

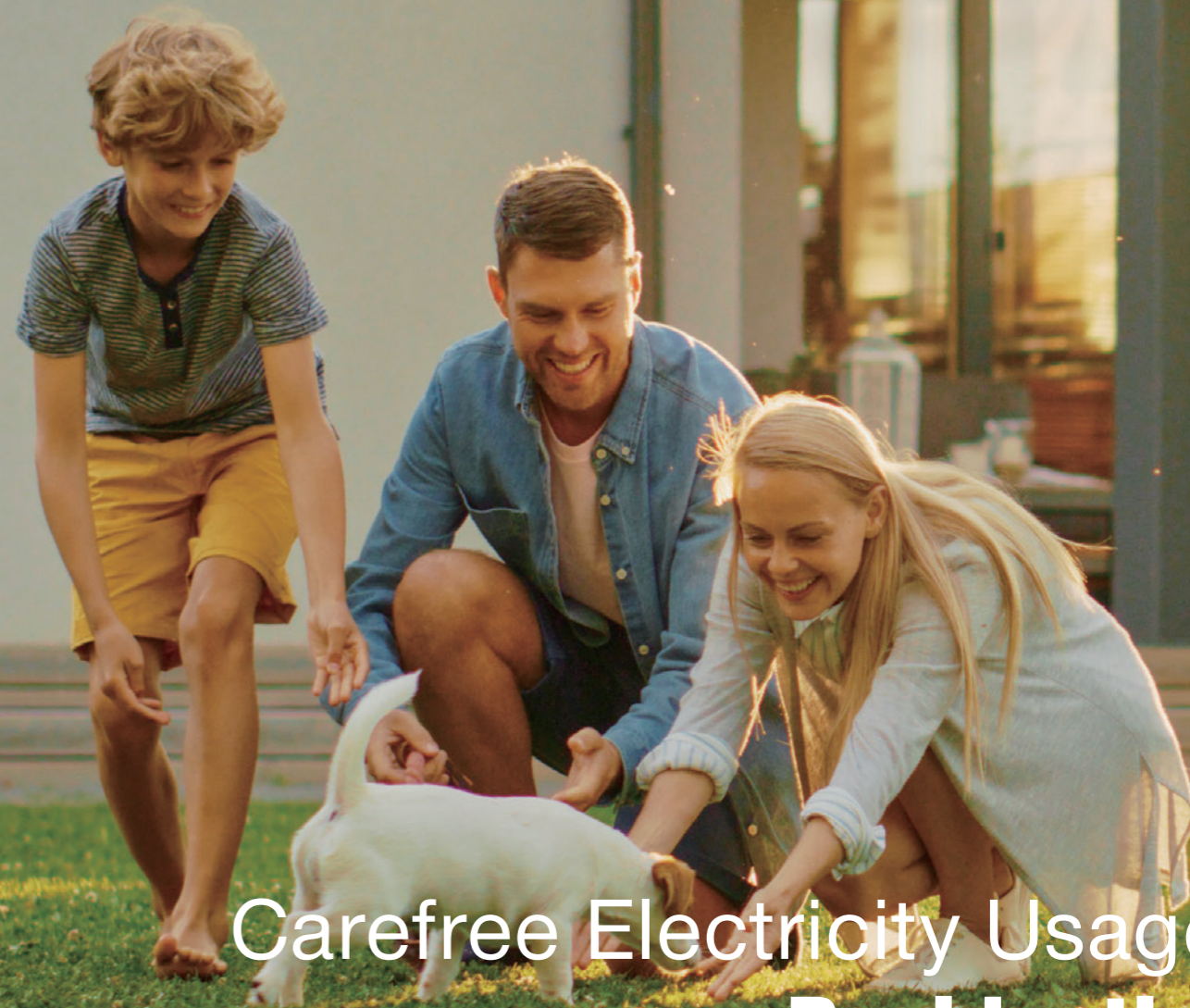
**LESSO**

**BUILDING A SOLAR-POWERED WORLD**

**LESSO NEW ENERGY DEVELOPMENT PRIVATE LIMITED**

One Raffles Quay, North Tower, #19-03, 48583 Singapore  
CHINA LESSO, STOCK CODE:2128.HK

**LESSO**



Carefree Electricity Usage  
**Residential  
Energy Storage Solutions**



## Company Overview

Headquartered in Singapore, LESSO Solar specializes in making solar panels and related products and providing new-energy solutions covering various clients' needs: residential, commercial, industrial, commercial and utility scale.

**3.5GWh<sup>+</sup>**  
capacity

## Building a Green Energy Ecosystem

The world's demand for energy is rapidly shifting towards a preference for green energy.

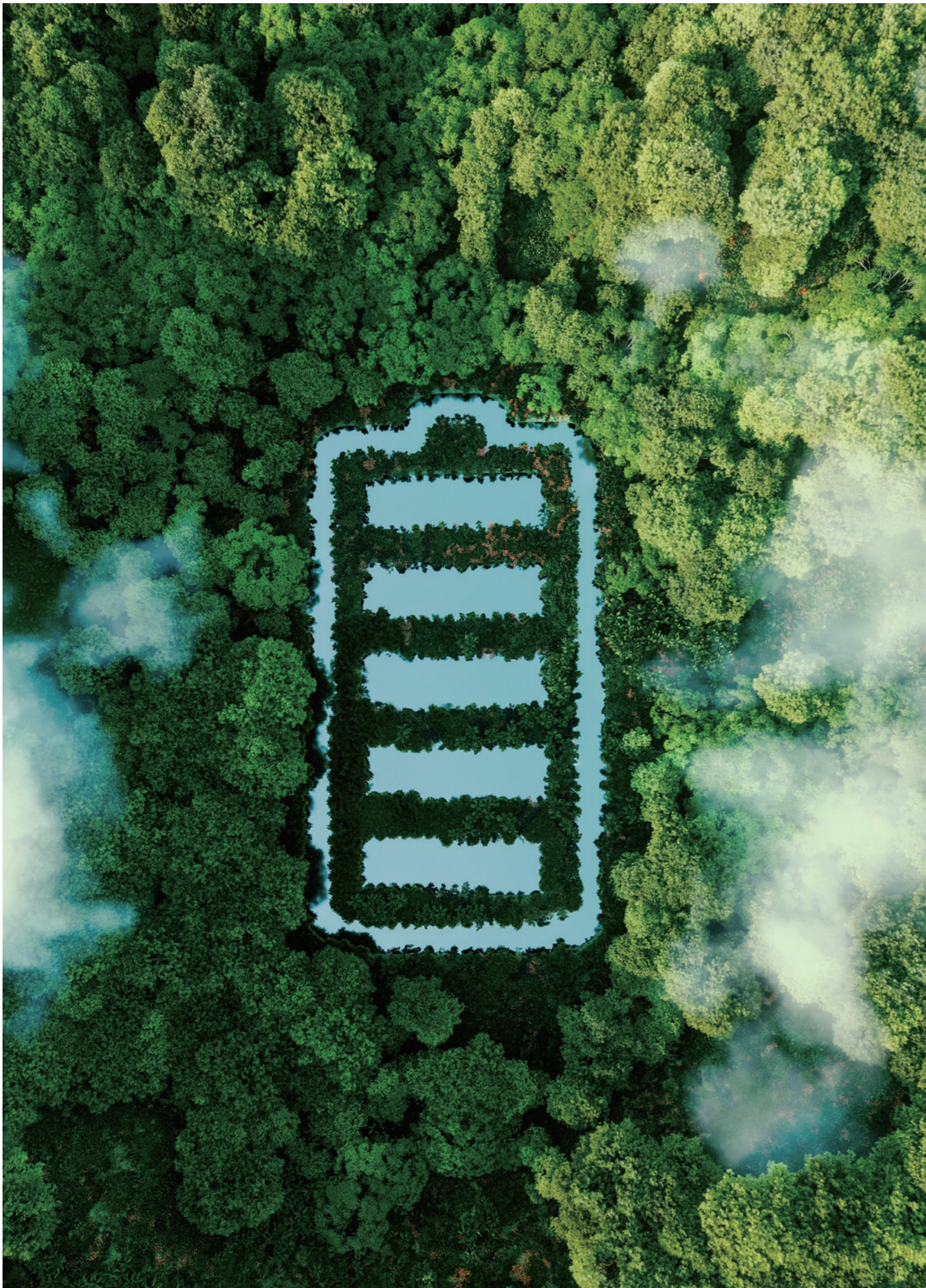
LESSO is committed to building a smart energy ecosystem by building an interconnected energy network, creating mutually beneficial partnerships with other players in the ecosystem, promoting the global goal of "carbon neutrality", creating a clean energy lifestyle for all.

**100<sup>+</sup>**  
r&d team

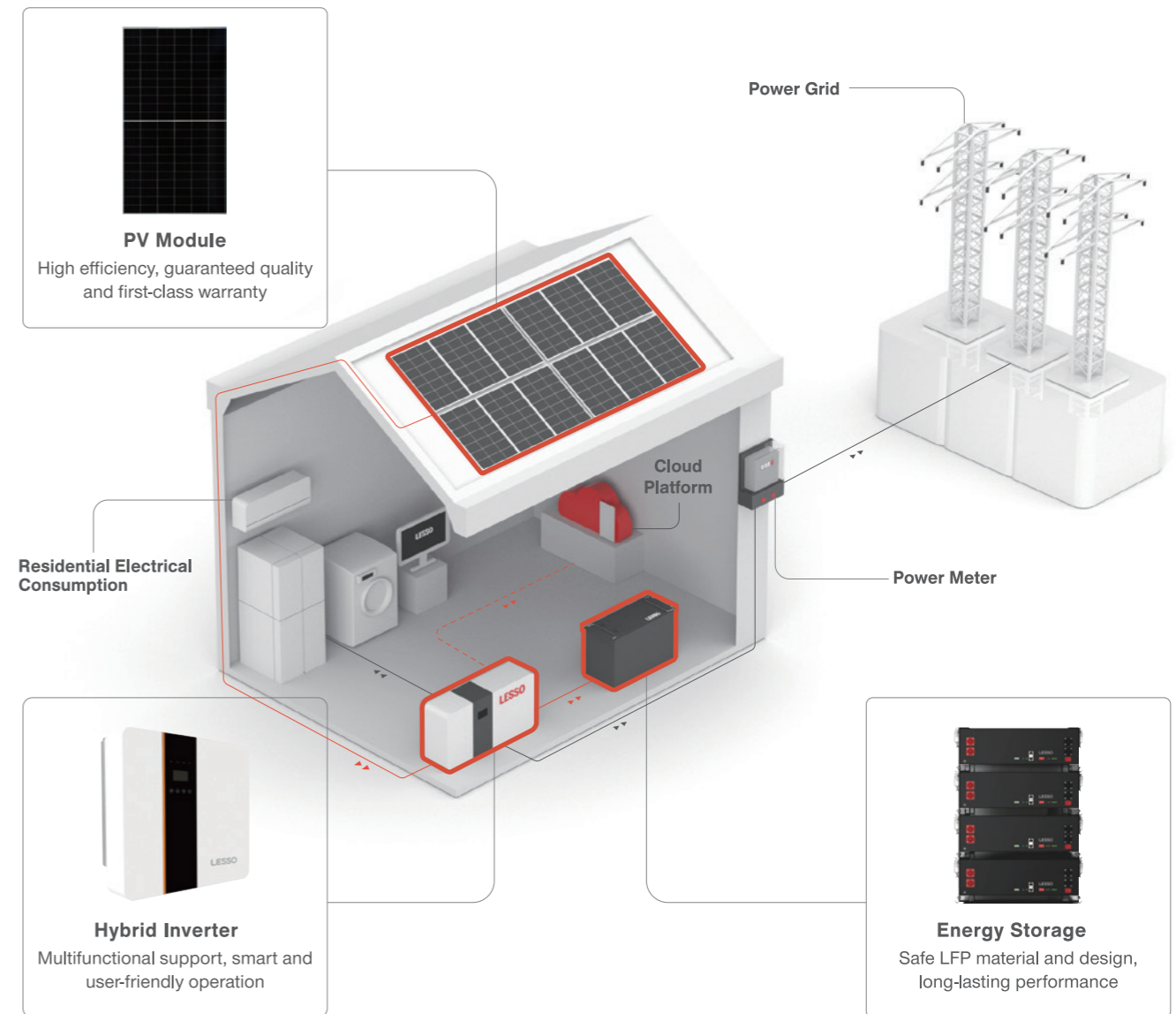
## New Energy, New Lifestyle

LESSO Solar focuses on renewable energy generation and storage systems, providing a fully customizable solution, taking into consideration the lifecycle of the entire system, to cater to the various needs of different customers.

**24/7**  
service



## Solar Energy Generation and Storage Solution - Residential Use



### Advantages of LESSO Residential Energy Storage Solutions

#### Cost Efficiency, Value for money

Disregarding rebates, returns on investment is up to 15% + IRR with IRR as high as 25%

#### Secure and Reliable System

Any power anomalies detected would result in the shutting down of an isolated unit to protect the entire system

#### Convenient and Precise in Operation

Supports multiple communication connection methods: CAN / RS485 / WIFI / LAN / DRM

#### Multiple usage scenarios

Using smart BMS, it connects a wide range of power, between 5 - 20kWh

#### High Efficiency

Supports 30A quick charge, 9kW PV input, input current up to 13.5A

#### Multi-level protection

4 levels of security monitoring: battery monitoring, battery pack monitoring, overall system monitoring, home appliance safety measures

### LESSO energy storage solutions:

Residential, commercial and industrial, centralized PV energy storage system solutions

# 182 MBB Mono Perc Half-cell Module



Power Range  
**390W~415W**



Power Tolerance  
**0W~ +5W**



Maximum Efficiency  
**21.2%**

## Features and Benefits



The application of multi-busbar (MBB) half-cut cell technology brings stronger resistance to shade and lower risk of hot spot.



Strict control on raw materials and process optimization of high efficiency PERC ensure better resistance against PID of PV module.



Through harsh weathering tests of sand, dust, salt mist, ammonia, etc., to get stronger weather resistance of outdoor environment.



Lower oxygen and carbon content result in lower LID.

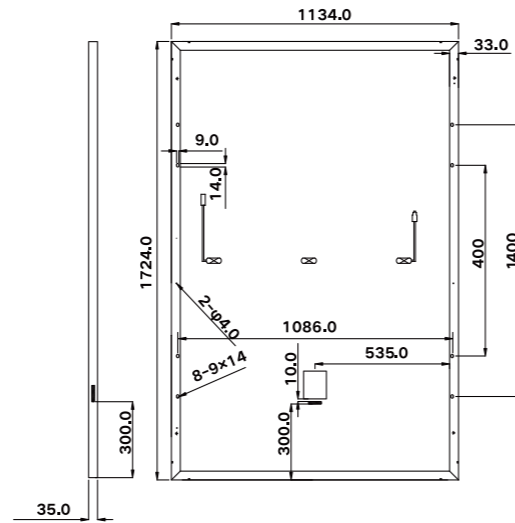


By series and parallel design, to reduce the series RS and achieve higher power output and lower BOS cost.



Lower temperature coefficient and lower operating temperature can ensure higher power generation.

(Unit: mm)



## First-Class Warranty



**12** years product workmanship warranty



1<sup>st</sup> year power degradation no more than **2%**.  
Subsequent annual power degradation no more than **0.55%**



**25** years linear power output warranty

## Electrical Performance Parameters STC

Model Type		390D(HPM) 54(182)	395D(HPM) 54(182)	400D(HPM) 54(182)	405D(HPM) 54(182)	410D(HPM) 54(182)	415D(HPM) 54(182)
Nominal Max. Power	Pmax(W)	390	395	400	405	410	415
Maximum Power Voltage	Vmp(V)	30.55	30.75	30.95	31.15	31.35	31.55
Maximum Power Current	Imp(A)	12.77	12.84	12.92	13.00	13.08	13.16
Open Circuit Voltage	Voc(V)	36.57	36.77	36.97	37.17	37.37	37.57
Short Circuit Current	Isc(A)	13.64	13.71	13.79	13.87	13.95	14.03
Module Efficiency	(%)	19.90	20.20	20.50	20.70	21.00	21.20
Power Tolerance	(W)	0~+5W					

\* STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5. \* Power measurement tolerance ±3%.

## Electrical Performance Parameters NMOT

Model Type		390D(HPM) 54(182)	395D(HPM) 54(182)	400D(HPM) 54(182)	405D(HPM) 54(182)	410D(HPM) 54(182)	415D(HPM) 54(182)
Nominal Max. Power	Pmax(W)	285	290	295	300	305	310
Maximum Power Voltage	Vmp(V)	27.25	27.64	28.00	28.38	28.72	28.88
Maximum Power Current	Imp(A)	10.46	10.50	10.54	10.58	10.62	10.54
Open Circuit Voltage	Voc(V)	34.53	34.68	34.83	34.98	35.13	35.28
Short Circuit Current	Isc(A)	10.84	10.94	11.70	11.19	11.24	11.32

\* NMOT: Irradiance 800W/m<sup>2</sup>, Cell Temperature 20°C, Wind Speed 1m/s. \* Power measurement tolerance ±3%.

## Structure Performance

Solar Cell Type	182mm Mono-crystalline (Half Cell)
Solar Cell Arrangement	108pcs(6×18)
Module Dimension	1724×1134×35mm
Weight	21.8kg
Front Glass	3.2 mm, highly transparent tempered glass with anti-reflective coating
Back Sheet	White
Frame	Anodized Aluminum Alloy
Junction Box	IP68 rated
Cable	4mm <sup>2</sup> PV cable, 300mm or customized length
Diode Quantity	3pcs
Front side/Rear side	5400pa/2400pa
Connector	MC4 Compatible
Per Pallet	31pcs
Per Container(40' HQ)	806pcs

## Temperature Characteristics

Nominal Module Operating Temperature	44±2°C
Temperature Coefficient (Isc)	+0.048%
Temperature Coefficient (Voc)	-0.26%
Temperature Coefficient (Pmax)	-0.34%

## Maximum Parameters

Working Temperature	-40~+85°C
Maximum System Voltage	1500V DC
Nominal Maximum Fuse Current	25A

# LSRTH Series

## Residential Hybrid Inverter (Single Phase)

### User-friendly and flexible

Support multiple parallel connection  
Support connection with diesel generator  
Compatible with lead-acid and lithium-iron battery

### Economical

Intelligent EMS management function  
Automatic on/off grid switching to ensure important loads operating during the grid network blackout



	LSRTH 3KTLL	LSRTH 3K6TLL	LSRTH 4KTLL	LSRTH 4K6TLL	LSRTH 5KTLL	LSRTH 6KTLL
Max. Input Power (kW)	4.6	4.6	6	6	7	7
Max. Input Voltage (V)	550					
MPPT Voltage Range (V)	125 - 500					
Max. Current per MPPT (A)	14					
Number of MPPT/ Number of String per MPPT	2/1					
Rated Output Power (kVA)	3	3.68	4	4.6	5	6
Max. Output Current (A)	13	16	17.4	20	21.7	26
Grid Voltage Range (V)	240/211~264					
Rated Grid Frequency (Hz)	50/60					
Power factor	0.8 leading~0.8 lagging					
THDi	< 3%					
Grid Type	L+N+PE					
Battery Voltage Range (V)	40~58					
Max. Charging Voltage (V)	58					
Max. Charging/Discharging Current (A)	80 / 80					
Battery Type	Lithium iron phosphate battery / Lead acid battery					
Communication	CAN, RS485					
Emergency AC Power Supply (EPS)	220-240 / 110-120 (Connect to split-phase transformer)					
Rated Output Power (kVA)	3	3.68	4	4.6	5	6
Rated Output Voltage (V)	230					
Rated Output Current (A)	13	16	17.4	20	21.7	26
Rated Output Frequency (Hz)	50 / 60					
Automatic Switch Time (ms)	< 20					
THDu	< 2%					
Overload Capacity	110%, 30S / 120%, 10S / 150%, 0.02S					
Battery Charging/Discharging	95.0%					
Efficiency	97.6%					
Max. Efficiency	97.0%					
MPPT Efficiency	99.9%					
Protection Degree	IP65					
Noise (dB)	< 35					
Operating Temperature Range	-25~60°C					
Cooling Method	Natural cooling					
Relative Humidity	0~95% non-condensing					
Max. Operating Altitude	No limit below 2000m					
Dimensions W*D*H (mm)	550*200*520					
Weight (kg)	25					
Transformerless Topology	No					
Night Power Consumption	< 3					
Screen	LCD					
Communication	Standard / Optional / Optional / Standard / Standard					
Safety	IEC / EN62109-1 / -2, 1EC / EN62477-1					
EMC	IEC / EN 61000-6-1 IEC / EN 61000-6-3					
Grid Connection Standards	South Africa NRS097-2-1: 2017, UK/G98, G99					

Remarks: specifications are subject to change without notice

# LSRTH Series

## Residential Hybrid Inverter (Three Phase)

### Safe and reliable

Anti-islanding protection, PV reverse polarity protection, battery reverse polarity protection, insulation resistance monitoring, residual current monitoring, AC overcurrent protection, AC overload protection, short circuit protection

### User-friendly and flexible

D.G. connection  
Full power discharge and automatic management of battery charge and discharge;  
Natural cooling design with very low noise



	LSRTH 6KTL3L	LSRTH 8KTL3L	LSRTH 10KTL3L	LSRTH 12KTL3L	LSRTH 15KTL3L
Protection Degree	IP65				
Operating Temperature Range	-35~60°C				
Relative Humidity	0~100%				
Max. Operating Altitude	4000m (Limit over 2000m)				
Cooling Method	Natural cooling				
Noise(dB)	≤25dB				
Installation Mode	Wall mounted				
EMC	IEC/EN 61000-6-1:2019, IEC/EN 61000-6-2:2019, IEC/EN 61000-6-3:2021, IEN/EN 61000-6-4:2019, IEC/EN 61000-3-2:2019/A1:2021, EN 61000-3-3:2013/A2:2021, IEC/EN 61000-3-11:2019, EN 61000-3-12:2011				
Grid Connection Standards	Europe: EN 50549-1:2019/AC:2019; Poland: EN50549-1:2019/Rfg:2016/NC Rfg:2018/PTPIREE:2021; Germany: VDE-AR-N 4105:2018/DIN VDE V 0124-100(VDE V 0124-100):2020; South Africa: NRS 097-2-1:2017 Edition 2.1; GB: G99/1-6:2020; Spain: UNE217001:2020/UNE217002:2020/NTS V2.1:2021-07, IEC61727:2004/IEC62116:2014/IEC61683:1999; Hungary: EN50549-1:2019/RFG:2016/Hungary				
Safety standard	IEC / EN62109-1:2010, IEC / EN62109-2:2011				
Interface	LCD; APP				
BMS Connection	RS485, CAN				
EMS Connection	RS485				
Meter Communication Interface	RS485				
Communication Interface	WIFI / GPRS / 4G				
Max. Charging/Discharging Power	6600W	8800W	11000W	13200W	16500W
Battery Voltage Range(V)	125~600V				
Battery Operation Voltage Range(V)	150~550V				
Max. Charging/Discharging Current(A)	50A				
Rated Charging/Discharging Current(A)	40A				
Battery Type	LiFePO <sub>4</sub> / Lead acid battery				
Max. Input Power	9000W	12000W	15000W	18000W	22500W
Max. Input Voltage	1000V				
MPPT Voltage Range	180~850V				
Full Load MPPT Voltage Range	250V~850V	330V~850V	430V~850V	510V~850V	620V~850V
Start Voltage	125V				
Max. Current per MPPT	13/13A	13/13A	13/13A	13/13A	20/20A
Max. Short Circuit Current	16/16A	16/16A	16/16A	16/16A	30/30A
Number of MPP Trackers	2				
Number of MPPT / Number of String per MPPT	1/1	1/1	1/1	1/1	2/2
Rated Input Voltage	600V				
Rated Output Power	6000VA	8000VA	10000VA	12000VA	15000VA
Max. Output Power	6600VA	8800VA	11000VA	13200VA	16500VA
Max. Input Grid Power	13200VA	17600VA	22000VA	26400VA	33000VA
Max. Input Grid Current	19.1A	25A	31.8A	38.1A	47.6A
Rated Output Current	8.7A	11.5A	14.4A	17.3A	21.7A
Max. Output Current	9.5A	12.7A	15.9A	19.1A	23.8A
Rated Grid Voltage	380V/400V, 3W+N+PE				
Rated Grid Frequency	50Hz / 60Hz				
THDi	< 2%				
Rated Output Power	8000VA	8000VA	10000VA	12000VA	15000VA
Max. Output Power	8800VA	8800VA	11000VA	13200VA	16500VA
Rated Output Current	8.7A	11.5A	14.4A	17.3A	21.7A
Max. Output Current	9.5A	12.7A	15.9A	19.1A	23.8A
Rated Output Voltage	400V, 3W+N+PE				
Rated Output Frequency	50Hz/60Hz				
THDu	< 2%				
Max. Efficiency	97.9%	97.9%	98.2%	98.2%	98.5%
MPPT Efficiency	99.9%				
Dimensions W*D*H	530*560*200mm				
Weight	30kg	30kg	31kg	32kg	34kg

Remarks: specifications are subject to change without notice

# LSOTH(2-12)KL

## Residential Off-grid Inverter with MPPT (Single Phase Power Frequency)

### Economical

Intelligent EMS management function  
Automatic on/off grid switching to ensure important loads operating during the grid network blackout  
Within MPPT, supports direct connection of photovoltaic modules

### User-friendly and flexible

Support multiple parallel connection  
Support connection with diesel generator  
Compatible with lead-acid and lithium-iron battery



	LSOTH2KL	LSOTH3KL	LSOTH4KL	LSOTH5KL	LSOTH6KL	LSOTH8KL	LSOTH10KL	LSOTH12KL
Rated Power	2kW	3kW	4kW	5kW	6kW	8kW	10kW	12kW
Max Power	6kW	9kW	12kW	15kW	18kW	24kW	30kW	36kW
Rated Battery Voltage	12/24/48V	12/24/48V	24/48V	24/48V	24/48V	48V	48V	48V
MPPT Control Module	Charge Current	60A	60A	60A	60A	60A	60A	60A
	PV Module Input	1 circuit (60A)						
	PV Input Operating Voltage	15V-180V (12V System) ;30V-180V (24V System) ; 60V-180V (48V System)						
	Maximum PV Array Power	60A: 720W (12V System) 1440W (24V System) ; 2880W (48V System) ;						
	Max. Charge Current	OFF/30A/60A						
Input	Control Module Efficiency	≈99%						
	Unattended mode	MPPT Control Module continues to charge battery from PV module even when device is switched off						
	DC Input Voltage Range	10.5VDC-15VDC (12V voltage unit)						
	Mains AC Input Voltage Range	110Vac: (80-130)Vac; 220Vac: (160-260) Vac/(130-280)Vac (Adjustable)						
	Mains AC Input Frequency	45HZ-65HZ automatic match						
Output	Mains AC Charge Current	ON/OFF (Adjustable)						
	Inverter output voltage waveform	Pure sine wave						
	Inverter output Efficiency	≈90%						
	Inverter output voltage	200V/210V/220V/230V/240V (Adjustable)						
	Inverter output Frequency	50Hz/60Hz (Adjustable)						
Operating Mode	AC output voltage	110Vac±10%/220Vac±10%						
	AC output Frequency	Automatic tracking						
	Energy loss under power saving mode	5W						
	Inverter operating mode	Mains AC priority mode, battery priority mode, ECO mode, unattended mode, power generation mode						
	Battery Parameter	Supported battery type	Lead acid battery / LiFePO4 battery / NiCoMn battery / Gel battery / Customer self-defined					
Battery defining parameter		Constant-voltage charging setting, float-voltage charging setting, battery recovery voltage setting, mains AC recovery voltage setting, low voltage alarm setting, low voltage protection setting						
Battery charging mode		Lead acid battery: constant current, constant voltage, float charging LiFePO4 battery: constant current, constant voltage						
Lithium type battery selection		LiFePO4 battery: 3.2V per unit NiCoMn battery: 3.7V per unit						
Protection	System Protection	Battery low voltage protection / Battery high voltage protection / Overload protection / Over heating protection,etc						
	LCD display	Mains AC status, DC-AC status, charging status, alarm						
Display	Operating display	Operating status, Input & output voltage, PV module operating information, Inverter operating information and etc.						
	Language	English/Chinese (Adjustable)						
Switch Time	< 5ms							
Cooling Method	Smart temperature control system							
Communication	RS232/RS485 (Adjustable)							
Operating Temperature	(-10~40°C)							
Operating Altitude	≤3000m							
Product Dimensions (L*W*H)	495*320*220mm				560*390*200mm			
Package Dimensions (L*W*H)	600*380*290mm				715*420*316mm			
Net Weight (Approx)	16.5kg	19.5kg	22kg	25kg	28kg	31.5kg	36kg	40kg
Gross Weight (with wooden crate) (Approx)	19.5kg	22kg	25kg	28kg	31kg	36kg	41kg	45kg

Remarks: specifications are subject to change without notice



## LSRS(205/307/410)V50AH-LFP Residential Stacked Energy Storage

### Safety

Safer lithium iron phosphate, designed to comply with IEC, UL standards

### Convenient installation

The installation can be completed by simple stacking

### Scalability

10.24 KWh ~ 20.48 KWh can be extended

### Wide compatibility

Compatible with multiple brands of mainstream inverter use

### Long-lasting

15 years life design  
Long cycle life and superior performance

### WiFi optional

WiFi configuration is optional



## LSRR51V100AH-LFP Residential Rack Energy Storage

### Modular

Support up to 32 units in parallel, scale from 5 kWh to 160 kWh configuration without external controller

### 4 types of installation

Compact & Flexible. 3U (133mm) standard height design. Optional bracket kits available for different installation scenarios.



	LSRS205V50AH-LFP	LSRS307V50AH-LFP	LSRS410V50AH-LFP
Number of battery modules	2	3	4
Manage battery energy	10.24kWh	15.36kWh	20.48kWh
Nominal voltage	204.8V	307.2V	409.6V
Operation voltage range	185.6V~233.6V	278.4V~350.4V	371.2V~467.2V
Manage battery capacity		50Ah	
Max. charge current		50A	
Max. discharge current		50A	
Communication to inverter		CAN / RS485	
Wifi		Support	
Display		SOC status indicator LED	
IP rating		IP55	
Cycle life	6000 Cycles @25°C @70%EOL @0.2C charge & 0.5C discharge, 90% DOD		
Battery module weight		≈ 60kg (132.2lb)	
Module dimension (L*W*H)	630*440*590 mm (24.8*17.3*23.2 inch)	630*440*745 mm (24.8*17.3*29.3 inch)	630*440*900 mm (24.8*17.3*35.4 inch)
Cell type	LFP - Lithium iron phosphate (LiFePO4)		
Design life	15 years (25°C/77°F)		
Charge temp. range	0~50°C(32~122°F)		
Discharge temp. range	-10~50°C(14~122°F)		
Operating temperature	Charge:0~50°C(32~122°F) Discharge:-10~55°C(14~131°F)		
Relative humidity	5%~95%		
Install altitude	≤4000m		
Certification	CE / IEC62619 / UL1973 / UL9540A/UN38.3		

Remarks: specifications are subject to change without notice

	LSRR51V100AH-LFP	LSRR51V200AH-LFP	LSRR51V300AH-LFP	LSRR51V400AH-LFP
Nominal voltage	51.2V	51.2V	51.2V	51.2V
Nominal capacity	100Ah	200Ah	300Ah	400Ah
Nominal energy	5.12kWh	10.24kWh	15.36kWh	20.48kWh
Usable energy	4.92kWh	9.84kWh	14.76kWh	19.68kWh
Operating voltage range	44.8V~56.0V	44.8V~56.0V	44.8V~56.0V	44.8V~56.0V
Charge voltage	56V	56V	56V	56V
Float voltage	54.6V	54.6V	54.6V	54.6V
Recommended charge current	50A	50A	50A	50A
Max. charge current	70A	70A	70A	70A
Recommended discharge current	50A	50A	50A	50A
Max. discharge current	100A	100A	100A	100A
Communication	RS485 / CAN			
Peak discharge current/unit	101~119A@5mins 120~149A@15S			
IP rating	IP20			
Cycle life	≥ 6000 cycles @90%DOD			
Net weight/unit	≈47kg (103.6lb)			
Dimension/unit (W*H*D)	482*133.5*460mm (18.9*5.2*18.1 inch)			
Cell type	Lithium-iron phosphate (LiFePO4)			
Design life	15 years			
Operation temperature	-10~50°C (14~122°F)			
Storage temperature	-10~45°C(14~113°F)			
Relative humidity	5% - 90%, No condensation			
Install altitude	≤ 4000m			
Install location	Indoor			
Installation	Wall mounted / Floor mounted / Stack / Rack mounted			
Certification	CE / IEC62619 / UL1973 / UN38.3			

Remarks: specifications are subject to change without notice

# Application Scenarios

From the city to the countryside. From commercial to residential.  
We drive the growth of renewable energy

## LSRW51V(100/120/150)AH-LFP Residential Wall-mounted Energy Storage



### Safety

High safety LiFePO4 battery; Fire-safe, non-toxic; Lithium ferrous phosphate (LFP) cells. Meet UL1973, IEC62619 UN38.3 certification

### Flexible

Long cycle life (>6000cycles@ 80% DOD)  
Wall mounted

### Environment protection

Non-toxic and pollution-free

### Long-lasting

15 years life design  
Long cycle life and superior performance

### Wide compatibility

Compatible with multiple brands of mainstream inverter use

### Smart WiFi

Support WiFi APP and cloud platform monitor



	LSRW51V100AH-LFP	LSRW51V120AH-LFP	LSRW51V150AH-LFP
Nominal voltage	51.2V	51.2V	51.2V
Nominal capacity	100Ah	120Ah	150Ah
Nominal energy	5.12kWh	6.14kWh	7.68kWh
Usable energy	5.0kWh	6.0kWh	7.5kWh
Recommended charge current	50A	60A	75A
Max. continuous charge current	80A	100A	120A
Max. continuous discharge current	80A	108A	150A
Peak discharge current	300A/3s	500A/3s	500A/3s
Max. continuous discharge power	5kW	6kW	6kW
Peak discharge power	15kW/3s	24kW/3s	24kW/3s
Self-discharge rate (Sleep mode)	Capacity: ≤ 3% / month; ≤ 20% / years		
Standard charge voltage	56.0V		
Floating charge voltage	54.0V		
End of discharge voltage	43.2V		
Communication	RS485 / CAN		
IP rating	IP55		
Cycle life	≥ 6000 cycles @80%DOD		
Net weight	~60.7kg (133.8lb)	~74.2kg (163.5lb)	~82.3kg (181.4lb)
Dimension( L*W*H)	454*170*698mm (17.8*6.6*27.4 inch)	470*224*695mm (18.5*8.8*27.3 inch)	470*243*695mm (18.5*9.5*27.3 inch)
Battery housing	SGCC with white coating		
Operation temperature	0~45°C (32~113°F)		
Recommended operation temperature	15~30°C (59~86°F)		
Storage temperature for short time	-10~45°C (14~113°F)		
Storage temperature for long time	10~35°C (50~95°F)		
Operation humidity	5~95%		
Install altitude	≤ 4000m		
Install location	Under the roof		
Installation	Wall mounted		
Certification	CE / IEC62619 / UL1973 / UN38.3		

Remarks: specifications are subject to change without notice

### High-Rise Apartment Buildings

PV Pre-installation: No

Proposal: Parallel and offline optical thread all-in-one machine, energy storage and battery modules, newly installed PV modules

Function: Power generation and energy storage off-grid system + staggered peak power consumption



### Landed Residential / Villa

PV Pre-installation: No

Proposal: Parallel and offline optical thread all-in-one machine, energy storage and battery modules, newly installed PV modules

Function: Power generation and energy storage off-grid system + power generation grid connection system



### Landed Residential / Villa

PV Pre-installation: No

Proposal: Parallel and offline optical thread all-in-one machine, energy storage and battery modules

Function: Power generation and energy storage off-grid system + power generation grid connection system

