alpha TECHNOLOGIES™

Cellect™ 600 48Vdc Small Cell Power Supply, with Built-in Battery

Installation & Operation Manual

Your Power Solutions Partner

Cellect™ 600 48V Small Cell Power Supply with Built-in Battery

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.

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!**

Hazardous voltages are present at the input of power systems. The DC output from rectifiers and batteries, though not dangerous in voltage, has a high short-circuit current capacity that may cause severe burns and electrical arcing.

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.

1.5 Grounding Connection Notes

To provide a reliable source of backup power, it is necessary to establish a grounding system that provides for the safety of the service personnel responsible for the system operation and maintenance, and facilitates the proper operation and protection of equipment within the network. Such a grounding system provides protection with respect to operator safety, system communication and equipment protection.

The Cellect 600 is suitable for installation as part of an Isolated Bonding Network (IBN)."

1.6 Safety Ground

The safety ground is a two-part system. The first is a return path for stray current back to the input breaker. The second, is a return path from the enclosure to a second ground rod.

Typically, the safety or utility ground provides a return path to the input breaker or fuse panel by means of a connection to an appropriate driven ground rod at the base of the power pole. This path must meet the National Electrical

Code (NEC), as well as any local codes, to ensure the breaker will open, which prevents unwanted current flow from posing a hazard to service personnel.

1.7   Strike (Lightning) Ground

Lightning strikes, grid switching, shorts, or other abnormal events on the power line have the potential to cause "fast rise time currents" which can damage the powering system. The most viable method to protect the system from damage is to divert these "fast rise time currents" along a low-impedance path to ground.

The low-impedance path to ground prevents the current from producing high voltage levels and posing a threat to equipment. Without a low-impedance path to ground, the current (while travelling through wires of varying impedance) may produce high voltages that will damage the powering equipment.

To be most effective, all components of the grounding system need to be properly bonded to the ground rods.

2. Product Overview

Cellect™ 600 overcomes all of the challenges associated with providing DC power with battery backup for small cells. This small, lightweight, unit was designed for consistent, repeatable installation. Six individual circuits, with integrated over-current protection, and plug-and-play connectors ensure a sufficient number of circuits for site components. Full output power is achieved with either 120Vac or 240Vac input power and with temperatures ranging from -40 to 46°C (-40 to 115°F) plus solar loading. Cellect™ 600 comes with a universal mounting bracket for mounting on poles, walls, or combination brackets. To meet the aesthetic challenges, the product can be ordered with a primer finish that can be painted in any color needed to meet municipal or landlord requirements. The economical design and standard features provide industry-leading total cost of ownership for small cell DC power.

- 48V/600W telecom grade outdoor power system with IP65/Nema Type 3 rating
- Integrated battery backup increases system availability and end-user Quality of Experience (QoE)
- Key features enable outdoor small cell deployments
- Small physical size (16" x 9" x 6") alleviates optical intrusion concerns
- Light weight (<11kg, 24lb) design maximizes options for deployment on poles and walls
- Easy to install within minutes by a single technician
- Reduced OPEX resulting from maintenance-free battery and enclosure, as well as high efficiency rectifier design
- Advanced monitoring and control, including SNMP, at both the system level and for individual circuits

The Cellect™ 600 is suitable for installation in the following locations:

- Network Telecommunication Facilities
- Locations where the NEC applies
- OSP

Figure 1 — Cellect™ 600

2.1 Product Part Numbers

Product	Part Numbers
Cellect™ 600 Unit, Standard Powder Coat Finish	0100021-001
Cellect™ 600 Unit, Paintable Enclosure	0100021-002
Cellect™ 600 Startup Cable Kit	0370310-001

3. Product Specifications

Electrical	
Input Voltage:	100 to 240Vac
AC Input Frequency:	50 to 60Hz
Output Voltage:	-48 to -58Vdc
Output Power:	600W continuous, max total
Efficiency:	>94.5%
Electrical Noise:	< 30mV RMS (to 10MHz) < 150mV pk to pk (to 100MHz)
Acoustic Noise:	<40dBa at 1m (3 ft)
Battery Backup Capacity:	125 Wh
Mechanical	
Dimensions (HxWxD):	mm: 382H x 236W x 165D (195 w/bracket) Inches: 15H x 9.3W x 6.5D (7.7w/ bracket)
Weight:	<11kg (24lb.)
Connections: **(IP65 connectors)**	Six DC Outputs AC Input Alarms Ethernet
Environmental	
Temperature Operating:	-40 to 46˚C (-40 to 115˚F) plus solar loading
Temperature Storage:	-40 to 85˚C (-40 to 185˚F)
Environmental Protection:	IP65/Nema Type 3
Surge Protection:	6kV/3kA (AC power port)
Humidity:	5 to 95% RH
Elevation:	-500 to 2000m (-1640 to 6561ft)
Performance/ Features	
Power Backup Runtime:	15 min @ 450W load
Alarms:	AC Fail On Battery BMS Failure Loss of DC
LED:	Green: DC Output OK
Remote Monitoring:	Ethernet, SNMPv2c
Agency Compliance	
Safety:	IEC/CSA/UL 60950-1 IEC/CSA/UL 60950-22 Low Voltage Directive
EMC:	CFR47 (FCC) Part 15 Class A EN 55022 class A EN 61000-3-2, 3-3 EN 300-386 v1.6.1 EMC Directive 2014/30/EU
Immunity:	EN 61000-4-2, 4-3, 4-4, 4-5, 4-6, 4-11 ANSI / IEEE C62.41 CatB3
NEBS:	GR-63-CORE (pending) GR-1089-CORE (pending) GR-3108-CORE (pending) GR-3168-CORE (pending)

4. Product Features

4.1 Rectifier

The core of Cellect™ 600 is a DSP controlled rectifier that employs high frequency, switched mode conversion technique to provide a fully regulated and isolated DC output from the AC mains. It provides highly efficient power conversion with power factor correction. It features wide operating temperature ranges for installation in harsh outdoor environments and a wide input voltage range suitable for global installation requirements.

The output of the rectifier is internally connected to the built-in smart battery and six power outputs. The rectifier is able to continuously deliver a total of 600W to the six outputs.

The Cellect™ 600 has advanced transient protection providing CAT III protection circuits (6 kV/3 kA) to ensure reliable operation under abnormal conditions.

NOTE:

Special tools may be required to complete Cellect™ 600 installation and wiring. Refer to section 6, Installation, for more details.

4.2 Battery

NOTE:

Ensure that the Cellect™ 600 is fully charged prior to first use. Also, if the Cellect™ 600 is in storage for a period of six months, then it needs to be recharged before use.

The Cellect™ 600 includes a maintenance free, built-in smart battery pack providing 125Wh of backup power. The smart battery pack uses advanced high-performance nickel-metal hydride (NiMH) cells. Compared to other battery chemistries, the NiMH cells provide:

- High-rate discharge
- Improved reliability over a wide-range of operating temperatures
- Long life characteristics and high energy density

In addition, NiMH batteries are:

- Environmentally friendly - they do not contain highly toxic materials, and they do contain components that have high value as recycled material (such as nickel)
- Inherently safe due to the use of more benign active chemicals
- Simple to store and have fewer transportation requirements
- Not generally subject to transportation regulatory controls

The Cellect™ 600 smart battery pack has an intelligent battery management system (BMS) that controls the bidirectional power stage for charging and discharging.

The BMS monitors the input voltage, battery voltage, battery current, and battery temperature and determines the appropriate state for the battery pack. When the ambient temperature drops below 10℃, the BMS activates an internal heater to preserve the battery at optimal performance.

The backup runtime for the smart battery pack depends on the average total output power. The following table and figure provides typical backup runtime values at various output power rates.

Average Total Output Power (Watt)	25	50	75	100	200	300	400	500	600
Runtime (minutes)	278	142	91.0	72.3	33.8	22.0	15.7	12.4	9.5

Figure 2 — Battery Runtime vs. Average Total Output Power

0100021-J0 Rev. C
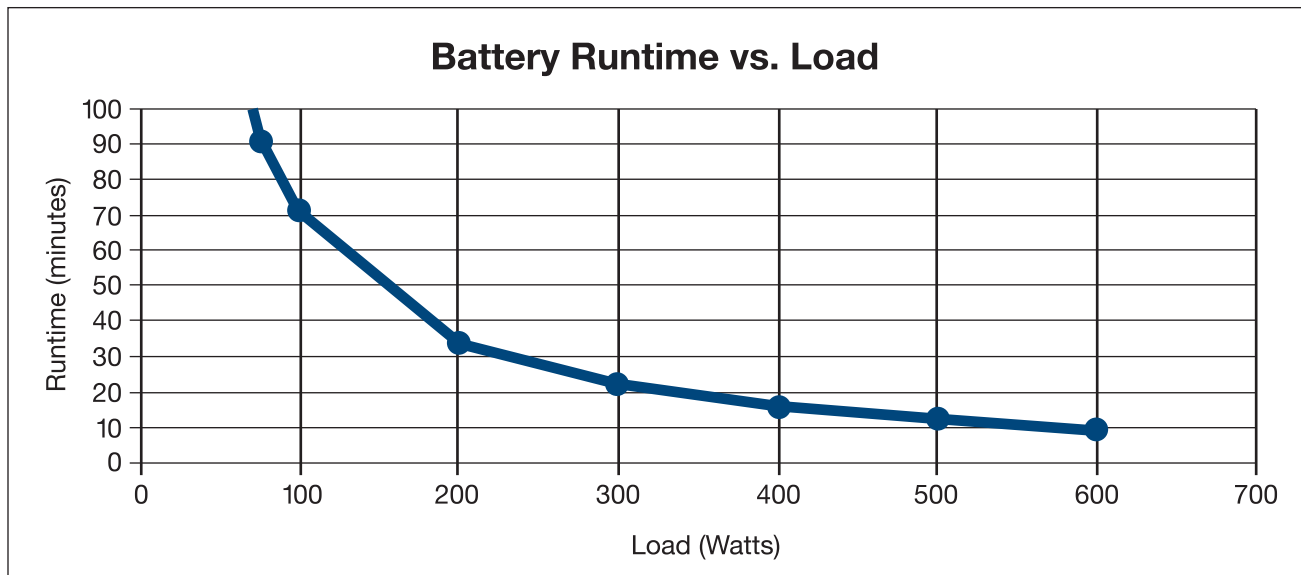
Battery Runtime vs. Load

Figure 3 — Battery Runtime vs. Load

There are five main states for the smart battery pack as listed in the following table.

State	Description
Battery OFF	Used to protect the battery from over discharging and during long periods of storage or transportation
Qualifying	Monitors transitions and select appropriate state
Charging	Performs charging of the battery following pre-defined algorithm for 10 h and monitors battery temperature.
Discharging	Detects missing input voltage and switches the power stage to boost mode. During discharge the output voltage is regulated to 48Vdc.
Fault	Alarm Fault is generated if the BMS detects, overvoltage on the input, over voltage on the battery, over current on the battery during charging, under voltage on the battery, over temperature on the battery, or communication loss.

4.3 Controller and Remote Monitoring

The Cellect™ 600 includes a built-in controller that communicates with the rectifier and the built-in smart battery pack while monitoring and controlling the power outputs. The controller provides web, SNMP and SNTP server functionality. Remote or local access is available through the Ethernet port.

4.4 Status Indicators

The Cellect™ 600 has an externally visible, three-color LED to provide status indication.

Priority	LED	Description	Conditions
1	RED (Blinking)	BMS Failure	Alarm is triggered if there a malfunction of the Battery Smart Pack due to communication error or battery fuse failure or over temperature
2	RED	Loss of DC	Alarm is generated if any of the outputs experience an overload condition for more than 50ms, short circuit or presence of foreign voltage. Alarm clears automatically if the above condition is not met.
3	AMBER	Battery on Discharge	Alarm is generated when there is no AC voltage
4	GREEN	Normal Operation, No Alarm	No alarms
5	OFF	AC Failed and Battery Discharged	The LED is OFF when there is no input voltage or it is below 88Vac; and the battery is completely depleted (unit shuts down)

4.5   Alarm Relays

The Cellect™ 600 has four Form C digital alarm output relays that are externally available with the following mapping:

Name	Alarm	Description	LED
Alarm Output K1	AC Fail	Alarm- contact opens if input AC voltage is below 88Vac. No Alarm – contact closes if input AC voltage is above 95Vac.	OFF or AMBER
Alarm Output K2	ON Battery	Alarm- contact opens if AC Fail and Battery on discharge. No Alarm – contact closes if AC is present.	AMBER
Alarm Output K3	BMS Failure	Alarm- contact opens if the Battery Smart Pack malfunction due to communication error or battery fuse failure. No Alarm – contact closes if the Battery Smart Pack is operating normally.	RED (blinking)
Alarm Output K4	Loss of DC	Alarm- contact opens if there is an output overload (see section 4.6.2) or short circuit condition. No Alarm – contact closes if all the outputs are operating normally	RED

4.6   Outputs

4.6.1   Output Power Limits

Cellect™ 600 has six individually powered output connectors. The maximum current for the DC OUT 6 should be limited to 13 Amps (600W @ 48V) for bulk DC power. The five power connectors DC OUT 1 through DC OUT 5 should be limited to 6.5 A (300W @ 48V). The total output power from all the outputs should not exceed 600W.

The output DC voltage is regulated around -55Vdc when AC input is present. When the battery is discharging during a power outage, the output voltage is regulated around -48Vdc until the battery is completely discharged, and the unit shuts down.

CAUTION!

The total output power from all connectors should not exceed 600W.

Each DC output is electronically controlled and protected which allows it to recover automatically, seamlessly from overload or short circuit conditions. Additionally, each output has an integrated surge and transient protection.

4.6.2   Output Power Overload

Up to 5% overload may be tolerated continuously on individual outputs and the unit total output power. However, if any of the outputs OUT 1 to 5 is overloaded to more than 320W or OUT 6 to more than 630W or the total output power drawn is more than 650W then the Cellect™ 600 goes into Overload state.

When an Overload condition occurs the Cellect™ 600 starts shedding load (outputs) in a priority order starting with OUT 6 (lowest priority) to OUT 1 (highest priority). The outputs are turned off sequentially until the total power draw falls below 620W.

The outputs that are turned OFF due to Overload are automatically restarted every 5 seconds following the reverse priority order.

4.6.3   4.6.3 Output Remote Control

Individual DC outputs may be turned ON/OFF remotely, via the web interface, to perform a power reset on the load or to be permanently set to an OFF state. See section 8.3 for instructions on how to remotely turn ON/OFF outputs.

5. Pre-Installation

5.1 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.

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

5.1.1 Returns for Service

Save the original shipping box. If the product needs to be returned for service, it should be packaged in its original shipping box. 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.

5.2 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.

5.3 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.

5.4 Painting the Cellect™ 600 Enclosure

The Cellect™ 600 comes with an aluminum solar shield that can be removed for painting. The unit can be ordered (P/N 0100021-002) with a clear chromate conversion finish which is ready for painting or wrapper application.

The Cellect™ 600 standard product (P/N 0100021-001) comes with a standard powder coat finish.

The three steps to painting a Cellect™ 600 are to first remove the solar shield, prime and paint the unit, and then reassemble it.

5.4.1 Tools Required to Remove the Solar Shield

- T20 pin in centre security head bit

5.4.3 Removing the Solar Shield

1. Remove the four screws on the front of the solar shield and the two screws on each side, save for reassembly.

2. Gently spread the bottom two corners on the solar shield.

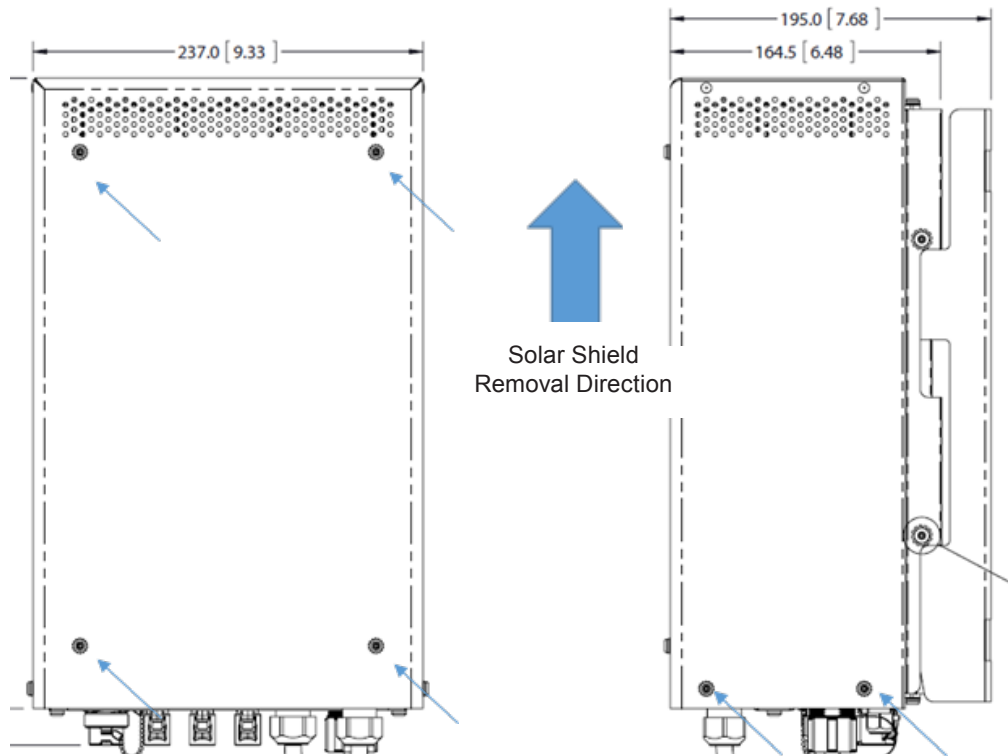3. Slide the solar shield up, until it completely clears the unit.

Solar Shield
Removal Direction

Figure 4 — Removing the Solar Shield

5.4.2 Painting the Solar Shield

The paint-ready solar shield is aluminum and is provided with a clear chromate conversion finish that readily accepts paint. Apply a high quality primer and then apply a top coat of paint the unit.

If a wrapper is applied instead of paint, pierce holes in the wrapper at the same positions of the holes at the top of the solar shield. It is important for these holes to remain unobstructed to ensure proper thermal management of the unit.

5.4.4 Reassembly

For reassembly, slide the solar shield into the unit and then reinsert the screws as in step 1 of "5.4.3 Removing the Solar Shield"

If any of the front screws will not tighten, lightly squeeze the underlying flanges with a pair of pliers to allow the thread cutting screws to cut new threads, and then tighten the screws.
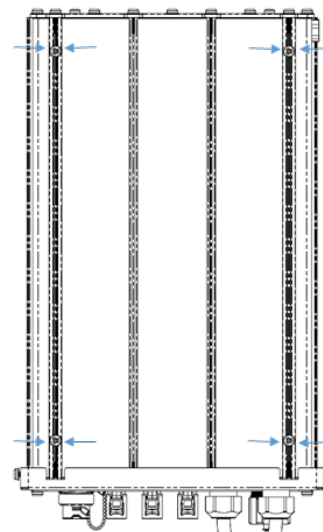
6. Installation

This chapter is provided for qualified personnel to install the Cellect™ 600.

6.1   Transportation and Storage

The Cellect™ 600 is shipped from the factory with the internal battery turned off to ensure optimal service life.

It is recommended to store the units in their original boxes, in dry environment with ambient temperature between 20° and 30°C (68° to 86°F).

The Cellect™ 600 may be stored for up 12 months without any maintenance. However, if the storage period will exceed one year, it is recommended that every 12 months the module be connected to an AC source for 2 hours to partially charge the internal battery. After the 2 hour charge, the internal battery needs to be turned off as per the procedure described in section 8.3 of this manual.

6.2   Configuring Remote Monitoring and SNMP

If the Cellect™ 600 is to be deployed to support remote monitoring, it is advised to perform the unit Network Configuration before actual field installation. Refer to section 8, for setup instructions.

6.3   General Field Installation Instructions

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

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

6.4   Safety Precautions

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.

6.5   Tools Required

Various insulated tools are essential for product installation.

The following list is a guide:
- T25 pin in centre security head bit
- Digital voltmeter equipped with test leads
- Cutters, crimpers, and wire strippers 0.25 to 10mm^2 (#24 to #6 AWG)

NOTE:

The following special tools are required for installation and wiring the Cellect™ 600:

- **T25 pin in centre security head bit, for unit mounting**

- **Anderson Power Products (APP) tool # PM1000G1, for making DC output cables**

- **Tyco Electronics (TE) tool # 91542-1, for making Alarm cables**

- **Tyco Electronics (TE) document (PN 408-8933) for the IDC connector for making Ethernet cables**

6.6   Mounting

The Cellect™ 600 can be wall or pole mounted. For more detailed information also refer to the 0100021-08 drawing at the back of this manual.

6.6.1   Mounting Options

The Cellect™ 600 can be mounted in a variety of ways. Choose any of the following:

- Mount to a wooden pole
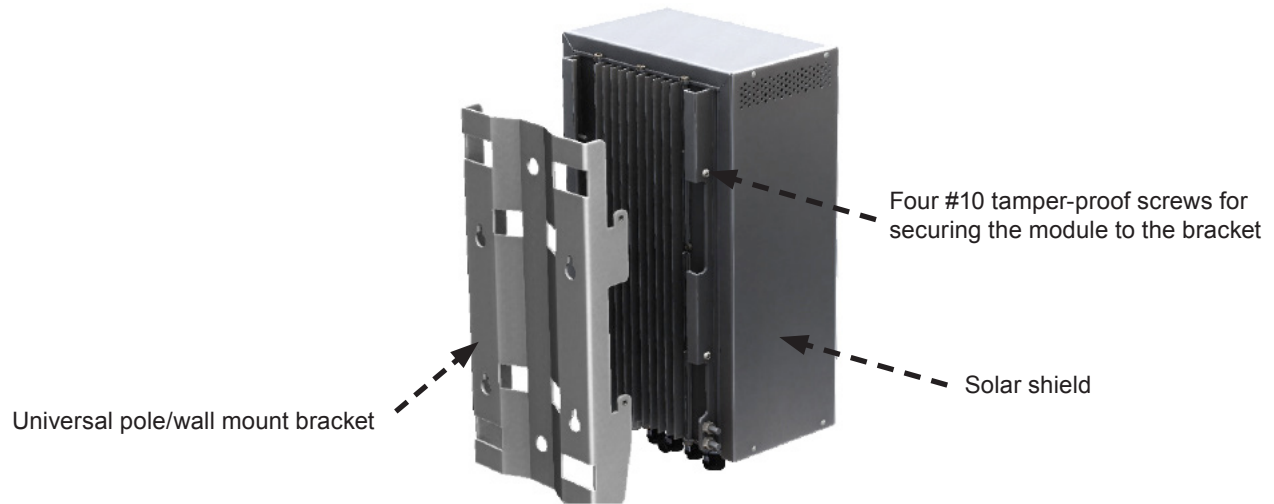- Mount steel or concrete pole
- Mount to a wall

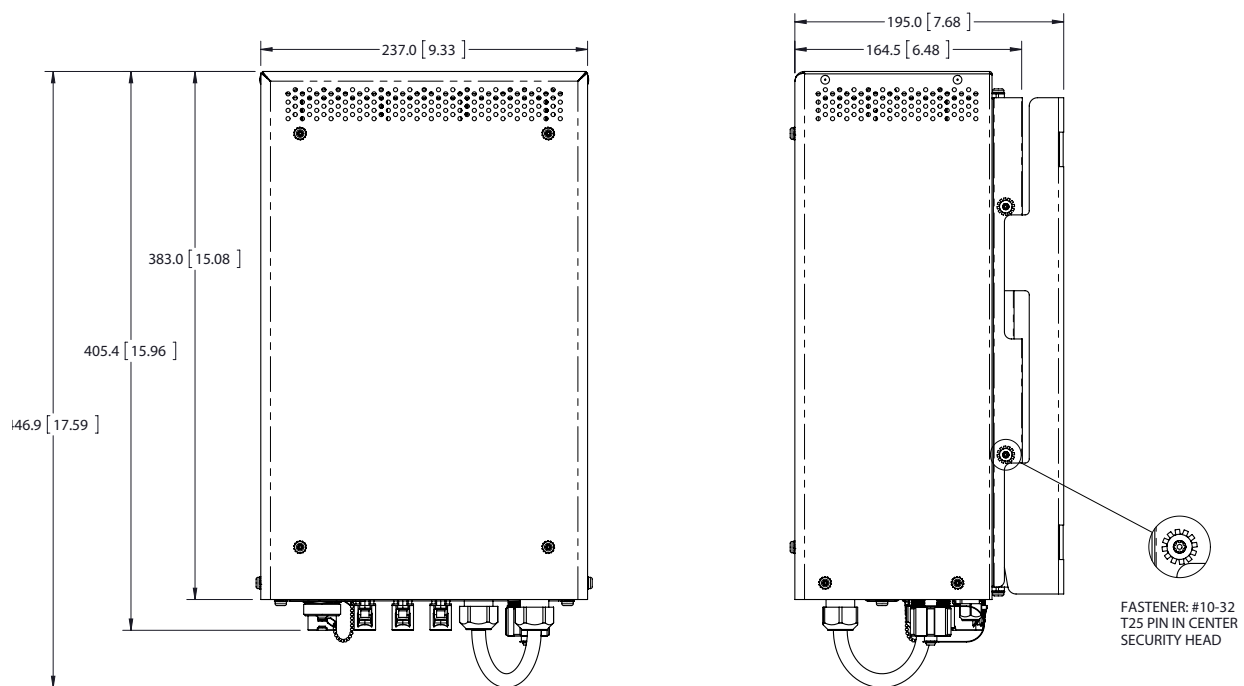Figure 5 — Unit parts

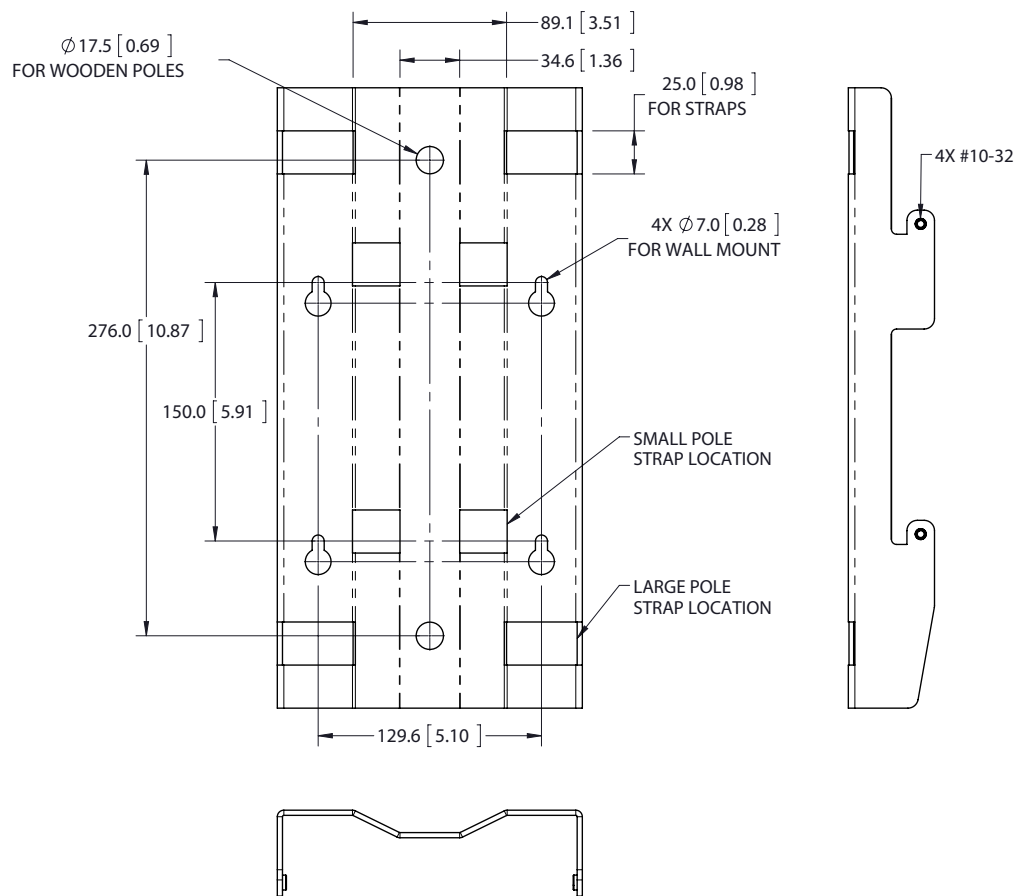## 6.7   Mounting Dimensions

Figure 6 — Mounting dimensions

∅17.5 [0.69]
FOR WOODEN POLES

89.1 [3.51]

34.6 [1.36]

25.0 [0.98]
FOR STRAPS

4X ∅7.0 [0.28]
FOR WALL MOUNT

276.0 [10.87]

150.0 [5.91]

SMALL POLE
STRAP LOCATION

LARGE POLE
STRAP LOCATION

129.6 [5.10]

4X #10-32

Figure 7 — Mounting bracket dimensions

6.7.1 Mounting to a Wooden Pole

Tools and materials required:

* T25 pin in centre Torx security drive for the bolts that attach the cabinet to the mounting bracket.
* Two 5/8" diameter machine bolts, UNC tread, SAE Grade 5 or better, length to suit the pole (not provided).
* Two 5/8" diameter zinc-plated lock washers and flat washers (not provided) .
* Two 5/8" diameter hex nuts UNC threaded (not provided).
* Auger or drill for boring 3/4" diameter holes in the wood pole (not provided).

Procedure

1. Using the mounting bracket as a template, drill two holes into the pole to accept the machine bolts.
2. Secure the mounting bracket to the pole with the machine bolts as show in Figure 8.
3. Secure the Cellect™ 600 module to the mounting bracket with the supplied bolts.
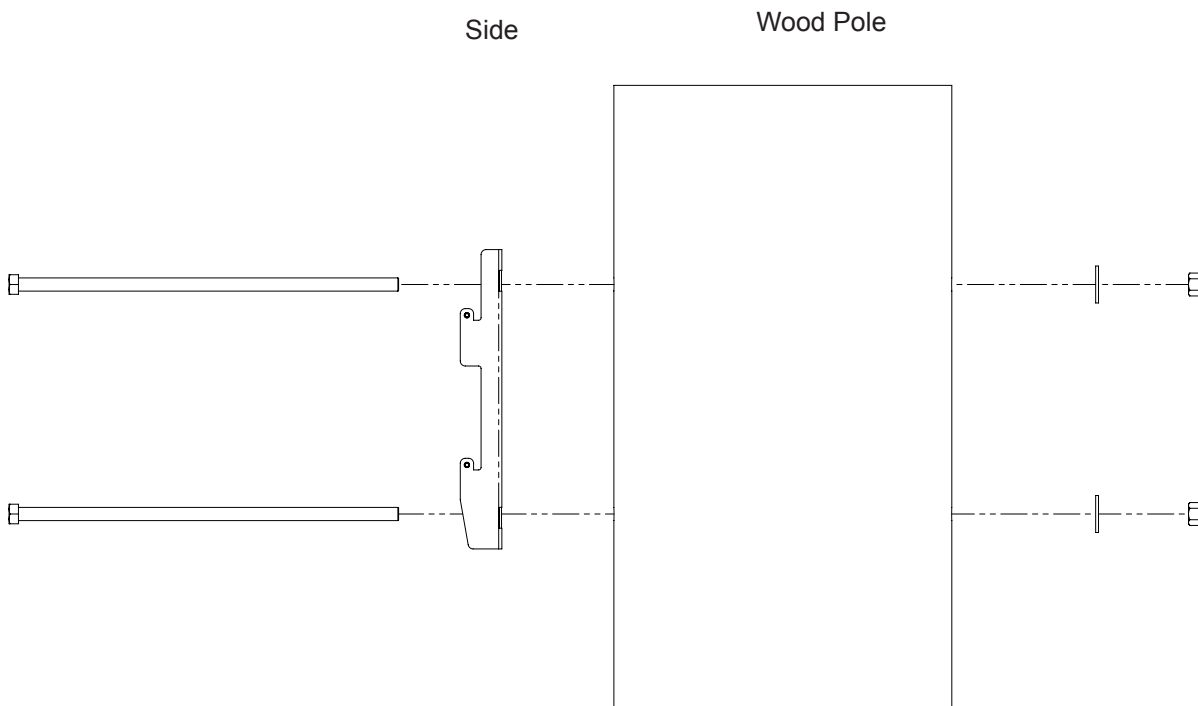
Figure 8 — Mounting to a wooden pole

6.7.2 Mounting to a Steel or Concrete Pole

Tools and materials required:

- T25 pin in centre Torx security drive for the bolts that attach the cabinet to the mounting bracket.
- Two pole mount straps that fit the pole. Straps must be stainless or galvanized.
- C001 Band-It tool or equivalent.
- C206 3/4 inch stainless steel Band-It band or equivalent.
- C256 3/4 inch stainless steel Band-It buckles or equivalent.
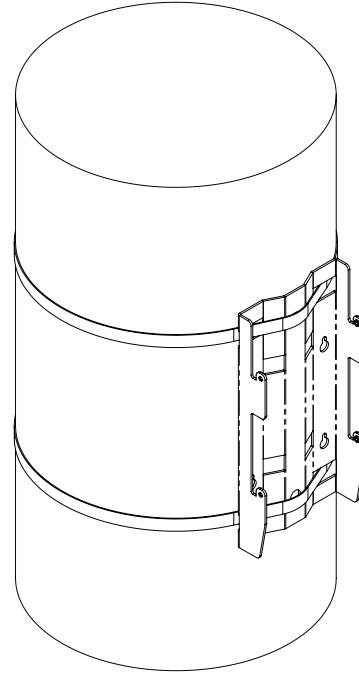
Procedure

1. Secure the mounting bracket to the pole with the straps.

Figure 9 — Securing the mounting bracket

2. Secure the module to the mounting bracket with the supplied bolts.
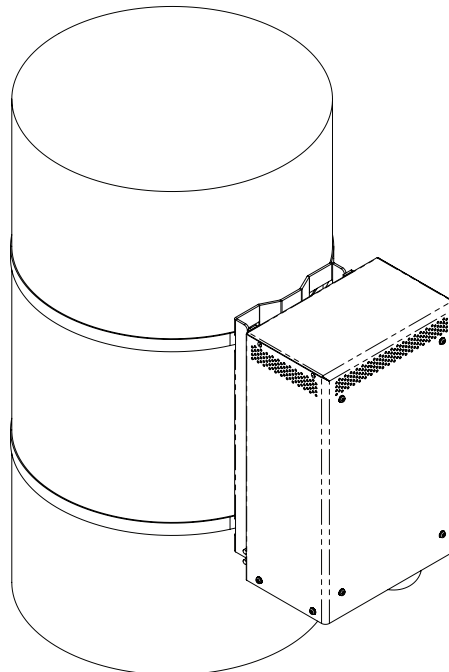
Figure 10 — Securing the module to the mounting bracket

6.7.3 Mounting to a Wall

Tools and materials required:

- T25 pin in centre Torx security drive for the bolts that attach the cabinet to the mounting bracket.
- Four 1/4" x 1-1/4" lag bolts (not provided).
- Four 1/4" diameter flat washers (not provided).
- Drill with 1/8" bit for drilling pilot holes (not provided).
- Assorted sockets and wrenches.

Procedure

1. Using the mounting bracket as a template, drill four pilot holes into the wall to accept 1/4" bolts.
2. Secure the mounting bracket to the wall with the four bolts and washers.
3. If the wall structure is not strong enough to support the weight of the unit reinforce the wall structure with 1/2" plywood of a suitable grade for the application environment.
4. Secure the module to the mounting bracket with the supplied bolts.

Side   Wall or studs
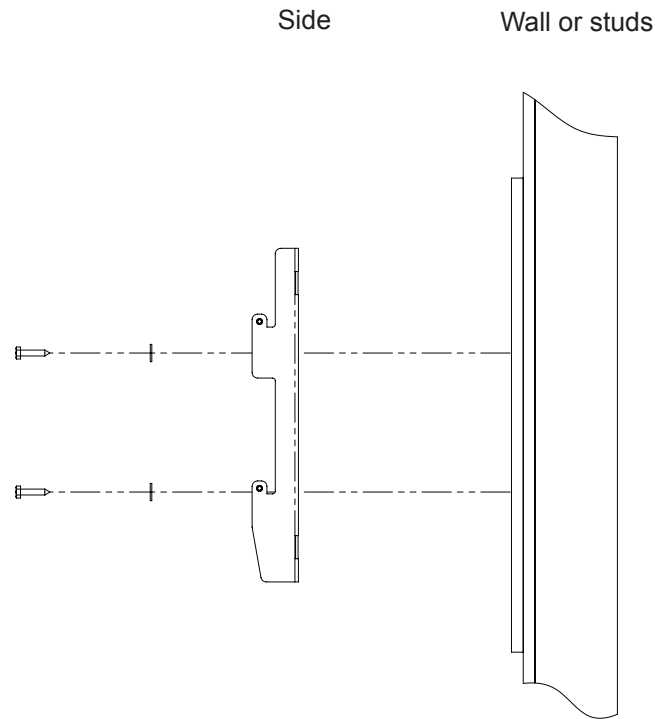
Figure 11 — Attaching the mounting bracket to the wall studs

6.8 AC Feed Protection/Sizing

It is required that a dedicated 15A branch circuit protection feeder breaker located at the AC distribution panel is used. It is also required that a suitable surge protection circuit (SPD) on the AC feed to reduce the over voltage category from Category IV to II is installed.

WARNING!

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.

6.9 Customer Connections

A Cellect™ 600 Startup Cable Kit is available from Alpha (P/N 0370310-001). It includes a set of 2.4m/8ft long cables each with one end pre-terminated with Cellect™ 600 mating connector as well as a cut cable at the other end. The kit contains:

- DC Input Cables (four)
- AC Input Cable (one)
- Alarm Cable (one)

Contact Alpha for other cable options. Alternatively, the following sections provide instructions on how to connect the various wiring cables that may be needed.

6.9.1 AC Input

AC input cable use: 3 x #16 AWG. Use the following mating cables for AC input connection. Crimp with Anderson Power Products (APP) tool (PM1000G1).

AC INPUT	
PIN	FUNCTION
1	GROUND
2	NOT USED
3	L1
4	L2
5	NOT USED

Figure 12 — Anderson Power Products (APP) tool - PM1000G1
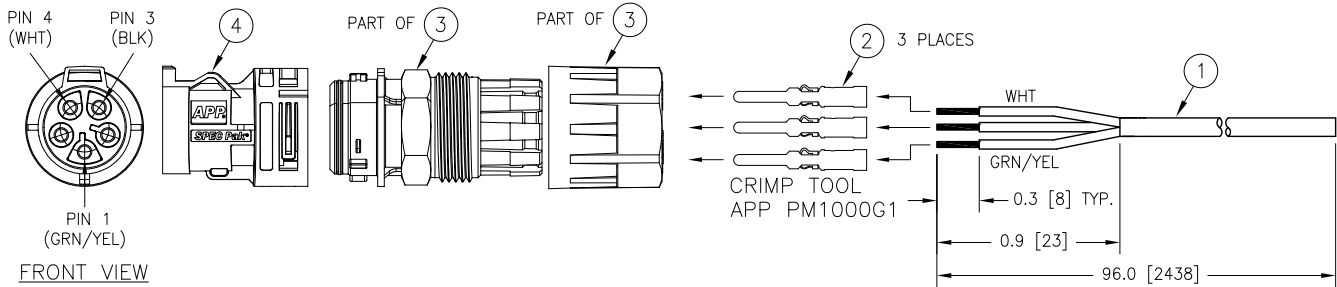
	Description	Alpha P/N	Manufacturer P/N
4	Heavy Duty Power Connectors, 5 Positions, MINI, 22A, IP68, UV and Flame Resistant Plastic	5450299	APP SK1-021M05
3	Sealing Gland, 5 Positions, IP68, UV and Flame Resistant Plastic	5450300	APP PS1T24-11X
2	Heavy Duty Power Connector Pin, 16-14AWG, Gold Plated	5380178	APP PM16P1416S30
1	Portable Cord Cable, 3 conductors, 16AWG, SJOOW Type, Standard, 300V (Qty = 8ft)	8580047	General Cable HF342 or equivalent

6.9.2 DC Output

DC Output cable use: 2 x #14 AWG. DC 1-5 can provide a maximum 300W per connection and DC 6 can provide a maximum of 600W. Use the following mating cable assembly for DC output connection. Crimp with Anderson Power Products (APP) tool (PM1000G1).
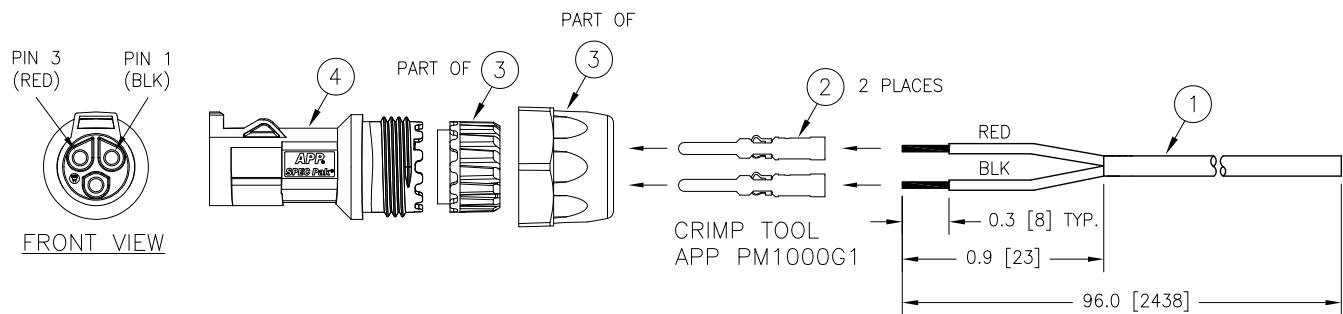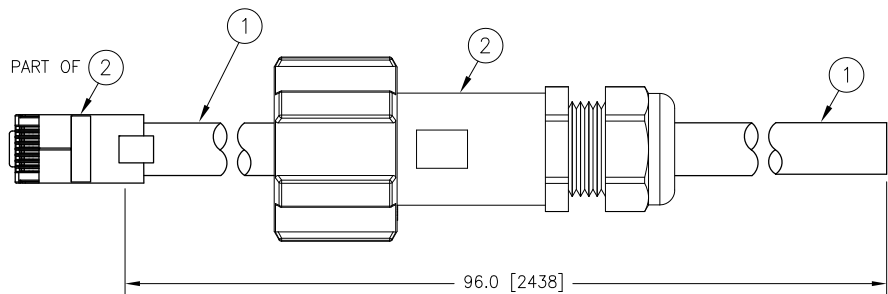

	Description	Alpha P/N	Manufacturer P/N
4	Heavy Duty Power Connectors, 3 Positions, MINI, 22A, IP68, UV and Flame Resistant Plastic	5450297	APP SK1-019M03
3	Sealing Gland, 3 Positions, IP68, UV and Flame Resistant Plastic	5450298	APP PS1T20-10X
2	Heavy Duty Power Connector Pin, 16-14AWG, Gold Plated	5380178	APP PM16P1416S30
1	Portable Cord Cable, 2 conductors, 14AWG, SJOOW Type, Standard, , 300V (Qty = 8ft)	8580046	General Cable HF358 or equivalent
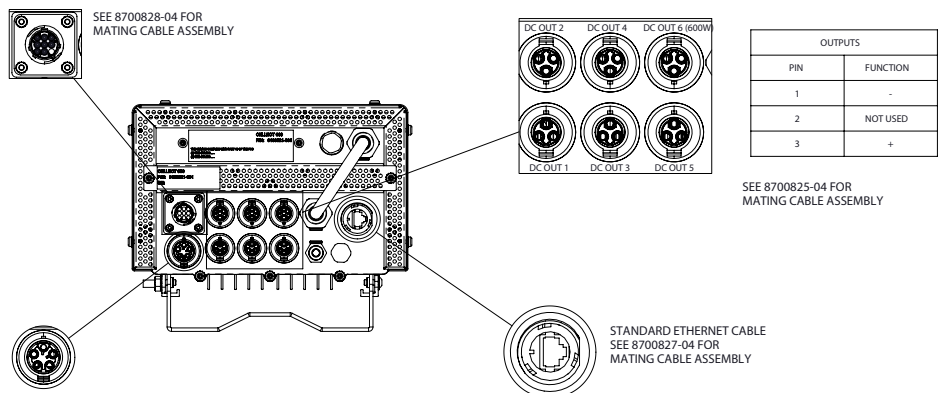
6.9.3 Ethernet

For Ethernet connection (the Ethernet port is intended for local craft access), prepare and install per the Tyco Electronics (TE) document (PN 408-8933) for the IDC connector.

	Description	Alpha P/N	Manufacturer P/N
2	Circular RJ4 Connector Plug, IP67, UV Resistant Plastic	5450303	TE 1954656-2
1	Data Cable, 8 conductors, 22AWG, Standard Unshielded, 300V (Qty = 8ft)	8580048	Unitronic 302208 or equivalent

## 6.9.4   Alarm Wiring

Alarm cable use: 8 x #22 AWG.

Use the following cable assembly for alarm wiring. Crimp with Tyco Electronics (TE) tool # 91542-1.

Figure 13 — Tyco Electronics (TE) tool - 91542-1

	ALARMS	
PIN	FUNCTION
1	K1-NC
2	K1-COM
3	K4-NC
4	K2-NC
5	K2-COM
6	K4-COM
7	K3-NC
8	K3-COM
9	NOT USED

	Description	Alpha P/N	Manufacturer P/N
4	CPC Connector Plug, 9 Positions, IP67, UV Resistant Plastic	5450301	TE 1977884-1
3	Standard Circular Connector Cable Clamp, 9 Positions, IP67, UV Resistant Plastic	5450302	TE 206966-7
2	Connector Pin, 24-20AWG, Brass, Gold Plated	5380180	TE 66566-7
1	Data Cable, 8 conductors, 22AWG, Standard Unshielded, 300V (Qty = 8ft)	8580048	Unitronic 302208 or equivalent
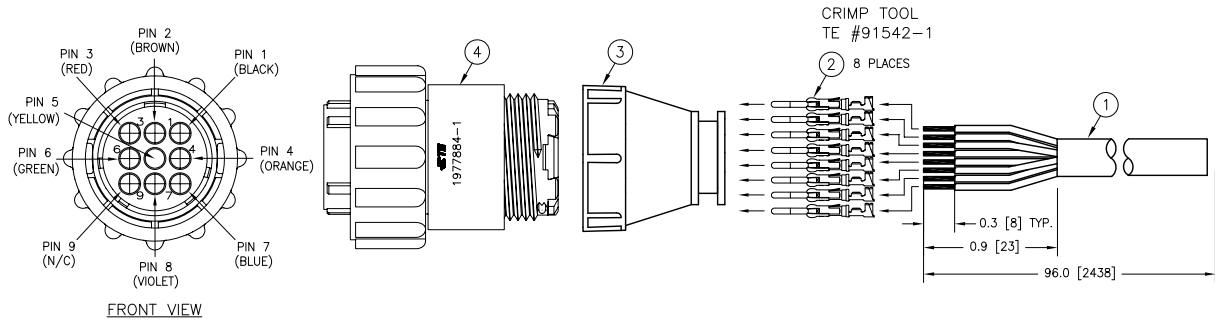
PIN#	WIRE COLOR	CONNECTOR ONTO PCB	SIGNAL
1	BLACK	P1 - PIN1	K1-NC/ OUT1
2	BROWN	P1 - PIN2	K1-COM /OUT1
3	RED	P4 - PIN1	K4-NC/ OUT4
4	ORANGE	P2 - PIN1	K2-NC/ OUT2
5	YELLOW	P2 - PIN2	K2-COM /OUT2
6	GREEN	P4 - PIN2	K4-COM /OUT4
7	BLUE	P3 - PIN1	K3-NC/ OUT3
8	VIOLET	P3 - PIN2	K3-COM /OUT3

6.9.5   Testing and Commissioning

See section 7.2.

6.9.6 Safety Ground

The safety ground is a two-part system. The first is a return path for stray current back to the input breaker. The second, is a return path from the enclosure to a second ground rod. To properly ground the enclosure, attach the grounding lug to the 2x 1/4"studs on 5/8"centers provided.
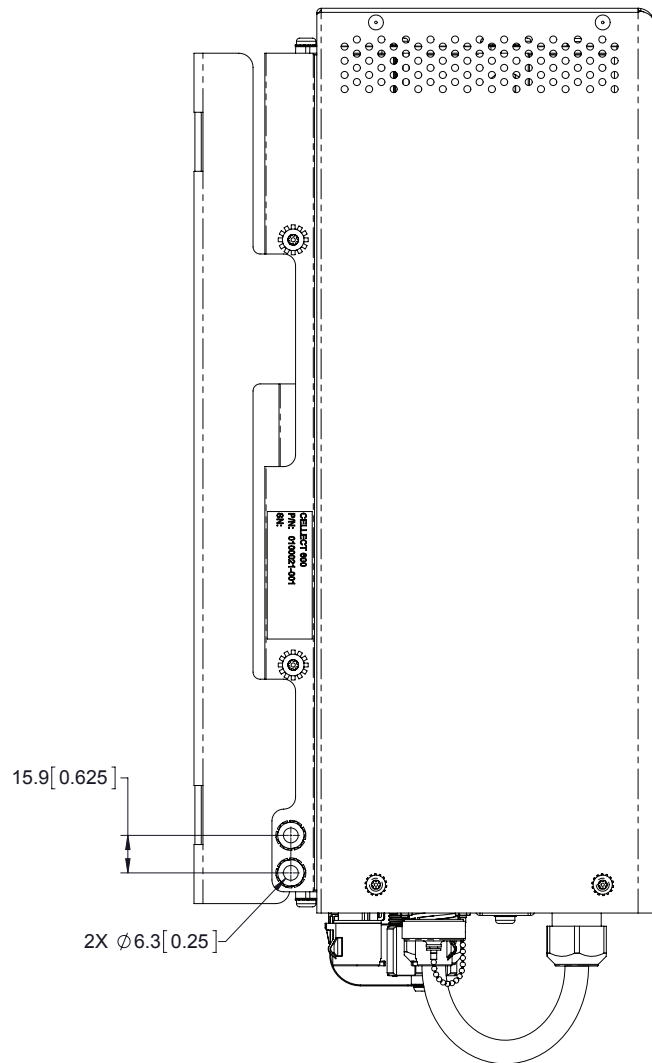

Figure 14 — Enclosure Ground

Typically, the safety or utility ground provides a return path to the input breaker or fuse panel by means of a connection to an appropriate driven ground rod at the base of the power pole. This path must meet the National Electrical Code (NEC), as well as any local codes, to ensure the breaker will open, which prevents unwanted current flow from posing a hazard to service personnel.

6.9.7 Strike (Lightning) Ground

Lightning strikes, grid switching, shorts, or other abnormal events on the power line have the potential to cause "fast rise time currents" which can damage the powering system. The most viable method to protect the system from damage is to divert these "fast rise time currents" along a low-impedance path to ground.

The low-impedance path to ground prevents the current from producing high voltage levels and posing a threat to equipment. Without a low-impedance path to ground, the current (while travelling through wires of varying impedance) may produce high voltages that will damage the powering equipment.

To be most effective, all components of the grounding system need to be properly bonded to the ground rods.

7. Operation

⚠️ **CAUTION!**

Ensure the unit is grounded before proceeding.

7.1 Communicating with the Cellect™ 600

There are two ways you can communicate with the Cellect™ 600.

1. Using an Ethernet connection to a PC or laptop, you can access the Cellect™ 600 interface via a web browser.

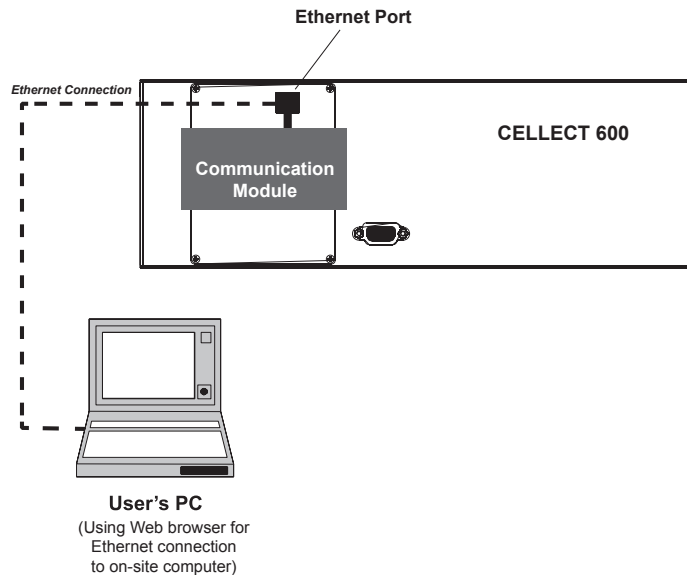2. Using a web browser, or SNMP server via the company intranet /internet.

Ethernet Port

Ethernet Connection

CELLECT 600

Communication Module

User's PC
(Using Web browser for Ethernet connection to on-site computer)

Figure 15 — Cellect™ 600 Communication

7.2 System Start Up

After completing the mechanical installation of the unit and the wiring, perform the following startup and test procedure to ensure proper operation:
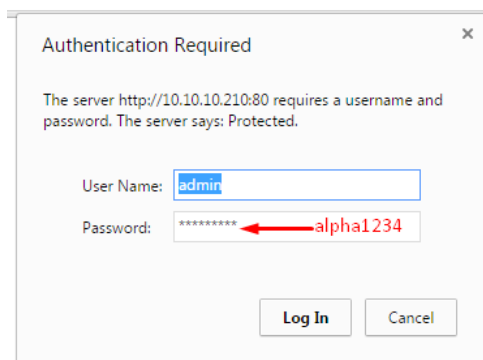
1. Ensure the AC is OFF.

2. Connect the DC load(s).

3. Connect Alarm cable.

4. Connect the Ethernet (if applicable).

5. Apply the AC power.

6. Verify the LED status (GREEN).

7. Ensure that the unit is AC powered for at least 12-hours to fully charge the built-in smart battery pack and provide the specified runtime.

8. Web Interface

8.1 Connecting to the Internet

To access the Cellect™ 600 via the web do the following:

1. Connect to a laptop or PC via the Ethernet port.
2. Select network properties, and then set the IP address of the host computer to be in the same sub net range (10.10.10.202).
3. Set the sub net mask to 255.255.255.0.
4. Close the network adapter set up, and then open a web browser (Internet Explorer 10 or later, Chrome or Firefox).
5. In the address field, type 10.10.10.210, and then press enter to login.
6. Enter the **User Name**: admin and **Password**: alpha1234.

The main Dashboard displays in the Internet Browser window, similar to Figure 16.
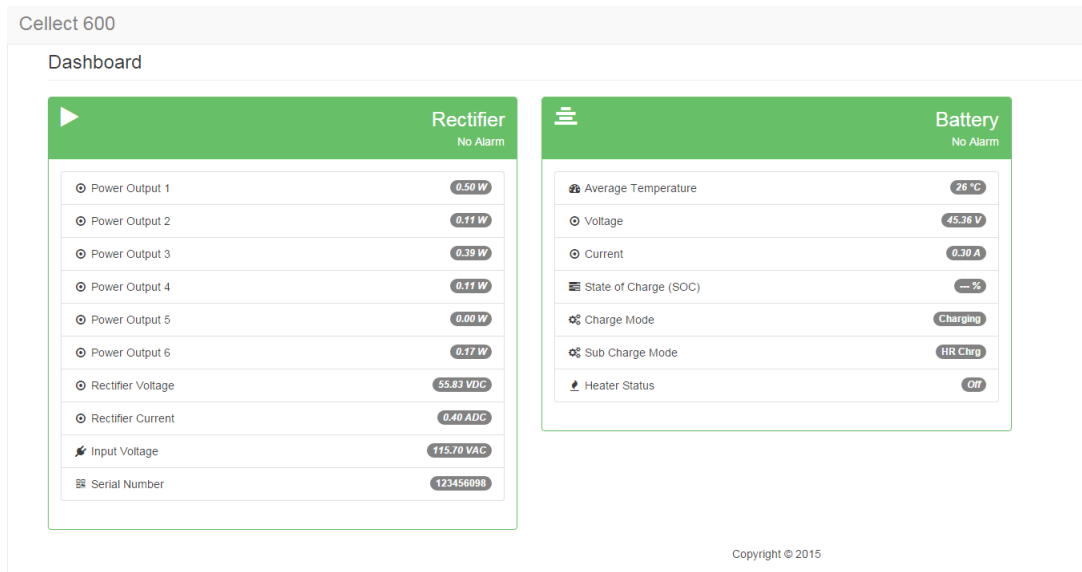
Figure 16 — Cellect™ 600 Main Dashboard

From the right-side of the main Dashboard you can access the System Settings, Network Configuration, the Event Log, and Upgrade the device.
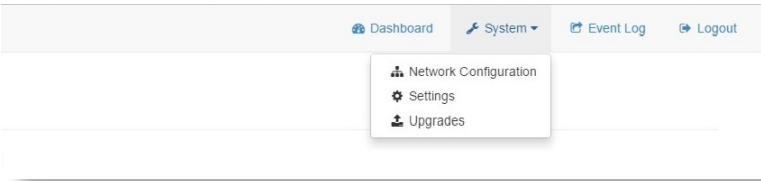
Figure 17 — System Menu

8.2 Network Configuration

From the Network Configuration menu the following properties can be configured.

- **Ethernet Port**: provides settings to select the preferred mode for accessing the unit – Automatic (DHCP) or Static IP address (which is the default).

- **SNMP**: provides the ability to add up to 10 destinations for servers and MIB files for Simple Network Management Protocol (SNMP).

- **Date and Time**: provides the ability to configure Simple Network Time Protocol (SNTP) server and the update interval as well as the Time Zone, and the actual date and time, if SNTP or Ethernet is not available.
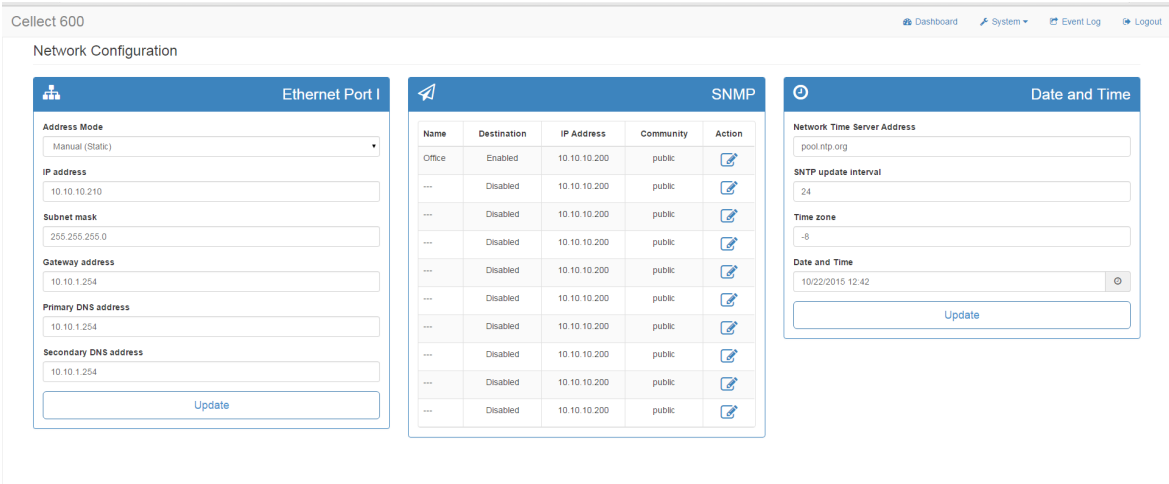
Figure 18 — Network Configuration Menu

8.2.1   Configuring SNMP to Receive Notifications

Configuring an IP address for notifications is referred to as *Subscribing to Notification Services*. Up to 10 destinations can be configured on the Cellect™ 600. Install the applicable notification MIB before configuring the destinations.

1. From the Network Configuration window, click **Action** on the **SNMP** table

2. Click the drop-down menu to **Enable** the **Destination**, then type a destination name in the **Name** field.

3. Click in the **IP Address** row to insert the IP address for the monitoring destination.

4. Click **Update** to complete the process.

8.2.2 Setting the Date and Time

1. From the Network Configuration window, click the **Calendar** icon to change the date and time.

2. Go to the year and month.

3. Click Clock icon, and then use the **arrows** to scroll and adjust the hours and minutes

4. Click **Update** to complete the process.

8.3   Settings

The Settings menu has submenus to configure the outputs and the battery.

- **Outputs** can be momentarily switched OFF or ON by sliding the button to the left or right. If the specific state (ON or OFF) is required as a default during start up, press the "Save state as default" button to create the default preset.

- **Battery** can be turned OFF and ON and the corresponding state made default by selecting "Save state as default". Default state for the battery is ON.

If the unit needs to be transported or stored for a long period of time, select the OFF state (without saving as default) and unplug AC. The battery will be OFF until next time the AC is plugged in.

Figure 19 — Settings Menu

⚠️ **CAUTION!**

Turn the battery to the Off position before disconnecting. This prevents self-discharge of the battery and preserves the capacity. Do not press "Save states as default" as this will permanently disconnect the battery.

8.4 Alarms

If an alarm condition is present and you are logged into the Cellect™ 600 via Ethernet, the main Dashboard may display various alarms similar to the following examples.

- Green = OK
- Yellow = Minor
- Red = Major

8.5   Upgrades

On the Cellect™ 600 you can **Upgrade** the following:

- Web Server Firmware
- Web Site Firmware
- Rectifier Firmware
- Battery Firmware
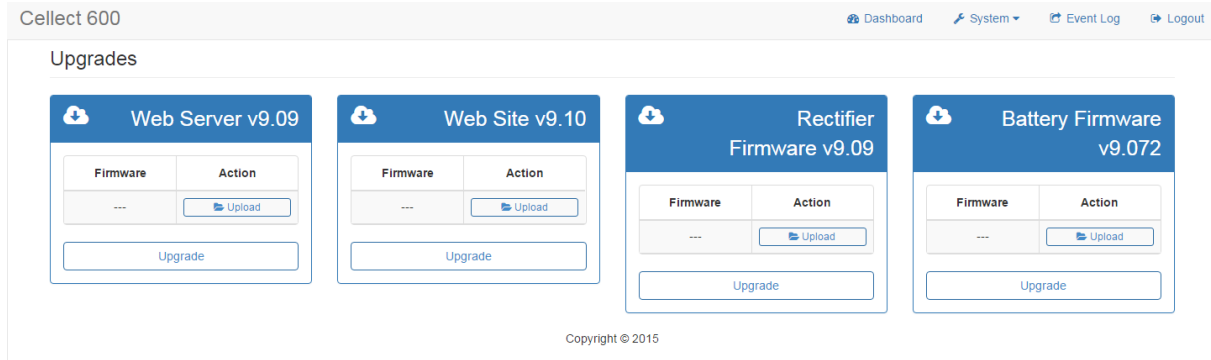
To Perform a Firmware Upgrade

1. From the main Dashboard go to **System > Upgrades**.
2. Insert a USB drive or access the network drive that contains the upgrade files.
3. From the window, select the file required (.fbin or .acan), and then click **Upload**.

4. Once the source file is ready, click the **Upgrade** button.

9. Cellect™ 600 Maintenance

Due to its high reliability and long service life, the Cellect™ 600 rarely requires maintenance.

9.1 System Inspection

If there is a suspected malfunction follow this system inspection procedure:

1. Ensure that the site specific configuration and settings are known. Verify that the user manuals and site specific connection and assembly drawings are available.

2. Visually inspect and verify that the equipment is free from physical damage, dirt deposits, corrosion or leaks. Carefully remove any accumulation of corrosion or dirt.

3. Inspect all cabling and ensure all connectors are securely terminated. Replace any damaged cables and correct any loose connections.

4. Verify that the system is ON, no alarms are present. Verify the green LED is ON. If it is not, correct possible alarms to put the system back in normal mode of operation.

5. Connect locally to the system via the Ethernet port with a laptop. Access the web interface, ensure that there are no alarms.

If a unit is permanently damaged or has stopped working it will need to replaced. The unit removal procedure is described in the following section.

9.2 Removing the Unit

The following insulated tool is essential for product removal: T25 pin in centre security head bit.

CAUTION!

Each individual unit weighs <11kg (24lb).

The Cellect™ 600 can only be repaired at an Alpha Authorized Repair Center. Do not open the product or attempt to repair it. Opening the Cellect™ 600 voids the warranty. Refer to the return or repair instructions in section 10 on page 34 for further details.

1. Disconnect the input and output connectors.
2. Remove the four #10-32 fasteners that hold the module to the mounting bracket.
3. Lift the module off of the bracket.
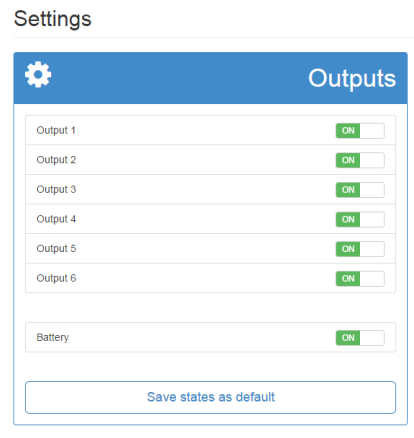
CAUTION!

Turn the battery to the Off position before disconnecting. This prevents self-discharge of the battery and preserves the capacity. Do not press "Save states as default" as this will permanently disconnect the battery.

164.5 [6.48]

FASTENER: #10-32
T25 PIN IN CENTER
SECURITY HEAD
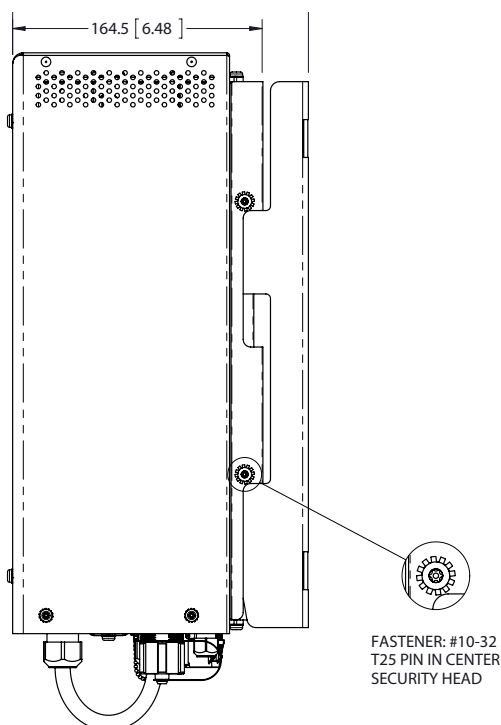
10.   Warranty and Service Information

10.1   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.

10.2   Warranty Statement

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

10.3   Limited Product Warranty

Alpha Technologies Ltd warrants all equipment manufactured by it to be free from defects in parts and labor, for a period of five years from the date of shipment from the factory. This warranty applies solely to products installed and operated in the United States and Canada. For other countries, contact your Alpha sales representative for warranty terms.

The Cellect 600 product includes a built-in NiMH rechargeable battery pack. As with all batteries, the maximum capacity of the battery will naturally decrease with time and usage. This warranty covers defective battery packs, battery packs that leak or are unable to provide at least 5 minutes of runtime after a full charge cycle. 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 Cellect 600 can only be repaired at an Alpha Authorized Repair Center. Do not open the product or attempt to repair it. Opening the Cellect 600 will void the warranty.

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.

10.4   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

10.5   Service Centers

For a list of international service centers, refer to the Alpha website:

www.alpha.ca

11. Acronyms and Definitions

AC	Alternating current
ANSI	American National Standards Institute
AWG	American Wire Gauge
BMS	Battery Management System
CEC	Canadian Electrical Code
CSA	Canadian Standards Association
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
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
SELV	Safety Extra Low Voltage
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
TCP/IP	Transmission Control Protocol / Internet Protocol
THD	Total harmonic distortion
UL	Underwriters Laboratories

12. 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.
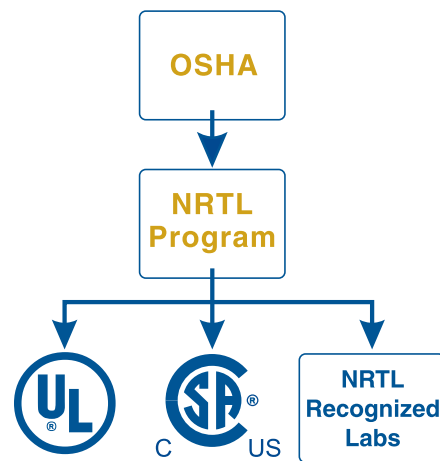
(1) www.csagroup.org
(2) www.scc.ca
(3) www.ulc.ca
(4) www.osha.gov

POLE/WALL MOUNTING BRACKET

PRODUCT OUTLINE

CUSTOMER CONNECTIONS

4X #10-32

25.0[0.98]
FOR STRAPS

89.1[3.51]
34.6[1.36]

4X Ø7.0[0.28]
FOR WALL MOUNT

SMALL POLE
STRAP LOCATION

LARGE POLE
STRAP LOCATION

129.6[5.10]

Ø17.5[0.69]
FOR WOODEN POLES

276.0[10.87]

150.0[5.91]

446.9[17.59]

416.1[16.38]

237.0[9.33]

383.0[15.08]

195.0[7.68]

164.5[6.48]

15.9[0.625]

FASTENER: #10-32
T25 PIN IN CENTER
SECURITY HEAD

2X 1/4-20 STUDS

GROUND STUDS

DC OUT 2   DC OUT 4   DC OUT 6 (600W)
DC OUT 1   DC OUT 3   DC OUT 5

SEE 8700825-04 FOR
MATING CABLE ASSEMBLY

STANDARD ETHERNET CABLE
SEE 8700827-04 FOR
MATING CABLE ASSEMBLY

SEE 8700828-04 FOR
MATING CABLE ASSEMBLY

SEE 8700826-04 FOR
MATING CABLE ASSEMBLY

OUTPUTS	
PIN	FUNCTION
1	-
2	NOT USED
3	+

ALARMS	
PIN	FUNCTION
1	K1-NC
2	K1-COM
3	K4-NC
4	K2-NC
5	K2-COM
6	K4-COM
7	K3-NC
8	K3-COM
9	NOT USED

AC INPUT	
PIN	FUNCTION
1	GROUND
2	NOT USED
3	L1
4	L2
5	NOT USED

alpha TECHNOLOGIES™

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

Power

Visit us at www.alpha.ca