

"SAMPLE"
SUPPORTING DOCUMENTATION
NET METERING APPLICATION

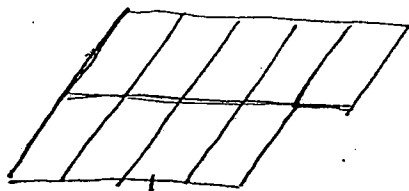
- ⇒ A critical safety requirement that your system **MUST** include is a manual visible AC disconnect switch located between the inverter and the AC panel. This AC disconnect switch needs to be accessible to AmerenUE at all times. PLEASE NOTE ON YOUR ONE-LINE THE SPECIFIC LOCATION OF THIS AC DISCONNECT SWITCH.
- ⇒ If the renewable installation is designed to operate in parallel with the Ameren system, then the installation must meet the requirements as specified in IEEE-1547, and more specifically, for inverters UL-1741. NOTE: Due to the anti-islanding requirements of IEEE-1547 and UL-1741, the example installation as shown would not allow for the customer to use their generation as backup generation. In other words, if Ameren's system is down your renewable generation will not operate either.
- ⇒ If customer intends to operate their renewable system independent of Ameren's system at times that customer has lost their Ameren supply, then Ameren will require other components in the customer's design for utility safety reasons. Thus the customer's design will differ from this sample, and requires Ameren approval.
- ⇒ The utility bi-directional meter is used for billing data. Only kWhs actually fed back into the grid will appear on the bi-directional meter and show on your AmerenUE bill. If the renewable system is producing power and you are consuming the power simultaneously, the bi-directional meter does not record the produced or used power. Check with your installer if you are interested in optional monitoring systems, such as Fat Spaniel, for more detailed renewable system usage and production data.

If you have questions, please contact lcogrove@ameren.com or (314) 554-2649.

LINE DIAGRAM
1.8 kW

Sample

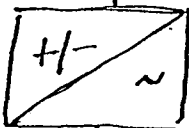
ONE-LINE DIAGRAM



PV Array
Modules = GE 200 watt
9 modules in series
1800 Watt total
Location = south side house over garage



DC Disconnect
located outside
south side house
to right of garage



Inverter
Brilliance GE
location - inside
beside breaker panel
southside of home



Lockable AC Disconnect
located on outside wall
southside house next
to meter

Incoming
Utility
Service



Utility bi-directional meter



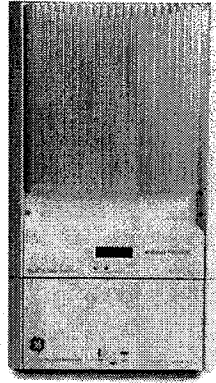
Main Panel
located inside
downstairs - south wall

See
NOTE →

NOTE:

This is a critical safety requirement. Your system MUST include a manual visible AC disconnect switch between the inverter and the AC panel accessible at all times to AmerenUE personnel. Please note on your one-line the specific location of this AC disconnect switch.

Get Connected with Brilliance™ Grid Tie Solar Inverters



Brilliance™ Inverters make installation efficient, easy, and affordable

GE Energy's Brilliance™ Inverters offer a family of grid tie solar inverters designed with the knowledge and expertise of renewable energy dealers and installers. The result is a high performance series of inverters that makes utility interactive installations easy and cost effective. GE Energy's Brilliance™ high performance photovoltaic (PV) string inverters offer high efficiency, low installed cost, clean design and high reliability. The Brilliance™ series includes high quality inverters that offer the best price versus performance in the industry backed with a GE 10 year warranty.

High performance string inverters

- Peak and average efficiency greater than 94% maximizes your PV investment
- Fast MPPT algorithm ensures maximum energy harvest from your array under any conditions
- Excellent thermal performance provides full rated power up to 140°F (40°C)
- FCC Part B compliance means less potential interference with communication, radio, and consumer electronics

Easy and inexpensive to install

- Includes integrated lockable AC/DC disconnect that is NEC compliant as a DC disconnect
- Includes a lightweight and versatile mounting bracket that simplifies installation
- Offers wide MPPT PV module input voltage range to make module selection and string sizing extremely flexible.

Advanced modular design

- Modular design allows Brilliance™ Grid Tie Inverters with the same or different power levels to be mounted side-by-side using the wiring box as a wiring raceway
- Easy access PV and utility terminal block simplifies wiring
- Wiring box can be separated from the sealed inverter enclosure allowing DC/AC connections to remain intact in the unlikely event that the inverters need to be serviced
- Rugged NEMA3R inverter enclosure allows reliable outdoor and indoor installations

Full feature inverter display and communications available day or night

- Includes Liquid Crystal Display (LCD) providing instantaneous power, daily and lifetime energy production PV array voltage and current utility voltage and frequency, time online "selling" today, and fault messages.
- LCD vibration sensor allows the tap of a finger to turn backlight on and display screen cycling
- Bright LED indicators provide system status at a glance
- Integrated RS232 and communications bus RJ45 communication ports

Certifications

Brilliance™ Inverters meet the following requirements:



UL-1741



imagination at work

NOTE: Inverters MUST meet UL-1741 certification. Installation must meet the requirements as specified in IEEE-1547.

Sample

GE Energy Brilliance™ Grid Tie Solar Inverter

Electrical Specifications

Models	GEPVb-2500-NA-240	GEPVb-3000-NA-240	GEPVb-3300-NA-240	GEPVb-3300-NA-208	GEPVb-3800-NA-240	GEPVb-5000-NA-240
Maximum AC power output	2500 W	3000 W	3300 W	3300 W	3800 W	5000 W
AC output voltage (nominal)	240 VAC	240 VAC	240 VAC	208 VAC	240 VAC	240 VAC
AC output voltage range	211–264 VAC	211–264 VAC	211–264 VAC	183–228 VAC	211–264 VAC	211–264 VAC
AC frequency (nominal)	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz
AC frequency range	59.3–60.5 Hz	59.3–60.5 Hz	59.3–60.5 Hz	59.3–60.5 Hz	59.3–60.5 Hz	59.3–60.5 Hz
Maximum continuous output current	11.8 A	14.2 A	15.6 A	18 A	16 A	21 A
Current THD	<3%	<5%	<3%	<3%	<3%	<5%
Power factor	>0.9	>0.9	>0.9	>0.9	>0.9	>0.99
DC input voltage range	195–600 VDC	195–600 VDC	195–600 VDC	195–600 VDC	195–600 VDC	235–600 VDC
Peak power tracking voltage range	195–550 VDC	195–550 VDC	195–550 VDC	195–550 VDC	195–550 VDC	235–550 VDC
Peak inverter efficiency	94.8%	94.6%	95.3%	94.7%	95.7%	96.2%
CEC efficiency	94.0%	94.5%	94.5%	94.0%	95.0%	95.5%
Night time power consumption	1 W	1 W	1 W	1 W	1 W	1 W
Output overcurrent protection	15 A	20 A	20 A	25 A	20 A	30 A

Mechanical Specifications

Operating temperature range	-13°F to +149°F (-25°C to +65°C)
Enclosure type	NEMA3R (outdoor rated)
Unit weight	49.0 lbs (22.2 kg) to 51.0 lbs (23.1 kg)
Shipping weight	57.0 lbs (25.9 kg) to 59.0 (26.8 kg)
Shipping dimensions (H x W x D)	34.1 x 20.4 x 10.3" (86.6 x 51.8 x 26.2 cm)
Inverter dimensions (H x W x D)	28.5 x 15.9 x 5.7" (75.5 x 40.3 x 14.6 cm)
Mounting	Wall mount (mounting bracket included)

Features

PV/Utility disconnect	Eliminates need for external PV (DC) disconnect. Complies with NEC requirements.
Cooling	Convection cooled, fan not required.
Display	Backlit 2-line 16-character liquid crystal display provides instantaneous power, daily and lifetime energy productions, PV array voltage and current, utility voltage and frequency, time online "selling" today, fault messages, and installer customizable screens.
Communications	One RS 232 and two communications bus RJ45 ports
Wiring box	PV, utility, ground, and communications connections. The inverter can be separated from the wiring box.
Warranty	10-year standard.



For more information about GE Energy's Brilliance™ Grid Tie Solar Inverters, visit www.ge-energy.com/solar.

Brilliance™ is a trademark of General Electric Company.
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GEA-14610 10/2/07



Sample

GE
Energy

■ GEPVp-200-MS

200 WATT PHOTOVOLTAIC MODULE
FOR 600 VOLT APPLICATIONS

FEATURES

- 54 poly-crystalline cells connected in series
- Peak power of 200 watts at 26.3 volts
- Designed for optimum use in residential and commercial grid-tied applications
- 20-year limited warranty on power output, 5-year limited warranty on materials and workmanship*
- Junction box and 1.8 meter cable with easy-click Solarlok Connectors included

BENEFITS

- Output power tolerance of +/- 5%
- Robust, clear anodized aluminum frame with pre-drilled holes for quick installation

CERTIFICATIONS

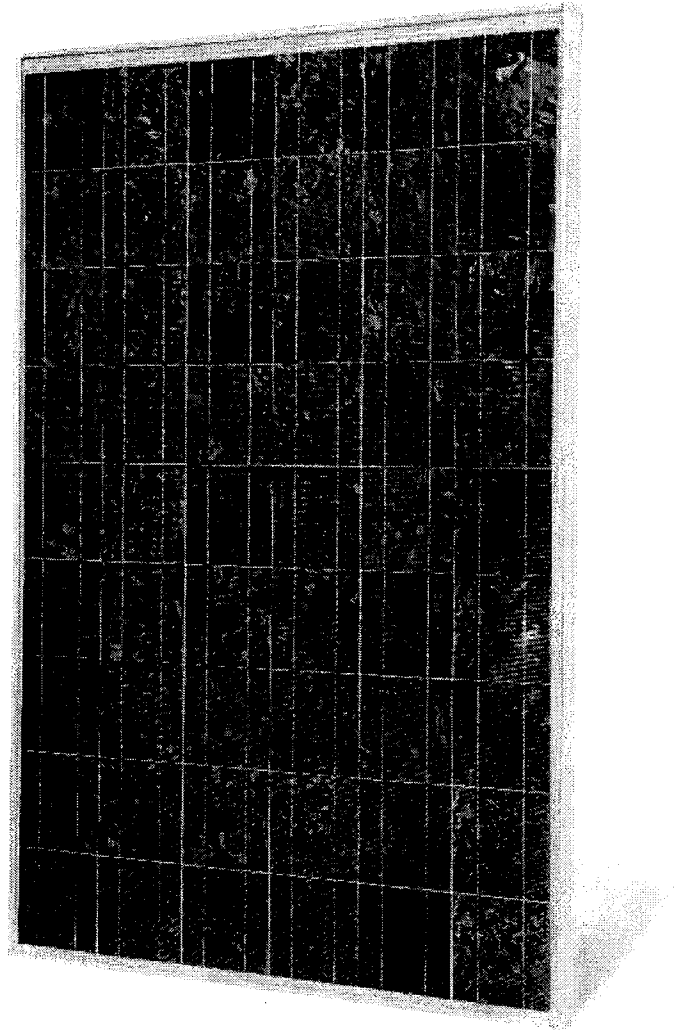
The GEPVp-200-MS Module meets the following requirements:



UL-1703



IEC-61215



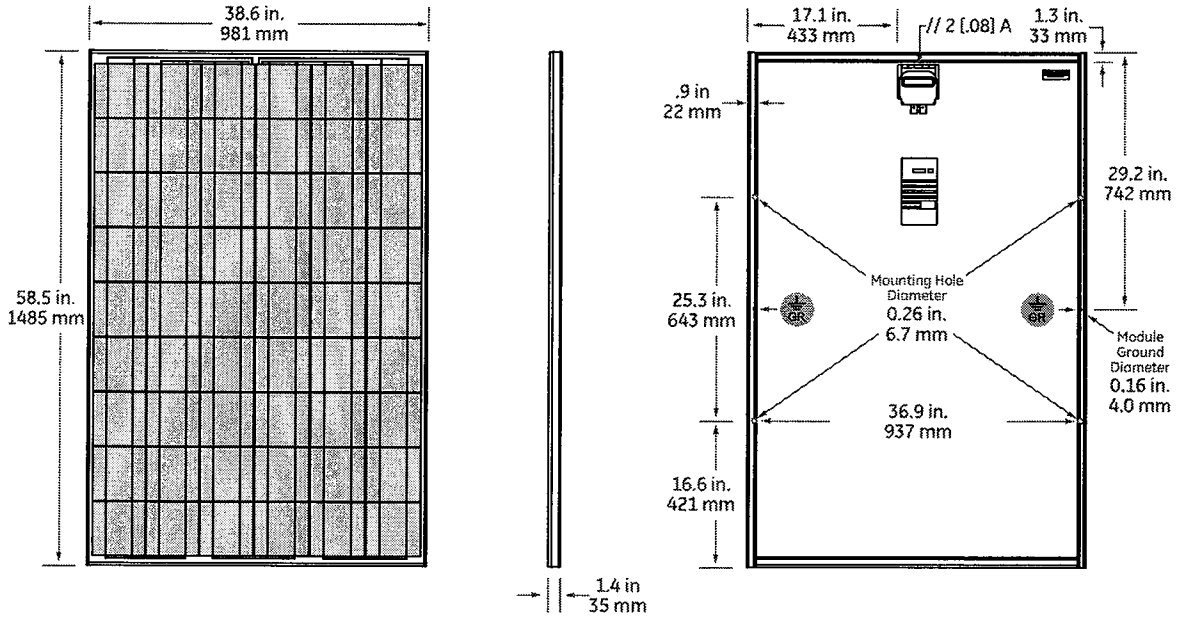
*Refer to GE Energy Product Warranty for specific details



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Sample

PHYSICAL CHARACTERISTICS

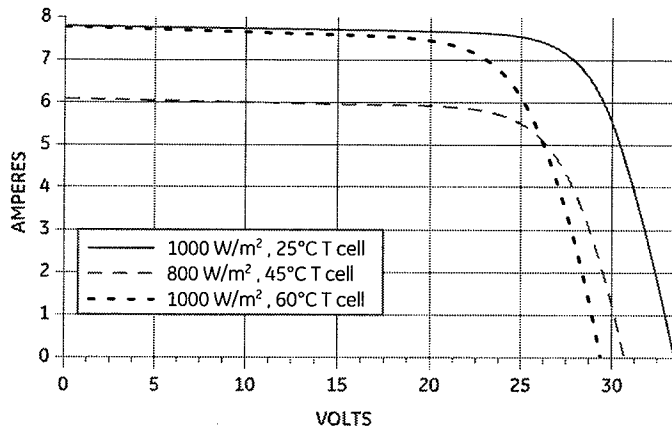


Physical Design Properties

Weight	39.0 lb [17.7 kg]
Weight (Wind) Bearing Potential	50 lbs/ft ² [125 mph equivalent]
Hailstone Impact Resistance	1" @ 50 mph [25 mm @ 80 kph]

ELECTRICAL PERFORMANCE

Typical IV Curve for GEPvp-200-MS Module



Typical Performance Characteristics

Peak Power (Wp)	Watts	200
Max. Power Voltage (Vmp)	Volts	26.3
Max. Power Current (Imp)	Amps	7.6
Open Circuit Voltage (Voc)	Volts	32.9
Short Circuit Current (Isc)	Amps	8.1
Short Circuit Temp. Coefficient	mA/°C	5.6
Open Circuit Voltage Coefficient	V/°C	-0.12
Max. Power Temp. Coefficient	%/°C	-0.5
Max. Series Fuse	Amps	15
Max. System Voltage	Volts	600
Normal Operating Cell Temperature [NOCT]	deg. C	45

IV parameters are rated at Standard Test Conditions (Irradiance of 1000 W/m², AM 1.5G, cell temperature 25°C). As with all poly-crystalline PV Modules, during the stabilization process that occurs during the first few days in service, module power may decrease approximately 3% from typical maximum power due to a phenomenon known as Light Induced Degradation (LID). All measurements are guaranteed at the laminate leads. NOCT is measured at 800 W/m², 20 deg. C ambient, and 1 m/s windspeed.



GE Energy
231 Lake Drive
Newark, DE 19702
302-451-7500

ge-energy.com/solar

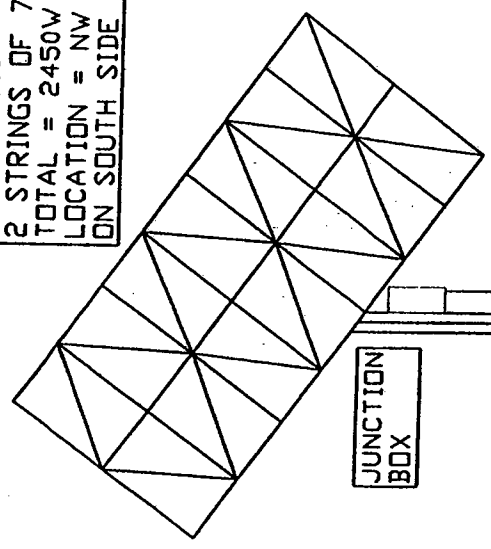
GEA-14807A (05/08) Photo: PSP30590-03



Sample

VMAX SYSTEM= 380.6V
 DC OPERATING VOLTAGE= 246.4V
 INVERTER MAX AC CURRENT= 8.35A
 DC OPERATING CURRENT= 4.95A
 ISC MODULE= 5.2A

SUNTECH 175W POLE MOUNTED
 PV MODULES
 2 STRINGS OF 7 MODULES
 TOTAL = 2450W
 LOCATION = NW OF GARAGE
 ON SOUTH SIDE PROPERTY



JUNCTION
 BOX

INCOMING
 UTILITY
 SERVICE

NOTE

EXTERNAL AC
 DISCONNECT
 LOCATED ON
 SOUTH WALL
 OUTSIDE

FRONIUS IG 2000
 INVERTER
 LOCATED INSIDE ON
 SOUTH WALL TO
 ADJACENT TO
 ELECTRIC PANEL
 W/ BUILT
 IN AC/DC
 DISCONNECT

100A
 SERVICE
 PANEL
 LOCATED
 INSIDE
 SOUTH
 WALL

WIRE RUN

30FT BURIED CONDUIT FROM POLE
 TO BUILDING
 40FT WITHIN BUILDING TO DC
 DISCONNECT/INVERTER

PROJECT : LINE DRAWING
 2.45KW PV SYSTEM

Sample

NOTE:
 This is a critical safety requirement. Your system MUST include a manual visible AC disconnect switch between the inverter and the AC panel accessible at all times to AmerenUE personnel. Please note on your one-line the specific location of this AC disconnect switch.

SKYSTREAM 3.7[®]

SMALL WIND TURBINE

Inverter Specifications

Manufacturer:	Southwest Windpower
Model:	Skystream 3.7
Inverter Type:	True sine wave, utility-interactive
Generator Type:	Permanent magnet, synchronous, rectified and inverted to grid
Commutation Type:	Line commutation
Nameplate/Rated Capacity:	2.3 [kW] continuous at 25 C, 2.4 [kW] peak
KVA Capacity:	2.3 [KVA] continuous at 25 C, 2.4 [KVA] peak
Power Factor:	99.9% at rated capacity
Nominal output voltage (AC):	120/240 [VAC] or 120/208 [VAC]
Max continuous output current:	10 [A] at 120/240 [VAC] or 120/208 [VAC] or 11.54 [A] at 120/208 [VAC]
Ambient temperature range:	-20 C to 50 C
Total Harmonic Distortion:	2.7% at rated capacity, meets UL 1741 and IEEE 1547 requirements
Efficiency:	93% at rated capacity
Frequency Accuracy:	+/- 0.05 [Hz]
Voltage Accuracy:	+/- 2.0V (L-N)
Surge Rating:	IEEE 1547 Surge Rating B3
Short Circuit Current:	720A peak before fast acting fuses open
Enclosure type:	3R (Rainproof)

Utility Interactive Ready

Meets UL 1741, Standard for Safety for Inverters, Converters, Controllers and Interconnections System Equipment for Use with Distributed Energy Resources, 1st Ed.; CAN/CSA-C22.2 No.107.1-01, 3rd Ed, General Use Power Supplies, IEEE 1547.

Configurations

Grid Type	Voltage Range [VAC_L-N]	Voltage Range [VAC_L-L]	Frequency Range [Hz]	Line Configuration
120/240 [VAC], 60 [Hz], Split Single Phase	105.6 - 132.0	211.2 - 264.0	59.3 - 60.5	L - N - L
120/208 [VAC], 60 [Hz], Three Phase	105.6 - 132.0	182.9 - 228.6	59.3 - 60.5	L - N - L

Southwest Windpower
 1801 W. Route 66 928.779.9463
 Flagstaff, AZ 86001 USA www.skystreamenergy.com

Makers of Skystream 3.7[®] / AIR / Whisper

Please recycle

SKYSTREAM 3.7[®] SERIAL

This unit is provided with fused trip limits and shall not be aggregated above 30kW on a single point of common connection.

configuration	120/240V 120/208V	240V
output power factor rating	1.0	
operating voltage range (ac)	106-132V L-n 212-264V	
operating frequency range	59.3-60.5 Hz	
nominal output voltage (ac)	240V	208V 240V
nominal output frequency	60Hz	
max continuous output current	10A	11.5A 10A
rated output power	2300W	
peak output power	2400W	
software revision	REV 2.02.00	
max ambient temperature	50C. output is reduced above 60C. nacelle	

Caution Risk of electric shock. Do not remove cover. No user serviceable parts inside. Refer to qualified personnel.

Caution Risk of electric shock. Both AC and DC voltage sources are terminated inside this equipment. Disconnect AC source and restrain turbine blades before servicing.

SK Skystream utility interactive inverter E300731 Enclosure Type 3R Rainproof IEEE 1547 Surge Rating B3

Southwest Windpower made in the USA
 Renewable Energy Meets Demand

NOTE: Inverters MUST meet UL-1741 certification. Installation must meet the requirements as specified in IEEE-1547.

Sample

