Freedom Forever
Planset Revision Letter

12/11/2023
REV #1

Attn. County of Columbia (FL):

The changes outlined in Revision Details have been applied to the plans corresponding to the following customer:

PATRICIA HALE
253 SOUTHWEST HUNTINGTON GLEN , LAKE CITY, FL 32024

Revision Details:

1. POI changed to PV breaker inside existing MSP - page PV-4

All corresponding changes are notated on the plans by revision clouds.

Thank you for your time in reviewing these plans. Please reach out if you have any additional questions or concerns.

Construction Engineering
Freedom Forever
engineering@freedomforever.com

BARUN CORP

December 11, 2023

Dear Whom It May Concern,

Project Name : PATRICIA HALE, 253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024

Installation of a 8.4 kW (DC) Rooftop PV Solar System

Per Florida Statute 377-705 (revised 7/01/2017), I, Ricardo Pino, P.E., a licensed engineer pursuant to Chapter 471, certify that the PV electrical system and electrical components are designed and approved using the code requirements and standards contained in the Florida Building Code.

If you have any questions regarding this project, please feel free to contact me.

Sincerely,

Ricardo Pino, P.E.
ricardop@baruncorp.com

Date: 2023.12.11
09:17:58 -05'00'

This item has been digitally signed and sealed by Ricardo E. Pino on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROJECT COMPLIES WITH THE FOLLOWING:
2020 7TH EDITION FLORIDA BUILDING CODE: BUILDING
2020 7TH EDITION FLORIDA BUILDING CODE: RESIDENTIAL
2020 7TH EDITION FLORIDA BUILDING CODE: MECHANICAL
2020 7TH EDITION FLORIDA BUILDING CODE: PLUMBING
2020 7TH EDITION FLORIDA BUILDING CODE: FUEL GAS
2020 7TH EDITION FLORIDA BUILDING CODE: ENERGY CONSERVATION
2020 7TH EDITION FLORIDA BUILDING CODE: EXISTING BUILDING
2020 7TH EDITION FLORIDA BUILDING CODE: ACCESSIBILITY
2020 7TH EDITION FLORIDA FIRE PREVENTION CODE (NFPA)
2017 NATIONAL ELECTRIC CODE (NEC)
AS ADOPTED BY COUNTY OF COLUMBIA (FL)

VICINITY MAP:

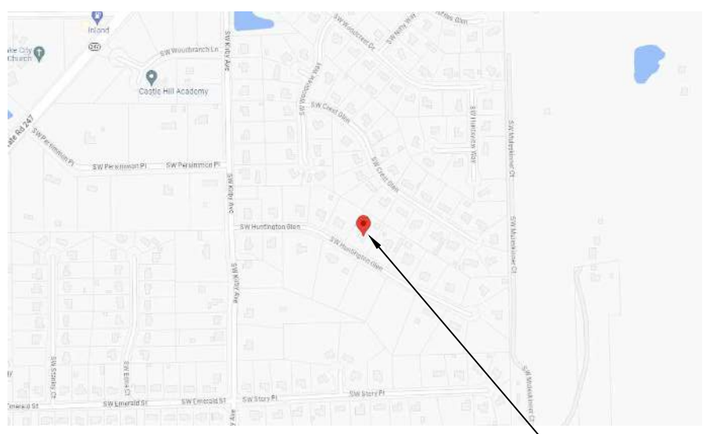


TABLE OF CONTENTS:

CONSTRUCTION NOTES:

CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS.
ALL SOLAR ENERGY SYSTEM EQUIPMENT SHALL BE SCREENED TO THE MAXIMUM EXTENT POSSIBLE AND SHALL BE PAINTED A COLOR SIMILAR TO THE SURFACE UPON WHICH THEY ARE MOUNTED.
MODULES SHALL BE TESTED , LISTED AND INDENTIFIED WITH FIRE CLASSIFICATION IN ACCORDANCE WITH UL 2703. SMOKE AND CARBON MONOXIDE ALARMS ARE REQUIRED PER SECTION R314 AND 315 TO BE VERIFIED AND INSPECTED BY INSPECTOR IN THE FIELD.
DIG ALERT (811) TO BE CONTACTED AND COMPLIANCE WITH EXCAVATION SAFETY PRIOR TO ANY EXCAVATION TAKING PLACE
PHOTOVOLTAIC SYSTEM GROUND WILL BE TIED INTO EXISTING GROUND AT MAIN SERVICE FROM DC DISCONNECT/INVERTER AS PER 2017 NEC SEC 250.166(A).
SOLAR PHOTOVOLTAIC SYSTEM EQUIPMENT WILL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF ART. 690 OF THE 2017 NEC
THE MAIN SERVICE PANEL WILL BE EQUIPPED WITH A GROUND ROD OR UFER
UTILITY COMPANY WILL BE NOTIFIED PRIOR TO ACTIVATION OF THE SOLAR PV SYSTEM
SOLAREDGE OPTIMIZERS ARE LISTED TO IEC 62109-1 (CLASS II SAFETY) AND UL 1741 STANDARDS
INSTALL CREW TO VERIFY ROOF STRUCTURE PRIOR TO COMMENCING WORK. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNT.

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 119
WIND EXPOSURE: C

Date: 2023.12.11 09:19:38 -05'00'

RICARDO E. PINO LICENSE No. 91113 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Ricardo E. Pino on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Columbia County Building Department Plans Reviewed for Code Compliance State of Florida

CLIENT:
PATRICIA HALE
253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024
AHJ: COUNTY OF COLUMBIA (FL)
UTILITY: "CLAY ELECTRIC COOPERATIVE, INC. (FL)"
METER: 156212732
APN: 11-4S-16-02905-206
PHONE: 3867587857
EMAIL: PGHALE@COMCAST.NET

SYSTEM:
SYSTEM SIZE (DC): 21 X 400 = 8.400 kW
SYSTEM SIZE (AC): 6.000 kW @ 240V
MODULES: 21 X FREEDOM FOREVER: FF-MP-BBB-400
OPTIMIZERS: 21 X SOLAREDGE S440
INVERTER: SOLAREDGE SE6000H-USRGM [SI1]

	REVISIONS	
NO.	REVISED BY	DATE
1	A.M.	12/11/2023
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

SITE LOCATION

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-1

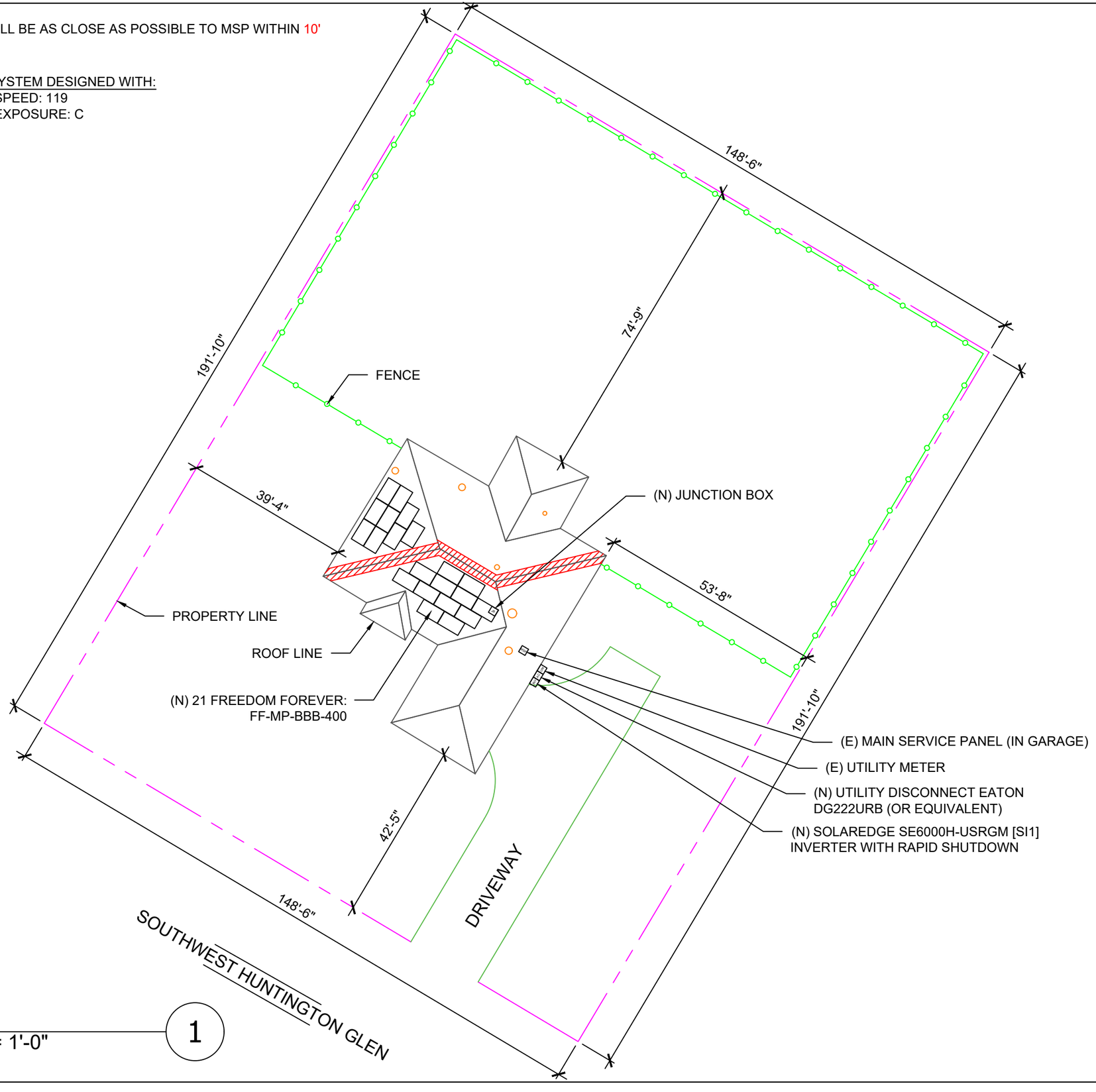
LEGEND:

- OBSTRUCTION
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- MSP — MSP
- JB — JUNCTION BOX
- INV — INVERTER
- PM — PRODUCTION METER

PV SYSTEM
8.400 kW-DC
6.000 kW-AC

BOS WILL BE AS CLOSE AS POSSIBLE TO MSP WITHIN 10'

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 119
WIND EXPOSURE: C



SITE PLAN
SCALE: 1/24" = 1'-0"

1

RICARDO E. PINO
LICENSE
No. 91113
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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ROOF AREA: 3309 SQ FT

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253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024
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EC13008056

SITE PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-2

LEGEND:

- OBSTRUCTION
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- MSP — MSP
- JB — JUNCTION BOX
- INV — INVERTER
- PM — PRODUCTION METER

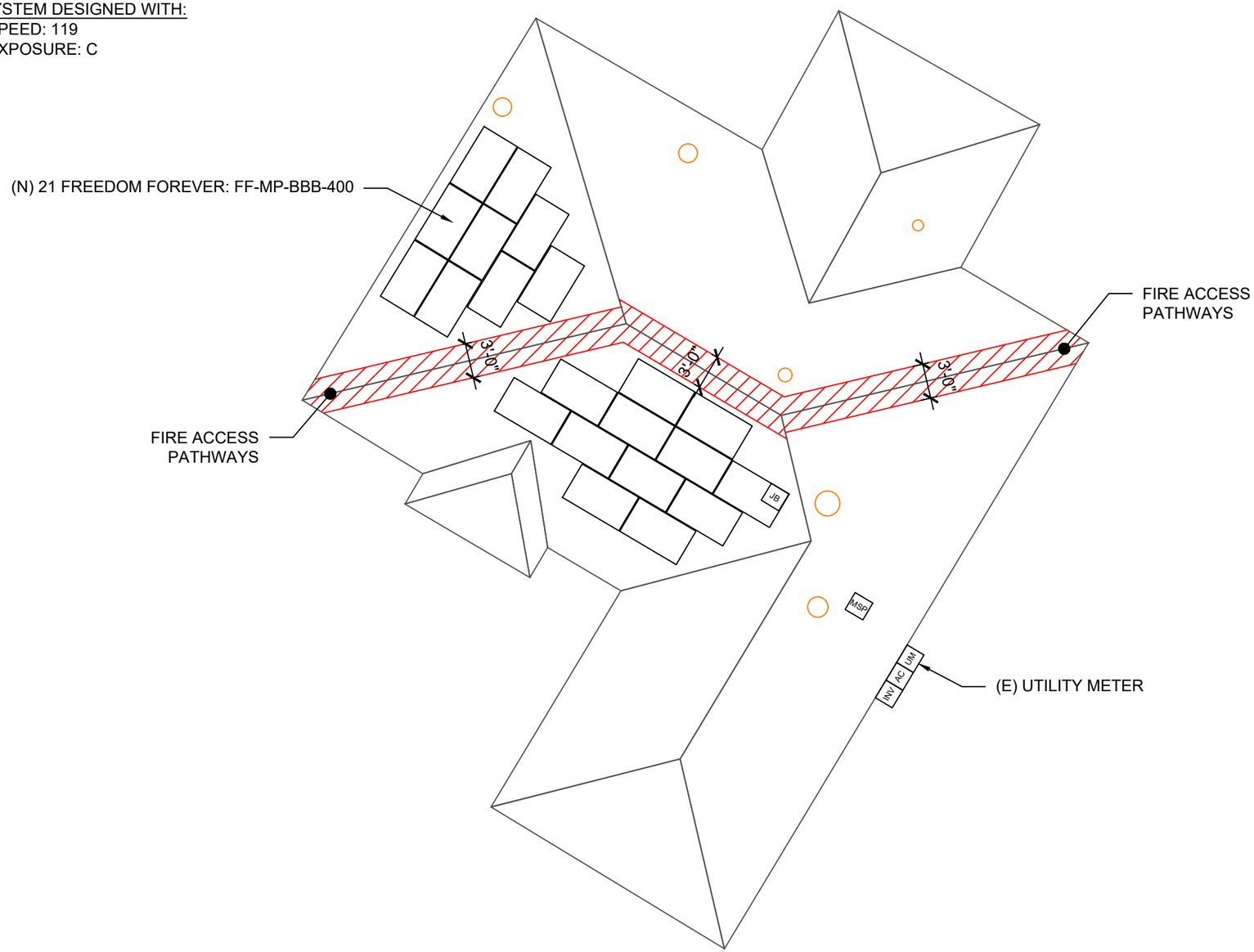
PV SYSTEM
8.400 kW-DC
6.000 kW-AC

MODIFIED SETBACKS PROPOSED AT RIDGE:
TOTAL ARRAY AREA = 441.41 SF
TOTAL ROOF AREA = 3309 SF
TOTAL ARRAY AREA AS A % TO ROOF AREA = 13.34%
13.34% < 33%

BOS WILL BE AS CLOSE AS POSSIBLE TO MSP WITHIN 10'

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 119
WIND EXPOSURE: C

TOTAL ROOF AREA: 3309 SQ FT
TOTAL ARRAY AREA: 441.41 SQ FT
ARRAY COVERAGE: 13.34%
SYSTEM DISTRIBUTED WEIGHT: 2.32 LBS
ROCKIT SMART SLIDE POINT-LOAD: 21.31 LBS



NOTES:
1. EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNTS
2. ATTACHED CLAMPS AT 25% FROM THE EDGE AND 50% FROM THE CENTER OF THE MODULES
3. JUNCTION BOX IS MOUNTED TO THE RAIL.

ROOF PLAN
SCALE: 3/32" = 1'-0"
1

RYAN NGO LICENSE No. 96636 STATE OF FLORIDA PROFESSIONAL ENGINEER

Ryan Ngo
Digitally signed by Ryan Ngo
Date: 2023.12.11 23:54:34-08'00'

This item has been digitally signed and sealed by Ryan Ngo, PE. on the date and/or time stamp shown using a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified by a 3rd Party Certificate Authority on any electronic copy.

ROOF AREA: 3309 SQ FT

CLIENT:
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[SI1]

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ROOF PLAN WITH MODULES LAYOUT

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-2A

ROOF DETAILS:

TOTAL ROOF AREA: 3309 SQ FT
TOTAL ARRAY AREA: 441.41 SQFT
ARRAY COVERAGE: 13.34%
SYSTEM DISTRIBUTED WEIGHT: 2.32 LBS
ROCKIT SMART SLIDE POINT-LOAD: 21.31 LBS

ROOF AREA STATEMENT						
ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	9	26	26	301	287 SQ FT	189.17 SQ FT
ROOF 2	12	26	26	211	584 SQ FT	252.23 SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT
----	----	----	----	----	SQ FT	SQ FT

RYAN NGO
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STATE OF
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PROFESSIONAL ENGINEER

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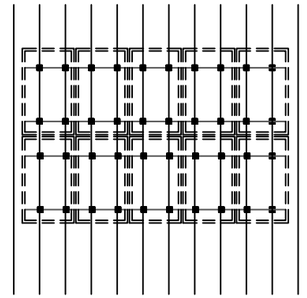
ROOF DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-2B

TABLE 1 - ARRAY INSTALLATION

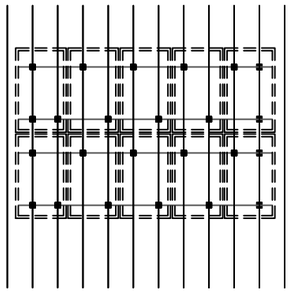
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE	MAX UNBRACED LENGTH(FT.)	STRUCTURAL ANALYSIS RESULT	PENETRATION PATTERN	MAX ATTACHMENT SPACING (IN.)	MAX RAIL OVERHANG(IN.)
ROOF 1	26	Comp Shingle	Ecofasten RockIt Smart Slide	2x4 @ 24" O.C.	7	PASS	STAGGERED	48	16
ROOF 2	26	Comp Shingle	Ecofasten RockIt Smart Slide	2x4 @ 24" O.C.	7	PASS	STAGGERED	48	16

1. CONTRACTOR TO VERIFY FRAMING TYPE AND MAX UNBRACED LENGTH PRIOR TO INSTALLATION. IF THE ABOVE INFORMATION DOES NOT MATCH FIELD CONDITIONS, NOTIFY ENGINEER OF RECORD IMMEDIATELY.
2. WHERE COLLAR TIES OR RAFTER SUPPORTS EXIST, CONTRACTOR SHALL USE RAFTERS WITH COLLAR TIES AS ATTACHMENT POINTS.
3. MAX RAIL OVERHANG APPLICABLE FOR RAILED ATTACHMENT INSTALLATIONS.



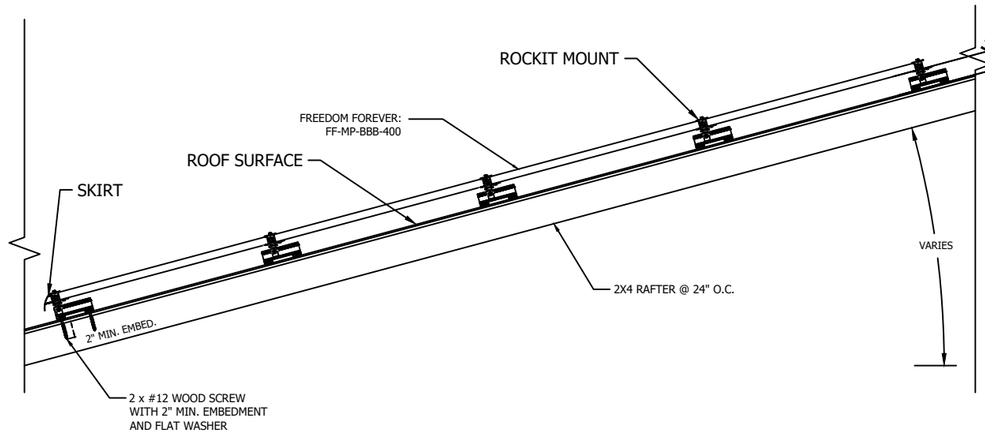
STACKED DETAIL

For Illustration purposes only



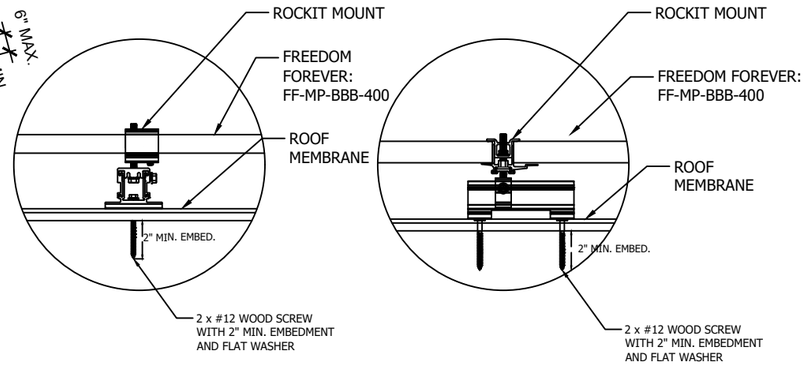
STAGGERED DETAIL

For Illustration purposes only



SOLAR PV ARRAY SECTION VIEW

Scale: NTS



ATTACHMENT DETAIL

Scale: NTS

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GREG ALBRIGHT
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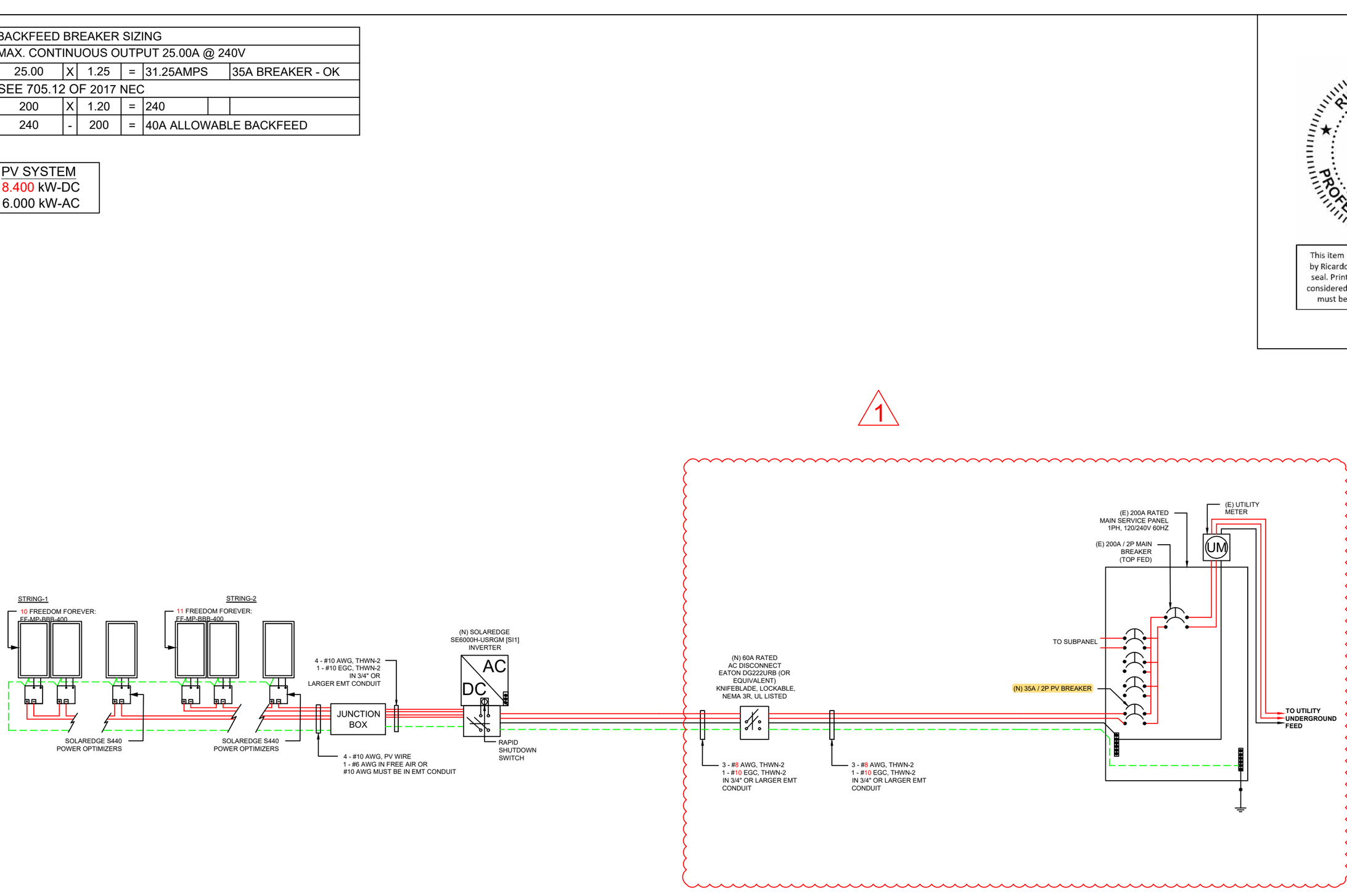
EC13008056

MOUNTING DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-3

BACKFEED BREAKER SIZING						
MAX. CONTINUOUS OUTPUT 25.00A @ 240V						
25.00	X	1.25	=	31.25AMPS		35A BREAKER - OK
SEE 705.12 OF 2017 NEC						
200	X	1.20	=	240		
240	-	200	=	40A ALLOWABLE BACKFEED		

PV SYSTEM
8.400 kW-DC
6.000 kW-AC



NOTE:
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RICARDO E. PINO
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THREE LINE DIAGRAM

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-4

MODULE INFO

MAKE/MODEL: FREEDOM FOREVER: FF-MP-BBB-400
Voc: 37.04 V
Vmp: 31.01 V
Isc: 13.79 A
Imp: 12.9 A
STC RATING: 400 W
PTC RATING: 374.9 W

MAX DC CURRENT: Imax = 1.25 X (OPTIMIZER OUTPUT CURRENT) = 1.25 X 15 = 18.75A
MAX AC CURRENT: Imax = 1.25 X (SUM OF MAX CONTINUOUS OUTPUT CURRENT FROM INVERTERS)
= 1.25 X (25.00) = 31.25A

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WIRE SCHEDULE

RACEWAY #	EQUIPMENT				CONDUCTOR QTY.	AWG WIRE SIZE	STARTING ALLOWABLE AMPACITY @ 90°C 310.15(B)(16)	STARTING CURRENT APPLIED TO CONDUCTORS IN RACEWAY	TEMPERATURE CORRECTION FACTOR 310.15(B)(2)(a)	ADJUSTMENT FACTOR FOR MORE THAN 3 CONDUCTORS 310.15(B)(3)(a)	ADJUSTED CONDUCTOR AMPACITY @ 90°C	MAXIMUM CURRENT APPLIED TO CONDUCTORS IN RACEWAY
1	DC	MODULE	TO	OPTIMIZER	2	10	40	17.24	0.96	1	38.40	21.55
2	DC	OPTIMIZER	TO	JUNCTION BOX	2	10	40	15.00	0.96	1	38.40	18.75
3	DC	JUNCTION BOX	TO	INVERTER	4	10	40	15.00	0.96	0.8	30.72	18.75
4	AC	INVERTER	TO	AC DISCONNECT	3	8	55	25.00	0.96	1	52.80	31.25
5	AC	AC DISCONNECT	TO	POI	3	8	55	25.00	0.96	1	52.80	31.25

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

CLIENT:
PATRICIA HALE
253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024
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CONDUCTOR CALCULATIONS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-5

OCPD SIZES:

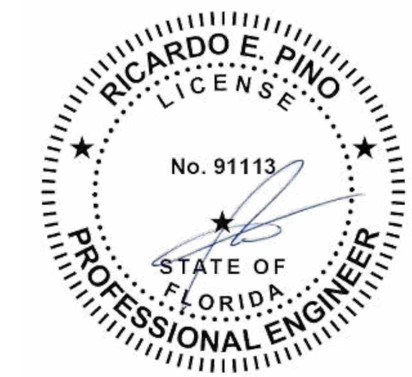
35A BREAKER

SERVICE LIST:

MBE INSERT

MATERIAL LIST:

QTY.	PART	PART #	DESCRIPTION
21	MODULES	PV-110-400	FREEDOM FOREVER: FF-MP-BBB-400
21	OPTIMIZERS	OPT-130-440-2	SOLAREDGE S440 POWER OPTIMIZER - FRAME MOUNTED MODULE ADD-ON
1	JUNCTION BOX	RAC-260-049	600VDC NEMA 3R UL LISTED JUNCTION BOX
2	ELECTRICAL ACCESSORIES	EA-350-326	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (FEMALE)
2	EQUIPMENT ACCESSORIES	EA-350-327	STAUBLI / MULTI-CONTACT MC4 CONNECTORS (MALE)
1	INVERTERS	INV-120-608	SE6000H-US [SI1] RGM 240V INVERTER UL1741 SA CERTIFIED INTEGRATED ARC FAULT PROTECTION AND RAPID SHUTDOWN
1	MONITORING EQUIPMENT	ME-180-502	SOLAREDGE CELL MODEM
1	DISCONNECTS	EE-321-060	60A RATED 240VAC NEMA 3R UL LISTED
3	ELECTRICAL ACCESSORIES	EA-350-113	IDEAL B-TAP 4/0-10 AWG
48	FITTINGS/ANCHORS	RAC-265-034	ROCKIT SMART SLIDE
51	FOOTINGS	RAC-265-004	"MFG: ECO FASTEN, ROCKIT COMP COUPLING AL BLK, MFG SKU: 2011021"
48	FITTINGS/ANCHORS	RAC-265-002	"MFG: ECO FASTEN, ROCKIT COMP SLIDE AL BLK, MFG SKU: 2011013"
48	FOOTINGS	RAC-265-001	"MFG: ECO FASTEN, GF-1 FLASHING GLV BLK 8X10"", MFG SKU: 3012020"
	FOOTINGS	RAC-265-028	"MFG: ECO FASTEN, SKIRT AL BLK 35MM & 40MM A80, MFG SKU: 2099012"
	FITTINGS/ANCHORS	RAC-265-031	"MFG: ECO FASTEN, SKIRT END CAP PLS 35MM&40MM-A, MFG SKU: 2099035"
21	RAILS	RAC-265-018	"MFG: ECO FASTEN, FRAME MLPE MOUNT SS, MFG SKU: 4011012"
96	SCREW	RAC-265-035	ROCKIT SCREW #12X3



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CLIENT:
PATRICIA HALE
253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024
AHJ: COUNTY OF COLUMBIA (FL)
UTILITY: "CLAY ELECTRIC COOPERATIVE, INC. (FL)"
METER: 156212732
APN: 11-4S-16-02905-206
PHONE: 3867587857
EMAIL: PGHALE@COMCAST.NET

SYSTEM:
SYSTEM SIZE (DC): 21 X 400 = 8.400 kW
SYSTEM SIZE (AC): 6.000 kW @ 240V
MODULES: 21 X FREEDOM FOREVER: FF-MP-BBB-400
OPTIMIZERS: 21 X SOLAREDGE S440
INVERTER: SOLAREDGE SE6000H-USRGM [SI1]

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FREEDOM FOREVER LLC
2619 CONSULATE DR SUITE 800, ORLANDO, FL 32819
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

EQUIPMENT & SERVICE LIST

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-6

WARNING:
POWER SOURCE OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

705.12(B)(2)(3)(b)

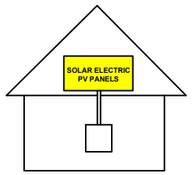
M

"WARNING"
DUAL POWER SOURCES
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM
RATED AC OUTPUT CURRENT - 25.00 AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.54

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

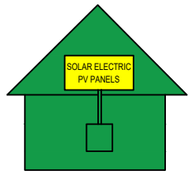
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



690.56(C)(1)(A)

EMERGENCY RESPONDER
THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN ENTIRE PV SYSTEM



NFPA 11.12.2.1.1.1.1

AC

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT - 25.00 AMPS
AC NORMAL OPERATING VOLTAGE - 240 VOLTS

690.15, 690.54

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

690.56(C)(3)

INVERTER

If you have any questions about your system, please call our Customer Support Team at
888.557.6431
or visit freedomforever.com/customer-service
This solar PV system was installed by
freedom FOREVER
*Freedom Forever is a licensed contractor in all states it operates in. For more information visit freedomforever.com/licenses

"WARNING"
ELECTRICAL SHOCK HAZARD.
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

690.13 (B)

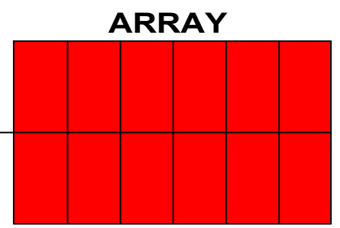
MAXIMUM POWER POINT CURRENT (Imp):	22.27/256A or 16.5A
MAXIMUM POWER POINT VOLTAGE (Vmp):	380V
MAXIMUM SYSTEM VOLTAGE (Vmax):	480V
SHORT-CIRCUIT CURRENT (Ibc):	16.5A

690.53

DC

J/B

ARRAY



NEC 690.31(G)(3) & (4)

"WARNING"
PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT AND ENCLOSURES

NOTES:

1. NEC ARTICLES 690 AND 705 AND IRC SECTION R324 MARKINGS SHOWN HEREON.
2. ALL MARKING SHALL CONSIST OF THE FOLLOWING:
   A. UV RESISTANT SIGN MATERIAL WITH ENGRAVED OR MACHINE PRINTED LETTERS OR ELECTRO-PLATING.
   B. RED BACKGROUND COLOR WHITE TEXT AND LINE WORK.
   C. ARIAL FONT.
3. ALL SIGNS SHALL BE SIZED APPROPRIATELY AND PLACED IN THE LOCATIONS SPECIFIED. SIGNAGE CANNOT BE HAND-WRITTEN.
4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS

RICARDO E. PINO
LICENSE
No. 91113
STATE OF FLORIDA
PROFESSIONAL ENGINEER

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OPTIMIZERS: 21 X SOLAREDGE S440
INVERTER: SOLAREDGE SE6000H-USRGM [SI1]

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GREG ALBRIGHT

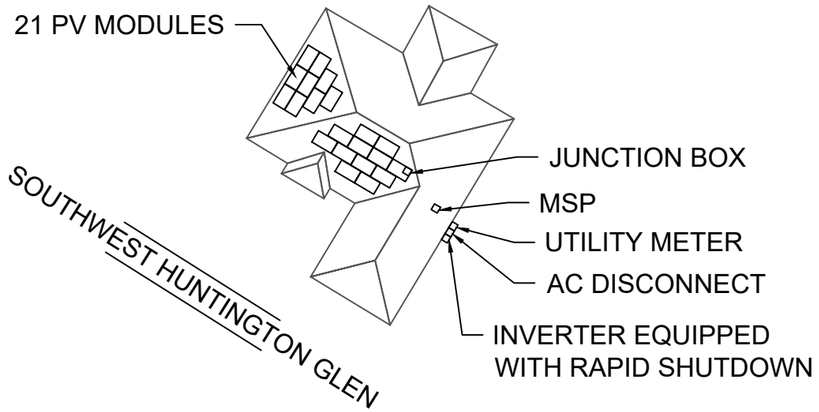
CONTRACTOR LICENSE:
CERTIFIED ELECTRICAL CONTRACTOR
EC13008056

LABELS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-7

CAUTION:

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



WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NOTES:

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4. SIGNS SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS.

RICARDO E. PINO LICENSE No. 91113 STATE OF FLORIDA PROFESSIONAL ENGINEER

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[SI1]

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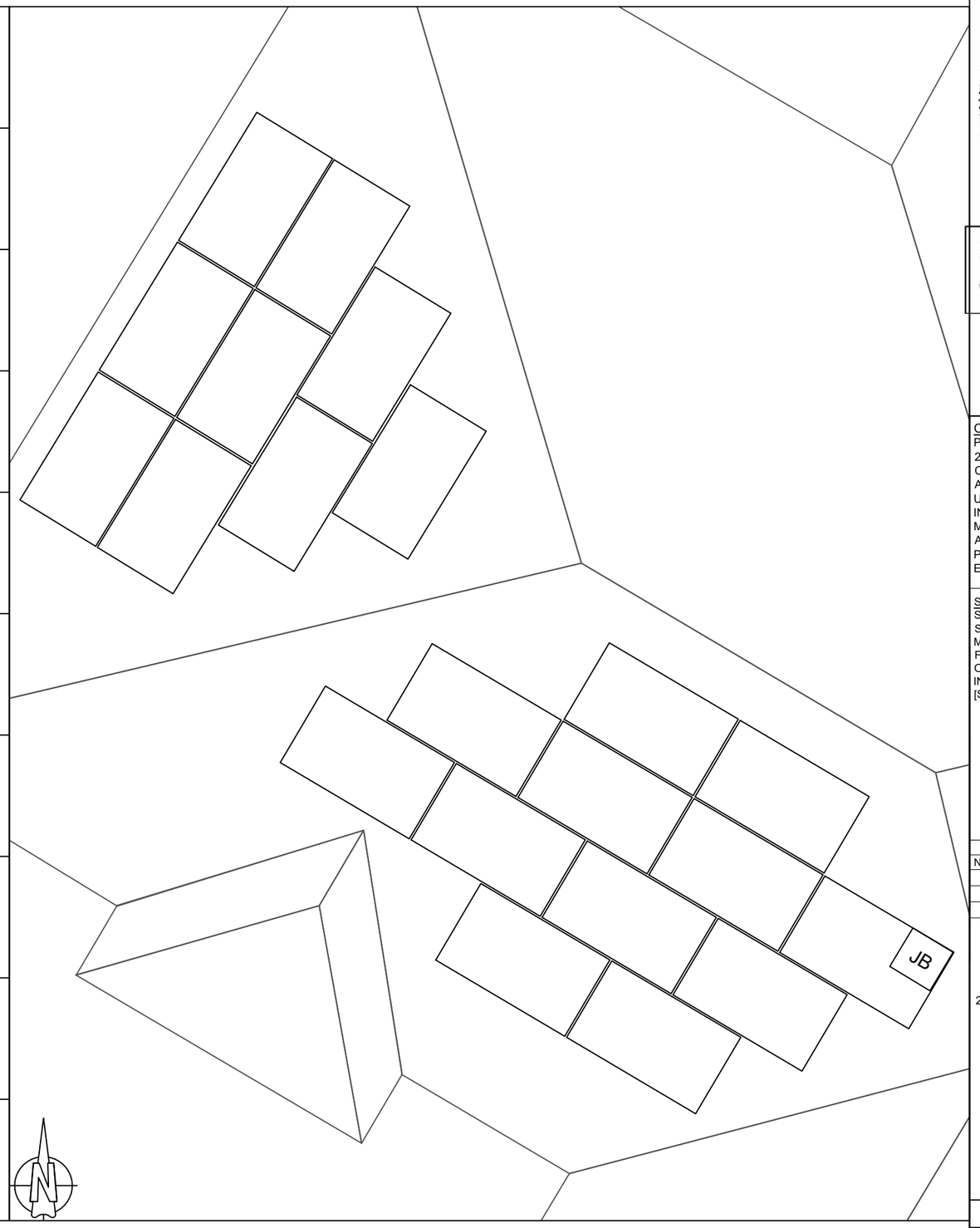
SITE PLACARD

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-7A

SOLAREDGE OPTIMIZER CHART

	1-10	11-20	21-30	31-40	41-50	51-60
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						



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OPTIMIZER CHART

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-8

SAFETY PLAN

INSTRUCTIONS:

1. USE SYMBOLS IN KEY TO MARK UP THIS SHEET.
2. SAFETY PLAN MUST BE MARKED BEFORE JOB STARTS AS PART OF THE PRE-PLAN
3. DOCUMENT ALL ADDITIONAL HAZARDS ON THIS PAGE & MAKE NOTES ON THE JHA SHEET

INCIDENT REPORTING:

INJURIES - CALL INJURY HOTLINE

(855) 400-7233

**If injury is life threatening, call 911 first THEN the Injury Hotline*

NON-INJURIES - USE MOBILE INCIDENT REPORTING
(Auto, Property Damage, Near Miss)

NEAREST OCCUPATIONAL/INDUSTRIAL CLINIC:

NAME: _____

ADDRESS: _____

NEAREST HOSPITAL:

NAME: _____

ADDRESS: _____

SAFETY COACH CONTACT INFORMATION:

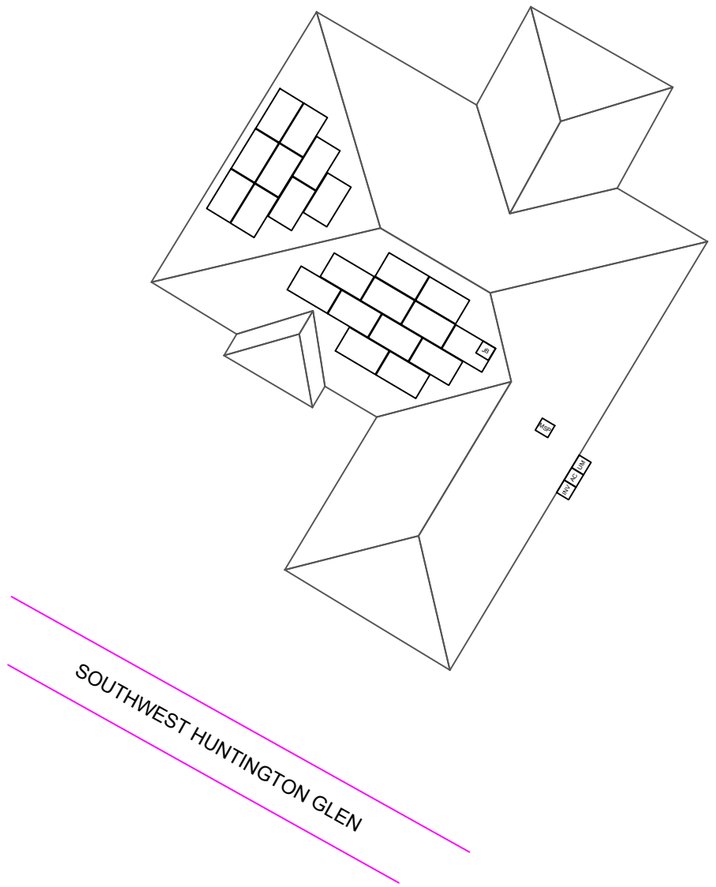
NAME: _____

PHONE NUMBER: _____

ALL EMPLOYEES ON SITE SHALL BE MADE AWARE OF THE SAFETY PLAN AND SIGN INDICATING THAT THEY ARE AWARE OF THE HAZARDS ON-SITE AND THE PLAN FOR WORKING SAFELY.

NAME	SIGNATURE

DATE: _____ TIME: _____



MARK UP KEY

- (P) PERMANENT ANCHOR
- (T) TEMPORARY ANCHOR
- IL INSTALLER LADDER
- B JUNCTION / COMBINER BOX
- S STUB-OUT
- SKYLIGHT
- NO LADDER ACCESS (STEEP GRADE OR GROUND LEVEL OBSTRUCTIONS)
- RESTRICTED ACCESS
- CONDUIT
- (GAS) GAS SHUT OFF
- (H_2O) WATER SHUT OFF
- (7) SERVICE DROP
- (Z) POWER LINES

RICARDO E. PINO LICENSE No. 91113 STATE OF FLORIDA PROFESSIONAL ENGINEER

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BREAK AND WATER LOG

THIS LOG IS TO BE FILLED OUT ANY TIME THE TEMP EXCEEDS **90** DEGREES. THE CREW LEAD AND ROOF LEAD ARE RESPONSIBLE FOR ENSURING THIS IS COMPLETED AND UPLOADED AT THE END OF EVERYDAY WHEN TEMPS EXCEED **90** DEGREES

NAME	0800HRS	0900HRS	1000HRS	1100HRS	1200HRS	1300HRS	1400HRS	1500HRS	1600HRS

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SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
365636	12/11/2023	A.M.	PV-9

JOB HAZARD ANALYSIS

Crew leader to fill out all sections below, hold a pre-job safety meeting with all personnel, and upload this completed document and the Safety Plan to Site Capture

Ladder Access
- Ladders must be inspected before each use.
- Extension ladders must be set up on a firm and level surface at a 4-to-1 rise to run angle (or 75 degrees) and the top must be secured to the structure. Extension style ladders placed on uneven, loose or slippery surfaces must additionally have the base firmly anchored or lashed so the base will not slip out.
- Extension ladders must be used with walk-through devices or the ladder must extend 36" above the stepping off point.
- A-frame ladders must only be climbed with the ladder spreader bars locked in the open position; A-frame ladders shall not be climbed while in the closed position (ex, closed and used while leaned against a structure).
- Additional notes:

Mobile Equipment
- Only Qualified operators will operate equipment; operators must maintain a certification on their person for the equipment being operated.
- Type(s) of mobile equipment (Type/Make/Model):
- Qualified operator(s):

Material Handling and Storage
- Materials will be staged/stored in a way that does not present a hazard to client, personnel or public. Materials stored on the roof will be physically protect from failing or sliding off.

Fall Protection
- A site-specific plan for fall prevention and protection is required prior to starting work and must remain onsite at all times until work is complete; a fall rescue plan must be outlined and discussed among the crew prior to work start.
- First-person-Up (FPU) must install their anchor and connect before any other task, including installing other anchors. The Last-Person-Down (LPD) must be the only person on a roof uninstalling fall protection.
- FPCP (name and title):
- FPU and LPD (name and title):

Electrical Safety
- The Electrical Qualified Person (EQP) is required onsite to perform electrical work.
- All electrical work will be performed with equipment in an electrically safe condition (de-energized) unless approval has been granted prior to work.
- Service drops and overhead electrical hazards will be indentified and protected from contact, as neccessary.
- EQP (name and tile):

Public Protection
- The safety of the Client and Public must be maintained at all times.
- The Client and the Public shall be prevented from entering the work zone through the use of barriers and/or signage, as required.
- Company, Client and Public property shall be protected from falling objects.
- Pets (including dogs) shall be secured by their owners prior to work start.
- The Client should not leave pets, family members, or others in charge or care of Employees, Contractors, or Temporary Workers.
- Crew leader responsible for communication with the client:
- Client and public is excluded from work area by barricades (N/A, Yes, No):

Training and Pre-Job Safety Briefing
- All employees onsite shall be made aware of the specific hazards of this project and review this HJA during a pre-job briefing, and their signature indicates awareness of site conditions and the plan to eliminate any hazards identified prior to and during the project.

- Crew leader (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):
- Crew member (name/title):

Airborne Contaminants:
- Asbestos-containing (Transite) piping (ACP) - Do not disturb (move, drill, cut fracture, etc.)
- Asbestos-containing thermal insulation (ACI) and Asbestos-containing duct wrapping (ACW) - do not disturb, no attic or crawlspace access is allowed if work to be performed could cause exposure to personnel, client or public.

- If yes, list specific tasks and protection in place:

Weather and Environment
- The site supervisor shall forecast the weather conditions at the job site, prior to crew arrival, in order to mitigate any hazards associated with inclement weather (heat, cold, wind, rain, etc.)
- The site supervisor will utilized a portable wind meter (anemometer) to verify actual onsite wind conditions, by checking at the ground and on any elevated work surface (ex, rooftop) prior to work start, at midday and prior to solar panel staging on a roof.
- Elevated work involving the moving or maneuvering of solar panels shall cease at 25mph (sustained wind) until wind subsides.
- Forecasted weather maximum temp (degrees f):

Heat Related Illness Prevention
- Employees shall have access to potable drinking water that is fresh, pure, and suitably cool. The water shall be located as close as practicable to the areas where employees are working. Water shall be supplied in sufficient quantity at the beginning of the work shift to provide at least one quart per employee per hour for drinking for the entire shift. Employees may begin the shift with smaller quantities of water if they identify the location and have effective means for replenishment during the shift to allow employees to drink on quart or more per hour. The frequent drinking of water shall be encouraged.
- Shade shall be present when temperature exceeds 80 degrees Fahrenheit. When the outdoor temperature in the work exceeds 80 degrees Fahrenheit, employees shall have and maintain one or more areas with shade at all times.
- New employees must be acclimatized. New employees will be monitored by their Crew Leader (site supervisor) for the first two (2) weeks of employment or longer when necessary.
- Employees will be allowed and encouraged to implement scheduled breaks during each shift. Employees must take cool-down breaks in the shade any time they feel the need to do so to protect them from overheating. Supervisors are REQUIRED to allow employees any break period they need during high heat conditions.
- Cool Vests are encouraged for all employees at all times during periods of high heat.
- Identify the location of the closet Occupational/Industrial Clinic or Hospital in case a crew member becomes ill.

What is the specific plan to provide and replenish sufficient water for all employees on site?
- If offsite replenish is necessary, where will you go to replenish water (location/address):
- Who will replenish the drinking water (name):

Restroom facilities
- Employees shall have access to restroom facilities with hand-washing stations. Use of onsite restroom is at the client's discretion (location is annotated below). If client does not give permission, location of suitable restroom facilities with hand-washing stations offsite will be provided. The onsite supervisor will identify location and make arrangements to ensure all employees have access at any point.
- Restroom facilities will be (circle one): Onsite - Offsite
- If Offsite, add location name and address:

Incident Reporting Procedure
- Contact your Site Supervisor
  - Name:
  - Phone:
- Contact your Manager
  - Name:
  - Phone:
- Contact your Site Supervisor
  - Name:
  - Phone:

With: Your full name, phone number, office location, brief description of what happen and when.

NOTE ADDITIONAL HAZARDS NOT ADDRESSED ABOVE
(add as many as necessary by using additional sheets)

Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:
Define the Hazard:	Method/steps to prevent incident:

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SAFETY PLAN

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365636	12/11/2023	A.M.	PV-10

FOR INSTALLATION REFERENCE ONLY

SCAN QR CODE TO ACCESS REFERENCE LINK

FREEDOM REFERENCES

INSTALL HOTLINE

PV INSTALLATION REFERENCES

ENPHASE

SOLAREDGE

TESLA

BATTERY INSTALLATION REFERENCES

Enphase Storage Systems

SOLAREDGE Storage Systems

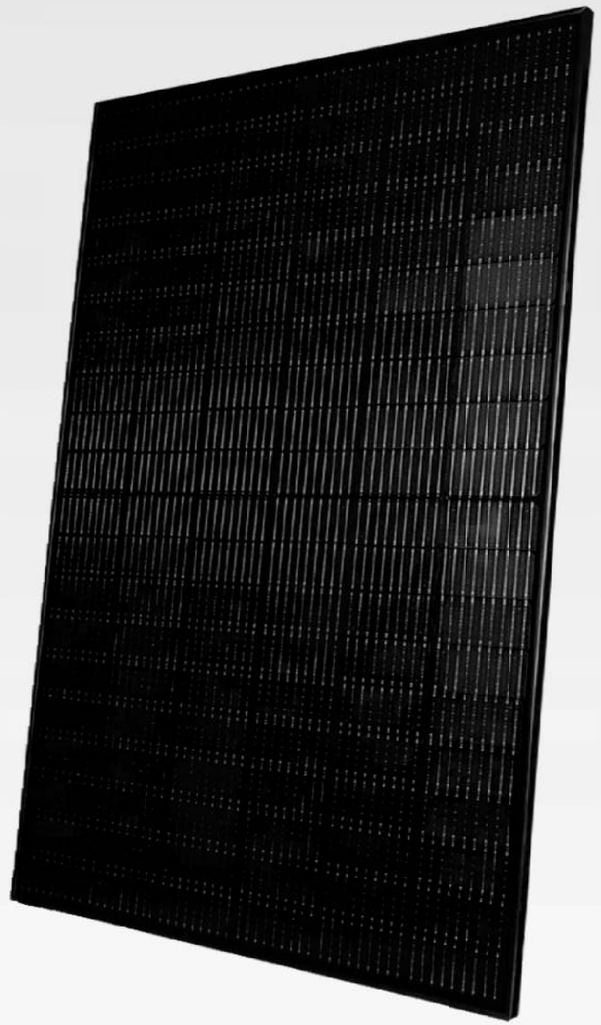
TESLA Storage Systems

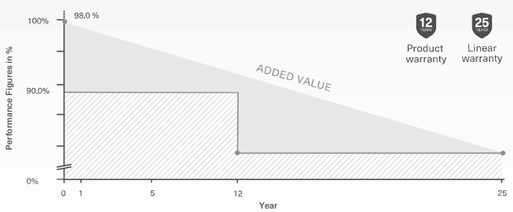
NON-BACKUP Battery Systems

Misc. Quick Guide

V1.4

400W MODULE





MODULE SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Characteristics	FF-MP-BBB-400
Maximum Power (Pmax)	400W
Maximum Power Voltage (Vmp)	31.01V
Maximum Power Current (Imp)[A]	12.90A
Open Circuit Voltage (Voc)[V]	37.04V
Short Circuit Current (Isc)[A]	13.79A
Module Efficiency	20.48%
Power Tolerance	0/+5W
STC	Irradiance of 1000W/m², AM1.5, Cell Temperature 25°C

MECHANICAL CHARACTERISTICS

Cell Type	Mono perc, 182 mm-half cells, 108 (6x9+6x9)
Weight	22.1 kgs (48.7 lbs)
Dimension	1722 x 1134 x 35 mm (67.80 x 44.65 x 1.38 in)
Front Glass	3.2 mm (.13 in)
Junction Box	IP68 (3 Bypass Diodes)
Output Cables	1200 mm (47.24 in)
Connector	Staubli MC4
Frame & Installation	Anodized aluminum profile

OPERATIONS CHARACTERISTICS

Operational Temperature	-40°C~+85°
Max System Voltage	1500V
Max Series Fuse Rating	25A
Safety Class	Class II
Fire Rating	Type 1

MECHANICAL LOADING

Snow Load	5,400Pa (113lb/ft2)
Rear Side Design Load	2,400Pa (50lb/ft2)

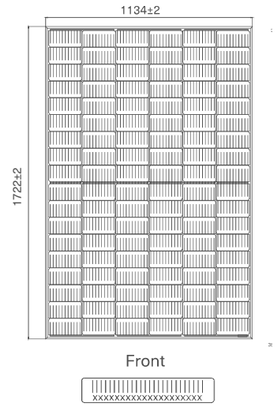
PACKAGING INFORMATION

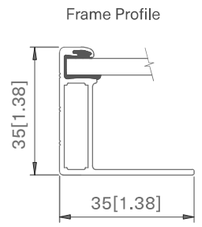
Container	20' GP	40' HC
Pallets per Container	6	26
Panels per Container	186	806
Panels per Pallet	31	31
Packaging Bon Weight	679 kg (1497 lbs)	
Panels per Pallet	1785 x 1130 x 1180 mm (70.28 x 44.49 x 46.46 in)	

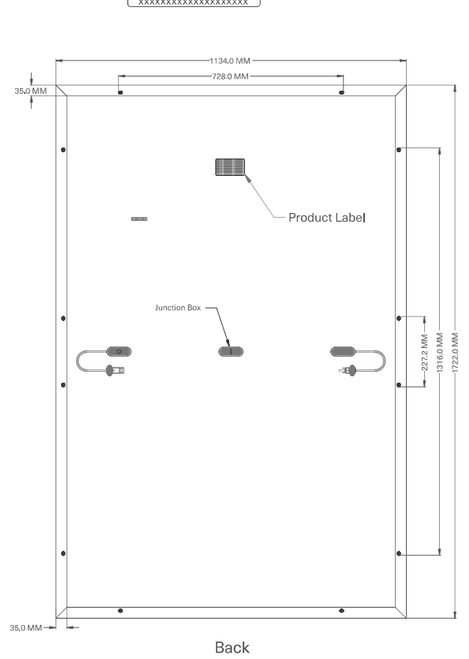
TEMPERATURE RATINGS

Temperature Coefficient of P_{max}	-0.350%/°C
Temperature Coefficient of V_{oc}	-0.275%/°C
Temperature Coefficient of I_{sc}	+0.045%/°C
Nominal Operating cell Temperature (NOCT)	42°C±2°C

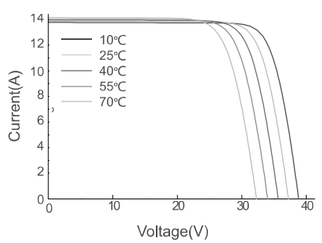
UL 61730 | UL 61215 | ISO 9001 | ISO 14001

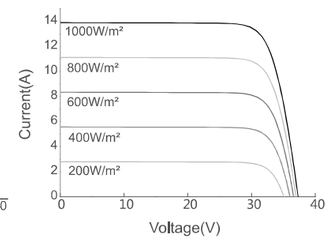






CURRENT-VOLTAGE CURVE





CERTIFICATE
OF COMPLIANCE

This certificate confirms the model(s) for the product listed are in compliance and authorized to bear the Certification Mark(s) shown below when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This document is for use with the Design Light Consortium or California Energy Commission application only.

Basic Listee:	PT IDN SOLAR TECH	**Multiple Listee:**	Freedom Forever Procurement LLC
Address:	KOMPLEK KABIL INDONUSA ESTATE, BLOK A NOMOR 19B, BATU BESAR, Batam	**Address:**	43445 Business Park Drive, Suite 110, Temecula, CA 92590
Country:	Indonesia	**Country:**	USA

Party Authorized to Apply Label: PT IDN SOLAR TECH
Report Issuing Office: Intertek Testing Services Shanghai Limited

Control Number: 5019087 **Authorized by:** Jordan Holbert
for L. Matthew Snyder, Certification Manager

VALID LISTING MARKS

This Certificate of Compliance is for the exclusive use of Intertek's Client and is provided pursuant to the Certification Agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the Agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the Agreement, for any loss, expense or damage occasioned by the use of this Certificate. Only the Client is authorized to permit copying or distribution of this Certificate and then only in its entirety. Use of Intertek's Certification mark is restricted to the conditions laid out in the Agreement and in this Certificate. Any further use of the Intertek name for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. Initial Factory Assessments and Follow up Services are for the purpose of assuring appropriate usage of the Certification mark in accordance with the Agreement, they are not for the purposes of production quality control and do not relieve the Client of their obligations in this respect.

Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667

Standard(s):	Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction [UL 61730-1:2017 Ed.1+R:30Apr2020] Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction [CSA C22.2#61730-1:2019 Ed.2] Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing [UL 61730-2:2017 Ed.1+R:30Apr2020]

CERTIFICATE
OF COMPLIANCE

	Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing [CSA C22.2#61730-2:2019 Ed.2] Terrestrial Photovoltaic (Pv) Modules - Design Qualification And Type Approval - Part 1: Test Requirements [UL 61215-1:2017 Ed.1] Terrestrial Photovoltaic (PV) Modules - Design Qualification And Type Approval - Part 1-1: Special Requirements For Testing of Crystalline Silicon Photovoltaic (PV) Modules [UL 61215-1-1:2017 Ed.1] Terrestrial Photovoltaic (Pv) Modules - Design Qualification And Type Approval - Part 2: Test Procedures[UL 61215-2:2017 Ed.1]
Product:	Crystalline Silicon Photovoltaic (PV) Modules
Brand Name:	Freedom Forever
Models:	MULTIPLE LISTEE 12 MODELS: FF-MP-BBB- followed by 365, 370, 375 or 380. FF-MP-BBB- followed by 395, 400, 405 or 410. BASIC LISTEE MODELS: NUSA120H- followed by 365, 370, 375 or 380; followed by MB. NUSA108H- followed by 395, 400, 405 or 410; followed by MB.

Power Optimizer

For North America

S440, S500

POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge residential inverters
- Detects abnormal PV connector behavior, preventing potential safety issues*
- Module-level voltage shutdown for installer and firefighter safety
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified cable management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with bifacial PV modules
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

* Expected availability in 2022

solaredge.com

solaredge

Power Optimizer

For North America

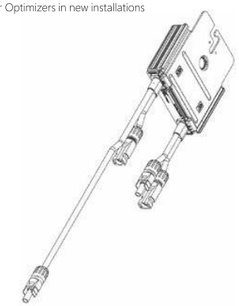
S440, S500

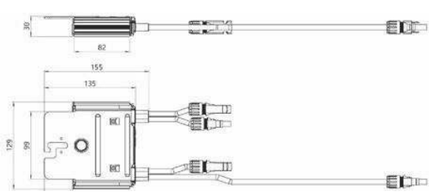
	S440	S500	Unit
INPUT			
Rated Input DC Power(1)	440	500	W
Absolute Maximum Input Voltage (Voc)	60		Vdc
MPPT Operating Range	8 - 60		Vdc
Maximum Short Circuit Current (Isc) of Connected PV Module	14.5	15	Adc
Maximum Efficiency	99.5		%
Weighted Efficiency	98.6		%
Overvoltage Category	II		
OUTPUT DURING OPERATION			
Maximum Output Current	15		Adc
Maximum Output Voltage	60		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)			
Safety Output Voltage per Power Optimizer	1+/-0.1		Vdc
STANDARD COMPLIANCE			
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 & 2020		
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3		
Safety	IEC62109-1 (class II safety), UL1741		
Material	UL94 V-0, UV Resistant		
RoHS	Yes		
Fire Safety	VDE-AR-E 2100-712:2013-05		
INSTALLATION SPECIFICATIONS			
Maximum Allowed System Voltage	1000		Vdc
Dimensions (W x L x H)	129 x 153 x 30 / 5.07 x 6.02 x 1.18		mm / in
Weight (including cables)	655 / 1.5		gr / lb
Input Connector	MC4(2)		
Input Wire Length	0.1 / 0.32		m / ft
Output Connector	MC4		
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32		m / ft
Operating Temperature Range(3)	-40 to +85		°C
Protection Rating	IP68 / Type6B		
Relative Humidity	0 - 100		%

(1) Rated power of the module at STC will not exceed the power optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed
(2) For other connector types please contact SolarEdge
(3) For ambient temperature above +70°C / +158°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV System Design Using a SolarEdge Inverter		Single Phase HD-Wave	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	S440, S500	8	14	18	
Maximum String Length (Power Optimizers)		25		50(4)	
Maximum Nominal Power per String		5700 (6000 with SE7600-US-SE11400-U)	6000	12750	W
Maximum Allowed Connected Power per String (5) (Permitted only when the difference in connected power between strings is 1,000W or less)		Refer to Footnote 5	One String 7200W	15,000W	
			Two strings or more 7800W		
Parallel Strings of Different Lengths or Orientations		Y			

(4) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
(5) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power. Refer to: https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf
(6) It is not allowed to mix S-series and P-series Power Optimizers in new installations





Intertek

RoHS

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

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted 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, NEC 2017 and NEC 2020 per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology

for North America

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

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5(1)							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V(2)	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V(2)	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

(1) For other regional settings please contact SolarEdge support
(2) A higher current source may be used; the inverter will limit its input current to the values stated

/ Single Phase Inverter with HD-Wave Technology

for North America

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

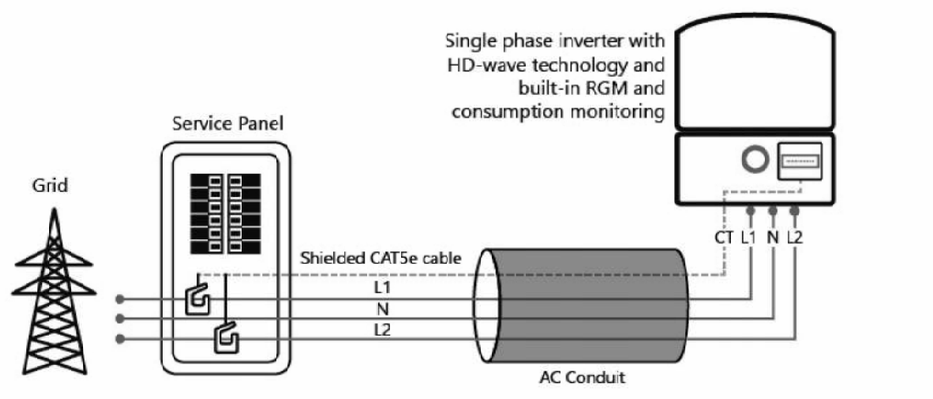
MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Metering, ANSI C12.20	Optional[3]							
Consumption metering								
Inverter Commissioning	With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection							
Rapid Shutdown - NEC 2014, NEC 2017 and NEC 2020, 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI 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	1" Maximum / 14-6 AWG					1" Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 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			dBA
Cooling	Natural Convection							
Operating Temperature Range	-40 to +140 / -40 to +60[4]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

(3) Inverter with Revenue Grade Meter P/N: SExxxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BNI4 . For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box

(4) 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

How to Enable Consumption Monitoring

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills



RoHS

Eaton DG222URB

Catalog Number: DG222URB

Eaton General duty non-fusible safety switch, single-throw, 60 A, NEMA 3R, Rainproof, Painted galvanized steel, Two-pole, Two-wire, 240 V

General specifications

Product Name Eaton general duty non-fusible safety switch	Catalog Number DG222URB
	UPC 782113144238
Product Length/Depth 7.38 in	Product Height 14.38 in
Product Width 8.69 in	Product Weight 9 lb
Warranty Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.	Certifications UL Listed
	Catalog Notes WARNING! Switch is not approved for service entrance unless a neutral kit is installed.

Product specifications

Product Category
General duty safety switch

Enclosure material
Painted galvanized steel

Type
Non-fusible, single-throw

Fuse configuration
Non-fusible

Number of wires
2

Enclosure
NEMA 3R

Voltage rating
240V

Amperage Rating
60A

Number Of Poles
Two-pole

Resources

Catalogs
Eaton's Volume 2—Commercial Distribution

Multimedia
Double Up on Safety

Switching Devices Flex Center

Specifications and datasheets
Eaton Specification Sheet - DG222URB

Warranty guides
Selling Policy 25-000 - Distribution and Control Products and Services

Eaton Corporation plc
Eaton House
30 Pembroke Road
Dublin 4, Ireland
Eaton.com

Eaton.com/socialmedia

BUCHANAN CONSTRUCTION PRODUCTS

B-TAP®

Listed 486B

Pressure Cable Connectors
File No. E-5238
Suitable for use on the line side of the service equipment.

INSULATION-PIERCING TAP CONNECTORS
CONECTORES DE DERIVACIÓN QUE PERFORAN EL AISLAMIENTO

Installation Instructions:

⚠ Warning

Improperly installed electrical wiring can be dangerous and cause electrical fires. The connector chosen must be sized to the wires being used. Consult local building code before doing any electrical work. For assistance, refer to an instructional book or consult a qualified electrician.

⚠ Warning

Contact with electricity can cause serious injury or death. Use on insulated cable only. [RHH, RHW(-2), THHN, THHW, THW, THWN, USE, XHHW(-2). Consult factory for other insulation types]. If the installation is to be made on an energized run, the tap conductor must be under no load and must not be grounded. Use electrically insulated gloves. De-energize the run cable if there are any questions of these conditions being met.

1. Determine the direction for the tap conductor to exit and discard one end cap. **See figure 1.**
2. Position the main (or feeder) side of the connector around the run cable and tighten the bolt finger tight. **See figure 2.** If required, loosen the bolt slightly to allow the connector to open completely. **DISASSEMBLY NOT RECOMMENDED.** The plastic "Turbo" spacer holds the connector open which eases installation and ensures proper connections.
3. Cut the end of the tap cable squarely. **DO NOT STRIP CABLE INSULATION.**
4. Insert the tap cable into the tap side of the connector until it is seated in the remaining end cap. **See figure 3.**
5. Continue tightening the torque regulating bolt with a standard box or socket wrench until the torque regulating piece breaks away. If the connector has two (2) assembly bolts, alternately tighten until the hexagonal torque devices break away. **See figures 4a & 4b.** Note that the plastic "turbo" spacer on the side will also break. To make the installation even easier and to relieve torque from the cables, a second wrench can be used on the hexagonal piece on the bottom of the connector.

   DO NOT use gripping type pliers, pipe, open ended or adjustable wrenches as these may damage the hexagonal torque regulating device. A torque wrench is not required.

   MAKE SURE ONLY THE TOP HEXAGONAL TORQUE DEVICE OF THE BOLT HEAD IS USED FOR ASSEMBLY. THE SECOND HEX PIECE [CLOSER TO THE BODY OF THE CONNECTOR] IS USED FOR DISASSEMBLY.

Note: The torque regulating bolt ensures the correct torque is applied to the conductors without using a torque wrench. Important information such as run and tap ranges, voltage ratings and material/temperature ratings is marked on the connector.

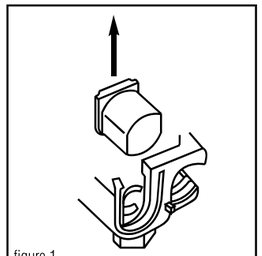


figure 1

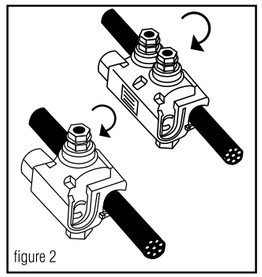


figure 2

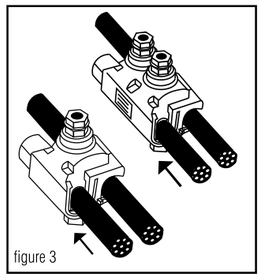
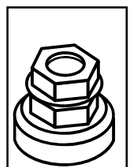
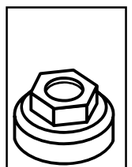


figure 3


Before Torque Applied
figure 4a


After correct Torque Reached, One Hex Piece Breaks-Away
figure 4b

Instalación Instrucciones:

⚠ Advertencia

Los cables eléctricos mal instalados pueden ser peligrosos y provocar incendios. El conector escogido debe ser de un tamaño adecuado para los cables que se utilicen. Consulte los códigos de construcción locales antes de efectuar trabajos eléctricos. Si necesita ayuda, consulte un libro de instrucciones o consulte con un electricista capacitado.

⚠ Advertencia

Use sólo en cable aislado. [RHH, RHW(-2), THHN, THHW, THW, THWN, USE, XHHW(-2). Consulte con la fábrica para obtener información sobre otros tipos de aislamiento]. Si se va a hacer la instalación sobre un cable con corriente el conductor derivado debe estar libre de carga y no debe estar aterado. Use guantes con aislamiento eléctrico. Quite le la corriente al cable del cual se hace la derivación si no se pueden cumplir estas condiciones. El contacto con electricidad puede producir lesiones graves o mortales.

1. Determine la dirección en la que el conductor derivado saldrá y deseche la tapa terminal sobrante. **Vea la ilustración 1.**
2. Coloque el lado principal (o de alimentación) del conector alrededor del cual se hace la derivación y apriete firmemente el dedo del perno. **Vea la ilustración 2**. Si hace falta, afloje el perno ligeramente para permitir que el conector se abra completamente. **NO ES RECOMENDABLE DESARMAR EL CONECTOR.** El espaciador "Turbo" de plástico mantiene al conector abierto, lo cual facilita la instalación y asegura que las conexiones se hagan correctamente.
3. Corte el extremo del cable de derivación perpendicularmente a su eje. **NO PELE EL AISLAMIENTO DEL CABLE.**
4. Inserte el cable de derivación en el lado de derivación del conector hasta que tope contra la tapa terminal que queda. **Vea la ilustración 3.**
5. Continué apretando este perno que regula la torsión con una llave estándar o de cubo hasta que la pieza que regula la torsión se parta y se separe. Si el conector tiene dos (2) pernos de ensamblaje, apriételos alternativamente hasta que el dispositivo de regulación de torció se parta. **Vea la ilustración 4a y 4b**. Observe que el espaciador "turbo" de plástico en el costado también se fracturará. Para hacer esta instalación aún más fácil y para aliviar la torsión de los cables, se puede usar una segunda llave sobre la pieza hexagonal al fondo del conector.

   NO USE alicates de presión, llaves de turbo, llaves comunes o ajustables ya que éstas pueden dañar el dispositivo hexagonal que regula la torsión. No se requiere una llave de torsión.

   ASEGÚRESE QUE SE USE, PARA EL ENSAMBLADO, SÓLO EL DISPOSITIVO SUPERIOR DE REGULACIÓN DE TORSIÓN DE LA CABEZA DEL PERNO. LA SEGUNDA PIEZA HEXAGONAL (LA MÁS CERCANA AL CUERPO DEL CONECTOR) SE USA SÓLO PARA DESARMAR EL CONECTOR.

Nota: El perno regulador de torsión garantiza la aplicación de la torsión correcta a los conductores sin usar una llave de torsión. La información importante de longitud de cable pelado y de toma, las clasificaciones de materiales y temperatura está marcada en el conector.

B-TAP® INSULATION PIERCING TAP CONNECTORS TORQUE AND CURRENT RATINGS

(Solid and/or Stranded)

CATALOG#	MAIN	TAP	NOMINAL TORQUE	TAP CURRENT RATIING (IN AMPS)*
BTC2/0-14	2/0-4	10-14+	80 IN. LBS.	40
BTC1/0-10	1/0-8	2-10++	80 IN. LBS.	130
BTC4/0-10	4/0-3	2-10+++	125 IN. LBS.	130
BTC4/0-6	4/0-2	1/0-6	160 IN. LBS.	170
BTC4/0-2	4/0-2	4/0-2	160 IN. LBS.	260
BTC250-6	250-4	4/0-6	160 IN. LBS.	260
BTC250-4	250-1	3/0-4	160 IN. LBS.	225
BTC250-2	250-1/0	4/0-2	160 IN. LBS.	260
BTC350-1/0	350-1/0	350-1/0	330 IN. LBS.	350
BTC500-4	500-2/0	4/0-4	330 IN. LBS.	260
BTC500-1/0	500-4/0	350-1/0	330 IN. LBS.	350
BTC500-14	750-3/0	10-14 ++++	80 IN. LBS.	40
BTC750-250	750-250	500-250	330 IN. LBS.	430

+10-14 Cu SOLID/STRANDED; 10-12 Al SOLID/STRANDED
++2-10 Cu SOLID/STRANDED; 2-10 Al STRANDED
+++2-10 Cu SOLID/STRANDED; 2-8 Al STRANDED
++++10-14 Cu SOLID/STRANDED; 10-12 Al STRANDED

Full line is 600V dual-rated, 194°F(90°C)

* Based on NEC Table 310-16 1996 (Not more than 3 insulated conductors in a raceway at ambient temperature of 30° C) for the largest tap wire size.

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

ADVERTENCIA: Cáncer y Daño Reproductivo - www.P65Warnings.ca.gov.

One year limited warranty. See idealind.com for more information.

Garantía limitada de un año. Visite www.idealind.com para obtener detalles de la garantía.

CONSTRUCTION PRODUCTS BUCHANAN
1800 S. Prairie Drive
Sycamore, IL, U.S.A.
800-435-0705 • www.idealind.com

ND 9053-2
1839420

IDEAL INDUSTRIES, INC.
1375 Park Avenue • Sycamore, Illinois 60178 • 815.895.5181 • www.idealind.com

ALL IDEAL Customers 2/9/23

Subject: **The Buchanan B-TAP® splice/tap connectors meet the 2020 NEC article 230.46 requirement for “line side applications”**

The Buchanan B-TAP® brand of insulation piercing connectors which correspond to part numbers beginning with “BTC” meet the requirements of article 230.46 of the 2020 NEC. These products have already been tested to the newer requirements. The installation instructions are in the process of being updated to show the required notation: “suitable for use on the line side of the service equipment”. This change will take a few weeks to get into our production.

In addition, the marking “SR” will be added to the product. That addition is in process and will take a few months to complete.

This notice will provide confirmation to the inspectors that B-TAP® products meet the requirements of the 2020 and 2023 NEC article 230.46 “Spliced and Tapped Conductors”.

Sushil Keswani
Director of Engineering
IDEAL Industries, Inc.,

UL Product iQ®

ZMVV.E5238 - Wire Connectors and Soldering Lugs

Note: We are enhancing our systems and you may notice duplicate entries/missing/outdated data. During this interim period, please contact our Customer Service at https://www.ul.com/about/locations.

Wire Connectors and Soldering Lugs

IDEAL INDUSTRIES INC
1375 Park Ave
SYCAMORE, IL 60178 United States

E5238

View model for additional information

Insulated butt splice crimp type connectors, Model(s): BVS1, BVS2, BVS5

Insulated flange spade type crimp cconnectors, Model(s): SV5-3.7, SVL5-4, SVL5-6

Insulated flange spade type crimp connectors, Model(s): FSNYD1-3.7, FSNYD1-4, FSNYD1-5, FSNYD2-3.7, FSNYD2-4, FSNYD2-5, FSNYD5-3.7, FSNYD5-4, FSNYD5-5

Insulated hook type crimp connectors, Model(s): HNYD1-3.7, HNYD1-4, HNYD1-5, HNYD2-3.7, HNYD2-4, HNYD2-5, HNYD5-3.7, HNYD5-4, HNYD5-5, HVY1-3.7, HVY1-4, HVY1-5, HVY2-4, HVY2-5, HVY5-3.7, HVY5-4, HVY5-5

Insulated locking spade crimp connectors, Model(s): LSNYD1-3.7, LSNYD2-3.7, LSNYD5-3.7, LSNYD5-4, LSNYD5-5, LSNYDL1-4, LSNYDL1-5, LSNYDL2-4, LSNYDL2-5

Insulated multiple stud ring type crimp connectors, Model(s): MSRNYD1-3753, MSRNYD2-3753, MSRNYD5-3753

Insulated parallel connectors, Model(s): PVT1, PVT14, PVT2, PVT22, PVT5, PVT8

Insulated pin type connectors, Model(s): PTNYD1-12, PTNYD2-12, PTNYD5-13

Insulated ring type crimp connectors, Model(s): RNYB14-11, RNYB22-11, RNYD1-10, RNYD1-3.2, RNYD1-5, RNYD1-6, RNYD1-8, RNYD2-10, RNYD2-2, RNYD2-3.2, RNYD2-6, RNYD2-8, RNYD5-10, RNYD5-12, RNYD5-3.2, RNYD5-3.7, RNYD5-5, RNYD5-6, RNYD5-8, RNYDL1-3.7, RNYDL1-4, RNYDL2-3.7, RNYDL2-4, RNYDL5-3.7, RNYDL5-4, RNYDM2-3.7, RNYDS1-3.7, RNYDS1-4, RNYDS2-4, RNYDS2-5, RNYDS5-4, RV1-3.2, RV1-5, RV1-6, RV2-3.2, RV5-10, RV5-3.7, RV5-5, RV5-6, RV5-8, RVL1-4, RVL2-4, RVL5-4, RVM1-3.7, RVM2-3.7, RVY1-3.2

Insulated spade type crimp connectors, Model(s): SNYD1-3.2, SNYD5-3.7, SNYD5-5, SNYDL1-3.7, SNYDL1-4, SNYDL2-3.7, SNYDL2-4, SNYDL2-5, SNYDL5-4, SNYDLL1-3.7, SNYDLL2-3.7, SNYDM1-4, SNYDM2-4, SNYDS1-5, SNYDS2-5, SVL1-3.7, SVL1-5, SVL2-3.7, SVL2-5, SVM1-4, SVM2-4, SVY1-3.2, SVY2-3.2, SVY5-3.7, SVY5-5, SVYL1-3.7, SVYL1-4, SVYL2-3.7, SVYL2-4, SVYL2-5, SVYL5-4, SVYLL1-3.7, SVYLL2-3.7, SVYM1-4, SVYM2-4, SVYS1-5, SVYS2-5, SVYS5-4

Insulated splice connectors, Model(s): PB1-, PB2-, PB5-

Insulating caps or covers, for use on manufacturer`s splice caps, for 2006-S, 2008-S connectors, Model(s): 2007

Insulating caps or covers, for use on manufacturer`s splice caps, for 2011-S connector, Model(s): 2014

Listed pressure cable connectors, Model(s): BHT1, BHT2, BHT5, BN1, BN2, BN5, BNT1-16, BNT14, BNT2-16, BNT22, BNT5-20, BNT8, BNYDF1, BNYDF2, BNYDF5, BNYT1, BNYT2, BNYT5, BV1, BV2, BV5, BVT14, BVT22, BVT8

Listed pressure ring terminal connectors, Model(s): RNYB14-8, RNYB8-11, RNYBL22-5, RNYBL22-6

Listed splicing wire connectors, Model(s): L12, L13, L15

Non-insulated flange spade crimp connectors, Model(s): FSN1-3.7, FSN1-4, FSN1-5, FSN2-3.7, FSN2-4, FSN2-5, FSN5-3.7, FSN5-4, FSN5-5, FSNB1-3.7, FSNB1-4, FSNB1-5, FSNB2-3.7, FSNB2-4, FSNB2-5, FSNB5-3.7, FSNB5-4, FSNB5-5, FSNL1-3.7, FSNL2-5

Non-insulated hook crimp connectors, Model(s): HN1-4, HN1-5, HN2-3.7, HN2-4, HN2-5, HN5-3.7, HN5-4, HN5-5

Non-insulated locking type crimp connectors, Model(s): LSN1-3.7, LSN2-3.7, LSN5-3.7, LSN5-4, LSN5-5, LSN5-6, LSNL1-4, LSNL1-5, LSNL2-5

Non-insulated multiple stud ring type crimp connectors, Model(s): MSRNB1-3753

Non-insulated parallel crimp connectors, Model(s): PNT 1, PNT 14, PNT 2, PNT 22, PNT 5, PNT 8, PNT1, PNT2, PNT5

Non-insulated pin type crimp connectors, Model(s): PTN1-12, PTN2-12, PTN5-13

Non-insulated ring type crimp connector, Model(s): RNB1-10, RNB1-3.2, RNB14-11, RNB14-12, RNB14-16, RNB1-6, RNB1-8, RNB2-10, RNB2-2, RNB2-6, RNB5-12, RNB8-12, RNBL1-4

Non-insulated ring type crimp connectors, Model(s): RNB1-3.2, RNB14-10, RNB14-5, RNB14-8, RNB1-5, RNB2-10, RNB22-10, RNB22-12, RNB22-8, RNB2-3.2, RNB2-8, RNB5-10, RNB5-3.2, RNB5-3.7, RNB5-3.7, RNB5-5, RNB5-6, RNB5-8, RNB8-10, RNB8-11, RNB8-16, RNB8-8, RNBL1-3.7, RNBL22-5, RNBL22-6, RNBL2-3.7, RNBL2-5, RNBL38-10, RNBL5-3.7, RNBL5-4, RNBM1-3.7, RNBM1-3.7, RNBM2-3.7, RNBM2-3.7, RNBM8-5, RNBS1-4, RNBS14-5, RNBS2-4, RNBS2-5, RNBS5-4, RNBS8-6

Non-insulated spade type crimp connectors, Model(s): SN1-3.2, SN2-3.2, SN5-3.7, SN5-5, SNB1-3.2, SNB5-3.7, SNB5-5, SNBL1-3.7, SNBL1-4, SNBL2-4, SNBL2-5, SNBL5-4, SNBL5-6, SNBLL1-3.7, SNBLL2-3.7, SNBM1-4, SNBS1-5, SNBS5-4, SNL1-3.7, SNL1-4, SNL2-3.7, SNL2-4, SNL2-5, SNLL1-3.7, SNLL2-3.7, SNM1-4, SNM2-4, SNS1-5, SNS2-5, SNS5-4

Pressure cable connectors, Model(s): KB - 1000, KB - 2/0, KB - 350, KB - 4/0, KB - 500, KB - 800, KS - 1000, KS - 2/0, KS - 350, KS - 4/0, KS - 500, KS - 800

Pressure terminal connectors, Model(s): FSVY1-3.7, FSVY1-4, FSVY1-5, FSVY2-3.7, FSVY2-4, FSVY2-5, FSVY5-3.7, FSVY5-4, FSVY5-5, K-5655, K-5656, LSV1-3.7, LSV2-3.7, LSV5-4, LSV5-5, LSV5-6, LSVL2-4, LSVS1-4, LSVS1-5, LSVS2-5, LSVY1-3.7, LSVY2-3.7, LSVY5-3.7, LSVY5-4, LSVY5-5, LSVY5-6, LSVYL1-4, LSVYL1-5, LSVYL2-4, LSVYL2-5, MSRNB2-3753, MSRVY1-3753, MSRVY2-3753, MSRVY5-3753, PTVY1-12, PTVY2-12, PTVY5-13, RVY1-10, RVY1-5, RVY1-6, RVY1-8, RVY2-10, RVY2-2, RVY2-3.2, RVY2-6, RVY2-8, RVY5-10, RVY5-12, RVY5-3.2, RVY5-3.7, RVY5-5, RVY5-6, RVY5-8, RVYL1-3.7, RVYL1-4, RVYL2-3.7, RVYL2-4, RVYL2-5, RVYL5-3.7, RVYL5-4, RVYM2-3.7, RVYS1-3.7, RVYS1-4, RVYS2-3.7, RVYS2-4, RVYS2-5, RVYS5-4, SNBM2-4, SNYD2-3.2, TLK16-6, TLK25-10

Pressure Terminal Connectors, Model(s): RNYB14-10, RNYB14-12, RNYB14-5, RNYB22-12, RNYB22-8, RNYB8-10, RNYB8-12, RNYB8-8, RNYBM8-5, RNYBS14-6

Slicing wire connectors, Model(s): OK-2 (Pkg. cat No. 84), OK-3 (Pkg. cat No. 85), OK-4 (Pkg. cat No. 86), OK-5 (Pkg. cat No. 87), OK-6W (Pkg. cat No. 88), OK-8 (Pkg. cat No. 90), OK-8W (NA)

Splicing wire connectors, Model(s): 12, 13, 14, 14-6, 15, 199, 199S, 200, 2002, 2006-S, 2008-S, 2011-S, 22-10, 22-12, 29, 299, 299S, 30, 300, 32, 33, 34, 340, 36, 37, 38, 39, 399, 400, 400AL, 42, 50, 615069, 66, 70, 800, AS-1/0, AS-2, AS-2/0, AS-350, AS-4, AS-4/0, AS-500, AS-6, B1, B2, B4, BT-2, BTC 1/0-10, BTC 1/0-14, BTC 2/0-14, BTC 250-4, BTC 350-1/0, BTC 4/0-10, BTC 4/0-2, BTC 4/0-6, BTC 500-1/0, BTC 500-14, BTC 500-4, BTC1/0-10, BTC2/0-14, BTC250-4, BTC350-1/0, BTC4/0-10, BTC4/0-2, BTC4/0-6, BTC500-1/0, BTC500-14, BTC500-4, BV1, BV1, BV2, BV2, BV5, BV5, C-3, C-4, C-5, K1/0, K1000, K2, K2/0, K250, K3, K3/0, K350, K4, K500, K6, K750, K8, KS10, R1, S1/O, S2, S2/0, S250, S3, S3/0, S350, S4, S500, S6, TRQ1, TRQ2, W1, W2, W4, WT1, WT2, WT3, WT4, WT6, WTW51, WTW52, WTW53, WTW54

Splicing Wire Connectors, Model(s): BNT1, BNT2

Splicing Wire Connectors:, Model(s): 46-404, 46-405

Splicinig wire connectors, Model(s): H-1566, H-1567, H-1570, H-1571, H-1572, H-1591, H-1592, H-1594

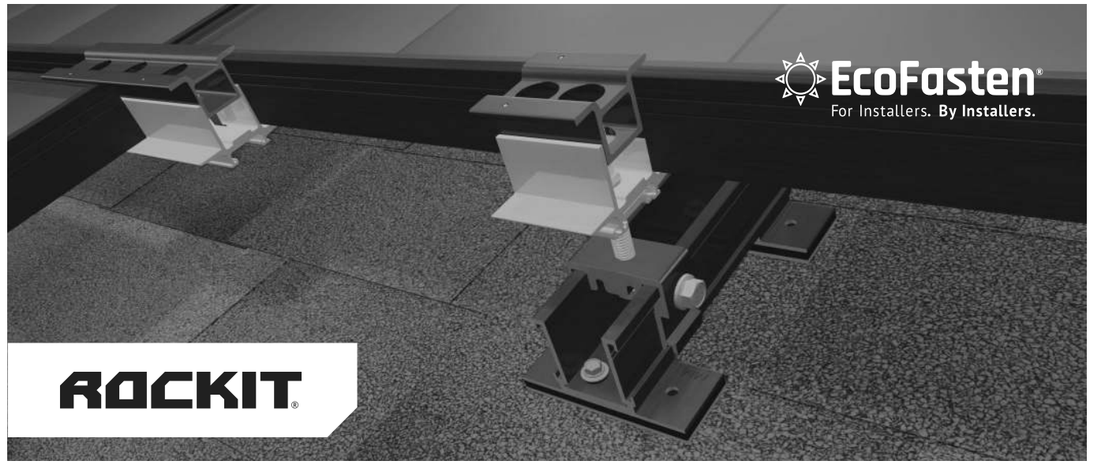
Terminal connectors, Model(s): 10, 11, 22, 250, 300, 341, 342, 410 with insulating cap No. 415, 411 with insulating cap No. 417, 412 with insulating cap No. 417, 451, 452, 454, 48, 49, 49 Black, 53-B, 59B, 600, 71B#, 72B#, 73B#, 73B+, 74B, 76B, 76B+, 78B+, 82, K-5504, LSNL2-4, M-3, PV3-750, PV3-750, PV3-750, PV4-750, PV4-750, PV4-750, RNBL2-4, RNBS14-6, RNBS38-6, RNBS38-8, RNYB22-10, RNYBS8-6, RV2-6, RVL2-5, SV5-5, WT1, WT2, WT3, WT4, WT41, WT51, WT52, WT53, WT54, WT6

Terminal Connectors, Model(s): RNB22-11

Wire Connectors, Model(s): 65, 653

Wire Connectors and Soldering Lugs, Model(s): L22, L23, L25, PS10, PS12, PS2, PS3, PS4, PS4S, PS5, PS6, PS8

- The equipment (71B, 72B and 73B) were also evaluated to the requirements of UL 2043 and are suitable for use in air handling spaces.
* - May be followed by suffix B, J, T or X.
NOTE - All models may be provided with or without prefix "V" or suffix "MP" or "V" and prefix "BP". All models may be followed by suffixes BT, UB or UF with or without a two or four digit number, with or without suffixes B, LP, NP, PF, PH, SP and/or T. Die Series terminals may be followed by Suffixes UI, UT, UF, US, or UB, with or without a two to four digit number, with or without Suffix T or B, followed by Suffixes SP, LP, NP, PF, or and/or NM, by PH or BE, with or without Suffixes NT, BS, and /or G.



INTRODUCING ROCKIT SMART SLIDE!

Introducing EcoFasten's patent pending RockIt Smart Slide, our simple solution for quickly installing the popular RockIt rail-less racking system to composition shingle roofs.

Features & Benefits

- Eliminates the need to pry up shingle courses and install a metal flashing
- Multiple opportunities to find the rafter
- No need for additional material when architectural shingles are not level
- Longer 6.75" slide avoids overlaps in shingle courses
- Integrated flashing utilizes UltraGrip Technology™ to create a watertight seal

ROCKIT SMART SLIDE

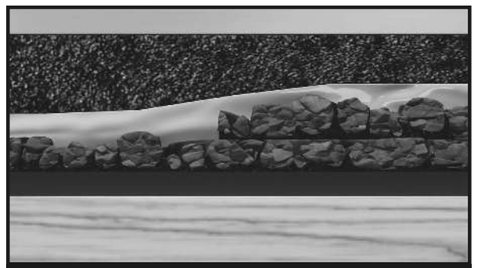
Required Components:

Part Number:	Description:
2011024	RI SMART SLIDE BLK 6.75"
2011025	RI SMART SCRW #12X3" W/BW

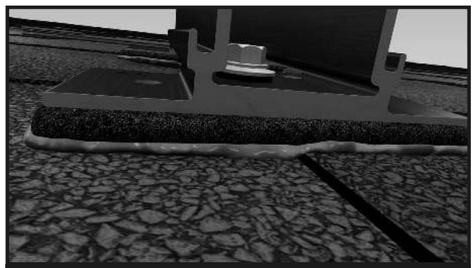
ROCKIT SMART SLIDE

Integrated UltraGrip Technology™

Pre-installed sealing pads are compatible with all composition shingle roofs. The compression achieved when fastened to the roof creates a super strong watertight seal. In most cases, the slide can be mounted to the deck without the need for sealant. A layer of flexible foam provides cushioning, which allows the waterproofing sealant to embed deep into the granules of the shingle as well as to flexibly conform over the steps found on architectural-style shingles.



A layer of flexible foam pushes the sealant deep into the shingle granules and around shingle steps



RockIt Smart Slide can be installed on top of architectural shingles steps

Testing & Documentation

- UL441 Rain Report
- TAS 100 (A)-95 Wind and Wind Driven Rain Resistance
- Mechanical Load Test/Structural Capacity Certification
- Florida Product Approval
- RockIt Installation Manual
- RockIt CutSheets

VERSION 1.1

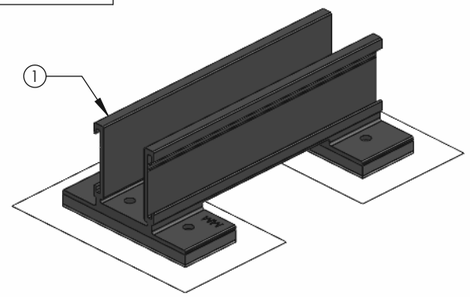
EcoFasten®
An Esdec Solar Group Company
4141 W. VAN BUREN ST, SUITE 2, PHOENIX AZ 85009
1-877-859-3947 | INFO@ECOFASTENSOLAR.COM

PRODUCT CUT SHEET

EcoFasten® For Installers. By Installers.

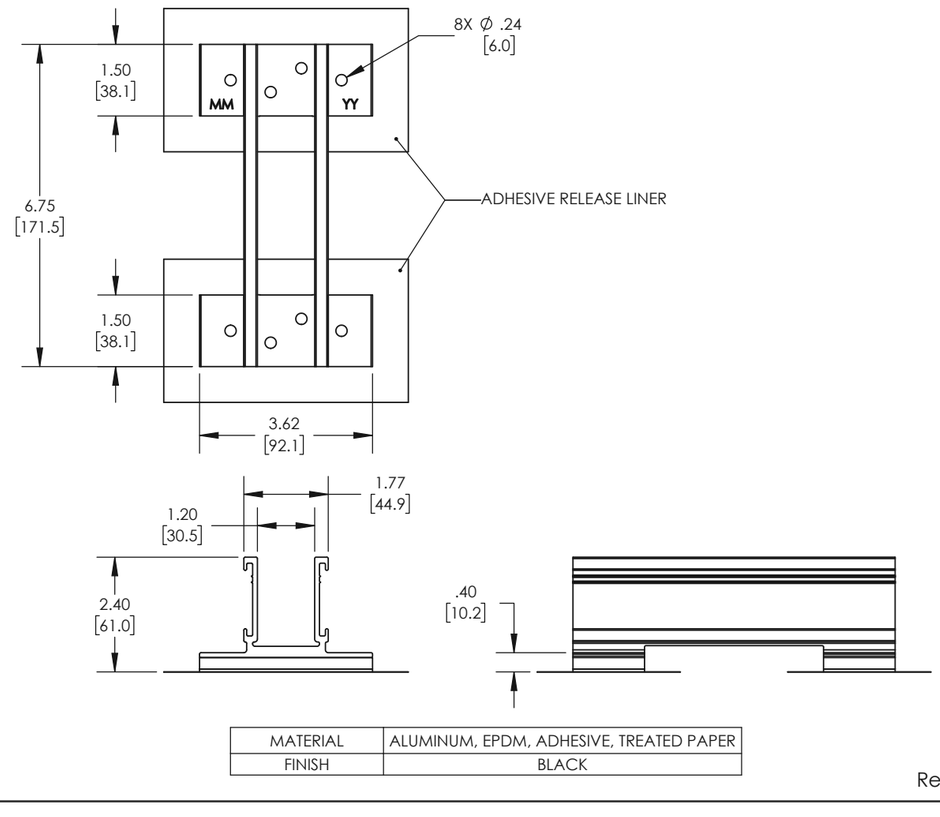
RI SMART SLIDE BLK 6.75"

PART NUMBER	DESCRIPTION
2011024	RI SMART SLIDE BLK 6.75"



ITEM NO.	DESCRIPTION
1	ROCKIT SMART SLIDE ASSEMBLY

1) ROCKIT FLASHLESS SLIDE ASSEMBLY



MATERIAL	ALUMINUM, EPDM, ADHESIVE, TREATED PAPER
FINISH	BLACK

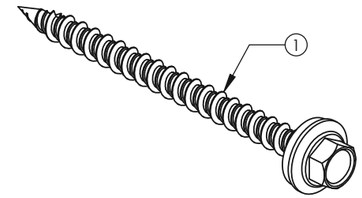
Rev: CS-3

PRODUCT CUT SHEET

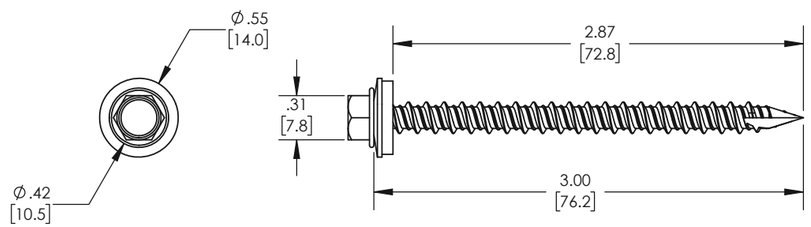
EcoFasten® For Installers. By Installers.

RI SMART SCREW #12X3" W/BW

PART NUMBER	DESCRIPTION
2011025	RI SMART SCREW #12X3" W/BW



ITEM NO.	DESCRIPTION
1	SELF TAPPING SCREW #12 WITH SEALING WASHER ASSEMBLY



MATERIAL	STAINLESS STEEL, EPDM RUBBER
FINISH	MILL, BLACK

Rev: CS-2

EcoFasten®
For Installers. **By Installers.**

ROCKIT®

COMPLETE RAIL-LESS RACKING SYSTEM

The RockIt system is the industry's premier rail-less PV racking system for composition shingle, tile, and metal roofs. Designed in conjunction with the needs of installers, RockIt quickly & easily installs with a single tool. Featuring an easy-to-position alignment slide and a top-down leveling system, RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that complements both commercial and residential applications. Conforms to UL 2703.

FEATURES & BENEFITS

- Patented watertight technology
- Fully integrated bonding
- Top-down leveling system
- North-South adjustability
- Single tool install
- Florida Product Approved for composition shingle roofs

Composition Shingle, Tile, Metal (ROOF TYPE)

Rail-Less (RACKING)

Structural-Attach Direct-Attach (ATTACHMENT)

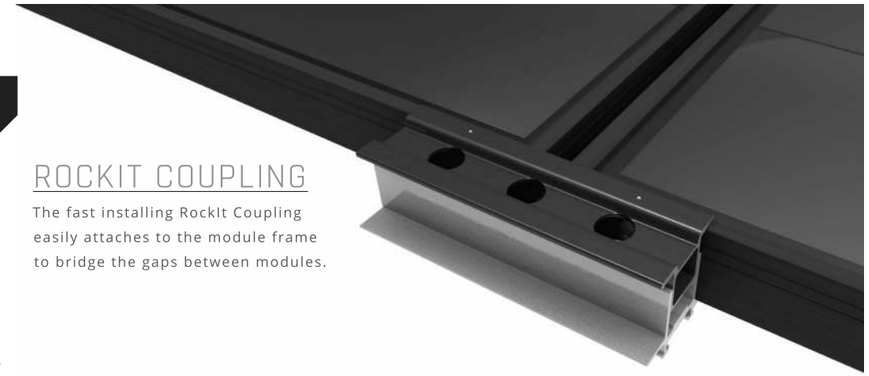
WATER TIGHT TECHNOLOGY

25 YEAR WARRANTY

STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS

ECOFASTENSOLAR.COM

ROCKIT



ROCKIT COUPLING

The fast installing RockIt Coupling easily attaches to the module frame to bridge the gaps between modules.

SKIRT

The sleek black Skirt installs first and acts as an alignment guide for the entire array. The Skirt End Cap does double duty as a skirt coupling device and an aesthetically-pleasing finishing touch.

ROCKIT MOUNT

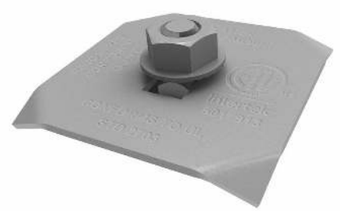
Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

ROCKIT COMP SLIDE

Available in four variations, the RockIt Slide allows installation on composition shingle, tile, and metal roofs.

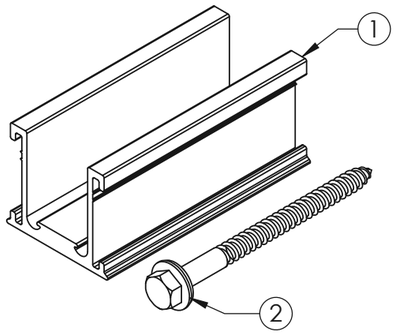
FRAME MLPE MOUNT

Attaches and fully bonds MLPE's (Module Level Power Electronics) to the module frame with a single bolt clip.



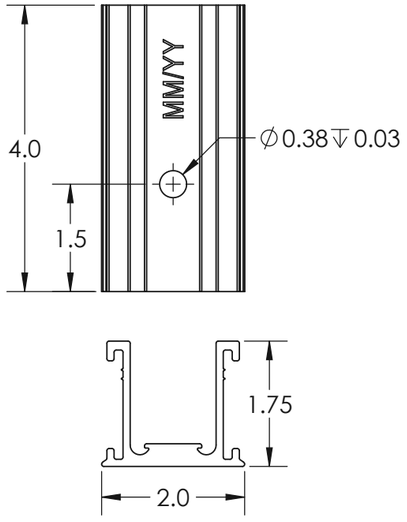
RI COMP SLIDE AL BLK

PART NUMBER	DESCRIPTION
2011013	RI COMP SLIDE AL BLK



ITEM NO.	DESCRIPTION
1	ROCKIT V3 SLIDECOMP
2	LAG SCREW, 5/16-4", THREAD 3", EPDM BACKED WASHER

1) ROCKIT V3 SLIDECOMP



Material	Aluminum
Finish	Black

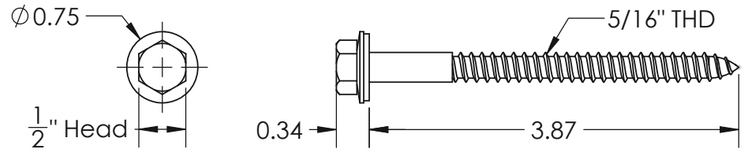
REV.- CS1

PRODUCT CUT SHEET

EcoFasten
For Installers. By Installers.

RI COMP SLIDE AL BLK

2) LAG SCREW, 5/16-4", THREAD 3", EPDM BACKED WASHER



Material	Stainless Steel
Finish	Mill

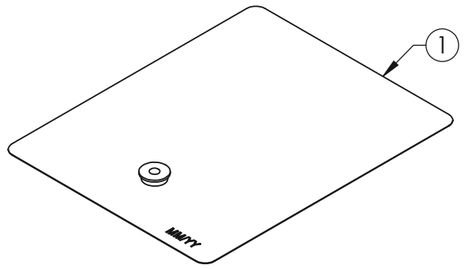
REV.- CS1

PRODUCT CUT SHEET

EcoFasten
For Installers. By Installers.

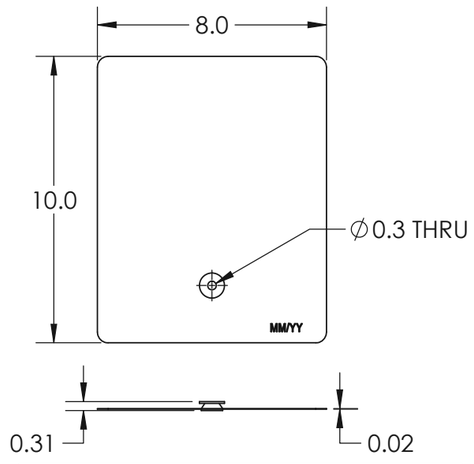
GF-1 FLASHING GLV BLK 8X10"

PART NUMBER	DESCRIPTION
3012020	GF-1 FLASHING GLV BLK 8X10"



ITEM NO.	DESCRIPTION
1	GF1M-GAL-BLK-810 W/O WASHER ASSEMBLY

1) GF1M-GAL-BLK-810 W/O WASHER ASSEMBLY



Material	Corrosion Resistant Steel
Finish	Black

REV.- CS1

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June 09, 2023

EcoFasten
4141 West Van Buren St.
Phoenix, AZ 85009

Attn.: EcoFasten Solar Engineering Department

Re: EcoFasten *RockIt System, with Comp Slide or Smart Slide,* Engineering Certification for Gable and Hip roofs.

This letter addresses the structural performance and code compliance of EcoFasten's RockIt Flush Mount System. The contents of the letter shall be reviewed in its entirety before application to any project design. The RockIt System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum RockIt Mount assemblies which are connected to a RockIt roof attachment, either the RockIt Comp Slide or RockIt Smart Slide, which is attached directly to the roof structure. Assembly details of a typical RockIt system and its core components are shown in Exhibit ECO 1.0. The RockIt Comp Slide assembly is shown in drawing EX-1 and the RockIt Smart Slide assembly is shown in drawing 850076. The EcoFasten RockIt System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16
- 2018 International Building Code, by the International Code Council, Inc.
- 2020 Florida Building Code
- SEAOC (Structural Engineer Association of California) report PV2-2017 Wind Design for Solar Arrays
- Aluminum Design Manual 2015, by The Aluminum Association, Inc.
- NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

The span tables provided in this letter are certified based on the structural performance of EcoFasten RockIt System in conjunction with RockIt Comp Slide or Smart Slide only, with no consideration of the structural adequacy of the PV modules, or the underlying roof supporting members. These tables are intended to be used under the responsible charge of a registered design professional where required by the authority having jurisdiction. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the system components regarding the applied or resultant loads of any chosen array configuration.

Sincerely,

Matthew S Kuzila, PE

06/09/2023

THIS ITEM HAS BELECTRONICALLY SIGNED AND SEALED BY MATTHEW S. KUZILA, PE ON THE DATE BELOW THE SEAL.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

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The tables included in this letter provide the maximum allowable spans of the RockIt System, when used in conjunction with one of the available roof mounts, as a Flush Mount System for the respective loads and configurations listed, covering wind exposure categories B, C, & D, roof zones provided in ASCE 7-16 for enclosed and partially enclosed gable roofs with slopes less than or equal to 7° & enclosed and partially enclosed gable or hip roofs with slopes of 8° to 60°. The tabulated spans are applicable when the following conditions are met:

1. *Span* is the distance between two adjacent roof attachment points (measured at the center of the attachment fasteners).

2. The underlying roof slope, measured between the roof surface and horizontal plane, is 0º to 60º.

3. The *mean roof height*, defined as the average of the roof eave height and the roof ridge height measured from grade for roofs with pitches above 10 degrees and defined as the eave height for roofs with pitches less than or equal to 10 degrees, does not exceed 30 feet.

4. A clearance from the module top surface to the roof surface of 2" minimum shall be provided and the height of the array, the distance from the module top surface to the roof surface (defined as h2), shall not exceed 6".

5. Module length and area shall not exceed the maximum values listed on the respective span tables.

6. All Flush Mount components shall be installed in a professional workmanlike manner per EcoFasten's RockIt Installation Manual and the requirements specified for the underlying roof supporting members in the certification letter of the selected roof attachment, RockIt Comp Slide or RockIt Smart Slide, are confirmed to be met.

The parameters and adjustments allowed in the span tables are defined as the following:

1. The Flush Mount System is designed as a Risk Category II structure as defined by ASCE 7-16 Table 1.5-1.

2. Wind speed shall conform to ASCE 7-16 Fig. 26.5-1B (for Risk Category II) and applicable state & local county/city amendments to the IBC. No special wind topographic features are included and both topographic coefficient (Kzt) and wind ground elevation factor (Ke) are taken as 1.0.

3. Snow load used in the span tables is the ground snow and shall conform to ASCE 7-16 Fig. 7.2-1 and applicable state & local county/city amendments to the IBC. If the local jurisdiction specified snow load is in the format of a flat roof snow, it shall first be converted to a ground snow following the local building code/amendments before the application of the attached span tables. No special snow conditions are considered including unbalanced, drifting, sliding, retention, or ponding snow. No rain-on-snow surcharge load is considered. The span tables do not apply to buildings which are intentionally kept below freezing, kept just above freezing, or unheated.

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4. The span tables reflect the ASCE 7 prescribed earthquake loads with the maximum magnitudes being:

(a) For ground snow no greater than 42psf: Ss ≤ 2.0g for Site Class A, B, C, & D.
(b) For ground snow greater than 65psf: Ss ≤ 1.0g for Site Class A, B, C, & D.
(c) For ground snow between 42 and 65psf: Ss ≤ 1.5g for Site Class A, B, C, & D.

5. Roof zones are defined by ASCE 7-16 Figure 30.3-2A to Figure 30.3-2I and are organized into three groups in which the zones share the same External Pressure Coefficients (GCp). Roof zones comprising each group along with each roof zone's size and location are depicted in Figures 1 and 2.

6. The maximum module cantilever length, measured from the module end to the nearest attachment point, shall be 1/3rd of the allowable span. For the RockIt mounting system, a cantilever is defined as the distance from the end of a module free edge to a RockIt Mount roof attachment. A module edge is not free if there is a RockIt Coupling connection to an adjacent module on that edge.

7. A 1.0" Tolerance for any specified dimension in this report is allowed for installation.

Components and Cladding Roof Zones Figures:

Per ASCE 7-16:

a = 10 % of least horizontal dimension of 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9m). If an overhang exists, the edge distance shall be measured from the outside edge of the overhang. The horizontal dimensions used to compute the edge distance shall not include any overhang distances.
B=Horizontal dimension of building measure normal to wind direction in ft (m)
h=Mean roof height, in ft (m), except that eave height shall be used for Θ ≤ 10 °
Θ = Angle of plane of roof from horizontal, in degrees.

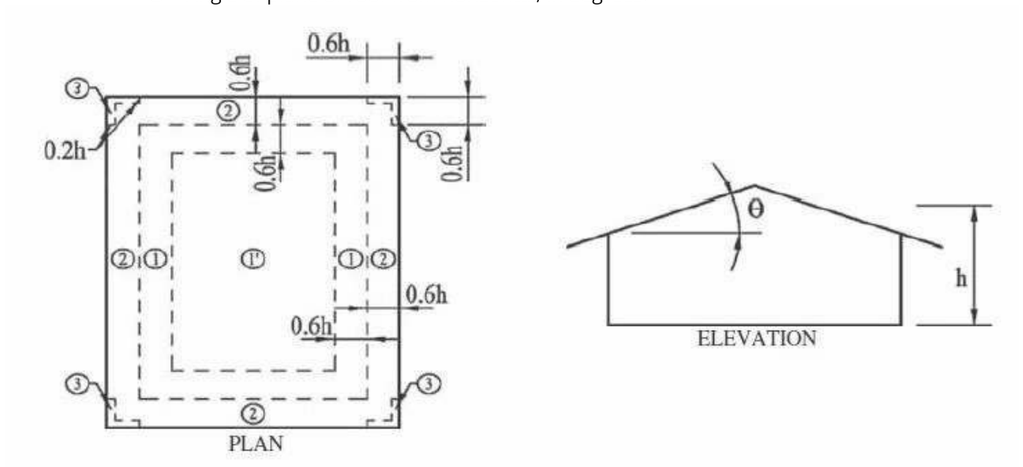

Figure 1: ASCE 7 Roof Zones for Gable Roofs Θ ≤ 7 °

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An ESDEC Company

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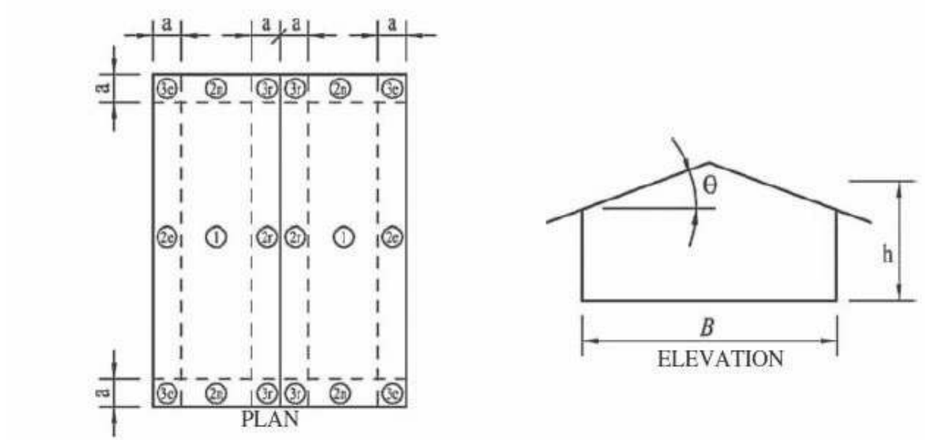

Figure 2: ASCE 7 Roof Zones for Gable Roofs 8 ° ≤ Θ ≤ 60 °

Grouping of ASCE 7-16 Roof Zones (Gable)									
Roof Slope	**0°-7°**			**8°-27°**			**28°-60°**		
Group	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
ASCE 7-16 Roof Zones	1 ' 1	2	3	1 2e	2n 2r 3e	3r	1 2e 2r	2n 3r	3e

Grouping of ASCE 7-16 Roof Zones (Hip)									
Roof Slope	**8°-20°**			**21°-27°**			**28°-60°**		
Group	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
ASCE 7-16 Roof Zones	1	2r	2e 3	1	2r 2e	3	1	2e	2r 3

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Spans for Array Edge

A module is defined as Exposed (per Section 29.4.4 of ASCE 7-16) if the distance from any of its free edges (an edge with no connectivity to other modules) to its facing roof edge (such as eave, ridge, rake, or hip) is greater than 0.5h (h is ASCE defined building height) AND if the distance from the same free edge to any other adjacent array or panel is greater than 4 feet. The maximum allowable span for Exposed Modules shall be the lesser of the following two: (1) The span value for the exposed module condition. (2) The span value determined by the site wind and ground snow load.

RockIt with GF1 Comp Slide Span Tables

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BARUN CORP

November 2, 2023

RE: CERTIFICATION LETTER

Project Address: PATRICIA HALE
253 SOUTHWEST HUNTINGTON GLEN
LAKE CITY, FL 32024

Design Criteria:

- Applicable Codes = 2020 FLBC/FLEBC 7th Edition, 2020 FLRC 7th Edition, 2018 IEBC/IBC, ASCE 7-16 and 2018 NDS
- Risk Category = II
- Wind Speed = 119 mph, Exposure Category C, Partially/Fully Enclosed Method
- Ground Snow Load = 0 psf
- Roof 1&2: 2 x 4 @ 24" OC, Roof DL = 7 psf, Roof LL/SL = 18 psf (Non-PV), Roof LL/SL = 0 psf (PV)

To Whom It May Concern,

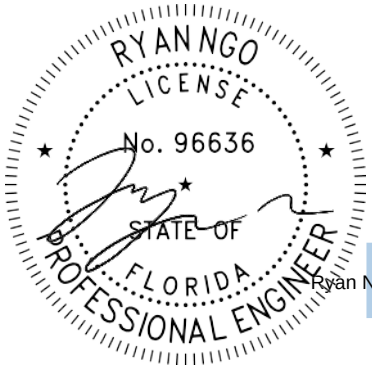
A structural evaluation of loading was conducted for the above address based on the design criteria listed above.

Existing roof structural framing has been reviewed for additional loading due to installation of Solar PV System on the roof. The structural review applies to the sections of roof that is directly supporting the Solar PV System.

Based on this evaluation, I certify that the alteration to the existing structure by installation of the Solar PV System meets the prescriptive compliance requirements of the applicable existing building and/or new building provisions adopted/referenced above.

Additionally, the Solar PV System assembly (including attachment hardware) has been reviewed to be in accordance with the manufacturer's specifications and to meet and/or exceed the requirements set forth by the referenced codes.

Sincerely,



Ryan Ngo Digitally signed by Ryan Ngo Date: 2023.12.11 23:54:45-08'00'

This item has been digitally signed and sealed by Ryan Ngo, PE. on the date and/or time stamp shown using a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified by a 3rd Party Certificate Authority on any electronic copy.

BARUN CORP	RESULTS SUMMARY
PATRICIA HALE, 253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024	

MOUNTING PLANE STRUCTURAL EVALUATION			
MOUNTING PLANE	**ROOF PITCH**	**RESULT**	**GOVERNING ANALYSIS**
Roof 1&2	26°	**OK**	IEBC IMPACT CHECK

STANDOFF HARDWARE EVALUATION FOR WIND UPLIFT	
MOUNTING PLANE	**WIND UPLIFT DCR**
Roof 1&2	58.3%

Limits of Scope of Work and Liability:

The existing structure has been reviewed based on the assumption that it has been originally designed and constructed per appropriate codes. The structural analysis of the subject property is based on the provided site survey data. The calculations produced for this structure's assessment are only for the roof framing supporting the proposed PV installation referenced in the stamped planset and were made according to generally recognized structural analysis standards and procedures. All PV modules, racking and attachment components shall be designed and installed per manufacturer's approved guidelines and specifications. These plans are not stamped for water leakage or existing damage to the structural component that was not accessed during the site survey. Prior to commencement of work, the PV system installer should verify that the existing roof and connections are in suitable condition and inspect framing noted on the certification letter and inform the Engineer of Record of any discrepancies prior to installation. The installer should also check for any damages such as water damage, cracked framing, etc. and inform the Engineer of Record of existing deficiencies which are unknown and/or were not observable during the time of survey and have not been included in this scope of work. Any change in the scope of the work shall not be accepted unless such change, addition, or deletion is approved in advance and in writing by the Engineer of Record.

BARUN CORP	LOAD CALCULATION
	Roof 1&2
PATRICIA HALE, 253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024	

PV PANELS DEAD LOAD (PV-DL)	
PV Panels Weight	= 2.50 psf
Hardware Assembly Weight	= 0.50 psf
Total PV Panels	**PV-DL = 3.00 psf**

ROOF DEAD LOAD (R-DL)			
Existing Roofing Material Weight	Composite Shingle Roof	1 Layer(s)	= 2.50 psf
Underlayment Weight			= 0.50 psf
Plywood/OSB Sheathing Weight			= 1.50 psf
Framing Weight	2 x 4 @ 24 in. O.C.		= 0.73 psf
No Vaulted Ceiling			= 0.00 psf
Miscellaneous			= 1.50 psf
Total Roof Dead Load			**R-DL = 6.70 psf**

REDUCED ROOF LIVE LOAD (Lr)	
Roof Live Load	Lo = 20.00 psf
Member Tributary Area	At < 200 ft^2
Roof 1&2 Pitch	26° or 6/12
Tributary Area Reduction Factor	R1 = 1.00
Roof Slope Reduction Factor	R2 = 0.90
Reduced Roof Live Load, Lr = Lo (R1) (R2)	**Lr = 18.00 psf**

SNOW LOAD	
Ground Snow Load	pg = 0.00 psf
Effective Roof Slope	26°
Snow Importance Factor	Is = 1.00
Snow Exposure Factor	Ce = 1.00
Snow Thermal Factor	Ct = 1.10
Minimum Flat Roof Snow Load	pf-min = 0.00 psf
Flat Roof Snow Load	**pf = 0.00 psf**

SLOPED ROOF SNOW LOAD ON ROOF (Non-Slippery Surfaces)	
Roof Slope Factor	Cs-roof = 1.00
Sloped Roof Snow Load on Roof	**ps-roof = 0.00 psf**

SLOPED ROOF SNOW LOAD ON PV PANELS (Unobstructed Slippery Surfaces)	
Roof Slope Factor	Cs-PV = 0.73
Sloped Roof Snow Load on PV Panels	**ps-PV = 0.00 psf**

BARUN CORP	IEBC IMPACT CHECK
	Roof 1&2
PATRICIA HALE, 253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024	

	EXISTING	WITH PV PANELS	
Roof Dead Load (DL) =	6.70	9.70	psf
Roof Live Load (Lr) =	18.00	0.00	psf
Roof Snow Load (SL) =	0.00	0.00	psf

	EXISTING	WITH PV PANELS	
(DL + Lr)/Cd =	19.76	10.78	psf
(DL + SL)/Cd =	5.83	8.43	psf
Maximum Gravity Load =	19.76	10.78	psf

Load Increase (%) = -45.46% **OK**

The requirements of section 806.2 of 2018 IEBC are met and the structure is permitted to remain unaltered.

BARUN CORP

WIND UPLIFT CALCULATION

Roof 1&2

PATRICIA HALE, 253 SOUTHWEST HUNTINGTON GLEN, LAKE CITY, FL 32024

SITE INFORMATION			
Ultimate Wind Speed =	119.00 mph	Roof Pitch =	26°
Risk Category =	II	Roof Type =	Hip
Exposure Category =	C	Velocity Pressure Exposure Coefficient, Kz =	0.85
Mean Roof Height =	15.00 ft	Topographic Factor, Kzt =	1.00
Solar Array Dead Load =	3.00 psf	Wind Directionality Factor, Kd =	0.85
a =	3.00 ft	Ground Elevation Factor, Ke =	1.00

DESIGN CALCULATIONS			
Wind Velocity Pressure, qh =		26.16 psf	(0.00256*Kz*Kzt*Kd*Ke*(V^2))
Solar Array Pressure Equalization Factor, ya =		0.60	
Hardware Type =	Ecofasten RockIT Smart Slide		
Allowable Load =	530.15 lbs	SPF, #12 Wood Screw x 2, 2" Embedment	
Array Edge Factor, γE =	1.50	Exposed Condition	
Max. X - Spacing (Zone 1) =	4.00 ft	Effective Wind Area	
Max. Y - Spacing (Zone 1) =	3.00 ft	12.00 ft²	
Max. X - Spacing (Zone 2e & 2r) =	4.00 ft	Effective Wind Area	
Max. Y - Spacing (Zone 2e & 2r) =	3.00 ft	12.00 ft²	
Max. X - Spacing (Zone 3) =	3.00 ft	Effective Wind Area	
Max. Y - Spacing (Zone 3) =	3.00 ft	9.00 ft²	

ROOF ZONE	GCp (-) UPLIFT	UPLIFT PRESSURE	PULLOUT FORCE
1	-1.35	-17.49 psf	209.86 lbs
2e & 2r	-1.94	-25.78 psf	309.30 lbs
3	-2.00	-26.63 psf	239.71 lbs

NOTE:

• Wind calculation is based on ASCE 7-16, 29.4 - C&C, LC #7: 0.6DL + 0.6WL is used.