



L-HPK25/12 is Sunnytek-Small home power kit is a package for getting power to houses that are off grid. Here we operate with no grid and power by sun enough for a smaller family to get lamps + power for a little extra. Components are of highest quality and all key parts are European brands only. System is designed for tropical areas where demands are very high if a long maintenance free like time is a dream. Design criteria is to offer a system where nothing needs service and rapid in 5 years and most parts handle at least 10-15 years or more.

Solar panels with 25W output is the key component and here we have selected a model based on multi crystalline silicon. They are best in this range of smaller panels and have a good reliability. We have 12 volt operation and no interterm in this system to keep costs down.

Technical specifications 25 W solar panel

Dimensions 547x350x30 mm with aluminum frame
 Max voltage 18 volt
 Max current 1.5 A
 Weight 2.8 Kg
 Output per day in tropics about 0.10 KWH / day
 Graph shows application at equator in Africa that is very typical for this area.
 Battery solution is the key of reliability and the most costly component in the system. Here care is needed to get a happy end user and no problems in a reasonable time.

Fixed system: inclination=-7°, orientation=0° (Optimum at given orientation)				
Month	E_d	E_m	H_d	H_m
Jan	0.10	2.97	5.29	164
Feb	0.10	2.86	5.68	159
Mar	0.11	3.37	6.04	187
Apr	0.10	3.12	5.75	173
May	0.11	3.32	5.88	182
Jun	0.12	3.45	6.30	189
Jul	0.12	3.70	6.57	204
Aug	0.12	3.68	6.61	205
Sep	0.11	3.39	6.31	189
Oct	0.10	3.23	5.82	180
Nov	0.09	2.68	4.93	148
Dec	0.09	2.82	5.03	156
Yearly average	0.106	3.22	5.85	178
Total for year		38.6		2140



Demands to get a long life time must be clear so the correct solution is selected. Here the deep cycling and charging temperatures are key numbers to get a good design. Solar panels in a tropical area will generate electrical power measured in KiloWatt Hours. These shall be charged into the battery in a good way. We have a 50 W solar panel and here we get a typical value depending on where we are located. We offer lead technology when temperature normally is less 25C and for higher temperatures a Lithium Iron Phosphate of 12AH 12 volt.



Lead battery shall not be cycled more that 30-40% of capacity to get a good life life time. Hotter is same as 30% or less and cold can be over 40% but care gives long life and no problems. Li-Fe-Po battery is here different and can handle temperatures up to 60C and over 5000 cycles down to full 80% of capacity. Here we have a of a 20 AH battery to 12 Volt to be OK. This handle deep cycling and high temperaturs and is preferred when hot. Lithium is 100% without maintenance. Simple choices is the it is less 25-30C when battery is charged lead can be OK. The hotter Lithium is absolutely preferred. Cost to buy is one matter and what is cheapest for 5 years is an other matter. In short following is typical at a 25-30C installation.

Battery selection in short with some criteria with day cycling

Battery model	Ambient temperature	Deep cycle	Lifetime
Lead Car SMA type	20 C	40%	6 months
Lead Car SMA type	30 C	40%	2-3 months
Lead GEL solar	25 C	40%	4-6 years
Li-Fe-Po	30C	80%	5-10 years

Solar charger system PWM Charger

All parts are important and charger is here a component that can change a lot of performance. PWM that is Pulse width modulation that is reliable and well sealed. We have a good German design that is cost efficient and best quality.



12 Volt DC operation

Direct DC simplifies a lot and cut costs

Cable set between solar panels and inverter

All kits have a 5 meter solar panel cable to be used from the panel connector to the solar charger. This is a weather resistant cable as it is used out door in rain and with lots of sun and corrosion.



Cable and fuse set for battery and electronics

Cable set 3 meter long between charger and battery with an automatic fuse to prevent problems. One box with cable clips is included for use on all cables.



Cable set with switches and all needed parts for installation

Electric connection set 230 Volt of high quality European equipment. Here we have 3 wall switches of high quality with 20 meter cable. There is 2 wall connectors 230 Volt with earth pole. We have 3 pcs junction box . All parts are IP 54 encapsulated and rugged for a long life with no problems. All parts are CE marked and fulfil international standards of electrical security.



Lamp unit with socket and lamp unit / led bar for 24 volt DC direct operation

Lamp kit contains 6 LED lamp housings wit E27 sockets of a universal design that works in and outdoor. IP 65 protection is OK in a bathroom so it is water sealed. Lamp is a 5W LED lamp with E27 socket giving 400 Lumen in light output. This design gives typical 30-50 thousand hours of lifetime.



Thunderbolt / Lightning protection

Many tropical areas have thunderstorms and lightning problems that destroy equipment. We include a spark

arrestor and transient protection to absorb the electrical shocks that can destroy all that is connected by a cable to the solar panel. This device follows the standards of 5000 Ampere transient protection (1000 Volt). Experience shows this is a key part for long trouble free life of the installation.



Content of the large solar home kit.

1 pcs	25 W	Solar panel with 1 meter cables and MP4 connectors
1 set	5 meter	Junction cable with MP4 connectors between panel and charger
1 pcs	12 volt 3A	MPPT high efficiency solar charger for 12 volt battery operation. EU product
1 set	2 meter	Cable set between charger and battery pack with fuse
1 pcs	Battery	Alternative 1 Lead Gel battery 12 AH 12 Volt Datasafe long life 10 years Alternative 2 Lithium Iron Phosphate battery 12AH 12 volt temperatures and longer life time.
1 set	Cables	Set of all cables between battery + inverters + fuse etc. Length 1 meter.
1 pcs	Junction	For position close to inverter and battery.
3 pcs	12 Volt	Wall switches European
3 pcs	12 volt	Junction box European
10 m	24 Volt	Cable 2x1.5 mm ² type EK
4 pcs	Lamp	Lamp with lamp housing 12 volt and 3 W led lamp included
1 box	8 mm	Cable clips 8 mm
1 pcs	5KA	Thunder bolt protection device

Calculation criteria for small home system

4 pcs 3 W led lamps	5 hours per day = 60 WH per 24 hours
1 pcs Mobile phone chargers	Intermittent 24 = 10 WH per 24 hours

Summary in KWH per 24 hours **Total 70 WH / Day**

1 panels of 25 W / each gives typical 0.1 KWH / day Margin about 30 %

