VICINITY MAP

LEGEND

UTIL	ALL IN ONE - UTILITY METER & MAIN PANEL
MSP	MAIN SERVICE PANEL
UM	UTILITY METER
INV	INVERTER W/ (INTEGRATED DC DISCO)
AC	AC DISCONNECT (UNFUSED)
AC	AC FUSED DISCONNECT
PVM	PV SYSTEM METER
DC	DC DISCONNECT
LC	LOAD CENTER
	FENCE/BLOCK WALL
	PROPERTY LINE
	TRENCH
	CONDUIT

SCOPE OF WORK

ELECTRICAL

QTY

MODULE
37 REC Solar REC355 AA

INVERTER
37 Enphase IQ7A-72-2-US

BALANCE OF SYSTEM
1 100A FUSED AC DISCONNECT
1 ENPHASE COMBINER BOX

POINT OF INTERCONNECTION
SUPPLY SIDE CONNECTION WITH FUSED 100A DISCONNECT

MAIN SERVICE PANEL
(E) 200A BUS
(E) 150A MAIN BREAKER

STRUCTURAL

MOUNTING HARDWARE, ROOFING, AND FRAMING

ROOFING: Comp Shingle
RAIL: IronRidge XR10
ATTACHMENT: IronRidge Flashfoot2
ROOF PITCH: 30°
FRAMING MEMBER: 2X6 RAFTER @ 24" O.C.

GENERAL NOTES

1. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE 2014 NEC, 2015 IBC, 2015 IRC, 2015 IFC AND ALL OTHER APPLICABLE REQUIREMENTS OF:

   JURISDICTION: Fulshear
   UTILITY: CenterPoint

2. PHOTOVOLTAIC SYSTEM SHALL BE INSTALLED ACCORDING TO THE 2017 NATIONAL ELECTRICAL CODE WITH REFERENCE TO THE FOLLOWING: ARTICLE 705, 690, 250, 230, 210, 200 AND TO INCLUDE REFERENCED SECTIONS AND TABLES

3. SECTION 705.6 ALL EQUIPMENT SHALL BE APPROVED FOR THE INTENDED USE AND SPECIFICALLY REQUIRES UTILITY-INTERACTIVE INVERTERS USED FOR INTERCONNECTION SYSTEMS BE LISTED AND IDENTIFIED FOR INTERCONNECTION SERVICE.

4. A PERMANENT PLAQUE OR DIRECTORY DENOTING THE LOCATION OF ALL ECLECTIC POWER SOURCE DISCONNECTING MEANS ON OR IN THE PREMISES SHALL BE INSTALLED AT EASH SERVICE EQUIPMENT LOCATION AND AT THE LOCATION(S) OF THE SYSTEM DISCONNECT(S) FOR ALL ELECTRIC POWER PRODUCTION SOURCES CAPABLE OF BEING INTERCONNECTED. NEC 705.10

5. THE OUTPUT OF AN INTERCONNECTED ELECTRIC POWER SOURCE SHALL BE CONNECTED AS SPECIFIED IN 705.12(A) or (B)

6. THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTIONS SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS. NEC 690.4(C)

7. ELECTRICAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC 110.14

8. PHOTOVOLTAIC SOURCE CIRCUITS. THE REQUIREMENTS OF ARTICLE 690 PERTAINING TO PHOTOVOLTAIC SOURCE CIRCUITS SHALL NOT APPLY TO AC MODULES. THE PHOTOVOLTAIC SOURCE CIRCUIT, CONDUCTORS, AND INVERTERS SHALL BE CONSIDERED AS INTERNAL WIRING OF AN AC MODULE. NEC 690.6(A)

9. PHOTOVOLTAIC SOURCE CIRCUIT, PHOTOVOLTAIC OUTPUT CIRCUIT, INVERTER OUTPUT CIRCUIT, AND STORAGE BATTERY CIRCUIT CONDUCTORS AND EQUIPMENT SHALL BE PROTECTED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 240.

10. PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12(A) THROUGH (D).

11. PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12 (A) THROUGH (D).

12. A GROUNDING ELECTRODE SHALL BE INSTALLED IN ACCORDANCE WITH 250.52 AND 250.54 AT THE LOCATION OF ALL GROUND- AND POLE-MOUNTED PV ARRAYS AND AS CLOSE AS PRACTICABLE TO THE LOCATION OF ROOF-MOUNTED PV ARRAYS. THE ELECTRODES SHALL BE CONNECTED DIRECTLY TO THE ARRAY FRAME(S) OR STRUCTURE. THE DC GROUNDING ELECTRODE CONDUCTOR SHALL BE SIZED ACCORDING TO 250.166. ADDITIONAL ELECTRODES ARE NOT PERMITTED TO BE USED AS A SUBSTITUTE FOR EQUIPMENT BONDING OR EQUIPMENT GROUNDING CONDUCTOR REQUIREMENTS. THE STRUCTURE OF A GROUND- OR POLE-MOUNTED PV ARRAY SHALL BE PERMITTED TO BE CONSIDERED A GROUNDING ELECTRODE IF IT MEETS THE REQUIREMENTS OF 250.52. ROOF-MOUNTED PV ARRAYS SHALL BE PERMITTED TO USE THE METAL FRAME OF A BUILDING OR STRUCTURE IF THE REQUIREMENTS OF 250.52(A)(2) ARE MET. NEC 690.47(D)

PAGE INDEX

Designed For: AMERICAN SOLAR INSTALLS

Modules: (37) REC Solar REC355 AA
Inverter(s): (37) Enphase IQ7A-72-2-US
DC System Size: 13.135 kW
AC System Size: 12.91 kW

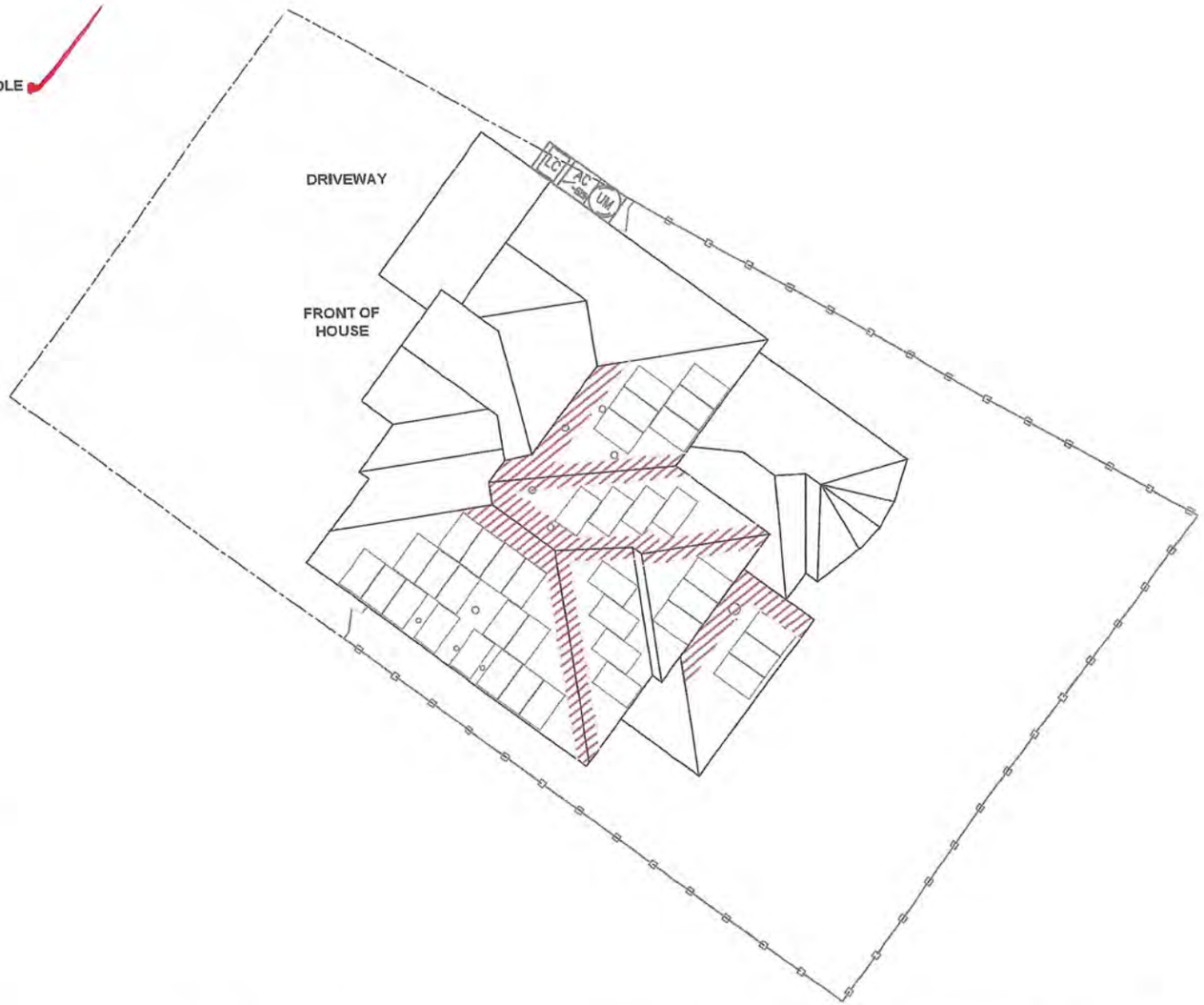
COVER PAGE

STANLEY Residence
6315 SOUTH SADDLE CREEK LN
FULSHEAR, TX. 77441

Designer: SKYFIRESD.COM
Scale: NTS
Date: 11/30/2020
Project ID: STANLEY

PV 1

6315 SOUTH SADDLE CREEK LN



STATE OF TEXAS
ROBERT SMYTHE
132277
LICENSED
PROFESSIONAL ENGINEER

12/03/2020

Designed For: AMERICAN SOLAR INSTALLS

Module: (37) REC Solar REC355 AA
Inverter(s): (37) Enphase IQ7A-72-2-US
DC System Size: 13.135 kW
AC System Size: 12.91 kW

SITE PLAN

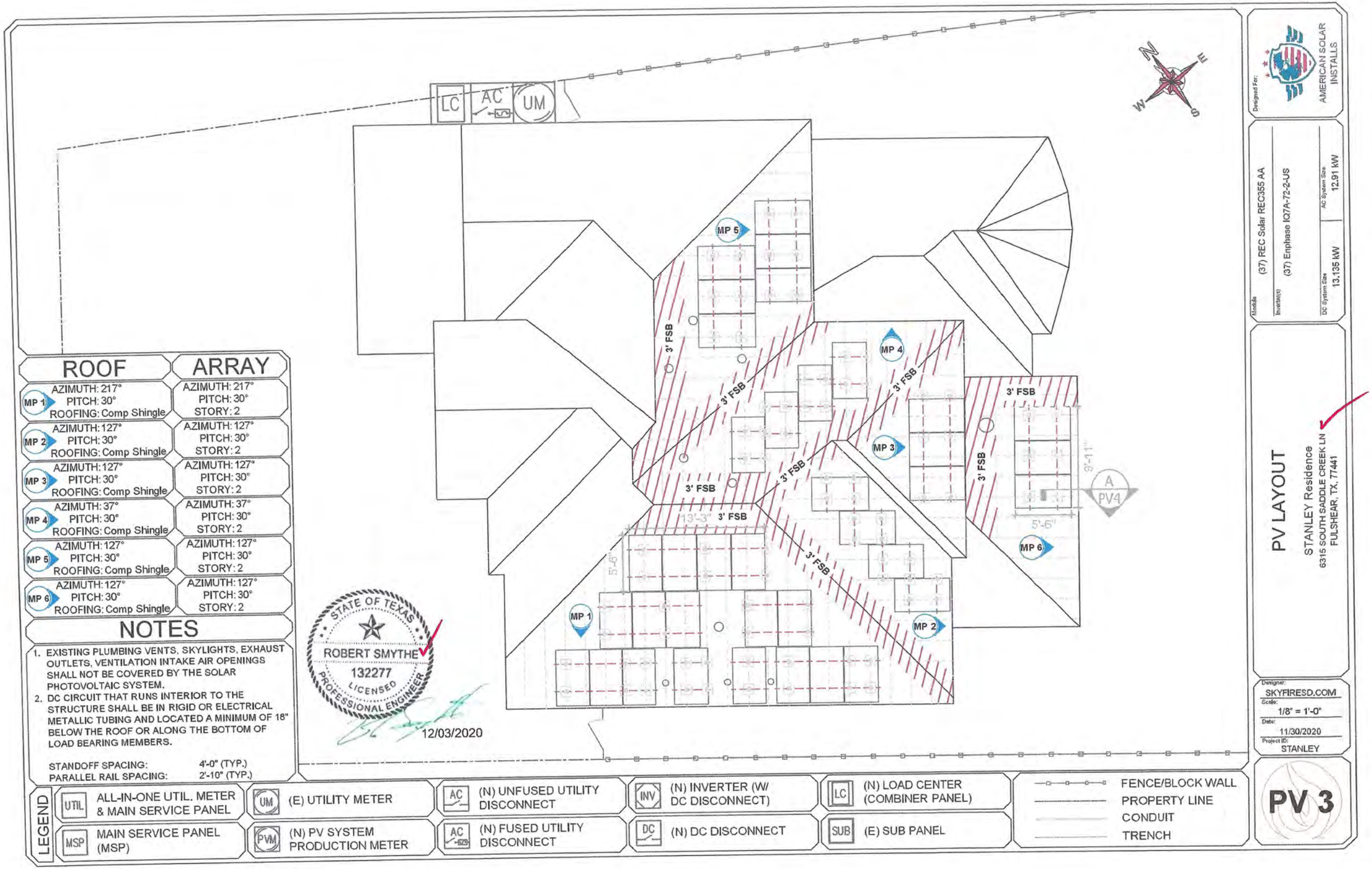
STANLEY Residence
6315 SOUTH SADDLE CREEK LN
FULSHEAR, TX. 77441

Designer: SKYFIRESD.COM
Scale: 1/16" = 1'-0"
Date: 11/30/2020
Project ID: STANLEY

PV 2

LEGEND

UTIL ALL-IN-ONE UTIL. METER & MAIN SERVICE PANEL	UM (E) UTILITY METER	AC (N) UNFUSED UTILITY DISCONNECT	INV (N) INVERTER (W/ DC DISCONNECT)	LC (N) LOAD CENTER (COMBINER PANEL)	FENCE/BLOCK WALL
MSP MAIN SERVICE PANEL (MSP)	PVM (N) PV SYSTEM PRODUCTION METER	AC (N) FUSED UTILITY DISCONNECT	DC (N) DC DISCONNECT	SUB (E) SUB PANEL	PROPERTY LINE
					CONDUIT
					TRENCH



ROOF	ARRAY
MP 1 AZIMUTH: 217° PITCH: 30° ROOFING: Comp Shingle	AZIMUTH: 217° PITCH: 30° STORY: 2
MP 2 AZIMUTH: 127° PITCH: 30° ROOFING: Comp Shingle	AZIMUTH: 127° PITCH: 30° STORY: 2
MP 3 AZIMUTH: 127° PITCH: 30° ROOFING: Comp Shingle	AZIMUTH: 127° PITCH: 30° STORY: 2
MP 4 AZIMUTH: 37° PITCH: 30° ROOFING: Comp Shingle	AZIMUTH: 37° PITCH: 30° STORY: 2
MP 5 AZIMUTH: 127° PITCH: 30° ROOFING: Comp Shingle	AZIMUTH: 127° PITCH: 30° STORY: 2
MP 6 AZIMUTH: 127° PITCH: 30° ROOFING: Comp Shingle	AZIMUTH: 127° PITCH: 30° STORY: 2

NOTES

1. EXISTING PLUMBING VENTS, SKYLIGHTS, EXHAUST OUTLETS, VENTILATION INTAKE AIR OPENINGS SHALL NOT BE COVERED BY THE SOLAR PHOTOVOLTAIC SYSTEM.
2. DC CIRCUIT THAT RUNS INTERIOR TO THE STRUCTURE SHALL BE IN RIGID OR ELECTRICAL METALLIC TUBING AND LOCATED A MINIMUM OF 18" BELOW THE ROOF OR ALONG THE BOTTOM OF LOAD BEARING MEMBERS.

STANDOFF SPACING: 4'-0" (TYP.)
PARALLEL RAIL SPACING: 2'-10" (TYP.)

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12/03/2020

LEGEND

UTIL	ALL-IN-ONE UTIL. METER & MAIN SERVICE PANEL	UM	(E) UTILITY METER	AC	(N) UNFUSED UTILITY DISCONNECT	INV	(N) INVERTER (W/ DC DISCONNECT)
MSP	MAIN SERVICE PANEL (MSP)	PVM	(N) PV SYSTEM PRODUCTION METER	AC	(N) FUSED UTILITY DISCONNECT	DC	(N) DC DISCONNECT

LC	(N) LOAD CENTER (COMBINER PANEL)		FENCE/BLOCK WALL
SUB	(E) SUB PANEL		PROPERTY LINE
			CONDUIT
			TRENCH

Designed For: AMERICAN SOLAR INSTALLS

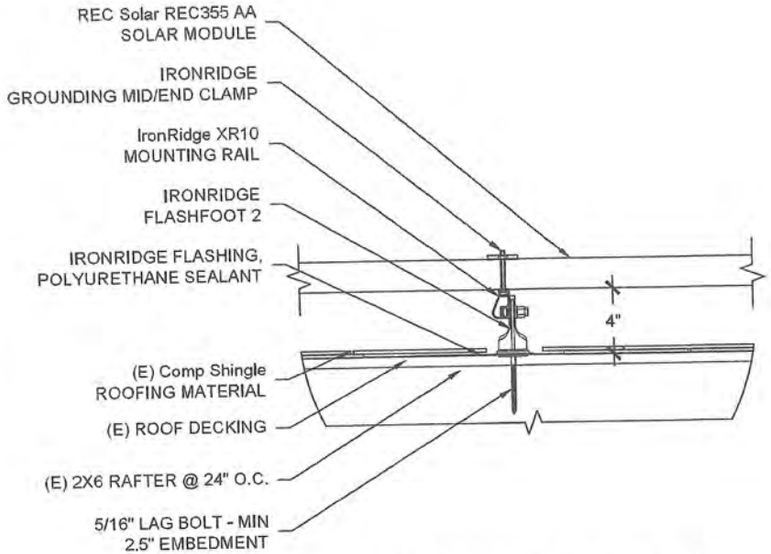
Modules: (37) REC Solar REC355 AA
Inverter(s): (37) Enphase IQ7A-72-2-US
DC System Size: 13.135 kW
AC System Size: 12.91 kW

PV LAYOUT

STANLEY Residence
6315 SOUTH SADDLE CREEK LN
FULSHEAR, TX, 77441

Designer: SKYFIRESD.COM
Scale: 1/8" = 1'-0"
Date: 11/30/2020
Project ID: STANLEY

PV 3



A STANDOFF DETAIL

Scale: 1' 1/2" = 1'

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PROFESSIONAL ENGINEER

12/03/2020

ARRAY

MODULE:	REC Solar REC355 AA
ORIENTATION:	Portrait
CONTIGUOUS SQ/FT:	75 - Largest Array

MOUNTING HARDWARE

RAIL:	IronRidge XR10
STANDOFF/STANCHION:	IronRidge Flashfoot2

ROOF

MEAN HEIGHT:	25'
MATERIAL:	Comp Shingle
SHAPE:	Pitched
PITCH:	30°
ZONE:	2

FRAMING MEMBER

RAFTER SIZE:	2 X 6
RAFTER SPACING:	24" O.C.

GEOGRAPHY

EXPOSURE CATEGORY:	C
BASIC WIND SPEED:	115
SNOW LOAD (PSF):	0

Designed For: AMERICAN SOLAR INSTALLS

Module: (37) REC Solar REC355 AA
Inverter(s): (37) Enphase IQ7A-72-2-US
DC System Size: 13.135 kW
AC System Size: 12.91 kW

DETAILS & UPLIFT CALCULATIONS

STANLEY Residence
6315 SOUTH SADDLE CREEK LN
FULSHEAR, TX, 77441

Designer: SKYFIRESD.COM
Scale: SEE DETAIL
Date: 11/30/2020
Project ID: STANLEY

PV 4

MODULE SPECS

(37) REC Solar REC355 AA

Voc = 44 V | Isc = 10.19 A
Vmp = 37.4 V | Imp = 9.5 A

NOTES

1. ALL SUPPLIED EQUIPMENT IS UL LISTED.
2. ALL MODULES WILL BE GROUNDED IN ACCORDANCE WITH ELECTRICAL CODE AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. PHOTOVOLTAIC SYSTEM CONNECTS WITH A FEEDER SUPPLY SIDE CONNECTION TO BE PERFORMED USING UL LISTED INSULATED TAP CONNECTORS INSIDE UL LISTED ENCLOSURE.
4. FUSED AC DISCONNECT TO BE VISIBLE FROM AND WITHIN 10' OF TAP LOCATION.
5. CONDUCTORS FOR SUPPLY SIDE CONNECTION SHALL NOT BE SMALLER THAN AWG #8.

AC CALCS

TOTAL INVERTER MAX AC CONTINUOUS OUTPUT x 125%
(53.65 x 1.25) = 67.0625

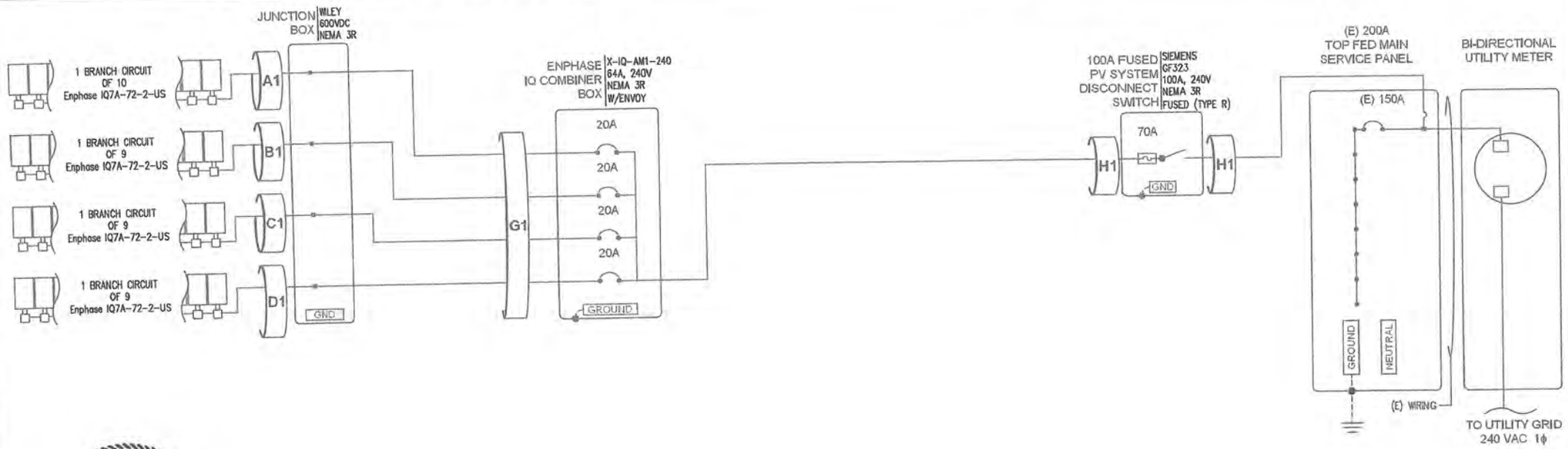
MINIMUM PROPOSED FUSE SIZE: 70A

ELECTRICAL PANEL SPECS

(E) 200A MAIN SERVICE PANEL.
(E) 150A/2P MAIN CIRCUIT BREAKER

GROUNDING NOTES

GROUNDING AND BONDING SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH NEC 250, 690.41, AND 690.47



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CONDUCTORS & CONDUIT

AC | ARRAY > J BOX

A1
Vmp = 240V
Isc = 14.5A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #12
TEMP RATING: 90°C
WIRE RATING: 30A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: 22.8A
Isc X 1.25% 18.125A

B1
Vmp = 240V
Isc = 13.05A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #12
TEMP RATING: 90°C
WIRE RATING: 30A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: 22.8A
Isc X 1.25% 16.3125A

C1
Vmp = 240V
Isc = 13.05A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #12
TEMP RATING: 90°C
WIRE RATING: 30A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: 22.8A
Isc X 1.25% 16.3125A

D1
Vmp = 240V
Isc = 13.05A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #0
TEMP RATING: 90°C
WIRE RATING: A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: A
Isc X 1.25% 16.3125A

J BOX > COMBINER

G1
Vmp = 240V
Isc = 14.5A
CONDUIT: 3/4" EMT
AWG #10 THWN-2
(4) L1
(4) L2
AWG #6 THWN-2
(1) EGC/GEC [GRN]
SIZING DETAILS
WIRE GAUGE: #10
TEMP RATING: 90°C
WIRE RATING: 40A
CONDUIT FILL: 0.4
TEMP DERATE: 0.76
WIRE OCP: 22.8A
Isc X 1.25% 18.125A

> POI

H1
Vmp= 240V
MAX CONT. Isc =53.65A
CONDUIT: 3/4" EMT
AWG #4 THWN-2
(1) L1 [BLK]
(1) L2 [RED]
(1) NEUTRAL [WHT]
AWG #6 THWN-2
(1) EGC [GRN]
SIZING DETAILS
WIRE GAUGE: #4
TEMP RATING: 90°C
WIRE RATING: 95A
CONDUIT FILL: 1
TEMP DERATE: 0.87
WIRE OCP: 82.65A
Isc X 1.25% 67.0625

TEMP SPECS

PER NEC 310.15 (B)(2)(a)
& NEC 110.14(C)(1)

MAX AVG. HI AMBIENT TEMP:	87°F
RECORD LOW TEMP:	36°F
TEMP CORRECTION ROOFTOP:	0.76
TEMP CORRECTION NON-ROOFTOP:	0.87
CONDUIT HEIGHT:	2 in.
ROOFTOP ADDER:	40°F
ROOFTOP TEMP:	127°F

WIRE SIZING NOTES

WIRE OCP = WIRE AMP RATING X CONDUIT FILL X TEMP. DERATE

MAX AC & DC Isc TO BE LESS OR EQUAL TO WIRE OCP FOR WIRE TO BE NEC COMPLIANT

CONDUCTORS ARE SUNLIGHT RESISTANT AND SUITABLE FOR WET OR DRY LOCATION

Designed For:
AMERICAN SOLAR INSTALLS

Module: (37) REC Solar REC355 AA
Inverter(s): (37) Enphase IQ7A-72-2-US
DC System Size: 13.135 kW
AC System Size: 12.91 kW

ONE LINE DIAGRAM

STANLEY Residence
6315 SOUTH SADDLE CREEK LN
FULSHEAR, TX, 77441

Designer: SKYFIRESD.COM
Scale: NTS
Date: 11/30/2020
Project ID: STANLEY

PV 5

MODULE SPECS

(37) REC Solar REC355 AA

Voc = 44 V Isc = 10.19 A
Vmp = 37.4 V Imp = 9.5 A

NOTES

1. ALL SUPPLIED EQUIPMENT IS UL LISTED.
2. ALL MODULES WILL BE GROUNDED IN ACCORDANCE WITH ELECTRICAL CODE AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. PHOTOVOLTAIC SYSTEM CONNECTS WITH A FEEDER SUPPLY SIDE CONNECTION TO BE PERFORMED USING UL LISTED INSULATED TAP CONNECTORS INSIDE UL LISTED ENCLOSURE.
4. FUSED AC DISCONNECT TO BE VISIBLE FROM AND WITHIN 10' OF TAP LOCATION.
5. CONDUCTORS FOR SUPPLY SIDE CONNECTION SHALL NOT BE SMALLER THAN AWG #8.

AC CALCS

TOTAL INVERTER MAX AC CONTINUOUS OUTPUT x 125%
(53.65 x 1.25) = 67.0625

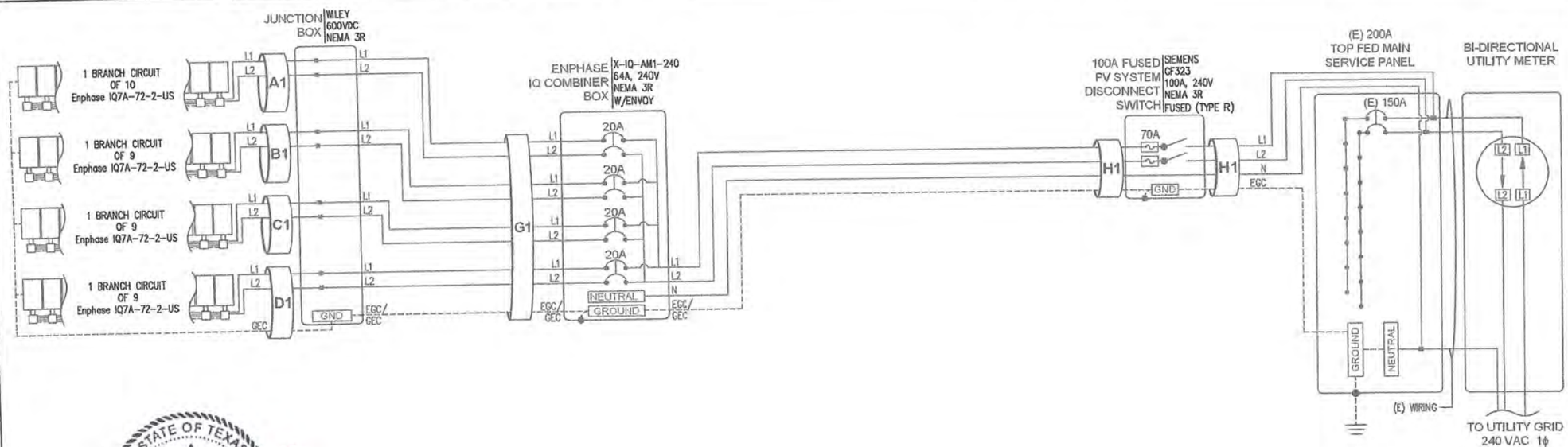
MINIMUM PROPOSED FUSE SIZE: 70A

ELECTRICAL PANEL SPECS

(E) 200A MAIN SERVICE PANEL
(E) 150A/2P MAIN CIRCUIT BREAKER

GROUNDING NOTES

GROUNDING AND BONDING SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH NEC 250, 690.41, AND 690.47



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PROFESSIONAL ENGINEER

12/03/2020

CONDUCTORS & CONDUIT

AC | ARRAY > J BOX

A1 — Vmp = 240V, Isc = 14.5A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #12
TEMP RATING: 90°C
WIRE RATING: 30A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: 22.8A
Isc X 1.25%: 18.125A

B1 — Vmp = 240V, Isc = 13.05A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #12
TEMP RATING: 90°C
WIRE RATING: 30A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: 22.8A
Isc X 1.25%: 16.3125A

C1 — Vmp = 240V, Isc = 13.05A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #12
TEMP RATING: 90°C
WIRE RATING: 30A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: 22.8A
Isc X 1.25%: 16.3125A

D1 — Vmp = 240V, Isc = 13.05A
CONDUIT: N\A
ENPHASE Q CABLE
(1) L1
(1) L2
SIZING DETAILS
WIRE GAUGE: #0
TEMP RATING: 90°C
WIRE RATING: A
CONDUIT FILL: 1
TEMP DERATE: 0.76
WIRE OCP: A
Isc X 1.25%: 16.3125A

J BOX > COMBINER

G1 — Vmp = 240V, Isc = 14.5A
CONDUIT: 3/4" EMT
AWG #10 THWN-2
(4) L1
(4) L2
AWG #6 THWN-2
(1) EGC/GEC [GRN]
SIZING DETAILS
WIRE GAUGE: #10
TEMP RATING: 90°C
WIRE RATING: 40A
CONDUIT FILL: 0.4
TEMP DERATE: 0.75
WIRE OCP: 22.8A
Isc X 1.25%: 18.125A

> POI

H1 — Vmp= 240V, MAX CONT. Isc =53.65A
CONDUIT: 3/4" EMT
AWG #4 THWN-2
(1) L1 [BLK]
(1) L2 [RED]
(1) NEUTRAL [WHT]
AWG #6 THWN-2
(1) EGC [GRN]
SIZING DETAILS
WIRE GAUGE: #4
TEMP RATING: 90°C
WIRE RATING: 95A
CONDUIT FILL: 1
TEMP DERATE: 0.87
WIRE OCP: 82.65A
Isc X 1.25%: 67.0625A

TEMP SPECS

PER NEC 310.15 (B)(2)(a)
& NEC 110.14(C)(1)

MAX AVG. HI AMBIENT TEMP:	87°F
RECORD LOW TEMP:	36°F
TEMP CORRECTION ROOFTOP:	0.76
TEMP CORRECTION NON-ROOFTOP:	0.87
CONDUIT HEIGHT:	2 in.
ROOFTOP ADDER:	40°F
ROOFTOP TEMP:	127°F

WIRE SIZING NOTES

WIRE OCP = WIRE AMP RATING X CONDUIT FILL X TEMP. DERATE

MAX AC & DC Isc TO BE LESS OR EQUAL TO WIRE OCP FOR WIRE TO BE NEC COMPLIANT

CONDUCTORS ARE SUNLIGHT RESISTANT AND SUITABLE FOR WET OR DRY LOCATION

Designed For:
AMERICAN SOLAR INSTALLS

Module: (37) REC Solar REC355 AA
Inverter(s): (37) Enphase IQ7A-72-2-US
AC System Size: 12.91 kW
DC System Size: 13.135 kW

THREE LINE DIAGRAM

STANLEY Residence
6315 SOUTH SADDLE CREEK LN
PULSHEAR, TX, 77441

Designer: SKYFIRESD.COM
Scale: SEE DETAIL
Date: 11/30/2020
Project ID: STANLEY

PV 5.1

CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES & JUNCTION BOXES

NEC 690.13(B)

⚠WARNING

ELECTRIC SHOCK HAZARD

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

NEC 110.27(C) & OSHA 1910.145

⚠WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 690.31(G)(3)(4)

WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31(G)(1)

WARNING
PHOTOVOLTAIC POWER SOURCE
DO NOT REMOVE UNLESS REPLACED IN EXACT LOCATION - PV POWER CIRCUIT DIRECTLY BELOW

RAPID SHUTDOWN

NEC 690.56(C)(3)

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

NEC 690.56(C)(1)(a) - Black on yellow

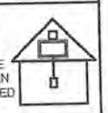
SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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

NEC 690.56(C)(1)(b) - White on red

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT.



DC DISCONNECT

NEC 690.13(B)

⚠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

NEC 690.13(B)

PHOTOVOLTAIC
DC DISCONNECT

NEC 690.53

MAXIMUM VOLTAGE	480
MAXIMUM CIRCUIT CURRENT	0.00
MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC TO DC CONVERTER (IF INSTALLED)	15

INVERTER

NEC 690.31(j) - Enphase IQ7A-72-2-US

⚠WARNING

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

NEC 690.54

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:	1.45
NOMINAL OPERATING AC VOLTAGE:	240

AC DISCONNECT, BREAKER, POINT OF INTERCONNETION

NEC 690.13(B)

PHOTOVOLTAIC
AC DISCONNECT

NEC 690.13(B)

⚠WARNING

ELECTRIC SHOCK HAZARD

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

NEC 690.54

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:	53.65
NOMINAL OPERATING AC VOLTAGE:	240

NET PV METER

NEC 705

⚠WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

BREAKER PANEL

NEC 690.13(B)

⚠WARNING

ELECTRIC SHOCK HAZARD

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

NEC 110.27(C) & OSHA 1910.145

⚠WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 690.54

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT:	53.65
NOMINAL OPERATING AC VOLTAGE:	240

MAIN SERVICE PANEL

NEC 690.13(B)

⚠WARNING

ELECTRIC SHOCK HAZARD

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

NEC 110.27(C) & OSHA 1910.145

⚠WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 710.15(C) & 690.9(C)

⚠WARNING

SINGLE 120-VOLT SUPPLY
DO NOT CONNECT
MULTIWIRE BRANCH CIRCUITS

NEC 690.15(C) & 690.33(E)(2)

DO NOT DISCONNECT UNDER LOAD

NEC 690.13, 705.12(B)(3-4), & 690.59

⚠CAUTION
PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

NEC 705.12(B)(3-4) & 690.59

⚠WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(B)(2)(c)

⚠WARNING

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

UTILITY METER

NEC 710.15(C) & 690.9(C)

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

NOTES

Marking Content and Format:
-Red Background
-White Lettering
-Minimum 3/8" Letter Height
-All capital letters
-Arial or similar font, Non bold

Only install applicable labels. Marking is required on all interior and exterior PV conduit, raceways, enclosures, cable assemblies, and junction boxes to alert the fire service to avoid cutting them. Marking shall be placed every 10', within 1' of turns or bends, above and/or below penetrations, and at all PV combiner and junction boxes. Reflective weather resistant material suitable for the environment (durable adhesive materials must meet this requirement)

Designed For: AMERICAN SOLAR INSTALLS

Module: (37) REC Solar REC355 AA
Inverter(s): (37) Enphase IQ7A-72-2-US
AC System Size: 12.91 kW
DC System Size: 13.135 kW

LABELS

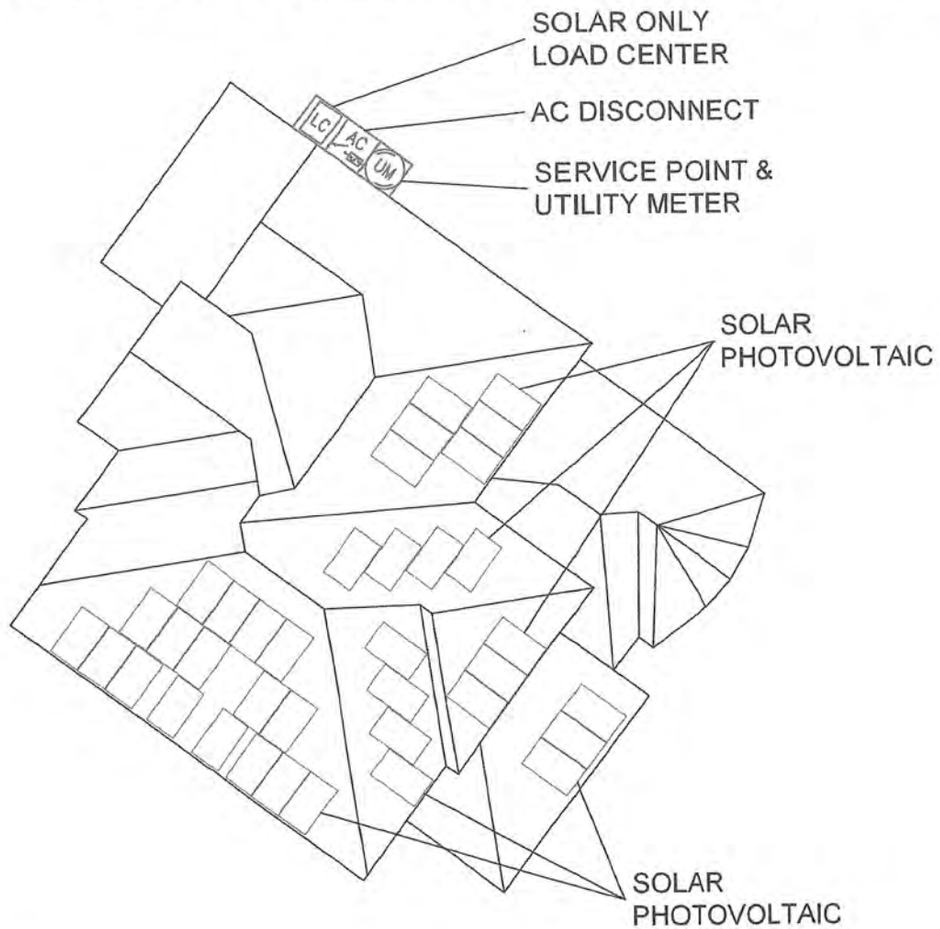
STANLEY Residence
6315 SOUTH SADDLE CREEK LN
PULSHEAR, TX. 77441

Designer: SKYFIRESD.COM
Scale: NTS
Date: 11/30/2020
Project ID: STANLEY

PV 6

CAUTION

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



- OPERATING VOLTAGE = 240V

MAX CURRENT = 53.65A

LOCATE ON MAIN SERVICE ENTRANCE SECTION

Designed For: AMERICAN SOLAR INSTALLS

Module: (37) REC Solar REC355 AA

Inverter(s): (37) Enphase IQ7A-72-2-US

DC System Size: 13.135 kW

AC System Size: 12.91 kW

DIRECTORY

STANLEY Residence
6315 SOUTH SADDLE CREEK LN
FULSHEAR, TX, 77441

Designer: SKYFIRESD.COM

Scale: NTS

Date: 11/30/2020

Project ID: STANLEY

PV 7

RIGHT ANGLE ENGINEERING

December 3, 2020

American Solar Installs
9110 Southern Creek Ct
Brookshire, TX 77423

RE: Structural Roof Evaluation for the ***Stanley Residence: 6315 South Saddle Creek Lane, Fulshear, Texas***

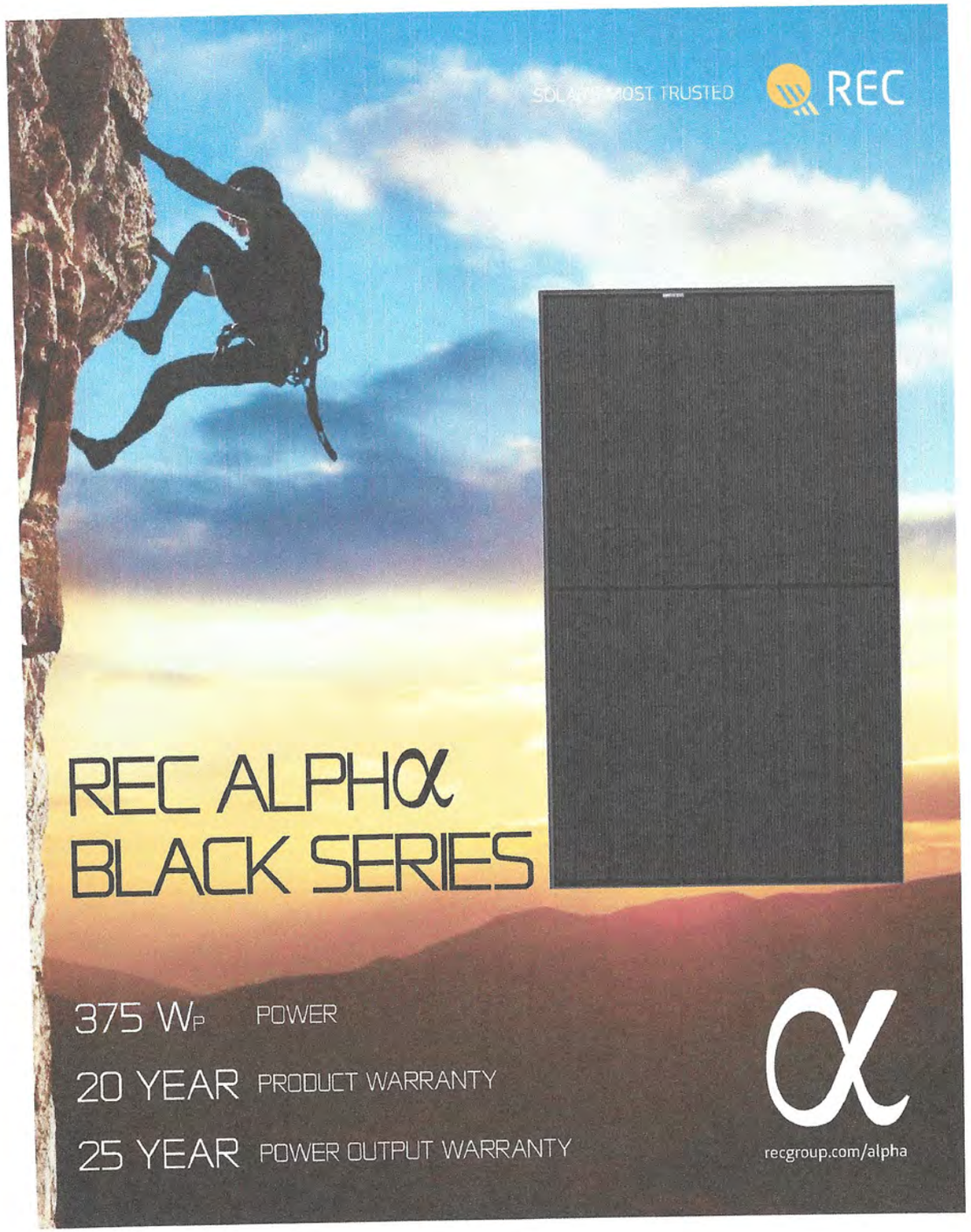
Per your request, we have evaluated the roof structure under the proposed solar panel array. The information used to evaluate this structure was gathered during a field visit by American Solar Installs on behalf of Right Angle Engineering. The solar array consists of 37 panels. Spaces between the panels are less than 24 inches.
The 2015 International Building code section 1607.12.5.1 states that the roof live load can be reduced to zero in areas that are covered by the photovoltaic panels. The reduction of the roof live load (20.0 psf) will offset the weight of the photovoltaic panels (3.0 psf) added to the roof. Based on our assessment we have determined that the existing roof framing will safely and adequately support the additional loads imposed by the solar panels. Waterproofing around the roof penetrations is the responsibility of others. Right Angle Engineering assumes no responsibility for improper installation of the solar panels.

Regards,

12/3/20

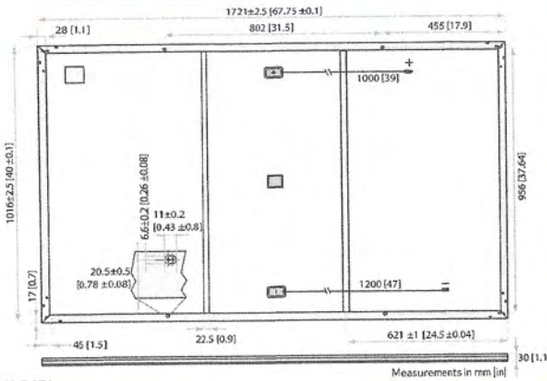
Robert D Smythe, P.E.
Right Angle Engineering

55 WEST 500 SOUTH, HEBER CITY, UT 84032
T 925.787.3067 U RIGHTANGLEENG.COM



REC ALPHα BLACK SERIES

PRODUCT DATASHEET



GENERAL DATA

Cell type:	120 half-cut cells with REC heterojunction cell technology 6 strings of 20 cells in series	Junction box:	3-part, 3 bypass diodes, IP67 rated in accordance with IEC 62790
Glass:	0.13 in (3.2 mm) solar glass with anti-reflection surface treatment	Cable:	12 AWG (4 mm²) PV wire, 39 + 47 in (1 + 1.2 m) In accordance with EN 50618
Backsheet:	Highly resistant polymeric construction	Connectors:	Staubli MC4 PV-KBT4/KST4, 12 AWG (4 mm²) in accordance with IEC 62852 IP68 only when connected
Frame:	Anodized aluminum (black)	Origin:	Made in Singapore

ELECTRICAL DATA @ STC

Product Code*: RECxxxAA Black					
Nominal Power - P_{MPP} (Wp)	355	360	365	370	375
Watt Class Sorting - (W)	-0/+5	-0/+5	-0/+5	-0/+5	-0/+5
Nominal Power Voltage - V_{MPP} (V)	37.4	37.7	38.0	38.3	38.7
Nominal Power Current - I_{MPP} (A)	9.50	9.55	9.60	9.66	9.72
Open Circuit Voltage - V_{OC} (V)	44.0	44.1	44.3	44.5	44.6
Short Circuit Current - I_{SC} (A)	10.19	10.23	10.26	10.30	10.40
Panel Efficiency (%)	20.3	20.6	20.9	21.2	21.4

Values at standard test conditions (STC: air mass AM 1.5, irradiance 1,075 W/sq ft (1,000 W/m²), temperature 77°F (25°C)), based on a production spread with a tolerance of V_{OC} & I_{SC} ±3% within one watt class. * Where xxx indicates the nominal power class (P_{MPP}) at STC above.

ELECTRICAL DATA @ NMOT

Product Code*: RECxxxAA Black					
Nominal Power - P_{MPP} (Wp)	270	274	278	282	286
Nominal Power Voltage - V_{MPP} (V)	35.2	35.5	35.8	36.1	36.4
Nominal Power Current - I_{MPP} (A)	7.67	7.71	7.76	7.80	7.85
Open Circuit Voltage - V_{OC} (V)	41.4	41.6	41.7	41.9	42.0
Short Circuit Current - I_{SC} (A)	8.23	8.26	8.29	8.32	8.40

Nominal module operating temperature (NMOT: air mass AM 1.5, irradiance 800 W/m², temperature 68°F (20°C), wind speed 3.3 ft/s (1 m/s)). * Where xxx indicates the nominal power class (P_{MPP}) at STC above.

CERTIFICATIONS

IEC 61215:2016, IEC 61730:2016, UL 1703, UL 61730	
IEC 62804	PID
IEC 61701	Salt Mist
IEC 62716	Ammonia Resistance
UL 1703	Fire Type Class 2
IEC 62782	Dynamic Mechanical Load
IEC 61215-2:2016	Hailstone (35mm)
AS4040.2 NCC 2016	Cyclic Wind Load
ISO 14001:2004, ISO 9001:2015, OHSAS 18001:2007	

WARRANTY

20 year product warranty
25 year linear power output warranty
Maximum annual power degression of 0.25% p.a.
Guarantees 92% of power after 25 years
See warranty conditions for further details.

MECHANICAL DATA

Dimensions:	67.8 x 40 x 1.2 in (1721 x 1016 x 30 mm)
Area:	18.8 sq ft (1.75 m²)
Weight:	43 lbs (19.5 kg)

MAXIMUM RATINGS

Operational temperature:	-40 ... +85°C
Maximum system voltage:	1000 V
Design load (+): snow Maximum test load (+):	4666 Pa (97.5 lbs/sq ft)* 7000 Pa (146 lbs/sq ft)*
Design load (-): wind Maximum test load (-):	2666 Pa (55.6 lbs/sq ft)* 4000 Pa (83.5 lbs/sq ft)*
Max series fuse rating:	25 A
Max reverse current:	25 A

* Calculated using a safety factor of 1.5
* See installation manual for mounting instructions

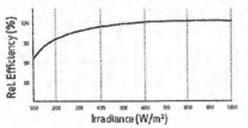
TEMPERATURE RATINGS*

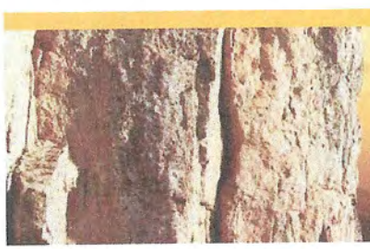
Nominal Module Operating Temperature:	44°C (±2°C)
Temperature coefficient of P_{MPP}:	-0.26 %/°C
Temperature coefficient of V_{OC}:	-0.24 %/°C
Temperature coefficient of I_{SC}:	0.04 %/°C

*The temperature coefficients stated are linear values

LOW LIGHT BEHAVIOUR

Typical low irradiance performance of module at STC:





Founded in Norway in 1996, REC is a leading vertically integrated solar energy company. Through integrated manufacturing from silicon to wafers, cells, high-quality panels and extending to solar solutions, REC provides the world with a reliable source of clean energy. REC's renowned product quality is supported by the lowest warranty claims rate in the industry. REC is a Bluestar Elkem company with headquarters in Norway and operational headquarters in Singapore. REC employs around 2,000 people worldwide, producing 1.5 GW of solar panels annually.

REC
www.recgroup.com

Ref: PM-05-12-01-Rev-B (08.16)

Specifications subject to change without notice.

Enphase
IQ 7A Microinverter

The high-powered smart grid-ready Enphase IQ 7A Micro™ dramatically simplifies the installation process while achieving the highest system efficiency for systems with 60-cell and 72-cell modules.

Part of the Enphase IQ System, the IQ 7A Micro integrates with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

The IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

High Power
- Peak output power 366 VA @ 240 VAC and 295 VA @ 208 VAC

Easy to Install
- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Efficient and Reliable
- Optimized for high powered 60-cell and 72-cell modules
- Highest CEC efficiency of 97%
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready
- Complies with advanced grid support, voltage and frequency ride-through requirements
- Envoy and Internet connection required
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

CERTIFIED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ 7A Microinverter

INPUT (DC)	IQ7A-72-2-US	
Commonly used module pairings[1]	295 W–460 W +	
Module compatibility	60-cell, 66-cell, and 72-cell PV modules	
Maximum input DC voltage	58 V	
Power point tracking voltage range[2]	18 V–58 V	
Min/Max start voltage	33 V / 58 V	
Max DC short circuit current (module Isc)[3]	15 A	
Overvoltage class DC port	II	
DC port backfeed current	0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT (AC)	**@ 240 VAC**	**@ 208 VAC**
Peak output power	366 VA	295 VA
Maximum continuous output power	349 VA	290 VA
Nominal (L-L) voltage/range[4]	240 V / 211–264 V	208 V / 183–229 V
Maximum continuous output current	1.45 A (240 VAC)	1.39 A (208 VAC)
Nominal frequency	60 Hz	
Extended frequency range	47–68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms	
Maximum units per 20 A (L-L) branch circuit[5]	11 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III	
AC port backfeed current	18 mA	
Power factor setting	1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging	
EFFICIENCY	**@240 VAC**	**@208 VAC**
CEC weighted efficiency	97.0 %	96.5%
MECHANICAL		
Ambient temperature range	-40°C to +60°C	
Relative humidity range	4% to 100% (condensing)	
Connector type: DC (IQ7A-72-2-US)	MC4	
Dimensions (HxWxD)	212 mm x 175 mm x 30.2 mm (without bracket)	
Weight	1.08 kg (2.38 lbs)	
Cooling	Natural convection – No fans	
Approved for wet locations	Yes	
Pollution degree	PD3	
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure	
Environmental category / UV exposure rating	NEMA Type 6 / outdoor	
FEATURES		
Communication	Power Line Communication (PLC)	
Monitoring	Enlighten Manager and MyEnlighten monitoring options Compatible with Enphase IQ Envoy	
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.	
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, 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 Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.	

1. No enforced DC/AC ratio. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility.
2. CEC peak power tracking voltage range is 38 V to 43 V.
3. Maximum continuous input DC current is 10.2A.
4. Voltage range can be extended beyond nominal if required by the utility.
5. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit **enphase.com**

2020-06-16

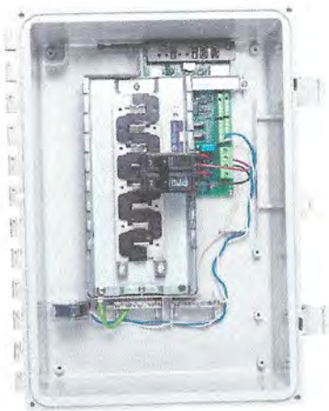
ENPHASE

Enphase Networking

Enphase IQ Combiner 3

(X-IQ-AM1-240-3)

The **Enphase IQ Combiner 3**™ with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV 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 Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

Simple

- Reduced size from previous combiner
- Centered mounting brackets support single stud mounting
- Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed

UL LISTED

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
ACCESSORIES and **REPLACEMENT PARTS** (not included, order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem with data plan 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.)
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	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
EPLC-01	Power line carrier (communication bridge pair), quantity 2
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 3 (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB) for Combiner 3
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envoy breaker included
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Height is 21.06" (53.5 cm with mounting brackets).
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) or CELLMODEM-M1 (4G based LTE-M) (not included)
COMPLIANCE	
Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit **enphase.com**

2018-09-13

ENPHASE

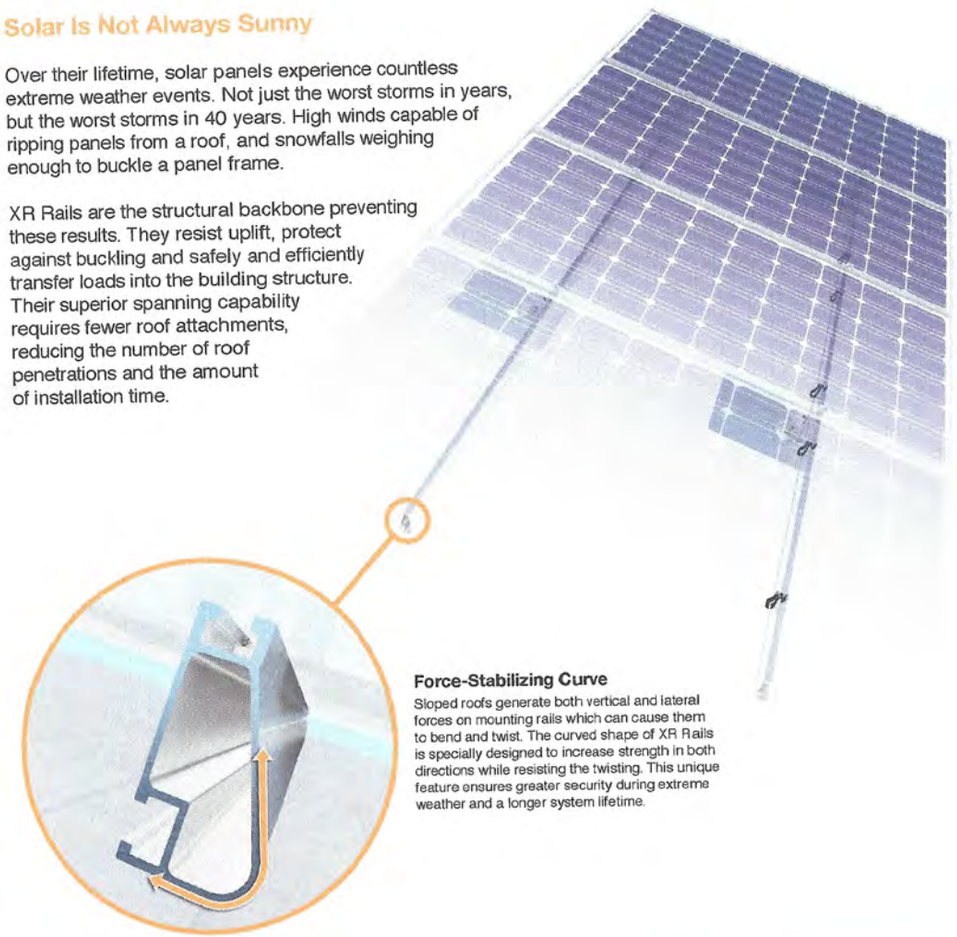
IRONRIDGE

XR Rail Family

Solar Is Not Always Sunny

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

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



Force-Stabilizing Curve

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

Compatible with Flat & Pitched Roofs

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

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

Corrosion-Resistant Materials

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

XR Rail Family

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

XR10

XR10 is a sleek, low-profile mounting rail, perfectly matched to regions without snow. It achieves 6 foot spans, while also staying light and economical.

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

XR100

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

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

XR1000

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

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

Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						

IRONRIDGE

UFO Family of Components

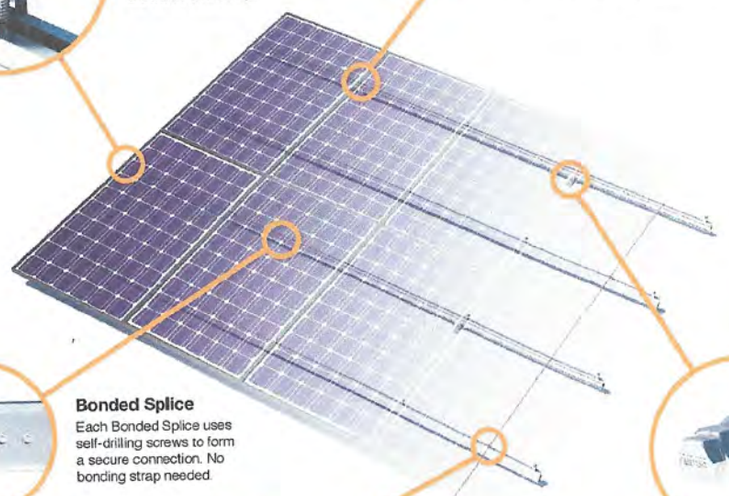
Simplified Grounding for Every Application

The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.

Universal Fastening Object (UFO)
The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.

Stopper Sleeve
The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.



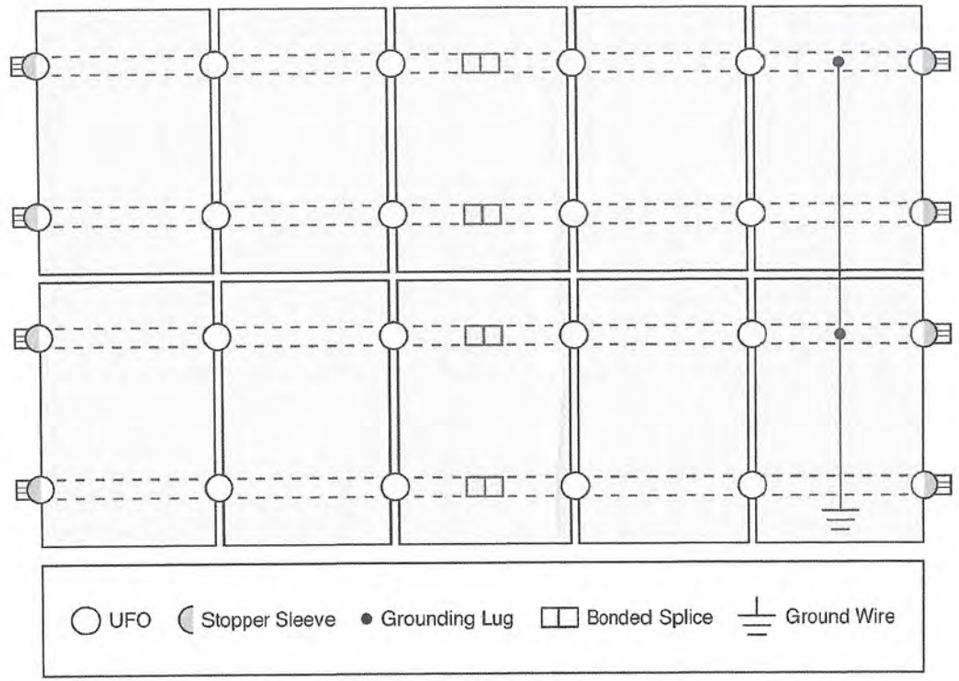
Bonded Splice
Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.

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

Bonded Attachments
The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

Tech Brief

System Diagram



Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

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

Go to IronRidge.com/UFO

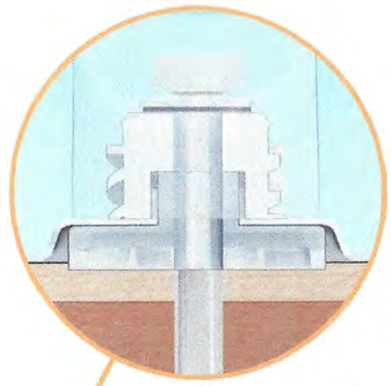
Cross-System Compatibility			
Feature	**Flush Mount**	**Tilt Mount**	**Ground Mount**
XR Rails	✔	✔	XR1000 Only
UFO/Stopper	✔	✔	✔
Bonded Splice	✔	✔	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		

IRONRIDGE

FlashFoot2

The Strongest Attachment in Solar

IronRidge FlashFoot2 raises the bar in solar roof protection. The unique water seal design is both elevated and encapsulated, delivering redundant layers of protection against water intrusion. In addition, the twist-on Cap perfectly aligns the rail attachment with the lag bolt to maximize mechanical strength.

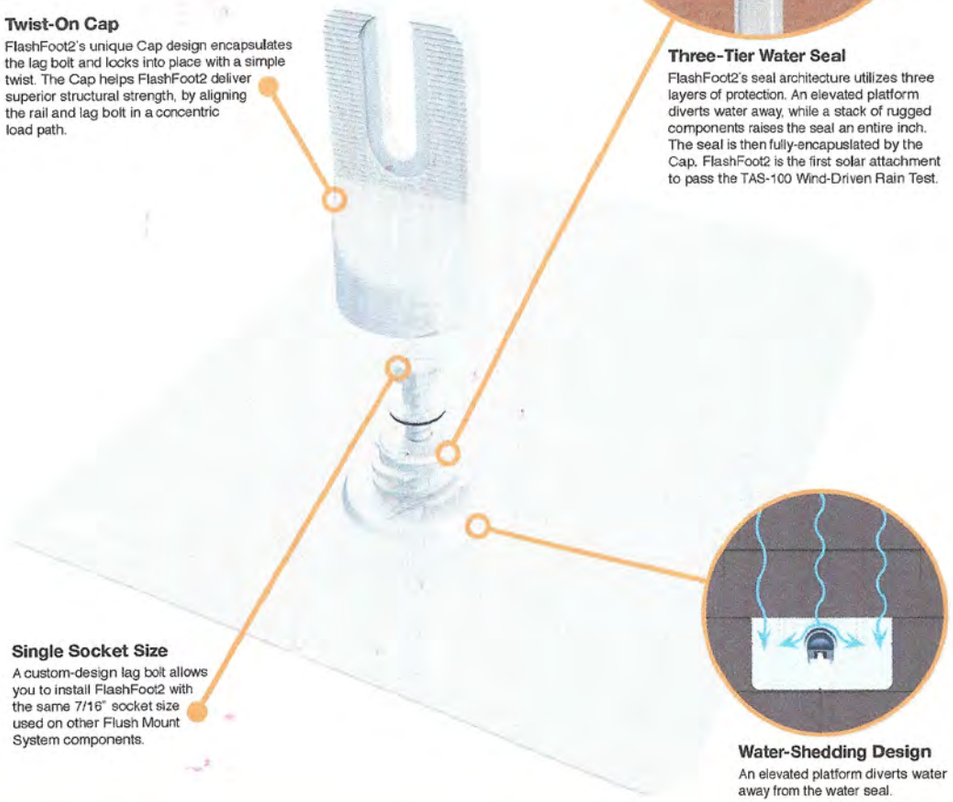


Three-Tier Water Seal

FlashFoot2's seal architecture utilizes three layers of protection. An elevated platform diverts water away, while a stack of rugged components raises the seal an entire inch. The seal is then fully-encapsulated by the Cap. FlashFoot2 is the first solar attachment to pass the TAS-100 Wind-Driven Rain Test.

Twist-On Cap

FlashFoot2's unique Cap design encapsulates the lag bolt and locks into place with a simple twist. The Cap helps FlashFoot2 deliver superior structural strength, by aligning the rail and lag bolt in a concentric load path.



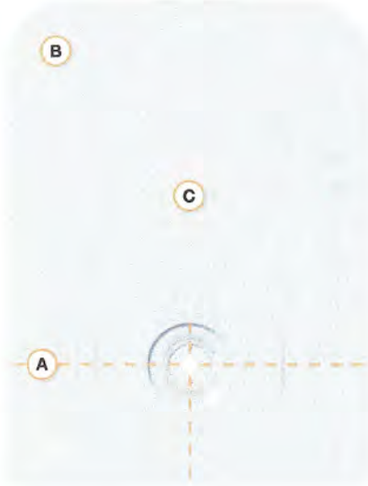
Single Socket Size

A custom-design lag bolt allows you to install FlashFoot2 with the same 7/16" socket size used on other Flush Mount System components.

Water-Shedding Design

An elevated platform diverts water away from the water seal.

Installation Features



A Alignment Markers

Quickly align the flashing with chalk lines to find pilot holes.

B Rounded Corners

Makes it easier to handle and insert under the roof shingles.

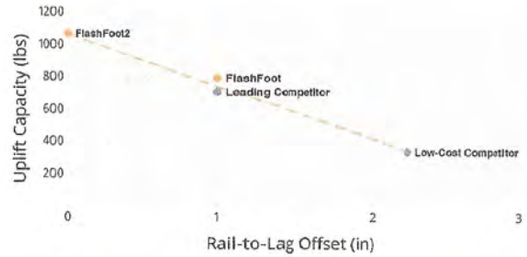
C Reinforcement Ribs

Help to stiffen the flashing and prevent any bending or crinkling during installation.

Benefits of Concentric Loading

Traditional solar attachments have a horizontal offset between the rail and lag bolt, which introduces leverage on the lag bolt and decreases uplift capacity.

FlashFoot2 is the only product to align the rail and lag bolt. This concentric loading design results in a stronger attachment for the system.



Testing & Certification

Structural Certification

Designed and Certified for Compliance with the International Building Code & ASCE/SEI-7.

Water Seal Ratings

Water Sealing Tested to UL 441 Section 27 "Rain Test" and TAS 100-95 "Wind Driven Rain Test" by Intertek. Ratings applicable for composition shingle roofs having slopes between 2:12 and 12:12.

UL 2703

Conforms to UL 2703 Mechanical and Bonding Requirements. See Flush Mount Install Manual for full ratings.