MORNINGSTAR
World's Leading Solar Controllers & Inverters

TriStar MPPT™

SOLAR CONTROLLER WITH MAXIMUM POWER POINT TRACKING

Product shown with optional meter.

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

System Status:

53.60V	28C	54.2A
2867W		MPPT

Data Logging:

Today Batt 46.4 Vmin	Day: -1 Batt 47.2 Vmin
Today Solar 58.9 Amax	Day: -1 Solar 56.8 Amax
Today Solar 107.2 Vmax	Day: -1 Solar 105.5 Vmax

TRISTAR MPPT™ SOLAR CONTROLLER

TRAKSTAR™ MAXIMUM POWER POINT TRACKING

TECHNICAL SPECIFICATIONS

Electrical

	TS-MPPT-30	TS-MPPT-45	TS-MPPT-60
• **Maximum Battery Current**	30 amps	45 amps	60 amps
• **Nominal Maximum Operating Power***			
12 Volt	400 Watts	600 Watts	800 Watts
24 Volt	800 Watts	1200 Watts	1600 Watts
48 Volt	1600 Watts	2400 Watts	3200 Watts

	TS-MPPT-30, 45 and 60
• **Peak Efficiency**	99%
• **Nominal System Voltage**	12, 24, 36 or 48 volts DC
• **Maximum PV 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

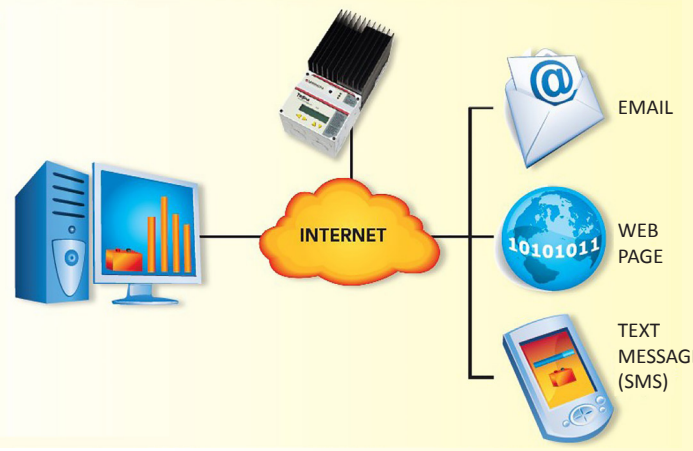
Note: Remote Temperature Sensor is included.

Mechanical

- **Dimensions** 29.1 x 13.0 x 14.2 cm
  11.4 x 5.1 x 5.6 in
- **Weight** 4.2 kg / 9.2 lbs
- **Max. Wire Size** 35 mm² / 2 AWG
- **Conduit knockouts** M20; ½, 1, 1 ¼ in
- **Enclosure** Type 1 (indoor and vented) IP20

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



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 and RoHS Compliant**
- **ETL Listed (UL1741)**
- **cETL (CSA C22.2 No. 107.1-01)**
- **FCC Class B Part 15 Compliant**
- **U.S. National Electrical Code (NEC) 690.5 Compliant**
- **Manufactured in a certified ISO 9001 facility**

*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 (reminder: do not exceed Voc).

**Exceeding Maximum PV Open Circuit Voltage may damage the controller.

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

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