Cardona

Historical Areas Board of Review(HABR)

Town of Orangetown Building Department
26 Orangeburg Road, Orangeburg,
New York 10962

PROPERTY ADDRESS: 128 Greenbush Rd Section/Block/Lot: 77.10-2-8

1. Provide a narrative summary explaining the project and including any facts pertaining to this project which applicant feels would be of interest to the Board;
2. Architectural Plans;
3. It is preferable to the HABR if the Architect would appear at the meeting with the Applicant.
4. Please bring SAMPLES of building materials to the meeting.
5. Materials checklist: (please provide the brand name, type, style, model and color numbers):

	COLOR	MATERIAL	MANUFACTURER
Roof:	House: Gray Barn/shed: Corrugated Metal		N/A
Siding:	House: light beige wood clapboard Barn/shed: wood board siding		
Decorative Siding:			
Soffits & Fascia:	white	Painted wood	
Gutters & Leaders:	white	Aluminum	
Windows:	white		
Trim:	White	Painted wood	
Shutters:	None		
Front Door:			
Back Door:			
Garage Door(s):	None		
Other Door(s):			
Lighting:			
Lighting:			
Stone or Rock being used on Structure:			
Stone or Rock being used on walkway(s):			
Other:	Hyundai modules Enphase microinverters		
Proposed Solar	Iron Ridge Racking		

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information provided
See attached

Narrative Summery and Project Description:

Proposed installation of roof-mounted solar panels on the existing barn and shed at the rear of the property. No structural changes are proposed. The work will not alter the home's exterior appearance, historic materials, or street-facing elevations. Panels will not be visible from Greenbush Road.

Roof

Main house: **Asphalt shingles – gray, existing**
Barn/Shed: **Corrugated metal roof – existing**
Manufacturer: **Unknown (existing structures)**

Siding

House: **Wood clapboard siding – light beige/off-white, existing**
Barn/Shed: **Wood board siding – natural weathered finish**
Manufacturer: **Unknown (existing structures)**

Decorative Siding

None

Soffits/Fascia

Painted wood – white, existing

Gutters/Leaders

Aluminum – white, existing

Windows

White vinyl or wood-framed double-hung windows, existing
Manufacturer: **Unknown**

Trim

Painted wood – white, existing

Shutters

None

Doors

Standard residential exterior doors – existing
Manufacturer: **Unknown**

Garage Doors

N/A

Lighting

Standard exterior wall-mounted residential fixtures – no changes proposed

Other

Solar equipment (proposed):

- Hyundai HIN-T435NF(BK) modules
- Enphase IQ8MC-72-M-US microinverters
- IronRidge XR100 racking system

Name of Municipality: TOWN OF ORANGETOWN **Date Submitted:** 12/8/2025

LAND USE BOARD APPLICATION

Please check all that apply:

___Commercial X Residential

___ **Planning Board** X **Historical Board**
___ **Zoning Board of Appeals** ___ **Architectural Board**

___ Subdivision
___ Number of Lots
___ Site Plan
___ Conditional Use

___ Special Permit
___ Variance
___ Performance Standards Review
___ Use Variance
___ Other (*specify*): _____

___ Consultation
___ Pre-Preliminary/Sketch
___ Preliminary
___ Final
___ Interpretation

PERMIT#: SOLP-8340-25
ASSIGNED INSPECTOR: Ken

Referred from Planning Board: YES / NO
If yes provide date of Planning Board meeting: _____

Project Name: Cardona Residence - Roof-Mounted Solar PV Installation

Street Address: 128 Greenbush Rd, Tappan, NY 10983

Tax Map Designation:
Section: 77.10 Block: 2 Lot(s): 8
Section: _____ Block: _____ Lot(s): _____

Directional Location:

On the East side of Greenbush Rd., approximately 175 feet South of the intersection of Oak tree Road, in the Town of ORANGETOWN in the hamlet/village of Tappan.

Acreage of Parcel 0.78 acres
School District SOCSD
Ambulance District SOAC
Water District Veolia

Zoning District R-15 Residencial
Postal District Tappan
Fire District Tappan
Sewer District ~~[illegible]~~ municipal sewer

Project Description: *(If additional space required, please attach a narrative summary.)*
Installation of a roof-mounted solar photovoltaic sys. on existing Barn & Shed. Includes: (20) Hyndai 435W solar modules w/ Enphase microinverters, mounted flush to existing roof surfaces w/ no changes visible from public roadway.

The undersigned agrees to an extension of the statutory time limit for scheduling a public hearing.

Date: 12/2/2025 Applicant's Signature: _____

APPLICATION REVIEW FORM

FILL IN WHERE APPLICABLE.

(IF THE FOLLOWING DOES NOT APPLY PLEASE MOVE ON TO THE NEXT PAGE)

If **subdivision**:

1) Is any variance from the subdivision regulations required? N/A
2) Is any open space being offered? ___ If so, what amount? N/A
3) Is this a standard or average density subdivision? N/A

If **site plan**:

1) Existing square footage N/A
2) Total square footage N/A
3) Number of dwelling units 1

If **special permit**, list special permit use and what the property will be used for.

N/A

Environmental Constraints:

Are there **slopes greater than 25%**? If yes, please indicate the amount and show the gross and net area NO

Are there **streams** on the site? If yes, please provide the names. NO

Are there **wetlands** on the site? If yes, please provide the names and type:

NO

Project History:

Has this project ever been reviewed before? ~~Yes~~ NO

If so, provide a narrative, including the list case number, name, date, and the board(s) you appeared before, and the status of any previous approvals.

List tax map section, block & lot numbers for all other abutting properties in the same ownership as this project.

None.

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TOWN OF ORANGETOWN
LAND USE BOARDS

OFFICE OF BUILDING, ZONING, PLANNING,
ADMINISTRATION AND ENFORCEMENT
TOWN OF ORANGETOWN
26 Orangeburg Road
Orangeburg, N.Y. 10962

(845)359-8410 Fax: (845) 359-8526

REFERRAL TO THE HISTORICAL AREAS BOARD OF REVIEW

Date: 12/1/25 **Section:** 77.10 **Block:** 2 **Lot:** 8

Applicant: Cardona

Address: 128 Greenbush Rd. Tappan NY 10983

RE: Application Made at: Same

Referred For: Ch. 12 sec. 12-4 (A) Requires HABR Approval

Comments: 8.7 kW 20 Panel Solar PV Array

Dear Cardona:

Please be advised that the Building Permit Application # 8340-25, which you submitted on 11/6/25, has been referred to the Historical Areas Board of Review. The Clerk to the Historical Areas Board of Review, Katlyn Bettmann can assist you in the preparation necessary to appear before the board. She can be reached at 845-359-8410 ext. 4316 or kbettmann @orangetown.com

Sincerely,

Glenn E. Maier
Assistant Building Inspector

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12/5/25

Signature of Director
NOTE: PLEASE KEEP FOR YOUR RECORDS
10-01-2024 : err

Date

CC: Katlyn Bettmann
Elizabeth Decort

APPLICATION FOR BUILDING/DEMOLITION PERMIT

APPLICANT MUST COMPLETE OR APPLICATION WILL NOT BE ACCEPTED

ZONING BULK REQUIREMENTS

Zone: _____ Group: _____ Use: _____

	Required	Existing	Proposed
Floor area ratio			
Lot area			
Lot width			
Street frontage			
Front yard setback			
Side yard setback			
Total side yard setback			
Rear yard setback			
Maximum building height			

Number of stories: _____ Construction Type: _____ Occupancy Class: _____

Zoning Chart Information Completed by: _____

1. Sewage: (circle one) Town County Private
2. How many kitchens on the property? _____
3. Are there any renters, tenants, lessees or boarders at this property? YES / NO
4. Are there any other building permits on this property? YES / NO
5. Is the property in a flood plain? YES / NO

AFFIDAVIT

State of ~~New York~~ Texas
County of ~~Rockland~~ SS.: Harris
Town / Village of _____)

I, Jeffery Tamayo being duly sworn, deposes and says that he/she is the **(circle one)** owner, lessee, engineer, surveyor, architect, builder, or agent of the owner) in fee of the premises to which this application applies; that he/she (the applicant) is duly authorized to make this application and that the statements contained in the papers submitted herein are true to the best of his/her knowledge and belief, and that the work will be performed in the manner set forth in the application and in the plans and specifications filed therewith, and in accordance with the State Uniform Building Code and all other applicable laws, ordinances and regulations of the municipality. I also declare that the structure or area described in this application will not be occupied or used until I have obtained a Certificate of Occupancy or Certificate of Compliance.

Signature and Mailing Address

Jeffery Tamayo

5570 Searsville Road.
Pine Bush, NY 12566

NOTARY PUBLIC STATE OF TEXAS
Tony Mitchell
ID NUMBER
133949651
COMMISSION EXPIRES
September 7, 2026

SWORN to before me this 28th day of October, 20 25

Witness: Tony M

(If not witnessed by Building Department personnel, Notary signature is required.)

Tony Mitchell, Notary Public

OFFICIAL USE ONLY:

Checked by: _____ Date: _____

Permit Granted for: _____

_____

_____

_____

_____

Signature: _____ Date: _____

Director, OBZPAE

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Project Summary: Solar Panel Installation

This project seeks to improve and upgrade the current electrical system on the property with solar power production capability while avoiding any alterations to the historic building that is currently under my stewardship.

As I was considering this improvement, my goal was to find an option of sufficient surface area with southern exposure on an existing roof that would have minimal impact from the street view and would not include roofs on either of the principal dwellings, whose appearance I felt should stay intact as I have developed them.

The project involves the placement of panels on two existing outbuildings. One structure is a small barn/garage that was built in 2000 and replaced a garage with a similar footprint that was destroyed in a storm. This building is wood timber construction with board and batten siding and asphalt shingle roofing.

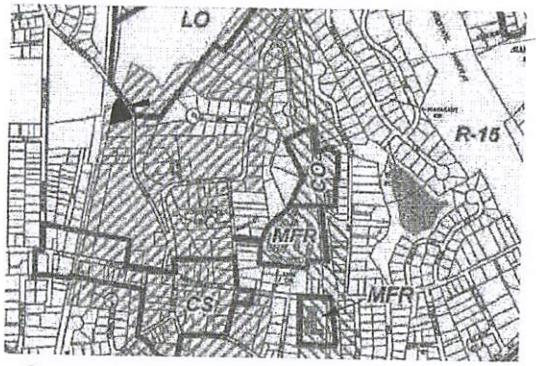
The other structure is a garage/shed that was moved to the property and reassembled by the previous homeowners. Its construction is steel frame with painted galvanized metal siding and galvanized corrugated metal roof panels. There is a small asphalt shed roof attached to this structure that will be utilized as well.

Both structures are sighted on the Northwest side of the property, away from the street. The Southern exposure of the metal shed/garage where 8 panels will be located is not visible from the street at all. The Southeastern exposure of the Barn/Garage where 12 panels will be located is at 116ft. from the street side property line directly west and has a limited sight line from the street, and 150ft from south border of the property, again with limited sight lines. When you would walk or drive by and have a view of the home no panels will be in your sight line

Neither of these two outbuildings hold any historical significance. However, as with all the work that I have endeavored to undertake on this property, I am always attempting to improve, and modernize where possible while keeping the historic character of the area intact.

Christopher Cardona
cpcardona@gmail.com

SWIS	PRINT KEY	NAME	ADDRESS
392489	77.06-3-13	The Noble Ninth Inc	149-39 11th Ave,Whitestone, NY 11357
392489	77.10-2-7	The Noble Ninth Inc	149-39 11th Ave,Whitestone, NY 11357
392489	77.10-2-8	Christopher Cardona	128 Greenbush Rd,Tappan, NY 10983
392489	77.10-2-9	Justin Toledo	116 Greenbush Rd,Tappan, NY 10983
392489	77.10-2-10	Elizabeth F Matsuda	98 Greenbush Rd,Tappan, NY 10983
392489	77.10-2-11	Cynthia Ann Miller	94 Greenbush Rd,Tappan, NY 10983
392489	77.10-2-13	Yris Salcedo	96 Greenbush Rd,Tappan, NY 10983
392489	77.11-1-1	Nicholas Woodford	115 Greenbush Rd,Tappan, NY 10983
392489	77.11-1-2	Gina Torres	111 Greenbush Rd,Tappan, NY 10983
392489	77.11-1-3	Raymond Virta	101 Greenbush Rd,Tappan, NY 10983



1 / A001 LOCATION PLAN (PARTIAL ZONING MAP)
NO SCALE

ZONING BULK TABLE

128 GREENBUSH ROAD
TAX MAP #
BOOK 87, PAGE 38, MAP #4535

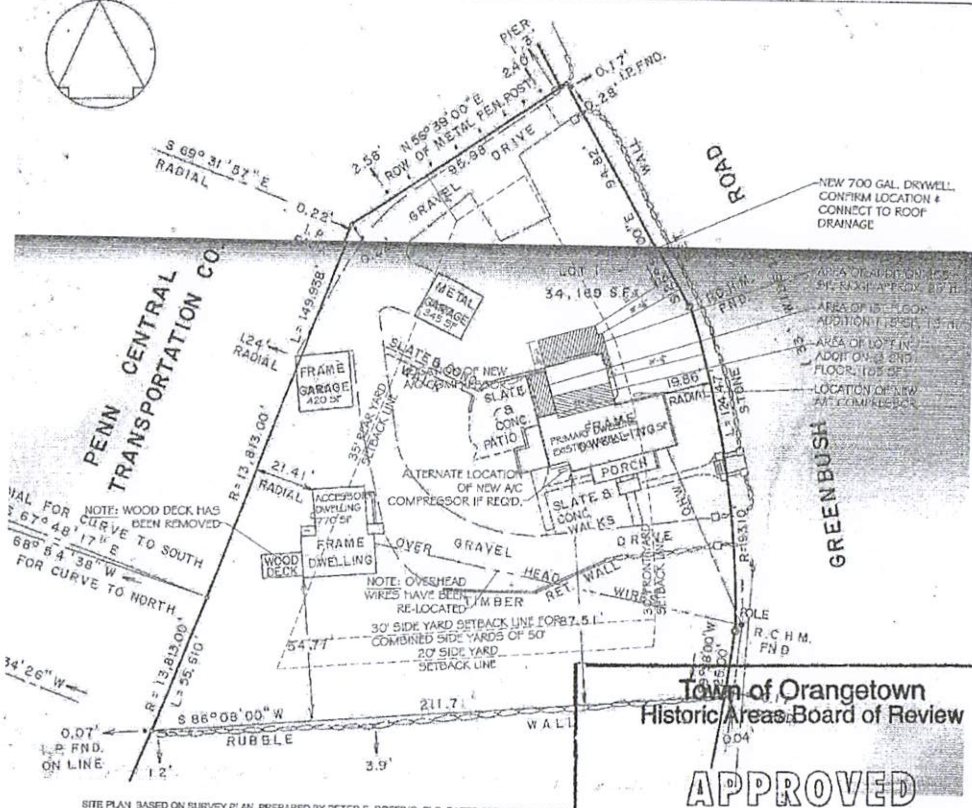
HAMLET OF TAPPAN - HISTORIC AREA OVERLAY
ZONING DISTRICT R-15, USE GROUP H

TOWN OF ORANGETOWN
ROCKLAND COUNTY, NY

EXISTING RESIDENCE AND PROPOSED ADDITION

STANDARDS	REQUIRED	EXISTING	PROPOSED WITH ADDITIONS
MAXIMUM FLOOR AREA RATIO	0.20	0.108	0.143
MINIMUM LOT AREA SQUARE FEET	15,000	34,169	NO CHANGE
MINIMUM LOT WIDTH FEET	100	244.29	NO CHANGE
MINIMUM STREET FRONTAGE FEET	75	244.29	NO CHANGE
FRONT YARD FEET	30	15.80'	NO CHANGE
SIDE YARD FEET	20	~124.80	NO CHANGE
SIDE YARDS COMBINED FEET	50	103.5	93.5
REAR YARD (FEET)	35	28.41 (1)	NO CHANGE
BUILDING HEIGHT - MAIN	12" PER FOOT OF SETBACK	APPROX. 18'-6" TO CENTER OF EX. ROOF	NO CHANGE TO EX. ROOF APPROX. 18'-3" TO CENTER OF NEW ROOF

NOTES ON TABLE
(1) EXISTING ACCESSORY DWELLING
(2) EXISTING FRAME GARAGE



SITE PLAN BASED ON SURVEY PLAN PREPARED BY PETER E. ROFFINO, P.L.S. DATED SEPTEMBER 11, 199[illegible]
REFER TO SURVEY PLAN FOR ADDITIONAL INFORMATION AND NOTES.

2 / A001 SITE PLAN WITH PROPOSED ADDITION
SCALE: 1" = 20'

Town of Orangetown
Historic Areas Board of Review

APPROVED

Subject to HABR# 18-08

Meeting Date: 6/12/18

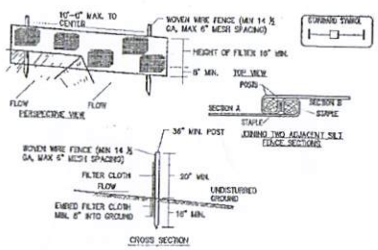
DESIGN CRITERIA

GROUND SNOW LOAD	WIND SPEED (MPH)	SEISMIC DESIGN CATEGORY	SUBJECT TO DAMAGE FROM			ICE BARRIER UNDERLAYMENT	FLOOD HAZARDS
			WEATHERING	FROST DEPTH	TERMITE		
30	98-108/SPECIAL	C	SEVERE	42	MOD/HEAVY	YES	NO

RESIDENTIAL CLIMATE ZONE: ZONE 5A
HEATING DEGREE DAYS (ALBANY NORMAL FOR 2015-2016) : 6438
MINIMUM THERMAL ENVELOPE VALUES FROM TABLE N1102.1.2 (ZONE 5)
FENESTRATION U-FACTOR: 0.32
SKYLIGHT U-FACTOR: 0.55
CEILINGS: R-49
WALLS: R-20/R-13 + 5
FLOORS: R-30
BASEMENT WALL: R-15/19
SLAB R VALUE & DEPTH 10/2FT
CRAWLSPACE: R-15/19

MIN. UNIFORMLY DISTRIBUTED LIVE LOADS
(TABLE R301.5)

DECKS	40 PSF
EXTERIOR BALCONIES	60 PSF
FIRE ESCAPES	40 PSF
GUARD RAILS	200 PSF
NON SLEEPING ROOMS	40 PSF
SLEEPING ROOMS	30 PSF
STAIRS	40 PSF



NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6" AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN SILT FENCE.
5. POSTS: STEEL EITHER "T" OR "U" TYPE OR 2" HARDWOOD
6. FENCE: WOVEN WIRE, 14½ GA. 6" MAX MESH OPENING
7. FILTER CLOTH: FILTER X MIRAFO 100X, STABILINKA T140N OR APPROVED EQUAL.
8. PREFABRICATED UNIT: GEOFAB ENVIROFENCE, OR APPROVED EQUAL.

3 / A001 SILT FENCING DETAILS & NOTES
NO SCALE

DRAWING LIST

ELIZABETH PARKS ARCHITECT
243 South Highland Road Garrison, NY 10524
tel. (914) 204-1150
elizabeth@elizabethparksarchitect.com

PROJECT: 128 Greenbush Road
TAPPAN, NY
ALTERATIONS & ADDITIONS
OWNER: Chris and Michelle Cardona

ISSUE DATES
4.23.18 PERMIT APPLICATION
3.6.18 REVIEW & PRICING
12.27.17 STRUCTURAL REVIEW
12.20.17 PROGRESS
12.11.17 PROGRESS
12.08.17 PROGRESS

DRAWING TITLE: SITE PLAN & PROJECT DATA
DATE: January 2017
SCALE: As Noted
DWG NO. A001

WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE
Scott E. Wyssling, PE
Heath J. Harpster, PE, P.Eng
Gregory T. Elvestad, PE

76 North Meadowbrook Drive
Alpine, UT 84004
office (201) 874-3483
swyssling@wysslingconsulting.com

November 3, 2025
Revised November 18, 2025

Solar Deployed, LLC
931 10th Street #114
Modesto, CA 95354

Re: Engineering Services
Cardona Residence
128 Greenbush Road, Tappan NY
8.700 kW System

To Whom It May Concern:

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

A. Site Assessment Information

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information will be utilized for approval and construction of the proposed system.

B. Description of Structure:

Roof Framing:	Steel purlins at 64" on center supported by steel trusses at 8'-0" on center. (Array 1) 2x8 rough sawn dimensional lumber at 16" on center. (Array 2) Assumed 2x4 dimensional lumber at 24" on center. (Array 3)
Roof Material:	Composite Asphalt Shingles & Metal
Roof Slope:	23 & 40 degrees
Attic Access:	Accessible
Foundation:	Permanent

C. Loading Criteria Used

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 30 psf
- **Wind Load** based on ASCE 7-16
  - Ultimate Wind Speed = 115 mph (based on Risk Category II)
  - Exposure Category C

Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the 2020 Residential Code of New York State (2018 IRC). *This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.*

D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent Ironridge installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The maximum allowable withdrawal force for a #14 screw is 194 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 2", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using two (2) #14 screws with a minimum of 2" embedment will be adequate and will include a sufficient factor of safety.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

E. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent Ironridge installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. System will be attached to the metal roofing material utilizing the patented Ironridge connection. Installation of the connections shall be in accordance with the manufacturer's recommendations.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the 2020 Residential Code of New York State (2018 IRC), current industry standards, and is based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

Scott E. Wyssling, PE
NY PE License No. 92303
New York COA # 022082

Wyssling Consulting, PLLC
76 N. Meadowbrook Drive, Alpine UT
New York COA #0022571

Signed 11/18/2025
Expires 7/31/2027

WYSSLING CONSULTING

(N) PV SYSTEM FOR CARDONA RESIDENCE | 128 GREENBUSH RD, TAPPAN, NY 10983

SYSTEM SIZE: 8.700 kW DC (STC-DC) | 6.600 kW AC (INVERTER)

APPLICABLE CODES & STANDARDS

2017 NATIONAL ELECTRICAL CODE
2017 NEW YORK STATE ELECTRICAL CODE
2020 NEW YORK STATE BUILDING CODE
2020 NEW YORK STATE RESIDENTIAL CODE
2020 NEW YORK STATE FIRE CODE
2020 NEW YORK STATE MECHANICAL CODE
2020 NEW YORK STATE PLUMBING CODE
2020 NEW YORK STATE ENERGY CODE
ANY ORANGETOWN TOWN MUNICIPAL CODES & AMENDMENTS

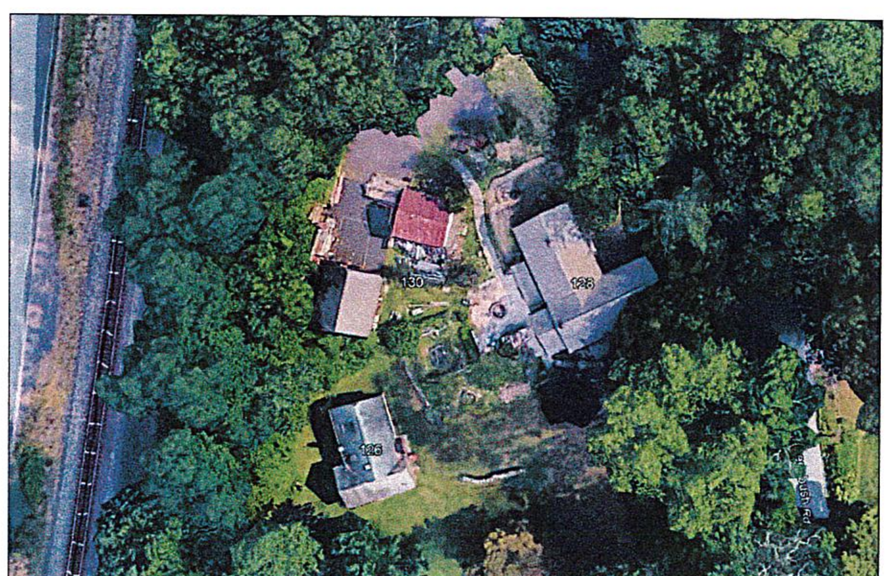
GENERAL NOTES

1.1.1 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
1.1.2 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION
1.1.3 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4: PV MODULES: IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY
1.1.4 PHOTOVOLTAIC PANELS AND MODULES SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL1703 OR WITH BOTH UL 61370-1 AND UL 61730-2.
1.1.5 NEC REFERS SPECIFICALLY TO "UNGROUNDED" PV SYSTEMS. ALSO DESIGNATED AS "TRANSFORMERLESS" BY INVERTER MANUFACTURERS AND "NON-ISOLATED" BY UNDERWRITERS LABORATORY.
1.1.6 INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE LISTED FOR THIS USE.
1.1.7 AS SPECIFIED BY THE AHJ, EQUIPMENT USED IN UNGROUNDED SYSTEMS LABELED ACCORDING TO NEC.
1.1.8 MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.
1.1.9 ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D). SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].
1.1.10 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
1.1.11 SOLAR PV MODULES (PANELS) CANNOT BE INSTALLED OVER OR BLOCK ANY ATTIC VENTS, PLUMBING VENTS, FURNACE OR WATER HEATER VENTS ETC.
1.1.12 ALL CONDUCTORS OF A CIRCUIT, INCLUDING THE EGC, MUST BE INSTALLED IN THE SAME RACEWAY OR CABLE, OR OTHERWISE RUN WITH THE PV ARRAY CIRCUIT CONDUCTORS WHEN THEY LEAVE THE VICINITY OF THE PV ARRAY.
1.1.13 ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE. GROUND MOUNTED SYSTEMS, WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF OF THE ROOF SURFACE.

SEE PV.02 FOR ADDITIONAL DETAILS

SITE PLAN
SCALE: 1/50"=1'

AERIAL IMAGE



SCOPE OF WORK:

*INSTALLATION OF NEW PV SYSTEM: **8.700 kW DC (STC-DC) | 6.600 kW AC (INVERTER)***

SYSTEM COMPONENTS

MODULE:	(20) HYUNDAI HIN-T435NF(BK)
OPTIMIZER/RSD:	MICROINVERTER INTEGRATED
INVERTER:	(20) ENPHASE IQ8MC-72-M-US [240V]
MOUNT 1:	(39) IRONRIDGE HUG
MOUNT 2:	(16) RAIL-TO-STRUT
RAILING:	IRONRIDGE XR100
MSP UPGRADE:	NO

BATTERY BACKUP DETAILS

NO BATTERY BACKUP FOR THE PROJECT

ADDITIONAL NOTES

PROJECT INFORMATION

AUTHORITIES HAVING JURISDICTION

AHJ:	ORANGETOWN TOWN
UTILITY:	CENTRAL HUDSON

DESIGN SPECIFICATIONS

OCCUPANCY:	R-3/U
CONSTRUCTION:	V-B
ZONING:	RESIDENTIAL
SNOW LOAD:	30
WIND EXPOSURE:	C
WIND SPEED:	115 MPH
ROOF SURFACE (BARN):	578.23
ROOF SURFACE (SHED):	374.55
PV COVERAGE:	419.98
NO. OF STORIES:	ONE
FIRE SPRINKLERS:	NO

ALL WORK SHALL COMPLY WITH APPLICABLE, LOCAL, MUNICIPAL CODES, AND TO MANUFACTURERS' LISTINGS AND INSTALLATION INSTRUCTIONS.

SHEET LIST TABLE

SITE PLAN LEGEND KEY

⎕	MAIN ELECTRICAL PANEL
▯	PV EQUIPMENT
—	PROPERTY LINE
┄	FENCE

REVISIONS *SEE RESPONSE LETTER FOR DETAILS*

ENGINEER OF RECORD

STATE OF NEW YORK
SCOTT E. WYSSLING
LICENSED PROFESSIONAL ENGINEER
092303

[illegible]

Wyssling Consulting, PLLC
76 N. Meadowbrook Drive, Alpine UT
New York COA #0022571

Signed 11/18/2025
Expires 7/31/2027

It is a violation of the law for any person, unless acting under the direction of a licensed professional, to alter an item in any way. If an item bearing the seal of a licensed professional is altered, the altering licensed professional shall affix to their item their seal and the notation "altered by" followed by their signature and the date of such alteration, and a specific description of the alteration.

GREENPOINT

GREENPOINT SOLAR & ELECTRICAL, INC.
5570 SEARSVILLE ROAD
PINE BUSH, NY 12566
PHONE: (845) 206-9551

NEW PV SYSTEM
8.700 kW DC (STC-DC)

CHRISTOPHER CARDONA
128 GREENBUSH RD,
TAPPAN, NY 10983
APN: 77.10-2-8

DESIGNED BY **SOLAR DEPLOYED, LLC.**
931 10TH ST #114, MODESTO, CA 95354
209-671-2001 | HELLO@SOLARDEPLOYED.COM

DESIGN LEAD: A.R.		SIGNATURE:	AR
DRAWN BY: D.A.		CHECKED BY:	A.B.
PAPER: 11X17 (ANSI B)		DATE:	10/29/2025

SHEET NAME:	SHEET NO.:
COVER SHEET	PV.01

SITE PLAN NOTES

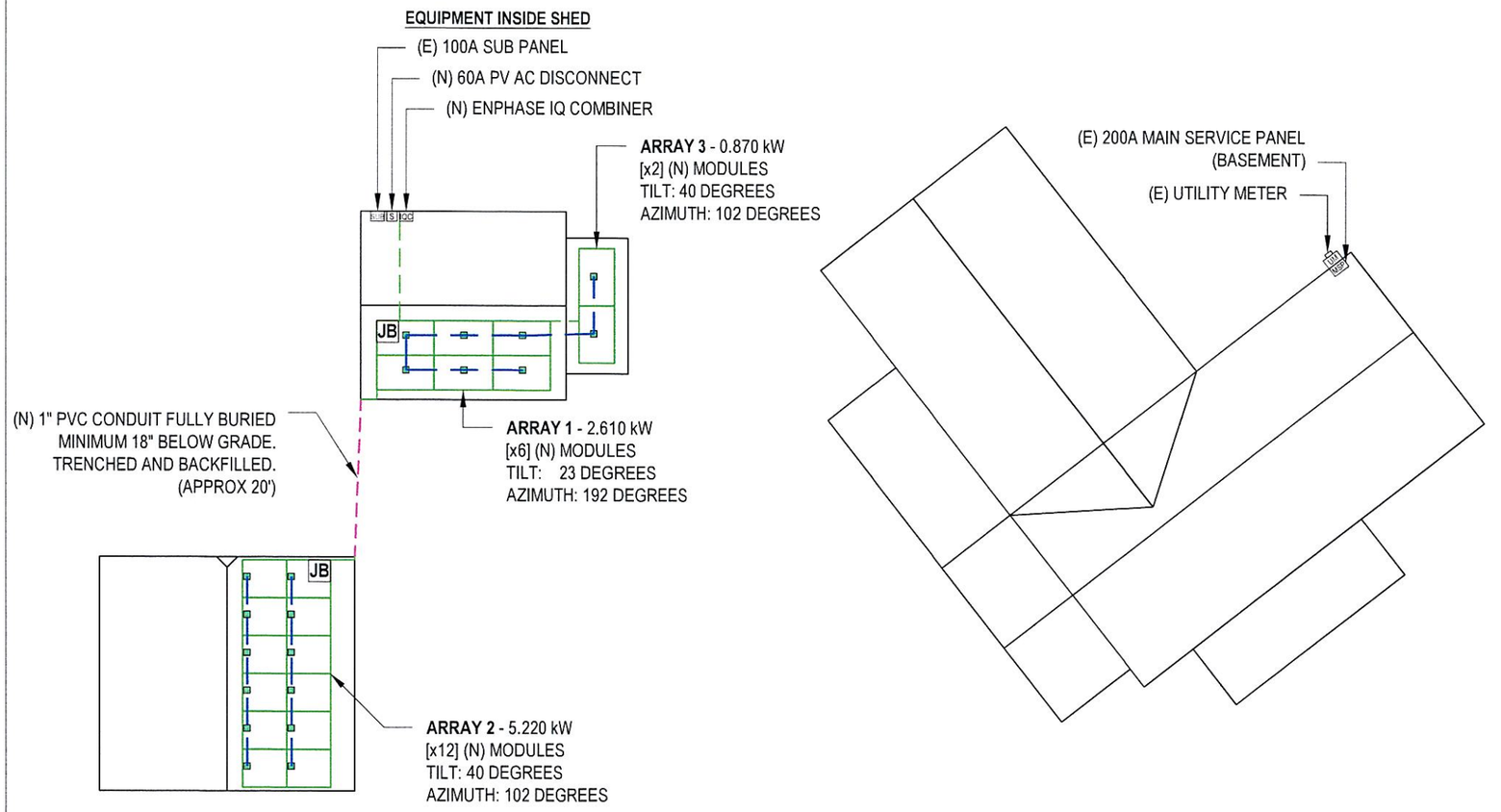
A. ALL WORK SHALL COMPLY WITH APPLICABLE, LOCAL, MUNICIPAL CODES, AND TO MANUFACTURERS' LISTINGS AND INSTALLATION INSTRUCTIONS.

B. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED [NEC 110.26].

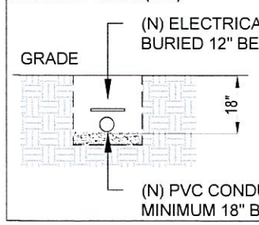
D. SOLAR PV MODULES (PANELS) CANNOT BE INSTALLED OVER OR BLOCK ANY ATTIC VENTS, PLUMBING VENTS, FURNACE OR WATER HEATER VENTS ETC.

E. ALL EQUIPMENT SHALL BE LISTED AND ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED, INCLUDING ROOF MOUNTED TRANSITION BOXES AND SWITCHES.

F. **EQUIPMENT LISTINGS AND CERTIFICATIONS ARE AS FOLLOWS:**
- I. MODULES ARE LISTED UNDER UL1703 (OR UL61370-1 & UL61370-2)
- II. INVERTER IS LISTED UNDER UL1741
- III. RACKING IS LISTED UNDER UL2703
- IV. RACKING SYSTEMS IN COMBINATION WITH TYPE 1 OR 2 MODULES, ARE CLASS A FIRE RATED.



TRENCHING DETAIL (NTS):



ROOF & FIRE PLAN
SCALE: 1/14" = 1'

LEGEND KEY

UM UTILITY METER	SUB SUB PANEL	BB BATTERY BANK	JB NEMA 3R JBOX	CHIMNEY	SATELLITE DISH
MSP MAIN SERVICE PANEL	ACL AC LOADCENTER	S AC DISCONNECT	OPTIMIZER/RSD/ MICROINVERTER	SKY LIGHT	PLUMBING VENT
INV INVERTER	IQC IQ COMBINER	PV PRODUCTION METER	PROPOSED CONDUIT	ATTIC VENT	ELECTRICAL MAST
			PROPOSED STRINGING		A/C ROOFTOP A/C UNIT
			TRENCHING		

ADDITIONAL NOTES

PV MODULE DETAILS

HYUNDAI
HIN-T435NF(BK)
435 WATTS
67.8" H X 44.6" L X 1.2" D
WEIGHT: 50.01 LBS

BARN ROOF AREA PV COVERAGE

ROOF SURFACE:	578.23 SQ.FT.
PV COVERAGE:	251.99 SQ.FT.
ROOF AREA COVERED:	43.58%

SHED ROOF AREA PV COVERAGE

ROOF SURFACE:	374.55 SQ.FT.
PV COVERAGE:	167.99 SQ.FT.
ROOF AREA COVERED:	44.85%

ENGINEER OF RECORD:

STATE OF NEW YORK
ROBERT E. WYSSLING
092303
LICENSED PROFESSIONAL ENGINEER

Wyssling Consulting, PLLC
76 N. Meadowbrook Drive, Alpine UT
New York COA #0022571

Signed 11/18/2025
Expires 7/31/2027

GREENPOINT SOLAR & ELECTRICAL, INC.
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NEW PV SYSTEM
8.700 kW DC (STC-DC)
CHRISTOPHER CARDONA
128 GREENBUSH RD,
TAPPAN, NY 10983
APN: 77.10-2-8

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DRAWN BY:	D.A.	CHECKED BY:	A.B.
PAPER:	11X17 (ANSI B)	DATE:	10/29/2025

SHEET NAME: **ELECTRICAL & FIRE PLAN**
SHEET NO.: **PV.02**

ROOF 1 INFORMATION

1. ROOF MATERIAL:	COMP SHINGLE
2. ROOF SLOPE:	40 DEGREES
3. ROOF STRUCTURE:	SINGLE SPAN RAFTERS + COLLAR TIE
4. RAFTER SIZE:	2X8
5. RAFTER SPACING:	16" O.C.
6. RAFTER SPAN (S):	4'-10"

MODULE INFORMATION

7. PV MODULE:	HYUNDAI HIN-T435NF(BK)
8. DIMENSION:	67.8" H X 44.6" W X 1.2" D
9. WEIGHT	50.01 LBS
10. MODULE CLEARANCE:	3IN. MIN / 6 IN. MAX

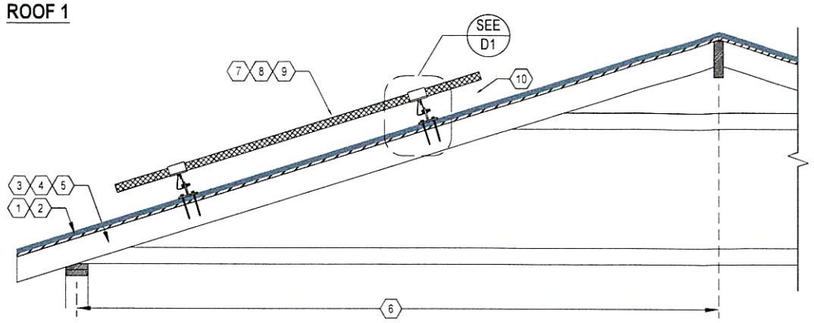
ATTACHMENT & RAILING

11. ATTACHMENT:	(39) IRONRIDGE HUG
12. MAX. HORIZONTAL STANDOFF:	48 IN.
13. STANDOFF STAGGERING:	YES
14. MAX. VERTICAL STANDOFF:	*PER INSTALLATION INSTRUCTIONS*
15. RAILING:	IRONRIDGE XR100
16. MAX RAIL CANTILEVER:	*PER INSTALLATION INSTRUCTIONS*
17. LAG BOLT SIZE:	#14
18. LAG BOLT EMBEDMENT:	2 IN.

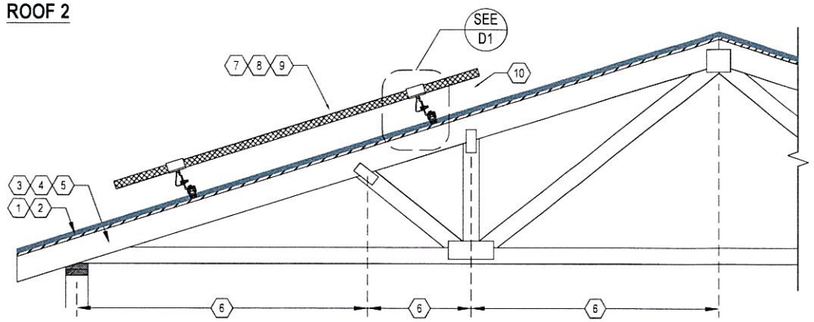
LOAD CALCULATIONS

APPROX. INSTALLATION AREA:	419.98 SQ. FT.
TOTAL SYSTEM WEIGHT:	1094.20 LBS.
DISTRIBUTED WEIGHT OF ARRAY:	2.61 PSF.
WEIGHT PER MOUNT:	28.06 LBS

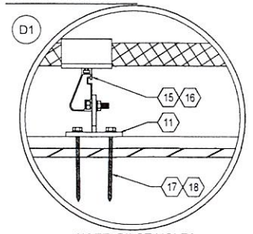
ROOF 1



ROOF 2

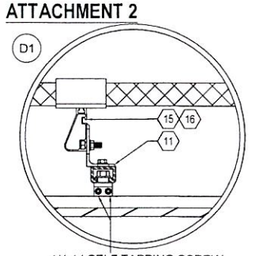


ATTACHMENT 1



NOTE: PILOT HOLES REQUIRED FOR #14 SCREW

ATTACHMENT 2



1/4-14 SELF TAPPING SCREW
1-1/2" L X 3/8" DIA. HEX HEAD

ROOF 2 INFORMATION

1. ROOF MATERIAL:	CORRUGATED METAL
2. ROOF SLOPE:	23 DEGREES
3. ROOF STRUCTURE:	STEEL TRUSS
4. RAFTER SIZE:	SEE LETTER
5. RAFTER SPACING:	8'-0" O.C.
6. RAFTER SPAN (S):	2'-11" & 1'-6" & 2'-11"

MODULE INFORMATION

7. PV MODULE:	HYUNDAI HIN-T435NF(BK)
8. DIMENSION:	67.8" H X 44.6" W X 1.2" D
9. WEIGHT	50.01 LBS
10. MODULE CLEARANCE:	3IN. MIN / 6 IN. MAX

ATTACHMENT & RAILING

11. ATTACHMENT:	(16) RAIL-TO-STRUT
12. MAX. HORIZONTAL STANDOFF:	60 IN.
13. STANDOFF STAGGERING:	NO
14. MAX. VERTICAL STANDOFF:	*PER INSTALLATION INSTRUCTIONS*
15. RAILING:	IRONRIDGE XR100
16. MAX RAIL CANTILEVER:	*PER INSTALLATION INSTRUCTIONS*
17. LAG BOLT SIZE:	1/4 IN. SELF-TAP SCREW
18. LAG BOLT EMBEDMENT:	N/A

ROOF 2 NOTE:
CUSTOM ROOF ATTACHMENT – METAL STRUT TO BE VERTICALLY MOUNTED OVER STEEL JOISTS USING SELF-TAPPING SCREWS WITH BUTYL TAPE AND RUBBER BUSHINGS FOR WATERPROOFING. IRONRIDGE XR100 RAILS MOUNTED TO STRUT.

STRUCTURAL NOTES

A. ALL HARDWARE, INCLUDING MOUNTING AND RACKING, TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS.

B. ALL PV RELATED RACKING ATTACHMENTS WILL BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER; FINAL ATTACHMENT LOCATIONS MAY BE ADJUSTED IN THE FIELD AS NECESSARY.

C. ROOFTOP PENETRATIONS PERTAINING TO SOLAR RACKING WILL BE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALNT PER CODE BY A LICENSED CONTRACTOR.

D. MAXIMUM VERTICAL STANDOFF BETWEEN RAILS & MAXIMUM RAIL CANTILEVER PER MANUFACTURER'S INSTALLATION INSTRUCTIONS

ENGINEER OF RECORD

Wyssling Consulting, PLLC
76 N. Meadowbrook Drive, Alpine UT
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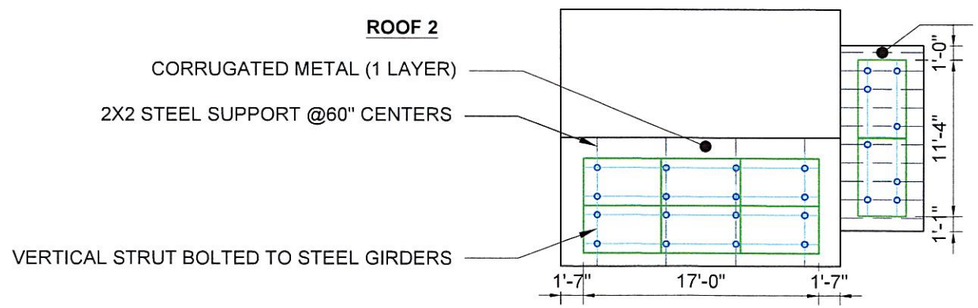

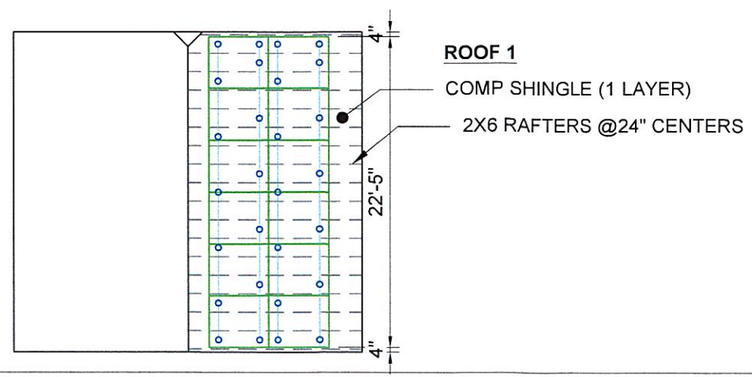

GREENPOINT
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PINE BUSH, NY 12566
PHONE: (845) 206-9551

NEW PV SYSTEM
8.700 kW DC (STC-DC)

CHRISTOPHER CARDONA
128 GREENBUSH RD,
TAPPAN, NY 10983

APN: 77.10-2-8

ATTACHMENT DETAIL
SCALE: 3/32" = 1'

DESIGNED BY **SOLAR DEPLOYED, LLC.**
931 10TH ST #114, MODESTO, CA 95354
209-671-2001 | HELLO@SOLARDEPLOYED.COM

DESIGN LEAD:	A.R.	SIGNATURE:	A.R
DRAWN BY:	D.A.	CHECKED BY:	A.B.
PAPER:	11X17 (ANSI B)	DATE:	10/29/2025

SHEET NAME: STRUCTURAL PLAN	SHEET NO.: PV.03

128 GREENBUSH RD, TAPPAN, NY 10983

PV SYSTEM ELECTRICAL SPECIFICATIONS AND CALCULATIONS

SYSTEM SUMMARY

SYSTEM SIZE (STC-DC):	**8.700 kW**
INVERTER RATED POWER (AC):	**6.60 kW**
MAX PV CURRENT (125%):	**33.25A**

OVERCURRENT CALCULATION

COMBINED INVERTER OUTPUT:	**26.60A**
MAX PV CURRENT (125%):	**33.25A**

MODULE SPECS

(20) HYUNDAI HIN-T435NF(BK)

RATED POWER (PMAX) (W)	435W
RATED POWER (PTC) (W)	411.6W
SHORT CIRCUIT CURRENT (ISC) (A)	14.32A
MAXIMUM POWER CURRENT (IMP) (A)	13.56A
OPEN CIRCUIT VOLTAGE (VOC) (V)	38.6V
MAXIMUM POWER VOLATGE (VMP) (V)	32.1V
TEMP. COEFF. OF VOC (%/C)	-0.238 %/C

MICROINVERTER SPECS

(20) ENPHASE IQ8MC-72-M-US [240V] [240V] [SI1-SB]

RATED POWER (W)	330W
MAX INPUT (A)	20A
MAX INPUT (V)	60V
MAX OUTPUT (A)	1.33A
MAX OUTPUT 125% (A)	1.66A
MAX OCPD (A)	20A

MAX. BRANCH CALC

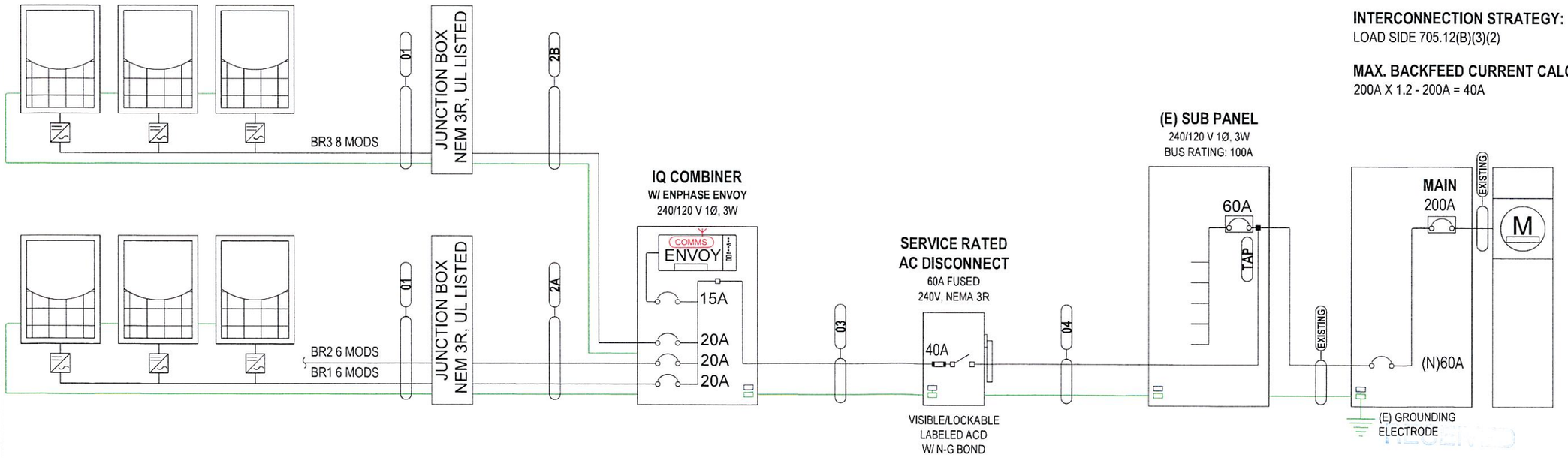
MAX OCPD (A) / (MAX OUTPUT X 1.25)

20A / 1.66A = 12.03 (ROUND DOWN)

MICROINVERTERS *PROVIDE MODULE-LEVEL RAPID SHUTDOWN & ARE 690.12 COMPLIANT.*

CONDUIT AND WIRE SCHEDULE

ID	CONDUCTOR	GROUND	CONDUIT	CURRENT CARRYING CONDUCTORS IN CONDUIT	CONT. CURRENT	125% MAX. CURRENT	MIN. OCPD	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	BASE AMP. @ 90°C	DERATED 90°C AMP.	TERMINAL TEMP. RATING	TERMINAL AMP RATING
01	12 AWG PV WIRE, Cu	6 AWG BARE, Cu	FREE AIR	N/A	20A PER BRANCH		N/A	0.94 (32°C)	1	40A	37.60A	90°C	40A
2A	10 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	1" PVC SCH40	4 (2 PER BRANCH)	20A PER BRANCH		20A	0.94 (32°C)	0.8	40A	30.08A	75°C	35A
2B	10 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	0.75" EMT	2 (2 PER BRANCH)	20A PER BRANCH		20A	0.94 (32°C)	1	40A	37.60A	75°C	35A
03	8 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	0.75" EMT	3	26.60A	33.25A	40A	0.94 (32°C)	1	55A	51.70A	75°C	50A
04	6 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	0.75" EMT	3	26.60A	33.25A	N/A	0.94 (32°C)	1	75A	70.50A	75°C	65A



(E) 200A MAIN SERVICE PANEL
240/120 V 1Ø, 3W
BUS RATING: **200**A
MCB RATING: **200A**

INTERCONNECTION STRATEGY:
LOAD SIDE 705.12(B)(3)(2)

MAX. BACKFEED CURRENT CALC:
200A X 1.2 - 200A = 40A

RECEIVED
DEC 08 2025
TOWN OF ORANGETOWN
LAND USE BOARDS

WEATHER STATION

WHITE PLAINS WESTCHESTER CO A
EXTREME LOW TEMP.:-17°C
2% HIGH TEMP. 32°C

TEMP. DERATE FACTOR: 0.94

WIRE TABLE AND CONDUIT NOTES

A. ROOFTOP TEMPERATURE CORRECTION FACTOR REFLECTS REQUIRED MIN. 7/8" CONDUIT HEIGHT FROM ROOF.

B. ALL CONDUCTORS SHALL BE COPPER AND RATED A MINIMUM OF 90°C; ALL TERMINALS SHALL BE RATED A MINIMUM OF 75°C.

C. ALL NEW WIRES ARE THWN-2 COPPER UNLESS OTHERWISE NOTED.

D. NEUTRAL WIRE SIZE TO MATCH CONDUCTOR RATING WHERE NEUTRAL IS APPLICABLE.

SEE DESIGN CALCULATIONS PAGE FOR ADDITIONAL NOTES AND DETAILS

ENGINEER OF RECORD:

STATE OF NEW YORK
092303
LICENSED PROFESSIONAL ENGINEER

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5570 SEARSVILLE ROAD
PINE BUSH, NY 12566
PHONE: (845) 206-9551

NEW PV SYSTEM
8.700 kW DC (STC-DC)
CHRISTOPHER CARDONA
128 GREENBUSH RD,
TAPPAN, NY 10983
APN: 77.10-2-8

DESIGNED BY **SOLAR DEPLOYED, LLC.**
931 10TH ST #114, MODESTO, CA 95354
209-671-2001 | HELLO@SOLARDEPLOYED.COM

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DRAWN BY:	D.A.	CHECKED BY:	A.B.
PAPER:	**11X17 (ANSI B)**	DATE:	**10/29/2025**

SHEET NAME: **LINE DIAGRAM**
SHEET NO.: **PV.04**

128 GREENBUSH RD, TAPPAN, NY 10983

PV SYSTEM ELECTRICAL SPECIFICATIONS AND CALCULATIONS

SYSTEM SUMMARY

SYSTEM SIZE (STC-DC):	**8.700 kW**
INVERTER RATED POWER (AC):	**6.60 kW**
MAX PV CURRENT (125%):	**33.25A**

OVERCURRENT CALCULATION

COMBINED INVERTER OUTPUT:	**26.60A**
MAX PV CURRENT (125%):	**33.25A**

MODULE SPECS

(20) HYUNDAI
HIN-T435NF(BK)

RATED POWER (PMAX) (W)	435W
RATED POWER (PTC) (W)	411.6W
SHORT CIRCUIT CURRENT (ISC) (A)	14.32A
MAXIMUM POWER CURRENT (IMP) (A)	13.56A
OPEN CIRCUIT VOLTAGE (VOC) (V)	38.6V
MAXIMUM POWER VOLATGE (VMP) (V)	32.1V
TEMP. COEFF. OF VOC (%/C)	-0.238 %/C

MICROINVERTER SPECS

(20) ENPHASE IQ8MC-72-M-US
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RATED POWER (W)	330W
MAX INPUT (A)	20A
MAX INPUT (V)	60V
MAX OUTPUT (A)	1.33A
MAX OUTPUT 125% (A)	1.66A
MAX OCPD (A)	20A

MAX. BRANCH CALC

MAX OCPD (A) / (MAX OUTPUT X 1.25)

20A / 1.66A = 12.03 (ROUND DOWN)

MICROINVERTERS *PROVIDE MODULE-LEVEL RAPID SHUTDOWN & ARE 690.12 COMPLIANT.*

CONDUIT AND WIRE SCHEDULE

***WEATHER STATION:* WHITE PLAINS WESTCHESTER CO A [ASHRAE EXTREME LOW TEMP.:-17°C | ASHRAE 2% HIGH TEMP. 32°C]**
ROOFTOP TEMPERATURE CORRECTION FACTOR REFLECTS REQUIRED MIN. 7/8" CONDUIT HEIGHT FROM ROOF
ALL CONDUCTORS SHALL BE COPPER AND RATED A MINIMUM OF 90°C; ALL TERMINALS SHALL BE RATED A MINIMUM OF 75°C.

ID	CONDUCTOR	GROUND	CONDUIT	CURRENT CARRYING CONDUCTORS IN CONDUIT	CONT. CURRENT	125% MAX. CURRENT	MIN. OCPD	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	BASE AMP. @ 90°C	DERATED 90°C AMP.	TERMINAL TEMP. RATING	TERMINAL AMP RATING
01	12 AWG PV WIRE, Cu	6 AWG BARE, Cu	FREE AIR	N/A	20A PER BRANCH		N/A	0.94 (32°C)	1	40A	37.60A	90°C	40A
2A	10 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	1" PVC SCH40	4 (2 PER BRANCH)	20A PER BRANCH		20A	0.94 (32°C)	0.8	40A	30.08A	75°C	35A
2B	10 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	0.75" EMT	2 (2 PER BRANCH)	20A PER BRANCH		20A	0.94 (32°C)	1	40A	37.60A	75°C	35A
03	8 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	0.75" EMT	3	26.60A	33.25A	40A	0.94 (32°C)	1	55A	51.70A	75°C	50A
04	6 AWG THWN-2, Cu	8 AWG, THWN-2, Cu	0.75" EMT	3	26.60A	33.25A	N/A	0.94 (32°C)	1	75A	70.50A	75°C	65A

ELECTRICAL & CONDUIT NOTES

A. MAIN PANEL UPGRADES. A TYPE 1 OR TYPE 2 SURGE PROTECTION DEVICE SHALL BE INSTALLED FOR THE NEW MSP EITHER AS AN INTEGRAL PART OF THE SERVICE EQUIPMENT OR LOCATED IMMEDIATELY ADJACENT THERETO. [NEC 230.67]

B. ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENT AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.

C. CONDUIT RACEWAYS SHALL BE PROVIDED WITH EXPANSION FITTINGS TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION. [NEC 110 (B) AND 110.14 (D)]

D. PROVIDE PULL BOXES AND/OR EXPANSION OR DEFLECTION FITTINGS FOR THE ROOFTOP CONDUITS TO ACCOMODATE THERMAL EXPANSION AND CONTRACTION. [NEC 300.7(B)]

E. ALL CONDUCTORS AND CONDUITS ON THE ROOF SHALL BE INSTALLED A MINIMUM DISTANCE ABOVE THE ROOF TO THE BOTTOM OF THE RACEWAY OR CABLE OF 7/8" IN. (INCLUDING CABLES UNDERNEATH MODULES AND RACKING).

F. ALL CONDUCTORS IN EXPOSED OUTDOOR LOCATIONS SHALL BE LISTED AND IDENTIFIED FOR USE IN DIRECT SUNLIGHT AND FOR THE APPLICATION. [NEC 690.31(C) THROUGH (F), 310.10(D)]

G. EXPOSED CONDUCTORS WITHIN THE PV ARRAY SHALL BE PV WIRE/CABLE, OR TYPE USE-2, OR TYPE RHW-2 (UL 4703 & 854 LISTED) [NEC 690.31(C)(1)]

H. ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE RAIN TIGHT AND APPROVED FOR USE IN WET LOCATIONS. (NEC 314.15)

I. DC WIRING INSIDE A BUILDING MUST BE IN METAL RACEWAYS, METAL-CLAD CABLE, OR METAL ENCLOSURES. [NEC 690.31(D)]

J. EQUIPMENT GROUNDING CONDUCTOR (EGC) SMALLER THAN #6-AWG SHALL BE PROTECTED FROM PHYSICAL DAMAGE BY AN IDENTIFIED RACEWAY OR CABLE ARMOR, UNLESS INSTALLED WITHIN HOLLOW SPACES OF THE FRAMING MEMBERS OF BUILDINGS OR STRUCTURES AND WHERE NOT SUBJECT TO PHYSICAL DAMAGE. [NEC 250.120(C)]

K. CABLES/WIRES THAT ARE SUBJECT TO PHYSICAL DAMAGE, SUCH AS THOSE NOT LOCATED UNDER THE MODULES, MUST BE PROTECTED. [NEC 300.4]

L. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.

ADDITIONAL NOTES

ENGINEER OF RECORD

Wyssling Consulting, PLLC
76 N. Meadowbrook Drive, Alpine UT
New York COA #0022571

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Expires 7/31/2027

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NEW PV SYSTEM
8.700 kW DC (STC-DC)

CHRISTOPHER CARDONA
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APN: 77.10-2-8

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DRAWN BY:	D.A.	CHECKED BY:	A.B.
PAPER:	**11X17 (ANSI B)**	DATE:	**10/29/2025**

SHEET NAME:	SHEET NO.:
DESIGN CALCULATIONS	**PV.05**

01

⚠ WARNING

ELECTRIC SHOCK HAZARD

TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

CODE REFERENCE: NEC 690.13(B)
LOCATION: PLACE ON **ALL** DISCONNECTING MEANS WHERE ENERGIZED IN AN OPEN POSITION

02

⚠ WARNING

POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

CODE REFERENCE: NEC 705.12(B)(3)(2)
LOCATION: AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT (I.E. MAIN PANEL **AND** SUB PANEL IF APPLICABLE)

03

⚠ WARNING

THIS EQUIPMENT FED BY MULTIPLE SOURCES: TOTAL RATING OF ALL OVERCURRRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR

CODE REFERENCE: NEC 705.12(B)(3)(3)
LOCATION: AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT (I.E. MAIN PANEL **AND** SUB PANEL IF APPLICABLE)

04

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

CODE REFERENCE: NEC 705.10
LOCATION: ALL EQUIPMENT CONTAINING OVERCURRENT DEVICES IN CIRCUITS SUPPLYING POWER TO A BUSBAR OR CONDUCTORS SUPPLIED FROM MULTIPLE SOURCES

05

PHOTOVOLTAIC POWER SOURCE

CODE REFERENCE: NEC 690.31(D)(2)
LOCATION: AT EXPOSED RACEWAYS, CABLE TRAYS, AND OTHER WIRING METHODS; SPACED A MAX. 10 FT SECTIONS OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

FORMAT
1. WHITE LETTERING ON A RED BACKGROUND
2. MINIMUM 3/8 INCHES LETTER HEIGHT
3. ALL LETTERS SHALL BE CAPITALIZED
4. ARIAL OR SIMILAR FONT (NON-BOLD)

MATERIAL
REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (USE UL-969 AS STANDARD FOR WEATHER RATING). DURABLE ADHESIVE MATERIALS.

06

AC DISCONNECT
AC PHOTOVOLTAIC POWER SOURCE

MAX AC OPERATING CURRENT:	26.60A MAX
AC OPERATING VOLTAGE:	240 VAC

CODE REFERENCE: NEC 690.54
LOCATION: AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT (I.E. MAIN PANEL **AND** SUB PANEL IF APPLICABLE)

07

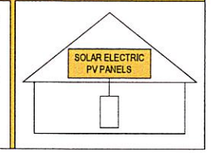
PHOTOVOLTAIC
AC DISCONNECT

CODE REFERENCE: NEC 690.13(B)
LOCATION: AT P.O.C. TO SERVICE DISTRIBUTION EQUIPMENT / AC DISCONNECTS / BREAKERS

08

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



CODE REFERENCE: NEC 690.56
LOCATION: SIGN TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.

09

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

CODE REFERENCE: NEC 690.56 (C)(2)
LOCATION: TO BE LOCATED ON OR NO MORE THAN 3 FT AWAY FROM RSD INITIATION DEVICE

10

⚠ WARNING

PHOTOVOLTAIC SYSTEM COMBINER PANEL

DO NOT ADD LOADS.

LOCATION: AT PV COMBINER PANEL **(IF APPLICABLE)**

ADDITIONAL NOTES

ENGINEER OF RECORD

Wyssling Consulting, PLLC
76 N. Meadowbrook Drive, Alpine UT
New York COA #0022571

Signed 11/18/2025
Expires 7/31/2027

GREENPOINT
GREENPOINT SOLAR & ELECTRICAL, INC.
5570 SEARSVILLE ROAD
PINE BUSH, NY 12566
PHONE: (845) 206-9551

NEW PV SYSTEM
8.700 kW DC (STC-DC)

CHRISTOPHER CARDONA
128 GREENBUSH RD,
TAPPAN, NY 10983

APN: 77.10-2-8

DESIGNED BY **SOLAR DEPLOYED, LLC.**
931 10TH ST #114, MODESTO, CA 95354
209-671-2001 | HELLO@SOLARDEPLOYED.COM

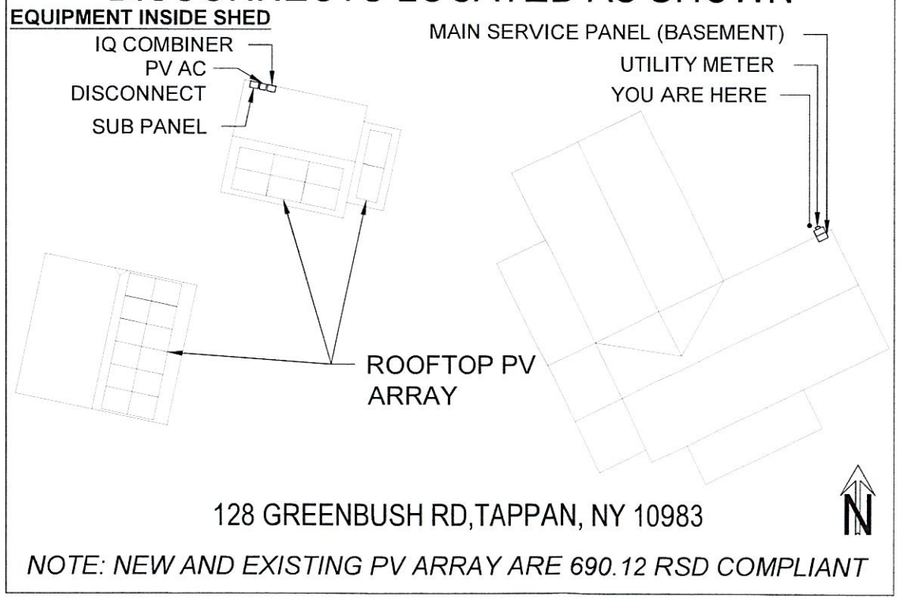
DESIGN LEAD:	A.R.	SIGNATURE:	AR
DRAWN BY:	D.A.	CHECKED BY:	A.B.
PAPER:	11X17 (ANSI B)	DATE:	10/29/2025

SHEET NAME: LABELS
SHEET NO.: PV.06

DISCONNECT DIRECTORY PLAQUE
INSTALL AT MAIN SERVICE PANEL

CAUTION:

POWER TO THIS BUILDING ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN



128 GREENBUSH RD,TAPPAN, NY 10983

NOTE: NEW AND EXISTING PV ARRAY ARE 690.12 RSD COMPLIANT

FORMAT
1. WHITE LETTERING ON A RED BACKGROUND
2. MINIMUM 3/8 INCHES LETTER HEIGHT
3. ALL LETTERS SHALL BE CAPITALIZED
4. ARIAL OR SIMILAR FONT (NON-BOLD)

MATERIAL
REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (USE UL-969 AS STANDARD FOR WEATHER RATING).
DURABLE ADHESIVE MATERIALS

RECEIVED
DEC 08 2025
TOWN OF ORANGETOWN
LAND USE BOARDS

ADDITIONAL NOTES

ENGINEER OF RECORD

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76 N. Meadowbrook Drive, Alpine UT
New York COA #0022571

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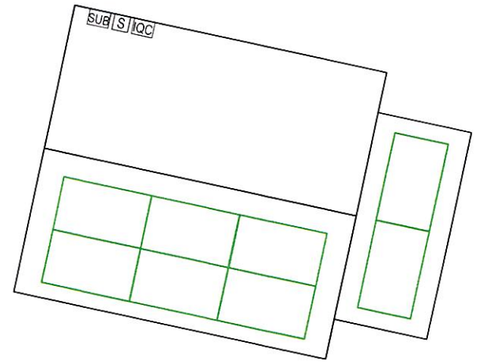
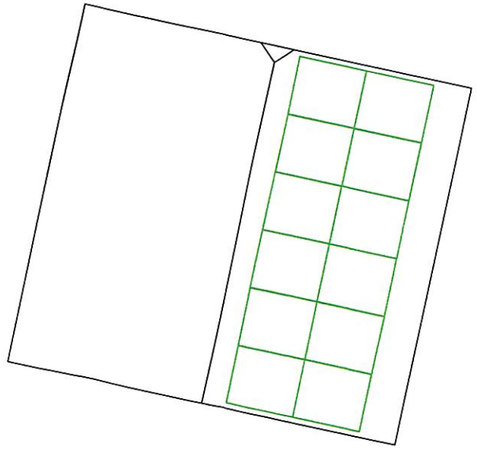
DRAWN BY:	D.A.	CHECKED BY:	A.B.
PAPER:	11X17 (ANSI B)	DATE:	10/29/2025

SHEET NAME:	SHEET NO.:
PLACARD MAP	PV.07

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46						
47	48	49	50	54	52	53						
54	55	56	57	58	59	60						
61	62	63	64	65	66	67						





RECEIVED
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ADDITIONAL NOTES

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SOLAR & ELECTRICAL

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PAPER:	11X17 (ANSI B)	DATE:	10/29/2025

SHEET NAME:	SHEET NO.:
MICROINVERTER MAP	MM

HD HYUNDAI ENERGY SOLUTIONS

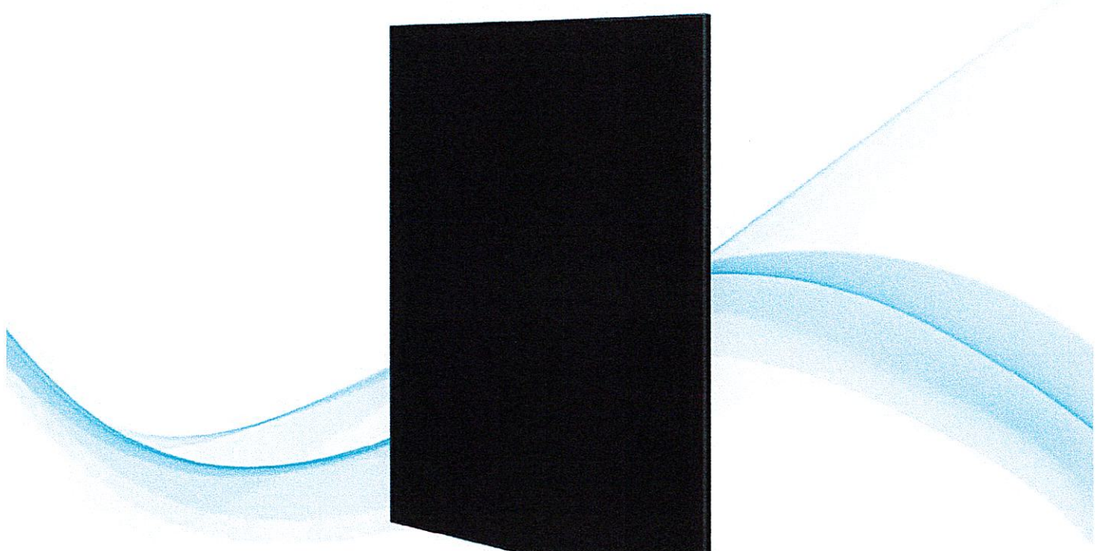
eng.hd-hyundaies.co.kr

HD HYUNDAI SOLAR MODULE

NF(BK) Series

Premium N-Type TOPCon Module

HiN-T430NF(BK) I HiN-T435NF(BK) I HiN-T440NF(BK)

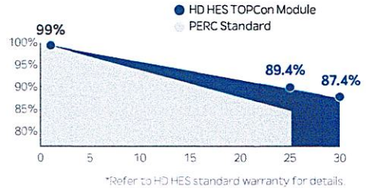


22.53% High Efficiency | High-End TOPCon Technology | Higher Bifaciality | Long-Term Reliability | Compatible with Carport Applications | For Residential (Full Black Design)

HD Hyundai's Warranty Provisions

25 YEARS
- 25-Year Product Warranty
  - Materials and workmanship

30 YEARS
- 30-Year Performance Warranty
  - First year degradation: 1%
  - Linear warranty after initial year: with 0.4%p annual degradation, 87.4% is guaranteed up to 30years



*Refer to HD HES standard warranty for details.

Certification

ISO 9001 : Quality management systems
ISO 14001 : Environmental management systems
ISO 45001 : Occupational health and safety management systems
UL 61730: Photovoltaic (PV) module safety qualification (CSA)
IEC 61701: Salt mist corrosion testing
IEC 62716: Ammonia corrosion testing
IEC 62804: Potential induced Degradation (PID) testing
IEC 60068-2-68: Sand and dust testing for environmental durability

Electrical Characteristics

HiN-TxxxNF(BK)		HiN-T430NF(BK)		HiN-T435NF(BK)		HiN-T440NF(BK)	
Item	Unit		BNPI		BNPI		BNPI
Nominal output (Pmax)	W	430	476	435	482	440	488
Open circuit voltage (Voc)	V	38.4	38.4	38.6	38.6	38.8	38.8
Short circuit current (Isc)	A	14.25	15.79	14.32	15.87	14.39	15.94
Voltage at Pmax (Vmpp)	V	31.9	31.9	32.1	32.1	32.3	32.3
Current at Pmax (Impp)	A	13.48	14.94	13.56	15.01	13.63	15.10
Module efficiency	%	22.02	24.40	22.28	24.68	22.53	25.00
Power Class Sorting	W	0 ~ +5					
Temperature coefficient of Pmax	%/K	-0.30					
Temperature coefficient of Voc	%/K	-0.25					
Temperature coefficient of Isc	%/K	0.046					
Bifaciality	%	80%±10%					

*STC : Irradiance 1,000 W/m², cell temperature 25℃, AM=1.5 / Test uncertainty for Pmax ±3%, Voc ±3%, Isc ±3%
**The electrical properties of BNPI are measured under the irradiance corresponding to 1000 W/m² on the module front and 135 W/m² on the module rear.

Additional Power Gain from rear side					
Pmpp gain	Pmpp[W]	Vmpp[V]	Impp[A]	Voc[V]	Isc[A]
5%	458	32.30	14.18	38.80	14.97
15%	493	32.30	15.27	38.80	16.12
25%	528	32.40	16.36	38.90	17.27

*Electrical characteristics with different rear power gain (reference to 440W)

Mechanical Characteristics

Dimensions	1,722mm (L) x 1,134mm (W) x 30mm (H) (67.8in x 44.6in x 1.2in)
Weight	24.5 kg (50.01lbs)
Solar Cells	N-Type TOPCon, 108 (6x18) monocrystalline 16BB half-cut bifacial cells
Output Cables	Cable : (+)1,200mm(47.2in), (-)1,200mm(47.2in) / Customized length available Connector : Stäubli MC4 genuine Connector / Compatible, IP68
Junction Box	3-part, 3 bypass diodes, IP68 rated
Construction	Front : 2.0mm(0.08in) semi-tempered solar glass with high transmittance and anti-reflective coating Rear : 2.0mm(0.08in) semi-tempered solar glass
Frame	Anodized aluminum alloy

Installation Safety Guide

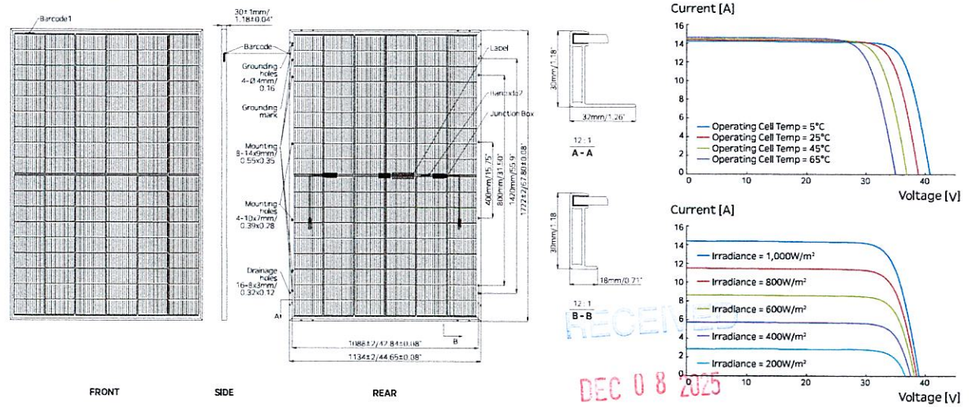
- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not handle or install modules when they are wet.

Nominal Module Operation Temperature	44℃ ± 2℃
Operating Temperature	-40℃~+85℃
Maximum System Voltage	DC 1,500 V
Maximum Reverse Current	30A
Maximum Test Load *See Installation Manual	Front 5,400Pa *Rear 5,400Pa
Fire Performance	Type 29

Shipping Configurations

Packing Direction	Vertical	Packing pallet weight (kg)	912
Container Size (HC)	40'	Modules Per Pallet (pcs)	36
Pallets Per Container	26	Modules Per Container (pcs)	936

Module Diagram (unit : mm)



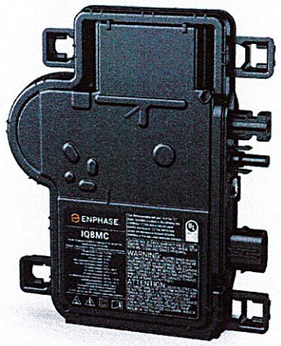
I-V Curves (HiN-T440NF(BK))

Sales & Marketing
hes.sales@hd.com

HD HYUNDAI ENERGY SOLUTIONS

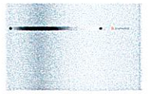
ENPHASE.

DATA SHEET



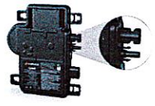
IQ8MC Microinverter

Our newest IQ8 Series Microinverters are the industry's first microgrid-forming*, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC), which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55-nm technology with high-speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to the IQ8 Series Microinverters that have integrated MC4 connectors.

IQ8 Series Microinverters are UL Listed as PV rapid shutdown equipment and conforms with various regulations when installed according to the manufacturer's instructions.

*Meets UL 1741 only when installed with IQ System Controller 2 or 3.

Easy to install

- Lightweight and compact with plug-and-play connectors
- Power line communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produces power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB)

NOTE:

- IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, and so on) in the same system.
- IQ Microinverters ship with default settings that meet North America's IEEE 1547 interconnection standard requirements. Region-specific adjustments may be requested by an Authority Having Jurisdiction (AHJ) or utility representative. An IQ Gateway is required to make these changes during installation.

IQ8MC Microinverter

INPUT DATA (DC)	UNITS	IQ8MC-72-M-US
Commonly used module pairings [1]	W	260–460
Module compatibility	–	To meet compatibility, PV modules must be within the following max. input DC voltage and max. module I_{sc}. Module compatibility can be checked at https://enphase.com/installers/microinverters/calculator.
MPPT voltage range	V	25–45
Operating range	V	18–58
Min./Max. start voltage	V	22/58
Max. input DC voltage	V	60
Max. continuous operating DC current	A	14
Max. input DC short-circuit current	A	25
Max. module I_{sc}	A	20
Overvoltage class DC port	–	II
DC port backfeed current	mA	0
PV array configuration	–	Ungrounded array; no additional DC side protection required; AC side protection requires max 20 A per branch circuit

OUTPUT DATA (AC)	UNITS	IQ8MC-72-M-US @240 VAC	IQ8MC-72-M-US @208 VAC
Peak output power	VA	330	315
Max. continuous output power	VA	320	310
Nominal grid voltage (L-L)	V	240, split-phase (L-L), 180°	208, single-phase (L-L), 120°
Min./Max. grid voltage [2]	V	211–264	183–229
Max. continuous output current	A	1.33	1.49
Nominal frequency	Hz	60	
Extended frequency range	Hz	47–68	
AC short circuit fault current over three cycles	Arms	2.70	
Max. units per 20 A (L-L) branch circuit [3]	–	12	10
Total harmonic distortion	%	<5	
Overvoltage class AC port	–	III	
AC port backfeed current	mA	18	
Power factor setting	–	1.0	
Grid-tied power factor (adjustable)	–	0.85 leading ... 0.85 lagging	
Peak efficiency	%	97.4	97.2
CEC weighted efficiency	%	97.0	96.5
Nighttime power consumption	mW	33	25

MECHANICAL DATA	UNITS
Ambient temperature range	-40°C to 65°C (-40°F to 149°F)
Relative humidity range	4% to 100% (condensing)
DC connector type	Stäubli MC4
Dimensions (H × W × D); Weight	212 mm (8.3") × 175 mm (6.9") × 30.2 mm (1.2"); 1.1 kg (2.43 lbs)
Cooling	Natural convection – no fans
Approved for wet locations; Pollution degree	Yes; PD3
Enclosure	Class II double-insulated, corrosion-resistant polymeric enclosure
Environ. category; UV exposure rating	NEMA Type 6; outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB), FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01. This product is UL Listed as PV rapid shutdown equipment and conforms with NEC 2014, NEC 2017, NEC 2020, and NEC 2023 section 690.12 and C22.1-2018 Rule 64-218 rapid shutdown of PV systems for AC and DC conductors when installed according to the manufacturer's instructions.

(1) No enforced DC/AC ratio.
(2) Nominal voltage range can be extended beyond nominal if required by the utility.
(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8MC-MC4-DSH-00049-4.0-EN-US-2024-02-09

Revision history

REVISION	DATE	DESCRIPTION
DSH-00049-4.0	February 2024	Added information about IEEE 1547 interconnection standard requirements.
DSH-00049-3.0	October 2023	Included NEC 2023 specification in the "Compliance" section.
DSH-00049-2.0	September 2023	Updated module compatibility information.
DSH-00049-1.0	May 2023	Preliminary release.

ENPHASE.

DATA SHEET

X-IQ-AM1-240-5
X-IQ-AM1-240-5C

IQ Combiner 5/5C

The IQ Combiner 5/5C consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications. IQ Combiner 5/5C uses wired control communication and is compatible with IQ System Controller 3/3G and IQ Battery 5P.

The IQ Combiner 5/5C, IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provide a complete grid-agnostic Enphase Energy System.

IQ Series Microinverters
The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) simplify the installation process.

IQ System Controller 3/3G
Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power.

IQ Battery 5P
Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters.

IQ Load Controller
Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life.

Enphase 5 year limited warranty

NOM

CERTIFIED E311166

5-year limited warranty

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect (CELLMODEM-M1-06-SP-05), only with IQ Combiner 5C
- Supports flexible networking: Wi-Fi, Ethernet, or cellular
- Provides production metering (revenue grade) and consumption monitoring

Easy to install

- Mounts to one stud with centered brackets
- Supports bottom, back, and side conduit entries
- Supports up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV branch circuits
- Bluetooth-based Wi-Fi provisioning for easy Wi-Fi setup

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- 5-year limited warranty
- 2-year labor reimbursement program coverage included for both the IQ Combiner SKUs*
- UL1741 Listed

*For country-specific warranty information, see the https://enphase.com/installers/resources/warranty page.

IQ Combiner 5/5C

MODEL NUMBER	
IQ Combiner 5 (X-IQ-AM1-240-5)	IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSIC12.20 ±0.5%), consumption monitoring (±2.5%), and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat.
IQ Combiner 5C (X-IQ-AM1-240-5C)	IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%) and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05)[1]. Includes a silver solar shield to deflect heat.
WHAT'S IN THE BOX	
IQ Gateway printed circuit board	IQ Gateway is the platform for total energy management for comprehensive, remote maintenance, and management of the Enphase Energy System
Busbar	80 A busbar with support for one IQ Gateway breaker and four 20 A breaker for installing IQ Series Microinverters and IQ Battery 5P
IQ Gateway breaker	Circuit breaker, 2-pole, 10 A/15 A
Production CT	Pre-wired revenue-grade solid-core CT, accurate up to ±0.5%
Consumption CT	Two consumption metering clamp CTs, shipped with the box, accurate up to ±2.5%
IQ Battery CT	One battery metering clamp CT, shipped with the box, accurate up to ±2.5%
CTRL board	Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P
Enphase Mobile Connect (only with IQ Combiner 5C)	4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan
Accessories kit	Spare control headers for the COMMS-KIT-02 board
ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY)	
CELLMODEM-M1-06-SP-05	4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan
CELLMODEM-M1-06-AT-05	4G-based LTE-M1 cellular modem with a 5-year AT&T data plan
Circuit breakers (off-the-shelf)	Supports Eaton BR2XX, Siemens Q2XX and GE/ABB THQL21XX Series circuit breakers (XX represents 10, 15, 20, 30, 40, 50, or 60). Also supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with the hold-down kit.
Circuit breakers (provided by Enphase)	BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (more details in the "Accessories" section)
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 5/5C
XA-ENV2-PCBA-5	IQ Gateway replacement printed circuit board (PCB) for IQ Combiner 5/5C
X-IQ-NA-HD-125A	Hold-down kit compatible with Eaton BR-B Series circuit breakers (with screws)
XA-COMMS2-PCBA-5	Replacement COMMS-KIT-02 printed circuit board (PCB) for IQ Combiner 5/5C
ELECTRICAL SPECIFICATIONS	
Rating	80 A
System voltage and frequency	120/240 VAC, 60 Hz
Busbar rating	125 A
Fault current rating	10 kAIC
Maximum continuous current rating (input from PV/storage)	64 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR, Siemens Q, or GE/ABB THQL Series distributed generation (DG) breakers only (not included)
Maximum total branch circuit breaker rating (input)	80 A of distributed generation/95 A with IQ Gateway breaker included
IQ Gateway breaker	10 A or 15 A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-CLAMP)	A pair of 200 A clamp-style current transformers is included with the box
IQ Battery metering CT	200 A clamp-style current transformer for IQ Battery metering, included with the box

[1] A plug-and-play industrial-grade cell modem for systems of up to 60 microinverters. Available in the United States, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.

IQC-5-5C-DSH-00007-4.0-EN-US-2024-06-13

MECHANICAL DATA		
Dimensions (W × H × D)		37.5 cm × 49.5 cm × 16.8 cm (14.75" × 19.5" × 6.63"). Height is 53.5 cm (21.06") with mounting brackets.
Weight		7.5 kg (16.5 lb)
Ambient temperature range		-40°C to 46°C (-40°F to 115°F)
Cooling		Natural convection, plus heat shield
Enclosure environmental rating		Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes		• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors • Always follow local code requirements for conductor sizing
Communication (in-premise connectivity)		Built-in CTRL board for wired communication with the IQ Battery 5P and the IQ System Controller 3/3G. Integrated power line communication for IQ Series Microinverters.
Altitude		Up to 2,600 meters (8,530 feet)
COMMUNICATION INTERFACES		
Integrated Wi-Fi		802.11b/g/n (dual band 2.4 GHz/5 GHz) for connecting the Enphase Cloud through the internet.
Wi-Fi range (recommended)		10 m (32.8 feet)
Bluetooth		BLE4.2, 10 m range to configure Wi-Fi SSID
Ethernet		Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included) for connecting to the Enphase Cloud through the internet.
Cellular/Mobile Connect		CELLMODEM-M1-06-SP-05 or CELLMODEM-M1-06-AT-05 (included with the IQ Combiner 5C)
Digital I/O		Digital input/output for grid operator control
USB 2.0		Mobile Connect, COMMS-KIT-01 for IQ Battery 3/3T/10/10T, COMMS-KIT-02 for IQ Battery 5P
Access point (AP) mode		For connection between the IQ Gateway and a mobile device running the Enphase Installer App
Metering ports		Up to two Consumption CTs, one IQ Battery CT, and one Production CT
Power line communication		90–110 kHz
Web API		See https://developer-v4.enphase.com
Local API		See Guide for local API at https://enphase.com/download/accessing-iq-gateway-local-apis-or-local-ui-token-based-authentication
COMPLIANCE		
IQ Combiner with IQ Gateway		UL 1741, CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003, NOM-208-SCFI-2016, UL 60601-1/CANCSA 22.2 No. 61010-1, IEEE 1547: 2018 (UL 1741-SB, 3rd Ed.), IEEE 2030.5/CSIP Compliant, Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
COMPATIBILITY		
PV	Microinverters	IQ6, IQ7, and IQ8 Series Microinverters
COMMS-KIT-01[2]	IQ System Controller	EP200G101-M240US00
	IQ System Controller 2	EP200G101-M240US01
	IQ Battery	ENCHARGE-3-1P-NA, ENCHARGE-10-1P-NA, ENCHARGE-3T-1P-NA, ENCHARGE-10T-1P-NA
COMMS-KIT-02[3]	IQ System Controller 3	SC200D111C240US01, SC200G111C240US01
	IQ Battery	IQBATTERY-5P-1P-NA

[2] For information about IQ Combiner 5/5C compatibility with the 2nd-generation batteries, refer to the compatibility matrix at https://enphase.com/download/compatibility-matrix.
[3] IQ Combiner 5/5C comes pre-equipped with COMMS-KIT-02.

IQC-5-5C-DSH-00007-4.0-EN-US-2024-06-13

Tech Brief

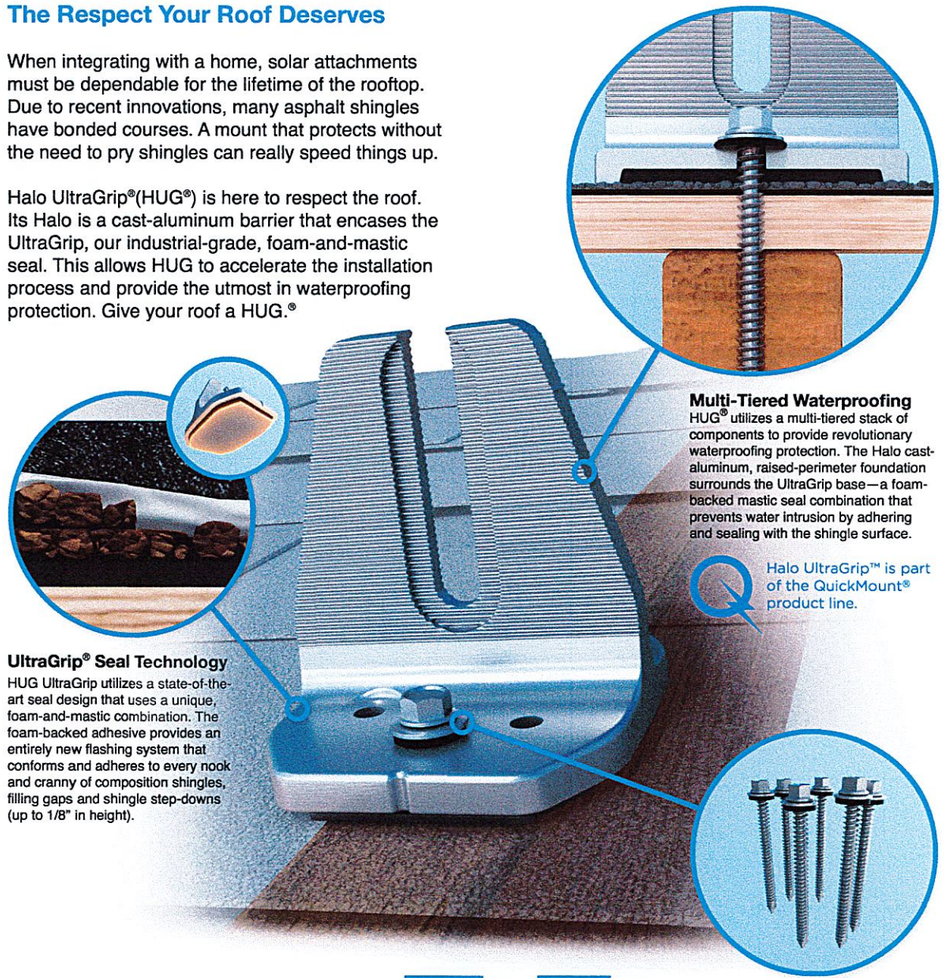
IRONRIDGE

QuickMount® HUG

The Respect Your Roof Deserves

When integrating with a home, solar attachments must be dependable for the lifetime of the rooftop. Due to recent innovations, many asphalt shingles have bonded courses. A mount that protects without the need to pry shingles can really speed things up.

Halo UltraGrip®(HUG®) is here to respect the roof. Its Halo is a cast-aluminum barrier that encases the UltraGrip, our industrial-grade, foam-and-mastic seal. This allows HUG to accelerate the installation process and provide the utmost in waterproofing protection. Give your roof a HUG.®



Multi-Tiered Waterproofing
HUG® utilizes a multi-tiered stack of components to provide revolutionary waterproofing protection. The Halo cast-aluminum, raised-perimeter foundation surrounds the UltraGrip base—a foam-backed mastic seal combination that prevents water intrusion by adhering and sealing with the shingle surface.

Halo UltraGrip™ is part of the QuickMount® product line.

UltraGrip® Seal Technology
HUG UltraGrip utilizes a state-of-the-art seal design that uses a unique, foam-and-mastic combination. The foam-backed adhesive provides an entirely new flashing system that conforms and adheres to every nook and cranny of composition shingles, filling gaps and shingle step-downs (up to 1/8" in height).

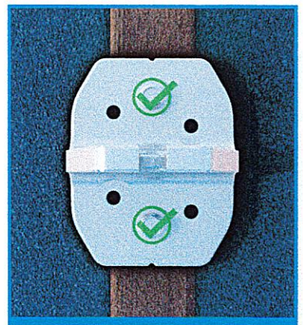
Rafter & Deck Mounting Options
Mount HUG® to the roof rafters, the roof deck, or both with our custom-engineered RD (rafter-or-deck) Structural Screw. The RD Structural Screw anchors HUG to the roof with an EPDM sealing washer, completing the stack of waterproofing barriers. See backside for more installation information.

Intertek

Triple Rated & Certified to Respect the Roof™
UL 2703, 441 (27)
TAS 100(A)-95

Tech Brief

Adaptive, Rafter-Friendly Installation

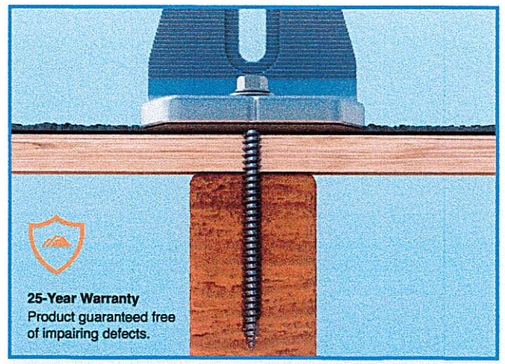


Hit the rafter? Good to go!
When you find a rafter, you can move on. Only 2 RD Structural Screws are needed.

Miss the rafter? Try it again.
Place another screw to the left or right. If rafter is found, install 3rd and final screw.

Still no luck? Install the rest.
If more than 3 screws miss the rafter, secure six screws to deck mount it.

Trusted Strength & Less Hassle



25-Year Warranty
Product guaranteed free of impairing defects.

Structural capacities of HUG® were reviewed in many load directions, with racking rail running cross-slope or up-slope in relation to roof pitch.

For further details, see the HUG certification letters for attaching to rafters and decking.

IronRidge designed the HUG, in combination with the RD Structural Screw to streamline installs, which means the following:

- No prying shingles
- No roof nail interference
- No pilot holes necessary
- No sealant (in most cases)
- No butyl shims needed

Attachment Loading

The rafter-mounted HUG has been tested and rated to support 1004 (lbs) of uplift and 368 (lbs) of lateral load.

Structural Design

Parts are designed and certified for compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings

HUG passed both the UL 441 Section 27 "Rain Test" and TAS 100(A)-95 "Wind Driven Rain Test" by Intertek.

UL 2703 System

Systems conform to UL 2703 mechanical and bonding requirements. See Flush Mount Manual for more info.

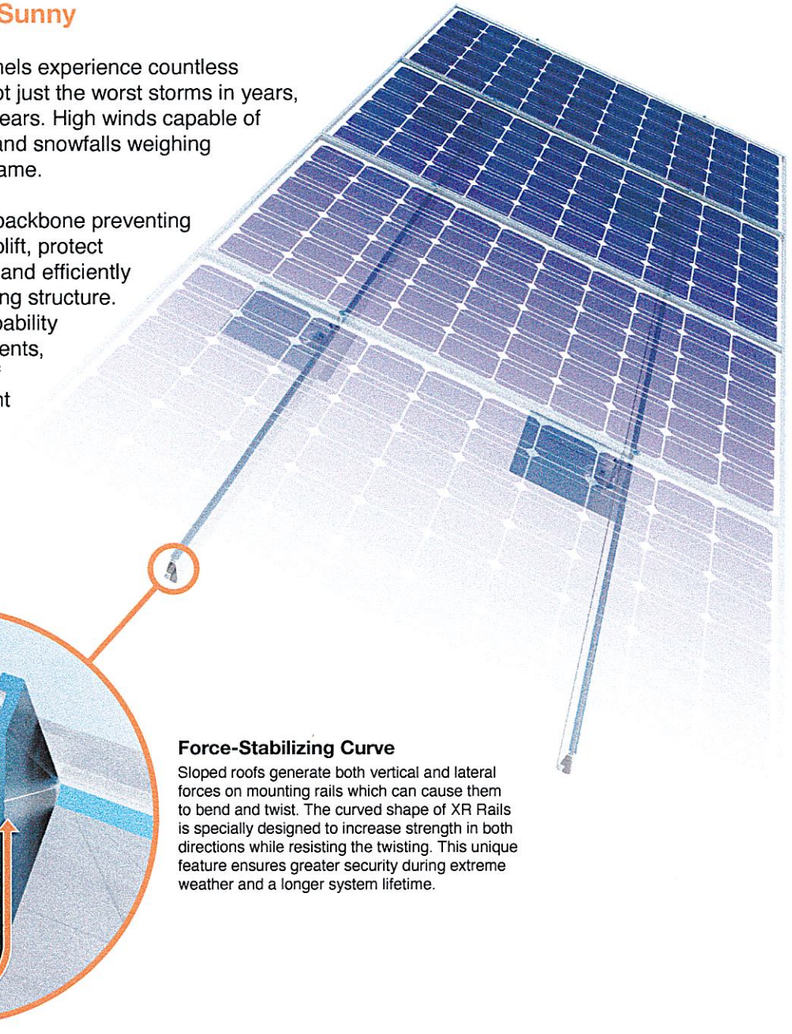
IRONRIDGE

XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

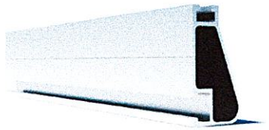
XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.

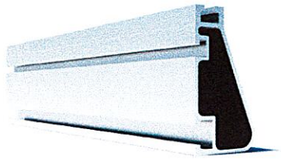
- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available



XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	90	XR10		XR100		XR1000	
	120						
	140						
	160						
20	90						
	120						
	140						
	160						
30	90						
	160						
40	90						
	160						
80	160						
120	160						

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

Tech Brief

IRONRIDGE

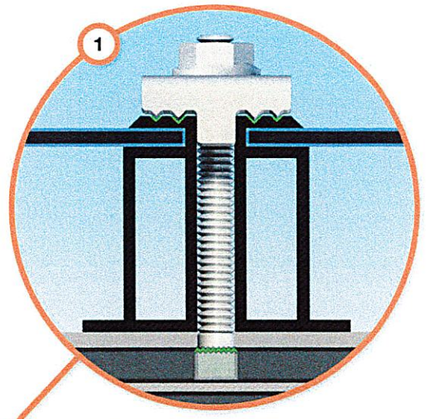
Integrated Grounding System

Simplified Grounding

For Greater Safety & Lower Cost

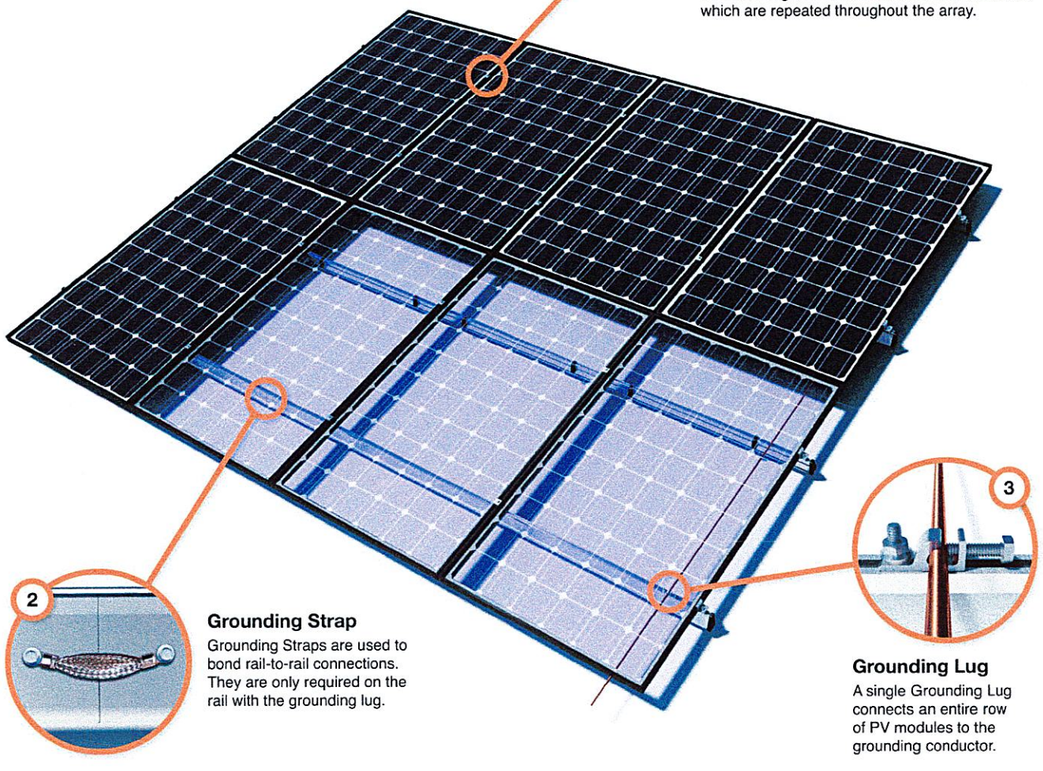
Traditionally, solar modules are grounded by attaching lugs, bolts or clips to the module frame, then connecting these to a copper conductor that runs throughout the array. This process adds time and cost to the installation, and often results in improper grounding, creating significant long-term safety risks.

The IronRidge Integrated Grounding System solves these challenges by bonding modules directly to the mounting rails. This approach eliminates separate module grounding hardware, and it creates many parallel grounding paths throughout the array, providing greater safety for system owners.



Grounding Mid Clamp

Each Grounding Mid Clamp pierces through the anodized coatings of both the module frame and the mounting rail to form secure electrical bonds, which are repeated throughout the array.



Grounding Strap

Grounding Straps are used to bond rail-to-rail connections. They are only required on the rail with the grounding lug.

Grounding Lug

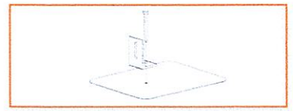
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.

Tech Brief

Installation Overview

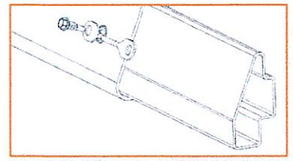
1 Install Roof Attachments

- Install appropriate roof flashing and/or standoff for roof type.
- Attach L-Feet to flashing or standoff.



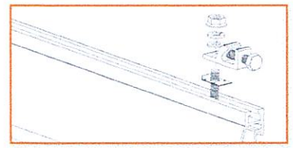
2 Prepare Rail Connections

- Insert splice into first rail, then secure with Grounding Strap and self-drilling screw.
- Slide second rail over splice, then secure with opposite end of Grounding Strap and self-drilling screw.



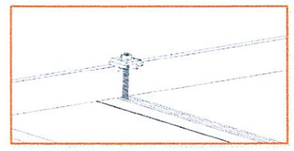
3 Mount & Ground Rails

- Attach rails to L-Feet and level rails.
- Install one Grounding Lug per row of modules.
- Connect Grounding Lug to grounding conductor.



4 Install Modules & Clamps

- Install first module using End Clamps and Grounding Mid Clamps.
- Install additional modules using Grounding Mid Clamps.
- Finish row with a second pair of End Clamps.

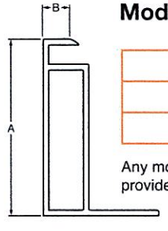


Testing & Certification

The IronRidge Integrated Grounding System has been tested and certified to UL 2703 by Intertek Group plc.

UL 2703 is a proposed UL standard for evaluating solar module mounting and clamping devices. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

The testing process closely mirrors that of UL 1703, the solar module testing standard, including temperature and humidity cycling, electrical and mechanical load testing, and manufacturing quality reviews.



Module Frame Compatibility

Dimension	Range
A	31.0mm - 51.0mm
B	5.08mm (minimum)

Any module frames whose parameters are not listed in the provided table have not been tested for compatibility.

The Grounding Clamp has proven robust in grounding 60-cell and 72-cell solar module frames with box construction and a range of anodization thicknesses.

All solar modules listed to UL 1703 and with frame construction within the parameters stated above are compatible with the IronRidge Integrated Grounding System.

Go to ironridge.com/ig

GROUNDING SPECIFICATION SHEET

25800 Commercentre Drive
Lake Forest, CA 92630 USA

Telephone: 949.448.4100
Facsimile: 949.448.4111
www.intertek.com

Test Verification of Conformity

In the basis of the tests undertaken, the sample(s) of the below product have been found to comply with the requirements of the referenced specifications at the time the tests were carried out.

Applicant Name & Address:	IronRidge, Inc. 1495 Zephyr Ave. Hayward, CA 94544
Product Description:	XR Rails with Integrated Grounding.
Ratings & Principle Characteristics:	Fire Class Resistance Rating: - Class A for Steep Slope Flush-Mount (symmetrical) Applications when using Type 1 and Type 2, Listed Photovoltaic Module. - Class A for Low Slope Flush-Mount and Tilt-Mount (symmetrical and asymmetrical) Applications when using Type 1, Listed Photovoltaic Module.
Models:	51-61GD-005, 51-61GD-005B, 51-5000-001, and 51-65-001
Brand Name:	N/A
Relevant Standards:	UL Subject 2703 (Section 15.2 and 15.3) Outline of Investigation for Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels, Issue Number: 2, Nov 13, 2012 **Referencing** UL1703 (Section 31.2) Standard for Safety for Flat-Plate Photovoltaic Modules and Panels, May 20, 2014
Verification Issuing Office:	Intertek Testing Services NA, Inc. 25800 Commercentre Dr. Lake Forest, CA 92630
Date of Tests:	08/27/2014 to 01/07/2015
Test Report Number(s):	101541132LAX-002

This verification is part of the full test report(s) and should be read in conjunction with them. This report does not automatically imply product certification.

Completed by:	Amar Kacel	**Reviewed by:**	Andrew Koretoff
Title:	PV Engineer	**Title:**	Reviewer
Signature:		**Signature:**	
Date:	01/26/2015	**Date:**	01/26/2015