

# Solar Power Option

Models: PVS240W-24 and PVS240W-48



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## ***Description, Installation, and Operation Manual***

## Limited Warranty

This product is subject to and covered by a limited warranty, a copy of which can be found at [www.fedsig.com/SSG-Warranty](http://www.fedsig.com/SSG-Warranty). A copy of this limited warranty can also be obtained by written request to Federal Signal Corporation, 2645 Federal Signal Drive, University Park, IL 60484, email to [info@fedsig.com](mailto:info@fedsig.com) or call +1 708-534-3400.

This limited warranty is in lieu of all other warranties, express or implied, contractual or statutory, including, but not limited to the warranty of merchantability, warranty of fitness for a particular purpose and any warranty against failure of its essential purpose.



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## Contents

<b>Safety Messages.....</b>	<b>6</b>
<b>General Description .....</b>	<b>9</b>
Overview .....	9
Features.....	9
Ordering Information .....	9
<b>Specifications .....</b>	<b>10</b>
<b>Installation.....</b>	<b>10</b>
Installing the Solar Panel Bracket .....	10
Required Equipment .....	10
Side Pole Installation .....	11
Top-of-Pole Installation .....	15
<b>Power Supply and Wiring .....</b>	<b>17</b>
Power Supply .....	17
Wiring the 48 V Junction Box.....	17
Wiring the 24 V Junction Box.....	18
Wiring the 24 V Junction Box (110 W Modules, three conductors).....	21
Wiring the Junction Box for 24 V (110 W Modules, four-wire).....	22
<b>Solar Regulator Settings—24 Vdc Operation .....</b>	<b>26</b>
Solar Configuration Only .....	26
Solar Panels and AC Battery Charger .....	28
Programming the PS-30M .....	29
<b>Getting Technical Support and Service.....</b>	<b>32</b>

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## Figures

Figure 1 Placement of 60 W Module (Top View) .....	13
Figure 2 Side Pole Mount (60 W Modules) .....	14
Figure 3 Side Pole Mount (110 W Modules) .....	15
Figure 4 Top-of-Pole Mount .....	16
Figure 5 Module Wiring (back view) .....	19
Figure 6 Wiring PVS220W Option .....	20
Figure 7 Wiring PVS240W Option .....	21
Figure 8 Module Wiring 110 W Panels .....	23
Figure 9 Wiring PVS220W Option .....	24
Figure 10 Module 110 W Placement .....	25
Figure 11 PS-30M Solar Regulator .....	26
Figure 12 Solar Only for AGM and GEL Batteries .....	27
Figure 13 Solar Only for Lead Acid Batteries .....	27
Figure 14 Solar Panel and AC Battery Charger for AGM, GEL, or Lead Acid Batteries .....	28
Figure 15 Final Assembly Solar Bracket 55 W or 60 W (4 Panel) .....	31
Figure 16 Final Assembly Solar Bracket Side Mount 110 W .....	32
Figure 17 Final Assembly Solar Bracket Top-of-Pole Mount 110 W (2 Panel) .....	33
Figure 18 DCB and DCFCB Solar Wiring .....	34
Figure 19 DCFCTB Solar Wiring .....	35
Figure 20 One-Way Solar UltraVoice Wiring Diagram .....	36
Figure 21 Two-Way Solar UltraVoice Wiring Diagram .....	37
Figure 22 Two-Way Primary AC with Solar UltraVoice Wiring Diagram .....	38
Figure 23 Two-Way Primary Solar with AC UltraVoice Wiring Diagram .....	39
Figure 24 Hawaii UltraVoice Wiring Diagram .....	40
Figure 25 Solar Assembly for the UltraVoice .....	41

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Figure 26 Solar Assembly for the DC Series Siren Control System .....	42
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## Tables

Table 1 Ordering Information .....	9
Table 2 Side Pole Mount .....	10
Table 3 Top-of-Pole Mount .....	10
Table 4 Required Tools .....	10
Table 5 Recommended AGM and GEL Batteries .....	26
Table 6 Lead Acid Batteries .....	27
Table 7 Settings for Switches .....	28

## **Safety Messages**

### **⚠ WARNING**

It is important to follow all instructions shipped with this product. This device is to be installed by trained personnel who are thoroughly familiar with the country's electric codes and will follow these guidelines as well as local codes and ordinances, including any state or local noise-control ordinances.

Listed below are important safety instructions and precautions you should follow:

#### **Important Notice**

Federal Signal reserves the right to make changes to devices and specifications detailed in the manual at any time in order to improve reliability, function, or design. The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for any inaccuracies.

#### **Publications**

Federal Signal recommends the following publications from the Federal Emergency Management Agency for assistance with planning an outdoor warning system:

- The "Outdoor Warning Guide" (CPG 1-17)
- "Civil Preparedness, Principles of Warning" (CPG 1-14)
- FEMA-REP-1, Appendix 3 (Nuclear Plant Guideline)
- FEMA-REP-10 (Nuclear Plant Guideline).

#### **Planning**

- If suitable warning equipment is not selected, the installation site for the siren is not selected properly, or the siren is not installed properly, it may not produce the intended optimum audible warning. Follow Federal Emergency Management Agency (FEMA) recommendations.
- If sirens are not activated in a timely manner when an emergency condition exists, they cannot provide the intended audible warning. It is imperative that knowledgeable people, who are provided with the necessary information, be available at all times to authorize the activation of the sirens.
- When sirens are used out of doors, people indoors may not be able to hear the warning signals. Separate warning devices or procedures may be needed to effectively warn people indoors.
- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near sirens. Review and comply with any local or state noise control ordinances as well as OSHA noise exposure regulations and guidelines.
- Activating the sirens may not result in people taking the desired actions if those to be warned are not properly trained about the meaning of siren sounds. Siren users should follow FEMA recommendations and instruct those to be warned of correct actions to be taken.
- After installation, service, or maintenance, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service and operating personnel do not have these instructions to refer to, the siren system may not provide the intended audible warning and service personnel may be exposed to death, permanent hearing loss, or other bodily injuries. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees. Also give a copy to anyone who is going to service or repair the siren.

**Installation and Service**

- Electrocution or severe personal injury can occur when performing various installation and service functions such as making electrical connections, drilling holes, or lifting equipment. Therefore, only experienced and qualified electricians should install this product in compliance with national, state, and any other applicable codes, ordinances, and regulations. Perform all work under the direction of the installation or service crew safety foreman.
- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near the sirens. Sirens may be operated from remote control points. Whenever possible, disconnect all siren power, including batteries, before working near the siren. Review and comply with any local or state noise control ordinances as well as OSHA noise exposure regulations and guidelines.
- After installation or service, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.
- If future service and operating personnel do not have these instructions to refer to and are not properly trained, the system may not provide the intended audible warning, and service personnel may be exposed to hazards that could result in death, permanent hearing loss, or other bodily injuries. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to recruits and trainees. Also give a copy to anyone who is going to service or repair the siren.

**Operation**

Failure to understand the capabilities and limitations of your siren could result in permanent hearing loss, other serious injuries, or death to persons too close to the sirens when you activate them or to those you need to warn. Carefully read and thoroughly understand all safety notices in this manual and all operations-related items in all instruction manuals shipped with the equipment. Thoroughly discuss all contingency plans with those responsible for warning people in your community, company, or jurisdiction. A well-written contingency plan document is recommended.

Solar modules generate DC electricity when exposed to light. Exposure to this voltage can result in serious injury or even death. Follow all safety precautions.

To stop production of electricity, cover panel surfaces with opaque material while working on system. Avoid touching terminals and/or wire ends until connections are made.

### Hazard Classification

Federal Signal uses signal words to identify the following:

#### **DANGER**

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

#### **WARNING**

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

#### **CAUTION**

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

#### **NOTICE**

NOTICE is used to address practices not related to physical injury.

***Read and understand the information contained in this manual before attempting to install or service the siren.***

Pay careful attention to notices located on the equipment.



## General Description

### Overview

This manual describes how to install the Solar Power option.

The Solar Power option provides an all inclusive solar powering option for all outdoor sirens. Solar powering batteries is an efficient and economical method of powering remote sirens, alerting, or control equipment. Applications include, but are not limited to, remote tsunami sirens, muster stations, and tornado sirens.

The PVS240W-24 and PVS240W-48 provide 240 W of power for charging batteries in 24 or 48 Vdc applications. These systems are equipped with solar regulators for accurate control, protection, and solar panel monitoring. These kits use four 60-watt highly efficient solar panels, each with junction boxes to allow ease of wiring.

The mounting hardware is aluminum for lightweight and high strength, able to withstand wind loads up to 170 mph. The kit includes thirty feet of cable to allow wiring from the panels to the Battery Cabinet. The solar regulators support gel, sealed, or flooded batteries with temperature compensation to extend battery life and improve system performance. Federal Signal determines the proper direction and tilt for each solar application based on location. Federal Signal recommends gel batteries for solar applications.

**NOTE:** The PVS220W-24 and PVS220W-48 are no longer available for sale. They are included in this manual for maintenance purposes only.

### Features

The Solar Power models have the following features:

- Enables remote/unwired deployment of sirens
- Solar power provides continuous charging of batteries
- Radio connectivity for two-way activation and control
- Eliminates expensive trenching of power to remote sites
- Supports mechanical or electronic sirens
- Allows 25 to 60° of tilt for solar optimization
- 24 or 48 Vdc operation
- Wind loads up to 170 mph

### Ordering Information

**Table 1 Ordering Information**

Part Number	Description
PVS240W-24	Solar Power Option UltraVoice (UV)
PVS240W-48	Solar Power Option Federal Controller (FC)

## Specifications

**Table 2 Side Pole Mount**

Net Weight	115 pounds (52 kg)
Shipping Weight	153 pounds (69 kg)

**Table 3 Top-of-Pole Mount**

Net Weight	112 pounds (51 kg)
Shipping Weight	150 pounds (68 kg)

## Installation

### Installing the Solar Panel Bracket

**⚠ DANGER**

***SHOCK HAZARD: Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, experienced electricians, per national and local electrical codes, acting under the installation crew safety foreman's direction, should perform the installation.***

Most bracket installations are one of two types: Side Pole Mount or Top Pole Mount. These two configurations make it possible to provide solar power in almost any situation. If the installations in this manual are not suitable, it may be practical to modify one of the configurations.

For best results, the solar modules must face true south. Consult FEMA CPG 1-17 and CPG 1-14 and your local Federal Signal representative to place your outdoor warning equipment properly.

### Required Equipment

You need the following equipment.

**Table 4 Required Tools**

Checklist	Required Tools
	Large flat head screwdriver
	Medium flat head screwdriver
	Narrow (3/16-in) flat head screwdriver
	Medium cross head screwdriver
	Socket driver set with 7/16-in, 9/16-in and 3/4-in sockets
	7/16-in open end wrench
	9/16-in open end wrench
	Adjustable wrench
	Wire cutters
	Needle nose pliers
	Wire strip and crimp tool
	Electric drill with 1/4-in drill bit
	Utility knife

Checklist	Required Tools
	Measuring tape

## Side Pole Installation

The bracket is typically mounted on a Class 2 utility pole (ANSI-type wooden pole or equivalent) with a minimum horizontal ground stress rating of 3,700 pounds (1678 kg). Ensure that soil loads will conform to this size utility pole.

**NOTE:** Certain soil conditions may require guying for the pole. Check with the proper building authorities.

To install a side pole mount solar bracket onto a wooden utility pole:

1. Uncrate and identify the various parts. You can use an empty box as a platform to protect assembly and modules from damage.
2. Place the solar modules face down with their junction boxes toward the center for the modules or toward the top for the 110 W panels.
3. Assemble the solar bracket onto the solar modules per the final assembly drawing. Apply thread-locking compound to all fastening hardware to ensure secure assembly.
4. Find the desired elevation on the pole. For best results, the solar modules must face true south. Mark the eight mounting holes on the pole for the bracket.
5. Drill a 3/8-inch pilot hole at each of the locations. Drill each hole at least 3-1/2 inches deep.
6. Using eight 1/2-inch stainless steel lag screws (minimum of 5 inches in length) or two sections of 3/4-inch wide stainless steel strapping, secure the solar bracket onto the pole.
7. Locate your site and find the latitude of your location. For the Northern Hemisphere, add or set the tilt angle at the value specified in the following table.

Latitude Range	Tilt Angle
90° to 60°	60°
60° to 25°	+15°
25° to 20°	+5°
20° to 0°	25°

### NOTICE

***Tilt angles are limited to a minimum of 25° and a maximum of 60°.***

8. Find the vertical distance Y for your setup from the tilt angle charts.

For any other type of pole, such as a galvanized steel pole, install the side mount solar bracket as follows:

1. Uncrate and identify the various parts. Use an empty box as a platform to protect assembly and modules from damage.
2. Start by placing the solar modules face down with their junction boxes toward the center for the modules or toward the top for the 110 W panels.
3. Assemble the solar bracket onto the solar modules per the final assembly drawing. Apply thread-locking compound to all fastening hardware to ensure secure assembly.
4. Find the desired elevation on the pole. For best results, the solar modules must face true south. Mark the two placement locations on the pole for the bracket.
5. Secure the solar bracket by clamping it onto the pole using two sections of 3/4-inch wide stainless steel strapping and the tilt angle charts.
6. Locate your site and find the latitude of your location. For the Northern Hemisphere, add or set the tilt angle at the following table.

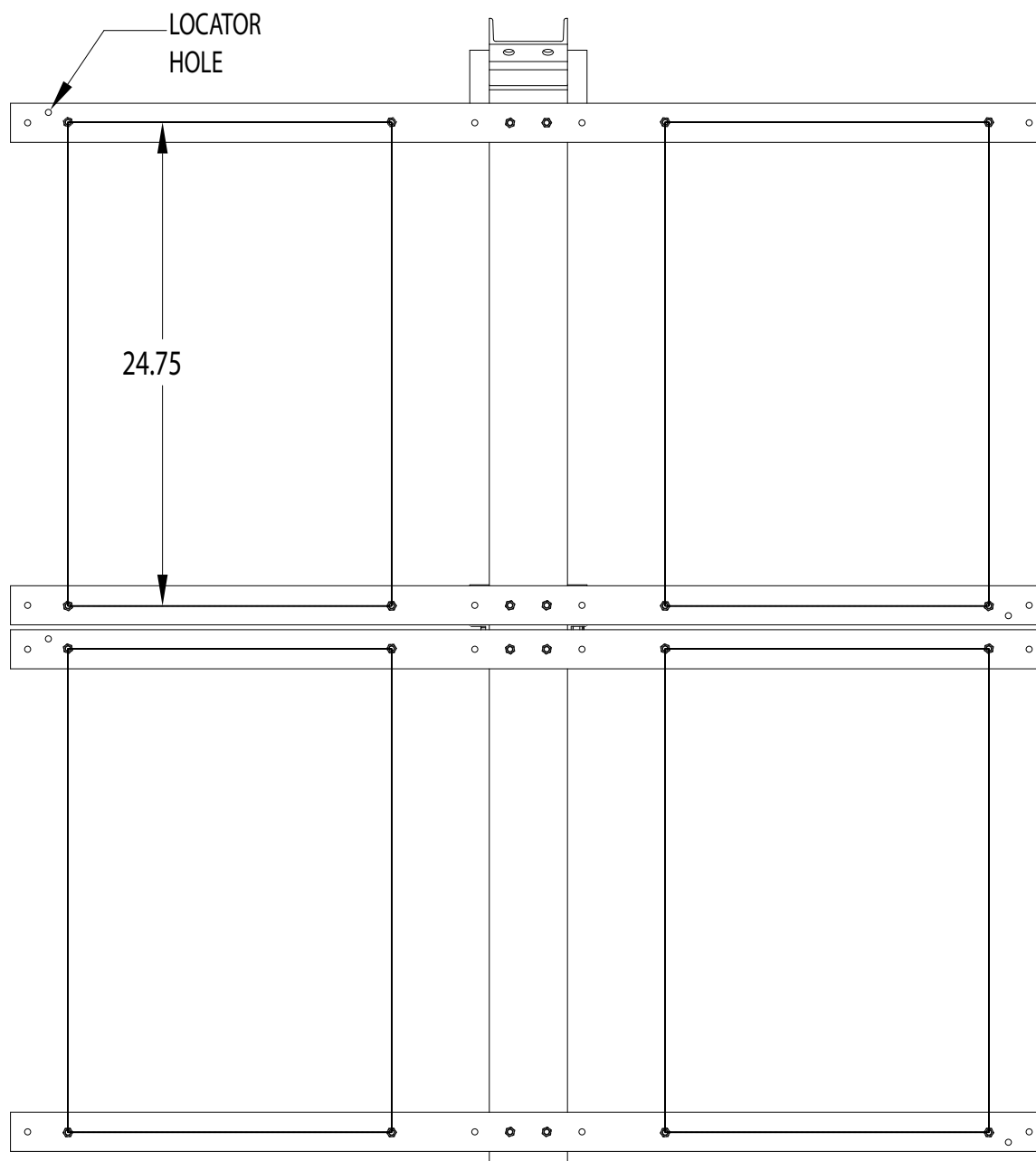
Latitude Range	Tilt Angle
90° to 60°	60°
60° to 25°	+15°
25° to 20°	+5°
20° to 0°	25°

### **NOTICE**

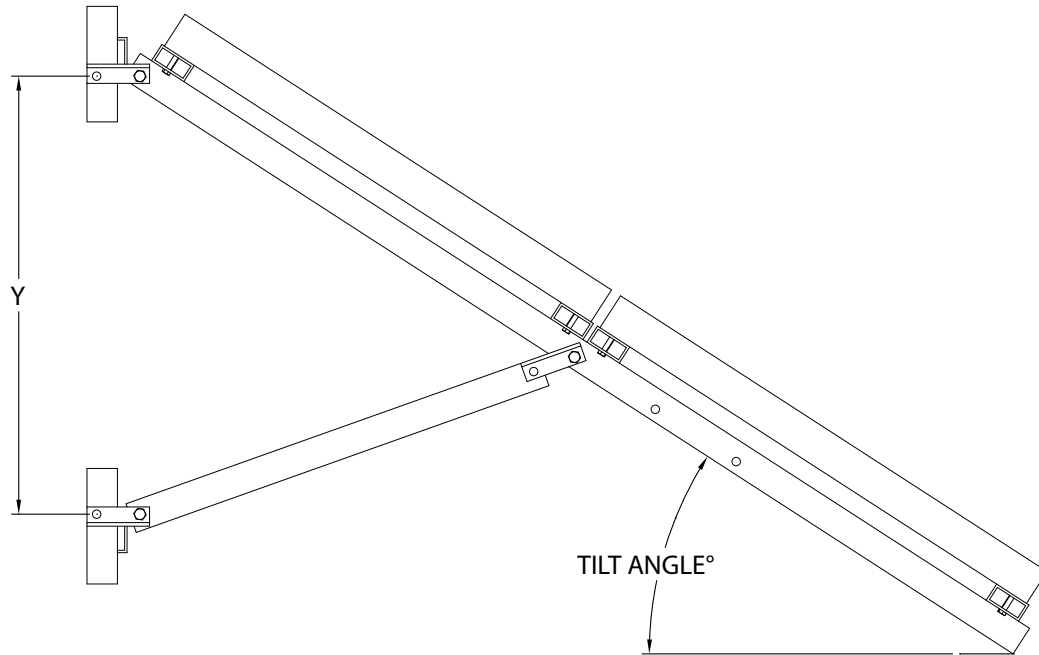
***Tilt angles are limited to a minimum of 25° and a maximum of 60°.***

7. Find the vertical distance Y for your setup from the tilt angle charts.

Figure 1 Placement of 60 W Module (Top View)



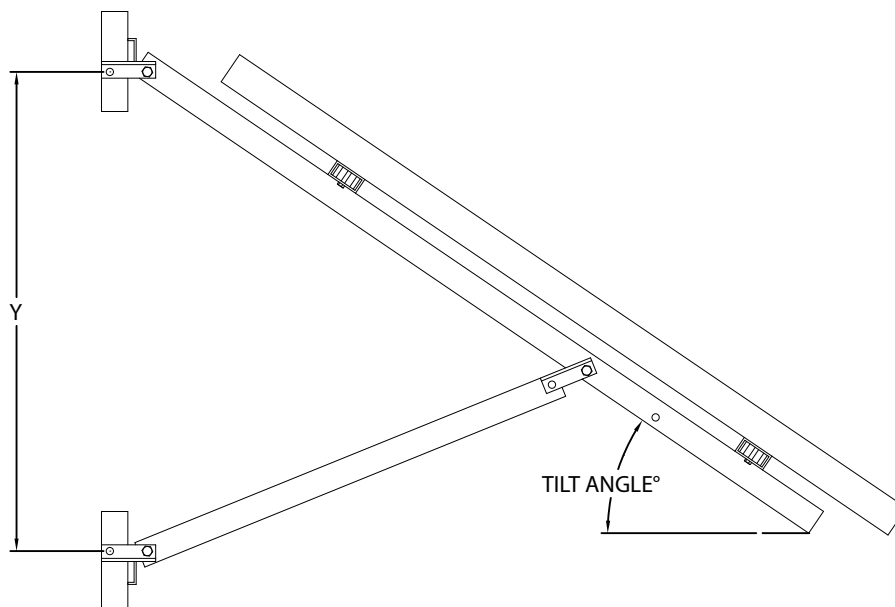
**Figure 2 Side Pole Mount (60 W Modules)**



291355C

Tilt Angle from horizontal	Vertical Distance Y	Hole Number
25°	15.00 in (38.10 cm)	1
30°	20.50 in (52.07 cm)	1
35°	26.00 in (66.04 cm)	1
40°	26.00 in (66.04 cm)	2
45°	31.50 in (80.01 cm)	2
50°	33.50 in (85.09 cm)	3
55°	42.50 in (107.95 cm)	3
60°	48.00 in (121.92 cm)	3

**Figure 3 Side Pole Mount (110 W Modules)**



Tilt Angle from horizontal	Vertical Distance Y	Hole Number
30°	23.00 in (58.42 cm)	1
35°	30.00 in (76.20 cm)	1
40°	28.75 in (73.03 cm)	2
45°	37.50 in (95.25 cm)	2
55°	48.00 in (121.92 cm)	1
60°	51.25 in (130.18 cm)	1

## Top-of-Pole Installation

To install a top-of-pole solar bracket:

1. Uncrate and identify the various parts. Use an empty box as a platform to protect the assembly and modules from damage.
2. Start by placing the solar modules face down with their junction boxes toward the center for the modules or toward the top for the 110 W panels.
3. Assemble the solar bracket onto the solar modules per the final assembly drawing. Apply thread-locking compound to all fastening hardware to ensure a secure assembly.

4. Locate your site and find the latitude of your location. For the Northern Hemisphere, add or set the tilt angle at the value specified in the following table.

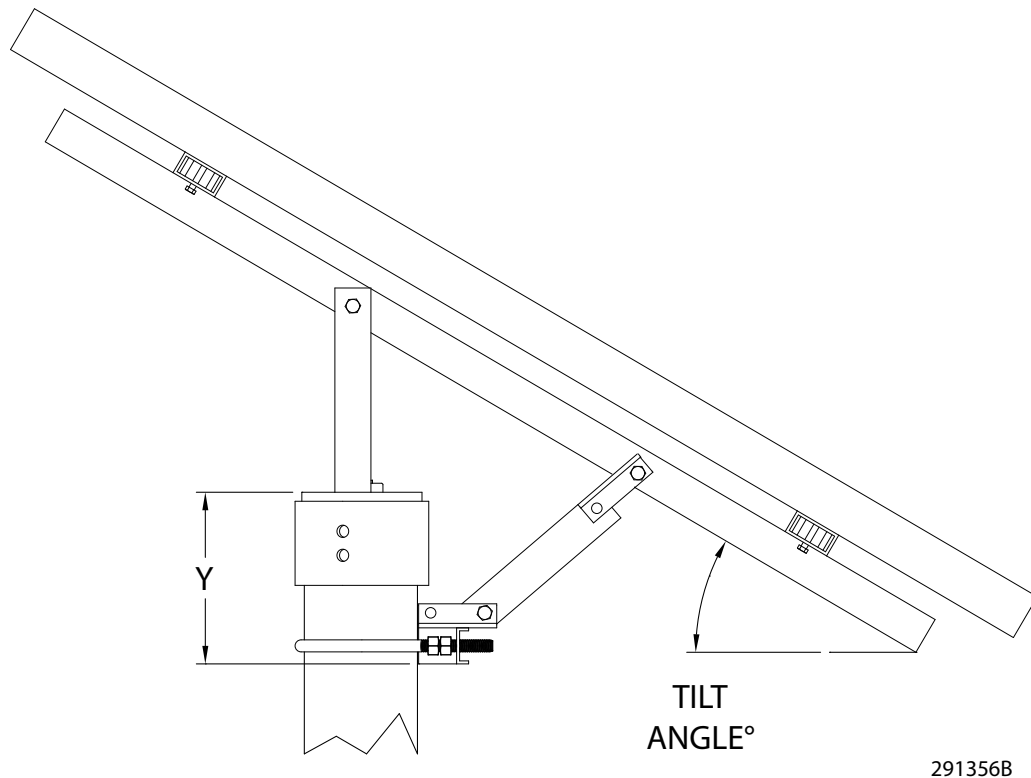
Latitude Range	Tilt Angle
90° to 60°	50°
60° to 25°	+15°
25° to 20°	+5°
20° to 0°	25°

**NOTICE**

***Tilt angles are limited to a minimum of 25° and a maximum of 50°.***

5. Find the vertical distance Y for your setup from the tilt angle chart. For best results, the solar modules must face true south.
6. Using the stainless steel u-bolt provided, secure the solar bracket onto the pole.

**Figure 4 Top-of-Pole Mount**



291356B



Tilt Angle from horizontal	Vertical Distance Y
25°	5.00 in (12.70 cm)
30°	5.50 in (13.97 cm)
35°	6.25 in (15.88 cm)
40°	7.00 in (17.78 cm)
45°	7.50 in (19.05 cm)
50°	7.75 in (19.69 cm)

## Power Supply and Wiring

### Power Supply

Connect four 60 W, 12 V solar modules in series to supply a 48 Vdc power supply for the 2001-130, Equinox, 508-128, and Eclipse8 electro-mechanical siren controls.

Connect four 60 W, 12 V solar modules in series/parallel to supply a 24 Vdc power supply for the UV electronic siren controls.

Connect two 110 W, 12V solar modules in series/parallel to supply a 24 Vdc power supply for the UV electronic siren controls.

### Wiring the 48 V Junction Box

To wire the junction box for the 48 V (60 W Modules):

1. Open the module junction box covers.
2. Knock out the appropriate junction box holes in the modules to allow the addition of cable clamps. An additional knockout is required for the array output wires leading from the array to the Control Cabinet.
3. Coat the module terminals with NO-OX-ID® or an equivalent corrosion inhibitor to prevent corrosion.
4. Cut the three-conductor cable 8-foot length (2.44 m) into three 32-inch (81.28 cm) sections.
5. Connect the black wires from the three-conductor cable sections as follows:
  - Negative (-) terminal of module A to positive (+) terminal of module B
  - Negative (-) terminal of module B to positive (+) terminal of module C
  - Negative (-) terminal of module C to positive (+) terminal of module D
6. Run one side of the two-conductor PV output cable 30-foot length (9.144 m) through the cable clamp to the module D junction box. Connect the black wire to the negative (-) terminal and butt splice the red wire to the red wire from the three-conductor cable within the junction box. Use the wire tie wraps provided to secure the output cable to the bracket.
7. Measure the voltage between red (+) and black (-) wires at the end of the PV output cable with the modules exposed to sunlight. If the wiring is correct, the voltage measures between 60 and 92 volts. If the voltage is not in this range, check the wire connections to ensure all steps were followed.

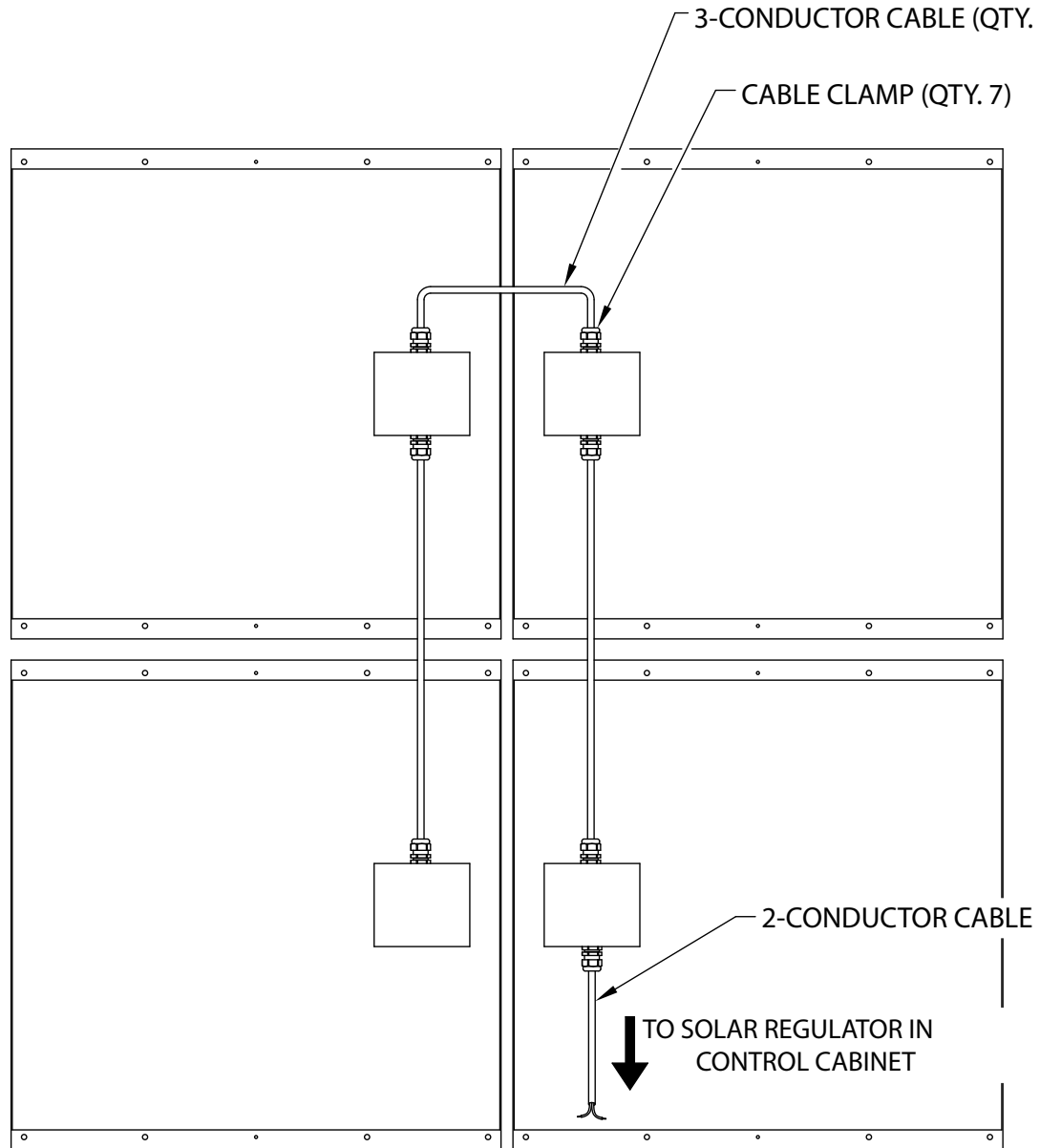
8. Close junction box covers.
9. Run the other side of the two-conductor PV output cable (30-foot length) down the pole to the Control Cabinet. Use the wire tie wraps provided to secure the output cable. Form a drip loop where the cable enters the Control Cabinet. Run the cable through the 1/2-inch NPT aluminum cord grip provided and connect to the solar regulator using the spade terminals.
10. Installation is now complete.

### Wiring the 24 V Junction Box

To wire the junction box for the 24 V (60 W Modules):

1. Open the module junction box covers.
2. Knock out the appropriate junction box holes in the modules to allow the addition of cable clamps. An additional knockout will be required for the array output wires leading from the array to the Control Cabinet.
3. Coat the module terminals with NO-OX-ID<sup>®</sup> or an equivalent corrosion inhibitor to prevent corrosion.
4. Cut a 32-inch (81.28 cm) section from the three-conductor cable 8-foot length (2.44 m).
5. Connect the white wire from the three-conductor section as follows:
  - Negative (-) terminal of module A to positive (+) terminal of module B
  - Negative (-) terminal of module C to positive (+) terminal of module D
6. Run the two-conductor PV output cable 30-foot length (9.144 m) through the cable clamp to the module D junction box. Connect the black wire to the negative (-) terminal and butt splice the red wire to the red wire from the three-conductor cable within the junction box. Use the wire tie wraps provided to secure the output cable to the bracket.
7. Measure the voltage between red (+) and black (-) wires at the end of the PV output cable with the modules exposed to sunlight. If the wiring is correct, the voltage measures between 30 and 46 Volts. If the voltage is not in this range, check the wire connections to ensure all steps were followed.
8. Close junction box covers.
9. Run the two-conductor PV output cable (30-foot length) down the pole to the Control Cabinet. Use wire tie wraps provided to secure the output cable. Form a drip loop where the cable enters the Control Cabinet. Run the cable through the 1/2-inch NPT aluminum cord grip provided and connect to the solar regulator using the spade terminals.
10. Installation is now complete.

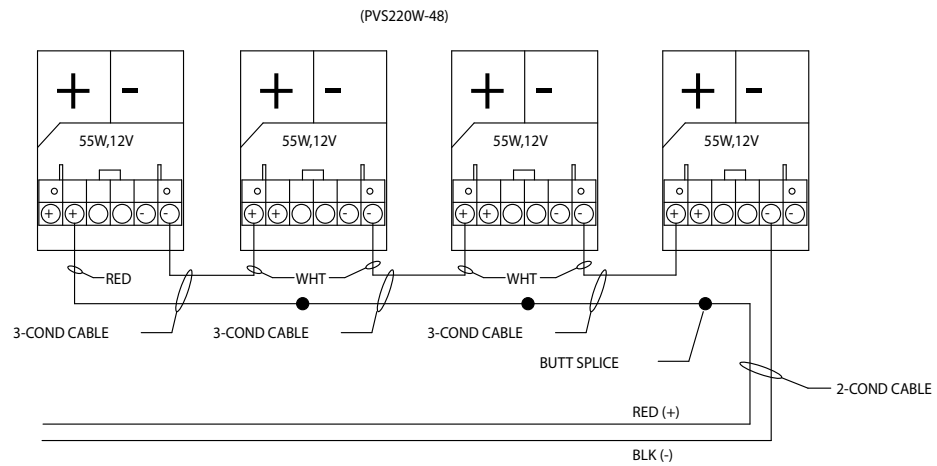
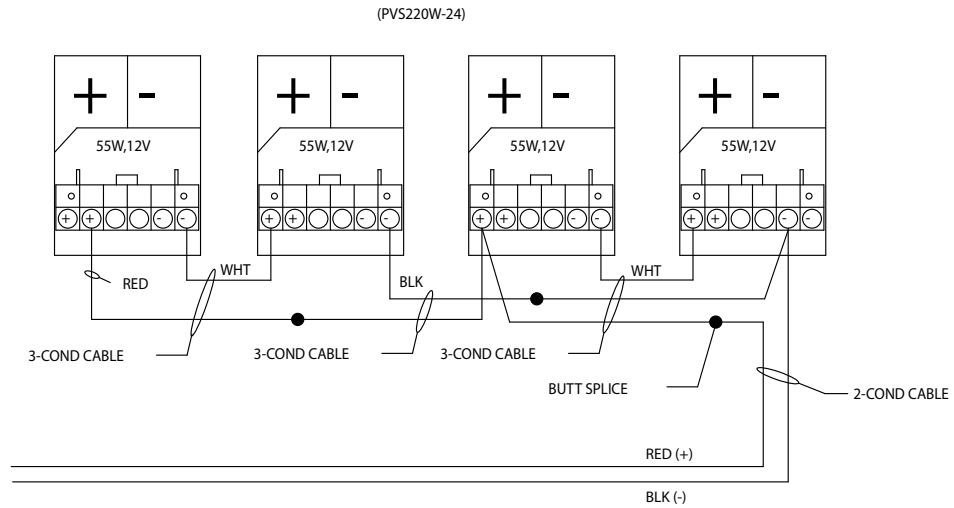
Figure 5 Module Wiring (back view)



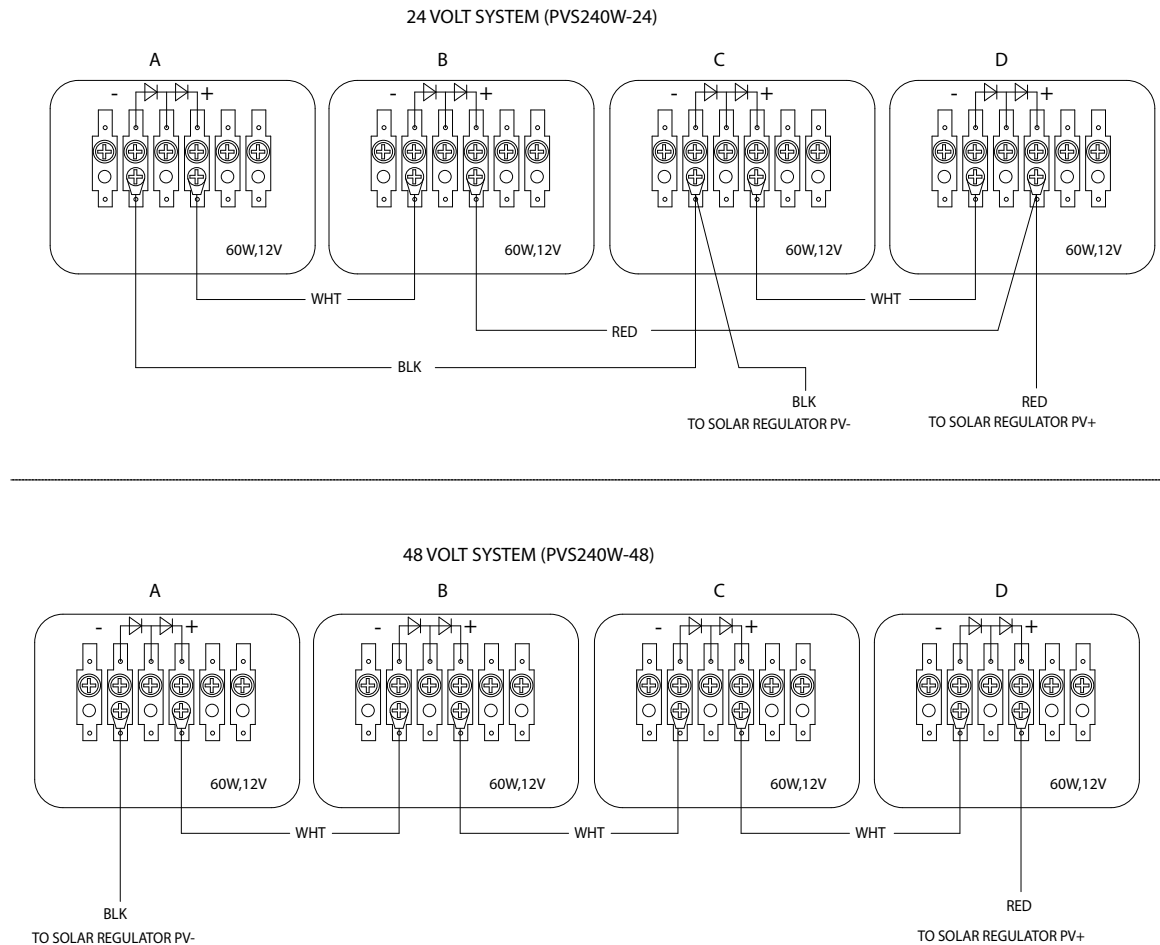
(BACK VIEW)  
MODULE WIRING

291357B

Figure 6 Wiring PVS220W Option



2913588

**Figure 7 Wiring PVS240W Option**

## Wiring the 24 V Junction Box (110 W Modules, three conductors)

To wire the 24 V junction box (110 W modules, three conductors):

1. Open the module junction box covers.
2. Knock out the appropriate junction box holes in the modules to allow the addition of cable clamps. An additional knockout will be required for the array output wires leading from the array to the Control Cabinet.
3. Coat the module terminals with NO-OX-ID® or an equivalent corrosion inhibitor to prevent corrosion.
4. Connect the white wire from the short three-conductor cable 3-foot length (91.44 cm) as follows:
  - Negative (-) terminal of module A to positive (+) terminal of module B
5. Run the long three-conductor PV output cable 60-foot length (18.288 m) through the cable clamp to the module B junction box. Connect the black wire to the negative (-) terminal and butt splice the red wire to the red wire from the three-conductor cable within the junction box. Use the wire tie wraps provided to secure the output cable to the bracket.

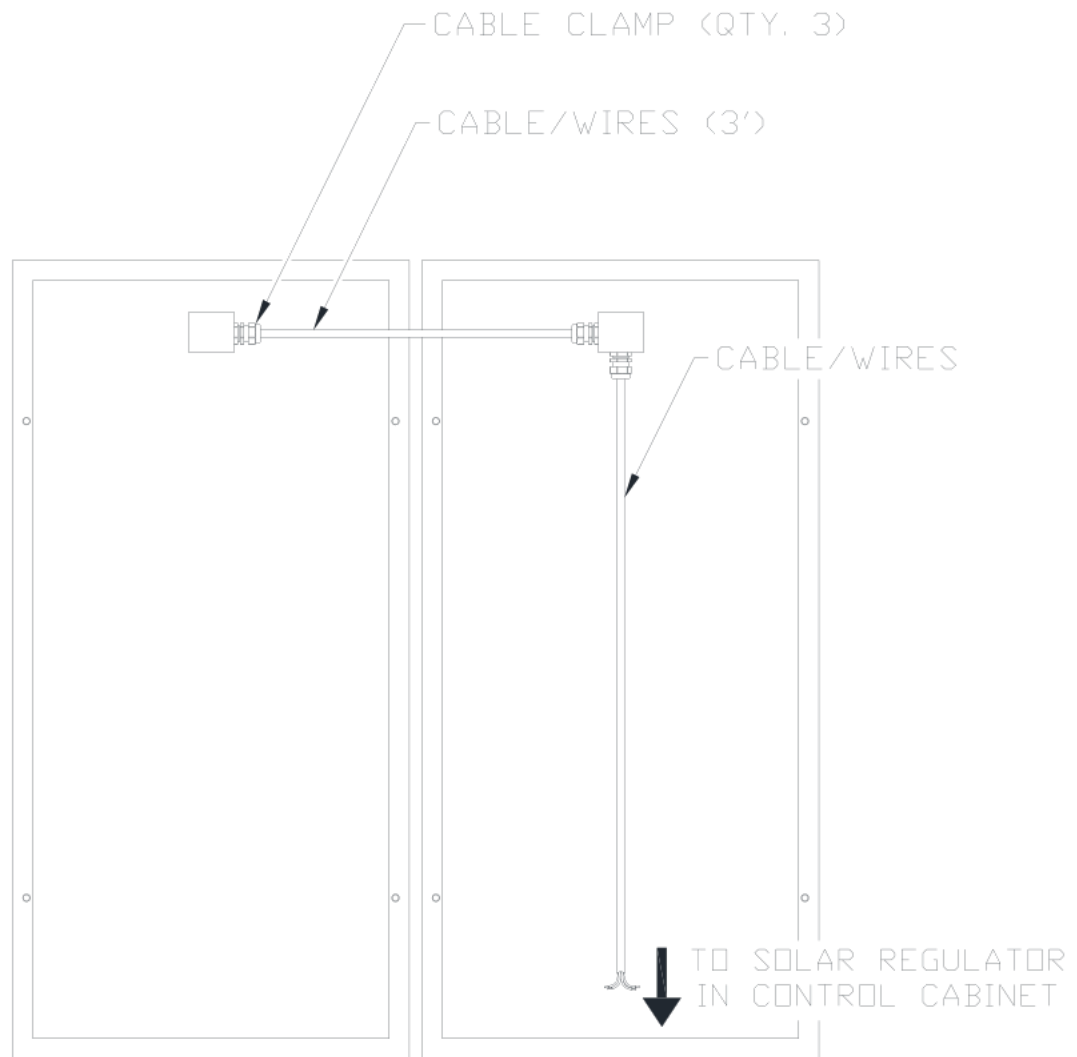
6. Measure the voltage between red (+) and black (-) wires at the end of the PV output cable with the modules exposed to sunlight. If the wiring is correct, the voltage measures between 30 and 46 Volts. If the voltage is not in this range, check the wire connections to ensure all steps were followed.
7. Close junction box covers.
8. Run the three-conductor PV output cable (60-foot length) down the pole to the Control Cabinet. Use wire tie wraps provided to secure the output cable. Form a drip loop where the cable enters the Control Cabinet. Run the cable through the 1/2-inch NPT aluminum cord grip provided and connect to the solar regulator using the spade terminals. Check the wire connections are made per diagram “Figure 24 Hawaii UltraVoice Wiring Diagram” on page 40.
9. Installation is now complete.

### Wiring the Junction Box for 24 V (110 W Modules, four-wire)

To wire the junction box for the 24 V (110 W modules, four-wire Hawaii):

1. Open the module junction box covers.
2. Knock out the appropriate junction box holes in the modules to allow the addition of cable clamps. An additional knockout will be required for the array output wires leading from the array to the Control Cabinet.
3. Coat module terminals with NO-OX-ID® or an equivalent corrosion inhibitor to prevent corrosion.
4. Run the wires 60-foot length (18.288 m) for the top mount or 30-foot (9.144 m) for the side mount, with an additional 3-foot length (91.44 cm) through the cable clamp to the module B junction box. Connect the shorter wires to the positive (+) and negative (-) terminals of module B. Run the longer wires out and connect to the terminals of module A. Use the wire tie wraps provided to secure the output cable to the bracket.
5. Measure the voltage between the two sets of red (+) and black (-) wires at the end of the PV output wires with the modules exposed to sunlight. If the wiring is correct, the voltage on each set of wires measures between 15 and 23 Volts. With a jumper installed on terminal blocks in the UV Control Cabinet, the series combination of the two modules measures between 30 and 46 Vdc. If either of these voltage values is not obtained, check the wire connections are made per diagram “Figure 24 Hawaii UltraVoice Wiring Diagram” on page 40.
6. Close junction box covers.
7. Run the wires down the pole to the Control Cabinet. Use wire tie wraps provided to secure the output cable. Form a drip loop where the cable enters the Control Cabinet. Run the cable through the 1/2-inch NPT aluminum cord grip provided and connect to the solar regulator using the spade terminals.
8. Installation is now complete.

Figure 8 Module Wiring 110 W Panels

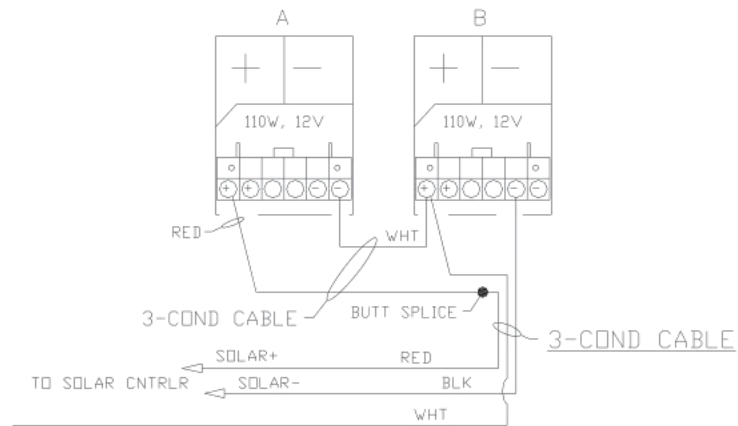


(BACK VIEW)  
MODULE WIRING  
110W PANELS

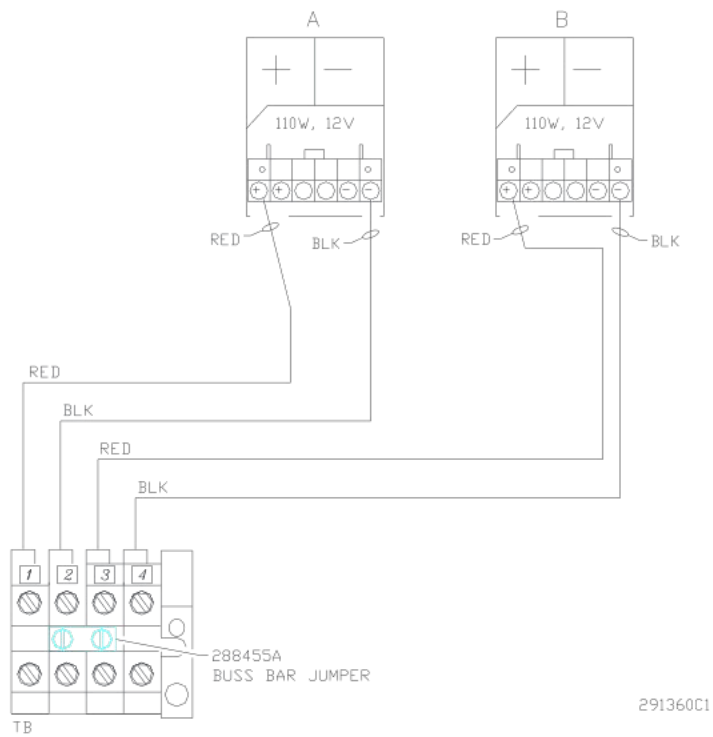
291359B

Figure 9 Wiring PVS220W Option

24 VOLT SYSTEM: 288996 (PVS220W-24)



24V STANDARD VERSION WIRING

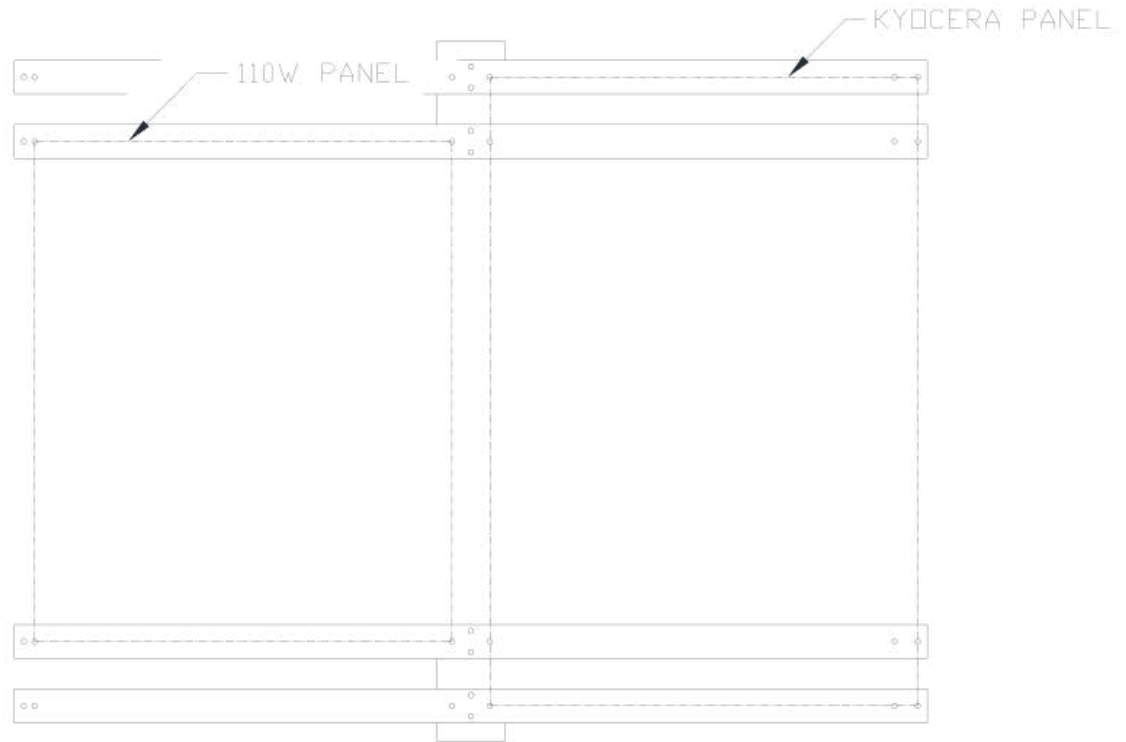


24V HAWAII VERSION WIRING

291360C1



Figure 10 Module 110 W Placement



110W MODULE PLACEMENT  
(TOP VIEW)

291367A1

## Solar Regulator Settings—24 Vdc Operation

Federal Signal equipment can operate in solar only or in a multi-power configuration (by using Solar Panels and AC Battery Charger). For the Morningstar® ProStar PS-30M Solar Regulator, Federal Signal recommends the following settings for solar-only configuration. Make these settings by removing the front cover and adjusting the DIP switch block located on the bottom right of the PS-30M Solar Regulator.

**Figure 11 PS-30M Solar Regulator**



### Solar Configuration Only

See “Figure 21 Two-Way Solar UltraVoice Wiring Diagram” on page 37 regarding charger sense wiring for Solar only configuration.

When used as solar only, the following settings are recommended for the PS-30M Solar Regulator. The settings are dependent on the battery type. Remove power before changing the switch settings.

**NOTE:** If you are not using the batteries listed in Table 5 or Table 6, see “Table 7 Settings for Switches” on page 28 for guidance.

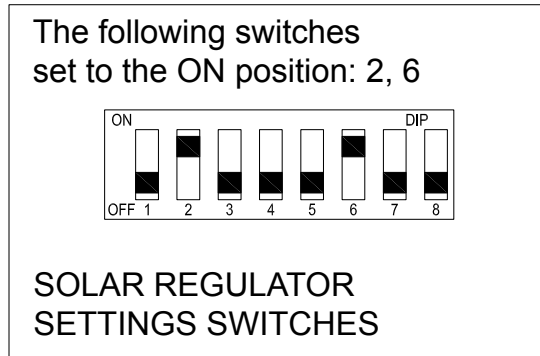
The following table lists the recommended batteries.

**Table 5 Recommended AGM and GEL Batteries**

Federal Signal Part Number	Description
15500007	MK Model 8A24DT, 78 Ah at C/20, Size 24
15500007-01	MK Model 8A27DT, 92 Ah at C/20, Size 27
15500007-02	MK Model 8A31DT, 97.6 Ah at C/20, Size 31
15500007A-03	GEL 73 Ah Model 8G24
15500007A-04	GEL 88 Ah Model 8G27
15500007A-05	GEL 97 Ah Model 8G31

For the AGM and GEL batteries (see Table 5), set the DIP switches as shown in Figure 12.

**Figure 12 Solar Only for AGM and GEL Batteries**

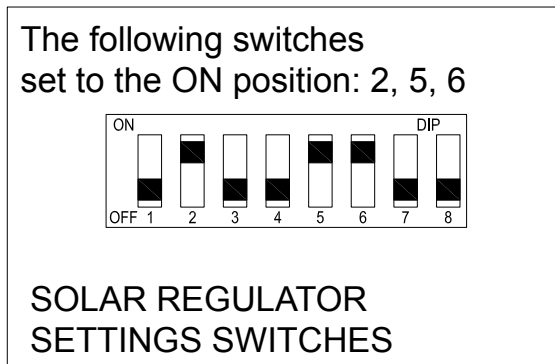


**Table 6 Lead Acid Batteries**

Federal Signal Part Number	Size	Manufacturer	Model	Capacity at C/20
IK-BATT-STD	Size 24	FVP	Model DC24-6	82 Ah
IK-BATT-EXT	Size 31	Delco	Model S2000	105 Ah

For the Lead Acid batteries (see Table 6), set the DIP switches as shown in Figure 13.

**Figure 13 Solar Only for Lead Acid Batteries**



**Table 7 Settings for Switches**

Settings 4-5-6	Battery Type	Absorp. Stage (volts)	Float Stage (volts)	Equalize Stage (volts)	Absorp. Time (mins)	Equalize Time (mins)	Equalize Timeout (mins)	Equalize Interval (days)
off-off-off	1 - Sealed*	14.00	13.50		150			
off-off-on	2 - Sealed*	14.15	13.50	14.40	150	60	120	28
off-on-off	3 - Sealed*	14.30	13.50	14.60	150	60	120	28
off-on-on	4- AGM/ Flooded	14.40	13.50	15.10	180	120	180	28
on-off-off	5 – Flooded	14.60	13.50	15.30	180	120	180	28
on-off-on	6 – Flooded	14.70	13.50	15.40	180	180	240	28
on-on-on	8 – Custom	Custom	Custom	Custom	Custom	Custom	Custom	Custom

\*Sealed battery type includes Gel and AGM batteries.

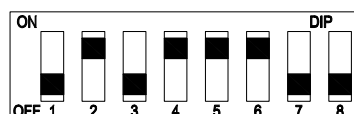
## Solar Panels and AC Battery Charger

See “Figure 22 Two-Way Primary AC with Solar UltraVoice Wiring Diagram” on page 38 regarding charger sense wiring for this mode of operation. The PS-30M Solar Regulator requires a custom file to allow the unit to work properly with the 860000235 (-01) charger in a UV cabinet. If the custom file is not used, the Solar Power option causes the AC charger to go into a fault mode during certain charging modes. The fault is only a nuisance and does not affect system operation.

When used as a combination AC charging with solar backup, the following settings are recommended.

### Figure 14 Solar Panel and AC Battery Charger for AGM, GEL, or Lead Acid Batteries

The following switches set to the ON position: 2, 4, 5, 6



**SOLAR REGULATOR  
SETTINGS SWITCHES**

Note regarding custom file:

If servicing the PS-30M Solar Regulator, it may be necessary to load the custom configuration into the unit. Contact Technical Support at [techsupport@fedsig.com](mailto:techsupport@fedsig.com) or 800-524-3021 to obtain a copy of the released configuration file via email.

## **Programming the PS-30M**

The programming requirements of the PS-30M:

- Laptop running Windows®
- Downloading MSView: <https://www.morningstarcorp.com/msview/>
- USB MeterBus Adapter (UMC-1):
  - <https://www.morningstarcorp.com/products/usb-meterbus-adapter/>
  - <https://www.morningstarcorp.com/buy/>
- Configuration File: fedsig 8\_28\_18.pspwm

To program the PS-30M:

1. Load MSView™ on a laptop.
2. Transfer the fedsig 8\_28\_18.pspwm configuration file to a folder on your computer.
3. Connect USB MeterBus Adapter (UMC-1) to a USB port on a laptop.  
**NOTE:** Ensure PS-30M has batteries and solar panels are connected before the next step.
4. Connect USB MeterBus Adapter (UMC-1) to the Serial port of PS-30M (black RJ-12 jack on PS-30M).
5. Open MSView.
6. Select Devices > Search for Connected Devices.

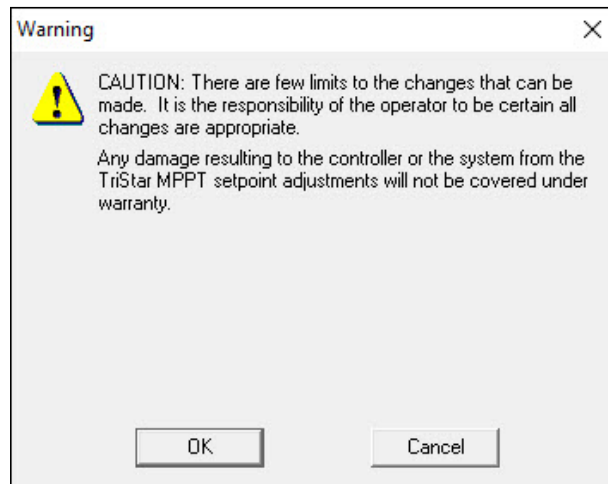
PS-30M appears

Now that connectivity has been established between the MSView software and the PS-30M, upload the configuration file.

To upload the configuration file:

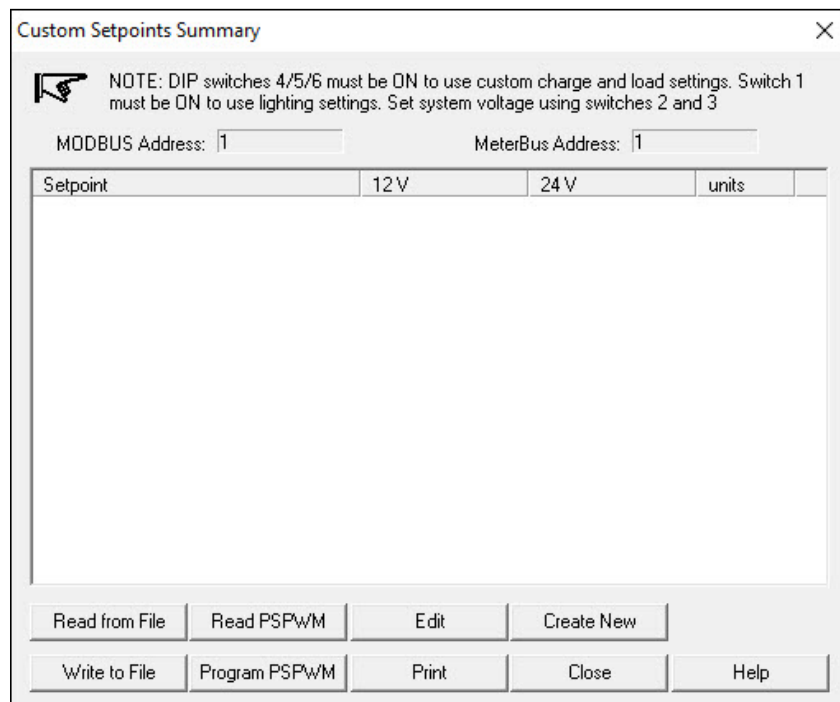
1. Select Tools > Prostar PWM Setup Wizard.

The Warning dialog box appears.



2. Click OK.

The Custom Setpoints Summary window appears.



3. Click the Read from File button.
4. Browse to the location where fedsig 8\_28\_18.pspwm is saved.
5. Select the file and click Open.

You will automatically return to the Custom Setpoints Summary dialog box.

6. Click the Program PSPWM button to load the file.

Now that the new configuration has been loaded, the PS-30M must be power cycled.

To power cycle:

1. Disconnect the batteries from the PS-30M.
2. Wait for 5 seconds.
3. Reconnect the batteries to the battery terminal of the PS-30M.

The PS-30M powers up, and the display shows battery voltages and state of charge.

## **Getting Technical Support and Service**

For technical support, contact:

Federal Signal  
Technical Support  
Phone: 800-524-3021 or 708-534-4790  
Email: techsupport@fedsig.com  
www.fedsig.com

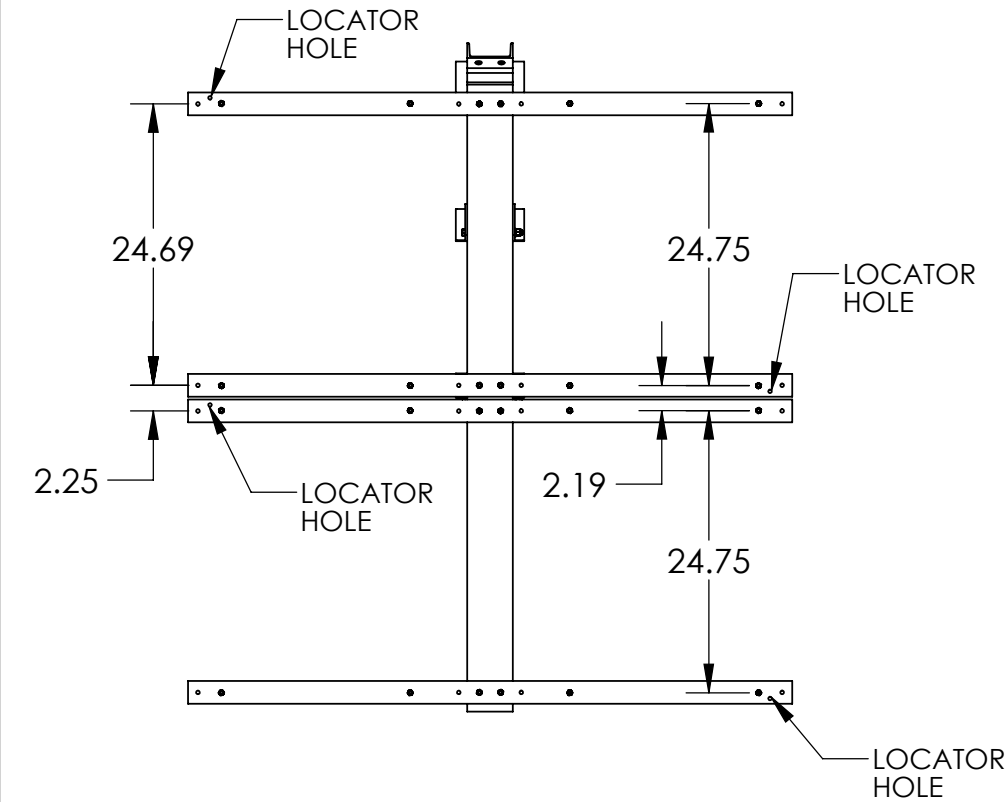
For customer support, contact:

Federal Signal  
Customer Support  
Phone: 800-548-7229 or 708-534-3400 extension 367511  
Email: customersupport@fedsig.com  
www.fedsig.com

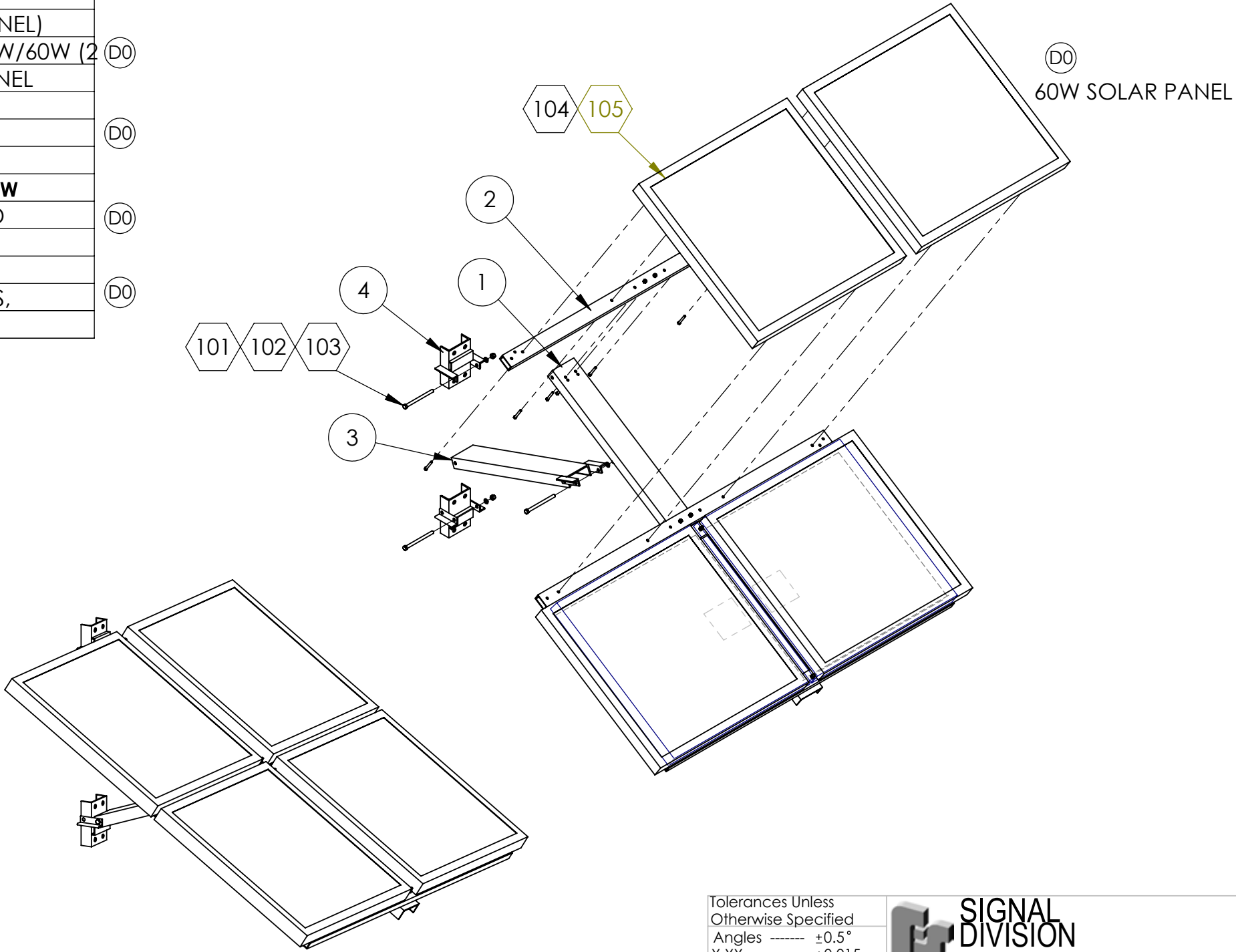


Figure 15 Final Assembly Solar Bracket 55 W or 60 W (4 Panel)

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	2881278C	CHANNEL, BASE, SOLAR 55W (4 PANEL)
2	4	2881279B	TUBING, RECTANGULAR, SOLAR 55W/60W (2
3	1	2881284A	ASSEMBLY, WELD, SUPPORT, CHANNEL
4	2	2881286A	CHANNEL, BRACKET, WELD
5	1	2881333	HARDWARE KIT
			<b>HARDWARE KIT PARTS ARE LISTED BELOW</b>
101	3	7002080A-80	SCREW,HEX,SS,3/8-16 X 5,FULL THRD
102	3	7058A013	NUT,EL STOP,HEX,LT SS,3/8-16
103	3	7074A046	LKWSHR, SPLT, SS, 3/8
104	24	7000A311-30	SCREW, MACH, 1/4-20, HEX HD, , SS,
105	24	7058A010	NUT, EL STOP, 1/4-20, , SS,



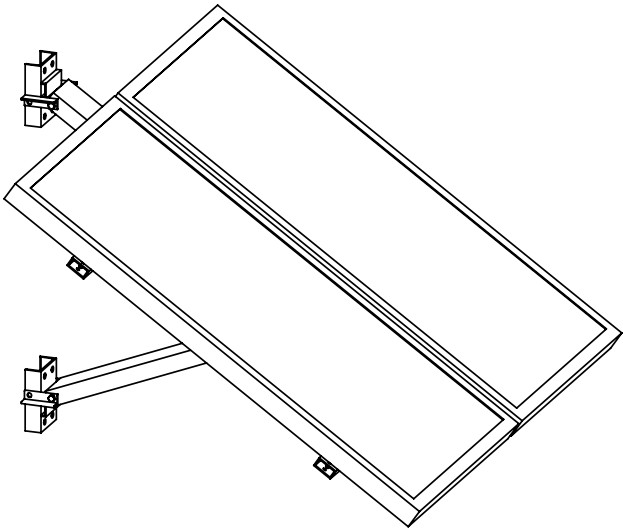
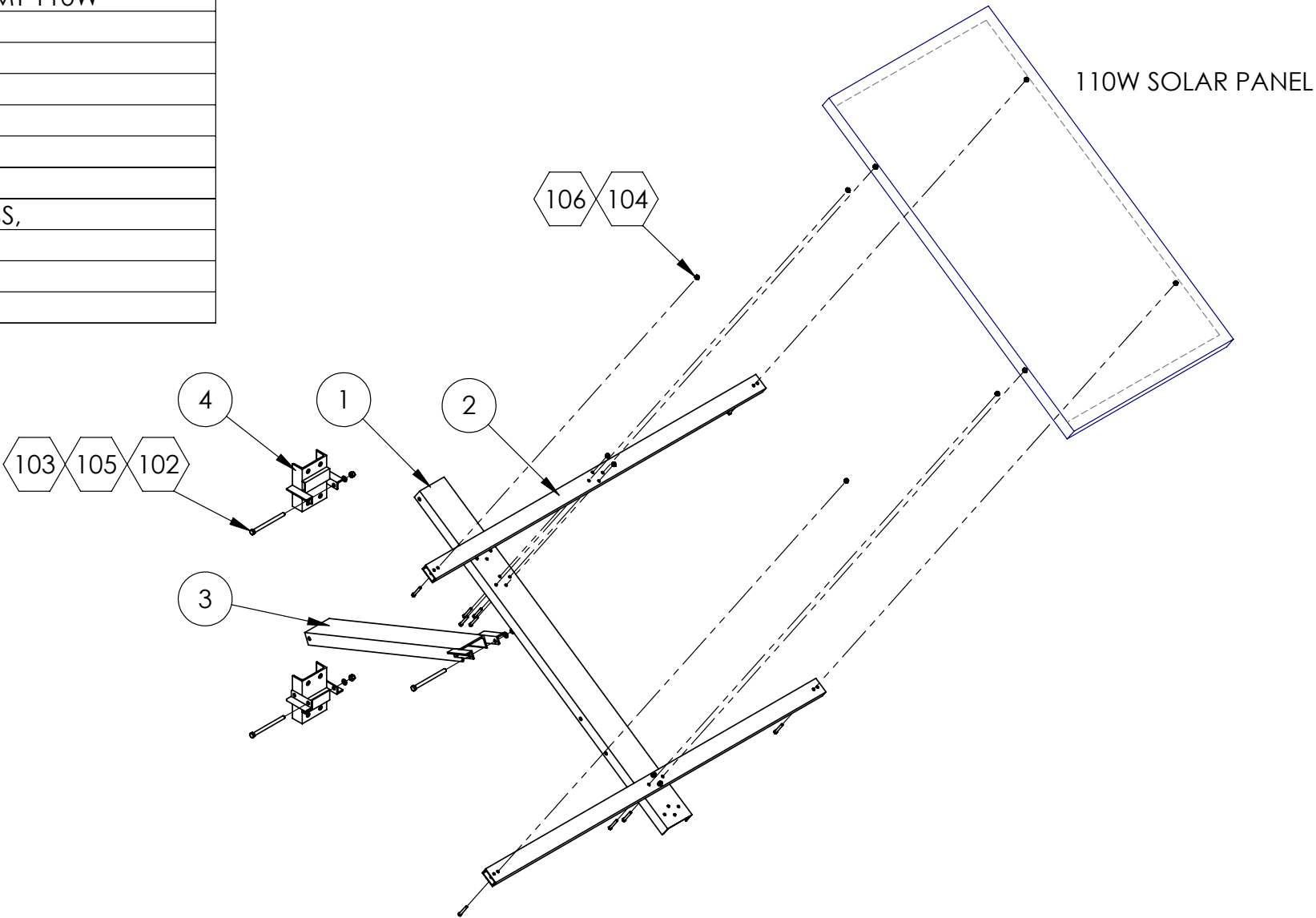
BRACKET ASSEMBLY



				FINISH:	NONE		MATERIAL DESCRIBED AND INFORMATION CONVEYED IS PROPRIETARY TO FEDERAL SIGNAL CORPORATION, IS OR MAY BE THE SUBJECT OF PATENT APPLICATIONS, AND MAY NOT BE COPIED, DIVULGED TO OTHERS, OR USED FOR MANUFACTURING WITHOUT CONSENT.					
				REMOVE BURRS, SHARP CORNERS AND EDGES								
				MATERIAL:	AS SPECIFIED		UNIT OF MEASURE	DRAWN BY:	VT	CHKD. BY:	SC	SCALE AT B SIZE:
							PC	DATE:	1/30/09	DATE:	2/2/09	NONE
				NAME:						DRAWING NUMBER:		
				FINAL ASSEMBLY, SOLAR BRACKET 55W/60W (4 PANEL)					2881287			
REV	CHANGE	DATE	BY									

Figure 16 Final Assembly Solar Bracket Side Mount 110 W

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	861000124A	CHANNEL, BASE, SOLAR SIDE MT 110W
2	2	861000053A	TUBING, RECTANGULAR, SOLAR 110W
3	1	861000126A	ASSY., WELD, SUPPORT, CHANNEL SIDE MT 110W
4	2	2881286A	CHANNEL, BRACKET, WELD
5	1	2881333B	HARDWARE KIT
			HARDWARE KIT PARTS ARE LISTED BELOW
101	12	7000A311-30	SCR,HEX HD,SS,1/4-20X1-7/8
102	3	7002080A-80	SCREW,HEX,SS,3/8-16 X 5,FULL THRD
103	3	7058A013	NUT, EL STOP, 3/8-16, 0.468/0.438" THK, SS,
104	12	7058050A	NUT,MACH SCR,KEPS,1/4-20
105	3	7074A046	LKWSHR, SPLT, SS, 3/8
106	12	7000A311-30	SCREW, MACH, 1/4-20, HEX HD, , SS,



A0	SEE ECR# 841	6/24/13	VT
REV	CHANGE	DATE	BY

FINISH:	NONE
REMOVE BURRS, SHARP CORNERS AND EDGES	
MATERIAL:	AS SPECIFIED
NAME:	FINAL ASSEMBLY, SOLAR BRACKET SIDE MOUNT 110W

Tolerances Unless Otherwise Specified
Angles ----- ±0.5°
X.XX ----- ±0.015
X.XXX ----- ±0.005

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DRAWN BY: VT DATE: 6/12/13	CHKD. BY: SAC DATE: 6/14/13	SCALE AT B SIZE: NONE
DRAWING NUMBER:		861000127A

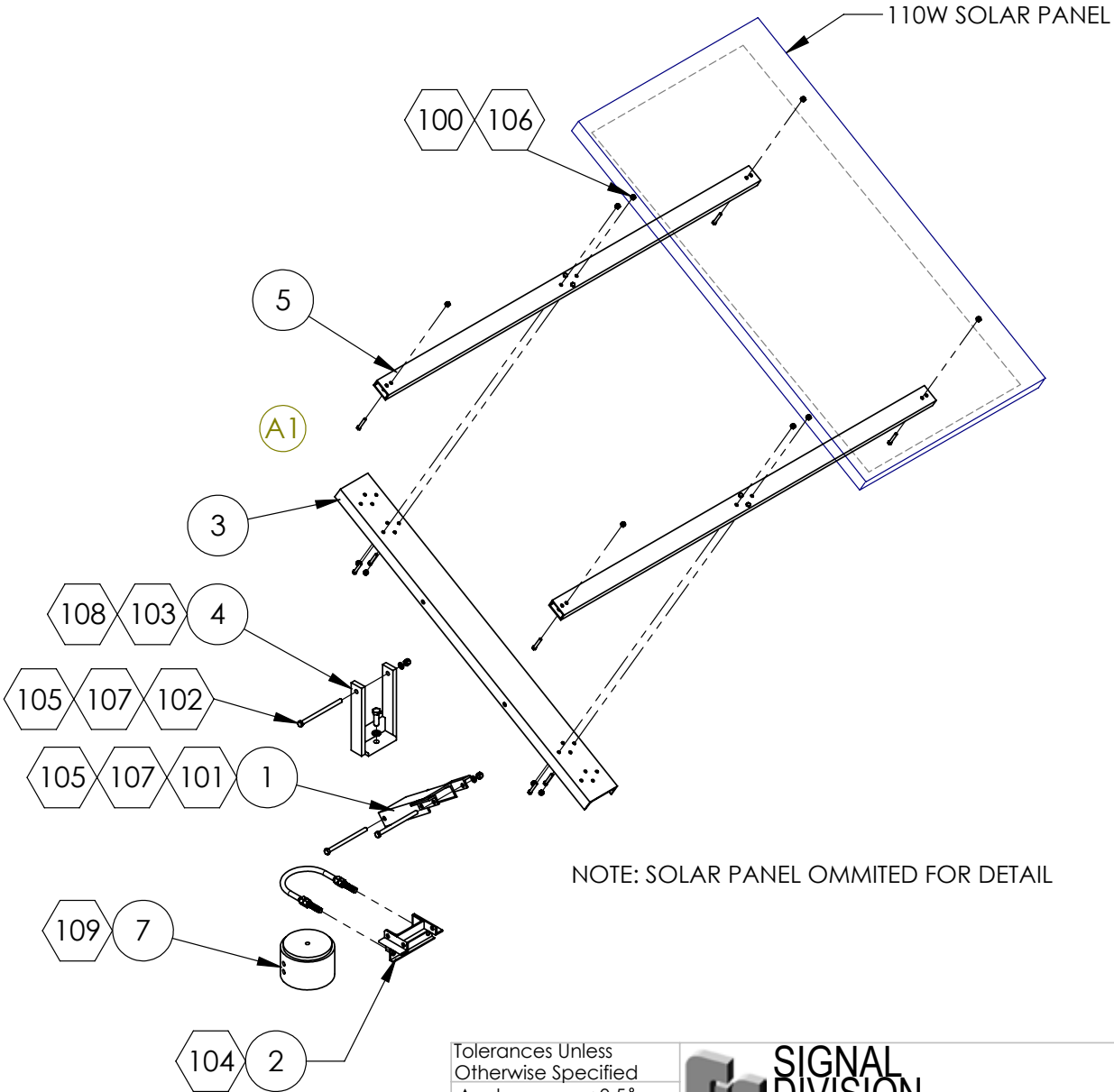
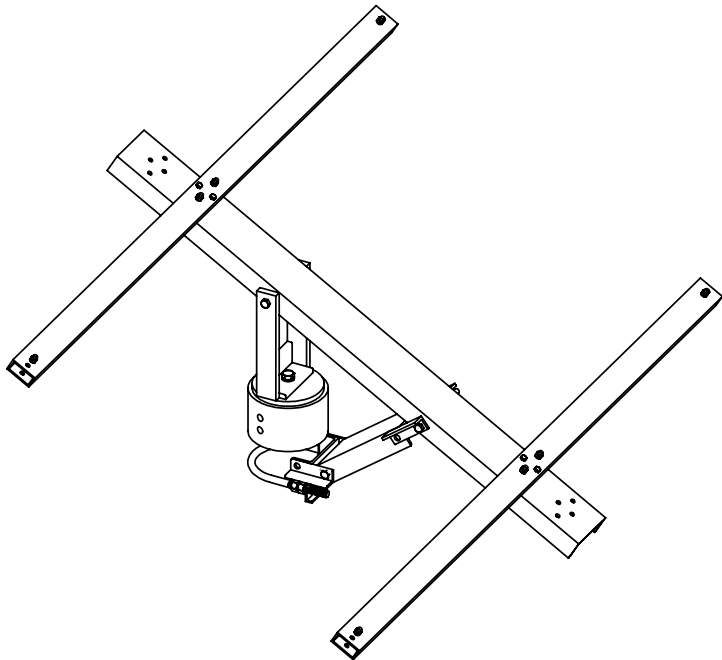
Figure 17 Final Assembly Solar Bracket Top-of-Pole Mount 110 W (2 Panel)

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	2881295A	ASSY, WELD, CHANNEL SUPPORT, TOP-OF-PO
2	1	2881298A	WELD ASSY, BRACKET, TOP-OF-POLE MOUNT
3	1	861000052A	CHANNEL, BASE, SOLAR 110W
4	1	2881294A	ASSEMBLY, WELD, BASE BRACKET
5	2	861000053A	TUBING, RECTANGULAR, SOLAR 110W
6	1	2881335	HARDWARE KIT
7	1	8570073A	WELDMENT ASSY, PIPE SLEEVE, SOLAR, PVS22
HARDWARE KIT PARTS LISTED BELOW			
100	12	7000A311-28	SCR,HEX HD,SS,1/4-20X1-7/8
101	2	7002080A-88	SCREW,HEX,SS,3/8-16 X 6-1/2
102	1	7002080A-96	SCREW,HEX,SS,3/8-16 X 6
103	1	7002A014-24	SCREW,CAP,HEX HD,SS,1/2-13 X 1-1/2
104	1	7003018A	BOLT, U, 1/2-13, , SS, FOR 4" PIPE
105	3	7058A013	NUT, EL STOP, 3/8-16, 0.468/0.438" THK, SS,
106	12	7058A010	NUT, EL STOP, 1/4-20, , SS,
107	3	7074A046	LKWSHR, SPLT, SS, 3/8
108	1	7074A059	WASHER, SPLT, 1/2, .873 OD, 0.135/0.125"
109	2	7000A338-104	SCREW HEX HD 1/2-13 SS

A2

A2

A2



NOTE: SOLAR PANEL OMMITED FOR DETAIL

Tolerances Unless Otherwise Specified
Angles ----- ±0.5°
X.XX ----- ±0.015
X.XXX ----- ±0.005



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				REMOVE BURRS, SHARP CORNERS AND EDGES						
				MATERIAL:	AS SPECIFIED		UNIT OF MEASURE	DRAWN BY: VT	CHKD. BY: SAC	SCALE AT B SIZE:
							PC	DATE: 10/29/12	DATE: 10/30/12	NONE
A2	SEE ECR # 2268	8/5/14	VT	NAME: FINAL ASSEMBLY, SOLAR BRACKET TOP-OF-POLE MOUNT 110W (2 PANEL)				DRAWING NUMBER: 861000039A		
A1	SEE ECR # 768	5/21/13	VT							
A0	REL. TO ECR # 113	10/30/12	VT							
REV	CHANGE	DATE	BY							

A2	SEE ECR # 2268	8/5/14	VT
A1	SEE ECR # 768	5/21/13	VT
A0	REL. TO ECR # 113	10/30/12	VT
REV	CHANGE		DATE

### Figure 18 DCB and DCFCB Solar Wiring

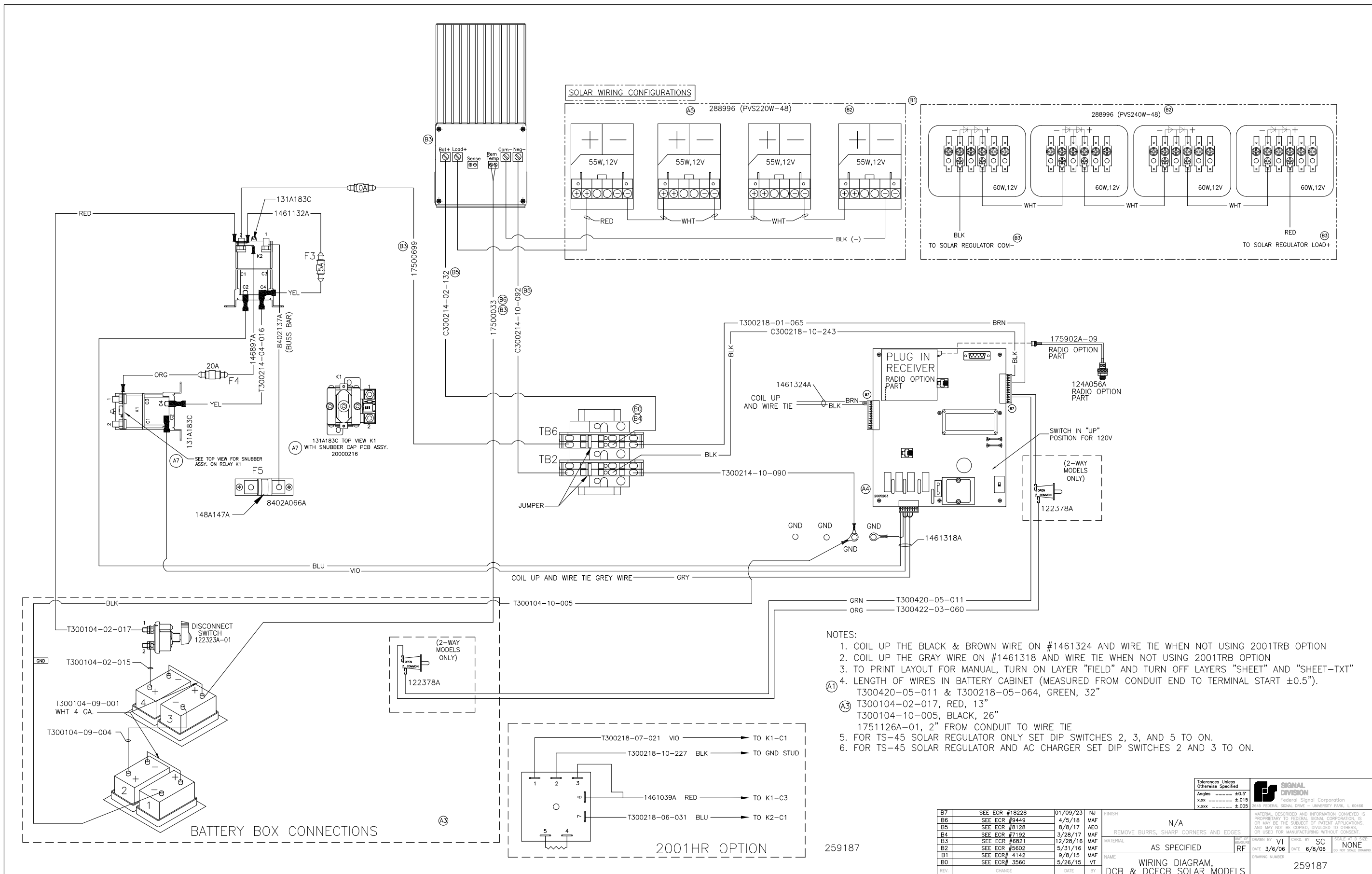
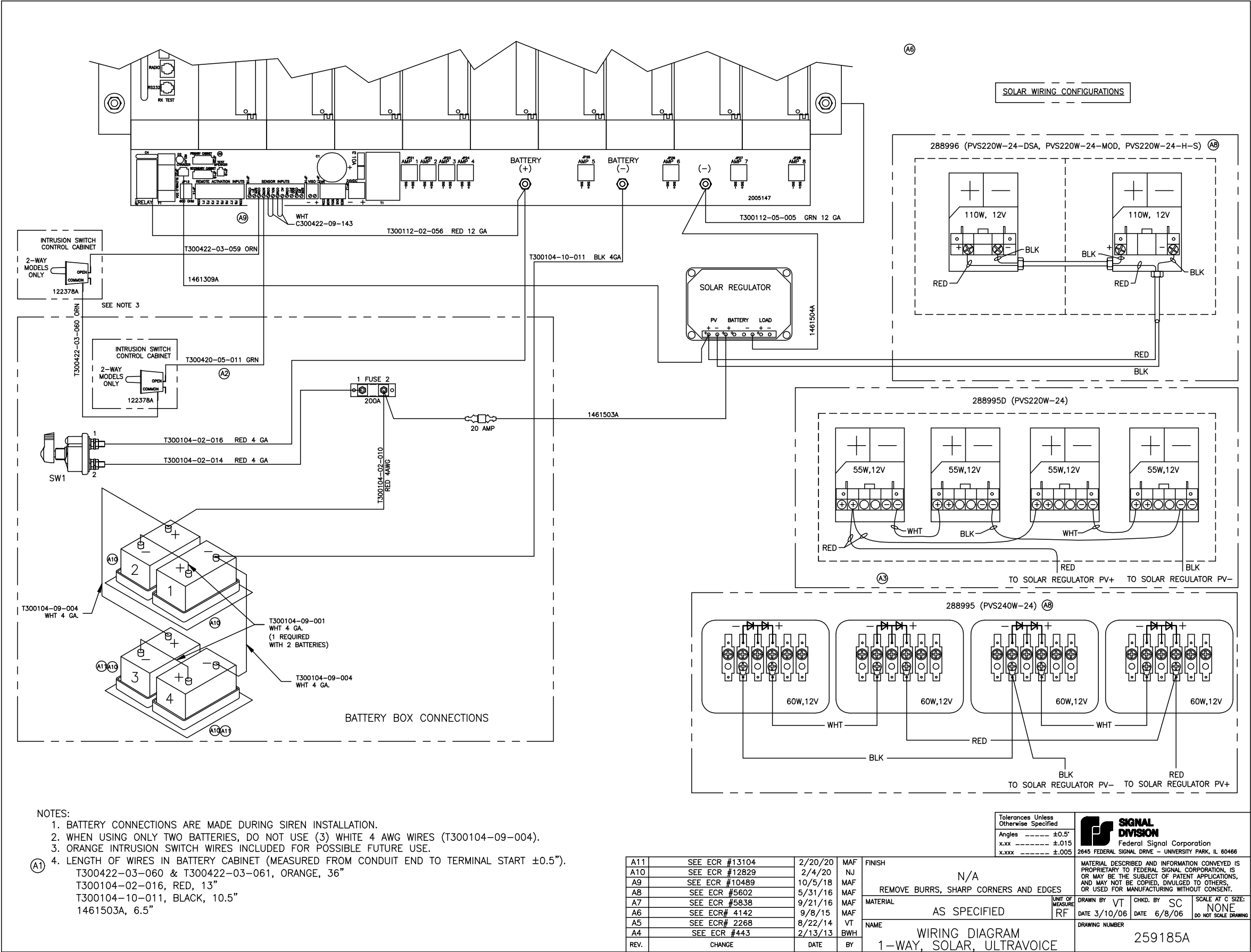


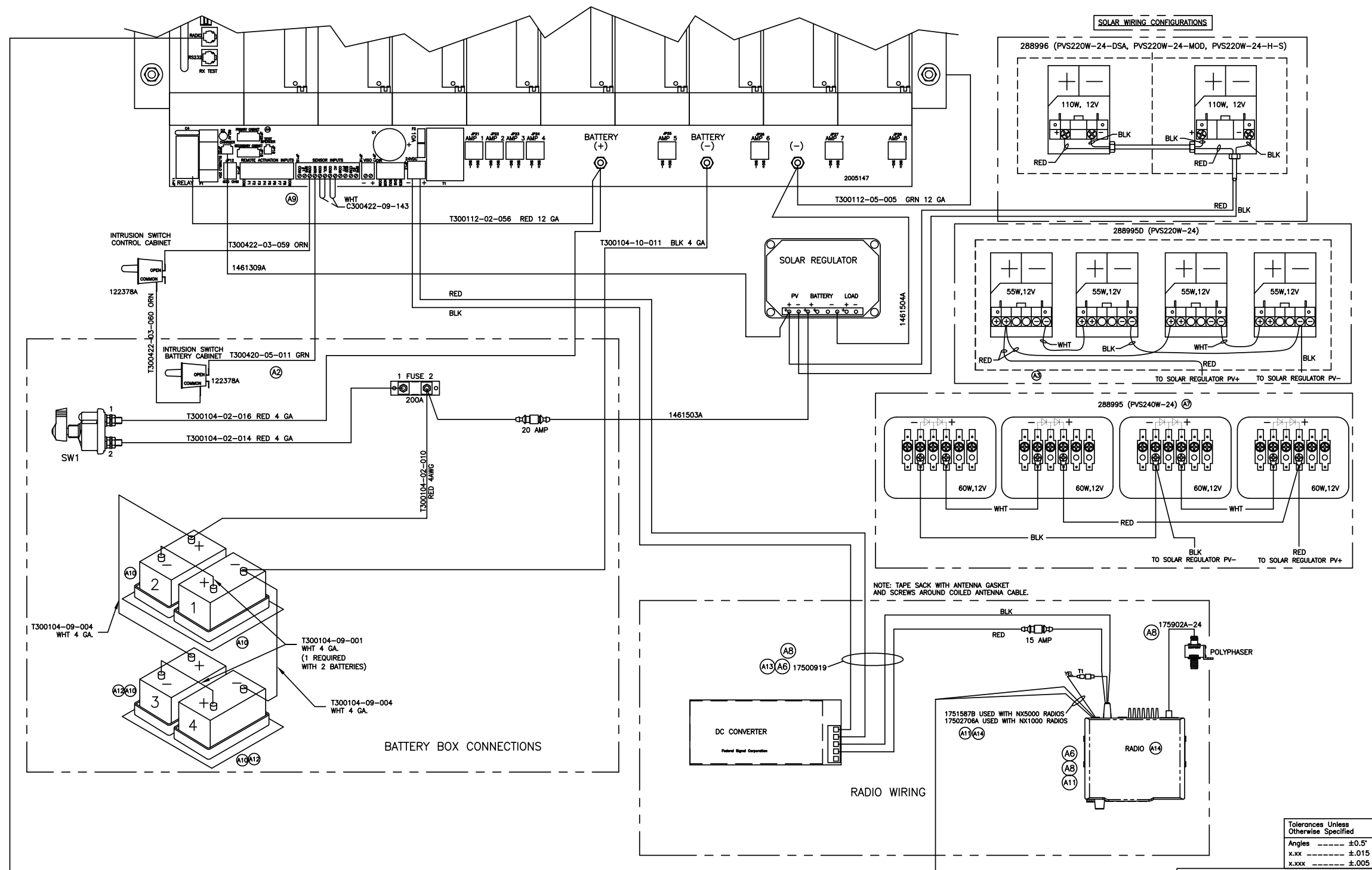


Figure 20 One-Way Solar UltraVoice Wiring Diagram





### Figure 21 Two-Way Solar UltraVoice Wiring Diagram

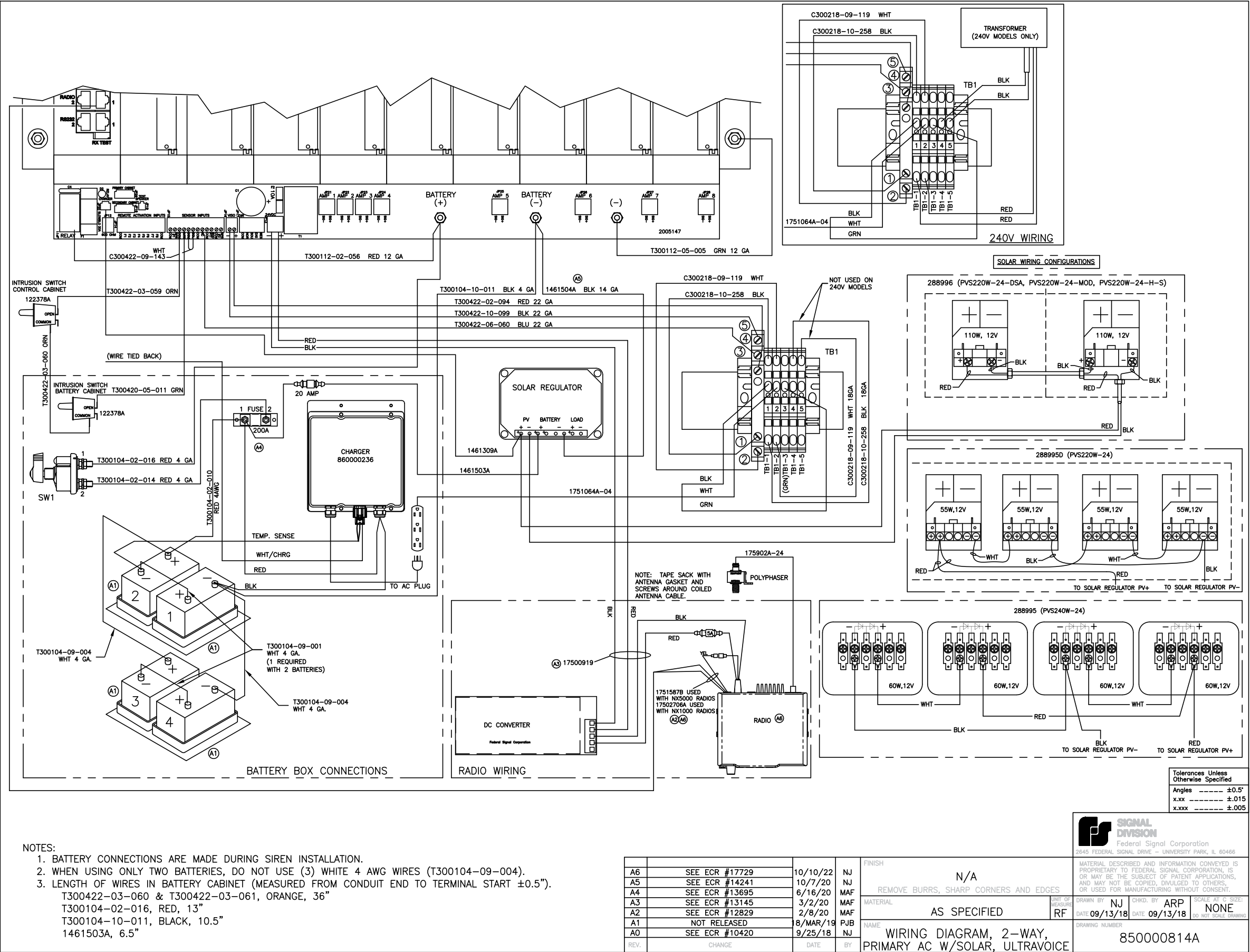


NOTES:

- NOTES:
1. BATTERY CONNECTIONS ARE MADE DURING SIREN INSTALLATION.
  2. WHEN USING ONLY TWO BATTERIES, DO NOT USE (3) WHITE 4 AWG WIRES (T300104-09-004).
  - (A1) 3. LENGTH OF WIRES IN BATTERY CABINET (MEASURED FROM CONDUIT END TO TERMINAL START  $\pm 0.5"$ ).  
T300422-03-060 & T300422-03-061, ORANGE, 36"  
T300104-02-016, RED, 13"  
T300104-10-011, BLACK, 10.5"  
1461503A, 6.5"

A14	SEE ECR #17729	10/10/22	NJ	FINISH	APPROPRIATE TOLERANCES, UNLESS OTHERWISE SPECIFIED, SHALL BE AS SHOWN				
A13	SEE ECR #13145	3/2/20	MAF	N/A REMOVE BURRS, SHARP CORNERS AND EDGES	MATERIAL DESCRIBED AND INFORMATION CONVEYED IS PROPRIETARY TO FEDERAL SIGNAL CORPORATION, IS OR MAY BE THE SUBJECT OF PATENT APPLICATIONS, AND MAY NOT BE COPIED, DULGLED TO OTHERS, OR USED FOR MANUFACTURING WITHOUT CONSENT				
A12	SEE ECR #13104	2/20/20	MAF		MATERIAL	NOT OF MEASURE	DRAWN BY VT	CHKD. BY SC	SCALE AT C SIZE: NONE
A11	SEE ECR #12829	2/3/20	NJ						
A10	NOT RELEASED	**	NJ		AS SPECIFIED	RF	DATE 3/10/06	DATE 6/8/06	DO NOT SCALE DRAWING
A9	SEE ECR #10458	10/5/18	NJ	WIRING DIAGRAM 2-WAY SOLAR ULTRAVOICE					
A8	SEE ECR #9210	2/23/18	MAF						
A7	SEE ECR #5602	5/31/16	MAF						
REV.	CHANGE	DATE	BY	DRAWING NUMBER 259186A					

Figure 22 Two-Way Primary AC with Solar UltraVoice Wiring Diagram





### Figure 23 Two-Way Primary Solar with AC UltraVoice Wiring Diagram

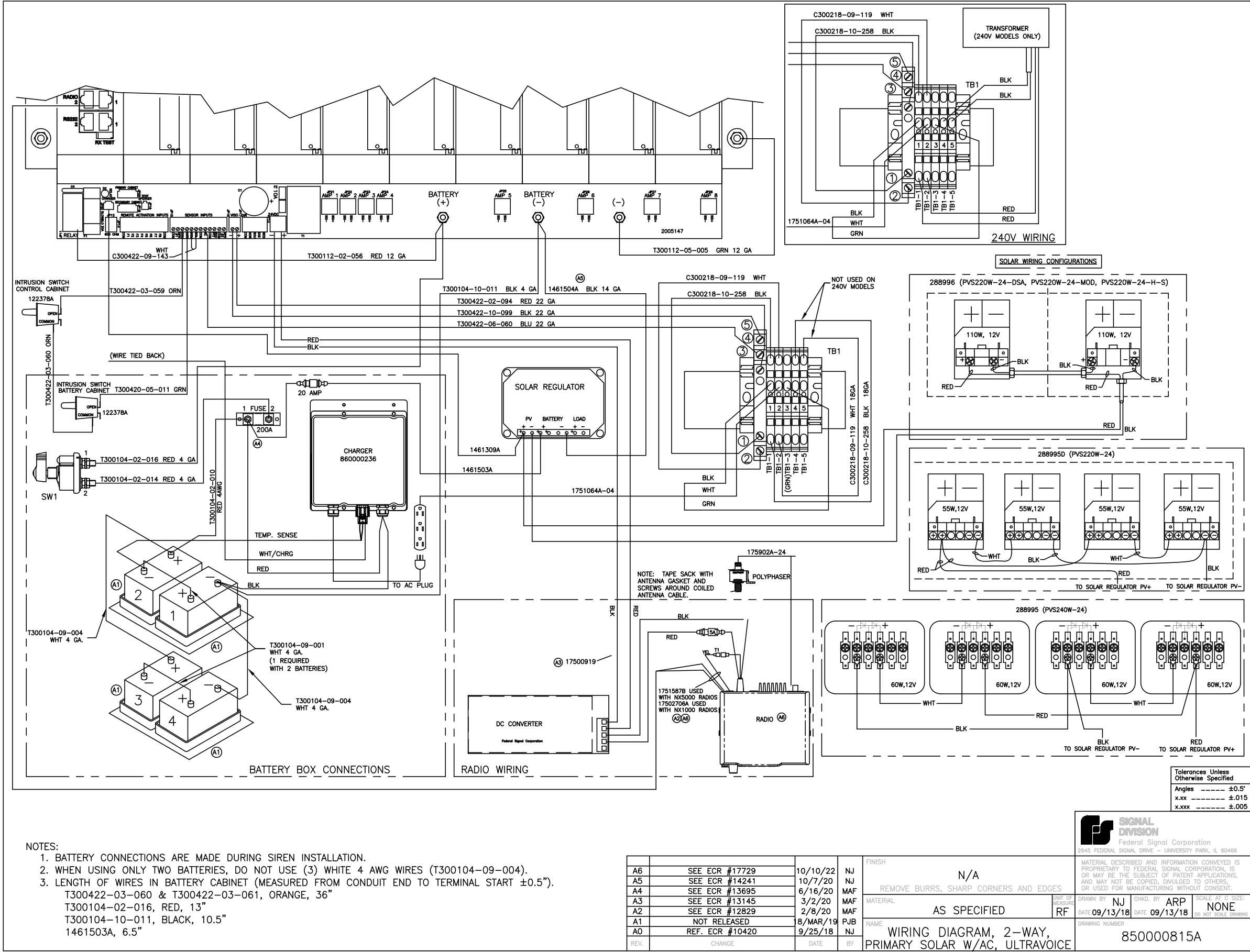
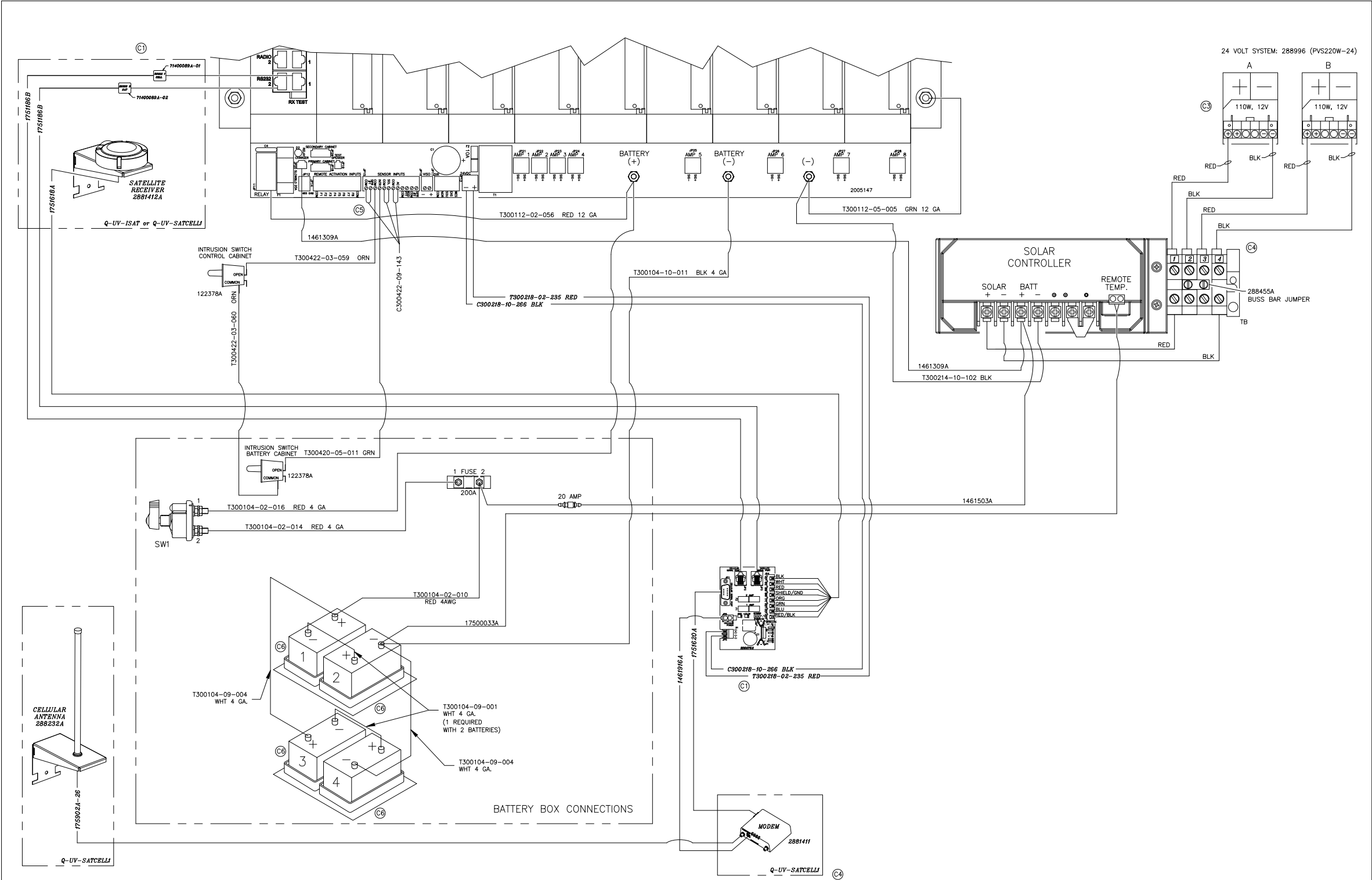



Figure 24 Hawaii UltraVoice Wiring Diagram



- NOTES:
1. OPTIONS SHOWN IN ITALICIZED TEXT FOR REFERENCE.
  2. BATTERY, SATELLITE RECEIVER & ANTENNA CONNECTIONS MADE DURING SIREN INSTALLATION.
  3. WHEN USING ONLY TWO BATTERIES, DO NOT USE (3) WHITE 4 AWG WIRES (T300104-09-004).
  4. LENGTH OF WIRES IN BATTERY CABINET (MEASURED FROM CONDUIT END TO TERMINAL START  $\pm 0.5"$ ).  
T300420-05-011, GREEN, 36"  
T300104-02-016, RED, 13"  
T300104-10-011, BLACK, 10.5"

REV.	CHANGE	DATE	BY	FINISH	MATERIAL	NAME	DRAWING NUMBER
C6	SEE ECR# XXXXX	XX/XX/XX	XXX	N/A	AS SPECIFIED	WIRING DIAGRAM, HAWAII SOLAR IN UV	259298C
C5	SEE ECR# 2268	8/22/14	VT	REMOVE BURRS, SHARP CORNERS AND EDGES			
C4	SEE ECR# 1605	2/12/14	VT				
C3	SEE ECR# 768	5/21/13	VT				
C2	SEE ECR# 113	10/12/12	VT				
C1	SEE ECR# 12-9359	8/7/12	VT				
C	REL. TO ECR# 12-8998	5/29/12	VT				

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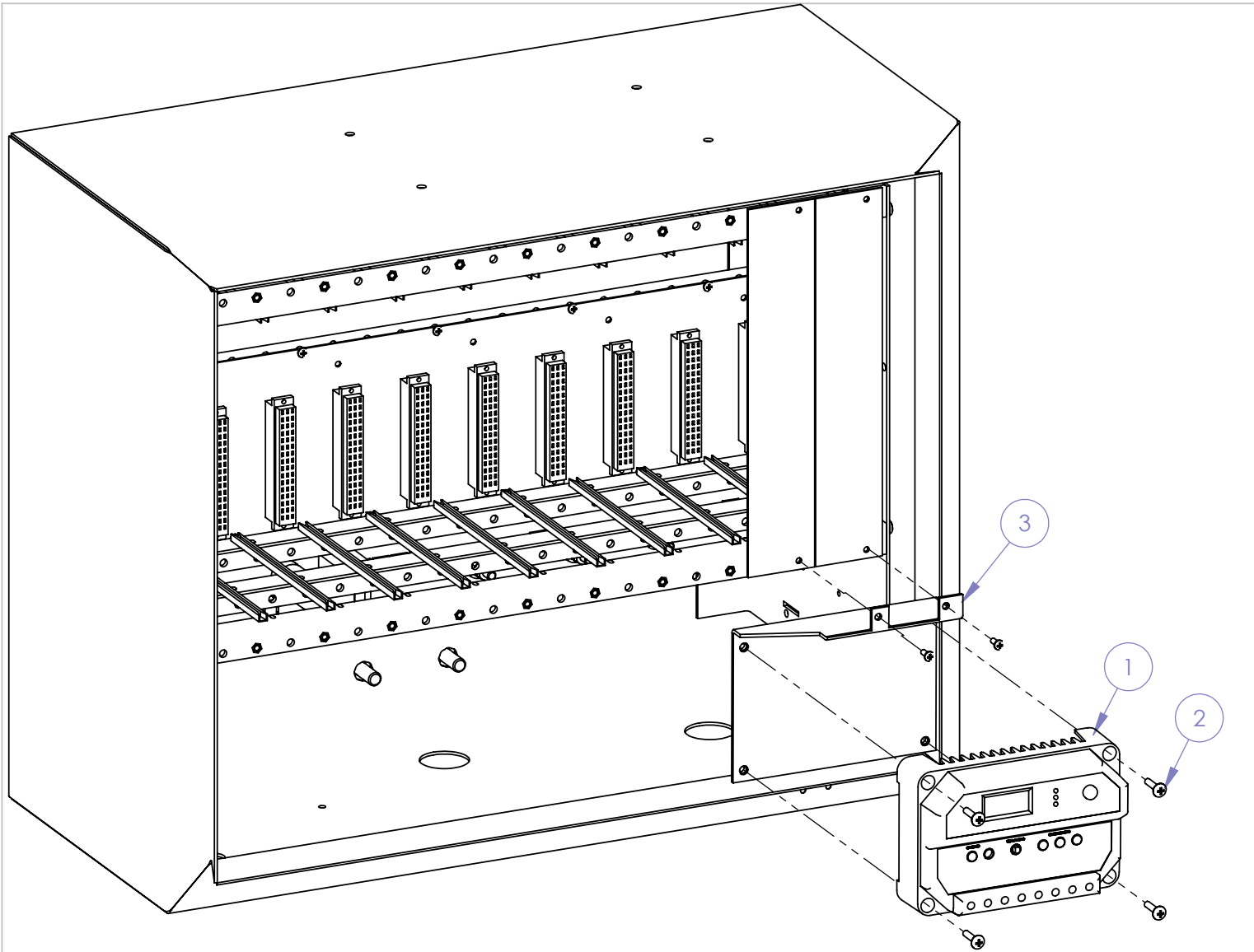
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DRAWN BY VT  
DATE 5/25/12

CHKD. BY RW  
DATE 12/14/12

SCALE AT C SIZE:  
NONE  
DO NOT SCALE DRAWING

Figure 25 Solar Assembly for the UltraVoice



ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	288964A-24	SOLAR REGULATOR, MORNING STAR, PROSTAR
2	4	7000A070-12	SCREW, MACH, 10-32, RND HD, PHIL, SS, 3/4
3	1	8600148A-01	BRKT ASSY, SOLAR, PROSTAR, UV
*	1	1461503A	WIRE LEAD,BATTERY (+),SOLAR,UV
*	1	1461504A	WIRE LEAD,SOLAR GND TO MOTHERBOARD
(B4) *	3	C300422-09-143	CUT WIRE,1/4NT:1/4NT,1.5"
(B4) NT SHWN	1	255379	MANUAL
(B4) **	1	288995	SOLAR KIT,SUNWIZE PVS220W-24/PVS240W-24
(B4) **	1	2881287	SOLAR BRACKET
(B4) **	1	2881336	KIT, CABLE AND CLAMP, SOLAR
(B4) **	2	7000A427-10	SCREWS,6-32,SS
(B4) REF	0	259185	WIRING DIA,UV 1-WAY,SOLAR
(B4) REF	0	259186	WIRING DIA,UV 2-WAY,SOLAR
REF	0	8600109	FINAL ASSY,UV 1-WAY
REF	0	8600111	FINAL ASSY, UV 2-WAY

\* SHOWN ON WIRING DIAGRAM  
\*\* NOT SHOWN, SHIPPED DIRECT TO CUSTOMER

DELETIONS FOR SOLAR OPTION (1-WAY & 2-WAY)			DELETIONS (CONT.)		
QTY.	PART NUMBER	DESCRIPTION	QTY.	PART NUMBER	DESCRIPTION
1	120816	CHARGER,24V,10A	1	1751064A-04	CABLE,AC TERMINATED
1	1612393B	LABEL,DIN RAIL,UV	2###	C300218-09-119	WIRE,CUT,WHT,5"
2	229218A	BRKT,T-BLOCK,END	2###	C300218-10-258	WIRE,CUT,BLK,5"
4#	229282A	TERM. BLOCK,1-POLE,35MM DIN	1###	T300422-02-094	T-WIRE,RED,28"
1##	229283A	CAP,END,TERM BLOCK,1 POLE	1###	T300422-06-060	T-WIRE,BLUE,28"
1	229288A	GROUND TERM BLOCK,3 POS	1###	T300422-10-099	T-WIRE,BLACK,28"
1	288810A-04	DIN RAIL,ALUM,UNCOATED,4.00"	1	8549A193A	LIGHTNING PROTECTOR
1###	288454B	INPUT MODULE,120V	1	1461243A	WIRE LEAD,FUSED,POWER SUPPLY
2	7011A152-06	#8 SHT METAL SCREW,SS	(B2) 1	81461875B	LABEL,NAMEPLATE,UL
(B2) 6	7058050A	NUT,MACH SCREW,KEPS 1/4-20	1	1612875A-05	LABEL, ELECTRICAL RATINGS
1	8600112A-01	BRKT ASSY,PWR SUPPLY			

# ONLY QTY 2 ON 1-WAY  
## ONLY 1-WAY MODELS  
### ONLY 2-WAY MODELS

Tolerances Unless  
Otherwise Specified  
Angles ----- ±0.5°  
X.XX ----- ±0.015  
X.XXX ----- ±0.005

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				REMOVE BURRS, SHARP CORNERS AND EDGES							
				MATERIAL:	N/A		UNIT OF MEASURE	DRAWN BY: MAF	CHKD. BY: MJF	SCALE AT B SIZE:	
B4	SEE ECO #5602			5/31/16	MAF			RF	DATE: 7/8/05	DATE: 9/21/05	NONE
B3	SEE ECO #08-2746			2/26/08	VT						
B2	SEE ECO #05-4180	11/22/05	MAF	NAME:	SOLAR ASSY,UV		DRAWING NUMBER: 8600124B				
B1	REL TO PROD ECO #05-4142	9/21/05	MAF								
REV	CHANGE	DATE	BY								

Figure 26 Solar Assembly for the DC Series Siren Control System

