

ARTICLE 690

SOLAR PHOTOVOLTAIC (PV) SYSTEMS

Introduction to Article 690—Solar Photovoltaic (PV) Systems

You have seen, or maybe own, devices powered by photovoltaic cells, such as night lights, car coolers, and toys. These generally consist of a small solar module powering a small device running on a few volts and a fraction of an ampere. A solar PV system that powers a building or interconnects with an electric utility operates on the same principals but on a much larger scale.

Solar PV systems that provide electrical power to an electrical system are complex. There are many issues that require expert knowledge in electrical, structural, and architectural issues.

The purpose of the *NEC* is to safeguard persons and property from the hazards arising from the use of electricity [90.1(A)]. Article 690 is focused on the electrical hazards that may arise from installing and operating a PV system. It consists of eight parts.

The general *Code* requirements of Chapters 1 through 4 also apply to these installations, except as specifically modified by this article [90.3].

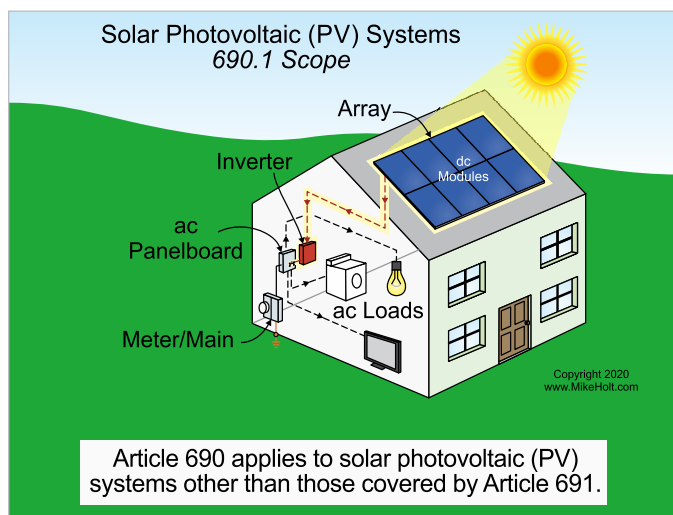
Part I. General

690.1 Scope



Scan this QR code for a video of Mike explaining this topic; it's a sample from the videos that accompany this textbook.
www.MikeHolt.com/20PVvideos

The requirements contained in Article 690 apply to solar photovoltaic systems other than those covered by Article 691. ▶**Figure 690-1**



▶**Figure 690-1**

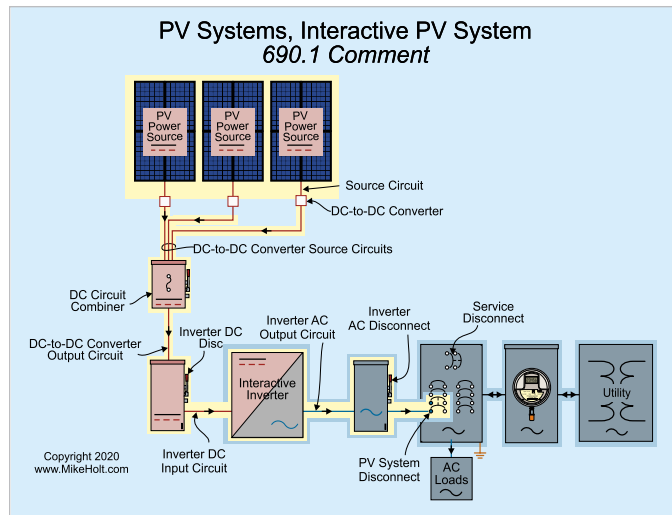
This article includes those PV systems that are interactive (operate in parallel with the electric utility), that are stand-alone systems, or are a combination of the two. PV systems can provide either ac or dc power.

Author's Comment:

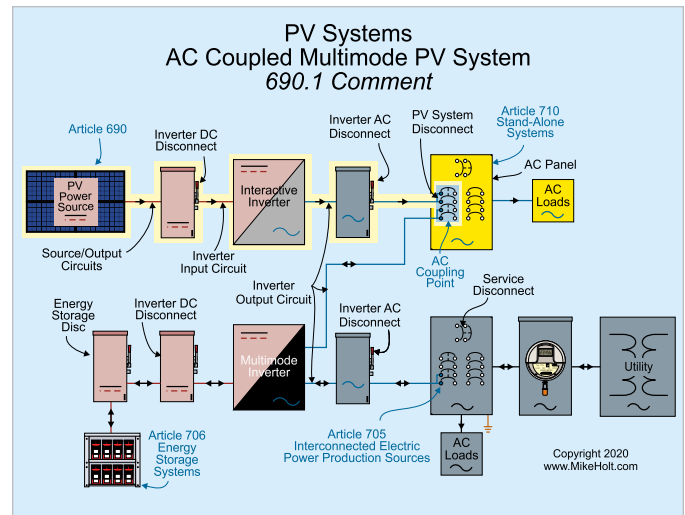
- ▶ Energy storage systems are covered in Article 706 and are permitted to be connected to, but are not a part of, PV systems.

Review the details in ▶**Figure 690-2**, ▶**Figure 690-3**, ▶**Figure 690-4**, ▶**Figure 690-5**, and ▶**Figure 690-6**.

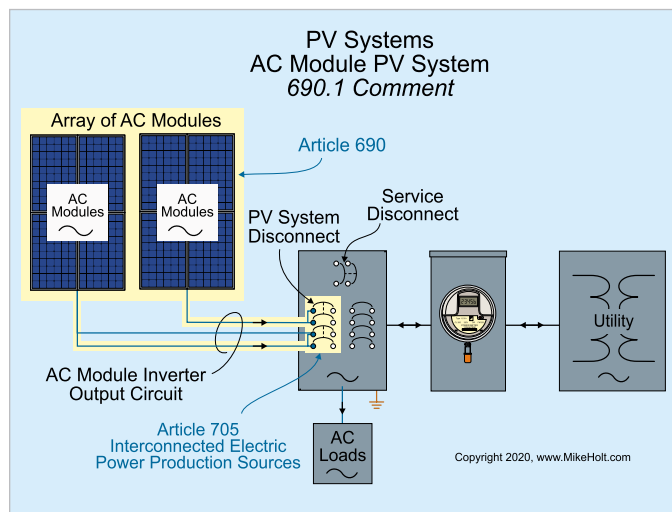
Note 2: Article 691 covers the installation of large-scale PV electric supply stations with an inverter generating capacity of not less than 5,000 kW, and not under the electric utility control. These facilities have specific design and safety features unique to large-scale PV supply stations and are for the sole purpose of providing electric supply to a system operated by a regulated utility. ▶**Figure 690-7**



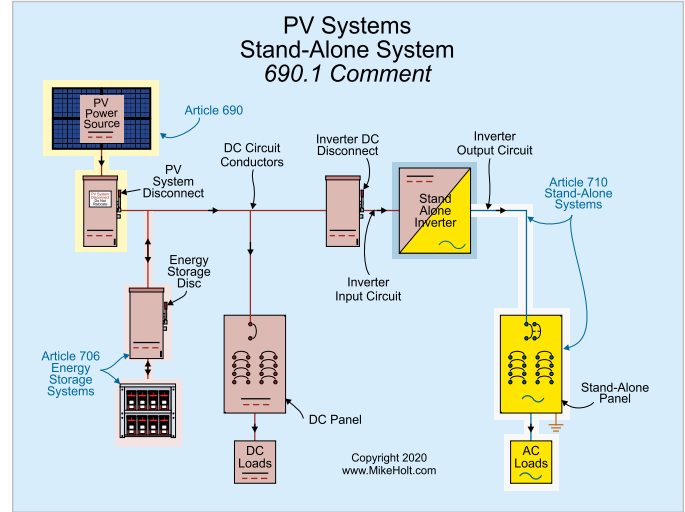
►Figure 690-2



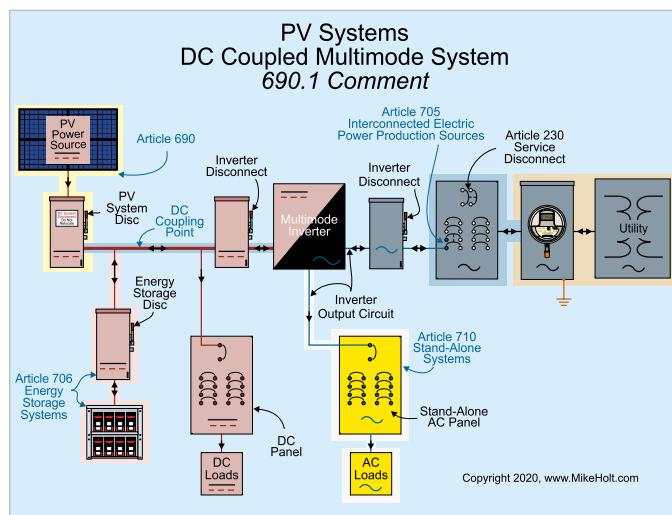
►Figure 690-5



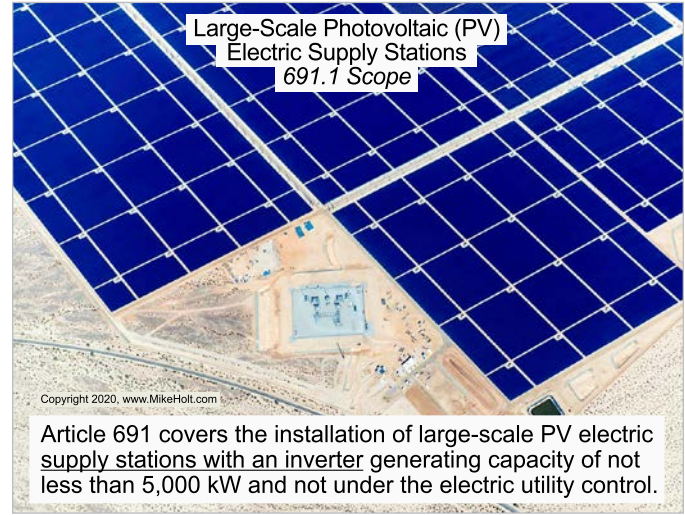
►Figure 690-3



►Figure 690-6



►Figure 690-4



►Figure 690-7