CITY OF WASHINGTON

PLANNING & DEVELOPMENT DEPARTMENT
301 Walnut St. · Washington, IL 61571
Ph. 309-444-1135 · Fax 309-444-9779
http://www.washington-illinois.org
joliphant@ci.washington.il.us

MEMORANDUM

TO: Chairman Burdette and Planning & Zoning Commission
FROM: Jon R. Oliphant, AICP, Planning & Development Director
SUBJECT: Public Hearing – Legacy Solar Special Use Request, 605 Ridge Street
DATE: September 23, 2019

Summary: John Luginbuhl of Legacy Solar has submitted a special use application on behalf of Alexander Tarter for the installation of a solar energy system on the detached garage at 605 Ridge Street. The zoning code requires a special use be issued in order to install a roof-mount solar energy system on an accessory structure. Staff recommends approval of this request.

Background: The property is approximately 0.15 acres and is zoned R-1 (Single- and Two-Family Residential). A detached garage was constructed on the south side of the property in 1976. A 7.875 KW solar photovoltaic array is proposed to be located on both the east-facing principal structure roof and the south-facing garage roof. The site plan submitted shows the installation would be comprised of 25 315-watt panels and cover approximately 20% of the principal structure roof and 44% of the accessory structure roof.

An attached letter submitted by the contractor indicates the reason for placing the panels on the garage is take the most advantage of the possible sun on the south-facing roof in addition to what can be generated on the east-facing principal structure roof.

Legacy Solar has attested that the roof is capable of supporting the proposed array. The City's electrical inspector has reviewed the attachments and has consented to this construction if the special use is approved. While a building permit would need to be issued if the special use is approved, the submitted attachments are thus far in conformance with the solar energy regulations. It would be installed in accordance with the adopted 2012 International Building Code.

The proposed use would not appear to be detrimental to the public's health, safety, or general welfare nor would it diminish property values or the use and enjoyment of properties in the vicinity. Placing the array solely on the roof on the house does not appear to be worthwhile because of the limited return on investment. The additional placement on the south-facing garage roof would be the best fit to allow the owner to take advantage of the cost savings from the solar generation. Based on all of these factors, staff would recommend that the special use request be approved for the installation of the solar energy system on the accessory structure.

A public hearing has been scheduled on this topic at the October 2 Planning and Zoning Commission meeting.

Enclosures

CITY OF WASHINGTON, ILLINOIS

APPLICATION FOR SPECIAL USE

To have a complete application for a special use, you must submit the following:

- Signed and completed application
- Plat showing subject property and all adjacent properties – See below for plat requirements
- Ownership documentation (lease, deed, mortgage, etc.)
- Accurate legal description obtained from the Warranty Deed
- Application fee of $100 payable to the City of Washington

Address or location of property: 605 Ridge Street Washington IL

Property Tax ID (PIN) number: 02 - 02 - 13 - 305 - 002

Current zoning classification of the property: R1

Current use of the property: Residential

What is the Special Use for? Solar panels on an accesory structure

How will you meet other requirements of the zoning code (such as parking or landscaping, if applicable)? N/A

Name of Applicant: John Luginbuhl Legacy Solar Phone Number of Applicant: _____

Address of Applicant: 19292 N 900 East Rd. Bloomington IL 61705

Owner of Property: Alexander Tarker

Address of Owner: 605 Ridge St. Washington IL 61571

I would like to receive correspondence by: ____ Mail ✓ Email Email address: _____

PLAT REQUIREMENTS: Your special use plat must show:

- Building or site plan layout and locations of proposed special uses, including square footage
- Adjacent properties, rights-of-way, streets, roads, railroads, waterways, and other physical features

PUBLIC HEARING: Your case will be referred with staff's recommendation to the next regularly scheduled Planning and Zoning Commission meeting for a public hearing. The Planning and Zoning Commission meets the first Wednesday of every month at 6:30 p.m at the Washington District Library meeting room at 380 N. Wilmor Road. At the Planning and Zoning Commission meeting, you will present your request. A special use cannot be recommended by the Planning and Zoning Commission unless the Commission finds, based upon the application and evidence presented at the public hearing, that all of the following conditions have been met:

1) The special use will not be detrimental to or endanger the public health, safety, morals, comfort, or general welfare; 2) The special use will not be injurious to the use and enjoyment of other property in the immediate vicinity, or substantially diminish or impair property values; 3) The special use will not impede development of surrounding property; 4) Adequate utilities, access roads, drainage, or necessary facilities will be provided; 5) Adequate ingress and egress provided to minimize traffic congestion in public streets; 6) The special use will conform to all other application regulations of the zoning district; and 7) If the special use would not otherwise be acceptable, the Planning Commission may recommend certain conditions be met to make the use acceptable, such as, but not limited to: landscape screening or fencing, specific hours of operation, night lighting or lighting restrictions, parking area requirements, signage restraints, outdoor storage limitations.

Certification: *To the best of my knowledge, the information contained herein, and on the attachments, is true, accurate, and correct, and substantially represents the existing features and proposed features. Any error, misstatement, or misrepresentation of material fact or expression of material fact, with or without intention, shall constitute sufficient grounds for the revocation or denial of the proposed Special Use.*

John M Luginbuhl
Signature of Applicant

8/22/19
Date

_____
Signature of Owner

_____
Date

After receiving a completed application, the City Clerk will file notice of your request with the local newspaper and with the adjoining property owners. If you have any questions, please contact Jon Oliphant, Planning & Development Director at (309) 444-1135.

FOR OFFICE USE ONLY Case No.: _____

Plat Submitted? Y / N Date: _____

Documentation of Authority Submitted: _____

Commission Action: _____

Fee Paid? Y / N / N/A Amount: _____ Date: _____

Landscaping Plan Submitted? Y / N / N/A Date: _____

Date to go before the Planning and Zoning Commission: _____

Ordinance Review: (first reading) _____ (second reading) _____

LEGACY SOLAR

Power for generations

September 23, 2019

Dear Special Use Committee,

We are requesting a special use permit to allow for a solar array to be placed on an accessory structure at 605 Ridge Street, Washington.

With the fire code setbacks, and extra space taken up by the small marginal roofs on the back, the primary structure did not allow for the placement of enough solar to meet the homeowner's needs.

Due to fire code setbacks for the residence, we could only fit 11 panels on that structure (192.9 sqft), which will only cover 20% of that structure's roof (960 sqft). This provided for less than half of the family's typical energy usage, and offered no savings with the lease option the family wanted to utilize.

Placing the remaining 14 panels on the freestanding garage allows the family to offset close to 100% of their energy usage, and take advantage of the lease option. This lease allows him to cut his electric expenses overall nearly in half with no upfront cost.

This array will cover 43.8% of the garage roof space. The garage is not visible from the road. It is a southfacing roof face and will maximize the available solar energy. There is no residence in the garage and it is not considered an occupied structure to the best of our knowledge.

Thank you for your consideration. We look forward to serving the Tarter family and others in your community in the future.

Please let us know if you have further questions.

Sincerely,

John Luginbuhl
Project Manager | **Legacy Solar**

p 309.645.0503
w legacysolarpower.com
e john@legacysolar.systems

SUNPOWER Preferred

CITY OF WASHINGTON

TAZEWELL COUNTY, ILLINOIS

LOCATION MAP

N
W E
S

Legend

- AG-1 (Agriculture)
- CE (Country Estates)
- R-1A (Single Family Residential)
- R-1 (1-2 Family Residential)
- R-2 (Multifamily Residential)
- C-1 (Local Retail)
- C-2 (General Retail)
- C-3 (Service Retail)
- I-1 (Light Industrial)
- I-2 (Heavy Industrial)

CITY OF WASHINGTON ILLINOIS ESTABLISHED IN 1825

Prepared by the City of Washington Department of Planning and Development

Printed: September 23, 2019

CITY OF WASHINGTON

TAZEWELL COUNTY, ILLINOIS

LOCATION MAP

N
W E
S

Prepared by the City of Washington
Department of Planning and Development

Printed: September 23, 2019

ALEX TARTER - 8.175kW DC, 7.875kW AC

SHEET CATALOG

INDEX NO.	DESCRIPTION
T-1	COVER PAGE
M-1	MOUNTING DETAIL
M-2	STRUCTURAL DETAIL
E-1	SINGLE LINE DIAGRAM
E-2	LOAD CALCULATIONS
PL-1	WARNING PLACARDS
SS	SPEC SHEET(S)

SCOPE OF WORK

GENERAL SYSTEM INFORMATION:
SYSTEM SIZE:
8175W DC, 7875W AC
MODULES:
(25)SUNPOWER X22-327-E-AC
BRANCH DETAILS:
1X11, 1X7, 1X7 BRANCHES OF AC MODULES

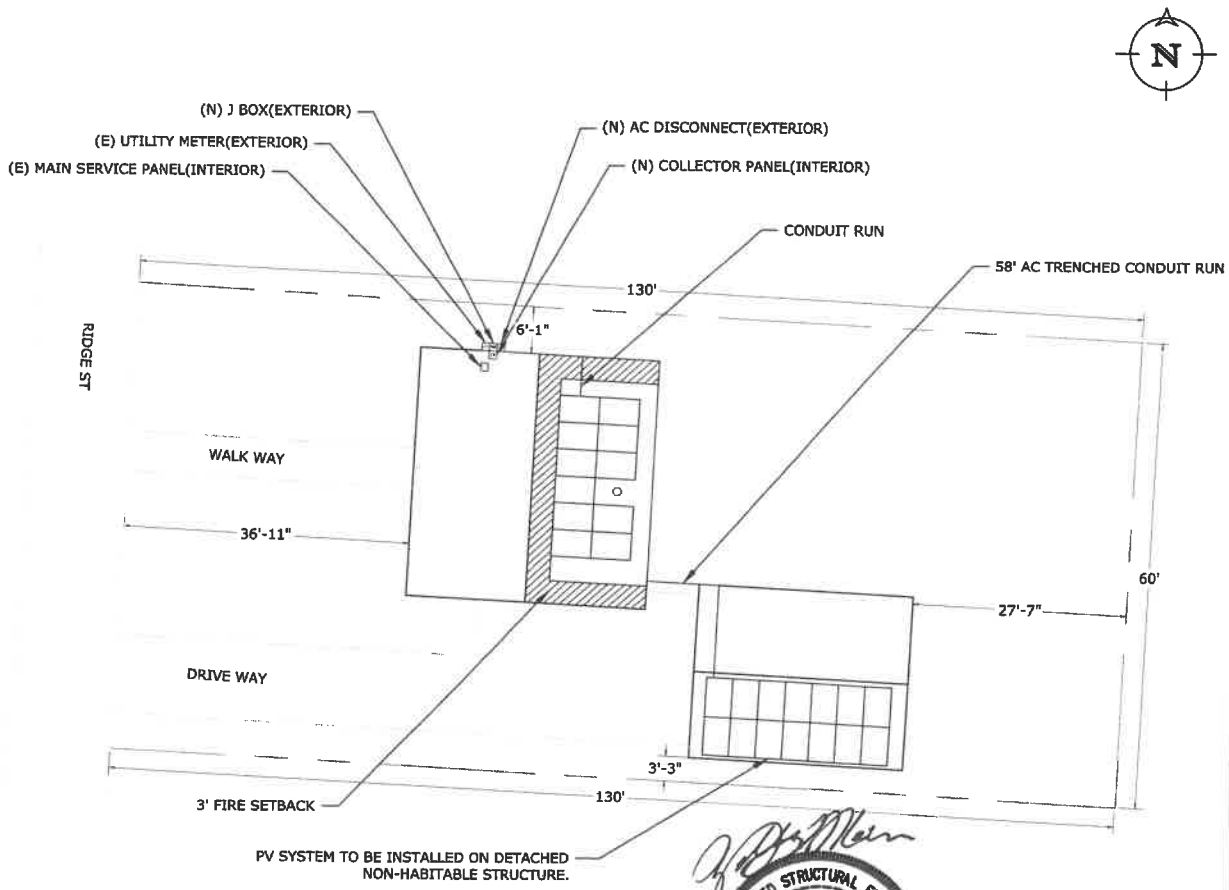
APPLICABLE CODES

- ELECTRIC CODE:NEC 2017
- FIRE CODE:IFC 2015
- BUILDING CODE:IBC 2012
- RESIDENTIAL CODE:IRC 2012

GENERAL NOTES

1.MODULES ARE LISTED UNDER UL 1703 AND CONFORM TO THE STANDARDS.
2.INVERTERS ARE LISTED UNDER UL 1741 AND CONFORM TO THE STANDARDS.
3.DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION MIGHT VARY.
4.WORKING CLEARANCES AROUND THE NEW PV ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26.
5.ALL GROUND WIRING CONNECTED TO THE MAIN SERVICE GROUNDING IN MAIN SERVICE PANEL/ SERVICE EQUIPMENT.
6.ALL CONDUCTORS SHALL BE 600V, 75°C STANDARD COPPER UNLESS OTHERWISE NOTED.
7.WHEN REQUIRED, A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
8.THE SYSTEM WILL NOT BE INTERCONNECTED BY THE CONTRACTOR UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND/OR THE UTILITY.
9.ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREES, WIRES OR SIGNS.
10.PV ARRAY COMBINER/JUNCTION BOX PROVIDES TRANSITION FROM ARRAY WIRING TO CONDUIT WIRING

SITE PLAN LAYOUT



SCALE:1/16" = 1'-0"

VECTOR ENGINEERS
551 W. GALENA PARK BLVD. STE. 101
DRAPER, UTAH 84020
PHONE (801) 990-1775
WWW.VECTORSE.COM

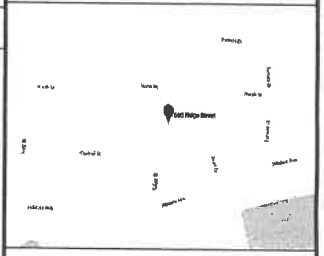
LICENSED STRUCTURAL ENGINEER
WELLS L. HOLMES
081.008195
STATE OF ILLINOIS

08/12/2019

Vector Structural Engineering has reviewed the existing structure with loading from the solar array and lag screw connections to the existing framing. The design of the racking system, connections, and all other structure is by others. Mechanical, architectural, and all other nonstructural aspects of the design are by others. Electrical is by others, unless stamped by Deen Levorsen.

License Expires: 11-30-2020
Firm License Number: 184.005810 - COA
VSE Project Number: U2278-0491-191

VICINITY MAP



LEGACY SOLAR

CUSTOMER INFORMATION

NAME:ALEX TARTER

ADDRESS:605 RIDGE ST, WASHINGTON IL 61571

40°42'34.9"N 89°24'07.4"W
APN: 020-213-305-002

AHJ: IL - CITY OF WASHINGTON

UTILITY:AMEREN

PRN NUMBER: LSS-004535

ILLUMINE i
Because quality matters

COVER PAGE

DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	T-1

INSTALLATION NOTES

1.STRUCTURAL ROOF MEMBER LOCATIONS ARE ESTIMATED AND SHOULD BE LOCATED AND VERIFIED BY THE CONTRACTOR WHEN LAG BOLT PENETRATION OR MECHANICAL ATTACHMENT TO THE STRUCTURE IS REQUIRED.
2.ROOFTOP PENETRATIONS FOR SOLAR RACKING WILL BE COMPLETED AND SEALED WITH APPROVED SEALANT PER CODE BY A LICENSED CONTRACTOR.
3.LAGS MUST HAVE A MINIMUM 2.5" THREAD EMBEDMENT INTO THE STRUCTURAL MEMBER.
4.ALL PV RACKING ATTACHMENTS SHALL BE STAGGERED BY ROW BETWEEN THE ROOF FRAMING MEMBERS AS NECESSARY.
5.ROOF MOUNTED STANDARD RAIL REQUIRES ONE THERMAL EXPANSION GAP FOR EVERY RUN OF RAIL GREATER THAN 40'.
6.ALL CONDUCTORS AND CONDUITS ON THE ROOF SHALL BE MINIMUM 2.5" ABOVE THE ROOF SURFACE (INCLUDING CABLES UNDERNEATH MODULES AND RACKING).
7.THE PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL OR BUILDING ROOF VENTS.

ROOF ACCESS PATHWAYS AND SETBACKS:
IFC 605.11.1.2.2 HIP ROOF LAYOUTS
PANELS AND MODULES INSTALLED ON GROUP R-3 BUILDINGS WITH HIP ROOF LAYOUTS SHALL BE LOCATED IN A MANNER THAT PROVIDES TWO, 3-FOOT WIDE ACCESS PATHWAYS FROM THE EAVE TO THE RIDGE ON EACH ROOF SLOPE WHERE PANELS AND MODULES ARE LOCATED. THE ACCESS PATHWAY SHALL BE AT A LOCATION ON THE BUILDING CAPABLE OF SUPPORTING THE FIRE FIGHTERS ACCESSING THE ROOF.

IFC 605.11.1.2.3 SINGLE-RIDGED ROOFS
PANELS AND MODULES INSTALLED ON GROUP R-3 BUILDINGS WITH A SINGLE RIDGE SHALL BE LOCATED IN A MANNER THAT PROVIDES TWO, 3-FOOT WIDE ACCESS PATHWAYS FROM THE EAVE TO THE RIDGE ON EACH ROOF SLOPE WHERE PANELS AND MODULES ARE LOCATED.

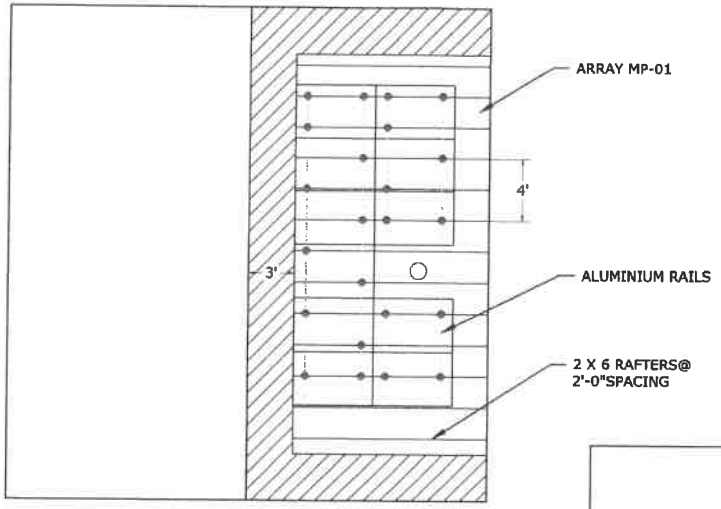
IFC 605.11.1.2.4 ROOFS WITH HIPS AND VALLEYS
PANELS AND MODULES INSTALLED ON GROUP R-3 BUILDINGS WITH ROOF HIPS AND VALLEYS SHALL NOT BE LOCATED CLOSER THAN 18 INCHES TO A HIP OR A VALLEY WHERE PANELS/MODULES ARE TO BE PLACED ON BOTH SIDES OF A HIP OR VALLEY. WHERE PANELS ARE TO BE LOCATED ON ONLY ONE SIDE OF A HIP OR VALLEY THAT IS OF EQUAL LENGTH, THE PANELS SHALL BE PERMITTED TO BE PLACED DIRECTLY ADJACENT TO THE HIP OR VALLEY.

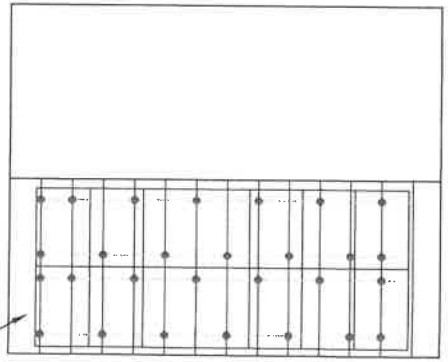
EXCEPTION: THESE REQUIREMENT SHALL NOT APPLY TO ROOFS WITH SLOPES OF TWO UNITS VERTICAL IN 12 UNITS HORIZONTAL (2:12) OR LESS.

SITE INFORMATION - WIND SPEED: 115 MPH AND SNOW LOAD: 20 PSF

SR. NO	AZIMUTH	PITCH	NO. OF MODULES	ARRAY AREA (SQ. FT.)	ROOF TYPE	ATTACHMENT	ROOF EXPOSURE	FRAME TYPE	FRAME SIZE	FRAME SPACING	MAX RAIL SPAN	OVER HANG
MP-01	93°	14°	11	192.9	COMPOSITION SHINGLE	FLASHKIT PRO	ATTIC	RAFTERS	2 X 6	2'-0"	4'-0"	2'-0"
MP-02	183°	14°	14	245.5	COMPOSITION SHINGLE	FLASHKIT PRO	ATTIC	RAFTERS	2 X 6	2'-0"	4'-0"	2'-0"

NOTE:
1.ATTACHMENT PLACEMENTS ARE APPROXIMATIONS
2.PENETRATIONS ARE STAGGERED





LICENSED STRUCTURAL ENGINEER
WELLS L. HOLMES
081.008195
STATE OF ILLINOIS

08/12/2019
License Expires: 11-30-2020

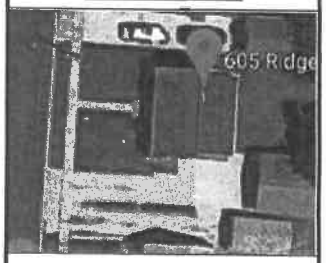
VECTOR ENGINEERS
651 W. GALENA PARK BLVD. STE. 101
DRAPER, UTAH 84020
PHONE (801) 990-1775
WWW.VECTORSE.COM

Vector Structural Engineering has reviewed the existing structure with loading from the solar array and lag screw connections to the existing framing. The design of the racking system, connections, and all other structure is by others. Mechanical, architectural, and all other nonstructural aspects of the design are by others. Electrical is by others, unless stamped by Dean Levorsen.

VSE Project Number: U2278-0491-191
Firm License Number: 184.005810 - COA

SCALE:1/8" = 1'-0"

AERIAL VIEW



LEGACY SOLAR

CUSTOMER INFORMATION

NAME:ALEX TARTER

ADDRESS:605 RIDGE ST, WASHINGTON IL 61571

40°42'34.9"N 89°24'07.4"W
APN: 020-213-305-002

AHJ: IL - CITY OF WASHINGTON

UTILITY:AMEREN

PRN NUMBER: LSS-004535

ILLUMINE i
Because quality matters

MOUNTING DETAIL

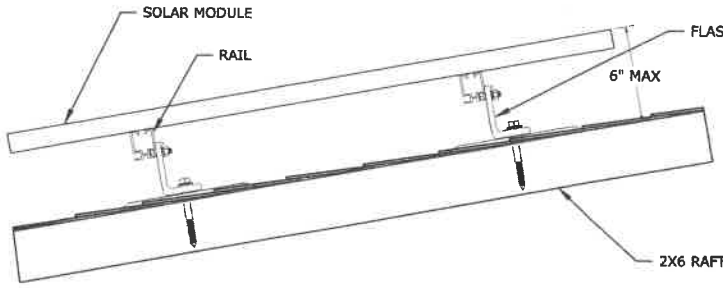
DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	M-1

DEAD LOAD CALCULATIONS

BOM	QUANTITY	LBS/UNIT	TOTAL WEIGHT (LBS)
MODULES	25	42.9	1072.50
MID-CLAMP	40	0.1375	5.50
END-CLAMP	20	0.2425	4.85
RAIL LENGTH	167	0.5625	93.94
SPLICE BAR	6	0.5625	3.38
FLASHKIT PRO	51	1.1023	56.22
TOTAL WEIGHT OF THE SYSTEM (LBS)			1236.38
TOTAL ARRAY AREA ON THE ROOF (SQ. FT.)			438.47
WEIGHT PER SQ. FT.(LBS)			2.82
WEIGHT PER PENETRATION (LBS)			24.24

ATTACHMENT DETAIL-FLASHKIT PRO



VECTOR engineers
651 W. GALENA PARK BLVD. STE. 101 DRAPER, UTAH 84020 PHONE (801) 990-1779 www.vectorse.com

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VSE Project Number: U2278-0491-191

MODULES DATA

SUNPOWER X22-327-E-AC	
MODULE DIMS	61.3"x41.2"x1.2"
LAG SCREWS	5/16"x3.5":2.5"MIN EMBEDMENT

LICENSED STRUCTURAL ENGINEER
WELLS L. HOLMES
081.008195
STATE OF ILLINOIS

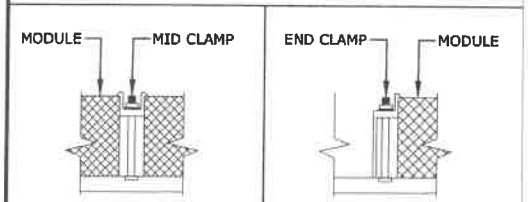
08/12/2019

License Expires: 11-30-2020

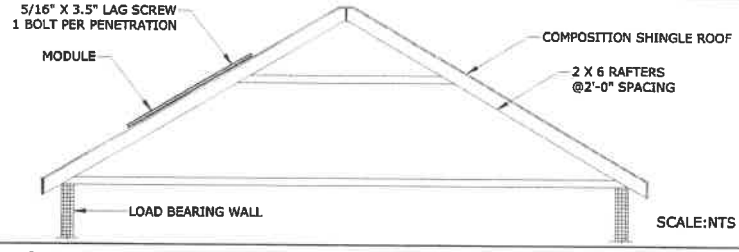
Firm License Number: 184.005810 - COA

LEGACY SOLAR

MID-CLAMP AND END-CLAMP ANATOMY



ROOF FRAMING DETAILS

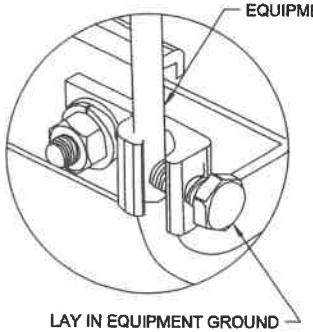


SCALE:NTS

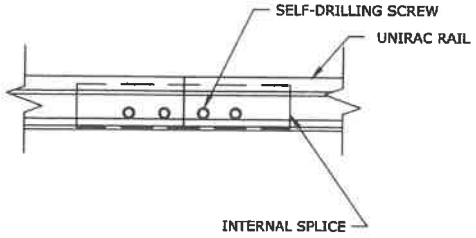
SCALE:NTS

GROUNDING DETAILS

GROUND CONDUTOR ASSEMBLY



RAIL TO RAIL



SCALE: NTS

CUSTOMER INFORMATION

NAME:ALEX TARTER

ADDRESS:605 RIDGE ST, WASHINGTON IL 61571

40°42'34.9"N 89°24'07.4"W
APN: 020-213-305-002

AHJ: IL - CITY OF WASHINGTON

UTILITY:AMEREN

PRN NUMBER: LSS-004535

ILLUMINE i
Because quality matters

STRUCTURAL DETAIL

DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	M-2

WARNING PLACARD

⚠ WARNING

ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

LABEL LOCATION
DC DISCONNECT,INVERTER
[PER CODE: NEC 690.35(F)]
[To be used when inverter is ungrounded]

⚠ WARNING

ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL LOCATION
AC DISCONNECT,POINT OF INTERCONNECTION
[PER CODE: NEC 690.17(E)]

⚠ WARNING

ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION
AC DISCONNECT,POINT OF INTERCONNECTION
[PER CODE: NEC 690.17(E)]

WARNING-Electric Shock Hazard
No User Serviceable Parts inside
Contact authorized service provide for assistance

LABEL LOCATION
INVERTER, JUNCTION BOXES(ROOF),
AC DISCONNECT
[PER CODE: NEC 690.13.G.3 & NEC 690.13.G.4]

WARNING:PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION
CONDUIT, COMBINER BOX
[PER CODE: NEC690.31(G)(3)(4) & NEC 690.13(G)(4)]

PHOTOVOLTAIC SYSTEM AC DISCONNECT SWITCH
RATED AC OPERATING CURRENT 32.75 AMPS AC
AC NOMINAL OPERATING VOLTAGE 221 VAC

LABEL LOCATION
AC DISCONNECT , POINT OF INTERCONNECTION
[PER CODE: NEC 690.54]

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVER-CURRENT DEVICE

LABEL LOCATION
POINT OF INTERCONNECTION
(PER CODE: NEC 705.12(D)(7)
[Not Required if Panel board is rated not less than sum of ampere ratings of all overcurrent devices supplying it]

CAUTION: SOLAR CIRCUIT

LABEL LOCATION
MARKINGS PLACED ON ALL INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLES AT LEAST EVERY 10 FT, AT TURNS AND ABOVE/BELOW PENETRATIONS AND ALL COMBINER/JUNCTION BOXES.
(PER CODE: IFC605.11.1.4)

SOLAR DISCONNECT

LABEL LOCATION
DISCONNECT, POINT OF INTERCONNECTION
[PER CODE: NEC690.13(B)]

⚠ WARNING
DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION
POINT OF INTERCONNECTION
[PER CODE: NEC705.12(D)(4)]

CAUTION: SOLAR ELECTRIC SYSTEM CONNECTED

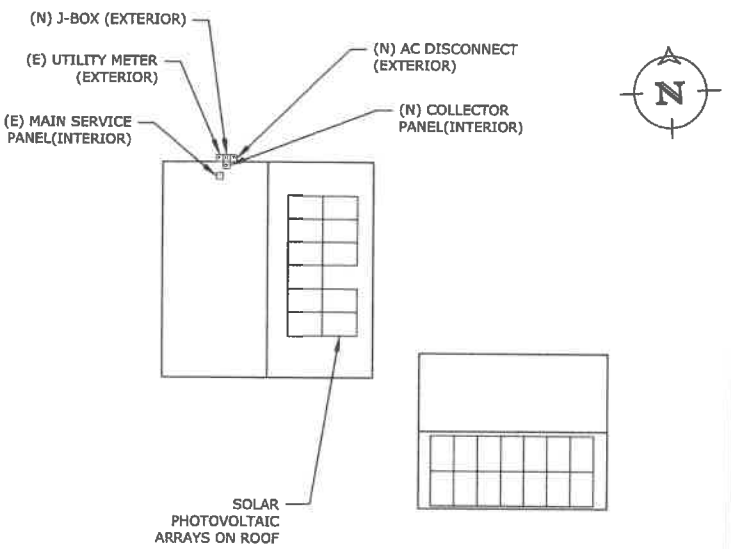
LABEL LOCATION
WEATHER RESISTANT MATERIAL, DURABLE ADHESDIVE, UL969 AS STANDARD TO WEATHER RATING (UL LISTING OF MARKINGS NOT REQUIRED), MIN ⅜" LETTER HEIGHT ARIAL OR SIMILAR FONT NON-BOLD,PLACED WITHIN THE MAIN SERVICE DISCONNECT,PLACED ON THE OUTSIDE OF THE COVER WHEN DISCONNECT IS OPERATED WITH THE SERVICE PANEL CLOSED.
(PWER CODE: NEC690.15 ,690.13(B))

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL LOCATION
AC DISCONNECT , DC DISCONNECT,POINT OF INTERCONNECTION
(PER CODE: NEC690.56(C))

WARNING: ⚠

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



ALL PLACARDS SHALL BE OF WEATHER PROOF CONSTRUCTION, BACKGROUND ON ALL PLACARDS SHALL BE RED WITH WHITE LETTERING U.O.N.
PLACARD SHALL BE MOUNTED DIRECTLY ON THE EXISTING UTILITY ELECTRICAL SERVICE.
FASTENERS APPROVED BY THE LOCAL JURISDICTION

LEGACY SOLAR

CUSTOMER INFORMATION

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ILLUMINE i
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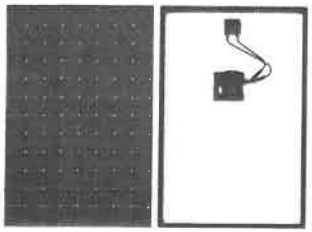
WARNING PLACARDS

DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	PL-1

SPEC SHEET

SUNPOWER®



SunPower® E-Series: E20-327 | E19-320

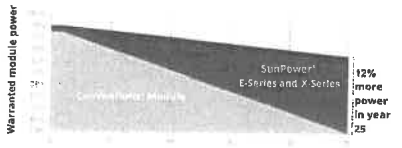
SunPower® Residential AC Module

Built specifically for use with the SunPower Equinox™ system, the only fully integrated solution designed, engineered, and warranted by one manufacturer.

Maximum Power. Minimalist Design.
Industry-leading efficiency means more power and savings per available space. With fewer modules required and hidden microinverters, less is truly more.

Highest Lifetime Energy and Savings.
Designed to deliver 60% more energy over 25 years in real-world conditions like partial shade and high temperatures.[1]

Best Reliability. Best Warranty.
With more than 25 million modules deployed around the world, SunPower technology is proven to last. That's why we stand behind our module and microinverter with the industry's best 25-year Combined Power and Product Warranty, including the highest Power Warranty in solar.



Fundamentally Different. And Better.

The SunPower® Maxeon® Solar Cell
- Enables highest efficiency modules available.[1]
- Unmatched reliability
- Patented solid metal foundation prevents breakage and corrosion

Factory-integrated Microinverter
- Simpler, faster installation
- Integrated wire management, rapid shutdown[2]
- Engineered and calibrated by SunPower for SunPower modules

Datasheet

E-Series: E20-327 | E19-320 SunPower® Residential AC Module

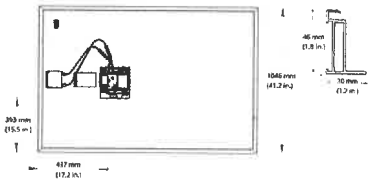
Inverter Model: Enphase IQ 7XS (IQ7XS-96-ACM-US)	@240 VAC	@208 VAC
Peak Output Power	320 VA	320 VA
Max. Continuous Output Power	315 VA	315 VA
Nom. (L-L) Voltage/Range[3] (V)	240 / 211–264	208 / 183–229
Max. Continuous Output Current (A)	1.31	1.51
Max. Units per 20 A (L-L) Br. Circuit	12 (single phase)	10 (two pole) wye
CEC Weighted Efficiency	97.5%	97.0%
Nom. Frequency	60 Hz	
Extended Frequency Range	47–68 Hz	
AC Short Circuit Fault Current Over 3 Cycles	5.8 A rms	
Overvoltage Class AC Port	III	
AC Port Backfeed Current	18 mA	
Power Factor Setting	1.0	
Power Factor (adjustable)	0.7 lead. / 0.7 lag.	

	SPR-E20-327-E-AC	SPR-E19-320-E-AC
Nom. Power[4] (Pnom)	327 W	320 W
Power Tol.	+5/–0%	+5/–0%
Module Efficiency	20.4%	19.9%
Temp. Coef. (Power)	–0.35%/°C	–0.35%/°C
Shade Tol.	• Three bypass diodes • Integrated module-level maximum power point tracking	

Operating Temp.	-40°F to +185°F (-40°C to +85°C)
Max. Ambient Temp.	122°F (50°C)
Max. Load	Wind: 62 psf, 3000 Pa, 305 kgf/m² front & back Snow: 125 psf, 6000 Pa, 611 kgf/m² front
Impact Resistance	1 inch (25 mm) diameter ball at 52 mph (23 m/s)

Solar Cells	96 Monocrystalline Maxeon Gen III
Front Glass	High-transmission tempered glass with anti-reflective coating
Environmental Rating	Outdoor rated
Frame	Class 1 black anodized (highest AAMA rating)
Weight	47.3 lbs (21.5 kg)
Recommended Max Module Spacing	1.3 in (33 mm)

Warranties	• 25-year limited power warranty • 25-year limited product warranty
Certifications and Compliance	• UL 1703 • UL 61215 / IEC 61646 • UL 1741 AC Modules (Type 2 fire rated) • UL 62109-1 / IEC 62109-2 • FCC Part 15 Class B • ICES-0003 Class B • CAN/CSA-C22.2 NO. 107.1-01 • CA Rule 21 (UL 1741 SA) • Included Volt/Var and Reactive Power Priority • UL Listed PV Rapid Shutdown Equipment Enables installation in accordance with: • NEC 690.6 (AC module) • NEC 690.12 Rapid Shutdown (inside and outside the array) • NEC 690.15 AC Connectors, 690.33(A)-(E)(1) When used with InvisiMount racking and InvisiMount accessories (UL 2703): • Module grounding and bonding through InvisiMount • Class A fire rated When used with AC module Q Cables and accessories (UL 5703 and UL 2238): • Rated for load break disconnect
PID Test	Potential-induced degradation free



LISTED Module Fire Performance Type 2

SUNPOWER®

531948 RevA

sunpower.com

LEGACY SOLAR

CUSTOMER INFORMATION

NAME:ALEX TARTER

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AHJ: IL - CITY OF WASHINGTON

UTILITY:AMEREN

PRN NUMBER: LSS-004535

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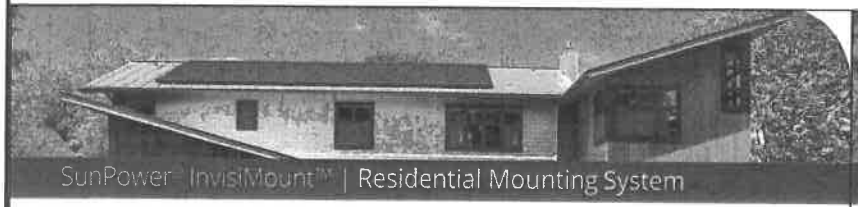
Because quality matters

MODULE SPEC SHEET

DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	SS-1

SPEC SHEET



SunPower InvisiMount™ | Residential Mounting System

Simple and Fast Installation

- Integrated module-to-rail grounding
- Pre-assembled mid and end clamps
- Levitating mid clamp for easy placement
- Mid clamp width facilitates consistent, even module spacing
- UL 2703 Listed integrated grounding

Flexible Design

- Addresses nearly all sloped residential roofs
- Design in landscape and portrait with up to 8' rail span
- Pre-drilled rails and rail splice
- Rails enable easy obstacle management

Customer-Preferred Aesthetics

- #1 module and #1 mounting aesthetics
- Best-in-class system aesthetics
- Premium, low-profile design
- Black anodized components
- Hidden mid clamps and new capped, flush end clamps

Part of Superior System

- Built for use with SunPower DC and AC modules
- Best-in-class system reliability and aesthetics
- New optional rooftop transition flashing, rail-mounted J-box, and wire management rail clips
- Combine with SunPower modules and SunPower EnergyLink™ monitoring app

Elegant Simplicity

SunPower® InvisiMount™ is a SunPower-designed rail-based mounting system. The InvisiMount system addresses residential sloped roofs and combines faster installation time, design flexibility, and superior aesthetics. The InvisiMount product was specifically envisioned and engineered to pair with SunPower modules. The resulting system-level approach amplifies the aesthetic and installation benefits—for homeowners and for installers.

sunpower.com

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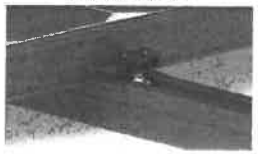
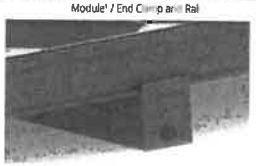
SunPower InvisiMount™ | Residential Mounting System

Module[1] / Mid Clamp and Rail



Module[1] / End Clamp and Rail



Mid Clamp

End Clamp

Rail & Rail Splice

Ground Lug Assembly *(for DC systems only)*

Mid Clamp	Black oxide stainless steel, 300 series	63 g (2.2 oz)
End Clamp	Black anodized aluminum 6000 series	110 g (3.88 oz)
Rail	Black anodized aluminum 6000 series	650 g/m (6 oz/ft)
Rail Splice	Aluminum alloy 6000 series	830 g/m (9 oz/ft)
Ground Lug Assembly	304 stainless steel (A2-70 bolt, tin-plated copper lug)	1065 g/m (3.75 oz)

Temperature	-40° C to 90° C (-40° F to 194° F)	
Max. Load (LRFD)	• 3000 Pa uplift • 6000 Pa downforce	

Application	• Composition Shingle Rafter Attachment • Composition Shingle Roof Decking Attachment • Curved and Flat Tile Roof Attachment • Universal interface for other roof attachments

Mid Clamp	Uplift	664 lbf
	Shear	540 lbf
End Clamp	Uplift	895 lbf
	Shear	220 lbf
Rail	Moment: upward	548 lbf-ft
	Moment: downward	580 lbf-ft
Rail Splice	Moment: upward	548 lbf-ft
	Moment: downward	580 lbf-ft
L-foot	Uplift	1000 lbf
	Shear	300 lbf

Warranties	• 25-year product warranty • 5-year finish warranty
Certifications	• UL 2703 Listed • Class A Fire Rated

Refer to roof attachment hardware manufacturer's documentation.

[1] Module frame that is compatible with the InvisiMount system required for hardware interoperability.

[2] SunPower recommends that all Equinox™, InvisiMount™, and AC module systems always be designed using the SunPower Design Tool. If a designer decides to instead use the component capacities listed in this document to design a system, note that the capacities shown are Load and Resistance Factor Design (LRFD) design loads, and are NOT to be used for Allowable Stress Design (ASD) calculations; and that a licensed Professional Engineer (PE) must then stamp all calculations. Should you have any questions please contact SunPower Technical Support at 1-800 SUNPOWER (1-800-786-7693).

sunpower.com
509506 RevE

SUNPOWER

LEGACY SOLAR

CUSTOMER INFORMATION

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AHJ: IL - CITY OF WASHINGTON

UTILITY:AMEREN

PRN NUMBER: LSS-004535

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RACKING SPEC SHEET

DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	SS-2

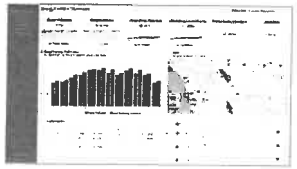
SPEC SHEET

SunPower® EnergyLink™ | Residential and Commercial PVS6

Improve Support, Reduce Maintenance Costs

An intuitive monitoring website enables you to:

- See a visual map of customer sites
- Remotely manage hundreds of sites
- Receive elective system reports
- Locate system issues and remotely diagnose
- Diagnose issues online
- Drill down for the status of individual devices



Add Value for Customers

With the SunPower Monitoring System customers can:

- See what their solar system produces each day, month, or year
- Optimize their solar investment and save on energy expenses
- See their energy use and estimated bill savings
- See their solar system's performance using the SunPower monitoring website or mobile app

SunPower EnergyLink—Plug-and-Play Installation

This complete solution for residential and commercial monitoring and control includes the SunPower® PV Supervisor 6 (PVS6) which improves the installation process, overall system reliability, and customer experience.

- Compact footprint for improved aesthetics
- Robust cloud connectivity and comprehensive local connectivity
- Flexible configuration of devices during installation
- Consumption metering
- Revenue-grade production metering (pending)
- Web-based commissioning
- Remote diagnostics of PVS6 and inverters
- Durable UL Type 3R enclosure reduces maintenance costs
- Easy integration with SunPower eBOS

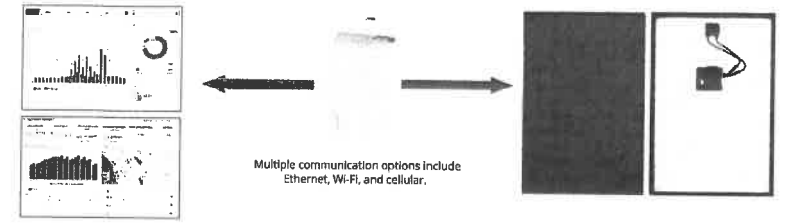
Robust Cloud Connectivity

Multiple options to maintain optimal connectivity:

- Hardwired Ethernet
- Wi-Fi
- Cellular backup

SUNPOWER®

SunPower® EnergyLink™ | Residential and Commercial PVS6



Site Requirements	
Number of SunPower AC modules supported per PVS6	85
Internet access	High-speed Internet access via accessible router or switch
Power	• 100–240 VAC (L-N) 50 or 60 Hz • 208 VAC (L-L in 3-phase) 60 Hz

Operating Conditions	
Temperature	-22°F to +140°F (-30°C to +60°C)
Humidity (maximum)	95% non-condensing

Mechanical	
Weight	5.5 lbs (2.5 kg)
Dimensions	11.8 × 8.0 × 4.2 in. (30.5 × 20.5 × 10.8 cm)
Enclosure rating	UL50E Type 3R

Communication Ports	
RS-485	Inverters and meters
Integrated Metering	• One channel of revenue-grade production metering • Two channels of consumption metering
Ethernet	1 LAN (or optional WAN) port
PLC	PLC for SunPower AC modules
Wi-Fi	802.11b/g/n 2.4 GHz and 5 GHz
Cellular	LTE Cat-M1/3G UMTS
ZigBee	IEEE 802.15.4 MAC 2.4GHz ISM band
Data Storage	60 days
Upgrades	Automatic firmware upgrades

Web and Mobile Device Support	
Customer site	monitor.us.sunpower.com
Partner site	pvsmgmt.us.sunpower.com
Browser	Firefox, Safari, and Chrome
Mobile devices	iPhone®, iPad®, and Android™
Customer app	1. Create account online at: monitor.us.sunpower.com. 2. On a mobile device, download the SunPower Monitoring app from Apple® "App Store℠" or Google Play™ store. 3. Sign in using account email and password.

Warranty and Certifications	
Warranty	10-year Limited Warranty
Certifications	UL, cUL, CE, UL 61010-1 and -2, FCC Part 15 (Class B)

FCC ID: YAW529027

E503346

SUNPOWER®

LEGACY SOLAR

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UTILITY:AMEREN

PRN NUMBER: LSS-004535

ILLUMINE i
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MONITORING SPEC SHEET

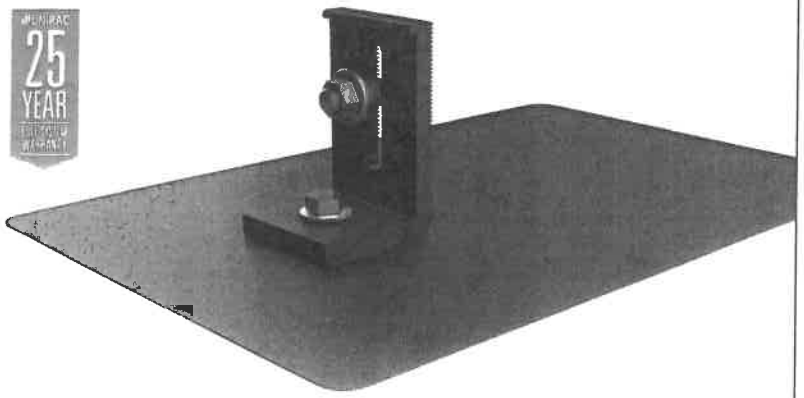
DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	SS-3

FLASHKIT PRO

UNIRAC
FEATURING EcoFasten Solar® TECHNOLOGY

FLASHKIT PRO is the complete attachment solution for composition shingle roofs. Unirac partnered with EcoFasten Solar to bring best-in-class design and performance together in one package. Kitted in 10 packs for maximum convenience, flashings and hardware are available in Mill or Dark finishes. With **FLASH**KIT PRO, you have everything you need for a quick, professional installation.



TRUSTED WATER SEAL FLASHINGS
FEATURING EcoFasten Solar® TECHNOLOGY

YOUR COMPLETE SOLUTION
Flashings, lags, continuous slot L-Feet and hardware

CONVENIENT 10 PACKS
Packaged for speed and ease of handling

THE COMPLETE ROOF ATTACHMENT SOLUTION

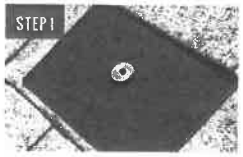
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FLASHKIT PRO

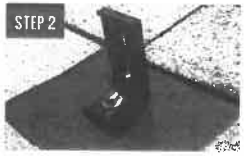
INSTALLATION GUIDE

UNIRAC
FEATURING EcoFasten Solar® TECHNOLOGY

FLASHKIT PRO IS THE COMPLETE FLASHING AND ATTACHMENT SOLUTION FOR COMPOSITION ROOFS.



INSTALL **FLASH**KIT PRO FLASHING



INSTALL L-FOOT

ATTACH L-FOOT TO RAIL

PRE-INSTALL SYSTEM LAYOUT

- Locate rafters and snap horizontal and vertical lines to mark the installation position for each flashing.
- Drill a pilot hole (1/4" diameter) for the lag bolt. Backfill with sealant.

STEP 1 INSTALL **FLASH**KIT PRO FLASHING

- Insert the flashing so the top part is under the next row of shingles and pushed far enough upslope to prevent water infiltration through vertical joint in shingles.
- The leading edge of flashing must butt against upper row of nails to prevent turning when torqued.

QUICK TIP:

- For vertical adjustment when leading edge of flashing hits nails in upper shingle courses, slide flashing up under shingles until leading edge engages nails. Measure remaining distance to adjust upslope.
- Remove flashing and cut a "V" notch at marks where nail shafts engaged leading edge of flashing the distance desired in Step 1. Notch depth not to exceed 2" in length by 1/2" in width.
- Re-install flashing with notched area upslope, and position notched leading edge underneath nail heads.

STEP 2 INSTALL L-FOOT

- Line up pilot hole with **FLASH**KIT PRO fastener hole.
- Insert the lag bolt through the EPDM washer, the top L-101-3 compression bracket, and the gasketed hole in the flashing and into the rafter.
- Torque to 100-140 torque inch-pounds depending on the type of wood and time of year. The visual indicator for proper torque is when the EPDM on the underside of the bonded washer begins to push out the sides as the washer compresses. If using an impact wrench to install the fasteners be careful not to over torque the fastener. You may need to stop and use a ratchet to finish the install.

STEP 3 ATTACH L-FOOT TO RAIL

- Slide the 3/8"-16 racking hardware into rail slot, spacing bolts to match the spacing of the attachments.
- Torque 3/8" nut to 30ft-lbs. Use anti-seize to prevent galling.
- If attaching L-Foot to light rail, ensure the L-Foot does not protrude above the top edge of the rail.

FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

LEGACY SOLAR

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PRN NUMBER: LSS-004535

ILLUMINEi
Because quality matters

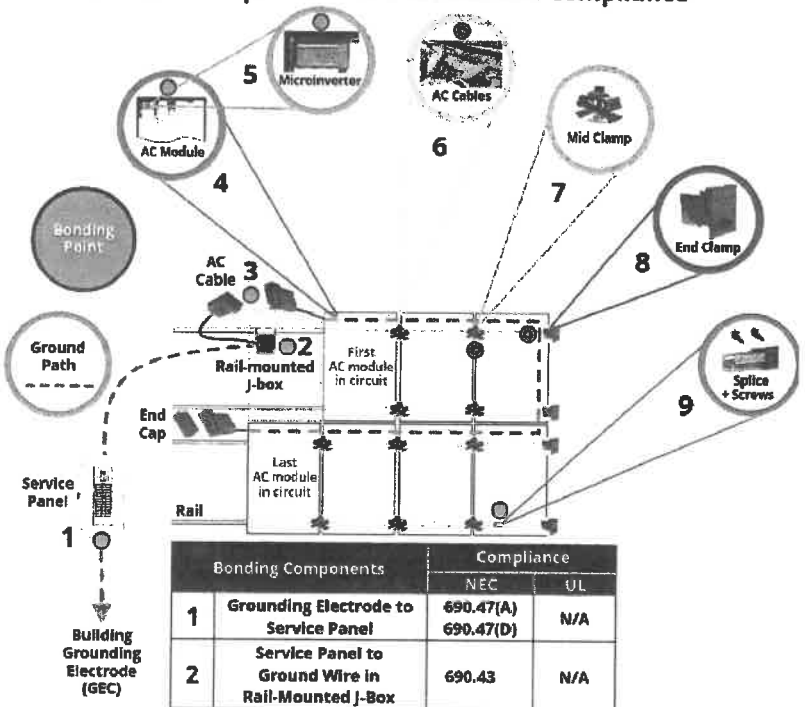
MOUNT SPEC SHEET

DESIGNER/CHECKED BY:
SN/AJ

SCALE:AS NOTED	REV:A
DATE:8/10/19	SS-4

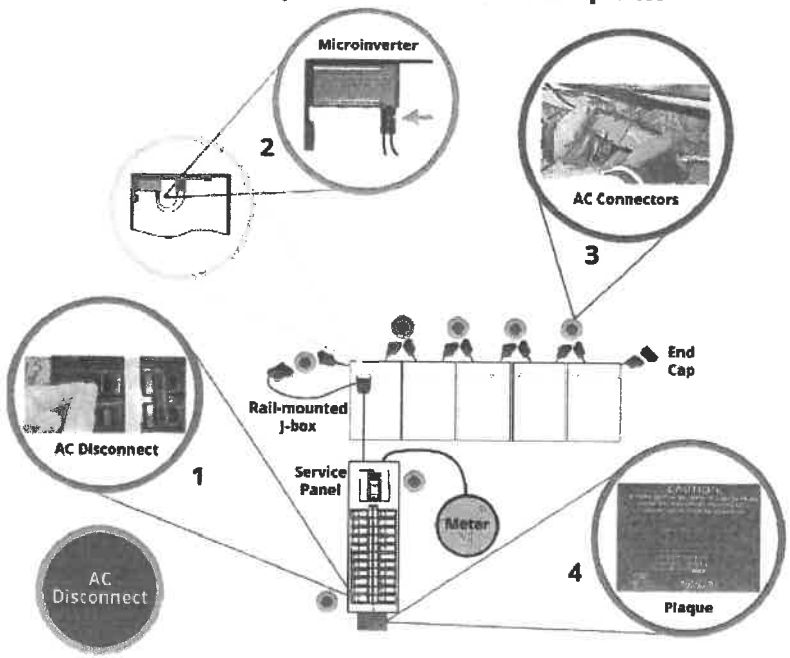
RSD & GROUNDING DETAILS

SunPower Equinox® Ground Path and Compliance



	Bonding Components	Compliance NEC	Compliance UL
1	Grounding Electrode to Service Panel	690.47(A) 690.47(D)	N/A
2	Service Panel to Ground Wire in Rail-Mounted J-Box	690.43	N/A
3	Rail-Mounted J-Box to AC Cable	690.43(A)	2703
4	AC Cable to Microinverter	N/A (part of Listing)	1703 1741
5	Microinverter to AC Module Frame	N/A (part of Listing)	1703 1741
6	AC Cable to AC Cable	690.31(D) 690.43(A) 690.43(D)	1741 6703 9703
7	AC Module Frame to Mid Clamp to Rail	690.43(A) 690.43(C) 690.43(D)	2703
8	AC Module Frame to End Clamp to Rail	690.43(A) 690.43(C) 690.43(D)	2703
9	Rail to Splice	690.43(A) 690.43(C) 690.43(D)	2703

SunPower Equinox® Disconnects and Compliance



	Compliance	NEC
1	AC Disconnect in Service Panel	690.12 690.15(A)(3)
2	DC Disconnect (factory wiring)	N/A (Part of the internal UL Listed AC Module assembly; not field wired.)
3	AC Connectors as Disconnects	690.15(A)(2) 690.33
4	Plaque	690.15(A)(4) 690.12 690.56(B) 705.10 Exception

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RSD AND GROUNDING DETAILS

DESIGNER/CHECKED BY:
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SCALE:AS NOTED | REV:A

DATE:8/10/19 | SS-5