EG4® Inverters and ESS Systems

NEC Code Compliance for AC & DC Disconnects

The following document clarifies the necessary disconnects for EG4® Inverters and Energy Storage Systems (ESS). It specifically details the certifications and features of the EG4® PowerPro ESS as they relate to the 2023 NEC code requirements for system disconnects including the ESS Emergency Disconnect (NEC 706.15).

The EG4® PowerPro ESS systems shown in Table 1 are ETL listed to UL 9540 and consist of EG4® Inverters integrated with EG4® Batteries of 4 types resulting in several configurations of approved ESS.

These ESS inverter/battery combinations have an integrated inverter, batteries, battery cabling, battery management system (BMS) and Energy Management System (EMS). The batteries in the EG4® PowerPro series are not "separate from the ESS Electronics and field serviceable", as referred to in NEC 706.15(E) - Disconnecting Means for Batteries.

This integrated control systems in the EG4 ESS meets the NEC code requirements for the ESS Emergency Shutdown Function required under NEC 706.15(A and B). This also satisfies the ESS Disconnect means for the batteries under 706.15(E) through direct shutdown of each battery through its BMS (Battery Management System) as well as disconnecting each battery's main breaker. Direct and rapid shutdown of every battery through its onboard BMS is much safer for First Responders and results in no voltage on any conductors outside of the battery upon initiation of the Emergency Shutdown Function as required in NEC 706.15(A).

Paralleling the ESS Disconnect Initiation Device, and the RSD Initiator allows one initiator to simultaneously perform the RSD (NEC 2023 609.12(C)) and the ESS Disconnect (NEC 706.15(B) functions - providing easy access for First Responders and resulting in the safest system possible.

Installers should not install an externally mounted DC Disconnect between the battery and inverter. This would result not only in a violation of the UL 9540 compliance of the EG4 ESS system but could result in the conductors between the batteries and the disconnects still being energized after shutdown - exposing First Responders to dangerous DC voltages. **Installers must install either a single paralleled RSD/ESS Disconnect Initiation Device or two separate co-located initiators – one for each function.**

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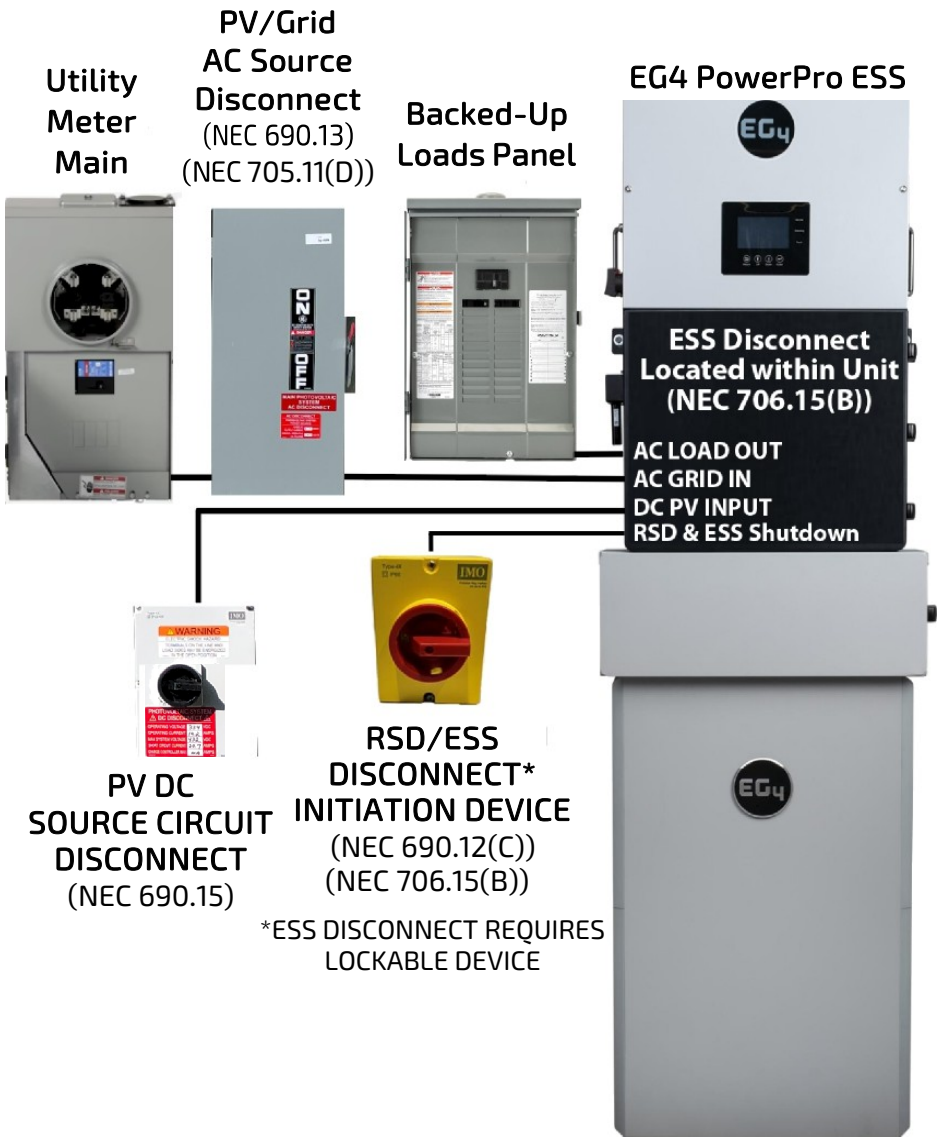
For Ground Mount Systems or other PV systems where an RSD system is not required, installers must install the ESS Disconnect Initiator as well as install a DC Source Circuit Disconnect (from the array) (NEC 690.13, 705.11(D)) to ensure that First Responders can also de-energize DC Source Circuit conductors entering a structure.

Installers also need to install a PV/Grid AC Source Disconnect (sell-back circuit) for system point of interconnection (POI) as required in NEC 690.13 and NEC 705.11(D) and this switch may need to be a visible, lockable, knife switch as required by many utilities.



This diagram is for conceptual purposes only in relation to needed disconnects. Actual installations may need more components.

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Table 1: EG4® ESS models with ETL Conforming to UL 9540

	FlexBOSS21	FlexBOSS18	18kPV-12LV	12KPV	12000XP	6000XP
EG4®-LL-48V 100AH, LiFePO4 Battery*			1 inverter + 3-6 batteries; 2 inverters + 6-12 batteries; 3 inverters + 7-12 batteries	Pending		
EG4® LifePower4 48V 100AH, LiFePO4 Battery*			1 inverter + 3-6 batteries; 2 inverters + 6-12 batteries; 3 inverters + 7-12 batteries	Pending		
EG4® WallMount AllWeather 48V 280Ah LiFePO4 Battery	1 inverter + 1-6 batteries; 2 inverters + 2-6 batteries; 3 inverters + 3-6 batteries					
EG4® WallMount Indoor 48V 280Ah LiFePO4 Battery	1 inverter + 1-6 batteries; 2 inverters + 2-6 batteries; 3 inverters + 3-6 batteries				Pending	

*Batteries must be mounted in server rack to comply with UL 9540

Certificates are available on each product page at eg4electronics.com

Reference: 2023 NEC Updates for Energy Storage Systems

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