



**ADDENDUM # 4**  
**RE-BID # FY 2017-2018-004-001**  
**A1A BUS SHELTER IMPROVEMENTS**

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Please ensure you check the City's website for the latest addendum released for this project. Below find the link to the City's website: [www.cohb.org/solicitations](http://www.cohb.org/solicitations).

**Firm must provide this form signed by an authorized officer of your Firm to acknowledge receipt of ADDENDUM # 4 and provide with your Firm's response.**

**PLEASE NOTE: Exhibit C – SPECIFICATIONS OF ELECTRICAL COMPONENTS**

The City of Hallandale is releasing Exhibit C – Specifications of Electrical Components to be used for this project. See specification sheets below. Exhibit C was not part of the original Bid release for this Project.



# ES17-12

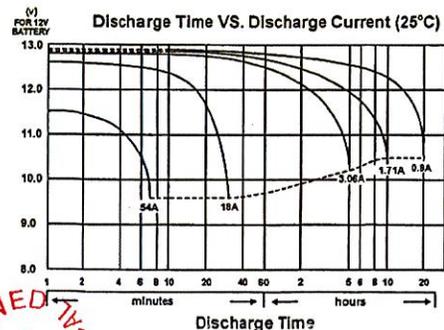
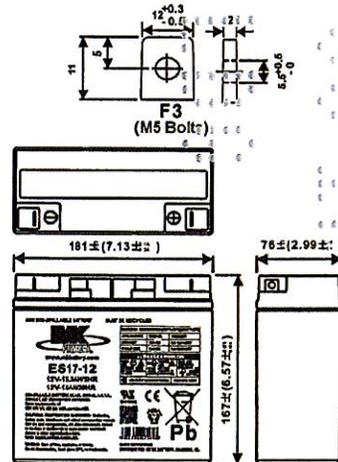
## SPECIFICATIONS

Nominal Voltage (V)	12V
<b>Nominal Capacity</b>	
20 hour rate (0.9A to 10.50V)	18Ah
10 hour rate (1.71A to 10.50V)	17.1Ah
5 hour rate (3.06A to 10.20V)	15.3Ah
1C (18A to 9.60V)	9.6Ah
3C (54A to 9.60V)	6.3Ah
<b>Weight</b>	Approx. 12.89Lbs. (5.86kg)
<b>Internal Resistance (at 1KHz)</b>	Approx. 12 mΩ
<b>Maximum Discharge Current for 5 seconds :</b>	270A
<b>Operating Temperature Range</b>	
Charge	-15°C (5°F) to 40°C (104°F)
Discharge	-15°C (5°F) to 50°C (122°F)
Storage	-15°C (5°F) to 40°C (104°F)
<b>Charge Retention (shelf life) at 20°C (68°F)</b>	
1 month	92%
3 months	90%
6 months	80%
<b>Charging Methods at 25°C (77°F)</b>	
<b>Cycle Use :</b>	Charging Voltage 14.4 to 15.0V Coefficient -5.0mv / °C / cell Maximum Charging Current : 5.4A
<b>Standby Use :</b>	Float Charging Voltage 13.50 to 13.80V Coefficient -3.0mv / °C / cell
<b>Case Material :</b>	ABS (Option : UL94 HB Flame Retardant Case Material)
<b>Terminal :</b>	F3

## Maintenance-Free Rechargeable Sealed Lead-Acid Battery



## DIMENSIONS



REVIEWED BY ELECTRONIC

## MK Battery

1631 South Sinclair Street • Anaheim, California 92806  
Toll Free: 800-372-9253 • Fax: 714-937-0818 • E-mail: sales@mkbattery.com





**SOLARTECH**<sup>®</sup>  
POWER, INC.

## F-Series 30W PV Module SPM030P-F

### Solartech F-Series Modules

Solartech photovoltaic F-Series Modules are constructed with high efficient polycrystalline solar cells and produce higher output per module than others in its class. This industrial grade module is an industry standard among various industry professionals.

### Features

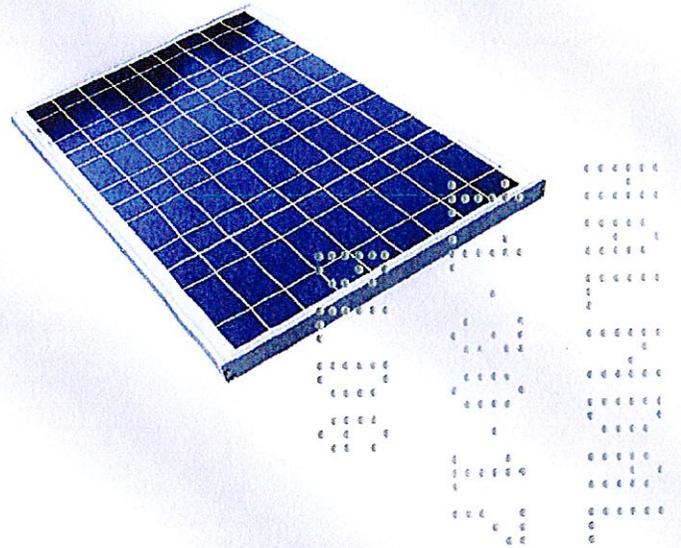
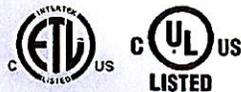
Class 1, Division 2, (C1D2) Group A,B,C and D

- Accessible junction box with 4-1/2" knockout for ease of installation.
- (EVA) with TPT cushions the solar cells within the laminate and ensures the operating characteristics of the solar cells under virtually any climatic condition
- Rigid anodized aluminum frame and low iron tempered glass
- Easily accessible grounding points on all four corners for fast installation
- Proven junction box technology

### Reliability

- Proven superior field performance
- Tight power tolerance

### Qualifications and Certifications



### Applications

- Traffic & Safety
- Federal Government
- Oil & Gas
- Security
- Telecommunications
- Water and Wastewater
- Weather & Environmental Monitoring
- RV Camper
- Emergency Power
- Telemetry
- SCADA, RTU, GPS
- Marine
- Area Lighting & Sign



Model Number  
SPM030P-F

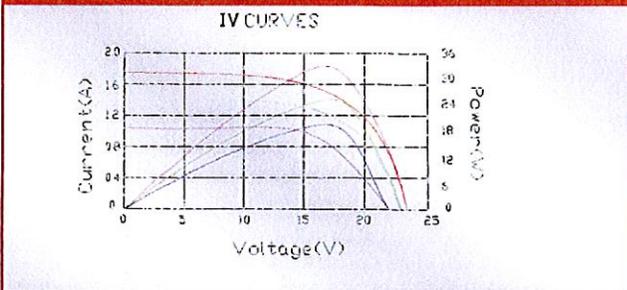
### Electrical Characteristics

Max power(Pm)	30W
Maximum power voltage(Vpm)	17.3V
Maximum power current (Ipm)	1.77A
Short circuit current (Isc)	1.93A
Open circuit voltage (Voc)	21.9V
Module efficiency	10.9%
Tolerance	±5%
Nominal Voltage	12V
Temperature coefficient of Voc	-0.36%/K
Temperature coefficient of Pm	-0.46%/K
Temperature coefficient of Isc	0.05%/K
NOCT	48°C ±2°C
Maximum series fuse rating	10A
Maximum system voltage	600V

### Mechanical Characteristics

Construction	Tempered glass, silicon cell, EVA, Polyester with Tedlar
Solar Cells	36 cells (156mm x 39mm) in a 4x9 matrix connected in series
Front Cover	High transmission 3.2mm(1/8") glass
Encapsulant	EVA(Double layers)
Back Cover	White polyester
Frame	Anodized aluminum
Junction Box	IP65, UL94-5VA material
Diodes	Schottky by-pass diodes
Terminal	Accept 8-14 AWG wire
Dimensions	26.2in(666mm)x16.2in(412mm)x1.38in(35mm)
Weight	7.7 lbs
Operating Temperature	-40°C~90°C
Storage Humidity	<90%

### IV Curves

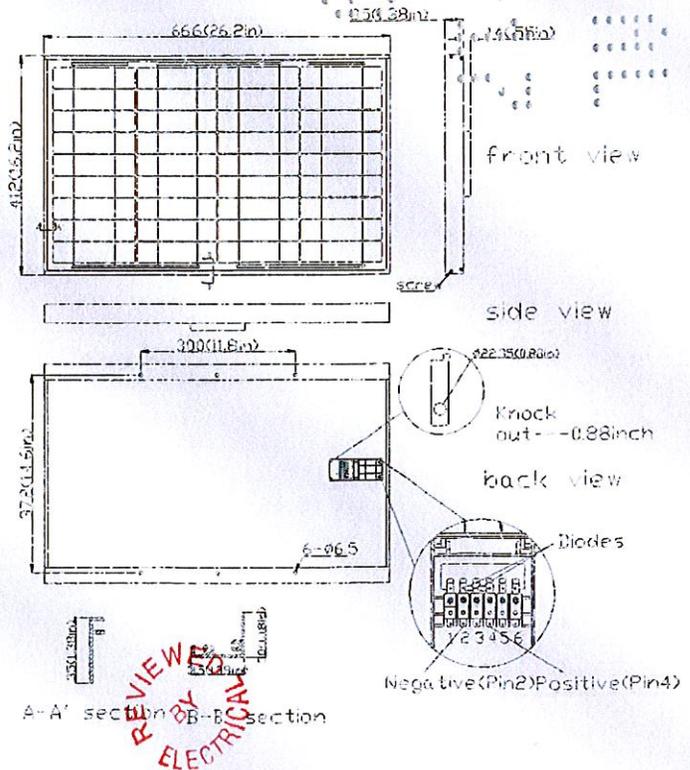


### Warranty

25-year limited warranty of 80% power output;  
12 year limited warranty of 90% power output;  
2-year limited warranty of materials and workmanship\*

### Certifications

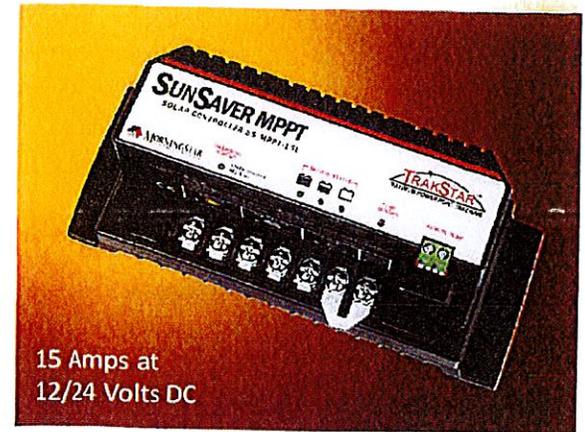
UL 1703 certification  
ETL Class I, Division 2, Groups A,B,C and D certification





# SunSaverMPPT™

SOLAR CONTROLLER WITH MAXIMUM  
POWER POINT TRACKING



Morningstar's SunSaver MPPT solar controller with TrakStar Technology™ is an advanced maximum power point tracking (MPPT) battery charger for off-grid photovoltaic (PV) systems. The controller features a smart tracking algorithm that maximizes the energy harvest from the PV and also provides load control to prevent over discharge of the battery.

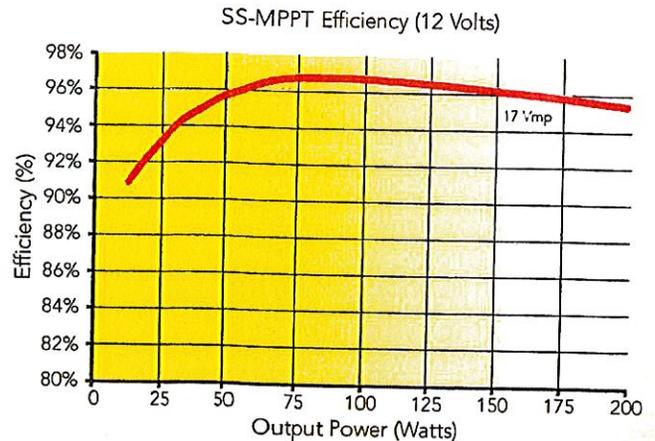
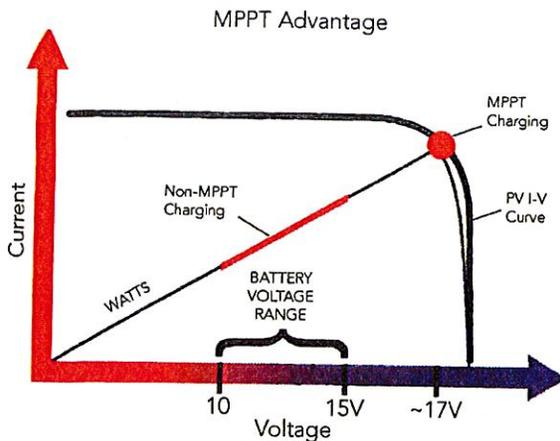
The SunSaver MPPT is well suited for both professional and consumer PV applications including automatic lighting control. Its charging process has been optimized for long battery life and improved system performance. This product is epoxy encapsulated for environmental protection, may be adjusted by the user via four settings switches or connection to a personal computer, and has an optional remote meter and battery temperature sensor.

## Key Features and Benefits

- **Maximizes Energy Harvest**  
Our TrakStar MPPT Technology features:
  - Peak efficiency of over 97%
  - Almost no power losses
  - Recognition of multiple power peaks during shading or mixed PV arrays
  - Excellent performance at low solar insolation levels
- **Use of High Voltage Modules**  
Enables the use of high voltage and thin film modules for off-grid battery charging.
- **Higher Voltage PV Arrays**  
Provides a means to use a higher voltage PV array to charge either a 12V or 24V battery.
- **Lower System Cost**  
Less expensive than other MPPT controllers and is affordable in smaller PV systems up to 400Wp. Allows system costs to be reduced by down-sizing the PV array, using on-grid or thin film modules and decreasing cable sizes.
- **Load Control**  
Automatically disconnects loads when the battery has been discharged to a low state of charge.
- **Personal Computer Connectivity**
  - NEW USB MeterBus Adapter for laptop compatibility.
  - PC MeterBus Adapter for RS-232.
  - Fully adjustable user selection via on-board preset switches or customized with PC connection.
  - Advanced automatic custom programmable lighting control with a PC connection.
  - Extensive controller and system data is provided by the status LED's and optional meter. Monitoring is also available with a personal computer.
  - 30 days of internal data logging of key PV system operating parameters.
- **Smaller Size**  
Mechanical dimensions are less than other MPPT controllers, making it easier to install in equipment enclosures.
- **Highly Reliable**  
Efficient electronics, a conservative thermal design and tropicalization result in high reliability and long life.
- **Extensive Electronic Protections**  
Fully protected against most system errors and faults.
- **Longer Battery Life**  
Efficient MPPT tracking and 4-stage charging increases battery life.

REVIEWED  
BY  
ELECTRICAL

# SUNSAVER MPPT™ SOLAR CONTROLLER



## TECHNICAL SPECIFICATIONS

### Electrical

- Peak Efficiency 97.5%
- Nominal Battery Voltage 12 or 24 volts
- Maximum Battery Charging Current 15 amps
- Battery Voltage Range 7-36 volts
- Nominal Maximum Operating Power\*
  - 12 volt battery 200 Watts
  - 24 volt battery 400 Watts
- Maximum PV Open Circuit Voltage\*\* 60 volts
- Rated Load Current 15 amps
- Self Consumption 35 milliamps
- Transient Surge Protection 4 x 1500 Watts

### Environmental

- Operating Temperature -40°C to +60°C
- Storage Temperature -55°C to +100°C
- Humidity 100%, non-condensing
- Tropicalization Epoxy encapsulation Conformal coating Marine rated terminals

### Electronic Protections

- PV: Overload, Short Circuit, High Voltage
- Load: Overload, Short Circuit
- Reverse Polarity: Battery, PV and Load
- Lightning and Transient Surges
- High Temperature
- Reverse Current at Night

### Battery Charging

- Battery Types Gel, Sealed, AGM, Flooded
- 4 Stage Charging Bulk, absorption, float, equalize (optional)
- Temperature Compensation
  - Coefficient -5mV/°C / cell (25°C ref)
  - Range -30°C to +60°C
  - Set points Absorption, float, equalize

### Mechanical

- Dimensions 16.9h x 6.4w x 7.3d cm  
6.6h x 2.5w x 2.9d in
- Weight 0.60 kg / 1.3 lbs
- Power Terminal 16 mm² / #6 AWG
- Enclosure Die cast aluminum with plastic cover

### Options

- Remote Meter
- Remote Temperature Sensor
- USB MeterBus Adapter (UMC-1)
- PC MeterBus Adapter for RS-232
- DIN Rail Mounting Clips

### Certifications

- CE Compliant
- RoHS Compliant
- UL 1741 / CSA 107.1-01 recognized component
- Manufactured in a Certified ISO 9001 Facility

\*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 (reminder: do not exceed Voc).

\*\*Exceeding Maximum PV Open Circuit Voltage may damage the controller.

WARRANTY: Five year warranty period. Contact Morningstar or your authorized distributor for complete terms.



## MORNINGSTAR

World's Leading Solar Controllers & Inverters

www.morningstarcorp.com

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**PLEASE NOTE RECEIPT OF ADDENDUM # 4 BY SIGNING BELOW AND INCLUDE WITH YOUR FIRM'S SUBMISSION.**

**I ACKNOWLEDGE RECEIPT OF ADDENDUM # 4:**

Company	
Name	
Title	
Signature	
Date	

Sincerely,



Andrea Lues, Director, Procurement Department