SHEET INDEX

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PROJECT DETAILS	
CUSTOMER NAME:	
STREET ADDRESS:	
APN:	
CITY, STATE, ZIP:	
PERMITTING AUTHORITY	
UTILITY COMPANY	

CONTRACTOR INFORMATION	
COMPANY	
LICENSE NUMBER	
PHONE NUMBER	
CONTRACTOR SIGNATURE	
SITE DETAILS	
ASHRAE EXTREME LOW	-4°C (39°F)
ASHRAE 2% HIGH	40°C (117°F)
CLIMATE DATA SOURCE	McClellan-Palomar Airpor 33.12°, -117.27°
WIND SPEED	120 MPH (ASCE 7-10)
RISK CATEGORY	II
WIND EXPOSURE CATEGORY	B
SEISMIC DESIGN CATEGORY	D
GROUND SNOW LOAD	0 PSF

GOVERNING CODES
CALIFORNIA ELECTRIC CODE, 2013 EDITION (CEC)
CALIFORNIA RESIDENTIAL CODE, 2013 (CRC)
CALIFORNIA PLUMBING CODE, 2013 (CPC)
CALIFORNIA BUILDING CODE, 2013 EDITION (CBC)
CALIFORNIA MECHANICAL CODE, 2013 (CMC)
ARTICLE 690, NEC 2011 CODE BOOK
TITLE 24 RESIDENCE ENERGY EFFICIENCY STANDARDS
CAL-FIRE PHOTOVOLTAIC INSTALLATION GUIDELINES

1 PLOT
PV-1 SCALE:

2 LOCATION
PV-1 SCALE: NTS

SCOPE OF WORK

THIS PROJECT INVOLVES THE INSTALLATION OF SOLAR PANELS. THE SOLAR PANELS WILL BE RACKED USING A PRE ENGINEERED
RACKING SYSTEM. THE RACKED MODULES WILL BE ELECTRICALLY CONNECTED WITH DC TO AC POWER INVERTERS AND INTERCONNECTED TO THE LOCAL UTILITY USING MEANS AND METHODS CONSISTENT WITH THE RULES ENFORCED BY THE LOCAL UTILITY AND PERMITTING JURISDICTION.

THIS DOCUMENT HAS BEEN PREPARED FOR THE PURPOSE OF DESCRIBING THE DESIGN OF A PROPOSED PHOTOVOLTAIC POWER SYSTEM WITH ENOUGH DETAIL TO DEMONSTRATE COMPLIANCE WITH ALL APPLICABLE CODES AND REGULATIONS. THE DOCUMENT SHOULD NOT BE RELIED UPON AS A SUBSTITUTE FOR FOLLOWING MANUFACTURER INSTALLATION MANUALS. INSTALLER SHALL INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER INSTALLATION MANUALS. NOTHING IN THIS DOCUMENT SHOULD BE INTERPRETED IN A WAY THAT OVERRIDES THE INSTRUCTIONS IN MANUFACTURER INSTALLATION MANUALS.

SYSTEM DETAILS	
DC RATING OF SYSTEM	9,380W
AC RATING OF SYSTEM	8,711W
AC OUTPUT CURRENT	0.96A
INVERTER(S)	(28) ENPHASE IQ6+72 MICRO INVERTERS
MODULE	LG ELECTRONICS LG335N1C-A5
ARRAY WIRING	(2) STRINGS OF 10 (1) STRINGS OF 8

INTERCONNECTION DETAILS	
POINT OF CONNECTION	BACKFEED AC CONNECTION PER NEC ARTICLE 705.12(D)
UTILITY SERVICE	120/240V 1
ELECTRICAL PANEL	MAIN SERVICE PANEL W/TOP-FED 200A BUSBAR, 200A

NABCEP CERTIFIED
PV Installation Professional

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
PROJECT SUMMARY

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
COVER

PROJECT DESCRIPTION:

28 x 335W LG ELECTRONICS LG335N1C-A5
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES

SYSTEM SIZE: 9.38 kW DC STC
ARRAY AREA: (#1) 516.32 SQ FT.

EQUIPMENT SUMMARY

28 LG ELECTRONICS PV MODULE (LG335N1C-A5)
28 ENPHASE IQ MICRO-INVERTER (ENPHASE IQ6+72)

1 SITE PLAN WITH ROOF PLAN
PV-1 SCALE: 1/32"=1'-0"

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REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
SITE PLAN

SHEET SIZE
ANSI B
11" X 17"

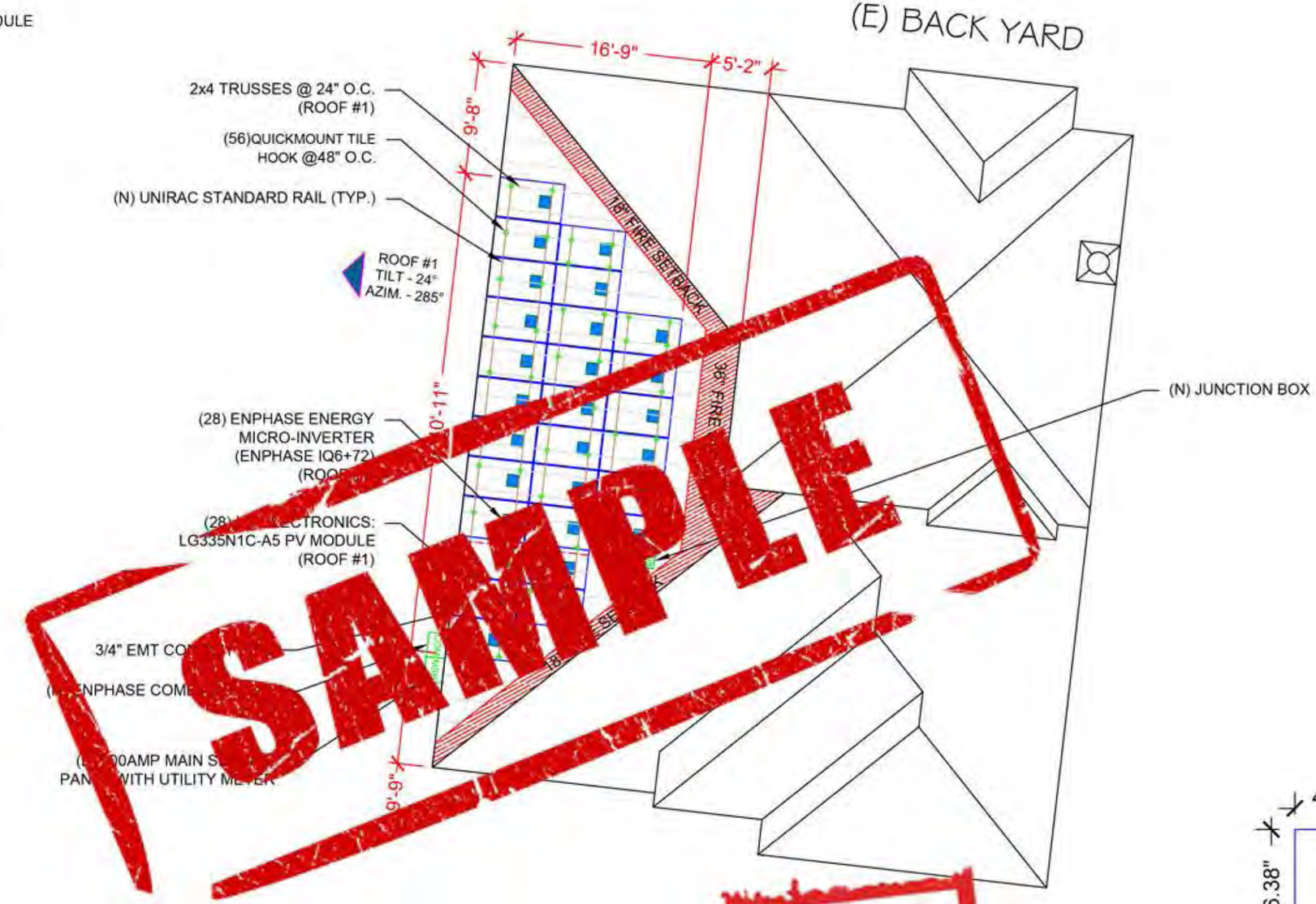
SHEET NUMBER
PV-1

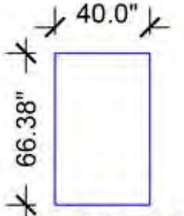
MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 28 MODULES
MODULE TYPE = LG ELECTRONICS LG335N1C-A5 MODULE
MODULE WEIGHT = 39.68 LBS / 18.0 KG.
MODULE DIMENSIONS = 66.38"x 40.0" = 18.44 SF
UNIT WEIGHT OF ARRAY = 2.15 PSF

ROOF DESCRIPTION				
ROOF TYPE			CONCRETE TILE ROOF	
ROOF	ROOF TILT	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	24°	285°	2"x4"	24" O.C.

ARRAY AREA & ROOF AREA CALC'S				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	28	516.32	865.39	60





LG ELECTRONICS
LG335N1C-A5
MODULES

LEGEN

JB	- JUNCTION BOX		- VENT, ATTIC FAN (ROOF OBSTRUCTION)
ACD	- NON FUSED AC DISC		- ROOF ATTACHMENT
MSP	- MAIN SERVICE PANEL		- TRUSSES
PVM	- PRODUCTION METER		- CONDUIT
COM	- ENPHASE COMBINER BOX		- MICRO INVERTER
			- CHIMNEY

1 ROOF PLAN & MODULES
PV-2 SCALE: 3/32"=1'-0"

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REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
ROOF PLAN & MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

(E) BACK YARD

STRING 3

STRING 2

STRING 1

ENGAGE[illegible]BLE

(E) FRONT YARD

N

W

E

S

1 ROOF PLAN & MODULES

PV-2

SCALE: 1/8"=1'-0"

NABCEP CERTIFIED

PV Installation Professional

REVISIONS

DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME

STRINGING

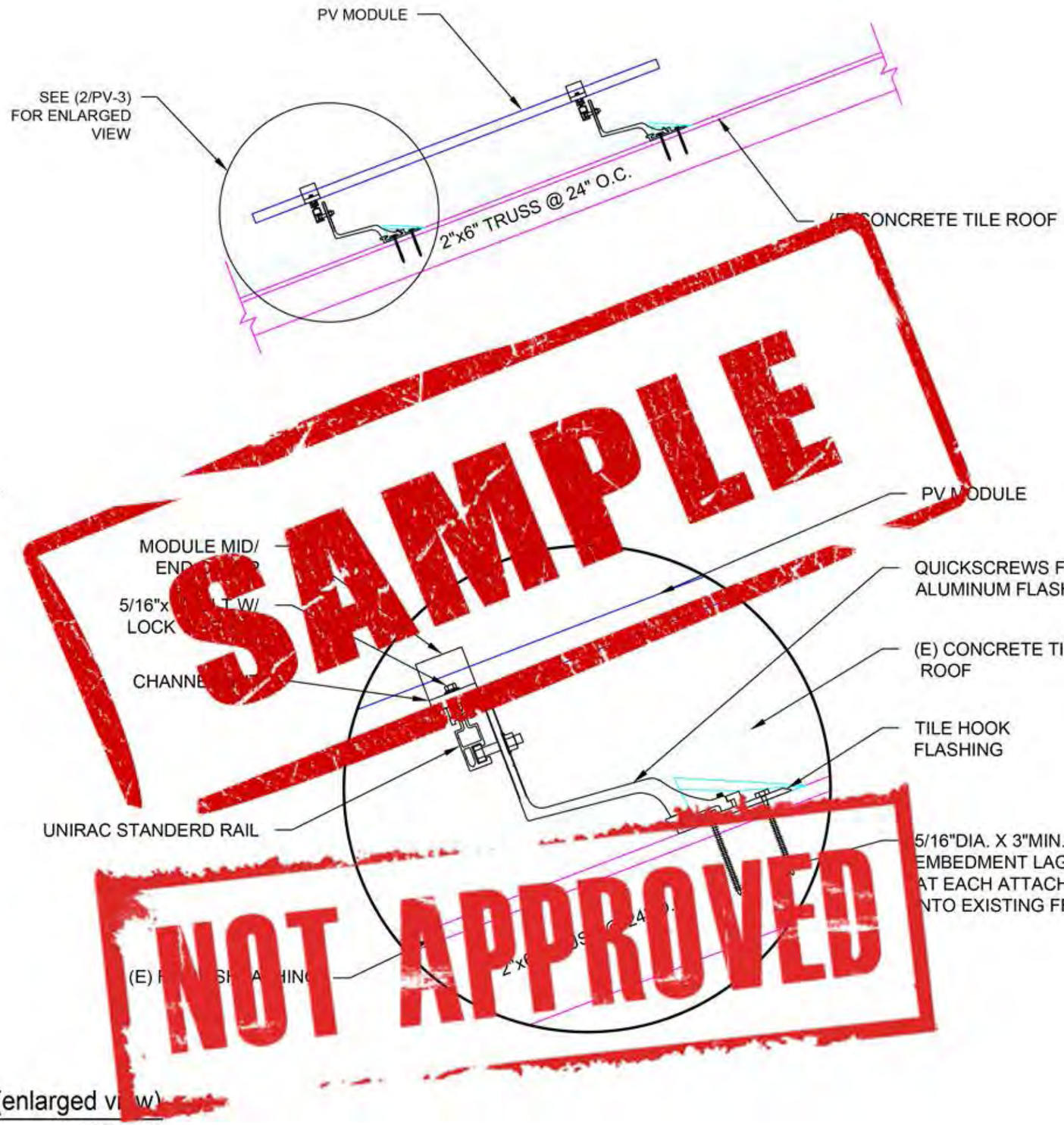
SHEET SIZE

ANSI B

11" X 17"

SHEET NUMBER

PV-2A



1 ATTACHMENT DETAIL
PV-3 SCALE: 1" = 1'-0"

2 ATTACHMENT DETAIL (enlarged view)
PV-3 SCALE: NTS

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PV Installation Professional

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-3

MODULES										
REF.	QTY.	MAKE AND MODEL	PMAX	PTC	ISC	IMP	VOC	VMP	TEMP. COEFF. OF VOC	FUSE RATING
PM1- 28	28	LG ELECTRONICS LG335N1C-A5	335W	311.1W	10.49A	9.83A	41.0V	34.10V	-0.27%/°C	20A

MICRO INVERTERS									
REF.	QTY.	MAKE AND MODEL	AC VOLTAGE	GROUND	MAX OCPD RATING	MAX OUTPUT CURRENT	MAX INPUT CURRENT PER BRANCH	MAX INPUT VOLTAGE	CEC WEIGHTED EFFICIENCY
I1-	28	ENPHASE IQ6+72 (240V)	240V	FLOATING	20A	1.17A	20A	62V	97.00%

OCPDS			
REF.	QTY.	RATED CURRENT	MAX VOLTAGE
CB1	1	50A	240VAC

INTERCONNECTION
120% RULE - NEC 705.12(D)(2)

UTILITY FEED + SOLAR BACKFEED 175 + 50A = 225A
BUSS RATING x 120% 200 x 120% = 240A

ID	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT (125%)	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	AMP. @ TERMINAL	LENGTH	VOLTAGE DROP
		ENGAGE CABLE		3		6 AWG BARE COPPER	0.82(47°C)	1.0			30A	24.60A	75°C	25A	87FT	0.86%
1	3	10AWG THWN-2, COPPER	3/4" DIA. EMT	6		AWG THWN-2, COPPER	0.82(47°C)	0.8			40A	26.24A	60°C	30A	15FT	0.25%
2	2	8AWG THWN-2, COPPER	3/4" DIA. EMT	2	N/A	8 AWG THWN-2, COPPER	1.04(25°C)	1.0			55A	57.20A	65°C	35A	10FT	0.17%

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PV Installation Professional

REVISIONS

DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
ELECTRICAL LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

MAX PV VOLTAGE & CURRENT CALC'S:

BRANCH CIRCUIT MAX VOLTAGE:
241.08VAC

MAX PV CURRENT PER NEC 690.8(A)(3)
1.25 X MAX AC OUTPUT CURRENT X # OF INVERTERS PER STRING
1.25 X 1.17 X 10 = 14.63A
1.25 X 1.17 X 10 = 14.63A
1.25 X 1.17 X 08 = 11.70A

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM JUNCTION BOX TO ENPHASE COMBINER BOX

AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2)(c): + 22°
EXPECTED WIRE TEMP (°C): 25° + 22° =47°
TEMP CORRECTION PER TABLE 310.16: 0.82
OF CURRENT CARRYING CONDUCTORS: 2
CONDUIT FILL CORRECTION PER NEC 310.15(B)(2)(a): 1
CIRCUIT CONDUCTOR SIZE: 10 AWG
CIRCUIT CONDUCTOR AMPACITY: 40 A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B):
1.25 X MAX AC OUTPUT CURRENT X # OF INVERTERS PER STRING
1.25 X 1.17 X 10 = 14.63A
1.25 X 1.17 X 10 = 14.63A
1.25 X 1.17 X 08 = 11.70A

DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC TABLE 310.16
TEMP CORR. PER NEC TABLE 310.16 X
CONDUIT FILL CORR. PER NEC 310.15(B)(2)(a) X
CIRCUIT CONDUCTOR AMPACITY =
0.82 X 1 X 40 = 32.8A

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM ENPHASE COMBINER TO MSP

EXPECTED WIRE TEMP (°C): 25°
TEMP CORRECTION PER NEC TABLE 310.16: 1.04
CIRCUIT CONDUCTOR SIZE: 8 AWG
CIRCUIT CONDUCTOR AMPACITY: 55A
OF CURRENT CARRYING CONDUCTORS: 3
CONDUIT FILL PER NEC 310.15(B)(2)(a): 1

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(B):
1.25 X OUTPUT CURRENT OF ENPHASE INVERTER
1.25 X 1.17 X 28 = 40.95A

DERATED AMPACITY OF CIRCUIT CONDUCTORS PER NEC TABLE 310.16
TEMP CORR. PER NEC 310.16 X
CONDUIT FILL CORR. PER NEC 310.15(B)(2)(a) X
CIRCUIT CONDUCTOR AMPACITY =
1.04 X 1 X 55 = 41.6A

INTERNAL VOLTAGE RISE WITHIN THE ENGAGE CABLES:
PER ENPHASE TABLE:
BRANCH CIRCUIT OF 10 = .45%
BRANCH CIRCUIT OF 10 = .45%
BRANCH CIRCUIT OF 08 = .30%

VOLTAGE RISE FROM THE ARRAY-MOUNTED AC JUNCTION BOX TO AC COMBINER BOX:
VRise = (AMPS/INVERTER * # OF INVERTERS) * (RESISTANCEΩ/ft) * (2 WAY WIRE LENGTH)

VRise = (1.17A * 10) * (.00129Ω/ft) * (50ft x 2)
VRise = (11.7) * (.00129) * (100)
VRise = 1.51V
VRise = 1.51V/240V = .63% VRise

VOLTAGE RISE FROM THE AC COMBINER BOX TO UTILITY:
VRise = (SUM OF STRING CURRENT) * (RESISTANCE Ω/ft) * (2 WAY WIRE LENGTH)

VRise = (1 X 28) * (.000809Ω/ft) * (10 X 2)
VRise = .45V
VRise = .45V/240V = .18%

SUMMARY OF CALCULATIONS FOR 240VAC APPLICATIONS:
.45 + .27 + .18 = .90% OK

INTERNAL VOLTAGE RISE WITHIN THE ENGAGE CABLES:
PER ENPHASE TABLE:
BRANCH CIRCUIT OF 10 = .45%
BRANCH CIRCUIT OF 10 = .45%
BRANCH CIRCUIT OF 08 = .30%

VOLTAGE RISE FROM THE ARRAY-MOUNTED AC JUNCTION BOX TO AC COMBINER BOX:
VRise = (AMPS/INVERTER * # OF INVERTERS) * (RESISTANCEΩ/ft) * (2 WAY WIRE LENGTH)

VRise = (1.17A * 10) * (.00129Ω/ft) * (50ft x 2)
VRise = (11.7) * (.00129) * (100)
VRise = 1.51V
VRise = 1.51V/240V = .63% VRise

VOLTAGE RISE FROM THE AC COMBINER BOX TO UTILITY:
VRise = (SUM OF STRING CURRENT) * (RESISTANCE Ω/ft) * (2 WAY WIRE LENGTH)

VRise = (1 X 28) * (.000809Ω/ft) * (10 X 2)
VRise = .45V
VRise = .45V/240V = .18%

CERTIFIED
PV Installation Professional

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
WIRING CALCULATIONS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-5

1 GROUND-FAULT DETECTION AND INTERRUPTION;
TO BE INSTALLED AT INVERTER PER NEC 2011 690.5 (C)

WARNING
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

2 DISCONNECTION MEANS; TO BE INSTALLED AT ALL AC AND DC DISCONNECTS RESPECTIVELY PER NEC 2011 690.14(C)(2)

SOLAR AC DISCONNECT

3 DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION; TO BE INSTALLED AT DISCONNECTING MEANS
PER NEC 2011 690.17

WARNING
ELECTRIC SHOCK HAZARD. DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION

6 INVERTER OUTPUT CONNECTION TO BE INSTALLED AT MAIN SERVICE PANEL
PER NEC 2011 690.64 (B)(7)

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

7 MARKING SHOULD BE PLACED ON ALL INTERIOR AND EXTERIOR PV CONDUIT, RACEWAYS, ENCLOSURES, AND CABLE ASSEMBLIES, EVERY 10 FEET, AT TURNS AND ABOVE AND/OR BELOW PENETRATIONS AND ALL PV COMBINER AND JUNCTION BOXES.
SHALL BE REFLECTIVE WEATHER RESISTANT MATE

CAUTION: SOLAR CIRCUIT

8 TO BE LOCATED AT MAIN SERVICE PANEL:
SHALL BE REFLECTIVE WEATHER RESISTANT MATER L

CAUTION:
SOLAR ELECTRIC SYSTEM CONNECTED

9 TO BE INSTALLED ON THE FACE OF THE SERVICE METER PANEL PER
NEC 2011 705.10

- MARKING CONTENT AND FORMAT
- RED BACKGROUND
- WHITE LETTERING
- MINIMUM 3/8" LETTER HEIGHT
- ALL CAPITAL LETTERS
- ARIAL OR SIMILAR FONT, NON-BOLD
- REFLECTIVE WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (DURABLE ADHESIVE MATERIALS MUST MEET THIS REQUIREMENT
- TO BE ATTACHED USING POP-RIVETS

CAUTION:
PO TO BUILD AC SUPPLIED
TH LOWI RCES WITH
DISCONN CATED AS SHOWN:

AC MICRO INVERTERS ON ROOF

NABCEP CERTIFIED
PV Installation Professional

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
PLACARDS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-6

NABCEP CERTIFIED
PV Installation Professional

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SAMPLE

NOT APPROVED

SHEET NAME
MAPPING

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-7

LG
Life's Good

Innovation for a Better Life

LG NeON 2 LG335N1C-A5 LG330N1C-A5 LG325N1C-A5

60 cell

LG's new module, LG NeON™ 2, adopts Cello technology. Cello technology replaces 3 busbars with 12 thin [illegible] to enhance power output and reliability. LG NeON [illegible] demonstrates LG's efforts to increase customer's [illegible] beyond efficiency. It features enhanced warranty, [illegible] performance under real environment, and aesthetic design suitable for roofs.

Enhanced Performance Warranty

LG NeON™ 2 has an enhanced performance warranty. The annual degradation has fallen from -0.6%/yr to -0.55%/yr. Even after 25 years, the cell guarantees 1.2%p more output than the previous LG NeON™ 2 modules.

Aesthetic Roof

LG NeON™ 2 has been designed with aesthetics in mind; thinner wires that appear all black at a distance. The product may help increase the value of a property with its modern design.

Better Performance on a Sunny Day

LG NeON™ 2 now performs better on sunny days thanks to its improved temperature coefficiency.

High Power Output

Compared with previous models, th[illegible] has been designed to signifi[illegible] its output efficiency, thereby m[illegible]ent even in limited space.

Outstanding Durability

With its newly reinforced frame design, LG has [illegible] an additional. Additionally, LG NeON™ 2 can endure a front load up to 6000 Pa, and a rear load up to 5400 Pa.

D[illegible]

Th[illegible] NeON[illegible] will contribute to [illegible] the light [illegible]rn reflected fro[illegible] the [illegible]orbed [illegible]nerate a great [illegible]

About LG Electronics

LG Electronics is a global player who has been committed to expanding its capacity, based on solar energy business as its [illegible] growth engine. We embarked on a solar energy source research program in 1985, supported by LG Group's rich experience in semi-conductor, LCD, chemistry, and materials industry. We successfully [illegible] to the market in 2010, which were exported to 32 countries in the following 2 years, thereafter. In 2013, LG NeON™ (previously known as Mono X® NeON) won "Intersolar Awa[illegible], the leader of innovation in the industry.

LG NeON 2 LG335N1C-A5 LG330N1C-A5 LG325N1C-A5

Mechanical Properties

Cells	6 x 10
Cell Vendor	LG
Cell Type	Monocrystalline / [illegible]
Cell Dimensions	161.7 [illegible] / 6 inches
# of Busbar	[illegible] Wire Busbar)
Dimensions (L x W x H)	1686 x 1016 x 40 mm 66.38 x 40 x 1.57 inch
Front Load	6000Pa
Rear L[illegible]	5400Pa
[illegible]	18 kg
Connector Type	[illegible]
Junction Box	[illegible] / Bypass Diodes
Cables	1[illegible]
Glass	High [illegible] Tempered Glass
Frame	Anod[illegible]inum

C[illegible]ion[illegible] Warr[illegible]

Cer[illegible]	IEC 6121[illegible]-2
	[illegible]3
	[illegible]1701 (Salt mist corrosion test)
	IEC 62716 (Ammonia corrosion test)
	ISO 9001
[illegible]le Fir[illegible]nce (USA)	Type 1
[illegible]ting (CANADA)	Class C (UL[illegible])
[illegible]uct Warranty	12 [illegible]
Output Warranty of Pmax	[illegible]arranty**

** 1) 1st year : 98%, 2) After 2nd year : [illegible]%, 3) 25 years : 84.8%

Temper[illegible]acteristics

	45 ± 3 °C
Pmpp	-0.37%/°C
Voc	-0.27%/°C
Isc	0.03 %/°C

Characteristic Curves

Electrical Properties (STC *)

Module	LG335N1C-A5	LG330N1C-A5	LG325N1C-A5
Maximum Power (Pmax)	335	330	325
MPP Voltage (Vmpp)	34.1	33.7	33.3
MPP Current (Impp)	9.83	9.8	9.77
Open Circuit Voltage (Voc)	41.0	40.9	40.8
Short Circuit Current (Isc)	10.49	10.45	10.41
Module Efficiency	19.6	19.3	19.0
Operating Temperature		-40 ~ +90	
Maximum System Voltage		1,000	
Maximum Series Fuse Rating		20	
Power Tolerance (%)		0 ~ +3	

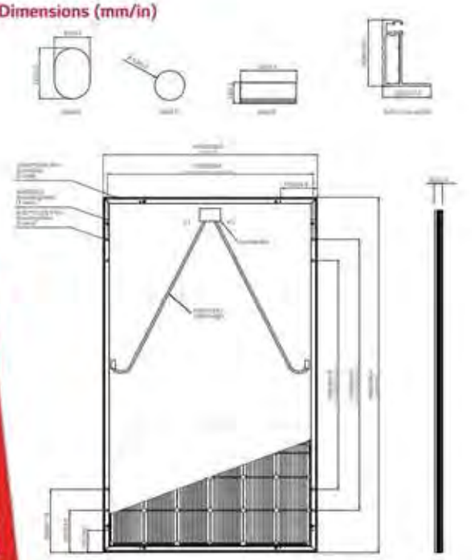
STC (Standard Test Condition) Irradiance 1,000W/m², Ambient Temperature 25 °C, AM 1.5
* Irradiance passes output is measured and determined by LG Electronics at its sole and absolute discretion.
** Typical change in module efficiency at 200W/m² in relation to 1000W/m² is -2.0%.

Electrical Properties (NOCT*)

Module	LG335N1C-A5	LG330N1C-A5	LG325N1C-A5
Maximum Power (Pmax)	247	243	240
MPP Voltage (Vmpp)	31.5	31.2	30.8
MPP Current (Impp)	7.83	7.81	7.78
Open Circuit Voltage (Voc)	38.2	38.1	38.0
Short Circuit Current (Isc)	8.44	8.41	8.38

* NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², ambient temperature 20 °C, wind speed 1m/s

Dimensions (mm/in)



LG Electronics U.S.A. Inc.
1000 Sylvan Ave, Englewood Cliffs, NJ 07632
Contact: lg.solar@lge.com
www.lgsolarusa.com

Innovation for a Better Life

NABCEP CERTIFIED
PV Installation Professional

REVISIONS

DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-8

Data Sheet
Enphase Microinverters

Enphase IQ 6 and IQ 6+ Microinverters

Designed for h gher powered modules, the smart gr d-ready Enphase IQ 6 Micro™ and Enphase IQ 6+ Micro™ are built on the sixth-generation platform and achieve the highest efficiency for module-level power electronics and reduced cost per watt.

Part of the Enphase IQ System, the IQ 6 and IQ 6+ Micro integrate seamlessly with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase En monitoring and analysis software.

The IQ 6 and IQ 6+ Micro reliable as they have fewer parts and undergo over 1 million hours of testing. Enphase provides an industry-leading warranty of 25 years.

y to Install

- (weight
- e cable managem
- B rapid shutdown (N

Produc

- Optimiz high powered modules
- Supports and 72-cell modul
- Maximizes energy produ

Smart Grid Ready

- Com tal, voltage and frequ e-through requirements
- Remo bles to respond to changin grid re emen
- Config ble for d e

UL CERTIFIED

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

ENPHASE.

Enphase IQ 6 and IQ 6+ Microinverters

INPUT DATA (DC)	IQ6-60-2-US AND IQ6-60-5-US		IQ6PLUS-72-2-US AND IQ6PLUS-72-5-US	
Commonly used module pairings[1]	195 W - 330 W +		235 W - 400 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		62 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 62 V	
Min/Max start voltage	22 V / 48 V		22 V / 62 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed under single fault	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			

OUTPUT DATA (AC)	IQ6-60-2-US AND IQ6-60-5-US		IQ6PLUS-72-2-US AND IQ6PLUS-72-5-US	
Peak output power	250 VA		290 VA	
Maximum continuous output power	240 VA		280 VA	
Nominal voltage/range[2]	240 V / 211-264 V	208 V (1Φ) / 183-229 V	240 V / 211-264 V	208 V (1Φ) / 183-229 V
Maximum continuous output current	1.0 A	1.11 A	1.17 A	1.35 A
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
Power factor at rated power	1.0		1.0	
Maximum units per 20 A branch circuit	16 (240 VAC)		13 (240 VAC)	
	14 (single-phase 208 VAC)		11 (single-phase 208 VAC)	
Overvoltage class AC port	II		II	
AC port backfeed under single fault	0 A		0 A	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	

EFFICIENCY	@240 V	@208 V (1Φ)	@240 V	@208 V (1Φ)
CEC weighted efficiency	97.0 %	96.5 %	97.0 %	96.5 %

MECHANICAL DATA	
Ambient temperature range	-40°C to +65°C
Relative humidity range	4% to 100% (condensing)
Connector type	MC4 or Amphenol H4 UTX
Dimensions (WxHxD)	219 mm x 191 mm x 37.9 mm (without bracket)
Weight	1.5 kg (3.3 lbs)
Cooling	Natural convection - No fans
Approved for wet locations	Yes
Pollution degree	PD3
Environmental category / UV exposure rating	Outdoor - NEMA 250, type 6 (IP67)

FEATURES	
Communication	Power Line
Monitoring	Enlighten Manager and MyEnlighten monitoring options Compatible with Enphase IQ Envoy
Compliance	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 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.

1. No enforced DC/AC ratio. See the compatibility calculator at enphase.com/en-us/support/module-compatibility.
2. Nominal voltage range can be extended beyond nominal if required by the utility.

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

2017-03-15

ENPHASE.

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REVISIONS

DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-9

Data Sheet
Enphase Networking

Enphase IQ Combiner

(X-IQ-AM1-240-B)

The Enphase IQ Combiner™ with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV installations by providing a consistent, pre-wired solution for residential applications.

Smart

- Includes IQ Envoy for communication and control
- Flexible networking Ethernet, or cellul
- Optional production metering and optional consumption monitoring.

Simple

- pre-installed 20 A breakers
- Pre-wired

Reliable

- Durable NRTL-certified NEMA 3R enclosure
- Five-year warranty

LISTED

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

Enphase IQ Combiner

MODEL NUMBER	
IQ Combiner X-IQ-AM1-240-B	IQ Combiner with Enphase IQ Envoy™ for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional consumption monitoring (+/- 2.5%).
ACCESSORIES (order separately)	
Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering (+/- 2.5%).
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
Solar branch circuit breakers	Three 2-pole 20 A/240 VAC DIN rail-mounted breakers
Max. system voltage	240 VAC
Rated output current	48 A
Rated input current, each input	16 A
Maximum fuse/circuit rating	20 A
Production metering	200 A solid core pre-installed and wired to IQ Envoy
MECHANICAL DATA	
Dimensions (WxHxD)	37.7 x 20.3 cm (15.0" x 8.0" x 8.0")
Weight	5 kg (11.2 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Vented, natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	14 AWG copper conductors for branch inputs 4 AWG copper conductors for combined output Follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTIONS	
Integrated WiFi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable - not included
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) - not included
COMPLIANCE	
Compliance, Combiner	UL 1741
Compliance, IQ Envoy	UL 916 CAN/CSA C22.2 No. 61010-1 47 CFR, Part 15, Class B, ICES 003 IEC/EN 61010-1:2010 EN50065-1, EN61000-4-5, EN61000-6-1, EN61000-6-2 ANSI C12.1 accuracy class 0.5

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

ENPHASE.

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REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-10

NABCEP CERTIFIED
PV Installation Professional

REVISIONS		
DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SM SOLAR MOUNT — NEW ENHANCEMENTS

UNIRAC
A HILTI GROUP COMPANY

SOLARMOUNT defined the standard in solar racking. New enhancements are designed to get installers off the roof faster than ever before. Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

SOLARMOUNT INTEGRATED BONDING ADVANTAGE

[e] enphase

WITH SYSTEM GROUNDING THROUGH ENPHASE MICROINVERTERS AND TRUNK CABLES

LOSE ALL THE COPPER & LUGS

UL2703 LISTED — BONDING & GROUNDING, MECHANICAL LOADING, SYSTEM FIRE CLASSIFICATION

ROOF MOUNT SYSTEMS

GET OFF THE ROOF FASTE[R THAN] EVER BEFORE

OPTIMIZED COMPONENTS • VERSATILITY • AVAILABILITY • DESIGN TOOLS

SAMPLE

NOT APPROVED

SM SOLAR MOUNT — NEW ENHANCEMENTS

UNIRAC
A HILTI GROUP COMPANY

OPTIMIZED COMPONENTS

INTEGRATED BONDING & PR[E-AS]SEMBLED PARTS

Components are pre-assem[bled and] optimized to reduce installation st[eps] and save labor time. [Our new] grounding & bonding process eliminates copp[er] wire and [grounding] straps or bonding jumpers to reduce costs. Utilize the mi[croinverter] mount with a wire management clip for an easier installation.

VERSATILITY

ONE PRODUC[T, MA]NY APP[LICATIONS]

Quickly ... fla[t] roof or at a[ny] angle. Change module ... while se[lecting from a h]uge variety of framed ... pitched roof[s] ... clear and dark ... projects fina[l] ... aspirations.

A[VAIL]ABILITY

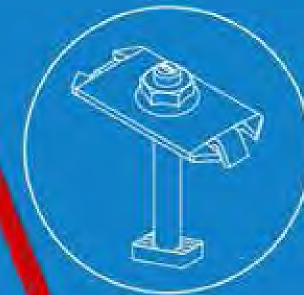
NAT[IONWI]DE NETWORK

Unirac ... the largest network of stocking distributors for our racking solutions ... partners have distinguished their level of ... support, ... ability, and overall value, thereby providing ... level of service to users of Unirac products. Count on our ... fast and accurate delivery to meet your project objectives ... for a list of distributors.

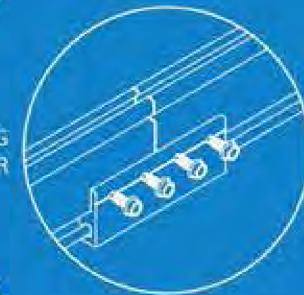
AUTOM[AT]ED DESIGN TOOL

... PLATFORM AT YOUR SERVICE

Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers; there's no need to print results and send to a distributor, just click and share.

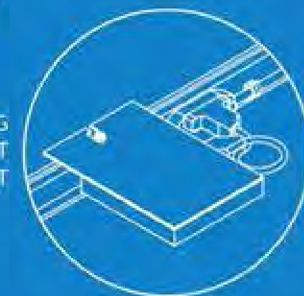


INTEGRATED BONDING MIDCLAMP



INTEGRATED BONDING SPLICE BAR

INTEGRATED BONDING L-FOOT w/ T-BOLT



INTEGRATED BONDING MICROINVERTER MOUNT w/ WIRE MANAGEMENT

UNIRAC CUSTOM[ER SERVICE] MEANS T[H]E HIGHEST LEVEL OF PRODUCT SUPPORT

BANKABLE WARRANTY • DESIGN TOOLS • PERMIT DOCUMENTATION

TECHNIC[AL S]UPPOR[T]

Unirac's te[chnical supp]ort ... is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering report[s] ... sheets greatly simplifies your permitting and project planning process.

[CERT]IFIED QUALITY P[RO]VIDER

Unirac is the only PV mo[unti]ng vendor with ISO certifications for 9001:2[008], 14001:2004 and OHSAS ... means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

BANKABLE WARRANTY

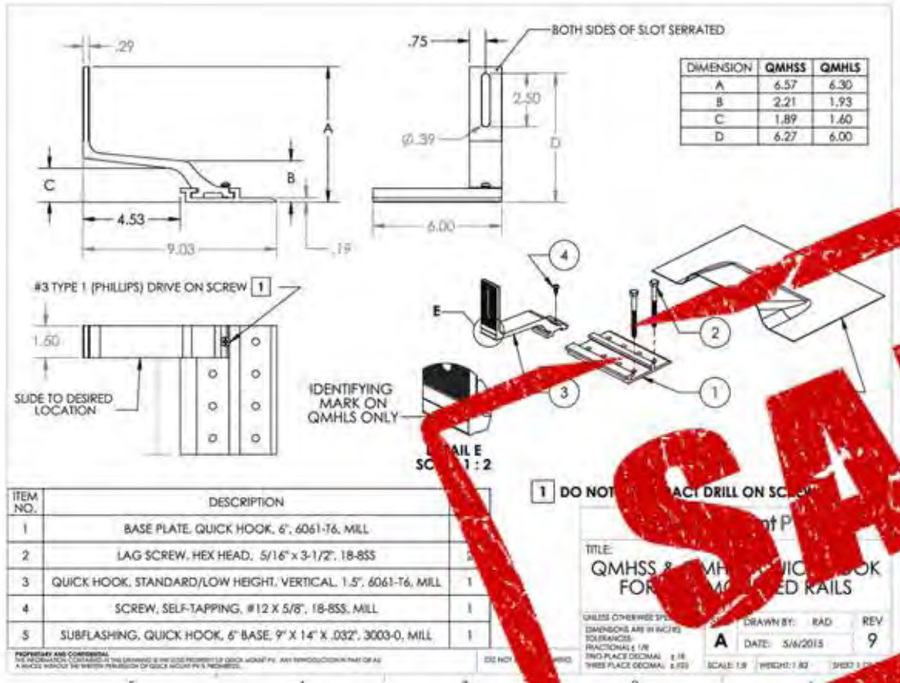
As a Hilti Group Company, Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. SOLARMOUNT is covered by a 10-year limited product warranty and a 5-year limited finish warranty.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

SHEET NAME: EQUIPMENT SPECIFICATION

SHEET SIZE: ANSI B 11" X 17"

SHEET NUMBER: PV-11



DIMENSION	QMHSS	QMHLS
A	6.57	6.30
B	2.21	1.93
C	1.89	1.60
D	6.27	6.00

ITEM NO.	DESCRIPTION	
1	BASE PLATE, QUICK HOOK, 6", 6061-T6, MILL	
2	LAG SCREW, HEX HEAD, 5/16" x 3-1/2", 18-8SS	2
3	QUICK HOOK, STANDARD/LOW HEIGHT, VERTICAL, 1.5", 6061-T6, MILL	1
4	SCREW, SELF-TAPPING, #12 X 5/8", 18-8SS, MILL	1
5	SUBFLASHING, QUICK HOOK, 6" BASE, 9" X 14" X .032", 3003-0, MILL	1

TITLE: QMHSS & QMHLS: QUICK HOOK FOR SIDE MOUNTED RAILS

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: RAD	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ± .18 THREE PLACE DECIMAL ± .125	A	DATE: 5/6/2015	9
	SCALE: 1:8	WEIGHT: 1.82	SHEET 1 OF 2

Quick Mount PV

TITLE: QMHSS & QMHLS: QUICK HOOK FOR SIDE MOUNTED RAILS

UNLESS OTHERWISE SPECIFIED:	SIZE	DRAWN BY: RAD	REV
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ± .18 THREE PLACE DECIMAL ± .125	A	DATE: 5/6/2015	9
	SCALE: 1:4	WEIGHT: 1.82	SHEET 2 OF 2

B172.3-34
Oct-2015, Rev 7

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REVISIONS

DESCRIPTION	DATE	REV

PROJECT DEVELOPER

SHEET NAME
EQUIPMENT SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-12