MEGA-PAK Power Systems

Solar and UPS Applications

SOLARCRAFT
POWER PRODUCTS

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

The MEGA-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 their size and weight, most MEGA-PAK ship with the solar array assembled, but detached. The batteries are also shipped outside the enclosure for ease of handling and damage avoidance. The MEGA-PAK does offer an integral battery hold down option.

Features

- Heavy gauge aluminum powder coated construction.
- Integral Flanges provide convenient mounting and can accommodate pedestals, solar modules, sun shades, antenna, or other enclosures.
- Unique DUBL-DUTY combination NEMA3R/4X construction allows batteries and electronics to be placed in the same enclosure, doing the work of several enclosures.
- Deep cycle, gel type batteries
- 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
- Standard enclosures to choose from; generous battery capacity provides high reliability for critical loads.
- Single wide as 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.
- MEGA-PAK solar/TEG hybrid systems available for natural gas monitoring and control.
- *Skid mounted systems include multiple battery hold down brackets to absorb rough handling and ensure reliable operation*
- Fully gasketed door with stainless steel screened louvers.
- All stainless steel hardware, hinge and padlockable latches. Key latches available.
- Solar/Stirling hybrid systems available for natural gas monitoring and control, especially in colder, northern latitudes.

▼ *Electronics compartment with solar controls, circuit breakers, satellite modem, DC/DC converter, switch, and server*

▼ *Skid mounted 520W systems for rapid deployment and minimal installation costs*

Designing a solar powered MEGA-PAK

To size 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 loads
Measure loads with a digital amp meter if possible. 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. 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 Insolation Map, and determine the winter peak sun hour value. Round down to the next 0.5 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 MEGA-PAK Sizing Matrix
Noting your daily power consumption in Ah, refer to the MEGA-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 Determining batteries
Battery requirments are based on your daily load (Ah) multiplied by the recommended days of autonomy. MEGA-PAK batteries are normally 265Ah. Therefore, when calculating autonomy, round up to the next battery capacity.

Device	Device name	Amps (A)	Hours/day (h/d)	Load = Ah/day
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

Battery enclosure for 3.6 KW MEGA-PAK stacks 12 batteries vertically and provides convenient mounting for control and power distribution; conserves valuable deck space on an offshore platform.

▲ *Rear view of 520W skid mounted systems*

▼ *1KW unitized system utilizes the large array for enclosure shading*

MEGA-PAK Solar Sizing Matrix

12 V	Winter Peak Sun Hours KWH/M² (A)												24 V
	0.5 hrs	1 hrs	1.5 hrs	2 hrs	2.5 hrs	3 hrs	3.5 hrs	4 hrs	4.5 hrs	5 hrs	5.5 hrs	6 hrs	
260W	5.9 Ah/d	11.8 Ah/d	17.7 Ah/d	23.6 Ah/d	29.6 Ah/d	35.5 Ah/d	41.4 Ah/d	47.3 Ah/d	53.2 Ah/d	59.1 Ah/d	65 Ah/d	70.9 Ah/d	520W
	246 mA	493 mA	739 mA	985 mA	1232 mA	1478 mA	1724 mA	1971 mA	2217 mA	2463 mA	2710 mA	2956 mA	
340W	8 Ah/d	16.1 Ah/d	24.1 Ah/d	32.1 Ah/d	40.2 Ah/d	48.2 Ah/d	56.2 Ah/d	64.3 Ah/d	72.3 Ah/d	80.3 Ah/d	88.4 Ah/d	96.4 Ah/d	680W
	335 mA	669 mA	1004 mA	1339 mA	1673 mA	2008 mA	2343 mA	2677 mA	3012 mA	3347 mA	3681 mA	4016 mA	
390W	8.9 Ah/d	17.7 Ah/d	26.6 Ah/d	35.5 Ah/d	44.3 Ah/d	53.2 Ah/d	62.1 Ah/d	70.9 Ah/d	79.8 Ah/d	88.7 Ah/d	97.5 Ah/d	106.4 Ah/d	780W
	370 mA	739 mA	1109 mA	1478 mA	1848 mA	2217 mA	2587 mA	2956 mA	3326 mA	3695 mA	4065 mA	4434 mA	
425W	10 Ah/d	20.1 Ah/d	30.1 Ah/d	40.2 Ah/d	50.2 Ah/d	60.2 Ah/d	70.3 Ah/d	80.3 Ah/d	90.4 Ah/d	100.4 Ah/d	110.4 Ah/d	120.5 Ah/d	850W
	418 mA	837 mA	1255 mA	1673 mA	2092 mA	2510 mA	2928 mA	3347 mA	3765 mA	4183 mA	4602 mA	5020 mA	
520W	11.8 Ah/d	23.6 Ah/d	35.5 Ah/d	47.3 Ah/d	59.1 Ah/d	70.9 Ah/d	82.8 Ah/d	94.6 Ah/d	106.4 Ah/d	118.2 Ah/d	130.1 Ah/d	141.9 Ah/d	1040W
	493 mA	985 mA	1478 mA	1971 mA	2463 mA	2956 mA	3449 mA	3941 mA	4434 mA	4927 mA	5419 mA	5912 mA	
650W	14.8 Ah/d	29.6 Ah/d	44.3 Ah/d	59.1 Ah/d	73.9 Ah/d	88.7 Ah/d	103.5 Ah/d	118.2 Ah/d	133 Ah/d	147.8 Ah/d	162.6 Ah/d	177.4 Ah/d	1300W
	616 mA	1232 mA	1848 mA	2463 mA	3079 mA	3695 mA	4311 mA	4927 mA	5543 mA	6158 mA	6774 mA	7390 mA	
780W	17.7 Ah/d	35.5 Ah/d	53.2 Ah/d	70.9 Ah/d	88.7 Ah/d	106.4 Ah/d	124.2 Ah/d	141.9 Ah/d	159.6 Ah/d	177.4 Ah/d	195.1 Ah/d	212.8 Ah/d	1560W
	739 mA	1478 mA	2217 mA	2956 mA	3695 mA	4434 mA	5173 mA	5912 mA	6651 mA	7390 mA	8129 mA	8868 mA	
910W	20.69AH	41.38Ah	62.07Ah	82.76Ah	103.45Ah	124.14Ah	144.83Ah	165.52Ah	186.21Ah	206.90Ah	227.59Ah	248.28Ah	1820W
	862mA	1724mA	2586mA	3448mA	4310mA	5169mA	6034mA	6896mA	7758mA	8620mA	9482mA	10344mA	
1040W	23.64Ah	47.29Ah	94.58Ah	94.58Ah	118.22Ah	141.87Ah	165.51Ah	189.16Ah	212.80Ah	236.45Ah	260.09Ah	283.47Ah	2080W
	985Ma	1970mA	3940mA	3940mA	4925mA	5910mA	6895mA	7880mA	8865mA	9850mA	10835mA	11820mA	
1170W	26.60Ah	53.20Ah	106.40Ah	106.40Ah	133.00Ah	159.60Ah	186.20Ah	212.80Ah	239.40Ah	266.00Ah	292.60Ah	319.20Ah	2340W
	1108mA	2216mA	4432mA	4432mA	5540mA	6648mA	7756mA	8664mA	9972mA	11080mA	12188mA	13296mA	
1300W	29.56Ah	59.12Ah	118.24Ah	118.24Ah	147.80Ah	177.36Ah	206.92Ah	236.48Ah	266.04Ah	295.60Ah	325.16Ah	354.72Ah	2600W
	1231mA	2463mA	4926mA	4926mA	6157mA	7389mA	8620mA	9852mA	11083mA	12315mA	13546mA	14778mA	
12V 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	24V Solar Array
	Recommended Autonomy												

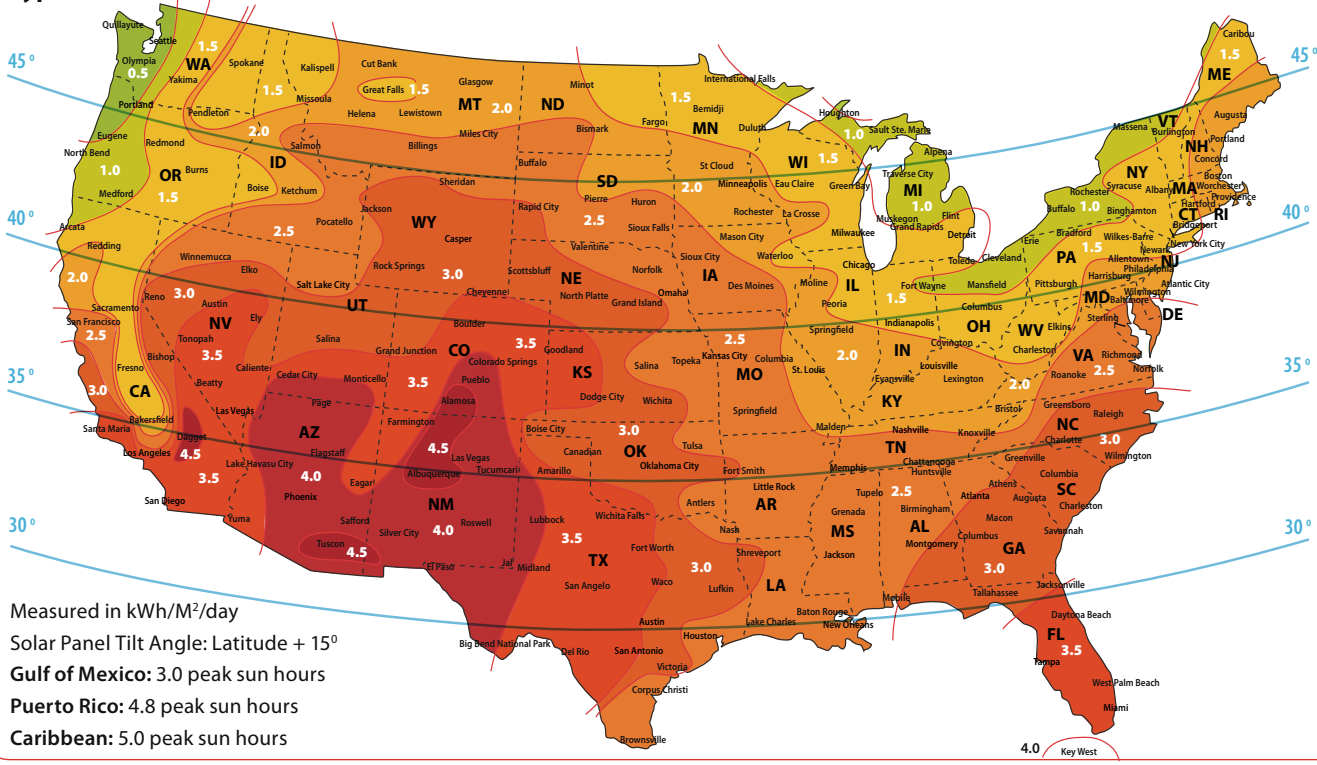
(A) Peak sun hours are listed across the top.

(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:



Measured in kWh/M²/day

Solar Panel Tilt Angle: Latitude + 15°

Gulf of Mexico: 3.0 peak sun hours

Puerto Rico: 4.8 peak sun hours

Caribbean: 5.0 peak sun hours

Designing a UPS MEGA-PAK

The MEGA-PAK, with its heavy battery capacity, delivers uniterrupted reliable power in the event of an AC power loss. A MEGA-PAK DC-UPS line powered system has a backup capacity ranging from hours to weeks. The MEGA-PAK is available in a single-wide or double-wide enclosure, or configured as a battery bank with electronics housed in a separate enclosure. Power options range from 70W to 200W.

Solarcraft's DC-UPS power supply is both a primary power supply and a battery charger, designed to be combined with storage batteries.

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

DC-UPS 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 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.
- 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.
- 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.

◄ *530 Ah DC-UPS provides long term (9 days) backup*

DC-UPS Power Specifications				
	12V		24V	
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.

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