Permit No.	Scan Date	DIN
3603-MSWLF-	**September 10, 2014**	**21745**

Solexus Development, LLC
14 Wing Stem Ct.
O'Fallon, MO 63368
636-474-9067
dbunge@solexus-development.com
www.solexus-development.com

RECEIVED
September 3, 2014
Solid Waste Section
Asheville Regional Office

AUGUST 4, 2014

Larry Frost, Environmental Engineer, Division of Waste Management, NCDENR

Dear Mr. Frost,

Attached, please find an installation plan for the proposed solar facility to be installed at the Auten Road closed landfill facility in Gaston County, North Carolina.

We believe that this information satisfies the requirements for a land use permit to proceed with the construction of the facility, and request that your office approve this project.

Please contact me if you have any questions or require any additional information.

Your assistance in this matter is greatly appreciated.

Regards,

PRESIDENT

Gaston County **Public Works Department**

October 14, 2013

Calor Energy
1910 Abbott Street, Unit 200
Charlotte, NC 28203

Attention: Mr. Rich Deming

Reference: Agreement for Amendment to One-Year Right to Develop Solar Facility

Mr. Deming:

Attached are three originals of the above document properly signed by the County. Please sign the contracts and return two fully executed originals for the County files.

Respectfully,

Ray Maxwell, PE
Director of Public Works

/Attachments

Agreement: Development of Solar Facility at the Auten Road Landfill

Parties: Calor Energy Consulting, LLC (Calor), and Gaston County, North Carolina (County). Note: The final counter-party to the proposed lease agreement will be a special purpose entity created specifically for this project by the project investors. This party is referred to below as the Tenant. At the time of system commissioning, the Tenant will be the party to all agreements with the County and Calor will no longer be a party to the agreements.

Summary: The County will give Calor Energy a one-year exclusive right to develop a solar project at the Auten Road Landfill. During this year, which begins after the execution of this agreement by the County, the County and Calor will negotiate in good faith to develop and execute a property lease on the property to cover an initial period of 10 years with an automatic renewal of 10 years and two 5 year options. In the event that the County ends the period prematurely, or elects to not move forward after interconnection and investor agreements have been executed, Calor will be reimbursed for expenses, outlined in Appendix A, of the development process. Otherwise, the County will incur no expense in the process except internal staff time.

C

Calor and its partners will endeavor to develop a solar facility at the site with the following steps:

- Secure a power purchase agreement (PPA)/interconnection agreement with one of the utility
- companies or other entity near the site.
- Develop and execute a land lease or easement, in conjunction with County legal counsel.
- Secure necessary environmental and regulatory approvals.
- Secure the necessary construction and investment resources to fund the project.
- Create a full set of design documents.
- Provide engineering, procurement and construction services
- Execute agreements giving the Renewable Energy Certificates generated by the system to County, with the stipulation that they be enrolled for the length of the lease and extensions in the Shift Equity, LLC Carbon Advantage Program. (CAP) (which can be referenced here: http://shiftequity.com/commodities/
- Create the legal structure and framework to execute the project.
- Install the system through to inspection and commissioning.

2012-385-#1

County will:

- Give Calor the exclusive right to develop the site for one year from the date of this agreement.
- At the end of the one year term, Calor must have completed steps one and two (PPA and lease/easement with the County). If the project is clearly underway but held up due to environmental/regulatory considerations, an extension of one year will be granted. An extension for other reasons may be granted at the option of the County.
- If Calor is unable to execute PPA and lease/easement agreements within one year, the Agreement will become null and void and the county will have no further obligations to Calor Energy unless the County decides to grant an extension to the agreement.
- If the County terminates this agreement before the stated term of one year, or declines to proceed after Calor secures PPA/interconnection agreements and environmental/regulatory approval, the County agrees to reimburse Calor for development costs to the extent that any of such costs have been incurred or are substantially complete. The costs are outlined in Appendix A.
- In the case that the one year term expires and Calor has been unable to develop a project, the documents and agreements created will be owned by Calor. At the County's request, Calor will endeavor to work with any successive vendor/developer to transfer these documents for fair compensation.

The actual lease and/or easement document will be negotiated with the County during this period of one year. The monetary terms of the lease agreement will be the following:

- The County retains rights to the renewable energy certificates (RECs) generated by the system in addition to a monetary lease payment of $300/ acre.
- The Owner shall enroll RECs into the Shift Equity, LLC Carbon Advantage Program (CAP) for the same term as the lease/easement agreement. REC revenue will be split in accordance with the CAP revenue-sharing model, which will guarantee that 50% of all revenue from the RECs will be paid to the County and the other 50% of the revenue will remain with Shift Equity, LLC, which will be responsible for all expenses related to certifying, marketing, and selling the RECs.
- At the expiration of the initial 10 year lease and automatic 10 year extension periods, the Tenant has the option to extend the lease for an additional two consecutive five year terms during which time the County will continue to place all RECs in the CAP system. If the Tenant elects not to exercise additional lease terms, the County has the right to request that the system be removed at no cost to the County. Alternatively, If the Tenant elects to renew the term of the lease, at the end of that period the County has the option to request that the system be removed at no cost to the County, to negotiate some further extension of the lease, or to take possession of the system for the amount of $1.
- Revenue from electricity generated will belong to the Investor Group for years 1-10 and 11-20 of the lease. If the two five year extensions are exercised, Tenant agrees to increase monetary lease payment to $500/acre with a 2% annual escalator.
- Operation and maintenance and insurance (of the system, the ground which it occupies, and any infrastructure associated with the system) are the responsibility of the Tenant for the entire term of the lease and any extensions. These expenses will be wholly incurred by the County if the County chooses to take possession of the system after the lease renewal periods have expired.

County Representative Date

See signature page

Calor Representative Date

10/21/13

Appendix A -- Costs associated with process of Solar Development

• PPA agreement executed	$ 7,500
• Design documents are complete but not stamped	$12,000
• Design documents are reviewed and stamped (additional cost)	$ 7,500
• Agreement is executed with project investors	$15,000
• Lease agreement executed	$ 17,500
• Interconnection Agreement	$ 7,500
• DENR installation approval	$ 17,500
• Environmental impact studies if required	$ 12,500
• NC Utility Commission Filings Complete	$ 3,500

VENDOR

By: _____ RDEming

Date: 10/21/13

GASTON COUNTY

By: _____

~~Manager~~/Assistant County Manager

Date: 10/4/2013

ATTEST:

_____ 10/7/2013

Clerk to the Board/~~Deputy Clerk to the Board~~

APPROVED AS TO FORM:

_____

~~County Attorney~~/Assistant County Attorney

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act.

_____ 10/2/13

Finance Director/~~Assistant Finance Director~~

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

FILE COPY

DEHNR

July 24, 1996

Warren W. Schindle, P.E., County Engineer
Gaston County
P.O. Box 1578
Gastonia, NC 28053

SUBJECT: Closure of the Auten Landfill
Permit # 36-03

Dear Mr. Schindle:

The Solid Waste Section (the Section) has received and reviewed documentation submitted by your consultant, MSA Consulting Engineers, on your behalf regarding the subject facility. Based on this documentation, the Section has determined that the subject facility has been closed in accordance with the applicable requirements. This determination may be rescinded should any of the documentation prove to be inaccurate.

The subject facility is considered closed subject to the attached post closure conditions. The owner of the facility, Gaston County, is responsible for compliance with these conditions.

This closure shall become effective upon written notification by Gaston County that the facility shall be maintained in compliance with the post closure conditions specified in this letter. Also, Rule .0510 states that when a disposal unit is closed, the permit to operate that unit is terminated and any future disposal operations will require approval by the Section.

POST CLOSURE CONDITIONS

1. **MANAGEMENT OF LANDFILL GAS:** The owner and/or operator shall take the measures necessary to ensure that the closed site shall continue to meet the design standards for landfill gas found in Rule .0503(2)(a).

2. **MANAGEMENT OF SURFACE WATER:** The owner and/or operator shall take the measures necessary to ensure that the closed site shall meet the requirements of Rule .0503(2)(c). In addition, the landfill unit shall be maintained such that surface water runoff occurs in a controlled manner, and surface water shall not be impounded over waste.

3. **AIR QUALITY:** The owner/operator shall ensure that landfill units do not violate any applicable requirements developed under a State Implementation Plan approved or promulgated by the U.S. EPA Administrator pursuant to Section 110 of the Clean Air Act, as amended.

4. **FINAL COVER SYSTEM:** The integrity and effectiveness of the final cover system and any permanent erosion control devices must be maintained. This could include making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events.

5. **PROPOSED USES:** The owner/operator shall submit a proposal for the Section's review and approval addressing post closure uses of the facility. Proposed post closure uses shall not violate any post closure conditions found in this letter. In particular, plans for post closure uses shall avoid possibilities for the entrapment of methane gas. Routine landfill gas monitoring within structures and at the facility boundary may not be sufficient to detect potentially dangerous situations.

6. **ONGOING SOLID WASTE MANAGEMENT ACTIVITIES:** Continuing solid waste management activities (e.g. yard waste composting, scrap tire collection, solid waste transfer) shall not violate any post closure conditions found in this letter, and must meet any other applicable requirements.

7. **RECORDATION:** The owner/operator shall ensure that the recordation requirements for land disposal sites found in Rule .0204 are met.

8. **WATER QUALITY MONITORING AND REPORTING REQUIREMENTS:**

a. Groundwater quality at this facility is subject to the "Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina", 15A NCAC 2L. This includes, but is not limited to, the provisions for detection monitoring, assessment, and corrective action.

b. Water quality detection monitoring shall include sampling of surface water monitoring points, to be approved by the section, in addition to sampling of the existing monitoring wells at the facility. The permittee shall sample the detection monitoring wells and surface water sampling locations at a minimum on a semi-annual basis.

c. Water quality detection monitoring shall continue for a minimum of five years from the date of the Section's receipt of Gaston County's notification that the facility will be maintained in compliance with the post-closure conditions specified in this letter. After five years the Section will determine if further monitoring is to be required.

d. Sampling equipment and methods shall conform to specifications in Attachment 1, "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities". The sampling parameters and methods shall be those found in Attachment 2, "Sampling and Analysis Requirements for Construction and Demolition Landfills and Closed Sanitary Landfills", or an alternate parameter list as approved by the Section.

e. The permittee shall maintain a record of all monitoring events and analytical data. Reports of the sampling events and analytical data shall be submitted to the Section in a timely manner.

f. Past groundwater quality data for this facility indicates that Groundwater Quality Standards have been exceeded for some chemical constituents. Additional water quality assessment will be necessary in the future. Until such time Gaston County will continue to monitor and sample ground water consistent with Conditions b, c, and d of this section.

If there are questions regarding this closure letter, please call Matthew Gantt, P.E. in the Winston-Salem Regional Office at (910) 771-4600, or the Solid Waste Section at (919) 733-0692.

Sincerely,

James C. Coffey

James C. Coffey
Permitting Branch
Solid Waste Section

cc: Julian Foscue
Matthew Gantt, P.E.
Bobby Lutfy
Anthony Foster
MSA Consulting Engineers
Central Files

August 4th 2014

Solexus Development
Auten Rd. Landfill Solar Installation Plan

Table of Contents:

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      - **Exhibit A – Product Data Sheets**
      - **Exhibit B – Site Plans**
      - **Exhibit C – Landfill History**

Introduction

As the cost of solar energy continues to fall, it has become an increasingly attractive option for new power generation capacity. We are pleased to see Gaston County taking a leadership position in this on-going shift. An investment in solar energy will provide your customers with clean sustainable energy at a competitive long-term rate for decades to come.

Solexus Development, a St. Louis based solar project developer. Our team brings together all of the key requirements for a successful project: strong development experience, the highest quality design and engineering, the most cost effective construction practices, and access to extremely competitive project capital. We strongly believe that these unique capabilities will provide a winning solution for this project.

Solexus Development is pleased to submit the following installation plan for a solar photovoltaic energy system. For due consideration, are proposing to build a 4.95MW AC facility.

Please feel free to contact David Bunge, President of Solexus Development if you have any questions regarding our proposal. We look forward to working with you.

Qualifications

Auten Rd. Landfill Solar Project Team

Solexus Development	Investor/EPC
Primary Responsibilities: • Primary point of contact • Team representative • Contract negotiations • Permitting • Project development • Project management	Primary Responsibilities: • System Owner • PPA counter-party • Project financing • System design and engineering • Procurement • Construction management • Operations and maintenance

Solexus Development:

Solexus Development will be providing development support for the Auten Rd. Landfill solar energy project. Solexus will serve as the primary point of contact for Gaston County.

Solexus Development is led by David Bunge. Originally from Mexico, Missouri, David moved back to the St. Louis area in 2011 to apply his experience in solar project development to help promote new market opportunities in the Midwest. David has been active in solar project development since 2007. He is an intelligent and highly motivated professional with experience in all aspects of project development from incentive analysis and project origination, to power purchase agreement negotiation and construction.

Prior to founding Solexus Development, David Bunge spent four years as Key Account Manager of Schuco USA's solar team. In this capacity, David spear-headed Schuco's project activities across the country, negotiating with leading developers, installers, and investors to provide modules, racking, and inverters to commercial and utility-scale projects. From 2010-2012, he led the sales team in total revenue.

From 2007-2009, David served as Business Development officer for PVee LLC, a project development company based in Raleigh, North Carolina. At PVee LLC, he oversaw project origination activities for utility-scale opportunities from 1MW to 16MW with fortune 500 clients and leading utilities.

David received his MBA from North Carolina State's Jenkin's School of Management in Raleigh, NC with a concentration in High Technology Entrepreneurship. He completed his undergraduate studies at Davidson College in Davidson, NC.

Key Accomplishments

Developed 6.5MW DC utility-scale solar project for City Utilities of Springfield

- Facilitated the closing of **over 20MW of solar project in 2013.**
- Development pipeline of **over 100MW for 2014-2015.**
- **Created Key Account position allowing Schuco to expand into project business**
- **Highest grossing sales person 3 years in a row with revenues in excess of $57MM**
- **2010 Most Total Margin Award**
- Sold complete system solutions to create **repeat sales opportunities**
- As Business Development Officer, took **responsibility for all sales and marketing materials** including the company business plan
- **Generated opportunities from $7 million to $112 million with** Fortune 500 clients **and publicly traded electric utilities**

Solexus Development Project Reference
• 1. Organization name
• **City Utilities of Springfield**
• 2. Location of project
• **2915 N. Farm Road 209, Strafford, MO 65757**
• 3. Nominal kW_{DC} STC rating of entire project
• **6,522kW DC**
• 4. Primary equipment installed
• **Canadian Solar CS6X-P 305, SMA 750CP-US, AP Alternatives Racking**
• 5. Commercial date
• **July 1st, 2014**
• 6. General project description/comments
• **Largest utility scale installation in Missouri awarded through a competitive bid process for a 25 year PPA.**
• 7. Did the project include ongoing operations and maintenance of primary equipment?
• **Yes**
• 8. Did the project include a long term Power Purchase Agreement for delivered energy?
• **Yes**
• 9. Organization reference contact name and title
• **Cara Schaefer – Director Energy Management and Conservation**
• 10. Organization reference contact phone number
• **417-831-8348**
• 11. Organization reference contact e-mail address
• **Cara.schaefer@cityutilities.net**

- **City Utilities of Springfield – 6.5MW DC – Summer 2014**

Solar Project Description

Solexus Development proposes to build a solar farm with a capacity of 4.95MW AC on approximately 35 acres of land at the Auten Road Landfill site.

The proposed solar energy farm is a low- profile and non- obtrusive use, and is on a similar scale as other "invisible" land uses due to the low impact on the subject site and the adjacent land uses. Once constructed, the solar energy farm will have no moving parts and produce no significant off- site noise, no harmful emissions or any other form of waste product.

The following presents a description of the project components that will be used to construct and maintain the solar energy facility.

Solar Modules

Photovoltaic (PV) modules will be employed to convert solar irradiance into electricity. PV modules are made up of semiconductors(such as silicon) and act as diodes that force electrons to flow in only one direction after being freed by the bombardment of photons from the sun. The electricity is collected from the modules as direct current (DC) electricity which is transformed into three- phase alternating current(AC) by centralized inverters.

Our current specification for the solar energy facility will utilize Jinko Solar's JKM300P-72. This 72 cell polycrystalline module is rated at 300 watts DC capacity. It has a class leading module efficiency of 15.43%. The module is designed for maximum environmental durability to reduce power losses at high temperatures and to withstand high wind loads (2400 pascal). These modules come with a 25 year linear performance warranty.

Inverters

The role of the inverter is to convert DC power from the solar modules into AC power that can be injected into the electrical grid. Power from the inverters will be routed to nearby pad-mount transformers to step the voltage up to the medium voltage of the AC collection system. For the proposed installations we have chosen SMA products. SMA is the worldwide leader in inverter manufacturing with sales of over 1.7 billion Euro in 2011.

We plan to use the SMA SunnyCentral 750CP-US. The CP-US family is UL listed at 1,000 V DC and features an integrated AC disconnect in accordance with NEC 2011 requirements. Both the outdoor enclosure with the OptiCool cooling concept and the separate connection area ensures simple installation while maximizing returns. With a peak efficiency of 98.7 percent,

the CP-US family outperforms all other inverters in its class.

All wiring throughout the array will be contained in above-ground conduit or cable trays. There are no plans for digging or excavation within the capped landfill area.

Mounting System

This installation will utilize the GameChange Racking Paver Rail Ballasted Ground System This solution is ideal for landfills with uneven settling issues, flat ground with subsurface rock preventing post driving, and brown-fields. It has the fastest installation with minimum component count and simple design. The racking system uses standard inexpensive 80 pound pavers stacked on ballast trays. The use of ballast eliminates the need for any penetrations into the soil.

The ballast calculations and the structural will be provided by a professional engineer licensed in North Carolina to ensure that the system will be built appropriately and will not have any negative impact on the landfill cap.

The proposed ballast plan will consist of 900lbs per 8 square foot pan. This approach will have an average weight of 110lbs per square foot. Based on our knowledge of the site and the condition of the cap, we anticipate that this added weight will have no impact on the integrity of the cap.

Other features of the system include:

- Fast top down panel attachment to aluminum rails
- Integrated wire management tray on top rail
- Tilt adjust-ability when mounting tubes to pans to accommodate uneven ground
- Rugged design for 120mph wind speed
- Meet IBC and ASME standards for structural loading
- Full layout and engineering analysis for every project
- Warranty 20 years - simply the best in the industry
- Made in the U.S.A.

Monitoring System

An effective monitoring system is crucial to the successful operation of a solar energy facility. The monitoring system provides critical feedback on system operations that is instrumental in optimizing day to day performance and responding to any system faults. The monitoring system facilitates rapid restoration of production, thus maximizing system performance. For the proposed installations, we have chosen the Meteo Control Safer'Sun Professional system. Meteo Control is the leading provider of monitoring solutions. The Safer'Sun system is deployed in over 6.7 Gigawatts of operational solar facilities worldwide.

Safer'Sun Professional works by bench-marking the detailed values it records from the photovoltaic system against the local meteorological data. This comparison enables Safer'Sun Professional to give a realistic evaluation of current performance, as well as historical data. A critical component of the monitoring system is the WEB'log data logger, which is installed directly at the photovoltaic system. It records all data that flows through sensors, digital energy meters and inverters. The WEB'log supports this integration through a wide variety of standard or custom protocols to support devices from a myriad of manufacturers. The WEB'log data logger can then make this data available in an on-line portal. This interface can be accessed for a number of purposes including marketing and promotion of the solar facility. The interface supports common internet standard such as xml, http, and Web 2.0 applications.

For additional information on the project equipment please review the data sheets in **Exhibit A.**

Waste Management Goals

Protect the Integrity of the Landfill Cap

The cap will not be penetrated. Additional fill may be added to low areas in order to create a more level surface which will meet the requirements of the mounting system manufacturer. There will be no grading of existing soil cap. Once the fill is in place temporary roadway surfaces will be used as required to minimize compaction and soil disturbance. Some vegetation may be disturbed due to construction vehicle traffic.

Prevent any Erosion Caused by the Solar Energy System

Low growth grasses will be planted on any disturbed areas and areas where fill is added. Once established, such vegetation will be maintained by mowing as required to prevent woody plants from becoming established. Since the panels are raised above the surface it is not anticipated that the vegetation will die due to lack of sun. If areas do come under stress from lack of light, shade tolerant grasses will be planted and maintained.

Limit Vehicle Equipment Access

Construction traffic will be minimized in the cell areas. It will be necessary to use construction machinery to place the ballast blocks and photovoltaic module arrays. When it is necessary to transverse the cap, temporary roadway surfaces will be used to minimize compaction and soil disturbance.

Contingency Plans

If, for any reason, remediation, maintenance or construction activities must take place within the solar farm perimeter the following guidelines will be followed:

- Most repairs can be accomplished by personnel on foot. If equipment is used, it will be very similar in size and weight as a medium-sized farm tractor.
- If heavy equipment is necessary, temporary roadway surfaces will be used to minimize compaction and soil disturbance.

If, for any reason, the solar farm must be abandoned due to unforeseen landfill impacts the following guidelines will be followed:

- Nothing permanent will be installed on the landfill cells. In the event the solar farm needs to be abandoned, all equipment will be removed and cap repaired if needed.

Preliminary Project Schedule

The following preliminary schedule outlines the construction milestones for the 4.95MW AC installation. This schedule is intended to provide a representative example of the process to commission a solar installation.

Week	Milestone
Week 1	Notice to Proceed Issued
Week 2	Site Preparation Work Completed
Week 3	Ballast Foundations Installed
Week 4	Mounting System Equipment Arrives
Week 5	Modules Arrive
Week 6	Mounting System Installed
Week 10	Modules Installed
Week 12	Inverters and BOS Installed
Week 13	Transformer Installed
Week 14	System Testing Begins
Week 15	Final Clean Up and Testing
Week 18	Commissioning Complete

Preliminary Output Analyses

4.95MW AC System

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

Auten Road Landfill Estimated Output

Station Identification	
City:	Charlotte
State:	North_Carolina
Latitude:	35.22° N
Longitude:	80.93° W
Elevation:	234 m
PV System Specifications	
DC Rating:	6435.0 kW
DC to AC Derate Factor:	0.820
AC Rating:	5276.7 kW
Array Type:	Fixed Tilt
Array Tilt:	30.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	8.5 ¢/kWh

Results			
Month	Solar Radiation ($kWh/m^2/day$)	AC Energy (kWh)	Energy Value ($)
1	3.90	630524	53594.54
2	4.36	632001	53720.08
3	5.26	819568	69663.28
4	5.96	885118	75235.03
5	5.95	880092	74807.82
6	5.97	835902	71051.67
7	5.72	820049	69704.17
8	5.69	826185	70225.73
9	5.26	742395	63103.58
10	5.13	775679	65932.71
11	4.11	620965	52782.03
12	3.59	576631	49013.64
Year	5.08	9045109	768834.27

Proposed Plan for Operations and Maintenance (O&M)

The Operation and Maintenance (O&M) will be the responsibility of the system owner and will be transparent to the Gaston County. The System Owner may subcontract O&M services to the EPC contractor or to any other specialized third party.

The electrical maintenance and check-up will be performed 3-4 times a year. The cleaning of panels will be done every 3-4 months. The following maintenance plan is indicative and will be subject to change per the actual conditions after installation.

Item #		Service Description	Approximate Service Frequency
1	Electrical Maintenance	Inspection of general site conditions, PV arrays, electrical equipment, data acquisition system, and balance of system.	3 months
2		System testing, including string level open circuit voltage and DC operating amperage tests, including the use of infrared scanning	3 months
3		Recalibration or replacement of DAS sensors and meters (per manufacturer's instructions, replacement parts provided by owner/manufacturer).	3 years
4		Inverter preventive maintenance per manufacturer's operating guidelines.	3 months
5		Cleaning of inverter cabinet air vents.	3 months
6		Cleaning and changing inverter air filters (as applicable and per manufacturer warranty requirements).	As applicable per manufacturer
7		Cleaning and removing dust from inverter heat sinks (as applicable and per manufacturer warranty requirements).	As applicable per manufacturer
8		Check torque marks and re-tightening appropriate wiring connections to design specification torque force (per manufacturer's guidelines).	As applicable per manufacturer
9		Inspection of Combiner Boxes	3 months
10	Structural and Mechanical Maintenance	Inspect array mounting structure for loose connections, rust, structural damage etc. (replacement parts provided by owner / manufacturer	1 year
11	Weed Abatement	Weed growing on the ground under the PV panels or besides them will be cut to a height of no more than 6 inches.	6 months
12	Cleaning of PV Panels	Cleaning of PV array modules using clear water	3 months
13		Removal of any materials (e.g. trash, bird nests, etc.) that may be found over and under the PV array modules obstructing airflow or sunlight.	3 months
14	Report	Provide written maintenance report suggesting corrective actions if any five (5) business days following performance of maintenance services.	After electrical maintenance

Exhibits

Exhibit A – Equipment Data Sheets

Exhibit B – Preliminary System Layout

Exhibit C – Landfill History

Attachment 1: Data Sheets

www.jinkosolar.com

Jinko Solar

JKM300P-72

POLY CRYSTALLINE MODULE
280-300 Watt

Jinko Solar introduces a brand-new line of high performance modules in wide application.

(US Market Use Only)

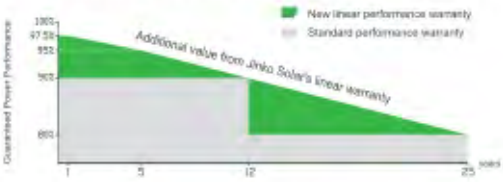
KEY FEATURES

- High module conversion efficiency (up to 15.46%), through superior manufacturing technology
- Perfect module self-cleaning capability, reduce power loss caused by dust (soiling effect)
- Excellent performance in low-light irradiance environment
- Extreme environment durability, low power degradation under high temperature
- Entire module certified to withstand high wind loads (2400 Pascal)

QUALITY&SAFETY

- Positive power tolerance of -0/+3% *
- 10 year warranty on material & workmanship *
- Industry leading power output warranty (12 years/90%, 25 years/80%)
- Premium linear performance warranty *

Premium Performance Warranty



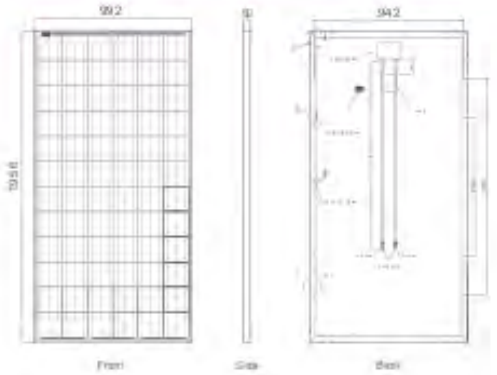
*Based on customer requirements and contract terms

ISO9001:2008、ISO14001:2004、OHSAS18001 certified factory
UL1703 certified products

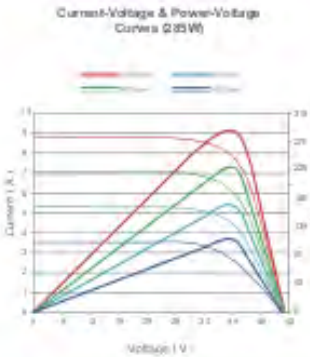
APPLICATIONS

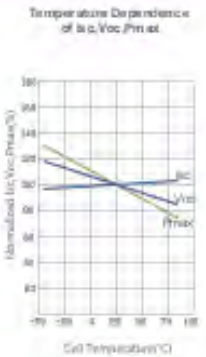
On-grid residential roof-tops | On-grid commercial/ industrial roof-tops | Solar power plants | Off-grid systems

Engineering Drawings



Electrical Performance & Temperature Dependence





Mechanical Characteristics

Cell Type	Poly-crystalline 156×156mm (6 inch)
No.of cells	72 (6×12)
Dimensions	1956×992×50mm (77.01×39.05×1.97 inch)
Weight	26.5 kg (58.4 lbs)
Front Glass	4.0mm, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP65 Rated
Output Cables	12 AWG, Length 900mm ~1200mm(optional)

Packaging Configuration

(Two boxes =One pallet)

20pcs/box, 40pcs/pallet, 440pcs/40 HQ Container

SPECIFICATIONS

Module Type	JKM280P		JKM285P		JKM290P		JKM295P		JKM300P	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	280Wp	206W	285Wp	209W	290Wp	213Wp	295Wp	216Wp	300Wp	220Wp
Maximum Power Voltage (Vmp)	35.5V	32.3V	36.0V	32.8V	36.4V	33.2V	36.8V	33.5V	37.2V	33.9V
Maximum Power Current (Imp)	7.89A	6.35A	7.92A	6.38A	7.97A	6.42A	8.02A	6.45A	8.07A	6.49A
Open-circuit Voltage (Voc)	44.5V	40.8V	44.7V	41.0V	44.9V	41.2V	45.2V	41.4V	45.4V	41.6V
Short-circuit Current (Isc)	8.31A	7.09A	8.35A	7.13A	8.39A	7.16A	8.95A	7.21A	8.98A	7.24A
Module Efficiency STC (%)	14.43%		14.69%		14.95%		15.20%		15.46%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1000VDC (UL)									
Maximum series fuse rating	15A									
Power tolerance	±3% / -0~+3% (Based on customer requirements and contract terms)									
Temperature coefficients of Pmax	-0.43%/°C									
Temperature coefficients of Voc	-0.32%/°C									
Temperature coefficients of Isc	0.06%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									

STC: Irradiance 1000W/m² Module Temperature 25°C AM=1.5

NOCT: Irradiance 800W/m² Module Temperature 20°C AM=1.5 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

The company reserves the final right for explanation on any of the information presented hereby. US-MKT-300P_v1.0_rev2013

Economical

- Savings in balance of system costs due to 1,000 V operating voltage
- Outdoor enclosure allows for direct field deployment
- Small footprint and light weight for easy shipping and installation

Efficient

- Highest efficiency in its power class
- Full nominal power at ambient temperatures up to 50 °C
- 10% additional power for continuous operation at ambient temperatures up to 25 °C

Flexible

- Configurable DC voltage range
- Integrated AC disconnect for NEC 2011 compliance
- Optional DC disconnects

Reliable

- Easy and safe installation and with large, separate connection area
- Powerful grid management functions (incl. LVRT and Frequency Ride Through)
- Full UL1741 and IEEE 1547 compliance

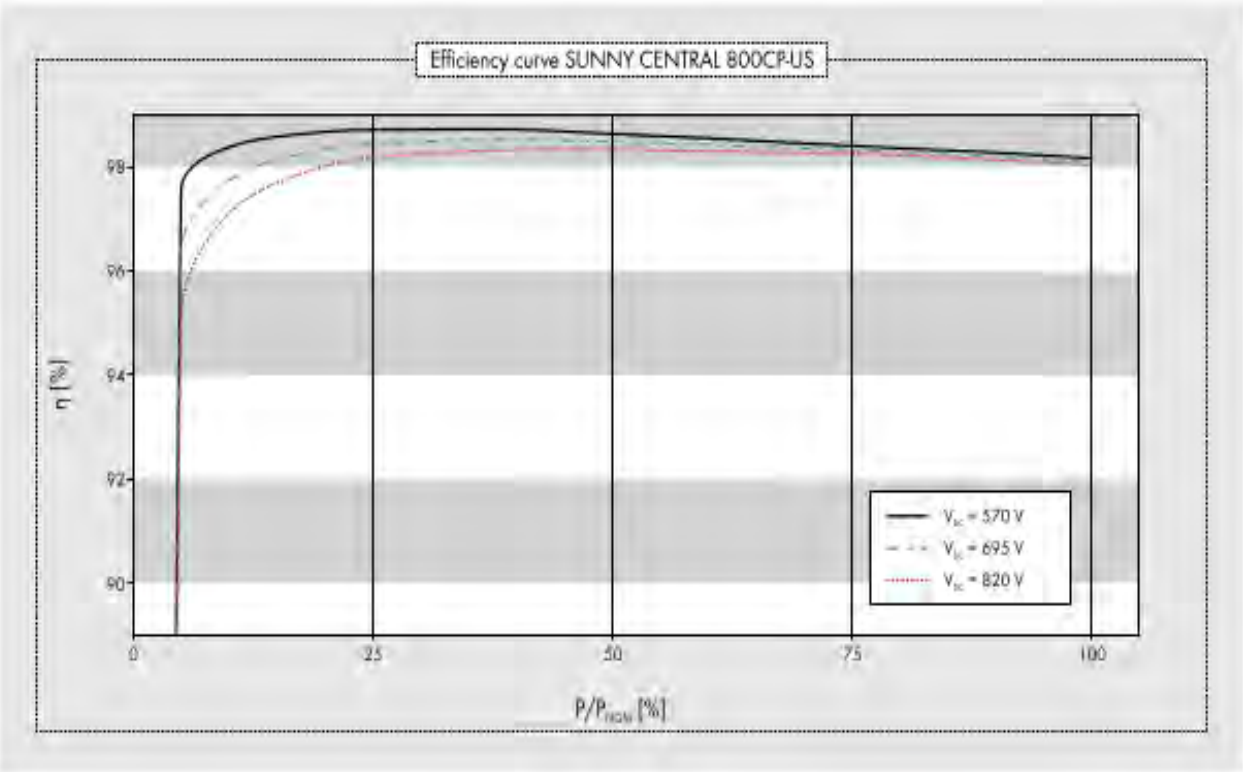
SUNNY CENTRAL
500CP-US / 630CP-US / 720CP-US / 750CP-US / 800CP-US

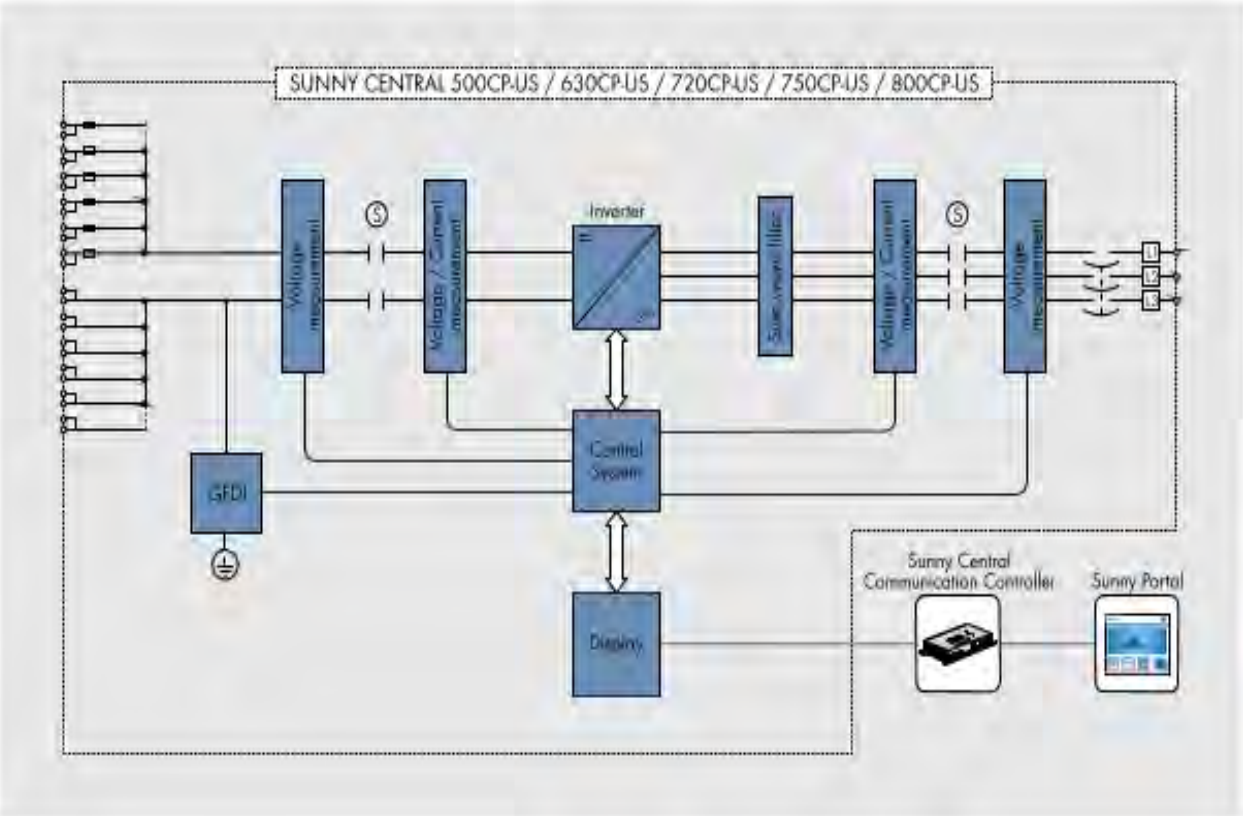
UL listed for commercial and utility-scale projects

The Sunny Central CP-US series delivers outstanding performance. In combination with an external transformer, the Sunny Central CP-US can be connected to any utility grid or three-phase commercial service while directly providing grid management functions. The CP-US family is UL listed at 1,000 V DC and features an integrated AC disconnect in accordance with NEC 2011 requirements. Both the outdoor enclosure with the OptiCool™ cooling concept and the separate connection area ensures simple installation while maximizing returns. With a peak efficiency of 98.7 percent, it outperforms all other inverters in its class. The Sunny Central CP-US can also be integrated with the Power Plant Controller as well as the Medium-voltage Power Platform for utility-scale applications.

Sunny Central 720CP-US	Sunny Central 750CP-US	Sunny Central 800CP-US
808 kW	853 kW	898 kW
1000 V	1000 V	1000 V
525 V ... 820 V / 525 V ... 820 V [1]	545 V ... 820 V / 545 V ... 820 V [1]	570 V ... 820 V / 570 V ... 820 V [1]
565 V	595 V	620 V
1600 A	1600 A	1600 A
515 V	545 V	568 V
1	1	1
1 : 6 ... 9	1 : 6 ... 9	1 : 6 ... 9
792 kVA / 720 kVA	825 kVA / 750 kVA	880 kVA / 800 kVA
324 V / 292 V ... 356 V	342 V / 308 V ... 376 V	360 V / 324 V ... 396 V
50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz
50 Hz, 60 Hz / 324 V	50 Hz, 60 Hz / 342 V	50 Hz, 60 Hz / 360 V
1411 A	1411 A	1411 A
< 3 %	< 3 %	< 3 %
1 / 0.8 leading ... 0.8 lagging		
3 / 3	3 / 3	3 / 3
98.6 % / 98.4 % / 98.0 %	98.6 % / 98.4 % / 98.0 %	98.7 % / 98.4 % / 98.5 %
DC contactor		
AC circuit breaker		
Surge Arrester Type II		
●	●	●
□	□	□
○	○	○
Lightning protection level III	Lightning protection level III	Lightning protection level III
□	□	□
●	●	●
I / IV	I / IV	I / IV
2743 / 2514 / 1092 mm (108 / 99 / 43 inches)		
1934 kg / 4262 lb	1934 kg / 4262 lb	1934 kg / 4262 lb
-25 °C ... +50 °C / -13 °F ... +122 °F	-25 °C ... +50 °C / -13 °F ... +122 °F	-25 °C ... +50 °C / -13 °F ... +122 °F
60 dB(A)	60 dB(A)	61 dB(A)
1700 W / 100 W	1700 W / < 100 W	1700 W / < 100 W
230 / 400 V (3/N/PE)	230 / 400 V (3/N/PE)	230 / 400 V (3/N/PE)
OptiCool	OptiCool	OptiCool
NEMA 3R / NEMA 3R	NEMA 3R / NEMA 3R	NEMA 3R / NEMA 3R
4C2, 4S2	4C2, 4S2	4C2, 4S2
in unprotected outdoor environments	in unprotected outdoor environments	in unprotected outdoor environments
15 % ... 95 %	15 % ... 95 %	15 % ... 95 %
2000 m	2000 m	2000 m
3000 m³/h	3000 m³/h	3000 m³/h
Ring terminal lug / cage clamp	Ring terminal lug / cage clamp	Ring terminal lug / cage clamp
Ring terminal lug / cage clamp	Ring terminal lug / cage clamp	Ring terminal lug / cage clamp
○	○	○
Ethernet (optical fiber optional), Modbus RS485	Ethernet (optical fiber optional), Modbus RS485	Ethernet (optical fiber optional), Modbus RS485
□	□	□
●	●	●
RAL 9016 / 9016 / 7005 / 7004		
● / □ / □ / ○ / ○	● / □ / □ / ○ / ○	● / □ / □ / ○ / ○
EMC conformity according to FCC, Part 15, Class A, UL 1741, UL 1998, IEEE 1547		
SC 720CP-US-10	SC 750CP-US-10	SC 800CP-US-10

[1] At 1.00 $U_{AC,r}$ and cos φ = 1
[2] The inverter will track MPP to 850V before self-protecting
[3] Measured efficiency includes all auxiliary power
[4] Included in the inverter's UL listing
[5] Sound pressure level at a distance of 10 m
[6] Self-consumption at rated operation


Efficiency curve SUNNY CENTRAL 800CP-US
η [%]
98
96
94
92
90
0
25
50
75
100
P/P_nom [%]
V_DC = 570 V
V_DC = 695 V
V_DC = 820 V


SUNNY CENTRAL 500CP-US / 630CP-US / 720CP-US / 750CP-US / 800CP-US
Voltage measurement
Voltage / Current measurement
Inverter
Sine wave filter
Voltage / Current measurement
Voltage measurement
L1
L2
L3
GFDI
Central System
Display
Sunny Central Communication Controller
Sunny Portal

GC Paver Rail Ballasted Ground System Technical Datasheet

GC Paver Rail Ballasted Ground System
has been designed based on the need for a cost-effective, simple-to-assemble racking system for PV solar panel installations.

Design Criteria and Performance Requirements:	GameChange Racking provides structural analysis by a Professional Engineer licensed in the applicable State to ensure that the structures, racking and the foundations have been designed to satisfy the local structural code requirements.
Quality Assurance:	1. Installation shall be performed by experienced crews having a minimum of five (5) years experience erecting similar structures. 2. The ground mount structures shall be erected in accordance with GameChange Racking's instructions and approved drawings.
Submissions:	1. GameChange shall provide set of engineering submittal drawings. 2. No fabrication of materials by GameChange Racking shall commence until submittal drawings are approved by the purchaser. Submittal drawings typically include: a. Structural Plans and Elevations b. Foundation Details c. Racking Details
Structure Design and Component Details:	1. The structure shall be designed and detailed according to good engineering practice. 2. A minimum of clearance of 1'-6" shall be maintained at the lowest point of the ground mount structure unless otherwise specified.
Material Delivery, Storage and Handling:	1. Materials shall be delivered to the job site by GameChange Racking FOB origin. 2. Access from unloading area to construction site shall be clear and unrestricted. 3. Materials shall be stored in a clean, dry and covered area that is secure
Notes:	1. When required, all special inspectors shall be retained by the customer. The extent of the inspection shall comply with the contract documents, applicable code requirements and the local jurisdiction. 2. All materials shall be new, of good quality and without defects which would lessen quality of work. 3. Customer shall be responsible for installation of the ground mount structures.
Site Preparation and Inspection:	Site preparation shall the responsibility of Customer.
Installation Steps:	Five simple steps are done in the field as the installation manual provided by GameChange Racking: Assemble ballast trays and tubes Placement of the racks supports and pavers. Placement of rails and cross braces Placement of panels Grounding

GAMECHANGE™
RACKING
STRONG. SIMPLE.

GC Paver Rail Ballasted Ground System Technical Datasheet

Ideal for landfills with uneven settling issues, flat ground with subsurface rock preventing post driving, and brown-fields
Fastest installation with minimum component count and simple design
Standard inexpensive 80 pound pavers stack on ballast trays
Fast top down panel attachment to aluminum rails
Integrated wire management tray on top rail
Tilt adjustability when mounting tubes to pans to accommodate uneven ground
Three inch vertical adjustability when mounting panel rails onto tubes
Rugged design for 120mph wind speed
15/20/25/30° tilt with multiple inter-row spacing options
Unique design innovations with patents pending
Module grounding strips included - approved by ETL to UL 467
Meet IBC and ASME standards for structural loading
Full layout and engineering analysis for every project
Warranty 20 years - simply the best in the industry
Made in the U.S.A.

1

2

3

4

5

6

Material:
Tray. Tube. Tube Clamp. Panel Mounting Plate. Cross Brace Mounting Plate. Cross Brace: G90 galvanized steel
Panel Mounting Rails: 6063T6 aluminum
Grounding Strip: 304 stainless steel
U Bolts. 3/8 inch diameter: hot dip galvanized or Magnacoat
Nuts. Washer. Lock Washers 3/8 inch: hot dip galvanized or Magnacoat serrated flange nuts
Plate mounting hardware:
Panel mounting clips: 5052 aluminum
¼-20 x 2.5" T bolts. ¼ -20 serrated flange nuts: stainless steel

Construction:
Adjustability of tilt when mounting tubes to pans to accommodate uneven ground
Three inch vertical adjustability when mounting panel rails onto tubes

Calculations:
100% code compliant designs for any locality
Third-party structural PE. stamped drawings and calculations
Individual system structural calculations
Individual system design calculations based on regional load values
Design loads according to IBC 2006 or 2009
Patent pending profile geometries with optimum material utilization

Grounding:
Racking system has integrated grounding utilizing grounding strips to end of each row
Grounding must be done by electrician at row ends

1. Place tube and ballasted tray assembles
2. Place standard pavers on tray
3. Aluminum rails mount quickly
4. Integrated wire management tray on rail
5. ETL/UL 467 Grounding Strips included
6. Panels rapidly attach using top mount clips

GAMECHANGE™ RACKING
STRONG. SIMPLE.

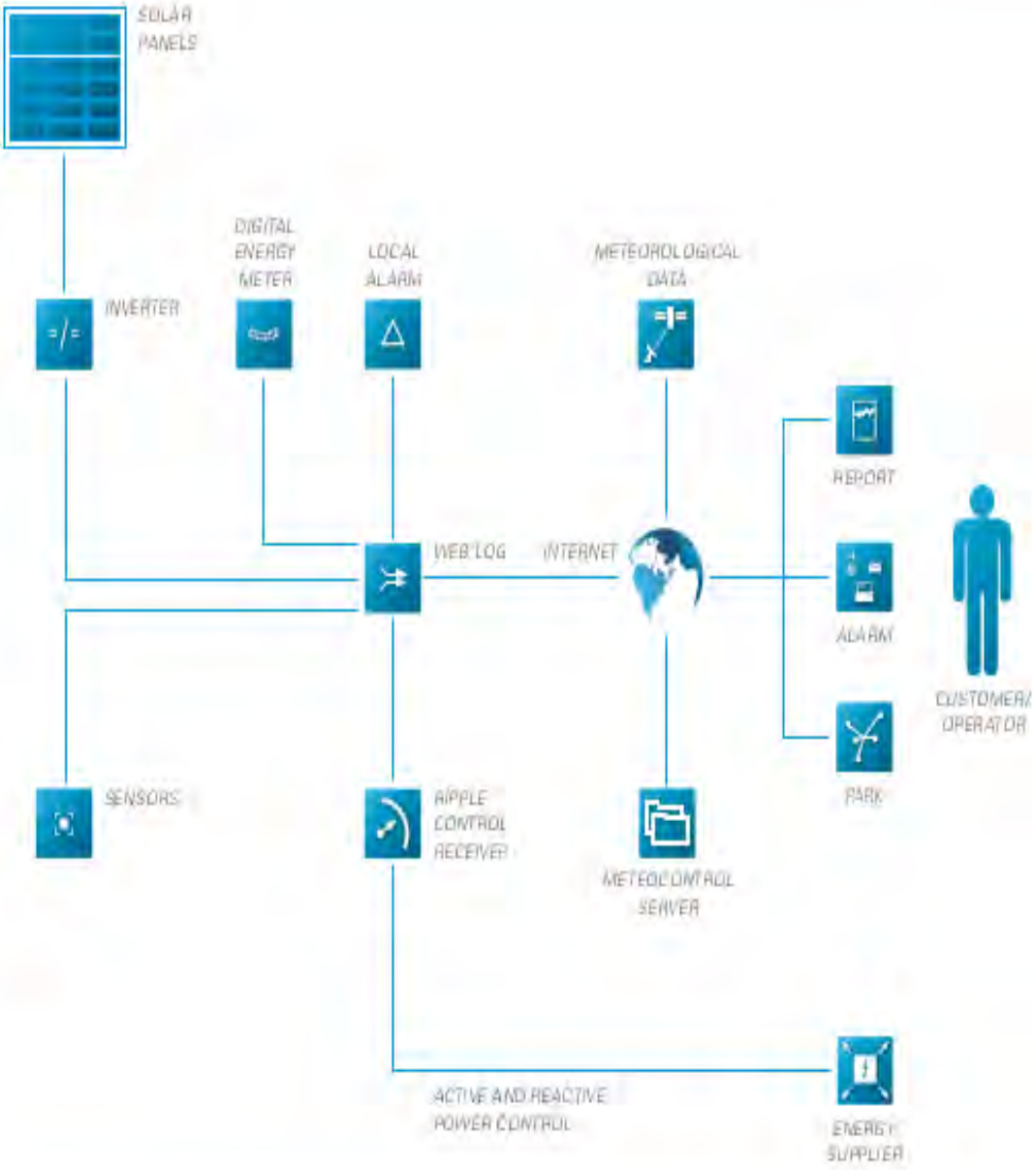
730 Fifth Avenue, 16th Floor, New York, NY 10019, 212-369-0206, www.gamechangeracking.com

SAFER'SUN PROFESSIONAL

Remote monitoring and yield analysis of photovoltaic systems

mc | meteo control |
Energy & Weather Services

So how does it work?



MAKING PROFESSIONAL MONITORING EVEN MORE PROFESSIONAL

safer'Sun Professional combines highly accurate data with sophisticated controls to maximise the efficiency of remote monitoring, management and maintenance of solar parks.

PARK MANAGEMENT

Maximising efficiency – any time, any place

safer'Sun Professional comes with a Web interface for easy, any time, any place access to management intelligence. This means that operators can analyse several systems across multiple inverters at a glance. Integrated maps quickly and reliably assign the measured data to individual installations. This Web portal features extensive on-the-fly monitoring and configuration functiyonality. This gives you significant efficiency gains and enables more attractive contractual terms by minimising your on-site maintenance and supervisory effort. In addition, your administrators are free to align the safer'Sun Professional portal with their own corporate design guidelines.

ALARM MANAGEMENT

Easy way to fast results

The Web portal acts as a central, transparent repository for fault messages, regardless of whether they originated on-site at a hardware level or were detected by safer'Sun Professional server-side software. You can thus instantly analyse and possibly also rectify faults online. Depending on how your individual alarm triggers are configured, safer'Sun Professional sends an automatic alert to your service team. A detailed history and a fault archive enable all issues to be tracked and fed into easy-to-follow reports.

Easy-to-use, CD-compliant portal to manage photovoltaic investments.

Reliable management built on real-time capture and analysis of alarms.

REPORTING

Single click to transparent answers

The safer'Sun Professional portal gives you and your customers a transparent overview of all technical and business metrics that impact on the performance of a photovoltaic installation. You can select various performance factors, run individual analyses and display the results in clearly laid out graphs. This gives you efficiency insights of un-precedented depth and transparency. In addition, you can benchmark individual installations in a park to directly compare factors such as components or location. And safer'Sun Professional keeps investors up-to-date on yield trends with regular reports by e-mail (CSV, HTML or PDF format).

Single-click benchmark comparison of specific yield across all locations.

TECHNICAL FEATURES

Compatibility

Connectivity

Intranet access via:
- Ethernet

Internet access via:
- Network/DSL
- Analogue modem
- ISDN modem
- GSM
- GPRS

meteo control
Energy & Weather Services

WEB'LOG PRO UNLIMITED

Item No.: 421.156, 421.157, 421.158, 421.159

DESCRIPTION OF FUNCTIONS

WEB'log is a powerful monitoring system that is compatible with many inverters and the monitoring portal safer'Sun. Sensors are connected via four analog and four digital inputs. Different communication variants are available for sending the measured data via the Internet. When malfunctions are detected in the system, an alert is sent immediately by e-mail, SMS or fax. In addition to the monitoring function, the requirements for grid feed-in management in accordance with EEG (German Renewable Energy Law) and the BDEW Medium Voltage Directive can also be met.

AMBIENT TEMPERATURE

Operation:	0° ... 55°C
Storage and transportation:	-20° ... 65°C
Protection class:	IP 20

TECHNICAL DATA

Power supply:	AC: 85...240 V, 47...63 Hz DC: 24 V
Analog inputs (configurable)	4 DC voltage measurement: 0...10 V (max. 24 V) DC current measurement: 0...20 mA (max. 40 mA, 3 V) Resistance measurement: PT1000
Digital inputs (configurable)	4 Pulse input in acc. with DIN 43864 (S0) Status input (function only via the device's internal power supply!)
Digital output:	1 Optocoupler output in acc. with DIN 43864 (S0) Max. load: 70 V, 50 mA DC (check polarity!) Alarm output or pulse output
Power consumption:	Max. 9 W at AC 230 V (in meas. mode without sensors) Max. current for sensors and / checker: 100 mA Max. 3.5 W at DC 24 V (in meas. mode without sensors)

DISPLAY

192 x 32 dot display
8 x LED display

INTERFACES

Modem (options):	421.157 without modem 421.156 PSTN modem (analog) 421.158 ISDN modem 421.159 GSM/GPRS modem (Quadband)
Communication:	1 x Ethernet (100 MBit) 1 x RS485 1 x RS422 Maximum detectable power: no limitation

POWER CONTROL

Active power procedure:	P(D I) internal Additionally with PCU: P(DI), P(AI)
Reactive power procedure:	Q fix, cosφ fix, Q(U), cosφ(P), cosφ(U), and inverter-integrated procedure Additionally with PCU: Q(DI), Q(AI), cos φ (AI), cos φ (DI)
Control:	Control of reactive power at the grid connection point with power quality analyser or main computer

Refer to the meteocontrol Power Control data sheet for a list of the procedures supported by the individual drivers.

MEASURING ACCURACY

Voltage input:	1% of end value (0.1 V)
Current input:	1% of end value (0.2 mA)

MEMORY

CF card

BATTERY

Lithium cell / type L2032, real time clock with battery back up

MECHANICAL DATA

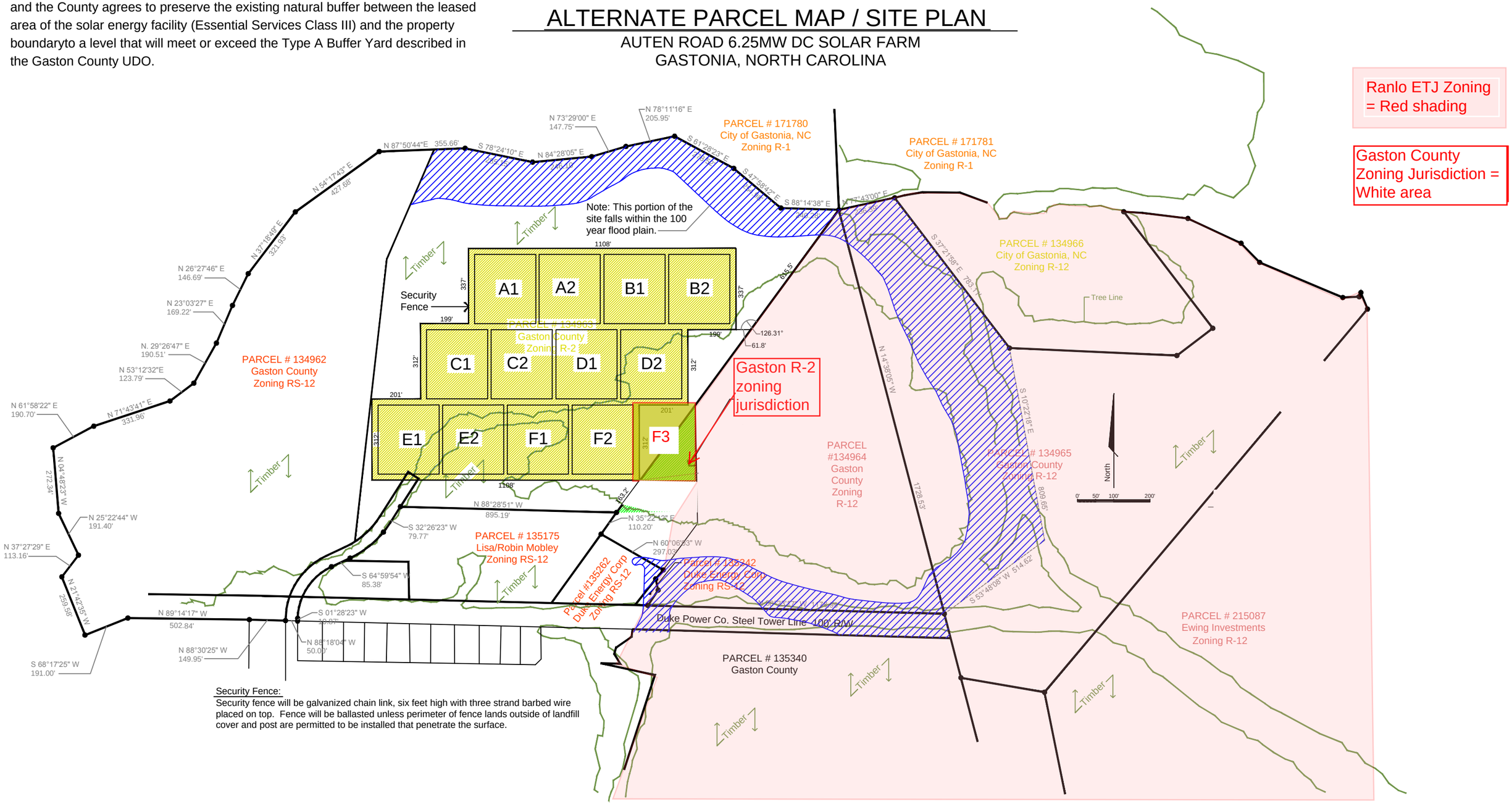
Size:	160 mm x 110 mm x 63 mm (W x H x D)
Installation:	Top-hat rail installation or wall mounting
Weight:	421.157 424 g 421.156 434 g 421.158 444 g 421.159 452 g

meteocontrol GmbH | Spichern Strasse 48 | 86157 Augsburg | Germany | Telephone +49 (0)821 56666 - 0 | Fax +49 (0)821 56666 - 11
E-mail info@meteocontrol.de | Web www.meteocontrol.de

Notes:
1. The existing natural buffer meets or exceeds the requirements of the ordinace and the County agrees to preserve the existing natural buffer between the leased area of the solar energy facility (Essential Services Class III) and the property boundaryto a level that will meet or exceed the Type A Buffer Yard described in the Gaston County UDO.

ALTERNATE PARCEL MAP / SITE PLAN

AUTEN ROAD 6.25MW DC SOLAR FARM
GASTONIA, NORTH CAROLINA



Security Fence:
Security fence will be galvanized chain link, six feet high with three strand barbed wire placed on top. Fence will be ballasted unless perimeter of fence lands outside of landfill cover and post are permitted to be installed that penetrate the surface.

Auten Road Landfill Site History

The Auten Road Landfill is a pre-Subtitle D (unlined) landfill that operated from 1975 until it was closed in 1987. A chronology of key events is presented in the following table:

Auten Road Landfill Key Events

Activity	Date
First Permitted	November 1975
Landfill Stops Receiving Waste	January 1987
County receives letter from the State recognizing placement of 2-feet of final cover and stating that additional grading and seeding is required for final closure certification	April 1987
The County contract with Law Engineering to perform 38 borings. Twenty-nine of the borings encountered at least 2 feet of soil cover. Two areas were identified as needing additional cover thickness.	September 1987
The Country contract with Denex Corp. and Law Engineering to conduct a study of the site which included 38 borings. Boring logs show the depth of final cover ranging primarily from 2 feet to 18 feet over the site.	June-October 1989
Debris from Hurricane Hugo is stored at the site as an emergency measure	September 1989
Hugo debris is cleared from the site	June 1990
County installs groundwater monitoring system	June 1994
NCDENR SWS determination that facility has been closed in accordance with applicable requirements	July 1996
County notification that facility will be maintained in accordance with the post-closure conditions specified in SWS letter dated July 24, 1996. County request effective closure date of November 28, 1995 to coincide with first groundwater monitoring event.	August 1996
SWS approve effective closure date of November 28, 1995.	August 1996.

As a note, The Auten Road Landfill did not receive waste after October 9, 1991, and is subject to compliance with the closure requirements of 15A NCAC 13B.0510. The County has historically monitored the site for explosive gases and groundwater contamination.