# Scope of work:

Installation of a solar photovoltaic system at the Tan residence. located at 6204 N Hoghan Circle, Paradise Valley, AZ 85253.

The power generated by the PV system will be interconnected with the utility grid through the electrical service equipment. The PV system does not include storage batteries.

# System Rating:

11.7 kW DC 8.6 kW AC

# Equipment Summary:

(36) LG Solar LG325N1K-V5 325 Watt PV Modules (36) Enphase Energy IQ7-60-2-US microinverters

# **Drawing Index:**

- E-1 Cover
- E-2 Site Plan
- Structural Calcs & Mounting Details One-Line Electrical Diagram E-3
- E-4
- Three-Line Electrical Diagram Array Diagram E-5
- E-6
- E-7 Notes
- E-8 Labels
- E-9 Load Calculations
- E-10 Equipment Specification Sheets

# Governing Codes:

- 2014 National Electrical Code
- 2015 International Building Code
- 2015 International Residential Code 2015 International Fire Code
- Underwriters Laboratories (UL) Standards







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Setback		PLANT LOCATION:	6204 N Hogahn Circle Paradise Valley AZ 85253
		11.7 8.6 Gi photovc	kW (DC) kW (AC) rid-tied ltaic system
71'		AHJ: Pa Utility: SR	radise Valley P
		APN: 169 Zoning: R-	9-22-080C 43
		С	Cover
		Dwg No:	
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		Drawings	s not to scale





ANEVA SOLAR

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# AZ ROC License: 287715 (CR-11)

Version History					
Version	Date				
А	7/23/20				
В	12/3/20				
С	1/8/21				

# Project name: Tan Solar

6204 N Hogahn Circle Paradise Valley AZ 85253 PLANT LOCATION:

11.7 kW (DC) 8.6 kW (AC) Grid-tied photovoltaic system

AHJ: Paradise Valley Utility: SRP

APN: 169-22-080C Zoning: R-43

Site Plan

Dwg No:

E-2

Drawings not to scale

6' block wall



Roof Moun x Height Ab	ting Detail ove Roof =	ANE	va Solar		
Rail	Solar	9393 N Suite Scottsda www.and 480.	. 90th Street e 102-353 ile, AZ 85258 evasolar.com 462.6382		
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	LG Solar	LG325N1	K-V5 🔻		
	Flush: F	ortrait/Lan	dsc. 🔻		
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		<u> </u>	Circl 85		
	Asp	halt shingle	Ψ	AT	u U A Z A Z
	2	4" O.C.	*		gah lley
	SnapN	Rack Ultra I	Rail 🔻		Va Va
		24"			4 N lise
	6' :		520. arad		
	Array 1 Array 2 Array 3				ů Č
	24	6	6		
	39.7	39.7	39.7		
(lbs.):	6.0	6.0	6.0	11.7	kW (DC)
(lbs.):	45.7	45.7	45.7	8.6	kW (ÀC) rid-tied
()-	1096.3	274.1	274.1	photovo	oltaic system
	18.4	18.4	18.4		
	442.6	110.6	110.6	AHJ: Pa	radise Valley
	2.5	2.5	2.5	Utility: SF	₹P
ts:	36	9	9	APN: 16	9-22-080C
	30.5	30.5	30.5	∠oning: R	-43
	440.0	440.0	440.0		
uind lac di	442.6	110.6	110.6	Structu	ral Calcs &
wind load:	9293.8	2323.4	2523.4	Mount	ing Details
a support.	200.2	200.2 v 3.6" AQT	206.2 M lac		
	5/10	X 3.3 AST	W lag	Dwg No:	E-3
				Drawing	s not to scale







Max continuous output power = 2880 W ac Nominal voltage = 240 V ac

# Total array

Nominal voltage = 240 V ac Continuous output current = 36 A ac

PV branch circuit #2 See Array Diagram, Dwg. E-6 PV branch circuit #2 L1 L2 See Array Diagram, Dwg. E-6 G PV branch circuit #2 L1 L2 See Array Diagram, Dwg. E-6 G PV branch circuit #1 L1 L2 G See Array Diagram, Dwg. E-6 G L1 L2 A label shall be installed per NEC. It shall state the following: SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN. To Panel A Existing Panel B Inside garage 200A Bus, 120/240V, NEMA 1 Existing wiring





# NOTES:

- 1. Photovoltaic system equipment shall be installed in accordance with the IRC, NEC articles 690 and 705, and applicable requirements of the service utility and authority having jurisdiction. Photovoltaic system equipment will be posted with applicable warnings, signage and plagues per NEC 690, 705.10 and 705.12.
- Photovoltaic source and output circuits shall comply with the wiring methods and installation and marking 2. requirements of NEC. Wiring methods and enclosures containing PV source conductors must be marked with the wording "WARNING: PHOTOVOLTAIC POWER SOURCE" by labels or other approved permanent marking means suitable for the environment and placed with a maximum of 10" spacing.
- 3. Breaker labeled "MAXIMUM AC OUTPUT CURRENT AND OPERATING AC VOLTAGE". Breaker shall be positioned at the opposite (load) end from the input feeder or main circuit breaker location, and labeled "WARNING: POWER SOURCE OUTPUT CONNECTION - DO NOT RELOCATE THIS OVERCURRENT DEVICE".
- Warning sign reading "WARNING ELECTRIC SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD 4. SIDES MAY BE ENERGIZED IN THE OFF POSITION"
- 5. Label "PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH." Switch to be lockable visible blade disconnect per utility requirements.
- 6. Label "PHOTOVOLTAIC ARRAY DC DISCONNECT SWITCH". Label with operating current, operating voltage, maximum system voltage, and short circuit current.
- 7. Listing agency names and numbers to be indicated on power inverters and solar modules
- Labeled PHOTOVOLTAIC SYSTEM DEDICATED KWH METER. 8.
- Bi-directional meter to be installed by utility. 9.
- 10. Dedicated photovoltaic combiner sub-panel. Label "LOADS NOT TO BE ADDED TO THIS PANEL"
- 11. All labels exposed to sunlight must be engraved and attached per approved method.
- 12. GEC installed as required by manufacturer instructions.
- 13. Label "BREAKER HAS BEEN DE-RATED PER NEC 705.12"
- 14. Existing equipment is noted with a dashed line. Solid lines denote equipment installed by Aneva Solar.
- 15. Wire may be run short distances outside of conduit if wire reads "SUNLIGHT RESISTANT"
- 16. Ambient temperature adjusted for conduits exposed to sunlight on or above rooftops. Conduit elevated min. 3 1/2"; Adder 30 DEG F.
- 18. All exterior equipment to be NEMA 3R.
- 19. The photovoltaic power source shall be labeled with the following warning at each junction box, combiner box, disconnect and device where energized, ungrounded circuits may be exposed during service:

WARNING: ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

- 20. DC circuits shall be protected by a listed (DC) arc-fault circuit interrupter and shall comply with NEC 690.11.
- 21. PV system circuits installed on or in buildings shall include a rapid shutdown function that controls specific conductors in accordance with NEC 690.12(B)(2). The rapid shutdown method shall be labelled in accordance with NEC 690.56(C)(1)(a). See Labels, Dwg. E-9 for example.

- 22. PV arrays shall be provided with DC ground-fault protection. PV power systems shall include ground fault protection for all PV source & output circuits.
- 23. Exposed PV rooftop conductors that are not located under the array shall be installed in a listed raceway, and shall include junction boxes at both ends of the raceway to transition from exposed conductors to the listed raceways.
- 24. A permanent plaque shall be installed. It shall state the following: PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN. The plaque shall be reflective with white, capitalized letters, on red background. Text height 3/8 inches minimum.
- 25. Label · WARNING: A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE SERVICE DISCONNECTING MEANS. FOLLOW PROPER LOCK-OUT/TAG-OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE.

26. Label "PHOTOVOLTAIC SYSTEM AC DISCONNECT SWITCH"

Keys:			
	IRREVERSIBLE CRIMP	MLO	М
•	WIRE SPLICE/BOND	PV	P
GFDI	GROUND FAULT DETECTOR & INTERRUPTER	SES	S
GFPD	GROUND FAULT PROTECTION DEVICE	GND	G
MCB	MAIN CIRCUIT BREAKER	NEU	N
OPD	OVERCURRENT PROTECTION DEVICE	GEC	G



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Version History					
Version	Date				
А	7/23/20				
В	12/3/20				
С	1/8/21				

# Project name: Tan Solar

l Hogahn Circle Valley AZ 85253 PLANT LOCATION: 6204 N F Paradise V

11.7 kW (DC) 8.6 kW (AC) Grid-tied photovoltaic system

AHJ: Paradise Valley Utility: SRP

APN: 169-22-080C Zoning: R-43

Notes

Dwg No:

E-7

Drawings not to scale

IAIN LUG ONLY

- PHOTOVOLTAIC
- SERVICE ENTRANCE SECTION
- ROUND
- IFUTRAI

GROUNDING ELECTRODE CONDUCTOR

Dedicated kWh meter (Black with white lettering) <b>&lt;8&gt;</b>	PHOTOVOLTAIC SYSTEM METER	LABEL SIZE: 1 X 3-1/2 INCHES TEXT HEIGHT: 1/4 INCHES		
Utility disconnect switch (Black with white lettering) <b>&lt;5&gt;</b>	PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH	LABEL SIZE: 1-1/2 X 3-1/2 INCHES TEXT HEIGHT:1/4 INCHES		
Disconnect switches, combiners, junction boxes (Red with white lettering) <b>&lt;4&gt;</b>	WARNING ELECTRIC SHOCK HAZARD - DO NOT TOUCH TERMINALS - TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OFF POSITION	LABEL SIZE: 1-1/2 X 3-1/2 INCHES TEXT HEIGHT: "WARNING" 1/4 INCHES OTHER TEXT - 3/16 INCHES		
Backfed breaker (Red with white lettering) <b>&lt;3&gt;</b>	WARNING INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE	LABEL SIZE: 7/8 X 2 INCHES TEXT HEIGHT: 1/8 (OR 1/16) INCHES	DC Warning Markings Sample label for compliance with International Fire Code (see Notes <23>)	WARNING: PHOTOVOLT POWER SOURCE
AC panel (Black with white lettering) <b>&lt;3&gt;</b>	PHOTOVOLTAIC ELECTRIC POWER SOURCE BREAKERS ARE BACKFED MAXIMUM AC CURRENT 36 A SYSTEM AC VOLTAGE 240 V	LABEL SIZE: 1-1/2 X 3-1/2 INCHES TEXT HEIGHT: 3/16 INCHES		
Main breaker de-rate (Black with white lettering)	BREAKER HAS BEEN DERATED PER NEC 705.12	LABEL SIZE: 1/2 X 1-3/4 INCHES TEXT HEIGHT: 1/8 (OR 1/16) INCHES		
			Place Plaque At Electrical Service Location Reflective - 3/8" High White Letters On Red Background	PHOTOVOLTAIC SYSTEM EQU WITH RAPID SHUTDOWN

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A 7/23/20							
B 12/3/20							
C 1/8/21							
· ·							
Project name: Tan Solar							
PLANT LOCATION: 6204 N Hogahn Circle Paradise Valley AZ 85253							
11.7 kW (DC) 8.6 kW (AC) Grid-tied photovoltaic system							
AHJ: Paradise Valley Utility: SRP APN: 169-22-080C Zoning: R-43							
Labels							
Dwg No: <b>E-8</b>							

Drawings not to scale

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						Les de la desta		220 02)	1 (						
	Existing Panel Schedule - Panel A		Load Calculations (Per NEC 220.82)		4	Existing Panel Schedule - Panel B									
Residential Panel	200 AMP	120/240V, 1PH, 3	3W, MAIN 200A/2P	NEMA 3R	SURFACE MOUNTED					Residential Panel	200 AMP	120/240V, 1PH, 3	W, MAIN 200A/2P	NEMA 3R	SURFACE MOUNTED
Location SES	Туре		AIC RATI	NG 22k/10kA	SERIES RATED	GENERAL LOADS (Pane	el B):			Location SES	Туре		AIC RATI	NG 22k/10k/	SERIES RATED
USE/AREA SERVED	CB	SPACE NUMBER	SPACE NUMBER	CB	USE/AREA SERVED	5196 sq. ft. @ 3V	/A/sq. ft.	15588 VA		USE/AREA SERVED	CB	SPACE NUMBER	SPACE NUMBER	CB	USE/AREA SERVED
	00A /2P	1	2	00A/2P		Two Small Appliance		3000 VA			304/20	1	2	304/20	
AC 1	JUN/2F	3	4	SUR/2F	AC 2	Laundry circuit		1500 VA		hot water	JUA/2F	3	4	JUA/2P	oven
	604/20	5	6	604/20		Dishwasher/Disposal		1800 VA			204/20	5	6	E04/20	
heat	OUA/2P	7	8	OUA/2P	heat	Refrigerator		1800 VA		dryer	SUA/2P	7	8	SUA/2P	jacuzzi heat
	404 (20	9	10	20A/1P	workshop	water heater		5000 VA			204/20	9	10	15A/1P	garage
range	40A/2P	11	12	15A/1P	lights	jacuzzi		9000 VA		dishwasher	ZUA/ZP	11	12	20A/1P	master bath
	204 (22	13	14	15A/1P	lights	oven		5000 VA		fridge	20A/1P	13	14	20A/1P	bath gfi
AH 1	3UA/2P	15	16	15A/1P	lights	pool		3000 VA		washer	20A/1P	15	16	20A/1P	garage fridge
	224 (22	17	18	15A/1P	lights	Dryer		5000 VA		lights	15A/1P	17	18	20A/1P	kitchen gfi
AH 2	30A/2P	19	20	15A/1P	lights			50688 VA		master	15A/1P	19	20	20A/1P	kitchen gfi
		21	22							lights	15A/1P	21	22	20A/1P	general
water heater	30A/2P	23	24	30A/2P	oven	First 10,000 at 100%		10000 VA		llights	15A/1P	23	24	20A/1P	general
laundry	20A/1P	25	26			Remainder at 40%		16275 VA		lights	15A/1P	25	26	15A/1P	garage
		27	28			GENE	ERAL LOADS:	26275 VA		garage	20A/1P	27	28	15A/1P	family room
		29	30							microwave	20A/1P	29	30	15A/1P	lights
		31	32			HVAC LOADS						31	32	20A/1P	gate
		33	34			None: All on panel A		0 VA		pool	20A/2P	33	34	20A/1P	fountain
		35	36			н	IVAC LOADS:	0 VA				35	36		
		37	38									37	38		
		39	40			TOTAL SERVICE LOAD (	PANEL B)					39	40		
						CENE	ERAL LOADS:	26275 1/4							
						GLINE	WAC LOADS:	0 VA							
THE 400A 'SES' SERVES (	2) LOAD CEN	TERS, EACH WITH 2	00A MAIN BREAKER	AND BUS B	AR. IN USING NEC	n	IVAC LUADS:	00075 144	-						
- 220.82, THE CALCULATIO	ON OF THE SE	RVICE LOAD FOR PA	ANEL B IS 109A. TH	EREFORE PAN	NEL B WOULD BE		IOTAL LOAD:	26275 VA							
PERMITTED TO BE SERVI	ED BY A 175A	MCB.													
						CALCULATED LOAD FOR	R SERVICE:	400 41400							
						26275	VA/ 240V =	109 AMPS	<u>,</u>						
BAR CANNOT EXCEED 12	TE SUM OF I	THE BUS BAR RA	TING	ICES SUPPLYI	NG POWER TO THE BUS										
						THEREFORE,	, PANEL B WOU	JLD BE							
			1			PERMITTED TO B	E SERVED BY A	175A MCB							



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А	7/23/20				
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# Project name: Tan Solar

PLANT LOCATION: 6204 N Hogahn Circle Paradise Valley AZ 85253

11.7 kW (DC) 8.6 kW (AC) Grid-tied photovoltaic system

AHJ: Paradise Valley Utility: SRP

APN: 169-22-080C Zoning: R-43

# Load Calculations

Dwg No:



# LG NeON<sup>®</sup>2 Black

# LG325N1K-V5

# 325W

The LG NeON® 2 is LG's best selling solar module, and is one of the most powerful and versatile modules on the market today. Featuring LG's Cello Technology, the LG NeON® 2 increases power output. New updates include an extended performance warranty from 86% to 90.08% to give customers higher performance and reliability.







# Features



# Enhanced Performance Warranty

LG NeON® 2 Black has an enhanced performance warranty. After 25 years, LG NeON® 2 Black is guaranteed at least 90.08% of initial performance.



# Better Performance on a Sunny Day

LG NeON® 2 Black now performs better on sunny days, thanks to its improved temperature coefficient.



£.

# Enhanced Product Warranty

LG has extended the warranty of the NeON® 2 Black to 25 years including labor, which is top level in the industry.

# Roof Aesthetics

LG  $\mathsf{NeON}^{\circledast}$  2 Black has been designed with aesthetics in mind using thinner wires that appear all black at a distance. LG NeON® 2 Black can increase the value of a property with its modern design.

# When you go solar, ask for the brand you can trust: LG Solar

# About LG Electronics

LG Electronics is a global leader in electronic products in the clean energy markets by offering solar PV panels and energy storage systems. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first MonoX® series to the market, which is now available in 32 countries. The NeON® (previous MonoX® NeON), NeON®2, NeON®2 BiFacial won the "Intersolar AWARD" in 2013, 2015 and 2016, which demonstrates LG's leadership and innovation in the solar industry. LG Solar

# LG NeON<sup>®</sup>2 Black

# LG325N1K-V5

60

General Data				
Cell Properties (Material/Type)	Monocrystalline/N-type			
Cell Maker	LG			
Cell Configuration	60 Cells (6 × 10)			
Number of Busbars	12EA			
Module Dimensions (L x W x H)	1,686mm x 1,016mm x 40 mm			
Weight	17.1 kg			
Glass (Material)	Tempered Glass with AR Coating			
Backsheet (Color)	Black			
Frame (Material)	Anodized Aluminium			
Junction Box (Protection Degree)	IP 68 with 3 Bypass Diodes			
Cables (Length)	1,000mm x 2EA			
Connector (Type/Maker)	MC 4/MC			

### Certifications and Warranty

	UL 1703
Certifications	ISO 9001, ISO 14001, ISO 50001
	OHSAS 18001
alt Mist Corrosion Test	IEC 62701:2012 Severity 6
Ammonia Corrosion Test	IEC 62716:2013
Aodule Fire Performance	Type 2 (UL 1703)
ire Rating	Class C (UL 790, ULC/ORD C 1703)
olar Module Product Warranty	25 Years
olar Module Output Warranty	Linear Warranty*
proved: 1st Year 98% from 2-24th year: 0.3	33%/vear down. after 25th year: 90.08%

### Temperature Characteristics

NMOT*	[°C]	42 ± 3			
Pmax	[%/°C]	-0.36			
Voc	[%/°C]	-0.27			
lsc	[%/°C]	0.03			
NMOT (Nominal Module Operating Temperature): Irradiance 800 W/m2, Ambient temperature 20 °C,					

### Electrical Properties (NMOT)

LG

Life's Good

Model		LG325N1K-V5		
Maximum Power (Pmax)	[W]	243		
MPP Voltage (Vmpp)	[V]	31.5		
MPP Current (Impp)	[A]	7.69		
Open Circuit Voltage (Voc)	[V]	38.4		
Short Circuit Current (Isc)	[A]	8.23		

### I-V Curves



2000 Millbrook Drive

www.lg-solar.com

incolnshire, IL 60069



LG325N1K-V5.pdf

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# Electrical Properties (STC\*)

Model

Maximum Power (Pmax)

MPP Voltage (Vmpp) MPP Current (Impp)

Power Tolerance

Operating Temperature

Maximum System Voltage

Maximum Series Fuse Rati

Mechanical Test Load (From

Mechanical Test Load (Rea

Number of Modules per Pal Number of Modules per 40 Packaging Box Dimension

Packaging Box Gross Weig

16-8.0+3.0/0.3+0. Drain Holes

B-04.3/0.2 Grounding Holes 8-8.5+12.0/0.3+0.5 Mounting Holes

Open Circuit Voltage (Voc Short Circuit Current (Isc Module Efficiency

		LG325N1K-V5
	[W]	325
	[V]	33.7
	[A]	9.65
5%)	[V]	40.9
5%)	[A]	10.23
	[%]	19.0
	[%]	0~+3

\* STC (Standard Test Condition): Irradiance 1000 W/m², cell temperature 25 °C, AM 1.5

# **Operating Conditions**

	[°C]	-40 ~+90	
	[V]	1,000(UL), 1000(IEC)	
g	[A]	20	
t)	[Pa/psf]	5,400/113	
)	[Pa/psf]	4,000/84	
	(1.5)		

\* Test Load = Design load x Safety Factor (1.5

# Packaging Configuration

llet	[EA]	25	
ft HQ Container	[EA]	650	
(L×W×H)	[mm]	1,750 × 1,120 × 1,221	
nt	[kg]	464	

# Dimensions (mm/inch)



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> Project name: Tan Solar

> > 6204 N Hogahn Circle Paradise Valley AZ 85253 PLANT LOCATION:

11.7 kW (DC) 8.6 kW (AC) Grid-tied photovoltaic system

AHJ: Paradise Valley Utility: SRP

APN: 169-22-080C Zoning: R-43

# Equipment Specification Sheets

Dwg No:

E-10

Data Sheet Enphase Microinverters Region: AMERICAS

# Enphase IQ 7 and IQ 7+ Microinverters

# The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy<sup>™</sup>, Enphase IQ Battery<sup>™</sup>, and the Enphase Enlighten<sup>™</sup> monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.

# Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

# Productive and Reliable

- Optimized for high powered 60-cell and 72-cell\* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

# Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- · Meets CA Rule 21 (UL 1741-SA)

\* The IQ 7+ Micro is required to support 72-cell modules.



To learn more about Enphase offerings, visit enphase.com



# Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2	
Commonly used module pairings <sup>1</sup>	235 W - 350 W +		235 W - 440 W	
Module compatibility	60-cell PV modul	les only	60-cell and 72	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V	22 V / 48 V		
Max DC short circuit current (module lsc)	15 A		15 A	
Overvoltage class DC port	11		11	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded AC side protectio	l array; No additior on requires max 20	nal DC side prote A per branch circ	
OUTPUT DATA (AC)	IQ 7 Microinver	ter	IQ 7+ Microi	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range <sup>2</sup>	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit <sup>3</sup>	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	
Overvoltage class AC port	III		111	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading 0.	85 lagging	0.85 leading	
EFFICIENCY	@240 V	@208 V	@240 V	
Peak efficiency	97.6 %	97.6 %	97.5 %	
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (cond	densing)		
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphen	ol H4 UTX with ad	ditional Q-DCC-5	
Dimensions (WxHxD)	212 mm x 175 mr	m x 30.2 mm (with	out bracket)	
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection	on - No fans		
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-in	sulated, corrosion	resistant polym	
Environmental category / UV exposure rating	NEMA Type 6 / or	utdoor		
FEATURES				
Communication	Power Line Comr	munication (PLC)		
Monitoring	Enlighten Manag Both options requ	er and MyEnlighte	n monitoring opti an Enphase IO Ei	
Disconnecting means	The AC and DC co disconnect requi	onnectors have be red by NEC 690.	en evaluated and	
Compliance	CA Rule 21 (UL 17 UL 62109-1, UL17 CAN/CSA-C22.2 This product is U NEC-2017 section and DC conducto	741-SA) 41/IEEE1547, FCC NO. 107.1-01 L Listed as PV Rap n 690.12 and C22.1 ors, when installed	Part 15 Class B, bid Shut Down Eq I-2015 Rule 64-21 according manu	

No enforced DC/AC ratio. See the compatibility calculator at <u>https://enphase.com/en-us/support/module-compat</u>
 Nominal voltage range can be extended beyond nominal if required by the utility.
 Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

# To learn more about Enphase offerings, visit enphase.com

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		ANE	va Solar
2-US + -cell PV modules		9393 N Suite Scottsda www.ane 480.4	. 90th Street 102-353 Ie, AZ 85258 evasolar.com 462.6382
		AZ RO 28771	C License: 5 (CR-11)
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⊖ ENPHASE.		Dwg No:	<b>-</b> -11
		Drawing	s not to scale

Data Sheet Enphase Q Cable Accessories **REGION: Americas** 

# **Enphase Q** Cable Accessories

The Enphase Q Cable<sup>™</sup> and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.

# 

# Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- · Link connectors eliminate cable waste

## Field-Wireable Connectors

- · Easily connect Q cables on the roof without complex wiring
- · Make connections from any open connector and center feed any section of cable within branch limits
- · Available in male and female connector types

# Enphase Q Cable Accessories

CONDUCTOR SPECIFICATIONS						
Certification	JL3003 (raw cable), UL 9703 (cable assemblies), DG cable					
Flame test rating	FT4					
Compliance	RoHS, OIL RES I, CE, UV resis	RoHS, OIL RES I, CE, UV resistant, combined UL for the United States				
Conductor type	THHN/THWN-2 dry/wet	THHN/THWN-2 dry/wet				
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.					
Q CABLE TYPES / ORDERING OPTI	ONS					
Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box		
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240		
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240		
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200		
ENPHASE Q CABLE ACCESSORIES						
Name	Model Number	Description				
Raw Q Cable	Q-12-RAW-200	300 meters of 12 AWG c	able with no connectors			
Field-wireable connector (male)	0-CONN-10M	M. I				
	Q CONTRICTOR	Make connections from	any open connector			
Field-wireable connector (female)	Q-CONN-10F	Make connections from Make connections from	any open connector any Q Cable open connec	tor		
Field-wireable connector (female) Cable Clip	Q-CONN-10F Q-CLIP-100	Make connections from Make connections from Used to fasten cabling to	any open connector any Q Cable open connec o the racking or to secure	tor looped cabling		
Field-wireable connector (female) Cable Clip Disconnect tool	Q-CONN-10F Q-CLIP-100 Q-DISC-10	Make connections from Make connections from Used to fasten cabling to Disconnect tool for Q Cab	any open connector any Q Cable open connec o the racking or to secure ole connectors, DC connect	tor looped cabling tors, and AC module mount		
Field-wireable connector (female) Cable Clip Disconnect tool Q Cable sealing caps (female)	Q-CONN-10F Q-CLIP-100 Q-DISC-10 Q-SEAL-10	Make connections from Make connections from Used to fasten cabling to Disconnect tool for Q Cab One needed to cover eac	any open connector any Q Cable open connec o the racking or to secure ole connectors, DC connec ch unused connector on th	tor looped cabling tors, and AC module mount ne cabling		
Field-wireable connector (female) Cable Clip Disconnect tool Q Cable sealing caps (female) Terminator	Q-CONN-10F Q-CLIP-100 Q-DISC-10 Q-SEAL-10 Q-TERM-10	Make connections from Make connections from Used to fasten cabling to Disconnect tool for Q Cab One needed to cover eac Terminator cap for unus	any open connector any Q Cable open connec o the racking or to secure ole connectors, DC connec ch unused connector on the ed cable ends	tor looped cabling tors, and AC module mount ne cabling		
Field-wireable connector (female) Cable Clip Disconnect tool Q Cable sealing caps (female) Terminator Friends PV2 to MC4 adaptor	Q-CONN-10F Q-CLIP-100 Q-DISC-10 Q-SEAL-10 Q-TERM-10 ECA-S20-S22	Make connections from Make connections from Used to fasten cabling to Disconnect tool for Q Cab One needed to cover eac Terminator cap for unus Connect PV module usir bulkhead connectors	any open connector any Q Cable open connec o the racking or to secure ole connectors, DC connec ch unused connector on th ed cable ends ng MC4 connectors to IQ r	tor looped cabling tors, and AC module mount ne cabling nicros with Friends PV2		
Field-wireable connector (female) Cable Clip Disconnect tool Q Cable sealing caps (female) Terminator Friends PV2 to MC4 adaptor Friends PV2 to UTX adaptor	Q-CONN-10F Q-CLIP-100 Q-DISC-10 Q-SEAL-10 Q-TERM-10 ECA-S20-S22 ECA-S20-S25	Make connections from Make connections from Used to fasten cabling to Disconnect tool for Q Cab One needed to cover ead Terminator cap for unus Connect PV module usin bulkhead connectors	any open connector any Q Cable open connect of the racking or to secure ble connectors, DC connect ch unused connector on th ed cable ends ng MC4 connectors to IQ r ng UTX connectors to IQ r	tor looped cabling tors, and AC module mount ne cabling micros with Friends PV2		
Field-wireable connector (female)         Cable Clip         Disconnect tool         Q Cable sealing caps (female)         Terminator         Friends PV2 to MC4 adaptor         Friends PV2 to UTX adaptor         Replacement DC Adaptor (MC4)	Q-CONN-10F Q-CLIP-100 Q-DISC-10 Q-SEAL-10 Q-TERM-10 ECA-S20-S22 ECA-S20-S25 Q-DCC-2	Make connections from Make connections from Used to fasten cabling to Disconnect tool for Q Cab One needed to cover ead Terminator cap for unus Connect PV module usir bulkhead connectors DC adaptor to MC4 (max	any open connector any Q Cable open connect of the racking or to secure ole connectors, DC connect och unused connector on the ed cable ends ng MC4 connectors to IQ n ng UTX connectors to IQ n c voltage 100 VDC)	tor looped cabling tors, and AC module mount ne cabling micros with Friends PV2 nicros with Friends PV2		



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### SEALING CAPS

Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)

### CABLE CLIP

Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)



# ANEVA SOLAR

9393 N. 90th Street Suite 102-353 Scottsdale, AZ 85258 www.anevasolar.com 480.462.6382

# AZ ROC License: 287715 (CR-11)

Version History			
Version	Date		
А	7/23/20		
В	12/3/20		
С	1/8/21		

# Project name: Tan Solar

6204 N Hogahn Circle Paradise Valley AZ 85253 PLANT LOCATION:

11.7 kW (DC) 8.6 kW (AC) Grid-tied photovoltaic system

AHJ: Paradise Valley Utility: SRP

APN: 169-22-080C Zoning: R-43

# Equipment **Specification Sheets**

Dwg No:

E-12

Data Sheet Enphase Networking

# Enphase **IQ Combiner 3**

(X-IQ-AM1-240-3)





# Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and optional consumption monitoring

# Simple

- Reduced size from previous combiner
- · Centered mounting brackets support single stud mounting
- · Supports back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- · 80 A total PV or storage branch circuits

# Reliable

- Durable NRTL-certified NEMA type
- 3R enclosure
- Five-year warranty
- UL listed



# Enphase IQ Combiner 3

MODEL NUMBER	
IQ Combiner 3 X-IQ-AM1-240-3	IQ Combiner 3 with Enphase IQ Envoy™ printed ci production metering (ANSI C12.20 +/- 0.5%) and
ACCESSORIES and REPLACEMENT PARTS (no	t included, order separately)
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan) CELLMODEM-M1 (4G based LTE-M / 5-year data plan)	Plug and play industrial grade cellular modem wi microinverters. (Available in the US, Canada, Me where there is adequate cellular service in the ins
Consumption Monitoring* CT CT-200-SPLIT	Split core current transformers enable whole hor
Circuit Breakers BRK-10A-2-240 BRK-15A-2-240 BRK-20A-2P-240	Supports Eaton BR210, BR215, BR220, BR230, BF Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220
EPLC-01	Power line carrier (communication bridge pair), o
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IC
XA-ENV-PCBA-3	Replacement IQ Envoy printed circuit board (PCB
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Ger
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80A of distributed generation / 90A with IQ Envo
Production Metering CT	200 A solid core pre-installed and wired to IQ Env
MECHANICAL DATA	
Dimensions (WxHxD)	49.5 x 37.5 x 16.8 cm (19.5" x 14.75" x 6.63"). Hei
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarb
Wire sizes	<ul> <li>20 A to 50 A breaker inputs: 14 to 4 AWG copp</li> <li>60 A breaker branch input: 4 to 1/0 AWG copp</li> <li>Main lug combined output: 10 to 2/0 AWG cop</li> <li>Neutral and ground: 14 to 1/0 copper conducts</li> <li>Always follow local code requirements for conduct</li> </ul>
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet ca
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM- (not included)
COMPLIANCE	
Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy clas
Compliance, IQ Envoy	UL 60601-1/CANCSA 22.2 No. 61010-1

\* Consumption monitoring is required for Enphase Storage Systems.

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rcuit board for integrated revenue grade PV optional\* consumption monitoring (+/- 2.5%).

th data plan for systems up to 60 tico, Puerto Rico, and the US Virgin Islands, stallation area.)

me consumption metering (+/- 2.5%). R240, BR250, and BR260 circuit breakers.

quantity 2

Combiner 3 (required for EPLC-01)

3) for Combiner 3

neration (DG) breakers only (not included)

y breaker included

ght is 21.06" (53.5 cm with mounting brackets).

onate construction

per conductors er conductors pper conductors ors uctor sizing.

able (not included)

03 (4G) or CELLMODEM-M1 (4G based LTE-M)

s 0.5 (PV production)

ENPHASE.

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# Equipment Specification Sheets

Dwg No:

E-13



# **Ultra Rail**



# The Ultimate Value in Rooftop Solar

Industry leading Wire Management Solutions



An install experience unlike any other

Mounts available for all roof types



Compatible with all Series 100 Module **Clamps & Accessories** 

# Start Installing Ultra Rail Today

RESOURCES DESIGN WHERE TO BUY

snapnrack.com/resources snapnrack.com/configurator snapnrack.com/where-to-buy

# Ultra Rail

# The SnapNrack Ultra Rail is a sleek, lightweight rail solution for mounting solar modules on the roof.

# The Entire System is a Snap to Install

- New Ultra Rail Mounts include snap-in brackets for attaching rail
- Compatible with all the SnapNrack Mid Clamps and End Clamps customers love
- Universal End Clamps and snap-in End Caps provide a clean look to the array edge



# Unparalleled Wire Management



Standard

# The Largest Span Capabilities of any Light Rail Solution

This table was prepared in compliance with applicable engineering codes and standards. Values are based on the following:

- ASCE 7-10
- Chapter 30 Wind Loads &
- Chapter 7 Snow Loads
- Roof Slope: 7 27 deg Roof Height: 0 - 30 ft
- Exposure: B
- · Roof Zone: 1
- Module Orientation: Portrait
- Roof Type: Comp

Visit SnapNrack.com for detailed span tables and certifications.



# Ultra Rall, UR-40 R Wind ( 110 115 120 125 130 135 140 5 10 15 20 25 30 35 40 45 50 60 70 80 90 100 110

# Quality. Innovative. Superior.

SnapNrack Solar Mounting Solutions are engineered to optimize material use and labor resources and improve overall installation quality and safety. 877-732-2860 www.snapnrack.com contact@snapnrack.com © 2018 by SnapNrack Solar Mounting Solutions. All rights reserved

 Open rail channel provides room for running wires resulting in a long-lasting quality install Industry best wire management offering includes Junction Boxes, Universal Wire Clamps, MLPE Attachment Kits, and Conduit

System is fully bonded and listed to UL 2703

all System Spans								
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# Equipment Specification Sheets

Dwg No:

E-14

