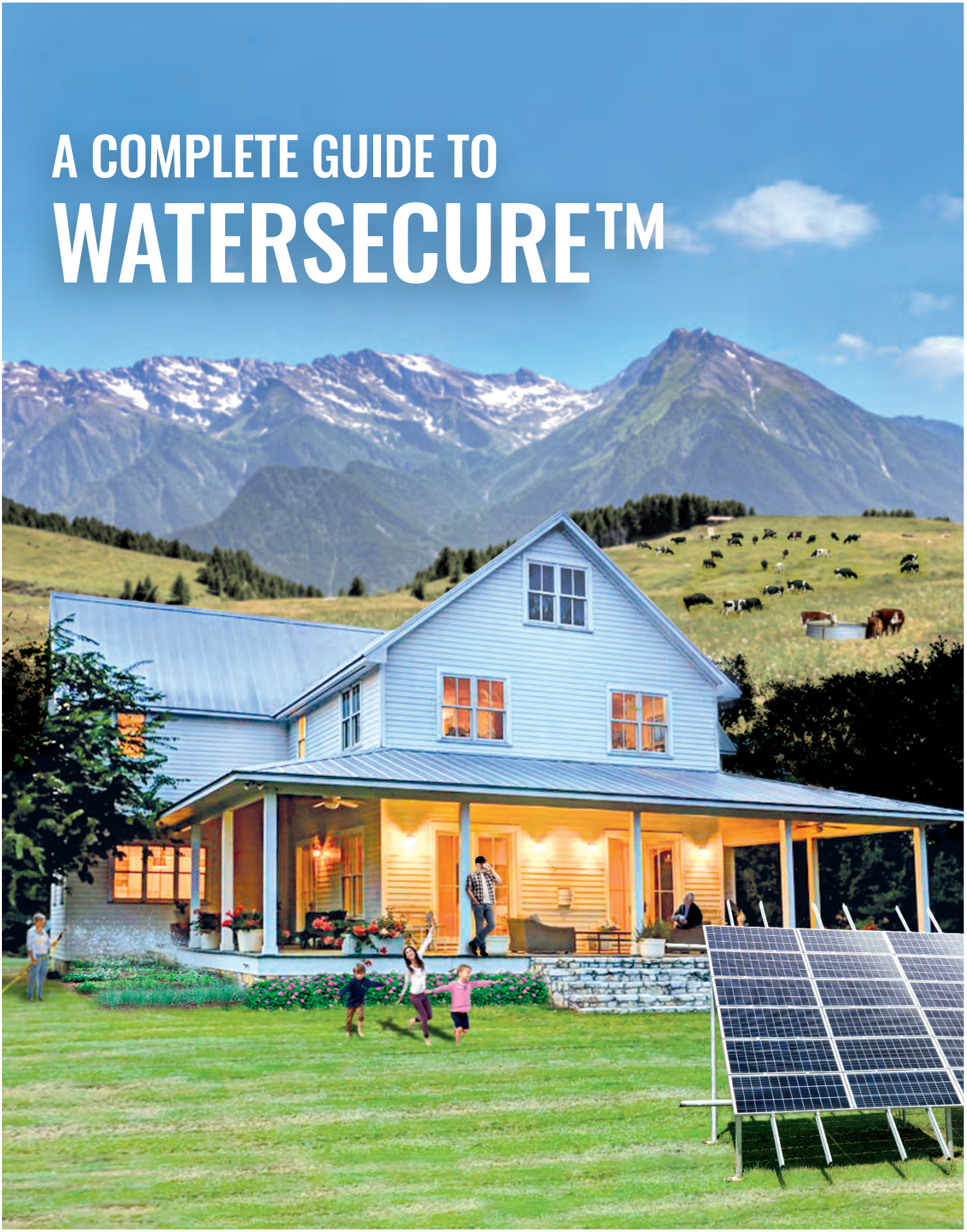
A COMPLETE GUIDE TO
WATERSECURE™



RPS
SOLAR PUMPS®

RESILIENCE. AFFORDABILITY. POWER.

Ensure your family's Water Security when the grid goes down! RPS offers a low stress, all in one **WaterSecure™** kit that transforms your current grid-tied 110v or 220v Single Phase water pump into a solar powered water pump with a solar charged battery bank.

RPS engineered three sizes of Watersecure, the WS-3K, WS-6K and WS-12K, that deliver up to 3,000, 6,000 or 12,000 watts of pure sine power. Plus, power household appliances like internet routers, coffee makers, lights, TV's, home health equipment, fans, fridges*, freezers*, laundry machines* and AC units*.

Watersecure Kits are **EXPANDABLE**, meaning you can start with a couple of batteries and panels and purchase more at a later time as your needs change.

Choose from NINE System Variants...

Battery Bank: 24V(3K) or 48V(6K &12K)
Solar Panels: 600W(3K), 800W, 1,200W, 1,600W, 2,400W

Sizing depends on the HP of your pump and power requirements of other appliances. Turn to **Page 5** for a short quiz on which Watersecure is right for you.
*Only compatible with WS-6K or WS-12K Kit

All WaterSecure™ kits contain:

- RPS 100W or 320W Rugged Aluminum Framed Mono-Crystalline Solar Panels
- Solar Wires (2 x 50ft)
- DC Cut-off Switch
- 3K, 6K or 12K Watersecure Inverter/Charger
- Plug+Wiring for AC or 220V Generator backup (3 feet)
- Battery Wiring and Jumpers (2.5 feet)
- Deep Cycle GEL 12V Batteries
- NEMA L14-30 Plug for quick install
- Breaker/Fuse
- Detailed Full-Color Installation Manual
- 2 Year Comprehensive Warranty
- Phone/Email/Text Support from Friendly USA based RPS engineers

We've created great in-depth videos on Watersecure demos and installation at...
Youtube.com/RPSSolarPumps

WIRING DIAGRAM

Overload Protection

Simple Troubleshooting

Easy-to-read LCD Display

MPPT Charge controller (40A, 60A)

Programmable Voltage, Current, Frequency & Intelligent Mode Features

RPS Scalable Ground Mount+
Solar Panels

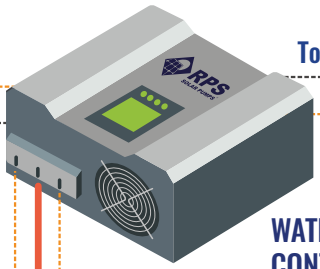
DC Cutoff
Switch

To B+ Terminal

To B- Terminal

To PV- Terminal

To PV+ Terminal



WATERSECURE
CONTROLLER

110V or 220V
Appliances

120V or 220V
AC PUMP Output

Optional AC Generator
or AC Grid Backup Input

MEMORABLE CUSTOMER SERVICE

Our famous customer support offers a direct line to talk with real, friendly humans here in the USA. Customers comment that our team has raised the standard for what to expect from a help line.

RPS engineers are available for questions, troubleshooting, or planning for installation. And you're not limited to one call, we want to make sure you continue getting great performance from our products.

We needed an off-grid solar backup for our home, barn and well. No power=no water=lots of problems. I did a lot of research and the RPS Watersecure 6K 1600 solved our problem for a 220v solar off grid system. Everyone at RPS is a pleasure to work with. It's as though they were right by my side as I did the install. All the parts are top notch made and fit perfectly. I took my time and started with the solar arrays and finished with the battery bank.

Be sure to follow the instructions as literally written and watch their videos first. When I was complete, I turned the system on and we have been off-grid since. I have the 6,000 watt inverter "brain" set for intelligent mode and it is also plugged into the grid. In the morning our very large irrigation system starts up, it eventually switches to grid power. After irrigating was over and the solar recharged, it switched back to battery and solar.

I am extremely happy with the system, the tech support, the quality of the components, the ease of install, and the fact that now we have water powered by the sun. Future plans are to put in a manual transfer switch to run some of the power to the house when not pumping water. Worth every penny.

- Steven in Nevada

CONTACT US

(888) 637-4493

support@ruralpowersystems.com

OUR SYSTEM

Just like your favorite gas powered generator is rated in watts, the WaterSecure™ uses a 3,000 watt, 6,000 watt, or 12,000 watt solar generator in the main control box. The controller makes DC power from sunlight and transforms it into AC 110/220V power, the same power you would get from the electric company! Power is stored in batteries until needed. More batteries means more storage, and more solar panels equates to faster recharge of batteries. Let's take an example of a Watersecure 6K-1200, which uses twelve 100W panels and four 160Ah, 12V batteries.

Volts x amps=Watts hours of Power

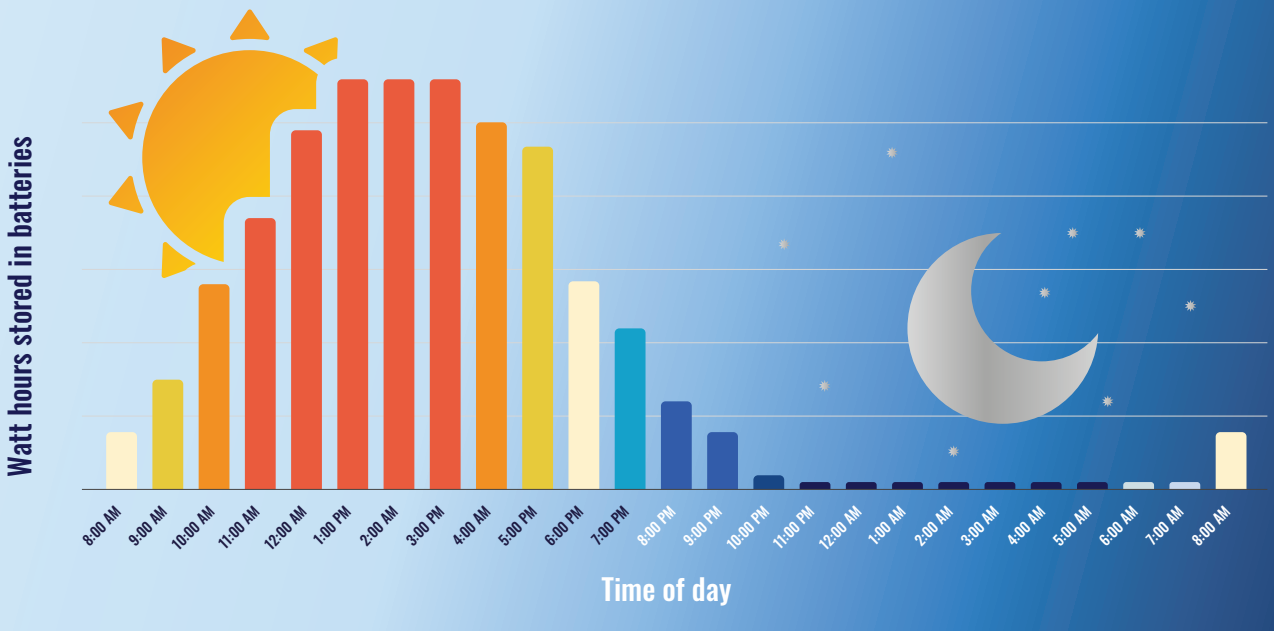
4 batteries x (160 Ah x 12V) = 7,680Wh of total stored energy

DC | WATERSECURE CONTROLLER | AC 110V OR 220V

Up to 80% more

Charging batteries with solar is a near perfect conversion of accumulated solar to storage in batteries but inverting DC into AC power isn't a perfect conversion. With the batteries kept at the healthy depth of discharge and the minimal losses in this charging and inversion, usable power from this example battery bank would be roughly 4,150Wh. Still a good deal of power and during the daytime-you'll some extra as you are collecting more of it from the sun than the battery bank needs to charge. In fact, during the day you can run closer to 5,706Wh of stuff off of the WS 6K-1200. That's a 38% power production boost during daytime and what we call a **"SOLAR BONUS"**!

Our recommendation: accomplish your most energy intensive tasks during sunlight hours, and prudently use battery power at night.



RPS engineers conservatively estimate 5 hours of usable sunlight per day for the **Solar Bonus**, but this will vary depending on your location, weather, and time of year. Some of the remaining 19 hours will fall during off peak light hours or nighttime. Of course, you may end up receiving more than 5 hours!

WHICH WATERSECURE IS RIGHT FOR YOU?

START WITH THE HP OF YOUR PUMP

1.5 HP or 2 HP?

½ HP, ¾ HP or 1 HP?

NOT USING A WATER PUMP?

START HERE...

Do you plan on powering any of the following items? Dishwasher, central AC unit, water heater, clothes dryer gas/electric, large saws or power tools?

YES!

NO

Do you have multiple large appliances and/or plan to run the entire house off the WS with normal loads?

Water needs over 2,100 gallons per day?

YES!

NO

YES!

NO

WATERSECURE 12K

WATERSECURE 6K

WATERSECURE 3K

(MAX 3/4 HP)

Plans power a second water pump like a booster as well?

Depending on the HP and use case of the pump, you may be able to use either a WS 6K or 12K, contact RPS for recommendations

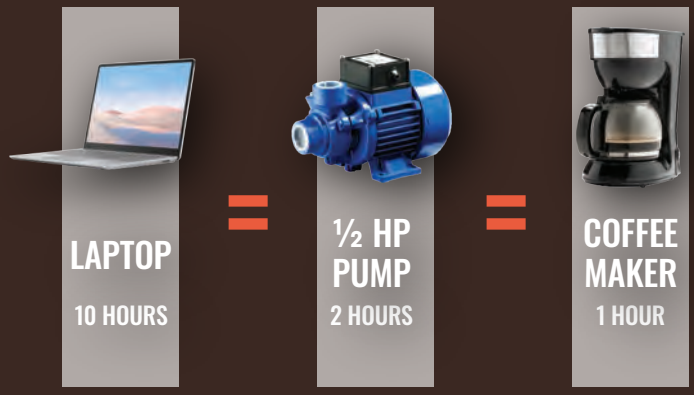
Watersecure powers up to a Larger loads and longer runtimes required? Ask about our Solar+Battery Trailers for a limited time.

GET READY

Whether preparing for grid blackouts or betting on an unpredictable world, the ability to pull the entire property off-grid brings a certain peace of mind.

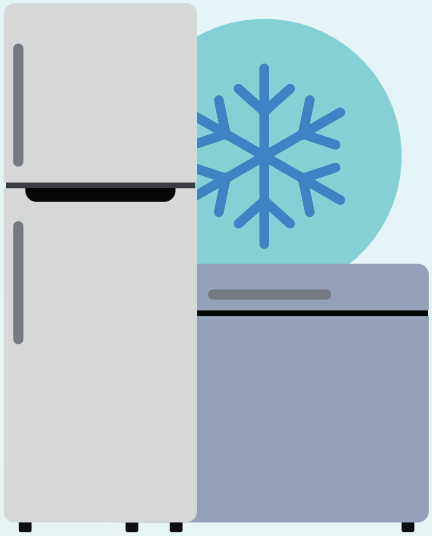
Watersecure adapts to your lifestyle! We've made some examples on the following pages of how someone could choose what to power. For example, if you power a coffee machine 1/2 hour each day (500W) instead of 1 hour (1,000W), then the 500W of energy saved can be used by something else - water your garden for another 1 Hour, or watch the big game on your laptop.

Choose How You Spend 1,000W



50-100 GALLONS

That's how much to budget per person, per day in your household. Just one hour of pumping water, assuming your pump produces 6 Gallons per minute, should provide 360 gallons - enough for a 3 or 4 person house!



As more power hungry appliances are plugged in at the same time, a larger Watersecure like a 6K or 12K is needed to handle the spike in power (Watts) upon startup. For example, if a water pump, AC unit and freezer were to simultaneously turn on, thier opertion requires an adequate surge rating that does not exceed the power output of the controller, **see page 15**. All of our Watersecure models can support **double their inverter rating for up to 10 seconds**, for example a WS-6K supports 12,000W. That's why a 6K and 12K may provide similar overall runtimes, but the 12K is the necessary choice to ensure that you aren't overwhelming the system with multiple, large appliances.

HOMESTEAD MINIMALIST

WATERSECURE 3K-600 (MAX 3/4 HP PUMP)

6 x 100W
Solar Panels

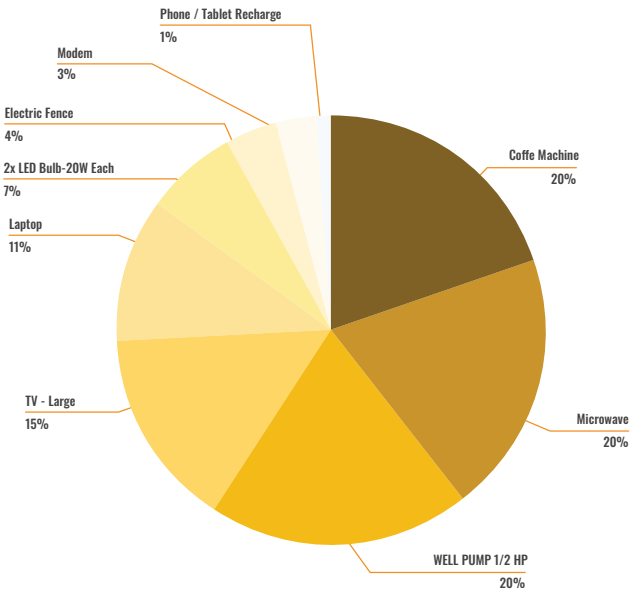
4 x 55Ah
RPS Batteries

24V
Array

There are 24 hours in a day, and 5 of those hours fall during peak sun, also known as the "SOLAR BONUS", indicated by yellow columns. The remaining 19 hours fall during off-peak sun, early morning, late afternoon or night time, shown by the blue columns. Total watts available during off-peak is always lower, plan usage accordingly so your actual Wh/Day fall below that number! Appliances like a fridge run 24/7, 5 hours during the Solar Bonus and another 19 hours during off peak sun.

Appliance	Appliance Watts	Hours of Daytime Usage "Solar Bonus"	Watts x Hours	Usage Off-Peak hours + Nighttime	Watts x Hours
Coffee Maker	1,000	0.5	500	0	0
Microwave	1,000	0.5	500	0.25	250
WELL PUMP 1/2 HP	500	1	500	1	500
Modem	15	5	75	19	285
TV - Large	200	2	400	1	200
Laptop	100	3	300	1	100
Phone / Tablet - Recharge	5	5	25	5	25
2x LED Bulb - 20W Each	40	5	200	3	120
Electric Fence	20	5	100	19	380
Wh/Day (Amount of power actually used)			2,600 Wh		1,860 Wh
Total Wh Available in Battery Bank			2,800 Wh		2,075 Wh

DAYTIME



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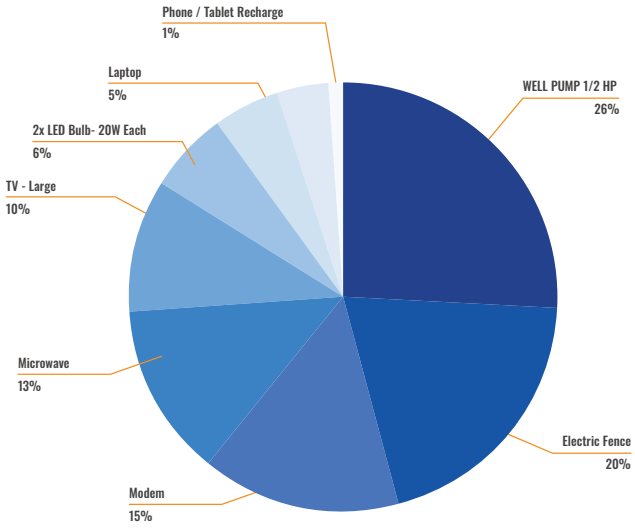


BLACKOUT SOLUTION

WATERSECURE 6K-1200 (MAX 1 HP PUMP)

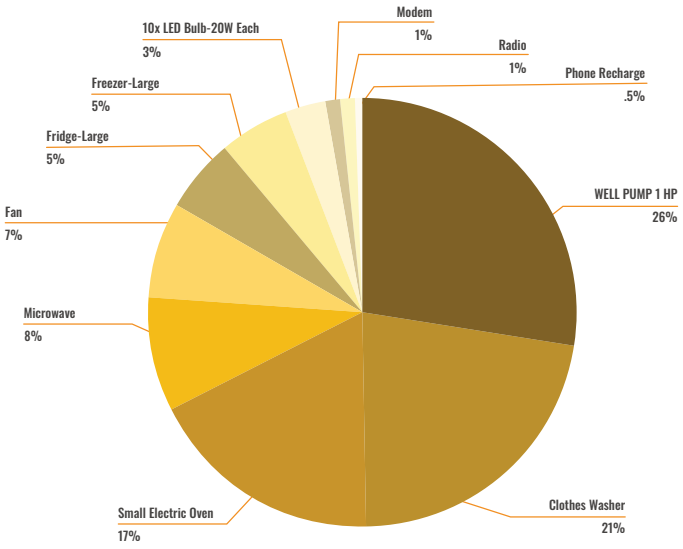
12 x 100W
Solar Panels

12 x 55Ah
RPS Batteries

48V
Array

Appliance	Appliance Watts	Hours of Daytime Usage "Solar Bonus"	Watts x Hours	Usage Off-Peak hours + Nighttime	Watts x Hours
Fridge - Large	60	5	300	19	1,140
Freezer - Large	60	5	300	19	1,140
Microwave	1,000	0.5	500	0	0
Toaster Oven / Small Electric Oven	1,000	1	1,000	0	0
Fan	150	3	450	0	0
WELL PUMP 1 HP	750	2	1,500	1	750
Clothes Washer	800	1.5	1,200	0	0
CPAP	60	0	0	10	600
Modem	15	5	75	4	60
Radio	20	4	80	0	0
Laptop	100	0	0	1	100
Phone / Tablet - Recharge	5	5	25	3	15
10x LED Bulb - 20W Each	200	1	200	1.5	300
Wh/Day			5,630 Wh		4,105 Wh
Total Wh Available in Battery Bank			5,706 Wh		4,147 Wh

DAYTIME



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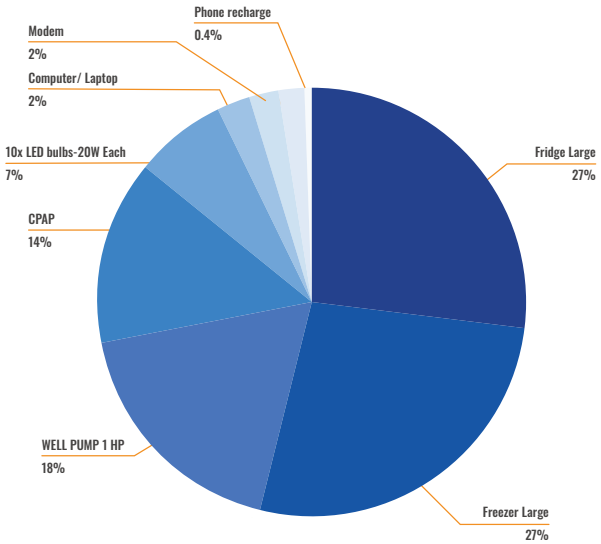


IRRIGATION EXPERT

WATERSECURE 6K-1600 (MAX 1 HP PUMP)

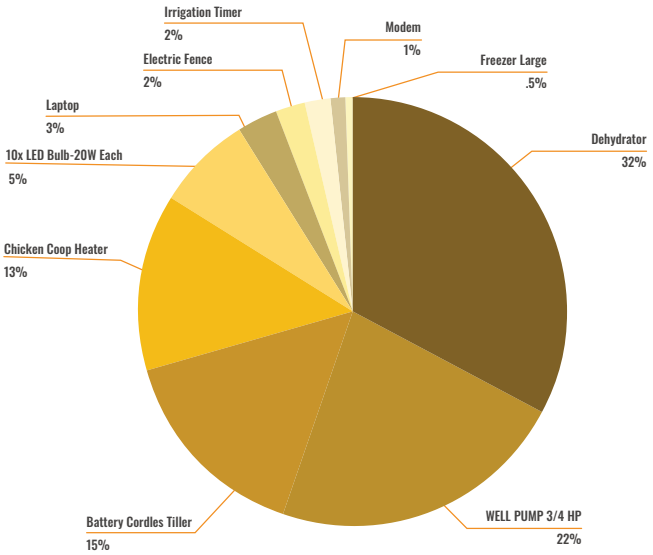
16 x 100W
Solar Panels

12 x 55Ah
RPS Batteries

48V
Array

Appliance	Appliance Watts	Hours of Daytime Usage "Solar Bonus"	Watts x Hours	Usage Off-Peak hours + Nighttime	Watts x Hours
Irrigation Timer + 4 solinoid valves	20	5	100	19	380
Chicken Coop Heater	200	5	1,000	6	1200
Electric Fence	20	5	100	19	380
WELL PUMP 3/4 HP	550	4	3,000	1	550
Battery for Cordless Tiller	580	2	1,160	0	0
Phone / Tablet - Recharge	5	5	25	5	25
Laptop	100	2	200	3	300
Modem	15	5	75	19	285
10x LED Bulb - 20W Each	200	2	200	4	800
Dehydrator	400	4	1,600	0	0
Wh/Day			7,110 Wh		4,120 Wh
Total Wh Available in Battery Bank			7,512 Wh		4,147 Wh

DAYTIME



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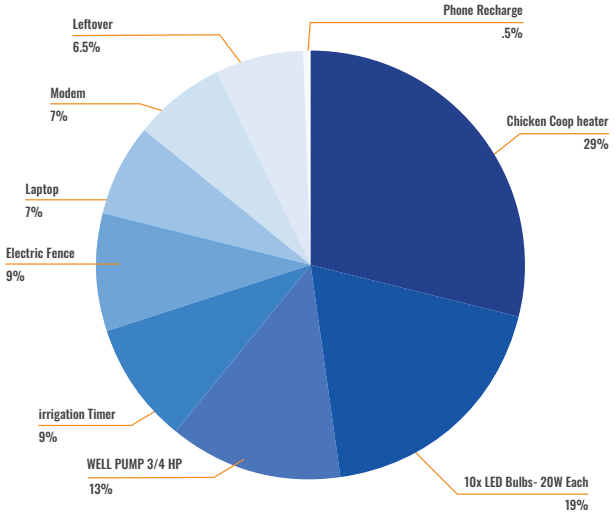


OFF-GRID CONSTRUCTION

WATERSECURE 6K-2400 (MAX 1 HP PUMP)

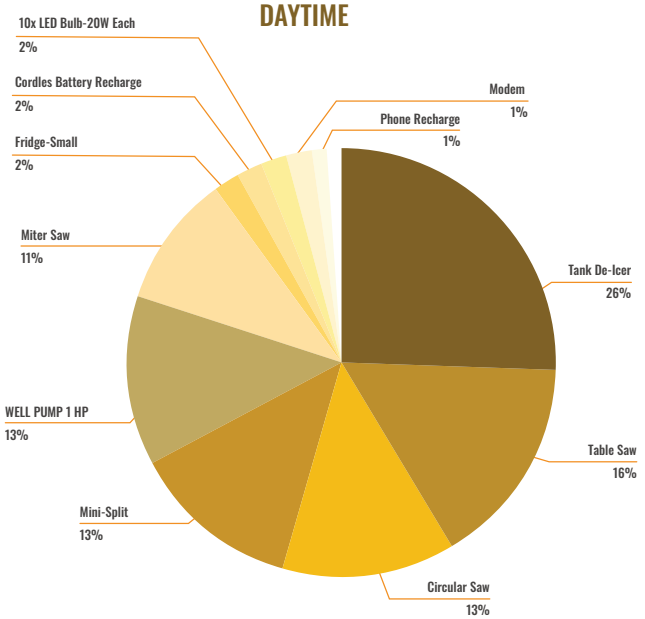
8 x 320W
Solar Panels

8 x 160Ah
RPS Batteries

48V
Array

Appliance	Appliance Watts	Hours of Daytime Usage "Solar Bonus"	Watts x Hours	Usage Off-Peak hours+ Nighttime	Watts x Hours
Fridge - Small	50	5	250	19	950
Mini Split AC/HEAT	500	3	1,500	0	0
WELL PUMP 1 HP	750	2	1,500	1	750
Circular Saw	1,200	1.25	1,500	0	0
Miter Saw	840	1.5	1,260	0	0
Table Saw	1,800	1	1,800	0	0
Cordless Tool Battery Recharge	50	5	250	0	0
Modem	15	5	75	0	0
Phone / Tablet - Recharge	5	5	25	0	0
10x LED Bulb - 20W Each	200	1	200	3	600
Tank De-Icer	1,000	3	3,000	6	6,000
Wh/Day			11,360 Wh		8,300 Wh
Total Wh Available in Battery Bank			11,532 Wh		8,554 Wh

DAYTIME



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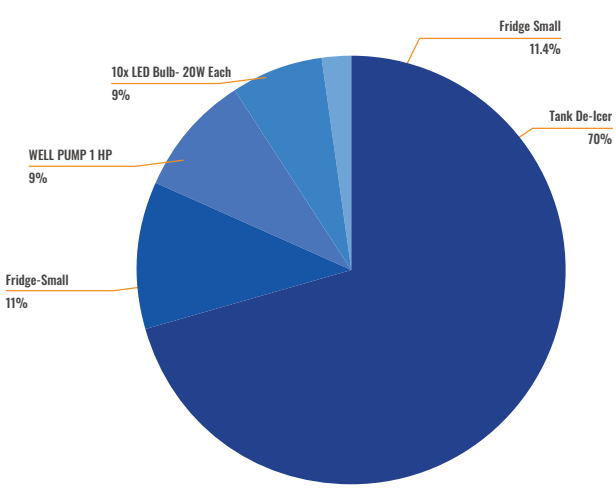


HOT WATER & 2 HP PUMP

WATERSECURE 12K-1600 (MAX 2 HP PUMP)

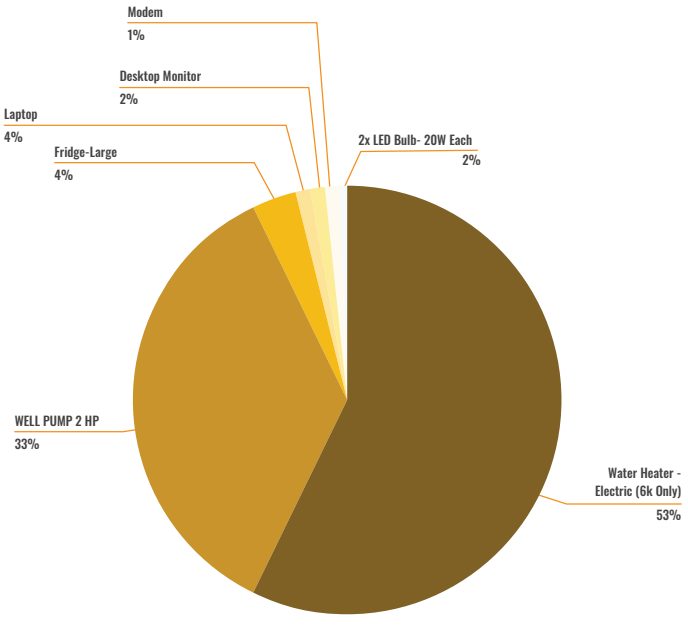
16 x 100W
Solar Panels

12 x 55Ah
RPS Batteries

48V
Array

Appliance	Appliance Watts	Hours of Daytime Usage "Solar Bonus")	Watts x Hours	Usage Off-Peak hours+ Nighttime	Watts x Hours
Fridge - Large	60	5	300	19	1,140
Water Heater - Electric (6K Only)	4,000	1	4,000	0	0
2 HP WELL PUMP	2,500	1	2,500	1	2,500
Modem	15	5	75	12	180
Radio	20	3	60	0	0
TV - Large	200	0	0	1	200
Laptop	150	2	300	0	0
Desktop Monitor	100	2	200	0	0
Phone / Tablet - Recharge	5	5	25	5	25
2x LED Bulb - 20W Each	40	1.5	60	5	200
Wh/Day			7,520 Wh		4,245 Wh
Total Wh Available in Battery Bank			7,525 Wh		4,277 Wh

DAYTIME



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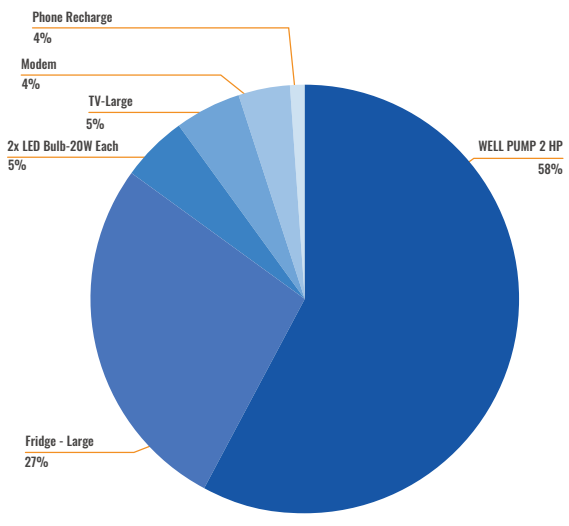


HEALTH ASSURANCE

WATERSECURE 12K-2400 (MAX 2 HP PUMP)

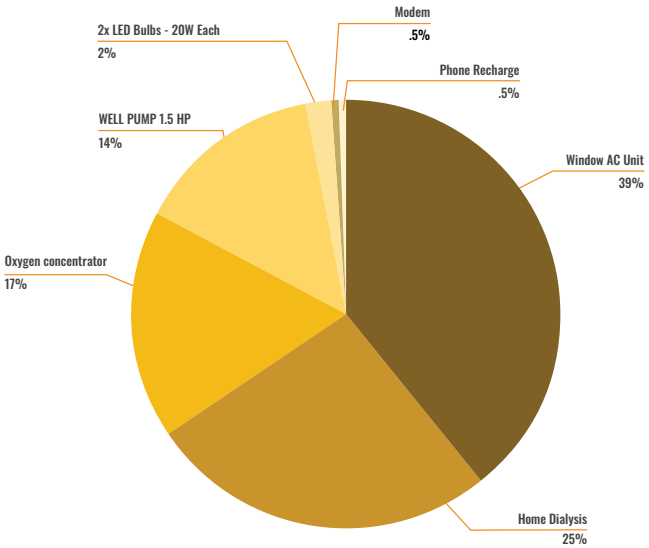
8 x 320W
Solar Panels

8 x 160Ah
RPS Batteries

48V
Array

Appliance	Appliance Watts	Hours of Daytime Usage "Solar Bonus")	Watts x Hours	Usage Off-Peak hours+ Nighttime	Watts x Hours
Window AC Unit	1,500	3	4,500	1	1,500
1.5 HP WELL PUMP	1,100	1.5	1,650	1	1,100
Home Dialysis	600	5	3,000	1	600
Oxygen Concentrator	400	5	2,000	12	4,800
Modem	15	3	45	8	120
Phone / Tablet - Recharge	5	4	20	3	15
2x LED Bulb - 20W Each	40	5	200	6	240
Wh/Day			11,415 Wh		8,375 Wh
Total Wh Available in Battery Bank			11,530 Wh		8,555 Wh

DAYTIME



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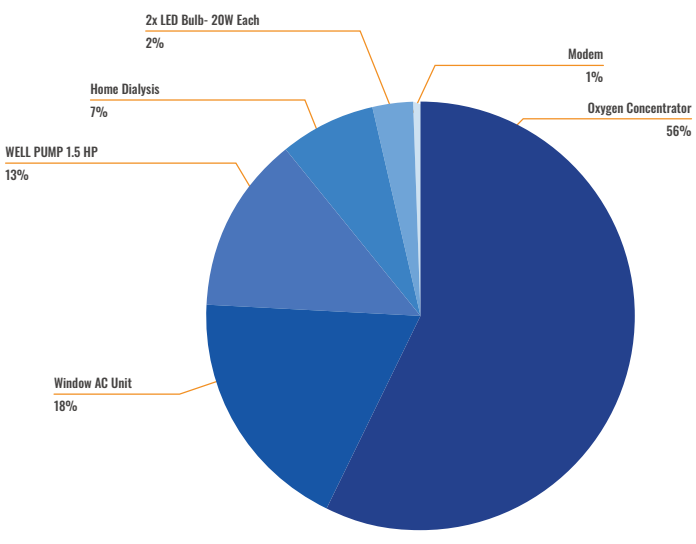
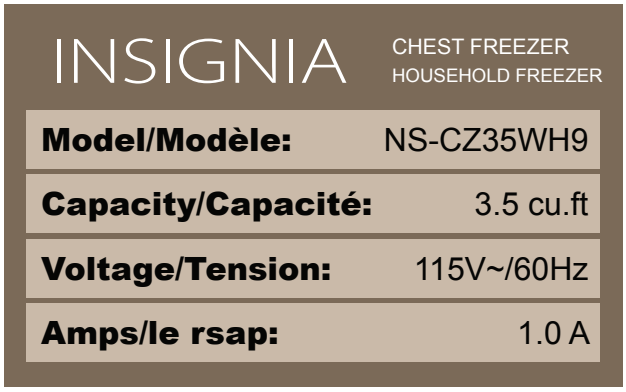


DIY WATERSECURE BUDGET

Take a walk around your property to look for spec stickers found on the back of appliances, see picture to the right. To calcualte the number of Watts an appliance consumes per hour("Appliance Watts"), locate Voltage (may be listed as VAC, Rating) and Amps (other names include "Rated Current" or "Max Amperage"). Then, plug Amps and Volts into the below equation...

Power (Appliance Watt) = Volts x Amps
Example: Fridge 115W = 115 x 1



Appliance Name	Appliance Watts	Appliance Watts x Daytime Hours	Usage Daytime (up to 5 hours) "Solar Bonus"	Appliance Watts x Off-Peak Hours	Usage Off-Peak Sun Hours+ Nightime
Example: Fridge	115W	115W x 5 hours	575 Wh	115W x 19 hours	2,185 Wh
Wh/Day					

If you're still wondering which WaterSecure™ system is right for you, take a picture of this page and send to support@rpssolarpumps.com with your contact information. One of our specialists will reach out with a recommendation and you'll even receive lower internal pricing for double checking sizing!

BUYING A WHOLE HOUSE GENERATOR VS WATERSECURE

Everytime storm, outage or emergency happens you'll need to anticipate cost of fuel. WaterSecure™ is a one time upfront cost that solves uncertainty

Generators emit carbon monoxide, harmful to breath in and can't be placed inside. Waterse-cure modeule and sealed batteries can be placed inside the home

May be difficult to find gas in an emergency or shortage situation. Gas prices fluctuate, most likely more expensive in the future due to surge pricing and inflation

WaterSecure™ is also compatible with generator or AC Grid backup if needed!

RPS batteries last 1,550 cycles, about 15 years. Solar panels last 25+ years.

STRETCH YOUR DOLLAR WITH THE SUN

	Generator Cost	Fuel $ per gallon	Gallons Per Day Used	Cost per 24Hrs	Cost per Week	Total Cost + 1 Week Storm	10th - 1 week storm
24kW Whole House Generator PROPANE	$5,000	$2.50	84	$210	$1,470	$6,470	$19,700
6kW Honda Generator GAS	$3,000	$3.50	18	$63	$441	$3,441	$7,410
Watersecure 6k-1600	$6,499	$0	0	0	0	$6,499	$6,499

		WS 3K	WS 6K	WS 12K
AC Input	*Input Voltage Waveform*	Pure Sine (utility or generator)		
	Nominal Input Voltage	**230VAC**		
	Low Line Disconnect	184Vac±4%(Normal) or 135Vac±4%(Wide) for 230Vac		
	Low Line Reconnect	194Vac±4%(Normal) or 145Vac±4%(Wide) for 230Vac		
	High Line Disconnect	263Vac±4%(Normal) or 263Vac±4%(Wide) for 230Vac		
	Max AC Input Voltage	230Vac for Max270Vac		
	Frequency	50Hz:41-54Hz, 60Hz:51-64Hz		
AC Charger	*Nominal Charge Current*	20A/35A/50A/70A (5 stages adjustable charging current)		
	Over Charge Protection	Bat.V≥31.0VDC for 24V battery, Beep Pattern 0.5s every 1s	Bat.V≥62.0VDC for 48V 0.5s every 1s & fault after 60s	
Solar Charger	*Rated Charge Current*	60A		
	PV Input Voltage range	30VDC-55VDC for 24VDC	60-110VDC for 48V	
	Max Solar Input (Watts)	1600w	2800w	2800w
	Max.PV open circuit array voltage	24V for 55VDC, 48V for 110VDC		
	Charger mode	MPPT		
	PV Low Voltage Reconnect	PV≥Bat.V=+3V		
	PV Low Voltage Disconnect	PV≤Bat.V		
	Efficiency	≥97%		
Charger	*Nominal Charger Current*	20A/35A/50A/70A (According to the inverter model), adjustable 5 stages charging current		
	Over Charge Protection	Bat.V≥15.5VDC/31VDC/62VDC,beeps 0.5s every 1s & fault after 60s		
Efficiency	*Efficiency (Battery Mode)*	>87%		
	Efficiency (Line Mode)	>98%		
Battery Voltage	*Nominal DC Input Voltage*	**24VDC**	**48VDC**	
	Low Battery Alarm	21VDC±0.6VDC for 24VDC	42VDC±1.2VDC for 48VDC	
	Low DC input shut-down	20VDC±0.6VDC for 24VDC	40VDC±1.2VDC for 48VDC	
	High DC input Alarm & Fault	32VDC±0.6VDC for 24VDC	64VDC±1.2VDC for 48VDC	
Transfer Time	*AC to DC*	20ms(max)		
	DC to AC	15ms(max)		
System Parameter	*Overload Protection*	100%<load<150%, beeps 0.5s every 1s, and Fault after 60s off the output, load>150% beeps 0.5s every 1s, and Fault after 20s		
	Output Short Circuit Protection	Current limit (Fault after 10s)		
	Surge Rating (10s)	1:2(VA)		
	Power Saver Mode	Load≤25W Enabled by default		
	Protections	Low battery, over charging, overload, over temp		
	Indicators	LED+LCD Display		
General Specifications	*Operating Temperature Range Vs Storage*	-13°C to 40°C -15°C~60°C		
	Operation humidity	5% to 95%(non-condensing)		
	Audible Noise	60dB max		
	Cooling	Forced air, variable speed fan		
	*Dimension (L*W*H)*	480*336*190mm	530*400*190mm	627*416*204mm
	Net Weight (kg)	28.0kg	39.0kg	66.5kg

Deep Cycle GEL VRLA Batteries

The highest quality VLRA sealed GEL batteries with operation lifetime up to 15 years and 1,350-1,550 cycles (50% DOD) before they lose only 40% of their capacity. Compare that to standard flooded lead acid batteries and you will see you are getting 3-4 times the lifetime for about the same cost. Both the 55ah and 160Ah pack a punch yet are easy to carry and handle. Gone are the days of checking and filling batteries every few months and risks with battery acid spilling!

SPECIFICATIONS

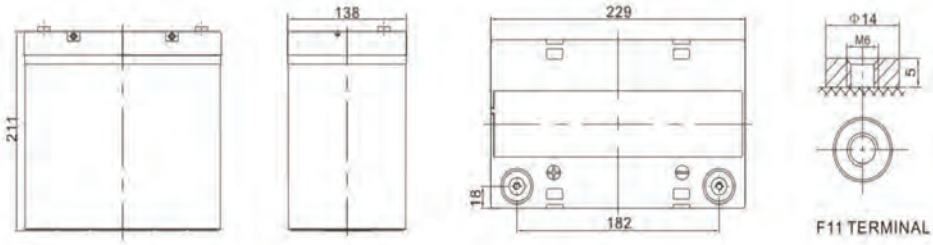
	55Ah	160Ah
Dimensions	9.02" x 5.43" 8.5" Height	20.9" x 8.15" 8.6" Height
Voltage	12V	12V
Max Discharge Current	1600A	550A
Weight	37 lbs	106 lbs
Design Life	15 Years	15 Years
Float Charge Voltage	13.6V - 13.8V	13.6V - 13.8V
Cycle Use Voltage	14.2V - 14.4V	14.2V - 14.4V
Normal Operating Temperature	25° C	25° C
Terminals: *Female Thread with Washers/Bolt*	M6 (F11)	M8 (F12)

The highest quality and longest lifetime lead acid batteries on the market today!

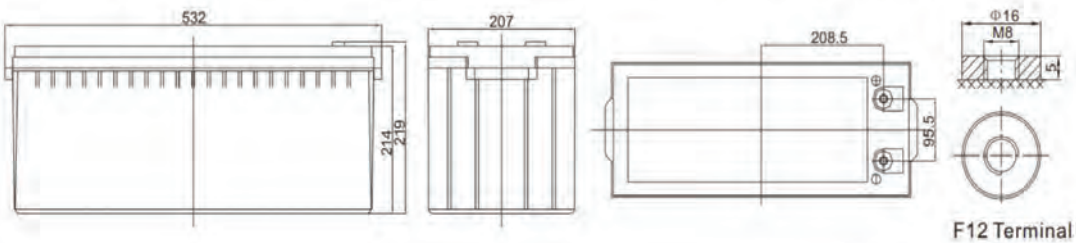
ISO 9001 ISO 14001 OHSAS 18001

MH 28539

55Ah



160Ah



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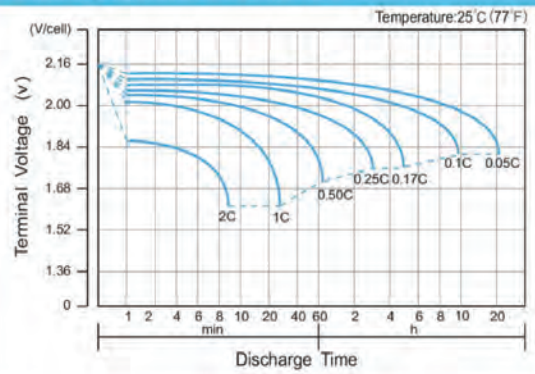
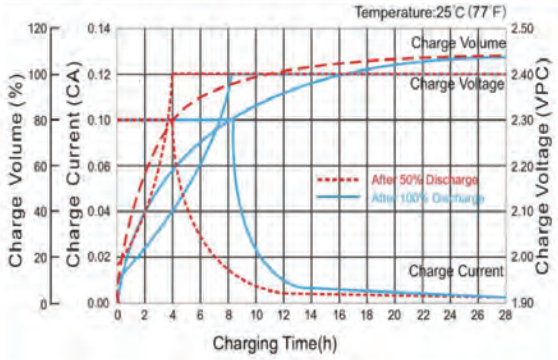
Deep Cycle VLRA Gel Batteries

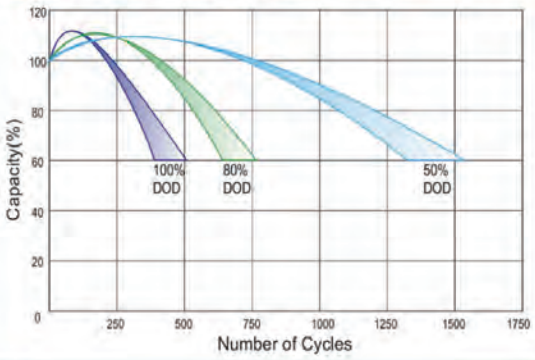
Discharge Characteristics Curve



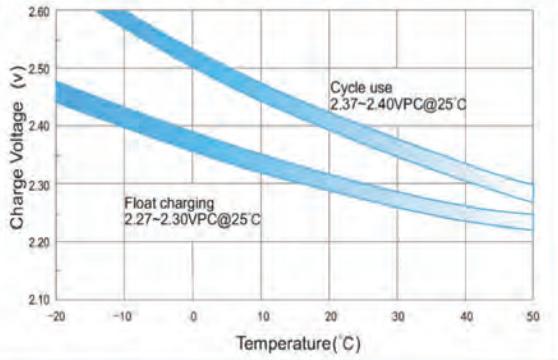
Charge Characteristic Curve for Cycle Use(IU)



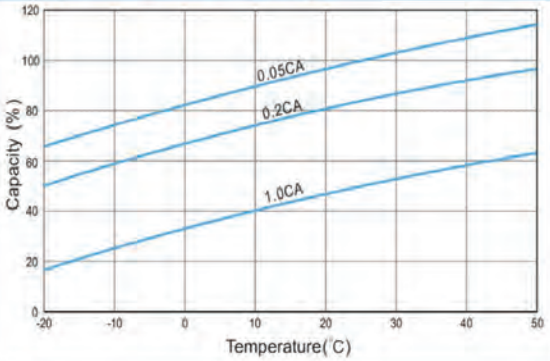
Cycle Life in Relation to Depth of Discharge



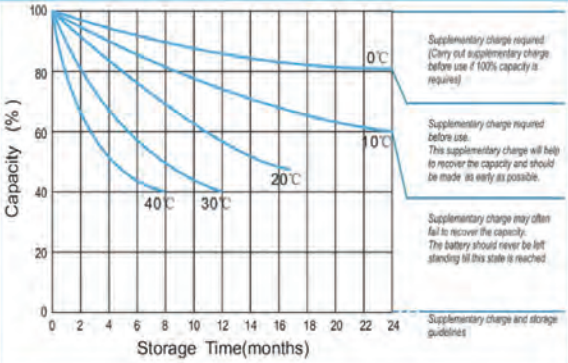
Relationship Between Charging Voltage and Temperature



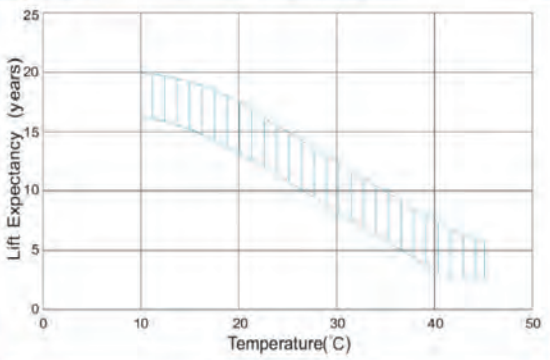
Temperature Effects on Capacity



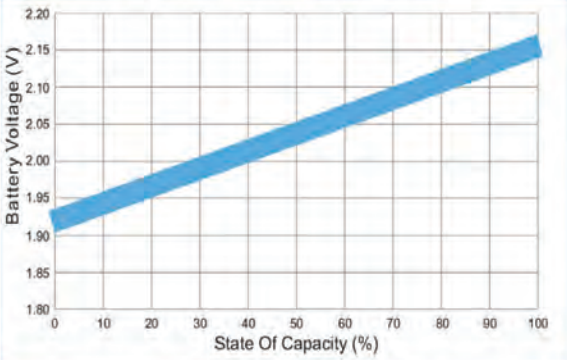
Storage Characteristics



Effect of Temperature on Long Term Life



Relationship of OCV And State of Charge(20°C)



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