PV System Details

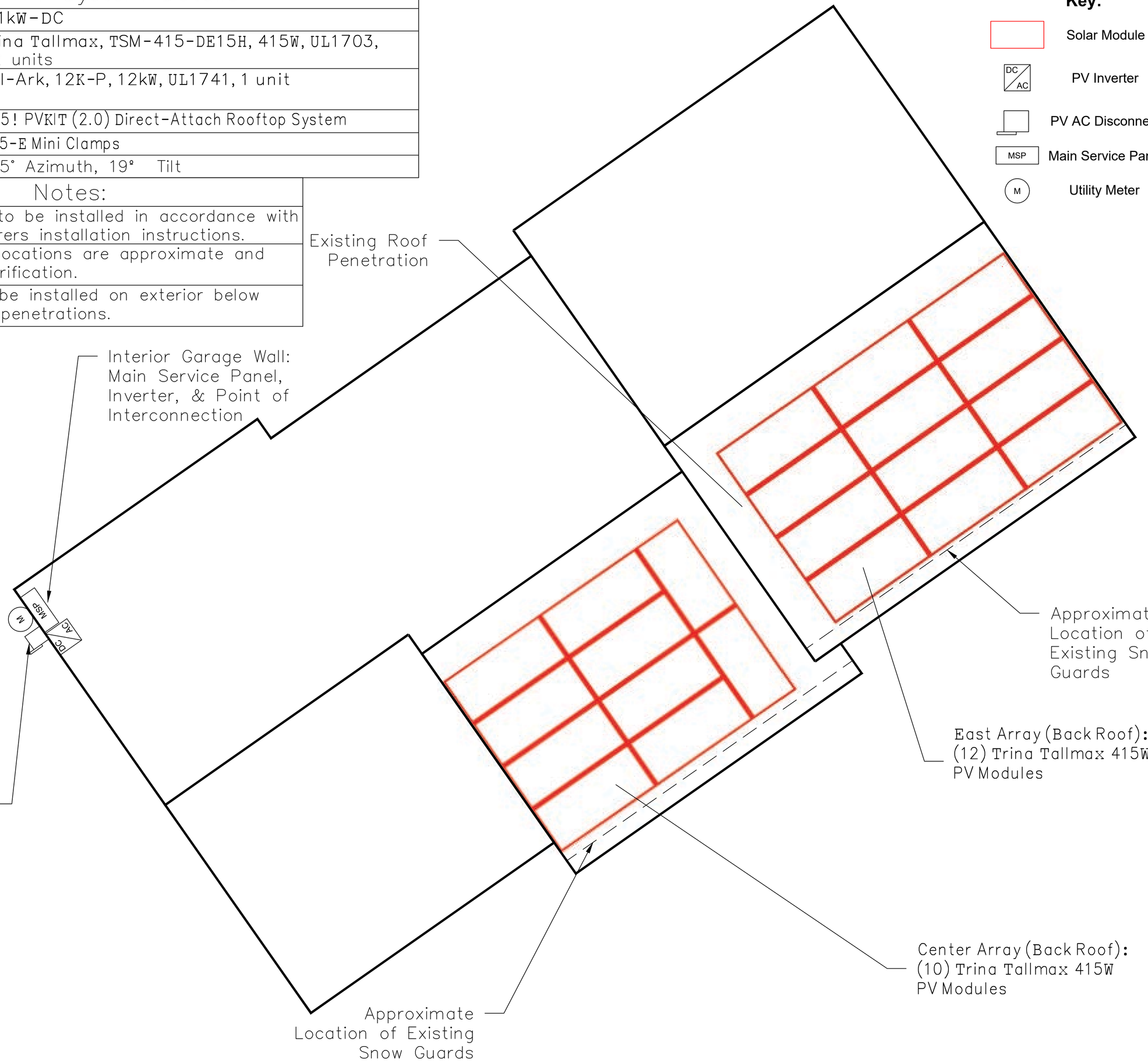
•System Size:	9.1kW-DC
•Module:	Trina Tallmax, TSM-415-DE15H, 415W, UL1703, 22 units
•Inverters:	Sol-Ark, 12K-P, 12kW, UL1741, 1 unit
•Racking:	S-5! PVKIT (2.0) Direct-Attach Rooftop System
•Foundation:	S-5-E Mini Clamps
•Orientation:	145° Azimuth, 19° Tilt

Notes:

1. All equipment to be installed in accordance with the manufacturers installation instructions.
2. All equipment locations are approximate and require field verification.
3. All conduit to be installed on exterior below ridge. No roof penetrations.

Key:

- Solar Module
- DC/AC — PV Inverter
- PV AC Disconnect
- MSP — Main Service Panel
- M — Utility Meter



REV #	DESCRIPTION	DATE	BY
0	INITIAL	03/10/21	CRP
1			
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DRAWN BY: CRP

ISSUE DATE: 03/10/21

SCALE: 1/4" = 1'

PROJECT: [redacted]

ADDRESS: [redacted]

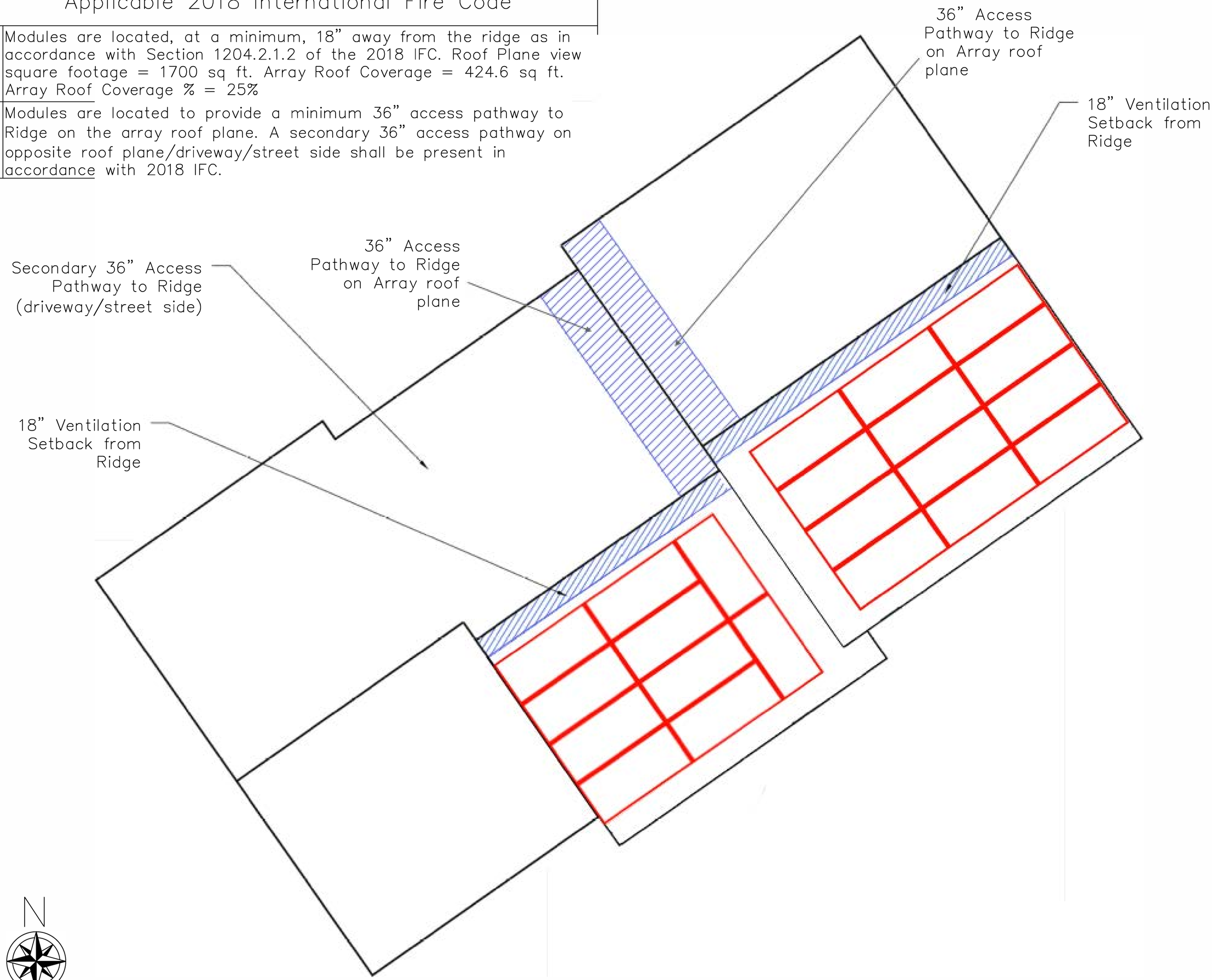
SHEET TITLE: Site Layout

DRAWING NUMBER

A101

Applicable 2018 International Fire Code

1	Modules are located, at a minimum, 18" away from the ridge as in accordance with Section 1204.2.1.2 of the 2018 IFC. Roof Plane view square footage = 1700 sq ft. Array Roof Coverage = 424.6 sq ft. Array Roof Coverage % = 25%
2	Modules are located to provide a minimum 36" access pathway to Ridge on the array roof plane. A secondary 36" access pathway on opposite roof plane/driveway/street side shall be present in accordance with 2018 IFC.



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DRAWN BY: CRP

ISSUE DATE: 03/10/21

SCALE: 1/4" = 1'

SHEET TITLE: Setbacks

DRAWING NUMBER: A-102

CONDUCTOR SCHEDULE

ITEM	CONDUCTOR TYPE	CONDUCTOR COUNT & SIZE	CONDUIT	NOTES
A	PV–Wire	(2) #10, (1) #10 EGC	Bundled in Free Air	Module Leads
B	PV Wire	(4) #10, (1) #10 EGC	Bundled in Free Air	Homeruns
C	THWN–2, 600V, CU	(4) #10, (1) #10 EGC	3/4" EMT	Strings
D	THWN–2, 600V CU	(2) #8 L1, L2, (2) #10 N, EGC	3/4" EMT	Inverter 1 Output
E	THWN–2, 600V CU	(2) #8 L1, L2, (2) #10 N, EGC	3/4" EMT	L1, L2, N

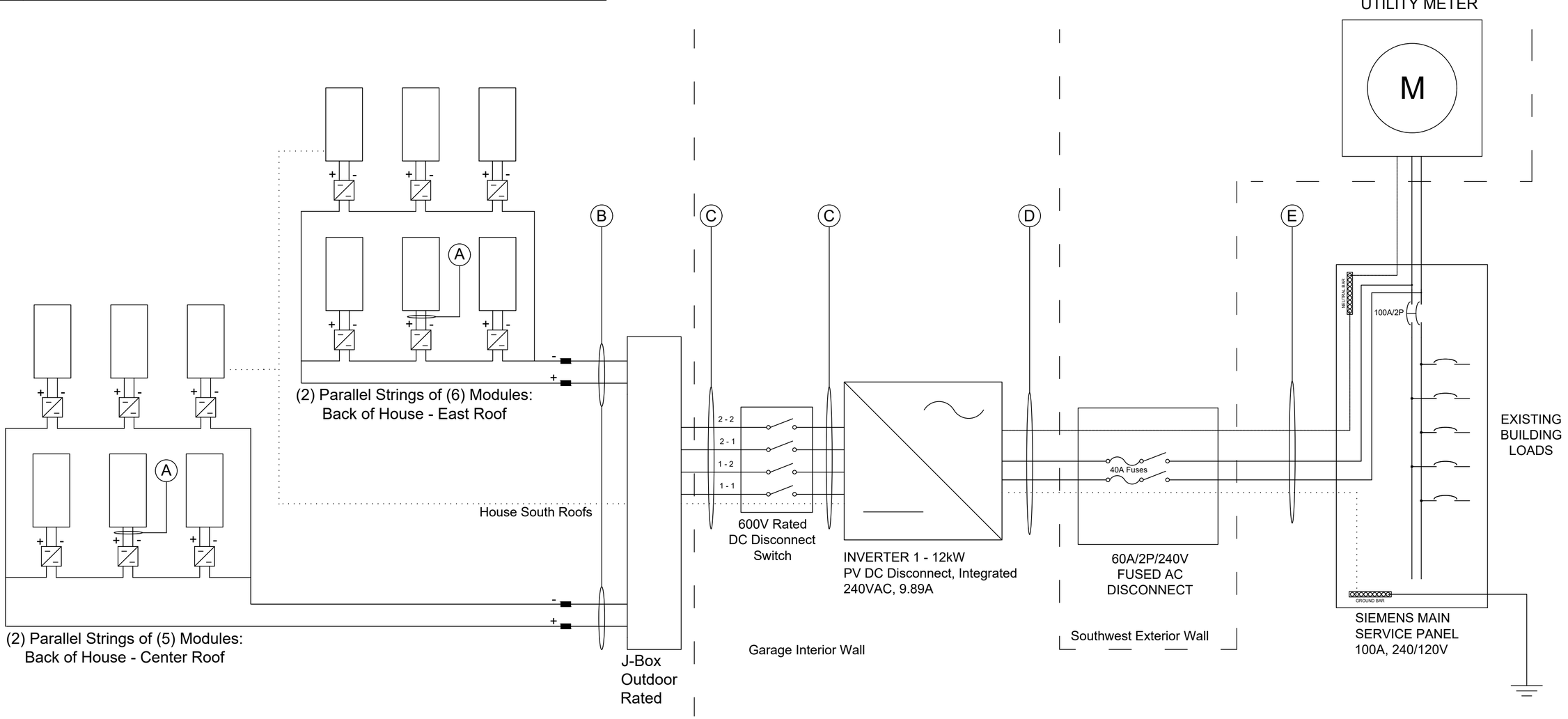
Notes:

1. Solar PV Load Side Interconnection shall be installed in accordance with NEC 705.12(A).
2. Conduit has been sized to the minimum, installers may use their discretion in upsizing to accommodate an easier wire pull
3. Module level rapid shutdown is provided by an inverter-integrated shutdown system in accordance with 690.12(B)(2)
4. All panels will be grounded with S-5! grounding components & installed per S-5! guidelines.

PV System Details

•System Size:	9.1kW-DC
•Module:	Trina Tallmax, TSM-415-DE15H, 415W, UL1703, 22 units
•Module Level Rapid Shutdown Device:	Inverter Integrated
•Inverter(s):	Sol-Ark, 12K-P, 12kW, UL1741, 1 unit
•DC Disconnect:	480V, Inverter Integrated
•AC Disconnect:	60A 240V/2P FUSED
•OCPD:	240V, 40A Fuses

Conductor Key:
- Positive DC (+)
- Negative DC (-)
- Line 1 AC
- Line 2 AC
- Neutral
- Equipment Grounding
- Grounding Electrode



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ISSUE DATE: 03/10/21
SCALE: N/A
PROJECT:
ADDRESS:
SHEET TITLE: Three Line Drawing

DRAWING NUMBER
E–101

THREE LINE CALCULATIONS

PV MODULE RATINGS @ STC:		
MODULE MAKE	TRINA SOLAR	
MODULE MODEL	TALLMAX 415W	
MAXIMUM POWER (Pmax)	415	W
RATED MAX POWER-POINT CURRENT (Imp)	9.89	A
RATED MAX POWER-POINT VOLTAGE (Vmp)	42.0	V
SHORT CIRCUIT CURRENT (Isc)	10.34	A
OPEN CIRCUIT VOLTAGE (Voc)	51.5	V
INVERTER RATINGS:		
INVERTER MAKE	SOL-ARK	
INVERTER MODEL	SOL-ARK 12K HYBRID	
MAX DC VOLT RATING	450	Vdc
MAX POWER @ 40°C	13,000	W
NOMINAL AC VOLTAGE	240	Vac
MAX INPUT DC CURRENT PER MPPT	20	A
MAX AC OUTPUT CURRENT (Imax)	40	A
MIN OCPD = Imax X 1.25	50	A
OCPD USED	50	A
STRING CALCS: ARRAY 1		
# OF MODULES	22	
MAX STRING LENGTH	12	
# OF STRINGS	2	
RATED Mpp VOLTAGE	300	V
RATED Mpp CURRENT	20	A
MAXIMUM SYSTEM VOLTAGE	309	V
MAXIMUM SYSTEM CURRENT	20	A
SITE SPECIFICATIONS:		
LOCATION: [redacted]		
1) LOWEST EXPECTED AMBIENT TEMP BASED ON ASHRAE MIN MEAN EXTREME DRY BULB TEMP FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION		
LOWEST EXPECTED AMBIENT TEMP	-20	°C
2) HIGHEST CONT. AMBIENT TEMP BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMP FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION		
HIGH CONT. TEMP	31	°C

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DRAWN BY: CRP
ISSUE DATE: 03/10/21
SCALE: N/A
PROJECT: [redacted]
SHEET TITLE: Electrical Calculation Details

DRAWING NUMBER
E–102

[redacted] [redacted]
pitched roof

28357 INDUSTRIAL BLVD., HAYWARD, CA 94545

Project Details

Name	[redacted]	**Date**	03/10/2021
Location	[redacted]	**Total modules**	22
Module	rin m S - 5-D 5 5 5mm	**Total watts**	
Dimensions	in e (5 5 mm)	**Attachments**	44
ASCE	7-10		

System Weight

Total system weight	lbs
Weight/attachment	28.1 lbs
Racking weight	192.8 lbs
Distributed weight	2.9 psf

Load Assumptions

Wind exposure	B
Wind speed	115 mph
Ground snow load	40 psf
Attachment spacing portrait	4.0'

Roof Information

Roof material	Metal	**Building height**	25 ft
Roof attachment	L-Foot Only	**Roof slope**	19 °
Attachment hardware	T Bolt	**Risk category**	II

Span Details XR100 - Portrait

Zone	Max span	Max cantilever
1	6' 10"	2' 9"
2	6' 10"	2' 9"
3	6' 10"	2' 9"

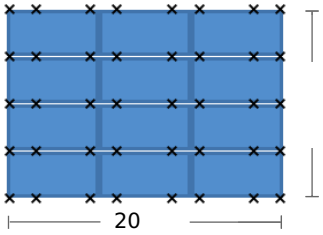
Reaction Forces XR100 - Portrait

Zone	Down (lbs)	Uplift (lbs)	Lateral (lbs)
1	285	102	89
2	285	212	89
3	285	336	89

Roof Section 1

Definition	Roof Section Weights	Roof Section (all segments)
12 modules	Total weight: 666.4 lbs	Provided rail: 112' [8 x 14']
Portrait orientation	Weight/attachment: 27.8 lbs	Attachments: 24
Graphical entry	Total Area: 235.8 sq ft	Splices: 4
	Distributed weight: 2.8 psf	Clamps: 28

Diagram



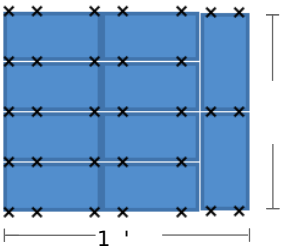
Segments

Columns	Length	Cantilever	Cantilever Violations	Rail	Attachments	Splices	Clamps
6	20' 7"	4"	None	56' [4 x 14']	12	2	14
			Row segment totals (x 2) →	**112' [8 x 14']**	**24**	**4**	**28**

Roof Section 2

Definition	Roof Section Weights	Roof Section (all segments)
10 modules	Total weight: 569.2 lbs	Provided rail: 112' [8 x 14']
Portrait orientation	Weight/attachment: 28.5 lbs	Attachments: 20
Graphical entry	Total Area: 196.8 sq ft	Splices: 4
	Distributed weight: 2.9 psf	Clamps: 24

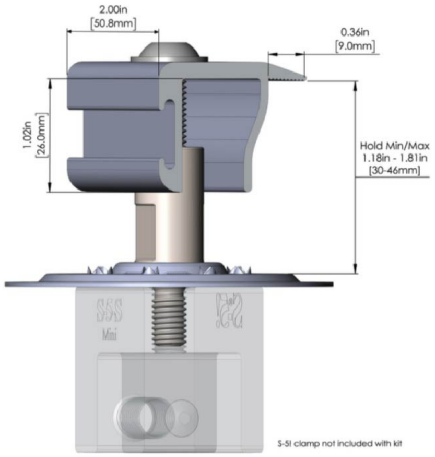
Diagram

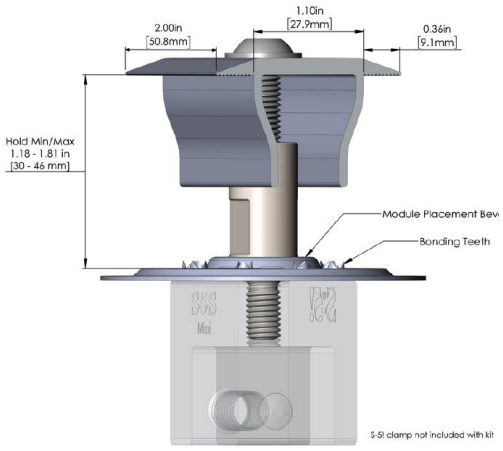


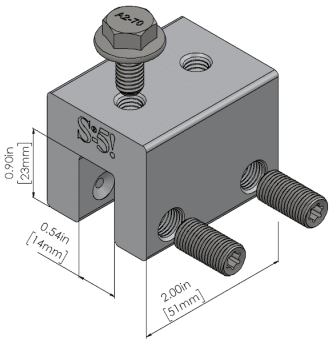
Segments

Columns	Length	Cantilever	Cantilever Violations	Rail	Attachments	Splices	Clamps
5	17' 2"	7"	None	56' [4 x 14']	10	2	12
			Row segment totals (x 2) →	**112' [8 x 14']**	**20**	**4**	**24**

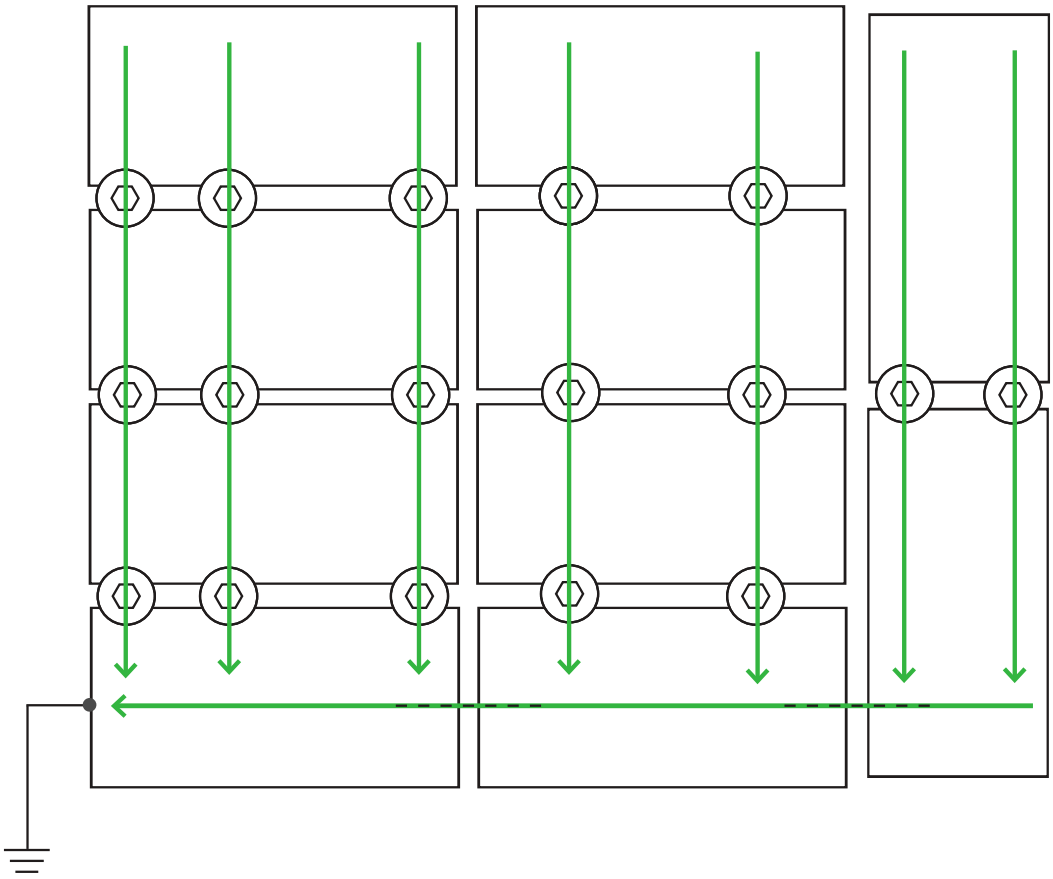
Clamp Detail







Grounding Diagram



S-5 Bonding Jumper

Grounding Lug

S-5 - i Clamp

Min 10 AWG Copper Wire

Fault Current Ground Path

Bonded Splice (Rail Connection)

Bill of Materials

Part	Spares	Total Qty
Rails & Splices		
XR-100-168B XR100, Rail 168" (14 Feet) Black	0	16
XR100-BOSS-01-M1 Bonded Splice, XR100	0	8
Clamps & Grounding		
UFO-CL-01-B1 Universal Module Clamp, Black	0	52
UFO-STP-40MM-B1 Stopper Sleeve, 40MM, Black	0	16
XR-LUG-03-A1 Grounding Lug, Low Profile	0	4
Attachments		
LFT-03-B1 Slotted L-Foot, Black	0	44
BHW-TB-02-A1 T-Bolt Bonding Hardware	0	44

1

PHOTOVOLTAIC INVERTER DC DISCONNECT
MAXIMUM DC VOLTAGE/CURRENT:548.14 Voc,13.52 Isc
NOMINAL DC VOLTAGE/CURRENT: 408.84 Vmp, 10.27 Imp
SOURCE: (1) String of (12)

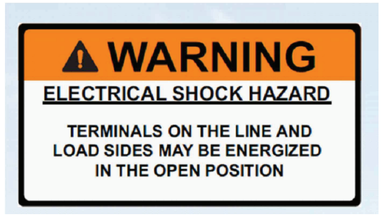
NEC 690.53: DIRECT CURRENT PHOTOVOLTAIC POWER SOURCE. **(LABEL TO BE MADE IN HOUSE)**
LABEL TO BE INSTALLED ON:
1) **INVERTER DC DISCONNECT**

2

PHOTOVOLTAIC AC DISCONNECT
RATED AC OUTPUT CURRENT: 16A
NOMINAL OPERATING AC VOLTAGE: 240 V
AC OVERCURENNT PROTECTION DEVICE: 20A/2P CB

NEC 690.54: INTERACTIVE SYSTEM POI.
LABEL TO BE INSTALLED ON "ALL INTERACTIVE SYSTEM POINTS OF INTERCONNECTION W/ OTHER SOURCES. **(LABEL TO BE MADE IN HOUSE)**
LABEL TO BE INSTALLED ON:
1) **AC COMBINER (Aggregate)**
2) **AC DISCO**
3) **SUBPANEL**
4) **ALL PV AC DISCONNECTING MEANS**

3



NEC 690.13(B): FOR PV DISCONNECTING MEANS WHERE THE LINE & LOAD TERMINALS MAY BE ENERGIZE IN THE OPEN POSITION.
LABEL TO BE INSTALLED ON:
1) **AC COMBINER**
2) **AC DISCO**
3) **INVERTER**
4) **SUBPANEL.**

NOT USED ON THIS JOB

4

SOLAR PV AC COMBINER PANEL DO NOT ADD LOADS

(LABEL TO BE MADE IN HOUSE)
LABEL TO BE INSTALLED ON:
1) **AC COMBINER PANEL**

5

WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31(G)(3): WIRING METHODS & ENCLOSURES THAT CONTAIN PV SYSTEM DC CIRCUIT CONDUCTORS.
LABEL TO BE INSTALLED ON:
1) **EXPOSED DC RACEWAYS, CABLE TRAYS, & OTHER WIRING METHODS**
2) **COVERS OR ENCLOSURES OF PULL BOXES & DC JUNCTION BOXES**

6

NEC 705.12(B)(3): EQUIPMENT CONTAINING OVERCURRENT DEVISES SHALL BE MARKED TO INDICATE THE PRESENCE OF ALL SOURCES.
LABEL TO BE INSTALLED ON:
1) **AC COMBINER PANEL / SUBPANEL**
2) **MAIN SERVICE PANEL**

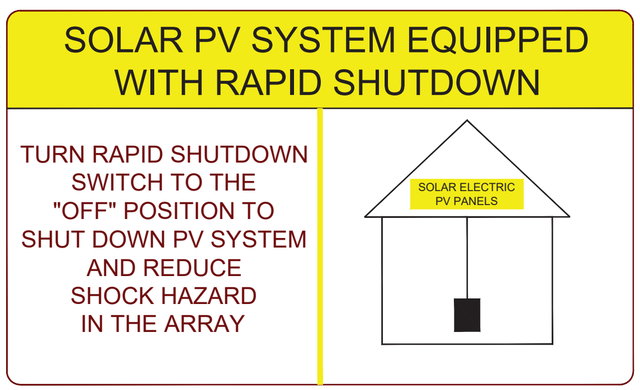
7

NEC 705.12(B)(2)(3)(c): THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED THE RATING OF THE BUSBAR.
LABEL TO BE INSTALLED ON:
1) **AC COMBINER PANEL**

8

NEC 705.12(B)(2)(3)(b): A PERMANENT WARNING LABEL TO BE APPLIED ON ENCLOSURES WITH "BACKFED" BREAKERS.
LABEL TO BE INSTALLED ADJACENT TO:
1) **ENCLOSURES WITH BACKFED BREAKERS**

9



NEC 690.56(C)(1): FOR PV SYSTEMS THAT SHUTDOWN THE ARRAY & CONDUCTORS LEAVING THE ARRAY (IE MODULE LEVEL RAPID SHUTDOWN). "SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN" SHALL HAVE CAPITALIZED LETTERS W/ A MIN HEIGHT OF $\frac{3}{8}$" IN BLACK ON YELLOW BACKGROUND. REMAINING CHARACTERS TO BE CAPITALIZED W/ MIN HEIGHT OF $\frac{3}{16}$" IN BLACK ON WHITE BACKGROUND.
LABEL TO BE INSTALLED:
1) **ON OR NO MORE THAN 3' FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEM IS CONNECTED, IE *UTILITY METER***

10

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

NEC 690.56(C)(3): RAPID SHUTDOWN SWITCH SHALL HAVE THIS LABEL LOCATED ON OR NO MORE THAN 3' FROM THE SWITCH. LABEL SHALL BE REFLECTIVE, ALL LETTERS CAPITALIZED, WITH A MIN HEIGHT OF $\frac{3}{8}$" IN WHITE ON RED BACKGROUND **(LABEL TO BE MADE IN HOUSE)**
LABEL TO BE INSTALLED ON:
1) **EXTERIOR RAPID SHUTDOWN SWITCH**

11

NEC 110.27(C) & OSHA 1910.14(f)(7): ENTRANCES TO GUARDED LOCATIONS THAT CONTAIN EXPOSED LIVE PARTS SHALL BE MARKED WITH CONSPICUOUS WARNING SIGNS.
LABEL TO BE INSTALLED ON:
1) **AC COMBINER**
2) **MAIN SERVICE PANEL**

12

THIS BUILDING IS SUPPLIED BY UTILITY & PV SOLAR ELECTRIC SYSTEM: PV SOLAR SYSTEM DISCONNECT LOCATED: (EXTERIOR EAST WALL, NEXT TO METER)

NEC 705.10: POWER SOURCE DIRECTORY
(WRITTEN DESCRIPTION: TO BE MADE IN HOUSE)
DENOTING THE LOCATION OF ALL ELECTRIC POWER SOURCE DISCONNECTING MEANS.
(LABEL TO BE MADE IN HOUSE)
LABEL TO BE INSTALLED ON:
1) **EACH SERVICE EQUIPMENT LOCATION, IE *UTILITY METER***

13

DC JUNCTION BOX
WARNING: ELECTRIC SHOCK HAZARD. TERMINALS ON THE LINE AND LOAD SIDES MAY BE NERGIZED IN THE OPEN POSITION
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

NEC 690.13(B): Where line and load sides may be energize in the open position.
(LABEL TO BE MADE IN HOUSE)
LABEL TO BE INSTALLED ON:
1) **DC JUNCTION BOXES**

14

SOLAR

NEC 705.12(B)(2)(3)(b): A PERMANENT WARNING LABEL TO BE APPLIED DIRECTLY ADJACENT TO "BACKFED" BREAKERS.
(LABEL TO BE MADE IN HOUSE)
LABEL TO BE INSTALLED ADJACENT TO:
1) **DIRECTLY ADJACENT TO BACKFED BREAKERS**

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DRAWN BY: CRP
ISSUE DATE: 03/10/21
SCALE: N/A
PROJECT:
ADDRESS:
SHEET TITLE: Three Line Drawing

DRAWING NUMBER
E-101

S-5!®

The Right Way!

S-5-S Clamp

The S-5-S clamp was created specifically for popular snap-together profiles—including residential profiles by Taylor Metals and Easy Lock Standing Seam. For horizontal seams under .540 inches (like the Firestone UC4) the S-5-S or S-5-S Mini can be used to avoid the necessity of crimping the seam.

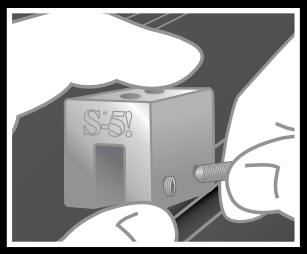
Its simple design and size make it perfect for use with S-5!® snow retention products and other heavy-duty applications. Installation is as simple as setting the patented round-point setscrews into the clamp, placing the clamp on the seam, and tightening them to the specified tension. Then, affix ancillary items using the bolt provided with the product. Go to www.S-5.com/tools for information and tools available for properly attaching and tensioning S-5! clamps.

S-5-S Mini Clamp

The S-5-S Mini is a bit shorter than the S-5-S and has one setscrew rather than two. The mini is the choice for attaching all kinds of rooftop accessories: signs, walkways, satellite dishes, antennas, rooftop lighting, lightning protection systems, solar arrays, exhaust stack bracing, conduit, condensate lines, mechanical equipment—just about anything!*

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

1



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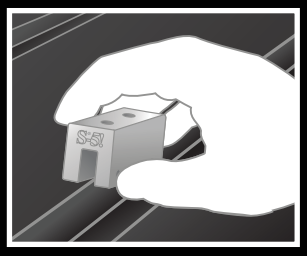

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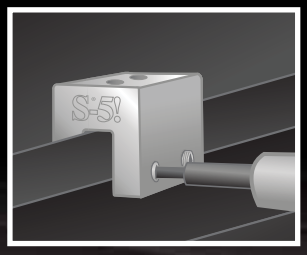
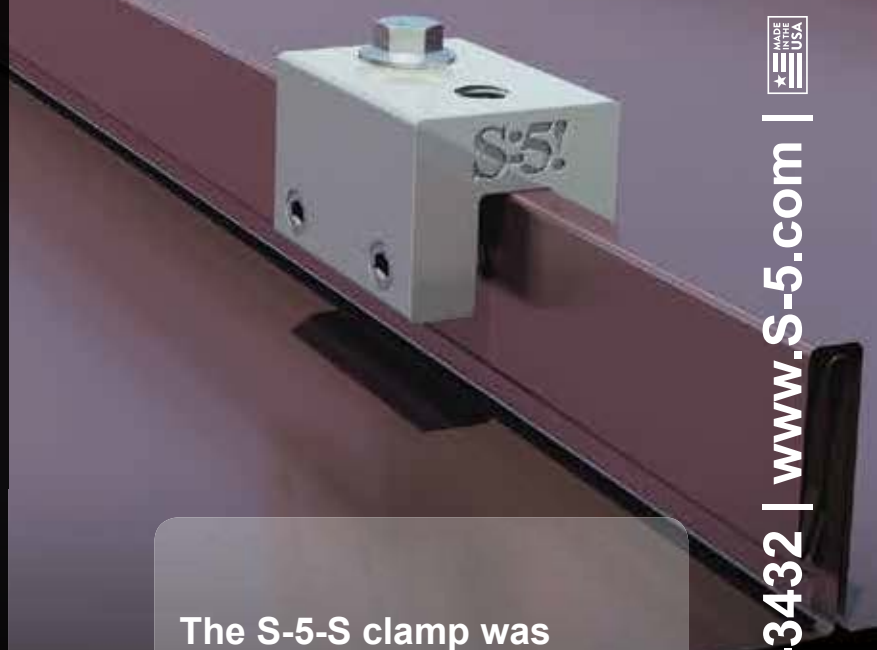


S-5-S and S-5-S Mini



The S-5-S clamp was created specifically for popular snap-together profiles.

The right way to attach almost anything to metal roofs!

888-825-3432 | www.S-5.com | MADE IN THE USA

S-5!®
The Right Way!

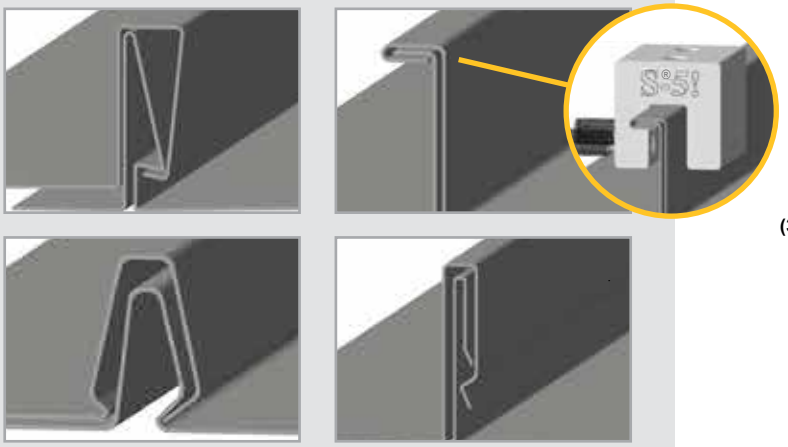
The strength of the S-5-S clamp is in its simple design. The patented setscrews will slightly dimple the metal seam material but not pierce it—leaving roof warranties intact.

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

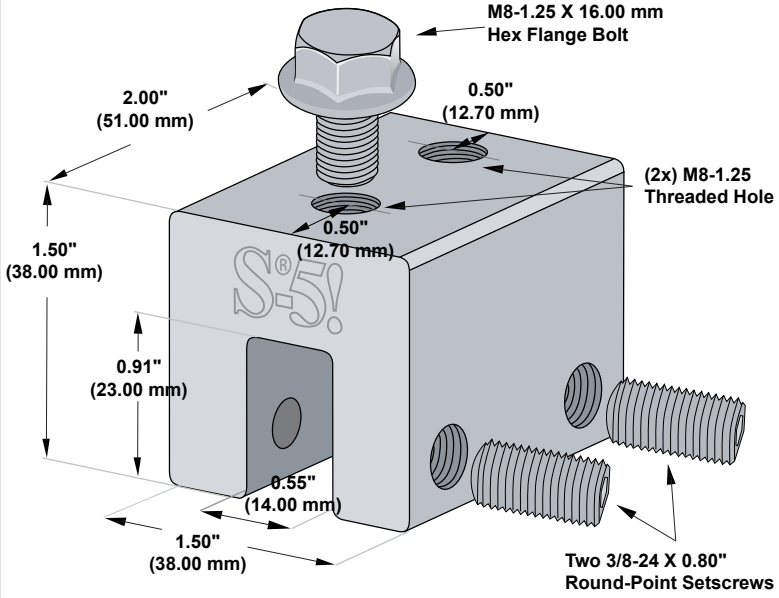
The S-5-S clamp has been tested for load-to-failure results on most major brands and profiles of standing seam roofing. The independent lab test data found at www.S-5.com can be used for load-critical designs and applications. S-5!® holding strength is unmatched in the industry. Profiles that are shaped as illustrated below will work with the S-5-S and S-5-S Mini. In order for the S-5-S or S-5-S Mini to fit these types of seams, the finished seam must:

- Be at least 1.00" high.
- Have a height distance less than or equal to 0.25" between the male portion of the panel and female portion of the panel.

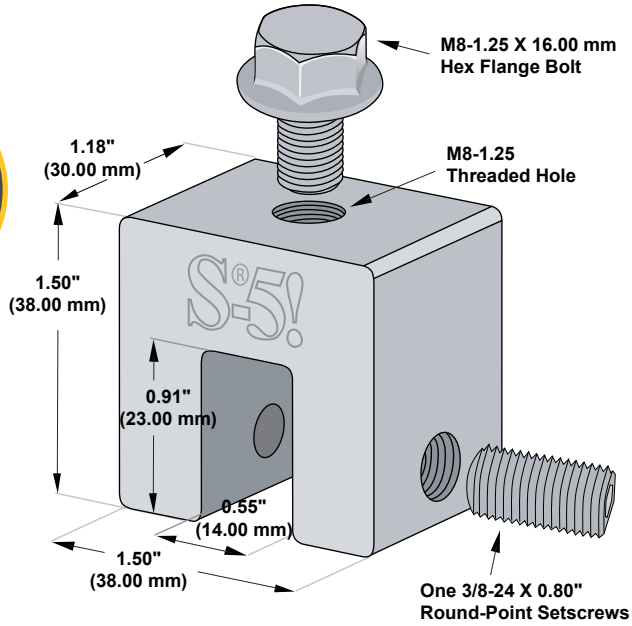
Example Profiles



S-5-S Clamp



S-5-S Mini Clamp



Please note: All measurements are rounded to the second decimal place.

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.

Distributed by

S-5!®
The Right Way!®

PVKIT® 2.0 MidGrab or EdgeGrab

The concept of combining photovoltaic arrays with standing seam metal roofing is growing—and for good reasons. A standing seam metal roof has a life expectancy consistent with that of framed PV modules—a 30-year power source on a 40-year roof, along with zero-penetration technology, creates the most sustainable roof system available with alternative power generation, all without compromising the roof manufacturer's warranty! PVKIT® 2.0 is also a great solution for attaching PV modules directly to many exposed fastener roofs when paired with S-5! brackets.

S-5! has introduced a new and improved PVKIT, boasting an improved installation experience for PV mounting technology. The kit comes preassembled with either the MidGrab or EdgeGrab for easier and more efficient installation. The kits were designed with thread lock on the standoff bolt so that the grab will seat to the PV Module frame by using one tool to drive the top bolt, eliminating a step required in the previous PVKIT. The PVKIT 2.0 features bonding teeth, which are more aggressive to secure a better ground path. No lugs or wire required except to connect one string of modules to another and to ground the system.

The S-5 PVKIT 2.0 is built to save you time and money —
The Right Way® to install solar to your metal roof.

PVKIT 2.0 Features:

Pre-assembled kit saves time and money

Only *one tool* needed for installation

Bolt head uses standard hex bit tip which is provided

Improved single piece EdgeGrab installs with ease

Low profile bolt head provides a sleek and clean finish

Also available in black by special order only

MidGrab leaves 1" gap between modules, allowing reduction per ASCE7

UL 2703 Listed

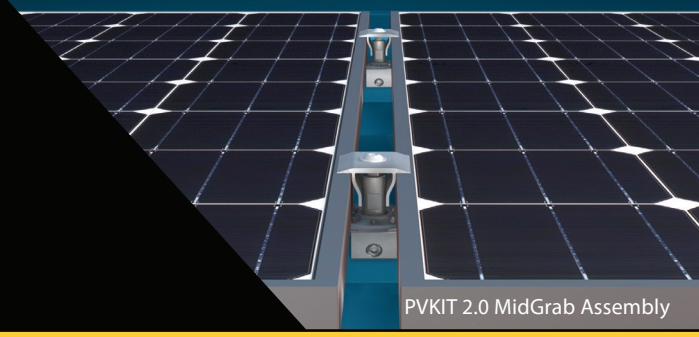
PVKIT 2.0 EdgeGrab Assembly

UL LISTED

MADE IN THE USA

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

S-5!®
The Right Way!®


PVKIT 2.0 MidGrab Assembly

PVKIT® 2.0: New Design

LISTED

The PVKIT 2.0 is furnished with the hardware shown at right, excluding the attachment clamp, which is supplied separately. The PVKIT 2.0 is compatible with most common metal roofing materials, including copper.

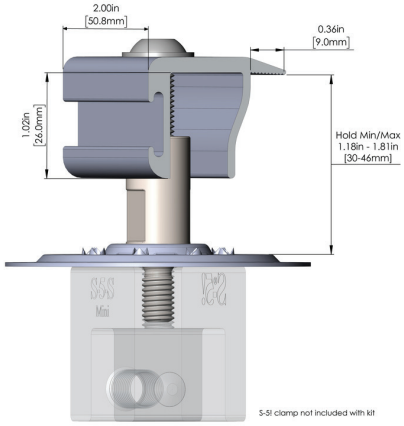
The Module Placement Bevel Guide makes the module placement easier. The mounting disk is multi-directional and rails are not required. The PV grab ears, holding the solar panels in place, are broader to allow for ease of installation and precise module engagement.

Accommodating module thicknesses between 30 and 46mm, the PVKIT 2.0 fits the majority of solar panels on the market. Using the S-5! mini clamps, it fits most standing seam metal roofs. When paired with other S-5! products, the PVKIT 2.0 and EdgeGrab or MidGrab will also work on most exposed fastener including corrugated metal roofs. The MidGrab is designed to fit mid conditions (two adjacent panels), while the new EdgeGrab is designed specifically for end conditions.

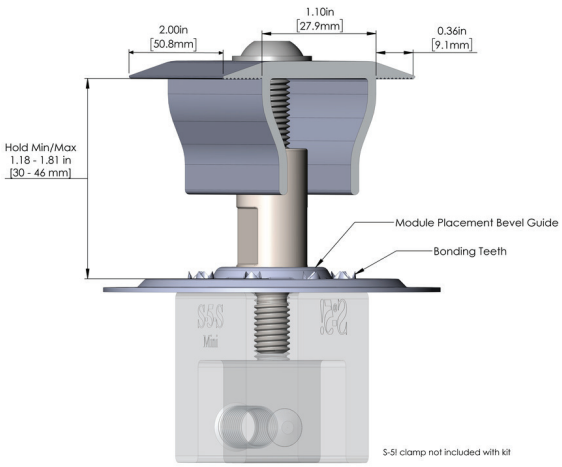
Wind dynamics are complex; thus, each system should be reviewed by a qualified licensed professional who understands wind effects prior to purchase and installation. For more detailed information including specifications, installation instructions, and CAD drawings, visit www.S-5.com or your PVKIT 2.0 distributor.

The PVKIT 2.0 continues to be the easiest, most cost-effective way to install solar panels directly to standing seam and exposed fastener metal roofs, remaining the most popular choice worldwide.

PVKIT 2.0 EdgeGrab



PVKIT 2.0 MidGrab



Certain components featured in illustration may not be UL listed. Due to the variety of attachment needs, S-5-PVKIT 2.0 are sold separately from S-5! clamps.

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

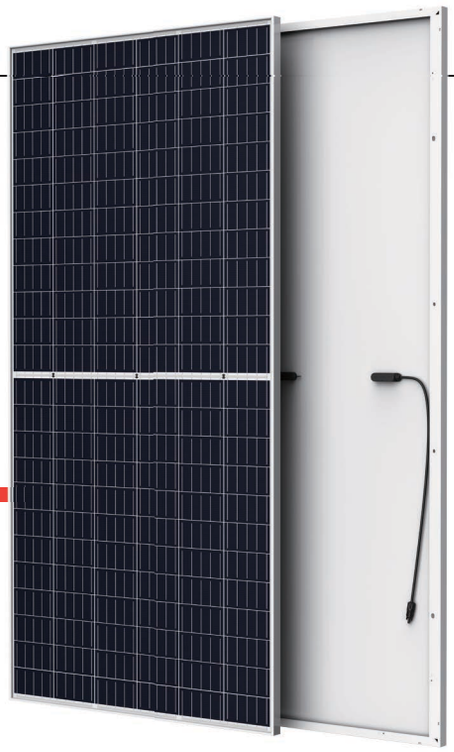
The independent lab test data found at www.S-5.com can be used for load-critical designs and applications.

Distributed by:

THE

TALLMAX M

FRAMED 144 LAYOUT MODULE



144 LAYOUT
MONOCRYSTALLINE MODULE

385-415W
POWER OUTPUT RANGE

20.7%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

PRODUCTS	POWER RANGE
TSM-DE15H(II)	385-415W

High power

- Up to 415W front power and 20.7% module efficiency with half-cut technology bringing more BOS savings
- Lower resistance of half-cut ensure high power

High reliability

- Ensured PID resistance through cell process and module material control
- Resistant to salt, acid and ammonia
- Mechanical performance: Up to 5400 Pa positive load and 2400 Pa negative load

High energy generation

- Excellent IAM and low light performance validated by 3rd party with cell process and module material optimization
- Lower temp coefficient (-0.36%) and NMOT bring more energy leading to lower LCOE
- Better anti-shading performance and lower operating temperature

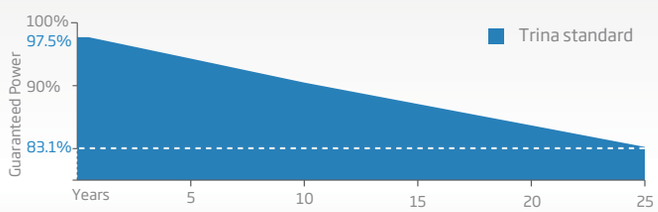
Founded in 1997, Trina Solar is the world's leading total solution provider for solar energy. With local presence around the globe, Trina Solar is able to provide exceptional service to each customer in each market and deliver our innovative, reliable products with the backing of Trina as a strong, bankable brand. Trina Solar now distributes its PV products to over 100 countries all over the world. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners in driving smart energy together.

Comprehensive Products and System Certificates

IEC61215/IEC61730/UL1703/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupation Health and Safety Management System

PERFORMANCE WARRANTY

12 Year Product Warranty · 25 Year Power Warranty



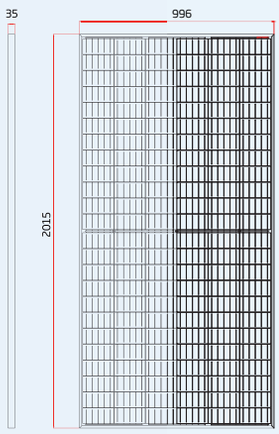
From the 2nd year to the 25th year, the average annual power decline will be no more than 0.6%.

Trinasolar

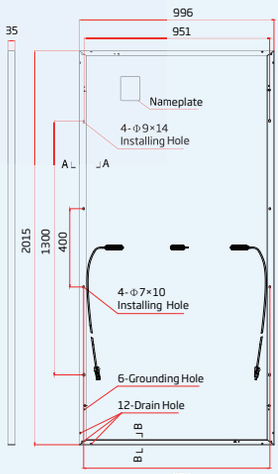
TALLMAX™

144 LAYOUT MODULE

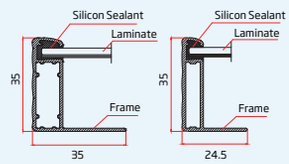
DIMENSIONS OF PV MODULE(mm)



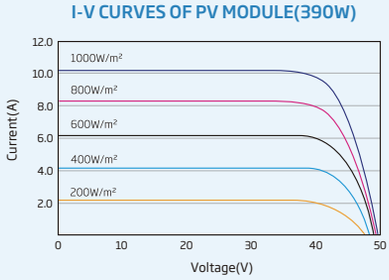
Front View



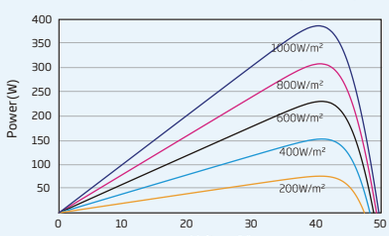
Back View



I-V CURVES OF PV MODULE(390W)



P-V CURVES OF PV MODULE(390W)



ELECTRICAL DATA (STC)

Peak Power Watts-P_{MAX} (Wp)*	385	390	395	400	405	410	415
Power Tolerance-P_{MAX} (W)	0 ~ +5						
Maximum Power Voltage-V_{MPP} (V)	40.1	40.5	40.8	41.1	41.4	41.7	42.0
Maximum Power Current-I_{MPP} (A)	9.61	9.64	9.69	9.74	9.79	9.84	9.89
Open Circuit Voltage-V_{OC} (V)	48.5	49.7	50.1	50.4	50.8	51.2	51.5
Short Circuit Current-I_{SC} (A)	10.03	10.08	10.13	10.18	10.23	10.29	10.34
Module Efficiency η_m (%)	19.2	19.4	19.7	19.9	20.2	20.4	20.7

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5.
*Measurement tolerance: ±3%.

ELECTRICAL DATA (NMOT)

Maximum Power-P_{MAX} (Wp)	291	296	299	303	307	311	314
Maximum Power Voltage-V_{MPP} (V)	37.9	38.6	38.9	39.1	39.4	39.7	39.9
Maximum Power Current-I_{MPP} (A)	7.68	7.66	7.70	7.74	7.78	7.82	7.87
Open Circuit Voltage-V_{OC} (V)	45.8	46.9	47.3	47.6	47.9	48.3	48.6
Short Circuit Current-I_{SC} (A)	8.08	8.12	8.16	8.20	8.24	8.29	8.33

NMOT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline
Cell Orientation	144 cells (6 × 24)
Module Dimensions	2015 × 996 × 35 mm (79.33× 39.21× 1.38 inches)
Weight	22.0 kg (48.5 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant Material	EVA
Backsheet	White
Frame	35 mm (1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), Portrait: N 280mm/P 280mm(11.02/11.02inches) Landscape: N 1400 mm /P 1400 mm (55.12/55.12 inches)
Connector	MC4 EVO2 / TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NMOT(Nominal Module Operating Temperature)	41°C (±3°C)
Temperature Coefficient of P_{MAX}	- 0.36%/°C
Temperature Coefficient of V_{OC}	- 0.26%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	20A

(Do not connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

12 year Product Workmanship Warranty
25 year Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 30 pieces
Modules per 40' container: 660 pieces

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CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

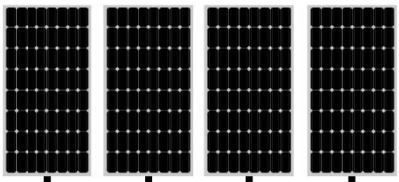
Version number: TSM_EN_2020_B

www.trinasolar.com

Sol-Ark
LIMITLESS POWER

AMERICAN MADE SOLAR PRIZE
U.S. DEPARTMENT OF ENERGY

12K BROCHURE



13kW DC Coupling
150V-425V @ 20A
per MPPT

Cloud Monitoring & Programming

MPPT 1
MPPT 2
Smarts
INVERTER
Sensors
Charger
Comms

Modes:
Grid Sell, Off-Grid, Meter Zero, Time of Use,
& Peak Shaving

RSD/Emergenecy Stop, External CT Sensors, Parallel Comms/Battery Comms, Auto Gen Start

Battery Agnostic
48V Nominal &
at least 50Ah

Stackable:
Additive Input & Output
Up to 8 units in 120/240V
Up to 9 units in 3-phase

4ms UPS
No-Glitch Transfer

Smart Load
Prioritize Necessities & Run Luxuries With Less

Gen Breaker
Up to 12kW
Generator Input

AC Coupling
9.6kW Output

Grid or Generator
63A Passthrough

Off-Grid Loads
9kW Continuous
16kW Peak

Sol-Ark™
LIMITLESS POWER

12K™

VETERAN OWNED BUSINESS

Highest Rating on Energy Sage

Nothing but positive reviews on EnergySage. We have a long track record of satisfied cstomers, as well as customers that have switched from other big names to go with our products instead.

Install Simplicity

Unlike many hybrid inverters, our system is an all-in-one unit. You don't have to piece together multiple parts to get basic functions. Ours does it all, does it better, and does it with simplicity.

7 Day/Week Engineering & Customer Support

Sol-Ark beats all competition at customer support.
We have engineers ready to assist with all questions, diagnosis, homeowner support, and remote unit management.We can solve virtually any problem without a site visit.

Feature Comparison	Sol-Ark 12K	Tesla Powerwall 2	Generac PWRCell	Solar Edge/LG Energy Hub	Enphase Encharge 10
Install Simplicity	All-In-One Hybrid, Solar Batt Calcula-tor, Some Load Mgmt	Entire Home Transfer Switch, No Load Mgmt	Entire Home Transfer Sitch, All-In-One Hybrid, Some Load Mgmt	Entire Home Transfer Switch, No Load Mgmt	Entire Home Transfer Switch, No Load Mgmt
7 day single line support	Yes	No	Yes	No	Yes
Peak Current (Off Grid)	63A	30A	50A	30A	24.6A
Continuous Power (On Grid)	9kW	5kW	7.6kW	5kW	3.84kW
Usable Battery Energy	20kWh	13.5kWh	18kWh	9.3kWh	10.5kWh
Battery Life Span	15 Years (LFP)	10 Years (NMC Active Cooling)	10 Years (NMC Active Cooling)	7 Years (NMC Passive Cooling)	15 Years (LFP)
PV to Batt to AC Efficiency	93%	87%	85%	82%	87%
Charging Batt from Gen	Yes	No	No	No	No
Fleet Mgmt Tool w/ Remote Setup	Yes	No	Yes	Yes	Yes

Sol-Ark™
LIMITLESS POWER

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Sales Questions: sales@sol-ark.com

Address: 5833 Curtis Rd #200, Parker, TX 75002