



TriStar MPPT™

SOLAR CONTROLLER WITH MAXIMUM POWER POINT TRACKING

- Maximizes Energy Harvest
- Extremely High Reliability
- Very High Efficiency
- Extensive Networking

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

OurTrakStar MPPTTechnology 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
- EMC-1: IP based network and internet connectivity

Metering and Data Logging

- TriStar meter and remote meter provides detailed operating data, alarms and faults
- Three LEDs display system status
- Up to 200 days of data logging via meters or communications
 ports

System Status:	53.60V	280	C	54.2A
oystem otatus.	2867W			MPPT
	Today 46.4 Vmin	Batt	Day:-1 47.2 Vmin	Batt
Data Logging:	Today 58.9 Amax	Solar	Day:-1 56.8 Amaz	Solar x
	Today 107.2 Vmax	Solar	Day:-1 105.5 Vma	Solar ax





World's Leading Solar Controllers & Inverters

Technical Specifications

Versions	TS-MPPT-30	TS-MPPT-45	TS-MPPT-60	TS-MPPT-60M
Meter	·`		'	
TS-M2	Optional	Optional	Optional	Included
TS-RM2	Optional	Optional	Optional	Optional
Electrical				
Maximum Battery Current	30 amps	45 amps	60 amps	60 amps
Nominal Maximum Operating Power* 12 Volt 24 Volt 48 Volt	400 Watts 800 Watts 1600 Watts	600 Watts 1200 Watts 2400 Watts	800 Watts 1600 Watts 3200 Watts	800 Watts 1600 Watts 3200 Watts
Peak Efficiency		9	9%	
Nominal System Voltage	12, 24, 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 V	Vatts/port	
Battery Charging				
Charging Algorithm		4-:	stage	
Charging Stages	Bulk, Absorption, Float, Equalize			
Temperature Compensation: Coefficent Range Set Points		–30°C	cell (25° ref) to +80°C pat, Equalize, HVD	
Remote Temperature Sensor (RTS)		Inc	luded	

Communication Ports	TS- MPPT-30	TS- MPPT-45	TS-MPPT-60	TS-MPPT-60M
MeterBus	Yes	Yes	Yes	Yes
RS-232	Yes	Yes	Yes	Yes
EIA-485	No	No	Yes	Yes
Ethernet	No	No	Yes	Yes
EMC-1	Yes	Yes	Yes	Yes

Electronic Protections	
Solar	Overload, Short Circuit, High Voltage
Battery	High Voltage
HighTemperature	
Lightning & Transient Surges	
Reverse Current at Night	

Environmental		
AmbientTemperature	-40°C to +45°C	
Storage Temperature	-55°C to +100°C	
Humidity	100% non-condensing	
Tropicalization	Epoxy encapsulation, Conformal coating, Marine rated terminals	

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
Maximum Wire Size	35 mm² / 2 AWG
Conduit Knockouts	M20; ½, 1, 1 ¼ in
Enclosure	Type 1 (indoor and vented) IP20

ertifications:

- 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
- IEC 62109

ptions:

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

otes:

nput power can exceed Nominal Maxnum Operating Power, but controller Il limit and provide its rated continuous aximum output current into batteries. is will not harm the controller (reminddo not exceed Voc).

Exceeding Maximum PV Open Circuit ltage may damage the controller.

ARRANTY:

ve year warranty period. ontact Morningstar or your authorized stributor for complete terms.