Others survive harsh conditions. We THRIVE in them

With over 25 years of experience and well over four million products in over 100 countries—most of them still in operation—Morningstar has truly earned its reputation for building the "world's leading solar controllers." At Morningstar, the word "reliability" means a lot more than a marketing adjective. It means a hardware failure rate of less than 0.4%—which is why we're the one manufacturer who even dares share this kind of specification.

That's why system designers of the most mission-critical solar energy installations around the world insist on Morningstar components, and why you should too on your next project. From mineral mines in South America to telecom repeater stations in Canada, from gas wells in the Middle East to mountain peaks in Nepal, Morningstar technology and legendary quality make the difference between success and failure—and make renewable energy a practical, cost-effective, and long-term solution.

Morningstar achieved its reputation by starting with faster, "smarter" signal processing optimized through superior engineering. Next, because heat reduces efficiency and product life, we add state-of-the-art thermal design to ensure that there are no fans to fail—unlike other higher-powered solar controller and inverter brands.

To raise the bar further, we use oversized, higher-spec components to achieve unprecedented performance levels. The result: products that literally stand by themselves and set new standards for the rest of the industry.

The reason Morningstar has such dedication to excellence is that we’re an employee-owned company. We not only can afford to be perfectionists, we have to be, since our brand’s reputation is synonymous with our own. Our determination and spirit of innovation is what gave Morningstar charge controllers their legendary staying power. Now with inverter-chargers to match the excellence of our controllers, we’re proud to offer a Morningstar solution perfect for your application.

Morningstar Professional Series

For decades, Morningstar's Professional Series™ has been the first choice of leading system designers and installers. Legendary reliability and performance make Professional Series components the first choice for mission-critical remote solar power projects ranging from off-grid telecommunications, oil & gas operations, and traffic control systems to lighting, surveillance monitoring, and agricultural installations.

With over four million Professional Series products in the field and a 25-year track record of unparalleled dependability, the industry's leading solar installers know they can bet their reputations on Morningstar.

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

“Having distributed solar products in Africa for more than 15 years, I know which manufacturers tend to last and which ones fail. Morningstar being very much in the lasting category.”
Lincoln Dahl, African Energy

“My SunSaver-10 has been running my 90 watt solar panel non-stop since September 1, 1998. It still works perfectly. That is now more than 17 years! Well past the listed 15 year expected life span noted in the Operator's Manual.”
Peter Caffall-Davis


“Morningstar components were an obvious choice being readily available and dependable in remote bush applications at reasonable cost”
Operations Manager
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<td>6A or 12A at 12V</td>
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</table>
Morningstar inverters are based on the same acclaimed technology that's behind our charge controllers, applying our superior thermal engineering and advanced software design expertise to the challenging field of power conversion. The result: inverters that are capable of stable, dependable operation over the long term, with no cooling fans necessary. There are no moving parts to fail or pull dust and debris into the system. The proven SureSine inverter will soon be joined by the revolutionary new high-frequency MultiWave inverter/charge-- which will provide Morningstar-quality solution for renewable and other energy systems at both ends of the spectrum.

**MultiWave™ 4kW Inverter/Charger**

48V Battery • 120 or 230 Vac input/output

The MultiWave™ inverter/charger establishes a new benchmark for battery-based inverters. Combining the surge and power capabilities of a low-frequency inverter with the agility and compactness of a high-frequency design, MultiWave is a radical all-new inverter/charger built with advanced energy storage technologies in mind—ones leapfrogging decades of incremental progress in power conversion. MultiWave's innovative, software-driven digital architecture can deliver more power with less weight, achieve peak efficiency of 95% across a wide load range, and is fast enough for use in uninterrupted power supply (UPS) applications.

Flexible and easy to install, MultiWave features a high-resolution display for programming and data access. A built-in DIN ReadyRail expansion system accommodates snap-in ReadyBlocks for adding generator control, system monitoring alert capability, battery management systems (BMS) and other future-proofing features as they become available.

**Flexible and easy to install, MultiWave features a high-resolution display for programming and data access.**

- **Ambient Operating Temperature**: -40 °C to +60 °C
- **Battery Terminals**: 1/0 AWG - 4/0 AWG, 6 AWG - 10 AWG
- **Weight**:
  - MW-4048-120: 20 kg / 45 lbs
  - MW-4048-230: 22 kg / 48 lbs
  - MW-4048-120-B: 26 kg / 58 lbs
  - MW-4048-SP-B: 28 kg / 62 lbs
- **Dimensions**:
  - Standard Version: 46.8 x 47.9 x 23.8 cm 18.43 x 18.86 x 9.37 in
  - BOS 'B' Version: 46.8 x 78.7 x 23.8 cm 18.43 x 31 x 9.37 in
- **Certifications**:
  - UL1741 CSA 22.2 #107.1-01
  - CE, IEC 62109-2, FCC Class B

**KEY FEATURES AND BENEFITS**

- **Nominal DC Input Battery Voltage**: 48VDC
- **Peak Efficiency**: 95%
- **Maximum Output Charge Current**: 90A
- **AC Input Frequency Range**: 42-68 Hz
- **AC Output Frequency (selectable)**: 50/60 Hz
- **AC Transfer Time**: <10 ms

**Quality:**
- Passively-cooled with no fans required; full power to +40°C
- 200% surge capacity: 8kW/5 seconds, for starting large inductive loads
- Sine-wave smoothing and power factor correction help clean up dirty AC power

**Modes:**
- Off-Grid, UPS, Solar Priority

**Ease of Installation**
- Easy commissioning with built-in meter, SD card or web-based MS Live View config
- Pre-wired BOS options for NEC-compliant installation
- Reduced weight through advanced electronic design allows easy mounting by a single person

**Generator Features**
- Advanced bi-directional charger rated at full inverter power
- Two AC inputs allow separate configuration for grid and generator charging, transfer and voltage/frequency window of operation

**Expandability**
- Ethernet-enabled for future communications with Morningstar inverters and charge controllers
- DIN ReadyRail expansion system accommodates snap-in ReadyBlocks for adding future functionality and capabilities, including relay control, communications, battery management systems (BMS)

**Data**
- Full featured standard meter
- Web interface provides real-time data, logging, advanced control, and configuration
- Open MODBUS communications protocol to communicate with third party devices
- SD Card allows installer/user to load new firmware and upload custom settings

*Charging: 4000W / 80A at 50VDC / 100A max output
SureSine™ Inverter
300 W; 12 Vdc input, 115 or 220 Vac output

SureSine is a pure sine wave inverter delivering AC power in off-grid solar applications, including rural electrification, telecom, remote homes, RVs, caravans and boats. A cast, anodized aluminum enclosure with no internal cooling fan needed ensures long-term reliability in 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.

**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

**Options**

**SureSine**

<table>
<thead>
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<th>Options</th>
<th>All Versions</th>
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<tr>
<td>Remote Meter (RM-1)</td>
<td>Yes</td>
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<tr>
<td>Relay Driver (RD-1)</td>
<td>Yes</td>
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<tr>
<td>EIA-485 Adapter (RSC-1)*</td>
<td>Yes</td>
</tr>
<tr>
<td>Ethernet Meterbus Converter (EMC-1)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* 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.

**Ambient Operating Temperature**
- -40 °C to +45 °C
- -40 °F to +113 °F

**Continuous Power Rating**
- SI-300-115V-UL: 300W @ 25 °C
- SI-300-220V: 300W @ 25 °C

**Peak Power Rating (10 minutes)**
- SI-300-115V-UL: 600W @ 25 °C
- SI-300-220V: 600W @ 25 °C

**DC Input System Voltage**
- 10.0 - 15.5V

**Waveform**
- Pure Sine Wave

**AC Output Voltage (RMS)**
- SI-300-115V-UL: 115 Vac +/- 10%
- SI-300-220V: 220 Vac +/- 10%

**AC Output Frequency**
- SI-300-115V-UL: 60 Hz +/- 0.1%
- SI-300-220V: 50 Hz +/- 0.1%

**Terminal**
- 35 mm² / 2 AWG

**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

**Warranty**
- 2 years

**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

**Waveform**
- Pure Sine Wave

**AC Output Voltage (RMS)**
- 115 Vac +/- 10%
- 220 Vac +/- 10%

**AC Output Frequency**
- 60 Hz +/- 0.1%
- 50 Hz +/- 0.1%
TriStar MPPT™ 600V Controller
60A at up to 600Voc

The TriStar MPPT 600V (TS-MPPT-600V) is a breakthrough in charge controller design. By accepting PV array input up to 600Voc, it enables installers to design systems with longer, 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 a cooling fan or fans, making it both extremely reliable and efficient (with 97.9% peak efficiency). Ideal for DC-coupled energy storage applications. Available in four 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

Power terminals
2.5 mm² – 35 mm²

Product Weight
8.98 kg / 19.8 lbs
12.3 kg / 27.1 lbs
12.75 kg / 28 lbs
16.79 kg / 37 lbs

Unit Shipping Weight
9.9 kg / 21.7 lbs
12.3 kg / 27.1 lbs
13.0 kg / 28.7 lbs
18.0 kg / 39.7 lbs

Dimensions
39.2 x 22.1 x 14.9 mm
15.4 x 8.7 x 5.9 in
54.2 x 32.2 x 14.9 mm
21.4 x 6.7 x 5.9 in

Standard Box
30.3 kg / 67 lbs
41.9 kg / 92 lbs
52.6 kg / 116 lbs
58.1 kg / 128 lbs

Discontinued
230V Battery Bank
900Wp
1800Wp
2400Wp
3200Wp

Options
TriStar Meter-2 (TS-M-2)
TriStar Remote Meter 2 (TS-RM-2)
MeterHub (HUB-1)
Ethernet Port
EXA-485 Adapter (EXA-1)
Remote Temperature Sensor (RTS)
Ground Fault Protection Device
Ethernet Meterbus Converter (EMC-1)

Certifications
CE, RoHS and REACH Compliant
IEC 62109
ETL Listed [UL-1741] and Canadian CSA C22.2 No. 107.101
EMC Compliance
FCC Class B Part 15 Compliant
U.S. National Electrical Code (NEC) Compliant
Manufactured in a Certified ISO 9001 Facility

MPPT Controllers

TriStar MPPT™ 600V Controller
30A, 45A or 60A at up to 150 Voc

The industry-leading TriStar MPPT with TrakStar Technology is an advanced maximum power point tracking controller for larger off-grid photovoltaic (PV) energy systems up to 3kWp. An iconic design, 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: 99% (TS-150).
- Built for reliability and performance, with an oversized heatsink and over-spec’d components. Fully-rated for operation at temperatures up to 45C.
- 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 +113 °F

Product Weight
3.6 kg / 8 lbs
3.6 kg / 8 lbs
4.1 kg / 9 lbs
4.3 kg / 9.4 lbs

Unit Shipping Weight
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

Certifications
CE, RoHS and REACH Compliant
IEC 62109
ETL Listed [UL-1741] and Canadian CSA C22.2 No. 107.101
EMC Compliance
FCC Class B Part 15 Compliant
U.S. National Electrical Code (NEC) Compliant
Manufactured in a Certified ISO 9001 Facility

Options
TriStar Meter-2 (TS-M-2)
TriStar Remote Meter 2 (TS-RM-2)
MeterHub (HUB-1)
Ethernet Port
EXA-485 Adapter (EXA-1)
Remote Temperature Sensor (RTS)
Ground Fault Protection Device
Ethernet Meterbus Converter (EMC-1)

Certifications
CE, RoHS and REACH Compliant
IEC 62109
ETL Listed [UL-1741] and Canadian CSA C22.2 No. 107.101
EMC Compliance
FCC Class B Part 15 Compliant
U.S. National Electrical Code (NEC) Compliant
Manufactured in a Certified ISO 9001 Facility

Options
TriStar Meter-2 (TS-M-2)
TriStar Remote Meter 2 (TS-RM-2)
MeterHub (HUB-1)
Ethernet Port
EXA-485 Adapter (EXA-1)
Remote Temperature Sensor (RTS)
Ground Fault Protection Device
Ethernet Meterbus Converter (EMC-1)
ProStar™ MPPT Controller
25A or 40A at up to 120 Voc

Prostar MPPT solar charge controller is an advanced maximum power point tracking (MPPT) battery charger for off-grid photovoltaic (PV) systems up to 1100 watts. All versions have TrakStar Technology and include load control.

The ProStar design has been proven in over two decades of use in the world’s most demanding installations—and ProStar today reflects Morningstar’s policy of continuous improvement through regular upgrades and enhancements. Because Morningstar’s employee-owned culture never “rests on success”, ProStar customers can own both a legend and the latest in a single product.

- 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.

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

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**Certifications**
- CE and RoHS Compliant
- 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

SunSaver MPPT™ Controller
15A at up to 80Voc

SunSaver MPPT with Trakstar technology is the perfect charging solution for smaller off-grid solar systems up to 400Wp. An industrial grade design proven in challenging applications and environments, SunSaver has been called the “single most successful charge controller in the solar industry.”

- 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.

**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

<table>
<thead>
<tr>
<th>Options</th>
<th>SS-MPPT-15L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Meter (RM-1)</td>
<td>Yes</td>
</tr>
<tr>
<td>Remote Temperature Sensor (RTS)</td>
<td>Yes</td>
</tr>
<tr>
<td>MeterHub (HUB-1)</td>
<td>Yes</td>
</tr>
<tr>
<td>PC MeterBus Adapter (MSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>DIN Rail Clips (DI-1)</td>
<td>Yes</td>
</tr>
<tr>
<td>Ground Fault Protection Device (GFPC-50V and GFPC-60V)</td>
<td>Yes</td>
</tr>
<tr>
<td>Ethernet MeterBus Converter (EMC-1)</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Pulse-Width Modulation (PWM) technology controllers are ideal for use in solar energy situations where 36 or 72 cell PV modules are available and the site is unshaded with no physical space limitations. All models incorporate advanced thermal design requiring no cooling fans, which ensures long-term reliability with no moving parts to fail—a unique feature among higher-powered controllers.

**PWM Controllers**

**TriStar™ Controller**

45A or 60A at 12-48V

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.

**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

**Options**

<table>
<thead>
<tr>
<th></th>
<th>TS-45</th>
<th>TS-60</th>
<th>TS-60M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built for reliability and performance, with an oversized heatsink and over-spec’d components. Fully-rated for operation at temperatures up to 45°C.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>More information with LED indicators. Optional meter displays extensive system and controller information in five languages; automatic self-test and reset.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Communications capability with RS-232 port, connects to a PC for custom settings, data logging, remote monitoring and control.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Fully adjustable with DIP switches for seven digital presets. Additional custom setting via RS-232.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Extensive electronic protection against reverse polarity, short circuits, overcurrent and excessive temperature.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Fanless design for long-term reliability.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Portable LED lighting towers providing 24/7 illumination for safer, more efficient mining operations throughout Brazil and Latin America.**

“I like to use Morningstar because it’s really robust and reliable.”

Ricardo Righi Reis
ProStar™ Controller
15A or 30A at 12/24V

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.

Certifications
- CE, RoHS and REACH Compliant
- IEC 62109
- Manufactured in a Certified ISO 9001 Facility
- FCC Part-15 Class B Compliant

Options

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<tr>
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<th>PS-15</th>
<th>PS-15M</th>
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<th>PS-30M</th>
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<td>Rated Solar Current</td>
<td>15A</td>
<td>15A</td>
<td>30A</td>
<td>30A</td>
</tr>
<tr>
<td>Rated Load Current</td>
<td>15A</td>
<td>15A</td>
<td>30A</td>
<td>30A</td>
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<tr>
<td>Nominal System Voltage</td>
<td>12/24 Vdc</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Digital Meter
- No
- Included
- No
- Included

Remote Meter (RM-1)
- Yes
- Yes
- Yes
- Yes

Ethernet Meter Bus Converter (EMC-1)
- Yes
- Yes
- Yes
- Yes

Remote Temperature Sensor (RTS)
- Yes
- Yes
- Yes
- Yes

Ground Fault Protection Device (GFPD-150V and GFPD-600V)
- Yes
- Yes
- Yes
- Yes

Ambient Operating Temperature
- -40 °C to +60 °C
- -40 °F to +140 °F

Terminal
- 16 mm² / 6 AWG

Product Weight
- PS-15: 0.3 kg / 0.66 lbs
- PS-15M: 0.4 kg / 0.9 lbs
- PS-30: 0.6 kg / 1.3 lbs
- PS-30M: 0.7 kg / 1.6 lbs

Unit Shipping Weight
- 0.3 kg / 0.86 lbs
- 0.4 kg / 0.9 lbs
- 0.3 kg / 0.9 lbs
- 0.4 kg / 0.9 lbs

Dimensions
- 15.3 x 10.5 x 5.5 cm
- 6.0 x 4.1 x 2.2 in

Warranty
- 5 years

SunSaver™ Controller
6A, 10A or 20A at 12V or 24V

The world's leading small solar controller for industrial and consumer markets. Proven in demanding locations, including mines and oilfields.

- Ideal for oil/gas applications. Approved for use in hazardous locations:
  - Class 1, Division 2, Groups A-D
- 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 voltage sense terminals, terminal cover, dead battery recovery, high voltage load protection for sensitive loads.
- L-versions include low-voltage load disconnect.

Certifications
- Hazardous Locations - Class 1, Div. 2 Groups A-D
- CE, RoHS and REACH Compliant
- ETL Listed: UL 1741 (with terminal cover)*
- FCC Title 47 (CFR), Part 15 Class B (for Class B L-versions)
- Manufactured in a Certified ISO 9001 Facility

Options

- DIN Rail Clips (DIN-1): Yes
- Ground Fault Protection Device (GFPD-150V): Yes

<table>
<thead>
<tr>
<th></th>
<th>SS-6-12V</th>
<th>SS-6L-12V</th>
<th>SS-10-12V</th>
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<tbody>
<tr>
<td>Rated Solar Current</td>
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<td>6A</td>
<td>10A</td>
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<tr>
<td>Rated Load Current</td>
<td>6A</td>
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<td>10A</td>
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<tr>
<td>Nominal System Voltage</td>
<td>12 Vdc</td>
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<tr>
<td>Low Voltage Disconnect</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<table>
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<tr>
<th></th>
<th>SS-10L-12V</th>
<th>SS-10L-24V</th>
<th>SS-20-12V</th>
<th>SS-20L-24V</th>
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<td>Rated Solar Current</td>
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<td>Rated Load Current</td>
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<tr>
<td>Nominal System Voltage</td>
<td>12 Vdc</td>
<td>24 Vdc</td>
<td>12 Vdc</td>
<td>24 Vdc</td>
</tr>
<tr>
<td>Low Voltage Disconnect</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Ambient Operating Temperature
- -40 °C to +60 °C
- -40 °F to +140 °F

Terminal
- 5 mm² / 10 AWG

Product Weight
- Unit Shipping Weight
- Unit Shipping Weight

Dimensions
- 15.2 x 5.5 x 3.4 cm
- 6.0 x 2.2 x 1.3 in

Warranty
- 5 years

DIN Rail Clips (DIN-1): Yes

* Wire terminal cover included with every SunSaver L-versions.
SunSaver Duo™ Controller
25A at 12V

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.

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

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

Dimensions:
- **without meter**
  - 17.0 x 5.6 x 4.1 cm
  - 6.7 x 2.2 x 1.6 in

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

**“Love it…it was worth the extra money over other brands that seemed to be of lesser quality”**

SunKeeper™ Controller
6A or 12A at 12V

Compact “point of use” design mounts directly to the solar module junction box or module frame and eliminates the need for an additional controller housing.

- **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.
- **Ideal for oil/gas applications.** Approved for use in hazardous locations: Class 1, Division 2, Groups A-D.

Certifications
- Hazardous Locations - Class 1, Div. 2 Groups A-D
- CE, RoHS and REACH Compliant
- Manufactured in a Certified ISO 9001 Facility

Options
- **Remote Temperature Sensor (RTS)**

Dimensions:
- **9.9 x 5.1 x 1.3 cm**
- **3.9 x 2.0 x 0.5 in**

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

**“This is a great little unit...an outstanding charge controller”**

**“Love it…it was worth the extra money over other brands that seemed to be of lesser quality”**

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**“This is a great little unit...an outstanding charge controller”**

SunSaver Duo
25A at 12V

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

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

Dimensions:
- **without meter**
  - 17.0 x 5.6 x 4.1 cm
  - 6.7 x 2.2 x 1.6 in

Certifications
- CE, RoHS and REACH Compliant
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- Hazardous Locations - Class 1, Div. 2 Groups A-D
- CE, RoHS and REACH Compliant
- Manufactured in a Certified ISO 9001 Facility

Options
- **Remote Temperature Sensor (RTS)**

Dimensions:
- **9.9 x 5.1 x 1.3 cm**
- **3.9 x 2.0 x 0.5 in**

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

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**“This is a great little unit...an outstanding charge controller”**
SunLight™ Controller
10A or 20A at 12V or 24V

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 OFF for any night. Unique ON/OFF/OFF 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.

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

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

Ambient Operating Temperature
-40 °C to +60 °C
-40 °F to +140 °F

Terminal
5.2mm² / 10 AWG

Product 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

SunGuard™ Controller
4.5A at 12V

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.

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

Ambient Operating Temperature
-40 °C to +60 °C
-40 °F to +140 °F

Product 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

* There is no load connection on the SunGuard.

Morningstar SunKeeper and SunSaver controllers are standard operating equipment for solar-powered applications on remote oil and gas extraction sites.
At Morningstar, this is our best side. Because we're the only complete line of full-powered solar controllers that don't need cooling fans. All of our controllers, including the legendary ProStar MPPT, get rid of excess heat more intelligently, through advanced passive cooling.

From the single-module SunGuard to the breakthrough TriStar 600V, Morningstar controllers—unlike our competition—have no moving parts to fail, no fans to suck in dirt and debris, no fan motor loads to affect solar harvest. It's one reason why leading solar professionals in the oil & gas, telecommunications, security, transportation and other industries have put over four million Morningstars into service since 1993. Learn how we can help your next project at www.morningstarcorp.com
**Accessories**

**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

**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

**Accessories**

**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
**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

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**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

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**Ethernet MeterBus Converter (EMC-1)**

Allows data transfer to the internet

**Compatible with:**
- TriStar MPPT Controller
- ProStar MPPT Controller
- SunSaver MPPT Controller
- TriStar Controller
- ProStar Controller
- SunSaver Duo Controller
- SureSine Inverter

- Connects to any meterbus enabled controller to provide enhanced data and network features
- Adds IP based MODBUS connectivity for remote communication and control
- Live View displays system status and log 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

**Remote telecommunications repeater installations in the Canadian Arctic using TriStar high-voltage controllers.**
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. When this occurs, not only is the earth bond compromised, but the battery and DC loads can also be left ungrounded and floating. For a negatively grounded system this means that the negative side of the battery and loads can float to negative Voc in relation to ground and the positive side can float to (negative Voc + Vbat). Morningstar’s GFPD better isolates the array from the battery and loads, while maintaining the bond to ground.

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

Ambient Operating Temperature
- -40 °C to -60 °C
- -40 °F to -140 °F

Terminal
- 25 mm² / 4 AWG
- 35 mm² / 2 AWG

Weight
- GFPD-150V: 2.0 kg / 4.4 lbs
- GFPD-600V: 4.4 kg / 9.8 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

Ground Fault Protection Device

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

Compatible with:
- TriStar MPPT-600V Controller
- TriStar MPPT Controller
- ProStar MPPT Controller
- SunSaver MPPT Controller
- TriStar Controller
- ProStar Controller
- SunSaver Duo Controller
- SureSine Inverter
- MeterHub

Wire Box (PS-MPPT-WB)
An optional two-piece enclosure accessory for ProStar MPPT. Provides effective cover for wires and conduits 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

Accessories

Wire Box (PS-MPPT-WB)
**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

- 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

How Mission-Critical Solar Becomes Mission ACCOMPLISHED

With a track record that goes back further than most solar brands, Morningstar’s ProStar and TriStar charge controllers are more than industry standards. They’re icons, recognized by designers the world over as the first choice for systems where failure isn’t an option.

**TriStar & ProStar Controllers**

In fact, Morningstar is a choice that’s been made by professionals well over three million times during the past several decades. In installations spanning from middle-east oil fields to Antarctic research stations. Morningstar products earned their place not just by surviving harsh conditions but by thriving in them, through best-in-class engineering, advanced thermal design for fanless operation, and using components rated well above industry-standard specs.

We design our products as over-achievers because, as an employee-owned company, our own reputations go out on the line along with every Morningstar product shipped. That’s why the industry’s leading installers keep betting their reputations on Morningstar. You can, too, with our comprehensive line ranging from the new game-changing 600V TriStar controller to the single-module SunGuard. Whatever your need, there’s a Morningstar powering solution perfect for your next project.
Quotes featured about Morningstar products were collected from online customer reviews.