

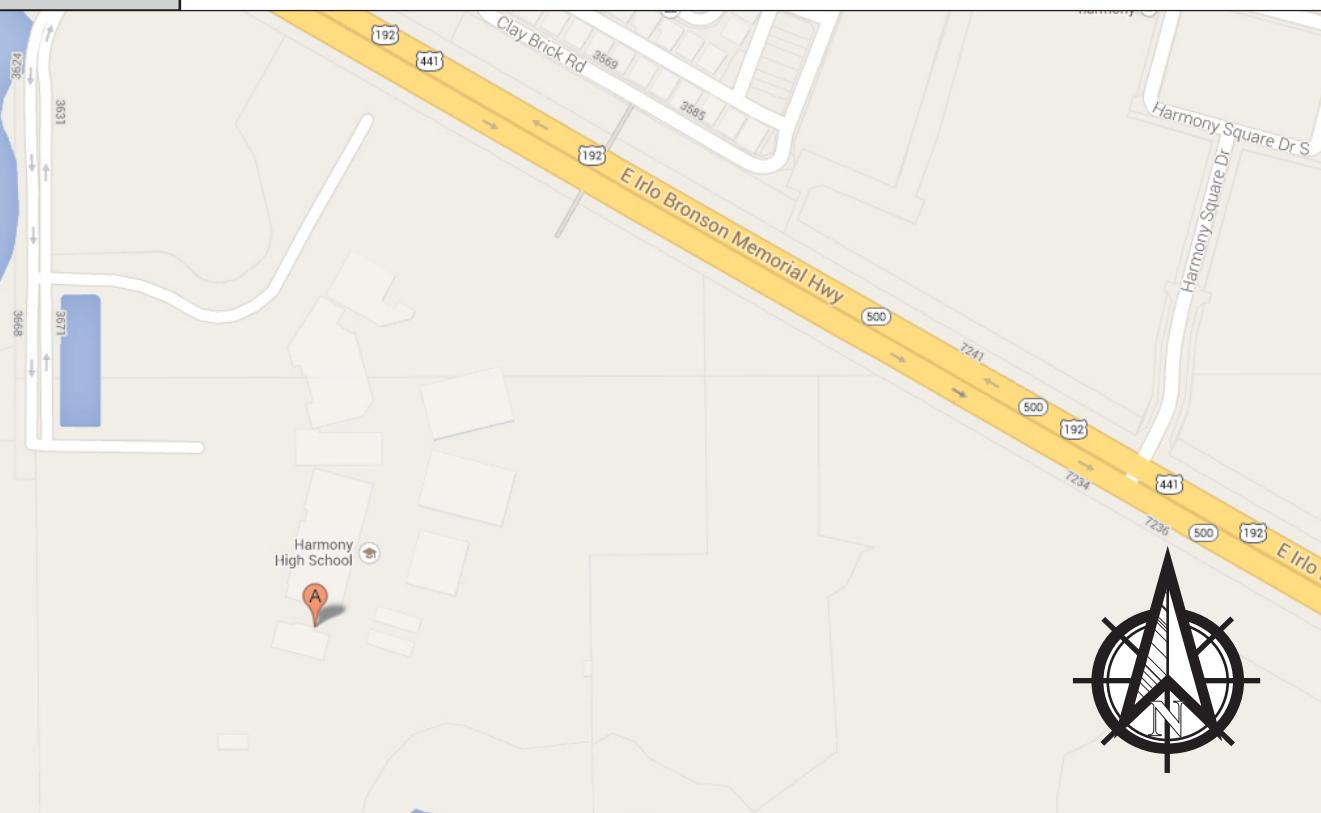
# HARMONY HIGH SCHOOL

## 10.7 kW BATTERY BACK-UP PHOTOVOLTAIC SYSTEM

### CONTENTS

- A-01 SYSTEM DESCRIPTION - OVERVIEW OF SYSTEM AND STANDARD SYMBOLS USED
- A-02, A-03 SITE PLAN - SHOWING LOCATION OF SOLAR ARRAY AND MAJOR COMPONENTS
  
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### MAP



### HARMONY HIGH SCHOOL

LOCATION:

3601 ST. CLOUD, FL 34771

### CONTENTS

**Vergona-Bowersox**

LICENSE # EC13005324  
3601 NORTH DIXIE HIGHWAY, BAY 16  
BOCA RATON, FL 33431  
PHONE: (561) 750-8677  
FAX: (561) 750-5118

### PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

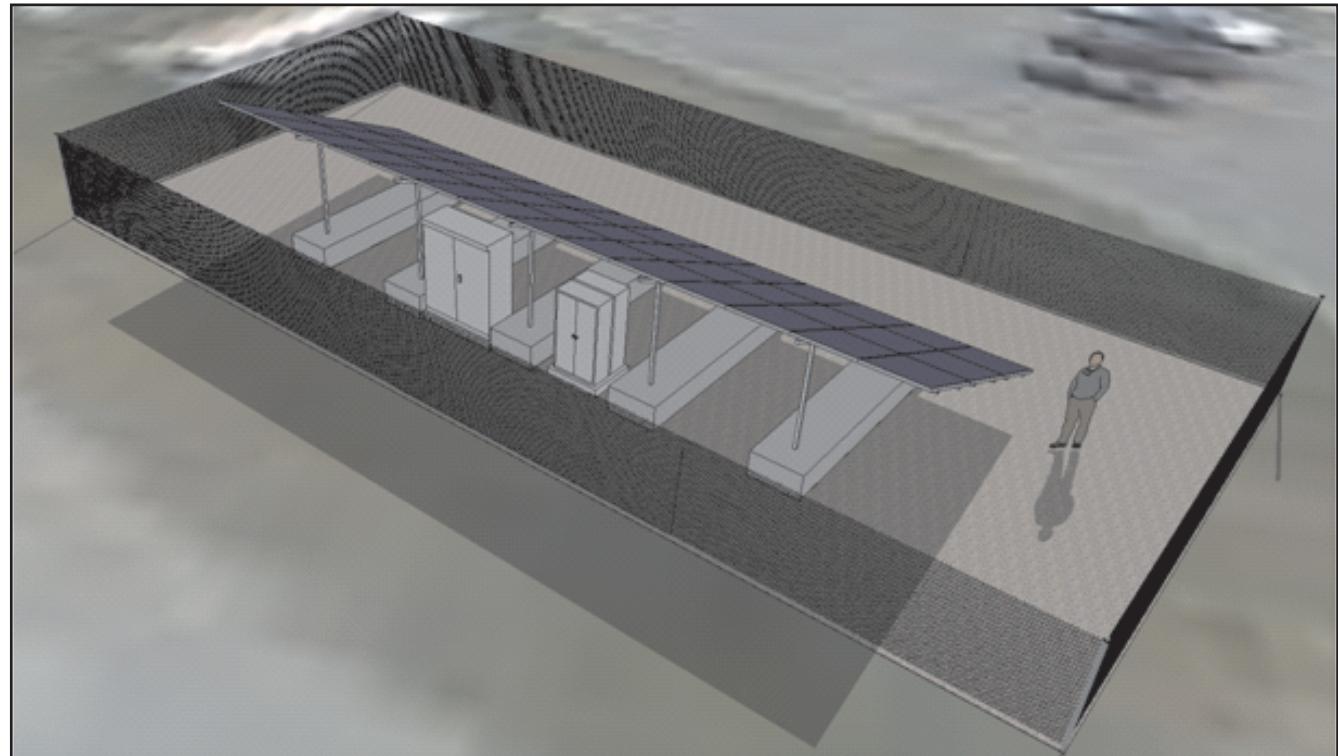
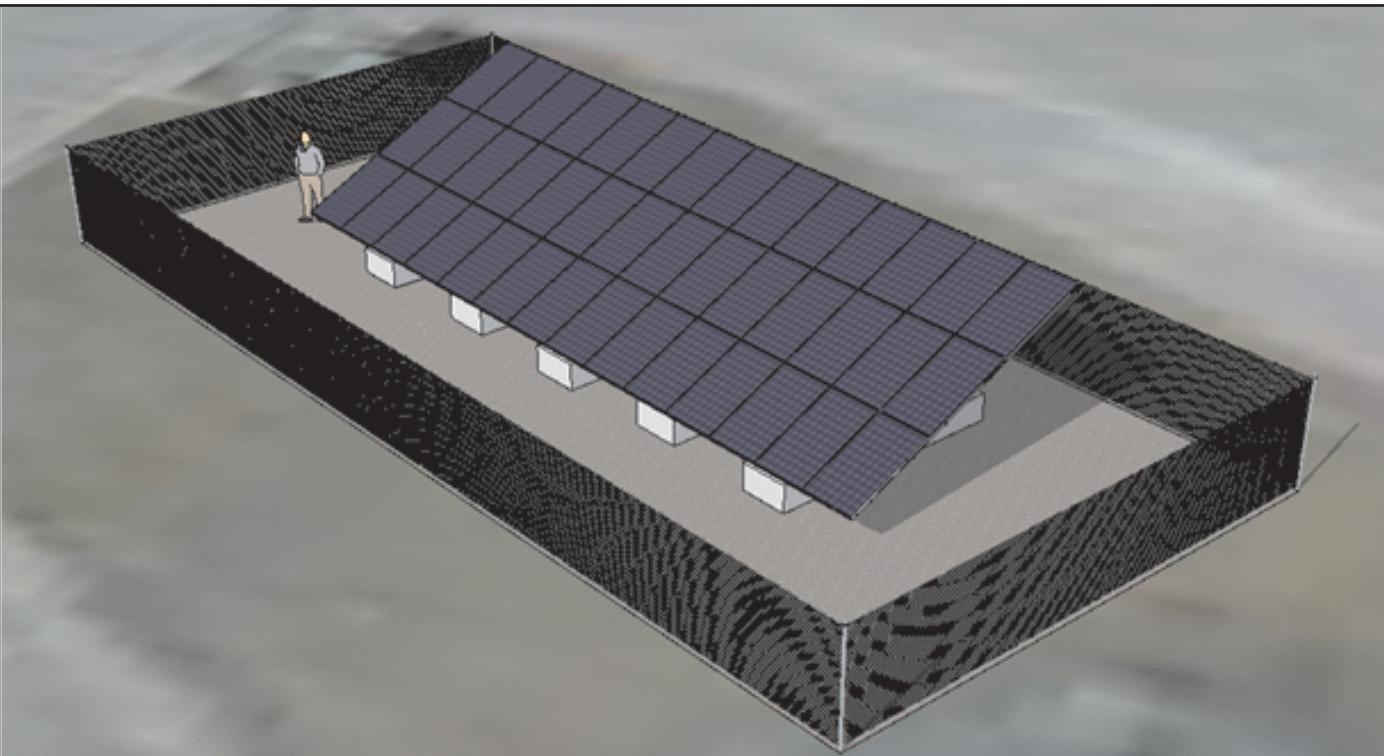
MODULES:  
SOLARWORLD  
SW255-MONO

# OF SOLAR MODULES:  
42

INVERTERS:  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET # REVISION #

A-00 02



## SYMBOLS

SECTION		SHEET WHERE SECTION IS LOCATED
ELEVATION		DETAIL ID SHEET WHERE SECTION IS LOCATED
DETAIL		DETAIL ID SHEET WHERE SECTION IS LOCATED
DETAIL (ENLARGED PLAN)		AREA TO BE ENLARGED
KEYED NOTES		KEYED NOTE DESIGNATION ON APPLICABLE SHEET
BONDING TERMINAL		
GROUNDING ELECTRODE		
SOLAR PANEL		
COMBINER BOX		
DC DISCONNECT		
MAIN DISTRIBUTION PANEL		
FUSE		
CIRCUIT BREAKER		
INVERTER		
TRANSFORMER		
AUTOMATIC TRANSFER SWITCH		

## ABREVIATIONS

AC	ALTERNATING CURRENT
APPROX	APPROXIMATELY
AWG	AMERICAN WIRE GAUGE
CB	COMBINER BOX
DC	DIRECT CURRENT
DCD	DIRECT CURRENT DISCONNECT
DISC	DISCONNECT
(E)	EXISTING
EL	ELEVATION
EQ	EQUAL
JB	JUNCTION BOX
MCB	MAIN COMBINER BOX
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MPPT	MAXIMUM POWER POINT TRACKING
(N)	NEW
OCPD	OVERCURRENT PROTECTION DEVICE
POCC	POINT OF COMMON COUPLING
PV	PHOTOVOLTAIC
SF	SQUARE FOOT
SLP	STANDBY LOAD PANEL
STC	STANDARD TEST CONDITIONS
TBD	TO BE DETERMINED
TYP	TYPICAL
VIF	VERIFY IN FIELD
WP	WEATHERPROOF

## SYSTEM DESCRIPTION

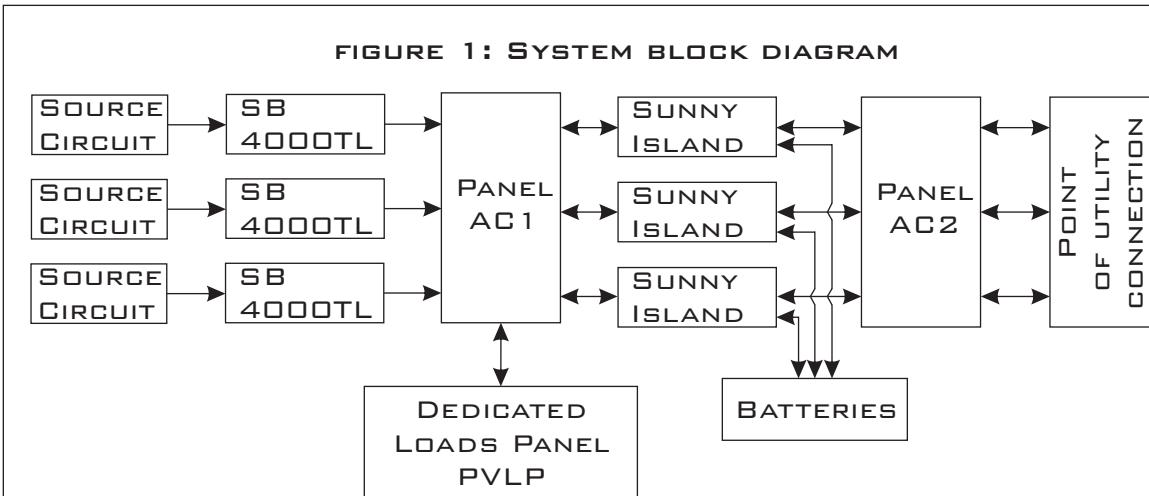
THIS SET OF PLANS COVERS GRID CONNECTED PHOTOVOLTAIC SYSTEM WITH BATTERY BACKUP. SOLAR GENERATION CONSISTS OF 42 SOLAR WORLD SW255-MONO; 255 WATT SOLAR PANELS. SOLAR PANELS ARE CONNECTED INTO THREE SERIES SOURCE CIRCUITS, EACH CONTAINING 14 PANELS. EACH SOURCE CIRCUIT FEEDS A SUNNY BOY 4000TL-US SOLAR INVERTER WHICH CONVERTS THE DC VOLTAGE FROM THE SOLAR PANELS TO AC.

THE SYSTEM IS ALSO EQUIPPED WITH THREE SMA SUNNY ISLAND 6048 BATTERY INVERTERS THAT ARE CAPABLE OF SUPPLYING ENERGY STORED IN BATTERIES TO DEDICATED LOADS. THE SUNNY ISLAND INVERTERS ARE ALSO ABLE TO USE ENERGY FROM THE SOLAR ARRAY OR FROM THE UTILITY TO KEEP THE BATTERIES CHARGED.

WHEN THE SUN IS SHINING AND THE GRID IS OPERATIONAL, POWER FROM THE SOLAR ARRAY IS SENT TO A DEDICATED LOAD PANEL LABELED "PVLP" WHICH FEEDS LIGHTING CIRCUITS AND OUTLETS IN THE BUILDING. IF THESE LOADS DO NOT REQUIRE THE POWER BEING GENERATED BY THE SOLAR ARRAY, THEN THE POWER IS MADE AVAILABLE TO THE LOADS IN THE REST OF THE BUILDING.

IF THE GRID IS NOT AVAILABLE, DEDICATED LOADS IN PANEL "PVLP" ARE FED FROM THE SOLAR ARRAY AND THE BATTERIES, BUT LOADS IN THE REST OF THE BUILDING ARE NOT POWERED UNTIL GRID POWER IS RESTORED.

ON A TYPICAL DAY OF FLORIDA SUNSHINE, THIS SYSTEM WILL PRODUCE APPROXIMATELY 44 KWH OF CLEAN ENERGY.



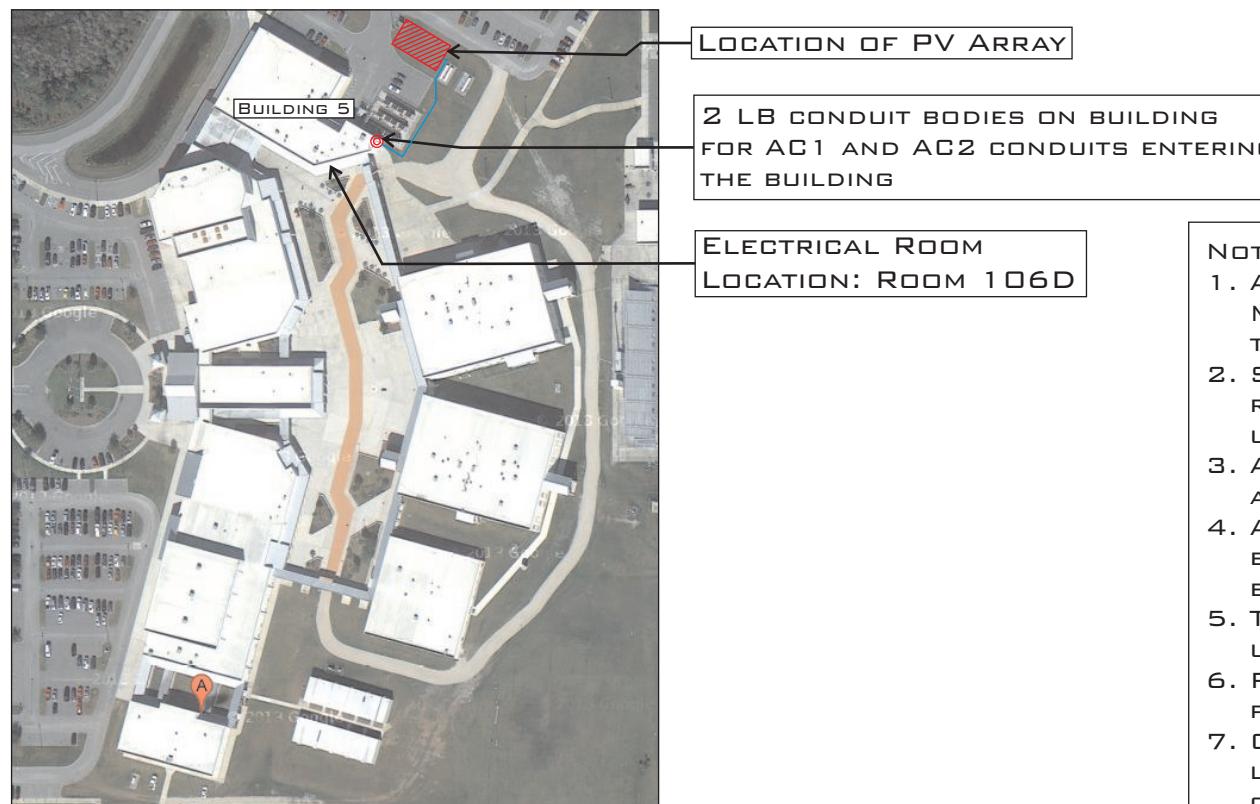
**Vergona-Bowersox Electric**  
LICENSE # EC13005324  
3601 NORTH DIXIE HIGHWAY, BAY 16  
BOCA RATON, FL 33431  
PHONE: (561) 750-8677  
FAX: (561) 750-5118

**PV SYSTEM ATTRIBUTES**  
TOTAL OUTPUT POWER: 10.7  
MODULES: SOLARWORLD SW255-MONO  
# OF SOLAR MODULES: 42  
INVERTERS: SMA SUNNYBOY 4000TL-US SUNNY ISLAND

SHEET #	Revision #
A-01	02

**HARMONY HIGH SCHOOL**  
LOCATION: 3601 ARTHUR J. GALLAGHER BLVD.,  
SYSTEM DESCRIPTION

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**FSEC**



**NOTE:**

1. ARRAY LOCATION DIMENSIONS, FENCING, WIRE RUN DISTANCES AND ROUTES ARE APPROXIMATIONS. MINOR ADJUSTMENTS LEFT TO THE DISCRETION OF THE CONTRACTOR MAY BE NECESSARY PENDING THE IDENTIFICATION OF ANY BURIED UTILITIES AND UNFORESEEN OBSTRUCTIONS.
2. SECURE DOUBLE BARRIERS WITH A DISTANCE NO LESS THAN 10 FEET IN BETWEEN THE BARRIERS IS REQUIRED AROUND THE PERIMETER OF THE CONSTRUCTION SITE WHENEVER HEAVY MACHINERY IS USED ON SITE WHILE THE SCHOOL IS OCCUPIED.
3. ALL CONSTRUCTION ACTIVITIES SHALL BE SEPARATED FROM THE OCCUPIED SCHOOL BY AT LEAST ONE SECURE BARRIER.
4. A BURIED STORM SEWER, BURIED WATER MAIN, BURIED FIRE MAIN, AND UNDERGROUND IRRIGATION EXISTS IN THE ANTICIPATED CONSTRUCTION AREA. THE SOLAR ARRAY AND ENCLOSURE SHALL NOT BE CONSTRUCTED ON TOP OF WATER MAIN OR FIRE MAIN.
5. THE CONTRACTOR SHALL LOCATE ALL BURIED UTILITIES IN THE AREA PRIOR TO CONSTRUCTION USING GROUND PENETRATING RADAR AND OTHER METHODS.
6. FINAL ARRAY PERIMETER FENCING MUST BE SPACED 10' MINIMUM FROM EAST, WEST AND SOUTH FACES OF THE ARRAY TO PREVENT SHADING OF THE SOLAR ARRAY.
7. GROUND COVER INSIDE FENCED ARRAY WILL BE 2" OF CRUSHED SHELL ON TOP OF POLYPROPYLENE LANDSCAPE FABRIC (WEED BLOCK). GRASS WILL BE REMOVED IN FENCED AREA BEFORE GROUND COVER IS APPLIED.

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*Electric*

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PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

MODULES:  
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42

INVERTERS:  
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SUNNY ISLAND

SHEET # | REVISION #

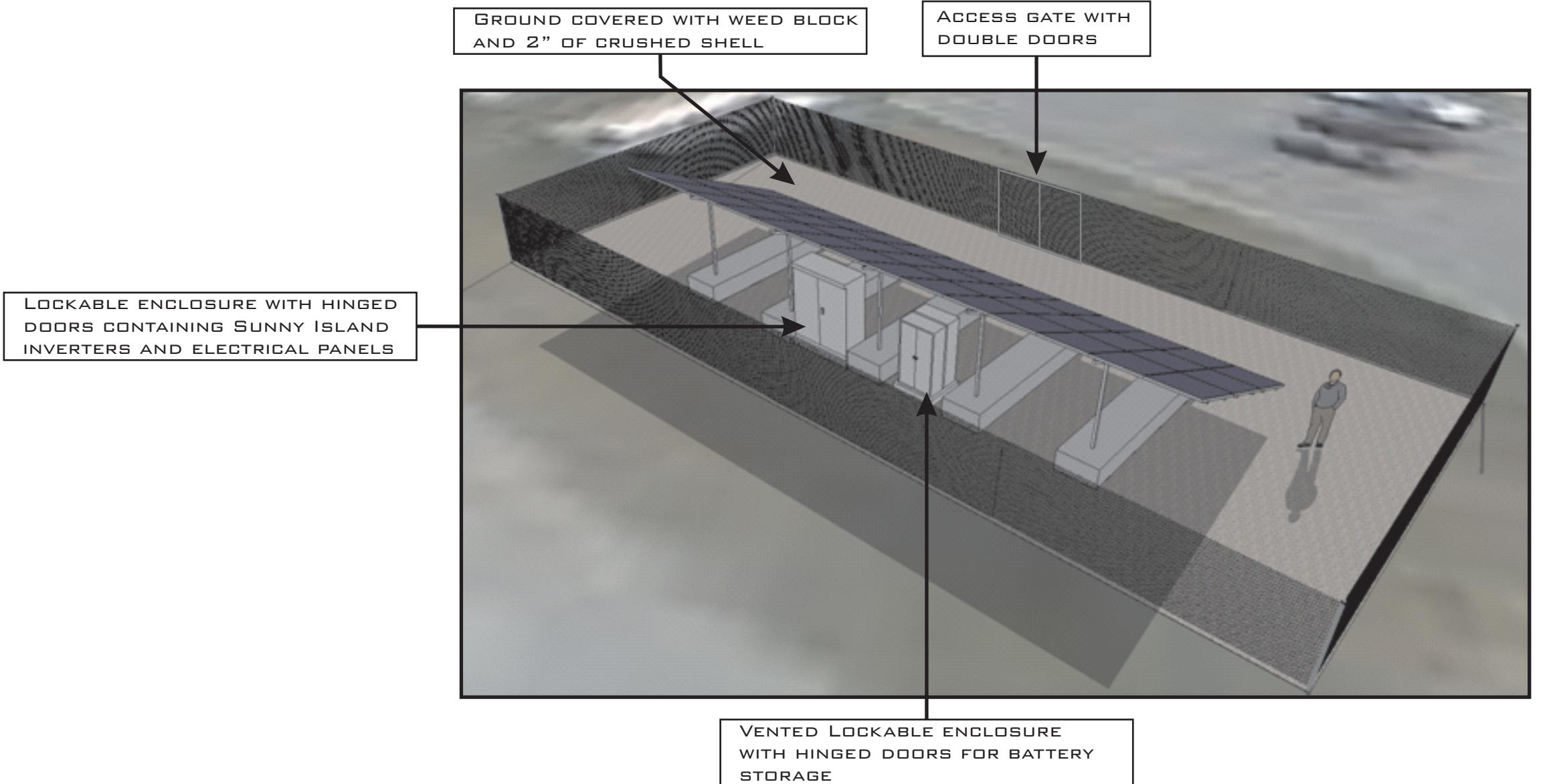
A-02 02

HARMONY HIGH SCHOOL

LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

SITE PLAN



## HARMONY HIGH SCHOOL

LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

## SITE PLAN - CONTINUED

**Vergona-Bowersox**  
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### PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

MODULES:  
SOLARWORLD  
SW255-MONO

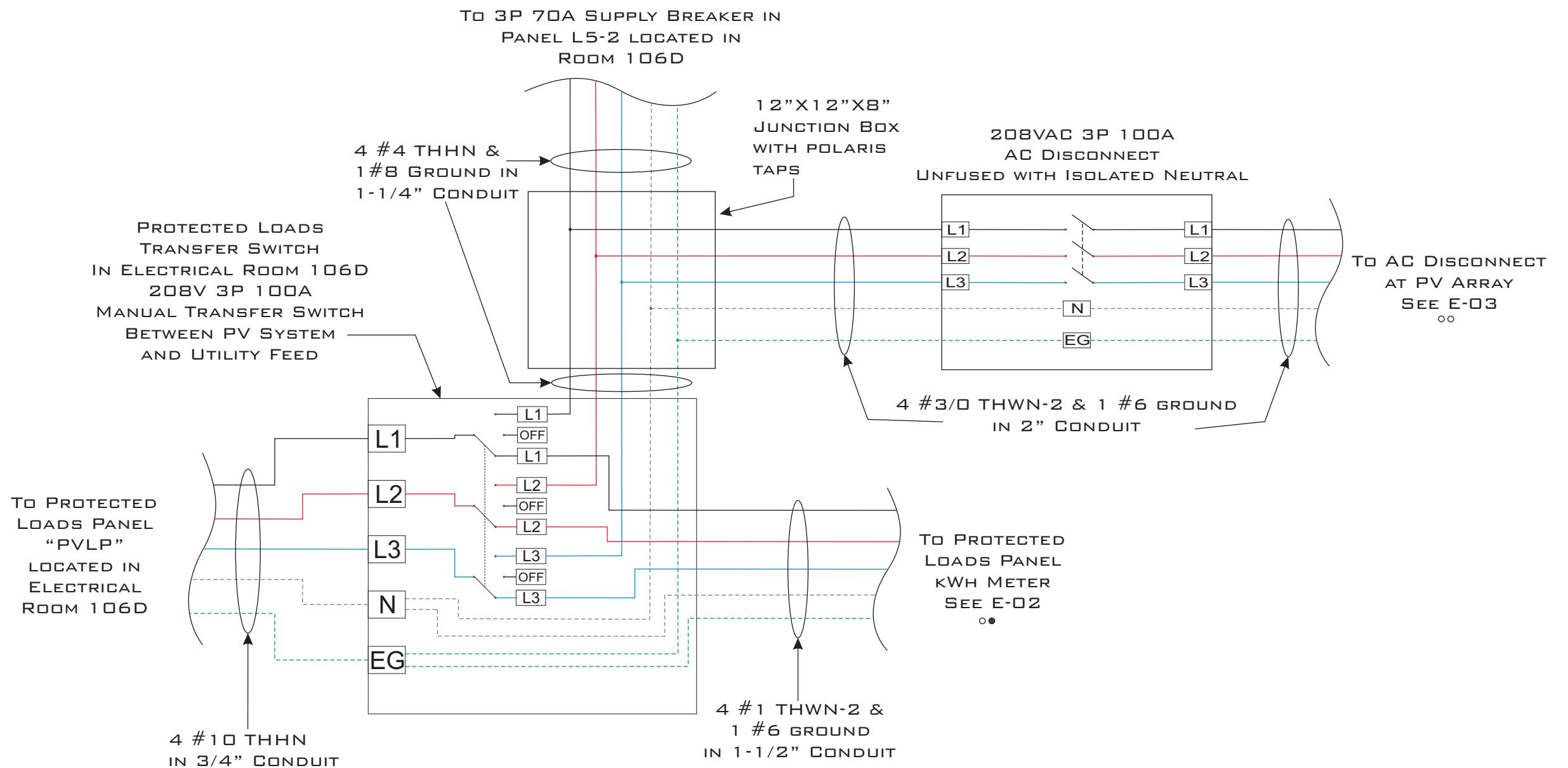
# OF SOLAR MODULES:  
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INVERTERS:  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET # | REVISION #

A-03 | 02

# EQUIPMENT LOCATED IN SCHOOL ELECTRICAL ROOM



HARMONY HIGH SCHOOL

LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

EQUIPMENT IN ELECTRICAL ROOM

Vergona-Bowersox

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BOCA RATON, FL 33431  
PHONE: (561) 750-8677  
FAX: (561) 750-5118

PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

MODULES:  
SOLARWORLD  
SW255-MONO

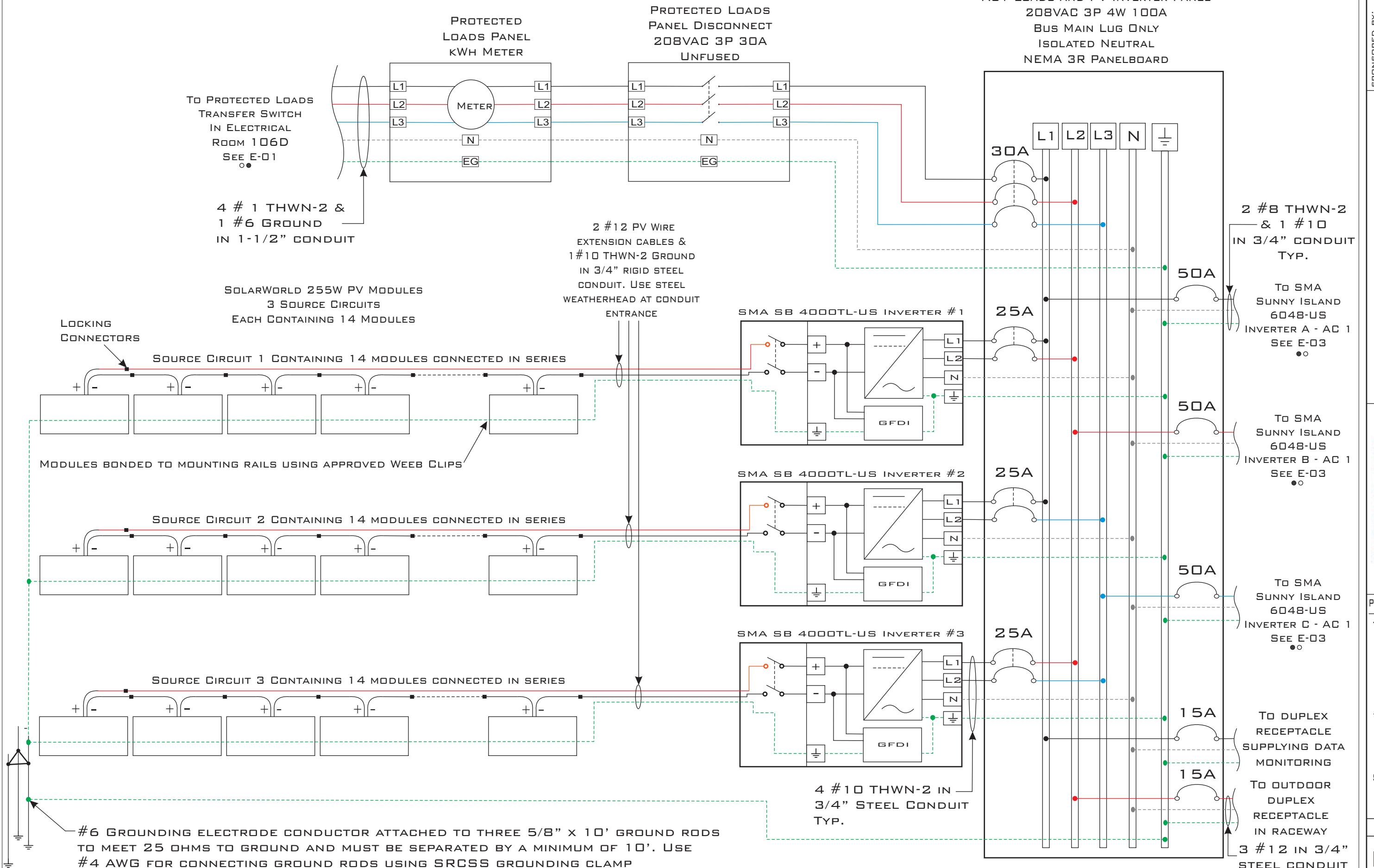
# OF SOLAR MODULES:  
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INVERTERS:  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET # REVISION #

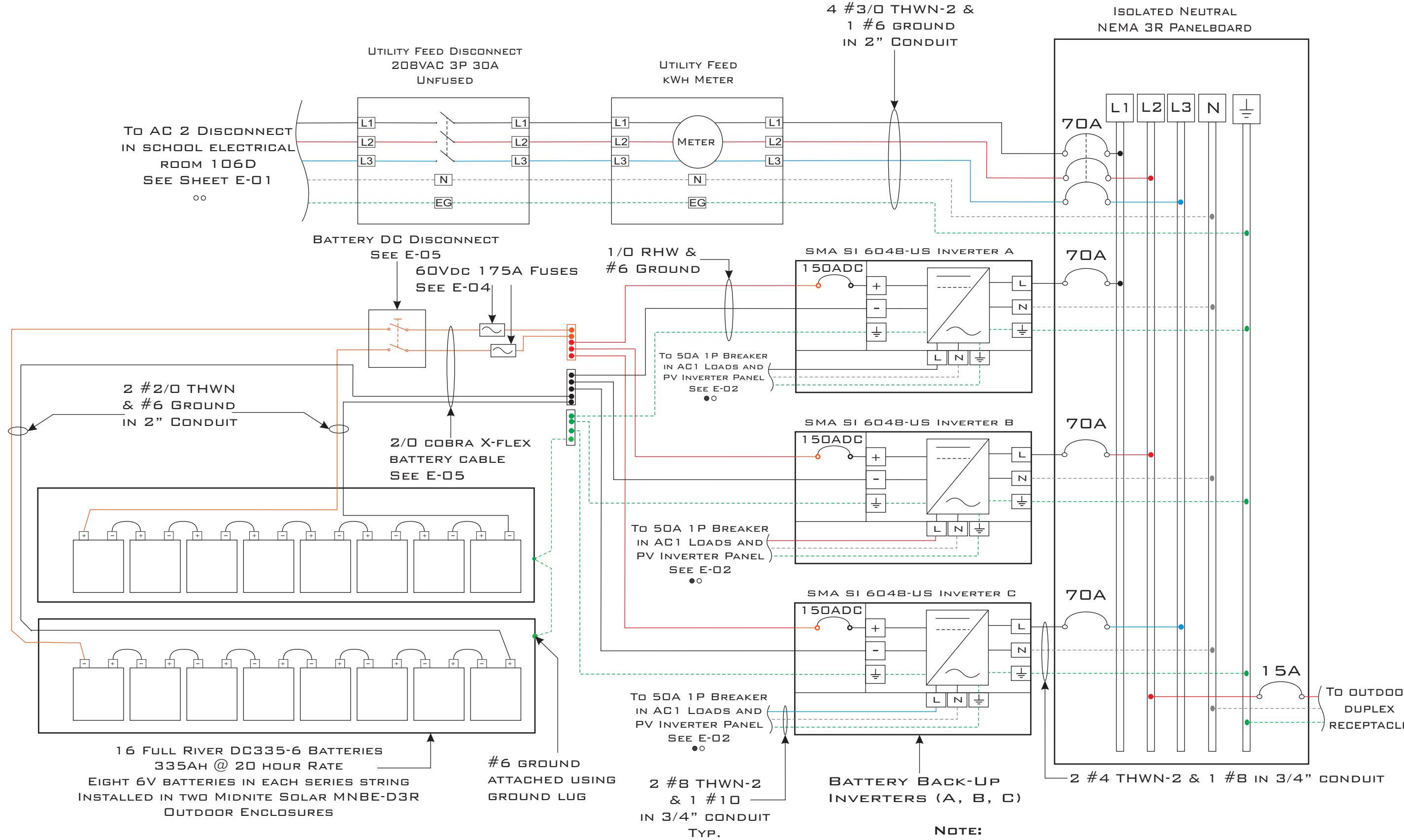
E-01 02

# PV INVERTER PANEL AND PV MODULES



# PV SUPPLY PANEL AND BATTERIES

AC2 LOADS AND PV SUPPLY PANEL  
208VAC 3P 4W 150A  
BUS MAIN LUG ONLY  
ISOLATED NEUTRAL  
NEMA 3R PANELBOARD



SHEET # REVISION  
E-03 00

**H A**  
LOCATION:  
**3601**

**Vergona-Bowersox**  
*Electric*  
LICENSE # EEC13005324  
3601 NORTH DIXIE HIGHWAY, BAY  
BOCA RATON, FL 33431  
PHONE: (561) 750-8677

## V SYSTEM ATTRIBUTE

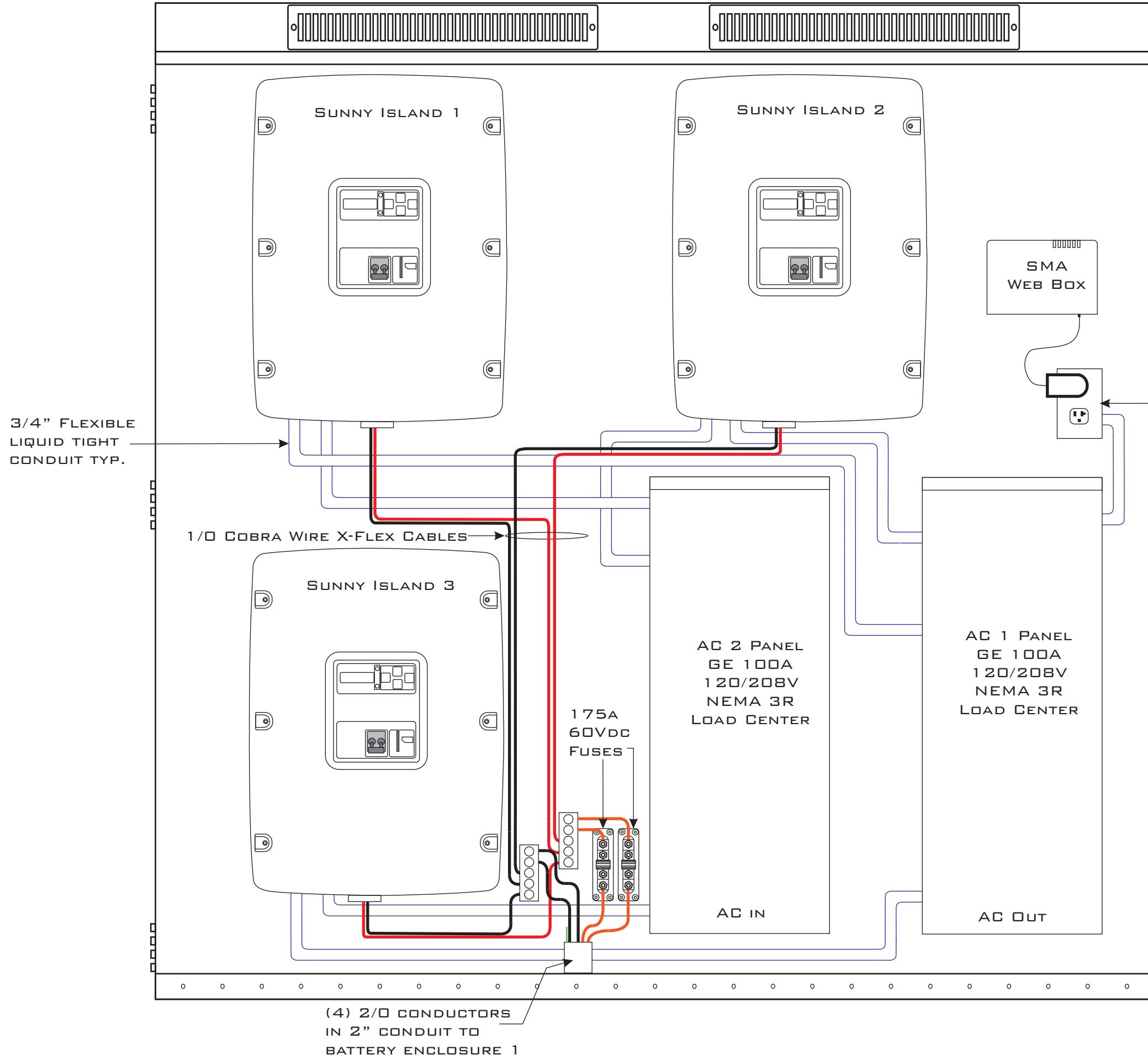
**TOTAL OUTPUT POWER:**

**MODULES:**  
**SOLARWORLD**  
**SW255-MONO**

**INVERTERS:**  
**SMA**  
**SUNNYBOY 4000TL-US**  
**SUNNY ISLAND**

Customer # \_\_\_\_\_ Revision \_\_\_\_\_

E-03 | 00



#### NOTES:

1. ALL 1/O AND 2/O FINE STRANDED WIRING MUST BE COBRA WIRE X-FLEX
2. USE SOLID PIN CRIMP ON CONNECTORS FOR CONNECTING FINE STRANDED CABLES TO POLARIS TAPS
3. USE ONLY CRIMP ON CONNECTORS FOR CONNECTING 2/O FINE STRANDED CABLES TO FUSE BLOCKS

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#### PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

MODULES:  
SOLARWORLD  
SW255-MONO

# OF SOLAR MODULES:  
42

INVERTERS:  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET # **E-04** REVISION # **02**

**HARMONY HIGH SCHOOL**  
LOCATION:  
3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771  
EQUIPMENT FITTING IN  
SUNNY ISLAND ENCLOSURE

**DUKE ENERGY®**  
**FSEC**

**HARMONY HIGH SCHOOL**

LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

EQUIPMENT FITTING IN  
BATTERY ENCLOSURES

**Vergona-Bowersox**  
**Electric**

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PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

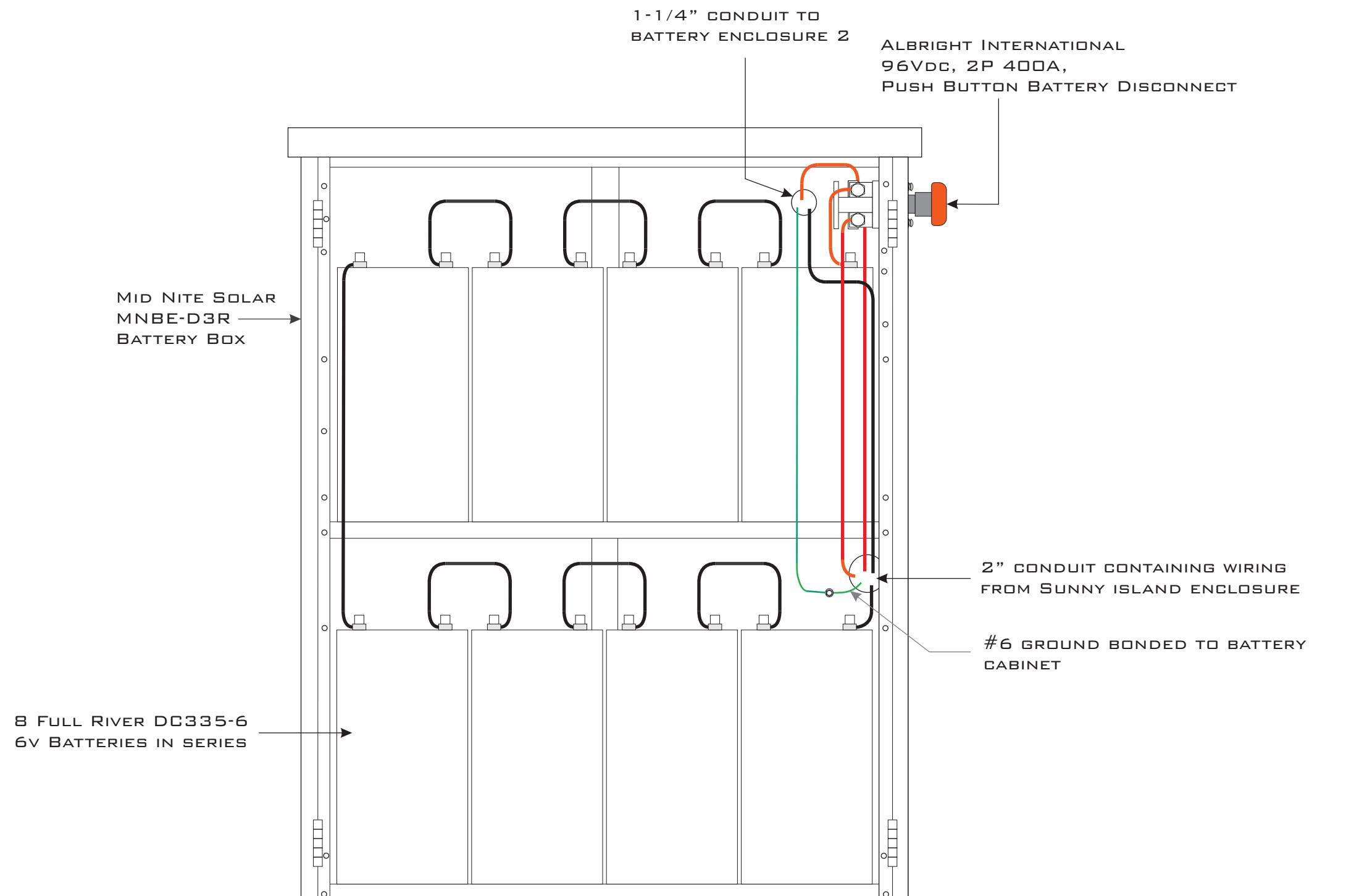
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# OF SOLAR MODULES:  
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INVERTERS:  
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SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET # REVISION #

E-05 02



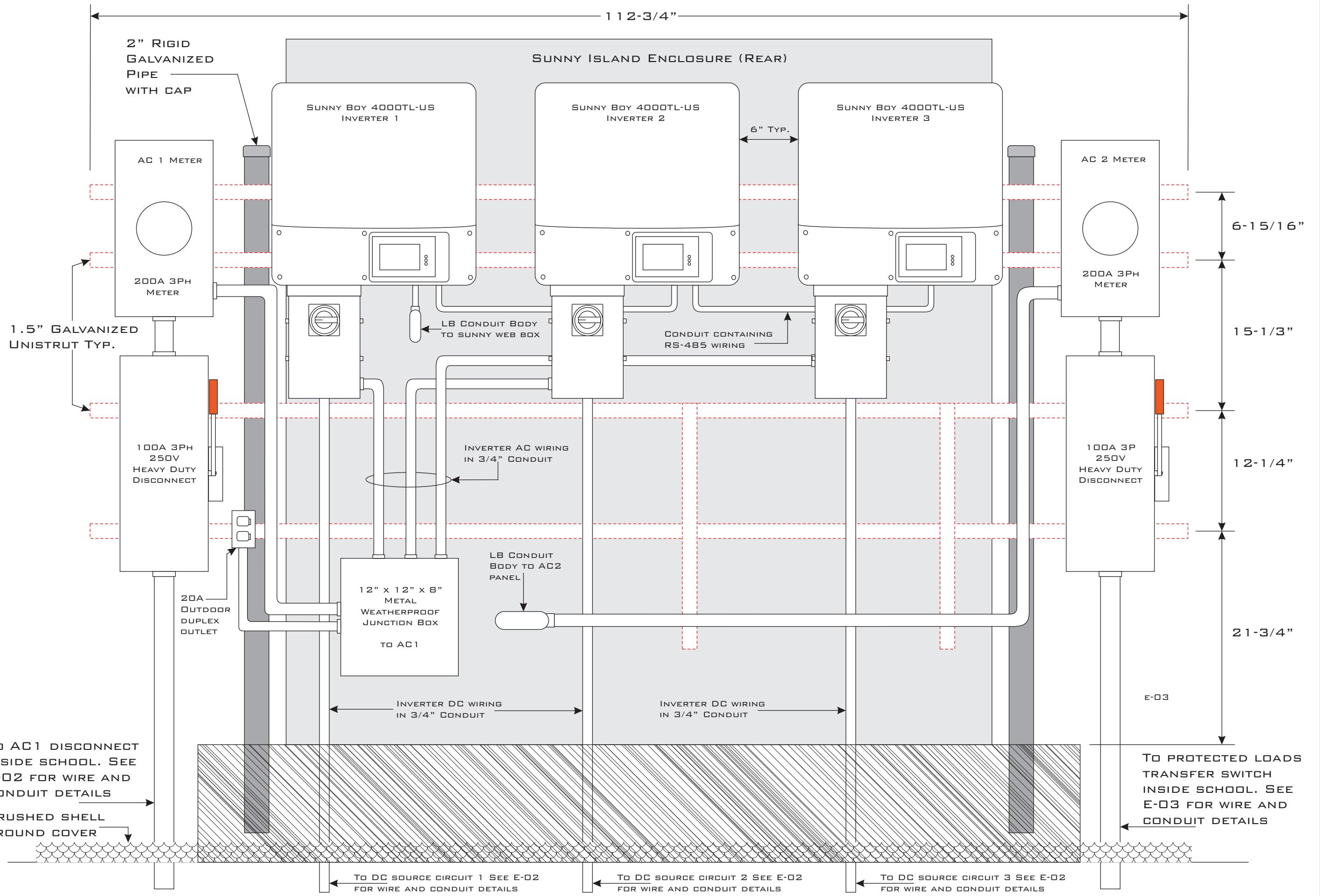
BATTERY DISCONNECT SCHEMATIC



DISCONNECT OPERATION: PUSH DOWN FOR OFF POSITION, PULL UP FOR ON POSITION.

NOTES:

1. BATTERY WIRING MUST BE COBRA WIRE 2/O X-FLEX CABLE
2. USE ONLY CRIMP ON CONNECTORS FOR CONNECTING 2/O FINE STRANDED CABLES TO BATTERY TERMINALS AND BATTERY DISCONNECT



## ELECTRICAL CALCULATIONS FOR STRING INVERTERS

MODULE MANUFACTURER	SOLARWORLD		
MODULE MODEL	SW 255 MONO		
INVERTER MANUFACTURER	SMA		
INVERTER MODEL	SUNNYBOY 4000TL		
NUMBER OF SOURCE CIRCUITS	1		
MODULES/SOURCE CIRCUIT	14		
TOTAL ARRAY POWER (kW)	3.6		
SYSTEM AC VOLTAGE	240V 1-PHASE		

MODULE PROPERTIES @ STC			
VOC	37.8	ISC	8.66
VMPP	31.4	IMP	8.15
TC VOC	-0.30% / °C	TC VMP	-0.45% / °C
PMP (W)	256		

DESIGN TEMPERATURE		
MIN. AMBIENT TEMP. °F	25	
MAX. AMBIENT TEMP. °F	130.0	
CALCULATED MAX. VOC	576	
CALCULATED MIN VMP	381	

INVERTER PROPERTIES		
MAX INPUT DC VOLTAGE	600 VDC	
MPPT VOLTAGE RANGE	175-480 VDC	
START VOLTAGE	150 VDC	
MAX INPUT POWER	4200 WDC	
MAX OUTPUT POWER	4000 WAC	

SB 4000TL DC INPUT CALCULATION										
ISC	1.25 x ISC	1.25 x 1.25 x ISC	AWG	75 °C AMPACITY	AMBIENT TEMP °F	TEMP DERATE	CONDUIT FILL	FILL DERATE	DERATED AMPACITY	MAXIMUM FUSE
8.66	10.83	13.53	#12	25	105.0	0.82	6	0.8	16.4	15 A

SB 4000TL AC OUTPUT CALCULATION									
OUTPUT CURRENT	1.25 x OUTPUT CURRENT	AWG	75 °C AMPACITY	AMBIENT TEMP °F	TEMP DERATE	CONDUIT FILL	FILL DERATE	DERATED AMPACITY	MAXIMUM CIRCUIT BREAKER (2P)
19.2	24.0	#10	35	85	1	3	1	35	25 A

SI 6048 AC 1 CALCULATION									
OUTPUT CURRENT	1.25 x OUTPUT CURRENT	AWG	75 °C AMPACITY	AMBIENT TEMP °F	TEMP DERATE	CONDUIT FILL	FILL DERATE	DERATED AMPACITY	MAXIMUM CIRCUIT BREAKER (2P)
24.0	30.0	#1	130	85	1	4	0.8	104	30 A

SI 6048 AC 2 CALCULATION									
OUTPUT CURRENT	1.25 x OUTPUT CURRENT	AWG	75 °C AMPACITY	AMBIENT TEMP °F	TEMP DERATE	CONDUIT FILL	FILL DERATE	DERATED AMPACITY	MAXIMUM CIRCUIT BREAKER (2P)
56.0	70.0	3/0	200	85	1	4	0.8	160	70 A

MAXIMUM CIRCUIT VOLTAGE DROP	2%
------------------------------	----

VOLTAGE DROP CALCULATIONS					
CIRCUIT	AWG	CIRCULAR MILLS	I	V	MAX LENGTH
SOURCE CIRCUIT	#12	6530	8.2	439.6	273 FEET
SB 4000TL AC OUTPUT	#10	10380	19.2	208	87 FEET
SI 6048 AC 1	#1	83690	24.0	120	324 FEET
SI 6048 AC 2	3/0	167800	56.0	120	279 FEET

### NOTES

TEMP DERATE BASED ON NEC TABLE 310.15(B)(2)(A)

CONDUIT FILL DERATE BASED ON NEC TABLE 310.15(B)(3)(A)

MAXIMUM VOC CALCULATED USING MODULE MANUFACTURE TEMPERATURE COEFFICIENTS PER NEC 690.7(A)

UNLESS SPECIFIED OTHERWISE, ALL WIRING MUST BE THHN OR THWN-2 COPPER WHEN IN CONDUIT. OPEN WIRING MUST BE PV WIRE.

ALL WIRE SIZES LISTED ARE THE MINIMUM ALLOWABLE

IN ANY CELL INDICATES THAT THE SYSTEM IS SAFE AND COMPLIES WITH NEC REQUIREMENTS

IN ANY CELL INDICATES A POTENTIALLY UNSAFE CONDITION

INFORMATION INPUT BY SYSTEM DESIGNER

INFORMATION OBTAINED FROM MANUFACTURER DATASHEETS



HARMONY HIGH SCHOOL  
LOCATION:  
3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

ELECTRICAL CALCULATIONS

Vergona-Bowersox  
Electric

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PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:

10.7

MODULES:

SOLARWORLD  
SW255-MONO

# OF SOLAR MODULES:

42

INVERTERS:

SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

Sheet #

02

Revision #

E-07 02

**SYSTEM BATTERIES**  
**NOMINAL VOLTAGE: 48VDC**  
**MAXIMUM VOLTAGE: 57.6VDC**  
**NORMAL OPERATING CURRENT: 130A**

LABEL FOR BATTERY ENCLOSURES

**PANEL AC1**  
**OPERATING VOLTAGE: 120/208V 3PH**  
**MAXIMUM OUTPUT TO PROTECTED LOADS: 25A**

LABEL FOR PANEL AC1

**PANEL AC2**  
**OPERATING VOLTAGE: 120/208V 3PH**  
**MAXIMUM INPUT CURRENT: 56A**

LABEL FOR PANEL AC2

**SOLAR INVERTER**  
**NORMAL DC VOLTAGE: 439.6V**  
**MAXIMUM DC VOLTAGE: 576V**  
**MAXIMUM DC CURRENT: 10.83A**  
**NORMAL DC CURRENT: 8.2A**  
**NORMAL AC VOLTAGE: 208V 1PH**  
**MAXIMUM AC CURRENT: 19.2A**

LABEL FOR SUNNY BOY INVERTERS

**BATTERY INVERTER**  
**NOMINAL DC VOLTAGE: 48V**  
**NORMAL AC VOLTAGE: 208V 1PH**  
**MAXIMUM AC1 CURRENT: 24A**  
**MAXIMUM AC2 CURRENT: 56A**

LABEL FOR SUNNY ISLAND INVERTERS

**WARNING**

THIS BUILDING CONTAINS DUAL POWER SOURCES. THE SECOND SOURCE IS A PHOTOVOLTAIC SYSTEM. DISCONNECTS FOR THIS SYSTEM ARE LOCATED AT THE SOLAR TRANSFER SWITCH IN ROOM 5-128 AND AT THE SOLAR ARRAY.

LABEL FOR MAIN BUILDING MAIN DISCONNECT

**WARNING**

THIS PANEL CONTAINS THE OVERCURRENT PROTECTION DEVICE FOR THE PHOTOVOLTAIC SYSTEM.  
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

**OPERATING VOLTAGE: 120/208V 3PH**  
**OVERCURRENT DEVICE RATING: 70A**

LABEL FOR INTERCONNECTION PANEL

**Vergona-Bowersox Electric**

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**PV SYSTEM ATTRIBUTES**

**TOTAL OUTPUT POWER: 10.7**

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SW255-MONO

**# OF SOLAR MODULES: 42**

**INVERTERS:**  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

**SHEET #**      **REVISION #**

**E-08**      **02**

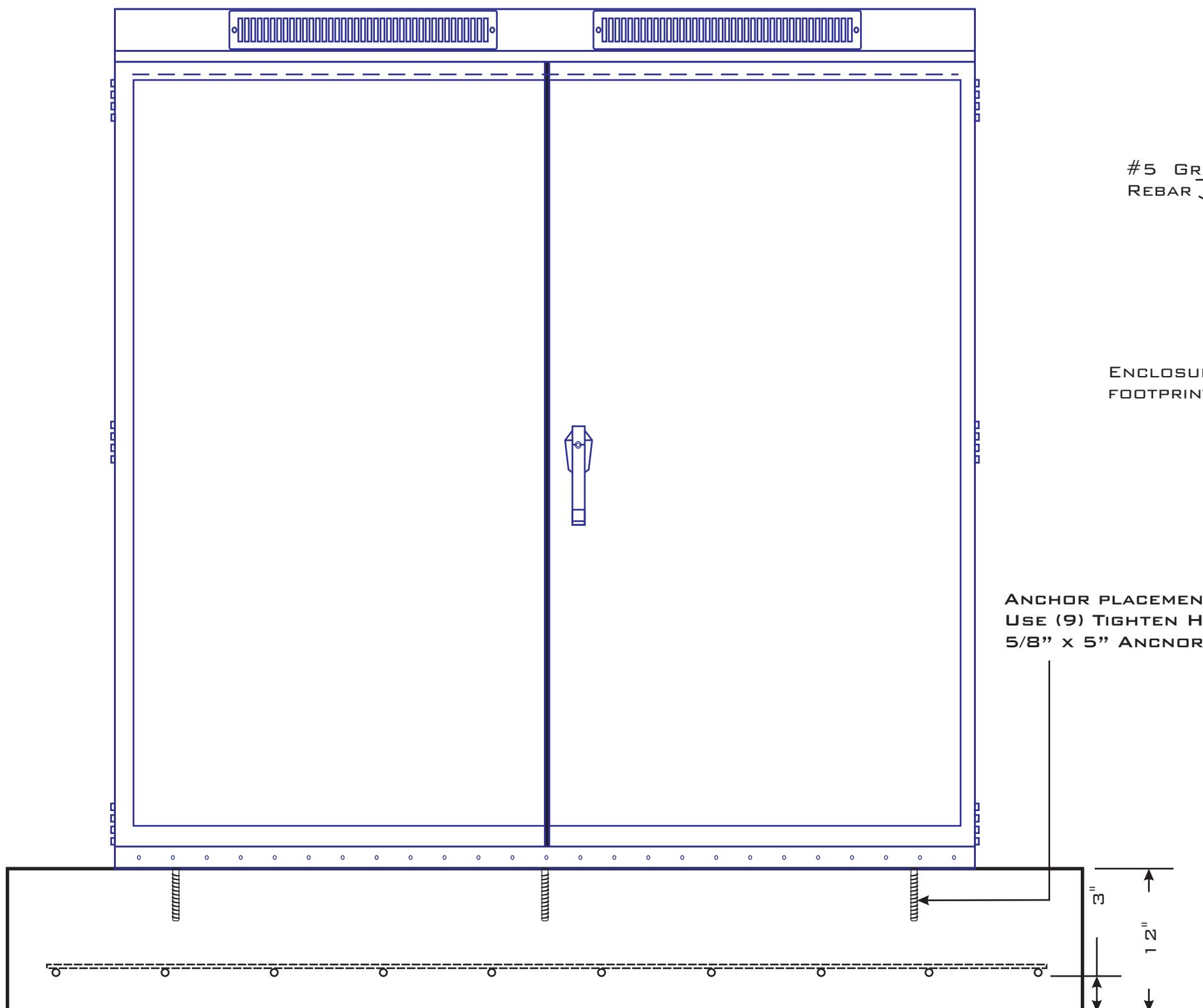
**HARMONY HIGH SCHOOL**

LOCATION:

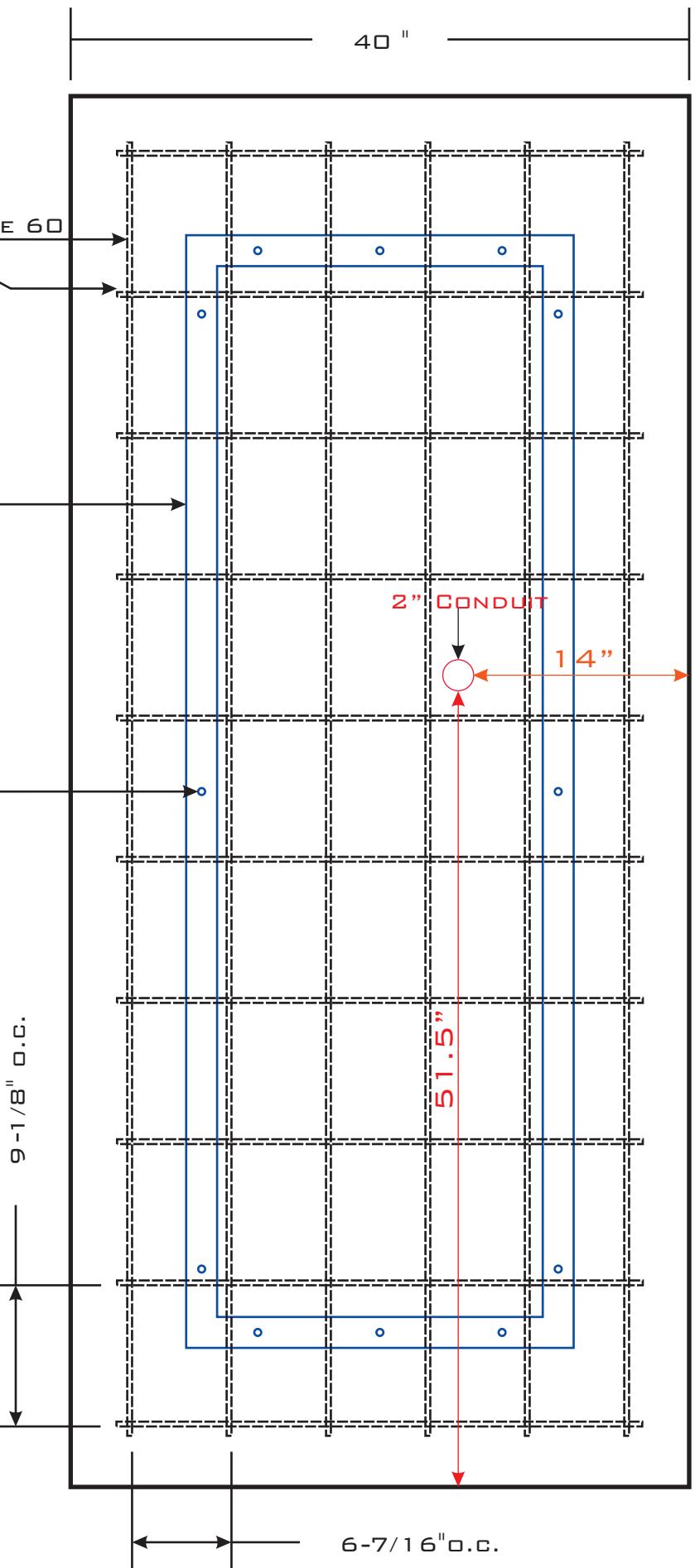
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ST. CLOUD, FL 34771

**LABELS**

## FRONT VIEW



## TOP VIEW



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**FSEC**

### HARMONY HIGH SCHOOL

#### LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771  
**SUNNY ISLAND ENCLOSURE MOUNTING DETAILS**

### Vergona-Bowersox

#### Electric

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#### PV SYSTEM ATTRIBUTES

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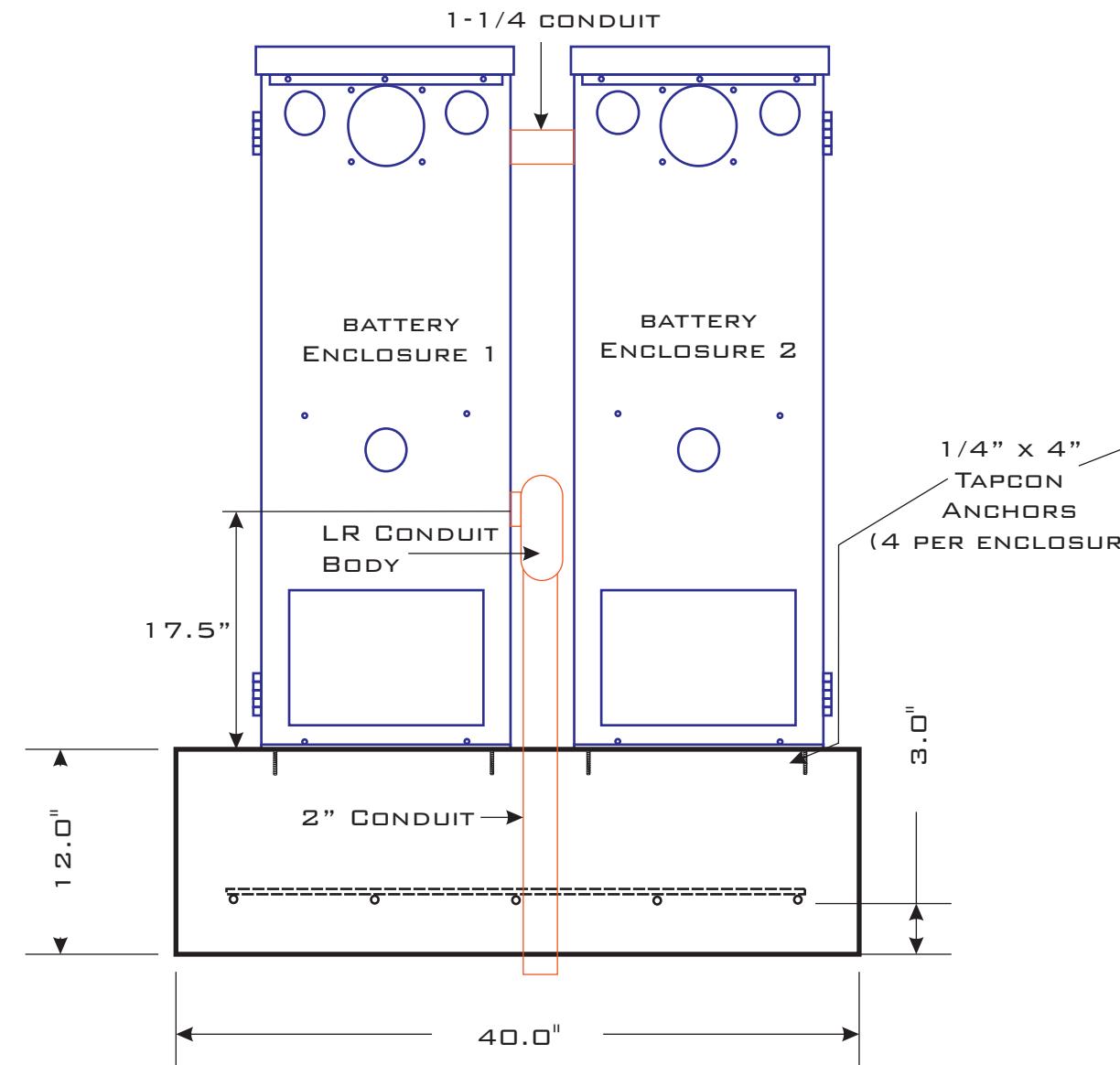
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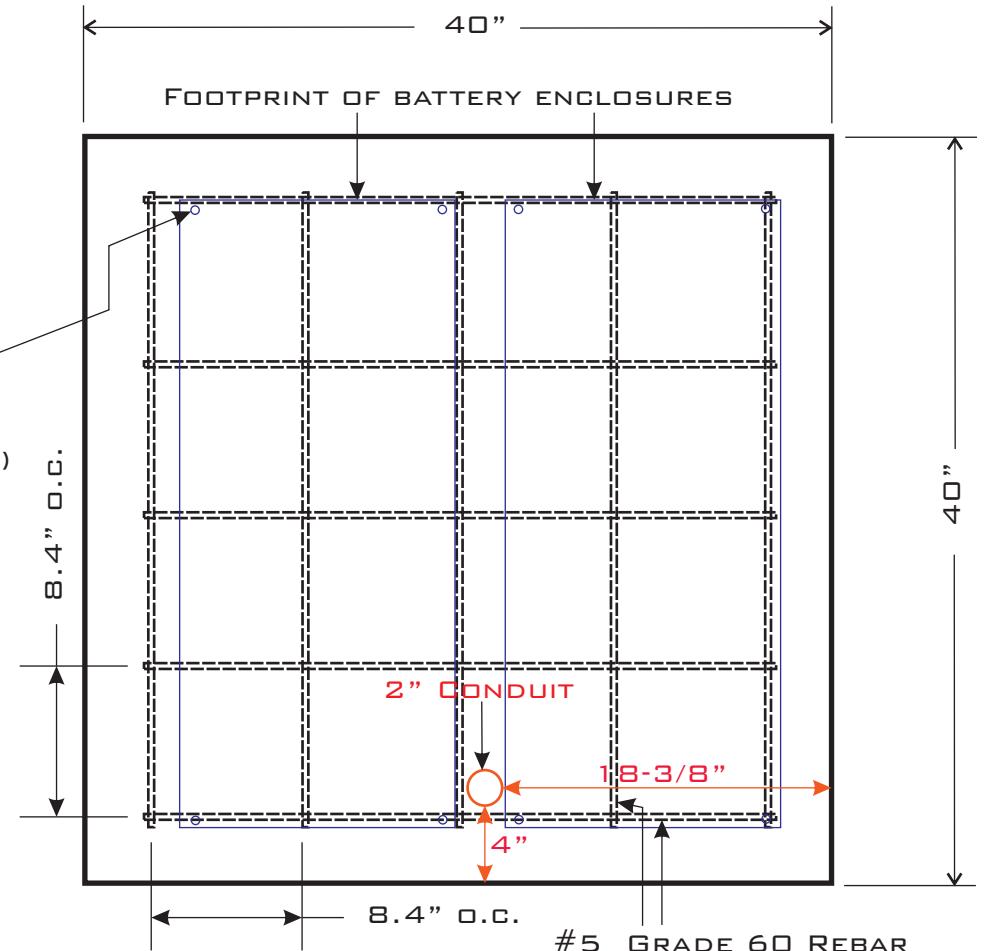
SHEET # 01

REVISION # 02

## SIDE VIEW



## TOP VIEW



### NOTES:

#### CONCRETE:

ALL CONCRETE WORK SHALL CONFORM WITH THE REQUIREMENTS OF ACI301 AND ACI318. CEMENT PER ASTM C150, TYPE II. AGGREGATE PER ASTM C33. CONCRETE SHALL BE READY MIXED IN ACCORDANCE WITH ASTM C94 AND SHALL BE DESIGNED FOR A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,000PSI.

#### REINFORCING:

1. REINFORCING STEEL SHALL CONFORM TO ASTM A615 (FY = 60KSI) DEFORMED BARS.
2. ACCURATELY PLACE OR SUPPORT ALL REINFORCING TO HAVE A CLEAR CONCRETE COVERAGE OF 3"

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## HARMONY HIGH SCHOOL

### LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

### BATTERY ENCLOSURE MOUNTING DETAILS

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*Electric*

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FAX: (561) 750-5187

### PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

MODULES:  
SOLARWORLD  
SW255-MONO

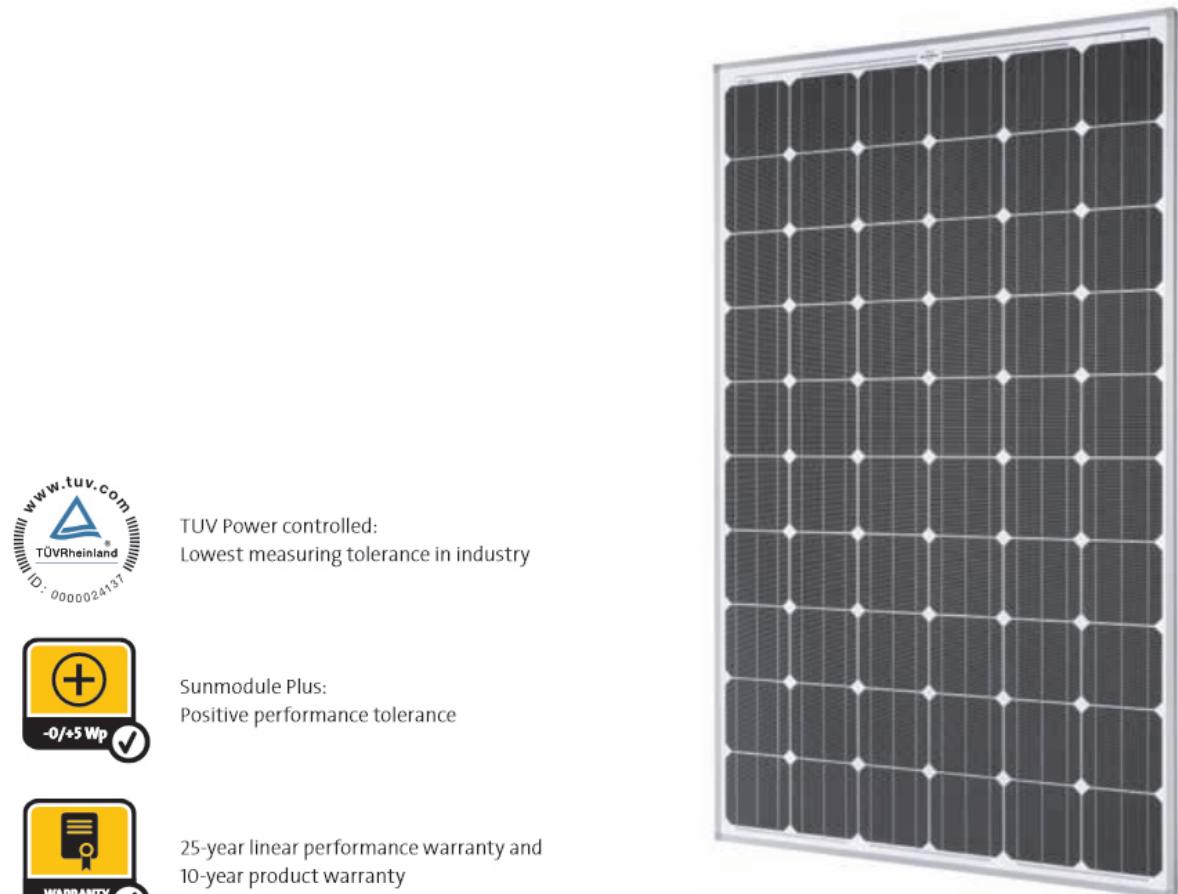
# OF SOLAR MODULES:  
42

INVERTERS:  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET #  REVISION #

M-02  02

# Sunmodule<sup>+</sup> SW 255 mono / 2.5 Frame



TUV Power controlled:  
Lowest measuring tolerance in industry



Sunmodule Plus:  
Positive performance tolerance



25-year linear performance warranty and  
10-year product warranty

## World-class quality

Fully-automated production lines and seamless monitoring of the process and material ensure the quality that the company sets as its benchmark for its sites worldwide.

## SolarWorld Plus-Sorting

Plus-Sorting guarantees highest system efficiency. SolarWorld only delivers modules that have greater than or equal to the nameplate rated power.

## 25 years linear performance guarantee and extension of product warranty to 10 years

SolarWorld guarantees a maximum performance degredation of 0.7% p.a. in the course of 25 years, a significant added value compared to the two-phase warranties common in the industry. In addition, SolarWorld is offering a product warranty, which has been extended to 10 years.\*

\*In accordance with the applicable SolarWorld Limited Warranty at purchase.  
[www.solarworld.com/warranty](http://www.solarworld.com/warranty)



- Qualified, IEC 61215
- Safety tested, IEC 61730
- Periodic Inspection



- ISO 9001
- ISO 14001 Certified



# Sunmodule<sup>+</sup> SW 255 mono / 2.5 Frame

## PERFORMANCE UNDER STANDARD TEST CONDITIONS (STC)\*

<b>Maximum power</b>	$P_{max}$	255 Wp
<b>Open circuit voltage</b>	$V_{oc}$	37.8 V
<b>Maximum power point voltage</b>	$V_{mpp}$	31.4 V
<b>Short circuit current</b>	$I_{sc}$	8.66 A
<b>Maximum power point current</b>	$I_{mpp}$	8.15 A

\*STC: 1000 W/m<sup>2</sup>, 25°C, AM 1.5

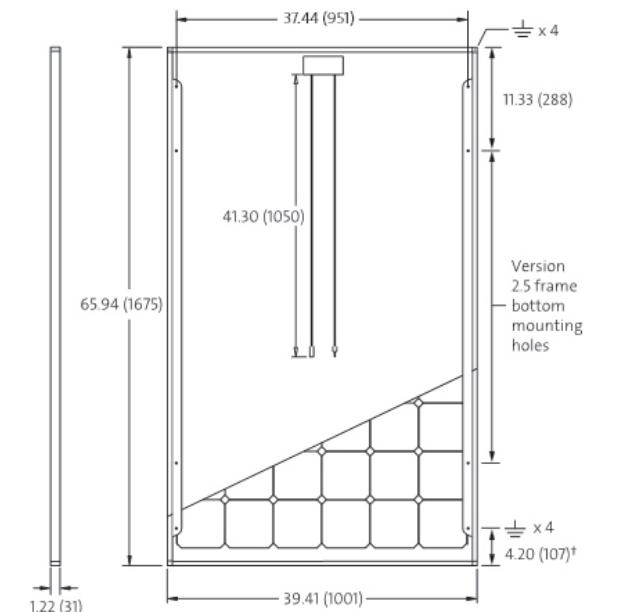
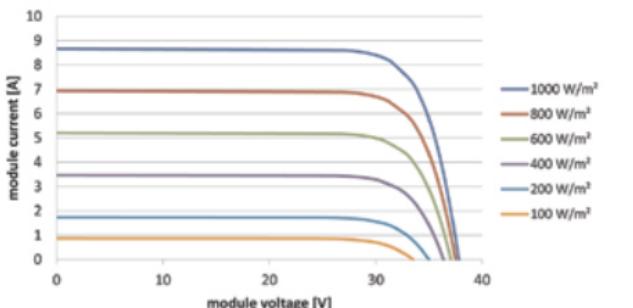
## PERFORMANCE AT 800 W/m<sup>2</sup>, NOCT, AM 1.5

<b>Maximum power</b>	$P_{max}$	184.1 Wp
<b>Open circuit voltage</b>	$V_{oc}$	34.0 V
<b>Maximum power point voltage</b>	$V_{mpp}$	28.3 V
<b>Short circuit current</b>	$I_{sc}$	6.99 A
<b>Maximum power point current</b>	$I_{mpp}$	6.52 A

Minor reduction in efficiency under partial load conditions at 25°C: at 200 W/m<sup>2</sup>, 95% (+/-3%) of the STC efficiency (1000 W/m<sup>2</sup>) is achieved.

## THERMAL CHARACTERISTICS

NOCT	48 °C
$TC I_{sc}$	0.004 %/K
$TC V_{oc}$	-0.30 %/K
$TC P_{mpp}$	-0.45 %/K
<b>Operating temperature</b>	-40°C to 85°C



1) Measuring tolerance traceable to TUV Rheinland: +/- 2% (TUV Power Controlled). All units provided are imperial. SI units provided in parentheses.

SolarWorld AG reserves the right to make specification changes without notice.

# SUNNY BOY 3000TL-US / 3800TL-US / 4000TL-US / 5000TL-US



**Certified**

- UL 1741 and 1699B compliant
- Integrated AFCI meets the requirements of NEC 2011 690.11

**Innovative**

- Secure Power Supply provides daytime power in case of grid outage

**Powerful**

- 97.2% maximum efficiency
- Wide input voltage range
- Shade management with OptiTrac Global Peak MPP tracking

**Flexible**

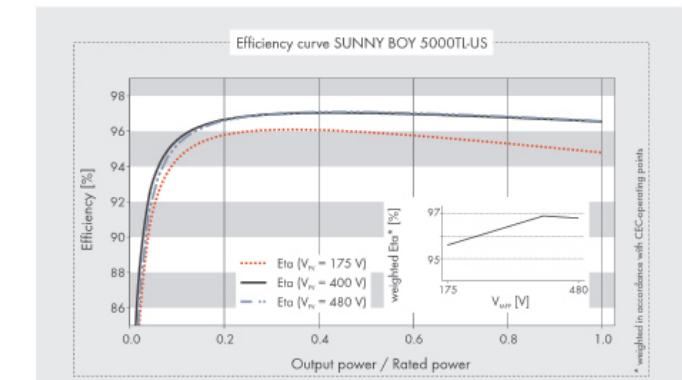
- Two MPP trackers provide numerous design options
- Extended operating temperature range

## SUNNY BOY 3000TL-US / 3800TL-US / 4000TL-US / 5000TL-US

Setting new heights in residential inverter performance

The Sunny Boy 3000TL-US/3800TL-US/4000TL-US/5000TL-US represents the next step in performance for UL certified inverters. Its transformerless design means high efficiency and reduced weight. Maximum power production is derived from wide input voltage and operating temperature ranges. Multiple MPP trackers and OptiTrac™ Global Peak mitigate the effect of shade and allow for installation at challenging sites. The unique Secure Power Supply feature provides daytime power in the event of a grid outage. High performance, flexible design and innovative features make the Sunny Boy TL-US series the first choice among solar professionals.

ENGINEERED  
IN GERMANY  
ASSEMBLED  
IN THE USA



### Accessories



● Standard feature ○ Optional feature – Not available  
Data at nominal conditions

Technical data	Sunny Boy 3000TL-US		Sunny Boy 3800TL-US		Sunny Boy 4000TL-US		Sunny Boy 5000TL-US	
	208 V AC	240 V AC	208 V AC	240 V AC	208 V AC	240 V AC	208 V AC	240 V AC
<b>Input (DC)</b>								
Max. DC power (@ cos φ = 1)	3200 W		4200 W		4200 W		5300 W	
Max. DC voltage	600 V		600 V		600 V		600 V	
Rated MPPT voltage range	175 - 480 V		175 - 480 V		175 - 480 V		175 - 480 V	
MPPT operating voltage range	125 V - 500 V		125 V - 500 V		125 V - 500 V		125 V - 500 V	
Min. DC voltage / start voltage	125 V / 150 V		125 V / 150 V		125 V / 150 V		125 V / 150 V	
Max. input current / per MPP tracker	18 A / 15 A		24 A / 15 A		24 A / 15 A		30 A / 15 A	
Number of MPP trackers / strings per MPP tracker	2 / 2							
<b>Output (AC)</b>								
AC nominal power	3000 W		3330 W		3840 W		4000 W	
Max. AC apparent power	3000 VA		3330 VA		3840 VA		4000 VA	
Nominal AC voltage / adjustable	208 V / ● 240 V / ●		208 V / ● 240 V / ●		208 V / ● 240 V / ●		208 V / ● 240 V / ●	
AC voltage range	183 - 229 V 211 - 264 V		183 - 229 V 211 - 264 V		183 - 229 V 211 - 264 V		183 - 229 V 211 - 264 V	
AC grid frequency; range	60 Hz / 59.3 - 60.5 Hz		60 Hz / 59.3 - 60.5 Hz		60 Hz / 59.3 - 60.5 Hz		60 Hz / 59.3 - 60.5 Hz	
Max. output current	15 A		16 A		20 A		22 A	
Power factor (cos φ)	1		1		1		1	
Output phases / line connections	1 / 2		1 / 2		1 / 2		1 / 2	
Harmonics	< 4%		< 4%		< 4%		< 4%	
<b>Efficiency</b>								
Max. efficiency	96.8%		97.1%		96.8%		97.2%	
CEC efficiency	96%		96.5%		96%		96.5%	
Protection devices								
DC disconnection device							●	
DC reverse-polarity protection							●	
Ground fault monitoring / Grid monitoring							● / ●	
AC short circuit protection							●	
All-pole sensitive residual current monitoring unit							●	
Arc fault circuit interrupter (AFCI) compliant to UL 1699B							●	
Protection class / overvoltage category							I / IV	
<b>General data</b>								
Dimensions (W / H / D) in mm (in)	490 / 519 / 185 (19.3 / 20.5 / 7.3)							
DC Disconnect dimensions (W / H / D) in mm (in)	187 / 297 / 190 (7.4 / 11.7 / 7.5)							
Packing dimensions (W / H / D) in mm (in)	617 / 597 / 266 (24.3 / 23.5 / 10.5)							
DC Disconnect packing dimensions (W / H / D) in mm (in)	370 / 240 / 280 (14.6 / 9.4 / 11.0)							
Weight / DC Disconnect weight	24 kg (53 lb) / 3.5 kg (8 lb)							
Packing weight / DC Disconnect packing weight	27 kg (60 lb) / 3.5 kg (8 lb)							
Operating temperature range	-40 °C ... +60 °C (-40 °F ... +140 °F)							
Noise emission (typical)	≤ 25 dB(A)		< 25 dB(A)		< 25 dB(A)		< 29 dB(A)	
Internal consumption at night	< 1 W		< 1 W		< 1 W		< 1 W	
Topology	Transformerless		Transformerless		Transformerless		Transformerless	
Cooling concept	Convection		Convection		Convection		Convection	
Electronics protection rating	NEMA 3R		NEMA 3R		NEMA 3R		NEMA 3R	
<b>Features</b>								
Secure Power Supply	●		●		●		●	
Display: graphic	●		●		●		●	
Interfaces: RS485 / Speedwire/Webconnect	○/○		○/○		○/○		○/○	
Interface: ZigBee	○		○		○		○	
Warranty: 10 / 15 / 20 years	●/○/○		●/○/○		●/○/○		●/○/○	
Certifications and permits (more available on request)	UL 1741, UL 1998, UL 1699B, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1							
NOTE: US inverters ship with gray lids								
Type designation	SB 3000TL-US-22		SB 3800TL-US-22		SB 4000TL-US-22		SB 5000TL-US-22	

Toll Free +1 888 4 SMA USA  
[www.SMA-America.com](http://www.SMA-America.com)

SMA America, LLC

SUNNY ISLAND

SHEET # DS-02

REVISION # 02

SB 3000TL-US-22 / 3800TL-US-22 / 4000TL-US-22 / 5000TL-US-22

one subject to change even for reasons of country-specific regulations or laws without notice. SMA reserves the right to make changes or corrections for errors or omissions. For current information, visit [www.SMA-Solar.com](http://www.SMA-Solar.com).



HARMONY HIGH SCHOOL

LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

DATASHEETS

LICENSE #: EC13005324  
3601 NORTH DIXIE HIGHWAY, BAY 16  
BOCA RATON, FL 33431  
PHONE: (561) 750-5187  
FAX: (561) 750-5187

## SUNNY ISLAND 4548-US / 6048-US



- Efficient**
- Maximum efficiency of 96%
  - CEC efficiency of 94.5% and 94%
  - State of charge calculation
  - Intelligent battery management for maximum battery life

- Simple**
- Easy commissioning with the "Quick Configuration Guide"
  - Complete off-grid management
  - Excellent for grid-tied battery back up

- Flexible**
- For Sunny Island systems from 4.5 to 100 kW
  - Single, split-phase and three-phase operation, connectable in parallel and modularly expandable
  - AC and DC coupling

- Durable**
- Extreme overload capability
  - OptiCool™ active temperature management system
  - 5-year standard warranty

## SUNNY ISLAND 4548-US / 6048-US

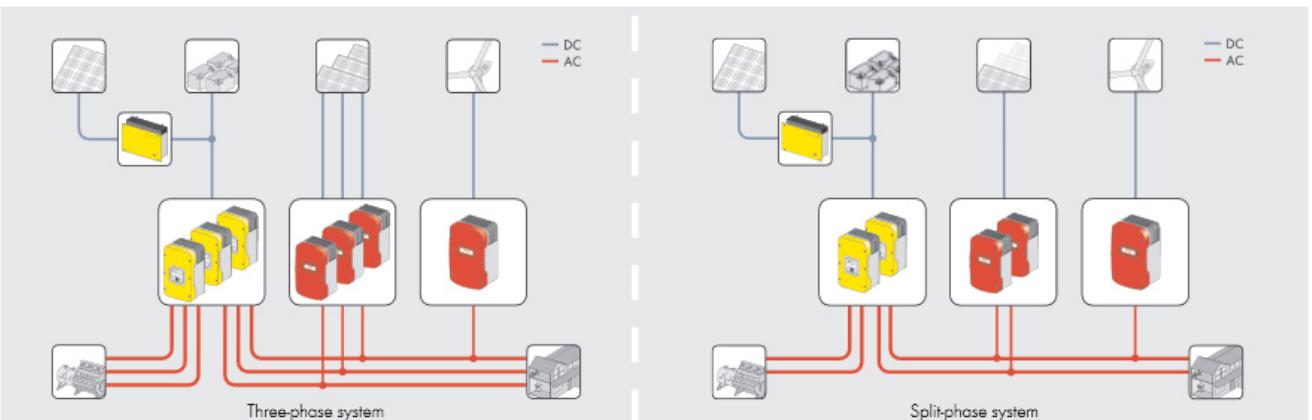
The efficient off-grid manager

The SMA Sunny Island 4548-US and 6048-US inverters are based on proven off-grid technology and feature industry leading power output. A maximum efficiency of 96 percent ensures peak production, which results in reduced diesel usage in rural communities. More flexible sizing allows for simplified system planning. And, with multicluster technology, up to 12 Sunny Islands can be integrated into off-grid power systems up 110 kW in size.



SI4548-US-10 / SI6048-US-10

Technical data	Sunny Island 4548-US	Sunny Island 6048-US
<b>AC output (loads)</b>		
Rated grid voltage / AC voltage range	120 V/105 V - 132 V	120 V/105 V - 132 V
Rated frequency / frequency range (adjustable)	60 Hz/55 Hz ... 65 Hz	60 Hz/55 Hz ... 65 Hz
AC power (at 25 °C / at 40 °C) for 3 hours	5000 W/4000 W	6000 W/5000 W
Rated power (@ $U_{\text{grid}}$ , $f_{\text{grid}}$ / 25 °C / @ $\cos \phi = 1$ )	4500 W	5750 W
AC power at 25 °C for 30 min / 1 min / 3 s	5300 W / 8400 W / 11000 W	7000 W / 8400 W / 11000 W
Rated current / max. output current (peak)	37.5 A/180 A for approx. 60 ms	48 A/180 A for approx. 60 ms
Total harmonic factor output voltage / power factor with rated power	3 % / -1 ... +1	3 % / -1 ... +1
<b>AC input (PV array or grid)</b>		
Rated input voltage / AC input voltage range	120 V/80 V - 150 V	120 V/80 V - 150 V
Rated input frequency / allowable input frequency range	60 Hz/54 Hz ... 66 Hz	60 Hz/54 Hz ... 66 Hz
Max. AC input current / adjustable	56 A/0 A ... 56 A	56 A/0 A ... 56 A
Max. AC input power	6.7 kW	6.7 kW
<b>Battery DC input</b>		
Rated input voltage / DC voltage range	48 V/41 V - 63 V	48 V/41 V - 63 V
Max. battery charging current / DC rated charging current	100 A / 85 A	130 A / 110 A
Battery type / battery capacity range	Lead, NiCd/100 Ah ... 10000 Ah	Lead, NiCd/100 Ah ... 10000 Ah
Charge control	IUoU charge procedure with automatic full charge and equalization charge	IUoU charge procedure with automatic full charge and equalization charge
<b>Efficiency / self-consumption</b>		
Max. efficiency / CEC efficiency	96 % / 94.5 %	96 % / 94 %
Self-consumption without load / standby	25 W/4 W	25 W/4 W
<b>Protective devices</b>		
DC reverse polarity protection / DC fuse	• / •	• / •
AC short-circuit / AC overload	• / •	• / •
Overtemperature / battery deep discharge	• / •	• / •
<b>General data</b>		
Dimensions (W / H / D)	467 / 612 / 235 mm (18.4 / 24.1 / 9.3 inch)	467 / 612 / 235 mm (18.4 / 24.1 / 9.3 inch)
Weight	63 kg / 139 lb	63 kg / 139 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +122 °F	-25 °C ... +60 °C / -13 °F ... +122 °F
<b>Features / function</b>		
Operation and display / multi-function relay	Internal / 2	Internal / 2
Degree of protection (according to IEC 60529)	indoors (NEMA 1)	indoors (NEMA 1)
Three-phase systems / parallel connection	• / •	• / •
Integrated bypass / multicluster operation	- / •	- / •
State of charge calculation / full charge / equalization charge	• / • / •	• / • / •
Integrated soft start / generator support	• / •	• / •
Battery temperature sensor / data cable	• / •	• / •
Warranty	5 years	5 years
Certificates and approvals	www.SMA-Solar.com	www.SMA-Solar.com
<b>Accessories</b>		
Battery cable / battery fuse	○ / ○	○ / ○
Interface (RS 485 / Multicluster PB)	○ / ○	○ / ○
Extended generator start "GenMan"	○	○
Load-shedding protection / battery current measurement	○ / ○	○ / ○
● Standard feature   ○ Optional feature   – Not available		
Type designation	SI4548-US-10	SI6048-US-10



SUNNYISLAND-6048US-US | 3 | 7 | 9 | Sunny Island OptiCool, and SMA are registered trademarks of SMA Solar Technology AG. Lead and figures comply with the rules of the car cockpit when printed on Hirsch fine paper.

**Vergona-Bowersox**  
*Electric*

LICENSE # EC13005324  
3601 NORTH DIXIE HIGHWAY, BAY 16  
BOCA RATON, FL 33431  
PHONE: (561) 750-8677  
FAX: (561) 750-5118



**HARMONY HIGH SCHOOL**

LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

**DATASHEETS**

PV SYSTEM ATTRIBUTES
<b>TOTAL OUTPUT POWER:</b> 10.7
<b>MODULES:</b> SOLARWORLD SW255-MONO
<b># OF SOLAR MODULES:</b> 42
<b>INVERTERS:</b> SMA SUNNYBOY 4000TL-US SUNNY ISLAND
<b>SHEET #</b> DS-03 <b>REVISION #</b> 02

# MidNite Solar

## Battery Enclosures

MidNite Solar offers indoor gray steel powder coated battery enclosures in three sizes. All include locking doors. When you need an enclosure for your sealed AGM or Gel battery bank, consider MidNite Solar. All enclosures are steel except the outdoor MNBE-D3R and 8D2x2 which are aluminum.

**MNBE-D**  
34W x 15.25D x 41.14H  
8 GVX3050 (2 shelf)  
8 Golf Cart (2 shelf)  
8 Group 31 (2 shelf)  
12 Golf Cart (3 shelf)  
12 Group 31 (3 shelf)

Shown with 8 GVX3050. Will fit 8 sealed L16 batteries with 3" head room. Two shelves standard. Ships knocked down in two boxes. Ship Wt. 116 LB. - ETL Listed

**MNBE-D3R (2 shelf) - Outdoor**  
Rain tight aluminum battery enclosure with locking door and two shelves. MNBE-D3R holds 8 GVX3050T or 8 golf cart or 8 group 31 batteries. Same dimensions as the MNBE-D.

**MNBE-8D2x2**  
Battery Enclosure with locking door and one shelf. Outdoor 3R rain proof design. Powder coated aluminum and stainless steel construction. Holds four 8D batteries. Gray powder coated steel. Same dimensions as the MNBE-C.

**MNBE-CL16 (2 shelf)**  
Battery Enclosure with locking door and two shelves. Holds eight sealed L-16 batteries. Gray powder coated steel. Same dimensions as the MNBE-C.

**MNBE-8D2x2 Deluxe** - Same as the regular but also includes 250A battery breaker and 4/0 interconnecting cables.

**MNBE - 8D2x2 Standard and Deluxe Models:**  
28 1/2W x 26 1/4D x 36H  
Wt. - Standard 90 LB.  
Wt. - Deluxe 91 LB.

**www.midnitesolar.com**  
17722 - 67th Ave NE, Arlington, WA 98223  
PH. 360-403-7207  
FAX 360-691-6862



## Battery Enclosures

**MNBE-A**

**MNBE-8D2x2**

**MNBE-C (3 shelf)**  
34W x 15.25D x 55H  
12 Golf Cart  
12 Group 31  
12 GVX3050 Concorde  
2 shelf for 8 L16's  
4 shelf for four 8D's  
Ships motor freight  
Ship Wt. 190 LB.  
ETL Listed

**MNBE-D 2 shelf shown & DR3**

**VERGONA-BOWERSOX ELECTRIC**

LICENSE # EC13005324  
3601 NORTH DIXIE HIGHWAY, BAY 16  
BOCA RATON, FL 33431  
PHONE: (561) 750-8677  
FAX: (561) 750-5118

PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER: 10.7

MODULES:  
SOLARWORLD  
SW255-MONO

# OF SOLAR MODULES: 42

INVERTERS:  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

ETL Listed for US & Canada

17722 - 67th Ave NE, Unit C, Arlington WA 98223  
Ph 425.374.9060 Fax 360.691.6862  
<http://www.midnitesolar.com>

**MidNite SOLAR, Inc.**

# ENCLOSURE FOR SUNNY ISLANDS AND OUTDOOR ELECTRICAL PANELS



TYPE 3R PAD-MOUNT TYPE 3R ENCLOSURES AND ACCESSORIES



## WEATHERPRO™ OUTDOOR PAD MOUNT, TYPE 3R



### INDUSTRY STANDARDS

UL 508A Listed; Type 3R; File No. E61997  
cUL/CSA C22.2 No. 94 Listed; Type 3R; File No. E61997

NEMA/EEMAC Type 3R  
IEC 60529, IP32

### APPLICATION

WEATHERPRO™ Outdoor Pad Mount Enclosures protect controls, drives, power distribution components or contactors in outdoor commercial or industrial power distribution and control applications. The overlapping two-door models with no center post allow full-width access to enclosure interior.

### FEATURES

- 3-point latching system with heavy duty handle
- Padlock provision in handle
- Open bottom with pre-punched mounting hole flange
- Drip edge overhang on top
- Louvered overhang with a closure plate
- Studs included for mounting optional panels on threaded bolts
- Welded body construction
- Sturdy 7 gauge lifting tabs
- Overlapping doors with no center post on two-door models
- Bonding provision on each door
- Bolted hinges on doors

### SPECIFICATIONS

- 14 gauge galvanized steel

### FINISH

RAL 7035 light-gray polyester powder paint inside and outside.  
Optional panels are white.

### ACCESSORIES

See also Accessories.  
Fan Shroud Kits  
19-in. Fixed Wall-Mount Rack  
19-in. Hinged Wall-Mount Panel  
Insect Screens

### MODIFICATION AND CUSTOMIZATION

Hoffman excels at modifying and customizing products to your specifications. Contact your local Hoffman sales office or distributor for complete information.

### BULLETIN: A3PM

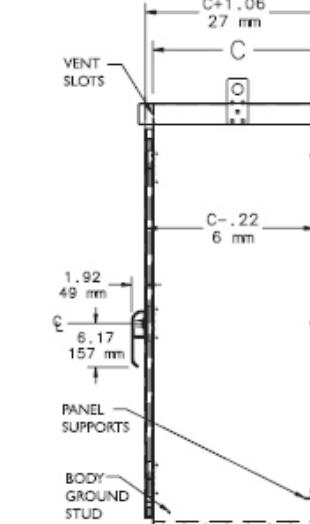
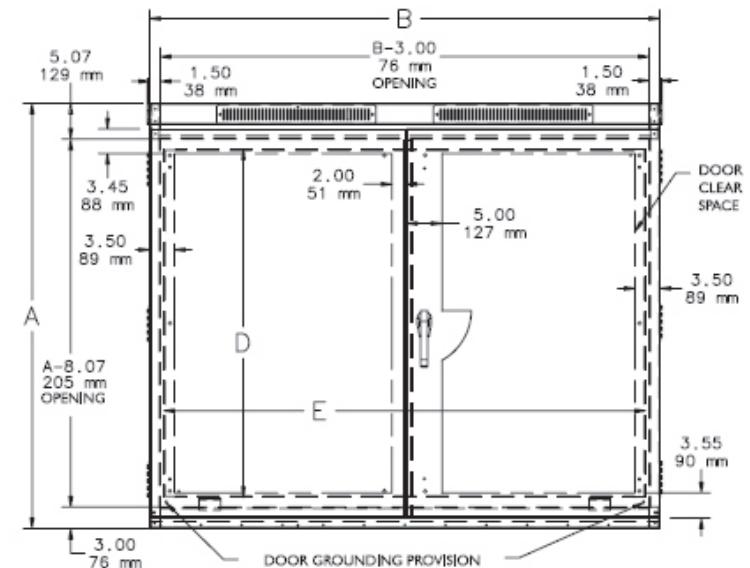
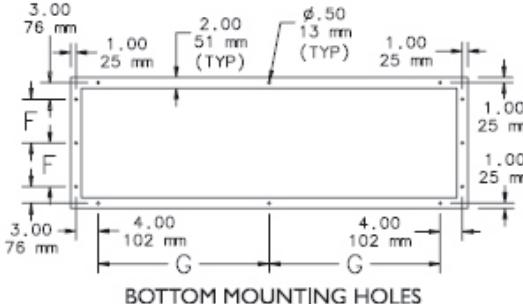
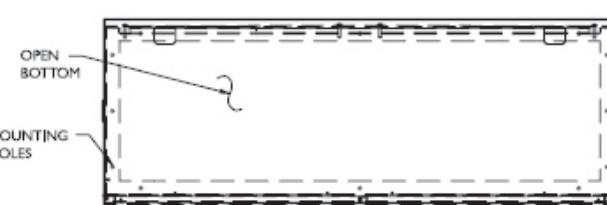
## TYPE 3R PAD-MOUNT TYPE 3R ENCLOSURES AND ACCESSORIES

### Standard Product WEATHERPRO Outdoor Pad-Mount Type 3R Two-Door Enclosures

Catalog Number	AxRxH in./mm	Panel	Panel Size Dx E in./mm	Mounting Dimensions F x G in./mm
A60R5218FSLP	60.00 x 52.00 x 18.00	A49P48N	49.16 x 48.00	4.90 x 20.90
	1524 x 1321 x 457		1249 x 1219	124 x 531
A60R5224FSLP	60.00 x 52.00 x 24.00	A49P48N	49.16 x 48.00	7.90 x 20.90
	1524 x 1321 x 610		1249 x 1219	201 x 531
A60R7224FSLP	60.00 x 72.00 x 24.00	A49P68N	49.16 x 68.00	7.90 x 30.90
	1524 x 1829 x 610		1249 x 1727	201 x 785
A72R7218FSLP	72.00 x 72.00 x 18.00	A61P68N	61.16 x 68.00	4.90 x 30.90
	1829 x 1829 x 457		1553 x 1727	124 x 785
A72R7224FSLP	72.00 x 72.00 x 24.00	A61P68N	61.16 x 68.00	7.90 x 30.90
	1829 x 1829 x 610		1553 x 1727	201 x 785

Purchase panels separately.

### Two-Door Enclosures



87789871

Vergona-Bowersox  
*Electric*

LICENSE # EC13005324  
3601 NORTH DIXIE HIGHWAY, BAY 16  
BOCA RATON, FL 33431  
PHONE: (561) 750-8677  
FAX: (561) 750-5118

### PV SYSTEM ATTRIBUTES

TOTAL OUTPUT POWER:  
10.7

MODULES:  
SOLARWORLD  
SW255-MONO

# OF SOLAR MODULES:  
42

INVERTERS:  
SMA

SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET #	DS-05
REVISION #	02

SPONSORED BY:

DUKE ENERGY®  
FSEC®

HARMONY HIGH SCHOOL

LOCATION:

3601 ARTHUR J. GALLAGHER BLVD.,  
ST. CLOUD, FL 34771

DATASHEETS

1 CONTRACTOR

SUBJECT TO CHANGE WITHOUT NOTICE

EQUIPMENT PROTECTION SOLUTIONS

Spec-00088 G

3 CONTRACTOR

SUBJECT TO CHANGE WITHOUT NOTICE

EQUIPMENT PROTECTION SOLUTIONS

Spec-00088 G

SHEET #

DS-05

REVISION #

02

## DC SURGE ARRESTOR

## AC SURGE ARRESTOR

## MidNite Solar Surge Protection Device

Part No.	MNSPD115	MNSPD300	MNSPD600
Nominal Voltage	0 to 90 VAC 0 to 115 VDC	0 to 250 VAC 0 to 300 VDC	0 to 485 VAC 0 to 600 VDC
MCOV	180V (162-198)	470V (423-517)	780V (702-858)
Clamp Voltage @ 100A Current 8/20 µs	295V	775V	1290V
Energy Absorption In Joules	1120 J (Full Device) 560 J (Each Section)	3130 J (Full Device) 1560 J (Each Section)	4320 J (Full Device) 2160 J (Each Section)
Suggested Placement	Up to 90 VAC circuits, 12V, 24V, 48V DC battery circuits	120/240 VAC circuits Offgrid PV combiners Charge controller inputs up to 300VDC	316V/480 VAC circuits Grid tie PV combiners Grid tie inverter input Non-Isolated Inverters
Diagnostic Blue LED	SPD115+300 LED indicators when voltage is present between L1+Ground and L2+Ground	SPD600 LED Indicators when voltage is present between L1+L2	
Thermal Disconnector - Internal Fuse			
Response time	<1micro sec.		

Performance		Mechanical Description		Diagnostics		Listings and Performance	
Surge Current Rating per Phase	57kA	Enclosure	Polycarbonate UL94V-0	Blue status LED, one per leg		UL Standard for Safety, UL 1449 Surge Protective Devices-Third Edition	
Short Circuit Current Rating	115kA	NEMA Rating	NEMA Type 4X			CSA C22.2 No. 8-M1986 Electromagnetic Interference (EMI) Filters, Fourth Edition	
T-MOVs	8	Connection Method	#12 AWG				
Fusing		Weight	1 lb.				
Thermal Fusing		Mounting Method	1/2" Conduit Knockout				
Overcurrent Fusing		Operating Altitude	Sea Level – 12,000' (3,658 Meters)				
Operating Frequency	0 to 60 Hz	Storage Temp	-40° F to +185° F (-40° C to +85° C)				
		Operating Temp	-40° F to +185° F (-40° C to +85° C)				

Model No.	Max Operating Voltage	Surge Current per Phase	Configuration	MCOV	SCCR	VPR 600V/3kA
MNSPD115	90VAC/115VDC	57kA	1Ø, 3-wire (2 Legs)	180V L-N	115kA	330V
MNSPD300	250VAC/300VDC	57kA	1Ø, 3-wire (2 Legs)	470V L-N	115kA	800V
MNSPD600	485VAC/600VDC	57kA	1Ø, 3-wire (2 Legs)	780V L-N	115kA	1500V

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AG Series  
Surge Protective Devices

Project:	
Location:	
Product Type:	
Contact/Phone:	
Model #:	

AG24013, AG2401C3, AG2083C3,  
AG48013, AG4803C3, AG65033/C3/L3AG Series  
Surge Protective Devices

The AG Series Surge Protective Devices (SPD) are designed for a variety of Type 1 and Type 2 applications. Type 1 applications include outdoor installations before service entrances and utility meter cabinets. Type 2 applications include installations after service entrances. CSA listed to ANSI/UL1449 3rd edition, the AG series is approved for outdoor applications including: irrigation equipment, farm equipment, pumps, lighting fixtures, traffic signaling devices, HVACR controls, and motors.

## Features

- UV resistant polycarbonate housing with ½" nominal nipple
- 18" leads; AG6503L3 – 36" leads
- Type 4 outdoor rainproof enclosure
- Green LED indicates surge protective status
- SPD Type 1 and/or Type 2 applications
- Limited 1-year warranty

## Ratings

See Table Below

1500L1/L3-L2Voltage Protection Ratings (VPR)							
Model	Service Voltage	Poles	Wire Configurations	Nominal Discharge Current	Maximum Continuous Operation Voltage	L-N/G	L-L
AG24013/C3	120/240 VAC	1 or 2	L1, L2, N/G	20kA	150 L-N/G 300 L-L	700	1200
AG2083C3	208 VAC	3	L1, L2, L3, N/G	20kA	150 L-N/G 300 L-L	700	1200
AG48013	277/480 VAC	1 or 2	L1, L2, N/G	20kA	320 L-N/G 640 L-L	1200	2000
AG4803C3	277/480 VAC	3	L1, L2, L3, N/G	20kA	320 L-N/G 640 L-L	1200	2000
AG65033/C3/L3	347/600 VAC	3	L1, L2, L3, N/G	20kA	420 L-N/G 840 L-L	1500	2500
AG2403C3	120/208/240 (High Leg Delta)	3	L1, L2, L3, N/G	20kA	150 L1/L3-N/G 270 L2-N/G 300 L1-L3 420 L1/L3-L2	700 L1/L3-N/G 1000 L2-N/G	1200 L1-L3 1500 L1/L3-L2



Surge Protection

**Vergona-Bowersox**  
*Electric*

LICENSE # EC13005324  
3601 NORTH DIXIE HIGHWAY, BAY 16  
BOCA RATON, FL 33431  
PHONE: (561) 750-8677  
FAX: (561) 750-5118

PV SYSTEM ATTRIBUTES  
TOTAL OUTPUT POWER: 10.7

MODULES:  
SOLARWORLD  
SW255-MONO

# OF SOLAR MODULES: 42

INVERTERS:  
SMA  
SUNNYBOY 4000TL-US  
SUNNY ISLAND

SHEET # DS-06  
REVISION # 02

SPONSORED BY:	DUKE ENERGY®
LOCATION:	3601 ARTHUR J. GALLAGHER BLVD., ST. CLOUD, FL 34771
DATASHEETS	

# DC335-6

(335AH/6 Volt)

Industry Reference: J305



## DEEP CYCLE SERIES

### CONSTANT CURRENT DISCHARGE (Amps)

CUT OFF VOLTAGE V/cell	30M	45M	1H	2H	3H	5H	8H	10H	12H	20H	24H
1.75V	301.5	222.6	184.3	102.4	75.9	53.2	36.4	30.0	25.7	16.8	14.0

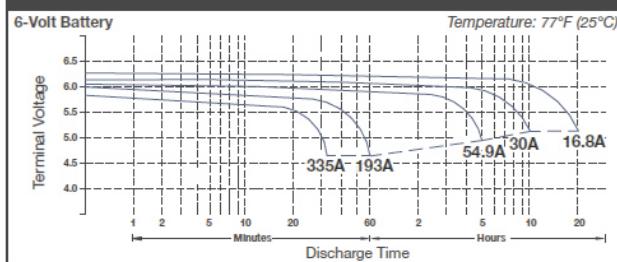
### RESERVE CAPACITY

@25 AMPS	@75 AMPS
751 Minutes	184 Minutes

### SPECIFICATIONS

Nominal Voltage	6 Volt	
Rated Capacity (20 hour rate)	335 AH	
Dimensions	Total Height (including terminals)	365 mm (14.37")
	Height	345 mm (13.58")
	Length	295 mm (11.61")
	Width	178 mm (7.00")
Weight	47.8 kg (105.4 lbs)	

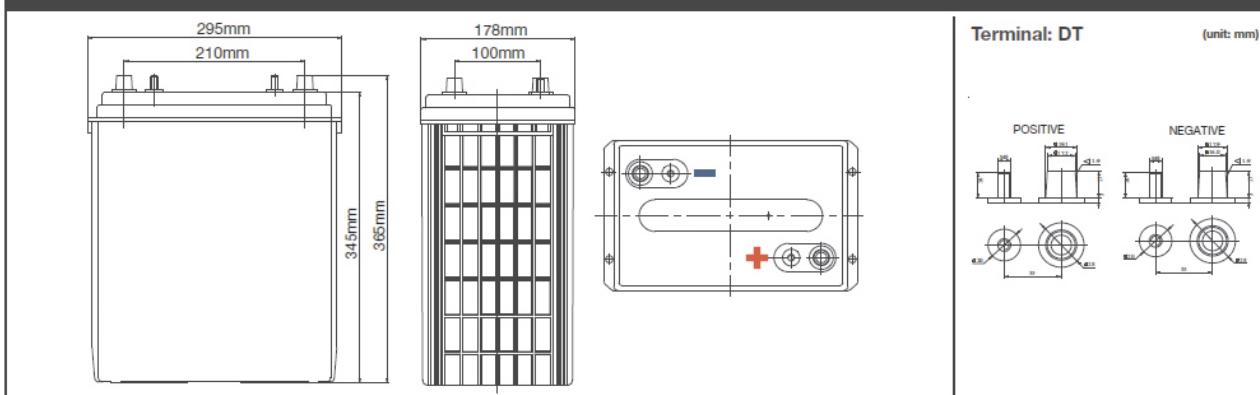
### DISCHARGE CHARACTERISTICS



### CHARACTERISTICS

Capacity 77°F (25°C)	20 Hour Rate (16.8A to 5.25 Volts)	335AH
	10 Hour Rate (30A to 5.25 Volts)	300AH
	5 Hour Rate (54.9A to 5.1 Volts)	274AH
Internal Resistance	Full charged Battery 77°F (25°C)	1.6m Ω
	104°F (40°C)	102%
Capacity Affected by Temperature (20 Hour Rate)	77°F (25°C)	100%
	32°F (0°C)	85%
	5°F (-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	82%
	Capacity after 12 month storage	64%
Max. Discharge Current 77°F (25°C)	2000A (5s)	
Terminal Standard	DT	
Charging Cycle (Constant Voltage)	Initial Charging Current $\leq 0.2 \times C_{20}$ 7.25 V ~ 7.45 V/77°F (25°C)	
Float	6.8 V ~ 6.9 V/77°F (25°C)	

### SIZE & DETAILED ILLUSTRATION



This information is generally descriptive only and is not intended to make or imply any representation, guarantee or warranty with respect to any cells and batteries. Cell and battery designs/specifications are subject to modifications without notice. Contact Fullriver for the latest information.

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