

DESIGN CRITERIA
 EXPOSURE CATEGORY = C
 WIND SPEED = 119 MPH
 SNOW LOAD = 15 PSF

MODULE AREA & WEIGHT CALCULATIONS
 PANEL TYPES COUNT: AREA, WEIGHT
 • (18) EAGLE CR BACK (ANSI616/280W) (300W) (78" T x 33.5" x 49.6 LB)
 • (18) EAGLE CR BACK (ANSI616/280W) (300W) (78" T x 33.5" x 49.6 LB)
 • (18) ENPHASE (EPR) US 72-2-LS (600W) (2-381 LB)
 ATTACHMENT COUNT: 36
 TOTAL ROOF AREA: 1500 SF
 TOTAL ARRAY AREA: (18) 70" T x 30.5" x 300 SF
 TOTAL ARRAY WEIGHT: (18) 49.6 x (18) 2.4 = 118.1, 1.5 = 983 LB
 WEIGHT AT EACH CONNECTION: 656.1 LB / 18 = 36.45 LB
 DISTRIBUTED LOAD: 983 LB / 300 SF = 3.27 PSF
 ROOF AREA COVERED BY ARRAY: 300 SF / 1500 SF = 20.0%

BILL OF MATERIALS
 EAGLE CR BACK (K1M30M2) 281CV (300W)
 ENPHASE (EPR) US 72-2-LS (240V) 600V, NEMA 3R
 LOAD CENTER (AC) 01 U/L LISTED
 AC DISCONNECT 01 LABELLED DISCONNECT (00A UNFUSED, 1PH 240V/AC)
 ATTACHMENTS 36 IRONBOLT (S) 1/2" X 3" FEET
 RAIL SPLICES 04 RAIL SPLICES
 MID CLAMPS 28 MID CLAMPS
 END CLAMPS 18 END CLAMPS
 GROUNDING LUG 1 94 GROUNDING LUG

ROOF PLANE #1	TRUSS SIZE	TRUSS ATTACHMENT	MODULE COUNT	ARRAY AZIMUTH
1	2 x 4	24 O.C.	18	30°
		48 O.C.	18	180°

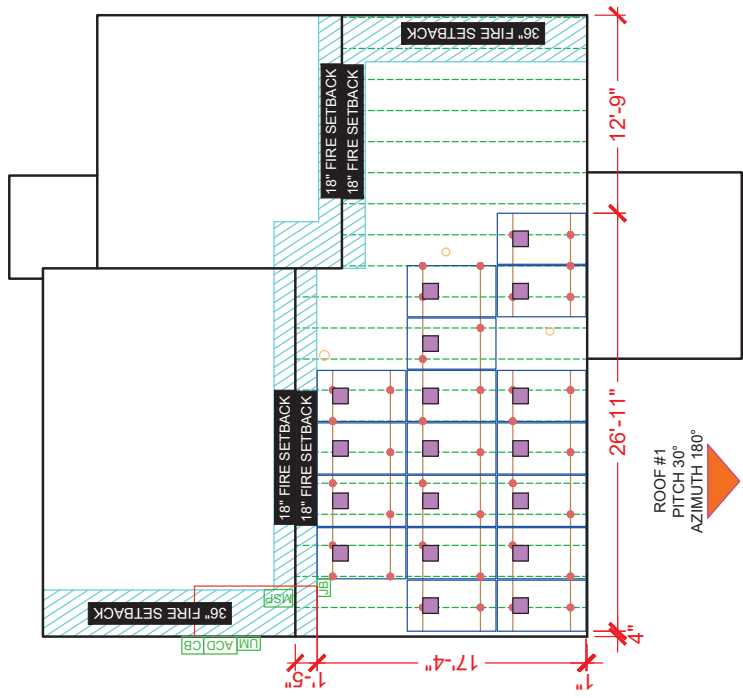
ROOF DESCRIPTION	TABLE
TRUSS ATTACHMENT	ARRAY AZIMUTH
MODULE COUNT	TILT
SPACING	
SIZE	
TRUSS	
TRUSS ATTACHMENT	
TABLE	

ROOF ACCESS POINT
 THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

LEGEND

- PV MODULE
- MICRO-INVERTER
- ROOF ATTACHMENT
- FIRE SETBACK
- CONDUIT
- TRUSS
- RAIL
- AC DISCONNECT UNFUSED (NEW)
- AC DISCONNECT FUSED (N/A)
- JUNCTION BOX (NEW)
- AUTO TRANSFORMER (N/A)
- SUBPANEL (N/A)
- DC DISCONNECT (N/A)
- DC COMBINER (N/A)
- EXISTING EQUIPMENT
- MAIN SERVICE PANEL (EXISTING, 200A)
- UTILITY METER (EXISTING)
- PRODUCTION METER (N/A)
- BATTERY (N/A)
- (0) INVERTER (N/A)
- COMBINER BOX (NEW)
- SOLA-RIDGE METER (N/A)
- BACKUP LOAD PANEL (N/A)

WINDING CREEK DRIVE
 (E) FRONT YARD



(E) BACK YARD

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



CONTRACTOR: TOP TIER SOLAR SOLUTIONS
 ADDRESS: 1530 CENTER PARK DR., SUITE 100, WINDING CREEK, NC 27546
 PHONE: 855-997-1213
 CONTRACTOR LICENSE # SC - CGC 123883
 ELECTRICAL LICENSE # NC - 87345
 Website: www.top tiersolar.com

REVISIONS	DESCRIPTION	DATE	REV

SIGNATURE & SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 048371
 Signed: 01/25/2023

HOMEOWNER INFO
 AQUIL KRIPS
 116 WINDING CREEK DRIVE,
 HARNETT COUNTY, NC 27546,
 USA

APR: 26/45739185
 EMAIL:
 PHONE:
SHEET NAME
 ROOF PLAN WITH MODULES

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-2



CONTRACTOR: TOP TIER SOLAR SOLUTIONS
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REVISIONS	DESCRIPTION	DATE	REV

SIGNATURE & SEAL



Signed: 01/25/2023

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APN: 2645739185
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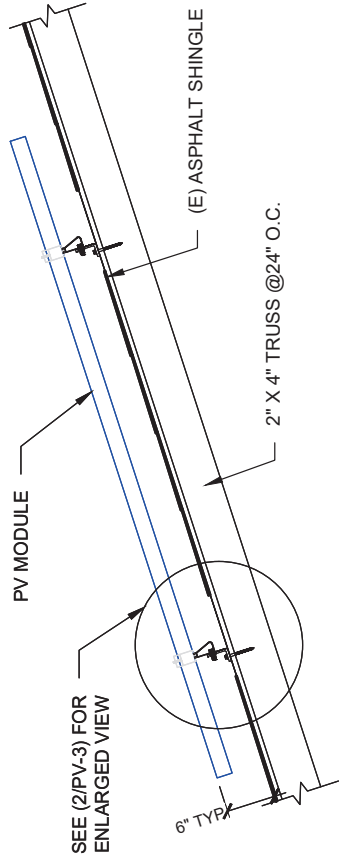
SHEET NAME

ATTACHMENT
 DETAIL

SHEET SIZE
 ANSI B
 11" X 17"

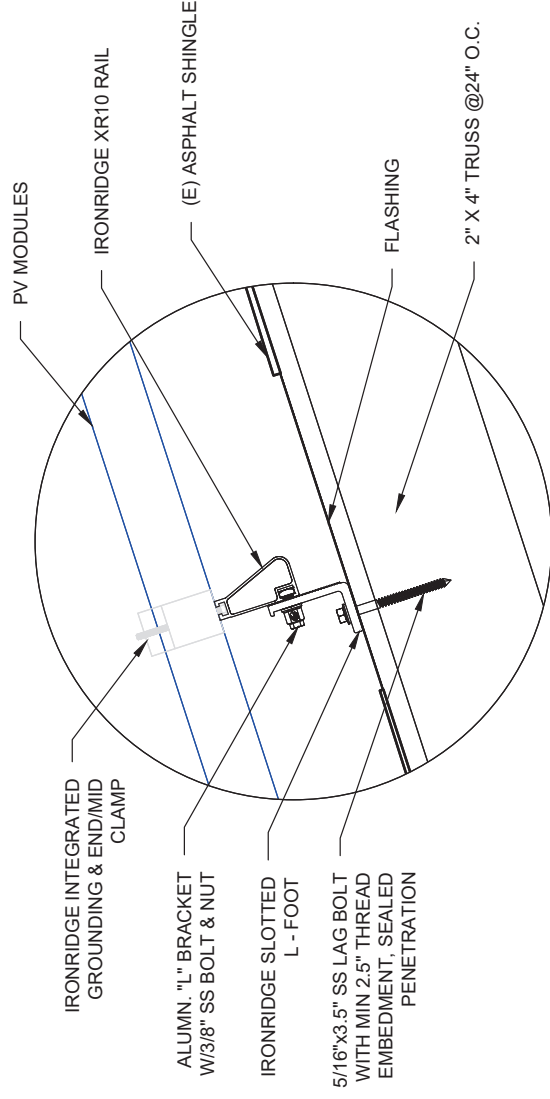
SHEET NUMBER

PV-3



SEE (2/PV-3) FOR ENLARGED VIEW

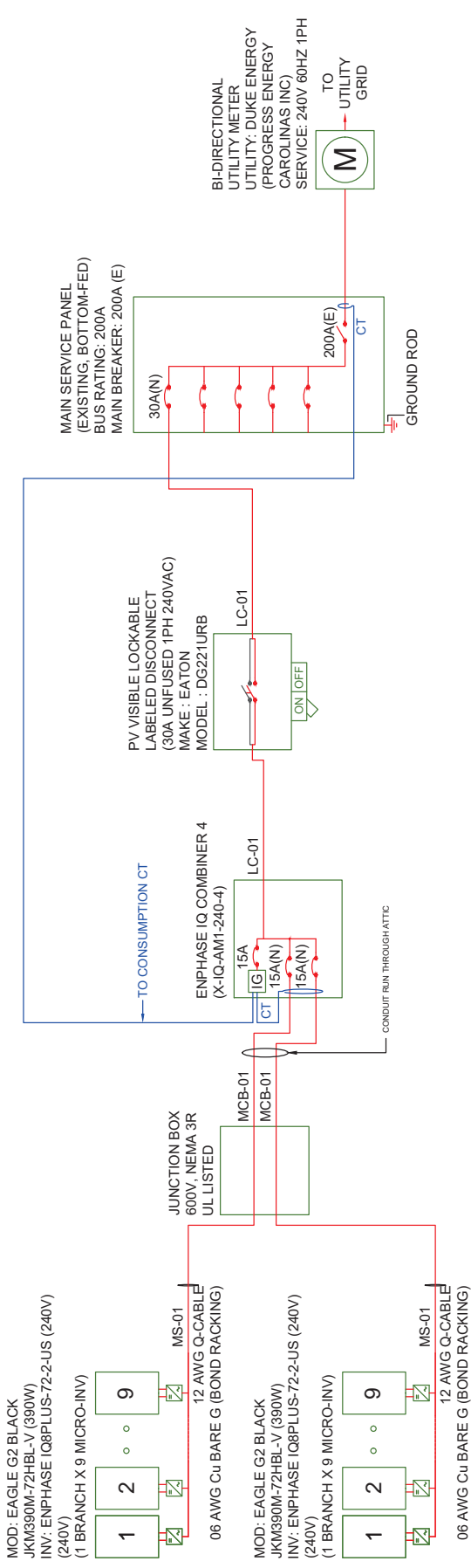
ATTACHMENT DETAIL
 SCALE: NTS



ATTACHMENT DETAIL (ENLARGED SECTION VIEW)
 SCALE: NTS

SYSTEM SUMMARY STC (7.020 kW DC / 5.220 kW AC)

- STC DC: (18) 390W = 7.020 kW
- STC AC: (18) 280W = 5.220 kW
- (18) EAGLE G2 BLACK JKM390M-72HBL-V (390W) MODULES
- (18) ENPHASE IQ8PLUS-72-2-US (240V) MICROINVERTERS
- 2x BRANCHES OF 9 CONNECTED IN PARALLEL



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

CONTRACTOR: TOP TIER SOLAR SOLUTIONS
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HOMEOWNER INFO

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 116 WINDING CREEK DRIVE,
 HARNETT COUNTY, NC 27546,
 USA

APR: 28/45179185
 EMAIL: -
 PHONE: -

SHEET NAME
 SINGLE LINE
 DIAGRAM

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-4

AC wire details		Ground	Min EMT	Min PVC	Min RMC
Wire	Min Ampacity	Neutral			
MS-01	13.61A	06 AWG BARE (NOT IN CONDUIT)	-	-	-
MCB-01	13.61A	10 AWG THWN-2	1/2 in	1/2 in	1/2 in
LC-01	27.23A	(2) 10 AWG THWN-2	1/2 in	1/2 in	1/2 in

INTERCONNECTION 120% RULE (MAIN PANEL)
 UTILITY FEED + TOTAL BACKFEED
 200A + 30A = 230A
 LESS OR EQUAL TO
 BUS RATING x 120%
 200A x 120% = 240A
 CALCULATION ENSURES BUS IS SAFE REGARDLESS OF LOADS

EXTREME CASE MODULE OUTPUT (EAGLE G2 BLACK JKM390M-72HBL-V (390W))
 $I_{sc}(25^{\circ}C) = 10.46A$, $T_{isc} = 0.048A/^{\circ}C$
 $I_{sc}(T) = I_{sc}(25^{\circ}C) + [T_{isc} \times (T - 25^{\circ}C)]$
 $I_{sc}(-9^{\circ}C) = 8.83A$, $I_{sc}(35^{\circ}C) = 10.94A$
 $V_{oc}(25^{\circ}C) = 48.60V$, $T_{voc} = -0.290V/^{\circ}C$
 $V_{oc}(T) = V_{oc}(25^{\circ}C) + [T_{voc} \times (T - 25^{\circ}C)]$
 $V_{oc}(-9^{\circ}C) = 58.46V$, $V_{oc}(35^{\circ}C) = 45.70V$

ELECTRICAL NOTES

- ALL GROUNDING TO COMPLY WITH NEC 680.47.
- ROOFTOP CONDUIT SHALL BE LOCATED MIN. 7/8" ABOVE ROOF SURFACE.
- ALL TERMINALS SHALL BE MIN. 75°C RATED.
- IF ENVOY PRESENT, ENVOY BREAKER DETERMINED AT FACTORY BY MANUFACTURER.
- IF ENVOY PRESENT, FOR IQ COMBINER USE SINGLE CT ON L1, AT SYSTEM CONTROLLER MAIN USE DOUBLE CT ON L1 AND L2.

ELECTRICAL SINGLE LINE DIAGRAM

SCALE: NTS

SYSTEM SUMMARY STC (7,020 kW DC / 5,220 kW AC)

STC DC: (18) 390W = 7,020 kW
 STC AC: (18) 290W = 5,220 kW

- (18) EAGLE G2 BLACK JKM390M-72HBL-V (390W) MODULES
- (18) ENPHASE IQ8PLUS-72-2-US (240V) MICROINVERTERS
- 2x BRANCHES OF 9 CONNECTED IN PARALLEL

CONTRACTOR: TOP TIER SOLAR SOLUTIONS
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REVISIONS	DESCRIPTION	DATE	REV

SIGNATURE & SEAL

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	9	240 V	13.61 A	15 A	2.6 kW	1	2	35	25 x 0.94 x 1.00 = 23.50 A	12 AWG (Q-Cable)	06 AWG BARE (NOT IN CONDUIT)	Cu	50 ft	0.79 %	-	-	-
MCB-01	9	240 V	13.61 A	15 A	2.6 kW	1	2	35	35 x 0.94 x 1.00 = 32.90 A	10 AWG THWN-2	10 AWG THWN-2	Cu	50 ft	0.47 %	1/2 in	1/2 in	1/2 in
LC-01	18	240 V	27.23 A	30 A	5.2 kW	1	2	35	35 x 0.94 x 1.00 = 32.90 A	10 AWG THWN-2	10 AWG THWN-2	Cu	10 ft	0.19 %	1/2 in	1/2 in	1/2 in

INTERCONNECTION 120% RULE (MAIN PANEL)

UTILITY FEED + TOTAL BACKFEED
 200A + 30A = 230A
 LESS OR EQUAL TO
 BUS RATING x 120%
 200A x 120% = 240A
 CALCULATION ENSURES BUS IS
 SAFE REGARDLESS OF LOADS

EXTREME CASE MODULE OUTPUT (EAGLE G2 BLACK JKM390M-72HBL-V (390W))

Isc(25°C) = 10.46A, Tisc = 0.048A/°C
 Isc(T) = Isc(25°C) + [Tisc x (T-25°C)]
 Isc(9°C) = 8.63A, Isc(35°C) = 10.94A
 Voc(25°C) = 48.60V, Tvoc = -0.290V/°C
 Voc(T) = Voc(25°C) + [Tvoc x (T-25°C)]
 Voc(9°C) = 58.46V, Voc(65°C) = 48.70V

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600V AND 90°C WET ENVIRONMENT.
- 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.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEBB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- PV EQUIPMENT SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NEC 690.
- EXACT LOCATION OF AUXILIARY GROUNDING TO BE DETERMINED AT TIME OF INSTALL.
- EXISTING WIRES MUST BE REPLACED IF SMALLER THAN LISTED MINIMUM SIZES PER NEC 310.15(B)(16).
- IF ENVOY PRESENT, ENVOY BREAKER DETERMINED AT FACTORY BY MANUFACTURER.
- IF ENVOY PRESENT, FOR IQ COMBINER USE SINGLE CT ON L1, AT SYSTEM CONTROLLER MAIN USE DOUBLE CT ON L1 AND L2.

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 116 WINDING CREEK DRIVE,
 HARNETT COUNTY, NC 27546,
 USA

APR: 264517918
 EMAIL: -
 PHONE: -

SHEET NAME
 WIRING
 CALCULATION

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-5

WARNING

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

LABEL LOCATION: INVERTERS, AC DISCONNECTS, AC COMBINER BOXES, AC JUNCTION BOXES
CODE REF: NEC 2017 - 690.13(B)

WARNING

ELECTRICAL SHOCK HAZARD
IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION: AC DISCONNECTS, AC COMBINER BOXES, SERVICE PANELS
CODE REF: NEC 2017 - 690.5(C)

PV SYSTEM DISCONNECT

MAXIMUM AC OPERATING CURRENT: 21.78 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 2017 - 690.54

PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH

LABEL LOCATION: AC DISCONNECTS FOR UTILITY ACCESS
CODE REF: UTILITY

PHOTOVOLTAIC SYSTEM METER

LABEL LOCATION: PV PRODUCTION METER
CODE REF: NEC 2017 - 690.4(B)

WARNING

PHOTOVOLTAIC SYSTEM COMBINER PANEL

DO NOT ADD LOADS

LABEL LOCATION: AC COMBINER BOX
CODE REF: NEC 2017 - 690.12(B)

CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFEED

LABEL LOCATION: INTERCONNECTION Placard (MSP BACKFEED BREAKER OR TAP BOX IF LINE SIDE TAP)
CODE REF: NEC 2017 - 705.2(4)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL LOCATION: MSP
CODE REF: NEC 2017 - 690.56(C)(3)

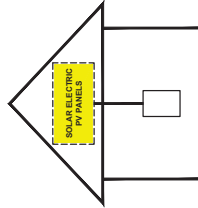
CAUTION

DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC

LABEL LOCATION: MSP, UTILITY METER (IF SEPARATE)
CODE REF: UTILITY

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.

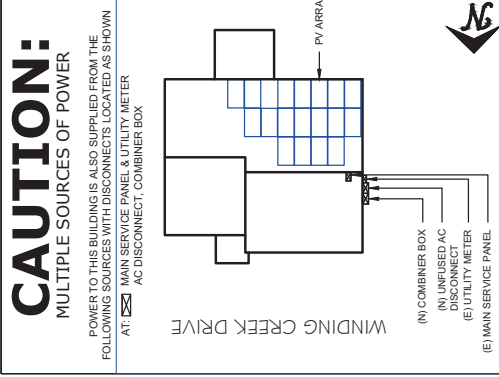


LABEL LOCATION: INTERCONNECTION POINT (MSP OR AC DISCONNECT IF LINE SIDE TAP)
CODE REF: NEC 2017 - 690.12, NEC 2017 - 690.56(C)

WARNING

A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE MAIN SERVICE DISCONNECT. FOLLOW THE PROPER LOCKOUT/TAG-OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE

LABEL LOCATION: MSP JUNCTION BOX (FOR LINE SIDE TAP)
CODE REF: UTILITY



CAUTION: MULTIPLE SOURCES OF POWER

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN AT: (A) MAIN SERVICE PANEL & UTILITY METER, (C) AC DISCONNECT, COMBINER BOX

LABEL LOCATION: MSP
CODE REF: NEC 2017 - 705.10

NOTES AND SPECIFICATIONS

- 1) SIGNS AND LABELS SHALL MEET THE REQUIREMENTS OF NEC 110.21(B), UNLESS SPECIFIC INSTRUCTIONS ARE REQUIRED BY SECTION 690, OR IF REQUESTED BY THE LOCAL AHJ.
- 2) SIGNS AND LABELS SHALL ADEQUATELY WARN OF HAZARDS USING EFFECTIVE WORDS, COLORS AND SYMBOLS.
- 3) LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR WIRING METHOD AND SHALL NOT BE HAND WRITTEN.
- 4) LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
- 5) SIGNS AND LABELS SHALL COMPLY WITH ANSI Z535.4 - 2011, PRODUCT SAFETY SIGNS AND LABELS, UNLESS OTHERWISE SPECIFIED.
- 6) DO NOT COVER EXISTING MANUFACTURER LABELS.

WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL



TOP TIER
SOLAR SOLUTIONS

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REVISIONS	DESCRIPTION	DATE	REV

SIGNATURE & SEAL

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EMAIL:
PHONE:

SHEET NAME

PLACARDS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER

PV-6



EAGLE MODULES

THE MOST DEPENDABLE SOLAR PRODUCT

EAGLE G2 BLACK

380-400 WATT • MONO PERC HALF-CELL MODULE

Positive power tolerance of 0-+3%
*PRELIMINARY VERSION

- NYSE-listed since 2010, Bloomberg Tier 1 manufacturer
- Top performance in the strictest 3rd party labs
- Automated manufacturing utilizing artificial intelligence
- Vertically integrated, tight controls on quality
- Premium solar module factory in Jacksonville, Florida

KEY FEATURES

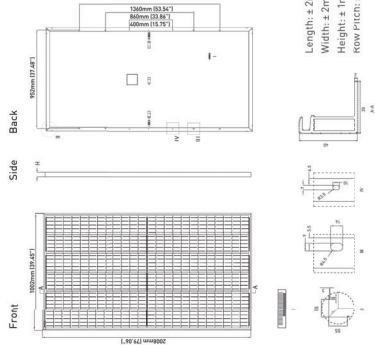
- Superior Aesthetics**
Black backsheet and black frame create ideal look for residential applications.
- Diamond Half-Cell Technology**
World-record breaking efficient mono PERC half-cells deliver high power in a small footprint.
- Thick and Tough**
Fire Type 1 rated module engineered with a thick frame, 3.2mm front side glass, and thick backsheet for added durability.
- Shade Tolerant**
Twin array design allows continued performance even with shading by trees or debris.
- Protected Against All Environments**
Certified to withstand humidity, heat, rain, marine environments, wind, hailstorms, and packed snow.
- Warranty**
12-year product and 25-year linear power warranty.

- ISO9001:2008 Quality Standards
- ISO14001:2004 Environmental Standards
- IEC61215, IEC61730 certification pending
- ISO 45001:2018 Occupational Health & Safety Standards
- UL1703/61730 certification pending

BUILDING YOUR TRUST IN SOLAR. WWW.JINKOSOLAR.US



ENGINEERING DRAWINGS



MECHANICAL CHARACTERISTICS

Cells	Mono PERC Diamond Cell (158.75 x 158.75mm)
Nc. of Half Cells	144 (6 x 24)
Dimensions	2008 x 1002 x 40mm (79.06 x 39.45 x 1.57mm)
Weight	22.5kg (49.6lbs)
Front Glass	3.2mm, Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68 Rated
Output Cables	12 AWG, 1400mm (55.12in)
Connector	Staubbil MC4 Series
File Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)
Hailstone Test	50mm Hailstones at 35m/s

TEMPERATURE CHARACTERISTICS

Temperature Coefficients of Pmax	-0.35%/°C
Temperature Coefficients of Voc	-0.27%/°C
Temperature Coefficients of Isc	0.048%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

MAXIMUM RATINGS

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage	1500VDC (UL and IEC)
Maximum Series Fuse Rating	20A

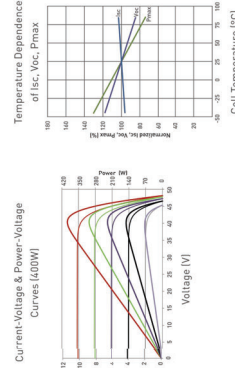
PACKAGING CONFIGURATION

[Two pallets - One stack]
275s/pallet, 54pcs/stack, 574pcs/40' HQ Container

WARRANTY

12-year product and 25-year linear power warranty
1st year degradation not to exceed 2.5%, each subsequent year not to exceed 0.6%, minimum power at year 25 is 83.1% or greater.

ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



ELECTRICAL CHARACTERISTICS

Module Type	JKM380M-72HBL-Y	JKM390M-72HBL-Y	JKM395M-72HBL-Y	JKM400M-72HBL-Y						
STC	NOCT	STC	NOCT	STC	NOCT					
380Wp	277Wp	385Wp	283Wp	395Wp	287Wp					
Maximum Power (Pmax)	39.10V	36.5V	39.27V	36.8V	37.4V	40.10V	37.6V			
Maximum Power Voltage (Vmp)	9.72A	7.67A	9.78A	7.71A	9.84A	7.75A	9.90A	7.77A	9.86A	7.82A
Maximum Power Current (Imp)	45.2V	45.4V	45.8V	45.5V	46.8V	45.8V	46.9V	47.1V	46.2V	
Open-circuit Voltage (Voc)	10.30A	8.32A	10.38A	8.38A	10.46A	8.45A	10.54A	8.51A	10.61A	8.57A
Short-circuit Current (Isc)	18.89%	19.14%	19.14%	19.14%	19.38%	19.63%	19.63%	19.88%	19.88%	
Module Efficiency STC (%)										

*STC: ☀ Irradiance 1000W/m²
NOCT: ☀ Irradiance 800W/m²
*Power measurement tolerance: ±3%

AM = 1.5
AM = 1.5
Wind Speed 1m/s

*PRELIMINARY VERSION
The company reserves the final right for explanation on any of the information presented hereby. JKM380-400M-72HBL-Y-D1-US

BUILDING YOUR TRUST IN SOLAR. WWW.JINKOSOLAR.US



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SIGNATURE & SEAL

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EMAIL: -
PHONE: -

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7



DATA SHEET

IQ8 Series 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.



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



Connect PV modules quickly and safely to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-in play MCA connectors.

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IQ8SE-DS-0001-01-EN-US-2022-03-17

IQ8 Series Microinverters

INPUT DATA (AC)	IQ8H-2-US	IQ8PLUS-72-US	IQ8H-72-US	IQ8H-72-US	IQ8H-72-US	IQ8H-240-72-US	IQ8H-240-72-US	IQ8H-240-72-US	IQ8H-240-72-US
Commonly used module pairings ²	235 - 350	235 - 440	260 - 460	295 - 500	320 - 540 ⁺	320 - 540 ⁺	320 - 540 ⁺	320 - 540 ⁺	295 - 500 ⁺
Module compatibility	60-cell/120 half-cell	60-cell/120 half-cell	60-cell/120 half-cell	66-cell/132 half-cell	72-cell/144 half-cell	72-cell/144 half-cell	72-cell/144 half-cell	72-cell/144 half-cell	72-cell/144 half-cell
MPP ¹ voltage range	27 - 37	29 - 45	33 - 45	36 - 45	38 - 45	38 - 45	38 - 45	38 - 45	38 - 45
Operating range	25 - 48	25 - 48	25 - 48	25 - 48	25 - 48	25 - 48	25 - 48	25 - 48	25 - 48
Min/max start voltage	30 / 48	30 / 48	30 / 48	30 / 48	30 / 48	30 / 48	30 / 48	30 / 48	30 / 48
Max input DC voltage	50	50	50	50	50	50	50	50	50
Max DC current ³ (module I _{sc})	A	15	15	15	15	15	15	15	15
Ovenoltage class DC port	II	II	II	II	II	II	II	II	II
DC port backfeed current	mA	0	0	0	0	0	0	0	0
PV array configuration									
141 Ungrounded array: No additional DC side protection required. AC side protector requires max 20A per branch circuit.									
OUTPUT DATA (AC)	IQ8H-2-US	IQ8PLUS-72-US	IQ8H-72-US	IQ8H-72-US	IQ8H-72-US	IQ8H-240-72-US	IQ8H-240-72-US	IQ8H-240-72-US	IQ8H-240-72-US
Peak output power	VA	245	300	330	366	384	384	384	366
Max continuous output power	VA	240	290	325	349	360	360	360	360
Nominal (L-L) voltage/range ⁴	V		240 / 211 - 264			208 / 183 - 260		208 / 183 - 260	
Max continuous output current	A	1.0	1.21	1.33	1.40	1.50	1.50	1.50	1.73
Nominal frequency	Hz		60		60		60		60
AC short circuit fault current over 3-cycles	Hz		50 - 68		50 - 68		50 - 68		50 - 68
Max units per 20 A (L-L) branch circuit ⁵	Units	16	13	11	11	10	10	10	9
Total harmonic distortion	%		<5%		<5%		<5%		<5%
Ovenoltage class AC port	III	III	III	III	III	III	III	III	III
AC port backfeed current	mA	30	30	30	30	30	30	30	30
Power factor setting	Power factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Grid-tied power factor (adjustable)	%	97.5	97.6	97.6	97.6	97.6	97.6	97.6	97.4
Peak efficiency	%	97	97	97	97.5	97	97	97	97
CEC weighted efficiency	%	97	97	97	97.5	97	97	97	97
Night-time power consumption	mW	60	60	60	60	60	60	60	60

SIGNATURE & SEAL

HOMEOWNER INFO

AQUIL KRIPS
116 WINDING CREEK DRIVE,
HARNETT COUNTY, NC 27546,
USA

APN: 284517918
EMAIL:
PHONE:

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

IQ8SE-DS-0001-01-EN-US-2022-03-17

REMARKS:

-40°C to +60°C (-40°F to +140°F)
4% to 100% (condensing)
MC4
212 mm (8.37") x 175 mm (6.89") x 30.2 mm (1.2")
1.08 kg (2.38 lbs)
Natural convection - no fans
Yes
P03
Class II double-insulated, corrosion resistant polymeric enclosure
NEMA Types 6 / outdoor

CERTIFICATIONS:

CA Rule 21 (UL 1741-SA), UL 62709-1, UL 1741/IEEE1977, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 1071-01
This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.2 and C22.2-2018 Rule 64-2.8 Rapid Shutdown of PV Systems, for AC and DC connectors, when installed according to manufacturer's instructions.

NOTES:

(1) The IQ8H-208 variant will be operating in grid-tied mode only. (2) Not referenced DC/AC ratio. See the compatibility calculator at <https://enphase.com> for more information. (3) Maximum output DC current is 10.6A (4) Nominal 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.

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

The **Enphase IQ Combiner 4/4C** with Enphase 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-year labor reimbursement program coverage included for both the IQ Combiner SKUs
- UL listed



To learn more about Enphase offerings, visit enphase.com



Enphase IQ Combiner 4/4C

MODEL NUMBER

IQ Combiner 4 (X-IQ-AM1-240-4)

IQ Combiner 4C (X-IQ-AM1-240-4C)

IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 V_r ± 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 with Enphase IQ Gateway printed circuit board for integrated revenue-grade PV production metering (ANSI C12.20 V_r ± 0.5%) and consumption monitoring (V_r ± 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. (Not included, order separately.)

ACCESSORIES AND REPLACEMENT PARTS

Enphase Communications Kit
 COMMS-CELLMODEM-M1-06-SP-05
 CELLMODEM-M1-06-AT-05
 CELLMODEM-M1-06-AT-05
 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
 EPLC-01
 XA-SOLARSHIELD-ES
 XA-PLUG-120-3
 XA-ENV-PGBA-3
 X-IQ-NA-HP-153A

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 EatonBR 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
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 lb)
Ambient temperature range	-40° C to +48° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	<ul style="list-style-type: none"> • 20 A to 50 A breaker inputs: 14 to 1/0 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • 80 A breaker branch input: 4 to 1/0 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
 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
 UL 60401-1/CAN/CSA 22.2 No. 61011-1

To learn more about Enphase offerings, visit enphase.com

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 PHONE: 888-897-1513
 CONTRACTOR LICENSE # SC - CGJ 123883
 ELECTRICAL LICENSE # C - 87345
 For info: info@top-tiersolar.com

REVISIONS	DESCRIPTION	DATE	REV

SIGNATURE & SEAL

HOMEOWNER INFO

AQUIL KRIPS
 116 WINDING CREEK DRIVE,
 HARNETT COUNTY, NC 27546,
 USA

APN: 2845079186
 EMAIL: -
 PHONE: -

SHEET NAME EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

A. System Specifications and Ratings

- Maximum Voltage: 1,000 Volts
- Maximum Current: 80 Amps
- Allowable Wire: 14 AWG – 6 AWG
- Spacing: Please maintain a spacing of at least 1/2" between uninsulated live parts and fittings for conduit, armored cable, and uninsulated live parts of opposite polarity.
- Enclosure Rating: Type 3R
- Roof Slope Range: 2.5 – 12:12
- Max Side Wall Fitting Size: 1"
- Max Floor Pass-Through Fitting Size: 1"
- Ambient Operating Conditions: (-35°C) - (+75°C)
- Compliance:
 - JB-1.2: UL1741
 - Approved wire connectors: must conform to UL1741
- System Marking: **Interek Symbol and File #5019942**
- Periodic Re-inspections: If re-inspections yield loose components, loose fasteners, or any corrosion between components, components that are found to be affected are to be replaced immediately.

Table 1: Typical Wire Size, Torque Loads and Ratings

	1 Conductor		2 Conductor		Torque		Current
	Type	NI/I	Type	NI/I	Inch Lbs	Voltage	
ABB 256 terminal block	10-24 awg		16-24 awg	50/Str	0.5-0.7	6.2-8.85	600V
ABB 2510 terminal block	6-24 awg		12-20 awg	50/Str	1.0-1.6	8.85-14.16	30 amp
ABB 2516 terminal block	4-24 awg		10-20 awg	50/Str	1.6-2.4	14.6-21.24	40 amp
ABB M6/8 terminal block	8-23 awg			50/Str	.08-1	8.85	60 amp
Ideal 452 Red WING-NUT Wire Connector	8-18 awg			50/Str	Self Torque	Self Torque	50 amp
Ideal 451 Yellow WING-NUT Wire Connector	10-18 awg			50/Str	Self Torque	Self Torque	600V
Ideal In-Sure Push-In Connector Part #B9	10-14 awg			50/Str	Self Torque	Self Torque	600V
WAGO 2209-1201	10-20 awg		16-24 awg	50/Str	Self Torque	Self Torque	600V
WAGO 2211-612	10-20 awg		10-24 awg	50/Str	Self Torque	Self Torque	600V
Dotite DRC75	6-12 awg			50/Str	Shapin	Shapin	30 amp
ESP NG-53	4-6 awg			50/Str		45	2000V
ESP NG-717	10-14 awg			50/Str		35	2000V
	4-6 awg			50/Str		45	2000V
	10-14 awg			50/Str		45	2000V
Brunal 4-5,3	4-6 awg			50/Str		45	2000V
	10-14 awg			50/Str		35	2000V

Table 2: Minimum wire-bending space for conductors through a wall opposite terminals in mm (inches)

Wire size, AWG or kcmil	Wires per terminal (pole)			
	1	2	3	4 or More
14-10 (2.1-5.3)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
8 (8.4)	Not specified	-	-	-
6 (13.3)	38.1 (1.5/2)	50.8 (2)	-	-



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REVISIONS	DESCRIPTION	DATE	REV

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HOMEOWNER INFO

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APN: 2840739185
 EMAIL: -
 PHONE: -

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B 11" X 17"

SHEET NUMBER
PV-10

Production Specifications

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	Catalog Number
Eaton general duty non-fusible safety switch	DG221URB
Product Length/Depth	UPC
6.88 in	782113120232
Product Width	Product Height
6.38 in	10.81 in
Product Weight	Product Weight
6 lb	6 lb
Warranty	Certifications
Eaton Selling Policy 25-000, one (1) year UL Listed from the date of installation of the	
Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.	Catalog Notes
	WARNING! Switch is not approved for service entrance unless a neutral kit is installed.

default taxonomy/AttributeLabel

Product Category
General duty safety switch
 Enclosure material
Painted galvanized steel
 Type
Non-fusible, single-throw
 Fuse configuration
Non-fusible
 Number of wires
2

Resources

Catalogs
 Eaton's Volume 2—Commercial Distribution
 Multimedia
 Double Up on Safety
 Switching Devices Flex Center
 Specifications and datasheets
 Eaton Specification Sheet - DG221URB



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HOMEOWNER INFO

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 HARNETT COUNTY, NC 27546,
 USA

APN: 2845179185
 EMAIL: _____
 PHONE: _____

SHEET NAME EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-11

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 Dublin 4, Ireland
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Flush Mount System

Datasheet



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.



Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.



UL 2703 Listed System

Entire system and components meet newest effective UL 2703 standard.



PE Certified

Pre-stamped engineering letters available in most states.



Design Assistant

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



20-Year Warranty

Twice the protection offered by competitors.

Datasheet

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)



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REVISIONS	DATE	REV

SIGNATURE & SEAL

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APN: 264577918
EMAIL:
PHONE:

SHEET NAME

EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12

L-Foot

ITEM NO	DESCRIPTION	QTY IN KIT
1	FOOT, EXTRUDED L - SLOTTED	4

PART NUMBER	DESCRIPTION
FM-LFT-003	Kit, 4Pcs, Slotted L-Foot, Mill
FM-LFT-003-B	Kit, 4Pcs, Slotted L-Foot, Black

1) Foot, Extruded L - Slotted

v1.11



CONTRACTOR: TOP TIER SQUARE SOLUTIONS
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SHEET NAME
 EQUIPMENT
 SPECIFICATION

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-13