## Case No. 17-0107-EL-REN IKEA-STO511 Staff Interrogatories – Initial Set

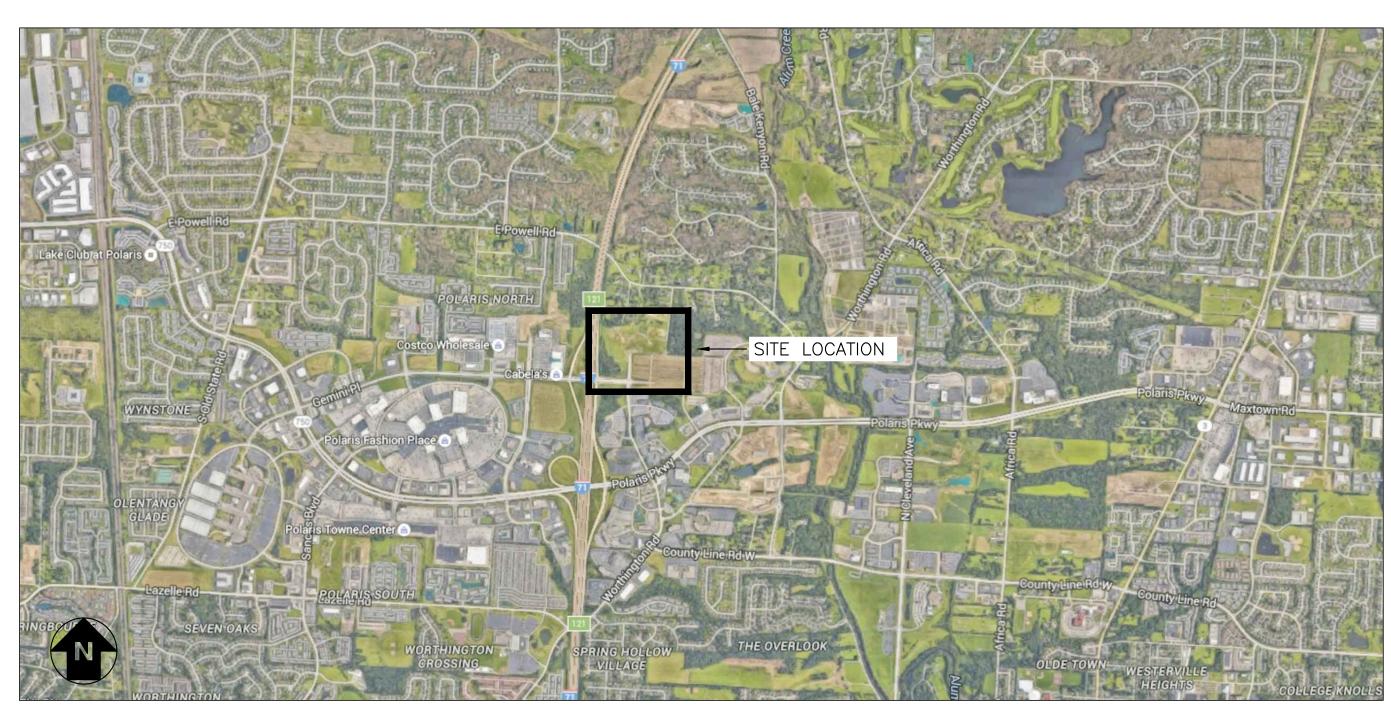
Question 1: In section I.1 the nameplate capacity is listed as 1,210 kW. But in section G.1 you state the facility has 3,546 340W panels. Since 3,546 x 340W= 1,205.64 kW. Is the nameplate capacity 1,205.64 MW?

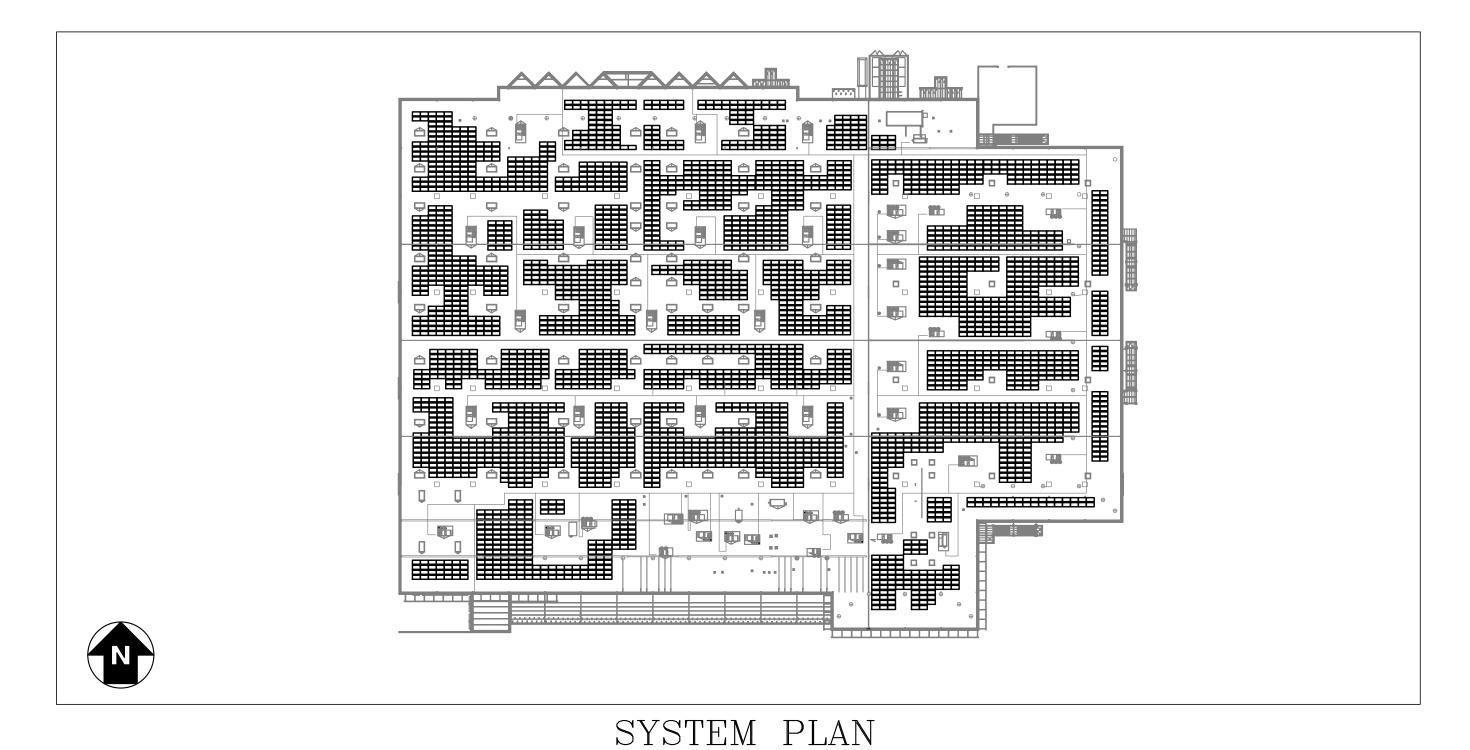
Answer 1: I must not have been looking at the final as-built plans for this system. The 3,546 number of modules is correct, but the modules were upgraded to a 350W model. The total system size is 3,546 modules x 350 watts = 1,241 KW. I have attached the array layout drawing and the module spec sheet below.

## 1,241.10 KW SOLAR ROOFTOP SYSTEM AT

# IKHA — COLUMBUS

## INTERSTATE 71 & GEMINI PLACE, COLUMBUS, OH 43240





LOCATION MAP SCALE: 1"=2000'-0"

## TOTAL SYSTEM SUMMARY:

TOTAL DC SYSTEM SIZE: 1,241.10 kWDC AC SYSTEM SIZE: 900.00 kWAC

MODULE MANUFACTURER: SUNMODULE MODULE MODEL: SW350-XL MONO 350W

MODULES PER STRING: MODULE QUANTITY: 3,546 STRING QUANTITY: 197

MODULE TILT: MODULE AZIMUTH: 180°

INVERTER MANUFACTURER: SOLECTRIA RENEWABLES

PVI-36TL INVERTER MODEL: INVERTER QUANTITY: 25

SUBSYSTEM SUMMARIES:

SYSTEM B
TOTAL DC SIZE:
AC SYSTEM SIZE:
MODULE QUANTITY:
STRING QUANTITY: SYSTEM A TOTAL DC SIZE: 598.5 kWDC 432.0 kWAC 1,710 AC SYSTEM SIZE:
MODULE QUANTITY:
STRING QUANTITY:

642.6 kWDC 468.0 kWAC 1,836 102

### SCOPE OF WORK SUMMARY

ROOFTOP PV ARRAY:
INSTALL SOLAR MODULES AND ROOFTOP BALLASTED RACKING SYSTEM ON TOP OF EXISTING
1 STORY BUILDING. INSTALL INVERTERS AND ELECTRICAL DISTRIBUTION EQUIPMENT TO INTERCONNECT AT EXISTING MAIN ELECTRICAL DISTRIBUTION EQUIPMENT.



CONSHOHOCKEN, PA 19428





50 HARRISON ST, SUITE 210 HOBOKEN, NEW JERSEY, 07030

## SCALE: 1"=80'-0"

## DRAWING INDEX

GENER	RAL						
G001	TITLE SHEET	•			•	•	
G100	SITE PLAN				0	0	
G200	OVERALL ARRAY PLAN	•			•	0	
G201	PARTIAL ARRAY PLAN		•	•	0	0	
G202	PARTIAL ARRAY PLAN		•	•	0	0	0
ELECTI	RICAL						
E001	ELECTRICAL NOTES AND SYMBOL LIST		•	•	0	0	0
E100	OVERALL ELECTRICAL PLAN		•	•	0	0	
E110	INVERTER PLAN & ELECTRICAL ELEVATION			•	•	•	0
E111	ELECTRICAL ROOM & EXTERIOR PLAN			•	•	0	0
E201	STRING WIRING PLAN		•	•	•	0	•
E202	STRING WIRING PLAN		•	•	•	0	0
E300	ONE LINE DIAGRAM — MSA SYSTEM		•	•	•	0	0
E301	ONE LINE DIAGRAM - MSB SYSTEM		•	•	0	0	0
E310	SCHEDULES & CALCULATIONS - MSA	•	•	•	•	0	0
E311	SCHEDULES & CALCULATIONS - MSB	•	•	•	0	0	0
E401	GROUNDING DETAILS		•	•	0	0	0
E402	ELECTRICAL DETAILS		•	•	0	0	0
E500	LABELS & SIGNAGE		•	•	0	0	•
E501	LABELS & SIGNAGE — ELECTRICAL YARD			•	0	0	0
E600	EQUIPMENT DATA SHEETS		•	•	0	•	0
E700	MONITORING DETAILS		•	•	0	•	0

**LEGEND:** 

UPDATED DRAWING ISSUED UNCHANGED, PREVIOUSLY ISSUED DRAWING STILL CURRENT DRAWING REMOVED FROM SET

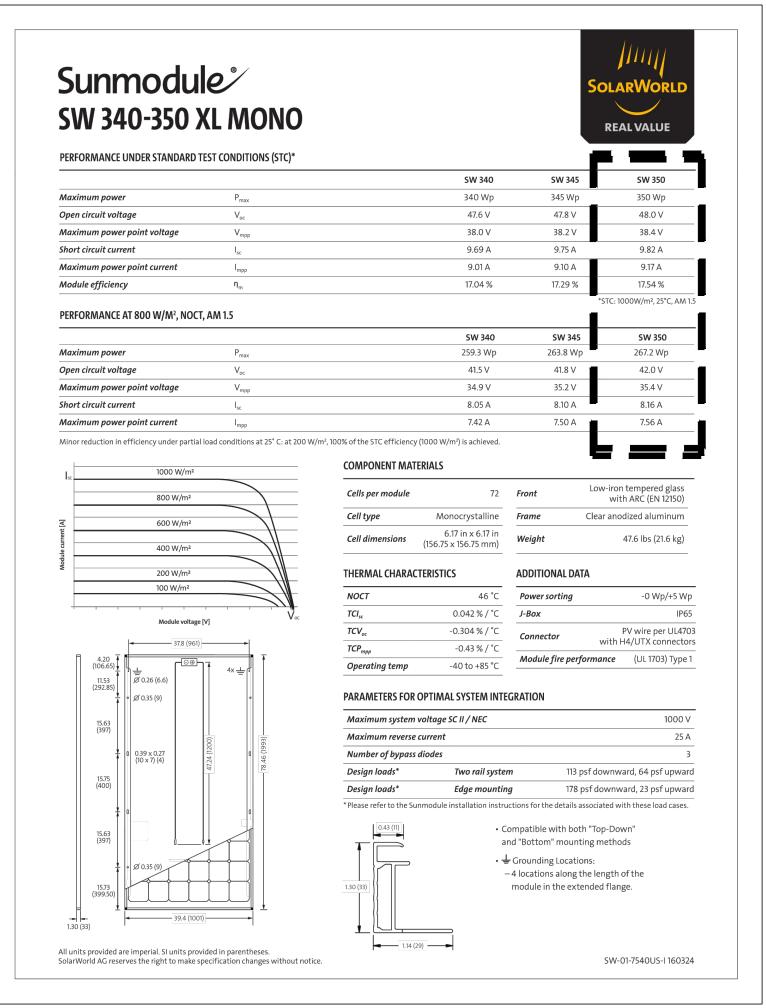
TITLE SHEET

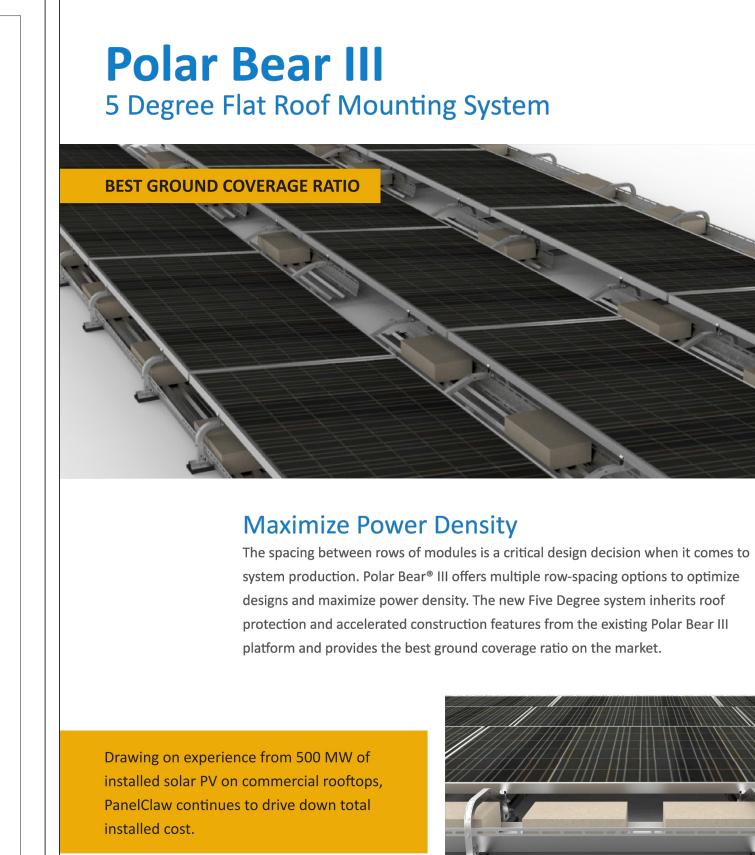
DRAWING # G001

1.10 KW SOLAR ROOFTOP SYSTEM IKEA — COLUMBUS INTERSTATE 71 & GEMINI PLACE COLUMBUS, OHIO 43240

01 OF 21







panelclaw.com

panelaw **Polar Bear III** 5 Degree Flat Roof Mounting System **BEST GROUND COVERAGE RATIO** 



**Shade Ratio** 

### **Best Power Density**

Polar Bear® III offers the best ground coverage ratio on the market. The tightrow spacing option allows for maximum roof capacity while the single module tilt up and walkway path facilitate system maintenance.

2:1

**Shade Ratio** 

#### **Most Trusted on the Roof** The engineered design emphasizes builtin features to provide long-term roof

- Mechanically secured rubber roof pads Fully captured ballast blocks
- Thermal compensation • System allows free water flow
- **Timesaving Project Accessories**

## Speed up total project completion with

(978) 688.4900 | sales@panelclaw.com

accessories for wire management, microinverter and solar optimizer attachment and shim pads to accommodate uneven areas of the roof.

pane claw

## **Three Components**

- Universal, light-weight component for quick and easy roof placement • Integrated recycled rubber roof protection pads
- management cabling options Two row-spacing options to optimize ground coverage ratio

Pre-drilled holes for wire

### **Ballast Tray**

- Locking end-tab to fully capture ballast blocks
- Adjustable mounting location to fit all major module brands
- Nested design to provide high packaging density

- Attachment to module using standard module mounting holes • UL 2703 certified for electrical bonding
- and grounding

© 2015 PanelClaw, Inc.

Boundary layer wind tunnel testing Third-party engineering review System Fire Rating

**Applications** 

Fully ballasted or mechanically attached

**Module Tilt Angle** 

**Module Orientation** 

**Module Attachment** 

Standard module

mounting holes

Up to 150 mph

(>150 mph by

Wind Exposure

Compatibility

Row Spacing

G90 steel and

aluminum

6.8" (2:1), 10.2" (3:1)

**Material Options** 

**Warranty, Testing** 

and Certifications

25 year warranty

UL 2703 certification

C, D, E and F

B and C (D by approval)

approval)

**Basic Wind Speed** 

PURE N G | N

SOLAR DAD STREE

REC

5° nominal

Landscape

Flat roof (max slope 5°)

Class A with Type 1 and Type 2 modules

## YASKAWA SOLECTRIA SOLAR **PVI** 14TL



#### **FEATURES** • 600 or 1000 VDC

solarworld.com

 Best in class efficiency Touch-safe fuses

• Dual & wide MPP tracking zones Modbus communications Integrated DC fused string

 DC arc-fault protection • PVI 36TL - HECO and Rule 21

#### OPTIONS Web-based monitoring

 Shade cover DC/AC disconnect covers Roof mount array brackets

• DC combiners bypass

SOLECTRIA.COM

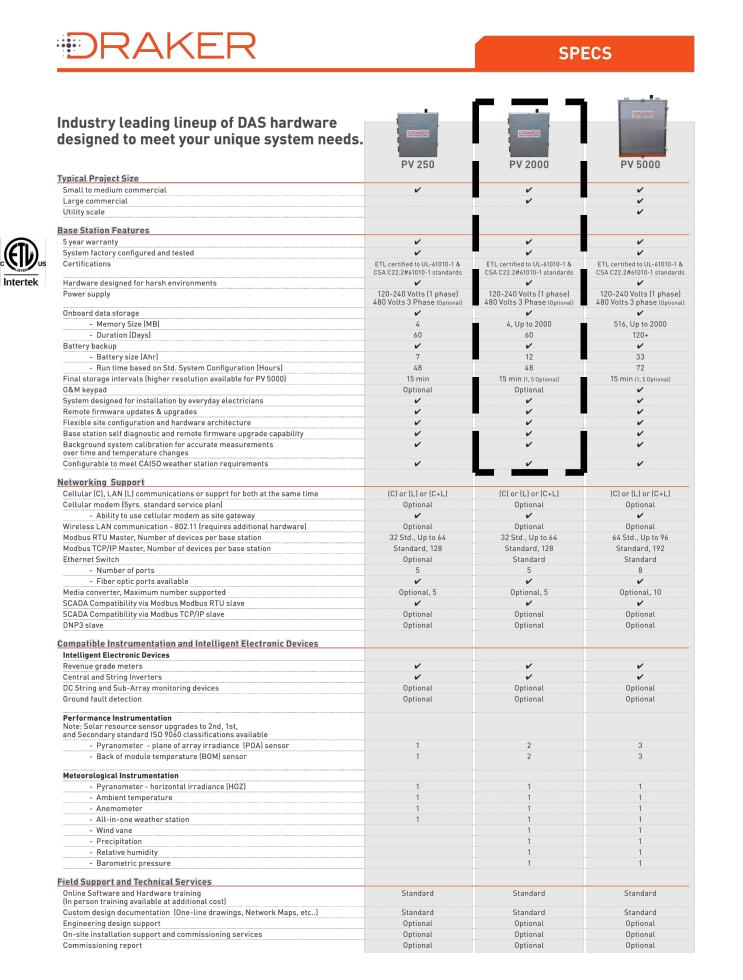
### 3-PH TRANSFORMERLESS STRING INVERTERS

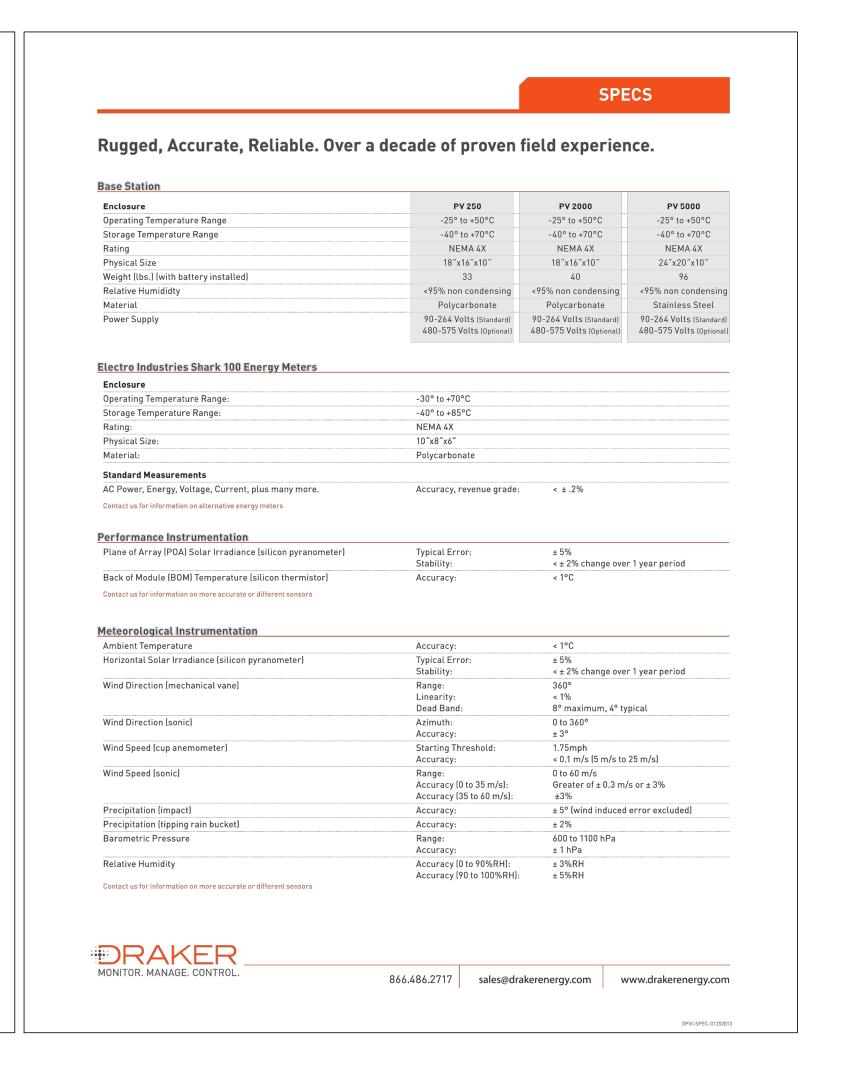
Yaskawa - Solectria Solar's PVI 14TL, PVI 20TL, PVI 23TL, PVI 28TL, and PVI 36TL are compact, transformerless three-phase inverters with a dual MPP tracker. These inverters come standard with AC and DC disconnects, user-interactive LCD, and an 8-position string combiner. Its small, lightweight design makes for quick and easy installation and maintenance. These inverters include an enhanced DSP control, comprehensive protection functions, and advanced thermal design enabling highest reliability and uptime. They also come with a standard 10 year warranty with options for 15 and 20 years. Options include web-based monitoring, shade cover, DC/AC disconnect covers, DC combiners bypass, and roof mount array bracket.



SPECIFICATIONS	PVI 14TL	PVI 20TL	PVI 23TL	PVI 28TL	PVI 36TL		
DC Input							
Absolute Maximum Open Circuit Voltage	600	VDC		1000 VDC			
perating Voltage Range	180-580 VDC 260-580 VDC		300-900 VDC		200-950 VDC		
ax Power Input Voltage Range (MPPT)	300-540 VDC	300-550 VDC	480-800 VDC	500-800 VDC	540-800 VDC		
PP Trackers			ith 4-fused inputs per trac	ker			
Maximum Operating Input Current	25 A per MPPT (50 A)	35 A per MPPT (70 A)	25 A per MPPT (50 A)	29 A per MPPT (58 A)	35 A per MPPT (70 A)		
	45.5 A per MPPT (90.4) 45.5 A per MPPT		/8 A per MPPT		53.5 A per MPPT		
Maximum Available PV Current (Isc x 1.25)	45 A per MPPT (90 A)	(91 A)	41 A per MPPT (82 A)	(96 A)	(107 A)		
Maximum PV Power (per MPPT)	9.5 kW	9.5 kW 13.5 kW 15.5 kW 19		19 kW	27 kW		
Strike Voltage	30	0 V		330 V			
AC Output							
Nominal Output Voltage	208 VAC, 3-Ph		480 VAC	C, 3-Ph			
AC Voltage Range (Standard)			-12%/+10%				
Continuous Output Power	14 kW	20 kW	23 kW	28 kW	36 kW		
Maximum Output Current	39 A	25.5 A	27.7 A	33.7 A	43.5 A		
Maximum Backfeed Current			0 A				
Nominal Output Frequency			60 Hz		1		
Output Frequency Range		59.3-60 5 Hz (ad	justable 55-65 Hz)		57-63 Hz		
	Unity, >0.99	Unity, >0.99	Jastable 33 03 112)	Unity, >0.99	57 05 112		
Power Factor	(±0.8 adjustable)	(±0.9 adjustable)		(±0.8 adjustable)	-		
Fault Current Contribution (1 Cycle RMS)	70.4 A	43.3 A	69.6		73.2 A		
Total Harmonic Distortion (THD) @ Rated Load			∢3%				
Grid Connection Type			3ø+/N/GND (4-wire)				
Efficiency							
Peak Efficiency	96.9%	97.4%	98.6%	98	.4%		
CEC Efficiency	96.0%	97.4%	70.070	98.0%	. ,		
Tare Loss	98.0 % 4 W	71.070	2 V				
	4 VV		2 V	•			
ntegrated String Combiner					15 07 20 1		
Fused Positions (4 positions per MPPT)	15 or 30 A 15 A (fuse by-pass available) (30 A only for combined inputs)						
<b>T</b> emperature				F. 4/00F/050C. (	000)		
	-13°F to +140°F			F to +140°F (-25°C to +6			
		irs over +50°C	De	erating occurs over +45°	°C		
Ambient Temperature Range		irs over +50°C -22°F to	De 0 +158°F		-40°F to +158°F		
Ambient Temperature Range Storage Temperature Range		irs over +50°C -22°F to	De 0 +158°F 10 +70°C)		°C		
Temperature Ambient Temperature Range Storage Temperature Range Relative Humidity (non-condensing)		irs over +50°C -22°F to	De 0 +158°F		-40°F to +158°F (-40°C to +70°C)		
Ambient Temperature Range Storage Temperature Range Relative Humidity (non-condensing)	Derating occu	rrs over +50°C -22°F tr (-30°C 1	De 0 +158°F 10 +70°C)	erating occurs over +45°	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
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Ambient Temperature Range Storage Temperature Range Relative Humidity (non-condensing) Operating Altitude	Derating occu	rrs over +50°C -22°F tr (-30°C 1	De 0 +158°F :0 +70°C) 0-95%	erating occurs over +45°	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
Ambient Temperature Range  Storage Temperature Range  Relative Humidity (non-condensing)  Operating Altitude  Data Monitoring  Optional SolrenView Web-based Monitoring	Derating occu	rrs over +50°C -22°F tr (-30°C 1	0 +158°F :0 +70°C) 0-95% ing from 6,562 ft/2,000 m	erating occurs over +45°	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
Ambient Temperature Range  Storage Temperature Range  Relative Humidity (non-condensing)  Operating Altitude  Data Monitoring  Optional SolrenView Web-based Monitoring  Optional Revenue Grade Monitoring	Derating occu	rrs over +50°C -22°F tr (-30°C 1	0+158°F 10+70°C) 0-95% ing from 6,562 ft/2,000 m)	erating occurs over +45°	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
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Ambient Temperature Range  Storage Temperature Range  Relative Humidity (non-condensing)  Operating Altitude  Data Monitoring  Optional SolrenView Web-based Monitoring  Optional Revenue Grade Monitoring  External Communication Interface  Testing & Certifications  Safety Listings & Certifications	Derating occu		Dec p +158°F to +70°C) 0-95% ing from 6,562 ft/2,000 m) Integrated External	erating occurs over +45°	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
Ambient Temperature Range  Storage Temperature Range  Relative Humidity (non-condensing)  Operating Altitude  Data Monitoring  Optional SolrenView Web-based Monitoring  Optional Revenue Grade Monitoring  External Communication Interface  Festing & Certifications  Gafety Listings & Certifications  Festing Agency	Derating occu	-22°Fti -22°Fti (-30°Cti 3,123 ft/4,000 m (derat	0+158°F 10+70°C) 0-95% ing from 6,562 ft/2,000 m Integrated External RS-485 Modbus RTU	erating occurs over +45°	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
Ambient Temperature Range Storage Temperature Range Relative Humidity (non-condensing) Operating Altitude  Data Monitoring Optional SolrenView Web-based Monitoring Optional Revenue Grade Monitoring External Communication Interface  Festing & Certifications Gafety Listings & Certifications Festing Agency Warranty	Derating occu		Dec p +158°F to +70°C) 0-95% ing from 6,562 ft/2,000 m Integrated External RS-485 Modbus RTU	erating occurs over +45°	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
Ambient Temperature Range  Storage Temperature Range  Relative Humidity (non-condensing)  Operating Altitude  Data Monitoring  Optional SolrenView Web-based Monitoring  Optional Revenue Grade Monitoring  External Communication Interface  Testing & Certifications  Safety Listings & Certifications  Testing Agency  Warranty  Standard	Derating occu	UL 1741/IEEE	Dec p +158°F to +70°C)  0-95%  ing from 6,562 ft/2,000 m  Integrated External RS-485 Modbus RTU  E1547, CSA C22.2#107.1, F	erating occurs over +45° )  FCC part 15 B  CSA	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from		
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Ambient Temperature Range  Storage Temperature Range  Relative Humidity (non-condensing)  Operating Altitude  Data Monitoring  Optional SolrenView Web-based Monitoring  Optional Revenue Grade Monitoring  External Communication Interface  Testing & Certifications  Safety Listings & Certifications  Testing Agency  Warranty  Standard  Optional  Enclosure  dBA (Decibel) Rating  AC/DC Disconnect  Dimensions (H x W x D)	Derating occu 1 1 41.6 in. x 21. (1057 mm x 544	UL 1741/IEEE TL  4 in. x 8.5 in. 4 mm x 216 mm)	Dec p +158°F (p +70°C) 0-95% ing from 6,562 ft/2,000 m/g Integrated External RS-485 Modbus RTU E1547, CSA C22.2#107.1, F  10 year year; extended service agrices (so dBA @ 3 m) Standard, fully-integrated 3 (100	erating occurs over +45°  FCC part 15 B  CSA  eement  9.4 in. x 23.6 in. x 9.1 in 11 mm x 600 mm x 232 i	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from 9,800 ft/3,000 m)		
Ambient Temperature Range  Storage Temperature Range  Relative Humidity (non-condensing)  Operating Altitude  Data Monitoring  Optional SolrenView Web-based Monitoring  Optional Revenue Grade Monitoring  External Communication Interface  Testing & Certifications  Safety Listings & Certifications  Testing Agency  Warranty  Standard  Optional  Enclosure  dBA (Decibel) Rating  AC/DC Disconnect  Dimensions (H x W x D)  Weight	Derating occu	UL 1741/IEEE TL  4 in. x 8.5 in. 4 mm x 216 mm) 132 lbs (60 kg)	Dec 158°F ro +70°C)  0-95%  ing from 6,562 ft/2,000 m)  Integrated External RS-485 Modbus RTU  E1547, CSA C22.2#107.1, F  10 year year; extended service agreer; extended service agrees  < 50 dBA @ 3 m  Standard, fully-integrated  104 lbs (4	erating occurs over +45°  FCC part 15 B  CSA  eement  9.4 in. x 23.6 in. x 9.1 in 11 mm x 600 mm x 232 i	-40°F to +158°F (-40°C to +70°C) 13,123 ft/4,000 m (derating from 9,800 ft/3,000 m) 1. nm) 121 lbs (55kg)		
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**SOLECTRIA SOLAR** www.solectria.com | inverters@solectria.com | 978.683.9700





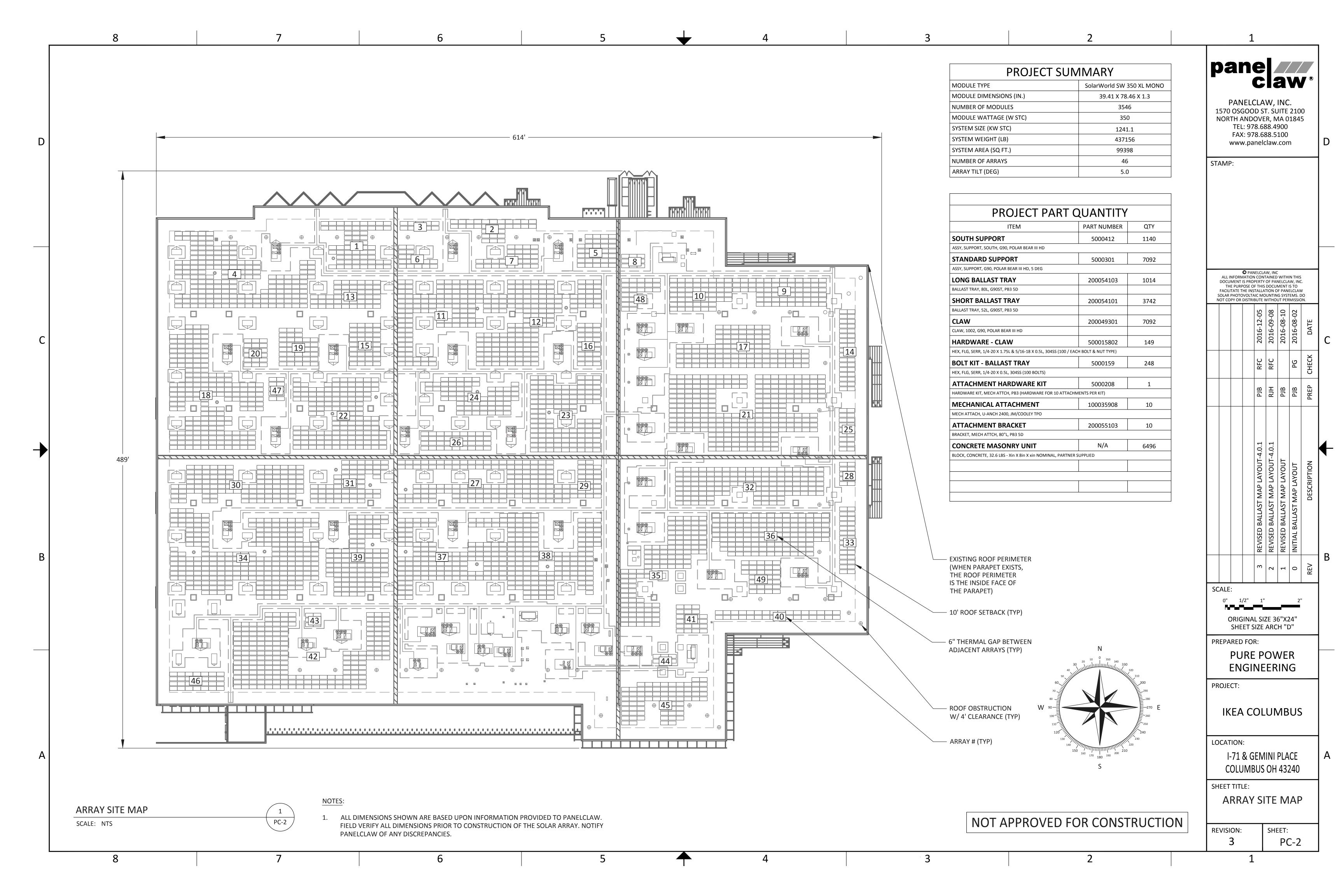
EQUIPMENT DATA SHEETS

E600

AC MO

R ROOFTOP SYS
COLUMBUS
R & GEMINI PLA

1.10 KW IKE, INTERST



This foregoing document was electronically filed with the Public Utilities

**Commission of Ohio Docketing Information System on** 

2/9/2018 3:09:22 PM

in

Case No(s). 18-0107-EL-REN

Summary: Reply Reply to staff inquiries electronically filed by Mr. Christopher Moore on behalf of IKEA PROPERTY OWNER