

## GenStar™ MPPT

DC System Controller



- True Controller Technology Integration
- 99% Peak Efficiency
- Powerful Load Control
- Fanless Design

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

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



Since 1993 the name Morningstar has been synonymous with industry-leading charge controllers, used in mission-critical applications around the world. That tradition continues with Morningstar's GenStar MPPT. First in our new Integrated Series and a new flagship for Morningstar, GenStar MPPT combines the muscle of our iconic TriStar MPPT controller line with our most forward-thinking research and development yet in intelligent power conversion and control.

The revolutionary GenStar represents Morningstar's best engineering efforts brought together in a single design, with full, advanced communications and control features built-in— plus the ability to add more technology to any system through our innovative ReadyRail expansion technology. ReadyBlock™ snap-in modules make it easy to add key features when needed—such as BMS, Shunt and Relay capabilities-- ensuring a future-proofed system which can always be upgraded and is never obsolete. Equally important, GenStar MPPT is not just “compatible” with advanced battery chemistries such as lithium-- GenStar was engineered with lithium in its DNA.

In short, we designed GenStar MPPT to be the industry's first truly “future-proofed” charging system, one that can grow with a solar powering system as needs change. The new GenStars feature best-in-class efficiency and extremely low self-consumption, thanks to fanless design along with our acclaimed TrakStar™ MPPT technology. Full communications capability as a standard feature and international certifications for global use complete Morningstar's next generation of charge controllers—and set a new bar for the rest of the industry.

### KEY FEATURES AND BENEFITS

- 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, instead of outside the system as with a typical stand-alone accessory device. Available ReadyBlock modules include:
  - » **ReadyShunt** – Battery meter & DC Current Sensor for monitoring SOC, energy in/out (Amp hours), current measurement for system sources and loads, and more
  - » **ReadyBMS** – BMS Interface for full communications and control with lithium batteries
  - » **ReadyRelay** – Relay Controller for signaling (dry contact) & advanced load control
- Full network integration without requiring adapters – Modbus via RS-232, USB and EIA485; ModbusIP, SNMP and HTML (LiveView 2.0) via Ethernet, MS-CAN connects MS Devices (proprietary), EIA-485 serial to Ethernet bridging
- LiveView 2.0 Web App and Morningstar Mobile App provide live dashboard views, system control and firmware updates.

LiveView 2.0 also includes settings adjustments and historic data

- Powerful Load Control – built-in 30A load capability, unique for controllers in this power class
- Oversized PV Array Input capability – array input power rating @ 150% meets today's system design needs for PV oversizing
- Extensive electronic protections include cold-weather lithium “fold back” circuitry to guard against cold-weather charging damage. Also, short-circuit, over-current and reverse polarity to ensure the controller will not be damaged by wiring mistakes or overloads
- Fanless design for improved efficiency and exceptional long-term reliability



**READY|BLOCK**

ReadyRelay block, part of the ReadyRail expansion system

### Technical Specifications

MODELS	GS-MPPT-60M-200V	GS-MPPT-80M-200V	GS-MPPT-100M-200V
<b>ELECTRICAL</b>			
Nominal Battery Voltage	12-24-48VDC		
Battery Voltage Range	9V - 72V (Charging); 10V - 72V (Load); Power Off < 8V		
Maximum Charge Current	60A	80A	100A
Maximum Input Voltage	200V*		
MPPT Operating Voltage Range	> Battery Voltage + 1 Volt ; < 180V		
Max. Input Current (Imp, loc)	56A, 60A	75A, 80A	94A, 100A
Nominal Max Output Power (12,24,48V)**	800W, 1600W, 3200W	1075W, 2150W, 4300W	1350W, 2700W, 5400W
Maximum PV array size***	7.8kW	10.5kW	13kW
Max Recommended PV array size (12,24,48V)	1200W, 2400W, 4800W	1600W, 3200W, 6400W	2000W, 4000W, 8000W
Maximum Load Current	30A		
Max Load Power (LVD = 11V, 22V, 44V)	330W, 660W, 1320W		
Peak Efficiency	99%		
Max. Self-consumption	< 2.4 Watts (12/24V); < 3.2 Watts (48V)		
Grounding Leg	Negative (Positive Ground compatible with singular ground point)		
Real-Time Clock (RTC)	Yes, w/ coin cell backup		
Transient Surge Protection	4500 W/port (battery solar and load terminals)		
<b>I/O, COMMUNICATION, INTERFACES</b>	SD Card (8 GB included) for logging, firmware updates, setpoints (unique with all 3 functions) USB-C for data, RS232/EIA-485 ports. Ethernet, WiFi (future), MS-CAN		
ReadyRail ReadyBlock support	3 ReadyBlock slots for expandability (BMS, Shunt, Relay)		
Standard graphical meter	•		
Remote Temperature Sensor, Battery Sense	•		
<b>BATTERY CHEMISTRIES SUPPORTED</b>	Lithium (multiple types), Lead-Acid (all types), NiCad, Flow		
<b>PROTECTIONS</b>	Reverse night current, Solar short circuit, PV reverse polarity, Solar overload (current limit), Load short circuit & overload, Battery removal protection, Low & high-temp foldback, High voltage foldback		

\* Recommended that Max Voc @ coldest record temperature < 190V to prevent high voltage current limiting.

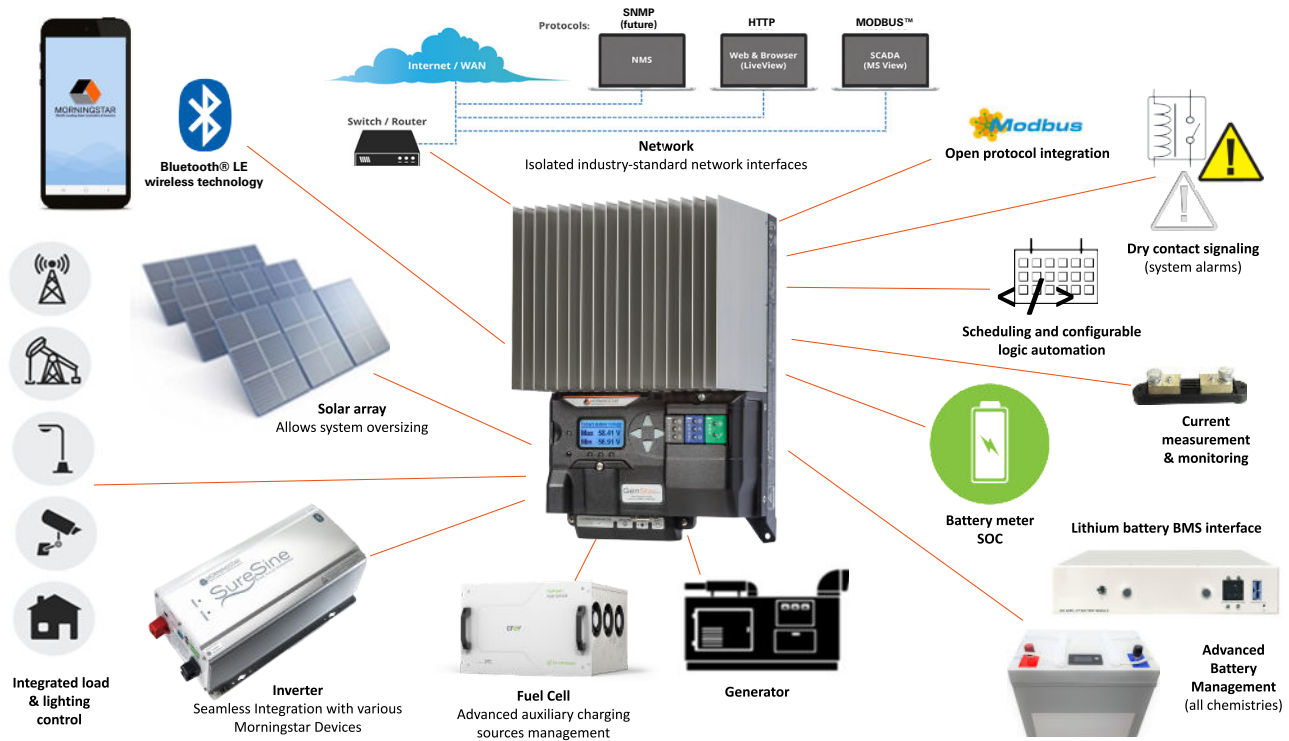
\*\* Max Output Power varies with battery voltage. Nominal Max Output Power is calculated @ 13.33 - 13.5V, 26.66 - 27V and 53.33 - 54V. If the maximum battery voltage = 60V, the Maximum Output Power = 3600W (60A), 4800W(80A) or 6000W(100A)

\*\*\* Based on Vmp = 140V and Max input current (Imp). 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

### Technical Specifications (continued)

<b>SOFTWARE</b>			
LiveView 2.0 web app	Dashboard, Settings Adjustment, Schedules, Actions, Firmware Update, Logged Data View		
Supported protocols	Modbus, ModbusIP, HTTP, SNMP v2C, BlueTooth LE		
Morningstar Mobile App	Dashboard, Actions and Firmware Update		
Datalogging capacity & capability	Internal (LiveView): 3 to 4 years daily records; 35,000 to 140,000 events (event frequency can vary greatly) Nearly infinite with 8 GB SD card (datafiles only)		
<b>MODELS</b>	<b>GS-MPPT-60M-200V</b>	<b>GS-MPPT-80M-200V</b>	<b>GS-MPPT-100M-200V</b>
<b>MECHANICAL</b>			
Enclosure Rating	IP20		
PV input and battery max. wire size	1/0 AWG all models		
Load Wire Size Range	2.5 - 16 mm <sup>2</sup> / 14 - 6 AWG		
Battery Sense Wire Size Range	0.25 - 1.0 mm <sup>2</sup> / 24 - 16 AWG		
Product Weight	14lb 10oz / 6.63 kg	15lb 10oz / 7.09 kg	16lb 7oz / 7.46 kg
Product Dimensions	14.19 x 8.74 x 6.70 in / 360.4 x 222 x 170.2 mm		
Shipping Dimensions L x W x H	18.5 x 12.5 x 10.5 in 469.9 x 317.5 x 266.7 mm	18.5 x 12.5 x 10.5 in 469.9 x 317.5 x 266.7 mm	18.5 x 12.5 x 10.5 in 469.9 x 317.5 x 266.7 mm
Shipping Weight	18.5 lbs / 8.39 kg	20.0 lbs / 9.07 kg	21.0 lbs / 9.52 kg
<b>ENVIRONMENTAL</b>			
Operating Ambient	-30°C to +45°C (full power); proportional derate to 60°C		
Storage Temp Range	-50°C to +80°C		
Max. Operating Altitude	3000 meters		
Humidity	100% non-condensing		
<b>CERTIFICATIONS</b>			
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	•		
CEC Australia listing	•		
IEC 60950	•		

## GenStar MPPT DC System Controller Capabilities



### DirectFET™ MOSFET premium power devices for superior internal heat transfer and array isolation

Highly-conductive, precision extruded aluminum heat sink with tapered fins (made with new manufacturing technology) eliminates the need for cooling fans, improves efficiency, increases reliability

Four-phase energy conversion circuitry helps achieve industry-leading efficiency

Over-spec components withstand temperatures higher than boiling water

Tough Lexan polycarbonate UL-listed lower cover

Backlit LCD display for easier monitoring

SD card slot enables data-logging, updating, and settings configuration

Multi-layer electronic protection circuitry

Battery temperature sense and voltage sense

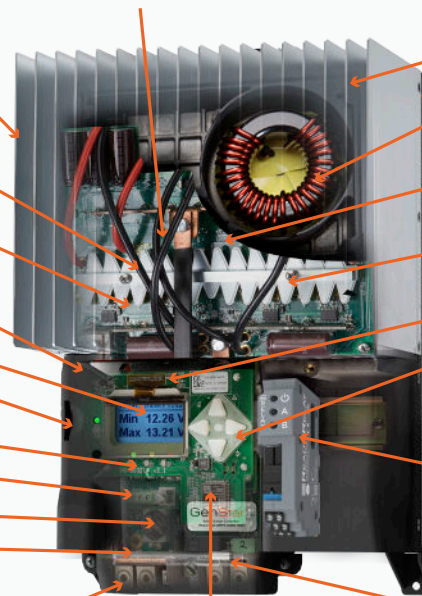
Real-time clock with back-up memory

Built-in load control— unique in this controller class

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

**TRAKSTAR™**  
MULTI-PHASE POWER POINT TRACKING

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



Large diameter, high torque, corrosion-resistant terminals

Bluetooth® LE wireless technology

Designed in the USA/Assembled in Taiwan

Rigid, cast aluminum chassis with built-in inductor housings for superb mechanical integrity

Four-phase energy storage section with sealed, precision-wound, heavy duty copper coils

Higher grade copper "pour" resists excessive heat on circuit boards

Unique, patented FET spring ensures even, positive contact between heat-producing components and heatsink, improving thermal handling

State-of-the-art software control improves response

Unique, programmable "soft key" provides a "favorite" customized push-button command based on any action in the user interface

**READYRAIL**

Unique ReadyRail/ReadyBlock architecture: enables easy integration of key features into the GenStar architecture with modular, snap-in blocks including the ReadyRelay (shown, for signaling and load control), ReadyBMS (for lithium battery communications), ReadyShunt (for advanced battery monitoring), and more

Communications data port: speaks Modbus™

**Modbus**