

ESD

SOLAR



6076 Park Blvd N

Pinellas Park, FL 33781

License # EC13011662

Tel. # (727)-744-0716

Property Owner Info:

Rickey Patterson
525 SW Sefner Court
Lake City, FL
32035

System Info:

Inverter: Enphase IQ8PLUS-72-2-US
PV Module: (44) Q.PEAK DUO BLK ML-G10+ 405
Rail: Iron Ridge XR-10
System Wattage: 17,820 W DC
Roof Material: Metal
Wind Load: 8 to 20 Deg
Fastener(s): (2) M8 Silver Bullet Fasteners

Sheet Index:	Date: 12/01/2023
S-1 Site Details	Drawn by: BS
S-2 Mounting Equipment	Revised by: ----
S-3 Mounting Plan	Rev #: ----
E-1 Line Diagram	Rev Date:----
E-2 Electrical Code	Page: S-1
N-1 Project Notes	

General Notes:

-Enphase IQ8PLUS-72-2-US Micro Inverters are located behind each module.

-Wire run from array to connection is less than 100 feet.

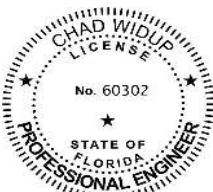
-1st Responder Access minimum of 36" unobstructed as per Section R324 of the 2021 IRC

-AC Disconnect will be Visible, Lockable, Labeled, Accessible and within 10ft of the Utility Meter.

I CERTIFY THAT THE SHEETING AND FRAMING OF THIS STRUCTURE WILL SAFELY ACCOMODATE CALCULATED WIND UPLIFT AND LATERAL FORCES AND EQUIPMENT DEAD LOADS. THIS IS ATTESTED TO BE MY SIGNATURE AND SEAL ON THIS DRAWING AT THE LOWER LEFT BOTTOM

Chad E Widup

Digitally signed by Chad E Widup
Date: 2023.12.04 19:11:29 -05'00'



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Chad Widup, P.E. NO. 60302
39905 Grays Airport Road
Lady Lake, FL 32159

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Legend:

 Utility Meter

 PV AC Disconnect

 Combiner Box

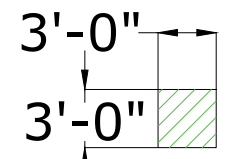
 Vent Pipe

 Square Vent

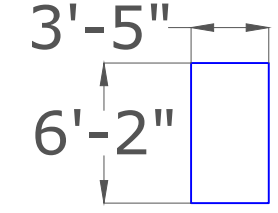
 Chimney

 Satellite

Ground Access Points are a minimum of 36" x 36"



Ground Access



PV Module

Requirements Met:

-2020 Florida Residential Code & FBC, 7th Edition (2021 International Residential Code) - 2nd Printing modified by the FL Building Standards

-2020 Florida Building Energy -Conservation Code 7th edition

-County of Columbia Code

-2017 National Electric Code

-2021 International Building Code

-2015 International Energy Code

-2021 International Fire Code

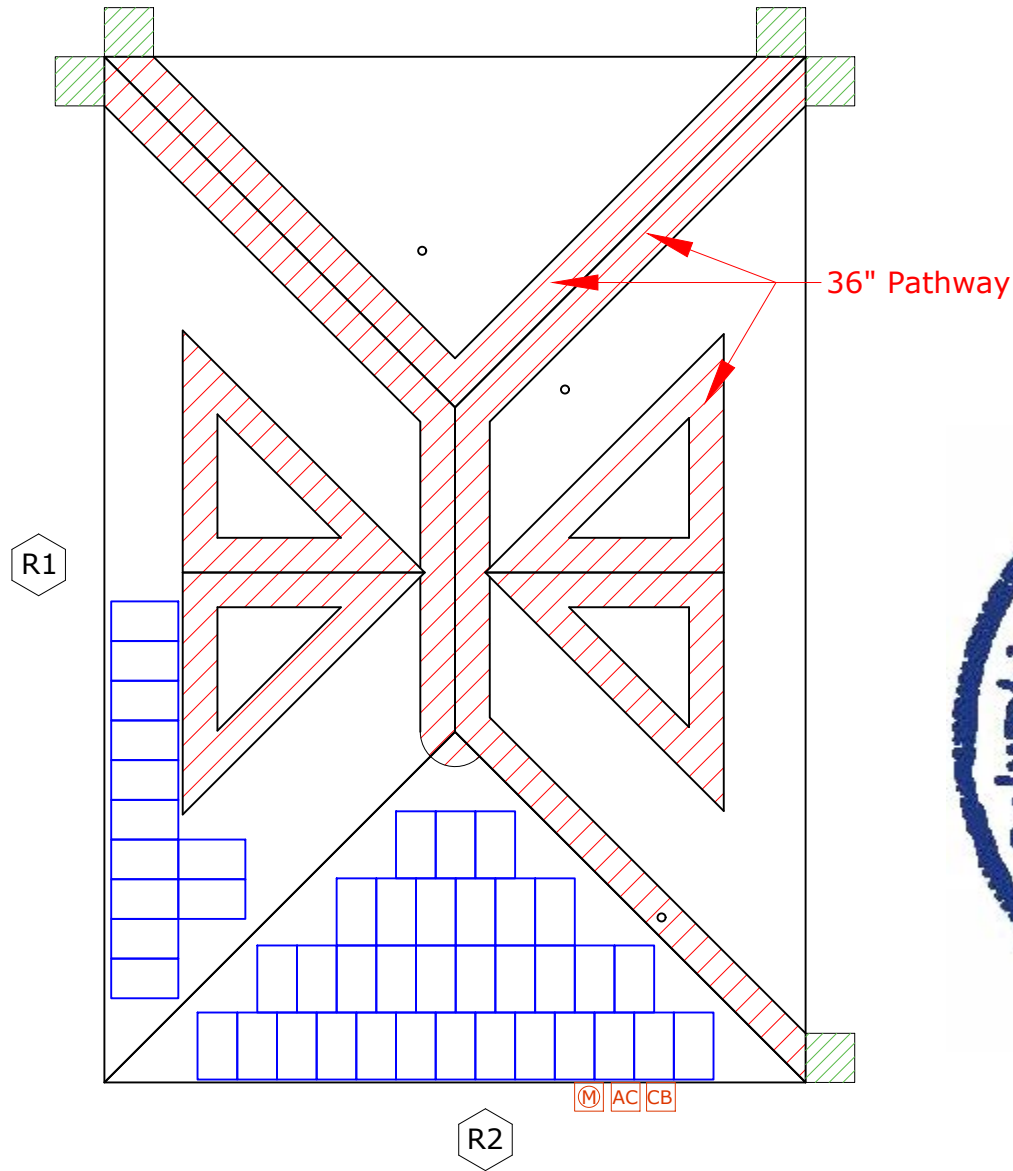
-NFPA 70th Edition, Chapter 11.12

-Florida Fire Prevention Code 2020 7th Edition

-NFPA-1 7th Edition & NFPA-101 2018

(30.1103308, -82.64939919999999)

Roof	# Modules	Pitch	Azimuth
R1	12	20°	263°
R2	32	20°	173°



FRONT OF HOUSE

Layout Subject to Change Based on Site Conditions

ESD SOLAR 6076 Park Blvd N Pinellas Park, FL 33781 License # EC13011662 Tel. # (727)-744-0716	Roof(s)	Pitch	Roof Structure	Overhang	Roof Type	Notes:
	R1-R2	4.4/12	2" x 4" @ 24" O.C.	12"	Hip	Truss
Property Owner Info: Rickey Patterson 525 SW Sefner Court Lake City, FL 32035	RAIL S-5 CLAMP ASSEMBLY L-FOOT A VARIES Q.PEAK DUO BLK ML-G10+ 405 RAIL L-FOOT S-5 CLAMP (E) METAL STANDING SEAM ROOF 6"					
Inverter: Enphase IQ8PLUS-72-2-US PV Module: (44) Q.PEAK DUO BLK ML-G10+ 405 Rail: Iron Ridge XR-10 System Wattage: 17,820 W DC Roof Material: Metal Wind Load: 8 to 20 Deg Fastener(s): (2) M8 Silver Bullet Fasteners	2020 FBC Roof Mounted PV Design Criteria: -Roof Height: 15' -Wind Speed(Vult): 120mph 3 sec gust -Exposure Category: C -Designed as per ASCE7-16 -Snow Load: 0psf					
Date: 12/01/2023 Drawn by: BS Revised by: ---- Rev #: ---- Rev Date:---- Page: S-2	S-5-N Clamp 1. S-5-N Clamp 2. S-5-N Insert 3. M8-1.25 SS Hex Flange Bolt (13mm Socket) 4. 3/8-24 SS Round Point Setscrew (3/16 Hex Drive) 5. Example Roof See Description / Length 1.75 1.67 1.33 .58 1.00 .62 .46					
Chad E Widup Digitally signed by Chad E Widup Date: 2023.12.04 19:13:57 -05'00'	IronRidge XR-10 FL#41858 STATE OF FLORIDA HIGH VELOCITY HURRICANE ZONES					
CHAD WIDUP LICENSE No. 60302 STATE OF FLORIDA PROFESSIONAL ENGINEER This item has been digitally signed and sealed by Chad Widup, PE on Dec 04, 2023 using a Digital Signature. Chad Widup, P.E. NO. 60302 39905 Grays Airport Road Lady Lake, FL 32159 Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.	- Subject roof has One layer. - All penetrations are sealed and flashed. S-5! mount product approval components to be used with IronRide rail product approval components per rational analysis					



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2020 FBC Roof Mounted PV Design Criteria:

- Roof Height: 15'
- Wind Speed(Vult): 120mph 3 sec gust
- Exposure Category: C
- Designed as per ASCE7-16
- Snow Load: 0psf

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Page: S-3

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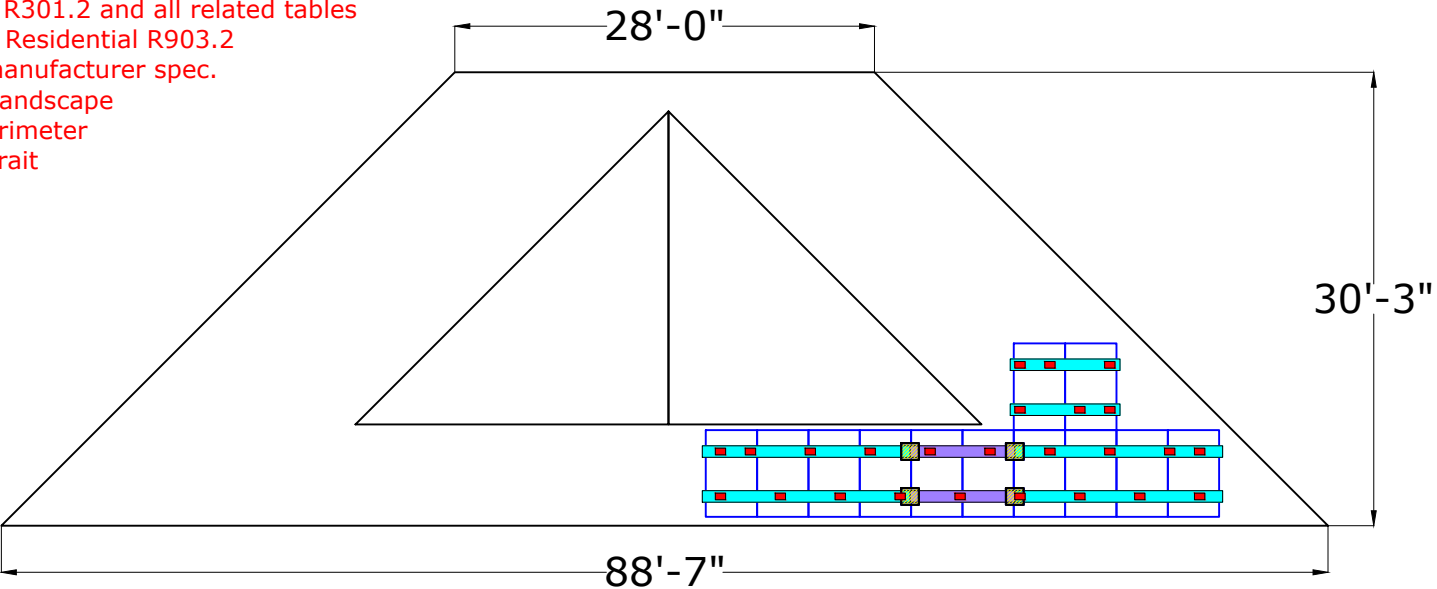


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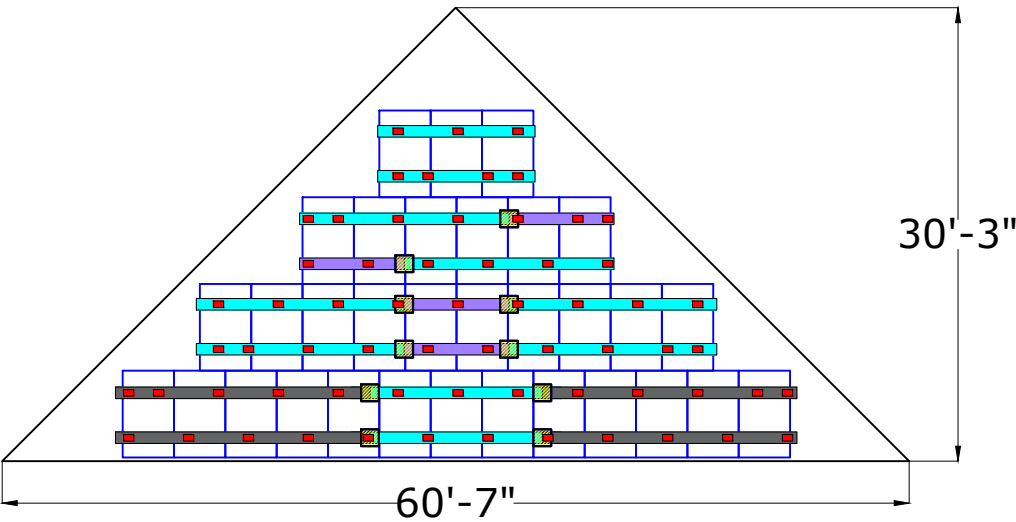
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- System meets all requirements of FBC Residential R301.2 and all related tables
- All Flashing to be installed in compliance with FBC Residential R903.2
- All roof mounted equipment will be installed per manufacturer spec.
- Rail to be mounted 1'-6" apart for PV Modules in Landscape
- Wind Zone widths are offset 48" from roof face perimeter
- Rail to be mounted 3' apart for PV Modules in Portrait
- All max cantilevers per manufacturer spec.
- Max Cantilever = Max Span * ($\frac{1}{3}$)



R1



R2

Electrical BOM	
Item	Quantity
Q.PEAK DUO BLK ML-G10+ 405	44
Enphase IQ8PLUS-72-2-US	44
Enphase Combiner Box	1
20A 2P Breakers	4
100A Fused Disconnect	1
70A Fuses	2

Structural BOM	
Item	Quantity
Splice Bar	14
S-5-N	89
Iron Ridge UFO's	100
Iron Ridge Sleeves/End Caps	24
6x6 J-Box	2
Iron Ridge Ground Lugs	6
IronRidge XR-10 14' Rail	19
IronRidge XR-10 17' Rail	4

Legend	
17' Rail	
14' Rail	
7' Rail	
4' Rail	
Mount Attachments	
Splice Bar	
Vent Pipe	
Square Vent	
Chimney	
Satellite	

Roof	# Modules	Pitch	Azimuth
R1	12	20°	263°
R2	32	20°	173°

Roof Zone	Max Span	Max Cantilever
Zone 1	48"	16.0"
Zone 2e	48"	16.0"
Zone 2r	48"	16.0"
Zone 3	48"	16.0"



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System Wattage:17,820 W DC

Note:
-All wiring to meet the 2017 NEC and Florida electric codes.
-Type of conduit to be determined on site by contractor.
-Number of rooftop Junction Boxes to be determined on site and are at least NEMA 3R rated.
-AC Disconnect will be visible, lockable, labeled, accessible, and located within 10ft of Utility Meter.
-12-2 NM-B Cable may be used for interior building and attic runs only. 12-2 Romex not to be used in conduit or outdoor environments.
-12-2 NM-B Cable may be used for Wire run B for Home runs under 100' or 10-2 for Home runs over 100'

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Label	Wire Type	Wire Size (AWG)	Ground (AWG)	Min. Conduit Size
A	PV Cable & Bare Copper	12	6	N/A
B	THHN	10	10	3/4"
C	THHN	4	8	1"
D	THHN	4	N/A	1"

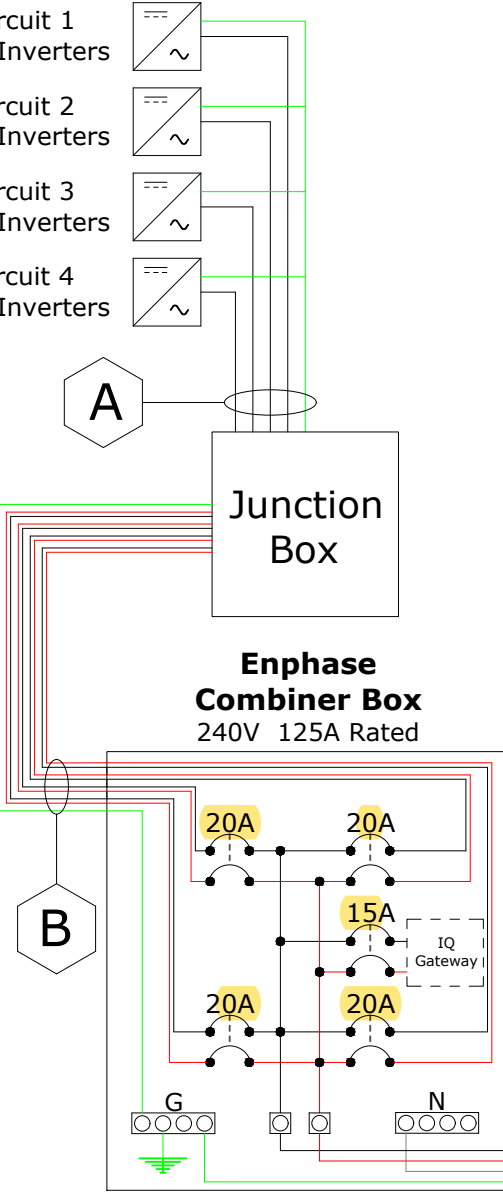
Photovoltaics:
(44) Q.PEAK DUO BLK ML-G10+ 405
Inverters:
(44) Enphase IQ8PLUS-72-2-US Micro Inverters
Maximum Inverters Per 20A Circuit (13)

Circuit 1
(11) Inverters

Circuit 2
(11) Inverters

Circuit 3
(11) Inverters

Circuit 4
(11) Inverters



100A Fused
PV AC Disconnect
Service Rated

(2) 70A Fuses

Neutral to
Ground Bond

Manual Lockable Disconnect
Located Adjacent to Utility Meter
Within 10' of Tap

GEC

GEC installed per NEC 250.24
and grounding electrodes to
be bonded per NEC 250.50

Line Side Tap

All Main Service
Disconnects to have a
neutral to ground bond

EXISTING

Main Service Panel
200A Main Breaker
200A Busbar

All conditions for NEC 312.8
referring to taps in over current
device enclosures must be met

GEC

Sub Panel
200A Main Breaker
200A Busbar

Overcurrent Protection Device (OCPD) Calculation	
Max AC Output Current	1.21A
No. of Inverters	44
Total Output Current	53.24A
Total * 125%	66.55A
OCPD Size	70A
Conductor Size	#4AWG
No. Current Carrying Conductors	<4

FOR MORE INFORMATION REGARDING SPECIFIC
CODE REQUIREMENTS, REFER TO PAGE N-1

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System Wattage:17,820 W DC

Note:

-Subject PV Systems has been designed to meet the requirments of the NEC 2017, and those set forth by the Florida Solar Energy Center Certification, Including Maximum Number of Module Strings, Maximum number of modules per string, Maximum Output, Module Manufacturer and model number, inverter manufacturer and model number, as applicable.
-All wiring to meet the 2017 NEC and Florida electric codes.
100A Disconnect
-Type of conduit to be determined on site by contractor.

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CHAD WIDUP

LICENSE

No. 60302

STATE OF FLORIDA

PROFESSIONAL ENGINEER

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Combined Inverter Output		
Design Temperature (°F)	94	
Max Ambient Temperature Range (°F)	87-95	310.15(B)(2)(a)
Conductor Temp Rating (°C)	90	
# of Current Carrying Conductors	<4	310.15(B)(3)(a)
Max AC Output Current	1.21A	
# of Inverters	44	
Total Output Current	53.24A	690.8(A)(3)
Total * 125%	66.55A	690.8(B)(1)
OCPD Size	70A	
Ambient Temp Correction Factor	0.96	310.15(B)(2)(a)
Raceway Fill Adjustment Factor	100%	310.15(B)(3)(a)
Conductor Allowable Ampacity	95A	
Conductor Adjusted Ampacity	91.2A	95A*0.96=91.2A

Equipment Temperature Ampacity Limitation	
Conductor Temp Rating (°C)	75
OCPD Size	70A
Conductor Size	4AWG
Conductor Allowable Ampacity	85A
Conductors Sized to coordinate with the lowest temperature rating of any connected termination, conductor, or device. Temperature ratings for the aforementioned equipment to be 75°C.	

Line Side Tap will be done in Main Service Panel inside home closest to Utility Meter.

Combiner box in compliance
Per Code NEC 705.12
4* 20A < 125A
*No other loads to be added

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

NEC 690.56(C)(3)

3/8 IN MIN. TEXT

3/16 IN MIN. TEXT

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.

SOLAR ELECTRIC PV PANELS

NEC 690.56(C)(1)

PHOTOVOLTAIC SYSTEM ! AC DISCONNECT !

RATED AC OUTPUT CURRENT: 53.24A
NOMINAL OPERATING VOLTAGE: 240VAC

NEC 690.54

EMERGENCY RESPONDER THIS SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE 'OFF' POSITION TO SHUTDOWN THE ENTIRE PV SYSTEM.

SOLAR ELECTRIC PV PANELS

NFPA 1.11.12.2.1.1.1.1

WARNING:

DUAL POWER SUPPLY SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

WARNING:

DEDICATED SOLAR PANEL DO NOT CONNECT ANY OTHER LOADS

DO NOT OPEN UNDER LOAD

Main Service Disconnect

-The label shall be red with white capital letters at least 3/4 in. in height and in a nonserif font.
-Materials used for the label shall be reflective, weather resistant, and suitable for the environment.

PV Disconnect and other equipment

-The label shall be red with white capital letters at least 3/8 in. in height and in a nonserif font.
-Materials used for the label shall be reflective, weather resistant, and suitable for the environment.

NEC LABEL NOTES:

1. THE WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH NEC 110.21(B)
2. LABELS SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE THEY ARE INSTALLED.
3. LABELS TO BE A MIN LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
4. LABELS SHALL ALSO COMPLY WITH THE SPECIFIC REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

J-Box not penetrating roof

Additional smoke alarms to be installed where not already existing in required locations and situations per FBC R314.2.2 and R312.3

WARNING

ELECTRICAL SHOCK HAZARD

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

NEC 690.13(B)

Load Side Connection ONLY

WARNING

POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

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

WARNING

INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

Q.PEAK DUO BLK ML-G10+
385-405
ENDURING HIGH
PERFORMANCE



Quality
Controlled PV

www.tuv.com
ID 1111232615



BREAKING THE 20% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology¹, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa).



A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty².

¹ APT test conditions according to IEC / TS 62804-1:2015, method A (-1500 V, 96h)

² See data sheet on rear for further information.

6 BUSBAR
CELL TECHNOLOGY

12 BUSBAR
CELL TECHNOLOGY

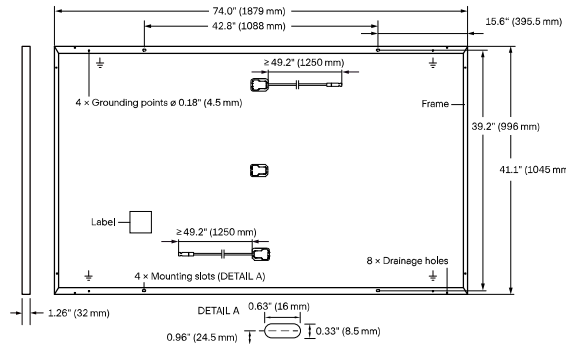
THE IDEAL SOLUTION FOR:



Rooftop arrays on
residential buildings

MECHANICAL SPECIFICATION

Format	74.0in × 41.1in × 1.26in (including frame) (1879mm × 1045mm × 32mm)
Weight	48.5lbs (22.0kg)
Front Cover	0.13in (3.2mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98in × 1.26-2.36in × 0.59-0.71in (53-101mm × 32-60mm × 15-18mm), IP67, with bypass diodes
Cable	4mm ² Solar cable; (+) ≥ 49.2in (1250mm), (-) ≥ 49.2in (1250mm)
Connector	Stäubli MC4; IP68

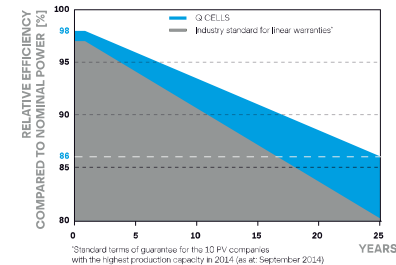


ELECTRICAL CHARACTERISTICS

POWER CLASS				385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W)								
Minimum	Power at MPP ¹	P _{MPP}	[W]	385	390	395	400	405
	Short Circuit Current ¹	I _{SC}	[A]	11.04	11.07	11.10	11.14	11.17
	Open Circuit Voltage ¹	V _{OC}	[V]	45.19	45.23	45.27	45.30	45.34
	Current at MPP	I _{MPP}	[A]	10.59	10.65	10.71	10.77	10.83
	Voltage at MPP	V _{MPP}	[V]	36.36	36.62	36.88	37.13	37.39
	Efficiency ¹	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²								
Minimum	Power at MPP	P _{MPP}	[W]	288.8	292.6	296.3	300.1	303.8
	Short Circuit Current	I _{SC}	[A]	8.90	8.92	8.95	8.97	9.00
	Open Circuit Voltage	V _{OC}	[V]	42.62	42.65	42.69	42.72	42.76
	Current at MPP	I _{MPP}	[A]	8.35	8.41	8.46	8.51	8.57
	Voltage at MPP	V _{MPP}	[V]	34.59	34.81	35.03	35.25	35.46

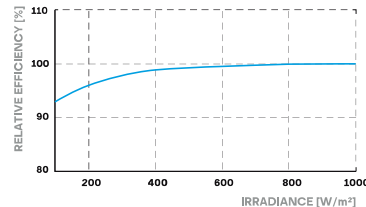
¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2°C, AM 1.5 according to IEC 60904-3 • • 800 W/m², NMOT, spectrum AM 1.5

Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I _{SC}	α	[%/K]	+0.04	Temperature Coefficient of V _{OC}	β	[%/K]	-0.27
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.34	Nominal Module Operating Temperature	NMOT	[°F]	109 ± 5.4 (43 ± 3°C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V _{sys}	[V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push / Pull ³	[lbs/ft ²]	75 (3600Pa)/55 (2660Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Test Load, Push / Pull ³	[lbs/ft ²]	113 (5400Pa)/84 (4000Pa)		

³ See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,
Quality Controlled PV - TÜV Rheinland,
IEC 61215:2016, IEC 61730:2016,
U.S. Patent No. 9,893,215 (solar cells).



Horizontal
packaging



43.3in
1100mm



48.0in
1220mm



1656lbs
751 kg



24
pallets



32
modules

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.



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.



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.

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

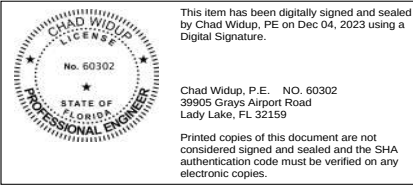
Microgrid-forming

- 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 Series Microinverters

INPUT DATA (DC)		I08-60-2-US	I08PLUS-72-2-US	I08M-72-2-US	I08A-72-2-US	I08H-240-72-2-US	I08H-208-72-2-US
Commonly used module pairings²	W	235 – 380	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell and 72-cell/144 half-cell					
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 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 current³ [module Isc]	A			15			
Overvoltage 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)		I08-60-2-US	I08PLUS-72-2-US	I08M-72-2-US	I08A-72-2-US	I08H-240-72-2-US	I08H-208-72-2-US
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range⁴	V			240 / 211 – 264			208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz			60			
Extended frequency range	Hz			50 – 68			
Max units per 20 A (L-L) branch circuit⁵		16	13	11	11	10	9
Total harmonic distortion				<5%			
Overvoltage class AC port				III			
AC port backfeed current	mA			30			
Power factor setting				1.0			
Grid-tied power factor (adjustable)				0.85 leading – 0.85 lagging			
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	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							
		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					
Certifications		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) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (3) Maximum continuous input 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.



IQ Combiner 4/4C



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

Smart

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

Simple

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

Reliable

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

IQ Combiner 4/4C

MODEL NUMBER

IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	IQ Combiner 4 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018)	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.

ACCESSORIES AND REPLACEMENT PARTS (not included, order separately)

Supported microinverters	IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8)
Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
X-IQ-NA-HD-125A	Hold-down kit for Eaton circuit breaker with screws

Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A pair of 200A split core current transformers
--	--

ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	120/240VAC, 60 Hz
Eaton BR series busbar rating	125A
Max. continuous current rating	65A
Max. continuous current rating (input from PV/storage)	64A
Max. fuse/circuit rating (output)	90A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation/95A with IQ Gateway breaker included
IQ Gateway breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200A solid core pre-installed and wired to IQ Gateway

MECHANICAL DATA

Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40°C to +46°C (-40°F to 115°F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20A to 50A breaker inputs: 14 to 4 AWG copper conductors • 60A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors • Always follow local code requirements for conductor sizing.
Altitude	Up to 3,000 meters (9,842 feet)

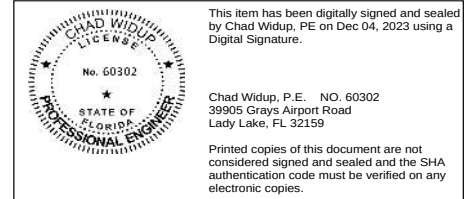
INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	IEEE 802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations.
Ethernet	Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included)

COMPLIANCE

Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3 rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1





RSTC Enterprises, Inc.
2214 Heimstead Road
Eau Claire, WI 54703
715-830-9997



Outdoor Photovoltaic Enclosures

Composition/Cedar Roof System

ETL listed and labeled

Report # 3171411PRT-002 Revised May, 2018

- UL50 Type 3R, 11 Edition Electrical equipment enclosures
- CSA C22.2 No. 290 Nema Type 3R
- Conforms to UL 1741 Standard

0799 Series Includes:

0799 - 2	Wire size 2/0-14
0799 - 5	Wire size 14-6
0799 - D	Wire size 14-8

Models available in Grey, Black or Stainless Steel

Basic Specifications

Material options:

- Powder coated, 18 gauge galvanized 90 steel (1,100 hours salt spray)
- Stainless steel

Process - Seamless draw (stamped)

Flashing - 15.25" x 17.25"

Height - 3"

Cavity - 255 Cubic inches

Base Plate:

- Fastened to base using toggle fastening system
- 5 roof deck knockouts
- Knockout sizes: (3) .5", (1) .75" and (1) 1"
- 8", 35mm slotted din rail
- Ground Block

Passthrough and combiner kits are available for either
AC or DC applications.

0799 Series





Powering Business Worldwide

pe.eaton.com

Product compliance: No Data

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Eaton general duty cartridge fuse safety switch

DG222NRB

UPC:782113144221

Dimensions:

- **Height:** 14.38 IN
- **Length:** 14.8 IN
- **Width:** 9.7 IN

Weight:10 LB

Notes:Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

Warranties:

- Eaton Selling Policy 25-000, one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

Specifications:

- **Type:** General duty, cartridge fused
- **Amperage Rating:** 60A
- **Enclosure:** NEMA 3R
- **Enclosure Material:** Painted galvanized steel
- **Fuse Class Provision:** Class H fuses
- **Fuse Configuration:** Fusible with neutral
- **Number Of Poles:** Two-pole
- **Number Of Wires:** Three-wire
- **Product Category:** General duty safety switch
- **Voltage Rating:** 240V

Supporting documents:

- [Eatons Volume 2-Commercial Distribution](#)
- [Eaton Specification Sheet - DG222NRB](#)

Certifications:

- UL Listed



Chad E Widup Digitally signed by Chad E Widup
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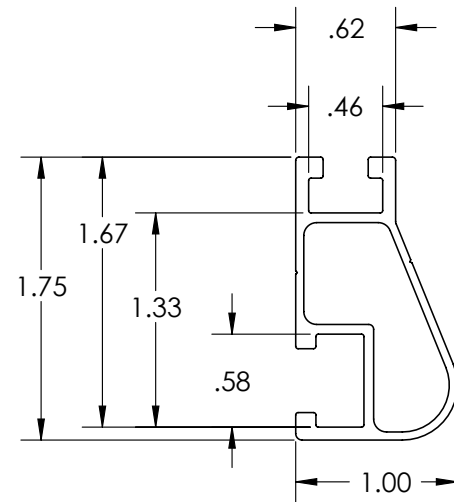


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Chad Widup, P.E. NO. 60302
39905 Grays Airport Road
Lady Lake, FL 32159

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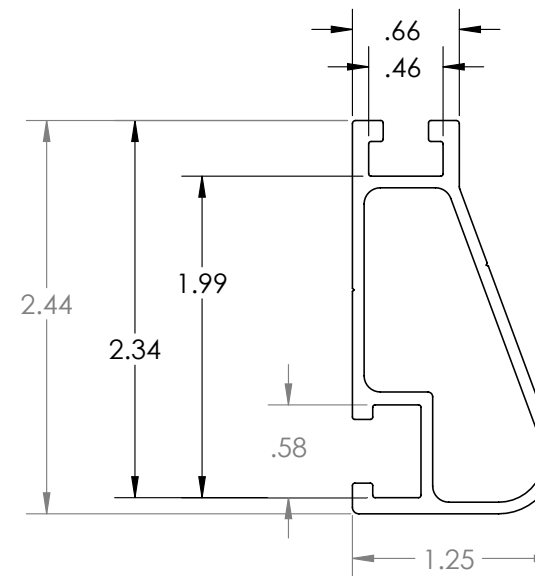
See Description / Length



Rail Section Properties	
Property	Value
Total Cross-Sectional Area	0.363 in ²
Section Modulus (X-axis)	0.136 in ³
Moment of Inertia (X-axis)	0.124 in ⁴
Moment of Inertia (Y-axis)	0.032 in ⁴
Torsional Constant	0.076 in ³
Polar Moment of Inertia	0.033 in ⁴

Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-10-132A	XR-10-132B	XR10, Rail 132" (11 Feet)	6000-Series Aluminum	4.67 lbs.
XR-10-168A	XR-10-168B	XR10, Rail 168" (14 Feet)		5.95 lbs.
XR-10-204A	XR-10-204B	XR10, Rail 204" (17 Feet)		7.22 lbs.

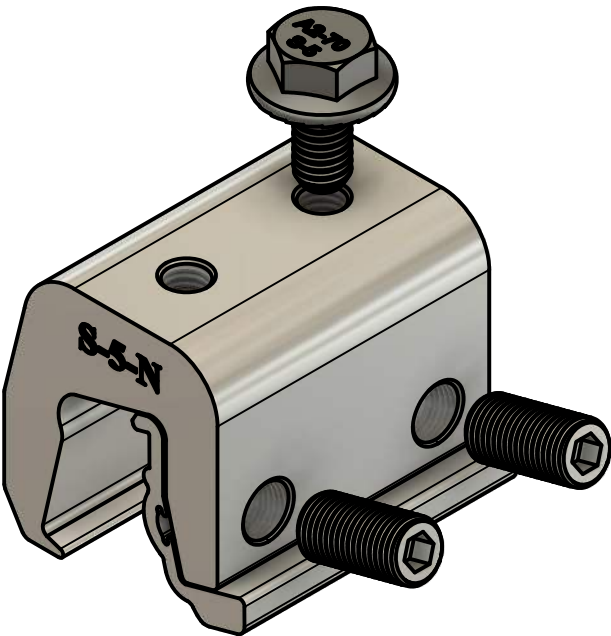
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Rail Section Properties	
Property	Value
Total Cross-Sectional Area	0.582 in ²
Section Modulus (X-axis)	0.297 in ³
Moment of Inertia (X-axis)	0.390 in ⁴
Moment of Inertia (Y-axis)	0.085 in ⁴
Torsional Constant	0.214 in ³
Polar Moment of Inertia	0.126 in ⁴

APPROVED MATERIALS:
6005-T6, 6005A-T61, 6105-T5, 6N01-T6
(34,000 PSI YIELD STRENGTH MINIMUM)

Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-100-132A	XR-100-132B	XR100, Rail 132" (11 Feet)	6000-Series Aluminum	7.50 lbs.
XR-100-168A	XR-100-168B	XR100, Rail 168" (14 Feet)		9.55 lbs.
XR-100-204A	XR-100-204B	XR100, Rail 204" (17 Feet)		11.60 lbs.



(2x) M8-1.25 Threaded Hole

1.50 [38.1mm]

0.50 [12.7mm]

0.84 [21.3mm]

1.10 [27.9mm]

0.83 [21.2mm]

0.79 [20mm]

S-5-N

S-5-N Insert

1.77 [44.9mm]

2.00 [50.8mm]

S-5-N

0.31 [8mm]

S-5-N Insert

1.57 [39.9mm]

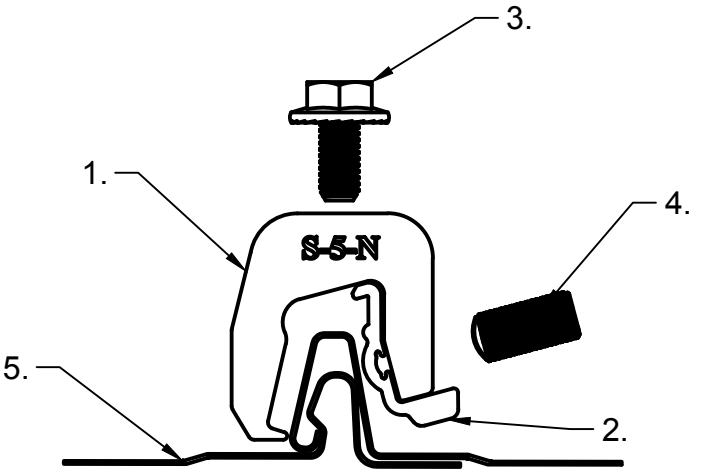
(2x) 3/8-24
Threaded Hole

0.38 [9.5mm]

1.63 [41.3mm]

General Notes:

1. S-5-N Clamp
2. S-5-N Insert
3. M8-1.25 SS Hex Flange Bolt (13mm Socket)
4. 3/8-24 SS Round Point Setscrew (3/16 Hex Drive)
5. Example Roof



MATERIAL:				METAL ROOF INNOVATIONS, LTD.	
6061 T6				8750 WALKER RD	
EST ASSEMBLY WT:				COLORADO SPRINGS, CO 80908	
.4065 lbs				719-495-0518	
HARDWARE:				719-495-0045 (FAX)	
M8-1.25 x 16 mm Bolt, (2) 3/8-24 x .800" Setscrews	TITLE				
	S-5-N CCD				
	DRAWING NO. NG73-A-0-A		DRAWN BY SNLR		DATE 12/15/2021
	SCALE 1:1	FILE NAME NG73-A-0-A (S-5-N) [CCD]			
	S-5!® PRODUCTS ARE PROTECTED BY MULTIPLE U.S. AND FOREIGN PATENTS. VISIT OUR WEBSITE AT WWW.S-5.COM FOR COMPLETE INFORMATION ON PATENTS AND TRADEMARKS				

The right way to attach almost anything to metal roofs!

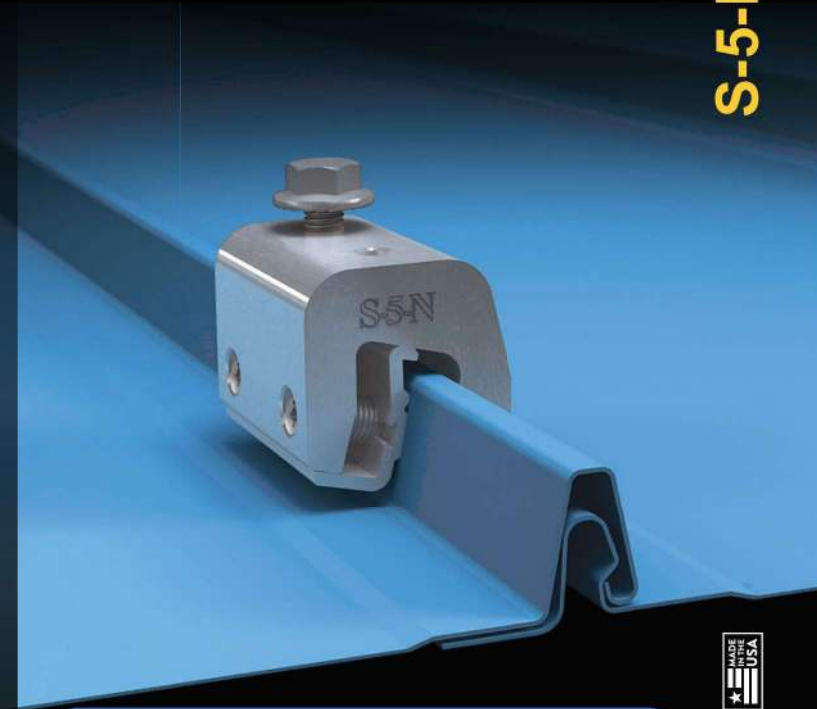
S-5!®

The Right Way!®

S-5-N Clamp

S-5! introduces the new and improved S-5-N clamps. The new design features an innovative insert that ensures a superior fit for new and wider nail strip profiles as well as older ones.

The S-5-N (standard) clamp is the best choice for snow retention and other heavy and load-critical applications. It is designed for use on the most popular 1" nail strip metal roofs, including: Taylor Metal's Easy Lock™, ASC Building Products' Skyline Roofing®, McElroy Metal's Meridian, New Tech Machinery's FF100, Schleich 1" Nail Strip, and roofing types with similar profiles.



S-5-N Mini Clamp

The S-5-N Mini offers correct fit to the same profiles as the standard S-5-N but is shorter and has one setscrew rather than two. The Mini is ideal for attaching various rooftop accessories, such as solar arrays, signs, walkways, satellite dishes, lightning protection systems, antennas, rooftop lighting, conduit, condensate lines and other lighter load applications*

*S-5! Mini clamps are not compatible with, and should not be used with S-5! SnoRail™/SnoFence™ or ColorGard® snow retention systems.

FEATURES AND BENEFITS

- Angled setscrews for easier installation - no special tools required
- Fits seam profiles having base of rib dimension < .82"
- Structural aluminum (6061-T6) clamp body and 300 series SS fasteners offer superior corrosion resistance & strength
- Clamp insert to facilitate installation and fit
- New design ensures straighter clamp position on seam

S-5-N and S-5-N Mini



888-825-3432 | www.S-5.com

S-5!®

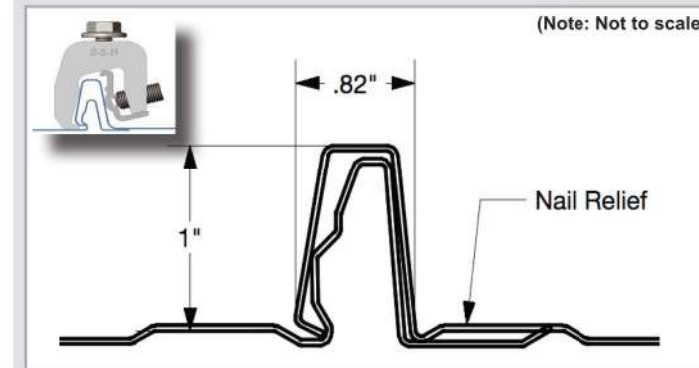
The Right Way!®

The new and improved S-5-N features angled setscrews, a wider throat, and an insert for easy installation and best fit for wider nail strip profiles.

The **S-5-N** and **S-5-N Mini** clamps are each supplied with the hardware shown to the right. Each box also includes a bit tip for tightening setscrews using an electric screw gun. The S-5-N is a structural aluminum attachment clamp, compatible with most common metal roofing materials (excluding copper). All included hardware is 300 series stainless steel. Please visit www.S-5.com for more information including CAD details, metallurgical compatibilities, and specifications.

S-5!® holding strength is unmatched in the industry.

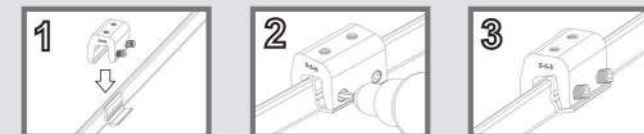
Fits Panels Up to .82"



(NOTE: Seams that exceed maximum allowance at the widest part of the seam will require hand crimping to allow the clamp to fit).

Ease of Installation...in 1...2...3

Installation Simplified: The S-5-N is still just as quick and easy to install as other S-5 clamps. But now, we've angled the setscrews toward the installer, allowing easier access with a screw gun, simplifying tool removal once the setscrew has been tightened - ensuring the clamp sits straighter on the seam. Choose the S-5-N for a non-penetrating solution that protects the roof while providing excellent holding strength.

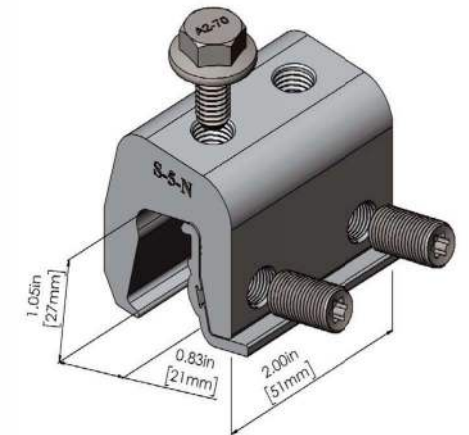


S-5!® Warning! Please use this product responsibly!

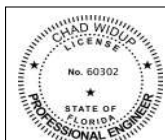
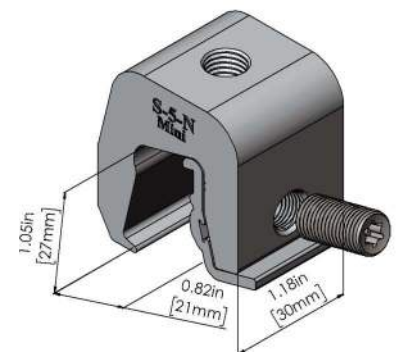
Products are protected by multiple U.S. and foreign patents. Visit the website at www.S-5.com for complete information on patents and trademarks. For maximum holding strength, setscrews should be tensioned and re-tensioned as the seam material compresses. Clamp setscrew tension should be verified using a calibrated torque wrench between 160 and 180 inch pounds when used on 22ga steel, and between 130 and 150 inch pounds for all other metals and thinner gauges of steel. Consult the S-5! website at www.S-5.com for published data regarding holding strength.

Copyright 2021, Metal Roof Innovations, Ltd. S-5! products are patent protected.
S-5! aggressively protects its patents, trademarks, and copyrights. Version: 081321.

S-5-N Clamp



S-5-N Mini Clamp



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Chad Widup, P.E. NO. 60302
39905 Grays Airport Road
Lady Lake, FL 32159

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