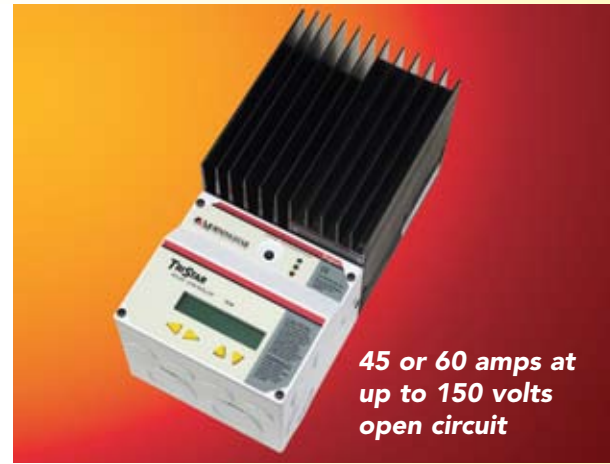


# TriStar MPPT™

## SOLAR CONTROLLER WITH MAXIMUM POWER POINT TRACKING

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.



**45 or 60 amps at  
up to 150 volts  
open circuit**

Product shown with optional meter.

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

## TECHNICAL SPECIFICATIONS

### Electrical

	TS-MPPT-45	TS-MPPT-60
• Maximum Battery Current	45 amps	60 amps
• Nominal Maximum Solar Input	12 Volt 24 Volt 48 Volt	600 Watts 1200 Watts 2400 Watts
		800 Watts 1600 Watts 3200 Watts

### TS-MPPT-45 and TS-MPPT-60

- 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

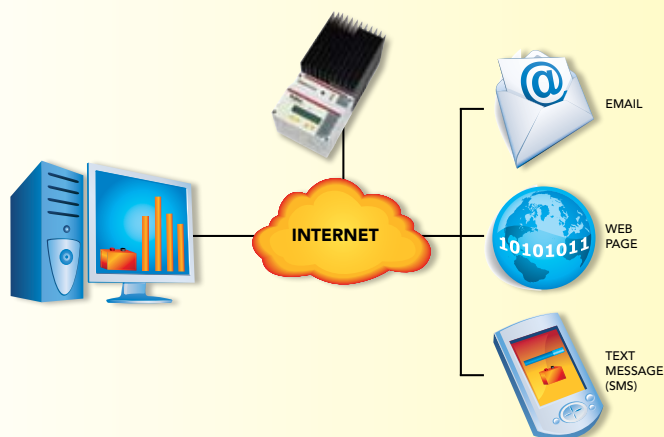
Note: Remote Temperature Sensor is included.

### Mechanical

- Dimensions 29.1 x 13.0 x 14.2 cm  
11.4 x 5.1 x 5.6 inch
- Weight 4.2 kg / 9.2 lbs.
- Max. Wire Size 35 mm<sup>2</sup> / 2 AWG
- Conduit knockouts M20; ½, 1, 1 ¼ inch
- 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-45	TS-MPPT-60
• MeterBus	Yes	Yes
• RS-232	Yes	Yes
• EIA-485	No	Yes
• Ethernet	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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