

23 - VSUN SOLAR VSUN370-120BMH (370W) MODULES
23 - ENPHASE IQ8PLUS -72-2-US MICRO-INVERTERS

(01) BRANCH OF 12 MODULES &
(01) BRANCH OF 11 MODULES CONNECTED IN PARALLEL PER BRANCH

SYSTEM SIZE:- 23 x 370W = 8.51 kWDC

SYSTEM SIZE:- 23 x 290W = 6.67 kWAC

EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULE	23	VSUN SOLAR VSUN370-120BMH (370W) MODULES
INVERTER	23	ENPHASE IQ8PLUS -72-2-US MICRO-INVERTERS
JUNCTION BOX	1	600V, 55A MAX, 4 INPUTS, MOUNTED ON ROOF FOR WIRE & CONDUIT TRANSITION
COMBINER BOX	1	ENPHASE IQ COMBINER BOX 4 (X-IQ-AM1-240-4)
AC DISCONNECT	1	AC DISCONNECT 60A FUSED,VISIBLE LOCKABLE LABELED, DISCONNECT 40A FUSES, 240 VAC
AC DISCONNECT	1	AC DISCONNECT 60A NON-FUSED,VISIBLE LOCKABLE LABELED DISCONNECT, 240 VAC

CONTRACTOR INFORMATION

NATIONWIDE SOLAR
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Nationwide
SOLAR



An Enphase® Premium Installer & Certified Unirac® Installer.
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REVISION	06/08/2023	⚠

PROJECT NAME

JOHN W PHIMISTER
12545 SE MILL CT,
PORTLAND, OR 97233 USA
APN# R305421
UTILITY: PORTLAND GENERAL
ELECTRIC
AHJ: CITY OF PORTLAND

SHEET NAME

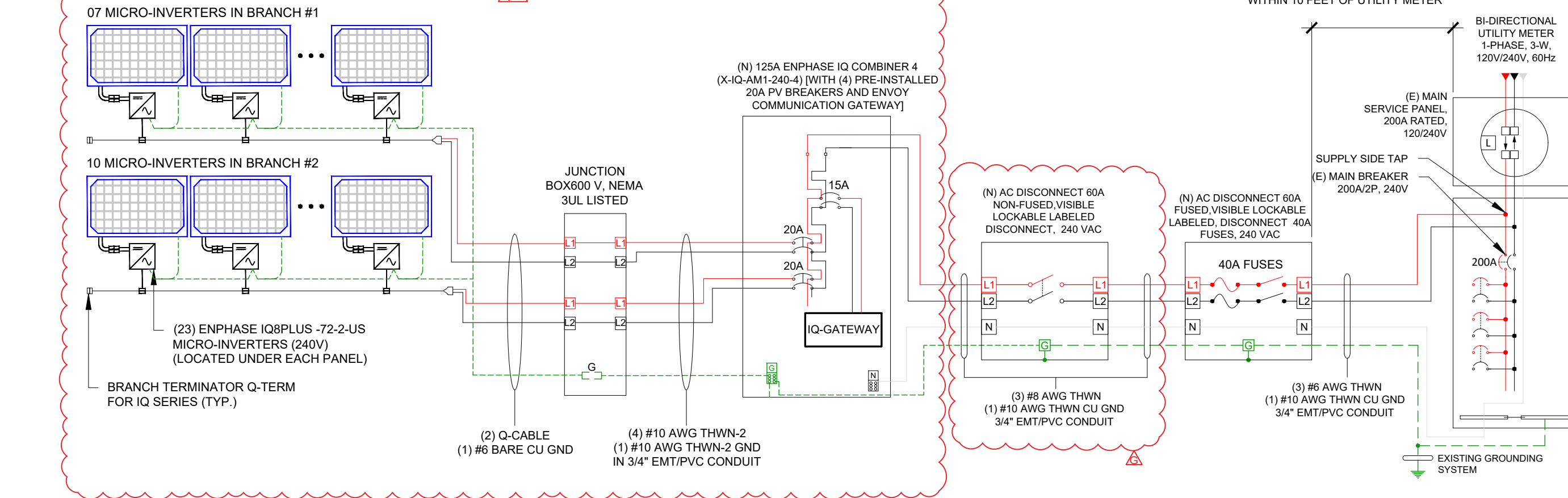
ELECTRICAL LINE
DIAGRAM

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-5



DISCONNECT NOTES:

1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH.
3. FUSED AC DISCONNECT TO BE USED.

GROUNDING & GENERAL NOTES:

1. A SECOND FACILITY GROUNDING ELECTRODE IS NOT REQUIRED PER [NEC690.47(C)(3)]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - JUNCTION BOXES DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.

INTERCONNECTION NOTES:

1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.64].
3. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95] AND [NEC 690.5]
4. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
5. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

REPLACE
SUBMITTED 7/14/2023

VISIBLE, LOCKABLE, LABELED
AC DISCONNECT LOCATED
WITHIN 10' OF UTILITY METER

SERVICE INFO.

UTILITY PROVIDER: PORTLAND GENERAL ELECTRIC
MAIN SERVICE VOLTAGE: 240V
MAIN PANEL BRAND: SQUARE D
MAIN SERVICE PANEL: (E) 200A
MAIN CIRCUIT BREAKER RATING: (E) 200A
MAIN SERVICE LOCATION: EAST
SERVICE FEED SOURCE: OVERHEAD

1

ELECTRICAL LINE DIAGRAM

SCALE: NTS

SOLAR MODULE SPECIFICATIONS

MANUFACTURER / MODEL #

VSUN SOLAR VSUN370-120BMH (370W)MODULES

VMP

34.5

IMP

10.72

VOC

41.4

ISC

11.26

MODULE DIMENSION

69.37L x 41.25W x 1.37D (In Inch)

INVERTER SPECIFICATIONS

MANUFACTURER / MODEL #

ENPHASE IQ8PLUS -72-2-US

NOMINAL OUTPUT VOLTAGE

240 VAC

NOMINAL OUTPUT CURRENT

1.21A

AMBIENT TEMPERATURE SPECS

WEATHER STATION: PORTLAND INTERNATIONAL AP

RECORD LOW TEMP

-6°

AMBIENT TEMP (HIGH TEMP 2%)

32°

CONDUIT HEIGHT

0.9"

CONDUCTOR TEMPERATURE RATE (ON ROOF)

90°

CONDUCTOR TEMPERATURE RATE (OFF ROOF)

75°

MODULE TEMPERATURE COEFFICIENT OF Voc

-0.26%/°C

PERCENT OF VALUES

NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT

.80

4-6

.70

7-9

.50

10-20

ELECTRICAL NOTES

1.) ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.

2.) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.

3.) WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.

4.) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.

5.) DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.

6.) WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.

7.) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.

8.) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.

9.) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.

10.) THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM JUNCTION BOX TO ENPHASE IQ COMBINER BOX 4:

AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2): (7/8" RULE)

EXPECTED WIRE TEMP (°C): 32°

TEMP CORRECTION PER TABLE 310.15(B)(1): 0.96

OF CURRENT CARRYING CONDUCTORS: 4

CONDUIT FILL CORRECTION PER NEC 310.15(C)(1): 0.80

CIRCUIT CONDUCTOR SIZE: 10 AWG

CIRCUIT CONDUCTOR AMPACITY: 40A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B):

1.25 X # MICRO-INVERTERS (MAX. BRANCH LENGTH) X MAX OUTPUT CURRENT

1.25 X 10 X 1.21A = 15.13A

DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC TABLE 310.15(B)(1)

TEMP CORR. PER NEC TABLE 310.15(B)(1) X

CONDUIT FILL CORR. PER NEC 310.15(C)(1) X

CIRCUIT CONDUCTOR AMPACITY =

0.96 X 0.80 X 40 = 29.12A

RESULT SHOULD BE GREATER THAN 15.13A OTHERWISE LESS THE ENTRY FOR CIRCUIT CONDUCTOR SIZE AND AMPACITY

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM ENPHASE IQ COMBINER BOX 4 TO AC DISCONNECT:

OF INVERTERS: 23

EXPECTED WIRE TEMP (°C): 32°

TEMP CORRECTION PER TABLE 310.15(B)(1): 0.94

OF CURRENT CARRYING CONDUCTORS: 3

CONDUIT FILL PER NEC 310.15(C)(1): 1.0

CIRCUIT CONDUCTOR SIZE: 8 AWG

CIRCUIT CONDUCTOR AMPACITY: 50 A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(B):

1.25 X # MICRO-INVERTERS X MAX OUTPUT CURRENT =

1.25 X 1.21 X 23 = 34.79A

DERATED AMPACITY OF CIRCUIT CONDUCTORS PER NEC TABLE 310.16:

TEMP CORR. PER NEC TABLE 310.15(B)(1) X

CONDUIT FILL CORR. PER NEC 310.15(C)(1) X

CIRCUIT CONDUCTOR AMPACITY =

0.94 X 1.0 X 50 = 47A

RESULT SHOULD BE GREATER THAN 34.79A OTHERWISE LESS THE ENTRY FOR CIRCUIT CONDUCTOR SIZE AND AMPACITY

AC CONDUCTOR AMPACITY CALCULATIONS:
FROM AC DISCONNECT TO INTERCONNECTION:

OF INVERTERS: 23

EXPECTED WIRE TEMP (°C): 32°

TEMP CORRECTION PER TABLE 310.15(B)(1): 0.94

OF CURRENT CARRYING CONDUCTORS: 3

CONDUIT FILL PER NEC 310.15(C)(1): 1.0

CIRCUIT CONDUCTOR SIZE: 6 AWG

CIRCUIT CONDUCTOR AMPACITY: 65 A

REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(B):

1.25 X # MICRO-INVERTERS X MAX OUTPUT CURRENT =

1.25 X 1.21 X 23 = 34.79A

DERATED AMPACITY OF CIRCUIT CONDUCTORS PER NEC TABLE 310.16:

TEMP CORR. PER NEC TABLE 310.15(B)(1) X

CONDUIT FILL CORR. PER NEC 310.15(C)(1) X

CIRCUIT CONDUCTOR AMPACITY =

0.94 X 1.0 X 65 = 61.1A

RESULT SHOULD BE GREATER THAN 34.79A OTHERWISE LESS THE ENTRY FOR CIRCUIT CONDUCTOR SIZE AND AMPACITY

VOLTAGE DROP CALCULATIONS

WIRE RUN

OF MODS

V (VOLTS)

I (AMPS)

L (FT)

VD (%)

WIRE SIZE*

RACEWAY

BRANCH #1 (MODULE) TO PASS THRU J. BOX

12

240

14.52

55

1.20%

12 AWG

FREE AIR

BRANCH #2 (MODULE) TO PASS THRU J. BOX

11

240

13.31

50

1.10%

12 AWG

FREE AIR

PASS THRU J. BOX TO AC COMBINER (MAX BRANCH)

12

240

14.52

40

0.51%

10AWG

3/4" EMT/PVC

AC COMBINER TO AC DISCONNECT

23

240

27.83

10

0.16%

8 AWG

3/4" EMT/PVC

AC DISCONNECT TO INTERCONNECTION

23

240

27.83

05

0.05%

6 AWG

3/4" EMT/PVC

MAX VOLTAGE DROP: 1.92%

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APN# R305421

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AHJ: CITY OF PORTLAND

SHEET NAME

ELECTRICAL CALCULATION

SHEET SIZE

ANSI B 11" X 17"

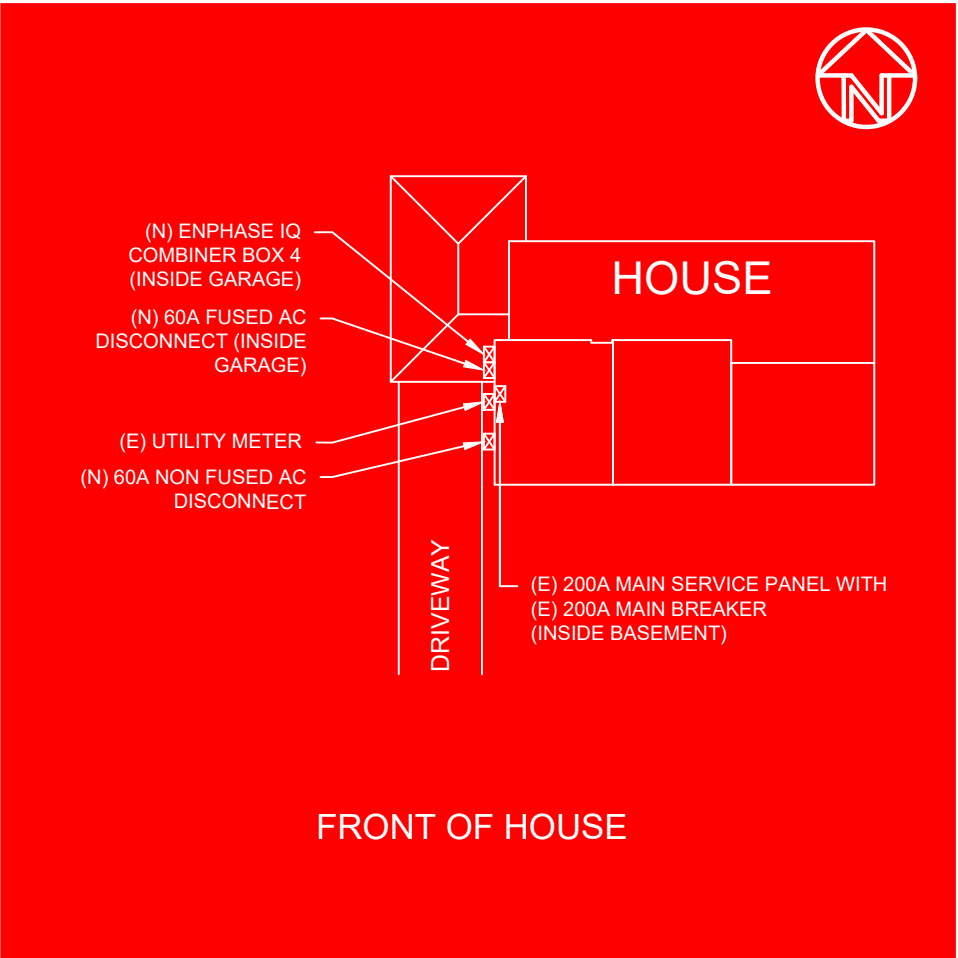
SHEET NUMBER

PV-6

1

ELECTRICAL CALCULATION

SCALE: NTS



DIRECTORY
PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM.

(ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS OUTLINED WITHIN: NEC 690.56(B) & (C), [NEC 705.10])

- THE REQUIREMENTS FOR THE PLACARD ARE:
- MADE OF METAL OR HARD PLASTIC
 - HAVE A RED BACKGROUND WITH WHITE ENGRAVING
 - LETTERS SHOULD BE 9MM (1/4") TALL (COMPARABLE TO 25 POINT ARIAL FONT)

REPLACE
SUBMITTED 7/14/2023

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PLACARD

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