MORNINGSTAR
WORLD'S LEADING SOLAR CONTROLLERS & INVERTERS

MORNINGSTAR
Three Decades
SINCE 1993
THE OFF-GRID EXPERTS

Product Catalog

VERSION 15.7

What's behind “the world’s leading solar controllers and inverters"?

- **The highest reliability in the solar industry:** with the lowest hardware failure rate, Morningstar has truly earned its reputation for the highest level of reliability in the solar industry. That’s backed by more than 4 million solar controllers and components in over 100 countries since 1993. Morningstar is the first choice among leading solar professionals. In fact, new Morningstar customers often tell us “it’s the brand I should have chosen first.”

- **The most cost-effective solar solution:** the direct result of the industry’s highest dependability rate is reduced long-term costs. Morningstar products typically outlast those of our competitors’ in the field— sometimes by a decade or more. Our extreme reliability means far fewer field service calls, which further lowers operational risk and cost. And since we design and engineer our products for maximum efficiency, that translates into more solar electricity available on-site to power applications while also reducing heat in equipment enclosures.

- **The most advanced technology, design and engineering on-board every model:** Morningstar products start with the advantage of faster, “smarter” signal processing and high-grade “overspec’d” components throughout, all optimized by our in-house, proprietary design and engineering. Next, because heat reduces efficiency and product life, we incorporate state-of-the-art thermal design to ensure that there are no fans to fail-- unlike our in-kind competition. The result: products that set new standards for the rest of the industry.

- **Excellence in every product through employee ownership:** as an employee-owned company not only can we afford to be perfectionists, we have to be—because our brand’s reputation is synonymous with our own. We can design and build for the long-term instead of a bottom line. Our determination and spirit of innovation is what gave Morningstar charge controllers their legendary staying power.

The Morningstar Differences

TrakStar MPPT Technology

The industry’s reference standard for maximum efficiency in solar charge control. Morningstar’s proprietary, patented Maximum Power Point Tracking algorithms are so advanced they’ve even been copied—don’t be fooled by imitations! TrakStar technology works by “sweeping” for the maximum power point some hundreds of times faster than competitors’ designs, which greatly reduces lost energy—it more accurately “maps” the full power curve, increasing the total energy harvest. Its ultra-high conversion efficiency is ideal for areas where seasonal, weather and shading conditions cause wide variations in solar “harvesting,” and every Watt counts.

Morningstar PWM Technology

PWM (Pulse-Width Modulation) controllers are simpler than their MPPT counterparts, operating as a switch which “throttles back” solar electricity to prevent battery overcharging. Morningstar builds its PWM controllers to the same exacting high standards as our MPPT models, and as a result they are over-achievers in their class—selected models provide load and diversion control along with battery charging and regulation. PWM technology is ideal for warmer climates with consistent sunlight, minimal shading and no physical space limitations, such as smaller pole-mounted industrial systems with 36 or 72-cell modules.

Fanless Design

Nearly every higher-powered charge controller employs cooling fans to shed excess heat during operation. Except Morningstar—we use fanless design with advanced passive cooling throughout our line, and go to great lengths to avoid moving parts. There are three reasons why. Fans pull in dirt, dust and debris along with air, which can shorten the life of the controller. Fans have moving parts which ultimately can fail, resulting in expensive service calls at the least convenient times. And fans require electricity to run, making them a parasitic drain on the controller’s electricity output. In fact, the inherent unreliability of cooling fans is why some of our competitors exclude them from their full warranty coverage, typically offering only two years on fans. That’s an engineering compromise you’ll simply never have to worry about with a Morningstar.

HazLoc Certifications

Of the many thousands of solar charge controller models from the over 700* brands on the market, only a handful have earned hazardous location certification. Many of them are Morningstars; we now have the widest range of higher-powered controllers rated for HazLoc operations. With HazLoc- rated controllers capable of supporting solar electric systems up to 1100 Watts—including MPPT models enabling larger, more efficient “oversized” systems—Morningstar has emerged as the leader in the field, with both the coveted North American UL/CSA (Class 1/Division 2, Groups A-D) and International/European IECEx/ATEX (Zone 2) hazardous location certifications on selected charge controllers.

Communications Capabilities

Many Morningstar controllers support Simple Network Management Protocol (SNMP), for system communications and network integration, when used with the Morningstar EMC-1 network adapter. This is especially important for SCADA and other industrial operations. Morningstar offers both serial and Ethernet communications using the industry-standard Modbus™ protocol with many different solar controllers including the ProStar™ and TriStar™ lines.

**ENF Solar Trade Platform and Directory of Solar Companies https://www.enfsolar.com*

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Integrated Series

Shown with optional ReadyBlocks installed

MORNINGSTAR INTEGRATEDSERIES

A truly “re-imagined" Morningstar line delivering state-of-the-art power conversion, the Integrated Series represents Morningstar’s most forward-thinking research and development yet, backed by 30 years of leadership in the solar field. Providing the industry with the first fully-integrated solar charging systems, platforms, components and accessories, Integrated Series is designed for system designers who need complete solar charging solutions with everything necessary already built-in: intelligence, communications, and control.

Leading with the revolutionary GenStar MPPT solar DC system controller, Integrated Series components are engineered for seamless compatibility with other Morningstar components such as our new SureSine inverters. Integrated Series provides easy system expandability and a comprehensive suite of software functionality built-in to cover diverse needs in demanding industrial applications.

On the installation and configuration side, the Integrated Series eliminates the need for a complex and clumsy ecosystem of add-on accessories to deliver peak functionality. There’s no need for the typical dongles, additional cabling, or widgets attached to primary components which can add complexity and compromise efficiency.

As seen in:

SOLAR BUILDER · Solar Power World · pv magazine · PES

Introducing GenStar MPPT: the industry’s first fully-integrated Solar DC system controller

Out of the box, GenStar is an overachiever—delivering legendary Morningstar quality, efficiency, power and reliability along with our latest in advanced communications and control technologies. But the GenStar genius doesn't stop there

We asked leading solar professionals for their “wish list” of advanced technologies and capabilities. Then made it easy and cost-effective to add them when needed, through our innovative ReadyRail architecture

The expandable GenStar is fully future-proofed for system needs, today and tomorrow. With three models up to 100A maximum current, GenStar’s ready to bring success to your next critical project

- All-new design with “lithium DNA” and advanced communications/control features
- Oversized PV array input capability along with powerful 30 Amp load control—unique for a controller in this power class
- Full network integration without adapters, wiring or extra equipment needed
- Fanless design for maximum efficiency and reliability

READY|BLOCK

Advanced features can be built-in and fully integrated with exclusive snap-in ReadyBlocks, instead of wired outside the system as accessories:

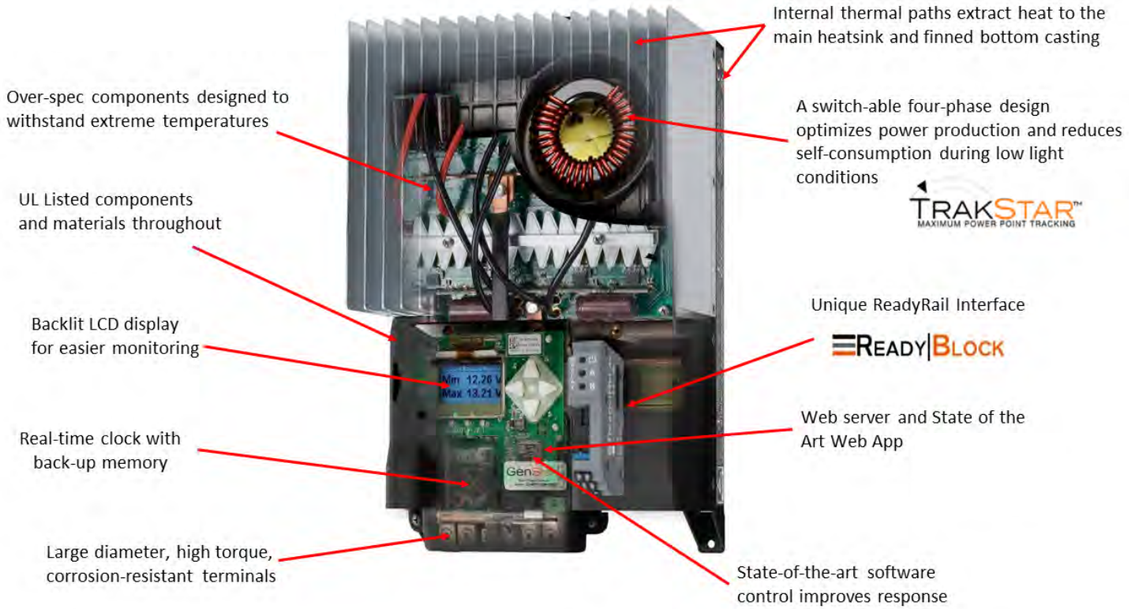
- ReadyShunt– battery metering/monitoring, key metrics including SOC, energy in/out (Amp hours), current measurement for system sources and loads, and more
- ReadyBMS– full communications and control with lithium batteries
- ReadyRelay– signaling (dry contact), advanced load control

With optional ReadyBlocks Installed

MORNINGSTAR INTEGRATEDSERIES
WORLD'S LEADING SOLAR CONTROLLERS & INVERTERS

8 Pheasant Run, Newtown, PA 18940 USA
www.morningstarcorp.com

Inside Look



Flagship of Morningstar's new Integrated Series of components, GenStar MPPT is the industry's first fully-integrated solar DC system controller. An alll-new design incorporating "lithium DNA," in line with the future of energy storage and in keeping with the goal of being a truly "future proofed" platform. All the most requested communication and control features are built-in, without the need for complex and costly add-on wired accessories that can compromise reliability and system integration.

Additional functionality can be easily added when required, thanks to the innovative built in ReadyBlock/ReadyRail system. Simply add the desired ReadyBlock to the ReadyRail. No additional cabling, network configuration or addressing are required, making system integration literally a snap. ReadyBlocks are truly "plug 'n' play, saving installation time and improving reliability while reducing system complexity. Because they physically and electronically become a part of the host component hardware and software, the key features supported by the blocks are instantly available and accessible.

Any firmware updates are also seamless, because the parent/host device (such as a GenStar) will automatically update the block firmware when required and any updates are available.

GenStar™ MPPT Fully-Integrated Solar DC System Controller

60A, 80A or 100A at 200Voc; 30A Load Control

GenStar MPPT™

Morningstar designed GenStar MPPT as the industry's first truly "future-proofed" charging system, one that can grow with a solar powering system as needs change.

- **Powerful Load Control** – built-in 30A load capability, unique for controllers in this power class
- **Full network integration** without requiring adapters or extra equipment– Modbus and ModbusIP via 485, Ethernet, WiFi, MS-CAN connects MS Devices (proprietary), GS network information bridging
- **Oversized PV Array Input capability** – array input power rating @ 150% meets today's system design needs for PV oversizing
- **LiveView 2.0 web app interface on-boar**d. Future communications capabilities (easily added) will include WiFi, and Bluetooth connectivity with a mobile device and app for easy connection, dashboard views, downloading data, firmware updates
- **ReadyBlock expansion system** through exclusive ReadyRail design achieves true controller technology integration– all information is instantly available since it's actually part of the hardware and software of the charge controller itself:
  - » **ReadyShunt –** battery metering/monitoring, key metrics including lead-acid SOC, energy in/out (Amp hours), current measurement for system sources and loads, and more
  - » **ReadyBMS full communications** and control with Tier 2/Closed-Loop lithium battery brands in Morningstar's Energy Storage Partner program
  - » **ReadyRelay –** signaling (dry contact), advanced load control
- **Extensive electronic protections** include cold-weather lithium "fold back" circuitry
- **Fanless design** for improved efficiency and exceptional long-term reliability

Ambient Operating Temperature	-30°C to +45°C (full power); proportional derate to 60°C
Enclosure Rating	IP20
Product Weight	
GS-MPPT-60M-200V	14lb 10oz / 6.63 kg
GS-MPPT-80M-200V	15lb 10oz / 7.09 kg
GS-MPPT-100M-200V	16lb 7oz / 7.46 kg
Unit Shipping Weight	
GS-MPPT-60M-200V	18.5 lbs / 8.39 kg
GS-MPPT-80M-200V	20.0 lbs / 9.07 kg
GS-MPPT-100M-200V	21.0 lbs / 9.52 kg
Dimensions	14.19 x 8.74 x 6.70 in / 360.4 x 222 x 170.2 mm
Warranty	5 years

Certifications

- UL 1741 / CSA 22.2 107-1
- IEC 62109-1
- EMC Directive 2014/30/EU
- ICES-003 (latest std, class B)
- FCC Class B Compliant
- IEC 60950

GenStar MPPT	GS-MPPT-60M-200V	GS-MPPT-80M-200V	GS-MPPT-100M-200V
Maximum Battery Current	60A	80A	100A
Nominal Maximum Output Power			
	Max Output Max PV Input*	Max Output Max PV Input*	Max Output Max PV Input*
12 Volt	800W 1200W	1075W 1600W	1350W 2000W
24 Volt	1600W 2400W	2150W 3200W	2700W 4000W
48 Volt	3200W 4800W	4300W 6400W	5400W 8000W
Nominal Operating Voltage	12-24-48VDc		
Battery Voltage Range	8V - 72V		
PV Input and Battery Max. Wire Size	1/0 AWG all models		

Exclusive ReadyRail and ReadyBlock technology: making system integration a "snap"

READY|RAIL READY|BLOCK

- **The hardware and software solution** for quick, seamless integration of key features into DC Solar Charging and other Morningstar components, including GenStar MPPT
- **Literally a snap**—no additional cabling, network conguration or addressing required. Truly "plug 'n' play"
- **Saves installation time and improves reliability**, while reducing system complexity
- **May be mixed and matched** to support a variety of custom system needs

Up to three (3) ReadyBlocks can be easily added to the ReadyRail standard DIN-mount built into a parent component such as the Morningstar's GenStar MPPT, in any combination. Other planned Morningstar components will accommodate up to six (6) blocks.

READY|SHUNT

RB-SHUNT-KIT-500, RB-SHUNT, SHUNT-500-50

Battery metering/monitoring, key metrics including lead-acid SOC, energy in/out (amp hours), current-measurement for system sources and loads, and more

READY|RELAY

RB-RELAY

Signaling (dry contact), advanced load control

READY|BMS

RB-BMS

Full communications and control (closed-loop operation) with lithium batteries

A series proven by the professionals who depend on it to power their projects

"Morningstar's **high quality, reliable controllers** make them [our] No. 1 partner when supplying power to many of the world's most remote, harshest environments."
~Lukas Geider, JCE Group, provider of (Ex) electrical control systems for hazardous and safe area environments

"The Morningstar TriStar 45A & 60A Controllers are **the best controllers in the world** for diversion load applications…"
~Florin Fleseriu, EcoVolt (Europe)

"Having distributed solar products in Africa for years, I know which manufacturers tend to last and which ones fail. **Morningstar being very much in the "lasting" category.**"
~Lincoln Dahl, African Energy (distributor)

Off-shore platform helideck lighting powered by Morningstar. Courtesy Orga BV

"…I've probably used every model that Morningstar makes at one point or another… In a high-altitude, low-temperature environment with reflective snow cover, the MPPT works incredibly well, providing about 20% to **25% more energy capture…I've measured it side by side…it's astonishing.**"
~Tracy Dahl, polar power expert using Morningstar in Arctic and Antarctic projects

"We have chosen Morningstar products for our off-grid solar photovoltaic solutions deployed at about 2,000 sites in the Middle East… [they have] proved to **be a reliable source of power supply even in the harsh desert conditions.**"
~Agile Europe, provider of system solutions for oil & gas projects throughout the Middle East

"…**We standardised on Morningstar** MPPT solar controllers in our Hazardous Area Zone-certified solar power systems for use in safety-critical power systems for offshore oil and gas assets… with Morningstar, we know we won't have to go back for expensive service calls in the field."
~Remco Vonk, General Manager Asia & Pacific, Orga BV, a global provider of offshore power, helideck lighting, and marine & aviation navigation marking systems for safety-critical infrastructure assets

"**We love Morningstar** and generally use it in most applications. It's very rugged, sturdy equipment… It's important for us to have **tested, proven, reliable components**… "
~Justin Taylor, Sales Manager, Connexa, provider of remote security and surveillance systems

As seen in:

SOLAR BUILDER · Solar Power World · pv magazine · PES

With over 1,600 off-grid inverters* already on the market from our competitors, we had to make sure that our six new ones raised the bar.

Meet the Result

Our new SureSine inverters start with the industrial-grade "over build" quality and precision engineering that made Morningstar the industry leader in off-grid solar over the past three decades. Next, we added our customers' wish list of inverter features and technologies. Finally, we designed-in the performance and safety needed to achieve industry-leading NRTL conformance certifications— unique in this class of inverters.

SureSine is the inverter line our customers asked us to build. And our competitors will wish we hadn't. Multiple DC/AC configurations means there's a SureSine ideal for your next project. Contact Morningstar to learn more www.morningstarcorp.com

Simple Network Management Protocol SNMP COMPATIBLE

- Six all-new inverter models from 150 to 2500 Watts; 120 or 230V output, 12, 24 or 48V DC input options
- Superior industrial-grade design "over built" in the Morningstar tradition, including a low-frequency toroidal transformer for improved sinewave stability
- Engineered for system-level integration with Morningstar charge controllers
- Full communications capabilities: Bluetooth, RS-485, USB. Ethernet, MS-CAN while using MODBUS protocol
- AC hardwire terminal options on selected models
- Fanless convection cooling with extruded aluminum heat sinking, for maximum efficiency and reliability

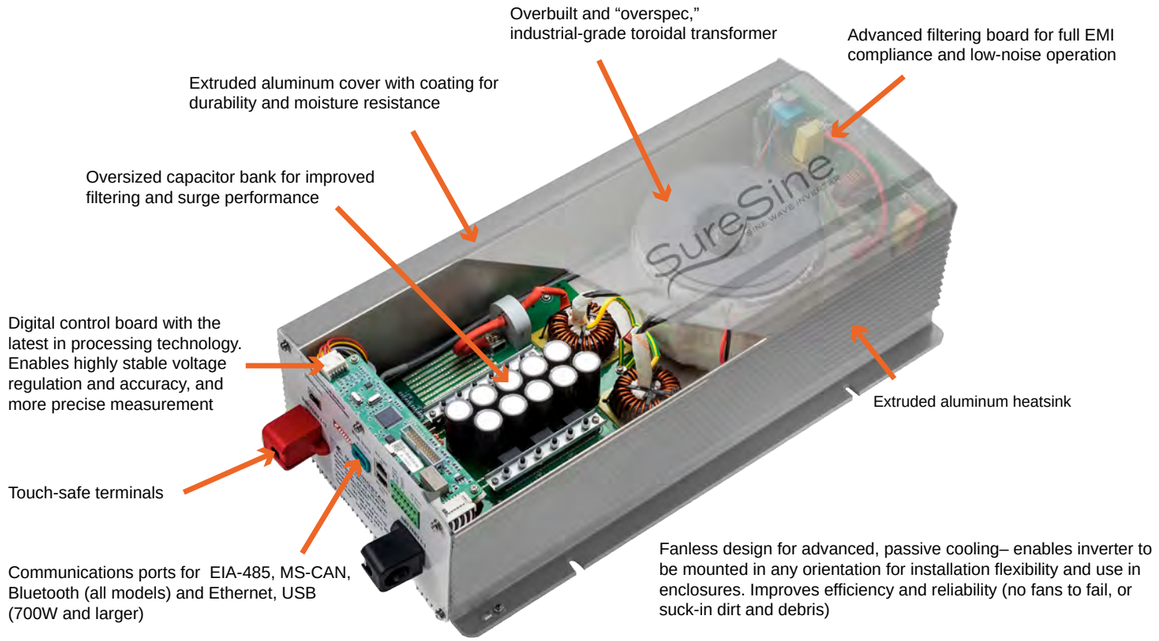
*source: ENF Solar industry company and product directory 2022 https://www.enfsolar.com/pv/inverter

Wireless Android and iOS utility apps included for easy set-up and monitoring with remote devices

MORNINGSTAR PROFESSIONAL SERIES
WORLD'S LEADING SOLAR CONTROLLERS & INVERTERS

8 Pheasant Run, Newtown, PA 18940 USA | www.morningstarcorp.com

Inside Look



SureSine™ Off-Grid Inverters

150-2500W; 120 or 230V output & 12, 24 or 48V DC input options

The new, comprehensive SureSine off-grid inverter line is Morningstar's response to the demand for "a Morningstar of inverters" built to the same high standards as our iconic charge controllers. Six new models from 150-2,500W with 120 or 230V output and 12, 24 or 48V DC input options cover a wide range of applications requiring a high-performance, industrial-grade inverter. The new SureSines come with wireless Android and iOS utility apps and NRTL certification plus an array of AC hardwire remote terminal options.

- **Engineered for system-level integration and communication** with Morningstar charge controllers, for more seamless system design and operation – enables system designers to go "all Morningstar" in projects.
- **Wireless Android and iOS utility apps** for set-up and monitoring with remote devices, plus Bluetooth communications.
- **AC options include:** hard-wire terminals for all markets and power levels, Type B for North America 150, 300, and 700W versions, and Universal for International 150, 300, and 700W versions).
- **Industrial-grade quality throughout,** built on premium toroidal transformers for improved sinewave stability. Designed for the most demanding off-grid mission-critical installations.
- **Superior thermal performance with fanless design means higher reliability** – for example, the 300W model doesn't derate until 45◦C and delivers 200W at 60◦C. The small 150W model doesn't derate even at 60◦C! That's outstanding performance in their power classes.
- **Full communications capabilities include**: RS485, USB, Ethernet, MS-CAN, Bluetooth while using industry-standard MODBUS protocol.

Certifications

- IEC 62109-1
- IEC 62109-2
- IEC 62368-1(pending)
- UL 1741, UL 458 (pending)

SureSine	SureSine 150	SureSine 300	SureSine 700
Rated Battery Voltage	12, 24 or 48V	12, 24 or 48V	12, 24 or 48V
Min. Battery Operating Voltage	10.5 / 21.0 / 42.0 V		
Max. Battery Operating Voltage	16.5 / 33.0 / 66.0 V		

SureSine	SureSine 1000	SureSine 1250	SureSine 2500
Rated Battery Voltage	24 or 48V	24 or 48V	48V
Min. Battery Operating Voltage	10.5 / 21.0 / 42.0 V		
Max. Battery Operating Voltage	16.5 / 33.0 / 66.0 V		

SureSine™ Classic Inverter

300 W; 12 Vdc input, 115 or 220 Vac output

SureSine Sine Wave Inverter

Simple Network Management Protocol SNMP COMPATIBLE

"...how all inverters should be made. Thank you, Morningstar"

Compact, powerful and proven in demanding rural electrification and other demanding projects around the globe, the SureSine Classic inverter is the right tool for DC to AC power conversion in small residential, mobile and recreational, and light industrial applications where environmental extremes are a consideration. A cast, anodized aluminum enclosure and encapsulated circuitry —plus an effectively sealed, fanless design-- ensure long-term, dependable operation under the harshest conditions.

- **Improved load operation –** Pure sine wave provides quality AC equivalent to grid power. Toroidal transformer design generates good wave form throughout the range of input voltages. Handles 200% surge up to 600W.
- **High reliability –** No internal cooling fan or other moving parts. Uses epoxy encapsulation, conformal coating, stainless steel hardware and an anodized aluminum enclosure to protect against harsh tropical and marine environments.
- **More power available –** High efficiency and low self consumption maximizes power to the loads. Automatic stand-by reduces consumption during no load conditions.
- **Speaks Modbus, and SNMP** with the optional EMC-1 adapter

Ambient Operating Temperature	-40 °C TO +45 °C -40 °F TO +113 °F
Terminal	35 mm^2 / 2 AWG
Product Weight **Unit Shipping Weight**	4.5 kg / 10 lbs 5.2 kg / 11.5 lbs
Dimensions	21.3 x 15.2 x 10.5 cm 8.4 x 6.0 x 4.1 in
Warranty	2 years

Certifications

- CE, RoHS and REACH Compliant
- ETL Listed (UL 458) - 115V version ONLY
- FCC Title 47 (CFR), Part 15 Subpart B for Class B Device
- EN 60950-1+A11:2001, rev. 4/4/04
- Manufactured in a Certified ISO 9001 Facility

SureSine inverter being used in a tropical marina dock-side power application

SureSine	SI-300-115V-UL	SI-300-220V
Continuous Power Rating	300W @ 25 °C	300W @ 25 °C
Peak Power Rating (10 minutes)	600W @ 25 °C	600W @ 25 °C
DC Input System Voltage	10.0 - 15.5V	10.0 - 15.5V
Waveform	Pure Sine Wave	Pure Sine Wave
AC Output Voltage (RMS)	115 Vac +/- 10%	220 Vac +/- 10%
AC Output Frequency	60 Hz +/- 0.1%	50 Hz +/- 0.1%

Options	All Versions	
Remote Meter (RM-1)	Yes	Yes
PC MeterBus Adapter (MSC)	Yes	Yes
Relay Driver (RD-1)	Yes	Yes
EIA-485 Adapter (RSC-1)*	Yes	Yes
Ethernet Meterbus Converter (EMC-1)	Yes	Yes

* The EIA-485/RS-232 Adapter can be used in conjunction with the PC Meter-Bus Adapter to enable the SureSine to communicate over a 485 network.

TriStar™ Charge Controllers

Our iconic, industry-leading design for larger (up to 4.2kW) engineered systems. TriStars are used around the globe in some of the most challenging critical power situations imaginable—in explosion-proof containers and powering helideck lighting on off-shore oil and gas platforms, for example. In fact, TriStars are often spec'd-in to replace lesser charge controllers in those and other mission-critical applications to ensure against system failure and expensive service calls. As some of our users tell us, “it’s the brand I should have bought the first time.”

TriStar models offer parallel scalability for charging and load control to achieve system power ratings of up to 45kW, making them ideal for large hybrid system design. They also boast the highest peak efficiency for off-grid controllers in the industry, up to 99%. TriStar MPPT models incorporate TrakStar solar harvesting technology; PWM versions provide charging plus load and diversion control.

TriStar’s unique footprint and advanced thermal management with fanless design make them ideal for enclosing in tight spaces, including explosion-proof containers. The success of the TriStar as an industry standard is due to our “ground up” approach in its design—including the new manufacturing technology required to create its uniquely tapered heat sink for perfect heat dissipation.

“...one of the best charge controllers out there...these things are tanks.”

“It is a Morningstar, what do you expect! It is great."

Inside Look

Aluminum Heat Sink
Highly-conductive, precision extruded heat sink with tapered fins (made with new manufacturing technology). Eliminates the need for cooling fans, improves efficiency, increases reliability

DirectFET™ MOSFET Premium Power Devices
For superior internal heat transfer and array isolation

Rigid, Cast Aluminum Inductor Housing

Triple Converter Design
Helps achieve industry-leading efficiency– each 20 Amp conversion “engine” kicks-in only when needed (part of the “tri” in TriStar)

Triple design turns on/off the 3 phases sequentially to maximize efficiency and save energy when it's needed most (cloudy days)

Heavy Duty Copper Coils
3-inductor energy storage section with sealed, precision-wound, heavy duty copper coils, one for each charging phase (more of the “tri” in TriStar)

Higher Grade Copper “Pour”
Resists excessive heat on circuit boards

Over-Spec Components
For maximum performance and durability under the most extreme temperatures and conditions

Patented FET Spring
Ensures even, positive contact between heat-producing components and heatsink, improving thermal handling

Multi-Layer Electronic Protection Circuitry

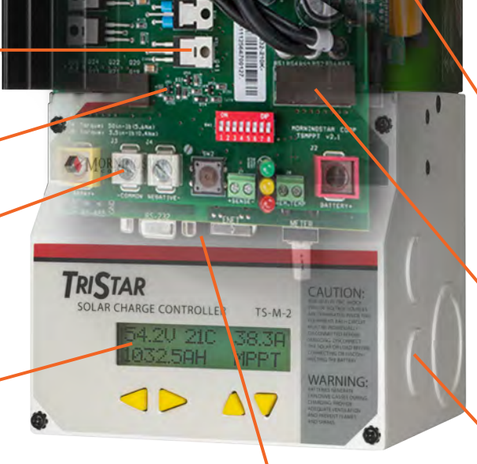
Purer Signal Path
Soldered, "connectorless" board interconnects provide a purer signal path with no weak points to fail

Large Diameter High Torque, Corrosion-Resistant Terminals

State-of-the-Art Control Software
Improves response

Backlit LCD Display
For easier monitoring

Powder-Coated Steel Enclosure
For durability



TRAKSTAR™ MAXIMUM POWER POINT TRACKING

Morningstar's acclaimed TrakStar technology ensures the highest yield possible from the solar array

5-year warranty (2 1/2 times longer than many competitors)

Communications Data Port
Speaks Modbus, and SNMP (with the EMC-1 adapter)

Simple Network Management Protocol SNMP COMPATIBLE

Modbus

TriStar MPPT™ 600V Controller

60A at up to 600Voc

TriStar MPPT

TRAKSTAR™ MAXIMUM POWER POINT TRACKING

Simple Network Management Protocol SNMP COMPATIBLE

The TriStar MPPT 600V (TS-MPPT-600V) is a breakthrough in charge controller design. By accepting PV array input up to 600 Voc, it enables installers to design systems with longer and fewer strings, reducing cabling and hardware which make installation and wiring easier and faster. Morningstar's advanced digital engineering combined with superior thermal management make the TS-MPPT-600V with TrakStar technology the only charge controller in its class that doesn't require cooling fans, making it both extremely reliable and efficient (with 97.9% peak efficiency). Available in three versions:

- TS-MPPT-60-600V-48: Standard
- TS-MPPT-60-600V-48-DB: with Disconnect Box
- TS-MPPT-60-600V-48-DB-TR: with DC Transfer Switch

Noteworthy features

- Accommodates PV systems > 150 Voc with long wire runs from the array to the controller.
- Uses Morningstar's patented 4-stage charging algorithm to optimize battery health.
- Features extensive system networking, monitoring and communications.
- Optimized for harsh environments and equipped with electronic protections.
- Enables battery back-up for grid-tied systems using more efficient DC-coupling system topology (as opposed to AC-coupling).

Ambient Operating Temperature	40 °C to +45 °C -40 °F to +113 °F
Power Terminals	2.5 mm^2–35 mm^2 14 AWG–2 AWG
Product Weight TS-MPPT-60-600V-48 TS-MPPT-60-600V-48-DB TS-MPPT-60-600V-48-DB-TR	 8.98 kg / 19.8 lbs 12.3 kg / 27.1 lbs 12.75 kg / 28 lbs
Unit Shipping Weight TS-MPPT-60-600V-48 TS-MPPT-60-600V-48-DB TS-MPPT-60-600V-48-DB-TR	 9.9 kg / 21.7 lbs 12.3 kg / 27.1 lbs 13.0 kg / 28.7 lbs
Dimensions Standard Box DC Disconnect Box	 39.2 x 22.1 x 14.9 cm 15.4 x 8.7 x 5.9 in 54.2 x 22.1 x 14.9 cm 21.4 x 8.7 x 5.9 in
Warranty	5 years

Certifications

- CE, RoHS and REACH Compliant
- IEC 62109
- ETL Listed [UL-1741 and Canadian CSA C22.2 No. 107.1.01]
- EMC Compliance
- FCC Class B Part 15 Compliant
- U.S. National Electrical Code (NEC) Compliant
- Manufactured in a Certified ISO 9001 Facility

TriStar MPPT 600V	All Versions
Maximum Battery Current	60A
Nominal Maximum Operating Power*	3200Wp, 48 Volt
Maximum Open Circuit Voltage	600V
Battery Operating Voltage Range	16 - 72 Vdc
Nominal System Voltage	48 Vdc custom programmable to 24V, 36V and 60V
PV Input Operating Voltage Range	100V to Voc = 525V
Hydro Input Operating Voltage Range	Battery Voltage to 500V

*** 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.**

Options	All Versions
Ground Fault Protection Device (GFPD-150V and GFPD-600V)	Yes
MeterHub (HUB-1)	Yes
Relay Driver (RD-1)	Yes
TriStar Meter-2-600V (TS-M-2-600V)	Yes
TriStar Remote Meter-2 (TS-RM-2)	Yes
Ethernet MeterBus Converter (EMC-1)	Yes
Remote Temperature Sensor (RTS)	Included

TriStar MPPT™ Controller

30A, 45A or 60A at up to 150 Voc

TriStar MPPT

TRAKSTAR™ MAXIMUM POWER POINT TRACKING

Simple Network Management Protocol SNMP COMPATIBLE

Advanced maximum power point tracking controller for larger off-grid photovoltaic (PV) energy systems up to 4.2 kW. TriStars have been proven in solar installations around the globe and remain the first choice for designers of mission-critical systems where failure is not an option.

- **Maximizes energy harvest** – superior peak power tracking over conventional MPPT controllers.
- **Highest peak efficiency** for off-grid controllers in the industry, up to 99%.
- **Built for reliability and performance,** with an oversized heatsink and over-spec'd components. Fully-rated for operation at temperatures up to 45◦C.
- **Extensive networking and communications** features enable system monitoring, data logging, and adjustability.
- **On-board RS-232 port included on all models;** Ethernet included on all 60A models.
- **Extensive electronic protections** include short-circuit, over-current and reverse polarity to ensure the controller will not be damaged by wiring mistakes or overloads.
- **Fanless design** for long-term reliability.

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Terminals	35 mm^2 / 2 AWG
Product Weight TS-MPPT-30 TS-MPPT-45 TS-MPPT-60 TS-MPPT-60M	 3.6 kg / 8 lbs 3.6 kg / 8 lbs 4.1 kg / 9 lbs 4.3 kg / 9.4 lbs
Unit Shipping Weight TS-MPPT-30 TS-MPPT-45 TS-MPPT-60 TS-MPPT-60M	 4.5 kg / 9.9 lbs 4.5 kg / 9.9 lbs 5.0 kg / 11 lbs 5.2 kg / 11.4 lbs
Dimensions	29.1 x 13.0 x 14.2 cm 11.4 x 5.1 x 5.6 in
Warranty	5 years

Certifications

- CE, RoHS and REACH Compliant
- IEC 62109
- ETL Listed [UL-1741 and Canadian CSA C22.2 No. 107.1.01]
- EMC Compliance
- FCC Class B Part 15 Compliant
- U.S. National Electrical Code (NEC) Compliant
- Manufactured in a Certified ISO 9001 Facility

TriStar MPPT	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
Maximum Battery Current	30A	45A	60A	
Nominal Maximum Output Power*				
12V 24V 48V	400Wp 800Wp 1600Wp	600Wp 1200Wp 2400Wp	Max Output 800Wp 1600Wp 3200Wp	Max PV Input* 1100Wp 2100Wp 4200Wp
Max Recommended Solar PV Input*	~ 130% of Nominal Max Ouput Power (60 Amp models shown above)			
Nominal System Voltage	12, 24, or 48V DC			

*** The PV array power rating may exceed the controller's Max Nominal Output Power specification. The controller will limit battery current and prevent damage. Array oversizing should be considered on a case by case basis. See our array string sizer tool and related tech documentation.** https://www.morningstarcorp.com/array-oversizing

Options	TS MPPT-30	TS MPPT-45	TS MPPT-60	TS MPPT-60M
TriStar Meter-2 (TS-M-2)	Yes	Yes	Yes	Pre-installed
TriStar Remote Meter 2 (TS-RM-2)	Yes	Yes	Yes	Yes
MeterHub (HUB-1)	Yes	Yes	Yes	Yes
Ethernet Port	No	No	Included	Included
EIA-485 Adapter (RSC-1)	Yes	Yes	Included	Included
Remote Temperature Sensor (RTS)	Included	Included	Included	Included
Ground Fault Protection Device (GFPD-150V and GFPD-600V)	Yes	Yes	Yes	Yes
Ethernet MeterBus Converter (EMC-1)	Yes	Yes	Yes	Yes

TriStar™ Controller
45A or 60A at 12-48V

TriStar PWM

Three-function PWM controller for larger systems, providing reliable PWM solar battery charging or load control or diversion regulation.

- **Built for reliability and performance,** with an oversized heatsink and over-spec'd components. Fully-rated for operation at temperatures up to 45◦C.
- **More information with LED indicators.** Optional meter displays extensive system and controller information in five languages; automatic self-test and reset.
- **Communications capability** with RS-232 port, connects to a PC for custom settings, data logging, remote monitoring and control.
- **Fully adjustable** with DIP switches for seven digital presets. Additional custom setting via RS-232.
- **Extensive electronic protection** against reverse polarity, short circuits, overcurrent and excessive temperature.
- **Fanless design** for long-term reliability.

Simple Network Management Protocol SNMP COMPATIBLE

"I like to use Morningstar because it's really robust and reliable."

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Terminal	35 mm² / 2 AWG
Product Weight TS-45 TS-60 TS-60M	 1.6 kg / 3.5 lbs 1.6 kg / 3.5 lbs 1.8 kg / 4 lbs
Unit Shipping Weight TS-45 TS-60 TS-60M	 2.0 kg / 4.4 lbs 2.0 kg / 4.4 lbs 2.2 kg / 4.8 lbs
Dimensions	26.0 x 12.7 x 7.1 cm 10.3 x 5.0 x 2.8 in
Warranty	5 years

Certifications

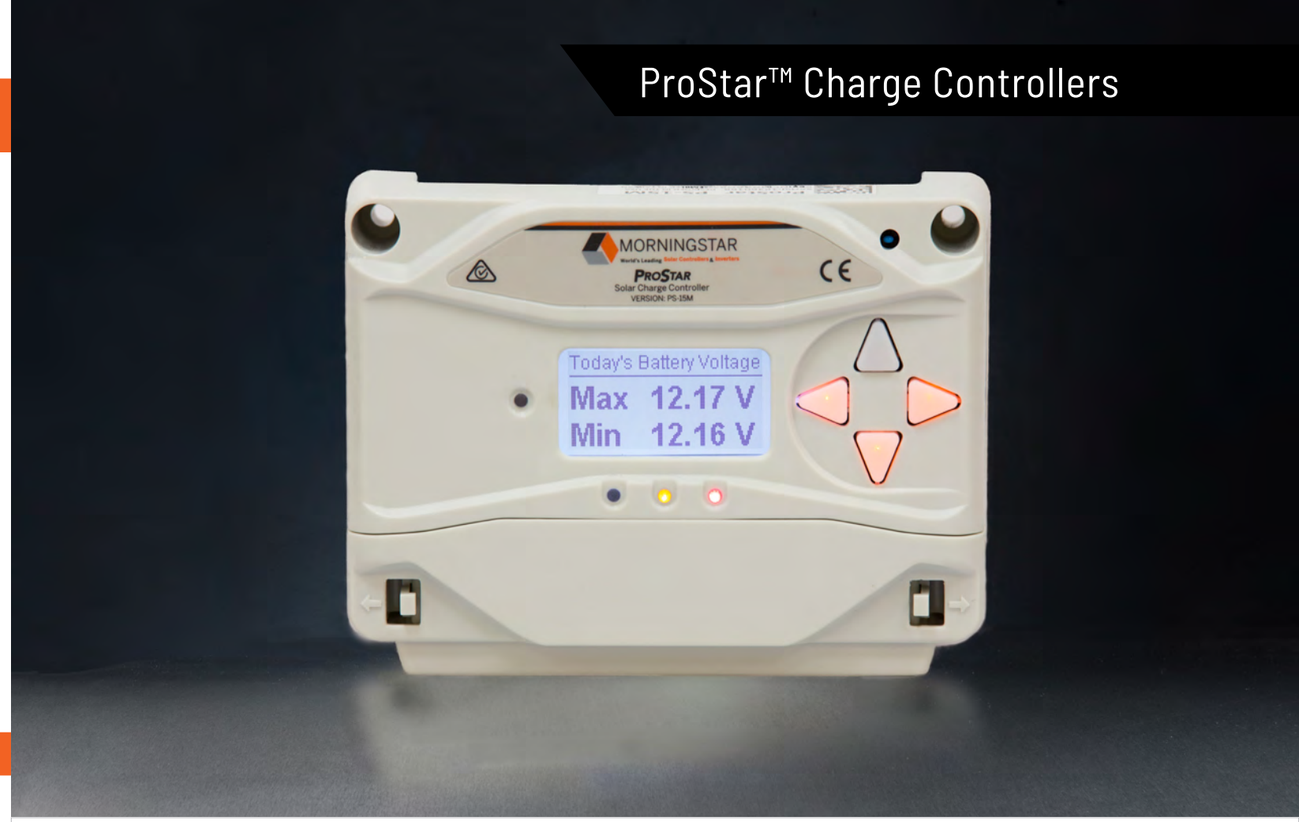
- CE, RoHS and REACH Compliant
- IEC 62109
- ETL Listed [UL-1741 and Canadian CSA C22.2 No. 107.1.01]
- EMC Compliance
- FCC Title 47 (CFR), Part 15 Subpart B for Class B Device
- Manufactured in a Certified ISO 9001 Facility

TriStar	TS-45	TS-60	TS-60M
Rated Solar, Load or Diversion Current	45A	60A	60A
Nominal Maximum Output Power*	12, 24 or 48 Vdc		

Options	TS-45	TS-60	TS-60M
TriStar Meter-2 (TS-M-2)	Yes	Yes	Pre-installed
TriStar Remote Meter-2 (TS-RM-2)	Yes	Yes	Yes
MeterHub (HUB-1)	Yes	Yes	Yes
EIA-485 Adapter (RSC-1)	Yes	Yes	Yes
Remote Temperature Sensor (RTS)*	Yes	Yes	Yes
Ground Fault Protection Device (GFPD-150V and GFPD-600V)	Yes	Yes	Yes

*** Required for temperature compensated charging. Not included.**

ProStar™ Charge Controllers



Morningstar controllers powering Marine Aids to Navigation Light Stations in Papua New Guinea, proven in over 10 years of use in this harsh tropical environment

"...you get what you pay for, and this one is worth every penny ... count on Morningstar."

Proven in over two decades of use-- yet continually improving—ProStar is unique in the industry as both "the legend and the latest in the same product." As a result, ProStars have both decades of experience behind them and reflect the latest in charge controller technology.

An advanced mid-range controller capable of powering oversized systems up to 1400W, ProStar MPPT has TrakStar technology for maximizing solar harvesting. The MPPT and PWM models are now further distinguished as one of the most powerful solar controller choices available for North American and International/ European hazardous location (HazLoc) installations, with both UL/CSA and IECEx/ATEX certification. This enables solar professionals to successfully design even larger remote powering solutions for critical industrial applications requiring HazLoc safety certifications.

All models incorporate Morningstar's hallmark fanless design for long-term reliability, and all ProStar controllers "speak" Modbus, and SNMP (with the optional EMC-1 adapter) for communications and networking integration.

Inside Look

High-frequency design
Combined with our premium, “over-spec’d” components, this greatly improves control response which does a lot for the entire system: controls system transients, avoids regulation overshoot, and provides overcurrent/overload protection

TrakStar™
Morningstar’s hallmark MPPT technology precisely seeks and locks onto the true maximum power point quickly and accurately, to ensure you get the most output possible from your solar array

Cooling Fan
Just kidding. We’ve never needed them

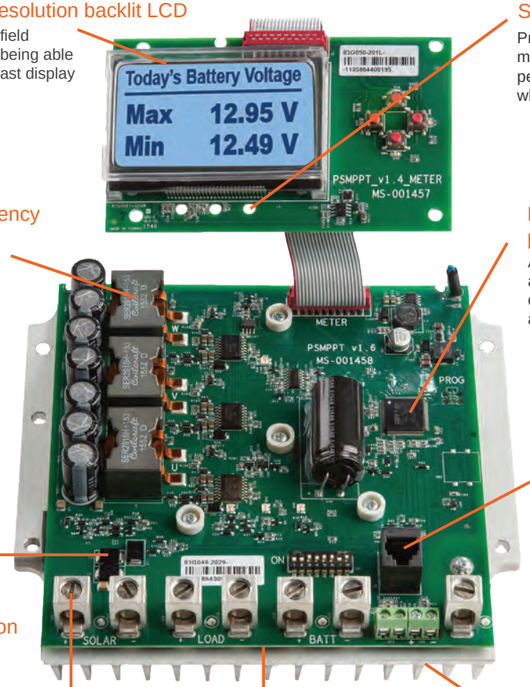
Lexan polycarbonate UL listed case
Protects the precision electronics inside with an impact strength 30 times greater than the acrylic thermoplastics commonly used in lesser controllers

Lithium foldback
Lithium batteries are expensive and vulnerable to cold temperatures. When it gets close to freezing, the controller backs off charging to avoid damaging the batteries

5 year warranty
Up to 2 ½ times longer than some competitors in this class. No surprise there—when you build something this well, you’re willing to back it for the long-haul

Large format, high-resolution backlit LCD
When you’ve been in the field installing, you appreciate being able to read a crisp, high contrast display on site

Self-diagnostics
ProStar is smart enough to monitor and analyze system performance, and alert you when you need to know



Premium high-frequency CoilCraft surface mount inductors
They’re worth it, because they allow the faster power “tracking” that lets us build this much power and control into such a compact footprint

High-speed ARM processor
All-digital calibration for high accuracy, using the same efficient technology found in advanced mobile devices

Multi-function data port with serial/meter auto-detect
“Talks solar” with standard industry language, to ensure compatibility in a system

Built-in 4500W Transient Voltage Surge Suppression for lightning protection
Nature, do your worst — this controller can take it

Large diameter, high torque, corrosion resistant terminals
If you’ve ever trashed a lesser terminal during an installation, you’ll appreciate a bit of “overkill” here

DirectFET™ MOSFET power devices
This allows us to surface-mount these critical components underneath the main board, next to the heat sink, reducing the distance the heat has to travel to keep the controller even cooler

Highly-conductive aluminum heatsink extrusion
As opposed to cast aluminum, which is less effective in passive cooling applications

ProStar™ MPPT Controller
25A or 40A at up to 120 Voc

With optional wirebox

TRAKSTAR™ MAXIMUM POWER POINT TRACKING

Simple Network Management Protocol SNMP COMPATIBLE

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Wire Size Range	Power terminals: 2.5 - 16 mm2 / #14 - 6 AWG (up to #2 AWG with Wire Box)
Product Weight **Unit Shipping Weight**	1.4 kg / 3.1 lbs 1.9 kg / 4.2 lbs
Dimensions	20 x 19.3 x 7 cm 7.9 x 7.6 x 2.8 in
Warranty	5 years

Certifications
- CE and RoHS Compliant
- IEC 62109
- ETL Listed [UL-1741 and Canadian CSA C22.2 No. 107.1.01]
- FCC Class B Part 15 Compliant
- Manufactured in a Certified ISO 9001 Facility
- UL/CSA Class 1, Division 2, Groups A-D for North America
- IECEx/ATEX for Zone 2 International and European use

ProStar MPPT

The ProStar MPPT solar controller is an advanced maximum power point tracking (MPPT) battery charger for off-grid photovoltaic (PV) systems with PV array max power (Pmp) up to 1400 watts.

- **Maximizes energy harvest –** superior peak power tracking over conventional MPPT controllers.
- **Custom programmable –** with or without a computer.
- **Advanced self-diagnostics –** warns against installation errors.
- **Data logging -** up to 256 days of detailed power & load data.
- **Automatic Lighting Control** – multi-event load control provides powerful options for PV lighting systems.
- **Extensive electronic protections** include short-circuit, over-current and reverse polarity to ensure the controller will not be damaged by wiring mistakes or overloads.
- **Fanless design** for long-term reliability.
- **Ideal for Oil & Gas** and other industrial applications requiring hazardous location (HazLoc) approvals. Certifications include UL/CSA Class 1, Division 2, Groups A-D for North America, and IECEx/ATEX for Zone 2 International and European use.

ProStar MPPT	PS-MPPT-25	PS-MPPT-25M	PS-MPPT-40	PS-MPPT-40M
Maximum Battery Current	25A	25A	40A	40A
Nominal Maximum Output Power / Max Recommended Solar PV Input*				
12 volt battery 24 volt battery	350W 700W	440W 880W	550W 1100W	700W 1400W
Maximum PV Open Circuit Voltage (Voc)	120 Volts (without damage to unit)			
Nominal Battery Voltage	12V or 24V			

***The PV array power rating may exceed the controller’s Max Nominal Output Power specification (< 130% recommended). The controller will limit battery current and prevent damage. Array oversizing should be considered on a case by case basis. See our array string sizer tool and related tech documentation.**

https://www.morningstarcorp.com/array-oversizing.

Options	PS-MPPT-25	PS-MPPT-25M	PS-MPPT-40	PS-MPPT-40M
Digital Meter	No	Included	No	Included
Remote Meter (RM-1)	Yes	Yes	Yes	Yes
Remote Temperature Sensor (RTS)	Yes	Yes	Yes	Yes
MeterHub (HUB-1)	Yes	Yes	Yes	Yes
Wire Box (PS-MPPT-WB)	Yes	Yes	Yes	Yes
PC Meterbus Adapter (MSC)	Yes	Yes	Yes	Yes
USB MeterBus Adapter (UMC-1)	Yes	Yes	Yes	Yes
Ethernet MeterBus Converter (EMC-1)	Yes	Yes	Yes	Yes

ProStar™ Controller

15A or 30A at 12/24V

ProStar PWM

Simple Network Management Protocol SNMP COMPATIBLE

Mid-range PWM solar charge controller for both professional and consumer applications, incorporating legendary ProStar design and performance.

- **Longer battery life** through 4-stage charging and temperature compensation. Constant voltage PWM series regulation. Choice of three battery types. Voltage-sense terminals for more accurate battery monitoring.
- **More information** with three battery-level LED indicators. Optional meter includes safety disconnect and displays amps, volts, temperature and self-test.
- **Extensive electronic protection** against reverse polarity, reverse current at night, short circuits, overcurrent and excessive temperature. No mechanical fuses.
- **Fanless design** for long-term reliability.
- **Ideal for Oil & Gas** and other industrial applications requiring hazardous location (HazLoc) approvals. Certifications include UL/CSA Class 1, Division 2, Groups A-D for North America, and IECEx/ATEX for Zone 2 International and European use.

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Wire Size Range	Power terminals: 2.5 - 16 mm2 / 14 - 6 AWG
Product Weight	
PS-15	0.3 kg / 0.86 lbs
PS-15M	0.4 kg / 0.9 lbs
PS-30	0.3 kg / 0.86 lbs
PS-30M	0.4 kg / 0.9 lbs
Unit Shipping Weight	
PS-15	0.6 kg / 1.4 lbs
PS-15M	0.7 kg / 1.6 lbs
PS-30	0.6 kg / 1.4 lbs
PS-30M	0.7 kg / 1.6 lbs
Dimensions	15.3 x 10.5 x 5.5 cm 6.01 x 4.14 x 2.17 in
Warranty	5 years

Certifications

- CE, RoHS and REACH Compliant
- IEC 62109
- Manufactured in a Certified ISO 9001 Facility
- FCC Part-15 Class B Compliant
- UL/CSA Class 1, Division 2, Groups A-D for North America
- IECEx/ATEX for Zone 2 International and European use

	PS-15	PS-15M	PS-30	PS-30M
Rated Solar Current	15A	15A	30A	30A
Rated Load Current *	15A	15A	30A	30A
Nominal System Voltage	12/24 Vdc			

Options	PS-15	PS-15M	PS-30	PS-30M
Digital Meter	No	Included	No	Included
Remote Meter (RM-1)	Yes	Yes	Yes	Yes
Ethernet MeterBus Converter (EMC-1)	Yes	Yes	Yes	Yes
Remote Temperature Sensor (RTS)	Yes	Yes	Yes	Yes
Ground Fault Protection Device (GF-PD-150V and GFPD-600V)	Yes	Yes	Yes	Yes

*** Low voltage disconnect included on all ProStar controllers.**

SunSaver™ Charge Controllers

SunSavers in remote powering system by Deka Solar and Ameresco, Eagle Ford Shale site in Texas

"...This is the only one I'd use... it's the one I wish I'd bought first"

"The single most successful charge controller in the solar industry," Morningstar's legendary SunSaver earned its place through its proven performance, exceptional build quality, and outstanding reliability . Since its introduction in 1998, over 1.5 million SunSaver controllers have served as standard solar equipment in the most demanding installations in oil & gas operations and other industrial applications around the globe. Most are still in use—a testimonial to the built-in excellence and longevity of their design.

The SunSaver MPPT with TrakStar technology is the perfect charging solution for smaller off-grid solar systems up to 520W. The hardened, tropicalized PWM version is the industry's leading controller for extreme environments, and provides load control.

The MPPT version speaks Modbus, and SNMP with the optional EMC-1 adapter. Both versions are now rated for world-wide use in Hazardous Locations, with UL/CSA for North America and IECEx/ATEX for International and European applications.

Inside Look

High-frequency circuit design
Improves control response and guards against system transients, regulation overshoot, and overcurrent/overload conditions

Self-diagnostics
Monitor and analyze system performance

TrakStar MPPT technology
Ensures the maximum output possible from the solar array

Hazardous location rating
UL/CSA Class 1, Division 2, Groups A-D for North America; IECEx/ATEX for Zone 2 International and European use. Ideal for oil & gas and other industrial environments

Advanced electronic protection
Includes on-board surge protection

High-torque, marine-rated corrosion-resistant terminals
Make installation easier and ensure long-term connection integrity

Extruded aluminum heat sink
Provides superior thermal management and eliminates the need for a cooling fan

Speaks Modbus, and SNMP
(with the EMC-1 adapter)

Simple Network Management Protocol SNMP COMPATIBLE
Modbus

Hazardous location rating
UL/CSA Class 1, Division 2, Groups A-D for North America; IECEx/ATEX for Zone 2 International and European use. Ideal for oil & gas and other industrial environments

Self diagnostics
Monitor and analyze system performance

Hardened for field use
Through a combination of anodized aluminum enclosure, epoxy encapsulation, marine-rated terminals and high-impact plastics

High-torque, marine-rated corrosion-resistant terminals
Make installation easier and ensure long-term connection integrity

Advanced electronic protection
Includes on-board surge protection

Extruded aluminum cover with built-in heat sink
Provides superior thermal management and eliminates the need for a cooling fan

Epoxy encapsulation
Unique, premium formula with high thermal conductivity and low electrical conduction; protects internal electronics in extreme conditions

SunSaver™ MPPT Controller
15A at up to 60Voc

TRAKSTAR™ MAXIMUM POWER POINT TRACKING

Simple Network Management Protocol SNMP COMPATIBLE

An industrial-grade design proven in challenging applications, the SunSaver MPPT with TrakStar technology is the perfect solar charging solution for off-grid systems up to 520W.

- **Maximum power point tracking (MPPT)** optimally matches the solar array to the battery—no wasted PV electricity.
- **Use of high voltage modules –** In addition to 12V crystalline modules, enables use of high voltage modules for off-grid battery charging.
- **Converts 36V or 24V arrays** for use with either a 24V or 12V battery.
- **Automatic Lighting Control –** four programmable timer sequences for PV lighting applications using MSView.
- **Extensive electronic protections** include short-circuit, over-current and reverse polarity to ensure the controller will not be damaged by wiring mistakes or overloads.
- **Ideal for Oil & Gas** and other industrial applications requiring hazardous location (HazLoc) approval. Certifications include UL/CSA Class 1, Division 2, Groups A-D for North America, and IECEx/ATEX for Zone 2 International and European use.

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Terminal	16 mm^2 / 6 AWG
Product Weight **Unit Shipping Weight**	0.60 kg / 1.3 lbs 0.7 kg / 1.6 lbs
Dimensions	16.9 x 6.4 x 7.3 cm 6.6 x 2.5 x 2.9 in
Warranty	5 years

Certifications

- CE, RoHS and REACH Compliant
- IEC 62109
- ETL Listed [UL-1741 and Canadian CSA C22.2 No. 107.1.01]
- EMC Compliance
- FCC Title 47 (CFR), Part 15 Subpart B for Class B Device
- Manufactured in a Certified ISO 9001 Facility
- UL/CSA Class 1, Division 2, Groups A-D for North America
- IECEx/ATEX for Zone 2 International and European use

SunSaver MPPT	SS-MPPT-15L
Maximum Battery Current	15A
Nominal Max. Output Power / Max Recommended Solar PV Input*	
12V Battery Bank 24V Battery Bank	200W / 260W 400W / 520W
Max. PV open circuit voltage**	60 volts (without damage to unit)
Nominal System Voltage	12/24 Vdc

***The PV array power rating may exceed the controller's Max Nominal Output Power specification (< 130% recommended). The controller will limit battery current and prevent damage. Array oversizing should be considered on a case by case basis. See our array string sizer tool and related tech documentation.**
https://www.morningstarcorp.com/array-oversizing

****PV Voltage must be greater than Vbattery + 1 Volt to start charging**

Options	SS-MPPT-15L
Remote Meter (RM-1)	Yes
Remote Temperature Sensor (RTS)	Yes
MeterHub (HUB-1)	Yes
PC MeterBus Adapter (MSC)	Yes
DIN Rail Clips (DIN-1)	Yes
Ground Fault Protection Device (GFPD-150V and GFPD-600V)	Yes
Ethernet MeterBus Converter (EMC-1)	Yes

SunSaver™ Controller

6A, 10A or 20A at 12V or 24V

SunSaver PWM

The third-generation SunSaver brings over two decades of advances in software and electronics to the same rugged, hardened design that made the original the leading solar powering solution for oil & gas, mining, and other extreme industrial applications.

- **Ideal for Oil & Gas** and other industrial applications requiring hazardous location (HazLoc) approval. Certifications include UL/CSA Class 1, Division 2, Groups A-D for North America, and IECEx/ATEX for Zone 2 International and European use.
- **Longer battery life** through PWM 4-stage charging and temperature compensation. Sealed or flooded battery select.
- **Tropicalization -** hardened for field use with anodized aluminum enclosure, epoxy encapsulation, marine-rated terminals.
- **Additional features** include full electronic protections, 3-state battery LED indicators, terminal cover, dead battery recovery, high voltage load protection for sensitive loads.
- **L-versions** include low-voltage load disconnect.

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Terminal	5 mm^2 / 10 AWG
Product Weight **Unit Shipping Weight**	0.23 kg / 0.5 lbs 0.4 kg / 0.9 lbs
Dimensions	15.2 x 5.5 x 3.4 cm 6.0 x 2.2 x 1.3 in
Warranty	5 years

Certifications

- Hazardous Locations - Class 1, Div. 2 Groups A-D
- CE, RoHS and REACH Compliant
- UL 1604/ANSI/ISA 12.12.01-2000 (USA) and CSA C22.2 No. 213-M1987 (Reaffirmed 2004) (CANADA) Listed
- ETL Listed: UL 1741 (with terminal cover)*
- FCC Title 47 (CFR), Part 15 Subpart B for Class B Device
- Manufactured in a Certified ISO 9001 Facility
- UL/CSA Class 1, Division 2, Groups A-D for North America
- IECEx/ATEX for Zone 2 International and European use

* Wire terminal cover included with every SunSaver

SunSaver	SS-6-12V	SS-6L-12V	SS-10-12V
Rated Solar Current	6A	6A	10A
Rated Load Current	6A	6A	10A
Nominal System Voltage	12 Vdc		
Low Voltage Disconnect	No	Yes	No

SunSaver	SS-10L-12V	SS-10L-24V	SS-20L-12V	SS-20L-24V
Rated Solar Current	10A	10A	20A	20A
Rated Load Current	10A	10A	20A	20A
Nominal System Voltage	12Vdc	24Vdc	12Vdc	24Vdc
Low Voltage Disconnect	Yes	Yes	Yes	Yes

Options	All Versions
DIN Rail Clips (DIN-1)	Yes
Ground Fault Protection Device (GFPD-150V and GFPD-600V)	Yes

SunSaver Duo™ Controller

25A at 12V

Sunsaver Duo PWM

"Love it...it was worth the extra money over other brands that seemed to be of lesser quality"

A two-battery solar charge controller with optional remote meter, designed for RV/caravan and marine use.

- **Rugged design -** epoxy encapsulation protects against dust and high humidity. Extensive electronic protections include short-circuit, over-current and reverse polarity to ensure the controller will not be damaged by wiring mistakes or overloads.
- **User adjustable -** set parameters with on-board DIP switches or further customize with a PC using Morningstar MSView software.
- **Dual battery charging capability;** house and vehicle for example.


In Wall Mount


Frame Mount

Back

Ambient Operating Temperature	-40 °C to +45 °C -40 °F to +113 °F
Terminal	16 mm^2 / 6 AWG
Product Weight SSD-25 SSD-25RM **Unit Shipping Weight** SSD-25 SSD-25RM	 0.26 kg / 0.57 lbs 0.27 kg / 0.59 lbs 0.6 kg / 1.3 lbs 1.0 kg / 2.2 lbs
Dimensions: without meter	17.0 x 5.6 x 4.1 cm 6.7 x 2.2 x 1.6 in
Warranty	5 years

Certifications

- CE, RoHS and REACH Compliant
- Manufactured in a Certified ISO 9001 Facility

SunSaver Duo	SSD-25	SSD-25RM
Rated Solar Current	25A	25A
Rated Load Current*	None	None
Nominal System Voltage	12Vdc	12Vdc

Options	SSD-25	SSD-25RM
Remote Meter (RM-1)	Yes	Included
Remote Temperature Sensor (RTS)	Yes	Yes
PC MeterBus Adapter (MSC)	Yes	Yes
DIN Rail Clips (DIN-1)	Yes	Yes
EIA-485 Adapter (RSC-1)**	Yes	Yes
Ground Fault Protection Device (GFPD-150V and GFPD-600V)	Yes	Yes
Ethernet MeterBus Converter (EMC-1)	Yes	Yes

* There is no load connection on the SunSaver Duo.
** The EIA-485 / RS-232 Adapter can be used in conjunction with the PC MeterBus Adapter to enable these devices to communicate over a 485 network.

The Digital Oilfield is Going Solar...

From wellhead to pipeline, operators are using solar to power a range of applications: injection pumping, security monitoring, data and communications, RTUs and PLCs, field instrumentation (temperature, pressure, flow, level), actuated valves, injection pumps, cathodic protection, and much more. With no moving parts, no fuel needed, and little maintenance required, solar works out to be a reliable, cost-effective solution for upstream and midstream systems.

...and the solar brand it's going to is Morningstar

Used in over 100 countries and with over four million sold, Morningstar's reliability and technology has been tested and proven in mission-critical installations for nearly 30 years. Now with comprehensive Hazardous Location certifications–UL/CSA in North America and IECEx/ATEX Internationally-- Morningstar has the widest, most dependable line of HazLoc solar controllers in the industry.

Morningstar's line of ProStar™ and SunSaver ™ charge controllers, UL/CSA and IECEx/ATEX rated for use in hazardous locations (ProStar HazLoc models available September)

"…We standardised on using Morningstar MPPT solar controllers in our Hazardous Area Zone-certified solar power systems for use in safety critical power systems for offshore oil and gas assets. Their **high-efficiency is uniquely suited for our needs…** Most important, with Morningstar, we know we won't have to go back for expensive service calls in the field."

--Remco Vonk, General Manager Asia & Pacific, Orga BV, a global provider of offshore power, helideck lighting, and marine & aviation navigation marking systems for safety critical infrastructure assets

"Morningstar's **high-quality, reliable controllers** make them JCE's No. 1 partner when supplying power to many of the world's most remote, harshest environments."

-Lukas Geider, Business Development Assistant, JCE Group, provider of (Ex) electrical control systems for hazardous and safe area environments

"We have chosen Morningstar products for our off-grid solar photovoltaic solutions deployed at about 2000 sites in the Middle East… [they have] proved to be a **reliable source of power** supply even in the harsh desert conditions"

-- Agile Europe, provider of system solutions for oil & gas projects throughout the Middle East

Morningstar SunKeeper™ UL/CSA rated controller, for single-module systems

Get the free guide to *Solar Powered Industrial Systems* and see how operators around the globe achieve solar success with Morningstar

MORNINGSTAR
World's Leading Solar Controllers & Inverters
25+ years Since 1993

8 Pheasant Run, Newtown, PA 18940 USA | morningstarcorp.com

SunKeeper™ Controller
6A or 12A at 12V

SunKeeper PWM

Compact "point of use" design that mounts directly to the solar panel junction box or module/panel frame in its own IP65-rated case, which eliminates the need for an additional controller housing. ideal for small, single-module solar industrial systems.

- **Ideal for Oil & Gas** and other industrial applications requiring hazardous location (HazLoc) approvals. UL/CSA Class 1, Division 2, Groups A-D certification for use in North America.
- **High temperature rated –** to 70° for operation in high temperatures at the solar module; no need to de-rate.
- **Rugged design –** approved for outdoor use without an additional enclosure. IP65 rated with UV-resistant case; epoxy encapsulated electronics and watertight connection to junction box.

"This is a great little unit…an outstanding charge controller"

Ambient Operating Temperature	-40 °C to +70 °C -40 °F to +158 °F
Terminal	2.0mm^2 / 14 AWG
Product Weight **Unit Shipping Weight**	0.11 kg / 0.25 lbs 0.2 kg / 0.4 lbs
Dimensions	9.9 x 5.1 x 1.3 cm 3.9 x 2.0 x 0.5 in
Warranty	5 years

Certifications

- Hazardous Locations - UL/CSA approved for Class 1, Division 2, Groups A-D use in hazardous locations
- CE, RoHS and REACH Compliant
- UL 1604/ANSI/ISA 12.12.01-2000 and CSA C22.2 No. 213-M1987 Listed
- Manufactured in a Certified ISO 9001 Facility

SunKeeper	SK-6	SK-12
Rated Solar Current	6A	12A
Rated Load Current*	None	None
Nominal System Voltage	12Vdc	12Vdc

Options	All Versions
Remote Temperature Sensor (RTS)**	Yes

* There is no load connection on the SunKeeper.
** Installation of the RTS to the SunKeeper requires some soldering

Remote oilfield solar installation with the Morningstar SunKeeper on-board. Courtesy SunWize

SunLight™ Controller
10A or 20A at 12V or 24V

SunLight PWM

World's leading solar lighting controller for street and pathway lighting, parking areas, bus stations, signage, and much more.

- **Provides 10 lighting options** with accurate on-board timer. User adjustable for 2 to 10 hours ON or for ON all night. Unique ON/OFF/ON settings conserve energy and turn lights on again for 1 or 2 hours before sunrise. Timer accuracy is within 2 seconds.
- **Easy to set-up,** with test-button feature and LED indicator. To confirm correct installation, test button turns light on during the day and LED indicates selected lighting option.
- **Rugged design** with anodized aluminum enclosure, epoxy encapsulation, corrosion-resistant terminals.

"Bulletproof and dependable...I will use them again and again"

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Terminal	5.2mm² / 10 AWG
Product Weight **Unit Shipping Weight**	0.27 kg / 0.6 lbs 0.3 kg / 0.7 lbs
Dimensions	16.8 x 5.5 x 3.4 cm 6.6 x 2.2 x 1.3 in
Warranty	5 years

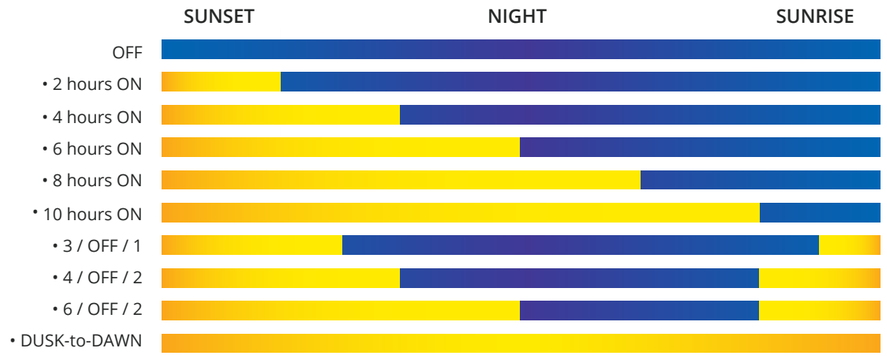
SunLight	**SL-10L-12**	**SL-10L-24**	**SL-20L-12**	**SL-20L-24**
Rated Solar Current	10A	10A	20A	20A
Rated Load Current*	10A	10A	20A	20A
Nominal System Voltage	12Vdc	24Vdc	12Vdc	24Vdc

Options	**All Versions**			
DIN Rail Clips (DIN-1)	Yes	Yes	Yes	Yes
Ground Fault Protection Device (GFPD-150V and GFPD-600V)	Yes	Yes	Yes	Yes

* Low Voltage Disconnect is included in all SunLight Controllers.

Certifications
- CE, RoHS and REACH Compliant
- Manufactured in a Certified ISO 9001 Facility

Lighting Control Options



SunGuard™ Controller
4.5A at 12V

SunGuard PWM

Single module, compact solar charge controller for small systems, ideal for both professional and consumer use.

- **Rugged design** - 100% solid state, epoxy encapsulated; rated for 25% overloads (no need to de-rate).
- **Longer battery life** - series design PWM charging (instead of shunt) with temperature compensation, low self-consumption.
- **Easy to install** - outdoor rated connecting wires make a waterproof connection to the solar module and battery.

"Rock solid, potted so waterproof, long track-record...great charge controller for a small system"

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Product Weight **Unit Shipping Weight**	0.1 kg / 0.2 lbs 0.1 kg / 0.3 lbs
Dimensions	6.4 x 5.1 x 3.8 cm 2.5 x 2.0 x 1.5 in
Warranty	5 years

SunGuard	**SG-4**
Rated Solar Current	4.5A
Rated Load Current*	None
Nominal System Voltage	12Vdc

* There is no load connection on the SunGuard.

Certifications
- CE, RoHS and REACH Compliant
- Manufactured in a Certified ISO 9001 Facility

Converter EMC-1

Ethernet Networking Adapter

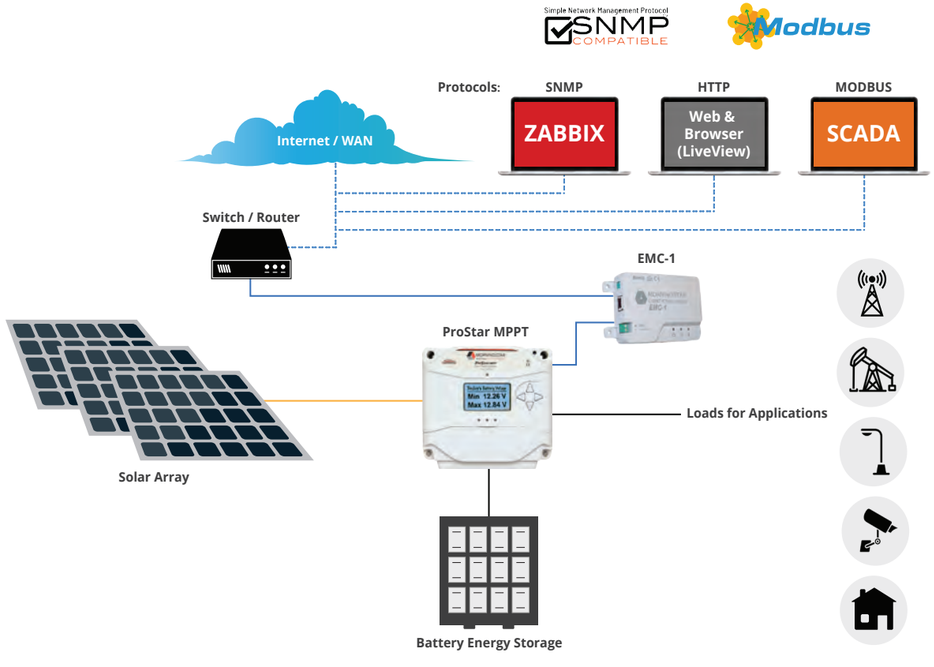
Simple Network Management Protocol SNMP ENABLED

Connects to any enabled solar controller or inverter to provide enhanced data and network features, including SNMP (Simple Network Management Protocol) and Modbus, an important feature for maintaining telecommunications and other industrial powering systems as well as SCADA operations. EMC-1 allows MeterBus-enabled system components to send data to the internet.

Compatible with:

TriStar MPPT Controller
ProStar MPPT Controller
SunSaver MPPT Controller
TriStar Controller
ProStar Controller
SunSaver Duo Controller
SureSine Inverter

- Enables communications, monitoring, and networking integration
- Adds IP based MODBUS connectivity for remote communication and SCADA functionality
- LiveView displays system status and logs data directly from the EMC in an easy to view webpage
- Powered via meterbus port on controller, PoE or DC Input for 12,24 or 48V systems



MORNINGSTAR INTEGRATEDSERIES

ReadyBlock/ReadyRail Products, and Morningstar Accessories

ReadyBlock/Ready Rail expansion products for Integrated Series models

Compatible with: GenStar MPPT Solar DC Integrated Chargers

READY|BMS

The solution for building "lithium DNA" into any system—now or later

- Provides communication with lithium batteries
- Enables "closed-loop" charging control
- Delivers integrated battery BMS data
- No need for additional configuration or connections

ReadyBMS currently supports 2-way communication and both open loop and closed loop communications with Discover and PylonTech LiFePO4 batteries, which are closed-loop/Tier 2 partners in our Energy Storage Partner (ESP) program. In addition, Morningstar plans to bring additional partner brands into the closed-loop Tier 2 level. Check the Morningstar ESP webpage for more information and updates.

READY|SHUNT

The integrated solution for optimizing the most popular battery chemistries

- Can be added to parent/host component at any time
- Integrated battery metering solution
- System current measurements
- Energy production & consumption metrics

Comprehensive, integrated battery metering solution for lead-acid and other commonly-used battery types. Provides visibility on all critical battery information including SOC (state-of-charge) and other key metrics essential to battery health. Compatible with LiveView monitoring built-into GenStar MPPT and other Morningstar charging platforms.

READY|RELAY

Add advanced load control and signaling functionality to any compatible Morningstar system

- Easily add features and functionality
- Dry contacts control
- Alarm conditions signaling
- Smart Load control
- No need for external wiring
- Reduced field down-time

Achieves tighter control over the energy balancing in a system, through smart logic and prioritizing loads for load-shedding. ReadyRelays are individually replaceable without removing a block from service— quickly and easily, in conditions where space is very tight (such as in enclosures). Eliminates the need to specify and source individual relays, especially in lower power applications, with two high-quality relays provided per ReadyBlock.

Ground Fault Protection Device

Off-grid and on-grid PV safety device

Morningstar's Ground Fault Protection Device (GFPD) prevents current from following any unintended paths during a ground fault.

Other ground fault detection/interruption products break the bond to the grounded conductor for the entire system. When this occurs, not only is the earth bond compromised, but the battery and DC loads can also be left ungrounded and floating to potentially dangerous voltages from the PV array. Morningstar's GFPD uses a double pole breaker to isolate the PV array while maintaining the ground bond for the battery and loads.

Compatible with:

TriStar MPPT-600V Controller TriStar MPPT Controller

- Disconnects both the positive and negative conductor and completely isolates PV source circuits
- Trips at 300mA compared to 1A for alternative solutions
- Provides design flexibility to accommodate large and small array configurations
- Uses high quality breaker solutions rather than fuses which are problematic to replace at remote sites
- Works like a traditional AC GFI
- Maintains the integrity of earth bond for battery and loads
- Does not require an extra warning label at the battery per U.S. National Electric Code requirements
- Makes it easier to locate and troubleshoot ground faults
- Powered via the pv system's battery
- Equipped with both visual and audible alarms
- Built to support both single controller and multiple controller systems
- When the earth bond is not broken, Morningstar's GFPD will only shut off affected controllers
- All loads will continue to operate safely with the battery remaining bonded to ground
- Multiple controllers and GFPDs can be added on an as-needed basis

Ground Fault Protection Device	GFPD-150V	GFPD-600V
Number of Poles	2	2
Maximum Solar Voltage	150V	600V
Maximum Solar Current	60A	50A
Trip Method	Relay	
Mounting	DIN-rail or Panel-Mount	
Input Voltage	8-72 Vdc	
Self-Consumption	<0.5W	
Ground Fault Threshold Current	300 mA +/- 10%	
Output Trip Signal	12V	
Nominal System Voltage	12, 24, 36 or 48 Vdc	

Ambient Operating Temperature	-40 °C to +60 °C -40 °F to +140 °F
Terminal	25 mm^2 / 4 AWG and 35 mm^2 / 2 AWG
Weight	
GFPD-150V	2.0 kg / 4.4 lbs
GFPD-600V	4.4 kg / 8.9 lbs
Dimensions	
GFPD-150V	26.9 x 12.8 x 11.2 cm 10.6 x 5.1 x 4.4 in
GFPD-600V	35.7 x 22.1 x 10.6 cm 14.1 x 8.7 x 4.2 in
Warranty	5 years

Certifications

- CE, RoHS and REACH Compliant
- ETL Listed: UL 1741
- CSA C22.2 No. 107.1-01 Listed
- GFPD-150V is UL-489 Compliant
- GFPD-600V is UL-1077 Compliant
- FCC Class B Part 15 Compliant
- U.S. National Electrical Code (NEC) 690.5 Compliant for use as a GFPD device
- Meets EMC Directives (Immunity, Emissions and Safety)
- Manufactured in a Certified ISO 9001 Facility

Relay Driver (RD -1)

Logic Module for system control functions. The Relay Driver provides high level system control functions such as high/low voltage alarms, load control and generator start.

Compatible with:

TriStar MPPT 600V Controller
TriStar MPPT Controller
SunSaver MPPT Controller
TriStar Controller
SunSaver Duo Controller
SureSine Inverter
MeterHub

- Cost-effective and Highly reliable
- Fully Programmable
- Advanced Generator Control
- Industrial Design
- LED Indicators
- 4 independent relay driver outputs (relays not included)
- Used for high/low voltage alarms, load control, and generator start
- Reads digital data inputs from 'compatible' controllers and inverters
- Reads battery voltage in systems with other controllers

Wire Box (PS-MPPT-WB)

An optional two-piece enclosure accessory for ProStar MPPT. Provides effective cover for wires and conduit leading to and from the ProStar MPPT controller. This Wire Box may be required or recommended by authorities having jurisdiction to reduce hazards associated with exposed wires, conduits and connections.

Compatible with:

ProStar MPPT Controller

- Material: High strength polycarbonate Lexan
- Enclosure space: accommodates 35mm2 wire
- Meets NEC standards for conduits and wire bending

Remote Temperature Sensor (RTS)

Sends battery temperature data to controllers.

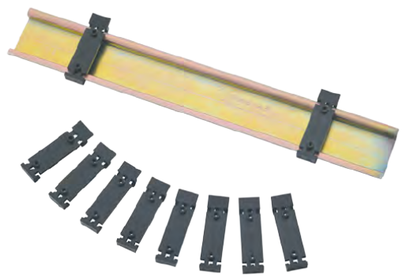
Compatible with:

TriStar MPPT 600V Controller*
TriStar MPPT Controller*
ProStar MPPT Controller
SunSaver MPPT Controller
TriStar Controller
ProStar Controller
SunSaver Duo Controller
SunKeeper Controller

- Improves battery charging by using temperature at the battery for very accurate temperature compensation
- Recommended for solar systems that experience temperature variations during the year or whenever the temperature at the battery will be more than 5 °C (9 °F) different than the temperature at the controller

*Remote Temperature Sensors included with all TriStar MPPT units.

DIN Rail Clips (DIN-1)



For installing controllers and accessories to DIN Rails.

Compatible with:

SunSaver MPPT Controller
SunSaver Controller
SunSaver Duo Controller
SunLight Controller

- Rugged plastic clips match SunSaver and SunLight mounting holes
- Provides a simple way to install controllers to DIN rails
- Enables removal of controllers from DIN rails without removing the clips
- Polypropylene clips
- Fits all 35mm standard DIN rails
- Includes mounting screws

TriStar Meter-2-600V (TS-M-2-600V)

On-Board Advanced Digital Display for the TriStar MPPT 600V Controller. Displays extensive system and controller information, logged data, bar graph metering, as well as alarms and faults for easy troubleshooting.

Compatible with:

TriStar MPPT 600V Controller
MeterHub

- 2 x 16 character LCD display
- Mounts to the controller*
- Displays extensive system and controller information, logged data, bar graph metering as well as alarms and faults for easy troubleshooting
- Choice of 5 languages (English, French, German, Portuguese or Spanish)

* Replaces stock front faceplate

TriStar Meter-2 (TS-M-2)

On-Board Advanced Digital Display for the TriStar and TriStar MPPT Controllers. The meter will display a great deal of information about your TriStar controller and the operation of your system. In addition, the meter enables manual functions and controller diagnostics. These capabilities will increase your confidence that the system is working properly and will help you to improve reliability, battery life and system performance.

Compatible with:

TriStar MPPT Controller
TriStar Controller
MeterHub

- 2 x 16 character LCD display
- Mounts to the controller*
- Displays extensive system and controller information, logged data, bar graph metering as well as alarms and faults for easy troubleshooting
- Choice of 5 languages (English, French, German, Portuguese or Spanish)

* Replaces stock front faceplate on TriStar and TriStar MPPT controllers.

TriStar Remote Meter-2 (TS-RM-2)

Remote Digital Display for the TriStar Family Controllers. The TS-RM-2 provides the same data display as the TS-M-2, except that it ships with 30 meters of cable and a flat faceplate. These features enable convenient mounting away from the controller.

Compatible with:

TriStar MPPT 600V Controller
TriStar MPPT Controller
TriStar Controller
MeterHub

- 2 x 16 character LCD display
- Displays extensive system and controller information, logged data, bar graph metering, as well as alarms and faults for easy troubleshooting
- Choice of 5 languages (English, French, German, Portuguese or Spanish)

Remote Meter (RM-1)

Remote Digital Display for viewing a controller or inverter in a separate location. This meter provides comprehensive system information for easy monitoring including voltage, current and temperature.

Compatible with:

ProStar MPPT Controller
SunSaver MPPT Controller
SunSaver Duo Controller
SureSine Inverter
ProStar Controller

- Easy to install and use
- Low self-consumption
- 4 digit display with custom icons
- Displays systems information, logged data*, alarms and errors
- May be mounted in the wall or on the wall with included frame
- Includes 10 meters of cable

*Logged data only available for the SunSaver MPPT, ProStar MPPT and ProStar controllers

MeterHub (HUB -1)

This product electrically isolates devices that supply power to the network, preventing damage to the network in the event of grounding problems.

Compatible with:

TriStar MPPT 600V Controller
TriStar MPPT Controller
ProStar MPPT Controller
SunSaver MPPT Controller
TriStar Controller
TriStar Meter 2
TriStar Remote Meter 2
Relay Driver

- Allows several Morningstar products to communicate over a MeterBus network (maximum 15 devices)
- In multi-controller systems the TS-M-2, TS-M-2-600V and TS-RM-2 are networkable using Morningstar's MeterHub to allow individual controller data and aggregate system data to be displayed together on a single meter.
- Enables multiple controllers to share a TriStar Meter or Relay Driver
- Provides electrical isolation

PC MeterBus Adapter (MSC)

Converts RJ-11 MeterBus to RS-232 Connector.

Compatible with:

ProStar MPPT Controller
SunSaver MPPT Controller
SunSaver Duo Controller
SureSine Inverter

- Used to connect a Morningstar controller or inverter to a PC or other third party serial enabled device
- Communications link enables monitoring and logging of data as well as customizing of set points

EIA-485 / RS-232 Adapter (RSC-1)

Converts RS-232 to EIA-485 Connector.

Compatible with:

TriStar MPPT Controller
SunSaver MPPT Controller
TriStar Controller
SunSaver Duo Controller
SureSine Inverter
Relay Driver

- Allows up to 128 Morningstar products to communicate on the same communications bus and over much greater distances than with RS-232
- All data is transmitted via MODBUS™ protocol
- Removable four (4) position EIA-485 terminal
- 9-pin RS-232 connector (male)
- Status LED for monitoring and diagnostics
- Molded tabs for attachment to 35mm standard DIN rail
- RS-232 ribbon cable (not shown) with low-profile connectors

Typical configurations include:

- Networking several TriStar and/or TriStar MPPT controllers
- Adding Morningstar PC Meterbus Adapters (MSC) for use with an RJ-11 port in multi-device networks
- Adding Morningstar's Relay Driver (RD-1) to a network
- Integrating any compatible Morningstar product into an existing EIA-485 network, such as those used by industrial control or SCADA systems

USB MeterBus Adapter (UMC-1)

Converts the MeterBus RJ-11 to a standard USB 2.0 interface.

Compatible with:

ProStar MPPT Controller
SunSaver MPPT Controller
SunSaver Duo Controller
SureSine Inverter
ProStar Controller

- Allows communication between a computer and compatible Morningstar products
- Can be used for:
  - Programming custom charging set-points
  - Logging live data
- Communication with third party hardware that supports MODBUS™ communication

If you naturally think 'Morningstar first...' ...you're in the best company

For almost 30 years Morningstar has built its reputation on industry-leading dependability and performance. The result: over four million Morningstar products sold, serving in mission-critical applications in over 100 countries— on mountaintops, deserts, at sea, even at the North and South poles.

Morningstar solar components are the first choice for the world's leading off-grid professionals because we've proven ourselves to them over and over again, with products that set performance standards even under the most challenging conditions. With our exceptionally deep, wide range of eight product lines and nearly 40 models plus accessories, you can depend on us for your next off-grid project as well.

"The Morningstar TriStar 45A & 60A controllers are the best controllers in the world for diversion load applications..."

~ EUROPE/FLORIN FLESERIU, ECOVOLT

"...I've probably used every model that Morningstar makes at one point or another..."

~ TRACY DAHL, POLAR POWER EXPERT
(has used Morningstar in projects from the Arctic to the Antarctic)

"...I installed [this Morningstar system] around 20 years ago here in Chile on a rural electrification project and it still works!"

~ SOUTH AMERICA/JUAN LIVINGSTONE

For Your Off-Grid Charge Controller and Inverter Needs

Morningstar Corporation, 8 Pheasant Run, Newtown, PA 18940 USA
www.morningstarcorp.com

Control #MS-0003666 / Rev 05/2023

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World's Leading Solar Controllers & Inverters