SUNERGY SOLUTIONS
Clean Solar Energy

CLIENT INFORMATION

Kevin Beane
33 South Mill St
Portsmouth NH 03801

PROJECT NAME:
Beane, Kevin

PROJECT LOCATION:
33 South Mill St
Portsmouth NH 03801

SYSTEM SIZE (MODULE QTY):
6.4 kW DC

PHOTOVOLTAIC MODULE AND MANUFACTURER
(16) Q CELL 400W

INVERTER MANUF. & MODEL
(16) Enphase IQ8+ Microinverters

AC VOLTAGE	*AC CURRENT*
240 VAC	19.36 A
ARRAY AZIMUTH	*ARRAY TILT*
varies	varies

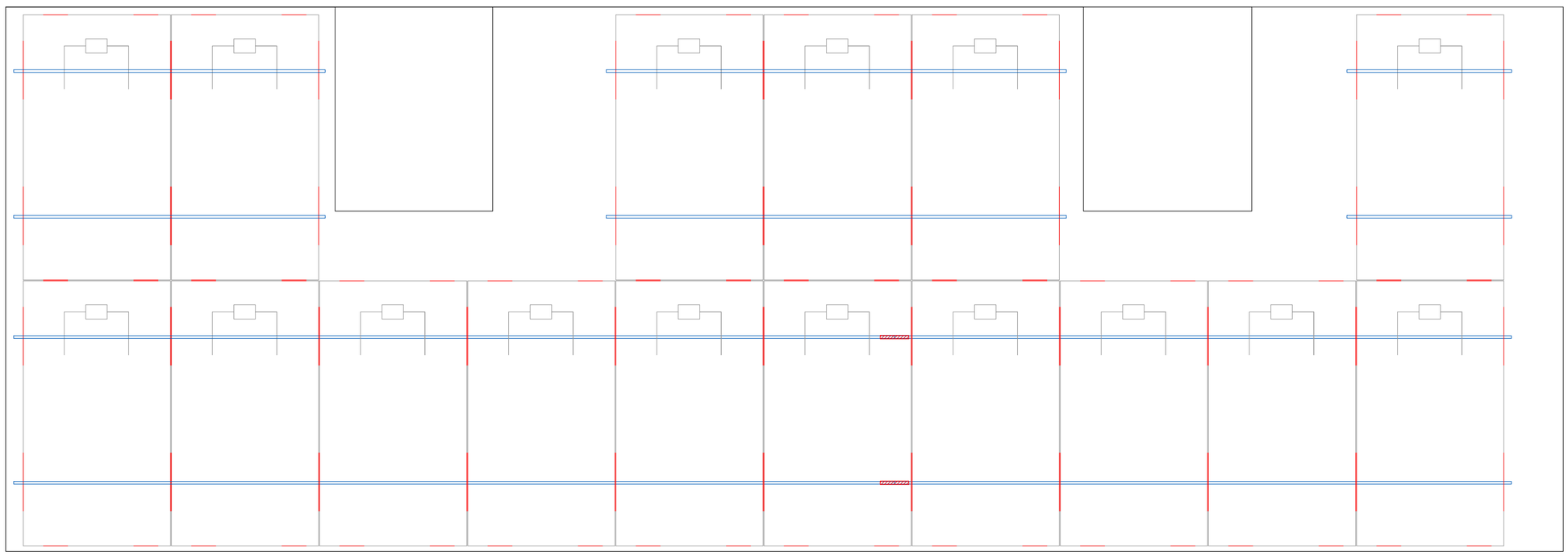
SUNERGY SOLUTIONS
Clean Solar Energy
75 Gilcreast Road
Suite 210
Londonderry NH 03053
(603) 387-9996
nicole@sunergysolutions.us

DRAWING NUMBER:
PV - 1.0

DRAWING TITLE:
SITE OVERVIEW

DRAWN BY:	*APPROVED BY:*
A DeFreitas	A DeFreitas
SHEET SIZE:	*SCALE:*
D	NTS
DATE:	*REV:*
6/7/22	1

REV.	DATE	DESCRIPTION	APP'D.
3		AS BUILT SET	AKD
2		CONSTRUCTION SET	AKD
1	6/7/22	PERMIT SET	AKD
0		FEASIBILITY OVERHEAD	AKD



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DRAWING NUMBER:

PV - 1.1

DRAWING TITLE:

PLAN VIEW

DRAWN BY:	*APPROVED BY:*
A DeFreitas	A DeFreitas
SHEET SIZE:	*SCALE:*
D	SHOWN
DATE:	*REV:*
6/7/22	1

REV.	DATE	DESCRIPTION	APP'D.
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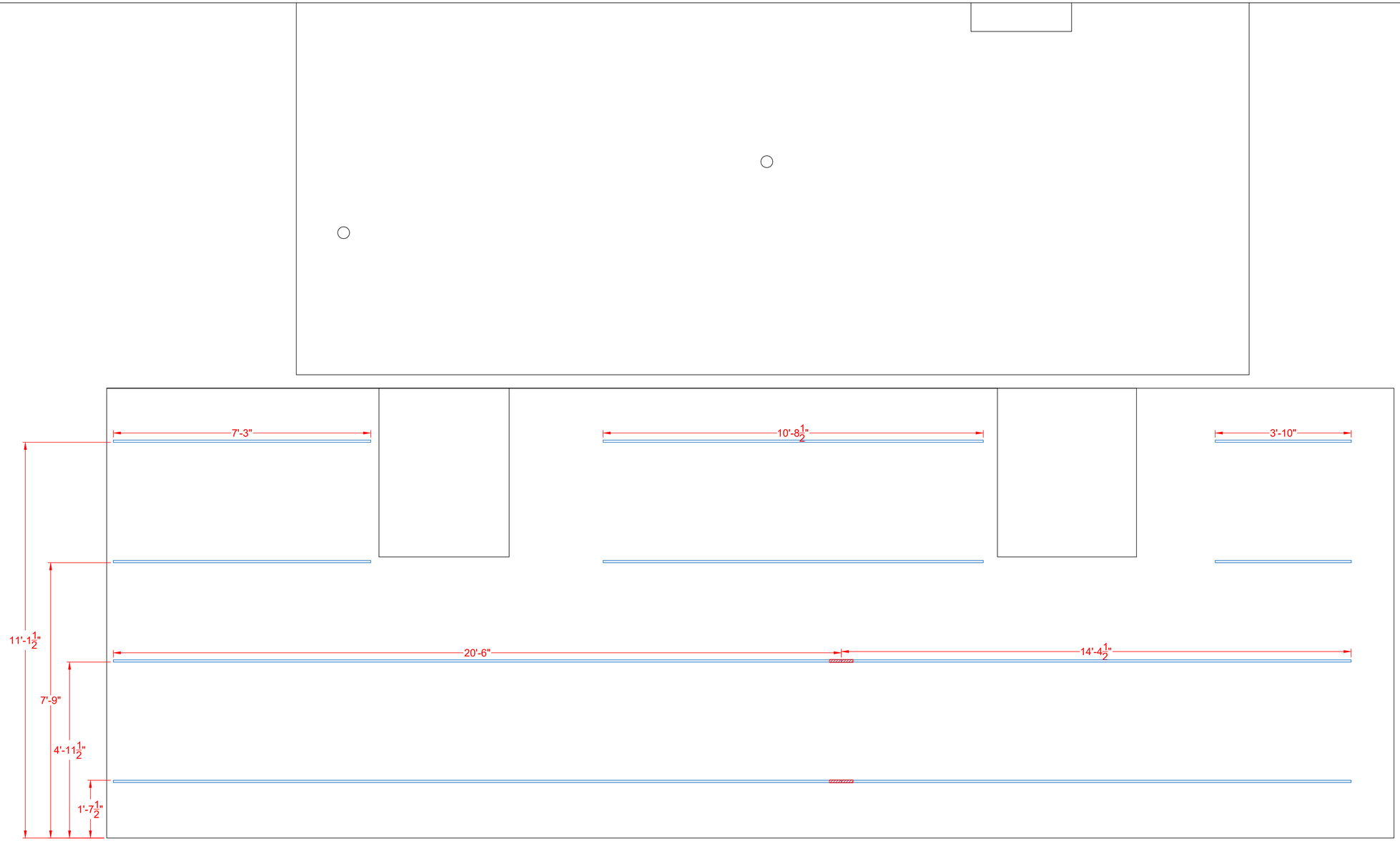

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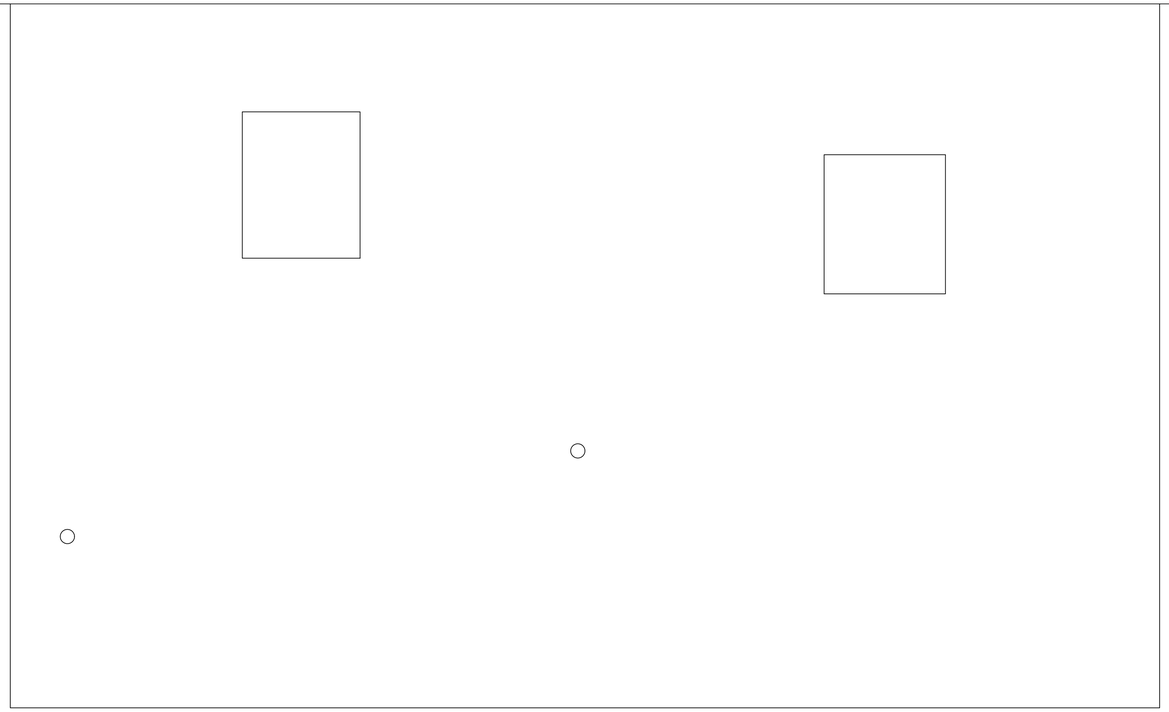
nicole@sunergysolutions.us

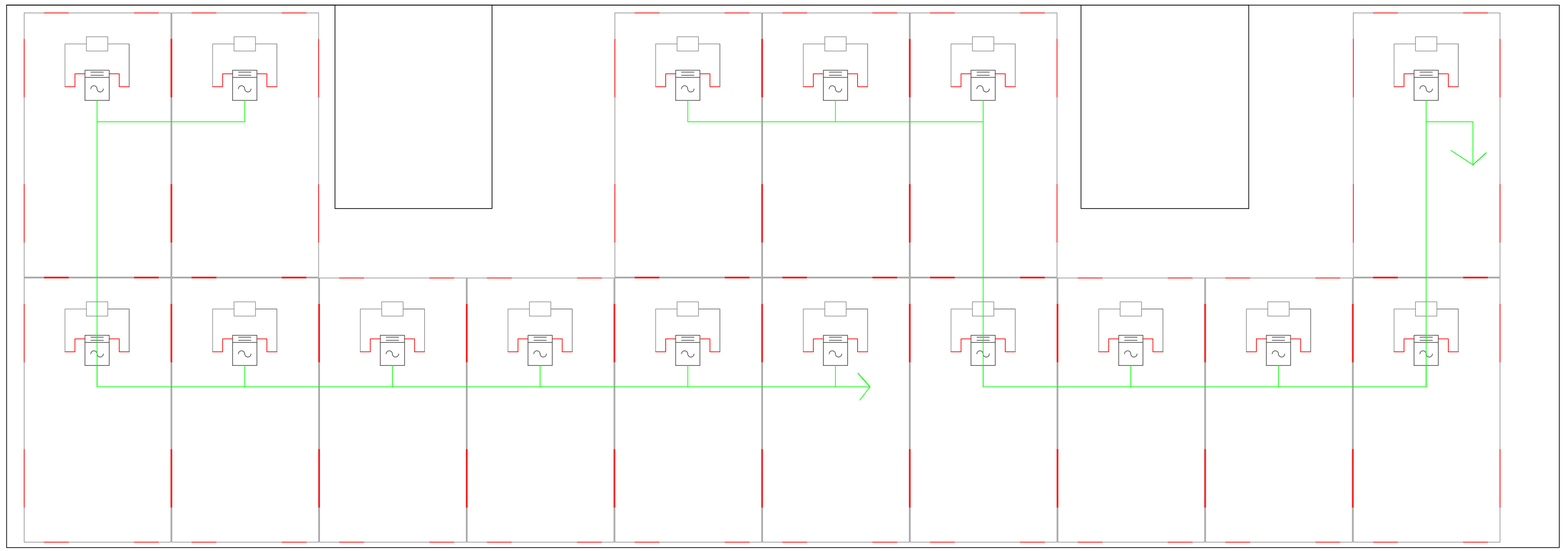
DRAWING NUMBER:
PV - 1.2

DRAWING TITLE:
RAILS & L-FEET LAYOUT

DRAWN BY:	*APPROVED BY:*
A DeFreitas	A DeFreitas
SHEET SIZE:	*SCALE:*
D	SHOWN
DATE:	*REV:*
6/7/22	1

REV.	DATE	DESCRIPTION	APP'D.
3		AS BUILT SET	AKD
2		CONSTRUCTION SET	AKD
1	6/7/22	PERMIT SET	AKD
0		FEASIBILITY OVERHEAD	AKD





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INVERTER MANUF. & MODEL
(16) Enphase IQ8+ Microinverters

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240 VAC	19.36 A
ARRAY AZIMUTH	*ARRAY TILT*
varies	varies

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DRAWING NUMBER:
PV - 1.3

DRAWING TITLE:
ARRAY WIRING

DRAWN BY:	*APPROVED BY:*
A DeFreitas	A DeFreitas
SHEET SIZE:	*SCALE:*
D	NTS
DATE:	*REV:*
6/7/22	1

REV.	DATE	DESCRIPTION	APP'D.
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2		CONSTRUCTION SET	AKD
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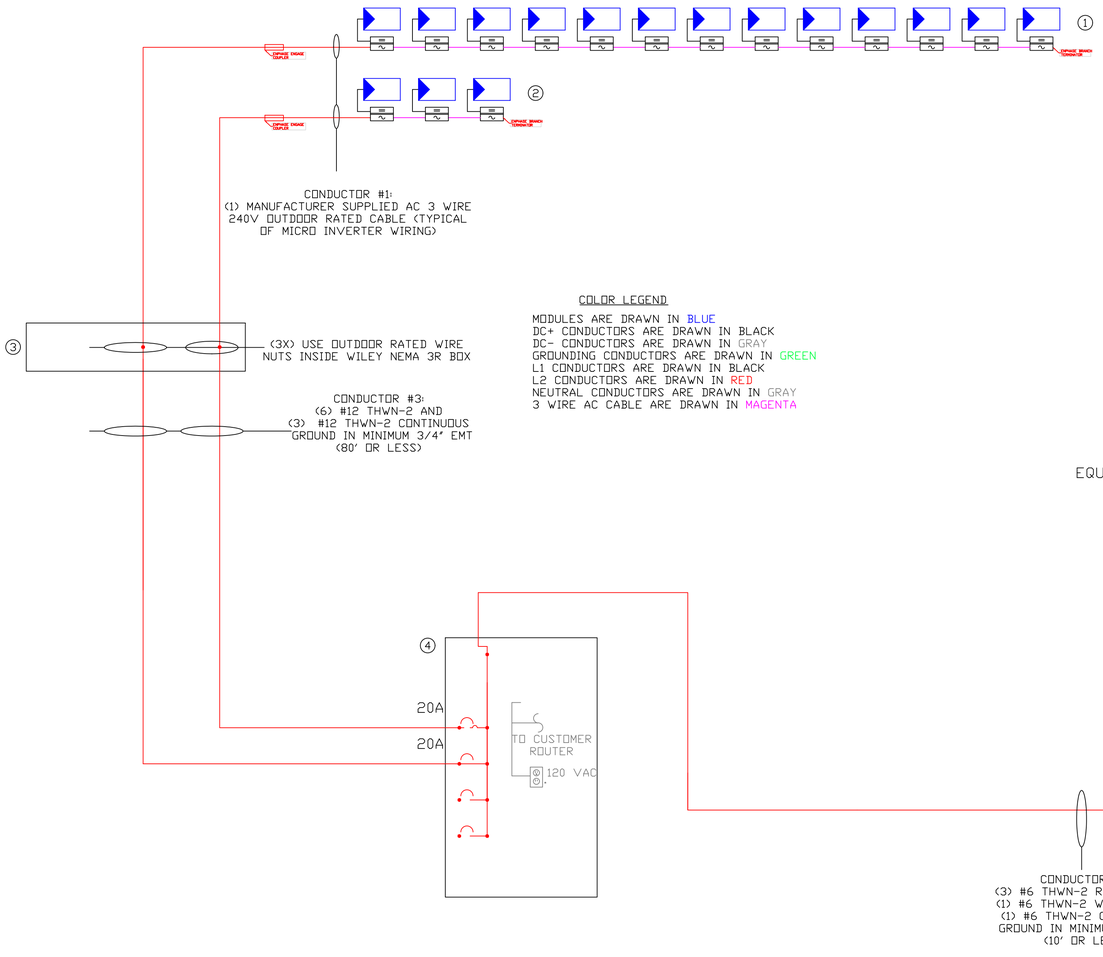

MODULE SPECIFICATIONS:	IQ8+ MICRO INVERTER SPECIFICATIONS:
Q CELL 400W Pmp: 400W Vmp: 33.94 Vdc Voc: 40.66 Vdc Imp: 10.02A Isc: 10.52A Isc X 1.25: 10.52A X 1.25 = 13.15A Isc X 1.56: 10.52A X 1.56 = 16.44A	MAX AC OUTPUT POWER: 290W MAX AC OUTPUT CURRENT: 1.21A OPERATING VOLTAGE: 240 VAC, SINGLE PHASE
	BRANCH CIRCUIT (1) SPECIFICATIONS: Pmp: 4400W Vmax: 240 VAC Imp: 15.95A Imp X 1.25: 15.95A X 1.25 = 19.94A
	BRANCH CIRCUIT (2) SPECIFICATIONS: Pmp: 1200W Vmax: 240 VAC Imp: 4.35 Imp X 1.25: 4.35A X 1.25 = 5.44A

EQUIPMENT:

1: (X1) BRANCH CIRCUIT OF (13) Q CELL 400W SOLAR ELECTRIC MODULES
2: (X1) BRANCH CIRCUIT OF (3) Q CELL 400W SOLAR ELECTRIC MODULES
1.1: (16) ENPHASE IQ8+ MICRO INVERTERS RAIL MOUNTED BENEATH EACH MODULE, 2 WIRE 240VAC, 290W
3: 12X12X4 ROOF MOUNTED JUNCTION BOX NEMA 3R
4: AC COMBINER BOX, 100 AMPS, NEMA 3R. MODEL # TBD
5: EXTERNAL FUSED UTILITY DISCONNECT, 60A, 3P, 600 VAC, NEMA 3R, 60 AMP FUSES.
6: 12X12X8 PVC JUNCTION BOX NEMA 3R FOR TAPS / INTERCONNECTION
7: EXISTING UTILITY METER

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INVERTER MANUF. & MODEL
(16) Enphase IQ8+ Microinverters

AC VOLTAGE	*AC CURRENT*
240 VAC	19.36 A
ARRAY AZIMUTH	*ARRAY TILT*
varies	varies

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(603) 387-9996
nicole@sunergysolutions.us

DRAWING NUMBER:
PV - 1.4

DRAWING TITLE:
SINGLE LINE DIAGRAM

DRAWN BY:	*APPROVED BY:*
A DeFreitas	A DeFreitas
SHEET SIZE:	*SCALE:*
D	NTS
DATE:	*REV:*
6/7/22	1

REV.	DATE	DESCRIPTION	APP'D.
3		AS BUILT SET	AKD
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1	6/7/22	PERMIT SET	AKD
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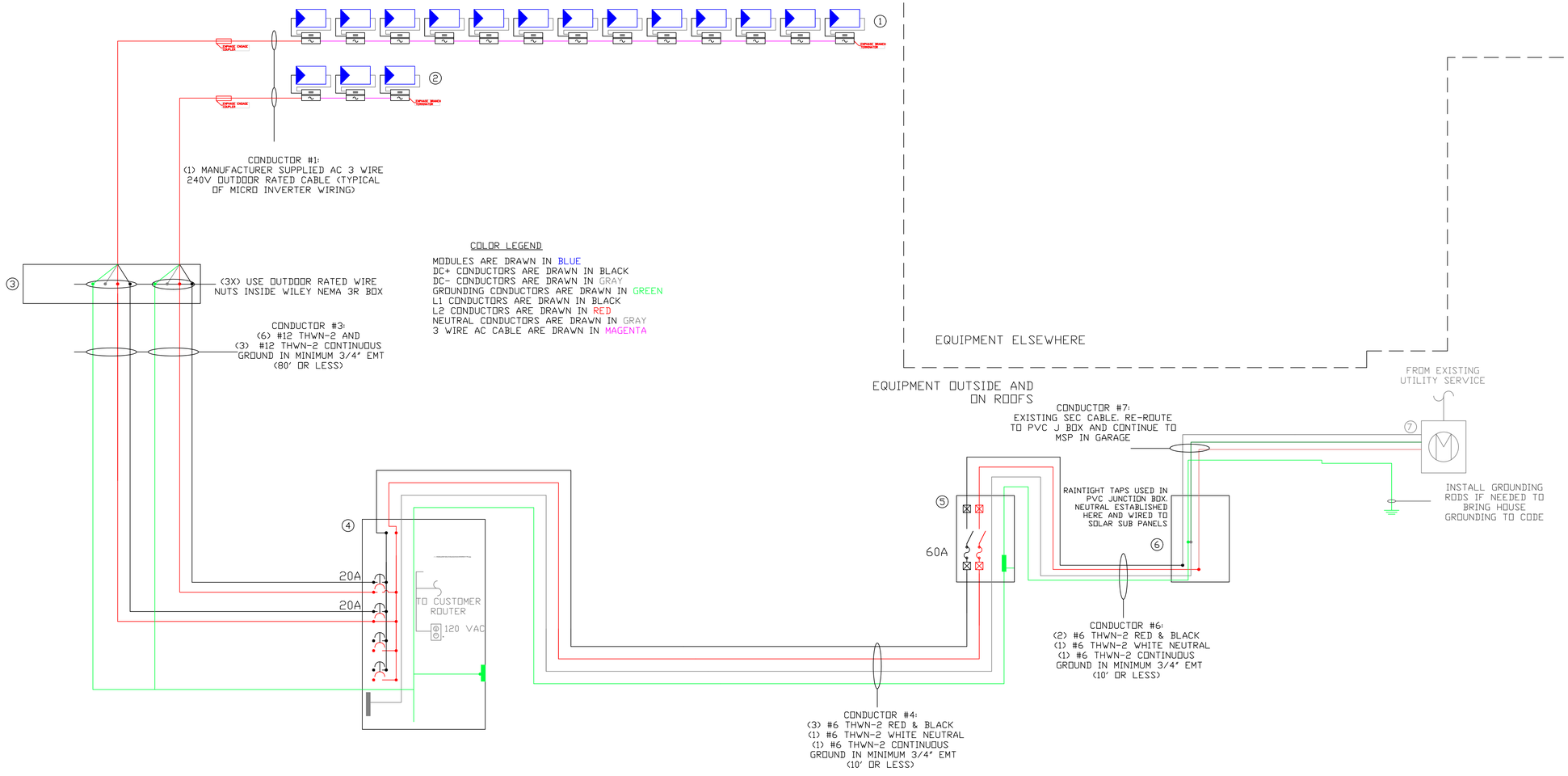

MODULE SPECIFICATIONS:
Q CELL 400W
Pmp: 400W
Vmp: 33.94 Vdc
Voc: 40.66 Vdc
Imp: 10.02A
Isc: 10.52A
Isc X 1.25: 10.52A X 1.25 = 13.15A
Isc X 1.56: 10.52A X 1.56 = 16.44A

IQ8+ MICRO INVERTER SPECIFICATIONS:
MAX AC OUTPUT POWER: 290W
MAX AC OUTPUT CURRENT: 1.21A
OPERATING VOLTAGE: 240 VAC, SINGLE PHASE

BRANCH CIRCUIT (1) SPECIFICATIONS:
Pmp: 4400W
Vmax: 240 VAC
Imp: 15.95A
Imp X 1.25: 15.95A X 1.25 = 19.94A

BRANCH CIRCUIT (2) SPECIFICATIONS:
Pmp: 1200W
Vmax: 240 VAC
Imp: 4.35
Imp X 1.25: 4.35A X 1.25 = 5.44A

EQUIPMENT:

1: (X1) BRANCH CIRCUIT OF (13) Q CELL 400W SOLAR ELECTRIC MODULES
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DRAWING NUMBER: PV - 1.5

DRAWING TITLE: THREE LINE DIAGRAM

DRAWN BY:	*APPROVED BY:*
A DeFreitas	A DeFreitas
SHEET SIZE:	*SCALE:*
D	NTS
DATE:	*REV:*
6/7/22	1

REV.	DATE	DESCRIPTION	APP'D.
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ENPHASE

DATA SHEET

IQ8 and IQ8+ Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

IQ8SP-DS-0002-01-EN-US-2022-03-17

* Only when installed with IQ System Controller 2, meets UL 1741.

** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings[1]	W	235 – 350	235 – 440
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell
MPPT voltage range	V	27 – 37	29 – 45
Operating range	V	25 – 48	25 – 58
Min/max start voltage	V	30 / 48	30 / 58
Max input DC voltage	V	50	60
Max DC current[2] [module Isc]	A	15	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		**IQ8-60-2-US**	**IQ8PLUS-72-2-US**
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range[3]	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit[4]		16	13
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.5	97.6
CEC weighted efficiency	%	97	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (HxWxD)		212 mm (8.3”) x 175 mm (6.9”) x 30.2 mm (1.2”)	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer’s instructions.	

(1) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility
(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

powered by Q.ANTUM DUO Z

Q.PEAK DUO BLK ML-G10+
385-410

ENDURING HIGH PERFORMANCE

25 YR Warranty
Product & Performance

Q CELLS
Yield Security

BREAKING THE 20 % EFFICIENCY BARRIER
Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 21.1%.

THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY
Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new “Quality Controlled PV” of the independent certification institute TÜV Rheinland.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).

A RELIABLE INVESTMENT
Inclusive 25-year product warranty and 25-year linear performance warranty[1].

[1] See data sheet on rear for further information.

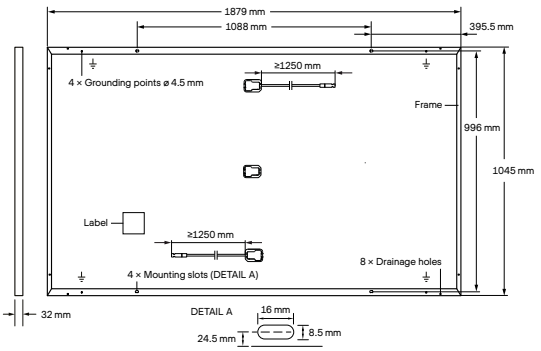
THE IDEAL SOLUTION FOR:
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	1879 mm × 1045 mm × 32 mm (including frame)
Weight	22.0 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥1250 mm, (–) ≥1250 mm
Connector	Stäubli MC4; IP68

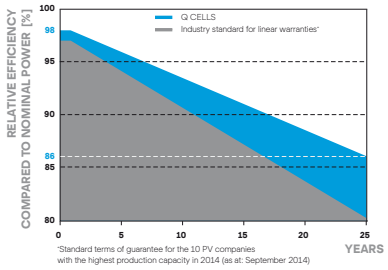


ELECTRICAL CHARACTERISTICS

POWER CLASS				385	390	395	400	405	410
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W)									
Minimum	Power at MPP[1]	P_{MPP}	[W]	385	390	395	400	405	410
	Short Circuit Current[1]	I_{SC}	[A]	11.04	11.07	11.10	11.14	11.17	11.20
	Open Circuit Voltage[1]	V_{OC}	[V]	45.19	45.23	45.27	45.30	45.34	45.37
	Current at MPP	I_{MPP}	[A]	10.59	10.65	10.71	10.77	10.83	10.89
	Voltage at MPP	V_{MPP}	[V]	36.36	36.62	36.88	37.13	37.39	37.64
	Efficiency[1]	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6	20.9
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]									
Minimum	Power at MPP	P_{MPP}	[W]	288.8	292.6	296.3	300.1	303.8	307.6
	Short Circuit Current	I_{SC}	[A]	8.90	8.92	8.95	8.97	9.00	9.03
	Open Circuit Voltage	V_{OC}	[V]	42.62	42.65	42.69	42.72	42.76	42.79
	Current at MPP	I_{MPP}	[A]	8.35	8.41	8.46	8.51	8.57	8.62
	Voltage at MPP	V_{MPP}	[V]	34.59	34.81	35.03	35.25	35.46	35.68

[1]Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2]800 W/m², NMOT, spectrum AM 1.5

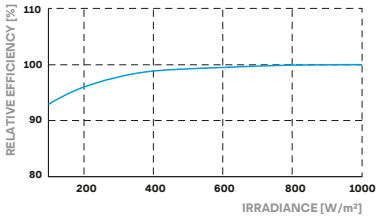
Q CELLS PERFORMANCE WARRANTY



At least 98 % of nominal power during first year. Thereafter max. 0.5 % degradation per year. At least 93.5 % of nominal power up to 10 years. At least 86 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	–0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	–0.34	Nominal Module Operating Temperature	NMOT	[°C]	43±3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1000	PV module classification	Class II
Maximum Reverse Current	I_R	[A]	20	Fire Rating based on ANSI / UL 61730	C / TYPE 2
Max. Design Load, Push / Pull		[Pa]	3600 / 2660	Permitted Module Temperature on Continuous Duty	–40 °C - +85 °C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000		

QUALIFICATIONS AND CERTIFICATES

Quality Controlled PV - TÜV Rheinland;
IEC 61215:2016; IEC 61730:2016.
This data sheet complies with DIN EN 50380.
QCPV Certification ongoing.
Certification holder:
Hanwha Q CELLS GmbH

TÜVRheinland CERTIFIED
www.tuv.com
ID 1111220277

CE

PACKAGING INFORMATION

Horizontal packaging	1940 mm	1100 mm	1220 mm	751 kg	28 pallets	24 pallets	32 modules

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Made in Korea

Hanwha Q CELLS Australia Pty Ltd
Suite 1, Level 1, 15 Blue Street, North Sydney, NSW 2060, Australia | **TEL** +61 (0)2 9016 3033 | **FAX** +61 (0)2 9016 3032 | **EMAIL** q-cells-australia@q-cells.com | **WEB** www.q-cells.com/au

Engineered in Germany

Q CELLS