

**PHOTOVOLTAIC
DC DISCONNECT**
PER IFC 605.113, NEC 690.15, NEC 690.13(B)

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH 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
PER NEC 690.17(E)

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ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
ON BOTH LINE AND
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IN THE OPEN POSITION
DC VOLTAGE IS ALWAYS PRESENT
WHEN SOLAR MODULES
ARE EXPOSED TO SUNLIGHT
PER NEC 690.17(E)

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

PER NEC 690.53

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

**PHOTOVOLTAIC
AC DISCONNECT**
PER IFC 605.113, IFC 605.11
NEC 690.15(B), NEC 690.15(C)

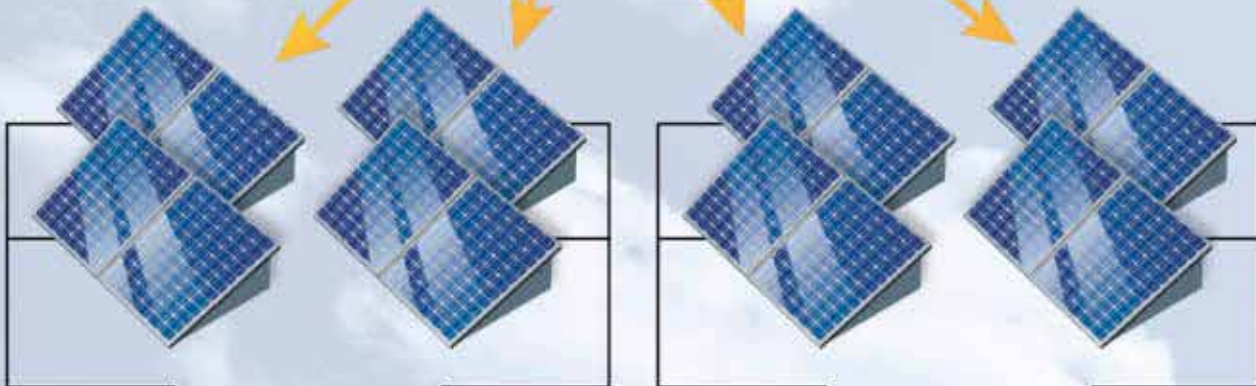
PV Labeling Requirements – NEC 2014

**PHOTOVOLTAIC SYS
EQUIPPED WITH
RAPID SHUTDOWN**
PER NEC 690.56

**PHOTOVOLTAIC
DC DISCONNECT**
PER IFC 605.113, NEC 690.15, NEC 690.13(B)

SUN

A. SOLAR PANELS



B. COMBINER BOX



C. DC BREAKER OR DISCONNECT



E. INVERTER

D. CONDUIT



WARNING: PHOTOVOLTAIC POWER SOURCE

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.

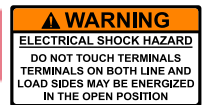
*Must be reflective per
NEC 630.31 &
IFC 605.11.1.2*



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 inverter. 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 label is posted showing the location of all disconnects servicing a facility so that emergency personnel can shut down everything related to power transportation.

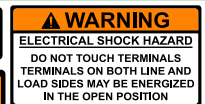


PHOTOVOLTAIC AC DISCONNECT	_____
MAXIMUM AC OPERATING CURRENT:	_____
NOMINAL OPERATING AC VOLTAGE:	_____

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:	_____



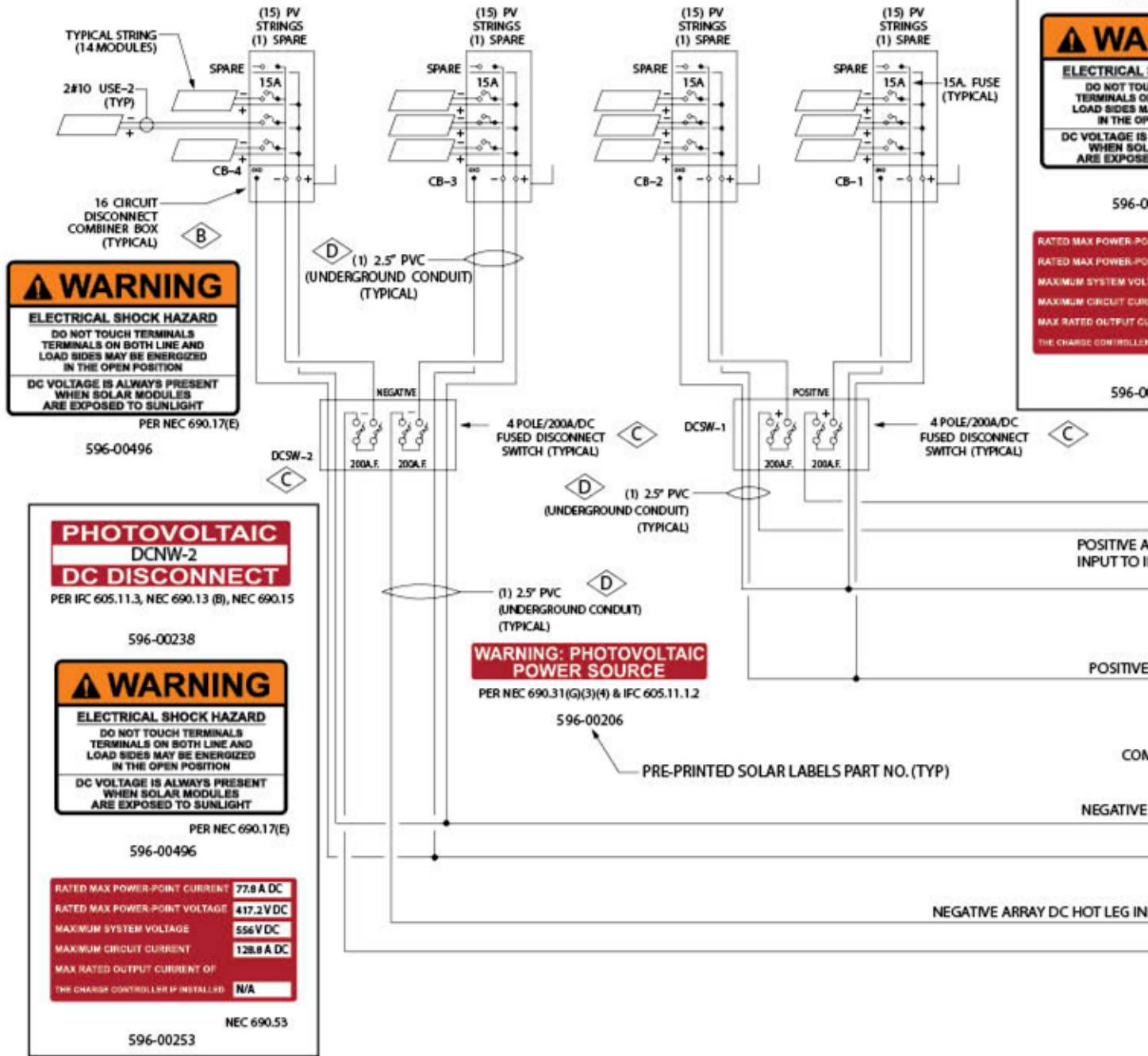
H. **POWER ENCLOSURE** — A power enclosure is simply a point where multiple power cables are spliced together.

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 offsets 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



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