

PROJECT DESCRIPTION:

65x231 CANADIAN SOLAR: CS6U 330 WATT MODULES

SYSTEM SIZE: 76.23 kW DC STC
 ARRAY AREA: ROOF#1 - 6916.8 SQ FT.

EQUIPMENT SUMMARY

65 CANADIAN SOLAR: CS6U 330 WATT MODULES
 04 FRONIUS SYMO 15.0-3 208

APPLICABLE CODES & STANDARDS

BUILDING: IBC 2017 IRC 2017
 ELECTRICAL: NEC 2014

DESIGN SPECIFICATION

OCCUPANCY: II
 CONSTRUCTION: SINGLE FAMILY
 GROUND SNOW LOAD: 5PSF
 WIND EXPOSURE: B
 WIND SPEED: 110(MPH)

AUTHORITIES HAVING JURISDICTION

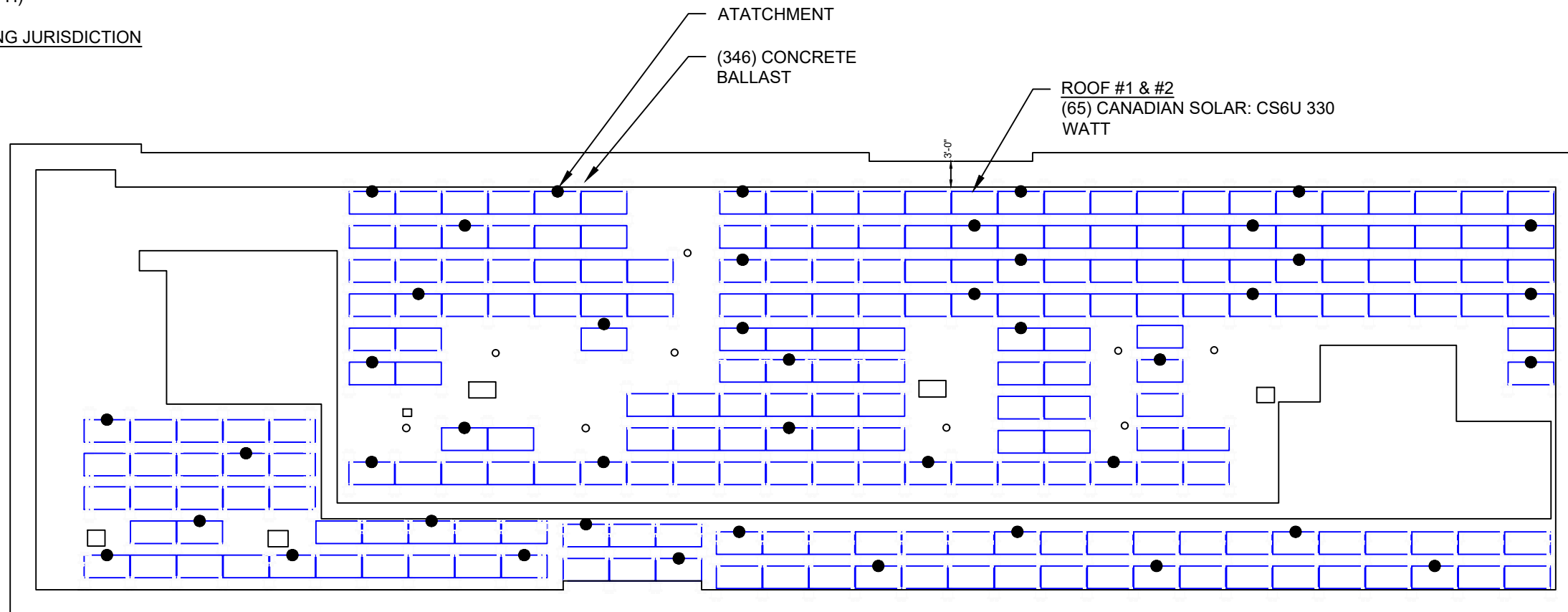
BUILDING: N/A
 ZONING: N/A
 UTILITY: N/A

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 231 MODULES
 MODULE TYPE = CANADIAN SOLAR: CS6U 330 WATT
 MODULE WEIGHT = 49.4 LBS / 22.4 KG.
 MODULE DIMENSIONS = 77.2"x 39.1" = 20.96 SF
 UNIT WEIGHT OF ARRAY = 2.36 PSF

ARRAY AREA & ROOF AREA CALC'S

ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	37	648.98	1710.00	38
#2	28	491.12	2832.43	17



REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 00/00/0000

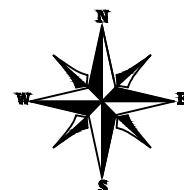
PROJECT NAME & ADDRESS

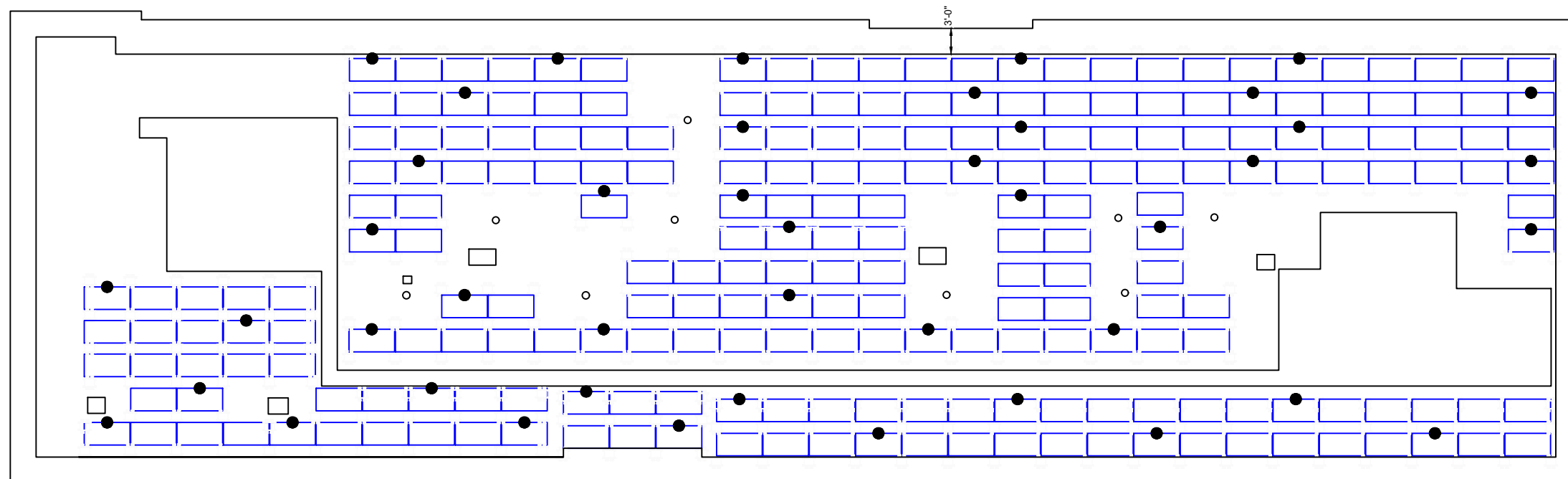
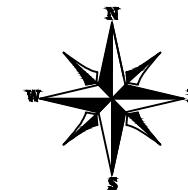
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SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
**ANSI B
 11" X 17"**

SHEET NUMBER
PV-1





REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 00/00/0000

PROJECT NAME & ADDRESS

XXXX
XXXX
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XXXX

BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	231	CANADIAN SOLAR: CS6U 330 WATT
INVERTER	4	FRONIUS SYMO 15.0-3 208 INVERTER
AC DISCONNECT	4	100A FUSED, 240V NEMA 3R, UL LISTED,
PV METER	1	PV REVENUE METER
SOLAR LOAD CENTER	1	SOLAR LOAD CENTER
L-BRACKET	40	L-BRACKET
SERRATED FLANGE NUT	120	SERRATED FLANGE NUT
BALLAST TRAY ASSEMBLY	346	BALLAST TRAY ASSEMBLY
SERRATED FLANGE BOLT	80	SERRATED FLANGE BOLT
ATTACHEMT	40	ATTACHEMT
ECO FOOT2	344	
UNIVERSAL CLAM KIT	270	
WIND DEFLECTOR	231	
SIDE DEFLECTOR KIT	0	
BLLAST BLOCK	713	

1 ROOF PLAN WITH STRING LAYOUT

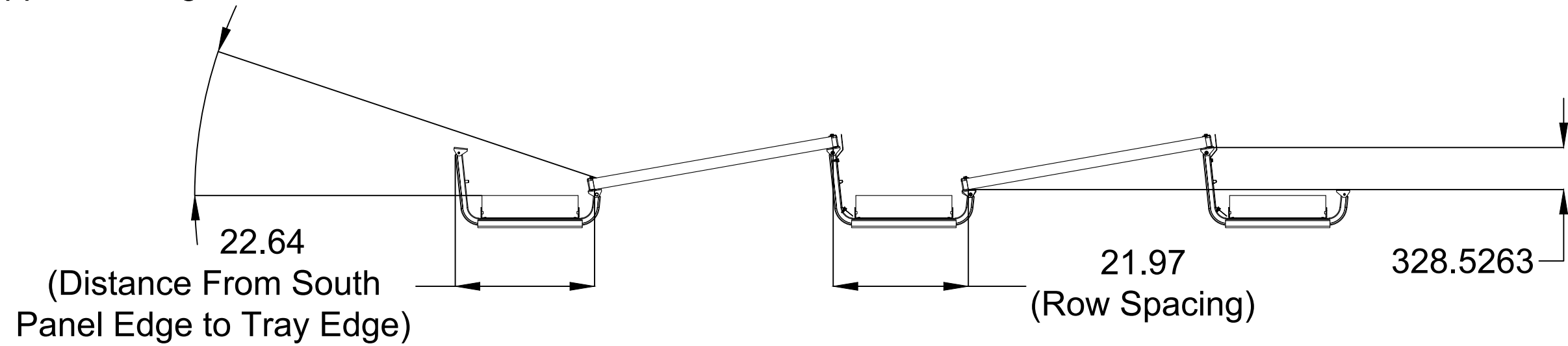
PV-2 SCALE: 1/16" = 1'-0"

SHEET NAME
STRING
LAYOUT

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

Sun Approach Angle 19°



REVISIONS		
DESCRIPTION	DATE	REV

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DATE: 00/00/0000

PROJECT NAME & ADDRESS

XXXX
XXXX
XXXX
XXXX

SHEET NAME
ATTACHMENT
DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3



MAXPOWER CS6U-315 | 320 | 325 | 330P

Canadian Solar's modules use the latest innovative cell technology, increasing module power output and system reliability, ensured by 15 years of experience in module manufacturing, well-engineered module design, stringent BOM quality testing, an automated manufacturing process and 100% EL testing.

25 years

linear power output warranty

10 years

product warranty on materials and workmanship

KEY FEATURES



Excellent module efficiency of up to 16.97 %



Cell efficiency of up to 18.8 %



Outstanding low irradiance performance: 96.0 %



High PTC rating of up to 91.55 %



IP67 junction box for long-term weather endurance



Heavy snow load up to 5400 Pa, wind load up to 2400 Pa

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2008 / Quality management system
ISO 14001:2004 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730: VDE / CE / CQC / MCS
UL 1703 / IEC 61215 performance: CEC listed (US)
UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE / Take-e-way
UNI 9177 Reaction to Fire: Class 1



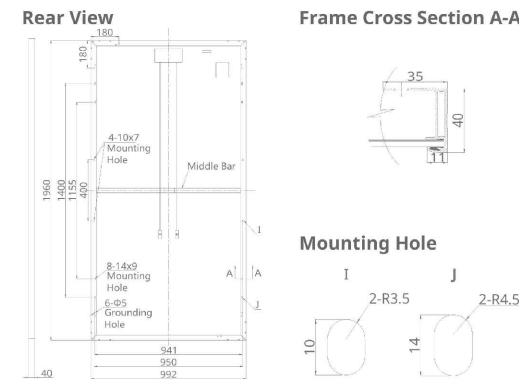
* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. As a leading PV project developer and manufacturer of solar modules with over 15 GW deployed around the world since 2001, Canadian Solar Inc. (NASDAQ: CSIQ) is one of the most bankable solar companies worldwide.

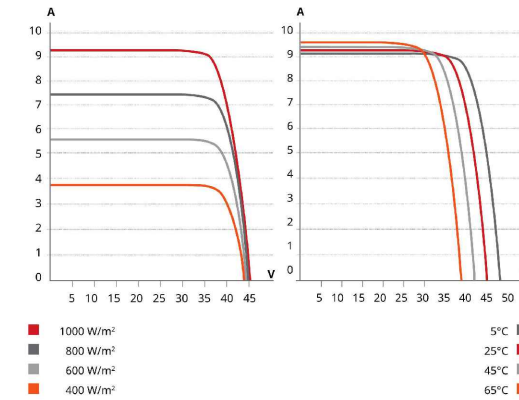
CANADIAN SOLAR INC.

2430 Camino Ramon, Suite 240 San Ramon, CA, USA 94583-4385 | www.canadiansolar.com/na | sales.us@canadiansolar.com

ENGINEERING DRAWING (mm)



CS6U-320P / I-V CURVES



ELECTRICAL DATA / STC*

CS6U	315P	320P	325P	330P
Nominal Max. Power (Pmax)	315 W	320 W	325 W	330 W
Opt. Operating Voltage (Vmp)	36.6 V	36.8 V	37.0 V	37.2 V
Opt. Operating Current (Imp)	8.61 A	8.69 A	8.78 A	8.88 A
Open Circuit Voltage (Voc)	45.1 V	45.3 V	45.5 V	45.6 V
Short Circuit Current (Isc)	9.18 A	9.26 A	9.34 A	9.45 A
Module Efficiency	16.20%	16.46%	16.72%	16.97%
Operating Temperature	-40°C ~ +85°C			
Max. System Voltage	1000 V (IEC) or 1000 V (UL)			
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)			
Max. Series Fuse Rating	15 A			
Application Classification	Class A			
Power Tolerance	0 ~ + 5 W			

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

Specification	Data
Cell Type	Poly-crystalline, 6 inch
Cell Arrangement	72 (6x12)
Dimensions	1960 x 992 x 40 mm (77.2 x 39.1 x 1.57 in)
Weight	22.4 kg (49.4 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	Anodized aluminium alloy
J-Box	IP67, 3 diodes
Cable	4 mm² (IEC) or 4 mm² & 12 AWG 1000V (UL), 1160 mm (45.7 in)
Connector	T4 (IEC/UL)
Per Pallet	26 pieces, 635kg (1400lbs)
Per container (40' HQ)	624 pieces

ELECTRICAL DATA / NOCT*

CS6U	315P	320P	325P	330P
Nominal Max. Power (Pmax)	228 W	232 W	236 W	239 W
Opt. Operating Voltage (Vmp)	33.4 V	33.6 V	33.7 V	33.9 V
Opt. Operating Current (Imp)	6.84 A	6.91 A	6.98 A	7.05 A
Open Circuit Voltage (Voc)	41.5 V	41.6 V	41.8 V	41.9 V
Short Circuit Current (Isc)	7.44 A	7.50 A	7.57 A	7.66 A

* Under Nominal Operating Cell Temperature (NOCT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

PERFORMANCE AT LOW IRRADIANCE

Outstanding performance at low irradiance, average relative efficiency of 96.0 % from an irradiance of 1000 W/m² to 200 W/m² (AM 1.5, 25°C).

The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, Canadian Solar Inc. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

Caution: For professional use only. The installation and handling of PV modules requires professional skills and should only be performed by qualified professionals. Please read the safety and installation instructions before using the modules.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.41 % / °C
Temperature Coefficient (Voc)	-0.31 % / °C
Temperature Coefficient (Isc)	0.053 % / °C
Nominal Operating Cell Temperature	45±2 °C

PARTNER SECTION



REVISIONS		
DESCRIPTION	DATE	REV

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DATE: 00/00/0000

PROJECT NAME & ADDRESS

XXXX
XXXX
XXXX
XXXX

SHEET NAME
**EQUIPMENT
SPECIFICATION**

SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

PV-4

Enphase® M215



The **Enphase® M215 Microinverter** with integrated ground delivers increased energy harvest and reduces design and installation complexity with its all-AC approach. With the advanced M215, the DC circuit is isolated and insulated from ground, so **no Ground Electrode Conductor (GEC) is required for the microinverter**. This further simplifies installation, enhances safety, and saves on labor and materials costs.

The Enphase M215 integrates seamlessly with the Engage® Cable, the Envoy® Communications Gateway™, and Enlighten®, Enphase's monitoring and analysis software.

PRODUCTIVE

- Maximizes energy production
- Minimizes impact of shading, dust, and debris
- No single point of system failure

SIMPLE

- No GEC needed for microinverter
- No DC design or string calculation required
- Easy installation with Engage Cable

RELIABLE

- More than 1 million hours of testing and millions of units shipped
- Industry-leading warranty, up to 25 years



Enphase® M215 Microinverter // DATA

INPUT DATA (DC)	M215-60-2LL-S22-IG, M215-60-2LL-S25-IG	
Recommended input power (STC)	190 - 270 W	
Maximum input DC voltage	48 V	
Peak power tracking voltage	27 V - 39 V	
Operating range	16 V - 48 V	
Min/Max start voltage	22 V / 48 V	
Max DC short circuit current	15 A	
OUTPUT DATA (AC)	@208 VAC	@240 VAC
Peak output power	225 W	225 W
Rated (continuous) output power	215 W	215 W
Nominal output current	1.03 A (A rms at nominal duration)	0.9 A (A rms at nominal duration)
Nominal voltage/range	208 V / 183-229 V	240 V / 211-264 V
Nominal frequency/range	60.0 / 57-61 Hz	60.0 / 57-61 Hz
Extended frequency range*	57-62.5 Hz	57-62.5 Hz
Power factor	>0.95	>0.95
Maximum units per 20 A branch circuit	25 (three phase)	17 (single phase)
Maximum output fault current	850 mA rms for 6 cycles	850 mA rms for 6 cycles
EFFICIENCY		
CEC weighted efficiency, 240 VAC	96.5%	
CEC weighted efficiency, 208 VAC	96.5%	
Peak inverter efficiency	96.5%	
Static MPPT efficiency (weighted, reference EN50530)	99.4 %	
Night time power consumption	65 mW max	
MECHANICAL DATA		
Ambient temperature range	-40°C to +65°C	
Dimensions (WxHxD)	171 mm x 173 mm x 30 mm (without mounting bracket)	
Weight	1.6 kg (3.4 lbs)	
Cooling	Natural convection - No fans	
Enclosure environmental rating	Outdoor - NEMA 6	
Connector type	M215-60-2LL-S22-IG: MC4 M215-60-2LL-S25-IG: Amphenol H4	
FEATURES		
Compatibility	Compatible with 60-cell PV modules.	
Communication	Power line	
Integrated ground	The DC circuit meets the requirements for ungrounded PV arrays in NEC 690.35. Equipment ground is provided in the Engage Cable. No additional GEC or ground is required. Ground fault protection (GFP) is integrated into the microinverter.	
Monitoring	Enlighten Manager and MyEnlighten monitoring options	
Compliance	UL1741/IEEE1547, FCC Part 15 Class B, CAN/CSA-C22.2 NO. 0-M91, 0.4-04, and 107.1-01	

* Frequency ranges can be extended beyond nominal if required by the utility

To learn more about Enphase Microinverter technology, visit enphase.com

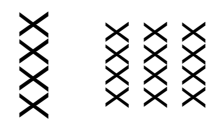


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DESCRIPTION	DATE	REV

Signature with Seal

DATE: 00/00/0000

PROJECT NAME & ADDRESS



SHEET NAME	EQUIPMENT SPECIFICATION
SHEET SIZE	ANSI B 11" X 17"
SHEET NUMBER	PV-5

Ballasted Roof Mounts



10° Tilt Angle Shown

IronRidge Ballasted Roof Mount System, the simplest on the market, is the best choice for large flat roofs that require no roof penetration

IronRidge's Ballasted Roof Mount System is a compact and versatile solution that is easy to ship, quick to install, and light on the roof. Works with industry standard ballast blocks and is available with or without EPDM backing making our ballast system suitable for virtually any commercial roof.

Specifications Summary

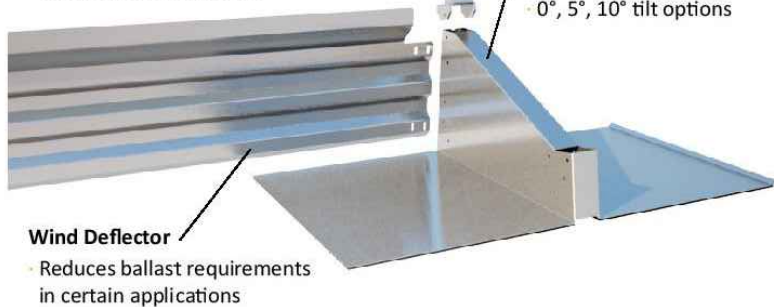
Max Allowable Roof Slope	5 Degrees (1:12)
Max Building Height	Up To 60'
Max Wind Speed	Up to 120 mph
Roof Loading	As Low As 3.4 psf
Module Orientation	Landscape
Wind Exposure	Category B & C (D upon Request)
Typical Installation Speed	12 Modules / person hour.
Warranty	10 Years
Tilt Options	0° (flat), 5° and 10°
Materials	5052 Aluminum, With Stainless Steel Hardware

Mounting Plate Assembly

- Holds most framed solar panels
- Stainless steel hardware

Ballast Tray Assembly

- 2 piece quicksnap design
- 0°, 5°, 10° tilt options



Wind Deflector

- Reduces ballast requirements in certain applications

Ballasted Roof Mounts



QuickSnap

No-tool assembly of mounting tray reduces shipping cost and increases portability

Clamps

Top down clamping for fast installation. Adapters available to attach to long side of module when required by manufacturer

Rubber Footing

Optional EPDM backing protects roofing material

Mounting Plate

Designed to work with integrated grounding clips to eliminate the installation of ground lugs on each panel

Why IronRidge



Experience - Designing/manufacturing solar mounting products since 1996

Single Source - Roof mounts, ballasted mounts, large arrays, and more; *a solution for your specific application*

Customer Satisfaction - Customer service and technical support to help you succeed

On-line Resources Available:

- Video Tutorials
- Product Configurators
- Product Certifications
- Installation Guides
- Data Sheets
- Reseller Locator



Sales: 800-227-9523
sales@ironridge.com

www.IronRidge.com
1435 Baechtel Road
Willits, CA 95490

REVISIONS

DESCRIPTION	DATE	REV

Signature with Seal

DATE: 00/00/0000

PROJECT NAME & ADDRESS



SHEET NAME
EQUIPMENT SPECIFICATION

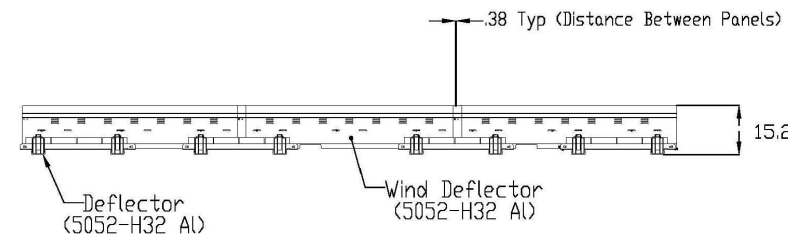
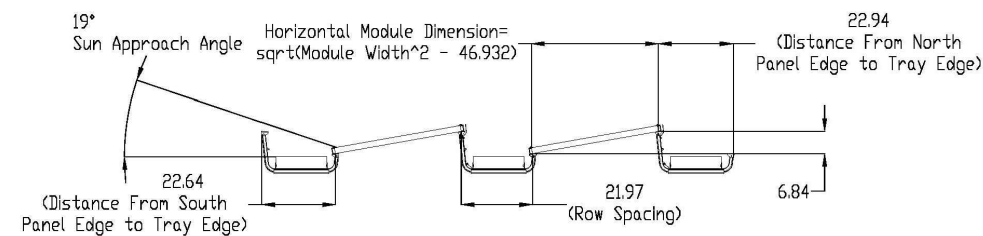
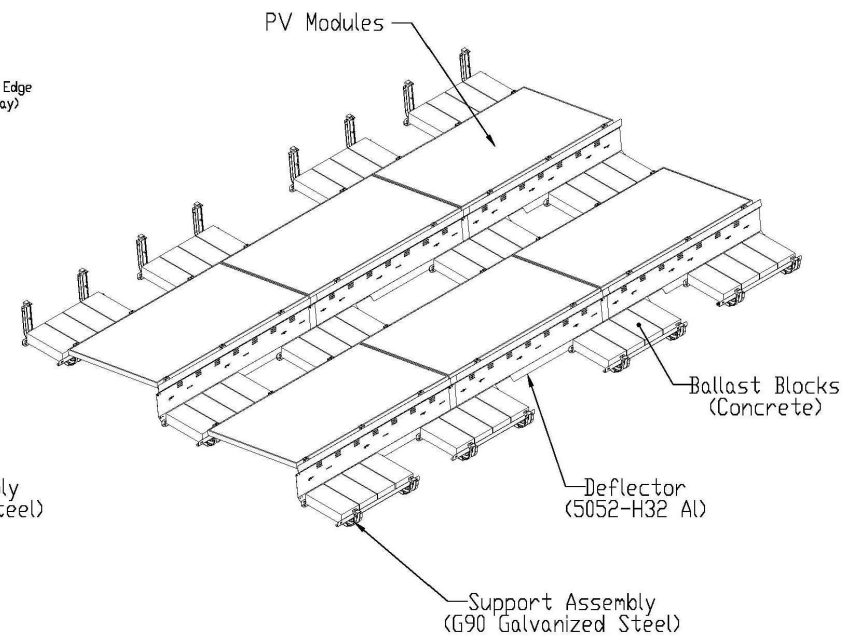
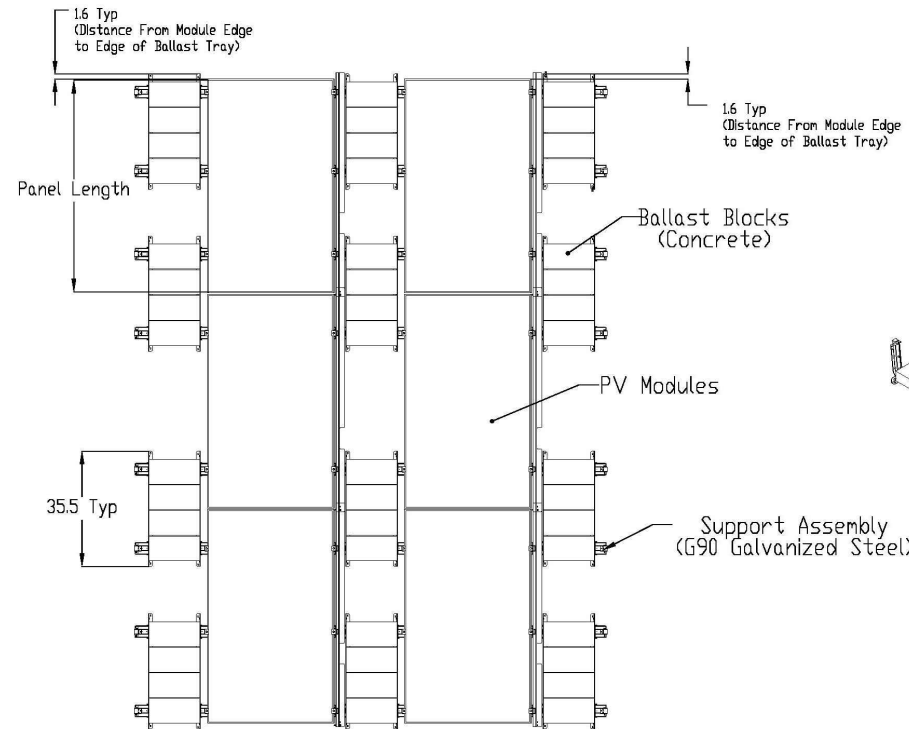
SHEET SIZE

**ANSI B
11" X 17"**

SHEET NUMBER

PV-6

IronRidge Ballasted Roof Mount System 10 Degree Exhibit A



www.ironridge.com | Solar Mounting Made Simple™



IronRidge
1435 Baechtel Road
Willits, CA 95490

Hayward Office
26120 Eden Landing Road Suite #2
Hayward, CA 94545

IronRidge's Product Manufacturer Notes

1. This drawing is for layout reference only.
2. All hardware is stainless steel.
3. All dimensions are in inches.

No.	Description	Date

Product Category:
Ballasted Roof Mount (BRM)

Product:
Ballasted Roof Mount

Drawing Name:
Typical System Assembly Details

Date: 25 July, 2012

Drawn by: EP

Checked by: SM

Exhibit A

Scale: 1/16" = 1'-0"

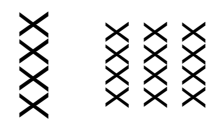
25 July, 2012

REVISIONS		
DESCRIPTION	DATE	REV

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DATE: 00/00/0000

PROJECT NAME & ADDRESS



SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B 11" X 17"

SHEET NUMBER
PV-7