

EXISTING STRING CALCULATION

String #	No of Modules	Estimated Power	I _{max}	V _{oc}	V _{mpp}	V _{rise} (<= 2%)
1	10	4,600 W	19.75 AC	<30	240V AC	1.35+0.62 = 1.97
2	10	4,600 W	19.75 AC	<30	240V AC	1.18+0.62 = 1.8
3	10	4,600 W	19.75 AC	<30	240V AC	1.24+0.62 = 1.86
4	10	4,600 W	19.75 AC	<30	240V AC	1.18+0.62 = 1.8

EXISTING SYSTEM DETAIL

40 X REC460AA PURE-RX
460W
ENPHASE IQ8X-80-M-US MICROINVERTERS
380VA
RAPID SHUTDOWN EQUIPPED

The diagram illustrates the existing solar system configuration. Four strings of solar panels (String 1 to String 4) are connected to an IQ Combiner 5. The combiner is connected to an IQ Controller 3, which is connected to a Main Load Panel. The Main Load Panel is connected to a Utility Meter and a 100A Non-Fusible AC Disconnect. The Main Load Panel also includes an Enphase Rapid Shut down switch and a Span Remote Meter Kit. The Main Load Panel is connected to four IQ Batteries (5p (1) to 5p (4)).

Existing System Detail

- System Size: 18,400W DC
- Battery Total Energy: 15.0 kWh
- (40) REC460AA Pure-RX
- (40) ENPHASE IQ8X-80-M-US MICROINVERTERS
- 03 x IQBATTERY-5P-1P-NA: IQ Battery 5P
- Inverter Output: 1.58A max @ 240 VAC (each microinverter)
- 380 VA AC output max (each micro inverter)
- 15.2 kVA AC output max

New System Detail

- Battery Total Energy: 5.0 kWh
- 01 x IQBATTERY-5P-1P-NA: IQ Battery 5P

Total System Detail

- Battery Total Energy: 20.0 kWh
- 04 x IQBATTERY-5P-1P-NA: IQ Battery 5P

The load center/disconnect will be visible, lockable, accessible to utility linesmen, and properly labeled per NEC requirements. It will be located on the exterior wall next to the utility meter.

Prepare cable in usual manner.

Stretch tape and apply half-lapped to form void-free joint. Degree of stretch is not critical and may vary in different sections of joint to accomplish void-free application.

Protect the joint with two half-lapped layers of any scotch vinyl plastic electrical tape.

Sr.No	#Wire	Conduit Size	Ground Wire	Amperage
1	1 x #12 Q Cable		#10 Bare Cu	20
2	4 x #10 MC Cable			20
3	8 x #10 THHN Cu	3/4" LFMC	#10 Green Cu	20
4	8 x #10 THHN Cu	3/4" EMT	#10 Green Cu	20
5	3 x #4 THHN Cu	1" LFNC	#6 Green Cu	80
6	3 x #3/0 THHN Cu	2" PVC		200
7	3 x #3/0 THHN Cu	2" PVC	#6 Green Cu	200
8	4 x #12 THHN Cu	3/4" LFNC	#10 Green Cu	16
9	2 x #4 THHN Cu	1" EMT	#8 Green Cu	80
10	2 x #4 THHN Cu	1" LFNC	#8 Green Cu	80
11	Enphase Control Cable (4 conductors)			
12	Lead Wire 18AWG, PVC Extruded			
13	2 x #10 THHN Cu			20

NEC Code (2020) and UL Standard References

Rapid Shut Down	NEC 690.12 (A-D), UL1741	Grounding	NEC Article 250.30(A)
Disconnecting Means	NEC 690.13	Conduit Fill	NEC Table C.9, 310.15(B)(3)(a)
Feeder Sizing	NEC Table 310, 15(B)(16, 17)	Interconnection	NEC 705.12
Over current Protection	NEC 690.9		

8MSOLAR

ADVANCING ENERGY INDEPENDENCE

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Bonnes John

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Customer Signature:

Sheet Name:

Electrical One Line Diagram

JOB NUMBER:

25-222-JB

Date:

05/01/2025

Revision:

A

Sheet Size:

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17" X 22"

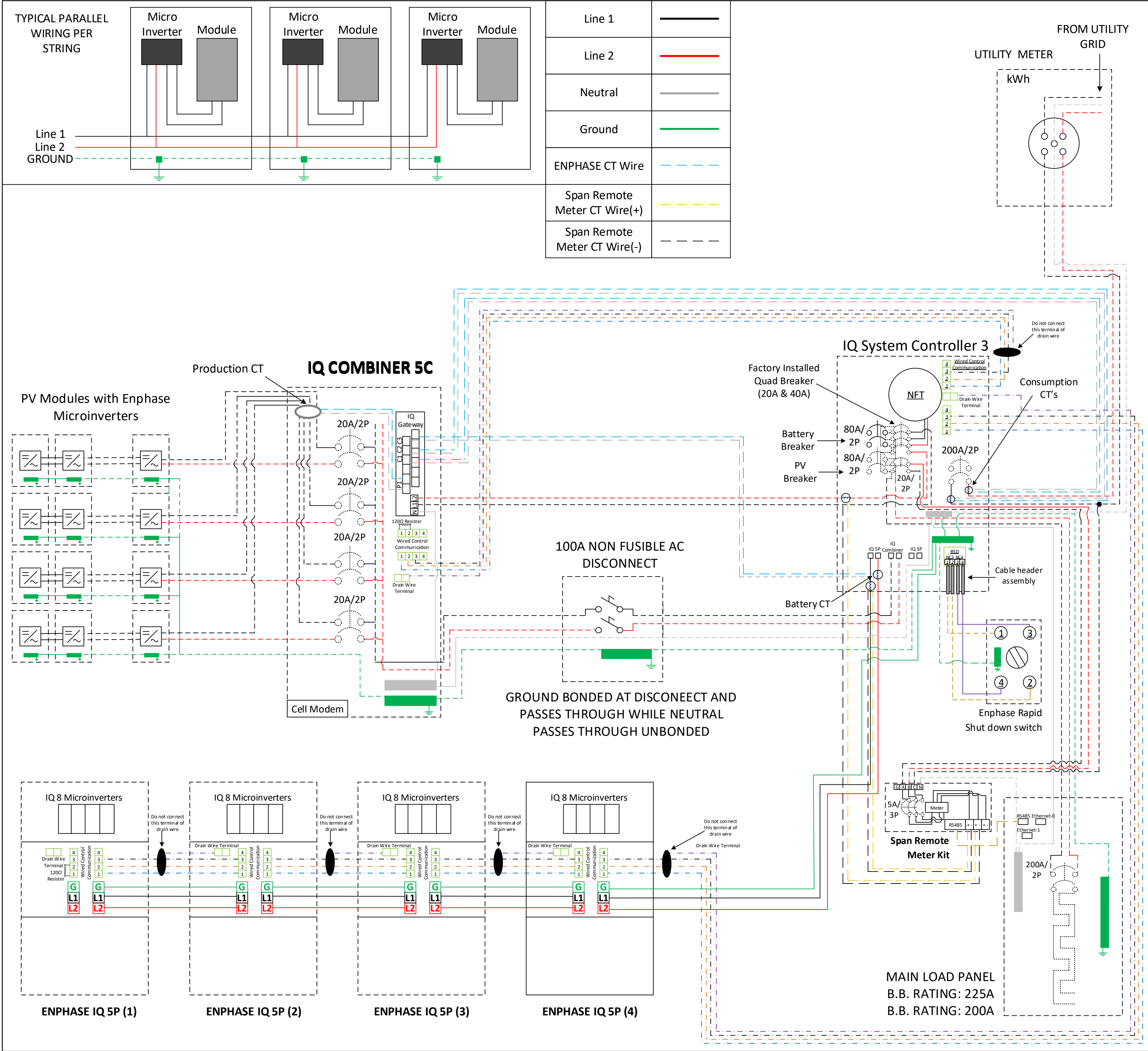
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PV1

NABCEP
CERTIFIED

PV Installation
Professional

Ali Buttar
PVIP #031310-32



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Detailed Electrical Diagram

JOB NUMBER:

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Date:

05/01/2025

Revision:

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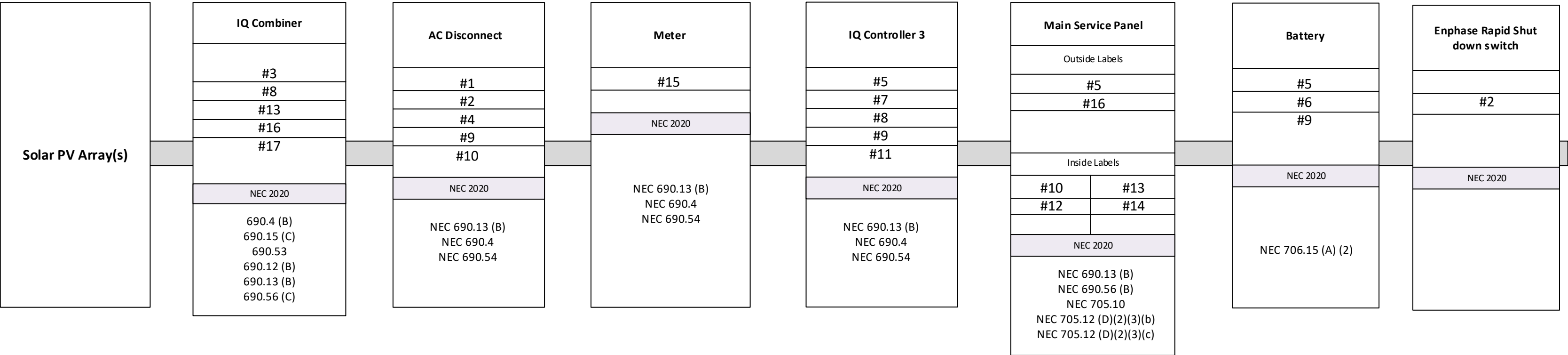
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PV2





LABELING AND WARNING
SIGNS: NEC 2020

A. PURPOSE
PROVIDE EMERGENCY RESPONDERS WITH APPROPRIATE WARNING AND GUIDANCE WITH RESPECT TO ISOLATING THE SOLAR ELECTRIC SYSTEM. THIS CAN FACILITATE IDENTIFYING ENERGIZED ELECTRICAL LINES THAT CONNECT THE SOLAR PANELS TO THE INVERTER, AS SHOULD NOT BE CUT WHEN VENTING FOR SMOKE REMOVAL.

B. MAIN SERVICE DISCONNECT:

1. RESIDENTIAL BUILDINGS- THE MARKING MAY BE PLACED WITHIN THE MAIN SERVICE DISCONNECT. THE MARKING SHALL BE PLACED ON THE OUTSIDE COVER IF THE MAIN SERVICE DISCONNECT IS OPERABLE WITH THE SERVICE PANEL CLOSED.

2. COMMERCIAL BUILDINGS- THE MARKINGS SHALL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT CLEARLY VISIBLE FROM THE LOCATION WHERE THE LEVER IS OPERATED

3. MARKINGS, VERBIAGE, FORMAT AND TYPE OF MATERIAL

a. VERBIAGE: CAUTION; SOLAR ELECTRIC SYSTEM CONNECTED

b. FORMAT:

(1) WHITE LETTERING ON A RED BACKGROUND

(2) MINIMUM 3/8 INCH LETTER HEIGHT

(3) ALL LETTERS SHALL BE CAPITALIZED

(4) ARIAL OR SIMILAR FONT, NON-BOLD

c. MATERIAL:

(1) REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (USE UL-969) AS STANDARD FOR WEATHER RATING); DURABLE ADHESIVE MATERIALS MEET THIS REQUIREMENT.

C. MARKING REQUIREMENTS ON CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, COMBINERS AND JUNCTION BOXES;

1. MARKING: PLACEMENT, VERBIAGE, FORMAT AND TYPE OF MATERIAL.

a. PLACEMENT: MARKINGS SHALL BE PLACED EVERY 10 (TEN) FEET ON ALL INTERIOR AND EXTERIOR DC CONDUITS, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES, AT TURNS ABOVE AND/OR BELOW PENETRATIONS, ALL COMBINERS AND JUNCTION BOXES.

b. VERBIAGE: CAUTION SOLAR CIRCUIT

c. THE FORMAT AND TYPE OF MATERIAL SHALL ADHERE TO SECTION B-3.B & C ABOVE

D. INVERTERS ARE NOT REQUIRED TO HAVE CAUTION MARKINGS

#1

PHOTOVOLATIC

AC DISCONNECT

#6

BATTERY

#12

WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

#2

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

#7

MAIN BATTERY SYSTEM DISCONNECT

#13

WARNING

ELECTRIC SHOCK HAZARD
TERMINAL ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

#3

PHOTOVOLTVIC POWER SOURCE

OPERATING AC VOLTAGE 240 V

MAXIMUN OPERATING AC OUTPUT CURRENT 63.2 A

#8

WARNING

THREE POWER SOURCES

SOURCES: UTILITY GRID, BATTERY AND PV SOLAR ELECTRIC SYSTEM

#14

WARNING

POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

#4

AC DISCONNECT PHOTOVOLTAIC SYSTEM POWER SOURCE

RATED AC OUTPUT CURRENT 63.2 AMPS

NOMINAL OPERATING AC VOLTAGE 240 VOLTS

#9

SERVICE DISCONNECT LOCATED IN THE IQ CONTROLLER 3

#15

WARNING

THIS SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM

#5

SOLAR AC DISCONNECT LOCATED AT SOUTH SIDE WALL OF THE HOUSE BESIDE THE UTILITY METER

#10

BATTERY DISCONNECT LOCATED IN THE IQ CONTROLLER 3

#16

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

#11

WARNING

SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFEED

#17

PHOTOVOLTAIC SYSTEM COMBINER PANEL DO NOT ADD LOADS



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PV Labels

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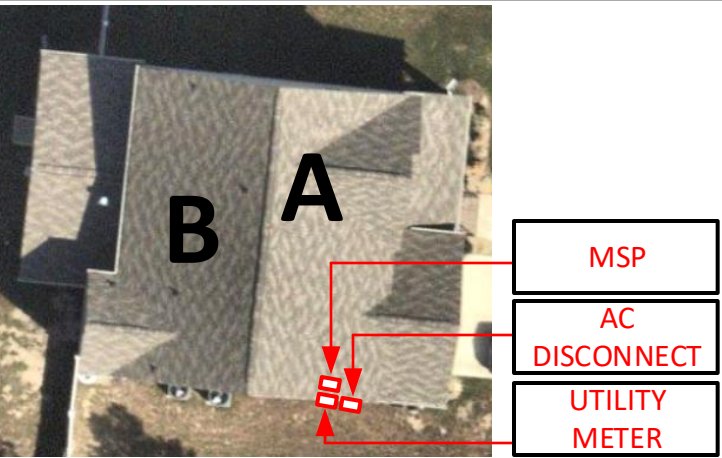
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PV3





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Bill of Material

JOB NUMBER:

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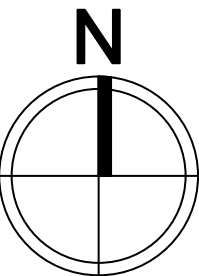
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PV4



BILL OF MATERIAL
SCALE: 1/8" - 1'



PV LABELS		
Sr No	Code	Qty
05	8M-001	01
06	03-395	01
09	8M-002	01

ELECTRICAL ITEMS

- 01 x IQBATTERY-5P-1P-NA: IQ Battery 5P
- 01 x BRK-80A-2P-240V: Circuit Breaker, 2 pole, 80A (Eaton BR280B)
- 01 x CTRL-SC3-NA-01: Enphase Control Cable, 25ft