

**PHOTOVOLTAIC**  
**DC DISCONNECT**

Solar Power Solutions

**WARNING**  
**ELECTRICAL SHOCK HAZARD**  
DO NOT TOUCH TERMINALS  
TERMINALS ON BOTH LINE AND  
LOAD SIDES MAY BE ENERGIZED  
IN THE OPEN POSITION  
DC VOLTAGE IS ALWAYS PRESENT  
WHEN SOLAR MODULES  
ARE EXPOSED TO SUNLIGHT

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

RATED MAX POWER-POINT CURRENT	77.8 A DC
RATED MAX POWER-POINT VOLTAGE	417.2 V DC
MAXIMUM SYSTEM VOLTAGE	556 V DC
MAXIMUM CIRCUIT CURRENT	128.8 A DC
MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER IF INSTALLED	N/A

**PHOTOVOLTAIC**  
**AC DISCONNECT**

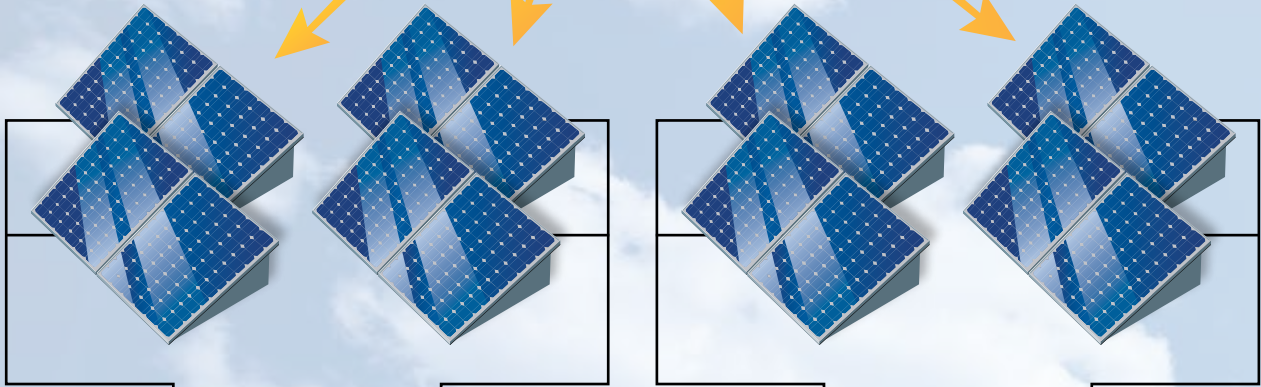
**PHOTOVOLTAIC SYS**  
**EQUIPPED WITH**  
**RAPID SHUTDO**

PV Labeling Requirements

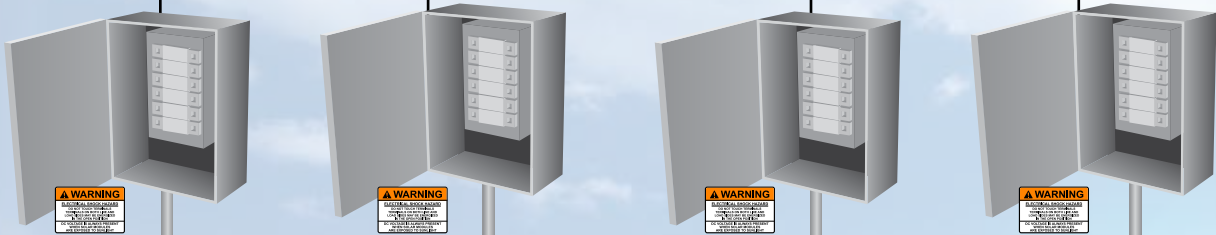
**PHOTOVOLTAIC**  
**DC DISCONNECT**

SUN

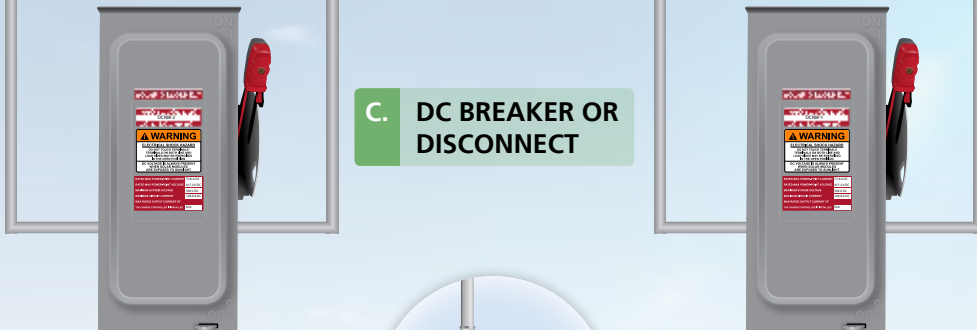
A. SOLAR PANELS



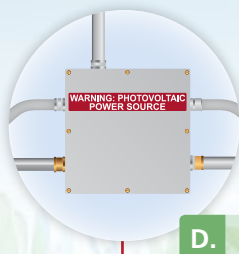
B. COMBINER BOX



C. DC BREAKER OR DISCONNECT



E. INVERTER



D. CONDUIT



WARNING: PHOTOVOLTAIC POWER SOURCE

WARNING: PHOTOVOLTAIC POWER SOURCE

WARNING: PHOTOVOLTAIC POWER SOURCE

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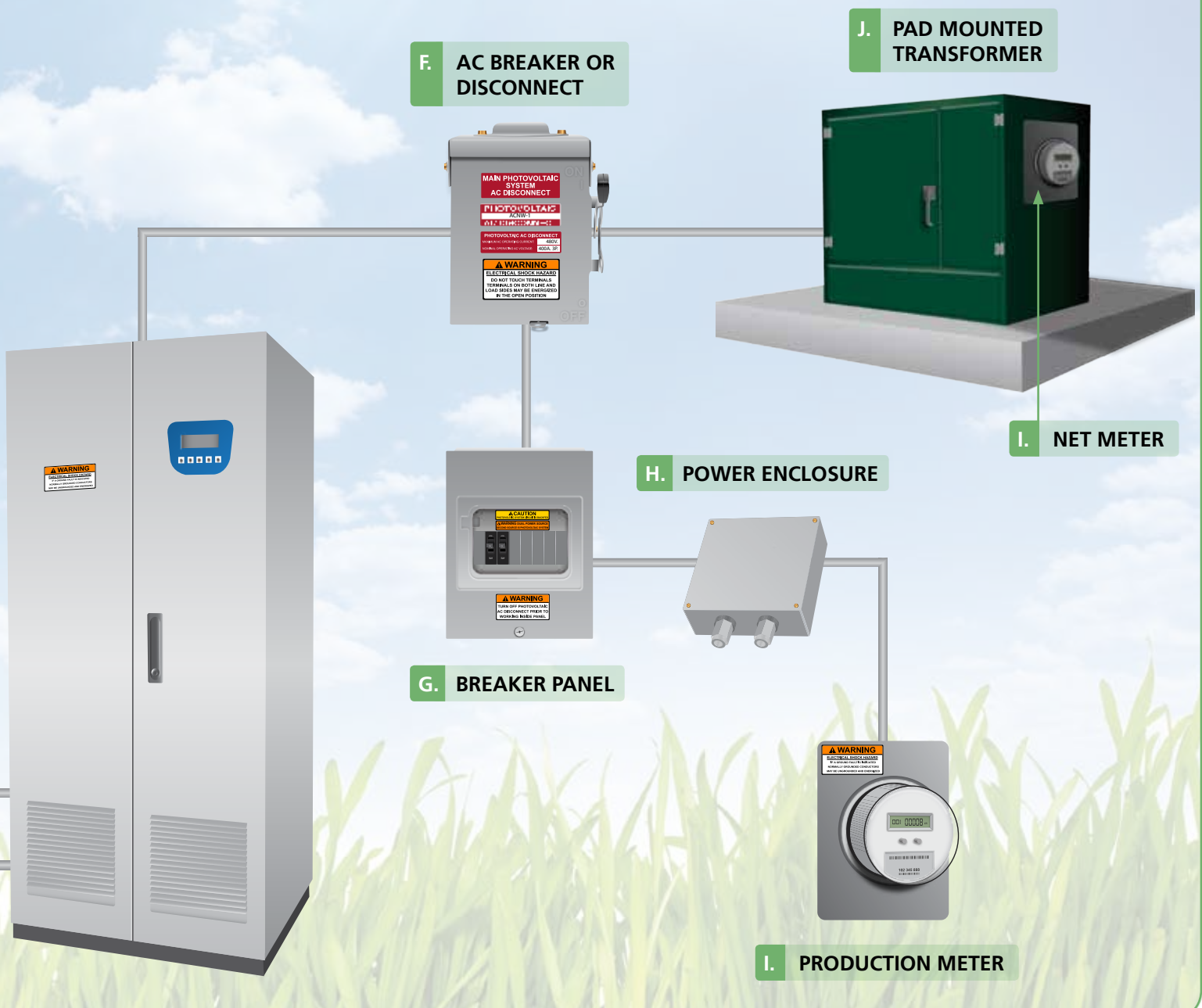


# Typical Solar Installation with Labels

Incorporating code-compliant solar installation labeling into an engineering drawing is just as critical as every other component within the system design. Communicating the labeling requirements to the installer must be clear, concise and adhere to the latest National Electrical Code (NEC) and International Fire Code (IFC) requirements for text height, wording and reflectivity (where required).

Often, the labeling portion of the system design process is missed which can impede the installation passing inspection the first time. Incorporating the labeling into the actual drawings helps to remind the installer of the importance of labeling and its implementation in the construction of the system.

The labels shown in this layout are one example of how to include the latest labeling requirements into the engineering process. Joining the proper label design to the specific section for the NEC 690 article allows for easy reference by the installer and inspector.



**A. SOLAR PANEL** — Solar Photovoltaic panels convert energy from the sun into DC power.

**B. COMBINER BOX** — Power cables run DC power from multiple solar panels into the combiner box which unites all the power cables into one. Typically, a combiner box consolidates multiple power sources into one single power source that is fed to a DC breaker or recombiner box.



**C. DC BREAKER or DC DISCONNECT** — The DC breaker is designed to shut off the DC power coming from the solar array. Shutting off the DC breaker does not stop power from feeding into the DC breaker, but keeps the power from going past the DC breaker. This is why EMT or conduit must be marked with the words PHOTOVOLTAIC POWER SOURCE to alert emergency personnel to the presence of a live solar circuit.



RATED MAX POWER-POINT CURRENT	_____
RATED MAX POWER-POINT VOLTAGE	_____
MAXIMUM SYSTEM VOLTAGE	_____
MAXIMUM CIRCUIT CURRENT	_____
MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER IF INSTALLED	_____



**D. CONDUIT** — The conduit routes and protects the solar power cables.

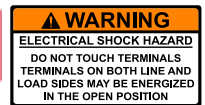
*Must be reflective per  
NEC 630.31 &  
IFC 605.11.1.2*



**E. INVERTER** — The transformer converts the DC voltage into AC Voltage that can be sold back to the utility or consumed onsite.

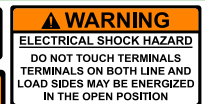


**F. AC BREAKER or AC DISCONNECT** — The AC breaker cuts power coming from the transformer. The AC Breaker does not stop power from feeding into the transformer or from the solar array, it simply isolates and prevents AC voltage from continuing into a breaker panel. This is why a plaque or sign is posted showing the location of all disconnects servicing a facility so that emergency personnel can shut down everything related to power transportation.



PHOTOVOLTAIC AC DISCONNECT	_____
MAXIMUM AC OPERATING CURRENT:	_____
NOMINAL OPERATING AC VOLTAGE:	_____

**G. BREAKER PANEL** — A breaker panel allocates the power into multiple circuits with circuit breakers and fuses servicing various areas of the facility. In our homes, we might call this a fuse box or breaker box. Each breaker might service different aspects of the building such as lighting, heating and ventilation, air conditioning, offices, warehouse, etc.



PHOTOVOLTAIC AC DISCONNECT	_____
MAXIMUM AC OPERATING CURRENT:	_____
NOMINAL OPERATING AC VOLTAGE:	_____



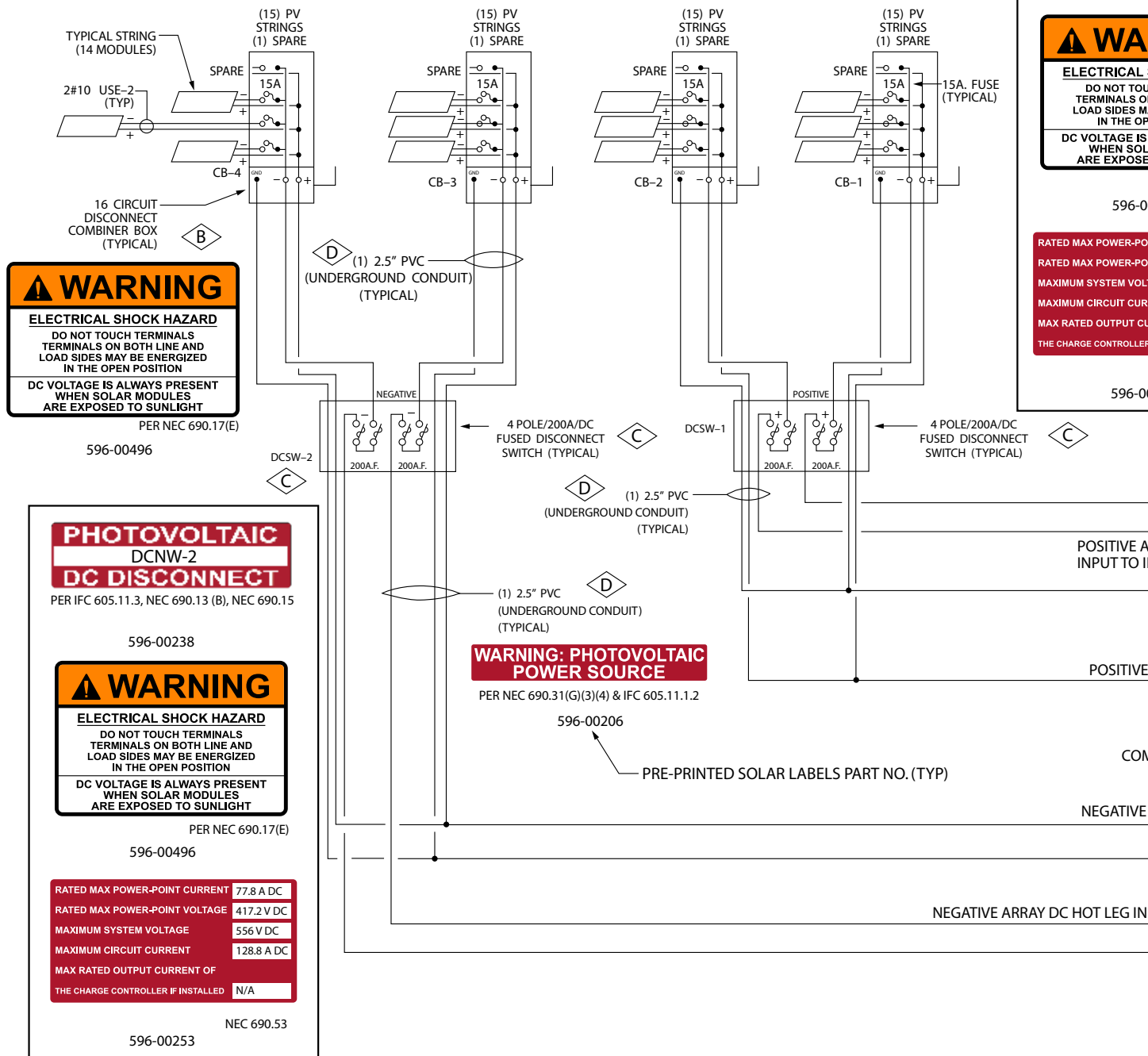
**H. POWER ENCLOSURE** — A power enclosure is simply a point where multiple power cables are spliced together.

**I. PRODUCTION / NET METER** — A mechanism for monitoring the utilization of electricity. Meters are typically used by the utility to calculate and bill for electricity consumption. Meters also can determine power coming from the PV installation which then offset the utility's electrical usage, saving both energy use and money.



**J. PAD MOUNTED TRANSFORMER** — A device that transfers electrical energy from one circuit to another through inductively coupled conductors, transforming utility scale voltages to voltages used by a dwelling or commercial building. This is typically the point at which the utility combines and distributes power to the local area.

# Engineering Schematic



**PHOTOVOLTAIC DCN-2 DC DISCONNECT**  
PER IFC 605.11.3, NEC 690.15

596-00238

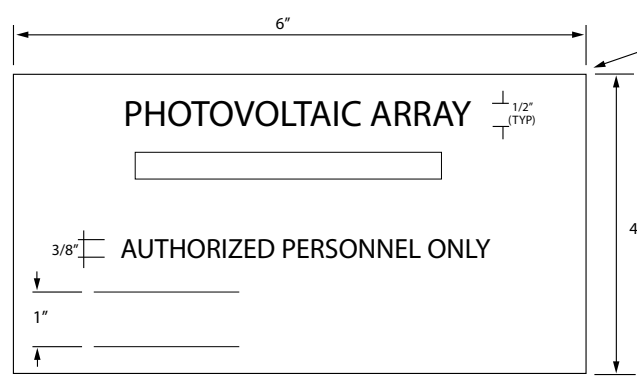
**WARNING**  
ELECTRICAL SHOCK HAZARD  
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DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

596-00496

RATED MAX POWER-POINT CURRENT: 77.8 A DC  
RATED MAX POWER-POINT VOLTAGE: 417.2 V DC  
MAXIMUM SYSTEM VOLTAGE: 556 V DC  
MAXIMUM CIRCUIT CURRENT: 128.8 A DC  
MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER: N/A

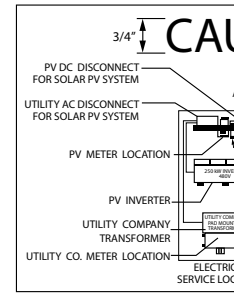
596-00253

## WEST ENTRANCE 3



558-00350  
4" wide continuous vinyl can be substituted and printed with TagPrint Pro

## FACILITY



HellermannTyton North America  
**800-537-1512**  
www.HellermannTyton.com  
email: corp@htamericas.com  
**HellermannTyton**

**VOLTAIC**  
W-1  
**CONNECT**  
690.15, NEC 690.13(B)

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PER NEC 690.17(E)

0496

MAXIMUM AC OPERATING CURRENT:	400 A 3P
NOMINAL OPERATING AC VOLTAGE:	480V

PER NEC 690.53

**WARNING**  
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DC VOLTAGE IS ALWAYS PRESENT ON SOLAR MODULES EXPOSED TO SUNLIGHT  
PER NEC 690.17(E)

596-00496

**WARNING**  
**ELECTRICAL SHOCK HAZARD**  
IF A GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED  
PER NEC 690.5(C)

596-00498

**PHOTOVOLTAIC AC DISCONNECT**  
ACNW-1  
PER IFC 605.11.3, NEC 690.15 & NEC 690.13(B)

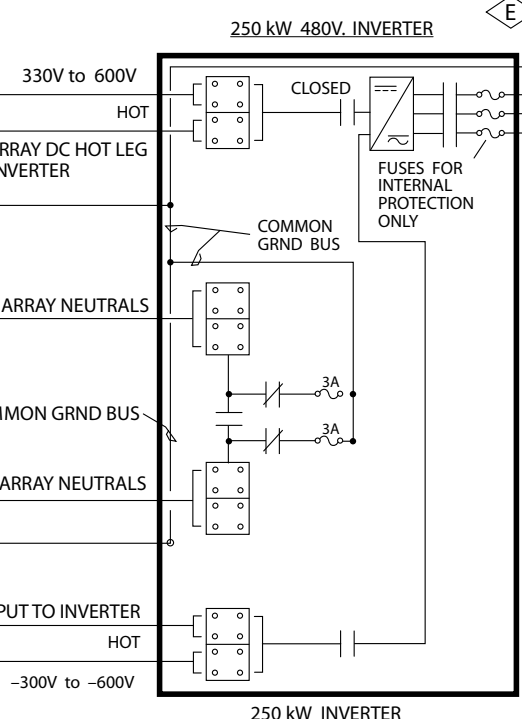
596-00237

**WARNING**  
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DO NOT TOUCH TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION  
PER IFC 690.17(E)

596-00497

**PHOTOVOLTAIC AC DISCONNECT**  
MAXIMUM AC OPERATING CURRENT: 400 A 3P  
NOMINAL OPERATING AC VOLTAGE: 480V  
PER NEC 690.54, NEC 690.13(B)

596-00239



**PHOTOVOLTAIC AC DISCONNECT**  
ACNW-2  
PER IFC 605.11.3, NEC 690.15, NEC 690.13(B)

596-00237

**MAIN PHOTOVOLTAIC SYSTEM AC DISCONNECT**  
NEC 690.15 & NEC 690.13(B)

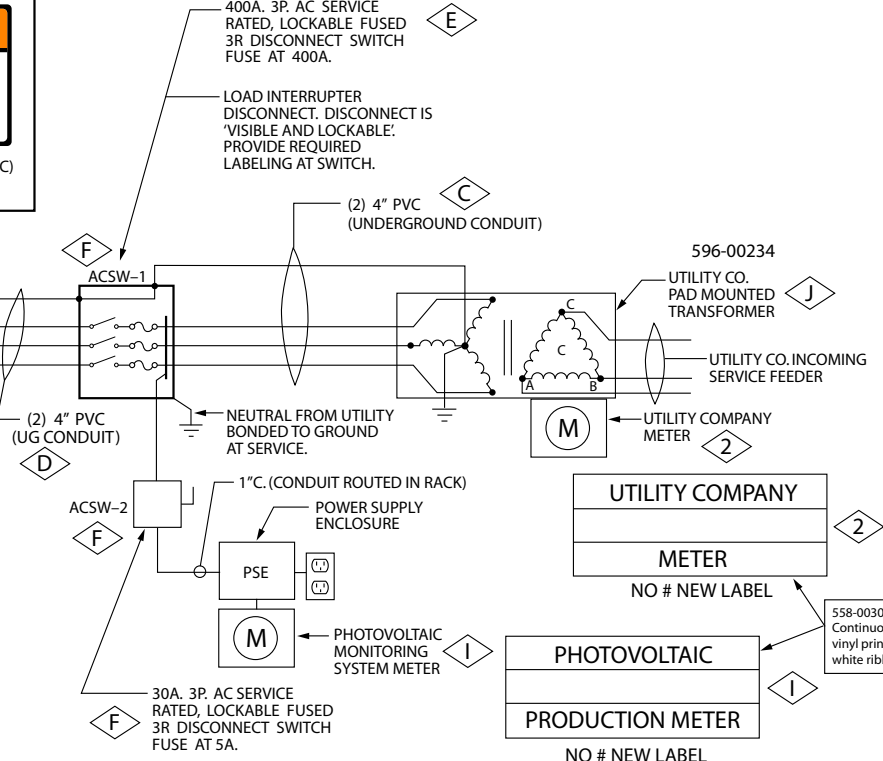
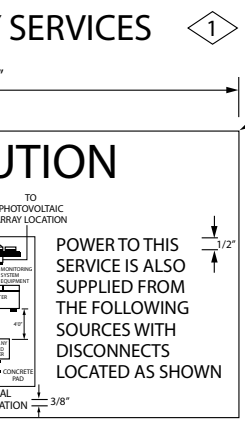
596-00255

**WARNING**  
**ELECTRICAL SHOCK HAZARD**  
DO NOT TOUCH TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION  
PER NEC 690.17(E)

596-00497

**PHOTOVOLTAIC AC DISCONNECT**  
MAXIMUM AC OPERATING CURRENT: 400 A 3P  
NOMINAL OPERATING AC VOLTAGE: 480V  
PER NEC 690.54, NEC 690.13(B)

596-00239



- LABEL AND MARKINGS LEGEND:**
- B** PHOTOVOLTAIC COMBINER BOX GENERIC WARNING LABEL APPLIED TO ALL PHOTOVOLTAIC COMBINER BOXES; 1 PER COMBINER BOX (4 TOTAL).
  - C** PHOTOVOLTAIC SYSTEM DC DISCONNECT WARNING LABEL WITH SYSTEM SPECIFICATIONS, APPLIED TO ALL PHOTOVOLTAIC DC DISCONNECTS; 1 PER DC DISCONNECT (2 TOTAL).
  - D** LABELS ARE TO APPEAR AT EVERY SECTION OF THE WIRING SYSTEM THAT IS SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILING OR FLOORS. SPACING BETWEEN LABELS NOT TO EXCEED 10 FEET (3 M).
  - E** PHOTOVOLTAIC INVERTER GENERIC WARNING APPLIED TO ALL INVERTERS; 1 PER INVERTER (1 TOTAL).
  - F** PHOTOVOLTAIC SYSTEM AC DISCONNECT WARNING LABEL WITH SYSTEM SPECIFICATIONS, APPLIED TO ALL PHOTOVOLTAIC AC DISCONNECTS; 1 PER AC DISCONNECT (2 TOTAL).
  - I** LABEL FOR SYSTEM OWNER KWH PRODUCTION METER; 1 PER MONITORING SYSTEM METER (1 TOTAL).
  - J** UTILITY CONNECTION GENERIC WARNING LABEL APPLIED TO UTILITY PHOTOVOLTAIC SYSTEM TRANSFORMER; 1 PER UTILITY SERVICE (1 TOTAL).
  - 1** PROVIDES THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC DISCONNECTING MEANS. THIS LABEL SHALL BE APPLIED TO THE MAIN SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC DISCONNECTING MEANS; 1 PER POC (1 TOTAL).
  - 2** LABEL FOR REQUIRED UTILITY COMPANY METER SOCKET; 1 PER UTILITY METER (1 TOTAL).
  - 3** LABEL FOR WEST ENTRANCE. INSTALL SIGNAGE ON ENTRANCE DOOR AT EYE LEVEL.