# Traffic Mini Battery Backup System

## Installation & Operation Manual

Part # 0170021-J0
*Effective: 05/2017*

member of The Group™

*Your Power Solutions Partner*

# Traffic Mini
# Battery Backup System

**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 Technologies or your nearest Alpha representative.**

**NOTE:**

**Alpha 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 Technologies:

Canada and USA: **1-888-462-7487**
International: **+1-604-436-5547**

## Copyright

# Table of Contents

# 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.

The use of ATTENTION indicates specific regulatory/code requirements that may affect the placement of equipment and /or installation procedures.

**NOTE:**

**A NOTE provides additional information to help complete a specific task or procedure. Notes are designated with a checkmark, 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!**

**You must read and understand the following warnings before installing the Traffic Mini BBS and its components. Failure to do so could result in personal injury or death.**

- Read and follow all instructions included in this manual.
- Only trained personnel are qualified to install or replace this equipment and its components.
- Use proper lifting techniques whenever handling equipment, parts, or batteries.

**CAUTION!**

**Risk of Electric Shock. See Installation Instruction before connecting to the supply.**

- The Traffic Mini BBS shall be connected only to a dedicated branch circuit.

**CAUTION!**

**To reduce the risk of fire, connect only to a maximum branch circuit overcurrent protection in accordance with the National Electrical Code, ANSI/NFPA 70.**

- Always assume electrical connections or conductors are live. Switch all circuit breakers and double check connections with a voltmeter before performing installation or maintenance.
- A disconnect switch shall be provided by others for the AC input and AC output circuits.
- The branch circuit overcurrent protection for the AC input and AC output circuit shall be provided in the end installation.
- Place warning label(s) on the utility panel to tell emergency personnel that a UPS is installed.
- Use only proper lifting techniques whenever handling equipment, parts, or batteries.

**WARNING!**

**The Alpha Traffic Mini BBS has more than one live input circuit. AC power may be present at the outputs even if the system is disconnected from line or battery power.**

**WARNING!**

**This Type 3R Electrical Enclosure has some water ingress. Installations should install wiring at least 12mm (0.5in) away from the inside corners of the enclosure.**

**CAUTION!**

**The Alpha UPS module metal surfaces can be very hot to the touch.**

## 1.3 Battery Safety

**CAUTION!**

**Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.**

- Battery installation and servicing should be performed or supervised by personnel knowledgeable about batteries and the required precautions performed.
- Be extra cautious when connecting or adjusting battery cabling. An improperly connected battery cable or an unconnected battery cable can result in arching, fire or explosion.
- Before attaching the batteries to the Alpha Traffic Mini BBS, make sure that the polarity is correct.
- Use new batteries when installing a new unit. Verify that all batteries are the same type with identical date codes.
- When replacing batteries, use sealed lead acid batteries, rated 12V. Never install old or untested batteries.
- Batteries that show signs of cracking, leaking or swelling must be replaced immediately by authorized personnel using a battery of identical type and rating.

**CAUTION!**

**Never open, damage or mutilate batteries. Released Electrolyte is harmful to the skin and eyes. It may be toxic and hazardous to the environment.**

- Never dispose of batteries in a fire. The batteries may explode. Follow the manufacturer's directions and check with your local jurisdictions for safe battery disposal.
- If electrolyte splashes on your skin, immediately wash the affected area with water. If electrolyte gets into your eyes, wash them for at least 10 minutes with clean running water or special neutralizing eye wash solution. Seek medical attention at once.
- Neutralize spilled electrolyte with special neutralizing solution and a "spill kit" or solution of 1 lbs (0.45KG) of baking soda (bicarbonate of soda) in 1 gallon (3.8 L) of water.

**CAUTION!**

**A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries.**

a. Remove watches, rings, or other metal objects.

b. Use tools with insulated handles.

c. Wear rubber gloves and boots.

d. Do not lay tools or metal parts on top of batteries.

e. Disconnect the charging source before connecting or disconnecting battery terminals.

f. Determine if the battery is inadvertently grounded. If inadvertently grounded, remove the source from the ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if the grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).Never let live battery wires touch the Alpha UPS module, the enclosure or any other metal objects. This can cause a fire or explosion.

- Do not smoke or introduce sparks in the vicinity of a battery.
- If the batteries have been in storage for more than 3 months, recharge them for at least 24 hours and then test them with a load before installation.
- Each AlphaCell™ battery has a date code found on the warning label which must be recorded in the maintenance log. If non-Alpha batteries are used, see the manufacturer's documentation for date code type and placement.

## 1.4 Work Environment Safety

- Do not work alone under hazardous conditions.
- Keep the chassis area clear and dust-free during and after the installation.
- Keep tools away from walk areas where you or others could fall over them.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Do not work on the unit or connect or disconnect cables during periods of lightning activity.

## 1.5 Certification and Compliance

The Alpha Traffic Mini BBS, has been designed, manufactured, and tested to the requirements of the following national and international safety standards:

- CAN/CSA-C22.2 No. 107.3-14 – Uninterruptible Power Systems; additional requirements (RD): CAN/CSA-C22.2 No. 60950-1-07 - Information Technology Equipment - Safety.
- UL 1778 (Edition 5) – Uninterruptible Power Systems; additional requirements (RD): UL 60950-1 (Edition 2) - Information Technology Equipment - Safety.
- FCC CFR47 Part 15 Class A – This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Industry Canada - This Class A digital device apparatus complies with Canadian ICES-003.
- Industry Canada - Cet appareil numrique de la Classe A est conformé la norme NMB-003 du Canada.

# 2. Product Overview

## 2.1 Introduction

This manual covers the features and installation of Alpha Technologies Traffic Mini Battery Backup System (BBS). The following documents are provided to aid in installation and system start-up:

- Specifications: 0170021-B1
- Schematic: 7400751-05
- Outline drawing: 0170021-06

## 2.2 Features and Benefits

The Traffic Mini BBS provides constant, reliable backup power for Traffic, ITS, Access Control, Security, Public Utility and Telecommunications applications in a compact, all-in-one enclosure. Alpha's Traffic Mini BBS series provides the same functionality as the Alpha class leading FXM Series, for lower space constraint applications, in a single easy to install cabinet with a favorable curb appeal.

The Traffic Mini BBS is a rugged enclosure made of 0.125” aluminum and designed to easily accommodate an Alpha uninterruptible power supply (UPS), a Universal Automatic Transfer Switch (UATS), and up to four Alpha-Cell™ 100 XTV or two 195/220 GXL’s. The Traffic Mini BBS is an outdoor rated (NEMA 3R) enclosure. Features include:

- Drop down lift off door
- Type 2 Corbin lock, integrated document holder
- Tamper switch
- Wide range Automatic Voltage Regulation (AVR)
- Remote monitoring/control
- Temperature compensated battery charging for extended battery life

Figure 1 — Front view

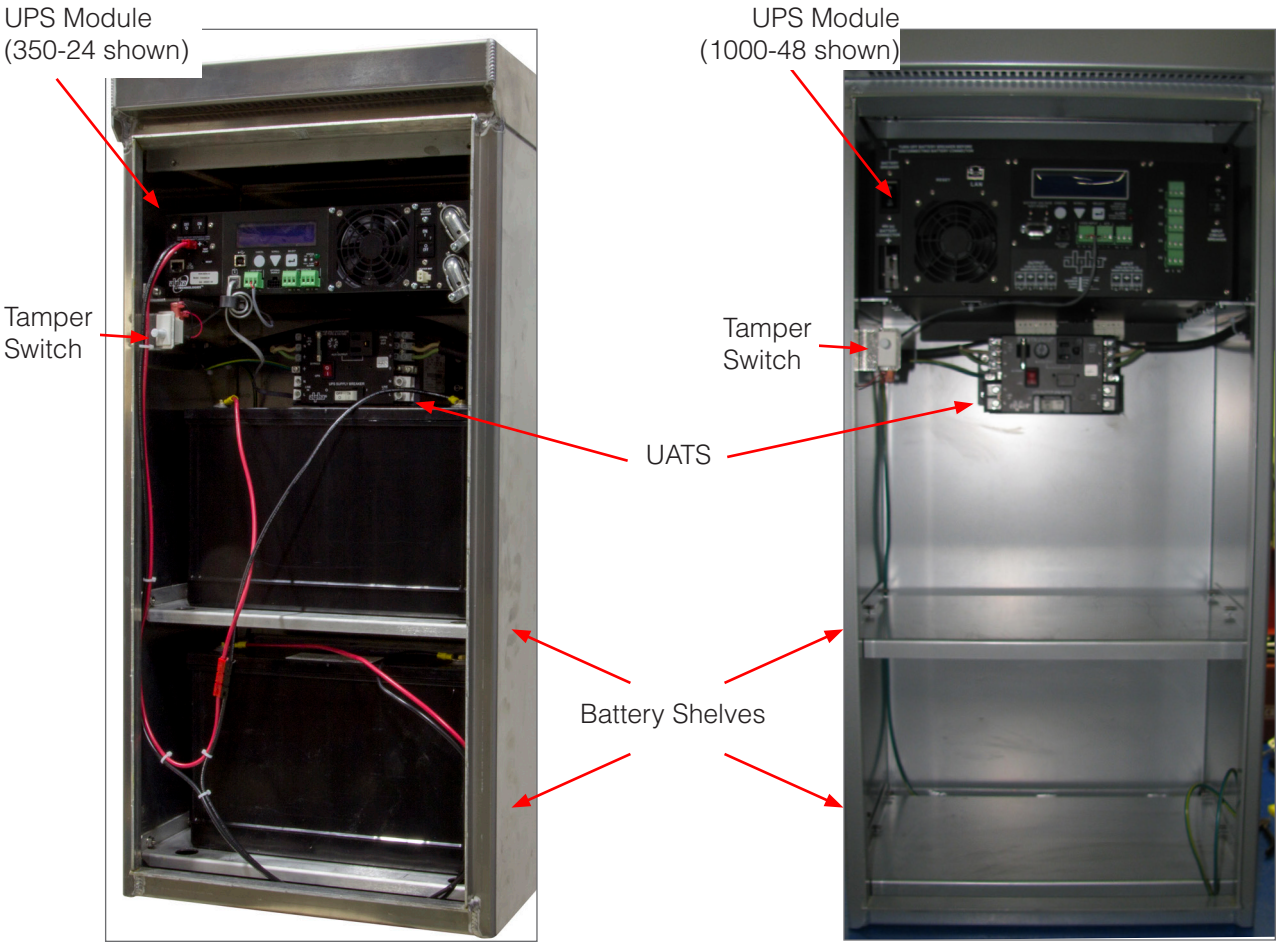



Figure 2 — Standard Enclosure Interiors

## 2.3 Part Numbers and Options

| The Traffic Mini BBS is available in the following configurations: | |
|---|---|
| Description | Part Number |
| Traffic Mini 1000-48 BBS, 120Vac, 48Vdvc | 0170021-010 |
| Traffic Mini 350-24 BBS, 120Vac, 24Vdc | 0170021-040 |
| | |
| The Traffic Mini BBS is available with the following options and accessories: | |
| Description | Part Number |
| Battery Heater Mat, 120Vac 55W, M Type, 8” x 13”, 1-15P | 1890053-001 |
| Battery Heater Mat, 120Vac 55W, D Type, 8” x 13" | 189-224-10 |
| | |
| PowerAgent Remote Battery Monitoring System | 0370260-002 |
| | |
| Enclosure 8” High Pedestal Kit | 7400770-001 |
| | |
| Wooden Pole Mount Kit: | |
| Pole Mount Strap Kit, MMOE/AOES6, Bare | 740-765-22 |
| Pole Mount Bracket Kit, Zinc, Steel, Set of 2 | 744-670-20 |

| | |
|---|---|
| Steel/Concrete Pole Mount Kit: | |
| Pole Mount Strap Kit, MMOE/AOES6, Bare | 740-765-22 |
| Pole Mount Bracket, Set of 2, Steel/Concrete Pole, PWE | 591-557-20 |
| | |
| Wall Mount Kit: | |
| Pole Mount Strap Kit, MMOE/AOES6, Bare | 740-765-22 |
| Wall Mount Bracket Set, PWE Enclosure | 744-800-20 |

The following batteries are available for use in the Traffic Mini BBS:

| Part Number | Description | Quantity Required | |
|---|---|---|---|
| | | Mini 1000-48 | Mini 350-24 |
| 181-025-10 | Batt,VRLA,AGM,12V,17Ah | 4 | 2 |
| 181-013-10 | Batt,VRLA,AGM,12V,34 Ah | 4 | 2 |
| 1810226 | AlphaCell XTV,12V 56 Ah,Top M6-Fem Term | 4 | 2 |
| 181-230-10 | Batt,Gel,195GXL,12V,100 Ah,Case 31 | N/A | 2 |
| 181-231-10 | Batt,Gel,220GXL,12V,109 Ah,Case 31 | N/A | 2 |

The above information is valid at the time of publication. Consult factory for up-to-date ordering information.

# 3. Pre-Installation

## 3.1 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. See the following table for the material and its environmental codes.

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
| **Cardboard** | **Polyethylene Terephthalate** | **Low Density Polyethylene** | **Polystyrene** | **Steel** | **Aluminum** | **Wood** |
| Packing boxes<br>Caps | Flexible film<br>Packaging | Bubble wrap<br>Shrink wrap<br>Plastic bags | Foam | Strapping on pallets | Strapping on pallets | Pallets<br>Lumber |

### 3.1.1 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.

## 3.2 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.

## 3.3 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.

## 3.4 Safety Precautions

**WARNING!**

**The Mini BBS is intended for permanent AC connection only.**

**The Mini BBS must be correctly grounded for proper operation. Older sites may have inadequate electrical grounding. Inspection must be performed by a qualified electrician before installation to ensure that grounding meets the local electrical code.**

**The utility line feeding the Mini BBS input MUST be protected by a circuit breaker certified for this use in accordance with the local electrical code.**

**The UPS equipment that is powered by the service panel requires the neutral to be permanently bonded to the ground. Always disconnect the batteries before servicing.**

**The input and output lines to and from the Mini BBS MUST have disconnect devices attached.**

- Install the Traffic Mini BBS on a structure that supports the total weight. The Traffic Mini 1000 BBS weighs approximately 65 lbs. (29.5 kg) not including batteries and the Traffic Mini 350 BBS weighs approximately 55 lbs. (25 kg) not including batteries.
- The input wiring must reach a suitably grounded power outlet and the load wiring must reach the Mini BBS output terminal blocks.

## 3.5 Electromagnetic Compatibility

Observe the following EMC requirements when setting up the Mini BBS and its internal equipment:

- All AC mains and external supply conductors must be enclosed in a metal conduit or raceway when specified by local, national, and/or other applicable government codes and regulations.
- The customer must provide suitable surge protection.

# 4. Installation

Only qualified personnel should install and connect the power components within the Alpha power system. For the battery installation, refer primarily to the manufacturer's manual.

## 4.1 Safety Precautions

Refer to the Safety section near the front of this manual.

**WARNING!**

**To avoid personal injury or damage to the equipment, always use at least two installation personnel to remove the unit from its packaging.**

**Electronic modules, batteries or other components, with the exception of factory-installed components, must not be installed until the Traffic Mini BBS enclosure has been securely set in place at its permanent location.**

**Transporting the unit with batteries installed may cause short circuit, fire, explosion, and/or damage to the battery pack, enclosure and installed equipment. Damage caused by improper shipping or transporting a unit with batteries is not covered by the warranty.**

## 4.2 Mounting the Traffic Mini BBS

There are five options for mounting the Traffic Mini BBS.

1. Mounting to a wooden pole
2. Mounting to a steel/concrete pole
3. Mounting to a wall
4. Mounting to a pad standalone or with optional pedestal
5. Mounting to an existing traffic enclosure

### 4.2.1 Mounting to a Pole or Wall

If mounting the enclosure to a wood, steel/concrete pole, or wall, the optional pole/wall mount strap kit needs to be installed to the rear wall of the enclosure according to the following instructions. When this is complete, the appropriate pole or wall mount brackets are installed to the supporting structure as described in subsequent sections.

Refer to drawing 0170021-06, at the back of the manual, to assist with the following procedure.

#### Installing the pole/wall mount strap kit

Tools and materials required:

- Assorted sockets or wrenches
- (1) pole/wall mount strap kit which includes (2) pole/wall mount straps, (8) sets of ¼"-20 x ¾" S/S carriage bolts, ¼" S/S flat washers & ¼" S/S locknuts and (1) 3/8"-16 x 1" cap screw.

**Procedure:**

1. Using a 5/16” drill bit, drill through the (8) half shears identified as pole/wall mount strap mounting hole locations on the rear wall of the enclosure shown in drawing 0170021-06, at the back of the manual.

**NOTE:**

**These are not knockouts. Do not attempt to punch them out.**

2. Secure the (2) pole mount straps to the enclosure with the supplied carriage bolts, nuts, and flat washers.
3. Install the 3/8”-16 x 1” cap screw loosely into the bottom pole mount strap. Do not tighten until after the enclosure has been seated onto the pole/wall mounting brackets.

### 4.2.2 Mounting to a wooden pole

Tools and materials required:

- Auger or drill for boring ¾” diameter holes in the wooden pole
- Assorted sockets or wrenches
- (2) wood pole mount brackets (provided in the kit)
- (2) 5/8” diameter machine bolts (UNC threaded), SAE (Grade 5 or better), length to suit pole
- (2) 5/8” diameter zinc-plated flat washers
- (2) 5/8” diameter hex nuts (UNC threaded)

**WARNING!**

**Alpha recommends positioning the enclosure on the opposite side of the pole from oncoming traffic to reduce the danger of falling equipment in the event that a pole is struck by a vehicle.**

Refer to drawing 0170021-06, at the back of the manual, to assist with the following procedure.

**Procedure:**

1. Install the pole/wall mount strap kit to the rear wall of the enclosure as instructed in the procedure given in section 4.2.1.
2. Mark drilling locations for the upper and lower mounting brackets on the utility pole. Use a plumb line to check for plumb. Their centers should be 13” apart.
3. Drill two ¾” diameter holes completely through the pole at the marked locations.
4. Secure each bracket to the pole with a 5/8” machine bolt, washer, and nut (not supplied). Do not fully tighten the bolts at this time.
5. Position the enclosure so that the upper and lower straps are aligned to be seated onto the mounting brackets. It may be necessary to slightly rock the enclosure and pull downward to properly seat it onto the brackets.
6. Tighten the machine bolts to secure the enclosure to the pole.
7. Tighten the cap screw at the lower pole mount strap to secure the enclosure to the pole mount bracket.

### 4.2.3 Mounting to a steel or concrete pole

Tools and materials required:

- Assorted sockets or wrenches
- (2) steel/concrete pole mount brackets (provided in the kit)
- (2) steel bands (not supplied) rated to support the loaded enclosure (including batteries) and sized for the pole diameter

**WARNING!**

**Alpha recommends positioning the enclosure on the opposite side of the pole from oncoming traffic to reduce the danger of falling equipment in the event that a pole is struck by a vehicle.**

Refer to drawing 0170021-06, at the back of the manual, to assist with the following procedure.

Procedure:

1. Install the pole/wall mount strap kit to the enclosure as instructed in the procedure given in section 4.2.1.
2. Mark the locations for the upper and lower mounting brackets on the utility pole. Use a plumb line to check for plumb. Their centers should be 13” apart.
3. Loosely attach the mounting brackets with steel bands to the pole at marked locations. Do not fully tighten the steel bands at this time.
4. Position the enclosure so that the upper and lower straps are aligned to be seated onto the mounting brackets. It may be necessary to slightly rock the enclosure and pull downward to properly seat it onto the brackets.
5. Tighten the steel bands to secure the enclosure to the pole.
6. Tighten the cap screw at the lower pole mount strap to secure the enclosure to the pole mount bracket.

### 4.2.4 Mounting to a wall

Tools and materials required:

- Drill with assorted size bits
- Assorted sockets or wrenches
- (4) ¼” x 1-1/8” lag bolts
- (4) ¼” diameter flat washers

Refer to drawing 0170021-06, at the back of the manual, to assist with the following procedure.

**Procedure:**

1. Install the pole/wall mount strap kit to the enclosure as instructed in the procedure given in section 4.2.1.
2. Using the wall mount bracket as a template, drill (4) x 1/8” pilot holes into the wall to accept ¼” bolts.
3. Secure the mounting bracket to the wall with the (4) bolts and washers.

**NOTE:**

**If the wall structure is not strong enough to support the weight of the fully loaded enclosure (including batteries), use a wooden backing plate that has a minimum thickness of 1-1/4” and a maximum width of 4” that is securely mounted to a wall stud or studs.**

4. Secure the enclosure to the mounting bracket with the bolts.

### 4.2.5 Mounting to a pad/pedestal

Tools and materials required:

- Step drill to drill ½" to 1" diameter holes
- Assorted sockets or wrenches
- (4) ¾" screw anchors

Refer to drawing 0170021-06, at the back of the manual, to assist with the following procedure.

**Procedure for direct pad mount:**

1. Drill out the (4) half shears in the enclosure base to a diameter of 1".
2. Mount the enclosure to the concrete pad using (4) ¾" screw anchors.

**Procedure for optional pedestal mount:**

1. Mount the pedestal to the concrete pad using (4) 3/4" screw anchors through the 1" holes located in the base of the pedestal.
2. Drill out the (4) half shears in the enclosure base to a diameter of 1/2".
3. Mount the enclosure on top of the pedestal and secure using 3/8" screws (supplied in the pedestal kit).

### 4.2.6 Mounting to an existing enclosure

Tools and material required:

- Drill and assorted drill bits
- Assorted sockets or wrenches
- (4) sets of ¼"-20 18-8 S/S hex head bolts and nuts
- Waterproof sealant

Refer to drawing 0170021-06, at the back of the manual, to assist with the following procedure.

**Procedure:**

1. Using a 5/16" drill bit, drill through the (4) half shears identified as traffic cabinet mounting locations on the rear wall of the enclosure shown in drawing 0170021-06, at the back of the manual.

**NOTE:**

**These are not knockouts. Do not attempt to punch them out.**

2. Position the enclosure so the back wall of the enclosure is flush to the existing traffic enclosure at the desired mounting location.

**NOTE:**

**The Mini enclosure cannot be mounted without support under the base when mounting to another enclosure. Alpha recommends the Mini enclosure be mounted at the ground level of the existing enclosure with support provided by the existing mounting structure.**

3. Drill 5/16" holes at the locations drilled in step 1 through the interior back wall of the Mini enclosure through into the existing enclosure.
4. Using ¼" hardware, secure the Mini enclosure to the existing enclosure.
5. Apply sealant around the seams of the mating surfaces of the two enclosures to prevent water ingress.

# 5. Wiring

**WARNING!**

**Before starting, disconnect the Line power and turn OFF both the UPS Battery and AC input circuit breakers.**

**Separate the AC input power cables from the output power cables within the Mini BBS enclosure. Route them through separate conduit openings in the enclosure.**

## 5.1 Preparation

There are four connections that need to pass through the enclosure:

1. Protective earth ground
2. AC input to UPS
3. AC output to load
4. Optional Ethernet and dry contact connection for UPS remote monitoring and control

The Traffic Mini BBS enclosure accommodates several cable pass through points at the rear and base of the enclosure. These points are half shears and must be drilled out to accommodate the appropriate size fittings. There are four half shears located on the back wall of the enclosure in line with the ATS and five half shears on the base; two at the front and three at the rear. Refer to drawing 0170021-06 for designated cable pass through half shear locations. Determine the cable pass through locations based on the site requirements and drill them out before commencing the wiring.

Tools and Materials Required:

- Step drill and/or Greenlee punch to create holes for appropriate trade size fittings
- Slot head screwdriver to fit the ATS terminal block connections and enclosure ground lug
- Assorted sockets or wrenches
- Voltmeter
- Maximum #6 AWG wire for wiring the AC input and output terminal blocks and ground
- Battery terminal corrosion inhibitor such as NOCO Company's NCP-2 or Sanchem Inc.'s No-Ox ID Grease "A"
- Torque wrench for battery terminal connections
- Optional battery heater mats
- Reference schematic drawing 7400751-05

## 5.2 Grounding

**WARNING!**

**An enclosure that is not properly grounded presents an electrical hazard**

**Procedure:**

1. Open the front door and, if desired, disconnect the bonding/restraining wires from the door and put the door aside.
2. The protective earth ground lug is located on the lower back wall of the enclosure (Figure 3). The lug can accept up to a #6 AWG wire. Use one of the designated cable pass through holes to route the protective earth ground wire into the enclosure.
3. Use a flat head screwdriver to connect the ground wire to the lug.

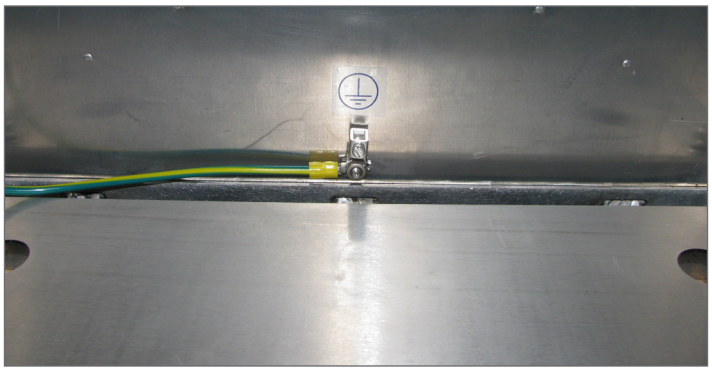


Figure 3 — Protective Earth Connection

## 5.3 AC Input / Output Connections

**CAUTION!**

**AC input wires must be routed in flexible or rigid conduit as far away as possible from DC power wires to minimize EMI disturbances.**

**Procedure:**

1. The AC input/output cables connect to the terminal blocks on either side of the UATS (Figure 4). The terminal blocks can accept up to a maximum of #6 AWG wire. Use appropriate conduit/fittings and route the cables into the enclosure through the designated pass through holes.
2. Strip the ends of the wires 0.35” (9mm). Insert the wires into the terminal blocks and tighten the terminal block screws using a flat head screwdriver (maximum torque 16 lbf-in).

AC Input Terminals


AC Output Terminals

Figure 4 — UATS Connections

## 5.4 Network Cable

The UPS module comes equipped with an RJ-45 Ethernet jack for local or remote UPS control and monitoring. If this connection is used, ensure the Ethernet cable is routed through its own dedicated enclosure pass through. Refer to the UPS manual for connecting the Ethernet cable to the UPS.

## 5.5 Optional Battery Heater Mats

Place the heater mat with the line cord plug on the upper battery shelf and the other mat on the lower battery shelf. Connect the two mats together using the Molex connectors. Plug the heater mat line cord into the ATS Auxiliary Output receptacle (Figure 5). Refer to the instructions supplied with the heater mat for the line cord thermostat placement information.

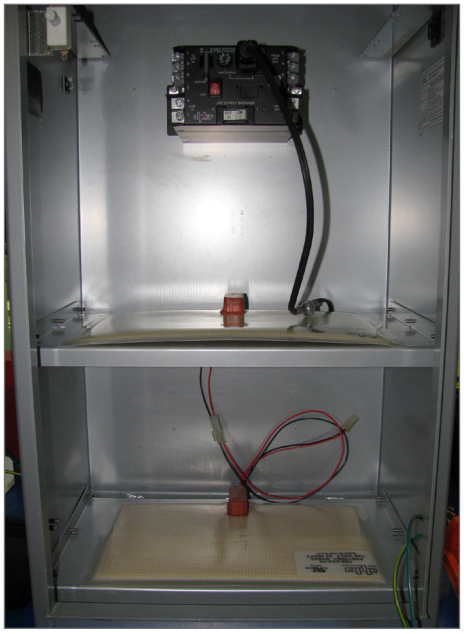


Figure 5 — Battery Heater Mat Installation

## 5.6 Installing and Wiring the Batteries

**WARNING!**

**The batteries must be installed by qualified personnel trained in the safe use of high energy power supplies and their batteries. Refer to the safety section in this manual.**

- Use new batteries when installing a new unit. Verify that all batteries are the same type with identical date codes.
- Use appropriate battery voltage string for 24V and 48V versions of the products.

### 5.6.1 Battery Preparation

The Traffic Mini BBS includes a battery cable harness configured for either a 24V or 48V battery string depending on the system ordered. The harness allows for quick disconnection of individual batteries. The harness is made up of two assemblies; the individual quick disconnect cables that connect to each battery and the main harness that connects the batteries to the UPS.

The individual battery disconnect cables need to be installed on the batteries before the batteries are installed in the enclosure.

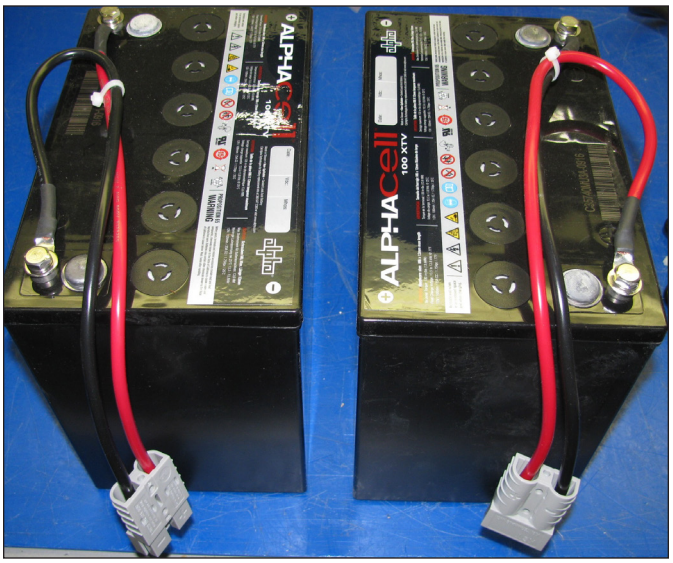
**Procedure:**

1. Coat the battery terminals with the corrosion inhibitor.
2. For a 48V battery string, there are four quick disconnect cable assemblies to be installed; two are for the batteries to be installed to the left side on the battery shelves and two for the batteries to be installed to the right side on the battery shelves.
3. For a 24V battery string, there are two quick disconnect cables; one left and one right.
4. Install each quick disconnect cable to the battery terminals so that the connector will be at the front of each battery when they are installed in the enclosure (Figure 6).
5. Make sure to observe correct polarity when installing these cables; red wire to '+' battery terminal, black wire to '-' battery terminal. Torque the bolts to the appropriate specification.

**WARNING!**

**Torque the battery terminals according to the manufacturer's specifications as given on the name plate or data sheet.**

Left side Assembly




Right Side Assembly

Figure 6 — Quick Disconnect Cable Connections

### 5.6.2 Installing the Batteries

The batteries are now ready to be installed in the enclosure and wiring completed.

**Procedure:**

1. If using battery heater mats, place the mats on the battery shelves and connect the mats as instructed in section 5.5
2. Place the batteries on the shelves. Orient the batteries so that the battery terminals are on the outside, towards the side walls and the connectors are at the front. Note for a 24V battery string, the placement of the two batteries on the shelves will depend on the size. For small batteries, use the top shelf for both batteries. For large batteries, both shelves will hold one battery.
3. The main battery harness connector labelled "To UPS" will route down from the UPS battery input and across the door switch bracket on the left side of the enclosure (Figure 7). **Do not plug this connector into the UPS at this time**.

Figure 7 — Main Harness Routing

4. For a 48V battery string, plug in batteries #1 and #2 on the top shelf first. Then route the remaining two connectors on the main harness through the middle of the two batteries and down through the hole at the rear of the enclosure. Plug in batteries #3 and #4 to the remaining two connectors. The black '-' wire of the main harness connector on battery #4 should run all the way back to the UPS '-'. Refer to drawing 7400751-05, at the back of the manual. For a 24V battery string, plug in batteries #1 and #2 to the main harness. See Figure 8 and Figure 9 for typical 48V and 24V battery string installations.

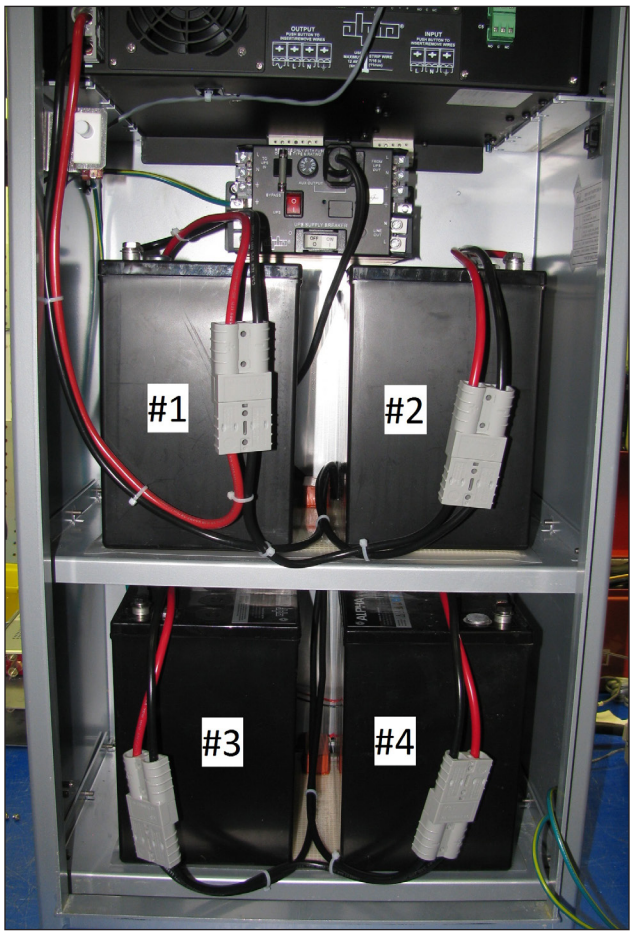



Figure 8 — Typical 48V battery Installation

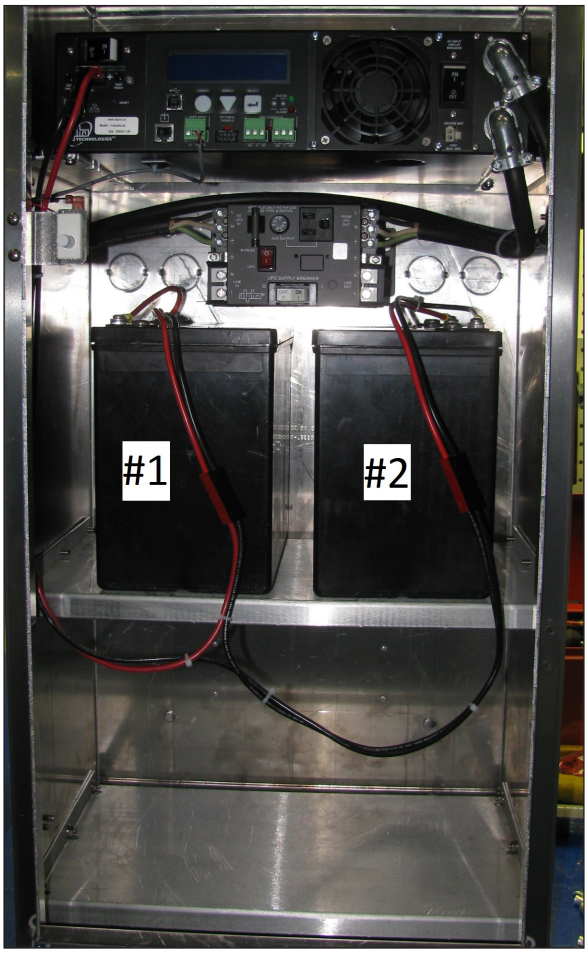



Figure 9 — Typical 24V battery Installation

5. Check battery string polarity and voltages before connecting to the UPS. Use a voltmeter to verify the voltage across the connector pins. It should read 21-27V for a 24V battery string and 42-54V for a 48V battery string. Triple check the polarity of all connections.
6. Make sure the UPS battery breaker is OFF. Plug the main harness connector labelled “To UPS” into the battery connector on the UPS.
7. Connect the battery temperature sensor to the UPS temperature input. Attach the sensor to the long side of the battery body between batteries #1 and #2, about 2 to 3” (5 to 7.5 cm) from the base of the battery.

# 6. System Start Up

**Procedure:**

1. Check all system connections for tightness, polarity, physical damage, etc.
2. Plug the battery string into the UPS battery input.
3. Switch the UPS battery circuit breaker ON. The LCD displays STANDBY.
4. Set the UATS bypass switch to the “UPS” position and switch the UATS UPS supply breaker ON.
5. Switch the utility breaker at the main power panel ON.
6. Switch the UPS AC input breaker ON. If qualified, LINE appears on the LCD.

**NOTE:**

**AC will be present at the UATS “Line Out” terminals as soon as the UPS AC input breaker is turned ON.**

7. The ‘User Input Alarm’ will be active. Pull out the tamper switch plunger to defeat this alarm.
8. Allow the batteries to charge for approximately 12 hours.
9. The load should be receiving power from the UPS. If not, perform troubleshooting.

## 6.1 Operation

Perform the following tests to check the system operation.

For detailed information on UATS and UPS operation, refer to their respective manuals.

**Procedure:**

1. Ensure the UATS bypass switch is set to the “UPS” position, the battery string is connected to the UPS, and the battery breaker is ON.
2. With the system running in LINE mode, switch the main utility breaker OFF or, alternatively, the UATS UPS supply breaker OFF and confirm UPS transfer to INVERTER mode and confirm the load is receiving power.
3. Switch the main utility breaker ON and confirm UPS transfer back to LINE mode.
4. Press the ‘Select’ button on the UPS and confirm the ‘User Input Alarm’ is active. Pull out the tamper switch plunger and confirm the alarm clears.

# 7. Maintenance

## 7.1 General Maintenance

Although very little maintenance is required with Alpha systems, routine checks and adjustments are recommended to ensure optimum system performance. Qualified service personnel should do the repairs.

The following table lists a few maintenance procedures for this system. These procedures should be performed at least once a year.

**WARNING!**

**Use extreme care when working inside the unit while the system is energized. Do not make contact with live components or parts.**

**Circuit cards, including RAM chips, can be damaged by static electricity. Always wear a grounded wrist strap when handling or installing circuit cards.**

**Ensure redundant modules or batteries are used to eliminate the threat of service interruptions while performing maintenance on the system's alarms and control settings.**

**Table A — Sample maintenance log**

| Procedure | Interval | Date Completed |
|---|---|---|
| Clean ventilation openings. | 1-6 months | |
| Inspect all system connections. Re-torque if necessary. | 1 year | |
| Verify alarm/control settings. | 1 year | |
| Verify alarm relay operation. | 1 year | |

Refer also to the instructions in the maintenance chapters of the applicable product manuals

## 7.2 Replacement Parts

| Part | Alpha Part Number | Part Number Description |
|---|---|---|
| Air Filter | 561-294-10 | Fltr,9.75"X8.0"x.88" Al,UL Class 2,w/Fl |
| Tamper Switch | 424-038-10 | Sw,Plunger,SPDT,Pull-to-Cheat,10A |
| 48V Battery String Cable Kit | 8701021-001 | BCK,48V,#8 AWG,1/4"-R Term,Traffic Encl |
| 24V Battery String Cable Kit | 8701030-001 | BCK,24V,#10 AWG,1/4"-R Term,Traffic Encl |
| Mini 1000 BBS UPS Module Kit | 0380490-001 | Kit,FRU,Mini 1000 UPS Module |
| Mini 350 BBS Module Kit | 017-241-29 | FXM350-24,120VACI/O,24Vo,60/50Hz,SNMP |

## 7.3 Filter Maintenance

Tools required:

- #1 Phillips head screwdriver

**Procedure:**

1. Open the door and remove the filter retaining screw (Figure 10).
2. Slide the filter up the guides and underneath the document holder. Lift up the bottom of the document holder slightly to remove the filter.
3. Wash the filter thoroughly with water. Replace the filter if it is damaged.
4. Drain excess water.
5. Clean the door vents and vents at the top front of the enclosure if necessary.
6. Locate the air flow direction indicator arrow on the filter frame. The arrow needs to be pointing towards the inside of the enclosure when the filter is reinstalled.
7. Slide the filter back in the guides and reinstall the filter retaining screw.

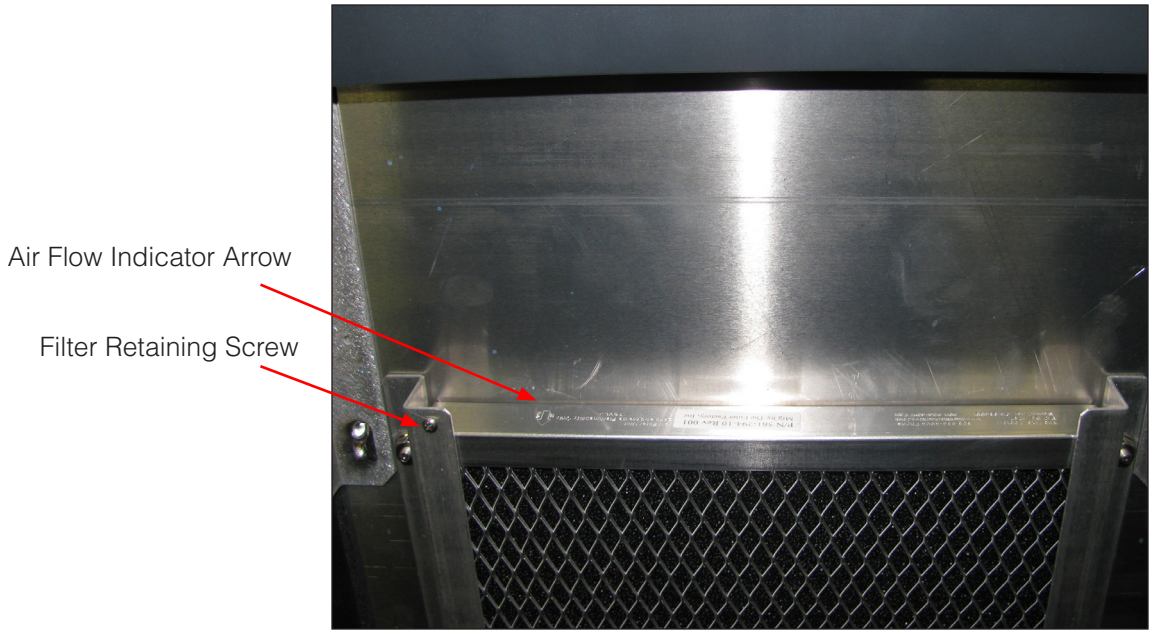



Figure 10 — Filter Replacement

# 8. Warranty Statement and Service Information

## 8.1 Technical Support

**In Canada and the USA, call toll free 1-888-462-7487.**

**Customers outside Canada and the USA, call +1-604-436-5547.**

## 8.2 Warranty Statement

For full information details review Alpha's online Warranty Statement at www.alpha.ca/support.

## 8.3 Product Warranty

Alpha warrants that for a period of five (5) years from the date of shipment its products shall be free from defects under normal authorized use consistent with the product specifications and Alpha's instructions, the terms of the manual will take precedence.

The warranty provides for repairing, replacing or issuing credit (at Alpha'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 Alpha will pay the cost of shipping the repaired or replacement unit back to the customer.

## 8.4 Battery Warranty

Note that battery warranty terms and conditions vary by battery and by intended use.

The most common battery warranty provided by Alpha is a two year full replacement warranty with a pro-rated warranty for the following three years. Pro rated warranty provides a credit applicable toward the purchase of new batteries from Alpha. The credit is calculated as the purchase price multiplied by the percentage of the battery life that was not available (in months). Battery warranty coverage is lost where the battery charge is not maintained for 6 months.

Contact your Alpha sales representative or the Technical Support team at the above number to understand your entitlements under Battery Warranty.

## 8.5 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.ca.

## 8.6 Service Information

For a list of international service centers, refer to the Alpha website: www.alpha.ca.

# 9. Acronyms and Definitions

| | |
|---|---|
| AC | Alternating current |
| ANSI | American National Standards Institute |
| AWG | American Wire Gauge |
| BBS | Battery Backup System |
| 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 |
| DHCP | Dynamic Host Configuration Protocol |
| EIA | Electronic Industries Alliance |
| EMC | Electromagnetic compatibility |
| EMI | Electromagnetic interference |
| ERM | Electromagnetic Compatibility and Radio Spectrum Matters |
| ESD | Electrostatic Discharge |
| FCC | Federal Communications Commission (for the USA) |
| GSM | Group Speciale Mobile (global system for mobile communications) |
| HVSD | High voltage shutdown |
| IEC | International Electrotechnical Commission |
| IEEE | Institute of Electrical and Electronics Engineers |
| 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 |
| OSHA | Occupational Safety & Health Administration |
| OVP | Over voltage protection |
| RAM | Random access memory |
| RU | Rack unit (1.75”) |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| THD | Total harmonic distortion |
| UL | Underwriters Laboratories |
| UPS | Uninterruptible Power Supply |
| UATS | Universal Automatic Transfer Switch |
| VRLA | Valve regulated lead acid |

# 10. Specifications

| Table B — Traffic Mini BBS Specifications | | |
|---|---|---|
| **Electrical** | | |
| **Parameter** | **Mini 1000-48 BBS** | **Mini 350-24 BBS** |
| **Input** | | |
| **Nominal voltage, Vac** | 120 | |
| **Automatic voltage regulation, Vac** | 85 - 169 | 88 - 152 |
| **Frequency, Hz** | 50/60 ±5% | 50/60 ±5% |
| **Current, Amps (@ nominal Vin and max battery charging current)** | 14 | 5.3 |
| **Typical efficiency*** | Line mode >92%<br>Inverter mode >82% | Line mode >96%<br>Inverter mode >82% |
| **AC input configuration** | 2W + PE | |
| **Output** | | |
| **Nominal voltage, Vac** | 120 | |
| **Frequency, Hz** | = Input frequency | |
| **Power, W / VA** | 1000 / 1000 | 350 / 350 |
| **Power factor** | 0.8 | |
| **Batteries (for use with VRLA type only)** | | |
| **Nominal voltage, Vdc** | 48 | 24 |
| **Max. battery capacity, Ah** | 56 | 109 |
| **Max. Battery Charger Current, Amps** | 10 | 6 |
| **Battery charger temperature compensation, mV/°C/Cell** | -5 (factory default), user adjustable to -2.5, -4, -5, or -6 | -5 (factory default), user adjustable to -2.5, -4, -5, or -6 |
| **Mechanical** | | |
| **Dimensions, H x W x D, in (mm)** | Enclosure: 34 x 16 x 12 (864 x 406 x 305)<br>Pedestal: 8 x 16 x 12 (203 x 406 x 305) | |
| **Weight without batteries, lb (kg)** | 65 (29.5) | 55 (25) |
| **Mounting** | Flush to existing traffic enclosure, optional kits for wall, pole, or pedestal | |
| **Environmental** | | |
| **Cooling** | Vented | |
| **Enclosure material** | Aluminum, 5052-H32 | |
| **Temperature range, ºC (°F)** | Operating: -40 to 50 (-40 to 122)**<br>Storage: -40 to 75 (-40 to 167) | |
| **Humidity** | 0 to 95% non condensing | |
| **Altitude, m (ft)** | 2000 m (6562 ft) | |
| **Compliance** | | |
| **Enclosure Rating** | Type 3R | |
| **Safety** | CAN/CSA-C22.2 No. 107.3-14<br>CAN/CSA-C22.2 No. 60950-1-07<br>UL 1778 (Ed. 5)<br>UL 60950-1 (Ed. 2) | |
| *Efficiency is measured at an ambient temperature of 25ºC, full resistive condition and nominal line and battery voltage.<br>**UPS power module capable of operating up to a maximum of 74°C. Output power derates above 50°C ambient. | | |
| The above information is valid at the time of publication. Consult factory for up-to-date ordering information. Specifications are subject to change without notice. | | |

# 11. 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)

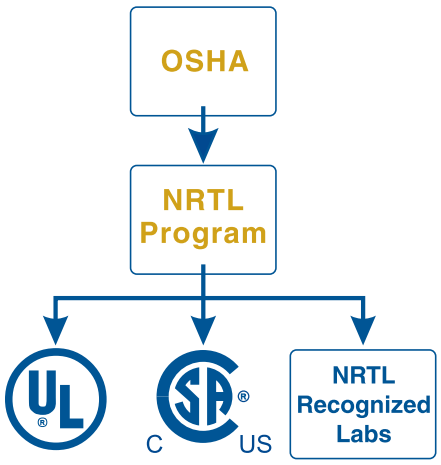
Only Underwriters Laboratories may grant a licence for the use of this mark, which indicates compliance with both Canadian and US requirements. (3)

## 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)



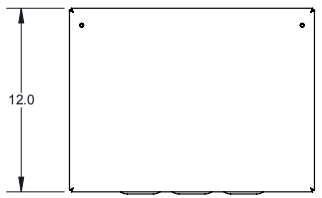

## Governance of NRTL

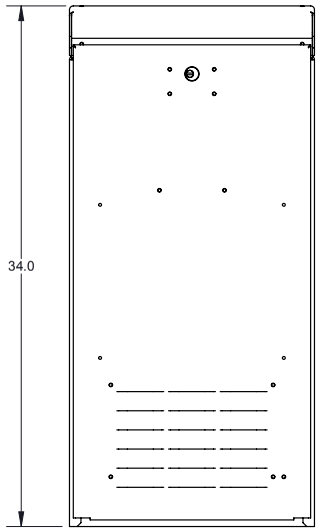
The NRTL Program is both national and international in scope with foreign labs permitted.

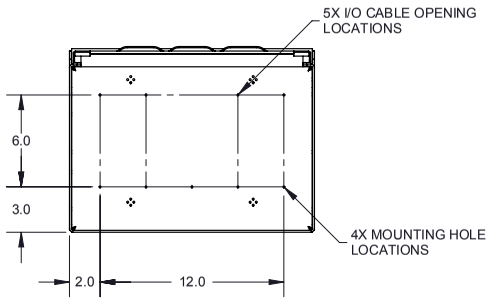
(1)www.csagroup.org
(2) www.scc.ca
(3) www.ulc.ca
(4) www.osha.gov

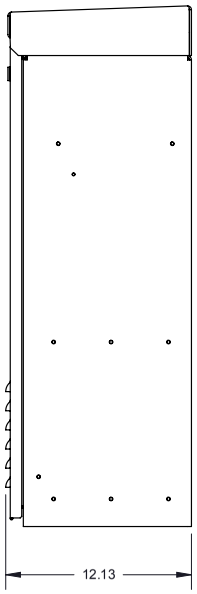
DO NOT SCALE DRAWING

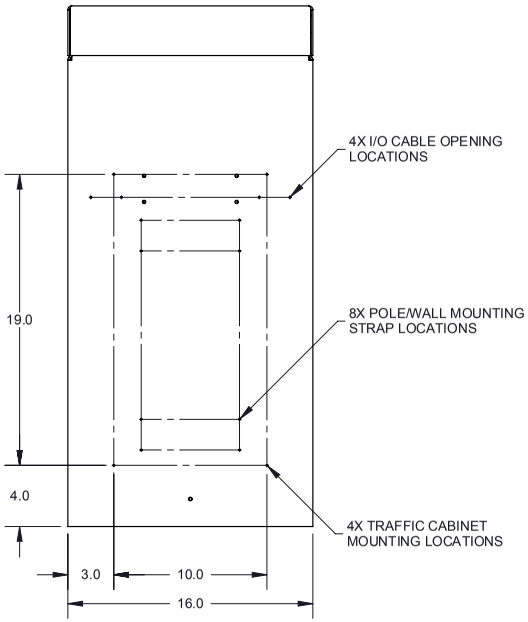
| REVISIONS | | | | |
|---|---|---|---|---|
| LTR | DESCRIPTION | DWN | DATE | CHK |

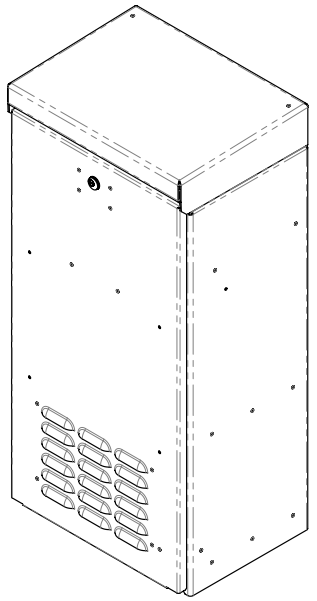


ITEM REFER TO BUBBLE NUMBER IN BILL OF MATERIALS.

NOTES UNLESS OTHERWISE SPECIFIED:

1. PRODUCT TO BE FABRICATED ACCORDING TO ATL PRODUCTION STANDARD 0700001

UNLESS OTHERWISE SPECIFIED DIM ARE IN INCHES
X.X ±0.040
X.XX ±0.020
X.XXX ±0.010
ANGULAR: ±1°
INTERPRET DIM AND TOL PER ASME Y14.5-1994
THIRD ANGLE PROJECTION



| APPROVALS | | DATE |
|---|---|---|
| DRAWN | RP | 1/1/2017 |
| CHECKED | JK | 1/1/2017 |



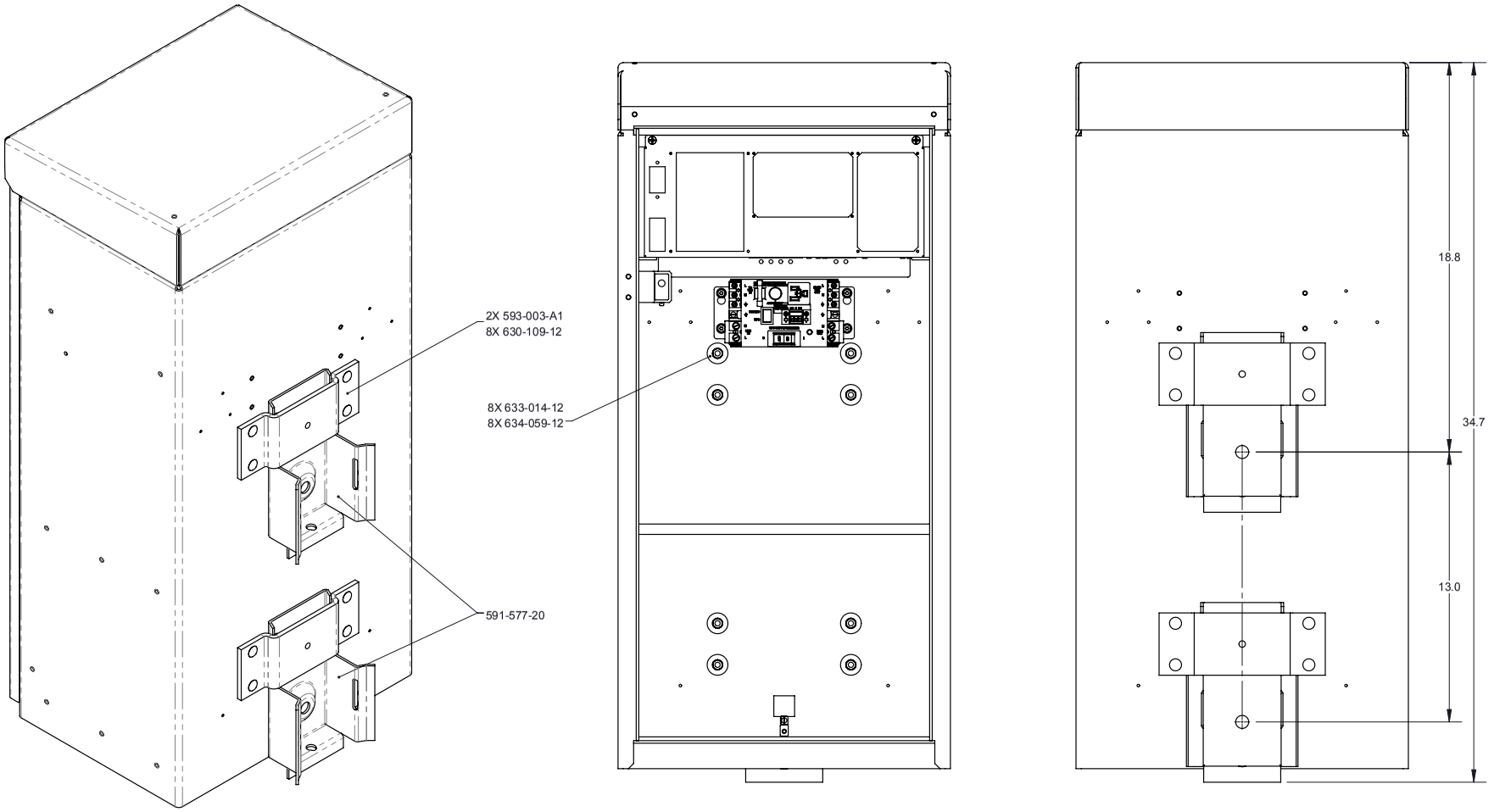
TECHNOLOGIES

TITLE: OUTLINE DRAWING TRAFFIC,MINI BBS

| SIZE | DWG NO. | REV |
|---|---|---|
| B | 0170021-06 | A |

SCALE: 1:1 SHEET 1 OF 5

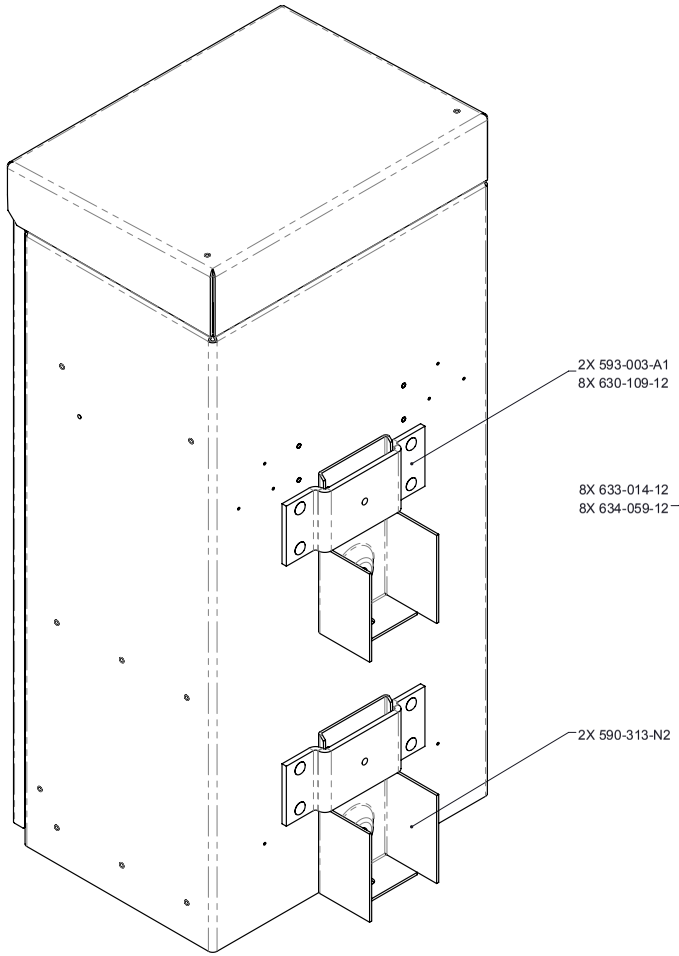
DO NOT SCALE DRAWING

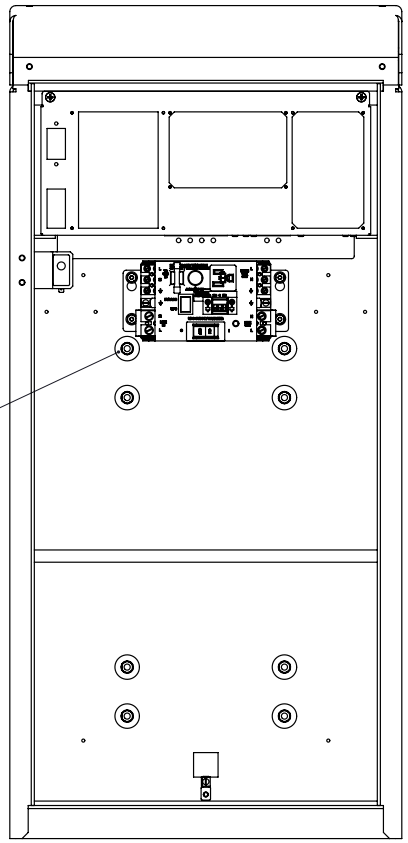


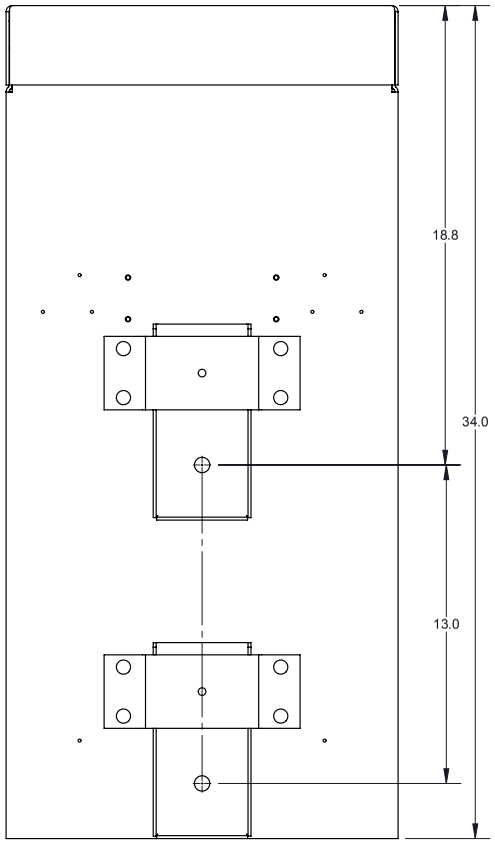

740-765-22 - POLE MOUNT STRAP KIT
591-557-20 - STEEL/CONCRETE POLE MOUNT KIT

| | | | |
|---|---|---|---|
| TITLE: | OUTLINE DRAWING TRAFFIC,MINI BBS | | |
| SIZE B | DWG NO. 0170021-06 | | REV A |
| SCALE: 1:5 | SHEET 2 OF 5 | | |

DO NOT SCALE DRAWING



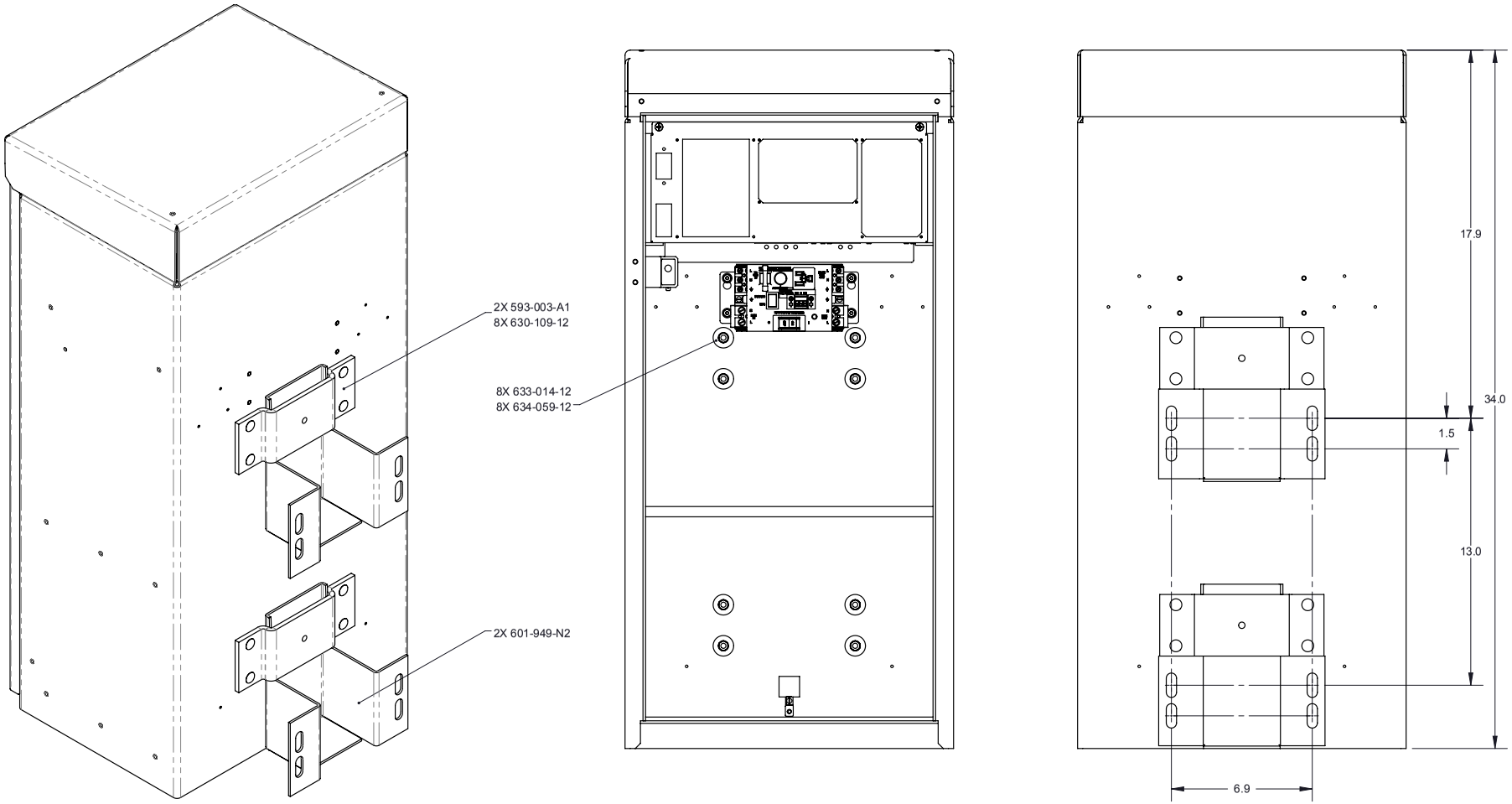



740-765-22 - POLE MOUNT STRAP KIT
744-670-20 - WOOD POLE MOUNT KIT

| | | |
|---|---|---|
| TECHNOLOGIES™ | | |
| TITLE: | OUTLINE DRAWING<br>TRAFFIC,MINI BBS | |
| SIZE: B | DWG NO. 0170021-06 | REV: A |
| SCALE: 1:5 | SHEET 3 OF 5 | |

DO NOT SCALE DRAWING

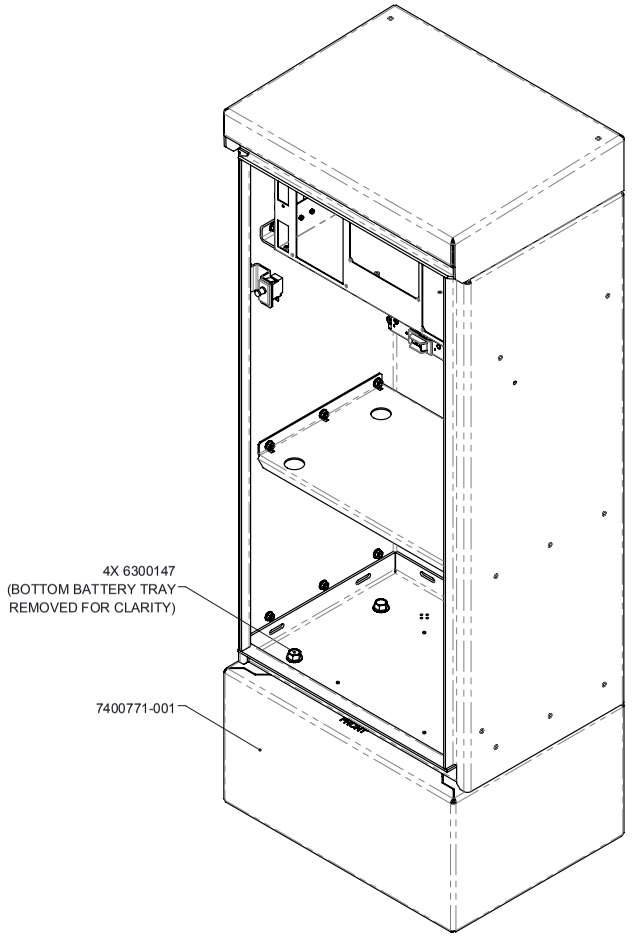


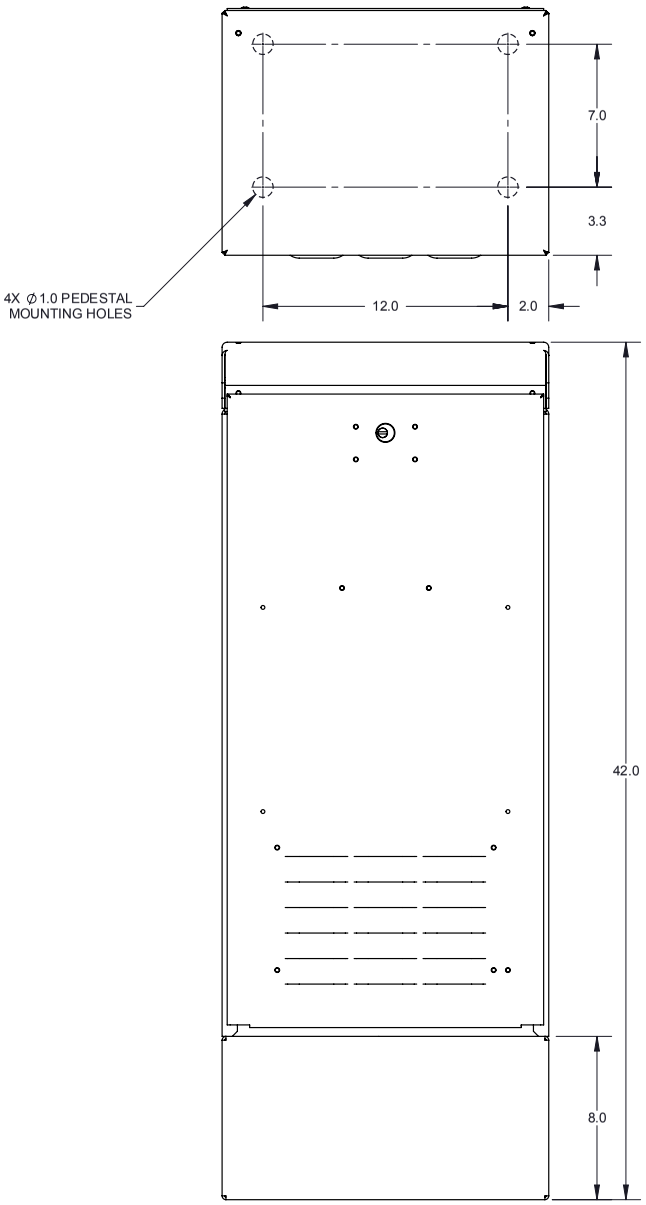

740-765-22 - POLE MOUNT STRAP KIT
744-800-20 - WALL MOUNT KIT

TECHNOLOGIES™

| | | |
|---|---|---|
| TITLE: | OUTLINE DRAWING<br>TRAFFIC,MINI BBS | |
| SIZE: B | DWG NO. 0170021-06 | REV: A |
| SCALE: 1:5 | SHEET 4 OF 5 | |

DO NOT SCALE DRAWING



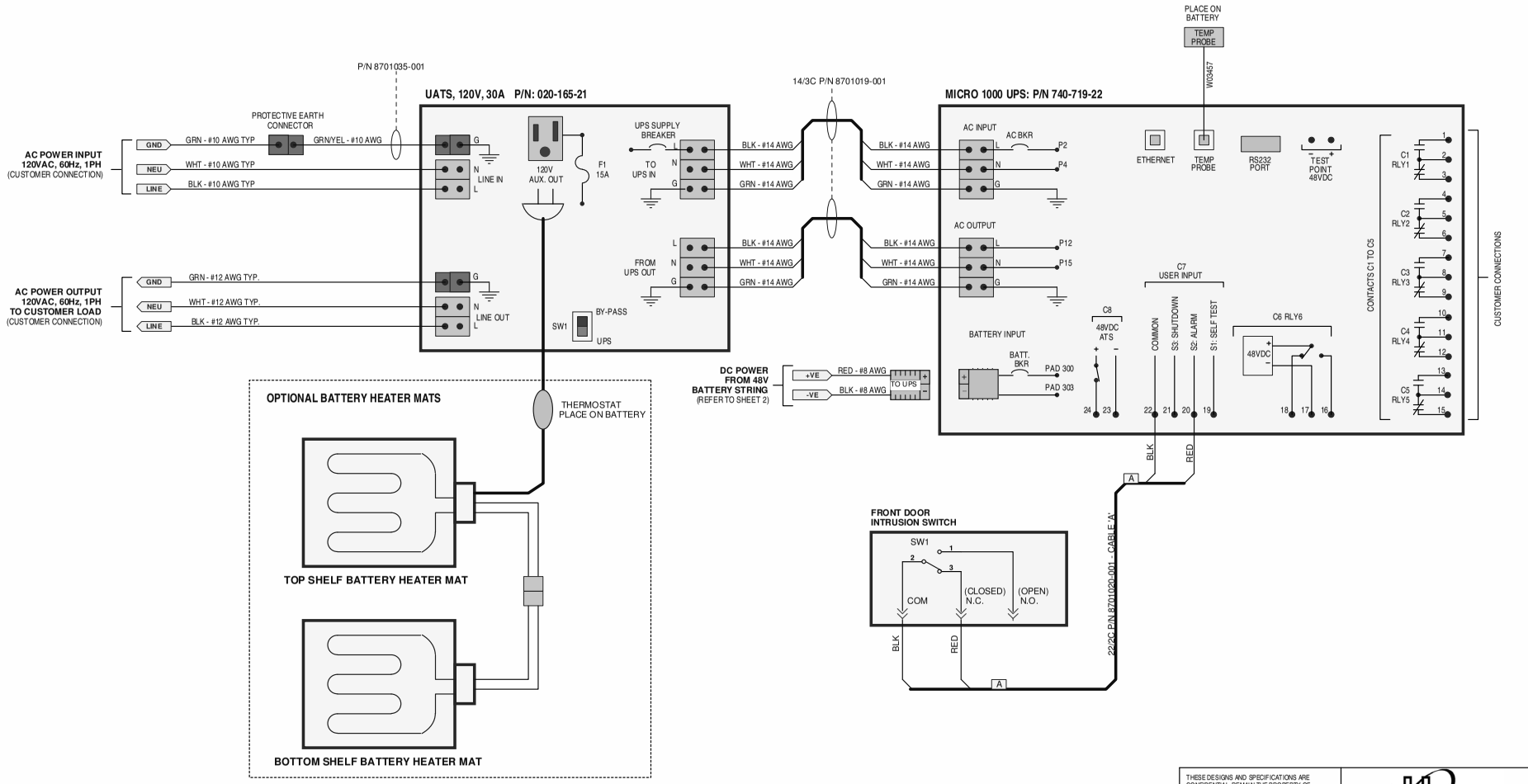

7400770-001 - PEDESTAL MOUNT KIT

| | | |
|---|---|---|
| TITLE: OUTLINE DRAWING TRAFFIC,MINI BBS | | |
| SIZE B | DWG NO. 0170021-06 | REV A |
| SCALE: 1:6 | SHEET 5 OF 5 | |

**CONFIGURATION: 7400751-001:**

**MINI 1000 BBS, 120VAC, 48VDC**

| REVISIONS | | | | |
|---|---|---|---|---|
| LTR | DESCRIPTION | DRW | DATE | CHK |
| B | UPDATED TO NEW BMS CONTROLLER | JK | 2017/02 | JJ |






| APPROVALS | | DATE |
|---|---|---|
| DRAWN | J.K. | 2016/08 |
| CHECKED | J.J. | 2017/01 |



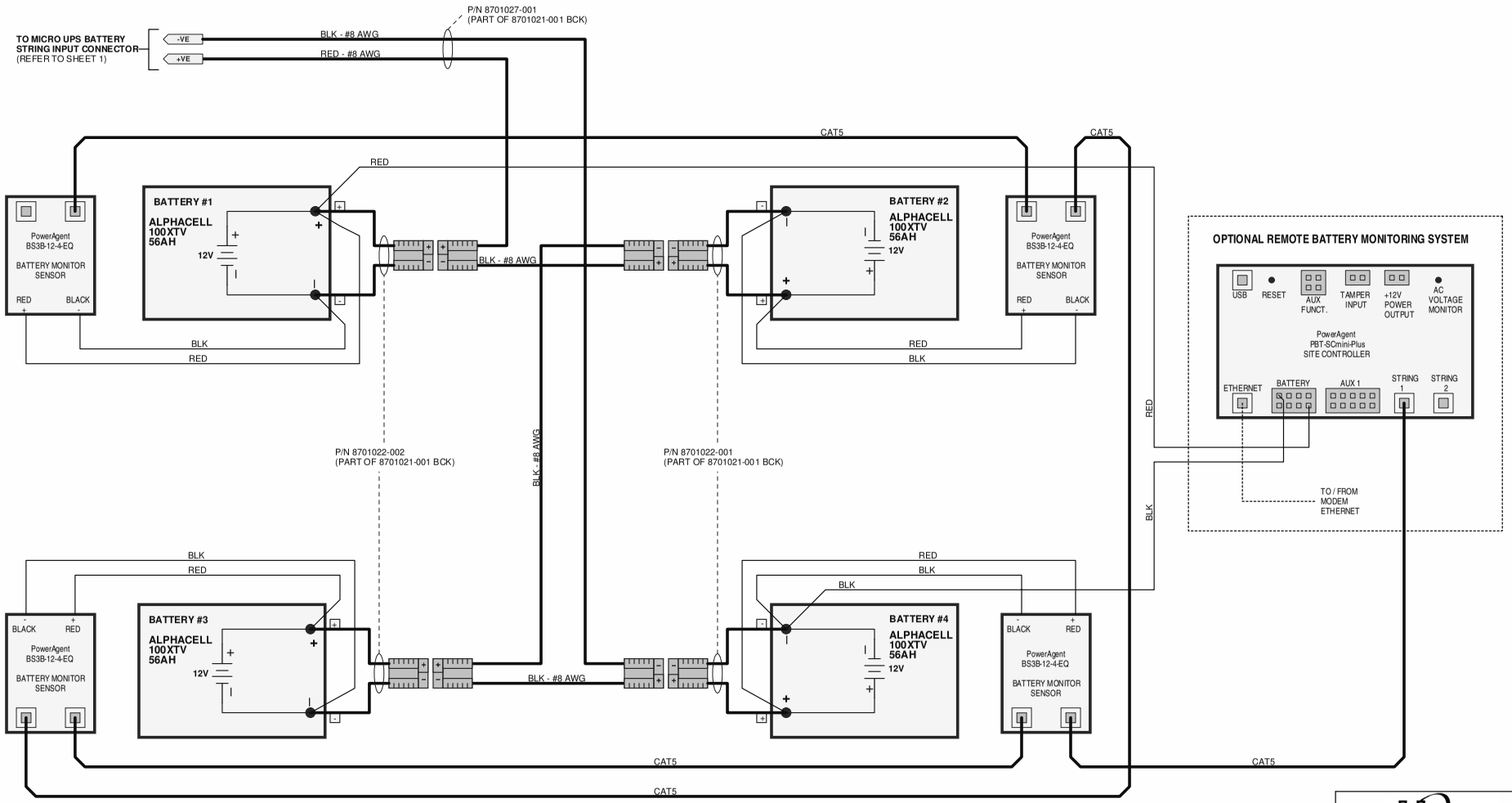
TITLE: SCHEMATIC, TRAFFIC MINI 350/1000 BBS

| SIZE | DWG NO. | REV |
|---|---|---|
| B | 7400751-05 | B |

SCALE NTS SHEET 1 of 4

| REVISIONS | | | | |
|---|---|---|---|---|
| LTR | DESCRIPTION | DRW | DATE | CHK |

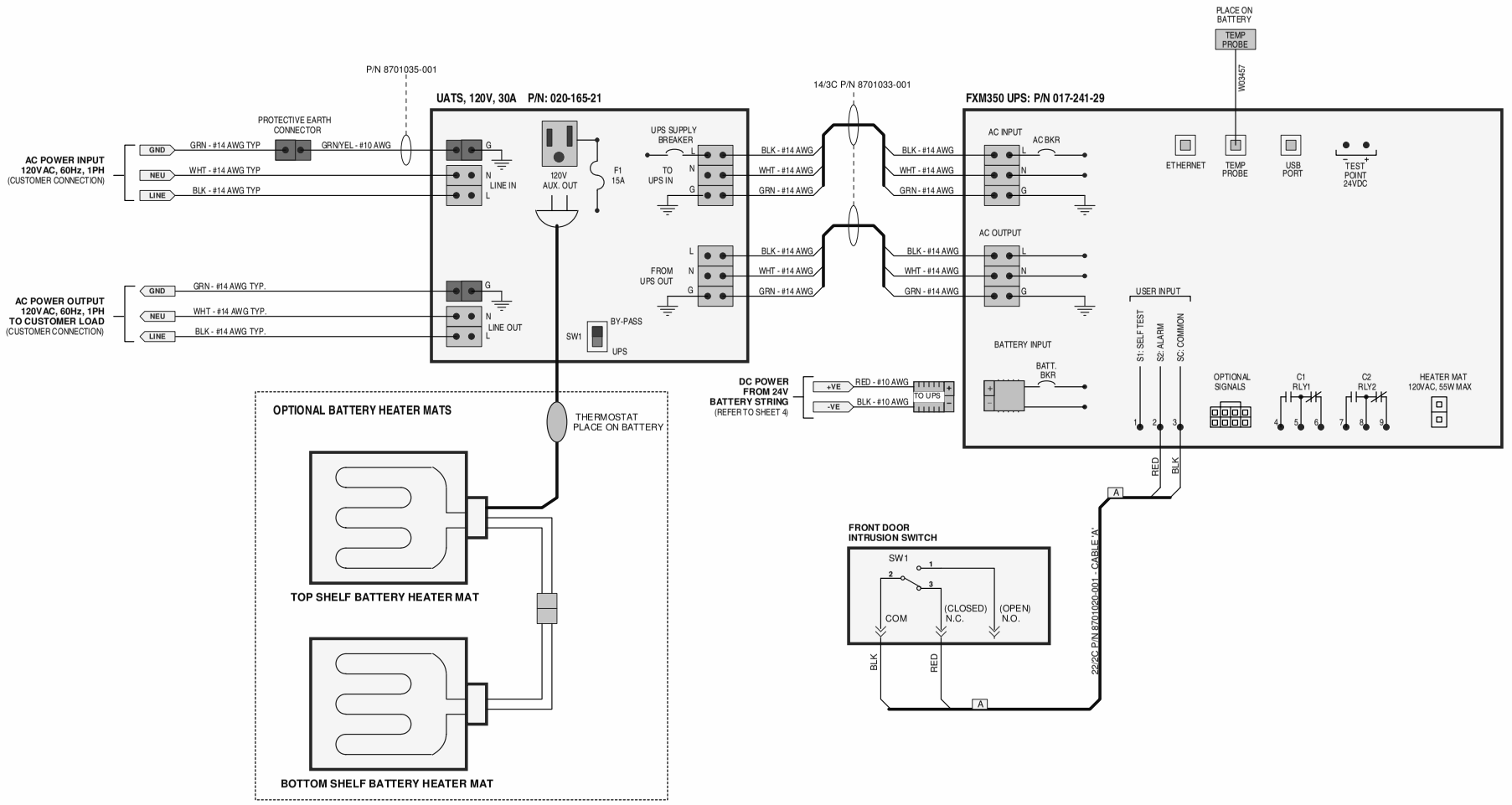
## CONFIGURATION: 7400751-001:
## MINI 1000 BBS, 120VAC, 48VDC




| | | | |
|---|---|---|---|
| TITLE | SCHEMATIC, TRAFFIC MINI 350/1000 BBS | | |
| SIZE B | DWG NO. 7400751-05 | | REV B |
| SCALE NTS | | SHEET 2 of 4 | |

| REVISIONS | | | | |
|---|---|---|---|---|
| LTR | DESCRIPTION | DRW | DATE | CHK |

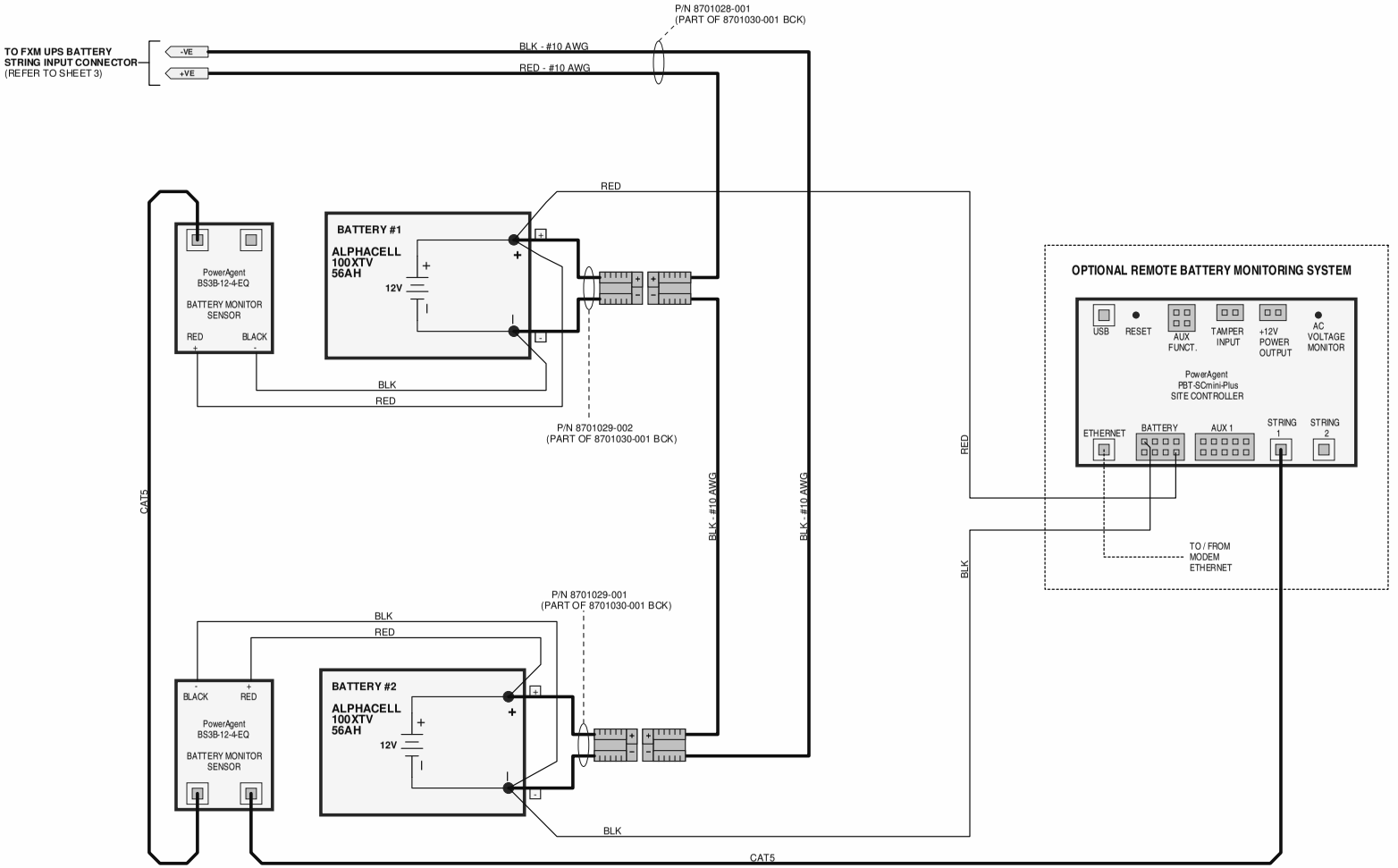
## CONFIGURATION: 7400751-002:
## MINI 350 BBS, 120VAC, 24VDC




| | | | |
|---|---|---|---|
| TITLE | SCHEMATIC, TRAFFIC MINI 350/1000 BBS | | |
| SIZE B | DWG NO. 7400751-05 | REV B | |
| SCALE NTS | SHEET 3 of 4 | | |

| REVISIONS | | | | |
|---|---|---|---|---|
| LTR | DESCRIPTION | DRW | DATE | CHK |

## CONFIGURATION: 7400751-002:
## MINI 350 BBS, 120VAC, 24VDC




| | | | |
|---|---|---|---|
| TITLE | SCHEMATIC, TRAFFIC MINI 350/1000 BBS | | |
| SIZE B | DWG NO. 7400751-05 | | REV B |
| SCALE NTS | | SHEET 4 of 4 | |

**Alpha Technologies Ltd.**
7700 Riverfront Gate
Burnaby, BC V5J 5M4
Canada
Tel: +1 604 436 5900
Fax: +1 604 436 1233
Toll Free: +1 800 667 8743
www.alpha.ca

**Alpha Technologies Inc.**
3767 Alpha Way
Bellingham, WA 98226
United States
Tel: +1 360 647 2360
Fax: +1 360 671 4936
www.alpha.com

**Alpha Industrial Power Inc.**
1075 Satellite Blvd NW.
Suite 400
Suwanee, GA 30024
Tel: +1 678 475 3995
Fax: +1 678 584 9259
www.alpha.com

**Alpha Energy**
17825 59th Ave. NE, Suite B
Arlington, WA 98223
United States
Tel: +1 360 435 6030
Fax: +1 360 435 6019
www.alpha.com

**Alpha Technologies GmbH.**
Hansastrasse 8
D-91126
Schwabach, Germany
Tel: +49 9122 79889 0
Fax: +49 9122 79889 21
www.alphatechnologies.com

**Alpha Technologies Europe Ltd.**
Twyford House, Thorley
Bishop's Stortford
Hertfordshire, CM22 7PA
United Kingdom
Tel: +44 1279 501110
Fax: +44 1279 659870
www.alphatechnologies.com

**Alphatec Ltd.**
339 St. Andrews St.
Suite 101 Andrea Chambers
P.O. Box 56468
3307 Limassol, Cyprus
Tel: +357 25 375 675
Fax: +357 25 359 595
www.alpha.com

**Alpha Technologies Pty Ltd.**
Suite 2 32-34 Peter Brock Drive
Eastern Creek NSW 2766
Australia
Tel: +61 2 8599 6960
www.alpha.com

**Alpha Innovations Brasil**
Address: Rua Alvares Cabral,
Nº 338 – Diadema - SP
09981-030
Brazil
Tel: +55 11 2476 0150
www.alphainnovations.com.br

**Alpha Technologies S.A.**
1, Avenue Alexander Fleming
B-1348 Ottignies, Louvain-la-Neuve
Belgium
Tel: +32 10 438 510
Fax: +32 10 438 213
www.alphatechnologies.eu

**OutBack Power**
17825 59th Ave. NE, Suite B
Arlington, WA 98223
United States
Tel: +1 360 435 6030
Fax: +1 360 435 6019
www.outbackpower.com

**Alpha Tec Trading (Shenzhen) Co. Ltd.**
Suite 1903, Tower 1,
China Hong Kong City,
33 Canton Road,
Kowloon, Hong Kong
Tel: +852 2736 8663
Fax: +852 2199 7988
www.alpha.com

**NavSemi Technologies Pvt. Ltd.**
Bengaluru, India Office
Plot No: 29 (P1) & 31 (P1),
Electronic City Phase 2,
Bengaluru - 560 100, India.
Tel: +91 80 6539 2666
www.navsemi.com

**Alpha Mexico Network Power S.A. de C.V.**
Calle Dakota #204, of 303, Col. Nápoles.
México D.F. C.P.03810, México
Tel: +55 5543 1114
Toll Free: +01 800 0082 886
www.alphapower.mx

**Alpha Technologies Turkey Enerji Ltd Sti**
Altaycesme MAh.Sarigul Sok No 33 Umut Kent
Sistesi A Blok D:5
Maltepe, Istanbul
Turkey
Tel: +90 216 370 23 28
Fax: +90 216 370 23 68
www.alpha.com.tr

For technical support, contact Alpha Technologies:
Canada and USA: 1-888-462-7487
International: +1-604-436-5547

Visit us at www.alpha.ca

Power