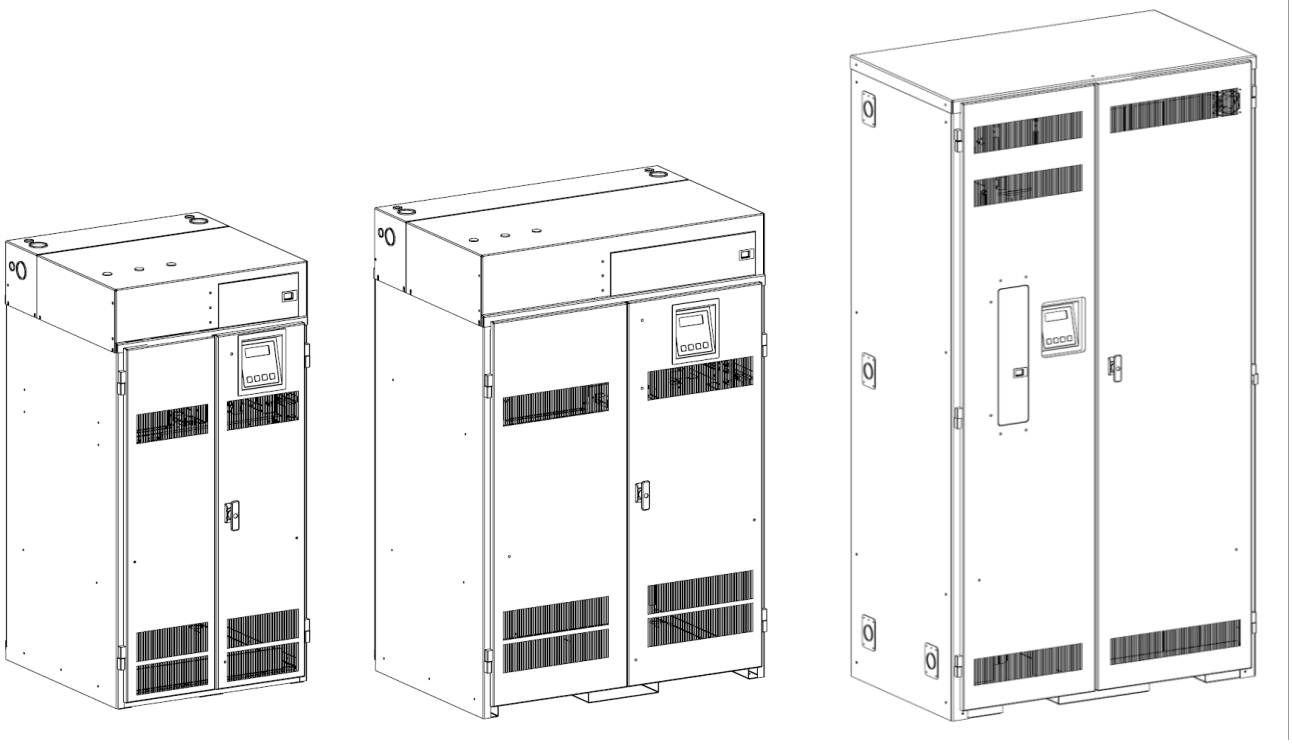
MYERS
EMERGENCY POWER SYSTEMS

Illuminator™ System Series Supernova

1.75 kW – 16.7 kW

Installation Guide



44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerseps.com

This unit contains LETHAL VOLTAGES. All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY! There are NO USER SERVICEABLE PARTS inside this unit.

IMPORTANT SAFEGUARDS

When using electrical equipment, you should always follow basic safety precautions, including the following:

1. **READ AND FOLLOW ALL SAFETY INSTRUCTIONS.**
2. **Do not install the system outdoors.**
3. **Do not install near gas or electric heaters or in other high-temperature locations.**
4. **Use caution when servicing batteries. Depending on battery type, batteries contain either acid or alkali and can cause burns to skin and eyes. If battery fluid is spilled on skin or in the eyes, flush with fresh water and contact a physician immediately.**
5. **Equipment should be mounted in locations where unauthorized personnel will not readily subject it to tampering.**
6. **The use of accessory equipment not recommended by Manufacturer may cause an unsafe condition and void the warranty.**
7. **Do not use this equipment for other than its intended use.**
8. **Qualified service personnel must perform all servicing of this equipment.**

SAVE THESE INSTRUCTIONS

The installation and use of this product must comply with all national, federal, state, municipal, or local codes that apply. If you need help, please call Service at 1-610-868-5400.

C A U T I O N

READ ENTIRE MANUAL AND REVIEW ALL DOCUMENTATION BEFORE ATTEMPTING SYSTEM INSTALLATION!

FOR SERVICE OR INSTALLATION INFORMATION:
TELEPHONE: (610) 868-5400 (24 HR. HOTLINE)
FAX: (610) 954-8227

FOR YOUR PROTECTION....

PLEASE COMPLETE AND RETURN WARRANTY REGISTRATION CARD IMMEDIATELY.

Table of Contents

CHAPTER 1

SAFETY WARNINGS

Read the following precautions before you install the system.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important instructions that you should follow during installation and maintenance of the system and batteries. Please read all instructions before operating the equipment and save this manual for future reference.

DANGER

This system contains **LETHAL VOLTAGES**. AUTHORIZED SERVICE PERSONNEL should perform all repairs and service **ONLY**. There is **NO USER SERVICEABLE PARTS** inside the system.

WARNING

- Do not install the system outdoors.
- Do not install near gas or electric heaters or in other high-temperature locations.
- Use caution when servicing batteries. Battery acid can cause burns to skin and eyes. If acid is spilled on skin or in the eyes, flush with fresh water and contact a physician immediately.
- Equipment should be mounted in locations where unauthorized personnel do not readily subject it to tampering.
- The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
- Do not use this equipment for other than intended use.
- Only qualified service personnel (such as a licensed electrician) should perform the system and battery installation and initial startup. There is a risk of electrical shock.

CHAPTER 2

INTRODUCTION

Please read this manual thoroughly before operating your safety system. Keep this manual and the system User's Guide in the folder mounted inside the unit's door.

WARNING

Only qualified service personnel (such as a licensed electrician) should perform the system and battery installation and initial startup. There is a risk of electrical shock.

Please record your unit's part number, serial number, and model number below. You can find these numbers on the labels on the inside of the system's right door.

Part Number _____

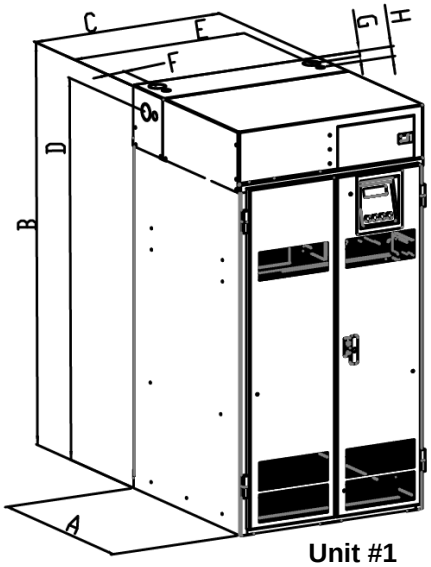
Serial Number _____

Model Number _____

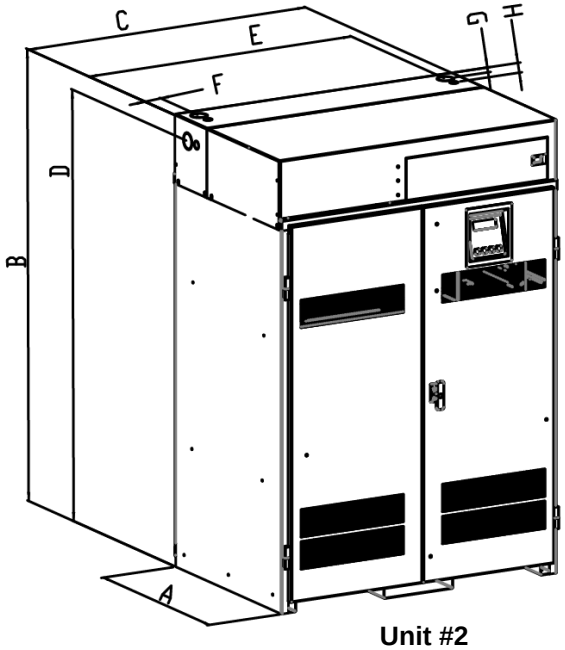
CHAPTER 3

BEFORE INSTALLING THE UNIT

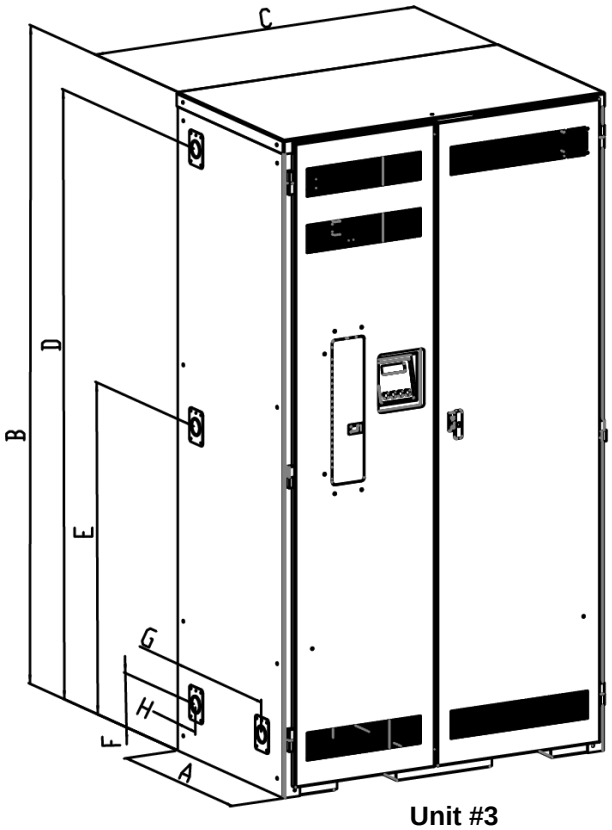
Installation Dimensions and Clearances



Unit #1
1.75-5.0kVA



Unit #2
6.25-7.5kVA



Unit #3
10.0-16.7kVA

Table 3.1 Dimensions

Unit #1 (1.75-5.0KVA)

Unit	Depth (A)	Height (B)	Width (C)	(D)	(E)	(F)	(G)	(H)
Cabinet	25" (63.5 cm)	48" (61.0 cm)	24" (60.9 cm)	44.75" (113.6 cm)	22.13" (56.2 cm)	2.06" (5.2 cm)	2.38" (6.0 cm)	3.38" (8.6 cm)
Extended Height Option		56.3" (143 cm)		53.8 (136.7 cm)				

Unit #2 (6.25-7.5KVA)

Unit	Depth (A)	Height (B)	Width (C)	(D)	(E)	(F)	(G)	(H)
Cabinet	25" (63.5 cm)	53" (135.9 cm)	36" (91.4 cm)	50.5" (128.3 cm)	34.18" (86.8 cm)	2.06" (5.2 cm)	2.38" (6.0 cm)	3.38" (8.6 cm)
Extended Height Option		61" (155 cm)		58.5" (148.5 cm)				

Unit #3 (10.0-16.7KVA)

Unit	Depth (A)	Height (B)	Width (C)	(D)	(E)	(F)	(G)	(H)
Cabinet	25" (63.5 cm)	78.3" (199 cm)	42" (106.7 cm)	71.38" (181.3 cm)	38.88" (98.8 cm)	6.38" (16.2 cm)	19.5" (49.5 cm)	4.5" (11.4 cm)

Table 3.2 Required Clearances

Sides	Top	Front
0" (0.0 cm)	12" (30.5 cm)	39" (100.0 cm)

Table 3.3 Conduit Knockouts

Conduit Knockouts
Knockout holes are universally sized to accept 0.875", 1.0", 1.75" & 2" across all units (1.25KVA to 16.7KVA).

Location Guidelines

Keep the following guidelines in mind when choosing the location for your system and batteries:

- Verify that the environment meets the requirements in “Storage and Operating Environment” on page 9. The environment can affect the reliability and performance of both the unit and the batteries.
- Choose a permanent location for the unit. Attempting to move the unit after you have installed the batteries can damage the batteries and the cabinet.

CAUTION

Do not move the unit after you install the batteries. If you do, the unit and batteries may be damaged.

CEC requires the unit to be located in a service room. If the room is equipped with a sprinkler system, the unit must be provided with sprinkler proof covers.

The system should be connected to the emergency generator, if available.

This equipment is heavy. Refer to Table 3.4 when you choose a site to make sure that the floor can support the weight of the system, the batteries, and any other necessary equipment.

Table 3.4 System Weight [in lbs. (kg)] for 90-Minute System Models

	90-Minute System Models								
	1.75kw	2.5kw	3.75kw	5.0kw	6.25kw	7.5kw	10.0kw	12.5kw	16.7kw
Unit with Standard SLC Batteries	620	785	1029	1273	1664	1908	2495	3470	3471
Unit without Batteries	297	297	297	297	444	444	1031	1031	1031

Table 3.5 System Weight [in lbs. (kg)] for 120-Minute System Models

	120-Minute System Models								
	1.31kw	1.88kw	2.81kw	3.75kw	4.69kw	5.63kw	7.5kw	9.38kw	12.5kw
Unit with Standard SLC Batteries	620	785	1029	1273	1664	1908	2495	3470	3471
Unit without Batteries	297	297	297	297	444	444	1031	1031	1031

Receiving and Moving the Unit and the Batteries

Systems weigh several hundred pounds, (see Table 3.4; ask your sales representative for additional information). Make sure you are prepared for these weights before you unload or move the unit or the batteries. Do not install any batteries until you have permanently installed the unit and connected all conduit and wiring.

Storage and Operating Environment

Make sure you store and install the system in a clean, cool, dry place with normal ventilation and level floors.

Storage Temperature

Store the batteries (in the system) at -18 to 40°C (0 to 104°F). Batteries have a longer shelf life if they are stored below 25°C (77°F). Keep stored batteries fully charged. Recharge the batteries every 90–180 days. The system without batteries may be stored at -20 to 70°C (-4 to 158°F).

Ventilation

The air around the unit must be clean, dust-free, and free of corrosive chemicals or other contaminants. Do not place the system or batteries in a sealed room or container.

Operating Temperature

System can operate from 20° to 30°C (68° to 86°F) and up to 95% relative humidity. The batteries' service life is longer if the operating temperature stays below 25°C (77°F).

Batteries

The temperature should be near 25°C (77°F) for optimum battery performance. Batteries are less efficient at temperatures below 18°C (65°F), and high temperatures reduce battery life. Typically, at about 35°C (95°F), battery life is half of what it would be at a normal temperature of 25°C (77°F). At about 45°C (113°F), battery life is one-fourth of normal.

Make sure that heaters, sunlight, air conditioners, or outside air vents are not directed toward the batteries. These conditions can make the temperature within battery strings vary, which can cause differences in the batteries' voltages. Eventually, these conditions affect battery performance.

Do not allow tobacco smoking, sparks, or flames in the system location because hydrogen is concentrated under the vent cap of each cell of the battery. Hydrogen is highly explosive, and it is hard to detect because it is colorless, odorless, and lighter than air.

Every type of battery can produce hydrogen gas, even sealed maintenance-free batteries. The gas is vented through the vent caps and into the air, mainly when the unit is charging the batteries. The batteries produce the most hydrogen when maximum voltage is present in fully charged batteries; the batteries do not produce hydrogen during float charging. The amount of current that the charger supplies to the batteries (not the battery ampere-hour) determines how much hydrogen is produced.

High Altitude Operation

The maximum altitude without derating is 3,048m (10,000 ft). A derating factor of 1% per 305m (1,000ft) up to a maximum of 4,572m (15,000ft)

CHAPTER 4

INSTALLATION OVERVIEW

Figure 4.1 shows typical installations of system. Standard 1.75 kW, 2.5 kW, 3.75 kW, 5.0 kW, 6.25 kW, 7.5 kW, 10.0 kW, 12.5 kW, and 16.7 kW models **do not** have external battery cabinets.

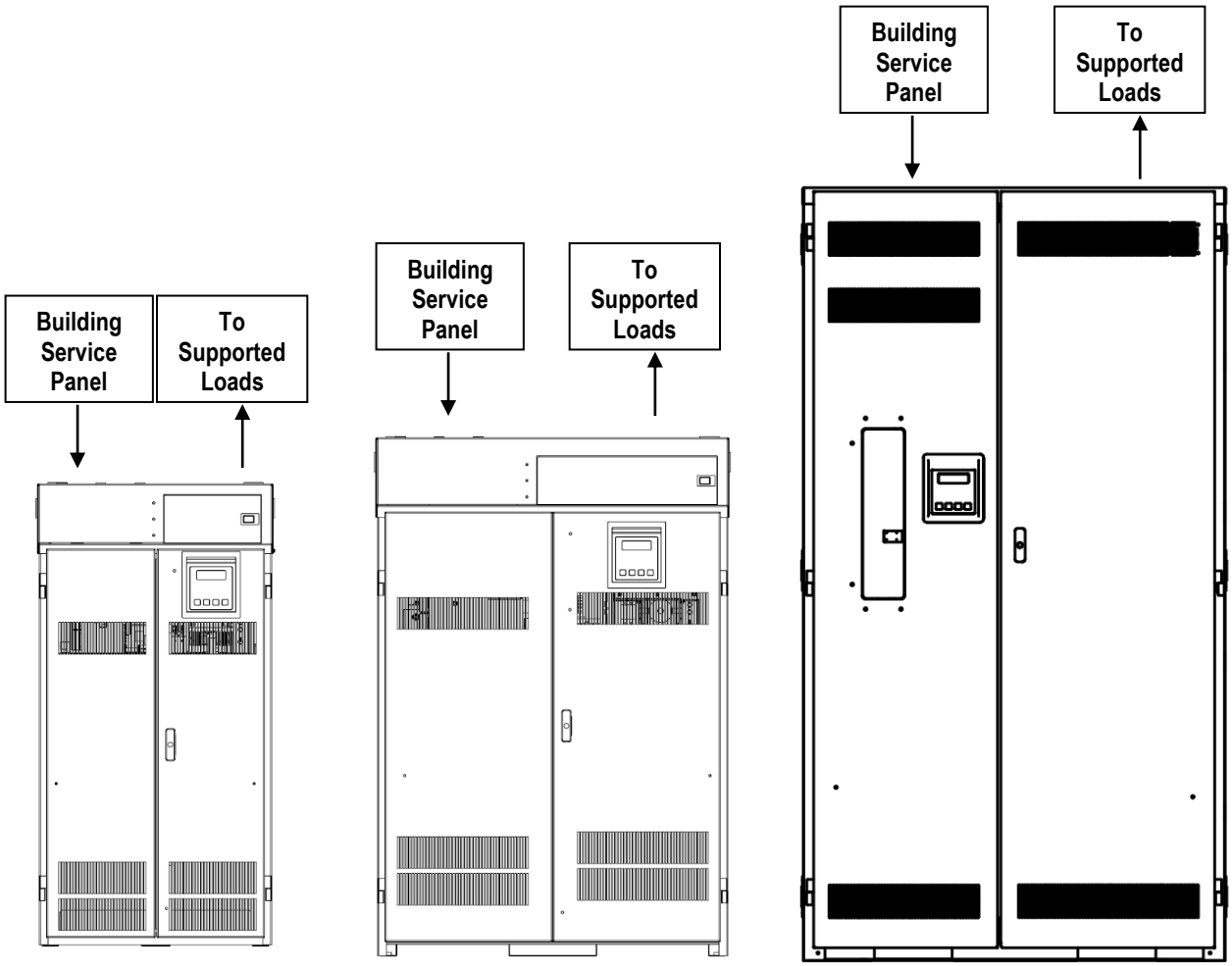


Figure 4.1 Typical Hardwired Installation

CHAPTER 5

AC INPUT & AC OUTPUT INSTALLATION

WARNING

Only qualified service personnel (such as a licensed electrician) should perform the AC installation. There is a risk of electrical shock.

Read the following cautions before you continue.

CAUTION

- Unit contains hazardous AC and DC voltages. Because of these voltages, a qualified electrician must install the system, AC line service, and batteries. The electrician must install the AC line service according to local and national codes and must be familiar with batteries and battery installation.
- Before you install, maintain, or service the unit, always remove or shut off all sources of AC and DC power and shut off the system. You must disconnect AC line input at the service panel and turn off the Installation Switch (S1), the Main AC Input Circuit Breaker (CB1), and the Battery Fuse(s) to make sure the unit does not supply output voltage.
- Whenever AC and/or DC voltage is applied, there is AC voltage inside the unit; this is because the unit can supply power from AC line or from its batteries. To avoid equipment damage or personal injury, always assume that there may be voltage inside the unit.
- Remove rings, watches, and other jewelry before installing the AC wiring. Always wear protective clothing and eye protection and use insulated tools when working near batteries. Whenever you are servicing an energized unit with the inside panel open, electric shock is possible; follow all local safety codes. TEST BEFORE TOUCHING!
- To reduce the risk of fire or electric shock, install the unit and its batteries in a temperature and humidity-controlled indoor area free of conductive contaminants. See page 7 for operating environment specifications.

---

1. Open the unit's doors. Make sure the installation switch and the input circuit breaker are off, and the battery fuse(s) removed.
2. Look at the ID label on the inside right door. Write down the following information:

   Input Voltage: _____
   Output Voltage: _____
3. Now, make sure the input and output voltages are what you need. **Remember that the system provides single-phase power only.**

- Does the input voltage available for the system at the AC service panel match the input voltage shown on the unit's ID label?

  Service Panel Voltage = _____ Input Voltage __*Yes* /__No
- Does the output voltage on the ID label match the voltage your loads (protected equipment) need?

  Load Voltage = _____ Output Voltage __Yes/__No

  If you answered NO to either of the preceding questions, **call SERVICE**.

4. Now, use the information you wrote down in Step 2 to find the correct circuit breaker for the service panel that is for your system.

Table 5.1 Recommended Circuit Breaker for Maximum Input Current

System	Input Voltage (Vac)	Max. Current	Recommended Circuit Breaker
1.75 kW	120V	20 amps	25A
1.75 kW	208V	11 amps	15A
1.75 kW	240V	10 amps	15A
1.75 kW	277V	9 amps	15A
1.75 kW	480V	5 amps	10A
2.5 kW	120V	28 amps	35A
2.5 kW	208V	16 amps	20A
2.5 kW	240V	14 amps	20A
2.5 kW	277V	12 amps	15A
2.5 kW	480V	7 amps	10A
3.75 kW	120V	42 amps	50A
3.75 kW	208V	24 amps	30A
3.75 kW	240V	21 amps	25A
3.75 kW	277V	18 amps	25A
3.75 kW	480V	11 amps	15A
5.0 kW	120V	56 amps	70A
5.0 kW	208V	33 amps	40A
5.0 kW	240V	28 amps	35A
5.0 kW	277V	24 amps	30A
5.0 kW	480V	14 amps	20A
6.25 kW	120V	70 amps	80A
6.25 kW	208V	41 amps	50A
6.25 kW	240V	35 amps	40A
6.25 kW	277V	31 amps	35A
6.25 kW	480V	18 amps	25A
7.5 kW	120V	84 amps	100A
7.5 kW	208V	49 amps	60A
7.5 kW	240V	42 amps	50A
7.5 kW	277V	37 amps	45A
7.5 kW	480V	21 amps	25A
10.0 kW	120V	113 amps	150A
10.0 kW	208V	65 amps	80A
10.0 kW	240V	56 amps	70A
10.0 kW	277V	49 amps	60A
10.0 kW	480V	28 amps	35A
12.5 kW	120V	141 amps	175A
12.5 kW	208V	81 amps	90A
12.5 kW	240V	70 amps	80A
12.5 kW	277V	61 amps	70A
12.5 kW	480V	35 amps	40A
16.7 kW	120V	188 amps	225A
16.7 kW	208V	108 amps	125A
16.7 kW	240V	94 amps	110A
16.7 kW	277V	81 amps	100A
16.7 kW	480V	47 amps	60A

WARNING: THE EXTERNAL INPUT CIRCUIT BREAKER PROTECTING THE SYSTEM MUST BE A "MOTOR START", DELAYED TRIP TYPE. * IF INPUT AUTO OR INPUT ISOLATION TRANSFORMER WAS ADDED TO THE SYSTEM. CONSULT FACTORY. THIS IS DUE TO MAGNETIC INRUSH CURRENT DRAWN DURING APPLICATION OF AC POWER.

5. Write down the circuit breaker value that applies to your system from Table 5.1:

   _____

6. Now, look at Table 5.2 below, and use the notes below to find the proper gauge wire for the recommended circuit breaker recorded in step 5.

Table 5.2 Recommended Minimum Wire Sizes

Read These Important Notes!	For this Input Circuit Breaker Size...	Use this Size 90°C Copper Wire	
		AWG	Mm2
This table lists the AWG and mm2 wire size for each circuit breaker size. The minimum recommended circuit breaker sizes for each model and voltage application are listed in Table 5.1. The temperature rating of conductor must not be less than 90° C wire. Based on the ampacities given in Tables 310-16 of the National Electrical Code, ANSI/NFPA 70-1993 (Table 2 of the CEC), and NEC article 220 (CEC Section 4). Circuit conductors, must be the same size (ampacity) wires and equipment-grounding conductors must meet Table 250-95 of the National Electrical Code. Code may require a larger wire size than shown in this table because of temperature, number of conductors in the conduit, or long service runs. Follow local code requirements.	10, 16, 20	12	3.31
	25, 30	10	5.26
	32, 35, 40, 45	8	8.36
	50, 63	6	13.30
	70, 80	4	21.15
	90, 100	2	33.62
	110	1	42.11
	125	1/0	53.49
	150, 175	3/0	67.43
	225	4/0	74.40

7. The input circuit breaker in the input service panel provides the means for disconnecting AC to the unit. Only authorized persons shall be able to disconnect AC to the unit [see NEC 700-20 and 700-21]. If you are using the input circuit breaker to disconnect AC, you must make sure that only authorized persons have control of the circuit breaker panel to meet the requirements of NEC 700-20.

8. Read the following caution, before removing conduit knockouts.

CAUTION

To prevent electrical shock or damage to your equipment, the Installation Switch (S1), the Main AC Input Circuit Breaker (CB1), and the circuit breaker at the input service panel should all be turned off. The Main DC Battery Fuse and the Battery Disconnect Fuse(s) (if you have one) should be removed.

9. Remove knockouts for AC Input and AC Output in the top or left and right side of the system (See figure 4.1). AC input conductors and AC output conductors must be installed in separate conduits, and emergency and non-emergency output circuits must be installed in separate conduits.

CAUTION

Do not drill the cabinet; drill filings may damage the unit and keep it from operating. If you need larger knockouts, use a chassis punch to punch out the appropriate knockout. Do not create additional knockouts.

10. Install the conduit. You must run the AC input service conductors and AC output conductors through separate conduits. Emergency output conductors and non-emergency output conductors must also be run through separate conduits. Emergency output circuits shall be installed in dedicated conduit systems and not shared with other electrical circuits as described in NEC 700-9(b) [CEC Section 47-108].

The next step explains where to make the AC connections to the system.

INSTALLING AC INPUT WIRES:

11. Connect AC utility from the service panel to the system's terminal block labeled **"INPUT"**.
    For 2-wire input: connect hot wire to the input block marked **"Line"**, connect the common wire to the input block marked **"Neutral"** and connect the ground wire to the Green/Yellow terminal block marked **"Ground"**.
    For 3-wire input: connect each hot wire to each of the input block positions marked **"Line"**, connect the ground wire to the Green/Yellow terminal block marked **"Ground"**.

INSTALLING AC OUTPUT WIRES:

*****IF EXTERNAL MAINTENANCE BYPASS IS REQUIRED, SEE DEVIATION DRAWING FOR WIRING OF LOAD OUTPUT.***

12. Connecting load wires without system distribution circuit breakers – connect load wires to the system's terminal block labeled **"OUTPUT"**. Connect hot wire(s) to the output block marked **"Nor. On"**, the common wire(s) to the output block marked **"Neutral"** and the ground wire(s) to the Green/Yellow terminal block marked **"Ground"**. Emergency only load hot wires must be connected to the optional circuit on the output terminal block labeled **"Nor. Off"**.

    Connecting load wires with system distribution circuit breakers – connect the hot wire from each branch circuit to a circuit breaker, connect the common wire from each branch circuit to the neutral connection bar and connect ground wire to the Green/Yellow terminal block at the output for 1.5KW – 5.0KW systems or the ground connection bar for 6.0KW – 16.7KW systems.

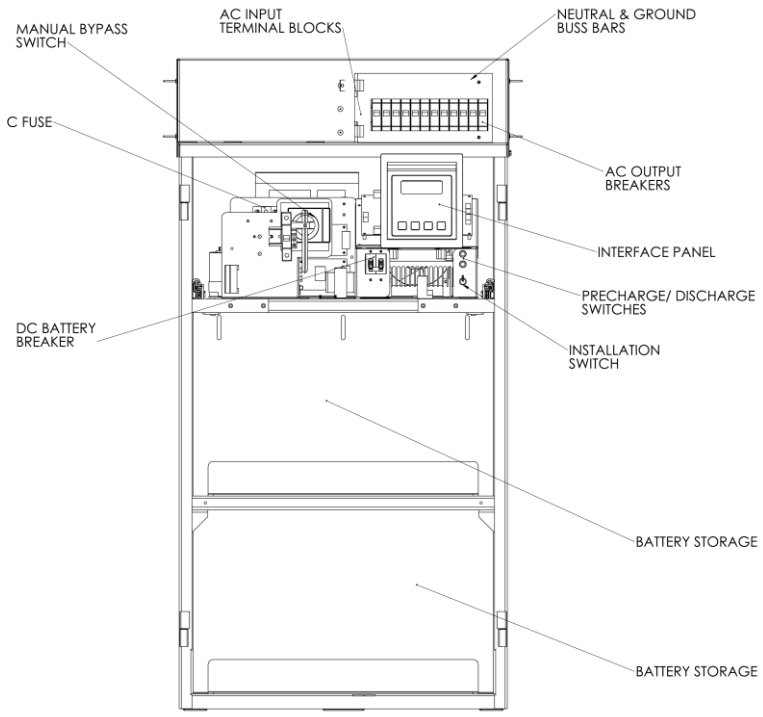


Figure 5.1 AC Connections for 1.75 k W– 5.0 kW systems

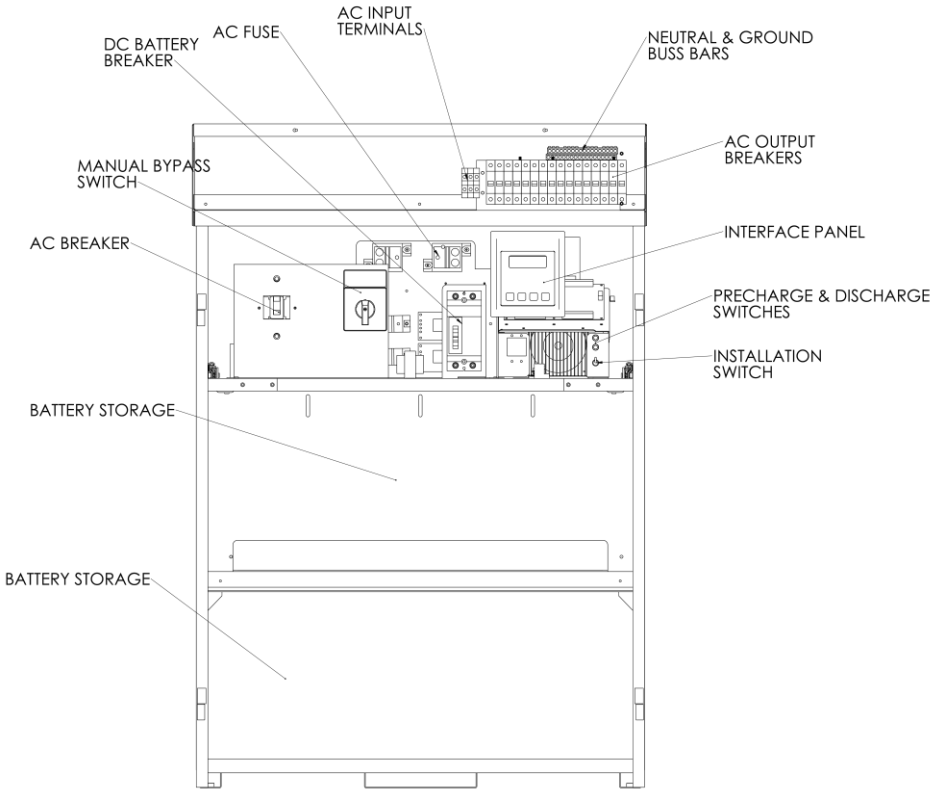


Figure 5.2 AC Connections for 6.25 k W– 7.5 kW systems

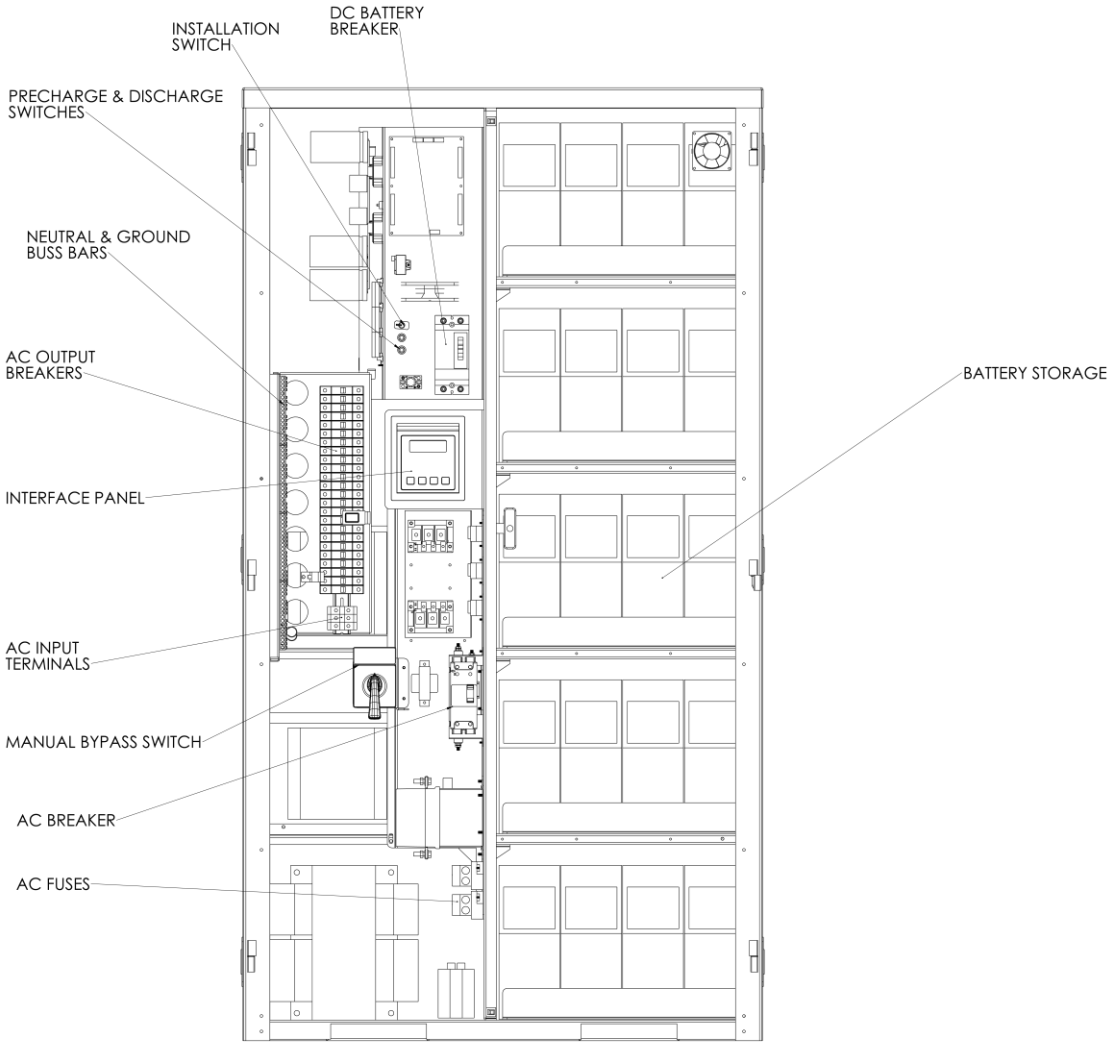


Figure 5.3 AC Connections for 10 kW – 16.7 kW systems

CHAPTER 6

INSTALLING BATTERIES AND DC WIRING

WARNING

Only qualified service personnel (such as a licensed electrician) should perform the battery and DC wiring installation. There is a risk of electrical shock.

This section explains how to install system batteries, fuses, and cables. For all models, you must install the batteries in the system cabinet. An electrician who is familiar with battery installations and applicable building and electrical codes should install the batteries.

WARNING

The batteries that will need to be installed in this system could cause you harm or severely damage the electronics if proper precautions are not followed. Batteries connected in series parallel configuration could produce lethal voltages with unlimited current. All batteries should be inspected for damage prior to installation. Never install a battery that is leaking electrolyte. Battery terminals should be cleaned with a wire brush to remove any oxidation. All tools should be insulated. Rubber gloves and safety glasses are recommended. **IN THIS SYSTEM BATTERY NEGATIVE IS TIED TO GROUND INSIDE THE INVERTER.** This means that the cabinet and shelves are at ground potential as soon as negative connections are made to the batteries. It is strongly recommended to make all negative connections to the batteries the last step to prevent any chance of shorting battery positive to ground. With the DC fuse(s) removed, make connections to battery positive first, working your way towards battery negative. Leave individual strings of batteries open at the last battery negative until all batteries are installed. Then connect each string's negative.

Safety Instructions

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This section contains important instructions that a qualified service person should follow during installation and maintenance of the system and batteries. ONLY a qualified service person should work with the batteries.

CAUTION

Full voltage and current are always present at the battery terminals. The batteries used in this system can produce dangerous voltages, extremely high currents, and a risk of electric shock. They may cause severe injury if the terminals are shorted together or to ground (earth). You must be extremely careful to avoid electric shock and burns caused by contacting battery terminals or shorting terminals during battery installation. Do not touch un-insulated battery terminals.

A qualified electrician familiar with battery systems and required precautions must install and service the batteries. Any battery used with this unit shall comply with the applicable requirements for batteries in the standard for emergency lighting and power equipment, UL 924 (Canada's National Building Code). Cabinets are design to be used with, and batteries must be replaced with, manufacturer battery number BAT-CG12105X, BAT-CG12150X OR BAT-CG12180X, see the battery wiring diagram that came with the battery cables. If you substitute batteries not supplied by manufacturer, the unit's UL (cUL) listing is void and the equipment may fail. Installation must conform to national and local codes as well. Keep unauthorized personnel away from batteries.

The electrician must take these precautions:

Wear protective clothing and eyewear. For battery systems >48vdc, wear rubber gloves and boots. Batteries contain corrosive acids or caustic alkalis and toxic materials and can rupture or leak if mistreated. Remove rings and metal wristwatches or other metal objects and jewelry. Don't carry metal objects in your pockets where the objects can fall onto the batteries or into the system.

Tools must have insulated handles and must be insulated so that they do not short battery terminals. Do not allow a tool to short a battery terminal to another battery terminal or to the cabinet at any time. Do not lay tools or metal parts on top of the batteries, and do not lay them where they could fall onto the batteries or into the cabinet.

Install the batteries as shown on the battery-wiring diagram provided with the system. When connecting cables, never allow a cable to short across a battery's terminals, the string of batteries, or to the cabinet.

Align the cables on the battery terminals so that the cable lug does not contact any part of the cabinet even if the battery is moved. Keep the cable away from any sharp metal edges.

CAUTION

Install the battery cables so the system doors cannot pinch them.

If you are replacing batteries or repairing battery connections, follow the procedure in the system user's Guide to shut down your system and remove both AC and DC input power.

Before Installing the Batteries

Tools

CAUTION

Always use insulated tools when you work with batteries. Always torque connections to the manufacturer's recommendations.

When you work with system batteries, you need the following tools. The tools must be insulated so they do not short battery terminals to the cabinet. Wear the safety equipment required by local code whenever the doors are open and whenever you are working on batteries. Other tools may be necessary for optional batteries.

- Digital volt-ohm meter
- 7/16" socket wrench
- 3" extension socket
- Ratchet
- Wire brush
- Electrical tape
- Conductive grease or petroleum jelly
- Brush (to apply grease or petroleum jelly to terminals)
- Safety equipment required by local codes
- Torque wrench calibrated in inch-pounds or Newton-meters
- Safety glasses with side shields

Battery Voltage (vdc)

Models	1.75k	2.5k	3.75k	5.0k	6.25k	7.5k	10.0k	12.5k	16.7k
Battery Volts for 90 Minute Systems	48v	48v	72v	96v	120v	144v	144v	180v	240v
Models	1.31k	1.88k	2.81k	3.75k	4.69k	5.63k	7.5k	9.38k	12.5k
Battery Volts for 120 Minute Systems	48v	48v	72v	96v	120v	144v	144v	180v	240v

Battery Cable Sizing

The battery cable or wire used varies. For the 100 AH battery (BAT-CG12105X) the size is 6 AWG, for the 150 AH battery (BAT-CG12150X) the size is 4 AWG, and for the 180 AH battery (BAT-CG12180X), the size is 2 AWG. This is because the batteries string current varies with battery type.

If the battery cabinets must be more than two feet (0.6 meters) from the main inverter cabinet, you may need to install larger battery cables between the battery cabinets and the system. Using long cable runs and larger diameter cables require a modified installation of the system; call SERVICE if you did not order the longer, larger-diameter cable with the system.

DC Disconnect

Systems have a Main Battery Circuit Breaker inside the cabinet; this circuit breaker lets you remove DC power from the batteries.

Installing and Connecting the Batteries

Battery Wiring Diagram

The battery interconnect wiring diagrams are in the rear of this manual and you should have also received a copy with your system in the documentation. This battery-wiring diagram shows how you should install the batteries, make terminal, and fuse connections. Use the diagram as you follow the steps below.

Location

The system batteries belong inside the unit. Before you start installing the batteries, you must install the system in its permanent location. If you have not already done this, see “Location Guidelines” on page 9 to choose a location.

CAUTION

To prevent damage to your equipment, do not move the system after the batteries are installed.

To make sure a location is acceptable for the system, review the requirements in Chapter 3.

Electronics Cabinet Battery Connections

The battery cables are connected to the battery circuit breaker at the factory.

All of the single-phase systems have only one series battery string.

Do not connect any battery cables to the batteries at this time. Use the battery-wiring diagram shipped with the system as you follow these steps.

Arranging the Batteries

NOTE *As you arrange the batteries, you must be wearing the required safety equipment.*

Arrange the batteries in the cabinet only as shown in the battery-wiring diagram. This arrangement is designed to maximize airflow around the batteries. The cabinets are designed so that battery cases should never touch. Air should be free to circulate. Clean the entire surface of all battery terminals with the wire brush before you install the batteries to create good contact points.

Load the batteries into the system. Starting with the bottom shelf, load one shelf at a time.

CAUTION

Never install the batteries in an airtight enclosure.

Connecting the Cables Between Batteries

When you make battery terminal connections, use the torque wrench to tighten the battery terminal connections securely. You can find out what torque value to use by finding the battery number on the front of the battery. Then, use Table 6.1 to find the torque value for that battery.

Table 6.1 Battery Torque

Battery Type	Torque
BAT-CG12105E	Torque to 100 in lbs. (11.3 Nm)
BAT-CG12105G	Torque to 100 in lbs. (11.3 Nm)
BAT-CG12105H	Torque to 110 in lbs. (12.4 Nm)
BAT-CG12105I	Torque to 120 in lbs. (13.6 Nm)
BAT-CG12150B	Torque to 120 in lbs. (13.6 Nm)
BAT-CG12150C	Torque to 100 in lbs. (11.3 Nm)
BAT-CG12150D	Torque to 100 in lbs. (11.3 Nm)
BAT-CG12180	Torque to 100 in lbs. (11.3 Nm)
BAT-CG12180A	Torque to 120 in lbs. (13.6 Nm)

Now, follow these steps to connect the cables:

1. Using the battery-wiring diagram, determine which batteries belong to each battery string.

NOTE: *For standard 90-minute runtimes, 1.75 kW, 2.5 kW, 3.75 kW, 5.0 kW, 6.25 kW, 7.5 kW, 10.0kW, 12.5kW, and 16.7kW models have one battery string.*

2. Clean the cable connectors with the wire brush before you make the battery connections.

NOTE *As you carry out the following step, use these guidelines:*
If you are using conductive grease, apply a thin coating of high-temperature conductive grease on each post and every cable connector before you assemble and torque the connection to slow corrosion.
If you use nonconductive grease like petroleum jelly, do not apply any grease before you make the connections and torque them. Instead, make the connection first; then, torque it to the value shown in Table 6.1. After you make the connection, apply a coating of the nonconductive grease to the hardware at the battery terminals.

3. In each battery string, connect the battery tie straps between the batteries as shown in the battery-wiring diagram (positive terminal to negative terminal). Torque the connections to the value shown for your battery in Table 6.1.

1. Connect the battery cables from one shelf to the next as shown on the battery-wiring diagram. Torque the connections to the value shown for your battery in Table 6.1.

2. Connect the red wire from the battery circuit breaker to the positive of the battery as shown on the battery-wiring diagram.

CAUTION

Hazardous voltage is present! System batteries are high current sources. These batteries can produce dangerous voltages, extremely high currents, and a risk of electric shock.

6. Next, use the voltmeter to check the DC voltage between the positive (+) position on the battery block inside the electronics cabinet and the unconnected battery negative terminal. This voltage should be approximately the battery voltage record on the unit ID label. If it is greater than + or – 5% Vdc, review the battery wiring diagram. Correct any wiring errors and recheck the DC voltage; do not go on until your measurement is within + or – 5% Vdc. If the measurement is too high and you cannot find the cause of the problem, call SERVICE.

CAUTION

If you do not verify that voltage and current direction are correct, the equipment may fail.

Connecting the Negative Battery Cable(s) to the Battery String(s)

Connect the cable to the battery (-) negative.

Replacing the Batteries

CAUTION

A battery can present a risk of electrical shock and high short circuit current. A qualified electrician familiar with battery systems should service the batteries.

Review all the safety instructions at the beginning of this chapter before you replace any batteries.

Use the Same Quantity and Type of Battery

CAUTION

You must use the same quantity and type of battery. Substituting batteries not supplied by manufacturer voids the UL (CUL) listing and may cause equipment damage.

To ensure continued superior performance of your system and to maintain proper charger operation, you must replace the batteries in the system with the same number of batteries. These batteries must be the same types as the original batteries. The replacement batteries should have the same voltage and ampere-hour rating as the original batteries.

Handle Used Batteries with Care!

Assume that old batteries are fully charged. Use the same precautions you would use when handling a new battery. Do not short battery terminals or the battery string with a cable or tool when you disconnect the batteries! Batteries contain lead. Please dispose of old batteries properly.

CAUTION

Do not dispose of batteries in a fire because the batteries could explode. Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

Dispose of Batteries Properly

CAUTION

Batteries contain lead. Many state and local governments have regulations about used battery disposal. Please dispose of the batteries properly.

CHAPTER 7

TURNING ON THE SYSTEM AND SETTING PARAMETERS

Several parameters in the system software determine when and how your system conducts the automatic monthly and annual tests. Refer to “User Setup” in the “Front Panel Display” chapter of the system user’s Guide for a description of each test.

Starting the Unit

Before you can set the parameters, you must start the system.

WARNING

Verify that the system AC Input Circuit Breaker and Installation Switch are off.

1. Turn on the AC input at the building service panel; ensure that the systems input breaker (CB1) is off.
2. Locate the DC Pre-charge Switch (S2), see figure 7.1 or figure 7.2 or figure 7.3; press it for five seconds; then, install the main battery fuse (F1) inside the electronics cabinet.
3. Turn on the System AC input circuit breaker (CB1). (See figure 5.1 or figure 5.2)
4. Turn on the Installation Switch (S1). Leave the loads (protected equipment) off. Unit will run on batteries, then transfer to normal mode.

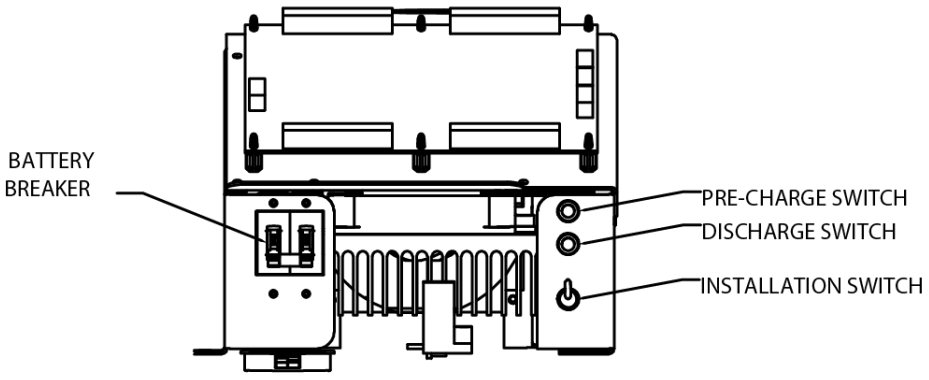


Figure 7.1 Battery Fuse, DC Pre-charge Switch & Installation Switch (1.75 kW – 5.0 kW)

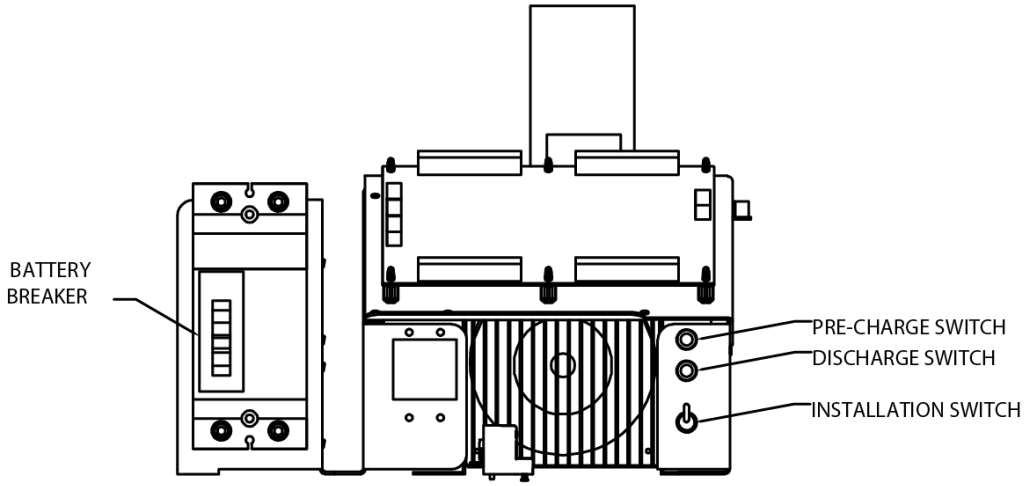


Figure 7.2 Battery Fuse, DC Pre-charge Switch & Installation Switch (6.25 kW – 7.5 kW)
(4.69 kW System for 120 Minute run-time)

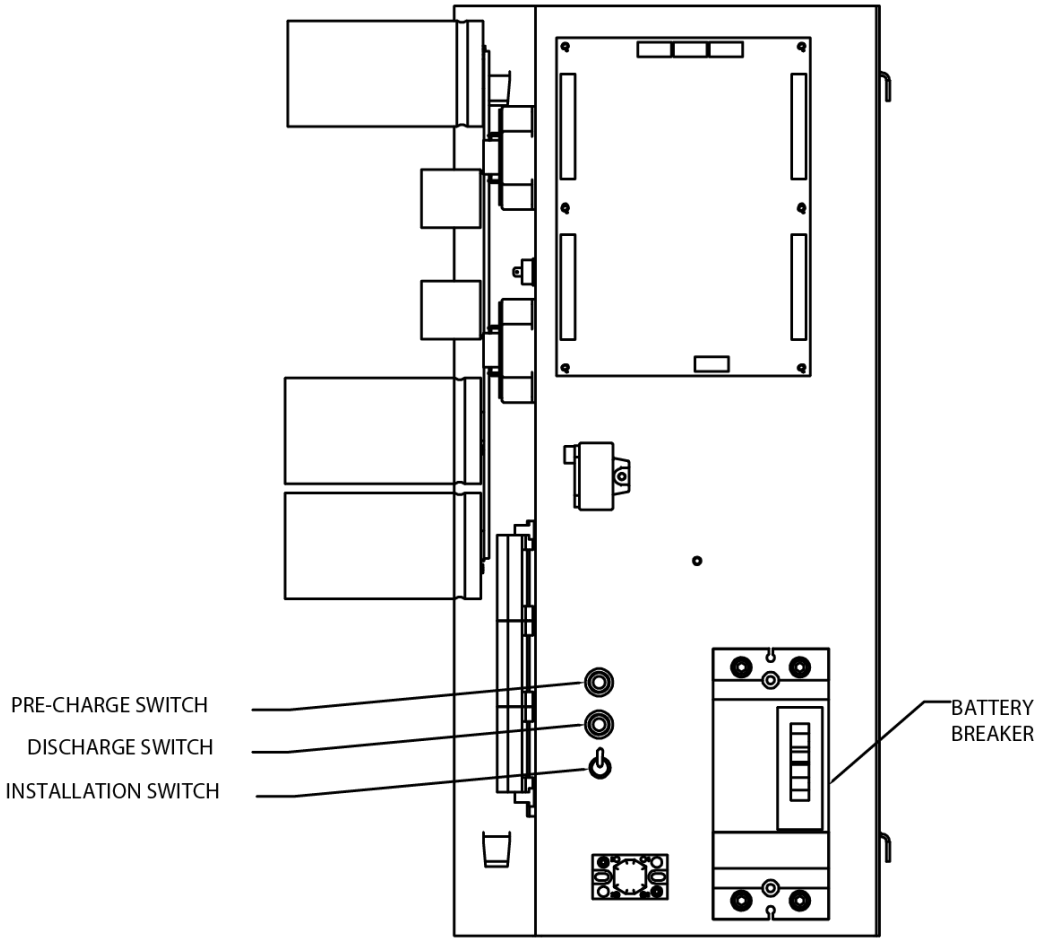


Figure 7.3 Battery Fuse, DC Pre-charge Switch & Installation Switch (10 kW – 16.7 kW)
(7.5 kW System for 120 Minute run-time)

FRONT PANEL DISPLAY

The Front Panel Display assembly consists of a 4 x 20 vacuum fluorescent display and a 4-button keypad. The 4 buttons can navigate through all the menus by using the left and right arrow keys, the ENTER and the ESCAPE.

The default menu will scroll between the status screen and the Identification/Date-Time screen. To view the other menu options from the default screen, press the **ENTER** key, and then press the left or the right arrow key to go to the desired menu.

The Menu's available are Meter, Test Log, Event Log, Alarm Log, User Setup, Factory Setup, Status, System Information, and Test Mode.

Once the desired menu has been reached, press the **ENTER** key to gain access to this menu. Once into the menu, use the left or right arrow key to scroll to different functions within the menu. Press the **ENTER** key again to gain access to the desire function. To exit, press the **ESCAPE** key until the desired level has been reached. (See figure 7.4)

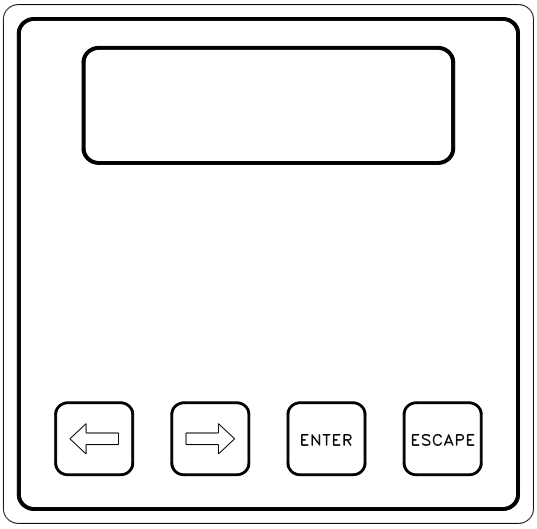


Figure 7.4 Front Panel Display

Control Panel Keypads

Table 7.1 Keypad Functions

Key Name	Description
Enter (Blue)	Pressing this key will view menus.
Escape (Black)	Pressing this key will exit out of menus and return to the Identification/Date-Time screen.
[◄] (Red)	This key functions as Left scroll key.
[►] (Red)	This key functions as Right scroll key.

Meter Functions

To get to the meter functions from the default screen, press the **ENTER** key, scroll to the METER menu using the left or the right arrow key, then press the **ENTER** key again. Use left or the right arrow key to view the meter function desired.

Table 7.2 Meter Functions

Function	Description
Voltage Input	Measures the AC Input Voltage to the Inverter.
Voltage Output	Measures the AC Output Voltage from the Inverter.
Current Output	Measures the AC Output Current from the Inverter. If there are Normally Off loads connected, it will read the sum of Normally On and Normally Off outputs.
Battery Voltage	Measures DC Battery Voltage.
Battery Current	Measures the DC Battery Current. When in charge mode, the current will be positive. When in Inverter mode, the current will be negative.
Battery Temperature	Optional feature – measures temperature at the battery.
Internal Temperature	Measures the ambient temperature inside the system.
Inverter Minutes	Indicates the total minutes the system has run on inverter.
System Days	Indicates the total days the system has been on-line.
VA Output	Indicates the AC Volts-Amps of the Inverter output.
Inverter Watts	Indicates the DC Watts (Battery Power) the Inverter is processing.

Test Log

To get to the Test log menu from the default screen, press the **ENTER** key, scroll to the Test log menu using the left or right arrow key, then press the **ENTER** key again. Use the left or right arrow key to view the test desired, and the press the **ENTER** key for more information.

The Test log indicates the Date, Time and Duration of the test. It also indicates if it was a monthly or yearly test, and it records the output voltage, the output current, the ambient temperature, and if there were any alarm conditions.

The numbers of tests that can be captured in the test log are 75. The format is first in is first out so; test number one is the most recent test.

Event Log

To get to the Event log menu from the default screen, press the **ENTER** key, scroll to the Event log menu using the left or right arrow key, then press the **ENTER** key again. Use the left or right arrow key to view the event desired, and then press the **ENTER** key for more information.

The Event log is identical to the test log in parameters it stores. The Event log captures data every time there is a transfer from utility power to battery power. The numbers of events that can be captured in the event log are 75. The format is first in is first out so; event number one is the most recent event.

Alarm Log

To get the Alarm log menu from the default screen, press the **ENTER** key, scroll to the alarm log menu using the left or right arrow key, then press the **ENTER** key again. Use the left or right arrow key to view the alarm desired, and then press the **ENTER** key for more information.

Any alarm that has occurred is captured in the Alarm log. The numbers of alarms that can be captured in the alarm log are 75. The format is first in is first out so; alarm number one is the most recent alarm.

Alarms

To get to the Alarm menu from the default screen, press the **ENTER** key, scroll the Alarm menu using the left or right arrow key, then press the **ENTER** key again.

The alarm menu displays all present alarms. If there are no alarms, the display screen will indicate no alarms.

User Setup

To get to the User Setup menu from the default screen, press the **ENTER** key, scroll to the User Setup menu using the left or right arrow key, then press the **ENTER** key again. The display will prompt for a password.
****** The password is left arrow, right arrow, left arrow, and right arrow. ******

Once the password is entered, the user has access to change the following functions:
Date, Time, Month Test, Year Test, Low VAC, High VAC, Near Low Battery, Low Battery, High Temp, Load Reduction Current.

Date
The parameters are Day of Week, Month, Day, and Year.
To change any of the parameters, use the left or right arrow key depending if you want to increase or decrease. Once the parameter is correct, press the **ENTER** key and the next parameter can be changed.

Time
The parameters are Hour and Minute. The 24-hour standard is used so 2:00 PM would be 14 hours. Use the left or right arrow key to change the parameters and the **ENTER** key to scroll between parameters.

Month Test, Year Test
The parameters are Date, Time (Hours and Minutes) use the left or right arrow key to change the parameters and the **ENTER** key to scroll between parameters.

Low VAC, High VAC, Near Low Battery, Low Battery, High Temperature
Parameters are set in Volts AC, Volts DC, and Degrees Centigrade respectively. Use the left or right arrow key to turn on or off this alarm. When the alarm is turned on, a number will appear. To change the number, press the **ENTER** key

and then use the left or right arrow key. Once the desired number is reached, press the **ENTER** key and this will return to the top-level menu.

Table 7.3 Near Low Battery Fault Chart

DC Voltage	Near Low Battery
48VDC	43VDC
72VDC	65VDC
96VDC	86VDC
120VDC	108VDC
144VDC	130VDC
180VDC	162VDC
240VDC	216VDC

Load Reduction Current
Parameters are set in Amps AC.
Use the same technique as the above alarms for modification.
Load Reduction Current is a useful diagnostic tool that will automatically generate a fault when the output current is 10 percent higher or lower than the set-point number.

Status

Indicates the Status of the machine – Line Present, Battery Charging, Ready, Battery Power, and if any faults are present.

System Information

Indicates Model Number, Serial Number and Current Software Revision Level of the system.

Test Mode

To initiate a Test and cause the inverter to run on battery power.

Completing the Installation

Close the doors and lock the cabinet. You have finished installing the system. Follow the steps in the Startup and Warranty Validation form to test the installation and startup the system for the first time. After you complete this form, return it to the manufacturer to validate the warranty.

Keep the System Installation Guide and the User's Guide in the folder attached to the inside of the system door.

PART II

OPTIONS MANUALS

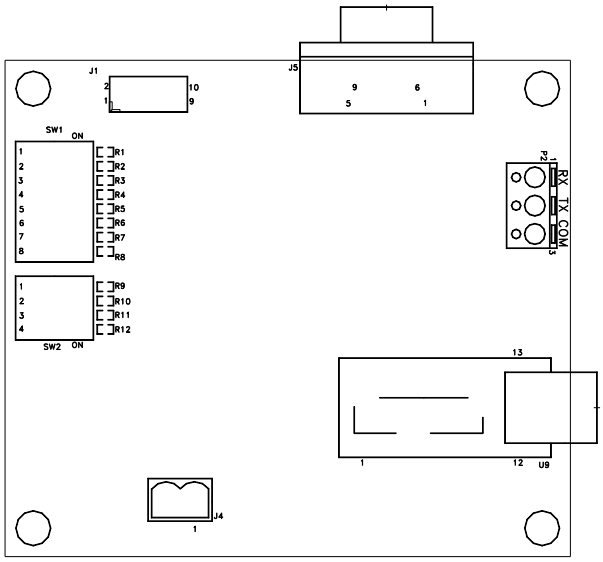
(Section continues on next page)

BACNET COMMUNICATION OPTION MANUAL

SINGLE PHASE

ILLUMINATOR SUPERNOVA

EMERGENCY LIGHTING CENTRAL INVERTER



Myers Emergency Power Systems
44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerseps.com

Table of Contents

SECTION 1

BACnet Communication Option Board

The BACnet Communication Option Board for the single-phase Illuminator Supernova Emergency Lighting Central Inverter has two internal connections, the RS232 communication bus and the input power. There are two external connections, a RS485 output connector and a USB connection that is the computer interface. For detailed operation on the protocol and commands for the computer interface see manual 114063 RS-232 Communications. There are also two dip jumpers that setup the baud rate and address. See Figure 1 for locations of the connections.

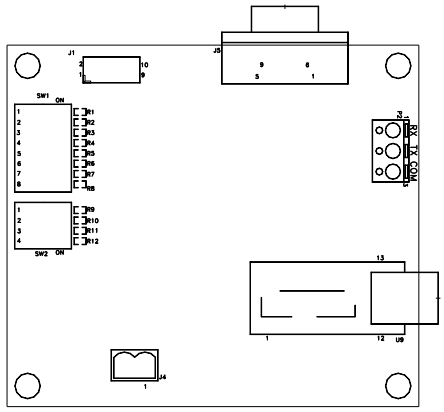


Figure 1 – Outline of BACnet Communication Board.

SECTION 2

Description of Operation

EBI acts as a simple B-ASC server device. It supports a total of 112 Analog Input (AI), 67 Binary Input (BI) and 3 File (FI) objects. EBI is a full MS/TP master device. The MS/TP MAC address is configurable via seven DIP switches, or optionally using a soft-configured MAC address. EBI supports baud rates of 9600, 19200, 38400, 57600 and 115200. The device requires external network biasing and termination resistors when it is used as an end-of-line device. The MS/TP transceiver is optically isolated and the isolated ground is provided along with + and - EIA-485 terminations.

You may configure the Device Object_Name and Object_Identifier and Max_Master by writing to the appropriate Device object properties.

The built-in objects have a mostly fixed configuration of Object_Names, engineering units and state text. AI objects have only required properties. BI objects include fixed Inactive_Text and Active_Text property values, as well as all required properties. Objects BI52 through BI67 correspond to input and output contact statuses. The Object_Name property for these 16 objects are writable.

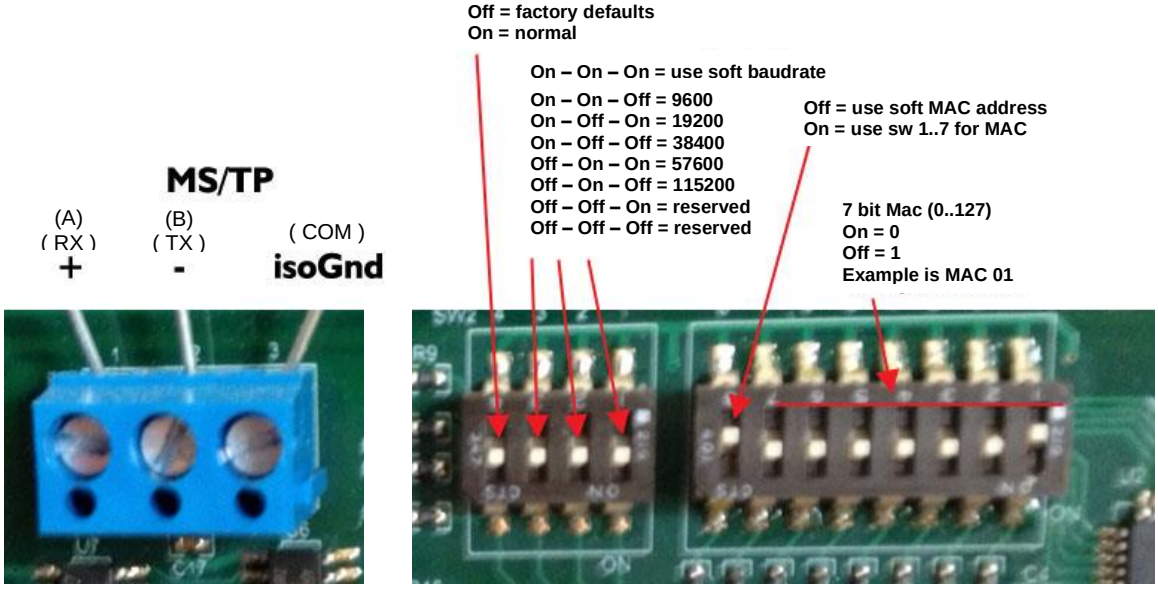
File objects include a writable Archive property. Files are used to access one of three dynamic logs of Alarms, Tests and Events.

SECTION 3

Settings

There are two objects, AV1 and AV2 that will allow the software to change the Baudrate and MAC address respectively. If SW2 is in the ON-ON-ON-ON position upon reset or power on the baud rate can be changed by writing to AV-1; Present_Value through BACnet. The AV1 is not in effect when the right three switches are in any other position than ON. If SW1, switch 8 is in the OFF position upon reset or power on the MAC address can be changed by writing to AV-2; Present_Value through BACnet. The AV2 is not in effect when switch 8 is in the ON position.

Termination, Baudrate and MAC Address:



Factory Defaults:

device.Object_Name	EBI
device.Object_Identifier	Device 560000
device.Max_Master	127
device.MACaddress	01
device.Baudrate	38400
device.Description	
device.Database_Revision	1
BI52.Object_Name	Input Contact Status 1
…	
BI58.Object_Name	Input Contact Status 8
BI59.Object_Name	Output Contact Status 1
…	

SECTION 4

Object Summary

objectID	object name	notes
AI1	INPUT VOLTAGE	VAC
AI4	OUTPUT VOLTAGE	VAC
AI7	OUTPUT CURRENT	A AC
AI10	BATTERY VOLTAGE	V
AI11	AMBIENT TEMPERATURE	°C
AI12	OUTPUT VA (TOTAL)	VA
AI13	OUTPUT VA	VA
AI16	SYSTEM DAYS	days (0..65535)
AI17	UPS RUN TIME	min (0..65535)
AI25	BATTERY CURRENT	A DC
BI1	SYSTEM READY STATUS	1=ready
BI2	AC LINE PRESENT STATUS	1=present
BI3	BATTERY CHARGING STATUS	1=charging
BI4	BATTERY POWER STATUS	1=battery power
BI19	Overload	0=normal 1=alarm
BI24	Input not Present	0=normal 1=alarm
BI26	Battery Low	0=normal 1=alarm
BI28	High Ambient Temperature	0=normal 1=alarm
BI30	Over Temperature	0=normal 1=alarm
BI33	Overload Shutdown	0=normal 1=alarm
BI39	Input Voltage Low	0=normal 1=alarm
BI40	Input Voltage High	0=normal 1=alarm
BI43	Battery Charger	0=normal 1=alarm
BI44	Inverter Failure	0=normal 1=alarm
BI45	Near Low Battery	0=normal 1=alarm
BI46	Load Reduction	0=normal 1=alarm
BI48	Runtime Failure	0=normal 1=alarm
FI1	AlarmLog	
FI2	EventLog	
FI3	TestLog	

SECTION 5

Protocol Implementation

Vendor Name:	**Myers Power Products**, **Inc.**
Product Name:	**EBI**
Product Model Number:	**PCB404303P00**
Applications Software Version:	**v2.00**
Firmware Revision:	**v1.02**
BACnet Protocol Revision:	**12**

BACnet Standardized Device Profile (Annex L)

EBI is capable of supporting the B-ASC profile and lower.

BACnet Interoperability Building Blocks Supported (Annex K)

DM-DDB-B, DM-DCC-B, DM-DOB-B,DM-TS-B, DM-RD-B, DS-RP-B, DS-WP-B

Segmentation Capability

EBI does not support segmentation.

Standard Object Types Supported

No object types may be dynamically created or deleted.
EBI supports the following object types:
Analog Input, Binary Input, Device and File.
Optional Properties Supported:

Device	OBJECT_NAME	writable	32 chars
	OBJECT_IDENTIFIER	writable	
	DESCRIPTION	writable	64 chars
Binary Input	INACTIVE_TEXT	read-only	
	ACTIVE_TEXT	read-only	
BI52..BI67	OBJECT_NAME	writable	32 chars
File	ARCHIVE	writable	

Data Link Layer Options

MS/TP master (Clause 9): 9600, 19200, 38400, 57600, and 115200 baud

Device Address Binding

Static binding is not supported.

Networking Options

EBI does not provide router or Annex H tunneling or BBMD functionality.

Character Sets Supported

UTF-8

BACNET IP AND SNMP COMMUNICATION OPTION MANUAL

SINGLE-PHASE

ILLUMINATOR SUPERNOVA

EMERGENCY LIGHTING CENTRAL INVERTER

Myers Emergency Power Systems
44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerseps.com

Table of Contents

Contents

SECTION 1
BACNET MS/TP Communication Board

BACnet IP and SNMP communication from the single-phase Illuminator Supernova Emergency Lighting Central Inverter is achieved via a standard Myers EPS BACnet MS/TP communication board – which converts the RS-232 communication with the inverter controller into the BACnet MS/TP protocol – and a Babel Buster BB2-7030 BACnet MS/TP to BACnet IP Gateway and Router, made by Control Solutions Inc. (https://www.csimn.com). Figure 1 describes the data flow at a high level.

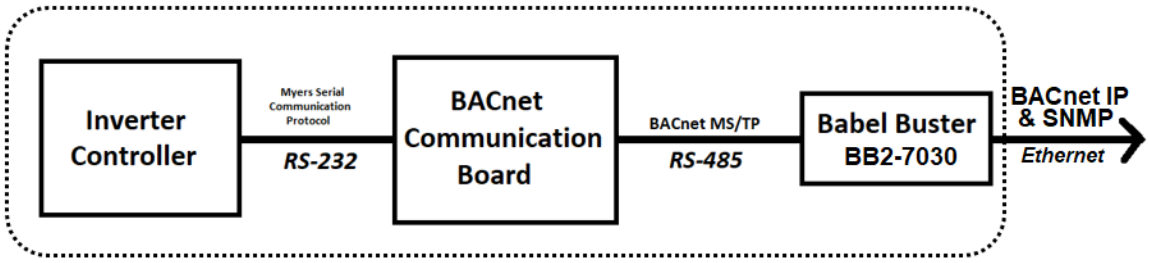


Figure 1 *– Data Flow to Achieve BACnet IP and SNMP Integration*

Everything inside the dashed box (including the Control Solutions Inc. Babel Buster BB2-7030) is pre-wired, pre-programmed and pre-configured by Myers EPS, and is internally mounted and powered inside the inverter cabinet (and will remain powered when the utility A/C input goes down and the inverter switches to battery power). The integrator may integrate directly to the Ethernet link on the BB2-7030. The below information on the BACnet Communication Board is for your information only.

The BACnet Communication Option Board for the single-phase Illuminator Supernova Emergency Lighting Central Inverter has two internal connections; the RS232 communication bus to the inverter controller, and the input power that powers the board. There are two external connections, a RS485 output connector that is the BACnet MS/TP link, and a USB connection that is a serial computer interface into the RS232 communication bus to the inverter controller. For detailed operation on the protocol and commands for the computer interface see manual 114063 RS-232 Communications. There are also two DIP switches that setup the BACnet MS/TP communication settings. **These should not be changed.** Figure 2 shows a diagram of the BACnet Communication Board and required DIP settings.

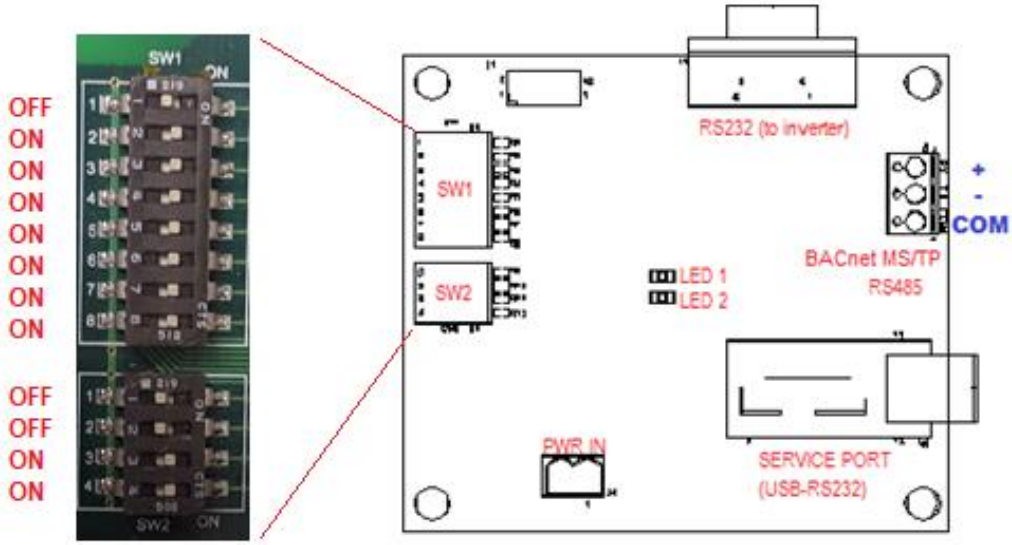


Figure 2 – Outline of BACnet Communication Board, and required DIP settings (do not change)

Babel Buster BB2-7030

The Babel Buster BB2-7030 is a DIN-rail mounted protocol bridge that is pre-programmed to convert between BACnet MS/TP and BACnet IP and/or SNMP. It features two external connectors; one for BACnet MS/TP RS485 and power **in (**24 Volts AC or DC), and the other for Ethernet (LAN connection) **out**. Figure 2 is a diagram of the BB2-7030.

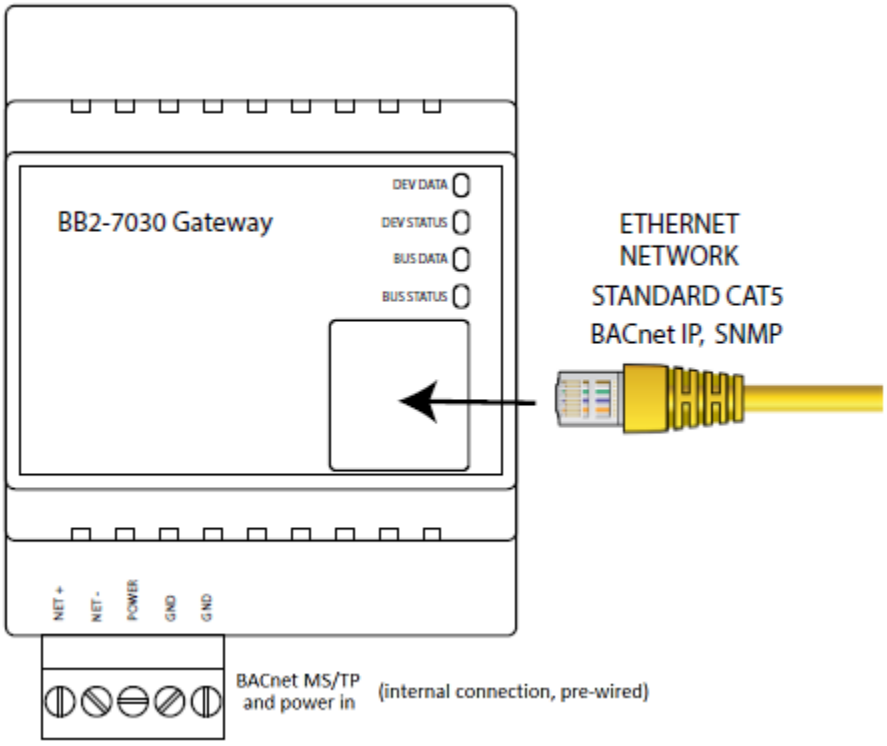


Figure 2 *– BB2-7030 Diagram*

The lower (BACnet MS/TP and power in) connector is pre-wired. Please do not change the internal wiring. The upper (Ethernet) connector should be connected to the Local Area Network (LAN) to which it will be integrated via BACnet IP and/or SNMP. The BB2-7030 is preprogrammed to:

- Provide BACnet IP proxy objects to read the values of the BACnet objects presented by the Myers inverter (see Section 4). The proxy objects are updated every 5 seconds
- Provide SNMP OIDs to access all BACnet objects, and act as an SNMP Agent (server) such that they can also be read via SNMP

The BB2-7030 can be configured using its onboard web server to generate SNMP traps when programmed conditions are met (e.g. ‘inverter is running on battery power’, ‘inverter is overloaded’, ‘ambient temperature is too high’, etc.).

SECTION 2

Description of Operation

The single-phase Illuminator Supernova Emergency Lighting Central Inverter acts as a BACnet IP server, and SNMP Agent (server).

It supports a total of *nine* analog objects (floating point on BACnet IP, and rounded to the nearest integer on SNMP), *seventeen* binary flag objects and *three* file objects (only accessible when BB2-7030 is in Router Mode).

It can also be programmed to transmit SNMP 'traps' when a programmed condition is met (analog value goes above or below a threshold value, or binary flag gets set to 1 or cleared to 0). The traps can be sent to specified IP addresses on the LAN.

SECTION 3

Default Ethernet Settings

- **IP Address:** 10.0.0.101 (static)
- **Subnet Mask:** 255.255.255.0
- **Gateway:** 10.0.0.1
- **DHCP Client:** Turned off by default (but DHCP is supported)
- **Web Server Port:** 80 (HTTP default)

Default BACnet IP Settings

- **Device Instance**: 20800
- **Port**: 47808 (0xBAC0)
- **BACnet Router**: Disabled
- **BBMD**: Disabled
- **APDU Timeout**: 3 seconds
- **APDU Retries**: 3

Default SNMP Settings

- **SNMP Version Support**: v1, v2c (v3 is ***not*** supported)
- **Community**: public
- **Traps**: Disabled

SECTION 4
Object Summary

Analog Inputs (analog sensors or counters read from the inverter)

Register	Object Name	Units	SNMP OID
AI 1	Input Voltage	Volts AC	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.1
AI 4	Output Voltage	Volts AC	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.2
AI 7	Output Current	Amps AC	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.3
AI 10	Battery Voltage	Volts DC	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.4
AI 11	Ambient Temperature	°C (Degrees Celsius)	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.5
AI 13	Output VA	VA (Volt-Ampere Reactive)	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.6
AI 16	Days Online	Days	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.7
AI 17	Battery Runtime	Minutes	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.8
AI 25	Battery Current	Amps DC	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.9

Binary Inputs (status flags from the inverter; value is either 0 or 1)

Register	Object Name	SNMP OID
BI 1	System Ready Status	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.10
BI 2	On Utility Power	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.11
BI 3	Battery Is Charging	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.12
BI 4	On Battery Power	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.13
BI 19	Overloaded	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.14
BI 24	Input Not Present Alarm	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.15
BI 26	Battery Low Alarm	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.16
BI 28	High Ambient Temperature Alarm	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.17
BI 30	Inverter Over Temperature Alarm	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.18
BI 33	Overload Shutdown Alarm	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.19
BI 39	Input Voltage Low	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.20
BI 40	Input Voltage High	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.21
BI 43	Battery Charger Alarm	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.22
BI 44	Inverter Failure	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.23
BI 45	Near Low Battery	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.24
BI 46	Load Reduction Alarm	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.25
BI 48	Runtime Failure	1.3.6.1.4.1.3815.1.3.1.1.1.1.2.26

File Inputs

File Input objects can only be accessed when the BB2-7030 is in Router Mode (see Section 6 below). The contents of the files are described in Section 6 below. File objects cannot be accessed via SNMP.

Object	Object Name
FI 1	Alarm Log File *(only available when BB2-7030 is in Router Mode)*
FI 2	Event Log File *(only available when BB2-7030 is in Router Mode)*
FI 3	Test Log File *(only available when BB2-7030 is in Router Mode)*

SECTION 5
Connecting to the BB2-7030 Web Server the First Time

To be able to do things like change the IP address, set a different BACnet 'Device Instance' number, change the SNMP 'community' code, or set up SNMP traps, you will first need to connect to the BB2-7030's web server.

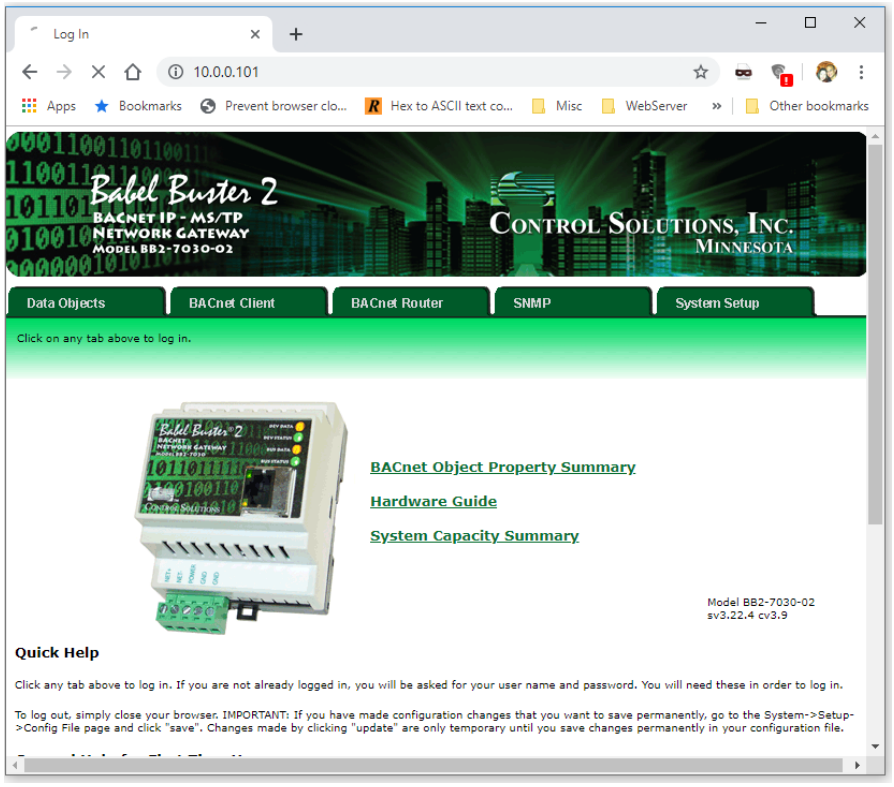
Start by directly connecting an Ethernet cable between your PC and the BB2-7030.

The default IP address of the BB2-7030 is **10.0.0.101**. If your PC is running Microsoft Windows, and is not already on the 10.0.0.0 domain, you will need to add a route on your PC. Do this by opening a command prompt with administrator privileges. First type "ipconfig" and note the IPv4 address listed for the adapter that is connected to the same LAN as the BB2-7030 (or directly to the BB2-7030). Now type the following command into the command prompt, but replace the **`x.x.x.x`** with your PC's IPv4 address.

```
route add 10.0.0.0 mask 255.255.255.0 x.x.x.x
```

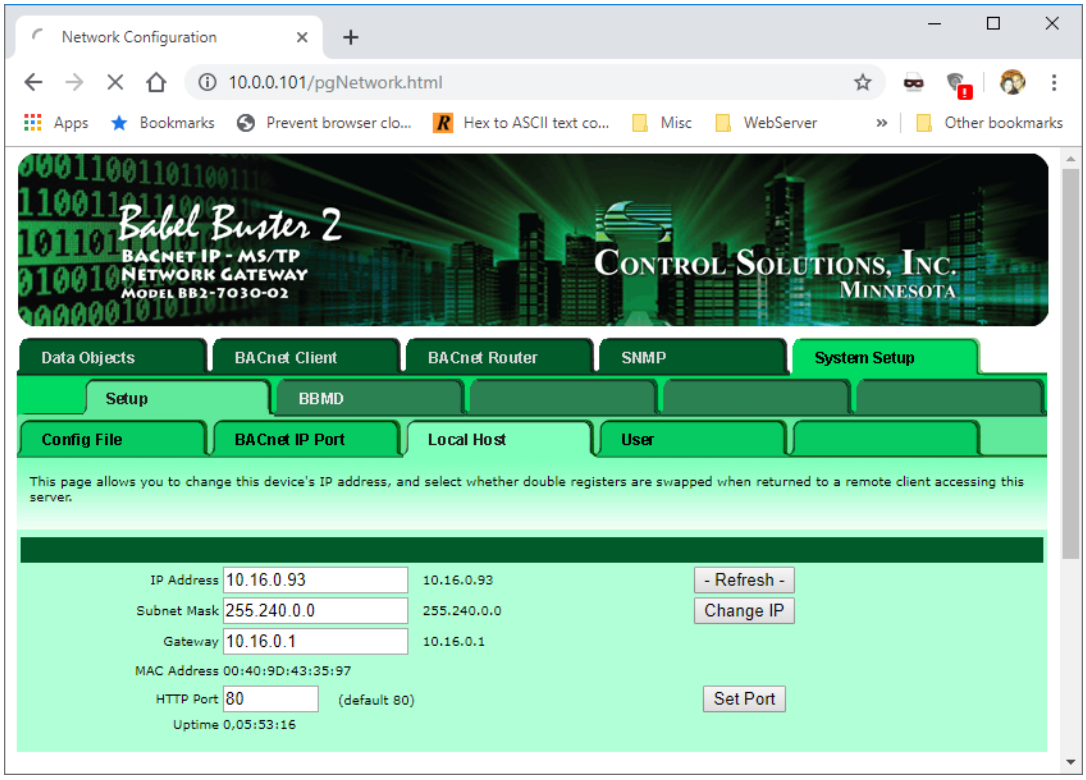
You should now be able to view the BB2-7030 homepage by entering "10.0.0.101" into the URL box of your web browser.

If you are running a non-Windows operating system, or if the above command doesn't work, please refer to your operating system's instructions on how to change your PC's IP address to a static IP of 10.0.0.100. You should now be able to view the BB2-7030 homepage by entering "10.0.0.101" into the URL box of your web browser.



Setting up IP Address and LAN Settings

Click on the “System Setup” tab. You will be presented with a ‘Sign in’ popup prompt. Type “root” for Username, and “buster” for Password. Now navigate to “System Setup” >> “Setup” >> “Local Host”. The page should look like this:



Enter the IP Address that you desire your BB2-7030 to have, and the Subnet Mask and Gateway address for the LAN that the BB2-7030 will be on. If you wish the BB2-7030 to be a DHCP client (i.e. to automatically be assigned IP address, subnet mask and gateway address from a DHCP server if one exists and is reachable on the LAN), simply enter “255.255.255.255” as the IP Address. However, DHCP is not recommended because it means the IP address of the BB2-7030 becomes dynamic and can periodically change; you will have to periodically update any software that communicates with it (over BACnet IP, SNMP or HTTP).

When done, click the “Change IP” button to save your changes. Wait at least 15 seconds until the settings are changed and the webpage reloads. Now cycle power to your BB2-7030 by pulling out and then re-inserting the “BACnet MS/TP and Power In” connector. At this point, if you wish you may disconnect the direct ethernet connection between your PC and the BB2-7030 and put it on the LAN and connect to it through the LAN via its new IP address setting.

Note that clicking the “Change IP” button results in a permanent change of the programmed IP address, even if power to the BB2-7030 is lost. All other programming requires explicit saving (described in the “Saving Your Changes” section below) but changing IP settings is the exception.

Setting Up BACnet IP (Including Device Instance)

Once the IP address is correctly set, the BACnet IP should immediately be working using the IP address you set, Device Instance number 20800, Port 47808, and the BACnet objects described above in Section 4. If these settings are OK, you're good to go.

If you need to change the Device Instance number (**which must be globally unique on the BACnet network**) or Port Number, you can do so on the following page: "System Setup" >> "Setup" >> "BACnet IP Port" . Make the required changes, click the "Save" button, and then refer to the "Saving and Activating Your Changes" subsection below to make your changes permanent ***(otherwise, they may be lost if the inverter loses power for long enough for the entire battery to deplete, or if maintenance is performed on the inverter)***.

By default, the BB2-7030 acts as a BACnet MS/TP to BACnet IP gateway (proxy) for one device (the single Myers EPS inverter system). In the unlikely case that you wish to configure it to be a BACnet router, see the section below on Gateway vs Router.

Setting Up the SNMP Agent

Once the IP address is correctly set, the SNMP Agent (server) should immediately be working using the IP address you set, "public" as the community, and "Get" operations on the SNMP OIDs described in Section 4 above (after the first "Get", you may use "Get Next" as well, or walk the entire MIB). If these settings are OK, you're good to go.

The BB2-7030 supports SNMP v1 and v2c. Note that SNMP v3 is ***not*** supported.

Setting Up SNMP Traps

The BB2-7030 can use SNMP's "trap" mechanism to generate notifications (and send them to one or more trap receiving PCs/devices) when a programmed condition occurs. By default, no traps are programmed. You are only able to program one trap per object (see object list in Section 4).

To program traps, go to the "SNMP" >> "SNMP Agent" >> "Traps" webpage. You must follow the below instructions for each trap you wish to program:

1. Enter the last number (number after the last '.') of the OID of the object you wish to program a trap for (see object list in Section 4).
2. Click the 'Update' button.
3. Select the rule from the dropdown menu. Allowed rules for analog objects are "greater than", "greater or equal", "less than", "less or equal", "equal to" and "not equal to". For binary objects, you only need the "equal" rule.

4. Set the value. For analog objects, use any value. For binary objects, use “0” to trap on a logic 0, or “1” to trap on a logic 1.
5. For analog values, consider setting a hysteresis. For example, if you are programming a trap for when ambient temperature is greater than 30°C, you might want to put in a hysteresis of 2°C so that if the temperature is right on the 30°C mark and oscillating with small variations over and under 30°C, you don’t get hit with a flood of traps (with a hysteresis of 2°C, once the temperature exceeds 30°C and you get the first trap, you won’t get another trap until the temperature drops all the way down to 28°C, and then comes back up over 30°C, or the Repeat Time elapses)
6. If you only want the trap to happen if the condition is reached for a minimum period of time, set that period in the “minimum on time” box. Enter it in the form HH:MM:SS (so for a 10 second minimum on time, you would type “00:00:10”)
7. “minimum off time” is another form of hysteresis, except using time instead of value. For example, if you are programming a trap for when ambient temperature is greater than 30°C, you can make the minimum off time be 2 minutes (00:02:00) so that the temperature has to be below 30°C consistently for 2 whole minutes before a trap can be generated once the temperature climbs above 30°C again.
8. Select the checkbox on whether you want the trap when the rule evaluates to True, to False, or you can check both. Typically, you will only want to trap on True.
9. The Repeat Time field determines how long (in ‘seconds’) the BB2-7030 will wait before resending a trap that is still asserted. For example, if you trap on loss of utility power, and you set the Repeat Time to 30 seconds, and utility power is lost for 10 minutes, you will get one trap every 30 seconds for 10 minutes (for a total of 20 traps). If you enter 0 here, the BB2-7030 uses its default repeat time of 60 seconds.
10. The Repeat Count sets the number of traps to send in immediate succession at each repeat time. If you set this to 0 or 1, the BB2-7030 uses the default repeat count of 1. Using a higher number is only necessary if the network or your ‘Trap Receiver’ client is unreliable and you want to maximize the chances of traps getting through. Going back to the above example, if you trap on loss of utility power, and you set the Repeat Time to 30 seconds, and the Repeat Count to 5, and utility power is lost for 10 minutes, you will get five back-to-back traps every 30 seconds for the 10 minutes for a total of 100 traps.
11. Click the “Update” button once more.

Once you have programmed all your traps, go to the “SNMP” >> “SNMP Agent” >> “Send Traps To” webpage, enter the IP address of your PC/device that will receive the SNMP traps, and click the “Update” button. If you wish to have multiple trap receivers on multiple devices, repeat this process but increment the number in the “Device #” box each time.

Finally, refer to the “Saving and Activating Your Changes” subsection below to make your programming changes permanent ***(otherwise, they may be lost if the inverter loses power for long enough for the entire battery to deplete, or if maintenance is performed on the inverter)***.

Saving and Activating Your Changes

Any changes you make on the BB2-7030 web pages - other than changing IP address - are temporary. They will not take effect until you activate them, plus they will be lost on a power cycle of the BB2-7030, until you permanently save them.

To permanently save your programming, go to “System Setup” >> “Setup” >> “Config File” , select “**ESeriesBacnet.xml**” from the dropdown list (if it is not already selected), and click the “Save” button. The BB2-7030 will take 10 seconds or so to save the changes. The changes are now permanent and will survive power cycles.

Finally, click the “Load” button to get the BB2-7030 to reinitialize itself and activate your programming changes.

Warning: It is imperative that you click “Save” before you click “Load”. If you accidentally click “Load” first, the BB2-7030 will reload its programming from before you made any changes, and all your changes will be lost!

If you would like to back up your BB2-7030 programming on your PC for safe-keeping or to share with Tech Support, click the “View” button. Your browser will load and display an xml file that contains the BB2-7030’s programming in xml format. To download and save the xml file, press Ctrl-S (⌘-*s* on an Apple) or right click on white space on the page and click “Save As”.

SECTION 6
Using BB2-7030 as a BACnet Router

Gateway vs Router

By default, the BACnet IP Communication Option ships with the BB2-7030 configured to act as a BACnet IP Gateway. This means the BB2-7030 acts as a proxy, keeping a local copy of all the BACnet objects from the BACnet MS/TP Communication Board, and updating their current values every 5 seconds via BACnet MS/TP, and then presenting the copied objects to the BACnet IP world as its own objects.

In this default configuration, every inverter requires its own BB2-7030, and the inverters appear to the BACnet IP system as a native BACnet IP device. This is illustrated in Figure 3 below:

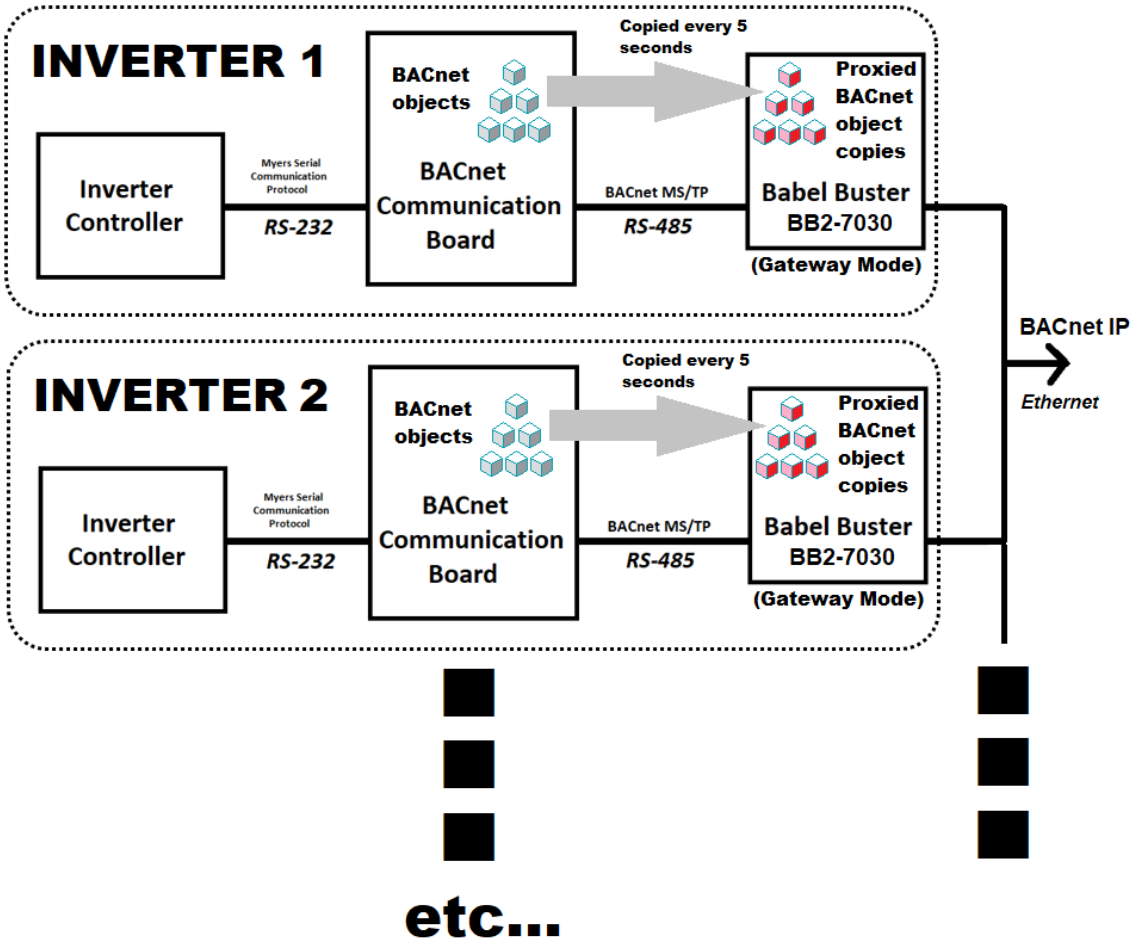


Figure 3 *– Each Inverter Has a BB2-7030 Acting as a Gateway (Proxy)*

This configuration is ideal for buildings that are wired with Ethernet (LAN) wiring (with Ethernet network switches, etc.).

However, the BB2-7030 also has the capability to act as a BACnet MS/TP to IP router (please do not confuse the terminology “BACnet router” with a standard Ethernet network router; they are very different devices). When configured as a BACnet MS/TP router, the BB2-7030 will no longer periodically read and proxy BACnet objects from the BACnet Communication Board. Instead, it will act as a simple ‘middleman’, bridging the BACnet MS/TP network with a BACnet IP network, ‘blindly’ passing traffic back and forth. All devices on the BACnet MS/TP network will become visible on the BACnet IP network, and vice versa. They will be one ‘hop’ apart (the hop through the BB2-7030 router).

This option is more complicated to configure and wire, but it is ideal for buildings that are wired with RS-485 wiring (RS-485 is the physical layer of BACnet MS/TP), and/or systems with 3rd party (non-Myers) BACnet MS/TP devices, but where BACnet IP integration is also required.

This system topology is illustrated in Figure 4:

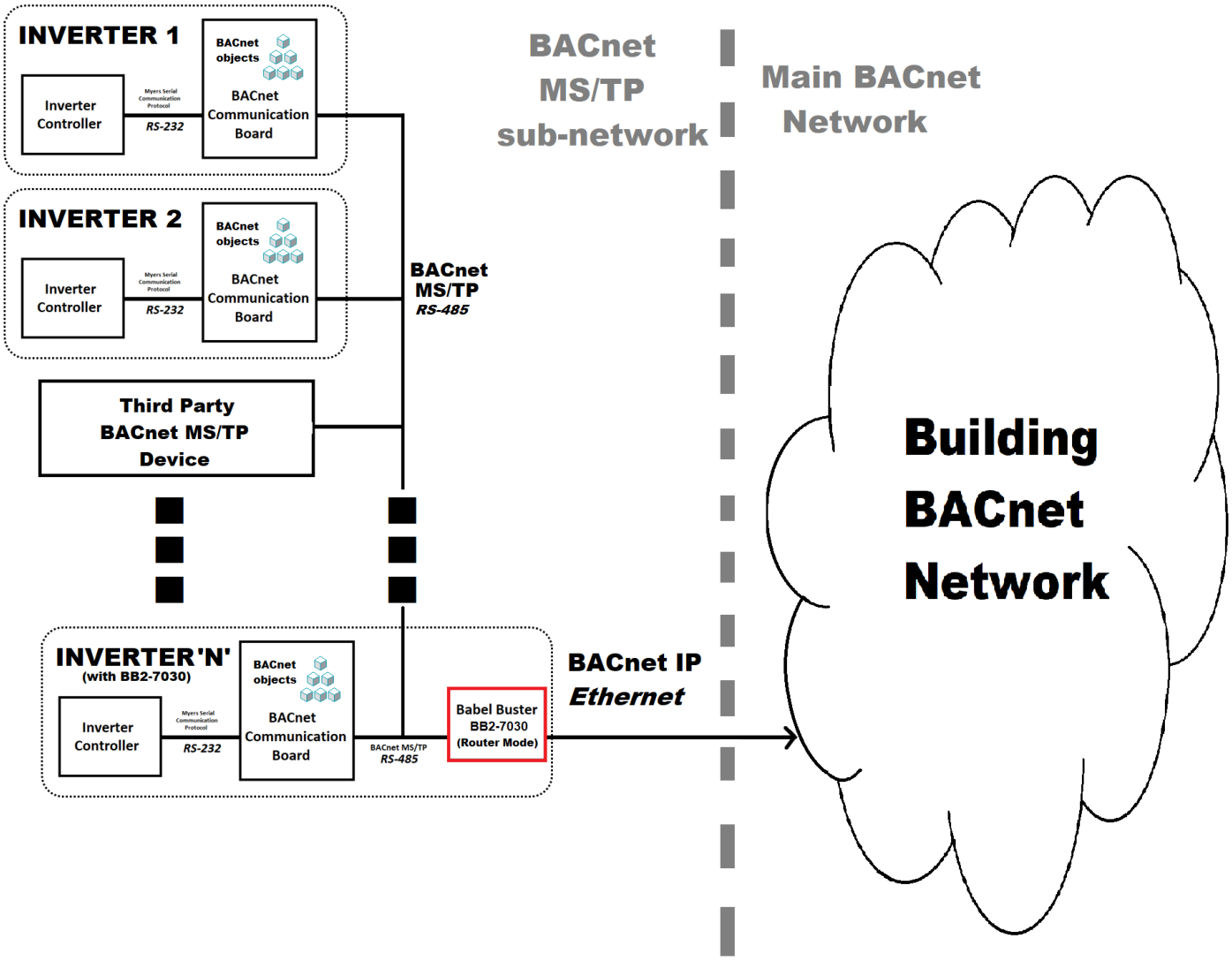


Figure 4 – BB2-7030 in Router Mode, Connecting Networks

Important points to note when operating the BB2-7030 in router mode:

1. In the inverter with the BB2-7030 router (marked “Inverter ‘N’” in the figure above), you must wire the incoming (external) BACnet MS/TP bus to the BACnet MS/TP terminal block on the BACnet MS/TP Communication board (it has 3 screw terminals ; see Figure 2 in Section 1) while keeping the wires that connect to the BB2-7030 also connected.
2. Myers Emergency Power Systems cannot take responsibility for or assist in the behavior / programming / operation of 3rd party (non-Myers) BACnet devices sharing the network. Troubleshooting will have to involve the 3rd party company’s tech support, and/or Control Solutions Incorporated tech support (the manufacturer of the BB2-7030).
3. Each BACnet MS/TP bus must have only one router connecting it to the BACnet IP network. Having multiple routers on the same bus segment will result in problematic and undefined behavior.

4. In line with standard BACnet practice, each device on a given BACnet MS/TP bus must be set to a unique MAC address. For Myers BACnet Communication Boards, this is typically done with DIP switches on the board ; please refer to that device's instruction manual.
5. In line with standard BACnet practice, each device on the entire BACnet network (including all BACnet MS/TP bus segments, and all BACnet IP networks) must be set a unique Device Instance number. Again, refer to each device's instruction manual for instructions on how to set respective Device Instance numbers.
6. Three extra objects are only visible in Router Mode; namely, 'File Input' (FI) objects for the Alarm Log file (FI 1), the Event Log file (FI 2), and the Test Log file (FI 3). Refer to the respective sections below for descriptions on what these files contain..

Configuring BB2-7030 As A Router

While the inverter that ships with a BACnet IP Communication Option (marked Inverter 'N' in Figure 4 above) will be preconfigured to act as a BACnet Gateway, it will have an (inactive) XML file already loaded into it (from Myers EPS manufacturing) that reconfigures the device to be a BACnet Router instead, along with some manual steps on the 'BACnet IP Port' and "Network Info" settings pages.

- On the BB2-7030 web page, go to "System Setup">>"Setup">>"Config File" and select "**SimpleRouterConfiguration.xml**" from the drop-down menu.
- Click the "Load" button. Wait 15 seconds or so for the BB2-7030 to load this new configuration.
- In the text box marked "Boot configuration", type **SimpleRouterConfiguration.xml**
- Click the "Boot" button.
- Navigate the web page to:

  "System Setup" >> "Setup" >> "BACnet IP Port"
- Uncheck the following three checkboxes on the bottom-right of the "BACnet IP Settings" section of the webpage:
  - I-Am route learning
  - I-Am-Router route learning
  - Disable ALL routing
- Click the 'Save' button on the top-right of the "BACnet IP Settings" section of the webpage.
- Navigate the web page to:

  "BACnet Router" >> "Local Networks" >> "Network Info"

- Enter the allocated network numbers for the BACnet IP Network (on the Ethernet side of this BB2-7030), and for the MS/TP Network (on the MS/TP RS-485 side of this BB2-7030). See the section below marked “On Network Numbers” for more detailed information.
- Enter the hop counts for the BACnet IP and MS/TP networks. See the section below marked “On Hop Counts” for more detailed information.
- Optionally, enter names for each network in the “Network Info” text boxes. This is optional, and purely informational. These names will only live within this BB2-7030 ; they are not global to the network.
- Finally, click the “Save” button to temporarily save your changes.
- To permanently save your changes, refer to the section above titled “Saving and Activating Your Changes”.

On Network Numbers

In a large BACnet network that is comprised of multiple smaller sub-networks with BACnet routers in between, each sub-network in the system must be assigned a globally unique network number. All routers on the ‘edges’ of that sub-network must be configured with the same network number for that sub-network.

If your network only consists of a single MS/TP sub-network and a single IP network (with a single BB2-7030 in between), then you can assign any two arbitrary numbers to each sub-network in the BB2-7030 “Network Info” configuration page.

On Hop Counts

In a large BACnet network that is comprised of multiple smaller sub-networks with routers in between, each time a message has to cross from one sub-network to another (through a BACnet router), it is considered a ‘hop’.

Please count the maximum number of hops from any device to any other device on the network, add 1 or 2 to this number as a small buffer, and use this number as the Hop Count on the BB2-7030 “Network Info” configuration page.

If your network only consists of a single MS/TP sub-network and a single IP network (with a single BB2-7030 in between), then you should set the Hop Count to 2.

Parsing File Records (Alarm, Event and Test Logs)

This section will describe the information contained in Alarm, Event and Test log files, and how to parse them. These files can only be accessed when the BB2-7030 is operating in Router Mode. They are accessed as standard BACnet File Input objects.

Alarm Logs

This is an example of an Alarm Log file:

```
19/08/21  09:31     INVERTER FAULT
19/08/25  22:14     LOW VAC
```

- Each line in the file begins with a timestamp in the format “YY/MM/DD HH:MM”. Note that the time is in 24-hour format. Note also that the time must be set up correctly in the inverter control board, or the timestamps will be wrong. This can be done using the display mounted on the front of the cabinet.
- A tab character separates the date from the time, and another tab separates the time from the alarm descriptor.
- The final column on the right is the alarm descriptor, which describes the cause of the alarm.
- Each line ends with a DOS style line ending (“\r\n”)

Event Logs

This is an example of an Event Log file:

```
19/08/16   11:35    13   1    277.4    10.2   24.0
19/08/18   20:09    6    3    278.5    10.6   28.3
```

- Each line in the file begins with a timestamp in the format “YY/MM/DD HH:MM”. Note that the time is in 24-hour format. Note also that the time must be set up correctly in the inverter control board, or the timestamps will be wrong. This can be done using the display mounted on the front of the cabinet.
- A tab character separates the date from the time. Tab characters separate all the fields in the file.
- The next field describes the duration of the event (in integer minutes)
- The next field is a count for the ‘number of faults encountered’.
- The next field provides the recorded output voltage (in Volts)
- The next field provides the recorded output current (in Amps)
- The final field provides the recorded temperature, in degrees Celsius
- Each line ends with a DOS style line ending (“\r\n”)

Test Logs

This is an example of a Test Log file:

```
19/08/15   02:45     M   20     0   277.9    10.8    28.0
19/08/30   23:00     Y   20     2   276.1    10.6    27.6
```

- Each line in the file begins with a timestamp in the format “YY/MM/DD HH:MM”. Note that the time is in 24-hour format. Note also that the time must be set up correctly in the inverter control board, or the timestamps will be wrong. This can be done using the display mounted on the front of the cabinet.
- A tab character separates the date from the time. Tab characters separate all the fields in the file.
- The next field describes whether the test was an automatically scheduled test (“M” for Monthly, or “Y” for Yearly), or a manually invoked test (“E” for Event).
- The next field describes the duration of the test (in integer minutes)
- The next field is a count for the ‘number of faults encountered’.
- The next field provides the recorded output voltage (in Volts)
- The final field provides the recorded output current (in Amps)
- The next field describes the recorded temperature, in degrees Celsius
- Each line ends with a DOS style line ending (“\r\n”)

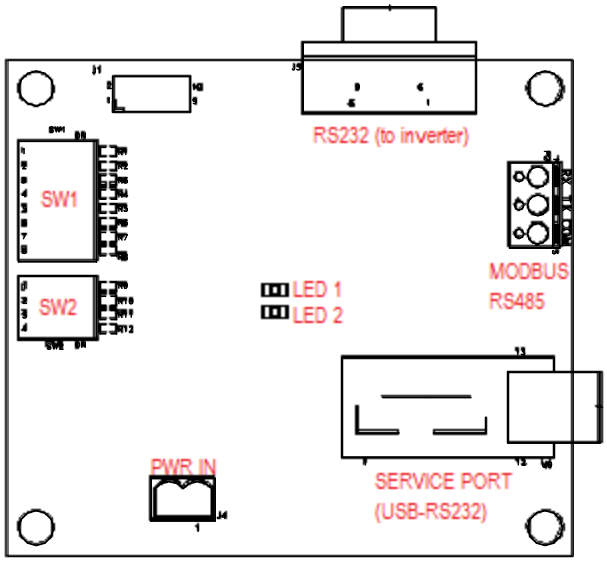
Please contact Myers EPS Service at (610) 868-5400 if you have questions or concerns.

MODBUS SERIAL COMMUNICATION OPTION MANUAL

SINGLE PHASE

ILLUMINATOR SUPERNOVA

EMERGENCY LIGHTING CENTRAL INVERTER



Myers Emergency Power Systems
44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerseps.com

Table of Contents

SECTION 1

MODBUS Serial Comm Option Board - Introduction

The MODBUS Communication Option Board for the single-phase Illuminator Supernova Emergency Lighting Central Inverter has two internal connections; the RS232 communication bus to the inverter controller, and the input power that powers the board. There are two external connections, a RS485 output connector that is the MODBUS link, and a USB connection that is a serial computer interface into the RS232 communication bus to the inverter controller. For detailed operation on the protocol and commands for the computer interface see manual 114063 RS-232 Communications. There are also two DIP switches that select the MODBUS protocol (RTU or ASCII), baud rate, parity, and MODBUS slave address. See Figure 1 for the locations of these components.

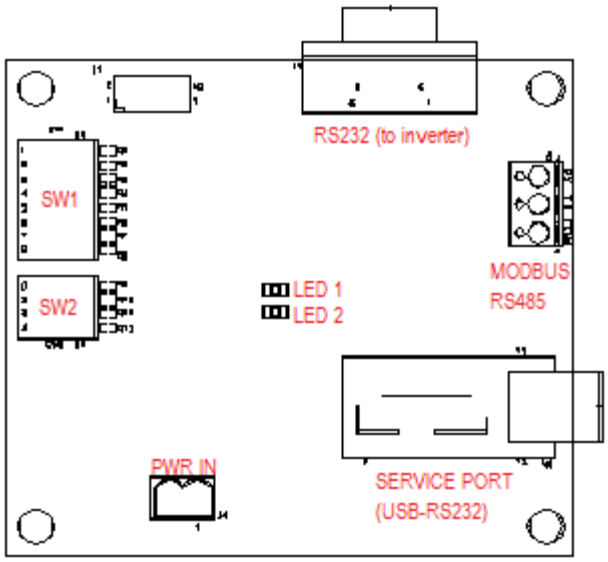


Figure 1 – Outline of MODBUS Communication Board.

SECTION 2

Description of Operation

The MODBUS Communication Option Board acts as a MODBUS slave. It supports both the RTU (binary) and ASCII modes of MODBUS Over Serial Line. For both modes, it supports either Even Parity or No Parity, and four baud rates: 9600bps, 19,200bps, 38,400bps and 115,200bps. It supports being set to any legal MODBUS slave address, between 1 and 247 (inclusive).

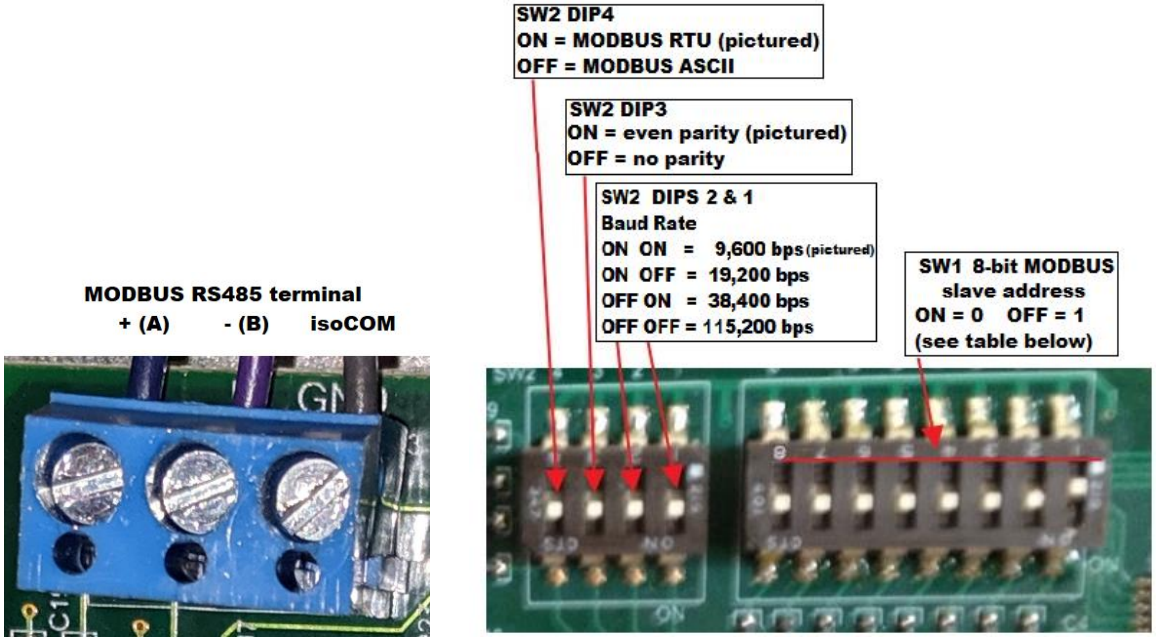
It supports a total of *twelve* 16-bit analog objects (known as 'holding registers' in MODBUS), *sixteen* binary flag objects (known as 'coils' in MODBUS) and *three* File Record objects. File Records are used to access one of three dynamic logs of Alarms, Tests and Events.

The MODBUS Communication Option Board also supports the MODBUS "Report Server ID" self-identification command, reporting its model number and firmware revision in an ASCII string. You can also program a User ID up to 32 bytes long (in ASCII) that will be appended to the end of the self-identification string.

SECTION 3

Settings

RS-485 connection, Serial Mode, Parity, Baudrate and Slave Address:



MODBUS Slave Address Settings

MODBUS Slave Address is set on SW1, an 8-position DIP switch. The tables below describe the possible address settings:

MODBUS Slave Addresses 1 – 63

8	7	6	5	4	3	2	1	Address
ON	ON	ON	ON	ON	ON	ON	ON	247 (0xF7)
ON	ON	ON	ON	ON	ON	ON	OFF	1 (0x01)
ON	ON	ON	ON	ON	ON	OFF	ON	2 (0x02)
ON	ON	ON	ON	ON	ON	OFF	OFF	3 (0x03)
ON	ON	ON	ON	ON	OFF	ON	ON	4 (0x04)
ON	ON	ON	ON	ON	OFF	ON	OFF	5 (0x05)
ON	ON	ON	ON	ON	OFF	OFF	ON	6 (0x06)
ON	ON	ON	ON	ON	OFF	OFF	OFF	7 (0x07)
ON	ON	ON	ON	OFF	ON	ON	ON	8 (0x08)
ON	ON	ON	ON	OFF	ON	ON	OFF	9 (0x09)
ON	ON	ON	ON	OFF	ON	OFF	ON	10 (0x0A)
ON	ON	ON	ON	OFF	ON	OFF	OFF	11 (0x0B)
ON	ON	ON	ON	OFF	OFF	ON	ON	12 (0x0C)
ON	ON	ON	ON	OFF	OFF	ON	OFF	13 (0x0D)
ON	ON	ON	ON	OFF	OFF	OFF	ON	14 (0x0E)
ON	ON	ON	ON	OFF	OFF	OFF	OFF	15 (0x0F)
ON	ON	ON	OFF	ON	ON	ON	ON	16 (0x10)
ON	ON	ON	OFF	ON	ON	ON	OFF	17 (0x11)
ON	ON	ON	OFF	ON	ON	OFF	ON	18 (0x12)
ON	ON	ON	OFF	ON	ON	OFF	OFF	19 (0x13)
ON	ON	ON	OFF	ON	OFF	ON	ON	20 (0x14)
ON	ON	ON	OFF	ON	OFF	ON	OFF	21 (0x15)
ON	ON	ON	OFF	ON	OFF	OFF	ON	22 (0x16)
ON	ON	ON	OFF	ON	OFF	OFF	OFF	23 (0x17)
ON	ON	ON	OFF	OFF	ON	ON	ON	24 (0x18)
ON	ON	ON	OFF	OFF	ON	ON	OFF	25 (0x19)
ON	ON	ON	OFF	OFF	ON	OFF	ON	26 (0x1A)
ON	ON	ON	OFF	OFF	ON	OFF	OFF	27 (0x1B)
ON	ON	ON	OFF	OFF	OFF	ON	ON	28 (0x1C)
ON	ON	ON	OFF	OFF	OFF	ON	OFF	29 (0x1D)
ON	ON	ON	OFF	OFF	OFF	OFF	ON	30 (0x1E)
ON	ON	ON	OFF	OFF	OFF	OFF	OFF	31 (0x1F)
ON	ON	OFF	ON	ON	ON	ON	ON	32 (0x20)
ON	ON	OFF	ON	ON	ON	ON	OFF	33 (0x21)
ON	ON	OFF	ON	ON	ON	OFF	ON	34 (0x22)
ON	ON	OFF	ON	ON	ON	OFF	OFF	35 (0x23)
ON	ON	OFF	ON	ON	OFF	ON	ON	36 (0x24)
ON	ON	OFF	ON	ON	OFF	ON	OFF	37 (0x25)
ON	ON	OFF	ON	ON	OFF	OFF	ON	38 (0x26)
ON	ON	OFF	ON	ON	OFF	OFF	OFF	39 (0x27)
ON	ON	OFF	ON	OFF	ON	ON	ON	40 (0x28)
ON	ON	OFF	ON	OFF	ON	ON	OFF	41 (0x29)
ON	ON	OFF	ON	OFF	ON	OFF	ON	42 (0x2A)
ON	ON	OFF	ON	OFF	ON	OFF	OFF	43 (0x2B)
ON	ON	OFF	ON	OFF	OFF	ON	ON	44 (0x2C)
ON	ON	OFF	ON	OFF	OFF	ON	OFF	45 (0x2D)
ON	ON	OFF	ON	OFF	OFF	OFF	ON	46 (0x2E)
ON	ON	OFF	ON	OFF	OFF	OFF	OFF	47 (0x2F)
ON	ON	OFF	OFF	ON	ON	ON	ON	48 (0x30)
ON	ON	OFF	OFF	ON	ON	ON	OFF	49 (0x31)
ON	ON	OFF	OFF	ON	ON	OFF	ON	50 (0x32)
ON	ON	OFF	OFF	ON	ON	OFF	OFF	51 (0x33)
ON	ON	OFF	OFF	ON	OFF	ON	ON	52 (0x34)
ON	ON	OFF	OFF	ON	OFF	ON	OFF	53 (0x35)
ON	ON	OFF	OFF	ON	OFF	OFF	ON	54 (0x36)
ON	ON	OFF	OFF	ON	OFF	OFF	OFF	55 (0x37)
ON	ON	OFF	OFF	OFF	ON	ON	ON	56 (0x38)
ON	ON	OFF	OFF	OFF	ON	ON	OFF	57 (0x39)
ON	ON	OFF	OFF	OFF	ON	OFF	ON	58 (0x3A)
ON	ON	OFF	OFF	OFF	ON	OFF	OFF	59 (0x3B)
ON	ON	OFF	OFF	OFF	OFF	ON	ON	60 (0x3C)
ON	ON	OFF	OFF	OFF	OFF	ON	OFF	61 (0x3D)
ON	ON	OFF	OFF	OFF	OFF	OFF	ON	62 (0x3E)
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	63 (0x3F)

MODBUS Slave Addresses 64 – 127

8	7	6	5	4	3	2	1	Address
ON	OFF	ON	ON	ON	ON	ON	ON	64 (0x40)
ON	OFF	ON	ON	ON	ON	ON	OFF	65 (0x41)
ON	OFF	ON	ON	ON	ON	OFF	ON	66 (0x42)
ON	OFF	ON	ON	ON	ON	OFF	OFF	67 (0x43)
ON	OFF	ON	ON	ON	OFF	ON	ON	68 (0x44)
ON	OFF	ON	ON	ON	OFF	ON	OFF	69 (0x45)
ON	OFF	ON	ON	ON	OFF	OFF	ON	70 (0x46)
ON	OFF	ON	ON	ON	OFF	OFF	OFF	71 (0x47)
ON	OFF	ON	ON	OFF	ON	ON	ON	72 (0x48)
ON	OFF	ON	ON	OFF	ON	ON	OFF	73 (0x49)
ON	OFF	ON	ON	OFF	ON	OFF	ON	74 (0x4A)
ON	OFF	ON	ON	OFF	ON	OFF	OFF	75 (0x4B)
ON	OFF	ON	ON	OFF	OFF	ON	ON	76 (0x4C)
ON	OFF	ON	ON	OFF	OFF	ON	OFF	77 (0x4D)
ON	OFF	ON	ON	OFF	OFF	OFF	ON	78 (0x4E)
ON	OFF	ON	ON	OFF	OFF	OFF	OFF	79 (0x4F)
ON	OFF	ON	OFF	ON	ON	ON	ON	80 (0x50)
ON	OFF	ON	OFF	ON	ON	ON	OFF	81 (0x51)
ON	OFF	ON	OFF	ON	ON	OFF	ON	82 (0x52)
ON	OFF	ON	OFF	ON	ON	OFF	OFF	83 (0x53)
ON	OFF	ON	OFF	ON	OFF	ON	ON	84 (0x54)
ON	OFF	ON	OFF	ON	OFF	ON	OFF	85 (0x55)
ON	OFF	ON	OFF	ON	OFF	OFF	ON	86 (0x56)
ON	OFF	ON	OFF	ON	OFF	OFF	OFF	87 (0x57)
ON	OFF	ON	OFF	OFF	ON	ON	ON	88 (0x58)
ON	OFF	ON	OFF	OFF	ON	ON	OFF	89 (0x59)
ON	OFF	ON	OFF	OFF	ON	OFF	ON	90 (0x5A)
ON	OFF	ON	OFF	OFF	ON	OFF	OFF	91 (0x5B)
ON	OFF	ON	OFF	OFF	OFF	ON	ON	92 (0x5C)
ON	OFF	ON	OFF	OFF	OFF	ON	OFF	93 (0x5D)
ON	OFF	ON	OFF	OFF	OFF	OFF	ON	94 (0x5E)
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	95 (0x5F)
ON	OFF	OFF	ON	ON	ON	ON	ON	96 (0x60)
ON	OFF	OFF	ON	ON	ON	ON	OFF	97 (0x61)
ON	OFF	OFF	ON	ON	ON	OFF	ON	98 (0x62)
ON	OFF	OFF	ON	ON	ON	OFF	OFF	99 (0x63)
ON	OFF	OFF	ON	ON	OFF	ON	ON	100 (0x64)
ON	OFF	OFF	ON	ON	OFF	ON	OFF	101 (0x65)
ON	OFF	OFF	ON	ON	OFF	OFF	ON	102 (0x66)
ON	OFF	OFF	ON	ON	OFF	OFF	OFF	103 (0x67)
ON	OFF	OFF	ON	OFF	ON	ON	ON	104 (0x68)
ON	OFF	OFF	ON	OFF	ON	ON	OFF	105 (0x69)
ON	OFF	OFF	ON	OFF	ON	OFF	ON	106 (0x6A)
ON	OFF	OFF	ON	OFF	ON	OFF	OFF	107 (0x6B)
ON	OFF	OFF	ON	OFF	OFF	ON	ON	108 (0x6C)
ON	OFF	OFF	ON	OFF	OFF	ON	OFF	109 (0x6D)
ON	OFF	OFF	ON	OFF	OFF	OFF	ON	110 (0x6E)
ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	111 (0x6F)
ON	OFF	OFF	OFF	ON	ON	ON	ON	112 (0x70)
ON	OFF	OFF	OFF	ON	ON	ON	OFF	113 (0x71)
ON	OFF	OFF	OFF	ON	ON	OFF	ON	114 (0x72)
ON	OFF	OFF	OFF	ON	ON	OFF	OFF	115 (0x73)
ON	OFF	OFF	OFF	ON	OFF	ON	ON	116 (0x74)
ON	OFF	OFF	OFF	ON	OFF	ON	OFF	117 (0x75)
ON	OFF	OFF	OFF	ON	OFF	OFF	ON	118 (0x76)
ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	119 (0x77)
ON	OFF	OFF	OFF	OFF	ON	ON	ON	120 (0x78)
ON	OFF	OFF	OFF	OFF	ON	ON	OFF	121 (0x79)
ON	OFF	OFF	OFF	OFF	ON	OFF	ON	122 (0x7A)
ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	123 (0x7B)
ON	OFF	OFF	OFF	OFF	OFF	ON	ON	124 (0x7C)
ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	125 (0x7D)
ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	126 (0x7E)
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	127 (0x7F)

MODBUS Slave Addresses 128 – 191

8	7	6	5	4	3	2	1	Address
OFF	ON	ON	ON	ON	ON	ON	ON	128 (0x80)
OFF	ON	ON	ON	ON	ON	ON	OFF	129 (0x81)
OFF	ON	ON	ON	ON	ON	OFF	ON	130 (0x82)
OFF	ON	ON	ON	ON	ON	OFF	OFF	131 (0x83)
OFF	ON	ON	ON	ON	OFF	ON	ON	132 (0x84)
OFF	ON	ON	ON	ON	OFF	ON	OFF	133 (0x85)
OFF	ON	ON	ON	ON	OFF	OFF	ON	134 (0x86)
OFF	ON	ON	ON	ON	OFF	OFF	OFF	135 (0x87)
OFF	ON	ON	ON	OFF	ON	ON	ON	136 (0x88)
OFF	ON	ON	ON	OFF	ON	ON	OFF	137 (0x89)
OFF	ON	ON	ON	OFF	ON	OFF	ON	138 (0x8A)
OFF	ON	ON	ON	OFF	ON	OFF	OFF	139 (0x8B)
OFF	ON	ON	ON	OFF	OFF	ON	ON	140 (0x8C)
OFF	ON	ON	ON	OFF	OFF	ON	OFF	141 (0x8D)
OFF	ON	ON	ON	OFF	OFF	OFF	ON	142 (0x8E)
OFF	ON	ON	ON	OFF	OFF	OFF	OFF	143 (0x8F)
OFF	ON	ON	OFF	ON	ON	ON	ON	144 (0x90)
OFF	ON	ON	OFF	ON	ON	ON	OFF	145 (0x91)
OFF	ON	ON	OFF	ON	ON	OFF	ON	146 (0x92)
OFF	ON	ON	OFF	ON	ON	OFF	OFF	147 (0x93)
OFF	ON	ON	OFF	ON	OFF	ON	ON	148 (0x94)
OFF	ON	ON	OFF	ON	OFF	ON	OFF	149 (0x95)
OFF	ON	ON	OFF	ON	OFF	OFF	ON	150 (0x96)
OFF	ON	ON	OFF	ON	OFF	OFF	OFF	151 (0x97)
OFF	ON	ON	OFF	OFF	ON	ON	ON	152 (0x98)
OFF	ON	ON	OFF	OFF	ON	ON	OFF	153 (0x99)
OFF	ON	ON	OFF	OFF	ON	OFF	ON	154 (0x9A)
OFF	ON	ON	OFF	OFF	ON	OFF	OFF	155 (0x9B)
OFF	ON	ON	OFF	OFF	OFF	ON	ON	156 (0x9C)
OFF	ON	ON	OFF	OFF	OFF	ON	OFF	157 (0x9D)
OFF	ON	ON	OFF	OFF	OFF	OFF	ON	158 (0x9E)
OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	159 (0x9F)
OFF	ON	OFF	ON	ON	ON	ON	ON	160 (0xA0)
OFF	ON	OFF	ON	ON	ON	ON	OFF	161 (0xA1)
OFF	ON	OFF	ON	ON	ON	OFF	ON	162 (0xA2)
OFF	ON	OFF	ON	ON	ON	OFF	OFF	163 (0xA3)
OFF	ON	OFF	ON	ON	OFF	ON	ON	164 (0xA4)
OFF	ON	OFF	ON	ON	OFF	ON	OFF	165 (0xA5)
OFF	ON	OFF	ON	ON	OFF	OFF	ON	166 (0xA6)
OFF	ON	OFF	ON	ON	OFF	OFF	OFF	167 (0xA7)
OFF	ON	OFF	ON	OFF	ON	ON	ON	168 (0xA8)
OFF	ON	OFF	ON	OFF	ON	ON	OFF	169 (0xA9)
OFF	ON	OFF	ON	OFF	ON	OFF	ON	170 (0xAA)
OFF	ON	OFF	ON	OFF	ON	OFF	OFF	171 (0xAB)
OFF	ON	OFF	ON	OFF	OFF	ON	ON	172 (0xAC)
OFF	ON	OFF	ON	OFF	OFF	ON	OFF	173 (0xAD)
OFF	ON	OFF	ON	OFF	OFF	OFF	ON	174 (0xAE)
OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	175 (0xAF)
OFF	ON	OFF	OFF	ON	ON	ON	ON	176 (0xB0)
OFF	ON	OFF	OFF	ON	ON	ON	OFF	177 (0xB1)
OFF	ON	OFF	OFF	ON	ON	OFF	ON	178 (0xB2)
OFF	ON	OFF	OFF	ON	ON	OFF	OFF	179 (0xB3)
OFF	ON	OFF	OFF	ON	OFF	ON	ON	180 (0xB4)
OFF	ON	OFF	OFF	ON	OFF	ON	OFF	181 (0xB5)
OFF	ON	OFF	OFF	ON	OFF	OFF	ON	182 (0xB6)
OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	183 (0xB7)
OFF	ON	OFF	OFF	OFF	ON	ON	ON	184 (0xB8)
OFF	ON	OFF	OFF	OFF	ON	ON	OFF	185 (0xB9)
OFF	ON	OFF	OFF	OFF	ON	OFF	ON	186 (0xBA)
OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	187 (0xBB)
OFF	ON	OFF	OFF	OFF	OFF	ON	ON	188 (0xBC)
OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	189 (0xBD)
OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	190 (0xBE)
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	191 (0xBF)

MODBUS Slave Addresses 192 – 247

8	7	6	5	4	3	2	1	Address
OFF	OFF	ON	ON	ON	ON	ON	ON	192 (0xC0)
OFF	OFF	ON	ON	ON	ON	ON	OFF	193 (0xC1)
OFF	OFF	ON	ON	ON	ON	OFF	ON	194 (0xC2)
OFF	OFF	ON	ON	ON	ON	OFF	OFF	195 (0xC3)
OFF	OFF	ON	ON	ON	OFF	ON	ON	196 (0xC4)
OFF	OFF	ON	ON	ON	OFF	ON	OFF	197 (0xC5)
OFF	OFF	ON	ON	ON	OFF	OFF	ON	198 (0xC6)
OFF	OFF	ON	ON	ON	OFF	OFF	OFF	199 (0xC7)
OFF	OFF	ON	ON	OFF	ON	ON	ON	200 (0xC8)
OFF	OFF	ON	ON	OFF	ON	ON	OFF	201 (0xC9)
OFF	OFF	ON	ON	OFF	ON	OFF	ON	202 (0xCA)
OFF	OFF	ON	ON	OFF	ON	OFF	OFF	203 (0xCB)
OFF	OFF	ON	ON	OFF	OFF	ON	ON	204 (0xCC)
OFF	OFF	ON	ON	OFF	OFF	ON	OFF	205 (0xCD)
OFF	OFF	ON	ON	OFF	OFF	OFF	ON	206 (0xCE)
OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	207 (0xCF)
OFF	OFF	ON	OFF	ON	ON	ON	ON	208 (0xD0)
OFF	OFF	ON	OFF	ON	ON	ON	OFF	209 (0xD1)
OFF	OFF	ON	OFF	ON	ON	OFF	ON	210 (0xD2)
OFF	OFF	ON	OFF	ON	ON	OFF	OFF	211 (0xD3)
OFF	OFF	ON	OFF	ON	OFF	ON	ON	212 (0xD4)
OFF	OFF	ON	OFF	ON	OFF	ON	OFF	213 (0xD5)
OFF	OFF	ON	OFF	ON	OFF	OFF	ON	214 (0xD6)
OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	215 (0xD7)
OFF	OFF	ON	OFF	OFF	ON	ON	ON	216 (0xD8)
OFF	OFF	ON	OFF	OFF	ON	ON	OFF	217 (0xD9)
OFF	OFF	ON	OFF	OFF	ON	OFF	ON	218 (0xDA)
OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	219 (0xDB)
OFF	OFF	ON	OFF	OFF	OFF	ON	ON	220 (0xDC)
OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	221 (0xDD)
OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	222 (0xDE)
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	223 (0xDF)
OFF	OFF	OFF	ON	ON	ON	ON	ON	224 (0xE0)
OFF	OFF	OFF	ON	ON	ON	ON	OFF	225 (0xE1)
OFF	OFF	OFF	ON	ON	ON	OFF	ON	226 (0xE2)
OFF	OFF	OFF	ON	ON	ON	OFF	OFF	227 (0xE3)
OFF	OFF	OFF	ON	ON	OFF	ON	ON	228 (0xE4)
OFF	OFF	OFF	ON	ON	OFF	ON	OFF	229 (0xE5)
OFF	OFF	OFF	ON	ON	OFF	OFF	ON	230 (0xE6)
OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	231 (0xE7)
OFF	OFF	OFF	ON	OFF	ON	ON	ON	232 (0xE8)
OFF	OFF	OFF	ON	OFF	ON	ON	OFF	233 (0xE9)
OFF	OFF	OFF	ON	OFF	ON	OFF	ON	234 (0xEA)
OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	235 (0xEB)
OFF	OFF	OFF	ON	OFF	OFF	ON	ON	236 (0xEC)
OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	237 (0xED)
OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	238 (0xEE)
OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	239 (0xEF)
OFF	OFF	OFF	OFF	ON	ON	ON	ON	240 (0xF0)
OFF	OFF	OFF	OFF	ON	ON	ON	OFF	241 (0xF1)
OFF	OFF	OFF	OFF	ON	ON	OFF	ON	242 (0xF2)
OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	243 (0xF3)
OFF	OFF	OFF	OFF	ON	OFF	ON	ON	244 (0xF4)
OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	245 (0xF5)
OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	246 (0xF6)
OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	247 (0xF7)
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	7 (0x07)
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	6 (0x06)
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	5 (0x05)
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	4 (0x04)
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	3 (0x03)
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	2 (0x02)
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	1 (0x01)
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	247 (0xF7)

Serial Communication Information

- **MODBUS Slave Address:** 1 to 247 (selectable by DIP)
- **Communication Mode:** MODBUS RTU or MODBUS ASCII (selectable by DIP)
- **Parity:** Even or None (selectable by DIP)
- **Baud Rate:** 9600, 19200, 38400 or 115200 (selectable by DIP)
- **Start Bits:** 1
- **Data Bits:**
  - 8 if MODBUS RTU
  - 7 if MODBUS ASCII
- **Stop Bits:**
  - 1 if Even Parity
  - 2 if No Parity
- **Flow Control:** None

LED Behavior

The MODBUS Communication Option Board has two LEDs.

- LED1 blinks to indicate communication on the RS-232 serial link between the MODBUS Communication Option Board and the inverter controller.
- LED2 blinks to indicate communication on the MODBUS RS-485 bus.

Note: both LEDs should be blinking to indicate healthy operation. Note that the RS-232 link will always be active, while the MODBUS link is only active when transactions are initiated by the MODBUS master. If there is no MODBUS master on the bus yet, LED2 will remain off. Also note that just because LED2 is blinking, that does not necessarily mean that this particular MODBUS Communication Option Board is communicating on the bus. If the MODBUS master is only addressing *other* devices on the bus, the LED will still blink indicating traffic on the bus.

SECTION 4
Object Summary (Registers and Coils)

The sixteen-bit registers can be accessed via either MODBUS Function Code 3 (0x03 Read Holding Registers) or Function Code 4 (0x04 Read Input Registers). Results will be identical.

The flag objects can be accessed via either MODBUS Function Code 1 (0x01 Read Coils) or Function Code 2 (0x02 Read Discrete Inputs). Results will be identical.

All objects are read-only; no MODBUS write commands are supported.

Register	Object Name	Units
0 (0x0000)	Input Voltage	0.1 Volts AC (e.g. 1203 = 120.3V)
3 (0x0003)	Output Voltage	0.1 Volts AC
6 (0x0006)	Output Current	0.1 Amps AC (e.g. 461 = 46.1A)
9 (0x0009)	Battery Voltage	0.1 Volts DC (e.g. 483 = 48.3 V)
10 (0x000A)	Ambient Temperature	0.1 °C (e.g. 301 = 30.1°C = 86.1°F)
12 (0x000C)	Output VA	1 VA (e.g. 10000 = 10kVA)
15 (0x000F)	Days Online	Days (0-65535)
16 (0x0010)	Battery Runtime	Minutes (0-65535)
24 (0x0018)	Battery Current	0.1 Amps DC (e.g. 52 = 5.2A)
152 (0x0098)	Alarm Log File Size	Bytes (0-65535)
153 (0x0099)	Event Log File Size	Bytes (0-65535)
154 (0x009A)	Test Log File Size	Bytes (0-65535)
Coil	**Object Name**	**Values**
0 (0x0000)	System Ready Status	1 = ready, 0 = not ready
1 (0x0001)	AC Line Present Status	1 = present, 0 = not present
2 (0x0002)	Battery Charging Status	1 = charging, 0 = not charging
3 (0x0003)	On Battery Power Status	1 = battery power, 0 = line power
18 (0x0012)	Overload	1 = alarm, 0 = normal
23 (0x0017)	Input not Present	1 = alarm, 0 = normal
25 (0x0019)	Battery Low	1 = alarm, 0 = normal
27 (0x001B)	High Ambient Temperature	1 = alarm, 0 = normal
29 (0x001D)	Over Temperature	1 = alarm, 0 = normal
32 (0x0020)	Overload Shutdown	1 = alarm, 0 = normal
38 (0x0026)	Input Voltage Low	1 = alarm, 0 = normal
39 (0x0027)	Input Voltage High	1 = alarm, 0 = normal
42 (0x002A)	Battery Charger	1 = alarm, 0 = normal
43 (0x002B)	Inverter Failure	1 = alarm, 0 = normal
44 (0x002C)	Near Low Battery	1 = alarm, 0 = normal
45 (0x002D)	Load Reduction	1 = alarm, 0 = normal
47 (0x002F)	Runtime Failure	1 = alarm, 0 = normal

SECTION 5

Biasing, Link Load and Link Termination

The MODBUS Communication Option Board includes weak (10kΩ) pull-up and pull-down resistors on the MODBUS RS-485 link for the purpose of link biasing. Therefore, external link biasing on the bus is not required when at least one MODBUS Communication Option Board is connected on the bus segment.

The RS-485 transceiver in the MODBUS Communication Option Board is a Maxim MAX487E, which presents a quarter (1/4) Unit Load on the bus. Up to 128 quarter-Unit-Load devices may be on the same bus segment before requiring a repeater. However, for long (1000ft and greater) RS485 wire runs, fewer devices and lower baud rates (9,600 bps or 19,200 bps) are recommended for reliable performance. If this is not possible, you should consider multiple independent MODBUS segments, either running separately as separate systems, or combined with signal repeaters, or combined over MODBUS TCP using an Ethernet backbone and bridge devices.

The MODBUS electrical specification allows various wiring topologies, but for best performance at high baud rates and long wire runs, pure daisy chaining is strongly recommended to minimize reflections on the line.

To further minimize reflections and improve link reliability, you must correctly terminate the MODBUS link externally on either end of the bus as recommended by the MODBUS specification (and according to the type of link cable used).

SECTION 6

Device Identification

To enable identification and differentiation of MODBUS Communication Option Boards on the same MODBUS link, the board:

- Allows you to set a custom User ID string (up to 31 bytes of printable ASCII characters, i.e. ASCII characters 0x20 through 0x7E)
- Allows you to read out identification strings using either of two different methods:
    - MODBUS Report Server ID (MODBUS Function Code 0x11)
    - MODBUS Encapsulated Interface Transport ‘Read Device Identification’ (MODBUS Function Code 0x2B / 0x0E)

  The identification strings that you can read out include the User ID string (if set), manufacturer info, model number, and firmware revision.

Setting a Custom User ID

Setting a Custom User ID is done with MODBUS Function Code 0x15 (Write File Record). See the description of the Write File Record function code in the MODBUS Application Protocol Specification document from http://www.modbus.org/specs.php

- Sub Request Reference Type must be **0x06**
- Sub Request File Number must be **0x0004**. Note: File numbers 1, 2 and 3 are used for Alarm Log, Event Log and Test Log file records which are Read Only (see Section 7).
- Sub Request Record Number must be 0x0000 through 0x001F to start writing at any of the 32 bytes of the Custom User ID string. It is recommended that you start writing at Record Number 0x0000 and write all 32 bytes (or less) in one MODBUS packet/frame.
- The Sub Request Record Data occurs in 16-bit 'byte pairs'. The MODBUS Communication Option Board will always ignore the first (most significant) byte of a pair, and will only store the second.

Example

You wish to set the Custom User ID string to "2nd Floor West Emergency Lights".

- **Step 1**: Converted to ASCII codes in hexadecimal, this string is:

```
32 6e 64 20 46 6c 6f 6f 72 20 57 65 73 74 20 45
6d 65 72 67 65 6e 63 79 20 4c 69 67 68 74 73 00
```

- **Step 2**: As stated above, the MODBUS Communication Option Board ignores the most significant byte of each byte pair. After translating the string to byte pairs, we have:

```
00 32 00 6e 00 64 00 20 00 46 00 6c 00 6f 00 6f
00 72 00 20 00 57 00 65 00 73 00 74 00 20 00 45
00 6d 00 65 00 72 00 67 00 65 00 6e 00 63 00 79
00 20 00 4c 00 69 00 67 00 68 00 74 00 73 00 00
```

- **Step 3**: The entire MODBUS PDU (Protocol Data Unit) would therefore be:

```
                        15 47 06 00 04 00 00 00 20
00 32 00 6e 00 64 00 20 00 46 00 6c 00 6f 00 6f
00 72 00 20 00 57 00 65 00 73 00 74 00 20 00 45
00 6d 00 65 00 72 00 67 00 65 00 6e 00 63 00 79
00 20 00 4c 00 69 00 67 00 68 00 74 00 73 00 00
```

  Where:
  - 0x15 is the MODBUS Function Code (Write File Record)
  - 0x47 (71) is the size of the remainder of the PDU
  - 0x06 is the Sub Request Reference Type (fixed)
  - 0x0004 is the Sub Request File Number
  - 0x0000 is the Sub Request Record Number
  - 0x00020 is the Sub Request Record Length (in units of '2 byte words')

Requesting Identification With 'Report Server ID' (0x11)

The first way to request identification from the MODBUS Communication Option Board is with MODBUS Function Code 0x11 (Report Server ID).

The MODBUS Communication Option Board will respond with an ASCII string that contains:

- The Custom User ID (if set)
- Manufacturer info
- Model number
- Firmware revision

Requesting Identification With 'EIT Read Device Identification' (0x2B / 0x0E)

The second way to request identification from the MODBUS Communication Option Board is with MODBUS Encapsulated Interface Transport 'Read Device Identification' (MODBUS Function Code 0x2B / 0x0E). Refer to the MODBUS Application Protocol Specification document from http://www.modbus.org/specs.php for details on this function.

Use Function Code 0x2B, and MEI Type 0x0E. The MODBUS Communication Option Board has conformity level 3, so it can support any Device ID code (1 = basic device ID, 2 = regular device ID, 3 = extended device ID, 4 = specific device ID).

The MODBUS Communication Option Board supports Object IDs 0x00 (Vendor Name) through 0x06 (UserApplicationName). Object ID 0x06 (UserApplicationName) is used to return the Custom User ID string (if set).

SECTION 7

Retrieving File Records (Alarm, Event, and Test Logs)

The MODBUS Communication Option Board allows you to retrieve:

- **Alarm Logs**: Time stamped data on alarm conditions that have occurred (if any).
- **Event Logs**: Time stamped data that the inverter keeps on events (such as power ups)
- **Test Logs**: Time stamped logs of inverter self-tests that have taken place, and their results. The self-tests may have been automated (monthly or yearly tests on preset schedule), or manual (user invoked).

To discover the current file sizes of the above three files, read registers 112, 113 and 114 (see the Object Summary table in Section 4). You need to know the file size to avoid reading outside the bounds of the respective log file (which will result in MODBUS errors).

Reading a log is done with MODBUS Function Code 0x14 (Read File Record). See the description of the Read File Record function code in the MODBUS Application Protocol Specification document from http://www.modbus.org/specs.php

- Sub Request Reference Type must be **0x06**
- Sub Request File Number must be **0x0001**, **0x0002** or **0x0003**.
  - File Number 0x0001 is used to access the Alarm Log file
  - File Number 0x0002 is used to access the Event Log file
  - File Number 0x0003 is used to access the Test Log file
  - *Note: File number 0x0004 can be used to read out the Custom User ID string (see Section 6)*
- Sub Request Record Number must be between 0x0000 and the file size (retrieved through the respective register; 112, 113 or 114).
- The Sub Request Record Data is returned by the MODBUS Communication Option Board in 16-bit 'byte pairs'. The MODBUS Communication Option Board will always populate the first (most significant) byte of a pair with 0x00, and will put a byte from the respective file in the second (least significant) byte of the pair.
- All bytes from the files are going to be printable ASCII characters, or tabs (ASCII 0x09), or DOS style line endings (ASCII 0x0D, and ASCII 0x0A). See the sections below to understand how to parse the data in the files.

Example

In this example, we will retrieve the contents of the Alarm Log file.

- **Step 1:** The first step is to determine the current size of the Alarm Log file. We do this using the Read Holding Registers (0x03) function, on register 0x70 (112 - the Alarm Log File Size register). Let's assume we transmit the following PDU…

  ```
  03 00 70 00 01
  ```

  …and receive the following PDU in response from the MODBUS Communication Option Board:

  ```
  03 02 00 37
  ```

  The response says that the Alarm Log file is currently 0x37 (55) bytes long.

- **Step 2**: Now we have to use function code 0x14 (Read File Record) to retrieve the Alarm Log file. For the sake of this example, let's read the Alarm Log file in two transactions; a 32-byte read, followed by a 55 – 32 = 23 byte read. Here are the request PDUs and response PDUs:

  Request PDU 1

  ```
  14 07 06 00 01 00 00 00 20
  ```

  Where:
  - 0x14 (20) is the Read File Record function code
  - 0x07 is the remaining length of the PDU in bytes
  - 0x06 is the Reference Type (fixed)

- 0x0001 is the File Number (for the Alarm Log File)
- 0x0000 is the Record Number (we're starting to read the file from byte 0)
- 0x0020 (32) is the Record Length. We wish to read the first 32 bytes of the file.

Response PDU 1

```
                                                14 42 41 06
00 31 00 39 00 2f 00 30 00 38 00 2f 00 32 00 31
00 09 00 30 00 39 00 3a 00 33 00 31 00 09 00 49
00 4e 00 56 00 45 00 52 00 54 00 45 00 52 00 20
00 46 00 41 00 55 00 4c 00 54 00 0D 00 0A 00 31
```

Where:

- 0x14 (20) is the Read File Record function code
- 0x42 (66) is the remaining length of the PDU in bytes
- 0x41 (65) is the file read response length (including the Reference Type byte)
- 0x06 is the Reference Type (fixed)
- The last 64 bytes of the PDU are byte pairs. If you eliminate all the (0x00 valued) most significant bytes of each byte pair, you are left with the ASCII data read out of the Alarm Log file:

```
31 39 2f 30 38 2f 32 31 09 30 39 3a 33 31 09 49
4e 56 45 52 54 45 52 20 46 41 55 4c 54 0D 0A 31
```

Note that 0x09 is the 'tab' character, and 0x0D 0x0A is a DOS style line ending ("\r\n"). The ASCII would display as:

```
19/08/21  09:31     INVERTER FAULT
1
```

Request PDU 2

```
14 07 06 00 01 00 20 00 17
```

Where:

- 0x14 (20) is the Read File Record function code
- 0x07 is the remaining length of the PDU in bytes
- 0x06 is the Reference Type (fixed)
- 0x0001 is the File Number (for the Alarm Log File)
- 0x0020 (32) is the Record Number (we're starting to read the file from byte 32, where we left off)
- 0x0017 (23) is the Record Length. This is the remainder of the file (55 – 32 = 23 bytes)

Response PDU 2

```
                                                14 30 2F 06
00 39 00 2f 00 30 00 38 00 2f 00 32 00 35 00 09
00 32 00 32 00 3a 00 31 00 34 00 09 00 4c 00 4f
00 57 00 20 00 56 00 41 00 43 00 0D 00 0A
```

Where:

- 0x14 (20) is the Read File Record function code
- 0x30 (48) is the remaining length of the PDU in bytes

- 0x2F (47) is the file read response length (including the Reference Type byte)
- 0x06 is the Reference Type (fixed)
- The last 46 bytes of the PDU are byte pairs. If you eliminate all the (0x00 valued) most significant bytes of each byte pair, you are left with the ASCII data read out of the Alarm Log file:

```
39 2f 30 38 2f 32 35 09 32 32 3a 31 34 09 4c 4f
57 20 56 41 43 0D 0A
```

Note that 0x09 is the 'tab' character, and 0x0D 0x0A is a DOS style line ending ("\r\n"). The ASCII would display as:

```
9/08/25   22:14     LOW VAC
```

- **Step 3**: Now we have only to combine the two received fragments of the Alarm Log File to form the complete file, revealing two alarm events logged on August 21st 2019 and August 25th 2019:

```
19/08/21  09:31     INVERTER FAULT
19/08/25  22:14     LOW VAC
```

Further information follows below on how to parse the data in Alarm Log, Event Log and Test Log files.

Parsing File Records (Alarm, Event and Test Logs)

This section will describe the information contained in Alarm, Event and Test log files, and how to parse them.

Alarm Logs

This is an example of an Alarm Log file:

```
19/08/21  09:31     INVERTER FAULT
19/08/25  22:14     LOW VAC
```

- Each line in the file begins with a timestamp in the format “YY/MM/DD HH:MM”. Note that the time is in 24-hour format. Note also that the time must be set up correctly in the inverter control board, or the timestamps will be wrong. This can be done using the display mounted on the front of the cabinet.
- A tab character separates the date from the time, and another tab separates the time from the alarm descriptor.
- The final column on the right is the alarm descriptor, which describes the cause of the alarm.
- Each line ends with a DOS style line ending (“\r\n”)

Event Logs

This is an example of an Event Log file:

```
19/08/16   11:35    13   1    277.4    10.2   24.0
19/08/18   20:09    6    3    278.5    10.6   28.3
```

- Each line in the file begins with a timestamp in the format “YY/MM/DD HH:MM”. Note that the time is in 24-hour format. Note also that the time must be set up correctly in the inverter control board, or the timestamps will be wrong. This can be done using the display mounted on the front of the cabinet.
- A tab character separates the date from the time. Tab characters separate all the fields in the file.
- The next field describes the duration of the event (in integer minutes)
- The next field is a count for the ‘number of faults encountered’.
- The next field provides the recorded output voltage (in Volts)
- The next field provides the recorded output current (in Amps)
- The final field provides the recorded temperature, in degrees Celsius
- Each line ends with a DOS style line ending (“\r\n”)

Test Logs

This is an example of a Test Log file:

```
19/08/15    02:45     M    20      0    277.9     10.8     28.0
19/08/30    23:00     Y    20      2    276.1     10.6     27.6
```

- Each line in the file begins with a timestamp in the format “YY/MM/DD HH:MM”. Note that the time is in 24-hour format. Note also that the time must be set up correctly in the inverter control board, or the timestamps will be wrong. This can be done using the display mounted on the front of the cabinet.
- A tab character separates the date from the time. Tab characters separate all the fields in the file.
- The next field describes whether the test was a monthly or yearly automatically scheduled test (“M” for Monthly or “Y” for Yearly).
- The next field describes the duration of the test (in integer minutes)
- The next field is a count for the ‘number of faults encountered’.
- The next field provides the recorded output voltage (in Volts)
- The next field provides the recorded output current (in Amps)
- The final field describes the recorded temperature, in degrees Celsius
- Each line ends with a DOS style line ending (“\r\n”)

MODBUS TCP AND SNMP COMMUNICATION OPTION MANUAL

SINGLE-PHASE

ILLUMINATOR SUPERNOVA

EMERGENCY LIGHTING CENTRAL INVERTER

Myers Emergency Power Systems
44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerseps.com

Table of Contents

SECTION 1
MODBUS Serial Communication Board

MODBUS TCP and SNMP communication from the single-phase Illuminator Supernova Emergency Lighting Central Inverter is achieved via a standard Myers EPS MODBUS serial communication option board – which converts the RS-232 communication with the inverter controller into the MODBUS RTU protocol – and a Babel Buster BB2-6010 MODBUS RTU to MODBUS TCP Gateway, made by Control Solutions Inc. (https://www.csimn.com). Figure 1 describes the data flow at a high level.

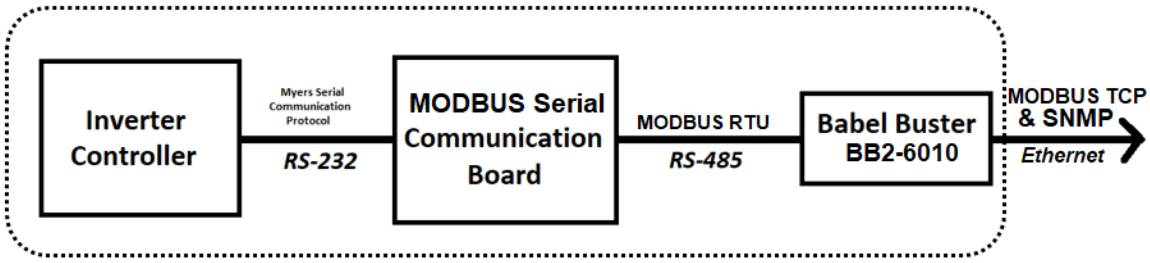


***Figure 1** – Data Flow to Achieve MODBUS TCP and SNMP Integration*

Everything inside the dashed box (including the Control Solutions Inc. Babel Buster BB2-6010) is pre-wired, pre-programmed and pre-configured by Myers EPS, and is internally mounted and powered inside the inverter cabinet (and will remain powered when the utility A/C input goes down and the inverter switches to battery power). The integrator may integrate directly to the Ethernet link on the BB2-6010. The below information on the MODBUS Serial Communication Board is for your information only.

The MODBUS Serial Communication Option Board for the single-phase Illuminator Supernova Emergency Lighting Central Inverter has two internal connections; the RS232 communication bus to the inverter controller, and the input power that powers the board. There are two external connections, a RS485 output connector that is the MODBUS RTU link, and a USB connection that is a serial computer interface into the RS232 communication bus to the inverter controller. For detailed operation on the protocol and commands for the computer interface see manual 114063 RS-232 Communications. There are also two DIP switches that setup the MODBUS RTU communication settings. **These should not be changed.** Figure 2 shows an outline diagram of the MODBUS Serial Communication Option Board and required DIP settings.

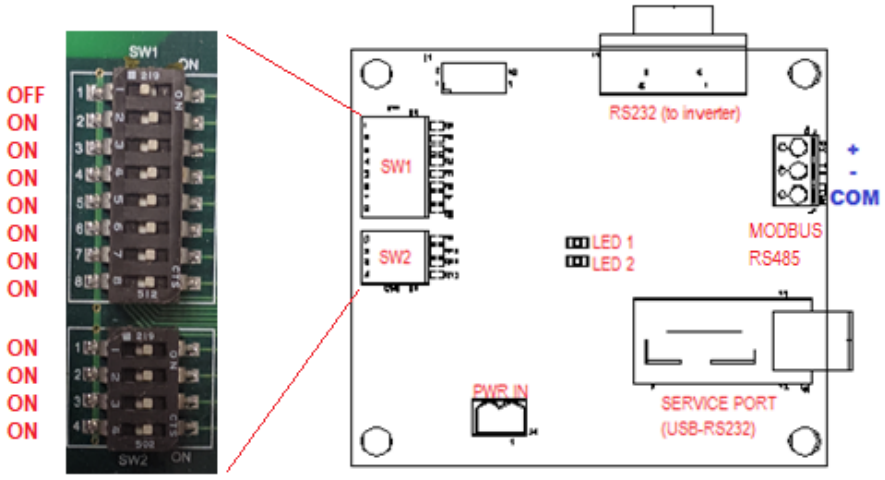


Figure 2 – Outline of MODBUS Serial Communication Board, and required DIP settings (do not change)

Babel Buster BB2-6010

The Babel Buster BB2-6010 is a DIN-rail mounted protocol bridge that is pre-programmed to convert between MODBUS RTU and MODBUS TCP and/or SNMP. It features two external connectors; one for MODBUS RTU RS485 and power **in (**24 Volts AC or DC), and the other for Ethernet (LAN connection) **out**. Figure 2 is a diagram of the BB2-6010.

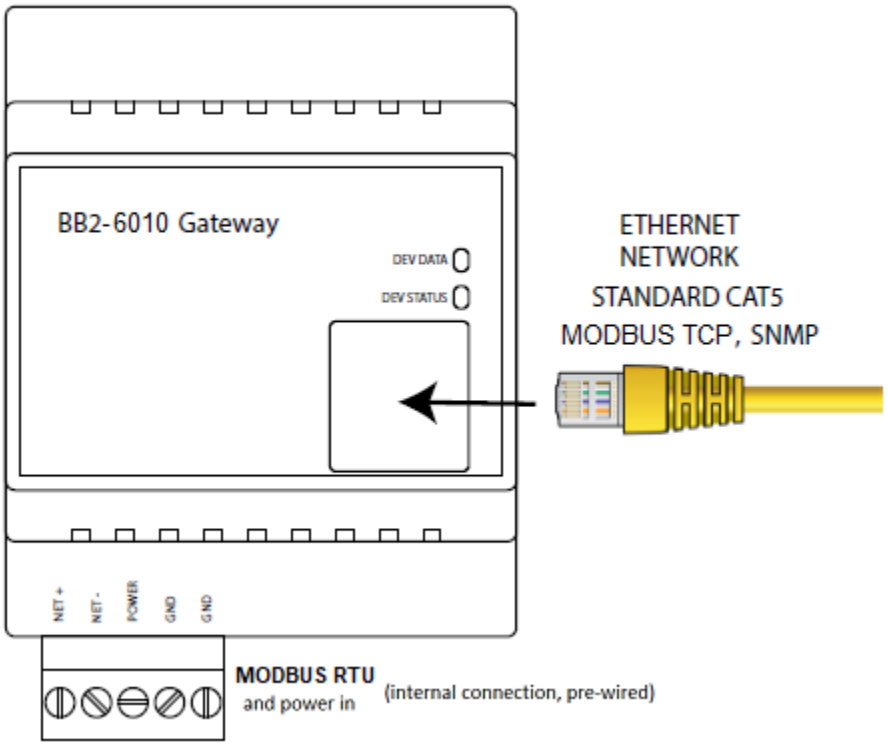


Figure 2 *– BB2-6010 Diagram*

The lower (MODBUS RTU and power in) connector is pre-wired. Please do not change the internal wiring. The upper (Ethernet) connector should be connected to the Local Area Network (LAN) to which it will be integrated via MODBUS TCP and/or SNMP. The BB2-6010 is preprogrammed to:

- Provide proxy objects to read the values of the MODBUS objects presented by the inverter (see Section 4). The proxy objects are updated once every second.
- Provide SNMP OIDs to access all MODBUS objects, and act as an SNMP Agent (server) such that they can also be read via SNMP

The BB2-6010 can be configured using its onboard web server to generate SNMP traps when programmed conditions are met (e.g. ‘inverter is running on battery power’, ‘inverter is overloaded’, ‘ambient temperature is too high’, etc.).

SECTION 2

Description of Operation

The single-phase Illuminator Supernova Emergency Lighting Central Inverter acts as a MODBUS TCP server, and SNMP Agent (server).

It supports a total of *nine* analog objects (sixteen-bit integers), and *seventeen* binary flag objects.

It can also be programmed to transmit SNMP 'traps' when a programmed condition is met (analog value goes above or below a threshold value, or binary flag gets set to 1 or cleared to 0). The traps can be sent to specified IP addresses on the LAN.

SECTION 3

Default Ethernet Settings

- **IP Address:** 10.0.0.101 (static)
- **Subnet Mask:** 255.255.255.0
- **Gateway:** 10.0.0.1
- **DHCP Client:** Turned off by default (but DHCP is supported)
- **Web Server Port:** 80 (HTTP default)

Default MODBUS TCP Settings

- **Port**: 502

Default SNMP Settings

- **SNMP Version Support**: v1, v2c (v3 is ***not*** supported)
- **Community**: public
- **Traps**: Disabled

SECTION 4

Object Summary

All registers below are accessible via either MODBUS Function Code 3 (0x03 Read Holding Registers) using the specified register address, or SNMP 'Get' / 'Get Next' using the specified SNMP OID.

Register / SNMP OID	Object Name	Units
Analog Values (analog sensors or counters read from the inverter)		
0 (0x0000) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.1*	Input Voltage	0.1 Volts AC (e.g. 1203 = 120.3V)
3 (0x0003) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.4*	Output Voltage	0.1 Volts AC
6 (0x0006) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.7*	Output Current	0.1 Amps AC (e.g. 65 = 6.5A)
9 (0x0009) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.10*	Battery Voltage	0.1 Volts DC (e.g. 483 = 48.3 V)
10 (0x000A) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.11*	Ambient Temperature	0.1 °C (e.g. 301 = 30.1°C = 86.1°F)
12 (0x000C) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.13*	Output VA	1 VA
15 (0x000F) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.16*	Days Online	Days (0-65535)
16 (0x0010) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.17*	Battery Runtime	Minutes (0-65535)
24 (0x0018) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.25*	Battery Current	0.1 Amps DC (e.g. 52 = 5.2A)
Binary Values (status flags from the inverter; value is either 0 or 1)		
100 (0x0064) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.101*	System Ready Status	0 (false) or 1 (true)
101 (0x0065) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.102*	AC Line Present Status	0 (false) or 1 (true)
102 (0x0066) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.103*	Battery Charging Status	0 (false) or 1 (true)
103 (0x0067) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.104*	On Battery Power Status	0 (false) or 1 (true)
118 (0x0076) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.119*	Inverter Overloaded	0 (false) or 1 (true)
123 (0x007B) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.124*	Input not Present	0 (false) or 1 (true)
125 (0x007D) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.126*	Battery Low	0 (false) or 1 (true)
127 (0x007F) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.128*	High Ambient Temperature	0 (false) or 1 (true)
129 (0x0081) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.130*	Inverter Over Temperature	0 (false) or 1 (true)
132 (0x0084) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.133*	Overload Shutdown	0 (false) or 1 (true)
138 (0x008A) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.139*	Input Voltage Low	0 (false) or 1 (true)
139 (0x008B) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.140*	Input Voltage High	0 (false) or 1 (true)
142 (0x008E)	Battery Charger Alarm	0 (false) or 1 (true)

1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.143		
Register / SNMP OID	**Object Name**	**Units**
143 (0x008F) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.144*	Inverter Failure	0 (false) or 1 (true)
144 (0x0090) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.145*	Near Low Battery	0 (false) or 1 (true)
145 (0x0091) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.146*	In Load Reduction	0 (false) or 1 (true)
147 (0x0093) *1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.148*	Inverter Runtime Failure	0 (false) or 1 (true)

SECTION 5
Connecting to the BB2-6010 Web Server the First Time

To be able to do things like change the IP address, change the SNMP 'community' code, or set up SNMP traps, you will first need to connect to the BB2-6010's web server.

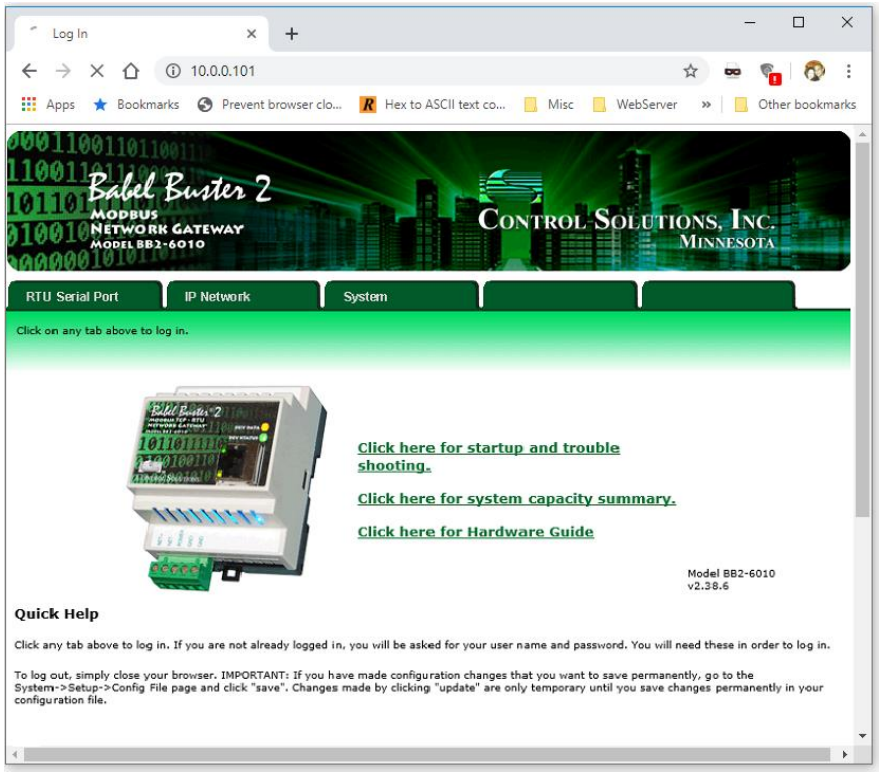
Start by directly connecting an Ethernet cable between your PC and the BB2-6010.

The default IP address of the BB2-6010 is **10.0.0.101**. If your PC is running Microsoft Windows, and is not already on the 10.0.0.0 domain, you will need to add a route on your PC. Do this by opening a command prompt with administrator privileges. First type "ipconfig" and note the IPv4 address listed for the adapter that is connected to the same LAN as the BB2-6010 (or directly to the BB2-6010). Now type the following command into the command prompt, but replace the **`x.x.x.x`** with your PC's IPv4 address.

```
route add 10.0.0.0 mask 255.255.255.0 x.x.x.x
```

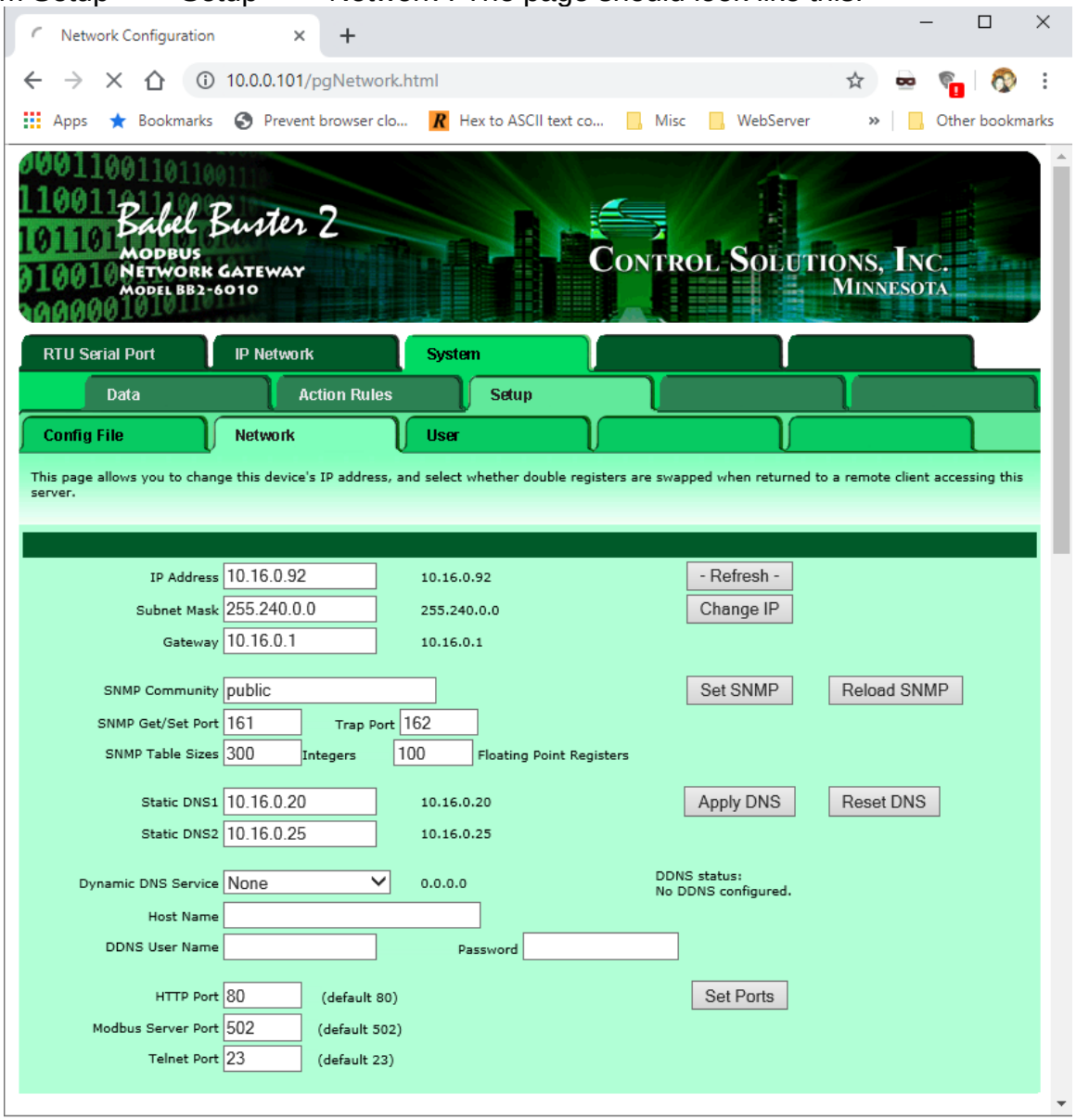
You should now be able to view the BB2-6010 homepage by entering "10.0.0.101" into the URL box of your web browser.

If you are running a non-Windows operating system, or if the above command doesn't work, please refer to your operating system's instructions on how to change your PC's IP address to a static IP of 10.0.0.100. You should now be able to view the BB2-6010 homepage by entering "10.0.0.101" into the URL box of your web browser.



Setting Up IP Address and LAN Settings

Click on the “System” tab. You will be presented with a ‘Sign in’ popup prompt. Type “root” for Username, and “buster” for Password. Now navigate to “System Setup” >> “Setup” >> “Network”. The page should look like this:



Enter the IP Address that you desire your BB2-6010 to have, and the Subnet Mask and Gateway address for the LAN that the BB2-6010 will be on. If you wish the BB2-6010 to be a DHCP client (i.e. to automatically be assigned IP address, subnet mask and gateway address from a DHCP server if one exists and is reachable on the LAN), simply enter “255.255.255.255” as the IP Address. However, DHCP is not recommended because it means the IP address of the BB2-6010 becomes dynamic and can periodically change; you will have to periodically update any software that communicates with it (over MODBUS TCP, SNMP or HTTP).

When done, click the “Change IP” button to save your changes. Wait at least 15 seconds until the settings are changed and the webpage reloads. Now cycle power to your BB2-6010 by pulling out and then re-inserting the “MODBUS RTU and Power In” connector. At this point, if you wish you may disconnect the direct ethernet connection between your PC and the BB2-6010 and put it on the LAN and connect to it through the LAN via its new IP address setting.

Note that clicking the “Change IP” button results in a permanent change of the programmed IP address, even if power to the BB2-6010 is lost. All other programming requires explicit saving (described in the “Saving Your Changes” section below) but changing IP settings is the exception.

Setting Up MODBUS TCP

Once the IP address is correctly set, the MODBUS TCP interface should immediately be working using the IP address you set, Port 502, and the objects described above in Section 4 (using MODBUS Function Code 0x03 - Read Holding Registers). If these settings are OK, you’re good to go.

If you need to change the MODBUS TCP port number, you can do so on the following page: “System Setup” >> “Setup” >> “Network”. Make the required changes, click the “Set Ports” button, and then refer to the “Saving and Activating Your Changes” subsection below to make your changes permanent ***(otherwise, they may be lost if the inverter loses power for long enough for the entire battery to deplete, or if maintenance is performed on the inverter)***.

Setting Up the SNMP Agent

Once the IP address is correctly set, the SNMP Agent (server) should immediately be working using the IP address you set, “public” as the community, and “Get” operations on the SNMP OIDs described in Section 4 above (after the first “Get”, you may use “Get Next” as well, or walk the entire MIB). If these settings are OK, you’re good to go.

The BB2-6010 supports SNMP v1 and v2c. Note that SNMP v3 is ***not*** supported.

If you need to change the community code, you can do so on the following page: “System Setup” >> “Setup” >> “Network”. Make the required changes, click the “Set SNMP” button, and then refer to the “Saving and Activating Your Changes” subsection below to make your changes permanent ***(otherwise, they may be lost if the inverter loses power for long enough for the entire battery to deplete, or if maintenance is performed on the inverter)***.

Setting Up SNMP Traps

The BB2-6010 can use SNMP’s “trap” mechanism to generate notifications (and send them to one or more trap receiving PCs/devices) when a programmed condition occurs. By default, no traps are programmed.

The first step in programming a trap is to program a ‘Threshold’ rule (a rule that when true, will send a trap). To program a ‘Threshold’ rule, first navigate to the following web page: “System” >> “Action Rules” >> “Thresholds” . Initially, there is just one threshold rule, and it is blank. As you program more rules, they will appear on the list, and each time the BB2-6010 will auto-generate a new threshold rule that is blank. In the “Rule #” column, click on the last rule in the list (that is blank). The web page will change to a page that lets you program the details of the rule. To illustrate, we will create an example rule that becomes true when the ambient temperature exceeds 30°C.

1 In the ‘register #’ box, enter the register number (from the table in Section 4) plus one. Adding one to the register number is critical. The Ambient Temperature object is in register 10, so we enter 11.

2 Type a descriptive name in the ‘event name’ box. We will enter “Ambient Temp is too high”. This step is optional but will help you remember what the rule is for. The text you enter here will also be embedded in SNMP traps generated by this rule evaluating to ‘true’.

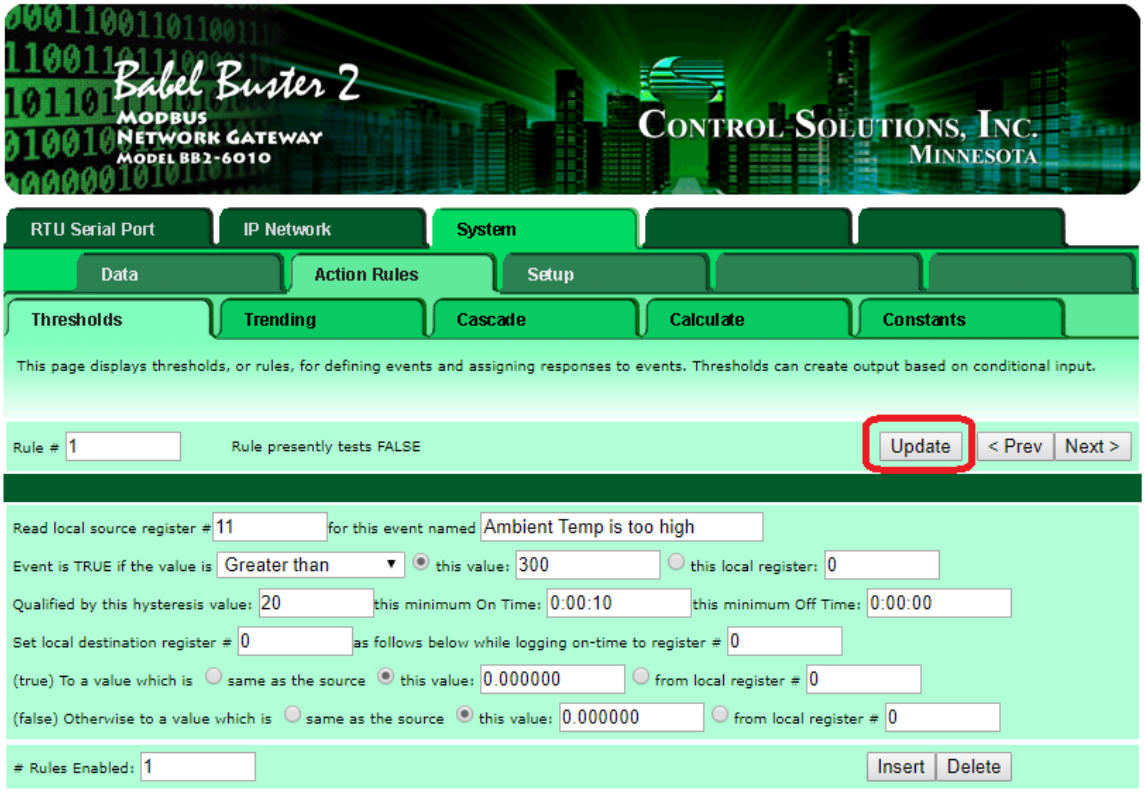
3 Set the dropdown menu to “Greater than”, click the “this value:” radio button (if it is not already selected) and enter 300 as the value (300 is 30.0°C, in units of 0.1°C as described in Section 4)

4 For analog values such as ambient temperature, consider setting a hysteresis. For our example, you might want to put in a hysteresis of 2°C (20 in units of 0.1°C) so that if the temperature is right on the 30°C mark and oscillating with small variations over and under 30°C, you don’t get hit with a flood of traps. With a hysteresis of 2°C, once the temperature exceeds 30°C and you get the first trap, you won’t get another trap until the temperature drops all the way down to 28°C, and then comes back up over 30°C again (or the Repeat Time elapses… more on this later)

5 If you only want the trap to happen if the condition is reached for a minimum period of time, set that period in the “minimum on time” box. Enter it in the form HH:MM:SS (so for a 10 second minimum on time, you would type “00:00:10”)

6 “minimum off time” is another form of hysteresis, except using time instead of value. In our example, we could make the ‘minimum off time’ be 2 minutes (00:02:00) so that the temperature has to be below 30°C consistently for 2 whole minutes before a trap can be generated once the temperature climbs above 30°C again. But lets just do it by value since we did that in step 4.

7 We can ignore the rest of the rule programming. Let’s click the “Update” button to temporarily save the rule.



Once you have programmed all your desired rules, the next step is to make them generate traps. The BB2-6010 lets you send traps to up to three different groups of “Trap Receivers” (in case you want some traps to go to one destination, and other traps to go to another). For now, lets assume you only want to have one group of trap receivers. Go to the “IP Network” >> “SNMP Setup” >> “Devices” web page. For each trap receiving device:

- Enter the device’s IP address **or** hostname (IP address is preferable for a static IP device. For a DHCP client device whose IP address changes over time, enter its hostname in the “Domain Name” box – if using hostnames, please ensure that DNS server has been correctly set in the “Setting Up IP Address and LAN Settings” section above)
- Optionally enter a textual name for the device (such as “Maintenance PC” or “Net Mgmt Server”, etc.)
- Check the “Group 1” checkbox
- Click the “Update” button

Next, go to the “IP Network” >> “SNMP Setup” >> “Trap Enable” webpage and click the “Trap on True” checkbox and the “Enable Group 1” checkbox for all the rules you programmed above. Then click the “Update” button. Note:

- The Repeat Time field determines how long (in ‘seconds’) the BB2-6010 will wait before resending a trap that is still asserted. For example, if you trap on loss of utility power, and you set the Repeat Time to 30 seconds, and utility power is lost for 10 minutes, you will get one trap every 30 seconds for 10 minutes (for a total of 20 traps). If you enter 0 here, the BB2-6010 uses its default repeat time of 60 seconds.

- The Repeat Count sets the number of traps to send in immediate succession at each repeat time. If you set this to 0 or 1, the BB2-6010 uses the default repeat count of 1. Using a higher number is only necessary if the network or your 'Trap Receiver' client is unreliable, and you want to maximize the chances of traps getting through. Going back to the above example, if you trap on loss of utility power, and you set the Repeat Time to 30 seconds, and the Repeat Count to 5, and utility power is lost for 10 minutes, you will get five back-to-back traps every 30 seconds for the 10 minutes for a total of 100 traps.

Finally, refer to the "Saving and Activating Your Changes" subsection below to make your programming changes permanent ***(otherwise, they may be lost if the inverter loses power for long enough for the entire battery to deplete, or if maintenance is performed on the inverter)***.

Saving and Activating Your Changes

Any changes you make on the BB2-6010 web pages - other than changing IP address - are temporary. They will not take effect until you activate them, plus they will be lost on a power cycle of the BB2-6010, until you permanently save them.

To permanently save your programming, go to "System" >> "Setup" >> "Config File" , select "**InverterModbus.xml**" from the dropdown list (if it is not already selected), and click the "Save" button. The BB2-6010 will take 10 seconds or so to save the changes. The changes are now permanent and will survive power cycles.

Finally, click the "Load" button to get the BB2-6010 to reinitialize itself and activate your programming changes.

Warning: It is imperative that you click "Save" before you click "Load". If you accidentally click "Load" first, the BB2-6010 will reload its programming from before you made any changes, and all your changes will be lost!

If you would like to back up your BB2-6010 programming on your PC for safe-keeping or to share with Tech Support, click the "View" button. Your browser will load and display an xml file that contains the BB2-6010's programming in xml format. To download and save the xml file, press Ctrl-S (⌘-*s* on an Apple) or right click on white space on the page and click "Save As".

Please contact Myers Service at (610) 868-5400 if you have questions or concerns.

RS-232 Communications

Illuminator Supernova

Users Manual

TABLE OF CONTENTS

INTRODUCTION

This manual is intended to explain the operation of the serial communication protocol for the Illuminator Supernova Emergency Lighting Central Inverter. Serial Communication can be established by means of a computer using terminal emulation software (such as Tera Term, PuTTy, xterm, etc.), or by any embedded device capable of RS-232 serial communication. We shall call this device the Client.

The protocol used is proprietary, and specific to Myers EPS' Emergency Lighting Central Inverters.

CONNECTION

The Central Inverter has a 9-pin Sub-D (DB9) female connector typically located on the back (inside) of the front display panel located on the door of the inverter. See below for the exact location of the connector.

The connection between the Client and the Inverter is a straight-through connection.
Do ***not*** use a Null Modem Cable that flips pins 2 and 3.
Pin 2 and Pin 3 are the Data send and receive lines; Pin 5 is the Ground (common) line.
Optical isolation on the interface card provides galvanic isolation between the client device's ground signal and the inverter's ground.

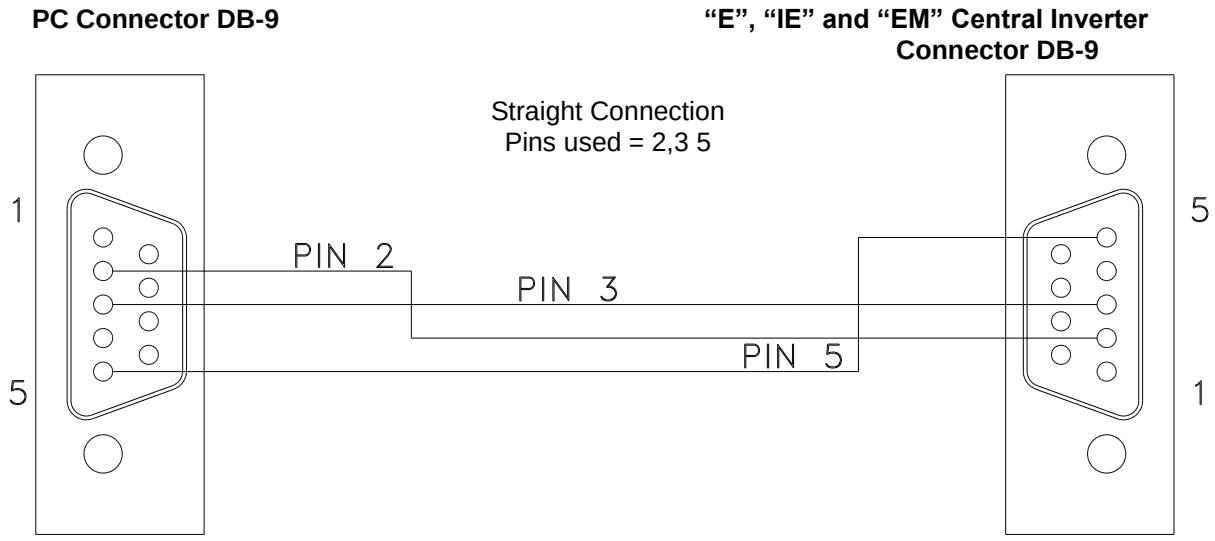


Illustration 1 – Interconnect Schematic for RS-232 Connection

TERMINAL SETTINGS

Baud Rate:	19,200
Data Bits:	8
Parity:	None
Stop Bits:	1
Flow Control:	None
Character Set:	ANSI

The Illuminator Supernova RS-232 protocol uses carriage returns (‘\r’, ANSI code 0x0D), but does ***not*** use line feeds (‘\n’, ANSI code 0x0A). If you are manually typing commands, some terminal emulator software will automatically feed the line back when you press enter (and a carriage return is sent) and when the inverter responds (with a response string followed by a carriage return). However, some terminal emulator software will not do this, and you will end up with something like the following which is difficult to read:

```
CMD> setpoint
             lvac:   108.0 off
                           hvac:    132.0 off
                                              nlbatt:  111.0 off
                                                                 lb
att:     105.0 off
                  htemp:    45.0 off
                                      lrc:         0.0 off
```

If this is the case, look for the setting in your terminal emulator software that automatically appends line feeds after (outgoing or incoming) carriage returns.

When the inverter is ***not*** in ‘shell mode’, it will ***not*** echo back characters you type (even though it is indeed receiving them). To see what you are typing when the inverter is not in ‘shell mode’, turn on the ‘local echo’ setting on your terminal emulator.

When the inverter ***is*** in ‘shell mode’, it ***will*** echo back characters you type. You will want to turn off the ‘local echo’ setting on your terminal emulator, or you will see doubles of every character as you type.

*** Always use lower case letters for communication unless noted otherwise.***

COMMANDS

Shell Command

To be able to use the commands below, the inverter must be in ‘shell mode’. To enter ‘shell mode’, simply type “shell” (without quotation marks) and press enter. If it doesn’t work, you might have mistyped it, or the inverter may have received some characters before you even started. If this is the case, just type “shell” again and press enter.

Remember that lower case letters must be used. Upper Case characters are ignored!

When in ‘shell mode’, the inverter will return a command prompt (CMD>) each time you press enter. Once this command prompt (CMD>) appears, the inverter is ready to receive another command.

Help screen

You may type “help” at the command prompt for a listing of various commands available.

```
CMD>help

ver          Display current firmware version.
set point    Display or modify set points.
meter        Display meter values.
status       Display present status.
alarms       Display alarms.
dump         Dump logs (alarms, tests, events).
dt           Display and change date-time setting.
help         List shell commands with brief descriptions.
exit         Exit from shell.
```

Version

The Revision level of the software is available by the “ver” command.

```
CMD>ver


IF: 2.08
FP: 1.02



CMD>
```

Alarm Setpoint

When the set point command is entered the following data is displayed:

```
CMD>setpoint

lvac  : 108.0 off
hvac  : 132.0 off
nlbatt: 111.0 off
lbatt : 105.0 off
htemp :  45.0  on
lrc   :   0.0 off
```

lvac is the Low Voltage AC alarm,
hvac is the High Voltage AC alarm,
nlbatt is the Near Low Battery Voltage alarm,
lbatt is the Low Battery Voltage Alarm,
htemp is the High temperature alarm set point, and
lrc is the Load Reduction Fault set point.

To change a setpoint, type ‘**setpoint**’, then press the ‘tab’ key, then the name of the setpoint you wish to change, then press the ‘tab’ key again, then type the new value you wish to set, then press the ‘tab’ key once more, and type ‘**on**’ or ‘**off**’ (to turn the alarm on or off respectively) and finally press ‘enter’.

For example, to turn on the low voltage alarm when the input voltage goes below 105 VAC, type "**lvac**" and then press tab and type"**105**" and then tab and then type "**on**" and press enter.

```
CMD>setpoint      lvac  105   on
```

The other set points can be changed in the same manner.

Meter Functions

To read Voltages and currents, the meter command may be used.
To use, type, "meter" and press enter. The following display will occur.

```
CMD>meter

vin      : 118.3
vout     : 118.3
iout     : 12.3
vbatt    : 54.1
ibatt    : 0.1
tbatt    : -61.1
tint     : 29.8
imin     : 0
days     : 0
vaout    : 1453.8
iwatts   : 6.6
```

vin is the (utility side) input voltage to the inverter, in Volts.
vout is the output (load side) voltage of the inverter, in Volts.
iout is the output current of the inverter (current consumed by the load), in Amps.
vbatt is the voltage of the battery, in Volts.
ibatt is the current through the battery, in Amps.
tbatt is not currently supported in hardware. Ignore this value; for now it is meaningless.
tint is the ambient temperature inside the inverter cabinet, in degrees Celsius. To convert to degrees Fahrenheit, subtract 32, then multiply by 5, then divide by 9. $°F = \frac{5(°C-32)}{9}$
imin is the cumulative 'number of minutes' (over its lifetime) that the inverter has spent running on battery power.
days is the number of days that the inverter system has been running
vaout is the output power of the inverter, in Vars (VA – voltage ampere reactive).
iwatts is the power being provided by the battery, in Watts.

Status

The different statuses of the machine are accessible by typing "status" and enter.
The following message occurs when status command is sent:

CMD>status

```
Battery Power   : 0
Battery Charging: 1
Line Present    : 1
System Ready    : 1
```

In this example, the inverter is running on utility power, so the **Battery Power** status is 0 (false) and **Line Present** is 1 (true). **Battery Charging** is 1 (true) because the battery will always be charging, even when its full. When the battery is full, the inverter uses 'float-charging' to keep the battery full – this only consumes a tiny amount of power (in the 'meter' example above, it is shown consuming 6.6W as it float-charges). Finally, **System Ready** is 1 (true). This will always be the case unless the inverter is rebooting, on battery power, or charging.

Alarms

The alarm status of the machine is available through the “alarms” command.
When the alarm command is typed, the following information is available.

CMD>alarms

```
Inverter          : 0
Charger           : 0
Output            : 0
Overload          : 0
Overload Shutdown: 0
High Ambient      : 0
High VAC          : 0
Low VAC           : 0
Low Battery       : 0
Near Low Battery  : 0
Utility           : 0
Load Reduction    : 0
Runtime           : 0
Circuit Breaker   : 0
Overtemp          : 0
```

The format is binary. A “1” indicates that the alarm is present (asserted); a “0” indicates that no alarm is present (unasserted).

The **Inverter** alarm indicates a problem in the inverter’s internal circuitry.
The **Charger** alarm indicates a problem in the charging circuitry that charges the battery.
The **Output** alarm indicates an issue with the output, such as a short circuit.
The **Overload** alarm indicates too much load (above the rating of the inverter) on the output.
The **Overload Shutdown** alarm indicates that the load is so high (above the rating of the inverter) that the inverter has shutdown to protect itself.
The **High Ambient** alarm indicates excessively high temperature inside the inverter cabinet.
The **High VAC** alarm indicates an excessively high input voltage (utility) to the inverter.
The **Low VAC** alarm indicates an excessively low input voltage (utility) to the inverter.
The **Low Battery** alarm indicates that the battery charge has almost been depleted.
The **Near Low Battery** alarm indicates that the inverter is approaching low battery.
The **Utility** alarm is 0 if the input voltage to the inverter is good, or 1 if it is not (indicating that the inverter is currently running the output from the battery).
The **Load Reduction** alarm indicates a reduction in the load below a preprogrammed threshold (which may happen if a load device goes offline, such as a lamp out). This feature is turned off by default.
The **Runtime** alarm indicates a self-test has failed (perhaps due to the age of the battery).
The **Circuit Breaker** alarm indicates that a circuit breaker has tripped. This feature only works when the right circuit breaker option is purchased.
The **Overtemp** alarm indicates that the internal circuitry of the inverter has reached an excessive temperature.

Alarms, Events, and Tests Dump

The dump command displays all of the memory content for Events, Tests or Alarms.

The dump command must be followed by a tab and then either “alarms”, “tests” or “events” as the second field. After pressing the ‘enter’ key, the inverter will display a “Press Enter when ready…” prompt. Press the ‘enter’ key once again, and the inverter will dump out the specified log. Note that this log may be several kilobytes in size and will be streamed out in one go.

Here is an abbreviated example of an alarm log dump:

```
CMD>dump        alarms



Final settings will be displayed next.
If you wish to save to a file, enable text capture now.
Do not forget to stop capture after data is transferred.
Press Enter when ready...


***********< ALARM LOGS >***********

1/75       UTILITY
09/20/19 17:49
END : 09/20/19 17:49

2/75       UTILITY
02/11/19 12:52
END : 02/11/19 12:52

3/75       UTILITY
11/29/18 13:36
END : 11/29/18 13:36

4/75       UTILITY
09/11/18 12:41
END : 09/11/18 12:54

 :    :     :     :

74/75    LOAD REDUCTION
07/25/16 13:58
END : 07/25/16 13:58

75/75    LOAD REDUCTION
07/25/16 13:58
END : 07/25/16 13:58



CMD>
```

The alarm log has up to 75 entries, and in this example, it is full. The alarms shown above include UTILITY alarms and LOAD REDUCTION alarms (see the write-up of the ‘alarms’ command above for details on what these mean). The first date and time is the timestamp of the start of the alarm event (when the alarm condition asserted), and the second date and time is the timestamp of the end of the alarm event (when the alarm condition unasserted).

Here is an abbreviated example of a test log dump:

```
CMD>dump        tests



Final settings will be displayed next.
If you wish to save to a file, enable text capture now.
```

```
Do not forget to stop capture after data is transferred.
Press Enter when ready...


***********< TEST LOGS >***********

1/75       MONTHLY
09/20/19 17:43
DURATION : 5 MIN
FAULTS   : 0
VOUT     : 125.3
IOUT     : 7.5
TEMP     : 33.5 deg C

:    :     :     :

75/75       MONTHLY
03/15/14 08:30
DURATION : 5 MIN
FAULTS   : 0
VOUT     : 126.2
IOUT     : 6.4
TEMP     : 26.3 deg C



CMD>
```

These log each of the times that the inverter ran self-test (which tests the battery and inverter operation – the primary goal is to make sure that the battery does not yet need to be replaced). Again, there is space for up to 75 logs. The first line of a log entry will indicate whether the self-test was an automated monthly self-test (**MONTHLY**), or an automated yearly self-test (**YEARLY**). The rest of the entry will tell you the timestamp of the self-test, the duration of the test (in minutes), whether or not faults were detected, the output voltage (in Volts) and current (in Amps) of the inverter during the test, and the ambient internal temperature inside the cabinet (in degrees Celsius).

Finally, the event log (which also has up to 75 entries) will store the results of manually evoked self-test events (**EVENT**). The entries will have the exact same format as the test log, but instead of **MONTHLY** or **YEARLY**, it will say **EVENT**.

Date and Time

The date and time can be viewed by typing the “dt” command.
When dt is sent, the interface sends back the date and time information. Each parameter of the date and time are assigned a number. The dt command produces the following message:

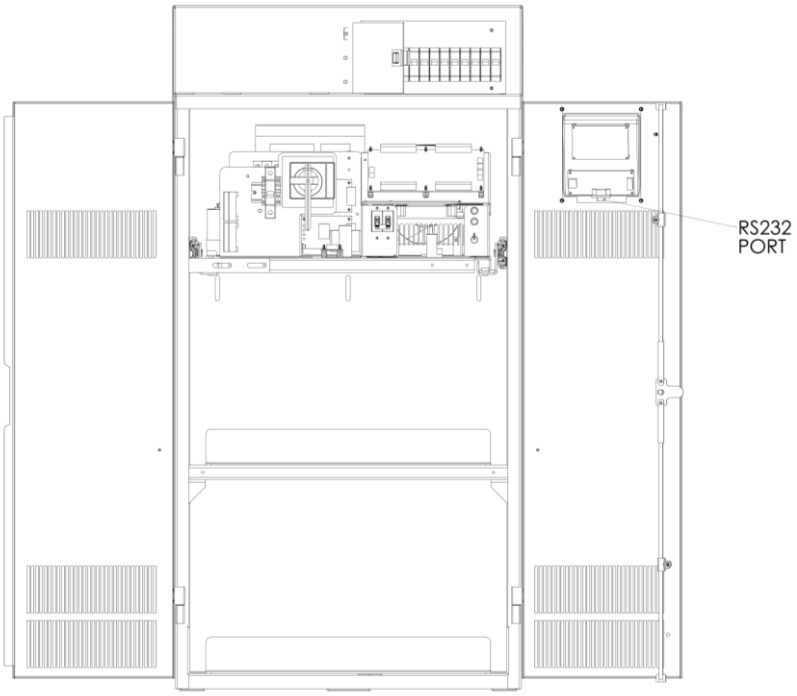
```
CMD>dt


(1) day of week : 1..7
(2) month : 1..12
(3) day of month : 1..31
(4) year : 0..99
(5) hours : 0..23
(6) minutes : 0..59

THU OCT 10, 2019
14:59:24



CMD>
```

The number for the **`day of week`** parameter for example is 1 and its allowed values are 1 through 7, where 1=Sunday, 2=Monday, … , 7=Saturday.

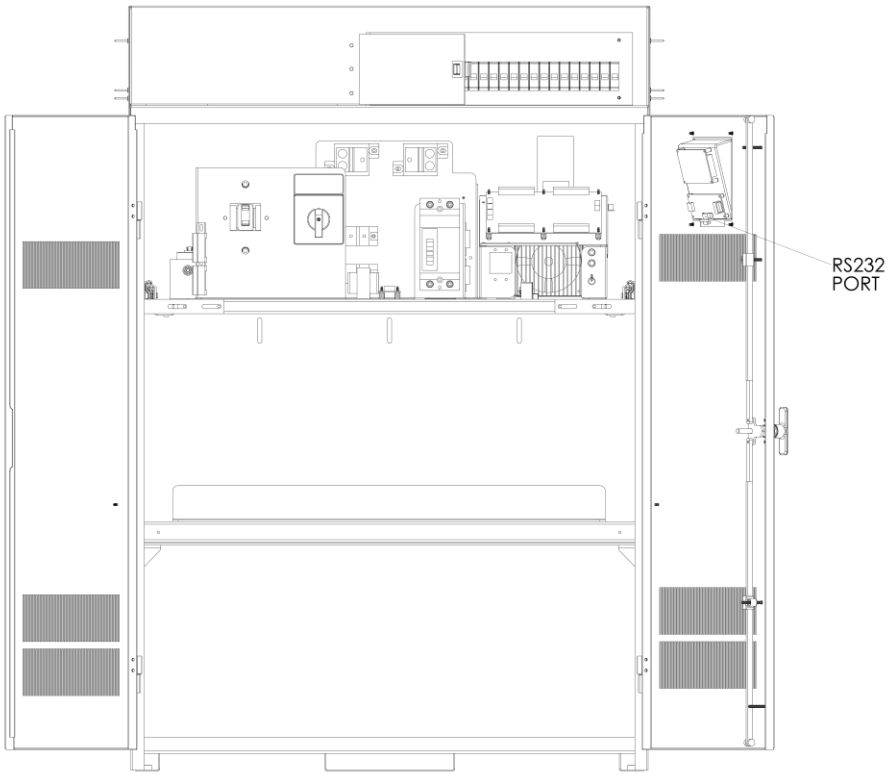
To change a parameter, type the **`dt`** command, then press the ‘tab’ key, then type the parameter number, press ‘tab’ again, then type the new value you wish to set the parameter to, and finally press ‘enter’.

Note: The inverter does not support Daylight Savings Time. If you set the inverter date and time during daylight savings, note that logged timestamps during non-daylight-saving times (i.e. winter) will be one hour ahead of the actual time (because the actual time went back by an hour). Or, if you set the inverter date and time during non-daylight-savings (i.e. winter), logged timestamps during daylight saving times will be one hour behind the actual time (because the actual time went forward by an hour). Alternatively, you can change the inverter’s date and time during the switches into and out of daylight savings.

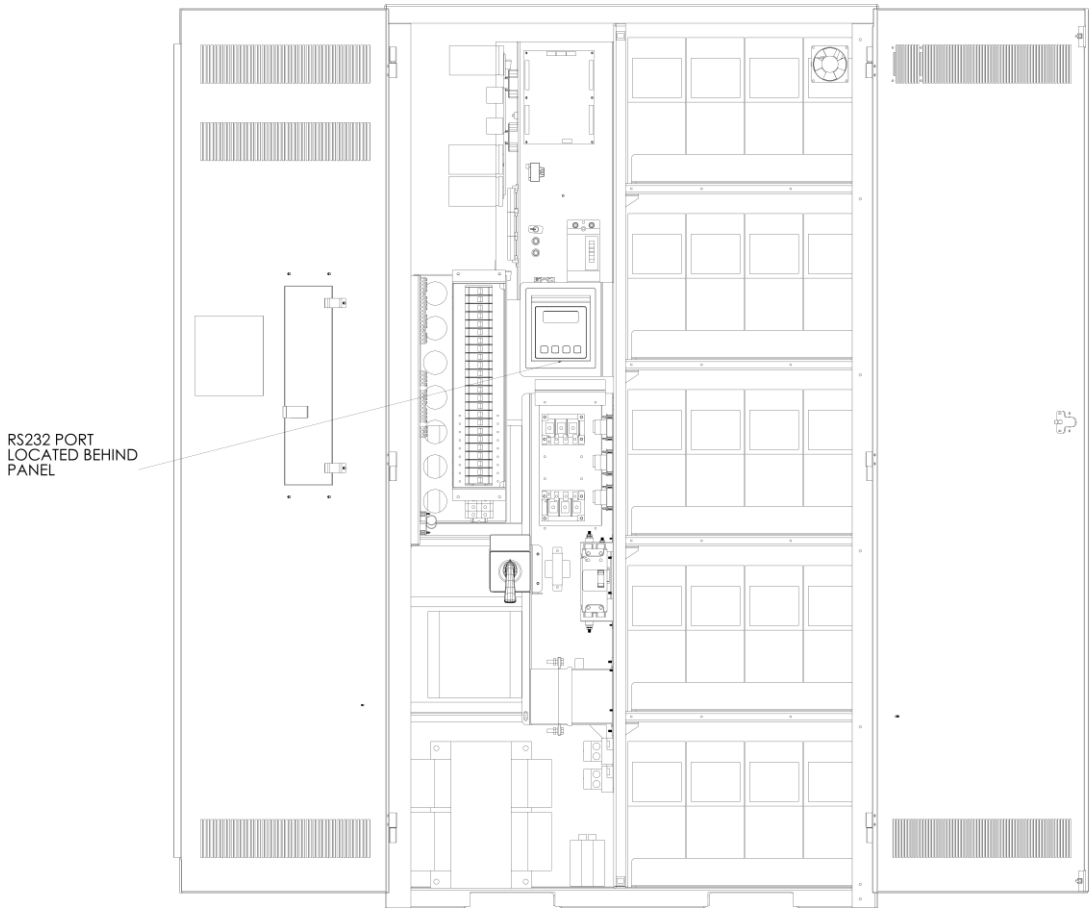
LOCATION OF THE RS232 PORT FOR “I” 1.75-5.0K



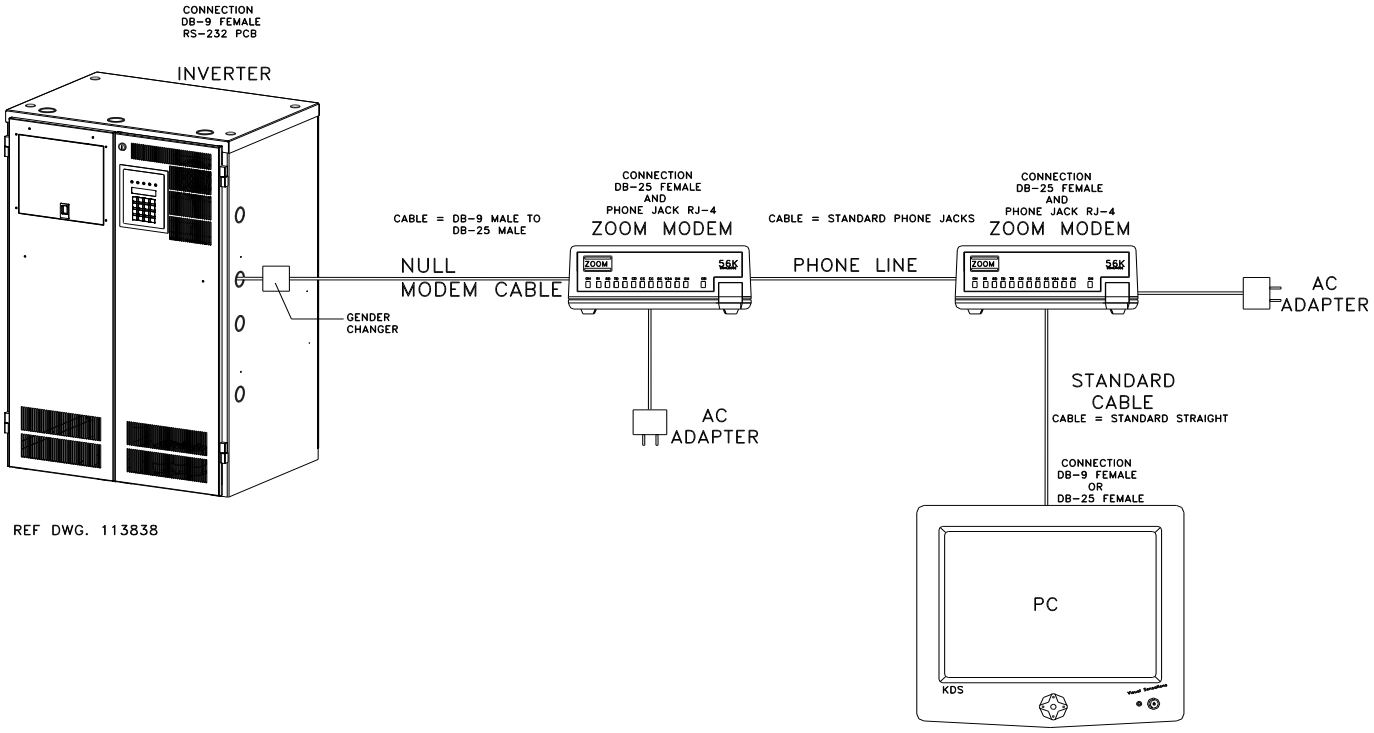
LOCATION OF THE RS232 PORT FOR “I” 6.25 –7.5K



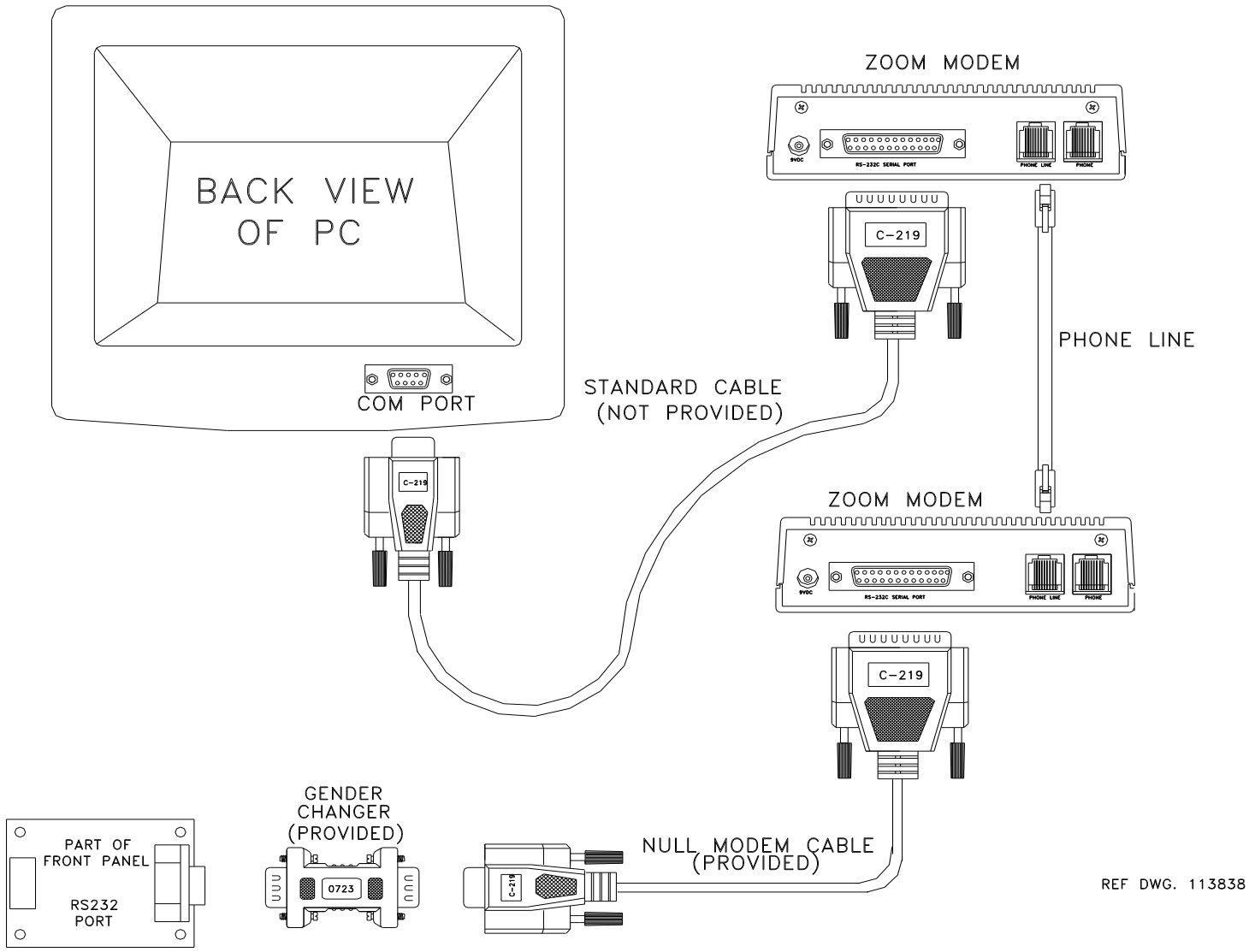
LOCATION OF THE RS232 PORT FOR “I” 10.0 – 16.7K



ZOOM MODEM CONNECTION BLOCK DIAGRAM



DETAILED WIRING DIAGRAM



Configuring the ZOOM Modem (optional)

Connect the 9VDC Power Adapter

Connect the PC serial port to the modem's serial port

On the PC, bring up a terminal communications program such as HyperTerminal.

Configure your terminal emulator software to the following:

19,200 BPS
8 Data Bits
No Parity
No Stop Bits
No Flow Control

Make sure there is communication by typing AT<enter> until the message "OK" appears.

Type the following AT commands:

ATM1	**<enter>**	(speaker on until connected)
AT&D0	**<enter>**	(ignore DTR)
AT&K0	**<enter>**	(no flow control)
ATS0=1	**<enter>**	(auto-answer after one ring)
AT&W0		(store to non-volatile memory)

Dialing the ZOOM Modem

Type AT<enter> until the message "OK" appears

Type for example:

ATD9, 16109545224 <enter>
ATD is the command
9,16109545224 is the phone number –9, for outside line.

Wait for the message "connected"

To hang up:

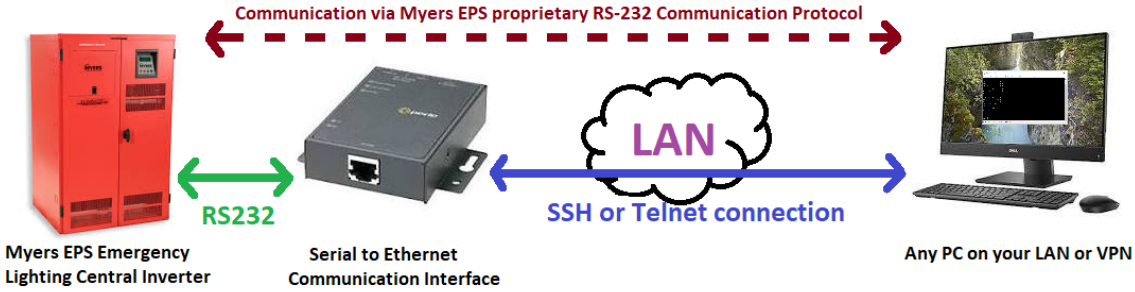
Type three plus signs (+++) and wait for the message "OK"
Type **ATH0** <enter> to hang up or,
Type **ATO0** <enter> to enter online mode again

Serial to Ethernet Adapter

Quick Start Manual

Myers Emergency Power Systems
44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerseps.com

Myers Emergency Power Systems – Emergency Lighting Central Inverter Serial to Ethernet Communication Interface – QuickStart Guide



The Serial to Ethernet Communication Interface primarily allows you to monitor and control your Myers EPS Emergency Lighting Central Inverter over an SSH connection (on port 2222) using the Myers EPS RS-232 Communication Protocol. The SSH port number can be configured, or if you choose, Telnet may be selected instead of SSH.

The Serial to Ethernet Communication Interface is based on the IOLAN SDG1 product by Perle, which has many features including the ability to install a Virtual Com Port (VCP) driver on a Windows PC, create a virtual COM port, and make a 'serial tunnel' through your LAN from that virtual COM port to your inverter to exactly mimic being directly connected from your PC to the inverter with a serial (RS232) cable.

This QuickStart Guide only describes a subset of the features in the IOLAN SDG1:

1. Basic network configuration
2. Communicating with your inverter via an SSH client
3. Changing the port number
4. Changing the protocol from SSH to Telnet
5. Factory Reset

For more information on instead using the Virtual Com Port feature or other features, please reference the IOLAN Secure User's Guide, Perle Document Part Number 5500431-10, currently hosted at the following URL:
https://www.perle.com/support_services/documentation_pdfs/iolan_scg-sdg-stg_ug.pdf

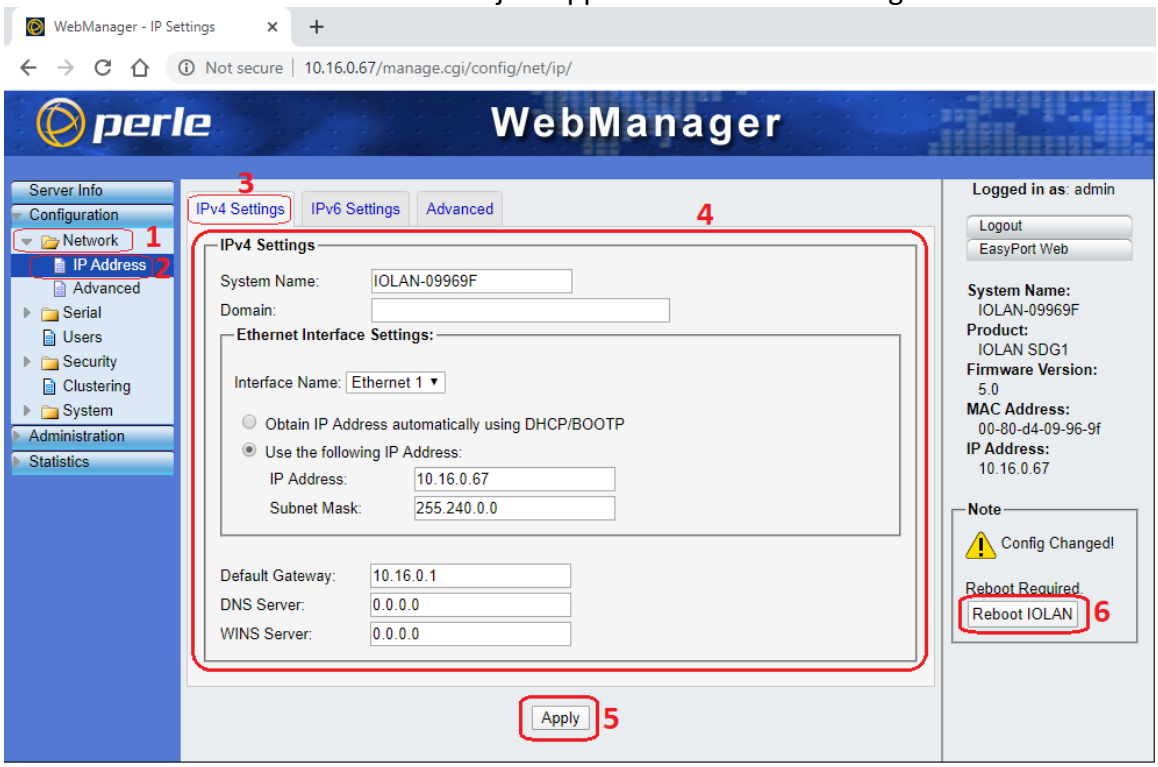
1 - Basic Network Configuration for your LAN

The default static IP address of the IOLAN SDG1 is **10.16.0.67** (Subnet Mask **255.240.0.0**). To set it to the correct network settings for your LAN:

1. Connect a direct Ethernet cable connection between a PC and the IOLAN SDG1. It doesn't matter if the Ethernet cable is a straight-through or crossover cable.
2. Set the wired LAN interface of the connected PC to a static IP address in the 10.16.0.XXX range (where XXX is any number from 1 to 254, *except 67*). Set the subnet mask to 255.240.0.0. It doesn't matter what you set the Default Gateway or DNS Server settings to. Note that you should save your previous settings for the PC so that you can remember how to restore them when you're done. Note also that the instructions to change the IP address, subnet, etc. will vary depending on which version of which Operating System is on your PC. If you are not aware of how to do so, please Google how to do so for your Operating System and version. Note also that if your PC has multiple network interfaces

(for example, a Wired LAN Interface, and a Wireless (WiFi) LAN Interface), be sure to only change these settings on the correct Wired LAN Interface.

3. Open a web browser window, and enter “10.16.0.67” in the “Address” bar.
4. The login page of the IOLAN SDG1 will load. Enter “**admin**” as the Username, and “**superuser**” as the Password.
5. On the navigation frame (left column), click the word “Network” (with an icon of a yellow folder to the left of it). This will expand the “Network” menu.
6. Click the word “IP Address” in the expanded “Network” menu.
7. Click on the “IPv4 Settings” tab if it is not already selected.
8. Set the IP address, Subnet Mask, and Default Gateway you wish to assign the IOLAN SDG1 to work on your LAN. Note: Entering a static IP address is highly recommended, even if your LAN includes a DHCP (dynamic IP) server, because with DHCP your IOLAN SDG1 might periodically change IP address.
9. Click the Apply button
10. Click the “Reboot IOLAN” button that just appeared in the bottom right



11. Close your web browser window
12. Disconnect the Ethernet cable between your PC and the IOLAN SDG1
13. Restore the previous IP settings for the wired LAN interface on your PC
14. Connect the IOLAN SDG1 ethernet port to your LAN
15. We recommend you stick a label on the IOLAN SDG1 – or on the outside of your inverter cabinet – listing the IP address and subnet mask you set the device up with. This may prove very useful to you or someone else in future.

2 - Communicating with Your Inverter Using an SSH Client

Your Serial to Ethernet Communication Interface is now ready for SSH communication with your Myers EPS Emergency Lighting Central Inverter, using the IP address you set in Section 1 above, and SSH on port **2222**. If you would like to change

the port number, or use Telnet instead of SSH, see sections 3 and 4 below (note that SSH is highly recommended over Telnet, as it is encrypted while all Telnet communications – including passwords – are cleartext).

Simply open your SSH Client software (for example, PuTTY is a completely free and very lightweight SSH client, Windows 10 and newer includes a bundled OpenSSH Client feature that can be enabled, etc.) and connect to the SSH server on the IOLAN SDG1. The first time you do this from a given PC, the SSH Client will ask you if you wish to accept the security key, and you must answer 'yes'. You will then be presented with a login. Use "**myerseps**" as the username, and "**inverter**" as the password.

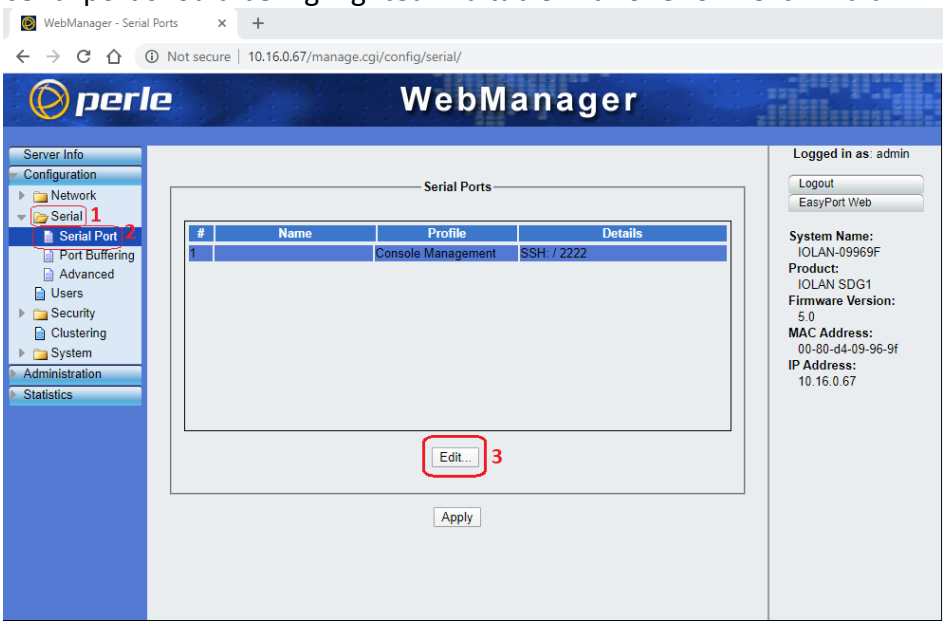
You should now be connected to your Myers EPS Emergency Lighting Central Inverter, and ready to communicate with it using the Myers EPS RS-232 Communication Protocol, as described in the RS-232 Protocol Manual. To find the right RS-232 Protocol Manual in PDF format:

- For Series-E or Series-IE inverters, Google "**Myers EPS 114063 pdf**"
- For Series-CI, Series-CIII, Series-CR, Series-DR or Series-SR inverters, Google "**Myers EPS 113786 pdf**"

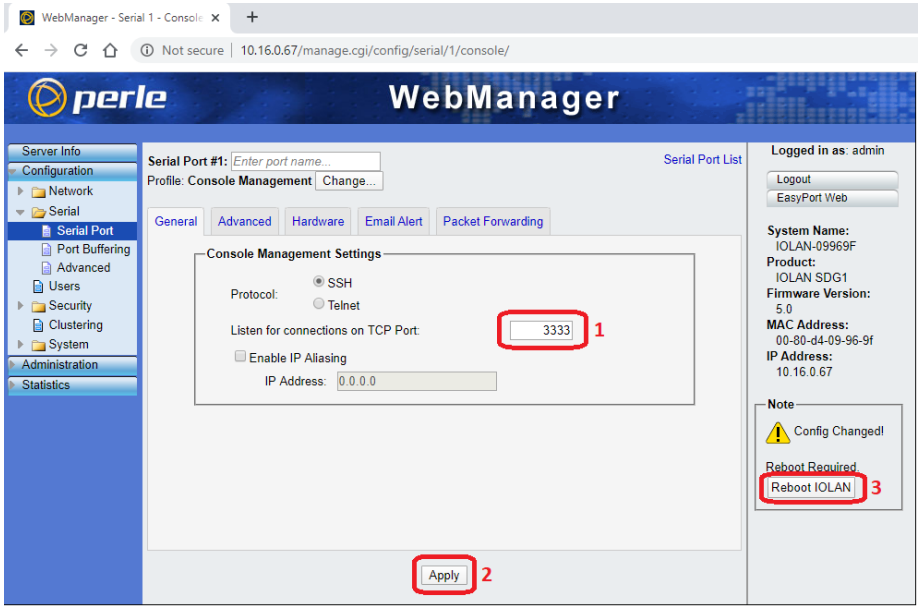
3 - Changing the Port Number

Depending on your organization's IT policies, sometimes certain port numbers may be firewalled (blocked) on your LAN, and so you might be asked by your IT/network staff to change the port number used by this interface to a port number that is not firewalled.

1. Open a web browser window, type the IP address (that you set to your IOLAN SDG1 in Section 1 above) in the "Address" bar, and press enter.
2. The login page of the IOLAN SDG1 will load. Enter "**admin**" as the Username, and "**superuser**" as the Password.
3. On the navigation frame (left column), click the word "Serial" (with an icon of a yellow folder to the left of it). This will expand the "Serial" menu.
4. Click the word "Serial Port" in the expanded "Serial" menu.
5. One serial port should be highlighted in a table with one row. Click "Edit…"



6. Change the port number to your desired value in the box labeled “Listed for connections on TCP Port”
7. Click the “Apply” button
8. Click the “Reboot IOLAN” button that just appeared in the bottom right. After the IOLAN SDG1 reboots (give is 60 seconds), it will accept SSH connections on the new port number you specified.



4 - Changing the Protocol from SSH to Telnet

Depending on your organization’s IT policies or available client software on your PCs, you may desire to use Telnet protocol instead of SSH. Note that SSH is simply an encrypted and more secure version of Telnet, therefore, SSH is highly recommended over Telnet. But if you must use Telnet, simply follow the same exact steps in the “Changing the Port Number” section above (section 3), except in step 6, instead of changing the port number, change the selected protocol from “SSH” to “Telnet”.

5 - Factory Reset

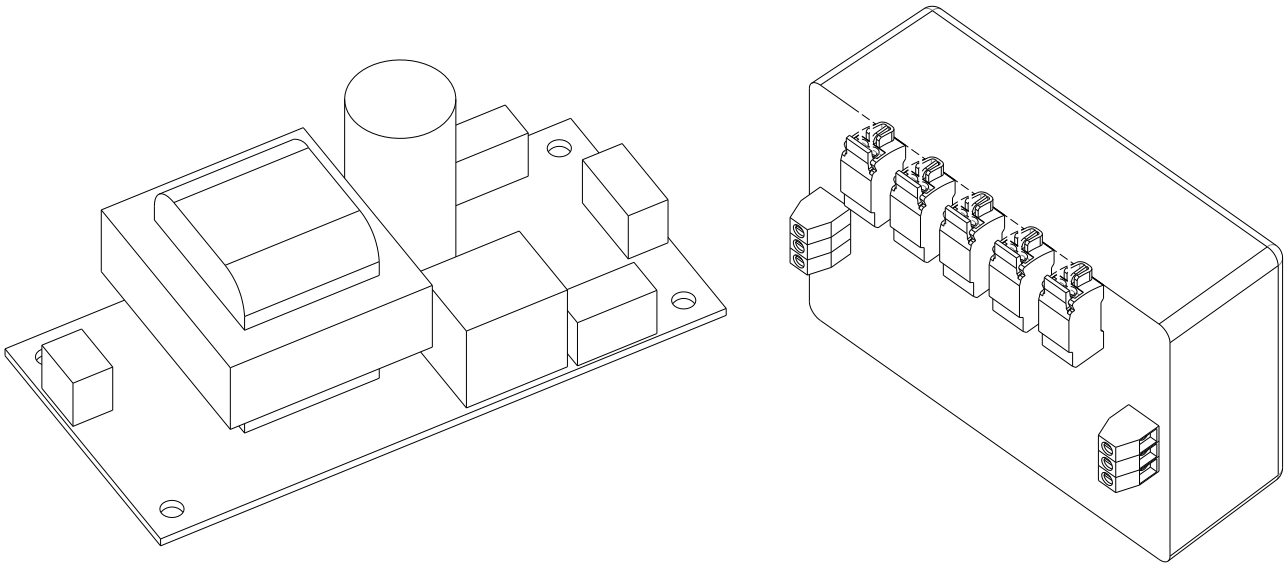
If the configuration or operation of your IOLAN SDG1 were to somehow get corrupted beyond recovery, or were you to forget or lose the IP address of your IOLAN SDG, it can be simply recovered using the Reset pinhole button next to the Ethernet jack on the device. You will need a small paper clip that is straightened out, or other narrow and long implement able to fit through the small hole. When the Reset button is pushed (through the small hole), you will feel the mechanical feedback sensation of the button.

- Tap the Reset button to perform a simple reboot of the device, or:
- Hold the Reset button down for over 3 seconds (but less than 10 seconds) to perform a Factory Reset. Note that this will not work if the IOLAN SDG1 is in the process of rebooting; make sure it is fully booted before doing this.

BATTERY THERMAL RUNAWAY SYSTEM OPTION MANUAL

FOR

EMERGENCY LIGHTING CENTRAL INVERTER



Myers Emergency Power Systems
44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerseps.com

Table of Contents

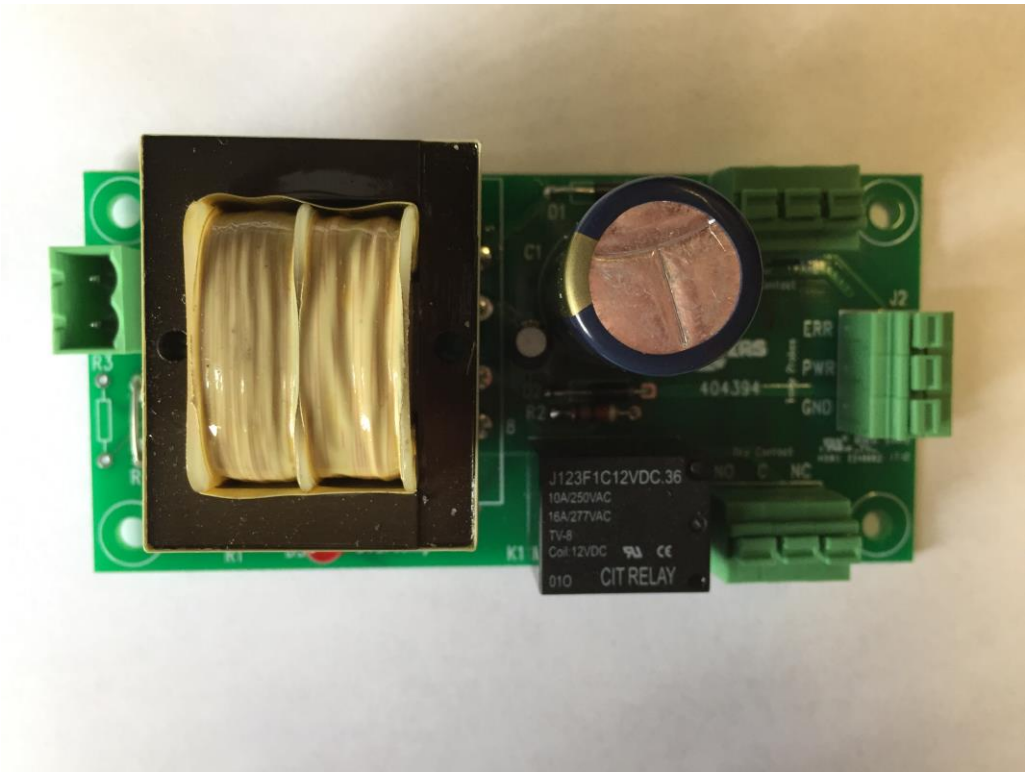
SECTION 1

System Description

The Thermal Runaway Detection Option consists of two components. The first PCB component is the Power Supply Relay PCB that performs a summary dry contact closure on an alarm from any of the temperature sensor boards. This PCB is shown in Picture 1. The second PCB component is a Temperature Sensor PCB that measures the temperature from each battery, runs an algorithm, and sets an alarm if there is a troubling condition. The temperature sensor PCB is shown in Picture 2.

Power Supply/Summary Relay PCB connections

The Power Supply and Summary Alarm PCB can be identified by the assembly number PCB404394XXX. The main power is supplied to the connector on the left. If jumpers R4 and R5 are installed the input voltage required is 115vac. If jumper R3 is installed then the input voltage is set up to accept a 230vac input. Connector J2, in the center on the right side of the PCB is used to supply the power to the Temperature Sensor PCB as well as collects the alarm trigger from the Temperature Sensor PCB. The connectors on the right at the top and bottom as shown provides the summary dry contacts for the alarm signal.



Picture 1 – Power Supply/Summary Relay PCB

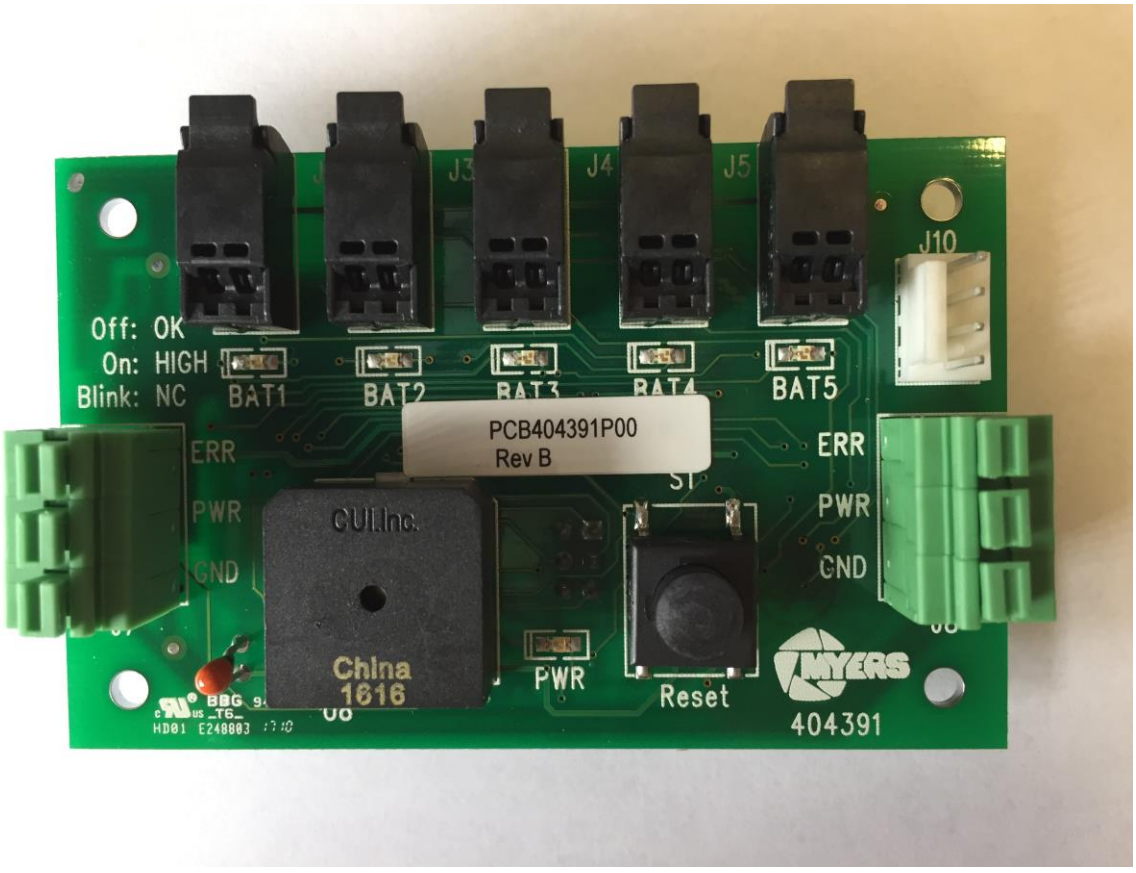
Temperature Sensor PCB Connections:

The Temperature Sensor PCB can be identified by the assembly number PCB404391XXX. The power is supplied to the connector on the left as well as the connector on the right labeled ERR, PWR, and GND. The two connectors support daisy chaining from one temperature sensor circuit board to another*.

*Note – A maximum of four daisy chained Temperature Sensor PCB's can be connected to a single Power Supply/Summary Relay PCB.

Two position insulation displacement connectors, J1-J5, provide the termination for the battery temperature probes. The temperature probe are NTC type and have a measurement range from -40°C to 125°C**. The wire length of the temperature probes can be cut to any length without adversely affecting the temperature accuracy.

**Note – Only use Myers Emergency Power Systems supplied temperature probes (Part# RE-THER2100I).



Picture 2 – Temperature Sensor PCB

System Schematic:

Figure 1 shows a schematic of the power supply and temperature sensor PCB and the connections. The schematic shows a two temperature sensor board system with four temperature probes connected to each monitoring board but there are many other different possible configurations. Dry contacts are setup for normally open configuration. Contact rating: 0.5 Amps @ 277VAC maximum.

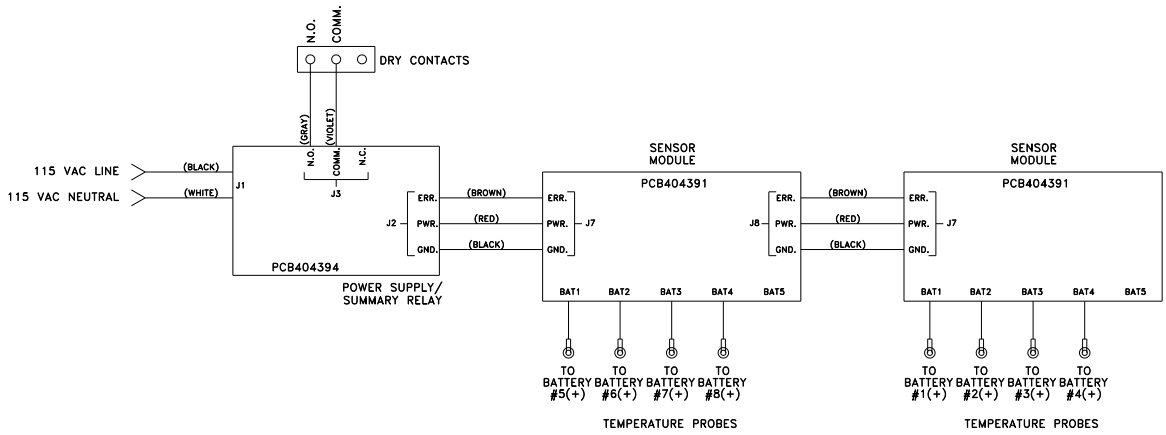


Figure 1 –System Schematic

SECTION 2

Description of Operation

The Thermal Runaway System monitors each of the battery temperatures individually and annunciates an alarm if one of two conditions occurs.

1) If any of the connected battery temperature probes measure a differential rise greater than 40°C between the measured battery temperature and the ambient temperature as measured from a temperature sensor on the Temperature Sensor PCB.***

***Note: The Temperature Sensor PCB Modules must be mounted in proximity to the batteries that are being measured. Never lengthen or splice the supplied battery temperature probes to move the Temperature Sensor PCB further from the measured batteries.

2) If any of the connected battery temperature probes measure an absolute temperature greater than 80°C.

If a battery is in a thermal runaway condition there are four indications that will result. The four conditions will remain in a latched state until the reset button is depressed for a few seconds and then released.

1) The summary alarm contact will be activated.
2) The audible summary alarm will be activated on the temperature sensor pcb with the battery that is in a thermal runaway condition.
3) The LED below the particular battery temperature probe connector on the temperature sensor pcb will be illuminated.
4) The Battery Overtemp LED on the power supply/summary relay pcb will be illuminated.

LED Definitions

1) Power Supply/Summary Relay PCB (PCB404394XXX)
    a. Battery Overtemp LED – Illuminated when a battery is experiencing thermal runaway condition on one or more of the batteries on the connected Temperature Sensor PCB.

2) Temperature Sensor PCB (PCB404391XXX)
    a. PWR LED – Illuminated when the +5V supply is present on the temperature sensor pcb.
    b. BAT1-BAT5 – There are three states of the LED for each of the battery temperature probes.
        i. LED OFF – Temperature probe connected and in tolerance.
        ii. LED ON – Connected battery is in a thermal runaway condition.
        iii. LED Flash – Temperature probe not connected****.

****Note: If a temperature probe is not connected all other probe channels will operate normally. The probe that is not connected will be ignored.

SECTION 3

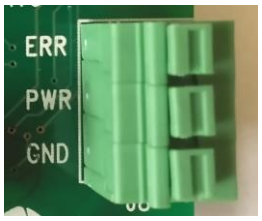
System Installation

1) Power Supply/Summary Relay – The PCB's will be installed in the Emergency Lighting Inverter Electronics Cabinet. Dependant on the number of batteries there may be more than one power supply presenting the electronics module please refer to Battery Thermal Runaway drawing specific to the Emergency Lighting Inverter System Installed.

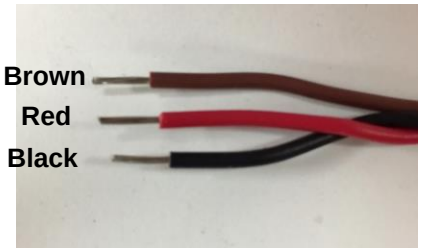
    a. The dry contacts will already be combined through the power supply/summary relay printed circuit boards and wired to a terminal block labeled Thermal Dry Contacts. There will be a normally open, common, and normally closed set of contacts rated for 277VAC, 0.5AAC.

    b. The power and error signal connections will need to be wired from the Power Supply/Summary Relay PCB to the first Temperature Sensor PCB via the wire supplied in the kit. To install the wires in the power supply/summary relay pcb follow the instructions below:
        i. Strip about ¼" off from the end of each of the three wires.
        ii. Depress and hold the actuator on top of the terminal block down.
        iii. Insert the wire all the way to the back of the terminal block being careful not to pinch any insulation in the connector.
            1. Brown Wire = ERR
            2. Red Wire = PWR
            3. Black Wire = GND
        iv. Release the actuator and tug on the wire to ensure a good connection.

    Picture 3 and picture 4 show the terminal block on the printed circuit board and the wire stripped.



Picture 3



Picture 4

2) Temperature Sensor PCB – The PCB's will be mounted in the battery cabinets of the Emergency Lighting Inverter. If the batteries are in the same cabinet as the electronics then it will be mounted in the electronics/battery cabinet. The thermal probe leads are 1000mm long to accommodate all scenarios. The temperature probe leads may be trimmed to any length without affecting the temperature measurement. Dependant on the number of batteries and battery cabinets there may be more than one temperature sensor module required. Please refer to Battery Thermal Runaway drawing specific to the Emergency Lighting Inverter System Installed.

Note: Do not connect more than four temperature sensor pcb's to one power supply/summary relay pcb and do not connect power supply/summary relay pcb's to each other.

a. The power and error signal connections will need to be wired from the Power Supply/Summary Relay PCB to the first Temperature Sensor PCB via the wire supplied in the kit. To install the wires in the temperature sensor pcb follow the instructions below:
    i. Strip about ¼" off from the end of each of the three wires.
    ii. Depress and hold the actuator on top of the terminal block down.
    iii. Insert the wire all the way to the back of the terminal block being careful not to pinch any insulation in the connector.
        1. Brown Wire = ERR
        2. Red Wire = PWR
        3. Black Wire = GND
    iv. Release the actuator and tug on the wire to ensure a good connection.

b. The power and error signal connections will need to be wired from the first Temperature Sensor PCB to the next Temperature sensor PCB via the wire supplied in the kit. This will follow the instruction in item a until the last temperature sensor pcb has been wired.

c. The temperature probes are installed following the instruction below:

   i. Make sure that the stripped wire is removed and ends of the temperature probe are full insulated and separated by at least 1 inch. See Picture 5.

Picture 5

   ii. Lift the top of the connector fully and insert the probe wire all the way into the connector. The wire should insert about ½" inside the connector. See Picture 6.

Note: The blade of the insulation displacement knife is in the back of the left side hole and if the top is not fully lifted the wire may be stopped by the top of the insulation displacement knife and will not make a proper connection.

   iii. Once the probe ifs fully inserted force the wire into the insulation displacement knife by pressing the top down securely locking it in place.

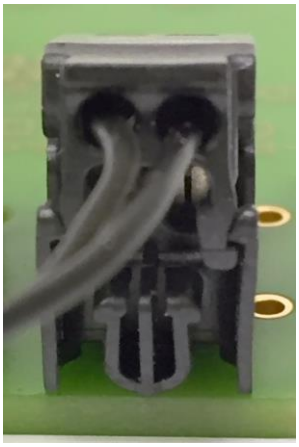


Figure 6

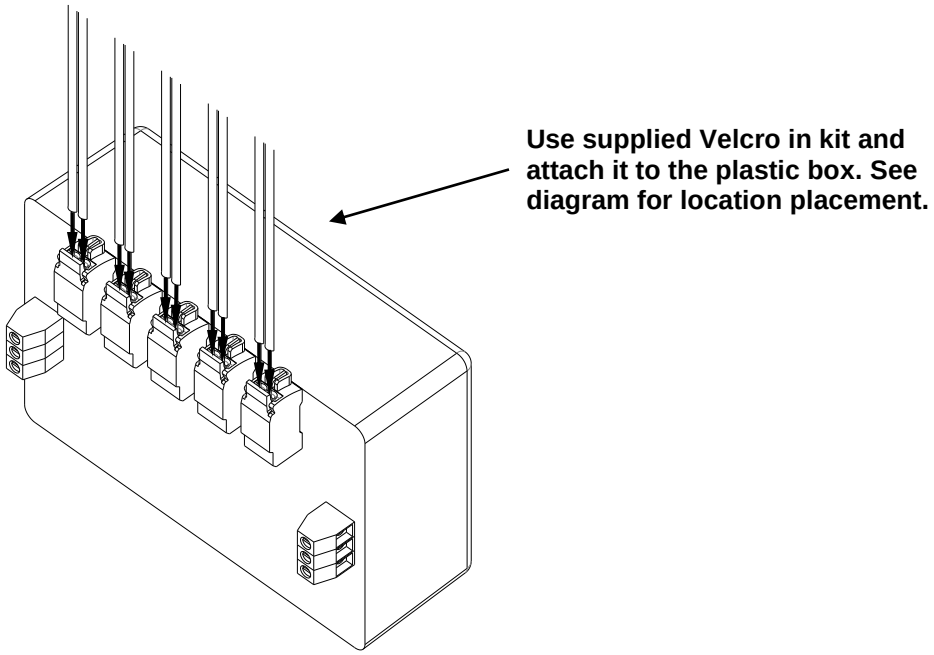


Figure 2 – Stripped Probe leads insert into connectors

PART III

DRAWINGS

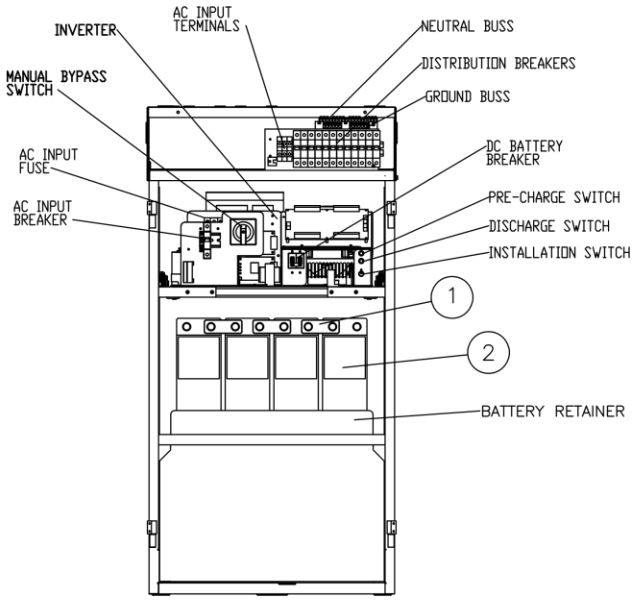
(Drawings section continues on next page)

CAUTION:

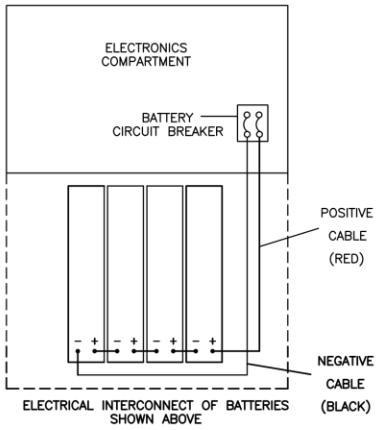
1–BEFORE WIRING TO BATTERY, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.

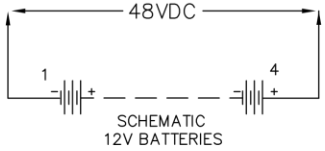
2–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.

3–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



CABINET DIMS: 24"W X 47"H X 25"D
DOORS AND TOP COVER OMMITTED FOR CLARITY





ITEM NO.	DESCRIPTION	QTY.	PART NO.
2	BATTERY	4	BAT–CG12100I BAT–CG12100H BAT–CG12100E
1	INTERCONNECT	3	MANUFACTURER PROVIDED

REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

SCALE: 1 = 10 | DRAWN BY: V A
DATE: 06/11/20 | APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT,
1.75kVA @ 90 min. & 1.3kVA @ 120 min.

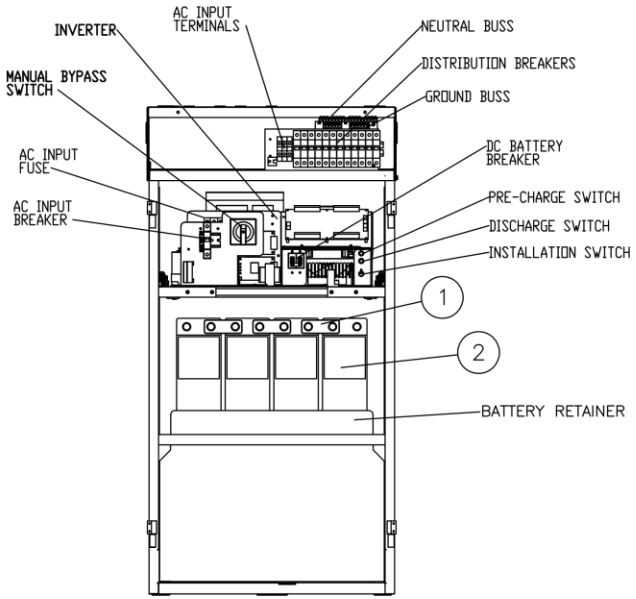
DRAWING NUMBER: 303779A

CAUTION:

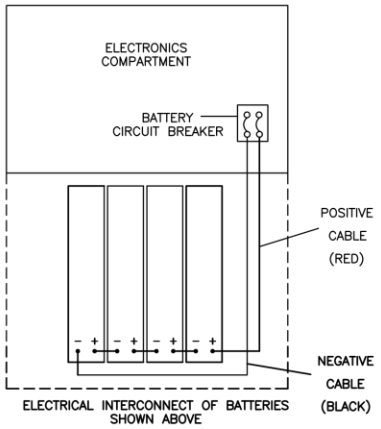
1–BEFORE WIRING TO BATTERY, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.

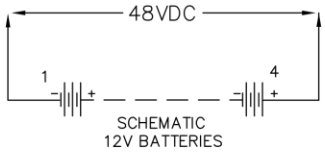
2–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.

3–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



CABINET DIMS: 24"W X 47"H X 25"D
DOORS AND TOP COVER OMMITTED FOR CLARITY





ITEM NO.	DESCRIPTION	QTY.	PART NO.
2	BATTERY	4	BAT–CG12150D BAT–CG12150C BAT–CG12150B
1	INTERCONNECT	3	MANUFACTURER PROVIDED

REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

SCALE: 1 = 10 | DRAWN BY: V A
DATE: 06/11/20 | APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT,
2.5kVA @ 90 min. & 1.88kVA @ 120 min.

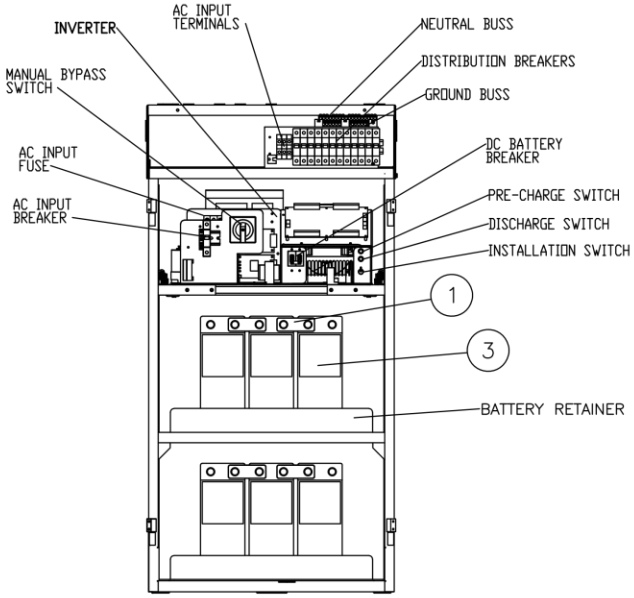
DRAWING NUMBER: 303780A

CAUTION:

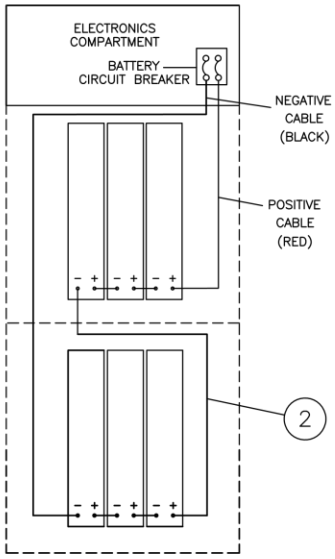
1–BEFORE WIRING TO BATTERY, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.

2–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.

3–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



CABINET DIMS: 24"W X 47"H X 25"D
DOORS AND TOP COVER OMMITTED FOR CLARITY



ELECTRICAL INTERCONNECT OF BATTERIES SHOWN ABOVE

SCHEMATIC
12V BATTERIES

ITEM NO.	DESCRIPTION	QTY.	PART NO.
3	BATTERY	6	BAT–CG12150D BAT–CG12150C BAT–CG12150B
2	CABLE 4 GA. 36"LG.	1	W–B036–040L2B
1	INTERCONNECT	4	MANUFACTURER PROVIDED

REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

SCALE: 1 = 10 | DRAWN BY: V A
DATE: 06/11/20 | APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT, 3.75kVA @ 90 min. & 2.8kVA @ 120 min.

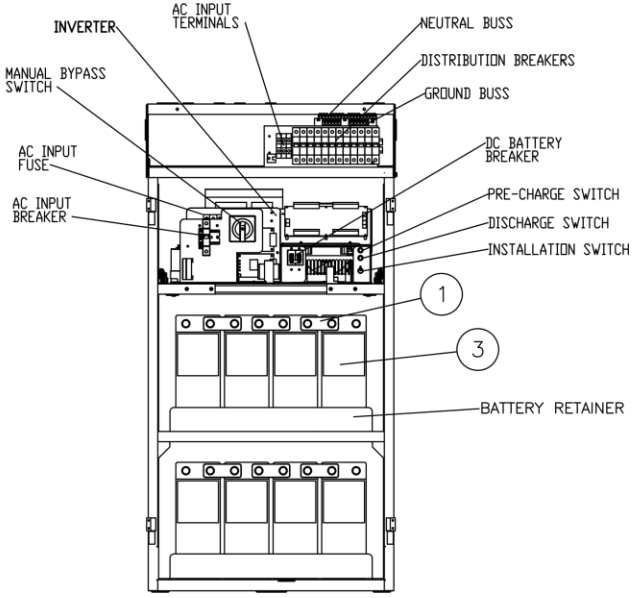
DRAWING NUMBER: 303781A

CAUTION:

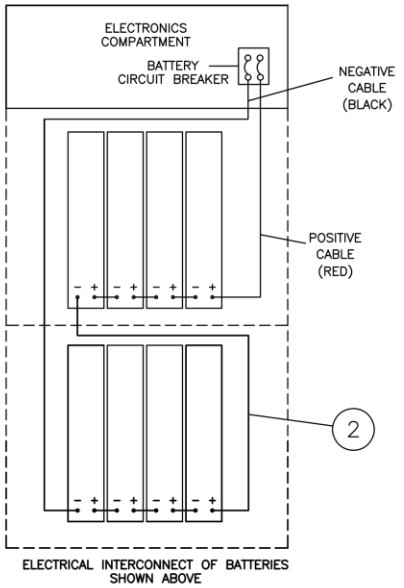
1–BEFORE WIRING TO BATTERY, TURN INSTALLATION SWITCH TO OFF AND TURN OFF CIRCUIT BREAKER.

2–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.

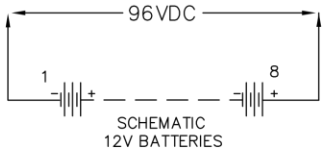
3–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



CABINET DIMS: 24"W X 47"H X 25"D
DOORS AND TOP COVER OMMITTED FOR CLARITY



ELECTRICAL INTERCONNECT OF BATTERIES SHOWN ABOVE



SCHEMATIC
12V BATTERIES

ITEM NO.	DESCRIPTION	QTY.	PART NO.
3	BATTERY	8	BAT–CG12150D BAT–CG12150C BAT–CG12150B
2	CABLE 4 GA. 36"LG.	1	W–B036–040L2B
1	INTERCONNECT	6	MANUFACTURER PROVIDED

REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

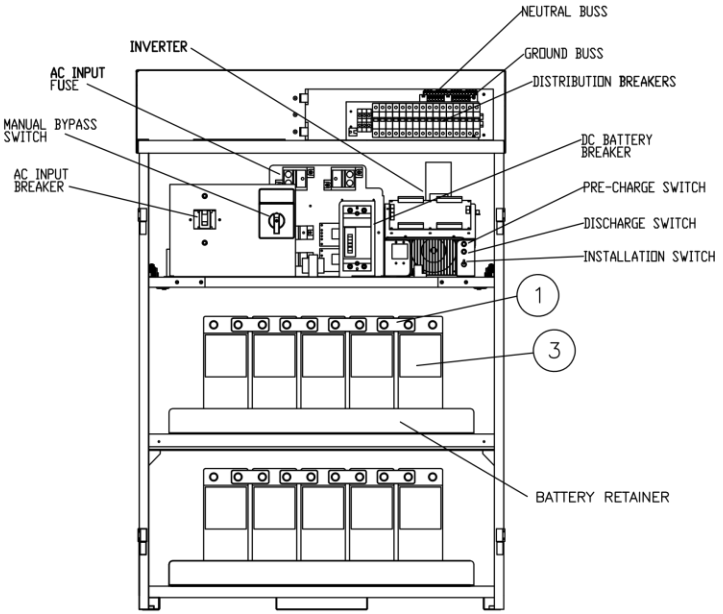
SCALE: 1 = 10 | DRAWN BY: V A
DATE: 06/11/20 | APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT, 5kVA @ 90 min. & 3.75kVA @ 120 min.

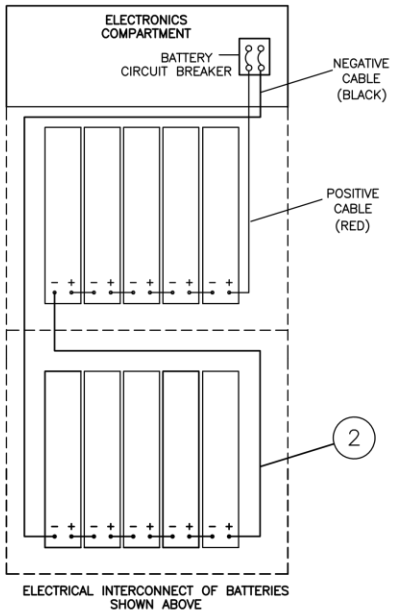
DRAWING NUMBER: 303782A

CAUTION:

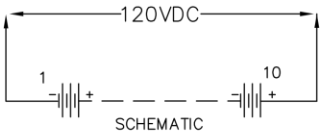
1–BEFORE WIRING TO BATTERY, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.
2–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.
3–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



CABINET DIMS: 36"W X 53"H X 25"D
DOORS AND TOP COVER OMMITTED FOR CLARITY



ELECTRICAL INTERCONNECT OF BATTERIES SHOWN ABOVE



SCHEMATIC
12V BATTERIES

ITEM NO.	DESCRIPTION	QTY.	PART NO.
3	BATTERY	10	BAT–CG12150D BAT–CG12150C BAT–CG12150B
2	CABLE 4 GA. 36"LG.	1	W–B036–040L2B
1	INTERCONNECT	8	MANUFACTURER PROVIDED

REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

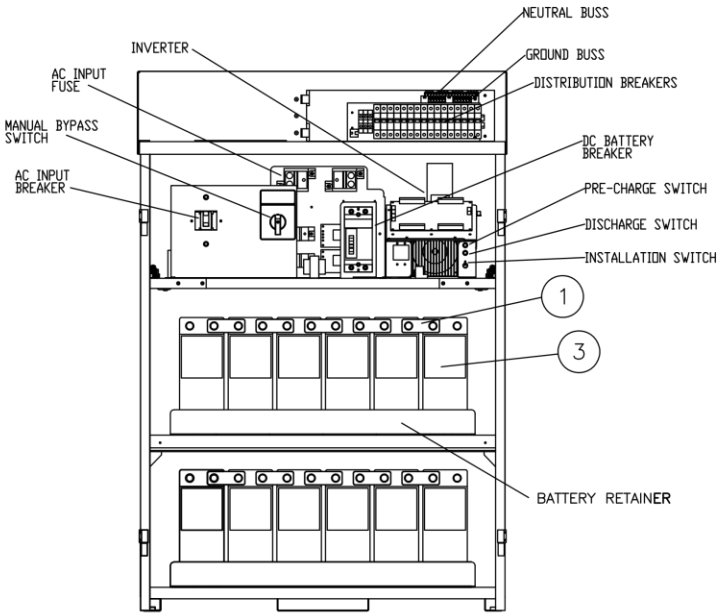
SCALE: 1 = 10 | DRAWN BY: V A
DATE: 06/11/20 | APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT,
6kVA @ 90 min. & 4.5kVA @ 120 min.

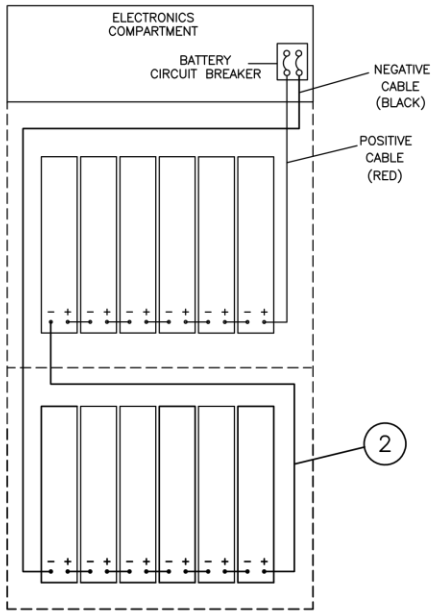
DRAWING NUMBER: 303783A

CAUTION:

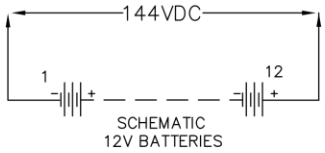
1–BEFORE WIRING TO BATTERY, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.
2–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.
3–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



CABINET DIMS: 36"W X 53"H X 25"D
DOORS AND TOP COVER OMMITTED FOR CLARITY



ELECTRICAL INTERCONNECT OF BATTERIES SHOWN ABOVE



SCHEMATIC
12V BATTERIES

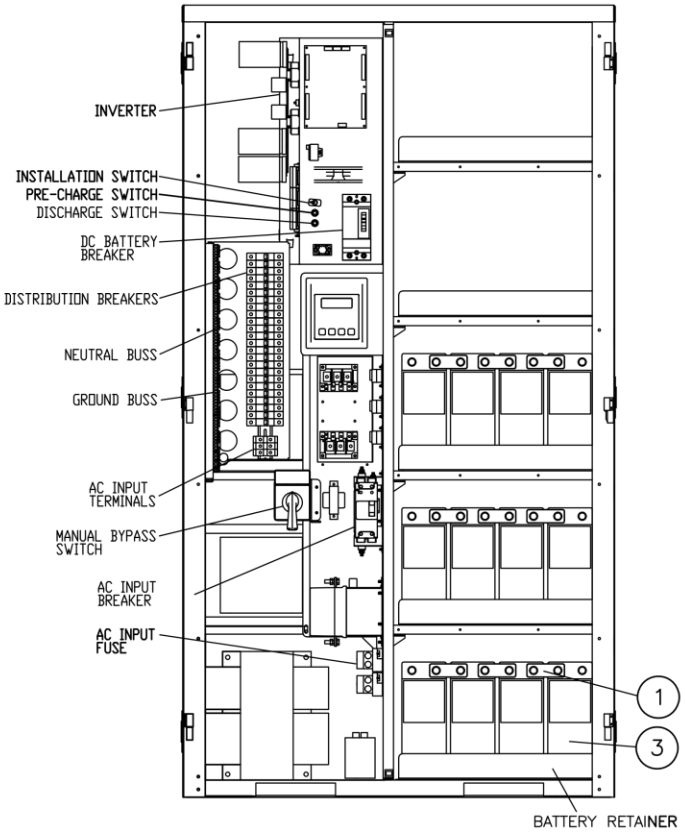
ITEM NO.	DESCRIPTION	QTY.	PART NO.
3	BATTERY	12	BAT–CG12150D BAT–CG12150C BAT–CG12150B
2	CABLE 4 GA. 36"LG.	1	W–B036–040L2B
1	INTERCONNECT	10	MANUFACTURER PROVIDED

REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

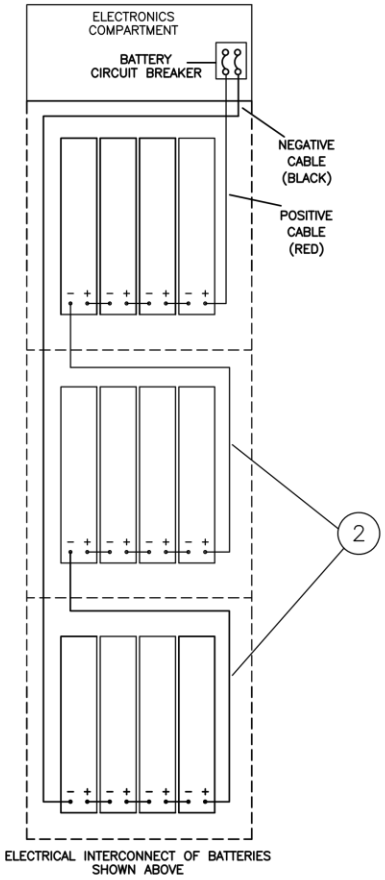
SCALE: 1 = 10 | DRAWN BY: V A
DATE: 06/11/20 | APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT,
7.5kVA @ 90 min. & 5.63kVA @ 120 min.

DRAWING NUMBER: 303784A



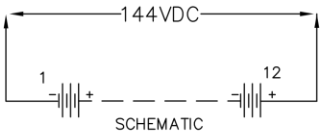
CABINET DIMS: 42"W X 77"H X 25"D
DOORS OMMITTED FOR CLARITY



ELECTRICAL INTERCONNECT OF BATTERIES SHOWN ABOVE

CAUTION:

1–BEFORE WIRING TO INVERTER, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.
2–CUT ITEMS 3 & 4 TO MINIMUM LENGTH.
3–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.
4–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



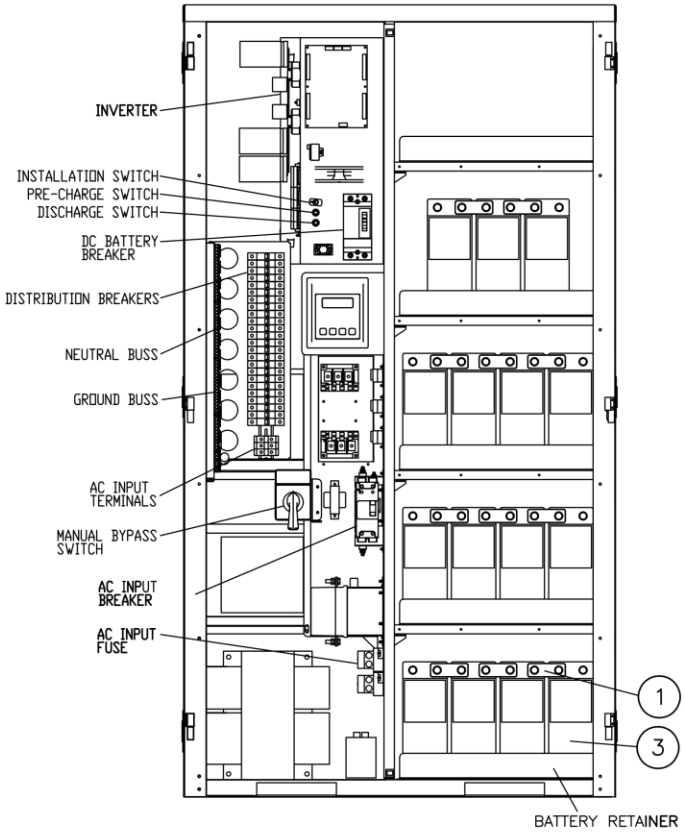
SCHEMATIC
12V BATTERIES

ITEM NO.	DESCRIPTION	QTY.	PART NO.
3	BATTERY	12	BAT–CG12180A BAT–CG12180
2	CABLE 4 GA. 36"LG.	2	W–B036–040L2B
1	INTERCONNECT	9	MANUFACTURER PROVIDED

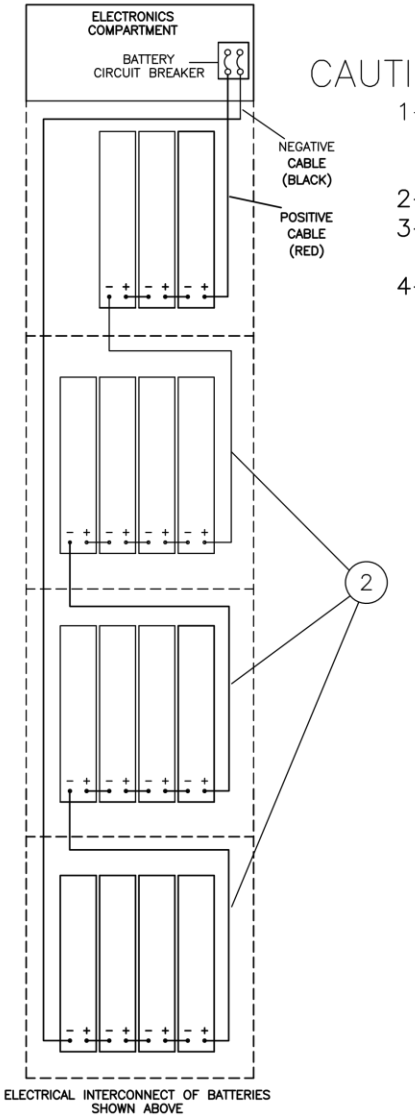
REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

SCALE: 1 = 10
DATE: 06/11/20
DRAWN BY: V A
APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT,
10kVA @ 90 min. & 7.5kVA @ 120 min.
DRAWING NUMBER: 303785A



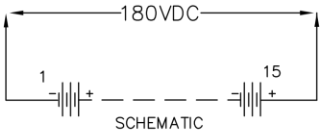
CABINET DIMS: 42"W X 77"H X 25"D
DOORS OMMITTED FOR CLARITY



ELECTRICAL INTERCONNECT OF BATTERIES SHOWN ABOVE

CAUTION:

1–BEFORE WIRING TO INVERTER, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.
2–CUT ITEMS 3 & 4 TO MINIMUM LENGTH.
3–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.
4–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



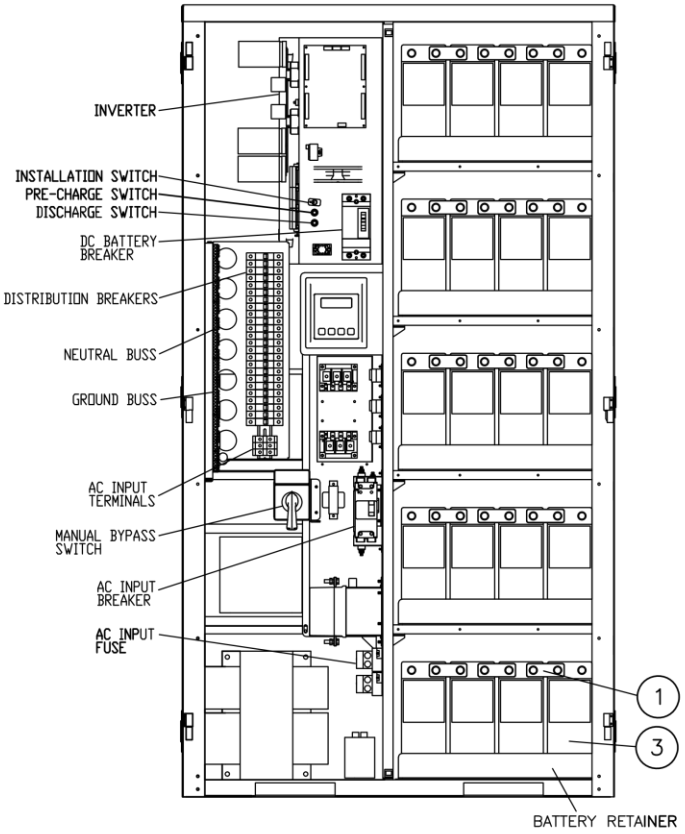
SCHEMATIC
12V BATTERIES

ITEM NO.	DESCRIPTION	QTY.	PART NO.
3	BATTERY	15	BAT–CG12180A BAT–CG12180
2	CABLE 4 GA. 36"LG.	3	W–B036–040L2B
1	INTERCONNECT	11	MANUFACTURER PROVIDED

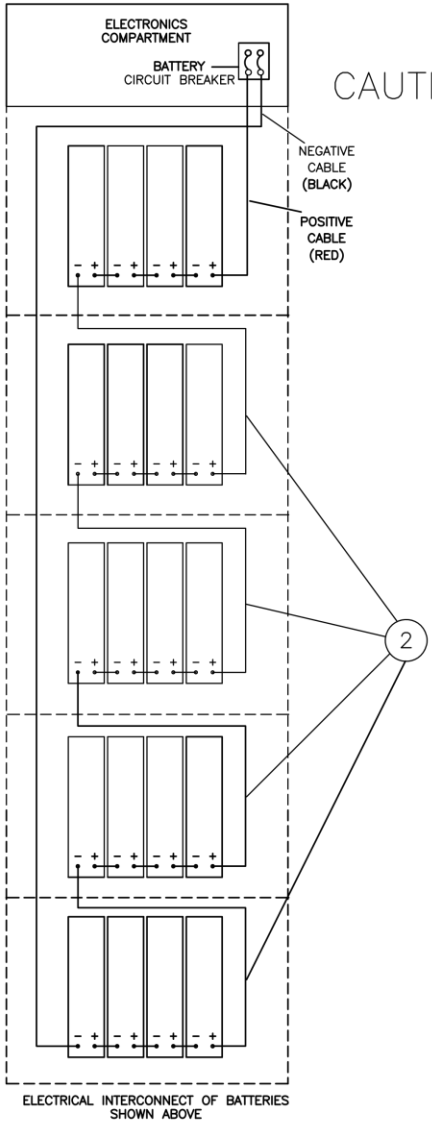
REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

SCALE: 1 = 10
DATE: 06/11/20
DRAWN BY: V A
APPROVED BY:

BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT,
12.5kVA @ 90 min. & 9.38kVA @ 120 min.
DRAWING NUMBER: 303786A



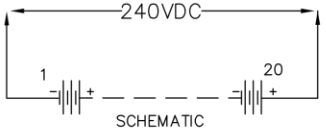
CABINET DIMS: 42"W X 77"H X 25"D
DOORS OMMITTED FOR CLARITY



ELECTRICAL INTERCONNECT OF BATTERIES SHOWN ABOVE

CAUTION:

1–BEFORE WIRING TO INVERTER, TURN INSTALLATION SWITCH TO OFF AND TURN OFF DC CIRCUIT BREAKER.
2–CUT ITEMS 3 & 4 TO MINIMUM LENGTH.
3–OBSERVE POLARITY, CONNECT BATTERIES AS SHOWN.
4–FOLLOW START–UP PROCEDURE IN SYSTEM MANUAL.



SCHEMATIC
12V BATTERIES

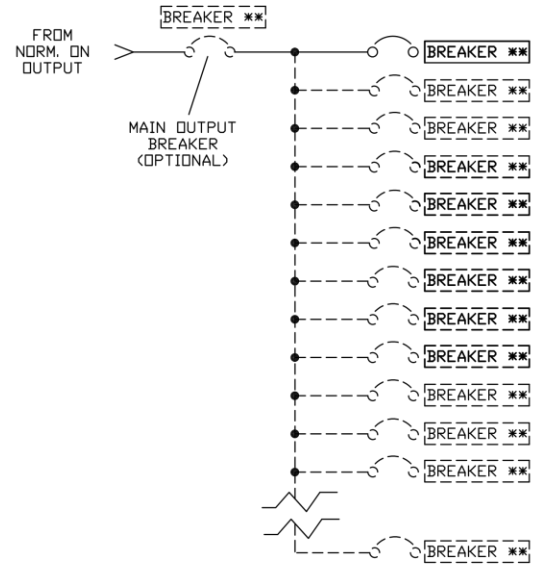
ITEM NO.	DESCRIPTION	QTY.	PART NO.
3	BATTERY	20	BAT–CG12180A BAT–CG12180
2	CABLE 4 GA. 36"LG.	4	W–B036–040L2B
1	INTERCONNECT	15	MANUFACTURER PROVIDED

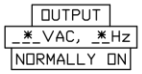
REV.	DESCRIPTION	DATE	BY
A	INITIAL RELEASE	06/11/20	V A

SCALE: 1 = 10
DRAWN BY: V A
DATE: 06/11/20
APPROVED BY:

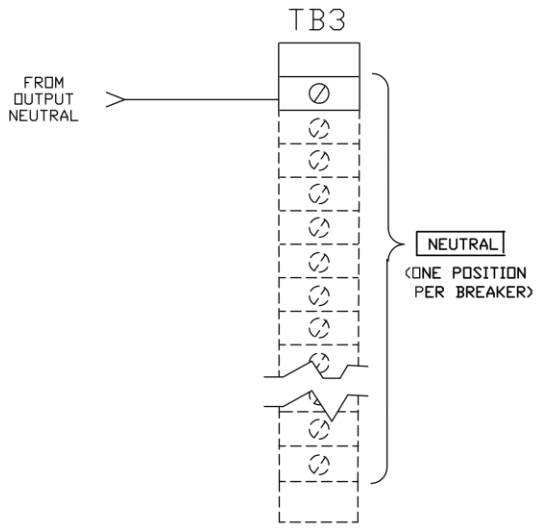
BATTERY INT, I SERIES, SINGLE PHASE, FRONT MOUNT,
16.7kVA @ 90 min. & 12.5kVA @ 120 min.

DRAWING NUMBER: 303787A





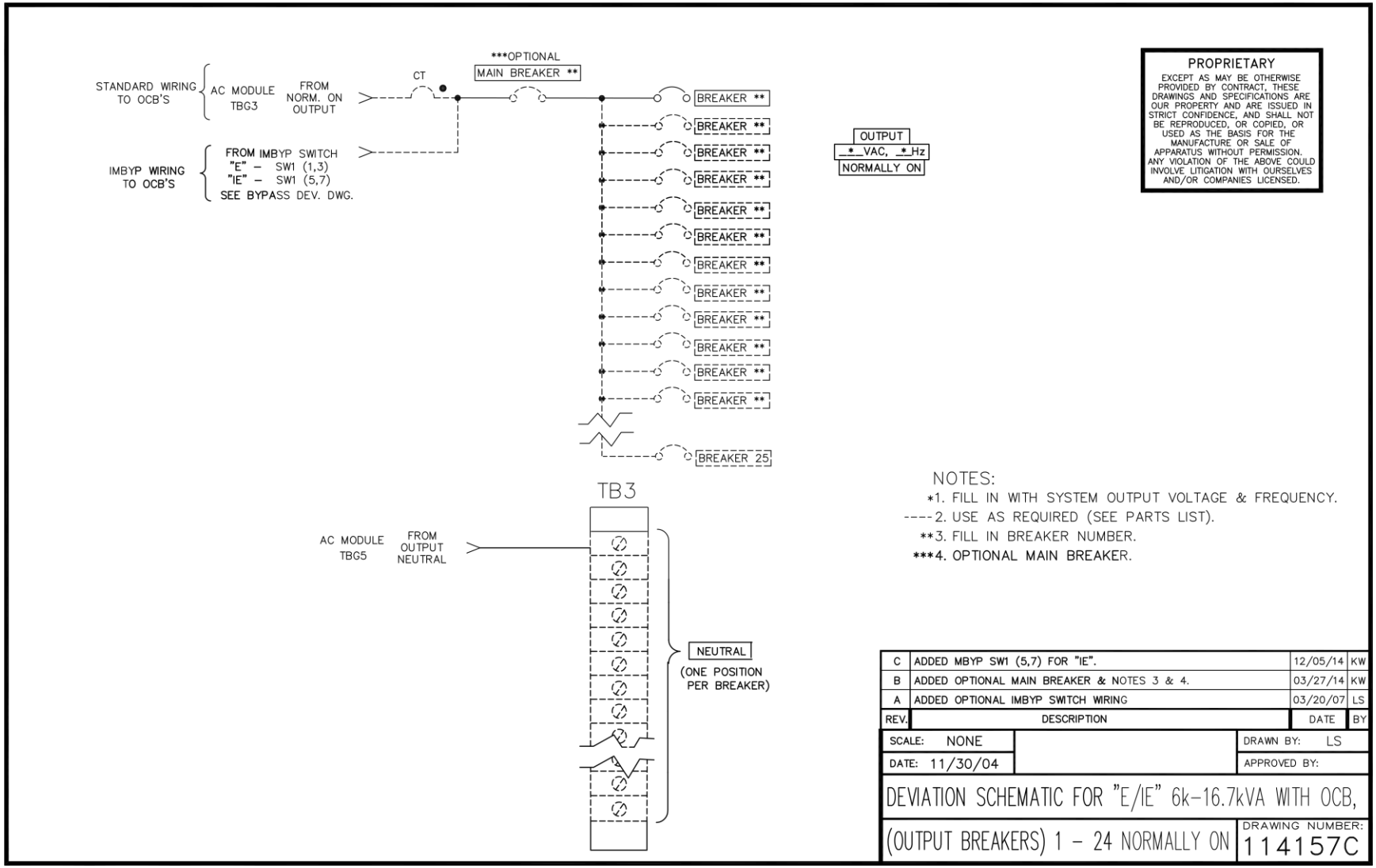
NOTES:
*1. FILL IN WITH SYSTEM OUTPUT VOLTAGE & FREQUENCY.
----- 2. USE AS REQUIRED (SEE PARTS LIST).
** 3. FILL IN CIRCUIT BREAKER NUMBER.



REV	DESCRIPTION	DATE	BY
C	REVISED LABELS, ADDED NOTE 3.	10/17/19	KW
B	ADDED OPTIONAL MAIN BREAKER	6/04/10	RD
A	CHANGED # OF POSSIBLE BREAKERS FROM 12 TO 24	4/15/04	LS

DESCRIPTION:
DEV. SCH. FOR "IS-C"(E & IE 1.5k - 5k) WITH OCB 1-24 NORMALLY ON, OPTIONAL MAIN OCB

SCALE: NONE
DATE: 04/15/04
DRAWING NUMBER: 113712C
DRAWN BY: LS
APPROVED BY:



NOTES:

*1. FILL IN WITH SYSTEM OUTPUT VOLTAGE & FREQUENCY.

----2. USE AS REQUIRED (SEE PARTS LIST).

**3. FILL IN BREAKER NUMBER.

***4. OPTIONAL MAIN BREAKER.

REV.	DESCRIPTION	DATE	BY
C	ADDED MBYP SW1 (5,7) FOR "IE".	12/05/14	KW
B	ADDED OPTIONAL MAIN BREAKER & NOTES 3 & 4.	03/27/14	KW
A	ADDED OPTIONAL IMBYP SWITCH WIRING	03/20/07	LS

SCALE: NONE		DRAWN BY: LS
DATE: 11/30/04		APPROVED BY:

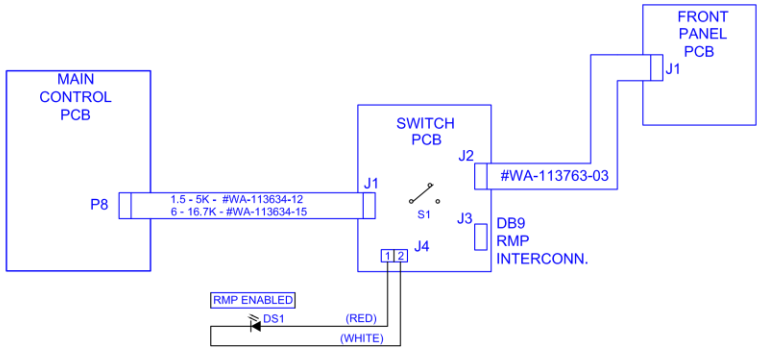
DEVIATION SCHEMATIC FOR "E/IE" 6k-16.7kVA WITH OCB,

(OUTPUT BREAKERS) 1 - 24 NORMALLY ON

DRAWING NUMBER: 114157C

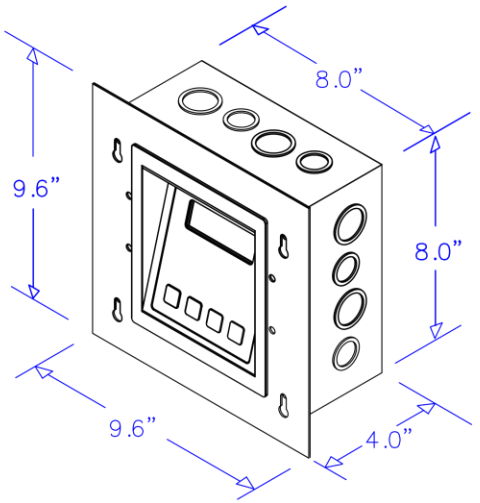
SECTION A

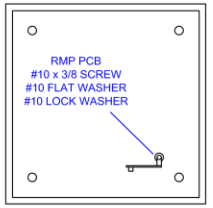
WIRING FOR REMOTE METER PANEL IN ELECTRONICS CABINET (WIRING BY MANUFACTURER)



*** SWITCH "S1" DRIVES EITHER LOCAL FRONT PANEL OR REMOTE PANEL BOTH METERS WILL NOT OPERATE AT THE SAME TIME.**

SECTION B

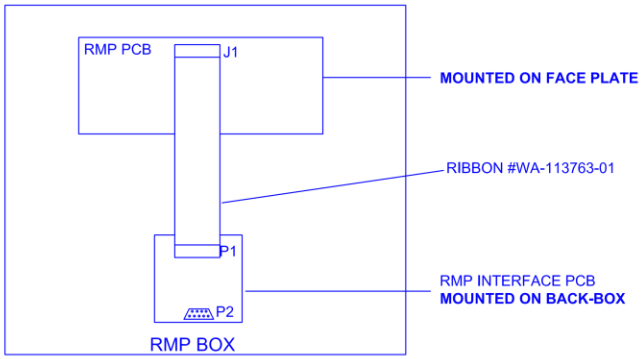




RMP PCB MOUNT DETAIL

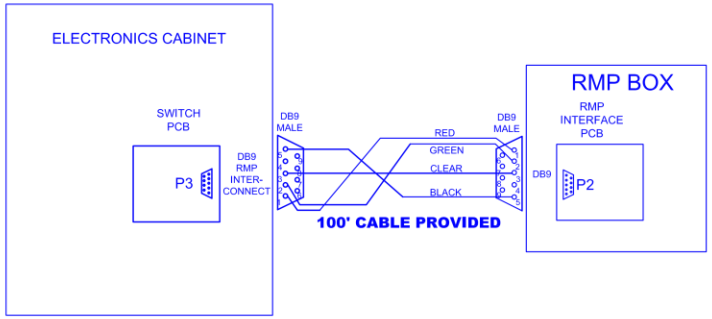
SECTION C

WIRING FOR REMOTE METER PANEL IN REMOTE BOX (WIRING BY MANUFACTURER)



SECTION D

REMOTE METER PANEL INTERCONNECT WIRE BETWEEN ELECTRONICS CABINET & REMOTE BOX

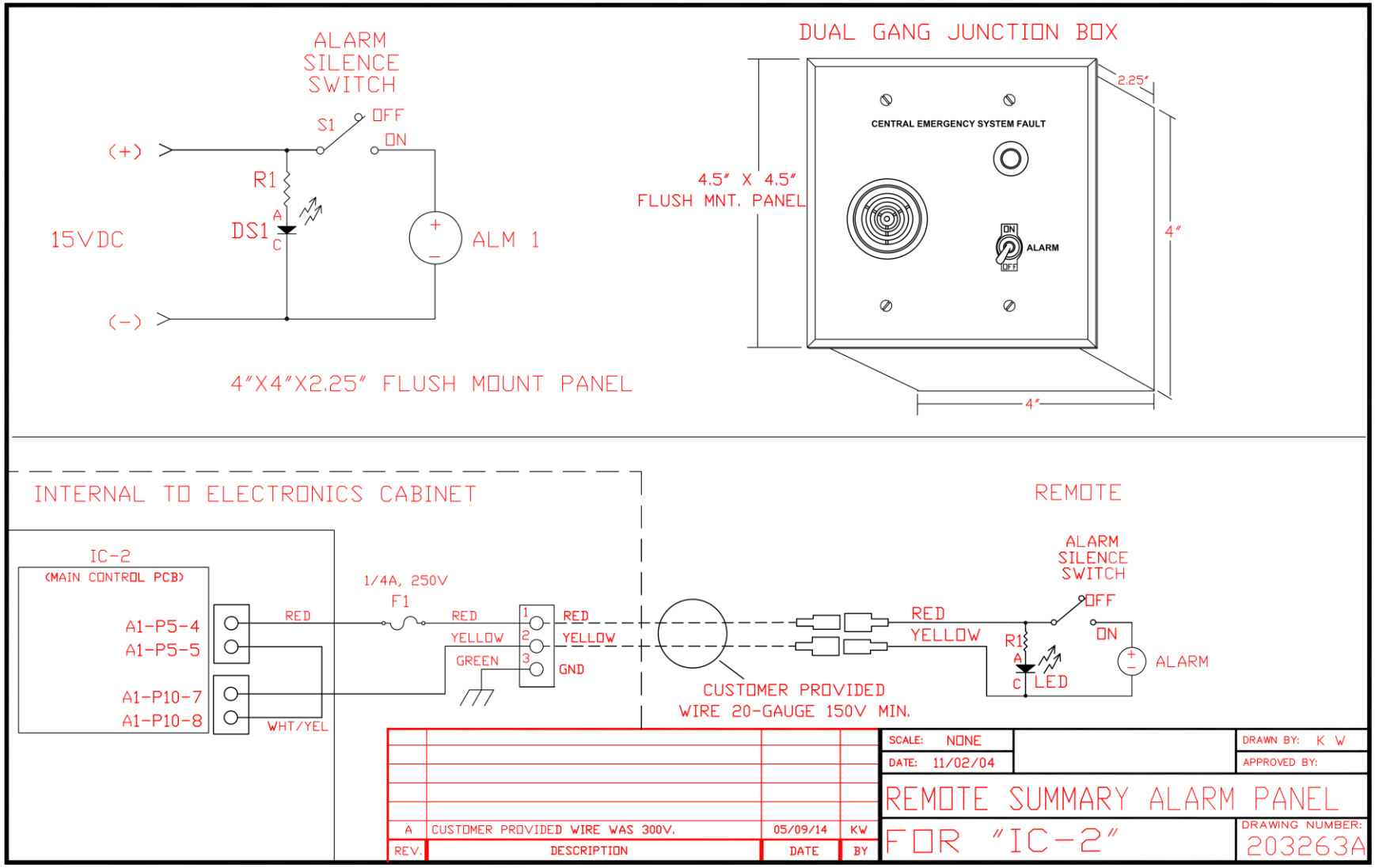


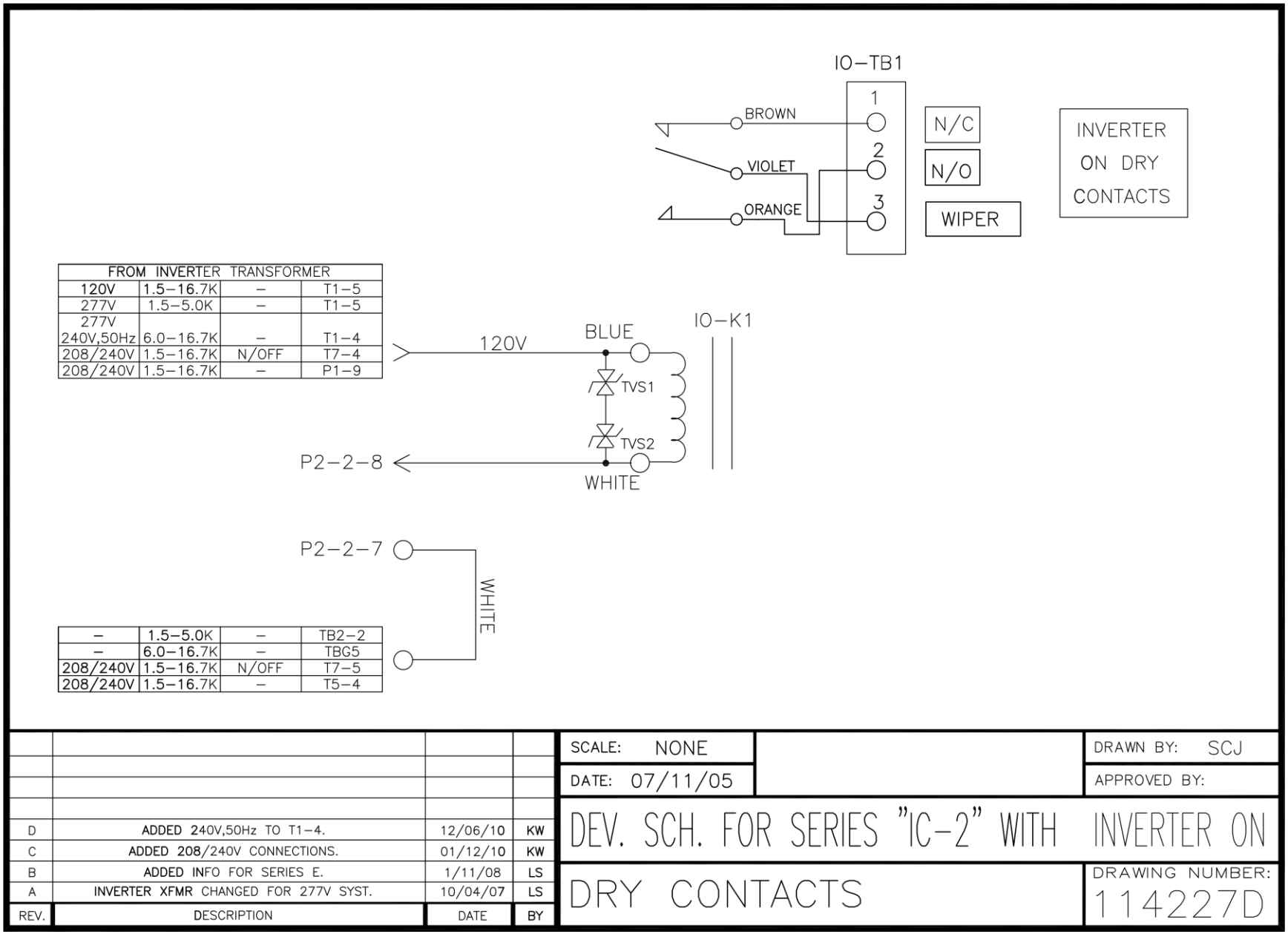
REV.	DESCRIPTION	DATE	BY
C	ADDED RMP PCB MOUNT DETAIL.	07/14/10	KW
B	RMP J1 WAS P1.	06/30/10	KW
A	REVISED FOR 3 POLE LOCAL/REMOTE SWITCH PCB.	01/18/05	KW

SCALE: NONE
DATE: 11/02/04
DRAWN BY: K W
APPROVED BY:

REMOTE METER PANEL FOR "IC-2"

DRAWING NUMBER: 403299C


ALARM
SILENCE
SWITCH
S1
OFF
ON
(+)
R1
A
DS1
C
15VDC
ALM 1
(-)
4"X4"X2.25" FLUSH MOUNT PANEL
DUAL GANG JUNCTION BOX
4.5" X 4.5"
FLUSH MNT. PANEL
CENTRAL EMERGENCY SYSTEM FAULT
ON
OFF
ALARM
2.25"
4"
4"
INTERNAL TO ELECTRONICS CABINET
IC-2
(MAIN CONTROL PCB)
A1-P5-4
A1-P5-5
A1-P10-7
A1-P10-8
RED
WHT/YEL
1/4A, 250V
F1
RED
YELLOW
GREEN
1
2
3
RED
YELLOW
GND
CUSTOMER PROVIDED
WIRE 20-GAUGE 150V MIN.
REMOTE
ALARM
SILENCE
SWITCH
OFF
ON
RED
YELLOW
R1
A
C
LED
ALARM
A
CUSTOMER PROVIDED WIRE WAS 300V.
05/09/14
KW
REV.
DESCRIPTION
DATE
BY
SCALE: NONE
DATE: 11/02/04
DRAWN BY: K W
APPROVED BY:
REMOTE SUMMARY ALARM PANEL
FOR "IC-2"
DRAWING NUMBER:
203263A

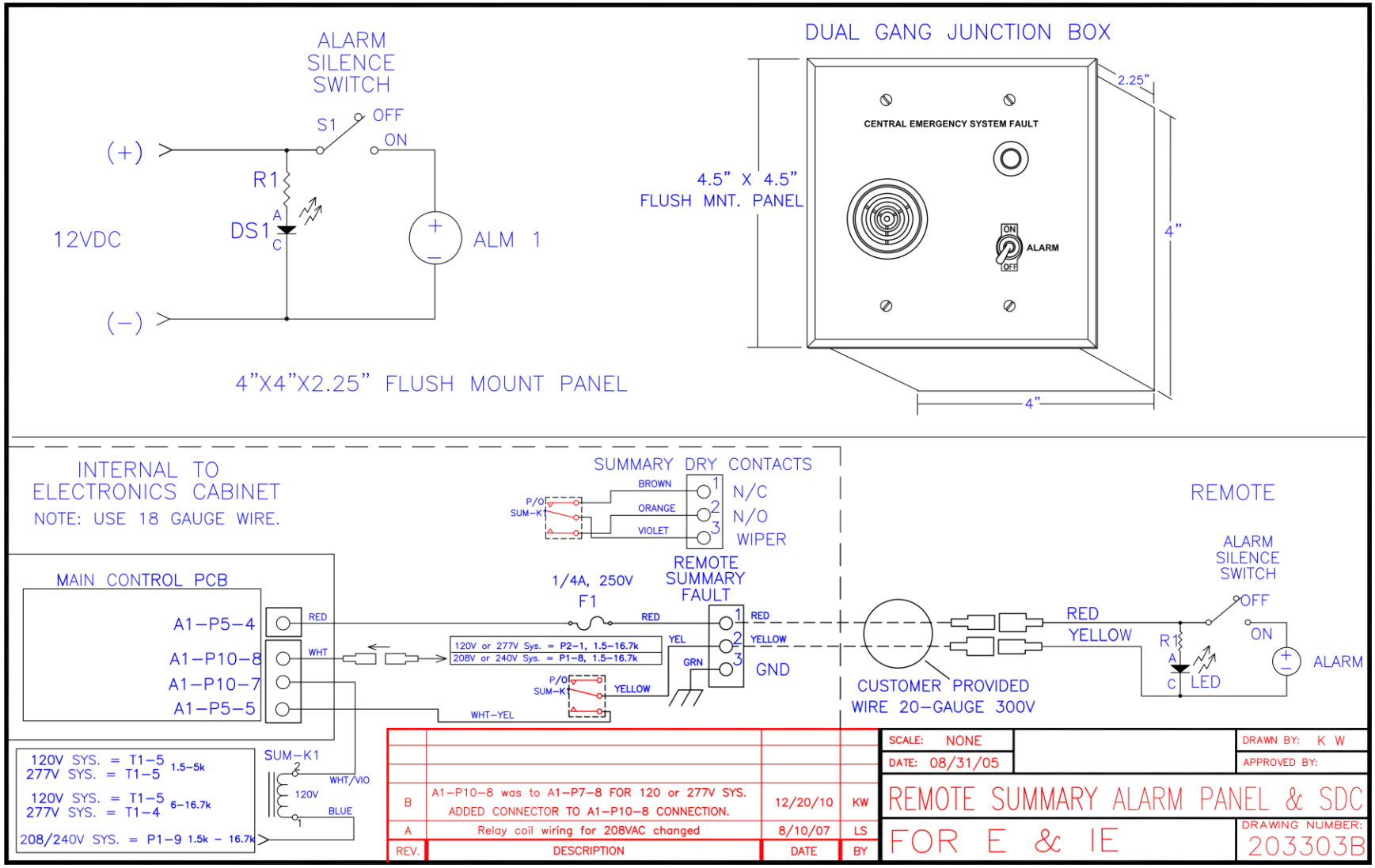


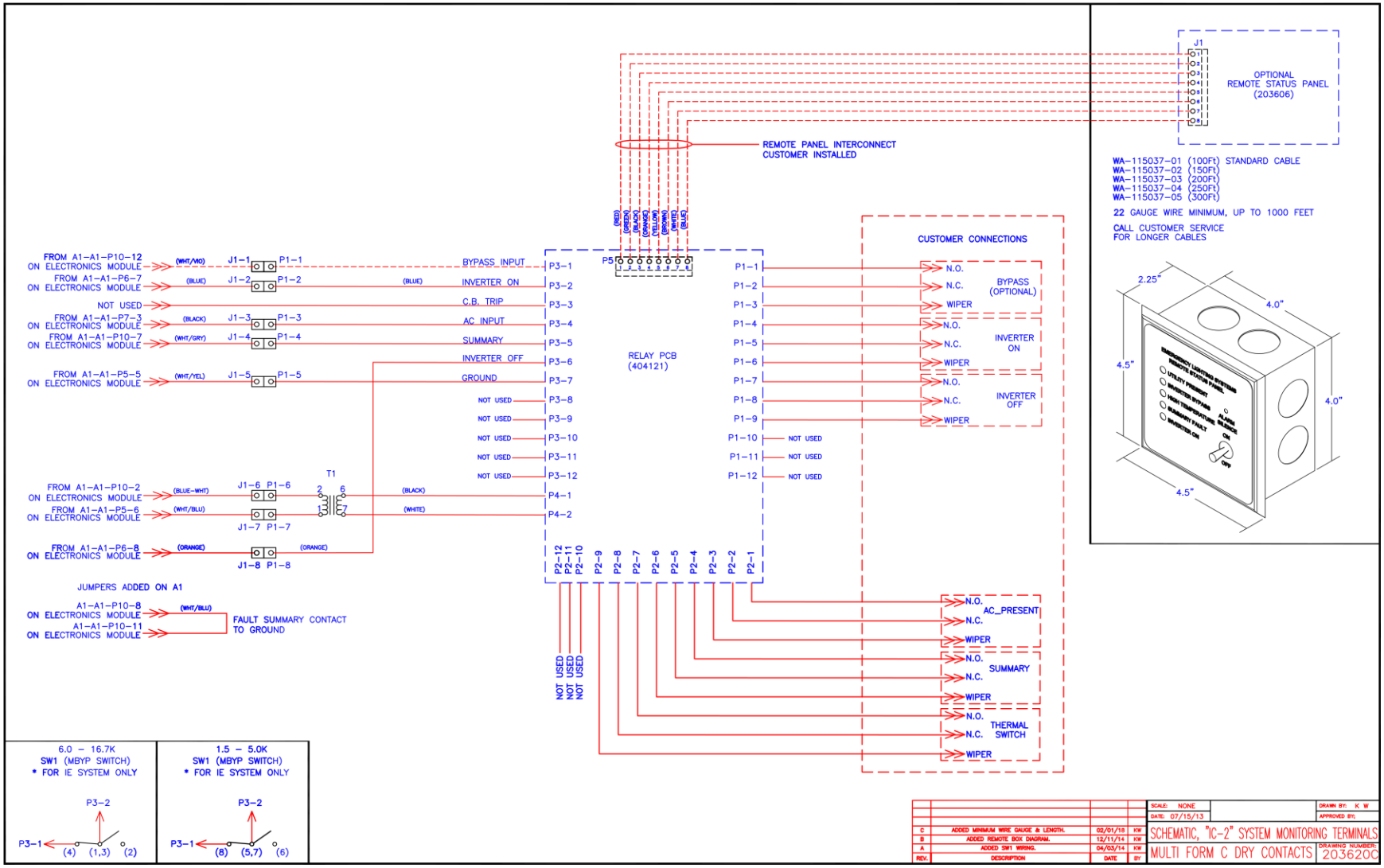
REV.	DESCRIPTION	DATE	BY
D	ADDED 240V,50Hz TO T1–4.	12/06/10	KW
C	ADDED 208/240V CONNECTIONS.	01/12/10	KW
B	ADDED INFO FOR SERIES E.	1/11/08	LS
A	INVERTER XFMR CHANGED FOR 277V SYST.	10/04/07	LS

SCALE: NONE
DATE: 07/11/05
DRAWN BY: SCJ
APPROVED BY:

DEV. SCH. FOR SERIES "IC-2" WITH INVERTER ON DRY CONTACTS

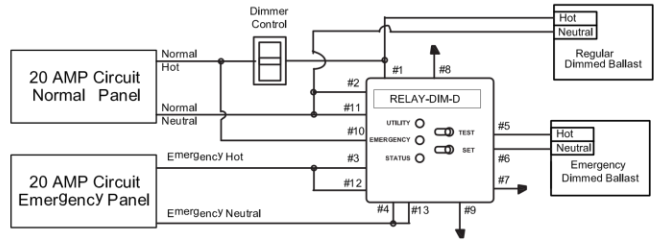
DRAWING NUMBER: 114227D


ALARM SILENCE SWITCH
S1
OFF
ON
(+)
R1
A
DS1
C
12VDC
ALM 1
(–)
4"X4"X2.25" FLUSH MOUNT PANEL
DUAL GANG JUNCTION BOX
4.5" X 4.5"
FLUSH MNT. PANEL
CENTRAL EMERGENCY SYSTEM FAULT
ON
ALARM
OFF
2.25"
4"
4"
INTERNAL TO ELECTRONICS CABINET
NOTE: USE 18 GAUGE WIRE.
SUMMARY DRY CONTACTS
BROWN
ORANGE
VIOLET
P/O SUM-K1
N/C
N/O
WIPER
REMOTE SUMMARY FAULT
1/4A, 250V
F1
MAIN CONTROL PCB
A1–P5–4
A1–P10–8
A1–P10–7
A1–P5–5
RED
WHT
YEL
GRN
YELLOW
WHT–YEL
120V or 277V Sys. = P2–1, 1.5–16.7k
208V or 240V Sys. = P1–8, 1.5–16.7k
GND
CUSTOMER PROVIDED
WIRE 20–GAUGE 300V
REMOTE
ALARM SILENCE SWITCH
OFF
ON
R1
LED
ALARM
120V SYS. = T1–5
277V SYS. = T1–5
1.5–5k
120V SYS. = T1–5
277V SYS. = T1–4
6–16.7k
208/240V SYS. = P1–9 1.5k – 16.7k
SUM–K1
WHT/VIO
120V
BLUE
B
A1–P10–8 was to A1–P7–8 FOR 120 or 277V SYS.
ADDED CONNECTOR TO A1–P10–8 CONNECTION.
12/20/10
KW
A
Relay coil wiring for 208VAC changed
8/10/07
LS
REV.
DESCRIPTION
DATE
BY
SCALE: NONE
DATE: 08/31/05
DRAWN BY: K W
APPROVED BY:
REMOTE SUMMARY ALARM PANEL & SDC
FOR E & IE
DRAWING NUMBER:
203303B

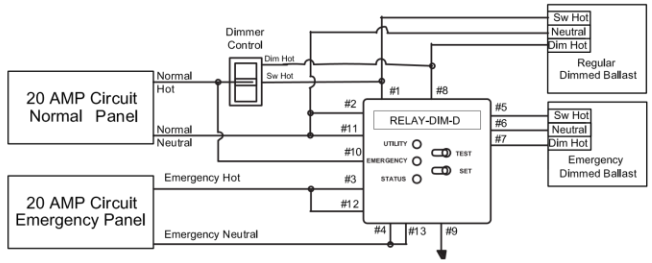

J1
OPTIONAL
REMOTE STATUS PANEL
(203606)
REMOTE PANEL INTERCONNECT
CUSTOMER INSTALLED
WA-115037-01 (100Ft) STANDARD CABLE
WA-115037-02 (150Ft)
WA-115037-03 (200Ft)
WA-115037-04 (250Ft)
WA-115037-05 (300Ft)
22 GAUGE WIRE MINIMUM, UP TO 1000 FEET
CALL CUSTOMER SERVICE
FOR LONGER CABLES
2.25"
4.0"
4.5"
4.0"
4.5"
CUSTOMER CONNECTIONS
RELAY PCB
(404121)
P5
(RED)
(GREEN)
(BLACK)
(ORANGE)
(YELLOW)
(WHITE)
(BLUE)
FROM A1-A1-P10-12
ON ELECTRONICS MODULE
(WHT/VIO)
J1-1
P1-1
BYPASS INPUT
P3-1
FROM A1-A1-P6-7
ON ELECTRONICS MODULE
(BLUE)
J1-2
P1-2
(BLUE)
INVERTER ON
P3-2
NOT USED
C.B. TRIP
P3-3
FROM A1-A1-P7-3
ON ELECTRONICS MODULE
(BLACK)
J1-3
P1-3
AC INPUT
P3-4
FROM A1-A1-P10-7
ON ELECTRONICS MODULE
(WHT/GRY)
J1-4
P1-4
SUMMARY
P3-5
INVERTER OFF
P3-6
FROM A1-A1-P5-5
ON ELECTRONICS MODULE
(WHT/YEL)
J1-5
P1-5
GROUND
P3-7
NOT USED
P3-8
NOT USED
P3-9
NOT USED
P3-10
NOT USED
P3-11
NOT USED
P3-12
T1
FROM A1-A1-P10-2
ON ELECTRONICS MODULE
(BLUE-WHT)
J1-6 P1-6
2
6
(BLACK)
P4-1
FROM A1-A1-P5-6
ON ELECTRONICS MODULE
(WHT/BLU)
J1-7 P1-7
1
7
(WHITE)
P4-2
FROM A1-A1-P6-8
ON ELECTRONICS MODULE
(ORANGE)
J1-8 P1-8
(ORANGE)
JUMPERS ADDED ON A1
A1-A1-P10-8
ON ELECTRONICS MODULE
A1-A1-P10-11
ON ELECTRONICS MODULE
(WHT/BLU)
FAULT SUMMARY CONTACT
TO GROUND
P2-12
P2-11
P2-10
P2-9
P2-8
P2-7
P2-6
P2-5
P2-4
P2-3
P2-2
P2-1
NOT USED
NOT USED
NOT USED
P1-1
P1-2
P1-3
P1-4
P1-5
P1-6
P1-7
P1-8
P1-9
P1-10
P1-11
P1-12
NOT USED
NOT USED
NOT USED
N.O.
N.C.
WIPER
BYPASS
(OPTIONAL)
INVERTER
ON
INVERTER
OFF
N.O.
AC_PRESENT
N.C.
WIPER
N.O.
SUMMARY
N.C.
WIPER
N.O.
THERMAL
SWITCH
N.C.
WIPER
6.0 - 16.7K
SW1 (MBYP SWITCH)
* FOR IE SYSTEM ONLY
P3-2
P3-1
(4)
(1,3)
(2)
1.5 - 5.0K
SW1 (MBYP SWITCH)
* FOR IE SYSTEM ONLY
P3-2
P3-1
(8)
(5,7)
(6)
C ADDED MINIMUM WIRE GAUGE & LENGTH. 02/01/18 KW
B ADDED REMOTE BOX DIAGRAM. 12/11/14 KW
A ADDED SW1 WIRING. 04/03/14 KW
REV. DESCRIPTION DATE BY
SCALE: NONE
DATE: 07/15/13
DRAWN BY: K W
APPROVED BY:
SCHEMATIC, "IC-2" SYSTEM MONITORING TERMINALS
MULTI FORM C DRY CONTACTS
DRAWING NUMBER:
203620C

RELAY-DIM-D WIRING DIAGRAMS

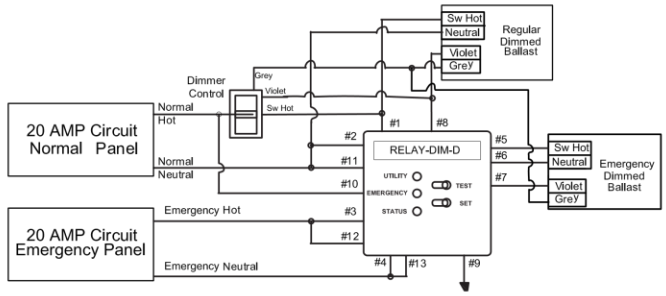
2-WIRE DIMMABLE LOADS



3-WIRE DIMMABLE LOADS



4-WIRE DIMMABLE LOADS (0-10V)



MODEL #: RLY-DIM-D

WIRING DIAGRAM
UL1008 TRANSFER
RELAY

MYERS™
EMERGENCY POWER SYSTEMS

DRAWING NUMBER:
115540

DATE: 12/28/18 | DRAWN BY: RD

Notes: