



# TriStar MPPT™ 600V Charge Controller



## Performance

Introducing the TriStar MPPT 600V (TS-MPPT-600V) Charge Controller. Morningstar launched the TriStar MPPT Controller family in 2009. Today this line of MPPT controllers has become the world's leading photovoltaic (PV) charge controllers /regulators—operating in a myriad of autonomous residential, commercial and industrial installations around the globe. The TS-MPPT-600V builds off these varied application experiences and Morningstar's 20 years of power electronics' engineering excellence to deliver our customers the best overall charge controller solution for their stand-alone or back-up (solar- or wind-powered) system installation needs.



## TrakStar™ Technology

The TS-MPPT-600V features an advanced internal processor and utilizes Morningstar's patented *TrakStar Advanced Maximum Power Point Tracking Technology* to harvest the maximum power from the solar array's peak power point, under all weather & operating conditions. This high-speed processing technology and sweeping methodology enables the TS-MPPT-600V to sweep from the battery voltage to Voc (open circuit voltage) of the array faster than its 150V predecessor controllers—faster than 1/10<sup>th</sup> of a second.

## TS-MPPT-600V Benefits

- Delivers the Industry's Best-in-Class Power Efficiency
- Uses Morningstar's patented 4-Stage Charging Algorithm to Optimize Battery Health
  - Charging States: Bulk, Absorption, Float & Equalize
- Equipped with Extensive System Networking, Monitoring & Communications
- Environmentally-Optimized Design
- Extensive Electronic Protections
- Superior Lightning Protection (from nearby lightning-induced voltage & current spikes)
- Robust Thermal & Mechanical Design

**"The TS-MPPT-600V uses advanced power electronics to efficiently convert up to 600 Voc PV for 48 or 120 VDC battery-bank systems."**

## Quality & Reliability

Morningstar's products are ***built from the inside out*** and deliver more than twice the industry average in operating life.

The TS-MPPT-600V—with its robust thermal, mechanical & electrical design; extensive electronic protections; no moving parts as well as epoxy encapsulated inductors & conformally coated printed circuit boards—delivers high reliability and excellent performance.

The TS-MPPT-600V is manufactured in a certified ISO 9001 facility and has been extensively tested. Its certifications include:

- RoHS Compliant, CE & NEC Compliant
- FCC Part 15 Class B Compliant
- Canadian ICES-003 & UL-1741 (CSA C22.2 No. 107-1-01) Listed



# TS-MPPT-600V

## Communications

Morningstar's TriStar MPPT Controllers are the **only out-of-the-box** charge controllers to offer open communication protocols and true Ethernet-enabled functionality. *Why does this matter?*

The TS-MPPT-600V uses reliable, established, industry standard open communication protocols & interfaces to help reduce overall system operational costs and to increase system integration efficiencies. As a result, there are no proprietary network hardware or software compatibility issues to sort out as well as no requirement for external gateways—enabling developers to use proven & readily available code to speed development time and decrease costs:

- Protocols: Supports MODBUS™ RTU & MODBUS TCP/IP™, SNMP v2 & SMTP (for system networking & monitoring)
- Communication Ports / Interfaces: Ethernet, EIA-485, RS-232 & MeterBus™ (for flexible communications)
- Data Logging

## Parallel Operation

The TS-MPPT-600V was engineered to support parallel operation. Up to four TS-MPPT-600V controllers may be used in parallel to manage charging from a single source input (Solar or Wind). The TS-MPPT-600V enables customers to use their grid-tied high-voltage PV installation to provide input operation of 12 – 15 kWp (depending on system sizing) of back-up power during an outage—to power critical loads (lights, sump pump, furnace controls, well pumps, servers, security, communications, etc...) in a cost-effective way.

## Optimized Battery Health

Morningstar designed the TS-MPPT-600V's battery charging process to deliver long battery life & improved system performance.

## Simplified Installation & Use

The TS-MPPT-600V controller is built for easy installation, set-up and use. Its self-diagnostics & electronic error protections make installation easier and prevents the chance of installation mistakes / system faults. It is also equipped with 8 adjustable switches to make system set-up & configuration simple.

- Easy series installation
- No combiners required
- Wire cost savings off-set the higher cost of the controller
- Supports the use of small wire gauge
- Supports long wire runs

## Innovation

Morningstar's TriStar MPPT Controllers are the ideal choice for residential, industrial & small commercial installations. They offer a highly efficient power path for charging batteries with for high-voltage strings, thin film & other grid-tie PV modules. Some typical application scenarios include:

- Off-Grid PV Systems >150Voc with Long Wire Runs
- New Installation Grid-Tie PV Systems w/Battery Back-up
- Retrofit Grid-Tie PV Systems w/Battery Back-up
- Small Wind (Off-Grid or Grid-Tied w/Battery Back-up)

The TS-MPPT-600V's high voltage capability and flexible design also means that very long wire runs from the array to the controller are now possible.

## TS-MPPT-600V Features

- 250-500Vmp Input Power Range
- Maximum 60A Continuous Battery Current
- Supports 48 or 120 VDC Battery Bank System (nominal system voltage)
- Simple & Cost-effective Design (less copper & less labor)
- Wired for 600V (enables the use existing high voltage PV for battery charging, without the need to rewire the installation)
- Optional Accessories Available Include:
  - Ground Fault Protection Device (GFPD-600V)
  - MeterHub™ (HUB-1)
  - Relay Driver (RD-1)
  - DC Disconnect Box (DB-1) - Includes 600VDC PV Disconnect & 48VDC Battery Disconnect
  - Meter (Local or Remote)
    - Universal Meter (UM-1)
    - TriStar™ Remote Meter-2 (TS-RM-2)

