P O W E R

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T O M O -

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GR-CA-026-02

powering tomorrow

Growatt

Off-grid Energy Storage Solutions

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

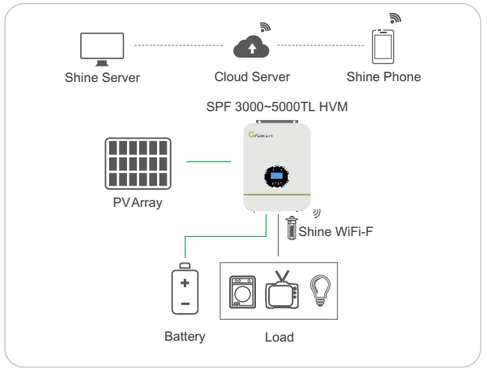
- Integrated MPPT Controller
- The priority of grid supply and photovoltaic power can be set
- Compatible with lead acid and lithium batteries
- Optional Wi-Fi or GPRS remote communication module
- Supports up to 6 single-phase or three-phase machines in parallel

System Diagram

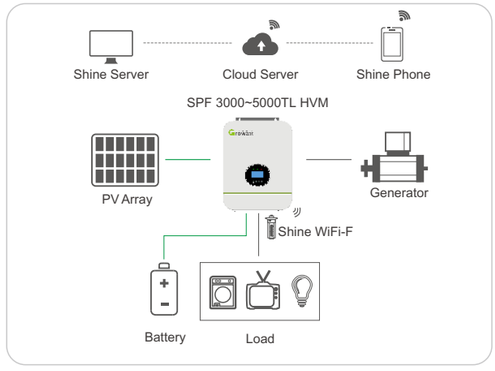
A. Single inverter basic application

AC cable | DC cable | COM cable

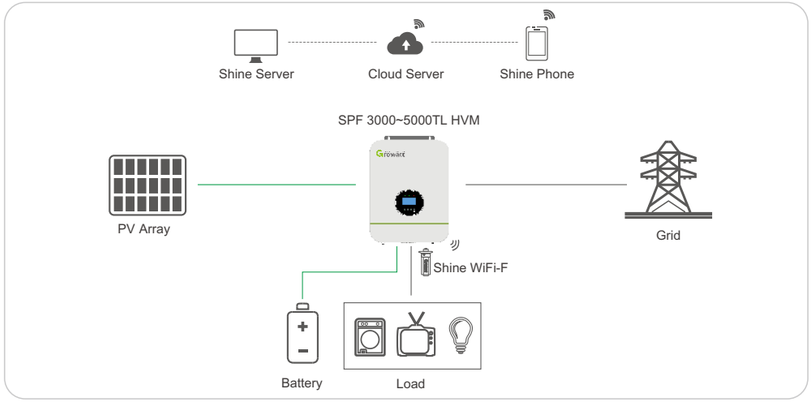
01 Only PV application



02 PV+generator application

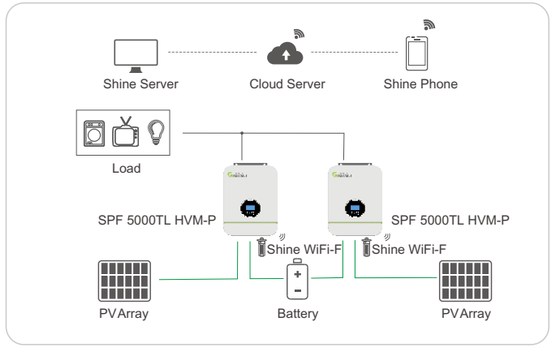


03 PV+grid supply application

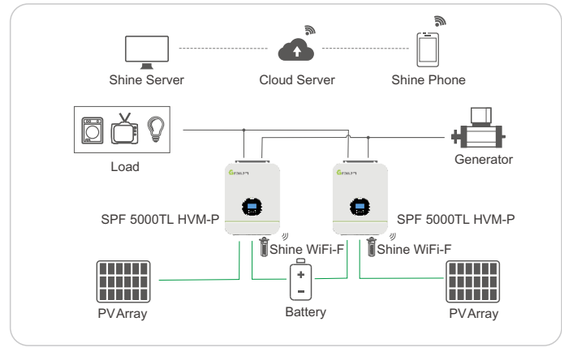


B. Single-phase parallel application

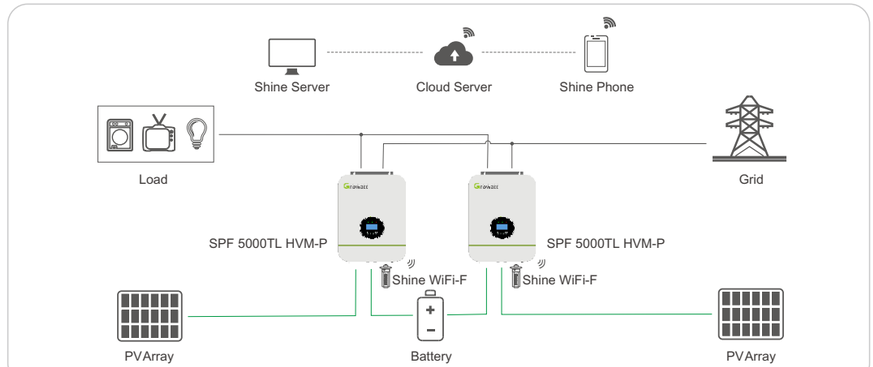
01 Only PV application



02 PV+generator application

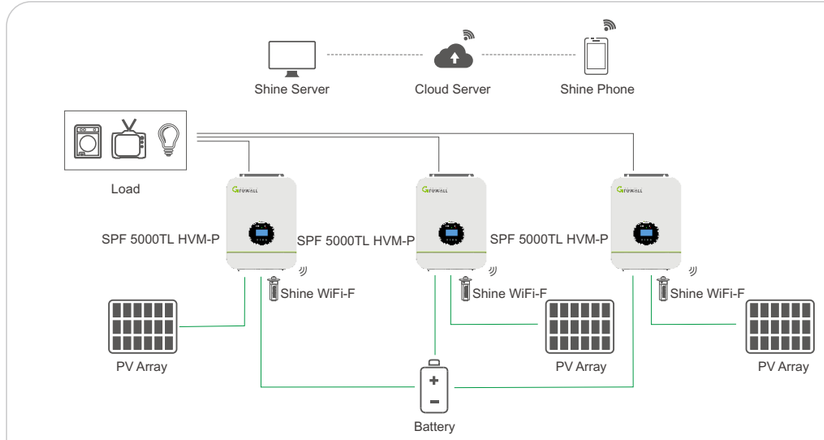


03 PV+grid supply application

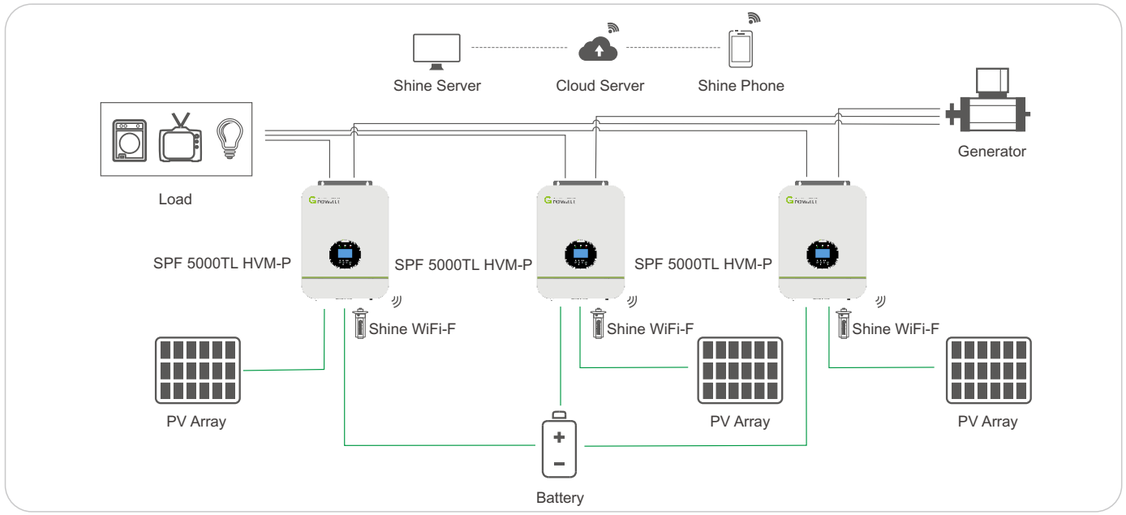


C. Three-phase parallel application

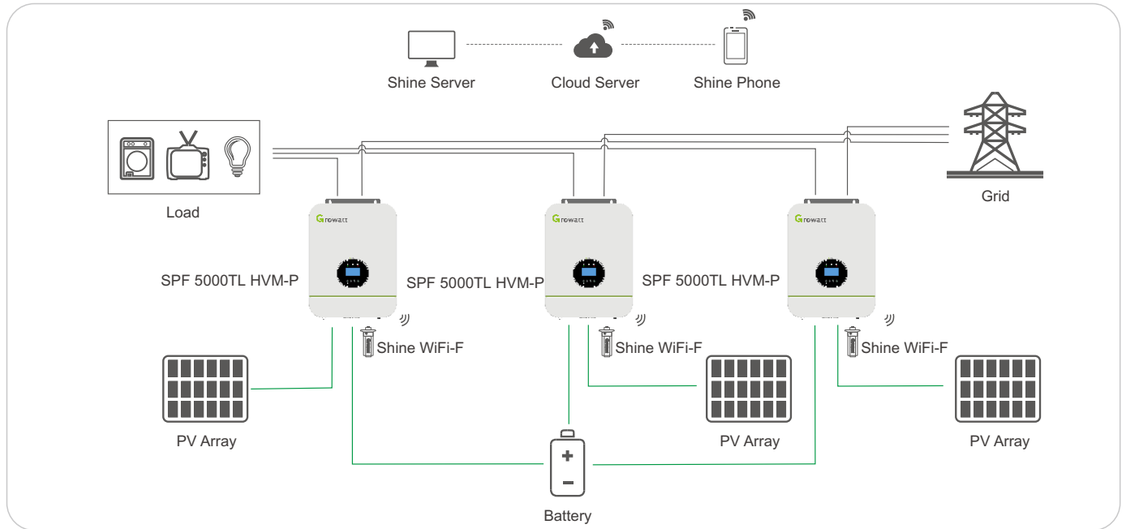
01 Only PV application



02 PV+generator application

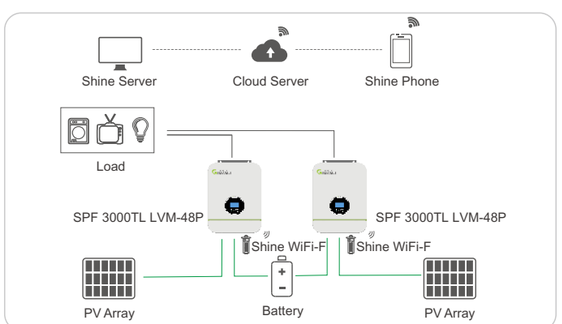


03 PV+grid supply application

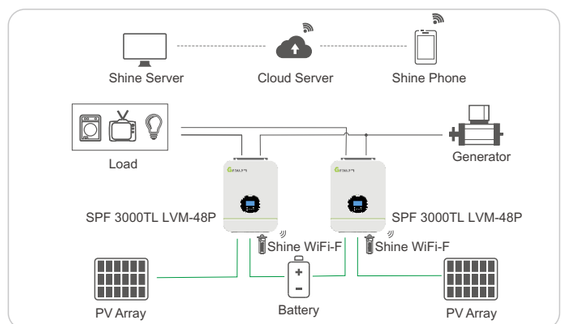


D. Split-phase parallel application (only SPF 3000TL LVM) application

01 Only PV application



02 PV+generator 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	
Battery Type	Lead-acid	Lithium/Lead-acid	
INVERTER OUTPUT			
Rated Power	3000VA/ 3000W		5000VA/ 5000W
Parallel Capability	No		No/ Yes，6 units maximum
AC Voltage Regulation (Battery Mode)	230VAC ± 5% @ 50/60Hz		
Surge Power	6000VA		10000VA
Efficiency (Peak)	93%		
Waveform	Pure sine wave		
Transfer Time	10ms typical, 20ms Max		
SOLAR CHARGER			
Maximum PV Array Power	1500W	1800W	4500W
MPPT Range @ Operating Voltage	30VDC ~ 80VDC	60VDC ~ 115VDC	
Maximum PV Array Open Circuit Voltage	102VDC	145VDC	
Number of Independent MPP Trackers/ Strings Per MPP Tracker	1/1		
Maximum Solar Charge Current	50A	30A	80A
Maximum Efficiency	98%		
AC CHARGER			
Charge Current	30A	15A	60A
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			
Protection Degree	IP20		
Dimension (W/H/D)	315/400/130mm		350/455/130mm
Net Weight (kgs)	8.5		11.5
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
Battery Type	Lead-acid	Lithium/Lead-acid
INVERTER OUTPUT		
Rated Power	3000VA/ 3000W	
Parallel Capability	Yes, 6 units maximum	
AC Voltage Regulation (Battery Mode)	120VAC ± 5% @ 50/60Hz	
Surge Power	6000VA	
Efficiency (Peak)	93%	
Waveform	Pure sine wave	
Transfer Time	10ms typical, 20ms Max	
SOLAR CHARGER		
Maximum PV Array Power	2000W	4500W
MPPT Range @ Operating Voltage	30VDC ~ 115VDC	60VDC ~ 115VDC
Maximum PV Array Open Circuit Voltage	145VDC	
Number of Independent MPP Trackers/ Strings Per MPP Tracker	1/1	
Maximum Solar Charge Current	80A	
Maximum Efficiency	97%	
Standby Power Consumption	2 W	
AC CHARGER		
Charge Current	60A	40A
AC Input Voltage	120 VAC	
Selectable Voltage Range	95-140 VAC (For Personal Computers) ; 65-140 VAC (For Home Appliances)	
Frequency Range	50Hz/60Hz (Auto sensing)	
PHYSICAL		
Protection Degree	IP20	
Dimension (W/H/D)	350/455/130mm	
Net Weight (kgs)	11	
OPERATING ENVIRONMENT		
Humidity	5% to 95% Relative Humidity(Non-condensing)	
Operating Temperature	0°C - 55°C	
Storage Temperature	-15°C - 60°C	

Solutions

Application scenarios of the high frequency inverter (Wide PV range)

Wide PV range series inverter is off-grid inverter for back-up power and self-consumption application , maximum PV input voltage up to 450Vdc, also it can work without battery that indirect savings in investment cost.

Product Features
(SPF 5000TL HVM-WPV)

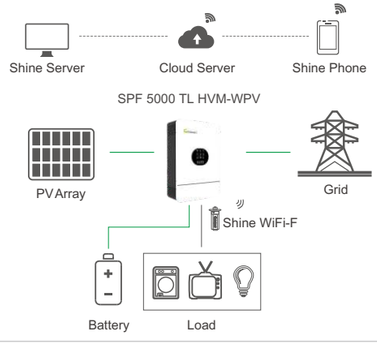
- Integrated MPPT charge controller
- Maximun PV input voltage up to 450VDC
- Configurable grid or solar input priority
- Optional WIFI/ GPRS remote monitoring
- Parallel for scalability

Product Features
(SPF 5000 ES)

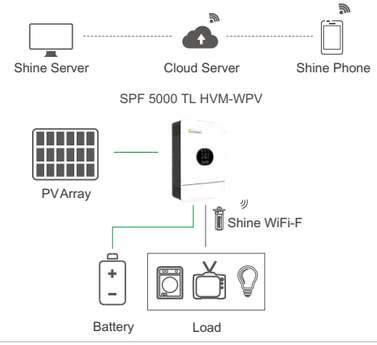
- Integrated MPPT charge controller
- It can work with battery or without battery
- Maximun PV input voltage up to 450VDC
- Configurable grid or solar input priority
- Optional WIFI/ GPRS remote monitoring
- Parallel for scalability
- Equalization charging function
- Timing charging and output function

System Diagram

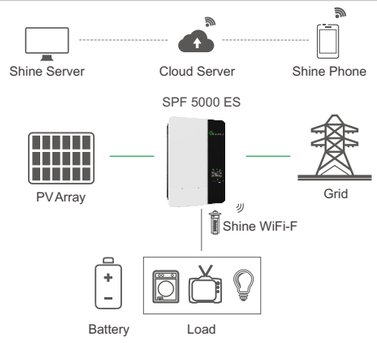
01 PV+ grid supply appliction



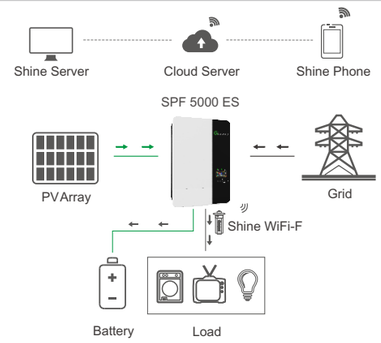
02 Only PV application



01 Without battery mode appliction



02 SUB mode application



SPF 5000TL HVM-WPV

High frequency,
wide PV input voltage, 230Vac output

Datasheet	SPF 5000TL HVM-WPV/WPV-P
Battery Voltage	48VDC
Battery Type	Lithium/Lead-acid
INVERTER OUTPUT	
Rated Power	5000VA/ 5000W
Parallel Capability	No/ Yes, 6 units maximum
AC Voltage Regulation (Battery Mode)	230VAC ± 5% @ 50/60Hz
Surge Power	10000VA
Efficiency (Peak)	93%
Waveform	Pure sine wave
Transfer Time	10ms typical, 20ms Max
SOLAR CHARGER	
Maximum PV Array Power	5500W
MPPT Range @ Operating Voltage	120VDC ~ 430VDC
Maximum PV Array Open Circuit Voltage	450VDC
Number of Independent MPP Trackers/ Strings Per MPP Tracker	1/1
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	
Protection Degree	IP20
Dimension (W/H/D)	330/485/135mm
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 5000 ES

High frequency,
wide PV input voltage, 230Vac output

Datasheet	SPF 5000 ES
Battery Voltage	48VDC
Battery Type	Lithium/Lead-acid
INVERTER OUTPUT	
Rated Power	5000VA/ 5000W
Parallel Capability	Yes, 6 units maximum
AC Voltage Regulation (Battery Mode)	230VAC ± 5% @ 50/60Hz
Surge Power	10000VA
Efficiency (Peak)	93%
Waveform	Pure sine wave
Transfer Time	10ms typical, 20ms Max
SOLAR CHARGER	
Maximum PV Array Power	6000W
MPPT Range @ Operating Voltage	120VDC ~ 430VDC
Maximum PV Array Open Circuit Voltage	450VDC
Number of Independent MPP Trackers/ Strings Per MPP Tracker	1/1
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	
Protection Degree	IP20
Dimension (W/H/D)	330/485/135mm
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

Solutions

Application scenarios of the low frequency inverter

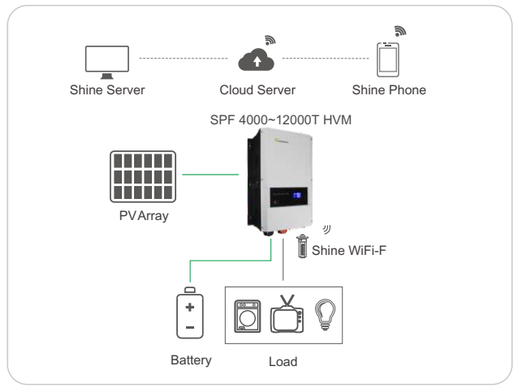
Suitable for the area with many impact loads (like motors) but without or in shortage of electricity, and areas suffering from power instability.

Product Features

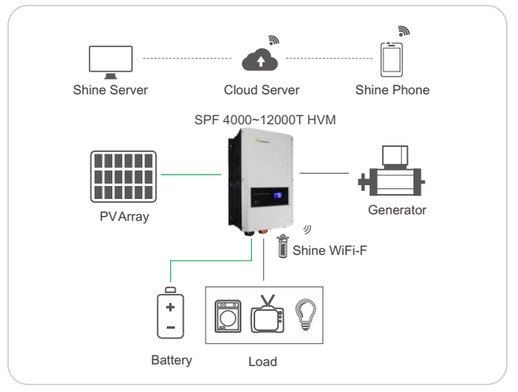
- Integrated MPPT Controller
- Built-in power frequency transformer, strong impact resistance
- The priority of grid supply and photovoltaic power can be set.
- Optional Wi-Fi or GPRS remote communication module
- Split-phase 120 V/240 V AC output (Only SPF 4000-12000T DVM)

System Diagram

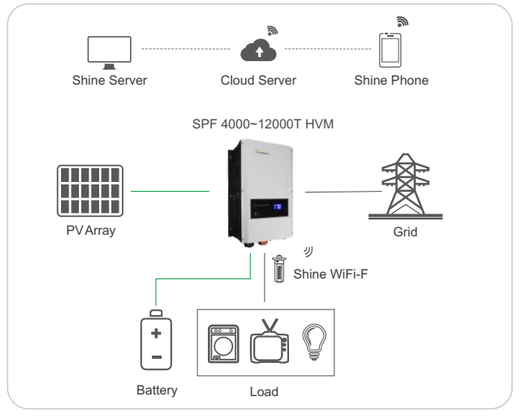
01 Only PV application



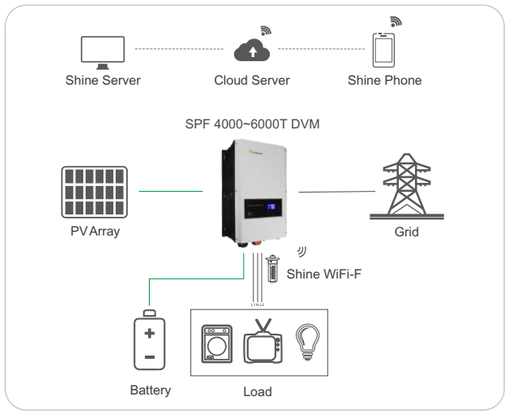
02 PV+generator application



03 PV+grid supply application



04 Split-phase application



SPF 4000T~12000T DVM

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

Datasheet	SPF 4000T DVM	SPF 5000T DVM	SPF 6000T DVM	SPF 8000T DVM	SPF 10000T DVM	SPF 12000T DVM
Battery Voltage	48VDC					
Battery Type	Lithium/Lead-acid					
INVERTER OUTPUT						
Rated Power	4KW	5KW	6KW	8KW	10KW	12KW
Surge Rating	12KW	15KW	18KW	24KW	30KW	36KW
Waveform	Pure sine wave/ same as input (bypass mode)					
Nominal Output Voltage RMS	104-110-115-120/208-220-230-240VAC(optional)					
Output Frequency	50Hz/60Hz +/-0.3 Hz					
Inverter Efficiency(Peak)	>85%					
Transfer Time	10ms(max)					
SOLAR CHARGER						
Maximum PV Charge Current	80A			120A		
Maximum PV Array Power	5000W			7000W		
Number Of Independent MPP Trackers/ Strings Per MPP Tracker	1/1			2/1		
MPPT Range @ Operating Voltage(VDC)	60~145VDC			60~145VDC		
Maximum PV Array Open Circuit Voltage	150VDC			150VDC		
Maximum Efficiency	>98%			>98%		
AC INPUT						
Voltage	230VAC					
Selectable Voltage Range	184~272VAC(UPS);154~272VAC(APL)					
Frequency Range	50Hz/60Hz (Auto sensing)					
Max. Charging Current	40A	50A	60A	70A	80A	100A
MECHANICAL SPECIFICATIONS						
Protection Degree	IP20					
Dimensions (W/H/D)	360/540/218mm	360/540/218mm	360/540/218mm	380/650/225mm	380/650/225mm	380/650/225mm
Weight (kgs)	42	47	52	64	66	75
OPERATING ENVIRONMENT						
Operation Temperature Range	0°C to 45°C					

SPF 4000T~12000T HVM

Low frequency, 230Vac output

Datasheet	SPF 4KT HVM	SPF 5KT HVM	SPF 6KT HVM	SPF 8KT HVM	SPF 10KT HVM	SPF 12KT HVM
Battery Voltage	48VDC	48VDC	48VDC	48VDC	48VDC	48VDC
Battery Type	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid
INVERTER OUTPUT						
Rated Power	4KW	5KW	6KW	8KW	10KW	12KW
Surge Rating	12KW	15KW	18KW	24KW	30KW	36KW
Waveform	Pure sine wave/ same as input(bypass mode)					
Nominal Output Voltage RMS	220V/230V/240VAC(+/-10% RMS)					
Output Frequency	50Hz/60Hz +/-0.3 Hz					
Inverter Efficiency(Peak)	>85%			>88%		
Line Mode Efficiency	>95%					
Power Factor	1.0					
Transfer Time	10ms typical, 20ms Max					
SOLAR CHARGER						
Maximum PV Charge Current	80A			120A		
Maximum PV Array Power	5000W			7000W		
Number Of Independent MPP Trackers/ Strings Per MPP Tracker	1/1			2/1		
MPPT Range @ Operating Voltage(VDC)	60~145VDC					
Maximum PV Array Open Circuit Voltage	150VDC					
Maximum Efficiency	>98%					
AC INPUT						
Voltage	230VAC					
Selectable Voltage Range	154~272VAC(for appliances);184~272VAC(for UPS)					
Frequency Range	50Hz/60Hz (Auto sensing)					
Maximum Charge Current	40A	50A	60A	70A	80A	100A
MECHANICAL SPECIFICATIONS						
Protection Degree	IP20					
Dimensions (W/H/D)	360/540/218mm			380/650/255mm		
Net Weight (kgs)	38	41	45	64	66	75
OPERATING ENVIRONMENT						
Operation Temperature Range	0°C to 45°C					

Solutions

Application scenarios of the MPPT controller

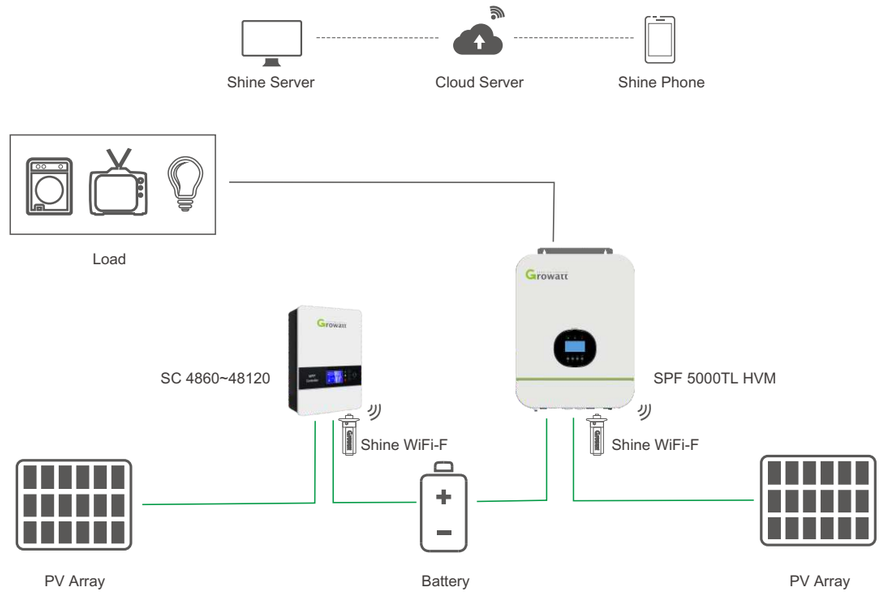
Suitable for the areas needs long backup time also without or in shortage of electricity, and areas suffering from power instability.

Product Features

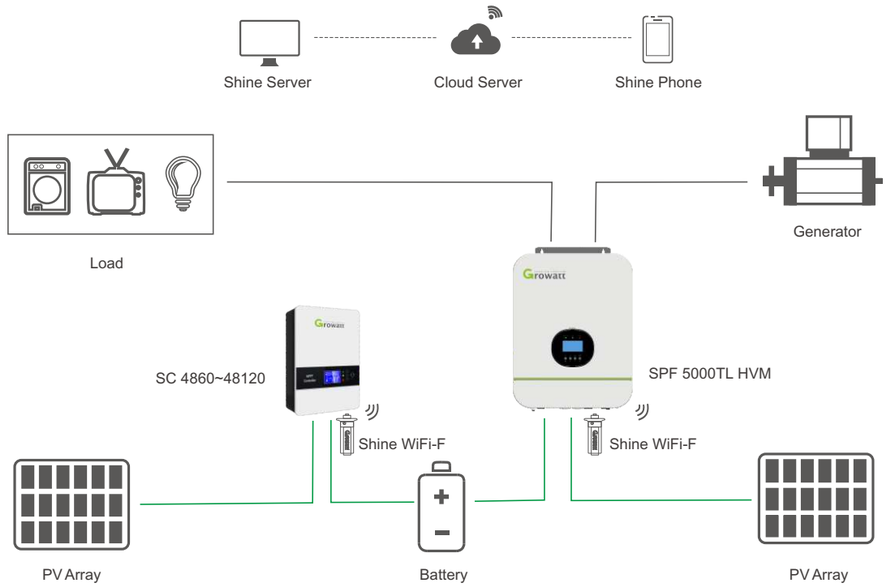
- 12 V/24 V/48 V battery voltage automatically adapted
- Compensation function for battery temperature
- Optional Wi-Fi or GPRS remote communication module

System Diagram

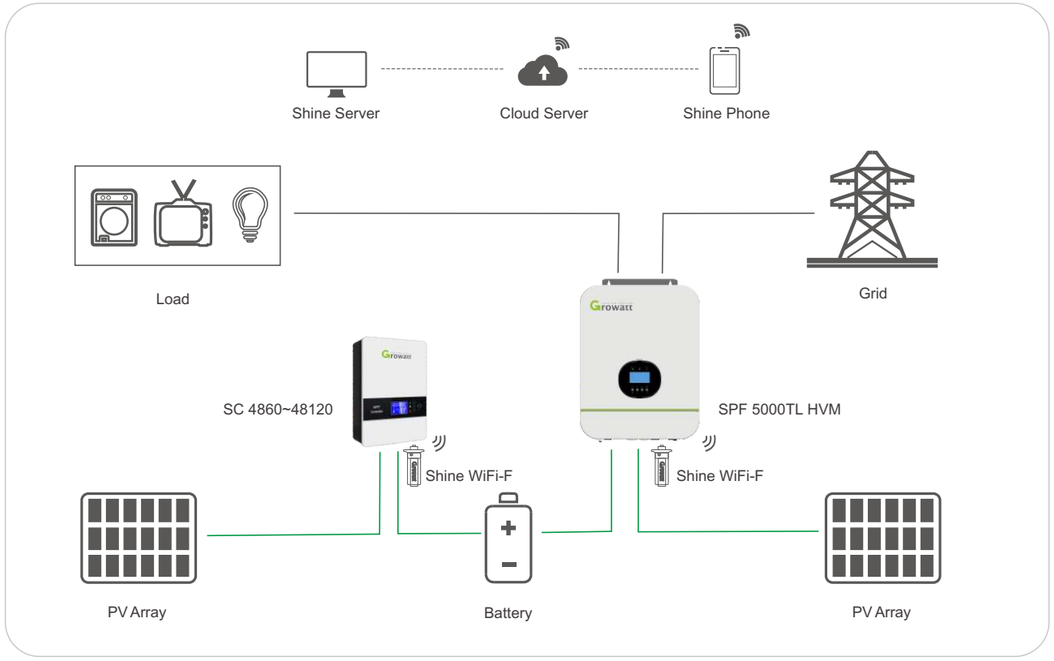
01 Only PV expansion application



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			
ELECTRICAL				
PV OPerating Voltage	18~50Vdc@12V 34~100Vdc@24V 60~145Vdc@48V			
Max.PV Open Circuit Voltage	150Vdc			
Max.PV Input Power	1000W@12V 2000W@24V 4000W@48V	1250W@12V 2500W@24V 5000W@48V	1500W@12V 3000W@24V 6000W@48V	1750W@12V 3500W@24V 7000W@48V
Max.Charging Current	60A	80A	100A	120A
Self Consumption	2W			
MPPT Efficiency	99.5%			
Conversion Efficiency	97.5%			
Protection	Overload,high voltage, high temperature protection			
BATTERY CHARGING				
Battery Type	Sealed: AGM, Gel, Flooded,User define			
Charging Algorithm	3-stage: Bulk, Absorption, Float, Equalize			
Bulk Charge Voltage	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			
Temperature Compensation	-5mV/°C /2V with BTS(Optional)			
CONMMUNICATION				
Conmmunication Port	USB			
MECHANICAL				
Net Weight (kgs)	3	3.2	3.9	4.1
Gross Weight (kgs)	3.7	3.9	4.5	4.7
Dimensions (W/H/D)	177/277/99mm		197/302/99mm	
Packing Dimensions	380/270/170			
Cooling	Fan cooling			
Protection Degree	IP20			
ENVIRONMENT				
Ambient Temperature	-25~60℃(Derating from 45℃)			
Storage Temperature	-40℃~+80℃			
Humidity	100% non-condensing			

Solutions

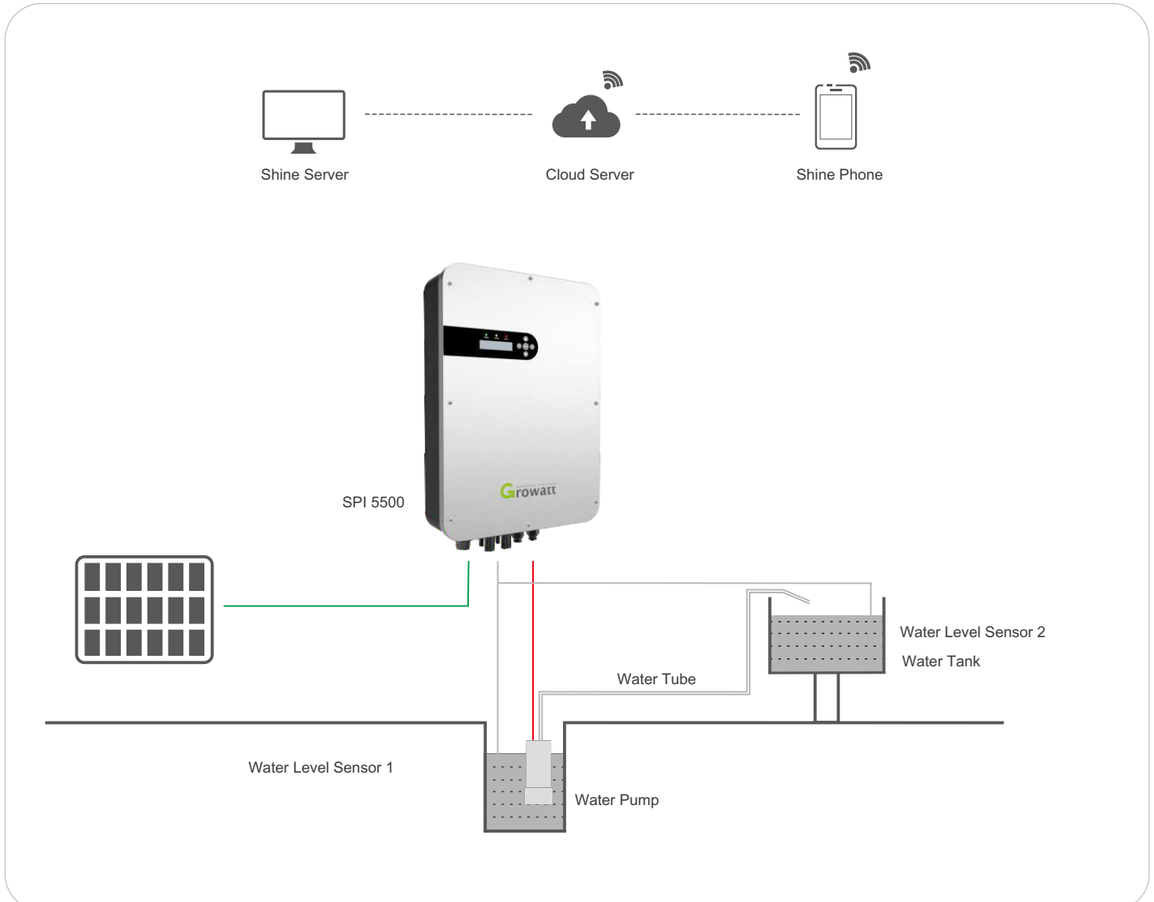
Application scenarios of the pump inverter

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			
Recommend PV power	3600W	4800W	6600W	9000W	11000W	13200W	15600W	18000W	22200W	26500W
Recommend Pump Capacity	2.2KW(3HP)	3KW(4HP)	3.7KW(5HP)	5.5KW(7.5HP)	7.5KW(10HP)	9.2KW(12.5HP)	11KW(15HP)	13KW(17.5HP)	15KW(20HP)	18.5KW(25HP)
Max. DC Input Voltage (Vdc)	900V									
Recommed MPP Votage (Vdc)	500-680V									
Protection Degree	IP65									
Weight (kgs)	14			15			16		22	
Demension (W/H/D)	325/478 /155mm			346/563/148mm			405/533/190mm			
Operation Temperature Range	0℃ to 60℃									

US 2000

2.4 kWh lithium battery module

Datasheet	Growatt US2000
BATTERY DATA	
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)
GENERAL DATA	
Dimension (W/H/D)	410/440/88.5mm
Weight (kgs)	24
Working Temperature	0°C~50°C
Storage Temperature	0°C~45°C
FEATURES	
Design Life	10 Years (25°C/77°F)
Cycle Life	>4500 (25°C, 90% DoD)
Single String Quantity	8pcs
Communication Port	CAN / RS485
TÜV , CE , UN38.3	

GBLI6531 Lithium battery

6.5 kWh lithium battery module

Datasheet	Growatt GBLI6531
BATTERY DATA	
Nominal Voltage	51.2V
Normal Capacity	6.5kWh
Usable Capacity	6kWh
Operating Voltage	48 ~ 57.6V
Charging/Discharging Current	64A 96A (Max)
Rated Discharging Power	3.3KW
MAX Discharging Power	4.2KW,5KW(Peak 3S)
GENERAL DATA	
Dimension (W/H/D)	475/765/145mm
Weight (kgs)	57.5
Protection Degree	IP55
Working Temperature	-10°C~+45°C
Storage Temperature	-20°C~+45°C
FEATURES	
DoD	94.5%
Cycle Life	>6000 (25°C, 90% DOD)
Single String Quantity	1-2pcs
Communication Port	CAN2.0 / RS485
Warranty	10 Years
IEC62619 , CE , UN38.3	

* When the temperature is below 0 ℃ or above 45℃, the performance will be limited.

Shine WiFi-F

Monitoring devices

Datasheet	WiFi-F
GENERAL DATA	
Dimensions(W/H/D)	79/135/29mm
Weight	63g
Manual Language	English, Chinese
WIRELESS PARAMETERS	
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.)
HARDWARE PARAMETERS	
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 (Acess Point); station mode (with soft AP)
Security Mechanisms	WEP / WPA-PSK / WPA2-PSK
Encryption	WEP64 / WEP128 / TKIP / AES
APPLICATION ON PARAMETERS	
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

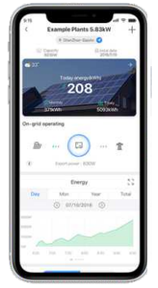
Datasheet	GPRS-F
GENERAL DATA	
Dimensions (W/H/D)	79/135/29mm
Weight	70g
Language	English, Chinese
WIRELESS PARAMETERS	
Wireless Type	GPRS
GRM / GPRS /EDGE Frequency Range	850/900/1800/1900 MHz
Antenna Gain	3dbi
Max. Output Power: GSM850 / GRM900	2W; DCS1800/PCS1900:1W
Speed	Max. 85.6Kbps(DL); Max 42.8Kbps(UL)
HARDWARE PARAMETERS	
Serial Port Speed	9600bps
Operating Voltage	5V(+/-15%)
Operating Current	1A
Operating Temperature	-30°C ... +65°C
Storage Temperature	-40°C ... +70°C
APPLICATION PARAMETERS	
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 Interva	5 Mins(1-15 adjstable)
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.

ShineServer



ShinePhone

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 adjustab e
- Inverter parameters are adjustable

Smart Online Service System (OSS)

OSS platform

APP platform

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.

OFF-GRID ENERGY STORAGE SYSTEM

▶ 15KW Three phse system ▶ South Africa ▶ SPF 5000TL HVM-P

▶ 5KW Single phase Lithiem battery

▶ Nigeria

▶ SPF 5000TL HVM

▶ 15KW Three phase system ▶ China ▶ SPF 5000TL HVM-P

OFF GRID SYSTEM

▶ 30kW ▶ Afghanistan ▶ SPF 3000~5000 HVM-P

▶ 30kW

▶ South Africa

▶ SPF 5000TL HVM-P