ORANGE COUNTY GOVERNMENT FLORIDA

Interoffice Memorandum

April 26, 2021

TO: Mayor Jerry L. Demings
-AND-
County Commissioners

FROM: Ed Torres, MS, PE, LEED AP, Director
Utilities Department

SUBJECT: **BCC AGENDA ITEM – Consent Agenda**
May 11, 2021 BCC Meeting
Consent Order Florida Department of Environmental Protection v. City of Orlando/Orange County Government, OCG File No.: 20-1567 Water Conserv II Distribution Center – FLA010795
Contact Person: Michael J. Hudkins, PE, Manager
Utilities Water Reclamation Division
407-254-9685

Under Chapter 403, Florida Statutes, and Title 62, Florida Administrative Code, the Florida Department of Environmental Protection (FDEP) has jurisdiction over the operation of Orange County's (County) water reclamation system. Pursuant to that authority, FDEP has initiated this Consent Order to provide for payment of civil penalties for an unauthorized public access reclaimed water discharge during the period of September 22, 2020 and September 28, 2020.

The 42-inch reclaim water transmission main from the County's South Water Reclamation Facility (SWRF), which is part of the Water Conserv II system, experienced a pipeline failure on September 22, 2020 and resulted in an unauthorized reclaimed water discharge. There was an additional unauthorized discharge, albeit minor, which occurred during the pipeline repairs on September 28, 2020. The Consent Order requires the County to pay $3,400 in civil penalties and $250 for costs and expenses incurred for a total payment of $3,650.

It was established with FDEP that all due diligence was provided in the operation and maintenance of the 42-inch reclaimed water transmission main and that the pipeline failure was beyond the reasonable control of the City of Orlando (City) and County. The demonstrated good faith efforts of the City and County resulted in a fine reduction. In lieu of making a cash payment of $3,400 in civil penalties, the City and County proposed to offset this amount by implementing and completing a FDEP-approved Pollution Prevention (P2) project. The P2 project involves an energy-saving environmental enhancement project at Water Conserv II that includes installing a 50-Watt solar system. The solar system will replace the current utility power used at a point of service connection (Turnout) at Water Conserv II. The City and County demonstrated that the P2 project was at least one and a half times the civil penalty off-set amount, which in this case is the equivalent of at least $5,100. The remaining $250 in administrative costs must be paid within 30 days of the effective date of the Consent Order.

The County Attorney's Office has reviewed the Consent Order prepared by FDEP and has approved it as to form. Utilities Department staff has reviewed the Consent Order and recommends approval.

Action Requested: **Approval of Department of Environmental Protection v. City of Orlando/Orange County Government, OGC File No.: 20-1567 Water Conserv II Distribution Center – FLA010795 Consent Order; authorization for the County Administrator to execute the Consent Order; approval of the 50-watt solar system P2 project at Water Conserv II; and authorization to pay costs and expenses in the amount of $250.**

District 1.

FLORIDA DEPARTMENT OF Environmental Protection

CENTRAL DISTRICT OFFICE
3319 MAGUIRE BLVD., SUITE 232
ORLANDO, FLORIDA 32803

April 7, 2021

Mr. Kevin Edmonds, Chief Administrative Officer
City of Orlando
400 South Orange Avenue
Orlando, Florida 32801
kevin.edmonds@cityoforlando.net

Byron Brooks, County Administrator
County Administrator's Office
County Administration Building, 5th Floor
201 South Rosalind Avenue
Orlando, Florida 32801
michael.hudkins@ocfl.net

SUBJECT: Department of Environmental Protection v. City of Orlando/Orange County Government, OGC File No.: 20-1567
Water Conserv II Distribution Center - FLA010795

Messrs. Edmonds and Brooks:

The State of Florida Department of Environmental Protection ("Department") finds that City of Orlando and Orange County Government ("Respondent") had an unauthorized discharge of approximately 684,000 gallons of treated wastewater on September 22, 2020 and September 28, 2020, in violation of Section 403, Florida Statues (F.S.) and Chapter 62-604, Florida Administrative Code (F.A.C.). Although there are no actions required to correct the violations, the Respondent remains subject to civil penalties as a result of the violation(s). The Respondent is also responsible for costs incurred by the Department during the investigation of this matter.

The Department's Offer

Based on the violations described above, the Department is seeking $3,400.00 in civil penalties and $250.00 for costs and expenses the Department has incurred in investigating this matter, which amounts to a total of $3,650.00. The civil penalty in this matter includes one violation of $2,000.00 or more.

However in lieu of paying the full civil penalty, the Department has determined that $3,400.00 of the civil penalty may be offset through implementation of the Pollution Prevention Project (P2 Project) described in the attached Exhibit. This amount is referred to as the "offset amount."

Respondent's Acceptance

If you wish to accept this offer and fully resolve the enforcement matter pending against the Respondent, please sign this letter and return it to the Department at 3319 Maguire Blvd., Suite 232, Orlando, Florida 32803 by **April 26, 2021.** The Department will then countersign it and file it with a designated clerk of the Department. Once the document is filed with the designated clerk, it will constitute a final order of the Department pursuant to Section 120.52(7), F.S. and will be effective unless a request for an administrative hearing is filed by a third party in accordance with Chapter 120, F.S. and the attached Notice of Rights.

By accepting this offer you, Mr. Kevin Edmonds:

(1) certify that you are authorized and empowered to negotiate, enter into, and accept the terms of this offer in the name and on behalf of Respondent;

(2) acknowledge and waive Respondent's right to an administrative hearing pursuant to Sections 120.569 and 120.57, F.S., on the terms of this offer, once final;

(3) acknowledge and waive Respondent's right to an appeal pursuant to Section 120.68, F.S.

The Department acknowledges that the Respondent's acceptance of this offer does not constitute an admission of liability for the violation referenced above.

By accepting this offer you, Mr. Byron Brooks:

(1) certify that you are authorized and empowered to negotiate, enter into, and accept the terms of this offer in the name and on behalf of Respondent;

(2) acknowledge and waive Respondent's right to an administrative hearing pursuant to Sections 120.569 and 120.57, F.S., on the terms of this offer, once final;

(3) acknowledge and waive Respondent's right to an appeal pursuant to Section 120.68, F.S.

The Department acknowledges that the Respondent's acceptance of this offer does not constitute an admission of liability for the violation referenced above.

Respondent's Performance

After signing and returning this document to the Department,

(1) Upon signing this letter, you must implement the P2 Project in accordance with the requirements identified in the attached Exhibit A. You must begin the P2 Project within **30** days, and fully complete the P2 Project within **90** days of your signing this letter. Your failure to timely start or complete the P2 Project, or timely provide the Department with the Final Report, will cause the P2 Project option to be forfeited and the balance of the civil penalty shall be due within 10 days of notice from the Department.

(2) Respondents must pay $250.00 within 30 days of the effective date of this Order.

(3) Respondents shall make all payments required by this Order by cashier's check, money order or on-line payment. Cashier's check or money order shall be made payable to the "Department of Environmental Protection" and shall include both the OGC number assigned to this Order and the notation "Water Quality Assurance Trust Fund." Online payments by e-check can be made by going to the DEP Business Portal at: http://www.fldepportal.com/go/pay/
It will take a number of days after this order is final, effective and filed with the Clerk of the Department before ability to make online payment is available.

The Department may enforce the terms of this document, once final, and seek to collect monies owed pursuant to Sections 120.69 and 403.121, F.S.

Until clerked by the Department, this letter is only a settlement offer and not a final agency action. Consequently, neither the Respondent nor any other party may request an administrative hearing to contest this letter pursuant to Chapter 120, F.S. Once this letter is clerked and becomes a final order of the Department, as explained above, the attached Notice of Rights will apply to parties, other than the Respondent, whose interests will be substantially affected.

Electronic signatures or other versions of the parties' signatures, such as .pdf or facsimile, shall be valid and have the same force and effect as originals. No modifications of the terms of this Order will be effective until reduced to writing,

executed by both Respondents and the Department, and filed with the clerk of the Department.

Please be aware that if the Respondents decline to respond to the Department's offer, the Department will assume that the Respondents are not interested in resolving the matter and will proceed accordingly.

If you have any questions, please contact Jenny E. Farrell at 407-897-4173 or at jenny.e.farrell@dep.state.fl.us.

Sincerely,

Aaron Watkins
District Director
Central District

FOR THE RESPONDENTS:

I, Kevin Edmonds [Type or Print Name], **HEREBY ACCEPT THE TERMS OF THE SETTLEMENT OFFER IDENTIFIED ABOVE.**

By: Kevin Edmonds Date: 4/20/2021
[Signature]

Title: Chief Administrative Officer
[Type or Print]

I, Burton W. Brooks [Type or Print Name], **HEREBY ACCEPT THE TERMS OF THE SETTLEMENT OFFER IDENTIFIED ABOVE.**

By: Burton W. Brooks Date: 05/11/2021
[Signature]

Title: County Administrator
[Type or Print]

BOARD OF COUNTY COMMISSIONERS · ORANGE COUNTY FLORIDA

FOR DEPARTMENT USE ONLY

DONE AND ORDERED this 20 day of May, 2021, in Orange County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

on behalf of
Aaron Watkins
District Director
Central District

Filed, on this date, pursuant to section 120.52, F.S., with the designated Department Clerk, receipt of which is hereby acknowledged.

Clerk

May 20, 2021
Date

Attachments: Notice of Rights

Final clerked copy furnished to:
Lea Crandall, Agency Clerk (lea.crandall@dep.state.fl.us)

NOTICE OF RIGHTS

Persons who are not parties to this Order, but whose substantial interests are affected by it, have a right to petition for an administrative hearing under Sections 120.569 and 120.57, Florida Statutes. Because the administrative hearing process is designed to formulate final agency action, the filing of a petition concerning this Order means that the Department's final action may be different from the position it has taken in the Order.

The petition for administrative hearing must contain all of the following information:

a) The OGC Number assigned to this Order;

b) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding;

c) An explanation of how the petitioner's substantial interests will be affected by the Order;

d) A statement of when and how the petitioner received notice of the Order;

e) Either a statement of all material facts disputed by the petitioner or a statement that the petitioner does not dispute any material facts;

f) A statement of the specific facts the petitioner contends warrant reversal or modification of the Order;

g) A statement of the rules or statutes the petitioner contends require reversal or modification of the Order; and

h) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Order.

The petition must be filed (received) at the Department's Office of General Counsel, 3900 Commonwealth Boulevard, MS# 35, Tallahassee, Florida 32399-3000 or received via electronic correspondence at Agency_Clerk@floridadep.gov, within 21 days of receipt of this notice. A copy of the petition must also be mailed at the time of filing to the District Office at the address indicated above. Failure to file a petition within the 21-day period constitutes a person's waiver of the right to request an administrative hearing and to participate as a party to this proceeding under Sections 120.569 and 120.57, Florida Statutes. Mediation under Section 120.573, Florida Statutes, is not available in this proceeding.

Exhibit A

P2 Project Summary
Water Conserv II Distribution Center
17498 McKinney Road
Winter Garden, FL 34787
407-656-2332-X228
Scott Ruland / Project Manager

A. **Project Description**: The Water Conserv II project provides beneficial reclaim water usage through metered point of connections referred to as Turnouts. The turnouts are large meter assemblies that include the following equipment: flow meter, flow control valve, pressure transducers, solenoids, communications (SCADA) radio, and PLC. The following P2 Project will remove all the current electrical utilization with the proposed installation of a solar powered system. Water Conserv II is proposing the purchase and installation of a 50-Watt continuous solar system. The system consists of a 300-Watt 60 Cell solar module, including cabinet, cables, regulator, four (4) 8G8D 265AH 12V gel batteries, 300-Watt wave inverter, 60 AMP charge controller/meter, and miscellaneous conduits, racks and cabling. This system will replace the current utility provided power to the selected location. The location selected for the project is the Turnout for Southern Hill Farms. This 120-acre family owned, and operated facility hosts annual events as well as weddings, birthday parties and other events. This site will provide public awareness of the use of renewable and clean energy at Water Conserv II.

B. **Environmental and Economic Benefits**: The proposed P2 project will result in energy conservation with a 100% net savings in electrical usage. The solar power generation is a renewable and sustainable resource which will replace the existing reliance on utility power provided by DUKE ENERGY. The project is replacing the 25.92 kwh per month or 311.04 kwh per year consumption. According to the EPA's Greenhouse Gas Equivalencies Calculator this project will result in an annual reduction of 0.235 tons of carbon emissions.
The project will result in an electric cost savings of $ 758.40 annually. Electrical cost savings were calculated on the "on peak" and "off peak" power usage for the project. Additionally, the project will eliminate the current DUKE fuel charges calculated by the kw consumption resulting in an additional $566.48 savings annually. Fuel charges were calculated on the "on peak" and "off peak" power usage for the project. Total annual costs savings for electrical usage are calculated at $1,324.88.

Table 1

(Water Conserv II - Southern Hill Farms)							
Annual Resource Consumption Comparison							
Item	Quantity Used (gal/lb/kwh-**specify**)			Purchasing Cost ($)			Percent (%) Reduction
	Before	After	Reduction	Before	After	Reduction	
Water							
Chemicals							

Materials							
Energy (kwh)	311.04	0	311.04	1,324.88	0	1,324.88	100
Total Annual Cost Savings =							
Annual Waste Generation Comparison							
Item	Quantity Generated (gal/lb/tons-**specify**)			Disposal Cost ($)			Percent (%) Reduction
	Before	After	Reduction	Before	After	Reduction	
Hazardous Waste							
Industrial Wastewater							
Solid Waste							
Air Emissions (Co_2 tons)	0.235	0	0.235	N/A	N/A	N/A	100
Total Annual Cost Savings = $1,324.88							
Total Annual Avoided Cost Savings = $1,324.88							

C. **Project Cost**: Project costs include a 50-Watt Solar module that is sold as a complete package unit and electrical installation costs. Related activities including design, installation, and testing will be performed by project staff in accordance with their regular job duties. Table 2 provides the applicable costs for the project with the estimated annual savings (Table 1) and projected payback period.

Table 2

(Water Conserv II - Southern Hill Farms)		
Project Costs		
Item	Costs	
50 Watt Solar System (package unit)	$	6,600.00
Electrical Contractor	$	1,160.00
Total Cost = $7,760		
Projected Payback		
Project Costs	$	7,760.00
Annual Cost Savings	$	1,325.00
Projected Payback = 5.86 years		

D. **Project Reporting:**

1. Within 60 days of completing the P2 Project, Water Conserv II shall submit to the Department a Final Report that includes the following:

a. A confirmation that the information presented in Sections A-C of the Summary is unchanged, or an updated version with the sections changed appropriately. A statement that the Project was implemented successfully. An explanation of any problems encountered and corrections applied. A statement indicating the date the Project was started and also the date completed.

b. Attached expense reports, receipts, purchasing instruments and other documents itemizing costs expended on preparing and implementing the Project.

AMERESCO SOLAR
Green • Clean • Sustainable

202 S. Live Oak Suite B
Tomball, TX 77375
Website: www.amerescosolar.com
281-351-0031
281-378-2304
Prepared by: Travis Tomczyszyn

QUOTE

DATE	3/24/2021
QUOTE #	
CUSTOMER ID	
VALID UNTIL	

CUSTOMER

Bob Serpa
Maintenance Chief
Woodard & Curran, Inc. /Water Conserv II
17498 McKinney Rd
Winter Garden, FL 34787
Office Phone: 407-656-2332-X225 | Cell Phone: 386-320-2097
E-mail: bob.serpa@waterconservii.com"

DESCRIPTION	UNIT PRICE	QTY	TAXED	AMOUNT
50 WATT CONTINOUS SYSTEM-UNIT-4T-2	6,600.00	1		6,600.00
PREWIRED INTEGRATED ASSEMBLY, TS-MPPT60,TSM-2,		1		-
SI300 INVERTER, BREAKERS, TERMINAL BLOCK, WIRING,				-
SCHEMATICS AND ENGINEERING				-
				-
300 WATT 60 CELL SOLAR MODULES		2		-
TGPL-4-ALUMINUM POWDERCOAT , UL LISTED(HOLDS 4 265AH BATT)		1		-
SKID MOUNT FOR 300 WATT SOLAR MODULES		1		-
OP35' OUTPUT CABLE, CUT IN HALF		1		-
BATTERY CABLE KIT: INCLUDES PARALLEL JUMPERS AND				-
REGULATOR TO BATTERY CABLE		1		-
8G8D 265AH 12V GEL BATTERY		4		-
SI-300-115UL 300 WATT PURE SINE WAVE INVERTER		1		-
TS-MPPT60M 60AMP MPPT 12/24/48V CHARGE CONTROLLER /METER		1		-
				-

Subtotal	$	6,600.00
TAXABLE	$	-
Tax rate		
Tax due	$	-
Shipping		
TOTAL	**$**	**6,600.00**

TERMS AND CONDITIONS

If you have any questions about this price quote, please contact
Travis Tomczyszyn 281-378-2304 or Email: ttom@ameresco.com

Thank You For Your Business!

Service Estimate

March 24, 2021

From: Ben Everard
To: Bob Serpa

Job Name: Water Conserv
Subject: Electrical Installation of Turnout 4T-2

We propose to furnish all labor and material for the sum of **$1,160.00** as specified by the following scope:

1. Provide and install conduit and wiring from the owner installed solar panel system cabinet to the existing electrical distribution cabinet not to exceed 40'.
2. Use 3/4" IMC conduit.
3. Inside the conduit pull (3) #10 THHN conductors.
4. All work to be done during normal business hours (Mon thru Fri) unless otherwise noted.

Payment Terms: Due upon completion of work.

Thank you for the opportunity to provide you with this proposal. Bright Future Electric, LLC will provide a complete installation according to manufacturer's recommendations and in a neat and workmanship like manner. This proposal is valid for 30 days from the above date.

Sincerely,

Ben Everard

Ben Everard – Service Estimator – (407) 625-9689 – Bene@brifutelectric.com

Customer Signature: _____ Date: _____

Print Name: _____ Title: _____

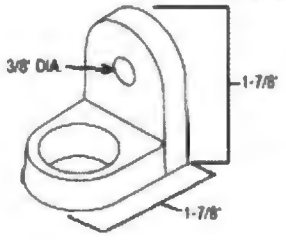
630 Maguire Rd. Ocoee, Fl. 34761
407-654-0155 PHONE 407-654-5669 FAX

8G8D LTP

Valve-Regulated, Gelled-Electrolyte Battery

SPECIFICATIONS

Nominal Voltage (V)	12V
Capacity at C/100	265Ah
Weight	160.8 (72.9 kg)
Plate Alloy	Lead Calcium
Posts	Forged terminals & bushings
Container/Cover	Polypropylene
Operating Temperature Range	-76°F (-60°C) – 140°F (60°C)
Charge Voltage @ 68°F (20°C)	
Cycle	2.30 - 2.35 VPC
Float	2.25 - 2.30 VPC
Vent	Self-sealing (2 PSI operation)
Electrolyte	Sulfuric acid thixotropic gel
Resistance	4.0 Milliohms (full charge)
Terminal	T975

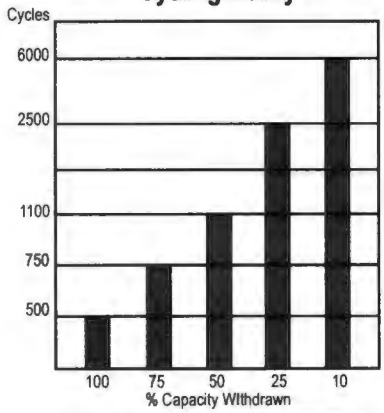


Rated non-spillable by ICAO, IATA and DOT
Approved by CEC
Made in the U.S.A by East Penn Manufacturing

DIMENSIONS

Length (mm)	**20.75 (527 mm)**
Width (mm)	**11 (279 mm)**
Height (mm)	**11 (279 mm)**

Cycling Ability



Number of cycles vs. depth of discharge at +20°C
discharge with 20 hour rate

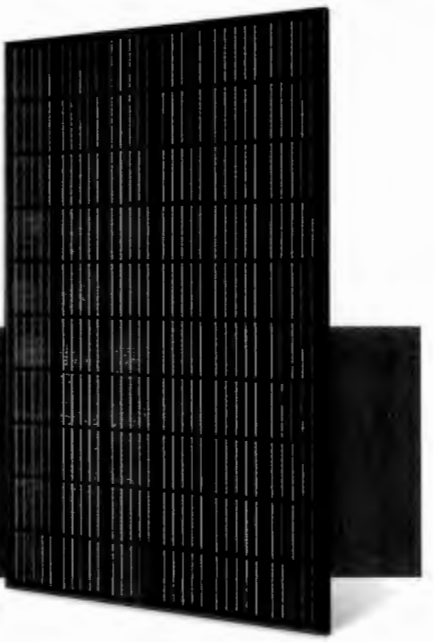
Distributed by:

MK Battery
1645 South Sinclair Street • Anaheim, California 92806
Toll Free: 800-372-9253 • Fax: 714-937-0818 • E-Mail: sales@mkbattery.com

HYUNDAI SOLAR MODULE

RG
BLACK

Mono-Crystalline Type
HiD-S290RG(BK) HiD-S295RG(BK) HiD-S300RG(BK)
HiD-S305RG(BK)



60
Cells

For Residential Applications

All Black Module For Sleek Design

More Power Generation In Low Light

HYUNDAI CELL
Hyundai Cell Assembled in USA

PERL Technology

PERL technology provides ultra-high efficiency with better performance in low irradiation. Maximizes installation capacity in limited space.

Anti-LID / PID

Both LID(Light Induced Degradation) and PID(Potential Induced Degradation) are strictly eliminated to ensure higher actual yield during lifetime.

Mechanical Strength

Tempered glass and reinforced frame design withstand rigorous weather conditions such as heavy snow and strong wind.

Reliable Warranty

HYUNDAI

Global brand with powerful financial strength provide reliable 25-year warranty.

Corrosion Resistant

NH_3 NaCl

Various tests under harsh environmental conditions such as ammonia and salt-mist passed.

UL / VDE Test Labs

UL VDE

Hyundai's R&D center is an accredited test laboratory of both UL and VDE.

Hyundai's Warranty Provisions

10 YEARS
- 10-Year Product Warranty
  - On materials and workmanship

25 YEARS
- 25-Year Performance Warranty
  - Initial year: 97%
  - Linear warranty after second year: with 0.7%p annual degradation, 80% is guaranteed up to 25 years

About Hyundai Solar

Established in 1972, Hyundai Heavy Industries (HHI) is one of the most trusted names in the heavy industries sector with 48,000 employees and more than 40 Billion USD in annual sales (2015). As a global leader and innovator, Hyundai Heavy Industries is committed to building a future growth engine by developing and investing heavily in the field of renewable energy.

Started as a core business division of HHI, Hyundai Solar (Hyundai Heavy Industries Green Energy) now stands as an independent company and an affiliate of HHI as from December 2016. We have strong pride in providing high-quality PV products to more than 3,000 customers worldwide.

Certification

HYUNDAI GREEN ENERGY

Electrical Characteristics

		Mono-Crystalline Module (HiD-S____RG (BK))			
		290	295	300	305
Nominal Output (Pmpp)	W	290	295	300	305
Open Circuit Voltage (Voc)	V	39.6	39.8	40.0	40.4
Short Circuit Current (Isc)	A	9.7	9.8	9.8	9.8
Voltage at Pmax (Vmpp)	V	31.9	32.3	32.5	32.9
Current at Pmax (Impp)	A	9.2	9.2	9.3	9.3
Module Efficiency	%	17.3	17.6	17.9	18.2
Cell Type	-	mono-crystalline silicon			
Maximum System Voltage	V	1,000			
Temperature Coefficient of Pmax	%/K	-0.391			
Temperature Coefficient of Voc	%/K	-0.31			
Temperature Coefficient of Isc	%/K	0.031			

*All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

Mechanical Characteristics

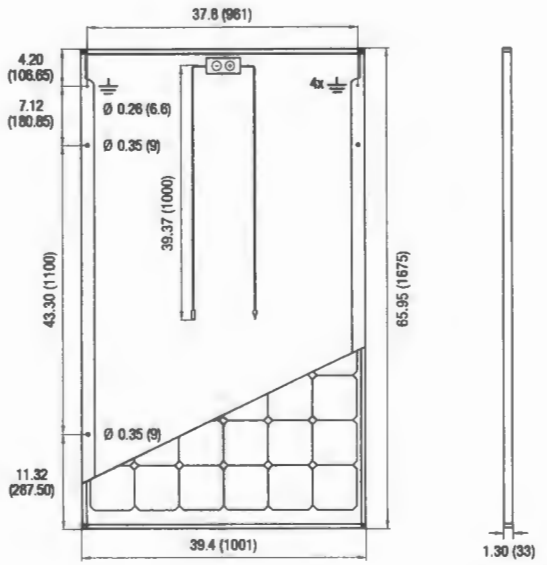
Dimensions	1,001mm (39.40") x 1,675mm (65.95") x 33mm (1.3")
Weight	18.0kg (39.7lbs)
Solar Cells	60 cells in series (6 x 10 matrix) (Hyundai cell)
Output Cables	4 mm² (12AWG) cables with polarized weatherproof connectors, IEC certified (UL listed), Length 1.0 m (39.4")
Junction Box	IP65, weatherproof, IEC certified (UL listed)
Bypass Diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front Glass : Anti-reflection coated glass, 3.2 mm (0.126") Encapsulant : EVA I Back Sheet : Weatherproof film
Frame	Clear anodized aluminum alloy type 6063 (Black Color)

Installation Safety Guide

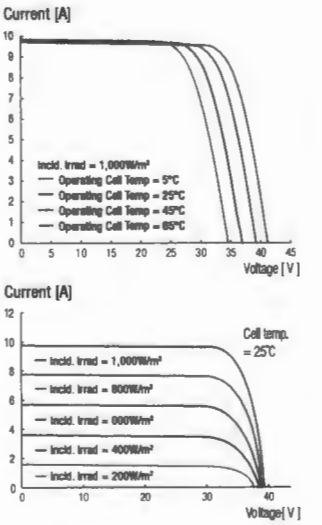
- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not damage or scratch the rear surface of the module.
- Do not handle or install modules when they are wet.

Nominal Operating Cell Temperature	46°C ± 2
Operating Temperature	-40 – 85°C
Maximum System Voltage	DC 1,000 V (UL)
Maximum Reverse Current	25A
Maximum Design Load	Front 113 psf Rear 64 psf

Module Diagram (unit : mm)



I-V Curves



HYUNDAI GREEN ENERGY

Printed on FSC certified eco-friendly paper.

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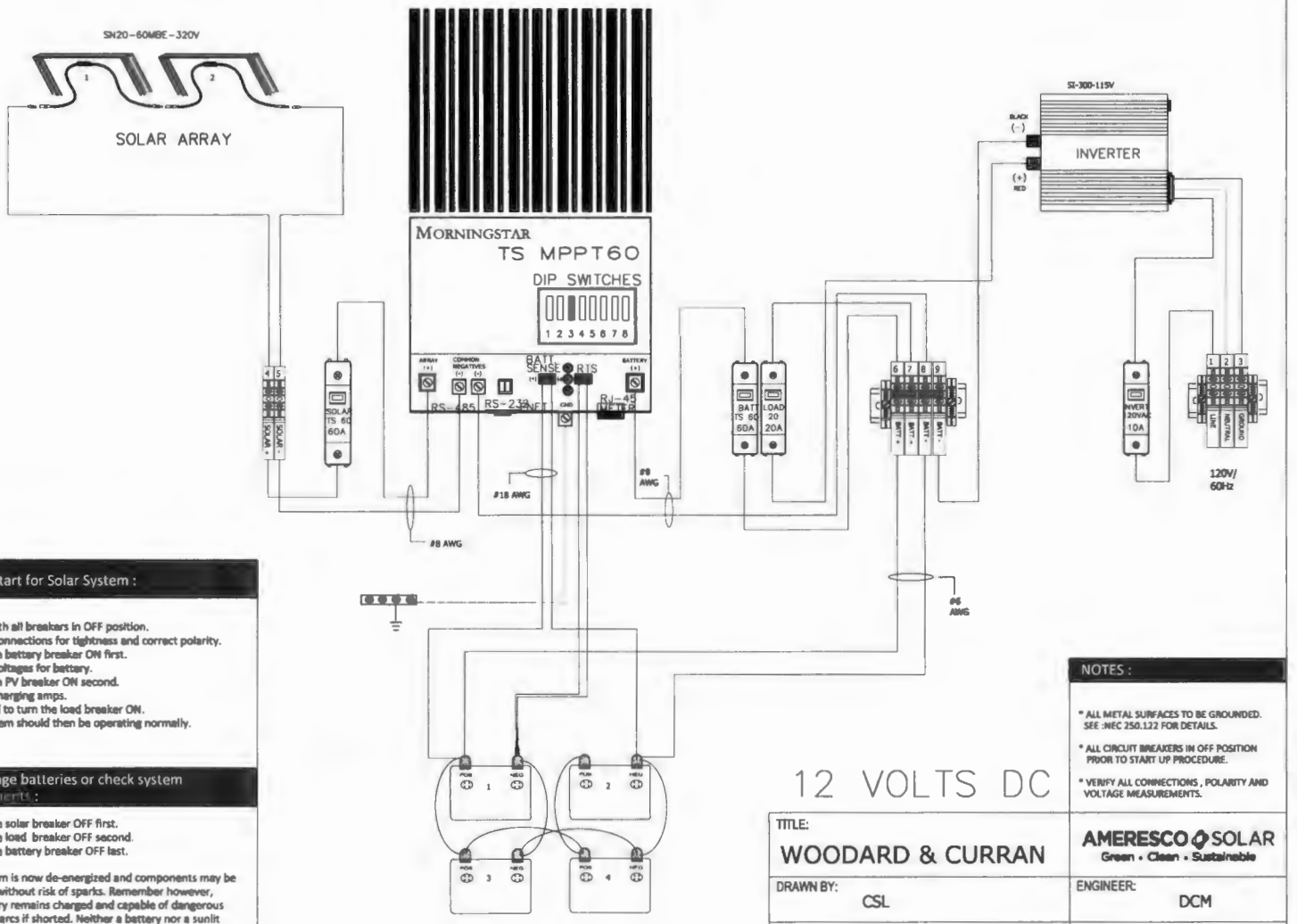
Europe : +49-89-71042-2023, Australia : +61-2-9238-2283

Printed Date : 05/2019



Quick Start for Solar System :

* Start with all breakers in OFF position.
* Check connections for tightness and correct polarity.
* Turn the battery breaker ON first.
* Verify voltages for battery.
* Turn the PV breaker ON second.
* Verify charging amps.
* Proceed to turn the load breaker ON.

The system should then be operating normally.

To change batteries or check system components :

* Turn the solar breaker OFF first.
* Turn the load breaker OFF second.
* Turn the battery breaker OFF last.

The system is now de-energized and components may be changed without risk of sparks. Remember however, the battery remains charged and capable of dangerous sparks or arcs if shorted. Neither a battery nor a sunlit solar module can be de-energized, only disconnected.

NOTES :

* ALL METAL SURFACES TO BE GROUNDED. SEE :NEC 250.122 FOR DETAILS.
* ALL CIRCUIT BREAKERS IN OFF POSITION PRIOR TO START UP PROCEDURE.
* VERIFY ALL CONNECTIONS , POLARITY AND VOLTAGE MEASUREMENTS.

12 VOLTS DC

TITLE: WOODARD & CURRAN	AMERESCO SOLAR Green • Clean • Sustainable
DRAWN BY: CSL	ENGINEER: DCM
DATE: 06 / 05 / 2019	SALES: TT

THIS DRAWING IS ONLY FOR SUBMITTAL PURPOSES.

MORNINGSTAR
PROFESSIONAL SERIES
World's Leading Solar Controllers & Inverters

+1-215-321-4457
sales@morningstarcorp.com

SureSine™ Inverter

FOR REMOTE OFF-GRID PV/SOLAR SYSTEMS

- Superior Load Operation
- More Power Available
- Extremely High Reliability
- No Cooling Fan Needed

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.

The SureSine's combination of performance, features and competitive price provides the best small inverter value on the market. It is highly reliable, having no internal cooling fan or other moving parts prone to failure.

KEY FEATURES AND BENEFITS

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. 600W peak/surge power.
- Outstanding Surge Capability – handles a 200% surge during load start-up, to a maximum of 600W.

More Power Available

- High Efficiency – a high peak efficiency will reduce heating and make more solar energy available for powering loads.
- Low Self-Consumption – The SureSine consumes only 450mA of current during operation with a full sine-wave present at the AC output. During periods where no load is detected, solar energy is not wasted because the SureSine automatically powers down to standby mode, reducing self-consumption to one-tenth of operating consumption.

Extremely High Reliability

- Extensive Electronic Protections – the SureSine has extensive electronic protections that will automatically protect against faults and user mistakes such as short circuit, overload, high temperature and low voltage disconnect. Recovery from most faults is automatic.
- No Internal Cooling Fan – a key design objective since fans often fail in harsh environments and are noisy, consume power and blow dirt into the electronics.
- Tropicalization – the SureSine uses epoxy encapsulation, conformal coating, stainless steel hardware, and an anodized aluminum enclosure to protect against harsh tropical and marine environments.

Other Features

- More Information – the two LEDs provide important information to the user about system status and any fault conditions. An optional digital meter may be connected to the SureSine to display additional system information.
- Remote On/Off – improves safety by making it easy to install the SureSine in an inaccessible location or enclosure. Reduces system cost by avoiding the need to add an AC safety disconnect to the system.
- Adjustability & Communications – four DIP switches provide easy adjustability of several system parameters. Additional adjustability is possible using Morningstar's USB MeterBus Adapter (UMC-1) to connect to a PC. Free 3rd-party MODBUS software is available for custom programming. IP-based communication, including SNMP, is enabled through Morningstar's Ethernet MeterBus Converter (EMC-1).

Simple Network Management Protocol
SNMP COMPATIBLE

8 Pheasant Run, Newtown, PA 18940 USA

www.morningstarcorp.com

MORNINGSTAR
PROFESSIONAL SERIES
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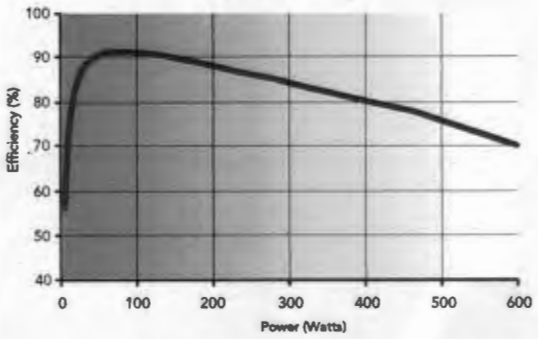
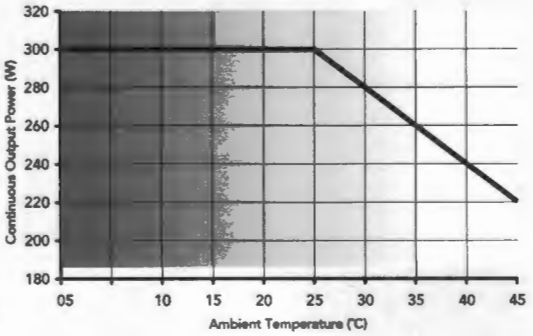
Technical Specifications

Versions	SI-300-115V-UL SI-300-220V
Electrical	
Continuous Power Rating	300 Watts @ 25°C
Peak Power Rating (15 minutes)	600 Watts @ 25°C
DC Input Voltage	10.0V – 15.5V
Waveform	Pure sine wave
AC Output Voltage (RMS)*	220V or 115V +/– 10%
AC Output Frequency*	50 or 60 Hz +/– 0.1%
Peak Efficiency	92%
Total Harmonic Distortion (THD)	< 4%
Self Consumption	
Inverter On (no load)	450mA
Inverter Off	25mA
Stand-by	55mA
Low Voltage Disconnect (LVD)	11.5 V or 10.5 V**
Low Voltage Reconnect	12.6 V or 11.6 V**
LVD Warning Threshold (buzzer)	11.8 V or 10.8 V**
LVD Delay Period	4 minutes
High Voltage Disconnect	15.5 V
High Voltage Reconnect	14.5 V
Standby On Threshold	~ 8 Watts
Standby Off Threshold	~ 8 Watts
High Temperature Disconnect	95°C (heatsink)
High Temperature Reconnect	80°C (heatsink)

Inverter Efficiency



Temperature De-Rate Curve



*Two separate versions available:
220VAC at 50 Hz or 115VAC at 60 Hz
Other output voltages available upon request.
**User selectable on both versions.

Electronic Protections

- Reverse Polarity (fused)
- AC Short Circuit
- AC Overload
- High Voltage Disconnect
- Low Battery Disconnect
- High Temperature Disconnect

Mechanical Specifications

- Dimensions: 213 x 152 x 105 mm
  8.4 x 6.0 x 4.1 in
- Weight: 4.5 Kg / 10.0 lbs
- AC Terminals: Max. Wire Size
  — 4 mm² / 12 AWG
- DC Terminals: Max. Wire Size
  — 2.5 to 35 mm² / 14 to 2 AWG
- Remote On/Off Terminals: Max. Wire Size
  — 0.25 to 1.0 mm² / 24 to 16 AWG
- Enclosure: IP20
  Cast anodized aluminum

Environmental Specifications

- Ambient Operating Temp: –40°C to +45°C
- Storage Temperature: –55°C to +85°C
- Humidity: 100% (non-condensing)
- Tropicalization: Conformal coating on printed circuit boards. Epoxy encapsulated transformer and inductors.

Accessories

- Remote Meter (RM-1)
- PC MeterBus Adapter (MSC)
- USB Communications Adapter (UMC-1)
- Ethernet Communications Adapter (EMC-1)
- Meter Hub (HUB-1)
- Relay Driver (RD-1)

Certifications

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

Warranty

Two year warranty period.
Contact Morningstar or your authorized distributor for complete terms.

AMERESCO SOLAR

Green • Clean • Sustainable

Ameresco Solar supplies and distributes a complete line of enclosures to accommodate a wide range of off-grid applications. We have a large selection of enclosures and control cabinets ranging from single battery (for pole and ROHN towers) to custom skid-mounted, multi-battery enclosures. Our enclosure line has the flexibilty to meet your solar system storage needs.

TGPL-4 Series Features:

NEMA Ratings
- NEMA 3R (Standard)
- NEMA 4, NEMA 4X

Available Material and Finish
- Mill finished aluminum (Standard)
- Powder coated aluminum (White)
- Stainless steel (304 or 316)

Enclosure Dimensions
- Overall: (H) 55" x (W) 26.125" x (D) 25"

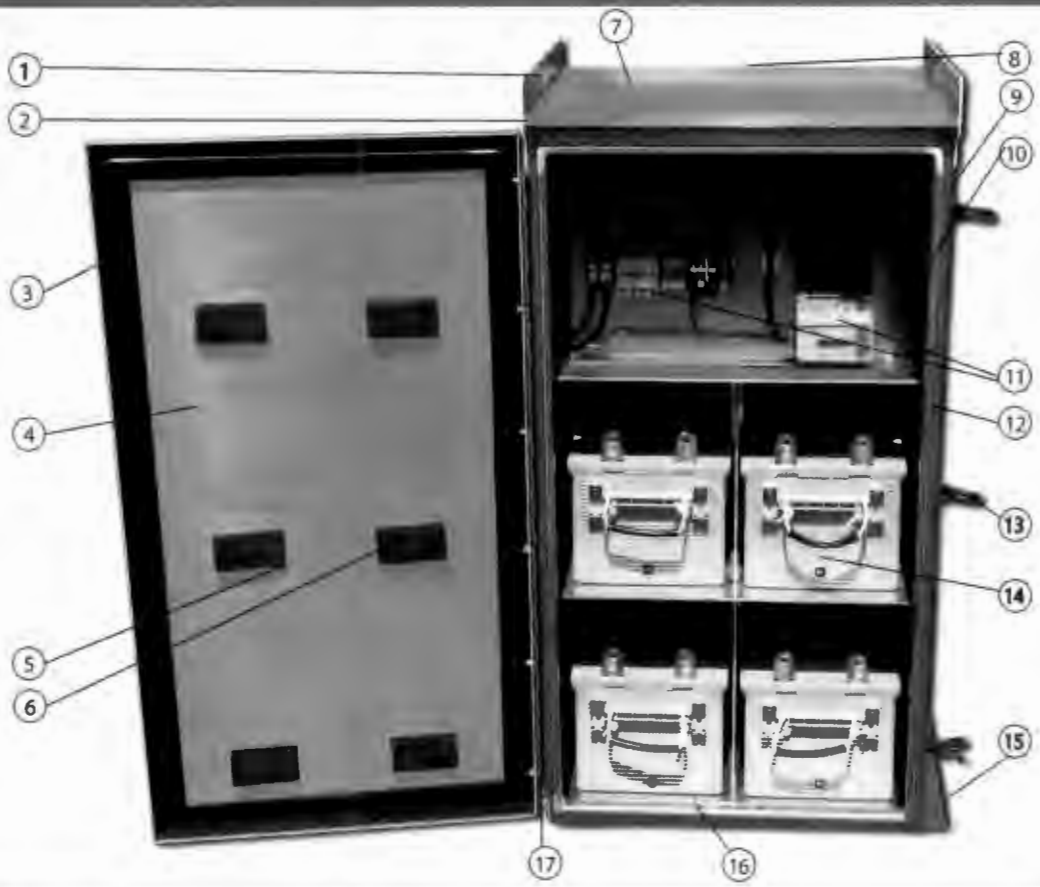
Back Panel Dimensions
- (H) 12.5" x (W) 20"
- Custom option available

Battery Capacity
- BCI Group 8G4D & 8G8D
- (4) with Back Panel (Assembly)
- (6) without Back Panel (Assembly)

Weight
- 142 lbs

Photographs are intended to portray typical enclosure appearance, actual appearance my vary.

ENCLOSURES - TGPL-4 Series



1. Lifting Eye
2. Rain Drip Lip
3. Closed Cell Neoprene Gasket
4. Door
5. Door Vent
6. Filter Media
7. TGPL-4 Enclosure
8. Mounting Tab Rail (Solar Array)
9. Side Vents (Cross Ventelation)
10. Back Panel
11. Electrical Assembly (Not included)
12. Double Flanged Door Opening
13. Stainless Steel Lockable Draw Latch
14. Battery (Not included)
15. Mounting Rails (Foundation)
16. Door Stop
17. Stainless Steel Hinge

Enclosure Options

(4) Battery Bank : 8G8D

(6) Battery Bank : 8G8D

Back Panel Assembly

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30, 45 or 60 amps
at up to 150 volts
open circuit.

TriStar MPPT™

SOLAR CONTROLLER WITH MAXIMUM POWER POINT TRACKING

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

Morningstar's TriStar MPPT solar controller with TrakStar Technology™ is an advanced maximum power point tracking (MPPT) battery charger for off-grid photovoltaic (PV) systems up to 3kW. The controller provides the industry's highest peak efficiency of 99% and significantly less power loss compared to other MPPT controllers.

The TriStar MPPT features a smart tracking algorithm that maximizes the energy harvest from the PV by rapidly finding the solar array peak power point with extremely fast sweeping of the entire I-V curve. This product is the first PV controller to include on-board Ethernet for a fully web-enabled interface and includes up to 200 days of data logging.

KEY FEATURES AND BENEFITS

Maximizes Energy Harvest

Our TrakStar MPPT Technology features:

- Better peak power point tracking than other MPPT controllers
- Very fast sweeping of the entire I-V curve
- Recognition of multiple power points during shading or mixed PV arrays
- Excellent performance at sunrise and low solar insolation levels

Extremely High Reliability

- Robust thermal design and no cooling fans
- Parallel circuit design provides less stress and longer life for electronic components
- No mechanical relays
- Extensive electronic protections including PV short circuit protection
- Epoxy encapsulated inductors and conformally coated printed circuit boards

Very High Efficiency

- Peak efficiency of 99%
- Proprietary tracking algorithm minimizes power losses
- Low self-consumption
- Continuous operation at full power to 45°C without need to de-rate
- Selected electronic devices with higher ratings to minimize losses from heating

Extensive Networking and Communications Capabilities

Enables system monitoring, data logging and adjustability. Uses open standard MODBUS™ protocol and Morningstar's MS View software.

- Meterbus: communications between compatible Morningstar products
- Serial RS-232: connection to a personal computer
- EIA-485: communications between multiple devices on a bus
- Ethernet: fully web-enabled interface to a local network or internet; view from a web browser or send email/text messages
- EMC-1: IP based network and internet connectivity

Metering and Data Logging

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

System Status:

53.60V	28C	54.2A
2867W		MPPT

Data Logging:

Today	46.4 Vmin	Batt	Day:-1	47.2 Vmin	Batt
Today	58.9 Amax	Solar	Day:-1	56.8 Amax	Solar
Today	107.2 Vmax	Solar	Day:-1	105.5 Vmax	Solar

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TRAKSTAR MAXIMUM POWER POINT TRACKING

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Technical Specifications

Versions	TS-MPPT-30	TS-MPPT-45	TS-MPPT-60	TS-MPPT-60M
Meter				
TS-M2	Optional	Optional	Optional	Included
TS-RM2	Optional	Optional	Optional	Optional
Electrical				
Maximum Battery Current	30 amps	45 amps	60 amps	60 amps
Nominal Maximum Operating Power*				
12 Volt	400 Watts	600 Watts	800 Watts	800 Watts
24 Volt	800 Watts	1200 Watts	1600 Watts	1600 Watts
48 Volt	1600 Watts	2400 Watts	3200 Watts	3200 Watts
Peak Efficiency	99%			
Nominal System Voltage	12, 24, or 48 volts DC			
Maximum PV Open Circuit Voltage**	150 volts DC			
Battery Operating Voltage Range	8-72 volts DC			
Maximum Self-consumption	2.7 Watts			
Transient Surge Protection	4500 Watts/port			
Battery Charging				
Charging Algorithm	4-stage			
Charging Stages	Bulk, Absorption, Float, Equalize			
Temperature Compensation:				
Coefficent	-5mV/°C/cell (25° ref)			
Range	-30°C to +80°C			
Set Points	Absorption, Float, Equalize, HVD			
Remote Temperature Sensor (RTS)	Included			

Certifications:

- CE and RoHS Compliant
- ETL Listed (UL1741)
- cETL (CSA C22.2 No. 107.1-01)
- FCC Class B Part 15 Compliant
- U.S. National Electrical Code (NEC) 690.5 Compliant
- Manufactured in a certified ISO 9001 facility
- IEC 62109

Options:

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

Notes:

*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 yeer warranty period. Contact Morningstar or your authorized distributor for complete terms.

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

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

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

Mechanical	
Dimensions	29.1 x 13.0 x 14.2 cm 11.4 x 5.1 x 5.6 in
Weight	4.2 kg / 9.2 lbs
Maximum Wire Size	35 mm² / 2 AWG
Conduit Knockouts	M20; ½, 1, 1 ¼ in
Enclosure	Type 1 (indoor and vented) IP20

Control # MS-001901 Revision: 2/2018