ANEXOS

Índice de anexos

ANEXO 1: Ficha técnica de paneles fotovoltaicos

SunPower® E-Series Residential Solar Panels | E20-327

More than 20% Efficiency

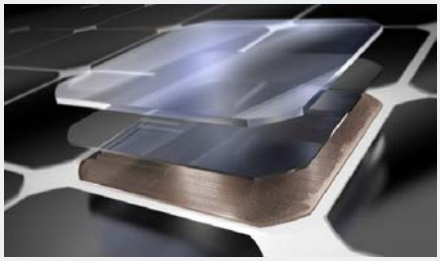
Ideal for roofs where space is at a premium or where future expansion might be needed.

High Performance

Delivers excellent performance in real-world conditions, such as high temperatures, clouds and low light.[1,2,4]

Proven Value

Designed for residential rooftops, E-Series panels deliver the features, value and performance for any home.



Maxeon® Solar Cells: Fundamentally better
Engineered for performance, designed for durability.

Engineered for Peace of Mind

Designed to deliver consistent, trouble-free energy over a very long lifetime.[3,4]

Designed for Durability

The SunPower Maxeon Solar Cell is the only cell built on a solid copper foundation. Virtually impervious to the corrosion and cracking that degrade conventional panels.[3]

#1 Rank in Fraunhofer durability test.[9]
100% power maintained in Atlas 25+ comprehensive durability test.[10]

High Performance & Excellent Durability

SPR-E20-327

E20 SERIES

High Efficiency[5]

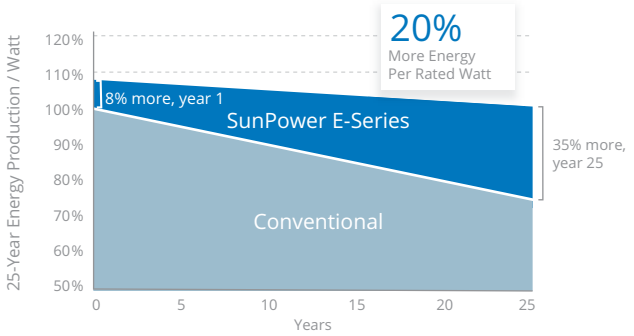
Generate more energy per square foot

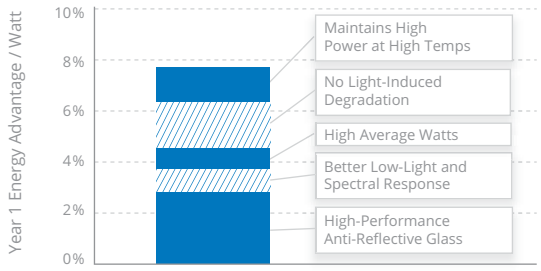
E-Series residential panels convert more sunlight to electricity by producing 31% more power per panel[1] and 60% more energy per square foot over 25 years.[1,2,3]

High Energy Production[6]

Produce more energy per rated watt

High year-one performance delivers 7–9% more energy per rated watt.[2] This advantage increases over time, producing 20% more energy over the first 25 years to meet your needs.[3]

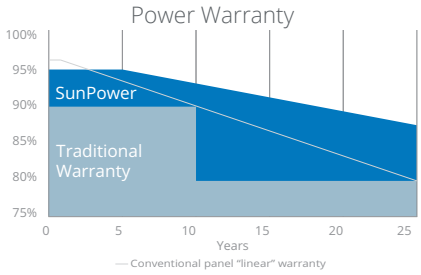




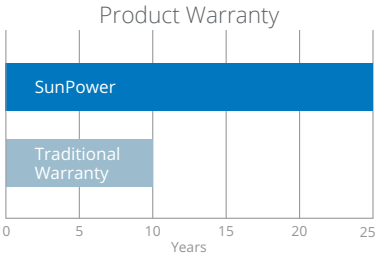
SUNPOWER®

SunPower® E-Series Residential Solar Panels | E20-327

SunPower Offers The Best Combined Power And Product Warranty



More guaranteed power: 95% for first 5 years, –0.4%/yr. to year 25 [7]

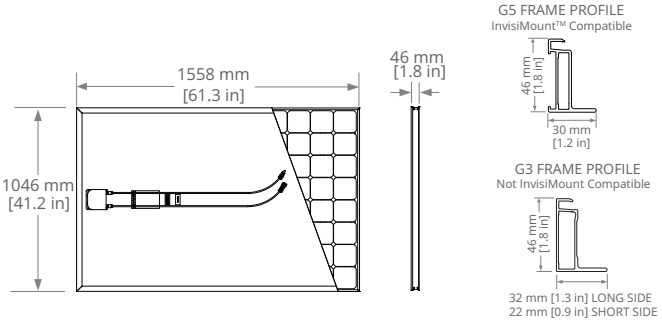


Combined Power and Product defect 25-year coverage that includes panel replacement costs [8]

Electrical Data		
	SPR-E20-327	SPR-E19-320
Nominal Power (Pnom)[11]	327 W	320 W
Power Tolerance	+5/–0%	+5/–0%
Avg. Panel Efficiency[12]	20.4%	19.9%
Rated Voltage (Vmpp)	54.7 V	54.7 V
Rated Current (Impp)	5.98 A	5.86 A
Open-Circuit Voltage (Voc)	64.9 V	64.8 V
Short-Circuit Current (Isc)	6.46 A	6.24 A
Max. System Voltage	600 V UL & 1000 V IEC	
Maximum Series Fuse	15 A	
Power Temp Coef.	–0.38% / ° C	
Voltage Temp Coef.	–176.6 mV / ° C	
Current Temp Coef.	3.5 mA / ° C	

Tests And Certifications	
Standard Tests[13]	UL1703 (Type 2 Fire Rating), IEC 61215, IEC 61730
Quality Certs	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, REACH SVHC-163, PV Cycle
Sustainability	Cradle to Cradle (eligible for LEED points)[14]
Ammonia Test	IEC 62716
Desert Test	10.1109/PVSC.2013.6744437
Salt Spray Test	IEC 61701 (maximum severity)
PID Test	Potential-Induced Degradation free: 1000 V[9]
Available Listings	UL, TUV, JET, MCS, CSA, FSEC, CEC

Operating Condition And Mechanical Data	
Temperature	–40° F to +185° F (–40° C to +85° C)
Impact Resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)
Appearance	Class A
Solar Cells	96 Monocrystalline Maxeon Gen II
Tempered Glass	High-transmission tempered anti-reflective
Junction Box	IP-65, MC4 compatible
Weight	41 lbs (18.6 kg)
Max. Load	G5 Frame: Wind: 62 psf, 3000 Pa front & back Snow: 125 psf, 6000 Pa front G3 Frame: Wind: 50 psf, 2400 Pa front & back Snow: 112 psf, 5400 Pa front
Frame	Class 1 black anodized (highest AAMA rating)



REFERENCES:
1 All comparisons are SPR-E20-327 vs. a representative conventional panel: 250 W, approx. 1.6 m², 15.3% efficiency.
2 Typically 7–9% more energy per watt, BEW/DNV Engineering "SunPower Yield Report," Jan 2013.
3 SunPower 0.25%/yr degradation vs. 1.0%/yr conv. panel. Campeau, Z. et al. "SunPower Module Degradation Rate," SunPower white paper, Feb 2013; Jordan, Dirk "SunPower Test Report," NREL, Q1-2015.
4 "SunPower Module 40-Year Useful Life" SunPower white paper, May 2015. Useful life is 99 out of 100 panels operating at more than 70% of rated power.
5 Second highest, after SunPower X-Series, of over 3,200 silicon solar panels, Photon Module Survey, Feb 2014.
6 8% more energy than the average of the top 10 panel companies tested in 2012 (151 panels, 102 companies), Photon International, Feb 2013.
7 Compared with the top 15 manufacturers. SunPower Warranty Review, May 2015.
8 Some restrictions and exclusions may apply. See warranty for details.
9 5 of top 8 panel manufacturers tested in 2013 report, 3 additional panels in 2014. Ferrara, C., et al. "Fraunhofer PV Durability Initiative for Solar Modules: Part 2". Photovoltaics International, 2014.
10 Compared with the non-stress-tested control panel. Atlas 25+ Durability test report, Feb 2013.
11 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25° C). NREL calibration Standard: SOMS current, LACCS FF and Voltage.
12 Based on average of measured power values during production.
13 Type 2 fire rating per UL1703:2013, Class C fire rating per UL1703:2002.
14 See salesperson for details.

See www.sunpower.com/facts for more reference information.
For more details, see extended datasheet: www.sunpower.com/datasheets.

G5 frames have no mounting holes. Please read the safety and installation guide.

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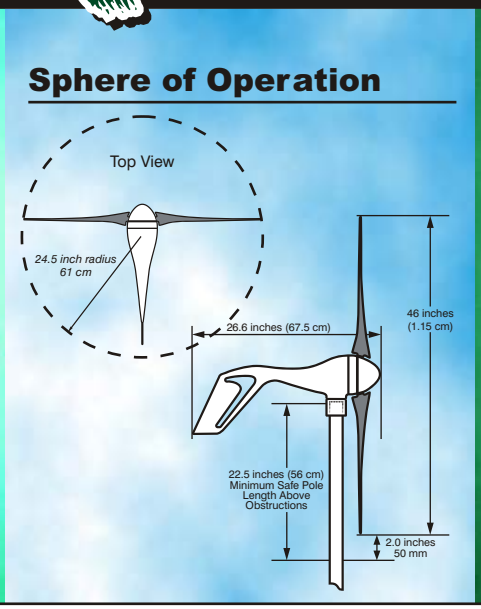
SUNPOWER®

ANEXO 2: Ficha técnica de aerogenerador

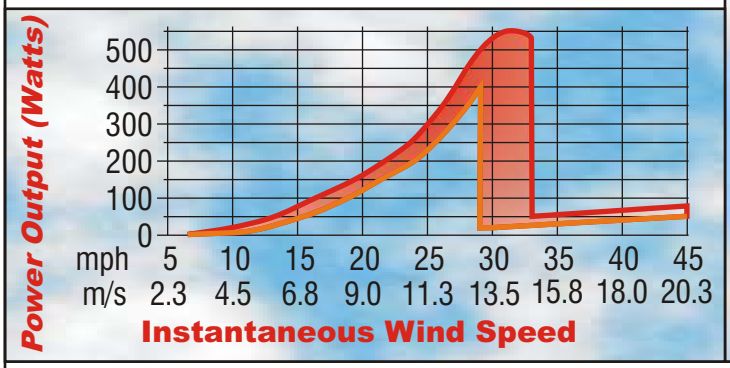
Patent Pending

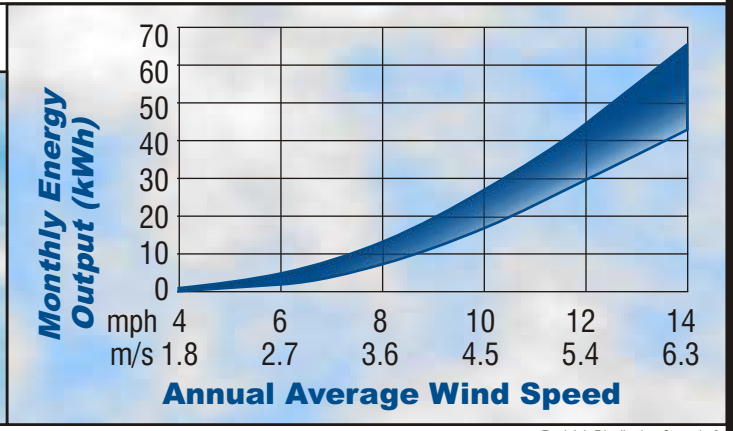
AIR X SPECIFICATIONS



Rotor Diameter:	**46 inches (1.15m)**
Weight:	**13 lbs (5.85kg) (Shipping: 27”x15”x9” (686x38x228mm) / 17 lbs (7.7kg))**
Mount:	**1.5” schedule 40 pipe (1.9” OD, 48 mm)**
Start-up wind speed:	**7 mph (3.13 m/s)**
Voltage:	**12 and 24 VDC (36 and 48 VDC available soon)**
Rated Power:	**400 watts at 28mph (12.5m/s)**
Turbine Controller:	**Microprocessor-based smart internal regulator with Peak Power Tracking**
Blades (three):	**Carbon Fiber Composite**
Body:	**Cast aluminum (Air-X Marine is powder coated for corrosion protection)**
Kilowatt hours per month:	**38 kWh/mo @12mph (5.4m/s)**
Warranty:	**3 Year Limited Warranty**
Survival Wind speed:	**110 mph (49.2 m/s)**
Over-speed Protection:	**Electronic torque control**

Performance Curves (preliminary*)





Top Line - Non-Turbulent Site
Bottom Line - Turbulent Site

*derived from field and wind tunnel testing

Rayleigh Distribution Curve k=2

Southwest Windpower
Renewable Energy Made Simple
(928) 779-9463
www.windenergy.com

ANEXO 3: Ficha técnica de baterías

Power. Sheet.

CR-430 Commercial Deep Cycle

The Power Behind Performance

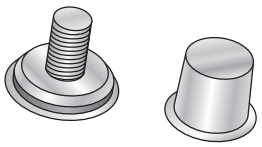
CROWN® BATTERY SINCE 1926

Crown Battery Manufacturing's team of research and development engineers welcome the opportunity to discuss your technical requirements during the design and specification stage. To access this technical assistance, please contact:

Crown Battery Manufacturing's Product Support Department
+1.419.334.7181 | sales@crownbattery.com | Fax +1.419.334.7124

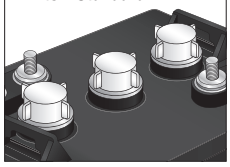
AVAILABLE TERMINAL STYLES:

Standard

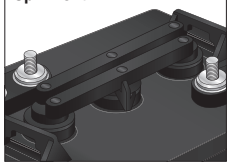


VENT CAP OPTIONS:

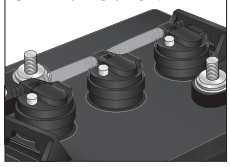
White – Standard



Spin Vent



SPW Manifold Vent



PHYSICAL SPECIFICATIONS

BCI Group Size	Model Description	Nominal Voltage	Length		Width		Container Height		Terminal Height		Weight		Cover & Container Material	Case to Cover Seal Method
			in	mm	in	mm	in	mm	in	mm	lbs	kgs		
903	CR-430	6	12.38	314	7.19	183	15.29	388	16.13	410	122	55.3	Polypropylene Plastic	Heat Seal

ELECTRICAL SPECIFICATIONS

Ampere Hour Capacity (Ah)							Discharge Capacity Minutes					KWH (kWh)	Internal Resistance
100 Hr	72 Hr	48 Hr	20 Hr	10 Hr	5 Hr	2 Hr	100A	75A	50A	25A	10A	100 Hr	80°F / 27°C
525	490	460	430	355	340	256	165	240	391	904	2735	3.150	8.1mΩ

CHARGING INSTRUCTIONS:

Crown Battery Manufacturing Company specifies the following standard battery charge profile for the CR-430 deep cycle battery when used in an electric vehicle service:

Phase 1: Constant Current (I1) I1 = highest amperage available < 100 amps

Phase 1: Constant Current (I1) I1 = minimum amperage available > 40 amps

Normal transition to Phase 2 at 2.37 Volts Per Cell.

Safety transition to END OF CHARGE of dV / dt <0V / 1 hr, dt = 1 hr. (NEGATIVE SLOPE).

Timeout for Phase 1 = 10 hours.

Phase 2: Constant Voltage (U2) U2 = 2.37 VPC

Normal Transition to Phase 3 at I2 = 15.0 amps or approximate.

Safety transition to END OF CHARGE of I dI/dt I < 0.4 amp / 1 hr, dt = 1 hr.

Phase 3: Constant Current (I3) I3 = 15.0 amps or approximate

Normal transition to END OF CHARGE at 115 -118% of AH returned.

PLEASE CONTACT CROWN BATTERY MANUFACTURING COMPANY TO ADVISE THE SPECIFIC CHARGE TERMINATION METHOD USED.

Timeout for charging phases 1 - 3 at 16 hours.

Temperature compensation coefficient = +/- 3 mV / °C.

Recommended Equalization Charge: Every seven (7) days. 4 additional hours at normal finish rate of 15.0 amps for 4 hours.

Safety transition to END OF CHARGE at maximum voltage of 2.7 VPC.

CR-430 Commercial Deep Cycle Battery

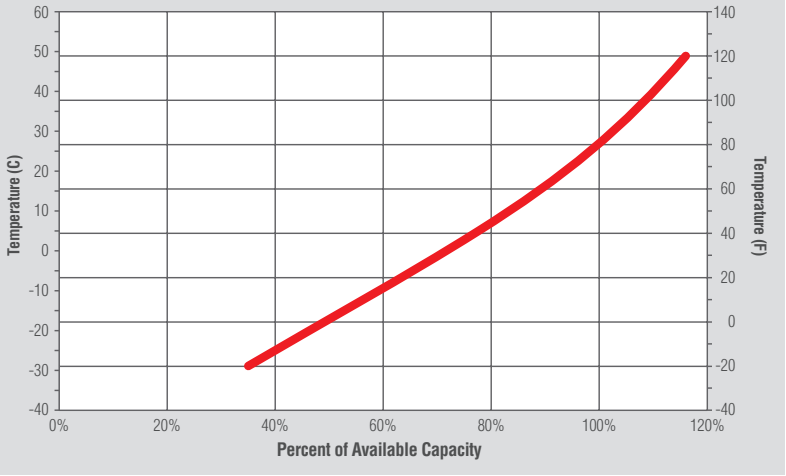
APPLICATION RECOMMENDATIONS

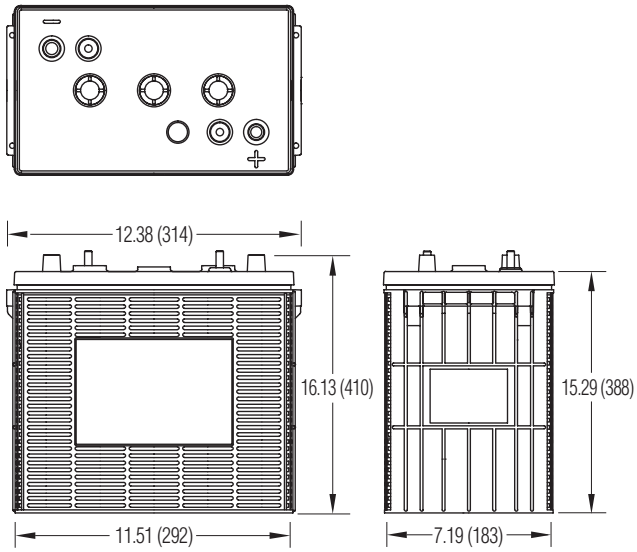
Specific Gravity	Operating Temperature Range	Self Discharge	Terminal Torque Specifications
Fully charged battery specific gravity (100% state-of-charge) is 1.275 Fully discharged battery specific gravity (100% depth-of-discharge) is 1.125	-40°F to 120°F (-40°C to 49°C). Flooded lead acid battery capacities are temperature sensitive: refer to the temperature / capacity projection chart below to identify available capacity at the application operating temperature. **Application Note:** Maintain a state of charge greater than 60 percent when operating flooded lead acid batteries at temperatures below 32°F (0°C).	Fully charged batteries that are stored at a temperature of 80°F (27°C) will self-discharge at a rate of 3.5% per week.	SAE / Automotive Terminal Style: 50 to 70 in-lbs / 6 to 8 Nm Stainless Threaded Terminal (Types C, S, Z): 100 to 120 in-lbs / 11 to 14 Nm

Application Note: *Lead acid batteries contain corrosive battery electrolyte and generate highly flammable hydrogen gas. When working near batteries wear protective clothing, gloves, and safety glasses when handling batteries and electrolyte and always work in a well-ventilated area. Do not over-torque terminals. Over-torque can result in terminal damage, breakage, terminal meltdown or fire.*

Crown Battery's flooded lead acid deep cycle batteries require periodic preventative maintenance and effective charging service to ensure dependable service life. Customers can find Crown Battery's recommended best practices for deep cycle battery care, maintenance and application at ***www.crownbattery.com/en/wp-content/uploads/2012/10/SafetyFirst-DeepCycle2.pdf*** *or by contacting Crown Battery to request this information.*

AVAILABLE CAPACITY AT APPLICATION OPERATING TEMPERATURE





TYPICAL BATTERY CYCLE LIFE / DEPTH OF DISCHARGE

Battery Model	100% DOD Cycles	End-Cycle Voltage	50% DOD Cycles	End-Cycle Voltage	40% DOD Cycles	End-Cycle Voltage	20% DOD Cycles	End-Cycle Voltage
CR-430	500	1.75 VPC	1200	1.94 VPC	1500	1.97 VPC	3000	2.05 VPC

The battery life references presented above are estimations based upon stationary life cycle testing conducted at Crown Battery Manufacturing's Testing Center in Fremont, Ohio USA. The data references are nominal and should not be construed as maximum or minimum values for specifications or for final design. Data for this product type may vary from that shown herein, and Crown Battery makes no warranties – expressed or implied – based upon the data shown above.

Effect of Battery Temperature on Battery Life

Lead acid batteries are electrochemical storage devices that store and release chemical energy upon demand in the form of electricity. By virtue of their design lead acid batteries are highly reactive to temperature – with the rate of chemical reactions that occur within the battery being affected by the operating temperature where the battery is used. Higher operating temperatures will result in faster chemical reactions within the battery – delivering improved discharge performance; conversely, cooler operating temperatures will result in slower internal chemistry. However, higher operating temperatures also result in shortened battery life as the increased rate of chemical reactions will accelerate the rate of deterioration of internal components.

Typical battery life is based upon a baseline operating temperature of 80°F / 27°C. Temperature increases of 15°F / 10°C over the baseline will cause the battery's rate of internal chemical reactions to double – something that will reduce battery life due to the accelerated deterioration of internal components. Please contact Crown Battery to discuss any minimal requirements for battery life when operating batteries in temperatures greater than 80°F / 27°C.

The Power Behind Performance

CROWN® BATTERY SINCE 1926

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sales@crownbattery.com

The data shown are nominal and should not be construed as maximum or minimum values for specification or final design. Data for this product type may vary from that shown herein.

Visit our website at www.crownbattery.com

ANEXO 4: Ficha técnica de inversor

The RD Series Inverter/Charger

For Renewable Energy Applications

The RD Series Inverter/Charger is powerful, easy-to-use, and cost effective.

MODEL NUMBERS:

- RD2212
- RD1824
- RD2824
- RD3924

AVAILABLE FOR:

- Renewable Energy Systems
  - Off-grid Power
  - Back-up Power

AVAILABLE ACCESSORIES:

- AGS
- Battery Monitor Kit
- DC Load Disconnect
- Fuse Blocks
- Remote
- Remote Switch Adapter
- Series Stacking Interface

The Powerful Difference

Reliable Off-Grid Power from Magnum Energy

The RD Series Inverter/Charger from Magnum Energy is a new generation inverter designed specifically for renewable energy use. The RD Series is powerful, easy-to-use, and best of all, cost effective.

Power Factor Corrected (PFC) Charger: Our PFC charger is built into all of our inverter chargers. It uses less energy from a generator than a standard charger – using 25-30% less AC current than standard chargers.

Safe and reliable: The RD Series is ETL Listed to the stringent requirements of UL 1741, ensuring that the inverter is safe and reliable.

Easy-to-install: Install the RD Series in four easy steps: simply connect the inverter's output to your distribution circuits or electrical panel, connect your power cable (AC) to the inverter's easy-to-reach terminal block, connect the batteries, and switch on the power.

Features

You asked and Magnum listened. The RD Series Inverter/Charger is loaded with features:

Choices: The RD Series comes in four power models and 12 and 24 volt models, allowing you to choose the model that is right for you.

Versatile mounting: Mount the RD Series on a shelf or wall.

Lightweight: The lightweight aluminum base and cover also provides noise reduction and corrosion resistance.

Multiple ports: The RD Series provides multiple ports, including an RS485 communication port for network expansion, and a remote port.

Accessible design: The extra large AC access cover with terminal screw block and 360° DC connection terminals with covers make this inverter more accessible when it needs to be.

Convenient switches: The RD Series comes with an on/off inverter-mounted switch with an easy-to-read LED indicator.

Expanded transfer relay: 60 Amp transfer service is available on all models.

Buy with ease: The RD Series is backed by a two-year (24-month) limited warranty.

Accessories and Options*

Remote control: For convenient finger-tip operation, including the new one-knob™ programming.

AGS module: Automatically starts and stops your generator based on temperature or battery voltage.

** For more detailed information and specifications on these accessories, please see the accessories data sheet.*

MAGNUM ENERGY

The RD Series Inverter/Charger

Specifications

	RD2212	RD1824	RD2824	RD3924
Inverter Specifications				
Input battery voltage range	9 - 16 VDC	18 - 32 VDC	18 - 32 VDC	18 - 32 VDC
Nominal AC output voltage	120 VAC	120 VAC	120 VAC	120 VAC
Output frequency and accuracy	60 Hz ± 0.005%	60 Hz ± 0.005%	60 Hz ± 0.005%	60 Hz ± 0.005%
1 msec surge current (amps AC)	60	70	100	150
100 msec surge current (amps AC)	37	40	60	90
5 sec surge power (real watts)	3700	4000	6000	9000
30 sec surge power (real watts)	3450	3300	4800	6400
5 min surge power (real watts)	3100	2850	3950	5800
30 min surge power (real watts)	2400	2400	3500	4750
Continuous power output at 25° C	2200 VA	1800 VA	2800 VA	3900 VA
Rated input battery current	191.0 ADC	88 ADC	133 ADC	188 ADC
Inverter efficiency (peak)	95%	95%	94%	93%
Transfer time	16 msecs	16 msecs	16 msecs	16 msecs
Search Mode	.2 ADC	.3 ADC	.3 ADC	.3 ADC
No Load (120 VAC output)	0.87 ADC	.5 ADC	.6 ADC	.6 ADC
Waveform	Modified Sine Wave	Modified Sine Wave	Modified Sine Wave	Modified Sine Wave
Charger Specifications				
Continuous output at 25° C	110 ADC	50 ADC	80 ADC	105 ADC
Charger efficiency	85%	85%	85%	92%
Power factor	> 0.95	> 0.95	> 0.95	> 0.95
Input current at rated output (AC amps)	15	15	21	29
General Features and Capabilities				
Transfer relay capability	2 legs at 30 A for 120 V/30 A or 240 V/60 A service			
Five stage charging capability	Bulk, Absorb, Float, Equalize, and Battery Saver™			
Battery temperature compensation	With available temp sensor (battery temp 0 – 50° C)			
Remote inverter on/off switch	With available pigtail to connect to dry contact			
Internal cooling	0 to 120 cfm variable speed drive using dual 92mm brushless DC fans			
Overcurrent protection	Yes, with two overlapping circuits			
Overtemperature protection	Yes on transformer, MOSFETS, and battery			
Conformal coating on PCB's for corrosion protection	Yes			
Powder coated chassis & top for corrosion protection	Yes			
Stainless steel fasteners for corrosion protection	Yes			
Listings	ETL listed to UL1741			
Warranty	Two years			
Environmental Specifications				
Operating temperature	-20° C to +60° C (-4° F to 140° F)			
Nonoperating temperature	-40° C to +70° C (-40° F to 158° F)			
Operating humidity	0 to 95% RH non condensing			
Physical Specifications				
Dimensions (h x w x d)	13.75" x 12.65" x 8.0" (34.9 cm x 32.1 cm x 20.3 cm)			
Mounting	Shelf or wall (vents up)			
Weight	38 lb (17 kg)	38 lb (17 kg)	42 lb (19 kg)	45 lb (20 kg)
Max operating altitude	15,000' (4570 m)			

Magnum Energy, Inc.
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Everett, Washington 98203 USA

Phone: 425-353-8833
Fax: 425-353-8390
Web: www.magnumenergy.com

The Powerful Difference

Testing for specifications at 25° C
Specifications subject to change without notice.
March 2007, Rev B Part #64-0300

Authorized Magnum Dealer