



Uni-Pak™ Power Systems Solar and UPS Applications

SOLARCRAFT
POWER PRODUCTS

The Solarcraft Uni-Pak™ is a family of versatile power systems designed for high reliability in remote or outdoor applications. Available as either a solar or line powered configuration, the Uni-Pak™ utilizes DUBL-DUTY™ construction, doing the work of several enclosures.

The Uni-Pak™ is available in a basic configuration to provide power only, or can be expanded to provide room for your electronics, communications equipment or instrumentation. Because of its unique design, the Uni-Pak™ can be shipped fully assembled, minimizing installation time and errors.

Features

- ▶ Heavy gauge aluminum powder coated construction
- ▶ Integral flanges allow pipe, pole, tower, wall or rack mounting; and can accommodate pedestals, solar modules, sun shades, antenna, or other enclosures
- ▶ Unique DUBL-DUTY combination NEMA 3R/4X construction allows batteries and electronics to be placed in the same enclosure, doing the work of several enclosures
- ▶ Deep cycle, gel type batteries
- ▶ Integral battery hold down brackets
- ▶ High reflectance white finish keeps batteries and electronics cooler, extending their life
 - ▶ Robust welded construction
 - ▶ 5-year warranty
 - ▶ Full range of solar and DC-UPS systems
 - ▶ 35 standard enclosures from which to choose
- ▶ Generous battery capacity provides high reliability for critical loads.
- ▶ Single wide and double wide styles available, see attached enclosure options.
- ▶ RF kit provides radio mounting bracket, data cable with terminal blocks, lightning arrestor and coaxial jumper.

- ▶ Available in type 304 or 316 stainless steel with a passivated finish.
- ▶ Uni-Pak™ solar/TEG hybrid systems available for natural gas monitoring and control.
- ▶ Fully gasketed door with stainless steel screened louvers.
- ▶ All stainless steel hardware, hinge and padlockable latches. Key latches available.

◀ *Badger Meter System:*
The solar Uni-Pak™ can ship fully assembled and tested, with the array folded flat for transit. Deployment takes about five minutes on site.



▲ *Double-wide Uni-Pak™ deployed for pipeline control of block valves, Mohave Desert.*

How to select your solar powered Uni-Pak™

When sizing a solar power system, it is critical to measure loads carefully and calculate solar power generation based on worst case conditions. The following worksheet should help.

1 Calculating your loads

All voltages must be the same. Calculate 12V and 24V loads separately. If a Solarcraft DC/DC converter is used, assume 80% efficiency. (Divide the load by 0.8.) If dual voltages are required, it is generally a good idea to make the system voltage the same as the dominant load. Then, use a DC/DC converter to power the smaller load. When using inverters, include both the inverter efficiency and the quiescent current draw, which can be significant with pure sine wave inverters. When using the Solarcraft 12/24 VDC to 24 VAC inverter, assume 95% efficiency, and 0.05A quiescent load; 90% efficiency at high temperatures. If you are using a 120 VAC sine wave inverter, assume 80% efficiency, and 60% at high temperatures.

2 Determining sun hours

Once you have determined your daily load in Ah, locate your site on the map below, and determine the winter peak sun hour value. Round down to the next .5 sun hour. For example, the Houston and the Gulf Coast is rated at 3.3, so round down to 3.0 peak sun hours.

3 Using the Uni-Pak™ Sizing Matrix

Noting your daily power consumption in Ah, refer to the Uni-Pak™ Solar Sizing Matrix at the top of the next page. Knowing your peak sun

hour value, scroll down that column until the Ah exceeds your daily load. We normally recommend at least a 10% safety factor on top of that to compensate for long-term system aging.

4 Selecting the batteries

Select your batteries based on your daily load (Ah) multiplied by the recommended days of autonomy. Uni-Pak™ batteries are normally 98Ah and 110Ah. Therefore, when calculating autonomy, round up to the next battery capacity.

Device	Device name	Amps (A)	Hours/day (h/d)	Load = A • h/d
Device 1				
Device 2				
Device 3				
Communication Device	Receive Mode			
	Transmit Mode			
	Standby Mode			
Total for all Devices	(Add values in Load column)			Ah/day

▼ *Stainless steel enclosure is used for a solar/wind hybrid system on an offshore platform; and also houses the customer's well-logging equipment.*



▲ *Detail showing waterproof connectors and bronze hole plugs.*



◀ *Solar Uni-Pak™ with MDS 9710 radio.*

► *Double wide custom Uni-Pak™ for seismic monitoring application. Electronics compartment lined with foil-faced insulation.*



Uni-Pak™ Solar Sizing Matrix

(B) 12 Volt	Winter Peak Sun Hours KWH/M ² (A)												(B) 24 Volt
	0.5 hrs	1 hrs	1.5 hrs	2 hrs	2.5 hrs	3 hrs	3.5 hrs	4 hrs	4.5	5 hrs	5.5 hrs	6 hrs	
40W	0.94Ah	1.88Ah	2.82Ah	3.76Ah	4.70Ah	5.64Ah	6.58Ah	7.52Ah	8.46Ah	9.40Ah	10.34Ah	11.28Ah	80W
	40mA	80mA	117mA	156mA	195mA	235mA	274mA	313mA	352mA	391mA	430mA	470mA	
50W	1.20Ah	2.40Ah	3.60Ah	4.80Ah	6.00Ah	7.20Ah	8.40Ah	9.60Ah	10.80Ah	12.00Ah	13.20Ah	14.40Ah	100W
	50mA	100mA	150mA	200mA	250mA	300mA	350mA	400mA	450mA	500mA	550mA	600mA	
65W	1.50Ah	3.00Ah	4.50Ah	6.00Ah	7.50Ah	9.00Ah	10.50Ah	12.00Ah	13.50Ah	15.00Ah	16.50Ah	18.00Ah	130W
	62mA	125mA	187mA	260mA	312mA	375mA	437mA	500mA	562mA	625mA	687mA	750mA	
85W	2.00Ah	4.00Ah	6.00Ah	8.00Ah	10.00Ah	12.00Ah	14.00Ah	16.00Ah	18.00Ah	20.00Ah	22.00Ah	24.00Ah	170W
	83mA	166mA	260mA	333mA	416mA	500mA	583mA	666mA	750mA	833mA	916mA	100mA	
130W	2.95Ah	5.91Ah	8.86Ah	11.82Ah	14.77Ah	17.73Ah	20.68Ah	23.64Ah	26.59Ah	29.55Ah	32.50Ah	35.46Ah	260W
	123mA	246mA	369mA	492mA	615mA	738mA	861mA	985mA	1108mA	1231mA	1354mA	1477mA	
170W	4.08Ah	8.16Ah	12.24Ah	16.32Ah	20.40Ah	24.48Ah	28.56Ah	32.64Ah	36.72Ah	40.80Ah	44.88h	48.96h	340W
	170mA	340mA	510mA	680mA	850mA	1020mA	1190mA	1360mA	1530mA	1700mA	1870mA	2040mA	
260 W	5.91Ah	11.82Ah	17.73Ah	23.64Ah	29.55Ah	35.46Ah	41.37Ah	47.28Ah	53.19Ah	59.10Ah	65.00Ah	70.92Ah	520W
	246mA	492mA	738mA	984mA	1230mA	1477mA	1723mA	1970mA	2216mA	2462mA	2708mA	2955mA	
340W	8.00Ah	16.00 Ah	24.00Ah	32.00Ah	40.00Ah	48.00h	56.00h	64.00h	72.00h	80.00h	88.00h	96.00h	680W
	333mA	666mA	999mA	1332mA	1665mA	1998mA	2331mA	2664mA	2997mA	3330mA	3663mA	3996mA	
390W	8.87Ah	17.74Ah	26.61Ah	35.48Ah	44.35Ah	53.22Ah	62.09Ah	70.96Ah	79.83Ah	88.70Ah	97.57Ah	106.44Ah	780W
	369mA	739mA	11108mA	1477mA	1847mA	22217mA	2586mA	2956mA	3325mA	3695mA	4064mA	4434mA	
520W	11.82Ah	23.65Ah	35.47Ah	47.30Ah	59.12Ah	70.95Ah	82.77Ah	94.60Ah	104.42Ah	118.25Ah	130.07Ah	141.90Ah	1140W
	492mA	985mA	1477mA	1970mA	2462mA	2955mA	3477mA	4432mA	4432mA	4925mA	5417mA	5910mA	
12V Solar Array	Recommended Autonomy (C)												24V Solar Array
	36 days	33 days	30 days	27 days	25 days	20 days	17 days	15 days	12 days	10 days	8 days	7 days	

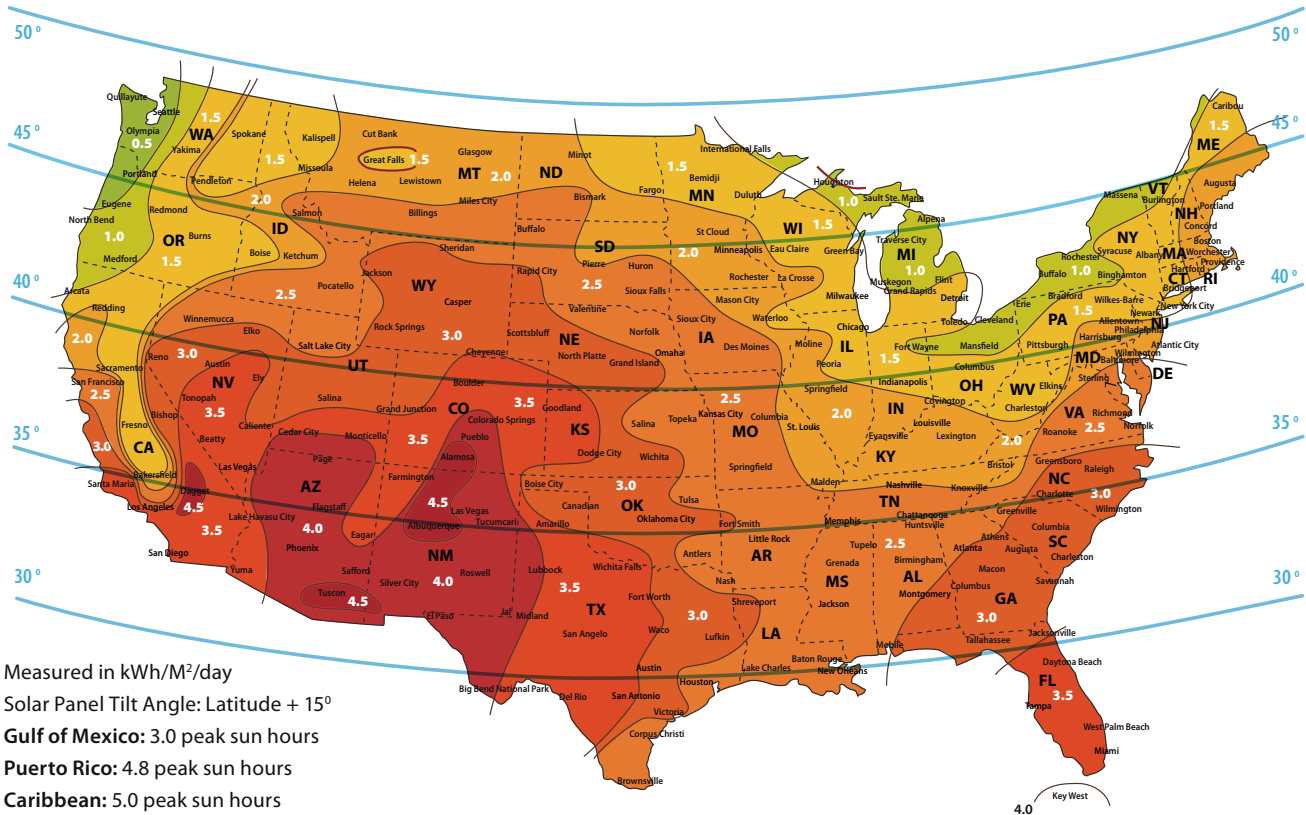
(A) Peak sun hours are listed across the top.
 (B) 12V systems are listed in the left column,

24V systems are on the right. Solar panel requirements are designated in Watts.

(C) Recommended days of system autonomy are listed at the bottom of the chart.

Solarcraft Insolation Map

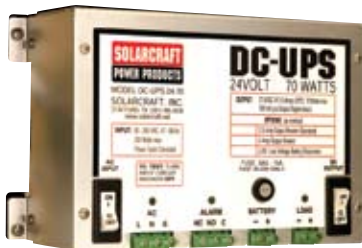
Typical Peak Sun Hours:



Uni-Pak™ DC-UPS Systems

The Uni-Pak™ can be packaged as a line powered system (AC) with a backup capacity ranging from hours to weeks. Power options range from 30W to 200W. The Solarcraft DC-UPS power supply has the following features:

- ▶ Universal Input
- ▶ Filtered, regulated output
- ▶ Power factor
- ▶ Circuit breaker
- ▶ Loss of power alarm
- ▶ Can run at fully capacity continuously without tripping or folding back
- ▶ Low Voltage Disconnect (LVD) option protects batteries from excessive deep discharge, which can damage them.
- ▶ True Universal Input – 47-66 Hz, 85-265 VAC (automatic, no jumpers); 110-370 VDC input.
- ▶ Power-factor-corrected Input – prevents harmonic degradation of the AC power line feeding the system.
- ▶ 150 Watt Total System Power Output – with 70 watts for load power and 80 Watts or more for battery charging.
- ▶ Constant-current Limited Output – avoids the shutdown problems common with conventional power supplies.
- ▶ Temperature Compensated Output – provides proper voltage for battery charging over wide temperatures.
- ▶ Low Noise Output – allows use with sensitive electronics used in control, monitoring, and communications.
- ▶ Glitch-less Switchover – provides continuous load power free of sharp transients.



▲ The Solarcraft DC-UPS is available in 30W, 70W, and 100W, and can be paralleled for greater output.

- ▶ Wide Operating Temperature – makes it suitable for indoor or outdoor use (–20 - 60° C, –4 - 140° F).
- ▶ Input and Output Magnetic Circuit Breakers – provide precise protection over broad temperature ranges.
- ▶ Isolated Form C Alarm Contacts – provide remote signaling or shed loads when AC power fails.
- ▶ Status Indicators – provide system status at a glance and aid with troubleshooting.
- ▶ Reverse Battery Protection – with a replaceable fuse protects the DC-UPS and your loads from costly damage.
- ▶ Convenient Mounting – allows the DC-UPS to be flat panel mounted.
- ▶ Rugged Enclosure / Quality Construction – for trouble-free service in harsh industrial or remote applications.

To select your DC-UPS Uni-Pak™, calculate your load multiplied by the number of hours backup desired, then consult the attached enclosure options to select the best enclosure for your needs.

DC-UPS Power Specifications				
	12V		24V	
30W	2.2A @ 13.8V	3.5A	1.1A @ 27.6V	1.75A
70W	5.0A @ 13.8V	10.5A	2.5A @ 27.6V	5.25A
100W	7.5A @ 13.8V	10.5A	3.75A @ 27.6V	5.25A
140W	10.0A @ 13.8V	21.0A	5.0A @ 27.6V	10.50A
200W	15.0A @ 13.8V	21.0A	7.5A @ 27.6V	10.50A
	Max load current (breaker rating)	Max battery charging current, no load	Max load current (breaker rating)	Max battery charging current, no load

For additional electrical specifications, please refer to DC-UPS spec sheet. All models available as standard or LVD (Low voltage Disconnect) option.



◀ 56" DC-UPS battery tower is used on offshore platforms that have generators. Even though it has a very small footprint, it provides three weeks of autonomy.

▶ Double-wide DC-UPS Uni-Pak™ provides complete pipeline monitoring and control, replacing three enclosures and a rack with a single integrated enclosure.



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Solarcraft, Inc.

4007C Greenbriar Drive
Stafford, Texas 77477
877-340-1224 toll free

281-340-1224 local
281-340-1230 fax
www.solarcraft.net