

Rec'd
CP # 800169
#50 mm

TOWN OF PLAINFIELD ZONING AND BUILDING PERMIT APPLICATION



Property Owner:

Name: Smith, Elizabeth & Ahonen, Cory Phone: 603-667-629

Street: 341 Bean Road Email: cahonen@gmail.com

City State Zip: Plainfield, NH 03781

Project: **Permit Type:** (Check one) Building Zoning

Street Address: 341 Bean Road

Tax Map: 250 Lot Number: 007 Lot Acreage: 46 Zoning District: Rural Residential (RR)

Proposed project distances to property lines (in feet): Front: Rear: Side: Side:

State Approved Septic Design #: Driveway Permit #:

Please provide a written description of the project including appropriate dimensions: A roof mounted 8.775kW PV array mounted on the barn. Consisting of (27) REC N-Peak 325 Watt modules and a SolarEdge SE7600H-RGM inverter

Contractor Information:

Builder:	Electrician:	Plumber:
Name: <u> </u>	Name: <u>ReVision Energy / William Levay</u>	Name: <u> </u>
Phone: <u> </u>	Phone: <u>603-632-1263</u>	Phone: <u> </u>

Applicant Signature: *A. Ahonen* Date:

Required Attachments:
Please provide a copy of plans detailing the project. Hand-drawn plans can be used if necessary. Permits cannot be issued without receipt of the proper fee. If you are unsure of the amount due or have any questions about your application, contact the town office (603-469-3201).

TOWN USE: Current Use: Yes / No ZBA: Yes / No PB: Yes / No

BOARD OF SELECTMEN ACTION

Reviewed By Building Inspector or Zoning Administrator _____

_____ Approved _____ Denied

Permit #: _____ Date: _____

PROJECT SUMMARY:

THE PROJECT SCOPE INCLUDES THE DESIGN, SPECIFICATION, PROCUREMENT, INSTALLATION AND COMMISSIONING OF A COMPLETE, TURN-KEY, GRID-TIED PHOTOVOLTAIC ELECTRIC SYSTEM.

MODULE TYPE	(27) REC N-PEAK 325
INVERTER	(1) SE7600H-US
OPTIMIZER	(27) SOLAREEDGE P540
ARRAY PITCH	45°
ARRAY AZIMUTH	173°
RACKING	BLACK IRONRIDGE XR100 ALUMINUM RAIL
ATTACHMENT	SNAPRACK WIDE STANDING SEAM CLAMPS AND ALUMINUM L-FEET

AUTHORITIES HAVING JURISDICTION:

BUILDING AUTHORITY	PLAINFIELD NH
ELECTRICAL AUTHORITY	PLAINFIELD NH
ZONING/PLANNING AUTHORITY	PLAINFIELD NH
ELECTRICAL UTILITY	LIBERTY

DESIGN CRITERIA:

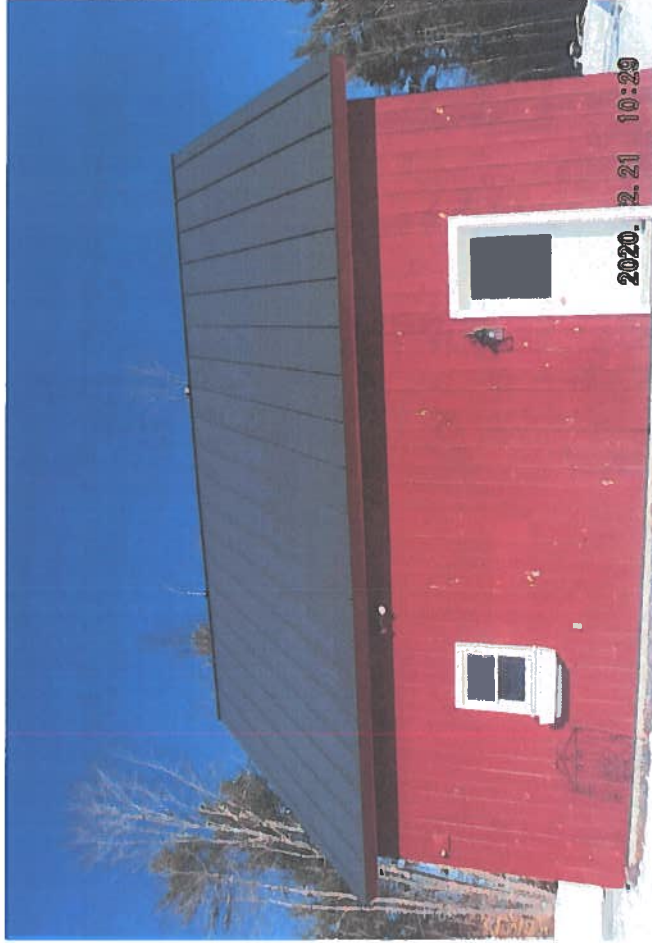
OCCUPANCY	RESIDENTIAL
DESIGN WIND LOAD	115 MPH
RISK CATEGORY	I
GROUND SNOW LOAD	90 PSF
EXPOSURE CATEGORY	C
ROOF HEIGHT	12' ABOVE GRADE TO EAVES
ROOF COMPOSITION	STANDING SEAM STEEL
RAFTER	2'X8"
RAFTER SPACING	16" O.C.

SHEET LIST:

G001	TITLE SHEET
A001	SITE PLAN
A002	MODULE LAYOUT
E001	ONE-LINE DIAGRAM

GENERAL NOTES:

1. ALL WORK SHALL COMPLY WITH LOCAL AND STATE ORDINANCES AND BUILDING CODES.
2. ELECTRICAL INSTALLATION SHALL COMPLY WITH STATE AND LOCALLY ADOPTED ELECTRICAL CODE.
3. ROOFTOP PENETRATIONS SHALL BE SEALED.
4. ALL EQUIPMENT SHALL BE LISTED AND TESTED BY A RECOGNIZED LABORATORY.
5. SYSTEM SHALL CONFORM TO RAPID SHUTDOWN REQUIREMENTS PER NEC 690.
6. CONDUIT RUNS BETWEEN SUB-ARRAYS, COMBINERS, AND DISCONNECTS SHALL BE INSTALLED IN THE MOST DIRECT ROUTE POSSIBLE.
7. ELECTRICAL EQUIPMENT SHALL BE INSTALLED TO MAINTAIN CLEARANCES REQUIRED BY NEC 110.
8. EQUIPMENT SHALL BE LABELED PER NEC 2017 REQUIREMENTS.



78 MAIN STREET
ENFIELD, NH 03748
(603)-632-1263

CLIENT:

ELIZABETH SMITH
341 BEAN RD
PLAINFIELD NH, 03781

SYSTEM TYPE:

8.775KW GRID TIED SOLAR
PHOTOVOLTAIC SYSTEM

DESIGNED BY:	MCF
REVISION:	0
PRINT SIZE:	11" X 17"
DATE:	2/27/2020
TITLE:	

TITLE SHEET

TITLE NUMBER

G001

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THIS DIAGRAM IS PROVIDED AS A SERVICE AND IS BASED ON THE INFORMATION SUPPLIED TO US. IT IS SUBJECT TO CHANGE BASED ON A CHANGE OF CONDITIONS, PERMITS, LOCAL, STATE, FEDERAL, AND LOCAL ELECTRICAL CODES AND LOCAL GOVERNMENTAL AUTHORITIES.



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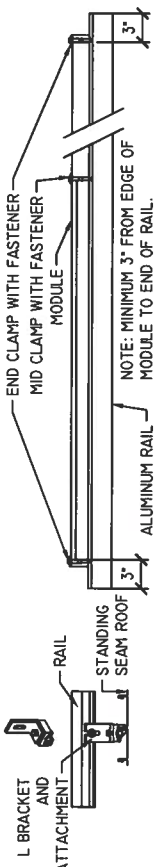
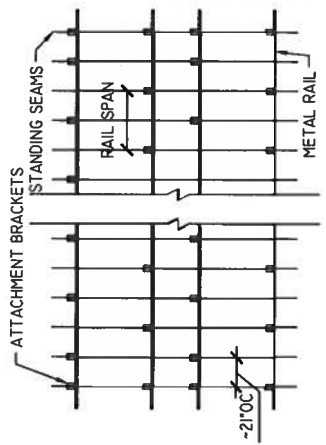
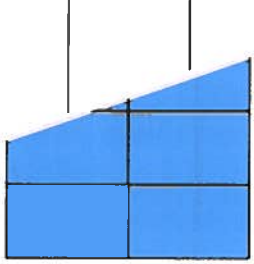
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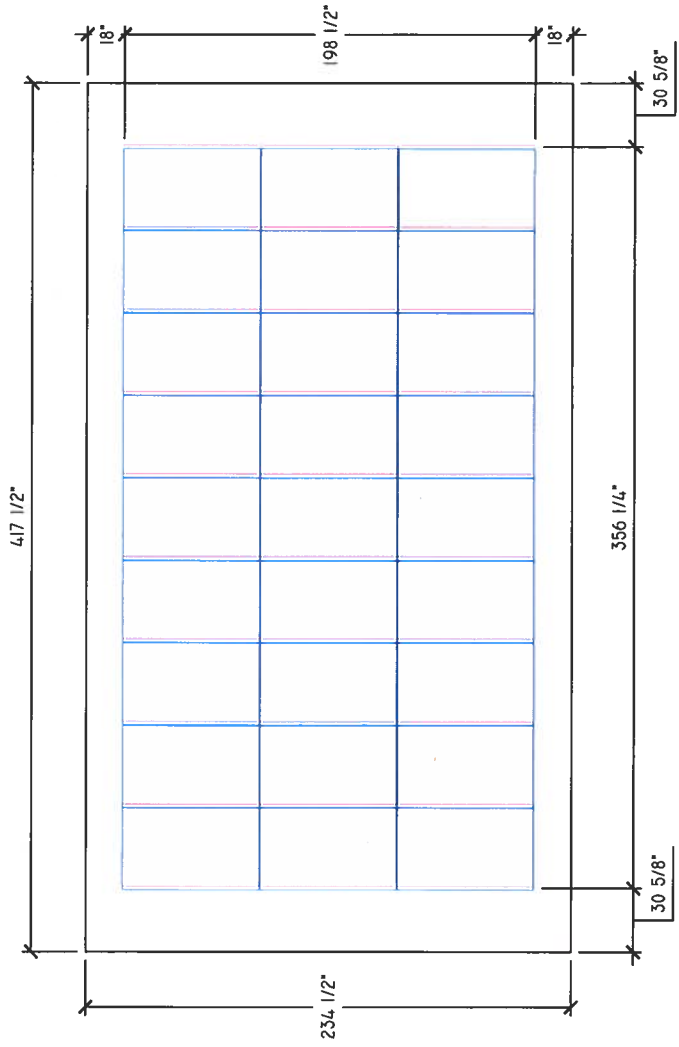
DESIGNED BY: MCF
REVISION: 0
PRINT SIZE: 11" X 17"
DATE: 2/27/2020
DWG TITLE: MODULE LAYOUT

THIS DIAGRAM IS PROVIDED AS A REPRESENTATION OF THE INFORMATION SUPPLIED. IT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE APPLICABLE EDITIONS OF THE NATIONAL ELECTRICAL CODE, AND LOCAL GOVERNMENTAL AUTHORITIES.

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A002



- ATTACHMENT NOTES:
1. MAXIMUM RAIL LENGTH IS 100' BEFORE EXPANSION GAP IS REQUIRED.
 2. MAXIMUM RAIL SPAN IS TYPICALLY 4'. THIS DISTANCE WILL VARY BASED ON ROOF SLOPE, SNOW LOAD, WIND SPEED, AND EXPOSURE CATEGORY.
 3. MAXIMUM RAIL CANTILEVER DISTANCE IS 0.40 X RAIL SPAN.
 4. SEAL ALL ATTACHMENT POINTS WITH GEOCELL. SEALS SHALL BE WATERTIGHT BETWEEN THE ATTACHMENT BRACKETS, ROOF MATERIAL AND STRUCTURAL MEMBERS.
 5. ROOF ATTACHMENTS SHALL BE STAGGERED FOR EVEN DISTRIBUTION OF LOAD ON ROOF RAFTERS.
 6. CLEARANCE BETWEEN THE ROOF AND THE BOTTOM OF THE RAIL SHALL BE A MINIMUM OF 2".

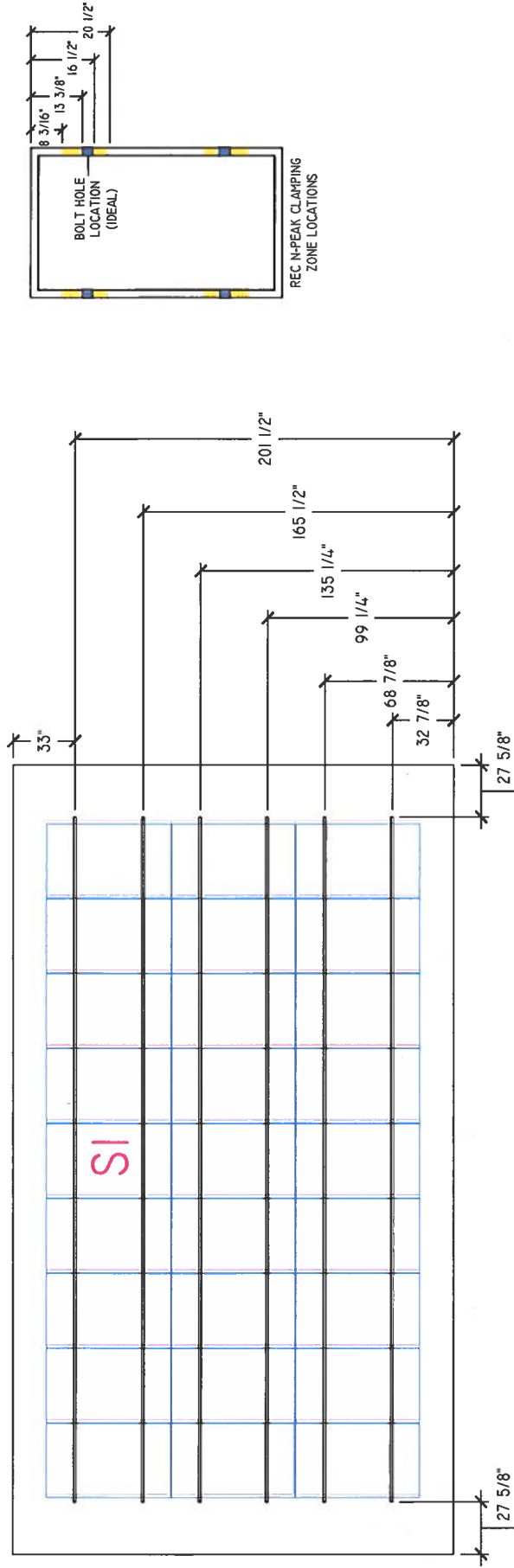


SUMMARY			
TYPE	PRODUCT	DIMENSIONS	QUANTITY
MODULE:	REC N-PEAK 325	39.25IN X 65.94IN	27
RAIL:	IRON RIDGE XR100	24.8 IN	(6) FULL (6) CUT
FASTENERS:	IRON RIDGE UFO	0.375 IN	60 MIN

INVERTER	WATTS / STRING	MAX MODS PER STRING
SE7600H-US	6000	18

RAIL LENGTH								
RAIL SECTION TAG	NUMBER OF RAIL SECTIONS	QTY OF PANELS IN SECTION	RAFTER SPACING	MODULE ORIENTATION	RAIL ORIENTATION	RAIL LENGTH (IN)	FULL STICKS	CUT PIECE (IN)
SI	6	9	16"	PORTRAIT	HORIZONTAL	362 1/4	1	(1) 114 1/4

CUT LIST		
RAIL LENGTH (IN)	QTY	
FULL	6	
114 1/4	6	



ELIZABETH SMITH
 341 BEAN RD
 PLAINFIELD NH, 03781



February 21, 2020

To: ReVision Energy
7 Commercial Drive
Brentwood, NH 03833

Subject: Structural Certification for Installation of Solar Panels
Ahonen Residence
341 Bean Road
Plainfield, NH. 03781

To Whom It May Concern,

A design check for the subject residence was done on the existing roofing and framing systems for the installation of solar panels over the roof. From a field inspection of the property, the existing roof support structures were observed by the client's auditors as follows:

The roof structure of (MP1) consists of metal roofing over a layer of composition shingles on roof plywood that is supported by nominal 2x8 rafters @ 16" o.c.. The rafters have a max projected horizontal span of 11'-7", with a slope of 45 degrees. The rafters are connected at the ridge to a continuous 2x10 ridge board and are supported at the eave by a load bearing wall. There are double 2x6 collar ties @ 10'-0" o.c. for structural stability.

The existing roof framing system of (MP1) is judged to be adequate to withstand the loading imposed by the installation of the solar panels. No reinforcement is necessary.

The spacing of the solar standoffs should be kept at 42" o.c. with a staggered pattern to ensure proper distribution of loads.

I further certify that all applicable loads required by the codes and design criteria listed below were applied to the Ironridge solar rail system and analyzed. Furthermore, the installation crews have been thoroughly trained to install the solar panels based on the specific roof installation instructions developed by Ironridge for the racking system and S-51 for the roof connections. Finally, I accept the certifications indicated by the solar panel manufacturer for the ability of the panels to withstand high wind and snow loads.

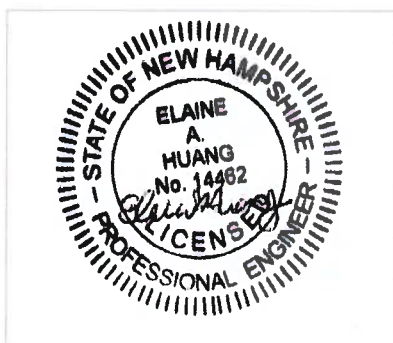
Design Criteria:

- Applicable Codes = 2015 IBC/IRC, ASCE 7-10, and 2015 NDS
- Roof Dead Load = 10.27 psf (MP1)
- Roof Live Load = 20 psf
- Wind Speed = 115 mph, Exposure C
- Ground Snow Load = 90 psf - Roof Snow Load = 44.1 psf

Please contact me with any further questions or concerns regarding this project.

Sincerely,

Elaine Huang, P.E.
Project Engineer



Wind Calculations Per ASCE 7-10 Components and Cladding

Input Variables	
Wind Speed	115 mph
Exposure Category	C
Roof Shape	Gable/Hip
Roof Slope	45 degrees
Mean Roof Height	20 ft
Building Least Width	40 ft
Effective Wind Area	17.5 ft

Design Wind Pressure Calculations	
Wind Pressure $P = qh*(G*Cp)$	
$qh = 0.00256 * Kz * Kzt * Kd * V^2 * I$	(Eq. 30.3-1)
Kz (Exposure Coefficient) = 0.9	Table 30.3-1
Kzt (topographic factor) = 1	(Fig. 26.8-1)
Kd (Wind Directionality Factor) = 0.85	Table 26.6-1
V (Design Wind Speed) = 115 mph	
I Importance Factor = 1	(Table 1.5-1)
$qh = 25.90$	

Standoff Uplift Calculations					
	Zone 1	Zone 2	Zone 3	Positive	
G_{Cp} =	-0.90	-1.10	-1.10	0.85	(Fig. 6-11)
Uplift Pressure =	-23.31 psf	-28.49 psf	-28.49 psf	22.0 psf	
X Standoff Spacing =	3.50	3.50	3.50		
Y Standoff Spacing =	2.75	2.75	2.75		
Tributary Area =	9.63	9.63	9.63		
Footing Uplift =	-224 lb	-274 lb	-274 lb		

Standoff Uplift Check	
Maximum Design Uplift =	-274 lb
Standoff Uplift Capacity =	400 lb
400 lb capacity > 274 lb demand Therefore, OK	

Fastener Uplift Capacity Check	
Fastener = 1 - 5/16" dia Lag	
Number of Fasteners =	1
Embedment Depth =	2.5
Pullout Capacity Per Inch =	205 lb (NDS Eq 12.2-1)
Fastener Capacity =	513 lb (NDS Eq 11.3-1)
w/ F.S. of 1.0 = 513 lb	
513 lb capacity > 274 lb demand Therefore, OK	

Fastener Shear Capacity Check		
Embedment Depth Reduction Factor	1	
Lateral Force From Gravity Loads	300	
Attachment Lateral Capacity	288	(NDS Table 12K)
288 lb capacity > 301 lb demand Therefore, OK		

SOLAR'S MOST TRUSTED



REC N-PEAK SERIES

PREMIUM MONO N-TYPE
SOLAR PANELS WITH
WORLD-CLASS PERFORMANCE



MONO N-TYPE: THE
MOST EFFICIENT C-SI
TECHNOLOGY



NO LIGHT INDUCED
DEGRADATION



SUPER-STRONG
FRAME UP TO 7000 PA
SNOW LOAD



FLEXIBLE
INSTALLATION
OPTIONS



IMPROVED
PERFORMANCE IN
SHADED CONDITIONS



GUARANTEED HIGH
POWER OVER LIFETIME



330 W_P

POWER

20

YEAR PRODUCT
WARRANTY

0.5%

ANNUAL DEGRADATION OVER
25 YEAR POWER WARRANTY

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US

INVERTERS



Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Extremely small
- Built-in module-level monitoring
- Outdoor and indoor installation
- Optional: Revenue grade data, ANSI C12.20 Class 0.5 (0.5% accuracy)

/ Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

SE3000H-US SE3800H-US SE5000H-US SE6000H-US SE7600H-US SE10000H-US SE11400H-US

ADDITIONAL FEATURES

Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)
Revenue Grade Data, ANSI C12.20	Optional ¹⁾
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi station for local connection
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect

STANDARD COMPLIANCE

Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCE according to T.I.L. M-07
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)
Emissions	FCC Part 15 Class B

INSTALLATION SPECIFICATIONS

AC Output Conduit Size / AWG Range	3/4" minimum / 14-6 AWG		3/4" minimum / 14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	3/4" minimum / 1-2 strings / 14-6 AWG		3/4" minimum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174		21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10	25.1 / 11.4	26.2 / 11.9	38.8 / 17.6	lb / kg
Noise	< 25		< 50		dB(A)
Cooling	Natural Convection				
Operating Temperature Range	-40 to +140 / -40 to +60 ²⁾				°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)				

¹⁾ Revenue grade inverter P/N: SExxxxH-US000BNC4

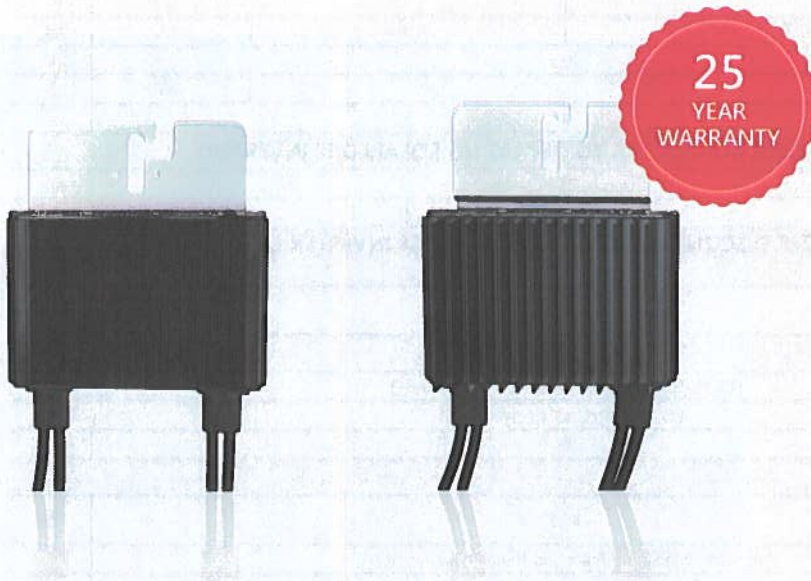
²⁾ Full power up to at least 50°C / 122°F; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505

POWER OPTIMIZER



PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety