

# US Rapid Shutdown Compliance



NEC 2017/2020 Rooftop Systems Must Comply with Both:

## 690.12(B)(1) Control Conductors Outside Array Boundary

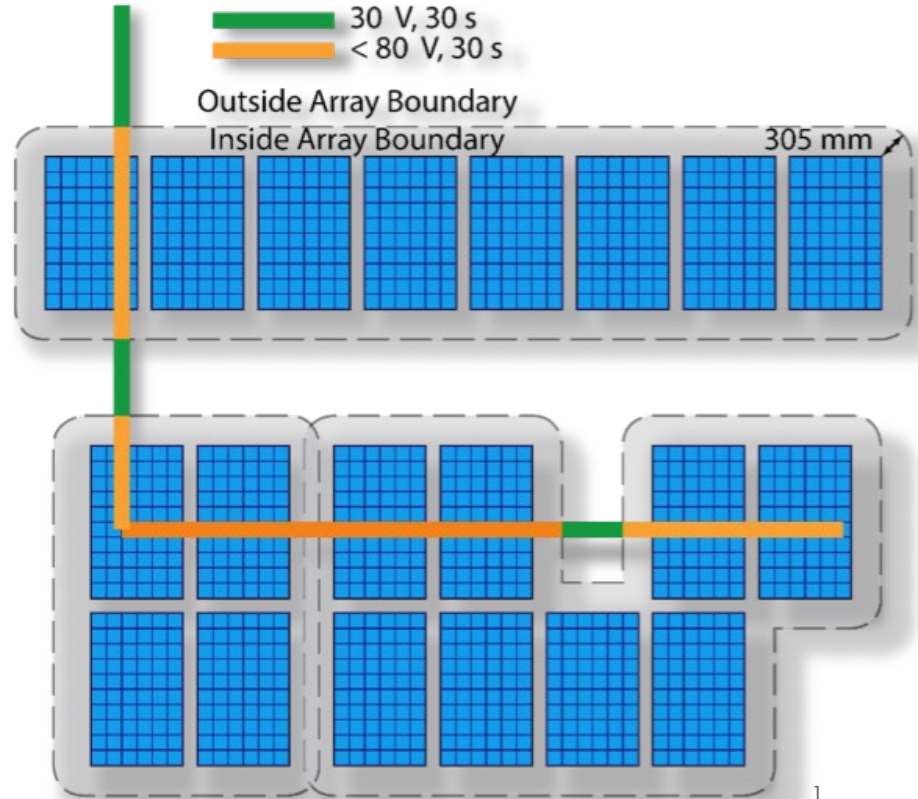
Mandatory - No flexibility  
 $\leq 30$  V within 30 Seconds

and

## 690.12(B)(2) Control Conductors Inside Array Boundary

3 options:

- (1) UL 3741 PV Hazard Control Array
- (2) MLPE
- (3) No metal or exposed cables (BIPV)



# Rapid Shutdown- NEC 690.12

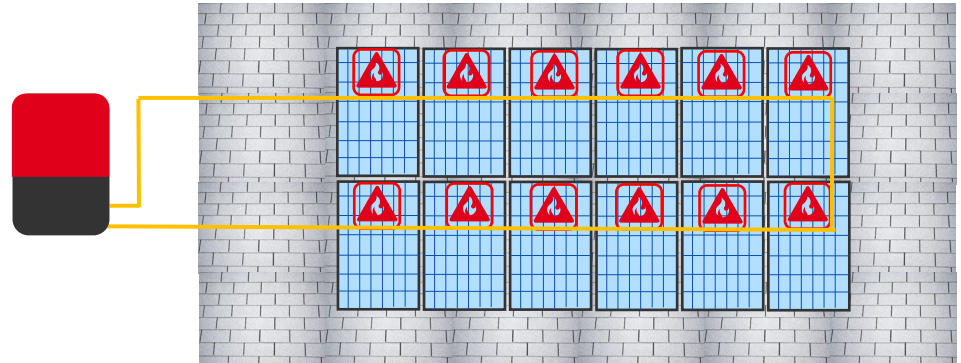
PV dc circuits on or in a building must include a rapid shutdown function to reduce shock hazard for emergency responders in accordance with 690.12(A) through (D).



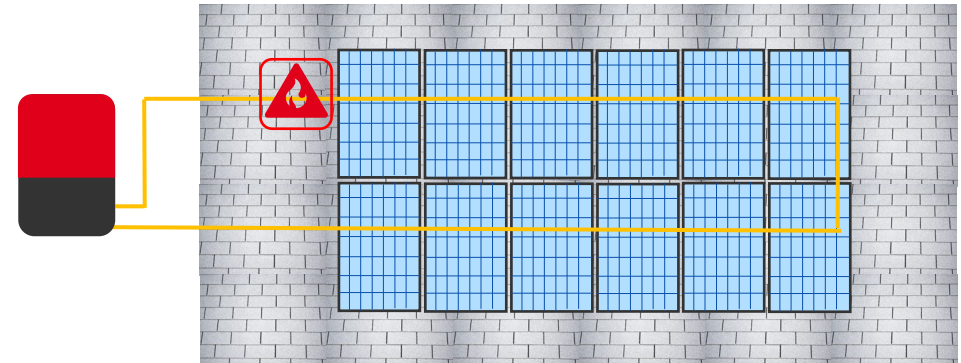
Both are safe!



= Rapid Shutdown Device



Standard PV Array



UL Listed PV Hazard Control Array

# Rooftop PV Systems Have an Inherent Safety Already Built-in

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**Transformerless PV inverters have daily insulation resistance measurement and continuous residual current detection**

→ Ground faults will immediately be detected

**Transformerless PV string inverters isolate the PV array from ground reference after disconnection from AC**

→ Single point contact to live PV circuit poses no risk to first responders

**Systems built to meet the current NEC also meet current building codes**

→ Walkways and set-offs provide access areas for first responders

→ No reason to cut holes in PV modules

# Reason Will Prevail!

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**Only qualified personnel are allowed to perform work on PV arrays**

→ Fire fighters do not remove modules or intentionally chop holes into them

**Presence of voltage in an array is not dangerous –becoming part of the current path is**

→ What really matters is continuous insulation and monitoring thereof

**Reliable wire management and good workmanship are basis for continued insulation**

→ Mounting system plays a key role in PV Hazard Control

**Key takeaway: Multiple faults and damaged firefighter protective equipment required to make PV system dangerous for firefighters.**

→ UL 3741 accounts for likelihood of faults