

*Naps Power Pack is used in health clinics, schools, and other rural electrification projects.*

## Naps Universal Power Pack (NPP)

Complete 12V photovoltaic power systems especially designed for use in emergency situations and where rapid installation is required. Universal Power Packs comprise: photovoltaic (PV) array, battery box with integral charge controller, detachable meter unit, and all necessary cables with plug-in connectors.

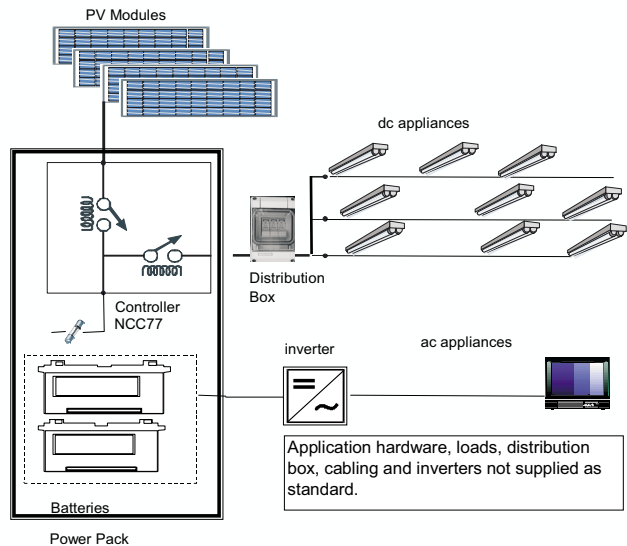
Normally defined as either transportable or stationary versions. Transportable versions are typically used as rapidly-installed systems, as they feature sealed batteries. Stationary versions use vented tubular plate batteries and are more suited to fixed installations. A stationary pack is a convenient building block for providing electrical services to individual buildings often found in rural schools and hospitals. The transportable and stationary versions may be used for medical refrigerators, TV/video distance learning applications, lighting, satellite communications and many other dc and ac power supply applications.

In the sunnier parts of the world, the standard Power Pack will supply 12V loads of up to 0.6 kWh per day. The performance map on the back page gives more details of loads that can be supported in different locations.

Naps rural systems consist of well-proven components, and may be configured to your exact needs by our engineering experts.

### Options include:

- transportable or stationary versions.
- Inverter to provide ac power for hand tools, computers etc.
- Dedicated loads, for medical applications, lighting and cold storage, are available.



### Charge Controller

The NCC77 controller is a 12 or 24 volt series controller for medium sized PV systems. It will control up to 400 peak Watts of PV modules configured for 12 volt operation, 800 peak watts for 24 Volt systems.

This controller is used in conjunction with a detached meter unit featuring a digital display(12V systems only), array current, load current and battery voltage are selectable by a rotary switch.

Auto-sensing temperature sensor is fitted as standard.

Regulator also allows for field-adjustable battery selection for sealed or vented batteries.

- Operating temperature range: 0 to 45°C
- Maximum voltage: 40V (Battery)\*  
50V (Array)  
\* For 6 or 12 lead acid cells only.
- Current consumption: @12V <30mA  
@24V <22mA

Typical average values, both relays on

Regulator circuit:

- Max continuous charging current 30A

Load circuit:

- Current peak (1 sec): 45A
- Max continuous load current 20A
- Max load current (<5min) 30A
- Voltage drop at 30Amps (load) <.6V
- Low voltage disconnect: 1.9V/cell

### Modules

All modules have tempered glass front, polymer backsheet, EVA encapsulant and anodised aluminium frame. Meet or exceed IEC 61215.

NP50G module, 50 peak Watts, 36 crystalline cells.

### PV Array

Consisting of PV modules, mounting structure, interconnect cables, array cable, array input plug and strain relief cable clip.

20250 For 4 NP50G series modules

20260 For 8 NP50G series modules

### Structure

Transportable/Stationary

Anodised aluminium with galvanised iron feet for ground or roof mounting. Tilt angle adjustable 15-65 degrees in standard configuration.

### Battery Box

Transportable/Stationary

Standard supply is a reinforced plastic box, size 600mm x 400mm x 410mm. Fitted with lid, prewired controller, array, load, meter sockets and battery cables.

### Battery

Standard supply is 2 units per Naps Power Pack

For the transportable power packs valve regulated(sealed) lead-acid types are used.

Type	Volts	Ah (C10)	Ah (C120)	Wt(kgs)
A512	12	100	115	40

For stationary power packs low antimony tubular plate, vented lead acid types are used.

Type	Volts	Ah (C10)	Ah (C120)	Wt(kgs)
6GLS100	12	96	145	43(dry)

### Typical applications

General dc Power source for

- Lighting
- Cold storage
- Medical equipment
- Office equipment <sup>1</sup>
- TV/video Education systems
- Portable Communications
- Fixed Communications <sup>1</sup>
- a.c. power generation

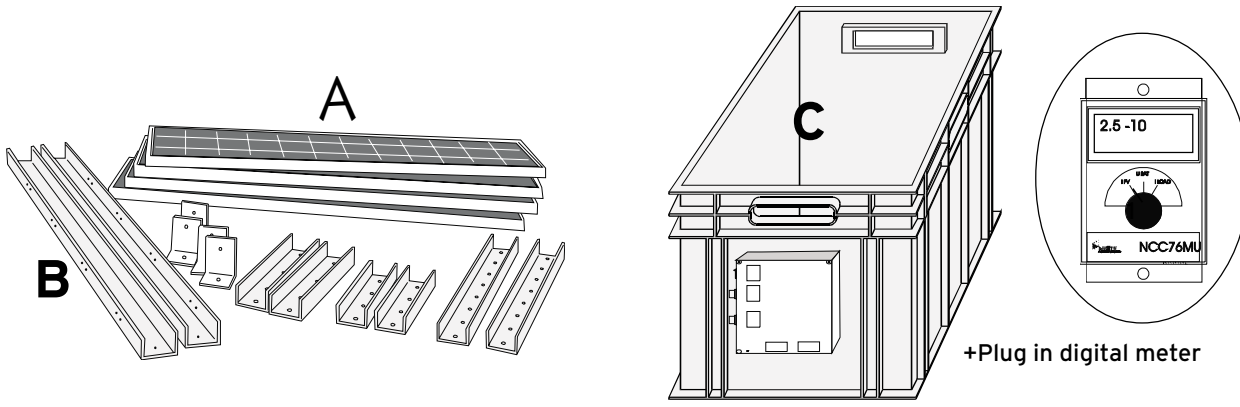
<sup>1</sup>Inverter required

Consult Naps for further information.



*Example: Medical equipment for aids testing.*

## Naps Universal Power Packs, standard components



Code	Product	QUANTITY
A	Photovoltaic modules	4
B	Module Support structure	1
C	Naps Battery pack, with NCC77 controller +auto fuse + detachable meter unit	1
D	Sealed (or Vented) 12V/100 Ah Batteries	2
E	Battery interconnect cables	1
F	50m x 6mm <sup>2</sup> cable, incorporating Load/Array plugs	1
G	Inter module connection cable	
I	Tool kit	

### Naps Universal Power Pack system description

The NPP systems consist of a photovoltaic (PV) array and charge controller and storage battery housed in battery box, which incorporates all necessary internal connections and foolproof array and load connectors. During the day, the PV array charges the battery. At any time, day or night, the load can draw power from the battery. The charge controller prevents excessive overcharging of the battery and will also disconnect the load if the battery becomes discharged too deeply.

Battery selection may depend on the application. Transportable versions feature spill-proof batteries (approved for air shipment). The Stationary version uses vented batteries.

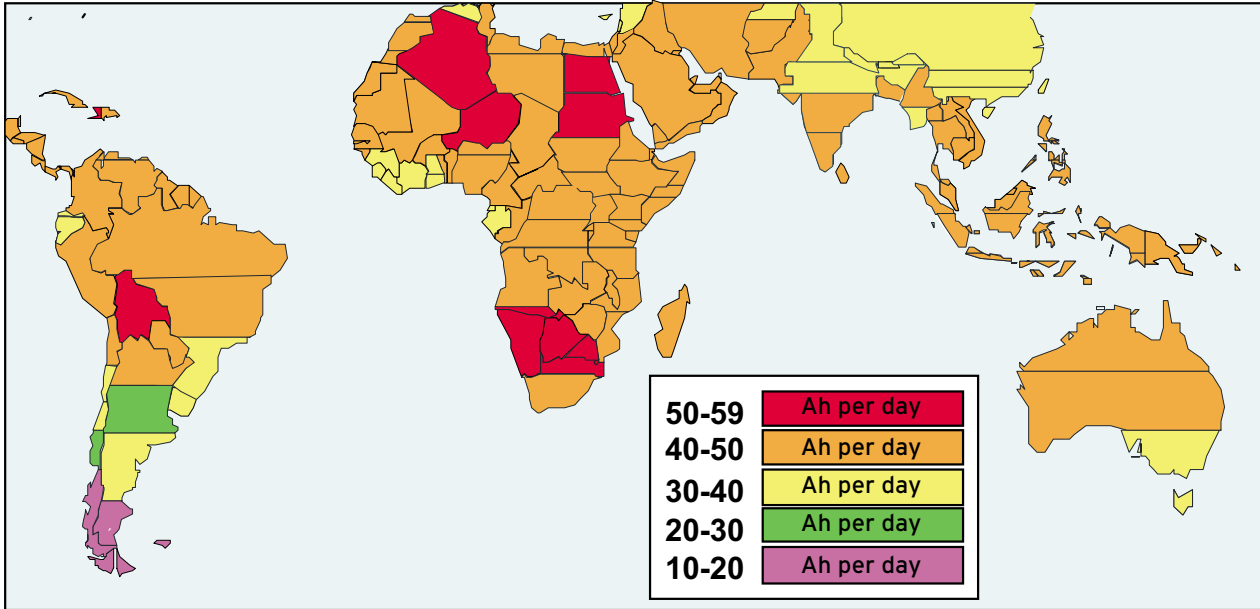
The PV array consists of 4 PV modules connected in parallel, together with mounting structure and all necessary cables. The number of modules depends on the load demand, location and method of use, and is normally chosen to ensure that the array provides sufficient charge to the battery to match the load consumption under average weather conditions in the worst month of the year.

The battery acts as a buffer between the load and the array, storing the equivalent of several days' consumption. This not only allows continuous operation of the load, but also acts as an emergency reserve in the cases of unusually bad weather or PV array/controller failure.

The battery capacity depends on the load demand and the reliability (days of autonomy) required.

Batteries are normally parallel connected within the battery box.

## Power Pack Performance, Average Battery Charging Ah per day 4 module array NP50G



### Power Pack Performance

The load that can be powered by a photovoltaic system depends on the location and the number of photovoltaic modules used.

The map above gives an indication of the daily loads in Ampere-hours (Ah) per day that can be supported by a fixed 4 module array (the standard configuration). You should then multiply this figure by .9, as a safety factor (derating), to allow for environmental factors, such as below average insolation.

Find your location on the map and see the range of Ah/day that the 4 module array can support in that region. If your load is significantly higher than this, you may need further Power Pack systems. If your load is significantly lower, a Power Pack system with a smaller number of modules (less than 4) may be appropriate.

1 Ah per day is equivalent to 0.5W continuous load in a 12V system. Divide the zonal figures by 4, to achieve a figure for one panel. Multiply by the number of solar panels to estimate battery charging capability of smaller or multiple systems.

To estimate your load requirement, either multiply Amps consumption by hours of use per day, or use the formula (Watts x hours per day)/Nominal system voltage (12).

The map is for guidance only. A precise estimate of system size and system configuration for a particular load and location can be given by any Naps office.

Finland	Tel. +358 10 452 5711 Fax +358 10 452 5744 finland@napssystems.com
France	Tel. +33 1 6037 3560 Fax +33 1 6037 8411 france@napssystems.com
Kenya	Tel. +254 2 577 961 / 577 963 Fax +254 2 577 064 kenya@napssystems.com
Norway	Tel. +47 67 105 730 Fax +47 67 105 731 norway@napssystems.com
Sweden	Tel. +46 8 449 5930 Fax +46 8 740 5001 sweden@napssystems.com
UK	Tel. +44 1993 772 359 Fax +44 1993 779 338 uk@napssystems.com