

# PHOTOVOLTAIC ROOF MOUNT SYSTEM

23 MODULES - SYSTEM SIZE STC (8.855 KW DC / 6.67 KW AC)

185 COOL SPRINGS ROAD, LILLINGTON, NC 27546, USA (35.4225288, -78.9358928)



**CONTRACTOR**

NAME: TOP TIER SOLAR SOLUTIONS  
 ADDRESS: 1530 CENTER PARK DR, CHARLOTTE, NC 28217, USA  
 PHONE: 855-997-1213  
 LICENSE #: SC - CLG-123883  
 ELECTRICAL LICENSE #: NC - 87345  
 BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

**SYSTEM SUMMARY STC DC/AC**  
 (8.855 KW DC / 6.67 KW AC)

- 1X CIRCUIT OF 12 MODULES CONNECTED IN PARALLEL
- 1X CIRCUIT OF 11 MODULES CONNECTED IN PARALLEL
- (23) MISSION SOLAR ENERGY MSE385SX5R 385W MODULES
- (23) IQ8PLUS-72-2-US MICROINVERTERS
- STC DC: (23) 385 = 8.855 KW
- STC AC: (23) 290 = 6.67 KW

**GOVERNING CODES**

- 2018 NORTH CAROLINA STATE BUILDING CODE
- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL RESIDENTIAL CODE
- 2018 INTERNATIONAL FIRE CODE
- 2020 NATIONAL ELECTRICAL CODE

**GENERAL NOTES**

- 1) ALL PANELS, SWITCHES, ETC. SHALL HAVE SUFFICIENT GUTTER SPACE AND LUGS IN COMPLIANCE WITH UL REQUIREMENTS TO ACCOMMODATE CONDUCTORS SHOWN.
- 2) THIS SYSTEM WILL NOT BE INTERCONNECTED UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND UTILITY IS OBTAINED.
- 3) ALL EXTERIOR ELECTRICAL DEVICES AND EQUIPMENT INCLUDING THOSE THAT ARE EXPOSED TO OUTSIDE ENVIRONMENT SHALL BE WEATHERPROOF AND SHALL BE LISTED BY 'UL' FOR THE TYPE OF APPLICATION AND 'UL' LABEL SHALL APPEAR ON ALL ELECTRICAL EQUIPMENT.
- 4) WIRING METHOD SHALL BE EMT ABOVE GROUND MOUNTED IN CONCEALED SPACES (UNLESS APPROVED OTHERWISE) AND SCHEDULE-40 PVC FOR BELOW GROUND INSTALLATIONS UNLESS NOTED OTHERWISE.
- 5) AN OSHA APPROVED LADDER PROVIDING ACCESS TO ALL PORTIONS OF THE ARRAY SHALL BE SECURED IN PRIOR TO REQUESTING INSPECTION.
- 6) IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE CONDUCTOR IF NECESSARY.

**SAFETY PLAN NOTES**

- INSTALLERS SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME.
- INSTALLERS SHALL UPDATE NAME, ADDRESS AND PHONE NUMBER OF NEAREST URGENT CARE FACILITY RELATIVE TO THE SITE BEFORE STARTING WORK.

**LOCATION OF NEAREST URGENT CARE FACILITY**

- (FOR INSTALLER USE ONLY)
- NAME:
  - ADDRESS:
  - PHONE NUMBER:



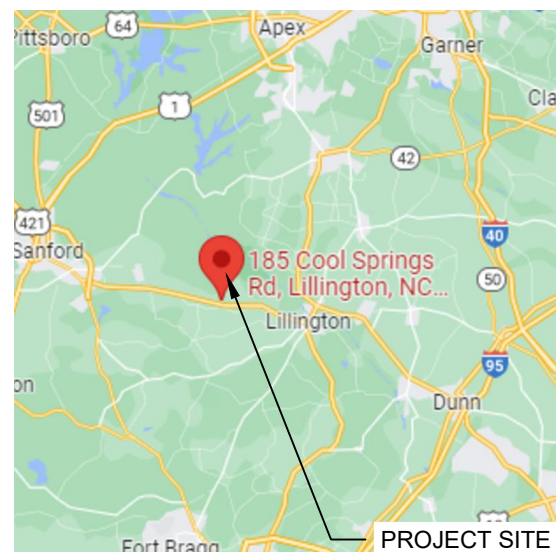
**SHEET INDEX**

- PV-1 COVER PAGE
- PV-2 ROOF PLAN WITH MODULES
- PV-3 ATTACHMENT DETAIL
- PV-4 SINGLE LINE DIAGRAM
- PV-5 WIRING CALCULATION
- PV-6 PLACARDS
- PV-7+ EQUIPMENT SPECIFICATION

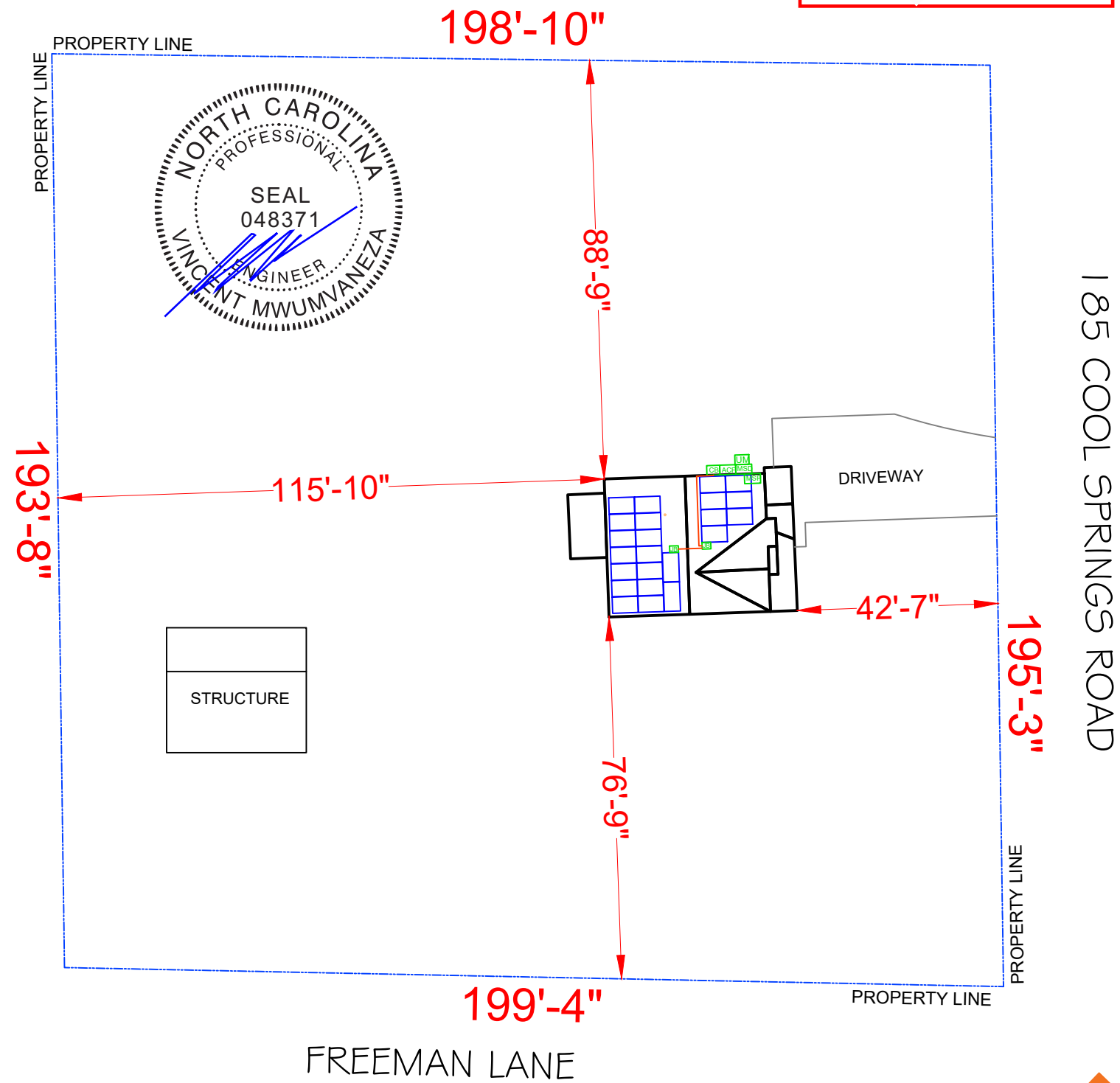
AHJ: HARNETT COUNTY  
 UTILITY: DUKE ENERGY  
 (PROGRESS ENERGY CAROLINAS INC)



**HOUSE PHOTO**  
 SCALE: NTS



**VICINITY MAP**  
 SCALE: NTS



**LEGEND**

- PV MODULE
- CONDUIT
- DRIVEWAY
- DIMENSIONS
- PROPERTY LINE
- FENCE
- MSP MAIN SERVICE PANEL (EXISTING, 200A)
- UM UTILITY METER (EXISTING)
- PM PRODUCTION METER (N/A)
- BAT BATTERY (N/A)
- INV (I) INVERTER (N/A)
- CB COMBINER PANEL (NEW)
- SM SOLAREGE METER (N/A)
- BLP BACKUP LOAD PANEL (N/A)
- AC AC DISCONNECT UNFUSED (N/A)
- ACF AC DISCONNECT FUSED (NEW)
- JB JUNCTION BOX (NEW)
- MSD MAIN SERVICE DISCONNECT (NEW)
- SUB SUBPANEL (N/A)
- DCD DC DISCONNECT (N/A)
- DCC DC COMBINER (N/A)
- EE EXISTING EQUIPMENT

**SITE PLAN & SAFETY PLAN**  
 SCALE: 1"=30'



**REVISIONS**

DESCRIPTION	DATE	REV

**SIGNATURE & SEAL**

**HOMEOWNER INFO**

LISA BLACKFORD  
 185 COOL SPRINGS RD,  
 LILLINGTON, NC 27546, USA

APN: 7324754  
 EMAIL: -  
 PHONE: -

**SHEET NAME**

COVER PAGE

**SHEET SIZE**

ANSI B  
 11" X 17"

**SHEET NUMBER**

PV-1

**MODULE AREA & WEIGHT CALCULATIONS**

PANEL TYPES (COUNT, AREA, WEIGHT):  
 - (23X) MISSION SOLAR ENERGY MSE385SX5R 385W (75.1" X 41.1", 49 LBS)  
 MICRO-INVERTER TYPES (COUNT, WEIGHT):  
 - (23X) IQ8PLUS-72-2-US (2.38 LBS)  
 ATTACHMENT COUNT: 52  
 MOUNTING SYSTEM WEIGHT/MODULE: 1.5 LBS  
 TOTAL ROOF AREA: 1447 SF  
 TOTAL ARRAY AREA: (23) 75.1" X 41.1" = 493.00 SF  
 TOTAL ARRAY WEIGHT: (23) 49.0 + (23) 2.4 + (23) 1.5 = 1216 LBS  
 WEIGHT AT EACH CONNECTION: 682 LBS / 52 = 13.11 LBS  
 DISTRIBUTED LOAD: 1216 LBS / 493.00 SF = 2.47 PSF  
 ROOF AREA COVERED BY ARRAY: 493 SF / 1278.79 SF = 38.55%

**DESIGN CRITERIA**

EXPOSURE CATEGORY = C  
 WIND SPEED = 115 MPH  
 SNOW LOAD = 15 PSF



**CONTRACTOR**

NAME: TOP TIER SOLAR SOLUTIONS  
 ADDRESS: 1530 CENTER PARK DR, CHARLOTTE, NC 28217, USA  
 PHONE: 855-997-1213  
 LICENSE #: SC - CLG. 123883  
 ELECTRICAL LICENSE #: NC - 87345  
 BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

**REVISIONS**

DESCRIPTION	DATE	REV

**SIGNATURE & SEAL**

**HOMEOWNER INFO**

**LISA BLACKFORD**  
 185 COOL SPRINGS RD,  
 LILLINGTON, NC 27546, USA

APN: 7324754  
 EMAIL: -  
 PHONE: -

**SHEET NAME**

ROOF PLAN WITH  
 MODULES

**SHEET SIZE**

ANSI B  
 11" X 17"

**SHEET NUMBER**

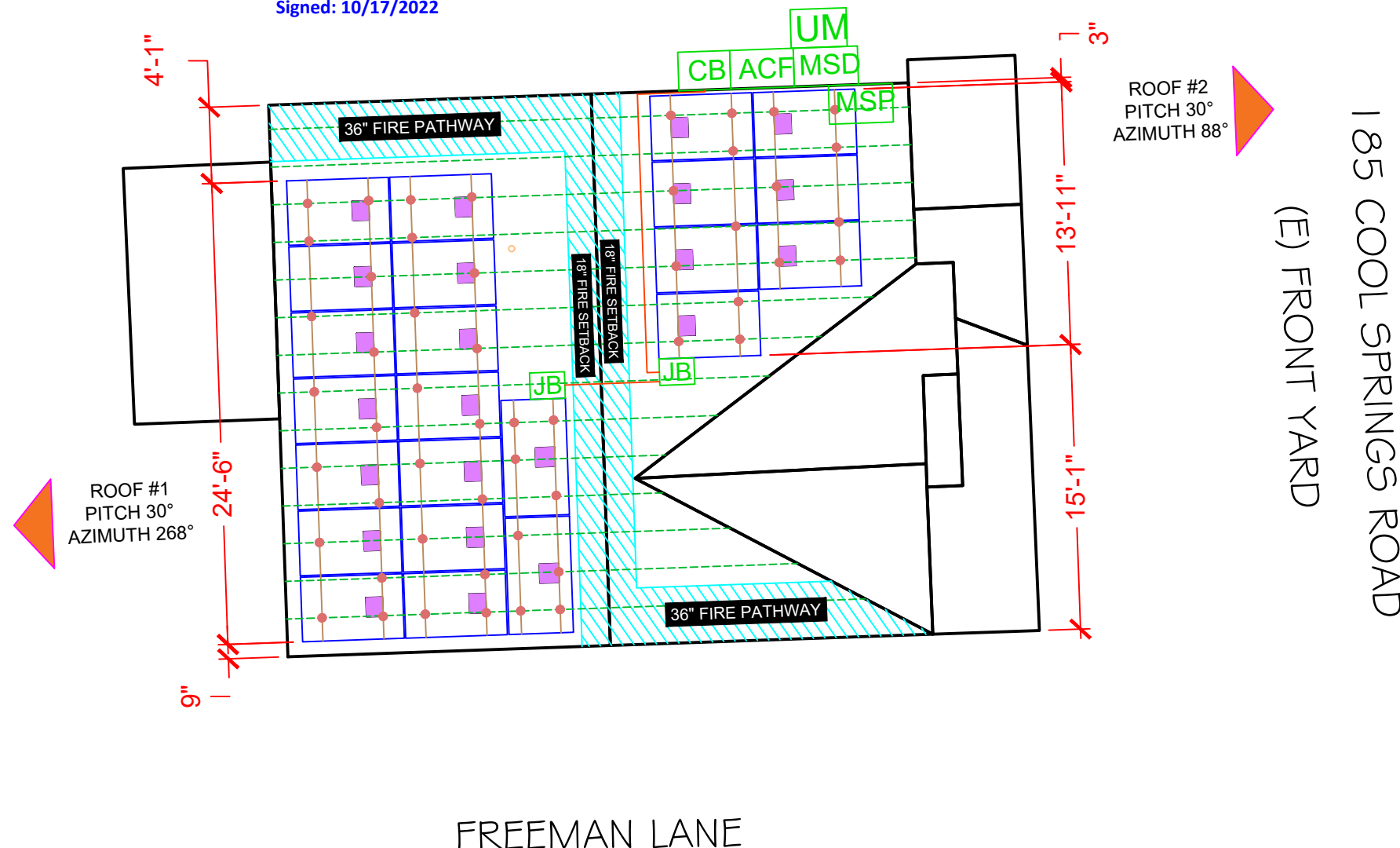
PV-2



Signed: 10/17/2022

BILL OF MATERIALS	
SOLAR PV MODULES	23 MISSION SOLAR ENERGY MSE385SX5R 385W
MICRO INVERTERS	23 IQ8PLUS-72-2-US
LOAD CENTER	01 AC COMBINER PANEL (MIN RATING 30A)
AC DISCONNECT	01 PV VISIBLE LOCKABLE LABELED DISCONNECT (60A FUSED 1PH 240VAC)
ATTACHMENTS	52 IRONRIDGE SLOTTED L-FEET
RAIL	13 IRONRIDGE RESOURCES - XR10
RAIL SPLICE	04 RAIL SPLICE
MID CLAMP	36 MID CLAMP
END CLAMP	20 END CLAMP
GROUNDING LUG	05 GROUNDING LUG

ROOF DESCRIPTION TABLE						
ROOF PLANE	TRUSS SIZE	TRUSS SPACING	MODULE COUNT	ARRAY TILT	AZIMUTH	MAX. ATTACHMENT SPACING
#1	2" x4"	48" O.C.	16	30°	268°	48"
#2	2" x4"	48" O.C.	7	30°	88°	48"



**LEGEND**

- PV MODULE
- MICRO-INVERTER
- ROOF ATTACHMENT
- DIMENSIONS
- PROPERTY LINE
- FENCE

<b>MSP</b> MAIN SERVICE PANEL (EXISTING, 200A)	<b>AC</b> AC DISCONNECT UNFUSED (N/A)
<b>UM</b> UTILITY METER (EXISTING)	<b>ACF</b> AC DISCONNECT FUSED (NEW)
<b>PM</b> PRODUCTION METER (N/A)	<b>JB</b> JUNCTION BOX (NEW)
<b>BAT</b> BATTERY (N/A)	<b>MSD</b> MAIN SERVICE DISCONNECT (NEW)
<b>INV</b> (0) INVERTER (N/A)	<b>SUB</b> SUBPANEL (N/A)
<b>CB</b> COMBINER PANEL (NEW)	<b>DCD</b> DC DISCONNECT (N/A)
<b>SM</b> SOLAREEDGE METER (N/A)	<b>DCC</b> DC COMBINER (N/A)
<b>BLP</b> BACKUP LOAD PANEL (N/A)	<b>EE</b> EXISTING EQUIPMENT

**ROOF PLAN WITH MODULES**

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





**CONTRACTOR**

NAME: TOP TIER SOLAR SOLUTIONS  
ADDRESS: 1530 CENTER PARK DR,  
CHARLOTTE, NC 28217, USA  
PHONE: 855-997-1213  
LICENSE #: SC - CLG. 123883  
ELECTRICALLICENSE #: NC - 87345  
BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

**REVISIONS**

DESCRIPTION	DATE	REV

**SIGNATURE & SEAL**

**HOMEOWNER INFO**

**LISA BLACKFORD**  
185 COOL SPRINGS RD,  
LILLINGTON, NC 27546, USA

APN: 7324754  
EMAIL: -  
PHONE: -

**SHEET NAME**

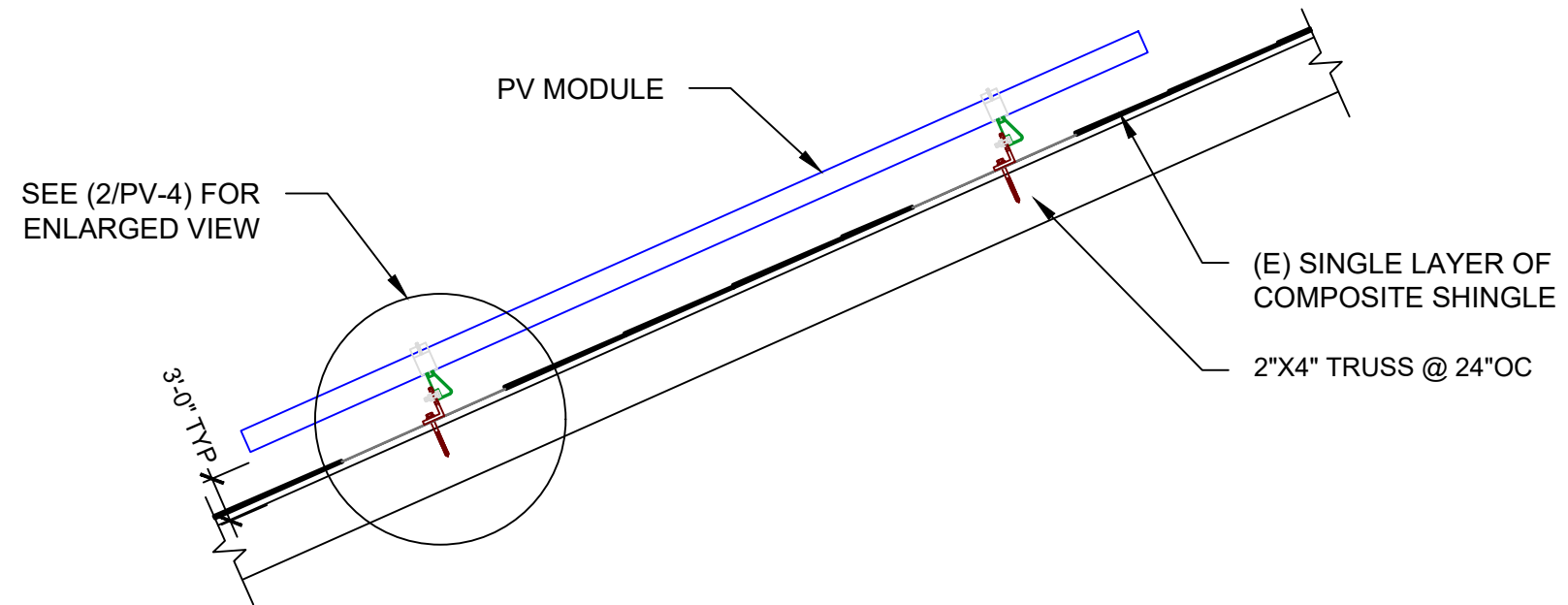
ATTACHMENT  
DETAIL

**SHEET SIZE**

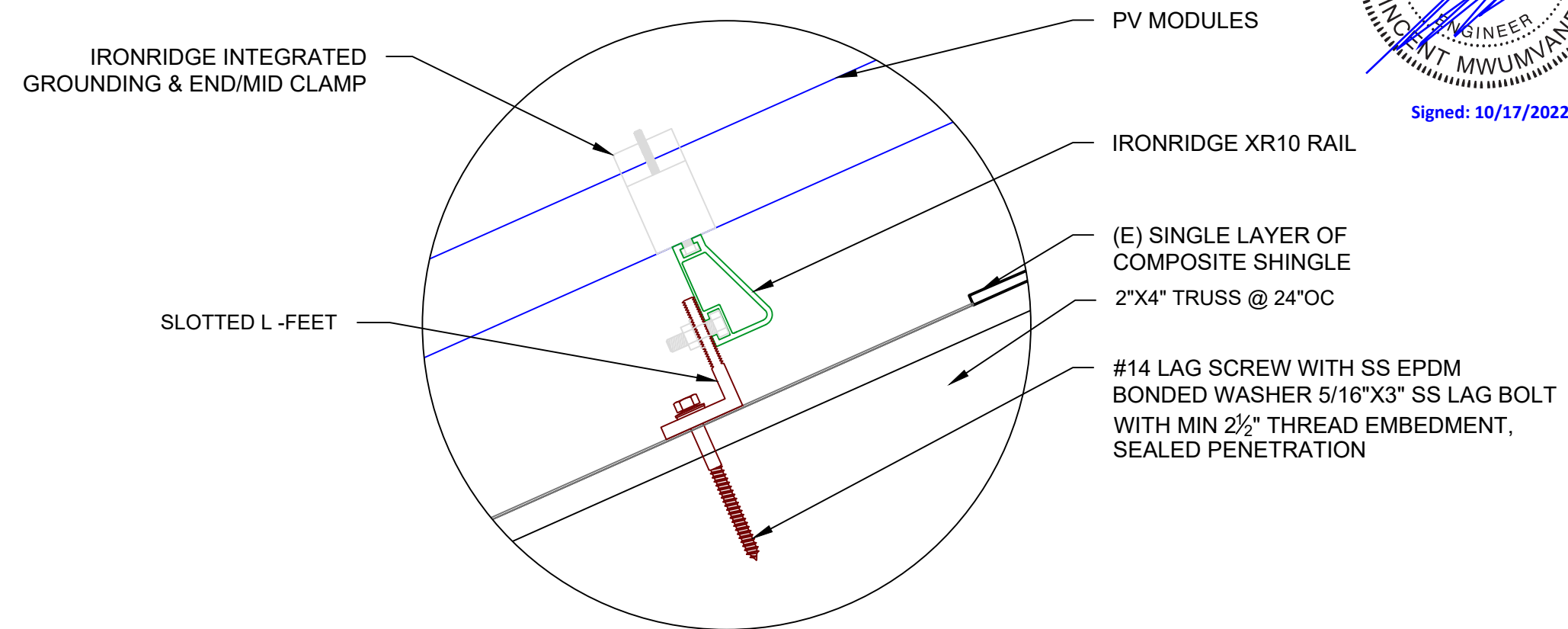
ANSI B  
11" X 17"

**SHEET NUMBER**

PV-3



Signed: 10/17/2022



**ATTACHMENT DETAIL**

SCALE: NTS

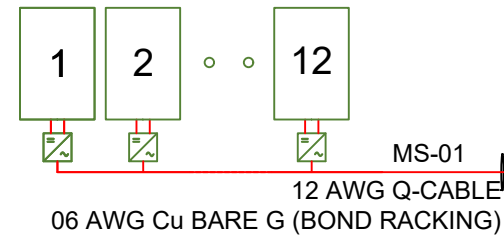
**ATTACHMENT DETAIL (ENLARGED SECTION VIEW)**

SCALE: NTS

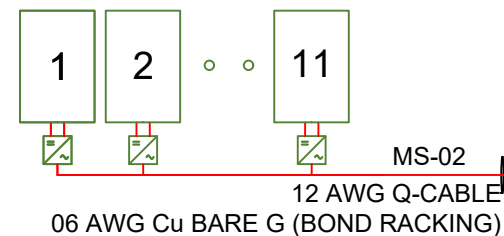
## SYSTEM SUMMARY STC DC/AC (8.855 KW DC / 6.67 KW AC)

- 1X CIRCUIT OF 12 MODULES CONNECTED IN PARALLEL
  - 1X CIRCUIT OF 11 MODULES CONNECTED IN PARALLEL
  - (23) MISSION SOLAR ENERGY MSE385SX5R 385W MODULES
  - (23) IQ8PLUS-72-2-US MICROINVERTERS
- STC DC: (23) 385 = 8.855 KW  
STC AC: (23) 290 = 6.67 KW

MOD: MISSION SOLAR ENERGY  
MSE385SX5R 385W  
INV: IQ8PLUS-72-2-US (240V)  
(1 CIRCUIT X 12 MICRO-INV)



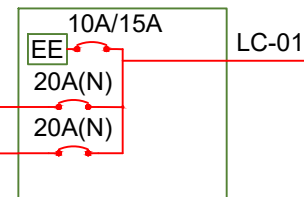
MOD: MISSION SOLAR ENERGY  
MSE385SX5R 385W  
INV: IQ8PLUS-72-2-US (240V)  
(1 CIRCUIT X 11 MICRO-INV)



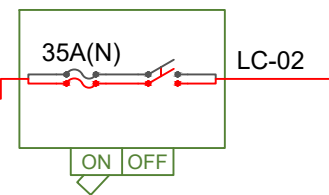
JUNCTION BOX  
600V, NEMA 3R  
UL LISTED

MCB-01  
MCB-02

ENPHASE IQ  
COMBINER4C-ES  
(X-IQ-AM1-240-4C-ES)  
120/240V, 1Ø, 3W  
MAX. CONTINUOUS  
CURRENT: 65A  
MAX. OCPD: 90A

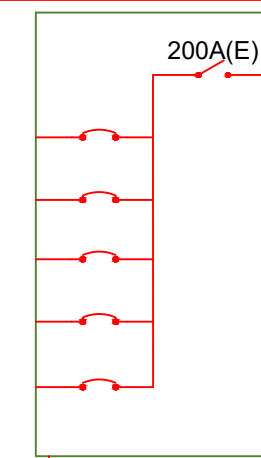


PV VISIBLE LOCKABLE  
LABELED DISCONNECT  
(60A FUSED 1PH 240VAC)

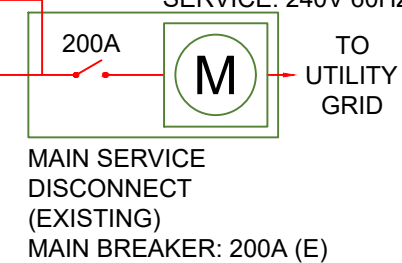


## INTERCONNECTION- PROTECTED LOAD TAP

MAIN SERVICE PANEL  
(EXISTING, TOP-FED)  
BUS RATING: 200A  
MAIN BREAKER: 200A (E)



UTILITY METER  
UTILITY: DUKE ENERGY  
(PROGRESS ENERGY  
CAROLINAS INC)  
SERVICE: 240V 60HZ 1PH



NOTE:HOLD ON KITS FOR PV BREAKERS  
IS MANDATORY FOR IQ COMBINER 4 / 4C.

NOTE:HOLD DOWN KIT BRHDK125  
IS NEEDED PER NEC 710.15  
FOR PV BREAKER FOR ALL IQ 8 SERIES  
MIRCO INVERTERS FAMILY

### NOTE:

- ALL GROUNDING TO COMPLY WITH NEC 690.47.
- ROOF TOP CONDUIT SHALL BE LOCATED MIN. 7/8" ABOVE ROOF SURFACE.
- ALL TERMINALS SHALL BE MIN. 75 DEG. C RATED.



### CONTRACTOR

NAME: TOP TIER SOLAR SOLUTIONS  
ADDRESS: 1530 CENTER PARK DR,  
CHARLOTTE, NC 28217, USA  
PHONE: 855-997-1213  
LICENSE #: SC - CLG. 123883  
ELECTRICALLICENSE #: NC - 87345  
BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

### REVISIONS

DESCRIPTION	DATE	REV

### SIGNATURE & SEAL

### HOMEOWNER INFO

**LISA BLACKFORD**  
185 COOL SPRINGS RD,  
LILLINGTON, NC 27546, USA

APN: 7324754  
EMAIL: -  
PHONE: -

### SHEET NAME

SINGLE LINE  
DIAGRAM

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-4

### AC wire details

Wire	Min Ampacity	Live	Neutral	Ground	Min EMT	Min PVC	Min RMC
MS-01	18.15A	12 AWG (Q-Cable)	-	06 AWG BARE (NOT IN CONDUIT)	-	-	-
MS-02	16.64A	12 AWG (Q-Cable)	-	06 AWG BARE (NOT IN CONDUIT)	-	-	-
MCB-01	18.15A	(2) 10 AWG THWN-2	10 AWG THWN-2	10 AWG THWN-2	0.50 in	0.50 in	0.50 in
MCB-02	16.64A	(2) 10 AWG THWN-2	10 AWG THWN-2	10 AWG THWN-2	0.50 in	0.50 in	0.50 in
LC-01	34.79A	(2) 08 AWG THWN-2	08 AWG THWN-2	10 AWG THWN-2	0.75 in	0.75 in	0.75 in
LC-02	34.79A	(2) 06 AWG THWN-2	06 AWG THWN-2	10 AWG THWN-2	0.75 in	0.75 in	0.75 in

INTERCONNECTION 120% RULE  
(MAIN PANEL)

INTERCONNECTION  
120% RULE  
NOT APPLICABLE

LINE-SIDE TAP DOES NOT AFFECT  
MAIN PANEL

EXTREME CASE MODULE OUTPUT  
(MISSION SOLAR ENERGY MSE385SX5R 385W)

$I_{sc}(25^{\circ}C) = 10.97A$ ,  $T_{isc} = 0.039\%/^{\circ}C$   
 $I_{sc}(T) = I_{sc}(25^{\circ}C) \times [1 + T_{isc} \times (T - 25^{\circ}C)]$   
 $I_{sc}(-11^{\circ}C) = 10.82A$ ,  $I_{sc}(34^{\circ}C) = 11.01A$

$V_{oc}(25^{\circ}C) = 45.03V$ ,  $T_{voc} = -0.262\%/^{\circ}C$   
 $V_{oc}(T) = V_{oc}(25^{\circ}C) \times [1 + T_{voc} \times (T - 25^{\circ}C)]$   
 $V_{oc}(-11^{\circ}C) = 49.28V$ ,  $V_{oc}(34^{\circ}C) = 43.97V$

# ELECTRICAL SINGLE LINE DIAGRAM

SCALE: NTS

## SYSTEM SUMMARY STC DC/AC

(8.855 KW DC / 6.67 KW AC)

- 1X CIRCUIT OF 12 MODULES CONNECTED IN PARALLEL
  - 1X CIRCUIT OF 11 MODULES CONNECTED IN PARALLEL
  - (23) MISSION SOLAR ENERGY MSE385SX5R 385W MODULES
  - (23) IQ8PLUS-72-2-US MICROINVERTERS
- STC DC: (23) 385 = 8.855 KW  
STC AC: (23) 290 = 6.67 KW



### CONTRACTOR

NAME: TOP TIER SOLAR SOLUTIONS  
ADDRESS: 1530 CENTER PARK DR,  
CHARLOTTE, NC 28217, USA  
PHONE: 855-997-1213  
LICENSE #: SC - CLG. 123883  
ELECTRICALLICENSE #: NC - 87345  
BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

### REVISIONS

DESCRIPTION	DATE	REV

### SIGNATURE & SEAL

### HOMEOWNER INFO

**LISA BLACKFORD**  
185 COOL SPRINGS RD,  
LILLINGTON, NC 27546, USA

APN: 7324754  
EMAIL: -  
PHONE: -

### SHEET NAME

WIRING  
CALCULATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-6

### AC wire details

WireID	#Modules	Nominal Voltage	Backfeed *1.25 /cond. set	Min OCPD	Total Power	Conductor sets	ccConductors /conduit	Expected max temp	Adjusted ampacity (ampacity x temp derate x conduit fill derate)	Conductor & neutral size	EGC size (Cu)	Conductor metal	Max length	V drop	Min EMT size	Min PVC size	Min RMC size
MS-01	12	240 V	18.15 A	20 A	3.5 kW	1	2	34	25 x 0.94 x 1.00 = 23.50 A	12 AWG (Q-Cable)	06 AWG BARE (NOT IN CONDUIT)	Cu	50 ft	1.05 %	-	-	-
MS-02	11	240 V	16.64 A	20 A	3.2 kW	1	2	34	25 x 0.94 x 1.00 = 23.50 A	12 AWG (Q-Cable)	06 AWG BARE (NOT IN CONDUIT)	Cu	50 ft	0.96 %	-	-	-
MCB-01	12	240 V	18.15 A	20 A	3.5 kW	1	2	34	35 x 0.94 x 1.00 = 32.90 A	10 AWG THWN-2	10 AWG THWN-2	Cu	50 ft	0.63 %	0.50 in	0.50 in	0.50 in
MCB-02	11	240 V	16.64 A	20 A	3.2 kW	1	2	34	35 x 0.94 x 1.00 = 32.90 A	10 AWG THWN-2	10 AWG THWN-2	Cu	50 ft	0.58 %	0.50 in	0.50 in	0.50 in
LC-01	23	240 V	34.79 A	35 A	6.7 kW	1	2	34	50 x 0.94 x 1.00 = 47.00 A	08 AWG THWN-2	10 AWG THWN-2	Cu	10 ft	0.16 %	0.75 in	0.75 in	0.75 in
LC-02	23	240 V	34.79 A	60 A	6.7 kW	1	2	34	65 x 0.94 x 1.00 = 61.10 A	06 AWG THWN-2	10 AWG THWN-2	Cu	10 ft	0.10 %	0.75 in	0.75 in	0.75 in

INTERCONNECTION 120% RULE  
(MAIN PANEL)

INTERCONNECTION  
120% RULE  
NOT APPLICABLE

LINE-SIDE TAP DOES NOT AFFECT  
MAIN PANEL

EXTREME CASE MODULE OUTPUT  
(MISSION SOLAR ENERGY MSE385SX5R 385W)

$I_{sc}(25^{\circ}\text{C}) = 10.97\text{A}$ ,  $T_{isc} = 0.039\%/^{\circ}\text{C}$   
 $I_{sc}(T) = I_{sc}(25^{\circ}\text{C}) \times [1 + T_{isc} \times (T - 25^{\circ}\text{C})]$   
 $I_{sc}(-11^{\circ}\text{C}) = 10.82\text{A}$ ,  $I_{sc}(34^{\circ}\text{C}) = 11.01\text{A}$   
 $V_{oc}(25^{\circ}\text{C}) = 45.03\text{V}$ ,  $T_{voc} = -0.262\%/^{\circ}\text{C}$   
 $V_{oc}(T) = V_{oc}(25^{\circ}\text{C}) \times [1 + T_{voc} \times (T - 25^{\circ}\text{C})]$   
 $V_{oc}(-11^{\circ}\text{C}) = 49.28\text{V}$ ,  $V_{oc}(34^{\circ}\text{C}) = 43.97\text{V}$

## ELECTRICAL NOTES

- 1) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- 2) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- 3) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- 4) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- 5) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- 6) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- 7) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- 8) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- 9) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C.VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- 10) PV EQUIPMENT SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NEC 690.
- 11) EXACT LOCATION OF AUXILIARY GROUNDING TO BE DETERMINED AT TIME OF INSTALL.
- 12) EXISTING WIRES MUST BE REPLACED IF SMALLER THAN LISTED MINIMUM SIZES PER NEC 310.15(B)(16).
- 13) AC DISCONNECT LOCATED WITHIN 10' OR LESS FROM UTILITY METER
- 14) IF ENVOY PRESENT, ENVOY BREAKER DETERMINED AT FACTORY BY MANUFACTURER.
- 15) IF ENVOY PRESENT, FOR IQ COMBINER USE SINGLE CT ON L1. AT SYSTEM CONTROLLER MAIN USE DOUBLE CT ON L1 AND L2.

1

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

LABEL LOCATION: INVERTERS, AC DISCONNECTS, AC COMBINER BOXES  
CODE REF: NEC 2020 - 690.13(B)

2

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

LABEL LOCATION: UTILITY SERVICE ENTRANCE (MSP OR AC DISCONNECT IF LINE SIDE TAP), AND WHEREVER REQUIRED BY AHJ (INVERTERS, DC DISCONNECTS, OTHER)  
CODE REF: NEC 2020 - 690.56(C)(2)

3

**PV SYSTEM DISCONNECT**  
MAXIMUM AC OPERATING CURRENT: 27.83 AMPS  
NOMINAL OPERATING AC VOLTAGE: 240.0 VAC

LABEL LOCATION: INTERCONNECTION Placard (MSP BACKFEED BREAKER OR TAP BOX IF LINE SIDE TAP), AC DISCONNECTS  
CODE REF: NEC 2020 - 690.54

4

**PHOTOVOLTAIC AC DISCONNECT**

LABEL LOCATION: INTERCONNECTION Placard (MSP BACKFEED BREAKER OR TAP BOX IF LINE SIDE TAP), AC DISCONNECTS  
CODE REF: NEC 2020 - 690.13(B)

5

**MAIN PHOTOVOLTAIC SYSTEM DISCONNECT**

LABEL LOCATION: AC DISCONNECTS FOR UTILITY ACCESS  
CODE REF: NEC 2020 - 690.13(B)

6

**WARNING**  
POWER SOURCE OUTPUT CONNECTION  
DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION: FIRST BACKFEED BREAKER (MSP/SUBPANEL) IF NO LINE SIDE TAP  
CODE REF: NEC 2020 - 705.12(B)(3)(2), CEC 2019 - 705.12(B)(2)(3)(b), CEC 2019 - 705.12(B)(3)

7

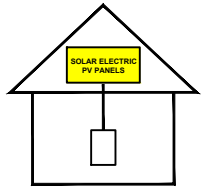
**CAUTION: MULTIPLE POWER SOURCES**

LABEL LOCATION: N/A  
CODE REF: NEC 2020 - 690.56(B), NEC 2020 - 705.10

8

**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.



LABEL LOCATION: INTERCONNECTION POINT (MSP OR AC DISCONNECT IF LINE SIDE TAP)  
CODE REF: NEC 2020 - 690.56(C)

9

**WARNING**  
SOLAR SYSTEM CONNECTED AND ENERGISED

LABEL LOCATION: UTILITY METER  
CODE REF: NEC 2020 - 690.13(B)

10

**WARNING**  
TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

LABEL LOCATION: MSP  
CODE REF: NEC 2020 - 110.27(C)

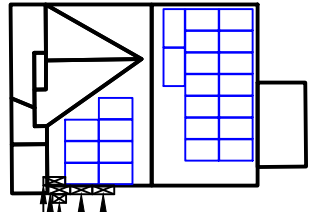
11

**CAUTION: MULTIPLE SOURCES OF POWER**

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

MAIN SERVICE PANEL & UTILITY METER  
AC DISCONNECT  
COMBINER PANEL

185 COOL SPRINGS ROAD



(N) COMBINER BOX  
(N) FUSED AC DISCONNECT  
(E) UTILITY METER  
(E) MAIN SERVICE DISCONNECT  
(E) MAIN SERVICE PANEL (INSIDE HOUSE)

LABEL LOCATION: MSP  
CODE REF: NEC 2020 - 705.10, NEC 2020 - 710.10



**CONTRACTOR**

NAME: TOP TIER SOLAR SOLUTIONS  
ADDRESS: 1530 CENTER PARK DR, CHARLOTTE, NC 28217, USA  
PHONE: 855-997-1213  
LICENSE #: SC - CLG. 123883  
ELECTRICALLICENSE #: NC - 87345  
BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

**REVISIONS**

DESCRIPTION	DATE	REV

**SIGNATURE & SEAL**

**HOMEOWNER INFO**

**LISA BLACKFORD**  
185 COOL SPRINGS RD,  
LILLINGTON, NC 27546, USA

APN: 7324754  
EMAIL: -  
PHONE: -

**SHEET NAME**

PLACARDS

**SHEET SIZE**

ANSI B  
11" X 17"

**SHEET NUMBER**

PV-7

MSE PERC 66

MISSION SOLAR ENERGY

**385W**

Class leading power output -0 to +3%

Positive Power Tolerance

## True American Quality True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas where we manufacture our modules. We produce American, high-quality solar modules ensuring the highest-in-class power output and best-in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long term.

Demand the best. Demand Mission Solar Energy.



### Certified Reliability

- Tested to UL 61730 & IEC Standards
- PID resistant
- Resistance to salt mist corrosion



### Advanced Technology

- 6 Busbar
- Passivated Emitter Rear Contact
- Ideal for all applications



### Extreme Weather Resilience

- Up to 5,400 Pa front load & 3,600 Pa back load
- Tested load to UL 61730
- 40 mm frame



### BAA Compliant for Government Projects

- Buy American Act
- American Recovery & Reinvestment Act

### FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2% in year one and 0.58% annually from years two to 30 with 84.08% capacity guaranteed in year 25. For more information, visit [www.missionsolar.com/warranty](http://www.missionsolar.com/warranty)

### CERTIFICATIONS

CEC



UL 61730 / IEC 61215 / IEC 61730 / IEC 61701

If you have questions or concerns about certification of our products in your area, please contact Mission Solar Energy.

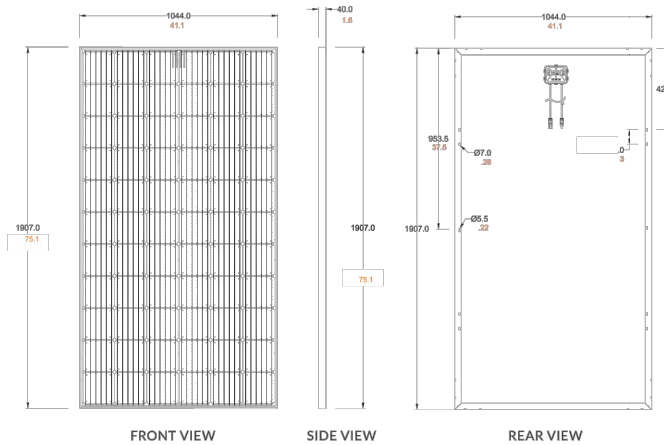


Class Leading  
375-385W

MSE PERC 66

### BASIC DIMENSIONS

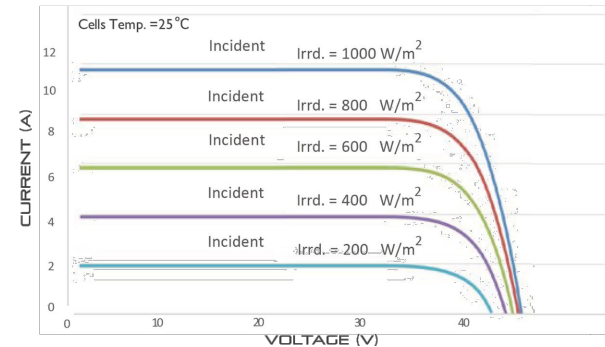
[UNITS: MM/IN]



### CURRENT-VOLTAGE CURVE

MSE385SX5R: 385WP, 66 CELL SOLAR MODULE

Current-voltage characteristics with dependence on irradiance and module temperature



### CERTIFICATIONS AND TESTS

IEC	61215, 61730, 61701
UL	61730



CEC



Mission Solar Energy

8303 S. New Braunfels Ave., San Antonio, Texas 78235  
[www.missionsolar.com](http://www.missionsolar.com) | [info@missionsolar.com](mailto:info@missionsolar.com)

Mission Solar Energy reserves the right to make specification changes without notice.  
C-SA2-MKTG-0027 REV 2 05/05/2021

### ELECTRICAL SPECIFICATION

PRODUCT TYPE	MSExxxSX5R (xxx = Pmax)				
Power Output	P <sub>max</sub>	Wp	375	380	385
Module Efficiency	%		18.8	19.1	19.3
Tolerance	%		0/+3	0/+3	0/+3
Short Circuit Current	I <sub>sc</sub>	V	10.85	10.91	10.97
Open Circuit Voltage	V <sub>oc</sub>	A	44.64	44.84	45.03
Rated Current	I <sub>mp</sub>	V	10.26	10.34	10.42
Rated Voltage	V <sub>mp</sub>	V	36.56	36.75	36.93
Fuse Rating	A		20	20	20
System Voltage	V		1,000	1,000	1,000

### TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44.43°C (±3.7%)
Temperature Coefficient of P <sub>max</sub>	-0.361%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.262%/°C
Temperature Coefficient of I <sub>sc</sub>	0.039%/°C

### OPERATING CONDITIONS

Maximum System Voltage	1,000Vdc
Operating Temperature Range	-40°C (-40°F) to +85°C (185°F)
Maximum Series Fuse Rating	20A
Fire Safety Classification	Type 1
Front & Back Load (UL Standard)	Up to 5,400 Pa front and 3,600 Pa back load, Tested to UL 61730
Hail Safety Impact Velocity	25mm at 23 m/s

### MECHANICAL DATA

Solar Cells	P-type mono-crystalline silicon
Cell Orientation	66 cells (6x11)
Module Dimension	1,907mm x 1,044mm x 40mm
Weight	22 kg (49 lbs.)
Front Glass	3.2mm, tempered, low-iron, anti-reflective
Frame	Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.0m, Wire 4mm <sup>2</sup> (12AWG)
Connector	Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MCA, Renhe 05-8

### SHIPPING INFORMATION

Container Feet	Ship To	Pallet	Panels	380 W Bin
53'	Most States	30	780	296.40 kW
Double Stack	CA	26	676	256.88 kW

### PALLET [26 PANELS]

Weight	Height	Width	Length
1,274 lbs. (572 kg)	47.56 in (120.80 cm)	46 in (116.84 cm)	77 in (195.58 cm)

TOP TIER SOLAR SOLUTIONS

### CONTRACTOR

NAME: TOP TIER SOLAR SOLUTIONS  
ADDRESS: 1530 CENTER PARK DR, CHARLOTTE, NC 28217, USA  
PHONE: 855-997-1213  
LICENSE #: SC - CLG.123883  
ELECTRICALLICENSE #: NC - 87345  
BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

### REVISIONS

DESCRIPTION	DATE	REV

### SIGNATURE & SEAL

### HOMEOWNER INFO

LISA BLACKFORD  
185 COOL SPRINGS RD,  
LILLINGTON, NC 27546, USA

APN: 7324754  
EMAIL: -  
PHONE: -

### SHEET NAME

EQUIPMENT SPECIFICATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-8



## 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 super-fast 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 Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



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 IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



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

© 2021 Enphase Energy. All rights reserved. Enphase, the Enphase logo, IQ8 microinverters, and other names are trademarks of Enphase Energy, Inc. Data subject to change.

IQ8SP-DS-0002-01-EN-US-2021-10-19

### 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) requirements

## IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings <sup>1</sup>	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current <sup>2</sup> [module Isc]	A		15
Overtoltage class DC port			II
DC port backfeed current	mA		0
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range <sup>3</sup>	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
Max units per 20 A (L-L) branch circuit <sup>4</sup>		16	13
Total harmonic distortion		<5%	
Overtoltage 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	%	97.5	97.6
CEC weighted efficiency	%	97	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		MC4	
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Acoustic noise at 1 m		<60 dBA	
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, UL1741/IEE1547, 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, 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) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2021-10-19

### CONTRACTOR

NAME: TOP TIER SOLAR SOLUTIONS  
ADDRESS: 1530 CENTER PARK DR,  
CHARLOTTE, NC 28217, USA  
PHONE: 855-997-1213  
LICENSE #: SC - CLG. 123883  
ELECTRICALLICENSE #: NC - 87345  
BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

### REVISIONS

DESCRIPTION	DATE	REV

### SIGNATURE & SEAL

### HOMEOWNER INFO

LISA BLACKFORD  
185 COOL SPRINGS RD,  
LILLINGTON, NC 27546, USA

APN: 7324754  
EMAIL: -  
PHONE: -

### SHEET NAME

EQUIPMENT  
SPECIFICATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-9



# Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4  
X-IQ-AM1-240-4C



X-IQ-AM1-240-4C

X-IQ-AM1-240-4



To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

The **Enphase 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 and 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 Enphase 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
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

### Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC 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



## Enphase IQ Combiner 4/4C

### MODEL NUMBER

**IQ Combiner 4 (X-IQ-AM1-240-4)** IQ Combiner 4 with Enphase 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 system and IQ System Controller 2 and to deflect heat.

**IQ Combiner 4C (X-IQ-AM1-240-4C)** IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase 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)

Ensemble 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 for Ensemble sites - 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
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
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)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.

### ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 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. 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	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers

### MECHANICAL DATA

Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" 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	Up to 3000 meters (9,842 feet)

### INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)

### COMPLIANCE

Compliance, IQ 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) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

© 2022 Enphase Energy. All rights reserved. Enphase, the Enphase logo, IQ Combiner 4/4C, and other names are trademarks of Enphase Energy, Inc. Data subject to change. 08-26-2022



### CONTRACTOR

NAME: TOP TIER SOLAR SOLUTIONS  
ADDRESS: 1530 CENTER PARK DR,  
CHARLOTTE, NC 28217, USA  
PHONE: 855-997-1213  
LICENSE #: SC - CLG. 123883  
ELECTRICALLICENSE #: NC - 87345  
BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

### REVISIONS

DESCRIPTION	DATE	REV

### SIGNATURE & SEAL

### HOMEOWNER INFO

**LISA BLACKFORD**  
185 COOL SPRINGS RD,  
LILLINGTON, NC 27546, USA

APN: 7324754  
EMAIL: -  
PHONE: -

### SHEET NAME

EQUIPMENT  
SPECIFICATION

### SHEET SIZE

ANSI B  
11" X 17"

### SHEET NUMBER

PV-10




# Flush Mount System





### Built for solar's toughest roofs.


IronRidge builds the strongest mounting system for pitched roofs in solar. Every component has been tested to the limit and proven in extreme environments.


Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 20-year warranty.


**Strength Tested**  
 All components evaluated for superior structural performance.

**PE Certified**  
 Pre-stamped engineering letters available in most states.

**Class A Fire Rating**  
 Certified to maintain the fire resistance rating of the existing roof.

**Design Assistant**  
 Online software makes it simple to create, share, and price projects.

**UL 2703 Listed System**  
 Entire system and components meet newest effective UL 2703 standard.

**20-Year Warranty**  
 Twice the protection offered by competitors.

### XR Rails ☺


**XR10 Rail**



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear and black finish


**XR100 Rail**



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

**XR1000 Rail**



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

**Bonded Splices**



All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

### Clamps & Grounding ☺


**UFOs**



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

**Stopper Sleeves**



Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

**Grounding Lugs**



Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

**Microinverter Kits**



Mount MIs or POs to XR Rails.

- Bonds devices to rails
- Kit comes assembled
- Listed to UL 2703

### Attachments ☺


**FlashFoot2**



Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish


**Slotted L-Feet**



Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

**Bonding Hardware**



Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

**Flush Standoffs**




Raise Flush Mount System to various heights.

- Works with vent flashing
- 4" and 7" lengths
- Ships assembled

### Resources

**Design Assistant**  
 Go from rough layout to fully engineered system. For free.  
[Go to IronRidge.com/design](http://GoToIronRidge.com/design)

**NABCEP Certified Training**  
 Earn free continuing education credits, while learning more about our systems.  
[Go to IronRidge.com/training](http://GoToIronRidge.com/training)



**CONTRACTOR**  
 NAME: TOP TIER SOLAR SOLUTIONS  
 ADDRESS: 1530 CENTER PARK DR,  
 CHARLOTTE, NC 28217, USA  
 PHONE: 855-997-1213  
 LICENSE #: SC - CLG. 123883  
 ELECTRICAL LICENSE #: NC - 87345  
 BDUNFORD@TOPTIERSOLARSOLUTIONS.COM

**REVISIONS**

DESCRIPTION	DATE	REV

**SIGNATURE & SEAL**

**HOMEOWNER INFO**

**LISA BLACKFORD**  
 185 COOL SPRINGS RD,  
 LILLINGTON, NC 27546, USA

APN: 7324754  
 EMAIL: -  
 PHONE: -

**SHEET NAME**  
 EQUIPMENT SPECIFICATION

**SHEET SIZE**  
 ANSI B  
 11" X 17"

**SHEET NUMBER**  
 PV-11