

# GROUND FAULT PROTECTION DEVICE



Morningstar's Ground Fault Protection Device (GFPD) is an innovation for ground fault detection and interruption for the photovoltaic (PV) industry. It has greater sensitivity and better isolation while maintaining the bond to earth ground. Ground fault protection is used in electrical systems to prevent current from following any unintended paths during a ground fault. Morningstar's GFPD has been designed to meet the ground fault protection requirements of the US National Electric Code (NEC) for grounded PV systems.

How it Works: A GFPD needs to detect any stray current and interrupt (break) the circuit until safe operation can be restored. A current imbalance between the primary positive and negative PV conductors entering the controller or inverter may indicate a ground fault condition. Morningstar's GFPD will detect this condition and break the circuit on both the positive and negative legs. Disconnecting both poles ensures interruption of the ground fault current.

Other ground fault detection/interruption products break the bond to the grounded conductor. When this occurs, not only is the earth bond compromised, but the battery and DC loads can also be left ungrounded and floating. For a negatively grounded system this means that the negative side of the battery and loads can float to negative Voc in relation to ground. **Morningstar's GFPD better isolates the array from the battery and loads, while maintaining the bond to ground.**

## Key Features and Benefits

### ■ Simple and Flexible Installation

- Side or below flush mounting with coupling hardware included
- Feedback signal wire harness comes pre-wired
- Includes fused battery cable for power
- Compatible with other supplier's PV controllers and inverters
- For positive or negative grounded PV systems

### ■ Greater Sensitivity

- More precise than fused ground fault protection
- Activates starting at 300mA compared to 1A for alternative solutions
- Sensing device provides consistent, accurate measurement

### ■ Maintains the bond to earth ground

- Normally grounded components (conductors, controller, battery and DC loads) will not be left floating
- Avoids problems of other ground fault protection options, which can allow the battery and load to float to PV array voltages in relation to ground

### ■ No Fuses

- Avoids problematic replacements of fuses, which are often unavailable at remote sites
- Uses high quality breaker switches that continue to operate after ground fault interruptions

### ■ Safety Features

- Breaks the connection to the PV array during a fault condition
- Leaves the battery and DC loads grounded under all conditions. Alternative ground fault solutions require a warning label on the battery to note that "dangerous voltages are present"
- Features audible and visual indications
- Includes push-button test circuit

### ■ Better Isolation

- Disconnects both the positive and negative conductor
- Completely isolates the ground fault from the controller, battery and loads

### ■ Supports both single controller and multiple controller systems

- Will only shut off affected controllers while maintaining the system earth bond
- All loads will continue to operate safely with the battery remaining bonded to the ground
- Multiple controllers and GFPDs may be added later on an as-needed basis

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## TECHNICAL SPECIFICATIONS

### Electrical

	GFPD-150V	GFPD-600V
• Maximum Solar Voltage (Voc)	150V	600V
• Maximum Solar Current	85A	50A
• Supply Voltage Range	10-72 Vdc	
• Self-Consumption	<0.5W	
• Ground Fault Threshold Current	300 mA +/- 10%	
• Number of Poles	2	
• Trip Method	Relay	
• Output Trip Signal	12V	
• Nominal System Voltage	12, 24, 36 or 48 Vdc	

### Environmental

	GFPD-150V	GFPD-600V
• Ambient Temperature	-40°C to +50°C	-40°C to +60°C
• Storage Temperature	-55°C to +85°C	-55°C to +85°C
• Humidity	Up to 100%, non-condensing	
• Tropicalization	PCB Conformal Coating	

### Electronic Protections

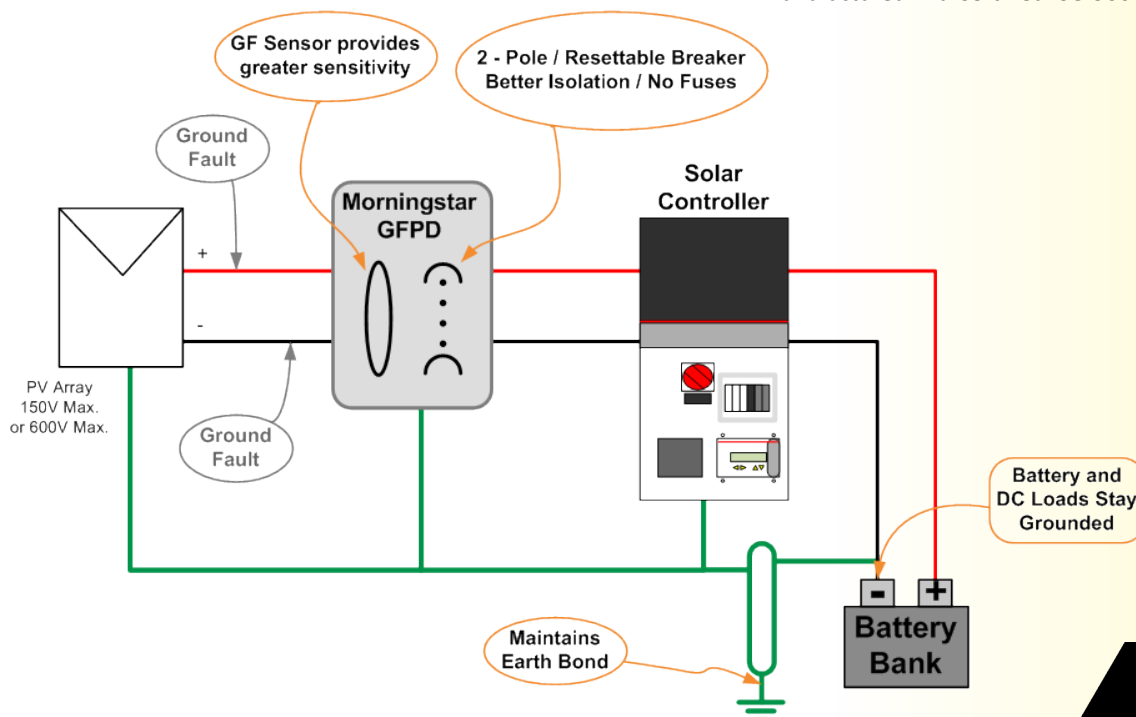
- Reverse Polarity
- Disconnected Feedback Signal Circuit Detection

### Mechanical

	GFPD-150V	GFPD-600V
• Dimensions	26.9 x 12.8 x 11.2 cm 10.6 x 5.1 x 4.4 in	35.7 x 22.1 x 10.6 cm 14.1 x 8.7 x 4.2 in
• Weight	2.0 kg / 4.4 lbs	4.4 kg / 8.9 lbs
• Mounting Post	DIN- and Panel-Mount Options	
• Terminal	Up to 13 mm <sup>2</sup> / 6 AWG	

### Certifications

- CE, RoHS and REACH Compliant
- UL 1741 and CSA C22.2 No. 107.1-01 Listed
  - GFPD-150V is UL-489 Listed
  - GFPD-600V is UL-1077 Listed
- Meets EMC Directives (Immunity, Emissions and Safety)
- FCC Class B Part 15 Compliant
- U.S. National Electrical Code (NEC) 690.5 Compliant for use as a GFPD device
- Manufactured in a Certified ISO 9001 Facility



**WARRANTY:** Five year warranty period. Contact Morningstar or your authorized distributor for complete terms.



**MORNINGSTAR**

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