Morningstar’s TriStar MPPT solar controller with TrakStar Technology™ is an advanced maximum power point tracking (MPPT) battery charger for off-grid photovoltaic (PV) systems up to 3kW. The controller provides the industry’s highest peak efficiency of 99% and significantly less power loss compared to other MPPT controllers.

The TriStar MPPT features a smart tracking algorithm that maximizes the energy harvest from the PV by rapidly finding the solar array peak power point with extremely fast sweeping of the entire I-V curve. This product is the first PV controller to include on-board Ethernet for a fully web-enabled interface and includes up to 200 days of data logging.

### Key Features and Benefits

#### Maximizes Energy Harvest
Our TrakStar MPPT Technology features:
- Better peak power point tracking than other MPPT controllers
- Very fast sweeping of the entire I-V curve
- Recognition of multiple power points during shading or mixed PV arrays
- Excellent performance at sunrise and low solar insolation levels

#### Extremely High Reliability
- Robust thermal design and no cooling fans
- Parallel circuit design provides less stress and longer life for electronic components
- No mechanical relays
- Extensive electronic protections including PV short circuit protection
- Epoxy encapsulated inductors and conformally coated printed circuit boards

#### Very High Efficiency
- Peak efficiency of 99%
- Proprietary tracking algorithm minimizes power losses
- Low self-consumption
- Continuous operation at full power to 45°C without need to de-rate
- Selected electronic devices with higher ratings to minimize losses from heating

#### Extensive Networking and 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: connection to a personal computer
- EIA-485: communications between multiple devices on a bus
- Ethernet: fully web-enabled interface to a local network or internet; view from a web browser or send email/text messages.

#### Metering and Data Logging
- Optional TriStar meter and remote meter provides detailed operating data, alarms and faults
- Three LED’s display system status
- Up to 200 days of data logging via meters or communications ports

<table>
<thead>
<tr>
<th>System Status:</th>
<th>53.60V</th>
<th>28C</th>
<th>54.2A</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2867W</td>
<td>MPPT</td>
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<table>
<thead>
<tr>
<th>Data Logging:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today Batt</td>
</tr>
<tr>
<td>46.4Vmin</td>
</tr>
<tr>
<td>Today Solar</td>
</tr>
<tr>
<td>58.9Amax</td>
</tr>
<tr>
<td>Today Solar</td>
</tr>
<tr>
<td>107.2Vmax</td>
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</tbody>
</table>
**Environmental**
- Ambient Temperature: –40°C to +45°C
- Storage Temperature: –55°C to +100°C
- Humidity: 100% non-condensing
- Tropicalization: Epoxy encapsulation, Conformal coating, Marine rated terminals

**Electrical**
- **TS-MPPT-30**, **TS-MPPT-45**, **TS-MPPT-60**
  - Maximum Battery Current: 30 amps, 45 amps, 60 amps
  - Nominal Maximum Solar Input:
    - 12 Volt: 400 Watts, 600 Watts, 800 Watts
    - 24 Volt: 800 Watts, 1200 Watts, 1600 Watts
    - 48 Volt: 1600 Watts, 2400 Watts, 3200 Watts
  - Peak Efficiency: 99%
  - Nominal System Voltage: 12, 24, 36 or 48 volts DC
  - Max. Solar Open Circuit Voltage: 150 volts DC
  - Battery Operating Voltage Range: 8-72 volts DC
  - Maximum Self-consumption: 2.7 Watts
  - Transient Surge Protection: 4500 Watts/port

**Electronic Protections**
- Solar: Overload, Short Circuit, High Voltage
- Battery: High Voltage
- High Temperature
- Lightning and Transient Surges
- Reverse Current at Night

**Battery Charging**
- Charging algorithm: 4-stage
- Charging stages: Bulk, Absorption, Float, Equalize
- Temperature Compensation
  - Coefficient: –5mV/°C/cell (25° ref)
  - Range: –30°C to +80°C
  - Set points: Absorption, Float, Equalize, HVD
- Note: Remote Temperature Sensor is included.

**Mechanical**
- Dimensions: 29.1 x 13.0 x 14.2 cm
- Weight: 4.2 kg / 9.2 lbs.
- Max. Wire Size: 35 mm² / 2 AWG
- Conduit knockouts: M20, ½, 1, 1 ¼ inch
- Enclosure: Type 1 (indoor and vented), IP20

**Communication Ports**
- **TS-MPPT-30**, **TS-MPPT-45**, **TS-MPPT-60**
  - MeterBus: Yes, Yes, Yes
  - RS-232: Yes, Yes, Yes
  - EIA-485: No, No, Yes
  - Ethernet: No, No, Yes

**Options**
- TriStar Meter-2 (TS-M-2)
- TriStar Remote Meter-2 (TS-RM-2)
- Meter Hub (HUB-1)
- Relay Driver (RD-1)

**Certifications**
- CE Compliant
- ETL Listed (UL1741)
- cETL (CSA C22.2 No. 107.1-01)
- FCC Class B Part 15 Compliant
- Complies with (NEC) U.S. National Electric Code
- RoHS Compliant
- Manufactured in a certified ISO 9001 facility

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

**AUTHORIZED MORNINGSTAR DISTRIBUTOR:**

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**MORNINGSTAR**
World’s Leading Solar Controllers & Inverters

www.morningstarcorp.com

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