



PV Inverter

- Grid-tied Inverter
- Off Grid Inverter w/backup
- Hybrid Inverter w/backup
- Power Management

POWER
NEVER ENDS

About FSP

FSP, a leading power supply manufacturer with more than 23 years dedicated in power industry. Strong RD resource is one of our advantages, 8 RD centers and more than 500 professional engineers providing high reliability, high efficiency designed products in order to meet various demands. Providing clean and high efficiency products is always one of our goals, all products from FSP are in compliance with worldwide latest safety and efficiency request.

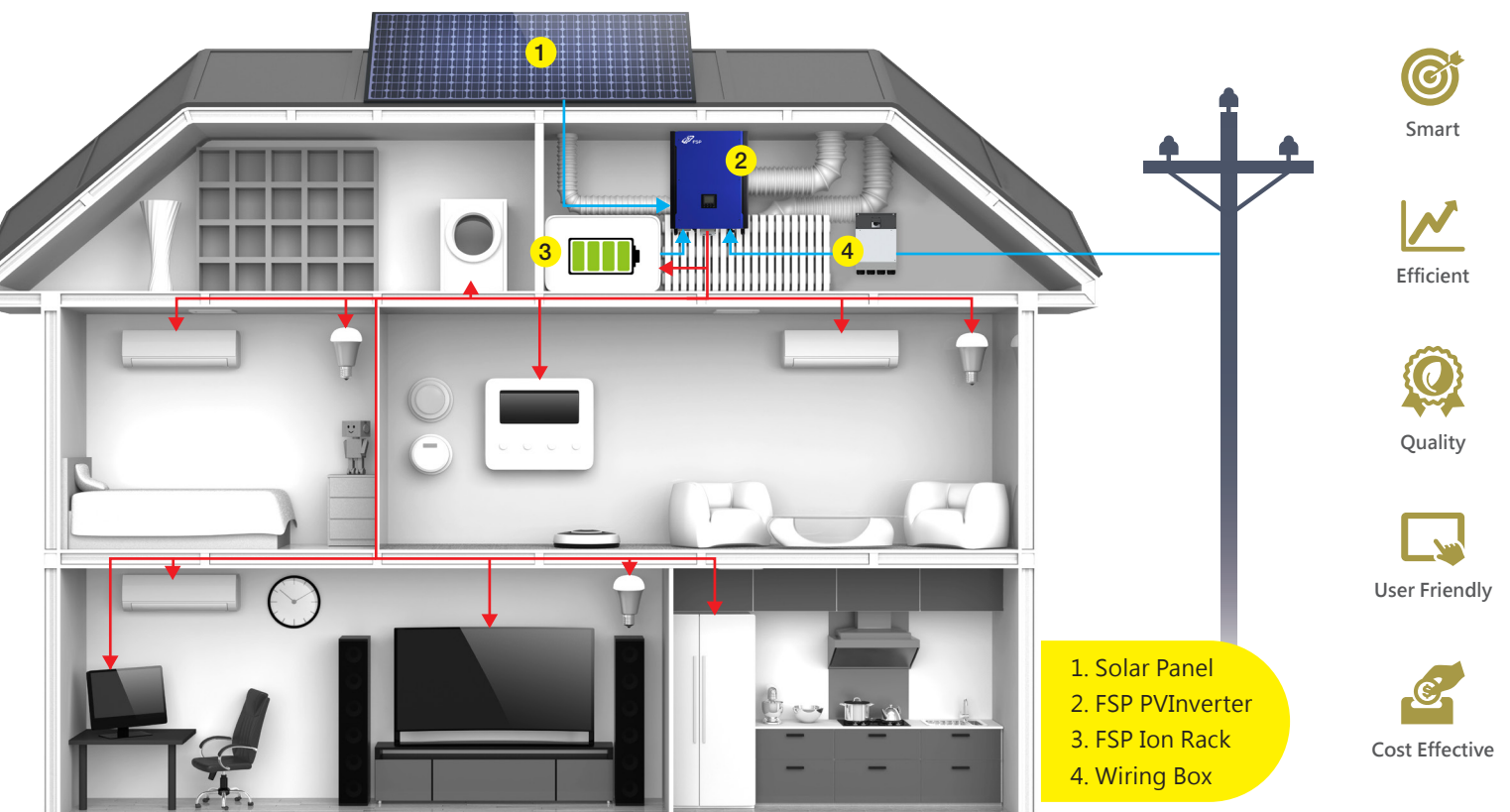
Established : April, 1993

Headquarters : Taiwan, Taoyuan

Quality Certification : ISO 9001, ISO 13485, ISO 14001, ISO 14064-1, OHSAS 18001, QC 080000, EICC

Listed on Taiwan Stock Exchange in 2002

Global Service Locations : 28 Sales offices/ 4 Manufacturers/ 8 R&D Centers



Safety and efficiency:

- Scalable and flexible to extend the power system
- Peak efficiency 96%; EU efficiency 95%

Quality assurance:

Quality, continual improvement and customer satisfaction are personal responsibility of each engineering team.

- FSP strict selected components from top globe vendors
- Solid phase-gate quality control and monitoring

Easy monitoring:

- User friendly LCD display window
- Communication via Modbus, SNMP and relay cards.
- Real time remote control

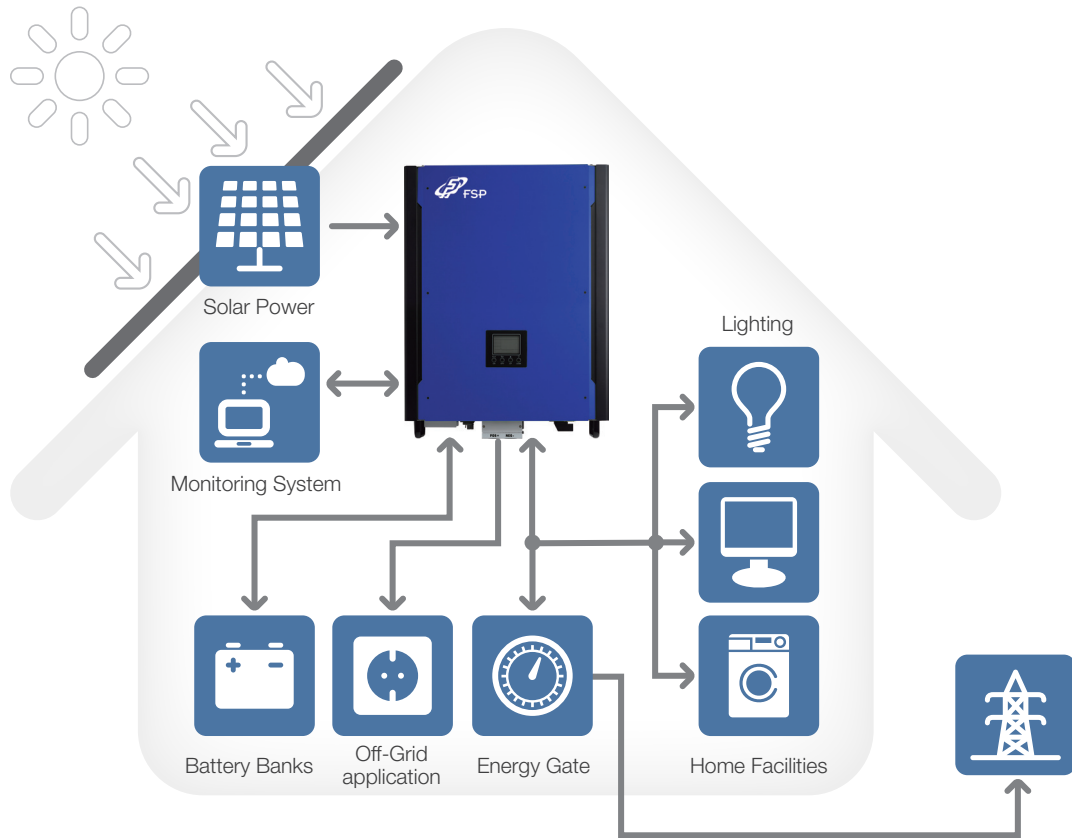
Certifications:



VDE-AR-N 4105
VDE 0126-1-1
SAA, EN62109

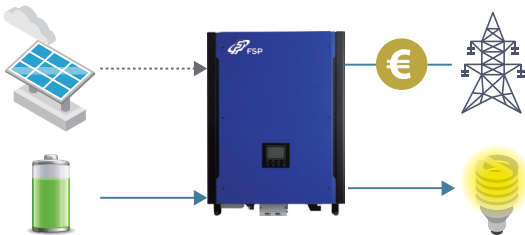
IEC62040,
IEC 61000-6-3,
IEC 61000-6-2

FSP Green Energy Solution for Smart Home



Feed-in priority

HySpirit series, an intelligent design for more options to utilize Solar Energy, it is not just conventional PV inverter Feed-in only, but also energy storage and Loads supporting.



Self consumption priority/ Load shifting

Depend on your cost demand, HySpirit can offer you a difference choice for self-consumption or load shifting automatically via battery banks and/or Solar power without utility power to save your money and/or reduce energy bill.



Alike Uninterruptible Power Supply

Off-grid operation is also available for HySpirit. When utility is outage or disconnection, it will switch to backup mode and keep supporting power to your facilities.





- Programmable multiple operation modes: Grid-tie, off-grid and grid-tie with backup
- Pure sinewave and programmable priority for Battery or Grid
- Self-consumption and Feed-in to the grid
- User-adjustable charging current and voltage
- Monitoring software for real-time status display and control
- Parallel operation up to 6 units only available for 10k model

HySpirit Grid-tied & Off Grid Inverter Specification

Model Number	FSP302PV-230H-48	FSP103PV-230TH-48
Grid system	Single Phase, 230Vac	Three Phase, 230/400Vac
Rated power	3,000W	10,000W
Max. PV input power	4,500W	14,800W
Operating PV voltage range	116 - 500Vdc	320 - 900Vdc
MPPT voltage range (Full Power)	250 - 450Vdc	400 - 800Vdc
Number of MPPT	1	2
Max. input current (DC)	18A	37.2 A (18.6A per MPPT)
Max. input current (AC)	30A	40A
Grid-Tied Characteristic		
Output voltage range	184 – 264Vac	184 – 264Vac per phase
Nominal output current	13A	14.5A per phase
Power factor range	0.9 lead – 0.9 lag	
THDi	< 4%	
Efficiency (PV to Grid)	> 96%	> 96%
CEC weighted efficiency (PV to Grid)	> 95%	> 95%
Off-Grid Characteristic		
AC start up voltage	120 -140Vac per phase	
Feed in voltage range	170 - 280Vac per phase	
Auto wake up voltage	180Vac	180Vac per phase
Max. AC input current	30A	40A
Output waveform	Pure sinewave	
THDv	< 4%	
Efficiency (PV to AC)	93%	91%
Efficiency (Battery to AC)	93%	91%
Charging Characteristic		
Max. charging power	1,200W	9,600W
Max. charging current	5 – 25A programmable, default 25A	10 – 200A programmable, default 60A
Nominal Battery voltage	48Vdc	48Vdc
Battery voltage range	40 – 60Vdc	40 – 60Vdc
Max. discharging Current	92A	275A
Night time power consumption	<30W	
Physical & Environment Data		
Operating ambient temp range	0°C to 40°C	-10°C - 55°C*
Humidity	0 - 90%, non-condensing	
Altitude	0 - 1000m**	0 - 2000m**
Dimensions (W x H x D)	438 mm x 480 mm x 107 mm	500 mm x 622 mm x 168 mm
Net weight	16kg	45 kg
Protect function	Overload, short circuit, over / under voltage, high temperature	
Cooling	Air forced	
Enclosure environmental rating	IP20	IP20
Interface		
HMI	LCD display	
Comm. port	RS232/ USB	RS232/ USB and CAN
Optional smart card	SNMP, Modbus, and AS400	
Features		
Monitoring software	SolarPower	
Compliance	IEC 61000-6-3, IEC 61000-6-2, VDE V 0126-1-1, VDE-AR-N 4105, EN62109 · IEC62040	

*Power derating above 50°C

** Power derating 1% per 100m while higher than 1000m

*Product specification are subject to change w/o further notice



- Smart independent MPPTs to enhance to 97% high -conversion efficiency
- Advanced DSP technology
- Modular design for easy maintenance
- Industrial-grade components implemented and IP 65 protection for outdoor and harsh environment
- User-adjustable charging current and voltage
- Monitoring software for real-time status display and control

Spirit Grid-tied Inverter Specification

Model Number	FSP302PV-230	FSP502PV-230
Grid system	Single Phase, 230Vac	
Rated power	3,000W	4,600W
Max. PV input power	3,200W	5,000W
Operating PV voltage range	125 - 500Vdc	125 - 500Vdc
MPPT voltage range (Full Power)	250 - 500Vdc	180 - 500Vdc
Number of MPPT	1	2
Max. input current	13A	30 A (15A per MPPT)
Grid-Tied Characteristic		
Feed in voltage range	184 – 264Vac	
AC frequency	50 Hz/ 60 Hz (Auto)	
Power factor (> 50% load)	>0.99	
THDi	< 4%	
Efficiency (PV to Grid)	>97%	>97%
CEC weighted efficiency (PV to Grid)	>96%	>96.5%
Nominal/ Max. output current	13A/ 17A	20A/ 25A
Physical & Environment Data		
Operating ambient temp range	-25°C to 60°C *	
Humidity	0 - 100%, non-condensing	
Altitude	0 - 1000m**	
Dimensions (W x H x D)	270 mm x 450 mm x 155 mm	310 mm x 515 mm x 185 mm
Net weight	13kg	21 kg
Protect function	Ground fault, short circuit, over current, high temperature	
Cooling	Natural	
Enclosure environmental rating	IP65	
Interface		
HMI	LCD display	
Comm. port	RS232/ USB card	
Optional smart card	SNMP card, Modbus card & Modbus server	
Features		
Monitoring software	Yes	
Compliance	IEC 61000-6-2:2005, IEC 61000-6-3:2007 +A1:2011 VDE V 0126-1-1, VDE-AR-N 4105, IEC/EN62109-2:2011, IEC/EN62109-1:2010	

*When temperature exceed 80°C, output power will de-rate according to the below formula:
 $P = P_{Rating} \times [110\% - (T - 80) \times 10\%]$

**Power derating 1% per 100m while higher than 1000m

*Product specification are subject to change w/o further notice



- Scalable: Parallel operation up to 6 units only available for 5KVA
- Selectable input voltage range for PC or home appliances
- Built-in MPPT charger controller and selectable charging current based on your applications
- Smart battery charging algorithm to optimize battery life
- Configurable AC/Solar input priority via LCD panel
- Compatible to mains or generators
- Auto restart while AC back and cold start function available
- Overload and short circuit protection

EssenSolar Off Grid Inverter Specification

Model Number	FSP102PV-230F-48	FSP302PV-230F-48	FSP502PV-230F-48
Grid system	Single Phase, 230Vac		
Rated power	1,000VA/ 1,000W	3,000VA/ 2,400W	5,000VA/ 4,000W
Max. PV input power	900W	900W	4,000W
Max. PV voltage (OC)	102Vdc	102Vdc	145Vdc
MPPT voltage range (Full Power)	60 - 88Vdc	60 - 88dc	60 - 115Vdc
Number of MPPT	1	1	1
Input Characteristic			
AC voltage	Single Phase, 230Vac		
Selectable Voltage Range	170-280 Vac (For PC/ SPS applications)	90-280 Vac (For home facilities)	
Frequency range	50 Hz/ 60 Hz (Auto)		
Output Characteristic			
AC voltage regulation @ backup mode	230Vac \pm 5%		
Surge ability	2,000VA	6,000VA	10,000VA
Transfer time	10 ms (For PC/ SPS) ; 20 ms (For home facilities)		
Output waveform	Pure sinewave		
Peak Efficiency (PV to AC)	95%	95%	95%
Efficiency (Battery to AC)	90%	90%	90%
Charging Characteristic			
Max. charging power	860W	860W	6,720W
Max. charging current	18A	18A	140A
Max. PV charging current	18A	18A	80A
Max. AC charging current	15A	15A	60A
Nominal Battery voltage	48Vdc	48Vdc	48Vdc
Over charge protection	62Vdc	62Vdc	60Vdc
Battery floating voltage	54Vdc	54Vdc	54Vdc
Rated backup time w/ 48V/ 100Ah (min)	186	63	40
Max. Efficiency (PV to Battery)	98%	98%	98%
Night time power consumption	<2W		
Physical & Environment Data			
Operating ambient temp range	0°C - 55°C		
Humidity	5 - 95% RH, non-condensing		
Altitude	0 - 1000m		
Dimensions (W x H x D)	272 mm x 355 mm x 100 mm	272 mm x 355 mm x 100 mm	295 mm x 468 mm x 120 mm
Net weight	7kg	7.5kg	11 kg
Protect function	Overload, short circuit, over voltage, high temperature		
Cooling	Air forced		
Enclosure environmental rating	IP20		
Interface			
HMI	LCD display		
Communication port	USB	USB	RS232
Dry contact port	Yes	Yes	Yes
Optional accessories	Remote control panel, Parallel kits (Only for 5k model)		
Features			
Monitoring software	Yes		
Compliance	IEC 55022 Class A		IEC 62109, IEC 60950,
Certification	CE		



- Scalable: Parallel operation up to 6 units only available for 4k & 5KVA
- Selectable input voltage range for PC or home appliances
- Smart battery charging algorithm to optimize battery life
- Configurable AC/Solar input priority via LCD panel
- Compatible to mains or generators
- Auto restart while AC back and cold start function available
- Overload and short circuit protection

Expert Off Grid Inverter Specification

Model Number	FSP202PV-230FW-24	FSP302PV-230FW-24	FSP402PV-230FW-48	FSP502PV-230FW-48
Grid system	Single Phase, 230Vac			
Rated power	2,000VA/ 1,600W	3,000VA/2400W	4,000VA/ 3,200W	5,000VA/ 4,000W
Max. PV input power	900W		900W	4,000W
Max. PV voltage (OC)	60Vdc	60Vdc	105Vdc	105Vdc
Number of MPPT	0	0	0	0
Input Characteristic				
AC voltage	Single Phase, 230Vac			
Selectable Voltage Range	170-280 Vac (For PC/ SPS applications)		90-280 Vac (For Home facilities)	
Frequency range	50 Hz/ 60 Hz (Auto)			
Output Characteristic				
AC voltage regulation @ backup mode	230Vac \pm 5%			
Surge ability	4,000VA	6,000VA	8,000VA	10,000VA
Transfer time	10 ms (For PC/ SPS) ; 20 ms (For home facilities)			
Output waveform	Pure sinewave			
Peak Efficiency (PV to AC)	95%	95%	95%	95%
Efficiency (Battery to AC)	90%	90%	90%	90%
Charging Characteristic				
Max. charging power	1,200W	1,200W	5,280W	5,280W
Max. charging current	50A	50A	110A	110A
Max. PV charging current	50A	50A	50A	50A
Max. AC charging current	30A	30A	60A	60A
Nominal Battery voltage	24Vdc	24Vdc	48Vdc	48Vdc
Over charge protection	31Vdc	31Vdc	60Vdc	60Vdc
Battery floating voltage	27Vdc	27Vdc	54Vdc	54Vdc
Rated backup time w/ 100Ah (min)	50	28	50	40
Night time power consumption	<2W			
Physical & Environment Data				
Operating ambient temp range	0°C - 55°C			
Humidity	5 - 95% RH, non-condensing			
Altitude	0 - 1000m			
Dimensions (W x H x D)	272 mm x 355 mm x 100 mm		295 mm x 468 mm x 120 mm	
Net weight	6.5kg	7kg	9.8kg	9.8kg
Protect function	Overload, short circuit, over voltage, high temperature			
Cooling	Air forced			
Enclosure environmental rating	IP20			
Interface				
HMI	LCD display			
Communication port	USB		RS232	
Dry contact port	Yes			
Optional accessories	Remote control panel, Parallel kits (Only for 4k & 5k model)			
Features				
Monitoring software	Yes			
Compliance	IEC 55022 Class A		IEC 60950,	
Certification	CE			