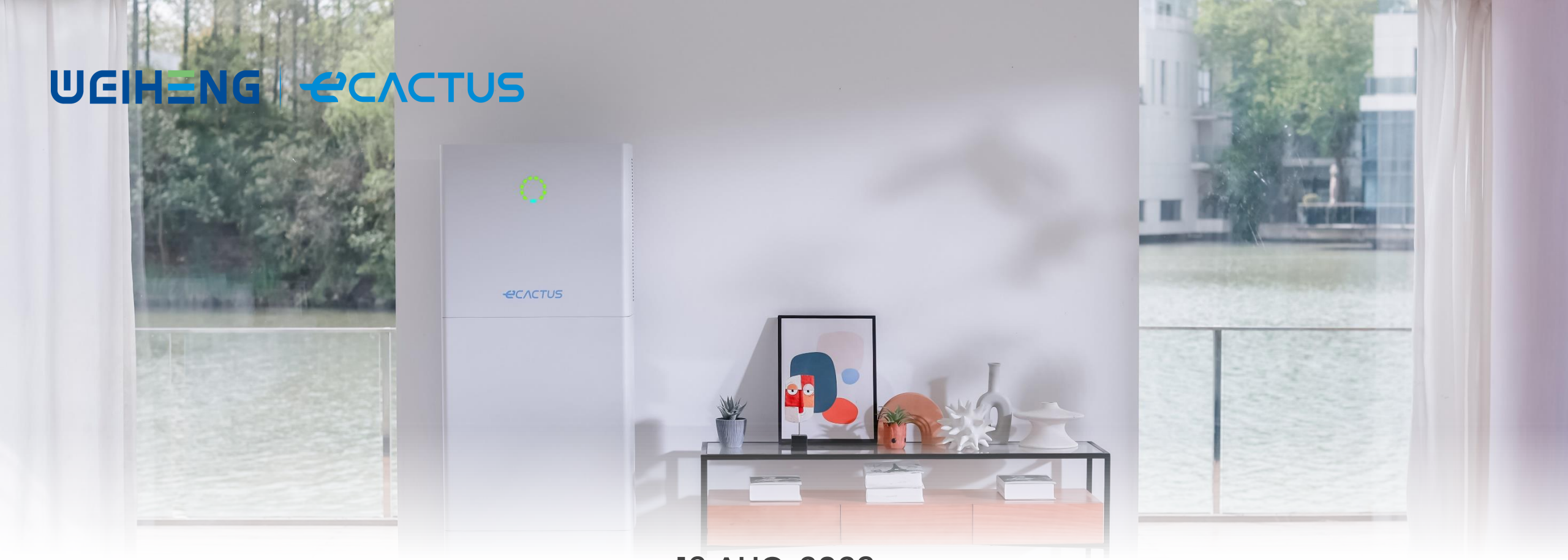

16 AUG, 2023

Technical Training V2.2.2 Product

Overseas Service Department
Jiangsu Weiheng Intelligent Technology Co., Ltd.

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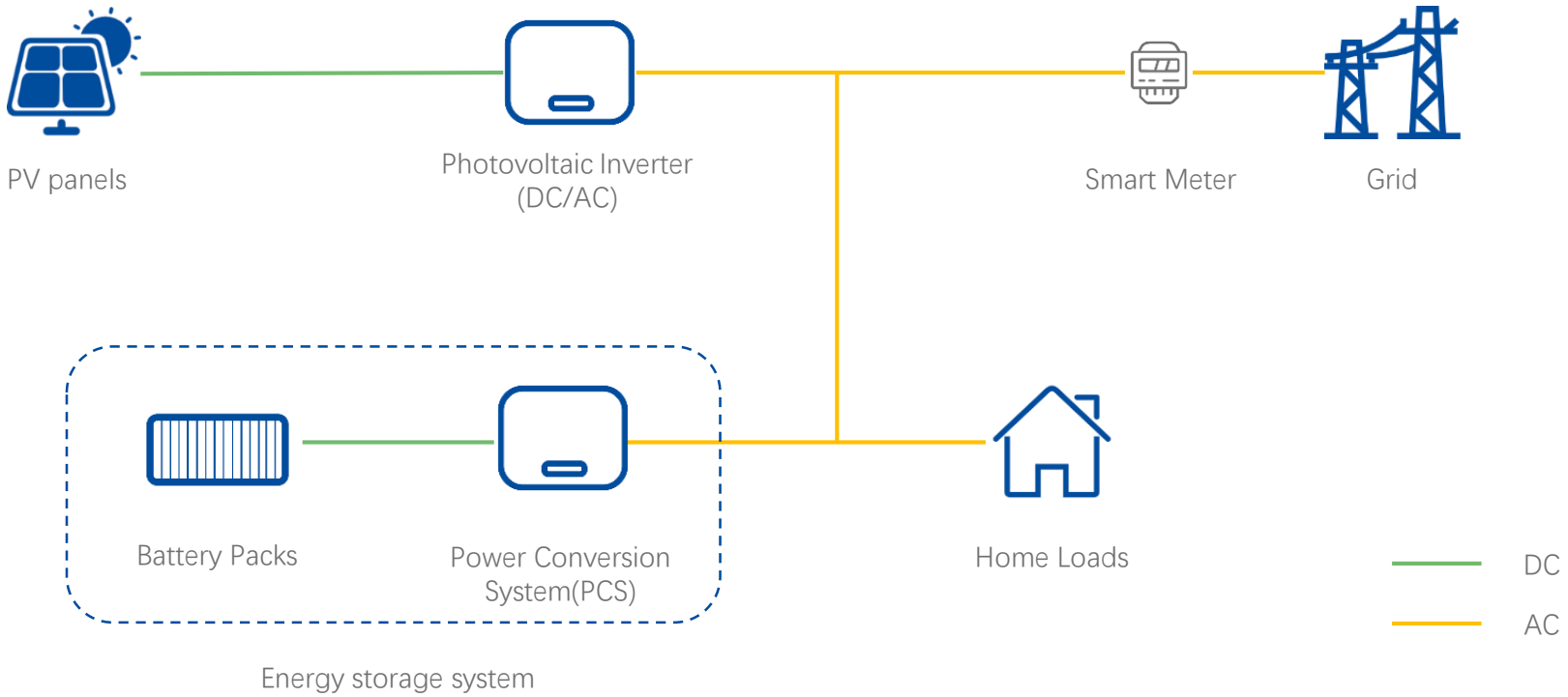
Content

Household PV+ESS composition

Hole system consists of PV panels, Inverter, Energy storage system , Home Loads (Including EPS loads), Grid



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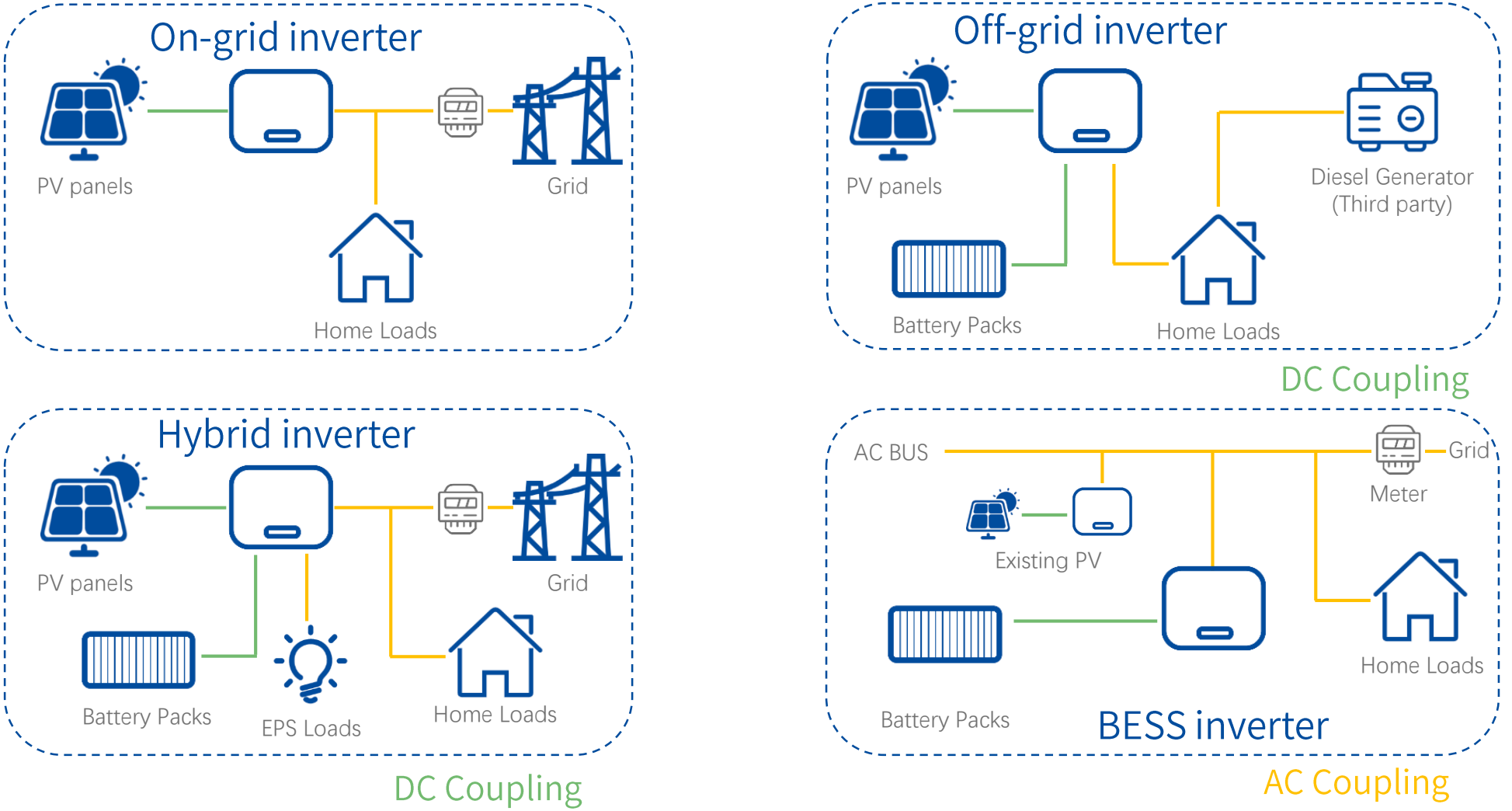
Inverter types

On-grid inverter, off-grid inverter, Hybrid inverter and BESS inverter



Inverter types

Difference between On-grid inverter, off-grid inverter, and Hybrid inverter

On-grid inverter

PV connected
Feed-in power to grid
No off-grid function
Stop working when grid power outage.
No EPS port
No Battery port

Off-grid inverter

PV connected
Support grid connected
NO feed-in power to grid
With output port
With Battery port
NO EPS function

Hybrid inverter

PV connected
Feed-in power to grid
With EPS port and EPS function
With Battery port
On-grid/off-grid switching
Back-up mode

WEIHENG **Hybrid-inverter** Products

Copia SH/TH

Single/Three phase
Hybrid PV inverter
EPS port (10ms Switching Time)
Battery port
2 MPPT
IP 65 Protection
25dB Noise
AC Coupling/DC coupling

Agave SH all-in-one

Single Phase
With Battery storage system
EPS port (10ms Switching Time)
Battery inside
2 MPPT
IP 65 Protection
25dB Noise
5.12kWh/10.24kWh
AC Coupling/DC coupling

Agave SH Plus all-in-one

Single phase
With Battery storage system
EPS port (10ms Switching Time)
Battery inside
2 MPPT
IP 65 Protection
25dB Noise
Up to 26.4kWh
AC Coupling/DC coupling

PV panel parameters and Inverter parameters

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Photovoltaic panel module important parameters introduction correlating with INPUTs of inverter

PV panel parameters (Example)

Performance STC

Under Standard Test Conditions STC:
1000 W/m2; spectrum AM 1.5;
Cell temperature 25°C
Measurement tolerance STC:
Pmpp ±3%; Isc ±10%; Uoc ±10%

Nominal Power Pmpp (Wp)	260	265	270	275
Open Circuit Voltage Uoc (V)	38,08	38,25	38,42	38,60
Voltage Umpp (V)	30,57	30,80	31,03	31,26
Short Circuit Current Isc (A)	9,18	9,27	9,36	9,44
Current Impp (A)	8,56	8,65	8,74	8,82
Efficiency η (%)	15,5	15,8	16,1	16,4

Copia Inverter PV input parameters

Model	WH-SHC362	WH-SHC462	WH-SHC502	WH-SHC602
PV Input				
Absolute max Voltage (d.c.V)	600			
MPPT Voltage Range (d.c.V)	100..550			
Max. DC Input Power (W)	4800	6200	6650	8000
Start-up Voltage (d.c.V)	90			
Rated Operating Voltage (d.c.V)	360			
Max. Input Current (d.c.A)	12.5/12.5			
Max. inverter backfeed current to array (d.c.A)	0			
Isc PV (d.c.A)	18/18			
NO. of MPP Trackers	2			
NO. of Strings per MPP Tracker	1			

Device has two MPPT, so the panels should be split to two strings in case the PV power redundancy and wasted.

PV string parameters requirement

Photovoltaic panel installation requirement

One string total V_{oc} (STC) < 600 d.c.V	Otherwise machine will be in fault mode and not work.	mandatory
Panel I_{mpp} <12.5A	Otherwise machine will only input maximum 12.5A.	Optional
Panel short-circuit I_{sc} < 18A	PV I_{sc} should less than inverter I_{sc} PV input.	mandatory

How about this panel?

Answer?

1. Calculate PCS: 600V/37.5V=16, maximum 16 PCS.
2. Calculate Watt: because inverter Immp is 12.5A, so the panel input power is 31.6*12.5=395W, 3325/395=8.4 pcs. Each MPPT could connect 8 pcs panels. (< 15 pcs)

PCS: 8 pcs for one string or 9 pcs
Pmax input: 3160W for one string (9 pcs, 3325W)
MPPT input voltage: 252.8 V (9pcs, 284.4 V)

We can connect the panels with higher Immp over than 12.5A, but the machine only take 12.5A. Same as Power, excess will be wasted.

Panel parameters	Peak power (Pmax)	410 W
	MPPT Voltage (Vmpp)	31.6 d.c.V
	MPPT Current (Immp)	**13.0 A**
	Voc	37.5 d.c.V
	Isc	13.9 A

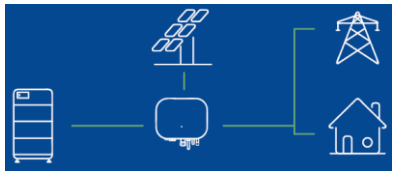
WH-SHC502 Inverter	Max input Voltage	600 d.c.V
	MPPT Voltage range	100-550 d.c.V
	Max DC input power	6650 W(2 MPPT)
	Max input current Immp	12.5 A
	Isc PV	18 A
	MPPT	2

Copia SH/TH Hybrid PV inverter

Single Phase

W×D×H 510*205*480

Operation Temp (°C): -25~+60
Ingress Protection: IP65
Noise Emission (dB): <25dB



Model	WH-SHC362	WH-SHC462	WH-SHC502	WH-SHC602	Three Phase Model
PV input					**PV input**
Max PV voltage (d.c.V)	600				1000
MPPT voltage (d.c.V)	100-550				180...980
MAX DC input power (W)	4800	6200	6650	8000	7600/9000/12000/15000/20000/20000
Max. Input Current (d.c.A)	12.5/12.5				18/18
Isc PV (d.c.A)	18/18				22/22
NO. of MPP Trackers	2				2
NO. of Strings per MPP Tracker	1				1
Battery					**Battery**
Battery Voltage Range (d.c.V)	80-500				160-700
Max. Charge/Discharge Current (d.c.A)	25				25
AC output					**AC output**
Rated output Power (W)	3600	4600	5000	6000	5000/6000/8000/10000/12000/13000
Max. Apparent Power from Grid (VA)	7200	9200	10000	12000	11000/13200/17600/17900/17900/17900
Rated Voltage (a.c.V)	220/230/240				3/N/PE;220/380 3/N/PE;230/400 3/N/PE;240/415
Rated Frequency (Hz)	50/60				50/60
EPS output					**EPS output**
Rated output Power (W)	3600	4600	5000	6000	5000/6000/8000/10000/12000/13000
Max. Apparent Power (VA)	4320	5520	6000	7200	10000/12000/16000/16000/16000/16000
Rated Voltage (a.c.V)	220/230/240				3/N/PE;220/380 3/N/PE;230/400 3/N/PE;240/415
Switch time (ms)	<10				<10

Over/Under voltage protection
Residual current detection
Battery Input reverse polarity protection
Over heat protection

DC isolation protection
Anti-islanding protection
PV reverse polarity protection

DC injection monitoring
Over load protection
Surge protection

Myrtillo Battery Packs

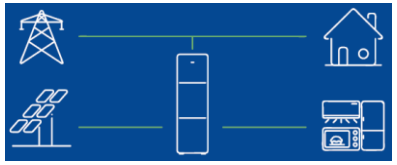
Item	WH-BMC102-5.12KWH
Rated Energy (kWh)	5.12
Usable Energy (kWh)	4.86
Configuration	1P32S
Rated Voltage (V)	102.4
Voltage Range (Vdc)	91.2~115.2
Rated Capacity (Ah)	50
Max. Charge/Discharge Current (A)	25/40
Communication	CAN/RS485
Scalability	Up to 8S
Humidity	≤95%
Operating Temperature (℃)	Charge: -10°C~50°C; Discharge: -20°C~50°C
Dimension (W/D/H)(mm)	646*330*188
Weight (kg)	<48
Installation Mode	Stack
Ingress Protection	IP55
Altitude (m)	<2000
Safety	UN38.3/IEC61000/IEC62619/CE
Cycle Life	6000 cycle @25°C, 95%DOD, 60%EOL
Design Life	15 years (25°C)

Agave SH all-in-one Hybrid inverter

Single Phase

W×D×H 550 × 233 × 1125mm
W×D×H 550 × 233 × 1750mm

Operation Temp (°C): -10~+55
Ingress Protection: IP65
Noise Emission (dB): <25dB



Model	WH-SPHA3.6H-5.12kWh WH-SPHA3.6H-10.24kWh	WH-SPHA4.6H-5.12kWh* WH-SPHA4.6H-10.24kWh*	WH-SPHA5.0H-5.12kWh WH-SPHA5.0H-10.24kWh	WH-SPHA6.0H-5.12kWh WH-SPHA6.0H-10.24kWh
PV input				
Max PV voltage (d.c.V)	600			
MPPT voltage (d.c.V)	100-550			
MAX DC input power (W)	4800	6200	6650	8000
Max. Input Current (d.c.A)	12.5/12.5			
Isc PV (d.c.A)	18/18			
NO. of MPP Trackers	2			
NO. of Strings per MPP Tracker	1			
Battery				
Battery Voltage Range (d.c.V)	**5.12kWh/10.24kWh**			
Nominal Battery Voltage (d.c.V)	204.8/409.6			
Max. Charge/Discharge Current (d.c.A)	25			
Depth of Discharge (%)	90%			
AC output				
Rated output Power (W)	3600	4600	5000	6000
Max. Apparent Power from Grid (VA)	7200	9200	10000	12000
Rated Voltage (a.c.V)	220/230/240			
Rated Frequency (Hz)	50/60			
EPS output				
Rated output Power (W)	3600	4600	5000	6000
Max. Apparent Power (VA)	4320	5520	6000	7200
Rated Voltage (a.c.V)	220/230/240			
Switch time (ms)	<10			

Over/Under voltage protection
Residual current detection
Battery Input reverse polarity protection
Over heat protection

DC isolation protection
Anti-islanding protection
PV reverse polarity protection
For details please check datasheet

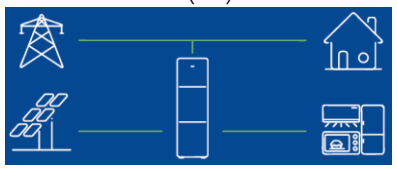
DC injection monitoring
Over load protection
Surge protection

Agave SH Plus all-in-one Hybrid inverter

Single Phase

W×D×H 600*425.5*1900 mm

Operation Temp (°C): -20~+50
Ingress Protection: IP65
Noise Emission (dB): <25dB



Model	WH-SHC362-13.2kWh/WH-SHC362-16.5kWh WH-SHC362-19.8kWh/WH-SHC362-23.1kWh WH-SHC362-26.4kWh	WH-SHC462-13.2kWh/WH-SHC462-16.5kWh WH-SHC462-19.8kWh/WH-SHC462-23.1kWh WH-SHC462-26.4kWh	WH-SHC502-13.2kWh/WH-SHC502-16.5kWh WH-SHC502-19.8kWh/WH-SHC502-23.1kWh WH-SHC502-26.4kWh	WH-SHC602-13.2kWh/WH-SHC602-16.5kWh WH-SHC602-19.8kWh/WH-SHC602-
PV input				
Max PV voltage (d.c.V)	600			
MPPT voltage (d.c.V)	100-550			
MAX DC input power (W)	4800	6200	6650	8000
Max. Input Current (d.c.A)	12.5/12.5			
Isc PV (d.c.A)	18/18			
NO. of MPP Trackers	2			
NO. of Strings per MPP Tracker	1			
Battery				
Battery Voltage Range (d.c.V)	**$LiFePO_4$ 13.2kWh/16.5kWh/19.8kWh/23.1kWh/26.4kWh**			
Max. Charge/Discharge Current (d.c.A)	25			
Depth of Discharge (%)	92%			
AC output				
Rated output Power (W)	3600	4600	5000	6000
Max. Apparent Power from Grid (VA)	7200	9200	10000	12000
Rated Voltage (a.c.V)	220/230/240			
Rated Frequency (Hz)	50/60			
EPS output				
Rated output Power (W)	3600	4600	5000	6000
Max. Apparent Power (VA)	4320	5520	6000	7200
Rated Voltage (a.c.V)	220/230/240			
Switch time (ms)	<10			

Over/Under voltage protection
Residual current detection
Battery Input reverse polarity protection
Over heat protection

DC isolation protection
Anti-islanding protection
PV reverse polarity protection
For details please check datasheet

DC injection monitoring
Over load protection
Surge protection

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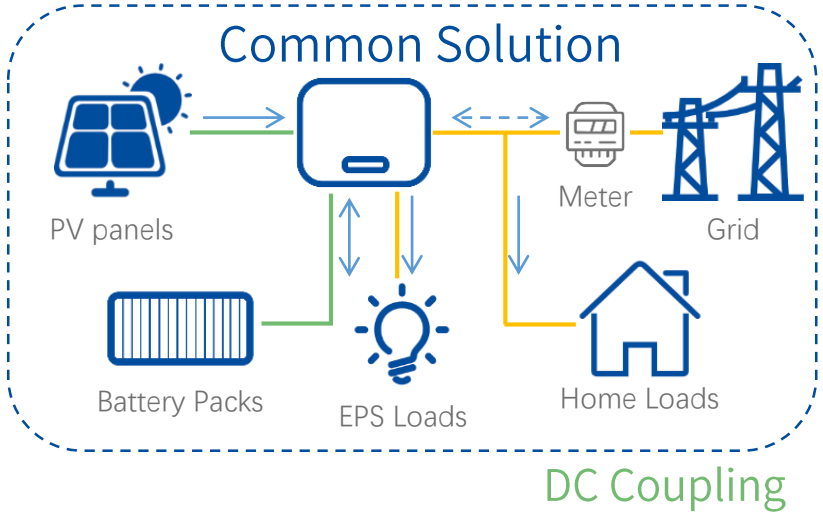
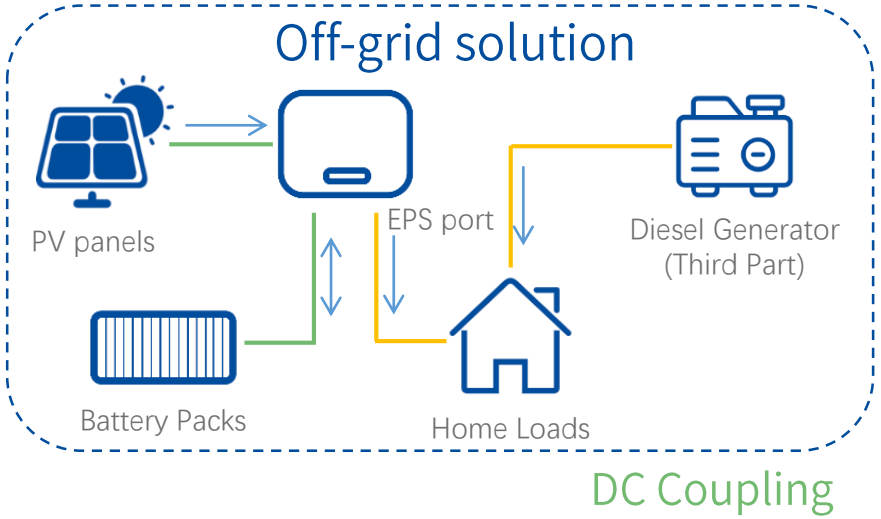
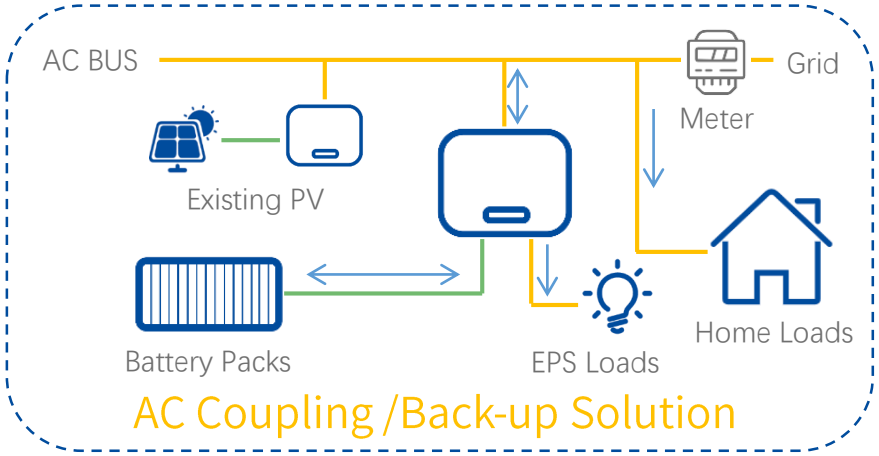
Content

Copia Product Solution





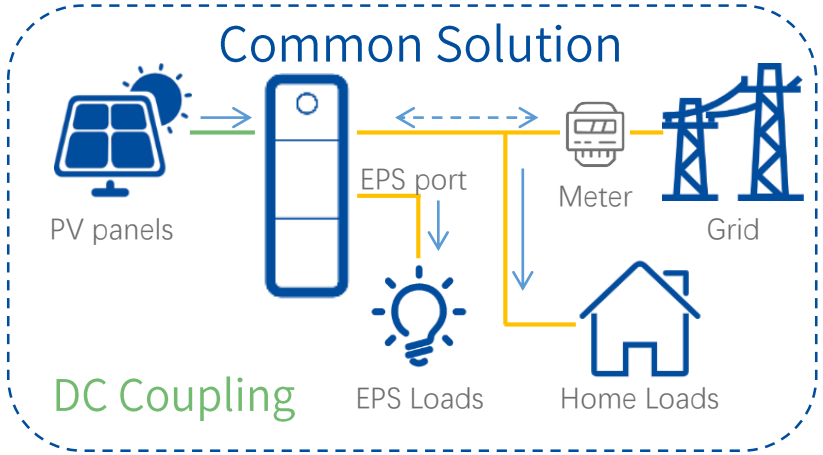
Backup mode:
When grid is outage, Home loads(non-critical) is powered off. The EPS port can output up to 6000W power to support the EPS loads within 10ms automatically. The EPS loads will continuously work until battery energy is exhausted and there is no stable PV power input.

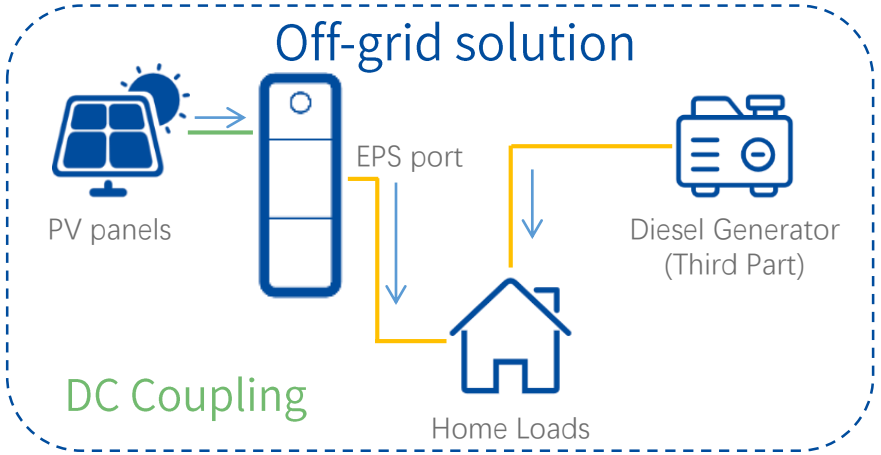


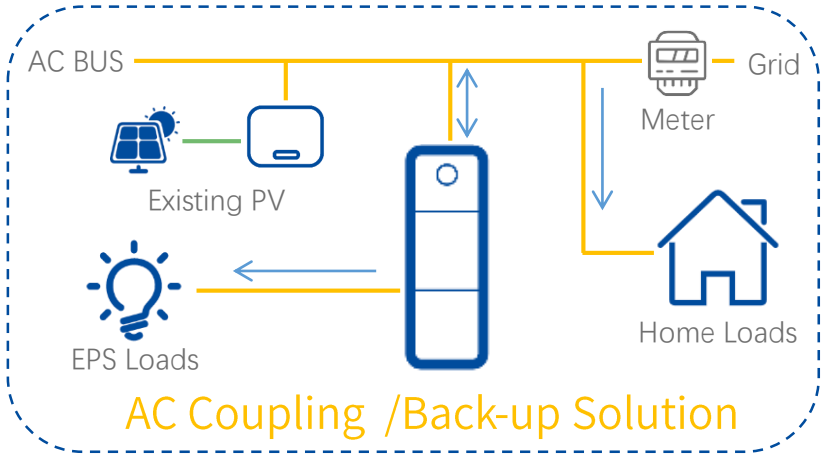
On-grid mode:
Smart energy center connects directly to the grid. Both EPS loads and Home loads (non-critical) are connected to the grid and can be powered up.

Power Flow
DC
AC

Agave Product Solution

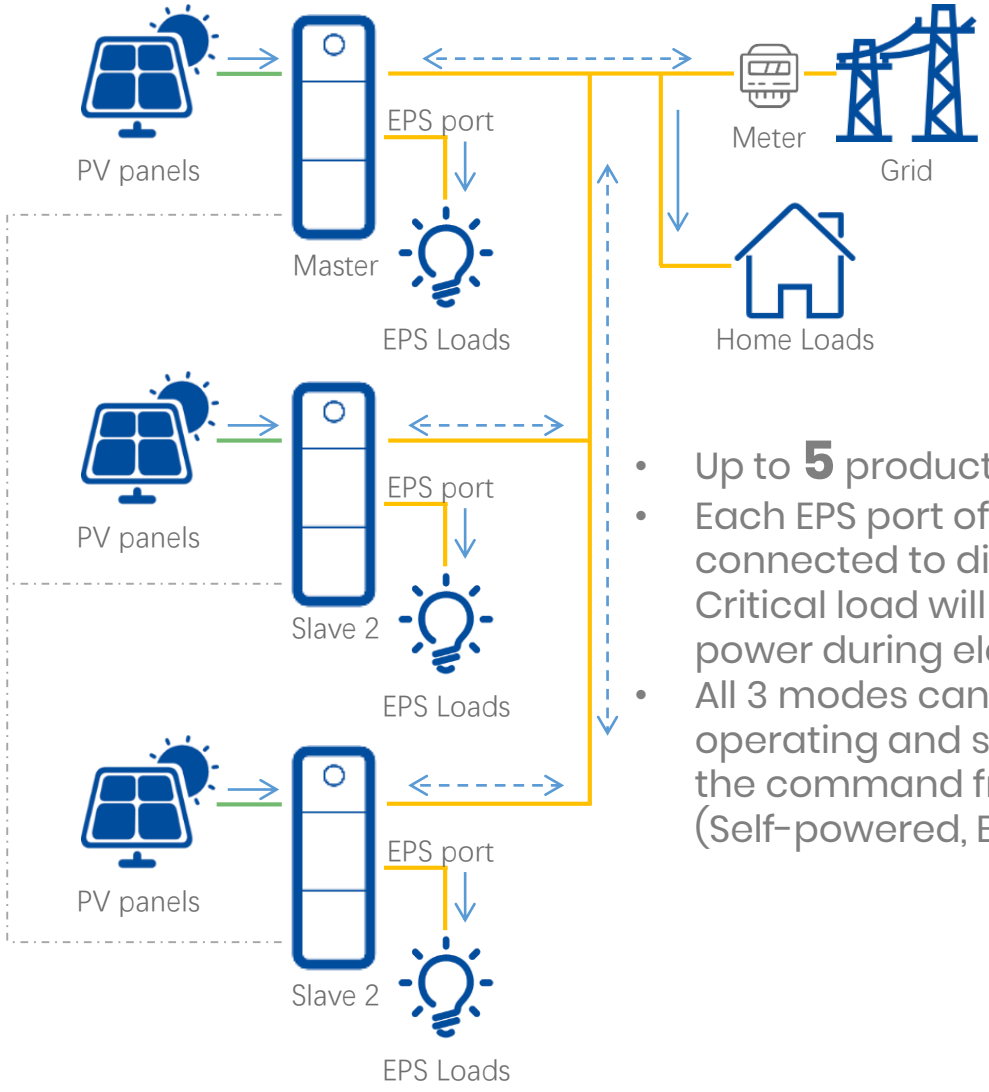




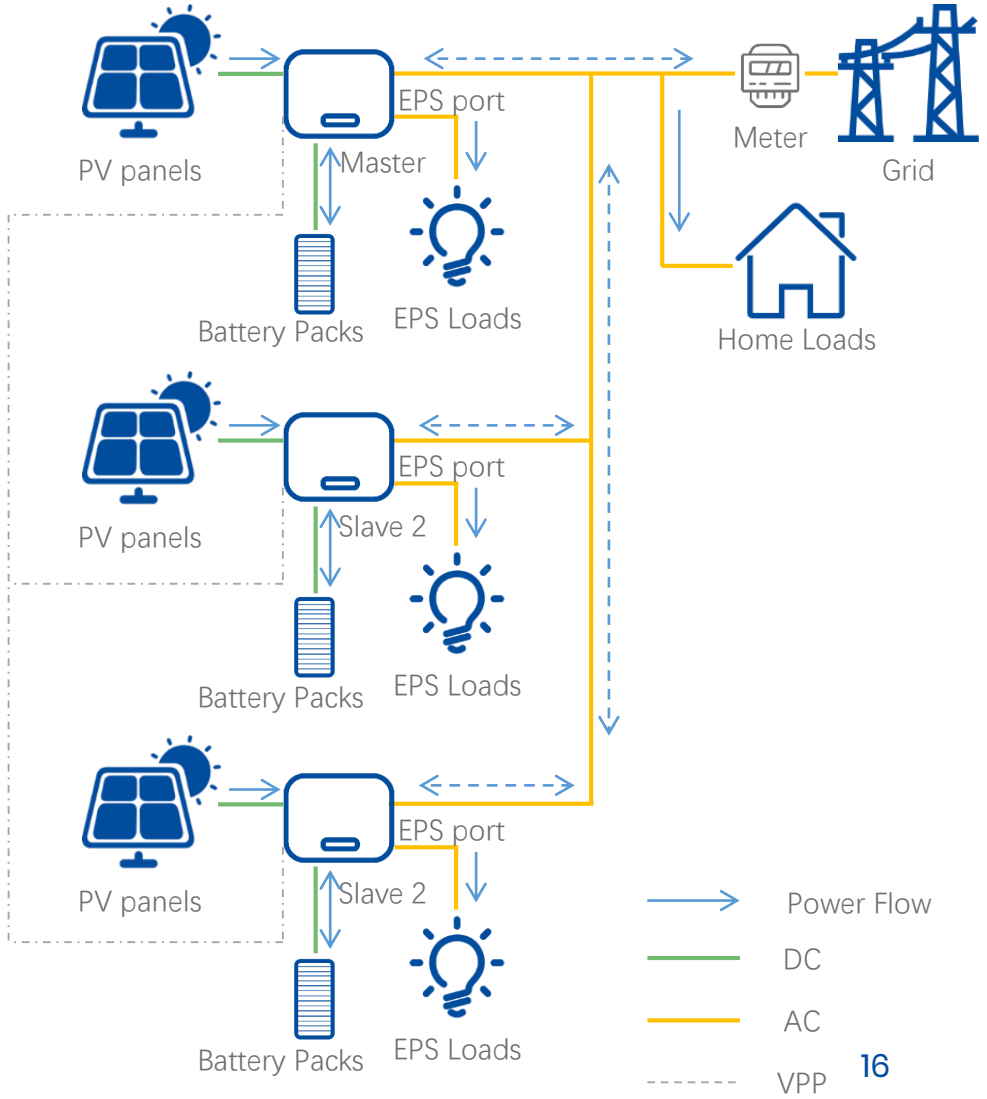


Power Flow
DC
AC

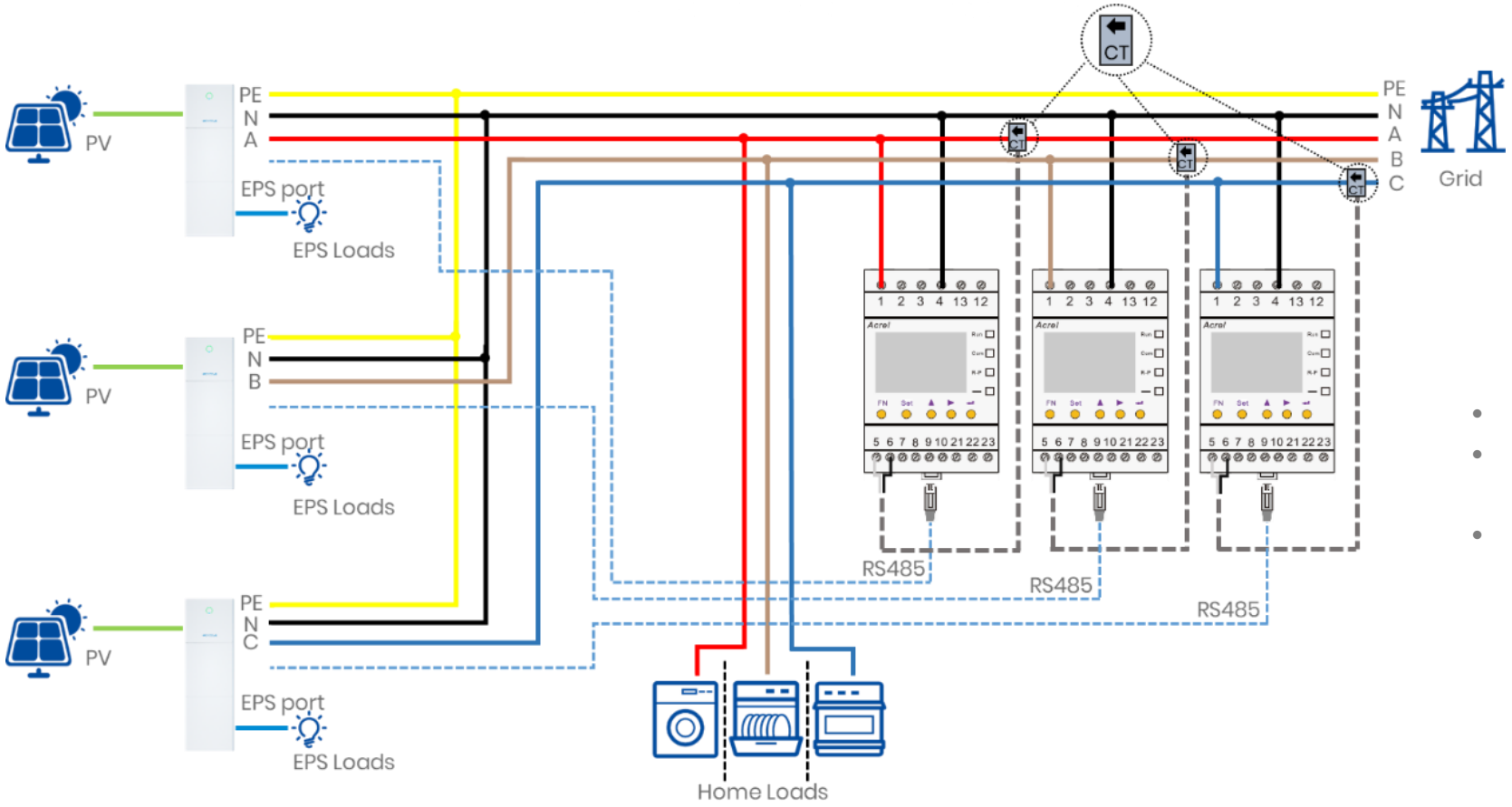
Parallel Solution on Single Phase



- Up to **5** products can be paralleled.
- Each EPS port of the product is connected to different critical load. Critical load will be supplied by backup power during electricity outage.
- All 3 modes can be applied for system operating and slave machine will follow the command from master machine. (Self-powered, Back-up, Load-shifting)

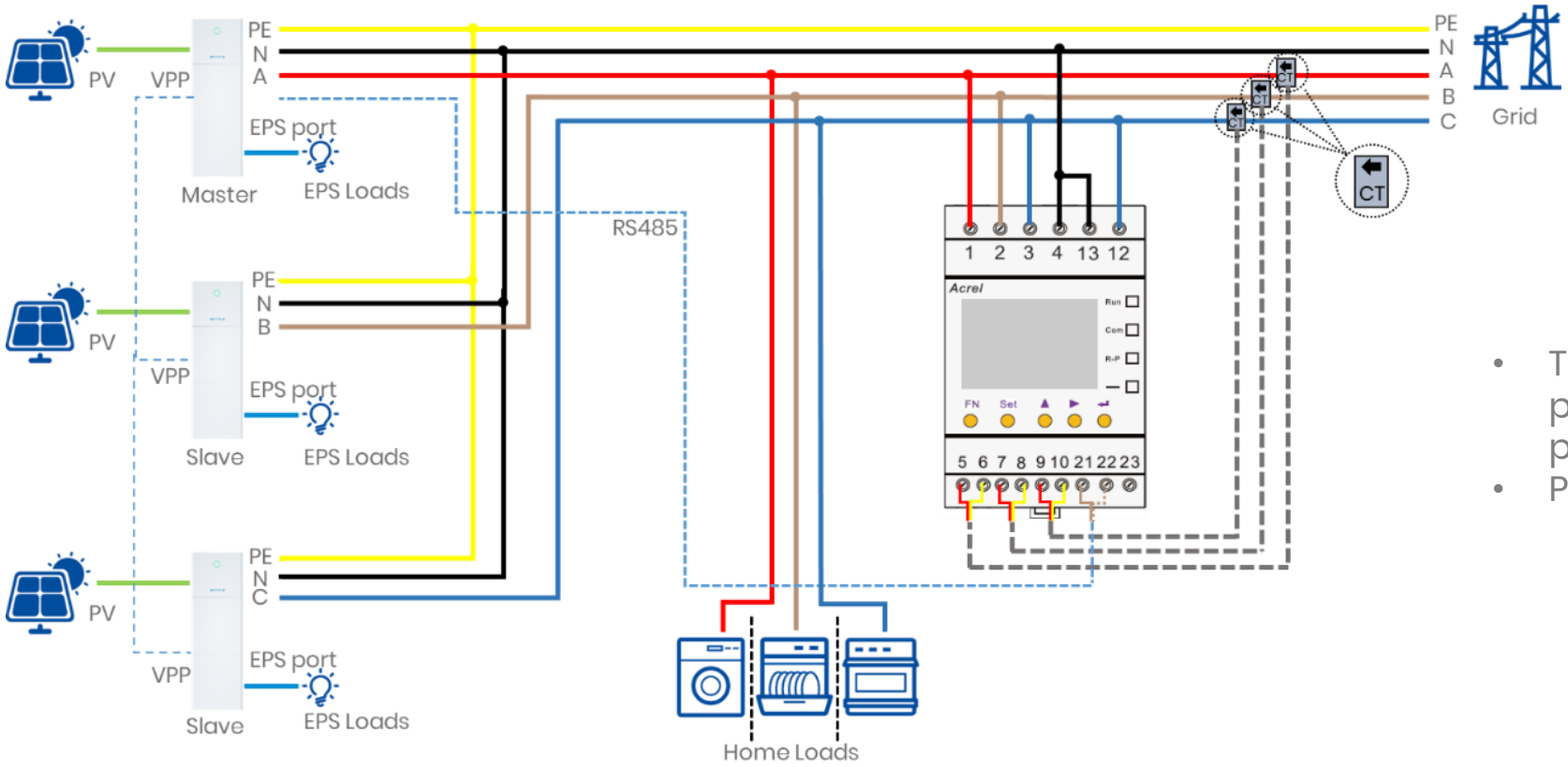


Solution on Three Phase Separately



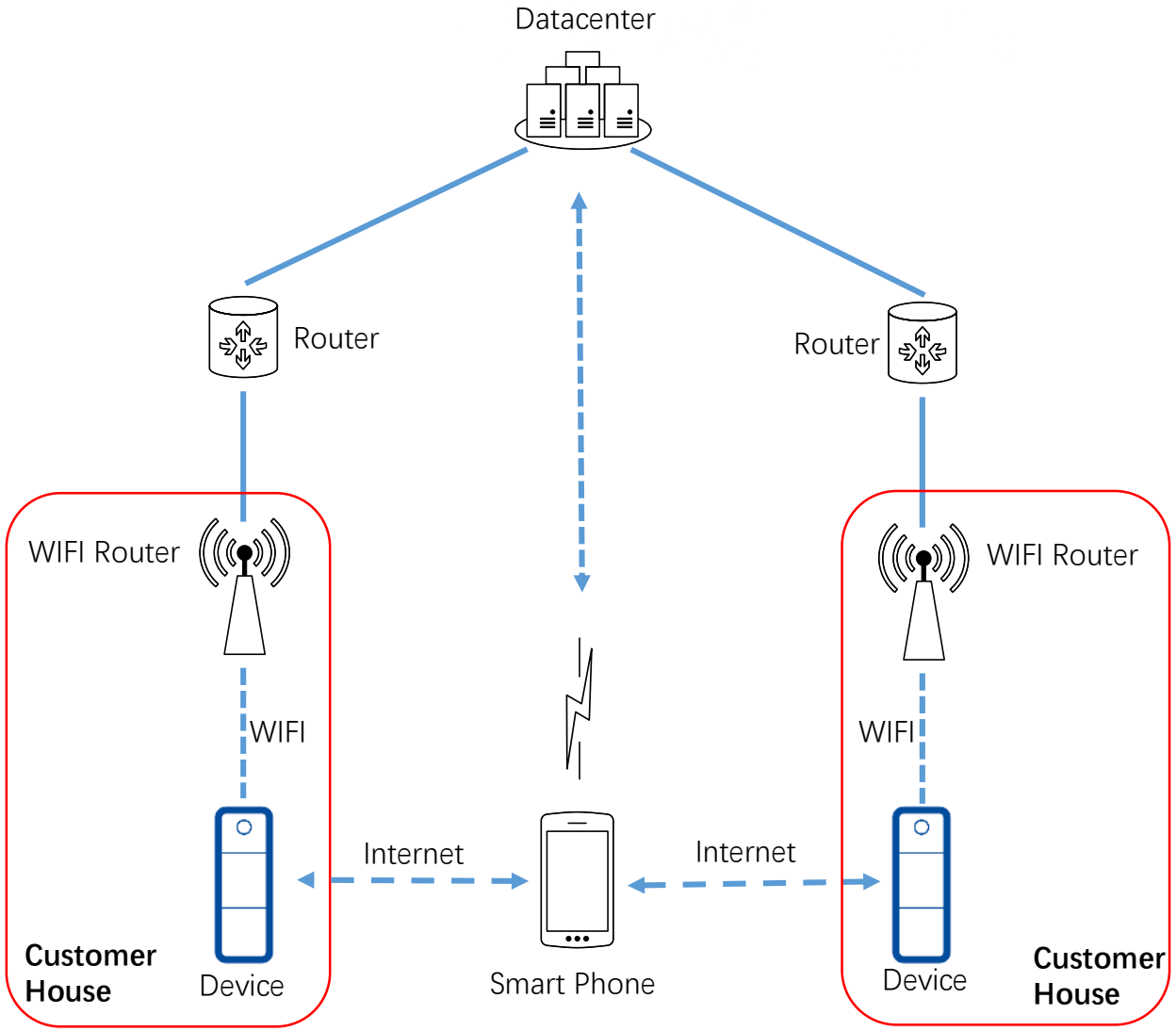
- One machine on single phase only.
- Three machines on single phase work separately with single phase meters.
- PV could be optional and machines just work as back-up.

Solution on Three Phase Parallel



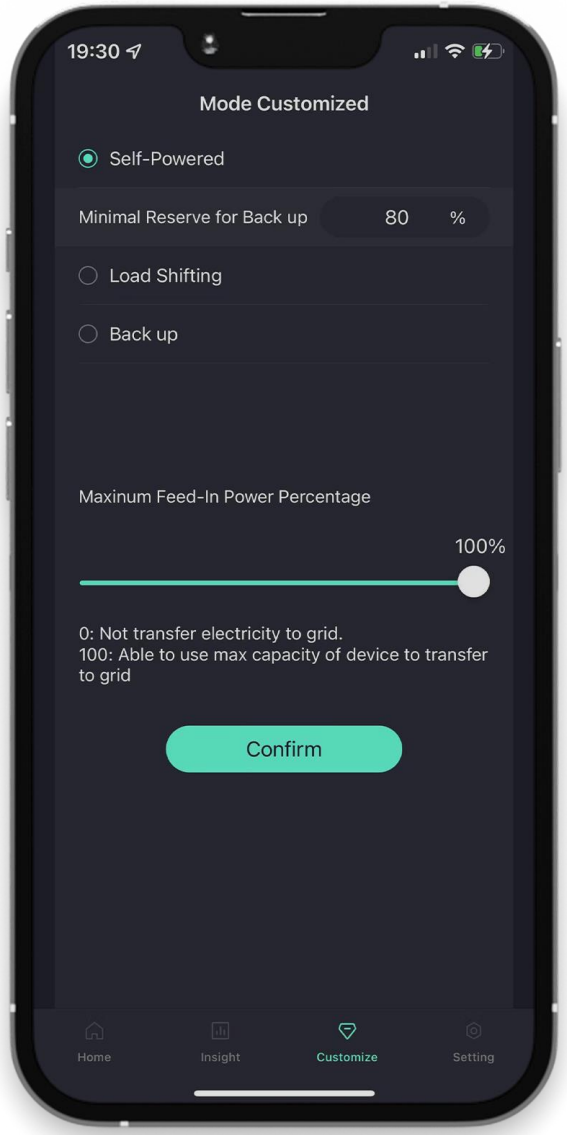
- Three machines installed on three phase separately, but with one three phase meter.
- Parallel connection.

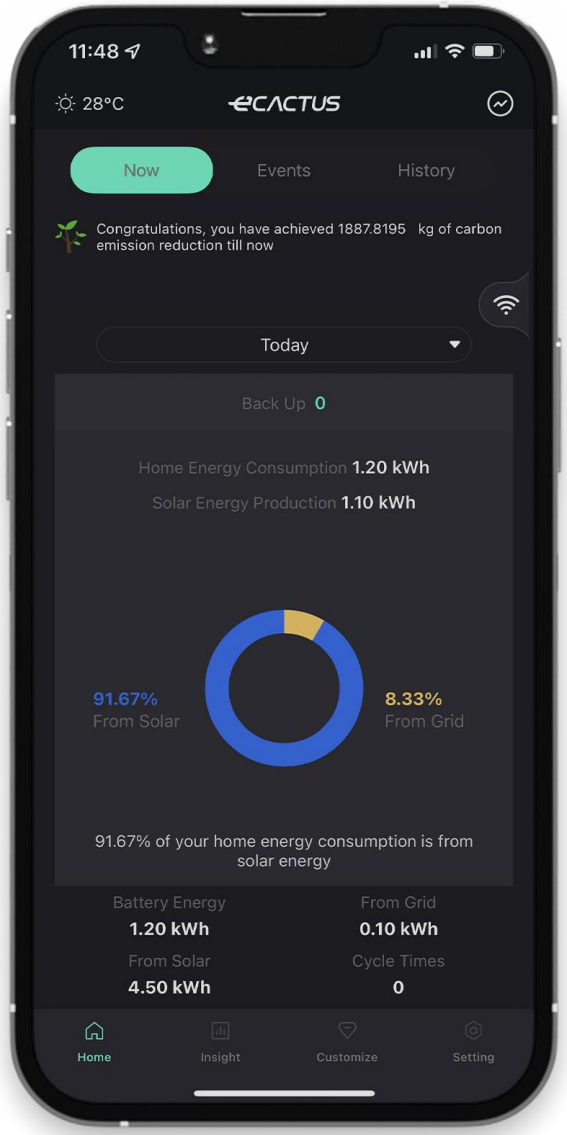
Device Network Brief Introduction



- Machine communicates with datacenter through internet, and connects to home WIFI.
- Mobile phone (installed ECOS APP) connect datacenter through internet.
- Mobile communicate with machine through internet.
- One user can monitor more than one machines.
- We use ECOS APP to configure the WIFI connection for machine.

Device Remote Monitoring APP





- Remote monitoring
- Working mode change
- Power flow checking
- Total consumption data
- Total Solar produce energy

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