HISTORIC AND DESIGN REVIEW COMMISSION
April 05, 2017

HDRC CASE NO:	**2017-124**
ADDRESS:	424 LAMAR ST
LEGAL DESCRIPTION:	NCB 529 BLK 2 LOT 6
ZONING:	IDZ H
CITY COUNCIL DIST.:	2
DISTRICT:	Dignowity Hill Historic District
APPLICANT:	Jessica Silva/Advanced Solar
OWNER:	William Maney, Jr.
TYPE OF WORK:	Solar installation on the primary structure

REQUEST:

The applicant is requesting a Certificate of Appropriateness for approval to install a solar panel array including sixteen (16) panels on the west facing roof slope at 424 Lamar.

APPLICABLE CITATIONS:

Historic Design Guidelines, Chapter 3, Guidelines for Additions

6. Designing for Energy Efficiency

C. SOLAR COLLECTORS
i. Location—Locate solar collectors on side or rear roof pitch of the primary historic structure to the maximum extent feasible to minimize visibility from the public right-of-way while maximizing solar access. Alternatively, locate solar collectors on a garage or outbuilding or consider a ground-mount system where solar access to the primary structure is limited.
ii. Mounting (sloped roof surfaces)—Mount solar collectors flush with the surface of a sloped roof. Select collectors that are similar in color to the roof surface to reduce visibility.
iii. Mounting (flat roof surfaces)—Mount solar collectors flush with the surface of a flat roof to the maximum extent feasible. Where solar access limitations preclude a flush mount, locate panels towards the rear of the roof where visibility from the public right-of-way will be minimized.

FINDINGS:

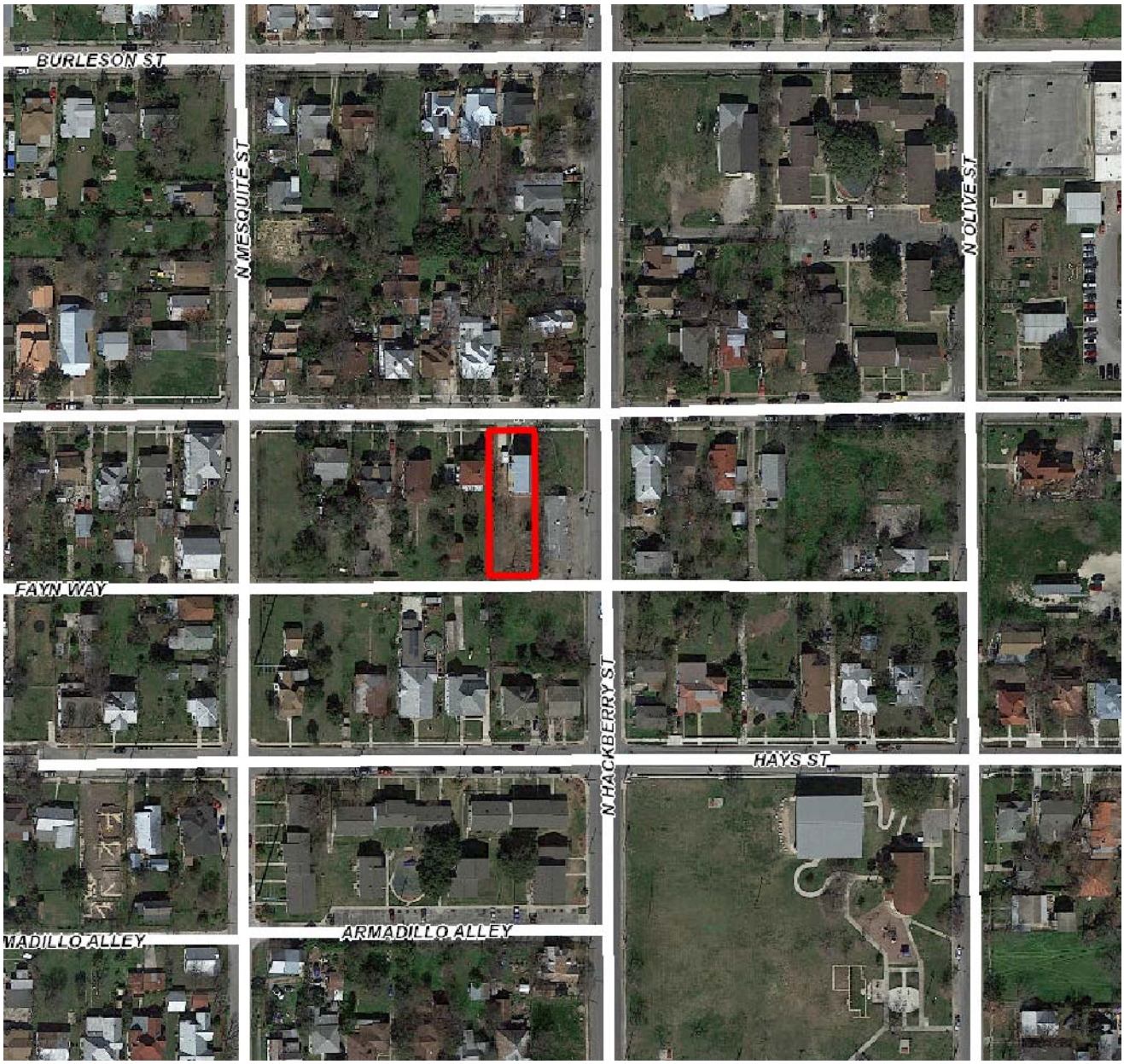
a. The structure at 424 Lamar is a two story contemporary structure which was constructed in 2014. The structure features a front facing gabled roof and its roofing materials include a standing seam metal roof. The applicant has proposed to install a solar panel array including sixteen (16) panels on the west facing roof slope.
b. The Guidelines for Additions 6.C.i. states that solar collectors should be located on the side or rear roof pitch of the primary historic structure to the maximum extent feasible to minimize visibility from the public right of way while maximizing solar access. Additionally, solar collectors may be located on garages or other accessory structures where access to the primary structure is limited. The applicant has proposed to locate the proposed panels on the west facing roof slope, where they would be visible from the public right of way. This is not consistent with the Guidelines.

RECOMMENDATION:

Staff does not recommend approval based on finding b. Staff recommends that the applicant explore the installation of solar panels further toward the rear of the structure to be consistent with the Guidelines.

CASE MANAGER:

Edward Hall



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Flex Viewer

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Printed:Mar 21, 2017


424


4
2
4
CJ9·F421

PV SITE LAYOUT 1

CONSTRUCTION NOTES:

1. ALL EQUIPMENT TO BE LISTED OR LABLED FOR ITS APPLIATION.
2. INSTALLATION TO BE COMPLIANT WITH THE NEC.
3. MODULE GROUNDNG METHOD SHALL BE WEEB UGC AND WEEB LUGS.
4. ALL CONDUCTORS ARE COPPER, UNLESS OTHERWISE SPECIIFIED.
5. 3.0 PSF MAX DEAD LOAD CONTRIBUTED FROM SOLAR ARRAY

LEGEND

---	= EQUIPMENT GROUNDING CONDUCTORS	—	= CIRCUIT CONDUCTORS
L1	= LINE 1 TERMINAL (PHASED BLACK)	L2	= LINE 2 TERMINAL (PHASED RED)
N	= NEUTRAL TERMINAL (PHASED WHITE)	G	= GROUND TERMINAL (PHASED GREEN)
⊕	= POSITIVE TERMINAL (PHASED BLACK)	⊖	= NEGATIVE TERMINAL (PHASED WHITE)
∿	= FUSE	⌒	= CIRCUIT BREAKER

DESCRIPTION	DATE	REV
ORIGINAL	2/6/2017	A
REVISED		B
REVISED		C
Mstr Elect#	96107	

DESIGN & DRAFTING BY:
Advanced Solar and Electric llc
Master Electrician:
James D. Flores, Sr

Commercial SOLAR ARRAY 5.76 KW D/C
Qty 16 Mission (72c) MSE360SQ4S Modules

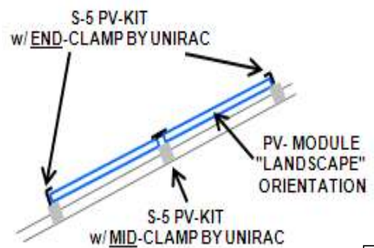
3 WIRING DIAGRAM

1. #8 BARE COPPER GROUND
2. 4-#10 USE-2 MC4-W/CONNECTORS TO MODULES, #8 GRND, IN 3/4" EMT
3. 1-#8 THWN-2, 2-#8THWN-2 #8 GRND, IN 1" EMT
4. 1-#6 THWN-2, 2-#6THWN-2, IN 1" EMT

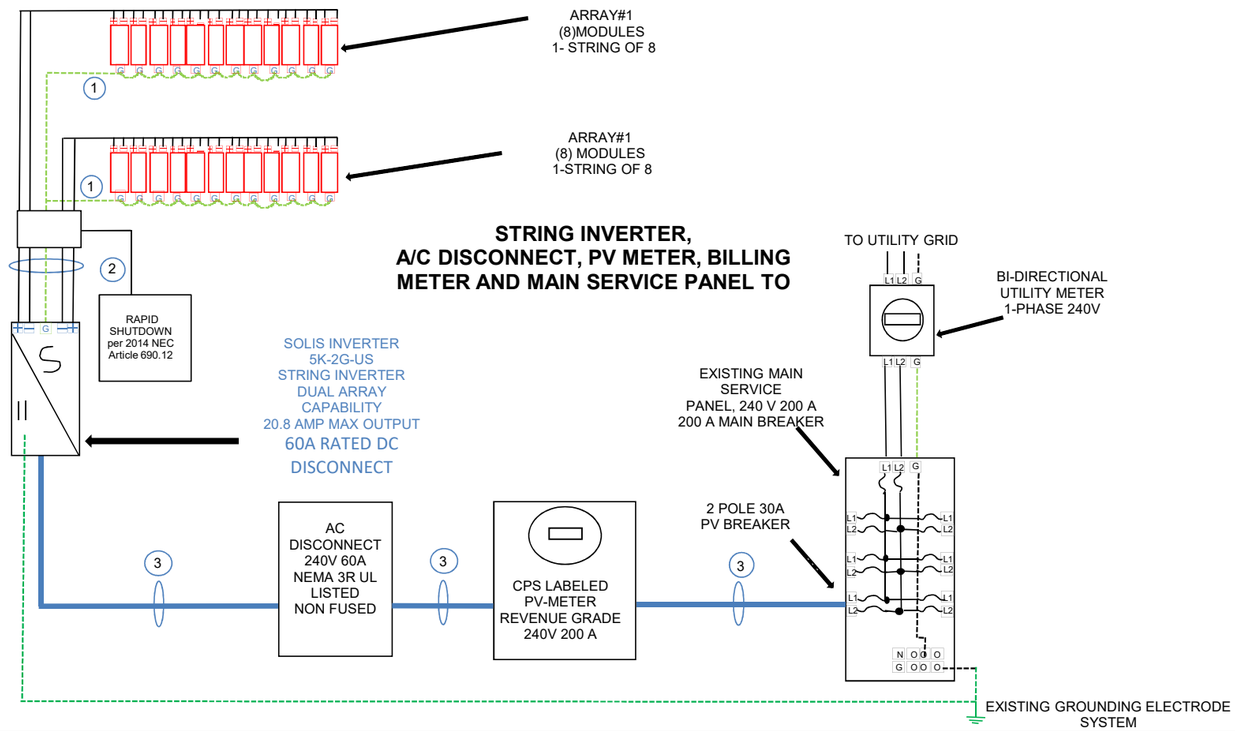
COMPOSITION SHINGLE ROOF

SOLAR MODULE

STANDING SEAM ROOF MOUNT APPLICATION
S-5 BRAND STANDING SEAM ROOF CLAMP W/PV MOUNTING KIT ALL COMPONENTS ARE STAINLESS OR ALUMINUM



MOUNTING METHOD 2



SIGNAGES PER NEC 690.17 & 705.10-705.12:

PV AC DISCONNECT: (2014 NEC ARTICLES: 690.17, 690.53)

PV SYSTEM DC DISCONNECT
RATED MAX. POWER-POINT CURRENT: XXX ADC
RATED MAX. POWER-POINT VOLTAGE: XXX VDC
MAXIMUM SYSTEM VOLTAGE: XXX VDC
SHORT –CURCUIT CURRENT: XXX ADC

WARNING: ELECTRIC SHOCK HAZARD
TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSISTION

PV AC DISCONNECT: (2014 NEC ARTICLES: 690.54)

PV SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT: XXX AMPS
NOMINAL OPERATING AC VOLTAGE: XXX VOLTS

PV METER SOCKET:

PV METER

WARNING: ELECTRIC SHOCK HAZARD
TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSISTION

INVERTER OUTPUT CONNECTION: (2014 NEC ARTICLE 705.12 D-2 B)

WARNING: INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

CUSTOMER SERVICE PANEL: (2014 NEC ARTICLE 705.10)

WARNING: THIS PREMISE IS SUPPLIED BY MORE THAN ONE SOURCE OF ELECTRIC POWER
(UTILITY, PV, XXX)

CPS ENERGY REVENUE METER SOCKET:

REVENUE METER

PV AGGREGATION PANEL:

DO NOT REMOVE, ADD OR RELOCATE ANY CIRCUITS FROM THIS PANEL

TRANSFORMERLESS OR NON-ISOLATED INVERTERS ONLY:

WARNING
ELECTRIC SHOCK HAZZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE

NOTES:
1– CUSTOMERS SHALL BE RESPONSIBLE FOR COMPLYING WITH THE NEC AND OTHER APPLICABLE CODES ON ALL LABELING THAT IS REQUIRED FOR OTHER COMPONENTS OF THE PV SYSTEM INSTALLATION.
2– LABELING SHALL MEET THE FOLLOWING REQUIREMENTS:
A) REFLECTIVE, WEATHER RESISTANT AND SUFFICIENT DURABILITY TO WITHSTAND THE ENVIROMENT INVOLVED.
B) RED BACKGROUND WITH WHITE LETTERING.
C) MINIMUM 3/8" TALL CHARACTERS (SIZE MAY BE REDUCED ONLY WHEN NECESSARY TO FIT ON EQUIPMENT)
D) ADHESIVE FOR ALL LABELING SHALL BE WEATHER RESISTANT AND OF SUFFICIENT DURABILITY TO WITH STAND THE ENVIROMENT INVOLVED.
3– PERMANENT PLACARDS DENOTING LOCATIONS SHALL BE PLACED AT BOTH THE PV METER AND REVENUE METER WHERE A VARIANCE HAS BEEN APPROVED FOR THE METERS TO BE PLACED REMOTE.
4– LABELING WARNING THAT THERE ARE DUAL SOURCES SUPPLYING SHALL ALSO BE PLACED ON THE JUNCTION BOX USED ON LINE-SIDE

William Maney Jr.
424 Lamar
San Antonio TX 78202
Commercial Application
TECL #27328

SHEET TITLE: PHOTOVOLTAIC INSTALLATION

PAGE NUMBER: PV-1

Advanced Solar and Electric L.L.C.

105 W. Loop 539, Cibolo, Texas 78108 (210) 556-1399 www.advancedsolar.com sales@advancedsolar.com

TECL# 27328

Site Survey Worksheet

CUSTOMER:	William Maney Jr.	DATE:	February 3, 2017
JOB SITE:	424 Lamar	w Phone:	210 387-1981
CITY / ST / ZIP	San Antonio 78202 TX	c Phone:	210 387-1981
EMAIL	willmaney@gmail.com	1 or 2 Story:	Two Story
Proposed System	5.760 (D/C KW capacity)	AHJ:	COSA
Panel Configuration	QTY 16	360	Mission (72c) MSE360SQ4S
Inverter Configuration	QTY 1	Solis	Solis-5K-2G-US (240V)
Inverter Configuration	QTY 0	Solis	0
Roof Type	STANDING SEAM METAL ROOF	Drawn By:	Rep: Joel Alderman

All Arrays		Array #1	Array #2	Array #3	Array #4
Tilt:		25.0			
Azimuth:		270			
QTY	16	16			
KW d/c	5.76	5.76	0.00	0.00	0.00
(CPSE only) KW a/c	5.16				
NREL Default kwH	8352	8352	0	0	0
NREL Actual kWh:	7701	7701	0	0	0
% Default	92.21%	92.21%			

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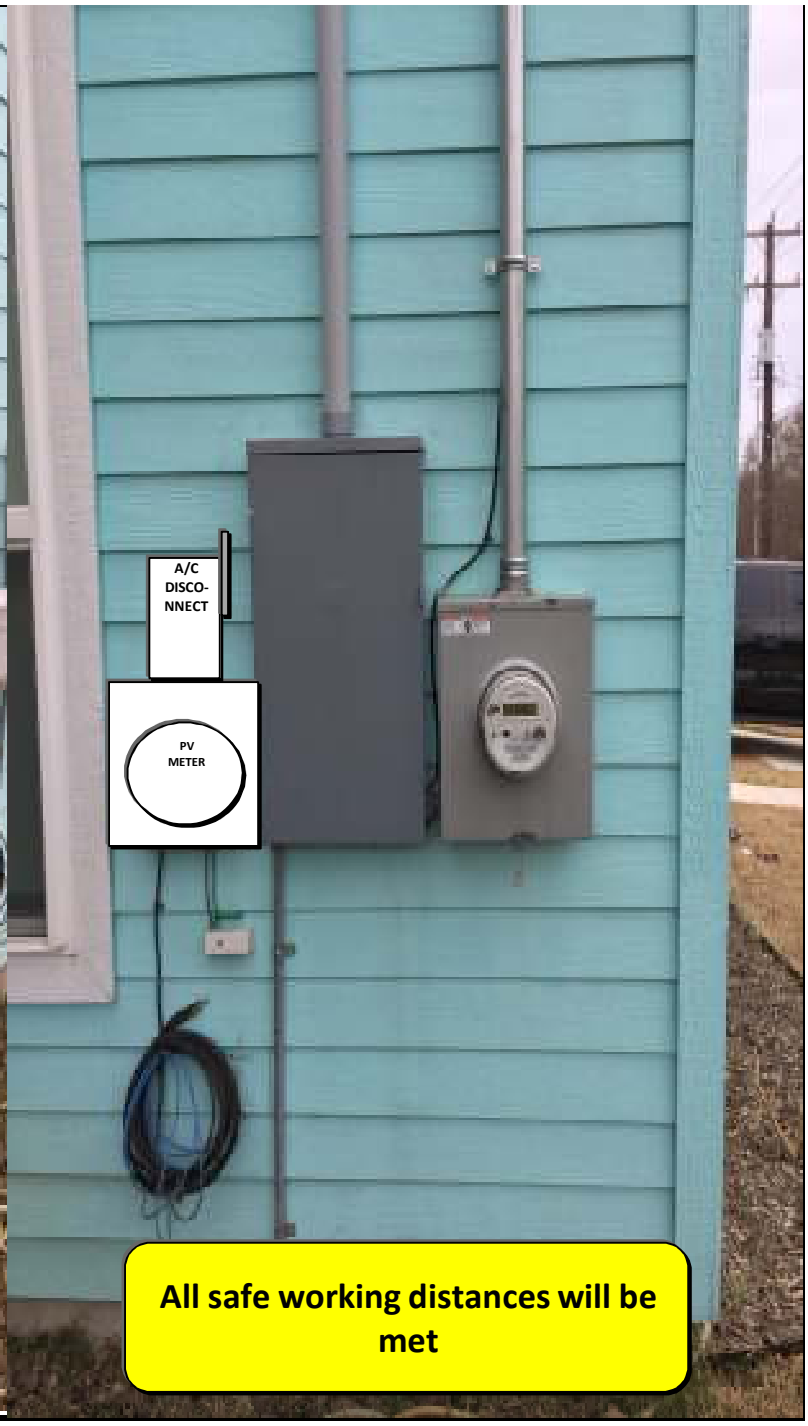
Site Survey Worksheet

CUSTOMER:	**William Maney Jr.**	**DATE:**	**#VALUE!**
JOB SITE:	**424 Lamar**	**PHONE #1:**	**210 387-1981**
CITY / ST / ZIP	**San Antonio**	**TX**	**PHONE #2: 210 387-1981**
EMAIL	**willmaney@gmail.com**	**TYPE:**	**Commercial**



solis inverters

2.5kW to 5kW

Ginlong Solis US Version Single Phase Inverters

Leading Features

- **Compact and lightweight design inside a corrosion-resistant NEMA 4X enclosure**
- **Easy to install and visually pleasing for indoor or outdoor installations**
- **Single Phase 240Vac and 208Vac output**
- **Up to 97.8% efficient with an ultra-low start up voltage**
- **Dual (2) MPPT designs with fast (< 5 sec.) MPPT response times**
- **Industry-leading (100-500Vdc) operating MPPT range**
- **Integrated Arc Fault Circuit Interrupt (AFCI) option**
- **RS485 Modbus communication protocol with Wi-Fi interface (optional GPRS)**
- **Web based data monitoring with downloadable Solis Web App.**
- **10 Year Standard Warranty with extension options**

Accessories & monitoring

WiFi Stick

Web Box

Rapid Shutdown Device

Contact us today.

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e: **sales@ginlong-usa.com**
w: **ginlong-usa.com**

Manufacturer:

Ginlong Technologies Ltd., Ningbo, Zhejiang P.R. China

US Headquarters:

565 Metro Place South / Suite 3214, Dublin, OH 43017 USA

GINLONG

Technical Specification

Model	Solis-2.5K-2G-US	Solis-3K-2G-US	Solis-3.6K-2G-US	Solis-4K-2G-US	Solis-4.6K-2G-US	Solis-5K-2G-US
Energy Source	PV					
DC Values						
Max Usable Input Current per MPPT (Amps)	10 + 10	10 + 10	10 + 10	10 + 18	10 + 18	10 + 18
Max Short Circuit Input Current (Amps)	15.6+15.6	15.6+15.6	15.6+15.6	15.6+28.1	15.6+28.1	15.6+28.1
Start-Up Voltage (Volts)	120Vdc					
Max Voltage (Volts)	600					
Operating MPPT Voltage Range (Volts)	100-500					
Full Power MPPT Voltage Range (Volts)	125-500	150-500	180-500	145-500	165-500	180-500
Max Power per MPPT (Watts)	3000	3600	4000	4000	4600	5000
Number of MPPT	2					
Inputs per MPPT	1	1	1	1 + 2	1 + 2	1 + 2
AC Values (208Vac and 240Vac)						
Operating Voltage Range (Volts)	183-228(for 208V rate)/211-264(for 240V rated)					
Operating Frequency Range (Hertz)	59.3 - 60.5					
Ambient Operating Temperature Range (Celsius and Fahrenheit)	-25°C to 60°C / -13°F to 140°F					
Operating Surroundings Humidity	0-100%Condensing					
Power Factor	0.9leading ... 0.9lagging					
Grid Current THD	<3%					
Nominal Output Power (Watts)	2500	3000	3600	4000	4600	5000
Max Continuous Output Power (Watts)	2800	3300	4000	4400	5000	5000
Max Output Current for 240V Grid (Amps)	10.4	12.5	15.0	16.7	19.2	20.8
Efficiency						
Peak Efficiency	97.5%	97.5%	97.5%	97.8%	97.8%	97.8%
CEC Weighted Efficiency	95.5%	96.5%	96.5%	97.0%	97.0%	97.0%
MPPT Efficiency	>99%					
Protection						
Max Overcurrent Protection Device (Amps)	20	20	20	30	30	30
Temperature Protection	Yes					
DC Reverse Polarity Protection	Yes					
Output Overvoltage Protection-Varistor	Yes					
Islanding Protection	Yes					
Integrated AFCI (DC arc fault circuit protection)	Yes					
Integrated DC Switch	Yes					
Rapid Shutdown	Optional					
General Data						
Dimensions (W*H*D)	13.3*25.9*6.8in (338*658*173mm)					
Weight	33.1 lb.			38.6 lb.		
Topology	Transformer-less					
Internal consumption	< 1W (Night)					
Enclosure Type	NEMA 4X					
Cooling Concept	Natural Convection					
Noise Emissions (Typical)	<30 dBA					
Max operating altitude without derating	13120					
Compliance	CAN/CSAC22.2 N107.1, UL1741, IEEE1547, UL1998, UL1699B, FCC part15,Class B					
Features						
Display	LCD, 2 × 20 Z					
Interface	RS485, WiFi/GPRS(Optional)					
Connections	Plugged 3/4" openings for bottom and side					
Warranty	Standard 10 Year (Extendable to 20 Years)					

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MSE-350 PERC

High Power Module

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Up to 360W power

Advanced Technology:
PERC and 4 busbars drive
>18% module efficiency

Reduced System Costs:
Robust design, 1500V
and simple installation

Certified Reliability:
3X IEC, salt mist, ammonia

Proudly assembled in the USA
Mission Solar Energy is headquartered in San Antonio, TX with cell and module facilities onsite. Our team of more than 400 staff call Texas home and are devoted to producing high quality solar products and services. Our supply chain includes local and domestic vendors increasing our impact to the U.S. economy.

Assembled in the USA

CERTIFICATIONS

IEC 61215/ IEC 61730/ IEC 61701
UL 1703: CSA

Independently Audited by SOLARBUYER

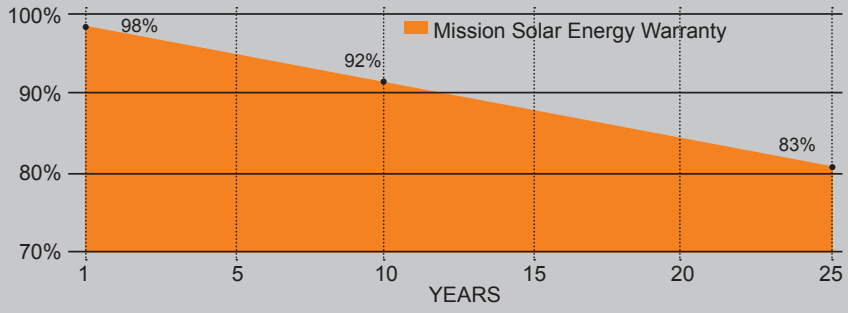
*As there are different certification requirements in different markets, please contact your local Mission Solar Energy sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

Outstanding performance with PERC
Passivated Emitter Rear Cell (PERC) technology provides excellent power output through advanced cell architecture.

Best in class quality
Mission Solar Energy production lines are fully automated and include multiple quality checks throughout the production process including 3X EL Testing, 100% Visual inspection, and positive binning.

Proven reliability and bankability
Mission Solar Energy panels have been tested by independent testing centers to meet and exceed IEC standards. Its panels are already deployed in multiple installations.

25-YEAR LINEAR WARRANTY



ELECTRICAL SPECIFICATIONS

Electrical parameters at Standard Test Condition (STC)

Module Type			MSE345SQ4S	MSE350SQ4S	MSE355SQ4S	MSE360SQ4S	MSE365SQ4S
Power Output	Pmax	Wp	345	350	355	360	365
Tolerance					0~+3%		
Short-Circuit Current	Isc	A	9.70	9.73	9.76	9.79	9.81
Open Circuit Voltage	Voc	V	46.98	47.38	47.68	48.08	48.12
Rated Current	Imp	A	9.04	9.11	9.19	9.28	9.32
Rated Voltage	Vmp	V	38.43	38.68	38.98	39.28	39.32

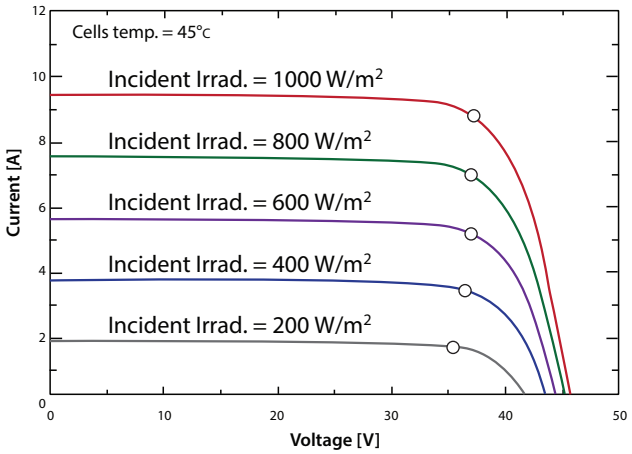
TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44°C (±2°C)
Temperature Coefficient of Pmax	-0.427%/°C
Temperature Coefficient of Voc	-0.318%/°C
Temperature Coefficient of Isc	0.042%/°C

OPERATING CONDITIONS

Maximum System Voltage	1,500VDC for UL
Operating Temperature Range	-40°C (-40°F) to +90°C (194°F)
Maximum Series Fuse Rating	15A
Fire Safety Classification	Class C
Static Load Wind/Snow	2400Pa/5400Pa
Hail Safety Impact Velocity	25mm at 23 m/s

MSE360SQ4S: 360WP, 72CELL SOLAR MODULE CURRENT-VOLTAGE CURVE

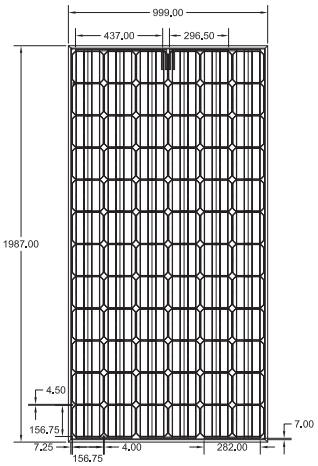


Current-voltage characteristics with dependence on irradiance and module temperature

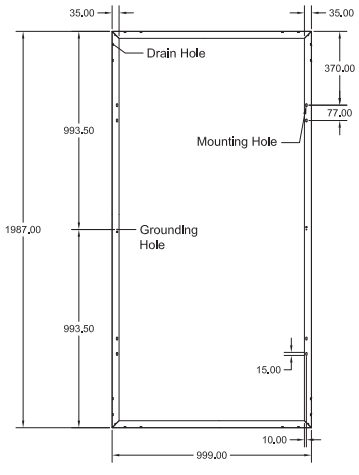
MECHANICAL DATA

Solar Cells	P-type Mono-crystalline Silicon (6 in.)
Cell orientation	72 cells (6x12), 4 busbar
Module dimension	1987mm x 999mm x 40mm (78.23 in. x 39.33 in. x 1.57 in.)
Weight	21.6 kg (47.6 lb)
Front Glass	3.2mm (0.126 in.) tempered, Low-iron, Anti-reflective coating
Frame	Anodized aluminum alloy
Encapsulant	Ethylene vinyl acetate (EVA)
J-Box	Protection class IP67 with bypass-diode
Cables	PV wire, 1.2m (47.2 in.), 4mm² / 12 AWG
Connector	MC4 or MC4 compatible

BASIC DESIGN (UNITS: MM)



Front View



Back View

MISSION SOLAR ENERGY

Mission Solar Energy reserves the right to make specification changes without notice.

Rev. 5.01

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Solar inverters

ABB solar system accessories
Rapid Shutdown for residential and small commercial

ABB now offers the only family of rapid shutdown products for string inverters today.This product provides a fail-safe solution for emergency responders to eliminate voltage at the PV array in compliance with NEC 2014 Rapid Shutdown code requirements.

The ABB Rapid Shutdown system requires no extra conduit; minimizing additional material cost and associated labor.

Shutdown occurs at the rooftop box when utility power is lost or when the PV system's AC disconnect switch is opened. In jurisdictions requiring a dedicated activation switch, an optional emergency stop button is available. The Rapid Shutdown box can mount directly to the PV mounting rail and lay parallel to the roofing surface. The NEMA 4X design permits installation angles from 0-90° while maintaining its water-tight seal from mounted snow or driven rain.

Three models are available to cover all system configurations; including, a two-string pass through, a two-string combined and a four-string combined box.

The unique features of each box can be used to maintain the specific configuration of the PV system. Dual outputs in the box maintain the benefits of ABB's dual MPPT inverter channels, while the single output box is perfect for small PV arrays utilizing one MPPT channel or systems requiring two rapid shutdown boxes.

To further reduce system cost, string combining models reduce the number of output conductors between the rooftop box and the inverter. The applicable rapid shutdown boxes include disconnect switches to comply with NEC 2014 690.15(C) *Direct-Current Combiner Disconnects*.

Highlights:

- Meets NEC 690.12 while avoiding the cost of additional conduit making this solution the most cost-effective rapid shutdown product available
- Immediately eliminates voltage and current upon activation
- NEMA 4X enclosure provides added protection from the harshest rooftop conditions
- Multiple string combining models available provide additional savings by reducing the number of DC conductors to the inverter
- Equipment disconnect included in string combining models provide safety and compliance with NEC 2014 combiner-disconnect requirements

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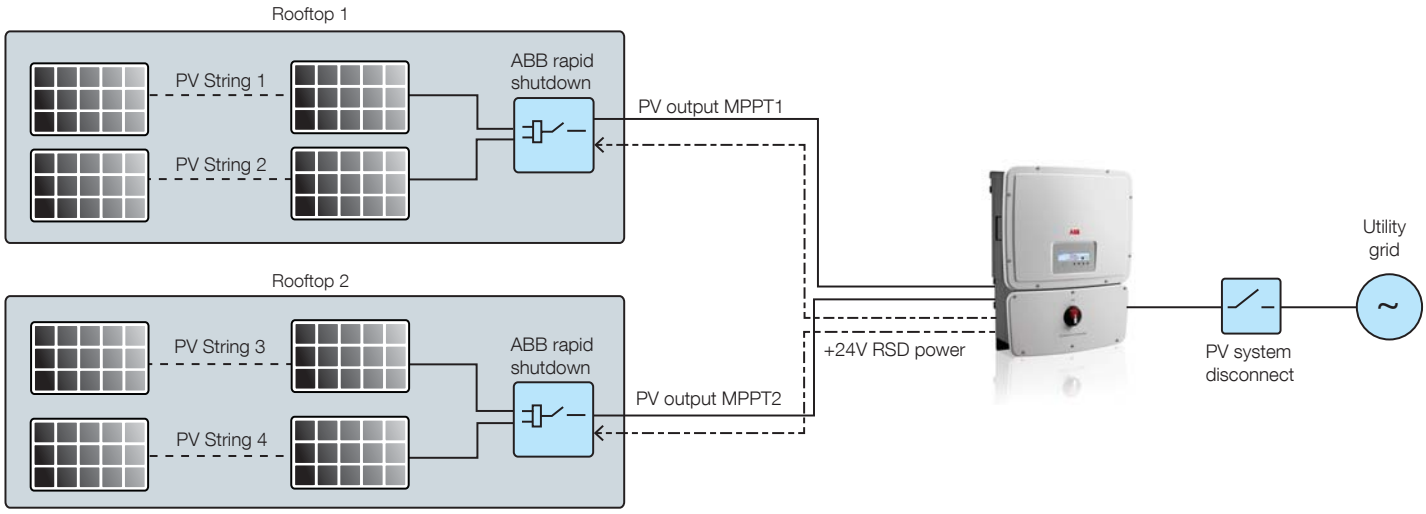
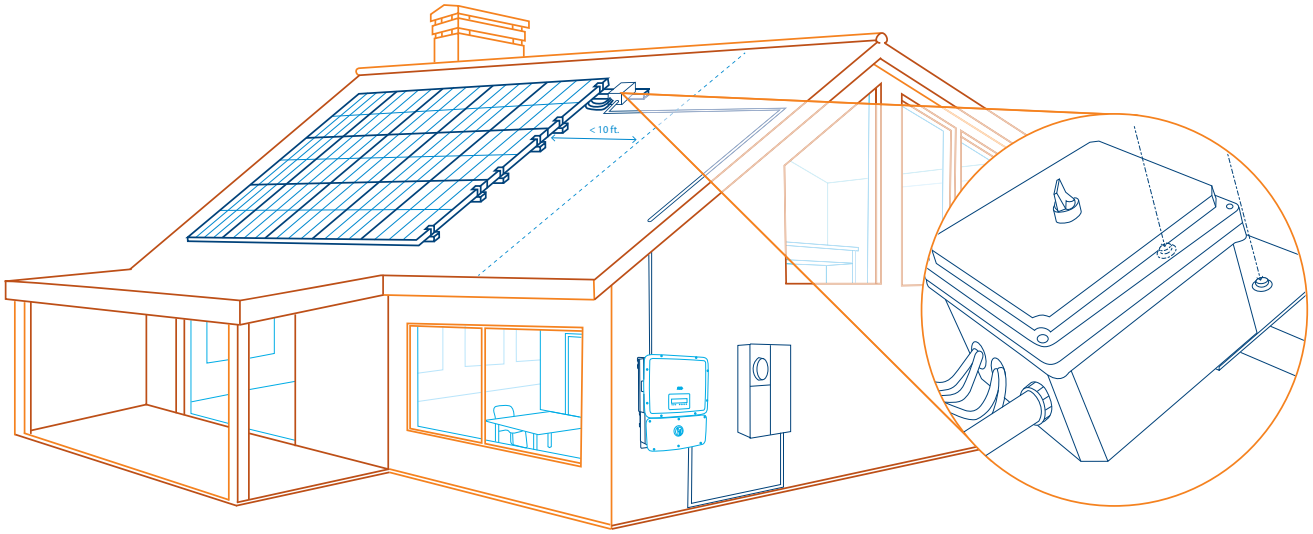
Rapid shutdown wiring diagram: 2-RSD system



Two RS2-1CN6 boxes may be powered by one power supply. For PV systems requiring two RSD boxes order the RS2-1CN6- kit and one RS2-1CN6 box.



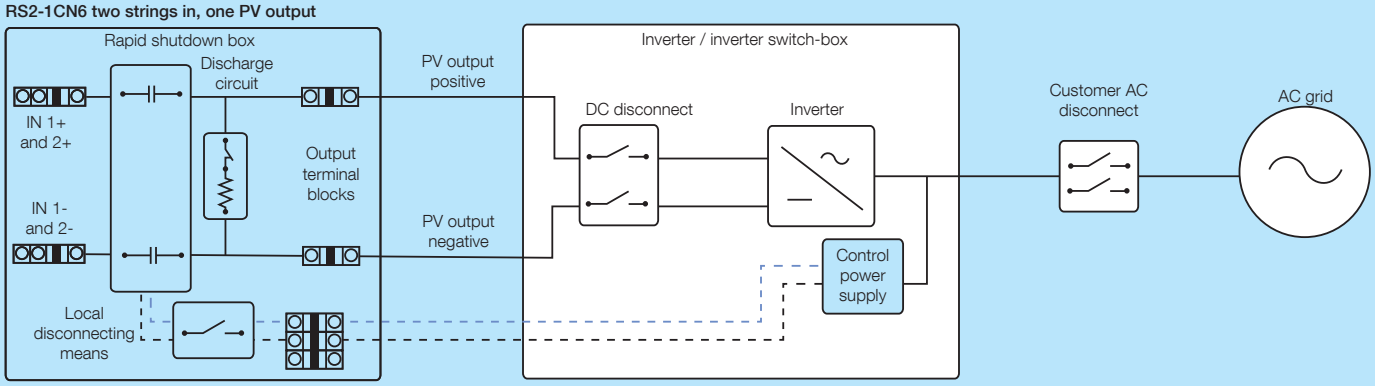
Technical data and types

Type code	2-String pass-through	2-String combined	4-String combined
PV source conductor input			
Max input current (per string)		11.25A	
Max input voltage		600V	
Number of input strings	2	2	4
Conductor size		14-8 AWG	
PV output conductors output			
Number of output circuits	2	1	2
Conductor size		12-6 AWG	
DC disconnect	N/A	Yes	Yes
Control power			
Power consumption	<5W, 24V/0.2A	<2.5W, 24V/0.1A	<5W, 24V/0.2A
Maximum power conductor size		12 AWG	
E-stop button		Optional	
Environmental			
Mounting angle		0-90°	
Dimensions H x W x D		10.54“x8.54“x5.32“ (without mounting bracket)	
Weight	6lb	5.8lb	6.2lb
Operating temperature range		-25°C to +70°C	
Enclosure rating		NEMA 4X	
Certifications		UL1741:2010, FCC Part 15 Class B	
Warranty			
Standard warranty		10 Years	
Available models			
Rapid shutdown kit	RS2-2PN6-kit	RS2-1CN6-kit	RS4-2CN6-kit
Rapid shutdown rooftop box for 2-box system	N/A	RS2-1CN6	N/A
Optional emergency stop		1SFA611821R1026	

Information in this document is subject to change without notice

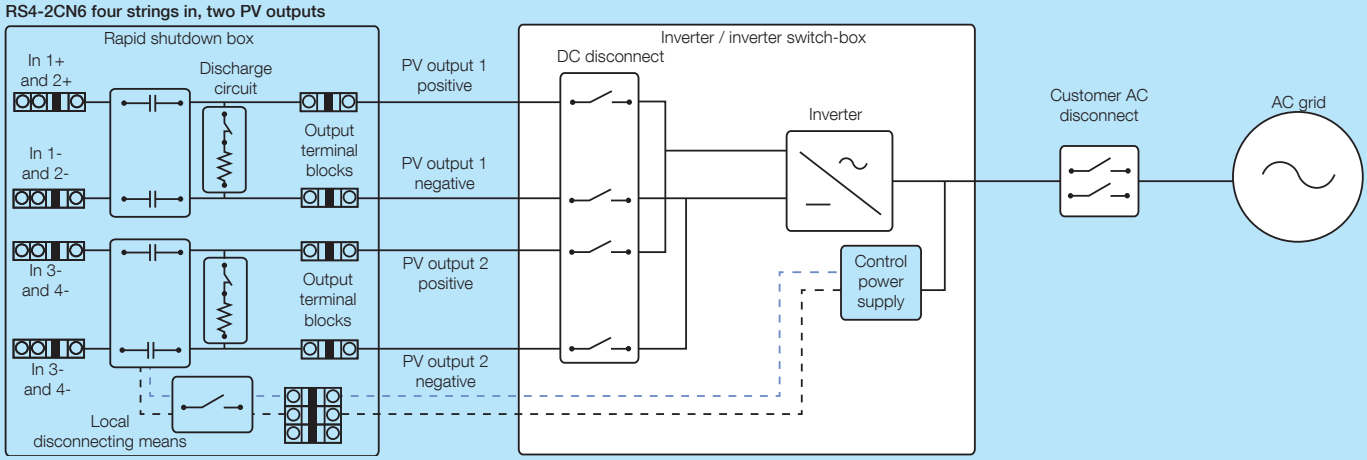
Block diagram for rapid shut down models

RS2-1CN6 two strings in, one PV output



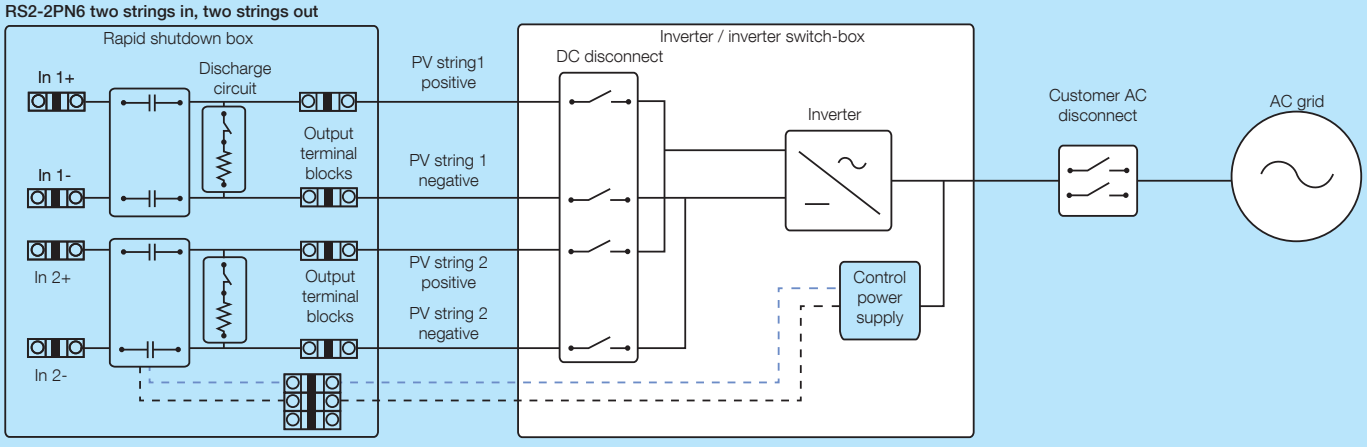
This 2-string model combines the strings to one PV output circuit. The RS2-1CN6 includes a disconnect switch on the front cover to disconnect the PV output conductors from the equipment down stream. Auxillary terminals are provided for connecting an emergency stop button, if desired.

RS4-2CN6 four strings in, two PV outputs



This 4-string model combines 2-strings together in two separate PV output circuits. The RS4-2CN6 includes a disconnect switch on the front cover to disconnect the PV output conductors from the equipment downstream. Auxillary terminals are provided for connecting an emergency stop button, if desired.

RS2-2PN6 two strings in, two strings out



The RS2-2PN6 is a 2-string pass-through with no string combining and no local disconnecting means included. Auxillary terminals are provided for connecting an emergency stop button, if desired.

Support and service

ABB supports its customers with a dedicated, global service organization in more than 60 countries, with strong regional and national technical partner networks providing a complete range of life cycle services.

For more information please contact your local ABB representative or visit:

www.abb.com/solarinverters

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ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

Compliance Document

No. D 15 06 86470 008

Holder of Certificate: **Ningbo Ginlong Technologies Co., Ltd.**
No.57 Jintong Road
Binhai Industrial Park, Xiangshan
315712 Ningbo, Zhejiang
PEOPLE'S REPUBLIC OF CHINA

Product: **Converter**
Grid-connected photovoltaic inverter

This Compliance document confirms the compliance with the listed standards on a voluntary basis. It refers only to the sample submitted for testing and certification and does not certify the quality or safety of the serial products. See also notes overleaf.

Test report no.: 704091364708-00

647558

Date, 2015-06-08 (Zhengdong Ma)

TÜV SÜD Product Service GmbH · Zertifizierstelle · Ridlerstraße 65 · 80339 München · Germany

TÜV®

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Model(s):

**Solis-xK-2G, GCI-xK-2G,
GCI-xK-2G-W, GCI-xK-2G-H
(x=1, 1.5, 2, 2.5, 3, 3.6, 4, 4.6 or 5,
indicates different output powers)**

Parameters:

PDC max:	See attachement
UDC max:	See attachement
UDC startup:	See attachement
VDC MPPT range:	See attachement
IDC max:	See attachement
Ipv max short circuit:	See attachement
Rated output voltage:	230V
Rated output frequency:	50Hz
IAC max:	See attachement
PAC max:	See attachement
PF:	1 (at rated power)
Protection class:	I
Degree of protection:	IP65
Overvoltage category:	III[MAINS], II[PV]
Ambient temperature:	-25°C to +60°C

See attachements for more details

Tested according to:

IEC 61727(ed.2)
IEC 62116(ed.2)

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No. D 15 06 86470 008

Product Service

Model / Parameters	Solis-1K-2G	Solis-1.5K-2G	Solis-2K-2G	Solis-2.5K-2G	Solis-3K-2G	Solis-3.6K-2G	Solis-4K-2G	Solis-4.6K-2G	Solis-5K-2G
PDC max (W)	1200	1800	2300	3000	3500	4200	4600	5300	5300
UDC max (V d.c.)	500	500	500	600	600	600	600	600	600
VDC startup	80	120	120	120	120	120	120	120	120
VDC MPPT range (V d.c.)	70-400	100-400	100-400	100-500	100-500	100-500	100-500	100-500	100-500
IDC max (A d.c.)	10	10	10	10/10	10/10	10/10	15/15	15/15	15/15
Ipv max short circuit (A d.c.)	12	12	12	12/12	12/12	12/12	20/20	20/20	20/20
PAC max (W)	1100	1700	2200	2800	3300	4000	4400	5000	5000
IAC max (A)	5.2	8.1	10.5	13.3	15.7	16	21	23.8	23.8

Model / Parameters	GCI-1K-2G	GCI-1.5K-2G	GCI-2K-2G	GCI-2.5K-2G	GCI-3K-2G	GCI-3.6K-2G	GCI-4K-2G	GCI-4.6K-2G	GCI-5K-2G
PDC max (W)	1200	1800	2300	3000	3500	4200	4600	5300	5300
UDC max (V d.c.)	500	500	500	600	600	600	600	600	600
VDC startup	80	120	120	120	120	120	120	120	120
VDC MPPT range (V d.c.)	70-400	100-400	100-400	100-500	100-500	100-500	100-500	100-500	100-500
IDC max (A d.c.)	10	10	10	10/10	10/10	10/10	15/15	15/15	15/15
Ipv max short circuit (A d.c.)	12	12	12	12/12	12/12	12/12	20/20	20/20	20/20
PAC max (W)	1100	1500	2200	2800	3300	4000	4400	5000	5000
IAC max (A)	5.2	8.1	10.5	13.3	15.7	16	21	23.8	23.8

Compliance Document
No. D 15 06 86470 008

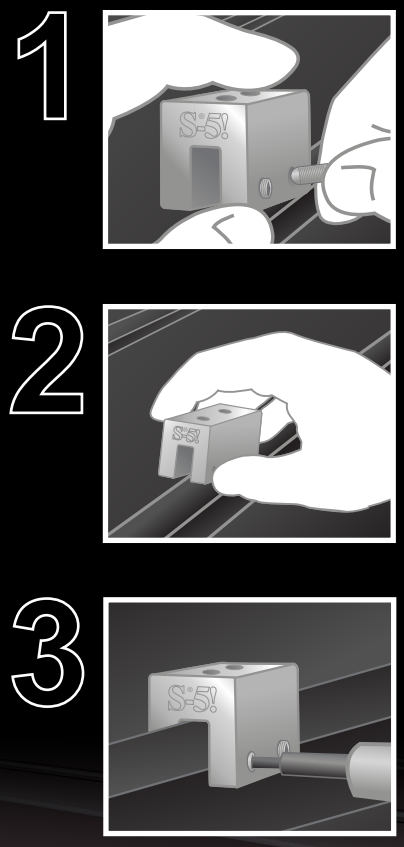
Product Service

Model / Parameters	GCI-1K-2G-W	GCI-1.5K-2G-W	GCI-2K-2G-W	GCI-2.5K-2G-W	GCI-3K-2G-W	GCI-3.6K-2G-W	GCI-4K-2G-W	GCI-4.6K-2G-W	GCI-5K-2G-W
PDC max (W)	1200	1800	2300	3000	3500	4200	4600	5300	5300
UDC max (V d.c.)	500	500	500	600	600	600	600	600	600
VDC startup	80	120	120	120	120	120	120	120	120
VDC MPPT range (V d.c.)	70-400	100-400	100-400	100-500	100-500	100-500	100-500	100-500	100-500
IDC max (A d.c.)	10	10	10	10/10	10/10	10/10	15/15	15/15	15/15
Ipv max short circuit (A d.c.)	12	12	12	12/12	12/12	12/12	20/20	20/20	20/20
PAC max (W)	1100	1500	2200	2800	3300	4000	4400	5000	5000
IAC max (A)	5.2	8.1	10.5	13.3	15.7	16	21	23.8	23.8

Model / Parameters	GCI-1K-2G-H	GCI-1.5K-2G-H	GCI-2K-2G-H	GCI-2.5K-2G-H	GCI-3K-2G-H	GCI-3.6K-2G-H	GCI-4K-2G-H	GCI-4.6K-2G-H	GCI-5K-2G-H
PDC max (W)	1200	1800	2300	3000	3500	4200	4600	5300	5300
UDC max (V d.c.)	500	500	500	600	600	600	600	600	600
VDC startup	80	120	120	120	120	120	120	120	120
VDC MPPT range (V d.c.)	70-400	100-400	100-400	100-500	100-500	100-500	100-500	100-500	100-500
IDC max (A d.c.)	10	10	10	10/10	10/10	10/10	15/15	15/15	15/15
Ipv max short circuit (A d.c.)	12	12	12	12/12	12/12	12/12	20/20	20/20	20/20
PAC max (W)	1100	1500	2200	2800	3300	4000	4400	5000	5000
IAC max (A)	5.2	8.1	10.5	13.3	15.7	16	21	23.8	23.8

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.

The right way to attach almost anything to metal roofs!

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

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

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

S-5!®
The Right Way!

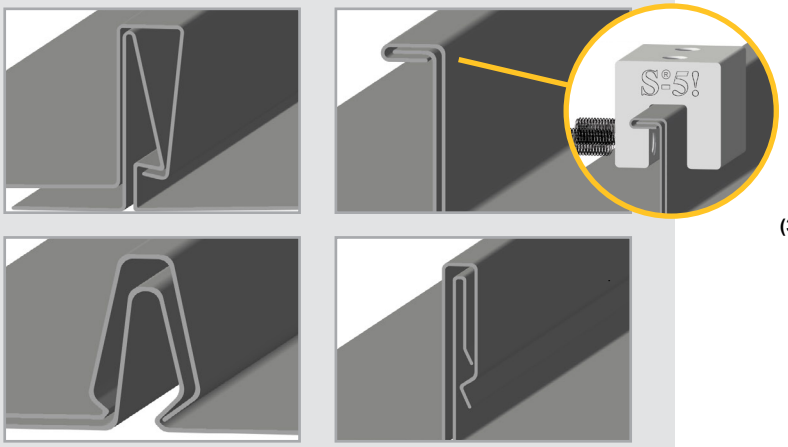
The strength of the S-5-S clamp is in its simple design. The patented setscrews will slightly dimple the metal seam material but not pierce it—leaving roof warranties intact.

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.

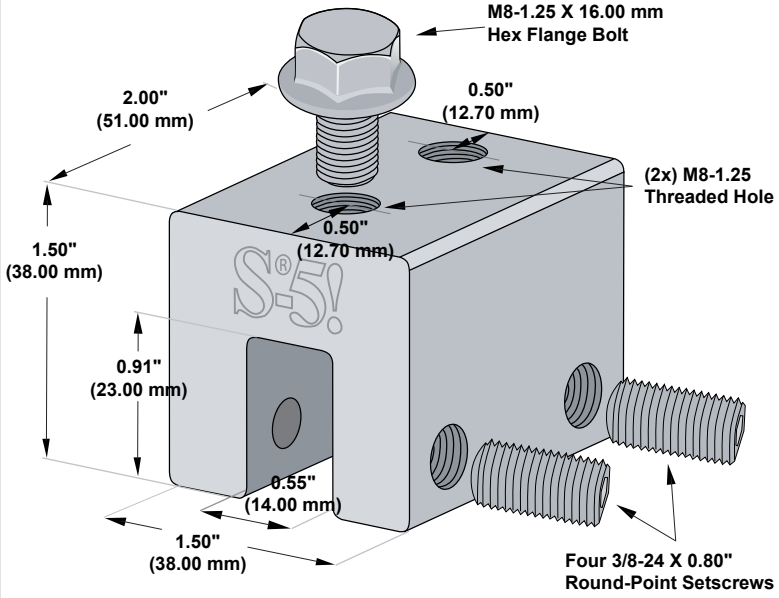
The S-5-S clamp has been tested for load-to-failure results on most major brands and profiles of standing seam roofing. The independent lab test data found at www.S-5.com can be used for load-critical designs and applications. S-5!® holding strength is unmatched in the industry. Profiles that are shaped 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.

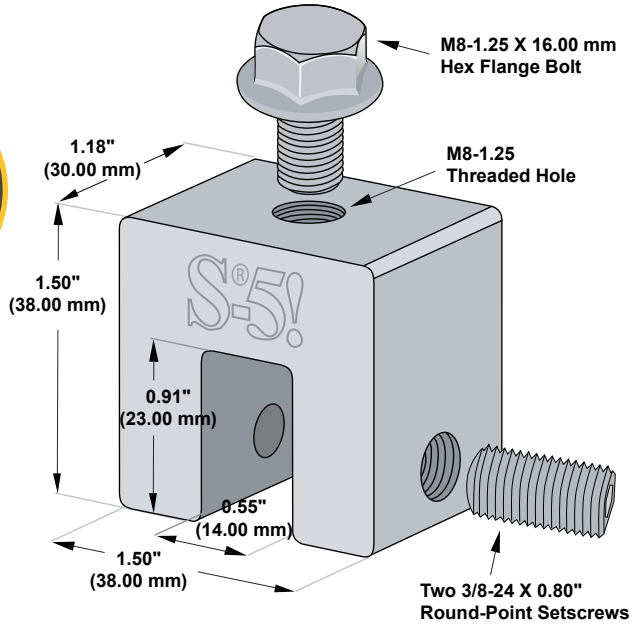
Example Profiles



S-5-S Clamp



S-5-S Mini Clamp

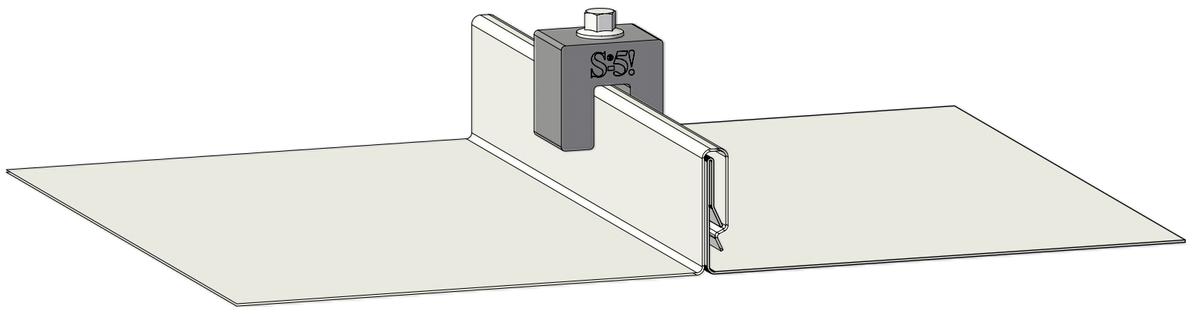


Please note: All measurements are rounded to the second decimal place.

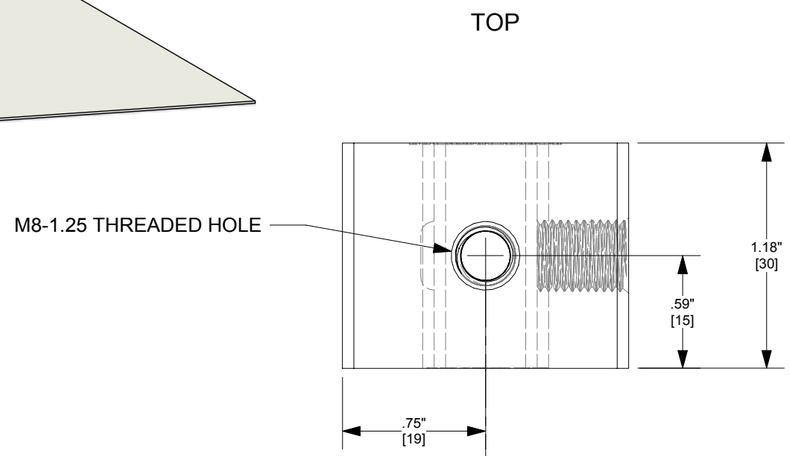
S-5!® Warning! Please use this product responsibly!

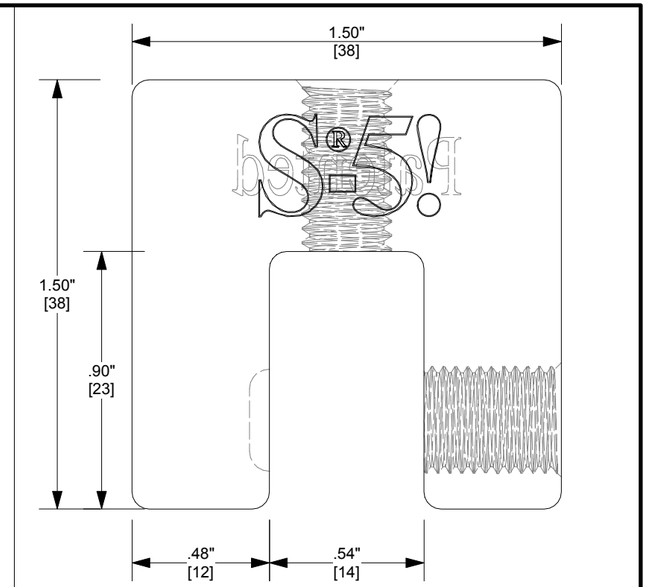
Products are protected by multiple U.S. and foreign patents. Visit the website at www.S-5.com for complete information on patents and trademarks. For maximum holding strength, setscrews should be tensioned and re-tensioned as the seam material compresses. Clamp setscrew tension should be verified using 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.

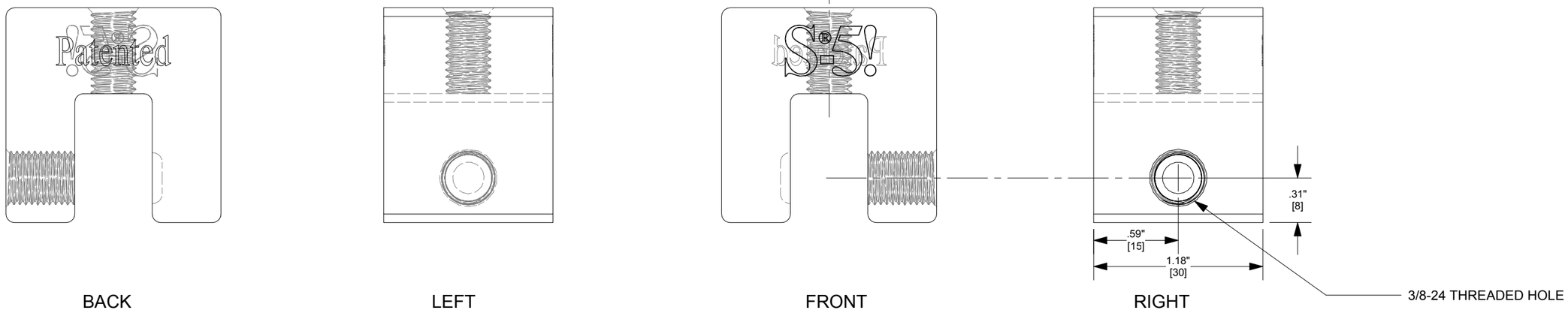
Distributed by



S-5-S Mini

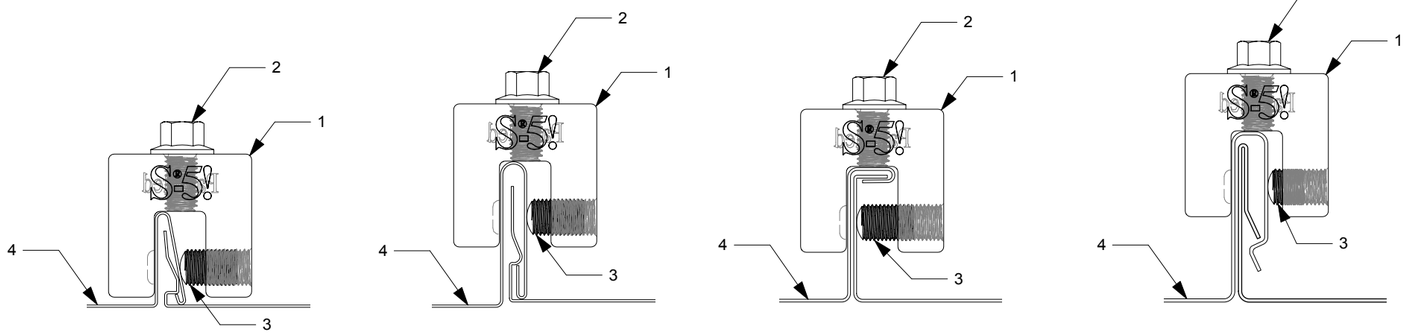






Notes

1. S-5-S MINI
2. M8-1.25 X 16MM HEX FLANGE BOLT
3. 3/8-24 X.8" ROUND POINT SETSCREW
4. EXAMPLE PROFILE



FOR STANDING SEAM SPECIFIC MECHANICAL LOAD TEST INFORMATION AND CLAMP INSTALLATION INFORMATION PLEASE VISIT: WWW.S-5.COM

MATERIAL: **6061 T6**	S-5! The Right Way!
EST ASSEMBLY WEIGHT : **0.27 LBS**	METAL ROOF INNOVATIONS, LTD. 8655 TABLE BUTTE RD COLORADO SPRINGS, CO 80908 719-495-0518 719-495-0045 (FAX)
SUPPLIED HARDWARE: M8-1.25 X 16MM (13MM HEX) 18/8 SS 3/8-24 X .8" 18/8 SS	TITLE: S-5-S MINI
SCALE: **1:0.75**	DRAWING NO. S08-A-1-A CCD | DRAWN BY DMMH | DATE 05/15/2012
OTHER:	