

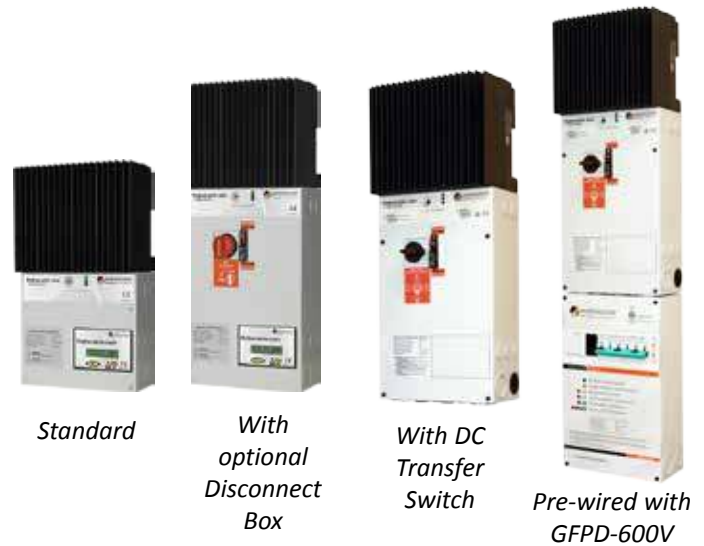
TRISTAR MPPT™ 600V

SOLAR•WIND•HYDRO

HIGH VOLTAGE CHARGE CONTROLLER

Morningstar's TriStar MPPT 600V Charge Controller can be used with higher voltage photovoltaic (PV) arrays, wind turbines or hydropower systems. This product enables the following application scenarios:

- Adding modules incrementally with no string sizing issues
- Off-grid PV, wind or hydro systems with input voltages greater than 150V
- Fewer combined circuits and lower current for long wire runs from the array to the controller
- New installation grid-tie PV systems with battery back-up
- Retrofitting grid-tie PV systems to include battery back-up without changing the PV array configuration
- Supplementary charging for AC Coupled PV systems



KEY FEATURES AND BENEFITS

➤ **High Voltage Capacity**

- Maximum input voltage of 600V
- Operates with PV array Voc voltages up to 525 Voc
- Wind, hydro operating voltages up to 500 Vdc
- Pre-set for 48 Vdc battery systems
- Programmable for 24V, 36V and 60V battery systems
- Allows long wire runs from the array to the controller
- Higher voltage reduces voltage drop and wire costs
- No combiner boxes required for single or two string systems
- Better enables grid-tie PV systems with battery back-up
- Enables easier PV array expansion than lower voltage systems and accommodates increasing loads
- Supports battery based solar PV, wind, hydro and other high voltage DC power systems

➤ **Extremely High Reliability**

- Robust thermal design and no cooling fans
- No moving parts
- Superior lightning protection from nearby lightning-induced voltage/current spikes
- Extensive electronic protections
- Epoxy encapsulated inductors and conformally coated printed circuit boards

➤ **Very High Efficiency**

- 97.9 % peak efficiency
- Proprietary tracking algorithm minimizes power losses
- Low self-consumption
- Continuous operation at full power to 45°C ambient temperatures without need to de-rate
- Electronic devices with higher ratings to minimize losses from heating

➤ **Maximizes Energy Harvest**

Our TrakStar™ MPPT Technology features:

- Better peak power point tracking than other MPPT charge controllers
- Very fast sweeping of the entire PV array
- Recognition of multiple power points during shading or mixed PV arrays
- Low input voltage operation
- Excellent performance at sunrise and low solar insolation levels

➤ **Communications Capabilities**

- Enables system monitoring, data logging and adjustability. Uses open standard MODBUS™ protocol and Morningstar's MS View software
- Meterbus: Communications between compatible Morningstar products
- Serial RS-232 and EIA-485 serial connectivity
- Ethernet: fully web-enabled interface to a local network or internet; view from a web browser or send email

➤ **Other Features**

- High-Low voltage barrier improves safety
- Available with optional Disconnect Box: 600V PV disconnect switch, battery breaker and prewired input/output bus bars
- Available with DC Transfer Switch option for switching from a GT string inverter to battery backup charging during a utility outage. Multiple controllers and GFPDs may be added later, on an as-needed basis

Four Versions:

TS-MPPT-60-600V-48 Standard

TS-MPPT-60-600V-48-DB With Disconnect Box (600V; 25A 1-Pole disconnect switch)

TS-MPPT-60-600V-48-DB-TR* With DC Transfer Switch (600V; 30A double pole; double throw DC Transfer Switch)

TS-MPPT-60-600V-48-DB-TR-GFPD** Pre-wired with Ground Fault Protection Device

All non-standard versions include a 1-Pole; 63A PV battery breaker*** and pre-wired PV/Battery busbars

TR versions also include a pre-wired String Inverter busbar

TECHNICAL SPECIFICATIONS

Electrical

- Peak Efficiency 97.9%
- Maximum Battery Current 60A
- Maximum Input Operating Current 15A (self limiting)
- Maximum Solar Open Circuit Voltage 600V
- Nominal Maximum Operating Power**** 3200Wp, 48 Volt
- Nominal System Voltage 48 Vdc
custom programmable to 24V, 36V and 60V
- Battery Operating Voltage Range 16-72 Vdc
- PV Input Operating Voltage Range 100V to Voc = 525V
- Wind/Hydro Input Operating Voltage Range Battery Voltage to 500V
- Self-Consumption 1.75 - 2.50 W
- Transient Surge Protection 4500 Watts/port

Electronic Protections

- Input Overload, high voltage
- Battery High voltage, battery sense disconnected, remote temperature sense disconnected
- General Operation High temperature, reverse current at night, lightning and transient surges

Environmental

- Ambient Temperature -40 °C to +45 °C
- Storage Temperature -55 °C to +85 °C
- Humidity 100% non-condensing
- Tropicalization Epoxy encapsulation, conformal coating, marine-rated terminals

Battery Charging

- Charging Stages MPPT, absorption, float, equalize
- Temperature Compensation
 - Coefficient -5mV/°C/cell (25° ref)
 - Range -30 °C to +80 °C / -22 °F to +176 °F
 - Set points Absorption, Float, Equalize, HVD

Note: Remote Temperature Sensor is included.

Mechanical

- Dimensions
 - Standard Version 39.2 x 22.1 x 14.9 cm / 15.4 x 8.7 x 5.9 in
 - DB & TR Version 54.2 x 22.1 x 14.9 cm / 21.4 x 8.7 x 5.9 in
- Unit Weight
 - Standard Version 9.0 kg / 19.8 lbs
 - DB & TR Version 12.8 kg / 28.1 lbs
- Maximum Wire Size
 - Power Terminals 2.5 mm² - 35 mm² / 14 AWG - 2 AWG
 - RTS/Sense Terminals 0.25 mm² - 1.0 mm² / 24 AWG - 16 AWG
- Conduit Knockouts M20; 0.50, 1.00, 1.25 inches
- Enclosure Rating Type 1 (indoor and vented), IP20

Communication

- Ports Ethernet, EIA-485, RS-232, MeterBus
- Supported Protocols MeterBus, MODBUS RTU, MODBUS TCP/IP, HTTP, SNMP v2, SMTP

Options

- TriStar 600V Meter (TS-M-2-600V)
- TriStar Remote Meter (TS-RM-2)
- Meter Hub (HUB-1)
- Relay Driver (RD-1)
- 600V Ground Fault Protection Device (GFPD-600V)

Certifications

- CE, RoHS, NEC Compliant
- ETL Listed: UL-1741 and Canadian CSA C22.2 No. 107.1.01
- FCC Class B Part 15 Compliant

* Can be used as a 2-pole version of the Disconnect Box.

** See GFPD-600V datasheet for additional specifications.

*** Can be replaced with 2-pole battery breaker.

**** Input power can exceed Nominal Maximum Operating Power, but controller will limit and provide its rated continuous maximum output current into batteries. This will not harm the controller.

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