CLEAN ENERGY





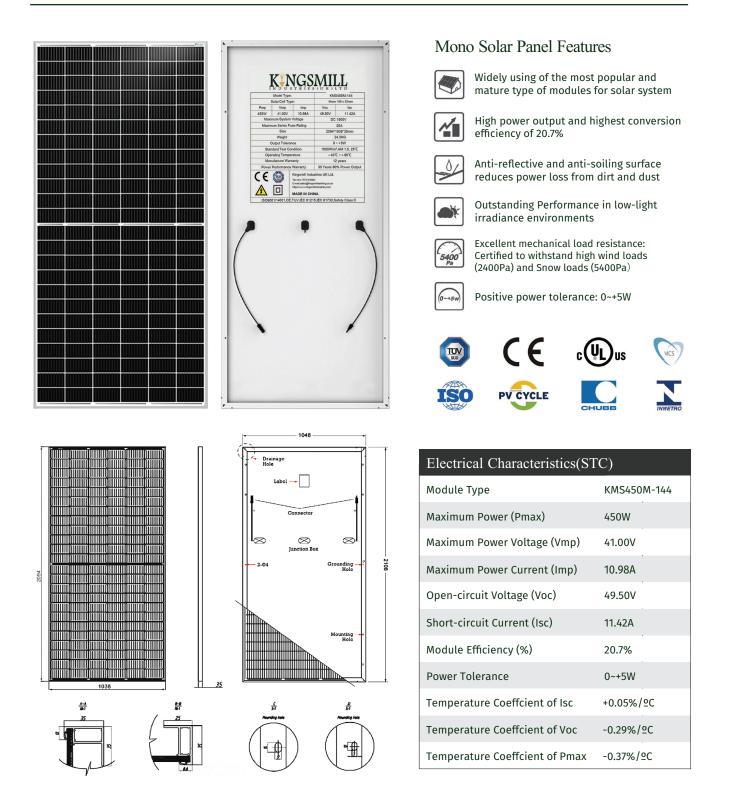
Solar Panels

450W Photovoltaic Solar Panel	CE: 2-4
550W Photovoltaic Solar Panel	CE: 5-7
600w Photovoltaic Solar Panel	CE: 8-10
Power Inverters Off Grid Inverter	CE: 11-17
Energy Storage	
Solar Tubular Batteries	CE: 15-17
Growatt Hope 4.8L- C1 Lithium Battery	CE: 18-20
Growatt Hope 4.8L- C1 KIT	CE: 21
Clean Energy Accessories	
MC4 Connector	CE: 22



450W Photovoltaic Solar Panels are certified for the most challenging environmental conditions. This 450W Photovoltaic high-power monocrystalline solar panel operates at 20.7% efficiency to maximize the light absorption area.

Product Options





Product Features

Warranty
12 years for product defects in materials & workmanship
12 years for 90% of warranted minimum power output
30 years for 80% of warranted minimum power output
30 years liner warranty

Reliable Quality

Positive power tolerance: 0~+5W

100% EL Double-inspection ensures modules are defects free

Modules Binned by Current to improve system performance

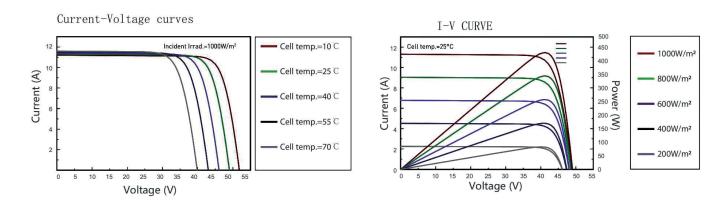
Potential induced Degradation (PID) Resistant

1009 979			Added	Value From	Warranty	
90%		- 4				1
809	*					
	0	6	12	18	24	30 Year

Mechanical Parameters	
Cell(mm)	9BB Mono 166*83
Weight(kg)	24.5kg
Glass Thickness	3.2mm,Low Iron Tempered Glass
Dimensions (L*W*H)(mm)	2094*1038*35mm
Cable Cross Section Size (mm ²)	4
Cable Cross Section Length (mm)	300
No.of Cells and Connections	144(6*24)
Junction Box	IP67/68,3 Diodes
Connector	MC4 Compatiple

Working Conditions	
Maximum System Voltage	DC 1500V
Operating Temperature	-40°C~ +85°C
Maximum Series Fuse	20A
Maximum Static Load,Front (e.g.,snow and wind)	5400Pa (112 lb/ft ²)
Maximum Static Load,Back (e.g.,wind)	2400Pa (50 lb/ft ²)
NOCT	44±2°C
Positive power tolerance	$0 \sim +5W$
Application Class	Class A

I-V Curve



K N G SMILL IN D U S T R I E S (U K) L T D

Product Features

GLASS

- Antireflective glass
 Translucency of normal luminance is increased by 2%
 Module efficiency is increased by 2%
 Self-cleaning option
- •Service life as long as 25 years (30 years optional)

SOLAR CELL

High efficiency PV cells
Appearance consistency
Color sorting ensure consistent appearance on each module
Anti-PID

FRAME

Conventinal frame
Boost bearing capability and prolong service life
Serrated-clip design tensile strength
Seal-lip design glue injection







JUNCTION BOX

- •Conventional standalone edition and engineering custom edition
- •Quality diode ensures module running safety
- •IP67 protection level
- Heat dissipation
- Long service life



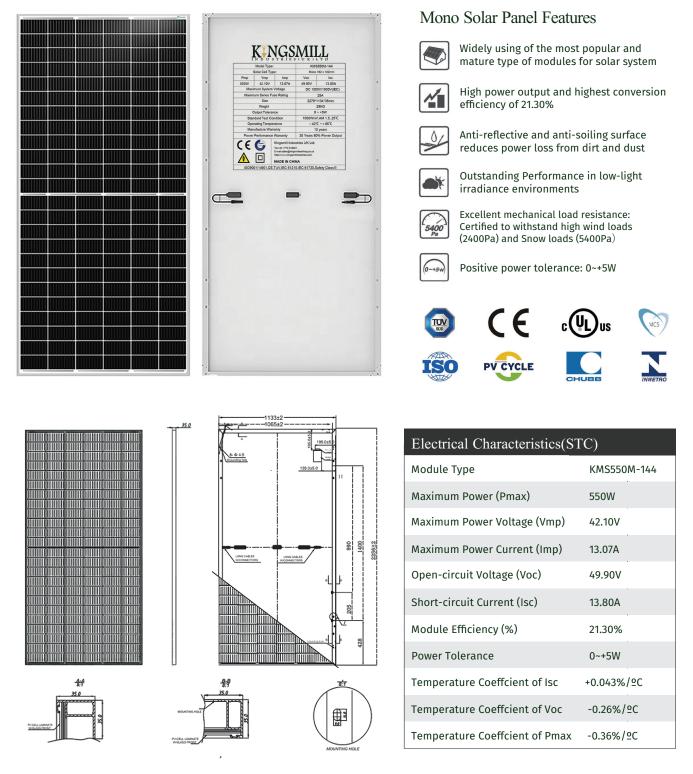
More Information

All with A Grade for on-grid & off-grid use for residential and public rooftop and ground mounting Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat.



550W Photovoltaic Solar Panels are certified for the most challenging environmental conditions. This 550W Photovoltaic high-power monocrystalline solar panel operates at 21.30% efficiency to maximize the light absorption area.

Product Options





Product Features

Warranty
12 years for product defects in materials & workmanship
12 years for 90% of warranted minimum power output
30 years for 80% of warranted minimum power output
30 years liner warranty

Reliable Quality

Positive power tolerance: 0~+5W

100% EL Double-inspection ensures modules are defects free

Modules Binned by Current to improve system performance

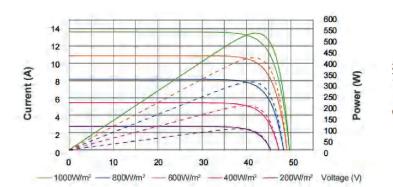
Potential induced Degradation (PID) Resistant

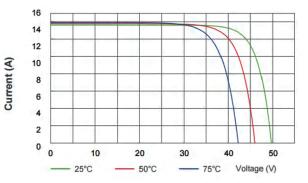
100% 97%		 	Added	Value From	Warranty	
90%						
80%			_			
(0	6	12	18	24	30 Year

Mechanical Parameters	
Cell(mm)	Mono 182*182mm
Weight(kg)	29kg
Glass Thickness	3.2mm, AR Coating Tempered Glass
Dimensions (L*W*H)(mm)	2279*1134*35mm
Cable Cross Section Size (mm ²)	4
Cable Cross Section Length (mm)	300
No.of Cells and Connections	144(6*24)
Junction Box	IP67
Connector	MC4 Compatiple

Working Conditions	
Maximum System Voltage	DC 1000V/1500V(IEC)
Operating Temperature	-40°C~ +85°C
Maximum Series Fuse	25A
Maximum Static Load,Front (e.g.,snow	and wind) 5400Pa (112 lb/ft ²)
Maximum Static Load,Back (e.g.,wind)	2400Pa (50 lb/ft²)
NOCT	45±2°C
Positive power tolerance	0~ +5W
Application Class	Class A

I-V Curve





Product Features

GLASS

Antireflective glass
Self-cleaning function
Module efficiency is increased by 2%
Service life as long as 25 years (30 years optional)



SOLAR CELL

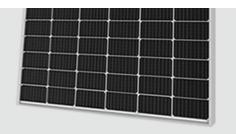
- •Uniform color
- •High PID resistant
- •Low breakage rate
- •High stunt-resistance
- •High model efficiency up to 20%

FRAME

- Conventinal frame
- •Seal-lip design glue injection
- •Serrated-clip design tensile strength
- ·Boost bearing capability and prolong service life

JUNCTION BOX

- •Heat dissipation
- Long service life
- >IP67 protection level
- •Innovative Full-Glue-Filled
- •Waterproofness Junction Box









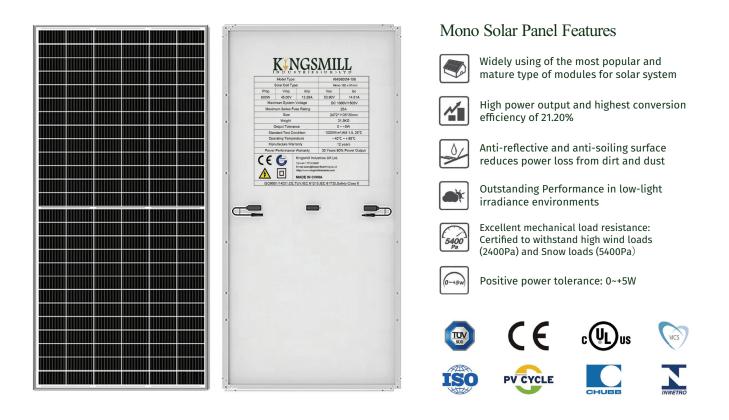
More Information

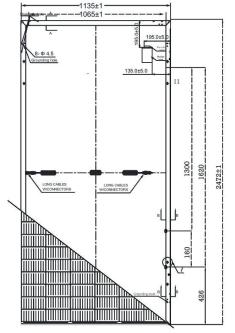
All with A Grade for on-grid & off-grid use for residential and public rooftop and ground mounting Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat.

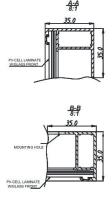


600W Photovoltaic Solar Panels are certified for the most challenging environmental conditions. This 600W Photovoltaic high-power monocrystalline solar panel operates at 21.20% efficiency to maximize the light absorption area.

Product Options









Electrical Characteristics(STC)			
Module Type	KMS600M-156		
Maximum Power (Pmax)	600W		
Maximum Power Voltage (Vmp)	45.00V		
Maximum Power Current (Imp)	13.26A		
Open-circuit Voltage (Voc)	53.90V		
Short-circuit Current (Isc)	14.01A		
Module Efficiency (%)	21.20%		
Power Tolerance	0~+5W		
Temperature Coeffcient of Isc	+0.05%/≌C		
Temperature Coeffcient of Voc	-0.29%/ºC		
Temperature Coeffcient of Pmax	-0.37%/ºC		



Product Features

Warranty
12 years for product defects in materials & workmanship
12 years for 90% of warranted minimum power output
25 years for 80% of warranted minimum power output
25 years liner warranty

Reliable Quality

Positive power tolerance: 0~+5W

100% EL Double-inspection ensures modules are defects free

Modules Binned by Current to improve system performance

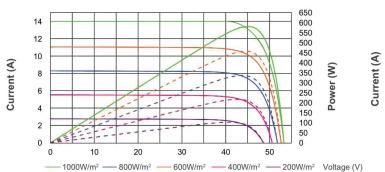
Potential induced Degradation (PID) Resistant

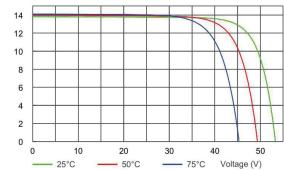
100% 97%			Added	Value From	Warranty	
90%	6				 	
809	6		-			
	0	6	12	18	24	30 Year

Mechanical Parameters	
Cell(mm)	10BB Mono 182*91
Weight(kg)	31.5kg
Glass Thickness	3.2mm (0.13inches), Tempered AR Glass
Dimensions (L*W*H)(mm)	2472*1135*35mm
Cable Cross Section Size (mm ²)	4
Cable Cross Section Length (mm)	300
No.of Cells and Connections	156(6*26)
Junction Box	IP68, with Bypass Diodes
Connector	MC4 Compatiple

Working Conditions	
Maximum System Voltage	DC 1000V/1500V
Operating Temperature	-40°C~ +85°C
Maximum Series Fuse	25A
Maximum Static Load,Front (e.g.,snow and w	ind) 5400Pa (112 lb/ft²)
Maximum Static Load,Back (e.g.,wind)	2400Pa (50 lb/ft ²)
NOCT	44 ± 2°C
Positive power tolerance	0~+5W
Application Class	Class A

I-V Curve





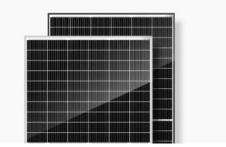


600W PHOTOVOLTAIC SOLAR PANEL

Product Features

MULTI BUSBAR TECHNOLOGY

Improves efficiency of modulesOffers better appearance



FRAME

Conventinal frame

•Boost bearing capability

HALF CUT TECHNOLOGY

Under the same shadow conditionLower power loss than full cell

•Prolong service life

•Serrated-clip design tensile strength

SPLIT JUNCTION BOX

Reduced internal power lossEnsures model running safety





More Information

All with A Grade for on-grid & off-grid use for residential and public rooftop and ground mounting Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat.



Growatt SPF 3500-5000 ES is a 230VAC output voltage off-grid inverter for back up power and self-consumption application, with a maximum PV input voltage up to 450VDC. It can also work without battery to saving system investment cost.

Product Options



Datasheet	KMSPF 3500 ES	KMSPF 5000 ES			
Battery Voltage	48VDC				
Battery Type	Lithium/Lead-acid				
INVERTER OUTPUT	KMSPF 3500 ES	KMSPF 5000 ES			
Rated Power	3500VA/ 3500W	5000VA/ 5000W			
Parallel Capability	Yes, 6 unit	s maximum			
AC Voltage Regulation (Battery Mode)	23DVAC ± 55	% @50/6DHz			
Surge Power	7000VA	10000VA			
Efficiency (Peak)	93	1%			
Waveform	Pure si	ne wave			
Transfer Time	10ms typical 20ms Max				
SOLAR CHARGER	KMSPF 3500 ES	KMSPF 5000 ES			
Maximum PV Array Power	4500W	6000W			
MPPT Range @ Operating Voltage	120VDC - 430VDC				
Number of Independent MPP Trackers / Strings Per MPP Tracker	1,	/1			
Maximum PV Array Open Circuit Voltage	450	VDC			
Maximum Solar Charge Current	80A	100A			
AC CHARGER	KMSPF 3500 ES	KMSPF 5000 ES			
Charge Current	60A	80A			
AC Input Voltage	230	VAC			
Selectable Voltage Range	170-280 VAC (For Personal Compute	ers) : 90-280 VAC (For Home Appliances)			
Frequency Range	50Hz/60Hz (Auto Sensing)				
DUNCICAL					
PHYSICAL	KMSPF 3500 ES KMSPF 5000 ES				
Protection Degree	IP20				
Dimension(W/H/D)	330/485/135mm	330/485/135mm			
Net Weight	11.5kgs	12kgs			
OPERATING ENVIRONMENT	KMSPF 3500 ES	KMSPF 5000 ES			



5% to 95% Relative Humidity (Non-condensing)

<2000m

0°C - 55°C -15°C - 60°C

Humidity

Attitude

Operating Temperature

Storage Temperature

POWER INVERTERS

Product Features

- Integrated MPPT charge controller.
- Equalization charging function.
- Work with battery or without battery.
- Maximum PV input voltage up to 450VDC.
- Configurable grid or solar input priority.
- Optional WIFI/ GPRS remote monitoring.
- Support parallel operation for capacity expansion up to 30kW.
- PV and Grid power the load jointly if PV energy unsufficient.
- Flexibly schedule the Inverter charging and discharging time.

More Information

Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat.



Growatt SPF 3000TL LVM series inverter has a pure sine wave output inverter also just for 120VAC power supply system. It is perfect for off-grid , backup power and selfconsumption applications. It is a multifunctional off grid solar inverter, integrated with a MPPT solar charge controller, a high frequency pure sine wave inverter and a UPS function module in one machine, which is perfect for off grid backup power and self-consumption applications. The transformerless design provides reliable power conversion in compact size.

Product Options



Datasheet	SPF 3000TL LVM-24P	SPF 3000TL LVM-48P			
Battery Voltage	24VDC	48VDC			
INVERTER OUTPUT	SPF 3000TL LVM-24P	SPF 3000TL LVM-48P			
Rated Power	3000VA/ 3000W	3000VA/ 3000W			
Parallel Capability		2000VA/ 3000W			
AC Voltage Regulation (Battery Mode)	120VAC ± 5% @ 50/60Hz	120VAC ± 5% @ 50/60Hz			
	-				
Surge Power	6000VA	6000VA			
Efficiency (Peak)	93	3%			
Waveform	Pure s	ine wave			
Transfer Time	10 ms (For Personal Computers	s); 20 ms (For Home Appliances)			
SOLAR CHARGER	SPF 3000TL LVM-24P	SPF 3000TL LVM-48P			
Maximum PV Array Power	2000W	4500W			
MPPT Range @ Operating Voltage	30VDC ~ 115VDC	60VDC ~ 115VDC			
Maximum PV Array Open Circuit Voltage	145VDC	145VDC			
Maximum Solar Charge Current	80A	80A			
Maximum Efficiency	98%	98%			
Standby Power Consumption	2W	2W			
		·			
AC CHARGER	SPF 3000TL LVM-24P	SPF 3000TL LVM-48P			
Charge Current	60A	40A			
AC Input Voltage	120 VAC	120 VAC			
Selectable Voltage Range	95-140 VAC (For Personal Computers) ; 65-140 VAC (For Home Appliances)			
Frequency Range	50Hz/60Hz (Auto Sensing)				
PHYSICAL	SPF 3000TL LVM-24P	SPF 3000TL LVM-48P			
Dimension(W/H/D)	130/350	/455mm			
	11.5kgs				

OPERATING ENVIRONMENT	SPF 3000TL LVM-24P	SPF 3000TL LVM-48P		
Humidity	5% to 95% Relative Humidity (Non-condensing)			
Operating Temperature	0°C - 55°C			
Storage Temperature	-15°C	- 60°C		



POWER INVERTERS

Product Features

- Integrated MPPT charge controller.
- Configurable grid or solar input priority.
- Optional WIFI/ GPRS remote monitoring.
- Parallel for scalability

More Information

Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat. Our clean energy solutions provide electrical power as a way to decarbonize and transition to clean energy in our mission to combat climate change.

For more information regarding battery installation please download our pdf HERE.



Product Options

These lead tubular batteries use premium technology and high grade materials to deliver maximum power for extended durations and have an appreciably longer life span. These batteries are specifically suitable for powering up UPS and inverters. These flooded lead acid batteries are environment-friendly, highly reliable in performance and are low in cost. Hear again our extensive research and development wing has helped us create batteries customized to suit Indian operating conditions. These flooded batteries are perfect for use in battery powered vehicles and to power inverters as well as for telecom use.

DURACREEN È SOLAR TUBULAR BATTERY LXXSTB2200-1 12Y,200.40

	Capacity at 27 deg C when	Dimension (±3mm)			Weight (KG±5%)	
Model	discharged at (C20 upto 1.75 VPc 1.280)	Length	Width	Height	Dry	Filled
KMASTB16500	150 AH	505	190	410	29	56
KMASTB22000	200 AH	505	190	410	29	61
KMASTB26000	240 AH	505	190	410	34	68

*The height mentioned is upto terminal top

	Initial Charge	At Coi	tial Charge Constant urrent (A) Constant		Triple Charge Current in (mA)	
Model	Minimum AH Input (AH)	Start (Upto 2.3Vpc)	Finish (Upto 2.75Vpc)	Limiting Current (Amps)	Min.	Max.
KMASTB16500	15	7.5	525	25	130	520
KMASTB22000	20	9	630	30	155	625
KMASTB26000	24	11	770	36.6	190	765

Initial charging instruction for dry charge battery

- 1: Filling in specific 1.220± 0.005 at 27 deg C
- 2: Rest Period 12 hrs
- 3: In order to reduce the charging time, the following route may be adopted
 - For ASTB 22000 The initial 2.36Vpc charging current may be 20A upto followed by 9A upto 2.75Vpc
 - For ASTB 26000 The initial 2.36Vpc charging current may be 24A upto followed by 11A upto 2.75Vpc

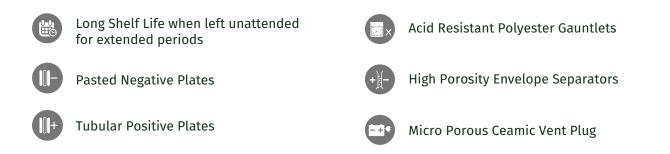


ENERGY STORAGE

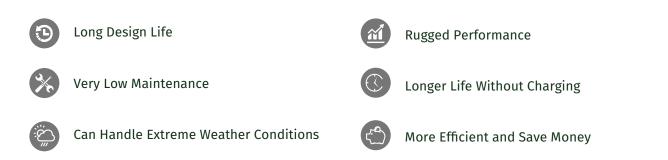
Condition of Fully Charged

- 3 Consecutive hourly reading of specific gravity and voltage become constant
- Top of charge voltage will be around 16.2V 16.5V
- All Cells should be gas freely
- Minimum Ah has been given
- Specific Gravity at fully Charged condition 1.240 ± 0.005 at 27 Deg C

Product Features



Product Benefits

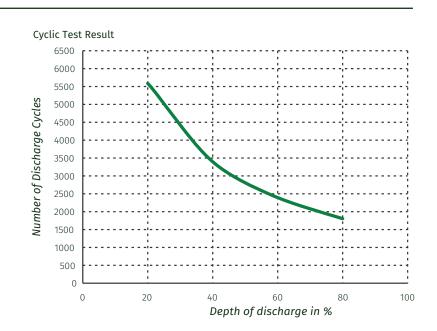




Battery Cyclic Performance

Calculation & Estimation IDEAL CYCLIC PERFORMANCE

Graph 1, Cycle life vs. DOD of KINGSMILL SOLAR TUBULAR BATTERY with Ideal Charge Table 1, data of cycle number



Discharge & Charge Scenario (80%DOD)

CYCLE METHOD

Discharge with $2I_{10}$ for 4 hours (80% DOD), charge with $2I_{10}$ for 3.5 hour + I_{10} for 0.5 hour + 0.25I for 3.5 hour. This is one cycle

RESIDUE CAPACITY DETERMINATION

The batteries are discharged at 10 hour rate after every 50 cycles to test battery capacity. When residue capacity of 10-hour rate capacity is lower than 80%, test is ended. After discharge at 10-hour rate after every 50 cycles, the charge method is: charge 80% of discharged capacity with current of $2I_{10}$ + charge 20% with 10 current of I_{10} + charge 20% with current of 0.41₁₀ (i.e. charge 120% of discharged capacity)

TEMPERATURE - 27 C

Advantage of Upper Constant Current Charge Model Battery; can be completely recharged within 8 hours. The end charge voltage will be higher than 2.6Vpc, which is good for active material exchange. Disadvantage of Upper Constant Current Charge Model

It has risk of battery malfunction without voltage limited. It is not easy to manage charging in practice.

* Technical Parameters are Subject to Change due to Continuous improvements and R&D

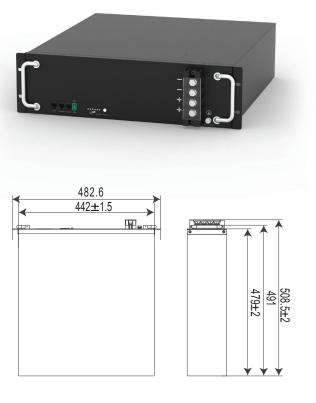
More Information

Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat.



Growatt Hope 4.8L-C1 Lithium Battery is an energy storage unit composed of cells, mechanical parts, battery management system (BMS) as well as power and signal terminals.

Product Options





Datasheet	Hope 4.8L-C1		
Battery Data			
Nominal Voltage	48V		
Normal Capacity	4.8kWh		
Usable Capacity	4.46kWh		
Operating Voltage	42 ~ 54V		
Rated Charging Current	50A		
Rated Discharging Current	100A		
Max. Discharging Power	4.5kW		
Peak Discharging Power	6.1kW/6s		
Max Charging Power	4.5KW		
General Data			
Dimension (W/D/H)	442/130/480mm		
Dimension (W/D/H) Weight	442/130/480mm 45Kg		
· · · ·			
Weight	45Kg		
Weight IP Protection	45Kg IP20		
Weight IP Protection Working Temperature	45Kg IP20 -10°C-+55°C		
Weight IP Protection Working Temperature Storage Temperature	45Kg IP20 -10°C-+55°C		
Weight IP Protection Working Temperature Storage Temperature Features	45Kg IP20 -10°C-+55°C -20°C-+45°C		
Weight IP Protection Working Temperature Storage Temperature Features DOD	45Kg IP20 -10° C~+55° C -20° C~+45° C		

Product Features

- Compact size and easy installation
- High energy density and efficiency
- Excellent safety of LiFePO4 battery
- DoD up to 93%

Certifications

ISO9001/14001

• CE

TUV



IEC62619, CE, UN38.3

ENERGY STORAGE

More Information

Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat. Our clean energy solutions provide electrical power as a way to decarbonize and transition to clean energy in our mission to combat climate change.

How to Install

Installation Of Battery

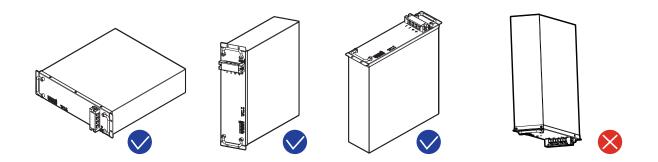
It is recommended to install the battery into a cabinet and place it indoor. If you install it outdoor, select a cabinet with a sufficient IP rating. Build sunshade & rain shelter to avoid direct exposure to sunlight and rain for outdoor application

CAUTION

- Do NOT expose battery into sunshine or rain directly.
- Keep the dirt or dust at a minimal level.
- Do not install battery in a place where flood frequently occurs.
- Do not install battery in highly humid area.
- Ensure direct contact between battery shell and ambient air and do NOT cover or shield battery.

1 - Battery Orientation

The battery supports stackable installation with brackets. At most 8 batteries can be athwart stacked. Ensure that you install the battery in correct directions. Please refer tofigures below ($\sqrt{}$ means acceptable and X unacceptable).





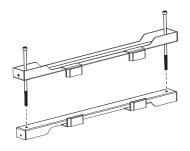
2 - Stackable Installation With Bracket Support

CAUTION !

Before installing battery, remove conductive ornaments such as watch, bracelet and rings and wear protection equipment. Check and confirm the battery is powered off and battery breakers are turned off before any process.

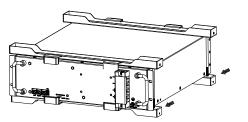
Step 1

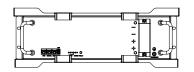
Prepare support brackets.



Step 2

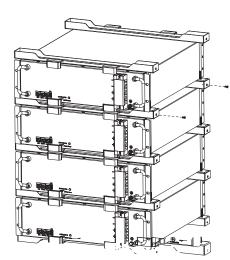
Set the battery into 2 pcs of brackets from the rear.



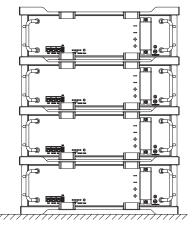


Step 3

Stack battery packs with brackets and fasten screws. At most 8 battery packs can be stacked in this way.







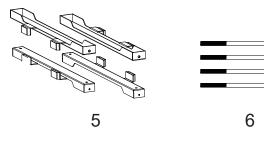
For more information regarding battery installation please download our pdf HERE.



Hope 4.8L-C1 Kit package

Item NO	Item Number	Qty
5	Battery Bracket	4 pcs
6	Screw bolt	4 pcs
7	RNB-22-6 lug	4 pcs
8	Screw	4 pcs
9	Power+ Cable	1 pcs
10	Power- Cable	1 pcs
11	Network Cable A	1 pcs
12	Network Cable B	1 pcs





9





8





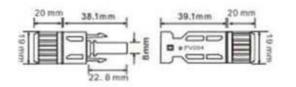
10

MC4 connectors are commonly used for connecting solar panels. It is a standard connector that enables the easy construction of strings of panels and is a staple in the renewable energy sector.

Product Options



Product Features



The MC4 system consists of a plug and socket design, a male and female connector.

More Information

Solar panels are a clean source of energy that use the sun's rays to convert them into electricity or heat.





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