ROOF MOUNT PHOTOVOLTAIC SYSTEM

CODES:

THIS PROPOSED INSTALLATION COMPLIES WITH THE FOLLOWING:
2018 NORTH CAROLINA BUILDING CODE
2018 NORTH CAROLINA RESIDENTIAL CODE
2018 NORTH CAROLINA PLUMBING CODE
2018 NORTH CAROLINA MECHANICAL CODE
2018 NORTH CAROLINA FUEL GAS CODE
2020 NATIONAL ELECTRICAL CODE
AS ADOPTED BY COUNTY OF HARNETT

VICINITY MAP:

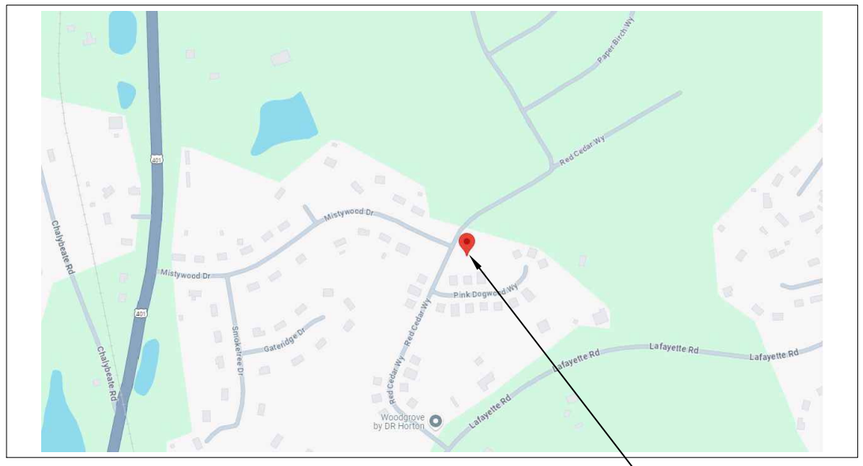
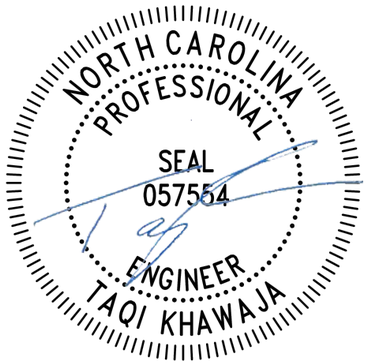


TABLE OF CONTENTS:

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 2020 NEC SEC 250.166(A).
SOLAR PHOTOVOLTAIC SYSTEM EQUIPMENT WILL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF ART. 690 OF THE 2020 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
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: 130
WIND EXPOSURE: B
SNOW LOAD: 15



Signed by: Taqi Khawaja, PE
Signed on: 09/19/2024

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

PROJECT DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-1

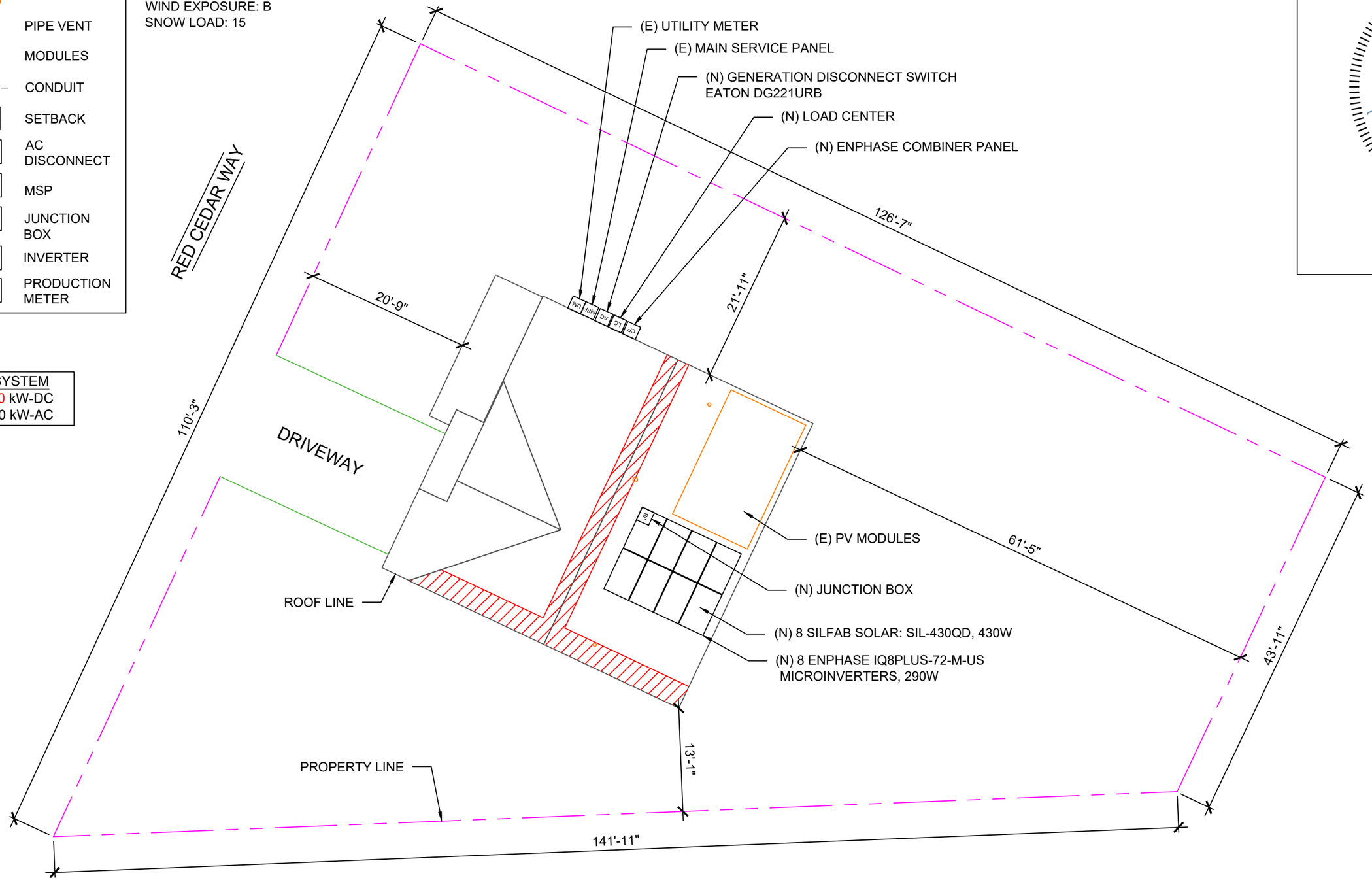
LEGEND:

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

PV SYSTEM
3.440 kW-DC
2.320 kW-AC

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

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 130
WIND EXPOSURE: B
SNOW LOAD: 15



SITE PLAN
SCALE: 2/25" = 1'-0"

1

NORTH CAROLINA PROFESSIONAL SEAL 057554 ENGINEER TAQI KHAWAJA

Signed by: Taqi Khawaja, PE
Signed on: 09/19/2024

ROOF AREA: 1861.55 SQ FT

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

SITE PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-2

LEGEND:

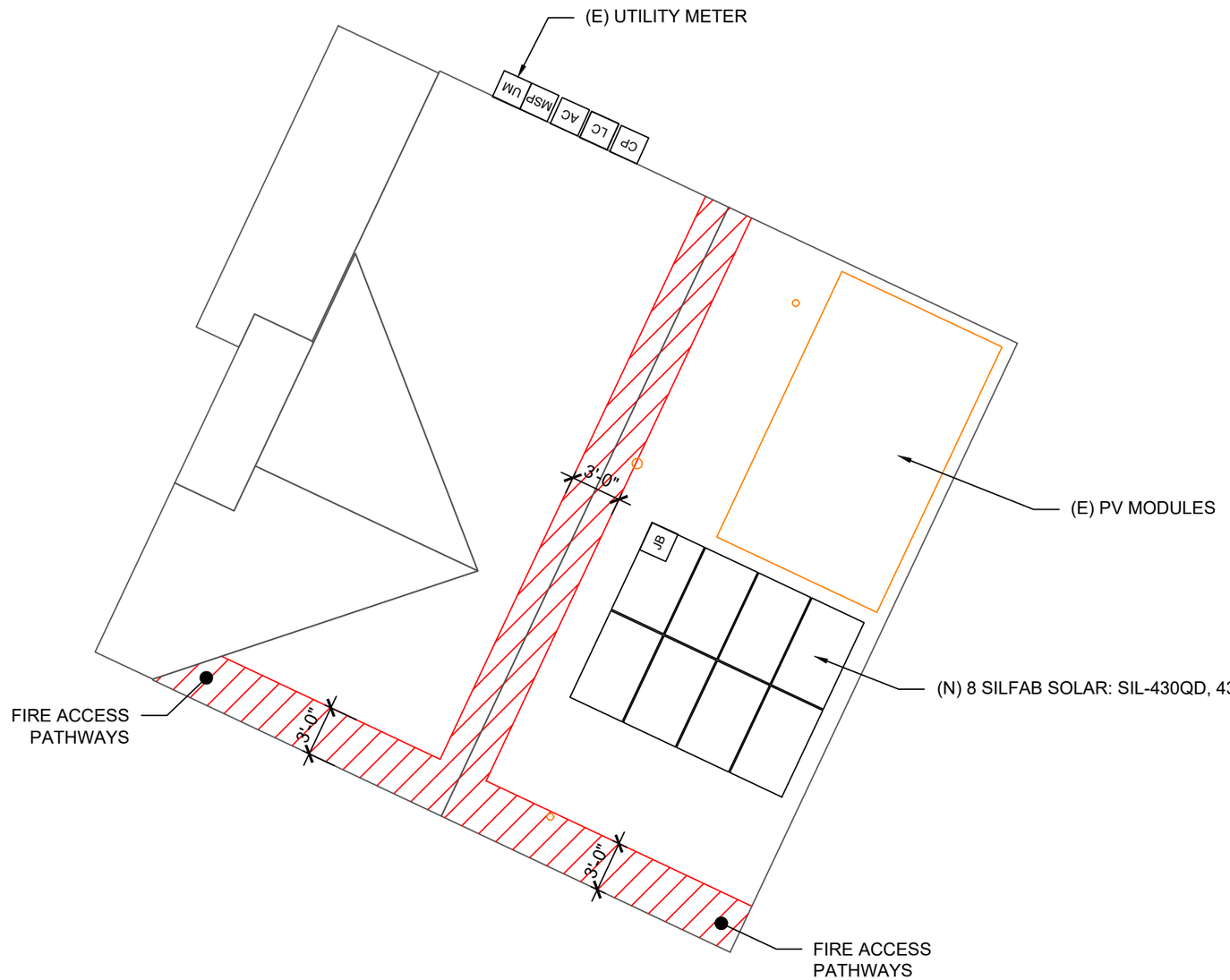
- OBSTRUCTION
- PIPE VENT
- MODULES
- CONDUIT
- SETBACK
- AC — AC DISCONNECT
- MSP — MSP
- JB — JUNCTION BOX
- INV — INVERTER
- PM — PRODUCTION METER

PV SYSTEM
3.440 kW-DC
2.320 kW-AC

MODIFIED SETBACKS PROPOSED AT RIDGE:
TOTAL ARRAY AREA = 167.91 SF
TOTAL ROOF AREA = 1861.55 SF
TOTAL ARRAY AREA AS A % TO ROOF AREA = 9.02%
9.02% < 33%

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

THIS SYSTEM DESIGNED WITH:
WIND SPEED: 130
WIND EXPOSURE: B
SNOW LOAD: 15



TOTAL ROOF AREA: 1861.55 SQ FT
TOTAL ARRAY AREA: 167.91 SQ FT
ARRAY COVERAGE: 19.12%
SYSTEM DISTRIBUTED WEIGHT: 2.71 LBS
ROCKIT SMART SLIDE POINT-LOAD: 19.5 LBS

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

1

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.

NORTH CAROLINA PROFESSIONAL SEAL 057554 ENGINEER TAQI KHAWAJA

Signed by: Taqi Khawaja, PE
Signed on: 09/19/2024

ROOF AREA: 1861.55 SQ FT

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

ROOF PLAN WITH MODULES LAYOUT

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-2A

ROOF DETAILS:

TOTAL ROOF AREA: 1861.55 SQ FT
TOTAL ARRAY AREA: 167.91 SQFT
ARRAY COVERAGE: 19.12%
SYSTEM DISTRIBUTED WEIGHT: 2.71 LBS
ROCKIT SMART SLIDE POINT-LOAD: 19.5 LBS

NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 057554
TAQI KHAWAJA

Signed by: Taqi Khawaja, PE
Signed on: 09/19/2024

ROOF AREA STATEMENT

ROOF	MODULE QUANTITY	ROOF PITCH	ARRAY PITCH	AZIMUTH	ROOF AREA	ARRAY AREA
ROOF 1	8	24	24	115.2	818.63 SQ FT	167.91 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
----	----	----	----	----	SQ FT	SQ FT

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

REVISIONS

NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

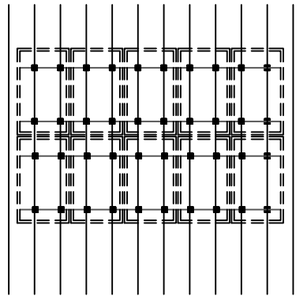
ARRAY DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-2B

TABLE 1 – ARRAY INSTALLATION

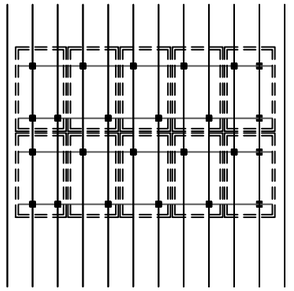
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE	MAX UNBRACED LENGTH(FT.)	STRUCTURAL ANALYSIS RESULT	PENETRATION PATTERN	MAX ATTACHMENT SPACING (IN.)	MAX RAIL OVERHANG(IN.)
ROOF 1	24	Comp Shingle	Ecofasten RockIt Smart Slide	2x4 @ 24" O.C.	7	PASS	STAGGERED	48	16

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.



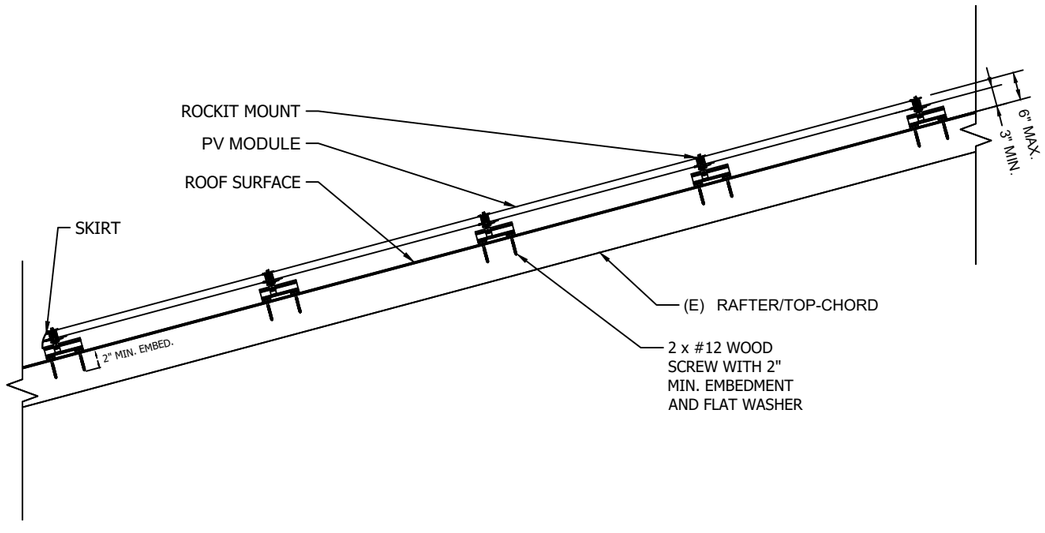
STACKED DETAIL

For Illustration purposes only



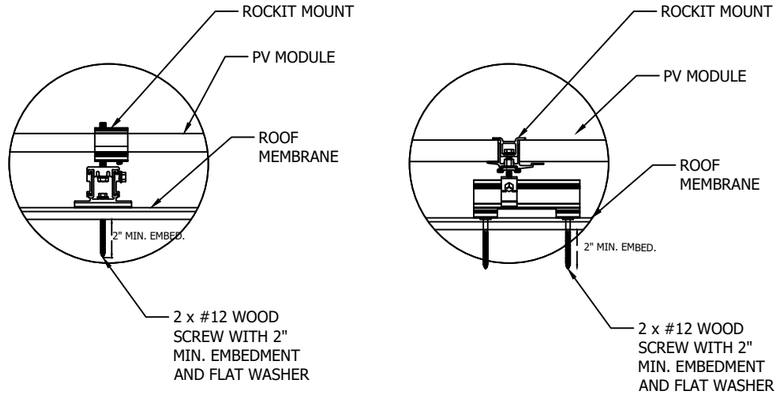
STAGGERED DETAIL

For Illustration purposes only



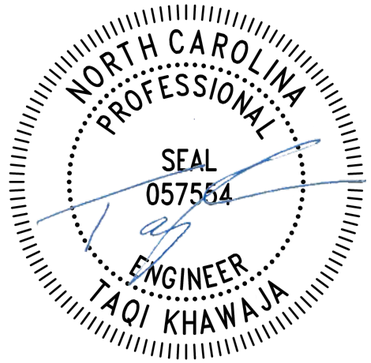
SOLAR PV ARRAY SECTION VIEW

Scale: NTS



ATTACHMENT DETAIL

Scale: NTS



Signed by: Taqi Khawaja, PE
Signed on: 09/19/2024

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075
GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

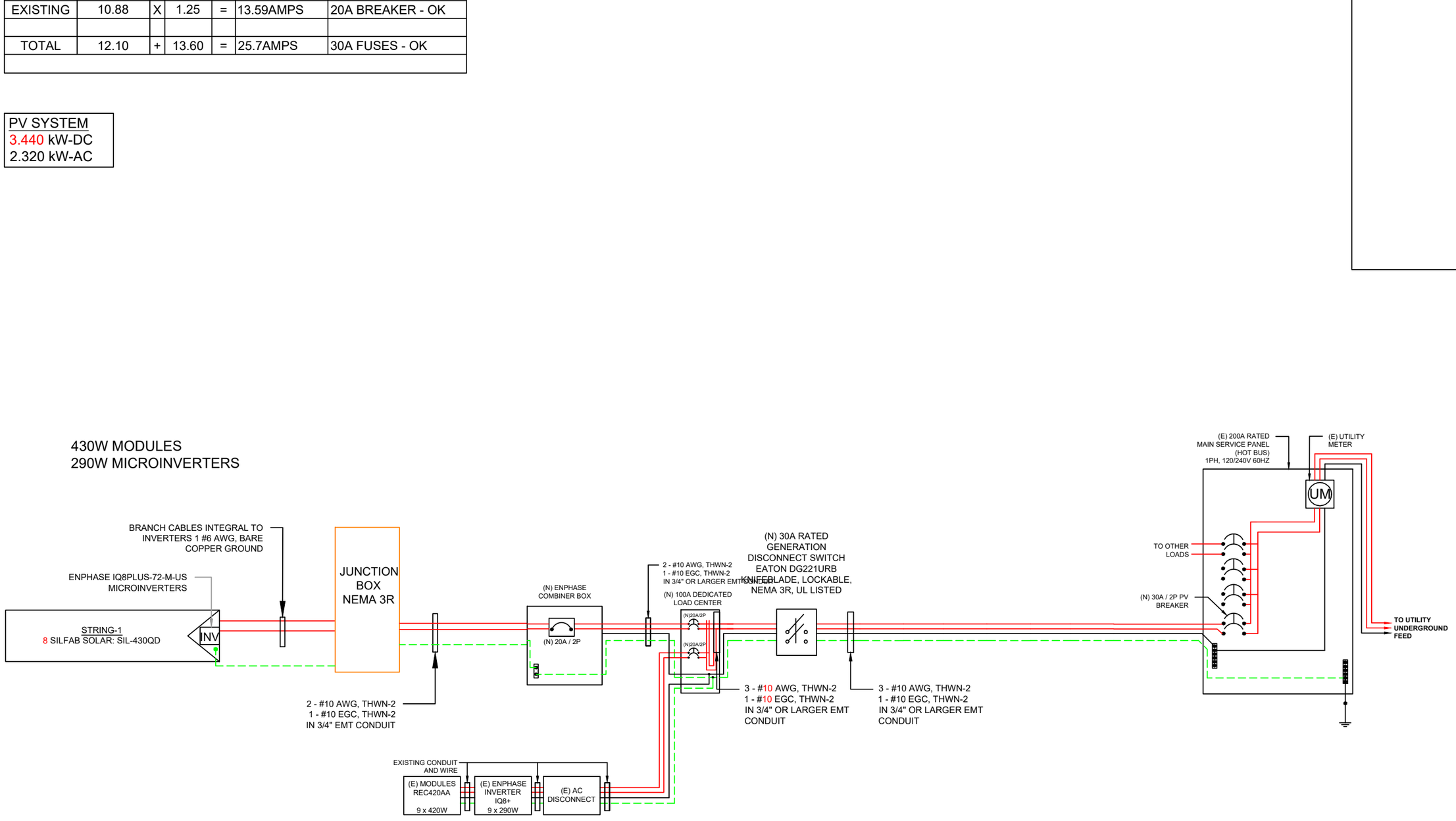
MOUNTING DETAILS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-3

	BACKFEED BREAKER/FUSE SIZING					
	(TOTAL) MAX. CONTINUOUS OUTPUT 20.56A @ 240V					
NEW	9.68	X	1.25	=	12.1AMPS	20A BREAKER - OK
EXISTING	10.88	X	1.25	=	13.59AMPS	20A BREAKER - OK
TOTAL	12.10	+	13.60	=	25.7AMPS	30A FUSES - OK

PV SYSTEM
3.440 kW-DC
2.320 kW-AC

430W MODULES
290W MICROINVERTERS



NOTE:
CONDUIT AND CONDUCTORS SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

THREE LINE DIAGRAM

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-4

MODULE INFO

MAKE/MODEL: SILFAB SOLAR: SIL-430QD
Voc: 38.91 V
Vmp: 33.25 V
Isc: 13.87 A
Imp: 12.93 A
STC RATING: 430 W
PTC RATING: 405.8 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 (20.56) = 25.70A

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	MICROINVERTER	2	10	40	17.34	0.91	1	36.40	21.67
2	AC	MICROINVERTER	TO	JUNCTION BOX	2	10	40	9.68	0.91	1	36.40	12.10
3	AC	JUNCTION BOX	TO	ENPHASE COMBINER PANEL	2	10	40	9.68	0.91	1	36.40	12.10
4	AC	ENPHASE COMBINER PANEL	TO	DEDICATED LOAD CENTER	3	10	40	20.56	0.91	1	36.40	25.69
5	AC	EXISTING INVERTER 1	TO	DEDICATED LOAD CENTER	3	10	40	10.88	0.91	1	36.40	13.59
6	AC	DEDICATED LOAD CENTER	TO	AC DISCONNECT	3	10	40	20.56	0.91	1	36.40	25.69
7	AC	AC DISCONNECT	TO	POI	3	10	40	20.56	0.91	1	36.40	25.69

CONDUCTOR AMPACITY CALCULATIONS IN ACCORDANCE WITH NEC 690.8.

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

CONDUCTOR CALCULATIONS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-5

OCPD SIZES:

20A BREAKER
20A BREAKER
30A BREAKER

SERVICE LIST:

NONE

MATERIAL LIST:

QTY.	PART	PART #	DESCRIPTION
8	110 - MODULES	PV-110-430-SIL	"MFG: SILFAB, 430W BOB, MFG SKU: SIL-430QD"
8	120 - INVERTERS	INV-120-017	"MFG: ENPHASE, IQ8+ MICROINVERTER 72CELL W/ INTEGRATED MC4, MFG SKU: IQ8PLUS-72-M-US"
1	180 - MONITORING EQUIPMENT	ME-180-201-4C	"MFG: ENPHASE, AC COMBINER W/ IQ GATEWAY PCBA, 80A, 240V, MFG SKU: X2-IQ-AM1-240-4C"
10	160 - EQUIPMENT ACCESSORIES	EA-160-106	"MFG: ENPHASE, Q CABLE PORTRAIT FOR 60/72 CELL, MFG SKU: Q-12-10-240"
10	160 - EQUIPMENT ACCESSORIES	EA-160-120	"MFG: ENPHASE, Q CABLE LANDSCAPE 72 CELL, MFG SKU: Q-12-20-200"
2	160 - EQUIPMENT ACCESSORIES	EA-160-107	"MFG: ENPHASE, SEALING CAP FOR Q CABLE, MFG SKU: Q-SEAL-10"
1	160 - EQUIPMENT ACCESSORIES	EA-160-109	"MFG: ENPHASE, TERMINATOR CAP FOR Q CABLE, MFG SKU: Q-TERM-10"
4	160 - EQUIPMENT ACCESSORIES	EA-160-111	"MFG: ENPHASE, FEMALE FIELD WIREABLE CONNECTOR FOR Q CABLE, MFG SKU: Q-CONN-10F"
4	160 - EQUIPMENT ACCESSORIES	EA-160-112	"MFG: ENPHASE, MALE FIELD WIREABLE CONNECTOR FOR Q CABLE, MFG SKU: Q-CONN-10M"
1	260 - FITTINGS/ANCHORS	RAC-260-049	"MFG: EZ SOLAR, JUNCTION BOX, PV, MFG SKU: JB-1.2"
1	320 - DISCONNECTS	EE-321-030	"MFG: EATON, DISCONNECT, GENERAL DUTY, 2P, 240V, 30A, NON FUSIBLE, NEMA 3R, MFG SKU: DG221URB"
100	260 - FITTINGS/ANCHORS	RAC-260-550	"MFG: BURNDY, PV WILEY CABLE CLIP THICKNESS RANGE: 1.3 TO 3MM MFG SKU: ACC-FPV180"
1	350 - ELECTRICAL ACCESSORIES	EA-350-585	"MFG: ILSCO, GROUND LUG, MFG SKU: SGB-4"
19	260 - FITTINGS/ANCHORS	RAC-265-034	"MFG: ECO FASTEN, ROCKIT SMART SLIDE BLK 6 - 75"", MFG SKU: 2011024"
8	260 - FITTINGS/ANCHORS	RAC-265-004	"MFG: ECO FASTEN, ROCKIT COMP COUPLING AL BLK, MFG SKU: 2011021"
4	260 - FITTINGS/ANCHORS	RAC-265-028	"MFG: ECO FASTEN, SKIRT AL BLK 35MM & 40MM A80, MFG SKU: 2099012"
1	260 - FITTINGS/ANCHORS	RAC-265-031	"MFG: ECO FASTEN, SKIRT END CAP PLS 35MM&40MM-A, MFG SKU: 2099035"
8	260 - FITTINGS/ANCHORS	RAC-265-018	"MFG: ECO FASTEN, FRAME MLPE MOUNT SS, MFG SKU: 4011012"
1	260 - FITTINGS/ANCHORS	RAC-260-049	"MFG: EZ SOLAR, JUNCTION BOX, PV, MFG SKU: JB-1.2"
76	260 - FITTINGS/ANCHORS	RAC-265-035	"MFG: ECO FASTEN, ROCKIT SCREW #12X3"" W/BW, MFG SKU: 2011025"
19	260 - FITTINGS/ANCHORS	RAC-265-003	"MFG: ECO FASTEN, ROCKIT MOUNT AL BLK, MFG SKU: 2011020"
10	260 - FITTINGS/ANCHORS	RAC-265-040	"MFG: ECO FASTEN, SMART CONDUIT MOUNT W/HW, MFG SKU: 4011017"
10	"420 - 3/4"" FITTINGS"	FIT-420-082	"MFG: BRIDGEPORT, 3/4"" HANGER/COWBOY STRAPS, STEEL, MFG SKU: 2110"

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

EQUIPMENT & SERVICE LIST

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-6

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

690.13(B)

DO NOT DISCONNECT UNDER LOAD

NEC 690.15 (B) & NEC 690.33(D)(2)

⚠ WARNING

SINGLE 120-VOLT SUPPLY
DO NOT CONNECT
MULTIWIRE BRANCH CIRCUITS

NEC 710.15(C) & 692.9 (C)

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(D) & NEC 690.59

⚠ WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 110.27(C) & OSHA 1910.145(F)(7)

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

706.15(C)(4) & 690.13(B)

⚠ WARNING

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

NEC 705.12(B)(3)(3)

⚠ WARNING

THE DISCONNECTION OF THE GROUNDED CONDUCTOR(S) MAY RESULT IN OVERVOLTAGE ON THE EQUIPMENT

NEC 690.31(E)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

690.56(C)(3)

M

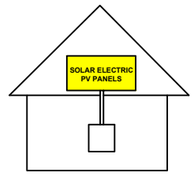
AC

PM

INVERTER

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



IFC 605.11.3.1(1) & 690.56(C)

⚠ CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

NEC 705.12(D) & NEC 690.59

⚠ WARNING

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

NEC 705.12(C) & NEC 690.59

⚠ WARNING

ARC FLASH AND SHOCK HAZARD
APPROPRIATE PPE REQUIRED

24 INCH FLASH HAZARD BOUNDARY
3 CAL/CM^2 FLASH HAZARD AT 18 INCHES
480 VAC SHOCK HAZARD WHEN COVER IS REMOVED
42 INCH LIMITED APPROACH
12 INCH RESTRICTED APPROACH - 500 V CLASS 00 GLOVES
1 INCH PROHIBITED APPROACH - 500 V CLASS 00 GLOVES

LOCATION: 236 RED CEDAR WAY FUQUAY-VARINA, NC 27526

NEC 706.15(C) AND NEC 110.16

PHOTOVOLTAIC AC DISCONNECT

NEC 690.13(B)

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT: 20.56A
NOMINAL OPERATING AC VOLTAGE: 240V

NEC 690.54

⚠ WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(D) & NEC 690.59

SOLAR PV DC CIRCUIT

EVERY 10' ON CONDUIT AND ENCLOSURES
NEC 690.31

PHOTOVOLTAIC POWER SOURCE

EVERY 10' ON CONDUIT AND ENCLOSURES
NEC 690.31(D)(2)

MAXIMUM VOLTAGE	60	V
MAXIMUM CIRCUIT CURRENT	N/A	A
MAX DC-DC CONVERTER OUTPUT CURRENT	15	A

DC

J/B

PHOTOVOLTAIC DC DISCONNECT

NEC 690.13(B)

MAXIMUM DC VOLTAGE OF PV SYSTEM

NEC 690.53

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

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

706.15(C)(4) & 690.13(B)

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

706.15(C)(4) & 690.13(B)

⚠ WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 110.27(C) & OSHA 1910.145(F)(7)

ARRAY

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

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

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

REVISIONS		
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

freedom FOREVER

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

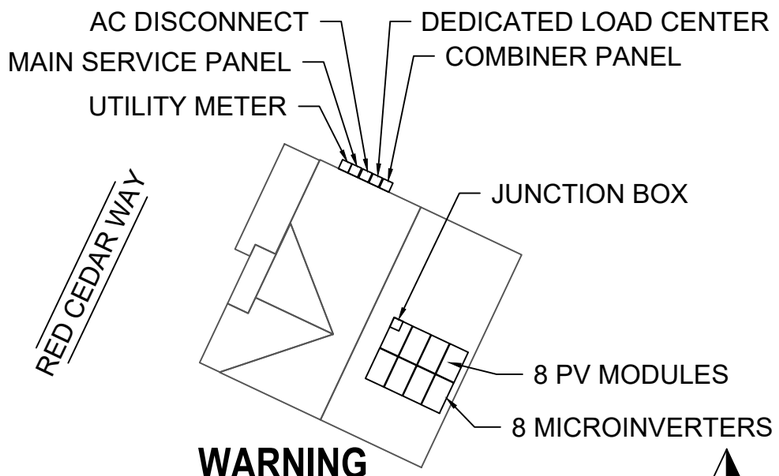
CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

LABELS

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	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:

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. AERIAL 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.

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

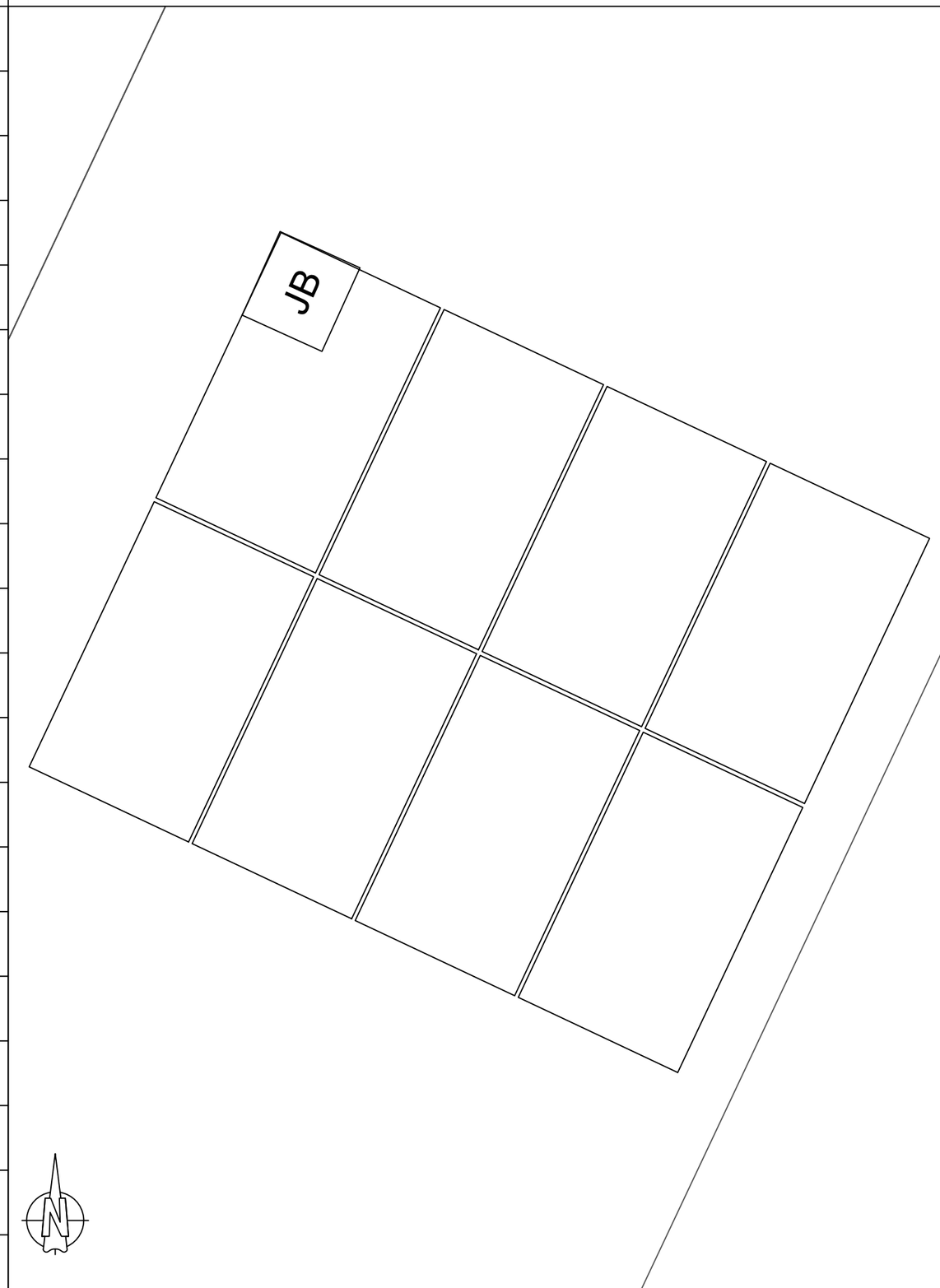
CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

SITE PLACARD

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	A.M.	PV-7A

	1-20	21-40	41-60
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

ENPHASE MICROINVERTER CHART



CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

MICROINVERTER CHART

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	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:

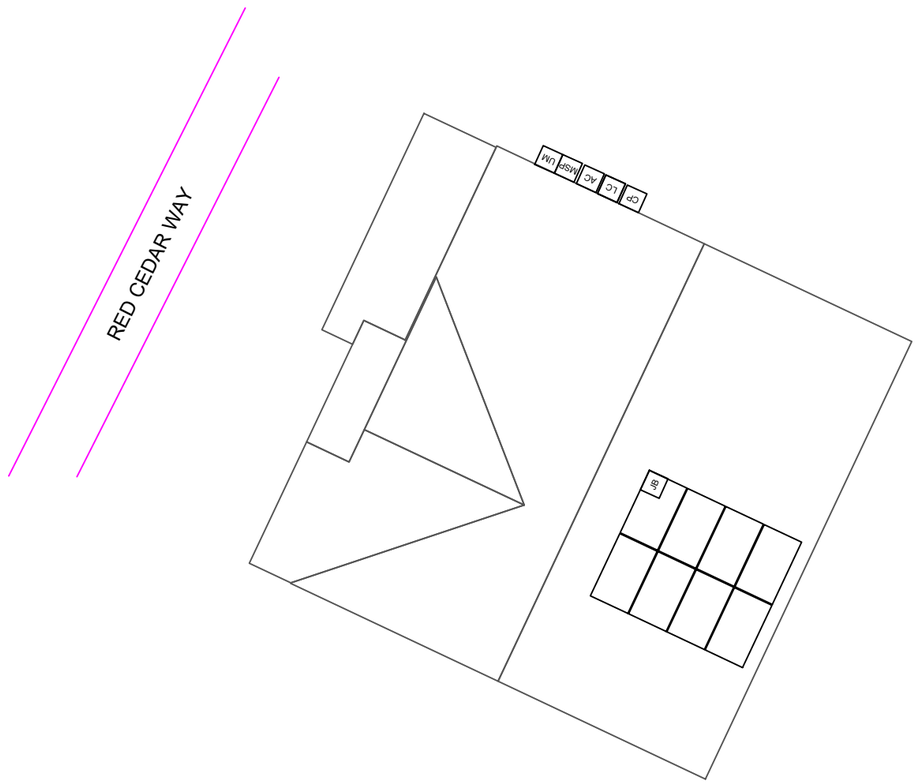
NAME: _____

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

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

POLICIES

INSTRUCTIONS:

1. SCAN QR LINK BELOW TO ACCESS ALL FREEDOM FOREVER SAFETY POLICIES AND PROGRAMS.

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	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:

CLIENT:
SAMUEL NGWAMUKIE
236 RED CEDAR WAY, FUQUAY-VARINA, NC 27526
AHJ: COUNTY OF HARNETT
UTILITY: DUKE ENERGY
METER: 343838926
APN: 080653 0007 94
EMAIL: NGWAMUKIES@GMAIL.COM
FINANCE: MOSAIC

SYSTEM:
SYSTEM SIZE (DC): 8 X 430 = 3.440 kW
SYSTEM SIZE (AC): 2.320 kW @ 240V
MODULES: 8 X SILFAB SOLAR: SIL-430QD
INVERTER: ENPHASE IQ8PLUS-72-M-US

EXISTING SYSTEM:
SYSTEM SIZE (DC): 9 X 420 = 3.780 kW
SYSTEM SIZE (AC): 2.610 kW @ 240V

	REVISIONS	
NO.	REVISED BY	DATE
-	-	-
-	-	-
-	-	-

FREEDOM FOREVER LLC
415 INDUSTRIAL CT., GREER, SC 29651
Tel: (800) 385-1075

GREG ALBRIGHT

CONTRACTOR LICENSE:
ELECTRICAL CONTRACTOR U.34043

SAFETY PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
500462	9/19/2024	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

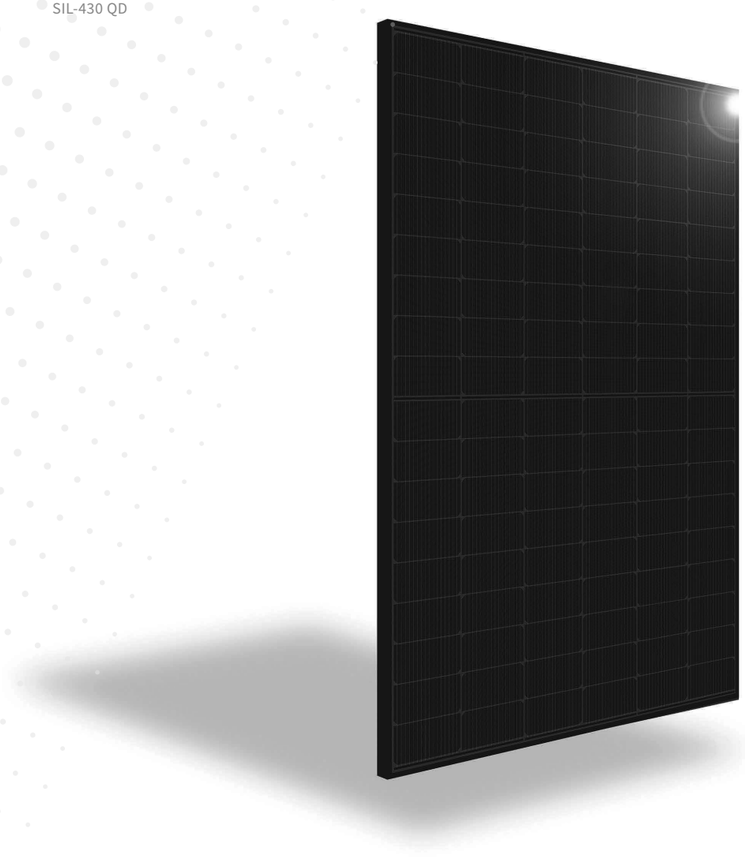
Misc. Quick Guide

V1.4

SILFAB PRIME NTC

SIL-430 QD

SILFAB SOLAR®



INTRODUCING NEXT-GENERATION N-TYPE CELL TECHNOLOGY

- Improved Shade Tolerance
- Improved Low-Light Performance
- Increased Performance in High Temperatures
- Enhanced Durability
- Reduced Degradation Rate
- Industry-Leading Warranty

SILFABSOLAR.COM

ELECTRICAL SPECIFICATIONS		430	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	430	321
Maximum power voltage (Vpmax)	V	33.25	31.02
Maximum power current (Ipmax)	A	12.93	10.33
Open circuit voltage (Voc)	V	38.91	36.58
Short circuit current (Isc)	A	13.87	11.15
Module efficiency	%	22.1%	20.6%
Maximum system voltage (VDC)	V	1000	
Series fuse rating	A	25	
Power Tolerance	Wp	0 to +10	

Measurement conditions: STC 1000 W/m² • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0 to +10 W.

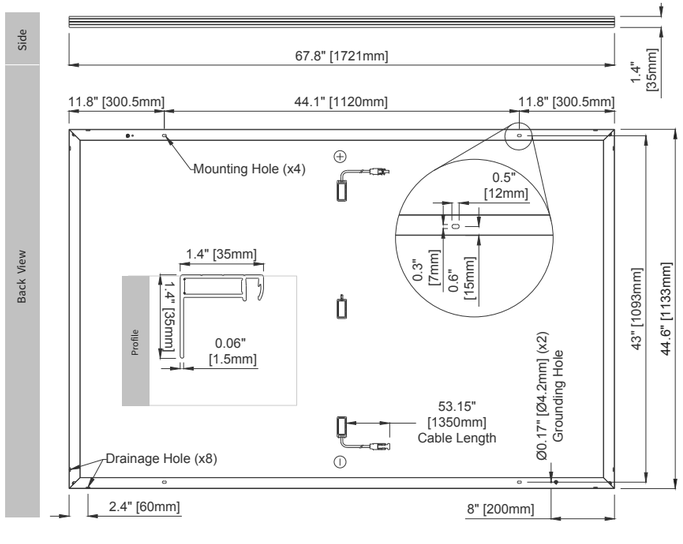
MECHANICAL PROPERTIES / COMPONENTS	METRIC	IMPERIAL
Module weight	21 kg ± 0.2 kg	46.3 lbs ± 0.4 lbs
Dimensions (H x L x D)	1721 mm x 1133 mm x 35 mm	67.8 in x 44.6 in x 1.37 in
Maximum surface load (wind/snow)*	4000 Pa rear load / 5400 Pa front load	83.5 lb/ft² rear load / 112.8 lb/ft² front load
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	108 Half cells - N-Type Silicon solar cell 182 mm x 91 mm	108 Half cells - N-Type Silicon solar cell 7.16 in x 3.58 in
Glass	3.2 mm high transmittance, tempered, antireflective coating	0.126 in high transmittance, tempered, antireflective coating
Cables and connectors (refer to installation manual)	1350 mm, ø 5.7 mm, MC4 from Staubli	53.1 in, ø 0.22 in (12 AWG), MC4 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, fluorine-free PV backsheet	
Frame	Anodized aluminum (Black)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP68 rated, 3 diodes	

TEMPERATURE RATINGS	
Temperature Coefficient Isc	0.04 %/°C
Temperature Coefficient Voc	-0.24 %/°C
Temperature Coefficient Pmax	-0.29 %/°C
NOCT (± 2 °C)	45 °C
Operating temperature	-40/+85 °C

WARRANTIES	
Module product workmanship warranty	25 years**
Linear power performance guarantee	30 years
	≥ 98% end 1st yr ≥ 94.7% end 12th yr ≥ 90.8% end 25th yr ≥ 89.3% end 30th yr

CERTIFICATIONS		SHIPPING SPECS	
Product	UL 61215, UL 61730, CSA C22.2#61730, IEC 61215, IEC 61730, IEC 61701 (Salt Mist Corrosion), IEC 62716 (Ammonia Corrosion), CEC Listed, UL Fire Rating: Type 2	Modules Per Pallet:	26 or 26 (California)
		Pallets Per Truck	32 or 30 (California)
Factory	ISO9001:2015	Modules Per Truck	832 or 780 (California)

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.
** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com.
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads.



SILFAB SOLAR INC.

1770 Port Drive
Burlington WA 98233 USA
T +1 360.569.4733
info@silfabsolar.com
SILFABSOLAR.COM

7149 Logistics Lane
Fort Mill SC 29715 USA
T +1 839.400.4338

240 Courtneypark Drive East
Mississauga ON L5T 2Y3 Canada
T +1 905.255.2501
F +1 905.696.0267

Silfab - SIL-430-QD-20240227

ENPHASE

DATA SHEET

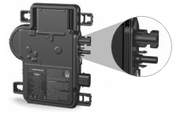
IQ8 and IQ8+ Microinverters

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

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

Enphase 25 year limited warranty

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



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

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL listed as PV Rapid Shutdown Equipment and conform with various regulations, when installed according to manufacturer's instructions.

*Only when installed with IQ System Controller 2, meets UL 1741.
**IQ8 and IQ8+ support split-phase, 240V installations only.

Easy to install

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

High productivity and reliability

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

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB 3rd Ed.)

Note:

IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, etc) in the same system.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-M-US	IQ8PLUS-72-M-US
Commonly used module pairings[1]	W	235 – 350	235 – 440
Module compatibility		60-cell / 120 half-cell	54-cell / 108 half-cell, 60-cell / 120 half-cell, 66-cell / 132 half-cell and 72-cell / 144 half-cell
MPPT voltage range	V	27 – 37	27 – 45
Operating range	V	16 – 48	16 – 58
Min. / Max. start voltage	V	22 / 48	22 / 58
Max. input DC voltage	V	50	60
Max. continuous input DC current	A	10	12
Max. input DC short-circuit current	A	25	
Max. module I_{sc}	A	20	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1 x 1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	

OUTPUT DATA (AC)		IQ8-60-M-US	IQ8PLUS-72-M-US
Peak output power	VA	245	300
Max. continuous output power	VA	240	290
Nominal (L-L) voltage / range[2]	V	240 / 211 – 264	
Max. continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	47 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max. units per 20 A (L-L) branch circuit[3]		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.7	
CEC weighted efficiency	%	97	
Night-time power consumption	mW	60	

MECHANICAL DATA	
Ambient temperature range	-40°C to +60°C (-40°F to +140°F)
Relative humidity range	4% to 100% (condensing)
DC Connector type	Stäubli MC4
Dimensions (H x W x D)	212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")
Weight	1.1 kg (2.43 lbs)
Cooling	Natural convection – no fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure
Environ. category / UV exposure rating	NEMA Type 6 / outdoor

COMPLIANCE	
Certifications	CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3rd Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN / CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shutdown Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at https://link.enphase.com/module-compatibility. (2) Nominal voltage range can be extended beyond nominal if required by the utility. (3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-MC4-12A-DS-0079-03-EN-US-2022-12-27

Data Sheet
Enphase Networking

IQ Combiner 4/4C

X-IQ-AM1-240-4C
X2-IQ-AM1-240-4C (IEEE 1547:2018)

X-IQ-AM1-240-4
X2-IQ-AM1-240-4 (IEEE 1547:2018)

The **IQ Combiner 4/4C** with IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure. It streamlines IQ Microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Supports Wi-Fi, Ethernet, or cellular connectivity
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Mounts on single stud with centered brackets
- Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

LISTED

To learn more about Enphase offerings, visit **enphase.com**
IQ-C-4-4C-DS-0103-EN-US-12-29-2022

ENPHASE

IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	IQ Combiner 4 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018)	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Supported microinverters	IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8)
Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	 - Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
X-IQ-NA-HD-125A	Hold-down kit for Eaton circuit breaker with screws
Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A pair of 200A split core current transformers
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240VAC, 60 Hz
Eaton BR series busbar rating	125A
Max. continuous current rating	65A
Max. continuous current rating (input from PV/storage)	64A
Max. fuse/circuit rating (output)	90A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation/95A with IQ Gateway breaker included
IQ Gateway breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200A solid core pre-installed and wired to IQ Gateway
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40°C to +46°C (-40°F to 115°F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20A to 50A breaker inputs: 14 to 4 AWG copper conductors • 60A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors • Always follow local code requirements for conductor sizing.
Altitude	Up to 3,000 meters (9,842 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	IEEE 802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations.
Ethernet	Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

Eaton DG221URB

Catalog Number: DG221URB

Eaton General duty non-fusible safety switch, single-throw, 30 A, 240 V, NEMA 3R, Rainproof, Painted galvanized steel, Two-pole, Two-wire

General specifications

Product Name Eaton general duty non-fusible safety switch	Catalog Number DG221URB
	UPC 782113120232
Product Length/Depth 6.88 in	Product Height 10.81 in
Product Width 6.38 in	Product Weight 6 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
30A

Number Of Poles
Two-pole

Resources

Catalogs
Eaton's Volume 2—Commercial Distribution

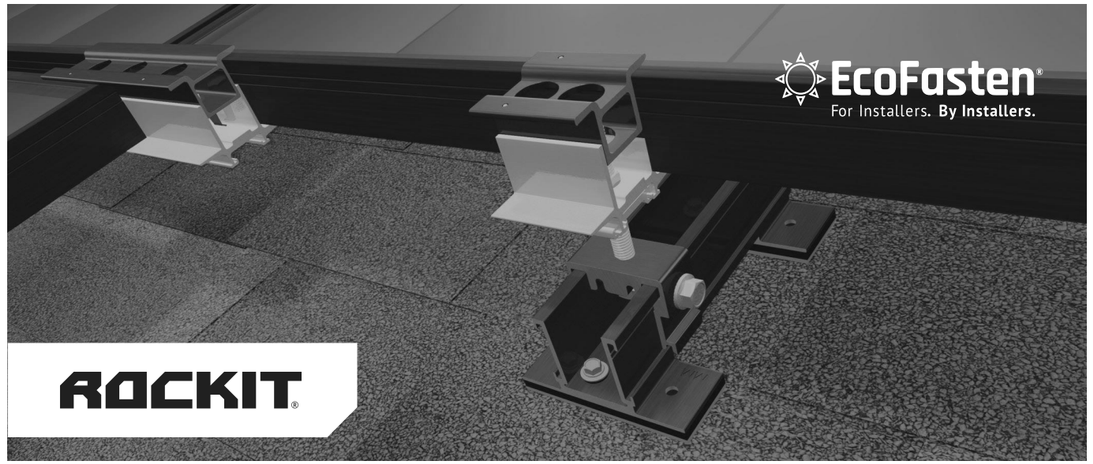
Multimedia
Double Up on Safety

Switching Devices Flex Center

Specifications and datasheets
Eaton Specification Sheet - DG221URB

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

Eaton.com/socialmedia



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:

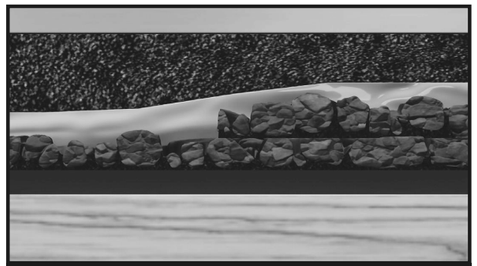
Part Number:	Description:
2011024	RI SMART SLIDE BLK 6.75"
2011025	RI SMART SCRW #12X3" W/BW

ECOFASTENSOLAR.COM

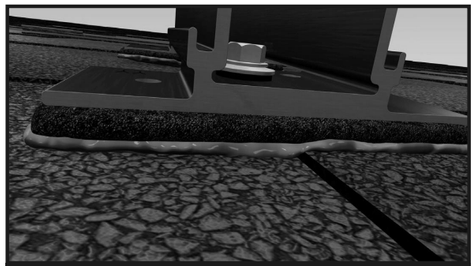
ROCKIT SMART SLIDE

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

WATER TIGHT TECHNOLOGY

VERSION 1.1

EcoFasten®
An Esdec Solar Group Company

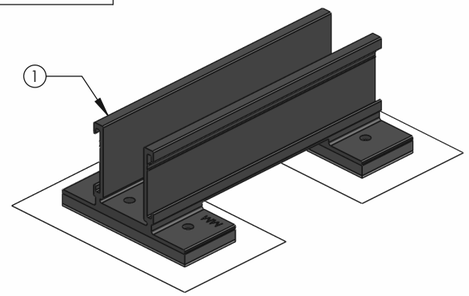
4141 W. VAN BUREN ST, SUITE 2, PHOENIX AZ 85009
1-877-859-3947 | INFO@ECOFASTENSOLAR.COM

PRODUCT CUT SHEET

EcoFasten® For Installers. By Installers.

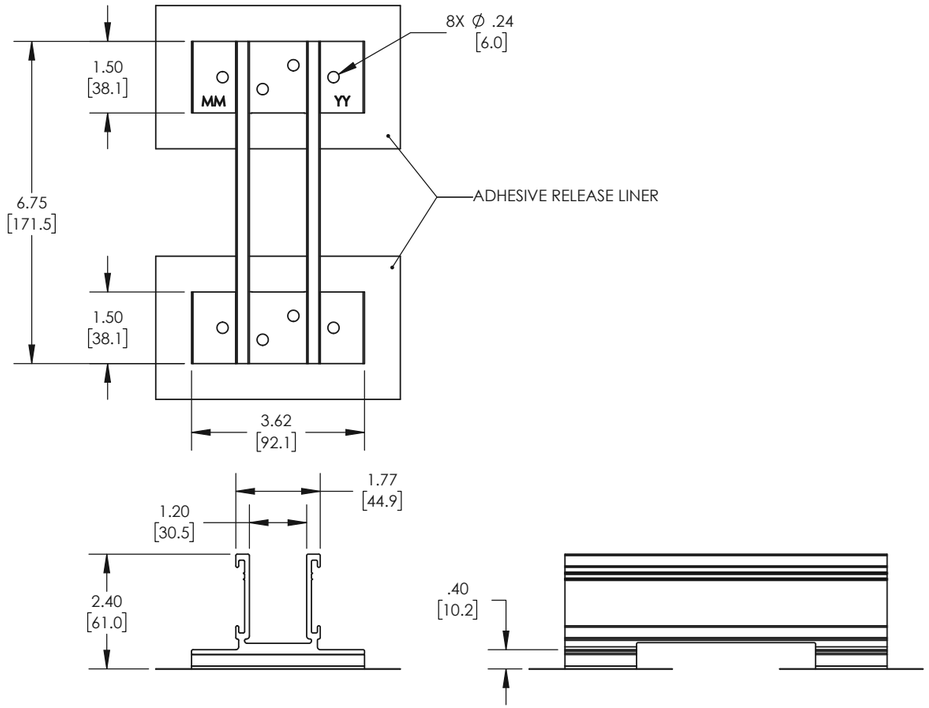
RI SMART SLIDE BLK 6.75"

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

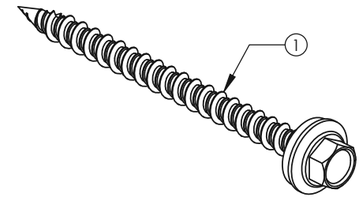
Rev: CS-3

PRODUCT CUT SHEET

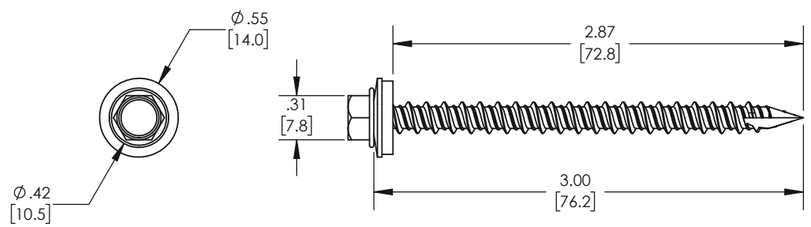
EcoFasten® For Installers. By Installers.

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

ROOF TYPE — **Composition Shingle, Tile, Metal**

RACKING — **Rail-Less**

ATTACHMENT — **Structural-Attach Direct-Attach**

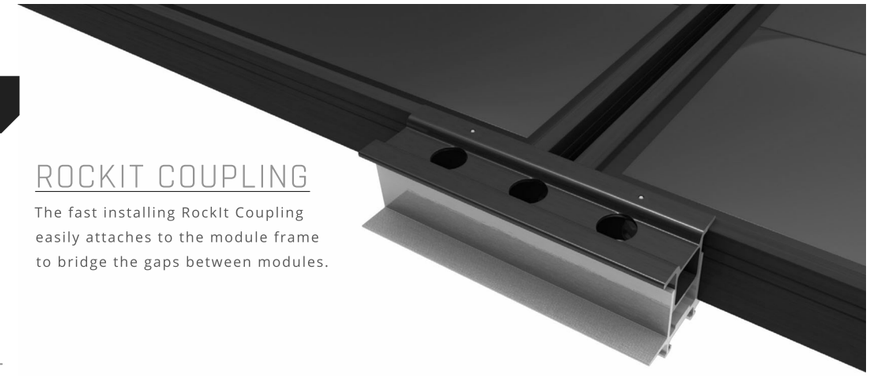
WATER TIGHT TECHNOLOGY

25 YEAR WARRANTY

STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS

ECOFASTENSOLAR.COM

ROCKIT

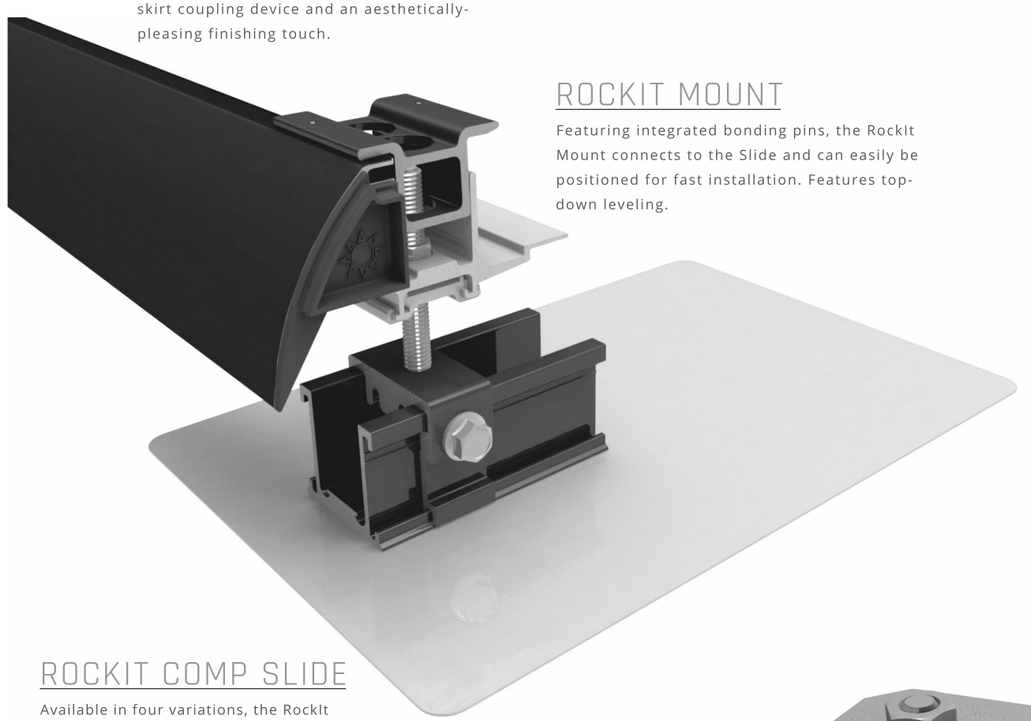


ROCKIT COUPLING

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

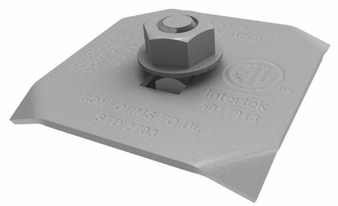
Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

ROCKIT COMP SLIDE

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

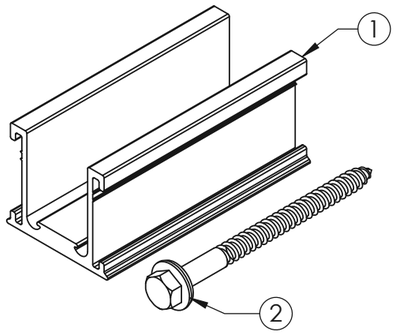
FRAME MLPE MOUNT

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



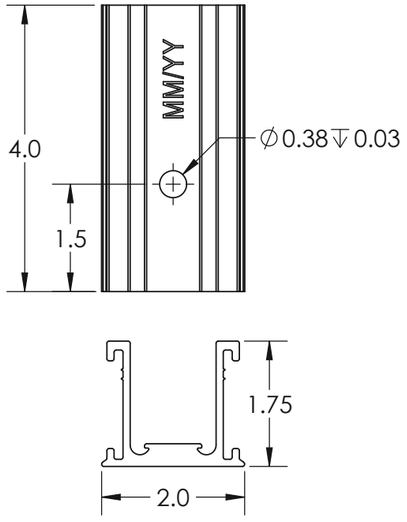
RI COMP SLIDE AL BLK

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

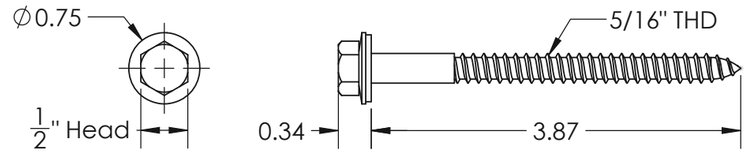
REV.- CS1

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

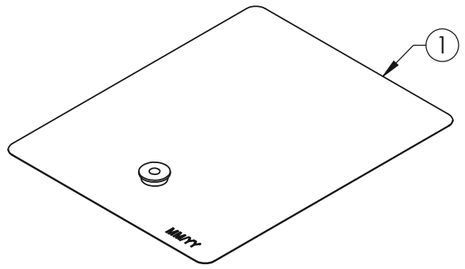
REV.- CS1

PRODUCT CUT SHEET

EcoFasten
For Installers. By Installers.

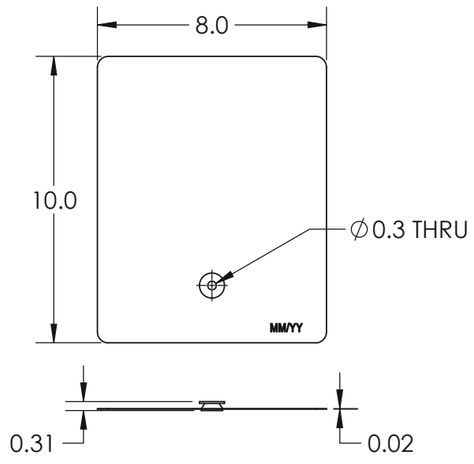
GF-1 FLASHING GLV BLK 8X10"

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

EcoFasten
AN ENSTALL COMPANY

ECOFASTEN SOLAR LLC
4141 W. VAN BUREN ST., SUITE 2
PHOENIX, AZ 85009

877-859-3947
INFO@ECOFASTENSOLAR.COM

April 8th, 2024

EcoFasten
4141 West Van Buren St.
Phoenix, AZ 85009

Attn.: EcoFasten Solar Engineering Department

Re: Report # 7.16-RockIt_ CS-SS EcoFasten RockIt System, with Comp Slide or Smart Slide, Certification for Gable and Hip roofs.

This letter certifies the loading criteria and design basis used for the structural analysis of the EcoFasten - RockIt System as shown in Report # 7.16-RockIt_CS-SS "Engineering Certification for the EcoFasten - RockIt System with Comp or Smart Slide for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications. The Span Tables provided in the referenced report may be used when all assumptions listed therein are met.

Building Codes:

1. ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
2. 2021 International Building Code (IBC)
3. 2021 International Residential Code (IRC)
4. SEAOC (Structural Engineer Association of California) report PV2-2017 Wind Design for Solar Arrays
5. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
6. Aluminum Design Manual 2020, by The Aluminum Association, Inc.
7. ANSI/AWC NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

Please note our evaluation only applies to EcoFasten products and excludes the structural adequacy of the chosen roof attachments, PV modules, or underlying roof supporting members. It shall be the responsibility of the installer or system designer to verify the structural capacity and adequacy of the referenced system components with respect to the applied or resultant loads of the chosen array configuration.

Sincerely,

NORTH CAROLINA PROFESSIONAL SEAL 042455 ENGINEER MATTHEW S KUZILA

Matthew S Kuzila, P.E.

Sealed 04.08.2024
Expires 12.31.2024