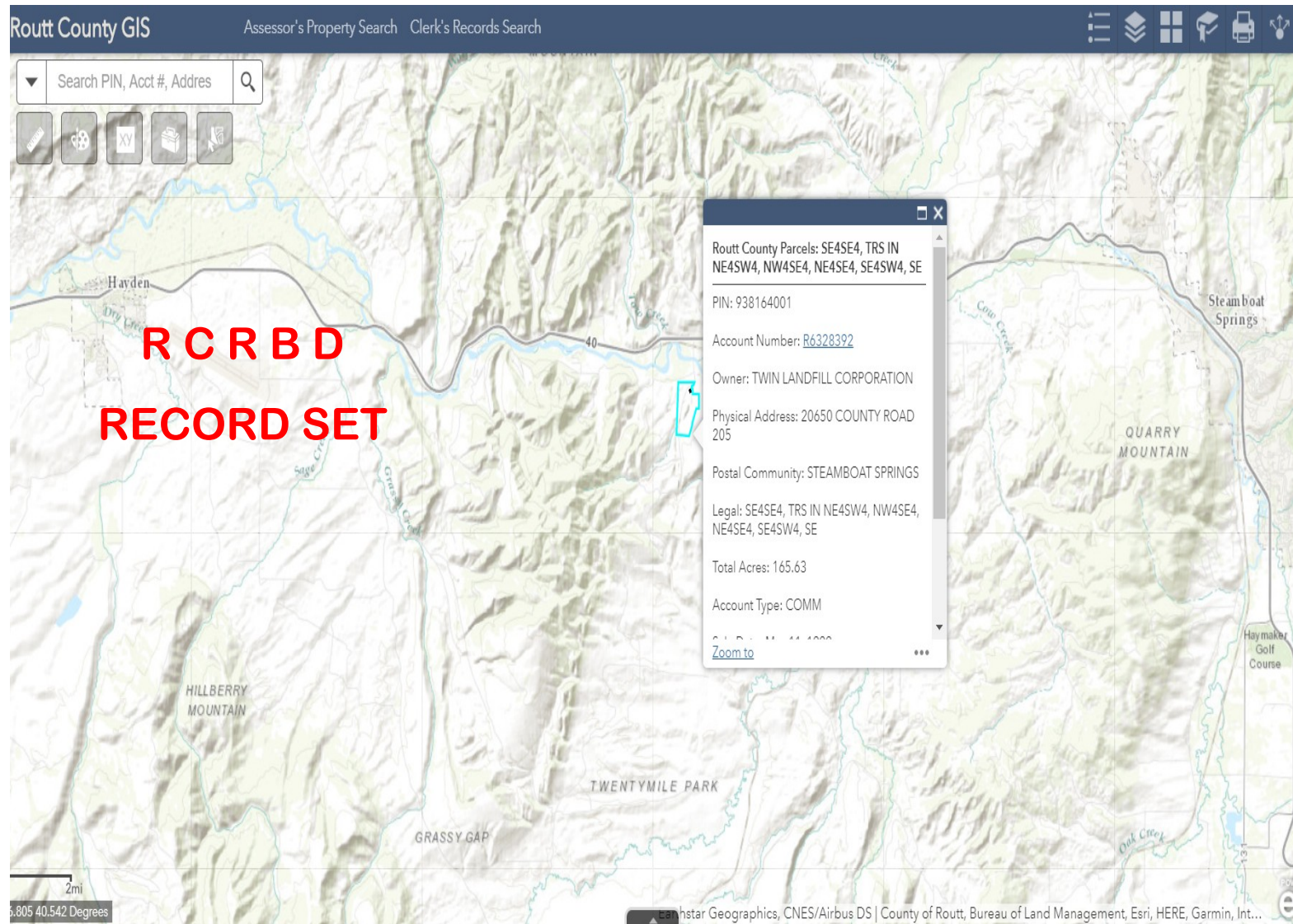


One line approved by YVEA Engineering.
Contact Bill Barva for additional questions
970-971-2244 bbarva@yvea.com.

Solar systems must be inspected by Yampa Valley Electric Association prior to connection to power grid to confirm compliance with automatic disconnects.

Routt County Assessor Location of Twin Landfill Property for Solar Array



Twin Landfill Corp
20655 CR 205, Milner, CO 80487

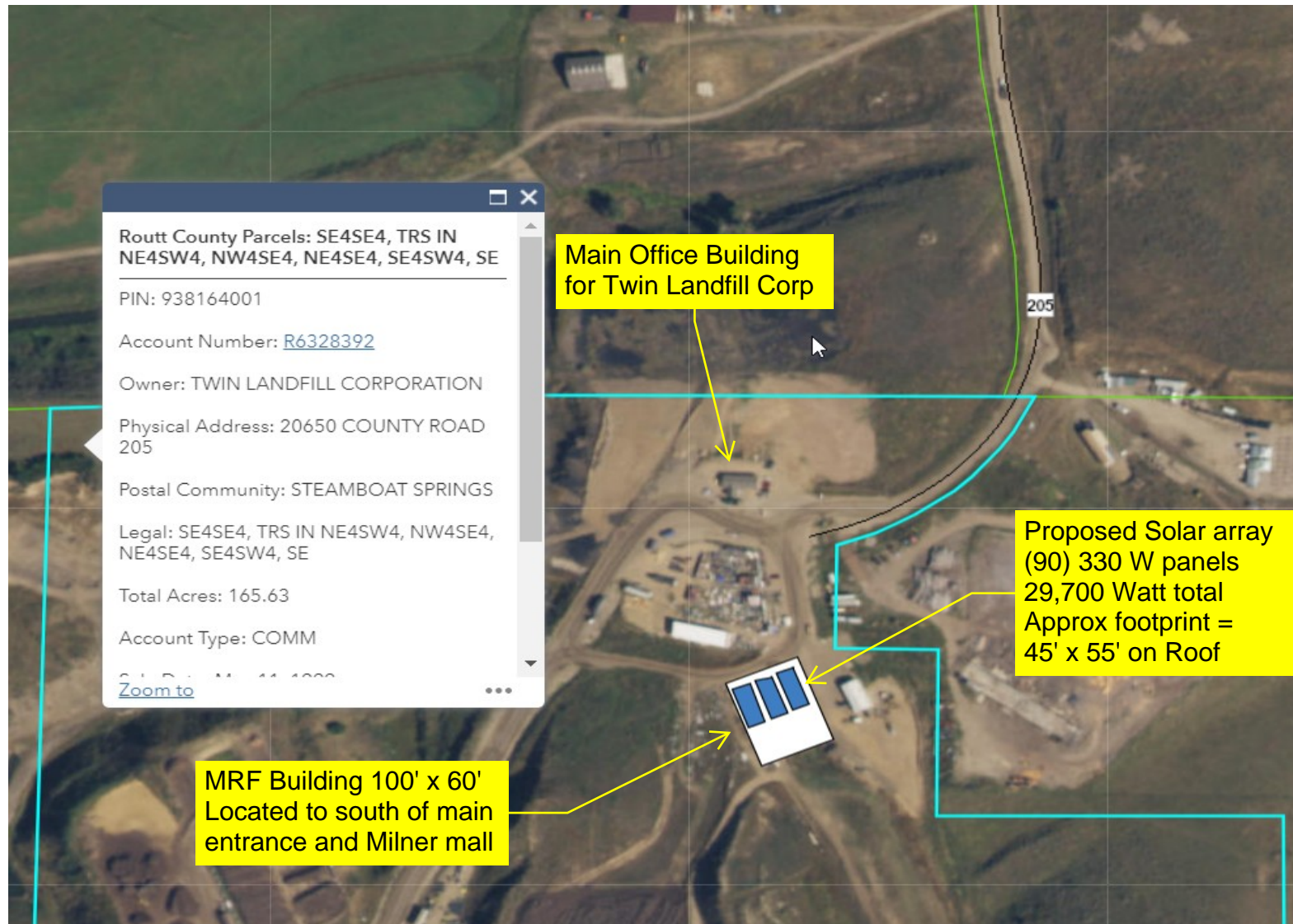
PJ2691-1
Fire Prevention
In: 10/16/2017
Out: 10/24/2017

FULL PERMIT

R C R B D

RECORD SET

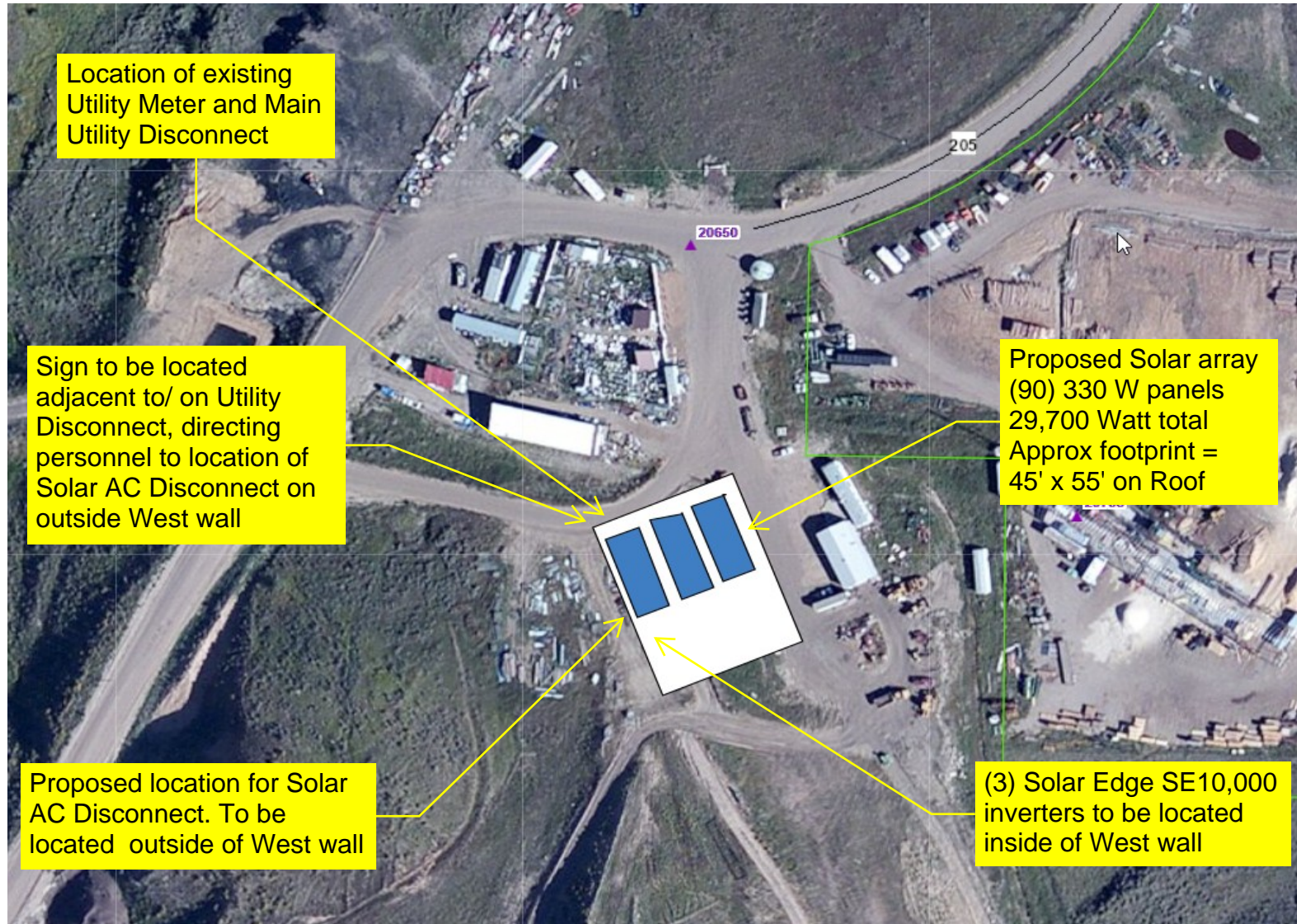
Approximate Location of Solar Array on MRF building at Twin Landfill Corp Property



Twin Landfill Corp
20655 CR 205, Milner, CO 80487

RECORD SET

Approximate Location of Solar Components and Utility equipment on MRF building at Twin Landfill Corp Property



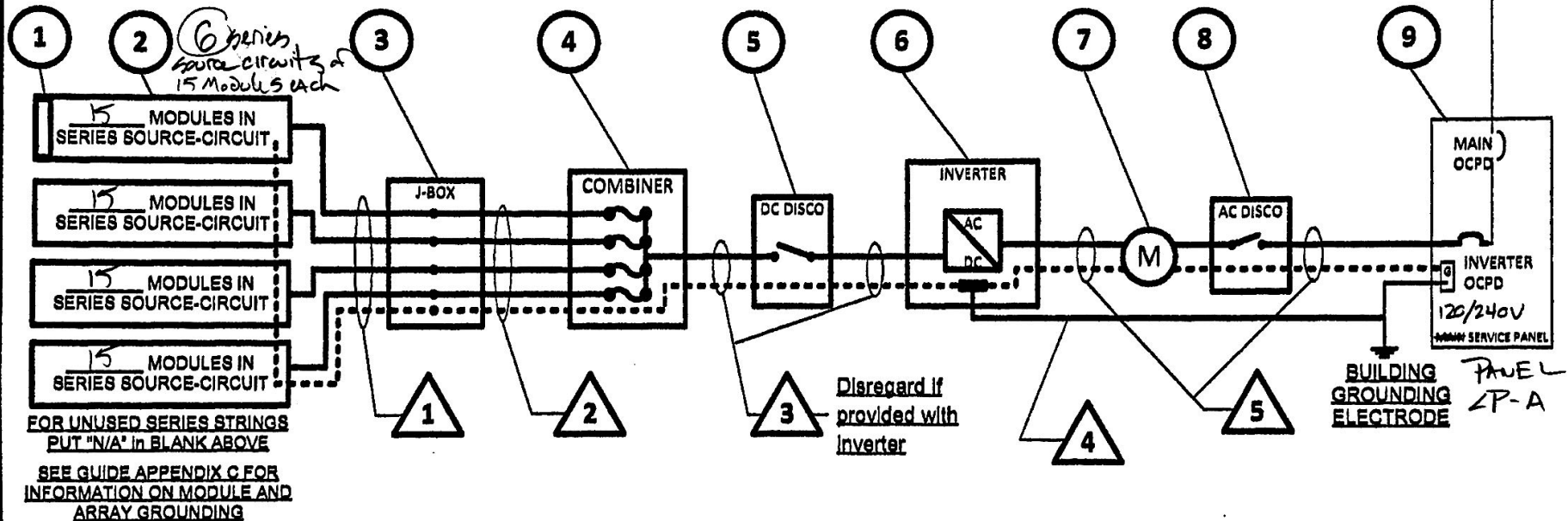
Twin Landfill Corp
20655 CR 205, Milner, CO 80487

STANDARD STRING SYSTEM ELECTRICAL DIAGRAM

One line approved by YVEA Engineering. Contact Bill Barva for additional questions 970-971-2244 bbarva@yvea.com.

Solar systems must be inspected by Yampa Valley Electric Association prior to connection to power grid to confirm compliance with automatic disconnects.

EQUIPMENT SCHEDULE			
TAG	DESCRIPTION	PART NUMBER	NOTES
1	SOLAR PV MODULE	GCL 330	GCL-PG/72H 330
2	PV ARRAY	GCL 330	(90) GCL 330 (29,700W) Total Power 29,700W
3	J-BOX (IF USED)		
4	COMBINER (IF USED)	MNPUG	MIDNITE Solar MNPUG (3) 3units
5	DC DISCONNECT	SE 1000CA-US	SOLAR EDGE SE 1000CA-US (3) 3units
6	DC/AC INVERTER	SE 1000CA-US	SOLAR EDGE SE 1000CA-US (3) 3units
7	GEN METER (IF USED)		
8	AC DISCONNECT (IF USED)	D224N	Square D safety switch 200A 240VAC
9	SERVICE PANEL	PANEL LP-A	240 VAC, 150 A MAIN, 400 A BUS, 50 A INVERTER OCPD (SEE NOTE 5 FOR INVERTER OCPDs, ALSO SEE GUIDE SECTION 9)



CONDUIT AND CONDUCTOR SCHEDULE					
TAG	DESCRIPTION OR CONDUCTOR TYPE	COND. GAUGE	NUMBER OF CONDUCTORS	CONDUIT TYPE	CONDUIT SIZE
1	USE-2 <input type="checkbox"/> or PV WIRE <input checked="" type="checkbox"/>	10	12	N/A	N/A
	BARE COPPER EQ. GRD. COND. (EGC)	6	1	N/A	N/A
2	THWN-2 <input type="checkbox"/> or XHHW-2 <input type="checkbox"/> or RHW-2 <input type="checkbox"/>	N/A			
3	THWN-2 <input checked="" type="checkbox"/> or XHHW-2 <input type="checkbox"/> or RHW-2 <input type="checkbox"/>	8	6	EMT	1"
	INSULATED EGC	8	1	EMT	1"
4	DC GROUNDING ELECTRODE COND.	6	1	EMT	1 1/2"
5	THWN-2 <input checked="" type="checkbox"/> or XHHW-2 <input type="checkbox"/> or RHW-2 <input type="checkbox"/>	6	9	EMT	1 1/2"
	INSULATED EGC	6	3	EMT	1 1/2"

Contractor Name, Address and Phone: <i>Brightside Solar</i> <i>P.O. Box 773115</i> <i>Steamboat Springs</i> <i>CO 80477</i>		One-Line Standard Electrical Diagram for Small-Scale, Single-Phase PV Systems	
Site Name: <i>TWINS LANDFILL CORP</i>		Site Address: <i>20650 CR 205 MILNER, CO</i>	
System AC Size: <i>30kW</i>			
Drawn By: <i>M. P. VA</i>	SIZE	FSCM NO	OWG NO
Checked By:	SCALE	NTS	Date:
			SHEET

NOTES FOR STANDARD STRING SYSTEM ELECTRICAL DIAGRAM

PV MODULE RATINGS @ STC (Guide Section 5)

MODULE MAKE	GCL
MODULE MODEL	GCL-76/72H 330
MAX POWER-POINT CURRENT (I_{MP})	8.73 A
MAX POWER-POINT VOLTAGE (V_{MP})	37.8 V
OPEN-CIRCUIT VOLTAGE (V_{OC})	46.2 V
SHORT-CIRCUIT CURRENT (I_{SC})	9.33 A
MAX SERIES FUSE (OCPD)	15 A
MAXIMUM POWER (P_{MAX})	330 W
MAX VOLTAGE (TYP 600V _{DC})	1500 V
VOC TEMP COEFF (mV/°C <input checked="" type="checkbox"/> or %/°C <input checked="" type="checkbox"/>)	-0.22%
IF COEFF SUPPLIED, CIRCLE UNITS	

NOTES FOR ALL DRAWINGS:

OCPD = OVERCURRENT PROTECTION DEVICE
NATIONAL ELECTRICAL CODE® REFERENCES
SHOWN AS (NEC XXX.XX)

INVERTER RATINGS (Guide Section 4)

INVERTER MAKE	SOLAR EDGE
INVERTER MODEL	SE 10,000A-US (3)
MAX DC VOLT RATING	500 V
MAX POWER @ 40°C	10,000 W
NOMINAL AC VOLTAGE	240 V
MAX AC CURRENT	42 A
MAX OCPD RATING	60 A

SIGNS-SEE GUIDE SECTION 7

SIGN FOR DC DISCONNECT

PHOTOVOLTAIC POWER SOURCE	
RATED MPP CURRENT	28.28 A
RATED MPP VOLTAGE	350 V
MAX SYSTEM VOLTAGE	500 V
MAX CIRCUIT CURRENT	30 A
WARNING: ELECTRICAL SHOCK HAZARD-LINE AND LOAD MAY BE ENERGIZED IN OPEN POSITION	

SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)

SOLAR PV SYSTEM AC POINT OF CONNECTION	
AC OUTPUT CURRENT	42 A
NOMINAL AC VOLTAGE	240 V
THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)	

NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 8 and 8 and Appendix D):

- 1.) LOWEST EXPECT AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP -30 °C
- 2.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMPERATURE 25 °C
- 2.) 2005 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.8" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES),
 - a) 12 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH 180 OF 7.68 AMPS OR LESS WHEN PROTECTED BY A 12-AMP OR SMALLER FUSE.
 - b) 10 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH 180 OF 9.8 AMPS OR LESS WHEN PROTECTED BY A 15-AMP OR SMALLER FUSE.

NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):

- 1) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENT? YES ☒ NO ☐ N/A ☐
- 2) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENT? YES ☐ NO ☐ N/A ☒
- 3) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.53 SIGN OR OCPD RATING AT DISCONNECT
- 4) SIZE INVERTER OUTPUT CIRCUIT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING. (See Guide Section 9)
- 5) TOTAL OF INVERTER OCPD(s), ONE FOR EACH INVERTER. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN 690.64(B)(2)(a)? YES ☒ NO ☐

Contractor Name,
Address and Phone:

RightSide Solar
703-304-7731
Stamant Springs
GA 30447

Notes for One-Line Standard Electrical Diagram for Single-Phase PV Systems

Site Name: TWIN LANDFILL CORP
Site Address: 20650 CR 205, MILNEZ, CO
System AC Size: 30 kW

Drawn By: <u>M. Piva</u>	SIZE	FSCM NO	DWG NO	REV
Checked By:	SCALE	NTS	Date:	SHEET

(1)



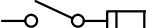
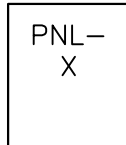

(1) Provide new breaker as shown.

DISTRIBUTION BOARD - 1A					
Load	kVA				A
	Cont	Rec	Other	Total	
PANEL LP-A	4.2	2.3	18.0	25.5	31.8
DISTRIBUTION BOARD - 1B			79.6	79.6	96.9
SubTotal	4.2	2.3	97.6	105.1	kVA
25% of Largest Motor				5.6	kVA
Total				110.7	kVA
			230.7	Amps at	480 V

DISTRIBUTION BOARD - 1B					
	kVA				A
Load	Cont	Rec	Other	Total	
VB-1			11.6	14.5	18
VB-2			11.6	14.5	18
VB-3			11.6	14.5	18
F66			22.4	28.1	34
BALER CONVEYOR			2.5	3.1	4
LINEAR ACTUATOR-1			.9	1.1	1
LINEAR ACTUATOR-2			.9	1.1	1
MCC-1A			17.9	19.5	23
Sub Total			79.6	79.6	kVA
25% of Largest Motor				5.6	kVA
Total				85.2	kVA
			102.5	Amps at	480 V

MOTOR CONTROL CENTER MCC-1A					
	kVA				A
Load	Cont	Rec	Other	Total	
TURTABLE			6.3	7.9	10
INCLINE			6.3	7.9	10
DRUM			1.7	2.2	3
MAGNET			1.7	2.2	3
WIPER			1.7	2.2	3
SubTotal			17.9	17.9	kVA
25% of Largest Motor				1.6	kVA
Total				19.5	kVA
			23.4	Amps at	480 V

GENERAL NOTES	
1.	ALL WORK SHOWN IS NEW, UNLESS NOTED OTHERWISE.
2.	WORK TO BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE, 2011 EDITION.
2.	SEAL ALL CONDUIT PENETRATIONS OF FLOORS AND FIRE RATED ASSEMBLIES TO MAINTAIN FIRE RATING.
3.	PROVIDE NEW TYPEWRITTEN DIRECTORIES REFLECTING WORK PERFORMED FOR ALL NEW PANELBOARDS IN THIS PROJECT.

SYMBOLS	POWER SYMBOLS	NOTES
	CONDUIT INSTALLED CONCEALED ABOVE CEILINGS OR IN WALLS IN FINISHED AREAS OR EXPOSED IN UNFINISHED AREAS	
	UTILITY METER	
	STATIONARY — CIRCUIT BREAKER; RATING AS SHOWN ON PLANS	
	SWITCH AND FUSE; RATING AS SHOWN ON PLANS	
	SURFACE MOUNTED PANELBOARD	
	GROUND ROD — COPPER CLAD STEEL	

MRF BLDG
TWIN ENVIRO

Milner, CO
80477

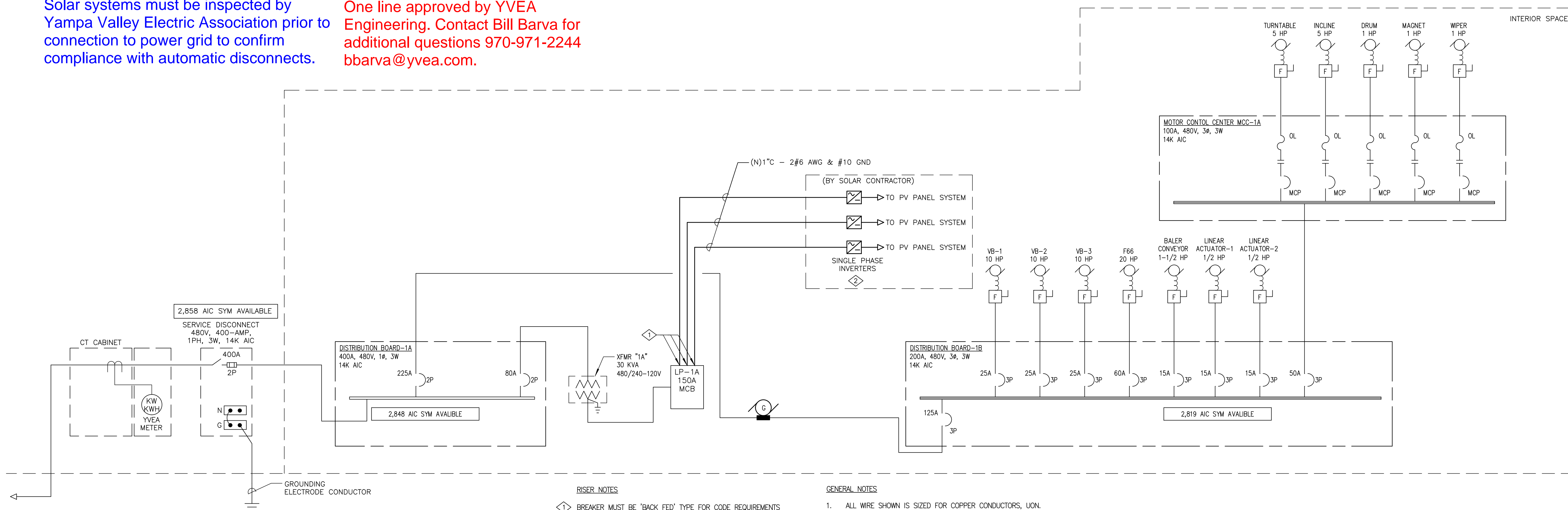
BRIGHTSIDE
SOLAR

PO Box 773484
Steamboat Springs, CO
80477

1 PANEL & LOAD SCHEDULES

Solar systems must be inspected by Yampa Valley Electric Association prior to connection to power grid to confirm compliance with automatic disconnects.

One line approved by YVEA Engineering. Contact Bill Barva for additional questions 970-971-2244 bbarva@yvea.com.



2 SINGLE LINE DIAGRAM

RISER NOTES

- ① BREAKER MUST BE 'BACK FED' TYPE FOR CODE REQUIREMENTS FOR A SOLAR PV SYSTEM FEED. LOCATE WITHIN PANELBOARD AT OPPOSITE END OF WHERE UTILITY FEED IS LOCATED PER CODE.
- ② PROVIDED BY SOLAR CONTRACTOR.

GENERAL NOTES

1. ALL WIRE SHOWN IS SIZED FOR COPPER CONDUCTORS, UON
2. ALL WORK SHOWN IS EXISTING, UON.

WILDER ENGINEERING LLC
Andrew Wilder PE
1170 Blue Sage Drive
Steamboat Springs, CO 80487
P: 970-819-7848
E: andy@wilder-eng.com

[illegible]

Scale:	24x36 NTS
Description:	LEGEND, SINGLE LINE DIAG
Project Name:	MURPHY BUILDING
Project Number:	2017103
Sheet No.	E-100



GCL-P6/72H

HIGH EFFICIENCY
MULTICRYSTALLINE MODULE

GCL-P6/72H 320-340 Watt

340^W

MAXIMUM POWER OUTPUT

17.5%

MAXIMUM MODULE EFFICIENCY

0~+5^W

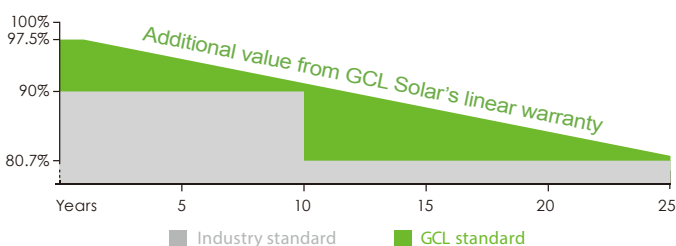
POWER OUTPUT GUARANTEE

Trust GCL to Deliver Reliable Performance Over Time

- World-class manufacturer of crystalline silicon photovoltaic modules
- Fully automatic facility and world-class technology
- Rigorous quality control to meet the highest standard:
ISO9001:2008, ISO 14001: 2004 and OHSAS: 18001 2007
- Tested for harsh environments (salt mist, ammonia corrosion and sand blowing test: IEC 61701, IEC 62716, DIN EN 60068-2- 68)
- Long term reliability tests
- 2*100% EL inspection ensuring defect-free modules

LINEAR PERFORMANCE WARRANTY

10 Years Product Warranty 25 Years Linear Power Warranty



Ideal choice for large scale utility solar plant



Selected encapsulating material and stringent production process control ensure product highly PID resistant



Passed sand blowing test, salt mist test and ammonia test, flexible for harsh environments



Optimized system performance by module level current sorting



Special cell process ensures great performance in low irradiance environment



High quality wafer plus advanced cell technology guarantee high module efficiency



High transparent self-cleaning tempered glass increases module power output and ensures easy maintenance

Additional insurance backed by Swiss RE



Bringing Green Power to Life

GCL-P6/72H

HIGH EFFICIENCY MULTICRYSTALLINE MODULE

ELECTRICAL SPECIFICATION (STC)

TYPE (STC)	GCL-P6/72H 320	GCL-P6/72H 325	GCL-P6/72H 330	GCL-P6/72H 335	GCL-P6/72H 340
Maximum Power P_{max} (W)	320	325	330	335	340
Maximum Power Voltage V_{mp} (V)	37.4	37.6	37.8	38.0	38.2
Maximum Power Current I_{mp} (A)	8.56	8.64	8.73	8.82	8.90
Short Circuit Current I_{sc} (A)	9.17	9.24	9.33	9.41	9.49
Open Circuit Voltage V_{oc} (V)	45.8	46.0	46.2	46.4	46.6
Module Efficiency (%)	16.5	16.7	17.0	17.3	17.5
Power Output Tolerance P_m (W)	0~+5				

Values at Standard Test Conditions STC (Air Mass 1.5, Irradiance 1000W/m², Cell Temperature 25 °C).

ELECTRICAL SPECIFICATION (NOCT)

Maximum Power P_{max} (W)	231.20	234.61	237.71	240.37	243.95
Maximum Power Voltage V_{mp} (V)	34.10	34.30	34.50	34.70	34.90
Maximum Power Current I_{mp} (A)	6.78	6.84	6.89	6.93	6.99
Short Circuit Current I_{sc} (A)	7.38	7.46	7.58	7.63	7.68
Open Circuit Voltage V_{oc} (V)	42.5	42.7	42.9	43.1	43.3

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

MECHANICAL DATA

Solar Cells	Poly 156×156mm (6 inches)
Cell Orientation	72 Cells (6×12)
Module Dimensions	1956×992×40mm (77 × 39.05 × 1.57 inches)
Weight	22.5kg/26kg
Glass	High transparency solar glass 3.2mm (0.13 inches) or 4mm (0.16 inches)
Backsheet	White
Frame	Silver, anodized aluminium alloy
J-Box	IP67 Rated
Cables	4.0mm ² (0.006 inches ²), 1200mm (47.2 inches)
Connector	Original MC4 or Compatible
Wind Load/ Snow Load	2400Pa/5400Pa*

*For more details please check the installation manual of GCLSI

TEMPERATURE RATINGS

Nominal Operating Cell Temperature (NOCT)	45±2°C
Temperature Coefficient of P_{max}	-0.41%/ °C
Temperature Coefficient of V_{oc}	-0.32%/ °C
Temperature Coefficient of I_{sc}	+0.055%/ °C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC(IEC)
Max Series Fuse Rating	15A

WARRANTY

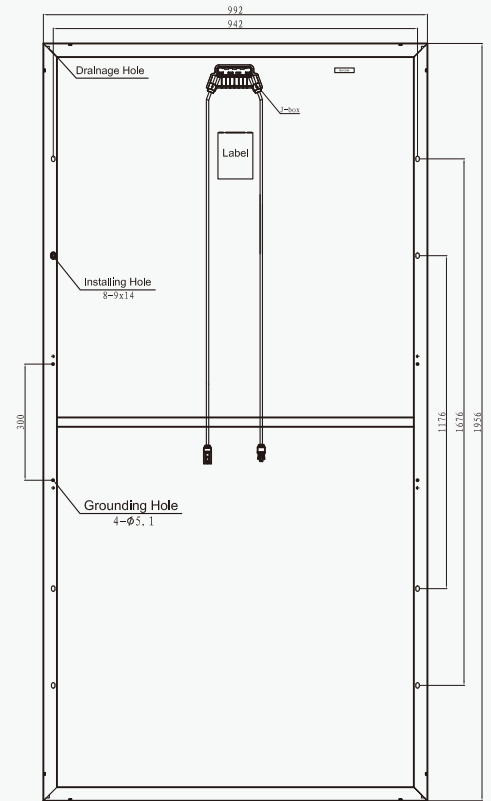
10 years Product Workmanship Warranty
25 years linear Power Warranty

PACKAGING CONFIGURATION

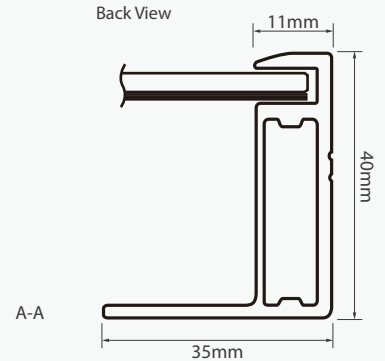
Modules per box: 26 pieces
Modules per 40' container: 624 pieces

(Please refer to GCL standard warranty for details)

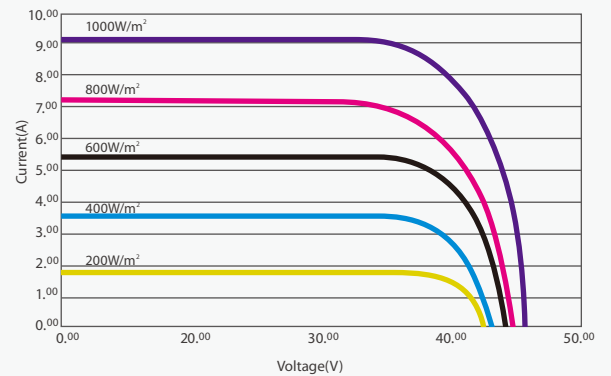
MODULE DIMENSION



Back View



I-V CURVES OF MODULE (315W)



Excellent performance under weak light conditions: at an irradiance intensity of 200W/m² W/m(AM 1.5, 25 °C), 96.5% or higher of the STC efficiency (1000 W/m²) is achieved



Bringing Green Power to Life
<http://en.gclsi.com>

GCL-EN-P6/72-2016-V2.0

CAUTION: READ INSTALLATION MANUAL BEFORE USING THE PRODUCT

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SolarEdge Power Optimizer

Module Add-On For North America

P300 / P320 / P370 / P400 / P405



POWER OPTIMIZER

PV power optimization at the module-level

- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety



SolarEdge Power Optimizer

Module Add-On for North America

P300 / P320 / P370 / P400 / P405

	P300 (for 60-cell mod- ules)	P320 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	
INPUT						
Rated Input DC Power ⁽¹⁾	300	320	370	400	405	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105	Vdc
Maximum Short Circuit Current (Isc)	10	11		10.1		Adc
Maximum DC Input Current	12.5	13.75		12.63		Adc
Maximum Efficiency	99.5					%
Weighted Efficiency	98.8					%
Overvoltage Category	II					
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)						
Maximum Output Current	15					Adc
Maximum Output Voltage	60				85	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)						
Safety Output Voltage per Power Optimizer	1					Vdc
STANDARD COMPLIANCE						
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3					
Safety	IEC62109-1 (class II safety), UL1741					
RoHS	Yes					
INSTALLATION SPECIFICATIONS						
Maximum Allowed System Voltage	1000					Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters					
Dimensions (W x L x H)	128 x 152 x 27.5 / 5 x 5.97 x 1.08			128 x 152 x 35 / 5 x 5.97 x 1.37	128 x 152 x 50 / 5 x 5.97 x 1.96	mm / in
Weight (including cables)	630 / 1.4			750 / 1.7	845 / 1.9	gr / lb
Input Connector	MC4 Compatible		MC4 / Amphenol AH4	MC4 Compatible		
Output Wire Type / Connector	Double Insulated; MC4 Compatible		Double Insulated; MC4 / Amphenol AH4	Double Insulated; MC4 Compatible		
Output Wire Length	0.95 / 3.0		1.2 / 3.9			m / ft
Operating Temperature Range	-40 - +85 / -40 - +185					°C / °F
Protection Rating	IP68 / NEMA6P					
Relative Humidity	0 - 100					%

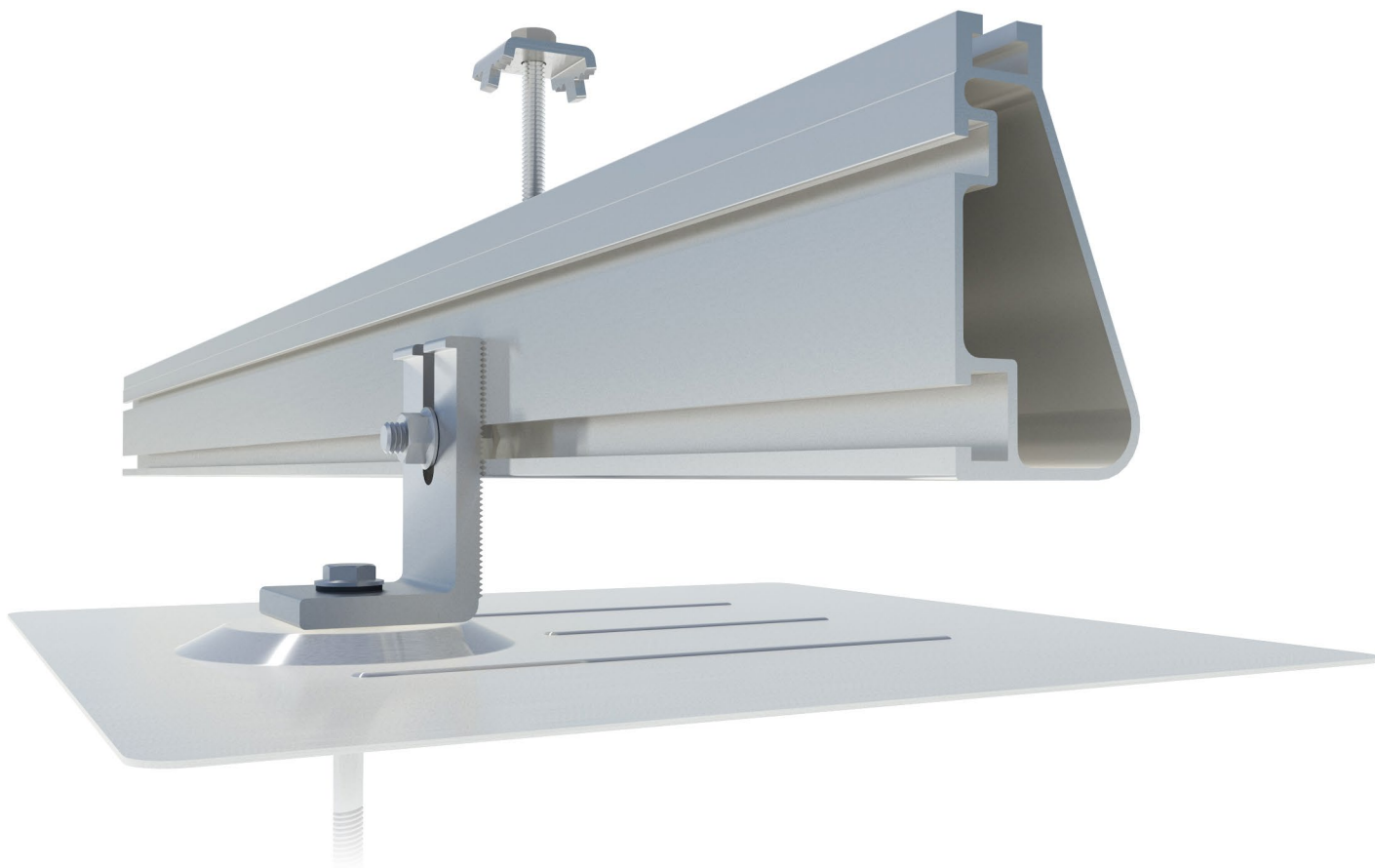
⁽¹⁾ Rated STC power of the module. Module of up to +5% power tolerance allowed.

PV SYSTEM DESIGN USING A SOLAREEDGE INVERTER ⁽²⁾⁽³⁾	SINGLE PHASE HD-WAVE	SINGLE PHASE	THREE PHASE 208V	THREE PHASE 480V	
Minimum String Length (Power Optimizers)	8		10	18	
Maximum String Length (Power Optimizers)	25		25	50	
Maximum Power per String	5700 (6000 with SE7600H-US)	5250	6000	12750	W
Parallel Strings of Different Lengths or Orientations	Yes				

⁽²⁾ For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf.

⁽³⁾ It is not allowed to mix P405 with P300/P370/P400/P600/P700 in one string.





Built for solar's toughest roofs.

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

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



Strength Tested

All components evaluated for superior structural performance.



PE Certified

Pre-stamped engineering letters available in most states.



Class A Fire Rating

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



Design Software

Online tool generates a complete bill of materials in minutes.



Integrated Grounding

UL 2703 system eliminates separate module grounding components.



20 Year Warranty

Twice the protection offered by competitors.

XR Rails

XR10 Rail



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

- 6' spanning capability
- Moderate load capability
- Clear anodized finish

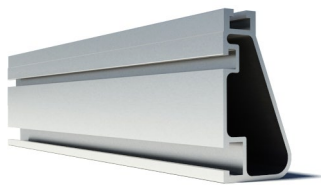
XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear & black anod. finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

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

Internal Splices

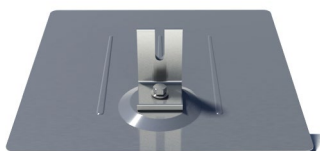


All rails use internal splices for seamless connections.

- Self-tapping screws
- Varying versions for rails
- Grounding Straps offered

Attachments

FlashFoot



Anchor, flash, and mount with all-in-one attachments.

- Ships with all hardware
- IBC & IRC compliant
- Certified with XR Rails

Slotted L-Feet



Drop-in design for rapid rail attachment.

- High-friction serrated face
- Heavy-duty profile shape
- Clear & black anod. finish

Standoffs



Raise flush or tilted systems to various heights.

- Works with vent flashing
- Ships pre-assembled
- 4" and 7" Lengths

Tilt Legs



Tilt assembly to desired angle, up to 45 degrees.

- Attaches directly to rail
- Ships with all hardware
- Fixed and adjustable

Clamps & Grounding

End Clamps



Slide in clamps and secure modules at ends of rails.

- Mill finish & black anod.
- Sizes from 1.22" to 2.3"
- Optional Under Clamps

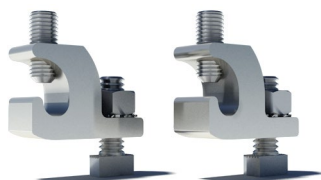
Grounding Mid Clamps



Attach and ground modules in the middle of the rail.

- Parallel bonding T-bolt
- Reusable up to 10 times
- Mill & black stainless

T-Bolt Grounding Lugs



Ground system using the rail's top slot.

- Easy top-slot mounting
- Eliminates pre-drilling
- Swivels in any direction

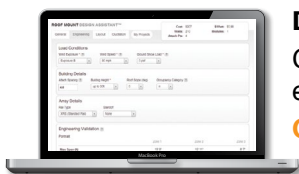
Accessories



Provide a finished and organized look for rails.

- Snap-in Wire Clips
- Perfected End Caps
- UV-protected polymer

Free Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

Go to IronRidge.com/rm



NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

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August 28, 2017

R C R B D

Brightside Solar, Inc.
PO Box 773115
Steamboat Springs, CO 80477

RECORD SET

Reference: Twin Enviro, Material Recycling Facility

Subject: Proposed Solar Array

Dear Mr. Piva,

This letter addresses your proposal to place a 90 panel solar array on the roof of the Twin Enviro Landfill's material recycling facility (MRF). The proposed array will consist of 6 rows of 15 panels flush mounted to Ironridge XR1000 rail systems. The rails will be secured to the steel building roof structure with S-5 Versa brackets placed at 48" on center and attached to the existing Z-girt purlins with (3)1/4" self-drilling screws at each bracket. The proposed array will result in a distributed load of 2.5psf on the existing roof. The MRF is a prefabricated steel building placed on a cast in place concrete foundation. The 65'x100' building is a typical steel building with beam-column superstructure and 12" Z-girt purlins spanning between the beam-column locations at 4'-8" on center. The shed roof is pitched to the southwest at approximately 3 degrees. The design documents from Star Building Systems indicate the MRF was designed in 2015 to comply with the 2009 IBC code. The roof system was designed using a 3.5 psf dead load, a 90 psf ground snow load, and an additional 20 psf live load. The building was also designed for wind loading of 90 mph, and exposure C. I performed a site visit on July 3, 2017 to view the existing structure, and the building was performing well with no visible structural issues.

I have also reviewed the load charts and specifications for the Ironridge XR1000 rail system you intend to use on the roof mounted solar array at the MRF. The load charts show a maximum allowable span of 57" between mounts for a ground snow load of 90psf and 100mph wind loading. Your proposed mount spacing of 48" on center will be more than adequate to support the rail systems. The 90 psf ground snow load design of the MRF corresponds to a roof snow load of 63 psf. The appropriate roof snow load for Milner is 55 psf according to the RCRBD design value page in the SEAC publication. Based on this fact and the array dead load of 2.5 psf no structural modifications to the existing building will be required to properly mount and support the proposed array. Thank you for your attention to these items and if you have any additional questions or concerns please do not hesitate to contact me.

Sincerely,

Craig Frithsen, PE



Milner Landfill MRF

PITCHED ROOF

Project Details

NAME	Milner Landfill MRF	DATE	2017-08-28
LOCATION	Steamboat Springs, CO, 80487	TOTAL MODULES	90
MODULE	Mission Solar Energy:MSE335SE1J (40mm)	TOTAL WATTS	30,150
DIMENSIONS	77.6" x 39.0" x 1.6" (1mm x 990mm x 40mm)	ATTACHMENT PTS	156

Load Assumptions

WIND EXPOSURE	C
WIND SPEED	100 mph
GROUND SNOW LOAD	90 psf
ATTACHMENT SPACING	4.0 ft

Building Details

ROOF SLOPE	5 deg
BUILDING HEIGHT	30 ft
RISK CATEGORY	I

Engineering

XR1000 SPAN DETAILS (Portrait)

Roof Zone	Max Span	Max Cantilever
1	5' 1"	2'
2	5' 1"	2'
3	5' 1"	2'

MAXIMUM REACTION FORCES (Portrait)

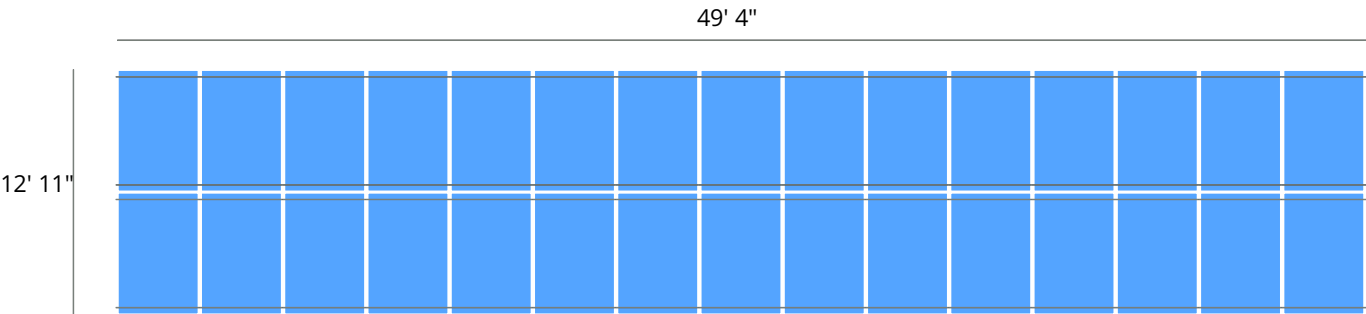
Roof Zone	Down	Uplift	Lateral
1	819.00	-143.00	72.00
2	819.00	-277.00	72.00
3	819.00	-444.00	72.00

System Weight

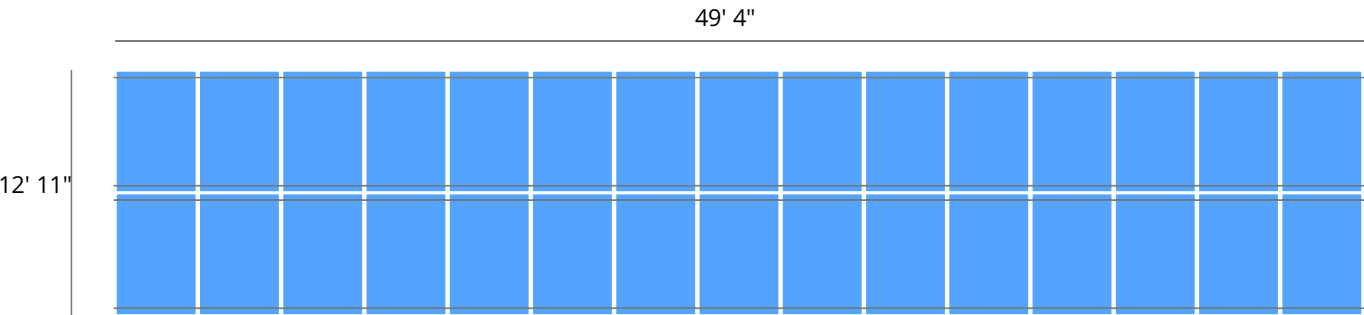
TOTAL WEIGHT	4866 lbs
WEIGHT/ATTACHMENT	31.2 lbs
DISTRIBUTED WEIGHT	2.5 psf
RACKING WEIGHT	659.5 lbs

Array Details

Array	Cols	Rows	Orientation	Row Length	Provided Rails	Attachments	Clamps	Splices
A	15	2	PORTRAIT	49' 4"	200'[8 x 14', 8 x 11']	52	64	12

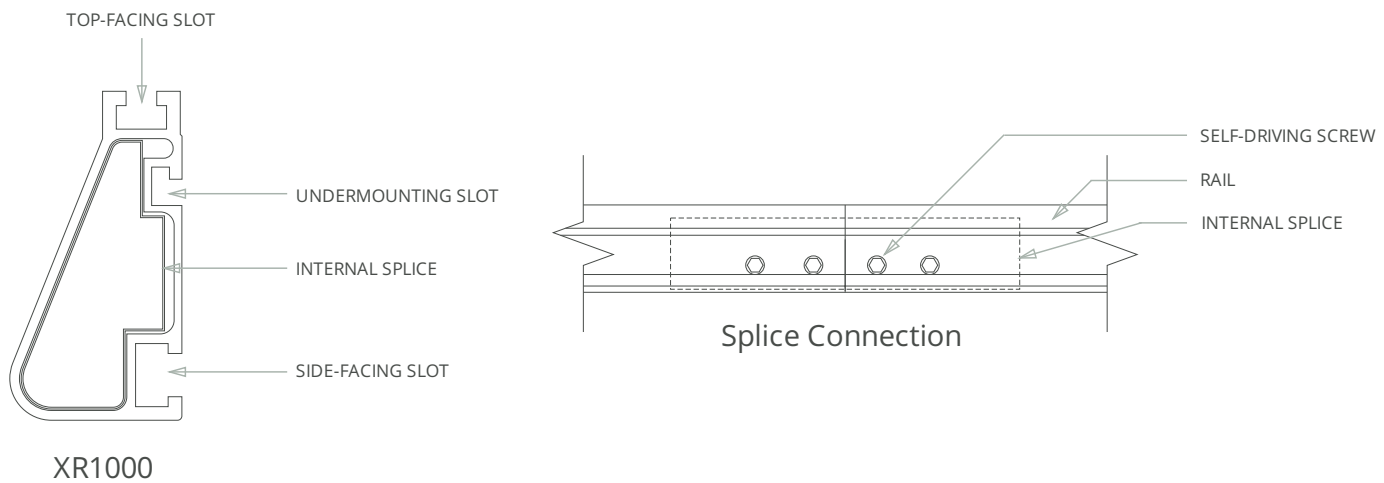


Array	Cols	Rows	Orientation	Row Length	Provided Rails	Attachments	Clamps	Splices
B	15	2	PORTRAIT	49' 4"	200'[8 x 14', 8 x 11']	52	64	12

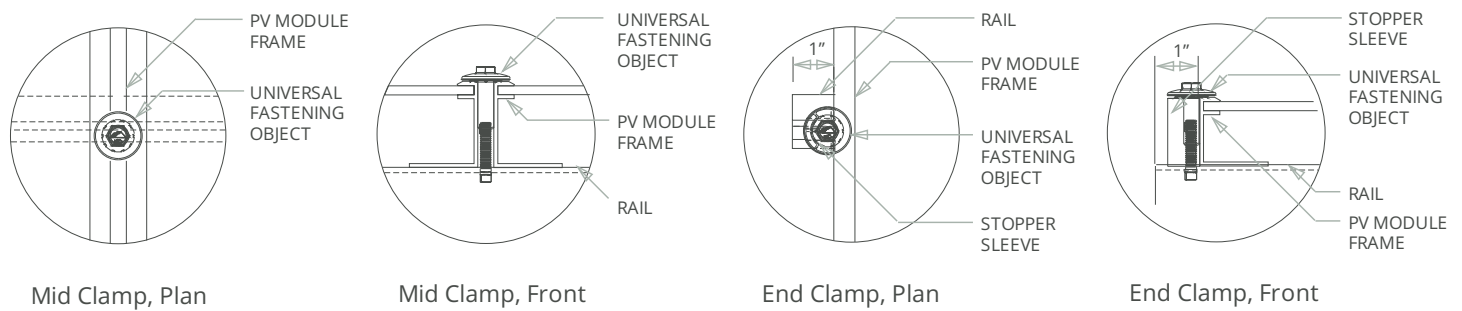


Note: The images displayed in this report are meant to represent one portion of the array. The use of a break line indicates that the array may continue on beyond that point.

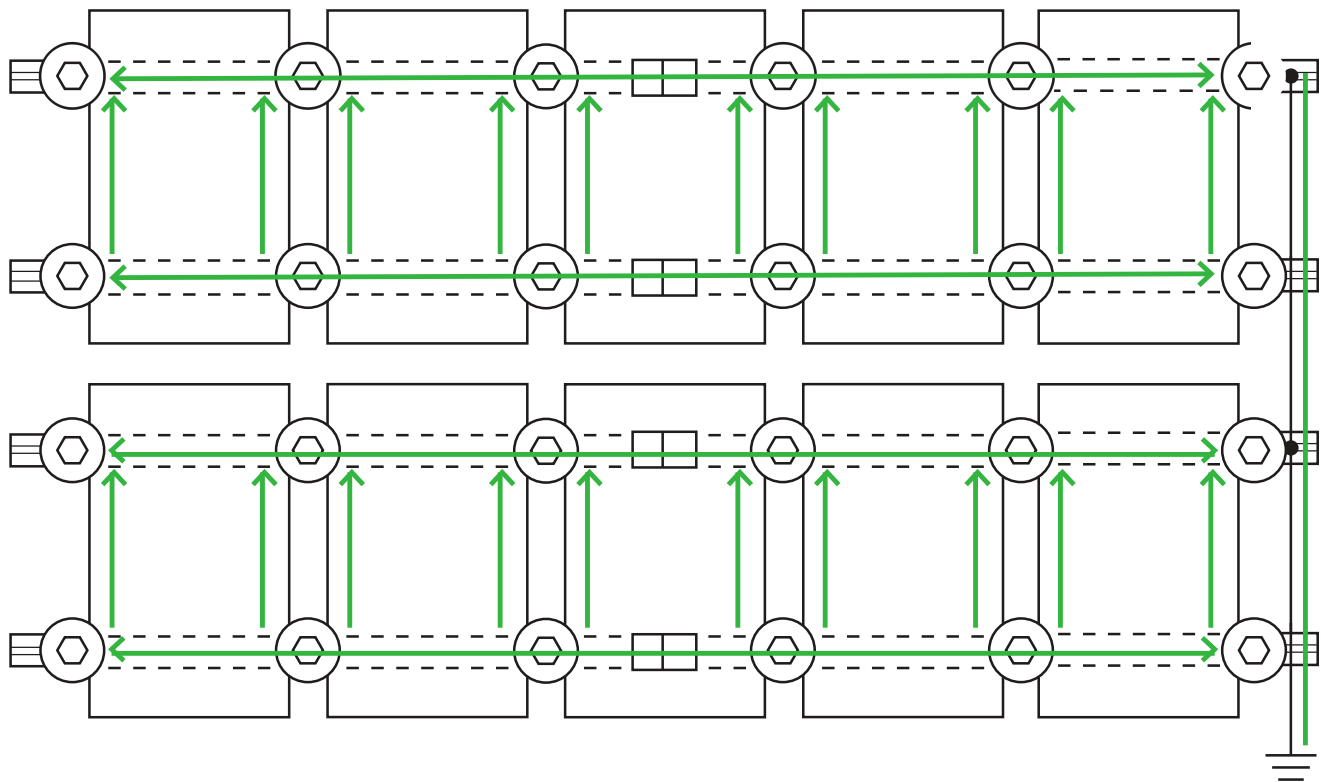
Splice Detail



Clamp Detail



Grounding Diagram



 UFO Clamp

 Fault Current Ground Path

 Grounding Lug *

 Min 10 AWG Copper Wire *

 Bonded Splice (Rail Connection)

* Grounding Lugs and Wire are not required in systems using Enphase microinverters.

Milner Landfill MRF

PITCHED ROOF

Bill of Materials

GROUP	PART	DESCRIPTION	TOTAL QTY
RAILS & SPLICES	XR-1000-132A	XR1000, Rail 132" (11 Feet) Clear	24
	XR-1000-168A	XR1000, Rail 168" (14 Feet) Clear	24
	XR-1000-SPLC-BD	Kit, XR1000 Bonded Splice	36
CLAMPS & GROUNDING	UFO-CL-001	Kit, 4pcs, Universal Module Clamp	48
	GD-LUG-003	Kit, 2pcs, Grounding Lug, Low Profile	3
	UFO-STP-40MM	Kit, 4pcs, Stopper Sleeve, 40MM, Clear	6
ATTACHMENTS	FM-LFT-003	Kit, 4pcs, Slotted L-Foot, Mill	39
	FM-SQ-BHW	Kit, 4pcs, Square-Bolt Bonding Attachment Hardware	39
ACCESSORIES	XR-1000-CAP	Kit, End Cap XR1000 (10 sets per bag)	2



SolarEdge Single Phase Inverters

For North America

SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US /
SE7600A-US / SE10000A-US / SE11400A-US



INVERTERS

The best choice for SolarEdge enabled systems

- Specifically designed to work with power optimizers
- Superior efficiency (98%)
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight and easy to install outdoors or indoors on provided bracket
- Built-in module-level monitoring
- Internet connection through Ethernet or Wireless
- Fixed voltage inverter for longer strings
- Optional – revenue grade data, ANSI C12.1



Single Phase Inverters for North America

SE3000A-US / SE3800A-US / SE5000A-US / SE6000A-US /
SE7600A-US / SE10000A-US / SE11400A-US

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	SE10000A-US	SE11400A-US	
OUTPUT								
Nominal AC Power Output	3000	3800	5000	6000	7600	9980 @ 208V 10000 @ 240V	11400	VA
Max. AC Power Output	3300	4150	5400 @ 208V 5450 @ 240V	6000	8350	10800 @ 208V 10950 @ 240V	12000	VA
AC Output Voltage Min.-Nom.-Max. ⁽¹⁾ 183 - 208 - 229 Vac	-	-	✓	-	-	✓	-	
AC Output Voltage Min.-Nom.-Max. ⁽¹⁾ 211 - 240 - 264 Vac	✓	✓	✓	✓	✓	✓	✓	
AC Frequency Min.-Nom.-Max. ⁽¹⁾	59.3 - 60 - 60.5							Hz
Max. Continuous Output Current	12.5	16	24 @ 208V 21 @ 240V	25	32	48 @ 208V 42 @ 240V	47.5	A
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							Yes
INPUT								
Maximum DC Power (STC)	4050	5100	6750	8100	10250	13500	15350	W
Transformer-less, Ungrounded	Yes							
Max. Input Voltage	500							Vdc
Nom. DC Input Voltage	325 @ 208V / 350 @ 240V							Vdc
Max. Input Current ⁽²⁾	9.5	13	16.5 @ 208V 15.5 @ 240V	18	23	33 @ 208V 30.5 @ 240V	34.5	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	97.7	98.2	98.3	98.3	98	98	98	%
CEC Weighted Efficiency	97.5	98	97 @ 208V 98 @ 240V	97.5	97.5	97 @ 208V 97.5 @ 240V	97.5	%
Nighttime Power Consumption	< 2.5					< 4		W
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, RS232, Ethernet, ZigBee (optional)							
Revenue Grade Data, ANSI C12.1	Optional ⁽³⁾							
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect ⁽⁵⁾							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC part15 class B							
INSTALLATION SPECIFICATIONS								
AC output conduit size / AWG range	3/4" minimum / 16-6 AWG					3/4" minimum / 8-3 AWG		
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 16-6 AWG					3/4" minimum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	30.5 x 12.5 x 7.2 / 775 x 315 x 184					30.5 x 12.5 x 10.5 / 775 x 315 x 260		in / mm
Weight with Safety Switch	51.2 / 23.2		54.7 / 24.7			88.4 / 40.1		lb / kg
Cooling	Natural Convection				Natural convection and internal fan (user replaceable)	Fans (user replaceable)		
Noise	< 25				< 50			
Min.-Max. Operating Temperature Range	-13 to +140 / -25 to +60 (-40 to +60 version available ⁽⁴⁾)							°F / °C
Protection Rating	NEMA 3R							

⁽¹⁾ For other regional settings please contact SolarEdge support.

⁽²⁾ A higher current source may be used; the inverter will limit its input current to the values stated.

⁽³⁾ Revenue grade inverter P/N: SExxxxA-US000NNR2 (for 7600W inverter:SE7600A-US002NNR2).

⁽⁴⁾ -40 version P/N: SExxxxA-US000NNU4 (for 7600W inverter:SE7600A-US002NNU4).

⁽⁵⁾ P/Ns SExxxxA-US0xxxxx have Manual Rapid Shutdown for NEC 2014 compliance (NEC 2017 compliance with outdoor installation)



RoHS



List Price \$589.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Depth	8.25 Inches
Height	29.00 Inches
Wire Size	#2 to 300 AWG/kcmil(Al) - #4 to 300 AWG/kcmil(Cu)
Width	17.25 Inches
Action	Single Throw
Ampere Rating	200A
Approvals	UL Listed File: E2875
Enclosure Rating	NEMA 1
Factory Installed Neutral	Yes
Enclosure Type	General Purpose (Indoor)
Fuse Type	Cartridge (Class H, K, J or R)
Terminal Type	Lugs
Disconnect Type	Fusible
Mounting Type	Surface
Type of Duty	General Duty
Short Circuit Current Rating	100kA (max. depending on fuse type)
Number of Poles	2-Pole
Maximum Voltage Rating	240VAC

Shipping and Ordering

Category	00006 - Safety Switch, General Duty, 30 - 200A indoor
Discount Schedule	DE1A
Article Number	785901460749
Package Quantity	1
Weight	41.8 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.