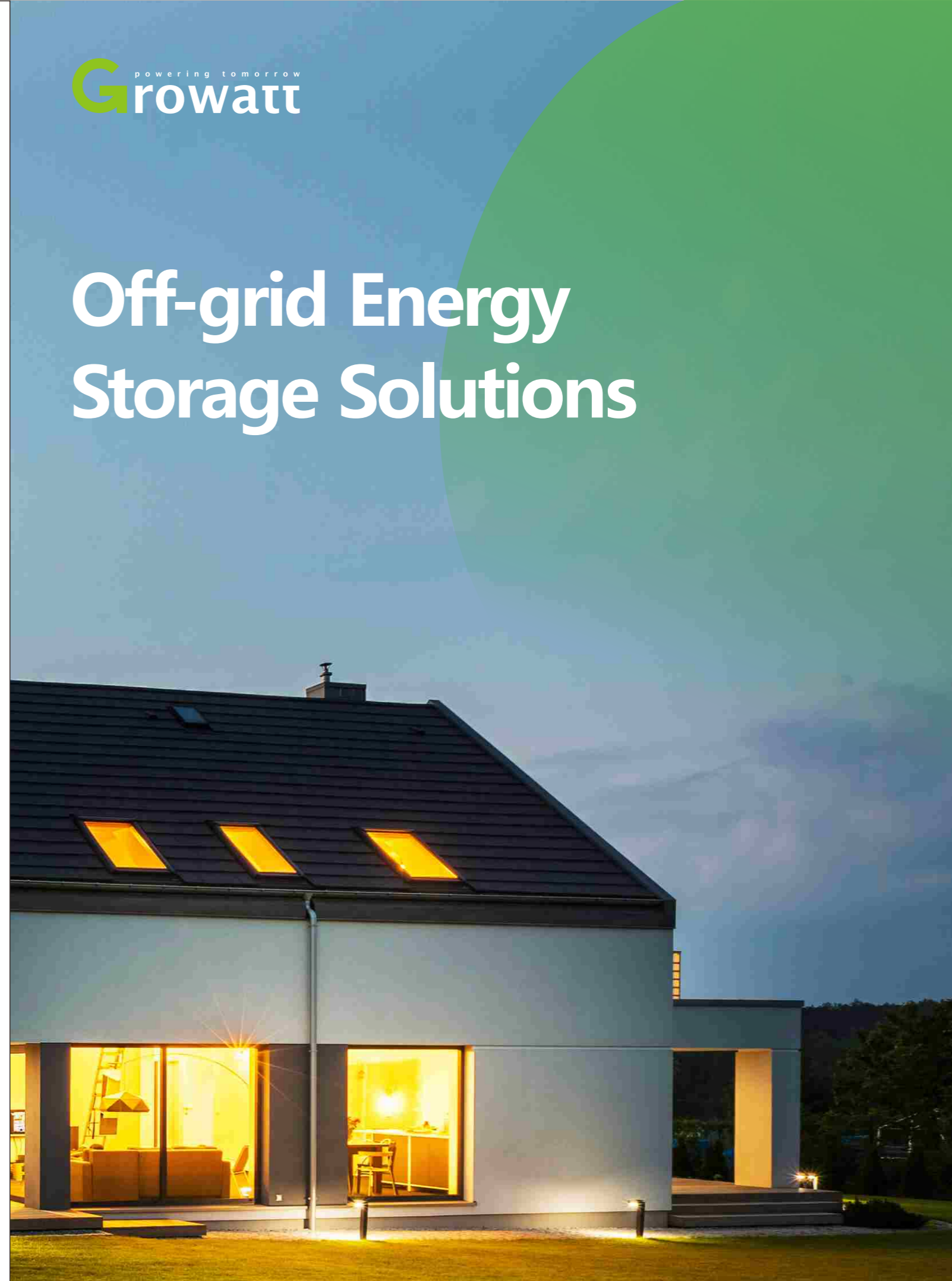


# Off-grid Energy Storage Solutions

P O W E R  
- I N G ●  
T O M O -  
R R O W ●

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GROWATT NEW ENERGY TECHNOLOGY CO.,LTD  
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[www.ginverter.com](http://www.ginverter.com)



# Overview

PV Off-grid Solutions use photovoltaic power to solve the household electricity, domestic water and work electricity demand of residents, schools or small factories in areas without or in shortage of electricity, and areas suffering from power instability. Being economical, clean, environmentally friendly and noise-free, photovoltaic power can partially or completely replace the power generation function of a diesel generator.

Growatt has complete high-frequency off-grid inverter, low frequency off-grid inverter, MPPT controller, solar pump inverter, and related lithium battery as well as monitoring products, which can form 3-30 kW photovoltaic off-grid systems according to the needs of practical applications.



High Frequency Inverter



Low Frequency Inverter



MPPT Controller



Solar pump Inverter

# Solutions

## Application scenarios of the high frequency inverter

Suitable for the area without impact loads (like motors) but without or in shortage of electricity and areas suffering from power instability.

### Product Features

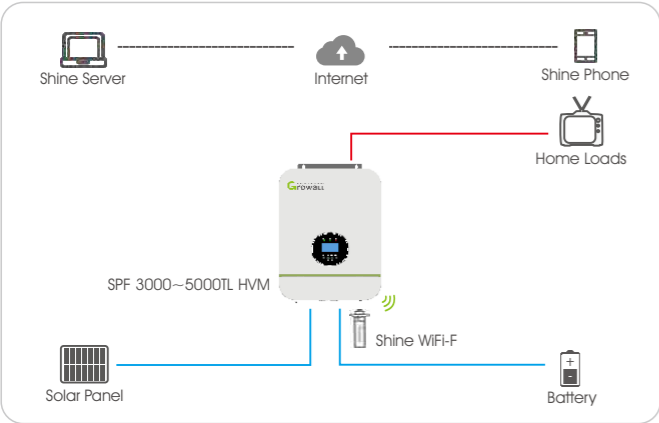
- Integrated MPPT Controller
- The priority of grid supply and photovoltaic power can be set
- Compatible with lead acid and lithium batteries
- Optional Wi-Fi or GPRS remote communication module
- Supports up to 6 single-phase or three-phase machines in parallel

### System Diagram

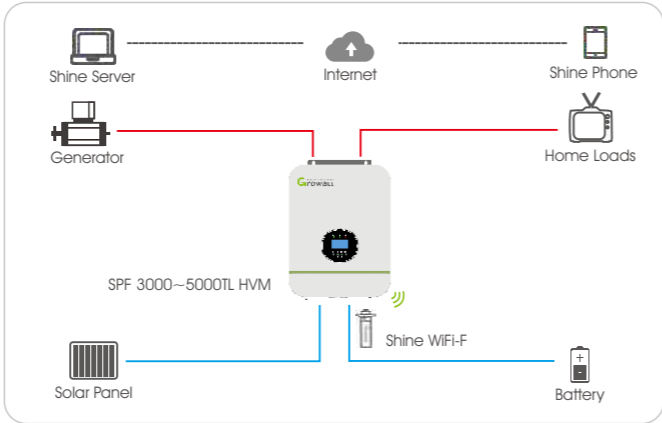
#### A. Single inverter basic application

AC cable | DC cable | COM cable

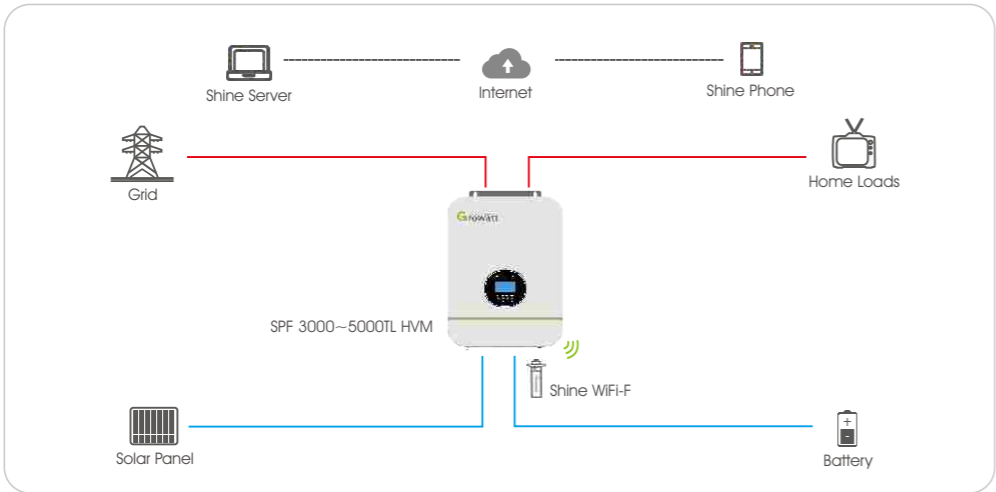
##### 01 Only PV application



##### 02 PV + generator application

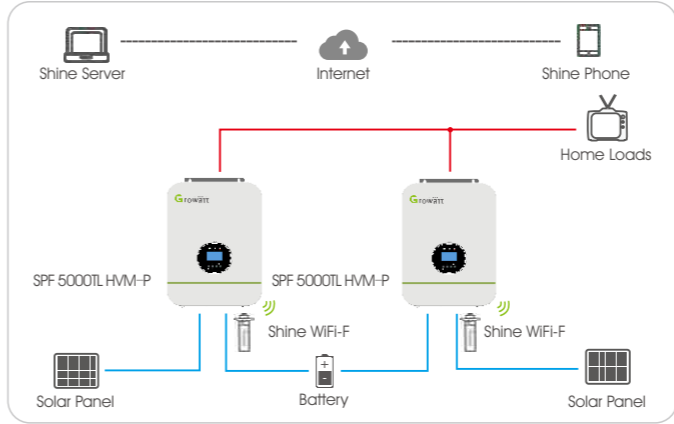


##### 03 PV + grid supply application

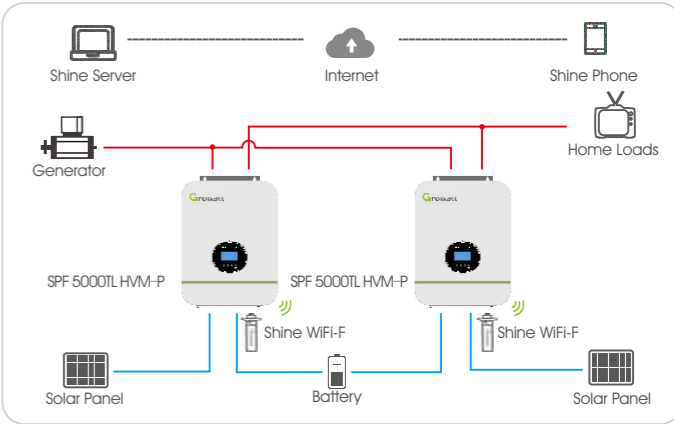


#### B. Single-phase parallel application

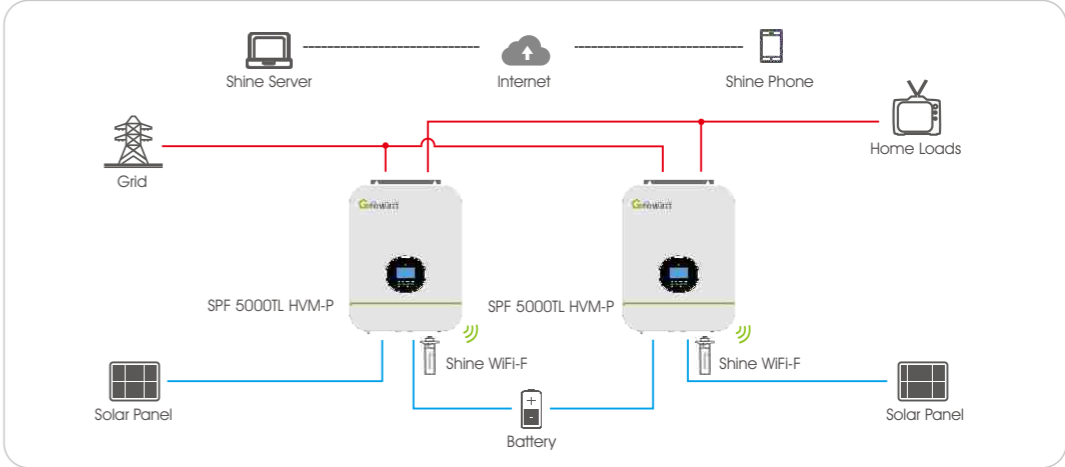
##### 01 Only PV application



##### 02 PV + generator application

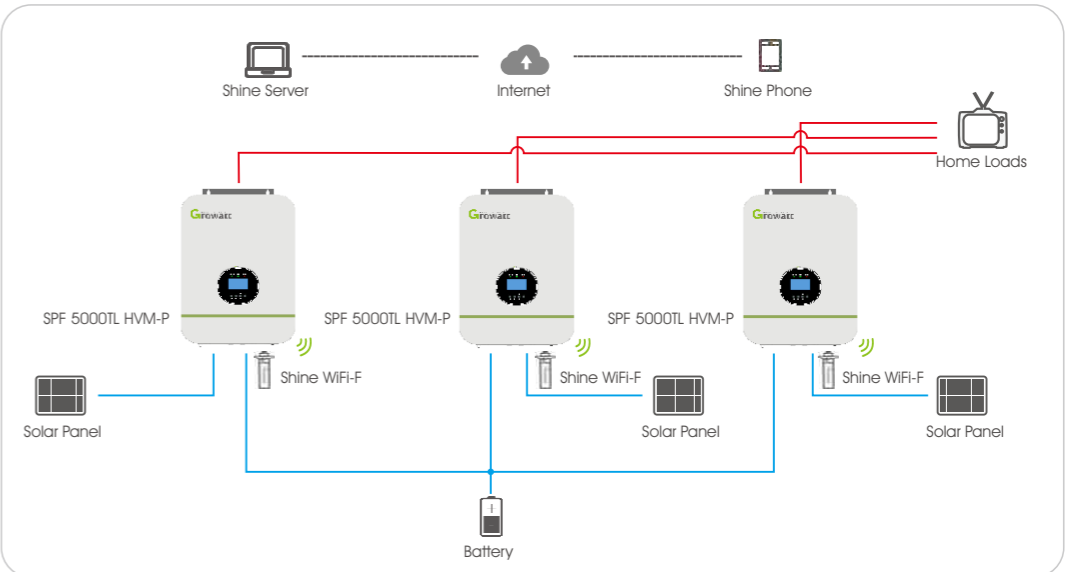


##### 03 PV + grid supply application

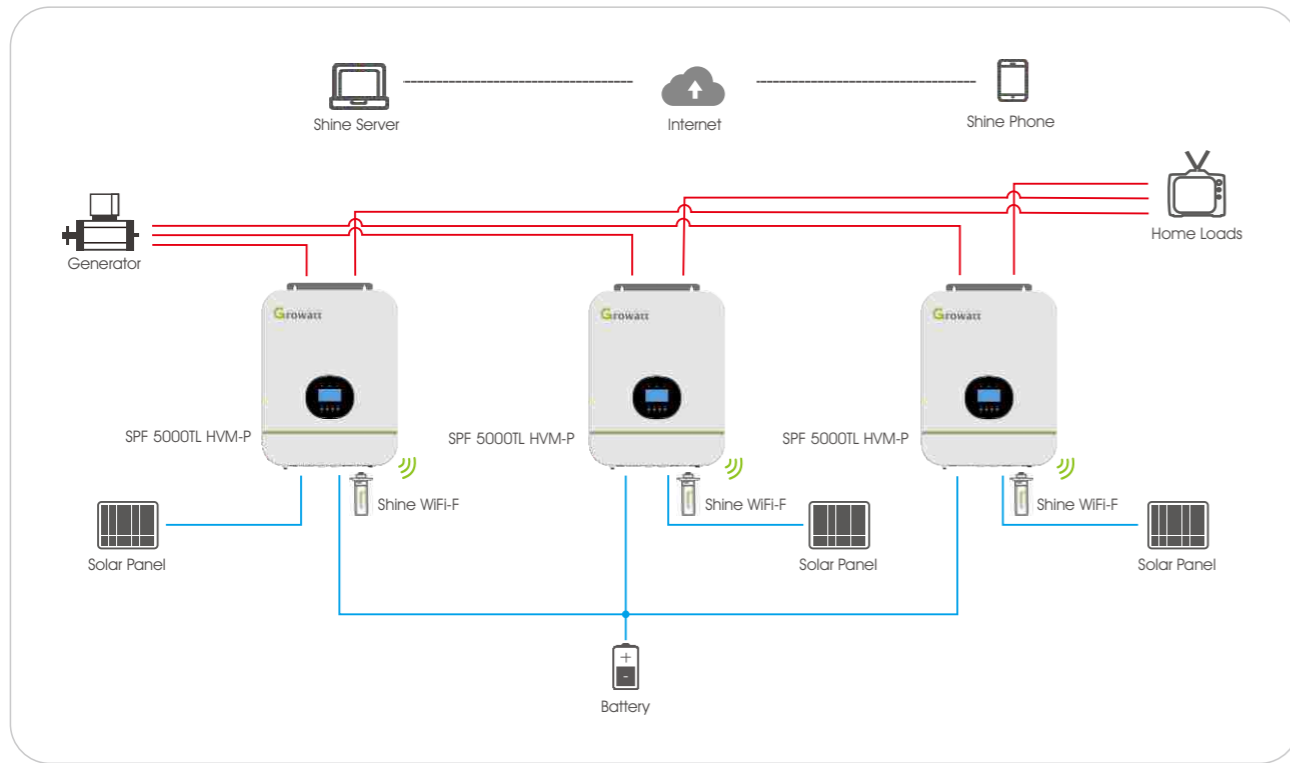


#### C. Three-phase parallel application

##### 01 Only PV application

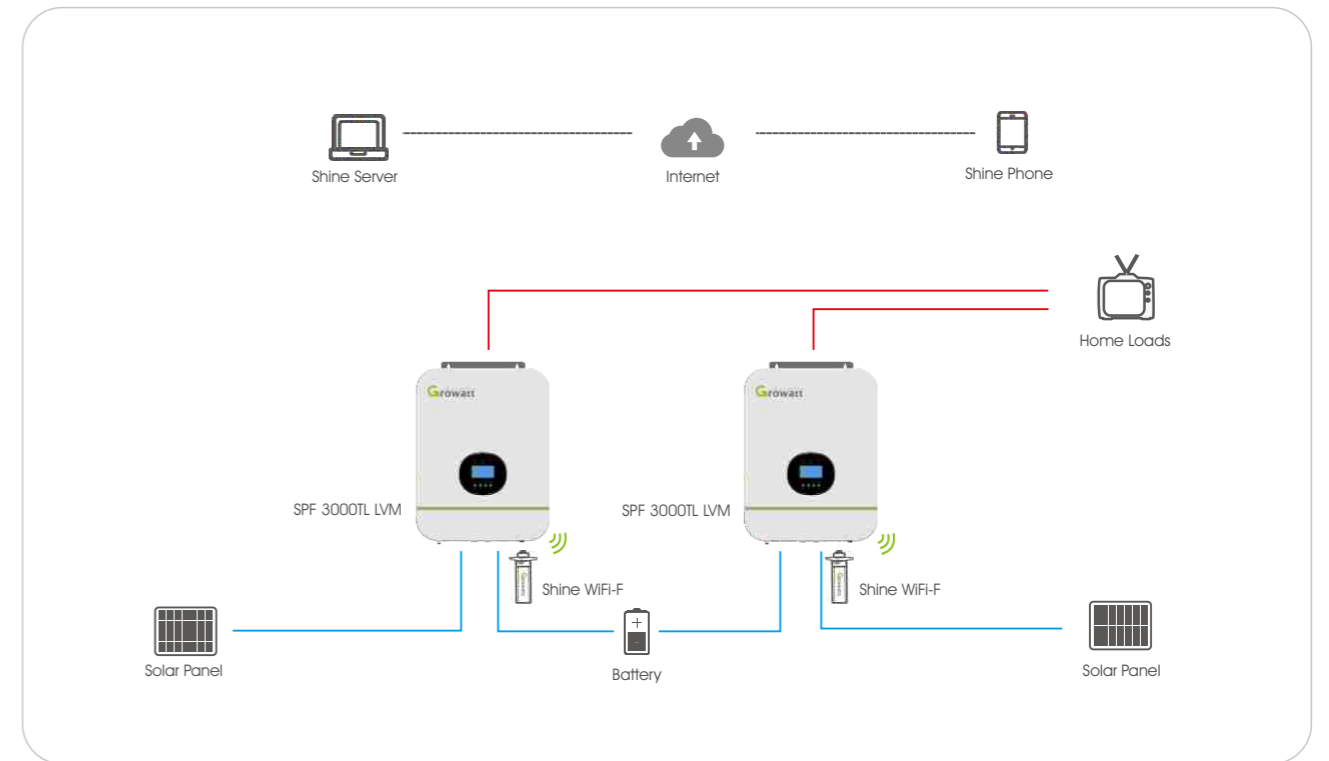


02 PV+generator application

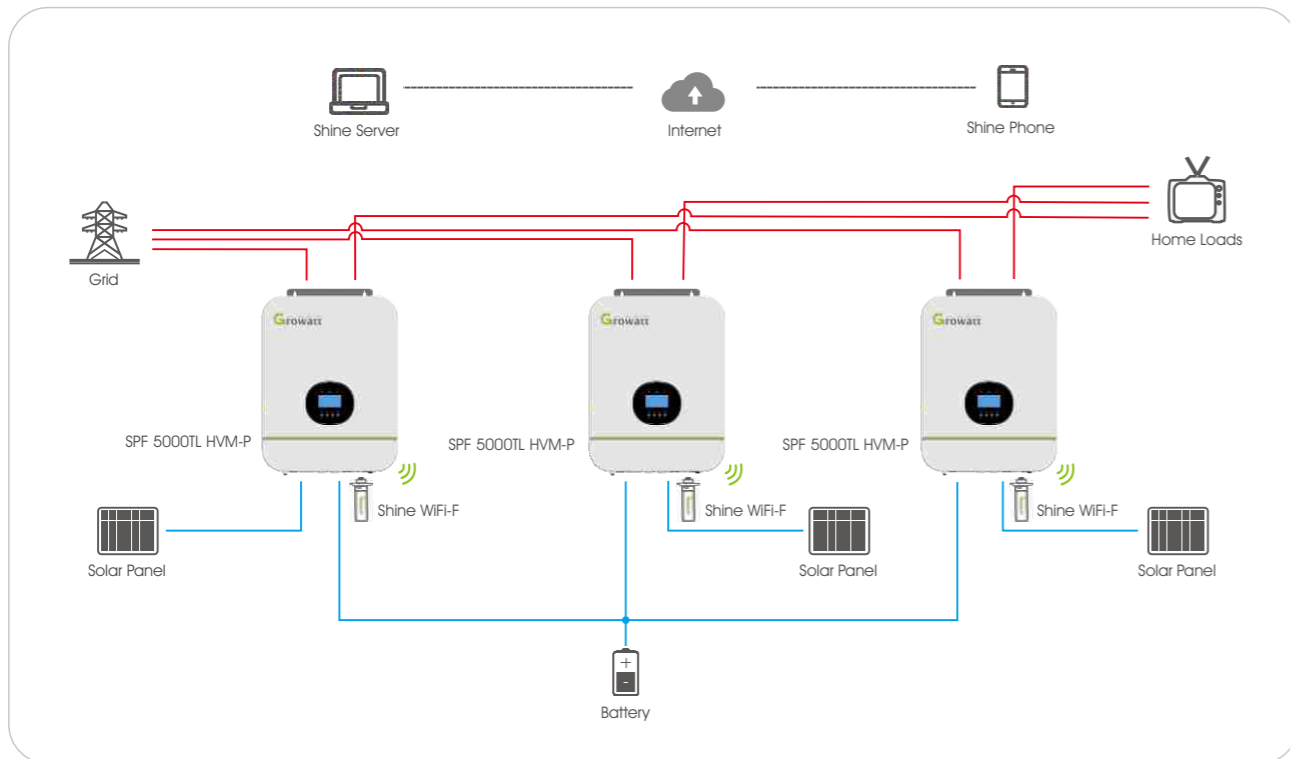


D. Split-phase parallel application (only SPF 3000TL LVM)

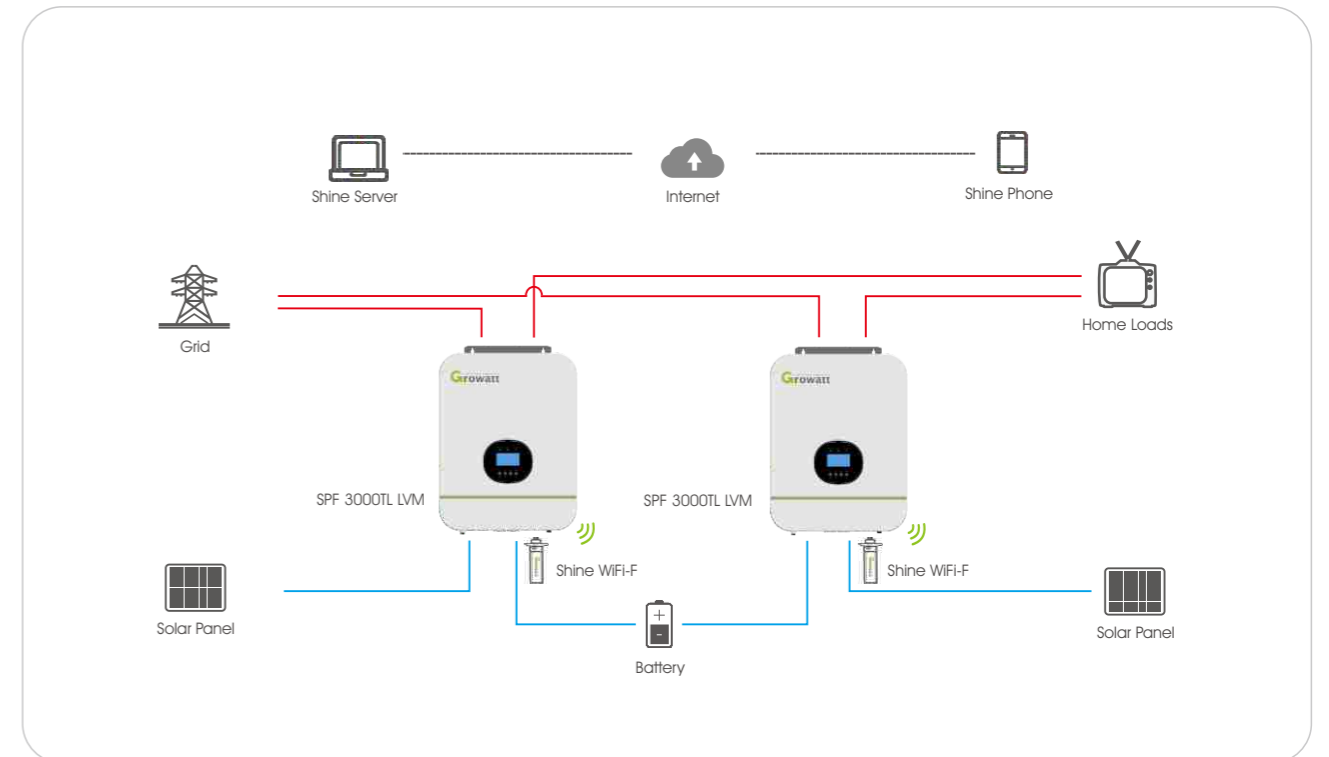
01 PV+generator application



03 PV+grid supply application



02 PV+grid supply application



# SPF 3000~5000TL HVM

High frequency, 230Vac output



Datasheet	SPF 3000TL HVM-24	SPF 3000TL HVM-48	SPF 5000TL HVM/HVM-P
Battery voltage	24VDC	48VDC	48VDC

INVERTER OUTPUT			
RATED POWER	3000VA/ 3000W	3000VA/ 3000W	5000VA/ 5000W
Parallel Capability	No	No	Yes, 6 units
AC Voltage Regulation (Battery Mode)	230VAC ± 5% @ 50/60Hz	230VAC ± 5% @ 50/60Hz	230VAC ± 5% @ 50/60Hz
Surge Power	6000VA	6000VA	10000VA
Efficiency (Peak)	93%	93%	93%
Waveform	Pure sine wave	Pure sine wave	Pure sine wave
Transfer Time	10 ms (For Personal Computers); 20 ms (For Home Appliances)		

SOLAR CHARGER			
Maximum PV Array Power	1000W	2400W	4500W
MPPT Range @ Operating Voltage	30VDC ~ 80VDC	60VDC ~ 115VDC	60VDC ~ 115VDC
Maximum PV Array Open Circuit Voltage	100VDC	145VDC	145VDC
Maximum Solar Charge Current	50A	40A	80A
Maximum Efficiency	97%	97%	97%
Standby Power Consumption	2 W	2 W	2 W

AC CHARGER			
Charge Current	30A	15A	60A
AC Input Voltage	230 VAC	230 VAC	230 VAC
Selectable Voltage Range	170-280 VAC (For Personal Computers) ; 90-280 VAC (For Home Appliances)		
Frequency Range	50Hz/60Hz (Auto sensing)	50Hz/60Hz (Auto sensing)	50Hz/60Hz (Auto sensing)

PHYSICAL			
Dimension (D/W/H) in mm	120/315/390	120/315/390	130/350/455
Net Weight (kgs)	8	8	14.5

OPERATING ENVIRONMENT			
Humidity	5% to 95% Relative Humidity(Non-condensing)	5% to 95% Relative Humidity(Non-condensing)	5% to 95% Relative Humidity(Non-condensing)
Operating Temperature	0°C - 55°C	0°C - 55°C	0°C - 55°C
Storage Temperature	-15°C - 60°C	-15°C - 60°C	-15°C - 60°C

# SPF 3000~5000TL HVM-WPV

High frequency, wide PV input voltage, 230Vac output



Datasheet	SPF 3000TL HVM-WPV	SPF 5000TL HVM-WPV
Battery voltage	24VDC	48VDC

INVERTER OUTPUT		
RATED POWER	3000VA/ 3000W	5000VA/ 5000W
Parallel Capability	Yes, 6 units	
AC Voltage Regulation (Battery Mode)	230VAC ± 5% @ 50/60Hz	
Surge Power	6000VA	10000VA
Efficiency (Peak)	93%	
Waveform	Pure sine wave	
Transfer Time	10 ms (For Personal Computers); 20 ms (For Home Appliances)	

SOLAR CHARGER		
Maximum PV Array Power	3500W	5500W
MPPT Range @ Operating Voltage	120VDC ~ 430VDC	
Maximum PV Array Open Circuit Voltage	450VDC	
Maximum Solar Charge Current	100A	
Maximum Efficiency	97%	

AC CHARGER	
Charge Current	80A
AC Input Voltage	230 VAC
Selectable Voltage Range	170-280 VAC (For Personal Computers) ; 90-280 VAC (For Home Appliances)
Frequency Range	50Hz/60Hz (Auto sensing)

PHYSICAL	
Dimension (D/W/H) in mm	485/330/135
Net Weight (kgs)	12

OPERATING ENVIRONMENT	
Humidity	5% to 95% Relative Humidity(Non-condensing)
Operating Temperature	0°C - 55°C
Storage Temperature	-15°C - 60°C

# SPF 3000TL LVM

High frequency, 120Vac output, supporting split phases system



Datasheet	SPF 3000TL LVM-24P	SPF 3000TL LVM-48P
Battery voltage	24VDC	48VDC
<b>INVERTER OUTPUT</b>		
RATED POWER	3000VA/ 3000W	3000VA/ 3000W
Parallel Capability	Yes	Yes
AC Voltage Regulation (Battery Mode)	120VAC ± 5% @ 50/60Hz	120VAC ± 5% @ 50/60Hz
Surge Power	6000VA	6000VA
Efficiency (Peak)	93%	93%
Waveform	Pure sine wave	Pure sine wave
Transfer Time	10 ms (For Personal Computers); 20 ms (For Home Appliances)	10 ms (For Personal Computers); 20 ms (For Home Appliances)
<b>SOLAR CHARGER</b>		
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	97%	97%
Standby Power Consumption	2 W	2 W
<b>AC CHARGER</b>		
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)	95-140 VAC (For Personal Computers) ; 65-140 VAC (For Home Appliances)
Frequency Range	50Hz/60Hz (Auto sensing)	50Hz/60Hz (Auto sensing)
<b>PHYSICAL</b>		
Dimension (D/W/H) in mm	130/350/455	130/350/455
Net Weight (kgs)	11	11
<b>OPERATING ENVIRONMENT</b>		
Humidity	5% to 95% Relative Humidity(Non-condensing)	5% to 95% Relative Humidity(Non-condensing)
Operating Temperature	0°C - 55°C	0°C - 55°C
Storage Temperature	-15°C - 60°C	-15°C - 60°C

## Application scenarios of the low frequency inverter

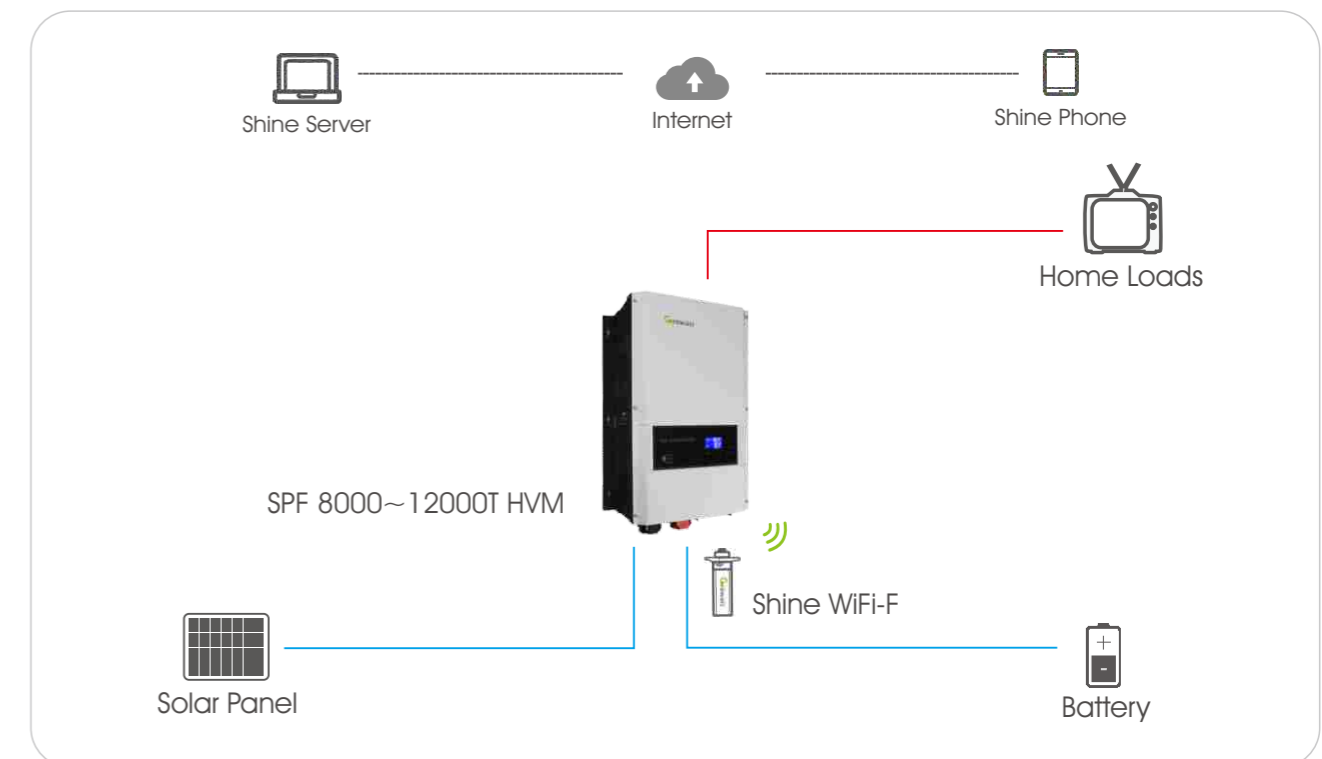
Suitable for the area with many impact loads (like motors) but without or in shortage of electricity, and areas suffering from power instability.

### Product Features

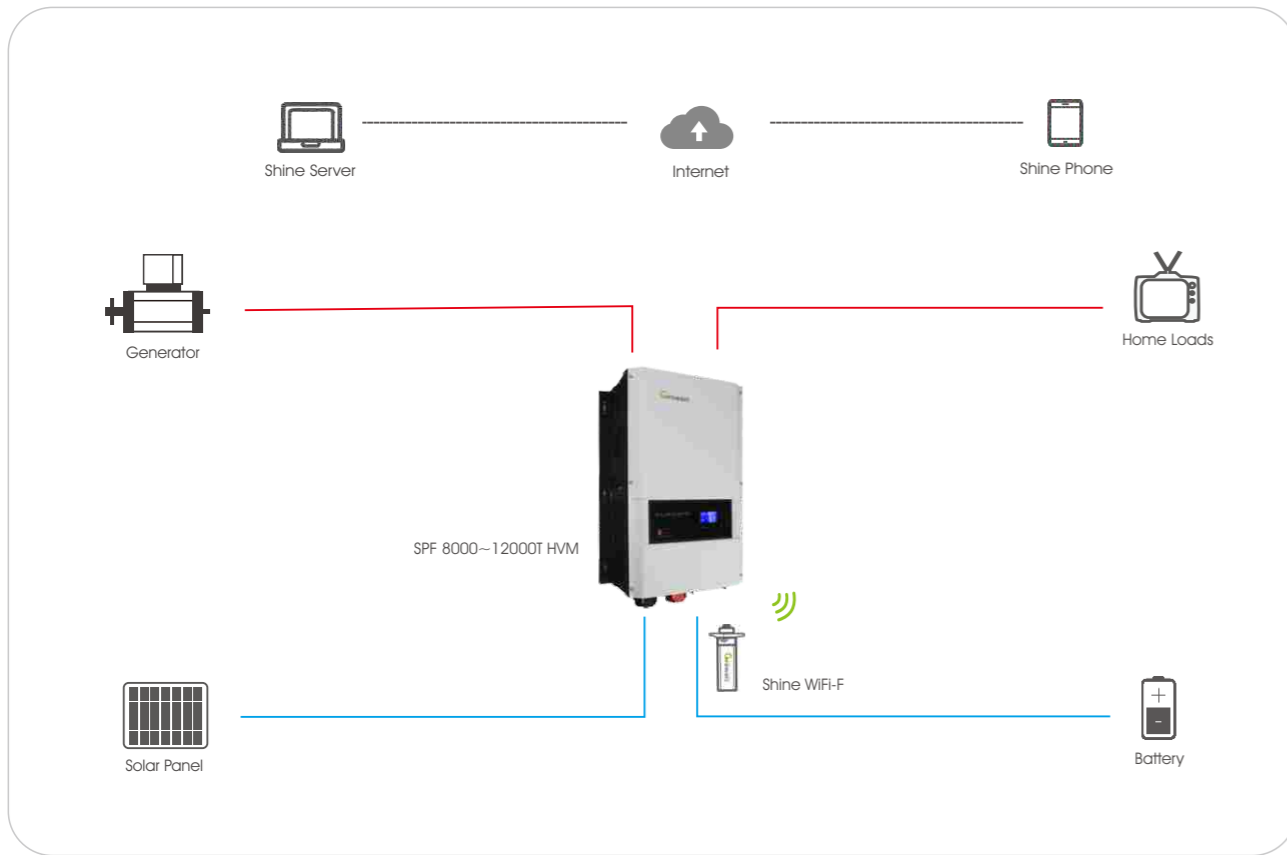
- Integrated MPPT Controller
- Built-in power frequency transformer, strong impact resistance
- The priority of grid supply and photovoltaic power can be set.
- Optional Wi-Fi or GPRS remote communication module
- Split-phase 120 V/240 V AC output (Only SPF 4000-6000T DVM)

### System Diagram

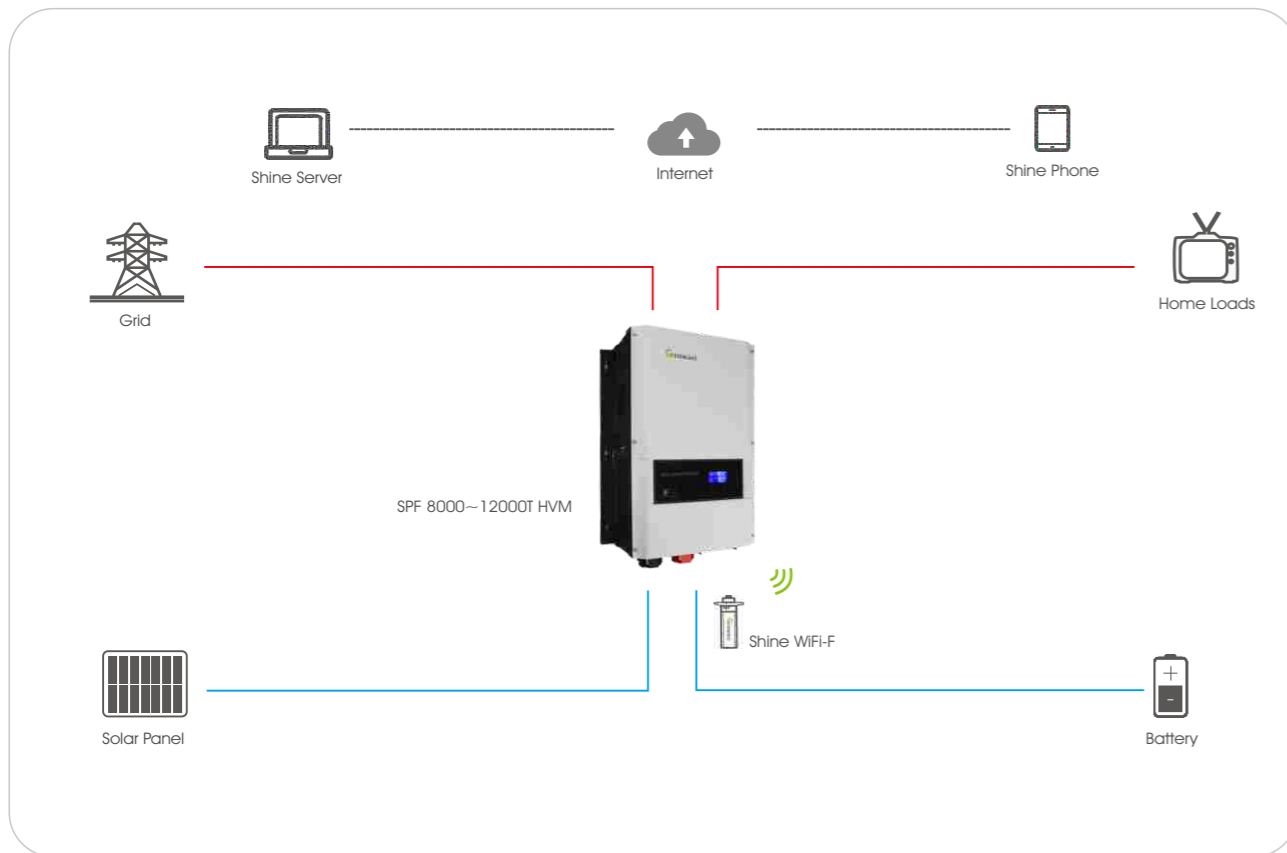
#### 01 Only PV application



02 PV+generator application



03 PV+grid supply application



# SPF 4000T~6000T DVM

Low frequency,  
120 V/240Vac split-phase output



Datasheet	SPF 4000T DVM	SPF 5000T DVM	SPF 6000T DVM
Battery voltage	48VDC	48VDC	48VDC
<b>INVERTER OUTPUT</b>			
Rated Power	4KW	5KW	6KW
Capable of Starting Electric Motor	4HP	5HP	6HP
Waveform	Pure sine wave/ same as input (bypass mode)	Pure sine wave/ same as input (bypass mode)	Pure sine wave/ same as input (bypass mode)
Nominal Output Voltage RMS	120V/240VAC(+/-10% RMS)	120V/240VAC(+/-10% RMS)	120V/240VAC(+/-10% RMS)
Output Frequency	50Hz/60Hz +/-0.3 Hz	50Hz/60Hz +/-0.3 Hz	50Hz/60Hz +/-0.3 Hz
Inverter Efficiency(Peak)	>85%	>85%	>85%
Transfer Time	10ms(max)	10ms(max)	10ms(max)
<b>SOLAR CHARGER</b>			
Maximum PV Charge Current	80A	80A	80A
Maximum PV Array Power	5000W	5000W	5000W
MPPT Range @ Operating Voltage(VDC)	60~140VDC	60~140VDC	60~140VDC
Maximum PV Array Open Circuit Voltage	150VDC	150VDC	150VDC
Maximum Efficiency	>98%	>98%	>98%
Power Consumption	<150W	<150W	<150W
<b>AC INPUT</b>			
Voltage	230VAC	230VAC	230VAC
Selectable Voltage Range	184~272VAC(UPS);154~272VAC(APL)	184~272VAC(UPS);154~272VAC(APL)	184~272VAC(UPS);154~272VAC(APL)
Frequency Range	50Hz/60Hz (Auto sensing)	50Hz/60Hz (Auto sensing)	50Hz/60Hz (Auto sensing)
<b>AC CHARGER</b>			
Max. Charging Current	40A	50A	60A
Overcharge Protection S.D.	62V	62V	62V
<b>MECHANICAL SPECIFICATIONS</b>			
Dimensions (W*H*D)	440/218/540	440/218/540	440*218*540mm
Weight (kg)	42	47	52
<b>OPERATING ENVIRONMENT</b>			
Operation Temperature Range	0°C to 40°C	0°C to 40°C	0°C to 40°C

# SPF 8000T~12000T HVM

Low frequency, 230Vac output



Datasheet	SPF 8000T HVM	SPF 10000T HVM	SPF 12000T HVM
Battery voltage	48VDC	48VDC	48VDC
<b>INVERTER OUTPUT</b>			
Rated Power	8KW	10KW	12KW
Surge Rating (20ms)	24KW	30KW	36KW
Capable of Starting Electric Motor	4HP	5HP	6HP
Waveform	Pure sine wave/ same as input (bypass mode)	Pure sine wave/ same as input (bypass mode)	Pure sine wave/ same as input (bypass mode)
Nominal Output Voltage RMS	220V/230V/240VAC(+/-10% RMS)	220V/230V/240VAC(+/-10% RMS)	220V/230V/240VAC(+/-10% RMS)
Output Frequency	50Hz/60Hz +/-0.3 Hz	50Hz/60Hz +/-0.3 Hz	50Hz/60Hz +/-0.3 Hz
Inverter Efficiency(Peak)	>88%	>88%	>88%
Transfer Time	10ms(max)	10ms(max)	10ms(max)
<b>SOLAR CHARGER</b>			
Maximum PV Charge Current	80A	80A	80A
Maximum PV Array Power	5000W	5000W	5000W
MPPT Range @ Operating Voltage(VDC)	60~145VDC	60~145VDC	60~145VDC
Maximum PV Array Open Circuit Voltage	150VDC	150VDC	150VDC
Maximum Efficiency	>98%	>98%	>98%
Standby Power Consumption	<2W	<2W	<2W
<b>AC INPUT</b>			
Voltage	230VAC	230VAC	230VAC
Selectable Voltage Range	184~272VAC(UPS);154~272VAC(APL)	184~272VAC(UPS);154~272VAC(APL)	184~272VAC(UPS);154~272VAC(APL)
Frequency Range	50Hz/60Hz (Auto sensing)	50Hz/60Hz (Auto sensing)	50Hz/60Hz (Auto sensing)
<b>AC CHARGER</b>			
Max. Charging Current	70A	80A	100A
Overcharge Protection S.D.	62V	62V	62V
<b>MECHANICAL SPECIFICATIONS</b>			
Dimensions (W*H*D)	650/460/255	650/460/255	650/460/255
Net Weight (Solar CHG) kg	70	76	76
<b>OPERATING ENVIRONMENT</b>			
Operation Temperature Range	0°C to 40°C	0°C to 40°C	0°C to 40°C

## Application scenarios of the MPPT controller

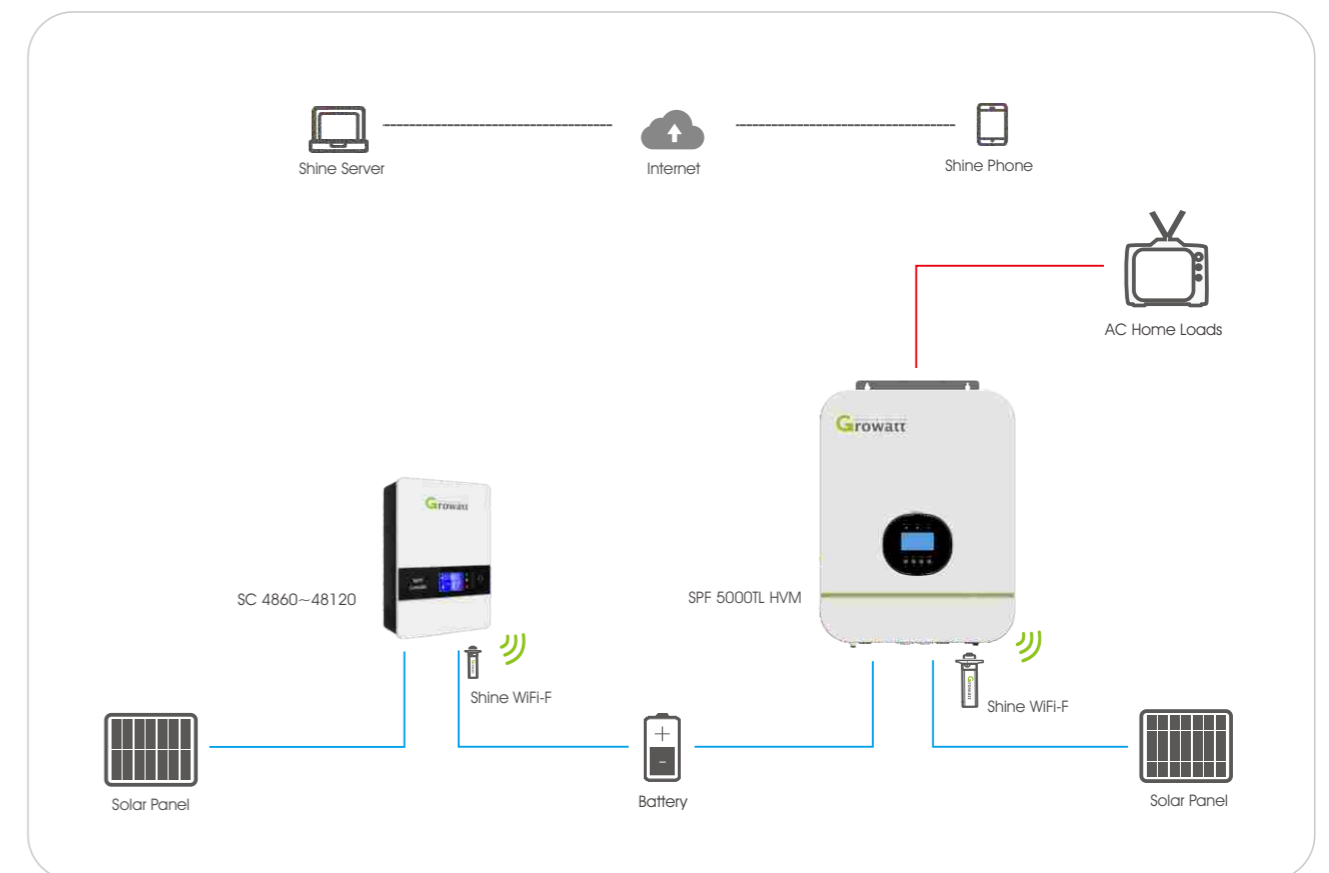
Suitable for the areas needs long backup time also without or in shortage of electricity, and areas suffering from power instability.

## Product Features

- 12 V/24 V/48 V battery voltage automatically adapted
- Compensation function for battery temperature
- Optional Wi-Fi or GPRS remote communication module

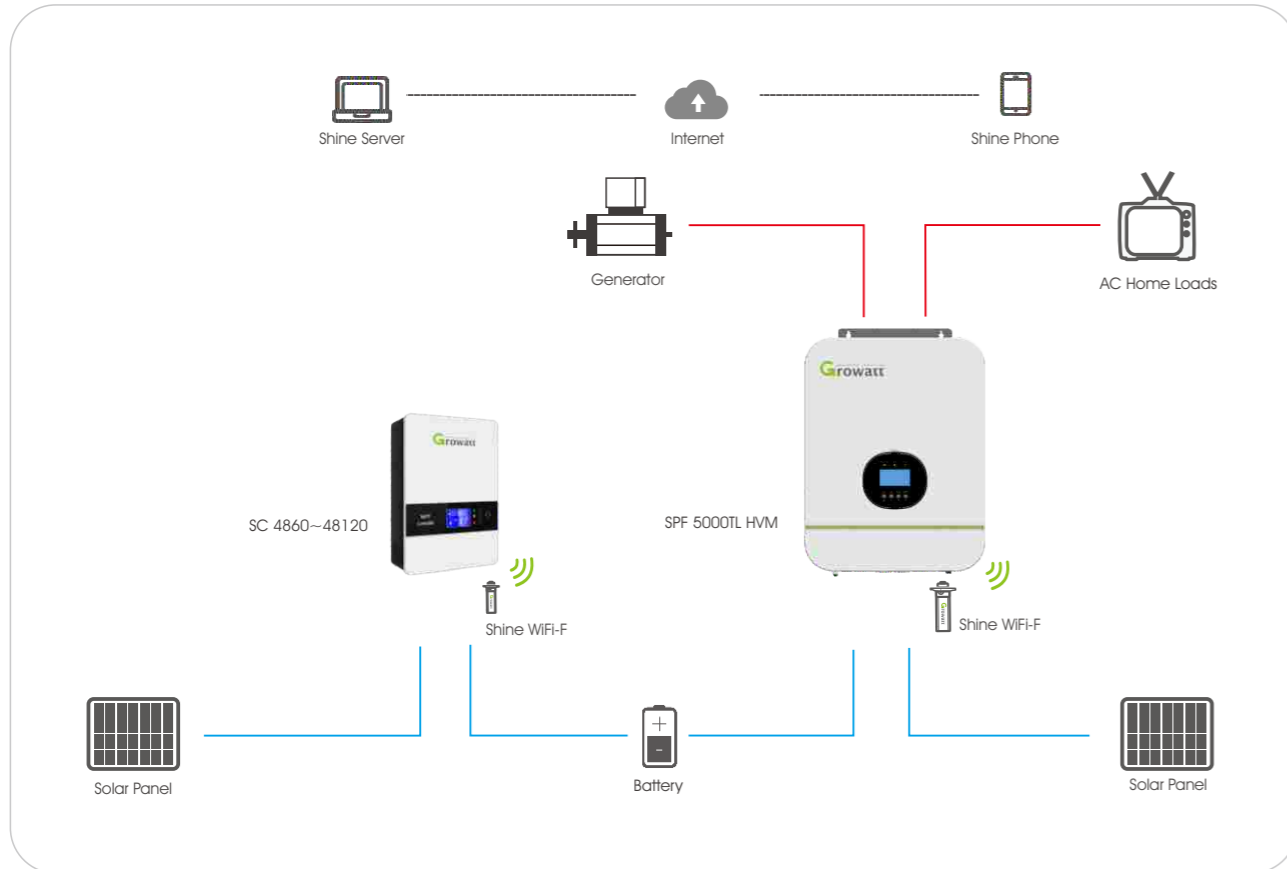
## System Diagram

01 Only PV expansion application

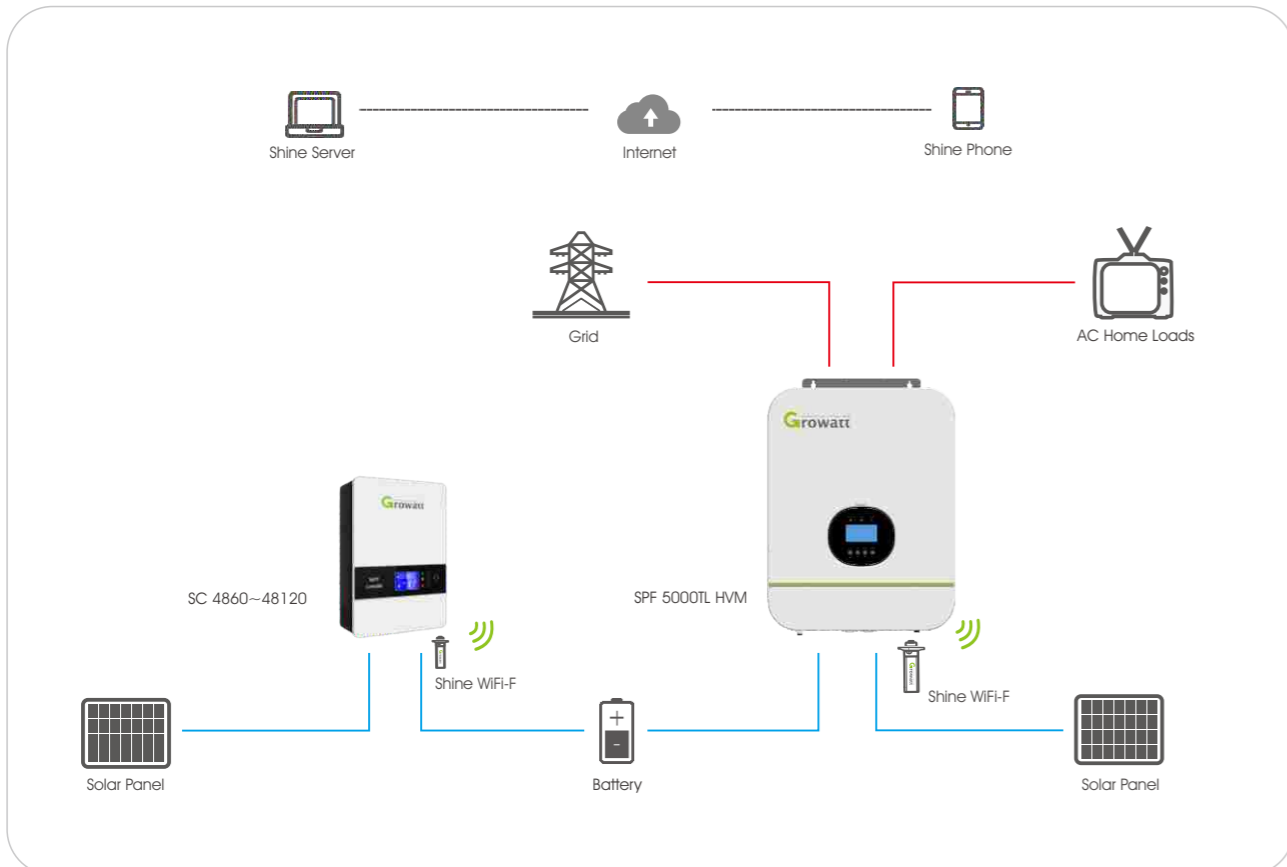




## 02 PV expansion + generator



## 03 PV expansion + grid supply



# SC 4860~48120

## MPPT Controller



Datasheet	SC 4860	SC 4880	SC 48100	SC 48120
Solar System Voltage	12V/24V/48V	12V/24V/48V	12V/24V/48V	12V/24V/48V
<b>Electrical</b>				
PV Operating voltage	18~145Vdc@12V 34~145Vdc@24V 60~145Vdc@48V	18~145Vdc@12V 34~145Vdc@24V 60~145Vdc@48V	18~145Vdc@12V 34~145Vdc@24V 60~145Vdc@48V	18~145Vdc@12V 34~145Vdc@24V 60~145Vdc@48V
Max.PV Open circuit Voltage	150Vdc	150Vdc	150Vdc	150Vdc
Max.PV input power	4000W	5000W	6000W	7000W
Max.charging current	60A	80A	100A	120A
Self Consumption	2W	2W	2W	2W
MPPT Efficiency	99.5%	99.5%	99.5%	99.5%
Conversion Efficiency	97.5%	97.5%	97.5%	97.5%
Protection	Overload,high voltage, high temperature protection	Overload,high voltage, high temperature protection	Overload,high voltage, high temperature protection	Overload,high voltage, high temperature protection
<b>Battery Charging</b>				
Battery Type	Sealed: AGM, Gel, Flooded,Lithium,User define	Sealed: AGM, Gel, Flooded,Lithium,User define	Sealed: AGM, Gel, Flooded,Lithium,User define	Sealed: AGM, Gel, Flooded,Lithium,User define
Charging Algorithm	3-stage: Bulk, Absorption, Float, Equalize	3-stage: Bulk, Absorption, Float, Equalize	3-stage: Bulk, Absorption, Float, Equalize	3-stage: Bulk, Absorption, Float, Equalize
Bulk charge voltage	14.1V@12V 28.2V@24V 56.4V@48V User define:48~58.4V	14.1V@12V 28.2V@24V 56.4V@48V User define:48~58.4V	14.1V@12V 28.2V@24V 56.4V@48V User define:48~58.4V	14.1V@12V 28.2V@24V 56.4V@48V User define:48~58.4V
Float charge voltage	13.6V@12V 27.2V@24V 54.4V@48V User define:48~58.4V	13.6V@12V 27.2V@24V 54.4V@48V User define:48~58.4V	13.6V@12V 27.2V@24V 54.4V@48V User define:48~58.4V	13.6V@12V 27.2V@24V 54.4V@48V User define:48~58.4V
Temperature compensation	-5mV/°C /2V with BTS(Optional)	-5mV/°C /2V with BTS(Optional)	-5mV/°C /2V with BTS(Optional)	-5mV/°C /2V with BTS(Optional)
<b>Communication</b>				
Communication Port	USB	USB	USB	USB
<b>Mechanical</b>				
Net weight	3kg	3kg	4kg	4kg
Gross weight	4kg	4kg	5kg	5kg
Dimensions	290*180*90	290*180*90	300*183*90	300*183*90
Packing dimensions	330*250*145	330*250*145	375*255*175	375*255*175
Cooling	Fan cooling	Fan cooling	Fan cooling	Fan cooling
Enclosure	IP20	IP20	IP20	IP20
<b>Environment</b>				
Ambient Temperature	~25~60°C(Derating from 45°C)	~25~60°C(Derating from 45°C)	~25~60°C(Derating from 45°C)	~25~60°C(Derating from 45°C)
Storage Temperature	-40°C~+80°C	-40°C~+80°C	-40°C~+80°C	-40°C~+80°C
Humidity	100% non-condensing	100% non-condensing	100% non-condensing	100% non-condensing

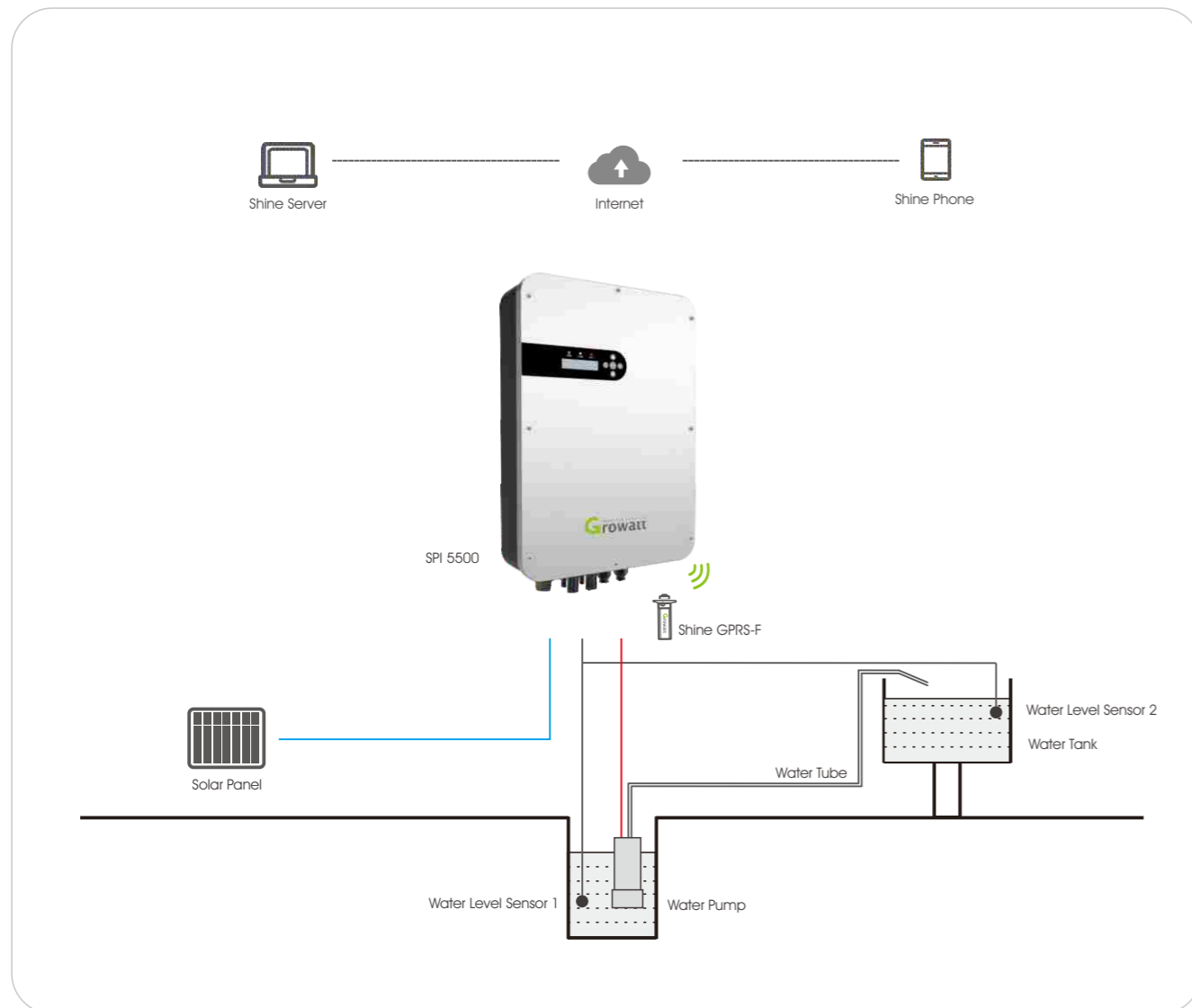
## Application scenarios of the pump inverter

Suitable for the areas need power to pumping the water but without electricity.

### Product Features

- Dynamic MPPT control, MPPT efficiency up to 99%
- IP65 design for outdoor installation
- Functions and parameters can be set via LCD
- Optional water level detection sensor
- Optional Wi-Fi or GPRS remote communication module

### System Diagram



## SPI 3000~22000

### Solar Pump Inverter



Datasheet	SPI 3000	SPI 4000	SPI 5500	SPI 7500	SPI 9200	SPI 11000	SPI 13000	SPI 15000	SPI 18500	SPI 22000
Rated Output Power (W)	3000W	4000W	5500W	7500W	9200W	11000W	13000W	15000W	18500W	22000W
Max. Output Current (A)	8A	10A	13A	18A	21A	23A	28A	30A	38A	45A
Output Frequency (Hz)	0-50/60Hz									
Output Voltage (Vac)	3PH 380V									
Qty. of PV Input Ports	2			3			6			
Startup Voltage (Vdc)	250V									
Max. DC Input Voltage (Vdc)	900V									
Recommned MPP Votage (Vdc)	500-680V									
Ingress Protection	IP65									
Weight (kg)	14kg			15kg			16kg		22kg	
Dimension (mm)	478/325 /155			563/346/148			533/405/190			

# US 2000

2.4 kWh lithium battery module



Datasheet	Growatt US2000
<b>Battery Data</b>	
Nominal Voltage	48V
Normal Capacity	2400Wh
Usable Capacity	2200Wh
Discharge Voltage	45 ~ 53.5V
Charge Voltage	52.5 ~ 53.5V
Charge/Discharge Current	≤25A (Recommended) 50A (Max) 100A (Peak@15sec)
<b>General Data</b>	
Dimension (mm)	440/410/88.5
Weight	24Kg
Working temperature	0°C~50°C
Storage Temperature	0°C~45°C
<b>Features</b>	
Design Life	10 Years (25°C/77°F)
Cycle Life	> 4500 (25°C, 90% DoD)
Single string quantity	8pcs
Communication Port	CAN / RS485

# Shine WiFi-F

Monitoring devices



Datasheet	WiFi-F
<b>General Data</b>	
Dimensions(Length/Width/Height)	135/79/29
Weight	63g
Manual language	English, Chinese
<b>Wireless Parameters</b>	
Wireless Type	WiFi
Wireless Standard	802.11 b/g/n
Transmit power	802.11b: +20dBm(Max.); 802.11g: +18dBm(Max.); 802.11n: +15dBm(Max.)
Receiver sensitivity	802.11b: -89dBm(Max.); 802.11g: -81dBm(Max.); 802.11n: -71dBm(Max.)
<b>Hardware Parameters</b>	
Data Interface	UART: 9600bps; Ethernet: 100Mbps
Operating Voltage	5V (+/-15%)
Operating Current	1A
Operating Temperature	-20°C~+65°C
Storage Temperature	-40°C~+70°C
Network Type	AP (Access Point); Station Mode (with Soft AP)
Security Mechanisms	WEP / WPA-PSK / WPA2-PSK / WAPI
Encryption	WEP64 / WEP128 / TKIP / AES
<b>Application on Parameters</b>	
Supported servers	ShineServer
Inverter communication	USB A-type
Sever Communication	WiFi via router (Modbus TCP protocol)
Supported Routers	Wireless router (Include 3G router)
User Configuration Interface	Wireless web server (Internet Browser)
Max. Communication Range	100m
Data Transfer Interval	5 minutes
Default Server URL	server-cn.growatt.com

# Shine GPRS-F

Monitoring devices



Datasheet	GPRS-F
<b>General Data</b>	
Dimensions(Length/Width/Height)	135/79/29
Weight	70g
Language	English, Chinese
<b>Wireless Parameters</b>	
Wireless Type	GPRS
GSM/GPRS/EDGE Frequency Range	850/900/1800/1900 MHz
Antenna Gain	3dbi
Max. Output Power: GSM850/GSM900	2W; DCS1800/PCS1900: 1W
Speed	Max. 85.6Kbps(DL); Max 42.8Kbps(UL)
<b>Hardware Parameters</b>	
Serial port speed	9600bps
Operating voltage	5V(+/-15%)
Operating current	1A
Operating temperature	-30℃ ... +65℃
Storage temperature	-40℃ ... +70℃
<b>Application Parameters</b>	
Servers	ShineServer
Communication with inverter	USB A-type
Communication with server	TCP(Modbus TCP protocol)
Network supported	2G GSM(GPRS)
Configuration interface	APP
SIM type	regular SIM card
Uploading interval	5 Mins(1-15 adjustable)
Default server IP	server-cn.growatt.com

## EXCEPT THE STRENGTHS OF PRODUCT WITH GROWATT, YOU CAN ALSO ENJOY

### Powerful Monitoring Platform

ShineServer and ShinePhone are the new generation monitoring systems developed by Growatt and freely open to our users.



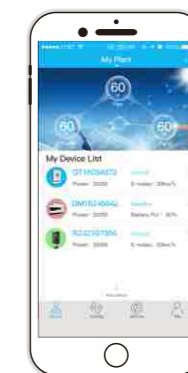
### Powerful cloud server

- User data security
- Up to 10 years user data storage
- Continues data upload even local network outage

### Managing wherever you are and whatever you want

- Mobile APP platform
- Working mode adjustable
- Inverter parameters are adjustable

### Smart Online Service System (OSS)



Growatt Online Smart Service (OSS in short) system is a smart customer service platform, which can offer a quick support for service, lowering service costs for both Growatt installers and distributors. With the help of Growatt OSS, service engineers almost can handle 60%+ problems by remote configuration and FW updating without on-site service.