE:**

**Operator is cautioned to review the drawings and illustrations contained in this manual before proceeding. If there are questions regarding the safe operation of this powering system, contact Alpha and Outback Energy GmbH or your nearest AOE representative.**

**NOTE:**

**AOE shall not be held liable for any damage or injury involving its enclosures, power supplies, generators, batteries, or other hardware if used or operated in any manner or subject to any condition inconsistent with its intended purpose, or if installed or operated in an unapproved manner, or improperly maintained.**

For technical support, contact Alpha and Outback Energy GmbH:

**Tel: +49 9122 79889 0**
**Mail: info@alpha-outback-energy.com**

## Copyright

# Table of Contents

# List of Figures

# 1. Safety

SAVE THESE INSTRUCTIONS: This manual contains important safety instructions that must be followed during the installation, servicing, and maintenance of the product. Keep it in a safe place. Review the drawings and illustrations contained in this manual before proceeding. If there are any questions regarding the safe installation or operation of this product, contact Alpha Technologies or the nearest Alpha representative.

## 1.1 Safety Symbols

To reduce the risk of injury or death, and to ensure the continued safe operation of this product, the following symbols have been placed throughout this manual. Where these symbols appear, use extra care and attention.

**NOTE:**

**A NOTE provides additional information to help complete a specific task or procedure. Notes are designated with a check mark, the word NOTE, and a rule beneath which the information appears**

**CAUTION!**

**CAUTION indicates safety information intended to PREVENT DAMAGE to material or equipment. Cautions are designated with a yellow warning triangle, the word CAUTION, and a rule beneath which the information appears.**

**WARNING!**

**WARNING presents safety information to PREVENT INJURY OR DEATH to personnel. Warnings are indicated by a shock hazard icon, the word WARNING, and a rule beneath which the information appears.**

**HOT!**

**The use of HOT presents safety information to PREVENT BURNS to the technician or user.**

## 1.2 General Warning and Cautions

**WARNING!**

**This system is designed to be installed in a restricted access location that is inaccessible to the general public.**

## 1.3 Mechanical Safety

**CAUTION!**

**Do not disassemble the product – call our qualified service centers for servicing. Incorrect reassembling may result in a risk of electrical shock or fire.**

**Do not operate the product if it has received a sharp blow, it has been dropped, or otherwise damaged in any way – return it to a qualified service center for repair.**

## 1.4 Electrical Safety

**WARNING!**

**The DC input to the modules (and the converter system) – though not dangerous in voltage – has a high short circuit current capacity that may cause severe burns and electrical arcing.**

**The DC output is a potentially dangerous voltage. Do not touch the output connections when under power. Ensure that power has been removed from the outputs before working on them.**

Before working with any live battery or power system, follow these precautions:

a. Remove all metallic jewelry, such as watches, rings, metal rimmed glasses, or necklaces.

b. Wear safety glasses with side shields at all times during the installation.

c. Use OSHA approved insulated hand tools. Do not rest tools on top of batteries.

**WARNING!**

**Lethal voltages are present within the power system. Always assume that an electrical connection or conductor is energized. Check the circuit with a voltmeter with respect to the grounded portion of the enclosure (both AC and DC) before performing any installation or removal procedure.**

- Do not work alone under hazardous conditions.
- A licensed electrician is required to install permanently wired equipment. Hazardous voltages are present at the input of power systems. Ensure that the utility power is disconnected and locked out before performing any installation or removal procedure.
- Ensure that no liquids or wet clothes come into contact with internal components.
- Hazardous electrically live parts inside this unit are energized from the batteries even when the AC input power is disconnected.
- The enclosure which contains the DC or AC power system along with customer installed radios must remain locked at all times, except when authorized service personnel are present.
- Always assume electrical connections or conductors are live. Turn off all circuit breakers and double-check with a voltmeter before performing installation or maintenance.
- Place a warning label on the utility panel to warn emergency personnel that a reserve battery source is present which will power the loads in a power outage condition or if the AC disconnect breaker is turned off.
- At high ambient temperature conditions, the internal temperature can be hot so use caution when touching the equipment.

# 2. Product Overview

The LPS04 is a compact, stand-alone DC to DC up-converter system designed for distributed power communications applications using +/- 190Vdc (RFT-V circuit) over twisted copper pairs. Using switched mode technology, the LPS04 quad output converter module provides outstanding efficiency in a compact design.

Applications include, powering mini DSLAMs, optical network terminals in fiber to the home networks, as well as with municipal Wi-Fi access points. The LPS04 may be installed inside or outside a remote OSP power cabinet. Line powering enables using the existing remote power node backup without the need at the remote site of AC utility or battery backup, thus reducing the installation and operating expenses and providing flexibility related to site selections for the installation of the remote communicating equipment.

Alpha's LPS04 modular DC to DC converter unit incorporates a full range of standard features including, current limiting and individual ground fault interrupt for each circuit. Particular emphasis is placed on recognizing a fault condition and shutting down the circuit as quickly as possible to ensure the highest level of safety. Compliance wit GR-1089-CORE Class A2 enables crafts people to work on the equipment while powered which significantly reduced the administrative and labeling requirements and overheads for the high voltage wiring.

- Four +/- 190Vdc line powering RFT-V channels with current limiting and ground fault protection
- 91% efficiency for increased OPEX savings and reduced carbon footprint
- Rugged and sealed enclosure for installation either inside or outside power cabinets
- Wide operating temperature range for deployment in harsh OSP environment
- High reliability sealed design


Figure 1 — LPS04

## 2.1 Product part number

Part number 0120037-001.

# 3. Product Specifications

| | |
|---|---|
| **Electrical** | |
| **Input voltage:** | -40 to -60Vdc |
| **Output voltage:** | ±190Vdc (RFT-V) |
| **Power:** | 96W nominal per output, >92W for worst case conditions (4 outputs per module) |
| **Efficiency:** | >91% |
| **Regulation:** | <2% no load to full load<br><1% line |
| **Output Noise:**<br>**Wide band:** | <500mVRMS (10kHz to 10MHz)<br><2.5V p-p (10kHz to 100MHz) |
| **Connections:** | Two blunt cut cables |
| **Recommended Breaker:** | 15A dc |
| **Enclosure:** | NEMA 3R |
| **Mechanical** | |
| Dimensions (HxWxD): | 142mm x 305mm x 54mm (5.6in x 12in x 2.1in) |
| Weight: | 2.9kg (6.5lbs) |
| **Environmental** | |
| Temperature Operating: | - 40 to 65˚C (-40 to 149˚F) |
| Temperature storage: | - 40 to 85˚C (-40 to 185˚F) |
| Humidity | 0 to 100% RH non-condensing |
| Altitude: | -500 to 2800m (1640 to 9186ft) |
| **Performance/ Features** | |
| **Alarm relays:** | 1x Form C |
| **Alarm indicating LEDs (1 per channel):** | Channel OK (green)<br>Recoverable (yellow)<br>Irrecoverable Fault (red) |
| **Agency Compliance** | |
| **Safety:** | CSA 60950-1-07 (ed.2)/UL 60950-1 (ed.2)<br>CSA 60950-21-03 (ed.1)/UL 60950-21 (ed.1)<br>CSA 94.2-07 (ed.1)/UL 50E (ed.1)<br>GR-1089-CORE Class A2<br>CSA 60950-22-07 (ed.1)/UL 60950-22 (ed.1) |
| **EMC:** | ETSI EN 300 386 V 1.6.1<br>EN 55022-2010, Class A<br>FCC CFR 47, Part 15, Subpart B, Class A |
| **MTBF:** | > 400,000 @30°C (86°F) ambient; test model Telcordia SR-332, Issue 2 (2006) |

# 4. Features

## 4.1 Converter Modules

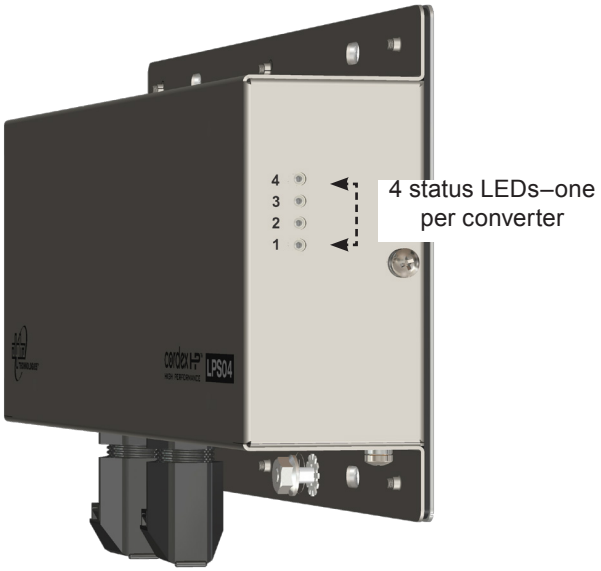
An LPS04 unit contains four isolated DC to DC line powering converters (channels) with a common control and supervisory circuit. Each converter output operates independently. An internal micro controller monitors both the inputs and outputs of the converters, turns the converters on and off, and generates converter fail alarm if required.

### 4.1.1 Status Indicators

The LPS04 unit has four LED indicators – one per converter. The LEDs are color-coded to indicate converter channel status as follows:

**Table A — Converter Status LEDs**

| LED State | Converter status |
|---|---|
| Green | Normal operation (Vout > 90%) |
| Yellow | Recoverable:<br>• Over temperature |
| Blinking yellow | Recoverable:<br>• OCP/Overload<br>• Input quality not OK |
| Red | Locked-State:<br>• OVP<br>• Fuse Fail |
| Blinking red | Recoverable:<br>• GFI |
| OFF | No power<br>• Input fuse cut-off |




### 4.1.2 Module Alarm Relay

An alarm is activated after any of the following conditions on any channel

- Internal regulation fails
- Output voltage <±140V
- Over Voltage Protection (OVP) operation
- Ground Fault Interrupt (GFI) trip
- Input fuse or output fuse fail
- Output short circuit (±30V ± 20%)
- Input voltage out of range
- Heat sink/ambient temperature out of range (Over Temperature Protection)

## 4.2 LPS04 Connections and Indicators

For detailed information on the connections, refer to section 6.5 of this manual.

Input connection: 18 AWG 3-conductor wire cable

Output connection: 24 AWG 12-conductor wire cable

Ground connection: #10-32 ground stud

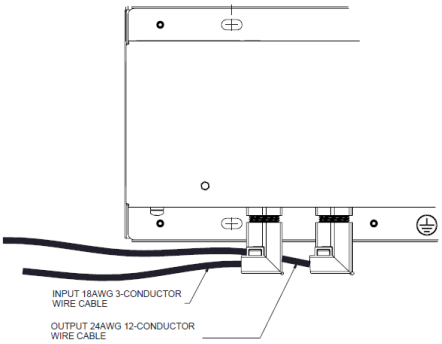



Figure 2 — Cable Gauge

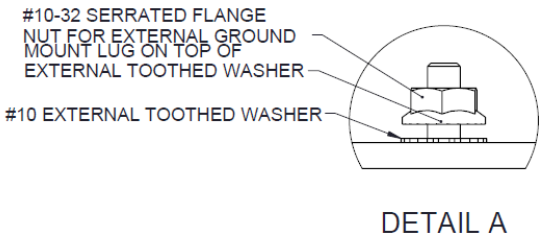



Figure 3 — Ground Connection

## 4.3 Connecting the DC Input

**WARNING!**

**Warning: The LPS04 unit shall be permanently connected to the DC mains supply with the supplied power cable. A DC breaker shall be used as a disconnect device, and shall be rated at 15A DC.**

**Grounding: The LPS04 unit shall be reliably grounded via a #6 AWG copper inductor at the grounding terminal provided on the LPS04 unit.**

# 5. Site Evaluation and Pre-Installation

## 5.1 Pre-Installation Requirements

### 5.1.1 Effective Capacitance

The effective capacitance of each output of the LPS04 is 2.7 microfarads maximum between the output connections to the telecommunications network and 0.5 microfarads between each output connection to the telecommunications network and earth ground.

- At the time of installation, carry out a system assessment to ensure that the effective capacitance of the total system, including the capacitance of the LPS04 system, does not exceed 11 µF (Line to Earth) and 40µF (Line to Line).

### 5.1.2 RFT-V Circuits

- At the time of installation, ensure that the voltage rating of the wiring of the telecommunication network is adequate for the normal RFT circuit voltage (+/-200Vdc), together with superimposed transients.
- Ensure that the circuits to be connected together are all RFT-V circuits.

### 5.1.3 Primary Protection

The LPS04 has built-in second level surge protection in compliance with the GR-1089 requirement. Primary protection must be in place at the customer site.

The LPS04 includes secondary surge protection. External primary surge protection devices are necessary to optimally protect the RFT-V circuits from lightning surge and maintain safety certification to UL/CSA 60950-21.

Each channel (pair) must be properly protected by the upstream system using a 5-pin protector to a level corresponding to a Bourns 2410 Series. For example: 2410-33-G-MSP-S provides the part in a red color. This protector should be UL 497 listed and rated for 300-400 Volts voltage breakdown range.

### 5.1.4 Installation Locations

**WARNING!**

**Do not submerge the LPS04 under water.**

Allowable installation locations for the LPS04 include the following: outdoors, direct sunlight, and inside or outside a cabinet.

## 5.2 Packing Materials

Alpha is committed to providing products and services that meet our customers' needs and expectations in a sustainable manner, while complying with all relevant regulatory requirements. As such Alpha strives to follow our quality and environmental objectives from product supply and development through to the packaging for our products.

Packaging assemblies and methods are tested to International Safe Transit Association standards.

Rectifiers and batteries are shipped on individual pallets and are packaged according to the manufacturer's guidelines.

Almost all of Alpha's packaging material is from sustainable resources and or is recyclable.

### 5.2.1 Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is unavailable, make sure that the product is packed with at least three inches of shock-absorbing material to prevent shipping damage.

Alpha Technologies is not responsible for damage caused by improper packaging of returned products.

## 5.3 Check for Damage

Before unpacking the product, note any damage to the shipping container. Unpack the product and inspect the exterior for damage. If any damage is observed, contact the carrier immediately.

Continue the inspection for any internal damage. In the unlikely event of internal damage, inform the carrier and contact Alpha Technologies for advice on the impact of any damage.

## 5.4 General Receipt of Shipment

The inventory included with your shipment depends on the options you have ordered. The options are clearly marked on the shipping container labels and bill of materials.

Call Alpha Technologies if you have any questions before you proceed: 1 888 462-7487

# 6. LPS04 Installation

This chapter is provided for qualified personnel to install an LPS04 system.

## 6.1 General Instructions

This chapter provides cabling details and notes on cable sizing for DC applications.

Connections to the converter system must comply with all the local codes and ordinances.

## 6.2 Safety Precautions

**WARNING!**

**The DC input to the modules (and the converter system) – though not dangerous in voltage – has a high short circuit current capacity that may cause severe burns and electrical arcing.**

**The DC output is a potentially dangerous voltage. Do not touch the output connections when under power. Per GR1089-ClassA2, qualified technicians can work on the unit when energized.**

**The LPS04 unit shall be continuously energized to prevent condensation within the enclosure.**

Before working with any live power system, take the following precautions:

- Remove all metallic jewelry; e.g., watches, rings, metal rimmed glasses, necklaces.
- Wear safety glasses with side shields (and prescription lenses if necessary) at all times during installation.

Use insulated metallic tools.

The installer should follow all applicable local rules and regulations for electrical and battery installations; e.g., CSA, UL, CEC, NEC, OSHA, and local fire codes.

## 6.3 Tools Required

Various insulated tools are essential for product installation. The following list is a guide:

- Phillips head screwdriver, #2 (tip size 3/16")
- Slot head screwdriver (blade size 1/8")
- Digital voltmeter equipped with test leads
- Cutters, crimpers, and wire strippers 0.25 to 10mm$^2$ (#24 to #6 AWG)

## 6.4 Mounting

The following figures show the two recommended mounting orientations. For more detailed information refer to 0120037-08 drawing at the back of this manual.

Recommended hardware:

- 4x #12 to 1/4" screws or bolts
- 4x #12 to 1/4" flat narrow washers with 0.75" OD max.
- 4x #12 to 1/4" sealing washers for watertight mount

The LPS04 can be mounted to surfaces with #12 (MG) to 1/4-20 fastening hardware in four locations. Alpha recommends using flat washers for improved fastening.

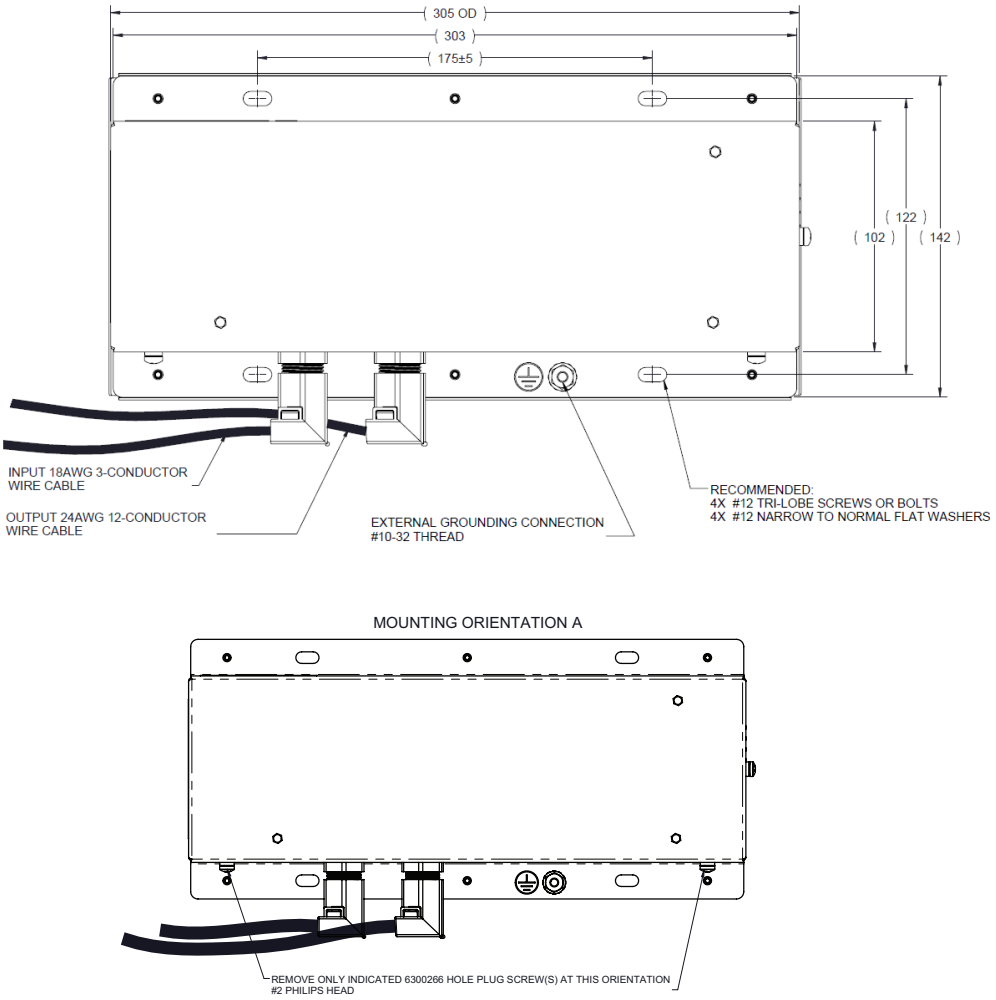



Figure 4 — Panel or wall mount option A

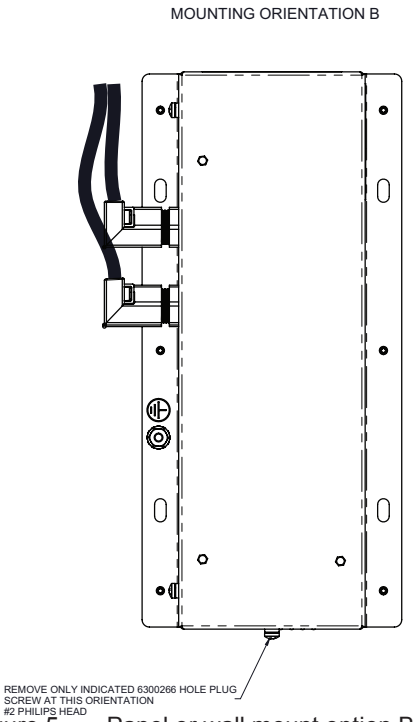
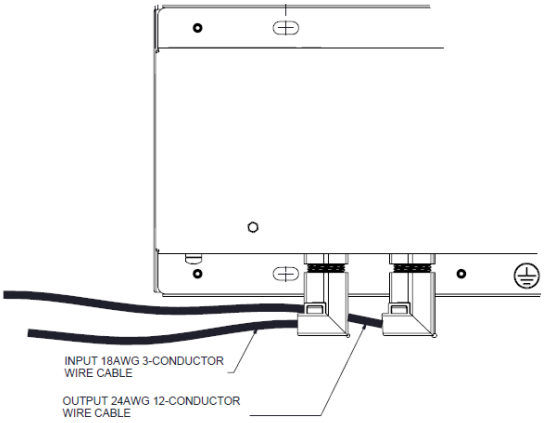



Figure 5 — Panel or wall mount option B

## 6.5 Input and Output Wiring




## 6.6 Input Cables

Input Cable (#12 AWG, 3-Conductor, 6ft)

| Wire Color | Circuit Designation |
|---|---|
| **White** | -48V |
| **Black** | 48V_RTN |
| **Green** | Chassis Ground |

## 6.7 Output Cables

Output Cable (#24 AWG, 12-Conductor, 6ft)

| Output | Wire Color | Circuit Designation |
|---|---|---|
| **Output 1** | White/Blue | +190V_OUT1 |
| | Blue | -190V_OUT1 |
| **Output 2** | White/Orange | +190V_OUT2 |
| | Orange | -190V_OUT2 |
| **Output 3** | White/Green | +190V_OUT3 |
| | Green | -190V_OUT3 |
| **Output 4** | White/Brown | +190V_OUT4 |
| | Brown | -190V_OUT4 |
| **Alarm** | Blue/Red | Relay_NC |
| | Red | Relay_COM |
| | Gray | Relay_NO |
| | White/Gray | -- |

## 6.8 Troubleshooting Converter Status LEDs

### 6.8.1 Card Alarms (All 4 LEDs)

| LED State | Individual Converter status | Action |
|---|---|---|
| Green | Normal operation (Vout > 90%) | None |
| Yellow | Recoverable:<br>• Ambient temperature high | Resets automatically when ambient temperature reduces to approximately 85°C or below. |
| Blinking yellow | • Input qualify not OK | Output is disabled if input voltage is not within the range of 40-60Vdc. |
| OFF | Recoverable<br>• No power | Check input wiring |
| | Non-recoverable:<br>• Main input fuse cut-off | Potential component failure. Replace with new module. |

### 6.8.2 Individual Channel Alarms

| LED State | Individual Converter Status | Action |
|---|---|---|
| **Green** | Normal | None |
| **Blinking Yellow** | Recoverable:<br>• OCP/Overload | Ensure the load is within the rated current. |
| | Recoverable:<br>• Vout low | Check that output is within the regular range. |
| | Non-recoverable:<br>• Converter Input Fuse fail | Potential component failure. Replace with new module. |
| **Red** | Recoverable:<br>• OVP | OVP will cause the output to restart every 2 seconds, until the fault is removed. If the fault persists for 60 seconds, the output will shut down for 60 seconds and then attempt to restart every 60 seconds until the fault is cleared. |
| | Non-recoverable:<br>• Converter Output Fuse fail | Failed fuses are not field replaceable. Replace with new module. |
| **Blinking Red** | Recoverable:<br>• GFI | The converter attempts to restart every 2 seconds until the fault is removed. If the fault persists for 60 seconds, the output will shut down for 30 seconds and attempt to restart every 30 seconds until the fault is cleared. |

# 7. Warranty and Service Information

## 7.1 Technical Support

**Tel: +49 9122 79889 0**
**Mail: info@alpha-outback-energy.com**

## 7.2 Warranty Statement

For full information details contact us:

**Tel: +49 9122 79889 0**
**Mail: info@alpha-outback-energy.com**

## 7.3 Limited Hardware Warranty

AOE warrants that for a period of two (2) years from the date of shipment its products shall be free from defects under normal authorized use consistent with the product specifications and AOEâ€™s instructions, unless otherwise specified in the product manual, in which case, the terms of the manual will take precedence

The warranty provides for repairing, replacing or issuing credit (at AOE's discretion) for any equipment manufactured by it and returned by the customer to the factory or other authorized location during the warranty period.

There are limitations to this warranty coverage. The warranty does not provide to the customer or other parties any remedies other than the above. It does not provide coverage for any loss of profits, loss of use, costs for removal or installation of defective equipment, damages or consequential damages based upon equipment failure during or after the warranty period. No other obligations are expressed or implied. Warranty also does not cover damage or equipment failure due to cause(s) external to the unit including, but not limited to, environmental conditions, water damage, power surges or any other external influence.

The customer is responsible for all shipping and handling charges. Where products are covered under warranty AOE will pay the cost of shipping the repaired or replacement unit back to the customer.

## 7.4 Battery Warranty

Note that battery warranty terms and conditions vary by battery and by intended use. Contact your AOE sales representative or the Technical Support team at the above number to understand your entitlements under Battery Warranty.

## 7.5 Warranty Claims

Any claim under this Limited Warranty must be made in writing to Alpha BEFORE sending material back. Alpha will provide Product return instructions upon approval of return request. A Service Repair Order (SRO) and / or Return Authorization (RA) number will be issued ensuring that your service needs are handled promptly and efficiently. Claims must be made online at www.alpha-outback-energy.com

## 7.6 Service Centers

For more information, refer to the AOE website: www.alpha-outback-energy.com

# 8. Acronyms and Definitions

| | |
|---|---|
| AC | Alternating current |
| ANSI | American National Standards Institute |
| AWG | American Wire Gauge |
| BTU | British thermal unit |
| CAN | Controller area network |
| CEC | Canadian Electrical Code |
| CSA | Canadian Standards Association |
| CX | Cordex™ series; e.g., CXC for Cordex System Controller |
| DC | Direct current |
| EMC | Electromagnetic compatibility |
| EMI | Electromagnetic interference |
| ERM | Electromagnetic Compatibility and Radio Spectrum Matters |
| ESD | Electrostatic Discharge |
| FCC | Federal Communications Commission (for the USA) |
| GFI | Ground fault interrupt |
| IP | Internet Protocol |
| LED | Light emitting diode |
| LVD | Low voltage disconnect |
| MIL | One thousandth of an inch; used in expressing wire cross sectional area |
| MOV | Metal oxide varistor |
| MTBF | Mean time between failures |
| NC | Normally closed |
| NEC | National Electrical Code (for the USA) |
| NO | Normally open |
| OSP | Outside plant |
| OVP | Over voltage protection |
| RFT circuit | Remote feeding telecommunication circuit:<br>A secondary circuit within the equipment, intended to supply or receive DC power via a telecommunication network at voltages exceeding the limits for TNV circuits, and on which overvoltages from telecommunication networks are possible. |
| RFT-V circuit | An RFT circuit, which is so designed and protected that under normal operating conditions and single fault conditions, the voltages are limited and the accessible area of contact is limited. |
| RU | Rack unit (1.75") |
| SELV | Safety Extra Low Voltage |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| THD | Total harmonic distortion |
| UL | Underwriters Laboratories |

# 9. Certification

## About CSA and NRTL

CSA (Canadian Standards Association also known as CSA International) was established in 1919 as an independent testing laboratory in Canada. CSA received its recognition as an NRTL (Nationally Recognized Testing Laboratory) in 1992 from OSHA (Occupational Safety and Health Administration) in the United States of America (Docket No. NRTL-2-92). This was expanded and renewed in 1997, 1999, and 2001. The specific notifications were posted on OSHA's official website as follows:

- Federal Register #: 59:40602 - 40609 [08/09/1994]
- Federal Register #: 64:60240 - 60241 [11/04/1999]
- Federal Register #: 66:35271 - 35278 [07/03/2001]

When these marks appear with the indicator "C and US" or "NRTL/C" it means that the product is certified for both the US and Canadian markets, to the applicable US and Canadian standards. (1)

Alpha rectifier and power system products, bearing the aforementioned CSA marks, are certified to CSA C22.2 No. 60950-01 and UL 60950-01. Alpha UPS products, bearing the aforementioned CSA marks, are certified to CSA C22.2 No. 107.3 and UL 1778.

As part of the reciprocal, US/Canada agreement regarding testing laboratories, the Standards Council of Canada (Canada's national accreditation body) granted Underwriters Laboratories (UL) authority to certify products for sale in Canada. (2)

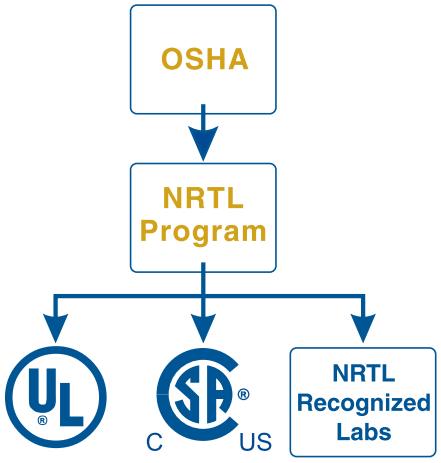
Only Underwriters Laboratories may grant a licence for the use of this mark, which indicates compliance with both Canadian and US requirements. (3)

## NRTLs capabilities

NRTLs are third party organizations recognized by OSHA, US Department of Labor, under the NRTL program.

The testing and certifications are based on product safety standards developed by US based standards developing organizations and are often issued by the American National Standards Institute (ANSI). (4)

The NRTL determines that a product meets the requirements of an appropriate consensus-based product safety standard either by successfully testing the product itself, or by verifying that a contract laboratory has done so, and the NRTL certifies that the product meets the requirements of the product safety standard. (4)



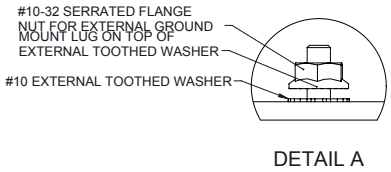

## Governance of NRTL

The NRTL Program is both national and international in scope with foreign labs permitted.

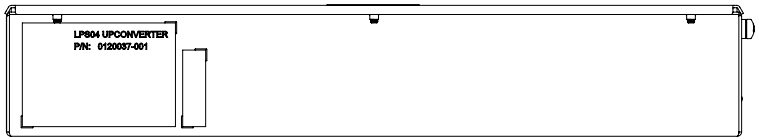
(1) www.csagroup.org
(2) www.scc.ca
(3) www.ulc.ca
(4) www.osha.gov

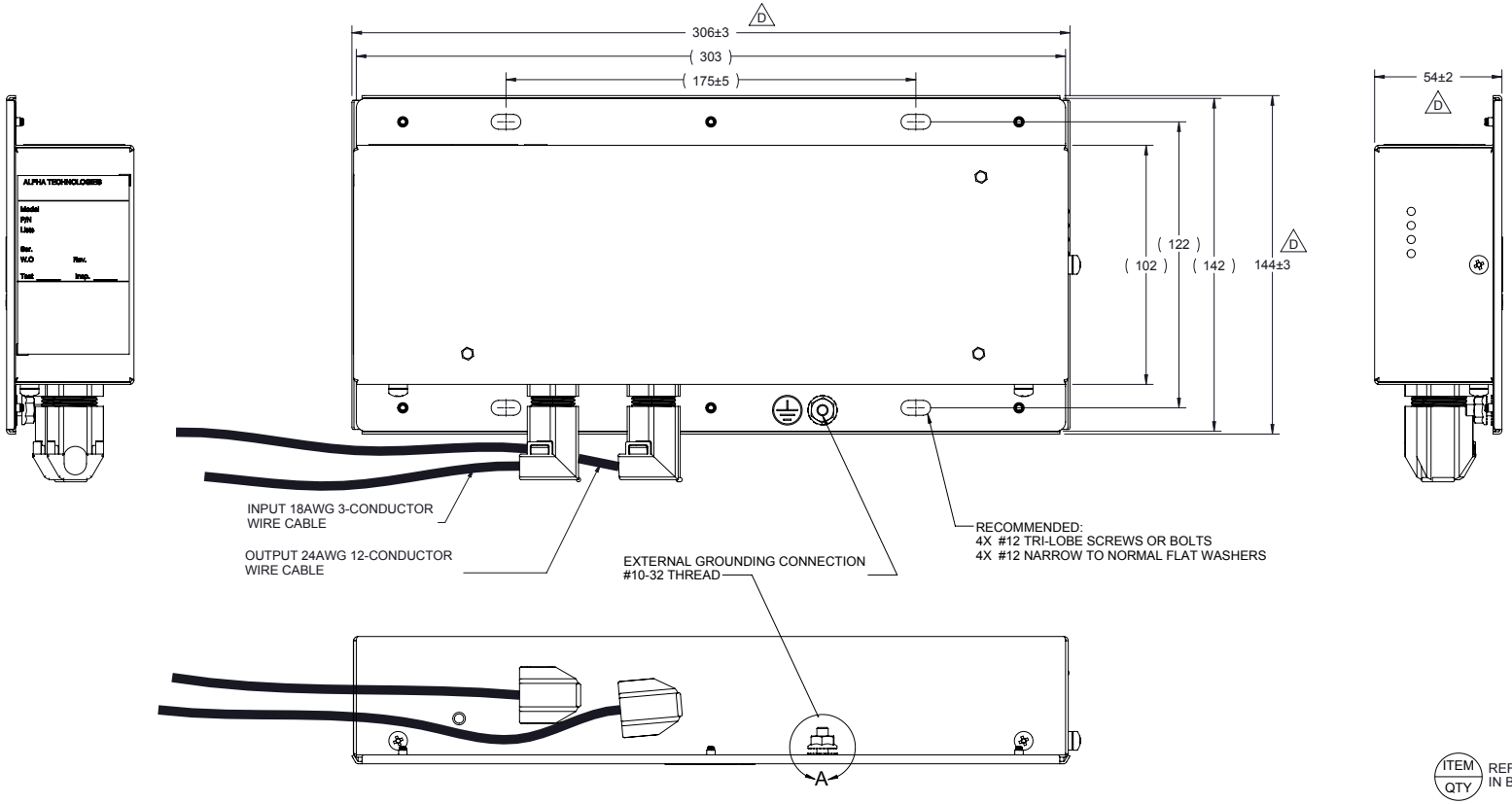
DO NOT SCALE DRAWING

| REVISIONS | | | | |
|---|---|---|---|---|
| LTR | DESCRIPTION | DWN | DATE | CHK |
| B | INITIAL RELEASE | H.Wu | 4/29/2014 | ZL |
| C | LIGHT TIGHT FITTINGS UPDATED; UPDATED LINE POSITIONS | H.Wu | 6/17/2014 | ZL |
| D | ADDED HEIGHT AND LOOSENED OUTTER DIMENSIONS | H.Wu | 9/22/2014 | SL |




DETAIL A




ITEM / QTY — REFER TO BUBBLE NUMBER IN BILL OF MATERIALS.

NOTES UNLESS OTHERWISE SPECIFIED:

1. PRODUCT TO BE FABRICATED ACCORDING TO ATL PRODUCTION STANDARD 0700001
2. FOR RECCOMMENDED MOUNTING ORIENTATIONS REFER TO SHEET 2

UNLESS OTHERWISE SPECIFIED DIM ARE IN INCHES
X.X ±0.040
X.XX ±0.020
X.XXX ±0.010
ANGULAR: ±3°
INTERPRET DIM AND TOL PER ASME Y14.5-1994
THIRD ANGLE PROJECTION



| APPROVALS | | DATE |
|---|---|---|
| DRAWN | H.Wu | 4/28/2014 |
| CHECKED | ZL | 5/1/2014 |



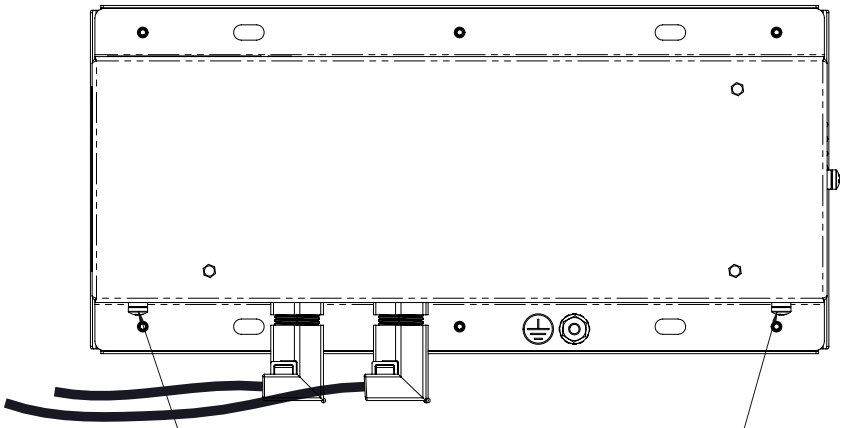
TITLE: OUTLINE,CUST CONN, LPS04

| SIZE | DWG NO. | REV |
|---|---|---|
| B | 0120037-08 | D |

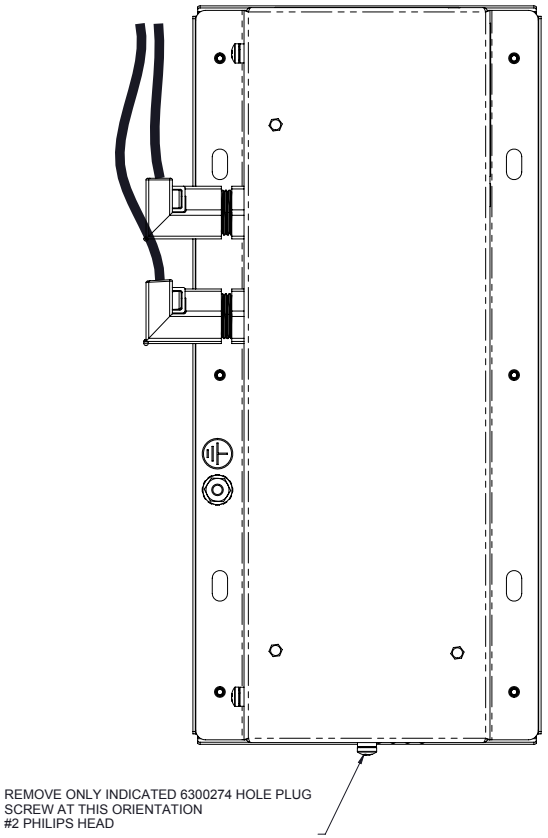
SCALE: 1:1 SHEET 1 OF 2

DO NOT SCALE DRAWING

MOUNTING ORIENTATION A




MOUNTING ORIENTATION B




| | | | |
|---|---|---|---|
| TECHNOLOGIES™ | | | |
| TITLE: | OUTLINE,CUST CONN, LPS04 | | |
| SIZE B | DWG NO. 0120037-08 | | REV D |
| SCALE: 1:1 | SHEET 2 OF 2 | | |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Power