

4415 Brookville Road, Brookville

HPC Case # 23/59-11A

Master Plan Site # 23/59, Locust Hill



HISTORIC PRESERVATION COMMISSION


Isiah Leggett
County Executive

Leslie Miles
Acting-Chairperson

Date: March 14, 2011

MEMORANDUM

TO: Carla Reid, Director
Department of Permitting Services

FROM: Josh Silver, Senior Planner 
Historic Preservation Section
Maryland-National Capital Park & Planning Commission

SUBJECT: Historic Area Work Permit #560199, solar array installation

The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **approved** at the March 9, 2011 meeting.

The HPC staff has reviewed and stamped the attached construction drawings.

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: John Fuller |

Address: 4415 Brookeville Road, Brookeville

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once the work is complete the applicant will contact the staff person assigned to this application at 301-563-3400 or joshua.silver@mncppc-mc.org to schedule a follow-up site visit.





RETURN TO DEPARTMENT OF PERMITTING SERVICES
255 ROCKVILLE PIKE 2nd FLOOR ROCKVILLE MD 20850
240 777-6370

DPS - #8

**HISTORIC PRESERVATION COMMISSION
301/563-3400**

**APPLICATION FOR
HISTORIC AREA WORK PERMIT**

Contact Person: Duane Glass c/o Standard Solar, Inc

Daytime Phone No.: 240-479-1514

Tax Account No.: 08-02645563

Name of Property Owner: John Fuller Daytime Phone No.: 301-840-1100

Address: 4415 Brookeville Rd. Brookeville MD 20833
Street Number City State Zip Code

Contractor: Standard Solar, Inc. Phone No.: 301-944-1200 x 5106

Contractor Registration No.: MHIC 124908

Agent for Owner: Duane Glass Daytime Phone No.: 240-479-1514

LOCATION OF BUILDING/PREMISE

House Number: 4415 Street: Brookeville Rd.
Town/City: Brookeville Nearest Cross Street: Zion Rd
Lot: _____ Block: _____ Subdivision: Brooke Grove
Liber: 7196 Folio: 718 Parcel: P060

PART ONE: TYPE OF PERMIT ACTION AND USE

1A. CHECK ALL APPLICABLE: CHECK ALL APPLICABLE:
 Construct Extend Alter/Renovate A/C Slab Room Addition Porch Deck Shed
 Move Install Wreck/Raze Solar Fireplace Woodburning Stove Single Family
 Revision Repair Revocable Fence/Wall (complete Section 4) Other: _____

1B. Construction cost estimate: \$ 34,750

1C. If this is a revision of a previously approved active permit, see Permit # _____

PART TWO: COMPLETE FOR NEW CONSTRUCTION AND EXTEND/ADDITIONS

2A. Type of sewage disposal: 01 WSSC 02 Septic 03 Other: _____

2B. Type of water supply: 01 WSSC 02 Well 03 Other: _____

PART THREE: COMPLETE ONLY FOR FENCE/RETAINING WALL

3A. Height _____ feet _____ inches

3B. Indicate whether the fence or retaining wall is to be constructed on one of the following locations:
 On party line/property line Entirely on land of owner On public right of way/easement

I hereby certify that I have the authority to make the foregoing application, that the application is correct, and that the construction will comply with plans approved by all agencies listed and I hereby acknowledge and accept this to be a condition for the issuance of this permit.

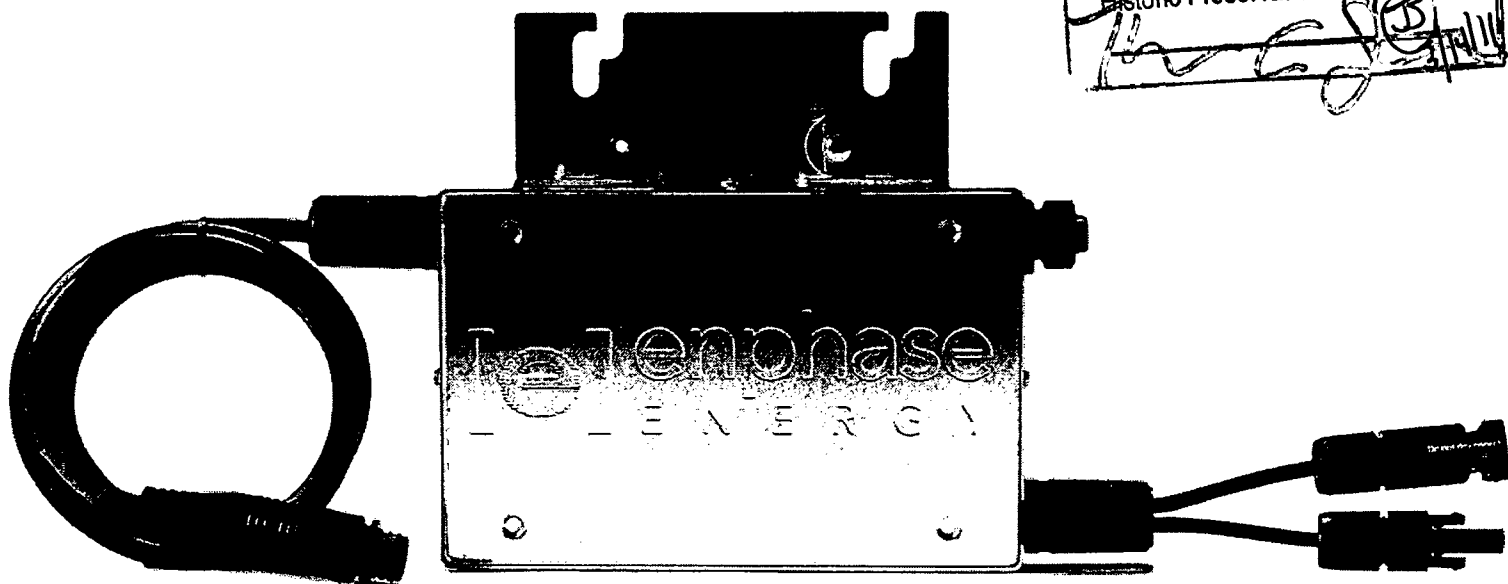
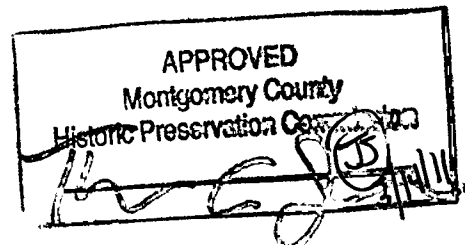
[Signature] 2/3/2011
Signature of owner or authorized agent Date

Approved: [Signature] For Chairman, Historic Preservation Commission
Disapproved: _____ Signature: [Signature] Date: 3/14/11
Application/Permit No.: 560199 Date Filed: 2/4/2011 Date Issued: _____



ENPHASE MICROINVERTER

M210



The Enphase Energy Microinverter System improves energy harvest, increases reliability, and dramatically simplifies design, installation and management of solar power systems. The Enphase System includes the microinverter, the Envoy Communications Gateway, and the web-based Enlighten monitoring and analysis website.

PRODUCTIVE

- Maximum energy production
- Resilient to dust, debris and shading
- Performance monitoring per module

RELIABLE

- MTBF of 331 years
- System availability greater than 99.8%
- No single point of system failure

SMART

- Quick & simple design, installation and management
- 24/7 monitoring and analysis



MICROINVERTER TECHNICAL DATA

Input Data (DC)		
	M210-84-208-S12	M210-84-240-S12
Recommended input power (STC)	240W	240W
Maximum input DC voltage	62V	62V
Peak power tracking voltage	31V – 50V	31V – 50V
Min./Max. start voltage	38V/62V	38V/62V
Max. DC short circuit current	12A	12A
Max. input current	10A	10A
Output Data (AC)		
Maximum output power	210W	210W
Nominal output current	1.00 A	.88 A
Nominal voltage/range	208V/183V-229V	240V/211V-264V
Extended voltage/range	208V/179V-232V	240V/206V-269V
Nominal frequency/range	60.0/59.3-60.5	60.0/59.3-60.5
Extended frequency/range	60.0/59.2-60.6	60.0/59.2-60.6
Power factor	>0.95	>0.95
Maximum units per branch	18	13
Efficiency		
Peak inverter efficiency	96.0%	96.0%
CEC weighted efficiency	95.5%	95.5%
Nominal MPP tracking	99.6%	99.6%
Mechanical Data		
Operating temperature range	-40°C to +65°C	-40°C to +65°C
Night time power consumption	30mW	30mW
Dimensions (WxHxD)	8" x 5.25" x 1.25"	
Weight	4.4 lbs	
Cooling	Natural Convection – No Fans	
Enclosure environmental rating	Outdoor – NEMA 6	
Features		
Communication	Powerline	
Warranty	15 Years	
Compliance	UL1741/IEEE1547 FCC Part 15 Class B	

Enphase Energy, Inc.

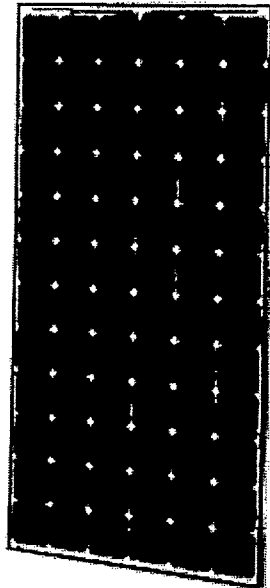
201 1st Street, Suite 300, Petaluma, CA 94952
877 797 4743 enphaseenergy.com

142-00006 REV 03



HIT[®] Power 215A

Module Efficiency: 17.1%
Cell Efficiency: 19.3%
Power Output - 215 Watts



HIT[®] Power
Photovoltaic Module

High Efficiency

HIT[®] Power solar panels are leaders in sunlight conversion efficiency. Obtain maximum power within a fixed amount of space. Save money using fewer system attachments and racking materials, and reduce costs by spending less time installing per watt. HIT Power models are ideal for grid-connected solar systems, areas with performance based incentives, and renewable energy credits.

Power Guarantee

SANYO's power ratings for HIT Power panels guarantee customers receive 100% of the nameplate rated power (or more) at the time of purchase, enabling owners to generate more kWh per rated watt, quicken investments returns, and help realize complete customer satisfaction.

Temperature Performance

As temperatures rise, HIT Power solar panels produce 10% or more electricity (kWh) than conventional crystalline silicon solar panels at the same temperature.

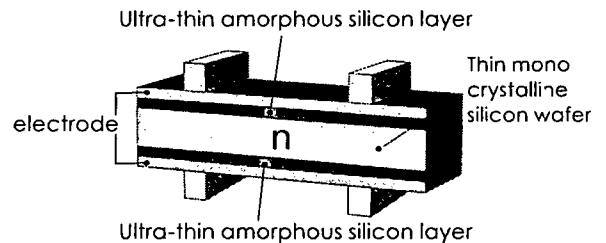
Valuable Features

The packing density of the panels reduces transportation, fuel, and storage costs per installed watt.

American Made Quality

SANYO silicon wafers located inside HIT solar panels are made in California and Oregon, and the panels are assembled in an ISO 9001 (quality), 14001 (environment), and 18001 (safety) certified factory. Unique eco-packing minimizes cardboard waste at the job site. The panels have a Limited 20-Year Power Output and 5-Year Product Workmanship Warranty.

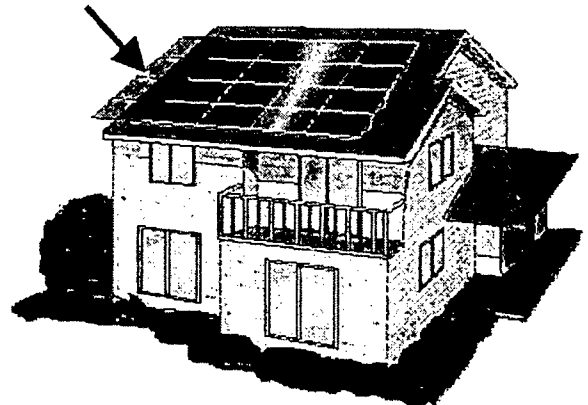
SANYO HIT[®] Solar Cell Structure



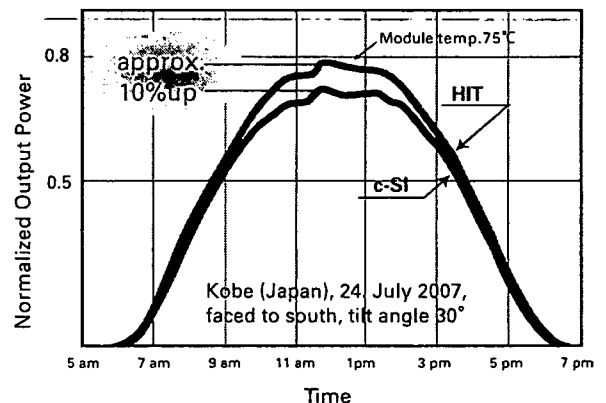
SANYO'S Proprietary Technology

HIT solar cells are hybrids of mono crystalline silicon surrounded by ultra-thin amorphous silicon layers, and are available solely from SANYO.

Unnecessary Section When Using SANYO



Increased Performance with SANYO



HIT Power 215A

Electrical Specifications

Model	HIT Power 215A or HIT-N215A01
Rated Power (Pmax) ¹	215 W
Maximum Power Voltage (Vpm)	42.0 V
Maximum Power Current (Ipm)	5.13 A
Open Circuit Voltage (Voc)	51.6 V
Short Circuit Current (Isc)	5.61 A
Temperature Coefficient (Pmax)	-0.336%/°C
Temperature Coefficient (Voc)	-0.143 V/°C
Temperature Coefficient (Isc)	1.96 mA/°C
NOCT	114.8°F (46°C)
CEC PTC Rating	199.6 W
Cell Efficiency	19.3%
Module Efficiency	17.1%
Watts per Ft. ²	15.85 W
Maximum System Voltage	600 V
Series Fuse Rating	15 A
Warranted Tolerance (+/-)	-0% / +10%

Mechanical Specifications

Internal Bypass Diodes	3 Bypass Diodes
Module Area	13.56 Ft ² (1.26m ²)
Weight	35.3 Lbs. (16kg)
Dimensions LxWxH	62.2x31.4x1.8 in. (1580x798x46 mm)
Cable Length +Male/-Female	46.45/40.55 in. (1180/1030 mm)
Cable Size / Connector Type	No. 12 AWG / MC4™ Locking Connectors
Static Wind / Snow Load	60PSF (2880Pa) / 39PSF (1867Pa)
Pallet Dimensions LxWxH	63.2x32x72.8 in. (1607x815x1850 mm)
Quantity per Pallet / Pallet Weight	34 pcs./1234.5 Lbs (560 kg)
Quantity per 53' Trailer	952 pcs.

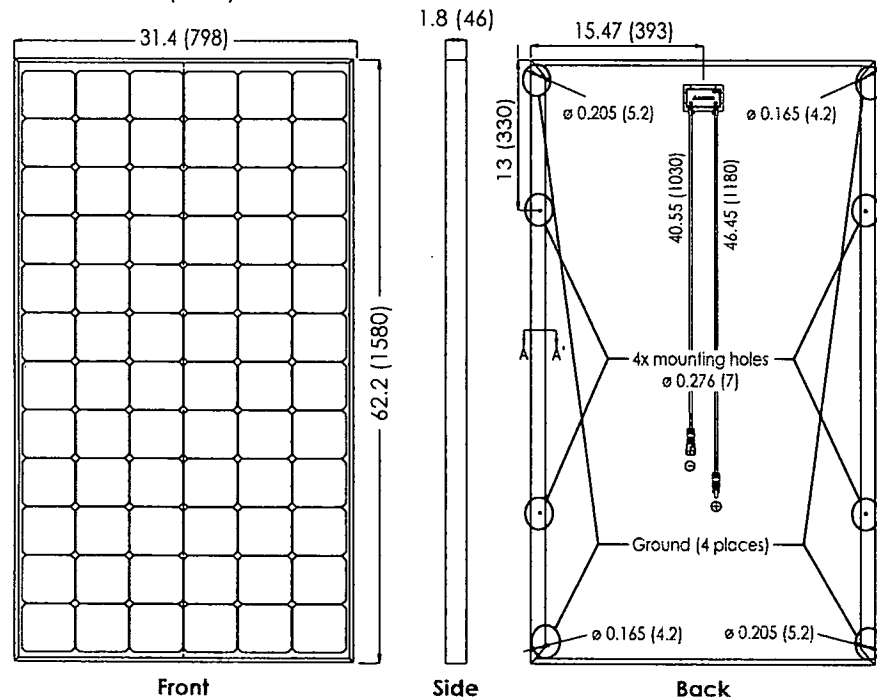
Operating Conditions & Safety Ratings

Ambient Operating Temperature	-4°F to 115°F (-20°C to 46°C) ²
Hail Safety Impact Velocity	1" hailstone (25mm) at 52 mph (23m/s)
Fire Safety Classification	Class C
Safety & Rating Certifications	UL 1703, cUL, CEC
Limited Warranty	5 Years Workmanship, 20 Years Power Output

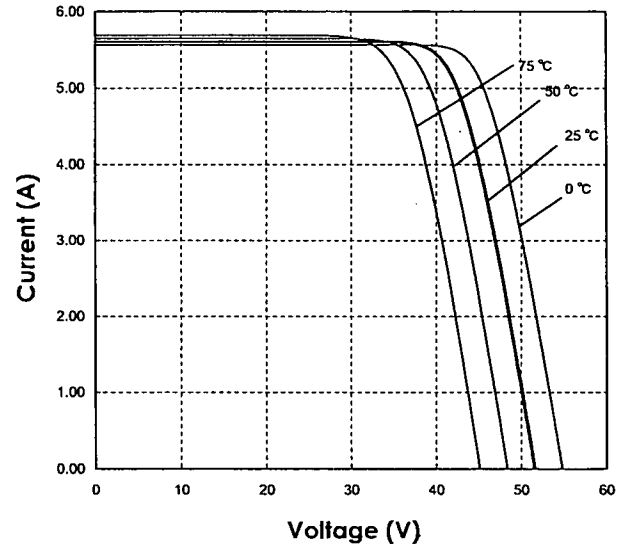
¹STC: Cell temp. 25°C, AM1.5, 1000W/m² Monthly average low and high of the installation site.
 Note: Specifications and information above may change without notice.
 All modules connected in the solar array should be of the same model number.

Dimensions

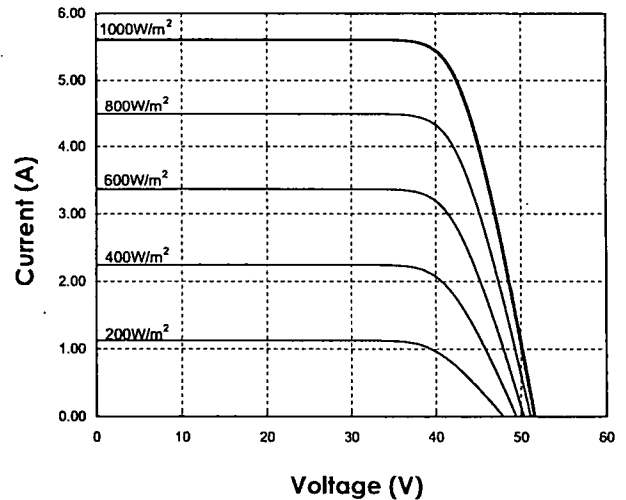
Unit: inches (mm)



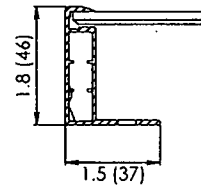
Dependence on Temperature



Dependence on Irradiance



Section A-A'



HIT[®] is a registered trademark of SANYO Electric Co., Ltd. The name "HIT[®]" comes from "Heterojunction with intrinsic Thin-layer" which is an original technology of SANYO Electric Co., Ltd.



CAUTION!

Read the operating instructions carefully before use of these products

SANYO

SANYO North America
Energy System Solutions Division

550 S. Winchester Blvd., Suite 510
San Jose, CA 95128, U.S.A.
www.sanyo.com/solar
solar@sec.sanyo.com

Green-Fasten

Attachments secure, roof intact.

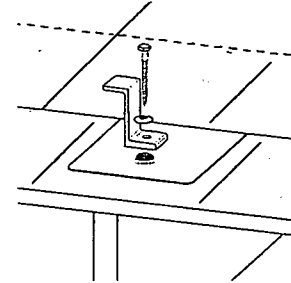
Roof Attachment Specialists
Attachments Secure — Roof Intact

Installing Green-Fasten on a Composition Shingle Roof

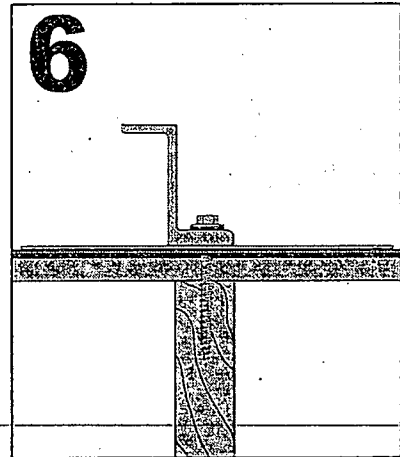
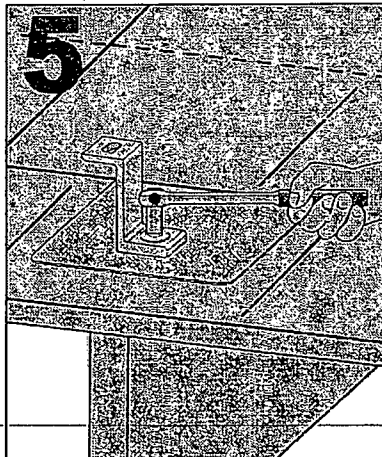
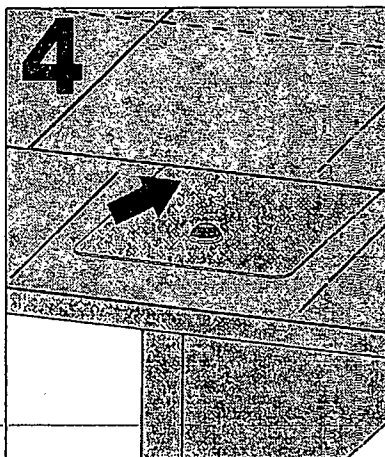
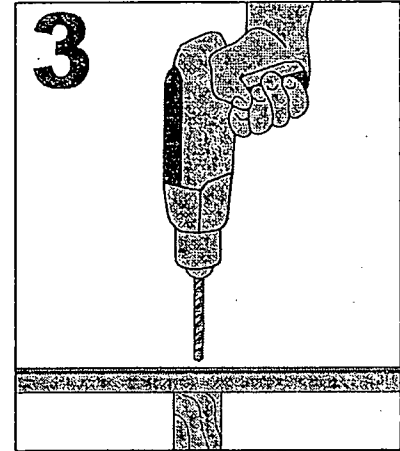
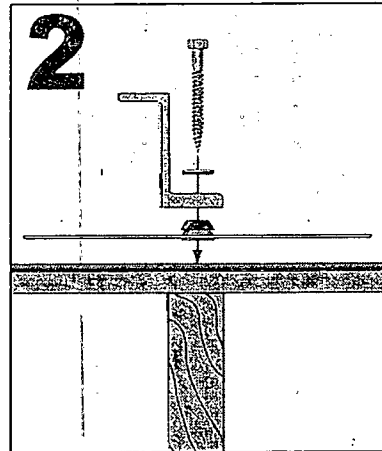
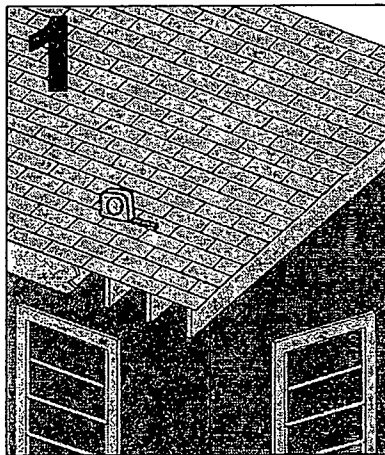
No need to remove any shingles if you can locate the rafters.

Tools Required:

- Drill, socket drive for lag bolt, tape measure, stud finder, chalk line, etc.
1. Locate the rafters and snap horizontal and vertical lines to mark the installation position for each Green-Fasten. Note: vertical location is for illustration only, generally items are not installed at the eave.
 2. Center the Green-Fasten over the rafter.
 3. Drill a pilot hole for the lag bolt.
 4. Insert the flashing so the top part is under the next row of shingles and the hole lines up with the pilot hole.
 5. Insert the lag bolt through the neoprene-bonded washer, the top compression component (Z-Bracket pictured) and the Gasketed hole in the flashing and into the rafter.



Consult an engineer or go to www.eco-fasten.com for engineering data.



Document version: 04.22.2009

Eco-Fasten
289 Harrel Street • Morrisville, VT 05661
Toll Free Phone 1.888.766.4273 • Toll Free Fax 1.888.756.9994
E-mail info@eco-fasten.com

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Made in Vermont, USA
from recycled materials

JAC-RACK PV MODULE MOUNTING SYSTEM

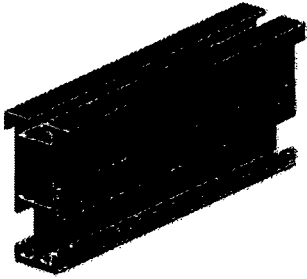
SECTION 1. SERIES 150 & 250 COMPONENTS

SECTION 2. SERIES 150 & 250 INSTALLATION GUIDE

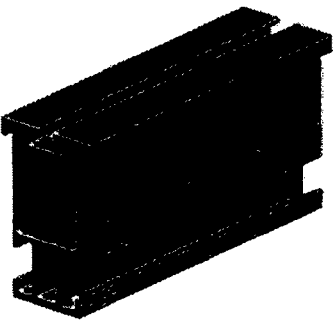
SECTION 3. DESIGN LOAD CALCULATION GUIDE

SECTION 4. ENGINEERING CERTIFICATIONS

SECTION 1: SERIES 150 & 250 COMPONENTS



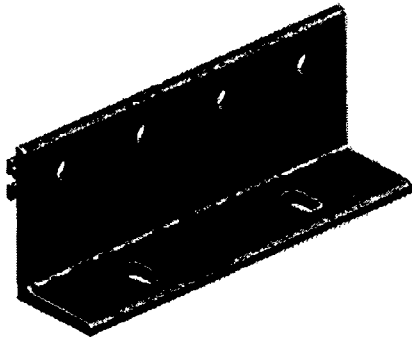
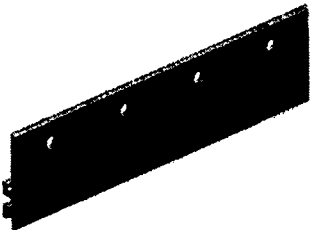
The Series 150 Rail is suitable for most residential applications. It is available in a mill as well as a clear and black anodized finish. Our anodized coating has been tested to withstand severe weathering conditions. The rail is made from tough 6000 Series extruded aluminum and will provide years of trouble free-service.



The Series 250 Rail is suitable for residential and commercial applications and is available in a mill or clear anodized finish. Our anodized coating has been tested to withstand severe weathering conditions. The rail, like the Series 150, is made from tough 6000 Series extruded aluminum and will provide years of trouble-free service.

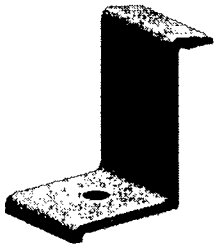


The **Mounting Brackets** are designed for roof mount installations and can also be used with stanchions or risers. They are made from 6000 Series extruded aluminum and are available in a mill finish or a clear or black anodized finish. The back of the bracket is serrated to interlock with the Rail, providing a more positive attachment of the Rail to the bracket.



The **Splice Plate or Splice Plate Mounting Bracket** the bracket serves a dual purpose: 1) as an Extension Device to create a longer rail, and 2) as a Mounting Bracket supporting the extended Rail at its most critical point. The Splice Plate Mounting Bracket is made from 6000 Series extruded aluminum and is available in a mill finish or a clear or black anodized finish. The interlocking dovetail provides a very positive connection between the rail sections.

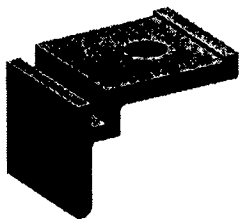
MODULE MOUNTING BRACKETS



End Mounting Brackets are made of 6000 Series extruded aluminum and are available in a mill finish or a clear or black anodized finish. They are designed to fit specific PV modules. Please consult our fit chart for the specific part number for your application. For top down installations, four (4) clamps are required for each row of modules, and they should be installed with a minimum of ¼ inch clearance from the end of the rail.



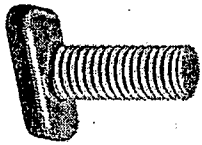
Top Mounting Clamps are made of 6000 Series extruded aluminum and are available in a mill finish or a clear or black anodized finish. One part number is designed to fit PV modules. We recommend the use of our "Ground Control" Clip and ¼ turn, 5/16" bolt and nut with the clamp. The clamp must be torqued to 10 to 12 ft/lbs. to insure proper grounding of the module.



Bottom Mounting Bracket is designed to mount to the lower flange of most PV modules; and, like our other brackets, available in mill, clear or black anodized finish

FASTENERS

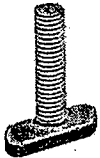
Our stainless steel fasteners feature a ¼ turn bolt head for easy, on-site installation, and ArmorGalv® coating that provides a barrier to the galvanic reaction that occurs between aluminum and stainless steel, causing corrosion and thread galling.



Mounting Bracket "T" Bolt,
3/8x1x1" ArmorGalv® coated



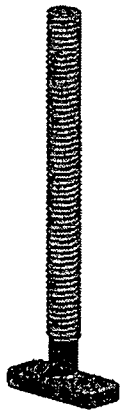
3/8x16", ArmorGalv® Nut



End Mounting Bracket "T" Bolt,
5/16x16x1" ArmorGalv® coated



5/16x18", ArmorGalv® Nut



Top Mounting Bracket "T" Bolt,
5/16x16x2 1/4" &
5/16x16x2 7/8" ArmorGalv®



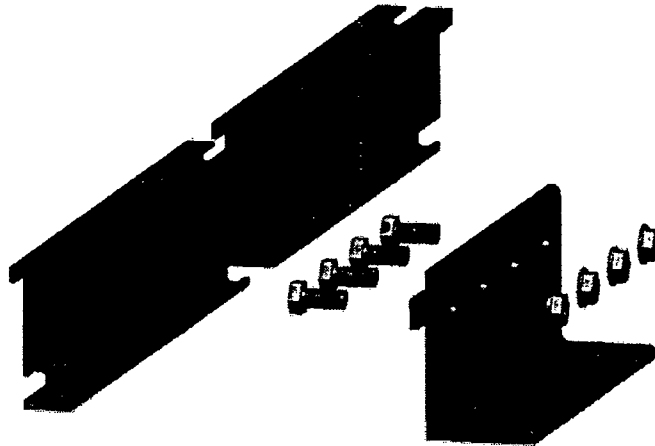
The "Ground Control" Clip comes assembled to the Top Mounting t-bolt and its spring feature positions the bolt on the Rail. It also grounds the module and the Rail when properly assembled.

Splice Plate ¼ x20 x1", ArmorGalv® coated,
Self-drilling, Self-tapping Bolt

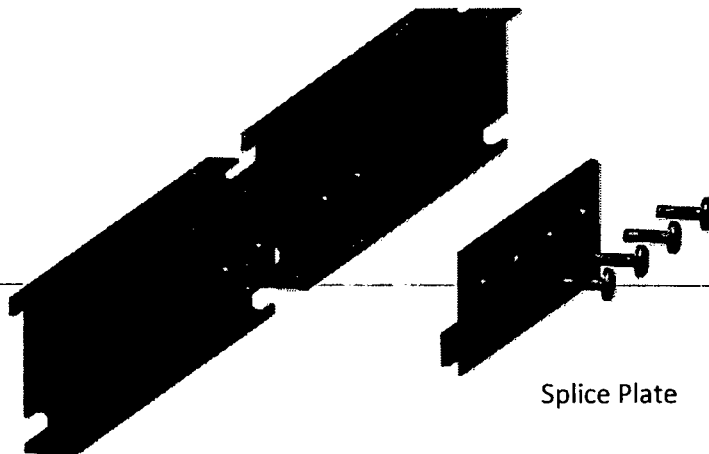
SECTION 2: SERIES 150 & 250 INSTALLATION GUIDE

This installation guide provides instructions for the mounting of the Series 150 and 250 Rails on a roof or wall, and can be used as supporting documentation for permit applications. JAC-RACK Inc. certifies that the Series 150 and 250 PV Mounting System described herein will meet building codes and structural requirements when installed in accordance with these instructions. JAC-RACK provides a limited warranty of the components.

1. Determine the layout of your installation and inventory all components.
2. If your installation requires splices to lengthen the Rails, use our Splice Plate or Splice Bracket. The Splice Plate is installed as shown with (4) self-drilling and self-tapping screws. The Splice Bracket is installed with (4) ¼ turn, 3/8x16x1" bolts. Any splices must be done prior to mounting the Rail onto the Mounting Brackets.



Splice Plate Bracket

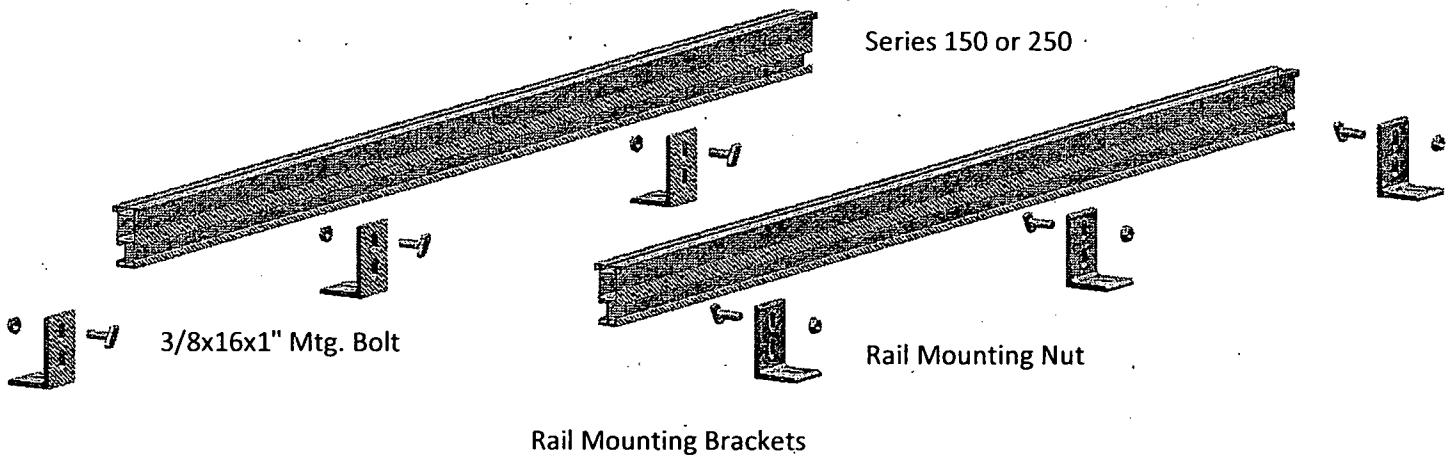


Splice Plate

3. After determining the number of Mounting Brackets required for your installation, and providing for the bracket attachments, lay out the Rails and Mounting Brackets on the roof or job surface. Attach the Mounting Brackets to the roof structure or alternative mounting configuration. **Consult your local building codes for acceptable methods of attachment to the roof.**

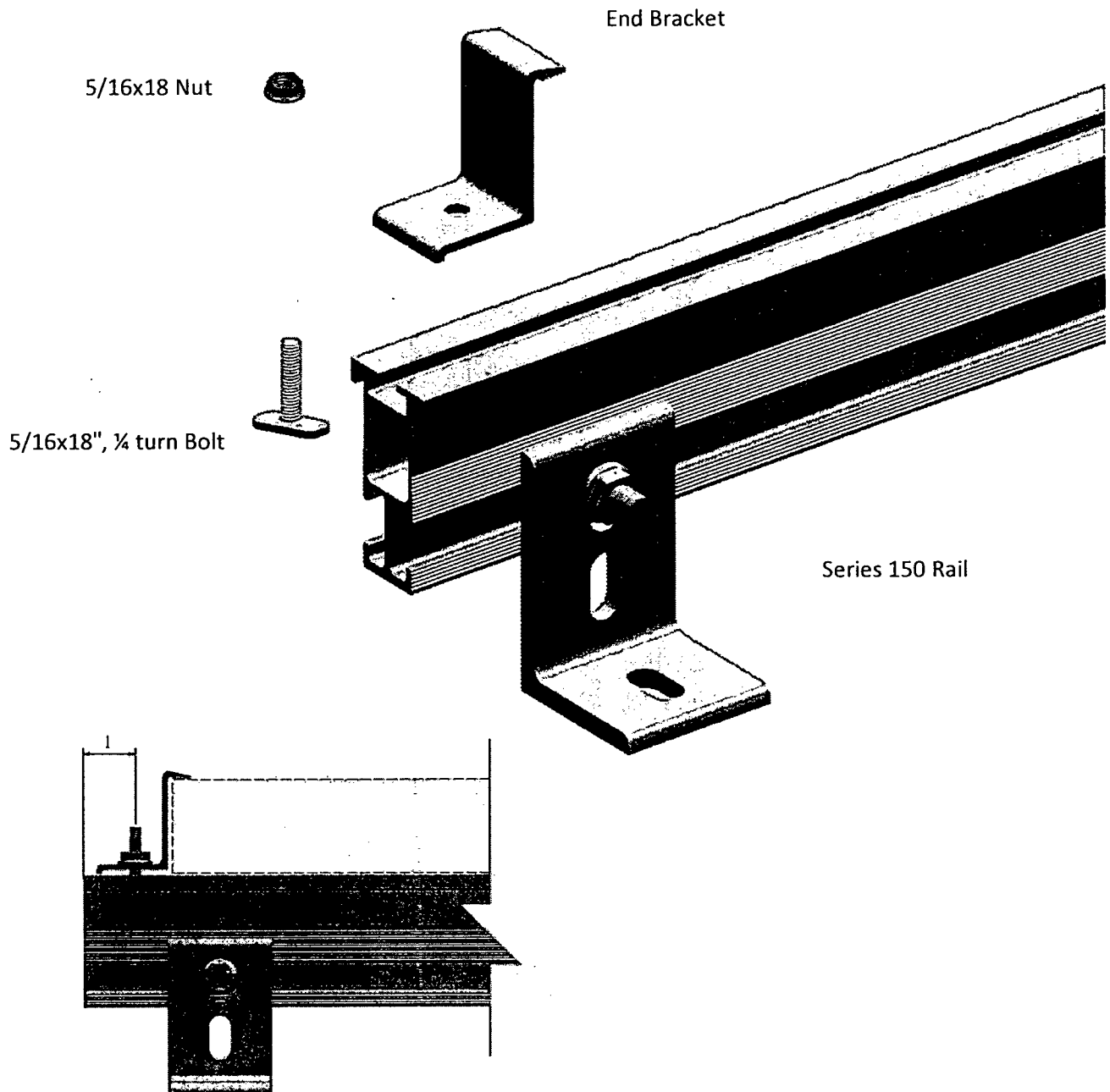
Refer to Series 150 and Series 250 Rail Span Tables on pages 9 and 10.

4. Using JAC-RACK's ¼ turn, 3/8x18x1" Bolts (or standard 3/8x18/x1" bolts), attach the Rails to the Mounting Brackets as shown.



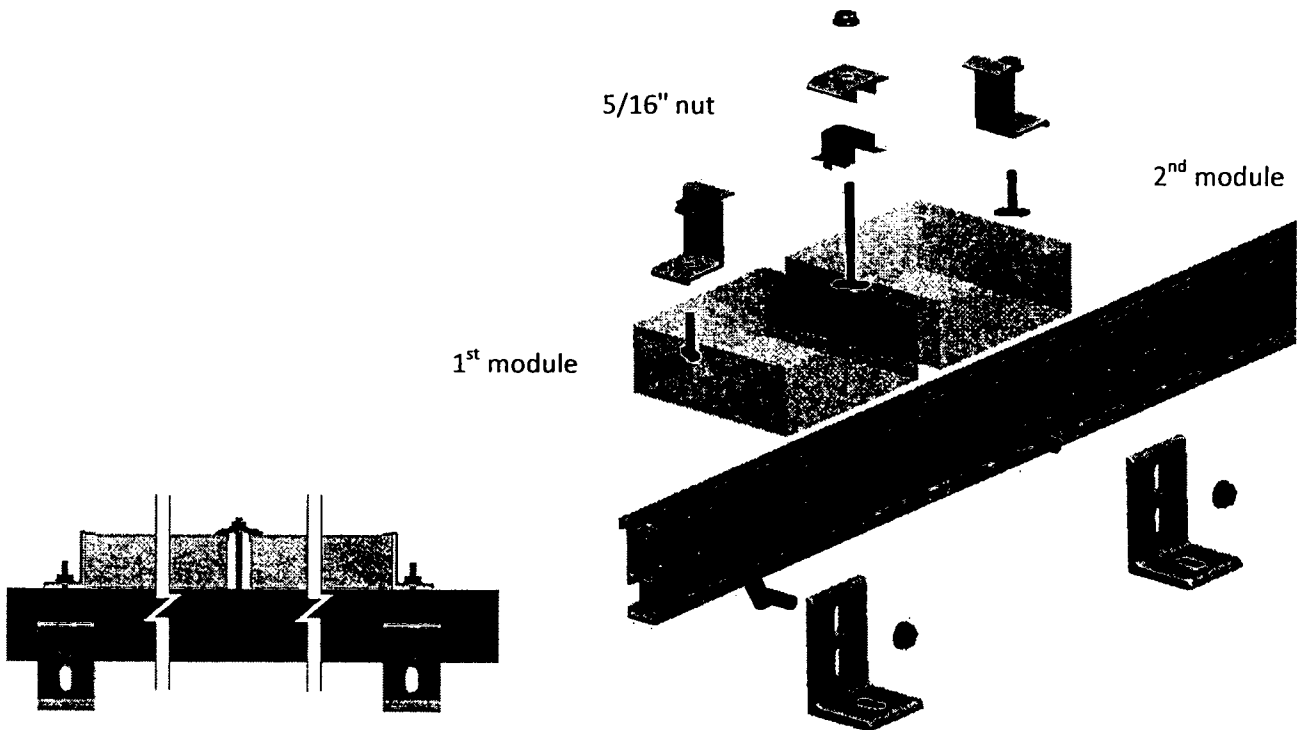
Note: When the Rails are mounted in longitudinal mode (the rails are oriented left to right vs. top to bottom), the Mounting Brackets must be oriented to the outside surface of the Rail and be installed with the mounting leg pointing down the roof surface.

JAC-RACK INSTALLATION GUIDE



5. Locate the End Mounting Bracket and 5/16x18x1.5" mounting bolts and assemble the brackets to the Rails 1" from the end of the Rail. for portrait installation (Rails running top to bottom), start from the lowest point on the roof. For landscape installations (Rails running left to right) start from either the left or right edge of the Rail and progress to the end of the row.

Top Module Bracket, bolt, and Grounding Clip



After each bracket has been loosely fastened to each Rail, position the 1st module under the end clamp and tighten the 5/16" nut to "finger tight".

6. Along the Rail and opposite to the End Mounting Clamp, position the top clamp, Mounting Bolt and Grounding Clip assembly by depressing the head of the bolt into the channel of the Rail and rotating the bolt head $\frac{1}{4}$ turn. The patented spring feature will firmly retain the bolt.
7. Before tightening the bolt, place the 2nd module on the Rails and position it so that the grounding lugs are under both the 1st and 2nd module. Snug the nut to retain the modules and repeat the process to the end of the row.
8. At the end of the row, assemble the End Mounting Bracket to retain the last module.
9. Once all modules in the row are in position, the End Mounting Brackets are snug, the Grounding Clips are positioned under adjacent modules; then, starting from one end of the row, torque all of the 5/16" nuts to 10 to 12 ft/lbs to insure engagement of the barbs on the Grounding Clips with the Rail and modules and proper grounding of the modules.
10. Repeat the process to install the remaining modules in the array.

JAC-RACK INSTALLATION GUIDE

Series 150 Rail Span Table (Refer to page 15 for an example of how to determine the proper span.)

(A) Rail spacing (ft)	(B) Span (ft)	Allowable Load (plf)
3	5	130
	5.5	98
	6	74
	6.5	59
	7	47
	7.5	38
	8	31
5	4.5	178
	5	131
	5.5	98
	6	73
	6.5	58
	7	46
	7.33	41

Total Load: $TL = DL + LL$ (psf)

Allowable Load (plf) = $TL \times \text{Rail Spacing}$

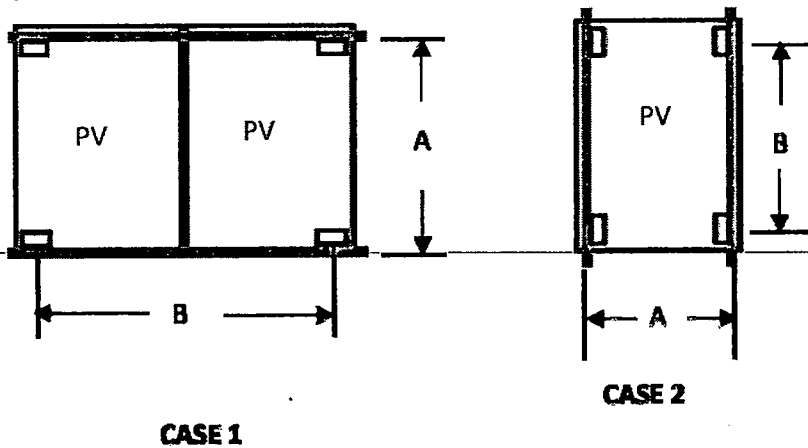
Allowable load based on total load deflection of $L/180$

Allowable load is for simple spans loading only.

Other loading conditions can be provided upon request.

Do not exceed spans

Refer to Section 3 for calculating allowable design loads.



Series 250 Rail Span Table

(A) Rail spacing (ft)	(B) Span (ft)	Allowable Load (plf)
3	7	105
	7.5	85
	8	70
	8.5	58
	9	49
	9.5	42
	10	36
5	6	169
	6.5	131
	7	106
	7.5	86
	8	71
	8.5	59
	9	49

Total Load: $TL = DL + LL$ (psf)

Allowable Load (plf) = $TL \times \text{Rail Spacing}$

Allowable load based on total load deflection of $L/180$

Allowable load is for simple spans loading only.

Other loading conditions can be provided upon request.

Do not exceed spans

Refer to Section 3 for calculating allowable design loads.

Section 3: DESIGN LOAD CALCULATION GUIDE

This portion of the installation manual will guide you through the selection of rail support spacing by calculating the appropriate design load. Design loads are primarily due to self weight, snow and wind.

JAC-RACK RAILS, when installed in accordance with this manual, will meet or exceed the structural requirements of the 2006 International Building Code, ASCE-7-05, 2005 Aluminum Design Manual and California Building Code 2007.

It is the installer's sole responsibility for:

1. Verifying that all JAC RACK parts are appropriate for the particular installation including the proper location.
2. The appropriate anchorage system. Verify that lag screw/bolt and any other mounting systems are adequately installed for pullout, shear capacity and waterproofing.
3. Selection and installation of all waterproofing materials, i.e. flashing, caulking.
4. Verification of all design parameters (live and dead loads, snow loads, wind speed and seismic design category). Consult with local building department or a licensed professional engineer.
5. Compliance of local mechanical and electrical codes. Verification of correct installation of mechanical and electrical components.
6. Safe work site.

Determination of Design Loads

The procedure to determine Design Load is specified by the American Society of Civil Engineers 7-05 and referenced in the 2006 International Building Code. Refer to ASCE 7-05 for additional definitions and procedures not presented in this manual.

ASCE 7-05 Limitations:

1. The building height must be less than 60 feet. For installations on structures greater than 60 feet, consult a professional engineer.
2. The building must be enclosed, not an open or partially enclosed structure.
3. The building must not be irregular in shape like a geodesic dome.
5. The building has a flat or gable roof with a pitch less than 45 degrees or a hip roof with a pitch less than 27 degrees.

Determine design wind load

Design wind load for Components and Cladding used Method 1, the simplified Method from ASCE 7-05.

$$P_{net} = \lambda * K_{zt} * I * p_{net30}$$

Where

P_{net} = Design wind load (psf)

λ = Adjustment factor from Table 6-3

K_{zt} = Topographic factor at mean roof height, h (ft)

I = Importance factor from Table 6-1.

p_{net30} = Net design wind pressure for Exposure B, at h = 30 and I = 1.0 from Table 6-3a.

Required information:

V (mph) = Basic wind Speed. See FIGURE 6-1

h (ft) = Total roof height for flat roofs and mean roof height for pitched roofs

Effective Wind Area (ft²) = minimum total area of modules to be installed (A)

Roof Zone = See FIGURE 6-3

Roof Pitch (degrees)

Exposure Category

Calculation of Wind Load:

1. Basic Wind Speed V (mph):

Determine local wind speed using the maps in FIGURE 6-1.

2. Effective Wind Area (ft²)

Determine the smallest contributing area to a rail or support (use this area).

This number is to be rounded to nearest number less than 10, 20, 50, 100 or 500 ft².

3. Roof Zones

- a. Determine the roof zone from FIGURE 6-3.

4. Net Wind Pressure, p_{net30} from Table 6-3a.

Required information:

- a. Roof Zone (Zone) from step 3.
- b. Effective Wind Area from step 2.
- c. Basic Wind Speed from step 1.
- d. Roof pitch (degrees)

5. Topographic Factor, K_{zt}

The topographic factor is assumed to equal 1.0 for all installations with a roof pitch less than 10%. If an installer requires a pitch greater than 10% consult the manual ASCE 7-05, Section 6.5.7 and local building department.

6. Exposure Category

ASCE 7-05 has defined the categories as follows:

Exposure B: Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single family dwellings.

Exposure C: Open terrain with scattered obstructions having heights generally less than 30 feet. This category includes flat open country, grasslands, and all water surfaces in hurricane prone regions.

Exposure D: Flat, Unobstructed areas and water surfaces outside hurricane prone regions. This category includes smooth mud flats, salt flats, and unbroken ice.

Refer to ASCE 7-05 for additional information on exposure category.

7. Adjustment Factor, λ

Use TABLE 6-3

Required information:

- a. h (ft)
 - b. Exposure Category from step 6.
-

8. Importance Factor, I from TABLE 7-4.

9. Design Wind Load Calculation, p_{net} (psf)

$$P_{net} = \lambda K_{zt} I p_{net30}$$

Calculation of Snow Loads:

Required information:

1. Ground Snow Load, P_g from FIGURE 7-1.
2. Flat Roof Snow Load, $P_f = 0.7 * C_e * C_t * I * P_g$

where

C_e = Exposure factor from TABLE 7-2

C_t = Thermal factor from TABLE 7-3

I = Importance factor from TABLE 7-4

3. For sloped Roof, use $P_s = C_s P_f$

where

C_s = Roof slope factor from FIGURE 7-2

Refer to ASCE 7-05 for unbalanced roof snow loads, snow drift loads from higher roofs, roof projections and sliding snow.

Determining the Design Load

Use the calculated wind and snow loads for the different load cases listed below.

Case #1: $P \text{ (psf)} = 1.0D + 1.0S$ (downward force)

Case #2: $P \text{ (psf)} = 1.0D + 1.0P_{net}$ (downward force)

Case #3: $P \text{ (psf)} = 1.0D + 0.75S + 0.75P_{net}$ (downward force)

Case #4: $P \text{ (psf)} = 0.6D + 1.0P_{net}$ (uplift force)

where

D = Dead Load (psf) weight of solar panel and rail is usually 5 psf.

S = Snow Load (psf) use P_f for flat roof or P_s for sloped roofs.

P_{net} = Design Wind Load (psf) (Positive for downward force and negative for uplift force)

Design Load is the maximum of the load cases.

Example: Determine the proper span for Series 150 Rail. Refer to Span tables on pages 9 and 10.

1. Given the following:

Rail spacing, $S_r = 3\text{ft}$.

Design Live Load = 16 psf. (Design Live load may be snow or wind)

Design Dead Load = 3 psf (wt of PV panel).

The total load, $T_L = 19\text{ psf}$.

2. Calculate the allowable load: $L_{allow} = S_r \times T_L : 3\text{ ft} \times 19\text{ psf} = 57\text{ plf}$.
3. In Series 150 Span Table with the corresponding rail spacing and allowable load, the rail can span **6.5 ft** having an allowable load of 59 psf.

ASCE 7-05 TABLES AND FIGURES

TABLE 1-1: Occupancy Category of buildings and other structures for wind, snow, earthquakes and ice loads.

TABLE 6-1: Importance Factor for Wind Loads.

TABLE 6-3: Adjustment factor for Building Height and Exposure, λ .

TABLE 6-3a: Net Design Wind Pressure, P_{net30}

TABLE 7-2: Exposure Factor, C_e .

TABLE 7-3: Thermal Factor, C_t .

FIGURE 6-1: Basic Wind Speed

FIGURE 6-3: Components and Cladding for Enclosed Buildings with roof height less than 60 ft.

FIGURE 7-1: Ground Snow loads for the United States.

TABLE 7-4: Importance Factor for Snow Loads.

JAC-RACK INSTALLATION GUIDE

TABLE 1-1 OCCUPANCY CATEGORY OF BUILDINGS AND OTHER STRUCTURES FOR FLOOD, WIND, SNOW, EARTHQUAKE, AND ICE LOADS

<u>Nature of Occupancy</u>	Occupancy Category
Buildings and other structures that represent a low hazard to human life in the event of failure, including, but not limited to:	
<ul style="list-style-type: none"> • Agricultural facilities • Certain temporary facilities • Minor storage facilities 	I
All buildings and other structures except those listed in Occupancy Categories I, III, and IV ^a	II
Buildings and other structures that represent a substantial hazard to human life in the event of failure, including, but not limited to:	III
<ul style="list-style-type: none"> • Buildings and other structures where more than 300 people congregate in one area • Buildings and other structures with daycare facilities with a capacity greater than 150 • Buildings and other structures with elementary school or secondary school facilities with a capacity greater than 250 • Buildings and other structures with a capacity greater than 500 for colleges or adult education facilities • Health care facilities with a capacity of 50 or more resident patients, but not having surgery or emergency treatment facilities • Jails and detention facilities 	
Buildings and other structures, not included in Occupancy Category IV, with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure, including, but not limited to:	
<ul style="list-style-type: none"> • Power generating stations • Water treatment facilities • Sewage treatment facilities • Telecommunication centers 	
Buildings and other structures not included in Occupancy Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing sufficient quantities of toxic or explosive substances to be dangerous to the public if released.	
Buildings and other structures containing toxic or explosive substances shall be eligible for classification as Occupancy Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the toxic or explosive substances does not pose a threat to the public.	
Buildings and other structures designated as essential facilities, including, but not limited to:	IV
<ul style="list-style-type: none"> • Hospitals and other health care facilities having surgery or emergency treatment facilities • Fire, rescue, ambulance, and police stations and emergency vehicle garages • Designated earthquake, hurricane, or other emergency shelters • Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response • Power generating stations and other public utility facilities required in an emergency • Ancillary structures (including, but not limited to, communication towers, fuel storage tanks, cooling towers, electrical substation structures, fire water storage tanks or other structures housing or supporting water, or other fire-suppression material or equipment) required for operation of Occupancy Category IV structures during an emergency • Aviation control towers, air traffic control centers, and emergency aircraft hangars • Water storage facilities and pump structures required to maintain water pressure for fire suppression • Buildings and other structures having critical national defense functions 	
Buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing highly toxic substances where the quantity of the material exceeds a threshold quantity established by the authority having jurisdiction.	
Buildings and other structures containing highly toxic substances shall be eligible for classification as Occupancy Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2 that a release of the highly toxic substances does not pose a threat to the public. This reduced classification shall not be permitted if the buildings or other structures also function as essential facilities.	

^a Cogeneration power plants that do not supply power on the national grid shall be designated Occupancy Category II.

Source: ASCE 7-05

TABLE 6-1 IMPORTANCE FACTOR FOR WIND LOADS

Category ^a	Non-Hurricane Prone Regions and Hurricane Prone Regions with V= 85-100 mph and Alaska	Hurricane Prone Regions with V > 100 mph
I	0.87	0.77
II	1.00	1.00
III	1.15	1.15
IV	1.15	1.15

Source: ASCE 7-05

a. See Table 1-1

TABLE 6-3
Adjustment factor for Building Height and Exposure, λ

Mean roof height (ft)	Exposure		
	B	C	D
15	1.00	1.21	1.47
20	1.00	1.29	1.55
25	1.00	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	1.09	1.49	1.74
45	1.12	1.53	1.78
50	1.16	1.56	1.81
55	1.19	1.59	1.84
60	1.22	1.62	1.87

Source: ASCE 7-05

For Components and Cladding - Method 1

JAC-RACK INSTALLATION GUIDE

Table 6-3a Net Design Wind Pressure
Components and Cladding - Method 1

Enclosed Buildings
 $h \leq 60$ ft

Net Design Wind Pressure, P_{net30} (psf) (Exposure B at $h = 30$ ft with $I = 1.0$ and $K_{zt} = 1.0$)

Basic Wind Speed V (mph)

degrees	Zone	Effective wind Area (ft ²)	90		100		105		110		120	
Roof 0 to 7	1	10	5.9	-13.0	7.3	-18.0	8.1	-19.8	8.9	-21.8	10.5	-25.9
	1	20	5.6	-12.7	6.9	-17.5	7.6	-19.3	8.3	-21.2	9.9	-25.2
	1	50	5.1	-12.2	6.3	-16.9	6.9	-18.7	7.6	-20.5	9.0	-24.4
	1	100	4.7	-11.9	5.8	-16.5	6.4	-18.2	7.0	-19.9	8.3	-23.7
	2	10	5.9	-21.8	7.3	-30.2	8.1	-33.3	8.9	-36.5	10.5	-43.5
	2	20	5.6	-19.5	6.9	-27.0	7.6	-29.7	8.3	-32.6	9.9	-38.8
	2	50	5.1	-16.4	6.3	-22.7	6.9	-25.1	7.6	-27.5	9.0	-32.7
	2	100	4.7	-14.1	5.8	-19.5	6.4	-21.5	7.0	-23.6	8.3	-28.1
	3	10	5.9	-32.8	7.3	-45.4	8.1	-20.1	8.9	-55.0	10.5	-65.4
	3	20	5.6	-27.2	6.9	-37.6	7.6	-41.5	8.3	-45.5	9.9	-54.2
	3	50	5.1	-19.7	6.3	-27.3	6.9	-30.1	7.6	-33.1	9.0	-39.3
	3	100	4.7	-14.1	5.8	-19.5	6.4	-21.5	7.0	-23.6	8.3	-28.1
Roof > 7 to 27	1	10	8.4	-13.3	10.4	-16.5	11.4	-18.2	12.5	-19.9	14.9	-23.7
	1	20	7.7	-13.0	9.4	-16.0	10.4	-17.6	11.4	-19.4	13.6	-23.0
	1	50	6.7	-12.5	8.2	-15.4	9.1	-17.0	10.0	-18.6	11.9	-22.2
	1	100	5.9	-12.1	7.3	-14.9	8.1	-16.5	8.9	-18.1	10.5	-21.5
	2	10	8.4	-23.2	10.4	-28.7	11.4	-31.6	12.5	-34.7	14.9	-41.3
	2	20	7.7	-21.4	9.4	-26.4	10.4	-29.1	11.4	-31.9	13.6	-38.0
	2	50	6.7	-18.9	8.2	-23.3	9.1	-25.7	10.0	-28.2	11.9	-33.6
	2	100	5.9	-17.0	7.3	-21.0	8.1	-23.2	8.9	-25.5	10.5	-30.3
	3	10	8.4	-34.3	10.4	-42.4	11.4	-46.7	12.5	-51.3	14.9	-61.0
	3	20	7.7	-32.1	9.4	-39.6	10.4	-43.7	11.4	-47.9	13.6	-57.1
	3	50	6.7	-29.1	8.2	-36.0	9.1	-39.7	10.0	-43.5	11.9	-51.8
	3	100	5.9	-26.9	7.3	-33.2	8.1	-36.6	8.9	-40.2	10.5	-47.9
Roof > 27 to 45	1	10	13.3	-14.6	16.5	-18.0	18.2	-19.8	19.9	-21.8	23.7	-25.9
	1	20	13.0	-13.8	16.0	-17.1	17.6	-18.8	19.4	-20.7	23.0	-24.6
	1	50	12.5	-12.8	15.4	-15.9	17.0	-17.5	18.6	-19.2	22.2	-22.8
	1	100	12.1	-12.1	14.9	-14.9	16.5	-16.5	18.1	-18.1	21.5	-21.5
	2	10	13.3	-17.0	16.5	-21.0	18.2	-23.2	19.9	-25.5	23.7	-30.3
	2	20	13.0	-16.3	16.0	-20.1	17.6	-22.2	19.4	-24.3	23.0	-29.0
	2	50	12.5	-15.3	15.4	-18.9	17.0	-20.8	18.6	-22.9	22.2	-27.2
	2	100	12.1	-14.6	14.9	-18.0	16.5	-19.8	18.1	-21.8	21.5	-25.9
	3	10	13.3	-17.0	16.5	-21.0	18.2	-23.2	19.9	-25.5	23.7	-30.3
	3	20	13.0	-16.3	16.0	-20.1	17.6	-22.2	19.4	-24.3	23.0	-29.0
	3	50	12.5	-15.3	15.4	-18.9	17.0	-20.8	18.6	-22.9	22.2	-27.2
	3	100	12.1	-14.6	14.9	-18.0	16.5	-19.8	18.1	-21.8	21.5	-25.9

Source: ASCE 7-05

JAC-RACK INSTALLATION GUIDE

Table 6-3a Net Design Wind Pressure
Components and Cladding - Method 1

Enclosed Buildings
h ≤ 60 ft

Net Design Wind Pressure, P_{net30} (psf) (Exposure B at h = 30ft with I = 1.0 and K_{zt} = 1.0)

Basic Wind Speed V (mph)

degrees	Zone	Effective wind Area (ft ²)	125		130		140		145		150	
Roof 0 to 7	1	10	11.4	-28.1	12.4	-30.4	14.3	-35.3	15.4	-37.8	21.1	-40.5
	1	20	10.7	-27.4	11.6	-29.6	13.4	-34.4	14.4	-36.9	19.8	-39.4
	1	50	9.8	-26.4	10.6	-28.6	12.3	-33.2	13.1	-35.6	18.1	-38.1
	1	100	9.1	-25.7	9.8	-27.8	11.4	-32.3	12.2	-34.6	16.7	-37.0
	2	10	11.4	-47.2	12.4	-51.0	14.3	-59.2	15.4	-63.5	21.1	-67.9
	2	20	10.7	-42.1	11.6	-45.6	13.4	-52.9	14.4	-56.7	19.8	-60.7
	2	50	9.8	-35.5	10.6	-38.4	12.3	-44.5	13.1	-47.8	18.1	-51.1
	2	100	9.1	-30.5	9.8	-33.0	11.4	-38.2	12.2	-41.0	16.7	-43.9
	3	10	11.4	-71.0	12.4	-76.8	14.3	-89.0	15.4	-95.5	21.1	102.2
	3	20	10.7	-58.5	11.6	-63.6	13.4	-73.8	14.4	-95.5	19.8	-84.7
	3	50	9.8	-42.7	10.6	-46.2	12.3	-53.5	13.1	-79.1	18.1	-61.5
	3	100	9.1	-30.5	9.8	-33.0	11.4	-38.2	12.2	-57.4	16.7	-43.9
Roof > 7 to 27	1	10	16.2	-25.7	17.5	-27.8	20.3	-32.3	21.8	-34.6	23.3	-37.0
	1	20	14.8	-25.0	16.0	-27.0	18.5	-31.4	19.9	-33.7	21.3	-36.0
	1	50	12.9	-24.1	13.9	-26.0	16.1	-30.2	17.3	-32.4	18.5	-34.6
	1	100	11.4	-23.2	12.4	-25.2	14.3	-29.3	15.4	-31.4	16.5	-33.6
	2	10	16.2	-44.8	17.5	-48.4	20.3	-56.2	21.8	-60.3	23.3	-64.5
	2	20	14.8	-41.2	16.0	-44.6	18.5	-51.7	19.9	-55.4	21.3	-59.3
	2	50	12.9	-36.5	13.9	-39.4	16.1	-45.7	17.3	-49.1	18.5	-52.5
	2	100	11.4	-32.9	12.4	-35.6	14.3	-41.2	15.4	-44.2	16.5	-47.3
	3	10	16.2	-66.2	17.5	-71.6	20.3	-83.1	21.8	-89.1	23.3	-95.4
	3	20	14.8	-61.9	16.0	-67.0	18.5	-77.7	19.9	-83.3	21.3	-89.2
	3	50	12.9	-56.2	13.9	-60.8	16.1	-70.5	17.3	-75.7	18.5	-81.0
	3	100	11.4	-51.9	12.4	-56.2	14.3	-65.1	15.4	-69.9	16.5	-74.8
Roof > 7 to 27	1	10	25.7	-28.1	27.8	-30.4	32.3	-35.3	34.6	-37.8	37.0	-40.5
	1	20	25.0	-26.7	27.0	-28.9	31.4	-33.5	33.7	-35.9	36.0	-38.4
	1	50	24.1	-24.8	26.0	-26.8	30.2	-31.1	32.4	-33.3	34.6	-35.7
	1	100	23.3	-23.3	25.2	-25.2	29.3	-29.3	31.4	-31.4	33.6	-33.6
	2	10	25.7	-32.9	27.8	-35.6	32.3	-41.2	34.6	-44.2	37.0	-47.3
	2	20	25.0	-31.4	27.0	-34.0	31.4	-39.4	33.7	-42.3	36.0	-45.3
	2	50	24.1	-29.5	26.0	-32.0	30.2	-37.1	32.4	-39.8	34.6	-42.5
	2	100	23.3	-28.1	25.2	-30.4	29.3	-35.3	31.4	-37.8	33.6	-40.5
	3	10	25.7	-32.9	27.8	-35.6	32.3	-41.2	34.6	-44.2	37.0	-47.3
	3	20	25.0	-31.4	27.0	-34.0	31.4	-39.4	33.7	-42.3	36.0	-45.3
	3	50	24.1	-29.5	26.0	-32.0	30.2	-37.1	32.4	-39.8	34.6	-42.5
	3	100	23.3	-28.1	25.2	-30.4	29.3	-35.3	31.4	-37.8	33.6	-40.5

Source: ASCE 7-05



JAC-RACK INSTALLATION GUIDE

Table 6-3a Net Design Wind Pressure Components and Cladding - Method 1

Roof Overhang

Enclosed Buildings
h ≤ 60 ft

Net Design Wind Pressure, P_{net30} (psf) (Exposure B at h = 30ft with I = 1.0 and K_{zt} = 1.0)

**Basic Wind Speed V
(mph)**

degrees	Zone	Effective wind Area (ft ²)	90	100	110	120	130	140	150
Roof 0 to	2	10	-21.0	-25.9	-31.4	-37.3	-43.8	-50.8	-58.3
	2	20	-20.6	-25.5	-30.8	-36.7	-43.0	-49.9	-57.3
	2	50	-20.1	-24.9	-30.1	-35.8	-42.0	-48.7	-55.9
	2	100	-19.8	-24.4	-29.5	-35.1	-41.2	-47.8	-54.9
	3	10	-34.6	-42.7	-51.6	-61.5	-72.1	-83.7	-96.0
	3	20	-27.1	-33.5	-40.5	-48.3	-56.6	-65.7	-75.4
	3	50	-17.3	-21.4	-25.9	-30.8	-36.1	-41.9	-48.1
	3	100	-10.0	-12.2	-14.8	-17.6	-20.6	-23.9	-27.4
Roof > 7	2	10	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5
	2	20	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5
	2	50	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5
	2	100	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5
	3	10	-45.7	-56.4	-68.3	-81.2	-95.3	-110.6	-126.9
	3	20	-41.2	-50.9	-61.6	-73.3	-86.0	-99.8	-114.5
	3	50	-35.3	-43.6	-52.8	-62.8	-73.7	-85.5	-98.1
	3	100	-30.9	-38.1	-46.1	-54.9	-64.4	-74.7	-85.8
Roof > 27	2	10	-24.7	-30.5	-36.9	-43.9	-51.5	-59.8	-68.6
	2	20	-24.0	-29.6	-35.8	-42.6	-50.0	-58.0	-66.5
	2	50	-23.0	-28.4	-34.3	-40.8	-47.9	-55.6	-63.8
	2	100	-22.2	-27.4	-33.2	-39.5	-46.4	-53.8	-61.7
	3	10	-24.7	-30.5	-36.9	-43.9	-51.5	-59.8	-68.6
	3	20	-24.0	-29.6	-35.8	-42.6	-50.0	-58.0	-66.5
	3	50	-23.0	-28.4	-34.3	-40.8	-47.9	-55.6	-63.8
	3	100	-22.2	-27.4	-33.2	-39.5	-46.4	-53.8	-61.7

Source: ASCE 7-05

TABLE 7-2 EXPOSURE FACTOR, C_e

Terrain Category	Fully exposed ^a
B	0.9
C	0.9
D	0.8
Above treeline in windswept mountainous areas	0.7

Source: ASCE 7-05

The terrain category and roof exposure condition chosen shall be representative of the anticipated conditions during the life of the structure. An exposure factor shall be determined for each roof of a structure.

^a Refer to ASCE 7-05 TABLE 7-2 for additional exposure conditions other than fully exposed.

TABLE 7-3 THERMAL FACTOR, C_t

Thermal Condition ^a	C_t
All structures as indicated below:	1.0
Structures kept just above freezing and others with cold, ventilated roofs in which the thermal resistance (R-value) between the ventilated space and the heated space exceeds 25 degrees F x h x ft ² /BTU	1.1
Unheated structures and structures intentionally kept below freezing.	1.2
Commonly heated greenhouse ^b with a roof having a thermal resistance (R-value) less than 2.0 degrees F x h x ft ² /BTU	0.85

Source: ASCE 7-05

For Components and Cladding - Method 1

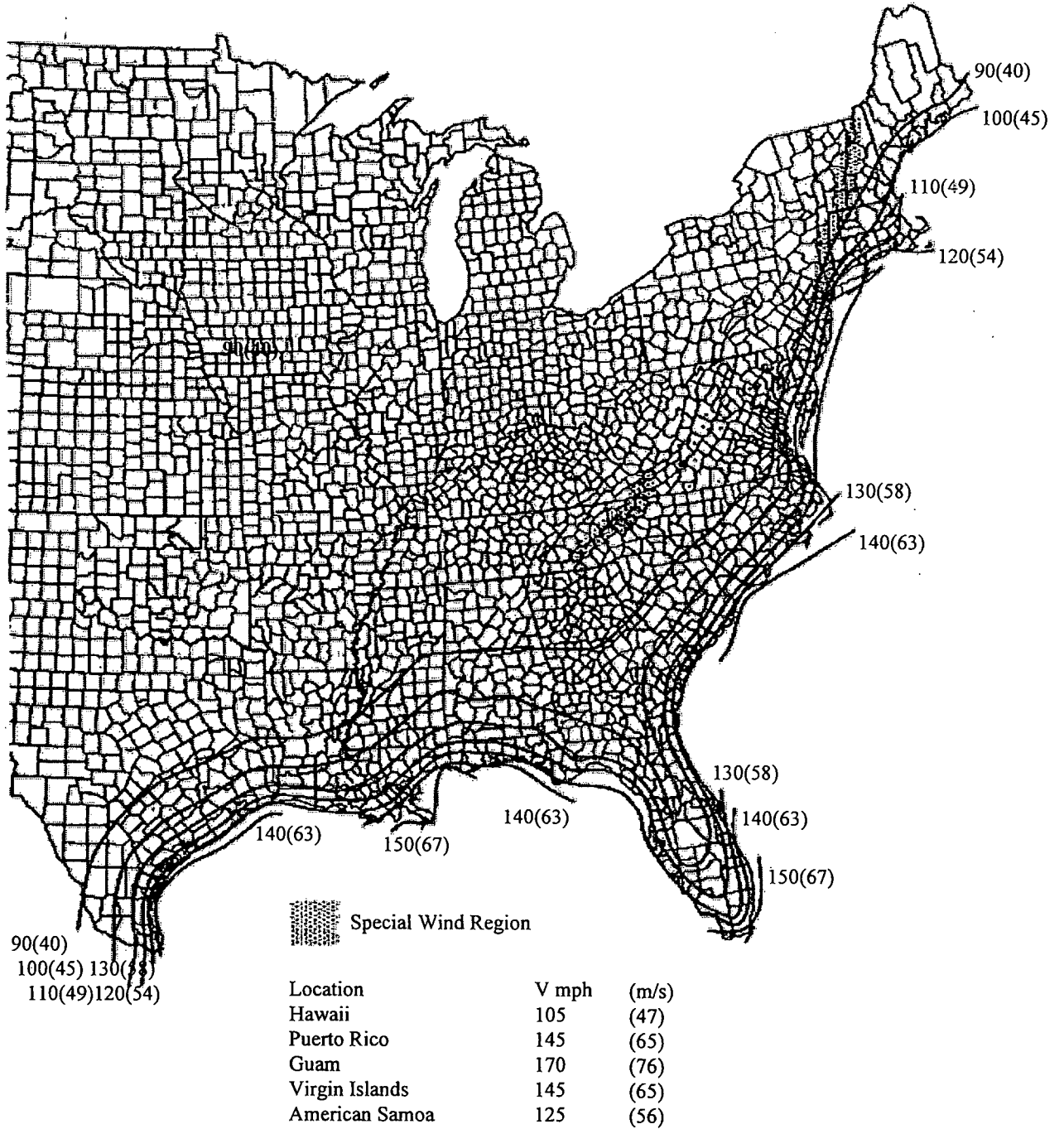
TABLE 7-4 IMPORTANCE FACTOR FOR SNOW LOADS

Category ^a	I
I	0.8
II	1.0
III	1.1
IV	1.2

a. See Table 1-1

JAC-RACK INSTALLATION GUIDE

FIGURE 6-1 Basic Wind Speed



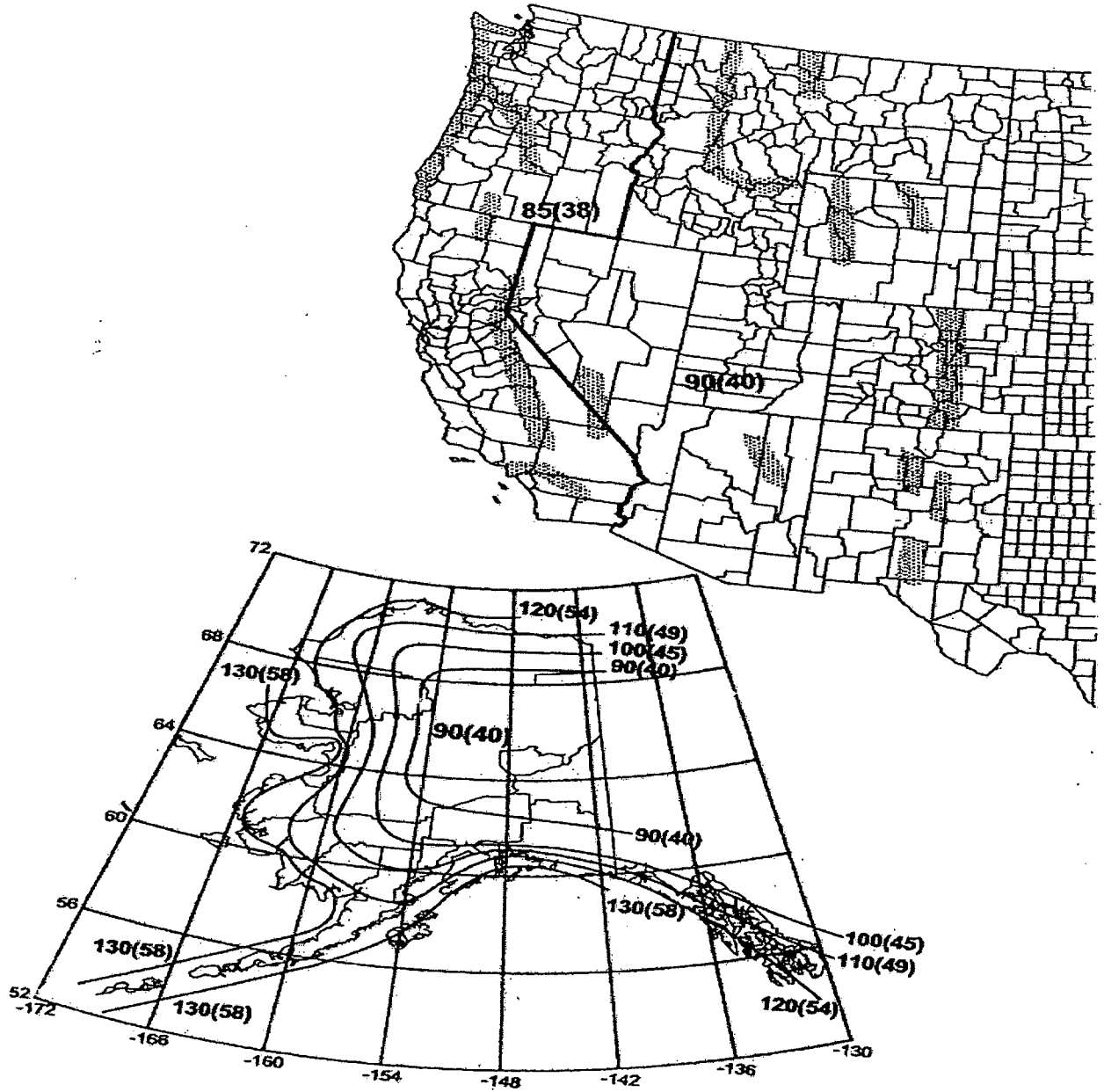
Notes:

1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s)

Source: ASCE 7-05

JAC-RACK INSTALLATION GUIDE

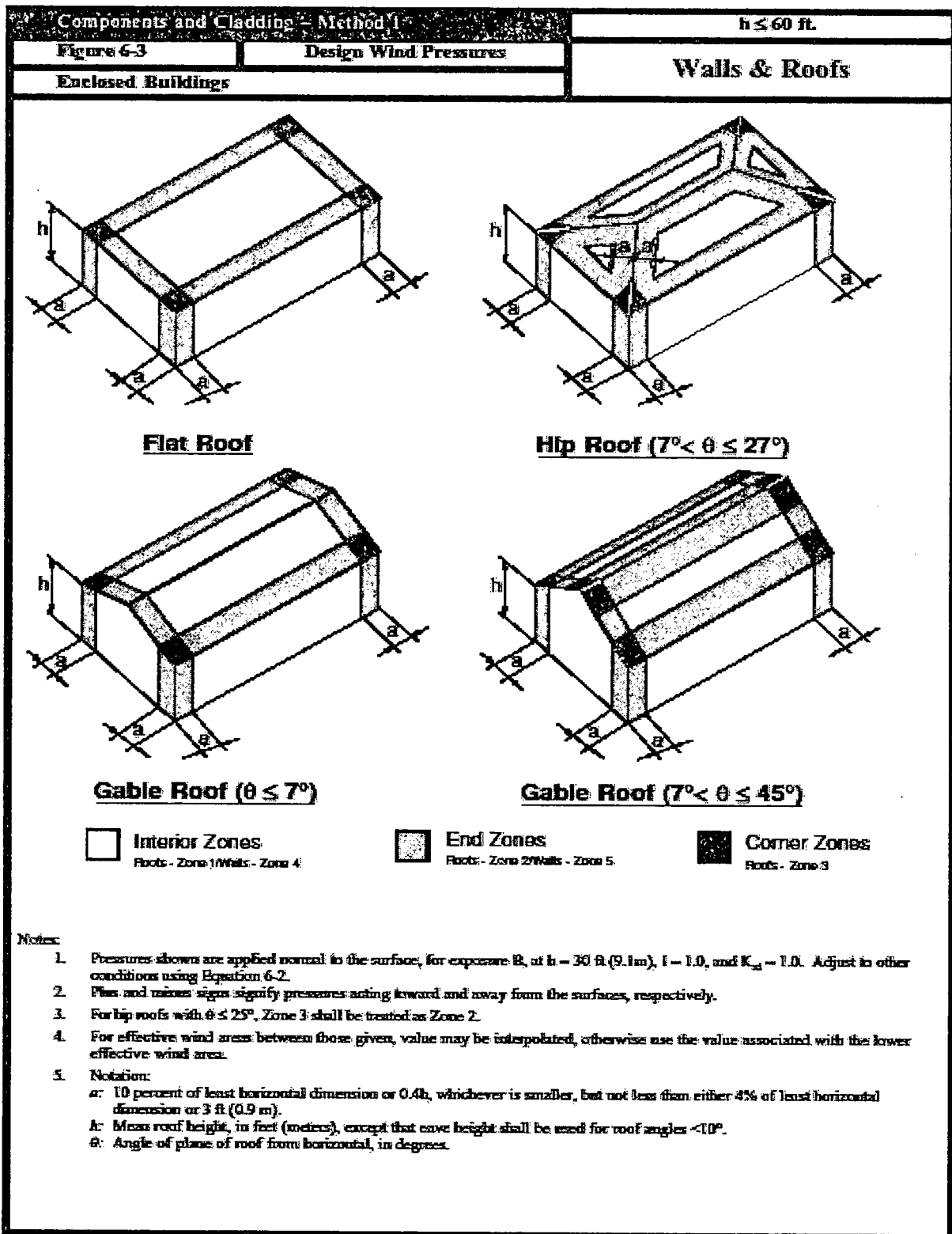
FIGURE 6-1 Basic Wind Speed



Source: ASCE 7-05

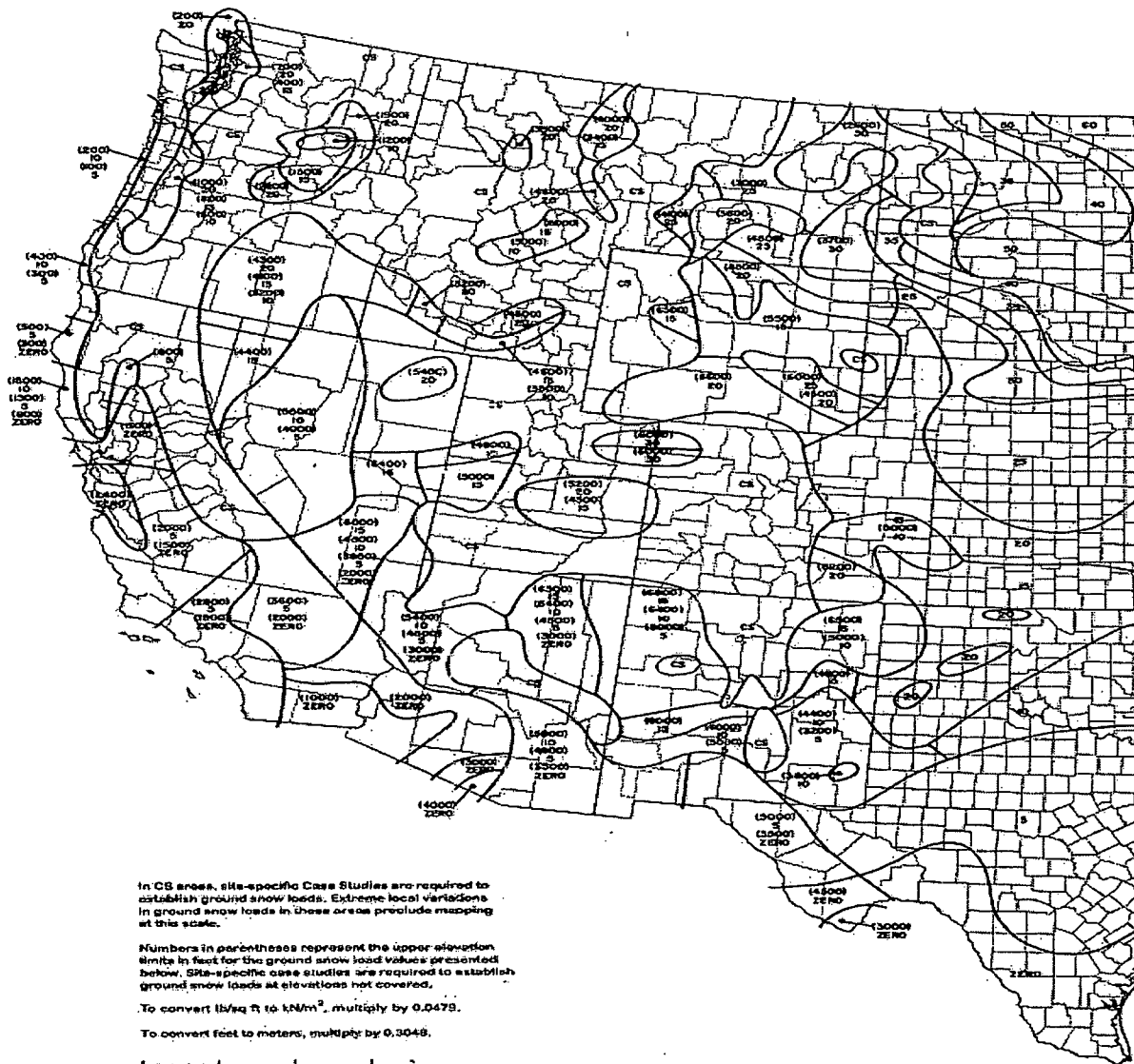
JAC RACK

Source: ASCE 7-05



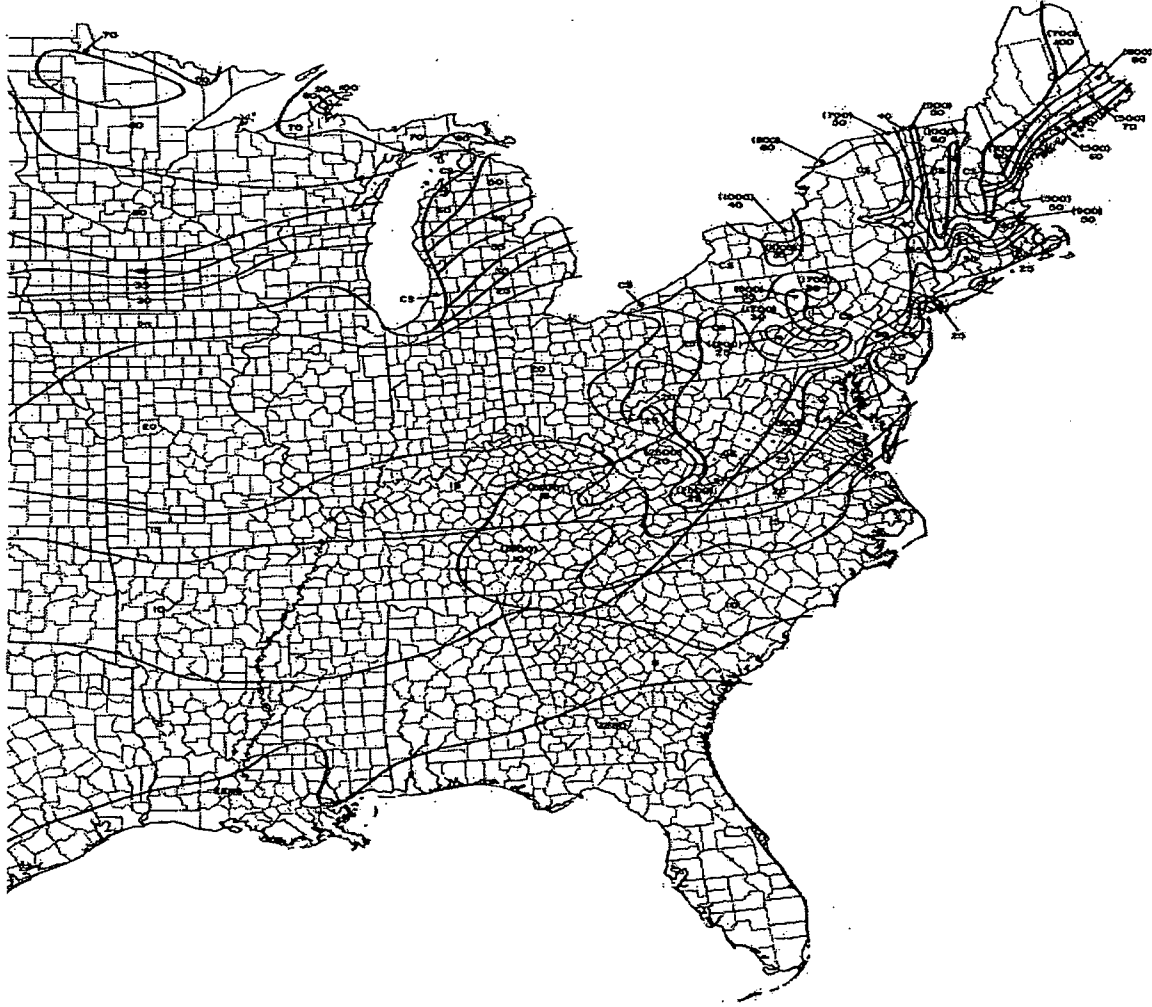
JAC-RACK INSTALLATION GUIDE

FIGURE 7-1 Ground Snow Load, Pg

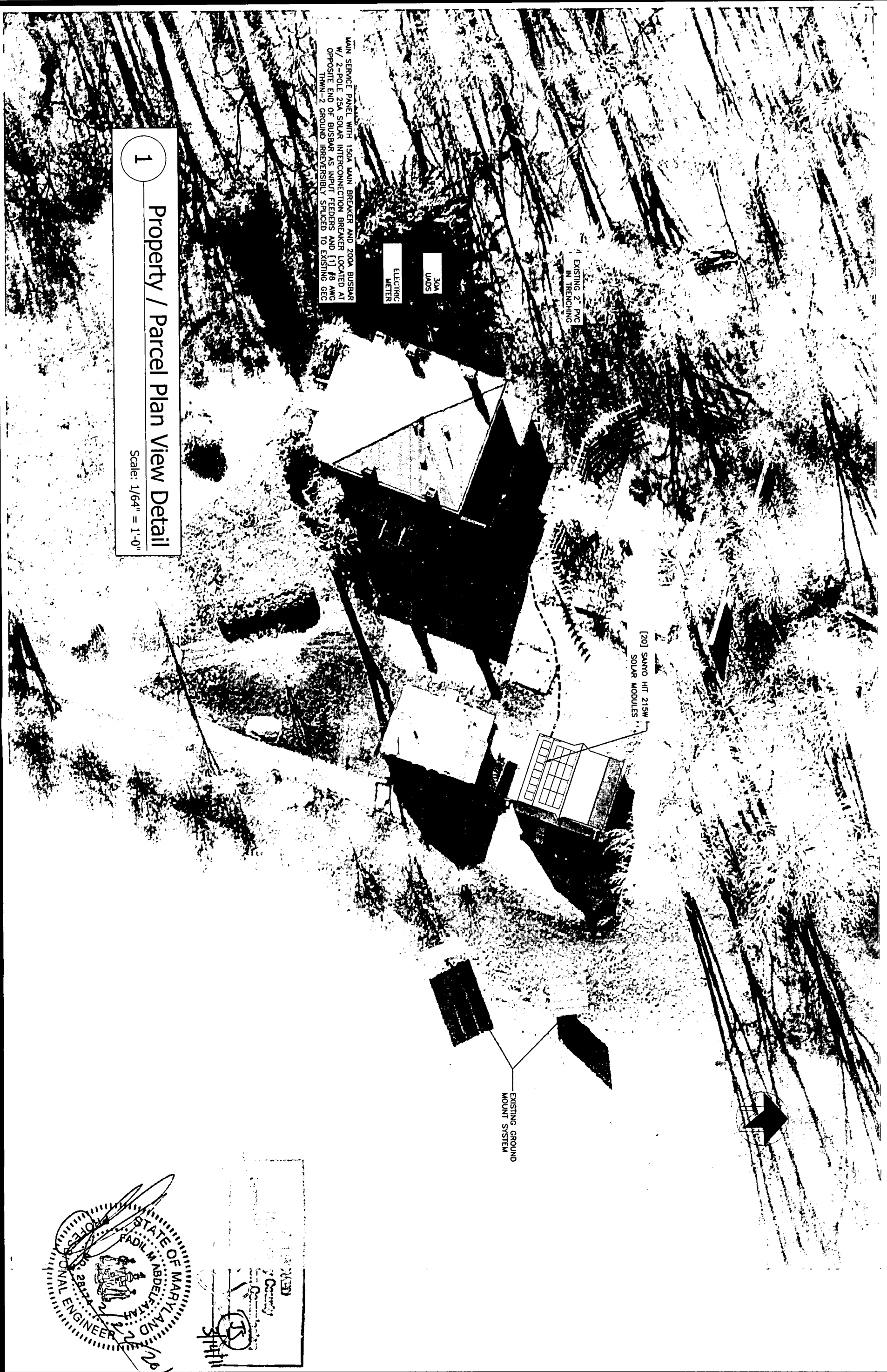


Source: ASCE 7-05

FIGURE 7-1 Ground Snow Load, Pg



Source: ASCE 7-05



1
Property / Parcel Plan View Detail
Scale: 1/64" = 1'-0"

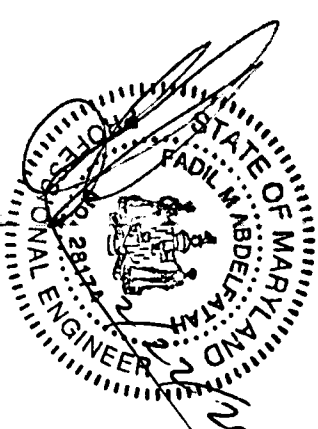
MAIN SERVICE PANEL WITH 150A MAIN BREAKER AND 200A BUSBAR W/ 2-POLE 25A SOLAR INTERCONNECTION BREAKER LOCATED AT OPPOSITE END OF BUSBAR AS INPUT FEEDERS AND [1] #8 AWG THWN-2 GROUND IRREVERSIBLY SPLICED TO EXISTING GEC

30A WADS
ELECTRIC METER

EXISTING 2" PVC IN TRENCHING

[20] SANYO HIT 215W SOLAR MODULES

EXISTING GROUND MOUNT SYSTEM

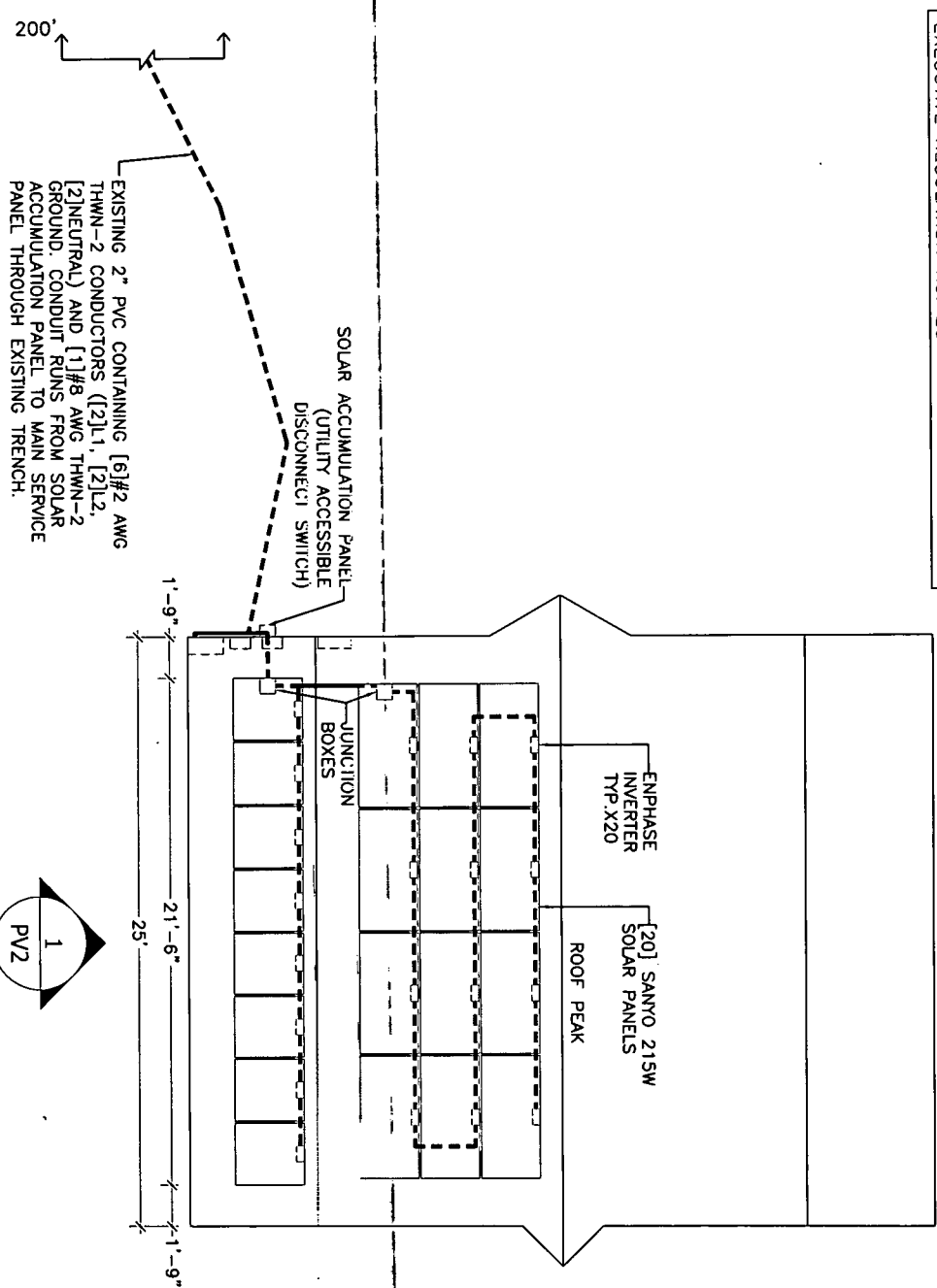


Company
Signature
Date

STANDARD SOLAR 1335 Brookville Rd. Suite 100 Brookville, MD 20833 Tel: 301-441-1234 Fax: 301-441-1235 www.standard-solar.com	PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT THESE DOCUMENTS AND THE APPLICATIONS AND THE APPLICABLE CODES IN CONNECTION WITH THEM WERE PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND. FADIL M. ABDELRAHMAN LICENSE NO. 10000 EXPIRES: JANUARY 23, 2015	NOTES 1. All work shall be performed in accordance with the applicable codes and standards. 2. The Client and Subcontractor shall be responsible for obtaining all necessary permits and approvals. 3. The Client and Subcontractor shall be responsible for obtaining all necessary easements and rights-of-way. 4. The Client and Subcontractor shall be responsible for obtaining all necessary utility information and connections. 5. The Client and Subcontractor shall be responsible for obtaining all necessary survey information and boundary lines. 6. The Client and Subcontractor shall be responsible for obtaining all necessary environmental information and permits. 7. The Client and Subcontractor shall be responsible for obtaining all necessary zoning information and permits. 8. The Client and Subcontractor shall be responsible for obtaining all necessary title insurance information and policies. 9. The Client and Subcontractor shall be responsible for obtaining all necessary title search information and reports. 10. The Client and Subcontractor shall be responsible for obtaining all necessary title commitment information and reports. 11. The Client and Subcontractor shall be responsible for obtaining all necessary title policy information and reports. 12. The Client and Subcontractor shall be responsible for obtaining all necessary title insurance information and policies. 13. The Client and Subcontractor shall be responsible for obtaining all necessary title search information and reports. 14. The Client and Subcontractor shall be responsible for obtaining all necessary title commitment information and reports. 15. The Client and Subcontractor shall be responsible for obtaining all necessary title policy information and reports.
	PROJECT TITLE FULLER JEFF PROJECT ADDRESS 4415 BROOKEVILLE RD BROOKEVILLE, MD 20833 SHEET TITLE SITE PLAN	REVISIONS 1. 11/26/2011 2. 12/15/2011 3. 01/26/2011
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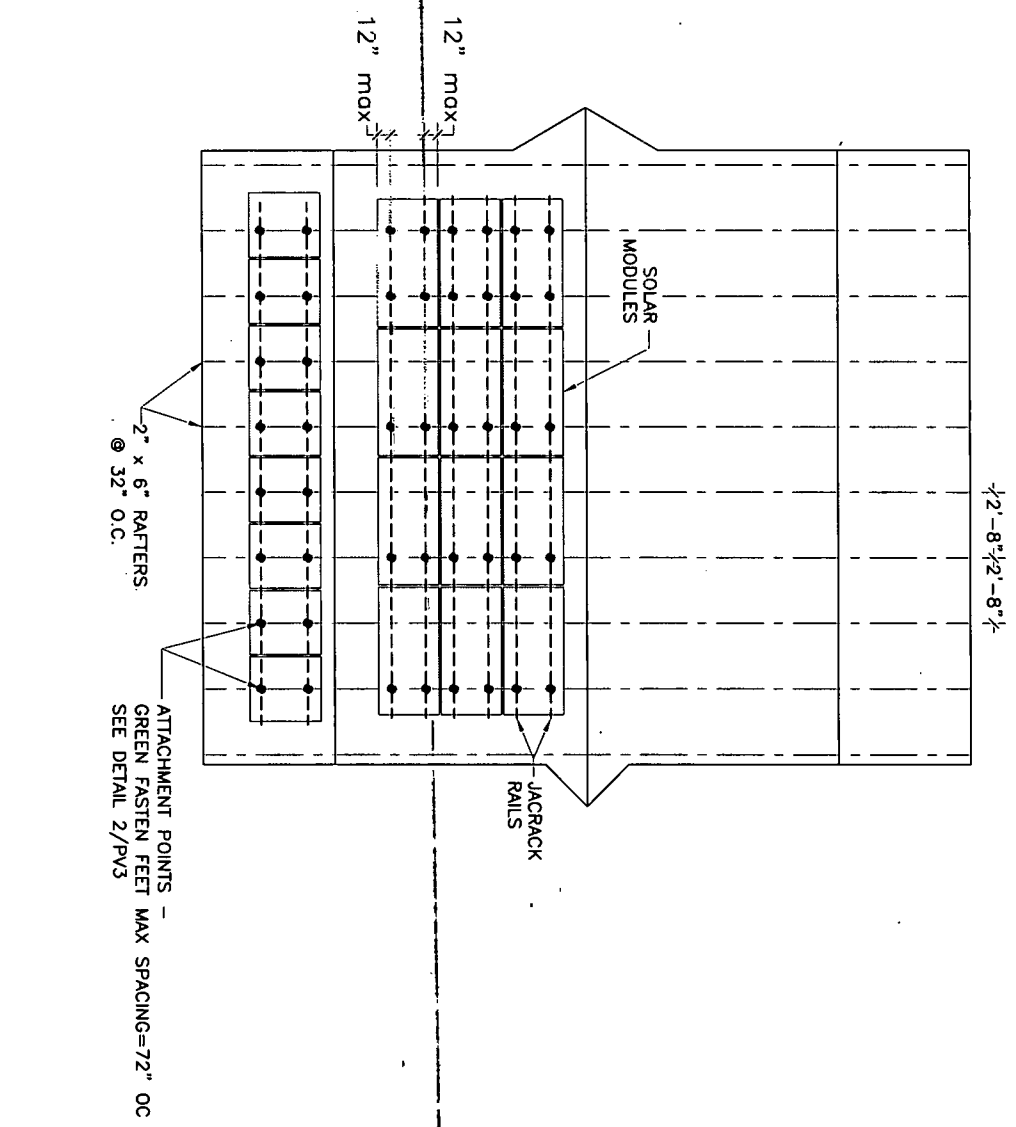
SYSTEM DESIGN PARAMETERS	
DESIGN WIND SPEED:	90mph
GROUND SNOW LOAD:	30 psf
SEISMIC DESIGN CAT:	B
WEATHERING:	SEVERE
TERMITE:	MODERATE TO HEAVY
FLOOD HAZARD:	JULY 2, 1979
AIR F.Z. INDEX:	300
MEAN ANNUAL TEMP.:	55°F
FROST LINE DEPTH:	24"
WINTER DESIGN TEMP.:	13°F

ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE INTERNATIONAL RESIDENTIAL CODE (IRC), 2009 EDITION, AS AMENDED BY MONTGOMERY COUNTY EXECUTIVE REGULATION No. 28-7

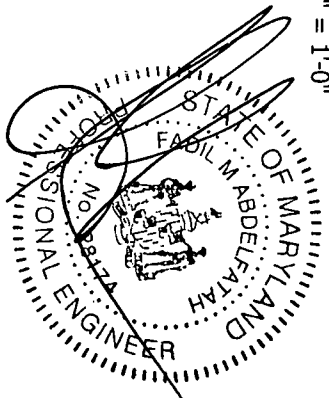


1
Plan View
Scale: 1/8" = 1'-0"

- NOTES:
1. ALL MODULES ARE GROUNDED WITH UL LISTED GROUNDING SYSTEM.
 2. SUNTECH TYPE CLAMPS TO BE USED IN CONJUNCTION WITH JACRACK MOUNTING SYSTEM
 3. ELECTRIC METER AND MAIN SERVICE PANEL ARE IN THE MAIN HOUSE.
 4. PLACE PLACARD NEAR METER INDICATING LOCATION OF DISCONNECT TO BE INSTALLED.
 5. USE EXISTING GROUND WIRE TO PULL NEW CONDUCTORS.



2
Plan View @ Attachment Points
Scale: 1/8" = 1'-0"



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 13355 Preaker Drive, Suite 200
 Rockville, MD 20850
 Phone: (301) 994-1300
 www.standard-solar.com

PROFESSIONAL CERTIFICATION
 I, JEFFREY FULLER, hereby certify that I am a duly Licensed Professional Engineer in the State of Maryland, License No. 11117, and that I am the author of the design and drawings herein.

NOTES
 1. All work is to be performed in accordance with the Maryland Professional Engineering Act and shall be in strict compliance with the Maryland Professional Engineering Act and the regulations thereunder.
 2. The Owner and Subcontractors shall certify that the design and drawings herein are in accordance with the Maryland Professional Engineering Act and the regulations thereunder.
 3. The Engineer shall be responsible for the design and drawings herein and shall be held liable for any errors or omissions which may occur hereon.

PROJECT TITLE
 FULLER JEF
 PROJECT ADDRESS
 4415 BROOKEVILLE RD
 BROOKEVILLE, MD 20833

SHEET TITLE
 Plan View

REVISIONS

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 This drawing is the property of STANDARD SOLAR. It is to be used only for the project and location specified herein. It is not to be used for any other project or location without the written consent of STANDARD SOLAR, INC.

PROJECT NUMBER
 10-0286

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 DTJ

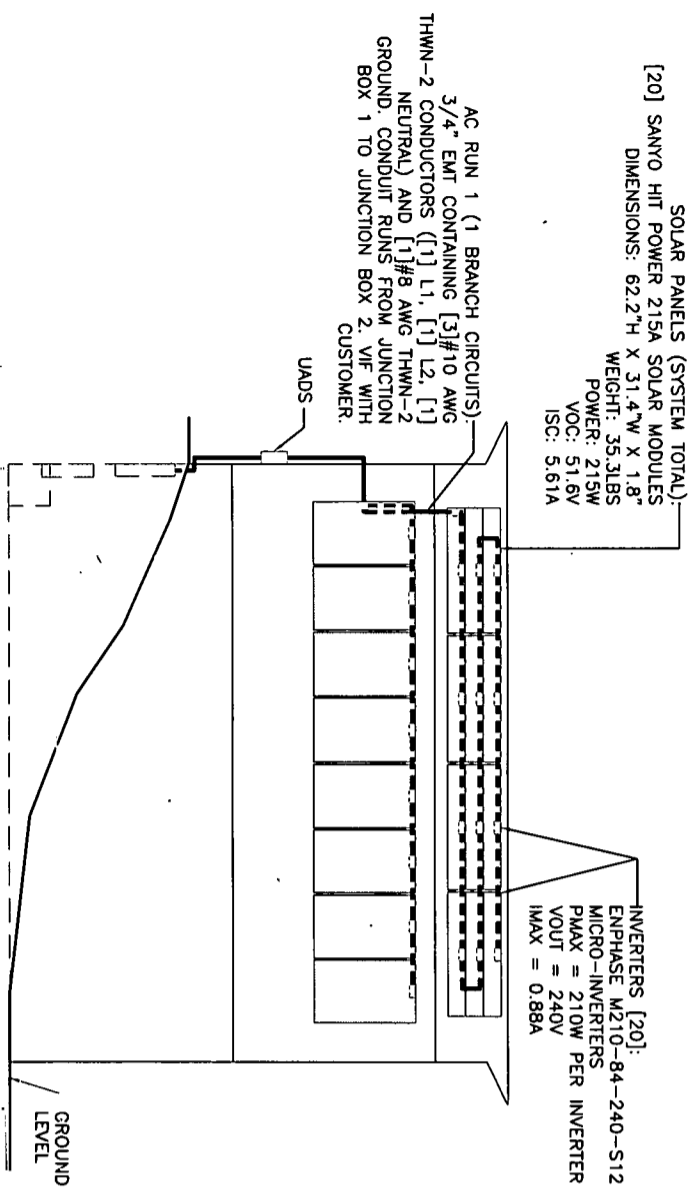
APPROVED BY
 MAJ

DATE
 01/26/2011

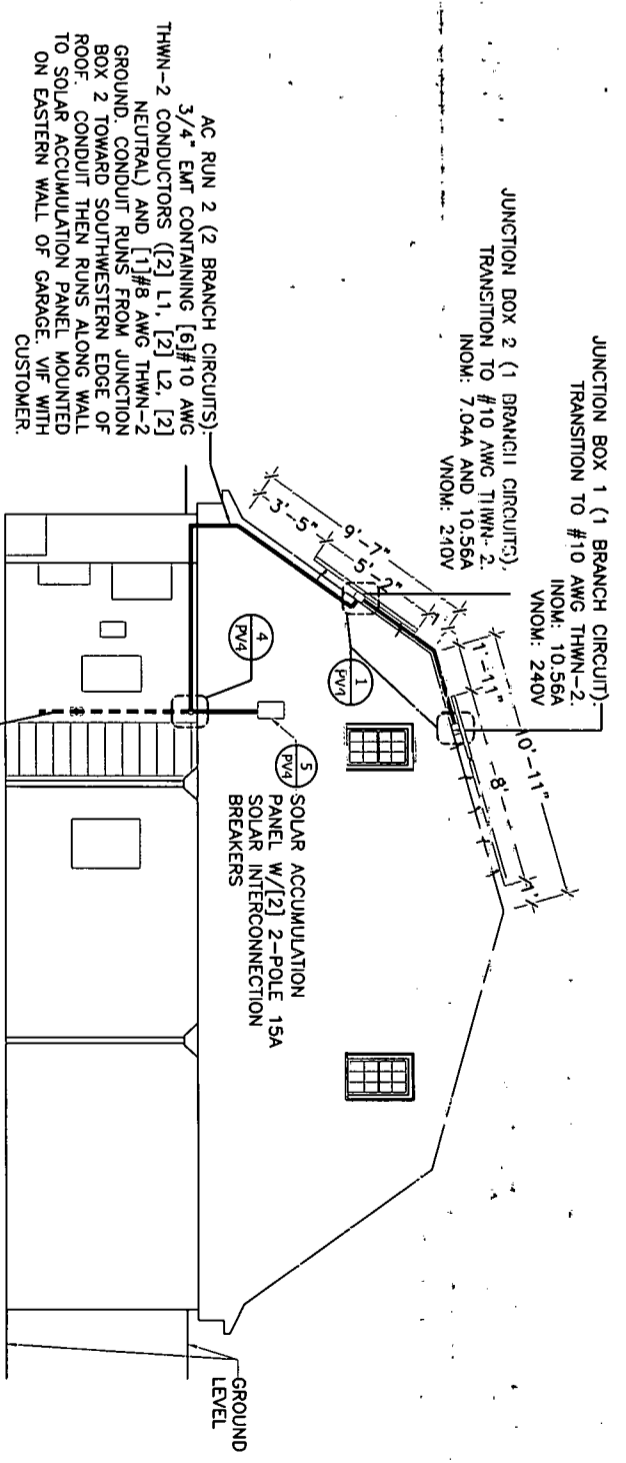
ORIGINAL SHEET SIZE
 11x17
 SHOULD MEASURE 1:

SCALE
 AS NOTED

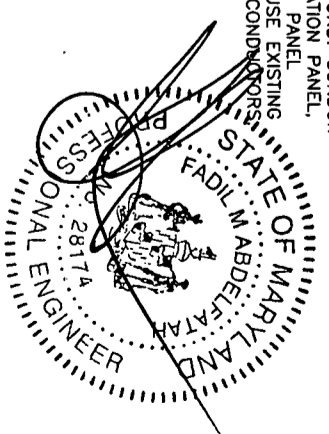
DRAWING
 PV1



1 South Elevation
Scale: 1/8" = 1'-0"



2 West Elevation
Scale: 1/8" = 1'-0"



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PROFESSIONAL ENGINEER
FADIM ABDEL FATTAH
LICENSED PROFESSIONAL ENGINEER
1. MEMBER CENTER THAT THESE DOCUMENTS WERE PREPARED BY AN APPLICABLE CODES IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROFESSIONAL ENGINEERING BOARD OF THE STATE OF MARYLAND. NUMBER 20172 EXPIRATION DATE: JANUARY 23, 2013.

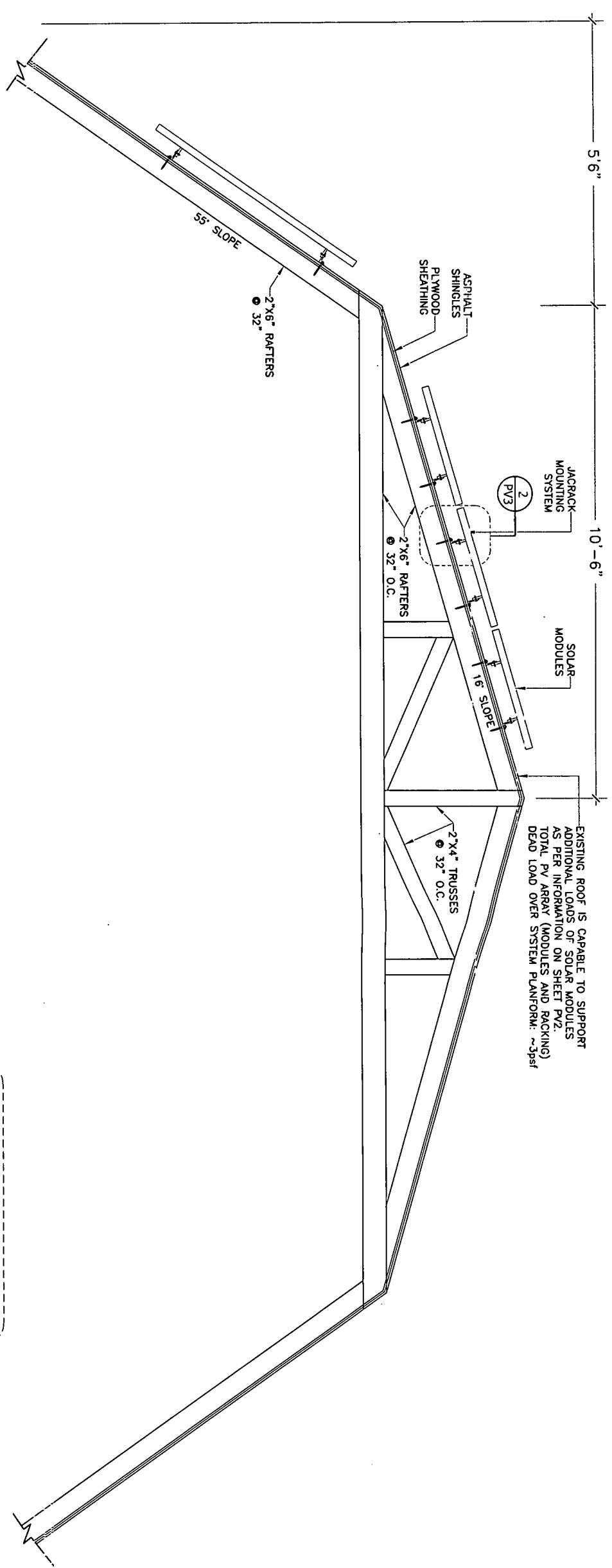
NOTES
1. All work to be performed in accordance with the manufacturer's specifications and recommendations.
2. The General and Subcontractor drawings represent the full and complete design of the work and shall be used for construction purposes only. No other drawings, specifications, or conditions shall be used without the written approval of the professional engineer.

PROJECT TITLE
FULLER JEFF
PROJECT ADDRESS
4415 BROOKEVILLE RD
BROOKEVILLE, MD 20833
SHEET TITLE
Elevations

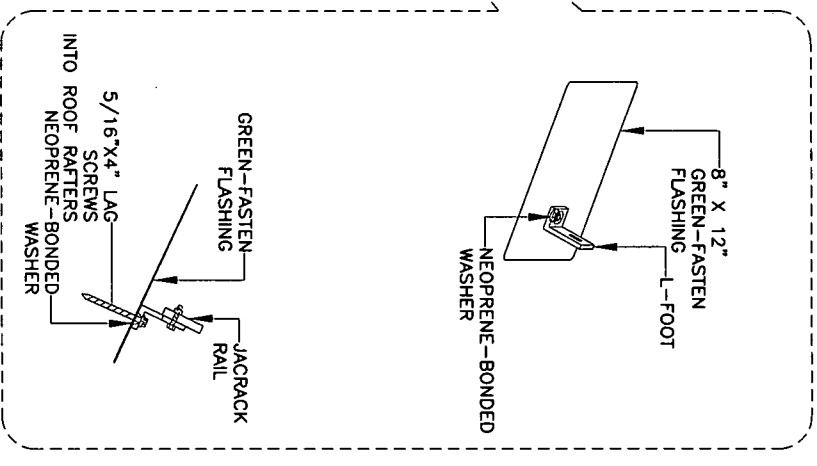
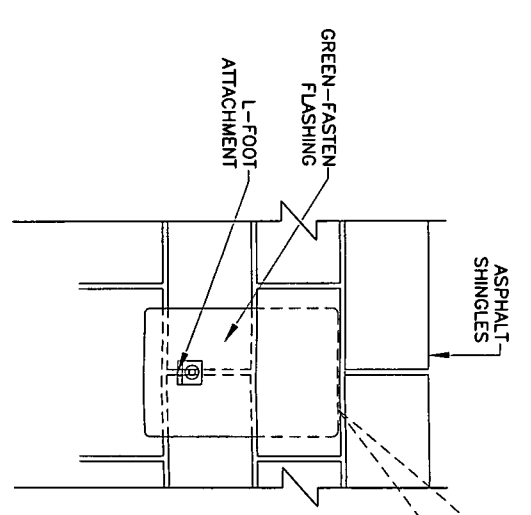
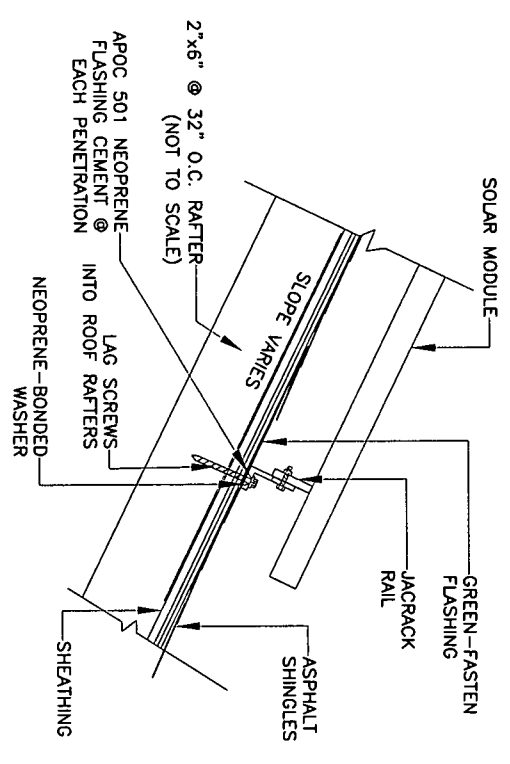
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DATE
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ORIGINAL SHEET SIZE
11x17
SCALE
AS NOTED

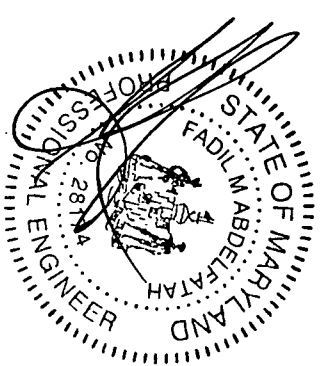
DRAWING
PV2



1
Roof Detail
Scale: 3/8" = 1'-0"



2
Green-Fasten Attachment Detail
Scale: 1" = 1'-0"



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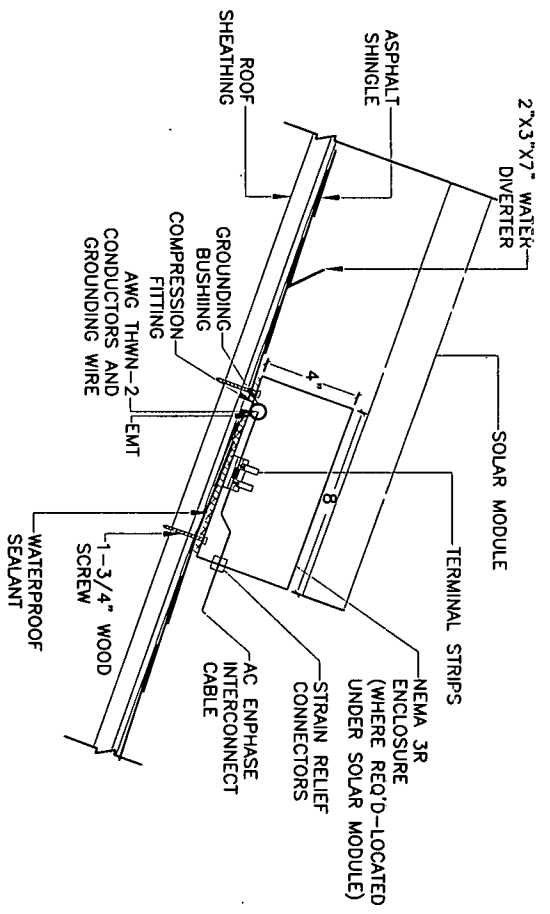
PROFESSIONAL ENGINEER
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE DESIGNED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A duly Licensed Professional Engineer in the State of Maryland.
DATE: JANUARY 23, 2011

STRUCTURAL ENGINEERS
1. All work is performed by a professional engineer and is in accordance with the standards and specifications of the American Institute of Steel Construction, Inc. (AISC) and the manufacturer's specifications and recommendations.
2. The General and Site-Specific design is based on the information provided by the client and is not intended to be used for any other purpose without the written consent of the engineer. The engineer is not responsible for any errors or omissions in the design or for any consequences arising from the use of the design for any purpose other than that intended.

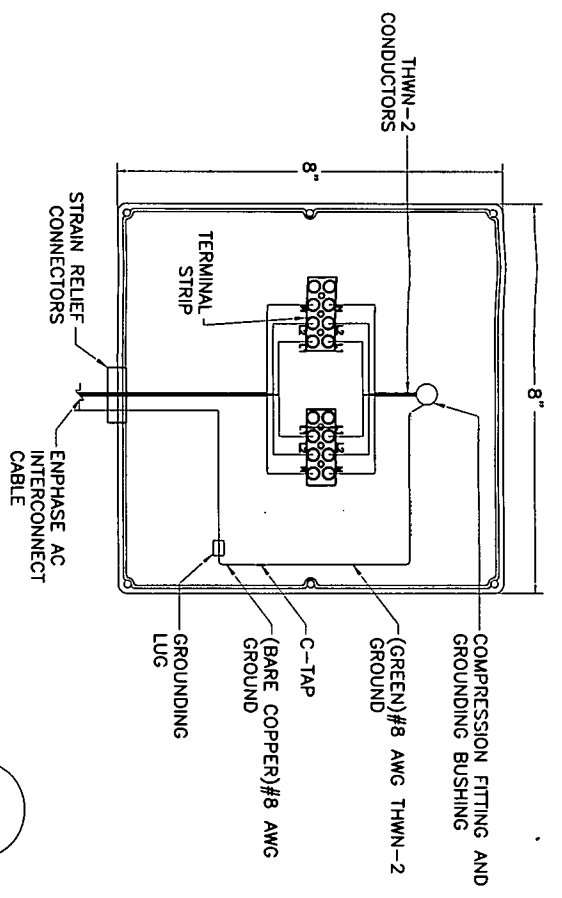
PROJECT TITLE
FULLER JEF
PROJECT ADDRESS
4415 BROOKEVILLE RD
BROOKEVILLE, MD 20833
SHEET TITLE
Detail Views
REVISIONS

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PROJECT NUMBER
10-0286
DRAWN BY
DTK
APPROVED BY
MAJ
DATE
01/26/2011
ORIGINAL SHEET SIZE
11x17
SHOULD MEASURE 1/4"

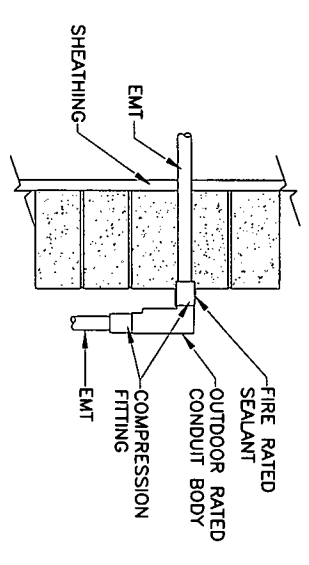
SCALE
AS NOTED
DRAWING
PV3



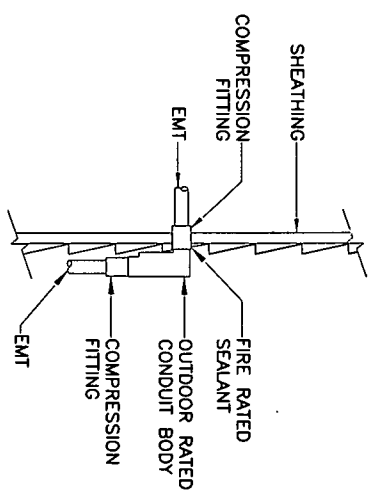
1 Roof Penetration Detail
Scale: 1-1/2"=1'-0"



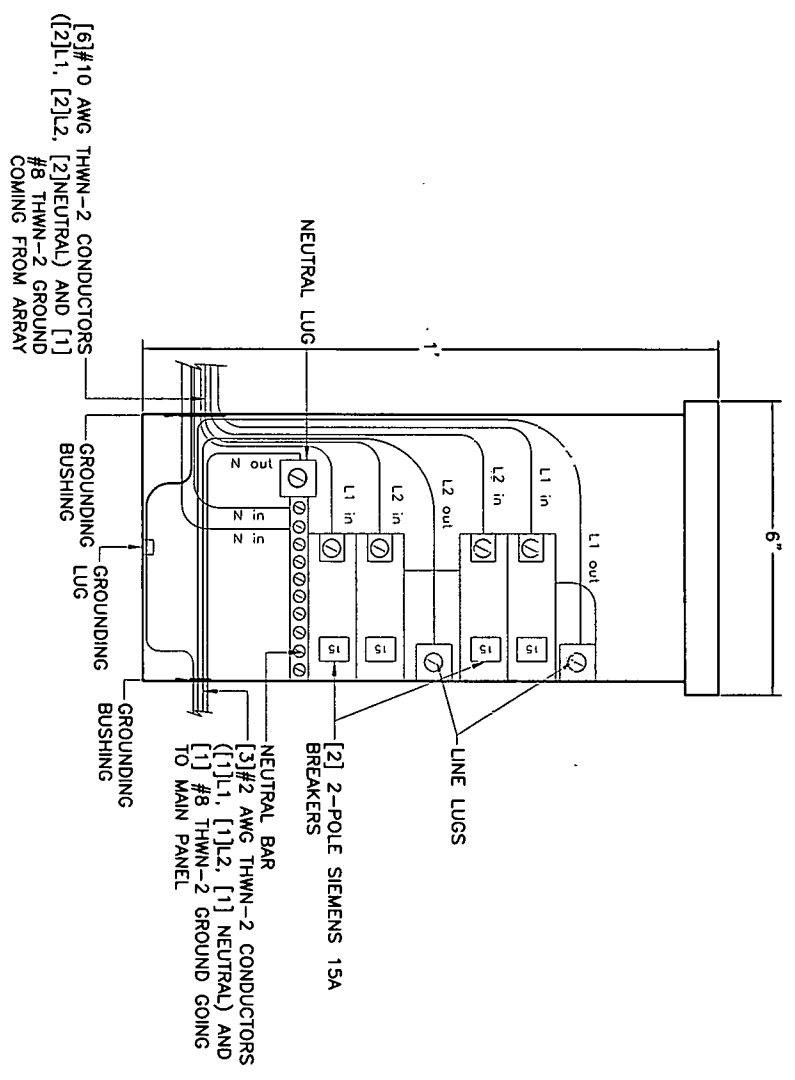
2 Transition Box Detail
Scale: 3" = 1'-0"



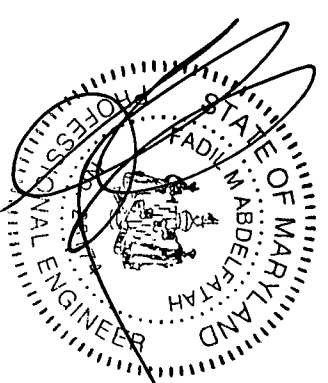
3 Wall Penetration Detail @House
Scale: 1-1/2"=1'-0"



4 Wall Penetration Detail
Scale: 1-1/2"=1'-0"



5 Solar Accumulation Panel Detail
Scale: 3" = 1'-0"



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Farmingdale, NY 11737
Phone: 516-946-1292
www.StandardSolar.com

PROFESSIONAL ENGINEER
I, **W. ABDELLATAH**, LICENSE NO. 11117, hereby certify that these documents were prepared in accordance with the provisions of the laws of the State of Maryland and were prepared by me or under my direct supervision and I am a duly Licensed Professional Engineer in the State of Maryland, License No. 11117, dated January 23, 2011.

STRUCTURAL ENGINEERS
1. All work shall be performed in accordance with the applicable provisions of the Maryland Professional Engineers and Architects Act, and the applicable provisions of the Maryland Professional Engineers and Architects Regulations.

2. The General and Site-Specific design reports, the site and structural drawings, and the design and construction documents shall be prepared and stamped by the engineer of record and shall be the responsibility of the engineer of record.

NOTES
1. All work shall be performed in accordance with the applicable provisions of the Maryland Professional Engineers and Architects Act, and the applicable provisions of the Maryland Professional Engineers and Architects Regulations.

2. The General and Site-Specific design reports, the site and structural drawings, and the design and construction documents shall be prepared and stamped by the engineer of record and shall be the responsibility of the engineer of record.

PROJECT TITLE
FULLER JEF
PROJECT ADDRESS
4415 BROOKEVILLE RD
BROOKEVILLE, MD 20833

SHEET TITLE
Detail Views

REVISIONS

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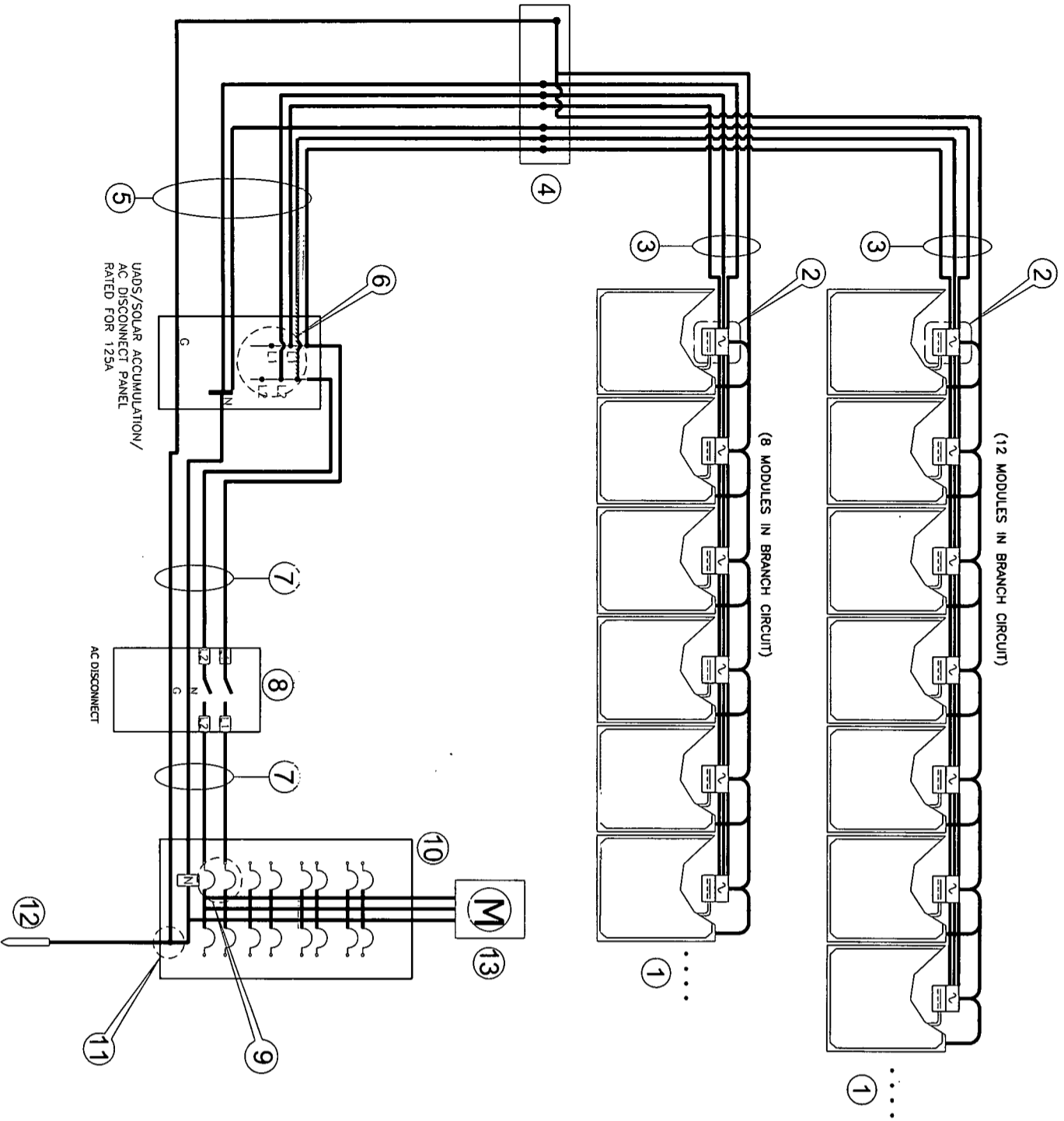
APPROVED BY
MAJ

DATE
01/26/2011

ORIGINAL SHEET SIZE
11X17
ROUND MEASURE ±

SCALE
AS NOTED

DRAWING
PV4



TAG	DESCRIPTION	NOTES
1	Solar Array	20 Modules Voc: 51.6V Isc: 5.61A
2	Inverter	20 Enphase Microinverters
3	Cable	AC ENPHASE INTERCONNECT CABLE
4	Transition Box	Transition to #10 AWG THWN-2
5	THWN-2 Wire	[6]#10 AWG; [1]#8 AWG GROUND 10.56 amps max.
6	Solar Accumulation Panel	[2] 2-pole 15A circuit breakers
7	THWN-2 Wire	[3]#2 AWG; [1]#8 AWG GROUND 17.6 amps max.
8	AC DISCONNECT PANEL	RATED FOR 30A
9	Solar Interconnection Breaker	[1] 2-pole 25A Interconnection breaker
10	Main Service Panel	150 amps Main Breaker with 200A Busbars
11	Grounding Electrode Conductor	#8 AWG THWN-2
12	Grounding Electrode	Existing Grounding Electrode Conductor System
13	Utility Electric Meter	Net Meter

MODULE:	SANYO HIT POWER 215A SOLAR MODULES
BRANCH CIRCUITS:	2
MODULES per BRANCH :	[1] BRANCH OF [12] MODULES AND [1] BRANCH OF [8] MODULES
SYSTEM SIZE:	4.3 kW

NEC 2008

NOTE: ALL LABELS WILL BE PLACED IN ACCORDANCE WITH NEC 690.51 - 690.56B.

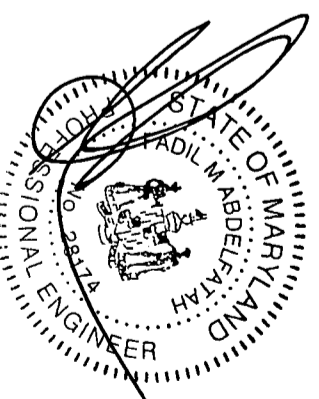
NOTE: ALL INVERTERS ARE LISTED TO THE UL 1741 AND IEEE 1547 STANDARDS.

NOTE: DISCONNECTS ARE IN COMPLIANCE WITH THE LOCAL UTILITIES.

NOTE: INVERTERS' GEC IS #8 BARE COPPER WIRE ATTACHED TO MANUFACTURER'S LAV-IN-LUG.

* INTERCONNECTION BREAKER SHALL BE LOCATED AT THE OPPOSITE END OF THE BUS FROM THE INPUT FEEDERS.

1 Three Line Diagram with Enphase Micro Inverters
Scale: None



<p>1355 Piedmont Drive, Suite 300 Rockville, MD 20850 301-984-1100 www.standard-solar.com</p>	<p>PROJECT TITLE FULLER JEF PROJECT ADDRESS 4415 BROOKEVILLE RD BROOKEVILLE, MD 20833</p>
	<p>SHEET TITLE Three Line Diagram</p>
<p>REVISIONS</p>	<p>DISCLAIMER This drawing is the property of STANDARD SOLAR CORPORATION, and is to be used only in connection with the project and for the purposes stated. NO OTHERS WITHOUT WRITTEN PERMISSION FROM STANDARD SOLAR, INC.</p>
<p>APPROVED BY MAJ</p>	<p>DRAWN BY DTK</p>
<p>DATE 01/26/2011</p>	<p>PROJECT NUMBER 10-0286</p>
<p>ORIGINAL SHEET SIZE 11X17 SHOULD MEASURE IT!</p>	<p>SCALE AS NOTED</p>
<p>DRAWING E1</p>	

PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE DRAWINGS WERE PREPARED IN ACCORDANCE WITH THE APPLICABLE CODES IN COUNTY, MARYLAND, INCLUDING THE NATIONAL ELECTRICAL CODE, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 28174, EXPIRATION DATE: 01/26/2011.

STRUCTURAL ENGINEERS
 1. All work to be performed is a preliminary estimate and is subject to change without notice. The engineer shall be held responsible for the accuracy of the information provided and shall be held responsible for the accuracy of the information provided.
 2. The Client and the Contractor shall be jointly responsible for the accuracy of the information provided. The engineer shall not be held responsible for the accuracy of the information provided by the Contractor. The engineer shall not be held responsible for the accuracy of the information provided by the Contractor.

FULLER, JEFF
 PROJECT ADDRESS
 4415 BROOKVILLE RD
 BROOKVILLE, MD 20833
 SHEET TITLE
 String Diagram

REVISIONS

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PROJECT NUMBER
 10 0200

DRAWN BY
 DTK

APPROVED BY
 MAJ

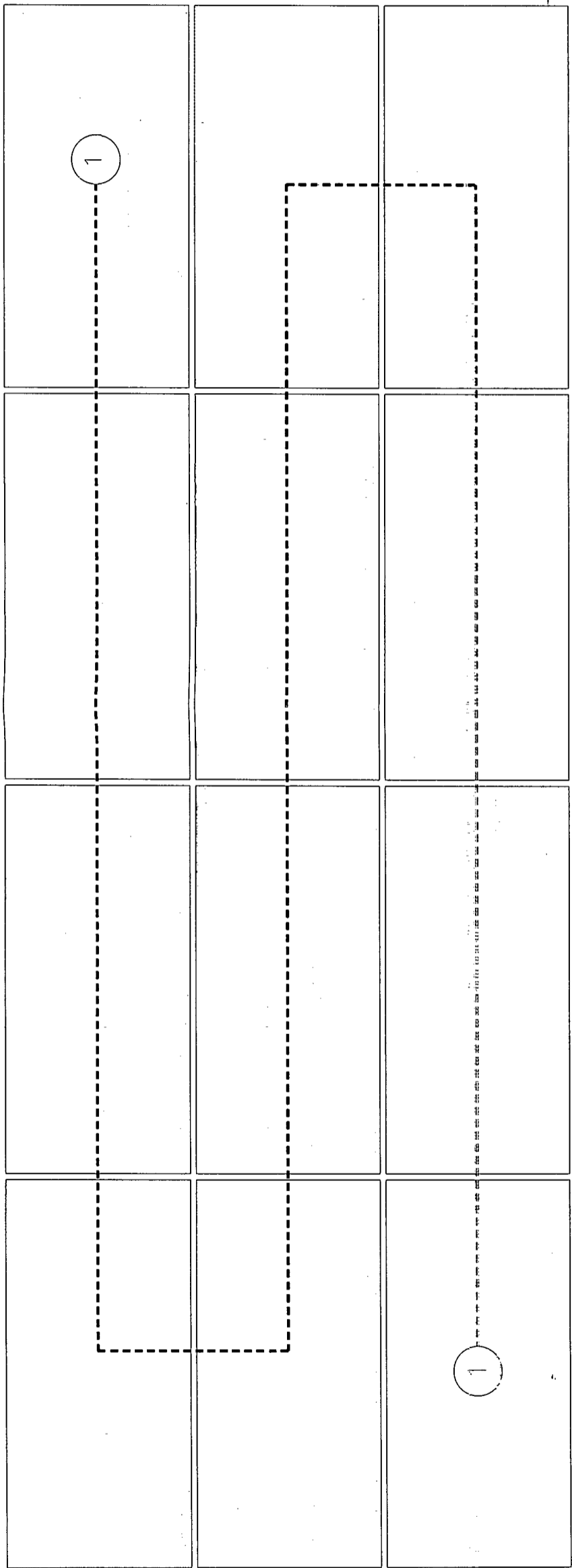
DATE
 01/26/2011

ORIGINAL SHEET SIZE
 11X17

SHOULD MEASURE IN:

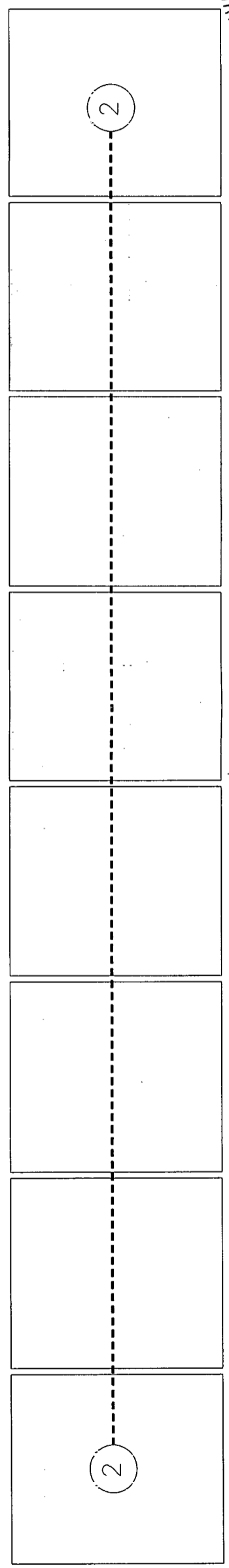
SCALE
 AS NOTED

DRAWING
 E2



PV SYSTEM AC POINT OF CONNECTION (BRANCH 1)

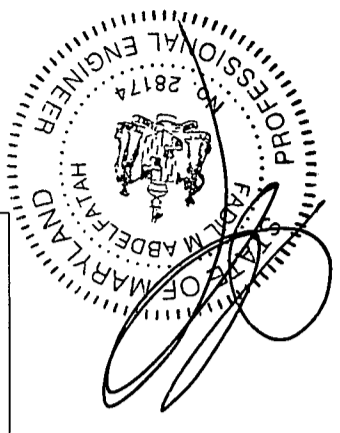
- 1. AC OUTPUT CURRENT: 10.56A
- 2. NOMINAL AC VOLTAGE: 240V



PV SYSTEM AC POINT OF CONNECTION (BRANCH 2)

- 1. AC OUTPUT CURRENT: 7.04A
- 2. NOMINAL AC VOLTAGE: 240V

String Diagram
 Scale: None



1

EXPEDITED
MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION
STAFF REPORT

Address:	4415 Brookeville Road, Brookeville	Meeting Date:	3/9/2011
Resource:	Master Plan Site #23/59 Locust Hill	Report Date:	3/2/2011
Applicant:	John Fuller (Duane Glass, Agent)	Public Notice:	2/23/2011
Review:	HAWP	Tax Credit:	N/A
Case Number:	23/59-11A	Staff:	Josh Silver
PROPOSAL:	Solar array installation		

STAFF RECOMMENDATION:

Approve
 Approve with conditions

ARCHITECTURAL DESCRIPTION

SIGNIFICANCE: Individually Designated Master Plan Site
STYLE: Rural Vernacular
DATE: 1868

PROPOSAL:

The applicant is proposing to install 20 flush mount photovoltaic panels on the roof slope of a non-contributing detached accessory structure located to the east of the historic house.

APPLICABLE GUIDELINES:**Montgomery County Code; Chapter 24A-8**

- (a) The commission shall instruct the director to deny a permit if it finds, based on the evidence and information presented to or before the commission that the alteration for which the permit is sought would be inappropriate, inconsistent with or detrimental to the preservation, enhancement or ultimate protection of the historic site or historic resource within an historic district, and to the purposes of this chapter.
- (b) The commission shall instruct the director to issue a permit, or issue a permit subject to such conditions as are found to be necessary to insure conformity with the purposes and requirements of this chapter, if it finds that:

- (1) The proposal will not substantially alter the exterior features of an historic site or historic resource within an historic district; or
- (2) The proposal is compatible in character and nature with the historical, archeological, architectural or cultural features of the historic site or the historic district in which an historic resource is located and would not be detrimental thereto or to the achievement of the purposes of this chapter; or
- (3) The proposal would enhance or aid in the protection, preservation and public or private utilization of the historic site or historic resource located within an historic district in a manner compatible with the historical, archeological, architectural or cultural value of the historic site or historic district in which an historic resource is located; or
- (4) The proposal is necessary in order that unsafe conditions or health hazards be remedied; or
- (5) The proposal is necessary in order that the owner of the subject property not be deprived of reasonable use of the property or suffer undue hardship; or
- (6) In balancing the interests of the public in preserving the historic site or historic resource located within an historic district, with the interests of the public from the use and benefit of the alternative proposal, the general public welfare is better served by granting the permit.
 - (c) It is not the intent of this chapter to limit new construction, alteration or repairs to any 1 period or architectural style.
 - (d) In the case of an application for work on an historic resource located within an historic district, the commission shall be lenient in its judgment of plans for structures of little historical or design significance or for plans involving new construction, unless such plans would seriously impair the historic or architectural value of surrounding historic resources or would impair the character of the historic district. (Ord. No. 9-4, § 1; Ord. No. 11-59.)

STAFF RECOMMENDATION:

Staff recommends that the Commission **approve the HAWP application** as being consistent with Chapter 24A-8(b), (1) and (2):

and with the general condition that the applicant shall present the **3 permit sets of drawings, if applicable, to Historic Preservation Commission (HPC) staff for review and stamping** prior to submission for the Montgomery County Department of Permitting Services (DPS) building permits;

and with the general condition that the applicant shall notify the Historic Preservation Staff if they propose to make **any alterations** to the approved plans. Once the work is completed the applicant will contact the staff person assigned to this application at 301-563-3400 or joshua.silver@mncppc-mc.org to schedule a follow-up site visit.



RETURN TO DEPARTMENT OF PERMITTING SERVICES
295 ROCKVILLE PIKE 2nd FLOOR ROCKVILLE MD 20850
240-777-3370

DPS - #8

**HISTORIC PRESERVATION COMMISSION
301/563-3400**

**APPLICATION FOR
HISTORIC AREA WORK PERMIT**

Contact Person: Duane Glass c/o Standard Solar, Inc

Daytime Phone No.: 240-479-1514

Tax Account No.: 08-02645563

Name of Property Owner: John Fuller

Daytime Phone No.: 301-840-1100

Address: 4415 Brookeville Rd.

Brookeville

MD

20833

Street Number

City

State

Zip Code

Contractor: Standard Solar, Inc.

Phone No.: 301-944-1200 x 5106

Contractor Registration No.: MHIC 124908

Agent for Owner: Duane Glass

Daytime Phone No.: 240-479-1514

LOCATION OF BUILDING/PREMISE

House Number: 4415

Street: Brookeville Rd.

Town/City: Brookeville

Nearest Cross Street: Zion Rd

Lot: _____ Block: _____ Subdivision: Brooke Grove

Liber: 7196

Folio: 718

Parcel: P060

PART ONE: TYPE OF PERMIT ACTION AND USE

1A. CHECK ALL APPLICABLE:

- Construct
- Extend
- Alter/Renovate
- Move
- Install
- Wreck/Raze
- Revision
- Repair
- Revocable

CHECK ALL APPLICABLE:

- A/C
- Slab
- Room Addition
- Porch
- Deck
- Shed
- Solar
- Fireplace
- Woodburning Stove
- Single Family
- Fence/Wall (complete Section 4)
- Other: _____

1B. Construction cost estimate: \$ 34,750

1C. If this is a revision of a previously approved active permit, see Permit # _____

PART TWO: COMPLETE FOR NEW CONSTRUCTION AND EXTEND/ADDITIONS

2A. Type of sewage disposal: 01 WSSC

02 Septic

03 Other: _____

2B. Type of water supply: 01 WSSC

02 Well

03 Other: _____

PART THREE: COMPLETE ONLY FOR FENCE/RETAINING WALL

3A. Height _____ feet _____ inches

3B. Indicate whether the fence or retaining wall is to be constructed on one of the following locations:

- On party line/property line
- Entirely on land of owner
- On public right of way/easement

I hereby certify that I have the authority to make the foregoing application, that the application is correct, and that the construction will comply with plans approved by all agencies listed and I hereby acknowledge and accept this to be a condition for the issuance of this permit.

[Signature]
Signature of owner or authorized agent

2/3/2011
Date

Approved: _____ For Chairperson, Historic Preservation Commission

Disapproved: _____ Signature: _____ Date: _____

Application/Permit No.: 560199 Date Filed: 2/4/2011 Date Issued: _____

**THE FOLLOWING ITEMS MUST BE COMPLETED AND THE
REQUIRED DOCUMENTS MUST ACCOMPANY THIS APPLICATION.**

1. WRITTEN DESCRIPTION OF PROJECT

- a. Description of existing structure(s) and environmental setting, including their historical features and significance:

The existing structure which the solar will be installed is one of two garages on the property that is separate from the main and Historic residence on the property.

- b. General description of project and its effect on the historic resource(s), the environmental setting, and, where applicable, the historic district:

Installation of flush mounted PV Solar Panels on existing garage.

2. SITE PLAN

Site and environmental setting, drawn to scale. You may use your plot. Your site plan must include:

- a. the scale, north arrow, and date;
- b. dimensions of all existing and proposed structures; and
- c. site features such as walkways, driveways, fences, ponds, streams, trash dumpsters, mechanical equipment, and landscaping.

3. PLANS AND ELEVATIONS

You must submit 2 copies of plans and elevations in a format no larger than 11" x 17". Plans on 8 1/2" x 11" paper are preferred.

- a. *Schematic construction plans*, with marked dimensions, indicating location, size and general type of walls, window and door openings, and other fixed features of both the existing resource(s) and the proposed work.
- b. Elevations (facades), with marked dimensions, clearly indicating proposed work in relation to existing construction and, when appropriate, context. All materials and fixtures proposed for the exterior must be noted on the elevations drawings. An existing and a proposed elevation drawing of each facade affected by the proposed work is required.

4. MATERIALS SPECIFICATIONS

General description of materials and manufactured items proposed for incorporation in the work of the project. This information may be included on your design drawings.

5. PHOTOGRAPHS

- a. Clearly labeled photographic prints of each facade of existing resource, including details of the affected portions. All labels should be placed on the front of photographs.
- b. Clearly label photographic prints of the resource as viewed from the public right-of-way and of the adjoining properties. All labels should be placed on the front of photographs.

6. TREE SURVEY

If you are proposing construction adjacent to or within the dripline of any tree 6" or larger in diameter (at approximately 4 feet above the ground), you must file an accurate tree survey identifying the size, location, and species of each tree of at least that dimension.

7. ADDRESSES OF ADJACENT AND CONFRONTING PROPERTY OWNERS

For **ALL** projects, provide an accurate list of adjacent and confronting property owners (not tenants), including names, addresses, and zip codes. This list should include the owners of all lots or parcels which adjoin the parcel in question, as well as the owner(s) of lot(s) or parcel(s) which lie directly across the street/highway from the parcel in question. You can obtain this information from the Department of Assessments and Taxation, 51 Monroe Street, Rockville, (301/279-1355).

PLEASE PRINT (IN BLUE OR BLACK INK) OR TYPE THIS INFORMATION ON THE FOLLOWING PAGE.
PLEASE STAY WITHIN THE GUIDES OF THE TEMPLATE. AS THIS WILL BE PHOTOCOPIED DIRECTLY ONTO MAILING LABELS.

4

HAWP APPLICATION: MAILING ADDRESSES FOR NOTIFYING
[Owner, Owner's Agent, Adjacent and Confronting Property Owners]

Owner's mailing address

John Fuller
4415 Brookeville Rd.
Brookeville, MD 20833

Owner's Agent's mailing address

Standard Solar, Inc.
Attn: Duane Glass
1355 Piccard Dr., #300
Rockville, MD 20850

Adjacent and confronting Property Owners mailing addresses

Richard Martin
4615 Brookeville Rd.
Brookeville, MD 20833

Jane Maller
P.O. Box 709
Olney, MD 20830

Robert Stabler
4401 Brookeville Rd.
Brookeville, MD 20833

Stephen White and Lynn Fields
4410 Brookeville Rd.
Brookeville, MD 20833

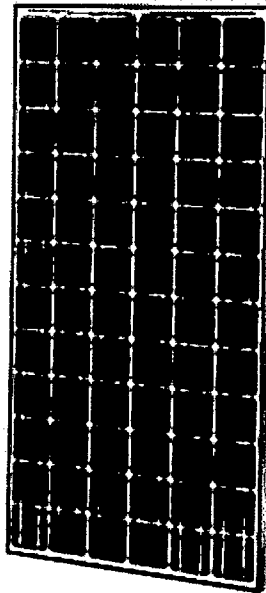
Brian Lane
4400 Brookeville Rd.
Brookeville, MD 20833

Our House Inc.
19715 Zion Rd.
Brookeville, MD 20833



HIT[®] Power 215A

Module Efficiency: 17.1%
Cell Efficiency: 19.3%
Power Output - 215Watts



HIT[®] Power
Photovoltaic Module

High Efficiency

HIT[®] Power solar panels are leaders in sunlight conversion efficiency. Obtain maximum power within a fixed amount of space. Save money using fewer system attachments and racking materials, and reduce costs by spending less time installing per watt. HIT Power models are ideal for grid-connected solar systems, areas with performance based incentives, and renewable energy credits.

Power Guarantee

SANYO's power ratings for HIT Power panels guarantee customers receive 100% of the nameplate rated power (or more) at the time of purchase, enabling owners to generate more kWh per rated watt, quicken investments returns, and help realize complete customer satisfaction.

Temperature Performance

As temperatures rise, HIT Power solar panels produce 10% or more electricity (kWh) than conventional crystalline silicon solar panels at the same temperature.

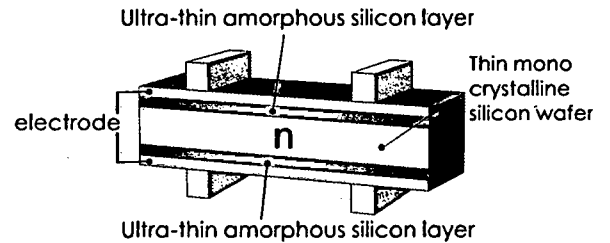
Valuable Features

The packing density of the panels reduces transportation, fuel, and storage costs per installed watt.

American Made Quality

SANYO silicon wafers located inside HIT solar panels are made in California and Oregon, and the panels are assembled in an ISO 9001 (quality), 14001 (environment), and 18001 (safety) certified factory. Unique eco-packing minimizes cardboard waste at the job site. The panels have a Limited 20-Year Power Output and 5-Year Product Workmanship Warranty.

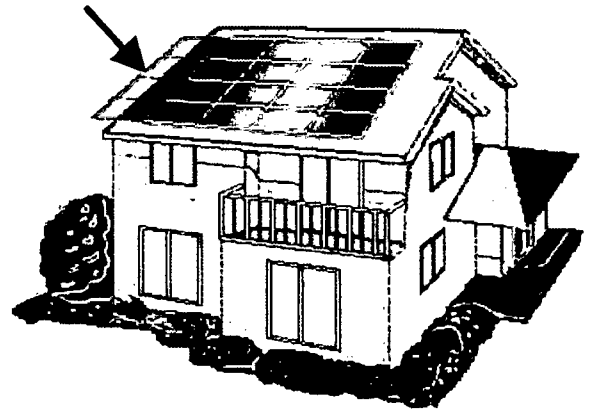
SANYO HIT[®] Solar Cell Structure



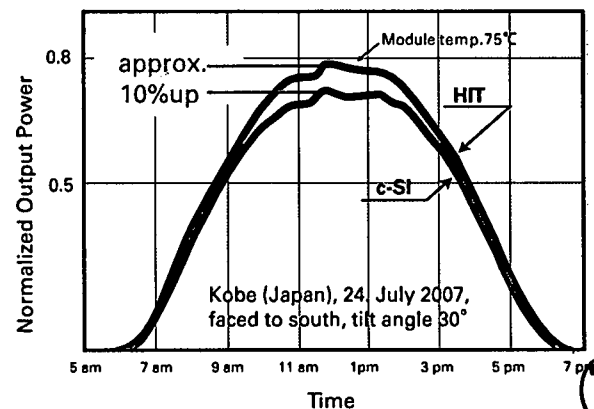
SANYO'S Proprietary Technology

HIT solar cells are hybrids of mono crystalline silicon surrounded by ultra-thin amorphous silicon layers, and are available solely from SANYO.

Unnecessary Section When Using SANYO



Increased Performance with SANYO



6

HIT Power 215A

Electrical Specifications

Model	HIT Power 215A or HIT-N215A01
Rated Power (P _{max}) ¹	215 W
Maximum Power Voltage (V _{pm})	42.0 V
Maximum Power Current (I _{pm})	5.13 A
Open Circuit Voltage (V _{oc})	51.6 V
Short Circuit Current (I _{sc})	5.61 A
Temperature Coefficient (P _{max})	-0.336%/°C
Temperature Coefficient (V _{oc})	-0.143 V/°C
Temperature Coefficient (I _{sc})	1.96 mA/°C
NOCT	114.8°F (46°C)
CEC PTC Rating	199.6 W
Cell Efficiency	19.3%
Module Efficiency	17.1%
Watts per Ft. ²	15.85 W
Maximum System Voltage	600 V
Series Fuse Rating	15 A
Warranted Tolerance (-/+)	-0% / +10%

Mechanical Specifications

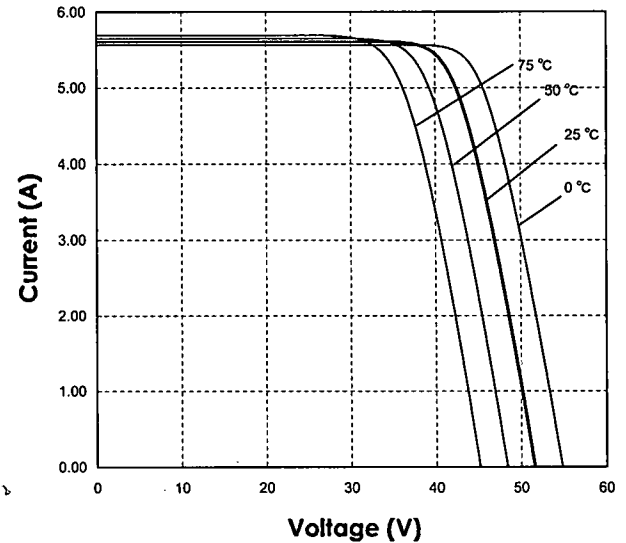
Internal Bypass Diodes	3 Bypass Diodes
Module Area	13.56 Ft ² (1.26m ²)
Weight	35.3 Lbs. (16kg)
Dimensions LxWxH	62.2x31.4x1.8 in. (1580x798x46 mm)
Cable Length +Male/-Female	46.45/40.55 in. (1180/1030 mm)
Cable Size / Connector Type	No. 12 AWG / MC4™ Locking Connectors
Static Wind / Snow Load	60PSF (2880Pa) / 39PSF (1867Pa)
Pallet Dimensions LxWxH	63.2x32x72.8 in. (1607x815x1850 mm)
Quantity per Pallet / Pallet Weight	34 pcs./1234.5 Lbs (560 kg)
Quantity per 53' Trailer	952 pcs.

Operating Conditions & Safety Ratings

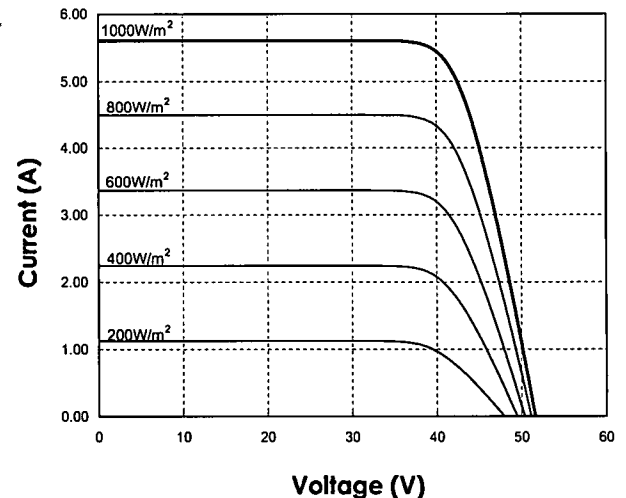
Ambient Operating Temperature	-4°F to 115°F (-20°C to 46°C) ²
Hail Safety Impact Velocity	1" hailstone (25mm) at 52 mph (23m/s)
Fire Safety Classification	Class C
Safety & Rating Certifications	UL 1703, cUL, CEC
Limited Warranty	5 Years Workmanship, 20 Years Power Output

¹STC: Cell temp. 25°C, AM1.5, 1000W/m² ²Monthly average low and high of the installation site.
 Note: Specifications and information above may change without notice.
 All modules connected in the solar array should be of the same model number.

Dependence on Temperature

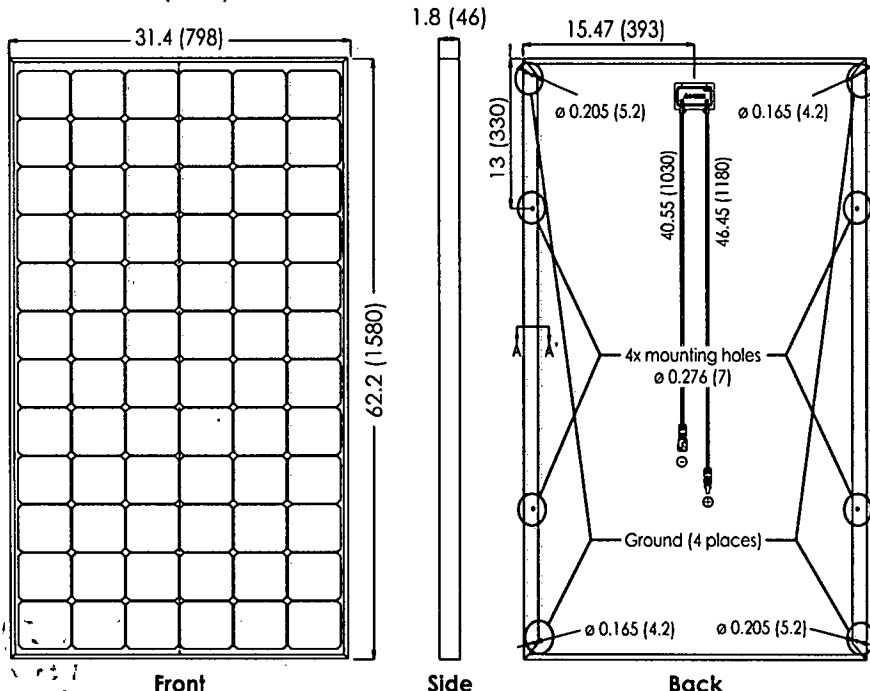


Dependence on Irradiance

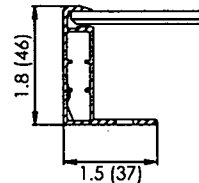


Dimensions

Unit: inches (mm)



Section A-A'



HIT[®] is a registered trademark of SANYO Electric Co., Ltd. The name "HIT[®]" comes from "Heterojunction with intrinsic Thin-layer" which is an original technology of SANYO Electric Co., Ltd.



Read the operating instructions carefully before use of these products

SANYO

SANYO North America
Energy System Solutions Division

550 S. Winchester Blvd., Suite 510
San Jose, CA 95128, U.S.A.

www.sanyo.com/solar
solar@sec.sanyo.com

HIT POWER 215A

Electrical Specifications

Model	HIT Power 215A or HIT-N215A01
Rated Power (Pmax) ¹	215 W
Maximum Power Voltage (Vpm)	42.0 V
Maximum Power Current (Ipm)	5.13 A
Open Circuit Voltage (Voc)	51.6 V
Short Circuit Current (Isc)	5.61 A
Temperature Coefficient (Pmax)	-0.336%/°C
Temperature Coefficient (Voc)	-0.143 V/°C
Temperature Coefficient (Isc)	1.96 mA/°C
NOCT	114.8°F (46°C)
CEC PTC Rating	99.6 W
Cell Efficiency	19.5%
Module Efficiency	17.1%
Watts per Ft. ²	15.85 W
Maximum System Voltage	600 V
Series Fuse Rating	15 A
Warranted Tolerance (-/+)	-0% / +10%

Mechanical Specifications

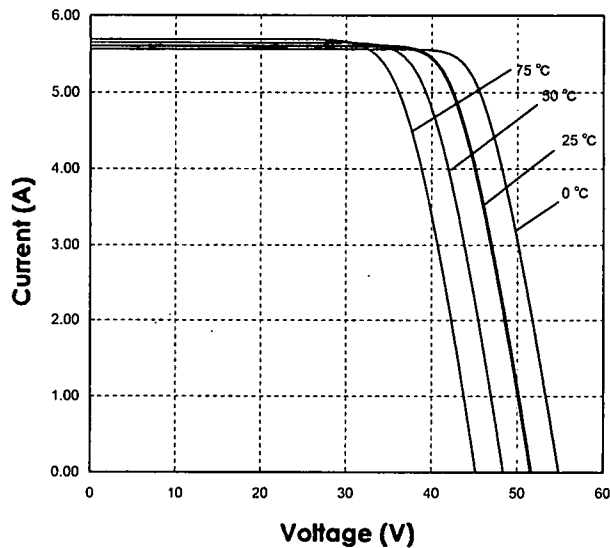
Internal Bypass Diodes	3 Bypass Diodes
Module Area	13.56 Ft. ² (.26m ²)
Weight	35.3 Lbs. (16kg)
Dimensions LxWxH	62.2x31.4x1.8 in. (1580x798x46 mm)
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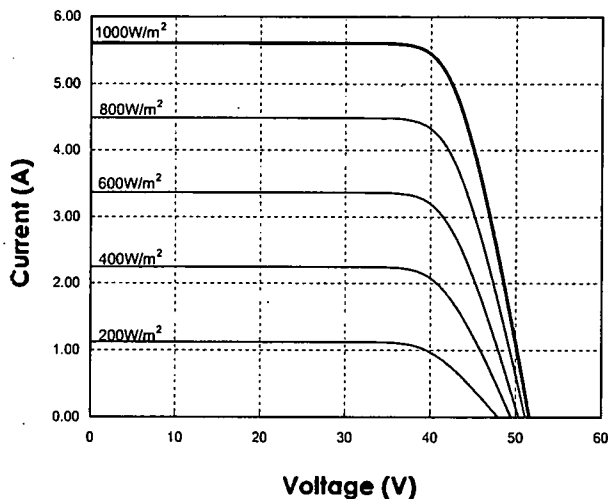
Ambient Operating Temperature	-4°F to 115°F (-20°C to 46°C) ²
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Dependence on Temperature

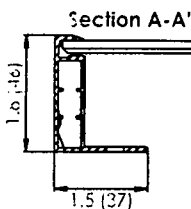
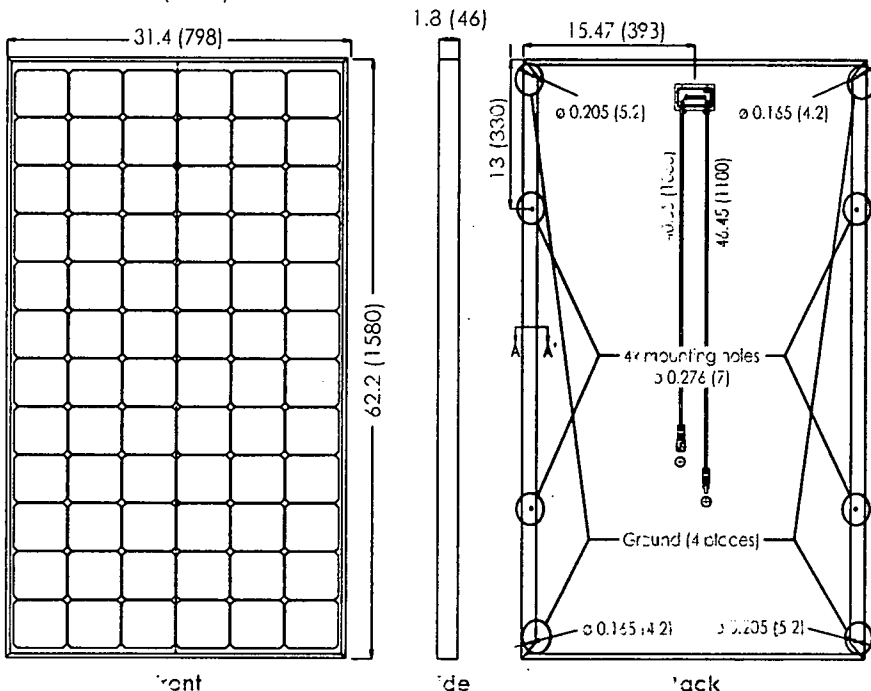


Dependence on Irradiance



Dimensions

Unit: inches (mm)



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CAUTION!
 Read the operating instructions carefully before use of these products



SANYO North America
 Energy System Solutions Division

550 S. Winchester Blvd., Suite 510
 San Jose, CA 95128, U.S.A.
 www.sanyo.com/solar
 solar@sec.sanyo.com



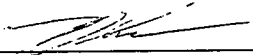
Existing Property Condition Photographs (duplicate as needed)



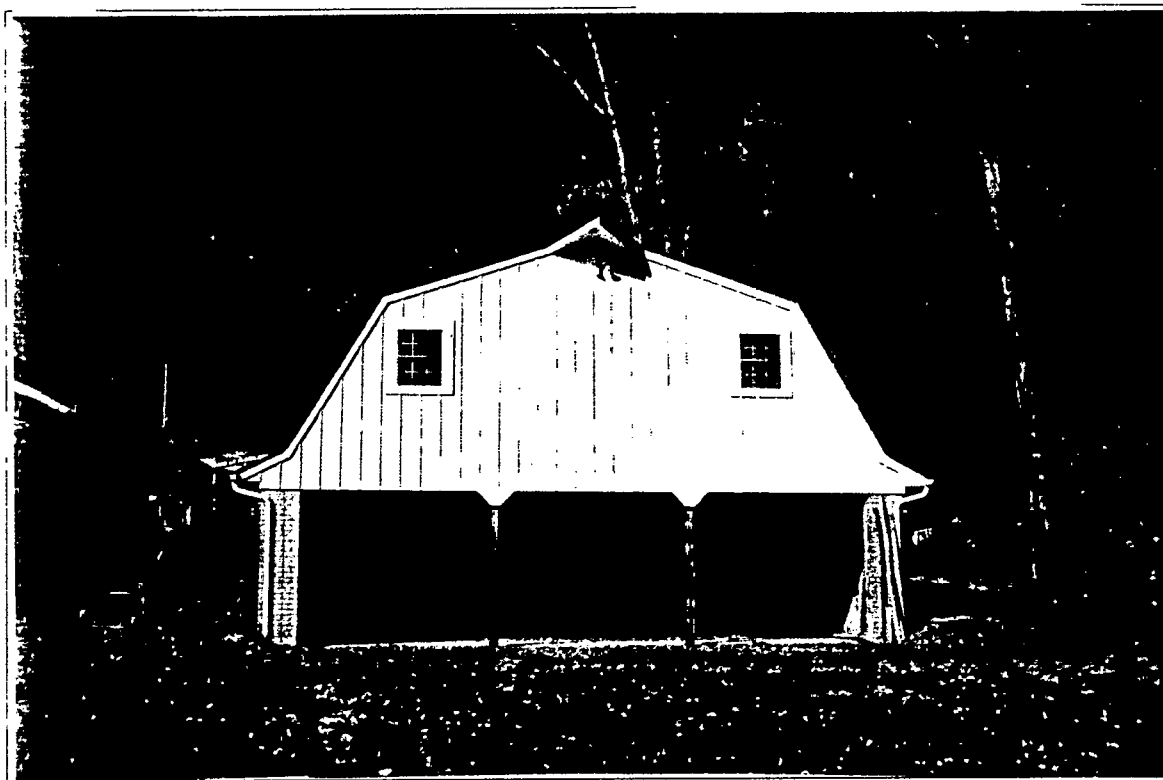
Detail: SOUTH FACING ROOF WHERE SOLAR PROPOSED



Detail: SOUTH EAST OF ROOF

Applicant: 

Existing Property Condition Photographs (duplicate as needed)



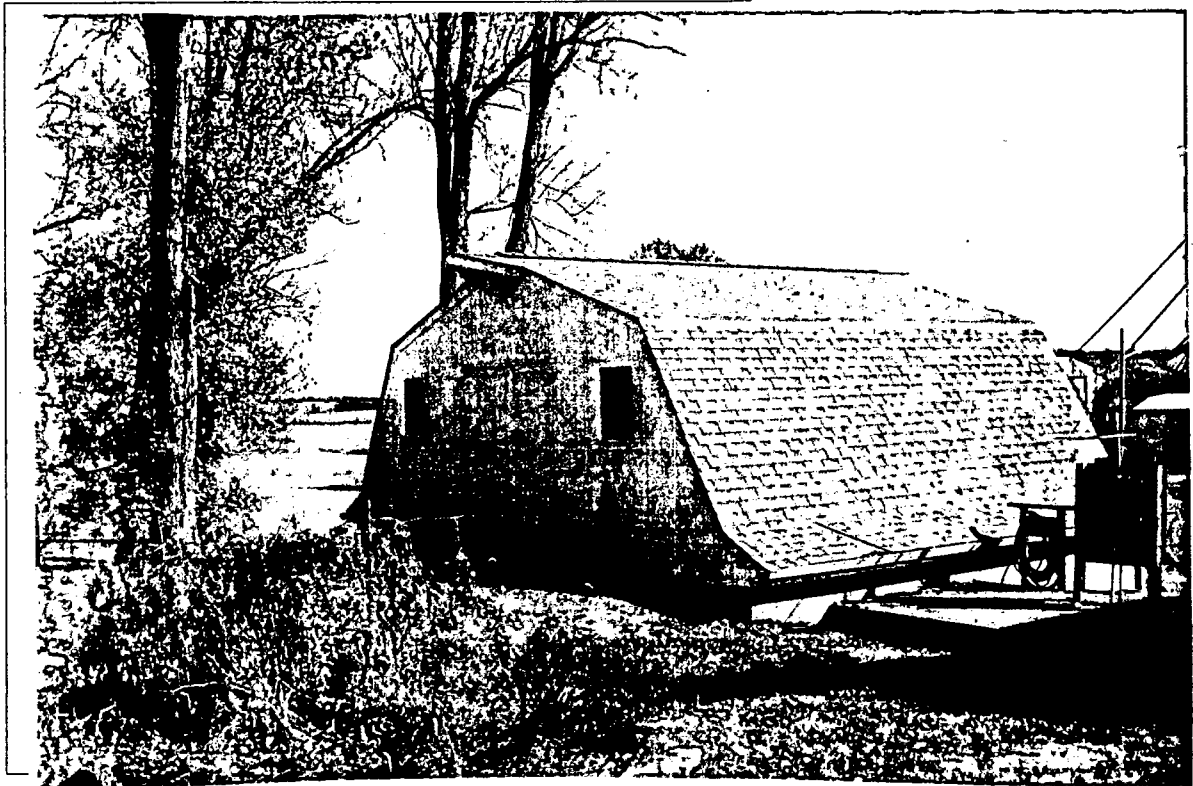
Detail: EAST FACING OF GARAGE



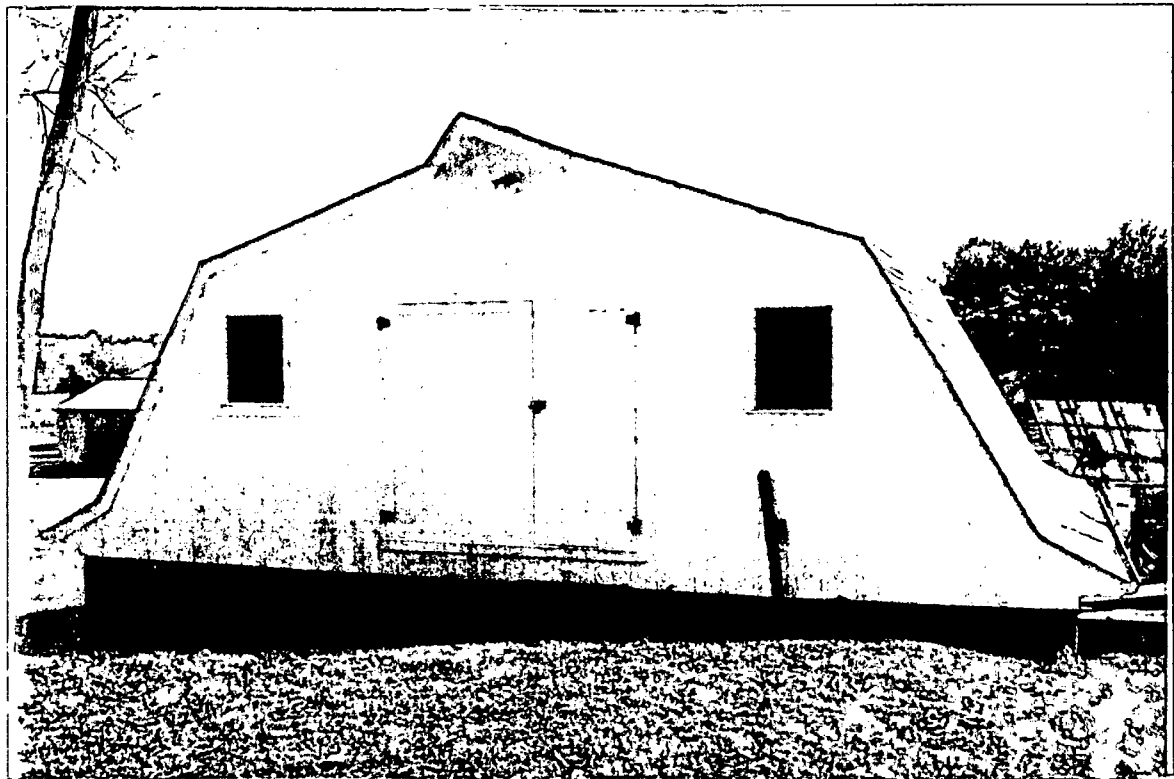
Detail: CLOSE UP OF ROOF

Applicant: _____

Existing Property Condition Photographs (duplicate as needed)

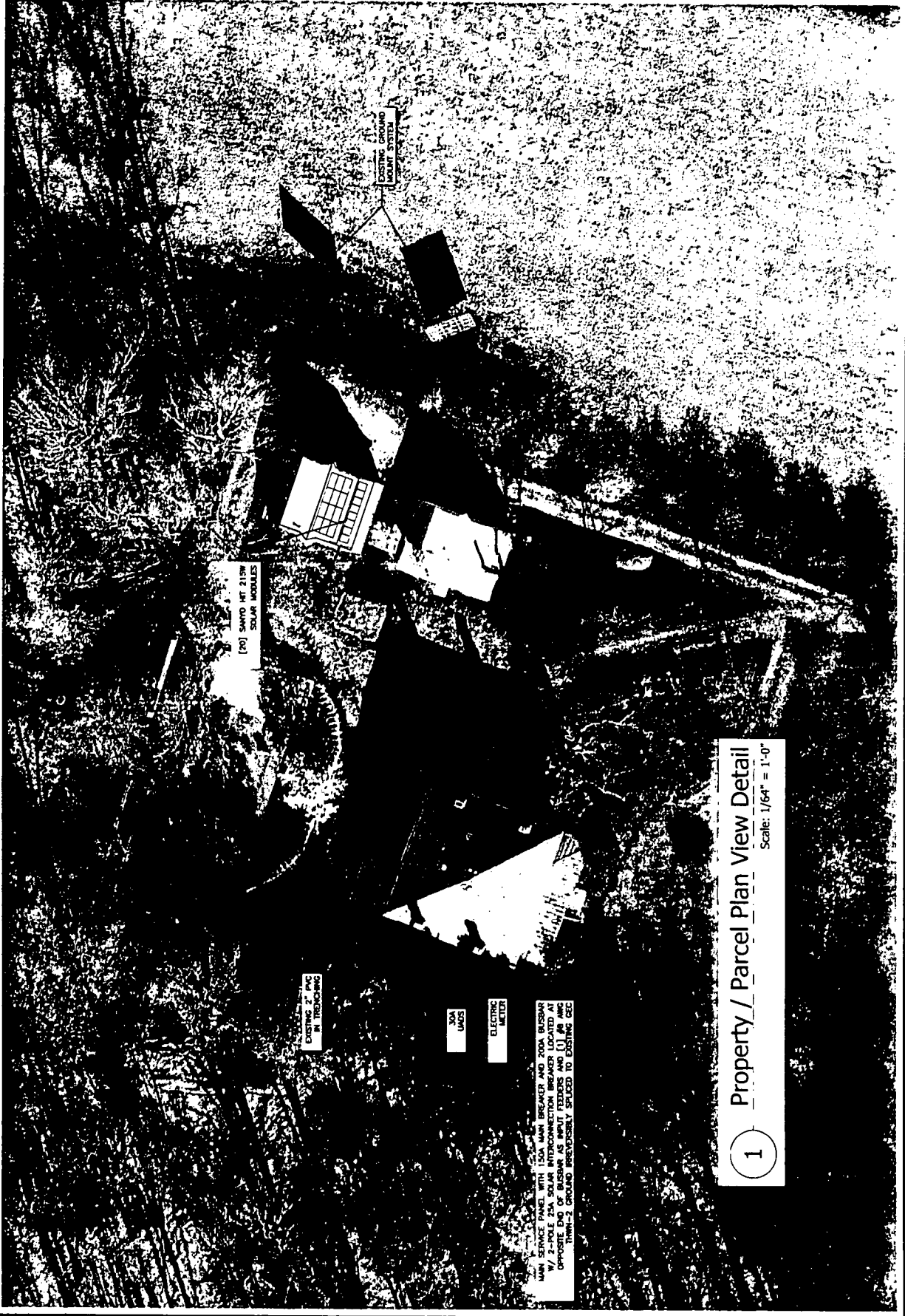


Detail: SOUTH WEST FACING OF GARAGE



Detail: WEST OF GARAGE

Applicant: _____

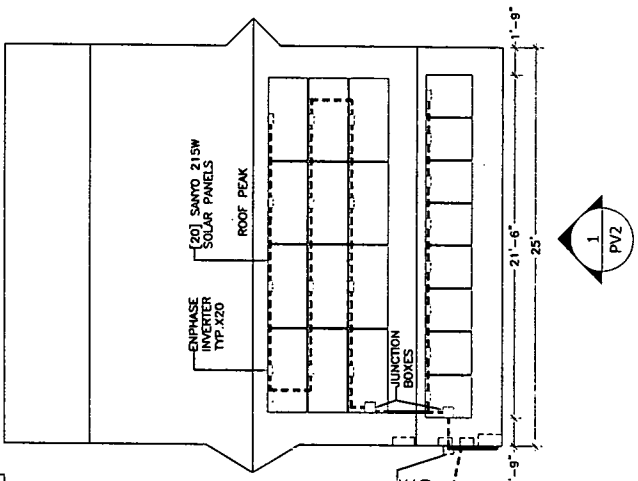


1 Property / Parcel Plan View Detail
 Scale: 1/64" = 1'-0"

11

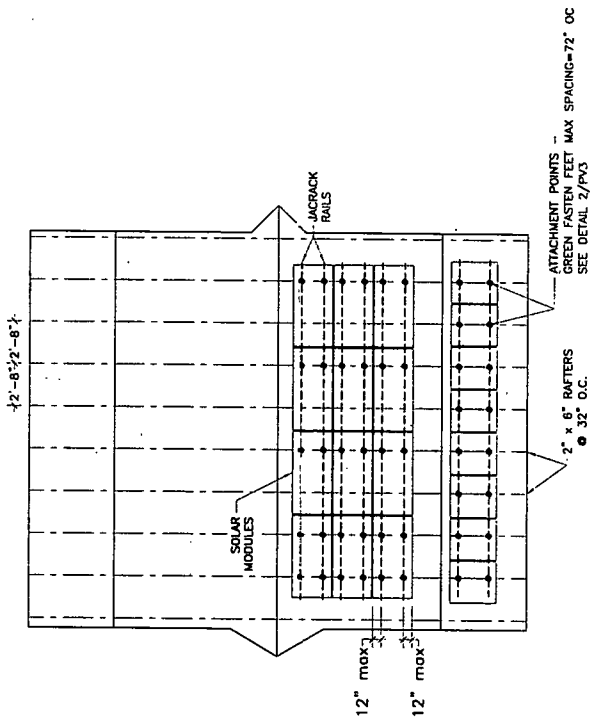
SYSTEM DESIGN PARAMETERS	
DESIGN WIND SPEED:	90mph
GROUND SNOW LOAD:	30 psf
SEISMIC DESIGN CAT:	B
WEATHERING:	SEVERE
TERMITE:	MODERATE TO HEAVY
FLOOD HAZARD:	JULY 2, 1979
AIR FZ. INDEX:	300
MEAN ANNUAL TEMP.:	55F
FROST LINE DEPTH:	24"
WINTER DESIGN TEMP.:	13F

ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE INTERNATIONAL RESIDENTIAL CODE (IRC), 2009 EDITION, AS AMENDED BY MONTGOMERY COUNTY EXECUTIVE REGULATION No. 28-7

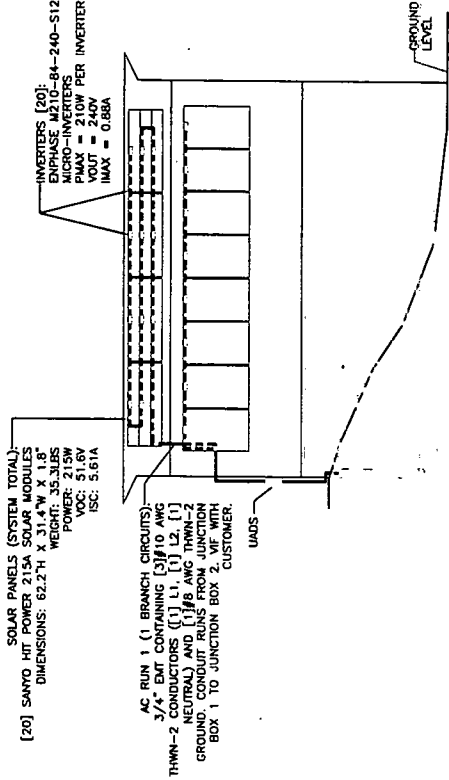


1 Plan View
 Scale: 1/8" = 1'-0"

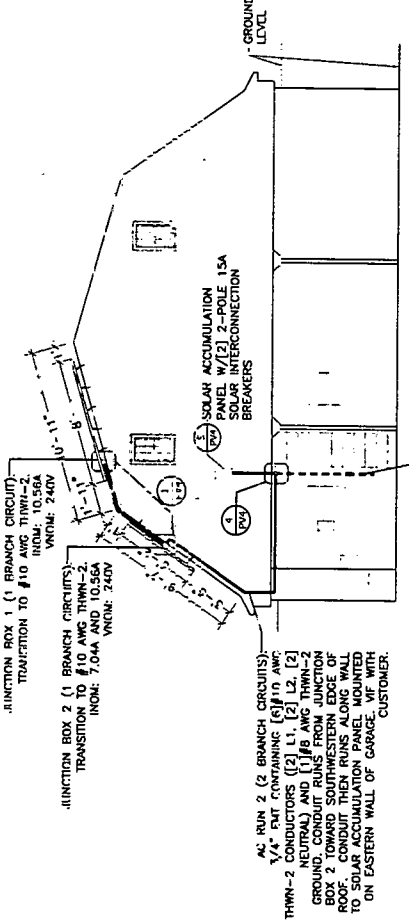
- NOTES:**
1. ALL MODULES ARE GROUNDED WITH UL LISTED GROUNDING SYSTEM.
 2. SUNTECH TYPE CLAMPS TO BE USED IN CONJUNCTION WITH JACRACK MOUNTING SYSTEM.
 3. ELECTRIC METER AND MAIN SERVICE PANEL ARE IN THE MAIN HOUSE.
 4. PLACE PLACARD NEAR METER INDICATING LOCATION OF DISCONNECT TO BE INSTALLED.
 5. USE EXISTING GROUND WIRE TO PULL NEW CONDUCTORS.



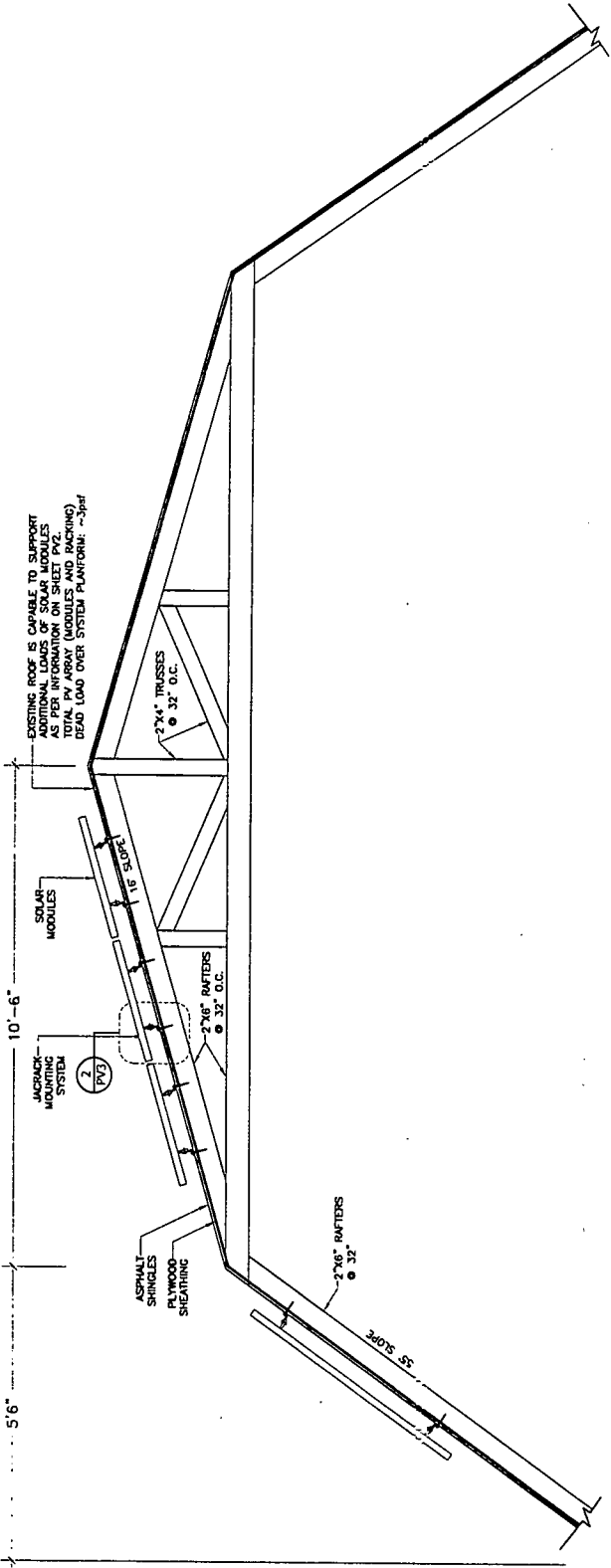
2 Plan View @ Attachment Points
 Scale: 1/8" = 1'-0"



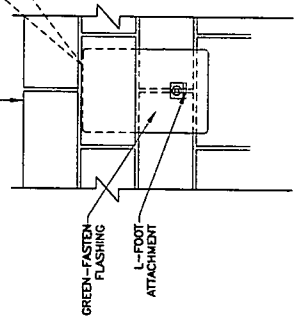
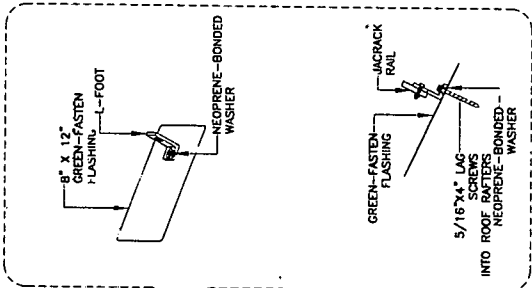
1 South Elevation
Scale: 1/8" = 1'-0"



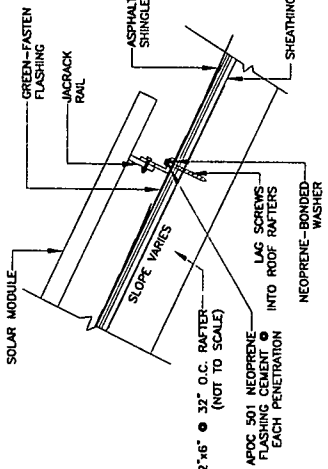
2 West Elevation
Scale: 1/8" = 1'-0"

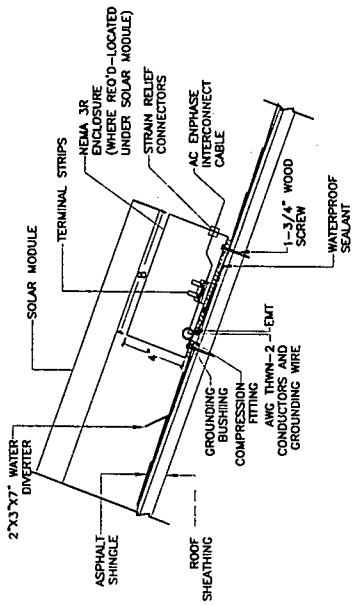


1 Roof Detail
 Scale: 3/8" = 1'-0"

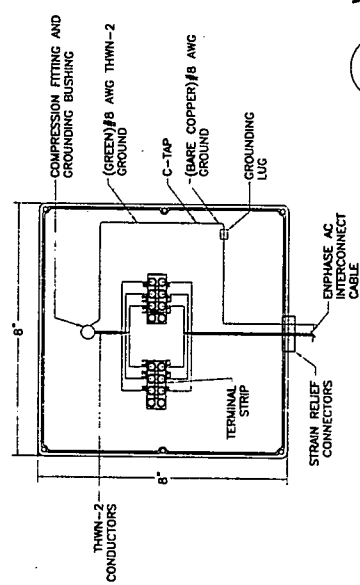


2 Green-Fasten Attachment Detail
 Scale: 1" = 1'-0"

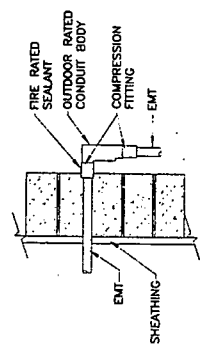




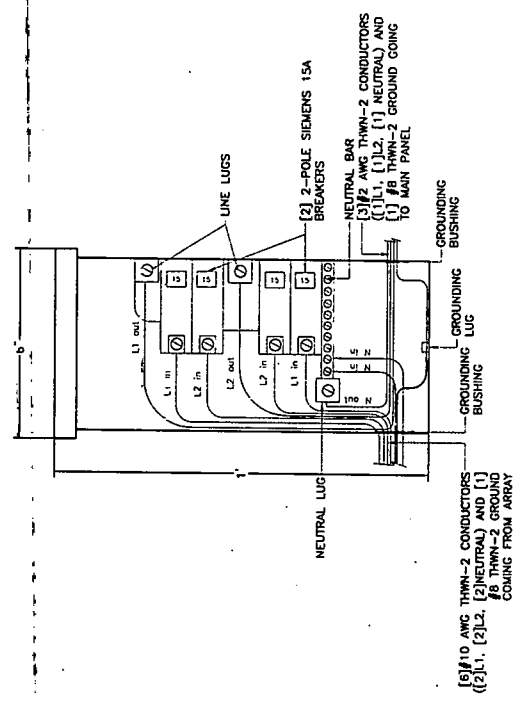
1 Roof Penetration Detail
 Scale: 1-1/2"=1'-0"



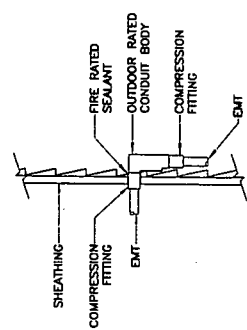
2 Transition Box Detail
 Scale: 3" = 1'-0"



3 Wall Penetration Detail @ House
 Scale: 1-1/2"=1'-0"



4 Solar Accumulation Panel Detail
 Scale: 3" = 1'-0"

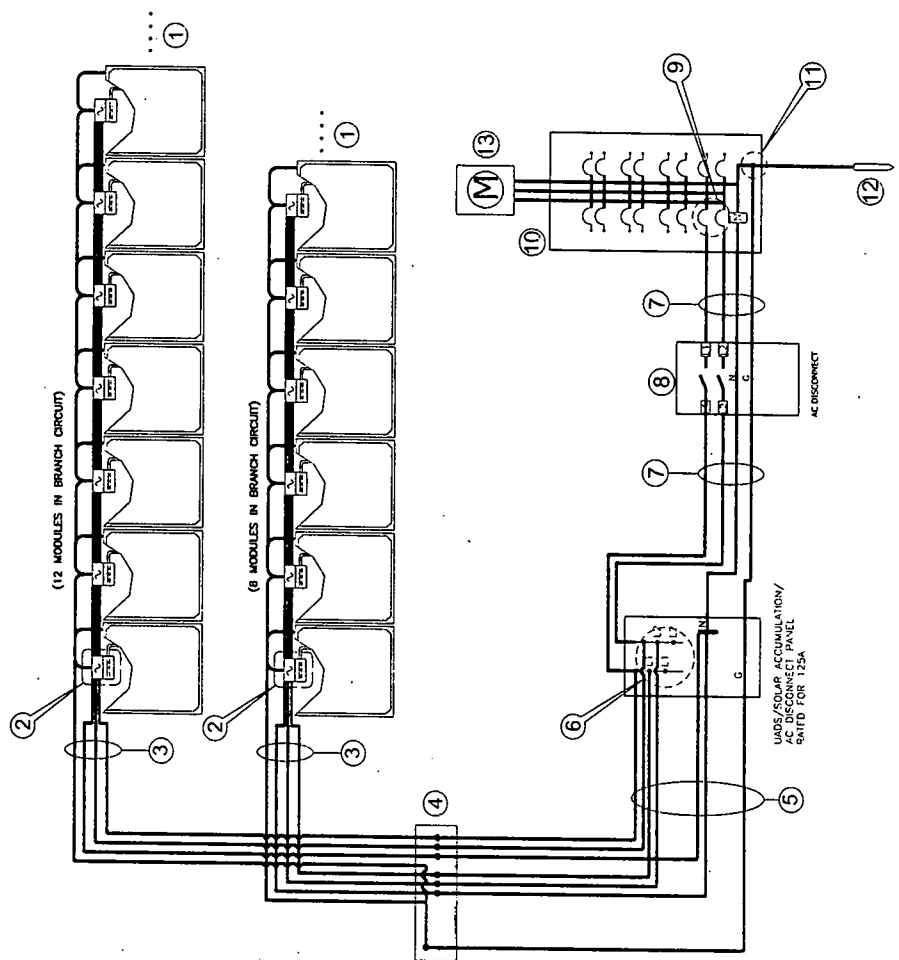


5 Wall Penetration Detail
 Scale: 1-1/2"=1'-0"

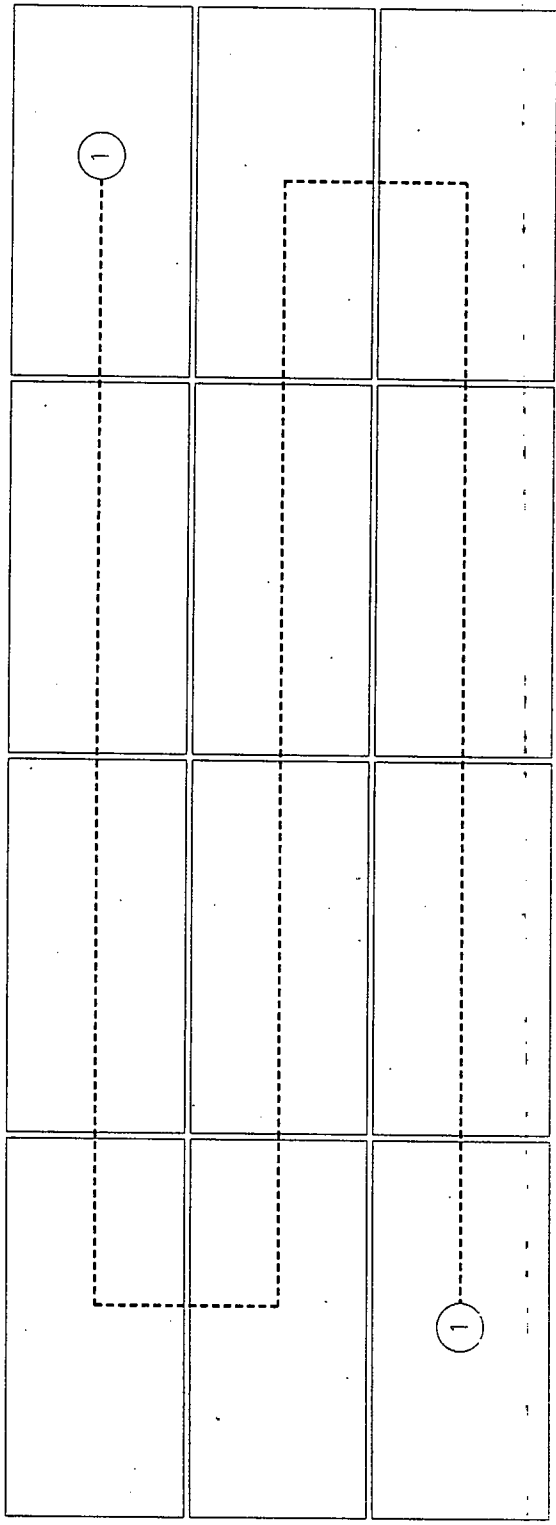
TAG	DESCRIPTION	NOTES
1	Solar Array	20 Modules Voc: 51.6V Isc: 5.61A
2	Inverter	20 Enphase Microinverters
3	Cable	AC ENPHASE INTERCONNECT CABLE
4	Transition Box	Transition to #10 AWG THWN-2
5	THWN-2 Wire	[6] #10 AWG; [1] #8 AWG GROUND 10.56 amps max.
6	Solar Accumulation Panel	[2] 2-pole 15A circuit breakers
7	THWN-2 Wire	[3] #2 AWG; [1] #8 AWG GROUND 17.6 amps max.
8	AC DISCONNECT PANEL	RATED FOR 30A
9	Solar Interconnection Breaker	[1] 2-pole 25A Interconnection Breaker
10	Main Service Panel	150 amps Main Breaker with 200A Busbars
11	Grounding Electrode Conductor	#8 AWG THWN-2
12	Grounding Electrode	Existing Grounding Electrode Conductor System
13	Utility Electric Meter	Net Meter

MODULE: SANYO HIT POWER 215A SOLAR MODULES
BRANCH CIRCUITS: 2
MODULES per BRANCH: [1] BRANCH OF [12] MODULES AND [1] BRANCH OF [8] MODULES
SYSTEM SIZE: 4.3 kW

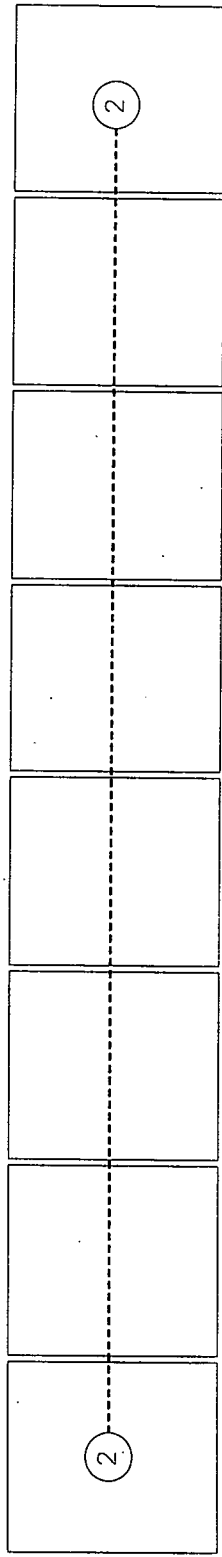
NOTE: ALL LABELS WILL BE PLACED IN ACCORDANCE WITH NEC 690.31 - 690.38.
NOTE: ALL INVERTERS ARE LISTED TO THE UL 1741 AND IEEE 1547 STANDARDS.
NOTE: DISCONNECTS ARE IN COMPLIANCE WITH THE 110.10.11 UTILITIES.
NOTE: INVERTERS' GEC IS #8 BARE COPPER WIRE ATTACHED TO MANUFACTURER'S LAY-IN-LUG.
*** INTERCONNECTION BUSBARS SHALL BE COATED AT THE OPPOSITE END OF THE BUS FROM THE INPUT FEEDERS.**



1 Three Line Diagram with Enphase Micro Inverters
 Scale: None



PV SYSTEM AC POINT OF CONNECTION (BRANCH 1)
 1. AC OUTPUT CURRENT: 10.56A
 2. NOMINAL AC VOLTAGE: 240V



PV SYSTEM AC POINT OF CONNECTION (BRANCH 2)
 1. AC OUTPUT CURRENT: 7.04A
 2. NOMINAL AC VOLTAGE: 240V

String Diagram
 Scale: None

1

17

E2