

# Why a PV Disconnect is a Good Idea on Your System

## 1. INTRODUCTION

As the adoption of solar energy continues to grow, ensuring the safety and efficiency of photovoltaic (PV) systems becomes increasingly important. One critical component that contributes to both is the PV disconnect. This paper explores the significance of PV disconnects in solar power systems, their role in safety and maintenance, compliance with codes and standards, and real-world applications.

## 2. WHAT IS A PV DISCONNECT?

A PV disconnect is a switch that allows for the disconnection of a solar photovoltaic system from its power source. It serves as an isolation point, enabling the safe interruption of the PV circuit. This is essential during maintenance, repair, and emergency situations, providing a means to safely isolate the system.

## 3. SAFETY AND MAINTENANCE

### 3.1 ENHANCING SAFETY

PV disconnects provide a way to enhance safety and protect both people and equipment. During emergency situations, technicians and/or first responders may need to interact with the system/equipment without the risk of live electrical currents. A PV disconnect ensures that the system can be safely de-energized from one central location, making the process simple and preventing potential electrical shocks or fires.

### 3.2 FACILITATING MAINTENANCE

Routine maintenance and repair also become safer and more straightforward thanks to a disconnect. Technicians can isolate the system from the power generation allowing them to perform their tasks without risk of shock or short circuit and without having to physically disconnect and isolate live wires (coming from the live PV, or other power source). By placing the disconnect(s) in an easily accessible location users can make it simple to locate and use as well as improve efficiency and reduce downtime or the overall repair.

## 4. COMPLIANCE WITH CODES AND STANDARDS

### 4.1 NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS

The National Fire Protection Association (NFPA) mandates the use of PV disconnects in solar power systems. According to NFPA, a disconnect means shall be provided to disconnect the PV system from all wiring systems including power systems, energy storage systems, and utilization equipment and its associated premises wiring. This requirement ensures that the system can be completely isolated, protecting users, equipment and maintenance workers from the hazards of electrical shock. NFPA also states that the disconnect must be clearly labeled as, "PV system disconnect," and should also include a warning regarding potential for electrical shock.

### 4.2 BREAKING THE CIRCUIT

PV disconnects are designed to break both the positive and negative sides of the PV circuit. This is due in part to the National Electric Code (NEC) mandating that disconnects break all conductors that are not solidly grounded. Since most PV systems lack a grounded conductor on the PV circuit, it is preferable to disconnect both sides of the circuit to comply with this requirement. Ultimately, it also provides the highest level of safety for anyone working on or near the system.

### 4.3 INSTALLATION AND FUNCTIONALITY

Disconnects are typically installed at strategic points within the solar power system. Their primary function is to provide a safe and efficient means to isolate the inverter from live sources. Proper installation and use of these disconnects ensure the system operates safely and within regulatory requirements. Often the disconnect is installed close to the array, unless there is a great distance between said array and the inverter. Some jurisdictions may even require a disconnect at both locations, while others may require none at all. Always consult the local AHJ to determine the requirements of any given system.

## 5. CASE STUDIES AND EXAMPLES

### 5.1 REAL-WORLD SCENARIOS

Several real-world examples highlight the importance of PV disconnects. In one case, a solar installation without a PV disconnect experienced a fire due to an electrical fault. The inability to quickly isolate the system exacerbated the situation. In another instance, a PV disconnect enabled technicians to safely perform maintenance on a large solar farm without shutting down the entire system, demonstrating the efficiency and safety benefits.

### 5.2 CONCLUSION

PV disconnects play a vital role in the safety and maintenance of solar energy systems. By providing a means to safely isolate different parts of the system, they enhance safety, comply with regulatory standards, and facilitate efficient maintenance. As solar energy continues to expand, the adoption of PV disconnects is essential for ensuring the safe and reliable operation of these systems.